

Relay Output Functions

The two relay outputs (FL and RYA-RYC) can be set to the functions described in the table below.

Function No. / Description	Action
0 [Low speed reach] Low speed reached	OFF: output frequency is low speed setting [Low limit frequency] (LL) ON: output frequency is > low speed setting LL
1 [Inv low spd reach] Inversion of low speed reached	OFF: output frequency is > low speed setting [Low limit frequency] (LL) ON: output frequency is low speed setting LL
2 [High speed reach] High speed reached	OFF: output frequency is < high speed setting [Upper limit freq] (UL) ON: output frequency is high speed setting UL
3 [Inv Hi spd reach] Inversion of high speed reached	OFF: output frequency is high speed setting [Upper limit freq] (UL) ON: output frequency is < high speed setting UL
4 [F100 speed reach] F 100 speed reached (See page 125 for more details on parameter F 100)	OFF: output frequency is < [Freq. 1 reached] (F 100) speed setting ON: output frequency is F 100 speed setting
5 [Inv F100 sp reach] Inversion of F 100 speed reached	OFF: output frequency is [Freq. 1 reached] (F 100) speed setting ON: output frequency is < F 100 speed setting
6 [Speed reach] Commanded speed reached	OFF: output frequency is commanded speed +/- [Freq.2 bandw.] (F 102) hysteresis band ON: output frequency is > commanded speed +/- F 102 hysteresis band
7 [Inv speed reach] Inversion of commanded speed reached	OFF: output frequency is > commanded speed +/- [Freq.2 bandw.] (F 102) hysteresis band ON: output frequency is commanded speed +/- F 102 hysteresis band
8 [F101 speed reach] F 101 speed reached (See page 125 for more details on parameters F 101 and F 102.)	OFF: output frequency is [Freq. 2 reached] (F 101) speed +/- [Freq.2 bandw.] (F 102) hysteresis band ON: output frequency is > F 101 speed +/- F 102 hysteresis band
9 [Inv F101 sp reach] Inversion of F 101 speed reached	OFF: output frequency is > [Freq. 2 reached] (F 101) speed +/- [Freq.2 bandw.] (F 102) hysteresis band ON: output frequency is F 101 speed +/- F 102 hysteresis band
10 [Drive fault] Fault relay. The drive is not in a fault state during auto fault reset attempts. See also function 36 page 112.	<p>OFF: No drive detected fault ON: drive detected fault</p> <div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center;">⚠ WARNING</p> <p>LOSS OF CONTROL</p> <ul style="list-style-type: none"> When F 130, F 132, F 137 is set to 10, the output will be active when the drive will detect a fault. The drive status will not be detected if the wiring is damaged for any reason. Do not select 10 unless you are sure that your signal will be present in any case. <p>Failure to follow these instructions can result in death, serious injury, or equipment damage.</p> </div>
11 [No drive fault] Inversion of Drive fault function.	OFF: drive detected fault ON: No drive detected fault
12 [Overload flt] Overtorque fault Overtorque fault detection is active only if parameter F 6 15 = 1. See page 143 for more detail on an overtorque detected fault and parameters F 6 15 and F 6 18.)	OFF: Estimated motor torque has NOT been at [Overtorque level] (F 6 15) level for a time period longer than that set by [Ovtorque det time] (F 6 18) ON: Estimated motor torque has been at F 6 15 level for a time period longer than that set by F 6 18. drive stopped, displaying OE
13 [Inv overload flt] Inversion of Overload flt function	OFF: Estimated motor torque has been at [Overtorque level] (F 6 15) level for a time period longer than that set by [Ovtorque det time] (F 6 18), drive stopped, displaying OE ON: Estimated motor torque has NOT been at F 6 15 level for a time period longer than that set by F 6 18

Function No. / Description		Action
14	[Drive running] Run relay	OFF: drive is not powering the motor ON: drive is powering the motor, accelerating, decelerating, at constant speed, or DC braking
15	[Drive no run] Inversion of Drive no run function	OFF: drive is powering the motor, accelerating, decelerating, at constant speed, or DC braking ON: drive is not powering the motor
