Altivar Process

Variable Speed Drives ATV630, ATV650, ATV660, ATV680

Programming Manual

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Table of Contents

Safety Information . . . 15
About the Book . . . 19
Part I Introduction . . . 23
Chapter 1 Setup . . . 25
Initial Steps . . . 26
Steps for Setting-Up the Drive . . . 28
Software Enhancements . . . 29
Chapter 2 Overview . . . 31
Factory Configuration . . . 32
Application Functions . . . 33
Basic Functions . . . 35
Graphic Display Terminal . . . 36
Structure of the Parameter Table . . . 41
Finding a Parameter in This Document . . . 42
Part II Programming . . . 43
Chapter 3 [Simply start] SYS - . . . 45
[Simply start] SIM - Menu . . . 46
[My menu] MYMn - Menu . . . 52
[Modified parameters] LMd - Menu . . . 52
Chapter 4 [Dashboard] dSH - . . . 53
[Pump dashboard] PMt - Menu . . . 54
[Fan dashboard] FAn - Menu . . . 56
[Dashboard] dSH - Menu . . . 58
[Control] Ctr - Menu . . . 59
[Control] Ftr - Menu . . . 62
[Dashboard] dSH - Menu . . . 63
[kWh Counters] KWC - menu . . . 64
[Dashboard] dSH - Menu . . . 66
Chapter 5 [Diagnostics] diA - . . . 67
5.1 [Diag. data] . . . 68
[Diag. data] ddt - Menu . . . 69
[Service message] SEr - Menu . . . 74
[Other State] SSt - Menu . . . 75
[Diagnostics] dAu - Menu . . . 76
[Identification] oid - Menu . . . 76
5.2 [Error history] PFH - Menu . . . 77
[Error history] PFH - Menu . . . 77
5.3 [Warnings] ALr - Menu . . . 80
[Actual warnings] ALrd - Menu . . . 81
[Warning group 1 definition] A1C - Menu . . . 81
[Warning group 2 definition] A2C - Menu . . . 81
[Warning group 3 definition] A3C - Menu . . . 82
[Warning group 4 definition] A4C - Menu . . . 82
[Warning group 5 definition] A5C - Menu . . . 82
[Warnings] ALr - Menu . . . 82

Chapter 6 [Display] Mon - 83
6.1 [Energy parameters] 84
[Elec Ener Input Counter] EL i - Menu 85
[Elec Ener Output Counter] ELo - Menu 87
[Mechanical energy] MEC - Menu 89
[Energy saving] ESA - Menu 90
6.2 [Application parameters] 91
[Application parameters] APr - Menu 91
6.3 [Pump parameters] 95
[Variable speed pump] MPP - Menu 96
[Multipump system] MPS - Menu 99
[Installation] MPVS - Menu 104
6.4 [Motor parameters] 105
[Motor parameters] MMo - Menu 105
6.5 [Drive parameters] 107
[Drive parameters] MP i - Menu 107
6.6 [Thermal monitoring] 110
[Thermal Monitoring] tPM - Menu 110
6.7 [PID display] 111
[PID display] P iC - Menu 111
6.8 [Counter management] 112
[Counter Management] ELt - Menu 112
6.9 [Other state] 115
[Other state] SSt - Menu 115
6.10 [I/O map] 116
[Digital Input Map] L iA - Menu 117
[AI1] A i1C - Menu 118
[AI2] A i2C - Menu 120
[AI3] A i3C - Menu 121
[AI4] A i4C - Menu 122
[AI5] A i5C - Menu 123
[Digital output map] LoA - Menu 124
[AQ1] Ao 1C - Menu 125
[AQ2] Ao2C - Menu 129
[DI5 frequency measured] PFC5 - Menu 131
[DI6 frequency measured] PFC6 - Menu 133
[Cabinet Digital Input Map] L iCA - Menu 134
[Cabinet Digital Output Map] LoCA - Menu 134
6.11 [Communication map] 135
[Communication map] CMM - Menu 136
[Modbus network diag] Mnd - Menu 140
[Com. scanner input map] iSA - Menu 141
[Com scan output map] oSA - Menu 142
[Modbus HMI Diag] MdH - Menu 143
[Ethernet Emb Diag] MPE - Menu 144
[Ethernet Module Diag] MtE - Menu 145
[DeviceNet Diag] dVn - Menu 146
[Profibus Diag] Prb - Menu 147
[PROFINET Diag] Prn - Menu 149
[Command word image] CWi - Menu 151
[Freq. ref. word map] rWi - Menu 152
[CANopen map] CnM - Menu 153

[PDO1 image] Pdo 1 - Menu . . . 154
[PDO2 image] Pdo2 - Menu . . . 156
[PDO3 image] Pdo3 - Menu . . . 157
[CANopen map] CnM - Menu . . . 158
6.12 [Data logging] . . . 159
[Distributed logging] dLo - Menu . . . 160
[Log dstrb prm select] LdP - Menu . . . 161
[Distributed logging] dLo - Menu . . . 162
Chapter 7 [Complete settings] CSt - . . . 163
7.1 Overview . . . 165
Application Control Mode . . . 165
7.2 [Macro configuration] . . . 168
[Macro configuration] MCr - Menu . . . 168
7.3 [Motor parameters] MPA - Menu . . . 170
[Motor parameters] MPA - Menu . . . 171
[Data] Mtd - Menu . . . 173
[Motor tune] Mtu - Menu . . . 180
[Motor monitoring] MoP - Menu . . . 186
[Thermal monitoring] tPP - Menu . . . 187
[Motor monitoring] MoP - Menu . . . 193
[Motor control] drC - Menu . . . 195
[Switching frequency] SWF - Menu . . . 200
7.4 [Define system units] . . . 202
[Define system units] SuC - Menu . . . 202
7.5 [Sensors assignment] . . . 206
[Sensors assignment] SCC - Menu . . . 207
[AI1 sensor config.] Menu . . . 209
[AI2 sensor config.] Menu . . . 212
[AI3 sensor config.] Menu . . . 214
[AI4 sensor config.] Menu . . . 216
[AI5 sensor config.] Menu . . . 218
[DI5 Pulse Sensor Config.] Menu . . . 220
[DI6 Pulse Sensor Config.] Menu . . . 222
[AIV1 configuration] Menu . . . 224
[AIV2 configuration] Menu . . . 226
[AIV3 configuration] Menu . . . 228
7.6 [Command and Reference] CrP - Menu . . . 230
[Command and Reference] CrP - Menu . . . 230
7.7 [Pump functions] - [Booster control] . . . 244
[System Architecture] MPS - Menu . . . 245
[MultiDrive Config] MPVC - Menu . . . 256
[Pumps configuration] PuMP - Menu . . . 260
[System Architecture] MPS - Menu . . . 263
[Booster control] bSC - Menu . . . 265
[Stage/Destage condition] SdCM - Menu . . . 268
[Stage/Destage method] SdMM - Menu . . . 272
[Booster control] bSC - Menu . . . 276
7.8 [Pump functions] - [Level control] . . . 277
[System architecture] MPS - Menu . . . 278
[Pumps configuration] PuMP - Menu . . . 278
[Level control] Lcc - Menu . . . 279
[Level control] Lcc - Menu . . . 286
[Level settings] LcL - Menu . . . 293

7.9 [Pump functions] - [PID controller] . . . 298
[PID controller] PId - Overview . . . 299
[PID Feedback] FdbA - Menu . . . 302
[PID Reference] rFC - Menu . . . 308
[PID preset references] PrI - Menu . . . 311
[PID Reference] rFC - Menu . . . 313
[Settings] SEt - Menu . . . 314
7.10 [Pump functions] - [Sleep/wakeup] . . . 317
[Sleep/Wakeup] SPW - Overview . . . 318
[Sleep menu] SLP - Menu . . . 321
[Sleep menu] SLP - Menu . . . 323
[Sleep menu] SLP - Menu . . . 324
[Boost] SbE - Menu . . . 325
[Advanced sleep check] AdS - Menu . . . 326
[Wake up menu] WKP - Menu . . . 328
[Wake up menu] WKP - Menu . . . 329
7.11 [Pump functions] - [Feedback monitoring] . . . 330
[Feedback monitoring] FKM - Menu . . . 330
7.12 [Pump functions] - [Pump characteristics] . . . 332
[Pump characteristics] PCr - Menu . . . 332
7.13 [Pump functions] - [Sensorless flow estimation] . . . 339
[Flow estimation] SFE - Menu . . . 339
7.14 [Pump functions] - [dP/Head Correction] . . . 342
[dP/Head Correction] dPHC - Menu . . . 342
7.15 [Pump functions] - [Pump start stop] . . . 344
[Pump start stop] PSE - Menu . . . 344
7.16 [Pump functions] - [Pipe fill] . . . 348
[Pipe fill] PFI - Menu . . . 349
[Pipe fill] PFI - Menu . . . 351
7.17 [Pump functions] - [Friction loss compensation] . . . 353
[Friction loss comp] FLC - Menu . . . 354
[Friction loss comp] FLC - Menu . . . 355
7.18 [Pump functions] - [Jockey pump] . . . 356
[Jockey pump] JKP - Menu . . . 356
7.19 [Pump functions] - [Priming pump ctrl] . . . 359
[Priming pump ctrl] PPC - Menu . . . 360
[Priming pump ctrl] PPC - Menu . . . 363
7.20 [Pump functions] - [Flow limitation] . . . 364
[Flow limitation] FLM - Menu . . . 365
[Flow limitation] FLM - Menu . . . 367
7.21 [Pump monitoring] - [Pumpcycle monitoring] . . . 368
[Pumpcycle monitoring] CSP - Menu . . . 368
7.22 [Pump monitoring] - [Anti jam] . . . 370
[Anti-jam monit] JAM - Menu . . . 370
7.23 [Pump monitoring] - [Dry run Monit] . . . 377
[Dry run Monit] dYr - Menu . . . 377
7.24 [Pump monitoring] - [Pump low flow Monit] . . . 380
[Pump low flow Monit] PLF - Menu . . . 381
[Pump low flow Monit] PLF - Menu . . . 383
7.25 [Pump monitoring] - [Thermal monitoring] . . . 386
[Thermal monitoring] tPP - Menu . . . 386
7.26 [Pump monitoring] - [Inlet pressure monitoring] . . . 387
[Inlet pressure monitoring] IPP - Menu . . . 388
[Inlet pressure monitoring] IPP - Menu . . . 390

7.27 [Pump monitoring] - [Outlet pressure monitoring] 391
[Outlet pressure monitoring] oPP - Menu 392
[Outlet pressure monitoring] oPP - Menu 394
7.28 [Pump monitoring] - [High flow monitoring] 395
[High flow monitoring] HFP - Menu 396
[High flow monitoring] HFP - Menu 398
7.29 [Fan] - [PID controller] 399
[PID Controller] P id - Menu 399
7.30 [Fan] - [Feedback monitoring] 400
[Feedback monitoring] FKM - Menu 400
7.31 [Fan] - [Jump frequency] 401
[Jump frequency] JuF - Menu 401
7.32 [Fan] 402
[Fan] CSFA - Menu 402
7.33 [Generic functions] - [Speed limits] 404
[Speed limits] SLM - Menu 404
7.34 [Generic functions] - [Ramp] 407
[Ramp] rAMP - Menu 407
7.35 [Generic functions] - [Ramp switching] 410
[Ramp switching] rPt - Menu 410
7.36 [Generic functions] - [Stop configuration] 412
[Stop configuration] Stt - Menu 412
7.37 [Generic functions] - [Auto DC injection] 418
[Auto DC injection] AdC - Menu 418
7.38 [Generic functions] - [Ref. operations] 421
[Ref. operations] oA i - Menu 421
7.39 [Generic functions] - [Preset speeds] 423
[Preset speeds] PSS - Menu 423
7.40 [Generic functions] - [+/- speed] 427
[+/- speed] uPd - Menu 427
7.41 [Generic functions] - [Jump frequency] 430
[Jump frequency] JuF - Menu 430
7.42 [Generic functions] - [PID controller] 431
[PID Controller] P id - Menu 431
7.43 [Generic functions] - [Feedback mon.] 432
[Feedback monitoring] FKM - Menu 432
7.44 [Generic functions] - [Threshold reached] 433
[Threshold reached] tHrE - Menu 433
7.45 [Generic functions] - [Mains contactor command] 435
[Mains contactor command] LLC - Menu 435
7.46 [Generic functions] - [Reverse disable] 438
[Reverse disable] rE in - Menu 438
7.47 [Generic functions] - [Torque limitation] 439
[Torque limitation] toL - Menu 439
7.48 [Generic functions] - [Parameters switching] 441
[Parameters switching] MLP - Menu 442
[Set 1] PS 1 - Menu 448
[Set 2] PS2 - Menu 448
[Set 3] PS3 - Menu 448
7.49 [Generic functions] - [Stop after speed timeout] 449
[Stop after speed timeout] PrSP - Menu 449
7.50 [Generic functions] - [Active Front End] 451
[Active Front End] AFE - Menu 451

7.51 [Generic monitoring] 452
[Process underload] uLd - Menu 453
[Process overload] oLd - Menu 455
[Stall monitoring] StPr - Menu 457
[Thermal monitoring] tPP - Menu 458
7.52 [Input/Output] - [I/O assignment] 459
[DI1 assignment] LIA - Menu 460
[DI2 assignment] L2A - Menu 463
[DI3 assignment] L3A - Menu 463
[DI4 assignment] L4A - Menu 464
[DI5 assignment] L5A - Menu 464
[DI6 assignment] L6A - Menu 465
[DI11 assignment] LI1A - Menu 465
[DI12 assignment] LI2A - Menu 466
[DI13 assignment] LI3A - Menu 466
[DI14 assignment] LI4A - Menu 467
[DI15 assignment] LI5A - Menu 467
[DI16 assignment] LI6A - Menu 468
[DI5 Pulse Input Assign] P15A - Menu 469
[DI6 Pulse Input Assign] P16A - Menu 470
[AI1 assignment] AI1A - Menu 471
[AI2 assignment] AI2A - Menu 472
[AI3 assignment] AI3A - Menu 472
[AI4 assignment] AI4A - Menu 472
[AI5 assignment] AI5A - Menu 473
[AIV1 assignment] AIV1A - Menu 473
[AIV2 assignment] AIV2A - Menu 473
[AIV3 assignment] AIV3A - Menu 474
[DI50 Assignment] dI50A - Menu 474
[DI51 Assignment] dI51A - Menu 474
[DI52 Assignment] dI52A - Menu 475
[DI53 Assignment] dI53A - Menu 476
[DI54 Assignment] dI54A - Menu 476
[DI55 Assignment] dI55A - Menu 476
[DI56 Assignment] dI56A - Menu 477
[DI57 Assignment] dI57A - Menu 477
[DI58 Assignment] dI58A - Menu 478
[DI59 Assignment] dI59A - Menu 478
7.53 [Input/Output] - [DI/DQ] 479
[DI1 Configuration] di1 - Menu 480
[DI2 Configuration] di2 - Menu 482
[DI3 Configuration] di3 - Menu 483
[DI4 Configuration] di4 - Menu 483
[DI5 Configuration] di5 - Menu 484
[DI6 Configuration] di6 - Menu 484
[DI11 Configuration] di11 - Menu 485
[DI12 Configuration] di12 - Menu 485
[DI13 Configuration] di13 - Menu 486
[DI14 Configuration] di14 - Menu 486
[DI15 Configuration] di15 - Menu 487
[DI16 Configuration] di16 - Menu 487
[DI5 Pulse Config] PAi5 - Menu 488
[DI6 Pulse Config] PAi6 - Menu 490
[DQ11 Configuration] doI1 - Menu 491
[DQ12 Configuration] doI2 - Menu 492

[DI50 Configuration] d I 5 0 - Menu 492
[DI51 Configuration] d I 5 1 - Menu 493
[DI52 Configuration] d I 5 2 - Menu 494
[DI53 Configuration] d I 5 3 - Menu 495
[DI54 Configuration] d I 5 4 - Menu 496
[DI55 Configuration] d I 5 5 - Menu 497
[DI56 Configuration] d I 5 6 - Menu 498
[DI57 Configuration] d I 5 7 - Menu 499
[DI58 Configuration] d I 5 8 - Menu 500
[DI59 Configuration] d I 5 9 - Menu 501
7.54 [Input/Output] - [Analog I/O] 502
[AI1 configuration] A I 1 - Menu 503
[AI2 configuration] A I 2 - Menu 506
[AI3 configuration] A I 3 - Menu 508
[AI4 configuration] A I 4 - Menu 509
[AI5 configuration] A I 5 - Menu 511
[AQ1 configuration] A o 1 - Menu 512
[AQ2 configuration] A o 2 - Menu 516
[Virtual AI1] A u 1 - Menu 518
[Virtual AI2] A u 2 - Menu 519
[Virtual AI3] A u 3 - Menu 519
7.55 [Input/Output] - [Relay] 520
[R1 configuration] r 1 - Menu 521
[R2 configuration] r 2 - Menu 523
[R3 configuration] r 3 - Menu 524
[R4 configuration] r 4 - Menu 525
[R5 configuration] r 5 - Menu 526
[R6 configuration] r 6 - Menu 527
[R60 configuration] r 6 0 - Menu 528
[R61 configuration] r 6 1 - Menu 529
[R62 configuration] r 6 2 - Menu 530
[R63 configuration] r 6 3 - Menu 531
[R64 configuration] r 6 4 - Menu 532
[R65 configuration] r 6 5 - Menu 533
[R66 configuration] r 6 6 - Menu 534
7.56 [Error/Warning handling] 535
[Auto fault reset] A t r - Menu 536
[Fault reset] r S t - Menu 537
[Catch on the fly] F L r - Menu 539
[Error detection disable] I n H - Menu 540
[External error] E t F - Menu 542
[Output phase loss] o P L - Menu 544
[Input phase loss] I P L - Menu 545
[4-20mA loss] L F L - Menu 546
[Fallback speed] L F F - Menu 548
[Fieldbus monitoring] C L L - Menu 549
[Embedded Modbus TCP] E M t C - Menu 550
[Communication module] C o M o - Menu 551
[Undervoltage handling] u S b - Menu 553
[Ground Fault] G r F L - Menu 555
[Motor thermal monit] t H t - Menu 556
[Drive overload monit] o b r - Menu 557
[Warn grp 1 definition] A I C - Menu 558

[Warn grp 2 definition] A2C - Menu . . . 560
[Warn grp 3 definition] A3C - Menu . . . 560
[Warn grp 4 definition] A4C - Menu . . . 560
[Warn grp 5 definition] A5C - Menu . . . 560
7.57 [Maintenance] . . . 561
[Diagnostics] dAu - Menu . . . 562
[Drive warranty mgnt] dWnA - Menu . . . 563
[Customer event 1] CE 1 - Menu . . . 564
[Customer event 2] CE2 - Menu . . . 565
[Customer event 3] CE3 - Menu . . . 565
[Customer event 4] CE4 - Menu . . . 566
[Customer event 5] CE5 - Menu . . . 566
[Customer events] CuEv - Menu . . . 567
[Fan management] FAnA - Menu . . . 568
[Maintenance] C5nA - Menu . . . 569
7.58 [Cabinet I/O functions] - [Monitoring circuit] . . . 570
[Monitoring circuit A] CnCA - Menu . . . 571
[Monitoring circuit B] CnCb - Menu . . . 573
[Monitoring circuit C] CnCC - Menu . . . 573
[Monitoring circuit D] CnCd - Menu . . . 574
7.59 [Cabinet I/O functions] - [Cabinet circuit] . . . 575
[Cabinet circuit A] CCnA - Menu . . . 576
[Cabinet circuit B] CCnb - Menu . . . 577
[Cabinet circuit C] CCnC - Menu . . . 577
7.60 [Cabinet I/O functions] - [Motor winding] . . . 578
[Motor winding A] Ct iA - Menu . . . 579
[Motor winding B] Ct ib - Menu . . . 580
7.61 [Cabinet I/O functions] - [Motor bearing] . . . 581
[Motor bearing A] Ct iC - Menu . . . 582
[Motor bearing B] Ct id - Menu . . . 582
7.62 [Cabinet I/O functions] - [Circuit breaker] . . . 583
[Circuit breaker] CCb - Menu . . . 583
Chapter 8 [Communication] Com - . . . 585
[Modbus Fieldbus] Md 1 - Menu . . . 586
[Com. scanner input] iC5 - Menu . . . 588
[Com. scanner output] oC5 - Menu . . . 589
[Modbus HMI] Md2 - Menu . . . 590
[Embd Eth Config] EtE - Menu . . . 591
[Eth Module Config] Eto - Menu . . . 592
[CANopen] Cno - Menu . . . 592
[DeviceNet] dnC - Menu . . . 592
[Profibus] PbC - Menu . . . 592
[Profinet] PnC - Menu . . . 592
Chapter 9 [File management] FMt - . . . 593
[Transfer config file] tCF - Menu . . . 594
[Factory settings] FCS - Menu . . . 594
[Parameter group list] Fry - Menu . . . 595
[Factory settings] FCS - Menu . . . 596
[Pre-settings] PrE5 - Menu . . . 597
Chapter 10 [My preferences] MyP - . . . 599
10.1 [Language] . . . 600
[Language] LnG - Menu . . . 600
10.2 [Password] . . . 601
[Password] Cod - Menu . . . 601

10.3 [Parameter access] . . . 603
[Restricted channels] PCd - Menu . . . 604
[Restricted param] PPA - Menu . . . 604
[Visibility] V iS - Menu . . . 605
10.4 [Customization] . . . 606
[My menu config.] MYC - Menu . . . 607
[Display screen type] MSC - Menu . . . 607
[Param. Bar Select] Pb5 - Menu . . . 608
[Customer parameters] CYP - Menu . . . 608
[Service message] SEr - Menu . . . 609
10.5 [Date & Time settings] . . . 610
[Date/time settings] rtC - Menu . . . 610
10.6 [Access level] . . . 611
[Access level] LAC - Menu . . . 611
10.7 [Webserver] . . . 612
[Webserver] Wb5 - Menu . . . 612
10.8 [Functions key mgnt] . . . 613
[Functions key mgnt] FKG - Menu . . . 613
10.9 [LCD settings] . . . 614
[LCD settings] CnL - Menu . . . 614
10.10 [Stop and go] . . . 615
[Stop and go] StG - Menu . . . 615
10.11 [QR code] . . . 617
[QR code] qrC - Menu . . . 617
10.12 [QR code] - [My link 1] . . . 618
[My link 1] MYL 1 - Menu . . . 618
10.13 [QR code] - [My link 2] . . . 619
[My link 2] MYL 2 - Menu . . . 619
10.14 [QR code] - [My link 3] . . . 620
[My link 3] MYL 3 - Menu . . . 620
10.15 [QR code] - [My link 4] . . . 621
[My link 4] MYL 4 - Menu . . . 621
10.16 [Pairing password] . . . 622
[Pairing password] PP i . . . 622
Part III Maintenance and diagnostics . . . 623
Chapter 11 Maintenance . . . 625
Maintenance . . . 625
Chapter 12 Diagnostics and Troubleshooting . . . 627
12.1 Warning Codes . . . 628
Warning Codes . . . 628
12.2 Error Codes . . . 630
Overview . . . 633
[AFE Modulation Rate Error] ACF 1 . . . 634
[AFE Current Control Error] ACF2 . . . 634
[Angle error] AsF . . . 635
[Circuit Breaker Error] CbF . . . 635
[CabinetCircuit A Error] CFA . . . 636
[CabinetCircuit B Error] CFb . . . 636
[CabinetCircuit C Error] CFC . . . 637
[Incorrect Configuration] CFF . . . 637
[Invalid Configuration] CF i . . . 638
[Conf Transfer Error] CF i2 . . . 638
[Pre-settings Transfer Error] CF i3 . . . 639
[Cabinet Overheat Error] CHF . . . 639
[Fieldbus Com Interrupt] CnF . . . 640

[CANopen Com Interrupt] CoF 640
[Precharge Capacitor] CrF 641
[AFE contactor fdbk error] CrF3 641
[Channel Switch Error] CSF 642
[Dry Run Error] drYF 642
[EEPROM Control] EEF1 643
[EEPROM Power] EEF2 643
[External Error] EPF1 644
[Fieldbus Error] EPF2 644
[Embd Eth Com Interrupt] EtHF 645
[FDR 1 Error] Fdr1 645
[FDR 2 Error] Fdr2 646
[Firmware Update Error] FWEr 646
[Boards Compatibility] HCF 647
[High Flow Error] HFPF 647
[MonitorCircuit A Error] iFA 648
[MonitorCircuit B Error] iFb 648
[MonitorCircuit C Error] iFC 649
[MonitorCircuit D Error] iFd 649
[Input Overheating] iHF 650
[Internal Link Error] iLF 650
[Internal Error 0] inF0 651
[Internal Error 1] inF1 651
[Internal Error 2] inF2 652
[Internal Error 3] inF3 652
[Internal Error 4] inF4 653
[Internal Error 6] inF6 653
[Internal Error 7] inF7 654
[Internal Error 8] inF8 654
[Internal Error 9] inF9 655
[Internal Error 10] inFA 655
[Internal Error 11] inFb 656
[Internal Error 12] inFC 656
[Internal Error 13] inFd 657
[Internal Error 14] inFE 657
[Internal Error 15] inFF 658
[Internal Error 16] inFG 658
[Internal Error 17] inFH 659
[Internal Error 18] inFI 659
[Internal Error 20] inFK 660
[Internal Error 21] inFL 660
[Internal Error 22] inFn 661
[Internal Error 23] inFn 661
[Internal Error 25] inFP 662
[Internal Error 27] inFr 662
[Internal Error 28] inFS 663
[Internal Error 29] inFt 663
[Internal Error 30] inFu 664
[Internal Error 31] inFV 664
[Inlet Pressure Error] iPPF 665
[Anti Jam Error] JAnF 665
[Input Contactor] LCF 666
[High Level Error] LCHF 666
[Low Level Error] LCLF 667
[AI1 4-20mA loss] LFF1 667

[AI2 4-20mA loss] LFF2 668
[AI3 4-20mA loss] LFF3 668
[AI4 4-20mA loss] LFF4 669
[AI5 4-20mA loss] LFF5 669
[Mains Freq Out Of Range] MFF 670
[M/P Device Error] MPdF 670
[Lead Pump Error] MPLF 671
[DC Bus Overvoltage] obF 671
[AFE Bus unbalancing] obF2 672
[Overcurrent] oCF 672
[Drive Overheating] oHF 673
[Process Overload] oLC 673
[Motor Overload] oLF 674
[Single Output Phase Loss] oPF1 674
[Output Phase Loss] oPF2 675
[Out Pressure High] oPHF 675
[Out Pressure Low] oPLF 676
[Supply Mains Overvoltage] oSF 676
[PumpCycle Start Error] PCPF 677
[PID Feedback Error] PFMF 677
[Program Loading Error] PGLF 678
[Program Running Error] PGrF 678
[Input phase loss] PHF 679
[Pump Low Flow Error] PLFF 679
[Safety Function Error] SAFF 680
[Motor short circuit] SCF1 680
[Ground Short Circuit] SCF3 681
[IGBT Short Circuit] SCF4 681
[Motor Short Circuit] SCF5 682
[AFE ShortCircuit error] SCF6 682
[Modbus Com Interruption] SLF1 683
[PC Com Interruption] SLF2 683
[HMI Com Interruption] SLF3 684
[Motor Overspeed] SoF 684
[Motor Stall Error] StF 685
[AI2 Thermal Sensor Error] tnCF 685
[AI3 Thermal Sensor Error] tnCF 686
[AI4 Thermal Sensor Error] tnCF 686
[AI5 Thermal Sensor Error] tnCF 687
[MotorWinding A Error] tnFA 687
[MotorWinding B Error] tnFb 688
[MotorBearing A Error] tnFC 688
[MotorBearing B Error] tnFd 689
[AI2 Th Detected Error] tnHF 689
[AI3 Th Detected Error] tnHF 690
[AI4 Th Detected Error] tnHF 690
[AI5 Th Detected Error] tnHF 691
[IGBT Overheating] tJF 691
[AFE IGBT over-heat error] tJF2 692
[Autotuning Error] tnF 692
[Process Underload] uLF 693
[AFE Mains Undervoltage] urF 693
[Supply Mains UnderV] uSF 694
12.3 FAQ 695
FAQ 695

Safety Information

Important Information

NOTICE

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, service, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of this symbol to a “Danger” or “Warning” safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ DANGER

DANGER indicates a hazardous situation which, if not avoided, **will result in** death or serious injury.

⚠ WARNING

WARNING indicates a hazardous situation which, if not avoided, **could result in** death or serious injury.

⚠ CAUTION

CAUTION indicates a hazardous situation which, if not avoided, **could result** in minor or moderate injury.

NOTICE

NOTICE is used to address practices not related to physical injury.

PLEASE NOTE

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction and operation of electrical equipment and its installation, and has received safety training to recognize and avoid the hazards involved.

Qualification Of Personnel

Only appropriately trained persons who are familiar with and understand the contents of this manual and all other pertinent product documentation are authorized to work on and with this product. In addition, these persons must have received safety training to recognize and avoid hazards involved. These persons must have sufficient technical training, knowledge and experience and be able to foresee and detect potential hazards that may be caused by using the product, by changing the settings and by the mechanical, electrical and electronic equipment of the entire system in which the product is used. All persons working on and with the product must be fully familiar with all applicable standards, directives, and accident prevention regulations when performing such work.

Intended Use

This product is a drive for three-phase synchronous, asynchronous motors and intended for industrial use according to this manual.The product may only be used in compliance with all applicable safety standard and local regulations and directives, the specified requirements and the technical data. The product must be installed outside the hazardous ATEX zone. Prior to using the product, you must perform a risk assessment in view of the planned application. Based on the results, the appropriate safety measures must be implemented.Since the product is used as a component in an entire system, you must ensure the safety of persons by means of the design of this entire system (for example, machine design). Any use other than the use explicitly permitted is prohibited and can result in hazards. Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel.

Product Related Information

Read and understand these instructions before performing any procedure with this drive.

⚠⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Only appropriately trained persons who are familiar with and understand the contents of this manual and all other pertinent product documentation and who have received safety training to recognize and avoid hazards involved are authorized to work on and with this drive system. Installation, adjustment, repair and maintenance must be performed by qualified personnel.
- The system integrator is responsible for compliance with all local and national electrical code requirements as well as all other applicable regulations with respect to grounding of all equipment.
- Many components of the product, including the printed circuit boards, operate with mains voltage. Do not touch. Use only electrically insulated tools.
- Do not touch unshielded components or terminals with voltage present.
- Motors can generate voltage when the shaft is rotated. Prior to performing any type of work on the drive system, block the motor shaft to prevent rotation.
- AC voltage can couple voltage to unused conductors in the motor cable. Insulate both ends of unused conductors of the motor cable.
- Do not short across the DC bus terminals or the DC bus capacitors or the braking resistor terminals.
- Before performing work on the drive system:
  - Disconnect all power, including external control power that may be present.
  - Place a **Do Not Turn On** label on all power switches.
  - Lock all power switches in the open position.
  - Wait 15 minutes to allow the DC bus capacitors to discharge. The DC bus LED is not an indicator of the absence of DC bus voltage that can exceed 800 Vdc.
  - Measure the voltage on the DC bus between the DC bus terminals (PA/+, PC/-) using a properly rated voltmeter to verify that the voltage is < 42 Vdc.
  - If the DC bus capacitors do not discharge properly, contact your local Schneider Electric representative. Do not repair or operate the product.
- Install and close all covers before applying voltage.

Failure to follow these instructions will result in death or serious injury.

Drive systems may perform unexpected movements because of incorrect wiring, incorrect settings, incorrect data or other errors.

⚠ WARNING

UNANTICIPATED EQUIPMENT OPERATION

- Carefully install the wiring in accordance with the EMC requirements.
- Do not operate the product with unknown or unsuitable settings or data.
- Perform a comprehensive commissioning test.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Damaged products or accessories may cause electric shock or unanticipated equipment operation.

⚠⚠ DANGER

ELECTRIC SHOCK OR UNANTICIPATED EQUIPMENT OPERATION

Do not use damaged products or accessories.

Failure to follow these instructions will result in death or serious injury.

Contact your local Schneider Electric sales office if you detect any damage whatsoever.

⚠ WARNING

LOSS OF CONTROL

- The designer of any control scheme must consider the potential failure modes of control paths and, for critical control functions, provide a means to achieve a safe state during and after a path failure. Examples of critical control functions are emergency stop, overtravel stop, power outage and restart.
- Separate or redundant control paths must be provided for critical control functions.
- System control paths may include communication links. Consideration must be given to the implications of unanticipated transmission delays or failures of the link.
- Observe all accident prevention regulations and local safety guidelines (1).
- Each implementation of the product must be individually and thoroughly tested for proper operation before being placed into service.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

(1) For USA: Additional information, refer to NEMA ICS 1.1 (latest edition), Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control and to NEMA ICS 7.1 (latest edition), Safety Standards for Construction and Guide for Selection, Installation and Operation of Adjustable-Speed Drive Systems.

NOTICE

DESTRUCTION DUE TO INCORRECT MAINS VOLTAGE

Before switching on and configuring the product, verify that it is approved for the mains voltage

Failure to follow these instructions can result in equipment damage.

The temperature of the products described in this manual may exceed 80 °C (176 °F) during operation.

⚠ WARNING

HOT SURFACES

- Ensure that any contact with hot surfaces is avoided.
- Do not allow flammable or heat-sensitive parts in the immediate vicinity of hot surfaces.
- Verify that the product has sufficiently cooled down before handling it.
- Verify that the heat dissipation is sufficient by performing a test run under maximum load conditions.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

This equipment has been designed to operate outside of any hazardous location. Only install this equipment in zones known to be free of a hazardous atmosphere.

⚠ DANGER

POTENTIAL FOR EXPLOSION

Install and use this equipment in non-hazardous locations only.

Failure to follow these instructions will result in death or serious injury.

Machines, controllers, and related equipment are usually integrated into networks. Unauthorized persons and malware may gain access to the machine as well as to other devices on the network/fieldbus of the machine and connected networks via insufficiently secure access to software and networks.

⚠ WARNING

UNAUTHORIZED ACCESS TO THE MACHINE VIA SOFTWARE AND NETWORKS

- In your hazard and risk analysis, consider all hazards that result from access to and operation on the network/fieldbus and develop an appropriate cyber security concept.
- Verify that the hardware infrastructure and the software infrastructure into which the machine is integrated as well as all organizational measures and rules covering access to this infrastructure consider the results of the hazard and risk analysis and are implemented according to best practices and standards covering IT security and cyber security (such as: ISO/IEC 27000 series, Common Criteria for Information Technology Security Evaluation, ISO/ IEC 15408, IEC 62351, ISA/IEC 62443, NIST Cybersecurity Framework, Information Security Forum - Standard of Good Practice for Information Security).
- Verify the effectiveness of your IT security and cyber security systems using appropriate, proven methods.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

About the Book

At a Glance

Document Scope

The purpose of this document is to:
- help you to set up the drive,
- show you how to program the drive,
- show you the different menus, modes, and parameters,
- help you in maintenance and diagnostics.

Validity Note

This documentation is valid for the Altivar Process drives.

The technical characteristics of the devices described in this document also appear online. To access this information online:

Step	Action
1	Go to the Schneider Electric home page *www.schneider-electric.com*.
2	In the **Search** box type the reference of a product or the name of a product range. ● Do not include blank spaces in the reference or product range. ● To get information on grouping similar modules, use asterisks (*).
3	If you entered a reference, go to the **Product Datasheets** search results and click on the reference that interests you. If you entered the name of a product range, go to the **Product Ranges** search results and click on the product range that interests you.
4	If more than one reference appears in the **Products** search results, click on the reference that interests you.
5	Depending on the size of your screen, you may need to scroll down to see the data sheet.
6	To save or print a data sheet as a .pdf file, click **Download XXX product datasheet**.

The characteristics that are presented in this manual should be the same as those characteristics that appear online. In line with our policy of constant improvement, we may revise content over time to improve clarity and accuracy. If you see a difference between the manual and online information, use the online information as your reference.

Related Documents

Use your tablet or your PC to quickly access detailed and comprehensive information on all our products on www.schneider-electric.com.

The internet site provides the information you need for products and solutions:

- The whole catalog for detailed characteristics and selection guides,
- The CAD files to help design your installation, available in over 20 different file formats,
- All software and firmware to maintain your installation up to date,
- A large quantity of White Papers, Environment documents, Application solutions, Specifications... to gain a better understanding of our electrical systems and equipment or automation,
- And finally all the User Guides related to your drive, listed below:

Title of Documentation	Reference Number
ATV600 Getting Started	EAV63253 (English), EAV63254 (French), EAV63255 (German), EAV63256 (Spanish), EAV64310 (Italian), EAV64298 (Chinese)
ATV600 Getting Started Annex (SCCR)	EAV64300 (English)
ATV630, ATV650 Installation Manual	EAV64301 (English), EAV64302 (French), EAV64306 (German), EAV64307 (Spanish), EAV63257 (Italian), EAV64317 (Chinese)
ATV600 Programming Manual	EAV64318) (English), EAV64320 (French), EAV64321 (German), EAV64322 (Spanish), EAV64323 (Italian), EAV64324 (Chinese)
ATV600 Modbus Serial Link Manual (Embedded)	EAV64325) (English)
ATV600 Ethernet Manual (Embedded)	EAV64327) (English),
ATV600 Ethernet IP - Modbus TCP Manual (VW3A3720)	EAV64328 (English),
ATV600 PROFIBUS DP manual (VW3A3607)	EAV64329) (English),
ATV600 DeviceNet manual (VW3A3609)	EAV64330 (English),
ATV600 PROFINET manual (VW3A3627)	EAV64331 (English),
ATV600 CANopen Serial Link Manual (VW3A3608, 618, 628)	EAV64333) (English),
ATV600 Communication Parameters	EAV64332 (English),
ATV600 Embedded Safety Function manual	EAV64334 (English),
Altivar Process Drive Systems – Installation manual	NHA37119 (English), NHA37121 (French), NHA37118 (German), NHA37122 (Spanish), NHA37123 (Italian), NHA37130 (Chinese), NHA37124 (Dutch), NHA37126 (Polish), NHA37127 (Portuguese), NHA37128 (Russian), NHA37129 (Turkish)
ATV660 Handbook	NHA37111 (English), NHA37110 (German)
ATV680 Handbook	NHA37113 (English), NHA37112 (German)
ATV600F, ATV900F Installation Instruction sheet	NVE57369 (English),
SoMove: FDT	SoMove_FDT (English, French, German, Spanish, Italian, Chinese)
Altivar Process ATV600: DTM	ATV6xx_DTM_Library_EN (English), ATV6xx_DTM_Library_FR (French), ATV6xx_DTM_Language_DE (German), ATV6xx_DTM_Library_SP (Spanish), ATV6xx_DTM_Library_IT (Italian), ATV6xx_DTM_Library_CN (Chinese)

You can download these technical publications and other technical information from our website at http://www.schneider-electric.com/ww/en/download

Terminology

The technical terms, terminology, and the corresponding descriptions in this manual normally use the terms or definitions in the relevant standards.

In the area of drive systems this includes, but is not limited to, terms such as **error, error message, failure, fault, fault reset, protection, safe state, safety function, warning, warning message**, and so on.

Among others, these standards include:

- IEC 61800 series: Adjustable speed electrical power drive systems
- IEC 61508 Ed.2 series: Functional safety of electrical/electronic/programmable electronic safety-related
- EN 954-1 Safety of machinery - Safety related parts of control systems
- ISO 13849-1 & 2 Safety of machinery - Safety related parts of control systems
- IEC 61158 series: Industrial communication networks - Fieldbus specifications
- IEC 61784 series: Industrial communication networks - Profiles
- IEC 60204-1: Safety of machinery - Electrical equipment of machines – Part 1: General requirements

In addition, the term **zone of operation** is used in conjunction with the description of specific hazards, and is defined as it is for a **hazard zone** or **danger zone** in the EC Machinery Directive (2006/42/EC) and in ISO 12100-1.

Part I
Introduction

What Is in This Part?

This part contains the following chapters:

Chapter	Chapter Name	Page
1	Setup	25
2	Overview	31

Chapter 1
Setup

What Is in This Chapter?

This chapter contains the following topics:

Topic	Page
Initial Steps	26
Steps for Setting-Up the Drive	28
Software Enhancements	29

Initial Steps

Before Powering up the Drive

⚠ WARNING

UNANTICIPATED EQUIPMENT OPERATION

Before switching on the device, verify that no unintended signals can be applied to the digital inputs that could cause unintended movements.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

If the drive was not connected to mains for an extended period of time, the capacitors must be restored to their full performance before the motor is started.

NOTICE

REDUCED CAPACITOR PERFORMANCE

- Apply mains voltage to the drive for one hour before starting the motor if the drive has not been connected to mains for the following periods of time:
  - 12 months at a maximum storage temperature of +50°C (+122°F)
  - 24 months at a maximum storage temperature of +45°C (+113°F)
  - 36 months at a maximum storage temperature of +40°C (+104°F)
- Verify that no Run command can be applied before the period of one hour has elapsed.
- Verify the date of manufacture if the drive is commissioned for the first time and run the specified procedure if the date of manufacture is more than 12 months in the past.

Failure to follow these instructions can result in equipment damage.

If the specified procedure cannot be performed without a Run command because of internal mains contactor control, perform this procedure with the power stage enabled, but the motor being at standstill so that there is no appreciable mains current in the capacitors.

Start-up

NOTE:
If a Run command such as Run forward, Run reverse, DC injection is still active during:

- A product reset to the factory settings,
- A manual "Fault Reset" using **[Fault Reset Assign]** rSF,
- A manual "Fault reset" by applying a product switched off and on again,
- A stop command given by a channel that is not the active channel command (such as Stop key of the display terminal in 2/3 wires control),

The drive is in a blocking state and displays **[Freewheel Stop]** nSt. It will be necessary to deactivate all active Run commands prior to authorizing a new Run command.

Mains Contactor

NOTICE

RISK OF DAMAGE TO THE DRIVE

Do not switch on the drive at intervals of less than 60 s.

Failure to follow these instructions can result in equipment damage.

Using a Motor with a Lower Rating or Dispensing with a Motor Altogether

In factory settings, the motor output phase loss detection is active: **[OutPhaseLoss Assign]** oPL is set to **[OPF Error Triggered]** YES. For details, refer to the parameter description *(see page 544)*. For commissioning tests or maintenance phase, the drive could be connected to a small motor power size and thus trigger an error **[Output Phase Loss]** oPF2 or **[Single output phase loss]** oPF1 when a Run command is applied.For that purpose, the function can be disabled by setting **[OutPhaseLossAssign]** oPL to **[Function Inactive]** nO.

Set also **[Motor control type]** Ctt to **[U/F VC Standard]** Std in **[Motor parameters]** MPA-. For details, refer to the parameter description *(see page 195)*.

NOTICE

MOTOR OVERHEATING

Install external thermal monitoring equipment under the following conditions:

- If a motor with a nominal current of less than 20% of the nominal current of the drive is connected.
- If you use the function Motor Switching.

Failure to follow these instructions can result in equipment damage.

⚠ ⚠ DANGER

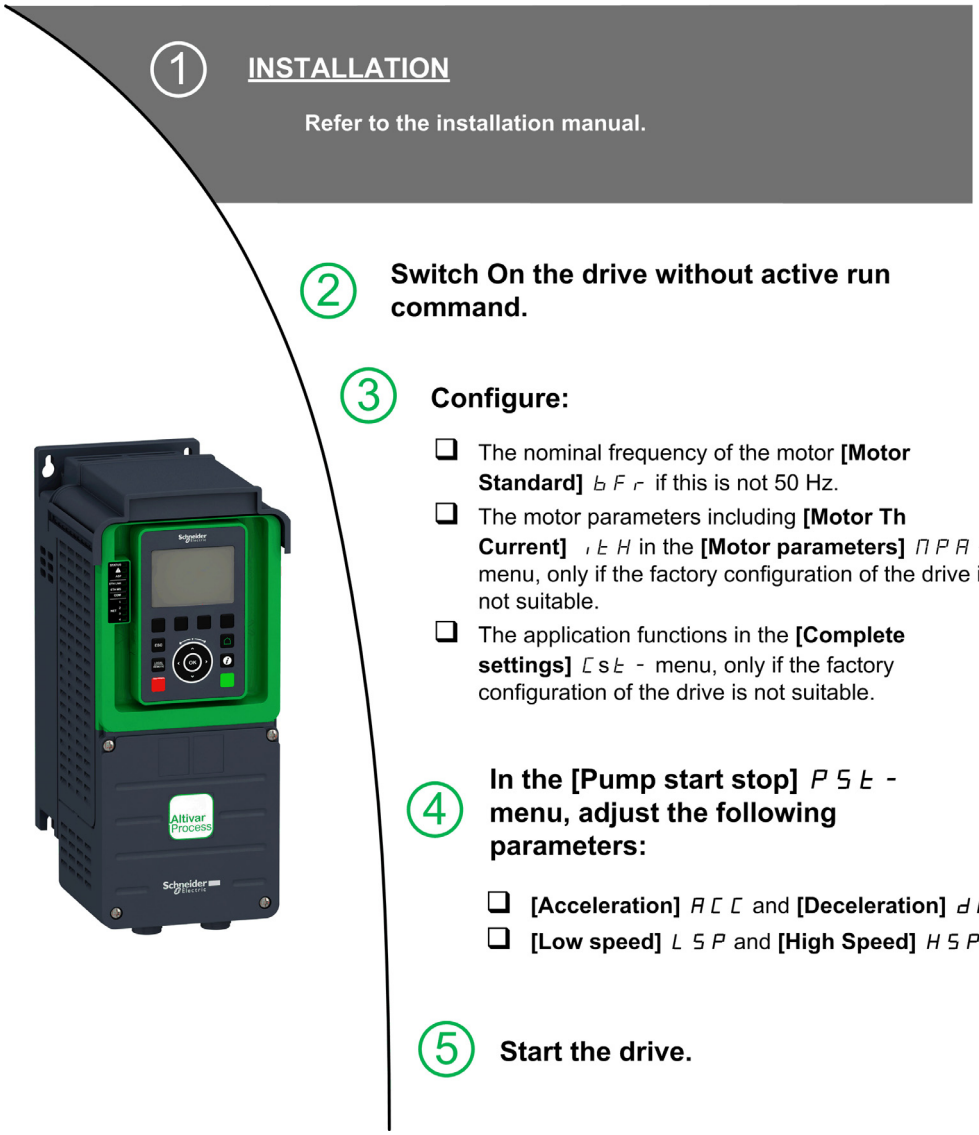
HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

If output phase monitoring is disabled, phase loss and, by implication, accidental disconnection of cables, are not detected.

- Verify that the setting of this parameter does not result in unsafe conditions.

Failure to follow these instructions will result in death or serious injury.

Steps for Setting-Up the Drive



⚠ WARNING

UNEXPECTED MOVEMENT

Drive systems may perform unexpected movements because of incorrect wiring, incorrect settings, incorrect data or other errors.

- Carefully install the wiring in accordance with the EMC requirements.
- Do not operate the product with unknown or unsuitable settings or data.
- Perform a comprehensive commissioning test.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Tips

Use the **[Config. Source]** FCS parameter *(see page 594)* to restore the factory settings at any time.

NOTE: The following operations must be performed for optimum drive performance in terms of accuracy and response time:

- Enter the values indicated on the motor nameplate in the **[Motor parameters]** MPA - menu.
- Perform autotuning with the motor cold and connected using the **[Autotuning]** tUn parameter.

Software Enhancements

Overview

Since the Altivar Process was first launched, it has benefited from the addition of several new functions. The software version has been updated to V1.6.

Although this documentation relates to version V1.6, it can still be used with earlier versions.

Enhancements Made to Version V1.2 in Comparison to V1.1

Factory setting	Enhancements
[Output Short Circuit Test] Strt	This function is now enabled in factory configuration and is accessible in the **[Motor monitoring]** MoP- menu

Menu	Parameter	Enhancements
[Motor parameters] MPA-	**[Motor Control Type]** Ctt	**[SYN_U VC]** SYnu: motor control type specific for permanent magnet synchronous motors
[Sleep/Wakeup] SPW-	**[Sleep Detect Mode]** SLPM	Replacement of **[Sensor]** Sns r: system enters in sleep mode on sensor condition by: • **[Flow]** LF: system enters in sleep mode on low flow • **[Pressure]** HP: system enters in sleep mode on high pressure • **[Multiple]** or: system enters in sleep mode on multiple-OR condition
		Addition of possible pressure sensor assignment and configuration for sleep function: • **[AIx Sensor config.]** SoAX- • **[AIV1 Sensor Config.]** SoV1- • **[Sleep Pressure Level]** SLPL
	[Wake Up Mode] WuPM	Addition of **[Pressure]** LP: wake up on low-pressure condition
		Addition of possible pressure sensor assignment and configuration for wake-up function: • **[AIx Sensor config.]** WoAX- • **[AIV1 Sensor Config.]** WoV1- • **[Wake Up Press Level]** WuPL
[Pipe fill] PF1-	**[Pipe Fill on Wake Up]** PFWu	New parameter
[Counter Management] ELt-	**[Fan operation Time]** FcPt	Replacement by **[Fan operation Time]** FPbt (32 bits)
[Data] Mtd-	**[% error EMF sync]** rdAE	This parameter is now accessible with the Graphic Display Terminal

Enhancements Made to Version V1.3 in Comparison to V1.2

In the **[Dashboard]** dSH- menu, the content of the tabs is improved for pumps and fan applications.

In the **[Complete settings]** CSt- menu, the **[Macro Configuration]** MCr- submenu is added with the **[Application Selection]** APPt parameter. It allows to hide unnecessary parameters according to the selected application type.

In the **[Pump functions]** PFt- menu, **[Booster Control]** bSt- and **[Level Control]** LuL- functions are available, including their related parameters and the settings for multi-pump architecture.

A new possible setting **[Rotational Current Injection]** rCI is added for synchronous motor **[Angle setting type]** ASt.

Up to 4 QR codes customizable with the commissioning software are displayed in **[QR code]** 9rC- menu.

Enchancements Made to Version V1.4 in Comparison to V1.3

Unification of Altivar Process ATV600 software version for all the product catalogue numbers.

Enchancements Made to Version V1.5 in Comparison to V1.4

Support of VW3A3720 EthernetIP/ModbusTCP fieldbus module.

Two virtual analog inputs has been added in **[Input/Output]** I O -, **[Sensor Assignment]** S S C - menu.

Enhancements Made to Version V1.6 in Comparison to V1.5

MultiDrive Link feature is available on ATV600 drives using a VW3A3721 EthernetIP/ModbusTCP fieldbus module.

Support of Multi Drives (1 Master drive and up to 5 slaves) and Multi Masters (1 Master only drive and up to 5 Masters or Slaves drives) architectures in **[Booster Control]** b S t - and **[Level Control]** L V L - functions.

Improvements and new functionalities on **[Booster Control]** b S t - and **[Level Control]** L V L - functions can be found in their related menus.

An output of the drive can be affected to value **[HMI cmd.]** b M P. This output is active when the Local/Remote key of Graphic Display Terminal is pressed and command and reference values comes from Graphic Display Terminal.

Chapter 2
Overview

What Is in This Chapter?

This chapter contains the following topics:

Topic	Page
Factory Configuration	32
Application Functions	33
Basic Functions	35
Graphic Display Terminal	36
Structure of the Parameter Table	41
Finding a Parameter in This Document	42

Factory Configuration

Factory Settings

The drive is factory-set for common operating conditions:

- Display: drive ready **[Pre-Ramp Ref Freq]** *FrH* when motor is ready to run and motor frequency when motor is running.
- The DI3 and DI5 to DI6 digital inputs, AI2 and AI3 analog inputs, R2 and R3 relays are unassigned.
- Stop mode when error detected: freewheel.

This table presents the basic parameters of the drive and their factory setting values:

Code	Name	Factory setting values
bFr	**[Motor Standard]**	**[50Hz IEC]** *50*
rin	**[Reverse Disable]**	**[Yes]** *YES*
tCC	**[2/3-Wire Control]**	**[2-Wire Control]** *2C*: 2-wire control
Ctt	**[Motor control type]**	**[U/F VC Quad.]** *uF9*: U/F for quadratics loads
ACC	**[Acceleration]**	10.0 s
dEC	**[Deceleration]**	10.0 s
LSP	**[Low Speed]**	0.0 Hz
HSP	**[High Speed]**	50.0 Hz
itH	**[Motor Th Current]**	Nominal motor current (value depending on drive rating)
Frd	**[Forward]**	**[DI1]** *di1*: Digital input DI1
Fr1	**[Ref Freq 1 Config]**	**[AI1]** *AI1*: Analog input AI1
r1	**[R1 Assignment]**	**[Operating State Fault]** *FLt*: the contact opens when the drive has detected error or when the drive has been switched off
brA	**[Dec.Ramp Adapt]**	**[Yes]** *YES*: function active (automatic adaptation of deceleration ramp)
Atr	**[Auto Fault Reset]**	**[No]** *no*: function inactive
Stt	**[Type of stop]**	**[On Ramp]** *rMP*: on ramp
Ao1	**[AQ1 assignment]**	**[Motor Frequency]** *oFr*: Motor frequency
Ao2	**[AQ2 assignment]**	**[Motor Current]** *oCr*: Motor current

NOTE: If you want to restore the drive presettings to their factory values, set **[Config. Source]** *FCS1* to **[Macro Config]** *in1*.

Verify whether the above values are compatible with the application and modify them if required.

Application Functions

Introduction

The following tables show the combinations of functions and applications in order to guide your selection.

The applications in these tables relate to the following applications:

- Borehole pump
- Pumping station
- Boosting station
- Miscellaneous: fan, compressor
- Lift station

Each application has its own special features, and the combinations listed here are not mandatory or exhaustive.

Some functions are designed specifically for a given application. In this case, the application is identified by a tab in the margin on the relevant programming pages.

Combinations of Functions and Control Functions

Function	Application				
	Borehole pump	Pumping station	Boosting station	Miscellaneous	Lift station
PID controller	X	X	X	X	
Sleep/wake up			X		
Feedback monitoring	X	X	X	X	X
Pump characteristics	X	X	X	X	X
Pump start stop	X	X	X	X	X
Pipe fill			X	X	
Friction loss compensation			X		
Sensorless flow estimation	X	X		X	X
Jockey pump			X		
Priming pump control			X		
Flow limitation	X	X	X		
Jump frequency					
Automatic restart	X	X		X	X
Catch on fly				X	
Threshold reached	X	X	X	X	X
Mains contactor command	X	X	X	X	X
Reverse disable	X	X	X	X	
Torque limitation				X	
Parameter set switching	X	X	X	X	X
Stop on prolonged speed		X		X	
Acceleration deceleration ramps	X	X	X	X	X
Motor control type	X	X	X	X	X
Motor tune	X	X	X	X	X
Output phase rotation	X	X	X	X	X
Energy parameter	X	X	X	X	X
Data logging	X	X	X	X	X

Combinations of Functions and Monitoring Functions

Function	Application				
	Borehole pump	Pumping station	Boosting station	Miscellaneous	Lift station
Pumpcycle monitoring	X	X	X	X	X
Anti-Jam		X			X
Dry run monitoring	X	X	X	X	X
Pump low flow monitoring	X	X	X	X	X
Thermal pump monitoring	X	X	X	X	X
Inlet pressure monitoring		X	X		
Outlet pressure monitoring	X	X	X	X	
High flow monitoring	X	X	X	X	X
Process underload monitoring	X	X	X	X	X
Process overload monitoring	X	X	X	X	X
Stall monitoring					X
Thermal sensor monitoring	X	X	X	X	X
Surge voltage limitation	X	X	X	X	X
4-20 loss	X	X	X	X	X
Safe Torque Off	X	X	X	X	X

Combinations of Functions and Display Functions

Function	Application				
	Borehole pump	Pumping station	Boosting station	Miscellaneous	Lift station
Energy parameters	X	X	X	X	X
Data logging	X	X	X	X	X

Basic Functions

Drive Ventilation

If **[Fan mode]** FFM is set to:

- **[Standard]** Std, the fan is activated during the all run time of the motor. According to drive rating, this could be the only available setting.
- **[Always]** run, the fan is always activated.
- **[Economy]** ECo, the fan is activated only if necessary, according to the internal thermal state of the drive.

Fan speed and **[Fan Operation Time]** FPbt are monitored values:

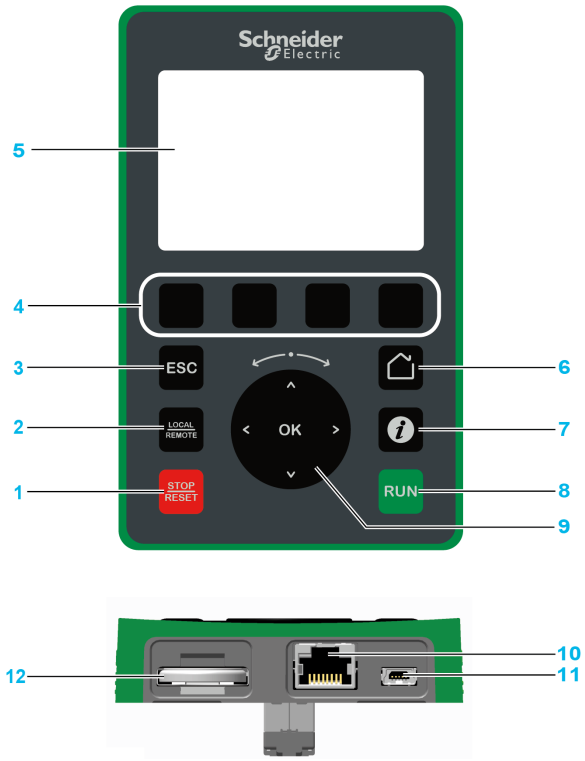
- An abnormal low speed of the fan triggers a warning **[Fan Feedback Warning]** FFdA.
- As soon as **[Fan Operation Time]** FPbt reach the predefined value of 45,000 hours, a warning **[Fan Counter Warning]** FCtA is triggered.

[Fan Operation Time] FPbt counter can be set to 0 by using the **[Time Counter Reset]** rPr parameter.

Graphic Display Terminal

Description of the Graphic Display Terminal

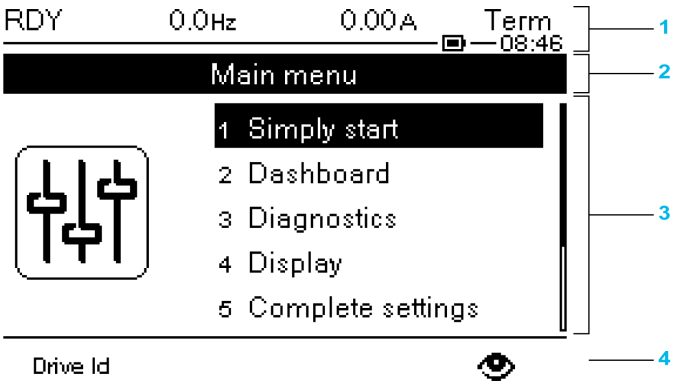
This Graphic Display Terminal is a local control unit which can be either plugged on the drive or mounted on the door of the wall-mounted or floor-standing enclosure. It has a cable with connectors, which is connected to the drive front Modbus serial link. The Graphic Display Terminal embeds a real time clock used for the time stamping of logged data and all other functions which require time information.



1 **STOP / RESET**: Stop command / apply a Fault Reset.
2 **LOCAL / REMOTE**: used to switch between local and remote control of the drive.
3 **ESC**: used to quit a menu/parameter or remove the currently displayed value in order to revert to the previous value retained in the memory
4 **F1 to F4**: function keys used to access drive id, QR code, quick view, and submenus. Simultaneous press of F1 and F4 keys generates a screenshot file in the Graphic Display Terminal internal memory.
5 **Graphic display**.
6 **Home**: used to access directly at the home page.
7 **Information**: used to have more information about menus, submenus, and parameters. The selected parameter or menu code is displayed on the first line of the information page.
8 **RUN**: executes the function assuming it has been configured.
9 **Touch wheel / OK**: used to save the current value or access the selected menu/parameter. The touch wheel is used to scroll fast into the menus. Up/down arrows are used for precise selections, right/left arrows are used to select digits when setting a numerical value of a parameter.
10 **RJ45 Modbus serial port**: used to connect the Graphic Display Terminal to the drive in remote control.
11 **MiniB USB port**: used to connect the Graphic Display Terminal to a computer.
12 **Battery** (10 years service life. Type: CR2032). The battery positive pole points to the front face of the Graphic Display Terminal.

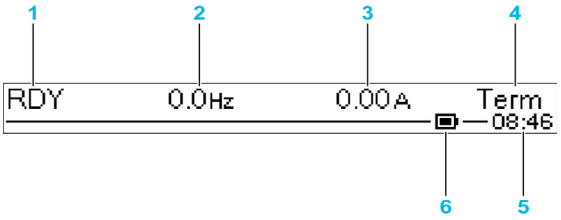
NOTE: Keys 1, 8 and 9 can be used to control the drive if control via the Graphic Display Terminal is activated. To activate the keys on the Graphic Display Terminal, you first need to set **[Ref Freq 1 Config]** *Fr 1* to **[Ref.Freq-Rmt.Term]** *LCC*.

Description of the Graphic Display



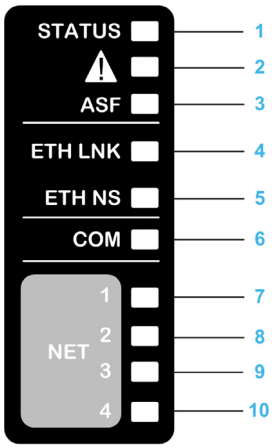
1 Display line: its content can be configured
2 Menu line: indicates the name of the current menu or submenu
3 Menus, submenus, parameters, values, bar charts, and so on, are displayed in drop-down window format on a maximum of five lines. The line or value selected by the navigation button is displayed in reverse video
4 Section displaying tabs (1 to 4 by menu), these tabs can be accessed using F1 to F4 keys

Display line details:



Key	
1	Drive state
2	Customer defined
3	Customer defined
4	Active control channel ● TERM: terminals ● HMI: Graphic Display Terminal ● MDB: integrated Modbus serial ● CAN: CANopen® ● NET: fieldbus module ● ETH: integrated Ethernet Modbus TCP
5	Present time
6	Battery level

Description of the Product Front LEDs



Following table provides the details of the drive status LEDs:

Item	LED	Color & status	Description
1	**STATUS**	OFF	Indicates that the drive is powered off
		Green flashing	Indicates that the drive is not running, ready to start
		Green blinking	Indicates that the drive is in transitory status (acceleration, deceleration, and so on)
		Green on	Indicates that the drive is running
2	**Warning/Error**	Red flashing	Indicates that the drive has detected a warning
		Red on	Indicates that the drive has detected an error
3	**ASF**	Yellow on	Indicates that the safety function has been triggered

Following table provides the details of the embedded Ethernet LEDs:

Item	LED	Color & status	Description
4	**ETH LNK**	OFF	Indicates that the embedded Ethernet link is not established
		Green on	Indicates that the embedded Ethernet link established at 100 Mbit/s
		Green blinking	Indicates embedded Ethernet fieldbus activity at 100 Mbit/s
		Yellow on	Indicates that the embedded Ethernet link established at 10 Mbit/s
		Yellow blinking	Indicates embedded Ethernet fieldbus activity at 10 Mbit/s
5	**ETH NS**	OFF	Indicates that the embedded Ethernet has no IP address
		Green/Red flashing	Indicates power on testing
		Green on	Indicates that the embedded Modbus TCP connection is established to the command word
		Green flashing	Indicates that the embedded Ethernet has a valid IP, but no Modbus TCP connection to the command word
		Red on	Indicates that the embedded Ethernet has detected a duplicated IP address
		Red	Indicate that the embedded Modbus TCP connection established to control the command word is closed or timed out

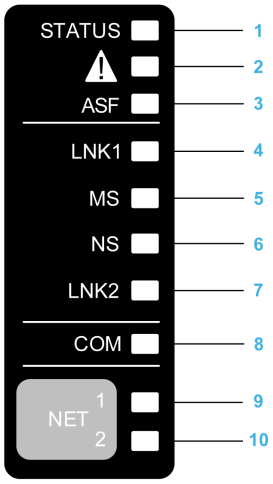
Following table provides the details of the embedded Modbus serial LEDs:

Item	LED	Color & status	Description
6	**COM**	Yellow flashing	Indicates embedded Modbus serial activity

Following table provides the details of the fieldbus module LEDs:

Item	LED	Color & status	Description
7	**NET 1**	Green/Yellow	for details, refer to the fieldbus manual
8	**NET 2**	Green/Red	for details, refer to the fieldbus manual
9	**NET 3**	Green/Red	for details, refer to the fieldbus manual
10	**NET 4**	Green/Yellow	for details, refer to the fieldbus manual

Description of the Product Front LEDs for ATV9••



Following table provides the details of the drive status LEDs:

Item	LED	Color & status	Description
1	**STATUS**	OFF	Indicates that the drive is powered off
		Green flashing	Indicates that the drive is not running, ready to start
		Green blinking	Indicates that the drive is in transitory status (acceleration, deceleration, and so on)
		Green on	Indicates that the drive is running
		Yellow on	Device Visual identification function when using SoMove or the device DTM
2	**Warning/Error**	Red flashing	Indicates that the drive detected warning
		Red on	Indicates that the drive detected error
3	**ASF**	Yellow on	Indicates that the safety function is activated

Following table provides the details of the embedded Ethernet LEDs:

Item	LED	Color & status	Description
4	**LNK1**	OFF	No link.
		Green/Yellow flashing	Power on testing.
		Green on	Link established at 100 Mbit/s.
		Green flashing	Link established at 10 Mbit/s.
		Yellow flashing	Fieldbus activity at 100 Mbit/s.
		Yellow on	Fieldbus activity at 10 Mbit/s.
5	**MS**	OFF	No power is supplied to the device.
		Green/Red flashing	Power up testing.
		Green on	The device is operating correctly.
		Green flashing	The device has not been configured.
		Red flashing	The device has detected a recoverable minor detected error.
		Red on	The device has detected a non-recoverable major detected error.

Item	LED	Color & status	Description
6	**NS**	OFF	The device does not have an IP address or powered off.
		Green/Red flashing	Power on testing.
		Green on	A connection is established to control the command word.
		Green flashing	Device has a valid IP, but no command word connection.
		Red flashing	Duplicated IP.
		Red on	An established connection to control the command word is closes or timed out.
7	**LNK2**	OFF	No link.
		Green/Yellow flashing	Power on testing.
		Green on	Link established at 100 Mbit/s.
		Green flashing	Link established at 10 Mbit/s.
		Yellow flashing	Fieldbus activity at 100 Mbit/s.
		Yellow on	Fieldbus activity at 10 Mbit/s.

Following table provides the details of the embedded Modbus serial LEDs:

Item	LED	Color & status	Description
8	**COM**	Yellow flashing	Indicates embedded Modbus serial activity

Following table provides the details of the fieldbus module LEDs:

Item	LED	Color & status	Description
9	**NET 1**	Green/Red	for details, refer to the fieldbus manual
10	**NET 2**	Green/Red	for details, refer to the fieldbus manual

Graphic Display Terminal Connected to a Computer

NOTICE

RISK OF DAMAGE TO THE COMPUTER

Do not connect the Graphic Display Terminal to the drive via a Modbus RJ45 link and to the computer via a USB link at the same time.

Failure to follow these instructions can result in equipment damage.

The Graphic Display Terminal is recognized as a USB storage device named SE_VW3A1111 while plugged on a computer.

This allows to access the saved drive configurations (`DRVCONF` menu) and the Graphic Display Terminal screenshots (`PRTSCR` menu).

Screenshots can be stored by a simultaneous press on `F1` and `F4` function keys

The Graphic Display Terminal language files can also be accessed and updated (`LANG` menu).

Language files are available on *www.schneider-electric.com*.

NOTE: make a backup of the original language file before you replace it by another one.

Structure of the Parameter Table

General Legend

Pictogram	Description
★	These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.
↻	Setting of this parameter can be done during operation or when stopped. **NOTE:** It is recommended to stop the motor before modifying any of the settings.
⌛	To change the assignment of the parameter, reinforced validation is required.

Parameter Presentation

Below is an example of a parameter presentation:

[Sample Menu] C o d E **– Menu**

Access

Parameters described below can be accessed by:

[Path] → [Sub-path]

About this menu

Description of the menu or function

[Parameter1] C o d E 1

Description of the parameter

Example of a table with a setting range:

Setting ( )	Description
0.0… 10,000.0	Setting range Factory setting: 50.0

[Parameter2] C o d E 2

Description of the parameter

Example of a table with a list of choices:

Setting ( )	Code / Value	Description
[50 Hz IEC]	5 0	IEC **Factory setting**
[60 Hz NEMA]	6 0	NEMA

Finding a Parameter in This Document

With the Graphic Display Terminal

Select the required parameter and press .

The parameter code is displayed at the top of the information window.

Example: **[Acceleration]** code is ACC.

With the Manual

It is possible to use either the parameter name or the parameter code to search in the manual the page giving details of the selected parameter.

Difference Between Menu and Parameter

A dash after menu and submenu codes is used to differentiate menu commands from parameter codes.

Example:

Level	Name	Code
Menu	**[Ramp]**	rAMP-
Parameter	**[Acceleration]**	ACC

Part II
Programming

What Is in This Part?

This part contains the following chapters:

Chapter	Chapter Name	Page
3	**[Simply start]** SYS -	45
4	**[Dashboard]** dSH -	53
5	**[Diagnostics]** d iA -	67
6	**[Display]** Mon -	83
7	**[Complete settings]** CSt -	163
8	**[Communication]** CoM -	585
9	**[File management]** FMt -	593
10	**[My preferences]** MYP -	599

Chapter 3
[Simply start] SYS -

Introduction

[Simply start] SYS - menu contains 3 tabs for quick access to mains features:

- Simply Start tab which gives a quick access to basic parameters to set.
- My Menu tab which is a user-defined menu for quick access to specific parameters.
- Modified Parameters tab which gives a quick access to the 10 last modified parameters.

What Is in This Chapter?

This chapter contains the following topics:

Topic	Page
[Simply start] S1M - Menu	46
[My menu] MYMn - Menu	52
[Modified parameters] LMd - Menu	52

[Simply start] S I M - Menu

Access

[Simply start] ➡ **[Simply start]**

About This Menu

⚠ WARNING

LOSS OF CONTROL

- Fully read and understand the manual of the connected motor.
- Verify that all motor parameters are correctly set by referring to the nameplate and the manual of the connected motor.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

This menu provides a quick access to the basic parameters to set.

[Motor Standard] b F r ★

Motor standard.

This parameter can be accessed if **[Motor control type]** C t t is not set to **[SYN_U VC]** S Y n u.

This parameter modifies the presets of the following parameters:

- **[High Speed]** H S P
- **[Motor Freq Thd]** F t d
- **[Nom Motor Voltage]** u n S
- **[Nominal Motor Freq]** F r S
- **[Max Frequency]** t F r

Setting	Code / Value	Description
[50 Hz IEC]	5 0	IEC **Factory setting**
[60 Hz NEMA]	6 0	NEMA

[Nominal motor power] n P r ★

Nominal motor power.

This parameter can be accessed if:

- **[Motor control type]** C t t is not set to **[SYN_U VC]** S Y n u, and
- **[Motor param choice]** M P C is set to **[Mot Power]** n P r.

Rated motor power given on the nameplate, in kW if **[Motor Standard]** b F r is set to **[50Hz IEC]** 5 0, in HP if **[Motor Standard]** b F r is set to **[60Hz NEMA]** 6 0.

Setting	Description
According to drive rating	– **Factory setting**: according to the drive rating

[Nom Motor Voltage] u n S ★

Nominal motor voltage.

This parameter can be accessed if **[Motor control type]** C t t is not set to **[SYN_U VC]** S Y n u.

Rated motor voltage given on the nameplate.

Setting	Description
100.0...690.0 Vac	Setting range **Factory setting**: according to drive rating and **[Motor Standard]** b F r

[Nom Motor Current] nCr ★

Rated motor current given on the nameplate.

This parameter can be accessed if **[Motor control type]** CtT is not set to **[SYN_U VC]** SYnU.

Setting	Description
0.25...1.5 In (1)	Setting range **Factory setting**: according to drive rating and **[Motor Standard]** bFr
(1) Corresponding to the rated drive current indicated in the installation manual and on the drive nameplate.	

[Nominal Motor Freq] FrS ★

Nominal motor frequency.

This parameter can be accessed if **[Motor control type]** CtT is not set to **[SYN_U VC]** SYnU.

The factory setting is 50 Hz, or preset to 60 Hz if **[Motor Standard]** bFr is set to 60 Hz.

Setting	Description
40.0...500.0 Hz	Setting range **Factory setting**: 50.0 Hz

[Nominal Motor Speed] nSP ★

Nominal motor speed.

This parameter can be accessed if **[Motor control type]** CtT is not set to **[SYN_U VC]** SYnU.

If the nameplate indicates the synchronous speed and the slip in Hz or as a %, use one of the formulas to calculate the rated speed:

- Nominal speed = Synchronous speed x $\frac{100 - \text{slip as a \%}}{100}$
- Nominal speed = Synchronous speed x $\frac{60 - \text{slip in Hz}}{60}$ (60 Hz motors)
- Nominal speed = Synchronous speed x $\frac{50 - \text{slip in Hz}}{50}$ (50 Hz motors).

Setting	Description
0...65,535 rpm	Setting range **Factory setting**: according to drive rating

[Motor 1 Cosinus Phi] CoS ★

Nominal motor cosinus Phi.

This parameter can be accessed if:

- **[Motor control type]** CtT is not set to **[SYN_U VC]** SYnU, and
- **[Motor param choice]** MPC is set to **[Mot Cosinus]** CoS.

Setting	Description
0.50...1.00	Setting range **Factory setting**: according to the drive rating

[2/3-Wire Control] tCC

2-wire or 3-wire control.

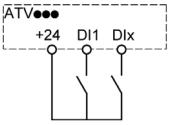
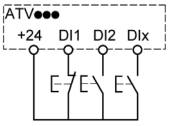
⚠ WARNING

UNANTICIPATED EQUIPMENT OPERATION

If this parameter is changed, the parameters **[Reverse Assign]** rrS and **[2-wire type]** tCt and the assignments of the digital inputs are reset to the factory setting.

Verify that this change is compatible with the type of wiring used.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Setting	Code / Value	Description
[2-Wire Control]	2C	**2-wire control (level commands):** This is the input state (0 or 1) or edge (0 to 1 or 1 to 0), which controls running or stopping. Example of **source** wiring:  **DI1** Forward **DIx** Reverse **Factory setting**
[3-Wire Control]	3C	**3-wire control (pulse commands) [3 wire]:** A **forward** or **reverse** pulse is sufficient to command starting, a **stop** pulse is sufficient to command stopping. Example of **source** wiring:  **DI1** Stop **DI2** Forward **DIx** Reverse

[Max Frequency] tFr

Maximum output frequency.

The factory setting is 60 Hz, or preset to 72 Hz if **[Motor Standard]** bFr is set to 60 Hz.

Setting	Description
10.0...500.0 Hz	Setting range **Factory setting**: 60 Hz

[Autotuning] tun

⚠ WARNING
UNEXPECTED MOVEMENT Autotuning moves the motor in order to tune the control loops. ● Only start the system if there are no persons or obstructions in the zone of operation. **Failure to follow these instructions can result in death, serious injury, or equipment damage.**

During autotuning, the motor makes small movement. Noise development and oscillations of the system are normal.

In any case, the motor has to be stopped before performing a tune operation. Verify that the application does not make the motor turn during the tune operation.

The tune operation optimizes:
- The motor performances at low speed.
- The estimation of the motor torque.
- The accuracy of the estimation of the process values in sensorless operation and monitoring.

Autotuning is only performed if no stop command has been activated. If a “freewheel stop” or “fast stop” function has been assigned to a digital input, this input must be set to 1 (active at 0).

Autotuning takes priority over any run or prefluxing commands, which will be taken into account after the autotuning sequence.

If autotuning has detected error, the drive always displays **[No action]** nO and, depending on the configuration of **[Tuning Error Resp]** tnL, may switch to **[Autotuning]** tun detected error mode.

Autotuning may last for several seconds. Do not interrupt the process. Wait for the Graphic Display Terminal to change to **[No action]** nO.

NOTE: The motor thermal state has a significant influence on the tuning result. Always perform a motor tuning with the motor stopped and cold. Verify that the application does not have the motor operate during a tuning operation.

To redo a motor tuning, wait that it is stopped and cold. Set first **[Autotuning]** tun to **[Erase Autotuning]** CLr, then redo the motor tuning.

The use of the motor tuning without doing a **[Erase Autotuning]** CLr first is used to get the thermal state estimation of the motor.

The cable length has an influence on the tune result. If the wiring is modified, it is necessary to redo the tune operation.

Setting	Code / Value	Description
[No action]	nO	Autotuning not in progress **Factory setting**
[Apply Autotuning]	YES	Autotuning is performed immediately if possible, then the parameter automatically changes to **[No action]** nO. If the drive state does not allow the tune operation immediately, the parameter changes to **[No action]** nO and the operation must be done again.
[Erase Autotuning]	CLr	The motor parameters measured by the autotuning function are reset. The default motor parameter values are used to control the motor. **[Autotuning Status]** tuS is set to **[Not done]** tAb.

[Autotuning Status] tUS

Autotuning status.

(for information only, cannot be modified)

This parameter is not saved at drive power off. It shows the autotuning status since last power-on.

Setting	Code / Value	Description
[Not done]	tAb	Autotune is not done **Factory setting**
[Pending]	PEnd	Autotune has been requested but not yet performed
[In Progress]	PrOG	Autotune is in progress
[Error]	FAIL	Autotune has detected error
[Autotuning Done]	donE	The motor parameters measured by the autotuning function are used to control the motor

[Tune Selection] StUn ★

Tune selection.

Setting	Code / Value	Description
[Default]	tAb	The default motor parameter values are used to control the motor **Factory setting**
[Measure]	MEAS	The values measured by the autotuning function are used to control the motor
[Custom]	CUS	The values manually set are used to control the motor

[Motor Th Current] ItH

Motor thermal monitoring current to be set to the rated current indicated on the nameplate.

Setting	Description
0.2...1.5 In(1)	Setting range **Factory setting**: According to drive rating
(1) Corresponding to the rated drive current indicated in the installation manual and on the drive nameplate.	

[Acceleration] ACC

Time to accelerate from 0 to the **[Nominal Motor Freq]** Fr S. To have a repeatability in the ramps, the value of this parameter must be set according to the possibility of the application.

Setting	Description
0.0...6,000.0 s (1)	Setting range **Factory setting**: 10.0 s
(1) Range 0.01 to 99.99 s or 0.1 to 999.9 s or 1...6,000 s according to **[Ramp increment]** Inr.	

[Deceleration] dEC

Time to decelerate from the **[Nominal Motor Freq]** Fr S to 0. To have a repeatability in the ramps, the value of this parameter must be set according to the possibility of the application.

Setting	Description
0.0...6,000.0 s (1)	Setting range **Factory setting**: 10.0 s
(1) Range 0.01 to 99.99 s or 0.1 to 999.9 s or 1...6,000 s according to **[Ramp increment]** Inr.	

[Low Speed] L S P

Low speed.

Motor frequency at minimum reference, can be set between 0 and **[High Speed]** H S P.

Setting	Description
0.0... **[High Speed]** H S P Hz	Setting range **Factory setting**: 0.0 Hz

[High Speed] H S P

High speed.

Motor frequency at maximum reference, can be set between **[Low Speed]** L S P and **[Max Frequency]** t F r. The factory setting changes to 60 Hz if **[Motor Standard]** b F r is set to **[60Hz NEMA]** 6 0.

Setting	Description
0.0...**[Max Frequency]** t F r Hz	Setting range **Factory setting**: 50.0 Hz

[My menu] MYMn - Menu

Access

[Simply start] ➡ [My menu]

About This Menu

This menu contains the parameters selected in the **[My menu config.]** MYC - Menu.

NOTE: This menu is empty by default.

[Modified parameters] LMd - Menu

Access

[Simply start] ➡ [Modified parameters]

About This Menu

This menu gives a quick access to the 10 last modified parameters

Chapter 4
[Dashboard] d S H -

Introduction

[Dashboard] d S H - menu contains tabs for quick access to system and display features:

- System tab to configure the main system parameters.
- Energy tab which provides a complete access for instantaneous power counters and energy reports by means of graphics on the Graphic Display Terminal.

What Is in This Chapter?

This chapter contains the following topics:

Topic	Page
[Pump dashboard] P n E - Menu	54
[Fan dashboard] F A n - Menu	56
[Dashboard] d S H - Menu	58
[Control] C t r - Menu	59
[Control] F t r - Menu	62
[Dashboard] d S H - Menu	63
[kWh Counters] K W C - menu	64
[Dashboard] d S H - Menu	66

[Pump dashboard] PMP - Menu

Access

[Dashboard] ➡ [Pump dashboard]

About This Menu

This menu provides informations related to the pump.

This menu can be accessed if **[Application Selection]** APPL is not set to **[Generic Fan Control]** FAn.

[Pre-Ramp Ref Freq] FrH

Frequency reference before ramp (signed value).

Actual frequency reference linked to the motor regardless of which reference channel has been selected. This parameter is in read-only mode.

Setting	Description
-**[High Speed]** HSP...**[High Speed]** HSP Hz	Setting range **Factory setting: –**

[Drive State] HMI S

Drive state.

Setting	Code / Value	Description
[Autotuning]	tUn	Autotuning
[In DC inject.]	dCb	DC Injection
[Ready]	rdY	Drive ready
[Freewheel]	nSt	Freewheel stop control
[Running]	rUn	Motor in steady state or run command present and zero reference
[Accelerating]	ACC	Acceleration
[Decelerating]	dEC	Deceleration
[Current limitation]	CL I	In current limitation
[Fast stop]	FSt	Fast stop
[Mot. fluxing]	FLU	Fluxing function is activated
[No Mains Voltage]	nLP	Control is powered on but the DC bus is not loaded
[control.stop]	CtL	Controlled stop
[Dec. adapt.]	obr	Adapted deceleration
[Output cut]	SoC	Stand by output cut
[Undervoltage Warning]	USA	Undervoltage warning
[In autotest]	St	Self test in progress
[Autotest error]	FA	Self test detected error
[Autotest OK]	YES	Self test OK
[EEprom test]	EP	Self test EEPROM detected error
["Operating State "Fault""]	FLt	Product has detected an error
[DCP Flashing Mode]	dCP	DCP flashing mode
[STO Active]	Sto	Safe Torque Off active
[Energy Saving]	IdLE	Idle stop and go mode

[MultiPump State] MPS ★

Multipump function state.

This parameter can be accessed if **[Pump System Archi]** MPSA is not set to **[No]** no.

Setting	Code / Value	Description
[None]	nonE	None
[Ready]	rEAdY	Ready
[Running]	run	Running
[Warning]	ALArM	Warning
[Error]	FAuLt	Error
[Not Available]	nAVL	Not available

[Available Pumps] MPAn ★

Number of available pumps.

This parameter can be accessed if **[Pump System Archi]** MPSA is not set to **[No]** no.

Setting	Description
0...**[Nb Of Pumps]** MPPn	Setting range **Factory setting: –**

[Nb of Staged Pumps] MPSn ★

Number of staged pumps.

This parameter can be accessed if **[Pump System Archi]** MPSA is not set to **[No]** no.

Setting	Description
0...**[Nb Of Pumps]** MPPn	Setting range **Factory setting: –**

[Motor Current] LCr

Motor current.

Setting	Description
According to drive rating	Setting range **Factory setting: –**

[Motor speed] SPd

Motor speed in rpm.

Setting	Description
0...65,535 rpm	Setting range **Factory setting: –**

[Motor Therm state] tHr

Motor thermal state.

The normal motor thermal state is 100%, the **[Motor Overload]** oLF threshold is set to 118%.

Setting	Description
0...200%	Setting range **Factory setting: –**

[Fan dashboard] FAn - Menu

Access

[Dashboard] ➡ **[Fan dashboard]**

About This Menu

This menu provides informations related to the fan.

This menu can be accessed if **[Application Selection]** APPL is set to **[Generic Fan Control]** FAn.

[Pre-Ramp Ref Freq] FrH

Frequency reference before ramp (signed value).

Actual frequency reference lied to the motor regardless of which reference channel has been selected. This parameter is in read-only mode.

Setting	Description
-**[High Speed]** HSP...**[High Speed]** HSP Hz	Setting range **Factory setting: –**

[Drive State] HMIS

Drive state.

Setting	Code / Value	Description
[Autotuning]	tUn	Autotuning
[In DC inject.]	dCb	DC Injection
[Ready]	rdY	Drive ready
[Freewheel]	nSt	Freewheel stop control
[Running]	rUn	Motor in steady state or run command present and zero reference
[Accelerating]	ACC	Acceleration
[Decelerating]	dEC	Deceleration
[Current limitation]	CLI	In current limitation
[Fast stop]	FSt	Fast stop
[Mot. fluxing]	FLU	Fluxing function is activated
[No Mains Voltage]	nLP	Control is powered on but the DC bus is not loaded
[control.stop]	CtL	Controlled stop
[Dec. adapt.]	obr	Adapted deceleration
[Output cut]	SoC	Stand by output cut
[Undervoltage Warning]	USA	Undervoltage warning
["Operating State "Fault""]	FLt	Product has detected an error
[DCP Flashing Mode]	dCP	DCP flashing mode
[STO Active]	Sto	Safe Torque Off active
[Energy Saving]	IdLE	Idle stop and go mode
[Firmware Update]	FWUP	Firmeware update
[AFE Mains Undervoltage]	urA	Displayed if the voltage applied on the Active Front End power brick exceeds the **[Mains Voltage]** urES, the drive stops on **[Freewheel Stop]** nSt.

[Motor Current] LCr

Motor current.

Setting	Description
According to drive rating	Setting range **Factory setting: –**

[Motor speed] SPd

Motor speed in rpm.

This parameter displays the estimated rotor speed without motor slip.

Setting	Description
0...65,535 rpm	Setting range **Factory setting: –**

[Motor Therm state] tHr

Motor thermal state.

The nominal motor thermal state is 100%, the **[Motor Overload]** oLF threshold is set to 118%.

Setting	Description
0...200%	Setting range **Factory setting: –**

[Dashboard] d S H - Menu

Access

[Dashboard]

About This Menu

Using **F4** function key on the Graphic Display Terminal, it is possible to select one of the following view for the **[Pump dashboard]** or **[Fan dashboard]** tab.

Pump curves and actual working point are available if valid pump characteristics have been entered and if **[Pump Curve Activate]** P C A is set to **[Yes]** Y E S.

[Operating time report] H o t

Displays the operating time histogram.

[Nb start report] H n S

Displays the number of start histogram.

[Power vs Flow] C P q

This shows the mechanical power versus the flow curve of the system.

[Head vs Flow] C H q

This shows the head of the pump versus the flow curve of the system.

[Efficiency vs Flow] C E q

This shows the efficiency (%) versus flow curve of the system.

[Efficiency] E F F

Displays the instantaneous efficiency curve.

[Control] CtrL - Menu

Access

[Dashboard] ➡ **[Control]**

About This Menu

This menu can be accessed if **[Application Selection]** APPt is not set to **[Generic Fan Control]** FAn.

[System App State] APSS

System application state

This parameter indicates the installation application state

This parameter can be accessed if **[Pump System Archi]** MPSA is set to **[Multi Drives]** nVSd or **[Multi Masters]** nVSdr

Setting	Code / Value	Description
[Running]	run	No application function in progress; the drive is running
[Stop]	StoP	No application function in progress; the drive is not running
[Manual Mode Active]	MAnu	Motor running; manual PID mode is active
[PID Active]	Auto	Motor running; auto PID mode is active
[Flow Limit In Progress]	FL iM	The flow limitation is in progress
[PipeFill In Progress]	F iLL	The pipe fill is in progress
[Jockey Pump Active]	JoCKEY	The jockey pump is active
[Boost In progress]	booSt	The boost is in progress
[Sleep Active]	SLEEP	The sleep is active
[Priming Pump Active]	Pr iM	The priming pump is active
[InletPres Comp In Progress]	CoMP	The inlet pressure compensation is in progress

[Application State] APPS

Application state.

This parameter indicates the drive application state.

Setting	Code / Value	Description
[Running]	run	No application function in progress; the drive is running
[Stop]	StoP	No application function in progress; the drive is not running
[Local Mode Active]	LoCAL	Forced local mode activated
[Channel 2 Active]	oVEr	Override speed control mode activated
[Manual Mode Active]	MAnu	Motor running; manual PID mode is active
[PID Active]	Auto	Motor running; auto PID mode is active
[Antijam In Progress]	AJAM	The Anti-jam is in progress
[Flow Limit In Progress]	FL iM	The flow limitation is in progress
[PipeFill In Progress]	F iLL	The pipe fill is in progress
[Jockey Pump Active]	JoCKEY	The jockey pump is active
[Boost In progress]	booSt	The boost is in progress
[Sleep Active]	SLEEP	The sleep is active
[Priming Pump Active]	Pr iM	The priming pump is active
[InletPres Comp In Progress]	CoMP	The inlet pressure compensation is in progress

[Booster Status] bCS ★

Booster status.

This parameter can be accessed if **[Application Selection]** APPt is set to **[Pump Booster Control]** boo St and **[Booster Control]** is set to **[Yes]** YES.

Setting	Code / Value	Description
[None]	nonE	Not configured
[Inactive]	nAct	Inactive
[Running]	run	Running
[Stage Pending]	StGP	Stage pending
[Destage Pending]	dStGP	Destage pending
[Staging]	StG	Staging
[Destaging]	dStG	Destage in progress

[LevelCtrl Status] LCS ★

Level control status.

This parameter can be accessed if **[Application Selection]** APPt is set to **[Pump Level Control]** LEVEL and **[LevelCtrl Mode]** LCM is not set to **[No]** no.

Setting	Code / Value	Description
[None]	nonE	Not configured
[Inactive]	nAct	Inactive
[Filling]	FILL	Filling in progress
[Emptying]	EMPtY	Emptying in progress
[Low Level]	LoW	Low level
[High Level]	hIGh	High level

[Tank Level] LCtL ★

Tank level.

This parameter can be accessed if **[Application Selection]** APPt is set to **[Pump Level Control]** LEVEL and **[LevelCtrl Mode]** LCM is not set to **[No]** no.

Setting	Description
0.0...100.0%	Setting range **Factory setting: –**

[PID Reference] rPC ★

PID reference.

This parameter can be accessed if **[PID Feedback]** PIF is not set to **[Not Configured]** no.

Setting	Description
0...65,535%	Setting range **Factory setting: –**

[PID Feedback] rPF ★

PID feedback.

This parameter can be accessed if **[PID Feedback]** PIF is not set to **[Not Configured]** no.

Setting	Description
0...65,535%	Setting range **Factory setting: –**

[Outlet Pressure] P S 2 u

Outlet pressure value.

Setting	Description
-32,767...32,767	Setting range according to **[P sensor unit]** S u P r **Factory setting: –**

[Inlet Press. Value] P S I u

Inlet pressure value.

This parameter can be accessed if **[InletPres Assign]** P S I A is not set to **[Not Configured]** n o.

Setting	Description
-32,767...32,767	Setting range according to **[P sensor unit]** S u P r **Factory setting: –**

[Installation Flow] F S I u

Flow rate sensor value.

This parameter can be accessed if **[Inst. Flow Assign.]** F S I A is not set to **[Not Configured]** n o.

Setting	Description
-32,767...32,767	Setting range according to **[Flow rate unit]** S u F r **Factory setting: –**

[Flow Estimated] S L F V ★

Estimated flow value.

This parameter can be accessed if **[Flow Estimation Mode]** F E M is set to **[No]** n o.

Setting	Description
-32,767...32,767	Setting range according to **[Flow rate unit]** S u F r **Factory setting: –**

[Control] F t r - Menu

Access

[Dashboard] ➡ **[Control]**

About This Menu

This menu can be accessed if **[Application Selection]** A P P t is set to **[Generic Fan Control]** F A n.

[PID Reference] r P C ★

PID reference.

This parameter can be accessed if **[PID Feedback]** P I F is not set to **[Not Configured]** n o.

Setting	Description
0...65,535%	Setting range **Factory setting: –**

[PID Feedback] r P F ★

PID feedback.

This parameter can be accessed if **[PID Feedback]** P I F is not set to **[Not Configured]** n o.

Setting	Description
0...65,535%	Setting range **Factory setting: –**

[Dashboard] d S H - Menu

Access

[Dashboard]

About This Menu

Using **F4** function key on the Graphic Display Terminal, it is possible to select one of the following view for the **[Control]** tab.

[PID Feedback Trend] P F t

Displays the instantaneous PID controller feedback curve.

[Outlet Pressure Trend] o P t

Displays the instantaneous outlet pressure curve.

[Inlet Pressure Trend] i P t

Displays the instantaneous inlet pressure curve.

[Installation Flow Trend] i F t

Displays the instantaneous installation flow curve.

[kWh Counters] kWC - menu

Access

[Dashboard] ➡ **[kWh Counters]**

About This Menu

This menu presents many energy objects available for instantaneous data and kW consumption reports.

It offers the possibility to display logged data with graphics by pressing the F4 function key.

[Elc energy cons] oC4★

Electrical energy consumed by the motor in TWh.

This parameter can be accessed if **[Elc energy cons(TWh)]** oC4 is not set to 0.

Setting	Description
0...999 TWh	Setting range **Factory setting**: –

[Elc energy cons] oC3★

Electrical energy consumed by the motor in GWh.

Setting	Description
0...999 GWh	Setting range **Factory setting**: –

[Elc energy cons] oC2★

Electrical energy consumed by the motor in MWh.

Setting	Description
0...999 MWh	Setting range **Factory setting**: –

[Elc energy cons] oC1★

Electrical energy consumed by the motor in kWh.

Setting	Description
0...999 kWh	Setting range **Factory setting**: –

[Elc energy cons] oC0★

Electrical energy consumed by the motor in Wh.

Setting	Description
0...999 Wh	Setting range **Factory setting**: –

[Acv Elc out pwr estm] EPrW

Active electrical output power estimation.

Setting	Description
-32,767...32,767	Setting range Value in kW or HP according to **[Motor Standard]** bFr setting **Factory setting**: –

[Elc Egy Today] oCt

Electrical energy consumed today by the motor in kWh.

Setting	Description
0...4,294,967,295 kWh	Setting range **Factory setting**: –

[Elc Egy Yesterday] oCY

Electrical energy consumed yesterday by the motor in kWh.

Setting	Description
0...4,294,967,295 kWh	Setting range **Factory setting**: –

[Dashboard] d S H - Menu

Access

[Dashboard]

About This Menu

Using **F4** function key on the Graphic Display Terminal, it is possible to select one of the following view for the **[Energy]** tab.

[Instant kW Trend] C V I

Displays the instantaneous electrical energy curve at the drive output.

[Daily kWh Report] H S d

Displays the daily energy histogram.

[Weekly kWh Report] H S W

Displays the weekly energy histogram.

[Monthly kWh Report] H S M

Displays the monthly energy histogram.

[Yearly kWh Report] H S Y

Displays the yearly energy histogram.

Chapter 5
[Diagnostics] d I A -

Introduction

[Diagnostics] d I A - menu presents drive and application data useful when diagnostics is required.

What Is in This Chapter?

This chapter contains the following sections:

Section	Topic	Page
5.1	**[Diag. data]**	68
5.2	**[Error history]** P F H - Menu	77
5.3	**[Warnings]** A L r - Menu	80

Section 5.1
[Diag. data]

What Is in This Section?

This section contains the following topics:

Topic	Page
[Diag. data] d d t - Menu	69
[Service message] S E r - Menu	74
[Other State] S S t - Menu	75
[Diagnostics] d R u - Menu	76
[Identification] o i d - Menu	76

[Diag. data] ddt - Menu

Access

[Diagnostics] ➡ [Diag. data]

About This Menu

This menu presents the actual warning and detected error in addition to drive data.

[Last Warning] LALr

Last warning which occurred.

Setting	Code / Value	Description
[No Warning Stored]	noA	No warning stored
[Fallback speed]	FrF	Reaction on event / fallback speed
[Speed Maintained]	rLS	Reaction on event / maintain speed
[Type of Stop]	Stt	Reaction on event / stop on [Type of stop] Stt without tripping in error
[Ref Frequency Warning]	SrA	Frequency reference reached
[Life Cycle Warn 1]	LCA1	Life cycle warning 1
[Life Cycle Warn 2]	LCA2	Life cycle warning 2
[Dry Run Warning]	drYA	Dry run warning
[Low Flow Warning]	LFA	Low flow warning
[High Flow Warning]	HFPA	High flow warning
[InPress Warning]	iPPA	Inlet pressure monitoring warning
[Low OutPres Warning]	oPLA	Outlet pressure low warning
[High OutPres Warning]	oPHA	Outlet pressure high warning
[PumpCycle warning]	PCPA	Pumpcycle monitoring warning
[Anti-Jam Warning]	JAMA	Anti-Jam warning is raised
[Pump Low Flow]	PLFA	Pump low flow warning
[Low Pressure Warning]	LPA	Low-pressure warning is raised
[Flow Limit Activated]	FSA	Flow limit function activated (FL_Mode_On)
[PID Error Warning]	PEE	Warning on PID error
[PID Feedback Warning]	PFA	Warning on PID feedback
[PID High Fdbck Warning]	PFAH	PID feedback high threshold reached
[PID Low Fdbck Warning]	PFAL	PID feedback low threshold reached
[Regulation Warning]	PiSH	PI feedback monitoring warning is raised
[AI2 Th Warning]	tP2A	Temperature monitoring AI2 warning
[AI3 Th Warning]	tP3A	Temperature monitoring AI3 warning
[AI4 Th Warning]	tP4A	Temperature monitoring AI4 warning
[AI5 Th Warning]	tP5A	Temperature monitoring AI5 warning
[AI1 4-20 Loss Warning]	AP1	AI1 4-20 loss warning on AI1
[AI3 4-20 Loss Warning]	AP3	AI3 4-20 loss warning on AI3
[AI4 4-20 Loss Warning]	AP4	AI4 4-20 loss warning on AI4
[AI5 4-20 Loss Warning]	AP5	AI5 4-20 loss warning on AI5
[IGBT Thermal Warning]	tJA	Warning on IGBT thermal state
[Fan Counter Warning]	FCtA	Fan counter speed warning
[Fan Feedback Warning]	FFdA	Fan feedback warning is raised
[Ext. Error Warning]	EFA	External error warning
[Undervoltage Warning]	uSA	Undervoltage warning is raised
[Preventive UnderV Active]	uPA	Controlled stop on power loss threshold id reached
[Motor Freq High Thd]	FtA	Motor frequency high threshold 1 reached
[Motor Freq Low Thd]	FtAL	Motor frequency low threshold 1 reached

Setting	Code / Value	Description
[Motor Freq High Thd 2]	F9LA	Motor frequency high threshold 2 reached
[Motor Freq Low Thd 2]	F2AL	Motor frequency low threshold 2 reached
[High Speed Reached]	FLA	High speed reached function result
[Ref Freq High Thd Reached]	rtAH	Reference frequency high threshold reached
[Ref Freq High Thd Reached]	rtAL	Reference frequency low threshold reached
[2nd Freq Thd Reached]	F2A	Frequency level reached (frequency meter)
[Ethernet Internal Warning]	inWN	Ethernet internal warning
[Current Thd Reached]	CtA	Motor current high threshold reached
[Low I Thd Reached]	CtAL	Motor current low threshold reached
[Process Undld Warning]	uLA	Underload is detected
[Process Overload Warning]	oLA	Overload is detected
[Torque Limit Reached]	SSA	Timeout on current or torque limitation is reached
[Drv Therm Thd Reached]	tAd	Drive thermal threshold reached function result
[Motor Therm Thd Reached]	tSA	Motor 1 thermal threshold reached
[Power High Threshold]	PtHA	Power high threshold reached
[Power Low Threshold]	PtHL	Power low threshold reached
[Cust Warning 1]	CAS1	Customer warning 1 active
[Cust Warning 2]	CAS2	Customer warning 2 active
[Cust Warning 3]	CAS3	Customer warning 3 active
[Cust Warning 4]	CAS4	Customer warning 4 active
[Cust Warning 5]	CASS	Customer warning 5 active
[Auto Backup Not Plugged]	drAP	Automatic backup with Display Terminal not plugged
[Auto Backup Warning]	drtF	Automatic backup transfer warning
[AFE Mains Undervoltage]	urA	AFE Mains undervoltage
[MonitorCircuit A Warn]	iWA	Monitoring circuit A warning
[MonitorCircuit B Warn]	iWb	Monitoring circuit B warning
[MonitorCircuit C Warn]	iWC	Monitoring circuit C warning
[MonitorCircuit D Warn]	iWd	Monitoring circuit D warning
[CabinetCircuit A Warn]	CWA	Cabinet circuit A warning
[CabinetCircuit B Warn]	CWb	Cabinet circuit B warning
[CabinetCircuit C Warn]	CWC	Cabinet circuit C warning
[MotorWinding A Warn]	tWA	Motor winding A warning
[MotorWinding B Warn]	tWb	Motor winding B warning
[MotorBearing A Warn]	tWC	Motor bearing A warning
[MotorBearing B Warn]	tWd	Motor bearing B warning
[Circuit Breaker Warn]	CbW	Circuit breaker warning
[AFE Motor Limitation]	CLiM	AFE motor limitation
[AFE Regen Limitation]	CLiG	AFE regen limitation
[AFE Thermal State Warn]	tHSA	AFE thermal state warning
[AFE IGBT Thermal Warn]	tHJA	AFE IGBT thermal warning
[Cabinet Fan Fdbck Warn]	FFCA	Cabinet fan feedback warning
[Cabinet Fan Counter Warn]	FCCA	Cabinet fan counter warning
[Cabinet Overheat Warn]	CHA	Cabinet overheat warning
[CMI Jumper Warn]	CMiJ	CMI jumper warning
[AFE Fan Counter Warn]	FCbA	AFE fan counter warning
[AFE Fan Fdbck Warn]	FFbA	AFE fan feedback warning
[Power Cons Warning]	PoWd	Power consumption warning
[Switch OutPres Warning]	oPSA	Outlet pressure high switch warning
[Slipping Warn]	AnA	Slipping warning
[Load Mvt Warn]	bSA	Load movement warning

Setting	Code / Value	Description
[Brake Cont Warn]	bcA	Brake contact warning
[Encoder Thermal Warn]	tPEA	Encoder Thermal warning
[MultiPump Capacity Warn]	MPcA	Multi-Pump available capacity warning
[Lead Pump Warn]	MPLA	Lead Pump not available
[High Level Warning]	LchA	High level warning
[Low Level Warning]	LcLA	Low level warning
[Level Switch Warning]	LcWA	Level switch warning
[M/P Device Warn]	MPdA	Multipump device warning

[Last Error] LFt

Last error which occurred.

Setting	Code / Value	Description
[No Error]	noF	No error detected
[EEPROM Control]	EEF1	EEPROM control
[Incorrect Configuration]	CFF	Invalid configuration at power-on
[Invalid Configuration]	CF1	Incorrect parameter configuration
[Modbus Com Interruption]	SLF1	Modbus local serial communication error
[Internal Link Error]	ILF	Option internal link error
[Fieldbus Com Interrupt]	CnF	Communication interruption on fieldbus module
[External Error]	EPF1	External error from LI or local link
[Overcurrent]	oCF	Over current error
[Precharge Capacitor]	CrF	Load relay error
[AI2 4-20 mA Loss]	LFF2	AI2 4-20 mA Loss
[Drive Overheating]	oHF	Drive over heating error
[Motor Overload]	oLF	Motor overload error
[DC Bus Overvoltage]	obF	DC bus overvoltage
[Supply Mains Overvoltage]	oSF	Over supply error
[Single Output Phase Loss]	oPF1	Motor 1-phase loss
[Input Phase Loss]	PHF	Main input 1-phase loss
[Supply Mains UnderV]	uSF	Under voltage error
[Motor Short Circuit]	SCF1	Motor short circuit error (hardware detection)
[Motor Overspeed]	SoF	Instability or driving load too high
[Autotuning Error]	tnF	Tune error
[Internal Error 1]	InF1	Unknown drive rating
[Internal Error 2]	InF2	Unknown or incompatible power board
[Internal Error 3]	InF3	Internal communication error
[Internal Error 4]	InF4	Internal data inconsistent
[EEprom Power]	EEF2	Internal memory error
[Ground Short Circuit]	SCF3	Direct ground short-circuit error (hardware detection)
[Output Phase Loss]	oPF2	Motor 3-phases loss
[CANopen Com Interrupt]	CoF	CANopen communication error
[Internal Error 7]	InF7	CPLD communication error
[Fieldbus Error]	EPF2	External error from fieldbus module
[Internal Error 8]	InF8	Power switching supply error
[PC Com Interruption]	SLF2	PC software communication interruption
[HMI Com Interruption]	SLF3	Graphic Display Terminal communication error
[Internal Error 9]	InF9	Current measurement circuit failure
[Internal Error 10]	InFA	Customer supply error
[Internal Error 11]	InFb	Thermal sensor error (OC or SC)

Setting	Code / Value	Description
[IGBT Overheating]	tJF	IGBT over heating error
[IGBT Short Circuit]	SCF4	IGBT short-circuit error (hardware detection)
[Motor Short Circuit]	SCF5	Load short-circuit error during IGON test sequence (hardware detection)
[Internal Error 12]	inFc	Internal error 12 (internal current supply)
[Input Contactor]	LCF	Line contactor failure
[Internal Error 6]	inF6	Unknown or incompatible option module
[Internal Error 14]	inFE	CPU error (ram, flash, task ...)
[AI3 4-20 mA Loss]	LFF3	AI3 4-20 mA loss
[AI4 4-20 mA Loss]	LFF4	AI4 4-20 mA loss
[Boards Compatibility]	HCF	Hardware configuration error
[Conf Transfer Error]	CF i2	Configuration transfer error
[AI5 4-20 mA Loss]	LFF5	AI5 4-20 mA loss
[Channel Switch Error]	CSF	Channel switching error
[Process Underload]	uLF	Torque underload error
[Process Overload]	oLC	Torque overload error
[Angle Error]	ASF	Angle Setting error
[Safety Function Error]	SAFF	Safety function error
[AI1 4-20 mA loss]	LFF1	AI1 4-20 mA loss
[AI3 Th Detected Error]	tH3F	AI3 thermal sensor detected error
[AI3 Thermal Sensor Error]	t3CF	Thermal sensor error on AI3
[PumpCycle Start Error]	PCPF	Pumpcycle detected error
[Out Pressure Low]	oPLF	Outlet pressure low
[High Flow Error]	HFPF	High flow error
[Inlet Pressure Error]	iPPF	Inlet pressure detected error
[Pump Low Flow Error]	PLFF	Pump low flow detected error
[AI4 Th Detected Error]	tH4F	AI4 thermal sensor detected error
[AI4 Thermal Sensor Error]	t4CF	Thermal sensor error on AI4
[AI5 Th Detected Error]	tH5F	AI5 thermal sensor detected error
[AI5 Thermal Sensor Error]	t5CF	Thermal sensor error on AI5
[Anti Jam Error]	JAMF	Anti-Jam detected error
[Out Pressure High]	oPHF	Outlet pressure high
[Dry Run Error]	dry4F	Dry run detected error
[PID FeedBack Error]	PFMF	PID feedBack detected error
[Program Loading Error]	PGLF	Program loading detected error
[Program Running Error]	PGrF	Program running detected error
[Lead Pump Error]	MPLF	The selected lead pump is not available
[Low Level Error]	LCLF	The minimum level switch is active during emptying process
[High Level Error]	LCHF	The maximum level switch is active during filling process
[Internal Error 16]	inFG	Internal error 16
[Internal Error 17]	inFH	Internal error 17
[Internal Error 0]	inF0	Internal error 0 (IPC)
[Internal Error 13]	inFd	Internal error 13 (different current)
[Motor Stall Error]	StF	Motor stall detected error
[Internal Error 21]	inFL	Internal error 21 (RTC)
[Embd Eth Com Interrupt]	EtHF	Embedded Ethernet communication interruption
[Internal Error 15]	inFF	Internal error 15 (flash)
[Firmware Update Error]	FWEr	Firmware Update Error
[Internal Error 22]	inFM	Internal error 22 (embedded Ethernet)

Setting	Code / Value	Description
[Internal Error 25]	inFP	Internal error 25
[Internal Error 20]	inFK	Internal error 20
[Internal Error 19]	inFJ	Internal error 19 (encoder module)
[Internal Error 27]	inFr	Internal error 27
[Pre-settings Transfer Error]	cFi3	Pre-settings Transfer Error
[Multidrive Link Error]	MdLF	Multidrive link error
[FDR 1 Error]	Fdr1	Embedded Ethernet FDR error
[FDR 2 Error]	Fdr2	Ethernet option FDR error
[Internal Error 17]	inFn	Internal Error 17 (Module link)
[Internal Error 28]	inF5	Internal Error 28 (AFE)
[Internal Error 29]	inFb	Internal Error 29 (Inverter)
[Internal Error 30]	inFu	Internal Error 30 (Rectifier)
[Internal Error 31]	inFu	Internal Error 31 (Missing brick)
[AFE ShortCircuit error]	SCF6	AFE ShortCircuit error
[AFE Bus unbalancing]	obF2	AFE Bus unbalancing
[MonitorCircuit A Error]	iFA	Monitoring circuit A error
[MonitorCircuit B Error]	iFb	Monitoring circuit B error
[MonitorCircuit C Error]	iFC	Monitoring circuit C error
[MonitorCircuit D Error]	iFd	Monitoring circuit D error
[CabinetCircuit A Error]	CFA	Cabinet circuit A error
[CabinetCircuit B Error]	CFb	Cabinet circuit B error
[CabinetCircuit C Error]	CFC	Cabinet circuit C error
[MotorWinding A Error]	tFA	Motor winding A error
[MotorWinding B Error]	tFb	Motor winding B error overheating
[AFE Modulation Rate Error]	ACF1	AFE modulation rate error
[AFE Current Control Error]	ACF2	AFE current control error
[Mains Freq Out Of Range]	MFF	Mains frequency out of range
[M/P Device Error]	MPdF	Multipump device error

[Nb Of Start] nSM

Number of motor starts (resettable).

Setting	Description
0...4,294,967,295	Setting range **Factory setting**: 0

[Motor Run Time] rtH

Motor run time.

Run elapsed time display (resettable) in seconds (length of time the motor has been switched on).

Setting	Description
0...4,294,967,295 s	Setting range **Factory setting**: _

[Service message] SEr - Menu

Access

[Diagnostics] ➡ [Diag. data] ➡ [Service message]

About This Menu

This menu presents the service messages.

This is a user-defined service message configured in **[My preferences]** MYP **➡ [Customization]** CuS **➡ [Service messages]** SEr.

[Other State] SSt - Menu

Access

[Diagnostics] ➡ [Diag. data] ➡ [Other State]

About This Menu

List of secondary states.

List

[Anti-Jam pending] JAMP

[Anti-Jam In Progress] JAMr

[PipeFill In Progress] F iLL

[InPres Comp Active] iPPC

[Sleep Active] SLM

[Priming pump running] PPon

[Jockey pump running] JPon

[Sleep Boost active] SLPb

[Sleep Checking activated] ASLC

[Set 1 active] CFP 1

[Set 2 active] CFP2

[Set 3 active] CFP3

[PID Active] Aut o

[DC Bus Charged] dbL

[Fast stop Active] FSt

[Fallback Frequency] FrF

[Speed Maintained] rLS

[Type of stop] Stt

[Frequency ref. att.] SrA

[Forward] MFrd

[Reverse] Mrr S

[Autotuning] tun

[Diagnostics] dAu - Menu

Access

[Diagnostics] ➡ [Diag. data] ➡ [Diagnostics]

About This Menu

This menu allows to make simple test sequences for diagnostics.

[FAN Diagnostics] Fnt

Diagnostics of internal fan(s).

This will start a test sequence.

[HMI LED Diagnostics] HLt

Diagnostics of product LED(s).

This will start a test sequence.

[IGBT Diag w motor] iWt

Diagnostics of product IGBT(s).

This will start a test sequence with the connected motor (open circuit/short-circuit).

[IGBT Diag w/o motor] iWot

Diagnostics of product IGBT(s).

This will start a test sequence without the motor (short-circuit).

[Identification] oid - Menu

Access

[Diagnostics] ➡ [Diag. data] ➡ [Identification]

About This Menu

This is a read-only menu that cannot be configured. It enables the following information to be displayed:

- Drive reference, power rating, and voltage
- Drive software version
- Drive serial number
- Type of option modules present, with their software version
- Graphic Display Terminal type and version

Section 5.2
[Error history] PFH - Menu

[Error history] PFH - Menu

Access

[Diagnostics] ➡ **[Error history]**

About This Menu

This menu shows the 15 last detected errors (dP1 to dPF).

Pressing OK key on the selected error code in the Error history list displays the drive data recorded when the error has been detected.

NOTE: Same content for **[Last Error 1]** dP1 to **[Last Error F]** dPF.

[Last Error 1] dP1

Last error 1.

Identical to **[Last Error]** LFt *(see page 71)*.

[Drive State] HS1

HMI status.

Identical to **[Drive State]** HMIS *(see page 56)*.

[Last Error 1 Status] EP1

Status of last error 1.

DRIVECOM status register (same as **[ETA state word]** ETA).

[ETI state word] IP1

ETI state word.

ETI status register (see the communication parameter file).

[Cmd word] CMP1

Cmd word.

Command register (same as **[Cmd word]** CMd).

[Motor current] LCP1

Motor current (same as **[Motor Current]** LCr).

Setting	Description
0...2*In	Setting range **Factory setting**: _

[Output frequency] rFP1

Output frequency (same as **[Output frequency]** rFr).

Setting	Description
-3,276.7...3,276.7 Hz	Setting range **Factory setting**: _

[Elapsed Time] rtPI

Elapsed time.

Setting	Description
0...65,535 h	Setting range **Factory setting**: _

[DC bus voltage] uLPI

DC bus voltage (same as **[DC bus voltage]** uLPI).

Setting	Description
0...921 Vdc	Setting range: **[No meas.]** ---- is displayed if no value is measured. **Factory setting**: _

[Motor therm state] tHPI

Motor thermal state (same as **[Motor Therm state]** tHr).

Setting	Description
0...200%	Setting range **Factory setting**: _

[Command Channel] dCCI

Command channel (same as **[Command channel]** CMdC).

Setting	Code / Value	Description
[Terminals]	tErM	Terminal block
[HMI]	HMI	Graphic Display Terminal
[Modbus]	Mdb	Modbus serial
[CANopen]	CAn	CANopen
[Com. Module]	nEt	Fieldbus module
[Ethernet Module]	EtH	Embedded Ethernet
[PC TOOL]	PWS	DTM based commissioning software

[Ref Freq Channel] drCI

Channel for reference frequency (same as **[Ref Freq Channel]** rFCC).

Identical to **[Command channel]** dCCI *(see page 78)*.

[Motor Torque] otPI

Estimated motor torque value (same as **[Motor Torque]** otr).

NOTE: The displayed value is always positive in motor mode and negative in generator mode whatever the direction.

Setting	Description
-300...300%	Setting range **Factory setting**: _

[Drive Thermal State] tdPI

Measured drive thermal state (same as **[Drive Therm State]** tHd).

Setting	Description
0...200%	Setting range **Factory setting**: _

[IGBT Junction Temp] tJPI

Estimated junction temperature value.

Setting	Description
0...255°C	Setting range **Factory setting**: _

[Switching Frequency] SFPI

Switching frequency applied (related to **[Switching Frequency]** SFr).

Setting	Description
0...65,535 Hz	Setting range **Factory setting**: _

[Last Error 2] dP2 to [Last Error F] dPF

Last error 2... Last error F

Identical to **[Last Error1]** dP1 *(see page 77)*.

[Power Brick Error ID] bP1I

Power Brick error ID

The value displayed is the bit number of the brick with actual error, starting with number 1 on the right side.

Setting	Description
0...255	Setting range **Factory setting**: _

[AFE Power brick error ID] bF1I

Active Front End brick error ID

The value displayed is the bit number of the brick with actual error, starting with number 1 on the right side.

Setting	Description
0...65535	Setting range **Factory setting**: _

Section 5.3
[Warnings] AL r - Menu

What Is in This Section?

This section contains the following topics:

Topic	Page
[Actual warnings] AL rd - Menu	81
[Warning group 1 definition] A 1C - Menu	81
[Warning group 2 definition] A2C - Menu	81
[Warning group 3 definition] A3C - Menu	82
[Warning group 4 definition] A4C - Menu	82
[Warning group 5 definition] A5C - Menu	82
[Warnings] AL r - Menu	82

[Actual warnings] AL r d - Menu

Access

[Diagnostics] ➡ [Warnings] ➡ [Actual warnings]

About This Menu

List of current warnings.

If a warning is active, ✓ and ❗ appears on the Graphic Display Terminal.

List of Available Warnings

Identical to **[Last warning]** *L AL r* *(see page 69)*.

[Warning group 1 definition] A 1C - Menu

Access

[Diagnostics] ➡ [Warnings] ➡ [Warning group 1 definition]

About This Menu

The following submenus group the warnings into 1 to 5 groups, each of which can be assigned to a relay or a digital output for remote signaling.

When one or a number of warnings selected in a group occurs, this warning group is activated.

List of Warnings

Identical to **[Last warning]** *L AL r* *(see page 69)*.

[Warning group 2 definition] A2C - Menu

Access

[Diagnostics] ➡ [Warnings] ➡ [Warning group 2 definition]

About This Menu

Identical to **[Warning group 1 definition]** *A 1C* *(see page 81)*

[Warning group 3 definition] A 3 C - Menu

Access

[Diagnostics] ➞ [Warnings] ➞ [Warning group 3 definition]

About This Menu

Identical to **[Warning group 1 definition]** A 1 C *(see page 81)*

[Warning group 4 definition] A 4 C - Menu

Access

[Diagnostics] ➞ [Warnings] ➞ [Warning group 4 definition]

About This Menu

Identical to **[Warning group 1 definition]** A 1 C *(see page 81)*

[Warning group 5 definition] A 5 C - Menu

Access

[Diagnostics] ➞ [Warnings] ➞ [Warning group 5 definition]

About This Menu

Identical to **[Warning group 1 definition]** A 1 C *(see page 81)*

[Warnings] A L r - Menu

Access

[Diagnostics] ➞ [Warnings]

About This Menu

This menu presents the warning history (30 past warnings).

[Warning History] A L H

Identical to **[Last warning]** L A L r *(see page 69)*.

Chapter 6
[Display] Mon -

Introduction

[Display] *Mon* **-** menu shows monitoring data related to the drive and the application.

It offers an application-oriented display in terms of energy, cost, cycle, efficiency, ...

This is available with customized units and graphics view.

What Is in This Chapter?

This chapter contains the following sections:

Section	Topic	Page
6.1	**[Energy parameters]**	84
6.2	**[Application parameters]**	91
6.3	**[Pump parameters]**	95
6.4	**[Motor parameters]**	105
6.5	**[Drive parameters]**	107
6.6	**[Thermal monitoring]**	110
6.7	**[PID display]**	111
6.8	**[Counter management]**	112
6.9	**[Other state]**	115
6.10	**[I/O map]**	116
6.11	**[Communication map]**	135
6.12	**[Data logging]**	159

Section 6.1
[Energy parameters]

What Is in This Section?

This section contains the following topics:

Topic	Page
[Elec Ener Input Counter] *E L ı -* Menu	85
[Elec Ener Output Counter] *E L o -* Menu	87
[Mechanical energy] *П E C -* Menu	89
[Energy saving] *E S A -* Menu	90

[Elec Ener Input Counter] E L I - Menu

Access

[Display] ➡ [Energy parameters] ➡ [Elec Ener Input Counter]

About This Menu

This menu presents the input electrical energy data.

NOTE: On Altivar Process range, except for ATV680 products, the power and energy parameters are estimated based on the output current of the drive. For ATV680 products, the power and energy parameters are measured.

[Active Input Power] I P r W

Active electrical input power.

Setting	Description
According to the drive rating	Setting range in kW if **[Motor Standard]** b F r is set to **[50Hz IEC]** 5 0 or in HP if **[Motor Standard]** b F r is set to **[60Hz NEMA]** 6 0 **Factory setting**: _

[Input Reactive Power] I 9 r W

Reactive electrical input power.

This parameter can be accessed on ATV680

Setting	Description
According to the drive rating	Setting range in kW if **[Motor Standard]** b F r is set to **[50Hz IEC]** 5 0 or in HP if **[Motor Standard]** b F r is set to **[60Hz NEMA]** 6 0 **Factory setting**: _

[Input Power Factor] P W F

Mains input power factor.

This parameter can be accessed on ATV680

Setting	Description
According to the drive rating	Setting range displayed as a percentage **Factory setting**: _

[Real Input Energy(TWh)] I E 4 ★

Input electrical power consumed (TWh).

This parameter can be accessed if **[Real Input Energy(TWh)]** I E 4 is not set to 0.

Setting	Description
-999...999 TWh	Setting range **Factory setting**: _

[Real Input Energy(GWh)] I E 3 ★

Input electrical power consumed (GWh).

Setting	Description
-999...999 GWh	Setting range **Factory setting**: _

[Real Input Energy(MWh)] ,E2★

Input electrical power consumed (MWh).

Setting	Description
-999...999 MWh	Setting range **Factory setting**: _

[Real Input Energy(kWh)] ,E1★

Input electrical power consumed (kWh).

Setting	Description
-999...999 kWh	Setting range **Factory setting**: _

[Real Input Energy(Wh)] ,E0★

Input electrical power consumed (Wh).

Setting	Description
-999...999 Wh	Setting range **Factory setting**: _

[Elec Ener Output Counter] E L o - Menu

Access

[Display] ➡ [Energy parameters] ➡ [Elec Ener Output Counter]

About This Menu

This menu presents the output electrical energy data.

[Acv Elc out pwr estm] E P r W

Active electrical output power estimation.

Setting	Description
According to the drive rating	Setting range in kW if **[Motor Standard]** b F r is set to **[50Hz IEC]** 5 0 or in HP if **[Motor Standard]** b F r is set to **[60Hz NEMA]** 6 0 **Factory setting**: _

[Real Consumption(TWh)] o E 4 ★

Electrical energy consumed (TWh).

This parameter can be accessed if **[Real Consumption(TWh)]** o E 4 is not set to 0.

Setting	Description
-999...999 TWh	Setting range **Factory setting**: _

[Real Consumption(GWh)] o E 3

Electrical energy consumed (GWh).

Setting	Description
-999...999 GWh	Setting range **Factory setting**: _

[Real Consumption(MWh)] o E 2

Electrical energy consumed (MWh).

Setting	Description
-999...999 MWh	Setting range **Factory setting**: _

[Real Consumption(kWh)] o E 1

Electrical energy consumed (kWh).

Setting	Description
-999...999 kWh	Setting range **Factory setting**: _

[Real Consumption(Wh)] o E 0

Electrical energy consumed (Wh).

Setting	Description
-999...999 Wh	Setting range **Factory setting**: _

[Elc Egy Today] oCt

Electrical energy consumed today by the motor (kWh).

Setting	Description
0...4,294,967,295 kWh	Setting range **Factory setting**: _

[Elc Egy Yesterday] oCY

Electrical energy consumed yesterday by the motor (kWh).

Setting	Description
0...4,294,967,295 kWh	Setting range **Factory setting**: _

[Over-Consumption Thd] PCAH

Power level for over-consumption.

Setting	Description
[Under-Consumption Thd] PCAL ...200.0%	Setting range **Factory setting**: 0.0%

[Under-Consumption Thd] PCAL

Power level for under-consumption.

Maximum value = PCAH if PCAH ≤ 100%.

Setting	Description
0.0...100.0% or **[Over-Consumption Thd]** PCAH if PCAH ≤ 100%	Setting range **Factory setting**: 0.0%

[Over/Under-Cons Delay] PCAt

Over/under-consumption detection time.

Setting	Description
0...60 min	Setting range **Factory setting**: 1 min

[Peak Output Power] MoEP

Peak output power.

Setting	Description
According to the drive rating	Setting range **Factory setting**: _

[Mechanical energy] ΠEC - Menu

Access

[Display] ➡ [Energy parameters] ➡ [Mechanical energy]

About This Menu

This menu presents the output mechanical energy data.

[Power Estim Value] oPrW

Motor shaft power estimation.

Setting	Description
According to the drive rating	Setting range in kW if **[Motor Standard]** bFr is set to **[50Hz IEC]** 50 or in HP if **[Motor Standard]** bFr is set to **[60Hz NEMA]** 60 **Factory setting**: _

[Motor Consumption(TWh)] ΠEH ★

Energy consumption (TWh).

This parameter can be accessed if **[Motor Consumption(TWh)]** ΠEH is not set to 0.

Setting	Description
0...999 TWh	Setting range **Factory setting**: _

[Motor Consumption(GWh)] ΠE3 ★

Energy consumption (GWh).

Setting	Description
0...999 GWh	Setting range **Factory setting**: _

[Motor Consumption(MWh)] ΠE2 ★

Energy consumption (MWh).

Setting	Description
0...999 MWh	Setting range **Factory setting**: _

[Motor Consumption(kWh)] ΠE 1 ★

Energy consumption (kWh).

Setting	Description
0...999 kWh	Setting range **Factory setting**: _

[Motor Consumption (Wh)] ΠE0 ★

Energy consumption (Wh).

Setting	Description
0...999 Wh	Setting range **Factory setting**: _

[Energy saving] E S A - Menu

Access

[Display] ➡ [Energy parameters] ➡ [Energy saving]

About This Menu

This menu presents the comparison in term of cost, energy, CO^2 between solutions with and without drive.

[Reference Power] P r E F

Reference Power without drive

Setting	Description
0.00...655.35 kW	Setting range in kW if **[Motor Standard]** b F r is set to **[50Hz IEC]** 5 0 or in HP if **[Motor Standard]** b F r is set to **[60Hz NEMA]** 6 0. **Factory setting**: 0.00 kW

[kWh Cost] E C S t

Cost of the kWh.

Setting	Description
0.00...655.35 $	Setting range in € if **[Motor Standard]** b F r is set to [50 Hz IEC] (50) or in $ if **[Motor Standard]** b F r is set to **[60Hz NEMA]** 6 0. **Factory setting**: _

[CO2 Ratio] E C o 2

Quantity of CO^2 by kWh.

Setting	Description
0.000...65.535 kg/kWh	Setting range **Factory setting**: 0.000 kg/kWh

[Energy Saved] E S A V

Energy saved with the drive solution.

Setting	Description
0...4,294,967,295 kWh	Setting range **Factory setting**: _

[Money Saved] C A S H

Cost saved with the drive solution.

Setting	Description
0.00...42,949,672 $	Setting range in € if **[Motor Standard]** b F r is set to **[50 Hz IEC]** 5 0 or in $ if **[Motor Standard]** b F r is set to **[60 Hz NEMA]** 6 0. **Factory setting**: _

[Co2 Saved] C o 2 S

CO^2 saved with the drive solution.

