

Altivar™ 660 Process Drive

Instruction Bulletin

NHA91297

Rev. 02, 08/2016

Retain for future use.

ENGLISH



Bulletin NHA60269, *Drives Systems Installation and Maintenance*, contains important information on installation, operation, service, and maintenance of this product. Read NHA60269 before performing any work on or with this product.

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Hazard Categories and Special Symbols

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 bulletin or on the equipment to warn of hazards or to call attention to information that clarifies or simplifies a procedure.



The addition of either 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 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. The safety alert symbol is not used with this signal word.

NOTE: Provides additional information to clarify or simplify a procedure.

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, installation, and operation of electrical equipment and has received safety training to recognize and avoid the hazards involved.

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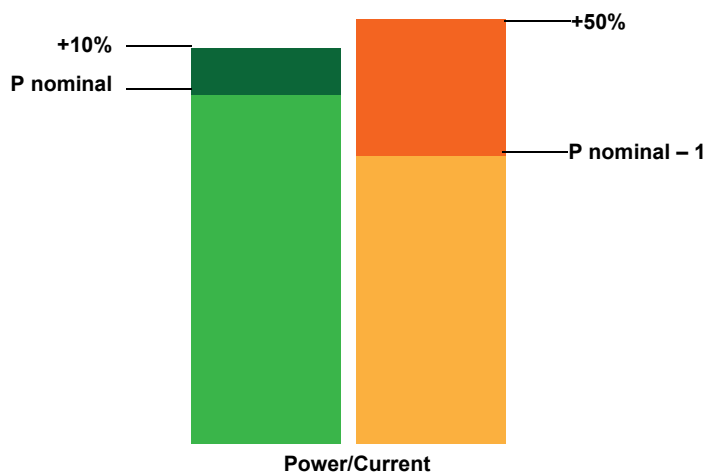
Section 1— Introduction

Application Considerations

Altivar 660 Process Drives are designed for use in two operating modes that can optimize the drive nominal rating according to the system constraints:

- Normal duty (ND): Dedicated mode for applications requiring a slight overload (up to 110%) with a motor power no higher than the drive nominal power
- Heavy duty (HD): Dedicated mode for applications requiring a significant overload (up to 150%) with a motor power no higher than the drive nominal power derated by one rating.

Figure 1 – Normal Duty (Left) and Heavy Duty (Right) Modes



About this Document

This instruction bulletin contains specifications, installation, operation, and maintenance information for the Altivar 660 (ATV660) process drives. The following document is also available from the Technical Library at www.schneider-electric.com:

- NHA60269, *Drives Systems Installation and Maintenance*

NHA60269 contains important information on installation, operation, service, and maintenance of this product. Read NHA60269 before performing any work on or with this product.

To replace documents, download them from the Technical Library at www.schneider-electric.us or contact your local Schneider Electric field office.

Terminology

The following terminology is used in this instruction bulletin:

- Enclosed drive or process drive refers to the combination of the drive, enclosure, and the power and control circuits that constitute the ATV660 Process Drive.
- Drive or power converter refers to the ATV630 or ATVG60 components.
- Bypass, or integral bypass starter, refers to the optional, integrated full voltage combination starter in the ATV660 Process Drive. When provided, the integral bypass starter may be used to start and run the motor in the unlikely event that the drive becomes inoperable.

Product Overview

The ATV660 Process Drive is for industrial, municipal, and high end commercial applications. All ratings are UL 508A Listed, with selectable control and power configurations.

Two power converters are used in the ATV660 Process Drive:

- ATV630 for 1–125 hp ND
- ATVG60 for 150–900 hp ND

This instruction bulletin contains information about the ATV660 Process Drive. Since the process drive is engineered to order, your equipment may not have the same features, functions, or characteristics described in this document. For information specific to your process drive, consult the additional documentation shipped with it.