16	[Motor overload] Motor overload alarm detection is only active if parameter DLN is set to either 0, 1, 4, or 5. See page 146 for more detail on motor overload protection settings.	OFF: motor thermal state is < 50% of motor overload detected fault level ON: motor thermal state is 50% of motor overload detected fault level
17	[Inv mot. overload] Inversion of Motor overload function	OFF: motor thermal state is 50% of motor overload detected fault level ON: motor thermal state is < 50% of motor overload detected fault level
20	[Torque alarm] Overtorque alarm detection is active only if parameter $F515 = 0$. See page 143 for more detail on the overtorque alarm and parameters [Overtorque level] ($F515$), [Overtorque band] ($F519$).	OFF: Estimated motor torque is < 70% of $F516$ level minus $F519$ hysteresis band ON: Estimated motor torque is 70% of $F516$ level
21	[Inv torque alarm] Inversion of Torque alarm function	OFF: Estimated motor torque is 70% of [Overtorque level] ($F516$) level ON: Estimated motor torque is < 70% of $F516$ level minus [Overtorque band] ($F519$) hysteresis band
22	[Gen. alarm] General alarm	OFF: No detected fault condition from the sources listed below exists ON: A detected fault has been issued by one of the following sources: <ul style="list-style-type: none"> • Overtorque detected fault (output functions 12 and 13) • Motor overload (output functions 16 and 17) • Overtorque detected fault (output functions 20 and 21) • Load detection loss (output functions 24 and 25) • Run time (output functions 42 and 43) • Undervoltage (output functions 54 and 55) • drive in sleep mode (see for more detail on parameter $F256$) • Power loss (see for more detail on parameter $F302$) • Overcurrent – motor current limit level (parameter $F501$) • Overvoltage – DC bus voltage overvoltage stall level (parameter $F526$) • Drive overheating
23	[Inv gen. alarm] Inversion of General alarm function	OFF: A detected fault has been issued by one of the following sources: <ul style="list-style-type: none"> • Overtorque detected fault (output functions 12 and 13) • Motor overload (output functions 16 and 17) • Overtorque detection loss (output functions 20 and 21) • Failure of load detection (output functions 24 and 25) • Run time (output functions 42 and 43) • Undervoltage (output functions 54 and 55) • Drive in sleep mode (see for more detail on parameter $F256$) • Power loss (see for more detail on parameter $F302$) • Overcurrent – motor current limit level (parameter $F501$) • Overvoltage – DC bus voltage overvoltage stall level (parameter $F526$) • drive overheating ON: No alarm condition from the sources listed above exists
24	[Underload detect.] (See page 141 for more detail on parameters $F609 - F612$ and the underload function.)	OFF: Motor current is greater than $F611$ level + $F609$ hysteresis band ON: Motor current is less than $F611$ level for the time set by $F612$
25	[Inv underl. det.] Inversion of Underload detect. function	OFF: Motor current is less than $F611$ level for the time set by $F612$ ON: Motor current is greater than $F611$ level + $F609$ hysteresis band

Function No. / Description	Action
<p>26 [Manu reset flt.] Non-autoresettable detected fault</p>	<p>OFF: None of the detected fault conditions listed below exist ON: One (or more) of the following detected fault conditions exists and has stopped the drive:</p> <ul style="list-style-type: none"> • <i>E</i> – external detected fault • <i>E - 18</i> – VIA analog input signal detected fault • <i>E - 19</i> – main control board CPU communication • <i>E - 20</i> – excessive torque boost • <i>E - 21</i> – main control board CPU detected fault 2 • <i>EEP 1</i> – main control board EEPROM detected fault 1 • <i>EEP 2</i> – main control board EEPROM detected fault 2 • <i>EEP 3</i> – main control board EEPROM detected fault 3 • <i>EF 2</i> – ground detected fault • <i>EPHO</i> – output phase detected fault detection • <i>EPH 1</i> – input phase detected fault detection • <i>Err 1</i> – speed reference • <i>Err 2</i> – main control board RAM • <i>Err 3</i> – main control board ROM • <i>Err 4</i> – main control board CPU detected fault 1 • <i>Err 5</i> – serial communication control • <i>Err 7</i> – motor current sensor • <i>Err 8</i> – serial communication network • <i>Err 9</i> – graphic display option communication interruption • <i>Et n 1</i> – auto-tuning • <i>EtYP</i> – drive ratings • <i>OC A</i> – short-circuit detected in drive output inverter stage during motor startup • <i>OC L</i> – short-circuit detected in motor or output wiring during motor startup • <i>OH 2</i> – external overheating • <i>Ot</i> – overtorque • <i>Uc</i> – underload • <i>UP 1</i> – Undervoltage