Setting	Description
0.0...429,496,729.5 t	Setting range **Factory setting**: _

Section 6.2
[Application parameters]

[Application parameters] APr - Menu

Access

[Display] ➞ [Application parameters]

About This Menu

This menu displays information related to the application.

[System App State] APSS

System application state

This parameter indicates the installation application state

This parameter can be accessed if **[Pump System Archi]** MPSA is set to **[Multi Drives]** nVSd or **[Multi Masters]** nVSdr

Setting	Code / Value	Description
[Running]	run	No application function in progress; the drive is running
[Stop]	StoP	No application function in progress; the drive is not running
[Manual Mode Active]	MAnu	Motor running; manual PID mode is active
[PID Active]	Auto	Motor running; auto PID mode is active
[Flow Limit In Progress]	FL_iM	The flow limitation is in progress
[PipeFill In Progress]	F_iLL	The pipe fill is in progress
[Jockey Pump Active]	JoCKEY	The jockey pump is active
[Boost In progress]	booSt	The boost is in progress
[Sleep Active]	SLEEP	The sleep is active
[Priming Pump Active]	Pr_iM	The priming pump is active
[InletPres Comp In Progress]	CoMP	The inlet pressure compensation is in progress

[Application State] APPS

Application state.

This parameter indicates the drive application state.

Setting	Code / Value	Description
[Running]	run	No application function in progress; the drive is running
[Stop]	StoP	No application function in progress; the drive is not running
[Local Mode Active]	LoCAL	Forced local mode activated
[Channel 2 Active]	oVEr	Override speed control mode activated
[Manual Mode Active]	MAnu	Motor running; manual PID mode is active
[PID Active]	Auto	Motor running; auto PID mode is active
[Antijam In Progress]	AJAM	The Anti-jam is in progress
[Flow Limit In Progress]	FL_iM	The flow limitation is in progress
[PipeFill In Progress]	F_iLL	The pipe fill is in progress
[Jockey Pump Active]	JoCKEY	The jockey pump is active
[Boost In progress]	booSt	The boost is in progress
[Sleep Active]	SLEEP	The sleep is active
[Priming Pump Active]	Pr_iM	The priming pump is active
[InletPres Comp In Progress]	CoMP	The inlet pressure compensation is in progress

[Booster Status] bCS ★

Booster status.

This parameter can be accessed if **[Application Selection]** APPt is set to **[Pump Booster Control]** booSt.

Setting	Code / Value	Description
[None]	nonE	Not configured
[Inactive]	nAct	Inactive
[Running]	run	Running
[Stage Pending]	StGP	Stage pending
[Destage Pending]	dStGP	Destage pending
[Staging]	StG	Staging
[Destaging]	dStG	Destage in progress

[LevelCtrl Status] LCS ★

Level control status.

This parameter can be accessed if **[Application Selection]** APPt is set to **[Pump Level Control]** LEVEL.

Setting	Code / Value	Description
[None]	nonE	Not configured
[Inactive]	nAct	Inactive
[Filling]	FILL	Filling in progress
[Emptying]	EMPtY	Emptying in progress
[Low Level]	LoW_LEVEL	Low level
[High Level]	hIGh_LEVEL	High level

[Tank Level] LCtL ★

Tank level.

This parameter can be accessed if **[Application Selection]** APPt is set to **[Pump Level Control]** LEVEL.

Setting	Description
0.0...100.0%	Setting range **Factory setting: –**

[Level Sensor Value] LCSV ★

Level sensor value.

This parameter can be accessed if **[Level Sensor Assign]** LcSA is not set to **[Not configured]** no.

Setting	Description
-327.67...327.67	Setting range **Factory setting: –**

[PID Reference] rPC ★

PID reference.

This parameter can be accessed if **[PID Feedback]** PIF is not set to **[Not Configured]** no.

Setting	Description
0...65,535%	Setting range **Factory setting: –**

[PID feedback] rPF ★

PID feedback.

This parameter can be accessed if **[PID Feedback]** PIF is not set to **[Not Configured]** nO.

Setting	Description
0...65,535%	Setting range **Factory setting: –**

[Installation Flow] FSIV

Flow rate sensor value.

This parameter can be accessed if **[Inst. Flow Assign.]** FSIA is not set to **[Not Configured]** nO.

Setting	Description
-32,767...32,767	Setting range according to **[Flow rate unit]** SUFr **Factory setting: –**

[Inlet Press. Value] PSIV

Inlet pressure value.

This parameter can be accessed if **[InletPres Assign]** PSIA is not set to **[Not Configured]** nO.

Setting	Description
-32,767...32,767	Setting range according to **[P sensor unit]** SUPr **Factory setting: –**

[Outlet Pressure] PS2V

Outlet pressure value.

This parameter can be accessed if **[OutletPres Assign]** PS2A is not set to **[Not Configured]** nO.

Setting	Description
-32,767...32,767	Setting range according to **[P sensor unit]** SUPr **Factory setting: –**

[Total Quantity] FSIC

Total quantity.

This parameter can be accessed if **[Inst. Flow Assign.]** FSIA is not set to **[Not Configured]** nO.

Setting	Description
-2,147,483,647...2,147,483,647	Setting range according to **[Flow rate unit]** SUFr **Factory setting: –**

[Highest Flow] FSIK

Highest flow.

This parameter can be accessed if **[Inst. Flow Assign.]** FSIA is not set to **[Not Configured]** nO.

Setting	Description
-32,767...32,767	Setting range according to **[Flow rate unit]** SUFr **Factory setting: –**

[Lowest Flow] F S I J

Lowest flow.

This parameter can be accessed if **[Inst. Flow Assign.]** F S I A is not set to **[Not Configured]** n o.

Setting	Description
-32,767...32,767	Setting range according to **[Flow rate unit]** S u F r **Factory setting: –**

Section 6.3
[Pump parameters]

What Is in This Section?

This section contains the following topics:

Topic	Page
[Variable speed pump] *ΠPP* - Menu	96
[Multipump system] *ΠPS* - Menu	99
[Installation] *ΠPV S* - Menu	104

[Variable speed pump] PPP - Menu

Access

[Display] ➡ [Pump parameters] ➡ [Variable speed pump]

About This Menu

This menu shows the pump-related parameters.

[Motor Run Time] rtH

Motor run time.

Run elapsed time display (resettable) in seconds (length of time the motor has been switched on).

Setting	Description
0...4,294,967,295 s	Setting range **Factory setting**: _

[Motor Mechanical speed] SPdM

Motor mechanical speed.

Setting	Description
0...65,535 rpm	Setting range **Factory setting**: _

[Nb Of Start] nSM

Number of motor starts (resettable).

Setting	Description
0...4,294,967,295	Setting range **Factory setting**: _

[Acv Elc out pwr estm] EPrW

Active electrical output power estimation.

Setting	Description
-327.67...327.67 kW	Setting range in kW if **[Motor Standard]** bFr is set to **[50 Hz IEC]** 50 or in HP if **[Motor Standard]** bFr is set to **[60 Hz NEMA]** 60 **Factory setting**: _

[Pump Flow] FS2V ★

Pump flow value.

This parameter can be accessed if **[Pump Flow Assign.]** FS2A is not set to **[Not Configured]** no.

Setting	Description
-32,767...32,767	Setting range according to **[Flow rate unit]** SuFr. **Factory setting: –**

[Flow Estimated] SLFV ★

Estimated flow value.

This parameter can be accessed if **[Flow Estimation Mode]** FEM is set to **[No]** no.

Setting	Description
-32,767...32,767	Setting range according to **[Flow rate unit]** SuFr **Factory setting: –**

[Inlet Press. Value] P S I V ★

Inlet pressure value.

This parameter can be accessed if **[InletPres Assign]** P S I A is not set to **[Not Configured]** n o.

Setting	Description
-32,767...32,767	Setting range according to **[P sensor unit]** S u P r **Factory setting: –**

[Est. Pump Head] S L H V ★

Estimated Pump head value

This parameter can be accessed if **[OutletPres Assign]** P S 2 A is not set to **[Not Configured]** n o.

Setting	Description
-32,767...32,767	Setting range according to **[P sensor unit]** S u P r **Factory setting: –**

[Est. Pump dP] S L d P ★

Estimated Pump delta pressure value

This parameter can be accessed if **[OutletPres Assign]** P S 2 A is not set to **[Not Configured]** n o.

Setting	Description
-32,767...32,767	Setting range according to **[P sensor unit]** S u P r **Factory setting: –**

[Outlet Pressure] P S 2 V ★

Outlet pressure.

This parameter can be accessed if **[OutletPres Assign]** P S 2 A is not set to **[Not Configured]** n o.

Setting	Description
-32,767...32,767	Setting range according to **[P sensor unit]** S u P r **Factory setting: –**

[Efficiency] E F Y

The efficiency is based on mechanical power.

Setting	Description
0.0...100.0 %	Setting range **Factory setting**: _

[Energy Cons. Ind.] E C I

Energy consumption indication is based on the consumption of the electrical power

Setting	Description
-32,767...32,767	Setting range **Factory setting: –**

[Energy Perf. Ind] E P I

Energy performance indicator is based on the electrical power

Setting	Description
-32,767...32,767	Setting range **Factory setting: –**

[Highest Eff.] *E F Y K*

Highest efficiency.

Setting	Description
0.0...100.0 %	Setting range **Factory setting**: _

[Lowest Eff.] *E F Y J*

Lowest efficiency.

Setting	Description
0.0...100.0 %	Setting range **Factory setting**: _

[Multipump system] MPS - Menu

Access

[Display] ➡ [Pump parameters] ➡ [Multipump system]

About This Menu

This menu can be accessed if **[Pump System Archit]** MPSA is not set to **[No]** no.

[MultiPump State] MPS

Multipump function state.

Setting	Code / Value	Description
[None]	nonE	None
[Ready]	rEAdY	Ready
[Running]	run	Running
[Warning]	ALArn	Warning
[Error]	FAuLt	Error
[Not Available]	nAVL	Not available

[Active Master ID] MM id

Active master ID.

This parameter can be accessed if **[Pump System Archi]** MPSA is set to **[Multi Masters]** nVSdr.

Setting	Code / Value	Description
[None]	nonE	No pump active.
[Pump 1]	P01	Pump 1.
[Pump 2]	P02	Pump 2.
[Pump 3]	P03	Pump 3.
[Pump 4]	P04	Pump 4.
[Pump 5]	P05	Pump 5.
[Pump 6]	P06	Pump 6.

[Available Pumps] MPAn

Number of available pumps.

Setting	Description
0...65,535	Setting range **Factory setting: –**

[Nb of Staged Pumps] MPSn

Number of staged pumps.

Setting	Description
0...65,535	Setting range **Factory setting: –**

[Lead Pump] PL id

Lead pump.

Setting	Code / Value	Description
[None]	nonE	None
[Pump 1]	P01	Pump number 1
[Pump 2]	P02	Pump number 2
[Pump 3]	P03	Pump number 3
[Pump 4]	P04	Pump number 4
[Pump 5]	P05	Pump number 5
[Pump 6]	P06	Pump number 6

[Next Staged Pump] Pnt S

Next pump to stage.

Identical to **[Lead Pump]** PL id *(see page 100)*.

[Next Destaged Pump] Pnt d

Next pump to destage.

Identical to **[Lead Pump]** PL id *(see page 100)*.

[Pump 1 State] P1S ★

Pump 1 state.

This parameter can be accessed if **[Nb Of Pumps]** nPPn or **[Nb of Devices]** nPGn is set to 1 or higher.

Setting	Code / Value	Description
[None]	nonE	Not configured
[Not Available]	nAuL	Unavailable
[Ready]	rdY	Ready
[Running]	run	Running

[Pump 1 Type] P1t ★

Pump 1 type.

This parameter can be accessed if **[Nb Of Pumps]** nPPn or **[Nb of Devices]** nPGn is set to 1 or higher.

Setting	Code / Value	Description
[None]	nonE	Undefined
[Lead]	LEAd	Lead pump
[Lead or Auxiliary]	LAF	Lead or auxiliary fixed speed pump
[Lead or Auxiliary Variable]	LAV	Lead or auxiliary variable speed pump
[Auxiliary]	AuXF	Auxiliary fixed speed pump
[Auxiliary Variable]	AuXV	Auxiliary variable speed pump
[Error]	Err	Error

[Pump 1 Runtime] P1ot ★

Pump 1 running time.

This parameter can be accessed if **[Nb Of Pumps]** nPPn or **[Nb of Devices]** nPGn is set to 1 or higher.

Setting	Description
0...4,294,967,295 s	Setting range **Factory setting: –**

[Pump 1 Nb Starts] P 1 n 5 ★

Pump 1 number of starts.

This parameter can be accessed if **[Nb Of Pumps]** n P P n or **[Nb of Devices]** n P G n is set to 1 or higher.

Setting	Description
0...4,294,967,295 s	Setting range **Factory setting: –**

[Pump 2 State] P 2 S ★

Pump 2 state.

This parameter can be accessed if **[Nb Of Pumps]** n P P n or **[Nb of Devices]** n P G n is set to 2 or higher.

Identical to **[Pump 1 State]** P 1 S *(see page 100)*.

[Pump 2 Type] P 2 t ★

Pump 2 type.

This parameter can be accessed if **[Nb Of Pumps]** n P P n or **[Nb of Devices]** n P G n is set to 2 or higher.

Identical to **[Pump 1 Type]** P 1 t *(see page 100)*.

[Pump 2 Runtime] P 2 o t ★

Pump 2 running time.

This parameter can be accessed if **[Nb Of Pumps]** n P P n or **[Nb of Devices]** n P G n is set to 2 or higher.

Identical to **[Pump 1 Runtime]** P 1 o t *(see page 100)*.

[Pump 2 Nb Starts] P 2 n 5 ★

Pump 2 number of starts.

This parameter can be accessed if **[Nb Of Pumps]** n P P n or **[Nb of Devices]** n P G n is set to 2 or higher.

Identical to **[Pump 1 Nb Starts]** P 1 n 5 *(see page 101)*.

[Pump 3 State] P 3 S ★

Pump 3 state.

This parameter can be accessed if **[Nb Of Pumps]** n P P n or **[Nb of Devices]** n P G n is set to 3 or higher.

Identical to **[Pump 1 State]** P 1 S *(see page 100)*.

[Pump 3 Type] P 3 t ★

Pump 3 type.

This parameter can be accessed if **[Nb Of Pumps]** n P P n or **[Nb of Devices]** n P G n is set to 3 or higher.

Identical to **[Pump 1 Type]** P 1 t *(see page 100)*.

[Pump 3 Runtime] P 3 o t ★

Pump 3 running time.

This parameter can be accessed if **[Nb Of Pumps]** n P P n or **[Nb of Devices]** n P G n is set to 3 or higher.

Identical to **[Pump 1 Runtime]** P 1 o t *(see page 100)*.

[Pump 3 Nb Starts] P 3 n 5 ★

Pump 3 number of starts.

This parameter can be accessed if **[Nb Of Pumps]** n P P n or **[Nb of Devices]** n P G n is set to 3 or higher.

Identical to **[Pump 1 Nb Starts]** P 1 n 5 *(see page 101)*.

[Pump 4 State] *P 4 S* ★

Pump 4 state.

This parameter can be accessed if **[Nb Of Pumps]** *n P P n* or **[Nb of Devices]** *n P G n* is set to 4 or higher.

Identical to **[Pump 1 State]** *P 1 S* *(see page 100)*.

[Pump 4 Type] *P 4 t* ★

Pump 4 type.

This parameter can be accessed if **[Nb Of Pumps]** *n P P n* or **[Nb of Devices]** *n P G n* is set to 4 or higher.

Identical to **[Pump 1 Type]** *P 1 t* *(see page 100)*.

[Pump 4 Runtime] *P 4 o t* ★

Pump 4 running time.

This parameter can be accessed if **[Nb Of Pumps]** *n P P n* or **[Nb of Devices]** *n P G n* is set to 4 or higher.

Identical to **[Pump 1 Runtime]** *P 1 o t* *(see page 100)*.

[Pump 4 Nb Starts] *P 4 n S* ★

Pump 4 number of starts.

This parameter can be accessed if **[Nb Of Pumps]** *n P P n* or **[Nb of Devices]** *n P G n* is set to 4 or higher.

Identical to **[Pump 1 Nb Starts]** *P 1 n S* *(see page 101)*.

[Pump 5 State] *P 5 S* ★

Pump 5 state.

This parameter can be accessed if **[Nb Of Pumps]** *n P P n* or **[Nb of Devices]** *n P G n* is set to 5 or higher.

Identical to **[Pump 1 State]** *P 1 S* *(see page 100)*.

[Pump 5 Type] *P 5 t* ★

Pump 5 type.

This parameter can be accessed if **[Nb Of Pumps]** *n P P n* or **[Nb of Devices]** *n P G n* is set to 5 or higher.

Identical to **[Pump 1 Type]** *P 1 t* *(see page 100)*.

[Pump 5 Runtime] *P 5 o t* ★

Pump 5 running time.

This parameter can be accessed if **[Nb Of Pumps]** *n P P n* or **[Nb of Devices]** *n P G n* is set to 5 or higher.

Identical to **[Pump 1 Runtime]** *P 1 o t* *(see page 100)*.

[Pump 5 Nb Starts] *P 5 n S* ★

Pump 5 number of starts.

This parameter can be accessed if **[Nb Of Pumps]** *n P P n* or **[Nb of Devices]** *n P G n* is set to 5 or higher.

Identical to **[Pump 1 Nb Starts]** *P 1 n S* *(see page 101)*.

[Pump 6 State] *P 6 S* ★

Pump 6 state.

This parameter can be accessed if **[Nb Of Pumps]** *n P P n* or **[Nb of Devices]** *n P G n* is set to 6.

Identical to **[Pump 1 State]** *P 1 S* *(see page 100)*.

[Pump 6 Type] P 6 t ★

Pump 6 type.

This parameter can be accessed if **[Nb Of Pumps]** n P P n or **[Nb of Devices]** n P G n is set to 6.

Identical to **[Pump 1 Type]** P 1 t *(see page 100)*.

[Pump 6 Runtime] P 6 o t ★

Pump 6 running time.

This parameter can be accessed if **[Nb Of Pumps]** n P P n or **[Nb of Devices]** n P G n is set to 6.

Identical to **[Pump 1 Runtime]** P 1 o t *(see page 100)*.

[Pump 6 Nb Starts] P 6 n 5 ★

Pump 6 number of starts.

This parameter can be accessed if **[Nb Of Pumps]** n P P n or **[Nb of Devices]** n P G n is set to 6.

Identical to **[Pump 1 Nb Starts]** P 1 n 5 *(see page 101)*.

[Installation] MPVS - Menu

Access

[Display] ➡ [Pump parameters] ➡ [Installation]

About This Menu

This menu can be accessed if **[Pump System Archit]** MPSA is set to **[Multi Drives]** nVSd or **[Multi Masters]** nVSdr.

[Sys Electrical Power] EPrS

Pump system electrical power

Setting	Description
-327.67...327.67 kW	Setting range in kW if **[Motor Standard]** bFr is set to **[50 Hz IEC]** 50 or in HP if **[Motor Standard]** bFr is set to **[60 Hz NEMA]** 60. **Factory setting**: _

[Sys Flow] SLFS

Pump system flow

Setting	Description
-32,767...32,767	Setting range according to **[Flow rate unit]** SuFr. **Factory setting: –**

[Sys Delta Pressure] SLdS

Pump system delta pressure

Setting	Description
-32,767...32,767	Setting range according to **[Flow rate unit]** SuFr. **Factory setting: –**

[Sys Efficiency Ind] EFYS

Pump system efficiency indicator

Setting	Description
0.0...100.0 %	Setting range **Factory setting: –**

[Sys Energy Cons Ind] ECiS

Pump system energy consumption indicator

Setting	Description
0...32,767	Setting range **Factory setting: –**

[Sys Performance Ind] EPiS

Pump system performance indicator

Setting	Description
0...32,767	Setting range **Factory setting: –**

Section 6.4
[Motor parameters]

[Motor parameters] MMO - Menu

Access

[Display] ➞ [Motor parameters]

About This Menu

This menu shows the motor-related parameters.

[Motor Speed] SPd

Motor speed.

This parameter displays the estimated rotor speed without motor slip.

Setting	Description
0...65,535 rpm	Setting range **Factory setting**:–

[Signed Mech Speed] SPd I

Signed motor mechanical speed.

Setting	Description
[Undefined] UNd...32,767 rpm	Setting range **Factory setting**:–

[Motor Voltage] UOP

Motor voltage.

Setting	Description
0...65,535 V	Setting range **Factory setting**:–

[Motor Power] OPr

Motor power.

Output power in % (100% = nominal motor power).

Setting	Description
-300...300%	Setting range **Factory setting**: –

[Nom Motor Torque] tqn

Computed nominal motor torque in Nm (+/- 2% tolerance).

Setting	Description
0.01...65,535 Nm	Setting range according to drive rating. **Factory setting**: –

[Motor Torque] ɑtr

Motor torque.

Output torque value (100% = **[Nom Motor Torque]** tqn).

NOTE: The displayed value is always positive in motor mode and negative in generator mode whatever the direction.

Setting	Description
-300.0... 300.0%	Setting range **Factory setting**: –

[Motor Torque (Nm)] ɑtqn

Motor torque (Nm).

Output torque value.

NOTE: The displayed value is always positive in motor mode and negative in generator mode whatever the direction.

Setting	Description
-32,767 Nm...32,767 Nm	Setting range: according to drive ratings **Factory setting**: –

[Motor Current] LCr

Motor current.

Setting	Description
0.00...65,535 A	Setting range according to drive ratings **Factory setting**: –

[Motor Therm state] tHr

Motor thermal state.

The normal motor thermal state is 100%, the **[Motor Overload]** ɑLF is set to 118%.

Setting	Description
0...200%	Setting range **Factory setting**: –

Section 6.5
[Drive parameters]

[Drive parameters] ΠP ı - Menu

Access

[Display] ➡ [Drive parameters]

About This Menu

This menu shows the drive-related parameters.

[AIV1 Image input] A ı V 1

AIV1 Image input.

This parameter is read-only. It enables to display the speed reference applied to the motor, or the sensor value, via the fieldbus channel.

Setting	Description
-8,192...8,192	Setting range **Factory setting**: –

[AIV2 Image input] A ı V 2

AIV2 Image input.

This parameter is read-only. It enables to display the speed reference applied to the motor, or the sensor value, via the fieldbus channel.

Setting	Description
-8,192...8,192	Setting range **Factory setting**: –

[AIV3 Image input] A ı V 3

AIV3 Image input.

This parameter is read-only. It enables to display the speed reference applied to the motor, or the sensor value, via the fieldbus channel.

Setting	Description
-8,192...8,192	Setting range **Factory setting**: –

[Pre-Ramp Ref Freq] F r H

Frequency reference before ramp.

This parameter is read-only. It enables to display the speed reference applied to the motor, regardless of which reference channel has been selected.

Setting	Description
-500.0...500.0 Hz	Setting range **Factory setting**: 0 Hz

[Ref Frequency] LFr

Reference frequency.

This parameter only appears if the function has been enabled. It is used to change the speed reference from the remote control. OK does not have to be pressed to enable a change of reference.

Setting	Description
-500.0...500.0 Hz	Setting range **Factory setting**: –

[Motor Frequency] rFr

Motor frequency.

This parameter displays the estimated rotor frequency without motor slip.

Setting	Description
-3,276.7...3,276.7 Hz	Setting range **Factory setting**: 0.0 Hz

[Multiplying coeff.] MFr

Multiplying coefficient

This parameter can be accessed if **[Ref Freq 2 Multiply]** MA2 or **[Ref Freq 3 Multiply]** MA3 are not set to **[Not Configured]** nO.

Setting	Description
0...100 %	Setting range **Factory setting**: –

[Mains Voltage] ULn

Mains voltage based on AC bus measurement, motor running or stopped.

Setting	Description
1.0...860.0 Vac	Setting range: **[no meas.]** - - - - is displayed if no value is measured. **Factory setting**: –

[Mains Voltage phase 1-2] UL1

Mains voltage phase 1-2 measurement.

Setting	Description
-3,276.7...3,276.7 Vac	Setting range **Factory setting**: –

[Mains Voltage phase 2-3] UL2

Mains voltage phase 2-3 measurement.

Setting	Description
-3,276.7...3,276.7 Vac	Setting range **Factory setting**: –

[Mains Voltage phase 3-1] UL3

Mains voltage phase 3-1 measurement

Setting	Description
-3,276.7...3,276.7 Vac	Setting range **Factory setting**: –

[Mains Current] ıLn

Actual mains current (effective value of the fundamental mode).

Accuracy: 2% (related to drive nominal current).

This parameter can be accessed on ATV680.

Setting	Description
According to drive rating	Setting range **Factory setting**: –

[Mains Frequency] FAC

Actual mains frequency.

This parameter can be accessed on ATV680.

Setting	Description
0.0...999.9 Hz	Setting range **Factory setting**: –

[DC Bus Voltage] Vbus

DC bus voltage.

Setting	Description
0...65,535 Vdc	Setting range **Factory setting**: –

[Drive Therm State] tHd

Drive thermal state.

The normal drive thermal state is 100%, the **[Motor Overload]** oLF is set to 118%.

Setting	Description
0...200%	Setting range **Factory setting**: –

[Used Param. Set] CFPS ★

Used parameter set.

Configuration parameter status (can be accessed if parameter switching function has been enabled).

Setting	Code / Value	Description
[None]	no	Not assigned
[Set N°1]	CFP1	Parameter set 1 active
[Set N°2]	CFP2	Parameter set 2 active
[Set N°3]	CFP3	Parameter set 3 active

[Config. active] CnFS

Active configuration.

Setting	Code / Value	Description
[In progress]	no	Transitory state
[Config. No.0]	CnF0	Configuration 0 active

Section 6.6
[Thermal monitoring]

[Thermal Monitoring] tPM- Menu

Access

[Display] ➞ **[Thermal Monitoring]**

About This Menu

The content of this menu can be accessed if the thermal monitoring function has been activated.

Wiring

Refer to the wiring *(see page 188)* of the **[Thermal monitoring]** tPP- menu.

[AI2 Th Value] tH2V ★

AI2 thermal value.

Setting	Description
-15...200°C	Setting range **Factory setting: –**

[AI3 Th Value] tH3V ★

AI3 thermal value.

Identical to **[AI2 Th Value]** tH2V.

[AI4 Th Value] tH4V ★

AI4 thermal value.

Identical to **[AI2 Th Value]** tH2V.

This parameter can be accessed if VW3A3203 I/O extension module has been inserted.

[AI5 Th Value] tH5V ★

AI5 thermal value.

Identical to **[AI2 Th Value]** tH2V.

This parameter can be accessed if VW3A3203 I/O extension module has been inserted.

Section 6.7
[PID display]

[PID display] P ıC - Menu

Access

[Display] ➞ **[PID display]**

About This Menu

NOTE: This function cannot be used with some other functions.

Following parameters can be accessed if **[PID feedback]** P ıF is not set to **[Not Configured]** nO.

[Internal PID ref] rP ı ★

Internal PID reference.

Setting	Description
0...32,767	Setting range **Factory setting**: 150

[PID Reference] rPC ★

PID setpoint value.

Setting	Description
0...65,535	Setting range **Factory setting**: 0

[PID feedback] rPF ★

PID feedback value.

Setting	Description
0...65,535	Setting range **Factory setting**: 0

[PID Error] rPE ★

PID error value.

Setting	Description
-32,767...32,767	Setting range **Factory setting: –**

[PID Output] rPo ★

PID output value.

Setting	Description
[PID Min Output] PoL ...**[PID Max Output]** PoH	Setting range **Factory setting**: _

Section 6.8
[Counter management]

[Counter Management] E L t - Menu

Access

[Display] ➞ **[Counter Management]**

About This Menu

This menu shows the drive and motor-related counters.

[Motor Run Time] r t H

Motor run time.

Run elapsed time display (resettable) in seconds (length of time the motor has been switched on).

Setting	Description
0...4,294,967,295 s	Setting range **Factory setting**: _

[Power-on Time] P t H

Power-on time (resettable) or counter can be set to 0 by using the **[Time Counter Reset]** r P r parameter.

Setting	Description
0...4,294,967,295 s	Setting range **Factory setting**: _

[Fan Operation Time] F P b t

Fan operation time.

As soon as **[Fan Operation Time]** F P b t reach the predefined value of 45,000 hours, a warning **[Fan Counter Warning]** F C t A is triggered.

[Fan Operation Time] F P b t counter can be set to 0 by using the **[Time Counter Reset]** r P r parameter.

Setting	Description
0...500,000 h	Setting range **Factory setting**: _

[Nb Of Start] n S M

Number of motor starts (resettable) or counter can be set to 0 by using the **[Time Counter Reset]** r P r parameter.

Setting	Description
0...4,294,967,295	Setting range **Factory setting**: _

[Cabinet Fan Opt Time] FCEt

Cabinet Fan operation time

If **[Cabinet Fan Oper Time]** FCEt has reached the predefined value of 30,000 hours, a warning **[Cabinet Fan Counter Warn]** FCCA is triggered.

This parameter can be accessed on ATV660 or ATV680.

Setting	Description
0...500,000 h	Setting range **Factory setting**: _

[AFE Run Time] brEH

AFE Run Time

This parameter can be accessed on ATV680.

Setting	Description
0...4,294,967,295 s	Setting range **Factory setting**: _

[AFE Power-On Time] bPEH

AFE brick power on elapsed time

This parameter can be accessed on ATV680.

Setting	Description
0...4,294,967,295 s	Setting range **Factory setting**: _

[AFE Fan Operation Time] FbAt

AFE Fan Operation Time

If **[AFE Fan Operation Time]** FbAt has reached the predefined value of 45,000 hours, a warning **[AFE Fan Counter Warn]** FCbA is triggered.

This parameter can be accessed on ATV680.

Setting	Description
0...50,000 h	Setting range **Factory setting**: _

[AFE Nb of starts] bnSA

AFE number of starts

This parameter can be accessed on ATV680.

Setting	Description
0...4,294,967,295	Setting range **Factory setting**: _

[Time Counter Reset] rPr

Time counter reset.

Setting	Code / Value	Description
[No]	nO	No **Factory setting**
[Run Time Reset]	rtH	Run time reset
[Power ON Time Reset]	PtH	Power ON time reset
[Reset Fan Counter]	FtH	Reset fan counter
[Clear NSM]	nSM	Clear number of motor starts
[Efficiency MAX]	EFYK	Efficiency max
[Efficiency MIN]	EFYJ	Efficiency min
[Flow Rate MAX]	FSIK	Flow rate max
[Flow Rate MIN]	FSIJ	Flow rate min
[Reset Total Quantity]	FSIC	Reset total quantity
[AFE Fan Operation Time]	FbAt	AFE Fan operation time (1)
[Clear Cabinet Fan]	FCt	Clear cabinet fan operation time **NOTE:** This selection can be accessed on ATV660 and ATV680.
[Clear AFE Power ON Time]	bPth	Clear AFE power ON time (1)
[Clear BRTH]	brth	Clear AFE run time (1)
[Clear AFE Nb. start]	bnSA	Clear AFE brick number of start (1)
1 This selection can be accessed on ATV680.		

Section 6.9
[Other state]

[Other state] SSt - Menu

Access

[Display] ➡ [Other state]

About This Menu

List of secondary states.

List

[Anti-Jam pending] JAMP

[Anti-Jam In Progress] JAMr

[PipeFill In Progress] F iLL

[InPres Comp Active] iPPC

[Sleep Active] SLM

[Priming pump running] PPon

[Jockey pump running] JPon

[Sleep Boost active] SLPb

[Sleep Checking activated] ASLC

[Set 1 active] CFP 1

[Set 2 active] CFP2

[Set 3 active] CFP3

[Automatic restart] Aut o

[DC Bus Charged] dbL

[Fast stop Active] FSt

[Fallback Frequency] FrF

[Speed Maintained] rLS

[Type of stop] Stt

[Ref Freq Warning] SrA

[Forward] MFrd

[Reverse] Mrr S

[Autotuning] tun

Section 6.10
[I/O map]

What Is in This Section?

This section contains the following topics:

Topic	Page
[Digital Input Map] L ,A - Menu	117
[AI1] A ,1C - Menu	118
[AI2] A ,2C - Menu	120
[AI3] A ,3C - Menu	121
[AI4] A ,4C - Menu	122
[AI5] A ,5C - Menu	123
[Digital output map] Lo A - Menu	124
[AQ1] Ao 1C - Menu	125
[AQ2] Ao2C - Menu	129
[DI5 frequency measured] PFC5 - Menu	131
[DI6 frequency measured] PFC6 - Menu	133
[Cabinet Digital Input Map] L ,CA - Menu	134
[Cabinet Digital Output Map] LoCA - Menu	134

[Digital Input Map] L ıR - Menu

Access

[Display] ➡ [I/O map] ➡ [Digital Input Map]

About This Menu

This menu presents the state and assignment of digital inputs.

Read-only parameters, cannot be configured.

It is used to visualize the state of the digital inputs and Safe Torque Off inputs.

It displays all the functions that are assigned to the digital input in order to verify for multiple assignments.

If no functions have been assigned, **[Not assigned]** nO is displayed. Use the touch wheel to scroll through the functions.

[AI1] AI1C - Menu

Access

[Display] ➡ [I/O map] ➡ [Analog inputs image] ➡ [AI1]

[AI1] AI1C

Physical value AI1.

AI1 customer image: value of analog input 1.

Setting	Description
-32,767...32,767	Setting range **Factory setting: –**

NOTE: The parameters **[AI1 Assignment]** AI1A, **[AI1 min value]** UIL1, **[AI1 max value]** UIH1 and **[AI1 filter]** AI1F can be accessed on the Graphic Display Terminal by pressing the **OK** key on the **[AI1]** AI1C parameter.

[AI1 Assignment] AI1A

Analog input AI1 functions assignment.

Read-only parameter, cannot be configured. It displays all the functions associated with input AI1 in order to verify, for example, for compatibility problems.

If no functions have been assigned, **[No]** no is displayed.

Setting	Code / Value	Description
[No]	no	Not assigned
[AQ1 assignment]	AO1	Analog output AQ1
[AQ2 assignment]	AO2	Analog output AQ2
[Ref Freq Channel 1]	Fr1	Reference frequency channel 1 **Factory Setting**
[Ref Freq Channel 2]	Fr2	Reference frequency channel 2
[Ref Frequency 2 Summing]	SA2	Reference frequency 2 summing
[PID Feedback]	PIF	PI controller feedback
[Subtract Ref Freq 2]	dA2	Subtract reference frequency 2
[Manual PID Ref.]	PIM	Manual speed reference of the PID controller (auto-man)
[PID Ref Frequency]	FPI	PID reference frequency
[Ref Frequency 3 Summing]	SA3	Reference frequency 3 summing
[Ref Frequency 1B]	Fr1b	Reference frequency 1B
[Subtract Ref Freq 3]	dA3	Subtract reference frequency 3
[Forced local]	FLOC	Forced local reference source1
[Ref Frequency 2 multiplier]	MA2	Reference frequency 2 multiplier
[Ref Frequency 3 multiplier]	MA3	Reference frequency 3 multiplier
[Virtual AI1 Channel]	AIC1	Virtual AI1 channel selector function
[InletPres Assign]	PS1A	Select the source of inlet pressure sensor
[OutletPres Assign]	PS2A	Select the source of outlet pressure sensor
[Inst Flow Assign]	FS1A	Select the source of installation flow sensor
[Pump Flow Assign]	FS2A	Select the source of pump flow sensor
[LevelCtrl Sensor]	LCSA	Level control analog sensor

[AI1 min value] uIL1★

AI1 minimum value.

AI1 voltage scaling parameter of 0%.

This parameter can be accessed if **[AI1 Type]** AI1t is set to **[Voltage]** IOu.

Setting	Description
0.0...10.0 Vdc	Setting range **Factory setting**: 0.0 Vdc

[AI1 max value] uIH1★

AI1 maximum value.

AI1 voltage scaling parameter of 100%.

This parameter can be accessed if **[AI1 Type]** AI1t is set to **[Voltage]** IOu.

Setting	Description
0.0...10.0 Vdc	Setting range **Factory setting**: 10.0 Vdc

[AI1 min. value] CrL1★

AI1 minimum value.

AI1 current scaling parameter of 0%.

This parameter can be accessed if **[AI1 Type]** AI1t is set to **[Current]** 0A.

Setting	Description
0.0...20.0 mA	Setting range **Factory setting**: 0.0 mA

[AI1 max. value] CrH1★

AI1 maximum value.

AI1 current scaling parameter of 100%.

This parameter can be accessed if **[AI1 Type]** AI1t is set to **[Current]** 0A.

Setting	Description
0.0...20.0 mA	Setting range **Factory setting**: 20.0 mA

[AI1 filter] AI1F

AI1 filter.

Interference filtering.

Setting	Description
0.00...10.00 s	Setting range **Factory setting**: 0.00 s

[AI2] AI2C - Menu

Access

[Display] ➡ **[I/O map]** ➡ **[Analog inputs image]** ➡ **[AI2]**

[AI2] AI2C

Physical value AI2.

AI2 customer image: value of analog input 2.

Identical to **[AI1]** AI1C *(see page 118)*.

[AI2 Assignment] AI2A

Configuration of AI2.

Identical to **[AI1 Assignment]** AI1A *(see page 118)*.

[AI2 min value] uIL2★

AI2 minimum value.

AI2 voltage scaling parameter of 0%.

This parameter can be accessed if **[AI2 Type]** AI2t is set to **[Voltage]** 10u.

Identical to **[AI1 min value]** uIL1 *(see page 119)*.

[AI2 max value] uIH2★

AI2 maximum value.

AI2 voltage scaling parameter of 100%.

This parameter can be accessed if **[AI2 Type]** AI2t is set to **[Voltage]** 10u.

Identical to **[AI1 max value]** uIH1 *(see page 119)*.

[AI2 min. value] CrL2★

AI2 current scaling parameter of 0%.

This parameter can be accessed if **[AI2 Type]** AI2t is set to **[Current]** 0A.

Identical to **[AI1 Min. Value]** CrL1 *(see page 120)*

[AI2 max. value] CrH2★

AI2 current scaling parameter of 100%.

This parameter can be accessed if **[AI2 Type]** AI2t is set to **[Current]** 0A.

Identifcal to **[AI2 Max. Value]** CrH1 *(see page 120)*

[AI2 filter] AI2F

AI2 filter.

Interference filtering.

Identical to **[AI1 filter]** AI1F *(see page 119)*.

[AI3] AI3C - Menu

Access

[Display] ➡ [I/O map] ➡ [Analog inputs image] ➡ [AI3]

[AI3] AI3C

Physical value AI3.

AI3 customer image: value of analog input 3.

Identical to **[AI1]** AI1C *(see page 118)*.

[AI3 Assignment] AI3A

Configuration of AI3.

Identical to **[AI1 Assignment]** AI1A *(see page 118)*.

[AI3 min value] uL3★

AI3 voltage scaling parameter of 0%.

This parameter can be accessed if **[AI3 Type]** AI3t is set to **[Voltage]** 10u.

Identical to **[AI1 min value]** uL1 *(see page 119)*.

[AI3 max value] uH3★

AI3 voltage scaling parameter of 100%.

This parameter can be accessed if **[AI3 Type]** AI3t is set to **[Voltage]** 10u.

Identical to **[AI1 max value]** uH1 *(see page 119)*.

[AI3 min. value] CrL3★

AI3 current scaling parameter of 0%.

This parameter can be accessed if **[AI3 Type]** AI3t is set to **[Current]** 0A.

Identical to **[AI1 min. value]** CrL1 *(see page 119)*.

[AI3 max. value] CrH3★

AI3 current scaling parameter of 100%.

This parameter can be accessed if **[AI3 Type]** AI3t is set to **[Current]** 0A.

Identical to **[AI1 max. value]** CrH1 *(see page 119)*.

[AI3 Filter] AI3F

AI3 filter.

Interference filtering.

Identical to **[AI1 filter]** AI1F *(see page 119)*.

[AI4] AI4C - Menu

Access

[Display] ➡ **[I/O map]** ➡ **[Analog inputs image]** ➡ **[AI4]**

[AI4] AI4C

Physical value AI4.

AI4 customer image: value of analog input 4.

Identical to **[AI1]** AI1C *(see page 118)*.

[AI4 Assignment] AI4A

AI4 functions assignment. If no functions have been assigned, **[No]** nO is displayed.

Identical to **[AI1 Assignment]** AI1A *(see page 118)*.

[AI4 min value] uIL4★

AI4 minimum value.

AI4 voltage scaling parameter of 0%.

This parameter can be accessed if **[AI4 Type]** AI4t is set to **[Voltage]** 10u.

Identical to **[AI1 min value]** uIL1 *(see page 119)*.

[AI4 max value] uIH4★

AI4 maximum value.

AI4 voltage scaling parameter of 100%.

This parameter can be accessed if **[AI4 Type]** AI4t is set to **[Voltage]** 10u.

Identical to **[AI1 max value]** uIH1 *(see page 119)*.

[AI4 min. value] CrL4★

AI4 minimum value.

AI4 current scaling parameter of 0%.

This parameter can be accessed if **[AI4 Type]** AI4t is set to **[Current]** 0A.

Identical to **[AI1 min. value]** CrL1 *(see page 119)*.

[AI4 max. value] CrH4★

AI4 maximum value.

AI4 current scaling parameter of 100%.

This parameter can be accessed if **[AI4 Type]** AI4t is set to **[Current]** 0A.

Identical to **[AI1 max. value]** CrH1 *(see page 119)*.

[AI4 filter] AI4F

AI4 filter.

Interference filtering.

Identical to **[AI1 filter]** AI1F *(see page 119)*.

[AI5] AI5C - Menu

Access

[Display] ➡ **[I/O map]** ➡ **[Analog inputs image]** ➡ **[AI5]**

[AI5] AI5C

AI5 customer image: value of analog input 5.

Identical to **[AI1]** AI1C *(see page 118)*.

[AI5 Assignment] AI5A

AI5 functions assignment. If no functions have been assigned, **[No]** nO is displayed.

Identical to **[AI1 Assignment]** AI1A *(see page 118)*.

[AI5 min value] U5L ★

AI5 voltage scaling parameter of 0%.

This parameter can be accessed if **[AI5 Type]** AI5t is set to **[Voltage]** 10U.

Identical to **[AI1 min value]** U1L *(see page 119)*.

[AI5 max value] U5H ★

AI5 voltage scaling parameter of 100%.

This parameter can be accessed if **[AI5 Type]** AI5t is set to **[Voltage]** 10U.

Identical to **[AI1 max value]** U1H *(see page 119)*.

[AI5 min. value] C5rL ★

AI5 current scaling parameter of 0%.

This parameter can be accessed if **[AI5 Type]** AI5t is set to **[Current]** 0A.

Identical to **[AI1 min. value]** C1rL *(see page 119)*.

[AI5 max. value] C5rH ★

AI5 current scaling parameter of 100%.

This parameter can be accessed if **[AI5 Type]** AI5t is set to **[Current]** 0A.

Identical to **[AI1 max. value]** C1rH *(see page 119)*.

[AI5 filter] AI5F

AI5 filter.

Interference filtering.

Identical to **[AI1 filter]** AI1F *(see page 119)*.

[Digital output map] L o A - Menu

Access

[Display] ➡ [I/O map] ➡ [Digital output map]

About This Menu

DQ assignment.

R1, R2, R3 assignment.

R4, R5, R6 assignment if VW3A3204 relay output option module has been inserted.

DQ11, DQ12 assignment if VW3A3203 I/O extension module has been inserted.

On the Graphic Display Terminal, click the digital output to see the assignment.

Read-only parameters, cannot be configured.

It displays the function which is assigned to a digital output. If no function has been assigned, **[Not assigned]** n o is displayed.

It allows to verify the delay, active state, and holding time set for the digital output. Possible values are identical as those in the configuration menu.

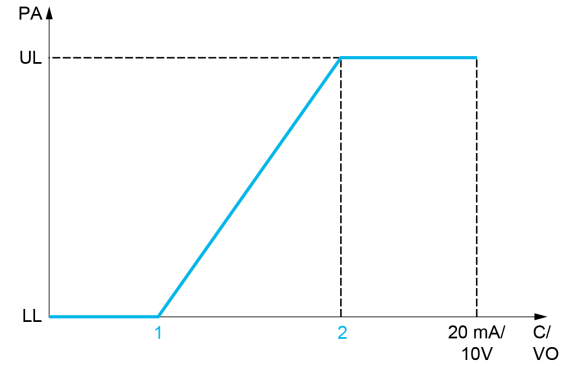
[AQ1] Ao IC - Menu

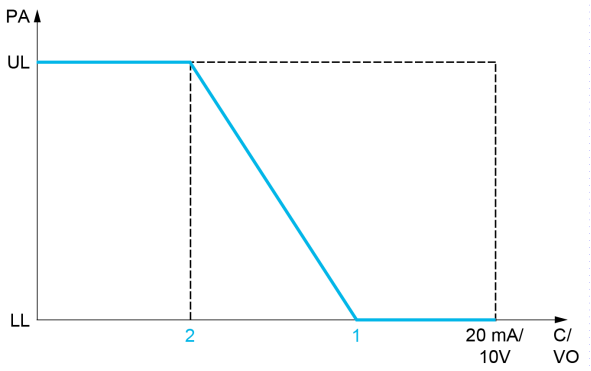
Access

[Display] ➡ [I/O map] ➡ [Analog outputs image] ➡ [AQ1]

Minimum and Maximum Output Values

The minimum output value, in volts, corresponds to the lower limit of the assigned parameter and the maximum value corresponds to its upper limit. The minimum value may be greater than the maximum value.





PA Parameter assigned
C / VO Current or voltage output
UL Upper limit
LL Low limit
1 **[Min Output]** AoLX or uoLX
2 **[Max Output]** AoHX or uoHX

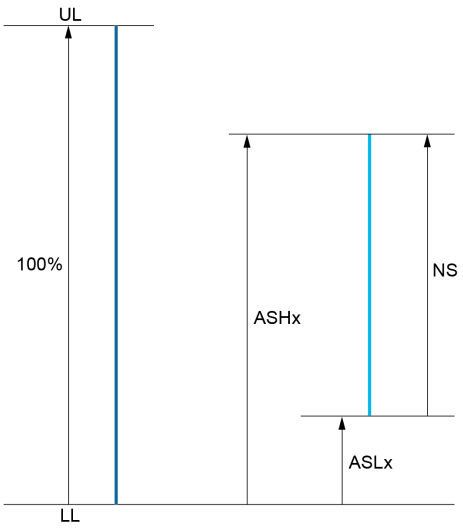
Scaling of the Assigned Parameter

The scale of the assigned parameter can be adapted in accordance with requirements by modifying the values of the lower and upper limits with two parameters for each analogic output.

These parameters are given in %. 100% corresponds to the total variation range of the configured parameter, so: 100% = upper limit - lower limit.

For example, **[Sign. torque]** StQ which varies between –3 and +3 times the rated torque, 100% corresponds to 6 times the rated torque.

- The **[Scaling AQx min]** ASLX parameter modifies the lower limit: new value = lower limit + (range x ASLX). The value 0% (factory setting) does not modify the lower limit.
- The **[Scaling AQx max]** ASHX parameter modifies the upper limit: new value = lower limit + (range x ASLX). The value 100% (factory setting) does not modify the upper limit.
- **[Scaling AQx min]** ASLX must always be lower than **[Scaling AQx max]** ASHX.



UL Upper limit of the assigned parameter
LL Lower limit of the assigned parameter
NS New scale
ASHX Scaling max
ASLX Scaling min

Application Example

The value of the motor current at the AQ1 output is to be transferred with 0...20 mA, range 2 in motor, in motor being the equivalent of a 0.8 In drive.

- The **[Motor Current]** oCr parameter varies from 0 to 2 times the rated drive current.
- **[Scaling AQ1 min]** ASL1 must not modify the lower limit, which therefore remains at its factory setting of 0%.
- **[Scaling AQ1 max]** ASH1 must modify the upper limit by 0.5x the rated motor torque, or 100 - 100/5 = 80% (new value = lower limit + (range x ASH1).

[AQ1] Ao1C

AQ1 customer image: value of analogic output 1.

Setting	Description
-32,767...32,767	Setting range **Factory setting**: _

[AQ1 assignment] AO1

AQ1 assignment.

Setting	Code / Value	Description
[Not Configured]	nO	Not assigned
[Motor Current]	OCr	Current in the motor, from 0 to 2 In (In = rated drive current indicated in the Installation manual and on the drive nameplate)
[Motor Frequency]	OFr	Output frequency, from 0 to [Max Frequency] tFr Factory Setting
[Ramp out.]	OrP	From 0 to [Max Frequency] tFr
[Motor torq.]	trq	Motor torque, from 0 to 3 times the rated motor torque
[Sign. torque]	Stq	Signed motor torque, between –3 and +3 times the rated motor torque. The + sign corresponds to the motor mode and the – sign to the generator mode (braking).
[sign ramp]	Ors	Signed ramp output, between –[Max Frequency] tFr and +[Max Frequency] tFr
[PID ref.]	OPS	PID controller reference between [Min PID reference] PIP1 and [Max PID reference] PIP2
[PID feedbk]	OPF	PID controller feedback between [Min PID feedback] PIF1 and [Max PID feedback] PIF2
[PID error]	OPE	PID controller detected error between –5% and +5% of [Max PID feedback] PIF2 – [Min PID feedback] PIF1
[PID output]	OPI	PID controller output between [Low speed] LSP and [High speed] HSP
[Drive power]	OPr	Motor power, between 0 and 2.5 times [Nominal Motor Power] nPr
[Mot thermal]	tHr	Motor thermal state, from 0 to 200% of the rated thermal state
[Drv thermal]	tHd	Drive thermal state, from 0 to 200% of the rated thermal state
[Sig. o/p frq.]	OFS	Signed output frequency, between –[Max Frequency] tFr and +[Max Frequency] tFr
[Motor volt.]	UOP	Voltage applied to the motor, between 0 and [Nom Motor Voltage] UnS
[Inlet Pressure Value]	PS1u	Inlet pressure value
[Outlet Pressure Value]	PS2u	Outlet pressure value
[Installation Flow]	FS1u	Installation flow value
[Pump Flow]	FS2u	Pump flow value

[AQ1 Min Output] UOL1 ★

AQ1 minimum output.

This parameter can be accessed if [AQ1 Type] AO1t is set to [Voltage] 10U.

Setting	Description
0.0...10.0 Vdc	Setting range Factory setting: 0.0 Vdc

[AQ1 max Output] UOH1 ★

AQ1 maximum output.

This parameter can be accessed if [AQ1 Type] AO1t is set to [Voltage] 10U.

Setting	Description
0.0...10.0 Vdc	Setting range Factory setting: 10.0 Vdc

[AQ1 min output] AOL 1 ★

AQ1 minimum output.

This parameter can be accessed if **[AQ1 Type]** AOT is set to **[Current]** 0A.

Setting	Description
0.0...20.0 mA	Setting range **Factory setting**: 0.0 mA

[AQ1 max output] AOH 1 ★

AQ1 maximum output.

This parameter can be accessed if **[AQ1 Type]** AOT is set to **[Current]** 0A.

Setting	Description
0.0...20.0 mA	Setting range **Factory setting**: 20.0 mA

[Scaling AQ1 min] ASL 1

Scaling of the lower limit of the assigned parameter, as a percentage of the maximum possible variation.

Setting	Description
0.0...100.0%	Setting range **Factory setting**: 0.0%

[Scaling AQ1 max] ASH 1

Scaling of the upper limit of the assigned parameter, as a percentage of the maximum possible variation.

Setting	Description
0.0...100.0%	Setting range **Factory setting**: 100.0%

[AQ1 Filter] AOIF

Interference filtering.

Setting	Description
0.00...10.00 s	Setting range **Factory setting**: 0.00 s

[AQ2] AO2C - Menu

Access

[Display] ➡ [I/O Map] ➡ [Analog outputs image] ➡ [AQ2]

[AQ2] AO2C

AQ2 customer image: value of analog output 2.

Identical to **[AQ1]** AO1C *(see page 126)*.

[AQ2 Assignment] AO2

AQ2 assignment.

Setting	Code / Value	Description
[Not Configured]	nO	Not assigned
[Motor Current]	OCr	Current in the motor, from 0 to 2 In (In = rated drive current indicated in the Installation manual and on the drive nameplate) **Factory Setting**
[Motor Frequency]	OFr	Output frequency, from 0 to **[Max Frequency]** tFr
[Ramp out.]	OrP	From 0 to **[Max Frequency]** tFr
[Motor torq.]	trq	Motor torque, from 0 to 3 times the rated motor torque
[Sign. torque]	Stq	Signed motor torque, between –3 and +3 times the rated motor torque. The + sign corresponds to the motor mode and the – sign to the generator mode (braking).
[sign ramp]	Ors	Signed ramp output, between –**[Max Frequency]** tFr and +**[Max Frequency]** tFr
[PID ref.]	OPS	PID controller reference between **[Min PID reference]** PIP1 and **[Max PID reference]** PIP2
[PID feedbk]	OPF	PID controller feedback between **[Min PID feedback]** PIF1 and **[Max PID feedback]** PIF2
[PID error]	OPE	PID controller detected error between –5% and +5% of **[Max PID feedback]** PIF2 – **[Min PID feedback]** PIF1
[PID output]	OPI	PID controller output between **[Low speed]** LSP and **[High speed]** HSP
[Drive power]	OPr	Motor power, between 0 and 2.5 times **[Nominal Motor Power]** nPr
[Mot thermal]	tHr	Motor thermal state, from 0 to 200% of the rated thermal state
[Drv thermal]	tHd	Drive thermal state, from 0 to 200% of the rated thermal state
[Sig. o/p frq.]	OFS	Signed output frequency, between –**[Max Frequency]** tFr and +**[Max Frequency]** tFr
[Motor volt.]	UOP	Voltage applied to the motor, between 0 and **[Nom Motor Voltage]** UnS
[Inlet Pressure Value]	PS1u	Inlet pressure value
[Outlet Pressure Value]	PS2u	Outlet pressure value
[Installation Flow]	FS1u	Installation flow value
[AI Virtual 1]	AIV1	Virtual analog input 1

[AQ2 Min Output] UOL2 ★

AQ2 minimum output.

This parameter can be accessed if **[AQ2 Type]** AO2t is set to **[Voltage]** 10U.

Identical to **[AQ1 min Output]** UOL1 *(see page 127)*.

[AQ2 Max Output] UOH2 ★

AQ2 maximum output.

This parameter can be accessed if **[AQ2 Type]** AO2t is set to **[Voltage]** 10U.

Identical to **[AQ1 max Output]** UOH1 *(see page 127)*.

[AQ2 Min Output] AoL2 ★

AQ2 minimum output.

This parameter can be accessed if **[AQ2 Type]** Ao2t is set to **[Current]** 0A.

Identical to **[AQ1 min Output]** uoL1 *(see page 128)*.

[AQ2 Max Output] AoH2 ★

AQ2 maximum output.

This parameter can be accessed if **[AQ2 Type]** Ao2t is set to **[Current]** 0A.

Identical to **[AQ1 max Output]** uoH1 *(see page 128)*.

[Scaling AQ2 min] AS L2

Scaling of the lower limit of the assigned parameter, as a % of the maximum possible variation.

Identical to **[Scaling AQ2 min]** ASL1 *(see page 128)*.

[Scaling AQ2 max] ASH2

Scaling of the upper limit of the assigned parameter, as a % of the maximum possible variation.

Identical to **[Scaling AQ1 max]** ASH1 *(see page 128)*.

[AQ2 Filter] Ao2F

Interference filtering.

Identical to **[AQ1 Filter]** AoIF *(see page 128)*.

[DI5 frequency measured] PFC5 - Menu

Access

[Display] ➡ [I/O map] ➡ [Freq. signal image] ➡ [DI5 frequency measured]

About This Menu

Following parameters can be accessed on the Graphic Display Terminal by pressing the OK key on the **[DI5 Frequency Measured]** PFC5 parameter.

[DI5 Frequency Measured] PFC5

Filtered customer pulse input frequency reference.

Setting	Description
0...4,294,967,295	Setting range **Factory setting**: _

[DI5 Pulse Input Assign] PI5A

Di5 pulse input assignment.

It displays all the functions associated with the pulse input in order to verify, for example, for compatibility problems.

If no functions have been assigned, **[No]** no is displayed.

Setting	Code / Value	Description
[No]	no	Not assigned **Factory Setting**
[AQ1 assignment]	AO1	Analog output AQ1
[AQ2 assignment]	AO2	Analog output AQ2
[Ref Freq Channel 1]	Fr1	Reference frequency channel 1
[Ref Freq Channel 2]	Fr2	Reference frequency channel 2
[Ref Frequency 2 Summing]	SA2	Reference frequency 2 summing
[PID Feedback]	PIF	PI controller feedback
[Subtract Ref Freq 2]	dA2	Subtract reference frequency 2
[Manual PID Ref.]	PIM	Manual speed reference of the PID controller (auto-man)
[PID Ref Frequency]	FPI	PID reference frequency
[Ref Frequency 3 Summing]	SA3	Reference frequency 3 summing
[Ref Frequency 1B]	Fr1b	Reference frequency 1B
[Subtract Ref Freq 2]	dA3	Subtract reference frequency 3
[Forced local]	FLOC	Forced local reference source1
[Ref Frequency 2 multiplier]	MA2	Reference frequency 2 multiplier
[Ref Frequency 3 multiplier]	MA3	Reference frequency 3 multiplier
[Virtual AI1 Channel]	AIC1	Virtual AI1 channel selector function
[InletPres Assign]	PS1A	Select the source of inlet pressure sensor
[OutletPres Assign]	PS2A	Select the source of outlet pressure sensor
[Inst Flow Assign]	FS1A	Select the source of installation flow sensor
[Pump Flow Assign]	FS2A	Select the source of pump flow sensor
[LevelCtrl Sensor]	LCSA	Level control analog sensor

[DI5 PulseInput Low Freq] P ı L 5

Di5 pulse input low frequency.

Pulse input scaling parameter of 0% in Hz x 10 unit.

Setting	Description
0.00...30000.00 Hz	Setting range **Factory setting**: 0 Hz

[DI5 PulseInput High Freq] P ı H 5

Di5 pulse input high frequency.

Pulse input scaling parameter of 100% in Hz x 10 unit.

Setting	Description
0.00...30.00 kHz	Setting range **Factory setting**: 30.00 kHz

[DI5 Frequency Filter] P F ı 5

Interference filtering pulse input cut-off time of the low-filter.

Setting	Description
0...1,000 ms	Setting range **Factory setting**: 0 ms

[DI6 frequency measured] PFC6 - Menu

Access

[Display] ➡ [I/O map] ➡ [Freq. signal image] ➡ [DI6 frequency measured]

About This Menu

Following parameters can be accessed on the Graphic Display Terminal by pressing the OK key on the **[DI6 Frequency Measured]** PFC6 parameter.

[DI6 Frequency Measured] PFC6

Filtered customer pulse input frequency reference.

Identical to **[DI5 frequency measured]** PFC5 *(see page 131)*.

[DI6 Pulse Input Assign] P16A

Di6 pulse input assignment.

Identical to **[DI5 Pulse Input Assign]** P15A *(see page 131)*.

[DI6 PulseInput Low Freq] P1L6

Di6 pulse input low frequency.

Identical to **[DI5 PulseInput Low Freq]** P1L5 *(see page 132)*.

[DI6 PulseInput High Freq] P1H6

Di6 pulse input high frequency.

Identical to **[DI5 PulseInput High Freq]** P1H5 *(see page 132)*.

[DI6 Frequency Filter] PF16

Interference filtering pulse input cut-off time of the low-filter.

Identical to **[DI5 Frequency Filter]** PF15 *(see page 132)*.

[Cabinet Digital Input Map] L iCA - Menu

Access

[Display] ➡ [I/O Map] ➡ [Cabinet Digital Input Map]

These parameters can be accessed on ATV660 or ATV680, equipped with cabinet IO, and if **[Access Level]** LAC is set to **[Expert]** EPr.

About This Menu

This menu presents the state and assignment of cabinet digital inputs.

Read-only parameters cannot be configured.

It is used to visualize the state of the cabinet digital inputs

It displays all the functions that are assigned to a cabinet digital input, in order to verify for multiple assignments.

If no functions have been assigned, **[Not assigned]** no is displayed. Use the touch wheel to scroll through the functions.

[Cabinet Digital Output Map] LoCA - Menu

Access

[Display] ➡ [I/O Map] ➡ [Cabinet Digital Output Map]

These parameters can be accessed on ATV660 or ATV680, equipped with cabinet IO, and if **[Access Level]** LAC is set to **[Expert]** EPr.

About This Menu

This menu presents the state and assignment of cabinet digital outputs.

Read-only parameters cannot be configured.

It displays the function which is assigned to a cabinet digital output. If no function has been assigned, **[Not assigned]** no is displayed.

It allows verifying the delay, active state, and holding time set for the cabinet digital outputs. Possible values are identical as those in the configuration menu.

Section 6.11
[Communication map]

What Is in This Section?

This section contains the following topics:

Topic	Page
[Communication map] CMM - Menu	136
[Modbus network diag] Mnd - Menu	140
[Com. scanner input map] ISA - Menu	141
[Com scan output map] oSA - Menu	142
[Modbus HMI Diag] MdH - Menu	143
[Ethernet Emb Diag] MPE - Menu	144
[Ethernet Module Diag] MtE - Menu	145
[DeviceNet Diag] dVn - Menu	146
[Profibus Diag] Prb - Menu	147
[PROFINET Diag] Prn - Menu	149
[Command word image] CWI - Menu	151
[Freq. ref. word map] rWI - Menu	152
[CANopen map] CnM - Menu	153
[PDO1 image] Po1 - Menu	154
[PDO2 image] Po2 - Menu	156
[PDO3 image] Po3 - Menu	157
[CANopen map] CnM - Menu	158

[Communication map] CMM - Menu

Access

[Display] ➡ [Communication map]

[Command Channel] CMdC

Command channel.

Setting	Code / Value	Description
[Terminals]	tEr	Terminal block source **Factory Setting**
[HMI]	LCC	Reference frequency via remote terminal
[Modbus]	Mdb	Reference frequency via Modbus
[CANopen]	CAn	Reference frequency via CANopen if a CANopen module has been inserted
[Com. Module]	nEt	Reference frequency via fieldbus module if a fieldbus module has been inserted
[Embedded Ethernet]	EtH	Embedded Ethernet
[PC tool]	PWS	DTM based software

[Cmd Register] CMd

Command register.

[Control Mode] CHCF is not set to **[I/O profile]** IO

Possible values in CiA402 profile, separate, or not separate mode:

Bit	Description, Value
0	Set to 1: "Switch on"/Contactor command
1	Set to 0: "Disable voltage"/Authorization to supply AC power
2	Set to 0: "Quick stop"
3	Set to 1: "Enable operation"/Run command
4 to 6	Reserved (= 0)
7	"Fault reset" acknowledgment active on 0 to 1 rising edge
8	Set to 1: Halt stop according to the **[Type Of Stop]** StT parameter without leaving the operation enabled state
9 and 10	Reserved (= 0)
11 to 15	Can be assigned to commands

Possible values in the I/O profile. On state command **[2-Wire Control]** *2 C* :

Bit	Description, Value
0	Forward (on state) command: 0: No forward command 1: Forward command **NOTE:** The assignment of bit 0 cannot be modified. It corresponds to the assignment of the terminals. It can be switched. Bit 0 *C d 0 0* is only active if the channel of this control word is active.
1 to 15	Can be assigned to commands

Possible values in the I/O profile. On edge command **[3-Wire Control]** *3 C* :

Bit	Description, Value
0	Stop (run authorization): 0: Stop 1: Run is authorized on a forward or reverse command
1	Forward (on 0 to 1 rising edge) command
2 to 15	Can be assigned to commands
NOTE: The assignment of bits 0 and 1 cannot be modified. It corresponds to the assignment of the terminals. It can be switched. Bits 0 *C d 0 0* and 1 *C d 0 1* are only active if the channel of this control word is active.	

[Ref Freq Channel] *r F C C*

Channel of reference frequency.

Identical to **[Command Channel]** *C N d C* *(see page 136)*

[Pre-Ramp Ref Freq] *F r H*

Frequency reference before ramp.

Setting	Description
-500.0...500.0 Hz	Setting range **Factory setting**: _

[CIA402 State Reg] *E t A*

CIA402 State Register.

Possible values in CiA402 profile, separate, or not separate mode:

Bit	Description, Value
0	"Ready to switch on", awaiting power section line supply
1	"Switched on", ready
2	"Operation enabled", running
3	Operating detected error state: 0: Inactive 1: Active
4	"Voltage enabled", power section line supply present: 0: Power section line supply absent 1: Power section line supply present **NOTE:** When the drive is powered by the power section only, this bit is always at 1.
5	Quick stop
6	"Switched on disabled", power section line supply locked
7	Warning: 0: No warning 1: Warning
8	Reserved (= 0)
9	Remote: command or reference via the network 0: Command or reference via the Graphic Display Terminal 1: Command or reference via the network
10	Targets reference reached: 0: The reference is not reached 1: The reference has been reached **NOTE:** When the drive is in speed mode, this is the speed reference.
11	"Internal limit active", reference outside limits: 0: The reference is within the limits 1: The reference is not within the limits **NOTE:** When the drive is in speed mode, the limits are defined by the **[Low speed]** *L S P* and **[High speed]** *H S P* parameters.
12	Reserved
13	Reserved
14	"Stop key", STOP via stop key: 0: STOP key not pressed 1: Stop triggered by the STOP key on the Graphic Display Terminal
15	"Direction", direction of rotation: 0: Forward rotation at output 1: Reverse rotation at output
NOTE: The combination of bits 0, 1, 2, 4, 5 and 6 defines the state in the DSP 402 state chart (see the communication manuals).	

Possible values in the I/O profile:

Bit	Description, Value
0	Reserved (= 0 or 1)
1	Ready: 0: Not ready 1: Ready
2	Running: 0: The drive does not start if a reference other than zero is applied 1: Running, if a reference other than zero is applied, the drive can start
3	Operating detected error state: 0: Inactive 1: Active
4	Power section line supply present: 0: Power section line supply absent 1: Power section line supply present
5	Reserved (= 1)
6	Reserved (= 0 or 1)
7	Warning 0: No warning 1: Warning
8	Reserved (= 0)
9	Command via a network: 0: Command via the terminals or the Graphic Display Terminal 1: Command via a network
10	Reference reached: 0: The reference is not reached 1: The reference has been reached
11	Reference outside limits: 0: The reference is within the limits 1: The reference is not within the limits **NOTE:** When the drive is in speed mode, the limits are defined by LSP and HSP parameters.
12	Reserved (= 0)
13	Reserved (= 0)
14	Stop via STOP key: 0: STOP key not pressed 1: Stop triggered by the STOP key on the Graphic Display Terminal
15	Direction of rotation: 0: Forward rotation at output 1: Reverse rotation at output
NOTE: The value is identical in the CiA402 profile and the I/O profile. In the I/O profile, the description of the values is simplified and does not refer to the CiA402 (Drivecom) state chart.	

[Modbus network diag] Mnd - Menu

Access

[Display] ➡ [Communication map] ➡ [Modbus network diag]

About This Menu

Used for the Modbus serial communication port at the bottom of the control block. Refer to the Modbus serial embedded communication manual for a complete description.

[COM LED] Mdb1

View of the Modbus communication LED.

[Mdb Frame Nb] MFCt

Modbus network frames counter: number of processed frames.

Setting	Description
0...65,535	Setting range **Factory setting**: _

[Mb NET CRC errors] MFEC

Modbus network CRC error countered: number of CRC errors

Setting	Description
0...65,535	Setting range **Factory setting**: _

[Com. scanner input map] ı 5 A - Menu

Access

[Display] ➡ [Communication map] ➡ [Modbus network diag] ➡ [Com. scanner input map]

About This Menu

Used for CANopen® and Modbus network.

[Com Scan In1 val.] n M I

Com scanner input 1 value. Value of the first input word.

Setting	Description
0...65,535	Setting range **Factory setting**: _

[Com Scan In2 val.] n M 2

Com scanner input 2 value. Value of the second input word.

Identical to **[Com Scan In1 val.] n M I** *(see page 141)*.

[Com Scan In3 val.] n M 3

Com scanner input 3 value. Value of the third input word.

Identical to **[Com Scan In1 val.] n M I** *(see page 141)*.

[Com Scan In4 val.] n M 4

Com scanner input 4 value. Value of the fourth input word.

Identical to **[Com Scan In1 val.] n M I** *(see page 141)*.

[Com Scan In5 val.] n M 5

Com scanner input 5 value. Value of the fifth input word.

Identical to **[Com Scan In1 val.] n M I** *(see page 141)*.

[Com Scan In6 val.] n M 6

Com scanner input 6 value. Value of the sixth input word.

Identical to **[Com Scan In1 val.] n M I** *(see page 141)*.

[Com Scan In7 val.] n M 7

Com scanner input 7 value. Value of the seventh input word.

Identical to **[Com Scan In1 val.] n M I** *(see page 141)*.

[Com Scan In8 val.] n M 8

Com scanner input 8 value. Value of the eighth input word.

Identical to **[Com Scan In1 val.] n M I** *(see page 141)*.

[Com scan output map] oSA - Menu

Access

[Display] ➡ [Communication map] ➡ [Com scan output map]

About This Menu

Used for CANopen® and Modbus networks.

[Com Scan Out1 val.] nC1

Com scanner output 1 value. Value of the first output word.

Setting	Description
0...65,535	Setting range **Factory setting**: _

[Com Scan Out2 val.] nC2

Com scanner output 2 value. Value of the second output word.

Identical to **[Com Scan Out1 val.] nC1** *(see page 142)*.

[Com Scan Out3 val.] nC3

Com scanner output 3 value. Value of the third output word.

Identical to **[Com Scan Out1 val.] nC1** *(see page 142)*.

[Com Scan Out4 val.] nC4

Com scanner output 4 value. Value of the fourth output word.

Identical to **[Com Scan Out1 val.] nC1** *(see page 142)*.

[Com Scan Out5 val.] nC5

Com scanner output 5 value. Value of the fifth output word.

Identical to **[Com Scan Out1 val.] nC1** *(see page 142)*.

[Com Scan Out6 val.] nC6

Com scanner output 6 value. Value of the sixth output word.

Identical to **[Com Scan Out1 val.] nC1** *(see page 142)*.

[Com Scan Out7 val.] nC7

Com scanner output 7 value. Value of the seventh output word.

Identical to **[Com Scan Out1 val.] nC1** *(see page 142)*.

[Com Scan Out8 val.] nC8

Com scanner output 8 value. Value of the eighth output word.

Identical to **[Com Scan Out1 val.] nC1** *(see page 142)*.

[Modbus HMI Diag] Π d H - Menu

Access

[Display] ➞ [Communication map] ➞ [Modbus HMI Diag]

About This Menu

Used for the Modbus serial communication port at the front of the control block (used by the Graphic Display Terminal)

[COM LED] Π d b 2

View of the Modbus HMI communication LED.

[Mdb NET frames] Π 2 C t

Terminal Modbus 2: number of processed frames.

Setting	Description
0...65,535	Setting range

[Mdb NET CRC errors] Π 2 E C

Terminal Modbus 2: number of CRC errors.

Setting	Description
0...65,535	Setting range

[Ethernet Emb Diag] nPE - Menu

Access

[Display] ➡ [Communication map] ➡ [Ethernet Emb Diag]

About This Menu

Refer to the Modbus TCP Ethernet-IP communication manual.

[MAC @] nACE

MAC address of the embedded Ethernet adapter.

Read-only parameter.

The address format is XX-XX-XX-XX-XX-XX.

[ETH emb Rx frames] ErXE

Ethernet embedded Rx frames counter.

Setting	Description
0...4,294,967,295	Setting range **Factory setting**: _

[ETH emb Tx frames] EtXE

Ethernet embedded Tx frames counter.

Setting	Description
0...4,294,967,295	Setting range **Factory setting**: _

[ETH emb error frames] EErE

Ethernet embedded error frames counter.

Setting	Description
0...4,294,967,295	Setting range **Factory setting**: _

[Ethernet Rate Data] ArdE ★

Actual data rate.

Setting	Code / Value	Description
[Auto]	Auto	Automatic
[10M. full]	10F	10 F
[10M. half]	10H	10 H
[100M. full]	100F	100 F
[100M. half]	100H	100 H

[Ethernet Module Diag] nEt - Menu

Access

[Display] ➡ [Communication map] ➡ [Ethernet Module Diag]

About This Menu

Following parameters are accessible if Ethernet-IP - Modbus TCP Module (VW3A3720, 721) has been inserted.

[MAC @] MAC

MAC address of the embedded Ethernet Modbus TCP board.

Read-only parameter.

The address format is XX-XX-XX-XX-XX-XX.

[ETH opt Rx frames] ErX

Ethernet embedded Rx frames counter.

Setting	Description
0...4,294,967,295	Setting range **Factory setting**: _

[ETH opt Tx frames] EtX

Ethernet embedded Tx frames counter.

Setting	Description
0...4,294,967,295	Setting range **Factory setting**: _

[ETH opt error frames] EEr

Ethernet embedded error frames counter.

Setting	Description
0...4,294,967,295	Setting range **Factory setting**: _

[Actual rate] Ard ★

Actual data rate.

Setting	Code / Value	Description
[Auto]	Auto	Automatic
[10M. full]	10F	10 F
[10M. half]	10H	10 H
[100M. full]	100F	100 F
[100M. half]	100H	100 H

[DeviceNet Diag] dVn - Menu

Access

[Display] ➡ [Communication map] ➡ [DeviceNet Diag]

About This Menu

Following parameters can be accessed if DeviceNet module (VW3A3609) has been inserted.

[Data rate used] bdru ★

Data rate used by the fieldbus module.

Setting	Code / Value	Description
[Automatic]	Auto	Automatic detection **Factory setting**
[125 Kbps]	125K	125,000 Bauds
[250 Kbps]	250K	250,000 Bauds
[500 Kbps]	500K	500,000 Bauds

[Fieldbus Error] EPF2

External detected error from fieldbus module.

[Fieldbus Com Interrupt] CnF

Fieldbus module communication interruption. Refer to the related fieldbus manual.

Setting	Description
0...65,535	Setting range **Factory setting**: _

[Profibus Diag] Prb - Menu

Access

[Display] ➡ [Communication] ➡ [Profibus Diag]

About This Menu

Following parameters can be accessible if Profibus DP module VW3A3607 has been inserted.

[Data rate used] bdru ★

Data rate used by the fieldbus module.

Setting	Code / Value	Description
[Automatic]	Auto	Automatic detection **Factory setting**
[9.6 Kbps]	9K6	9,600 Bauds
[19.2 Kbps]	19K2	19,200 Bauds
[93.75 Kbps]	93K7	93,750 Bauds
[187.5 Kbps]	187K	187,500 Bauds
[500 Kbps]	500K	500,000 Bauds
[1.5 Mbps]	1M5	1.5 MBauds
[3 Mbps]	3M	3 MBauds
[6 Mbps]	6M	6 MBauds
[12 Mbps]	12M	12 MBauds

[PPO profile used] PrFL ★

PPO profile in use.

Setting	Code / Value	Description
[Not configured]	unCG	Not configured
[1]	1	PROFIdrive
[100]	100	Device specific
[101]	101	Device specific
[102]	102	Device specific
[106]	106	Device specific
[107]	107	Device specific

[DP Master Active] dPMA ★

Active master: 1 or 2.

Setting	Code / Value	Description
[MCL1]	1	Master 1 **Factory setting**
[MCL2]	2	Master 2

[Fieldbus Error] EPF2

External detected error from fieldbus module.

[Fieldbus Com Interrupt] $C n F$

Fieldbus module communication interruption. Refer to the related fieldbus manual.

Setting	Description
0...65,535	Setting range **Factory setting**: _

[InternCom Error1] $, L F 1$

Option module communication interruption. Refer to the related fieldbus manual.

Setting	Description
0...65,535	Setting range **Factory setting**: _

[PROFINET Diag] Prn - Menu

Access

[Display] ➡ [Communication map] ➡ [PROFINET Diag]

About This Menu

Following parameters are accessible if PROFINET® module (VW3A3627) has been inserted.

[MAC @] nAC

MAC address of the PROFINET module.

read-only parameter.

The address format is XX-XX-XX-XX-XX-XX.

[PPO profile used] PrFL ★

PPO profile in use.

Setting	Code / Value	Description
[Not configured]	unCG	Not configured
[1]	1	PROFIdrive
[100]	100	Device specific
[101]	101	Device specific
[102]	102	Device specific
[106]	106	Device specific
[107]	107	Device specific

[Ethernet Error Code] Err ★

Ethernet specific error code.

Setting	Description
0...65,535	Setting range **Factory setting**: 0

[iPar Status] iPAE ★

PROFINET: IPAR service status.

Setting	Code / Value	Description
[Idle State]	idLE	Idle state
[Init]	init	Initialization
[Configuration]	Conf	Configuration
[Ready]	rdy	Ready
[Operational]	oPE	Operational
[Not Configured]	uCFG	Not configured
[Unrecoverable Error]	urEC	Unrecoverable detected error

[iPar Error Code] iPAd ★

IPar detected error code.

Setting	Description
0...5	Setting range **Factory setting**: 0

[DP Master Active] dPMA ★

Active master: 1 or 2.

Setting	Code / Value	Description
[MCL1]	1	Master 1 **Factory setting**
[MCL2]	2	Master 2

[Fieldbus Error] EPF2

External detected error from fieldbus module.

[Fieldbus Com Interrupt] CnF

Fieldbus module communication interruption.

Setting	Description
0...65,535	Setting range **Factory setting**: _

[InternCom Error1] iLF1

Option module communication interruption.

Setting	Description
0...65,535	Setting range **Factory setting**: _

[Command word image] CWI - Menu

Access

[Display] ➡ [Communication map] ➡ [Command word image]

About This Menu

Command word image.

[Modbus Cmd] CMd1

Command word image built with Modbus port source.

Identical to **[CMD Value]** CMd *(see page 136)*.

[CANopen Cmd] CMd2

Command word image built with CANopen® port source.

Identical to **[CMD Value]** CMd *(see page 136)*.

[COM. Module Cmd.] CMd3

Command word image built with fieldbus module source.

Identical to **[CMD Value]** CMd *(see page 136)*.

[Ethernet Embd cmd.] CMd5

Command word image built with Ethernet embedded source).

Identical to **[CMD Value]** CMd *(see page 136)*.

[Freq. ref. word map] rWI - Menu

Access

[Display] ➡ [Communication map] ➡ [Freq. ref. word map]

About This Menu

Frequency reference image.

[Modbus Ref Freq] LFr1

Frequency reference image built with Modbus port source (LFR_MDB).

Setting	Description
-32,767...32,767 Hz	Setting range **Factory setting**: 0.0 Hz

[CAN Ref Freq] LFr2

Frequency reference image built with CANopen® port source (LFR_CAN).

Setting	Description
-32,767...32,767 Hz	Setting range **Factory setting**: 0.0 Hz

[Com Module Ref Freq] LFr3

Frequency reference image built with fieldbus module source (LFR_COM).

Setting	Description
-32,767...32,767 Hz	Setting range **Factory setting**: 0.0 Hz

[Ethernet Embd Ref Freq] LFr5

Embedded Ethernet reference frequency.

Setting	Description
-32,767...32,767 Hz	Setting range **Factory setting**: 0.0 Hz

[CANopen map] CnM - Menu

Access

[Display] ➡ [Communication map] ➡ [CANopen map]

About This Menu

This menu is visible if a CANopen fieldbus module is present. Refer to the CANopen communication module manual.

[RUN LED] Crun

Bitfield: view of the CANopen® Run LED status.

[ERR LED] CAnE

Bitfield: view of the CANopen® error LED status.

[PDO1 image] Pd1- Menu

Access

[Display] ➡ [Communication map] ➡ [CANopen map] ➡ [PDO1 image]

About This Menu

View of the Receive PDO1 and Transmit PDO1.

[Receive PDO1-1] rP11★

First frame of the receive PDO1.

Setting	Description
0...65,535	Setting range **Factory setting**: _

[Receive PDO1-2] rP12★

Second frame of the receive PDO1.

Setting	Description
0...65,535	Setting range **Factory setting**: _

[Receive PDO1-3] rP13★

Third frame of the receive PDO1.

Setting	Description
0...65,535	Setting range **Factory setting**: _

[Receive PDO1-4] rP14★

Fourth frame of the receive PDO1.

Setting	Description
0...65,535	Setting range **Factory setting**: _

[Transmit PDO1-1] tP11★

First frame of the transmit PDO1.

Setting	Description
0...65,535	Setting range **Factory setting**: _

[Transmit PDO1-2] tP12★

Second frame of the transmit PDO1.

Setting	Description
0...65,535	Setting range **Factory setting**: _

[Transmit PDO1-3] tP13★

Third frame of the transmit PDO1.

Setting	Description
0...65,535	Setting range **Factory setting**: _

[Transmit PDO1-4] tP14★

Fourth frame of the transmit PDO1.

Setting	Description
0...65,535	Setting range **Factory setting**: _

[PDO2 image] P o 2 - Menu

Access

[Display] ➡ [Communication map] ➡ [CANopen map] ➡ [PDO2 image]

About This Menu

View of the RPDO2 and TPDO2: same structure as **[PDO1 image]** P o 1 - *(see page 154)*.

[Receive PDO2-1] r P 2 1★

First frame of the receive PDO2.

[Receive PDO2-2] r P 2 2★

Second frame of the receive PDO2.

[Receive PDO2-3] r P 2 3★

Third frame of the receive PDO2.

[Receive PDO2-4] r P 2 4★

Fourth frame of the receive PDO2.

[Transmit PDO2-1] t P 2 1★

First frame of the transmit PDO2.

[Transmit PDO2-2] t P 2 2★

Second frame of the transmit PDO2.

[Transmit PDO2-3] t P 2 3★

Third frame of the transmit PDO2.

[Transmit PDO2-4] t P 2 4★

Fourth frame of the transmit PDO2.

[PDO3 image] P o 3 - Menu

Access

[Display] ➡ [Communication map] ➡ [CANopen map] ➡ [PDO3 image]

About This Menu

View of the RPDO3 and TPDO3.

[Receive PDO3-1] r P 3 1★

First frame of the receive PDO3.

Setting	Description
0...65,535	Setting range **Factory setting**: _

[Receive PDO3-2] r P 3 2★

Second frame of the receive PDO3.

Identical settings as in **[Receive PDO3-1]** r P 3 1.

[Receive PDO3-3] r P 3 3★

Third frame of the receive PDO3.

Identical settings as in **[Receive PDO3-1]** r P 3 1.

[Receive PDO3-4] r P 3 4★

Fourth frame of the receive PDO3.

Identical settings as in **[Receive PDO3-1]** r P 3 1.

[Transmit PDO3-1] t P 3 1★

First frame of the transmit PDO3.

Setting	Description
0...65,535	Setting range **Factory setting**: _

[Transmit PDO3-2] t P 3 2★

Second frame of the transmit PDO3.

Identical settings as in **[Transmit PDO3-1]** t P 3 1.

[Transmit PDO3-3] t P 3 3★

Third frame of the transmit PDO3.

Identical settings as in **[Transmit PDO3-1]** t P 3 1.

[Transmit PDO3-4] t P 3 4★

Fourth frame of the transmit PDO3.

Identical settings as in **[Transmit PDO3-1]** t P 3 1.

[CANopen map] C n M - Menu

Access

[Display] ➡ [Communication map] ➡ [CANopen map]

About This Menu

CANopen® image.

[Canopen NMT state] n M t S

Drive NMT state of the CANopen® slave.

Settings	Code / Value	Description
[Boot]	b o o t	Bootup
[Stopped]	S t o P	Stopped
[Operation]	o P E	Operational
[Pre-op]	P o P E	Pre-Operational

[Number of TX PDO] n b t P

Number of transmit PDO.

Setting	Description
0...65,535	Setting range **Factory setting**: _

[Number of RX PDO] n b r P

Number of receive PDO.

Setting	Description
0...65,535	Setting range **Factory setting**: _

[CANopen Error] E r C o

Error registry CANopen®.

Setting	Description
0...5	Setting range **Factory setting**: _

[RX Error Counter] r E C ı

Number of receive error counter (not saved at power off).

Setting	Description
0...65,535	Setting range **Factory setting**: _

[TX Error Counter] t E C ı

Number of transmit errors countered (not saved at power off).

Setting	Description
0...65,535	Setting range **Factory setting**: _

Section 6.12
[Data logging]

What Is in This Section?

This section contains the following topics:

Topic	Page
[Distributed logging] *d L o* - Menu	160
[Log dstrb prm select] *L d P* - Menu	161
[Distributed logging] *d L o* - Menu	162

[Distributed logging] dLo- Menu

Access

[Display] ➡ [Data logging] ➡ [Distributed logging]

About This Menu

This menu is used to store data following specific parameters.

The distributed logging function allows to log up to four parameter distributions at the same time. Each parameter storage is synchronized with the same sample time.

The result of this function gives the possibility to extract a bar graph with 10 bars (every 10% of the defined maximum value) to visualize the distribution for each of the four selected parameters.

NOTE: Any modification of the data logging function configuration will clear the data previously stored.

This function aims at extracting samples of data to store them. When available, these samples can be uploaded by other tools (SoMove and/or Webserver). Data logging meets the need to record and store data over time.

The drive can store the following data:

Type of [Data logging]	Description	[Data logging] storage: Automatic/Manual	Access
Drive identification	Drive identification data	Automatic, in **[Dashboard]** dSH- menu	SoMove Webserver
Even warning logging	Warning logging	Automatic, in **[Dashboard]** dSH- menu	SoMove Webserver
Even error logging	Error logging	Automatic, in **[Dashboard]** dSH- menu	SoMove Webserver
Distribution logging	4 Distribution data	Manual	Webserver
Energy logging	1 Energy logging data	Automatic, in **[Dashboard]** dSH- menu	SoMove Webserver

Activation

To activate **[Distributed logging]** dLo-:

- Select 1 to 4 data to store with **[Log dstrb prm select]** LdP-
- Set **[Log Distrib State]** LdEn to **[Start]** StArt

The logging starts as soon as the motor is running.

To stop logging, set **[Log Distrib State]** LdEn to **[Stop]** StoP.

[Log Distrib State] LdEn

Logging distribution state.

Setting ❮❯	Code / Value	Description
[Stop]	StoP	Distribution logging disabled **Factory setting**
[Start]	StArt	Distribution logs only when the motor is started
[Always]	ALWAYS	Distribution logs all the time
[Reset]	rESEt	Distribution logging reset (configuration, data)
[Clear]	CLEAr	Clear distribution data
[Error]	Error	An error has been detected during distribution logging

[Log dstrb prm select] L d P - Menu

Access

[Display] ➡ [Data logging] ➡ [Distributed logging] ➡ [Log dstrb prm select]

About This Menu

This menu allows you to select up to 4 parameters for data logging. The peak value for each parameter is also stored.

[Log Distrib. Data 1] L d d 1

Logging distribution data 1.

Setting	Code / Value	Description
[Distrib. Log. Disable]	n o	Distribution logging disable **Factory setting**
[Motor Frequency]	r F r	Motor frequency
[Motor Current]	L C r	Motor current
[Motor Speed]	S P d	Motor speed
[Motor Voltage]	u o P	Motor voltage
[Motor Mech. Power]	o P r W	Motor mechanical power
[Input Elec. Power]	I P r W	Input electrical power
[Output Elec. Power]	E P r W	Output electrical power
[Motor Torque]	o t r	Motor torque
[Mains Voltage]	u L n	Mains voltage
[DC BUS Voltage]	V b u S	DC BUS voltage
[PID Feedback]	r P F	PID feedback
[AI1 Th Value]	t H 1 V	Thermal sensor AI1
[AI3 Th Value]	t H 3 V	Thermal sensor AI3
[AI4 Th Value]	t H 4 V	Thermal sensor AI4
[AI5 Th Value]	t H 5 V	Thermal sensor AI5
[Drive Thermal State]	t H d	Drive thermal state
[Motor Therm State]	t H r	Motor thermal state
[Installation Flow]	F S 1 u	Installation flow
[Pump Flow]	F S 2 u	Pump flow
[Inlet Pressure Value]	P S 1 u	Inlet pressure sensor
[Outlet Pressure Value]	P S 2 u	Outlet pressure sensor
[Energy Consum. Ind.]	E C I	Energy consumption indicator
[Pump Efficiency]	E F Y	Pump efficiency
[Energy Perf. Ind.]	E P I	Energy performance indicator

[Log Distrib. Data 2] L d d 2

Logging distribution data 2.

Identical to **[Log Distrib. Data 1]** L d d 1 *(see page 161)*.

[Log Distrib. Data 3] L d d 3

Logging distribution data 3.

Identical to **[Log Distrib. Data 1]** L d d 1 *(see page 161)*.

[Log Distrib. Data 4] L d d 4

Logging distribution data 4.

Identical to **[Log Distrib. Data 1]** L d d 1 *(see page 161)*.

[Distributed logging] dLo - Menu

Access

[Display] ➡ [Data logging] ➡ [Distributed logging]

About This Menu

NOTE: If a log data exceeds the user defined maximum values for log distribution data, this value will not be stored in the log distribution.

[Log Distrib Slp Time] LdSt

Logging distribution sample time.

Setting	Code / Value	Description
[200 ms]	200MS	200 ms
[1 second]	1S	1 s **Factory setting**
[2 second]	2S	2 s
[5 second]	5S	5 s

[Dist Max Val 1] LdM1

Maximum value of the log distribution data 1.

Setting	Description
10...65,535	Setting range **Factory setting**: _

[Dist Max Val 2] LdM2

Maximum value of the log distribution data 2.

Setting	Description
10...65,535	Setting range **Factory setting**: _

[Dist Max Val 3] LdM3

Maximum value of the log distribution data 3.

Setting	Description
10...65,535	Setting range **Factory setting**: _

[Dist Max Val 4] LdM4

Maximum value of the log distribution data 4.

Setting	Description
10...65,535	Setting range **Factory setting**: _

Chapter 7
[Complete settings] CSt -

Introduction

[Complete settings] CSt - menu presents all the settings related to drive functions for:

- Motor and drive configuration
- Application functions
- Monitoring functions

What Is in This Chapter?

This chapter contains the following sections:

Section	Topic	Page
7.1	Overview	165
7.2	**[Macro configuration]**	168
7.3	**[Motor parameters]** MPA - Menu	170
7.4	**[Define system units]**	202
7.5	**[Sensors assignment]**	206
7.6	**[Command and Reference]** CrP - Menu	230
7.7	**[Pump functions]** - **[Booster control]**	244
7.8	**[Pump functions]** - **[Level control]**	277
7.9	**[Pump functions]** - **[PID controller]**	298
7.10	**[Pump functions]** - **[Sleep/wakeup]**	317
7.11	**[Pump functions]** - **[Feedback monitoring]**	330
7.12	**[Pump functions]** - **[Pump characteristics]**	332
7.13	**[Pump functions]** - **[Sensorless flow estimation]**	339
7.14	**[Pump functions]** - **[dP/Head Correction]**	342
7.15	**[Pump functions]** - **[Pump start stop]**	344
7.16	**[Pump functions]** - **[Pipe fill]**	348
7.17	**[Pump functions]** - **[Friction loss compensation]**	353
7.18	**[Pump functions]** - **[Jockey pump]**	356
7.19	**[Pump functions]** - **[Priming pump ctrl]**	359
7.20	**[Pump functions]** - **[Flow limitation]**	364
7.21	**[Pump monitoring]** - **[Pumpcycle monitoring]**	368
7.22	**[Pump monitoring]** - **[Anti jam]**	370
7.23	**[Pump monitoring]** - **[Dry run Monit]**	377
7.24	**[Pump monitoring]** - **[Pump low flow Monit]**	380
7.25	**[Pump monitoring]** - **[Thermal monitoring]**	386
7.26	**[Pump monitoring]** - **[Inlet pressure monitoring]**	387
7.27	**[Pump monitoring]** - **[Outlet pressure monitoring]**	391
7.28	**[Pump monitoring]** - **[High flow monitoring]**	395
7.29	**[Fan]** - **[PID controller]**	399
7.30	**[Fan]** - **[Feedback monitoring]**	400
7.31	**[Fan]** - **[Jump frequency]**	401
7.32	**[Fan]**	402
7.33	**[Generic functions]** - **[Speed limits]**	404
7.34	**[Generic functions]** - **[Ramp]**	407
7.35	**[Generic functions]** - **[Ramp switching]**	410
7.36	**[Generic functions]** - **[Stop configuration]**	412

Section	Topic	Page
7.37	[Generic functions] - [Auto DC injection]	418
7.38	[Generic functions] - [Ref. operations]	421
7.39	[Generic functions] - [Preset speeds]	423
7.40	[Generic functions] - [+/- speed]	427
7.41	[Generic functions] - [Jump frequency]	430
7.42	[Generic functions] - [PID controller]	431
7.43	[Generic functions] - [Feedback mon.]	432
7.44	[Generic functions] - [Threshold reached]	433
7.45	[Generic functions] - [Mains contactor command]	435
7.46	[Generic functions] - [Reverse disable]	438
7.47	[Generic functions] - [Torque limitation]	439
7.48	[Generic functions] - [Parameters switching]	441
7.49	[Generic functions] - [Stop after speed timeout]	449
7.50	[Generic functions] - [Active Front End]	451
7.51	[Generic monitoring]	452
7.52	[Input/Output] - [I/O assignment]	459
7.53	[Input/Output] - [DI/DQ]	479
7.54	[Input/Output] - [Analog I/O]	502
7.55	[Input/Output] - [Relay]	520
7.56	[Error/Warning handling]	535
7.57	[Maintenance]	561
7.58	[Cabinet I/O functions] - [Monitoring circuit]	570
7.59	[Cabinet I/O functions] - [Cabinet circuit]	575
7.60	[Cabinet I/O functions] - [Motor winding]	578
7.61	[Cabinet I/O functions] - [Motor bearing]	581
7.62	[Cabinet I/O functions] - [Circuit breaker]	583

Section 7.1
Overview

Application Control Mode

Introduction

There are five application control modes for the pump controller.

The application control mode is determined according to the selected channel and **[PID regul.]** *P id* mode.

This table presents the priority order of the control modes:

Priority	Channel	Function	Control mode
1	Local	*FLo* or *tK*	Local
2	Channel 2	*Fr2*	Override
3	Channel 1	*PIM*	PID manu
4	Channel 1	*PISP*	PID auto
5	Channel 1	*Fr1* or *Fr1b*	Speed control

Application Control Functions

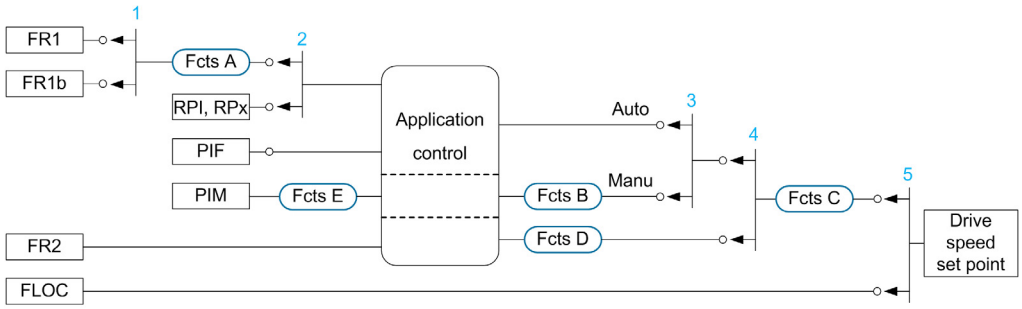
Application control functions are not all available in all modes.This table presents the availability of each function according to the selected mode:

Function	Channel 1			Channel 2	Local	Application status
	PId Manu	*PId* Auto	No *PId*			
Reference Frequency Source	*PIM*	*PISP*	*Fr1* or *Fr1b*	*Fr2*	*bMP* or *FLoC*	–
Centrifugal Pump Start & Stop	Yes	Yes	Yes	Yes	Yes	–
Thermal Pump Monitoring	Yes	Yes	Yes	Yes	Yes	–
Anti-Jam	Yes	Yes	Yes	No	No	*AJAM*
Priming Pump Control	Yes	Yes	Yes	No	No	*PrIM*
Pipe Fill	Yes	Yes	Yes	No	No	*FILL*
Dry Run Pump Monitoring	Yes	Yes	Yes	No	No	–
Pump Low Flow Monitoring	Yes	Yes	Yes	No	No	–
Pumpcycle Monitoring	Yes	Yes	Yes	No	No	–
High Flow Monitoring	Yes	Yes	Yes	No	No	–
Flow Limitation	Yes	Yes	Yes	No	No	*FLIM*
Outlet Pressure Monitoring	Yes	Yes	Yes	No	No	–
Inlet Pressure Monitoring	Yes	Yes	Yes	No	No	*CoMP*
Process Control (PID)	Yes (Manu)	Yes (Auto)	Not configured	No	No	*Auto* *MAnu*
PID Controller	Yes	Yes	No	No	No	*boost* *SLEEP*
Sleep Wake-Up (Pressure Control)	No	Yes	No	No	No	–
Advanced sleep Checking (Pressure Control)	No	Yes	No	No	No	–
Friction Loss Compensation	No	Yes	No	No	No	–

1 Multi-pump Management is active for Booster or Level Control. When Booster and Level Control are both inactive, all auxiliary pumps are stopped.

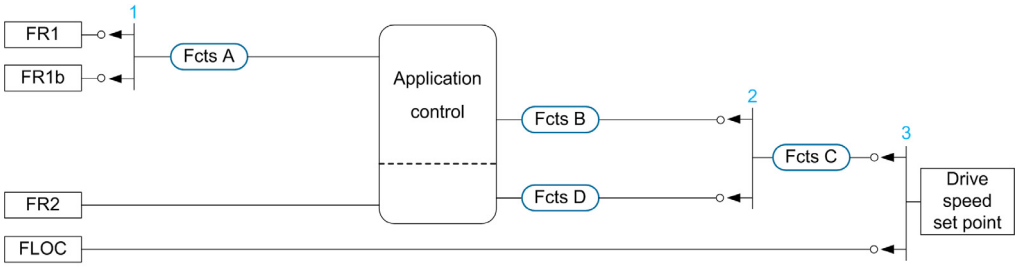
Function	Channel 1			Channel 2	Local	Application status
	PId Manu	PId Auto	No PId			
Jockey Pump Control	No	Yes	No	No	No	–
PID Feedback Monitoring	No	Yes	No	No	No	–
Stop After Speed Timeout	Yes	No	Yes	Yes	Yes	SLEEP
Multi-pump Management	Yes (1)	Yes (1)	Yes (1)	–	–	–
Booster Control	Yes	Yes	Yes	No	No	–
Level Control	N/A	N/A	Yes	No	No	–
1 Multi-pump Management is active for Booster or Level Control. When Booster and Level Control are both inactive, all auxiliary pumps are stopped.						

Reference Channel Overview with PID Configured



1 Commutation between channel 1 and channel 1b done with **[Acceleration 2]** rCb parameter
2 Choice of the process setpoint done with **[Intern PID Ref]** PII parameter
3 Manual function of the **[PID regul.]** PId, commutation done with **[Auto/Manual assign.]** PAu parameter
4 Choice between channel 1 and channel 2 done with **[Freq Switch Assign]** rFC parameter
5 Forced local mode activated by the function **[Forced Local Assign]** FLo or **[T/K]** FnK

Reference Channel Overview with PID Not Configured



1 Commutation between channel 1 and channel 1b done with **[Acceleration 2]** rCb parameter
2 Choice between channel 1 and channel 2 done with **[Freq Switch Assign]** rFC parameter
3 Forced local mode activated by the function **[Forced Local Assign]** FLo or **[T/K]** FnK

Monitoring Functions

This table presents the function availability depending on the application status:

Application status	System monitoring functions			Pump monitoring functions (pump running)			
	Outlet low pressure	Outlet high pressure	High flow	Inlet low pressure	Pump low flow	Dry run	Pumpcycle
AJAn	No	No	No	No	No	No	Only 1 per cycle
Pr in	No	Yes	Yes	N/A or no	N/A	N/A	N/A
FiLL	No	Yes	Yes	Yes	Yes	Yes	Each start
run, MAnu, Auto, FL in, CoMP	Yes	Yes	Yes	Yes	Yes	Yes	Each start
booSt	Yes	Yes	Yes	Yes	Yes	Yes	N/A
SLEEP	Yes	Yes	Yes	N/A or no	N/A	N/A	N/A
JoCKEY	Yes	Yes	Yes	Yes (1)	Yes (1)	Yes (1)	Each start (1)

1 If the VSD pump is used as a jockey pump

Section 7.2
[Macro configuration]

[Macro configuration] MCr - Menu

Access

[Complete settings] ➞ [Macro configuration]

About This Menu

This menu allows to select an application type in order to display only the parameters and menus useful for the selected application.

The application type selection should be done prior to the application settings.

Application compatibility

The following table shows the functions that can be configured depending of **[Application Selection]** APPL value.

Function	[Application Selection] APPL		
	[Generic Pump Control] GPMP	[Pump Level Control] LEVEL	[Pump Booster Control] boo5t
[Pump characteristics] PCr -	Yes	Yes	Yes
[Sensorless flow estimation] 5FE -	Yes	Only for Lead Pump in architectures with 1 variable speed pump. Available for all pumps in multiple variable speed pump architectures.	
[Pump start stop] P5t -	Yes	Yes	Yes
[Thermal monitoring] tPP -	Yes	Yes	Yes
[Anti-jam monit] JAM -	Yes	Only for Lead Pump in architectures with 1 variable speed pump. Available for all pumps in multiple variable speed pump architectures.	
[Priming pump ctrl] PPC -	Yes	Only for Lead Pump in architectures with 1 variable speed pump. Available for all pumps in multiple variable speed pump architectures.	
[Pipe fill] PF i -	Yes	Not available	Yes
[Dry run Monit] dYr -	Yes	Only for Lead Pump in architectures with 1 variable speed pump. Available for all pumps in multiple variable speed pump architectures.	
[Pump low flow Monit] PLF -	Yes	Only for Lead Pump in architectures with 1 variable speed pump. Available for all pumps in multiple variable speed pump architectures.	
[Pumpcycle monitoring] CSP -	Yes	Only for Lead Pump in architectures with 1 variable speed pump if no Lead Pump Alternation configured. Available for all pumps in multiple variable speed pump architectures.	
[High flow monitoring] HFP -	Yes	Based on Installation Flow Sensor	
[Flow limitation] FLM -	Yes	Not available	Yes
[Outlet pressure monitoring] oPP -	Yes	Yes	Yes

Function	[Application Selection] APPt		
	[Generic Pump Control] GPMP	[Pump Level Control] LEVEL	[Pump Booster Control] boost
[Inlet pressure monitoring]] IPP-	Yes	Only Warning can be configured	Yes
[PID controller] Pid-	Yes	Not available	Required
[Sleep/Wakeup] SPW-	Yes	Not available	Yes
[Frictionlosscomp] FLC-	Yes	Not available	Yes
[Jockey pump] JKP-	Yes	Not available	Yes
[Feedback monitoring] FKM-	Yes	Not available	Yes
[Booster control] bSt-	Not available	Not available	Yes
[Level Control] LVL-	Not available	Yes	Not available

[Application Selection] APPt

Application selection.

⚠ WARNING

UNANTICIPATED EQUIPMENT OPERATION

If this parameter is changed, the functions that are active with the current configuration are disabled and the assignments of the inputs used in these functions are reset to the factory setting.

Verify that this change is compatible with the type of wiring used.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Setting	Code / Value	Description
[Generic Pump Control]	GPMP	Generic pump control application **Factory setting**
[Pump Level Control]	LEVEL	Pump level control application
[Pump Booster Control]	boost	Pump booster control application
[Generic Fan Control]	FAn	Generic fan control application

Section 7.3
[Motor parameters] MPA - Menu

What Is in This Section?

This section contains the following topics:

Topic	Page
[Motor parameters] MPA - Menu	171
[Data] Mtd - Menu	173
[Motor tune] Mtu - Menu	180
[Motor monitoring] MoP - Menu	186
[Thermal monitoring] tPP - Menu	187
[Motor monitoring] MoP - Menu	193
[Motor control] drC - Menu	195
[Switching frequency] SWF - Menu	200

[Motor parameters] MPA - Menu

Access

[Complete settings] ➞ [Motor parameters]

About This Menu

For an application where less than 110% of overload is required
- Power rating of the drive could be equal to power rating of the motor
- Normal rating should be used

For an application where more that 110% of overload is required (up to 150%)
- Power rating of the drive should be greater than power rating of the motor
- High rating could be used to pre-adjust motor nameplate parameter

If high rating is selected, drive current limitation is extended to 1.5. In and maximum values of motor parameters linked to current and/or power are reduced. When switching from one to another selection, all the related parameters are set to their factory setting values.

In any case, the maximum current of the drive does not change. Setting the drive to high rating mode decreases the nominal values for the motor parameters. It means that for the same motor, an oversized drive is required in high rating mode.

[Dual Rating] drt

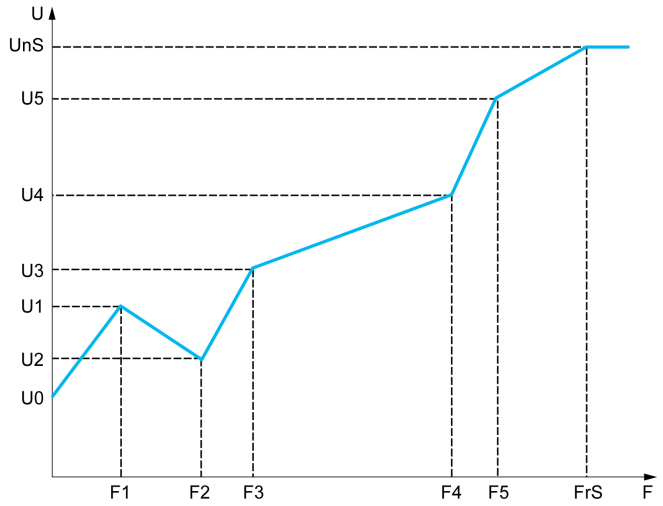
Dual rating state.

Setting	Code / Value	Description
[Normal rating]	nor MAL	Normal rating, drive current limitation is 1.1 In **Factory setting**
[High rating]	HIGH	High rating, drive current limitation is 1.5 In

[Motor Control Type] Ctt

Motor control type.

NOTE: Select the motor control type before entering parameter values.

Setting	Code / Value	Description
[U/F VC Standard]	STd	Standard motor control type. For applications that require torque at low speed. This motor control type can be used for motors connected in parallel.
[U/F VC 5pts]	uF5	5–segment V/F profile: As **[U/F VC Standard]** STd profile but also supports the avoidance of resonance (saturation).  The profile is defined by the values of parameters unS, FrS, u1 to u5 and F1 to F5. FrS > F5 > F4 > F3 > F2 > F1 **NOTE:** U0 is the result of an internal calculation based on motor parameters and multiplied by uFr (%). U0 can be adjusted by modifying uFr value.
[U/F VC Quad.]	uF9	Motor control type dedicated to variable torque applications, typically used for pumps and fans. **Factory setting**
[SYN_U VC]	SYnu	Open-loop synchronous motor: Motor control type specific for permanent magnet synchronous motors. This motor control type is used for variable torque applications.
[U/F VC Energy Sav.]	ECo	Specific motor control type optimized for energy saving. This motor control type automatically reduces the drive output current according to the motor load. This automatic current level adaptation allows energy saving for periods when load is kept to a minimum and preserves the drive performance up to full load.

[Data] nEd - Menu

Access

[Complete settings] ➡ **[Motor parameters]** ➡ **[Motor data]** ➡ **[Data]**

About This Menu

For synchronous motor parameters. Dedicated parameters can be accessed if **[Motor Control Type]** Ctt is set to **[SYN_U VC]** SYnu.

⚠ WARNING

LOSS OF CONTROL

- Fully read and understand the manual of the connected motor.
- Verify that all motor parameters are correctly set by referring to the nameplate and the manual of the connected motor.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

This table presents the steps to follow to set and optimize the motor data:

Step	Action
1	Enter the motor nameplate
2	Perform the **[Autotuning]** tun operation
3	Adjust **[Syn. EMF constant]** PHS to optimize the behavior: ● Start the motor at minimal stable frequency available on the machine (at minimum load). ● Check and note the **[% error EMF sync]** rdAE value: ❍ If the **[% error EMF sync]** rdAE value is lower than 0%, then **[Syn. EMF constant]** PHS may be increased. ❍ If the **[% error EMF sync]** rdAE value is upper than 0%, then **[Syn. EMF constant]** PHS may be reduced. **[% error EMF sync]** rdAE value should be closed to 0%. ● Stop the motor for modify **[Syn. EMF constant]** PHS in accordance with the value of the **[% error EMF sync]** rdAE (previously noted).

[Motor Standard] bFr ★

Motor standard.

This parameter modifies the presets of the following parameters:

- **[High Speed]** HSP
- **[Motor Freq Thd]** Ftd
- **[Nom Motor Voltage]** unS
- **[Nominal Motor Freq]** FrS
- **[Max Frequency]** tFr

This parameter can be accessed if **[Motor Control Type]** Ctt is not set to **[SYN_U VC]** SYnu.

Setting	Code / Value	Description
[50 Hz IEC]	50	IEC **Factory setting**
[60 Hz NEMA]	60	NEMA

[Nominal Motor Power] nPr ★

Nominal motor power.

This parameter can be accessed if **[Motor Control Type]** Ctt is not set to **[SYN_U VC]** SYnU.

Rated motor power given on the nameplate, in kW if **[Motor Standard]** bFr is set to **[50Hz IEC]** 50, in HP if **[Motor Standard]** bFr is set to **[60Hz NEMA]** 60.

Setting	Description
According to drive rating	– **Factory setting**: according to the drive rating

[Nom Motor Voltage] UnS ★

Nominal motor voltage.

This parameter can be accessed if **[Motor Control Type]** Ctt is not set to **[SYN_U VC]** SYnU.

Rated motor voltage given on the nameplate.

Setting	Description
100...690 Vac	Setting range **Factory setting**: according to drive rating and **[Motor Standard]** bFr

[Nom Motor Current] nCr ★

Rated motor current given on the nameplate.

This parameter can be accessed if **[Motor Control Type]** Ctt is not set to **[SYN_U VC]** SYnU.

Setting	Description
0.25...1.5 In (1)	Setting range **Factory setting**: according to drive rating and **[Motor Standard]** bFr
(1) Corresponding to the rated drive current indicated in the installation manual and on the drive nameplate.	

[Nominal Motor Freq] FrS ★

Nominal motor frequency.

This parameter can be accessed if **[Motor Control Type]** Ctt is not set to **[SYN_U VC]** SYnU.

The factory setting is 50 Hz, or preset to 60 Hz if **[Motor Standard]** bFr is set to 60 Hz.

Setting	Description
40.0...500.0 Hz	Setting range **Factory setting**: 50 Hz

[Nominal Motor Speed] nSP ★

Nominal motor speed.

This parameter can be accessed if **[Motor Control Type]** Ctt is not set to **[SYN_U VC]** SYnu.

If the nameplate indicates the synchronous speed and the slip in Hz or as a %, use any 1 of the formulas to calculate the rated speed:

- Nominal speed = Synchronous speed x $\frac{100 - \text{slip as a \%}}{100}$
- Nominal speed = Synchronous speed x $\frac{60 - \text{slip in Hz}}{60}$ (60 Hz motors)
- Nominal speed = Synchronous speed x $\frac{50 - \text{slip in Hz}}{50}$ (50 Hz motors).

Setting	Description
0...65,535 rpm	Setting range **Factory setting**: according to drive rating

[Motor Param Choice] MPC ★

Motor parameter choice.

This parameter can be accessed if **[Motor Control Type]** Ctt is not set to **[SYN_U VC]** SYnu.

Setting	Code / Value	Description
[Mot Power]	nPr	Motor power **Factory setting**
[Mot Cosinus]	CoS	Motor cosinus

[Motor 1 Cosinus Phi] CoS ★

Nominal motor cosinus Phi.

This parameter can be accessed if **[Motor Control Type]** Ctt is not set to **[SYN_U VC]** SYnu and if **[Motor param choice]** MPC is set to **[Mot Cosinus]** CoS.

Setting	Description
0.50...1.00	Setting range **Factory setting**: according to the drive rating

[AsyncMotor R Stator] rSA ★

Asynchronous motor stator resistance.

This parameter can be accessed if **[Access Level]** LAC is set to **[Expert]** EPr and if **[Motor Control Type]** Ctt is not set to **[SYN_U VC]** SYnu.

The factory setting is replaced by the result of the autotuning operation if it has been performed.

Setting	Description
0...65,535 mOhm	Setting range **Factory setting**: 0 mOhm

[Magnetizing Current] idA ★

Magnetizing current.

This parameter can be accessed if **[Access Level]** LAC is set to **[Expert]** EPr and if **[Motor Control Type]** Ctt is not set to **[SYN_U VC]** SYnu.

Setting	Description
0...6,553.5 A	Setting range **Factory setting**: 0 A

[AsyncMotor L Induct] LFA ★

Asynchronous motor leakage inductance.

This parameter can be accessed if **[Access Level]** LAC is set to **[Expert]** EPr and if **[Motor Control Type]** CTT is not set to **[SYN_U VC]** SYnU.

The factory setting is replaced by the result of the autotuning operation if it has been performed.

Setting	Description
0...655.35 mH	Setting range **Factory setting**: 0 mH

[Rotor Time Const] trA ★

Rotor time constant.

This parameter can be accessed if **[Access Level]** LAC is set to **[Expert]** EPr and if **[Motor Control Type]** CTT is not set to **[SYN_U VC]** SYnU.

Setting	Description
0...65,535 ms	Setting range **Factory setting**: 0 ms

[Sync Nominal I] nCrS ★

Sync motor nominal current.

This parameter can be accessed if **[Motor Control Type]** CTT is set to **[SYN_U VC]** SYnU.

Setting	Description
0.25...1.2 In (1)	Setting range **Factory setting**: according to the drive rating.
(1) Corresponding to the rated drive current indicated in the installation manual and on the drive nameplate.	

[Nom SyncMotor Speed] nSPS ★

Nominal synchronous motor speed.

This parameter can be accessed if **[Motor Control Type]** CTT is set to **[SYN_U VC]** SYnU.

Setting	Description
0...48,000 rpm	Setting range **Factory setting**: according to the drive rating.

[Nom Motor torque] tqS ★

Nominal motor torque

This parameter can be accessed if **[Motor Control Type]** CTT is set to **[SYN_U VC]** SYnU.

Setting	Description
0.1...6,553.5 Nm	Setting range **Factory setting**: according to the drive rating.

[Pole pairs] PPnS ★

Pole pairs.

This parameter can be accessed if **[Motor Control Type]** CTT is set to **[SYN_U VC]** SYnU.

Setting	Description
1...50	Setting range **Factory setting**: according to the drive rating.

[Angle setting type] AnGt ★

Automatic angle setting type.

This parameter can be accessed if **[Motor Control Type]** Ctt is set to **[SYN_U VC]** SYnU.

This function is used to align the rotor or to compute the angle of the rotor flux linked to permanent magnets in order to reduce torque jolt at start-up.

Setting	Code / Value	Description
[PSI align]	PSI	Pulse signal injection. Standard alignment mode, without rotor motion The angle measurement is realized by monitoring the stator current response to a pulse signal injection over a wide range of frequencies
[PSIO align]	PSIo	Pulse signal injection - optimized. Optimized alignment mode, without rotor motion Same operation as **[PSI align]** PSI is performed over an optimized range of frequencies The measurement time is reduced after the first run order or tune operation, even if the drive has been turned off **Factory setting**
[Rotational Current Injection]	rCI	Rotational current injection. Alignment mode with rotor motion. This alignment mode realizes the mechanical alignment of the rotor and the stator; it requires up to 4 s. The motor needs to be stopped and without resistive torque. **NOTE:** This setting is recommended when a sinus filter is used on the application. **NOTE:** For synchronous reluctant motor, it is recommended to use this setting.
[No align]	no	No alignment

[Syn. EMF constant] PHS ★

Synchronous motor EMF constant

This parameter can be accessed if **[Motor Control Type]** Ctt is set to **[SYN_U VC]** SYnU.

PHS adjustment allows you to reduce the current in operation without load.

Setting	Description
0...6,553.5 mV/rpm	Setting range **Factory setting**: 0 mV/rpm

[SyncMotor Stator R] rSAS ★

Calculated synchronous motor stator R.

Cold state stator resistance (per winding). The factory setting is replaced by the result of the tuning operation if it has been performed.

This parameter can be accessed if **[Access Level]** LAC is set to **[Expert]** EPr and if **[Motor Control Type]** Ctt is set to **[SYN_U VC]** SYnU.

You can enter the value if you know it.

Setting	Description
0...65,535 mOhm	Setting range **Factory setting**: 0 mOhm

[Autotune L d-axis] Ld S ★

Autotune L d-axis.

Axis "d" stator inductance in mH (per phase).

This parameter can be accessed if **[Access Level]** LAC is set to **[Expert]** EPr and if **[Motor Control Type]** Ctt is set to **[SYN_U VC]** SYnU.

On motors with smooth poles **[Autotune L d-axis]** Ld S = **[Autotune L q-axis]** Lq S = Stator inductance L.

The factory setting is replaced by the result of the autotuning operation if it has been performed.

Setting	Description
0...655.35 mH	Setting range **Factory setting**: 0

[Autotune L q-axis] L 9 S ★

Autotune L q-axis.

Axis "q" stator inductance in mH (per phase).

This parameter can be accessed if **[Access Level]** L A C is set to **[Expert]** E P r and if **[Motor Control Type]** C t t is set to **[SYN_U VC]** S Y n u.

On motors with smooth poles **[Autotune L d-axis]** L d S = **[Autotune L q-axis]** L 9 S = Stator inductance L.

The factory setting is replaced by the result of the autotuning operation if it has been performed.

Setting	Description
0...655.35 mH	Setting range **Factory setting**: 0

[Sync Nominal Freq] F r S S ★

Synchronous motor nominal frequency.

Nominal motor frequency for synchronous motor in Hz unit. Automatically updated according to **[Nom SyncMotor Speed]** n S P S and **[Pole pairs]** P P n S data.

This parameter can be accessed if **[Access Level]** L A C is set to **[Expert]** E P r and if **[Motor Control Type]** C t t is set to **[SYN_U VC]** S Y n u.

Setting	Description
10.0...500.0 Hz	Setting range **Factory setting**: n S P S x P P n S / 60

[PSI Align Curr Max] n C r ★

Maximum current of PSI alignment.

Current level in % of **[Sync Nominal I]** n C r S for **[PSI align]** P S i and **[PSI Oalign]** P S i o angle shift measurement modes. This parameter has an impact on the inductor measurement.

This parameter can be accessed if **[Access Level]** L A C is set to **[Expert]** E P r and if **[Motor Control Type]** C t t is set to **[SYN_U VC]** S Y n u.

This current must be equal to or higher than the maximum current level of the application; otherwise an instability may occur.

If **[PSI Align Curr Max]** n C r is set to **[AUTO]** A u t o, **[PSI Align Curr Max]** n C r is adapted by the drive according to the motor data settings.

Setting	Description
[AUTO] A u t o...300%	Setting range **Factory setting**: **[AUTO]** A u t o

NOTE: In case of instability, **[PSI Align Curr Max]** n C r should be increased by steps up to obtain the requested performances.

[Current Filter Time] CrtF ★

Filter time of the current.

This parameter can be accessed if **[Access Level]** LAC is set to **[Expert]** EPr.

Setting	Description
[AUTO] Auto...100.0 ms	Setting range **Factory setting**: **[AUTO]** Auto

[Currents Filter] CrFA ★

Internal currents filter time.

This parameter can be accessed if **[Access Level]** LAC is set to **[Expert]** EPr.

Setting	Description
0.0...100.0 ms	Setting range **Factory setting**: nSPS * PPnS / 60

[% error EMF sync] rdAE ★

Ratio D-axis current.

This parameter can be accessed if **[Motor Control Type]** Ctt is set to **[SYN_U VC]** SYnu.

Use **[% error EMF sync]** rdAE to adjust **[Syn. EMF constant]** PHS, **[% error EMF sync]** rdAE should be closed to 0%.

If the **[% error EMF sync]** rdAE value is:

- Lower than 0%:**[Syn. EMF constant]** PHS may be increased.
- Upper than 0%: **[Syn. EMF constant]** PHS may be reduced.

For the all steps to follow to optimize the synchronous motor settings *(see page 173)*.

Setting	Description
0.0...6,553.5%	Setting range **Factory setting**: _

[Motor tune] tUn - Menu

Access

[Complete settings] ➞ [Motor parameters] ➞ [Motor data] ➞ [Motor tune]

[Autotuning] tUn

⚠ WARNING

UNEXPECTED MOVEMENT

Autotuning moves the motor in order to tune the control loops.

- Only start the system if there are no persons or obstructions in the zone of operation.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

During autotuning, the motor makes small movement. Noise development and oscillations of the system are normal.

In any case, the motor has to be stopped before performing a tune operation. Verify that the application does not make the motor turn during the tune operation.

The tune operation optimizes:

- The motor performances at low speed.
- The estimation of the motor torque.
- The accuracy of the estimation of the process values in sensorless operation and monitoring.

Autotuning is only performed if no stop command has been activated. If a “freewheel stop” or “fast stop” function has been assigned to a digital input, this input must be set to 1 (active at 0).

Autotuning takes priority over any run or prefluxing commands, which will be taken into account after the autotuning sequence.

If autotuning has detected an error, the drive always displays **[No action]** nO and, depending on the configuration of **[Tuning Error Resp]** tnL, may switch to **[Autotuning]** tUn detected error mode.

Autotuning may last for several seconds. Do not interrupt the process. Wait for the Graphic Display Terminal to change to **[No action]** nO.

NOTE: The motor thermal state has a significant influence on the tuning result. Always perform a motor tuning with the motor stopped and cold. Verify that the application does not have the motor operate during a tuning operation.

To redo a motor tuning, wait that it is stopped and cold. Set first **[Autotuning]** tUn to **[Erase Autotuning]** CLr, then redo the motor tuning.

The use of the motor autotuning without doing a **[Erase Autotuning]** CLr first is used to get the thermal state estimation of the motor.

The cable length has an influence on the tune result. If the wiring is modified, it is necessary to redo the tune operation.

Setting	Code / Value	Description
[No action]	nO	Autotuning not in progress **Factory setting**
[Apply Autotuning]	YES	Autotuning is performed immediately if possible, then the parameter automatically changes to **[No action]** nO. If the drive state does not allow the tune operation immediately, the parameter changes to **[No]** nO and the operation must be done again.
[Erase Autotuning]	CLr	The motor parameters measured by the autotuning function are reset. The default motor parameter values are used to control the motor. **[Autotuning Status]** tUS is set to **[Not done]** tAb.

[Autotuning Status] tUS

Autotuning status.

This parameter is not saved at drive power-off. It shows the autotuning status since the last power-on (for information only, cannot be modified).

Setting	Code / Value	Description
[Not done]	tAb	The autotuning is not done **Factory setting**
[Pending]	PEnd	The autotuning has been requested but not yet performed
[In Progress]	PrOG	The autotuning is in progress
[Error]	FAIL	The autotuning has detected an error
[Done]	donE	The motor parameters measured by the autotuning function are used to control the motor

[Auto tuning usage] tUnU ★

Auto tune usage.

This parameter shows the way used to modify the motor parameters according to its estimated thermal state.

This parameter can be accessed if **[Access Level]** LAC is set to **[Expert]** EPr.

Setting	Code / Value	Description
[No]	no	No thermal state estimation **Factory setting**
[Therm Mot]	tM	Statoric thermal state estimation based on nominal current and current consumed by the motor.

[Tuning Error Resp] tnL ★

Response to autotune error.

This parameter can be accessed if **[Access Level]** LAC is set to **[Expert]** EPr.

Setting	Code / Value	Description
[Ignore]	no	Detected error ignored
[Freewheel Stop]	YES	Freewheel stop **Factory setting**

[Autotuning Assign] tUL ★

Autotuning input assignment.

The autotuning is performed when the assigned input or bit changes to 1.

This parameter can be accessed if **[Access Level]** LAC is set to **[Expert]** EPr.

NOTE: The autotuning causes the motor to start up.

Setting	Code / Value	Description
[Not Assigned]	nO	Not assigned **Factory setting**
[DI1]...**[DI6]**	LI1...LI6	Digital input DI1...DI6
[DI11]...**[DI16]**	LI11...LI16	Digital input DI11...DI16 if VW3A3203 I/O extension module has been inserted
[DI52 (High level)]... **[DI59 (High level)]**	d52H...d59H	Cabinet high level assignment digital inputs **NOTE:** This selection can be accessed on ATV660 and ATV680 equipped with Cabinet IO.
[CD00]...**[CD10]**	CD00...CD10	Virtual digital input CMD.0...CMD.10 in **[I/O profile]** IO configuration
[CD11]...**[CD15]**	CD11...CD15	Virtual digital input CMD.11...CMD.15 regardless of configuration
[C101]...**[C110]**	C101...C110	Virtual digital input CMD1.01...CMD1.10 with integrated Modbus Serial in **[I/O profile]** IO configuration
[C111]...**[C115]**	C111...C115	Virtual digital input CMD1.11...CMD1.15 with integrated Modbus Serial regardless of configuration
[C201]...**[C210]**	C201...C210	Virtual digital input CMD2.01...CMD2.10 with CANopen® fieldbus module in **[I/O profile]** IO configuration
[C211]...**[C215]**	C211...C215	Virtual digital input CMD2.11...CMD2.15 with CANopen® fieldbus module regardless of configuration
[C301]...**[C310]**	C301...C310	Virtual digital input CMD3.01...CMD3.10 with a fieldbus module in **[I/O profile]** IO configuration
[C311]...**[C315]**	C311...C315	Virtual digital input CMD3.11...CMD3.15 with a fieldbus module regardless of configuration
[C501]...**[C510]**	C501...C510	Virtual digital input CMD5.01...CMD5.10 with integrated Ethernet in **[I/O profile]** IO configuration
[C511]...**[C515]**	C511...C515	Virtual digital input CMD5.11...CMD5.15 with integrated Ethernet regardless of configuration

[Automatic autotune] AUt ★

Automatic autotune.

⚠ WARNING

UNEXPECTED MOVEMENT

If this function is activated, autotuning is performed each time the drive is switched on.

- Verify that activating this function does not result in unsafe conditions.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

The motor must be stopped when switching on the drive.

This parameter can be accessed if **[Access Level]** LAC is set to **[Expert]** EPr.

Setting ( )	Code / Value	Description
[No]	nO	Function deactivated **Factory setting**
[Yes]	YES	A tuning is automatically done at each power-up

[Tune Selection] tUn ★

Tune selection.

Setting	Code / Value	Description
[Default]	tAb	The default motor parameter values are used to control the motor **Factory setting**
[Measure]	MEAS	The values measured by the autotuning function are used to control the motor
[Custom]	CUS	The values manually set are used to control the motor

[Saliency mot. state] SMot ★

Information on synchronous motor saliency.