Figure 2 – Altivar 660 Process Drive, 1–125 hp, Types 1, 12, and 3R



Figure 3 – Altivar 660 Process Drive, 150–500 hp, Type 12

Standard Features

Process Drive Only

Process drives without bypass are available up to 700 hp HD / 900 hp ND @ 460 V; or 50 hp HD / 60 hp ND @ 230 V. The following are standard features for process drives without bypass, when no options are ordered:

- Circuit breaker disconnect
- UL Listed per UL 508A
- 100,000 AIC short-circuit rating
- Disconnect handle with lockout/tagout provisions
- Door mounted keypad holder and display
- One form C AFC Trip contact
- One form C AFC Run Mode contact
- Six programmable digital inputs
- Standard 3% input impedance
- Standard color RAL735
- Controller programming
 - Acceleration (ACC): 10 s
 - Deceleration (DEC): 10 s
 - Low speed (LSP): 3 Hz
- White component mounting plate

- Removable conduit entry plate on floor-mounted enclosures
- Class 10 overload protection

Process Drive with Bypass (up to and including 250 hp)

The following are standard features for process drives with bypass when no options are ordered:

- Circuit breaker disconnect
- UL Listed per UL 508A
- 100,000 AIC short-circuit rating
- Disconnect handle with lockout/tagout provisions
- Hand-Off-Auto (H-O-A) selector switch and manual speed potentiometer
- AFC-Off-Bypass and Test-Normal selector switches
- Door-mounted keypad display
- One form C AFC Trip contact
- One form C AFC Run Mode contact
- One Form C contact for remote indication of Bypass operation
- Manual trip condition reset in Off position of H-O-A selector switch
- Safety Interlock / Run Permissive wired to the user terminal block
- Controller programming
 - Acceleration (ACC): 10 s
 - Deceleration (DEC): 10 s
 - Low speed (LSP): 3 Hz
- White component mounting plate
- Removable conduit entry plate on floor-mounted enclosures
- Bypass with line reactor and communication card, including 24 V power supply to keep drive electronics alive in Bypass mode
- Class 20 overload protection
- Overload Trip (yellow) and Bypass (yellow) pilot lights
- Bypass and isolation contactors with mechanical and electrical interlocking
- Bypass and isolation contactor sequencing provides true motor isolation
- Remote bypass operation using Auto Start contacts

Installation and Maintenance Precautions

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Read and understand the precautions in bulletin NHA60269, *Drives Systems Installation and Maintenance*, before performing any procedures in this bulletin.

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

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Read and understand this manual before installing or operating the enclosed drive. Installation, adjustment, repair, and maintenance must be performed by qualified personnel.
- The user is responsible for compliance with national and local electrical codes with respect to grounding of all equipment.
- Many parts of this equipment, including the printed circuit boards, operate at the line voltage. DO NOT TOUCH. Use only electrically-insulated tools.
- DO NOT touch unshielded components or terminal strip screw connections with voltage present.
- DO NOT short across terminals PA/+ and PC/- or across the DC bus capacitors.
- Before servicing the equipment:
 - Disconnect the power, including the external control power that may be present. The circuit breaker or disconnecting switch does not always open all circuits.
 - Lock the circuit breaker or disconnecting switch in the opened position.
 - Place a “DO NOT TURN ON” label on the circuit breaker or disconnect switch of the enclosed drive.
 - Wait 15 minutes to allow the DC bus capacitors to discharge. Then follow the “DC Bus Voltage Measurement Procedure” in document NHA60269 to verify that the DC voltage is less than 42 V. The enclosed drive LED is not an indicator of the absence of DC bus voltage.
- Install and close all covers before applying power or starting and stopping the equipment.

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

⚠ WARNING

DAMAGED ENCLOSED DRIVE

- Do not install or operate any enclosed drive that appears damaged.
- If you find shipping damage, notify the carrier and your Schneider Electric sales representative.