<p>27 [Inv manu reset flt.] Inversion of Manu reset flt. function</p>	<p>OFF: One (or more) of the following fault conditions exists and has stopped the drive:</p> <ul style="list-style-type: none"> • <i>E</i> – external detected fault • <i>E - 18</i> – VIA analog input signal • <i>E - 19</i> – main control board CPU communication • <i>E - 20</i> – excessive torque boost • <i>E - 21</i> – main control board CPU detected fault 2 • <i>EEP 1</i> – main control board EEPROM detected fault 1 • <i>EEP 2</i> – main control board EEPROM detected fault 2 • <i>EEP 3</i> – main control board EEPROM detected fault 3 • <i>EF 2</i> – ground fault • <i>EPHO</i> – output phase loss detection • <i>EPH 1</i> – input phase loss detection • <i>Err 1</i> – speed reference • <i>Err 2</i> – main control board RAM • <i>Err 3</i> – main control board ROM • <i>Err 4</i> – main control board CPU detected fault 1 • <i>Err 5</i> – serial communication control • <i>Err 7</i> – motor current sensor • <i>Err 8</i> – serial communication network • <i>Err 9</i> – graphic display option communication interruption • <i>Et n 1</i> – auto-tuning • <i>EtYP</i> – drive ratings • <i>OC A</i> – short-circuit detected in drive output inverter stage during motor startup • <i>OC L</i> – short-circuit detected in motor or output wiring during motor startup • <i>OH 2</i> – external overheating • <i>Ot</i> – overtorque • <i>Uc</i> – underload • <i>UP 1</i> – Undervoltage <p>ON: None of the detected fault conditions listed above exist</p>

Function No. / Description	Action
<p>28 [Auto-reset fault] Auto-clear detected fault</p> <p>Note: Relay activates when maximum number of autoclear set by [Number auto reset] (<i>F 3 0 3</i>) page 135 is reached.</p>	<p>OFF: None of the detected fault conditions listed below exist ON: One (or more) of the following detected fault conditions exists:</p> <ul style="list-style-type: none"> • <i>F d 1</i> – damper detected fault 1 (closed damper) • <i>F d 2</i> – damper detected fault 2 (opened damper) • <i>O C 1</i> – overcurrent during acceleration • <i>O C 2</i> – overcurrent during deceleration • <i>O C 3</i> – overcurrent during constant speed • <i>O C 1 P</i> – Short circuit or ground detected fault during acceleration • <i>O C 2 P</i> – Short circuit or ground detected fault during deceleration • <i>O C 3 P</i> – Short circuit or ground detected fault during constant speed • <i>O H</i> – drive overheating • <i>O L 1</i> – drive overload • <i>O L 2</i> – motor overload • <i>O P 1</i> – overvoltage during acceleration • <i>O P 2</i> – overvoltage during deceleration • <i>O P 3</i> – overvoltage during constant speed
<p>29 [Inv auto-reset flt] Inversion of Auto-reset fault function</p> <p>Note: Relay deactivates when maximum number of autoclear set by [Number auto reset] (<i>F 3 0 3</i>) page 135 is reached.</p>	<p>OFF: One (or more) of the following detected fault conditions exists:</p> <ul style="list-style-type: none"> • <i>F d 1</i> – damper detected fault 1 (closed damper) • <i>F d 2</i> – damper detected fault 2 (opened damper) • <i>O C 1</i> – overcurrent during acceleration • <i>O C 2</i> – overcurrent during deceleration • <i>O C 3</i> – overcurrent during constant speed • <i>O C 1 P</i> – Short circuit or ground detected fault during acceleration • <i>O C 2 P</i> – Short circuit or ground detected fault during deceleration • <i>O C 3 P</i> – Short circuit or ground detected fault during constant speed • <i>O H</i> – drive overheating • <i>O L 1</i> – drive overload • <i>O L 2</i> – motor overload • <i>O P 1</i> – overvoltage during acceleration • <i>O P 2</i> – overvoltage during deceleration • <i>O P 3</i> – overvoltage during constant speed <p>ON: None of the detected fault conditions listed above exist</p>