This parameter can be accessed if **[Access Level]** LAC is set to **[Expert]** EPr and, **[Tune Selection]** tUn is set to **[Measure]** MEAS.

This parameter helps to optimization of motor control performances for synchronous motors.

Setting	Code / Value	Description
[No]	no	Tune not done
[Low salient]	LLS	[Low saliency level. Recommended configuration: **[Angle setting type]** ASt = **[PSI align]** PSI or **[PSIO align]** PSIo and **[HF inj. activation]** HFI = **[No]** no
[Med salient]	MLS	Medium saliency level. **[Angle setting type]** ASt = **[SPM align]** SPMA and **[HF inj. activation]** HFI = **[Yes]** YES can be used to improve performances
[Hgh salient]	HLS	High saliency level. **[Angle setting type]** ASt = **[IPM align]** IPMA and **[HF inj. activation]** HFI = **[Yes]** YES can be used to improve performances.

[Autotuning Lvl Of Current] tCr ★

Tune current ratio.

This parameter can be accessed if **[Access Level]** LAC is set to **[Expert]** EPr.

This parameter shows the level of current applied to the motor during auto tuning, in percent of the drive nominal current.

This parameter has an impact on the inductor measurement.

Setting	Description
[Auto] AUto...300%	**Factory setting: [Auto]** AUto

[Angle setting type] A S t ★

Automatic angle setting type.

This parameter can be accessed if **[Motor Control Type]** C t t is set to **[SYN_U VC]** S Y n u.

This function is used to align the rotor or to compute the angle of the rotor flux linked to permanent magnets in order to reduce torque jolt at start-up.

Setting	Code / Value	Description
[PSI align]	P S i	Pulse signal injection. Standard alignment mode, without rotor motion The angle measurement is realized by monitoring the stator current response to a pulse signal injection over a wide range of frequencies
[PSIO align]	P S i o	Pulse signal injection - optimized. Optimized alignment mode, without rotor motion Same operation as **[PSI align]** P S i is performed over an optimized range of frequencies The measurement time is reduced after the first run order or tune operation, even if the drive has been turned off **Factory setting**
[Rotational Current Injection]	r C i	Rotational current injection. Alignment mode with rotor motion. This alignment mode realizes the mechanical alignment of the rotor and the stator; it requires up to 4 s. The motor needs to be stopped and without resistive torque. **NOTE:** This setting is recommended when a sinus filter is used on the application. **NOTE:** For synchronous reluctant motor, it is recommended to use this setting.
[No align]	n o	No alignment

[PSI Align Curr Max] n C r ★

Maximum current of PSI alignment.

Current level in % of **[Sync Nominal I]** n C r S for **[PSI align]** P S i and **[PSI Oalign]** P S i o angle shift measurement modes. This parameter has an impact on the inductor measurement.

This parameter can be accessed if **[Access Level]** L A C is set to **[Expert]** E P r and if **[Motor Control Type]** C t t is set to **[SYN_U VC]** S Y n u.

This current must be equal to or higher than the maximum current level of the application; otherwise an instability may occur.

If **[PSI Align Curr Max]** n C r is set to **[AUTO]** A u t o, **[PSI Align Curr Max]** n C r is adapted by the drive according to the motor data settings.

Setting	Description
[AUTO] A u t o...300%	Setting range **Factory setting**: **[AUTO]** A u t o

[Rotational Current Level] r C L ★

Rotational current level.

This parameter can be accessed if **[Angle setting type]** A S t is set to **[Rotational Current Injection]** r C i.

The current level should be set according to the torque required during the alignment operation.

Setting	Description
10...300%	Setting range, as a percentage of the nominal motor current **Factory setting**: 75%

[Rotational Torque Current] rtC ★

Rotational torque current.

This parameter can be accessed if **[Angle setting type]** AST is set to **[Rotational Current Injection]** rCI, and, **[Access Level]** LAC is set to **[Expert]** EPr.

Setting	Description
0...300%	Setting range **Factory setting**: 0%

[RCI Max Freq] rCSP ★

RCI maximum output frequency.

This parameter can be accessed if **[Angle setting type]** AST is set to **[Rotational Current Injection]** rCI, and, **[Access Level]** LAC is set to **[Expert]** EPr.

Setting	Description
[AUTO] Auto...500.0 Hz	Setting range **Factory setting**: **[AUTO]** Auto

[RCI Round Nb] rCrP ★

RCI round number.

This parameter can be accessed if **[Angle setting type]** AST is set to **[Rotational Current Injection]** rCI, and, **[Access Level]** LAC is set to **[Expert]** EPr.

Setting	Description
[AUTO] Auto...32767	Setting range **Factory setting**: **[AUTO]** Auto

[RCI With Transformer] rCIr ★

RCI alignment with transformer.

This parameter can be accessed if **[Angle setting type]** AST is set to **[Rotational Current Injection]** rCI, and, **[Access Level]** LAC is set to **[Expert]** EPr.

Setting	Code / Value	Description
[No]	no	Function inactive **Factory setting**
[Yes]	YES	Function active

[Motor monitoring] Π o P - Menu

Access

[Complete settings] ➡ [Motor parameters] ➡ [Motor monitoring]

[Motor Th Current] ı t H

Motor thermal monitoring current to be set to the rated current indicated on the nameplate.

Setting ( )	Description
0.2...1.5 In(1)	Setting range **Factory setting**: According to drive rating
(1) Corresponding to the rated drive current indicated in the installation manual and on the drive nameplate.	

[Motor Thermal Mode] t H t

Motor thermal monitoring mode.

NOTE: An error is detected when the thermal state reaches 118% of the rated state and reactivation occurs when the state falls back below 100%.

Setting	Code / Value	Description
[No]	n o	No thermal monitoring
[Self cooled]	A C L	Self ventilated motor **Factory setting**
[Force-cool]	F C L	Fan-cooled motor

[MotorTemp ErrorResp] o L L

Overload error response.

Setting	Code / Value	Description
[Ignore]	n o	Detected error ignored
[Freewheel Stop]	Y E S	Free wheel **Factory setting**

[Thermal monitoring] tPP - Menu

Access

[Complete settings] ➞ [Motor parameters] ➞ [Motor monitoring] ➞ [Thermal monitoring]

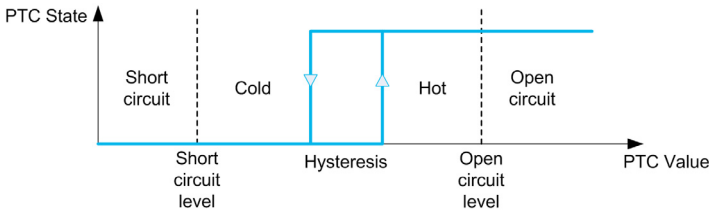
About This Menu

The thermal monitoring function helps to prevent against high temperature by monitoring the real temperature by the drive.

PTC, PT100, PT1000, and KTY84 thermal probes are supported by this function.

The function gives the possibility to manage 2 levels of monitoring:
- A Warning level: the drive triggers an event without stopping the application.
- An Error level: the drive triggers an event and stops the application.

The thermal probe is monitored for the following detected error:
- Overheating
- Probe break (loss of signal)
- Probe short-circuit



Activation

[AIx Th Monitoring] tHX5 allows you to activate the thermal monitoring on the related analog input:
- **[No]** nO: the function is disabled
- **[Yes]** YES: the thermal monitoring is enabled on the related AIx.

Type of Thermal Probe Selection

[AIx Type] AIXt allows you to select the type of thermal sensor(s) connected on the related analog input:
- **[No]** nO: no sensor
- **[PTC Management]** PtC: one to six PTC (in serial) is used
- **[KTY]** KtY: 1 KTY84 is used
- **[PT100]** 1Pt2: 1 PT100 connected with two wires is used
- **[PT1000]** 1Pt3: 1 PT1000 connected with two wires is used
- **[PT100 in 3 wires]** 1Pt23: 1 PT100 connected with three wires is used (AI4 & AI5 only)
- **[PT1000 in 3 wires]** 1Pt33: 1 PT1000 connected with three wires is used (AI4 & AI5 only)
- **[3PT100]** 3Pt2: 3 PT100 connected with two wires is used
- **[3PT1000]** 3Pt3: 3 PT1000 connected with two wires is used
- **[3PT100 in 3 wires]** 3Pt23: 3 PT100 connected with three wires is used (AI4 & AI5 only)
- **[3PT1000 in 3 wires]** 3Pt33: 3 PT1000 connected with three wires is used (AI4 & AI5 only)

2-wire thermal probes are supported on analog input 2 to analog input 5.

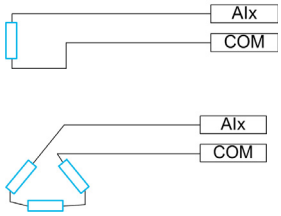
3-wire thermal probes are supported on analog input 4 and analog input 5. These inputs are available with the I/O extension option module.

If the probe is far from the drive, the 3-wire connection is recommended as compared to a 2-wire connection.

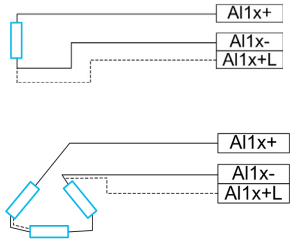
NOTE: In case of 3 serial probes, the drive monitors the average probe values.

Wiring for PT100 and PT1000 Probes

For 2-wire probes, the following wirings are possible:



For 3-wire probes, the following wirings are possible:



[AI2 Th Monitoring] tH2S

Activation of the thermal monitoring on AI2.

Setting	Code / Value	Description
[No]	nO	No **Factory setting**
[YES]	YES	Yes

[AI2 Type] AI2t ★

AI2 assignment.

This parameter can be accessed if **[AI2 Th Monitoring]** tH2S is not set to **[No]** nO.

Setting	Code / Value	Description
[Voltage]	10U	0-10 Vdc **Factory setting**
[Current]	0A	0-20 mA
[PTC Management]	PtC	1 to 6 PTC (in serial)
[KTY]	Kty	1 KTY84
[PT1000]	1Pt3	1 PT1000 connected with 2 wires
[PT100]	1Pt2	1 PT100 connected with 2 wires
[Water Prob]	LEvEL	Water level
[3PT1000]	3Pt3	3 PT1000 connected with 2 wires
[3PT100]	3Pt2	3 PT100 connected with 2 wires

[AI2 Th Error Resp] tH2b ★

Thermal monitoring response to a detected error for AI2.

This parameter can be accessed if **[AI2 Type]** AI2t is not set to

- **[Voltage]** 10U, or
- **[Current]** 0A.

Setting	Code / Value	Description
[Ignore]	nO	Detected error ignored
[Freewheel Stop]	YES	Freewheel stop
[Per STT]	StT	Stop according to **[Type of stop]** StT parameter but without an error triggered after stop
[Ramp stop]	rMP	Stop on ramp **Factory setting**

[AI2 Th Error Level] tH2F ★

Error detection level for AI2.

This parameter can be accessed if **[AI2 Type]** AI2t is not set to:

- **[Voltage]** 10U, or
- **[Current]** 0A, or
- **[PTC Management]** PtC.

Setting ( )	Description
-15.0...200.0°C	Setting range **Factory setting**: 110.0°C

[AI2 Th Warn Level] tH2A ★

Warning level for AI2.

This parameter can be accessed if **[AI2 Type]** AI2t is not set to:

- **[Voltage]** 10U, or
- **[Current]** 0A, or
- **[PTC Management]** PtC.

Setting ( )	Description
-15.0...200.0°C	Setting range **Factory setting**: 90.0°C

[AI2 Th Value] tH2V ★

AI2 thermal value.

This parameter can be accessed if **[AI2 Type]** AI2t is not set to:

- **[Voltage]** 10U, or
- **[Current]** 0A, or
- **[PTC Management]** PtC.

Setting	Description
-15.0...200.0°C	Setting range **Factory setting**: _

[AI3 Th Error Level] tH3F ★

Error detection level for AI3.

This parameter can be accessed if **[AI3 Type]** A I3t is not set to:

- **[Voltage]** 10U, or
- **[Current]** 0A, or
- **[PTC Management]** PtC.

Setting ( )	Description
-15.0...200.0°C	Setting range **Factory setting**: 110.0°C

[AI4 Th Monitoring] tH4S ★

Activation of the thermal monitoring on AI4.

This parameter can be accessed if VW3A3203 I/O extension module has been inserted.

Setting	Code / Value	Description
[No]	nO	No **Factory setting**
[YES]	YES	Yes

[AI4 Type] A I4t ★

AI4 assignment.

This parameter can be accessed if **[AI4 Th Monitoring]** tH4S is not set to **[No]** nO.

Setting	Code / Value	Description
[Voltage]	10U	0-10 Vdc
[Current]	0A	0-20 mA
[Voltage +/-]	n 10U	-10/+10 Vdc **Factory setting**

[AI4 Th Error Resp] tH4b ★

Thermal monitoring response to a detected error for AI4.

This parameter can be accessed if **[AI4 Type]** A I4t is not set to

- **[Voltage]** 10U, or
- **[Current]** 0A.

Setting	Code / Value	Description
[Ignore]	nO	Detected error ignored
[Freewheel Stop]	YES	Freewheel stop
[Per STT]	Stt	Stop according to **[Type of stop]** Stt parameter but without an error triggered after stop
[Ramp stop]	rMP	Stop on ramp **Factory setting**

[AI4 Th Error Level] tH4F ★

Error detection level for AI4.

This parameter can be accessed if **[AI4 Type]** A14t is not set to:

- **[Voltage]** 10U, or
- **[Current]** 0A, or
- **[PTC Management]** PtC.

Setting	Description
-15.0...200.0°C	Setting range **Factory setting**: 110.0°C

[AI4 Th Warn Level] tH4A ★

Warning level for AI4.

This parameter can be accessed if **[AI4 Type]** A14t is not set to:

- **[Voltage]** 10U, or
- **[Current]** 0A, or
- **[PTC Management]** PtC.

Setting	Description
-15.0...200.0°C	Setting range **Factory setting**: 90.0°C

[AI4 Th Value] tH4V ★

AI4 thermal value.

This parameter can be accessed if **[AI4 Type]** A14t is not set to:

- **[Voltage]** 10U, or
- **[Current]** 0A, or
- **[PTC Management]** PtC.

Setting	Description
-15.0...200.0°C	Setting range **Factory setting**: _

[AI5 Th Monitoring] tH5S ★

Activation of the thermal monitoring on AI5.

This parameter can be accessed if VW3A3203 I/O extension module has been inserted.

Setting	Code / Value	Description
[No]	nO	No **Factory setting**
[YES]	YES	Yes

[AI5 Type] A15t ★

AI5 assignment.

This parameter can be accessed if **[AI5 Th Monitoring]** tH5S is not set to **[No]** nO.

Identical to **[AI4 Type]** A14t *(see page 190)*.

[AI5 Th Error Resp] tHS5b ★

Thermal monitoring response to a detected error for AI5.

This parameter can be accessed if **[AI5 Type]** AI5t is not set to

- **[Voltage]** 10U, or
- **[Current]** 0A.

Setting	Code / Value	Description
[Ignore]	nO	Detected error ignored
[Freewheel Stop]	YES	Freewheel stop
[Per STT]	STT	Stop according to **[Type of stop]** STT parameter but without an error triggered after stop
[Ramp stop]	rMP	Stop on ramp **Factory setting**

[AI5 Th Error Level] tHS5F ★

Error detection level for AI5.

This parameter can be accessed if **[AI5 Type]** AI5t is not set to:

- **[Voltage]** 10U, or
- **[Current]** 0A, or
- **[PTC Management]** PTC.

Setting ❮❯	Description
-15.0...200.0°C	Setting range **Factory setting**: 110.0°C

[AI5 Th Warn Level] tHS5A ★

Warning level for AI5.

This parameter can be accessed if **[AI5 Type]** AI5t is not set to:

- **[Voltage]** 10U, or
- **[Current]** 0A, or
- **[PTC Management]** PTC.

Setting ❮❯	Description
-15.0...200.0°C	Setting range **Factory setting**: 90.0°C

[AI5 Th Value] tHS5V ★

AI5 thermal value.

This parameter can be accessed if **[AI5 Type]** AI5t is not set to:

- **[Voltage]** 10U, or
- **[Current]** 0A, or
- **[PTC Management]** PTC.

Setting	Description
-15.0...200.0°C	Setting range **Factory setting**: _

[Fallback Speed] LFF

Fallback speed.

Setting	Description
0.0...500.0 Hz	Setting range **Factory setting**: 0.0 Hz

[Motor monitoring] MOP - Menu

Access

[Complete settings] ➞ [Motor parameters] ➞ [Motor monitoring]

About This Menu

The thermal monitoring function helps to prevent the motor from overheating by an estimation of the thermal state of the motor.

[Current Limitation] CLI ★

Internal current limit.

NOTICE
OVERHEATING AND DAMAGE TO THE MOTOR • Verify that the motor is properly rated for the maximum current to be applied to the motor. • Consider the duty cycle of the motor and all factors of your application including derating requirements in determining the current limit. **Failure to follow these instructions can result in equipment damage.**

NOTE: If the setting is less than 0.25. In, the drive may lock in **[OutPhaseLoss Assign]** OPL if this has been enabled. If it is less than the no-load motor current, the motor cannot run.

Setting	Description
0...1.1 In(1)	Setting range **Factory setting**: 1.1 In(1)
(1) Corresponding to the rated drive current indicated in the installation manual and on the drive nameplate.	

[Attenuation Time] SOP ★

Attenuation time.

This parameter can be accessed if **[Motor surge limit.]** SVL is not set to **[No]** no.

The value of the **[Volt surge limit. opt]** SOP parameter corresponds to the attenuation time of the cable used. It is defined to help to prevent the superimposition of voltage wave reflections resulting from long cable lengths. It limits over-voltages to twice the DC bus rated voltage.

As surge voltage depends on many parameters such as types of cable, different motor powers in parallel, different cable lengths in parallel, and so on, it is recommend the use of an oscilloscope to check the over-voltage values obtained at the motor terminals.

For long cable lengths, an output of the filter or a dV/dt filter must be used.

To retain the overall drive performance, do not increase the SOP value unnecessarily.

NOTE: The factory setting of this parameter is 10 µs for ATV630C22N4 to ATV630C31N4.

Setting	Code / Value	Description
[6 µs]	6	6 µs
[8 µs]	8	8 µs **Factory setting**
[10 µs]	10	10 µs

[Sinus Filter Activation] oFI ★

Sinus filter activation.

This parameter can be accessed if **[Motor Control Type]** Ctt is not set to **[SYN_U VC]** SYnU.

NOTICE
RISK OF DAMAGE TO THE SINUS FILTER On systems using a sinus filter, the maximum output frequency **[Max frequency]** tFr must not exceed 100 Hz. **Failure to follow these instructions can result in equipment damage.**

Setting	Code / Value	Description
[No]	nO	No sinus filter **Factory setting**
[Yes]	YES	Use of a sinus filter to limit over-voltages on the motor and reduce the ground detected error leakage current or in case of applications with Step-Up transformer.

[Output Short Circuit Test] Strt

Output short circuit test configuration.

The drive outputs are tested on power-up and every time a run command is applied. These tests cause a slight delay (a few ms). In the event of an error, the drive locks.

The *drive output short-circuit (terminals U-V-W): SCF* error can be detected.

Setting	Code / Value	Description
[No]	nO	No test
[Yes]	YES	Output short circuit test enabled **Factory setting**

[Motor Therm Thd] ttd

Motor thermal threshold.

Setting ( )	Description
0...118%	Setting range **Factory setting**: 100%

[Motor control] drC - Menu

Access

[Complete settings] ➡ **[Motor parameters]** ➡ **[Motor control]**

About This Menu

This menu shows the motor control related parameters.

[IR compensation] UFr

This parameter is used to optimize torque at low speed, or to adapt to special cases (for example: for motors connected in parallel, decrease **[IR compensation]** UFr). If there is insufficient torque at low speed, increase **[IR compensation]** UFr. A too high value can avoid the motor to start (locking) or change the current limiting mode.

Setting	Description
0...200%	Setting range **Factory setting**: 100%

[Slip compensation] SLP ★

Slip compensation.

This parameter can be accessed if **[Motor Control Type]** Ctt is not set to **[SYN_U VC]** SYnU.

This parameter is set to 0% when **[Motor Control Type]** Ctt is set to **[U/F VC Quad.]** UF9.

The speeds given on motor nameplates are not necessarily exact.

If the slip setting is lower than the actual slip, the motor is not rotating at the correct speed in steady state, but at a lower speed than the reference.

If the slip setting is higher than the actual slip, the motor is overcompensated and the speed is unstable.

Setting	Description
0...300%	Setting range **Factory setting**: 100%

[U/F Profile] PFL ★

U/F profile.

This parameter can be accessed if **[Motor Control Type]** Ctt is set to **[U/F VC Quad.]** UF9.

This parameter is used to adjust the fluxing current level at zero speed, in % of nominal motor current at nominal speed.

Setting	Description
0...100%	Setting range **Factory setting**: 30%

[U1] U1 ★

Voltage point 1 on 5 points V/F.

This parameter can be accessed if **[Motor Control Type]** Ctt is set to **[V/F 5pts]** UF5.

Setting	Description
0...800 Vac	Setting range according to rating **Factory setting**: 0 Vac

[U2] u 2 ★

Voltage point 2 on 5 points V/F.

V/F profile setting.

This parameter can be accessed if **[Motor Control Type]** C t t is set to **[V/F 5pts]** u F 5.

Setting	Description
0...800 Vac	Setting range according to rating **Factory setting**: 0 Vac

[U3] u 3 ★

Voltage point 3 on 5 points V/F.

V/F profile setting.

This parameter can be accessed if **[Motor Control Type]** C t t is set to **[V/F 5pts]** u F 5.

Setting	Description
0...800 Vac	Setting range according to rating **Factory setting**: 0 Vac

[U4] u 4 ★

Voltage point on 4 points V/F.

V/F profile setting.

This parameter can be accessed if **[Motor Control Type]** C t t is set to **[V/F 5pts]** u F 5.

Setting	Description
0...800 Vac	Setting range according to rating **Factory setting**: 0 Vac

[U5] u 5 ★

Voltage point 5 on 5 points V/F.

V/F profile setting.

This parameter can be accessed if **[Motor Control Type]** C t t is set to **[V/F 5pts]** u F 5.

Setting	Description
0...800 Vac	Setting range according to rating **Factory setting**: 0 Vac

[F1] F 1 ★

Frequency point 1 on 5 points V/F.

V/F profile setting.

This parameter can be accessed if **[Motor Control Type]** C t t is set to **[V/F 5pts]** u F 5.

Setting	Description
0.0...500.0 Hz	Setting range **Factory setting**: 0.0 Hz

[F2] F 2 ★

Frequency point 2 on 5 points V/F.

V/F profile setting.

This parameter can be accessed if **[Motor Control Type]** C t t is set to **[V/F 5pts]** u F 5.

Setting ❮❯	Description
0.0...500.0 Hz	Setting range **Factory setting**: 0.0 Hz

[F3] F 3 ★

Frequency point 3 on 5 points V/F.

V/F profile setting.

This parameter can be accessed if **[Motor Control Type]** C t t is set to **[V/F 5pts]** u F 5.

Setting ❮❯	Description
0.0...500.0 Hz	Setting range **Factory setting**: 0.0 Hz

[F4] F 4 ★

Frequency point 4 on 5 points V/F.

V/F profile setting.

This parameter can be accessed if **[Motor Control Type]** C t t is set to **[V/F 5pts]** u F 5.

Setting ❮❯	Description
0.0...500.0 Hz	Setting range **Factory setting**: 0.0 Hz

[F5] F 5 ★

Frequency point 5 on 5 points V/F.

V/F profile setting.

This parameter can be accessed if **[Motor Control Type]** C t t is set to **[V/F 5pts]** u F 5.

Setting ❮❯	Description
0.0...500.0 Hz	Setting range **Factory setting**: 0.0 Hz

[Output Ph Rotation] P H r

Output phase rotation.

Modifying this parameter operates as an inversion of 2 of the three motor phases. This results in changing the direction of rotation of the motor.

Setting	Code / Value	Description
[ABC]	A b C	Standard rotation **Factory setting**
[ACB]	A C b	Opposite rotation

[Inertia Factor] $SPGu$ ★

Inertia factor

This parameter can be accessed if:

- **[Access Level]** LAC is set to **[Expert]** EPr, and
- **[Motor Control Type]** CtT is set to:
  - **[U/F VC 5pts]** $uF5$, or
  - **[U/F VC Quad.]** $uF9$, or
  - **[SYN_U VC]** $SYnu$.

Setting ( )	Description
0...1,000%	Setting range **Factory setting**: 40%

[Boost Activation] boA ★

Boost activation.

This parameter can be accessed if **[Access Level]** LAC is set to **[Expert]** EPr.

Setting	Code / Value	Description
[Inactive]	no	No boost **Factory setting**
[Dynamic]	$dYnA$	Dynamic boost, the magnetizing current value is modified according to the motor load. **NOTE:** Drive manages itself the value **[Magnetizing Current]** IdA to optimize the performances.
[Static]	$StAt$	Static boost, the magnetizing current value follows the profile whatever the motor load **NOTE:** With this selection the **[Boost]** boo and **[Freq Boost]** FAb are taken into account. **NOTE:** This selection can be used for conical motor with **[Boost]** boo sets to a negative value.
[Constant]	$CStE$	Constant boost, the magnetizing current is maintained in case of change of direction of the motor. An additional parameter is available to handle the deceleration and stop phase. $CStE$ can be accessed if **[Motor Control Type]** CtT is set to **[SYN_U VC]** $SYnu$ **NOTE:** With this selection only **[Boost]** boo is taken into account.

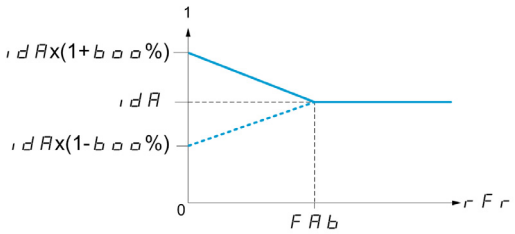
[Boost] bOO ★

Value at 0 Hz: % of nominal magnetizing current (taken into account if different from 0).

A too high value of **[Boost]** bOO can result in a magnetic saturation of the motor, which leads to a torque reduction.

This parameter can be accessed if:

- **[Access Level]** LAC is set to **[Expert]** EPr, and
- **[Boost Activation]** bOA is not set to **[Inactive]** nO.



NOTE: For synchronous motors, it is recommended to set this value to optimize control at low speed.

Setting	Description
-100...100%	Setting range If **[Boost Activation]** bOA is set to **[Dynamic]** dYnA, **[Boost]** bOO is set to 25%. **Factory setting**: 0%

[Freq Boost] FAb ★

Value at 0 Hz: speed threshold to reach nominal magnetizing current.

This parameter can be accessed if:

- **[Access Level]** LAC is set to **[Expert]** EPr, and
- **[Boost Activation]** bOA is not set to **[NO]** nO, and
- **[Boost Activation]** bOA is not set to **[Constant]** CStE.

Setting	Description
0.0...500.0 Hz	Setting range If **[Boost Activation]** bOA is set to **[Dynamic]** dYnA, **[Freq Boost]** FAb is set to 30.0 Hz. **Factory setting**: 0.0 Hz

NOTE: For synchronous motors, it is recommended to set this value to optimize control at low speed.

[Overmodul. Activation] OVMA

This parameter can be accessed if **[Access Level]** LAC is set to **[Expert]** EPr.

The purpose of the Overmodulation is to compensate the loss of output voltage due to the load.

Setting	Code / Value	Description
[Default]	dEFAuLt	Overmodulation is not configured **Factory setting**
[Full]	FuLL	Over modulation is active

[Switching frequency] SWF - Menu

Access

[Complete settings] ➡ **[Motor parameters]** ➡ **[Switching frequency]**

[Switching frequency] SFr

Drive switching frequency.

Adjustment range: The maximum value is limited to 4 kHz if **[Motor surge limit.]** SVL parameter is configured.

If **[Sinus Filter Activation]** oFI is set to **[Yes]** YES, the minimum value is 2 kHz and the maximum value is limited to 6 kHz or 8 kHz according to drive rating.

NOTE: In the event of excessive temperature rise, the drive automatically reduces the switching frequency and reset it once the temperature returns to normal.

In case of high-speed motor, it is advised to increase the PWM frequency **[Switching frequency]** SFr at 8, 12 kHz or 16 kHz

Setting ❮❯	Description
2...8 or 16 kHz according to drive rating	Setting range **Factory setting**: 4.0 kHz or 2.5 kHz according to the drive rating

[Noise Reduction] nrd

Motor noise reduction.

Random frequency modulation helps to prevent any resonance, which may occur at a fixed frequency.

Setting	Code / Value	Description
[No]	no	Fixed frequency **Factory setting**
[Yes]	YES	Frequency with random modulation

[Switch Freq Type] SFt ★

Switching frequency type.

This parameter can be accessed if **[Access Level]** LAC is set to **[Expert]** EPr.

The motor switching frequency is modified (reduced) when the internal temperature of the drive is too high.

Setting ❮❯	Code / Value	Description
[SFR type 1]	HF1	Heating loss optimization Allows the system to adapt the switching frequency according to the motor frequency. This setting optimizes the heating loss of the drive in order to improve the drive efficiency. **Factory setting**
[SFR type 2]	HF2	Allows the system to keep a constant chosen switching frequency **[Switching frequency]** SFr whatever the motor frequency **[Output frequency]** rFr. With this setting, the motor noise is kept as low as possible by a high switching frequency. In the event of overheating, the drive automatically decreases the switching frequency. It is restored to its original value when the temperature returns to normal.

[Motor Surge Limit.] SVL

Surge voltage limitation.

This function limits motor over-voltages and is useful in the following applications:
- NEMA motors
- Old or poor quality motors
- Spindle motors
- Rewound motors

This parameter can remain set to **[No]** nO for 230/400 Vac motors used at 230 Vac, or if the length of cable between the drive and the motor does not exceed:
- 4 m with unshielded cables
- 10 m with shielded cables

NOTE: When **[Motor Surge Limit.]** SVL is set to **[Yes]** YES, the maximum switching frequency **[Switching freq.]** SFr is modified.

Setting	Code / Value	Description
[No]	nO	Function inactive **Factory setting**
[Yes]	YES	Function active

[Attenuation Time] SoP ★

Attenuation time.

This parameter can be accessed if **[Motor surge limit.]** SVL is not set to **[No]** nO. The value of the **[Attenuation Time]** SoP parameter corresponds to the attenuation time of the cable used. It is defined to help to prevent the superimposition of voltage wave reflections resulting from long cable lengths. It limits over-voltages to twice the DC bus rated voltage. As surge voltage depends on many parameters such as types of cable, different motor powers in parallel, different cable lengths in parallel, and so on, It is recommended to use an oscilloscope to check the over-voltage values obtained at the motor terminals. If the higher value of **[Attenuation Time]** SoP is not enough according to the cable lengths, an output filter or a dV/dt filter must be used.

To retain the overall drive performance, do not increase the SoP value unnecessarily.

Setting	Code / Value	Description
[6 µs]	6	6 µs
[8 µs]	8	8 µs **Factory setting**
[10 µs]	10	10 µs

Section 7.4
[Define system units]

[Define system units] SUC - Menu

Access

[Complete settings] ➞ [Define system units]

About This Menu

In order to be easy to configure, commission, operate, and maintain, the drive uses the application units.

The physicals that are concerned by application units are:
- Pressure values
- Flow rate values
- Temperature values
- Currency values

NOTE: Some other default system units are automatically deduced from configurable system units or from other parameters.

System unit applies by default to all communication parameters and HMI (Graphic Display Terminal, Web server, DTM-based software).

When a system unit is changed, there is no rescaling of values. Numerical values are kept, but the meaning of these values is not the same:
- After a change, the behavior of the product will not change (the system stays numerically the same).
- If new values are written through communication or through HMI in new unit, then the behavior is impacted. In that case, all parameters should be reconfigured according to the new selected unit.
- In order to avoid issues due to a modification of system unit parameters, system units should be modified only during the installation of the product and before the commissioning of the functions.

The precision of the physical values is selected at the same time as the unit.

By default, values are signed.

Default range of values are:

16 bits values	32 bits values
-32,768...32,767	-2,147,483,648...2,147,483,648

[P sensor unit] SuPr

Default system application unit used for pressure.

Available pressure units:

Unit	Symbol	Conversion
Kilo Pascal	kPa	100 kPa = 1 bar
Millibar	mbar	
Bar	bar	
Pound / square inch (lb/in²)	psi psig	14.5 psi = 1 bar
Inch H2O Inch water gauge Inch water column	inH2O inWG inWC	1 inH2O 4°C = 0.0024908891 bar (0.036127292 psi)
Feet water gauge Feet water column Feet	ftWG ftWC ft	1 inH2O 4°C = 0.0298906692 bar (0.433527504 psi)
Meter water gauge Meter water column Meter	mWG mWC (mCE) m	1 mH2O(4°C) = 0.0980665 bar (1.42233433 psi)
Inch of mercury	inHg	1 inHg = 0.0338638864 bar (0.491154147 psi)
Percentage	%	–
w/o unit	–	–

Setting	Code / Value	Description
[1Kpa]	PA	1 kpa
[1mbar]	InbAr	1 mbar
[1Bar]	bAr	1 bar
[0.1Bar]	0.1bAr	0.1 bar **Factory setting**
[0.01Bar]	0.01bAr	0.01 bar
[1 PSI]	PSi	1 Psi
[0.1 PSI]	0.1PSi	0.1 psi
[1 PSIG]	PSiG	1 Psig
[0.1 PSIG]	0.1PSiG	0.1 Psig
[1inH20]	1inH20	1 inH20
[1inWg]	1inWG	1 inWg
[1inWC]	1inWC	1 inWc
[1 FtWg]	1FtWG	1 FtWg
[1 FtWC]	1FtWC	1 FtWC
[1 Ft]	1Ft	1 Ft
[1 MWG]	1mWG	1 mWg
[0.1 MWG]	0.1mWG	0.1 mWg
[1 MWC]	1mWC	1 mWC
[0.1 MWC]	0.1mWC	0.1 mWC
[1m]	1m	1 m
[0.1 m]	0.1m	0.1 m
[1 inHG]	1inHG	1 inHg
[0.1%]	0.1	0.1%
[0.1]	0.1Wo	0.1 w/o

[Flow rate unit] SuFr

Default system application unit used for flow rate.

Available flow units:

Unit	Symbol	Conversion
Liter / second	l/s	–
Liter / minute	l/min	–
Liter / hour	l/h	–
Cubic decimeter / minute	dm3/min	–
Cubic meter / second	m3/s	–
Cubic meter / minute	m3/min	–
Cubic meter / hour	m3/h	–
Gallon per second	gal/s	1 usgal = 3,785411784 l
Gallon per minute	gal/min; GPM	–
Gallon per hour	gal/h	–
Cubic feet / second	ft3/s	1 ft3 = 28.317 l
Cubic feet / minute	ft3/min; CFM, SCFM	–
Cubic feet / hour	ft3/h	–
Percentage	%	–
w/o unit	–	–

Setting	Code / Value	Description
[1 L/s]	1LS	L/s
[l/s]	0 1LS	0.1 L/s
[1 L/m]	1LN	L/m
[1 L/h]	1Lh	L/h
[1 dm3/mn]	1dN3N	d3/m
[1 m3/s]	1N3S	M3/s
[0.1 m3/s]	0 1N3S	0.1 M3/s
[1m3/m]	1N3Nn	M3/min
[0.1 m3/m]	0 1N3Nn	0.1 M3/min
[1 m3/h]	1N3h	1 M3/h
[0.1m3/h]	0 1N3h	0.1 M3/h **Factory setting**
[1 gal/s]	1GPS	1 Gal/s
[1 GPM]	1GPN	1 GPM
[1 gal/h]	1GPH	1 Gal/h
[1 ft3/s]	1CFS	1 ft3/s
[1CFM]	1CFN	1 CFM
[1SCFM]	1SCFN	1 SCFM
[1 Ft3/h]	1CFH	1 ft3/h
[1 Kg/s]	1GS	1 kg/s
[1 Kg/m]	1GN	1 kg/m
[1 Kg/h]	1GH	1 kg/h
[1 Lb/s]	1Lbs	1 lb/s
[1 Lb/m]	1LbN	1 lb/m
[1 Lb/h]	1LbH	1 lb/h
[0.1%]	0 1PC	0.1%
[0.1]	0 1Wo	0.1 w/o

[Temperature unit] SUtP

Default system application unit used for temperature.

Available temperature units:

Unit	Symbol	Conversion
Celsius Degree	°C	–
Fahrenheit Degree	°F	TF = 9/5*Tc+32
Percentage	%	–
w/o unit	–	–

Setting	Code / Value	Description
[0.1°C]	0.1C	0.1 °C **Factory setting**
[0.1°F]	0.1F	0.1 °F
[0.1%]	0.1PC	0.1%
[0.1]	0.1Wo	0.1 w/o

[Currency unit list] SUCU

Default system application unit used for currency.

Setting	Code / Value	Description
[EURO]	Euro	Euro **Factory setting**
[$]	doLLAr	Dollar
[£]	Pound	Pound
[Krone]	Kr	Krone
[Renminbi]	rMb	Renminbi
[Other]	otHEr	Other

[Liquid Density] rHo

Density of the fluid to be pumped.

This parameter can be accessed if **[Access Level]** LAC is not set to **[Expert]** EPr.

Setting	Description
100...10,000 kg/m3	Setting range **Factory setting**: 1000 kg/m3

Section 7.5
[Sensors assignment]

What Is in This Section?

This section contains the following topics:

Topic	Page
[Sensors assignment] SCC - Menu	207
[AI1 sensor config.] Menu	209
[AI2 sensor config.] Menu	212
[AI3 sensor config.] Menu	214
[AI4 sensor config.] Menu	216
[AI5 sensor config.] Menu	218
[DI5 Pulse Sensor Config.] Menu	220
[DI6 Pulse Sensor Config.] Menu	222
[AIV1 configuration] Menu	224
[AIV2 configuration] Menu	226
[AIV3 configuration] Menu	228

[Sensors assignment] SCC - Menu

Access

[Complete settings] ➡ [Sensors assignment]

About This Menu

This menu is used to set the sensors.

In case of mixing absolute and relative sensors, verify the consistency between all sensor data and adjust if necessary by using the process value scaling and the analog inputs operation functions.

[InletPres Assign] PS1A

Inlet pressure sensor assignment.

Setting	Code / Value	Description
[Not Configured]	nO	Not assigned **Factory setting**
[AI1]...**[AI3]**	AI1...AI3	Analog input AI1...AI3
[AI4]...**[AI5]**	AI4...AI5	Analog input AI4...AI5 if VW3A3203 I/O extension module has been inserted
[AI Virtual 1]...**[AI Virtual 3]**	AIV1...AIV3	Virtual analogic input 1...3
NOTE: For sensor configuration, refer to section **[Sensors assignment]** *(see page 207)*.		

[OutletPres Assign] PS2A

Outlet pressure sensor assignment.

Setting	Code / Value	Description
[Not Configured]	nO	Not assigned **Factory setting**
[AI1]...**[AI3]**	AI1...AI3	Analog input AI1...AI3
[AI4]...**[AI5]**	AI4...AI5	Analog input AI4...AI5 if VW3A3203 I/O extension module has been inserted
[AI Virtual 1]...**[AI Virtual 3]**	AIV1...AIV3	Virtual analogic input 1...3
NOTE: For sensor configuration, refer to section **[Sensors assignment]** *(see page 207)*.		

[Inst. Flow Assign.] F S I A

Installation flow sensor assignment.

Setting	Code / Value	Description
[Not Configured]	n o	Not assigned **Factory setting**
[AI1]...**[AI3]**	A I 1...A I 3	Analog input AI1...AI3
[AI4]...**[AI5]**	A I 4...A I 5	Analog input AI4...AI5 if VW3A3203 I/O extension module has been inserted
[AI Virtual 1]...**[AI Virtual 3]**	A I V 1...A I V 3	Virtual analogic input 1...3
[Di5 PulseInput Assignment]...**[Di6 PulseInput Assignment]**	P I 5...P I 6	Digital input DI5...DI6 used as pulse input
[Est. Pump Flow]	S L P F	Sensor less estimated flow
[Est. System Flow]	S L S F	Estimated system flow This selection is only possible if **[Pump System Archit]** M P S A is set to **[Multi Drives]** n V S d or **[Multi Masters]** n V S d r **NOTE:** To use this selection, all the pump characteristics of the system must be configured.
NOTE: For sensor configuration, refer to section **[Sensors assignment]** *(see page 207)*.		

[Pump Flow Assign.] F S 2 A

Pump flow sensor assignment.

Setting	Code / Value	Description
[Not Configured]	n o	Not assigned **Factory setting**
[AI1]...**[AI3]**	A I 1...A I 3	Analog input AI1...AI3
[AI4]...**[AI5]**	A I 4...A I 5	Analog input AI4...AI5 if VW3A3203 I/O extension module has been inserted
[AI Virtual 1]...**[AI Virtual 3]**	A I V 1...A I V 3	Virtual analogic input 1...3
[Di5 PulseInput Assignment]...**[Di6 PulseInput Assignment]**	P I 5...P I 6	Digital input DI5...DI6 used as pulse input
[Est. Pump Flow]	S L P F	Sensor less estimated flow
NOTE: For sensor configuration, refer to section **[Sensors assignment]** *(see page 207)*.		

[Level Sensor Assign] L C S A ★

Level sensor assignment.

This parameter can be accessed if **[Application Selection]** A P P L is set to **[Level]** L E V E L .

Setting	Code / Value	Description
[Not Configured]	n o	Not assigned **Factory setting**
[AI1]...**[AI3]**	A I 1...A I 3	Analog input AI1...AI3
[AI4]...**[AI5]**	A I 4...A I 5	Analog input AI4...AI5 if VW3A3203 I/O extension module has been inserted
[AI Virtual 1]...**[AI Virtual 3]**	A I V 1...A I V 3	Virtual analogic input 1...3
NOTE: For sensor configuration, refer to section **[Sensors assignment]** *(see page 207)*.		

[AI1 sensor config.] Menu

About This Menu

Access of **[AI1 Sensor Config.]** menu depends of the sensor assigned to this input.

The following table shows the **[AI1 Sensor Config.]** menus displayed in relation with the sensor and the applicative function used.

If...	And...	Then following menu will be displayed:
[InletPres Assign] *P S I A* is set to **[AI1]** *A I 1*	-	**[AI1 Sensor Config.]** *I C A 1* -
	[Priming Pump Assign] *P P o A* is not set to **[No]** *n o* *(see page 359)*	**[AI1 Sensor Config.]** *P P A 1* -
	[InletPres Monitoring] *I P P M* is not set to **[No]** *n o* *(see page 387)*	**[AI1 Sensor Config.]** *I P A 1* -
[OutletPres Assign] *P S 2 A* is set to **[AI1]** *A I 1*	-	**[AI1 Sensor Config.]** *o C A 1* -
	[Sleep Detect Mode] *S L P M* is set to **[Pressure]** *H P* or **[Multiple]** *o r*. *(see page 317)*	**[AI1 Sensor Config.]** *S o A 1* -
	[Wake Up Mode] *W u P M* is set to **[Pressure]** *L P*. *(see page 317)*	**[AI1 Sensor Config.]** *W o A 1* -
	[Activation Mode] *P F M* is set to **[Outlet Pressure]** *P S 2*. *(see page 348)*	**[AI1 Sensor Config.]** *P F A 1* -
	[OutPres Monitoring] *o P P M* is set to **[Sensor]** *S n S r* or **[Both]** *b o t h*. *(see page 391)*	**[AI1 Sensor Config]** *o o A 1* -
[Inst. Flow Assign.] *F S I A* is set to **[AI1]** *A I 1*	-	**[AI1 Sensor Config.]** *I F 1* -
	[LevelCtrl Strategy] *L C S t* is set to **[Energy Optimized]** *A d u*. *(see page 277)*	**[AI1 Sensor Config.]** *L I F 1* -
	[Sleep Detect Mode] *S L P M* is set to **[Flow]** *L F* or **[Multiple]** *o r*. *(see page 317)*	**[AI1 Sensor Config.]** *S I F 1* -
	[Mode Selection] *F L C M* is not set to **[Inactive]** *n o*. *(see page 353)*	**[AI1 Sensor Config.]** *F I F 1* -
	[Flow limitation Mode] *F L M* is not set to **[No]** *n o*. *(see page 364)*	**[AI1 Sensor Config.]** *L F 1* -
	[HighFlow Activation] *H F P M* is not set to **[No]** *n o*. *(see page 395)*	**[AI1 Sensor Config.]** *H I F 1* -
	• **[Booster Control]** *b C M* is set to **[Yes]** *Y E S* • **[Booster S/D Condition]** *b S d C* is set to **[Speed+Flow]** *S P F L*. *(see page 244)*	**[AI1 Sensor Config.]** *b I F 1* -
NOTE: The list of parameters is the same for each **[AI1 Sensor Config.]** menu.		

If...	And...	Then following menu will be displayed:
[Pump Flow Assign.] F S 2 A is set to [AI1] A I 1	-	[AI1 Sensor Config.] P F 1 -
	[PumpLF Monitoring] P L F M is set to [Flow] 9 or [Flow vs Speed] 9 n. (see page 380)	[AI1 Sensor Config.] n P F 1 -
[Level Sensor Assign] L C S A is set to [AI1] A I 1	(see page 277)	[AI1 Sensor Config.] L C A 1 -
NOTE: The list of parameters is the same for each [AI1 Sensor Config.] menu.		

[AI1 Type] A I 1 t

Configuration of analog input AI1.

Setting	Code / Value	Description
[Voltage]	1 0 u	0-10 Vdc **Factory setting**
[Current]	0 A	0-20 mA

[AI1 min value] u 1 L 1 ★

AI1 voltage scaling parameter of 0%.

This parameter can be accessed if **[AI1 Type]** A I 1 t is set to **[Voltage]** 1 0 u.

Setting	Description
0.0...10.0 Vdc	Setting range **Factory setting**: 0.0 Vdc

[AI1 max value] u 1 H 1 ★

AI1 voltage scaling parameter of 100%.

This parameter can be accessed if **[AI1 Type]** A I 1 t is set to **[Voltage]** 1 0 u.

Setting	Description
0.0...10.0 Vdc	Setting range **Factory setting**: 10.0 Vdc

[AI1 min. value] C r L 1 ★

AI1 current scaling parameter of 0%.

This parameter can be accessed if **[AI1 Type]** A I 1 t is set to **[Current]** 0 A.

Setting	Description
0.0...20.0 mA	Setting range **Factory setting**: 0.0 mA

[AI1 max. value] C r H 1 ★

AI1 current scaling parameter of 100%.

This parameter can be accessed if **[AI1 Type]** A I 1 t is set to **[Current]** 0 A.

Setting	Description
0.0...20.0 mA	Setting range **Factory setting**: 20.0 mA

[AI1 Lowest Process] *A I L*

AI1 lowest process.

Setting	Description
-32,767...32,767	Setting range. Value in application customer unit. **Factory setting**: 0

[AI1 Highest Process] *A I K*

AI1 highest process.

Setting	Description
-32,767...32,767	Setting range. Value in application customer unit **Factory setting**: 0

[AI2 sensor config.] Menu

About This Menu

Access of **[AI2 Sensor Config.]** menu depends of the sensor assigned to this input.

The following table shows the **[AI2 Sensor Config.]** menus displayed in relation with the sensor and the applicative function used.

If...	And...	Then following menu will be displayed:
[InletPres Assign] PS IA is set to **[AI2]** AI2	-	**[AI2 Sensor Config.]** IC A2 -
	[Priming Pump Assign] PPOA is not set to **[No]** NO *(see page 359)*	**[AI2 Sensor Config.]** PP A2 -
	[InletPres Monitoring] IPPM is not set to **[No]** NO *(see page 387)*	**[AI2 Sensor Config.]** IP A2 -
[OutletPres Assign] PS2A is set to **[AI2]** AI2	-	**[AI2 Sensor Config.]** OC A2 -
	[Sleep Detect Mode] SLPM is set to **[Pressure]** HP or **[Multiple]** OR. *(see page 317)*	**[AI2 Sensor Config.]** SO A2 -
	[Wake Up Mode] WUPM is set to **[Pressure]** LP. *(see page 317)*	**[AI2 Sensor Config.]** WO A2 -
	[Activation Mode] PFM is set to **[Outlet Pressure]** PS2. *(see page 348)*	**[AI2 Sensor Config.]** PF A2 -
	[OutPres Monitoring] OPPM is set to **[Sensor]** SNSR or **[Both]** both. *(see page 391)*	**[AI2 Sensor Config]** OO A2 -
[Inst. Flow Assign.] FS IA is set to **[AI2]** AI2	-	**[AI2 Sensor Config.]** IF2 -
	[LevelCtrl Strategy] LCST is set to **[Energy Optimized]** Adu. *(see page 277)*	**[AI2 Sensor Config.]** L IF2 -
	[Sleep Detect Mode] SLPM is set to **[Flow]** LF or **[Multiple]** OR. *(see page 317)*	**[AI2 Sensor Config.]** S IF2 -
	[Mode Selection] FLCM is not set to **[Inactive]** NO. *(see page 353)*	**[AI2 Sensor Config.]** F IF2 -
	[Flow limitation Mode] FLM is not set to **[No]** NO. *(see page 364)*	**[AI2 Sensor Config.]** LF2 -
	[HighFlow Activation] HFPM is not set to **[No]** NO. *(see page 395)*	**[AI2 Sensor Config.]** H IF2 -
	• **[Booster Control]** bCM is set to **[Yes]** YES • **[Booster S/D Condition]** bSdC is set to **[Speed+Flow]** SPFL. *(see page 244)*	**[AI2 Sensor Config.]** b IF2 -
[Pump Flow Assign.] FS2A is set to **[AI2]** AI2	-	**[AI2 Sensor Config.]** PF2 -
	[PumpLF Monitoring] PLFM is set to **[Flow]** Q or **[Flow vs Speed]** Qn. *(see page 380)*	**[AI2 Sensor Config.]** nPF2 -
NOTE: The list of parameters is the same for each **[AI2 Sensor Config.]** menu.		

If...	And...	Then following menu will be displayed:
[Level Sensor Assign] L C 5 A is set to **[AI2]** A I 2	*(see page 277)*	**[AI2 Sensor Config.]** L C A 2 -
NOTE: The list of parameters is the same for each **[AI2 Sensor Config.]** menu.		

[AI2 Type] A I 2 t

Configuration of analog input AI2.

Setting	Code / Value	Description
[Voltage]	I O u	0-10 Vdc **Factory setting**
[Current]	O A	0-20 mA

[AI2 min value] u I L 2 ★

AI2 voltage scaling parameter of 0%.

This parameter can be accessed if **[AI2 Type]** A I 2 t is set to **[Voltage]** I O u.

Identical to **[AI1 min value]** u I L 1 *(see page 210)*.

[AI2 max value] u I H 2 ★

AI2 voltage scaling parameter of 100%.

This parameter can be accessed if **[AI2 Type]** A I 2 t is set to **[Voltage]** I O u.

Identical to **[AI1 max value]** u I H 1 *(see page 210)*.

[AI2 min. value] C r L 2 ★

AI2 current scaling parameter of 0%.

This parameter can be accessed if **[AI2 Type]** A I 2 t is set to **[Current]** o A.

Identical to **[AI1 min. value]** C r L 1 *(see page 210)*.

[AI2 max. value] C r H 2 ★

AI2 current scaling parameter of 100%.

This parameter can be accessed if **[AI2 Type]** A I 2 t is set to **[Current]** o A.

Identical to **[AI1 max. value]** C r H 1 *(see page 210)*.

[AI2 Lowest Process] A I 2 J

AI2 lowest process.

Identical to **[AI1 Lowest Process]** A I 1 J *(see page 211)*.

[AI2 Highest Process] A I 2 K

AI2 highest process.

Identical to **[AI1 Highest Process]** A I 1 K *(see page 211)*.

[AI3 sensor config.] Menu

About This Menu

Access of **[AI3 Sensor Config.]** menu depends of the sensor assigned to this input.

The following table shows the **[AI3 Sensor Config.]** menus displayed in relation with the sensor and the applicative function used.

If...	And...	Then following menu will be displayed:
[InletPres Assign] PS IA is set to **[AI3]** AI3	-	**[AI3 Sensor Config.]** IC A3 -
	[Priming Pump Assign] PPOA is not set to **[No]** NO *(see page 359)*	**[AI3 Sensor Config.]** PP A3 -
	[InletPres Monitoring] IPPM is not set to **[No]** NO *(see page 387)*	**[AI3 Sensor Config.]** IP A3 -
[OutletPres Assign] PS2A is set to **[AI3]** AI3	-	**[AI3 Sensor Config.]** OC A3 -
	[Sleep Detect Mode] SLPM is set to **[Pressure]** HP or **[Multiple]** OR. *(see page 317)*	**[AI3 Sensor Config.]** SO A3 -
	[Wake Up Mode] WUPM is set to **[Pressure]** LP. *(see page 317)*	**[AI3 Sensor Config.]** WO A3 -
	[Activation Mode] PFM is set to **[Outlet Pressure]** PS2. *(see page 348)*	**[AI3 Sensor Config.]** PF A3 -
	[OutPres Monitoring] OPPM is set to **[Sensor]** SNSR or **[Both]** both. *(see page 391)*	**[AI3 Sensor Config]** OO A3 -
[Inst. Flow Assign.] FS IA is set to **[AI3]** AI3	-	**[AI3 Sensor Config.]** IF 3 -
	[LevelCtrl Strategy] LCST is set to **[Energy Optimized]** Adu. *(see page 277)*	**[AI3 Sensor Config.]** L IF 3 -
	[Sleep Detect Mode] SLPM is set to **[Flow]** LF or **[Multiple]** OR. *(see page 317)*	**[AI3 Sensor Config.]** S IF 3 -
	[Mode Selection] FLCM is not set to **[Inactive]** NO. *(see page 353)*	**[AI3 Sensor Config.]** F IF 3 -
	[Flow limitation Mode] FLM is not set to **[No]** NO. *(see page 364)*	**[AI3 Sensor Config.]** LF 3 -
	[HighFlow Activation] HFPM is not set to **[No]** NO. *(see page 395)*	**[AI3 Sensor Config.]** H IF 3 -
	• **[Booster Control]** bCM is set to **[Yes]** YES • **[Booster S/D Condition]** bSdC is set to **[Speed+Flow]** SPFL. *(see page 244)*	**[AI3 Sensor Config.]** b IF 3 -
NOTE: The list of parameters is the same for each **[AI3 Sensor Config.]** menu.		

If...	And...	Then following menu will be displayed:
[Pump Flow Assign.] F S 2 A is set to **[AI3]** A I 3	-	**[AI3 Sensor Config.]** P F 3 -
	[PumpLF Monitoring] P L F M is set to **[Flow]** 9 or **[Flow vs Speed]** 9 n. *(see page 380)*	**[AI3 Sensor Config.]** n P F 3 -
[Level Sensor Assign] L C S A is set to **[AI3]** A I 3	*(see page 277)*	**[AI3 Sensor Config.]** L C A 3 -
NOTE: The list of parameters is the same for each **[AI3 Sensor Config.]** menu.		

[AI3 Type] A I 3 t

Configuration of analog input AI3.

Setting	Code / Value	Description
[Voltage]	10 u	0-10 Vdc
[Current]	0 A	0-20 mA **Factory setting**

[AI3 min value] u I L 3 ★

AI3 voltage scaling parameter of 0%.

This parameter can be accessed if **[AI3 Type]** A I 3 t is set to **[Voltage]** 10 u.

Identical to **[AI1 min value]** u I L 1 *(see page 210)*.

[AI3 max value] u I H 3 ★

AI3 voltage scaling parameter of 100%.

This parameter can be accessed if **[AI3 Type]** A I 3 t is set to **[Voltage]** 10 u.

Identical to **[AI1 max value]** u I H 1 *(see page 210)*.

[AI3 min. value] C r L 3 ★

AI3 current scaling parameter of 0%.

This parameter can be accessed if **[AI3 Type]** A I 3 t is set to **[Current]** o A.

Identical to **[AI1 min. value]** C r L 1 *(see page 210)*.

[AI3 max. value] C r H 3 ★

AI3 current scaling parameter of 100%.

This parameter can be accessed if **[AI3 Type]** A I 3 t is set to **[Current]** o A.

Identical to **[AI1 max. value]** C r H 1 *(see page 210)*.

[AI3 Lowest Process] A I 3 J

AI3 lowest process.

Identical to **[AI1 Lowest Process]** A I 1 J *(see page 211)*.

[AI3 Highest Process] A I 3 K

AI3 highest process.

Identical to **[AI1 Highest Process]** A I 1 K *(see page 211)*.

[AI4 sensor config.] Menu

About This Menu

Access of **[AI4 Sensor Config.]** menu depends of the sensor assigned to this input.

The following table shows the **[AI4 Sensor Config.]** menus displayed in relation with the sensor and the applicative function used.

If...	And...	Then following menu will be displayed:
[InletPres Assign] P S I A is set to **[AI4]** A I 4	-	**[AI4 Sensor Config.]** I C A 4 -
	[Priming Pump Assign] P P o A is not set to **[No]** n o *(see page 359)*	**[AI4 Sensor Config.]** P P A 4 -
	[InletPres Monitoring] I P P M is not set to **[No]** n o *(see page 387)*	**[AI4 Sensor Config.]** I P A 4 -
[OutletPres Assign] P S 2 A is set to **[AI4]** A I 4	-	**[AI4 Sensor Config.]** o C A 4 -
	[Sleep Detect Mode] S L P M is set to **[Pressure]** H P or **[Multiple]** o r. *(see page 317)*	**[AI4 Sensor Config.]** S o A 4 -
	[Wake Up Mode] W U P M is set to **[Pressure]** L P. *(see page 317)*	**[AI4 Sensor Config.]** W o A 4 -
	[Activation Mode] P F M is set to **[Outlet Pressure]** P S 2. *(see page 348)*	**[AI4 Sensor Config.]** P F A 4 -
	[OutPres Monitoring] o P P M is set to **[Sensor]** S n S r or **[Both]** b o t h. *(see page 391)*	**[AI4 Sensor Config]** o o A 4 -
[Inst. Flow Assign.] F S I A is set to **[AI4]** A I 4	-	**[AI4 Sensor Config.]** I F 4 -
	[LevelCtrl Strategy] L C S t is set to **[Energy Optimized]** A d U. *(see page 277)*	**[AI4 Sensor Config.]** LIF4-
	[Sleep Detect Mode] S L P M is set to **[Flow]** L F or **[Multiple]** o r. *(see page 317)*	**[AI4 Sensor Config.]** S I F 4 -
	[Mode Selection] F L C M is not set to **[Inactive]** n o. *(see page 353)*	**[AI4 Sensor Config.]** F I F 4 -
	[Flow limitation Mode] F L M is not set to **[No]** n o. *(see page 364)*	**[AI4 Sensor Config.]** L F 4 -
	[HighFlow Activation] H F P M is not set to **[No]** n o. *(see page 395)*	**[AI4 Sensor Config.]** H I F 4 -
	• **[Booster Control]** b C M is set to **[Yes]** Y E S • **[Booster S/D Condition]** b S d C is set to **[Speed+Flow]** S P F L. *(see page 244)*	**[AI4 Sensor Config.]** b I F 4 -
NOTE: The list of parameters is the same for each **[AI4 Sensor Config.]** menu.		

If...	And...	Then following menu will be displayed:
[Pump Flow Assign.] F S 2 A is set to **[AI4]** A I 4	-	**[AI4 Sensor Config.]** P F 4 -
	[PumpLF Monitoring] P L F M is set to **[Flow]** 9 or **[Flow vs Speed]** 9 n. *(see page 380)*	**[AI4 Sensor Config.]** n P F 4 -
[Level Sensor Assign] L C S A is set to **[AI4]** A I 4	*(see page 277)*	**[AI4 Sensor Config.]** L C A 4 -
NOTE: The list of parameters is the same for each **[AI4 Sensor Config.]** menu.		

[AI4 Type] A I 4 t

Configuration of analog input AI4.

Setting	Code / Value	Description
[Voltage]	10 u	0-10 Vdc
[Current]	0 A	0-20 mA **Factory setting**

[AI4 min value] u I L 4 ★

AI4 voltage scaling parameter of 0%.

This parameter can be accessed if **[AI4 Type]** A I 4 t is set to **[Voltage]** 10 u.

Identical to **[AI1 min value]** u I L 1 *(see page 210)*.

[AI4 max value] u I H 4 ★

AI4 voltage scaling parameter of 100%.

This parameter can be accessed if **[AI4 Type]** A I 4 t is set to **[Voltage]** 10 u.

Identical to **[AI1 max value]** u I H 1 *(see page 210)*.

[AI4 min. value] C r L 4 ★

AI4 current scaling parameter of 0%.

This parameter can be accessed if **[AI4 Type]** A I 4 t is set to **[Current]** o A.

Identical to **[AI1 min. value]** C r L 1 *(see page 210)*.

[AI4 max. value] C r H 4 ★

AI4 current scaling parameter of 100%.

This parameter can be accessed if **[AI4 Type]** A I 4 t is set to **[Current]** o A.

Identical to **[AI1 max. value]** C r H 1 *(see page 210)*.

[AI4 Lowest Process] A I 4 J

AI4 lowest process.

Identical to **[AI1 Lowest Process]** A I 1 J *(see page 211)*.

[AI4 Highest Process] A I 4 K

AI4 highest process.

Identical to **[AI1 Highest Process]** A I 1 K *(see page 211)*.

[AI5 sensor config.] Menu

About This Menu

Access of **[AI5 Sensor Config.]** menu depends of the sensor assigned to this input.

The following table shows the **[AI5 Sensor Config.]** menus displayed in relation with the sensor and the applicative function used.

If...	And...	Then following menu will be displayed:
[InletPres Assign] P S I A is set to **[AI5]** A I 5	-	**[AI5 Sensor Config.]** I C A 5 -
	[Priming Pump Assign] P P o A is not set to **[No]** n o *(see page 359)*	**[AI5 Sensor Config.]** P P A 5 -
	[InletPres Monitoring] I P P M is not set to **[No]** n o *(see page 387)*	**[AI5 Sensor Config.]** I P A 5 -
[OutletPres Assign] P S 2 A is set to **[AI5]** A I 5	-	**[AI5 Sensor Config.]** o C A 5 -
	[Sleep Detect Mode] S L P M is set to **[Pressure]** H P or **[Multiple]** o r. *(see page 317)*	**[AI5 Sensor Config.]** S o A 5 -
	[Wake Up Mode] W u P M is set to **[Pressure]** L P. *(see page 317)*	**[AI5 Sensor Config.]** W o A 5 -
	[Activation Mode] P F M is set to **[Outlet Pressure]** P S 2. *(see page 348)*	**[AI5 Sensor Config.]** P F A 5 -
	[OutPres Monitoring] o P P M is set to **[Sensor]** S n S r or **[Both]** b o t h. *(see page 391)*	**[AI5 Sensor Config.]** o o A 5 -
[Inst. Flow Assign.] F S I A is set to **[AI5]** A I 5	-	**[AI5 Sensor Config.]** I F 5 -
	[LevelCtrl Strategy] L C S t is set to **[Energy Optimized]** A d u. *(see page 277)*	**[AI5 Sensor Config.]** L I F 5 -
	[Sleep Detect Mode] S L P M is set to **[Flow]** L F or **[Multiple]** o r. *(see page 317)*	**[AI5 Sensor Config.]** S I F 5 -
	[Mode Selection] F L C M is not set to **[Inactive]** n o. *(see page 353)*	**[AI5 Sensor Config.]** F I F 5 -
	[Flow limitation Mode] F L M is not set to **[No]** n o. *(see page 364)*	**[AI5 Sensor Config.]** L F 5 -
	[HighFlow Activation] H F P M is not set to **[No]** n o. *(see page 395)*	**[AI5 Sensor Config.]** H I F 5 -
	• **[Booster Control]** b C M is set to **[Yes]** Y E S • **[Booster S/D Condition]** b S d C is set to **[Speed+Flow]** S P F L. *(see page 244)*	**[AI5 Sensor Config.]** b I F 5 -
NOTE: The list of parameters is the same for each **[AI5 Sensor Config.]** menu.		

If...	And...	Then following menu will be displayed:
[Pump Flow Assign.] F S 2 A is set to **[AI5]** A I 5	-	**[AI5 Sensor Config.]** P F S -
	[PumpLF Monitoring] P L F M is set to **[Flow]** 9 or **[Flow vs Speed]** 9 n. *(see page 380)*	**[AI5 Sensor Config.]** n P F S -
[Level Sensor Assign] L C S A is set to **[AI5]** A I 5	*(see page 277)*	**[AI5 Sensor Config.]** L C A S -
NOTE: The list of parameters is the same for each **[AI5 Sensor Config.]** menu.		

[AI5 Type] A I 5 t

Configuration of analog input AI5.

Setting	Code / Value	Description
[Voltage]	10 u	0-10 Vdc
[Current]	0 A	0-20 mA **Factory setting**

[AI5 min value] u I L 5 ★

AI5 voltage scaling parameter of 0%.

This parameter can be accessed if **[AI5 Type]** A I 5 t is set to **[Voltage]** 10 u.

Identical to **[AI1 min value]** u I L 1 *(see page 210)*.

[AI5 max value] u I H 5 ★

AI5 voltage scaling parameter of 100%.

This parameter can be accessed if **[AI5 Type]** A I 5 t is set to **[Voltage]** 10 u.

Identical to **[AI1 max value]** u I H 1 *(see page 210)*.

[AI5 min. value] C r L 5 ★

AI5 current scaling parameter of 0%.

This parameter can be accessed if **[AI5 Type]** A I 5 t is set to **[Current]** o A.

Identical to **[AI1 min. value]** C r L 1 *(see page 210)*.

[AI5 max. value] C r H 5 ★

AI5 current scaling parameter of 100%.

This parameter can be accessed if **[AI5 Type]** A I 5 t is set to **[Current]** o A.

Identical to **[AI1 max. value]** C r H 1 *(see page 210)*.

[AI5 Lowest Process] A I 5 J

AI5 lowest process.

Identical to **[AI1 Lowest Process]** A I 1 J *(see page 211)*.

[AI5 Highest Process] A I 5 K

AI5 highest process.

Identical to **[AI1 Highest Process]** A I 1 K *(see page 211)*.

[DI5 Pulse Sensor Config.] Menu

About This Menu

Access of **[DI5 Pulse Sensor Config.]** menu depends of the sensor assigned to this input.

The following table shows the **[DI5 Pulse Sensor Config.]** menus displayed in relation with the sensor and the applicative function used.

If...	And...	Then following menu will be displayed:
[Inst. Flow Assign.] F S 1A is set to **[Di5 PulseInput Assignment]** P 1 5	-	**[DI5 Pulse Sensor Config.]** 1 F B -
	[LevelCtrl Strategy] L C S t is set to **[Energy Optimized]** A d u. *(see page 277)*	**[DI5 Pulse Sensor Config.]** L 1 P S -
	[Sleep Detect Mode] S L P M is set to **[Flow]** L F or **[Multiple]** o r. *(see page 317)*	**[DI5 Pulse Sensor Config.]** S 1 F B -
	[Mode Selection] F L C M is not set to **[Inactive]** n o. *(see page 353)*	**[DI5 Pulse Sensor Config.]** F 1 F B -
	[Flow limitation Mode] F L M is not set to **[No]** n o. *(see page 364)*	**[DI5 Pulse Sensor Config.]** L F B -
	[HighFlow Activation] H F P M is not set to **[No]** n o. *(see page 395)*	**[DI5 Pulse Sensor Config.]** H 1 F B -
	• **[Booster Control]** b C M is set to **[Yes]** Y E S • **[Booster S/D Condition]** b S d C is set to **[Speed+Flow]** S P F L. *(see page 244)*	**[DI5 Pulse Sensor Config.]** b 1 P S -
[Pump Flow Assign.] F S 2A is set to **[Di5 PulseInput Assignment]** P 1 5	-	**[DI5 Pulse Sensor Config.]** P F B -
	[PumpLF Monitoring] P L F M is set to **[Flow]** 9 or **[Flow vs Speed]** 9 n. *(see page 380)*	**[DI5 Pulse Sensor Config.]** n P F B -
NOTE: The list of parameters is the same for each **[DI5 Pulse Sensor Config.]** menu.		

[DI5 PulseInput Low Freq] P 1 L 5

Pulse input DI5 low frequency.

Setting	Description
0.00...30,000.00 Hz	Setting range **Factory setting**: 0.00 Hz

[DI5 PulseInput High Freq] P 1 H 5

Pulse input DI5 high frequency.

Setting	Description
0.00...30.00 kHz	Setting range **Factory setting**: 30.00 kHz

[DI5 Min Process] P I 5 J

Minimum process value for selected input.

Setting	Description
-32,767...32,767	Setting range **Factory setting**: 0

[DI5 Max Process] P I 5 K

Maximum process value for selected input.

Setting	Description
-32,767...32,767	Setting range **Factory setting**: 0

[DI6 Pulse Sensor Config.] Menu

About This Menu

Access of **[DI6 Pulse Sensor Config.]** menu depends of the sensor assigned to this input.

The following table shows the **[DI6 Pulse Sensor Config.]** menus displayed in relation with the sensor and the applicative function used.

If...	And...	Then following menu will be displayed:
[Inst. Flow Assign.] F S I A is set to **[Di6 PulseInput Assignment]** P I 6	-	**[DI6 Pulse Sensor Config.]** I F 9 -
	[LevelCtrl Strategy] L C S t is set to **[Energy Optimized]** A d u. *(see page 277)*	**[DI6 Pulse Sensor Config.]** L I P 6 -
	[Sleep Detect Mode] S L P M is set to **[Flow]** L F or **[Multiple]** o r. *(see page 317)*	**[DI6 Pulse Sensor Config.]** S I F 9 -
	[Mode Selection] F L C M is not set to **[Inactive]** n o. *(see page 353)*	**[DI6 Pulse Sensor Config.]** F I F 9 -
	[Flow limitation Mode] F L M is not set to **[No]** n o. *(see page 364)*	**[DI6 Pulse Sensor Config.]** L F 9 -
	[HighFlow Activation] H F P M is not set to **[No]** n o. *(see page 395)*	**[DI6 Pulse Sensor Config.]** H I F 9 -
	• **[Booster Control]** b C M is set to **[Yes]** Y E S • **[Booster S/D Condition]** b S d C is set to **[Speed+Flow]** S P F L. *(see page 244)*	**[DI6 Pulse Sensor Config.]** b I P 6 -
[Pump Flow Assign.] F S 2 A is set to **[Di6 PulseInput Assignment]** P I 6	-	**[DI6 Pulse Sensor Config.]** P F 9 -
	[PumpLF Monitoring] P L F M is set to **[Flow]** 9 or **[Flow vs Speed]** 9 n. *(see page 380)*	**[DI6 Pulse Sensor Config.]** n P F 9 -
NOTE: The list of parameters is the same for each **[DI6 Pulse Sensor Config.]** menu.		

[DI6 PulseInput Low Freq] P I L 6

Pulse input DI6 low frequency.

Setting	Description
0.00...30,000.00 Hz	Setting range **Factory setting**: 0.00 Hz

[DI6 PulseInput High Freq] P I H 6

Pulse input DI6 high frequency.

Setting	Description
0.00...30.00 kHz	Setting range **Factory setting**: 30.00 kHz

[DI6 Min Process] P ı 6 J

Minimum process value for selected input.

Setting	Description
-32,767...32,767	Setting range **Factory setting**: 0

[DI6 Max Process] P ı 6 K

Maximum process value for selected input.

Setting	Description
-32,767...32,767	Setting range **Factory setting**: 0

[AIV1 configuration] Menu

About This Menu

Access of **[AIV1 Sensor Config.]** menu depends of the sensor assigned to this input.

The following table shows the **[AIV1 Sensor Config.]** menus displayed in relation with the sensor and the applicative function used.

If...	And...	Then following menu will be displayed:
[InletPres Assign] *PS IA* is set to **[AI Virtual 1]** *AIV1*	-	**[AIV1 Sensor Config.]** *ICV1-*
	[Priming Pump Assign] *PPOA* is not set to **[No]** *nO* *(see page 359)*	**[AIV1 Sensor Config.]** *PPV1-*
	[InletPres Monitoring] *IPPM* is not set to **[No]** *nO* *(see page 387)*	**[AIV1 Sensor Config.]** *IPV1-*
[OutletPres Assign] *PS2A* is set to **[AI Virtual 1]** *AIV1*	-	**[AIV1 Sensor Config.]** *OCV1-*
	[Sleep Detect Mode] *SLPM* is set to **[Pressure]** *HP* or **[Multiple]** *or*. *(see page 317)*	**[AIV1 Sensor Config.]** *SOV1-*
	[Wake Up Mode] *WUPM* is set to **[Pressure]** *LP*. *(see page 317)*	**[AIV1 Sensor Config.]** *WOV1-*
	[Activation Mode] *PFM* is set to **[Outlet Pressure]** *PS2*. *(see page 348)*	**[AIV1 Sensor Config.]** *PFV1-*
	[OutPres Monitoring] *OPPM* is set to **[Sensor]** *SnSr* or **[Both]** *both*. *(see page 391)*	**[AIV1 Sensor Config]** *OOV1-*
[Inst. Flow Assign.] *FS IA* is set to **[AI Virtual 1]** *AIV1*	-	**[AIV1 Sensor Config.]** *IFV1-*
	[LevelCtrl Strategy] *LCSt* is set to **[Energy Optimized]** *Adu*. *(see page 277)*	**[AIV1 Sensor Config.]** *LIV1-*
	[Sleep Detect Mode] *SLPM* is set to **[Flow]** *LF* or **[Multiple]** *or*. *(see page 317)*	**[AIV1 Sensor Config.]** *SIV1-*
	[Mode Selection] *FLCM* is not set to **[Inactive]** *nO*. *(see page 353)*	**[AIV1 Sensor Config.]** *FIV1-*
	[Flow limitation Mode] *FLM* is not set to **[No]** *nO*. *(see page 364)*	**[AIV1 Sensor Config.]** *LFV1-*
	[HighFlow Activation] *HFPM* is not set to **[No]** *nO*. *(see page 395)*	**[AIV1 Sensor Config.]** *HIV1-*
	• **[Booster Control]** *bCM* is set to **[Yes]** *YES* • **[Booster S/D Condition]** *bSdC* is set to **[Speed+Flow]** *SPFL*. *(see page 244)*	**[AIV1 Sensor Config.]** *bIV1-*
NOTE: The list of parameters is the same for each **[AIV1 Sensor Config.]** menu.		

If...	And...	Then following menu will be displayed:
[Pump Flow Assign.] F S 2 A is set to **[AI Virtual 1]** A I V 1	-	**[AIV1 Sensor Config.]** P F V 1 -
	[PumpLF Monitoring] P L F M is set to **[Flow]** 9 or **[Flow vs Speed]** 9 n. *(see page 380)*	**[AIV1 Sensor Config.]** n P V 1 -
[Level Sensor Assign] L C S A is set to **[AI Virtual 1]** A I V 1	*(see page 277)*	**[AIV1 Sensor Config.]** L C V 1 -
NOTE: The list of parameters is the same for each **[AIV1 Sensor Config.]** menu.		

[AIV1 Channel Assignment] A I C 1

Channel assignment for virtual analog input AIV1.

Setting	Code / Value	Description
[Not Configured]	n o	Not assigned **Factory setting**
[Ref. Freq-Modbus]	M d b	Reference frequency via Modbus
[Ref. Freq-CANopen]	C A n	Reference frequency via CANopen if a CANopen module has been inserted
[Ref. Freq-Com. Module]	n E t	Reference frequency via fieldbus module if a fieldbus module has been inserted
[Embedded Ethernet]	E t H	Embedded Ethernet

[AIV1 Lowest Process] A u 1 J

AI virtual 1: minimum process value.

Setting	Description
-32,767...32,767	Setting range. Value in application customer unitt **Factory setting**: 0

[AIV1 Highest Process] A u 1 K

AI virtual 1: maximum process value.

Setting	Description
-32,767...32,767	Setting range. Value in application customer unitt **Factory setting**: 0

[AIV2 configuration] Menu

About This Menu

Access of **[AIV2 Sensor Config.]** menu depends of the sensor assigned to this input.

The following table shows the **[AIV2 Sensor Config.]** menus displayed in relation with the sensor and the applicative function used.

If...	And...	Then following menu will be displayed:
[InletPres Assign] PS IA is set to **[AI Virtual 2]** AIV2	-	**[AIV2 Sensor Config.]** ICV2 -
	[Priming Pump Assign] PPOA is not set to **[No]** NO *(see page 359)*	**[AIV2 Sensor Config.]** PPV2 -
	[InletPres Monitoring] IPPM is not set to **[No]** NO *(see page 387)*	**[AIV2 Sensor Config.]** IPV2 -
[OutletPres Assign] PS2A is set to **[AI Virtual 2]** AIV2	-	**[AIV2 Sensor Config.]** OCV2 -
	[Sleep Detect Mode] SLPM is set to **[Pressure]** HP or **[Multiple]** OR. *(see page 317)*	**[AIV2 Sensor Config.]** SOV2 -
	[Wake Up Mode] WUPM is set to **[Pressure]** LP. *(see page 317)*	**[AIV2 Sensor Config.]** WOV2 -
	[Activation Mode] PFM is set to **[Outlet Pressure]** PS2. *(see page 348)*	**[AIV2 Sensor Config.]** PFV2 -
	[OutPres Monitoring] OPPM is set to **[Sensor]** SNSR or **[Both]** both. *(see page 391)*	**[AIV2 Sensor Config]** OOV2 -
[Inst. Flow Assign.] FS IA is set to **[AI Virtual 2]** AIV2	-	**[AIV2 Sensor Config.]** IFV2 -
	[LevelCtrl Strategy] LCST is set to **[Energy Optimized]** Adu. *(see page 277)*	**[AIV2 Sensor Config.]** LIV2 -
	[Sleep Detect Mode] SLPM is set to **[Flow]** LF or **[Multiple]** OR. *(see page 317)*	**[AIV2 Sensor Config.]** SIV2 -
	[Mode Selection] FLCM is not set to **[Inactive]** NO. *(see page 353)*	**[AIV2 Sensor Config.]** FIV2 -
	[Flow limitation Mode] FLM is not set to **[No]** NO. *(see page 364)*	**[AIV2 Sensor Config.]** LFV2 -
	[HighFlow Activation] HFPM is not set to **[No]** NO. *(see page 395)*	**[AIV2 Sensor Config.]** HIV2 -
	• **[Booster Control]** bCM is set to **[Yes]** YES • **[Booster S/D Condition]** bSdC is set to **[Speed+Flow]** SPFL. *(see page 244)*	**[AIV2 Sensor Config.]** bIV2 -
NOTE: The list of parameters is the same for each **[AIV2 Sensor Config.]** menu.		

If...	And...	Then following menu will be displayed:
[Pump Flow Assign.] F S 2 A is set to **[AI Virtual 2]** A I V 2	-	**[AIV2 Sensor Config.]** P F V 2 -
	[PumpLF Monitoring] P L F M is set to **[Flow]** 9 or **[Flow vs Speed]** 9 n. *(see page 380)*	**[AIV2 Sensor Config.]** n P V 2 -
[Level Sensor Assign] L C S A is set to **[AI Virtual 2]** A I V 2	*(see page 277)*	**[AIV2 Sensor Config.]** L C V 2 -
NOTE: The list of parameters is the same for each **[AIV2 Sensor Config.]** menu.		

[AIV2 Channel Assignment] A I C 2

Channel assignment for virtual analog input AIV2.

Identical to **[AIV1 Channel Assignment]** A I C 1 *(see page 225)*.

[AIV2 Lowest Process] A u 2 J

AI virtual 2: minimum process value.

Identical to **[AIV1 Lowest Process]** A u 1 J *(see page 225)*.

[AIV2 Highest Process] A u 2 K

AI virtual 2: maximum process value.

Identical to **[AIV1 Highest Process]** A u 1 K *(see page 225)*.

[AIV3 configuration] Menu

About This Menu

Access of **[AIV3 Sensor Config.]** menu depends of the sensor assigned to this input.

The following table shows the **[AIV3 Sensor Config.]** menus displayed in relation with the sensor and the applicative function used.

If...	And...	Then following menu will be displayed:
[InletPres Assign] PS IA is set to **[AI Virtual 3]** AIV3	-	**[AIV3 Sensor Config.]** ICV3 -
	[Priming Pump Assign] PPOA is not set to **[No]** NO *(see page 359)*	**[AIV3 Sensor Config.]** PPV3 -
	[InletPres Monitoring] IPPM is not set to **[No]** NO *(see page 387)*	**[AIV3 Sensor Config.]** IPV3 -
[OutletPres Assign] PS2A is set to **[AI Virtual 3]** AIV3	-	**[AIV3 Sensor Config.]** OCV3 -
	[Sleep Detect Mode] SLPM is set to **[Pressure]** HP or **[Multiple]** OR. *(see page 317)*	**[AIV3 Sensor Config.]** SOV3 -
	[Wake Up Mode] WUPM is set to **[Pressure]** LP. *(see page 317)*	**[AIV3 Sensor Config.]** WOV3 -
	[Activation Mode] PFM is set to **[Outlet Pressure]** PS2. *(see page 348)*	**[AIV3 Sensor Config.]** PFV3 -
	[OutPres Monitoring] OPPM is set to **[Sensor]** SNSR or **[Both]** both. *(see page 391)*	**[AIV3 Sensor Config]** OOV3 -
[Inst. Flow Assign.] FS IA is set to **[AI Virtual 3]** AIV3	-	**[AIV3 Sensor Config.]** IFV3 -
	[LevelCtrl Strategy] LCST is set to **[Energy Optimized]** Adu. *(see page 277)*	**[AIV3 Sensor Config.]** L IV3 -
	[Sleep Detect Mode] SLPM is set to **[Flow]** LF or **[Multiple]** OR. *(see page 317)*	**[AIV3 Sensor Config.]** S IV3 -
	[Mode Selection] FLCM is not set to **[Inactive]** NO. *(see page 353)*	**[AIV3 Sensor Config.]** F IV3 -
	[Flow limitation Mode] FLM is not set to **[No]** NO. *(see page 364)*	**[AIV3 Sensor Config.]** LFV3 -
	[HighFlow Activation] HFPM is not set to **[No]** NO. *(see page 395)*	**[AIV3 Sensor Config.]** H IV3 -
	• **[Booster Control]** bCM is set to **[Yes]** YES • **[Booster S/D Condition]** bSdC is set to **[Speed+Flow]** SPFL. *(see page 244)*	**[AIV3 Sensor Config.]** b IV3 -
NOTE: The list of parameters is the same for each **[AIV3 Sensor Config.]** menu.		

If...	And...	Then following menu will be displayed:
[Pump Flow Assign.] F S 2 A is set to **[AI Virtual 3]** A I V 3	-	**[AIV3 Sensor Config.]** P F V 3 -
	[PumpLF Monitoring] P L F M is set to **[Flow]** 9 or **[Flow vs Speed]** 9 n. *(see page 380)*	**[AIV3 Sensor Config.]** n P V 3 -
[Level Sensor Assign] L C S A is set to **[AI Virtual 3]** A I V 3	*(see page 277)*	**[AIV3 Sensor Config.]** L C V 3 -
NOTE: The list of parameters is the same for each **[AIV3 Sensor Config.]** menu.		

[AIV3 Channel Assignment] A I C 3

Channel assignment for virtual analog input AIV3.

Identical to **[AIV1 Channel Assignment]** A I C 1 *(see page 225)*.

[AIV3 Lowest Process] A u 3 J

AI virtual 3: minimum process value.

Identical to **[AIV1 Lowest Process]** A u 1 J *(see page 225)*.

[AIV3 Highest Process] A u 3 K

AI virtual 3: maximum process value.

Identical to **[AIV1 Highest Process]** A u 1 K *(see page 225)*.

Section 7.6
[Command and Reference] CrP - Menu

[Command and Reference] CrP - Menu

Access

[Complete settings] ➡ **[Command and Reference]**

Command and Reference Channels Parameter Can Be Accessed

Run commands (forward, reverse, stop, and so on) and references can be sent using the following channels:

Command	Reference
Terminals: Digital inputs DI	Terminals: Analog inputs AI, pulse input
Graphic Display Terminal	Graphic Display Terminal
Integrated Modbus	Integrated Modbus
CANopen®	CANopen
Fieldbus module	Fieldbus module
–	+/– speed via the Graphic Display Terminal
Integrated Ethernet Modbus TCP	Integrated Ethernet Modbus TCP

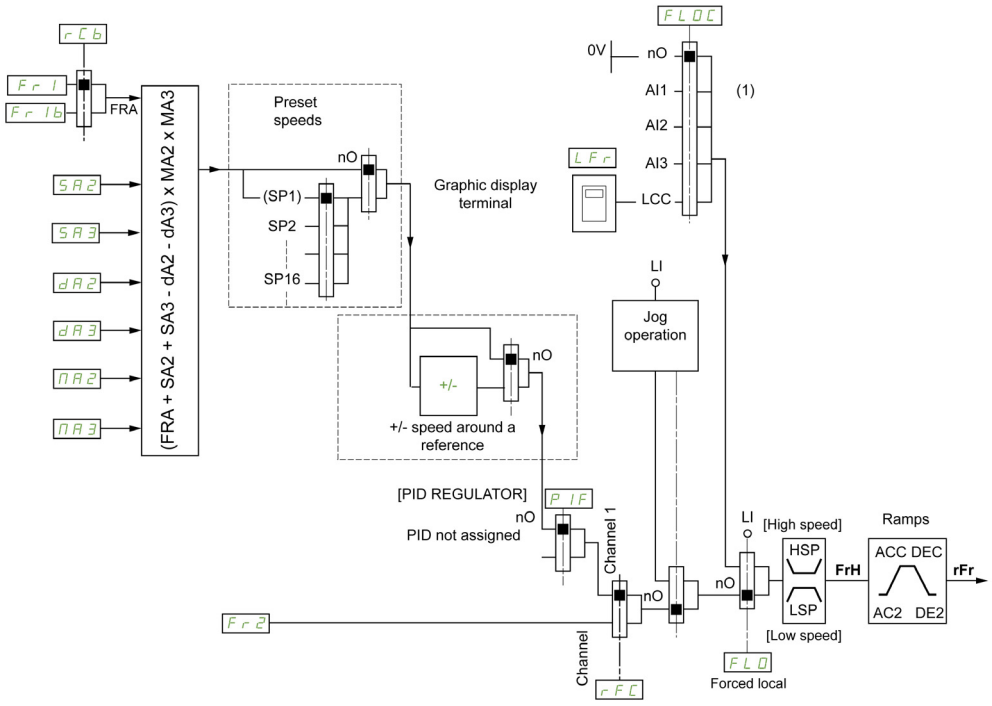
NOTE: The stop keys on the Graphic Display Terminal can be programmed as non-priority keys. A stop key can only have priority if the **[Stop Key Enable]** PSt parameter menu is set to **[Yes]** YES.

The behavior of the drive can be adapted according to requirements:

- **[Not separ.]** Sim: Command and reference are sent via the same channel.
- **[Separate]** SEP: Command and reference may be sent via different channels.In these configurations, control via the communication bus is performed in accordance with the DRIVECOM standard with only 5 freely assignable bits (see communication parameter manual). The application functions cannot be accessed via the communication interface.
- **[I/O profile]** io: The command and the reference can come from different channels. This configuration both simplify and extends use via the communication interface. Commands may be sent via the digital inputs on the terminals or via the communication bus. When commands are sent via a bus, they are available on a word, which acts as virtual terminals containing only digital inputs. Application functions can be assigned to the bits in this word. More than one function can be assigned to the same bit.

NOTE: Stop commands from the Graphic Display Terminal remain active even if the terminals are not the active command channel.

Reference Channel for [Not separ.] SIM, [Separate] SEP and [I/O profile] IO Configurations, PID Not Configured



(1) **Note**: Forced local is not active in **[I/O]**.

The black square represents the factory setting assignment.

Fr1: terminals (including I/O extension module), Graphic Display Terminal, integrated Modbus, CANopen®, communication card, embedded Ethernet, and fieldbus module.

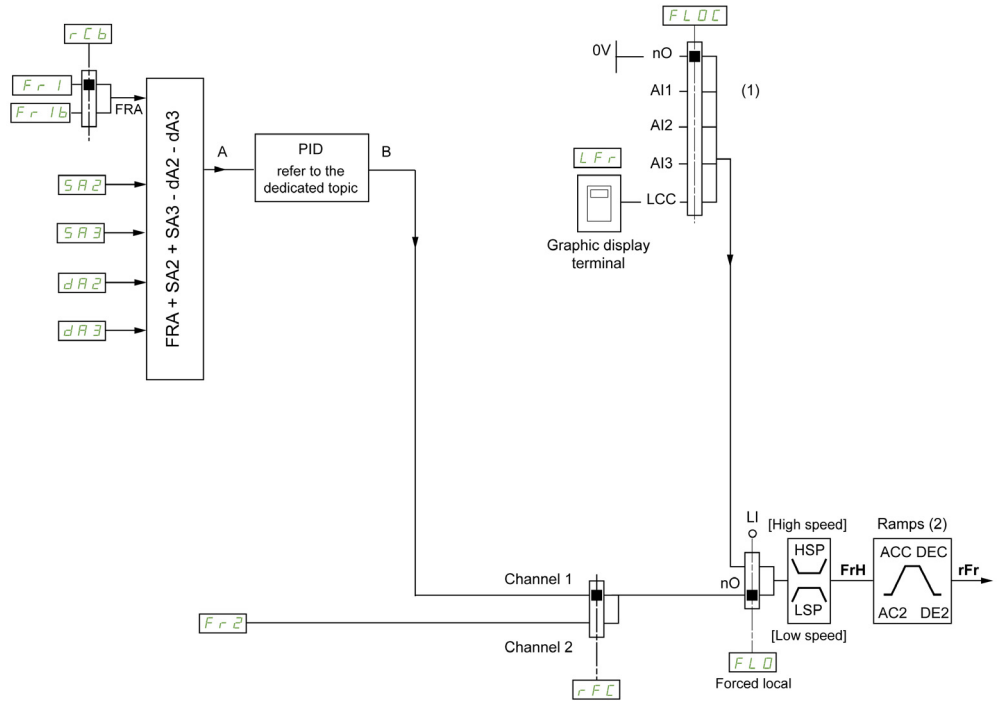
Fr1b, for SEP and IO: terminals (including I/O extension module), Graphic Display Terminal, integrated Modbus, CANopen®, embedded Ethernet, and fieldbus module.

Fr1b, for SIM: Graphic Display Terminal, only accessible if Fr1 = terminals.

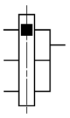
SA2, SA3, dA2, dA3, MA2, MA3: terminals (including I/O extension module), Graphic Display Terminal, integrated Modbus, CANopen®, communication card, embedded Ethernet, and fieldbus module.

Fr2: terminals (including I/O extension module), Graphic Display Terminal, integrated Modbus, CANopen®, embedded Ethernet communication card, +/– speed, and fieldbus module.

Reference Channel for [Not separ.] SIM, [Separate] SEP and [I/O profile] IO Configurations, PID Configured with PID References at the Terminals



(1) **Note**: Forced local is not active in **[I/O profile]**.
(2) Ramps not active if the PID function is active in automatic mode.



The black square represents the factory setting assignment.

Fr1: terminals (including I/O extension module), Graphic Display Terminal, integrated Modbus, CANopen®, communication card, embedded Ethernet, and fieldbus module.

Fr1b, for SEP and IO: terminals (including I/O extension module), Graphic Display Terminal, integrated Modbus, CANopen®, embedded Ethernet, and fieldbus module.

Fr1b, for SIM: Graphic Display Terminal, only accessible if Fr1 = terminals.

SA2, SA3, dA2, dA3: terminals (including I/O extension module), Graphic Display Terminal, integrated Modbus, CANopen®, communication card, embedded Ethernet, and fieldbus module.

Fr2: terminals (including I/O extension module), Graphic Display Terminal, integrated Modbus, CANopen®, embedded Ethernet communication card, +/– speed, and fieldbus module.

[Ref Freq 1 Config] *Fr 1*

Configuration reference frequency 1.

Setting	Code / Value	Description
[Not Configured]	*nO*	Not assigned
[AI1]	*AI1*	Analog input AI1 **Factory Setting**
[AI2]...**[AI3]**	*AI2*...*AI3*	Analog input AI2...AI3
[AI4]...**[AI5]**	*AI4*...*AI5*	Analog input AI4...AI5 if VW3A3203 I/O extension module has been inserted
[Ref Frequency via DI]	*uPdt*	Up/Down function is assigned by DIx
[HMI]	*LCC*	Reference Frequency via remote terminal
[Modbus]	*Mdb*	Reference frequency via Modbus
[CANopen]	*CAn*	Reference frequency via CANopen if a CANopen module has been inserted
[Com. Module]	*nEt*	Reference frequency via fieldbus module if a fieldbus module has been inserted
[Embedded Ethernet]	*EtH*	Embedded Ethernet
[DI5 PulseInput Assignment]...**[DI6 PulseInput Assignment]**	*PI5*...*PI6*	Digital input DI5...DI6 used as pulse input

[Ref.1B channel] *Fr 1b*

Configuration reference frequency 1B.

Setting	Code / Value	Description
[Not Configured]	*nO*	Not assigned **Factory setting**
[AI1]...**[AI3]**	*AI1*...*AI3*	Analog input AI1...AI3
[AI4]...**[AI5]**	*AI4*...*AI5*	Analog input AI4...AI5 if VW3A3203 I/O extension module has been inserted
[PulseInput Assignment On DI5]...**[PulseInput Assignment On DI6]**	*PI5*...*PI6*	Digital input DI5...DI6 used as pulse input

[Ref 1B switching] rCb

⚠ WARNING

UNANTICIPATED EQUIPMENT OPERATION

This parameter can cause unintended movements, for example an inversion of the direction of the rotation of the motor, a sudden acceleration or a stop.

- Verify that the setting of this parameter does not cause unintended movements.
- Verify that the setting of this parameter does not result in unsafe conditions.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Select switching (1 to 1B).

- If the assigned input or bit is at 0, **[Ref Freq 1 Config]** Fr1 is active.
- If the assigned input or bit is at 1, **[Ref.1B channel]** Fr1b is active.

[Ref 1B switching] rCb is forced to **[Ref Freq Channel 1]** Fr1 if **[Control Mode]** CHCF is set to **[Not separ.]** SIM with **[Ref Freq 1 Config]** Fr1 assigned via the terminals (analog inputs, pulse input).

NOTE: Activating this function from an other active command channel will also activate the monitoring of this new channel.

Setting	Code / Value	Description
[Ref Freq Channel 1]	Fr1	Reference channel = channel 1 (for RFC)
[Ref.1B channel]	Fr1b	Reference channel = channel 2 (for RFC)
[DI1]...**[DI6]**	LI1...LI6	Digital input DI1...DI6
[DI11]...**[DI16]**	LI11...LI16	Digital input DI11...DI16 if VW3A3203 I/O extension module has been inserted
[CD00]...**[CD10]**	Cd00...Cd10	Virtual digital input CMD.0...CMD.10 in **[I/O profile]** IO configuration
[CD11]...**[CD15]**	Cd11...Cd15	Virtual digital input CMD.11...CMD.15 regardless of configuration
[C101]...**[C110]**	C101...C110	Virtual digital input CMD1.01...CMD1.10 with integrated Modbus Serial in **[I/O profile]** IO configuration
[C111]...**[C115]**	C111...C115	Virtual digital input CMD1.11...CMD1.15 with integrated Modbus Serial regardless of configuration
[C201]...**[C210]**	C201...C210	Virtual digital input CMD2.01...CMD2.10 with CANopen® fieldbus module in **[I/O profile]** IO configuration
[C211]...**[C215]**	C211...C215	Virtual digital input CMD2.11...CMD2.15 with CANopen® fieldbus module regardless of configuration
[C301]...**[C310]**	C301...C310	Virtual digital input CMD3.01...CMD3.10 with a fieldbus module in **[I/O profile]** IO configuration
[C311]...**[C315]**	C311...C315	Virtual digital input CMD3.11...CMD3.15 with a fieldbus module regardless of configuration
[C501]...**[C510]**	C501...C510	Virtual digital input CMD5.01...CMD5.10 with integrated Ethernet in **[I/O profile]** IO configuration
[C511]...**[C515]**	C511...C515	Virtual digital input CMD5.11...CMD5.15 with integrated Ethernet regardless of configuration

[Reverse Disable] r in

Reverse directions disable.

NOTE: Anti-Jam function takes priority over **[Reverse Disable]** r in function. If an Anti jam function is used, reverse direction is applied despite of the **[Reverse disable]** r in configuration.

Lock of movement in reverse direction does not apply to direction requests sent by digital inputs.

Reverse direction requests sent by digital inputs are taken into account.

Reverse direction requests sent by the Graphic Display Terminal or sent by the line are not taken into account.

Any reverse speed reference originating from the PID, summing input, and so on, is interpreted as a zero reference (0 Hz).

Setting	Code / Value	Description
[No]	no	No
[Yes]	YES	Yes **Factory Setting**

[Control Mode] CHCF

Mixed mode configuration.

⚠ WARNING

UNANTICIPATED EQUIPMENT OPERATION

Disabling **[I/O profile]** io resets the drive to the factory settings.

- Verify that restoring the factory settings is compatible with the type of wiring used.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Setting	Code / Value	Description
[Not separ.]	SIM	Reference and command, not separate **Factory Setting**
[Separate]	SEP	Separate reference and command. This assignment cannot be accessed in **[I/O profile]** io
[I/O profile]	io	I/O profile

[Command Switching] CCS ★

⚠ WARNING

UNANTICIPATED EQUIPMENT OPERATION

This parameter can cause unintended movements, for example an inversion of the direction of the rotation of the motor, a sudden acceleration or a stop.

- Verify that the setting of this parameter does not cause unintended movements.
- Verify that the setting of this parameter does not result in unsafe conditions.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Control channel switch.

This parameter can be accessed if **[Control Mode]** CHCF is set to **[Separate]** SEP or to **[I/O profile]** IO.

If the assigned input or bit is at 0, channel **[Cmd channel 1]** Cd1 is active.If the assigned input or bit is at 1, channel **[Cmd channel 2]** Cd2 is active.

NOTE: Activating this function from an other active command channel will also activate the monitoring of this new channel.

Setting	Code / Value	Description
[Command channel 1]	Cd1	Command channel = channel 1 (for CCS) **Factory setting**
[Command channel 2]	Cd2	Command channel = channel 2 (for CCS)
[DI1]...**[DI6]**	LI1...LI6	Digital input DI1...DI6
[DI11]...**[DI16]**	LI11...LI16	Digital input DI11...DI16 if VW3A3203 I/O extension module has been inserted
[C101]...**[C110]**	C101...C110	Virtual digital input CMD1.01...CMD1.10 with integrated Modbus Serial in **[I/O profile]** IO configuration
[C111]...**[C115]**	C111...C115	Virtual digital input CMD1.11...CMD1.15 with integrated Modbus Serial regardless of configuration
[C201]...**[C210]**	C201...C210	Virtual digital input CMD2.01...CMD2.10 with CANopen® fieldbus module in **[I/O profile]** IO configuration
[C211]...**[C215]**	C211...C215	Virtual digital input CMD2.11...CMD2.15 with CANopen® fieldbus module regardless of configuration
[C301]...**[C310]**	C301...C310	Virtual digital input CMD3.01...CMD3.10 with a fieldbus module in **[I/O profile]** IO configuration
[C311]...**[C315]**	C311...C315	Virtual digital input CMD3.11...CMD3.15 with a fieldbus module regardless of configuration
[C501]...**[C510]**	C501...C510	Virtual digital input CMD5.01...CMD5.10 with integrated Ethernet in **[I/O profile]** IO configuration
[C511]...**[C515]**	C511...C515	Virtual digital input CMD5.11...CMD5.15 with integrated Ethernet regardless of configuration

[Cmd channel 1] CD1 ★

Command channel 1 assignment.

This parameter can be accessed if **[Control Mode]** CHCF is set to **[Separate]** SEP or **[I/O profile]** IO.

Setting	Code / Value	Description
[Terminals]	tEr	Terminal block source **Factory Setting**
[HMI]	LCC	Reference frequency via remote terminal
[Modbus]	Mdb	Reference frequency via Modbus
[CANopen]	CAn	Reference frequency via CANopen if a CANopen module has been inserted
[Com. Module]	nEt	Reference frequency via fieldbus module if a fieldbus module has been inserted
[Embedded Ethernet]	EtH	Embedded Ethernet
[PC tool]	PWS	DTM based software

[Cmd channel 2] CD2 ★

Command channel 2 assignment.

This parameter can be accessed if **[Control Mode]** CHCF is set to **[Separate]** SEP or **[I/O profile]** IO.

Identical to **[Cmd channel 1]** CD1 with factory setting **[Modbus]** Mdb.

[Freq Switch Assign] rFC

⚠ WARNING

UNANTICIPATED EQUIPMENT OPERATION

This parameter can cause unintended movements, for example an inversion of the direction of the rotation of the motor, a sudden acceleration or a stop.

- Verify that the setting of this parameter does not cause unintended movements.
- Verify that the setting of this parameter does not result in unsafe conditions.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

frequency switching assignment.

If the assigned input or bit is at 0, channel **[Ref Freq Channel 1]** Fr1 is active.

If the assigned input or bit is at 1, channel **[Ref Freq Channel 2]** Fr2 is active.

NOTE: Activating this function from an other active command channel will also activate the monitoring of this new channel.

Setting	Code / Value	Description
[Ref Freq Channel 1]	Fr1	Reference channel = channel 1 (for RFC)
[Ref.1B channel]	Fr1b	Reference channel = channel 2 (for RFC)
[DI1]...**[DI6]**	LI1...LI6	Digital input DI1...DI6
[DI11]...**[DI16]**	LI11...LI16	Digital input DI11...DI16 if VW3A3203 I/O extension module has been inserted
[CD00]...**[CD10]**	CD00...CD10	Virtual digital input CMD.0...CMD.10 in **[I/O profile]** IO configuration
[CD11]...**[CD15]**	CD11...CD15	Virtual digital input CMD.11...CMD.15 regardless of configuration
[C101]...**[C110]**	C101...C110	Virtual digital input CMD1.01...CMD1.10 with integrated Modbus Serial in **[I/O profile]** IO configuration
[C111]...**[C115]**	C111...C115	Virtual digital input CMD1.11...CMD1.15 with integrated Modbus Serial regardless of configuration
[C201]...**[C210]**	C201...C210	Virtual digital input CMD2.01...CMD2.10 with CANopen® fieldbus module in **[I/O profile]** IO configuration

Setting	Code / Value	Description
[C211]...**[C215]**	C211...C215	Virtual digital input CMD2.11...CMD2.15 with CANopen® fieldbus module regardless of configuration
[C301]...**[C310]**	C301...C310	Virtual digital input CMD3.01...CMD3.10 with a fieldbus module in **[I/O profile]** IO configuration
[C311]...**[C315]**	C311...C315	Virtual digital input CMD3.11...CMD3.15 with a fieldbus module regardless of configuration
[C501]...**[C510]**	C501...C510	Virtual digital input CMD5.01...CMD5.10 with integrated Ethernet in **[I/O profile]** IO configuration
[C511]...**[C515]**	C511...C515	Virtual digital input CMD5.11...CMD5.15 with integrated Ethernet regardless of configuration **NOTE:**

[Ref Freq 2 Config] Fr2

Configuration reference frequency 2.

Setting	Code / Value	Description
[Not Configured]	nO	Not assigned. If **[Control Mode]** CHCF is set to**[Not separ.]** SIM, the command is at the terminals with a zero reference. If **[Control Mode]** CHCF is set to **[Separate]** SEP or **[I/O profile]** IO, the reference is zero. **Factory Setting**
[AI1]...**[AI3]**	AI1...AI3	Analog input AI1...AI3
[AI4]...**[AI5]**	AI4...AI5	Analog input AI4...AI5 if VW3A3203 I/O extension module has been inserted
[Ref Frequency via DI]	UPdt	+/– speed command assigned to DIx
[Ref.Freq-Rmt.Term]	LCC	Display terminal source
[Ref. Freq-Modbus]	Mdb	Reference frequency via Modbus
[Ref. Freq- CANopen]	CAn	Reference frequency via CANopen if a CANopen module has been inserted
[Ref. Freq-Com. Module]	nEt	Reference frequency via fieldbus module if a fieldbus module has been inserted
[Embedded Ethernet]	Eth	Integrated Ethernet
[PulseInput Assignment On DI5]...**[PulseInput Assignment On DI6]**	PI5...PI6	Digital input DI5...DI6 used as pulse input

[Copy Ch1-Ch2] CoP

Copy channel 1 reference frequency to channel 2.

⚠ WARNING

UNANTICIPATED EQUIPMENT OPERATION

This parameter can cause unintended movements, for example an inversion of the direction of the rotation of the motor, a sudden acceleration or a stop.

- Verify that the setting of this parameter does not cause unintended movements.
- Verify that the setting of this parameter does not result in unsafe conditions.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Can be used to copy the current reference and/or the command with switching in order to avoid speed surges, for example.

If **[Control Mode]** CHCF *(see page 235)* is set to **[Not separ.]** SIM or **[Separate]** SEP, copying is possible only from channel 1 to channel 2.

If **[Control Mode]** CHCF is set to **[I/O profile]** IO, copying is possible in both directions.A reference or a command cannot be copied to a channel on the terminals.The reference copied is **[Pre-Ramp Ref Freq]** FrH (before ramp) unless the destination channel reference is set via +/– speed. In this case, the reference copied is **[Output frequency]** rFr (after ramp).

Setting	Code / Value	Description
[No]	nO	No copy **Factory Setting**
[Reference Frequency]	SP	Copy reference
[Command]	Cd	Copy command
[Cmd + Ref Frequency]	ALL	Copy reference and command

As the Graphic Display Terminal may be selected as the command and/or reference channel, its action modes can be configured.

Comments:

- The Graphic Display Terminal command/reference is only active if the command and/or reference channels from the terminal are active except for BMP with Local/ Remote key (command via the Graphic Display Terminal), which takes priority over these channels. Press Local/ Remote key again to revert control to the selected channel.
- Command and reference via the Graphic Display Terminal are impossible if the latter is connected to more than one drive.
- The preset PID reference functions can only be accessed if **[Control Mode]** CHCF is set to **[Not separ.]** SIM or **[Separate]** SEP.
- The command via the Graphic Display Terminal can be accessed regardless of the **[Control Mode]** CHCF.

[Forced Local Freq] FLoC

Forced local reference source assignment.

Setting	Code / Value	Description
[Not Configured]	nO	Not assigned (control via the terminals with zero reference) **Factory Setting**
[AI1]...**[AI3]**	AI1...AI3	Analog input AI1...AI3
[AI4]...**[AI5]**	AI4...AI5	Analog input AI4...AI5 if VW3A3203 I/O extension module has been inserted
[Ref.Freq-Rmt.Term]	LCC	Display terminal source

Setting	Code / Value	Description
[PulseInput Assignment On DI5]...**[PulseInput Assignment On DI6]**	P I5...P I6	Digital input DI5...DI6 used as pulse input

[Time-out Forc. Local] F L o t ★

Time for channel confirmation after forced local.

This parameter can be accessed if **[Forced Local Assign]** F L o is not set to **[No]** n o.

Setting	Description
0.1...30.0 s	Setting range **Factory setting**: 10.0 s

[Forced Local Assign] F L o

Forced local assignment.

Forced local mode is active when the input is at state 1.

[Forced Local Assign] F L o is forced to **[No]** n o if **[Control Mode]** C H C F is set to **[I/O profile]** I o.

Setting	Code / Value	Description
[Not Assigned]	n o	Not assigned **Factory setting**
[DI1]...**[DI6]**	L I1...L I6	Digital input DI1...DI6
[DI11]...**[DI16]**	L I11...L I16	Digital input DI11...DI16 if VW3A3203 I/O extension module has been inserted
[DI52 (High level)]... **[DI59 (High level)]**	d52H...d59H	Cabinet high level assignment digital inputs **NOTE:** This selection can be accessed on ATV660 and ATV680 equipped with Cabinet IO.

[Reverse Assign] rrS

Reverse assignment.

Setting	Code / Value	Description
[Not Assigned]	nO	Not assigned **Factory setting**
[DI1]...**[DI6]**	LI1...LI6	Digital input DI1...DI6
[DI11]...**[DI16]**	LI11...LI16	Digital input DI11...DI16 if VW3A3203 I/O extension module has been inserted
[DI52 (High level)]... **[DI59 (High level)]**	d52H...d59H	Cabinet high level assignment digital inputs **NOTE:** This selection can be accessed on ATV660 and ATV680 equipped with Cabinet IO.
[CD00]...**[CD10]**	Cd00...Cd10	Virtual digital input CMD.0...CMD.10 in **[I/O profile]** IO configuration
[CD11]...**[CD15]**	Cd11...Cd15	Virtual digital input CMD.11...CMD.15 regardless of configuration
[C101]...**[C110]**	C101...C110	Virtual digital input CMD1.01...CMD1.10 with integrated Modbus Serial in **[I/O profile]** IO configuration
[C111]...**[C115]**	C111...C115	Virtual digital input CMD1.11...CMD1.15 with integrated Modbus Serial regardless of configuration
[C201]...**[C210]**	C201...C210	Virtual digital input CMD2.01...CMD2.10 with CANopen® fieldbus module in **[I/O profile]** IO configuration
[C211]...**[C215]**	C211...C215	Virtual digital input CMD2.11...CMD2.15 with CANopen® fieldbus module regardless of configuration
[C301]...**[C310]**	C301...C310	Virtual digital input CMD3.01...CMD3.10 with a fieldbus module in **[I/O profile]** IO configuration
[C311]...**[C315]**	C311...C315	Virtual digital input CMD3.11...CMD3.15 with a fieldbus module regardless of configuration
[C501]...**[C510]**	C501...C510	Virtual digital input CMD5.01...CMD5.10 with integrated Ethernet in **[I/O profile]** IO configuration
[C511]...**[C515]**	C511...C515	Virtual digital input CMD5.11...CMD5.15 with integrated Ethernet regardless of configuration

[2/3-wire control] tCC

2-wire or 3-wire control.

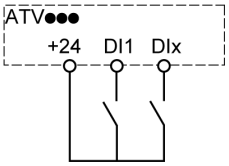
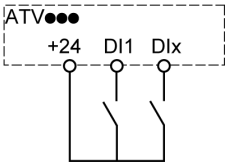
⚠ WARNING

UNANTICIPATED EQUIPMENT OPERATION

If this parameter is changed, the parameters **[Reverse Assign]** rrS and **[2-wire type]** tCt and the assignments of the digital inputs are reset to the factory setting.

Verify that this change is compatible with the type of wiring used.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Setting	Code / Value	Description
[2-Wire Control]	2C	**2-wire control (level commands):** This is the input state (0 or 1) or edge (0 to 1 or 1 to 0), which controls running or stopping. Example of **source** wiring:  **DI1** Forward **DIx** Reverse **Factory setting**
[3-Wire Control]	3C	**3-wire control (pulse commands) [3 wire]:** A **forward** or **reverse** pulse is sufficient to command starting, a **stop** pulse is sufficient to command stopping. Example of **source** wiring:  **DI1** Stop **DI2** Forward **DIx** Reverse

[2-wire type] tCt ★

Type of 2-wire control.

This parameter can be accessed if **[2/3-wire control]** tCC is set to **[2-Wire Control]** 2C.

⚠ WARNING

UNANTICIPATED EQUIPMENT OPERATION

Verify that the parameter setting is compatible with the type of wiring used.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Setting	Code / Value	Description
[Level]	LEL	State 0 or 1 is taken into account for run (1) or stop (0)
[Transition]	trn	A change of state (transition or edge) is necessary to initiate operation in order to avoid accidental restarts after a break in the supply mains **Factory setting**
[Level With Fwd Priority]	PFo	State 0 or 1 is taken into account for run or stop, but the “forward” input takes priority over the “reverse” input

[Stop Key Enable] PSt

Stop key enable.

⚠ WARNING

LOSS OF CONTROL

This function disables the Stop key of the Display Terminal if the setting of the parameter **[Command Channel]** CCdC is not HMI.

Only set this parameter to no if you have implemented appropriate alternative stop functions.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

This is a freewheel stop. If the active command channel is the Graphic Display Terminal, the stop is performed according to the **[Type of stop]** Stt irrespective of the configuration of **[Stop Key Enable]** PSt.

Setting	Code / Value	Description
[No]	no	–
[Yes]	YES	Gives priority to the STOP key on the Graphic Display Terminal when the Graphic Display Terminal is not enabled as the command channel **Factory Setting**

[HMI cmd.] bMP

HMI command.

Setting	Code / Value	Description
[Stop]	StoP	Stops the drive (although the controlled direction of operation and reference of the previous channel are copied (to be taken into account on the next RUN command))
[Bumpless]	buMP	Does not stop the drive (the controlled direction of operation and the reference of the previous channel are copied)
[Disabled]	diS	Disabled **Factory Setting**

Section 7.7
[Pump functions] - [Booster control]

Introduction

The aim of the booster control function is to maintain the desired pressure or flow at the outlet of the pumps according to the demand by:

- Managing the velocity of the variable speed pump connected to the drive.
- Staging/De-staging the auxiliary fixed speed pumps.

This menu can be accessed if **[Application Selection]** APPt is set to **[Pump Booster Control]** boo St.

What Is in This Section?

This section contains the following topics:

Topic	Page
[System Architecture] nPS - Menu	245
[MultiDrive Config] nPV C - Menu	256
[Pumps configuration] PunP - Menu	260
[System Architecture] nPS - Menu	263
[Booster control] bSC - Menu	265
[Stage/Destage condition] SdCn - Menu	268
[Stage/Destage method] Sdnn - Menu	272
[Booster control] bSC - Menu	276

[System Architecture] ΠP9 - Menu

Access

[Complete settings] ➡ **[Pump functions]** ➡ **[Booster control]** ➡ **[System architecture]**

About This Menu

This menu is used to define the equipment architecture.

The architecture is chosen by setting **[Pump System Archit]** ΠPSA to:

- **[Single Drive]** unduL : one variable speed pump and up to five fixed speed pumps
- **[Multi Drives]** nVSd: up to six variable speed pumps
- **[Multi Masters]** nVSdr : one master variable speed pump and up to five redundant masters or slaves.

In single drive architecture, the total number of pumps is set with **[Nb Of Pumps]** ΠPPn:

- With lead pump alternation, using interlocked switching relays for all pumps to connect them on mains or on the drive.
- Without lead pump alternation, using digital outputs to command the auxiliary pumps (with soft starters for example). The lead pump is always connected to the drive.
  In multiple drives architecture, the number of pumps is set with **[Nb of Devices]** ΠPGn. Lead pump alternation is not possible in this case.

MultiDrive Link Mechanism

Introduction:

MultiDrive Link function allows direct communication between a drives group.

This communication is done through an Ethernet link between each drives.

Some drive functions can be configured with the MultiDrive Link.

A VW3A3721 Ethernet module must be installed on the ATV600 drive to use MultiDrive Link.

Topology

MultiDrive Link function is an Ethernet based protocol.

It can be used in following topologies:

- Daisy chain
- Star
- Redundant ring with RSTP

More information about topologies is available in ATV600 Ethernet Option Manual.

MultiDrive Link Properties

MultiDrive Link Group:

A MultiDrive Link group can be composed of up to 6 devices.

Each device can be configured as Master or Slave, but only 1 active master must be present at same time in a MultiDrive Link group.

Each drive, must be identified with a unique ID from 1 to the maximum number of devices in the group.

Data Exchange Principle:

Each drive of the MultiDrive Link group sends data to all the drives of its group.

These data are sorted in data groups which are specifics for each application used in combination.

These data are sent using UDP frames with multicast IP addressing.

Network Configuration

The MultiDrive Link function uses the following network resources:

- IP address: 239.192.152.143
- UDP ports: 6700 and 6732
- Non routed networks

If the MultiDrive Link function is used over an Ethernet network, it is mandatory to take into account theses resources for its configuration.

Only one MultiDrive Link group can be used on a same Ethernet network.

Drive Configuration

Each drive used on a MultiDrive Link group must have an IP address.

This IP address can be set manually or assigned by a DHCP or BOOTP server.

MultiDrive Link Communication Monitoring

A permanent monitoring of the communication is performed by each drive of the MultiDrive Link Group to avoid:

- Execution of the same command
- Corruption of data on the MultiDrive Link group

Duplicate Slave ID:

The following table shows how the function reacts in case of duplicate slave ID detection:

If a Duplicate Slave ID is…	Then…
Detected at the same time in the MultiDrive Link group	It is not possible to identify the valid drive. In this case, both drives: ● are considered invalid ● are unavailable on the MultiDrive Link group ● don't send data on the MultiDrive Link group

Pump Cycling Mode

This functionality allows changing the start order of all available pumps in order to manage their wear. There are several ways to perform the pump cycling strategy by setting **[Pump Cycling Mode]** *ΠPPC*:

- Cycling based on pump order:
  - **[FIFO]** *F iFo* mode: pumps are started and stopped in ascending order
  - **[LIFO]** *L iFo* mode: pumps are started in ascending order while they are stopped in descending order
- Cycling based on running time:
  - **[Runtime]** *rt iΠE*: the available pump with the lowest running time is started first and the running pump with the highest running time is stopped first.
  - **[Runtime&LIFO]** *rtLF*: cycling based on a combination of running time and LIFO mode. The available pump with the lowest running time is started first and the running pump started at latest is stopped first.

  NOTE: This choice is not available if **[Pump System Archit]** *ΠPSA* is set to **[Multi Drives]** *nVSd*.

Lead Pump Alternation

The lead pump alternation function allows permuting the available pumps in order that each pump can become the lead pump (variable speed pump) instead of an auxiliary pump (fixed speed pump).

The lead pump is the first pump to be started and the last pump to be stopped. It is always associated to the variable speed drive.

The function can be activated by setting **[Lead Pump Alternation]** *ΠPLA*:

- **[No]** *no*: no lead pump alternation, the pump 1 is always the lead pump. The pump cycling is applied only on auxiliary pumps.
- **[Standard]** *YES*: the lead pump is permuted between all available pumps at each pump operation start.
- **[Redundancy]** *rEd*: lead pump alternation is effective only if the pump 1 is not available.

When lead pump alternation is activated, catch on fly function should be configured to reduce over current when a pump is started as the lead pump while it was running as auxiliary pump before. It is also possible to set **[Pump Ready Delay]** *ΠP id* to delay the availability of an auxiliary pump for a new start after it has been stopped.

Automatic Period Cycling

This function is used to balance the duty sharing of all the pumps of the MultiPump architecture.

When using this function, it is recommended to activate the Catch On Fly function.Depending of the value of **[Pump Cycling Mode]** *ΠPPC*, this function has different behavior:

- If **[Pump Cycling Mode]** *ΠPPC* is set to **[Runtime]** *rt iΠE*, the pumps alternate according to the differential operating time between the next to stage and next to destage pumps.
- If **[Pump Cycling Mode]** *ΠPPC* is set to **[FIFO]** *F iFo*, the pumps alternate periodically with the time defined on **[Pump Auto Cycling]** *ΠPCP*. However the time period resets in following cases:
  - At each destage
  - On lead pump stage
  - In architectures with 1 variable speed pumps and direct on line pumps, on first auxiliary pump stage whatever the value of **[Lead Pump Alternation]** *ΠPLA*.

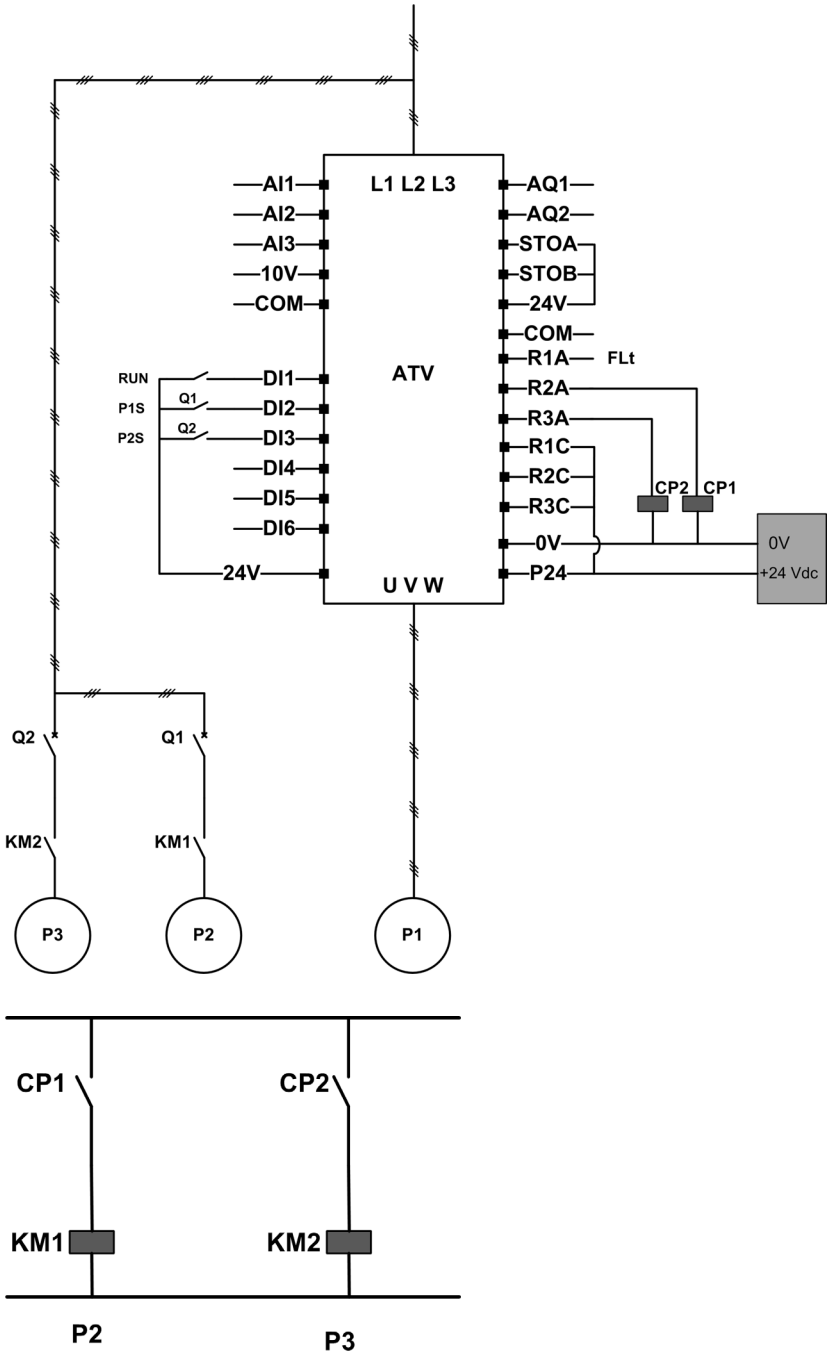
NOTE: This function is not active when **[Pump Cycling Mode]** *ΠPPC* is set to **[LIFO]** *L iFo* or **[Runtime&LIFO]** *rtLF*.

Display Parameters

A set of parameters to display the system is available in **[Display]** *Πon* - **[Pump parameters]** *PPr* - **[Multipump System]** *ΠPS* -:

- The state of the system **[MultiPump State]** *ΠPS*.
- The quantity of pumps available **[Available Pumps]** *ΠPAn* and the quantity of pump already staged **[Nb of Staged Pumps]** *ΠPSn*.
- The number of the pump selected to be the lead pump **[Lead Pump]** *PL id*.
- The number of the next pump to be staged **[Next Staged Pump]** *Pnt S* and de-staged **[Next Destaged Pump]** *Pntd*.
- For each pump (pump 1 in the example):
  - The state **[Pump 1 State]** *P 1S*
  - The type **[Pump 1 Type]** *P 1t*
  - The cumulated run time **[Pump 1 Runtime]** *P 1ot*
  - The cumulated number of starts **[Pump 1 Nb Starts]** *P 1nS*

Example of Architecture Without Lead Pump Alternation and Two Fixed Speed Pumps



Pump 2 and pump 3 are controlled by relay outputs R2 and R3.

The state of each pump is provided to the drive via digital inputs DI2 and DI3:

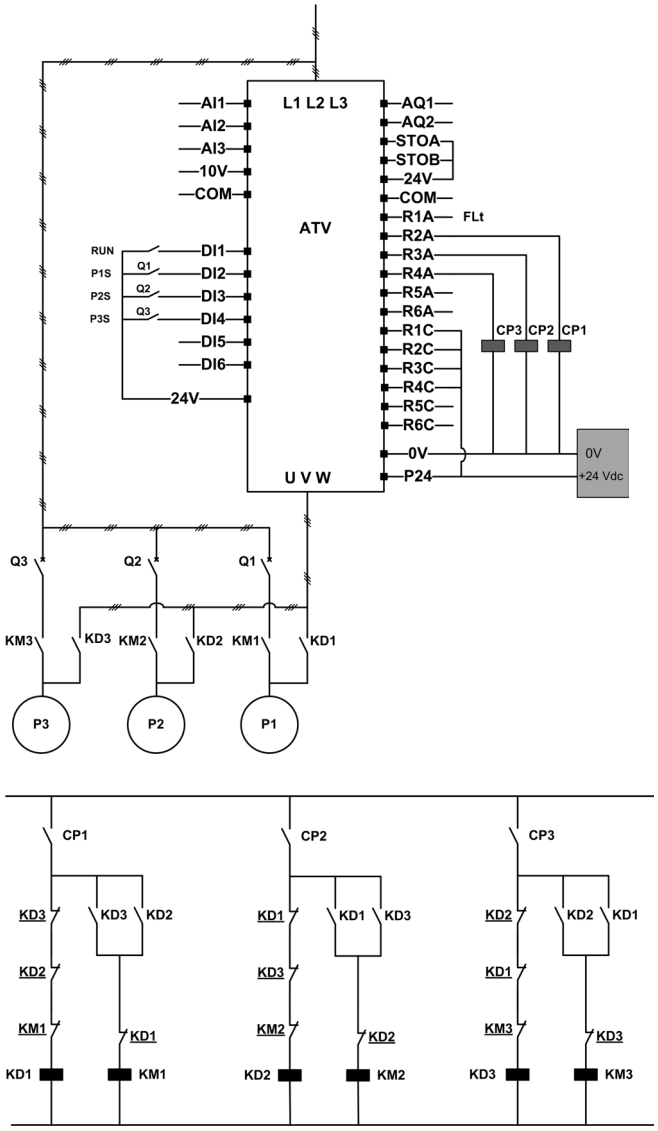
- 1 = the pump is ready to operate.
- 0 = the pump is not available.

KM1 is switched ON when CP1 is activated. CP1 is controlled via the relay output R2.

KM2 is switched ON when CP2 is activated. CP2 is controlled via the relay output R3.