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

⚠ CAUTION**RISK OF BURNS AND ROTATING FAN BLADES**

- Make sure that the device is sufficiently cooled and that the permitted ambient conditions are maintained.
- Do not touch components inside the enclosure. Heat sinks, chokes, and transformers may remain hot after removing power.
- Before opening the enclosure, ensure that the fans are not running. After switching off the voltage supply, the device fans may continue running for some time.

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

Operation Precautions**⚠ DANGER****HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

Before working on this equipment, turn off all power supplying it and perform the “DC Bus Voltage Measurement Procedure” in document NHA60269.

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

⚠ DANGER**UNQUALIFIED PERSONNEL**

- This equipment must be installed and serviced only by qualified personnel.
- Qualified personnel performing diagnostics or troubleshooting that requires electrical conductors to be energized must comply with:
 - NFPA 70 E® – Standard for Electrical Safety Requirements for Employee Workplaces®
 - CSA Z462 – Workplace Electrical Safety
 - OSHA Standards – 29 CFR Part 1910 Subpart S Electrical
 - NOM-029-STPS – Maintenance of Electrical Installation in the Workplace, Safety Conditions
 - Other national and local electrical codes that may apply

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

⚠ DANGER**HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

- Properly ground the enclosed drive Before Applying Power.
- Close and secure the enclosure doors before applying power.
- Certain adjustments and test procedures require that power be applied to this enclosed drive. Exercise extreme caution as hazardous voltages exist. The enclosure door must be closed and secured while turning on power or starting and stopping this enclosed drive. Always follow practices and procedures from NFPA 70E®, CSA Z462, NOM-029-STPS, and other applicable regulations defining safe electrical work practices.

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

⚠ WARNING**LOSS OF CONTROL**

- The designer of any control scheme must consider the potential failure modes of control paths and, for certain 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 and over travel stop.
- 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 anticipated transmission delays or failures of the link.¹
- Each implementation of the ATV660 Process Drive 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 additional information, refer to NEMA ICS 1.1 (latest edition), "Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control."

⚠ CAUTION**INCOMPATIBLE LINE VOLTAGE**

Before powering up and configuring the equipment, ensure that the line voltage is compatible with the supply voltage shown on the enclosed drive nameplate. The enclosed drive may be damaged if the line voltage is not compatible.

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

Section 2— Product Characteristics

Catalog Number Description

The catalog number is on the nameplate attached to the inside of the process drive door (see Figure 4 on page 16). The catalog number is coded to describe the configuration of the drive.

Use Table 2 on page 14 to translate the catalog number into a description of the process drive. The example in Table 1 translates the catalog number shown on the nameplate in Figure 1.

For descriptions of the options listed in Table 2, refer to Section 4 beginning on page 43.

Table 1 – Catalog Number Example: ATV660D22T4N2ANWAANAGK

Field											
01–02	03–04	05	06	07	08	09	10	11	12	13	14
ATV660	D22	T4	N	2	A	N	W	A	A	N	A,G,K
Altivar 660 Process Drive	3 hp	460 V, 3 phase	Normal Duty Power Rating	UL Listed	UL Type 12K Enclosure	No Harmonic Mitigation	Without Bypass	H-O-A Speed Pot.	Red Power On, Yellow Tripped, Green AFC Run, Yellow Auto	No Comm. Card	Ethernet Port in Front Door; Type 1 SPD; Additional 150 VA Control Power