<p>30 [Drive rdy 1] drive ready condition 1</p>	<p>OFF: drive not ready for operation ON: drive ready for operation (ready includes active run permissive and active run command)</p>
<p>31 [Inv drive rdy 1] Inversion of Drive rdy 1 function</p>	<p>OFF: drive ready for operation (ready includes active run permissive and active run command) ON: drive not ready for operation</p>
<p>32 [Drive rdy 2] drive ready condition 2</p>	<p>OFF: drive not ready for operation ON: drive ready for operation (ready does not include active run permissive or active run command)</p>
<p>33 [Inv drive rdy 2] Inversion of Drive rdy 2 function</p>	<p>OFF: drive ready for operation (ready does not include active run permissive or active run command) ON: drive not ready for operation</p>
<p>34 [VIB ref source] VIB input reference source</p>	<p>OFF: analog input terminal VIB is NOT the active speed reference source ON: VIB is the active speed reference source</p>
<p>35 [Inv VIB ref source] Inversion of VIB ref source function</p>	<p>OFF: analog input terminal VIB is the active speed reference source ON: VIB is NOT the active speed reference source</p>

Function No. / Description	Action
<p>36 [Fault relay] (The drive is not in a fault state during auto clear detected fault attempts. See also function 10 page 108)</p>	<div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center;">⚠ WARNING</p> <p>LOSS OF CONTROL</p> <ul style="list-style-type: none"> ● When <i>F 130</i>, <i>F 132</i>, <i>F 137</i> is set to <i>36</i>, the output will be active when the drive will detect a fault. ● The drive status will not be detected if the wiring is damaged for any reason. ● Do not select <i>36</i> unless you are sure that your signal will be present in any case. <p>Failure to follow these instructions can result in death, serious injury, or equipment damage.</p> </div> <p>OFF: No drive detected fault ON: drive detected fault. Relay activates when a clearable fault occurs and the drive attempts to restart. Relay deactivates when drive is restarting.</p>
<p>37 [Inv fault relay] Inversion of Fault relay function 36</p>	<p>OFF: drive detected fault ON: No drive detected fault Relay deactivates when a clearable fault occurs and the drive attempts to restart. Relay activates when drive is restarting.</p>
<p>38 [Ser. data relay FL] Serial communication data</p>	<p>OFF: Serial communication word <i>F A 5 0</i> bit 0 = 0 ON: Serial communication word <i>F A 5 0</i> bit 0 = 1</p>
<p>39 [Inv ser. dat rel. FL] Inversion of ser. dat rel. FL function</p>	<p>OFF: Serial communication word <i>F A 5 0</i> bit 0 = 1 ON: Serial communication word <i>F A 5 0</i> bit 0 = 0</p>
<p>40 [Ser. data relay RY] Serial communication data</p>	<p>OFF: Serial communication word <i>F A 5 0</i> bit 1 = 0 ON: Serial communication word <i>F A 5 0</i> bit 1 = 1</p>
<p>41 [Inv ser. dat rel RY] Inversion of ser. dat rel. RY function</p>	<p>OFF: Serial communication word <i>F A 5 0</i> bit 1 = 1 ON: Serial communication word <i>F A 5 0</i> bit 1 = 0</p>
<p>42 [Drive run time al] Drive operational run time alarm (see page 130 for more detail on parameter <i>F 6 2 1</i>).</p>	<p>OFF: Run time is < <i>F 6 2 1</i> time setting ON: Run time is <i>F 6 2 1</i> time setting</p>
<p>43 [Inv.drive run time al] Inversion of Drive run time al function</p>	<p>OFF: Run time is <i>F 6 2 1</i> time setting ON: Run time is < <i>F 6 2 1</i> time setting</p>
<p>44 [Drive serv. alarm] Drive service alarm (see page 144 for more detail on parameter <i>F 6 3 4</i>).</p>	<p>OFF: drive maintenance detected fault not active ON: drive maintenance detected fault active</p>
<p>45 [Inv. drive serv. alarm] Inversion of Drive serv. alarm function</p>	<p>OFF: drive maintenance detected fault active ON: drive maintenance detected fault not active</p>
<p>48 [LI F state] Logic input F state</p>	<p>OFF: Logic input F is not active ON: Logic input F is active</p>
<p>49 [Inv. LI F state] Inversion of LI F state function</p>	<p>OFF: Logic input F is active ON: Logic input F is not active</p>
<p>50 [LI R state] Logic input R state</p>	<p>OFF: Logic input R is not active ON: Logic input R is active</p>