Q1 and Q2 must be switched ON to have both pump 2 and pump 3 ready to operate.

Example of Architecture with Lead Pump Alternation on Three Pumps



Each pump is controlled by a relay output:

- Pump 1 control via relay output R2.
- Pump 2 control via relay output R3.
- Pump 3 control via relay output R4.

The state of each pump is provided to the drive via digital inputs DI2, DI3, and DI4:

- 1 = the pump is ready to operate.
- 0 = the pump is not available.

If the relay output R2 is the first activated, the pump 1 becomes the lead pump. CP1 is switched ON via relay output R2, KD1 is switched ON and the pump 1 is connected to the drive.

The other pumps cannot be connected to the drive thanks to KD1 (switched OFF) which prevent KD2 and KD3 to be activated when CP2 and CP3 are switched ON. The other pumps become auxiliary pumps and they are connected to the supply mains trough KM2 and KM3 which are activated when, respectively, CP2 and CP3 are switched ON, that is, when R3 and R4 are activated.

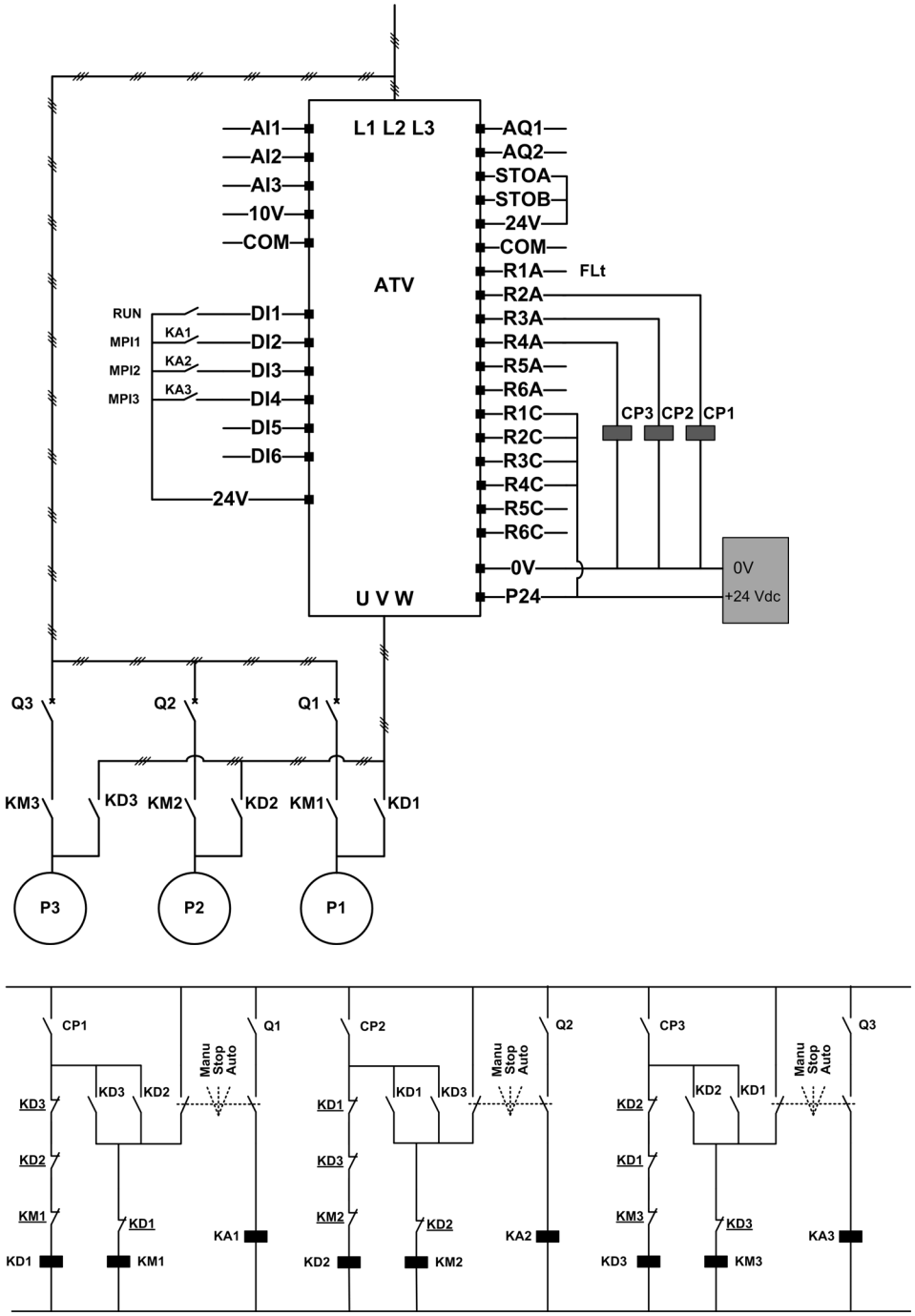
When relay output R3 is the first activated, the pump 2 becomes the lead pump. The other pumps become auxiliary pumps which are connected to the supply mains via KM1 and KM3.

When relay output R4 is the first activated, the pump 3 becomes the lead pump. The other pumps become auxiliary pumps which are connected to the supply mains via KM1 and KM2.

Q1, Q2, and Q3 must be switched ON to have all pumps ready to operate.

To change the lead pump, it is necessary to deactivate all relay outputs which means that all pumps must be already stopped. It is then possible to decide which relay output to be activated first and so defining the new lead pump.

Example of Architecture with Lead Pump Alternation on Three Pumps and Auto/Manu Switch



Each pump is controlled by a relay output:

- Pump 1 control via relay output R2.
- Pump 2 control via relay output R3.
- Pump 3 control via relay output R4.

The state of each pump is provided to the drive via digital inputs DI2, DI3, and DI4:

- 1 = the pump is ready to operate.
- 0 = the pump is not available (stopped or in manual mode).

In automatic mode: Same principle as previous architecture with lead pump alternation.

In manual mode: All pumps are connected to the supply mains through KM1, KM2, and KM3.

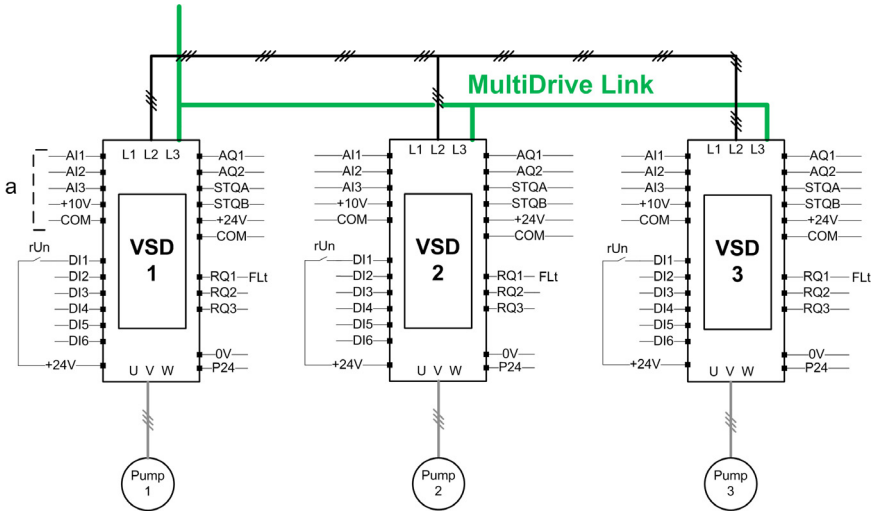
Example of Architecture with Three Pumps and MultiDrive Link

Each pump is controlled by an ATV600 drive.

The drives are connected together through the MultiDrive link using an Ethernet option module.

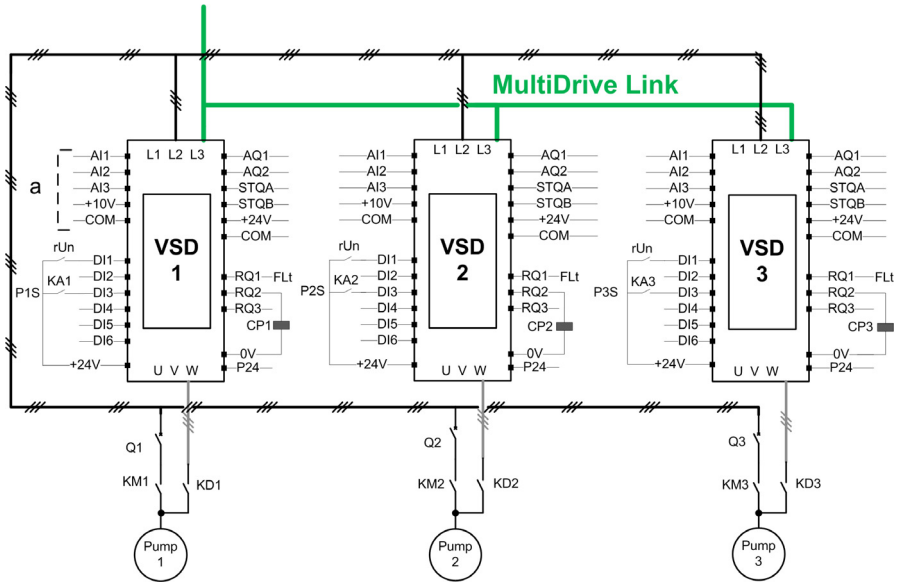
Each drive has its own RUN command:

- This command allows the pump to operate.
- On Master drive, this command allows execution of MultiPump functions like Booster and Level Control.



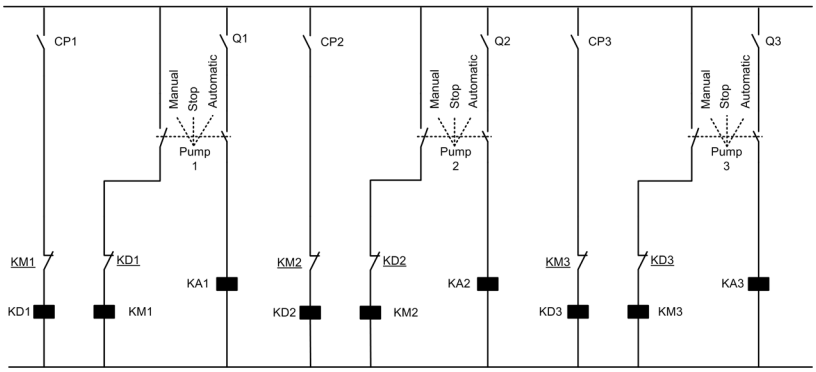
a Sensors connected to the master.

Example of Architecture with Three pumps, MultiDrive Link and Auto/Manu Switch



a Sensors connected to the master.

Switching board



The drives are connected together through the MultiDrive link using a VW3A3721 Ethernet option module.

Each drive has its own RUN command:
- This command allows the pump to operate.
- On Master drive, this command allows execution of MultiPump functions like Booster and Level Control.

The state of each pump is provided to the drive using digital input (DI3 in example).

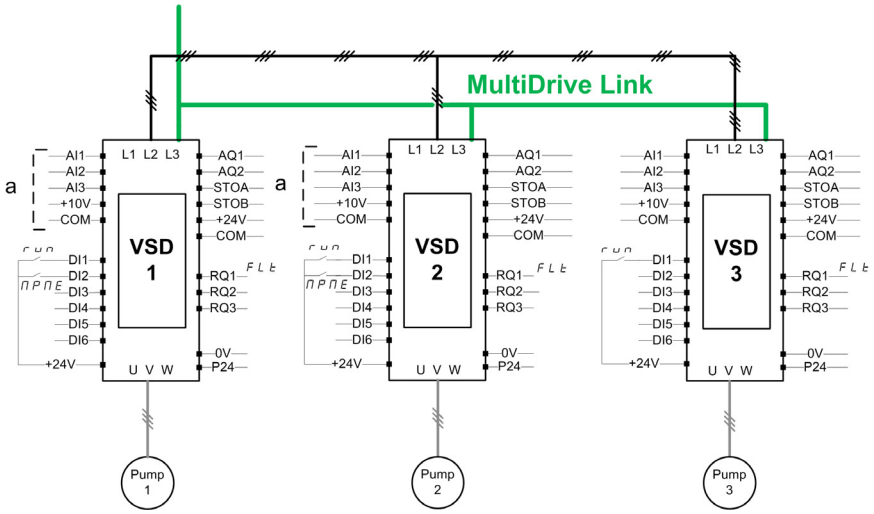
If this input is set to:
- 1 = the pump is ready to operate in Automatic mode.
- 0 = the pump is not available (Stopped or in Manual mode).

In Automatic mode, the pump is connected and controlled using the ATV600 drive.

In Manual mode, the pump is disconnected from the ATV600 drive and connected to the supply mains.

In Stop mode, the pump is disconnected from both supply mains and ATV600 drive.

Example of Architecture with Three pumps, MultiDrive Link and Service Continuity



NOTE: Pump 1 = Master, Pump 2: Master or slave, Pump 3: Slave

The drives are connected together through the MultiDrive Link using a VW3A3721 Ethernet option module.

Each drive has its own RUN command:
- This command allows the pump to operate.
- On Master drive, this command allows execution of MultiPump functions like Booster and Level Control.

Each dive of the architecture with **[M/P Device Role]** *PPdt* set as **[Master or Slave]** *PASt2* can acts as Master.

Master Selection

To allow selection of which drive will acts as Master, the parameter **[Master Enable Assign]** *PPPE* can be configured.

When the input is set to 1, the drive acts as a Master, otherwise, it acts as Slave.

Sensors Wiring

The sensors needed for the application control must be wired on all the drives that can acts as Masters.

Master Election

A drive can be elected as Master if:
- The RUN command is present
- And the drive is not in error state (except for system errors)
- And **[Master Enable Assign]** *MPME* input is active or not configured.

There is no additional condition on the primary master.

To switch on a secondary master, the primary master must be not available.

A not elected Master acts as a Slave. In this case, Application Control is not executed on it and the error reaction is same as a Slave in architectures without Service Continuity.

At power on, a Master takes the control of the application after the **[PwrOn Master Delay]** *MPPd* delay if the conditions described above are valid.

When the Master activation conditions are valid, the drive is elected as master of the application after the **[Master Act Delay]** *MPMd* delay. If the **[Master Enable Assign]** *MPME* is not configured in the architecture, it is recommended to set different delays on the possible masters of the application according to their priority.After election of the Master, the drive activates the output configured on **[Master Active Assign]** *MPMA* parameter.

NOTE: Even if the output is active, it does not mean that the master is active. The MultiDrive Link mechanism will elect one master among all the drives in the architecture and the active master ID can be identified by **[Active Master ID]** *MM id*.

The status of application is kept when switching from a master to another one.

Following applicative status are taken into account:
- **Sleep/Wake-up:** if the application is woken up
- **Priming Pump:** if the application is primed.
  NOTE: In this case the priming pump control have to be wired on each possible masters of the application.
- **Pipe Fill:** if the pipe is filled.

Example: if the master has finished its priming phase, the second one will not restart the priming sequence when it will take the control of the application.

Warnings and Errors Handling

MultiPump Capacity Warning

If the available capacity of the system is exceeded:
- **[MultiPump Capacity Warn]** *MPCA* warning is active if the number of pumps to be started is higher than the number of available pumps.
  NOTE: If the number of available pump is equal to 0, the warning is active.

Lead Pump Error/Warning

NOTE: The following handling is done if **[Pump System Architecture]** *MPSA* is set to **[Single Drive]** *VndoL*.

If the selected lead pump is not available:
- A **[Lead Pump Warn]** *MPLA* warning is active if the lead pump becomes not available while in run or if there is no lead pump available at run command.
- A **[Lead Pump Error]** *MPLF* error is active if the lead pump becomes not available while in run.If configured, the delay **[Pump Ready Delay]** *MP id* is applied on the error triggering if there is no lead pump available at run command.
  This error is handled whatever the active command channel if booster control or level control function is configured.

The drive response to a **[Lead Pump Error]** *MPLF* is set with **[MultiPump ErrorResp]** *MPFb* parameter.

MultiPump Device Error/Warning

NOTE: The following handling is done if **[Pump System Architecture]** *MPSA* is set to **[Multi Drives]** *nVSd* or **[Multi Masters]** *nVSdr*.

A device is considered not available by another when no data is received, through MultiDrive Link, for a time longer than **[MDL Comm Timeout]** *MLto* delay.

- On Master device, the **[M/P Device Warn]** *MPdA* warning is active if one or more Slave devices is not available or not ready.
- On Slave device, the **[M/P Device Warn]** *MPdA* warning is active if the Master device is not available.
- A **[M/P Device Error]** *MPdF* error is active if **[M/P Device Warn]** *MPdA* is active while system is running during more than twice **[Master Act Delay]** *MPMd* delay and a run command is set.

The **[M/P Device Error]** *MPdF* error can be active only on a device which acts as a Slave.

The drive response to a **[M/P Device Error]** *MPdF* is set with **[M/P Device ErrorResp]** *MPdb* parameter.

MultiDrive Link Error

NOTE: The following handling is done if **[Pump System Architecture]** *MPSA* is set to **[Multi Drives]** *nWSd*.

- A **[MultiDrive Link Error]** *MdLF* error is active if the MultiDrive Link architecture is not consistent (several Masters, several Slaves with same ID) at run command.

The drive response to a **[MultiDrive Link Error]** *MdLF* is set with **[MultiDrive ErrorResp]** *MdLb* parameter.

Application functions and Device Role

Depending of the device role selected in case of Multipumps Architecture, some functions can become not configurable.

The following table shows the list of functions that can be activated depending of the **[M/P Device Role]** *MPdt* selection. When a function is described as not available, this function is not displayed on Display Terminal.

Function	[M/P Device Role] *MPdt*	
	[Master] *MASt* or [Master Only] *MAS1* or [Master or Slave] *MAS2*	[Slave] *SLAVE*
[Anti-jam monit] *JAM-*	Yes	Yes
[Priming pump ctrl] *PPC-*	Yes	Yes (1)
[Pipe fill] *PF i-*	Yes	Not available
[High flow monitoring] *HFP-*	Yes	Not available
[Flow limitation] *FLM-*	Yes	Not available
[Outlet pressure monitoring] *oPP-*	Yes	Not available
[Inlet pressure monitoring] *iPP-*	Yes	Not available
[PID controller] *Pid-*	Yes	Not available
[Sleep/Wakeup] *SPW-*	Yes	Not available
[Friction loss comp] *FLC-*	Yes	Not available
[Jockey pump] *JKP-*	Yes	Not available
[Feedback monitoring] *FKM-*	Yes	Not available
1 Priming pump is used, when **[M/P Device Role]** *MPdt* is set to **[Slave]** *SLAVE*, only if the pump is controlled locally (for example during Anti-jam execution). In normal operation, the master manages the priming pump for the system.		

[Pump System Archi] ΠPSA

Pump system architecture selection.

Setting	Code / Value	Description
[Mono-Pump]	nO	Multi-pump control deactivated **Factory setting**
[Single Drive]	VndoL	Single drive with or without auxiliary pumps
[Multi Drives]	nVSd	Multiple drives
[Multi Masters]	nVSdr	Multiple Drives with Master redundancy

[Nb Of Pumps] ΠPPn ★

Number of pumps.

This parameter can be accessed if **[Pump System Archi]** ΠPSA is set to **[Single Drive]** VndoL .

Setting	Description
1...6	Setting range **Factory setting**: 1

[MultiDrive Config] nPVC - Menu

Access

[Complete settings] ➡ **[Pump functions]** ➡ **[Booster control]** ➡ **[System architecture]** ➡ **[Multidrive Config]**

About This Menu

This menu can be accessed if **[Pump System Archit]** nPSA is set to **[Multi Drives]** nVSd or **[Multi Masters]** nVSdr.

[M/P Device Role] nPdt ★

Multipump master or slave selection

Setting	Code / Value	Description
[Slave]	SLAVE	Drive is managed by the Master drive of Multipump architecture **Factory setting**
[Master]	nAST	Drive manages the other drives of Multipump architecture **NOTE:** This selection can be accessed if **[Pump System Archi]** nPSA is set to **[Multi Drives]** nVSd.
[Master Only]	nAST 1	Drive is the primary master of the Multipump architecture with master redundancy. **NOTE:** This selection can be accessed if **[Pump System Archi]** nPSA is set to **[Multi Drives]** nVSdr.
[Master or Slave]	nAST2	Drive acts as a slave as long as the drive with nAST 1 selection is available. It acts as master when the drive with nAST 1 selection is not available. **NOTE:** This selection can be accessed if **[Pump System Archi]** nPSA is set to **[Multi Drives]** nVSdr.

[Nb of Devices] nPGn ★

Number of Multipump devices

This parameter can be accessed if **[M/P Device Role]** nPdt is set to **[Master]** nAST, **[Master Only]** nAST 1, or **[Master or Slave]** nAST2

Setting	Description
1...6	Setting range **Factory setting**: 1

[M/P Device ID] nGid ★

Multipump device ID selection

The ID must be unique and selected between 1 and **[Nb of Devices]** nPGn on each drives of the MultiDrive Link group.

NOTE: This parameter is reset to **[No]** no if one of the following parameter value is changed:**[M/P Device Role]** nPdt, **[Nb of Devices]** nPGn, **[MDL Pairing Code]** ndPC.

Setting	Description
[No] no to 6	Setting range **Factory setting**: **[No]** no

[MDL Pairing Code] MdPC ★

MultiDrive Link pairing code.

This parameter is used to manage several MultiDrive Link architectures on a same Ethernet network. The pairing code have to be the same on each drives of a MultiDrive Link architecture.

This parameter can be accessed if **[Access Level]** LAC is set to **[Expert]** EPr.

Setting	Description
0...255	Setting range **Factory setting**: 0

[Master Enable Assign] MPME

Multi-pump master enable assignment.

This parameter can be accessed if **[M/P Device Role]** MPdt is set to **[Master or Slave]** MAS2.

This input is used to activate a drive of a MultiDrive Link group as a master.

Setting	Code / Value	Description
[Not Assigned]	nO	Not assigned **Factory setting**
[DI1]...**[DI6]**	LI1...LI6	Digital input DI1...DI6
[DI11]...**[DI16]**	LI11...LI16	Digital input DI11...DI16 if VW3A3203 I/O extension module has been inserted
[DI52 (High level)]... **[DI59 (High level)]**	d52H...d59H	Cabinet high level assignment digital inputs **NOTE:** This selection can be accessed on ATV660 and ATV680 equipped with Cabinet IO.
[CD00]...**[CD10]**	CD00...CD10	Virtual digital input CMD.0...CMD.10 in **[I/O profile]** IO configuration
[CD11]...**[CD15]**	CD11...CD15	Virtual digital input CMD.11...CMD.15 regardless of configuration
[C101]...**[C110]**	C101...C110	Virtual digital input CMD1.01...CMD1.10 with integrated Modbus Serial in **[I/O profile]** IO configuration
[C111]...**[C115]**	C111...C115	Virtual digital input CMD1.11...CMD1.15 with integrated Modbus Serial regardless of configuration
[C201]...**[C210]**	C201...C210	Virtual digital input CMD2.01...CMD2.10 with CANopen® fieldbus module in **[I/O profile]** IO configuration
[C211]...**[C215]**	C211...C215	Virtual digital input CMD2.11...CMD2.15 with CANopen® fieldbus module regardless of configuration
[C301]...**[C310]**	C301...C310	Virtual digital input CMD3.01...CMD3.10 with a fieldbus module in **[I/O profile]** IO configuration
[C311]...**[C315]**	C311...C315	Virtual digital input CMD3.11...CMD3.15 with a fieldbus module regardless of configuration
[C501]...**[C510]**	C501...C510	Virtual digital input CMD5.01...CMD5.10 with integrated Ethernet in **[I/O profile]** IO configuration
[C511]...**[C515]**	C511...C515	Virtual digital input CMD5.11...CMD5.15 with integrated Ethernet regardless of configuration

[Master Active Assign] *MPMA*

Multi-pump master activated assignment.

This parameter can be accessed if **[M/P Device Role]** *MPdt* is set to **[Master Only]** *MAST1* or **[Master or Slave]** *MAST2*.

This output is used to indicate if the drive acts as a master.

Setting	Code / Value	Description
[No]	*no*	Not assigned **Factory setting**
[R2]...**[R3]**	*r2*...*r3*	Relay output R2...R3
[R4]...**[R6]**	*r4*...*r6*	Relay output R4...R6 if VW3A3204 relay output option module has been inserted
[DQ11 Digital Output]...**[DQ12 Digital Output]**	*do11*...*do12*	Digital output DQ11...DQ12 if VW3A3203 I/O extension module has been inserted
[R61]…**[R66]**	*r61*...*r66*	Relay R61 …R66 **NOTE:** This selection can be accessed on ATV660 and ATV680 equipped with Cabinet IO

[Master Act Delay] *MPMd*

Multi-pump master activation delay.

This parameter can be accessed if **[M/P Device Role]** *MPdt* is set to **[Slave]** *SLAVE* or **[Master or Slave]** *MAST2*.

This parameter is used to set a delay on slaves drives before triggering a **[M/P Device Error]** *MPdF* if no master is available.

Setting	Description
0.0...99.9 s	Setting range **Factory setting**: 0.0 s

[PwrOn Master Delay] *MPPd*

Multi-pump power-on master delay.

This parameter can be accessed if **[M/P Device Role]** *MPdt* is set to **[Master Only]** *MAST1* or **[Master or Slave]** *MAST2*

Setting	Description
0...120 s	Setting range **Factory setting**: 30 s

[MultiDrive ErrorResp] *MdLb*

Response to Multi-Drive Link communication error.

Setting	Code / Value	Description
[Ignore]	*no*	Detected error ignored
[Freewheel Stop]	*YES*	Freewheel stop
[Per STT]	*Stt*	Stop according to **[Type of stop]** *Stt* parameter but without an error triggered after stop
[Ramp stop]	*rMP*	Stop on ramp **Factory setting**

[MDL Comm Timeout] nLto

MultiDrive Link communication timeout.

Setting	Description
0.05...10.00 s	Setting range **Factory setting**: 0.25 s

[M/P Device ErrorResp] nPdb

Response to multipump device error.

Setting	Code / Value	Description
[Ignore]	no	Detected error ignored
[Freewheel Stop]	YES	Freewheel stop
[Per STT]	Stt	Stop according to **[Type of stop]** Stt parameter but without an error triggered after stop
[Ramp stop]	rMP	Stop on ramp **Factory setting**

[Pumps configuration] PuPP - Menu

Access

[Complete settings] ➡ [Pump functions] ➡ [Booster control] ➡ [System architecture] ➡ [Pumps configuration]

Input and Output Configuration for Each Pump

For each pump (pump 1 in the example), it is possible to set:

- The drive digital output for the command: **[Pump 1 Cmd Assign]** PPo 1 if **[Lead Pump Alternation]** PPLA is not set to **[No]** no.
- The drive digital input for the pump availability information: **[Pump 1 Ready Assign]** PP 1 I. If not configured, the pump is considered as always available.

An internal configurable delay **[Pump Ready Delay]** PP 1d is available. When the digital input assigned to **[Pump 1 Ready Assign]** PP 1 I switches to the active state or after de-staging, the related pump is considered as not available during **[Pump Ready Delay]** PP 1d.

This is used to wait that the auxiliary pumps are stopped and that all contactors between the drive and the motor (if existing) are closed before staging.

[Pump 1 Cmd Assign] PPo 1 ★

Command assignment for pump 1.

This parameter can be accessed if:

- **[Pump System Archi]** PPSA is set to **[Multi Drives]** nVSd or **[Multi Masters]** nVSdr or,
- **[Pump System Archi]** PPSA is set to **[Single Drive]** VndoL and **[Nb Of Pumps]** PPPn is set to **[1]** 1 or above.

This parameter can be accessed if **[Nb Of Pumps]** PPPn is set to **[1]** 1 or above.

Setting	Code / Value	Description
[No]	no	Not assigned **Factory setting**
[R2]...**[R3]**	r2...r3	Relay output R2...R3
[R4]...**[R6]**	r4...r6	Relay output R4...R6 if VW3A3204 relay output option module has been inserted
[DQ11 Digital Output]...**[DQ12 Digital Output]**	do11...do12	Digital output DQ11...DQ12 if VW3A3203 I/O extension module has been inserted
[R61]…**[R66]**	r61...r66	Relay R61 …R66 **NOTE:** This selection can be accessed on ATV660 and ATV680 equipped with Cabinet IO

[Pump 1 Ready Assign] PP1 ★

Pump 1 ready to operate assignment.

This parameter can be accessed if **[Nb Of Pumps]** PPPn is set to **[1]** 1 or above.

Setting	Code / Value	Description
[Not Assigned]	nO	Not assigned **Factory setting**
[DI1]...**[DI6]**	L1I...L1G	Digital input DI1...DI6
[DI11]...**[DI16]**	L1I1...L1I6	Digital input DI11...DI16 if VW3A3203 I/O extension module has been inserted
[CD00]...**[CD10]**	CdO0...CdI0	Virtual digital input CMD.0...CMD.10 in **[I/O profile]** IO configuration
[CD11]...**[CD15]**	Cd11...Cd15	Virtual digital input CMD.11...CMD.15 regardless of configuration
[C101]...**[C110]**	C101...C110	Virtual digital input CMD1.01...CMD1.10 with integrated Modbus Serial in **[I/O profile]** IO configuration
[C111]...**[C115]**	C111...C115	Virtual digital input CMD1.11...CMD1.15 with integrated Modbus Serial regardless of configuration
[C201]...**[C210]**	C201...C210	Virtual digital input CMD2.01...CMD2.10 with CANopen® fieldbus module in **[I/O profile]** IO configuration
[C211]...**[C215]**	C211...C215	Virtual digital input CMD2.11...CMD2.15 with CANopen® fieldbus module regardless of configuration
[C301]...**[C310]**	C301...C310	Virtual digital input CMD3.01...CMD3.10 with a fieldbus module in **[I/O profile]** IO configuration
[C311]...**[C315]**	C311...C315	Virtual digital input CMD3.11...CMD3.15 with a fieldbus module regardless of configuration
[C501]...**[C510]**	C501...C510	Virtual digital input CMD5.01...CMD5.10 with integrated Ethernet Modbus TCP in **[I/O profile]** IO configuration
[C511]...**[C515]**	C511...C515	Virtual digital input CMD5.11...CMD5.15 with integrated Ethernet Modbus TCP regardless of configuration
[DI1 (Low level)]...**[DI6 (Low level)]**	L1L...L6L	Digital input DI1...DI6 used at low level
[DI52 (High level)]... **[DI59 (High level)]**	d52H...d59H	Cabinet high level digital inputs **NOTE:** This selection can be accessed on ATV660 and ATV680 equipped with Cabinet IO.
[DI52 (Low level)]... **[DI59 (Low level)]**	d52L...d59L	Cabinet low level digital inputs **NOTE:** This selection can be accessed on ATV660 and ATV680 equipped with Cabinet IO.

[Pump 2 Cmd Assign] PPO2 ★

Command assignment for pump 2.

This parameter can be accessed if **[Nb Of Pumps]** PPPn is set to **[2]** 2 or above.

Identical to **[Pump 1 Cmd Assign]** PPO 1 *(see page 260)*.

[Pump 2 Ready Assign] PP12 ★

Pump 2 ready to operate assignment.

This parameter can be accessed if **[Nb Of Pumps]** PPPn is set to **[2]** 2 or above.

Identical to **[Pump 1 Ready Assign]** PP1 1 *(see page 261)*.

[Pump 3 Cmd Assign] PPO3 ★

Command assignment for pump 3.

This parameter can be accessed if **[Nb Of Pumps]** PPPn is set to **[3]** 3 or above.

Identical to **[Pump 1 Cmd Assign]** PPO 1 *(see page 260)*.

[Pump 3 Ready Assign] MP i3 ★

Pump 3 ready to operate assignment.

This parameter can be accessed if **[Nb Of Pumps]** MPPn is set to **[3]** 3 or above.

Identical to **[Pump 1 Ready Assign]** MP i1 *(see page 261)*.

[Pump 4 Cmd Assign] MPo4 ★

Command assignment for pump 4.

This parameter can be accessed if **[Nb Of Pumps]** MPPn is set to **[4]** 4 or above.

Identical to **[Pump 1 Cmd Assign]** MPo1 *(see page 260)*.

[Pump 4 Ready Assign] MP i4 ★

Pump 4 ready to operate assignment.

This parameter can be accessed if **[Nb Of Pumps]** MPPn is set to **[4]** 4 or above.

Identical to **[Pump 1 Ready Assign]** MP i1 *(see page 261)*.

[Pump 5 Cmd Assign] MPo5 ★

Command assignment for pump 5.

This parameter can be accessed if **[Nb Of Pumps]** MPPn is set to **[5]** 5 or above.

Identical to **[Pump 1 Cmd Assign]** MPo1 *(see page 260)*.

[Pump 5 Ready Assign] MP i5 ★

Pump 5 ready to operate assignment.

This parameter can be accessed if **[Nb Of Pumps]** MPPn is set to **[5]** 5 or above.

Identical to **[Pump 1 Ready Assign]** MP i1 *(see page 261)*.

[Pump 6 Cmd Assign] MPo6 ★

Command assignment for pump 6.

This parameter can be accessed if **[Nb Of Pumps]** MPPn is set to **[6]** 6 or above.

Identical to **[Pump 1 Cmd Assign]** MPo1 *(see page 260)*.

[Pump 6 Ready Assign] MP i6 ★

Pump 6 ready to operate assignment.

This parameter can be accessed if **[Nb Of Pumps]** MPPn is set to **[6]** 6 or above.

Identical to **[Pump 1 Ready Assign]** MP i1 *(see page 261)*.

[System Architecture] ΠP9 - Menu

Access

[Complete settings] ➡ **[Pump functions]** ➡ **[Booster control]** ➡ **[System architecture]**

[Pump Cycling Mode] ΠPPC

Pump cycling mode.

Setting	Code / Value	Description
[FIFO]	FIFo	First in first out
[LIFO]	LIFo	Last in first out
[Runtime]	rtIME	Pump runtime **Factory setting**
[Runtime&LIFO]	rtLF	Runtime and Last in first out **NOTE:** This choice is not available if **[Pump System Archi]** ΠPSA is set to **[Multi Drives]** nVSd or **[Multi Masters]** nVSdr.

[Lead Pump Alternation] ΠPLA

Lead pump alternation.

This parameter can be accessed if **[Pump System Archi]** ΠPSA is set to **[Single Drive]** VndoL

NOTE: If **[Lead Pump Alternation]** ΠPLA is not set to **[No]** no, the **[Pump 1 Cmd Assign]** ΠPo1 and **[Pump 1 Ready Assign]** ΠP1 have to be configured.

Setting	Code / Value	Description
[No]	no	Deactivated **Factory setting**
[Standard]	YES	Standard alternation
[Redundancy]	rEd	Redundancy mode

[Pump Auto Cycling] ΠPCP

Pump auto cycling.

This parameter can be accessed if **[Pump System Architecture]** ΠPSA is set to **[Single Drive]** VndoL.

Setting	Description
0.0...24.0 h	Setting range **Factory setting**: 0.0 h

[Pump Ready Delay] ΠPrd

Pump ready delay.

It corresponds to the stop time of the pumps. The pumps are considered as in running state and can not be staged during this delay, whatever the active command channel.

Setting	Description
0...3600 s	Setting range **Factory setting**: 0 s

[MultiPump ErrorResp] *ΠPFb*

Response to multipump error.

This parameter can be accessed if **[Pump System Archi]** *ΠPSA* is set to **[Single Drive]** *Vndal*

Setting	Code / Value	Description
[Ignore]	*no*	Detected error ignored
[Freewheel Stop]	*YES*	Freewheel stop **Factory setting**
[Per STT]	*SEt*	Stop according to **[Type of stop]** *SEt* parameter but without an error triggered after stop
[Ramp stop]	*rMP*	Stop on ramp

[Booster control] bSC - Menu

Access

[Complete settings] ➞ **[Pump functions]** ➞ **[Booster control]** ➞ **[Booster control]**

About This Menu

This menu is used to set the booster control parameters.

Multiple drives control

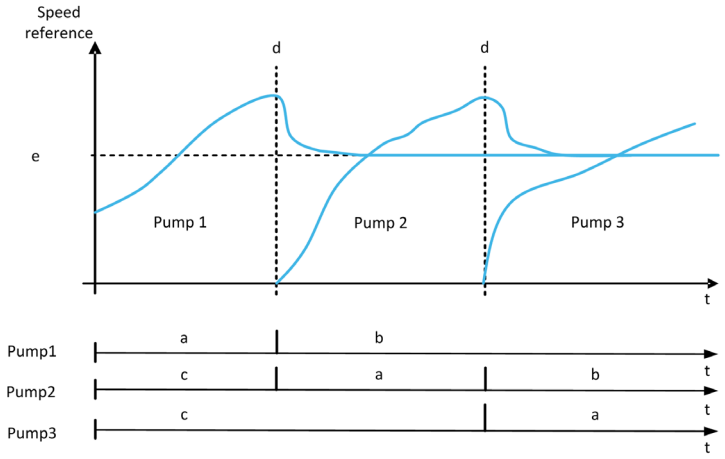
The multiple drives control mode is configured using **[M/P Speed Mode]** MPSt.

It has an effect on how the pump speed will be managed when running together.

This parameter must be the same on all the drives of MultiPump architecture

Distributed Speed Control Mode

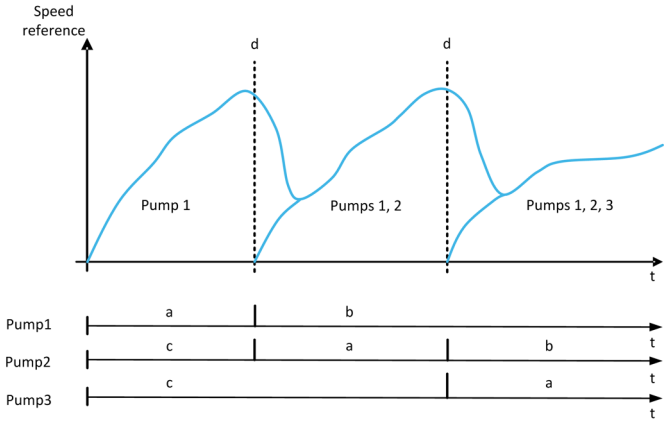
If **[M/P Speed Mode]** MPSt is set to **[Distributed]** dMC, the pumps will be staged and destaged one by one. With this selection, the last staged pump runs at variable speed and other pumps run at fixed speed.



a Pump runs at variable speed
b Pump runs at fixed speed
c Pump stopped
d Pump staging
e Fixed reference frequency in distributed mode: **[Pump Fixed Freq]** MPFS

Advanced Speed Control Mode

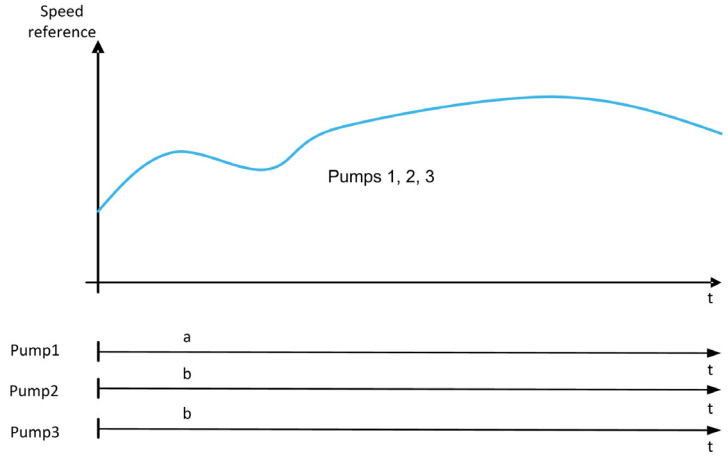
If **[M/P Speed Mode]** MPSt is set to **[Advanced]** AMC, the pumps are staged and destaged one by one. With this selection, all pumps run at the same speed.



a Pump runs at variable speed
b Pump speed follows the last staged pump speed
c Pump stopped
d Pump staging

Synchronized Speed Control Mode

If **[M/P Speed Mode]** *MPSt* is set to **[Synchronized]** *SYnC*, the pumps are staged and destaged simultaneously. With this selection, all pumps run at the same speed.



a Pump runs at variable speed
b Pump speed follows the pump 1 speed

[Booster Control] *bCM*

Booster control activation.

Setting	Code / Value	Description
[No]	*no*	Booster control function disabled **Factory setting**
[Yes]	*YES*	Booster control function enabled

[Type of Control] *toCt*

Type of control for the PID = unit choice.

This parameter can be accessed if:

- **[Pump System Archi]** *MPSA* is set to **[Multi Drives]** nVSD or **[Multi Masters]** *nVSdr* and,
- **[Booster Control]** *bCM* is set to **[Yes]** *YES*.

Setting	Code / Value	Description
[nA]	*nA*	(without unit) **Factory setting**
[Pressure]	*PrESS*	Pressure control and unit
[Flow]	*FLoW*	Flow control and unit
[Other]	*otHEr*	Other control and unit (%)

[M/P Speed Mode] *MPSt*

Multipump speed mode selection

This parameter can be accessed if:

- **[Pump System Archi]** *MPSA* is set to **[Multi Drives]** *nVSd* or **[Multi Masters]** *nVSdr* and,
- **[M/P Device Role]** *MPdt* is set to **[Master]** *MASt* or **[Master Only]** *MAS1* or **[Master or Slave]** *MAS2*.

Setting	Code / Value	Description
[Distributed]	*dMC*	Distributed multipump speed control mode
[Advanced]	*AMC*	Advanced multipump speed control mode **Factory setting**
[Synchronized]	*SYnC*	Synchronized multipump speed control mode

[Pump Fixed Freq] nPFS ★

Pump fixed frequency in distributed mode

This parameter can be accessed if **[M/P Speed Mode]** nPSt is set to **[Distributed]** dnC.

Setting	Description
0.0...500.0 Hz	Setting range **Factory setting**: 50 Hz

[Booster Nb Of Pumps] bCPn ★

Booster number of pumps

Maximum number of pumps that can operate in the same time.

NOTE: If set to 0, there is no maximum defined. All the pumps of the architecture can be used.

This parameter can be accessed if:

- **[Booster Control]** bCn is set to **[Yes]** YES and,
- **[M/P Speed Mode]** nPSt is not set to Synchronized SYnC

This parameter can be accessed if **[M/P Speed Mode]** nPSt is set to **[Distributed]** dnC or **[Advanced]** AnC.

Setting	Description
0...6	Setting range **Factory setting**: 0

[Stage/Destage condition] SdCM - Menu

Access

[Complete settings] ➡ **[Pump functions]** ➡ **[Booster control]** ➡ **[Booster control]** ➡ **[Stage/Destage condition]**

About This Menu

It is necessary to specify how the stage and de-stage conditions are managed by setting the **[Stage/Destage condition]** SdCM - menu:

- **[Speed]** SPd: staging/de-staging occurs according to conditions on the drive output frequency (Lead pump velocity).
- **[Feedback]** FbK : staging/de-staging occurs according to conditions on the outlet pressure feedback.
- **[Speed+Flow]** SPFL : staging occurs according to conditions on the drive output frequency (pump velocity), de-staging occurs according to flow conditions.
- **[Feedback+Flow]** FbFL : staging occurs according to conditions on the outlet pressure feedback, de-staging occurs acording to flow conditions.
- **[Energy Optimized]** oPt: staging/de-staging occurs automatically to optimize the energy consumption of the system.

After a staging or de-staging condition is taken into account, no new staging or de-staging can occur during **[Booster S/D Interval]** bSdt delay. This is applied in any case, regardless of the settings of the function.

Staging/Destaging on Speed Condition

- Staging occurs if the reference frequency stays above **[Booster Stg Speed]** bSS for longer than **[Booster Stg Delay]** bSd.
- De-staging occurs if the reference frequency stays below **[Booster Dstg Speed]** bdS for longer than **[Booster Dstg Delay]** bdd.

Staging/Destaging on Pressure Feedback Condition

- The working area **[Booster Working Range]** bCWR is expressed in a % of the reference value for the pressure.
- Staging occurs if PID error (taking into account **[PID Inversion]** PIC) stays below the working area while PID controller is at high limit speed for longer than **[Booster Stg Delay]** bSd.
  High limit speed corresponds to limitation speed of PID (minimum between **[High Speed]** HSP & **[PID Max Output]** PoH).
- De-staging occurs if PID error (taking into account **[PID Inversion]** PIC) stays above working area while PID controller is at low limit speed, for longer than **[Booster Dstg Delay]** bdd.
  Low limit speed corresponds to speed at which PID controller has no effect (maximum between **[Low Speed]** LSP & **[PID Min Output]** PoL).

Destaging on Flow Condition

- If **[Booster S/D Condition]** bSdC is set to **[Speed+Flow]** SPFL : staging occurs according to Speed condition (see Staging/Destaging on Speed Condition description).
- If **[Booster S/D Condition]** bSdC is set to **[Feedback+Flow]** FbFL : staging occurs according to Pressure Feedback condition (see Staging/Destaging on Pressure Feedback Condition description).
- De-staging occurs according to flow level **[Booster Dstg Flow]** bdF. Flow sensor or estimated system flow needs to be configured.
- If the **[Booster Dstg Flow]** bdF level is not reached and if pump is running at its low speed, de-staging occurs.

Staging/Destaging on Energy Optimized

If **[Booster S/D Condition]** *bSdC* is set to **[Energy Optimized]** *oPt*, staging/de-staging occurs automatically according to the pump characteristics to optimize the energy consumption of the system.

- This method can be selected if the pump curve characteristics are configured with **[Mode]** *PCM* = **[PHQ]** *PHQ*.
- The flow sensor or estimated system flow needs to be configured.
- **[Booster S/D Flow Hyst]** *bSdH* can be used to avoid many stage/de-stage of pumps.
- **[Head Static Offset]** *HEo* and **[Head Dynamic Gain]** *HEG* needs to be configured to have a good estimation of the required head according to the pressure setpoint.
- **[Pump Op Point Filter]** *WPXF* can be used to filter the pump operating point.

Staging/Destaging on Override

The override area is used whatever the configuration of the system and the strategy used.If the pressure feedback is out of the **[Booster Override Range]** *bCoA* range, expressed in % of the reference value for the pressure, a staging/de-staging is immediate. This increases the reactivity of the system in case of an important and rapid variation of the demand. It allows suppressing the staging/de-staging delay.

[Booster S/D Condition] *bSdC*

Booster stage/de-stage condition.

NOTE: The stage/de-stage condition list depends of the setting of **[M/P Speed Mode]** *MPSt*

Setting	Code / Value	Description
[Speed]	*SPd*	Staging/De-staging on speed condition
[Feedback]	*FbK*	Staging/De-staging on pressure feedback condition **Factory setting**
[Speed+Flow]	*SPFL*	Staging on speed, de-staging on flow condition
[Feedback+Flow]	*FbFL*	Staging on pressure feedback, de-staging on flow condition
[Energy Optimized]	*oPt*	Staging/De-staging automatically for energy optimization

[Inst. Flow Assign.] *FSIA* ★

Installation flow sensor assignment.

This parameter can be accessed if:

- **[Booster Control]** *bCM* is set to **[Yes]** *YES*
- **[Booster S/D Condition]** *bSdC* is set to **[Speed+Flow]** *SFPL*

Setting	Code / Value	Description
[Not Configured]	*no*	Not assigned **Factory setting**
[AI1]...**[AI3]**	*AI1*...*AI3*	Analog input AI1...AI3
[AI4]...**[AI5]**	*AI4*...*AI5*	Analog input AI4...AI5 if VW3A3203 I/O extension module has been inserted
[AI Virtual 1]...**[AI Virtual 3]**	*AIV1*...*AIV3*	Virtual analogic input 1...3
[Di5 PulseInput Assignment]...**[Di6 PulseInput Assignment]**	*Pi5*...*Pi6*	Digital input DI5...DI6 used as pulse input
[Est. Pump Flow]	*SLPF*	Sensor less estimated flow
[Est. System Flow]	*SLSF*	Estimated system flow This selection is only possible if **[Pump System Archit]** *MPSA* is set to **[Multi Drives]** *nvSd* or **[Multi Masters]** *nvSdr* **NOTE:** To use this selection, all the pump characteristics of the system must be configured.
NOTE: For sensor configuration, refer to section **[Sensors assignment]** *(see page 207)*.		

[Booster Working Range] bCWA ★

Booster working area in % of the reference value for the pressure.

This parameter can be accessed if **[Booster S/D Condition]** bSdC is set to **[Feedback]** FbK.

Setting	Description
1.0...100.0%	Setting range in % of the reference value for the pressure **Factory setting**: 2.0%

[Booster Stg Speed] bSS ★

Booster stage speed.

This parameter can be accessed if **[Booster S/D Condition]** bSdC is set to **[Speed]** SPd.

Setting	Description
0.0...500.0 Hz	Setting range **Factory setting**: 50.0 Hz

[Booster Dstg Speed] bdS ★

Booster de-stage speed.

This parameter can be accessed if **[Booster S/D Condition]** bSdC is set to **[Speed]** SPd.

Setting	Description
0.0...500.0 Hz	Setting range according to **[Flow rate unit]** SuFr. **Factory setting**: 40.0 Hz

[Booster Dstg Flow] bdF ★

Booster destage flow.

This parameter can be accessed if **[Booster S/D Condition]** bSdC is set to **[Speed+Flow]** SPFL or **[Feedback+Flow]** FbFL.

Setting	Description
0.0...3276.7	Setting range **Factory setting**: 0.0

[Booster Stg Delay] bSd

Booster stage delay.

Setting	Description
0.0...999.9 s	Setting range **Factory setting**: 10.0 s

[Booster Dstg Delay] bdd

Booster de-stage delay.

Setting	Description
0.0...999.9 s	Setting range **Factory setting**: 10.0 s

[Booster Override Range] bCoA

Booster override range.

Setting	Code / Value	Description
[No]	nO	Booster override range disabled **Factory setting**
0.1...100.0%		Setting range

[Booster S/D Flow Hyst] bSdH

Booster stage/destage flow hysteresis.

This parameter can be used to avoid many stage/de-stage of pumps.

This parameter can be accessed if **[Booster S/D Condition]** bSdC is set to **[Energy Optimized]** oPt.

Setting	Description
0.0...100.0%	Setting range. Percentage of nominal pump flow. **Factory setting**: 3.0%

[Head Static Offset] HEo ★

Head static offset.

This parameter can be accessed if **[Booster S/D Condition]** bSdC is set to **[Energy Optimized]** oPt.

This parameter must be configured to allow good estimation of head.

Setting	Description
-100.0...100.0%	Setting range **Factory setting**: 0.0%

[Head Dynamic Gain] HEG ★

Head dynamic gain.

This parameter can be accessed if **[Booster S/D Condition]** bSdC is set to **[Energy Optimized]** oPt.

This parameter must be configured to allow good estimation of head.

Setting	Description
-100.0...100.0%	Setting range **Factory setting**: 0.0%

[Pump Op Point Filter] WPXF ★

Pump operating point filter.

This parameter can be accessed if **[Mode]** PCM is not set to **[No]** nO.

Setting	Description
0.00 s...60.00 s	Setting range **Factory setting**: 1.00 s

[Stage/Destage method] SdMM - Menu

Access

[Complete settings] ➡ **[Pump functions]** ➡ **[Booster control]** ➡ **[Booster control]** ➡ **[Stage/Destage method]**

About This Menu

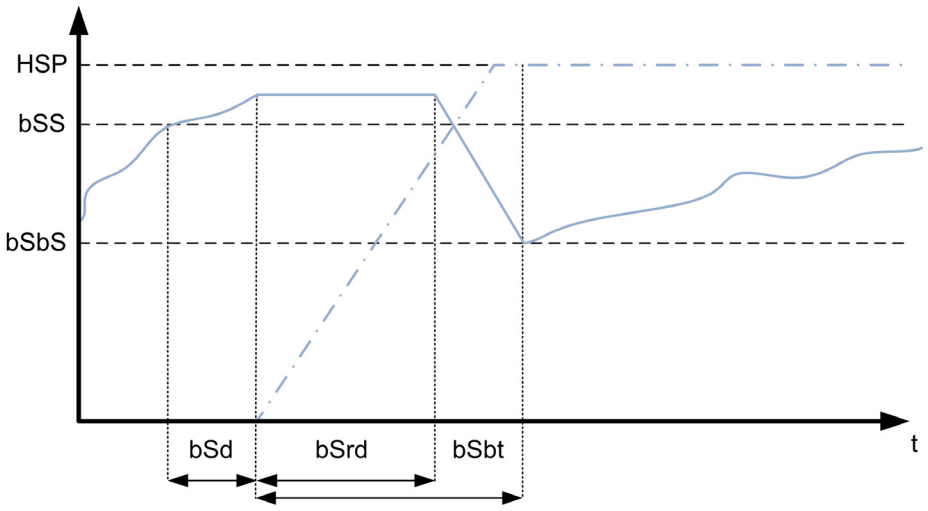
The stage/de-stage method is set by **[Booster S/D Control]** bSdM parameter:

- **[Speed]** bSPd: during stage/de-stage, PID controller is by-passed and a fixed reference frequency is applied.
- **[Feedback]** bFb: outlet pressure remains regulated by the PID controller during stage/de-stage.
- **[Advanced]** AdVC: outlet pressure remains regulated by the PID controller during stage/de-stage and disturbances due to stage/de-stage are taken into account by the PID controller to reduce them.

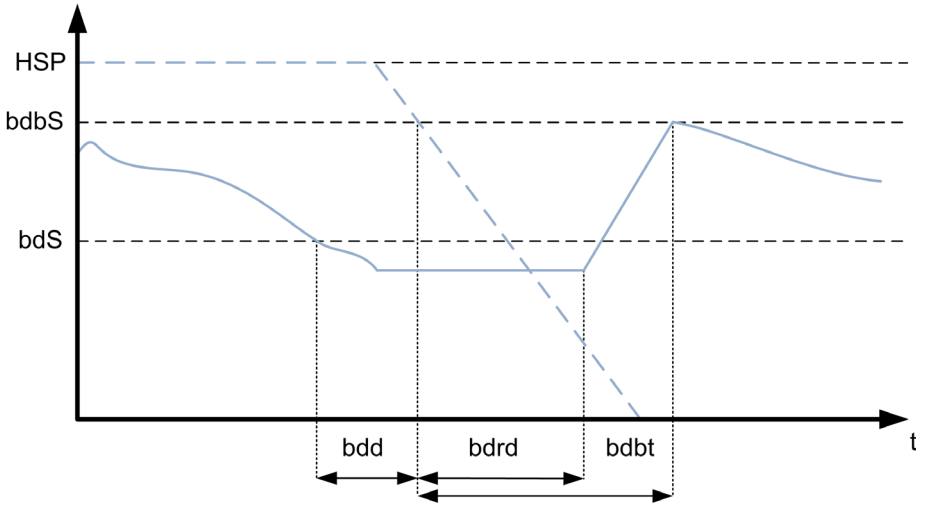
NOTE: When **[Pump System Archi]** MPSA is not set to **[Simple Drive]** VndoL, only **[Feedback]** bFb method is available.

Staging/Destaging on Speed Control

When the staging is requested, after the delay **[Booster Stg Ramp Delay]** bSrd, the variable speed pump output frequency is reduced to reach **[Booster Stg Bypass Spd]** bSbS according to **[Booster Stg Bypass Time]** bSbt.



When the de-staging is requested, after the delay **[Booster Dstg Ramp Delay]** bdrd, the variable speed pump output frequency is increased to reach **[Booster Dstg Bypass Spd]** bdbS according to **[Booster Dstg Bypass Time]** bdbt.



Staging/Destaging on Pressure Feedback Control

- When the staging is requested, a pump is started and the outlet pressure remains regulated according to the PID controller settings.
- When the de-staging is requested, a pump is stopped and the outlet pressure remains regulated according to the PID controller settings.

Staging/Destaging on Advanced Pressure Control

- When the staging is requested, a pump is started after the **[FeedFwd Stage Delay]** *FFSd* and the outlet pressure remains regulated according to the PID controller settings, in addition to a feedforward strategy to reduce the pressure overshoot.
- When the de-staging is requested, a pump is stopped after the **[FeedFwd Destage Delay]** *FFdd* and the outlet pressure remains regulated according to the PID controller settings, in addition to a feedforward strategy to reduce the pressure undershoot.
- The PID controller speed loop parameters should be adjusted to compensate the pressure variation linked to the normal operation of the system (close or open valves for example) without staging or de-staging a pump. The aim of the feedforward function is to reduce the overshoot or undershoot following a pump stage or de-stage. These two parameters should be set without variations generated by the system (close or open valves for example). The feedforward parameters should be adjusted after the PID controller is set.
- The **[FeedFwd Disturb Gain]** *FFG* parameter is a static gain that should be adjusted to reduce the maximum value of the output pressure overshoot or undershoot following a pump stage or de-stage.
- The **[FeedFwd Disturb Time]** *FFtG* parameter correspond to the time between the pump stage or de-stage command to the time when the maximum value of the output pressure overshoot or undershoot following a pump stage or de-stage is reached.

[Booster S/D Control] *bSdM*

Booster stage/de-stage control.

Setting	Code / Value	Description
[Speed]	*bSPd*	Basic speed
[Feedback]	*bFbK*	Basic feedback **Factory setting**
[Advanced]	*AdVC*	Advanced

[Booster Stg Bypass Speed] *bSbS* ★

Booster stage bypass speed.

This parameter can be accessed if **[Booster S/D Control]** *bSdM* is set to **[Speed]** *bSPd*.

Setting	Description
0.0...500.0 Hz	Setting range **Factory setting**: 45.0 Hz

[Booster Stg Bypass Time] *bSbt* ★

Booster stage bypass time.

This parameter can be accessed if **[Booster S/D Control]** *bSdM* is set to **[Speed]** *bSPd*.

Setting	Description
0.0...999.9 s	Setting range **Factory setting**: 3.0 s

[Booster Stg Ramp Delay] b S r d ★

Booster stage ramp delay.

This parameter can be accessed if **[Booster S/D Control]** b S d M is set to **[Speed]** b S P d.

Setting	Description
0.0...999.9 s	Setting range **Factory setting**: 1.0 s

[Booster Dstg Bypass Spd] b d b S ★

Booster de-stage bypass speed.

This parameter can be accessed if **[Booster S/D Control]** b S d M is set to **[Speed]** b S P d.

Setting	Description
0.0...500.0 Hz	Setting range **Factory setting**: 50.0 Hz

[Booster Dstg Bypass Time] b d b t ★

Booster de-stage bypass time.

This parameter can be accessed if **[Booster S/D Control]** b S d M is set to **[Speed]** b S P d.

Setting	Description
0.0...999.9 s	Setting range **Factory setting**: 1.0 s

[Booster Dstg Ramp Delay] b d r d ★

Booster de-stage ramp delay.

This parameter can be accessed if **[Booster S/D Control]** b S d M is set to **[Speed]** b S P d.

Setting	Description
0.0...999.9 s	Setting range **Factory setting**: 0.0 s

[FeedFwd Stage Delay] F F S d ★

Feed forward stage delay.

This parameter can be accessed if **[Booster S/D Control]** b S d M is set to **[Advanced]** A d V C.

Setting	Description
0.0...999.9 s	Setting range **Factory setting**: 1.0 s

[FeedFwd Destage Delay] F F d d ★

Feed forward de-stage delay.

This parameter can be accessed if **[Booster S/D Control]** b S d M is set to **[Advanced]** A d V C.

Setting	Description
0.0...999.9 s	Setting range **Factory setting**: 0.0 s

[FeedFwd Disturb Gain] FFG ★

Feed forward disturbance gain.

This parameter can be accessed if **[Booster S/D Control]** bSdM is set to **[Advanced]** AdVC.

Setting	Description
0.0...100.0%	Setting range **Factory setting**: 20.0%

[FeedFwd Disturb Time] FFtG ★

Feed forward disturbance time.

This parameter can be accessed if **[Booster S/D Control]** bSdM is set to **[Advanced]** AdVC.

Setting	Description
0.0...99.9 s	Setting range **Factory setting**: 3.0 s

[Booster control] bSC - Menu

Access

[Complete settings] ➡ **[Pump functions]** ➡ **[Booster control]** ➡ **[Booster control]**

[Booster S/D Interval] bSdt

Booster stage/de-stage time interval.

This parameter can be accessed if:

- **[Booster Control]** bCM is set to **[Yes]** YES and
- **[M/P Speed Mode]** MPSt is not set to **[Synchronized]** Sync

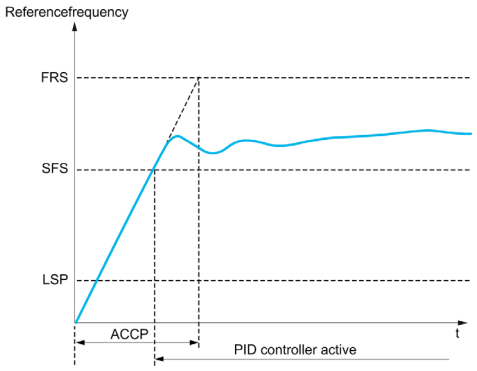
Setting	Description
0.0...999.9 s	Setting range **Factory setting**: 15.0 s

[PID acceleration time] ACCP ★

PID: acceleration during start-up.

PID start ramp can be applied before starting the PID controller to allow reaching quickly the PID reference without increasing PID gains. If configured, the **[Start Accel Ramp]** ACCS is applied up to **[Low Speed]** LSP instead of **[PID acceleration time]** ACCP.

This parameter can be accessed if **[PID feedback]** PIF is not set to **[Not Configured]** no.



Setting	Description
0.01...99,99 s (1)	Setting range **Factory setting**: 5.00 s
1 Range 0.01 to 99.99 s or 0.1 to 999.9 s or 1...6,000 s according to **[Ramp increment]** inr.	

Section 7.8
[Pump functions] - [Level control]

Introduction

The aim of the level control function is to operate:
- Filling operation
- Emptying operation

This function offers a random level functionality by changing the start and stop level after each operation (at the end of filling or emptying operation) in order to start and stop the next filling or emptying operation from different levels.

The level control function can be used for single pump or multi-pump architecture.

This menu can be accessed if **[Application Selection]** *APPL* is set to **[Pump Level Control]** *LEVEL*.

What Is in This Section?

This section contains the following topics:

Topic	Page
[System architecture] *SYS-* Menu	278
[Pumps configuration] *PUMP-* Menu	278
[Level control] *LCC-* Menu	279
[Level control] *LCC-* Menu	286
[Level settings] *LCL-* Menu	293

[System architecture] ΠΡ9 - Menu

Access

[Complete settings] ➡ [Pump functions] ➡ [Level control] ➡ [System architecture]

About This Menu

Identical to **[System architecture] ΠΡ9 -** Menu *(see page 245)*.

[Pumps configuration] PuΠP - Menu

Access

[Complete settings] ➡ [Pump functions] ➡ [Level control] ➡ [System architecture] ➡ [Pumps configuration]

About This Menu

Identical to **[Pumps configuration] PuΠP -** Menu *(see page 260)*.

[Level control] LCC - Menu

Access

[Complete settings] ➡ **[Pump functions]** ➡ **[Level control]** ➡ **[Level control]**

About This Menu

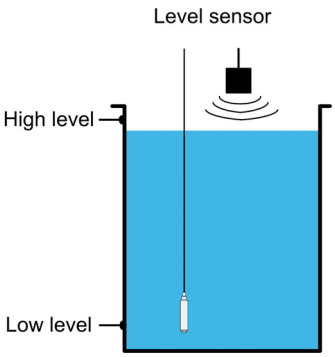
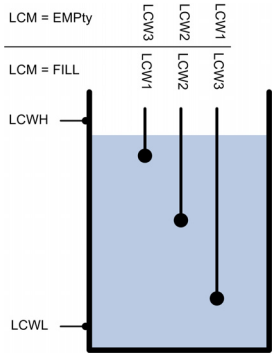
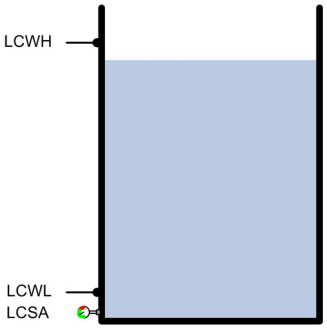
The function activation is done by setting the **[LevelCtrl Mode]** LCM:

- **[No]** nO: the function is not activated.
- **[Filling]** FILL: the function is activated to operate a filling operation.
- **[Emptying]** EMPTY: the function is activated to operate an emptying operation.

System Configuration

It is necessary to specify how the level of the liquid is acquired by setting the **[LevelCtrl Sensor Type]** LCnt:

- **[Level sensor]** LEuEL or **[Pressure sensor]** PrES: the level information comes from an analog sensor. The value returned by each sensor (sensor 1 in the example) is compared continuously to the configured levels **[Level 1 Pump Start]** LrL 1 and **[Level 1 Pump Stop]** LPL 1. It is necessary to associate an analog input for the level measurement by setting **[Level Sensor Assign]** LCSA.
- **[Level Switches]** SW: the level information comes from digital inputs. In this case. The state of each digital input indicates which pump to start and which pump to stop. The quantity of level switches required is equal to **[Nb Of Pumps]** nPPn. It is necessary to associate digital inputs (digital input 1 in the example) for the level measurement by setting **[Level Switch1 Assign]** LCW 1.

Analog level sensor	Switch level sensor	Analog pressure sensor
		

A random level factor **[LevelCtrl Random Factor]** LCrX can be set to reduce caking in the tank. A value of 0% deactivates the function. The start level for the first pump to start and the stop level for the last pump to stop is applied taking into account a random offset based on +/- **[LevelCtrl Random Factor]** LCrX %.

Level Control Strategy

Three level control strategies are available through **[LevelCtrl Strategy]** LCSt parameter:

- If using an analog sensor (analog sensor level or pressure sensor), **[Standard]** bASIC level control strategy and **[Energy Optimized]** Adu strategy are available.
- If using level switches, **[Switches]** trAd strategy is available.

[Standard] bAS -C level control strategy

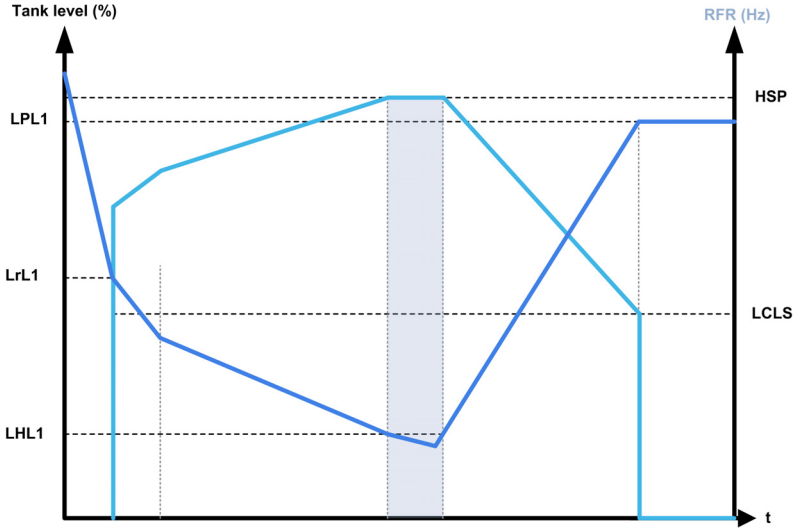
Starting and stopping pump is based on the comparison between the analog level sensor value and configured level values start and stop levels (Example for pump 1: the start level for the first pump to start **[Level 1st Pump Start]** LrL1 and the stop level for the last pump to stop **[Level 1st Pump Stop]** LPL1) according to the number of used pumps in the system.

[Empty Tank Level] LCEJ and **[Full Tank Level]** LCEK should be set to used this level control strategy.

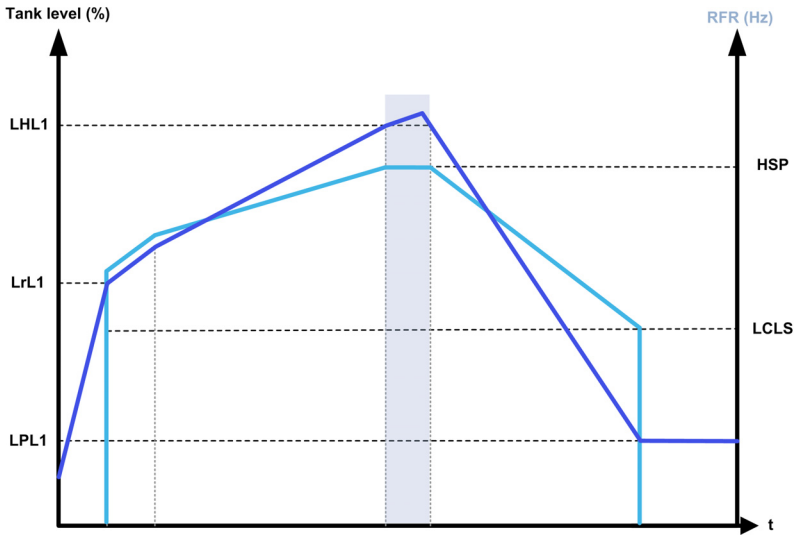
The reference frequency follows a trajectory computed according to the level in tank.

The following figures show the principal of the basic strategy in the case of one pump for filling and emptying process:

Filling



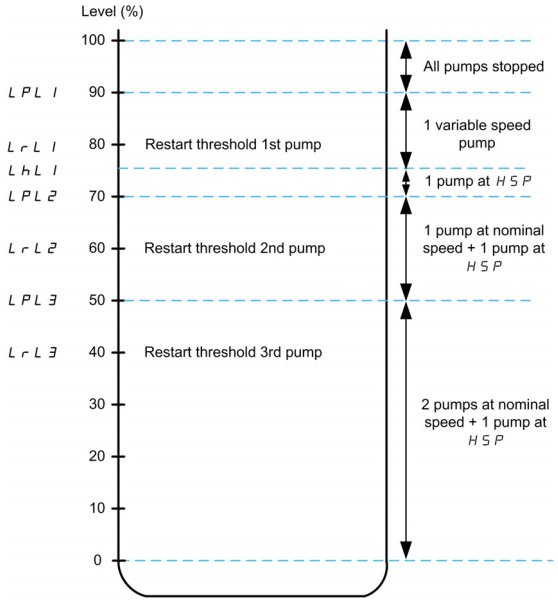
Emptying



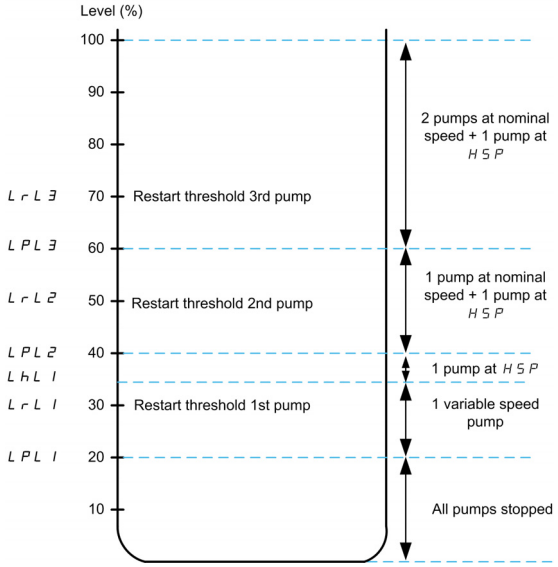
Strategy with one variable speed pump and fixed speed pumps

The following figures show how you can extrapolate this strategy in case of one variable speed pump and two fixed speed pumps:

Filling / three pumps



Emptying / three pumps



Cycle description example for emptying process with three pumps:

The variable speed pump starts at the first pump to start level **[Level 1st Pump Start]** LrL 1. If the level in the tank is still increasing, its frequency reference increases up to **[High Speed]** HSP. It corresponds to the tank level **[Level 1st Pump at HSP]** LHL 1.

When the level in the tank reaches the second pump to start **[Level 2nd Pump Start]** LrL 2, a fixed speed pump starts, the variable speed pumps is still at **[High Speed]** HSP.

When the level in the tank reaches the third pump to start level **[Level 3rd Pump Start]** LrL 3, the second fixed speed pump starts, the variable speed pumps is still at **[High Speed]** HSP.

When the level in the tank decreases under the first pump to stop level **[Level 1st Pump Stop]** LPL 1, a fixed speed pump stops, the variable speed pumps is still at **[High Speed]** HSP.

When the level in the tank decreases under second pump to stop level **[Level 2nd Pump Stop]** LPL 2, the second fixed speed pump stops, the variable speed pumps is still at **[High Speed]** HSP.

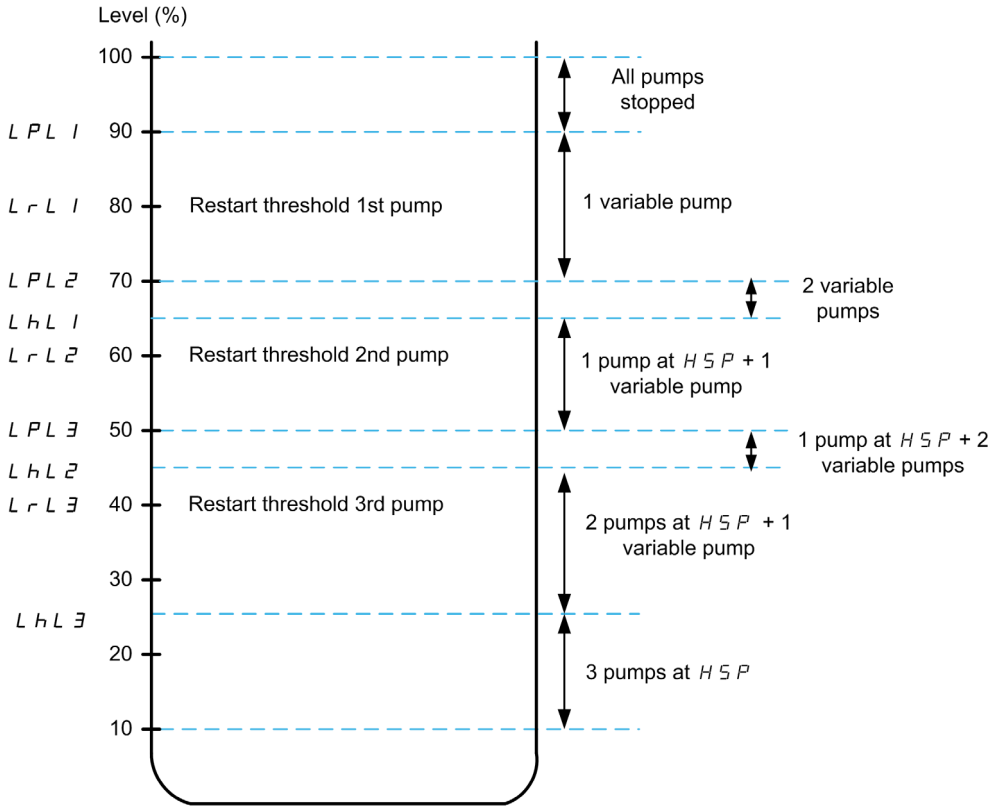
If the level in the tank is still decreasing, the frequency reference decreases up to **[LevelCtrl Low Speed]** LCLS.

When the level in the tank decreases under the third pump to stop level **[Level 3rd Pump Stop]** LPL 3, the variable speed pump stops.

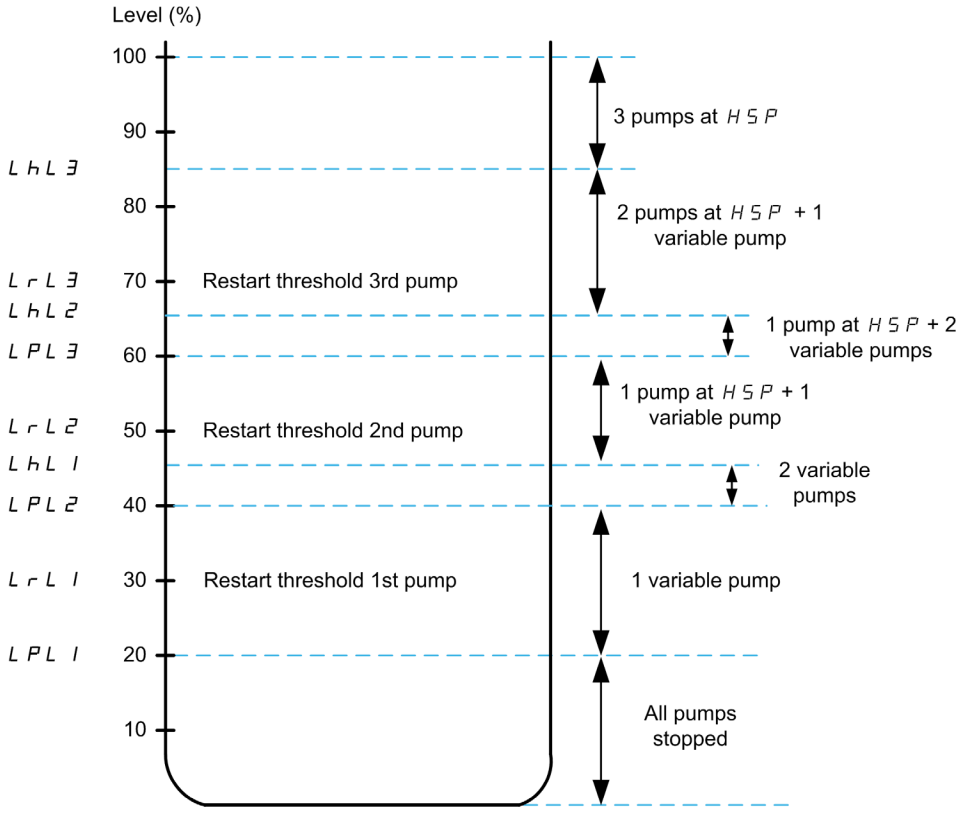
Strategy with multiple variable speed pumps

The following figures show how you can extrapolate this strategy in case of multiple variable speed pumps:

Filling / three pumps



Emptying / three pumps



Cycle description example for emptying process with three pumps:

The first pump is started when level reaches the point **[Level 1st Pump Start]** *LrL 1*. The pump frequency reference is calculated by the system between the point **[Level 1st Pump Stop]** *LPL 1* and **[Level 1st Pump at HSP]** *LHL 1*.

If the level in tank increases, the frequency reference increases until the **[High Speed]** *HSP* when level in tank reaches **[Level 1st Pump at HSP]** *LHL 1* and remains at this frequency reference.

If the level in tank decreases, the frequency reference decreases until **[Low Speed]** *LSP* when the level in tank reaches **[Level 1st Pump Stop]** *LPL 1* and then pump stops.

When the level in tank reaches the second pump to start **[Level 2nd Pump Start]** *LrL2*, the second pump starts and the two pumps runs at same calculated frequency reference between **[Level 2nd Pump Stop]** *LPL2* and **[Level 2nd Pump at HSP]** *LHL2*.

If the level in tank increases, the frequency reference of the two pumps increases until the **[High Speed]** *HSP* of each pump when level in tank reaches **[Level 2nd Pump at HSP]** *LHL2* and remains at this frequency reference.

If the level in tank decreases, the frequency reference decreases until a calculated low speed (point A of the curve) when the level in tank reaches **[Level 2st Pump Stop]** *LPL2* and then second pump stops.

When the level in tank reaches the third pump to start **[Level 3rd Pump Start]** *LrL3*, the third pump starts and the three pumps runs at same calculated frequency reference between **[Level 3rd Pump Stop]** *LPL3* and **[Level 3nd Pump at HSP]** *LHL3*.If the level in tank increases, the frequency reference of the three pumps increases until the **[High Speed]** *HSP* of each pump when level in tank reaches **[Level 3rd Pump at HSP]** *LHL3* and remains at this frequency reference.

If the level in tank decreases, the frequency reference decreases until a calculated low speed (point B of the curve) when the level in tank reaches **[Level 3rd Pump Stop]** *LPL3* and then third pump stops.

[Energy Optimized] *Ady* strategy

This strategy consists on the internal calculation of the optimal velocity profile which corresponds to the minimum of the energy consumed by the system during a filling or emptying process. The system runs at an optimal working point during the filling or emptying process.

To perform this strategy, following data are required:

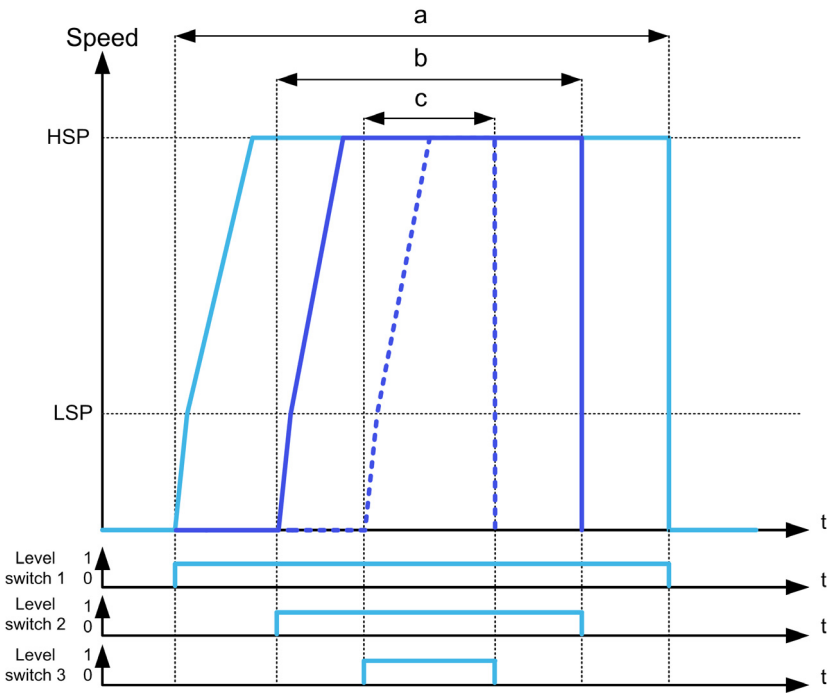
- Validated pump curve characteristics (Hn, Pn, Qn at nominal speed). The pump curves should be configured previously in the **[Pump characteristics]** *PCr -* menu; pump parameterization is valid if the pump curve status **[Status]** *PCS* equals to **[ACTIVE]** *ACtIVE*.
- Estimated or measured system flow.
- The volume of the tank **[Tank Volume]** *LCty*, the minimum delivery height of the system **[Min Delivery Height]** *LCdJ* and the maximum delivery height of the system **[Max Delivery Height]** *LCdK*.

[Switches] tr Ad strategy

Starting and stopping pumps is based on level switches status (0: OFF or 1: ON).

- If **[Pump System Archi]** PSA is set to **[Single Drive]** unduL , the variable speed pump runs at its nominal speed and auxiliary pumps runs at fixed speed.
- If **[Pump System Archi]** PSA is set to **[Multi Drives]** nVSd, all pumps are running at their nominal speed.

The following figure shows the principal with the switches strategy (example with 3 pumps):



a Variable speed pump 1 (lead pump)
b Fixed or variable speed pump 2
c Fixed or variable speed pump 3

The previous example shows the way that the pumps are stopped if **[LevelCtrl Stop Mode]** LCPM is set to **[Individual Stop]** ind iu. It is possible to stop all the pumps at the same time when level switch 1 changes to OFF state by setting **[LevelCtrl Stop Mode]** LCPM to **[Simultaneous Stop]** Com M.

Warnings and Errors Handling

- A **[High Level Warning]** LCHA warning is active if the maximum level switch defined by **[Max Level Switch Assign]** LCWL is active.
  If it occurs during filling process, a **[High Level Error]** LCHF error is activated.
  This error is active also if the sensor value reaches 100% of the tank in filling mode and 0% in emptying mode.
- A **[Low Level Warning]** LCLA warning is active if the minimum level switch defined by **[Min Level Switch Assign]** LCWH is active.
  If it occurs during emptying process, a **[Low Level Error]** LCLF error is activated.
- All pumps are stopped in case of **[High Level Error]** LCHF or **[Low Level Error]** LCLF error, whatever the setting of **[LevelCtrl Error Resp]** LCFb.
- A **[Level Switch Warning]** LCWA warning is active in case of an inconsistent feedback from the level switches (for example, if the level switches 1 and 3 are active and the level switch 2 is inactive).

[LevelCtrl Mode] LCM

Level control mode.

This parameter can be accessed if:

- **[Pump System Archi]** MPSA is set to **[Single Drive]** Vndol, or
- **[Pump System Archi]** MPSA is set to **[Multi Drives]** nVSd, and **[M/P Device Role]** MPdt is set to **[Master]** MAST, or
- **[Pump System Archi]** MPSA is set to **[Multi Masters]** nVSdr and,
- **[M/P Device Role]** MPdt is set to **[Master Only]** MAST 1 or **[Master or Slave]** MAS2.

Setting	Code / Value	Description
[No]	no	Deactivated **Factory setting**
[Filling]	FILL	Filling mode
[Emptying]	EMPTY	Emptying mode

[LevelCtrl Nb Of Pumps] LCPn ★

Number of pumps used in Level Control

Maximum number of pumps that can operate in the same time

This parameter can be accessed if **[LevelCtrl Mode]** LCM is not set to **[No]** no.

NOTE: If set to 0, there is no maximum defined. All the pumps of the architecture can be used.

Setting	Description
0...6	Setting range **Factory setting**: 0

[LevelCtrl Sensor Type] LCnt ★

Level control sensor type.

This parameter can be accessed if **[LevelCtrl Mode]** LCM is not set to **[No]** no.

Setting	Code / Value	Description
[Level Switches]	SW	Level switches **Factory setting**
[Level Sensor]	LEVEL	Level sensor
[Pressure Sensor]	PrES	Pressure sensor

[Level Sensor Assign] LCSA ★

Level sensor assignment.

This parameter can be accessed if:

- **[LevelCtrl Mode]** LCM is not set to **[No]** no, and
- **[LevelCtrl Sensor Type]** LCnt is not set to **[Level Switches]** SW

This parameter can be accessed if **[Application Selection]** APPt is set to **[Level]** LEVEL.

Setting	Code / Value	Description
[Not Configured]	no	Not assigned **Factory setting**
[AI1]...**[AI3]**	AI1...AI3	Analog input AI1...AI3
[AI4]...**[AI5]**	AI4...AI5	Analog input AI4...AI5 if VW3A3203 I/O extension module has been inserted
[AI Virtual 1]...**[AI Virtual 3]**	AIV1...AIV3	Virtual analogic input 1...3
NOTE: For sensor configuration, refer to section **[Sensors assignment]** *(see page 207)*.		

[Level control] LCC - Menu

Access

[Complete settings] ➡ **[Pump functions]** ➡ **[Level control]** ➡ **[Level control]**

About This Menu

This menu can be accessed if **[Pump System Archi]** PPSA is not set to **[No]** no.

Delivery Height Configuration

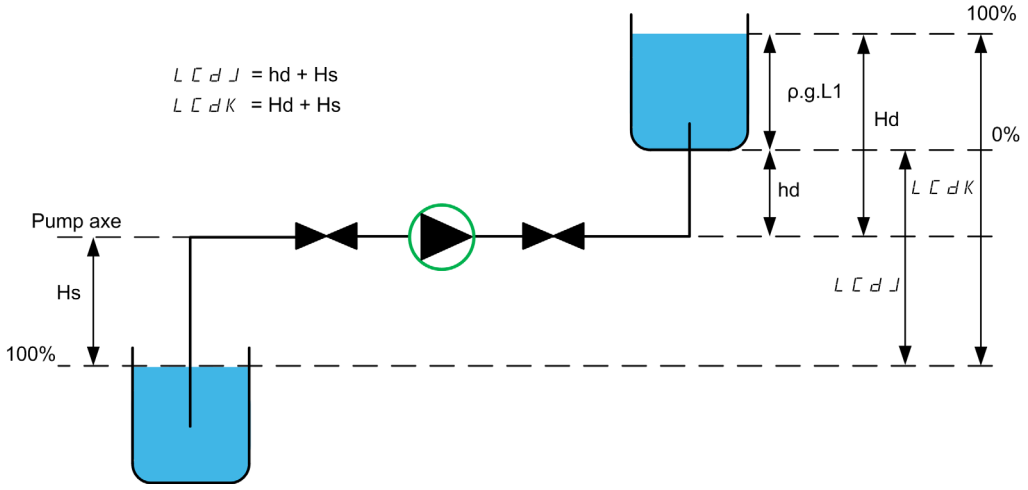
To work at optimal System Best Efficiency Point, it is needed to configure the static head of the system by configuring **[Min Delivery Height]** LCdJ and **[Max Delivery Height]** LCdK.

If these parameters are not configured, the system will work at Pump BEP instead of System BEP.

If only one of these parameters is configured, the other one will be calculated, taking into account the height estimation of the tank, based on sensor or tank configuration.

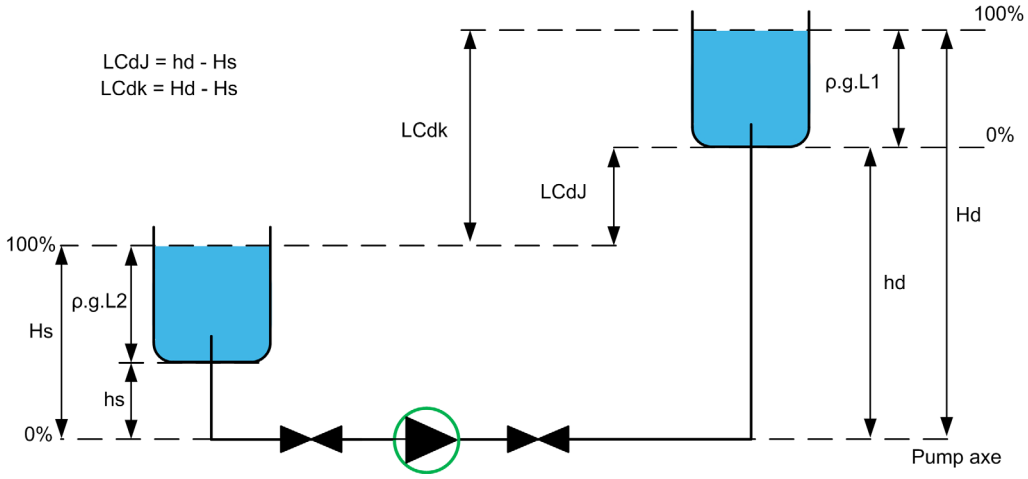
When the delivery height is constant whatever the tank level, the **[Min Delivery Height]** LCdJ and **[Max Delivery Height]** LCdK must be configured.

The following figure describe how to calculate the delivery heights in case of a filling process from source tank pumped from top to destination tank filled from bottom:



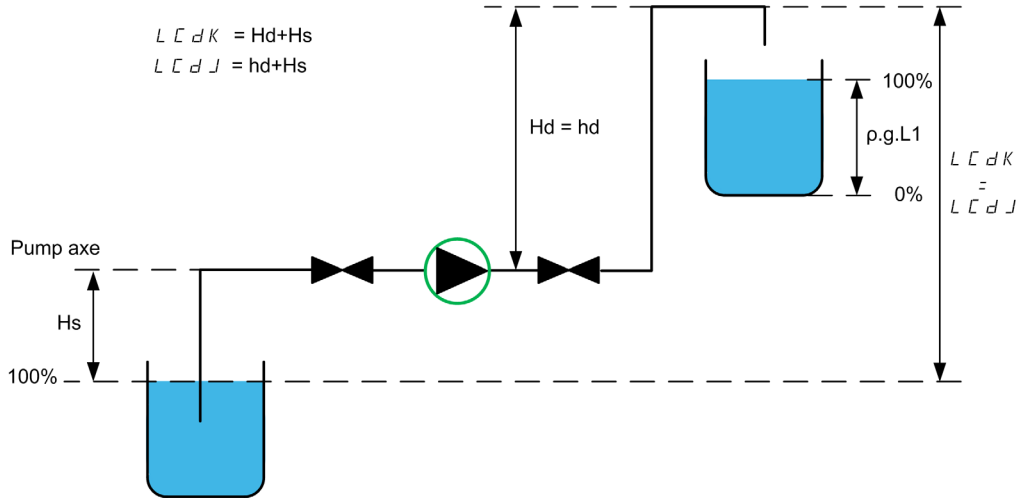
hd discharge height when destination tank is empty.
Hd discharge height when destination tank is full.
Hs suction height when source tank is full.

The following figure describe how to calculate the delivery heights in case of a filling process from source tank pumped from bottom to destination tank filled from bottom:



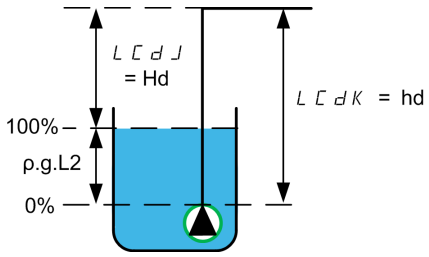
hd discharge height when destination tank is empty
Hd discharge height when destination tank is full.
hs suction height when source tank is empty.
Hs suction height when source tank is full.

The following figure describe how to calculate the delivery heights in case of a filling process from source tank pumped from top to destination tank filled from top:



hd discharge height when destination tank is empty.
Hd discharge height when destination tank is full.
Hs suction height when source tank is full.

The following figure describes how to calculate the delivery heights in case of an emptying process:



hd discharge height when destination tank is empty.
Hd discharge height when destination tank is full.

[Empty Tank Level] LCtJ ★

Empty tank level sensor value.

This parameter can be accessed if **[LevelCtrl Strategy]** Lcst is not set to **[Switches]** trAd.

Setting	Description
-32,767...32,767 m	Setting range in meter or in pressure value according to **[LevelCtrl Sensor Type]** LCnt **Factory setting**: 0.00 m

[Full Tank Level] LCtK ★

Full tank level sensor value.

This parameter can be accessed if **[LevelCtrl Strategy]** Lcst is not set to **[Switches]** trAd.

Setting	Description
-32,767...32,767 m	Setting range in meter or in pressure value according to **[LevelCtrl Sensor Type]** LCnt **Factory setting**: 0.00 m

[LevelCtrl Strategy] LCSt ★

Level control strategy.

This parameter can be accessed if **[LevelCtrl Mode]** LcM is not set to **[No]** no.

Setting	Code / Value	Description
[Switches]	trAd	Switches **Factory setting**
[Standard]	bAS ic	Standard
[Energy Optimized]	AdV	Energy optimized

[Inst. Flow Assign.] FS IA ★

Installation flow sensor assignment.

This parameter can be accessed if **[LevelCtrl Strategy]** LcSt is set to **[Energy Optimized]** Adu.

Setting	Code / Value	Description
[Not Configured]	no	Not assigned **Factory setting**
[AI1]...**[AI3]**	AI1...AI3	Analog input AI1...AI3
[AI4]...**[AI5]**	AI4...AI5	Analog input AI4...AI5 if VW3A3203 I/O extension module has been inserted
[AI Virtual 1]...**[AI Virtual 3]**	AIV1...AIV3	Virtual analogic input 1...3
[Di5 PulseInput Assignment]...**[Di6 PulseInput Assignment]**	PI5...PI6	Digital input DI5...DI6 used as pulse input
[Est. Pump Flow]	SLPF	Sensor less estimated flow
[Est. System Flow]	SLSF	Estimated system flow This selection is only possible if **[Pump System Archit]** MPSA is set to **[Multi Drives]** nVSd or **[Multi Masters]** nVSdr **NOTE:** To use this selection, all the pump characteristics of the system must be configured.
NOTE: For sensor configuration, refer to section **[Sensors assignment]** *(see page 207)*.		

[Tank Volume] LCtV ★

Tank volume to be filled or emptied.

This parameter can be accessed if **[LevelCtrl Strategy]** LcSt is set to **[Energy Optimized]** Adu.

Setting	Description
0...32,767	Setting range according to **[Flow rate unit]** SuFr **Factory setting**: 0

[Min Delivery Height] LCdJ ★

Minimum delivery height.

This parameter can be accessed if **[LevelCtrl Strategy]** LcSt is set to **[Energy Optimized]** Adu.

Setting	Description
0.00...327.67 m	Setting range according to **[Flow rate unit]** SuFr **Factory setting**: 0.00 m

[Max Delivery Height] LCdK ★

Maximum delivery height

This parameter can be accessed if **[LevelCtrl Strategy]** LcSt is set to **[Energy Optimized]** Adu.

Setting	Description
[No] nO...327.67 m	Setting range according to **[Flow rate unit]** SuFr **Factory setting**: **[No]** nO

[LevelCtrl Low Speed] LCLS ★

Level control low speed.

This parameter can be accessed if **[LevelCtrl Strategy]** LcSt is not set to **[Switches]** trAd.

Setting	Description
0.0...500.0 Hz	Setting range **Factory setting**: 35.0 Hz

[LevelCtrl Stop Mode] LCPM ★

Level control stop mode.

This parameter can be accessed if **[LevelCtrl Strategy]** LcSt is set to **[Switches]** trAd.

Setting	Code / Value	Description
[Simultaneous Stop]	coMM	All pumps stopped simultaneously
[Individual Stop]	indiV	Each pump stopped individually **Factory setting**

[LevelCtrl Random Factor] LCrX ★

Level control random factor.

This parameter can be accessed if **[LevelCtrl Mode]** LcM is not set to **[No]** nO.

Setting	Description
0...100%	Setting range **Factory setting**: 0%

[Min Level Switch Assign] LCWL ★

Minimum level switch assignment.

This parameter can be accessed if **[LevelCtrl Mode]** LcΠ is not set to **[No]** nO.

Setting	Code / Value	Description
[Not Assigned]	nO	Not assigned **Factory setting**
[DI1]...**[DI6]**	LI1...LI6	Digital input DI1...DI6
[DI11]...**[DI16]**	LI11...LI16	Digital input DI11...DI16 if VW3A3203 I/O extension module has been inserted
[DI52 (High level)]... **[DI59 (High level)]**	d52H...d59H	Cabinet high level assignment digital inputs **NOTE:** This selection can be accessed on ATV660 and ATV680 equipped with Cabinet IO.
[CD00]...**[CD10]**	CD00...CD10	Virtual digital input CMD.0...CMD.10 in **[I/O profile]** IO configuration
[CD11]...**[CD15]**	CD11...CD15	Virtual digital input CMD.11...CMD.15 regardless of configuration
[C101]...**[C110]**	C101...C110	Virtual digital input CMD1.01...CMD1.10 with integrated Modbus Serial in **[I/O profile]** IO configuration
[C111]...**[C115]**	C111...C115	Virtual digital input CMD1.11...CMD1.15 with integrated Modbus Serial regardless of configuration
[C201]...**[C210]**	C201...C210	Virtual digital input CMD2.01...CMD2.10 with CANopen® fieldbus module in **[I/O profile]** IO configuration
[C211]...**[C215]**	C211...C215	Virtual digital input CMD2.11...CMD2.15 with CANopen® fieldbus module regardless of configuration
[C301]...**[C310]**	C301...C310	Virtual digital input CMD3.01...CMD3.10 with a fieldbus module in **[I/O profile]** IO configuration
[C311]...**[C315]**	C311...C315	Virtual digital input CMD3.11...CMD3.15 with a fieldbus module regardless of configuration
[C501]...**[C510]**	C501...C510	Virtual digital input CMD5.01...CMD5.10 with integrated Ethernet in **[I/O profile]** IO configuration
[C511]...**[C515]**	C511...C515	Virtual digital input CMD5.11...CMD5.15 with integrated Ethernet regardless of configuration

[Max Level Switch Assign] LCWh ★

Maximum level switch assignment.

This parameter can be accessed if **[LevelCtrl Mode]** LcM is not set to **[No]** nO.

Setting	Code / Value	Description
[Not Assigned]	nO	Not assigned **Factory setting**
[DI1]...**[DI6]**	LI1...LI6	Digital input DI1...DI6
[DI11]...**[DI16]**	LI11...LI16	Digital input DI11...DI16 if VW3A3203 I/O extension module has been inserted
[DI52 (High level)]... **[DI59 (High level)]**	d52H...d59H	Cabinet high level assignment digital inputs **NOTE:** This selection can be accessed on ATV660 and ATV680 equipped with Cabinet IO.
[CD00]...**[CD10]**	CD00...CD10	Virtual digital input CMD.0...CMD.10 in **[I/O profile]** IO configuration
[CD11]...**[CD15]**	CD11...CD15	Virtual digital input CMD.11...CMD.15 regardless of configuration
[C101]...**[C110]**	C101...C110	Virtual digital input CMD1.01...CMD1.10 with integrated Modbus Serial in **[I/O profile]** IO configuration
[C111]...**[C115]**	C111...C115	Virtual digital input CMD1.11...CMD1.15 with integrated Modbus Serial regardless of configuration
[C201]...**[C210]**	C201...C210	Virtual digital input CMD2.01...CMD2.10 with CANopen® fieldbus module in **[I/O profile]** IO configuration
[C211]...**[C215]**	C211...C215	Virtual digital input CMD2.11...CMD2.15 with CANopen® fieldbus module regardless of configuration
[C301]...**[C310]**	C301...C310	Virtual digital input CMD3.01...CMD3.10 with a fieldbus module in **[I/O profile]** IO configuration
[C311]...**[C315]**	C311...C315	Virtual digital input CMD3.11...CMD3.15 with a fieldbus module regardless of configuration
[C501]...**[C510]**	C501...C510	Virtual digital input CMD5.01...CMD5.10 with integrated Ethernet in **[I/O profile]** IO configuration
[C511]...**[C515]**	C511...C515	Virtual digital input CMD5.11...CMD5.15 with integrated Ethernet regardless of configuration

[LevelCtrl Error Resp] LCFb ★

Level control error response.

This parameter can be accessed if **[LevelCtrl Mode]** LcM is not set to **[No]** nO.

Setting	Code / Value	Description
[Ignore]	nO	Detected error ignored
[Freewheel Stop]	YES	Freewheel stop
[Per STT]	Stt	Stop according to **[Type of stop]** Stt parameter but without an error triggered after stop
[Ramp stop]	rMP	Stop on ramp **Factory setting**

[Disturb Flow Comp] LC9G ★

Disturbance flow compensation.

This parameter can be accessed if **[LevelCtrl Strategy]** LCSt is set to **[Energy Optimized]** AdV.

Setting	Description
0...200%	Setting range **Factory setting**: 100%
NOTE: If the parameter is set below 100%, the priority is given to energy optimization compare to flow compensation.	

[Disturb Flow Resp Time] L C 9 t ★

Disturbance flow response time.

This parameter can be accessed if **[LevelCtrl Strategy]** L C S t is set to **[Energy Optimized]** A d V.

Setting	Description
0.0...10.00 s	Setting range **Factory setting**: 1.00 s

[LevelCtrl S/D Interval] L C d t ★

Level Control stage/destage interval

Time before taking into account a new stage/de-stage of pump.

This parameter can be accessed if **[LevelCtrl Strategy]** L C S t is set to **[Energy Optimized]** A d V.

Setting	Description
0.0...999.9 s	Setting range **Factory setting**: 15 s

[Level settings] LcL - Menu

Access

[Complete settings] ➡ **[Pump functions]** ➡ **[Level control]** ➡ **[Level settings]**

About This Menu

According to the configured **[LevelCtrl Strategy]** LCSt , it is necessary to assign:

- Digital inputs for the level switches, in case of **[Switches]** trAd has been selected.
- Levels in % for the next pump to start, for next pump to stop, and for the pump at high speed, in case of **[Standard]** bAS ,C or **[Energy Optimized]** Adu level control strategy has been selected.

[Level Switch1 Assign] LcW1 ★

Level switch 1 assignment.

This parameter can be accessed if:

- **[LevelCtrl Strategy]** LCSt is set to **[Switches]** trAd, and
- **[Nb Of Pumps]** nPPn is higher than 0.

Setting	Code / Value	Description
[Not Assigned]	no	Not assigned **Factory setting**
[DI1]...**[DI6]**	L ,1...L ,6	Digital input DI1...DI6
[DI11]...**[DI16]**	L ,11...L ,16	Digital input DI11...DI16 if VW3A3203 I/O extension module has been inserted
[DI52 (High level)]... **[DI59 (High level)]**	d52H...d59H	Cabinet high level assignment digital inputs **NOTE:** This selection can be accessed on ATV660 and ATV680 equipped with Cabinet IO.
[CD00]...**[CD10]**	Cd00...Cd10	Virtual digital input CMD.0...CMD.10 in **[I/O profile]** ,o configuration
[CD11]...**[CD15]**	Cd11...Cd15	Virtual digital input CMD.11...CMD.15 regardless of configuration
[C101]...**[C110]**	C101...C110	Virtual digital input CMD1.01...CMD1.10 with integrated Modbus Serial in **[I/O profile]** ,o configuration
[C111]...**[C115]**	C111...C115	Virtual digital input CMD1.11...CMD1.15 with integrated Modbus Serial regardless of configuration
[C201]...**[C210]**	C201...C210	Virtual digital input CMD2.01...CMD2.10 with CANopen® fieldbus module in **[I/O profile]** ,o configuration
[C211]...**[C215]**	C211...C215	Virtual digital input CMD2.11...CMD2.15 with CANopen® fieldbus module regardless of configuration
[C301]...**[C310]**	C301...C310	Virtual digital input CMD3.01...CMD3.10 with a fieldbus module in **[I/O profile]** ,o configuration
[C311]...**[C315]**	C311...C315	Virtual digital input CMD3.11...CMD3.15 with a fieldbus module regardless of configuration
[C501]...**[C510]**	C501...C510	Virtual digital input CMD5.01...CMD5.10 with integrated Ethernet in **[I/O profile]** ,o configuration
[C511]...**[C515]**	C511...C515	Virtual digital input CMD5.11...CMD5.15 with integrated Ethernet regardless of configuration

[Level Switch2 Assign] LcW2 ★

Level switch 2 assignment.

This parameter can be accessed if:

- **[LevelCtrl Strategy]** LCSt is set to **[Switches]** trAd, and
- **[Nb Of Pumps]** nPPn is higher than 1.

Identical to **[Level Switch1 Assign]** LcW1 *(see page 293)*.

[Level Switch3 Assign] LcW3 ★

Level switch 3 assignment.

This parameter can be accessed if:
- **[LevelCtrl Strategy]** LCSt is set to **[Switches]** trAd, and
- **[Nb Of Pumps]** nPPn is higher than 2.

Identical to **[Level Switch1 Assign]** LcW1 *(see page 293)*.

[Level Switch4 Assign] LcW4 ★

Level switch 4 assignment.

This parameter can be accessed if:
- **[LevelCtrl Strategy]** LCSt is set to **[Switches]** trAd, and
- **[Nb Of Pumps]** nPPn is higher than 3.

Identical to **[Level Switch1 Assign]** LcW1 *(see page 293)*.

[Level Switch5 Assign] LcW5 ★

Level switch 5 assignment.

This parameter can be accessed if:
- **[LevelCtrl Strategy]** LCSt is set to **[Switches]** trAd, and
- **[Nb Of Pumps]** nPPn is higher than 4.

Identical to **[Level Switch1 Assign]** LcW1 *(see page 293)*.

[Level Switch6 Assign] LcW6 ★

Level switch 6 assignment.

This parameter can be accessed if:
- **[LevelCtrl Strategy]** LCSt is set to **[Switches]** trAd, and
- **[Nb Of Pumps]** nPPn is higher than 5.

Identical to **[Level Switch1 Assign]** LcW1 *(see page 293)*.

[Level 1st Pump Start] LrL1 ★

Level to start first pump.

This parameter can be accessed if:
- **[LevelCtrl Strategy]** LCSt is not set to **[Switches]** trAd, and
- **[Nb Of Pumps]** nPPn is higher than 0.

Setting	Description
0...100%	Setting range **Factory setting**: 0%

[Level 1st Pump Stop] LPL1 ★

Level to stop first pump.

This parameter can be accessed if:
- **[LevelCtrl Strategy]** LCSt is not set to **[Switches]** trAd, and
- **[Nb Of Pumps]** nPPn is higher than 0.

Setting	Description
0...100%	Setting range **Factory setting**: 0%

[Level 1st Pump at HSP] LhL1 ★

Level to reach first pump high speed.

This parameter can be accessed if:
- **[LevelCtrl Strategy]** LCSt is not set to **[Switches]** trAd, and
- **[Nb Of Pumps]** nPPn is higher than 0.

Setting	Description
0...100%	Setting range **Factory setting**: 0%

[Level 2nd Pump Start] LrL2 ★

Level to start second pump.

This parameter can be accessed if:
- **[LevelCtrl Strategy]** LCSt is not set to **[Switches]** trAd or **[Energy Optimized]** AdV, and
- **[Nb Of Pumps]** nPPn is higher than 1.

Identical to **[Level 1st Pump Start]** LrL1 *(see page 294)*.

[Level 2nd Pump Stop] LPL2 ★

Level to stop second pump.

This parameter can be accessed if:
- **[LevelCtrl Strategy]** LCSt is not set to **[Switches]** trAd or **[Energy Optimized]** AdV, and
- **[Nb Of Pumps]** nPPn is higher than 1.

Identical to **[Level 1st Pump Start]** LrL1 *(see page 294)*.

[Level 2nd Pump at HSP] LhL2 ★

Level to reach second pump high speed.

This parameter can be accessed if:
- **[LevelCtrl Strategy]** LCSt is not set to **[Switches]** trAd or **[Energy Optimized]** AdV, and
- **[Nb Of Pumps]** nPPn is higher than 1.

Identical to **[Level 1st Pump Start]** LrL1 *(see page 295)*.

[Level 3rd Pump Start] LrL3 ★

Level to start third pump.

This parameter can be accessed if:
- **[LevelCtrl Strategy]** LCSt is not set to **[Switches]** trAd or **[Energy Optimized]** AdV, and
- **[Nb Of Pumps]** nPPn is higher than 2.

Identical to **[Level 1st Pump Start]** LrL1 *(see page 294)*.

[Level 3rd Pump Stop] LPL3 ★

Level to stop third pump.

This parameter can be accessed if:
- **[LevelCtrl Strategy]** LCSt is not set to **[Switches]** trAd or **[Energy Optimized]** AdV, and
- **[Nb Of Pumps]** nPPn is higher than 2.

Identical to **[Level 1st Pump Start]** LrL1 *(see page 294)*.

[Level 3rd Pump at HSP] LHL3 ★

Level to reach third pump high speed.

This parameter can be accessed if:
- **[LevelCtrl Strategy]** LCSt is not set to **[Switches]** trAd or **[Energy Optimized]** AdV, and
- **[Nb Of Pumps]** nPPn is higher than 2.

Identical to **[Level 1st Pump Start]** LrL1 *(see page 295)*.

[Level 4th Pump Start] LrL4 ★

Level to start fourth pump.

This parameter can be accessed if:
- **[LevelCtrl Strategy]** LCSt is not set to **[Switches]** trAd or **[Energy Optimized]** AdV, and
- **[Nb Of Pumps]** nPPn is higher than 3.

Identical to **[Level 1st Pump Start]** LrL1 *(see page 294)*.

[Level 4th Pump Stop] LPL4 ★

Level to stop fourth pump.

This parameter can be accessed if:
- **[LevelCtrl Strategy]** LCSt is not set to **[Switches]** trAd or **[Energy Optimized]** AdV, and
- **[Nb Of Pumps]** nPPn is higher than 3.

Identical to **[Level 1st Pump Start]** LrL1 *(see page 294)*.

[Level 4th Pump at HSP] LHL4 ★

Level to reach fourth pump high speed.

This parameter can be accessed if:
- **[LevelCtrl Strategy]** LCSt is not set to **[Switches]** trAd or **[Energy Optimized]** AdV, and
- **[Nb Of Pumps]** nPPn is higher than 3.

Identical to **[Level 1st Pump Start]** LrL1 *(see page 295)*.

[Level 5th Pump Start] LrL5 ★

Level to start fifth pump.

This parameter can be accessed if:
- **[LevelCtrl Strategy]** LCSt is not set to **[Switches]** trAd or **[Energy Optimized]** AdV, and
- **[Nb Of Pumps]** nPPn is higher than 4.

Identical to **[Level 1st Pump Start]** LrL1 *(see page 294)*.

[Level 5th Pump Stop] LPL5 ★

Level to stop fifth pump.

This parameter can be accessed if:
- **[LevelCtrl Strategy]** LCSt is not set to **[Switches]** trAd or **[Energy Optimized]** AdV, and
- **[Nb Of Pumps]** nPPn is higher than 4.

Identical to **[Level 1st Pump Start]** LrL1 *(see page 294)*.

[Level 5th Pump at HSP] LHL5 ★

Level to reach fifth pump high speed.

This parameter can be accessed if:
- **[LevelCtrl Strategy]** LCSt is not set to **[Switches]** trAd or **[Energy Optimized]** AdV, and
- **[Nb Of Pumps]** nPPn is higher than 4.

Identical to **[Level 1st Pump Start]** LrL1 *(see page 295)*.

[Level 6th Pump Start] LrL6 ★

Level to start sixth pump.

This parameter can be accessed if:
- **[LevelCtrl Strategy]** LCSt is not set to **[Switches]** trAd or **[Energy Optimized]** AdV, and
- **[Nb Of Pumps]** nPPn is higher than 5.

Identical to **[Level 1st Pump Start]** LrL1 *(see page 294)*.

[Level 6th Pump Stop] LPL6 ★

Level to stop sixth pump.

This parameter can be accessed if:
- **[LevelCtrl Strategy]** LCSt is not set to **[Switches]** trAd or **[Energy Optimized]** AdV, and
- **[Nb Of Pumps]** nPPn is higher than 5.

Identical to **[Level 1st Pump Start]** LrL1 *(see page 294)*.

[Level 6th Pump at HSP] LhL6 ★

Level to reach sixth pump high speed.

This parameter can be accessed if:
- **[LevelCtrl Strategy]** LCSt is not set to **[Switches]** trAd or **[Energy Optimized]** AdV, and
- **[Nb Of Pumps]** nPPn is higher than 5.

Identical to **[Level 1st Pump Start]** LrL1 *(see page 295)*.

Section 7.9
[Pump functions] - [PID controller]

What Is in This Section?

This section contains the following topics:

Topic	Page
[PID controller] *P id* - Overview	299
[PID Feedback] *FdbA* - Menu	302
[PID Reference] *rFC* - Menu	308
[PID preset references] *PrP* - Menu	311
[PID Reference] *rFC* - Menu	313
[Settings] *SEt* - Menu	314

[PID controller] PId - Overview

About This Menu

NOTE: This function cannot be used with some other functions.

Block Diagram

The function is activated by assigning an analog input to the PID feedback (measurement).

The PID feedback needs to be assigned to one of the analog inputs AI1 to AI5 or a pulse input, according to whether any I/O extension module has been inserted.

The PID reference needs to be assigned to the following parameters:

- Preset references via digital inputs (**[Ref PID Preset 2]** rP2, **[Ref PID Preset 3]** rP3, **[Ref PID Preset 4]** rP4).
- In accordance with the configuration of **[Intern PID Ref]** PII:
  - **[Internal PID ref]** rPI, or
  - Reference A **[Ref Freq 1 Config]** FrI or **[Ref.1B channel]** FrIb.

Combination Table for Preset PID References:

DI (Pr4)	DI (Pr2)	Pr2 = no	Reference
			rPI or FrI(b)
0	0		rPI or FrI(b)
0	1		rP2
1	0		rP3
1	1		rP4

A predictive speed reference can be used to initialize the speed on restarting the process.

Scaling of feedback and references:

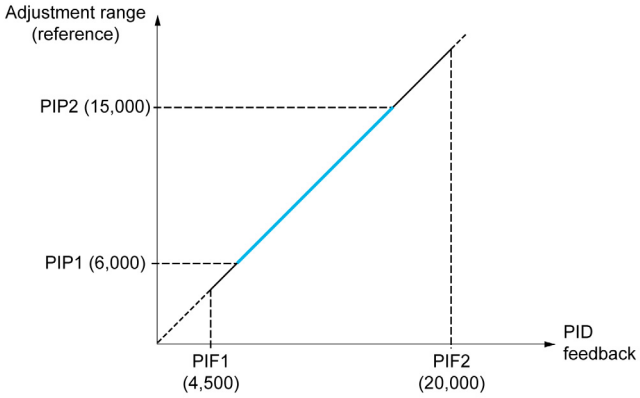
- **[Min PID feedback]** PIF1, **[Max PID feedback]** PIF2 parameters can be used to scale the PID feedback (sensor range). This scale must be maintained for all other parameters.
- **[Min PID Process]** PIP1, **[Max PID Process]** PIP2 parameters can be used to scale the adjustment range, for example the reference. **Check that the adjustment range remains within the sensor range.**

The maximum value of the scaling parameters is 32,767. To facilitate the installation, it is recommended to use values as close as possible to this maximum level, while retaining powers of 10 in relation to the actual values. The scaling is without unit if **[Type of control]** tOCt is set to **[NA]** nA, in % if set to **[OTHER]** otHEr, in process unit if set to **[PRESSURE]** PrES5 or **[FLOW]** FLoW.

Example

Adjustment of the volume in a tank, 6...15 m3.

- Probe used 4-20 mA, 4.5 m^3 for 4 mA and 20 m^3 for 20 mA, with the result that PIF1 = 4,500 and PIF2 = 20,000.
- Adjustment range 6 to 15 m^3, with the result that PIP1 = 6,000 (min. reference) and PIP2 = 15,000 (max. reference).
- Example references:
  - rP1 (internal reference) = 9,500
  - rP2 (preset reference) = 6,500
  - rP3 (preset reference) = 8,000
  - rP4 (preset reference) = 11,200



Other parameters:

- Reversal of the direction of correction **[PID Inversion]** *PIC*. If **[PID Inversion]** *PIC* is set to **[No]** *nO*, the speed of the motor increases when the detected error is positive (for example pressure control with a compressor). If **[PID Inversion]** *PIC* is set to **[Yes]** *YES*, the speed of the motor decreases when the detected error is positive (for example temperature control using a cooling fan).
- The integral gain may be short-circuited by a digital input.
- A warning on the **[PID feedback]** *PIF* may be configured.
- A warning on the **[PID error]** *rPE* may be configured.

"Manual - Automatic" Operation with PID

This function combines the PID controller, the preset speeds, and a manual reference. Depending on the state of the digital input, the speed reference is given by the preset speeds or by a manual reference input via the PID function.

Manual PID reference **[Manual PID reference]** *PIM*:

- Analog inputs AI1 to AI5
- Pulse inputs

Predictive speed reference **[Predictive Speed Ref]** *FPI*:

- **[AI1]** *AI1*: analog input
- **[AI2]** *AI2*: analog input
- **[AI3]** *AI3*: analog input
- **[AI4]** *AI4*: analog input if VW3A3203 I/O extension module has been inserted
- **[AI5]** *AI5*: analog input if VW3A3203 I/O extension module has been inserted
- **[DI5 PulseInput Assignment]** *PI5*: pulse input
- **[DI6 PulseInput Assignment]** *PI6*: pulse input
- **[Ref.Freq-Rmt.Term]** *LCC*: Graphic Display Terminal
- **[Modbus]** *Mdb*: integrated Modbus
- **[CANopen]** *CAn*: CANopen® (if inserted)
- **[Com. Module]** *nEt*: fieldbus option module (if inserted)
- **[Embedded Ethernet]** *EtH*: integrated Ethernet

Setting Up the PID Controller

1. Configuration in PID mode.

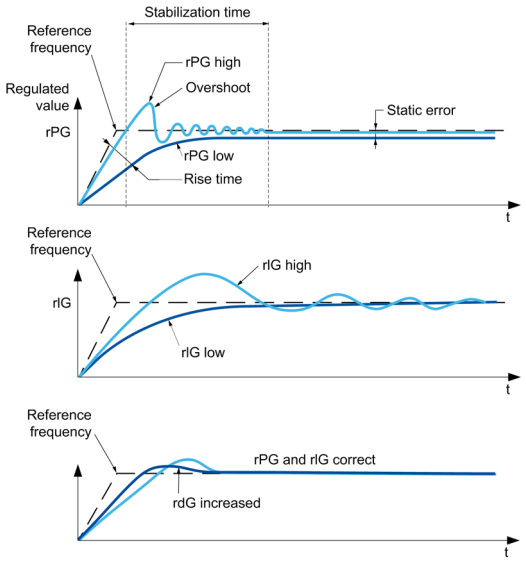
Refer to the Block Diagram *(see page 299)*.

2. Perform a test in factory settings mode.

To optimize the drive, adjust **[PID Prop.Gain]** rPG or **[PID Intgl.Gain]** rIG gradually and independently, and observe the effect on the PID feedback in relation to the reference.

3. If the factory settings are unstable or the reference is incorrect.

Step	Action
1	Perform a test with a speed reference in Manual mode (without PID controller) and with the drive on load for the speed range of the system: ● In steady state, the speed must be stable and comply with the reference, and the PID feedback signal must be stable. ● In transient state, the speed must follow the ramp and stabilize quickly, and the PID feedback must follow the speed. If not, see the settings for the drive and/or sensor signal and wiring.
2	Switch to PID mode.
3	Set **[PID ramp]** PrP to the minimum permitted by the mechanism without triggering an **[DC Bus Overvoltage]** obF.
4	Set the integral gain **[PID Intgl.Gain]** rIG to minimum.
5	Leave the derivative gain **[PID derivative gain]** rdG at 0.
6	Observe the PID feedback and the reference.
7	Switch the drive ON/OFF a number of times or vary the load or reference rapidly a number of times.
8	Set the proportional gain **[PID Prop.Gain]** rPG in order to ascertain the compromise between response time and stability in transient phases (slight overshoot and 1 to 2 oscillations before stabilizing).
9	If the reference varies from the preset value in steady state, gradually increase the integral gain **[PID Intgl.Gain]** rIG, reduce the proportional gain **[PID Prop.Gain]** rPG in the event of instability (pump applications), find a compromise between response time and static precision (see diagram).
10	Lastly, the derivative gain may permit the overshoot to be reduced and the response time to be improved, although this is more difficult to obtain a compromise in terms of stability, as it depends on 3 gains.
11	Perform in-production tests over the whole reference range.



The oscillation frequency depends on the system kinematics:

Parameter	Rise time	Overshoot	Stabilization time	Static error
rPG +	- -	+	=	-
rIG +	-	+ +	+	- -
rdG +	=	-	-	=

[PID Feedback] FdB - Menu

Access

[Complete settings] ➡ [Pump functions] ➡ [PID controller] ➡ [PID Feedback]

About This Menu

NOTE: This function cannot be used with some other functions.

[Type of Control] tOCt

Type of control for the PID = unit choice.

Setting	Code / Value	Description
[nA]	nA	(without unit) **Factory setting**
[Pressure]	PrESS	Pressure control and unit
[Flow]	FLOW	Flow control and unit
[Other]	OtHEr	Other control and unit (%)

[PID Feedback] PIF

PID controller feedback.

Setting	Code / Value	Description
[No]	no	Not assigned **Factory setting**
[AI1]...**[AI3]**	AI1...AI3	Analog input AI1...AI3
[AI4]...**[AI5]**	AI4...AI5	Analog input AI4...AI5 if VW3A3203 I/O extension module has been inserted
[AI Virtual 1]...**[AI Virtual 3]**	AIV1...AIV3	Virtual analogic input 1...3
[PulseInput Assignment On DI5]...**[PulseInput Assignment On DI6]**	PI5...PI6	Digital input DI5...DI6 used as pulse input

[AI1 Type] AI1t ★

Configuration of analog input AI1.

This parameter can be accessed if **[PID Feedback]** PIF is set to **[AI1]** AI1.

Setting	Code / Value	Description
[Voltage]	10U	0-10 Vdc **Factory setting**
[Current]	0A	0-20 mA
[PTC Management]	PtC	1 to 6 PTC (in serial)
[KTY]	Kty	1 KTY84
[PT100]	1Pt2	1 PT100 connected with 2 wires
[PT1000]	1Pt3	1 PT1000 connected with 2 wires

[AI1 min value] uIL1 ★

AI1 voltage scaling parameter of 0%.

This parameter can be accessed if:
- **[PID Feedback]** PIF is set to **[AI1]** AI1, and
- **[AI1 Type]** AI1t is set to **[Voltage]** 10U.

Setting	Description
0.0...10.0 Vdc	Setting range **Factory setting**: 0.0 Vdc

[AI1 max value] uIH1 ★

AI1 voltage scaling parameter of 100%.

This parameter can be accessed if:
- **[PID Feedback]** PIF is set to **[AI1]** AI1, and
- **[AI1 Type]** AI1t is set to **[Voltage]** 10U.

Setting	Description
0.0...10.0 Vdc	Setting range **Factory setting**: 10.0 Vdc

[AI1 min. value] CrL1 ★

AI1 current scaling parameter of 0%.

This parameter can be accessed if:
- **[PID Feedback]** PIF is set to **[AI1]** AI1, and
- **[AI1 Type]** AI1t is set to **[Current]** 0A.

Setting	Description
0.0...20.0 mA	Setting range **Factory setting**: 0.0 mA

[AI1 max. value] CrH1 ★

AI1 current scaling parameter of 100%.

This parameter can be accessed if:
- **[PID Feedback]** PIF is set to **[AI1]** AI1, and
- **[AI1 Type]** AI1t is set to **[Current]** 0A.

Setting	Description
0.0...20.0 mA	Setting range **Factory setting**: 20.0 mA

[AI2 Type] A i2t ★

Configuration of analog input AI2.

This parameter can be accessed if **[PID Feedback]** P iF is set to **[AI2]** A i2.

Setting	Code / Value	Description
[Voltage]	10u	0-10 Vdc **Factory setting**
[Current]	0A	0-20 mA
[PTC Management]	PtC	1 to 6 PTC (in serial)
[KTY]	Kty	1 KTY84
[PT1000]	1Pt3	1 PT1000 connected with 2 wires
[PT100]	1Pt2	1 PT100 connected with 2 wires
[Water Prob]	LEuEL	Water level
[3PT1000]	3Pt3	3 PT1000 connected with 2 wires
[3PT100]	3Pt2	3 PT100 connected with 2 wires

[AI2 min value] u iL2 ★

AI2 voltage scaling parameter of 0%.

This parameter can be accessed if:
- **[PID Feedback]** P iF is set to **[AI2]** A i2, and
- **[AI2 Type]** A i2t is set to **[Voltage]** 10u.

Identical to **[AI1 min value]** u iL1 *(see page 303)*.

[AI2 max value] u iH2 ★

AI2 voltage scaling parameter of 100%.

This parameter can be accessed if:
- **[PID Feedback]** P iF is set to **[AI2]** A i2, and
- **[AI2 Type]** A i2t is set to **[Voltage]** 10u.

Identical to **[AI1 max value]** u iH1 *(see page 303)*.

[AI2 min. value] CrL2 ★

AI2 current scaling parameter of 0%.

This parameter can be accessed if:
- **[PID Feedback]** P iF is set to **[AI2]** A i2, and
- **[AI2 Type]** A i2t is not set to **[Current]** 0A.

Identical to **[AI1 min. value]** CrL1 *(see page 303)*.

[AI2 max. value] CrH2 ★

AI2 current scaling parameter of 100%.

This parameter can be accessed if:
- **[PID Feedback]** P iF is set to **[AI2]** A i2, and
- **[AI2 Type]** A i2t is not set to **[Current]** 0A.