Table 2 – Catalog Number Description

Field	Digit	Characteristic	Description	
01–02	1–6	Drive Style	Altivar 660 Process Drive, 2-quadrant, 6-pulse drive	
03–04	7–9	Power Rating (kW)	Normal Duty	Heavy Duty
			U07 = 1 hp	
			U15 = 2 hp	U15 = 1 hp
			U22 = 3 hp	U22 = 2 hp
			U40 = 5 hp	U30 = 3 hp
			U55 = 7.5 hp	U55 = 5 hp
			U75 = 10 hp	U75 = 7.5 hp
			D11 = 15 hp	D11 = 10 hp
			D15 = 20 hp	D15 = 15 hp
			D18 = 25 hp	D18 = 20 hp
			D22 = 30 hp	D22 = 25 hp
			D30 = 40 hp	D30 = 30 hp
			D37 = 50 hp	D37 = 40 hp
			D45 = 60 hp	D45 = 50 hp
			D55 = 75 hp	D55 = 60 hp
			D75 = 100 hp	D75 = 75 hp
			D90 = 125 hp	D90 = 100 hp
			C11 = 150 hp	C11 = 125 hp
			C13 = 200 hp	C13 = 150 hp
			C16 = 250 hp	C16 = 200 hp
			C20 = 300 hp	C20 = 250 hp
			C25 = 400 hp	C25 = 300 hp
C31 = 500 hp	C31 = 400 hp			
C40 = 600 hp	C40 = 500 hp			
C50 = 700 hp	C50 = 600 hp			
C63 = 900 hp	C63 = 700 hp			
05	10–11	Voltage Class	U3 = 230 V, Three Phase T4 = 460 V, Three Phase	
06	12	Duty Rating	N = Normal Duty H = Heavy Duty	
07	13	Region	2 = UL Marking 6 = cUL Marking (Canada)	
08	14	Enclosure Type	G = Type 1 General Purpose A = Type 12K Industrial Use, Dust-tight/Drip-tight H = Type 3R Outdoor Use	
09	15	Line Harmonic Mitigation	N = None A = Line Reactor M = Passive Harmonic Filter	
10	16	Power Circuit	W = without Bypass Y = Integral Full-Voltage Bypass	

Table 2 – Catalog Number Description *(continued)*

Field	Digit	Characteristic	Description
11	17	Control Options	N = Prewired for Remote H-O-A A = H-O-A, Speed Potentiometer B = H-O-A, Speed Potentiometer, Start/Stop Push Button
12	18	Light Options	N = None A = Red Power On, Yellow Tripped, Green AFC Run, Yellow Auto B = Red Power On, Yellow Tripped, Green AFC Run (Default)
13	19	Communication Card	N = None A = Profibus DP V1 B = CANopen Daisy Chain C = DeviceNet D = CANopen SUB-D E = CANopen Open Style F = ProfiNet G = Ethernet IP Dual Port
14	Varies	Miscellaneous Options	A = Ethernet Port in Front Door B = Line Contactor C = Drive I/O Extension D = Relay Output Card E = 0–10 V Auto Speed Reference F = 1 N.O. (Form A) Auxiliary Auto Mode Contact G = Surge Protective Device (SPD) (Type 1) H = SPD (Type 2) K = Additional 150 VA Control Power L = Push-to-Test Pilot Lights P = Permanent Wire Markers Q = Door-Mounted Overload Reset Push Button R = Service Entrance (3R only) S = 50 °C Ambient Operation T = Service Switch U = Wireway Cubical (when available) V = Manufactured in the U.S. X = dV/dt Filter (1000 ft)

Nameplate Identification

The nameplate for the Altivar 660 Process Drive is on the inside of the enclosure door. See Figure 4. The nameplate identifies the drive type and modification options. When identifying or describing the Altivar 660 Process Drive, use the data from this nameplate.