<p>51 [Inv. LI R state] Inversion of LI R state function</p>	<p>OFF: Logic input R is active ON: Logic input R is not active</p>
<p>52 [Speed ref = VIA] Drive speed reference equals VIA signal</p>	<p>OFF: Speed reference from the source identified by [Frequency mode sel] (<i>F 0 0 d</i>) or the source identified by [Remote spd ref 2] (<i>F 2 0 7</i>) ≠ VIA signal ON: Speed reference from the source identified by <i>F 0 0 d</i> or the source identified by <i>F 2 0 7</i> = VIA signal</p>
<p>53 [Inv. speed ref = VIA] Inversion of Speed ref = VIA function</p>	<p>OFF: Speed reference from the source identified by [Frequency mode sel] (<i>F 0 0 d</i>) or the source identified by [Remote spd ref 2] (<i>F 2 0 7</i>) = VIA signal ON: Speed reference from the source identified by <i>F 0 0 d</i> or the source identified by <i>F 2 0 7</i> ≠ VIA signal</p>

Function No. / Description	Action
54 [Undervolt. alarm] Undervoltage alarm	OFF: Undervoltage detected fault is not active ON: Undervoltage detected fault is active
55 [Inv. undervolt. alarm] Inversion of Undervolt. al. function	OFF: Undervoltage detected fault is active ON: Undervoltage detected fault is not active
56 [Loc / remote] Local/remote switching	OFF: drive is in remote mode ON: drive is in local mode
57 [Inv. loc / remote] Inversion of Loc / remote function	OFF: drive is in local mode ON: drive is in remote mode
58 [PTC alarm] PTC thermal alarm	OFF: Motor temperature as indicated by PTC thermal probes is < 60% of the detected fault level ON: Motor temperature as indicated by PTC thermal probes is 60% of the detected fault level
59 [Inv. PTC alarm] Inversion of PTC alarm function	OFF: Motor temperature as indicated by PTC thermal probes is 60% of the detected fault level ON: Motor temperature as indicated by PTC thermal probes is < 60% of the detected fault level
60 [Speed ref = VIB] Drive speed reference equals VIB signal	OFF: Speed reference from the source identified by [Frequency mode sel] (F P D d) or the source identified [Remote spd ref 2] (F 2 0 7) ≠ VIB signal ON: Speed reference from source identified by F P D d or the source identified F 2 0 7 = VIB signal
61 [Inv. speed ref = VIB] Inversion of Speed ref = VIB function	OFF: Speed reference from source identified by [Frequency mode sel] (F P D d) or the source identified [Remote spd ref 2] (F 2 0 7) = VIB signal ON: Speed reference from the source identified by F P D d or the source identified F 2 0 7 ≠ VIB signal
62 [VIA detection] Analog VIA detection	ON: The value of VIA is equal to or higher than F 1 6 0 + F 1 6 1 OFF: The value of VIA is equal to or lower than F 1 6 0 - F 1 6 1
63 [Inv. VIA detection] Inversion of VIA detection function	ON: The value of VIA is equal to or lower than F 1 6 0 - F 1 6 1 OFF: The value of VIA is equal to or higher than F 1 6 0 + F 1 6 1
64 [VIB detection] Analog VIB detection	ON: The value of VIB is equal to or higher than F 1 6 2 + F 1 6 3 OFF: The value of VIB is equal to or lower than F 1 6 2 - F 1 6 3
65 [Inv. VIB detection] Inversion of VIB detection function	ON: The value of VIB is equal to or lower than F 1 6 2 - F 1 6 3 OFF: The value of VIB is equal to or higher than F 1 6 2 + F 1 6 3
66 [Freq. reach hyst] Set frequency attainment signal with hysteresis	ON: The ouptput frequency is equal to or higher than F 1 0 1 + F 1 0 2 OFF: The ouptput frequency is equal to or lower than F 1 0 1 - F 1 0 2 (See page 125 for more detail on parameters F 1 0 1 and F 1 0 2.)
67 [Inv. freq. reach hyst] Inversion of Freq. reach hyst function	ON: The ouptput frequency is equal to or lower than F 1 0 1 - F 1 0 2 OFF: The ouptput frequency is equal to or higher than F 1 0 1 + F 1 0 2 (See page 125 for more detail on parameters F 1 0 1 and F 1 0 2.)
68 [Damper] Damper control	ON: The damper is ON. OFF: The damper is OFF (see page 127)
69 [Inv. damper] Inversion of Damper function	ON: The damper is OFF. OFF: The damper is ON (see page 127)
70 [DisOil Inj PL] Disable oil injection in high speed positive logic	Positive logic
71 [DisOil Inj NL] Disable oil injection in high speed negative logic	Negative logic
254 [Relay OFF] Relay output is OFF	OFF
255 [Relay ON] Relay output is ON	ON