Identical to **[AI1 max. value]** CrH1 *(see page 303)*.

[AI3 Type] A i3t ★

Configuration of analog input AI3.

This parameter can be accessed if **[PID Feedback]** P iF is set to **[AI3]** A i3.

Identical to **[AI1 Type]** A i1t with factory setting: **[Current]** 0A *(see page 304)*.

[AI3 min value] uIL3 ★

AI3 voltage scaling parameter of 0%.

This parameter can be accessed if:
- **[PID Feedback]** PIF is set to **[AI3]** AI3, and
- **[AI3 Type]** AI3t is set to **[Voltage]** 10u.

Identical to **[AI1 min value]** uIL1 *(see page 303)*.

[AI3 max value] uIH3 ★

AI3 voltage scaling parameter of 100%.

This parameter can be accessed if:
- **[PID Feedback]** PIF is set to **[AI3]** AI3, and
- **[AI3 Type]** AI3t is set to **[Voltage]** 10u.

Identical to **[AI1 max value]** uIH1 *(see page 303)*.

[AI3 min. value] CrL3 ★

AI3 current scaling parameter of 0%.

This parameter can be accessed if:
- **[PID Feedback]** PIF is set to **[AI3]** AI3, and
- **[AI3 Type]** AI3t is set to **[Current]** 0A.

Identical to **[AI1 min. value]** CrL1 *(see page 303)*.

[AI3 max. value] CrH3 ★

AI3 current scaling parameter of 100%.

This parameter can be accessed if:
- **[PID Feedback]** PIF is set to **[AI3]** AI3, and
- **[AI3 Type]** AI3t is set to **[Current]** 0A.

Identical to **[AI1 max. value]** CrH1 *(see page 303)*.

[AI4 Type] AI4t ★

Configuration of analog input AI4.

This parameter can be accessed if:
- VW3A3203 I/O extension module has been inserted, and
- **[PID Feedback]** PIF is set to **[AI4]** AI4.

Setting	Code / Value	Description
[Voltage]	10u	0-10 Vdc
[Current]	0A	0-20 mA
[Voltage +/-]	n10u	-10/+10 Vdc **Factory setting**

[AI4 min value] uIL4 ★

AI4 voltage scaling parameter of 0%.

This parameter can be accessed if:
- **[PID Feedback]** PIF is set to **[AI4]** AI4, and
- **[AI4 Type]** AI4t is set to **[Voltage]** 10u.

Identical to **[AI1 min value]** uIL1 *(see page 303)*.

[AI4 max value] uH4 ★

AI4 voltage scaling parameter of 100%.

This parameter can be accessed if:
- **[PID Feedback]** PIF is set to **[AI4]** AI4, and
- **[AI4 Type]** AI4t is set to **[Voltage]** 10u.

Identical to **[AI1 max value]** uH1 *(see page 303)*.

[AI4 min. value] CrL4 ★

AI4 current scaling parameter of 0%.

This parameter can be accessed if:
- **[PID Feedback]** PIF is set to **[AI4]** AI4, and
- **[AI4 Type]** AI4t is set to **[Current]** 0A.

Identical to **[AI1 min. value]** CrL1 *(see page 303)*.

[AI4 max. value] CrH4 ★

AI4 current scaling parameter of 100%.

This parameter can be accessed if:
- **[PID Feedback]** PIF is set to **[AI4]** AI4, and
- **[AI4 Type]** AI4t is not set to **[Current]** 0A.

Identical to **[AI1 max. value]** CrH1 *(see page 303)*.

[AI5 Type] AI5t ★

Configuration of analog input AI5.

This parameter can be accessed if:
- VW3A3203 I/O extension module has been inserted, and
- **[PID Feedback]** PIF is set to **[AI5]** AI5.

Identical to **[AI4 Type]** AI4t *(see page 305)*.

[AI5 min value] uL5 ★

AI5 voltage scaling parameter of 0%.

This parameter can be accessed if:
- **[PID Feedback]** PIF is set to **[AI5]** AI5, and
- **[AI5 Type]** AI5t is set to **[Voltage]** 10u.

Identical to **[AI1 min value]** uL1 *(see page 303)*.

[AI5 max value] uH5 ★

AI5 voltage scaling parameter of 100%.

This parameter can be accessed if:
- **[PID Feedback]** PIF is set to **[AI5]** AI5, and
- **[AI5 Type]** AI5t is set to **[Voltage]** 10u.

Identical to **[AI1 max value]** uH1 *(see page 303)*.

[AI5 min. value] CrL5 ★

AI5 current scaling parameter of 0%.

This parameter can be accessed if:
- **[PID Feedback]** PIF is set to **[AI5]** AI5, and
- **[AI5 Type]** AI5t is set to **[Current]** 0A.

Identical to **[AI1 min. value]** CrL1 *(see page 303)*.

[AI5 max. value] $CrH5$ ★

AI5 current scaling parameter of 100%.

This parameter can be accessed if:

- **[PID Feedback]** PiF is set to **[AI5]** $Ai5$, and
- **[AI5 Type]** $Ai5t$ is set to **[Current]** $0A$.

Identical to **[AI1 max. value]** $CrH1$ *(see page 303)*.

[Min PID feedback] $PiF1$ ★

Minimum PID feedback.

This parameter can be accessed if **[PID Feedback]** PiF is not set to **[No]** nO.

Setting	Description
0...**[Max PID feedback]** $PiF2$	Setting range **Factory setting**: 100

[Max PID feedback] $PiF2$ ★

Maximum PID feedback.

This parameter can be accessed if **[PID Feedback]** PiF is not set to **[No]** nO.

Setting	Description
[Min PID feedback] $PiF1$...32,767	Setting range **Factory setting**: 1,000

[PID feedback] rPF ★

Value for PID feedback, display only.

This parameter can be accessed if **[PID Feedback]** PiF is not set to **[No]** nO.

Setting	Description
0...65,535	Setting range **Factory setting**: _

[Min Fbk Warning] PAL ★

Minimum feedback level warning.

This parameter can be accessed if **[PID Feedback]** PiF is not set to **[No]** nO.

Setting	Description
0...65,535	Setting range **Factory setting**: 100

[Max Fbk Warning] PAH ★

Maximum feedback level warning.

This parameter can be accessed if **[PID Feedback]** PiF is not set to **[No]** nO.

Setting	Description
0...65,535	Setting range **Factory setting**: 1,000

[PID Reference] rF - Menu

Access

[Complete settings] ➡ **[Pump functions]** ➡ **[PID controller]** ➡ **[PID Reference]**

About This Menu

NOTE: This function cannot be used with some other functions.

[Intern PID Ref] PI★

Internal PID controller reference.

This parameter can be accessed if **[PID Feedback]** PIF is not set to **[Not Configured]** nO.

Setting	Code / Value	Description
[No]	nO	The PID controller reference is given by **[Ref Freq 1 Config]** Fr1 or **[Ref.1B channel]** Fr1b with summing/subtraction/multiplication functions. Refer to the block diagram *(see page 299)*. **Factory setting**
[Yes]	YES	The PID controller reference is internal via **[Internal PID ref]** rPI.

[Ref Freq 1 Config] Fr1★

Configuration reference frequency 1.

This parameter can be accessed if:

- **[PID Feedback]** PIF is not set to **[Not Configured]** nO, and
- **[Intern PID Ref]** PII is set to **[No]** nO.

Setting	Code / Value	Description
[Not Configured]	nO	Not assigned
[AI1]	AI1	Analog input AI1 **Factory Setting**
[AI2]...[AI3]	AI2...AI3	Analog input AI2...AI3
[AI4]...[AI5]	AI4...AI5	Analog input AI4...AI5 if VW3A3203 I/O extension module has been inserted
[Ref Frequency via DI]	UPdt	Up/Down function is assigned by DIx
[HMI]	LCC	Reference Frequency via remote terminal
[Modbus]	Mdb	Reference frequency via Modbus
[CANopen]	CAn	Reference frequency via CANopen if a CANopen module has been inserted
[Com. Module]	nEt	Reference frequency via fieldbus module if a fieldbus module has been inserted
[Embedded Ethernet]	EtH	Embedded Ethernet
[DI5 PulseInput Assignment]...[DI6 PulseInput Assignment]	PI5...PI6	Digital input DI5...DI6 used as pulse input

[Min PID reference] PPI★

Minimum PID reference.

This parameter can be accessed if **[PID Feedback]** PIF is not set to **[Not Configured]** nO.

Setting ⟲	Description
[Min PID feedback] PIF1...**[Max PID reference]** PIP2	Setting range **Factory setting**: 150

[Max PID reference] P I P 2 ★

Maximum PID reference.

This parameter can be accessed if **[PID Feedback]** P I F is not set to **[Not Configured]** n o.

Setting	Description
[Min PID reference] P I P 1...**[Max PID feedback]** P I F 2	Setting range **Factory setting**: 900

[Internal PID ref] r P I ★

Internal PID controller reference.

This parameter can be accessed if:

- **[PID Feedback]** P I F is not set to **[Not Configured]** n o, and
- **[Intern PID Ref]** P I I is set to **[Yes]** Y E S.

Setting	Description
[Min PID reference] P I P 1...**[Max PID reference]** P I P 2	Setting range **Factory setting**: 150

[Auto/Manual assign.] P A u ★

Auto/Manual select input.

This parameter can be accessed if **[PID Feedback]** P I F is not set to **[Not Configured]** n o.

Setting	Code / Value	Description
[Not Assigned]	n o	Not assigned **Factory setting**
[DI1]...**[DI6]**	L I 1...L I 6	Digital input DI1...DI6
[DI11]...**[DI16]**	L I 1 1...L I 1 6	Digital input DI11...DI16 if VW3A3203 I/O extension module has been inserted
[DI52 (High level)]... **[DI59 (High level)]**	d 5 2 H...d 5 9 H	Cabinet high level assignment digital inputs **NOTE:** This selection can be accessed on ATV660 and ATV680 equipped with Cabinet IO.
[CD00]...**[CD10]**	C d 0 0...C d 1 0	Virtual digital input CMD.0...CMD.10 in **[I/O profile]** I o configuration
[CD11]...**[CD15]**	C d 1 1...C d 1 5	Virtual digital input CMD.11...CMD.15 regardless of configuration
[C101]...**[C110]**	C 1 0 1...C 1 1 0	Virtual digital input CMD1.01...CMD1.10 with integrated Modbus Serial in **[I/O profile]** I o configuration
[C111]...**[C115]**	C 1 1 1...C 1 1 5	Virtual digital input CMD1.11...CMD1.15 with integrated Modbus Serial regardless of configuration
[C201]...**[C210]**	C 2 0 1...C 2 1 0	Virtual digital input CMD2.01...CMD2.10 with CANopen® fieldbus module in **[I/O profile]** I o configuration
[C211]...**[C215]**	C 2 1 1...C 2 1 5	Virtual digital input CMD2.11...CMD2.15 with CANopen® fieldbus module regardless of configuration
[C301]...**[C310]**	C 3 0 1...C 3 1 0	Virtual digital input CMD3.01...CMD3.10 with a fieldbus module in **[I/O profile]** I o configuration
[C311]...**[C315]**	C 3 1 1...C 3 1 5	Virtual digital input CMD3.11...CMD3.15 with a fieldbus module regardless of configuration
[C501]...**[C510]**	C 5 0 1...C 5 1 0	Virtual digital input CMD5.01...CMD5.10 with integrated Ethernet in **[I/O profile]** I o configuration
[C511]...**[C515]**	C 5 1 1...C 5 1 5	Virtual digital input CMD5.11...CMD5.15 with integrated Ethernet regardless of configuration

[Manual PID Reference] P ıΠ ★

Manual PID reference.

Reference input in manual mode.

This parameter can be accessed if:

- **[PID Feedback]** P ıF is not set to **[Not Configured]** nO, and
- **[Auto/Manual assign.]** PAu is not set to **[No]** nO.

The preset speeds are active on the manual reference if they have been configured.

Setting	Code / Value	Description
[No]	nO	Not assigned **Factory setting**
[AI1]...**[AI3]**	AI1...AI3	Analog input AI1...AI3
[AI4]...**[AI5]**	AI4...AI5	Analog input AI4...AI5 if VW3A3203 I/O extension module has been inserted
[PulseInput Assignment On DI5]...**[PulseInput Assignment On DI6]**	P ı5...P ı6	Digital input DI5...DI6 used as pulse input

[PID preset references] PrI - Menu

Access

[Complete settings] ➡ **[Pump functions]** ➡ **[PID controller]** ➡ **[PID Reference]** ➡ **[PID preset references]**

About This Menu

The function can be accessed if **[PID feedback ass.]** PIF is assigned.

[2 PID Preset Assign] Pr2

2 PID preset assignment.

If the assigned input or bit is at 0, the function is inactive.

If the assigned input or bit is at 1, the function is active.

Setting	Code / Value	Description
[Not Assigned]	nO	Not assigned **Factory setting**
[DI1]...**[DI6]**	LI1...LI6	Digital input DI1...DI6
[DI11]...**[DI16]**	LI11...LI16	Digital input DI11...DI16 if VW3A3203 I/O extension module has been inserted
[DI52 (High level)]... **[DI59 (High level)]**	d52H...d59H	Cabinet high level assignment digital inputs **NOTE:** This selection can be accessed on ATV660 and ATV680 equipped with Cabinet IO.
[CD00]...**[CD10]**	Cd00...Cd10	Virtual digital input CMD.0...CMD.10 in **[I/O profile]** IO configuration
[CD11]...**[CD15]**	Cd11...Cd15	Virtual digital input CMD.11...CMD.15 regardless of configuration
[C101]...**[C110]**	C101...C110	Virtual digital input CMD1.01...CMD1.10 with integrated Modbus Serial in **[I/O profile]** IO configuration
[C111]...**[C115]**	C111...C115	Virtual digital input CMD1.11...CMD1.15 with integrated Modbus Serial regardless of configuration
[C201]...**[C210]**	C201...C210	Virtual digital input CMD2.01...CMD2.10 with CANopen® fieldbus module in **[I/O profile]** IO configuration
[C211]...**[C215]**	C211...C215	Virtual digital input CMD2.11...CMD2.15 with CANopen® fieldbus module regardless of configuration
[C301]...**[C310]**	C301...C310	Virtual digital input CMD3.01...CMD3.10 with a fieldbus module in **[I/O profile]** IO configuration
[C311]...**[C315]**	C311...C315	Virtual digital input CMD3.11...CMD3.15 with a fieldbus module regardless of configuration
[C501]...**[C510]**	C501...C510	Virtual digital input CMD5.01...CMD5.10 with integrated Ethernet in **[I/O profile]** IO configuration
[C511]...**[C515]**	C511...C515	Virtual digital input CMD5.11...CMD5.15 with integrated Ethernet regardless of configuration

[4 PID Preset Assign] Pr4

4 PID preset assignment.

Identical to **[2 PID Preset Assign]** Pr2 *(see page 311)*.

Verify that **[2 PID Preset Assign]** Pr2 has been assigned before assigning this function.

[Ref PID Preset 2] rP2 ★

Second PID preset reference.

This parameter can be accessed only if **[2 PID Preset Assign]** Pr2 is assigned.

Setting ❮❯	Description
[Min PID reference] PIP1...**[Max PID reference]** PIP2	Setting range **Factory setting**: 300

[Ref PID Preset 3] rP3 ★

Third PID preset reference.

This parameter can be accessed only if **[4 preset PID ref.]** Pr4 is assigned.

Setting ❮❯	Description
[Min PID reference] P1P...**[Max PID reference]** P2P	Setting range **Factory setting**: 600

[Ref PID Preset 4] rP4 ★

Fourth PID preset reference.

This parameter can be accessed only if **[2 preset PID ref.]** Pr2 and **[4 preset PID ref.]** Pr4 are assigned.

Setting ❮❯	Description
[Min PID reference] P1P...**[Max PID reference]** P2P	Setting range **Factory setting**: 900

[PID Reference] rF - Menu

Access

[Complete settings] ➡ **[Pump functions]** ➡ **[PID controller]** ➡ **[PID Reference]**

[Predictive Speed Ref] FPI ★

Predictive speed reference.

This parameter can be accessed if:

- **[Access Level]** LAC is set to **[Expert]** EPr.
- **[PID feedback]** PIF is not set to **[No]** nO

Setting	Code / Value	Description
[Not Configured]	nO	Not assigned **Factory setting**
[AI1]...**[AI3]**	AI1...AI3	Analog input AI1...AI3
[AI4]...**[AI5]**	AI4...AI5	Analog input AI4...AI5 if VW3A3203 I/O extension module has been inserted
[Ref. Freq- Rmt.Term]	LCC	Reference frequency via remote terminal
[Ref. Freq-Modbus]	Mdb	Reference frequency via Modbus
[Ref. Freq-CANopen]	CAn	Reference frequency via CANopen
[Ref. Freq-Com. Module]	nEt	Reference frequency via communication module
[Embedded Ethernet]	EtH	Embedded Ethernet
[PulseInput Assignment On DI5]...**[PulseInput Assignment On DI6]**	PI5...PI6	Digital input DI5...DI6 used as pulse input

[Speed Input %] PSr ★

PID speed input % reference.

This parameter can be accessed if **[Access Level]** LAC is set to **[Expert]** EPr.

Setting	Description
1...100%	Setting range **Factory setting**: 100%

[Settings] SEt - Menu

Access

[Complete settings] ➡ **[Pump functions]** ➡ **[PID controller]** ➡ **[Settings]**

About This Menu

Following parameters can be accessed if **[PID Feedback]** PIF is not set to **[Not Configured]** nO.

NOTE: This function cannot be used with some other functions.

[PID Prop.Gain] rPG ★

Proportional gain.

Setting ❮❯	Description
0.01...100.00	Setting range **Factory setting**: 1.00

[PI Intgl.Gain] rIG ★

Integral gain.

Setting ❮❯	Description
0.01...100.00	Setting range **Factory setting**: 1.00

[PID derivative gain] rdG ★

Derivative gain.

Setting ❮❯	Description
0.00...100.00	Setting range **Factory setting**: 0.00

[PID ramp] PrP ★

PID acceleration/deceleration ramp, defined to go from **[Min PID reference]** PIP1 to **[Max PID reference]** PIP2 and conversely.

Setting ❮❯	Description
0.0...99.9 s	Setting range **Factory setting**: 0.0 s

[PID Inversion] PIC ★

PID inversion.

Setting	Code / Value	Description
[No]	nO	No **Factory setting**
[Yes]	YES	Yes

[PID Min Output] PoL ★

PID controller minimum output in Hz.

Setting ❮❯	Description
-500.0...500.0 Hz	Setting range **Factory setting**: 0.0 Hz

[PID Max Output] PoH ★

PID controller maximum output in Hz.

Setting ❮❯	Description
0.0...500.0 Hz	Setting range **Factory setting**: 60.0 Hz

[PID Error Warning] PEr ★

PID error warning.

Setting ❮❯	Description
0...65,535	Setting range **Factory setting**: 100

[PID Integral OFF] PIS ★

Integral shunt.

If the assigned input or bit is at 0, the function is inactive (the PID integral is enabled).

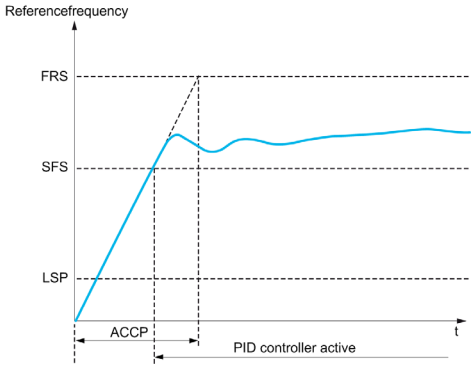
If the assigned input or bit is at 1, the function is active (the PID integral is disabled).

Setting	Code / Value	Description
[Not Assigned]	nO	Not assigned **Factory setting**
[DI1]...**[DI6]**	LI1...LI6	Digital input DI1...DI6
[DI11]...**[DI16]**	LI11...LI16	Digital input DI11...DI16 if VW3A3203 I/O extension module has been inserted
[DI52 (High level)]... **[DI59 (High level)]**	d52H...d59H	Cabinet high level assignment digital inputs **NOTE:** This selection can be accessed on ATV660 and ATV680 equipped with Cabinet IO.
[CD00]...**[CD10]**	Cd00...Cd10	Virtual digital input CMD.0...CMD.10 in **[I/O profile]** IO configuration
[CD11]...**[CD15]**	Cd11...Cd15	Virtual digital input CMD.11...CMD.15 regardless of configuration
[C101]...**[C110]**	C101...C110	Virtual digital input CMD1.01...CMD1.10 with integrated Modbus Serial in **[I/O profile]** IO configuration
[C111]...**[C115]**	C111...C115	Virtual digital input CMD1.11...CMD1.15 with integrated Modbus Serial regardless of configuration
[C201]...**[C210]**	C201...C210	Virtual digital input CMD2.01...CMD2.10 with CANopen® fieldbus module in **[I/O profile]** IO configuration
[C211]...**[C215]**	C211...C215	Virtual digital input CMD2.11...CMD2.15 with CANopen® fieldbus module regardless of configuration
[C301]...**[C310]**	C301...C310	Virtual digital input CMD3.01...CMD3.10 with a fieldbus module in **[I/O profile]** IO configuration
[C311]...**[C315]**	C311...C315	Virtual digital input CMD3.11...CMD3.15 with a fieldbus module regardless of configuration
[C501]...**[C510]**	C501...C510	Virtual digital input CMD5.01...CMD5.10 with integrated Ethernet in **[I/O profile]** IO configuration
[C511]...**[C515]**	C511...C515	Virtual digital input CMD5.11...CMD5.15 with integrated Ethernet regardless of configuration

[PID acceleration time] ACCP ★

PID: acceleration during start-up.

PID start ramp can be applied before starting the PID controller to allow reaching quickly the PID reference without increasing PID gains. If configured, the **[Start Accel Ramp]** ACC5 is applied up to **[Low Speed]** LSP instead of **[PID acceleration time]** ACCP.



Setting ❮❯	Description
0.01...99,99 s (1)	Setting range **Factory setting**: 5.00 s
1 Range 0.01 to 99.99 s or 0.1 to 999.9 s or 1...6,000 s according to **[Ramp increment]** INR.	

[PID Start Ref Freq] SFS ★

PID: speed reference for start-up.

Setting ❮❯	Description
0.0...500.0 Hz	Setting range If **[PID Start Ref Freq]** SFS is lower than **[Low speed]** LSP, this function has no effect. **Factory setting**: 0.0 Hz

Section 7.10
[Pump functions] - [Sleep/wakeup]

What Is in This Section?

This section contains the following topics:

Topic	Page
[Sleep/Wakeup] SPW - Overview	318
[Sleep menu] SLP - Menu	321
[Sleep menu] SLP - Menu	323
[Sleep menu] SLP - Menu	324
[Boost] Sbt - Menu	325
[Advanced sleep check] Ads - Menu	326
[Wake up menu] WKP - Menu	328
[Wake up menu] WKP - Menu	329

[Sleep/Wakeup] SPW - Overview

About This Menu

Following parameters can be accessed if **[PID feedback ass.]** PIF is not set to **[Not Configured]** no.

⚠ WARNING

UNANTICIPATED EQUIPMENT OPERATION

Verify that activating this function does not result in unsafe conditions.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

The purpose of the "Sleep / Wake-Up" function is to stop the motor in process standstill situations.

It allows you to save energy and helps to prevent premature aging of some equipment that cannot run for a long time at low speed because the greasing or cooling depends on the machine speed.

In a pressure-controlled pumping application:

- The purpose of the Sleep / Wake-Up function is to manage periods of the application where the water demand is low and where it is not needed to keep the main pumps running.
- It allows you to save energy in low demand periods. Then, when the demand is increasing, the application needs to wake up in order to meet the demand.
- Optionally, during a sleep period, a Jockey pump can be started to maintain an emergency service pressure or meet a low water demand.

Depending on user-defined wakeup conditions, the motor is restarted automatically.

Sleep/Wake-Up in PID Control Mode

When the drive is used in PID control, one of the following conditions is used to switch the application to the sleep state:

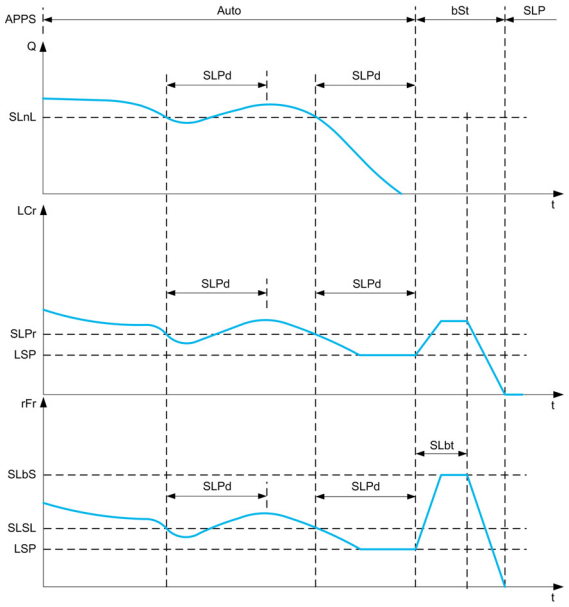
- Sleep on low speed(when all fixed pumps are Off in case of a multi-pump application).
- Sleep on low sleep sensor value (using flow sensor for monitoring).
- Sleep on low motor power (when all fixed pumps are Off in case of a multi-pump application).
- Sleep on external condition (using drive input).

The drive is in "PID control mode" when PID is active. Typically when:

- PID is configured, and
- Channel 1 is selected, and
- PID is in automatic mode.

When the drive is in a sleep state, a wake-up condition is used to restart the application:

- Wake-up on PID Feedback level
- Wake-up on PID Error level
- Wake-up on low-pressure condition



Sleep Conditions in PID Control Mode

If there is no valid wake-up condition, then the system switches to the sleep mode after one of the configured sleep conditions remains longer than **[Sleep Delay]** SLPd.

The sleep detection mode is selected by configuring **[Sleep Detect Mode]** SLPM. Then the system switches to sleep mode if the selected condition is met:

Configuration	Condition
LF sleep on flow sensor value	Sensor value is below the sleep level
SW sleep on switch or external condition	The switch input becomes active
SPd sleep on speed	The output frequency is below the sleep speed and all auxiliary
PWr sleep on power level	The output power is below the sleep power
HP sleep on pressure sensor value	Sensor value is higher than the sleep level
or multiple conditions	At least 1 of the configured condition to enter in sleep mode is met

Wake-Up Conditions in PID Control Mode

The system wakes up according to **[Wake Up Mode]** WuPM configuration:

- On PID Feedback level
- On PID Error level.
- On low-pressure condition.

The system wakes up if the wake up conditions are valid for a time longer than the **[Wake Up Delay]** WuPd.

If **[Feedback]** FbK is selected, then the system wakes up and goes back in PID control mode:

- When PID feedback drops below configured **[Wake Up Process Level]** WuPF if PID is configured in Direct mode, (**[PID Inversion]** PIC is set to no).
- When PID feedback raises above configured **[Wake Up Process Level]** WuPF, if PID is configured in Reverse mode (**[PID Inversion]** PIC is set to YES).

If **[Error]** Err is selected, then the system wakes up and goes back in PID control mode:

- When PID feedback drops below (**[PID reference]** rPC - **[Wake Up Process Error]** WuPE), if PID is configured in Direct mode (**[PID Inversion]** PIC is set to no).
- When PID feedback raises above (**[PID reference]** rPC + **[Wake Up Process Error]** WuPE), if PID is configured in Reverse mode (**[PID Inversion]** PIC is set to YES).

If **[Pressure]** LP is selected, then the system wakes up and goes back in PID control mode when the pressure feedback drops below **[Wake Up Process Level]** WuPF.

Boosting Phase in PID Control Mode

When entering the sleep mode, the motor accelerates to **[Sleep Boost Speed]** SLbS during **[Sleep Boost Time]** SLbt and then stops.

If **[Sleep Boost Time]** SLbt is set to 0, then the boost phase is ignored.

Initial State in PID Control Mode

Just after the system starts in automatic mode (a run order appears while in automatic mode - channel 1 already selected and PID auto):

- If a wake-up condition is met, the drive goes in PID control mode (PID started).
- If a wake-up condition is not met, the drive goes in sleep mode (PID stays stopped and motor is kept halted), and Boosting phase is ignored.

When the control is switched to automatic mode while the motor is running (switch to channel 1 or switch to PID auto mode for example), the drive stays in running state and switches to PID automatic mode.

Configuration of Sleep External Condition (Usage of a No Flow Switch for Example)

Sleep switch allows you to select the source of sleep external condition:

- no: no input selected for the sleep external condition.
- dIX: the sleep external condition (switch for example) is connected to DIx (the assignment is also possible on a control bit in I/O profile).

Configuration of Sleep Sensor (Flow or Pressure Sensor)

The assignment of a sleep sensor, the configuration of the selected physical input and the configuration of scaling to process value are performed.

A sleep sensor source is selected by **[Inst. Flow Assign.]** *FS IA* and **[OutletPres Assign]** *PS2A* which allows to select the analog or pulse input on which the sensor is connected:

- *no*: no input selected for sleep sensor value.
- *AIX*: sleep sensor is connected to AIx.
- *AIUX*: sleep sensor is connected to virtual AIUx.
- *PIX*: sleep sensor is connected to pulse input PIx.

The configuration of an analog input is performed.

The configuration of a pulse input is performed.

Depending on the selected source, the process range of the sensor is configured by:

- **[AIx Lowest Process]** *AIXJ*, **[AIx Highest Process]** *AIXK* (without unit), when connected on an analog input.
- **[AIv1 Lowest Process]** *AV1J*, **[AIv1 Highest Process]** *AV1K* (without unit), when using the virtual analog input.
- **[DIx PulseInput Low Freq]** *PILX*, **[DIx PulseInput High Freq]** *PIHX* (without unit), when connected on a pulse input configured in frequency.

[Sleep menu] SLP - Menu

Access

[Complete settings] ➡ **[Pump functions]** ➡ **[Sleep/Wakeup]** ➡ **[Sleep menu]**

About This Menu

[Sleep Detect Mode] SLPM

Sleep detection mode.

Setting	Code / Value	Description
[No]	nO	Not configured **Factory setting**
[Switch]	SW	System enters in sleep mode on switch condition
[Flow]	LF	System enters in sleep mode on low flow condition
[Speed]	SPd	System enters in sleep mode on speed condition
[Power]	PWr	System enters in sleep mode on power condition
[Pressure]	HP	System enters in sleep mode on high-pressure condition
[Multiple]	or	System enters in sleep mode on multiple-OR condition

[Sleep Switch Assign] SLPW

Sleep switch assignment.

This parameter can be accessed if **[Sleep Detect Mode]** SLPM is set to **[Switch]** SW.

Select an external condition to enter in sleep mode (for example, flow switch).

Setting	Code / Value	Description
[Not Assigned]	nO	Not assigned **Factory setting**
[DI1]...**[DI6]**	LI1...LI6	Digital input DI1...DI6
[DI11]...**[DI16]**	LI11...LI16	Digital input DI11...DI16 if VW3A3203 I/O extension module has been inserted
[CD00]...**[CD10]**	CD00...CD10	Virtual digital input CMD.0...CMD.10 in **[I/O profile]** IO configuration
[CD11]...**[CD15]**	CD11...CD15	Virtual digital input CMD.11...CMD.15 regardless of configuration
[C101]...**[C110]**	C101...C110	Virtual digital input CMD1.01...CMD1.10 with integrated Modbus Serial in **[I/O profile]** IO configuration
[C111]...**[C115]**	C111...C115	Virtual digital input CMD1.11...CMD1.15 with integrated Modbus Serial regardless of configuration
[C201]...**[C210]**	C201...C210	Virtual digital input CMD2.01...CMD2.10 with CANopen® fieldbus module in **[I/O profile]** IO configuration
[C211]...**[C215]**	C211...C215	Virtual digital input CMD2.11...CMD2.15 with CANopen® fieldbus module regardless of configuration
[C301]...**[C310]**	C301...C310	Virtual digital input CMD3.01...CMD3.10 with a fieldbus module in **[I/O profile]** IO configuration
[C311]...**[C315]**	C311...C315	Virtual digital input CMD3.11...CMD3.15 with a fieldbus module regardless of configuration
[C501]...**[C510]**	C501...C510	Virtual digital input CMD5.01...CMD5.10 with integrated Ethernet Modbus TCP in **[I/O profile]** IO configuration
[C511]...**[C515]**	C511...C515	Virtual digital input CMD5.11...CMD5.15 with integrated Ethernet Modbus TCP regardless of configuration

Setting	Code / Value	Description
[DI1 (Low level)]...[DI6 (Low level)]	L I L ... L 6 L	Digital input DI1...DI6 used at low level
[DI52 (High level)]... [DI59 (High level)]	d 5 2 H ... d 5 9 H	Cabinet high level digital inputs **NOTE:** This selection can be accessed on ATV660 and ATV680 equipped with Cabinet IO.
[DI52 (Low level)]... [DI59 (Low level)]	d 5 2 L ... d 5 9 L	Cabinet low level digital inputs **NOTE:** This selection can be accessed on ATV660 and ATV680 equipped with Cabinet IO.

[Inst. Flow Assign.] F 5 I A ★

Installation flow sensor assignment.

This parameter can be accessed if **[Sleep Detect Mode]** 5 L P M is set to **[Sensor]** 5 n 5 r.

Setting	Code / Value	Description
[Not Configured]	n o	Not assigned **Factory setting**
[AI1]...[AI3]	A I 1 ... A I 3	Analog input AI1...AI3
[AI4]...[AI5]	A I 4 ... A I 5	Analog input AI4...AI5 if VW3A3203 I/O extension module has been inserted
[AI Virtual 1]...[AI Virtual 3]	A I V 1 ... A I V 3	Virtual analogic input 1...3
[Di5 PulseInput Assignment]...[Di6 PulseInput Assignment]	P I 5 ... P I 6	Digital input DI5...DI6 used as pulse input
[Est. Pump Flow]	5 L P F	Sensor less estimated flow
[Est. System Flow]	5 L 5 F	Estimated system flow This selection is only possible if **[Pump System Archit]** M P 5 A is set to **[Multi Drives]** n V 5 d or **[Multi Masters]** n V 5 d r **NOTE:** To use this selection, all the pump characteristics of the system must be configured.
NOTE: For sensor configuration, refer to section **[Sensors assignment]** *(see page 207)*.		

[Sleep menu] SLP - Menu

Access

[Complete settings] ➡ **[Pump functions]** ➡ **[Sleep/wakeup]** ➡ **[Sleep menu]**

[Sleep Flow Level] SLnL ★

Sleep flow level.

Sensor level under which the system should enter the sleep mode (Zero value to deactivate).

This parameter can be accessed if:

- **[Inst. Flow Assign.]** FS IA is not set to **[Not Configured]** nO, and
- **[Sleep Detect Mode]** SLPM is set to
  - **[Flow]** LF, or
  - **[Multiple]** Or.

Setting ❨❩	Description
[No] nO to 32,767	Setting range Unit: **[Flow rate unit]** SUFr (for example, %, l/s; m3/h) **Factory setting**: **[No]** nO

[OutletPres Assign] PS2A ★

Outlet pressure sensor assignment.

This parameter can be accessed if:

- **[Sleep Detect Mode]** SLPM is set to **[Pressure]** HP, or
- **[Sleep Detect Mode]** SLPM is set to **[Multiple]** Or.

Setting	Code / Value	Description
[Not Configured]	nO	Not assigned **Factory setting**
[AI1]...**[AI3]**	AI1...AI3	Analog input AI1...AI3
[AI4]...**[AI5]**	AI4...AI5	Analog input AI4...AI5 if VW3A3203 I/O extension module has been inserted
[AI Virtual 1]...**[AI Virtual 3]**	AIV1...AIV3	Virtual analogic input 1...3
NOTE: For sensor configuration, refer to section **[Sensors assignment]** *(see page 207)*.		

[Sleep menu] SLP - Menu

Access

[Complete settings] ➡ [Pump functions] ➡ [Sleep/wakeup] ➡ [Sleep menu]

[Sleep Pressure Level] SLPL

Sleep pressure level.

This parameter can be accessed if:

- **[OutletPres Assign]** P52A is not set to **[Not Configured]** nO, and
- **[Sleep Detect Mode]** SLPM is set to
  - **[Pressure]** HP, or
  - **[Multiple]** or.

Setting	Description
[No] nO to 32,767	Setting range Unit: **[Flow rate unit]** SUFr (for example, %, l/s; m3/h) **Factory setting**: **[No]** nO

[Sleep Min Speed] SLSL ★

Sleep flow level.

Speed level under which the system should enter the sleep mode.

This parameter can be accessed if:

- **[Sleep Detect Mode]** SLPM is set to **[Speed]** SPd, or
- **[Sleep Detect Mode]** SLPM is set to **[Multiple]** or.

NOTE: To set this parameter, each **[Low Speed]** LSP values of all drives of a multipump architecture needs to be taken into account.

Setting	Description
0...500.0 Hz	Setting range **Factory setting**: **[No]** nO

[Sleep Power Level] SLPr ★

Sleep power level.

Power level under which the system should enter the sleep mode.

This parameter can be accessed if:

- **[Sleep Detect Mode]** SLPM is set to **[Power]** PWr, or
- **[Sleep Detect Mode]** SLPM is set to **[Multiple]** or.

Setting	Description
0...**[Nominal Motor Power]** nPr	Setting range **Factory setting**: **[No]** nO

[Sleep Delay] SLPd ★

Sleep delay.

This parameter can be accessed if **[Sleep Detect Mode]** SLPM is not set to **[Not Configured]** nO.

Setting	Description
0...3,600 s	Setting range **Factory setting**: 20 s

[Boost] SbE - Menu

Access

[Complete settings] ➡ **[Pump functions]** ➡ **[Sleep/wakeup]** ➡ **[Sleep menu]** ➡ **[Boost]**

About This Menu

Following parameters can be accessed if **[Sleep Detect Mode]** SLPM is not set to **[No]** nO.

[Sleep Boost Speed] SLbS ★

Sleep boost speed.

Setting	Description
0...599.0 Hz	Setting range **Factory setting**: nO

[Sleep Boost Time] SLbE ★

Sleep boost time.

This parameter can be accessed if **[Sleep Boost Speed]** SLbS is not set to 0.

Setting	Description
0...3,600 s	Setting range **Factory setting**: nO

[Advanced sleep check] AdS - Menu

Access

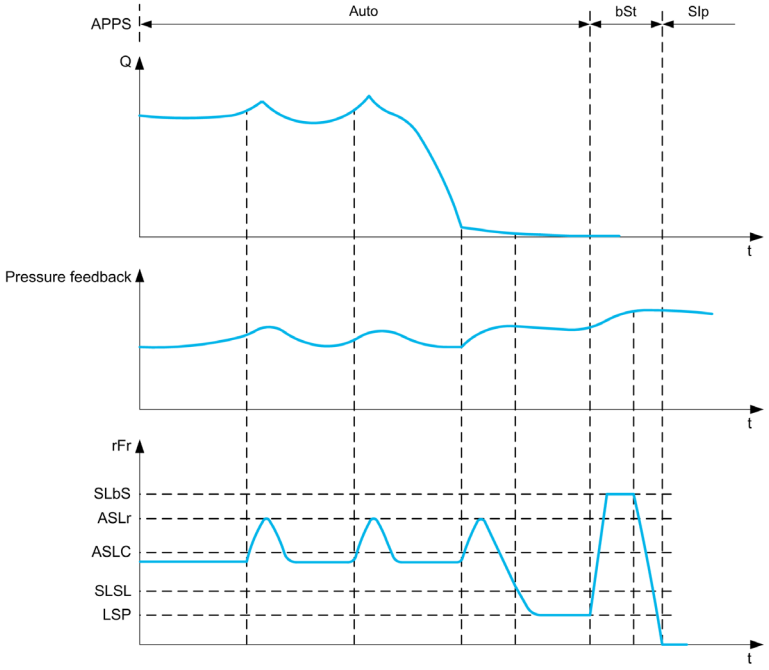
[Complete settings] ➡ [Pump functions] ➡ [Sleep/wakeup] ➡ [Sleep menu] ➡ [Advanced sleep check]

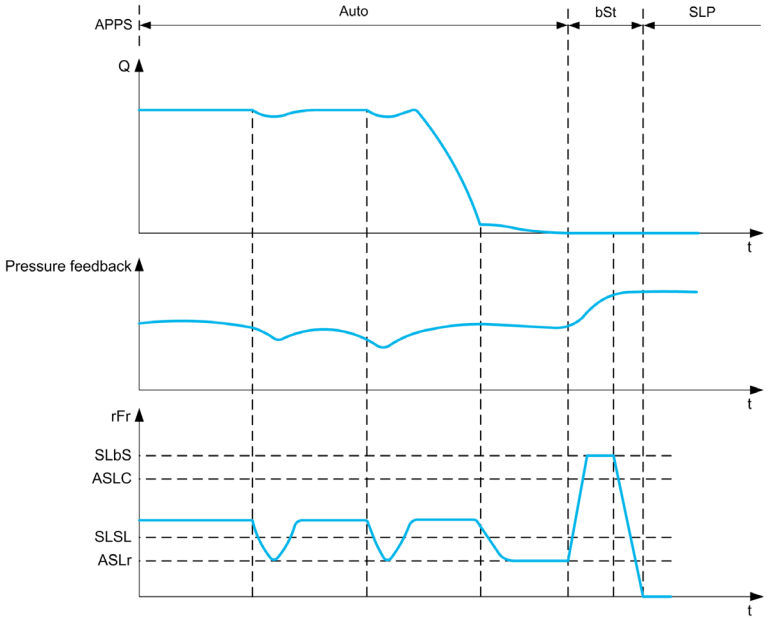
About This Menu

This function can be activated if **[Sleep Detect Mode]** SLPM is not set to **[No]** no.

This function can be activated if:

- **[Type of control]** toCt is set to **[Pressure]** PrESS and,
- **[Sleep Detect Mode]** SLPM is not set to **[No]** no.





[Sleep Mode] ASLn

Advanced sleep mode.

Setting	Code / Value	Description
[No]	nO	No **Factory setting**
[YES]	YES	Yes

[Sleep Condition] ASLC ★

Advanced sleep verifies speed condition.

This parameter can be accessed if **[Sleep Mode]** ASLn is not set to **[No]** nO.

Setting	Description
0...**[High Speed]** HSP	Setting range **Factory setting**: 0.0 Hz

[Sleep Delay] ASLd ★

Advanced sleep verifies delay.

This parameter can be accessed if **[Sleep Mode]** ASLn is not set to **[No]** nO.

Setting	Description
0...9,999 s	Setting range **Factory setting**: 20 s

[Check Sleep Ref Spd] ASLr ★

Advanced sleep verifies speed reference.

This parameter can be accessed if **[Sleep Mode]** ASLn is not set to **[No]** nO.

Setting	Description
0...**[High Speed]** HSP	Setting range **Factory setting**: 0.0 Hz

[Wake up menu] WKP - Menu

Access

[Complete settings] ➡ **[Pump functions]** ➡ **[Sleep/wakeup]** ➡ **[Wake up menu]**

About This Menu

This menu can be accessed if **[Sleep Detect Mode]** SLPM is not set to **[Not Configured]** nO.

[Wake Up Mode] WUPM ★

Wake-up mode.

Setting	Code / Value	Description
[Feedback]	FbK	Wake-up on PID feedback level **Factory setting**
[Error]	Err	Wake-up on PID error level
[Pressure]	LP	Wake-up on low-pressure condition

[Wake Up Process Level] WUPF ★

Wake-up process value level.

This parameter can be accessed if **[Wake Up Mode]** WUPM is set to **[FeedBack]** FbK.

Setting ❮❯	Description
[Min PID feedback] P1F1...**[Max PID feedback]** P1F2	Setting range **Factory setting**: 0

[Wake Up Process Error] WUPE ★

Wake-up process value error level.

This parameter can be accessed if **[Wake Up Mode]** WUPM is set to **[Error]** Err.

Setting ❮❯	Description
0...**[Max PID feedback]** P1F2	Setting range **Factory setting: 0,0 Hz**

[OutletPres Assign] PS2A ★

Outlet pressure sensor assignment.

This parameter can be accessed if **[Wake Up Mode]** WUPM is set to **[Pressure]** LP.

Setting	Code / Value	Description
[Not Configured]	nO	Not assigned **Factory setting**
[AI1]...**[AI3]**	A1I1...A1I3	Analog input AI1...AI3
[AI4]...**[AI5]**	A1I4...A1I5	Analog input AI4...AI5 if VW3A3203 I/O extension module has been inserted
[AI Virtual 1]...**[AI Virtual 3]**	A1VI1...A1VI3	Virtual analogic input 1...3
NOTE: For sensor configuration, refer to section **[Sensors assignment]** *(see page 207)*.		

[Wake up menu] WKP - Menu

Access

[Complete settings] ➡ **[Pump functions]** ➡ **[Sleep/wakeup]** ➡ **[Wake up menu]**

About This Menu

This menu can be accessed if **[Sleep Detect Mode]** SLPM is not set to **[Not Configured]** nO.

[Wake Up Press Level] WuPL ★

Wake-up pressure level.

Pressure level over which the system should leave the sleep mode.

This parameter can be accessed if **[Wake Up Mode]** WuPM is set to **[Pressure]** LP.

Setting	Description
[No] nO to 32,767	Setting range Unit: **[P sensor unit]** SuPr (for example, Pa, Bar, PSI, %) **Factory setting**: **[No]** nO

[Wake Up Delay] WuPd ★

Wake-up delay.

Setting	Description
0...3,600 s	Setting range **Factory setting**: 0 s

Section 7.11
[Pump functions] - [Feedback monitoring]

[Feedback monitoring] *F K П* - Menu

Access

[Complete settings] ➞ [Pump functions] ➞ [Feedback monitoring]

About This Menu

The function is typically used to detect cases where the installation capability is exceeded or where the installation is not operating properly:

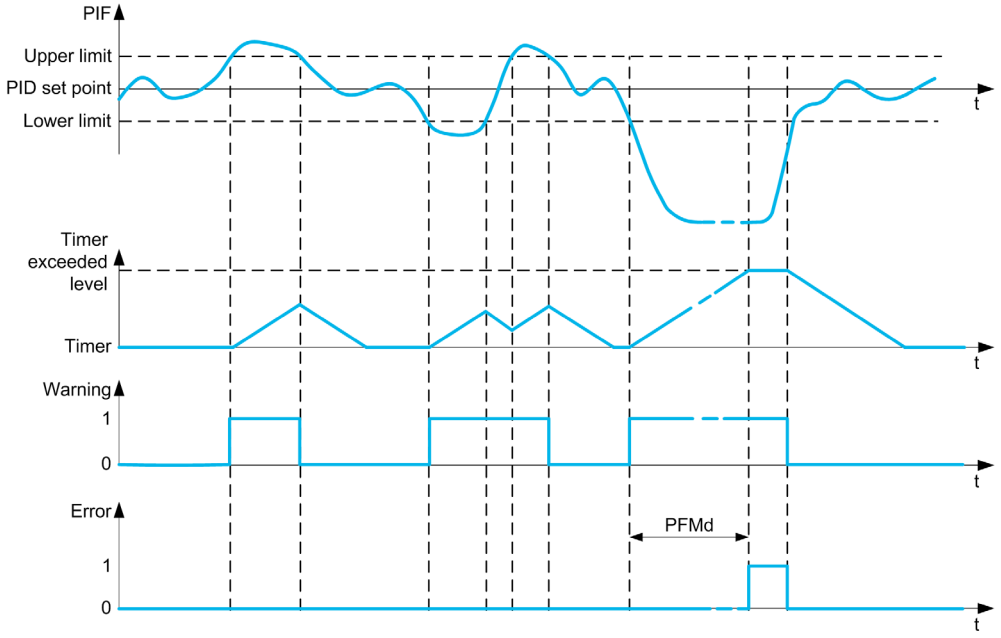
- Fire hydrant opened.
- Pump start-up with open discharge valve.
- Mechanical breakdown of pipes.
- Water leakage.

When the drive is running at high speed, this function monitors the PID feedback in order to detect if it is out of a given range around the setpoint during a configurable time.

By using a warning or a detected error, this function also indicates that:

- The capability of the installation is exceeded
- The proper control could not be ensured
- Something is wrong on the installation.

This graphic presents the PID feedback monitoring:



[PID Fdbk Monitoring] *P F П П*

PID feedback monitoring mode.

Parameter used to activate the function.

Setting	Code / Value	Description
[No]	*n o*	No **Factory setting**
[Yes]	*Y E S*	Yes

[PID Fdbk Range] PFPr ★

PID feedback monitoring range.

Range within which the PID feedback value is supposed to stay in normal situation.

This parameter can be accessed if **[PID Fdbk Monitoring]** PFPP is not set to **[No]** nO.

Setting	Description
0...100%	Setting range **Factory setting**: 3%

[PID Fdbk Error Delay] PFPd ★

PID feedback monitoring delay.

Delay to trig an error after detection of an anomaly.

This parameter can be accessed if **[PID Fdbk Monitoring]** PFPP is not set to **[No]** nO.

Setting	Description
0...3,600 s	Setting range **Factory setting**: 10 s

[PID Fdbk Error Resp] PFPb ★

PID feedback monitoring response to a detected error.

Define how the drive reacts when a feedback monitoring error occurs.

This parameter can be accessed if **[PID Fdbk Monitoring]** PFPP is not set to **[No]** nO.

Setting	Code / Value	Description
[Ignore]	nO	Detected error ignored
[Freewheel Stop]	YES	Freewheel stop
[Per STT]	StT	Stop according to **[Type of stop]** StT parameter but without an error triggered after stop
[Ramp stop]	rMP	Stop on ramp **Factory setting**

Section 7.12
[Pump functions] - [Pump characteristics]

[Pump characteristics] PCr - Menu

Access

[Complete settings] ➞ [Pump functions] ➞ [Pump characteristics]

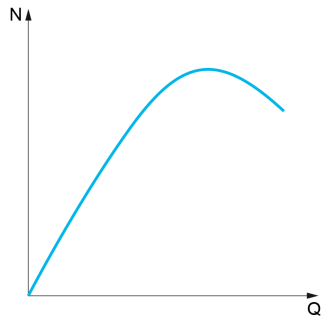
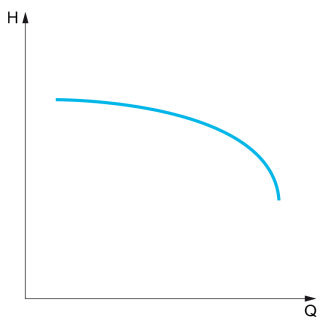
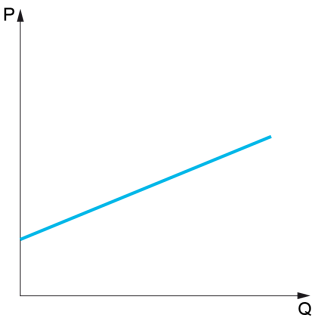
About This Menu

Centrifugal pump characteristic allows you to define the curve points for:
- Head
- Mechanical power
- Efficiency

The pump manufacture supplies these elements and it is necessary to define the performances of a pump at a given speed.

Pump data is characterized in several points and for a given speed (typically nominal speed):
- Speed (N) used for characterization: typically nominal speed.
- Flow (Q) on each characteristic point.
- Head (H) on each characteristic point.
- Power (P) on each characteristic point.

Example for simplified pump data curves:

Efficiency / Flow rate	Head / Flow rate	Power / Flow rate
		

This function allows to:
- interpolate the curves at a given speed, thus minimizing interpolation errors,
- interpolate the curves for other pump speeds using affinity motor control types.

Use-case

Several functions need **[HQ]** *H Q* or **[PQ]** *P Q* curves before being used.

Monitoring of pump working point on pump curve:

Use-case	Characterized Pump Data (vs. pump speed)	
	HQ	PQ
"Head vs Flow" curve	X	
"Power vs Flow" curve		X
"Power vs Speed" (fixed Q values)		X

Sensorless flow estimation:

Use-case	Characterized Pump Data (vs. pump speed)	
	HQ	PQ
Estimation of flow from head	X	
Estimation of flow from power		X

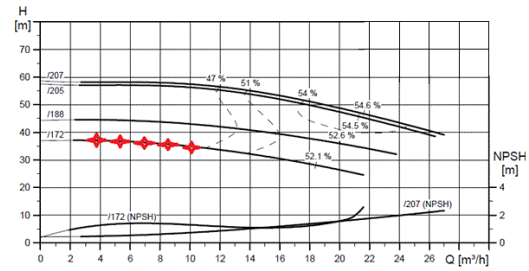
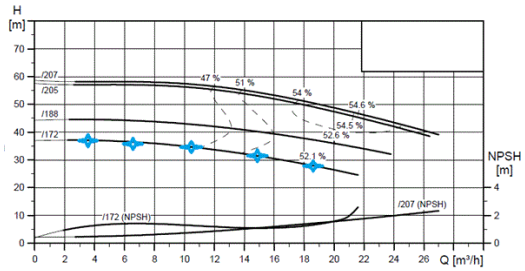
Function Activation

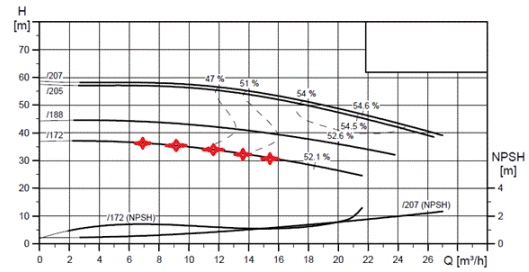
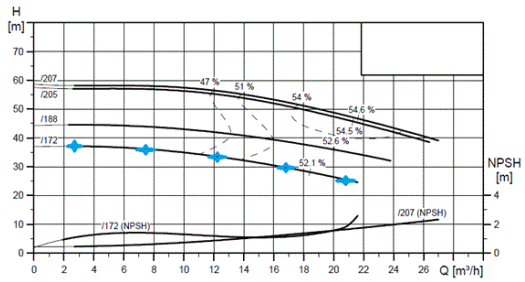
To activate this function, set **[Mode]** *P C M* to **[HQ]** *H Q* or **[PQ]** *P Q* or **[PHQ]** *P H Q*. It depends on the data you enter.

After entering all the data (curve + BEP), set **[Pump Curve Activate]** *P C A* to **[YES]** *Y E S*.

Curve Setting

The entering points should be spaced as evenly as possible over the operating range for the given speed:

Wrong points spacing	Right points spacing
	

Wrong points entering	Right points entering
	

For **[HQ]** *H Q* or **[PQ]** *P Q* curves, 5 points are advised:

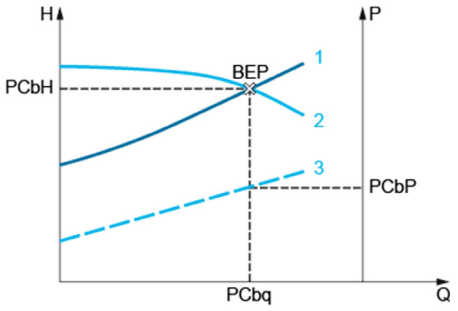
- Q1 near the low or zero flow point.
- Q3 near the BEP point.
- Q5 near the zero head point.
- Q2 equidistant between Q1 and Q3.
- Q4 equidistant between Q3 and Q5.

Configuration of Best Efficiency Point (BEP)

The configuration of BEP allows you to display this on H q, P q and E q curve:

- Pump curve flow rate at BEP: **[Flow at BEP]** P C b q.
- Pump curve head at BEP: **[Head BEP]** P C b H.
- Pump curve power at BEP: **[Power BEP]** P C b P.

This graphic represents the curve and the BEP:



1 System curve
2 Pump H q curve
3 Pump P q curve

[Mode] P C M

Pump curve mode.

Select which curve data are managed and is entered on.

Setting	Code / Value	Description
[No]	n o	Function is not activated **Factory setting**
[HQ]	H q	H, Q data is activated
[PQ]	P q	P, Q data is activated
[PHQ]	P H q	P, H, Q data is activated

[Pump Curve Activate] P C A ★

Pump curve activation.

Parameter used to reset or validate data to be used by other functions.

This parameter can be accessed if **[Mode]** P C M is not set to **[No]** n o.

Setting	Code / Value	Description
[No]	n o	Pump characteristics are deactivated and data can be modified **Factory setting**
[YES]	Y E S	Ask for pump characteristic activation. If it does not succeed, write back NO; else lock data modification

[Status] P C S ★

Pump curve status.

This parameter can be accessed if **[Mode]** P C M is not set to **[No]** n o.

Setting	Code / Value	Description
[None]	n o n E	Function is not configured **Factory setting**
[Inactive]	n A C t	Function is configured but inactive (data is unlocked)
[Active]	A C t i V E	Data is activated and can be used for other functions (data is locked)
[Failed]	F A i L E d	Data activation does not succeed (some points have not been entered or data entered does not comply with the rules)

[Pump Liquid Density] rHdC ★

Liquid density used to characterize pump.

This parameter can be accessed if **[Mode]** PCnF is not set to **[No]** nO.

Setting	Description
100...10,000 kg/m3	Setting range **Factory setting**: 1000 kg/m3

[Pump Speed] PCSP ★

Pump speed for which curves are entered.

This parameter can be accessed if **[Mode]** PCnF is not set to **[No]** nO.

Setting	Description
0...32,767 rpm	Setting range **Factory setting**: 0 rpm

[Flow at BEP] PCb9 ★

Pump curve flow rate at BEP.

This parameter can be accessed if **[Mode]** PCnF is not set to **[No]** nO.

Setting	Description
0...32,767	Setting range according to **[Flow rate unit]** SuFr **Factory setting**: 0

[Head BEP] PCbH ★

Pump curve head at BEP.

This parameter can be accessed if **[Mode]** PCnF is not set to **[No]** nO.

Setting	Description
0...32,767	Setting range according to **[P sensor unit]** SuPr **Factory setting**: 0

[Power BEP] PCbP ★

Pump curve power at BEP.

This parameter can be accessed if **[Mode]** PCnF is not set to **[No]** nO.

Setting	Description
0...32,767	Setting range according to **[Motor Standard]** bFr **Factory setting**: 0

[Flow 1] PC9 1 ★

Pump curve flow rate for point 1.

Flow rate entered at point 1 (for HQ and PQ curves).

This parameter can be accessed if **[Mode]** PCnF is not set to **[No]** nO.

Setting	Description
0...32,767	Setting range according to **[Flow rate unit]** SuFr **Factory setting**: 0

[Head 1] PCH 1★

Pump curve head for point 1.

Head entered at point 1 (for HQ curve).

This parameter ca be accessed if **[Mode]** PCM is set to **[HQ]** HQ or **[PHQ]** PHQ.

Setting	Description
0...32,767	Setting range according to **[P sensor unit]** SUPr **Factory setting**: 0

[Power 1] PCP 1★

Pump curve power for point 1.

Mechanical power entered at point 1 (for PQ curve).

This parameter ca be accessed if **[Mode]** PCM is set to **[PQ]** PQ or **[PHQ]** PHQ.

Setting	Description
0...32,767	Setting range according to **[Motor Standard]** bFr **Factory setting**: 0

[Flow 2] PCQ2★

Pump curve flow rate for point 2.

Flow rate entered at point 2 (for HQ and PQ curves).

This parameter can be accessed if **[Mode]** PCM is not set to **[No]** no.

Setting	Description
0...32,767	Setting range according to **[Flow rate unit]** SUFr **Factory setting**: 0

[Head 2] PCH2★

Pump curve head for point 2.

Head entered at point 2 (for HQ curve).

Setting	Description
0...32,767	Setting range according to **[P sensor unit]** SUPr **Factory setting**: 0

[Power 2] PCP2★

Pump curve power for point 2.

Mechanical power entered at point 2 (for PQ curve).

This parameter ca be accessed if **[Mode]** PCM is set to **[PQ]** PQ or **[PHQ]** PHQ.

Setting	Description
0...32,767	Setting range according to **[Motor Standard]** bFr **Factory setting**: 0

[Flow 3] PC93 ★

Pump curve flow rate for point 3.

Flow rate entered at point 3 (for HQ and PQ curves).

This parameter can be accessed if **[Mode]** PCM is not set to **[No]** no.

Setting	Description
0...32,767	Setting range according to **[Flow rate unit]** SuFr **Factory setting**: 0

[Head 3] PCH3 ★

Pump curve head for point 3.

Head entered at point 3 (for HQ curve).

This parameter ca be accessed if **[Mode]** PCM is set to **[HQ]** H9 or **[PHQ]** PH9.

Setting	Description
0...32,767	Setting range according to **[P sensor unit]** SuPr **Factory setting**: 0

[Power 3] PCP3 ★

Pump curve power for point 3.

Mechanical power entered at point 3 (for PQ curve).

This parameter ca be accessed if **[Mode]** PCM is set to **[PQ]** P9 or **[PHQ]** PH9.

Setting	Description
0...32,767	Setting range according to **[Motor Standard]** bFr **Factory setting**: 0

[Flow 4] PC94 ★

Pump curve flow rate for point 4.

Flow rate entered at point 4 (for HQ and PQ curves).

This parameter can be accessed if **[Mode]** PCM is not set to **[No]** no.

Setting	Description
0...32,767	Setting range according to **[Flow rate unit]** SuFr **Factory setting**: 0

[Head 4] PCH4 ★

Pump curve head for point 4.

Head entered at point 4 (for HQ curve).

This parameter ca be accessed if **[Mode]** PCM is set to **[HQ]** H9 or **[PHQ]** PH9.

Setting	Description
0...32,767	Setting range according to **[P sensor unit]** SuPr **Factory setting**: 0

[Power 4] PCP4 ★

Pump curve power for point 4.

Mechanical power entered at point 4 (for PQ curve).

This parameter ca be accessed if **[Mode]** PCM is set to **[PQ]** PQ or **[PHQ]** PHQ.

Setting ❮❯	Description
0...32,767	Setting range according to **[Motor Standard]** bFr **Factory setting**: 0

[Flow 5] PCQ5 ★

Pump curve flow rate for point 5.

Flow rate entered at point 5 (for HQ and PQ curves).

This parameter can be accessed if **[Mode]** PCM is not set to **[No]** no.

Setting ❮❯	Description
0...32,767	Setting range according to **[Flow rate unit]** SuFr **Factory setting**: 0

[Head 5] PCH5 ★

Pump curve head for point 5.

Head entered at point 5 (for HQ curve).

This parameter can be accessed if **[Mode]** PCM is set to **[HQ]** HQ or **[PHQ]** PHQ.

Setting ❮❯	Description
0...32,767	Setting range according to **[P sensor unit]** SuPr **Factory setting**: 0

[Power 5] PCP5 ★

Pump curve power for point 5.

Mechanical power entered at point 5 (for PQ curve).

This parameter can be accessed if **[Mode]** PCM is set to **[PQ]** PQ or **[PHQ]** PHQ.

Setting ❮❯	Description
0...32,767	Setting range according to **[Motor Standard]** bFr **Factory setting**: 0

[Pump Op Point Filter] WPXF ★

Pump operating point filter.

This parameter can be accessed if **[Mode]** PCM is not set to **[No]** no.

Setting ❮❯	Description
0.00 s...60.00 s	Setting range **Factory setting**: 1.00 s

Section 7.13
[Pump functions] - [Sensorless flow estimation]

[Flow estimation] 5FE - Menu

Access

[Complete settings] ➞ **[Pump functions]** ➞ **[Flow estimation]**

About This Menu

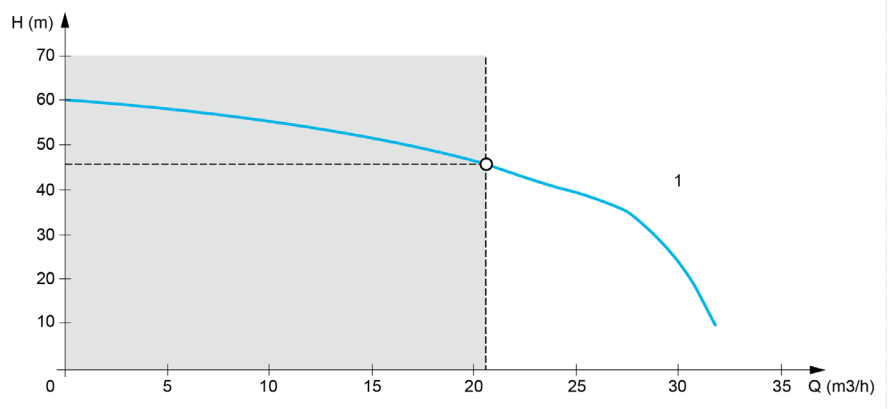
This function allows the estimation of the flow of the pump using the predefined pump curves HQ or PQ set in the pump characteristics.

The PQ curve shall be used if there is no pressure sensor on the system.

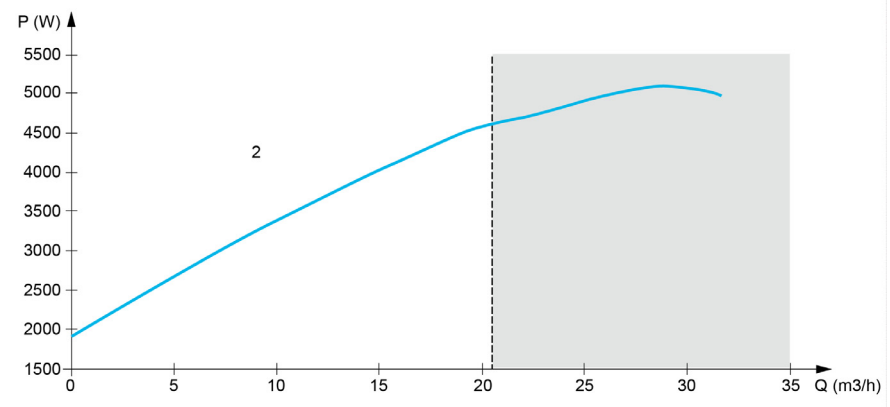
The HQ curve shall be used if inlet and/or outlet pressure feedbacks are available (or a differential value).

The curves shall be set in the pump characteristic functions before setting the sensorless flow estimation function.

The figure below shows the calculating area (1) using the HQ curve.



The figure below shows the calculating area (2) using the PQ curve.



Using the PQ curve, it is necessary to calibrate the function with:

- **[Power Dynamic Gain]** PEG to define a correction gain applied to the estimated power from the drive
- **[Power Static Offset]** PEo to define a correction offset applied to the estimated power from the drive
- **[Liquid Density]** rHo is the density of the fluid to be pumped

Using the HQ curve, it is necessary to enter the data related to the application:

- **[Liquid Density]** rHo is the density of the fluid to be pumped
- **[Head Dynamic Gain]** HEG is the correction gain, modeling the dynamical head losses between the two pressure sensors
- **[Head Static Offset]** HEo is a correction offset applied to the head provided by the pump

[Flow Estimation Mode] F E M

Flow estimation mode.

Setting	Code / Value	Description
[No]	n o	Function not activated **Factory setting**
[HQ]	H Q	H, Q data is activated
[PQ]	P Q	P, Q data is activated

[Head Dynamic Gain] H E G ★

Head dynamic gain.

This parameter can be accessed if **[Flow Estimation Mode]** F E M is set to **[HQ]** H Q.

Setting	Description
-100.0...100.0%	Setting range **Factory setting**: 0.0%

[Head Static Offset] H E o ★

Head static offset.

This parameter can be accessed if **[Flow Estimation Mode]** F E M is set to **[HQ]** H Q.

Setting	Description
-100.0...100.0%	Setting range **Factory setting**: 0.0%

[Power Dynamic Gain] P E G ★

Power dynamic gain.

This parameter can be accessed if **[Flow Estimation Mode]** F E M is set to **[PQ]** P Q.

Setting	Description
-100.0...100.0%	Setting range **Factory setting**: 0.0%

[Power Static Offset] P E o ★

Power static offset.

This parameter can be accessed if **[Flow Estimation Mode]** F E M is set to **[PQ]** P Q.

Setting	Description
-100.0...100.0%	Setting range **Factory setting**: 0.0%

[Pump Flow] F S 2 u

Pump flow sensor value.

Setting	Description
-32,767...32,767	Setting range **Factory setting**: -

[Flow Estimated] SLFu ★

Estimated flow value.

This parameter can be accessed if **[Flow Estimation Mode]** FEM is not set to **[No]** no

Setting	Description
Value in application customer unit	Setting range **Factory setting: -**

[Pump Op Point Filter] WPXF ★

Pump operating point filter.

This parameter can be accessed if **[Mode]** PCM is not set to **[No]** no.

Setting	Description
0.00 s...60.00 s	Setting range **Factory setting**: 1.00 s

Section 7.14
[Pump functions] - [dP/Head Correction]

[dP/Head Correction] dPHC - Menu

Access

[Complete settings] → **[Pump functions]** → **[dP/Head Correction]**

This menu can be accessed if:
- **[Mode]** PCM is set to **[HQ]** HQ or **[PHQ]** PHQ and,
- **[OutletPres Assign]** PS2A is not set to **[Not Configured]** no.

About This Menu

This function allows adjustment of the estimated delta pressure and the pump head using the predefined pump curves HQ or PHQ set in the pump characteristics and the outlet pressure sensor assigned.

The curves shall be set in the pump characteristics functions before setting the function

[Head Dynamic Gain] HEG ★

Head dynamic gain.

This parameter can be accessed if **[Flow Estimation Mode]** FEM is set to **[HQ]** HQ.

Setting	Description
-100.0...100.0%	Setting range **Factory setting**: 0.0%

[Head Static Offset] HEO ★

Head static offset.

This parameter can be accessed if **[Flow Estimation Mode]** FEM is set to **[HQ]** HQ.

Setting	Description
-100.0...100.0%	Setting range **Factory setting**: 0.0%

[Est. Pump dP] SLdP ★

Estimated Pump delta pressure value

This parameter can be accessed if **[OutletPres Assign]** PS2A is not set to **[Not Configured]** no.

Setting	Description
-32,767...32,767	Setting range according to **[P sensor unit]** SuPr **Factory setting: –**

[Est. Pump Head] SLHV ★

Estimated Pump head value

This parameter can be accessed if **[OutletPres Assign]** PS2A is not set to **[Not Configured]** no.

Setting	Description
-32,767...32,767	Setting range according to **[P sensor unit]** SuPr **Factory setting: –**

[Pump Op Point Filter] WPXF ★

Pump operating point filter.

This parameter can be accessed if **[Mode]** PCM is not set to **[No]** no.

Setting	Description
0.00 s...60.00 s	Setting range **Factory setting**: 1.00 s

Section 7.15
[Pump functions] - [Pump start stop]

[Pump start stop] PSt - Menu

Access

[Complete settings] ➞ **[Pump functions]** ➞ **[Pump start stop]**

About This Menu

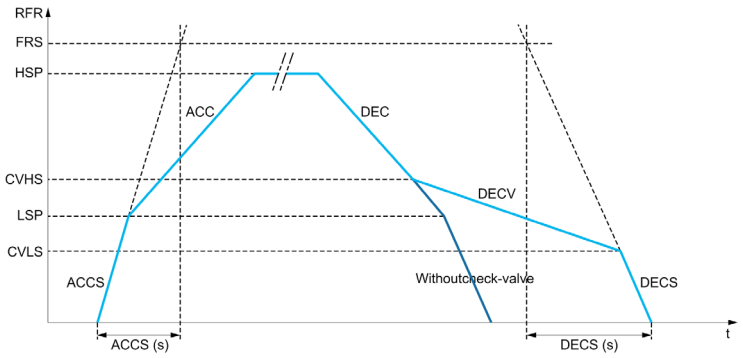
This function defines how the acceleration and deceleration are controlled during start and stop of the pump.

The pump working area is within the speed range **[Low Speed]** LSP - **[High Speed]** HSP.

The minimum speed is provided by the pump manufacturer according to the application.

Running below the minimum speed and/or starting the pump with a long acceleration ramp time has an impact on the lubrication of the seal, on the cooling of the impeller and the bearings.

A specific check-valve deceleration ramp is available to reduce any large variation of pressure that can generate an instability of the valve.



When the pump starts, the pump accelerates up to **[Low Speed]** LSP according to **[Start Accel Ramp]** ACC5.When the pump speed is above **[Low Speed]** LSP, the pump acceleration and deceleration are managed according to **[Acceleration]** ACC and **[Deceleration]** dEC if no other function is activated.

When the pump stops:

- The pump decelerates down to **[Check Valve Spd 2]** CVHS according to **[Deceleration]** dEC
- The pump decelerates from **[Check Valve Spd 2]** CVHS to **[Check Valve Spd 1]** CVLS according to **[Dec. Check Valve]** dECV
- The pump decelerates from **[Check Valve Spd 1]** CVLS to zero speed according to **[Deceleration on Stop]** dEC5

If **[Start Accel Ramp]** ACC5 = 0, the start ramp is ignored and **[Acceleration]** ACC is used to start the pump.

If **[Dec. Check Valve]** dECV = 0, the check-valve ramp is ignored and is used to decelerate up to **[Low Speed]** LSP, then **[Deceleration on Stop]** dEC5 is used (see below).

If **[Deceleration on Stop]** dEC5 = 0, the normal deceleration **[Deceleration]** dEC is used to stop the pump.

[Low Speed] LSP

Motor frequency at low speed.

Setting ❮❯	Description
0...**[High Speed]** HSP	Setting range **Factory setting**: 0 Hz

[High Speed] HSP

Motor frequency at high speed.

Setting	Description
[Low Speed] LSP...**[Max Frequency]** tFr	Setting range **Factory setting**: 50.0 Hz

[Acceleration] ACC

Time to accelerate from 0 to the **[Nominal Motor Freq]** Fr S.

To have repeatability in ramps, the value of this parameter must be set according to the possibility of the application.

Setting	Description
0.00...6,000.00 s (1)	Setting range **Factory setting**: 10.00 s
(1) Range 0.00 to 99.99 s or 0.0 to 999.9 s or 0 to 6,000 according to **[Ramp increment]** Inr	

[Deceleration] dEC

Time to decelerate from the **[Nominal Motor Freq]** Fr S to 0.

To have repeatability in ramps, the value of this parameter must be set according to the possibility of the application.

Setting	Description
0.00...6,000.00 s (1)	Setting range **Factory setting**: 10.00 s
(1) Range 0.00 to 99.99 s or 0.0 to 999.9 s or 0 to 6,000 according to **[Ramp increment]** Inr	

[Start Accel Ramp] ACC S

Acceleration on start.

Setting	Description
[No] nO...6,000 s (1)	Setting range **Factory setting**: **[No]** nO
(1) Range 0.00 to 99.99 s or 0.0 to 999.9 s or 0 to 6,000 according to **[Ramp increment]** Inr	

[Final Dec. Ramp] dEC S

Deceleration on stop.

Setting	Description
[No] nO...6,000 s (1)	Setting range **Factory setting**: **[No]** nO
(1) Range 0.00 to 99.99 s or 0.0 to 999.9 s or 0 to 6,000 according to **[Ramp increment]** Inr	

[Dec. Check Valve] dEC V

Deceleration while check valve is closing (smooth).

Setting	Description
[No] nO...6,000 s (1)	Setting range **Factory setting**: **[No]** nO
(1) Range 0.00 to 99.99 s or 0.0 to 999.9 s or 0 to 6,000 according to **[Ramp increment]** Inr	

[Check Valve Spd 1] CVLS ★

Speed level up to which check valve ramp is used.

This parameter can be accessed if **[Dec. Check Valve]** dECV is not set to 0.

Setting	Description
0...**[Check Valve Spd 2]** CVHS	Setting range **Factory setting**: 0 Hz

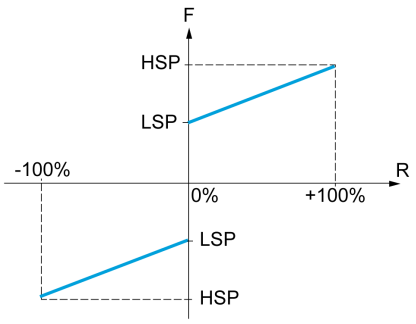
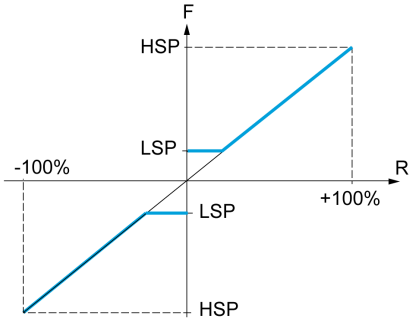
[Check Valve Spd 2] CVHS ★

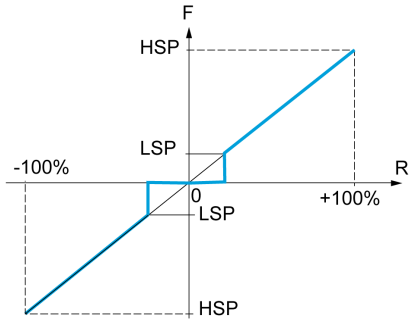
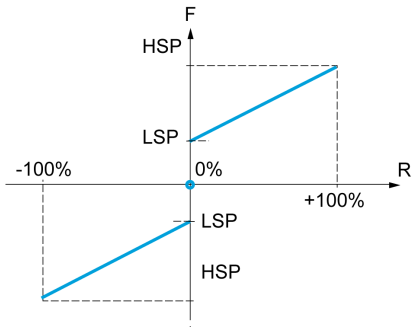
Speed level from which check valve ramp is used.

This parameter can be accessed if **[Dec. Check Valve]** dECV is not set to 0.

Setting	Description
[Check Valve Spd 1] CVLS...HSP	Setting range **Factory setting**: 0 Hz

[Ref Freq Template] bSP

Setting	Code / Value	Description
[Standard]	bSd	 **F** Frequency **R** Reference At zero reference the frequency = LSP **Factory setting**
[Deadband]	bLS	 **F** Frequency **R** Reference At reference = 0 to LSP the frequency = LSP

Setting	Code / Value	Description
[Pedestal]	bn5	 **F** Frequency **R** Reference At reference = 0 to LSP the frequency = 0
[Pedestal at 0%]	bn50	 **F** Frequency **R** Reference This operation is the same as **[Standard]** bSd, except that in the following cases at zero reference, the frequency = 0: The signal is less than **[Min nvalue]**, which is greater than 0 (example: 1 Vdc on a 2–10 Vdc input) The signal is greater than **[Min nvalue]**, which is greater than **[Max value]** (example: 11 Vdc on a 10–0 Vdc input). If the input range is configured as “bidirectional”, operation remains identical to **[Standard]** bSd. This parameter defines how the speed reference is taken into account, for analog inputs and pulse input only. In the case of the PID controller, this is the PID output reference. The limits are set by the **[Low speed]** LSP and **[High speed]** HSP parameters

Section 7.16
[Pump functions] - [Pipe fill]

What Is in This Section?

This section contains the following topics:

Topic	Page
[Pipe fill] *PF1-* Menu	349
[Pipe fill] *PF2-* Menu	351

[Pipe fill] PF ı - Menu

Access

[Complete settings] ➡ **[Pump functions]** ➡ **[Pipe fill]**

About This Menu

This menu can be accessed if **[Application Selection]** APPL is not set to **[Pump Level Control]** LEVEL or **[Generic Fan Control]** FAn.

The pipe fill function helps to prevent a water hammer effect from happening in the pipes when a system is filled in too quickly.

The function covers the horizontal pipe applications which are pressure-controlled by the PID function.

The pipe fill function can always be enabled or conditioned by a digital input (or a control bit in the I/O profile).

At the first start command in automatic mode, the system enters the pipe fill mode.

At next start commands, the drive will enter the pipe fill mode if the system pressure feedback is lower than **[Pipe Fill Pressure]** PFHP.

Each time the drive wakes-up, the drive enters the pipe fill mode if **[Pipe Fill on Wake Up]** PFWu is set to **[Yes]** YES.

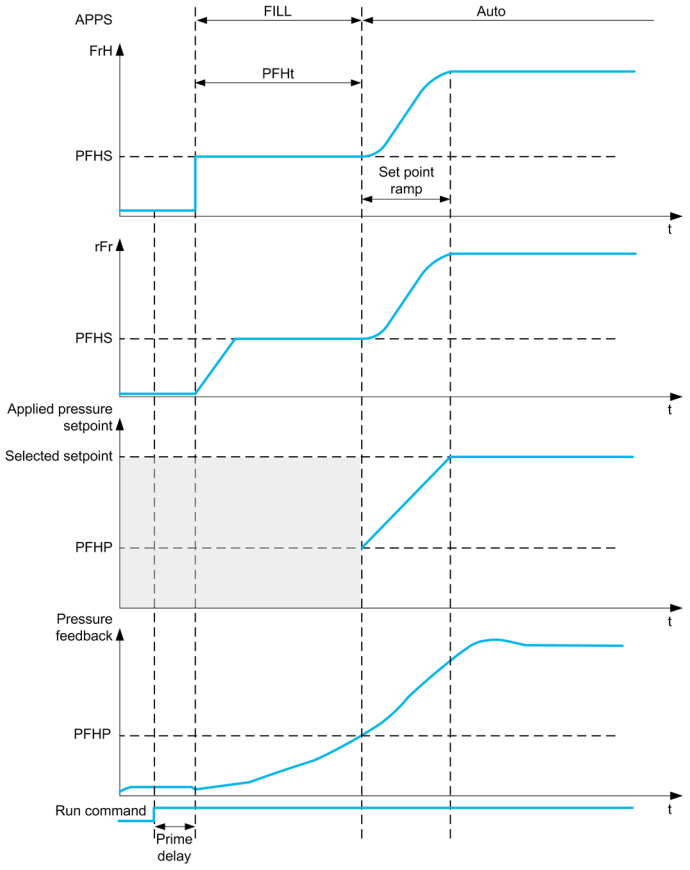
The system remains in the horizontal pipe fill at **[Pipe Fill Speed]** PFHS speed until:

- the pressure feedback becomes greater than **[Pipe Fill Pressure]** PFHP parameter, or
- the system has been in the pipe fill for longer than **[Pipe Fill Time]** PFHt time.

If one of these conditions is met, the system enters the automatic pressure regulation mode.

NOTE: If **[Pipe Fill Time]** PFHt is set to 0, the system never enter the Pipe fill mode.

To set up this function, it is recommended to set both **[Pipe Fill Speed]** PFHS and **[Pipe Fill Time]** PFHt according to the maximum quantity of liquid to fill in the empty system.



[Activation Mode] PFM

Pipe fill activation mode.

Setting	Code / Value	Description
[No]	nO	Pipes fill disabled **Factory setting**
[Feedback]	FbK	Pipe fill on PID feedback This selection can be accessed if **[Type of control]** tOCt is set to **[Pressure]** PrESS and **[PID feedback]** PIF is not set to **[Not Configured]** nO.
[Outlet Pressure]	PS2	Pipe fill on outlet pressure

[OutletPres Assign] PS2A ★

Outlet pressure sensor assignment.

This parameter can be accessed if **[Activation Mode]** PFM is set to **[Outlet Pressure]** PS2.

Setting	Code / Value	Description
[Not Configured]	nO	Not assigned **Factory setting**
[AI1]...**[AI3]**	AI1...AI3	Analog input AI1...AI3
[AI4]...**[AI5]**	AI4...AI5	Analog input AI4...AI5 if VW3A3203 I/O extension module has been inserted
[AI Virtual 1]...**[AI Virtual 3]**	AIV1...AIV3	Virtual analogic input 1...3
NOTE: For sensor configuration, refer to section **[Sensors assignment]** *(see page 207)*.		

[Pipe fill] PF ı - Menu

Access

[Complete settings] ➡ **[Pump functions]** ➡ **[Pipe fill]**

[Activation Source] PFEc ★

Pipe fill activation source.

This parameter can be accessed if **[Activation Mode]** PFM is not set to **[No]** no.

Setting	Code / Value	Description
[Not Assigned]	no	Not assigned **Factory setting**
[DI1]...**[DI6]**	L ı 1...L ı 6	Digital input DI1...DI6
[DI11]...**[DI16]**	L ı 11...L ı 16	Digital input DI11...DI16 if VW3A3203 I/O extension module has been inserted
[CD00]...**[CD10]**	Cd00...Cd10	Virtual digital input CMD.0...CMD.10 in **[I/O profile]** ıo configuration
[CD11]...**[CD15]**	Cd11...Cd15	Virtual digital input CMD.11...CMD.15 regardless of configuration
[C101]...**[C110]**	C101...C110	Virtual digital input CMD1.01...CMD1.10 with integrated Modbus Serial in **[I/O profile]** ıo configuration
[C111]...**[C115]**	C111...C115	Virtual digital input CMD1.11...CMD1.15 with integrated Modbus Serial regardless of configuration
[C201]...**[C210]**	C201...C210	Virtual digital input CMD2.01...CMD2.10 with CANopen® fieldbus module in **[I/O profile]** ıo configuration
[C211]...**[C215]**	C211...C215	Virtual digital input CMD2.11...CMD2.15 with CANopen® fieldbus module regardless of configuration
[C301]...**[C310]**	C301...C310	Virtual digital input CMD3.01...CMD3.10 with a fieldbus module in **[I/O profile]** ıo configuration
[C311]...**[C315]**	C311...C315	Virtual digital input CMD3.11...CMD3.15 with a fieldbus module regardless of configuration
[C501]...**[C510]**	C501...C510	Virtual digital input CMD5.01...CMD5.10 with integrated Ethernet Modbus TCP in **[I/O profile]** ıo configuration
[C511]...**[C515]**	C511...C515	Virtual digital input CMD5.11...CMD5.15 with integrated Ethernet Modbus TCP regardless of configuration
[DI1 (Low level)]...**[DI6 (Low level)]**	L 1L ...L 6L	Digital input DI1...DI6 used at low level
[DI52 (High level)]... **[DI59 (High level)]**	d52H...d59H	Cabinet high level digital inputs **NOTE:** This selection can be accessed on ATV660 and ATV680 equipped with Cabinet IO.
[DI52 (Low level)]... **[DI59 (Low level)]**	d52L ...d59L	Cabinet low level digital inputs **NOTE:** This selection can be accessed on ATV660 and ATV680 equipped with Cabinet IO.

[Pipe Fill on Wake Up] PFWu ★

Pipe fill cycle on wake-up.

This parameter can be accessed if:

- **[Access Level]** LAC is set to **[Expert]** EPr.
- **[Activation Mode]** PFM is not set to **[No]** no.

Setting	Code / Value	Description
[No]	no	No pipe fill cycle on wake-up
[Yes]	YES	A pipe fill cycle operates on wake-up **Factory setting**

[Pipe Fill SPeed] PFHS ★

Pipe fill speed.

This parameter can be accessed if
- **[Activation Mode]** PFM is not set to **[No]** nO, and
- **[Activation Source]** PFEC is not set to **[Not Assigned]** nO.

Setting ( )	Description
0.0...500.0 Hz	Setting range **Factory setting**: 25.0 Hz

[Pipe Fill Pressure] PFHP ★

Pipe fill pressure level.

This parameter can be accessed if
- **[Activation Mode]** PFM is not set to **[No]** nO, and
- **[Activation Source]** PFEC is not set to **[Not Assigned]** nO.

Setting ( )	Description
0...32,767	Setting range according to **[P sensor unit]** SUPr. **Factory setting**: 0

[Pipe Fill Time] PFHt ★

Pipe fill time.

This parameter can be accessed if
- **[Activation Mode]** PFM is not set to **[No]** nO, and
- **[Activation Source]** PFEC is not set to **[Not Assigned]** nO.

Setting ( )	Description
0...32,767 s	Setting range **Factory setting**: 10 s

Section 7.17
[Pump functions] - [Friction loss compensation]

What Is in This Section?

This section contains the following topics:

Topic	Page
[Friction loss comp] *F L C* **-** Menu	354
[Friction loss comp] *F L C* **-** Menu	355

[Friction loss comp] FLC - Menu

Access

[Complete settings] ➡ **[Pump functions]** ➡ **[Friction loss comp]**

This menu can be accessed if:

- **[Type of control]** tOCt is set to **[Pressure]** PrESS and,
- **[PID feedback]** PIF is not set to **[Not Configured]** nO.

About This Menu

This function monitors the system flow and displays an estimation of the head losses of the application.

This function can compensate these head losses by modifying the pressure set point. It helps to maintain a constant pressure at usage point whatever the flow demand.

This monitoring function is at station level and not a pump level only.

This function requires a flow sensor to monitor the flow of the system.

The dynamic estimation of the losses is based on values measured by the application:

- The static losses **[Static Compensation]** FLHO measured at no flow between the pumping point and the usage point.
- The dynamic losses, based on an application working point (Flow **[Flow at Point 1]** FLQ1; Head **[Comp. at Point 1]** FLH1) measured at nominal flow of the system.

If the function is set to compensation mode, the pressure set point is modified according to the estimated pressure drop.

NOTE: At low flow working point, as dynamic head losses are lower than at the nominal working point, this function reduces the pressure set point and thus allows saving electrical power.

[Mode Selection] FLCM ★

Mode selection.

Setting	Code / Value	Description
[Inactive]	nO	Inactive **Factory setting**
[Display]	MOn	Monitoring only: pressure drop is not used for compensation
[Compensation]	CoMP	Compensation: pressure drop is used to correct pressure set-point

[Inst. Flow Assign.] FSIA

Installation flow sensor assignment.

This parameter can be accessed if **[Mode Selection]** FLCM is not set to **[No]** nO.

Setting	Code / Value	Description
[Not Configured]	nO	Not assigned **Factory setting**
[AI1]...**[AI3]**	AI1...AI3	Analog input AI1...AI3
[AI4]...**[AI5]**	AI4...AI5	Analog input AI4...AI5 if VW3A3203 I/O extension module has been inserted
[AI Virtual 1]...**[AI Virtual 3]**	AIV1...AIV3	Virtual analogic input 1...3
[Di5 PulseInput Assignment]...**[Di6 PulseInput Assignment]**	PI5...PI6	Digital input DI5...DI6 used as pulse input
[Est. Pump Flow]	SLPF	Sensor less estimated flow
[Est. System Flow]	SLSF	Estimated system flow This selection is only possible if **[Pump System Archit]** MPSA is set to **[Multi Drives]** nVSd or **[Multi Masters]** nVSdr **NOTE:** To use this selection, all the pump characteristics of the system must be configured.
NOTE: For sensor configuration, refer to section **[Sensors assignment]** *(see page 207)*.		

[Friction loss comp] F L C - Menu

Access

[Complete settings] ➡ **[Pump functions]** ➡ **[Friction loss comp]**

About This Menu

The following parameters can be accessed if **[Mode Selection]** F L C M is not set to **[Inactive]** n o and **[Inst. Flow Assign.]** F S I A is set to **[Not Configured]** n o.

[Static Compensation] F L H O ★

Static compensation.

Setting	Description
0...32,767	Setting range **Factory setting**: 0

[Flow at Point 1] F L 9 I ★

Flow at point 1.

Setting	Description
0...32,767	Setting range **Factory setting**: 0

[Comp. at Point 1] F L H I ★

Compensation at point 1.

Setting	Description
0...32,767	Setting range **Factory setting**: 0

[Alpha] F L d A ★

Alpha.

This parameter can be accessed if **[Access Level]** L A C is set to **[Expert]** E P r.

Setting	Description
0.0...2.0	Setting range **Factory setting**: 2.0

[Delta Pressure] F L P d ★

Friction loss delta pressure.

Setting	Description
-32,768...32,767	Setting range **Factory setting**: _

Section 7.18
[Pump functions] - [Jockey pump]

[Jockey pump] JKP - Menu

Access

[Complete settings] ➞ **[Pump functions]** ➞ **[Jockey pump]**

About This Menu

This menu can be accessed if:
- **[Type of control]** tOCt is set to **[PRESSURE]** PrESS, and
- **[PID feedback]** P iF is assigned, and
- **[Sleep Detect Mode]** SLPM is not set to **[No]** no.

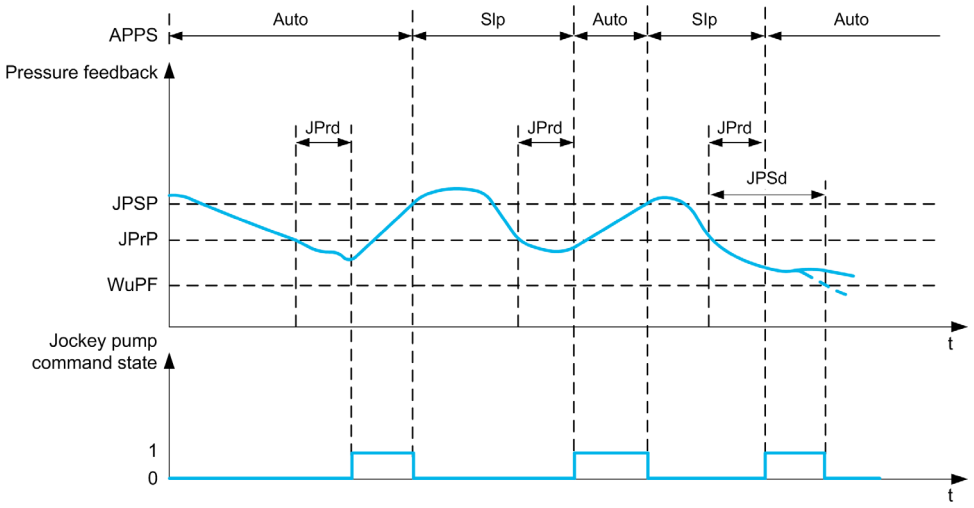
This function allows managing a jockey pump.

The jockey pump can be:
- A direct on-line pump in parallel to the variable speed pump, controlled by a digital output, or
- The variable speed pump used at fixed speed.

The jockey pump works in on/off control between two pressure set points.

The jockey pump is used during sleep period to maintain the service pressure.

From an energy efficiency point of view, it is better to start and stop a fixed speed pump than running the variable speed pump continuously at low speed.



During sleep mode, the pressure feedback is still monitored:
- If the pressure feedback falls below the jockey start pressure **[Minimum Pressure]** JPrP during a time longer than **[Delay to Start]** JPrd, the jockey pump is started;
- If the pressure feedback is over jockey stop pressure **[Maximum Pressure]** JPSP, the jockey pump is stopped

When the jockey pump is started, the pressure feedback is still monitored:
- If the pressure feedback stays below the jockey start pressure **[Maximum Pressure]** JPSP for longer than the wake-up delay **[Wake Up Delay]** JPWd, it means that the request is greater than what jockey pump can supply alone. The system wakes up and exit from sleep mode.
- If the pressure feedback falls below the wake-up pressure **[Wake UP Process level]** WuPF, the system wakes up and exit from sleep mode.

[Jockey Selection] JP

Select the jockey pump.

Setting	Code / Value	Description
[No]	nO	Not assigned **Factory setting**
[R2]...**[R3]**	r2...r3	Relay output R2...R3
[R4]...**[R6]**	r4...r6	Relay output R4...R6 if VW3A3204 relay output option module has been inserted
[DQ11 Digital Output]...**[DQ12 Digital Output]**	dO11...dO12	Digital output DQ11...DQ12 if VW3A3203 I/O extension module has been inserted
[R61]...**[R66]**	r61...r66	Relay R61 ...R66 **NOTE:** This selection can be accessed on ATV660 and ATV680 equipped with Cabinet IO

[Minimum Pressure] JPrP ★

Pressure threshold to start the jockey pump.

This parameter can be accessed if **[Jockey Selection]** JP is not set to **[No]** nO.

Setting	Description
0...**[Maximum Pressure]** JPSP	Setting range **Factory setting**: 0

[Delay to Start] JPrd ★

Delay to start the jockey pump.

This parameter can be accessed if **[Jockey Selection]** JP is not set to **[No]** nO.

Setting	Description
0...3,600 s	Setting range **Factory setting**: 0 s

[Maximum Pressure] JPSP ★

Pressure threshold to stop the jockey pump.

This parameter can be accessed if **[Jockey Selection]** JP is not set to **[No]** nO.

Setting	Description
[Minimum Pressure] JPrP...32,767	Setting range **Factory setting**: 0

[Wake Up Delay] JPWd ★

Delay to wake up the system when pressure feedback stays low.

This parameter can be accessed if **[Jockey Selection]** JP is not set to **[No]** nO.

Setting	Description
[No] nO...3,600 s	Setting range **Factory setting**: nO

[Reference Speed] JPr5 ★

Pump speed when **[VSP]** VSP is selected as jockey pump.

This parameter can be accessed if **[Jockey Selection]** JP is set to **[VSP]** VSP.

Setting	Description
[Low Speed] LSP...**[High Speed]** HSP	Setting range **Factory setting**: **[Maximum Pressure]** JP5P

Section 7.19
[Pump functions] - [Priming pump ctrl]

What Is in This Section?

This section contains the following topics:

Topic	Page
[Priming pump ctrl] *P P C* - Menu	360
[Priming pump ctrl] *P P C* - Menu	363

[Priming pump ctrl] PPC - Menu

Access

[Complete settings] ➡ **[Pump functions]** ➡ **[Priming pump ctrl]**

About This Menu

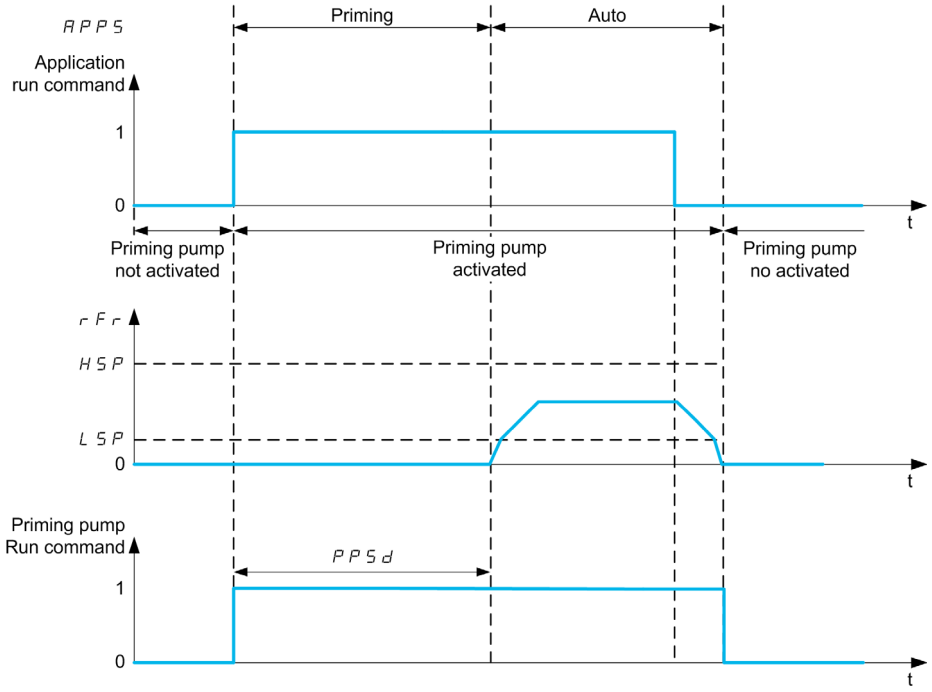
This function manages a priming pump.

The priming pump is placed at the inlet of the variable speed lead pump, controlled with a digital output.

The priming pump is used to maintain the inlet pressure to the lead pump.

This is done by running the priming pump before the main pump starts. Nevertheless, it is recommended to enable the dry-Run monitoring function.

The priming pumps keep pumping as long as the lead pump is active.



If the priming pump function is activated and the conditions to start the lead pump are present, the priming pump is started immediately while the lead pump will be started when one of the primed conditions is met :

- After the **[Priming Time]** PPSd delay
- When the digital input assigned with **[Primed Switch Assign]** PPWA is active for longer than **[Primed Condition Delay]** PPFd.
- When the analog input assigned with **[InletPres Assign]** PSIA is over **[Primed Inlet Level]** PPIL for longer than **[Primed Condition Delay]** PPFd.

If the priming pump is active, it is stopped when the lead pump is stopped, at the end of the deceleration phase.

When the system goes to the sleep mode, the priming pump is also deactivated.

When the system wakes up, the priming pump is immediately activated while the lead pump will be started when one of the primed conditions is met.

[Priming Pump Assign] PPoA

Select the priming pump.

Setting	Code / Value	Description
[No]	nO	Not assigned **Factory setting**
[R2]...**[R3]**	r2...r3	Relay output R2...R3
[R4]...**[R6]**	r4...r6	Relay output R4...R6 if VW3A3204 relay output option module has been inserted
[DQ11 Digital Output]...**[DQ12 Digital Output]**	do11...do12	Digital output DQ11...DQ12 if VW3A3203 I/O extension module has been inserted
[R61]…**[R66]**	r61...r66	Relay R61 …R66 **NOTE:** This selection can be accessed on ATV660 and ATV680 equipped with Cabinet IO

[Primed Switch Assign] PPWA ★

Primed condition: external switch assignment.

This parameter can be accessed if **[Priming Pump Assign]** PPoA is not set to **[No]** nO.

Setting	Code / Value	Description
[Not Assigned]	nO	Not assigned **Factory setting**
[DI1]...**[DI6]**	LI1...LI6	Digital input DI1...DI6
[DI11]...**[DI16]**	LI11...LI16	Digital input DI11...DI16 if VW3A3203 I/O extension module has been inserted
[DI1 (Low level)]...**[DI6 (Low level)]**	LIL...LGL	Digital input DI1...DI6 used at low level
[DI52 (High level)]… **[DI59 (High level)]**	d52H…d59H	Cabinet high level digital inputs **NOTE:** This selection can be accessed on ATV660 and ATV680 equipped with Cabinet IO.

[Primed Inlet Level] PP iL ★

Primed condition: inlet pressure detection level.

This parameter can be accessed if **[Priming Pump Assign]** PPoA is not set to **[No]** nO.

Setting	Code / Value	Description
[No]	0	Function disabled **Factory setting**
-3276.7...3276.7		Setting range according to the configuration done in the **[Define system units]** SuC - menu

[InletPres Assign] P S I A ★

Inlet pressure sensor assignment.

This parameter can be accessed if:

- **[Priming Pump Assign]** P P o A is not set to **[No]** n o.
- **[Primed Inlet Level]** P P I L is not set to **[No]** 0.

Setting	Code / Value	Description
[Not Configured]	n o	Not assigned **Factory setting**
[AI1]...**[AI3]**	A I 1...A I 3	Analog input AI1...AI3
[AI4]...**[AI5]**	A I 4...A I 5	Analog input AI4...AI5 if VW3A3203 I/O extension module has been inserted
[AI Virtual 1]...**[AI Virtual 3]**	A I V 1...A I V 3	Virtual analogic input 1...3
NOTE: For sensor configuration, refer to section **[Sensors assignment]** *(see page 207)*.		

[Priming pump ctrl] PPC - Menu

Access

[Complete settings] ➡ **[Pump functions]** ➡ **[Priming pump ctrl]**

[Primed Condition Delay] PPFd ★

Primed condition delay.

This parameter can be accessed if:

- **[Priming Pump Assign]** PPoA is not set to **[No]** no.
- **[Primed Switch Assign]** PPWA is not set to **[Not Assigned]** no.
- **[Primed Inlet Level]** PP iL is not set to **[No]** 0.

Setting	Description
0...60 s	Setting range **Factory setting**: 0 s

[Priming Time] PP5d ★

Delay before starting the lead pump.

This parameter can be accessed if **[Priming Pump Assign]** PPoA is not set to **[No]** no.

Setting	Description
0...3,600 s	Setting range **Factory setting**: 30 s

Section 7.20
[Pump functions] - [Flow limitation]

What Is in This Section?

This section contains the following topics:

Topic	Page
[Flow limitation] *F L П -* Menu	365
[Flow limitation] *F L П -* Menu	367

[Flow limitation] F L Π - Menu

Access

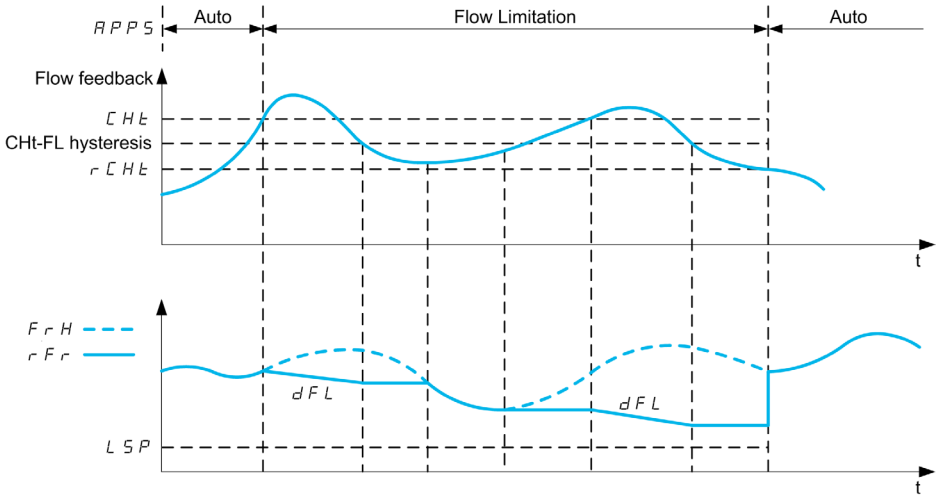
[Complete settings] ➡ [Pump functions] ➡ [Flow limitation]

About This Menu

This function allows you to limit the flow of the system to a configured value (according to local requirements, regulation, or availability of water).

This monitoring function is at station level and not a pump level only.

This function requires a flow sensor to monitor the flow of the system.



When the flow feedback is higher than the high flow **[Flow Lim Thd Active]** C H t , the pump reduces the speed set point according to the deceleration ramp **[Flow. Limit Dec.]** d F L .

When the flow feedback is lower than the high flow **[Flow Lim Thd Active]** C H t reduced by a fixed hysteresis value, the pump speed is maintained or reduced if the reference frequency decrease.

When the flow feedback is lower than the low flow **[FlowLim Thd Disable]** r C H t , the flow limitation stops and the pump speed follows the system reference frequency.

NOTE: This function does not decrease the motor speed under **[Low Speed]** L S P value.

[Flow limitation Mode] F L Π

Flow limitation mode.

Setting	Code / Value	Description
[No]	n o	No **Factory setting**
[YES]	Y E S	Yes

[Inst. Flow Assign.] F S I A ★

Installation flow sensor assignment.

This parameter can be accessed if **[Flow limitation Mode]** F L M is not set to **[No]** n o.

Setting	Code / Value	Description
[Not Configured]	n o	Not assigned **Factory setting**
[AI1]...**[AI3]**	A I 1...A I 3	Analog input AI1...AI3
[AI4]...**[AI5]**	A I 4...A I 5	Analog input AI4...AI5 if VW3A3203 I/O extension module has been inserted
[AI Virtual 1]...**[AI Virtual 3]**	A I V 1...A I V 3	Virtual analogic input 1...3
[Di5 PulseInput Assignment]...**[Di6 PulseInput Assignment]**	P I 5...P I 6	Digital input DI5...DI6 used as pulse input
[Est. Pump Flow]	S L P F	Sensor less estimated flow
[Est. System Flow]	S L S F	Estimated system flow This selection is only possible if **[Pump System Archit]** M P S A is set to **[Multi Drives]** n V S d or **[Multi Masters]** n V S d r **NOTE:** To use this selection, all the pump characteristics of the system must be configured.
NOTE: For sensor configuration, refer to section **[Sensors assignment]** *(see page 207)*.		

[Flow limitation] F L Π - Menu

Access

[Complete settings] ➡ [Pump functions] ➡ [Flow limitation]

[Flow Lim Thd Active] C H t ★

Flow limitation function threshold activation.

Setting	Description
Value in application customer unit	Setting range according to the configuration done in the **[Define system units]** S u C - menu. **Factory setting**: 0.0

[Flow.Lim.Thres.Inact.] r C H t ★

Flow limitation function threshold deactivation.

Setting	Description
Value in application customer unit	Setting range according to the configuration done in the **[Define system units]** S u C - menu. **Factory setting**: 0.0

[Flow. Limit Dec.] d F L ★

Flow limitation function deceleration time (between F r S and 0).

Setting	Description
0.01...99.99 s (1)	Setting range **Factory setting**: 5.0 s
(1) Range 0.01 to 99.99 s or 0.1 to 999.9 s or 1.0 to 6,000.0 according to **[Ramp increment]** i n r	

Section 7.21
[Pump monitoring] - [Pumpcycle monitoring]

[Pumpcycle monitoring] CSP - Menu

Access

[Complete settings] → **[Pump monitoring]** → **[Pumpcycle monitoring]**

About This Menu

The purpose of this function is to monitor the number of start sequences during a configured time window in order to prevent from an unwanted aging of the system and to detect any abnormal operation.

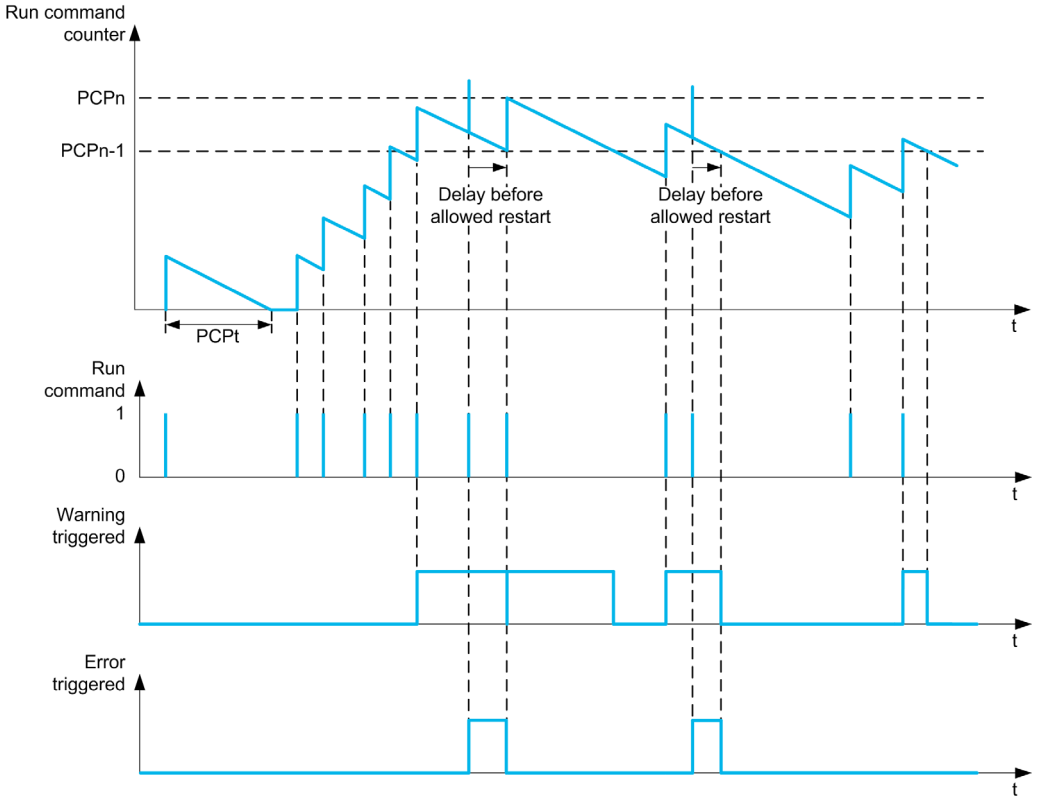
An internal counter counts the number of pump start sequences. Each time the pump is started, the counter is incremented. It is decreased by one every time window corresponding to one start.

If the counter reaches the maximum number allowed **[PumpCycle MaxStarts]** PCPn, a warning **[Pump Cycle warning]** PCPA is triggered.

If a start command occurs while the detected warning is active, an error **[PumpCycle Start Error]** PCPF is triggered. The application follows the **[PumpCycleError Resp]** PCPb defined behavior.

Restarting the pump is allowed as soon as the counter decreases under the maximum number of starts allowed, if the detected error has been cleared.

The function is based on the sliding time window in which the pump start commands are counted.



If **[PumpCycle Monitoring]** PCPM is set to **[Mode 1]** nor M, the function is activated without power Off time management.

If **[PumpCycle Monitoring]** PCPM is set to **[Mode 2]** rtC, the function is activated with power Off time management. This requires a time clock source such as the Graphic Display Terminal plugged at power On of the drive, or a Time server configured over Ethernet.

NOTE: Anti-Jam sequence is counted as one start whatever the effective number of start commands in the sequence.

[PumpCycle Monitoring] PCPM

Pumpcycle monitoring mode.

Setting	Code / Value	Description
[No]	nO	Cyclic monitoring disabled **Factory setting**
[Mode 1]	nOrM	Cyclic monitoring without power off time management
[Mode 2]	rtC	Cyclic monitoring with power off time management

[PumpCycle MaxStarts] PCPn ★

Maximum number of events to trip.

This parameter can be accessed if **[PumpCycle Monitoring]** PCPM is not set to **[No]** nO.

Setting	Description
1...99	Setting range **Factory setting**: 6

[PumpCycle Timeframe] PCPt ★

Window time.

This parameter can be accessed if PCPM is not set to **[Inactive]** nO.

Setting	Description
0...3,600 min	Setting range **Factory setting**: 60 min

[PumpCycleError Resp] PCPb ★

Pumpcycle monitoring response to a detected error.

This parameter can be accessed if PCPM is not set to **[Inactive]** nO.

Setting	Code / Value	Description
[Ignore]	nO	Detected error ignored
[Freewheel Stop]	YES	Freewheel stop
[Per STT]	Stt	Stop according to **[Type of stop]** Stt parameter but without an errortriggered after stop
[Fallback Speed]	LFF	Change to fallback speed, maintained as long as the detected error persists and the command has not been removed (1)
[Ramp stop]	rMP	Ramp stop **Factory setting**
1 Because, in this case, the detected error does not trigger a stop, it is recommended to assign a relay or logic output to its indication.		

[Fallback Speed] LFF ★

Fallback speed.

This parameter can be accessed if PCPM is not set to **[Inactive]** nO.

Setting	Description
0.0...500.0 Hz	Setting range **Factory setting**: 0.0 Hz

Section 7.22
[Pump monitoring] - [Anti jam]

[Anti-jam monit] JAM - Menu

Access

[Complete settings] → [Pump monitoring] → [Anti-jam monit]

About This Menu

In waste water applications, clogging substances reduce the efficiency of the system and may decrease the pump service life.

It may also help to clear a blocked impeller, pipe, or valve at downstream location.

The anti-Jam function allows, manually and/or automatically, to execute forward and reverse pump rotation cycles.

The frequency reference, acceleration and deceleration, in forward and in reverse direction can be adjusted by dedicated parameters. It allows you to set up the function in accordance with the application specifications. Refer to the pump datasheet while setting up the function.

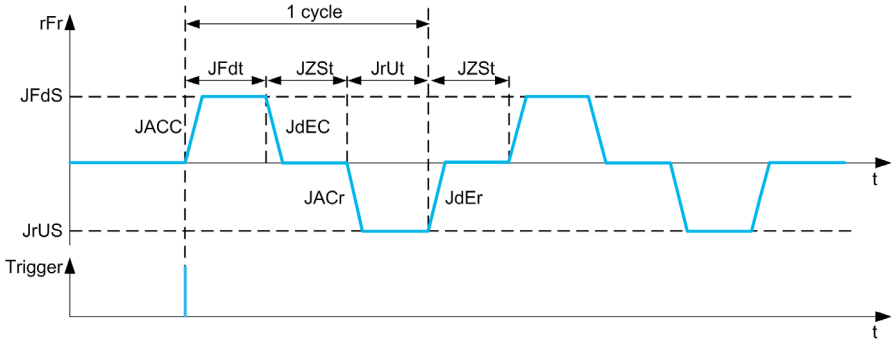
NOTE: The anti-Jam configuration overrides other configurations such as **[PID acceleration time]** ACCP or **[Start Accel Ramp]** ACC5.

NOTICE
DAMAGE TO THE PUMP This function uses forward and reverse operations. Verify that the pump and the installation are compatible with reverse operation before setting up this function. **Failure to follow these instructions can result in equipment damage.**

Anti-Jam Cycle

The anti-Jam function can be triggered:

- By an external trigger that can be assigned to a digital input (or word bit in IO profile).
- Automatically:
  - An automatic trigger can occur at each start command, or
  - Automatic triggers can occur within a predefined duration, or
  - Automatic triggers can occur depending on the motor torque threshold monitoring.



An Anti-Jam cycle is composed of:

- 1 forward action according to **[Anti-Jam Fwd Acc]** JACC, **[Anti-Jam Fwd Time]** JFdt, **[Anti-Jam Fwd Speed]** JFdS, **[Anti-Jam Fwd Dec]** JdEC,
- 1 stop action during **[Anti-Jam Stop Time]** JZSt,
- 1 reverse action according to **[Anti-Jam Rv Acc]** JACr,**[Anti-Jam Rv Time]** Jrdt, **[Anti-Jam Rv Speed]** JrVS, **[Anti-Jam Rv Dec]** JdEr,
- 1 stop action during **[Anti-Jam Stop Time]** JZSt,

An Anti-Jam sequence corresponds to a number of consecutive anti-Jam cycles: **[Anti-Jam Cycle Nb]** JnbC

NOTE: In case of an external trigger, if the command is removed before the end of the anti-Jam sequence, the anti-Jam sequence continues up to the end. In addition to the trigger, a run command is necessary during the whole anti-Jam sequence.

Anti-Jam Counting

The anti-Jam function monitors the number of sequences during a configured time window **[Anti-Jam Interval]** JAPt. It helps to detect untimely aging of the system and abnormal operation. For example, it occurs on an automatic trigger on a motor torque threshold.

An internal counter counts the number of sequences. Each time the sequence is started, the counter is incremented. It is decremented for each time window corresponding to one start.

If the counter reaches the maximum number allowed, **[Anti-Jam Max Seq]** JAPn, a warning **[Anti-Jam Warning]** JAPA and an error **[Anti Jam Error]** JAPF are triggered. The application follows the **[Anti-Jam Error Resp]** JAPb behavior defined.

[Anti-Jam Ext Trig] JEtC

Switch input selection.

Setting	Code / Value	Description
[Not Assigned]	nO	Not assigned **Factory setting**
[DI1]...**[DI6]**	LI1...LI6	Digital input DI1...DI6
[DI11]...**[DI16]**	LI11...LI16	Digital input DI11...DI16 if VW3A3203 I/O extension module has been inserted
[CD00]...**[CD10]**	CD00...CD10	Virtual digital input CMD.0...CMD.10 in **[I/O profile]** IO configuration
[CD11]...**[CD15]**	CD11...CD15	Virtual digital input CMD.11...CMD.15 regardless of configuration
[C101]...**[C110]**	C101...C110	Virtual digital input CMD1.01...CMD1.10 with integrated Modbus Serial in **[I/O profile]** IO configuration
[C111]...**[C115]**	C111...C115	Virtual digital input CMD1.11...CMD1.15 with integrated Modbus Serial regardless of configuration
[C201]...**[C210]**	C201...C210	Virtual digital input CMD2.01...CMD2.10 with CANopen® fieldbus module in **[I/O profile]** IO configuration
[C211]...**[C215]**	C211...C215	Virtual digital input CMD2.11...CMD2.15 with CANopen® fieldbus module regardless of configuration
[C301]...**[C310]**	C301...C310	Virtual digital input CMD3.01...CMD3.10 with a fieldbus module in **[I/O profile]** IO configuration
[C311]...**[C315]**	C311...C315	Virtual digital input CMD3.11...CMD3.15 with a fieldbus module regardless of configuration
[C501]...**[C510]**	C501...C510	Virtual digital input CMD5.01...CMD5.10 with integrated Ethernet Modbus TCP in **[I/O profile]** IO configuration
[C511]...**[C515]**	C511...C515	Virtual digital input CMD5.11...CMD5.15 with integrated Ethernet Modbus TCP regardless of configuration
[DI1 (Low level)]...**[DI6 (Low level)]**	LIL...L6L	Digital input DI1...DI6 used at low level
[DI52 (High level)]... **[DI59 (High level)]**	d52H...d59H	Cabinet high level digital inputs **NOTE:** This selection can be accessed on ATV660 and ATV680 equipped with Cabinet IO.
[DI52 (Low level)]... **[DI59 (Low level)]**	d52L...d59L	Cabinet low level digital inputs **NOTE:** This selection can be accessed on ATV660 and ATV680 equipped with Cabinet IO.

[Automatic Anti-Jam trigger] JAtC

Anti-Jam trigger mode.

Setting	Code / Value	Description
[No]	nO	Inactive
[Start]	StArt	An automatic trigger occurs at each start command
[Time]	tIME	Automatic triggers occur within a predefined duration
[Torque]	torqUE	Automatic triggers can occur depending on the motor torque threshold monitoring.

[Anti-Jam Trigger Time] JtCt ★

Inactive time before triggering an Anti-Jam when the pump has not been running.

This parameter can be accessed if **[Anti-Jam Auto Trig]** JAtC is set to **[Time]** tIME.

Setting	Description
0...9,999 h	Setting range **Factory setting**: 24 h

[Anti-jam Torque] JtCL ★

Level of torque to trigger.

This parameter can be accessed if **[Anti-Jam Auto Trig]** JAtC is set to **[Torque]** torQuE.

Setting	Description
10...150%	Setting range **Factory setting**: 110%

[Anti-Jam Start Delay] JtCd ★

Delay to trigger when an overtorque is detected.

This parameter can be accessed if **[Anti-Jam Auto Trig]** JAtC is set to **[Torque]** torQuE.

Setting	Description
0...3,600 s	Setting range **Factory setting**: 10 s

[Anti-Jam Fwd Acc] JACC ★

Anti-Jam acceleration in forward.

This parameter can be accessed if:

- **[Anti-Jam Ext Trig]** JEtC is not set to **[No]** no, or
- **[Anti-Jam Auto Trig]** JAtC is not set to **[No]** no.

Setting	Description
By default, with inr = 0.1: 0.00...300.00 s	Setting range **Factory setting**: 3 s
If inr = 0.01: 0.00...30.00 s	Setting range
If inr = 1: 0.00...3000.00 s	Setting range

[Anti-Jam Fwd Dec] JdEC ★

Anti-Jam deceleration in forward.

This parameter can be accessed if:

- **[Anti-Jam Ext Trig]** JEtC is not set to **[No]** no, or
- **[Anti-Jam Auto Trig]** JAtC is not set to **[No]** no.

Setting	Description
By default, with inr = 0.1: 0.00...300.00 s	Setting range **Factory setting**: 3 s
If inr = 0.01: 0.00...30.00 s	Setting range
If inr = 1: 0.00...3000.00 s	Setting range

[Anti-Jam Rv Acc] JArr ★

Anti-Jam acceleration in reverse.

This parameter can be accessed if:

- **[Anti-Jam Ext Trig]** JEtC is not set to **[No]** nO, or
- **[Anti-Jam Auto Trig]** JAtC is not set to **[No]** nO.

Setting ( )	Description
By default, with inr = 0.1: 0.00...300.00 s	Setting range **Factory setting**: 3 s
If inr = 0.01: 0.00...30.00 s	Setting range
If inr = 1: 0.00...3000.00 s	Setting range

[Anti-Jam Rv Dec] JdEr ★

Anti-Jam deceleration in reverse.

This parameter can be accessed if:

- **[Anti-Jam Ext Trig]** JEtC is not set to **[No]** nO, or
- **[Anti-Jam Auto Trig]** JAtC is not set to **[No]** nO.

Setting ( )	Description
By default, with inr = 0.1: 0.00...300.00 s	Setting range **Factory setting**: 3 s
If inr = 0.01: 0.00...30.00 s	Setting range
If inr = 1: 0.00...3000.00 s	Setting range

[Anti-Jam Fwd Speed] JFdS ★

Anti-Jam speed in forward.

This parameter can be accessed if:

- **[Anti-Jam Ext Trig]** JEtC is not set to **[No]** nO, or
- **[Anti-Jam Auto Trig]** JAtC is not set to **[No]** nO.

Setting ( )	Description
0.0...500.0 Hz	Setting range **Factory setting**: 0.0 Hz

[Anti-Jam Rv Speed] JruS ★

Anti-Jam speed in reverse.

This parameter can be accessed if:

- **[Anti-Jam Ext Trig]** JEtC is not set to **[No]** nO, or
- **[Anti-Jam Auto Trig]** JAtC is not set to **[No]** nO.

Setting ( )	Description
0.0...500.0 Hz	Setting range **Factory setting**: 0.0 Hz

[Anti-Jam Fwd Time] JFdt ★

Anti-Jam time in forward.

This parameter can be accessed if:
- **[Anti-Jam Ext Trig]** JEtC is not set to **[No]** no, or
- **[Anti-Jam Auto Trig]** JAtC is not set to **[No]** no.

Setting	Description
0...300 s	Setting range **Factory setting**: 1 s

[Anti-Jam Rv Time] Jrut ★

Anti-Jam time in reverse.

This parameter can be accessed if:
- **[Anti-Jam Ext Trig]** JEtC is not set to **[No]** no, or
- **[Anti-Jam Auto Trig]** JAtC is not set to **[No]** no.

Setting	Description
0...300 s	Setting range **Factory setting**: 1 s

[Anti-Jam Stop Time] JZSt ★

Anti-Jam time between forward and reverse.

This parameter can be accessed if:
- **[Anti-Jam Ext Trig]** JEtC is not set to **[No]** no, or
- **[Anti-Jam Auto Trig]** JAtC is not set to **[No]** no.

Setting	Description
0...300 s	Setting range **Factory setting**: 0 s

[Anti-Jam Cycle Nb] Jnbr ★

Anti-Jam cycle number.

This parameter can be accessed if:
- **[Anti-Jam Ext Trig]** JEtC is not set to **[No]** no, or
- **[Anti-Jam Auto Trig]** JAtC is not set to **[No]** no.

Setting	Description
1...100	Setting range **Factory setting**: 10

[Anti-Jam Max Seq] JAMn ★

Maximum consecutive anti-Jam sequences allowed.

This parameter can be accessed if:
- **[Anti-Jam Ext Trig]** JEtC is not set to **[No]** no, or
- **[Anti-Jam Auto Trig]** JAtC is not set to **[No]** no.

Setting	Description
1...99	Setting range **Factory setting**: 2

[Anti-Jam Interval] JAIt ★

Anti-Jam minimum time between two non-consecutive sequences.

This parameter can be accessed if:

- **[Anti-Jam Ext Trig]** JEtC is not set to **[No]** no, or
- **[Anti-Jam Auto Trig]** JAtC is not set to **[No]** no.

Setting ❮❯	Description
0...3,600 s	Setting range **Factory setting**: 60 s

[Anti-Jam Error Resp] JAIb ★

Anti-Jam monitoring function response to a detected error.

This parameter can be accessed if:

- **[Anti-Jam Ext Trig]** JEtC is not set to **[No]** no, or
- **[Anti-Jam Auto Trig]** JAtC is not set to **[No]** no.

Setting	Code / Value	Description
[Ignore]	no	Detected error ignored
[Freewheel Stop]	YES	Freewheel stop **Factory setting**
[Per STT]	Stt	Stop according to **[Type of stop]** Stt parameter but without an error triggered after stop
[Fallback Speed]	LFF	Change to fallback speed, maintained as long as the detected error persists and the run command has not been removed (1)
[Ramp stop]	rMP	Stop on ramp

1 Because, in this case, the detected error does not trigger a stop, it is recommended to assign a relay or logic output to its indication.