Figure 4 – Nameplate

Altivar Process		Schneider Electric	
Catalog Number / Número de Catálogo / Numéro de Catalogue ATV660D22T4N2ANWAANAGK		Volts 460 +10% / -15% Phase / Fase / Phase F (Hz) 60 Max Input Amps 21 Max Output Amps Series / Serie / Série A Ambient Temp / Temp Ambiente / Temp Ambiante 40°C	
Short Circuit Current Rating (SCCR), RMS, Symmetrical Corriente Nominal de Cortocircuito (SCCR), Simétricos RCM 100 KA Courant Nominal de Court-circuit (SCCR), RMS, Symétriques			
Fuse Class / Clase de Fusible / Classe de Fusible - Fuse Amperage / Amperaje de Fusible / Amperage de Fusible -		Enclosure / Gabinete / Armoire Type / Tipo / Type 1	
Power Wiring / Alambrado de Potencia / Câblage de Puissance Line / Línea / Ligne #14-10 / #8-2/0 Load / Carga / Charge #12-4 Torque / Par de apriete / Couple de Serrage 50 lb-in / 120 lb-in 26 lb-in		Wire Type and Temp Temp y Tipo de Conductor Temp et Type de Fil Cu 75 C	
SQUARE D by Schneider Electric Reference Manuals / Manuales de Referencia / Manuels de Reference NHA60269 NHA91297 FO# / Numero de Pedido de Fábrica / Numero de Commande de L'usine 35583056-001-00-01 09 1533 01 of 01		Assembled in USA Ensamblado en EUA Assemblé aux É.-U.  NHA64677 REV 00	

Short-Circuit Ratings

All Altivar 660 Process Drives include a circuit breaker as a disconnect device and have a short-circuit rating of 100,000 A at up to 480 V.

⚠ WARNING

IMPROPER OVERCURRENT COORDINATION

- Properly coordinate all protective devices.
- Do not connect the equipment to a power feeder whose short-circuit capacity exceeds the short-circuit current rating listed on the equipment nameplate.

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

Technical Characteristics

Table 3 – Electrical Specifications

Input voltage	208 Vac $\pm 10\%$, 230 Vac $\pm 10\%$, 460 Vac $\pm 10\%$ Other voltages available on request
Short circuit current rating (AC symmetrical)	100 kA
Control voltage	24 Vdc, 115 Vac $+10\%/-15\%$ (control power transformer included)
Displacement power factor	98% through speed range (in AFC operation mode)
Input frequency	50/60 Hz $\pm 5\%$
Output voltage	Three-phase output, maximum voltage equal to input voltage
Galvanic isolation	Galvanic isolation between power and control (inputs, outputs, and power supplies)
Output frequency range of power converter	0.1–500 Hz (factory setting of 60 Hz)
Torque/Overtorque	Normal Duty: 110% of nominal motor torque for 60 s Heavy Duty: 150% of nominal motor torque for 60 s
Current (transient)	Normal Duty: 110% of drive rated current for 60 s Heavy Duty: 150% of drive rated current for 60 s
Switching frequency	Selectable from 0.5–8 kHz. Factory setting: 2.5 kHz The drive reduces the switching frequency automatically in the event of excessive heatsink temperature.

Table 4 – Environmental Specifications

Storage temperature	-13 to +149 °F (-25 to +65 °C)
Operating temperature 1–100 hp HD, 1–125 hp ND 460 V; 1–50 hp HD, 1–60 hp ND 230 V	+14 to +104 °F (-10 to +40 °C), Type 1/12/3R; +14 to +122 °F (-10 to +50 °C), 1/12/3R (Optional)
Operating temperature 125–700 hp HD, 150–900 hp ND 460V	+14 to +122 °F (-10 to +50 °C), Type 1/12 (below 0 °C with additional enclosure heating, above +40 °C with derating). See “Maximum Ambient Temperature” on page 19 for more information.
Humidity	95% with no condensation or dripping water, conforming to IEC 60068-2-78
Altitude	3,300 ft. (1000 m), without derating, derating of the current by 1% for each additional 330 ft. (100 m) up to 9,842 ft. (3000 m) maximum
Enclosure	UL Type 1: General indoor (ventilated); UL Type 12: Indoor dust-tight (ventilated); UL Type 3R: Outdoor (ventilated)
Pollution degree	Pollution degree 2 (Type 1, 3R) or 3 (Type 12) per NEMA ICS-1 Annex A and IEC 61800-5-1
Operational test vibration	Conforming to IEC/EN 60068-2-6 1.5 mm at 3–10 Hz, 0.6 g at 10–200 Hz 3M3 conforming to IEC/EN 60721-3-3
Transit shock test	Conforming to National Safe Transit Association and International Safe Transit Association test for packages.
Operational shock	Conforming to IEC/EN 60068-2-27 4 g for 11 ms 3M3 conforming to IEC/EN 60721-3-3
Codes and standards	UL Listed per UL 508A IEEE519 compliant (passive harmonic filter required); Conforms to applicable NEMA ICS, NFPA, and IEC standards; Manufactured under ISO 9001 standards.