Section 7.23
[Pump monitoring] - [Dry run Monit]

[Dry run Monit] dYr - Menu

Access

[Complete settings] → [Pump monitoring] → [Dry run Monit]

Dry-Run Condition

A dry-run condition occurs when the pump impeller is not totally submerged. Working in dry running during a long time can cause premature wear of the pump impeller.

Dry run occurs when there is excessive air in the suction pipe:
- Because the pump is not primed, or
- Due to excessive air leak in the suction line.

This significantly may reduce the bearings and seal service life due to high temperature raise and poor lubrication.

About This Menu

This function prevents the pump from operating in dry condition.

The dry-run function monitors the flow using:
- a flow switch, or
- a set of 2 points (speed; power) for a flow estimation.

When using a flow switch, the dry-run condition occurs when the switch is at a high level.

NOTE: It is recommended to use a flow switch that is open in case of a low flow and to use a digital input active at low level (DIxL). This allows you to stop the pump in case of a broken wire of the flow switch.

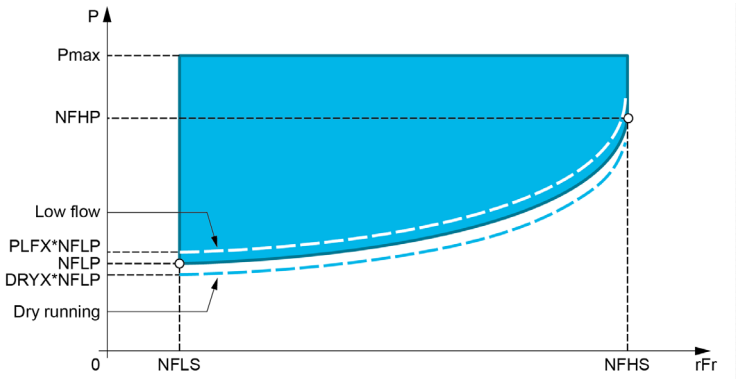
During the function setup, it is necessary to perform measurements at no-flow but with water in the system.

When using the flow estimation, the dry-run condition occurs if the estimated flow is lower than the no-flow power curve by **[Dry Run Factor]** drYX.

The no-flow power curve is defined by a set of 2 points:
- Minimum speed **[Low Speed]** nFLS ; Power at minimum speed **[Low Power]** nFLP
- Maximum speed **[High Speed]** nFHS; Power at maximum speed **[High Power]** nFHP

This no-flow power curve is also used by the pump low flow monitoring function.

NOTE: The no-flow power curve characterization shall be done after setting the motor control type.



In case of dry-run conditions, this function will:
- Trigger a warning **[Drive Running Warning]** drYA if the dry-run condition is present.
- Trigger an error **[Dry Run Error]** drYF if the dry-run condition is present for a time longer than **[DryRun Error Delay]** drYd. After the error has been triggered, even if the detected error has been cleared, it is not possible to restart the pump before the end of the **[DryRun Restart Delay]** drYr.

NOTE: The detected error is not saved in case of a drive power OFF.

[DryRun Mode] dr YN

Dry-run mode.

Setting	Code / Value	Description
[No]	nO	Not activated **Factory setting**
[Switch]	SWt	Using sensor switch
[Power]	PWr	Using the sensorless estimation

[Switch Select] dr YW ★

Dry-run switches select.

This parameter can be accessed if **[DryRun Mode]** dr YN is set to **[Switch]** SWt.

Setting	Code / Value	Description
[No]	nO	Not assigned **Factory setting**
[DI1]...[DI6]	LI1...LI6	Digital input DI1...DI6
[DI11]...[DI16]	LI11...LI16	Digital input DI11...DI16, if VW3A3203 I/O extension module has been inserted
[DI1 (Low level)]...[DI6 (Low level)]	LIL...LGL	Digital input DI1...DI6 used at low level
[DI11 (Low level)]...[DI16 (Low level)]	LI1L...LI6L	Digital input DI11...DI16 used at low level if VW3A3203 I/O extension module has been inserted

[Power Estim Value] oPrW ★

Motor mechanical power estimation

This parameter can be accessed if **[DryRun Mode]** dr YN is set to **[Power]** PWr.

Setting	Description
-327.67...327.67 kW	Setting range **Factory setting**: _

[Low Power] nFLP ★

No-flow low power.

This parameter can be accessed if **[DryRun Mode]** dr YN is set to **[Power]** PWr.

Setting ( )	Description
0.00...327.67 kW	Setting range **Factory setting**: 0.00 kW

[Low Speed] nFLS ★

No-flow low speed.

This parameter can be accessed if **[DryRun Mode]** dr YN is set to **[Power]** PWr.

Setting ( )	Description
0.0...500.0 Hz	Setting range **Factory setting**: 0.0 Hz

[High Power] nFHP ★

No-flow high power.

This parameter can be accessed if **[DryRun Mode]** drYM is set to **[Power]** PWr.

Setting	Description
0.00...327.67 kW	Setting range **Factory setting**: 0.00 kW

[High Speed] nFHS ★

No-flow high speed.

This parameter can be accessed if **[DryRun Mode]** drYM is set to **[Power]** PWr.

Setting	Description
0.0...500.0 Hz	Setting range **Factory setting**: 0.0 Hz

[Dry Run Factor] drYX ★

Dry-run factor.

This parameter can be accessed if **[DryRun Mode]** drYM is set to **[Power]** PWr.

Setting	Description
0...100%	Setting range **Factory setting**: 70%

[DryRun Error Delay] drYd ★

Dry run detected error delay.

This parameter can be accessed if **[DryRun Mode]** drYM is not set to **[No]** no.

Setting	Description
0...3,600 s	Setting range **Factory setting**: 5 s

[DryRun Restart Delay] drYr ★

Dry run detected error restart.

This parameter can be accessed if **[DryRun Mode]** drYM is not set to **[No]** no.

Setting	Description
10...3,600 s	Setting range **Factory setting**: 60 s

Section 7.24
[Pump monitoring] - [Pump low flow Monit]

What Is in This Section?

This section contains the following topics:

Topic	Page
[Pump low flow Monit] *P L F* - Menu	381
[Pump low flow Monit] *P L F* - Menu	383

[Pump low flow Monit] *P L F* - Menu

Access

[Complete settings] ➞ [Pump monitoring] ➞ [Pump low flow Monit]

About This Menu

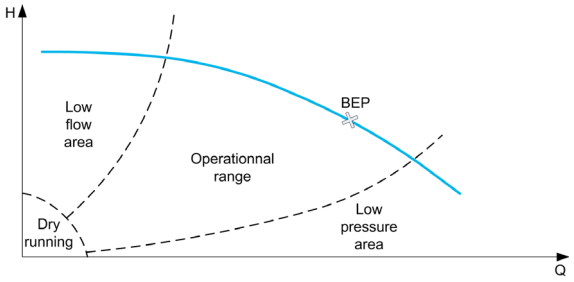
The main consequence of running in low flow pump area is an increase of pump temperature as the pump is cooled by the liquid flow.

In addition, the low flow area is not a good working area from energy efficiency point of view.

No flow or low flow could be caused by:
- The verify valve at the discharge is closed.
- Issue on the pipe at the discharge (blocked pipes, …).

This function helps to prevent the pump from being damaged by working at no or low flow.

The monitoring can be carried out with different methods using or not sensors and whether the system is mono or multi-pump.



This function helps to detect probable no or low flow situation with different methods:
- Using a flow switch that indicates directly low flow condition: this method can be used only in mono-pump system or if the flow switch is connected on protected pump.
  NOTE: It is recommended to use a flow switch that is open in case of a low flow and to use a digital input active at low level (DIxL). This allows you to stop the pump in case of a broken wire of the flow switch.
- Using a flow sensor and comparing the actual flow value to a given threshold:
  - This method can be used only in mono-pump system or if the flow sensor is connected on protected pump.
  - All data related to the selected input shall be configured according to the sensor(Type, minimum, and maximum process value, scaling, …).
- Using a flow sensor and comparing the actual flow value to "Low flow system curve" QN characteristic:
  - This method can be used only in mono-pump system or if the flow sensor is connected on protected pump.
  - All data related to the selected input shall be configured according to the sensor(Type, minimum, and maximum process value, scaling, …).
- Using Power/Speed estimation and comparing pump working point to "No Flow" Power characteristic:
  - Entering two [Speed; Power] points is required, first point in No Flow area (at Low speed point LSP), second point in high-speed area (At high-speed point HSP).
  - This method is not recommended in case of flat PQ curve.

Low flow monitoring is activated only after **[PumpLF ActivDelay]** *P L F A* after the pump has been started in order to disable the monitoring function during start operation.

Once a low flow condition is detected, a warning **[Low Flow Warning]** *L F A* is raised. Warning is automatically cleared when drive is stopped.

If the condition continues for longer than the configured **[PumpLF Error Delay]** *P L F d* delay, a detected error is raised and the drive reacts according to the configured **[PumpLF Error Resp]** *P L F b* error response. The monitoring is active even during the deceleration phase. It is recommended to set a greater delay than the complete deceleration sequence.

After error has been detected, it is maintained during **[PumpLF Restart Delay]** *P L F r* even if the warning has been reset.

NOTE: the drive restarts without delay if it is powered-off and on (restart delay is not saved). During the setup of the function, it is necessary to perform measurements at no flow but with water in the system.

[PumpLF Monitoring] PLFM

Pump low flow monitoring mode.

Setting	Code / Value	Description
[Not Configured]	nO	Not configured **Factory setting**
[Switch]	SW	Using flow switch
[Flow]	q	Low flow is detected using fixed flow threshold
[Flow vs Speed]	qn	Low flow is detected using flow vs speed
[No Flow power]	nF	Low flow is detected using no flow power characteristic

[PumpLF DI Assign] PLFW ★

Pump low flow no flow switch selection.

This parameter can be accessed if **[PumpLF Monitoring]** PLFM is set to **[Switch]** SW.

Setting	Code / Value	Description
[Not Assigned]	nO	Not assigned **Factory setting**
[DI1]...[DI6]	LI1...LI6	Digital input DI1...DI6
[DI11]...[DI16]	LI11...LI16	Digital input DI11...DI16 if VW3A3203 I/O extension module has been inserted

[Pump Flow Assign.] FS2A ★

Pump flow sensor assignment.

This parameter can be accessed if **[PumpLF Monitoring]** PLFM is set to **[Flow]** q or to **[Flow vs Speed]** qn.

Setting	Code / Value	Description
[Not Configured]	nO	Not assigned **Factory setting**
[AI1]...[AI3]	AI1...AI3	Analog input AI1...AI3
[AI4]...[AI5]	AI4...AI5	Analog input AI4...AI5 if VW3A3203 I/O extension module has been inserted
[AI Virtual 1]...[AI Virtual 3]	AIV1...AIV3	Virtual analogic input 1...3
[Di5 PulseInput Assignment]...[Di6 PulseInput Assignment]	PI5...PI6	Digital input DI5...DI6 used as pulse input
[Est. Pump Flow]	SLPF	Sensor less estimated flow
NOTE: For sensor configuration, refer to section **[Sensors assignment]** *(see page 207)*.		

[Pump low flow Monit] PLF - Menu

Access

[Complete settings] ➡ **[Pump monitoring]** ➡ **[Pump low flow Monit]**

About This Menu

During the setup of the function, it is necessary to perform measurements at no or low flow but always with water in the system.

[PumpLF Min Level] PLFL ★

Pump low flow minimum flow level.

This parameter can be accessed if **[PumpLF Monitoring]** PLFM is set to **[Flow]** Flo or **[Flow vs Speed]** FnS.

Setting	Description
0...32,767	Setting range according to **[Flow rate unit]** SUFr. **Factory setting**: 0

[Power Estim Value] oPrW ★

Motor mechanical power estimation. It can be used to set **[Low Power]** nFLP and **[High Power]** nFHP values.

This parameter can be accessed if **[PumpLF Monitoring]** PLFM is set to **[No Flow Power]** nF.

Setting	Description
According to drive rating	Setting range **Factory setting**: _

[Low Speed] nFLS ★

No flow low speed.

This parameter can be accessed if **[PumpLF Monitoring]** PLFM is set to **[No Flow Power]** nF.

Setting	Description
0.0...500.0 Hz	Setting range **Factory setting**: 0.0 Hz

[High Speed] nFHS ★

No flow high speed.

This parameter can be accessed if **[PumpLF Monitoring]** PLFM is set to **[No Flow Power]** nF.

Setting	Description
0.0...500.0 Hz	Setting range **Factory setting**: 0.0 Hz

[Low Power] nFLP ★

No flow low power.

This parameter can be accessed if **[PumpLF Monitoring]** PLFM is set to **[No Flow Power]** nF.

Setting	Description
0...32,767	Setting range **Factory setting**: 0

[High Power] nFHP ★

No flow high power.

This parameter can be accessed if **[PumpLF Monitoring]** PLFM is set to **[No Flow Power]** nF.

Setting	Description
0...32,767	Setting range **Factory setting**: 0

[PumpLF Power Factor] PLFX ★

Pump low flow power factor.

This parameter can be accessed if **[PumpLF Monitoring]** PLFM is set to **[No Flow Power]** nF.

Setting	Description
100...500%	Setting range **Factory setting**: 110%

[PumpLF ActivDelay] PLFA ★

Pump low flow monitoring activation delay after the pump has been started.

This parameter can be accessed if **[PumpLF Monitoring]** PLFM is not set to **[No]** no.

Setting	Description
0...3,600 s	Setting range **Factory setting**: 10 s

[PumpLF Error Delay] PLFd ★

Pump low flow detected error delay.

This parameter can be accessed if **[PumpLF Monitoring]** PLFM is not set to **[No]** no.

Setting	Description
0...3,600 s	Setting range **Factory setting**: 10 s

[PumpLF Error Resp] PLFb ★

Pump low flow monitoring function response to a detected error.

This parameter can be accessed if **[PumpLF Monitoring]** PLFM is not set to **[No]** no.

Setting	Code / Value	Description
[Ignore]	no	Detected error ignored
[Freewheel Stop]	YES	Freewheel stop **Factory setting**
[Per STT]	STT	Stop according to **[Type of stop]** STT parameter but without an error triggered after stop
[Fallback Speed]	LFF	Change to fallback speed, maintained as long as the detected error persists and the run command has not been removed (1)
[Ramp stop]	rMP	Stop on ramp

1 Because, in this case, the detected error does not trigger a stop, it is recommended to assign a relay or logic output to its indication.

[Fallback Speed] *L F F* ★

Fall back speed.

Setting	Description
0.0...500.0 Hz	Setting range **Factory setting**: 0.0 Hz

[PumpLF Restart Delay] *P L F r* ★

Pump low flow restart delay.

This parameter can be accessed if **[PumpLF Monitoring]** *P L F Π* is not set to **[No]** *n o*.

Setting	Description
0...3,600 s	Setting range **Factory setting**: 0 s

Section 7.25
[Pump monitoring] - [Thermal monitoring]

[Thermal monitoring] tPP - Menu

Access

[Complete settings] ➞ **[Pump monitoring]** ➞ **[Thermal monitoring]**

About This Menu

Identical to **[Thermal monitoring]** tPP - Menu *(see page 187)*.

Section 7.26
[Pump monitoring] - [Inlet pressure monitoring]

What Is in This Section?

This section contains the following topics:

Topic	Page
[Inlet pressure monitoring] *iPP-* Menu	388
[Inlet pressure monitoring] *iPP-* Menu	390

[Inlet pressure monitoring] ,PP - Menu

Access

[Complete settings] ➡ [Pump monitoring] ➡ [Inlet pressure monitoring]

About This Menu

This function helps to detect an inlet low-pressure situation.

This monitoring function is at station level and not a pump level only.

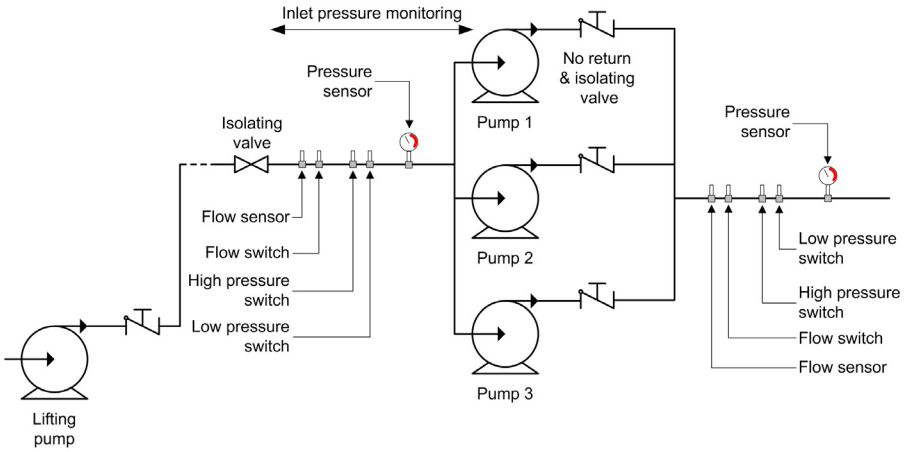
This function requires a pressure sensor to monitor the inlet pressure of the system.

In case of low inlet pressure situation, this function:

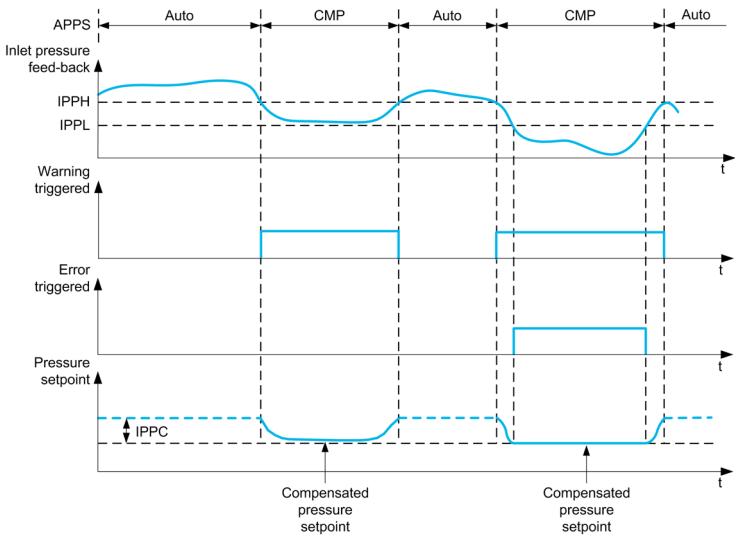
- Triggers a warning and reduces the outlet pressure set point within a predefined range in order to maintain the inlet pressure at an acceptable level. The inlet pressure compensation applies only to pressure controlled application.
- Triggers a detected error signal if, despite of this pressure set point reduction, the inlet pressure feedback is less than the minimum acceptable value configured.

The inlet pressure monitoring function can be used for mono-pump or multi-pump stations.

This is an example of a station architecture:



Monitoring Diagram



When the inlet pressure feedback is lower than **[InletPres High Thd]** ,PPH, a warning **[InletPres Warning]** ,PPA is triggered. In case of a pressure controlled application, the pressure set point is reduced according to **[InletPres Max Comp]** ,PPC.

When the inlet pressure feedback is less than **[InletPres Low Thd]** ,PPL, a detected error **[Inlet Pressure Error]** ,PPF is triggered. The application follows the **[InletPresErrorResp]** ,PFb defined behavior.

[InletPres Monitoring] ıPPM

Inlet pressure monitoring mode.

Setting	Code / Value	Description
[No]	nO	Not activated **Factory setting**
[Warning]	ALArM	Warning monitoring activated
[Compensation]	CoMP	Warning and compensation activated

[InletPres Assign] PSIA★

Inlet pressure sensor assignment.

This parameter can be accessed if **[InletPres Monitoring]** ıPPM is not set to **[No]** nO.

Setting	Code / Value	Description
[Not Configured]	nO	Not assigned **Factory setting**
[AI1]...**[AI3]**	AI1...AI3	Analog input AI1...AI3
[AI4]...**[AI5]**	AI4...AI5	Analog input AI4...AI5 if VW3A3203 I/O extension module has been inserted
[AI Virtual 1]...**[AI Virtual 3]**	AIV1...AIV3	Virtual analogic input 1...3
NOTE: For sensor configuration, refer to section **[Sensors assignment]** *(see page 207)*.		

[Inlet pressure monitoring] iPP - Menu

Access

[Complete settings] ➡ **[Pump monitoring]** ➡ **[Inlet pressure monitoring]**

[InletPres High Thd] iPPH ★

Inlet pressure monitoring high/acceptable pressure.

This parameter can be accessed if **[InletPres Monitoring]** iPPM is not set to **[No]** nO.

Setting	Description
-32,767...32,767	Setting range according to **[P sensor unit]** SuPr **Factory setting**: 0

[InletPres Low Thd] iPPL ★

Inlet pressure monitoring low/minimum pressure.

This parameter can be accessed if **[InletPres Monitoring]** iPPM is not set to **[No]** nO.

Setting	Description
-32,767...32,767	Setting range according to **[P sensor unit]** SuPr **Factory setting**: 0

[InletPres Max Comp] iPPC ★

Inlet pressure monitoring max compensation.

This parameter can be accessed if **[InletPres Monitoring]** iPPM is set to **[Compensation]** CoMP.

Setting	Description
0...32,768	Setting range according to **[P sensor unit]** SuPr **Factory setting**: 0

[InletPresError Resp] iPPb ★

Pressure monitoring function response to a detected error.

This parameter can be accessed if **[InletPres Monitoring]** iPPM is not set to **[No]** nO.

Setting	Code / Value	Description
[Ignore]	nO	Detected error ignored
[Freewheel Stop]	YES	Freewheel stop
[Per STT]	StT	Stop according to **[Type of stop]** StT parameter but without an error triggered after stop
[Ramp stop]	rMP	Stop on ramp **Factory setting**

Section 7.27
[Pump monitoring] - [Outlet pressure monitoring]

What Is in This Section?

This section contains the following topics:

Topic	Page
[Outlet pressure monitoring] ▫ P P - Menu	392
[Outlet pressure monitoring] ▫ P P - Menu	394

[Outlet pressure monitoring] oPP - Menu

Access

[Complete settings] ➡ [Pump monitoring] ➡ [Outlet pressure monitoring]

About This Menu

This function detects an outlet high and low-pressure situation.

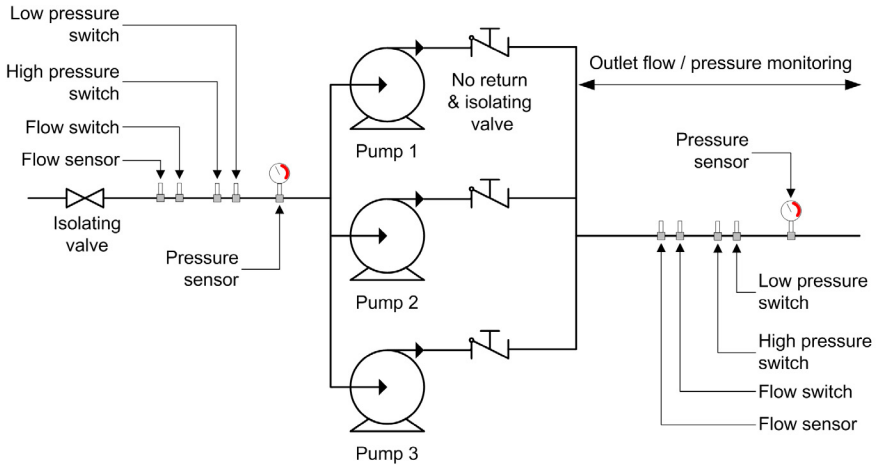
- It helps to prevent from high outlet pressure situations that can damage the hydraulic network (for example, pipe burst)
- It monitors low outlet pressure situations that can reflect damage on the hydraulic network (for example, pipe break)

This monitoring function is at the outlet station level.

The outlet pressure monitoring function requires a pressure sensor and/or a pressure switch to monitor the outlet pressure of the system.

- A high-pressure switch allows the activation of the high outlet pressure monitoring, according to the pressure switch specification.
- A pressure sensor allows the activation of both high and low outlet pressure monitoring, according to the **[OutPres Min Level]** oPPL and **[OutPres Max Level]** oPPH values.

Example of the station architecture:



The outlet pressure monitoring function monitors the outlet pressure of the system.

- When a low-Pressure condition is present, a **[Low OutPres Warning]** oPLA warning is triggered.
- When a high-Pressure condition is present, coming from the sensor, a **[High OutPres Warning]** oPHA warning is triggered.
- When a high-Pressure condition is present, coming from the switch, a **[Switch OutPres Warning]** oPSA warning is triggered.
- If the high-pressure condition remains for longer than **[OutPresError Delay]** oPPd time, a detected **[Out Pressure High]** oPHF error is triggered. The application follows the **[OutPresErrorResp]** oPPb defined behavior.
- If the low-pressure condition remains for longer than **[OutPresError Delay]** oPPd time, a detected **[Out Pressure Low]** oPLF error is triggered. The application follows the **[OutPresError Delay]** oPPd defined behavior.

NOTE:

- It is recommended to use a pressure switch that is open in case of high pressure and to use a digital input active at low level (DIxL). This allows stopping the pump in case of broken wire of the pressure switch.
- It is recommended to use a 4-20 mA pressure sensor and to enable the 4-20 mA loss function. This allows stopping the pump in case of broken wire of the pressure sensor.

[OutPres Monitoring] oPPM

Mode selection.

Setting	Code / Value	Description
[No]	nO	Inactive **Factory setting**
[Switch]	SW	Activated on switch
[Sensor]	SnSr	Activated on sensor
[Both]	bOtH	Activated on sensor and switch

[OutPres DI Assign] oPPW ★

High outlet pressure switch source.

This parameter can be accessed if:

- **[OutPres Monitoring]** oPPM is set to **[Switch]** SW, or
- **[OutPres Monitoring]** oPPM is set to **[Both]** bOtH.

Setting	Code / Value	Description
[Not Assigned]	nO	Not assigned **Factory setting**
[DI1]...[DI6]	LI1...LI6	Digital input DI1...DI6
[DI11]...[DI16]	LI11...LI16	Digital input DI11...DI16 if VW3A3203 I/O extension module has been inserted
[DI52 (High level)]... [DI59 (High level)]	dS2H...dS9H	Cabinet high level assignment digital inputs **NOTE:** This selection can be accessed on ATV660 and ATV680 equipped with Cabinet IO.

[OutletPres Assign] PS2A ★

Outlet pressure sensor assignment.

This parameter can be accessed if:

- **[OutPres Monitoring]** oPPM is set to **[Sensor]** SnSr, or
- **[OutPres Monitoring]** oPPM is set to **[Both]** bOtH.

Setting	Code / Value	Description
[Not Configured]	nO	Not assigned **Factory setting**
[AI1]...[AI3]	AI1...AI3	Analog input AI1...AI3
[AI4]...[AI5]	AI4...AI5	Analog input AI4...AI5 if VW3A3203 I/O extension module has been inserted
[AI Virtual 1]...[AI Virtual 3]	AIV1...AIV3	Virtual analogic input 1...3
NOTE: For sensor configuration, refer to section **[Sensors assignment]** *(see page 207)*.		

[Outlet pressure monitoring] oPP - Menu

Access

[Complete settings] ➡ **[Pump monitoring]** ➡ **[Outlet pressure monitoring]**

[OutPres Min Level] oPPL ★

Outlet pressure minimum level.

This parameter can be accessed if:

- **[OutPres Monitoring]** oPPM is set to **[Sensor]** SnSr, or
- **[OutPres Monitoring]** oPPM is set to **[Both]** both.

Setting	Description
0...32,767	Setting range, according to **[P sensor unit]** SuPr. **Factory setting**: 0

[OutPres Max Level] oPPH ★

Outlet pressure maximum level.

This parameter can be accessed if:

- **[OutPres Monitoring]** oPPM is set to **[Sensor]** SnSr, or
- **[OutPres Monitoring]** oPPM is set to **[Both]** both.

Setting	Description
0...32,767	Setting range, according to **[P sensor unit]** SuPr. **Factory setting**: 0

[OutPresError Delay] oPPd ★

Outlet pressure monitoring time.

This parameter can be accessed if **[OutPres Monitoring]** oPPM is not set to **[No]** no.

Setting	Description
0...3,600 s	Setting range **Factory setting**: 0 s

[OutPresError Resp] oPPb ★

Outlet pressure fault config.

This parameter can be accessed if **[OutPres Monitoring]** oPPM is not set to **[No]** no.

Setting	Code / Value	Description
[Ignore]	no	Detected error ignored
[Freewheel Stop]	YES	Freewheel stop
[Per STT]	StT	Stop according to **[Type of stop]** StT parameter but without an error triggered after stop
[Ramp stop]	rMP	Stop on ramp **Factory setting**

[Fallback Speed] LFF ★

Fall back speed.

Setting	Description
0.0...500.0 Hz	Setting range **Factory setting**: 0.0 Hz

Section 7.28
[Pump monitoring] - [High flow monitoring]

What Is in This Section?

This section contains the following topics:

Topic	Page
[High flow monitoring] *H F P* **-** Menu	396
[High flow monitoring] *H F P* **-** Menu	398

[High flow monitoring] *H F P* - Menu

Access

[Complete settings] ➡ [Pump monitoring] ➡ [High flow monitoring]

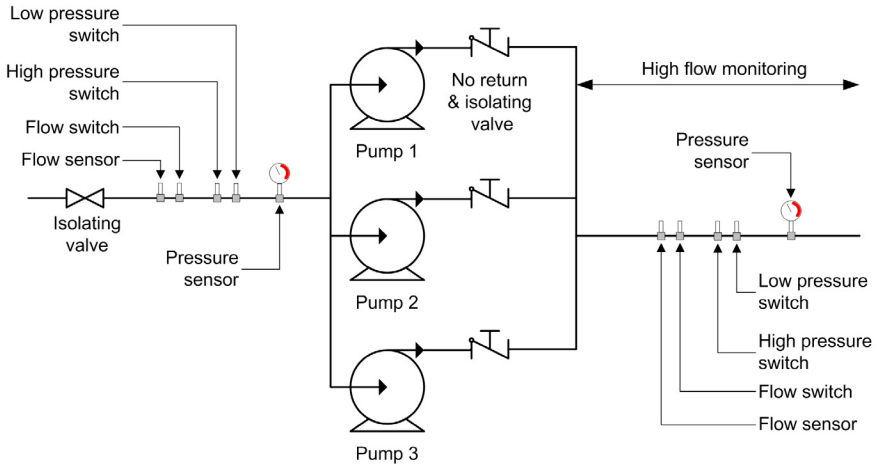
About This Menu

The high flow monitoring helps to detect abnormal outlet high flow situation:

- Works outside application flow capabilities
- Helps to detect pipe burst

This monitoring function is at outlet station level.This function requires a flow sensor to monitor the outlet flow of the system.

This is an example of a station architecture:



High flow monitoring function monitors the outlet flow of the system:

- When the outlet flow feedback is higher than **[HighFlow MaxLevel]** *H F P L* , a warning **[High Flow Warning]** *H F P A* is triggered. The application does not stop.
- If the outlet flow feedback remains higher than **[HighFlow MaxLevel]** *H F P L* for longer than **[HighFlowError Delay]** *H F P d* time, a detected error **[High Flow Error]** *H F P F* is triggered. The application follows the **[HighFlowErrorResp]** *H F P b* defined behavior.

If a high flow situation is detected in a multi-pump system, all the pumps stop.

[HighFlow Activation] *H F P A*

Mode selection.

Setting	Code / Value	Description
[No]	*n o*	Function disabled **Factory setting**
[YES]	*Y E S*	Function enabled

[Inst. Flow Assign.] F S I A ★

Installation flow sensor assignment.

This parameter can be accessed if **[HighFlow Activation]** H F P M is not set to **[No]** n o.

Setting	Code / Value	Description
[Not Configured]	n o	Not assigned **Factory setting**
[AI1]...**[AI3]**	A I 1...A I 3	Analog input AI1...AI3
[AI4]...**[AI5]**	A I 4...A I 5	Analog input AI4...AI5 if VW3A3203 I/O extension module has been inserted
[AI Virtual 1]...**[AI Virtual 3]**	A I V 1...A I V 3	Virtual analogic input 1...3
[Di5 PulseInput Assignment]...**[Di6 PulseInput Assignment]**	P I 5...P I 6	Digital input DI5...DI6 used as pulse input
[Est. Pump Flow]	S L P F	Sensor less estimated flow
[Est. System Flow]	S L S F	Estimated system flow This selection is only possible if **[Pump System Archit]** M P S A is set to **[Multi Drives]** n V S d or **[Multi Masters]** n V S d r **NOTE:** To use this selection, all the pump characteristics of the system must be configured.
NOTE: For sensor configuration, refer to section **[Sensors assignment]** *(see page 207)*.		

[High flow monitoring] HFP - Menu

Access

[Complete settings] ➡ **[Pump monitoring]** ➡ **[High flow monitoring]**

About This Menu

Following parameters can be accessed if **[HighFlow Activation]** HFPM is not set to **[No]** nO.

[HighFlow MaxLevel] HFPL ★

High flow max level.

Setting	Description
0...32,767	Setting range, according to **[Flow rate unit]** SUFr **Factory setting**: 32767

[HighFlowError Delay] HFPd ★

High flow delay.

Setting	Description
0...3,600 s	Setting range **Factory setting**: 10 s

[HighFlowError Resp] HFPb ★

High flow monitoring function response to a detected error.

Setting	Code / Value	Description
[Ignore]	nO	Detected error ignored
[Freewheel Stop]	YES	Freewheel stop
[Per STT]	Stt	Stop according to **[Type of stop]** Stt parameter but without an error triggered after stop
[Ramp stop]	rMP	Stop on ramp **Factory setting**

[Fallback Speed] LFF ★

Fall back speed.

Setting	Description
0.0...500.0 Hz	Setting range **Factory setting**: 0.0 Hz

Section 7.29
[Fan] - [PID controller]

[PID Controller] P id - Menu

Access

[Complete settings] ➞ [Fan] ➞ [PID Controller]

About This Menu

Identical to **[PID Controller]** P id - Menu *(see page 298)*.

Section 7.30
[Fan] - [Feedback monitoring]

[Feedback monitoring] *F K Π* - Menu

Access

[Complete settings] ➞ **[Fan]** ➞ **[Feedback monitoring]**

About This Menu

Identical to **[Feedback monitoring]** *F K Π* - Menu *(see page 330)*.

Section 7.31
[Fan] - [Jump frequency]

[Jump frequency] JUF - Menu

Access

[Complete settings] ➞ [Fan] ➞ [Jump frequency]

About This Menu

This function helps to prevent prolonged operation within an adjustable range around the regulated frequency.

This function can be used to help to prevent a speed, which could cause resonance, being reached. Setting the function to 0 renders it inactive.

[Skip Frequency] JPF

Jump frequency.

Setting	Description
0.0...500.0 Hz	Setting range **Factory setting**: 0.0 Hz

[Skip Frequency 2] JF2

Jump frequency 2.

Setting	Description
0.0...500.0 Hz	Setting range **Factory setting**: 0.0 Hz

[3rd Skip Frequency] JF3

Jump frequency 3.

Setting	Description
0.0...500.0 Hz	Setting range **Factory setting**: 0.0 Hz

[Skip.Freq.Hysteresis] JFH ★

Jump frequency bandwidth.

This parameter can be accessed if at least one skip frequency JPF, JF2, or JF3 is different from 0.

Skip frequency range: between JPF – JFH and JPF + JFH for example.

This adjustment is common to the 3 frequencies JPF, JF2, JF3.

Setting	Description
0.1...10.0 Hz	Setting range **Factory setting**: 1.0 Hz

Section 7.32
[Fan]

[Fan] C 5 F A - Menu

Access

[Complete settings] ➡ **[Fan]**

[Auto Fault Reset] A t r

This function can be used to automatically perform individual or multiple Fault Resets. If the cause of the error that has triggered the transition to the operating state Fault disappears while this function is active, the drive resumes normal operation. While the Fault Reset attempts are performed automatically, the output signal **[Operating state Fault]** is not available. If the attempts to perform the Fault Reset are not successful, the drive remains in the operating state Fault and the output signal **[Operating state Fault]** becomes active.

⚠ WARNING

UNANTICIPATED EQUIPMENT OPERATION

- Verify that activating this function does not result in unsafe conditions.
- Verify that the fact that the output signal "Operating state Fault" is not available while this function is active does not result in unsafe conditions.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

The drive error relay remains activated if this function is active. The speed reference and the operating direction must be maintained.

It is recommended to use 2-wire control (**[2/3-wire control]** t C C is set to **[2-Wire Control]** 2 C and **[2-wire type]** t C t is set to **[Level]** L E L).

If the restart has not taken place once the configurable time **[Fault Reset Time]** t A r has elapsed, the procedure is aborted and the drive remains locked until it is turned off and then on again.

The detected error codes, which permit this function, are listed.

Setting	Code / Value	Description
[No]	n o	Function inactive **Factory setting**
[Yes]	Y E S	Automatic restart, after locking in error state, if the detected error has disappeared and the other operating conditions permit the restart. The restart is performed by a series of automatic attempts separated by increasingly longer waiting periods: 1 s, 5 s, 10 s, then 1 minute for the following attempts.

[Catch On Fly] FLr

Catch on the fly function assignment.

Used to enable a smooth restart if the run command is maintained after the following events:

- Loss of line supply or disconnection.
- Clearance of current detected error or automatic restart.
- Freewheel stop (a delay of 5 time the **[Rotor Time Const]** trA is applied before taking the next run command into account).

The speed given by the drive resumes from the estimated speed of the motor at the time of the restart, then follows the ramp to the reference speed.

This function requires 2-wire level control.

When the function is operational, it activates at each run command, resulting in a slight delay of the current (0.5 s max).

[Catch On Fly] FLr is forced to **[No]** nO if **[Auto DC Injection]** AdC is set to **[Continuous]** Ct.

Setting	Code / Value	Description
[No]	nO	Function inactive **Factory setting**
[Yes]	YES	Function active

Section 7.33
[Generic functions] - [Speed limits]

[Speed limits] SLM - Menu

Access

[Complete settings] ➞ **[Generic functions]** ➞ **[Speed limits]**

About This Menu

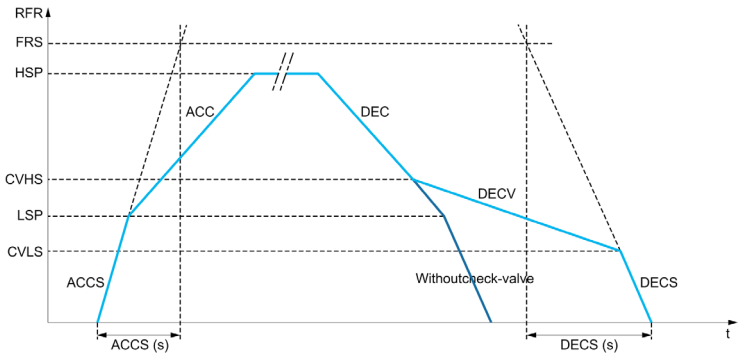
This function defines how the acceleration and deceleration are controlled during start and stop of the pump.

The pump working area is within the speed range **[Low Speed]** LSP - **[High Speed]** HSP.

The minimum speed is provided by the pump manufacturer according to the application.

Running below the minimum speed and/or starting the pump with a long acceleration ramp time has an impact on the lubrication of the seal, on the cooling of the impeller and the bearings.

A specific check-valve deceleration ramp is available to reduce any large variation of pressure that can generate an instability of the valve.



When the pump starts, the pump accelerates up to **[Low Speed]** LSP according to **[Start Accel Ramp]** ACCS.When the pump speed is above **[Low Speed]** LSP, the pump acceleration and deceleration are managed according to **[Acceleration]** ACC and **[Deceleration]** dEC if no other function is activated.

When the pump stops:

- The pump decelerates down to **[Check Valve Spd 2]** CVHS according to **[Deceleration]** dEC
- The pump decelerates from **[Check Valve Spd 2]** CVHS to **[Check Valve Spd 1]** CVLS according to **[Dec. Check Valve]** dECV
- The pump decelerates from **[Check Valve Spd 1]** CVLS to zero speed according to **[Deceleration on Stop]** dECS

If **[Start Accel Ramp]** ACCS = 0, the start ramp is ignored and **[Acceleration]** ACC is used to start the pump.

If **[Dec. Check Valve]** dECV = 0, the check-valve ramp is ignored and is used to decelerate down to **[Low Speed]** LSP, then **[Deceleration on Stop]** dECS is used (see below).

If **[Deceleration on Stop]** dECS = 0, the normal deceleration **[Deceleration]** dEC is used to stop the pump.

[Low Speed] LSP

Motor frequency at low speed.

Setting ⟲	Description
0.0...500.0 Hz	Setting range **Factory setting**: 0 Hz

[High Speed] H S P

Motor frequency at high speed.

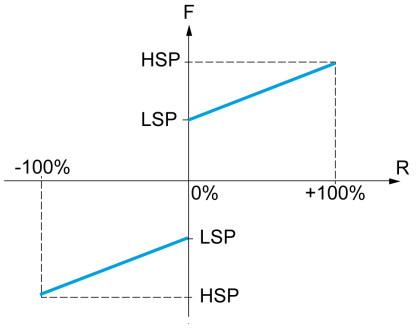
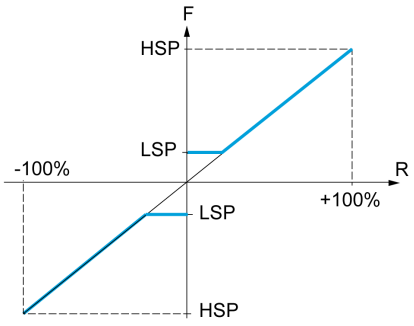
Setting	Description
0.0...500.0 Hz	Setting range **Factory setting**: 50.0 Hz

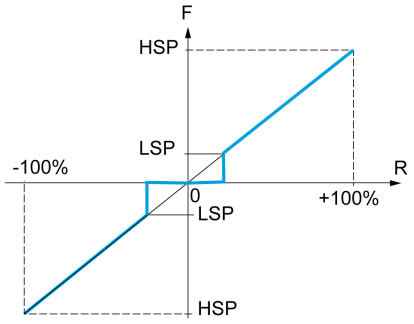
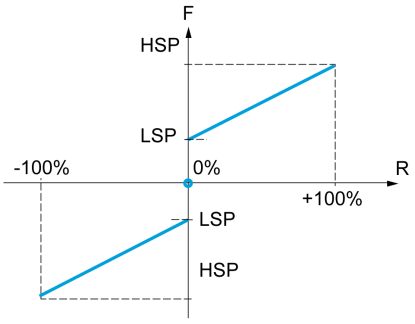
[Ref Freq Template] b S P

Low speed management (template).

This parameter defines how the speed reference is taken into account, for analog inputs and pulse input only. In the case of the PID controller, this is the PID output reference.

The limits are set by the **[Low speed]** L S P and **[High speed]** H S P parameters.

Setting	Code / Value	Description
[Standard]	b S d	 **F** Frequency **R** Reference At reference = 0, the frequency = **[Low speed]** L S P **Factory setting**
[Deadband]	b L S	 **F** Frequency **R** Reference At reference = 0 to **[Low speed]** L S P, the frequency = **[Low speed]** L S P

Setting	Code / Value	Description
[Pedestal]	bnS	 **F** Frequency **R** Reference At reference = 0 to LSP the frequency = 0
[Pedestal at 0%]	bnS0	 **F** Frequency **R** Reference This operation is the same as **[Standard]** bSd, except that in the following cases at zero reference, the frequency = 0: The signal is less than **[Min value]**, which is greater than 0 (example: 1 Vdc on a 2–10 Vdc input). The signal is greater than **[Min value]**, which is greater than **[Max value]** (example: 11 Vdc on a 10–0 Vdc input). If the input range is configured as “bidirectional”, the operation remains identical to **[Standard]** bSd. This parameter defines how the speed reference is taken into account, for analog inputs and pulse input only. In the case of the PID controller, this is the PID output reference. The limits are set by the **[Low speed]** LSP and **[High speed]** HSP parameters

Section 7.34
[Generic functions] - [Ramp]

[Ramp] r A M P - Menu

Access

[Complete settings] ➞ **[Generic functions]** ➞ **[Ramp]**

[Ramp Type] r P t

Type of ramp.

Setting	Code / Value	Description
[Linear]	L I n	Linear ramp **Factory setting**
[S-Ramp]	S	S ramp
[U-Ramp]	U	U ramp
[Customized]	C U S	Customer ramp

[Ramp increment] I n r

This parameter is valid for **[Acceleration]** A C C, **[Deceleration]** d E C, **[Acceleration 2]** A C 2 and **[Deceleration 2]** d E 2.

Setting	Code / Value	Description
[0.01]	0.0 1	Ramp up to 99.99 seconds
[0.1]	0. 1	Ramp up to 999.9 seconds **Factory setting**
[1]	1	Ramp up to 6,000 seconds

[Acceleration] A C C

Time to accelerate from 0 to the **[Nominal Motor Freq]** F r S.

To have repeatability in ramps, the value of this parameter must be set according to the possibility of the application.

Setting	Description
0.00...6,000.00 s (1)	Setting range **Factory setting**: 10.00 s
(1) Range 0.01 to 99.99 s or 0.1 to 999.9 s or 1 to 6,000 according to **[Ramp increment]** I n r	

[Deceleration] d E C

Time to decelerate from the **[Nominal Motor Freq]** F r S to 0.

To have repeatability in ramps, the value of this parameter must be set according to the possibility of the application.

Setting	Description
0.00...6,000.00 s (1)	Setting range **Factory setting**: 10.00 s
(1) Range 0.01 to 99.99 s or 0.1 to 999.9 s or 1 to 6,000 according to **[Ramp increment]** I n r	

[Begin Acc round] tA1 ★

Rounding of start of acceleration ramp as a percentage of the **[Acceleration]** ACC or **[Acceleration 2]** AC2 ramp time.

Can be set from 0 to 100%.

This parameter can be accessed if the **[Ramp type]** rPt is set to **[Customized]** CUS.

Setting	Description
0...100%	Setting range **Factory setting**: 10%

[End Acc round] tA2 ★

Rounding of end of acceleration ramp as a percentage of the **[Acceleration]** ACC or **[Acceleration 2]** AC2 ramp time.

Can be set between 0 and (100% - **[Begin Acc round]** tA1).

This parameter can be accessed if the **[Ramp type]** rPt is set to **[Customized]** CUS.

Setting	Description
0...100%	Setting range **Factory setting**: 10%

[Begin Dec round] tA3 ★

Rounding of start of deceleration ramp as a percentage of the **[Deceleration]** dEC or **[Deceleration 2]** dE2 ramp time.

Can be set from 0 to 100%.

This parameter can be accessed if the **[Ramp type]** rPt is set to **[Customized]** CUS.

Setting	Description
0...100%	Setting range **Factory setting**: 10%

[End Dec round] tA4 ★

Rounding of end of deceleration ramp as a percentage of the **[Deceleration]** dEC or **[Deceleration 2]** dE2 ramp time.

Can be set between 0 and (100% - **[Begin Dec round]** tA3).

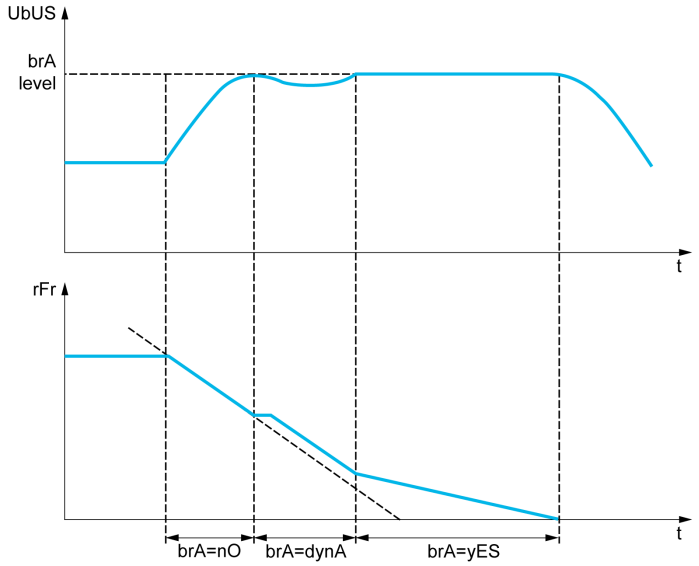
This parameter can be accessed if the **[Ramp type]** rPt is **[Customized]** CUS.

Setting	Description
0...100%	Setting range **Factory setting**: 10%

[Dec.Ramp Adapt] brA

Deceleration ramp adaptation.

NOTICE
DAMAGE TO THE MOTOR Only set this parameter to YES or nO if the connected motor is a permanent magnet synchronous motor. Other settings demagnetize permanent magnet synchronous motors. **Failure to follow these instructions can result in equipment damage.**



Activating this function automatically adapts the deceleration ramp, if this has been set at a too low value according to the inertia of the load, which can cause an overvoltage detected error.

The function is incompatible with applications requiring:

- Positioning on a ramp

Setting	Code / Value	Description
[No]	nO	Function inactive
[Yes]	YES	Function active, for applications that do not require strong deceleration **Factory setting**
[High Torque]	dYnA	Addition of a constant current flow component. The **[High torq. A]** dYnA selection appears depending on the rating of the drive and **[Motor control type]** Ctt. It enables stronger deceleration to be obtained than with **[Yes]** YES. Use comparative testing to determine your selection When **[Dec.Ramp Adapt]** brA is configured on **[High torque]** dYnA, the dynamic performances for braking are improved by the addition of a current flow component. The aim is to increase the iron loss and magnetic energy stored in the motor.

Section 7.35
[Generic functions] - [Ramp switching]

[Ramp switching] rPt - Menu

Access

[Complete settings] ➞ **[Generic functions]** ➞ **[Ramp switching]**

[Ramp 2 Thd] Frt

Ramp 2 frequency threshold

The second ramp is switched if the value of **[Ramp 2 Thd]** Frt is not 0 (0 deactivates the function) and the output frequency is greater than **[Ramp 2 Thd]** Frt.

Threshold ramp switching can be combined with **[Ramp Switch Assign]** rPS switching as follows:

DI or Bit	Frequency	Ramp
0	< Frt	ACC, dEC
0	> Frt	AC2, dE2
1	< Frt	AC2, dE2
1	> Frt	AC2, dE2

Setting ❮❯	Description
0.0...500.0 Hz	Setting range **Factory setting**: 0.0 Hz

[Ramp Switch Assign] rPS

Ramp switching.

Setting	Code / Value	Description
[Not Assigned]	nO	Not assigned **Factory setting**
[DI1]...**[DI6]**	LI1...LI6	Digital input DI1...DI6
[DI11]...**[DI16]**	LI11...LI16	Digital input DI11...DI16 if VW3A3203 I/O extension module has been inserted
[DI52 (High level)]... **[DI59 (High level)]**	d52H...d59H	Cabinet high level assignment digital inputs **NOTE:** This selection can be accessed on ATV660 and ATV680 equipped with Cabinet IO.
[CD00]...**[CD10]**	Cd00...Cd10	Virtual digital input CMD.0...CMD.10 in **[I/O profile]** IO configuration
[CD11]...**[CD15]**	Cd11...Cd15	Virtual digital input CMD.11...CMD.15 regardless of configuration
[C101]...**[C110]**	C101...C110	Virtual digital input CMD1.01...CMD1.10 with integrated Modbus Serial in **[I/O profile]** IO configuration
[C111]...**[C115]**	C111...C115	Virtual digital input CMD1.11...CMD1.15 with integrated Modbus Serial regardless of configuration
[C201]...**[C210]**	C201...C210	Virtual digital input CMD2.01...CMD2.10 with CANopen® fieldbus module in **[I/O profile]** IO configuration
[C211]...**[C215]**	C211...C215	Virtual digital input CMD2.11...CMD2.15 with CANopen® fieldbus module regardless of configuration

Setting	Code / Value	Description
[C301]...**[C310]**	C30 1...C3 10	Virtual digital input CMD3.01...CMD3.10 with a fieldbus module in **[I/O profile]** IO configuration
[C311]...**[C315]**	C3 11...C3 15	Virtual digital input CMD3.11...CMD3.15 with a fieldbus module regardless of configuration
[C501]...**[C510]**	C50 1...C5 10	Virtual digital input CMD5.01...CMD5.10 with integrated Ethernet in **[I/O profile]** IO configuration
[C511]...**[C515]**	C5 11...C5 15	Virtual digital input CMD5.11...CMD5.15 with integrated Ethernet regardless of configuration

[Acceleration 2] AC2 ★

Acceleration 2 ramp time.

Time to accelerate from 0 to the **[Nominal Motor Freq]** FrS. To have repeatability in ramps, the value of this parameter must be set according to the possibility of the application.

This parameter can be accessed if **[Ramp 2 Thd]** Frt is greater than 0 or if **[Ramp Switch Assign]** rPS is assigned.

Setting ❮❯	Description
0.0...6,000 s (1)	Setting range **Factory setting**: 5.0 s
(1) Range 0.01 to 99.99 s or 0.1 to 999.9 s or 1...6,000 s according to **[Ramp increment]** Inr.	

[Deceleration 2] dE2 ★

Time to decelerate from the **[Nominal Motor Freq]** FrS to 0. To have repeatability in ramps, the value of this parameter must be set according to the possibility of the application.

This parameter can be accessed if:

- **[Ramp 2 Thd]** Frt is greater than 0, or
- **[Ramp Switch Assign]** rPS is assigned.

Setting ❮❯	Description
0.0...6,000 s (1)	Setting range **Factory setting**: 5.0 s
(1) Range 0.01 to 99.99 s or 0.1 to 999.9 s or 1...6,000 s according to **[Ramp increment]** Inr.	

Section 7.36
[Generic functions] - [Stop configuration]

[Stop configuration] 5 t t - Menu

Access

[Complete settings] ➞ **[Generic functions]** ➞ **[Stop configuration]**

About This Menu

NOTE: This function cannot be used with some other functions.

[Type of stop] 5 t t

Normal stop mode.

Stop mode on disappearance of the run command or appearance of a stop command.

Setting	Code / Value	Description
[On Ramp]	r M P	Stop on ramp **Factory setting**
[Fast stop]	F S t	Fast stop
[Freewheel]	n S t	Freewheel stop
[DC injection]	d C I	DC injection stop. Available if **[Motor control type]** C t t is not set to **[SYN_U VC]** S Y n u.

[Freewheel stop ass.] n S t

Freewheel stop.

The stop is activated when the input or the bit changes to 0. If the input returns to state 1 and the run command is still active, the motor will only restart if **[2/3-wire control]** t C C is set to **[2-Wire Control]** 2 C and if **[2-wire type]** t C t is set to **[Level]** L E L or **[Fwd priority]** P F o. If not, a new run command must be sent.

Setting	Code / Value	Description
[Not Assigned]	n o	Not assigned **Factory setting**
[CD00]...**[CD10]**	C d 0 0...C d 1 0	Virtual digital input CMD.0...CMD.10 in **[I/O profile]** I o configuration
[CD11]...**[CD15]**	C d 1 1...C d 1 5	Virtual digital input CMD.11...CMD.15 regardless of configuration
[C101]...**[C110]**	C 1 0 1...C 1 1 0	Virtual digital input CMD1.01...CMD1.10 with integrated Modbus Serial in **[I/O profile]** I o configuration
[C111]...**[C115]**	C 1 1 1...C 1 1 5	Virtual digital input CMD1.11...CMD1.15 with integrated Modbus Serial regardless of configuration
[C201]...**[C210]**	C 2 0 1...C 2 1 0	Virtual digital input CMD2.01...CMD2.10 with CANopen® fieldbus module in **[I/O profile]** I o configuration
[C211]...**[C215]**	C 2 1 1...C 2 1 5	Virtual digital input CMD2.11...CMD2.15 with CANopen® fieldbus module regardless of configuration
[C301]...**[C310]**	C 3 0 1...C 3 1 0	Virtual digital input CMD3.01...CMD3.10 with a fieldbus module in **[I/O profile]** I o configuration
[C311]...**[C315]**	C 3 1 1...C 3 1 5	Virtual digital input CMD3.11...CMD3.15 with a fieldbus module regardless of configuration
[C501]...**[C510]**	C 5 0 1...C 5 1 0	Virtual digital input CMD5.01...CMD5.10 with integrated Ethernet Modbus TCP in **[I/O profile]** I o configuration
[C511]...**[C515]**	C 5 1 1...C 5 1 5	Virtual digital input CMD5.11...CMD5.15 with integrated Ethernet Modbus TCP regardless of configuration

Setting	Code / Value	Description
[DI1 (Low level)]...**[DI6 (Low level)]**	L I1L ... L I6L	Digital input DI1...DI6 used at low level
[DI11 (Low level)]...**[DI16 (Low level)]**	L I11L ... L I16L	Digital input DI11...DI16 used at low level if VW3A3203 I/O extension module has been inserted
[DI52 (Low level)]...**[DI59 (Low level)]**	dS2L ... dS9L	Digital input DI52…DI59 (low level) **NOTE:** This selection can be accessed on ATV660 and ATV680 equipped with Cabinet IO.

[Freewheel stop Thd] FFt ★

Freewheel stop threshold.

Speed threshold below which the motor switches to freewheel stop.

This parameter supports switching from a ramp stop or a fast stop to a freewheel stop below a low speed threshold.

This parameter can be accessed if:

- **[Type of stop]** Stt is set to **[Fast stop]** FSt or **[Ramp stop]** rMP, and
- **[Auto DC Injection]** AdC is configured.

Setting	Description
0.2...500.0 Hz	Setting range **Factory setting**: 0.2 Hz

[Fast stop ass.] FSt

Fast stop.

The stop is activated when the input changes to 0 or the bit changes to 1 (bit in **[I/O profile]** IO at 0).

If the input returns to state 1 and the run command is still active, the motor will only restart if **[2/3-wire control]** tCC is set to **[2-Wire Control]** 2C and if **[2-wire type]** tCt is set to **[Level]** LEL or **[Fwd priority]** PFO.

If not, a new run command must be sent.

NOTE: This function cannot be used with some other functions.

Setting	Code / Value	Description
[Not Assigned]	nO	Not assigned **Factory setting**
[CD00]...**[CD10]**	CD00 ... CD10	Virtual digital input CMD.0...CMD.10 in **[I/O profile]** IO configuration
[CD11]...**[CD15]**	CD11 ... CD15	Virtual digital input CMD.11...CMD.15 regardless of configuration
[C101]...**[C110]**	C101 ... C110	Virtual digital input CMD1.01...CMD1.10 with integrated Modbus Serial in **[I/O profile]** IO configuration
[C111]...**[C115]**	C111 ... C115	Virtual digital input CMD1.11...CMD1.15 with integrated Modbus Serial regardless of configuration
[C201]...**[C210]**	C201 ... C210	Virtual digital input CMD2.01...CMD2.10 with CANopen® fieldbus module in **[I/O profile]** IO configuration
[C211]...**[C215]**	C211 ... C215	Virtual digital input CMD2.11...CMD2.15 with CANopen® fieldbus module regardless of configuration
[C301]...**[C310]**	C301 ... C310	Virtual digital input CMD3.01...CMD3.10 with a fieldbus module in **[I/O profile]** IO configuration
[C311]...**[C315]**	C311 ... C315	Virtual digital input CMD3.11...CMD3.15 with a fieldbus module regardless of configuration
[C501]...**[C510]**	C501 ... C510	Virtual digital input CMD5.01...CMD5.10 with integrated Ethernet Modbus TCP in **[I/O profile]** IO configuration
[C511]...**[C515]**	C511 ... C515	Virtual digital input CMD5.11...CMD5.15 with integrated Ethernet Modbus TCP regardless of configuration

Setting	Code / Value	Description
[DI1 (Low level)]...**[DI6 (Low level)]**	L I1L ... L 6L	Digital input DI1...DI6 used at low level
[DI11 (Low level)]...**[DI16 (Low level)]**	L I1L ... L I6L	Digital input DI11...DI16 used at low level if VW3A3203 I/O extension module has been inserted
[DI52 (Low level)]...**[DI59 (Low level)]**	d52L ... d59L	Digital input DI52…DI59 (low level) **NOTE:** This selection can be accessed on ATV660 and ATV680 equipped with Cabinet IO.

[Ramp Divider] dCF ★

Fast Stop deceleration ramp reduction coefficient.

This parameter can be accessed if:

- **[Type of stop]** Stt is set to **[Fast stop]** FSt, or
- **[Fast stop assign.]** FSt is not set to **[No]** nO, or
- **[Stop type]** PrS is set to **[Fast stop]** FSt.

The ramp that is enabled (**[Deceleration]** dEC or **[Deceleration 2]** dE2) is then divided by this coefficient when stop requests are sent.

Value 0 corresponds to a minimum ramp time.

Setting	Description
0...10	Setting range **Factory setting**: 4

[DC Injection Assign] dC I

DC injection brake assignment.

⚠ WARNING

UNINTENDED MOVEMENT

- Do not use DC injection to generate holding torque when the motor is at a standstill.
- Use a holding brake to keep the motor in the standstill position.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

DC injection braking is initiated when the assigned input or bit changes to state 1.

If the input returns to state 0 and the run command is still active, the motor will only restart if **[2/3-wire control]** tCC is set to **[2-Wire Control]** 2C and if **[2-wire type]** tCt is set to **[Level]** LEL or **[Fwd priority]** PFO. If not, a new run command must be sent.

NOTE: This function cannot be used with some other functions.

Setting	Code / Value	Description
[Not Assigned]	nO	Not assigned **Factory setting**
[DI1]...**[DI6]**	L I1...L I6	Digital input DI1...DI6
[DI11]...**[DI16]**	L I11...L I16	Digital input DI11...DI16 if VW3A3203 I/O extension module has been inserted
[DI52 (High level)]… **[DI59 (High level)]**	d52H...d59H	Cabinet high level assignment digital inputs **NOTE:** This selection can be accessed on ATV660 and ATV680 equipped with Cabinet IO.
[CD00]...**[CD10]**	CD00...CD10	Virtual digital input CMD.0...CMD.10 in **[I/O profile]** IO configuration
[CD11]...**[CD15]**	CD11...CD15	Virtual digital input CMD.11...CMD.15 regardless of configuration
[C101]...**[C110]**	C101...C110	Virtual digital input CMD1.01...CMD1.10 with integrated Modbus Serial in **[I/O profile]** IO configuration

Setting	Code / Value	Description
[C111]...**[C115]**	C111...C115	Virtual digital input CMD1.11...CMD1.15 with integrated Modbus Serial regardless of configuration
[C201]...**[C210]**	C201...C210	Virtual digital input CMD2.01...CMD2.10 with CANopen® fieldbus module in **[I/O profile]** IO configuration
[C211]...**[C215]**	C211...C215	Virtual digital input CMD2.11...CMD2.15 with CANopen® fieldbus module regardless of configuration
[C301]...**[C310]**	C301...C310	Virtual digital input CMD3.01...CMD3.10 with a fieldbus module in **[I/O profile]** IO configuration
[C311]...**[C315]**	C311...C315	Virtual digital input CMD3.11...CMD3.15 with a fieldbus module regardless of configuration
[C501]...**[C510]**	C501...C510	Virtual digital input CMD5.01...CMD5.10 with integrated Ethernet in **[I/O profile]** IO configuration
[C511]...**[C515]**	C511...C515	Virtual digital input CMD5.11...CMD5.15 with integrated Ethernet regardless of configuration

[DC inject. level 1] IdC ★

DC injection current.

NOTICE
OVERHEATING AND DAMAGE TO THE MOTOR Verify that the connected motor is properly rated for the DC injection current to be applied in terms of amount and time in order to avoid overheating and damage to the motor. **Failure to follow these instructions can result in equipment damage.**

Level of DC injection braking current activated via digital input or selected as stop mode.

This parameter can be accessed if:

- **[Type of stop]** Stt is set to **[DC injection]** dC, or
- **[DC.Brake DI]** dCI is not set to **[No]** no.

Setting ❮❯	Description
0.1...1.41 In (1)	Setting range This setting is independent of the **[Auto DC Injection]** AdC - function. **Factory setting**: 0.7 In (1)
(1) In corresponds to the rated drive current indicated in the Installation Manual and on the drive nameplate.	

[DC injection time 1] tdI ★

DC injection time 1.

NOTICE
OVERHEATING AND DAMAGE TO THE MOTOR Verify that the connected motor is properly rated for the DC injection current to be applied in terms of amount and time in order to avoid overheating and damage to the motor. **Failure to follow these instructions can result in equipment damage.**

Maximum current injection time **[DC inject. level 1]** IdC. After this time, the injection current becomes **[DC inject. level 2]** IdC2.

This parameter can be accessed if:
- **[Type of stop]** Stt is set to **[DC injection]** dCI, or
- **[DC.Brake DI]** dCI is not set to **[No]** nO.

Setting ( )	Description
0.1...30 s	Setting range This setting is independent of the **[Auto DC Injection]** AdC - function. **Factory setting**: 0.5 s

[DC inject. level 2] IdC2 ★

DC injection current 2.

NOTICE
OVERHEATING AND DAMAGE TO THE MOTOR Verify that the connected motor is properly rated for the DC injection current to be applied in terms of amount and time in order to avoid overheating and damage to the motor. **Failure to follow these instructions can result in equipment damage.**

Injection current activated by digital input or selected as stop mode once period **[DC injection time 1]** tdI has elapsed.

This parameter can be accessed if:
- **[Type of stop]** Stt is set to **[DC injection]** dCI, or
- **[DC Injection Assign]** dCI is not set to **[No]** nO.

Setting ( )	Description
0.1 In (1)...**[DC inject. level 1]** IdC	Setting range This setting is independent of the **[Auto DC Injection]** AdC - function. **Factory setting**: 0.5 In (1)
(1) In corresponds to the rated drive current indicated in the Installation Manual and on the drive nameplate.	

[DC Inj Time 2] tdC ★

2nd DC injection time.

NOTICE
OVERHEATING AND DAMAGE TO THE MOTOR Verify that the connected motor is properly rated for the DC injection current to be applied in terms of amount and time in order to avoid overheating and damage to the motor. **Failure to follow these instructions can result in equipment damage.**

Maximum injection time **[DC inject. level 2]** IdC2 for injection, selected as stop mode only.

This parameter can be accessed if **[Type of stop]** Stt is set to **[DC injection]** dC1.

Setting	Description
0.1...30 s	Setting range This setting is independent of the **[Auto DC Injection]** AdC - function. **Factory setting**: 0.5 s

[SwitchOnDisable Stp] dbtd

Disable operation stop mode.

Setting	Code / Value	Description
[Freewheel Stop]	nSt	Disable drive function
[Ramp Stop]	rMP	Ramp stop then disable drive function **Factory setting**

Section 7.37
[Generic functions] - [Auto DC injection]

[Auto DC injection] AdC - Menu

Access

[Complete settings] → **[Generic functions]** → **[Auto DC injection]**

About This Menu

This menu presents the automatic injection of motor current function. This is used to hold the rotor of the motor at the end of the deceleration ramp.

[Auto DC Injection] AdC

Automatic DC Injection.

⚠ ⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

If the parameter **[Auto DC Injection]** AdC is set to **[Continuous]** Ct, DC injection is always active, even if the motor does not run.

- Verify that using this setting does not result in unsafe conditions.

Failure to follow these instructions will result in death or serious injury.

⚠ WARNING

UNINTENDED MOVEMENT

- Do not use DC injection to generate holding torque when the motor is at a standstill.
- Use a holding brake to keep the motor in the standstill position.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Automatic current injection on stopping (at the end of the ramp).

NOTE: There is an interlock between this function and **[Motor fluxing]** FLu. If **[Motor fluxing]** FLu is set to **[Continuous]** FCt, **[Auto DC Injection]** AdC must be **[No]** no.

[Auto DC Injection] AdC is forced to **[No]** no when **[Brake assignment]** bLC is not set to **[No]** no. This parameter gives rise to the injection of current even if a run command has not been sent.

Setting	Code / Value	Description
[No]	no	No injection
[Yes]	YES	Adjustable injection time **Factory setting**
[Continuous]	Ct	Continuous standstill injection

[Auto DC inj Level 1] SdC 1 ★

Auto DC injection level 1.

NOTICE
OVERHEATING AND DAMAGE TO THE MOTOR Verify that the connected motor is properly rated for the DC injection current to be applied in terms of amount and time in order to avoid overheating and damage to the motor. **Failure to follow these instructions can result in equipment damage.**

Level of standstill DC injection current **[Auto DC Injection]** AdC is not **[No]** nO.

Setting	Description
0...1.1 In (1)	Setting range **Factory setting**: 0.7 In (1)
(1) In corresponds to the rated drive current indicated in the Installation Manual and on the drive nameplate.	

[Auto DC Inj Time 1] tdC 1 ★

Auto DC injection time 1.

NOTICE
OVERHEATING AND DAMAGE TO THE MOTOR Verify that the connected motor is properly rated for the DC injection current to be applied in terms of amount and time in order to avoid overheating and damage to the motor. **Failure to follow these instructions can result in equipment damage.**

This parameter can be accessed if **[Auto DC Injection]** AdC is not set to **[No]** nO.

This time corresponds to the zero speed maintenance time, if **[Motor control type]** Ctt is set to **[SYN_U VC]** SYnU.

Setting	Description
0.1...30.0 s	Setting range **Factory setting**: 0.5 s

[Auto DC inj Level 2] SdC2 ★

Auto DC injection level 2.

NOTICE
OVERHEATING AND DAMAGE TO THE MOTOR Verify that the connected motor is properly rated for the DC injection current to be applied in terms of amount and time in order to avoid overheating and damage to the motor. **Failure to follow these instructions can result in equipment damage.**

Second level of standstill DC injection current.

This parameter can be accessed if **[Auto DC Injection]** AdC is not set to **[No]** nO.

Setting	Description
0...1.1 In (1)	Setting range **Factory setting**: 0.5 In (1)
(1) In corresponds to the rated drive current indicated in the Installation Manual and on the drive nameplate.	

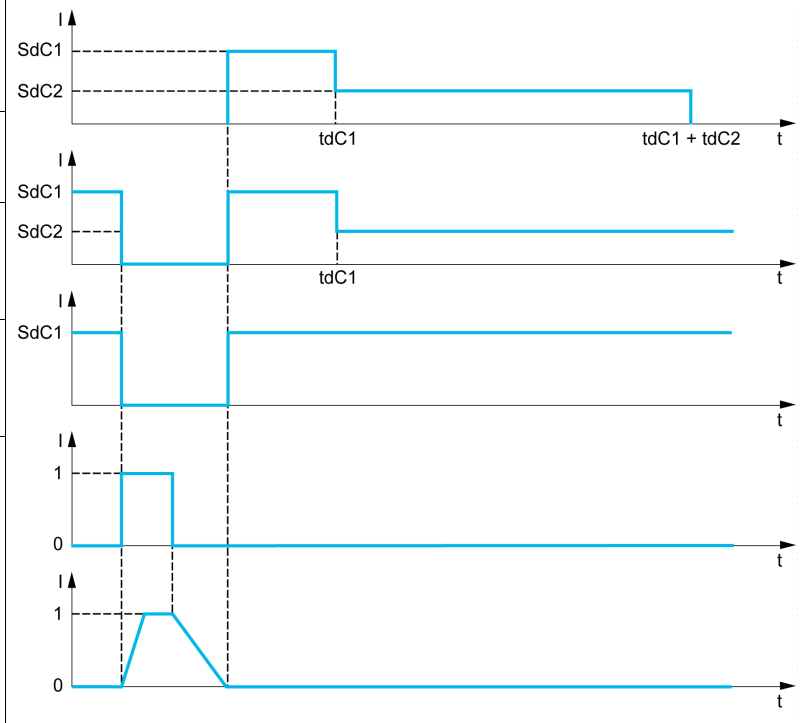
[Auto DC Inj Time 2] tdC2 ★

Auto DC injection time 2.

NOTICE
OVERHEATING AND DAMAGE TO THE MOTOR Verify that the connected motor is properly rated for the DC injection current to be applied in terms of amount and time in order to avoid overheating and damage to the motor. **Failure to follow these instructions can result in equipment damage.**

Second standstill injection time.

This parameter can be accessed if **[Auto DC Injection]** AdC is set to **[YES]** YES.

AdC	SdC2	Operation
YES	x	
Ct	≠ 0	
Ct	= 0	
Run command		
Speed		

Setting ❮❯	Description
0.0...30.0 s	Setting range **Factory setting**: 0.0 s

Section 7.38
[Generic functions] - [Ref. operations]

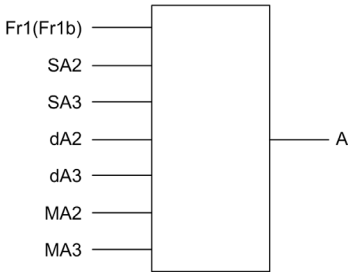
[Ref. operations] oA1 - Menu

Access

[Complete settings] ➞ [Generic functions] ➞ [Ref. operations]

About This Menu

Summing input / subtraction input / multiplier



A (Fr1 or Fr1b + SA2 + SA3 - dA2 - dA3) x MA2 x MA3

NOTE:

- If SA2, SA3, dA2, dA3 are not assigned, they are set to 0.
- If MA2, MA3 are not assigned, they are set to 1.
- A is limited by the minimum LSP and maximum HSP parameters.
- For a multiplication, the signal on MA2 or MA3 is interpreted as a %. 100% corresponds to the maximum value of the corresponding input. If MA2 or MA3 is sent via the communication bus or Graphic Display Terminal, an MFr multiplication variable must be sent via the bus or Graphic Display Terminal.
- Reversal of the direction of operation in the event of a negative result can be blocked (see **[Reverse Disable]** rIn).

[Summing Input 2] SA2

Summing input 2.

Selection of a reference to be added to **[Ref Freq 1 Config]** Fr1 or **[Ref.1B channel]** Fr1b.

Setting	Code / Value	Description
[Not Configured]	nO	Not assigned
[AI1]	AI1	Analog input AI1 **Factory Setting**
[AI2]...**[AI3]**	AI2...AI3	Analog input AI2...AI3
[AI4]...**[AI5]**	AI4...AI5	Analog input AI4...AI5 if VW3A3203 I/O extension module has been inserted
[Ref Frequency via DI]	UPdt	Up/Down function is assigned by DIx
[Ref. Freq- Rmt. Term]	LCC	Reference Frequency via remote terminal
[Ref. Freq-Modbus]	Mdb	Reference frequency via Modbus
[Ref. Freq-CANopen]	CAn	Reference frequency via CANopen if a CANopen module has been inserted
[Ref. Freq-Com. Module]	nEt	Reference frequency via fieldbus module if a fieldbus module has been inserted
[Embedded Ethernet]	EtH	Embedded Ethernet **NOTE:** This selection can be accessed on ATV340•••N4E drives.
[AI Virtual 1]...**[AI Virtual 3]**	AIV1...AIV3	Virtual analogic input 1...3
[DI5 PulseInput Assignment]...**[DI6 PulseInput Assignment]**	PI5...PI6	Digital input DI5...DI6 used as pulse input

[Summing Input 3] SA3

Summing input 3.

Selection of a reference to be added to **[Ref Freq 1 Config]** Fr1 or **[Ref.1B channel]** Fr1b.

Identical to **[Summing Input 2]** SA2

[Subtract Ref Freq 2] dA2

Subtract reference frequency 2.

Selection of a reference to be subtracted from **[Ref Freq 1 Config]** Fr1 or **[Ref.1B channel]** Fr1b.

Identical to **[Summing Input 2]** SA2

[Subtract Ref Freq 3] dA3

Subtract reference frequency 3.

Selection of a reference to be subtracted from **[Ref Freq 1 Config]** Fr1 or **[Ref.1B channel]** Fr1b.

Identical to **[Summing Input 2]** SA2.

[Ref Freq 2 Multiply] MA2

Reference frequency 2 multiply (in % of the source range).

Selection of a multiplier reference **[Ref Freq 1 Config]** Fr1 or **[Ref.1B channel]** Fr1b.

Identical to **[Summing Input 2]** SA2.

[Ref Freq 3 Multiply] MA3

Reference frequency 3 multiply (in % of the source range).

Selection of a multiplier reference **[Ref Freq 1 Config]** Fr1 or **[Ref.1B channel]** Fr1b.

Identical to **[Summing Input 2]** SA2.

Section 7.39
[Generic functions] - [Preset speeds]

[Preset speeds] PSS - Menu

Access

[Complete settings] ➞ [Generic functions] ➞ [Preset speeds]

About This Menu

NOTE: This function cannot be used with some other functions.

Combination Table for Preset Speed Inputs

2, 4, 8 or 16 speeds can be preset, requiring 1, 2, 3 or 4 digital inputs respectively.

It is necessary to configure:
- 2 and 4 speeds in order to obtain 4 speeds.
- 2, 4 and 8 speeds in order to obtain 8 speeds.
- 2, 4, 8 and 16 speeds in order to obtain 16 speeds.

16 Preset Freq (PS16)	8 Preset Freq (PS8)	4 Preset Freq (PS4)	2 Preset Freq (PS2)	Speed Reference
0	0	0	0	Reference 1 (1)
0	0	0	1	SP2
0	0	1	0	SP3
0	0	1	1	SP4
0	1	0	0	SP5
0	1	0	1	SP6
0	1	1	0	SP7
0	1	1	1	SP8
1	0	0	0	SP9
1	0	0	1	SP10
1	0	1	0	SP11
1	0	1	1	SP12
1	1	0	0	SP13
1	1	0	1	SP14
1	1	1	0	SP15
1	1	1	1	SP16

(1) Reference 1 = SP1, refer to diagram *(see page 230)*

[2 Preset Freq] P S 2

2 preset freq assignment.

Setting	Code / Value	Description
[Not Assigned]	n o	Not assigned **Factory setting**
[DI1]...[DI6]	L I 1...L I 6	Digital input DI1...DI6
[DI11]...[DI16]	L I 1 1...L I 1 6	Digital input DI11...DI16 if VW3A3203 I/O extension module has been inserted
[DI52 (High level)]... [DI59 (High level)]	d S 2 H...d S 9 H	Cabinet high level assignment digital inputs **NOTE:** This selection can be accessed on ATV660 and ATV680 equipped with Cabinet IO.
[CD00]...[CD10]	C d 0 0...C d 1 0	Virtual digital input CMD.0...CMD.10 in **[I/O profile]** I o configuration
[CD11]...[CD15]	C d 1 1...C d 1 5	Virtual digital input CMD.11...CMD.15 regardless of configuration
[C101]...[C110]	C 1 0 1...C 1 1 0	Virtual digital input CMD1.01...CMD1.10 with integrated Modbus Serial in **[I/O profile]** I o configuration
[C111]...[C115]	C 1 1 1...C 1 1 5	Virtual digital input CMD1.11...CMD1.15 with integrated Modbus Serial regardless of configuration
[C201]...[C210]	C 2 0 1...C 2 1 0	Virtual digital input CMD2.01...CMD2.10 with CANopen® fieldbus module in **[I/O profile]** I o configuration
[C211]...[C215]	C 2 1 1...C 2 1 5	Virtual digital input CMD2.11...CMD2.15 with CANopen® fieldbus module regardless of configuration
[C301]...[C310]	C 3 0 1...C 3 1 0	Virtual digital input CMD3.01...CMD3.10 with a fieldbus module in **[I/O profile]** I o configuration
[C311]...[C315]	C 3 1 1...C 3 1 5	Virtual digital input CMD3.11...CMD3.15 with a fieldbus module regardless of configuration
[C501]...[C510]	C 5 0 1...C 5 1 0	Virtual digital input CMD5.01...CMD5.10 with integrated Ethernet in **[I/O profile]** I o configuration
[C511]...[C515]	C 5 1 1...C 5 1 5	Virtual digital input CMD5.11...CMD5.15 with integrated Ethernet regardless of configuration

[4 Preset Freq] P S 4

4 preset freq assignment.

Identical to **[2 Preset Freq]** P S 2

To obtain 4 speeds, you must also configure 2 speeds.

[8 Preset Freq] P S 8

8 preset freq assignment.

Identical to **[2 Preset Freq]** P S 2

To obtain 8 speeds, you must also configure 2 and 4 speeds.

[16 Preset Freq] P S 1 6

16 preset freq assignment.

Identical to **[2 Preset Freq]** P S 2

To obtain 16 speeds, you must also configure 2, 4 and 8 speeds.

[Preset speed 2] S P 2 ★

Preset speed 2. See the combination table for preset speed inputs *(see page 423)*.

Setting ⟲	Description
0.0...500.0 Hz	Setting range **Factory setting**: 10.0 Hz

[Preset speed 3] 5 P 3 ★

Preset speed 3. See the combination table for preset speed inputs *(see page 423)*.

Setting ❮❯	Description
0.0...500.0 Hz	Setting range **Factory setting**: 15.0 Hz

[Preset speed 4] 5 P 4 ★

Preset speed 4. See the combination table for preset speed inputs *(see page 423)*.

Setting ❮❯	Description
0.0...500.0 Hz	Setting range **Factory setting**: 20.0 Hz

[Preset speed 5] 5 P 5 ★

Preset speed 5. See the combination table for preset speed inputs *(see page 423)*.

Setting ❮❯	Description
0.0...500.0 Hz	Setting range **Factory setting**: 25.0 Hz

[Preset speed 6] 5 P 6 ★

Preset speed 6. See the combination table for preset speed inputs *(see page 423)*.

Setting ❮❯	Description
0.0...500.0 Hz	Setting range **Factory setting**: 30.0 Hz

[Preset speed 7] 5 P 7 ★

Preset speed 7. See the combination table for preset speed inputs *(see page 423)*.

Setting ❮❯	Description
0.0...500.0 Hz	Setting range **Factory setting**: 35.0 Hz

[Preset speed 8] 5 P 8 ★

Preset speed 8. See the combination table for preset speed inputs *(see page 423)*.

Setting ❮❯	Description
0.0...500.0 Hz	Setting range **Factory setting**: 40.0 Hz

[Preset speed 9] 5 P 9 ★

Preset speed 9. See the combination table for preset speed inputs *(see page 423)*.

Setting ❮❯	Description
0.0...500.0 Hz	Setting range **Factory setting**: 45.0 Hz

[Preset speed 10] SP10 ★

Preset speed 10. See the combination table for preset speed inputs *(see page 423)*.

Setting ❮❯	Description
0.0...500.0 Hz	Setting range **Factory setting**: 50.0 Hz

[Preset speed 11] SP11 ★

Preset speed 11. See the combination table for preset speed inputs *(see page 423)*.

Setting ❮❯	Description
0.0...500.0 Hz	Setting range **Factory setting**: 55.0 Hz

[Preset speed 12] SP12 ★

Preset speed 12. See the combination table for preset speed inputs *(see page 423)*.

Setting ❮❯	Description
0.0...500.0 Hz	Setting range **Factory setting**: 60.0 Hz

[Preset speed 13] SP13 ★

Preset speed 13. See the combination table for preset speed inputs *(see page 423)*.

Setting ❮❯	Description
0.0...500.0 Hz	Setting range **Factory setting**: 70.0 Hz

[Preset speed 14] SP14 ★

Preset speed 14. See the combination table for preset speed inputs *(see page 423)*.

Setting ❮❯	Description
0.0...500.0 Hz	Setting range **Factory setting**: 80.0 Hz

[Preset speed 15] SP15 ★

Preset speed 15 See the combination table for preset speed inputs *(see page 423)*.

Setting ❮❯	Description
0.0...500.0 Hz	Setting range **Factory setting**: 90.0 Hz

[Preset speed 16] SP16 ★

Preset speed 16. See the combination table for preset speed inputs *(see page 423)*.

Setting ❮❯	Description
0.0...500.0 Hz	Setting range **Factory setting**: 100.0 Hz

Section 7.40
[Generic functions] - [+/- speed]

[+/- speed] uPd - Menu

Access

[Complete settings] ➞ [Generic functions] ➞ [+/- speed]

About This Menu

This function can be accessed if reference channel **[Ref Freq 2 Config]** FrC2 is set to **[Ref Frequency via DI]** uPdt

NOTE: This function cannot be used with some other functions.

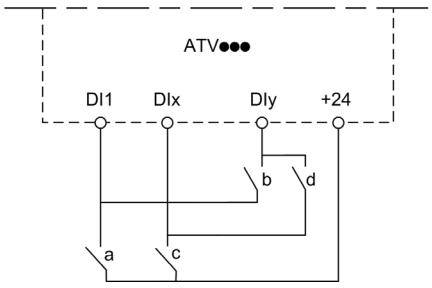
2 types of operations are available:

- **Use of single action keys:** 2 digital inputs are required in addition to the operating directions. The input assigned to the “+ speed” command increases the speed, the input assigned to the “– speed” command decreases the speed.
- **Use of double action keys:** Only one digital input assigned to “+ speed” is required.

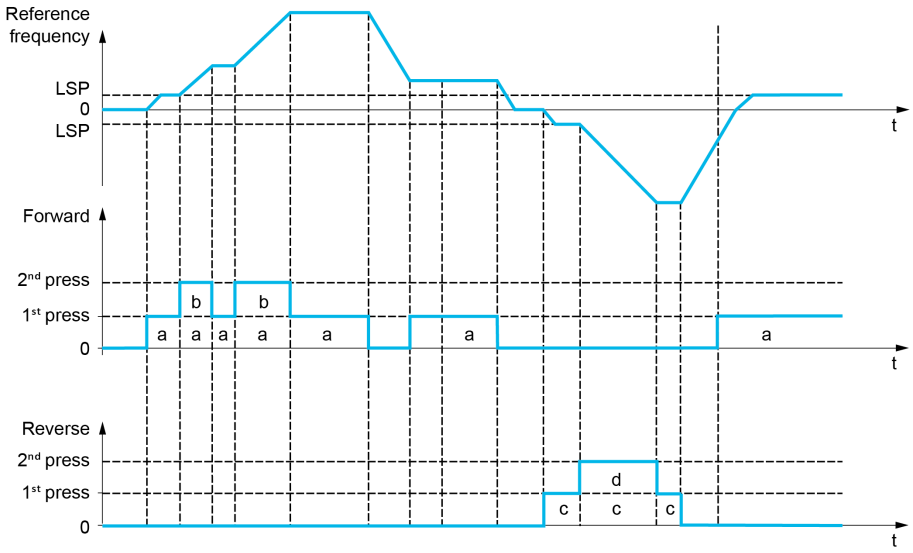
+/– speed with double-press buttons:

Description: 1 button pressed twice (2 steps) for each direction of rotation. A contact closes each time the button is pressed.

Setting	Released (– Speed)	First Press (Speed Maintained)	Second Press (Faster)
Forward button	–	a	a and b
Reverse button	–	c	c and d



DI1 Forward
DIx Reverse
DIy + speed



Do not use this +/– speed type with a 3-wire control.

Whichever type of operation is selected, the max. speed is set by **[High speed]** *HSP*.

NOTE: If the reference is switched via **[Freq Switch Assign]** *rFC* from any reference channel to another reference channel with "+/– speed", the value of reference **[Motor Frequency]** *rFr* (after ramp) may be copied at the same time in accordance with the **[Copy Ch1-Ch2]** *CoP* parameter.
If the reference is switched via **[Freq Switch Assign]** *rFC* from one reference channel to any other reference channel with "+/– speed", the value of reference **[Motor Frequency]** *rFr* (after ramp) is copied at the same time.
This helps to prevent the speed from being incorrectly reset to zero when switching takes place.

[+ Speed Assign] *USP*

Increase speed input assignment.

Function active if the assigned input or bit is at 1.

Setting	Code / Value	Description
[Not Assigned]	*nO*	Not assigned **Factory setting**
[DI1]...**[DI6]**	*LI1*...*LI6*	Digital input DI1...DI6
[DI11]...**[DI16]**	*LI11*...*LI16*	Digital input DI11...DI16 if VW3A3203 I/O extension module has been inserted
[DI52 (High level)]... **[DI59 (High level)]**	*dS2H*...*dS9H*	Cabinet high level assignment digital inputs **NOTE:** This selection can be accessed on ATV660 and ATV680 equipped with Cabinet IO.
[CD00]...**[CD10]**	*CD00*...*CD10*	Virtual digital input CMD.0...CMD.10 in **[I/O profile]** *IO* configuration
[CD11]...**[CD15]**	*CD11*...*CD15*	Virtual digital input CMD.11...CMD.15 regardless of configuration
[C101]...**[C110]**	*C101*...*C110*	Virtual digital input CMD1.01...CMD1.10 with integrated Modbus Serial in **[I/O profile]** *IO* configuration
[C111]...**[C115]**	*C111*...*C115*	Virtual digital input CMD1.11...CMD1.15 with integrated Modbus Serial regardless of configuration
[C201]...**[C210]**	*C201*...*C210*	Virtual digital input CMD2.01...CMD2.10 with CANopen® fieldbus module in **[I/O profile]** *IO* configuration

Setting	Code / Value	Description
[C211]...**[C215]**	C211...C215	Virtual digital input CMD2.11...CMD2.15 with CANopen® fieldbus module regardless of configuration
[C301]...**[C310]**	C301...C310	Virtual digital input CMD3.01...CMD3.10 with a fieldbus module in **[I/O profile]** IO configuration
[C311]...**[C315]**	C311...C315	Virtual digital input CMD3.11...CMD3.15 with a fieldbus module regardless of configuration
[C501]...**[C510]**	C501...C510	Virtual digital input CMD5.01...CMD5.10 with integrated Ethernet in **[I/O profile]** IO configuration
[C511]...**[C515]**	C511...C515	Virtual digital input CMD5.11...CMD5.15 with integrated Ethernet regardless of configuration

[- Speed Assign] dSP

Down speed input assignment. See the assignment conditions.

Parameter settings identical to **[+ Speed Assign]** uSP.

Function active if the assigned input or bit is at 1.

[Ref Frequency Save] SFr ★

Reference frequency saves. This parameter can be accessed if **[+ Speed Assign]** uSP is not set to **[Not Assigned]** nO.

Associated with the "+/– speed" function, this parameter can be used to save the reference:
- When the run commands disappear (saved to RAM).
- When the supply mains or the run commands disappear (saved to EEPROM).

Therefore, next time the drive starts up, the speed reference is the last reference frequency saved.

Setting	Code / Value	Description
[No save]	nO	Not saved **Factory setting**
[Save to RAM]	rAM	+/- speed with saving of the reference frequency in RAM
[Save to EEprom]	EEP	+/- speed with saving of the reference frequency in EEPROM

Section 7.41
[Generic functions] - [Jump frequency]

[Jump frequency] JuF - Menu

Access

[Complete settings] ➞ **[Generic functions]** ➞ **[Jump frequency]**

About This Menu

Identical to **[Jump frequency]** JuF - Menu *(see page 401)*.

Section 7.42
[Generic functions] - [PID controller]

[PID Controller] P id - Menu

Access

[Complete settings] ➡ **[Generic functions]** ➡ **[PID Controller]**

About This Menu

Identical to **[PID Controller]** P id - Menu *(see page 298)*.

Section 7.43
[Generic functions] - [Feedback mon.]

[Feedback monitoring] *F K П* - Menu

Access

[Complete settings] ➞ **[Generic functions]** ➞ **[Feedback monitoring]**

About This Menu

Identical to **[Feedback monitoring]** *F K П* - Menu *(see page 330)*.

Section 7.44
[Generic functions] - [Threshold reached]

[Threshold reached] tHrE - Menu

Access

[Complete settings] ➞ [Generic functions] ➞ [Threshold reached]

[Low I Threshold] CtdL

Current low threshold value.

Setting	Description
0...65,535 A	Setting range **Factory setting**: 0 A

[High Current Thd] Ctd

Current high threshold value.

Setting	Description
0...65,535 A	Setting range **Factory setting**: Drive nominal current

[Low Freq. Threshold] FtdL

Motor low frequency threshold.

Setting	Description
0.0...500.0 Hz	Setting range **Factory setting**: 0.0 Hz

[Motor Freq Thd] Ftd

Motor frequency threshold.

Setting	Description
0.0...500.0 Hz	Setting range **Factory setting**: 50.0 Hz

[2 Freq. Threshold] F2dL

Motor low frequency second threshold.

Setting	Description
0.0...500.0 Hz	Setting range **Factory setting**: 0.0 Hz

[Freq. threshold 2] F2d

Motor frequency threshold 2.

Setting	Description
0.0...500.0 Hz	Setting range **Factory setting**: 50.0 Hz

[Motor Thermal Thd] ttd

Motor thermal state threshold.

Setting	Description
0...118%	Setting range **Factory setting**: 100%

[Reference high Thd] rtd

Reference frequency high threshold.

Setting	Description
0.0...500.0 Hz	Setting range **Factory setting**: 0.0 Hz

[Reference low Thd] rtdL

Reference frequency low threshold.

Setting	Description
0.0...500.0 Hz	Setting range **Factory setting**: 0.0 Hz

[High torque thd.] ttH

High torque threshold.

Setting	Description
-300...300%	Setting range **Factory setting**: 100%

[Low torque thd.] ttL

Low torque threshold.

Setting	Description
-300...300%	Setting range **Factory setting**: 50%

Section 7.45
[Generic functions] - [Mains contactor command]

[Mains contactor command] L L C - Menu

Access

[Complete settings] ➞ **[Generic functions]** ➞ **[Mains contactor command]**

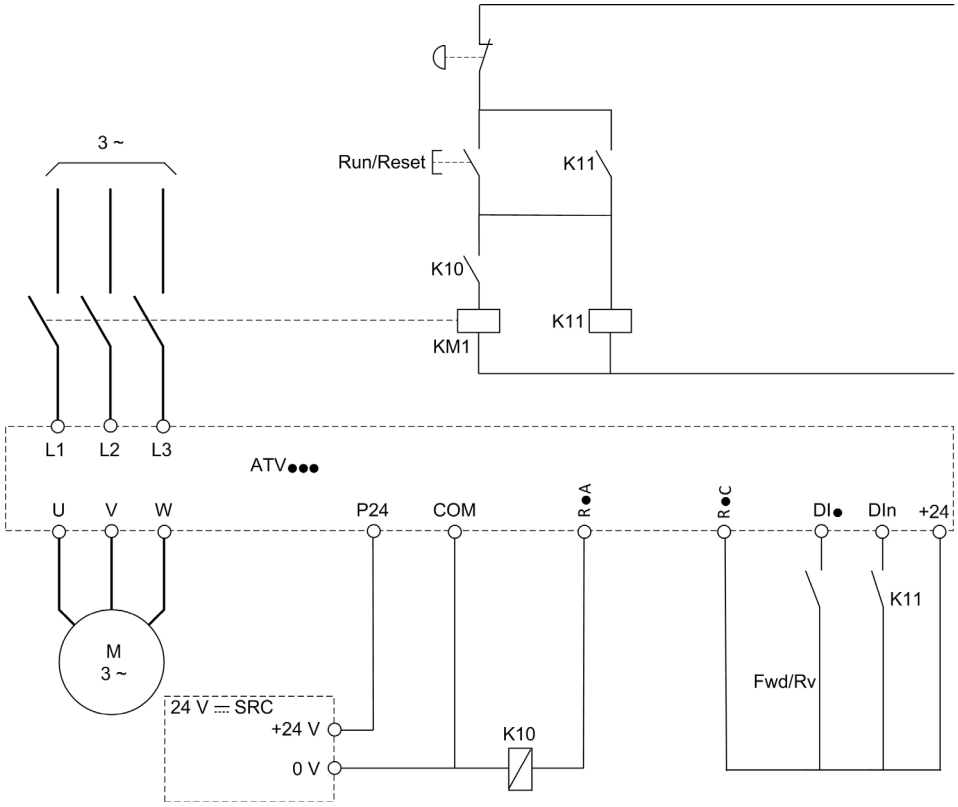
About This Menu

The line contactor closes every time a run command (forward or reverse) is sent and opens after every stop, as soon as the drive is locked. For example, if the stop mode is stop on ramp, the contactor opens when the motor reaches zero speed.

NOTE: The drive control power supply must be provided via an external 24 Vdc source.

NOTICE
DAMAGE TO THE DRIVE Do not use this function at intervals of less than 60 s. **Failure to follow these instructions can result in equipment damage.**

Example circuit (24 Vdc power supply):



DI• = Run command **[Forward]** F r d or **[Reverse]** r r S

R•A/R•C = **[Mains Contactor]** L L C

DIn = **[Drive Lock]** L E S

NOTE: The Run/Reset key must be pressed once the emergency stop key has been released.

[Mains Contactor] LLC

Mains contactor control.

Setting	Code / Value	Description
[No]	nO	Not assigned **Factory setting**
[R2]...**[R3]**	r2...r3	Relay output R2...R3
[R4]...**[R6]**	r4...r6	Relay output R4...R6 if VW3A3204 relay output option module has been inserted
[DQ11 Digital Output]...**[DQ12 Digital Output]**	dO11...dO12	Digital output DQ11...DQ12 if VW3A3203 I/O extension module has been inserted
[R61]…**[R66]**	r61...r66	Relay R61 …R66 **NOTE:** This selection can be accessed on ATV660 and ATV680 equipped with Cabinet IO

[Drive Lock] LES ★

Drive lock assignment.

This parameter can be accessed if **[Mains Contactor]** LLC is not set to **[No]** nO.

Setting	Code / Value	Description
[Not Assigned]	nO	Not assigned **Factory setting**
[CD00]...**[CD10]**	CD00...CD10	Virtual digital input CMD.0...CMD.10 in **[I/O profile]** IO configuration
[CD11]...**[CD15]**	CD11...CD15	Virtual digital input CMD.11...CMD.15 regardless of configuration
[C101]...**[C110]**	C101...C110	Virtual digital input CMD1.01...CMD1.10 with integrated Modbus Serial in **[I/O profile]** IO configuration
[C111]...**[C115]**	C111...C115	Virtual digital input CMD1.11...CMD1.15 with integrated Modbus Serial regardless of configuration
[C201]...**[C210]**	C201...C210	Virtual digital input CMD2.01...CMD2.10 with CANopen® fieldbus module in **[I/O profile]** IO configuration
[C211]...**[C215]**	C211...C215	Virtual digital input CMD2.11...CMD2.15 with CANopen® fieldbus module regardless of configuration
[C301]...**[C310]**	C301...C310	Virtual digital input CMD3.01...CMD3.10 with a fieldbus module in **[I/O profile]** IO configuration
[C311]...**[C315]**	C311...C315	Virtual digital input CMD3.11...CMD3.15 with a fieldbus module regardless of configuration
[C501]...**[C510]**	C501...C510	Virtual digital input CMD5.01...CMD5.10 with integrated Ethernet Modbus TCP in **[I/O profile]** IO configuration
[C511]...**[C515]**	C511...C515	Virtual digital input CMD5.11...CMD5.15 with integrated Ethernet Modbus TCP regardless of configuration
[DI1 (Low level)]...**[DI6 (Low level)]**	LIL...L6L	Digital input DI1...DI6 used at low level
[DI11 (Low level)]...**[DI16 (Low level)]**	LI1L...LI6L	Digital input DI11...DI16 used at low level if VW3A3203 I/O extension module has been inserted
[DI52 (Low level)]...**[DI59 (Low level)]**	d52L...d59L	Digital input DI52…DI59 (low level) **NOTE:** This selection can be accessed on ATV660 and ATV680 equipped with Cabinet IO.

[Mains V. time out] LCt

Monitoring time for closing of line contactor.

Setting	Description
1...999 s	Setting range **Factory setting**: 5 s

Section 7.46
[Generic functions] - [Reverse disable]

[Reverse disable] rE in - Menu

Access

[Complete settings] ➞ **[Generic functions]** ➞ **[Reverse disable]**

[Reverse Disable] r in

Reverse direction disable.

NOTE: Anti-Jam function takes priority over **[Reverse Disable]** r in function. If an Anti-Jam function is used, reverse direction is applied despite of the **[Reverse disable]** r in configuration.

Reverse direction requests sent by digital inputs are taken into account.

Reverse direction requests sent by the Graphic Display Terminal or sent by the line are not taken into account.

Any reverse speed reference originating from the PID, summing input, and so on, is interpreted as a zero reference (0 Hz).

Setting	Code / Value	Description
[No]	no	No
[Yes]	YES	Yes **Factory setting**

Section 7.47
[Generic functions] - [Torque limitation]

[Torque limitation] tOL - Menu

Access

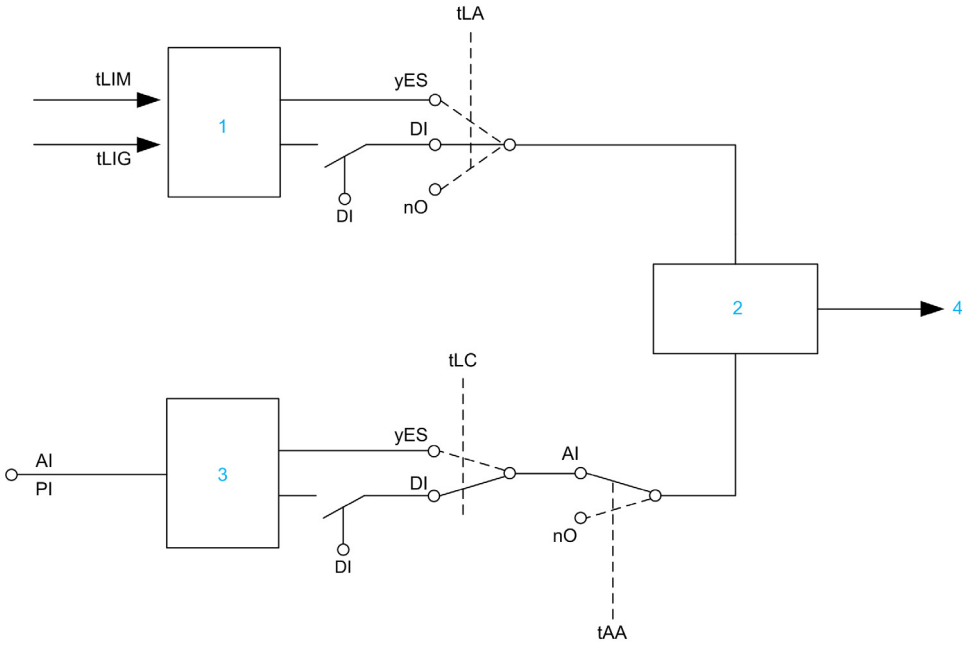
[Complete settings] ➡ [Generic functions] ➡ [Torque limitation]

About This Menu

There are 2 types of torque limitation:
- With a value that is fixed by a parameter
- With a value that is set by an analog input (AI or pulse)

If both types are enabled, the lowest value is taken into account.

These 2 types can be configured or switched remotely using a digital input or via the communication bus.



1 Torque limitation via parameter
2 Lowest value taken into account
3 Torque limitation via analog input, RP
4 Limitation value

[Torque limit activ.] ELA

Activation of the permanent torque limitation.

If the assigned input or bit is at 0, the function is inactive.

If the assigned input or bit is at 1, the function is active.

Setting	Code / Value	Description
[Not Assigned]	nO	Not assigned **Factory setting**
[Yes]	YES	Yes
[DI1]...**[DI6]**	LI1...LI6	Digital input DI1...DI6
[DI11]...**[DI16]**	LI11...LI16	Digital input DI11...DI16 if VW3A3203 I/O extension module has been inserted
[CD00]...**[CD10]**	CD00...CD10	Virtual digital input CMD.0...CMD.10 in **[I/O profile]** IO configuration
[CD11]...**[CD15]**	CD11...CD15	Virtual digital input CMD.11...CMD.15 regardless of configuration
[C101]...**[C110]**	C101...C110	Virtual digital input CMD1.01...CMD1.10 with integrated Modbus Serial in **[I/O profile]** IO configuration
[C111]...**[C115]**	C111...C115	Virtual digital input CMD1.11...CMD1.15 with integrated Modbus Serial regardless of configuration
[C201]...**[C210]**	C201...C210	Virtual digital input CMD2.01...CMD2.10 with CANopen® fieldbus module in **[I/O profile]** IO configuration
[C211]...**[C215]**	C211...C215	Virtual digital input CMD2.11...CMD2.15 with CANopen® fieldbus module regardless of configuration
[C301]...**[C310]**	C301...C310	Virtual digital input CMD3.01...CMD3.10 with a fieldbus module in **[I/O profile]** IO configuration
[C311]...**[C315]**	C311...C315	Virtual digital input CMD3.11...CMD3.15 with a fieldbus module regardless of configuration
[C501]...**[C510]**	C501...C510	Virtual digital input CMD5.01...CMD5.10 with integrated Ethernet Modbus TCP in **[I/O profile]** IO configuration
[C511]...**[C515]**	C511...C515	Virtual digital input CMD5.11...CMD5.15 with integrated Ethernet Modbus TCP regardless of configuration

Section 7.48
[Generic functions] - [Parameters switching]

What Is in This Section?

This section contains the following topics:

Topic	Page
[Parameters switching] *ΠLP* - Menu	442
[Set 1] *PS1* - Menu	448
[Set 2] *PS2* - Menu	448
[Set 3] *PS3* - Menu	448

[Parameters switching] MLP- Menu

Access

[Complete settings] ➡ **[Generic functions]** ➡ **[Parameters switching]**

About This Menu

A set of 1 to 15 parameters from the **[Parameter Selection]** SPS list *(see page 443)* can be selected and 2 or 3 different values assigned. These 2 or 3 sets of values can then be switched using 1 or 2 digital inputs or control word bits. This switching can be performed during operation (motor running). It can also be controlled based on 1 or 2 frequency thresholds, whereby each threshold acts as a digital input (0 = threshold not reached, 1 = threshold reached).

	Values 1	Values 2	Values 3
Parameter 1 ... Parameter 15	Parameter 1 ... Parameter 15	Parameter 1 ... Parameter 15	Parameter 1 ... Parameter 15
Input DI or bit or frequency threshold 2 values	0	1	0 or 1
Input DI or bit or frequency threshold 3 values	0	0	1

NOTE: Do not modify the parameters in **[Parameter Selection]** SPS *(see page 443)*, because any modifications made in this menu will be lost on the next power-up. The parameters can be adjusted during operation in the **[Parameters switching]** MLP- menu, on the active configuration.

[2 Parameter sets] CHA1

Parameter switching assignment 1.

Switching 2 parameter sets.

Setting	Code / Value	Description
[Not Assigned]	nO	Not assigned **Factory setting**
[Mot Freq High Thd]	FtA	Motor frequency high threshold reached
[2nd Freq Thd Reached]	F2A	Second frequency threshold reached
[DI1]...**[DI6]**	LI1...LI6	Digital input DI1...DI6
[DI11]...**[DI16]**	LI11...LI16	Digital input DI11...DI16 if VW3A3203 I/O extension module has been inserted
[CD00]...**[CD10]**	Cd00...Cd10	Virtual digital input CMD.0...CMD.10 in **[I/O profile]** IO configuration
[CD11]...**[CD15]**	Cd11...Cd15	Virtual digital input CMD.11...CMD.15 regardless of configuration
[C101]...**[C110]**	C101...C110	Virtual digital input CMD1.01...CMD1.10 with integrated Modbus Serial in **[I/O profile]** IO configuration
[C111]...**[C115]**	C111...C115	Virtual digital input CMD1.11...CMD1.15 with integrated Modbus Serial regardless of configuration
[C201]...**[C210]**	C201...C210	Virtual digital input CMD2.01...CMD2.10 with CANopen® fieldbus module in **[I/O profile]** IO configuration
[C211]...**[C215]**	C211...C215	Virtual digital input CMD2.11...CMD2.15 with CANopen® fieldbus module regardless of configuration
[C301]...**[C310]**	C301...C310	Virtual digital input CMD3.01...CMD3.10 with a fieldbus module in **[I/O profile]** IO configuration
[C311]...**[C315]**	C311...C315	Virtual digital input CMD3.11...CMD3.15 with a fieldbus module regardless of configuration
[C501]...**[C510]**	C501...C510	Virtual digital input CMD5.01...CMD5.10 with integrated Ethernet in **[I/O profile]** IO configuration
[C511]...**[C515]**	C511...C515	Virtual digital input CMD5.11...CMD5.15 with integrated Ethernet regardless of configuration

[3 Parameter sets] CHA2

Parameter switching assignment 2.

Identical to **[2 Parameter sets]** CHA 1.

Switching 3 parameter sets.

NOTE: In order to obtain 3 parameter sets, it is necessary to configure first **[2 Parameter sets]** CHA 1.

[Parameter Selection] SPS

This parameter can be accessed if **[2 Parameter sets]** CHA 1 is not set to **[No]** no.

Making an entry in this parameter opens a window containing all the adjustment parameters that can be accessed. Select 1 to 15 parameters using **OK** key. Parameter(s) can also be deselected using **OK** key.

Available parameters for parameters switching function are:

Parameter	Code
[Ramp increment]	inr
[Acceleration]	ACC
[Deceleration]	dEC
[Acceleration 2]	AC2
[Deceleration 2]	dE2
[Begin Acc round]	tA1
[End Acc round]	tA2
[Begin Dec round]	tA3
[End Dec round]	tA4
[Low Speed]	LSP
[High Speed]	HSP
[Motor Th Current]	itH
[IR compensation]	uFr
[Slip compensation]	SLP
[K speed loop filter]	SFC
[Speed time integral]	Sit
[Speed prop. gain]	SPG
[Inertia Factor]	SPGu
[Ramp Divider]	dCF
[DC Inj Level 1]	idC
[DC Inj Time 1]	tdi
[DC Inj Level 2]	idC2
[DC Inj Time 2]	tdC
[Auto DC inj Level 1]	SdC1
[Auto DC Inj Time 1]	tdC1
[Auto DC inj Level 2]	SdC2
[Auto DC Inj Time 2]	tdC2
[Switching frequency]	SFr
[Current Limitation]	CLi
[Low Speed Timeout]	tLS
[Sleep Offset Thres.]	SLE
[Preset speed 2]...[Preset speed 16]	SP2... SP16
[Multiplying coeff.]	MFr
[PID Prop.Gain]	rPG
[PID Intgl.Gain]	rIG
[PID derivative gain]	rdG

Parameter	Code
[PID ramp]	PrP
[PID Min Output]	PoL
[PID Max Output]	PoH
[PID Start Ref Freq]	SFS
[PID acceleration time]	ACCP
[Min fbk Warning]	PAL
[Max fbk Warning]	PAH
[PID error Warning]	PEr
[Speed input %]	PSr
[Ref PID Preset 2]	rP2
[Ref PID Preset 3]	rP3
[Ref PID Preset 4]	rP4
[PID Fdbk Range]	PFMr
[PID Fdbk Error Delay]	PFMd
[High Current Thd]	Ctd
[Low I Threshold]	CtdL
[Motor Freq Thd]	Ftd
[Low Freq.Threshold]	FtdL
[Freq. threshold 2]	F2d
[2 Freq. Threshold]	F2dL
[Freewheel stop Thd]	FFt
[Motor Therm Thd]	ttd
[Reference high Thd]	rtd
[Reference low Thd]	rtdL
[Skip Frequency]	JPF
[Skip Frequency 2]	JF2
[3rd Skip Frequency]	JF3
[Skip Freq.Hysteresis]	JFH
[Unld.Thr.Nom.Speed]	Lun
[Unld.Thr.0.Speed]	LuL
[Unld. FreqThr. Det.]	rMud
[Hysteresis Freq]	Srb
[Underload T.B.Rest.]	Ftu
[Ovld Detection Thr.]	LoC
[Overload T.B.Rest.]	Fto
[Fan mode]	FFM
[Pmax Motor]	tPMM
[Pmax Generator]	tPMG
[Stall Max Time]	StP1
[Stall Current]	StP2
[Stall Frequency]	StP3
[AI2 Th Warn Level]	tH2A
[AI5 Th Warn Level]	tH5A
[AI2 Th Error Level]	tH2F
[AI5 Th Error Level]	tH5F
[Start Accel Ramp]	ACCS
[Dec. Check Valve]	dECu

Parameter	Code
[Check Valve Speed 2]	CuH5
[Check Valve Speed 1]	CuL5
[Final Dec. Ramp]	dEC5
[Sleep Flow Level]	SLnL
[Sleep Min Speed]	SL5L
[Sleep Power Level]	SLPr
[Sleep Pressure Level]	SLPL
[Sleep Delay]	SLPd
[SLeep Boost Speed]	SLb5
[Sleep Boost Time]	SLbt
[Wake Up Process level]	WuPF
[Wake Up Process Error]	WuPE
[Wake Up Press level]	WuPL
[Sleep Condition]	ASLC
[Sleep Check Delay]	ASLd
[Check Sleep Ref spd]	ASLr
[Flow Lim Thd Active]	CHt
[FlowLim Thd Disable]	rCHt
[Flow. Limit Dec.]	dFL
[Pipe Fill TiMe]	PFHt
[Pipe Fill SPeed]	PFH5
[Pipe Fill Pressure]	PFHP
[Priming Time]	PP5d
[Primed Inlet Level]	PPiL
[Primed Condition Delay]	PPFd
[Minimum Pressure]	JPrP
[Delay to start]	JPrd
[Maximum Pressure]	JP5P
[Reference Speed]	JPr5
[Wake up Delay]	JPWd
[Alpha]	FLdA
[Comp. at Point 1]	FLH1
[Flow at Point 1]	FL91
[Static Compensation]	FLHO
[OutPres Min Level]	oPPL
[OutPres Max Level]	oPPH
[OutPresError Delay]	oPPd
[HighFlow MaxLevel]	HFPL
[HighFlowError Delay]	HFPd
[PumpCycle MaxStarts]	PCPn
[PumpCycle Timeframe]	PCPt
[InletPres High Thd]	iPPH
[InletPres Low Thd]	iPPL
[InletPres Max Comp]	iPPC
[Anti-Jam Trigger Time]	JtCt
[Anti-Jam Torque]	JtCL

Parameter	Code
[Anti-Jam Start Delay]	JtCd
[Anti-Jam Fwd Dec]	JdEC
[Anti-Jam Rv Dec]	JdEr
[Anti-Jam Fwd Acc]	JACC
[Anti-Jam Rv Acc]	JACr
[Anti-Jam Fwd Time]	JFdt
[Anti-Jam Rv Time]	Jrut
[Anti-Jam Fwd Speed]	JFdS
[Anti-Jam Rv Speed]	JruS
[Anti-Jam Stop Time]	JZSt
[Anti-Jam Cycle Nb]	JnbC
[Anti-Jam Max Seq]	JAMn
[Anti-Jam Interval]	JAMt
[DryRun Error Delay]	drYd
[DryRun Restart Delay]	drYr
[Dry Run Factor]	drYX
[PumpLF Min Level]	PLFL
[PumpLF Power Factor]	PLFX
[PumpLF ActivDelay]	PLFA
[PumpLF Error Delay]	PLFd
[PumpLF Restart Delay]	PLFr
[LevelCtrl Random Factor]	LCrX
[Level 1st Pump Start]	LrL1
[Level 2nd Pump Start]	LrL2
[Level 3rd Pump Start]	LrL3
[Level 4th Pump Start]	LrL4
[Level 5th Pump Start]	LrL5
[Level 6th Pump Start]	LrL6
[Level 1st Pump Stop]	LPL1
[Level 2nd Pump Stop]	LPL2
[Level 3rd Pump Stop]	LPL3
[Level 4th Pump Stop]	LPL4
[Level 5th Pump Stop]	LPL5
[Level 6th Pump Stop]	LPL6
[Level 1st Pump at HSP]	LHL1
[Level 2nd Pump at HSP]	LHL2
[Level 3rd Pump at HSP]	LHL3
[Level 4th Pump at HSP]	LHL4
[Level 5th Pump at HSP]	LHL5
[Level 6th Pump at HSP]	LHL6
[LevelCtrl Low Speed]	LCLS
[Min Delivery Height]	LCdJ
[Max Delivery Height]	LCdK
[LevelCtrl S/D Interval]	LCdt
[Booster Stg Speed]	bSS
[Booster Dstg Speed]	bdS
[Booster Stg Delay]	bSd

Parameter	Code
[Booster Stg Bypass Speed]	bSbS
[Booster Stg Ramp Delay]	bSrd
[Booster Stg Bypass Time]	bSbt
[Booster Dstg Delay]	bdd
[Booster Dstg Bypass Spd]	bdbS
[Booster Dstg Ramp Delay]	bdrd
[Booster Dstg Bypass Time]	bdbt
[Booster S/D Interval]	bSdt
[Booster Working Range]	bCWA
[Booster Override Range]	bCoA
[Booster S/D Flow Hyst]	bSdH
[Booster Dstg Flow]	bdF
[FeedFwd Stage Delay]	FFSd
[FeedFwd Destage Delay]	FFdd
[FeedFwd Disturb Gain]	FFG
[FeedFwd Disturb Time]	FFtG
[AFE Generator Mode]	CL iG
[Pump Fixed Freq]	nPFS
[Pump Op Point Filter]	WPXF

[Set 1] P S 1 - Menu

Access

[Complete settings] ➡ [Generic functions] ➡ [Parameters switching] ➡ [Set 1]

About This Menu

Making an entry in this menu opens a settings window containing the selected parameters in the order in which they were selected.

[Set 2] P S 2 - Menu

Access

[Complete settings] ➡ [Generic functions] ➡ [Parameters switching] ➡ [Set 2]

About This Menu

Identical to **[Set 1]** P S 1 - *(see page 448)*.

[Set 3] P S 3 - Menu

Access

[Complete settings] ➡ [Generic functions] ➡ [Parameters switching] ➡ [Set 3]

About This Menu

Identical to **[Set 1]** P S 1 - *(see page 448)*.

Section 7.49
[Generic functions] - [Stop after speed timeout]

[Stop after speed timeout] PrSP - Menu

Access

[Complete settings] ➡ **[Generic functions]** ➡ **[Stop after speed timeout]**

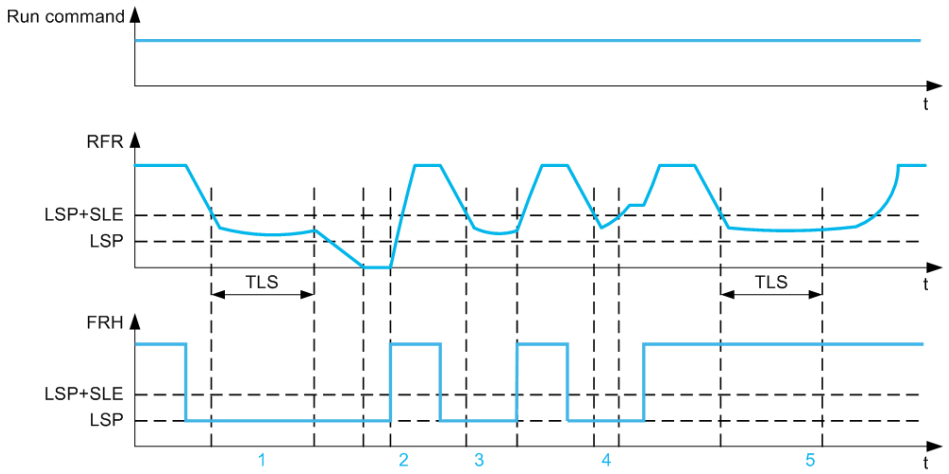
Sleep/Wake-Up in Speed Control Mode

The drive is in Speed control mode, when PID is not active, typically when:
- PID is not configured (the motor speed setpoint is controlled by an external PLC, for example).
- PID is in manual mode (manual application mode, for example).
- PID is not active because Channel 1 is not selected (forced local mode enabled, for example).

When the drive is used in Speed Control (PID not used or not active), a speed condition is used to switch the application to the sleep state. When the drive is in sleep state, the motor is restarted if the sleep condition disappears.

This function avoids prolonged operation at low speeds when neither useful nor compliant with the system constraints. It stops the motor after a period of operation at reduced speed. This time and speed can be adjusted.

In Speed control mode, Sleep/Wake-up is managed according to the following rules:
- The motor is stopped when **[Pre-Ramp Ref Freq]** FrH and **[Output frequency]** rFr become and stay lower than **[Low speed]** LSP + **[Sleep Offset Thres.]** SLE during **[Low Speed Timeout]** tLS.
- The motor is restarted when **[Pre-Ramp Ref Freq]** FrH > **[Low speed]** LSP + **[Sleep Offset Thres.]** SLE.



1 Nominal **[Low Speed Timeout]** tLS function action: after **[Low Speed Timeout]** tLS time, the motor is stopped according to the current deceleration ramp

2 **[Pre-Ramp Ref Freq]** FrH becomes greater than **[Low speed]** LSP + **[Sleep Offset Thres.]** SLE and run order still present **[Low Speed Timeout]** tLS function is deactivated

3 **[Low Speed Timeout]** tLS function is not activated because **[Pre-Ramp Ref Freq]** FrH becomes greater than **[Low speed]** LSP + **[Sleep Offset Thres.]** SLE before **[Low Speed Timeout]** tLS has expired

4 **[Low Speed Timeout]** tLS function is not activated because **[Output frequency]** rFr becomes greater than **[Low speed]** LSP + **[Sleep Offset Thres.]** SLE before **[Low Speed Timeout]** tLS has expired

5 **[Low Speed Timeout]** tLS function is not activated because **[Pre-Ramp Ref Freq]** FrH stays greater than **[Low speed]** LSP + **[Sleep Offset Thres.]** SLE

[Low Speed Timeout] tLS

Low speed timeout

Setting	Description
0.0...999.9 s	Setting range **Factory setting**: 0.0 s

[Sleep Offset Thres.] SLE ★

Sleep offset threshold.

This parameter can be accessed if **[Low Speed Timeout]** tLS is not set to 0.

Adjustable restart threshold (offset) following a stop after prolonged operation at **[Low speed]** LSP + **[Sleep Offset Thres.]** SLE, in Hz. The motor restarts if the reference rises above (LSP + SLE) and if a run command is still present.

Setting	Description
1.0...**[Max Frequency]** tFr	Setting range **Factory setting**: 1.0 Hz

Section 7.50
[Generic functions] - [Active Front End]

[Active Front End] AFE - Menu

Access

[Complete settings] ➞ **[Generic functions]** ➞ **[Active Front End]**

About This Menu

This menu is used to set the current limitation for active front end used in generator mode.

If the active front end is running in motor mode, a warning **[AFE Motor Limitation]** CL1M is triggered if the current limitation of 120% is reached, a warning **[AFE Regen Limitation]** CL1G is triggered when the limitation set with parameter **[AFE Generator Mode]** CL1G is reached.

NOTE: This menu can be accessed on ATV680.

[AFE Generator Mode] CL1G ★

AFE Generator Mode

This parameter sets the current limitation in generator operation mode. If the parameter is set to **[Low Harmonic]** LHM the drive will operate in Low Harmonic but not regenerate energy to the mains.

Setting	Code / Value	Description
[Low Harmonic]	LHM	Low Harmonic mode. **Factory setting**
[Low Harmonic & Regen]	LHrM	Low Harmonic and Regeneration mode (120%).
0.0...120.0 %		Current limitation in generator mode

Section 7.51
[Generic monitoring]

What Is in This Section?

This section contains the following topics:

Topic	Page
[Process underload] uLd - Menu	453
[Process overload] oLd - Menu	455
[Stall monitoring] StPr - Menu	457
[Thermal monitoring] tPP - Menu	458

[Process underload] uLd - Menu

Access

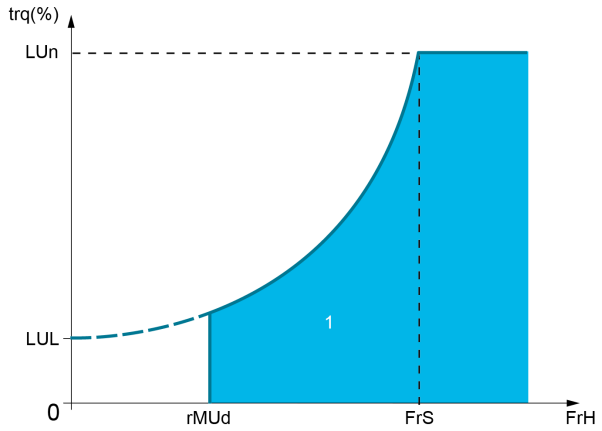
[Complete settings] ➜ **[Generic monitoring]** ➜ **[Process underload]**

Process Underload Detected Error

A process underload is detected when the next event occurs and remains pending for a minimum time **[Unld T. Del. Detect]** uLt, which is configurable:

- The motor is in steady state and the torque is below the set underload limit (**[Unld.Thr.0.Speed]** LuL, **[Unld.Thr.Nom.Speed]** Lun, **[Unld. FreqThr. Det.]** rMud parameters).
- The motor is in steady state when the offset between the frequency reference and motor frequency falls below the configurable threshold **[Hysteresis Freq]** Srb.

Between zero frequency and the rated frequency, the curve reflects the following equation: torque = LuL + (Lun - LuL) x (frequency)^2 / (rated frequency)^{2}The underload function is not active for frequencies below rMud.



1 Underload zone.

A relay or a digital output can be assigned to the signaling of this detected error in the **[Input/Output]** IO -, **[I/O assignment]** IOAS - menus.

[Unld T. Del. Detect] uLt

Underload detection time delay.

A value of 0 deactivates the function and makes the other parameters inaccessible.

Setting	Description
0...100 s	Setting range **Factory setting**: 0 s

[Unld.Thr.Nom.Speed] Lun ★

Underload threshold at nominal motor speed **[Nominal Motor Freq]** Fr S, as a % of the rated motor torque.

This parameter can be accessed if **[Unld T. Del. Detect]** uLt is not set to 0.

Setting	Description
20...100%	Setting range **Factory setting**: 60%

[Unld.Thr.0.Speed] ULL ★

Underload threshold at zero frequency as a % of the rated motor torque.

This parameter can be accessed if **[Unld T. Del. Detect]** ULt is not set to 0.

Setting ( )	Description
0...**[Unld.Thr.Nom.Speed]** LUn	Setting range **Factory setting**: 0%

[Unld. FreqThr. Det.] rMUd ★

Minimum frequency underload detection threshold.

This parameter can be accessed if **[Unld T. Del. Detect]** ULt is not set to 0.

Setting ( )	Description
0.0...500.0 Hz	Setting range **Factory setting**: 0.0 Hz

[Hysteresis Freq] Srb ★

Maximum deviation between the frequency reference and the motor frequency, which defines a steady state operation.

This parameter can be accessed if **[Unld T. Del. Detect]** ULt or **[Ovld Time Detect.]** tOL is not set to 0.

Setting ( )	Description
0.3...500.0 Hz	Setting range **Factory setting**: 0.3 Hz

[Underload Mangmt.] UdL ★

Underload management.

Behavior on switching to underload detection.

This parameter can be accessed if **[Unld T. Del. Detect]** ULt is not set to 0.

Setting	Code / Value	Description
[Ignore]	nO	Detected error ignored
[Freewheel stop]	YES	Freewheel stop **Factory setting**
[Ramp stop]	rMP	Stop on ramp
[Fast stop]	FSt	Fast stop

[Underload T.B.Rest.] Ftu ★

Minimum time permitted between an underload being detected and any automatic restart.

To allow an automatic restart, the value of **[Fault Reset Time]** tAr must exceed this parameter by at least 1 minute.

This parameter can be accessed if **[Underload Mangmt.]** UdL is not set to **[Ignore]** nO.

Setting ( )	Description
0...6 min	Setting range **Factory setting**: 0 min

[Process overload] oLd - Menu

Access

[Complete settings] ➡ **[Generic monitoring]** ➡ **[Process overload]**

About This Menu

A process overload error is detected when the next event occurs and remains pending for a minimum time **[Ovld Time Detect.]** tOL , which is configurable:

- The drive is in current limitation mode.
- The motor is in steady state and the current is above the set overload threshold **[Ovld Detection Thr.]** LOC .

The motor is in steady state when the offset between the frequency reference and motor frequency falls below the configurable threshold **[Hysteresis Freq]** Srb.

A relay or a digital output can be assigned to the signaling of this detected error.

[Ovld Time Detect.] tOL

Overload reaction time.

A value of 0 deactivates the function and makes the other parameters inaccessible.

Setting	Description
0...100 s	Setting range **Factory setting**: 0 s

[Ovld Detection Thr.] LOC ★

Overload threshold.

Overload detection threshold, as a % of the rated motor current **[Nom Motor Current]** nCr . This value must be less than the limit current in order for the function to work.

This parameter can be accessed if **[Ovld Time Detect.]** tOL is not set to 0.

Setting ❮❯	Description
70...150%	Setting range **Factory setting**: 110%

[Hysteresis Freq] Srb ★

Hysteresis for steady state.

Maximum deviation between the frequency reference and the motor frequency, which defines a steady state operation.

This parameter can be accessed if **[Ovld Time Detect.]** tOL or **[Unld T. Del. Detect.]** uLt is not set to 0.

Setting ❮❯	Description
0.3...500.0 Hz	Setting range **Factory setting**: 0.3 Hz

[Ovld.Proces.Mngmt] odL ★

Behavior on switching to overload detection.

This parameter can be accessed if **[Ovld Time Detect.]** tOL is not set to 0.

Setting	Code / Value	Description
[Ignore]	nO	Detected error ignored
[Freewheel stop]	YES	Freewheel stop **Factory setting**
[Ramp stop]	rMP	Stop on ramp
[Fast stop]	FSt	Fast stop

[Overload T.B.Rest.] $F t o$ ★

Minimum time permitted between an overload being detected and any automatic restart.

In order to allow an automatic restart, the value of **[Fault Reset Time]** $t A r$ must exceed this parameter by at least 1 minute.

This parameter can be accessed if **[Ovld Time Detect.]** $t o L$ or **[Ovld.Process.Mngmt]** $o d L$ is not set to 0.

Setting	Description
0...6 min	Setting range **Factory setting**: 0 min

[Stall monitoring] StPr - Menu

Access

[Complete settings] ➞ **[Generic monitoring]** ➞ **[Stall monitoring]**

About This Menu

This function helps to prevent a motor overload by monitoring the motor current and the speed rise time.

A stalling condition is when:

- An output frequency is smaller than the stalling frequency **[Stall Frequency]** StP3
- And an output current is higher than the stalling current **[Stall Current]** StP2
- During a time longer than the stalling time **[Stall Max Time]** StP1

When a stalling condition occurs, an **[Motor Stall Error]** StF error is triggered.

[Stall Monitoring] StPC

Stall monitoring activation.

Setting	Code / Value	Description
[No]	no	Function disabled **Factory setting**
[Yes]	YES	Function enabled

[Stall Max Time] StP1 ★

Motor stall maximum time.

This parameter can be accessed if **[Stall Monitoring]** StPC is not set to **[No]** no.

Setting	Description
0.0...200 s	Setting range **Factory setting**: 60.0 s

[Stall Current] StP2 ★

Stall monitoring current level.

This parameter can be accessed if **[Stall Monitoring]** StPC is not set to **[No]** no.

The factory setting changes to 150.0% if **[Dual rating]** drt is set to **[Heavy Duty]** HIGH

Setting	Description
0.0...150.0%	Setting range **Factory setting**: 150.0%

[Stall Frequency] StP3 ★

Stall monitoring frequency level.

This parameter can be accessed if **[Stall Monitoring]** StPC is not set to **[No]** no.

Setting	Description
0.0...**[Max Frequency]** tFr	Setting range **Factory setting**: 2.0 Hz

[Thermal monitoring] tPP - Menu

Access

[Complete settings] ➡ [Generic monitoring] ➡ [Thermal monitoring]

About This Menu

Identical to **[Thermal monitoring] tPP -** Menu *(see page 187)*.

Section 7.52
[Input/Output] - [I/O assignment]

What Is in This Section?

This section contains the following topics:

Topic	Page
[DI1 assignment] L I1A - Menu	460
[DI2 assignment] L I2A - Menu	463
[DI3 assignment] L I3A - Menu	463
[DI4 assignment] L I4A - Menu	464
[DI5 assignment] L I5A - Menu	464
[DI6 assignment] L I6A - Menu	465
[DI11 assignment] L I11A - Menu	465
[DI12 assignment] L I12A - Menu	466
[DI13 assignment] L I13A - Menu	466
[DI14 assignment] L I14A - Menu	467
[DI15 assignment] L I15A - Menu	467
[DI16 assignment] L I16A - Menu	468
[DI5 Pulse Input Assign] P I5A - Menu	469
[DI6 Pulse Input Assign] P I6A - Menu	470
[AI1 assignment] A I1A - Menu	471
[AI2 assignment] A I2A - Menu	472
[AI3 assignment] A I3A - Menu	472
[AI4 assignment] A I4A - Menu	472
[AI5 assignment] A I5A - Menu	473
[AIV1 assignment] AV1A - Menu	473
[AIV2 assignment] AV2A - Menu	473
[AIV3 assignment] AV3A - Menu	474
[DI50 Assignment] dS0A - Menu	474
[DI51 Assignment] dS1A - Menu	474
[DI52 Assignment] dS2A - Menu	475
[DI53 Assignment] dS3A - Menu	476
[DI54 Assignment] dS4A - Menu	476
[DI55 Assignment] dS5A - Menu	476
[DI56 Assignment] dS6A - Menu	477
[DI57 Assignment] dS7A - Menu	477
[DI58 Assignment] dS8A - Menu	478
[DI59 Assignment] dS9A - Menu	478

[DI1 assignment] L I A - Menu

Access

[Complete settings] ➡ [Input/Output] ➡ [I/O assignment] ➡ [DI1 assignment]

[DI1 Low Assignment] L I L

DI1 low assignment.

Setting	Code / Value	Description
[No]	n o	Not assigned
[Run]	r u n	Run enable
[Forward]	F r d	Forward operation
[Reverse]	r r S	Reverse operation
[Ramp switching]	r P S	Ramp switching
[+Speed]	u S P	+ speed
[- speed]	d S P	- Speed
[2 preset speeds]	P S 2	2 preset speeds
[4 preset speeds]	P S 4	4 preset speeds
[8 preset speeds]	P S 8	8 preset speeds
[Ref. 2 switching]	r F C	Reference switching
[Freewheel stop]	n S t	Freewheel stop
[DC injection]	d C I	Injection DC stop
[Fast stop]	F S t	Fast stop
[Forced local]	F L o	Forced local mode
[Fault reset]	r S F	Fault reset
[Autotuning Assign]	t u L	Autotuning assignment
[Auto / manual]	P A u	PID auto-manu
[PID integral reset]	P I S	Integral shunting PID
[2 preset PID ref].	P r 2	2 preset PID references
[4 preset PID ref.]	P r 4	4 preset PID references
[Torque limitation]	t L A	Permanent torque limitation
[External Error]	E t F	External error
[2 parameter sets]	C H A 1	Parameter switching 1
[3 parameter sets]	C H A 2	Parameter switching 2
[Cmd switching]	C C S	Command channel switching
[ErrorDetect Disable]	I n H	Error detection disable
[16 preset speeds]	P S 16	16 preset speeds
[Ref 1B switching]	r C b	Reference channel switching (1 to 1B)
[Drive Lock]	L E S	Drive lock assignment
[ProductRestart Assign]	r P A	Restart product
[Idle]	I d L S	Stop and go : idle mode enable condition
[R1]...[R3]	r 1...r 3	Relay output R1...R3
[R4]...[R6]	r 4...r 6	Relay output R4...R6, if VW3A3204 relay output option module has been inserted
[DQ11 digital output]...[DQ12 digital output]	d o 1 1...d o 1 2	Digital output DQ11...DQ12, if VW3A3203 I/O extension module has been inserted
[Preset spd2]	F P S 1	Function key preset speed 1 assignment
[Preset spd3]	F P S 2	Function key preset speed 2 assignment
[PID ref. 2]	F P r 1	Function key preset PI 1 assignment

Setting	Code / Value	Description
[PID ref. 3]	FPr2	Function key preset PI 2 assignment
[+Speed]	FuSP	Function key faster assignment
[-Speed]	FdSP	Function key slower assignment
[T/K]	Ft	Function key bumpless assignment
[VSP]	uSP	Variable speed pump selection
[Switch source]	oPPW	Outlet pressure switch select
[Switch Source]	SLPW	Select an external condition to enter in sleep mode (for example. Flow switch)
[Source Activation]	PFEC	Pipe fill enable condition
[Source Selection]	JEtC	External Anti-Jam trigger condition
[Switch Select]	drYW	Dry run no flow switch selection
[Switch Selection]	PLFW	Pump low flow no flow switch selection

[DI1 High Assignment] *L IH*

DI1 high assignment.

Setting	Code / Value	Description
[No]	no	Not assigned
[Run]	run	Run enable
[Forward]	Frd	Forward operation
[Reverse]	rrS	Reverse operation
[Ramp switching]	rPS	Ramp switching
[+Speed]	uSP	+ speed
[- speed]	dSP	- Speed
[2 preset speeds]	PS2	2 preset speeds
[4 preset speeds]	PS4	4 preset speeds
[8 preset speeds]	PS8	8 preset speeds
[Ref. 2 switching]	rFC	Reference switching
[DC injection]	dC1	Injection DC stop
[Forced local]	FLo	Forced local mode
[Fault reset]	rSF	Fault reset
[Autotuning Assign]	tuL	Autotuning assignment
[Auto / manual]	PAu	PID auto-manu
[PID integral reset]	P1S	Integral shunting PID
[2 preset PID ref].	Pr2	2 preset PID references
[4 preset PID ref.]	Pr4	4 preset PID references
[Torque limitation]	tLA	Permanent torque limitation
[External Error]	EtF	External error
[2 parameter sets]	CHA1	Parameter switching 1
[3 parameter sets]	CHA2	Parameter switching 2
[Cmd switching]	CCS	Command channel switching
[ErrorDetect Disable]	inH	Error detection disable
[16 preset speeds]	PS16	16 preset speeds
[Ref 1B switching]	rCb	Reference channel switching (1 to 1B)
[Drive Lock]	LES	Drive lock assignment
[ProductRestart Assign]	rPA	Restart product
[Idle]	idLS	Stop and go : idle mode enable condition
[R1]...[R3]	r1...r3	Relay output R1...R3
[R4]...[R6]	r4...r6	Relay output R4...R6, if VW3A3204 relay output option module has been inserted

Setting	Code / Value	Description
[DQ11 digital output]...**[DQ12 digital output]**	dO 11...dO 12	Digital output DQ11...DQ12, if VW3A3203 I/O extension module has been inserted
[Preset spd2]	FPS1	Function key preset speed 1 assignment
[Preset spd3]	FPS2	Function key preset speed 2 assignment
[PID ref. 2]	FPr1	Function key preset PI 1 assignment
[PID ref. 3]	FPr2	Function key preset PI 2 assignment
[+Speed]	FUSP	Function key faster assignment
[-Speed]	FdSP	Function key slower assignment
[T/K]	FtK	Function key bumpless assignment
[VSP]	USP	Variable speed pump selection
[Switch source]	oPPW	Outlet pressure switch select
[Switch Source]	SLPW	Select an external condition to enter in sleep mode (for example. Flow switch)
[Source Activation]	PFEC	Pipe fill enable condition
[Source Selection]	JEtC	External Anti-Jam trigger condition
[Switch Select]	drYW	Dry run no flow switch selection
[Switch Selection]	PLFW	Pump low flow no flow switch selection

[DI2 assignment] L 2 A - Menu

Access

[Complete settings] ➞ [Input/Output] ➞ [I/O assignment] ➞ [DI2 assignment]

About This Menu

Identical to **[DI1 assignment]** L 1 A - menu *(see page 460)*.

[DI2 Low Assignment] L 2 L

DI2 low assignment.

[DI2 High Assignment] L 2 H

DI2 high assignment.

[DI3 assignment] L 3 A - Menu

Access

[Complete settings] ➞ [Input/Output] ➞ [I/O assignment] ➞ [DI3 assignment]

About This Menu

Identical to **[DI1 assignment]** L 1 A - menu *(see page 460)*.

[DI3 Low Assignment] L 3 L

DI3 low assignment.

[DI3 High Assignment] L 3 H

DI3 high assignment.

[DI4 assignment] L 4 A - Menu

Access

[Complete settings] ➞ [Input/Output] ➞ [I/O assignment] ➞ [DI4 assignment]

About This Menu

Identical to **[DI1 assignment]** L 1 A - menu *(see page 460)*.

[DI4 Low Assignment] L 4 L

DI4 low assignment.

[DI4 High Assignment] L 4 H

DI4 high assignment.

[DI5 assignment] L 5 A - Menu

Access

[Complete settings] ➞ [Input/Output] ➞ [I/O assignment] ➞ [DI5 assignment]

About This Menu

Identical to **[DI1 assignment]** L 1 A - menu *(see page 460)*.

[DI5 Low Assignment] L 5 L

DI5 low assignment.

[DI5 High Assignment] L 5 H

DI5 high assignment.

[DI6 assignment] L 6 A - Menu

Access

[Complete settings] ➞ [Input/Output] ➞ [I/O assignment] ➞ [DI6 assignment]

About This Menu

Identical to **[DI1 assignment] L I A -** menu *(see page 460)*.

[DI6 Low Assignment] L 6 L

DI6 low assignment.

[DI6 High Assignment] L 6 H

DI6 high assignment.

[DI11 assignment] L I I A - Menu

Access

[Complete settings] ➞ [Input/Output] ➞ [I/O assignment] ➞ [DI11 assignment]

About This Menu

Identical to **[DI1 assignment] L I A -** menu *(see page 460)*.

Following parameters can be accessed if VW3A3203 I/O extension module has been inserted.

[DI11 Low Assignment] L I I L ★

DI11 low assignment.

[DI11 High Assignment] L I I H ★

DI11 high assignment.

[DI12 assignment] L I2A - Menu

Access

[Complete settings] ➞ [Input/Output] ➞ [I/O assignment] ➞ [DI12 assignment]

About This Menu

Identical to **[DI1 assignment] L I1A -** menu *(see page 460)*.

Following parameters can be accessed if VW3A3203 I/O extension module has been inserted.

[DI12 Low Assignment] L I2L ★

DI12 low assignment.

[DI12 High Assignment] L I2H ★

DI12 high assignment.

[DI13 assignment] L I3A - Menu

Access

[Complete settings] ➞ [Input/Output] ➞ [I/O assignment] ➞ [DI13 assignment]

About This Menu

Identical to **[DI1 assignment] L I1A -** menu *(see page 460)*.

Following parameters can be accessed if VW3A3203 I/O extension module has been inserted.

[DI13 Low Assignment] L I3L ★

DI13 low assignment.

[DI13 High Assignment] L I3H ★

DI13 high assignment.

[DI14 assignment] L I4A - Menu

Access

[Complete settings] ➞ [Input/Output] ➞ [I/O assignment] ➞ [DI14 assignment]

About This Menu

Identical to **[DI1 assignment] L I1A -** menu *(see page 460)*.

Following parameters can be accessed if VW3A3203 I/O extension module has been inserted.

[DI14 Low Assignment] L I4L ★

DI14 low assignment.

[DI14 High Assignment] L I4H ★

DI14 high assignment.

[DI15 assignment] L I5A - Menu

Access

[Complete settings] ➞ [Input/Output] ➞ [I/O assignment] ➞ [DI15 assignment]

About This Menu

Identical to **[DI1 assignment] L I1A -** menu *(see page 460)*.

Following parameters can be accessed if VW3A3203 I/O extension module has been inserted.

[DI15 Low Assignment] L I5L ★

DI15 low assignment.

[DI15 High Assignment] L I5H ★

DI15 high assignment.

[DI16 assignment] L I6A - Menu

Access

[Complete settings] ➡ [Input/Output] ➡ [I/O assignment] ➡ [DI16 assignment]

About This Menu

Identical to **[DI1 assignment]** L I1A - menu *(see page 460)*.

Following parameters can be accessed if VW3A3203 I/O extension module has been inserted.

[DI16 Low Assignment] L I6L ★

DI16 low assignment.

[DI16 High Assignment] L I6H ★

DI16 high assignment.

[DI5 Pulse Input Assign] P I5A - Menu

Access

[Complete settings] ➡ **[Input/Output]** ➡ **[I/O assignment]** ➡ **[DI5 Pulse Input Assign]**

About This Menu

Following parameters can be accessed on the Graphic Display Terminal by pressing the OK key on the **[DI5 Frequency Measured]** PFC5 parameter.

[DI5 Pulse Input Assign] P I5A

DI5 pulse input assignment.

It displays all the functions associated with the pulse input in order to verify, for example, for compatibility problems.

If no functions have been assigned, **[No]** nO is displayed.

Setting	Code / Value	Description
[No]	nO	Not assigned **Factory Setting**
[AQ1 assignment]	AO1	Analog output AQ1
[AQ2 assignment]	AO2	Analog output AQ2
[Ref Freq Channel 1]	Fr1	Reference frequency channel 1
[Ref Freq Channel 2]	Fr2	Reference frequency channel 2
[Ref Frequency 2 Summing]	SA2	Reference frequency 2 summing
[PID Feedback]	PIF	PI controller feedback
[Subtract Ref Freq 2]	dA2	Subtract reference frequency 2
[Manual PID Ref.]	PIM	Manual speed reference of the PID controller (auto-man)
[PID Ref Frequency]	FPI	PID reference frequency
[Ref Frequency 3 Summing]	SA3	Reference frequency 3 summing
[Ref Frequency 1B]	Fr1b	Reference frequency 1B
[Subtract Ref Freq 2]	dA3	Subtract reference frequency 3
[Forced local]	FLOC	Forced local reference source1
[Ref Frequency 2 multiplier]	MA2	Reference frequency 2 multiplier
[Ref Frequency 3 multiplier]	MA3	Reference frequency 3 multiplier
[Virtual AI1 Channel]	AIC1	Virtual AI1 channel selector function
[InletPres Assign]	PS1A	Select the source of inlet pressure sensor
[OutletPres Assign]	PS2A	Select the source of outlet pressure sensor
[Inst Flow Assign]	FS1A	Select the source of installation flow sensor
[Pump Flow Assign]	FS2A	Select the source of pump flow sensor
[LevelCtrl Sensor]	LCSA	Level control analog sensor

[DI6 Pulse Input Assign] P ı 6 A - Menu

Access

[Complete settings] ➡ **[Input/Output]** ➡ **[I/O assignment]** ➡ **[Pulse Input DI6 Assign]**

About This Menu

Identical to **[DI5 Pulse Input Assign]** P ı 5 A - *(see page 131)*.

Following parameters can be accessed on the Graphic Display Terminal by pressing the OK key on the **[DI6 Frequency Measured]** P F C 6 parameter.

[Pulse Input DI6 Assign] P ı 6 A

Pulse Input DI6 Assignment.

[AI1 assignment] AI1A - Menu

Access

[Complete settings] ➡ [Input/Output] ➡ [I/O assignment] ➡ [AI1 assignment]

[AI1 Assignment] AI1A

Analog input AI1 functions assignment.

Read-only parameter, cannot be configured. It displays all the functions associated with input AI1 in order to verify, for example, for compatibility problems.

If no functions have been assigned, **[No]** nO is displayed.

Setting	Code / Value	Description
[No]	nO	Not assigned
[AQ1 assignment]	AO1	Analog output AQ1
[AQ2 assignment]	AO2	Analog output AQ2
[Ref Freq Channel 1]	Fr1	Reference frequency channel 1 **Factory Setting**
[Ref Freq Channel 2]	Fr2	Reference frequency channel 2
[Ref Frequency 2 Summing]	SA2	Reference frequency 2 summing
[PID Feedback]	PIF	PI controller feedback
[Subtract Ref Freq 2]	dA2	Subtract reference frequency 2
[Manual PID Ref.]	PIM	Manual speed reference of the PID controller (auto-man)
[PID Ref Frequency]	FPI	PID reference frequency
[Ref Frequency 3 Summing]	SA3	Reference frequency 3 summing
[Ref Frequency 1B]	Fr1b	Reference frequency 1B
[Subtract Ref Freq 3]	dA3	Subtract reference frequency 3
[Forced local]	FLOC	Forced local reference source1
[Ref Frequency 2 multiplier]	MA2	Reference frequency 2 multiplier
[Ref Frequency 3 multiplier]	MA3	Reference frequency 3 multiplier
[Virtual AI1 Channel]	AIC1	Virtual AI1 channel selector function
[InletPres Assign]	PS1A	Select the source of inlet pressure sensor
[OutletPres Assign]	PS2A	Select the source of outlet pressure sensor
[Inst Flow Assign]	FS1A	Select the source of installation flow sensor
[Pump Flow Assign]	FS2A	Select the source of pump flow sensor
[LevelCtrl Sensor]	LCSA	Level control analog sensor

[AI2 assignment] A I 2 A - Menu

Access

[Complete settings] ➡ [Input/Output] ➡ [I/O assignment] ➡ [AI2 assignment]

About This Menu

Identical to **[AI1 assignment] A I 1 A -** menu *(see page 471)*.

[AI2 Assignment] A I 2 A

AI2 assignment.

[AI3 assignment] A I 3 A - Menu

Access

[Complete settings] ➡ [Input/Output] ➡ [I/O assignment] ➡ [AI3 assignment]

About This Menu

Identical to **[AI1 assignment] A I 1 A -** menu *(see page 471)*.

[AI3 assignment] A I 3 A

AI3 assignment.

[AI4 assignment] A I 4 A - Menu

Access

[Complete settings] ➡ [Input/Output] ➡ [I/O assignment] ➡ [AI4 assignment]

About This Menu

Identical to **[AI1 assignment] A I 1 A -** menu *(see page 471)*.

[AI4 Assignment] A I 4 A ★

AI4 assignment.

This parameter can be accessed if VW3A3203 I/O extension module has been inserted.

[AI5 assignment] AI5A - Menu

Access

[Complete settings] ➡ **[Input/Output]** ➡ **[I/O assignment]** ➡ **[AI5 assignment]**

About This Menu

Identical to **[AI1 assignment]** AI1A - menu *(see page 471)*.

[AI5 Assignment] AI5A★

AI5 assignment.

This parameter can be accessed if VW3A3203 I/O extension module has been inserted.

[AIV1 assignment] AIV1A - Menu

Access

[Complete settings] ➡ **[Input/Output]** ➡ **[I/O assignment]** ➡ **[AIV1 assignment]**

[AIV1 Assignment] AIV1A

Virtual analog input 1 function assignment.

Setting	Code / Value	Description
[No]	nO	Not assigned
[Ref Frequency 2 Summing]	SA2	Reference frequency 2 summing
[PID Feedback]	PIF	PI controller feedback
[Subtract Ref Freq 2]	dA2	Subtract reference frequency 2
[Ref Frequency 3 Summing]	SA3	Reference frequency 3 summing
[Subtract Ref Freq 3]	dA3	Subtract reference frequency 3
[Ref Frequency 2 multiplier]	MA2	Reference frequency 2 multiplier
[Ref Frequency 3 multiplier]	MA3	Reference frequency 3 multiplier
[InletPres Assign]	PSIA	Select the source of inlet pressure sensor
[OutletPres Assign]	PS2A	Select the source of outlet pressure sensor
[Inst Flow Assign]	FSIA	Select the source of installation flow sensor
[Pump Flow Assign]	FS2A	Select the source of pump flow sensor

[AIV2 assignment] AIV2A - Menu

Access

[Complete settings] ➡ **[Input/Output]** ➡ **[I/O assignment]** ➡ **[AIV2 assignment]**

About This Menu

Identical to **[AIV1 assignment]** AIV1A - menu *(see page 473)*

[AIV2 Assignment] AIV1A

Virtual analog input 2 function assignment.

[AIV3 assignment] AV3A - Menu

Access

[Complete settings] ➡ **[Input/Output]** ➡ **[I/O assignment]** ➡ **[AIV3 assignment]**

About This Menu

Identical to **[AIV1 assignment]** AV1A - menu *(see page 473)*

[AIV3 Assignment] AV3A

Virtual analog input 3 function assignment.

[DI50 Assignment] d50A - Menu

Access

[Complete settings] ➡ **[Input/Output]** ➡ **[I/O assignment]** ➡ **[DI50 Assignment]**

About This Menu

Following parameters can be accessed on ATV660 or ATV680, equipped with cabinet IO, and if **[Access Level]** LAC is set to **[Expert]** EPr.

[DI50 Low Assignment] d50L

DI50 low assignment.

[DI50 High Assignment] d50H

DI50 high assignment.

[DI51 Assignment] d51A - Menu

Access

[Complete settings] ➡ **[Input/Output]** ➡ **[I/O assignment]** ➡ **[DI51 Assignment]**

About This Menu

Following parameters can be accessed on ATV660 or ATV680, equipped with cabinet IO, and if **[Access Level]** LAC is set to **[Expert]** EPr.

[DI51 Low Assignment] d51L

DI51 low assignment.

[DI51 High Assignment] d51H

DI51 high assignment.

[DI52 Assignment] d S 2 A - Menu

Access

[Complete settings] ➞ [Input/Output] ➞ [I/O assignment] ➞ [DI52 Assignment]

About This Menu

Following parameters can be accessed on ATV660 or ATV680, equipped with cabinet IO, and if **[Access Level]** L A C is set to **[Expert]** E P r.

[DI52 Low Assignment] d S 2 L

DI52 low assignment.

Settings	Code/Value	Description
[No]	n o	Not assigned
[Freewheel stop]	n S t	Freewheel stop
[Ext Error assign]	E t F	External error assignment
[Drive Lock]	L E S	Drive lock assignment
[Monitor Circuit A]	i F A A	Monitoring circuit A assignment
[Monitor Circuit B]	i F A b	Monitoring circuit B assignment
[Monitor Circuit C]	i F A C	Monitoring circuit C assignment
[Monitor Circuit D]	i F A d	Monitoring circuit D assignment
[Cabinet Circuit A]	C F A A	Cabinet circuit A assignment
[Cabinet Circuit B]	C F A b	Cabinet circuit B assignment
[Cabinet Circuit C]	C F A C	Cabinet circuit C assignment
[Motor Winding A]	t F A A	Motor winding A assignment
[Motor Winding B]	t F A b	Motor winding B assignment
[Motor Bearing A]	t F A C	Motor bearing A assignment
[Motor Bearing B]	t F A d	Motor bearing B assignment

[DI52 High Assignment] d S 2 H

DI52 high assignment.

Settings	Code/Value	Description
[No]	n o	Not assigned
[Forced local]	F L o	Forced local mode
[Fault reset]	r S F	Fault reset
[Eternal Error]	E t F	External error
[Drive Lock]	L E S	Drive lock assignment
[Product Restart Assign]	r P A	Restart product
[Monitor Circuit A]	i F A A	Monitoring circuit A assignment
[Monitor Circuit B]	i F A b	Monitoring circuit B assignment
[Monitor Circuit C]	i F A C	Monitoring circuit C assignment
[Monitor Circuit D]	i F A d	Monitoring circuit D assignment
[Cabinet Circuit A]	C F A A	Cabinet circuit A assignment
[Cabinet Circuit B]	C F A b	Cabinet circuit B assignment
[Cabinet Circuit C]	C F A C	Cabinet circuit C assignment
[Motor Winding A]	t F A A	Motor winding A assignment
[Motor Winding B]	t F A b	Motor winding B assignment
[Motor Bearing A]	t F A C	Motor bearing A assignment
[Motor Bearing B]	t F A d	Motor bearing B assignment
[Mains Contactor]	L L C	Mains contactor control

[DI53 Assignment] d S 3 A - Menu

Access

[Complete settings] ➞ **[Input/Output]** ➞ **[I/O assignment]** ➞ **[DI53 Assignment]**

About This Menu

Identical to **[DI52 Assignment]** d S 2 A - Menu. *(see page 475)*

Following parameters can be accessed on ATV660 or ATV680, equipped with cabinet IO, and if **[Access Level]** L A C is set to **[Expert]** E P r .

[DI53 Low Assignment] d S 3 L

DI53 low assignment.

[DI53 High Assignment] d S 3 H

DI53 high assignment.

[DI54 Assignment] d S 4 A - Menu

Access

[Complete settings] ➞ **[Input/Output]** ➞ **[I/O assignment]** ➞ **[DI54 Assignment]**

About This Menu

Identical to **[DI52 Assignment]** d S 2 A - Menu. *(see page 475)*

Following parameters can be accessed on ATV660 or ATV680, equipped with cabinet IO, and if **[Access Level]** L A C is set to **[Expert]** E P r .

[DI54 Low Assignment] d S 4 L

DI54 low assignment.

[DI54 High Assignment] d S 4 H

DI54 high assignment.

[DI55 Assignment] d S 5 A - Menu

Access

[Complete settings] ➞ **[Input/Output]** ➞ **[I/O assignment]** ➞ **[DI55 Assignment]**

About This Menu

Identical to **[DI52 Assignment]** d S 2 A - Menu. *(see page 475)*

Following parameters can be accessed on ATV660 or ATV680, equipped with cabinet IO, and if **[Access Level]** L A C is set to **[Expert]** E P r .

[DI55 Low Assignment] d S 5 L

DI55 low assignment.

[DI55 High Assignment] d S 5 H

DI55 high assignment.

[DI56 Assignment] d S 6 A - Menu

Access

[Complete settings] ➡ **[Input/Output]** ➡ **[I/O assignment]** ➡ **[DI56 Assignment]**

About This Menu

Identical to **[DI52 Assignment]** d S 2 A - Menu. *(see page 475)*

Following parameters can be accessed on ATV660 or ATV680, equipped with cabinet IO, and if **[Access Level]** L A C is set to **[Expert]** E P r .

[DI56 Low Assignment] d S 6 L

DI56 low assignment.

[DI56 High Assignment] d S 6 H

DI56 high assignment.

[DI57 Assignment] d S 7 A - Menu

Access

[Complete settings] ➡ **[Input/Output]** ➡ **[I/O assignment]** ➡ **[DI57 Assignment]**

About This Menu

Identical to **[DI52 Assignment]** d S 2 A - Menu. *(see page 475)*

Following parameters can be accessed on ATV660 or ATV680, equipped with cabinet IO, and if **[Access Level]** L A C is set to **[Expert]** E P r .

[DI57 Low Assignment] d S 7 L

DI57 low assignment.

[DI57 High Assignment] d S 7 H

DI57 high assignment.

[DI58 Assignment] d 5 8 A - Menu

Access

[Complete settings] ➡ **[Input/Output]** ➡ **[I/O assignment]** ➡ **[DI58 Assignment]**

About This Menu

Identical to **[DI52 Assignment]** d 5 2 A - Menu. *(see page 475)*

Following parameters can be accessed on ATV660 or ATV680, equipped with cabinet IO, and if **[Access Level]** L A C is set to **[Expert]** E P r .

[DI58 Low Assignment] d 5 8 L

DI58 low assignment.

[DI58 High Assignment] d 5 8 H

DI58 high assignment.

[DI59 Assignment] d 5 9 A - Menu

Access

[Complete settings] ➡ **[Input/Output]** ➡ **[I/O assignment]** ➡ **[DI59 Assignment]**

About This Menu

Identical to **[DI52 Assignment]** d 5 2 A - Menu. *(see page 475)*

Following parameters can be accessed on ATV660 or ATV680, equipped with cabinet IO, and if **[Access Level]** L A C is set to **[Expert]** E P r .

[DI59 Low Assignment] d 5 9 L

DI59 low assignment.

[DI59 High Assignment] d 5 9 H

DI59 high assignment.

Section 7.53
[Input/Output] - [DI/DQ]

What Is in This Section?

This section contains the following topics:

Topic	Page
[DI1 Configuration] d i 1 - Menu	480
[DI2 Configuration] d i 2 - Menu	482
[DI3 Configuration] d i 3 - Menu	483
[DI4 Configuration] d i 4 - Menu	483
[DI5 Configuration] d i 5 - Menu	484
[DI6 Configuration] d i 6 - Menu	484
[DI11 Configuration] d i 1 1 - Menu	485
[DI12 Configuration] d i 1 2 - Menu	485
[DI13 Configuration] d i 1 3 - Menu	486
[DI14 Configuration] d i 1 4 - Menu	486
[DI15 Configuration] d i 1 5 - Menu	487
[DI16 Configuration] d i 1 6 - Menu	487
[DI5 Pulse Config] P A i 5 - Menu	488
[DI6 Pulse Config] P A i 6 - Menu	490
[DQ11 Configuration] d o 1 1 - Menu	491
[DQ12 Configuration] d o 1 2 - Menu	492
[DI50 Configuration] d i 5 0 - Menu	492
[DI51 Configuration] d i 5 1 - Menu	493
[DI52 Configuration] d i 5 2 - Menu	494
[DI53 Configuration] d i 5 3 - Menu	495
[DI54 Configuration] d i 5 4 - Menu	496
[DI55 Configuration] d i 5 5 - Menu	497
[DI56 Configuration] d i 5 6 - Menu	498
[DI57 Configuration] d i 5 7 - Menu	499
[DI58 Configuration] d i 5 8 - Menu	500
[DI59 Configuration] d i 5 9 - Menu	501

[DI1 Configuration] d I 1 - Menu

Access

[Complete settings] ➡ [Input/Output] ➡ [DI/DQ] ➡ [DI1 Configuration]

[DI1 Low Assignment] L I L

DI1 low assignment.

Setting	Code / Value	Description
[No]	n o	Not assigned
[Run]	r u n	Run enable
[Forward]	F r d	Forward operation
[Reverse]	r r S	Reverse operation
[Ramp switching]	r P S	Ramp switching
[+Speed]	u S P	+ speed
[- speed]	d S P	- Speed
[2 preset speeds]	P S 2	2 preset speeds
[4 preset speeds]	P S 4	4 preset speeds
[8 preset speeds]	P S 8	8 preset speeds
[Ref Freq 2 switching]	r F C	Reference switching
[Freewheel stop]	n S t	Freewheel stop
[DC injection]	d C I	Injection DC stop
[Fast stop]	F S t	Fast stop
[Forced local]	F L o	Forced local mode
[Fault reset]	r S F	Fault reset
[Autotuning]	t u L	Autotuning assignment
[Auto / manual]	P A u	PID auto-manu
[PID integral Disabled]	P I S	Integral shunting PID
[2 preset PID ref].	P r 2	2 preset PID references
[4 preset PID ref.]	P r 4	4 preset PID references
[Torque limitation]	t L A	Permanent torque limitation
[External Error]	E t F	External error
[2 parameter sets]	C H A 1	Parameter switching 1
[3 parameter sets]	C H A 2	Parameter switching 2
[Cmd switching]	C C S	Command channel switching
[ErrorDetect Disable]	I n H	Error detection disable
[16 preset speeds]	P S 16	16 preset speeds
[Ref 1B switching]	r C b	Reference channel switching (1 to 1B)
[Drive Lock]	L E S	Drive lock assignment
[ProductRestart Assign]	r P A	Restart product
[Idle]	I d L S	Stop and go : idle mode enable condition
[R1]...[R3]	r 1...r 3	Relay output R1...R3
[R4]...[R6]	r 4...r 6	Relay output R4...R6, if VW3A3204 relay output option module has been inserted
[DQ11 digital output]...[DQ12 digital output]	d o 1 1...d o 1 2	Digital output DQ11...DQ12, if VW3A3203 I/O extension module has been inserted
[Preset spd2]	F P S 1	Function key preset speed 1 assignment
[Preset spd3]	F P S 2	Function key preset speed 2 assignment
[PID ref. 2]	F P r 1	Function key preset PI 1 assignment
[PID ref. 3]	F P r 2	Function key preset PI 2 assignment
[+Speed]	F u S P	Function key faster assignment
[-Speed]	F d S P	Function key slower assignment

Setting	Code / Value	Description
[T/K]	FE	Function key bumpless assignment
[VSP]	uSP	Variable speed pump selection
[Switch source]	oPPW	Outlet pressure switch select
[Source Activation]	PFEC	Pipe fill enable condition
[Source Selection]	JEtC	External Anti-Jam trigger condition
[Switch Select]	drYW	Dry run no flow switch selection
[Switch Selection]	PLFW	Pump low flow no flow switch selection

[DI1 High Assignment] LIH

DI1 high assignment.

Setting	Code / Value	Description
[No]	nO	Not assigned
[Run]	run	Run enable
[Forward]	Frd	Forward operation
[Reverse]	rrS	Reverse operation
[Ramp switching]	rPS	Ramp switching
[+Speed]	uSP	+ speed
[- speed]	dSP	- Speed
[2 preset speeds]	PS2	2 preset speeds
[4 preset speeds]	PS4	4 preset speeds
[8 preset speeds]	PS8	8 preset speeds
[Ref. 2 switching]	rFC	Reference switching
[DC injection]	dC1	Injection DC stop
[Forced local]	FLO	Forced local mode
[Fault reset]	rSF	Fault reset
[Autotuning Assign]	tuL	Autotuning assignment
[External Error]	EtF	External error
[2 parameter sets]	CHA1	Parameter switching 1
[3 parameter sets]	CHA2	Parameter switching 2
[Cmd switching]	CCS	Command channel switching
[ErrorDetect Disable]	inH	Error detection disable
[16 preset speeds]	PS16	16 preset speeds
[Ref 1B switching]	rCb	Reference channel switching (1 to 1B)
[Drive Lock]	LES	Drive lock assignment
[ProductRestart Assign]	rPA	Restart product
[Idle]	idLS	Stop and go : idle mode enable condition
[R1]...[R3]	r1...r3	Relay output R1...R3
[R4]...[R6]	r4...r6	Relay output R4...R6, if VW3A3204 relay output option module has been inserted
[DQ11 digital output]...[DQ12 digital output]	do11...do12	Digital output DQ11...DQ12, if VW3A3203 I/O extension module has been inserted
[Preset spd2]	FPS1	Function key preset speed 1 assignment
[Preset spd3]	FPS2	Function key preset speed 2 assignment
[PID ref. 2]	FPr1	Function key preset PI 1 assignment
[PID ref. 3]	FPr2	Function key preset PI 2 assignment
[+Speed]	FuSP	Function key faster assignment
[-Speed]	FdSP	Function key slower assignment
[T/K]	FE	Function key bumpless assignment

1 Because, in this case, the detected error does not trigger a stop, it is recommended to assign a relay or logic output to its indication.

Setting	Code / Value	Description
[VSP]	uSP	Variable speed pump selection
[Switch source]	oPPW	Outlet pressure switch select
[Switch Source]	SLPW	Select an external condition to enter in sleep mode (for example. Flow switch)
[Source Activation]	PFEC	Pipe fill enable condition
[Source Selection]	JEtC	External Anti-Jam trigger condition
[Switch Select]	drYW	Dry run no flow switch selection
[Switch Selection]	PLFW	Pump low flow no flow switch selection
1 Because, in this case, the detected error does not trigger a stop, it is recommended to assign a relay or logic output to its indication.		

[DI1 Delay] LId

DI1 delay.

NOTE: Commands received via this digital input are processed once the delay time set via this parameter has elapsed.

Setting	Description
0...200 ms	Setting range **Factory setting**: 0 ms

[DI2 Configuration] di2 - Menu

Access

[Complete settings] ➡ [Input/Output] ➡ [DI/DQ] ➡ [DI2 Configuration]

About This Menu

Identical to **[DI1 Configuration]** di1 - menu *(see page 480)*.

[DI2 Low Assignment] L2L

DI2 low assignment.

[DI2 High Assignment] L2H

DI2 high assignment.

[DI2 Delay] L2d

DI2 delay.

[DI3 Configuration] d I 3 - Menu

Access

[Complete settings] ➡ [Input/Output] ➡ [DI/DQ] ➡ [DI3 Configuration]

About This Menu

Identical to **[DI1 Configuration] d I 1 -** menu *(see page 480)*.

[DI3 Low Assignment] L 3 L

DI3 low assignment.

[DI3 High Assignment] L 3 H

DI3 high assignment.

[DI3 Delay] L 3 d

DI3 delay.

[DI4 Configuration] d I 4 - Menu

Access

[Complete settings] ➡ [Input/Output] ➡ [DI/DQ] ➡ [DI4 Configuration]

About This Menu

Identical to **[DI1 Configuration] d I 1 -** menu *(see page 480)*.

[DI4 Low Assignment] L 4 L

DI4 low assignment.

[DI4 High Assignment] L 4 H

DI4 high assignment.

[DI4 Delay] L 4 d

DI4 delay.

[DI5 Configuration] d I 5 - Menu

Access

[Complete settings] ➡ [Input/Output] ➡ [DI/DQ] ➡ [DI5 Configuration]

About This Menu

Identical to **[DI1 Configuration] d I 1 -** menu *(see page 480)*.

[DI5 Low Assignment] L 5 L

DI5 low assignment.

[DI5 High Assignment] L 5 H

DI5 high assignment.

[DI5 Delay] L 5 d

DI5 delay.

[DI6 Configuration] d I 6 - Menu

Access

[Complete settings] ➡ [Input/Output] ➡ [DI/DQ] ➡ [DI6 Configuration]

About This Menu

Identical to **[DI1 Configuration] d I 1 -** menu *(see page 480)*.

[DI6 Low Assignment] L 6 L

DI6 low assignment.

[DI6 High Assignment] L 6 H

DI6 high assignment.

[DI6 Delay] L 6 d

DI6 delay.

[DI11 Configuration] d I I I - Menu

Access

[Complete settings] ➡ [Input/Output] ➡ [DI/DQ] ➡ [DI11 Configuration]

About This Menu

Identical to **[DI1 Configuration] d I I -** menu *(see page 480)*.

Following parameters can be accessed if VW3A3203 I/O extension module has been inserted.

[DI11 Low Assignment] L I I L ★

DI11 low assignment.

[DI11 High Assignment] L I I H ★

DI11 high assignment.

[DI11 Delay] L I I d ★

DI11 delay.

[DI12 Configuration] d I I 2 - Menu

Access

[Complete settings] ➡ [Input/Output] ➡ [DI/DQ] ➡ [DI12 Configuration]

About This Menu

Identical to **[DI1 Configuration] d I I -** menu *(see page 480)*.

Following parameters can be accessed if VW3A3203 I/O extension module has been inserted.

[DI12 Low Assignment] L I 2 L ★

DI12 low assignment.

[DI12 High Assignment] L I 2 H ★

DI12 high assignment.

[DI12 Delay] L I 2 d ★

DI12 delay.

[DI13 Configuration] d I 1 3 - Menu

Access

[Complete settings] ➡ [Input/Output] ➡ [DI/DQ] ➡ [DI13 Configuration]

About This Menu

Identical to **[DI1 Configuration] d I 1 -** menu *(see page 480)*.

Following parameters can be accessed if VW3A3203 I/O extension module has been inserted.

[DI13 Low Assignment] L I 3 L ★

DI13 low assignment.

[DI13 High Assignment] L I 3 H ★

DI13 high assignment.

[DI13 Delay] L I 3 d ★

DI13 delay.

[DI14 Configuration] d I 1 4 - Menu

Access

[Complete settings] ➡ [Input/Output] ➡ [DI/DQ] ➡ [DI14 Configuration]

About This Menu

Identical to **[DI1 Configuration] d I 1 -** menu *(see page 480)*.

Following parameters can be accessed if VW3A3203 I/O extension module has been inserted.

[DI14 Low Assignment] L I 4 L ★

DI14 low assignment.

[DI14 High Assignment] L I 4 H ★

DI14 high assignment.

[DI14 Delay] L I 4 d ★

DI14 delay.

[DI15 Configuration] d I 5 - Menu

Access

[Complete settings] ➡ [Input/Output] ➡ [DI/DQ] ➡ [DI15 Configuration]

About This Menu

Identical to **[DI1 Configuration] d I 1 -** menu *(see page 480)*.

Following parameters can be accessed if VW3A3203 I/O extension module has been inserted.

[DI15 Low Assignment] L I 5 L ★

DI15 low assignment.

[DI15 High Assignment] L I 5 H ★

DI15 high assignment.

[DI15 Delay] L I 5 d ★

DI15 delay.

[DI16 Configuration] d I 6 - Menu

Access

[Complete settings] ➡ [Input/Output] ➡ [DI/DQ] ➡ [DI16 Configuration]

About This Menu

Identical to **[DI1 Configuration] d I 1 -** menu *(see page 480)*.

Following parameters can be accessed if VW3A3203 I/O extension module has been inserted.

[DI16 Low Assignment] L I 6 L ★

DI16 low assignment.

[DI16 High Assignment] L I 6 H ★

DI16 high assignment.

[DI16 Delay] L I 6 d ★

DI16 delay.

[DI5 Pulse Config] PA i5 - Menu

Access

[Complete settings] ➡ **[Input/Output]** ➡ **[DI/DQ]** ➡ **[DI5 Pulse Config]**

About This Menu

Following parameters can be accessed on the Graphic Display Terminal by pressing the **OK** key on the **[DI5 Frequency Measured]** PFC5 parameter.

[DI5 Pulse Input Assign] PI5A

Di5 pulse input assignment.

It displays all the functions associated with the pulse input in order to verify, for example, for compatibility problems.

If no functions have been assigned, **[No]** no is displayed.

Setting	Code / Value	Description
[No]	no	Not assigned **Factory Setting**
[AQ1 assignment]	Ao1	Analog output AQ1
[AQ2 assignment]	Ao2	Analog output AQ2
[Ref Freq Channel 1]	Fr1	Reference frequency channel 1
[Ref Freq Channel 2]	Fr2	Reference frequency channel 2
[Ref Frequency 2 Summing]	SA2	Reference frequency 2 summing
[PID Feedback]	PIF	PI controller feedback
[Subtract Ref Freq 2]	dA2	Subtract reference frequency 2
[Manual PID Ref.]	PIM	Manual speed reference of the PID controller (auto-man)
[PID Ref Frequency]	FPI	PID reference frequency
[Ref Frequency 3 Summing]	SA3	Reference frequency 3 summing
[Ref Frequency 1B]	Fr1b	Reference frequency 1B
[Subtract Ref Freq 2]	dA3	Subtract reference frequency 3
[Forced local]	FLoC	Forced local reference source1
[Ref Frequency 2 multiplier]	MA2	Reference frequency 2 multiplier
[Ref Frequency 3 multiplier]	MA3	Reference frequency 3 multiplier
[Virtual AI1 Channel]	AIC1	Virtual AI1 channel selector function
[InletPres Assign]	PS1A	Select the source of inlet pressure sensor
[OutletPres Assign]	PS2A	Select the source of outlet pressure sensor
[Inst Flow Assign]	FS1A	Select the source of installation flow sensor
[Pump Flow Assign]	FS2A	Select the source of pump flow sensor
[LevelCtrl Sensor]	LCSA	Level control analog sensor

[DI5 PulseInput Low Freq] PIL5

DI5 pulse input low frequency.

Pulse input scaling parameter of 0% in Hz x 10 unit.

Setting	Description
0.00...30000.00 Hz	Setting range **Factory setting**: 0.00 Hz

[DI5 PulseInput High Freq] *P I H 5*

DI5 pulse input high frequency.

Pulse input scaling parameter of 100% in Hz x 10 unit.

Setting	Description
0.00...30.00 kHz	Setting range **Factory setting**: 30.00 kHz

[DI5 Frequency Filter] *P F I 5*

Interference filtering pulse input cut-off time of the low-filter.

Setting	Description
0...1,000 ms	Setting range **Factory setting**: 0 ms

[DI6 Pulse Config] PRI6 - Menu

Access

[Complete settings] ➡ **[Input/Output]** ➡ **[DI/DQ]** ➡ **[DI6 Pulse Config]**

About This Menu

Following parameters can be accessed on the Graphic Display Terminal by pressing the **OK** key on the **[DI6 Frequency Measured]** PFC6 parameter.

[DI6 Pulse Input Assign] PI6A

Filtered customer pulse input frequency reference.

Identical to **[DI5 Pulse Input Assign]** PI5A *(see page 131)*.

[DI6 PulseInput Low Freq] PIL6

DI6 pulse input low frequency.

Identical to **[DI5 PulseInput Low Freq]** PIL5 *(see page 132)*.

[DI6 PulseInput High Freq] PIH6

DI6 pulse input high frequency.

Identical to **[DI5 PulseInput High Freq]** PIH5 *(see page 132)*.

[DI6 Frequency Filter] PFI6

Interference filtering pulse input cut-off time of the low-filter.

Identical to **[DI5 Frequency Filter]** PFI5 *(see page 132)*.

[DQ11 Configuration] d o 1 1 - Menu

Access

[Complete settings] ➡ **[Input/Output]** ➡ **[DI/DQ]** ➡ **[DQ11 Configuration]**

About This Menu

Following parameters can be accessed if VW3A3203 I/O extension module has been inserted.

[DQ11 Assignment] d o 1 1★

Digital output 11 assignment.

Identical to **[R2 Assignment]** r 2 *(see page 523)*

[DQ11 actv delay] d 1 1 d★

DQ11 activation delay time.

The delay cannot be set for the **[Operating State "Fault"]** F L t and **[Mains Contactor]** L L C assignments, and remains at 0.

The change in state only takes effect once the configured time has elapsed when the information becomes true.

Setting	Description
0...60,000 ms	Setting range 0...9,999 ms then 10.00...60.00 s on the Graphic Display Terminal **Factory setting**: 0 ms

[DQ11 status] d 1 1 S★

DQ11 status (output active level).

Setting	Code / Value	Description
[1]	P o S	State 1 when the information is true **Factory Setting**
[0]	n E G	State 0 when the information is true

The configuration **[1]** P o S cannot be modified for the **[Operating State "Fault"]** F L t, **[Brake Sequence]** b L C, and **[Mains Contactor]** L L C assignments.

[DQ11 hold delay] d 1 1 H★

DQ11 holding delay time.

The holding time cannot be set for the **[Operating State "Fault"]** F L t, **[Brake Sequence]** b L C, and **[Mains Contactor]** L L C assignments, and remains at 0.

The change in state only takes effect once the configured time has elapsed when the information becomes false.

Setting	Description
0...9,999 ms	Setting range **Factory setting**: 0 ms

[DQ12 Configuration] dO I2 - Menu

Access

[Complete settings] ➡ **[Input/Output]** ➡ **[DI/DQ]** ➡ **[DQ12 Configuration]**

About This Menu

Identical to **[DQ11 Configuration]** dO I1 - Menu *(see page 491)*.

Following parameters can be accessed if VW3A3203 I/O extension module has been inserted.

[DQ12 Assignment] dO I2 ★

Digital output 12 assignment.

[DQ12 actv delay] d I2d ★

DQ12 activation delay time.

[DQ12 status] d I2S ★

DQ12 status (output active level).

[DQ12 hold delay] d I2H ★

DQ12 holding delay time.

[DI50 Configuration] d I50 - Menu

Access

[Complete settings] ➡ **[Input/Output]** ➡ **[DI/DQ]** ➡ **[DI50 Configuration]**

About This Menu

Identical to **[DI1 Configuration]** d I1 - Menu. *(see page 480)*

Following parameters can be accessed on ATV660 or ATV680, equipped with cabinet IO, and if **[Access Level]** LAC is set to **[Expert]** EPr.

NOTE: DI50 up to DI59 Inputs are used inside the Drive Systems enclosure for control and monitoring circuits.

[DI50 Low Assignment] d50L

DI50 low assignment.

[DI50 High Assignment] d50H

DI50 high assignment.

[DI50 delay] d50d

DI50 delay.

NOTE: Commands received via this digital input are processed once the delay time set via this parameter has elapsed.

Setting	Description
0...200 ms	Setting range **Factory setting**: 5 ms

[DI51 Configuration] d I 5 1 - Menu

Access

[Complete settings] ➡ **[Input/Output]** ➡ **[DI/DQ]** ➡ **[DI51 Configuration]**

About This Menu

Identical to **[DI1 Configuration]** d I 1 - Menu. *(see page 480)*

Following parameters can be accessed on ATV660 or ATV680, equipped with cabinet IO, and if **[Access Level]** L A C is set to **[Expert]** E P r .

NOTE: DI50 up to DI59 Inputs are used inside the Drive Systems enclosure for control and monitoring circuits.

[DI51 Low Assignment] d 5 1 L

DI51 low assignment.

[DI51 High Assignment] d 5 1 H

DI51 high assignment.

[DI51 delay] d 5 1 d

DI51 delay.

NOTE: Commands received via this digital input are processed once the delay time set via this parameter has elapsed.

Setting	Description
0...200 ms	Setting range **Factory setting**: 5 ms

[DI52 Configuration] d I 5 2 - Menu

Access

[Complete settings] ➡ **[Input/Output]** ➡ **[DI/DQ]** ➡ **[DI52 Configuration]**

About This Menu

Identical to **[DI1 Configuration]** d I 1 - Menu. *(see page 480)*

Following parameters can be accessed on ATV660 or ATV680, equipped with cabinet IO, and if **[Access Level]** L A C is set to **[Expert]** E P r .

NOTE: DI50 up to DI59 Inputs are used inside the Drive Systems enclosure for control and monitoring circuits.

[DI52 Low Assignment] d 5 2 L

DI52 low assignment.

[DI52 High Assignment] d 5 2 H

DI52 high assignment.

[DI52 delay] d 5 2 d

DI52 delay.

NOTE: Commands received via this digital input are processed once the delay time set via this parameter has elapsed.

Setting	Description
0...200 ms	Setting range **Factory setting**: 5 ms

[DI53 Configuration] d I 5 3 - Menu

Access

[Complete settings] ➡ **[Input/Output]** ➡ **[DI/DQ]** ➡ **[DI53 Configuration]**

About This Menu

Identical to **[DI1 Configuration]** d I 1 - Menu. *(see page 480)*

Following parameters can be accessed on ATV660 or ATV680, equipped with cabinet IO, and if **[Access Level]** L A C is set to **[Expert]** E P r .

NOTE: DI50 up to DI59 Inputs are used inside the Drive Systems enclosure for control and monitoring circuits.

[DI53 Low Assignment] d 5 3 L

DI53 low assignment.

[DI53 High Assignment] d 5 3 H

DI53 high assignment.

[DI53 delay] d 5 3 d

DI53 delay.

NOTE: Commands received via this digital input are processed once the delay time set via this parameter has elapsed.

Setting	Description
0...200 ms	Setting range **Factory setting**: 5 ms

[DI54 Configuration] d I 5 4 - Menu

Access

[Complete settings] ➡ **[Input/Output]** ➡ **[DI/DQ]** ➡ **[DI54 Configuration]**

About This Menu

Identical to **[DI1 Configuration]** d I 1 - Menu. *(see page 480)*

Following parameters can be accessed on ATV660 or ATV680, equipped with cabinet IO, and if **[Access Level]** L A C is set to **[Expert]** E P r .

NOTE: DI50 up to DI59 Inputs are used inside the Drive Systems enclosure for control and monitoring circuits.

[DI54 Low Assignment] d 5 4 L

DI54 low assignment.

[DI54 High Assignment] d 5 4 H

DI54 high assignment.

[DI54 delay] d 5 4 d

DI54 delay.

NOTE: Commands received via this digital input are processed once the delay time set via this parameter has elapsed.

Setting	Description
0...200 ms	Setting range **Factory setting**: 5 ms

[DI55 Configuration] d I 5 5 - Menu

Access

[Complete settings] ➡ **[Input/Output]** ➡ **[DI/DQ]** ➡ **[DI55 Configuration]**

About This Menu

Identical to **[DI1 Configuration]** d I 1 - Menu. *(see page 480)*

Following parameters can be accessed on ATV660 or ATV680, equipped with cabinet IO, and if **[Access Level]** L A C is set to **[Expert]** E P r .

NOTE: DI50 up to DI59 Inputs are used inside the Drive Systems enclosure for control and monitoring circuits.

[DI55 Low Assignment] d 5 5 L

DI55 low assignment.

[DI55 High Assignment] d 5 5 H

DI55 high assignment.

[DI55 delay] d 5 5 d

DI55 delay.

NOTE: Commands received via this digital input are processed once the delay time set via this parameter has elapsed.

Setting	Description
0...200 ms	Setting range **Factory setting**: 5 ms

[DI56 Configuration] d I 5 6 - Menu

Access

[Complete settings] ➡ **[Input/Output]** ➡ **[DI/DQ]** ➡ **[DI56 Configuration]**

About This Menu

Identical to **[DI1 Configuration]** d I 1 - Menu. *(see page 480)*

Following parameters can be accessed on ATV660 or ATV680, equipped with cabinet IO, and if **[Access Level]** L A C is set to **[Expert]** E P r .

NOTE: DI50 up to DI59 Inputs are used inside the Drive Systems enclosure for control and monitoring circuits.

[DI56 Low Assignment] d 5 6 L

DI56 low assignment.

[DI56 High Assignment] d 5 6 H

DI56 high assignment.

[DI56 delay] d 5 6 d

DI56 delay.

NOTE: Commands received via this digital input are processed once the delay time set via this parameter has elapsed.

Setting	Description
0...200 ms	Setting range **Factory setting**: 5 ms

[DI57 Configuration] d I 5 7 - Menu

Access

[Complete settings] ➡ **[Input/Output]** ➡ **[DI/DQ]** ➡ **[DI57 Configuration]**

About This Menu

Identical to **[DI1 Configuration]** d I 1 - Menu. *(see page 480)*

Following parameters can be accessed on ATV660 or ATV680, equipped with cabinet IO, and if **[Access Level]** L A C is set to **[Expert]** E P r .

NOTE: DI50 up to DI59 Inputs are used inside the Drive Systems enclosure for control and monitoring circuits.

[DI57 Low Assignment] d 5 7 L

DI57 low assignment.

[DI57 High Assignment] d 5 7 H

DI57 high assignment.

[DI57 delay] d 5 7 d

DI57 delay.

NOTE: Commands received via this digital input are processed once the delay time set via this parameter has elapsed.

Setting	Description
0...200 ms	Setting range **Factory setting**: 5 ms

[DI58 Configuration] d I 5 8 - Menu

Access

[Complete settings] ➡ **[Input/Output]** ➡ **[DI/DQ]** ➡ **[DI58 Configuration]**

About This Menu

Identical to **[DI1 Configuration]** d I 1 - Menu. *(see page 480)*

Following parameters can be accessed on ATV660 or ATV680, equipped with cabinet IO, and if **[Access Level]** L A C is set to **[Expert]** E P r .

NOTE: DI50 up to DI59 Inputs are used inside the Drive Systems enclosure for control and monitoring circuits.

[DI58 Low Assignment] d 5 8 L

DI58 low assignment.

[DI58 High Assignment] d 5 8 H

DI58 high assignment.

[DI58 delay] d 5 8 d

DI58 delay.

NOTE: Commands received via this digital input are processed once the delay time set via this parameter has elapsed.

Setting	Description
0...200 ms	Setting range **Factory setting**: 5 ms

[DI59 Configuration] d I 5 9 - Menu

Access

[Complete settings] ➡ **[Input/Output]** ➡ **[DI/DQ]** ➡ **[DI59 Configuration]**

About This Menu

Identical to **[DI1 Configuration]** d I 1 - Menu. *(see page 480)*

Following parameters can be accessed on ATV660 or ATV680, equipped with cabinet IO, and if **[Access Level]** L A C is set to **[Expert]** E P r .

NOTE: DI50 up to DI59 Inputs are used inside the Drive Systems enclosure for control and monitoring circuits.

[DI59 Low Assignment] d 5 9 L

DI59 low assignment.

[DI59 High Assignment] d 5 9 H

DI59 high assignment.

[DI59 delay] d 5 9 d

DI59 delay.

NOTE: Commands received via this digital input are processed once the delay time set via this parameter has elapsed.

Setting	Description
0...200 ms	Setting range **Factory setting**: 5 ms

Section 7.54
[Input/Output] - [Analog I/O]

What Is in This Section?

This section contains the following topics:

Topic	Page
[AI1 configuration] *AI1-* Menu	503
[AI2 configuration] *AI2-* Menu	506
[AI3 configuration] *AI3-* Menu	508
[AI4 configuration] *AI4-* Menu	509
[AI5 configuration] *AI5-* Menu	511
[AQ1 configuration] *AQ1-* Menu	512
[AQ2 configuration] *AQ2-* Menu	516
[Virtual AI1] *AV1-* Menu	518
[Virtual AI2] *AV2-* Menu	519
[Virtual AI3] *AV3-* Menu	519

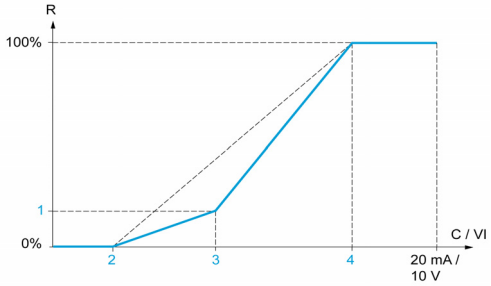
[AI1 configuration] A I 1 - Menu

Access

[Complete settings] ➡ **[Input/Output]** ➡ **[AI/AQ]** ➡ **[AI1 configuration]**

About This Menu

The input can be delinearized by configuring an intermediate point on the input/output curve of this input:



R Reference
C / VI Current or Voltage Input
1 **[Y Interm. point]**
2 **[Min value]** (0%)
3 **[X Interm. point]**
4 **[Max value]** (100%)

NOTE: For **[X Interm. point]**, 0% corresponds to **[Min value]** and 100% to **[Max value]**.

[AI1 Assignment] A I 1 A

Analog input AI1 functions assignment.

Read-only parameter, cannot be configured. It displays all the functions associated with input AI1 in order to verify, for example, for compatibility problems.

If no functions have been assigned, **[No]** n o is displayed.

Setting	Code / Value	Description
[No]	n o	Not assigned
[AQ1 assignment]	A o 1	Analog output AQ1
[AQ2 assignment]	A o 2	Analog output AQ2
[Ref Freq Channel 1]	F r 1	Reference frequency channel 1 **Factory Setting**
[Ref Freq Channel 2]	F r 2	Reference frequency channel 2
[Ref Frequency 2 Summing]	S A 2	Reference frequency 2 summing
[PID Feedback]	P I F	PI controller feedback
[Subtract Ref Freq 2]	d A 2	Subtract reference frequency 2
[Manual PID Ref.]	P I n	Manual speed reference of the PID controller (auto-man)
[PID Ref Frequency]	F P I	PID reference frequency
[Ref Frequency 3 Summing]	S A 3	Reference frequency 3 summing
[Ref Frequency 1B]	F r 1b	Reference frequency 1B
[Subtract Ref Freq 3]	d A 3	Subtract reference frequency 3
[Forced local]	F L o C	Forced local reference source1
[Ref Frequency 2 multiplier]	n A 2	Reference frequency 2 multiplier
[Ref Frequency 3 multiplier]	n A 3	Reference frequency 3 multiplier
[Virtual AI1 Channel]	A I C 1	Virtual AI1 channel selector function
[InletPres Assign]	P S 1A	Select the source of inlet pressure sensor
[OutletPres Assign]	P S 2A	Select the source of outlet pressure sensor
[Inst Flow Assign]	F S 1A	Select the source of installation flow sensor
[Pump Flow Assign]	F S 2A	Select the source of pump flow sensor
[LevelCtrl Sensor]	L C S A	Level control analog sensor

[AI1 Type] A I 1 E

Configuration of analog input AI1.

Setting	Code / Value	Description
[Voltage]	10U	0-10 Vdc **Factory setting**
[Current]	0A	0-20 mA
[PTC Management]	PTC	1 to 6 PTC (in serial)
[KTY]	KTY	1 KTY84
[PT100]	1PT2	1 PT100 connected with 2 wires
[PT1000]	1PT3	1 PT1000 connected with 2 wires

[AI1 min value] U I L 1 ★

AI1 voltage scaling parameter of 0%.

This parameter can be accessed if **[AI1 Type]** A I 1 E is set to **[Voltage]** 10U.

Setting	Description
0.0...10.0 Vdc	Setting range **Factory setting**: 0.0 Vdc

[AI1 max value] U I H 1 ★

AI1 voltage scaling parameter of 100%.

This parameter can be accessed if **[AI1 Type]** A I 1 E is set to **[Voltage]** 10U.

Setting	Description
0.0...10.0 Vdc	Setting range **Factory setting**: 10.0 Vdc

[AI1 min. value] C r L 1 ★

AI1 current scaling parameter of 0%.

This parameter can be accessed if **[AI1 Type]** A I 1 E is set to **[Current]** 0A.

Setting	Description
0.0...20.0 mA	Setting range **Factory setting**: 0.0 mA

[AI1 max. value] C r H 1 ★

AI1 current scaling parameter of 100%.

This parameter can be accessed if **[AI1 Type]** A I 1 E is set to **[Current]** 0A.

Setting	Description
0.0...20.0 mA	Setting range **Factory setting**: 20.0 mA

[AI1 filter] A I 1 F

AI1 cutoff time of the low filter.

Setting	Description
0.00...10.00 s	Setting range **Factory setting**: 0.00 s

[AI1 X Interm. point] A 1 IE

Input delinearization point coordinate. Percentage of the physical input signal.

0% corresponds to **[AI1 min value]** (u IL 1)

100% corresponds to **[AI1 max value]** (u IH 1)

Setting	Description
0...100%	Setting range **Factory setting**: 0%

[AI1 Y Interm. point] A 1 IS

Input delinearization point coordinate (frequency reference).

Percentage of the internal frequency reference corresponding to the **[AI1 X Interm. point]** (A 1 IE) percentage of physical input signal.

Setting	Description
0...100%	Setting range **Factory setting**: 0%

[AI2 configuration] AI2- Menu

Access

[Complete settings] ➡ **[Input/Output]** ➡ **[AI/AQ]** ➡ **[AI2 configuration]**

[AI2 Assignment] AI2A

AI2 functions assignment.

Identical to **[AI1 Assignment]** AI1A *(see page 503)*.

[AI2 Type] AI2t

Configuration of analog input AI2.

Setting	Code / Value	Description
[Voltage]	10U	0-10 Vdc **Factory setting**
[Current]	0A	0-20 mA
[PTC Management]	PTC	1 to 6 PTC (in serial)
[KTY]	KTY	1 KTY84
[PT1000]	1PT3	1 PT1000 connected with 2 wires
[PT100]	1PT2	1 PT100 connected with 2 wires
[Water Prob]	LEVEL	Water level
[3PT1000]	3PT3	3 PT1000 connected with 2 wires
[3PT100]	3PT2	3 PT100 connected with 2 wires

[AI2 min value] UIL2 ★

AI2 voltage scaling parameter of 0%.

This parameter can be accessed if **[AI2 Type]** AI2t is set to **[Voltage]** 10U.

Identical to **[AI1 min value]** UIL1 *(see page 504)*.

[AI2 max value] UIH2 ★

AI2 voltage scaling parameter of 100%.

This parameter can be accessed if **[AI2 Type]** AI2t is set to **[Voltage]** 10U.

Identical to **[AI1 max value]** UIH1 *(see page 504)*.

[AI2 min. value] CrL2 ★

AI2 current scaling parameter of 0%.

This parameter can be accessed if **[AI2 Type]** AI2t is set to **[Current]** 0A.

Identical to **[AI1 min. value]** CrL1 *(see page 504)*.

[AI2 max. value] CrH2 ★

AI2 current scaling parameter of 100%.

This parameter can be accessed if **[AI2 Type]** AI2t is set to **[Current]** 0A.

Identical to **[AI1 max. value]** CrH1 *(see page 504)*.

[AI2 filter] AI2F

AI2 filter.

Identical to **[AI1 filter]** AI1F *(see page 504)*.

[AI2 X Interm. point] *A I 2 E*

AI2 delinearization input level.

Identical to **[AI1 X Interm. point]** *A I 1 E* *(see page 505)*.

[AI2 Y Interm. point] *A I 2 S*

AI2 delinearization output level.

Identical to **[AI1 Y Interm. point]** *A I 1 S* *(see page 505)*.

[AI3 configuration] AI3- Menu

Access

[Complete settings] ➡ **[Input/Output]** ➡ **[AI/AQ]** ➡ **[AI3 configuration]**

[AI3 Assignment] AI3A

AI3 functions assignment.

Identical to **[AI1 Assignment]** AI1A *(see page 503)*.

[AI3 Type] AI3t

Configuration of analog input AI3.

Identical to **[AI2 Type]** AI2t *(see page 506)* with factory setting: **[Current]** 0A.

[AI3 min value] uIL3★

AI3 voltage scaling parameter of 0%.

Identical to **[AI1 min value]** uIL1 *(see page 504)*.

This parameter can be accessed if **[AI3 Type]** AI3t is set to **[Voltage]** 10u.

[AI3 max value] uIH3★

AI3 voltage scaling parameter of 100%.

Identical to **[AI1 max value]** uIH1 *(see page 504)*.

This parameter can be accessed if **[AI3 Type]** AI3t is set to **[Voltage]** 10u.

[AI3 min. value] CrL3★

AI3 current scaling parameter of 0%.

Identical to **[AI1 min. value]** CrL1 *(see page 504)*.

This parameter can be accessed if **[AI3 Type]** AI3t is set to **[Current]** 0A.

[AI3 max. value] CrH3★

AI3 current scaling parameter of 100%.

Identical to **[AI1 max. value]** CrH1 *(see page 504)*.

This parameter can be accessed if **[AI3 Type]** AI3t is set to **[Current]** 0A.

[AI3 filter] AI3F

AI3 cutoff time of the low filter.

Identical to **[AI1 filter]** AI1F *(see page 504)*.

[AI3 X Interm. point] AI3E

AI3 delinearization input level.

Identical to **[AI1 X Interm. point]** AI1E *(see page 505)*.

[AI3 Y Interm. point] AI3S

AI3 delinearization output level.

Identical to **[AI1 Y Interm. point]** AI1S *(see page 505)*.

[AI4 configuration] AI4 - Menu

Access

[Complete settings] ➡ [Input/Output] ➡ [AI/AQ] ➡ [AI4 configuration]

[AI4 Assignment] AI4A ★

AI4 functions assignment.

This parameter can be accessed if VW3A3203 I/O extension module has been inserted.

Identical to **[AI1 Assignment]** AI1A *(see page 503)*.

[AI4 Type] AI4t ★

Configuration of analog input AI4.

This parameter can be accessed if VW3A3203 I/O extension module has been inserted.

Setting	Code / Value	Description
[Voltage]	10U	0-10 Vdc
[Current]	0A	0-20 mA
[Voltage +/-]	n10U	-10/+10 Vdc **Factory setting**

[AI4 min value] UIL4 ★

AI4 voltage scaling parameter of 0%.

Identical to **[AI1 min value]** UIL1 *(see page 504)*.

[AI4 max value] UIH4 ★

AI4 voltage scaling parameter of 100%.

Identical to **[AI1 max value]** UIH1 *(see page 504)*.

[AI4 min. value] CrL4 ★

AI4 current scaling parameter of 0%.

Identical to **[AI1 min. value]** CrL1 *(see page 504)*.

[AI4 max. value] CrH4 ★

AI4 current scaling parameter of 100%.

Identical to **[AI1 max. value]** CrH1 *(see page 504)*.

[AI4 filter] AI4F ★

AI4 cutoff time of the low filter.

This parameter can be accessed if VW3A3203 I/O extension module has been inserted.

Identical to **[AI1 filter]** AI1F *(see page 504)*.

[AI4 X Interm. point] AI4E ★

AI4 delinearization input level.

This parameter can be accessed if VW3A3203 I/O extension module has been inserted.

Identical to **[AI1 X Interm. point]** AI1E *(see page 505)*.

[AI4 Y Interm. point] *A I 4 5* ★

AI4 delinearization output level.

This parameter can be accessed if VW3A3203 I/O extension module has been inserted.

Identical to **[AI1 Y Interm. point]** *A I 1 5* *(see page 505)*.

[AI5 configuration] A I 5 - Menu

Access

[Complete settings] ➡ [Input/Output] ➡ [AI/AQ] ➡ [AI5 configuration]

[AI5 Assignment] A I 5 A ★

AI5 functions assignment.

This parameter can be accessed if VW3A3203 I/O extension module has been inserted.

Identical to **[AI1 Assignment]** A I I A *(see page 503)*.

[AI5 Type] A I 5 t ★

Configuration of analog input AI5.

This parameter can be accessed if VW3A3203 I/O extension module has been inserted.

Identical to **[AI4 Type]** A I 4 t . *(see page 509)*

[AI5 min value] u I L 5 ★

AI5 voltage scaling parameter of 0%.

Identical to **[AI1 min value]** u I L I *(see page 504)*.

[AI5 max value] u I H 5 ★

AI5 voltage scaling parameter of 100%.

Identical to **[AI1 max value]** u I H I *(see page 504)*.

[AI5 min. value] C r L 5 ★

AI5 current scaling parameter of 0%.

Identical to **[AI1 min. value]** C r L I *(see page 504)*.

[AI5 max. value] C r H 5 ★

AI5 current scaling parameter of 100%.

Identical to **[AI1 max. value]** C r H I *(see page 504)*.

[AI5 filter] A I 5 F ★

AI5 cutoff time of the low filter.

This parameter can be accessed if VW3A3203 I/O extension module has been inserted.

Identical to **[AI1 filter]** A I I F *(see page 504)*.

[AI5 X Interm. point] A I 5 E ★

AI5 delinearization input level.

This parameter can be accessed if VW3A3203 I/O extension module has been inserted.

Identical to **[AI1 X Interm. point]** A I I E *(see page 505)*.

[AI5 Y Interm. point] A I 5 5 ★

AI5 delinearization output level.

This parameter can be accessed if VW3A3203 I/O extension module has been inserted.

Identical to **[AI1 Y Interm. point]** A I I 5 *(see page 505)*.

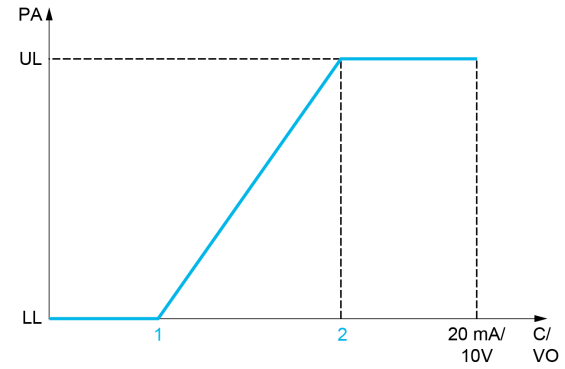
[AQ1 configuration] AO1 - Menu

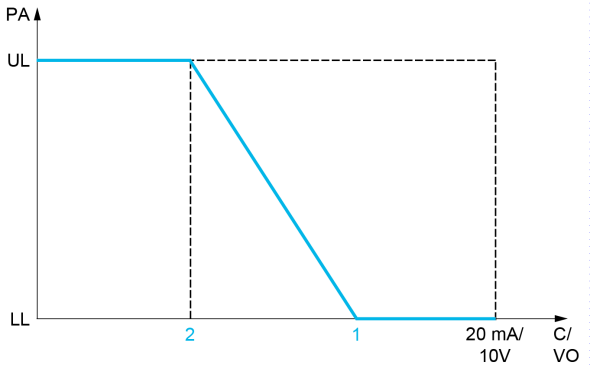
Access

[Complete settings] ➡ [Input/Output] ➡ [AI/AQ] ➡ [AQ1 configuration]

Minimum and Maximum Output Values

The minimum output value, in volts, corresponds to the lower limit of the assigned parameter and the maximum value corresponds to its upper limit. The minimum value may be greater than the maximum value.





PA Parameter assigned
C / VO Current or voltage output
UL Upper limit
LL Lower limit
1 **[Min Output]** AOL X or UOL X
2 **[Max Output]** AOH X or UOH X

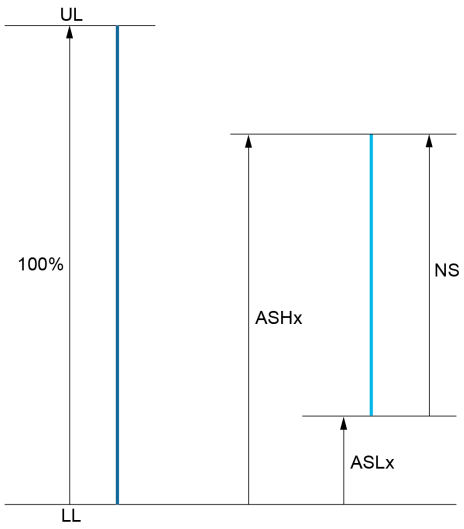
Scaling of the Assigned Parameter

The scale of the assigned parameter can be adapted in accordance with the requirements by modifying the values of the lower and upper limits with two parameters for each analog output.

These parameters are given in %. 100% corresponds to the total variation range of the configured parameter, so: 100% = upper limit - lower limit.

For example, **[Sign. torque]** StQ which varies between –3 and +3 times the rated torque, 100% corresponds to 6 times the rated torque.

- The **[Scaling AQx min]** ASLX parameter modifies the lower limit: new value = lower limit + (range x ASLX). The value 0% (factory setting) does not modify the lower limit.
- The **[Scaling AQx max]** ASHX) parameter modifies the upper limit: new value = lower limit + (range x ASLX). The value 100% (factory setting) does not modify the upper limit.
- **[Scaling AQx min]** ASLX must always be lower than **[Scaling AQx max]** ASHX.



UL Upper limit of the assigned parameter
LL Lower limit of the assigned parameter
NS New scale
1 ASHX
2 ASLX

Application Example

The value of the motor current at the AQ1 output is to be transferred with 0...20 mA, range 2 in motor, In motor being the equivalent of a 0.8 In drive.

- The **[Motor Current]** oCr parameter varies from 0 to 2 times the rated drive current, or a range of 2.5 times the rated drive current.
- **[Scaling AQ1 min]** ASL1 must not modify the lower limit, which therefore remains at its factory setting of 0%.
- **[Scaling AQ1 max]** ASH1 must modify the upper limit by 0.5x the rated motor torque, or 100 - 100/5 = 80% (new value = lower limit + (range x **[Scaling AQ1 max]** ASH1).

[AQ1 Assignment] AO1

AQ1 assignment.

Setting	Code / Value	Description
[Not Configured]	nO	Not assigned
[Motor Current]	OCr	Current in the motor, from 0 to 2 In (In = rated drive current indicated in the Installation manual and on the drive nameplate)
[Motor Frequency]	OFr	Output frequency, from 0 to [Max Frequency] tFr Factory Setting
[Ramp out.]	OrP	From 0 to [Max Frequency] tFr
[Motor torq.]	tqM	Motor torque, from 0 to 3 times the rated motor torque
[Sign. torque]	StqM	Signed motor torque, between –3 and +3 times the rated motor torque. The + sign corresponds to the motor mode and the – sign to the generator mode (braking).
[sign ramp]	OrS	Signed ramp output, between –[Max Frequency] tFr and +[Max Frequency] tFr
[PID ref.]	OPS	PID controller reference between [Min PID reference] PIP1 and [Max PID reference] PIP2
[PID feedbk]	OPF	PID controller feedback between [Min PID feedback] PIF1 and [Max PID feedback] PIF2
[PID error]	OPE	PID controller detected error between –5% and +5% of [Max PID feedback] PIF2 – [Min PID feedback] PIF1
[PID output]	OPI	PID controller output between [Low speed] LSP and [High speed] HSP
[Drive power]	OPr	Motor power, between 0 and 2.5 times [Nominal Motor Power] nPr
[Mot thermal]	tHr	Motor thermal state, from 0 to 200% of the rated thermal state
[Drv thermal]	tHd	Drive thermal state, from 0 to 200% of the rated thermal state
[Sig. o/p frq.]	OFS	Signed output frequency, between –[Max Frequency] tFr and +[Max Frequency] tFr
[Motor volt.]	UOP	Voltage applied to the motor, between 0 and [Nom Motor Voltage] UnS
[Inlet Pressure Value]	PS1u	Inlet pressure value
[Outlet Pressure Value]	PS2u	Outlet pressure value
[Installation Flow]	FS1u	Installation flow value
[Pump Flow]	FS2u	Pump flow value

[AQ1 Type] AO1t

AQ1 type.

Setting	Code / Value	Description
[Voltage]	10U	0-10 Vdc
[Current]	0A	0-20 mA Factory setting

[AQ1 min output] AOL1 ★

AQ1 current scaling parameter of 0%.

This parameter can be accessed if [AQ1 Type] AO1t is set to [Current] 0A.

Setting	Description
0.0...20.0 mA	Setting range Factory setting: 0.0 mA

[AQ1 max output] AOH1 ★

AQ1 current scaling parameter of 100%.

This parameter can be accessed if **[AQ1 Type]** AOI1 is set to **[Current]** 0A.

Setting	Description
0.0...20.0 mA	Setting range **Factory setting**: 20.0 mA

[AQ1 min Output] UOL1 ★

AQ1 voltage scaling parameter of 0%.

This parameter can be accessed if **[AQ1 Type]** AOI1 is set to **[Voltage]** 10U.

Setting	Description
0.0...10.0 Vdc	Setting range **Factory setting**: 0.0 Vdc

[AQ1 max Output] UOH1 ★

AQ1 voltage scaling parameter of 100%.

This parameter can be accessed if **[AQ1 Type]** AOI1 is set to **[Voltage]** 10U.

Setting	Description
0.0...10.0 Vdc	Setting range **Factory setting**: 10.0 Vdc

[Scaling AQ1 min] ASL1

AQ1 scaling parameter of 0%.

Scaling of the lower limit of the assigned parameter, as a % of the maximum possible variation.

Setting	Description
0.0...100.0%	Setting range **Factory setting**: 0.0%

[Scaling AQ1 max] ASH1

AQ1 scaling parameter of 100%.

Scaling of the upper limit of the assigned parameter, as a % of the maximum possible variation.

Setting	Description
0.0...100.0%	Setting range **Factory setting**: 100.0%

[AQ1 Filter] AOI1F

AQ1 cutoff time of the low-filter.

Setting	Description
0.00...10.00 s	Setting range **Factory setting**: 0.00 s

[AQ2 configuration] AO2 - Menu

Access

[Complete settings] ➡ [Input/Output] ➡ [AI/AQ] ➡ [AQ2 configuration]

[AQ2 assignment] AO2

AQ2 assignment.

Setting	Code / Value	Description
[Not Configured]	nO	Not assigned
[Motor Current]	OCr	Current in the motor, from 0 to 2 In (In = rated drive current indicated in the Installation manual and on the drive nameplate) **Factory Setting**
[Motor Frequency]	OFr	Output frequency, from 0 to [Max Frequency] tFr
[Ramp out.]	OrP	From 0 to [Max Frequency] tFr
[Motor torq.]	trq	Motor torque, from 0 to 3 times the rated motor torque
[Sign. torque]	Stq	Signed motor torque, between –3 and +3 times the rated motor torque. The + sign corresponds to the motor mode and the – sign to the generator mode (braking).
[sign ramp]	Ors	Signed ramp output, between –[Max Frequency] tFr and +[Max Frequency] tFr
[PID ref.]	OPS	PID controller reference between [Min PID reference] PIP1 and [Max PID reference] PIP2
[PID feedbk]	OPF	PID controller feedback between [Min PID feedback] PIF1 and [Max PID feedback] PIF2
[PID error]	OPE	PID controller detected error between –5% and +5% of [Max PID feedback] PIF2 – [Min PID feedback] PIF1
[PID output]	OPI	PID controller output between [Low speed] LSP and [High speed] HSP
[Drive power]	OPr	Motor power, between 0 and 2.5 times [Nominal Motor Power] nPr
[Mot thermal]	tHr	Motor thermal state, from 0 to 200% of the rated thermal state
[Drv thermal]	tHd	Drive thermal state, from 0 to 200% of the rated thermal state
[Sig. o/p frq.]	OFS	Signed output frequency, between –[Max Frequency] tFr and +[Max Frequency] tFr
[Motor volt.]	UOP	Voltage applied to the motor, between 0 and [Nom Motor Voltage] UnS
[Inlet Pressure Value]	PS1u	Inlet pressure value
[Outlet Pressure Value]	PS2u	Outlet pressure value
[Installation Flow]	FS1u	Installation flow value

[AQ2 Type] AO2t

AQ2 type.

Setting	Code / Value	Description
[Voltage]	10U	0-10 Vdc
[Current]	0A	0-20 mA **Factory setting**

[AQ2 min output] AOL2 ★

AQ2 current scaling parameter of 0%.

This parameter can be accessed if [AQ2 Type] AO2t is set to [Current] 0A.

Identical to [AQ1 min output] AOL1 *(see page 514)*.

[AQ2 max output] AoH2 ★

AQ2 current scaling parameter of 100%.

This parameter can be accessed if **[AQ2 Type]** Ao2t is set to **[Current]** 0A.

Identical to **[AQ1 max output]** AoH1 *(see page 515)*.

[AQ2 min Output] uoL2 ★

AQ2 voltage scaling parameter of 0%.

This parameter can be accessed if **[AQ2 Type]** Ao2t is set to **[Voltage]** 10u.

Identical to **[AQ1 min Output]** uoL1 *(see page 515)*.

[AQ2 max Output] uoH2 ★

AQ2 voltage scaling parameter of 100%.

This parameter can be accessed if **[AQ2 Type]** Ao2t is set to **[Voltage]** 10u.

Identical to **[AQ1 max Output]** uoH1 *(see page 515)*.

[Scaling AQ2 min] AS2L

AQ2 scaling parameter of 0%.

Identical to **[Scaling AQ1 min]** AS1L *(see page 515)*.

[Scaling AQ2 max] AS2H

AQ2 scaling parameter of 100%.

Identical to **[Scaling AQ1 max]** AS1H *(see page 515)*.

[AQ2 Filter] Ao2F

AQ2 cutoff time of the low-filter.

Identical to **[AQ1 Filter]** AoIF *(see page 515)*.

[Virtual AI1] AU1- Menu

Access

[Complete settings] ➡ [Input/Output] ➡ [AI/AQ] ➡ [Virtual AI1]

[AIV1 Assignment] AV1A

Virtual AI1 function assignment.

Setting	Code / Value	Description
[No]	nO	Not assigned
[Ref Frequency 2 Summing]	SA2	Reference frequency 2 summing
[PID Feedback]	PIF	PI controller feedback
[Subtract Ref Freq 2]	dA2	Subtract reference frequency 2
[Ref Frequency 3 Summing]	SA3	Reference frequency 3 summing
[Subtract Ref Freq 3]	dA3	Subtract reference frequency 3
[Ref Frequency 2 multiplier]	MA2	Reference frequency 2 multiplier
[Ref Frequency 3 multiplier]	MA3	Reference frequency 3 multiplier
[InletPres Assign]	PS1A	Select the source of inlet pressure sensor
[OutletPres Assign]	PS2A	Select the source of outlet pressure sensor
[Inst Flow Assign]	FS1A	Select the source of installation flow sensor
[Pump Flow Assign]	FS2A	Select the source of pump flow sensor

[AIV1 Channel Assignment] AIC1

Channel assignment for virtual analog input AIV1.

Setting	Code / Value	Description
[Not Configured]	nO	Not assigned **Factory setting**
[Ref. Freq-Modbus]	Mdb	Reference frequency via Modbus
[Ref. Freq-CANopen]	CAn	Reference frequency via CANopen if a CANopen module has been inserted
[Ref. Freq-Com. Module]	nEt	Reference frequency via fieldbus module if a fieldbus module has been inserted
[Embedded Ethernet]	EtH	Embedded Ethernet

[Virtual AI2] AU2 - Menu

Access

[Complete settings] ➡ [Input/Output] ➡ [AI/AQ] ➡ [Virtual AI2]

About This Menu

Identical to **[Virtual AI1]** AU1 - menu. *(see page 518)*

[AIV2 Assignment] AV2A

Virtual AI2 function assignment.

[AIV2 Channel Assign] AIC2

Channel assignment for virtual analog input AIV2.

[Virtual AI3] AU3 - Menu

Access

[Complete settings] ➡ [Input/Output] ➡ [AI/AQ] ➡ [Virtual AI3]

About This Menu

Identical to **[Virtual AI1]** AU1 - menu. *(see page 518)*

[AIV3 Assignment] AV3A

Virtual AI3 function assignment.

[AIV3 Channel Assign] AIC3

Channel assignment for virtual analog input AIV3.

Section 7.55
[Input/Output] - [Relay]

What Is in This Section?

This section contains the following topics:

Topic	Page
[R1 configuration] r 1 - Menu	521
[R2 configuration] r 2 - Menu	523
[R3 configuration] r 3 - Menu	524
[R4 configuration] r 4 - Menu	525
[R5 configuration] r 5 - Menu	526
[R6 configuration] r 6 - Menu	527
[R60 configuration] r 60 - Menu	528
[R61 configuration] r 61 - Menu	529
[R62 configuration] r 62 - Menu	530
[R63 configuration] r 63 - Menu	531
[R64 configuration] r 64 - Menu	532
[R65 configuration] r 65 - Menu	533
[R66 configuration] r 66 - Menu	534

[R1 configuration] r 1 - Menu

Access

[Complete settings] ➡ [Input/Output] ➡ [Relay] ➡ [R1 configuration]

[R1 Assignment] r 1

R1 assignment.

Setting	Code / Value	Description
[No]	nO	Not assigned
[Operating State Fault]	FLt	Operating state fault **Factory setting**
[Drive Running]	run	Drive running
[Mot Freq High Thd]	FtA	Motor frequency threshold (**[Motor Freq Thd]** Ftd) reached
[High Speed Reached]	FLA	High speed reached
[Current Thd Reached]	CtA	Motor current threshold (**[High Current Thd]** Ctd) reached
[Ref Freq Reached]	SrA	Frequency reference reached
[Motor Therm Thd Reached]	tSA	Motor thermal threshold (**[Motor Therm Thd]** ttd) reached
[PID Error Warning]	PEE	PID error warning
[PID Feedback Warning]	PFA	PID feedback warning
[AI2 4-20 Loss Warning]	AP2	AI2 4-20 mA loss warning
[Mot Freq High Thd 2]	F2A	Second frequency threshold (**[Freq. threshold 2]** F2d) reached
[Drv Therm Thd Reached]	tAd	Drive thermal threshold reached
[Ref Freq High Thd Reached]	rtAH	Frequency reference high threshold reached
[Ref Freq Low Thd Reached]	rtAL	Frequency reference low threshold reached
[Mot Freq Low Thd]	FtAL	Frequency low threshold (**[Low Freq.Threshold]** FtdL) reached
[Motor Freq Low Thd 2]	F2AL	Second frequency low threshold (**[2 Freq. Threshold]** F2dL) reached
[Low Current Reached]	CtAL	Current low threshold (**[Low I Threshold]** CtdL) reached
[Process Undld Warning]	uLA	Underload warning
[Process Overload Warning]	oLA	Overload warning
[Forward]	MFrd	Run forward
[Reverse]	Mrrs	Run reverse
[HMI Cmd]	bMP	Control via the Graphic Display Terminal is active.
[Neg Torque]	AtS	Actual torque sign
[Cnfg.0 act.]	CnF0	Configuration 0 active
[set 1 active]	CFP1	Parameter set 1 active
[set 2 active]	CFP2	Parameter set 2 active
[set 3 active]	CFP3	Parameter set 3 active
[DC Bus Charged]	dbL	DC bus charged
[In braking]	brS	In braking sequence
[Power removal state]	PrM	Power removal state
[I present]	MCP	Motor current present
[Warning Grp 1]	AG1	Warning group 1
[Warning Grp 2]	AG2	Warning group 2
[Warning Grp 3]	AG3	Warning group 3
[Warning Grp 4]	AG4	Warning group 4
[Warning Grp 5]	AG5	Warning group 5
[External Error Warning]	EFA	External error warning
[Undervoltage Warning]	uSA	Undervoltage warning
[Preventive UnderV Active]	uPA	Undervoltage prevention warning

Setting	Code / Value	Description
[Drive Thermal Warning]	tHA	Drive thermal state warning
[IGBT Thermal Warning]	tJA	Thermal junction warning
[AI3 4-20 Loss Warning]	APJ	AI3 4-20 mA loss warning
[Ready]	rdY	Ready to start
[AI1 4-20 Loss Warning]	AP1	AI1 4-20 mA loss warning
[Pump 1 Cmd]	MPo1	Pump 1 command

[R1 Delay time] r1d

R1 activation delay time.

The change in state takes effect once the configured time has elapsed when the information becomes true.

The delay cannot be set for the **[Operating State Fault]** FLt assignment; and remains at 0.

Setting	Description
0...60,000 ms	Setting range **Factory setting**: 0 ms

[R1 Active at] r1S

R1 status (output active level).

Setting	Code / Value	Description
1	PoS	State 1 when the information is true **Factory setting**
0	nEG	State 0 when the information is true

Configuration **[1]** PoS cannot be modified for the **[Operating State "Fault"]** FLt assignment.

[R1 Holding time] r1H

R1 holding delay time.

The change in state takes effect once the configured time has elapsed when the information becomes false.

The holding time cannot be set for the **[Operating State "Fault"]** FLt assignment, and remains at 0.

Setting	Description
0...9,999 ms	Setting range **Factory setting**: 0 ms

[R2 configuration] r 2 - Menu

Access

[Complete settings] ➡ **[Input/Output]** ➡ **[Relay]** ➡ **[R2 configuration]**

About This Menu

Identical to **[R1 configuration]** r 1 - Menu *(see page 521)*.

[R2 Assignment] r 2

R2 assignment.

Identical to **[R1 Assignment]** r 1 *(see page 521)* in addition to:

Setting	Code / Value	Description
[No]	n o	Not assigned **Factory setting**
[Brake Sequence]	b L C	Brake sequence
[Mains Contactor]	L L C	Mains contactor control
[DC charging]	d C o	DC charging
[M/S Device Warn]	M S d A	M/S device warning
[Jockey]	J o K Y	Jockey
[Priming]	P r i M	Priming
[Pump 1 Cmd]	M P o 1	Pump 1 command
[Pump 2 Cmd]	M P o 2	Pump 2 command
[Pump 3 Cmd]	M P o 3	Pump 3 command
[Pump 4 Cmd]	M P o 4	Pump 4 command
[Pump 5 Cmd]	M P o 5	Pump 5 command
[Pump 6 Cmd]	M P o 6	Pump 6 command
[CB Start Pulse]	C b E P	Circuit Breaker start pulse.
[CB Stop Pulse]	C b d P	Circuit Breaker stop pulse.

[R2 Delay time] r 2 d

R2 activation delay time.

[R2 Active at] r 2 S

R2 status (output active level).

[R2 Holding time] r 2 H

R2 holding delay time.

[R3 configuration] r 3 - Menu

Access

[Complete settings] ➡ [Input/Output] ➡ [Relay] ➡ [R3 configuration]

About This Menu

Identical to **[R1 configuration] r 1 -** Menu *(see page 521)*.

[R3 Assignment] r 3

R3 assignment.

Identical to **[R2 Assignment] r 2** *(see page 523)*.

[R3 Delay time] r 3 d

R3 activation delay time.

[R3 Active at] r 3 S

R3 status (output active level).

[R3 Holding time] r 3 H

R3 holding delay time.

[R4 configuration] r 4 - Menu

Access

[Complete settings] ➡ [Input/Output] ➡ [Relay] ➡ [R4 configuration]

About This Menu

Identical to **[R1 configuration]** r 1 - Menu *(see page 521)*.

Following parameters can be accessed if VW3A3204 relay output option module has been inserted.

[R4 Assignment] r 4 ★

R4 assignment.

Identical to **[R2 Assignment]** r 2 *(see page 523)*.

[R4 Delay time] r 4 d ★

R4 activation delay time.

[R4 Active at] r 4 S ★

R4 status (output active level).

[R4 Holding time] r 4 H ★

R4 holding delay time.

[R5 configuration] r 5 - Menu

Access

[Complete settings] ➡ [Input/Output] ➡ [Relay] ➡ [R5 configuration]

About This Menu

Identical to **[R1 configuration]** r 1 - Menu *(see page 521)*.

Following parameters can be accessed if VW3A3204 relay output option module has been inserted.

[R5 Assignment] r 5 ★

R5 assignment.

Identical to **[R2 Assignment]** r 2 *(see page 523)*.

[R5 Delay time] r 5 d ★

R5 activation delay time.

[R5 Active at] r 5 5 ★

R5 status (output active level).

[R5 Holding time] r 5 H ★

R5 holding delay time.

[R6 configuration] r 6 - Menu

Access

[Complete settings] ➡ [Input/Output] ➡ [Relay] ➡ [R6 configuration]

About This Menu

Identical to **[R1 configuration]** r 1 - Menu *(see page 521)*.

Following parameters can be accessed if VW3A3204 relay output option module has been inserted.

[R6 Assignment] r 6 ★

R6 assignment.

Identical to **[R2 Assignment]** r 2 *(see page 523)*.

[R6 Delay time] r 6 d ★

R6 activation delay time.

[R6 Active at] r 6 S ★

R6 status (output active level).

[R6 Holding time] r 6 H ★

R6 holding delay time.

[R60 configuration] r 6 0 - Menu

Access

[Complete settings] ➡ **[Input/Output]** ➡ **[Relay]** ➡ **[R60 configuration]**

About This Menu

Identical to **[R2 configuration]** r 2 - Menu *(see page 523)*.

Following parameters can be accessed on ATV660 or ATV680, equipped with cabinet IO, and if **[Access Level]** L A C is set to **[Expert]** E P r .

NOTE: R60 up to R66 Relays are used inside the Drive Systems enclosure for control and monitoring circuits.

[R60 Assignment] r 6 0

R60 assignment.

[R60 Delay time] r 6 0 d

R60 activation delay time.

[R60 Active at] r 6 0 S

R60 status (output active level).

[R60 Holding time] r 6 0 H

R60 holding delay time.

[R61 configuration] r 6 1 - Menu

Access

[Complete settings] ➡ **[Input/Output]** ➡ **[Relay]** ➡ **[R61 configuration]**

About This Menu

Identical to **[R2 configuration]** r 2 - Menu *(see page 523)*.

Following parameters can be accessed on ATV660 or ATV680, equipped with cabinet IO, and if **[Access Level]** L A C is set to **[Expert]** E P r .

NOTE: R60 up to R66 Relays are used inside the Drive Systems enclosure for control and monitoring circuits.

[R61 Assignment] r 6 1

R61 assignment.

[R61 Delay time] r 6 1 d

R61 activation delay time.

[R61 Active at] r 6 1 S

R61 status (output active level).

[R61 Holding time] r 6 1 H

R61 holding delay time.

[R62 configuration] r 6 2 - Menu

Access

[Complete settings] ➡ **[Input/Output]** ➡ **[Relay]** ➡ **[R62 configuration]**

About This Menu

Identical to **[R2 configuration]** r 2 - Menu *(see page 523)*.

Following parameters can be accessed on ATV660 or ATV680, equipped with cabinet IO, and if **[Access Level]** L A C is set to **[Expert]** E P r .

NOTE: R60 up to R66 Relays are used inside the Drive Systems enclosure for control and monitoring circuits.

[R62 Assignment] r 6 2

R62 assignment.

[R62 Delay time] r 6 2 d

R62 activation delay time.

[R62 Active at] r 6 2 S

R62 status (output active level).

[R62 Holding time] r 6 2 H

R62 holding delay time.

[R63 configuration] r 6 3 - Menu

Access

[Complete settings] ➡ **[Input/Output]** ➡ **[Relay]** ➡ **[R63 configuration]**

About This Menu

Identical to **[R2 configuration]** r 2 - Menu *(see page 523)*.

Following parameters can be accessed on ATV660 or ATV680, equipped with cabinet IO, and if **[Access Level]** L A C is set to **[Expert]** E P r .

NOTE: R60 up to R66 Relays are used inside the Drive Systems enclosure for control and monitoring circuits.

[R63 Assignment] r 6 3

R63 assignment.

[R63 Delay time] r 6 3 d

R63 activation delay time.

[R63 Active at] r 6 3 S

R63 status (output active level).

[R63 Holding time] r 6 3 H

R63 holding delay time.

[R64 configuration] r 6 4 - Menu

Access

[Complete settings] ➡ **[Input/Output]** ➡ **[Relay]** ➡ **[R64 configuration]**

About This Menu

Identical to **[R2 configuration]** r 2 - Menu *(see page 523)*.

Following parameters can be accessed on ATV660 or ATV680, equipped with cabinet IO, and if **[Access Level]** L A C is set to **[Expert]** E P r .

NOTE: R60 up to R66 Relays are used inside the Drive Systems enclosure for control and monitoring circuits.

[R64 Assignment] r 6 4

R64 assignment.

[R64 Delay time] r 6 4 d

R64 activation delay time.

[R64 Active at] r 6 4 S

R64 status (output active level).

[R64 Holding time] r 6 4 H

R64 holding delay time.

[R65 configuration] r 6 5 - Menu

Access

[Complete settings] ➡ **[Input/Output]** ➡ **[Relay]** ➡ **[R65 configuration]**

About This Menu

Identical to **[R2 configuration]** r 2 - Menu *(see page 523)*.

Following parameters can be accessed on ATV660 or ATV680, equipped with cabinet IO, and if **[Access Level]** L A C is set to **[Expert]** E P r .

NOTE: R60 up to R66 Relays are used inside the Drive Systems enclosure for control and monitoring circuits.

[R65 Assignment] r 6 5

R65 assignment.

[R65 Delay time] r 6 5 d

R65 activation delay time.

[R65 Active at] r 6 5 5

R65 status (output active level).

[R65 Holding time] r 6 5 H

R65 holding delay time.

[R66 configuration] r 6 6 - Menu

Access

[Complete settings] ➡ **[Input/Output]** ➡ **[Relay]** ➡ **[R66 configuration]**

About This Menu

Identical to **[R2 configuration]** r 2 - Menu *(see page 523)*.

Following parameters can be accessed on ATV660 or ATV680, equipped with cabinet IO, and if **[Access Level]** L A C is set to **[Expert]** E P r .

NOTE: R60 up to R66 Relays are used inside the Drive Systems enclosure for control and monitoring circuits.

[R66 Assignment] r 6 6

R66 assignment.

[R66 Delay time] r 6 6 d

R66 activation delay time.

[R66 Active at] r 6 6 S

R66 status (output active level).

[R66 Holding time] r 6 6 H

R66 holding delay time.

Section 7.56
[Error/Warning handling]

What Is in This Section?

This section contains the following topics:

Topic	Page
[Auto fault reset] Atr - Menu	536
[Fault reset] rSt - Menu	537
[Catch on the fly] FLr - Menu	539
[Error detection disable] inH - Menu	540
[External error] EtF - Menu	542
[Output phase loss] oPL - Menu	544
[Input phase loss] iPL - Menu	545
[4-20mA loss] LFL - Menu	546
[Fallback speed] LFF - Menu	548
[Fieldbus monitoring] CLL - Menu	549
[Embedded Modbus TCP] EMtC - Menu	550
[Communication module] CoMo - Menu	551
[Undervoltage handling] uSb - Menu	553
[Ground Fault] GrFL - Menu	555
[Motor thermal monit] tHt - Menu	556
[Drive overload monit] obr - Menu	557
[Warn grp 1 definition] A1C - Menu	558
[Warn grp 2 definition] A2C - Menu	560
[Warn grp 3 definition] A3C - Menu	560
[Warn grp 4 definition] A4C - Menu	560
[Warn grp 5 definition] A5C - Menu	560

[Auto fault reset] Atr - Menu

Access

[Complete settings] ➡ [Error/Warning handling] ➡ [Auto fault reset]

[Auto Fault Reset] Atr

Automatic fault reset.

This function can be used to automatically perform individual or multiple Fault Resets. If the cause of the error that has triggered the transition to the operating state Fault disappears while this function is active, the drive resumes normal operation. While the Fault Reset attempts are performed automatically, the output signal **[Operating state Fault]** is not available. If the attempts to perform the Fault Reset are not successful, the drive remains in the operating state Fault and the output signal **[Operating state Fault]** becomes active.

⚠ WARNING

UNANTICIPATED EQUIPMENT OPERATION

- Verify that activating this function does not result in unsafe conditions.
- Verify that the fact that the output signal "Operating state Fault" is not available while this function is active does not result in unsafe conditions.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

The drive fault relay remains activated if this function is active. The speed reference and the operating direction must be maintained.

It is recommended to use 2-wire control (**[2/3-wire control]** tCC is set to **[2 wire]** 2C and **[2-wire type]** tCt is set to **[Level]** LEL, refer to **[2/3-wire control]** tCC.

If the restart has not taken place once the configurable time **[Fault Reset Time]** tAr has elapsed, the procedure is aborted and the drive remains locked until it is turned off and then on again.

The detected error codes, which permit this function, are listed in the Diagnostics part of the manual.

Setting	Code / Value	Description
[No]	no	Function inactive **Factory setting**
[Yes]	YES	Automatic restart, after locking in error state, if the detected error has disappeared and the other operating conditions permit the restart. The restart is performed by a series of automatic attempts separated by increasingly longer waiting periods: 1 s, 5 s, 10 s, then 1 minute for the following attempts.

[Fault Reset Time] tAr ★

Maximum time for automatic restart function.

This parameter appears if **[Auto Fault Reset]** Atr is set to **[Yes]** YES. It can be used to limit the number of consecutive restarts on a recurrent detected error.

Setting	Code / Value	Description
[5 minutes]	5	5 minutes **Factory setting**
[10 minutes]	10	10 minutes
[30 minutes]	30	30 minutes
[1 hour]	1h	1 hour
[2 hours]	2h	2 hours
[3 hours]	3h	3 hours
[Unlimited]	Ct	Continuous

[Fault reset] rSt - Menu

Access

[Complete settings] ➞ [Error/Warning handling] ➞ [Fault reset]

[Fault Reset Assign] rSF

Fault reset input assignment.

Detected errors are cleared manually when the assigned input or bit changes to 1 if the cause of the detected error has disappeared.

The **STOP/RESET** key on the Graphic Display Terminal performs the same function.

Setting	Code / Value	Description
[Not Assigned]	nO	Not assigned **Factory setting**
[DI1]...**[DI6]**	LI1...LI6	Digital input DI1...DI6
[DI11]...**[DI16]**	LI11...LI16	Digital input DI11...DI16 if VW3A3203 I/O extension module has been inserted
[DI1 (Low level)]...**[DI6 (Low level)]**	LIL ...LGL	Digital input DI1...DI6 used at low level
[DI52 (High level)]... **[DI59 (High level)]**	dS2H...dS9H	Cabinet high level digital inputs **NOTE:** This selection can be accessed on ATV660 and ATV680 equipped with Cabinet IO.

Setting	Code / Value	Description
[Not Assigned]	nO	Not assigned **Factory setting**
[DI1]...**[DI6]**	LI1...LI6	Digital input DI1...DI6
[DI11]...**[DI16]**	LI11...LI16	Digital input DI11...DI16 if VW3A3203 I/O extension module has been inserted
[CD00]...**[CD10]**	Cd00...Cd10	Virtual digital input CMD.0...CMD.10 in **[I/O profile]** IO configuration
[CD11]...**[CD15]**	Cd11...Cd15	Virtual digital input CMD.11...CMD.15 regardless of configuration
[C101]...**[C110]**	C101...C110	Virtual digital input CMD1.01...CMD1.10 with integrated Modbus Serial in **[I/O profile]** IO configuration
[C111]...**[C115]**	C111...C115	Virtual digital input CMD1.11...CMD1.15 with integrated Modbus Serial regardless of configuration
[C201]...**[C210]**	C201...C210	Virtual digital input CMD2.01...CMD2.10 with CANopen® fieldbus module in **[I/O profile]** IO configuration
[C211]...**[C215]**	C211...C215	Virtual digital input CMD2.11...CMD2.15 with CANopen® fieldbus module regardless of configuration
[C301]...**[C310]**	C301...C310	Virtual digital input CMD3.01...CMD3.10 with a fieldbus module in **[I/O profile]** IO configuration
[C311]...**[C315]**	C311...C315	Virtual digital input CMD3.11...CMD3.15 with a fieldbus module regardless of configuration
[C501]...**[C510]**	C501...C510	Virtual digital input CMD5.01...CMD5.10 with integrated Ethernet in **[I/O profile]** IO configuration
[C511]...**[C515]**	C511...C515	Virtual digital input CMD5.11...CMD5.15 with integrated Ethernet regardless of configuration

[Product Restart] rP ★

The Restart function performs a Fault Reset and then restarts the drive. During this Restart procedure, the drive goes through the same steps as if it had been switched off and on again. Depending on the wiring and the configuration of the drive, this may result in immediate and unanticipated operation.

⚠ WARNING

UNANTICIPATED EQUIPMENT OPERATION

The Restart function performs a Fault Reset and restarts the drive.

- Verify that activating this function does not result in unsafe conditions.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Product restart.

This parameter can be accessed if **[Access Level]** LAC is set to **[Expert]** EPr mode.

This parameter can be used to reset all detected errors without having to disconnect the drive from the supply mains.

Setting	Code / Value	Description
[No]	nO	Function inactive **Factory setting**
[Yes]	YES	Reinitialization. Press and hold down the OK key for 2 s. The parameter changes back to **[No]** nO automatically as soon as the operation is complete. The drive can only be reinitialized when locked.

[Prod Restart Assign] rPA ★

Product restart assignment.

The Restart function performs a Fault Reset and then restarts the drive. During this Restart procedure, the drive goes through the same steps as if it had been switched off and on again. Depending on the wiring and the configuration of the drive, this may result in immediate and unanticipated operation. The Restart function can be assigned to a digital input

⚠ WARNING

UNANTICIPATED EQUIPMENT OPERATION

The Restart function performs a Fault Reset and restarts the drive.

- Verify that activating this function does not result in unsafe conditions.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

This parameter can be accessed if **[Access Level]** LAC is set to **[Expert]** EPr mode.

Setting	Code / Value	Description
[Not Assigned]	nO	Not assigned **Factory setting**
[DI1]...**[DI6]**	LI1...LI6	Digital input DI1...DI6
[DI11]...**[DI16]**	LI11...LI16	Digital input DI11...DI16 if VW3A3203 I/O extension module has been inserted
[DI52 (High level)]... **[DI59 (High level)]**	d52H...d59H	Cabinet high level assignment digital inputs **NOTE:** This selection can be accessed on ATV660 and ATV680 equipped with Cabinet IO.

[Catch on the fly] FLr - Menu

Access

[Complete settings] ➡ **[Error/Warning handling]** ➡ **[Catch on the fly]**

[Catch On Fly] FLr

Catch on the fly.

Used to enable a smooth restart if the run command is maintained after the following events:
- Loss of line supply or disconnection.
- Clearance of current detected error or automatic restart.
- Freewheel stop.

The speed given by the drive resumes from the estimated or measured speed of the motor at the time of the restart, then follows the ramp to the reference speed.

This function requires 2-wire level control.

When the function is operational, it activates at each run command, resulting in a slight delay of the current (0.5 s max).

FLr is forced to **[No]** nO if
- Motor Control Type CtT is set to **[FVC]** FVC or **[Sync.CL]** FSY, or
- **[Auto DC Injection]** AdC is set to **[Continuous]** Ct, or
- **[Brake assignment]** bLC is not set to **[No]** nO, or
- **[BL Mode]** b9M is not set to **[No]** nO.

Setting	Code / Value	Description
[No]	nO	Function inactive **Factory setting**
[Yes]	YES	Function active

[Catch on Fly Sensitivity] VCb ★

Catch on fly sensitivity.

This parameter can only be accessed if **[Access Level]** LAC is set to **[Expert]** EPr.

Setting the value of parameter **[Catch on Fly Sensitivity]** VCb too low may cause a wrong estimation of the speed of the motor.

⚠ WARNING

LOSS OF CONTROL
- Only reduce gradually the value of parameter [Catch on Fly Sensitivity] VCb.
- During commissioning, verify that the drive and the system operate as intended by performing tests and simulations in a controlled environment under controlled conditions

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Setting	Description
0.10...100.00 V	Setting range **Factory setting**: 0.20 V

[Error detection disable] inH - Menu

Access

[Complete settings] ➜ [Error/Warning handling] ➜ [Error detection disable]

[ErrorDetect Disabled] inH ★

Disable error detection.

In rare cases, the monitoring functions of the drive may be unwanted because they impede the purpose of the application. A typical example is a smoke extractor fan operating as a part of a fire protection system. If a fire occurs, the smoke extractor fan should operate as long as possible, even if, for example, the permissible ambient temperature of the drive is exceeded. In such applications, damage to or destruction of the device may be acceptable as collateral damage, for example, to keep other damage from occurring whose hazard potential is assessed to be more severe.

A parameter is provided to disable certain monitoring functions in such applications so that automatic error detection and automatic error responses of the device are no longer active. You must implement alternative monitoring functions for disabled monitoring functions that allow operators and/or master control systems to adequately respond to conditions which correspond to detected errors. For example, if overtemperature monitoring of the drive is disabled, the drive of a smoke extractor fan may itself cause a fire if errors go undetected. An overtemperature condition can be, for example, signaled in a control room without the drive being stopped immediately and automatically by its internal monitoring functions.

⚠ DANGER

MONITORING FUNCTIONS DISABLED, NO ERROR DETECTION

- Only use this parameter after a thorough risk assessment in compliance with all regulations and standards that apply to the device and to the application.
- Implement alternative monitoring functions for disabled monitoring functions that do not trigger automatic error responses of the drive, but allow for adequate, equivalent responses by other means in compliance with all applicable regulations and standards as well as the risk assessment.
- Commission and test the system with the monitoring functions enabled.
- During commissioning, verify that the drive and the system operate as intended by performing tests and simulations in a controlled environment under controlled conditions.

Failure to follow these instructions will result in death or serious injury.

This parameter can be accessed if **[Access Level]** LAC is set to **[Expert]** EPr.

If the assigned input or bit state is:
- 0: error detection is enabled.
- 1: error detection is disabled.

Current errors are cleared on a rising edge (change from 0 to 1) of the assigned input or bit.

Detection of following errors can be disabled: AnF, bOF, CnF, COF, dLF, EnF, EPF1, EPF2, FCF2, ETHF, InFA, InFB, InFV, LFF1, LFF3, ObF, OHF, OLC, OLF, OPF1, OPF2, OSF, PHF, SLF1, SLF2, SLF3, SOF, SPF, SSF, TFd, TJF, TnF, ULF, USF.

Setting	Code / Value	Description
[Not Assigned]	nO	Not assigned **Factory setting**
[DI1]...**[DI6]**	LI1...LI6	Digital input DI1...DI6
[DI11]...**[DI16]**	LI11...LI16	Digital input DI11...DI16 if VW3A3203 I/O extension module has been inserted
[DI52 (High level)]... **[DI59 (High level)]**	d52H...d59H	Cabinet high level assignment digital inputs **NOTE:** This selection can be accessed on ATV660 and ATV680 equipped with Cabinet IO.
[CD00]...**[CD10]**	CD00...CD10	Virtual digital input CMD.0...CMD.10 in **[I/O profile]** IO configuration
[CD11]...**[CD15]**	CD11...CD15	Virtual digital input CMD.11...CMD.15 regardless of configuration
[C101]...**[C110]**	C101...C110	Virtual digital input CMD1.01...CMD1.10 with integrated Modbus Serial in **[I/O profile]** IO configuration
[C111]...**[C115]**	C111...C115	Virtual digital input CMD1.11...CMD1.15 with integrated Modbus Serial regardless of configuration
[C201]...**[C210]**	C201...C210	Virtual digital input CMD2.01...CMD2.10 with CANopen® fieldbus module in **[I/O profile]** IO configuration
[C211]...**[C215]**	C211...C215	Virtual digital input CMD2.11...CMD2.15 with CANopen® fieldbus module regardless of configuration
[C301]...**[C310]**	C301...C310	Virtual digital input CMD3.01...CMD3.10 with a fieldbus module in **[I/O profile]** IO configuration
[C311]...**[C315]**	C311...C315	Virtual digital input CMD3.11...CMD3.15 with a fieldbus module regardless of configuration
[C501]...**[C510]**	C501...C510	Virtual digital input CMD5.01...CMD5.10 with integrated Ethernet in **[I/O profile]** IO configuration
[C511]...**[C515]**	C511...C515	Virtual digital input CMD5.11...CMD5.15 with integrated Ethernet regardless of configuration

[External error] *E Ł F* - Menu

Access

[Complete settings] ➡ [Error/Warning handling] ➡ [External error]

[Ext Error Assign] *E Ł F*

External error assignment.

If the assigned bit state is:
- 0: there is no external error.
- 1: there is an external error

Setting	Code / Value	Description
[Not Assigned]	*n o*	Not assigned **Factory setting**
[DI1]...**[DI6]**	*L I 1*...*L I 6*	Digital input DI1...DI6
[DI11]...**[DI16]**	*L I 1 1*...*L I 16*	Digital input DI11...DI16 if VW3A3203 I/O extension module has been inserted
[CD00]...**[CD10]**	*C d 0 0*...*C d 1 0*	Virtual digital input CMD.0...CMD.10 in **[I/O profile]** *I o* configuration
[CD11]...**[CD15]**	*C d 1 1*...*C d 1 5*	Virtual digital input CMD.11...CMD.15 regardless of configuration
[C101]...**[C110]**	*C 1 0 1*...*C 1 1 0*	Virtual digital input CMD1.01...CMD1.10 with integrated Modbus Serial in **[I/O profile]** *I o* configuration
[C111]...**[C115]**	*C 1 1 1*...*C 1 1 5*	Virtual digital input CMD1.11...CMD1.15 with integrated Modbus Serial regardless of configuration
[C201]...**[C210]**	*C 2 0 1*...*C 2 1 0*	Virtual digital input CMD2.01...CMD2.10 with CANopen® fieldbus module in **[I/O profile]** *I o* configuration
[C211]...**[C215]**	*C 2 1 1*...*C 2 1 5*	Virtual digital input CMD2.11...CMD2.15 with CANopen® fieldbus module regardless of configuration
[C301]...**[C310]**	*C 3 0 1*...*C 3 1 0*	Virtual digital input CMD3.01...CMD3.10 with a fieldbus module in **[I/O profile]** *I o* configuration
[C311]...**[C315]**	*C 3 1 1*...*C 3 1 5*	Virtual digital input CMD3.11...CMD3.15 with a fieldbus module regardless of configuration
[C501]...**[C510]**	*C 5 0 1*...*C 5 1 0*	Virtual digital input CMD5.01...CMD5.10 with integrated Ethernet Modbus TCP in **[I/O profile]** *I o* configuration
[C511]...**[C515]**	*C 5 1 1*...*C 5 1 5*	Virtual digital input CMD5.11...CMD5.15 with integrated Ethernet Modbus TCP regardless of configuration
[DI1 (Low level)]...**[DI6 (Low level)]**	*L I L*...*L 6 L*	Digital input DI1...DI6 used at low level
[DI52 (High level)]... **[DI59 (High level)]**	*d 5 2 H*...*d 5 9 H*	Cabinet high level digital inputs **NOTE:** This selection can be accessed on ATV660 and ATV680 equipped with Cabinet IO.
[DI52 (Low level)]... **[DI59 (Low level)]**	*d 5 2 L*...*d 5 9 L*	Cabinet low level digital inputs **NOTE:** This selection can be accessed on ATV660 and ATV680 equipped with Cabinet IO.

[Ext Error Resp] *E P L*

Drive response to external error.

Type of stop in the event of an external detected error.

Setting	Code / Value	Description
[Ignore]	*n o*	External detected error ignored
[Freewheel Stop]	*Y E S*	Freewheel stop **Factory setting**
[Per STT]	*S t t*	Stop according to configuration of **[Type of stop]** *S t t* *(see page 412)*, without tripping. In this case, the detected error relay does not open and the drive is ready to restart as soon as the detected error disappears, according to the restart conditions of the active command channel (for example, according to **[2/3-wire control]** *t C C* and **[2-wire type]** *t C t* *(see page 242)*if control is via the terminals). Configuring a warning for this detected error is recommended (assigned to a digital output, for example) in order to indicate the cause of the stop.
[Fallback speed]	*L F F*	Change to fallback speed, maintained as long as the detected error persists and the run command has not been removed(1)
[Speed maintained]	*r L S*	The drive maintains the speed being applied when the detected error occurred, as long as the detected error is active and the run command has not been removed(1)
[Ramp stop]	*r M P*	Stop on ramp
[Fast stop]	*F S t*	Fast stop
[DC Injection]	*d C ,*	DC injection stop. This type of stop cannot be used with some other functions.
(1) Because, in this case, the detected error does not trigger a stop, it is recommended to assign a relay or digital output to its indication.		

[Output phase loss] oPL - Menu

Access

[Complete settings] ➡ [Error/Warning handling] ➡ [Output phase loss]

[OutPhaseLoss Assign] oPL

Output phase loss assignment.

⚠⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

If output phase monitoring is disabled, phase loss and, by implication, accidental disconnection of cables, are not detected.

- Verify that the setting of this parameter does not result in unsafe conditions.

Failure to follow these instructions will result in death or serious injury.

NOTE: [OutPhaseLoss Assign] oPL is set to **[Function Inactive]** nO when **[Motor control type]** Ctt is set to **[SYN_U VC]** SYnU.

Setting	Code / Value	Description
[Function Inactive]	nO	Function inactive
[OPF Error Triggered]	YES	Tripping on **[OutPhaseLoss Assign]** oPL with freewheel stop **Factory setting**
[No Error Triggered]	oAC	No detected error triggered, but management of the output voltage in order to avoid an overcurrent when the link with the motor is re-established and catch on the fly performed (even if this function has not been configured).The drive switches to **[Output cut]** SoC state after **[OutPhL Time]** odt time. Catch on fly is possible as soon as the drive is in stand by output cut **[Output cut]** SoC state.

[OutPhaseLoss Delay] odt

Output (motor) phase loss detection time.

Time delay for taking the **[OutPhaseLoss Assign]** oPL detected error into account.

Setting ❮❯	Description
0.5...10 s	Setting range **Factory setting**: 0.5 s

[Input phase loss] iPL - Menu

Access

[Complete settings] ➡ [Error/Warning handling] ➡ [Input phase loss]

[InPhaseLoss Assign] iPL

Loss of input phase error response.

If one supply mains phase is missing and if this leads to performance decrease, an **[Input phase loss]** PHF error is triggered.

If 2 or 3 supply mains phases are missing, the drive operate until an **[Supply Mains UnderV]** USF error is triggered.

Setting	Code / Value	Description
[Ignore]	nO	The input phase loss monitoring function is disabled to be used when the drive is supplied via a single-phase supply or by the DC bus
[Freewheel]	YES	The drive stops in freewheel in case of a supply mains phase loss has been detected

[4-20mA loss] L F L - Menu

Access

[Complete settings] ➡ [Error/Warning handling] ➡ [4-20mA loss]

[AI1 4-20mA Loss] L F L 1

Response to 4-20mA loss on AI1.

Drive behavior on AI1 4-20 event.

Setting	Code / Value	Description
[Ignore]	n o	Detected error ignored. This is the only possible configuration if **[AI1 min. value]** C r L 1 is not greater than 3 mA **Factory setting**
[Freewheel]	Y E S	Freewheel stop
[Per STT]	S t t	Stop according to configuration of **[Type of stop]** S t t, without tripping. In this case, the error relay does not open and the drive is ready to restart as soon as the detected error disappears, according to the restart conditions of the active command channel (for example, according to **[2/3-wire control]** t C C and **[2-wire type]** t C t if control is via the terminals). Configuring a warning for this detected error is recommended (assigned to a digital output, for example) in order to indicate the cause of the stop
[fallback spd]	L F F	Change to fallback speed, maintained as long as the detected error persists and the run command has not been removed (1)
[Spd maint.]	r L S	The drive maintains the speed being applied when the detected error occurred, as long as the detected error is active and the run command has not been removed (1)
[Ramp stop]	r M P	Stop on ramp
[Fast stop]	F S t	Fast stop
[DC injection]	d C 1	DC injection stop. This type of stop cannot be used with some other functions
(1) Because, in this case, the detected error does not trigger a stop, it is recommended to assign a relay or digital output to its indication.		

[AI2 4-20mA loss] L F L 2

Response to 4-20mA loss on AI2.

Drive behavior on AI2 4-20 event.

Identical to **[AI1 4-20mA Loss]** L F L 1

[AI3 4-20mA loss] L F L 3

Response to 4-20mA loss on AI3.

Drive behavior on AI3 4-20 event.

Identical to **[AI1 4-20mA Loss]** L F L 1

[AI4 4-20mA loss] L F L 4 ★

Response to 4-20mA loss on AI4.

Drive behavior on AI4 4-20 event.

Identical to **[AI1 4-20mA Loss]** L F L 1

This parameter can be accessed if VW3A3203 I/O extension module has been inserted.

[AI5 4-20mA loss] *L F L 5* ★

Response to 4-20mA loss on AI5.

Drive behavior on AI5 4-20 event.

Identical to **[AI1 4-20mA Loss]** *L F L I*

This parameter can be accessed if VW3A3203 I/O extension module has been inserted.

[Fallback Speed] *L F F* ★

Fall back speed.

Setting	Description
0.0...500.0 Hz	Setting range **Factory setting**: 0.0 Hz

[Fallback speed] *L F F* - Menu

Access

[Complete settings] ➡ [Error/Warning handling] ➡ [Fallback speed]

[Fallback Speed] *L F F*

Fall back speed.

Setting	Description
0.0...500.0 Hz	Setting range **Factory setting**: 0.0 Hz

[Fieldbus monitoring] CLL - Menu

Access

[Complete settings] ➞ [Error/Warning handling] ➞ [Fieldbus monitoring]

[Modbus Error Resp] SLL

Response to Modbus interruption.

⚠ WARNING

LOSS OF CONTROL

If this parameter is set to nO, Modbus communication monitoring is disabled.

- Only use this setting after a thorough risk assessment in compliance with all regulations and standards that apply to the device and to the application.
- Only use this setting for tests during commissioning.
- Verify that communication monitoring has been re-enabled before completing the commissioning procedure and performing the final commissioning test.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Behavior of the drive in the event of a communication interruption with integrated Modbus.

Setting	Code / Value	Description
[Ignore]	nO	Detected error ignored
[Freewheel]	YES	Freewheel stop **Factory setting**
[Per STT]	STT	Stop according to configuration of **[Type of stop]** STT, without tripping. In this case, the error relay does not open and the drive is ready to restart as soon as the detected error disappears, according to the restart conditions of the active command channel (for example, according to **[2/3-wire control]** tCC and **[2-wire type]** tCt if control is via the terminals)(1)
[fallback spd]	LFF	Change to fallback speed, maintained as long as the detected error persists and the run command has not been removed(1)
[Spd maint.]	rLS	The drive maintains the speed being applied when the detected error occurred, as long as the detected error is active and the run command has not been removed(1)
[Ramp stop]	rMP	Stop on ramp
[Fast stop]	FST	Fast stop
[DC injection]	dCI	DC injection stop. This type of stop cannot be used with some other functions
(1) Because, in this case, the detected error does not trigger a stop, it is recommended to assign a relay or digital output to its indication.		

[Fallback Speed] LFF

Fall back speed.

Setting	Description
0.0...500.0 Hz	Setting range **Factory setting**: 0.0 Hz

[Embedded Modbus TCP] E M b C - Menu

Access

[Complete settings] ➡ [Error/Warning handling] ➡ [Embedded Modbus TCP]

[Eth Error Response] E t H L

Ethernet error response.

⚠ WARNING

LOSS OF CONTROL

If this parameter is set to n o, Ethernet communication monitoring is disabled.

- Only use this setting after a thorough risk assessment in compliance with all regulations and standards that apply to the device and to the application.
- Only use this setting for tests during commissioning.
- Verify that communication monitoring has been re-enabled before completing the commissioning procedure and performing the final commissioning test.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

The error response to a communication interruption is effective if the communication channel is involved in the active command channel.

Setting	Code / Value	Description
[Ignore]	n o	Detected error ignored
[Freewheel Stop]	y E S	Freewheel stop **Factory setting**
[Per STT]	S t t	Stop according to **[Type of stop]** S t t parameter but without an error triggered after stop
[Fallback Speed]	L F F	Change to fallback speed, maintained as long as the detected error persists and the run command has not been removed (1)
[Ramp stop]	r M P	Stop on ramp

1 Because, in this case, the detected error does not trigger a stop, it is recommended to assign a relay or logic output to its indication.

[Fallback Speed] L F F ★

Fall back speed.

Setting	Description
0.0...500.0 Hz	Setting range **Factory setting**: 0.0 Hz

[Communication module] CoMo - Menu

Access

[Complete settings] ➞ [Error/Warning handling] ➞ [Communication module]

[Fieldbus Interrupt Resp] CLL

⚠ WARNING

LOSS OF CONTROL

If this parameter is set to no, fieldbus communication monitoring is disabled.

- Only use this setting after a thorough risk assessment in compliance with all regulations and standards that apply to the device and to the application.
- Only use this setting for tests during commissioning.
- Verify that communication monitoring has been re-enabled before completing the commissioning procedure and performing the final commissioning test.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Response to fieldbus module communication interruption.

Setting	Code / Value	Description
[Ignore]	no	Detected error ignored
[Freewheel]	YES	Freewheel stop **Factory setting**
[Per STT]	StT	Stop according to configuration of **[Type of stop]** StT, without tripping. In this case, the error relay does not open and the drive is ready to restart as soon as the detected error disappears, according to the restart conditions of the active command channel (for example, according to **[2/3-wire control]** tCC and **[2-wire type]** tCt if control is via the terminals)(1)
[fallback spd]	LFF	Change to fallback speed, maintained as long as the detected error persists and the run command has not been removed(1)
[Spd maint.]	rLS	The drive maintains the speed being applied when the detected error occurred, as long as the detected error is active and the run command has not been removed(1)
[Ramp stop]	rMP	Stop on ramp
[Fast stop]	FSt	Fast stop
[DC injection]	dCI	DC injection stop. This type of stop cannot be used with some other functions

(1) Because, in this case, the detected error does not trigger a stop, it is recommended to assign a relay or digital output to its indication.

[CANopen Error Resp] C o L

⚠ WARNING

LOSS OF CONTROL

If this parameter is set to n o, CANopen communication monitoring is disabled.

- Only use this setting after a thorough risk assessment in compliance with all regulations and standards that apply to the device and to the application.
- Only use this setting for tests during commissioning.
- Verify that communication monitoring has been re-enabled before completing the commissioning procedure and performing the final commissioning test.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Response to CANopen error.

Behavior of the drive in the event of a communication interruption with CANopen®.

Setting	Code / Value	Description
[Ignore]	n o	Detected error ignored
[Freewheel Stop]	y E S	Freewheel stop **Factory setting**
[Per STT]	S t t	Stop according to **[Type of stop]** S t t parameter but without an error triggered after stop
[Fallback Speed]	L F F	Change to fallback speed, maintained as long as the detected error persists and the run command has not been removed (1)
[Ramp stop]	r M P	Stop on ramp
1 Because, in this case, the detected error does not trigger a stop, it is recommended to assign a relay or logic output to its indication.		

[Fallback Speed] L F F ★

Fall back speed.

Setting	Description
0.0...500.0 Hz	Setting range **Factory setting**: 0.0 Hz

[Undervoltage handling] uSb - Menu

Access

[Complete settings] → [Error/Warning handling] → [Undervoltage handling]

[Undervoltage Resp] uSb

Response to undervoltage.

Setting	Code / Value	Description
[Error Triggered]	0	The drive trips and the external detected error signal are triggered (the detected error relay assigned to **[Operating State Fault]** FLt will be opened) **Factory setting**
[Error Triggered w/o Relay]	1	The drive trips but the external detected error signal is not triggered (the detected error relay assigned to **[Operating State Fault]** FLt remains closed)
[Warning Triggered]	2	The warning and detected error relay remain closed. The warning can be assigned to a digital output or a relay

[Mains Voltage] urES

Rated voltage of the mains supply in Vac.

The factory setting value of this parameter depends of drive rating.

Settings	Code / Value	Description
[200 Vac]	200	200 Vac
[220 Vac]	220	220 Vac
[230 Vac]	230	230 Vac
[240 Vac]	240	240 Vac
[380 Vac]	380	380 Vac
[400 Vac]	400	400 Vac
[415 Vac]	415	415 Vac
[440 Vac]	440	440 Vac
[460 Vac]	460	460 Vac
[480 Vac]	480	480 Vac
[525 Vac]	525	525 Vac
[575 Vac]	575	575 Vac
[600 Vac]	600	600 Vac
[690 Vac]	690	690 Vac

[Undervoltage Level] uSL

Undervoltage level.

The factory setting is determined by the drive voltage rating.

Setting	Description
100...345 V	Setting range, according to drive rating **Factory setting**: According to drive rating

[UnderVolt Timeout] uSt

Undervoltage timeout.

Setting	Description
0.2...999.9 s	Setting range **Factory setting**: 0.2 s

[CtrlStopPLoss] StP

Controlled stop on power loss.

Behavior in the event of the undervoltage prevention level being reached.

Setting	Code / Value	Description
[No]	nO	No action **Factory setting**
[DC Maintain]	dCS	This stop mode uses the inertia of the application to maintain the control block powered, and thus to keep operational I/O state and fieldbus link as long as possible.
[Ramp stop]	rMP	Stop following an adjustable deceleration ramp **[Max stop time]** StM in order to help to prevent from uncontrolled stop of the application.
[Freewheel Stop]	LnF	Lock (freewheel stop) without triggering an error

[UnderV. Restart Tm] tSM ★

Undervoltage restart time.

This parameter can be accessed if **[CtrlStopPLoss]** StP is set to **[Ramp stop]** rMP.

The time delay before authorizing the restart after a complete stop for **[CtrlStopPLoss]** StP is set to **[Ramp stop]** rMP if the voltage has returned to normal.

Setting ❨❩	Description
1.0...999.9 s	Setting range **Factory setting**: 1.0 s

[Prevention Level] uPL ★

Undervoltage prevention level.

This parameter can be accessed if **[CtrlStopPLoss]** StP is set to **[No]** nO.

The adjustment range and factory setting are determined by the drive voltage rating and the **[Mains Voltage]** urES value.

Setting	Description
141...414 V	Setting range **Factory setting**: According to drive rating

[Max Stop Time] StM ★

Maximum stop time.

This parameter can be accessed if **[CtrlStopPLoss]** StP is set to **[Ramp stop]** rMP.

This parameter defines the deceleration ramp time in case of mains loss. During this controlled stop, the drive is powered thanks to the inertia of the application, the motor is in generator mode. It is recommended to verify that the deceleration set is compatible with the application inertia.

Setting ❨❩	Description
0.01...60.00 s	Setting range **Factory setting**: 1.00 s

[DC Bus Maintain Time] tbS ★

DC bus maintain time.

This parameter can be accessed if **[CtrlStopPLoss]** StP is set to **[DC Maintain]** dCS.

Setting ❨❩	Description
1...9999 s	Setting range **Factory setting**: 9999 s

[Ground Fault] GrFL - Menu

Access

[Complete settings] ➞ **[Error/Warning handling]** ➞ **[Ground Fault]**

About This Menu

This menu can be accessed if **[Access Level]** is set to **[Expert]** EPr

[Ground Fault Activation] GrFL

Ground fault error response.

Setting	Code / Value	Description
[ErrorDetect Disable]	InH	Disables error detection
[Yes]	YES	Use product internal value **Factory setting**
0.0...100.0%	_	Setting range, in % of the drive nominal current

[Motor thermal monit] ΕΗΕ - Menu

Access

[Complete settings] ➡ [Error/Warning handling] ➡ [Motor thermal monit]

[Motor Th Current] ιΕΗ

Motor thermal monitoring current to be set to the rated current indicated on the nameplate.

Setting ( )	Description
0.2...1.1_In(1)	Setting range **Factory setting**: According to drive rating
(1) Corresponding to the rated drive current indicated in the installation manual and on the drive nameplate.	

[Motor Thermal Mode] ΕΗΕ

Motor thermal monitoring mode.

NOTE: An error is detected when the thermal state reaches 118% of the rated state and reactivation occurs when the state falls back below 100%.

Setting	Code / Value	Description
[No]	nο	No thermal monitoring
[Self cooled]	ACL	Self ventilated motor **Factory setting**
[Force-cool]	FCL	Fan-cooled motor

[Drive overload monit] obr - Menu

Access

[Complete settings] ➡ **[Error/Warning handling]** ➡ **[Drive overload monit]**

Drive Overload Monitoring

When **[Drive Overload Monit]** tLoL is set to **[I2t Current Reduction]** i2t, the drive will adapt automatically its overload capabilities.

The current limitation will be automatically reduced depending of the machine cycles.

If **[Dual Rating]** drt is set to **[Normal rating]** nor MAL, the maximum overload capabilities are:

- 110% of drive nominal current for 60 seconds.
- 135% of drive nominal current for 2 seconds.

If **[Dual Rating]** drt is set to **[High rating]** HIGH, the maximum overload capabilities are:

- 150% of drive nominal current for 60 seconds.
- 180% of drive nominal current for 2 seconds.

If the drive currents is greater than the 2 or 60 seconds limits given above, the current limitation of the drive will be reduced automatically and the **[Current Reduction]** tLoW warning will be activated.

The current limitation can be reduced up to drive nominal current.

NOTE: The overload state is stored when the product is powered off. At next power on, the drive will react according to the value of **[I2t Actual Load Value]** tLoA.

[DriveTemp ErrorResp] oHL

Drive overtemperature error response.

Setting	Code / Value	Description
[Ignore]	nO	Detected error ignored
[Freewheel Stop]	YES	Freewheel stop **Factory setting**
[Per STT]	STT	Stop according to **[Type of stop]** STT parameter but without an error triggered after stop
[Fallback Speed]	LFF	Change to fallback speed, maintained as long as the detected error persists and the run command has not been removed (1)
[Ramp stop]	rMP	Stop on ramp
1 Because, in this case, the detected error does not trigger a stop, it is recommended to assign a relay or logic output to its indication.		

[Drv Thermal Warning] tHA

Drive thermal state warning.

Setting	Description
0...118%	Setting range **Factory setting**: 100%

[[Warn grp 1 definition] A I C - Menu

Access

[Complete settings] ➡ [Error/Warning handling] ➡ [Warning groups config] ➡ [Warn grp 1 definition]

About This Menu

The following submenus group the warnings into 1 to 5 groups, each of which can be assigned to a relay or a digital output for remote signaling.

When one or a number of warnings selected in a group occur, this warning group is activated.

List of Warnings

Setting	Code / Value	Description
[Fallback Frequency]	F r F	Fallback frequency
[Speed Maintained]	r L S	Speed maintained
[Type of stop]	S t t	Type of stop
[Ref Frequency Warning]	S r A	Reference frequency warning
[Life Cycle Warn 1]	L C A 1	Life cycle warning 1
[Life Cycle Warn 2]	L C A 2	Life cycle warning 2
[Drive Running Warning]	d r Y A	Drive running warning
[Low Flow Warning]	L F A	Low flow warning
[High Flow Warning]	H F P A	High flow warning
[InPress Warning]	I P P A	Inlet pressure warning
[Low OutPres Warning]	o P L A	Low OutPres warning
[High OutPres Warning]	o P H A	High OutPres warning
[Pump Cycle warning]	P C P A	Pumpcycle warning
[Anti-Jam Warning]	J A M A	Anti-Jam warning
[Pump Low Flow Warn]	P L F A	Pump low flow warning
[LowPres Warning]	L P A	LowPres warning
[Flow Limit Activated]	F S A	Flow limit activated
[PID Error Warning]	P E E	PID error warning
[PID Feedback Warning]	P F A	PID feedback warning
[PID High Fdbck Warning]	P F A H	PID high warning
[PID Low Fdbck Warning]	P F A L	PID low warning
[Regulation Warning]	P I S H	Regulation warning
[AI2 Th Warning]	t P 2 A	AI2 thermal sensor warning
[AI3 Th Warning]	t P 3 A	AI3 thermal sensor warning
[AI4 Th Warning]	t P 4 A	AI4 thermal sensor warning
[AI5 Th Warning]	t P 5 A	AI5 thermal sensor warning
[AI1 4-20 Loss Warning]	A P 1	AI1 4-20 loss warning
[AI2 4-20 Loss Warning]	A P 2	AI2 4-20 loss warning
[AI3 4-20 Loss Warning]	A P 3	AI3 4-20 loss warning
[AI4 4-20 Loss Warning]	A P 4	AI4 4-20 loss warning
[AI5 4-20 Loss Warning]	A P 5	AI5 4-20 loss warning
[Drive Thermal Warning]	t H A	Drive thermal state warning
[IGBT Thermal Warning]	t J A	IGBT thermal warning
[Fan Counter Warning]	F C t A	Fan counter warning
[Fan Feedback Warning]	F F d A	Fan feedback warning
[Ext. Error Warning]	E F A	External error warning
[Undervoltage Warning]	u S A	Undervoltage warning
[Preventive UnderV Active]	u P A	Preventive undervoltage active
[Mot Freq High Thd]	F t A	Motor frequency high threshold reached

Setting	Code / Value	Description
[Mot Freq Low Thd]	FtAL	Motor frequency low threshold reached
[Mot Freq Low Thd 2]	F2AL	Motor frequency low threshold 2 reached
[High speed reached]	FLA	High speed reached
[Ref Freq High Thd reached]	rtAH	Reference frequency high threshold reached
[Ref Freq Low Thd reached]	rtAL	Reference frequency low threshold reached
[2nd Frequency Thd Reached]	F2A	Second frequency threshold reached
[Current Thd Reached]	CtA	Current threshold reached
[Low Current Reached]	CtAL	Low Current Reached
[Process Undld Warning]	uLA	Process underload warning
[Process Overload Warning]	oLA	Process overload warning
[Drv Therm Thd reached]	tAd	Drive thermal threshold reached
[Motor Therm Thd Reached]	tSA	Motor thermal threshold reached
[Cust Warning 1]	CAS1	Customer Warning 1
[Cust Warning 2]	CAS2	Customer Warning 2
[Cust Warning 3]	CAS3	Customer Warning 3
[Cust Warning 4]	CAS4	Customer Warning 4
[Cust Warning 5]	CAS5	Customer Warning 5
[AFE Mains Undervoltage]	urA	AFE mains undervoltage
[Power Cons Warning]	PoWd	Power consumption warning
[Switch OutPres Warning]	oPSA	Switch OutPres warning
[Ethernet Internal Warning]	inWN	Ethernet internal warning
[MultiPump Capacity Warn]	NPcA	Multi-Pump available capacity warning
[Lead Pump Warn]	NPLA	Lead Pump not available
[High Level Warning]	LchA	High level warning
[Low Level Warning]	LcLA	Low level warning
[Level Switch Warning]	LcWA	Level switch warning
[M/P Device Warn]	NPdA	Multipump device warning
[MonitorCircuit A Warn]	iWA	Monitoring circuit A warning
[MonitorCircuit B Warn]	iWb	Monitoring circuit B warning
[MonitorCircuit C Warn]	iWC	Monitoring circuit C warning
[MonitorCircuit D Warn]	iWd	Monitoring circuit D warning
[CabinetCircuit A Warn]	CWA	Cabinet circuit A warning
[CabinetCircuit B Warn]	CWb	Cabinet circuit B warning
[CabinetCircuit C Warn]	CWC	Cabinet circuit C warning
[MotorWinding A Warn]	tWA	Motor winding A warning
[MotorWinding B Warn]	tWb	Motor winding B warning
[MotorBearing A Warn]	tWC	Motor winding C warning
[MotorBearing B Warn]	tWd	Motor winding D warning
[Circuit Breaker Warn]	CbW	Circuit breaker warning
[AFE Motor Limitation]	CLiM	AFE motor limitation
[AFE Generator Limitation]	CLiG	AFE generator limitation
[AFE Thermal State Warn]	tHSA	AFE sensor thermal warning
[AFE IGBT Thermal Warn]	tHJA	AFE IGBT thermal warning
[Cabinet Fan Fdbck Warn]	FFCA	Cabinet fan feedback warning
[Cabinet Fan Counter Warn]	FCCA	Cabinet fan counter warning
[Cabinet Overheat Warn]	CHA	Cabinet overheat warning
[CMI Jumper Warn]	CNiJ	CMI jumper warning
[AFE Fan Counter Warn]	FCbA	AFE fan counter warning
[AFE Fan Fdbck Warn]	FFbA	AFE fan feedback warning

[Warn grp 2 definition] A 2 C - Menu

Access

[Complete settings] ➞ [Error/Warning handling] ➞ [Warning groups config] ➞ [Warn grp 2 definition]

About This Menu

Identical to **[Warn grp 1 definition]** A 1 C *(see page 558)*

[Warn grp 3 definition] A 3 C - Menu

Access

[Complete settings] ➞ [Error/Warning handling] ➞ [Warning groups config] ➞ [Warn grp 3 definition]

About This Menu

Identical to **[Warn grp 1 definition]** A 1 C *(see page 558)*

[Warn grp 4 definition] A 4 C - Menu

Access

[Complete settings] ➞ [Error/Warning handling] ➞ [Warning groups config] ➞ [Warn grp 4 definition]

About This Menu

Identical to **[Warn grp 1 definition]** A 1 C *(see page 558)*

[Warn grp 5 definition] A 5 C - Menu

Access

[Complete settings] ➞ [Error/Warning handling] ➞ [Warning groups config] ➞ [Warn grp 5 definition]

About This Menu

Identical to **[Warn grp 1 definition]** A 1 C *(see page 558)*

Section 7.57
[Maintenance]

What Is in This Section?

This section contains the following topics:

Topic	Page
[Diagnostics] dAu - Menu	562
[Drive warranty mgnt] dWnA - Menu	563
[Customer event 1] CE 1 - Menu	564
[Customer event 2] CE2 - Menu	565
[Customer event 3] CE3 - Menu	565
[Customer event 4] CE4 - Menu	566
[Customer event 5] CE5 - Menu	566
[Customer events] CuEV - Menu	567
[Fan management] FAnA - Menu	568
[Maintenance] CSnA - Menu	569

[Diagnostics] dRu - Menu

Access

[Complete settings] ➡ [Maintenance] ➡ [Diagnostics]

About This Menu

This menu allows you to make simple test sequences for diagnostics.

[FAN Diagnostics] Fnt

Diagnostics of internal fan(s).

This starts a test sequence.

[LED Diagnostics] HLt

Diagnostics of product LED(s).

This starts a test sequence.

[IGBT Diag w motor] tWt

Diagnostics of internal fan(s).

This starts a test sequence with the motor (open circuit/short-circuit).

[IGBT Diag w/o motor] tWot

Diagnostics of product IGBT(s).

This starts a test sequence without the motor (short-circuit).

[Drive warranty mgnt] dWnA - Menu

Access

[Complete settings] ➡ [Maintenance] ➡ [Drive warranty mgnt]

About This Menu

The product life cycle date is initialized during product manufacturing.

A **[Life Cycle Warn 1]** LCA1 is triggered 2 months before the end of the warranty period. At the end of the warranty period a **[Life Cycle Warn 2]** LCA2 is triggered. This function requires date and time data coming from Graphic Display Terminal or a time server configured trough Ethernet.

[LifeCycle Warning] LCAC

Life cycle warning configuration.

Setting	Code / Value	Description
[No]	no	No
[YES]	YES	Yes **Factory setting**

[Warranty Expired] LCAd

Life cycle date.

End of warranty date (YYYY/MM/DD).

Setting	Description
YYYY/MM/DD	Setting range **Factory setting**: _

[Customer event 1] CE 1 - Menu

Access

[Complete settings] ➡ [Maintenance] ➡ [Customer events] ➡ [Customer event 1]

About This Menu

This menu allows you to define customized customer events based on the time.

[Config Warning 1] CCA 1

Configuration of customer warning 1.

Setting	Code / Value	Description
[Not Configured]	nO	Not configured **Factory setting**
[Counter]	CPt	Counter
[Date And Time]	dt	Date and time

[Counter Limit 1] CCL 1

Configuration counter limit 1.

Setting	Description
0...4294967295 s	Setting range **Factory setting**: 0 s

[Counter Source 1] CCS 1

Configuration counter source 1.

Setting	Code / Value	Description
[Mains/Control ON]	0	Mains or control supply on
[Mains Supply ON]	1	Mains supply on
[Drv In Run State]	2	Drive in running state **Factory setting**

[Current Counter 1] CC 1

Current counter 1.

Setting	Description
0...4294967295 s	Setting range **Factory setting**: 0 s

[Date Time Warn 1] Cdt 1★

Date time warning 1.

This parameter can be accessed with the Graphic Display Terminal only.

Setting ❮❯	Description
hh:mm DD/MM/YYYY	Setting range **Factory setting**: 00:00 01/01/2000

[Customer event 2] CE2 - Menu

Access

[Complete settings] ➡ [Maintenance] ➡ [Customer events] ➡ [Customer event 2]

About This Menu

Identical to **[Customer event 1] CE1 -** menu *(see page 564)*.

[Config Warning 2] CCA2

Configuration of customer warning 2.

[Counter Limit 2] CCL2

Configuration counter limit 2.

[Counter Source 2] CCS2

Configuration counter source 2.

[Current Counter 2] CC2

Current counter 2.

[Date Time Warn 2] CdE2 ★

Date time warning 2.

This parameter can be accessed with the Graphic Display Terminal only.

[Customer event 3] CE3 - Menu

Access

[Complete settings] ➡ [Maintenance] ➡ [Customer events] ➡ [Customer event 3]

About This Menu

Identical to **[Customer event 1] CE1 -** menu *(see page 564)*.

[Config Warning 3] CCA3

Configuration of customer warning 3.

[Counter Limit 3] CCL3

Configuration counter limit 3.

[Counter Source 3] CCS3

Configuration counter source 3.

[Current Counter 3] CC3

Current counter 3.

[Date Time Warn 3] CdE3 ★

Date time warning 3.

This parameter can be accessed with the Graphic Display TerminalGraphic display terminal only.

[Customer event 4] C E 4 - Menu

Access

[Complete settings] ➞ [Maintenance] ➞ [Customer events] ➞ [Customer event 4]

About This Menu

Identical to **[Customer event 1] C E 1 -** menu *(see page 564)*.

[Config Warning 4] C C A 4

Configuration of customer warning 4.

[Counter Limit 4] C C L 4

Configuration counter limit 4.

[Counter Source 4] C C S 4

Configuration counter source 4.

[Current Counter 4] C C 4

Current counter 4.

[Date Time Warn 4] C d t 4 ★

Date time warning 4.

This parameter can be accessed with the Graphic Display TerminalGraphic display terminal only.

[Customer event 5] C E 5 - Menu

Access

[Complete settings] ➞ [Maintenance] ➞ [Customer events] ➞ [Customer event 5]

About This Menu

Identical to **[Customer event 1] C E 1 -** menu *(see page 564)*.

[Config Warning 5] C C A 5

Configuration of customer warning 5.

[Counter Limit 5] C C L 5

Configuration counter limit 5.

[Counter Source 5] C C S 5

Configuration counter source 5.

[Current Counter 5] C C 5

Current counter 5.

[Date Time Warn 5] C d t 5 ★

Date time warning 5.

This parameter can be accessed with the Graphic Display Terminal only.

[Customer events] CUEV - Menu

Access

[Complete settings] ➡ [Maintenance] ➡ [Customer events]

[Warning Clearing] CAr

Customer warning clearing.

Setting	Code / Value	Description
[No Warning Clearing]	nO	No warning clearing **Factory setting**
[Clear Event 1 Warning]	rA1	Clear event 1 warning
[Clear Event 2 Warning]	rA2	Clear event 2 warning
[Clear Event 3 Warning]	rA3	Clear event 3 warning
[Clear Event 4 Warning]	rA4	Clear event 4 warning
[Clear Event 5 Warning]	rA5	Clear event 5 warning

[Fan management] FAnA - Menu

Access

[Complete settings] ➡ **[Maintenance]** ➡ **[Fan management]**

About This Menu

If **[Fan Mode]** FFn is set to **[Never]** StP, the fan of the drive is disabled.

Service life of Electronic component is reduced.

NOTICE
DAMAGE TO THE DRIVE The ambient temperature must be limited to 40°C (104°F). **Failure to follow these instructions can result in equipment damage.**

Fan speed and **[Fan Operation Time]** FPbt are monitored values.

An abnormal low speed or the fan trigger a warning **[Fan Feedback Warning]** FFdA. As soon as **[Fan Operation Time]** FPbt reach the predefined value of 45,000 hours, a warning **[Fan Counter Warning]** FCtA is triggered.

[Fan Operation Time] FPbt counter can be set to 0 by using the **[Counter Reset]** rPr parameter.

Additional fan management on ATV660 and ATV680:

- If any of the cabinet fan is running at an abnormal low speed a warning **[Cabinet Fan Fdbck Warn]** FFCA is trigged.
- If **[Cabinet Fan Oper Time]** FCt has reached the predefined value of 30,000 hours, a warning **[Cabinet Fan Counter Warn]** FCCA is triggered.

Additional fan management on ATV680 only:

- If any of the AFE fan bricks is running at an abnormal low speed the **[AFE Fan Fdbck Warn]** FFbA is trigged.
- If **[AFE Fan Operation Time]** FbAt has reached the predefined value of 45,000 hours, a warning **[AFE Fan Counter Warn]** FCbA is triggered.

[Fan Mode] FFn

Fan activation mode.

NOTE: For ATV660 and ATV680, this parameter is forced to **[Standard]** Std.

Setting	Code / Value	Description
[Standard]	Std	The fan is activated during the all run time of the motor. According to the drive rating, this could be the only available setting **Factory setting**
[Always]	run	The fan is always activated
[Economy]	Eco	The fan is activated only if necessary, according to the internal thermal state of the drive

[Maintenance] C S M A - Menu

Access

[Complete settings] ➡ [Maintenance]

[Time Counter Reset] r P r

Time counter reset.

NOTE: The list of possible values depends on the product size.

Setting	Code / Value	Description
[No]	n o	No **Factory setting**
[Run Time Reset]	r t H	Run time reset
[Power ON Time Reset]	P t H	Power ON time reset
[Reset Fan Counter]	F t H	Reset fan counter
[Clear NSM]	n S M	Clear number of motor starts
[Efficiency MAX]	E F Y K	Efficiency max
[Efficiency MIN]	E F Y J	Efficiency min
[Flow Rate MAX]	F S I K	Flow rate max
[Flow Rate MIN]	F S I J	Flow rate min
[Reset Total Quantity]	F S I C	Reset total quantity
[AFE Fan Operation Time]	F b A t	Fan operation time (1)
[Clear Cabinet Fan]	F C t	Clear cabinet fan operation time **NOTE:** This selection can be accessed on ATV660 and ATV680.
[Clear AFE Power ON Time]	b P t h	Clear AFE power ON time (1)
[Clear BRTH]	b r t h	Clear AFE run time (1)
[Clear AFE Nb. start]	b n S A	Clear AFE brick number of start (1)
1 This selection can be accessed on ATV680.		

Section 7.58
[Cabinet I/O functions] - [Monitoring circuit]

What Is in This Section?

This section contains the following topics:

Topic	Page
[Monitoring circuit A] C M C A - Menu	571
[Monitoring circuit B] C M C b - Menu	573
[Monitoring circuit C] C M C C - Menu	573
[Monitoring circuit D] C M C d - Menu	574

[Monitoring circuit A] CMCA - Menu

Access

[Complete settings] ➡ **[Cabinet I/O functions]** ➡ **[Monitoring circuit A]**

About This Menu

The use of this function is part of the wiring for monitoring and control functions inside the enclosure.

The Monitoring Circuits give the possibility to manage 2 levels of monitoring:

- A Warning level: the drive triggers an event without stopping the application. If **[MonitorCircuit ErrorResp]** iFrX is set to **[Ignore]** nO the **[MonitorCircuit Warn]** iWX will be triggered.
- An Error level: the drive triggers an event and stops the application. If **[MonitorCircuit ErrorResp]** iFrX is set to a different value **[MonitorCircuit Error]** iFX will be triggered.

This menu is used to assign a value on a cabinet digital input active at a High Level dS2H…dS9H or a low level dS2L …dS9L, and to control its behavior.

These parameters can be accessed on ATV660 or ATV680, equipped with cabinet IO, and if **[Access Level]** LAC is set to **[Expert]** EPr.

[MonitorCircuit A Assign] iFAA

Monitoring circuit A assignment

Setting	Code / Value	Description
[Not Assigned]	nO	Not assigned **Factory setting**
[DI52 High Assignment]...**[DI59 High Assignment]**	dS2H...dS9H	Cabinet high assignment digital inputs
[DI52 Low Assignment]...**[DI59 Low Assignment]**	dS2H...dS9H	Cabinet low assignment digital inputs

[MonitorCircuit A Monitor] iFMA ★

Monitoring circuit A error monitoring type

This parameter can be accessed if **[MonitorCircuit A Assign]** iFAA is not set to **[No]** nO

Setting	Code / Value	Description
[Always Active]	ALL	Always active **Factory setting**
[Ready & Run State]	rry	Ready and Run state
[Run State]	run	Run state

[MonitorCircuit A Delay] iFdA ★

Monitoring circuit A delay after Run

This parameter can be accessed if **[MonitorCircuit A Assign]** iFAA is not set to **[No]** nO

Setting	Description
0...300 s	Setting range **Factory setting**: 0 s

[MonitorCircuit A ErrorResp] ,FrA ★

Response to monitoring circuit A error

This parameter can be accessed if **[MonitorCircuit A Assign]** ,FAA is not set to **[No]** nO

Setting	Code / Value	Description
[Ignore]	nO	Detected error ignored
[Freewheel Stop]	YES	Freewheel stop **Factory setting**
[Per STT]	StT	Stop according to **[Type of stop]** StT parameter but without an error triggered after stop
[Fallback Speed]	LFF	Change to fallback speed, maintained as long as the detected error persists and the run command has not been removed (1)
[Spd maintained]	rLS	Speed maintained as long as the detected error persists and the run command has not been removed (1)
[Ramp stop]	rMP	Stop on ramp
[Fast stop]	FSt	Fast stop
[DC injection]	dC ,	DC injection
1 Because, in this case, the detected error does not trigger a stop, it is recommended to assign a relay or logic output to its indication.		

[Monitoring circuit B] C M C b - Menu

Access

[Complete settings] ➡ [Cabinet I/O functions] ➡ [Monitoring circuit B]

About This Menu

Identical to **[Monitoring circuit A] C M C A -** menu *(see page 571)*

[MonitorCircuit B Assign] i F A b

Monitoring circuit B assignment

[MonitorCircuit B Monitor] i F M b ★

Monitoring circuit B error monitoring type

[MonitorCircuit B Delay] i F d b ★

Monitoring circuit B delay after Run

[MonitorCircuit B ErrorResp] i F r b ★

Response to monitoring circuit B error

[Monitoring circuit C] C M C C - Menu

Access

[Complete settings] ➡ [Cabinet I/O functions] ➡ [Monitoring circuit C]

About This Menu

Identical to **[Monitoring circuit A] C M C A -** menu *(see page 571)*

[MonitorCircuit C Assign] i F A C

Monitoring circuit C assignment

[MonitorCircuit C Monitor] i F M C ★

Monitoring circuit C error monitoring type

[MonitorCircuit C Delay] i F d C ★

Monitoring circuit C delay after Run

[MonitorCircuit C ErrorResp] i F r C ★

Response to monitoring circuit C error

[Monitoring circuit D] CMCd - Menu

Access

[Complete settings] ➡ [Cabinet I/O functions] ➡ [Monitoring circuit D]

About This Menu

Identical to **[Monitoring circuit A]** CMCA - menu *(see page 571)*

[MonitorCircuit D Assign] iFAd

Monitoring circuit D assignment

[MonitorCircuit D Monitor] iFMd ★

Monitoring circuit D error monitoring type

[MonitorCircuit D Delay] iFdd ★

Monitoring circuit D delay after Run

[MonitorCircuit D ErrorResp] iFrd ★

Response to monitoring circuit D error

Section 7.59
[Cabinet I/O functions] - [Cabinet circuit]

What Is in This Section?

This section contains the following topics:

Topic	Page
[Cabinet circuit A] *CCnA* - Menu	576
[Cabinet circuit B] *CCnb* - Menu	577
[Cabinet circuit C] *CCnC* - Menu	577

[Cabinet circuit A] CCnA - Menu

Access

[Complete settings] ➡ **[Cabinet I/O functions]** ➡ **[Cabinet circuit A]**

About This Menu

These functions can be used to manage warnings or detected errors inside the cabinet enclosure.

The cabinet circuits give the possibility to manage 2 levels of monitoring:

- A Warning level: the drive triggers an event without stopping the application.
  If **[CabinetCircuit ErrorResp]** CFrX is set to **[Ignore]** no the **[CabinetCircuit Warn]** CWX will be triggered.
- An Error level: the drive triggers an event and stops the application.
  If **[CabinetCircuit ErrorResp]** CFrX is set to a different value **[CabinetCircuit Error]** CFX will be triggered.

Identical to **[Monitoring circuit A]** CnCA - menu *(see page 571)*

[CabinetCircuit A Assign] CFAA

Cabinet circuit A assignment

[CabinetCircuit A Monitor] CFnA ★

Cabinet circuit A error monitoring type

[CabinetCircuit A Delay] CFdA ★

Cabinet circuit A delay after Run

[CabinetCircuit A ErrorResp] CFrA ★

Response to Cabinet circuit A error

[Cabinet circuit B] CCnb - Menu

Access

[Complete settings] ➡ [Cabinet I/O functions] ➡ [Cabinet circuit B]

About This Menu

Identical to **[Cabinet circuit A]** CCnA - menu *(see page 571)*

[CabinetCircuit B Assign] CFAb

Cabinet circuit B assignment

[CabinetCircuit B Monitor] CFnb ★

Cabinet circuit B error monitoring type

[CabinetCircuit B Delay] CFdb ★

Cabinet circuit B delay after Run

[CabinetCircuit B ErrorResp] CFrb ★

Response to Cabinet circuit B error

[Cabinet circuit C] CCnC - Menu

Access

[Complete settings] ➡ [Cabinet I/O functions] ➡ [Cabinet circuit C]

About This Menu

Identical to **[Cabinet circuit A]** CCnA - menu *(see page 571)*

[CabinetCircuit C Assign] CFAC

Cabinet circuit C assignment

[CabinetCircuit C Monitor] CFnC ★

Cabinet circuit C error monitoring type

[CabinetCircuit C Delay] CFdC ★

Cabinet circuit C delay after Run

[CabinetCircuit C ErrorResp] CFrC ★

Response to Cabinet circuit C error

Section 7.60
[Cabinet I/O functions] - [Motor winding]

What Is in This Section?

This section contains the following topics:

Topic	Page
[Motor winding A] C t , A - Menu	579
[Motor winding B] C t , b - Menu	580

[Motor winding A] CtiA- Menu

Access

[Complete settings] ➡ [Cabinet I/O functions] ➡ [Motor winding A]

About This Menu

These functions will be mainly used with additional thermal relays to monitor the motor winding temperature.

These functions give the possibility to manage 2 levels of monitoring:

- A Warning level: the drive triggers an event without stopping the application.
  If **[MotorWinding/Bearing ErrorResp]** tFrX is set to **[Ignore]** no the **[MotorWinding/Bearing Warn]** CWX will be triggered.
- An Error level: the drive triggers an event and stops the application.
  If **[MotorWinding/Bearing ErrorResp]** tFrX is set to a different value **[MotorWinding/Bearing Error]** tFX will be triggered.

Identical to **[Monitoring circuit A]** CMCA- menu *(see page 571)*

[MotorWinding A Assign] tFAA

Motor winding A assignment

[MotorWinding A Monitor] tFMA★

Motor winding A monitoring

[MotorWinding A Delay] tFdA★

Motor winding A delay after Run

[MotorWinding A ErrorResp] tFrA★

Response to Motor winding A error

[Motor winding B] CtiB - Menu

Access

[Complete settings] ➡ [Cabinet I/O functions] ➡ [Motor winding B]

About This Menu

Identical to **[Motor winding A]** CtiA - menu *(see page 579)*

[MotorWinding B Assign] tFAb

Motor winding B assignment

[MotorWinding B Monitor] tFMb ★

Motor winding B monitoring

[MotorWinding B Delay] tFdb ★

Motor winding B delay after Run

[MotorWinding B ErrorResp] tFrb ★

Response to Motor winding B error

Section 7.61
[Cabinet I/O functions] - [Motor bearing]

What Is in This Section?

This section contains the following topics:

Topic	Page
[Motor bearing A] CbiC - Menu	582
[Motor bearing B] Cbid - Menu	582

[Motor bearing A] CbA- Menu

Access

[Complete settings] ➡ [Cabinet I/O functions] ➡ [Motor bearing A]

About This Menu

Identical to **[Motor winding A]** CbA- menu *(see page 579)*

[MotorBearing A Assign] bFAC

Motor bearing A assignment

[MotorBearing A Monitor] bFMC ★

Motor winding A monitoring

[MotorBearing A Delay] bFdC ★

Motor bearing A delay after Run

[MotorBearing A ErrorResp] bFrC ★

Response to Motor bearing A error

[Motor bearing B] CbB- Menu

Access

[Complete settings] ➡ [Cabinet I/O functions] ➡ [Motor bearing B]

About This Menu

Identical to **[Motor winding A]** CbA- menu *(see page 579)*

[MotorBearing B Assign] bFAd

Motor bearing B assignment

[MotorBearing B Monitor] bFMd ★

Motor winding B monitoring

[MotorBearing B Delay] bFdd ★

Motor bearing B delay after Run

[MotorBearing B ErrorResp] bFrd ★

Response to Motor bearing B error

Section 7.62
[Cabinet I/O functions] - [Circuit breaker]

[Circuit breaker] CCb - Menu

Access

[Complete settings] ➞ **[Cabinet I/O functions]** ➞ **[Circuit breaker]**

About This Menu

This menu is used to control the circuit breaker behavior

This menu can be accessed on ATV660 or ATV680, equipped with Cabinet IO, and if **[Access Level]** LAC is set to **[Expert]** EPr .

[CB start pulse activated] CbEP

Circuit breaker start pulse assignment

Setting	Code / Value	Description
[R61 Assignment]...[R66 Assignment]	r61...r66	Cabinet I/O relays outputs

[CB stop pulse activated] CbdP

Circuit breakers stop pulse assignment

Setting	Code / Value	Description
[R61 Assignment]...[R66 Assignment]	r61...r66	Cabinet I/O relays outputs

[CB status] Cbs

Circuit breaker status

If **[CB start pulse activated]** CbEP and **[CB stop pulse activated]** CbdP are not configured the **[CB Invalid Config]** CbC1 status is displayed. Both values must be set in order to configure the circuit breaker.

The **[CB stop disable]** Cbsd status is displayed until **[CB Disable stop delay]** Cbt5 is reached.

Setting	Code / Value	Description
[CB Not Configured]	no	Circuit breaker not configured
[CB Invalid Config]	CbC1	Circuit breaker invalid configuration
[CB In Start Pulse]	Cbst	Circuit breaker in start pulse
[CB Not Closed]	CbnC	Circuit breaker not closed
[CB Open]	Cbos	Circuit breaker in open
[CB In Stop Pulse]	CbsP	Circuit breaker in stop pulse
[CB Not Open]	Cbno	Circuit breaker not open
[CB Closed]	CbCs	Circuit breaker closed
[CB stop disable]	Cbsd	Circuit breaker stop is disable

[CB start pulse time] CbE 1

Circuit Breaker start pulse time.

Setting	Description
0.1...60.0 s	Setting range **Factory setting**: 0.5 s

[CB stop pulse time] CbE 2

Circuit Breaker stop pulse time.

Identical to **[CB start pulse time]** CbE 1

[CB Switch-on delay] CbE 3

Circuit Breaker Switch-on delay.

This parameter is used to set a minimal delay between a star pulse and a stop pulse.

Identical to **[CB start pulse time]** CbE 1

[CB Switch-off delay] CbE 4

Circuit Breaker Switch-off delay.

This parameter is used to set a minimal delay between a stop pulse and a start pulse.

Identical to **[CB start pulse time]** CbE 1

[CB Disable stop delay] CbE 5

Circuit Breaker Disable stop delay.

Setting	Description
0.0...360.0 s	Setting range **Factory setting**: 60.0 s

[CB Error Resp] Cb5r

The Circuit breaker gives the possibility to manage 2 levels of monitoring:

- A Warning level: the drive triggers an event without stopping the application.
- An Error level: the drive triggers an event and stops the application.
  If after a start command, no voltage is detected after the **[Mains V. time out]** LCE, the **[CB Error Resp]** Cb5r is triggered and the **[CB Not Closed]** CbnC status is displayed.
  If after a stop command, the voltage is still detected after **[Mains V. time out]** LCE, the **[CB Error Resp]** Cb5r is triggered and the **[CB Not Open]** Cbno status is displayed.

Setting	Code / Value	Description
[Error]	FLt	The drive stops the application
[Warning]	WAr	A warning is triggered and the drive remains in operation enable.

Chapter 8
[Communication] COM -

Introduction

[Communication] COM - menu presents the fieldbus submenus.

What Is in This Chapter?

This chapter contains the following topics:

Topic	Page
[Modbus Fieldbus] MD1 - Menu	586
[Com. scanner input] ICS - Menu	588
[Com. scanner output] OCS - Menu	589
[Modbus HMI] MD2 - Menu	590
[Embd Eth Config] ETE - Menu	591
[Eth Module Config] ETO - Menu	592
[CANopen] CNO - Menu	592
[DeviceNet] DNC - Menu	592
[Profibus] PBC - Menu	592
[Profinet] PNC - Menu	592

[Modbus Fieldbus] nd1 - Menu

Access

[Communication] ➞ [Comm parameters] ➞ [Modbus SL] ➞ [Modbus Fieldbus]

About This Menu

This menu is related to the Modbus serial communication port on the bottom of the control block.

Refer to the Modbus serial manual.

[Modbus Address] Add

Drive Modbus address.

Setting	Description
[OFF] oFF ...247	Setting range **Factory setting**: **[OFF]** oFF

[Bd.RateModbus] tbr

Baud rate Modbus.

Setting	Code / Value	Description
[4800 bps]	4K8	4,800 Bauds
[9600 bps]	9K6	9,600 Bauds
[19200 bps]	19K2	19,200 Bauds **Factory setting**
[38.4 Kbps]	38K4	38,400 Bauds

[Term Word Order] tWo ★

Terminal Modbus: word order.

This parameter can be accessed if **[Access Level]** LAC is set to **[Expert]** EPr.

Setting	Code / Value	Description
[OFF]	oFF	Low word first
[ON]	on	High word first **Factory setting**

[Modbus Format] tFo

Modbus communication format.

Setting	Code / Value	Description
[8-O-1]	8o1	8 bits odd parity 1 stop bit
[8-E-1]	8E1	8 bits even parity 1 stop bit **Factory setting**
[8-N-1]	8n1	8 bits no parity 1 stop bit
[8-N-2]	8n2	8 bits no parity 2 stop bits

[Modbus Timeout] ttO

Modbus timeout.

Setting	Description
0.1 ...30.0 s	Setting range **Factory setting**: 10.s

[Mdb Com Stat] *Com1*

Modbus communication status.

Setting	Code / Value	Description
[r0t0]	*r0t0*	Modbus no reception, no transmission
[r0t1]	*r0t1*	Modbus no reception, transmission
[r1t0]	*r1t0*	Modbus reception, no transmission
[r1t1]	*r1t1*	Modbus reception and transmission

[Com. scanner input] ıCS - Menu

Access

[Communication] ➞ [Comm parameters] ➞ [Modbus SL] ➞ [Modbus Fieldbus] ➞ [Com. scanner input]

[Scan. IN1 address] nMA1

Address of the first input word.

Setting	Description
0...65535	Setting range **Factory setting**: 3201 (EtA)

[Scan. IN2 address] nMA2

Address of the second input word.

Setting	Description
0...65535	Setting range **Factory setting**: 8604 (rFrd)

[Scan. IN3 address] nMA3

Address of the third input word.

Setting	Description
0...65535	Setting range **Factory setting**: 0

[Scan. IN4 address] nMA4

Address of the fourth input word.

Identical to **[Scan. IN3 address]** nMA3.

[Scan. IN5 address] nMA5

Address of the fifth input word.

Identical to **[Scan. IN3 address]** nMA3.

[Scan. IN6 address] nMA6

Address of the sixth input word.

Identical to **[Scan. IN3 address]** nMA3.

[Scan. IN7 address] nMA7

Address of the seventh input word.

Identical to **[Scan. IN3 address]** nMA3.

[Scan. IN8 address] nMA8

Address of the eighth input word.

Identical to **[Scan. IN3 address]** nMA3.

[Com. scanner output] oCS - Menu

Access

[Communication] ➞ [Comm parameters] ➞ [Modbus SL] ➞ [Modbus Fieldbus] ➞ [Com. scanner output]

[Scan.Out1 address] nCA1

Address of the first output word.

Setting	Description
0...65535	Setting range **Factory setting**: 8501(CMd)

[Scan.Out2 address] nCA2

Address of the second output word.

Setting	Description
0...65535	Setting range **Factory setting**: 8602(LFrd)

[Scan.Out3 address] nCA3

Address of the third output word.

Setting	Description
0...65535	Setting range **Factory setting**: 0

[Scan.Out4 address] nCA4

Address of the fourth output word.

Identical to **[Scan.Out3 address]** nCA3.

[Scan.Out5 address] nCA5

Address of the fifth output word.

Identical to **[Scan.Out3 address]** nCA3.

[Scan.Out6 address] nCA6

Address of the sixth output word.

Identical to **[Scan.Out3 address]** nCA3.

[Scan.Out7 address] nCA7

Address of the seventh output word.

Identical to **[Scan.Out3 address]** nCA3.

[Scan.Out8 address] nCA8

Address of the eighth output word.

Identical to **[Scan.Out3 address]** nCA3.

[Modbus HMI] Md2 - Menu

Access

[Communication] → [Comm parameters] → [Modbus SL] → [Modbus HMI]

About This Menu

This menu is related to the Modbus serial communication port on the front of the control block. It is used by default for the Graphic Display Terminal. The Graphic Display Terminal is compliant with baud rate equal to or lower than 19,200 bps.

[HMI Baud Rate] tbr2

Baud rate Modbus.

Setting	Code / Value	Description
[4800 bps]	4800	4,800 Bauds
[9600 bps]	9600	9,600 Bauds
[19200 bps]	19200	19,200 Bauds **Factory setting**
[38.4 Kbps]	38K4	38,400 Bauds

[Term 2 word order] tWo2 ★

Terminal Modbus 2: Word order.

This parameter can be accessed if **[Access Level]** LAC is set to **[Expert]** EPr.

Setting	Code / Value	Description
[LOW]	oFF	Low word first
[HIGH]	on	High word first **Factory setting**

[HMI Format] tFo2

HMI format.

Setting	Code / Value	Description
[8-O-1]	8o1	8.o.1.
[8-E-1]	8E1	8.E.1. **Factory setting**
[8-N-1]	8n1	8.n.1.
[8-N-2]	8n2	8.n.2.

[Mdb com start] Com2

Modbus communication status.

Setting	Code / Value	Description
[r0t0]	r0t0	Modbus no reception, no transmission
[r0t1]	r0t1	Modbus no reception, transmission
[r1t0]	r1t0	Modbus reception, no transmission
[r1t1]	r1t1	Modbus reception and transmission

[Embd Eth Config] E t E - Menu

Access

[Communication] ➡ [Comm parameters] ➡ [Embd Eth Config]

About This Menu

Refer to the Ethernet embedded manual.

[Device Name] P A n

The FDR (Fast Device Replacement) service is based on identification of the device by a “Device Name”. In the case of the Altivar drive, this is represented by the **[Device Name]** P A n parameter. Check that all the network devices have different “Device Names”.

[IP Mode Ether. Embd] , M O D

IP mode Ethernet embedded.

Setting	Code / Value	Description
[Fixed]	M A n u	Fixed address
[BOOTP]	b o o t P	BOOTP
[DHCP]	d H C P	DHCP **Factory setting**

[IP address] , C O

IP Address (, C O 1, , C O 2, , C O 3, , C O 4).

Setting	Description
0...255	Setting range **Factory setting**: 0.0.0.0

[Mask] , M O

Subnet mask (, M O 1, , M O 2, , M O 3, , M O 4).

Setting	Description
0...255	Setting range **Factory setting**: 0.0.0.0

[Gateway] , G O

Gateway address (, G O 1, , G O 2, , G O 3, , G O 4).

Setting	Description
0...255	Setting range **Factory setting**: 0.0.0.0

[Eth Module Config] E t o - Menu

Access

[Communication] ➡ [Comm parameters] ➡ [Eth Module Config]

About This Menu

Refer to the Ethernet-IP Modbus TCP fieldbus module manual.

[CANopen] C n o - Menu

Access

[Communication] ➡ [Comm parameters] ➡ [CANopen]

About This Menu

Refer to the CANopen fieldbus module manual.

[DeviceNet] d n C - Menu

Access

[Communication] ➡ [Comm parameters] ➡ [DeviceNet]

About This Menu

Refer to the DeviceNet fieldbus module manual.

[Profibus] P b C - Menu

Access

[Communication] ➡ [Comm parameters] ➡ [Profibus]

About This Menu

Refer to the Profibus DP fieldbus module manual.

[Profinet] P n C - Menu

Access

[Communication] ➡ [Comm parameters] ➡ [Profinet]

About This Menu

Refer to the PROFINET fieldbus module manual.

Chapter 9
[File management] F Π E -

Introduction

[File management] F Π E - menu presents the management of drive configuration files.

What Is in This Chapter?

This chapter contains the following topics:

Topic	Page
[Transfer config file] t C F - Menu	594
[Factory settings] F C S - Menu	594
[Parameter group list] F r Y - Menu	595
[Factory settings] F C S - Menu	596
[Pre-settings] P r E S - Menu	597

[Transfer config file] tCF - Menu

Access

[File management] ➡ [Transfer config file]

[Copy to the drive] oPF

This allows to select a previously saved drive configuration from the Graphic Display Terminal memory and transfer it to the drive.

The drive needs to be restarted after a configuration file transfer.

[Copy from the drive] SAF

This allows to save the actual drive configuration into the Graphic Display Terminal memory.

NOTE: The Graphic Display Terminal can store up to 16 configuration files.

[Factory settings] FCS - Menu

Access

[File management] ➡ [Factory settings]

About This Menu

This parameter allows to select the configuration to restore in case of factory setting operation.

[Config. Source] FCS ★

Setting	Code / Value	Description
[Macro-Conf]	in	Factory setting parameter set **Factory setting**
[Config 1]	CFG1	Customer parameter set 1
[Config 2]	CFG2	Customer parameter set 2
[Config 3]	CFG3	Customer parameter set 3

[Parameter group list] FrY - Menu

Access

[File management] ➡ **[Factory settings]** ➡ **[Parameter group list]**

About This Menu

Selection of menus to be loaded.

NOTE: In factory configuration and after a return to "factory settings", **[Parameter group list]** FrY will be empty.

[All] ALL

All parameters in all menus.

[Drive Configuration] drM

Load **[Complete settings]** CSt - menu.

[Motor Param] Mot

Load **[Motor parameters]** MPA - menu.

[Comm. Menu] CoM ★

Load **[Communication]** CoM - menu.

This parameter can be accessed if **[Config. Source]** FCS1 is set to **[Macro-Conf]** In1.

[Display Config.] di5 ★

Load **[Display screen type]** MSC - menu.

This parameter can be accessed if **[Config. Source]** FCS1 is set to **[Macro-Conf]** In1.

[Factory settings] FCS - Menu

Access

[File management] ➡ [Factory settings]

[Go to Factory settings] GFS

⚠ WARNING
UNANTICIPATED EQUIPMENT OPERATION
Verify that restoring the factory settings is compatible with the type of wiring used.
Failure to follow these instructions can result in death, serious injury, or equipment damage.

It is only possible to revert to the factory settings if at least one group of parameters has previously been selected.

[Save Configuration] SCS ★

Save configuration.

The active configuration to be saved does not appear for selection. For example, if it is **[Config 0]** Str0, only **[Config 1]** Str1, **[Config 2]** Str2 and **[Config 3]** Str3 appear. The parameter changes back to**[No]** no as soon as the operation is complete.

Setting	Code / Value	Description
[No]	no	No **Factory setting**
[Config 0]	Str0	Store customer parameter set 0
[Config 1]	Str1	Store customer parameter set 1
[Config 2]	Str2	Store customer parameter set 2
[Config 3]	Str3	Store customer parameter set 3

[Pre-settings] PrE S - Menu

Access

[File management] ➡ [Factory settings] ➡ [Pre-settings]

About This Menu

ATV660 and ATV680 give possibility to defined pre-settings for drive parameters.

It allows pre configuration and protection from modifications of:
- Drive functions
- Cabinet I/O functions

This pre-setting is done during the manufacturing of the drive system.

[Pre-settings Status] PSS

Drive Systems pre-settings status.

Setting	Code / Value	Description
[Not locked]	nACt	Pre-setting configuration is not locked. Parameters defined in the pre-setting list can be modified
[Locked]	Act	Pre-setting configuration is locked. Parameters defined in the pre-setting list cannot be modified

[Pre-settings Unlock] PSrt

Drive Systems pre-settings unlock.

This parameter can be used, by a Schneider Electric representative, to unlock the pre-setting configuration.

Setting	Description
0...65535	Setting range **Factory setting**: 0

Chapter 10
[My preferences] *П У Р -*

Introduction

[My preferences] *П У Р -* menu presents the possible settings for the user-defined HMI and parameter access.

What Is in This Chapter?

This chapter contains the following sections:

Section	Topic	Page
10.1	**[Language]**	600
10.2	**[Password]**	601
10.3	**[Parameter access]**	603
10.4	**[Customization]**	606
10.5	**[Date & Time settings]**	610
10.6	**[Access level]**	611
10.7	**[Webserver]**	612
10.8	**[Functions key mgnt]**	613
10.9	**[LCD settings]**	614
10.10	**[Stop and go]**	615
10.11	**[QR code]**	617
10.12	**[QR code]** - **[My link 1]**	618
10.13	**[QR code]** - **[My link 2]**	619
10.14	**[QR code]** - **[My link 3]**	620
10.15	**[QR code]** - **[My link 4]**	621
10.16	**[Pairing password]**	622

Section 10.1
[Language]

[Language] L n G - Menu

Access

[My preferences] ➞ [Language]

About This Menu

This menu allows to select the Graphic Display Terminal language.

Section 10.2
[Password]

[Password] C o d - Menu

Access

[My preferences] ➞ **[Password]**

About This Menu

Enables the configuration to be protected with an access code or a password to be entered in order to access a protected configuration:

- The drive is unlocked when the password is set to **[No password defined]** n o or when the correct password has been entered. All menus can be accessed.
- Before protecting the configuration with a password, you must:
  - Define the **[Upload rights]** u L r and **[Download rights]** d L r .
  - Make a careful note of the password and keep it in a place where you are able to find it.

[Password status] P S S t

Password status.

Setting	Code / Value	Description
[No password defined]	n o	No password defined **Factory setting**
[Password is unlocked]	u L	Password is unlocked
[Password is locked]	L o C	Password is locked

[Password] P W d

6-digits password. The password must be entered in order to unlock the drive. Once the correct code has been entered, the drive is unlocked until the next time the supply mains is disconnected.

[Upload rights] u L r

Upload rights.

Setting	Code / Value	Description
[Permitted]	u L r 0	Commissioning tools or the Graphic Display Terminal can save the whole configuration (password, monitoring, configuration) **Factory setting**
[Not allowed]	u L r 1	Commissioning tools or the Graphic Display Terminal cannot save the configuration if the drive is not protected by a password or if the correct password has been entered

[Download rights] dLr

Download rights.

Setting	Code / Value	Description
[Locked drv]	dLr 0	Lock drive: the configuration can be download to the drive only if the drive is protected by a password, which is the same as the password of the configuration to be downloaded
[Unlock. drv]	dLr 1	Unlock drive: the configuration can be downloaded to the drive or a configuration can be modified if the drive is unlocked or is not protected by a password **Factory setting**
[Not allowed]	dLr 2	The configuration can never be downloaded
[Lock/unlock]	dLr 3	Combination of **[Locked drv]** dLr 0 and **[Unlock. drv]** dLr 1

Section 10.3
[Parameter access]

What Is in This Section?

This section contains the following topics:

Topic	Page
[Restricted channels] PCd - Menu	604
[Restricted param] PPA - Menu	604
[Visibility] V ,S - Menu	605

[Restricted channels] PCd - Menu

Access

[My preferences] ➞ [Parameter access] ➞ [Restricted access] ➞ [Restricted channels]

About This Menu

Following channels can be selected to disable the accessibility to the related parameters.

[HMI] Con

Graphic Display Terminal.

[PC Tool] PWS

DTM-based commissioning software.

[Modbus] Mdb

Embedded Modbus serial.

[CANopen] CAn

CANopen fieldbus module.

[Com. Module] nEt

Fieldbus option module.

[Restricted param] PPA - Menu

Access

[My preferences] ➞ [Parameter access] ➞ [Restricted access] ➞ [Restricted param]

About This Menu

In these screens, all parameters in the **[Complete settings]** CSt - menu can be protected and are displayed for selection, except for the Expert parameters.

Press the **All** key to select all the parameters. Press the **All** key again to deselect all the parameters.

Content of the **[Complete settings]** CSt - menu. No selections can be made in this screen if there are no parameters.

[Visibility] V i S - Menu

Access

[My preferences] ➡ [Parameter access] ➡ [Visibility]

About This Menu

Selection to display all parameters or only the active parameters.

[Parameters] P V i S

Parameters.

Setting()	Code / Value	Description
[Active]	ACt	Only active parameters can be accessed **Factory setting**
[All]	ALL	All parameters can be accessed

Section 10.4
[Customization]

What Is in This Section?

This section contains the following topics:

Topic	Page
[My menu config.] *MYC* - Menu	607
[Display screen type] *MSC* - Menu	607
[Param. Bar Select] *PbS* - Menu	608
[Customer parameters] *CUP* - Menu	608
[Service message] *SEr* - Menu	609

[My menu config.] Π Y C - Menu

Access

[My preferences] ➡ **[Customization]** ➡ **[My menu config.]**

About This Menu

This menu allows to customize the **[My Menu]** Π Y Π n - menu *(see page 52)*.

[Parameter Selection] u Π P

Content of the **[Complete settings]** C S t - menu.

No selection can be made in this screen if there are no parameters.

[Selected List] u Π L

This menu allows to sort the selected parameters.

[My Menu] Π Y Π n

Used to define the name of the customized menu.

[Display screen type] Π S C - Menu

Access

[My preferences] ➡ **[Customization]** ➡ **[Display screen type]**

About This Menu

This parameter allows to select the type of display for the default screen.

[Display value type] Π d t

Type of screen display.

Setting	Code / Value	Description
[Digital]	d E C	Digital values **Factory setting**
[Bar graph]	b A r	Bar graph
[List]	L i S t	List of values
[Vu Meter]	V u Π E t	Vu meter

[Parameter Selection] Π P C

Customized selection.

This view allows to select the parameters to display on the default screen.

[Param. Bar Select] PbS - Menu

Access

[My preferences] ➡ [Customization] ➡ [Param. Bar Select]

About This Menu

This view allows to select the parameters to display on the top line of the Graphic Display Terminal screen.

[Customer parameters] CUP - Menu

Access

[My preferences] ➡ [Customization] ➡ [Customer parameters]

About This Menu

This menu allows to rename up to 15 parameters.

[Parameter Selection] SCP

Parameter selection.

This view allows to select up to 15 parameters.

[Custom Selection] CPn

Customized selection.

This view allows to set for each selected parameter:

- The name
- The unit if relevant (a custom unit is available)
- A multiplier (1...1000) if relevant
- A divisor (1...1000) if relevant
- An offset (-99.00...99.00) if relevant

[Service message] SEr - Menu

Access

[My preferences] ➡ **[Customization]** ➡ **[Service message]**

About This Menu

This menu allows to define a user-defined service message (5 lines, 23 digits per line).

This message can be displayed in **[theDiagnostics]** dIA -, **[Diag. data]** ddt - menu and **[Service message]** SEr - submenus.

[LINE 1] SnL01

Line 1.

[LINE 2] SnL02

Line 2.

[LINE 3] SnL03

Line 3.

[LINE 4] SnL04

Line 4.

[LINE 5] SnL05

Line 5.

Section 10.5
[Date & Time settings]

[Date/time settings] r t C - Menu

Access

[My preferences] ➞ [Date/time settings]

About This Menu

This view allows to set date and time. This information is used for the time stamping of all logged data.

If a time server is connected over Ethernet and configured in the webserver, date and time data are updated automatically according to the configuration.

Date and time information shall be available (time server available and configured, or Graphic Display Terminal plugged) at drive power up to enable the time stamping of the logged data.

Modifying these settings will modify previously logged data value in case of average data based on time.

Section 10.6
[Access level]

[Access level] L A C - Menu

Access

[My preferences] → [Access level]

About This Menu

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

A single input can activate several functions at the same time (reverse and 2nd ramp for example).

Verify that activating a digital input to several functions does not result in unsafe conditions.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

[Access Level] L A C

Level of access control.

Setting	Code / Value	Description
[Basic]	b A S	Access to all menus. Access to the [Simply start] S Y S -, [Dashboard] d S H -, [Diagnostics] d I A - and [My preferences] M Y P - menus only.
[Standard]	S t d	Access to all menus. **Factory setting**
[Expert]	E P r	Access to all menus and to additional parameters.

Section 10.7
[Webserver]

[Webserver] Wb5 - Menu

Access

[My preferences] → [Webserver]

About This Menu

This menu allows to manage Web services.

[EnableWebserver] EWEE

Enable Web services for the embedded Ethernet adapter.

Setting	Code / Value	Description
[No]	nO	Webserver disabled
[Yes]	YES	Webserver enabled **Factory setting**

[EnableWebserver] EWE ★

Enable Web services for the Ethernet based modules.

This parameter can be accessed if Ethernet-IP or PROFINET fieldbus module has been inserted.

Setting	Code / Value	Description
[No]	nO	Webserver disabled
[Yes]	YES	Webserver enabled **Factory setting**

[Reset EmbWeb] rWPE

Reset the embedded Ethernet webserver to its default configuration.

The default password is ADMIN.

Setting ❮❯	Code / Value	Description
[No]	nO	No **Factory setting**
[Yes]	YES	Yes

[Reset OptWeb Passwd] rWPO ★

Reset the password of the Ethernet-IP Modbus TCP fieldbus module webserver.

This parameter can be accessed if Ethernet-IP Modbus TCP fieldbus module has been inserted.

Setting ❮❯	Code / Value	Description
[No]	nO	No **Factory setting**
[Yes]	YES	Yes

[Webserver default password] WdP

8-digits password. A unique password is provided and must be entered at the first connection of the webserver in order to have access to the administrator accout (username = ADMIN).

Section 10.8
[Functions key mgnt]

[Functions key mgnt] FKG - Menu

Access

[My preferences] ➞ **[Functions key mgnt]**

About This Menu

This menu allows to assign functions to the Graphic Display Terminal function keys.

[F1 key assignment] Fn1

Function key 1. Following possible assignments cannot be accessed in **[I/O profile]** IO configuration.

Setting	Code / Value	Description
[Not assigned]	nO	Not assigned **Factory setting**
[Preset Speed 1]	FPS1	Function key preset speed 1 assignment
[Preset Speed 2]	FPS2	Function key preset speed 2 assignment
[PID Ref Frequency 1]	FPr1	Function key preset PID 1 assignment
[PID Ref Frequency 2]	FPr2	Function key preset PID 2 assignment
[+Speed]	FUSP	Function key faster assignment
[-Speed]	FdSP	Function key slower assignment

[F2 key assignment] Fn2

Function key 2.

Identical to **[F1 key assignment]** Fn1.

[F3 key assignment] Fn3

Function key 3.

Identical to **[F1 key assignment]** Fn1.

[F4 key assignment] Fn4

Function key 4.

Identical to **[F1 key assignment]** Fn1.

Section 10.9
[LCD settings]

[LCD settings] LCD - Menu

Access

[My preferences] → [LCD settings]

About This Menu

This menu allows to set the Graphic Display Terminal related parameters.

[Screen Contrast] LCS

Screen contrast setting.

Setting	Description
0...100%	Setting range **Factory setting**: 50%

[Standby] SBY

Stand-by delay.

NOTE: Disabling the automatic standby function of the display terminal backlight will reduce the backlight service time.

Setting	Description
no...10 min	Automatic backlight OFF time **Factory setting**: 10 min

[Display Terminal locked] KLCK

Graphic Display Terminal key locked. Press **ESC** and **Home** keys to Lock manually & unlock the Graphic Display Terminal keys. The **Stop** key remains active when the Graphic Display Terminal is locked.

Setting ( )	Description
no...10 min	Setting range **Factory setting**: 5 min

[Red Backlight] BCKL ★

Graphic Display Terminal red backlight function disabeled in case or an error triggered.

Setting ( )	Code / Value	Description
[No]	no	Red backlight disabled
[Yes]	YES	Red backlight enabled **Factory setting**

Section 10.10
[Stop and go]

[Stop and go] S t G - Menu

Access

[My preferences] ➞ **[Stop and go]**

About This Menu

This function is available for drives from frame size 4 to 7. When the function is active, the DC bus voltage is no longer maintained at operational level in order to save energy. When the drive is in energy saving state, the next run command shall be delayed up to 1 second during the DC bus charge.

[Energy Saving Delay] i d L n

Wait time before going to **[Energy Saving]** i d L E mode after motor is stopped.

At power-on, if **[Energy Saving Delay]** i d L n is not set to **[No]** n o, the drive goes directly to **[Energy Saving]** i d L E

The value **[No]** n o deactivate the function.

Setting	Description
[No] n o...32,400 s	Setting range **Factory setting**: n o

[Energy Saving Assign] ıdL S

Energy saving mode digital input assignment.

At active state rising edge, the drive switches to energy saving state if the motor is stopped without a run command active. A falling edge switch the drive to normal operation.

Setting	Code / Value	Description
[Not Assigned]	nO	Not assigned **Factory setting**
[DI1]...**[DI6]**	LI1...LI6	Digital input DI1...DI6
[DI11]...**[DI16]**	LI11...LI16	Digital input DI11...DI16 if VW3A3203 I/O extension module has been inserted
[DI52 (High level)]... **[DI59 (High level)]**	d52H...d59H	Cabinet high level assignment digital inputs **NOTE:** This selection can be accessed on ATV660 and ATV680 equipped with Cabinet IO.
[CD00]...**[CD10]**	CdO0...CdI0	Virtual digital input CMD.0...CMD.10 in **[I/O profile]** IO configuration
[CD11]...**[CD15]**	CdI1...CdI5	Virtual digital input CMD.11...CMD.15 regardless of configuration
[C101]...**[C110]**	CI01...CI10	Virtual digital input CMD1.01...CMD1.10 with integrated Modbus Serial in **[I/O profile]** IO configuration
[C111]...**[C115]**	CI11...CI15	Virtual digital input CMD1.11...CMD1.15 with integrated Modbus Serial regardless of configuration
[C201]...**[C210]**	C201...C210	Virtual digital input CMD2.01...CMD2.10 with CANopen® fieldbus module in **[I/O profile]** IO configuration
[C211]...**[C215]**	C211...C215	Virtual digital input CMD2.11...CMD2.15 with CANopen® fieldbus module regardless of configuration
[C301]...**[C310]**	C301...C310	Virtual digital input CMD3.01...CMD3.10 with a fieldbus module in **[I/O profile]** IO configuration
[C311]...**[C315]**	C311...C315	Virtual digital input CMD3.11...CMD3.15 with a fieldbus module regardless of configuration
[C501]...**[C510]**	C501...C510	Virtual digital input CMD5.01...CMD5.10 with integrated Ethernet in **[I/O profile]** IO configuration
[C511]...**[C515]**	C511...C515	Virtual digital input CMD5.11...CMD5.15 with integrated Ethernet regardless of configuration

Section 10.11
[QR code]

[QR code] qrC - Menu

Access

[My preferences] ➞ [QR code]

About This Menu

This menu gives access to a QR Codes on the Graphic Display Terminal.

[QR Code] qCC

Scan of this QR code brings to a landing page on Internet with the information on:
- Technical product datasheet,
- Link for Schneider Electric App available for services.

Section 10.12
[QR code] - [My link 1]

[My link 1] Π Y L 1 - Menu

Access

[My preferences] → [QR code] → [My link 1]

About This Menu

This menu gives access to a QR Code customized with the commissioning software.

[MyLink 1] 9 L 1

Section 10.13
[QR code] - [My link 2]

[My link 2] MYL2 - Menu

Access

[My preferences] ➡ [QR code] ➡ [My link 2]

About This Menu

This menu gives access to a QR Code customized with the commissioning software.

[MyLink 2] 9L2

Section 10.14
[QR code] - [My link 3]

[My link 3] MYL3 - Menu

Access

[My preferences] → [QR code] → [My link 3]

About This Menu

This menu gives access to a QR Code customized with the commissioning software.

[MyLink 3] QL3

Section 10.15
[QR code] - [My link 4]

[My link 4] Π Y L Ч - Menu

Access

[My preferences] ➞ [QR code] ➞ [My link 4]

About This Menu

This menu gives access to a QR Code customized with the commissioning software.

[MyLink 4] 9 L Ч

Section 10.16
[Pairing password]

[Pairing password] PPI

Access

[My preferences] ➞ **[Pairing password]**

About This Menu

This function can only be accessed in Expert mode.This function is used to detect whenever an option module has been replaced or the software has been modified in any way. When a pairing password is entered, the parameters of the option modules currently inserted are stored. On every subsequent power-up, these parameters are verified and, in the event of a discrepancy, the drive locks in **[Boards Compatibility]** HCF. Before the drive can be restarted, it is necessary to revert to the original situation or reenter the pairing password.

The following parameters are verified:
- The type of option modules.
- The software version of the drive and the option modules.
- The serial number for the control block boards.

[Pairing password] PPI

Operation as a pair password.

Setting	Description
[OFF] oFF...9,999	Setting range **Factory setting**: oFF

The **[OFF]** oFF value signifies that the pairing password function is inactive.

The **[ON]** on value signifies that the pairing password function is active and that a password is required to start the drive in the event of a **[Boards Compatibility]** HCF detected error.

As soon as the password has been entered, the drive is unlocked and the code changes to **[ON]** on.

Part III
Maintenance and diagnostics

What Is in This Part?

This part contains the following chapters:

Chapter	Chapter Name	Page
11	Maintenance	625
12	Diagnostics and Troubleshooting	627

Chapter 11
Maintenance

Maintenance

Limitation of Warranty

The warranty does not apply if the product has been opened, except by Schneider Electric services.

Servicing

⚠ ⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

Read and understand the instructions in **Safety Information** chapter before performing any procedure in this chapter.

Failure to follow these instructions will result in death or serious injury.

NOTICE

RISK OF DAMAGE TO THE DRIVE

Perform the following activities.

Failure to follow these instructions can result in equipment damage.

Environment	Part concerned	Action	Periodicity
Mechanical impact on the product	Housing - control block (led - display)	Verify the drive visual aspect	At least each year
Corrosion	Terminals - connector - screws - EMC plate	Inspect and clean if required	
Dust	Terminals - fans blowholes		
Temperature	Around the product	Verify and correct if required	
Cooling	Fan	Verify the fan operation	
		Replace the fan	After 3 to 5 years, depending on the operating conditions
Vibration	Terminal connections	Verify tightening at recommended torque	At least each year

Spares and Repairs

Serviceable product. Please contact your Schneider Electric representative.

Long Time Storage

If the drive was not connected to mains for an extended period of time, the capacitors must be restored to their full performance before the motor is started.

NOTICE

REDUCED CAPACITOR PERFORMANCE

- Apply mains voltage to the drive for one hour before starting the motor if the drive has not been connected to mains for the following periods of time:
  - 12 months at a maximum storage temperature of +50°C (+122°F)
  - 24 months at a maximum storage temperature of +45°C (+113°F)
  - 36 months at a maximum storage temperature of +40°C (+104°F)
- Verify that no Run command can be applied before the period of one hour has elapsed.
- Verify the date of manufacture if the drive is commissioned for the first time and run the specified procedure if the date of manufacture is more than 12 months in the past.

Failure to follow these instructions can result in equipment damage.

If the specified procedure cannot be performed without a Run command because of internal mains contactor control, perform this procedure with the power stage enabled, but the motor being at standstill so that there is no appreciable mains current in the capacitors.

Fan Replacement

It is possible to order a new fan for the drive maintenance, see the catalog numbers on *www.schneider-electric.com*.

Chapter 12
Diagnostics and Troubleshooting

Overview

This chapter describes the various types of diagnostics and provides troubleshooting assistance.

⚠ ⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

Read and understand the instructions in **Safety Information** chapter before performing any procedure in this chapter.

Failure to follow these instructions will result in death or serious injury.

What Is in This Chapter?

This chapter contains the following sections:

Section	Topic	Page
12.1	Warning Codes	628
12.2	Error Codes	630
12.3	FAQ	695

Section 12.1
Warning Codes

Warning Codes

List of Available Warnings

Setting	Code / Value	Description
[AI1 4-20 Loss Warning]	AP 1	4-20 loss warning on analog input AI1
[AI2 4-20 Loss Warning]	AP2	4-20 loss warning on analog input AI2
[AI3 4-20 Loss Warning]	AP3	4-20 loss warning on analog input AI3
[AI4 4-20 Loss Warning]	AP4	4-20 loss warning on analog input AI4
[AI5 4-20 Loss Warning]	AP5	4-20 loss warning on analog input AI5
[Cust Warning 1]	CAS 1	Customer warning 1
[Cust Warning 2]	CAS2	Customer warning 2
[Cust Warning 3]	CAS3	Customer warning 3
[Cust Warning 4]	CAS4	Customer warning 4
[Cust Warning 5]	CAS5	Customer warning 5
[Current Thd Reached]	CtA	Motor current high threshold reached
[Low Current Reached]	CtAL	Motor current low threshold reached
[Dry Run Warning]	drAy	Dry run monitoring function warning
[Ext. Error Warning]	EFA	External error warning
[2nd Frequency Thd Reached]	F2A	Second frequency threshold reached
[Motor Freq Low Thd 2]	F2AL	Motor frequency low threshold 2 reached
[Fan Counter Warning]	FCtA	Fan counter warning
[Fan Feedback Warning]	FFdA	Fan feedback warning
[High Speed Reached]	FLA	High speed reached
[Fallback Frequency]	FrF	Fallback frequency reaction
[Flow Limit Activated]	FSA	Flow limitation monitoring function is active
[Motor Freq High Thd]	FtA	Motor frequency high threshold reached
[Motor Freq Low Thd]	FtAL	Motor frequency low threshold reached
[High Flow Warning]	HFPA	High flow monitoring function warning
[InPress Warning]	iPPA	Inlet pressure monitoring function warning level reached
[Anti-Jam Warning]	JAMA	Anti-Jam maximum cycle counter reached
[Life Cycle Warn 1]	LCA 1	Life cycle warning 1
[Life Cycle Warn 2]	LCA2	Life cycle warning 2
[Low Flow Warning]	LFA	Low flow monitoring function warning level reached
[LowPres Warning]	LPA	Low pressure monitoring function warning level reached
[No Warning stored]	noA	No warning stored
[Process Overload Warning]	oLA	Process overload warning
[High OutPres Warning]	oPHA	High outlet pressure warning
[Low OutPress Warning]	oPLA	Low outlet pressure warning
[Switch OutPres Warning]	oPSA	High outlet pressure switch warning
[PumpCycle warning]	PCPA	Pumpcycle warning
[PID Error Warning]	PEE	PID error warning
[PID Feedback Warning]	PFA	PID feedback warning
[PID High Fdbck Warning]	PFAH	PID feedback high threshold warning
[PID Low Fdbck Warning]	PFAL	PID feedback low threshold warning
[Regulation Warning]	PiSH	PID feedback regulation warning

Setting	Code / Value	Description
[Pump Low Flow]	PLFA	Pump low flow warning level reached
[Power Cons Warning]	PoWd	Power consumption warning
[Speed Maintained]	rLS	Speed maintained function is active
[Ref Freq High Thd reached]	rtAH	Reference frequency high threshold reached
[Ref Freq Low Thd reached]	rtAL	Reference frequency low threshold reached
[Ref Frequency Warning]	SrA	Reference frequency reached
[Type of stop]	Stt	Detected error without stop according to [Type of stop] Stt
[Drv Therm Thd Reached]	tAd	Drive thermal threshold reached
[Drive Thermal Warning]	tHA	Drive thermal state warning
[IGBT Thermal Warning]	tJA	IGBT thermal state warning
[AI2 Th Warning]	tP2A	Thermal sensor warning on analog input AI2
[AI3 Th Warning]	tP3A	Thermal sensor warning on analog input AI3
[AI4 Th Warning]	tP4A	Thermal sensor warning on analog input AI4
[AI5 Th Warning]	tP5A	Thermal sensor warning on analog input AI5
[Motor Therm Thd Reached]	tSA	Motor thermal threshold reached
[Process Undld Warning]	uLA	Process underload warning
[Preventive UnderV Active]	uPA	Preventive undervoltage active
[Undervoltage Warning]	uSA	Undervoltage warning
[Ethernet Internal Warning]	inWN	Ethernet internal warning
[AFE Mains Undervoltage]	urA	AFE mains undervoltage
[MonitorCircuit A Warn]	iWA	Monitoring circuit A warning
[MonitorCircuit B Warn]	iWb	Monitoring circuit B warning
[MonitorCircuit C Warn]	iWC	Monitoring circuit C warning
[MonitorCircuit D Warn]	iWd	Monitoring circuit D warning
[CabinetCircuit A Warn]	CWA	Cabinet circuit A warning
[CabinetCircuit B Warn]	CWb	Cabinet circuit B warning
[CabinetCircuit C Warn]	CWC	Cabinet circuit C warning
[MotorWinding A Warn]	tWA	Motor winding A warning
[MotorWinding B Warn]	tWb	Motor winding B warning
[MotorBearing A Warn]	tWC	Motor winding C warning
[MotorBearing B Warn]	tWd	Motor winding D warning
[Circuit Breaker Warn]	CbW	Circuit breaker warning
[AFE Motor Limitation]	CLiN	AFE motor limitation
[AFE Generator Limitation]	CLiG	AFE generator limitation
[AFE Thermal State Warn]	tHSA	AFE sensor thermal warning
[AFE IGBT Thermal Warn]	tHJA	AFE IGBT thermal warning
[Cabinet Fan Fdbck Warn]	FFCA	Cabinet fan feedback warning
[Cabinet Fan Counter Warn]	FCCA	Cabinet fan counter warning
[Cabinet Overheat Warn]	CHA	Cabinet overheat warning
[CMI Jumper Warn]	CMiJ	CMI jumper warning
[AFE Fan Counter Warn]	FCbA	AFE fan counter warning
[AFE Fan Fdbck Warn]	FFbA	AFE fan feedback warning

Section 12.2
Error Codes

What Is in This Section?

This section contains the following topics:

Topic	Page
Overview	633
[AFE Modulation Rate Error] AFF1	634
[AFE Current Control Error] AFF2	634
[Angle error] ASF	635
[Circuit Breaker Error] CbF	635
[CabinetCircuit A Error] CFA	636
[CabinetCircuit B Error] CFb	636
[CabinetCircuit C Error] CFC	637
[Incorrect Configuration] CFF	637
[Invalid Configuration] CF1	638
[Conf Transfer Error] CF12	638
[Pre-settings Transfer Error] CF13	639
[Cabinet Overheat Error] CHF	639
[Fieldbus Com Interrupt] CnF	640
[CANopen Com Interrupt] CoF	640
[Precharge Capacitor] CrF	641
[AFE contactor fdbk error] CrF3	641
[Channel Switch Error] CSF	642
[Dry Run Error] drYF	642
[EEPROM Control] EEF1	643
[EEPROM Power] EEF2	643
[External Error] EPF1	644
[Fieldbus Error] EPF2	644
[Embd Eth Com Interrupt] EtHF	645
[FDR 1 Error] Fdr1	645
[FDR 2 Error] Fdr2	646
[Firmware Update Error] FWEr	646
[Boards Compatibility] HCF	647
[High Flow Error] HFPF	647
[MonitorCircuit A Error] iFA	648
[MonitorCircuit B Error] iFb	648
[MonitorCircuit C Error] iFC	649
[MonitorCircuit D Error] iFd	649
[Input Overheating] iHF	650
[Internal Link Error] iLF	650
[Internal Error 0] inF0	651
[Internal Error 1] inF1	651
[Internal Error 2] inF2	652
[Internal Error 3] inF3	652
[Internal Error 4] inF4	653

Topic	Page
[Internal Error 6] inF6	653
[Internal Error 7] inF7	654
[Internal Error 8] inF8	654
[Internal Error 9] inF9	655
[Internal Error 10] inFA	655
[Internal Error 11] inFb	656
[Internal Error 12] inFC	656
[Internal Error 13] inFd	657
[Internal Error 14] inFE	657
[Internal Error 15] inFF	658
[Internal Error 16] inFG	658
[Internal Error 17] inFH	659
[Internal Error 18] inF1	659
[Internal Error 20] inFK	660
[Internal Error 21] inFL	660
[Internal Error 22] inFM	661
[Internal Error 23] inFn	661
[Internal Error 25] inFP	662
[Internal Error 27] inFr	662
[Internal Error 28] inFS	663
[Internal Error 29] inFt	663
[Internal Error 30] inFu	664
[Internal Error 31] inFV	664
[Inlet Pressure Error] iPPF	665
[Anti Jam Error] JAMF	665
[Input Contactor] LCF	666
[High Level Error] LCHF	666
[High Level Error] LCLF	667
[AI1 4-20mA loss] LFF1	667
[AI2 4-20mA loss] LFF2	668
[AI3 4-20mA loss] LFF3	668
[AI4 4-20mA loss] LFF4	669
[AI5 4-20mA loss] LFF5	669
[Mains Freq Out Of Range] MFF	670
[M/P Device Error] MPdF	670
[Lead Pump Error] MPLF	671
[DC Bus Overvoltage] obF	671
[AFE Bus unbalancing] obF2	672
[Overcurrent] oCF	672
[Drive Overheating] oHF	673
[Process Overload] oLC	673
[Motor Overload] oLF	674
[Single Output Phase Loss] oPF1	674
[Output Phase Loss] oPF2	675
[Out Pressure High] oPHF	675
[Out Pressure Low] oPLF	676

Topic	Page
[Supply Mains Overvoltage] oSF	676
[PumpCycle Start Error] PCPF	677
[PID Feedback Error] PFnF	677
[Program Loading Error] PGLF	678
[Program Running Error] PGrF	678
[Input phase loss] PHF	679
[Pump Low Flow Error] PLFF	679
[Safety Function Error] SAFF	680
[Motor short circuit] SCF 1	680
[Ground Short Circuit] SCF3	681
[IGBT Short Circuit] SCF4	681
[Motor Short Circuit] SCF5	682
[AFE ShortCircuit error] SCF6	682
[Modbus Com Interruption] SLF 1	683
[PC Com Interruption] SLF2	683
[HMI Com Interruption] SLF3	684
[Motor Overspeed] SoF	684
[Motor Stall Error] StF	685
[AI2 Thermal Sensor Error] tA2CF	685
[AI3 Thermal Sensor Error] tA3CF	686
[AI4 Thermal Sensor Error] tA4CF	686
[AI5 Thermal Sensor Error] tA5CF	687
[MotorWinding A Error] tFA	687
[MotorWinding B Error] tFb	688
[MotorBearing A Error] tFC	688
[MotorBearing B Error] tFd	689
[AI2 Th Detected Error] tH2F	689
[AI3 Th Detected Error] tH3F	690
[AI4 Th Detected Error] tH4F	690
[AI5 Th Detected Error] tH5F	691
[IGBT Overheating] tJF	691
[AFE IGBT over-heat error] tJF2	692
[Autotuning Error] tnF	692
[Process Underload] uLF	693
[AFE Mains Undervoltage] urF	693
[Supply Mains UnderV] uSF	694

Overview

Clearing the Detected Error

This table presents the steps to follow if intervention on the drive system is required:

Step	Action
1	Disconnect all power, including external control power that may be present.
2	Lock that all power disconnects in the open position.
3	Wait 15 minutes to allow the DC bus capacitors to discharge (the drive LEDs are not indicators of the absence of DC bus voltage).
4	Measure the voltage of the DC bus between the PA/+ and PC/- terminals to ensure that the voltage is less than 42 Vdc.
5	If the DC bus capacitors do not discharge completely, contact your local Schneider Electric representative. Do not repair or operate the drive.
6	Find and correct the cause of the detected error.
7	Restore power to the drive to confirm that the detected error has been rectified.

After the cause has been removed, the detected error can be cleared by:

- Switching off the drive.
- Using the **[Product Restart]** $r\,P$ parameter.
- Using the **[Auto Fault Reset]** $A\,t\,r\,-$ function.
- A digital input or control bit set to the **[Fault reset]** $r\,5\,t\,-$ function.
- Pressing the **STOP/RESET** key on the Graphic Display Terminal if the active command channel is set to **[Ref. Freq-Rmt.Term]** $L\,C\,C$.

[AFE Modulation Rate Error] ACF 1

Probable Cause

Mains voltage is on a low limit, the modulation rate of the AFE increase, to protect the DC link capacitors the **[AFE Modulation Rate Error]** ACF 1 is triggered.

Remedy

- Verify mains voltage.
- Verify parameter setting for mains voltage.

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** AtrE or manually with the **[Fault Reset Assign]** rSF parameter after the cause has disappeared.

[AFE Current Control Error] ACF2

Probable Cause

Mains voltage interruption.

Remedy

- Verify mains voltage.
- Reduce number of voltage drop-downs.

Clearing the Error Code

This detected error requires a power reset.

[Angle error] A 5 F

Probable Cause

For synchronous motors, wrong setting of the speed loop when the reference goes through 0.

Remedy

- Verify the speed loop parameters.
- Verify the motor phases and the maximum current allowed by the drive.

Clearing the Error Code

This detected error can be cleared manually with the **[Fault Reset Assign]** r 5 F parameter after the cause has disappeared.

[Circuit Breaker Error] C b F

Probable Cause

The DC bus voltage level is not correct compared to the circuit breaker logic control (start or stop pulse) after the configured timeout **[Mains V. time out]** L C t .

Remedy

- Verify the circuit breaker logic control (pulse time for start and stop).
- Verify the mechanical state of the circuit breaker.

Clearing the Error Code

This detected error requires a power reset.

[CabinetCircuit A Error] CFA

Probable Cause

The monitoring function has detected an error. The digital input assigned to **[CabinetCircuit A Assign]** CFAA is active for duration longer than **[CabinetCircuit A Delay]** FdA.

Remedy

- Identify the cause of detection..
- Check the connected device (door switch, thermal switch,…) and its wiring.
- Verify the **[CabinetCircuit A Assign]** CFAA parameter assignment.

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** AtR or manually with the **[Fault Reset Assign]** rSF parameter after the cause has disappeared.

[CabinetCircuit B Error] CFb

Probable Cause

The monitoring function has detected an error. The digital input assigned to **[CabinetCircuit B Assign]** CFAb is active for duration longer than **[CabinetCircuit B Delay]** Fdb.

Remedy

- Identify the cause of detection..
- Check the connected device (door switch, thermal switch,…) and its wiring.
- Verify the **[CabinetCircuit B Assign]** CFAb parameter assignment.

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** AtR or manually with the **[Fault Reset Assign]** rSF parameter after the cause has disappeared.

[CabinetCircuit C Error] CFC

Probable Cause

The monitoring function has detected an error. The digital input assigned to **[CabinetCircuit C Assign]** CFAC is active for duration longer than **[CabinetCircuit C Delay]** FdC.

Remedy

- Identify the cause of detection..
- Check the connected device (door switch, thermal switch,…) and its wiring.
- Verify the **[CabinetCircuit C Assign]** CFAC parameter assignment.

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** AtR or manually with the **[Fault Reset Assign]** rSF parameter after the cause has disappeared.

[Incorrect Configuration] CFF

Probable Cause

- Option module changed or removed.
- Control block replaced by a control block configured on a drive with a different rating.
- The current configuration is inconsistent.

Remedy

- Verify that there is no detected error on the option module.
- In the event of the control block being changed deliberately, see the remarks below.
- Return to factory settings or retrieve the backup configuration if it is valid.

Clearing the Error Code

This detected error is cleared as soon as its cause disappears.

[Invalid Configuration] CF 1

Probable Cause

Invalid configuration. The configuration loaded in the drive via the commissioning tool or fieldbus is inconsistent.

Remedy

- Verify the previously loaded configuration.
- Load a compatible configuration.

Clearing the Error Code

This detected error is cleared as soon as its cause disappears.

[Conf Transfer Error] CF 12

Probable Cause

- The configuration has not been transferred properly.
- The configuration loaded is not compatible with the drive.

Remedy

- Check the configuration loaded previously.
- Load a compatible configuration.
- Use PC software commissioning tool to transfer a compatible configuration
- Perform a factory setting

Clearing the Error Code

This detected error is cleared as soon as its cause disappears.

[Pre-settings Transfer Error] CF 13

Probable Cause

The preset configuration has not been transferred properly.

Remedy

Contact your local Schneider Electric representative.

Clearing the Error Code

This detected error is cleared as soon as its cause disappears.

[Cabinet Overheat Error] CHF

Probable Cause

The cabinet thermal switch is at active state, the fan cabinet has been switched on but there is no fan feedback.

The digital inputs DI50 and DI51 of drives equipped with Cabinet IO are configured as cabinet temperature monitoring. If the enclose thermo switch opens in case of over temperature, the **[Cabinet Overheat Error]** CHF is triggered.

This error can be triggered only in RUN state. On other state, the **[Cabinet Overheat Warn]** CHA is active.

Remedy

- Verify fan cabinet and its wiring.
- Verify the temperature in the enclosure is not too high.
- Verify the setting of the thermoswitch (must be 60°C (140°F))

Clearing the Error Code

This detected error is cleared as soon as its cause disappears.

[Fieldbus Com Interrupt] CnF

Probable Cause

Communication interruption on fieldbus module.

This error is triggered when the communication between the fieldbus module and the master (PLC) is interrupted.

Remedy

- Verify the environment (electromagnetic compatibility).
- Verify the wiring.
- Verify the timeout.
- Replace the option module.
- Contact your local Schneider Electric representative

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** AtrAtr or manually with the **[Fault Reset Assign]** rSFrSF parameter after the cause has disappeared.

[CANopen Com Interrupt] CoF

Probable Cause

Communication interruption on the CANopen® fieldbus

Remedy

- Verify the communication fieldbus.
- Verify the timeout.
- Refer to the CANopen® user manual.

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** AtrAtr or manually with the **[Fault Reset Assign]** rSFrSF parameter after the cause has disappeared.

[Precharge Capacitor] CrF

Probable Cause

Charging circuit control detected error or charging resistor damaged.

Remedy

- Turn off the drive and then turn on again.
- Verify the internal connections.
- Contact your local Schneider Electric representative

Clearing the Error Code

This detected error requires a power reset.

[AFE contactor fdbk error] CrF3

Probable Cause

- The mains contactor feedback is inactive during DC Bus charging phase.
- The mains contactor feedback becomes inactive without mains phase loss detection while the drive is in operation (Ready or Run state).

Remedy

- Check the feedback circuit.
- Check the mechanical state of the mains contactor.

Clearing the Error Code

This detected error requires a power reset.

[Channel Switch Error] C S F

Probable Cause

Switch to a not valid channel.

Remedy

Verify the function parameters.

Clearing the Error Code

This detected error is cleared as soon as its cause disappears.

[Dry Run Error] d r Y F

Probable Cause

The dry run monitoring function has detected an error.

NOTE: After the error has been triggered, even if the detected error has been cleared, it is not possible to restart the pump before the end of the **[DryRun Restart Delay]** d r Y r .

Remedy

- Verify that the pump is well primed.
- Verify that there is no air leak in the suction line.
- Verify the settings of the monitoring function.

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** A t r or manually with the **[Fault Reset Assign]** r S F parameter after the cause has disappeared.

[EEPROM Control] *E E F 1*

Probable Cause

An error of the internal memory of the control block has been detected.

Remedy

- Verify the environment (electromagnetic compatibility).
- Switch off the product.
- Return to factory settings.
- Contact your local Schneider Electric representative.

Clearing the Error Code

This detected error requires a power reset.

[EEPROM Power] *E E F 2*

Probable Cause

An error of the internal memory of the power board has been detected.

Remedy

- Verify the environment (electromagnetic compatibility).
- Switch off the product.
- Return to factory settings.
- Contact your local Schneider Electric representative.

Clearing the Error Code

This detected error requires a power reset.

[External Error] E P F 1

Probable Cause

- Event triggered by an external device, depending on user.
- An external error has been triggered via Embedded Ethernet.

Remedy

Remove the cause of the external error.

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** A t r or manually with the **[Fault Reset Assign]** r S F parameter after the cause has disappeared.

[Fieldbus Error] E P F 2

Probable Cause

An external error has been triggered via fieldbus.

Remedy

Remove the cause of the external error.

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** A t r or manually with the **[Fault Reset Assign]** r S F parameter after the cause has disappeared.

[Embd Eth Com Interrupt] *E E H F*

Probable Cause

Communication interruption on the Ethernet IP ModbusTCP bus.

Remedy

- Check the communication bus.
- Refer to the Ethernet user manual.

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** *A E r* or manually with the **[Fault Reset Assign]** *r S F* parameter after the cause has disappeared.

[FDR 1 Error] *F d r 1*

Probable Cause

- Communication interruption between the drive and the PLC
- Configuration file incompatible, empty or corrupted.
- Drive rating not consistent with the configuration file

Remedy

- Verify the drive and PLC connection
- Verify the communication workload
- Restart the transfer of configuration file from drive to PLC

Clearing the Error Code

This detected error requires a power reset.

[FDR 2 Error] F d r 2

Probable Cause

- Communication interruption between the drive and the PLC
- Configuration file incompatible, empty or corrupted.
- Drive rating not consistent with the configuration file

Remedy

- Verify the drive and PLC connection
- Verify the communication workload
- Restart the transfer of configuration file from drive to PLC

Clearing the Error Code

This detected error requires a power reset.

[Firmware Update Error] F W E r

Probable Cause

Firmware update function has detected an error.

Remedy

Contact your local Schneider Electric representative.

Clearing the Error Code

This detected error is cleared as soon as its cause disappears.

[Boards Compatibility] *H C F*

Probable Cause

The **[Pairing password]** *P P ı* parameter has been enabled and an option module has been changed.

Remedy

- Refit the original option module.
- Confirm the configuration by entering the **[Pairing password]** *P P ı* if the module was changed deliberately.

Clearing the Error Code

This detected error is cleared as soon as its cause disappears.

[High Flow Error] *H F P F*

Probable Cause

The high flow monitoring function has detected an error.

Remedy

- Verify that the system works in its flow capabilities.
- Verify that there is no pipe burst at the outlet of the system.
- Verify the settings of the monitoring function.

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** *R E r* or manually with the **[Fault Reset Assign]** *r S F* parameter after the cause has disappeared.

[MonitorCircuit A Error] ıFA

Probable Cause

The digital input assigned to **[MonitorCircuit A Assign]** ıFAA is active for longer than **[MonitorCircuit A Delay]** ıFdA.

Remedy

- Check the connected device and its wiring.
- Verify the **[MonitorCircuit A Assign]** ıFAA parameter assignment.

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** AtrP or manually with the **[Fault Reset Assign]** rSF parameter after the cause has disappeared.

[MonitorCircuit B Error] ıFb

Probable Cause

The digital input assigned to **[MonitorCircuit B Assign]** ıFAb is active for longer than **[MonitorCircuit B Delay]** ıFdb.

Remedy

- Check the connected device and its wiring.
- Verify the **[MonitorCircuit B Assign]** ıFAb parameter assignment.

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** AtrP or manually with the **[Fault Reset Assign]** rSF parameter after the cause has disappeared.

[MonitorCircuit C Error] ıFC

Probable Cause

The digital input assigned to **[MonitorCircuit C Assign]** ıFAC is active for longer than **[MonitorCircuit C Delay]** ıFdC.

Remedy

- Check the connected device and its wiring.
- Verify the **[MonitorCircuit C Assign]** ıFAC parameter assignment.

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** AtrP or manually with the **[Fault Reset Assign]** rSF parameter after the cause has disappeared.

[MonitorCircuit D Error] ıFd

Probable Cause

The digital input assigned to **[MonitorCircuit D Assign]** ıFAd is active for longer than **[MonitorCircuit D Delay]** ıFdd.

Remedy

- Check the connected device and its wiring.
- Verify the **[MonitorCircuit D Assign]** ıFAd parameter assignment.

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** AtrP or manually with the **[Fault Reset Assign]** rSF parameter after the cause has disappeared.

[Input Overheating] iHF

Probable Cause

The AFE brick temperature is too high.

Remedy

Verify the drive ventilation and the ambient temperature. Wait for the drive to cool down before restarting.

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** AtrP or manually with the **[Fault Reset Assign]** rSF parameter after the cause has disappeared.

[Internal Link Error] iLF

Probable Cause

Communication interruption between option module and the drive.

Remedy

- Verify the environment (electromagnetic compatibility).
- Verify the connections.
- Replace the option module.
- Contact your local Schneider Electric representative.

Clearing the Error Code

This detected error requires a power reset.

[Internal Error 0] inF0

Probable Cause

Communication interruption between microprocessors of the control board.

Remedy

Contact your local Schneider Electric representative.

Clearing the Error Code

This detected error requires a power reset.

[Internal Error 1] inF1

Probable Cause

The power board rating is not valid.

Remedy

Contact your local Schneider Electric representative.

Clearing the Error Code

This detected error requires a power reset.

[Internal Error 2] inF2

Probable Cause

The power board is incompatible with the control block software.

Remedy

Contact your local Schneider Electric representative.

Clearing the Error Code

This detected error requires a power reset.

[Internal Error 3] inF3

Probable Cause

Internal communication detected error.

Remedy

- Verify the wiring on drive control terminals (internal 10V supply for analog inputs overloaded).
- Contact your local Schneider Electric representative.

Clearing the Error Code

This detected error requires a power reset.

[Internal Error 4] inF4

Probable Cause

Internal data inconsistent.

Remedy

Contact your local Schneider Electric representative.

Clearing the Error Code

This detected error requires a power reset.

[Internal Error 6] inF6

Probable Cause

- The option module installed in the drive is not recognized.
- The removable control terminal modules (if existing) are not present or not recognized.
- The embedded Ethernet adapter is not recognized.

Remedy

- Verify the catalog number and compatibility of the option module.
- Plug the removable control terminal modules after the drive has been switched off.
- Contact your local Schneider Electric representative.

Clearing the Error Code

This detected error requires a power reset.

[Internal Error 7] inF 7

Probable Cause

Communication interruption with CPLD component of Control board.

Remedy

Contact your local Schneider Electric representative.

Clearing the Error Code

This detected error requires a power reset.

[Internal Error 8] inF 8

Probable Cause

The internal power switching supply is not correct.

Remedy

Contact your local Schneider Electric representative.

Clearing the Error Code

This detected error requires a power reset.

[Internal Error 9] inF9

Probable Cause

An error on the current circuit measurement has been detected.

Remedy

Contact your local Schneider Electric representative.

Clearing the Error Code

This detected error requires a power reset.

[Internal Error 10] inFA

Probable Cause

The input stage is not operating correctly.

Remedy

Contact your local Schneider Electric representative.

Clearing the Error Code

This detected error requires a power reset.

[Internal Error 11] inFb

Probable Cause

The internal drive thermal sensor is not operating correctly.

Remedy

Contact your local Schneider Electric representative.

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** AtrE or manually with the **[Fault Reset Assign]** rSF parameter after the cause has disappeared.

[Internal Error 12] inFC

Probable Cause

Internal current supply error.

Remedy

Contact your local Schneider Electric representative.

Clearing the Error Code

This detected error requires a power reset.

[Internal Error 13] inFd

Probable Cause

Differential current deviation.

Remedy

Check connection of DigiLink cable (GG45).

Contact your local Schneider Electric representative.

Clearing the Error Code

This detected error requires a power reset.

[Internal Error 14] inFE

Probable Cause

Internal microprocessor detected error.

Remedy

- Verify that the error code can be cleared.
- Contact your local Schneider Electric representative.

Clearing the Error Code

This detected error requires a power reset.

[Internal Error 15] inFF

Probable Cause

Serial memory flash format error.

Remedy

Contact your local Schneider Electric representative.

Clearing the Error Code

This detected error requires a power reset.

[Internal Error 16] inFG

Probable Cause

Communication interruption with the Extension module of output relays module or internal error of the Extension module of output relays

Remedy

- Replace the option module.
- Contact your local Schneider Electric representative.

Clearing the Error Code

This detected error requires a power reset.

[Internal Error 17] inFH

Probable Cause

Communication interruption with the Extension module of digital & analog I/O or internal error of the Extension module of digital & analog I/O.

Remedy

- Replace the option module.
- Contact your local Schneider Electric representative.

Clearing the Error Code

This detected error requires a power reset.

[Internal Error 18] inF1

Probable Cause

Communication interruption with Safety function module or internal error of the Safety function module.

Remedy

- Replace the option module.
- Contact your local Schneider Electric representative.

Clearing the Error Code

This detected error requires a power reset.

[Internal Error 20] inFK

Probable Cause

Option module interface board error.

Remedy

Contact your local Schneider Electric representative.

Clearing the Error Code

This detected error requires a power reset.

[Internal Error 21] inFL

Probable Cause

Internal Real Time Clock error.

Remedy

Contact your local Schneider Electric representative.

Clearing the Error Code

This detected error requires a power reset.

[Internal Error 22] ınFП

Probable Cause

An error on the embedded Ethernet adapter has been detected.

Unstability of external 24 Vdc supply.

Remedy

Contact your local Schneider Electric representative.

Verify the 24 Vdc stability.

Clearing the Error Code

This detected error requires a power reset.

[Internal Error 23] ınFn

Probable Cause

A communication interruption between the control block and AFE or BU bricks has been detected.

Remedy

Contact your local Schneider Electric representative.

Clearing the Error Code

This detected error requires a power reset.

[Internal Error 25] ınFP

Probable Cause

Incompatibility between Control Board hardware version and firmware version.

Remedy

- Update the firmware package.
- Contact your local Schneider Electric representative.

Clearing the Error Code

This detected error requires a power reset.

[Internal Error 27] ınFr

Probable Cause

Diagnostics in CPLD have detected an error.

Remedy

Contact your local Schneider Electric representative.

Clearing the Error Code

This detected error requires a power reset.

[Internal Error 28] inF5

Probable Cause

An error on the AFE brick has been detected.

Remedy

Contact your local Schneider Electric representative.

Clearing the Error Code

This detected error requires a power reset.

[Internal Error 29] inF6

Probable Cause

An error on the inverter brick has been detected.

Remedy

Contact your local Schneider Electric representative.

Clearing the Error Code

This detected error requires a power reset.

[Internal Error 30] ınFb

Probable Cause

An error on the rectifier brick has been detected.

Remedy

Contact your local Schneider Electric representative.

Clearing the Error Code

This detected error requires a power reset.

[Internal Error 31] ınFV

Probable Cause

An error on the brick architecture has been detected (brick missing).

Remedy

Contact your local Schneider Electric representative.

Clearing the Error Code

This detected error requires a power reset.

[Inlet Pressure Error] iPPF

Probable Cause

The inlet pressure monitoring function has detected an error.

Remedy

- Search for a possible cause of low pressure at the inlet of system.
- Verify the settings of the monitoring function.

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** AtrE or manually with the **[Fault Reset Assign]** rSF parameter after the cause has disappeared.

[Anti Jam Error] JAMF

Probable Cause

The Anti-Jam monitoring function has exceeded the maximum number of sequences allowed in the time window.

Remedy

- Search for a clogging substance in the impeller.
- Verify the settings of the monitoring function.

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** AtrE or manually with the **[Fault Reset Assign]** rSF parameter after the cause has disappeared.

[Input Contactor] LCF

Probable Cause

The drive is not switched on even though **[Mains V. time out]** LCt timeout has elapsed.

Remedy

- Verify the input contactor and its wiring.
- Verify the **[Mains V. time out]** LCt timeout.
- Verify the supply mains/contactor/drive wiring.

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** Atr or manually with the **[Fault Reset Assign]** rSF parameter after the cause has disappeared.

[High Level Error] LCHF

Probable Cause

The maximum level switch is active during filling process.

Remedy

- Verify the parameter **[Max Level Switch Assign]** LCWL.
- Verify the state of the corresponding drive digital input and its wiring.

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** Atr or manually with the **[Fault Reset Assign]** rSF parameter after the cause has disappeared.

[Low Level Error] LCLF

Probable Cause

The minimum level switch is active during emptying process.

Remedy

- Verify the parameter **[Min Level Switch Assign]** LCWH.
- Verify the state of the corresponding drive digital input and its wiring.

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** AtrF or manually with the **[Fault Reset Assign]** rSF parameter after the cause has disappeared.

[AI1 4-20mA loss] LFFI

Probable Cause

Loss of the 4-20 mA on analog input AI1.

This error is triggered when the measured current is below 2 mA.

Remedy

- Verify the connection on the analog inputs.
- Verify the setting of **[AI1 4-20mA loss]** LFL I parameter.

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** AtrF or manually with the **[Fault Reset Assign]** rSF parameter after the cause has disappeared.

[AI2 4-20mA loss] LFF2

Probable Cause

Loss of the 4-20 mA on analog input AI2.

This error is triggered when the measured current is below 2 mA.

Remedy

- Verify the connection on the analog inputs.
- Verify the setting of **[AI2 4-20mA loss]** LFL2 parameter.

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** AtR or manually with the **[Fault Reset Assign]** rSF parameter after the cause has disappeared.

[AI3 4-20mA loss] LFF3

Probable Cause

Loss of the 4-20 mA on analog input AI3.

This error is triggered when the measured current is below 2 mA.

Remedy

- Verify the connection on the analog inputs.
- Verify the setting of **[AI3 4-20mA loss]** LFL3 parameter.

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** AtR or manually with the **[Fault Reset Assign]** rSF parameter after the cause has disappeared.

[AI4 4-20mA loss] LFF4

Probable Cause

Loss of the 4-20 mA on analog input AI4.

This error is triggered when the measured current is below 2mA.

Remedy

- Verify the connection on the analog inputs.
- Verify the setting of **[AI4 4-20mA loss]** LFL4 parameter.

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** AtrP or manually with the **[Fault Reset Assign]** rSF parameter after the cause has disappeared.

[AI5 4-20mA loss] LFF5

Probable Cause

Loss of the 4-20 mA on analog input AI5.

This error is triggered when the measured current is below 2 mA.

Remedy

- Verify the connection on the analog inputs.
- Verify the setting of **[AI5 4-20mA loss]** LFL5 parameter.

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** AtrP or manually with the **[Fault Reset Assign]** rSF parameter after the cause has disappeared.

[Mains Freq Out Of Range] ΠFF

Probable Cause

[Mains Frequency] FAC on the AFE brick is out of range.

Remedy

- Verify the mains frequency.

Clearing the Error Code

This detected error can be cleared manually with the **[Fault Reset Assign]** rSF parameter after the cause has disappeared.

[M/P Device Error] ΠPdF

Probable Cause

A device on the MultiDrive Link architecture is missing.

Remedy

Check the communication network.

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** Atr or manually with the **[Fault Reset Assign]** rSF parameter after the cause has disappeared.

[Lead Pump Error] ΠPLF

Probable Cause

The selected lead pump is not available while in run.

Remedy

Verify the state of the corresponding drive digital input for the pump availability information (for example **[Pump 1 Ready Assign]** ΠP1I for the pump 1).

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** AtrF or manually with the **[Fault Reset Assign]** rSF parameter after the cause has disappeared.

[DC Bus Overvoltage] obF

Probable Cause

- Deceleration time too short or driving load.
- Supply mains voltage too high.

Remedy

- Increase the deceleration time.
- Configure the **[Dec ramp adapt.]** brA function if it is compatible with the application.
- Verify the supply mains voltage.

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** AtrF or manually with the **[Fault Reset Assign]** rSF parameter after the cause has disappeared.

[AFE Bus unbalancing] obF2

Probable Cause

AFE DC bus unbalancing.

Remedy

Contact your local Schneider Electric representative.

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** Atr or manually with the **[Fault Reset Assign]** rSF parameter after the cause has disappeared.

[Overcurrent] oCF

Probable Cause

- Parameters in the **[Motor data]** MoA- menu are not correct.
- Inertia or load too high.
- Mechanical locking.

Remedy

- Verify the parameters.
- Verify the size of the motor/drive/load.
- Verify the state of the mechanism.
- Decrease **[Current limitation]** CLI.
- Increase the switching frequency.

Clearing the Error Code

This detected error requires a power reset.

[Drive Overheating] oHF

Probable Cause

Drive temperature too high.

Remedy

Verify the motor load, the drive ventilation, and the ambient temperature. Wait for the drive to cool down before restarting.

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** AtrY or manually with the **[Fault Reset Assign]** rSF parameter after the cause has disappeared.

[Process Overload] oLC

Probable Cause

Process overload.

Remedy

- Verify and remove the cause of the overload.
- Verify the parameters of the **[Process overload]** oLd- function.

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** AtrY or manually with the **[Fault Reset Assign]** rSF parameter after the cause has disappeared.

[Motor Overload] oLF

Probable Cause

Triggered by excessive motor current.

Remedy

- Verify the setting of the motor thermal monitoring
- Verify the motor load. Wait for the motor to cool down before restarting
- Verify the setting of the following parameters:
  - **[Motor Th Current]** ItH
  - **[Motor Thermal Mode]** tHt
  - **[Motor Therm Thd]** ttd
  - **[MotorTemp ErrorResp]** oLL

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** Atr or manually with the **[Fault Reset Assign]** rSF parameter after the cause has disappeared.

[Single Output Phase Loss] oPF I

Probable Cause

Loss of one phase at drive output.

Remedy

Verify the wiring from the drive to the motor.

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** Atr or manually with the **[Fault Reset Assign]** rSF parameter after the cause has disappeared.

[Output Phase Loss] oPF2

Probable Cause

- Motor not connected or motor power too low.
- Output contactor opened.
- Instantaneous instability in the motor current.

Remedy

- Verify the wiring from the drive to the motor.
- If an output contactor is being used, set **[OutPhaseLoss Assign]** oPL to **[No Error Triggered]** oAC.
- If the drive is connected to a low-power motor or not connected to a motor: In factory settings mode, motor phase loss detection is active **[Output Phase Loss]** oPL = **[OPF Error Triggered]** YES. Deactivate motor phase loss detection **[Output Phase Loss]** oPL = **[Function Inactive]** nO.
- Verify and optimize the following parameters: **[IR compensation]** UFr, **[Nom Motor Voltage]** UnS and **[Rated mot. current]** nCr and perform **[Autotuning]** tUn.

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** Atr or manually with the **[Fault Reset Assign]** rSF parameter after the cause has disappeared.

[Out Pressure High] oPHF

Probable Cause

The outlet pressure monitoring function has detected a high pressure error.

Remedy

- Search for a possible cause of high pressure at the outlet of system.
- Verify the settings of the monitoring function.

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** Atr or manually with the **[Fault Reset Assign]** rSF parameter after the cause has disappeared.

[Out Pressure Low] oPLF

Probable Cause

The outlet pressure monitoring function has detected a low pressure error.

Remedy

- Verify that there is no pipe broken at the outlet of the system.
- Search for a possible cause of low pressure at the outlet of system.
- Verify the settings of the monitoring function.

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** AtrE or manually with the **[Fault Reset Assign]** rSF parameter after the cause has disappeared.

[Supply Mains Overvoltage] oSF

Probable Cause

- Supply mains voltage too high.
- Disturbed supply mains.

Remedy

Verify the supply mains voltage.

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** AtrE or manually with the **[Fault Reset Assign]** rSF parameter after the cause has disappeared.

[PumpCycle Start Error] *P C P F*

Probable Cause

The Pumpcycle monitoring function has exceeded the maximum number of start sequences allowed in the time window.

Remedy

- Search for a possible cause of repetitive start of system.
- Verify the settings of the monitoring function.

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** *A t r* or manually with the **[Fault Reset Assign]** *r S F* parameter after the cause has disappeared.

[PID Feedback Error] *P F N F*

Probable Cause

The PID feedback error was out of the allowed range around the set point during the time window.

Remedy

- Check for mechanical breakdown of pipes.
- Check for water leakage.
- Check for open discharge valve.
- Check for fire hydrant opened.
- Verify the settings of the monitoring function.

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** *A t r* or manually with the **[Fault Reset Assign]** *r S F* parameter after the cause has disappeared.

[Program Loading Error] PGLF

Probable Cause

Verify that the error code can be cleared.

Remedy

Contact your local Schneider Electric representative.

Clearing the Error Code

This detected error is cleared as soon as its cause disappears.

[Program Running Error] PGrF

Probable Cause

Verify that the error code can be cleared.

Remedy

Contact your local Schneider Electric representative.

Clearing the Error Code

This detected error requires a power reset.

[Input phase loss] *P H F*

Probable Cause

- Drive incorrectly supplied or a tripped fused.
- One phase missing.
- 3-phase drive used on a single-phase supply mains.
- Unbalanced load.

Remedy

- Check the power connection and the fuses.
- Use a 3-phase supply mains.
- Disable the detected error by **[Input phase loss]** *IPL* = **[No]** *nO* if single phase supply mains or DC bus supply is used.

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** *AtrS* or manually with the **[Fault Reset Assign]** *rSF* parameter after the cause has disappeared.

[Pump Low Flow Error] *P L F F*

Probable Cause

The pump low flow monitoring function has detected an error.

Remedy

- Check valve is closed on discharge.
- Pipes are damaged on the discharge.
- Search for a possible cause of low flow at the outlet of system.
- Verify the settings of the monitoring function.

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** *AtrS* or manually with the **[Fault Reset Assign]** *rSF* parameter after the cause has disappeared.

[Safety Function Error] SAFF

Probable Cause

- Debounce time exceeded.
- Internal hardware error.
- STOA and STOB have a different status (high/low) for more than 1 second.

Remedy

- Verify the wiring of the digital inputs STOA and STOB.
- Contact your local Schneider Electric representative.

Clearing the Error Code

This detected error requires a power reset.

[Motor short circuit] SCFI

Probable Cause

Short-circuit or grounding at the drive output.

Remedy

- Verify the cables connecting the drive to the motor, and the motor insulation.
- Adjust the switching frequency.
- Connect chokes in series with the motor.

Clearing the Error Code

This detected error requires a power reset.

[Ground Short Circuit] SCF3

Probable Cause

Significant ground leakage current at the drive output if several motors are connected in parallel.

Remedy

- Verify the cables connecting the drive to the motor, and the motor insulation.
- Adjust the switching frequency.
- Connect chokes in series with the motor.

Clearing the Error Code

This detected error requires a power reset.

[IGBT Short Circuit] SCF4

Probable Cause

Power component detected error.

Remedy

Contact your local Schneider Electric representative.

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** AtrS or manually with the **[Fault Reset Assign]** rSF parameter after the cause has disappeared.

[Motor Short Circuit] 5CF5

Probable Cause

Short-circuit at drive output.

Remedy

- Verify the cables connecting the drive to the motor, and the motor's insulation.
- Contact your local Schneider Electric representative.

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** Atr or manually with the **[Fault Reset Assign]** rSF parameter after the cause has disappeared.

[AFE ShortCircuit error] 5CF6

Probable Cause

AFE rectifier IGBT short-circuit.

AFE over current due to power factor correction systems in the grid. Each switch of the capacitor produce over voltage in the mains which can lead an over current in the AFE rectifier.

Remedy

- Check the mains voltage when the power factor correction system is changing the capacitive load. Install only power factor correction systems with integrated reactors
- Verify the cables connecting the AFE brick to the mains.
- Contact your local Schneider Electric representative.

Clearing the Error Code

This detected error requires a power reset.

[Modbus Com Interruption] SLF1

Probable Cause

Communication interruption on the Modbus port.

Remedy

- Verify the communication bus.
- Verify the timeout.
- Refer to the Modbus user manual.

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** AtrP or manually with the **[Fault Reset Assign]** rSF parameter after the cause has disappeared.

[PC Com Interruption] SLF2

Probable Cause

Communication interruption with the commissioning software.

Remedy

- Verify the commissioning software connecting cable.
- Verify the timeout.

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** AtrP or manually with the **[Fault Reset Assign]** rSF parameter after the cause has disappeared.

[HMI Com Interruption] SLF3

Probable Cause

Communication interruption with the Display Terminal.

This error is triggered when the command or reference value are given using the Graphic Display Terminal and if the communication is interrupted during more than 2 seconds.

Remedy

- Verify the Display Terminal connection.
- Verify the timeout.

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** AtR or manually with the **[Fault Reset Assign]** rSF parameter after the cause has disappeared.

[Motor Overspeed] SOF

Probable Cause

- Instability or driving load too high.
- If a downstream contactor is used, the contacts between the motor and the drive have not been closed before applying a Run command.

Remedy

- Verify the motor parameter settings.
- Verify the size of the motor/drive/load.
- Verify and close the contacts between the motor and the drive before applying a Run command.

Clearing the Error Code

This detected error requires a power reset.

[Motor Stall Error] SEF

Probable Cause

The stall monitoring function has detected an error.

The **[Motor Stall Error]** SEF is triggered on the following conditions:

- The output frequency is small than the stalling frequency **[Stall Frequency]** SEP3
- The output current is higher than the stalling current **[Stall Current]** SEP2
- For a duration longer than the stalling time S**[tall Max Time]** SEP1.

Remedy

- Search for a mechanical blocking of the motor.
- Search for a possible cause of motor overload.
- Verify the settings of the monitoring function.

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** AEr or manually with the **[Fault Reset Assign]** rSF parameter after the cause has disappeared.

[AI2 Thermal Sensor Error] E2CF

Probable Cause

The thermal sensor monitoring function has detected a thermal sensor error on analog input AI2:

- Open circuit, or
- Short circuit.

Remedy

- Verify the sensor and its wiring.
- Replace the sensor.
- Verify the setting of **[AI2 Type]** AI2E parameter.

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** AEr or manually with the **[Fault Reset Assign]** rSF parameter after the cause has disappeared.

[AI3 Thermal Sensor Error] E 3 C F

Probable Cause

The thermal sensor monitoring function has detected a thermal sensor error on analog input AI3:

- Open circuit, or
- Short circuit.

Remedy

- Verify the sensor and its wiring.
- Replace the sensor.
- Verify the setting of **[AI3 Type]** A I 3 t parameter.

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** A t r or manually with the **[Fault Reset Assign]** r S F parameter after the cause has disappeared.

[AI4 Thermal Sensor Error] E 4 C F

Probable Cause

The thermal sensor monitoring function has detected a thermal sensor error on analog input AI4:

- Open circuit, or
- Short circuit.

Remedy

- Verify the sensor and its wiring.
- Replace the sensor.
- Verify the setting of **[AI4 Type]** A I 4 t parameter

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** A t r or manually with the **[Fault Reset Assign]** r S F parameter after the cause has disappeared.

[AI5 Thermal Sensor Error] tS5CF

Probable Cause

The thermal sensor monitoring function has detected a thermal sensor error on analog input AI5:

- Open circuit, or
- Short circuit.

Remedy

- Verify the sensor and its wiring.
- Replace the sensor.
- Verify the setting of **[AI5 Type]** AI5t parameter.

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** AtrS or manually with the **[Fault Reset Assign]** rSF parameter after the cause has disappeared.

[MotorWinding A Error] tFA

Probable Cause

The digital input assigned to **[MotorWinding A Assign]** tFAA is active for longer than **[MotorWinding A Delay]** tFdA.

Remedy

- Check the connected device (motor winding thermal switch) and its wiring.
- Verify the motor load and the ambient temperature. Wait for the motor to cool down before restarting.

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** AtrS or manually with the **[Fault Reset Assign]** rSF parameter after the cause has disappeared.

[MotorWinding B Error] tFb

Probable Cause

The digital input assigned to **[MotorWinding B Assign]** tFAb is active for longer than **[MotorWinding B Delay]** tFdb.

Remedy

- Check the connected device (motor winding thermal switch) and its wiring.
- Verify the motor load and the ambient temperature. Wait for the motor to cool down before restarting.

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** Atr or manually with the **[Fault Reset Assign]** rSF parameter after the cause has disappeared.

[MotorBearing A Error] tFC

Probable Cause

The digital input assigned to **[MotorBearing A Assign]** tFAC is active for longer than **[MotorBearing A Delay]** tFdC.

Remedy

- Check the connected device (motor winding thermal switch) and its wiring.
- Verify the motor load and the ambient temperature. Wait for the motor to cool down before restarting.

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** Atr or manually with the **[Fault Reset Assign]** rSF parameter after the cause has disappeared.

[MotorBearing B Error] tFd

Probable Cause

The digital input assigned to **[MotorBearing B Assign]** tFAd is active for longer than **[MotorBearing B Delay]** tFdd.

Remedy

- Check the connected device (motor winding thermal switch) and its wiring.
- Verify the motor load and the ambient temperature. Wait for the motor to cool down before restarting.

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** Atr or manually with the **[Fault Reset Assign]** rSF parameter after the cause has disappeared.

[AI2 Th Detected Error] tH2F

Probable Cause

The thermal sensor monitoring function has detected a high temperature error on analog input AI2.

Remedy

- Search for a possible cause of overheating.
- Verify the settings of the monitoring function.

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** Atr or manually with the **[Fault Reset Assign]** rSF parameter after the cause has disappeared.

[AI3 Th Detected Error] ELH3F

Probable Cause

The thermal sensor monitoring function has detected a high temperature error on analog input AI3.

Remedy

- Search for a possible cause of overheating.
- Verify the settings of the monitoring function.

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** AtrP or manually with the **[Fault Reset Assign]** rSF parameter after the cause has disappeared.

[AI4 Th Detected Error] ELH4F

Probable Cause

The thermal sensor monitoring function has detected a high temperature error on analog input AI4.

Remedy

- Search for a possible cause of overheating.
- Verify the settings of the monitoring function.

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** AtrP or manually with the **[Fault Reset Assign]** rSF parameter after the cause has disappeared.

[AI5 Th Detected Error] $tHSF$

Probable Cause

The thermal sensor monitoring function has detected a high temperature error on analog input AI5.

Remedy

- Search for a possible cause of overheating.
- Verify the settings of the monitoring function.

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** $AtrP$ or manually with the **[Fault Reset Assign]** rSF parameter after the cause has disappeared.

[IGBT Overheating] tJF

Probable Cause

Drive power stage overheating.

On AFE drives: the thermal model of the AFE IGBT thermal monitoring has detected an overheat. This function protects the IGBT's.

Remedy

- Verify the size of the load/motor/drive according to environment conditions.
- Reduce the switching frequency.

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** $AtrP$ or manually with the **[Fault Reset Assign]** rSF parameter after the cause has disappeared.

[AFE IGBT over-heat error] E JF2

Probable Cause

Rectifier IGBT power stage overheating.

Remedy

- Verify the size of the load/motor/drive according to environment conditions.
- Verify and clean, if necessary, the cooling channel.
- Clean or replace the filter mats on IP54 products.

Clearing the Error Code

This detected error requires a power reset.

[Autotuning Error] E nF

Probable Cause

- Special motor or motor whose power is not suitable for the drive.
- Motor not connected to the drive.
- Motor not stopped.

Remedy

- Verify that the motor/drive are compatible.
- Verify that the motor is connected to the drive during autotuning.
- If an output contactor is being used, verify that it is closed during autotuning.
- Verify that the motor is stopped during autotuning.

Clearing the Error Code

This detected error can be cleared manually with the **[Fault Reset Assign]** rSF parameter after the cause has disappeared.

[Process Underload] ULF

Probable Cause

Process underload.

Remedy

- Verify and remove the cause of the underload.
- Verify the parameters of the **[PROCESS UNDERLOAD]** ULd- function

Clearing the Error Code

This detected error can be cleared with the **[Auto Fault Reset]** AtrE or manually with the **[Fault Reset Assign]** rSF parameter after the cause has disappeared.

[AFE Mains Undervoltage] UrF

Probable Cause

- Too low DC-Bus voltage due to mains undervoltage.
- AFE overload.

Remedy

- Verify mains voltage.
- Verify the size of the load/motor/drive according to environment conditions.

Clearing the Error Code

This detected error is cleared as soon as its cause disappears.

[Supply Mains UnderV] u 5 F

Probable Cause

- supply mains too low.
- Transient voltage dips.

Remedy

Verify the voltage and the parameters of **[Undervoltage handling]** u 5 b.

Clearing the Error Code

This detected error is cleared as soon as its cause disappears.

Section 12.3
FAQ

FAQ

Introduction

If the display does not light up, verify the supply mains to the drive.

The assignment of the fast stop or freewheel functions help to prevent the drive starting if the corresponding digital inputs are not switched on. The drive then displays **[Freewheel]** nSt in freewheel stop and **[Fast stop]** FSt in fast stop. This is a normal behavior since these functions are active at zero so that the drive is stopped if there is a wire break.

Verify that the run command input is activated in accordance with the selected control mode (**[2/3-wire control]** tCC and **[2-wire type]** tCt parameters).

If the reference channel or command channel is assigned to a fieldbus, when the supply mains is connected, the drive displays **[Freewheel]** nSt. It remains in stop mode until the fieldbus gives a command.

Option Module Changed or Removed

When an option module is removed or replaced by another, the drive locks in **[Incorrect configuration]** CFF error mode at power-on. If the option module has been deliberately changed or removed, the detected error can be cleared by pressing the **OK** key twice, which causes the factory settings to be restored for the parameter groups affected by the option module.

Control Block Changed

When a control block is replaced by a control block configured on a drive with a different rating, the drive locks in **[Incorrect configuration]** CFF fault mode at power-on. If the control block has been deliberately changed, the detected error can be cleared by pressing the **OK** key twice, which **causes all the factory settings to be restored.**