Table 5 – Operation and Control

Maximum current	ND: 110% for 60 seconds per 10 minutes HD: 150% for 60 seconds per 10 minutes
Speed reference	AI1: 0–10 V, Impedance = 30 k Ω . Can be used for speed potentiometer, 1–10 k Ω . AI2: Factory setting: 4–20 mA. Impedance = 242 k Ω (reassignable, X–Y range with graphic display terminal).
Frequency resolution in analog reference	0.1 for 100 Hz (11 bits)
Harmonics	Less than 48% TDDi standard. Less than 5% TDDi with harmonic filter
Speed regulation	V/f control: equal to the motor's rated slip. Sensorless flux vector control (SFVC): 10% of the motor's rated slip from 20–100% of nominal motor torque
Efficiency	95% (or greater) at full load typical
Reference sample time	2 ms $\pm$ 0.5 ms
Acceleration and deceleration ramps	Drive: 0.1–999.9 s (definition in 0.1 s increments)
Graphic display terminal	Self diagnostics with trip indication messages in three languages. Refer to the Programming Manuals available online at www.schneider-electric.com .

Table 6 – Protection

Motor and Pump:	
Thermal overload	Class 10 electronic overload protection (drive) Class 20 bypass overload protection (drive with bypass)
Drive System:	
Overcurrent protection	An overcurrent protection device (OCPD) provides Type 1 coordination to the short-circuit current ratings.
Overtemperature protection	Protection if heatsink temperature exceeds 85 °C (185 °F)
Functional Safety:	
Functional safety of the drive	The function Safe Torque Off (STO) allows a controlled shut-down as well as switch-off of the power supply when at a standstill. It also helps prevent any unintended start of the motor according to ISO 13849-1, performance level PL e, according to IEC/EN 61508 safety integrity level SIL 3 and IEC/EN 61800-5-2.
Response time	$\leq$ 100 ms at STO (Safe Torque Off)

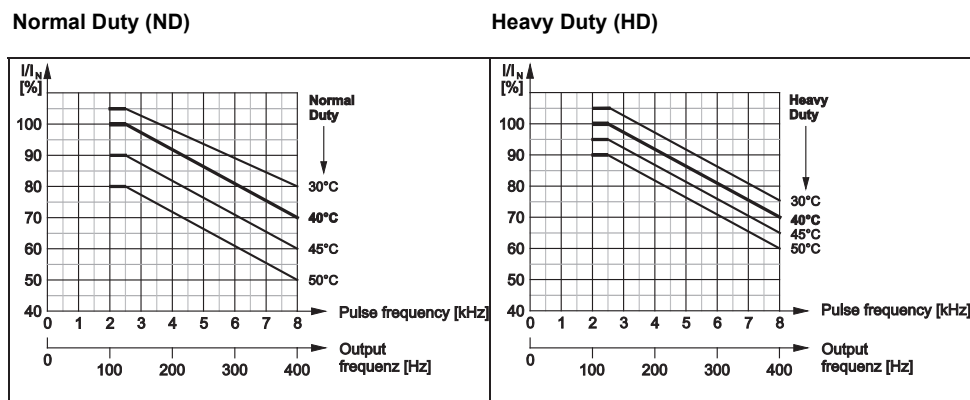
Maximum Ambient Temperature

For Type 1 and 12 enclosed drives rated 125–700 hp HD and 150–900 hp ND at 460 V, derating may be necessary depending on the pulse frequency, the maximum ambient temperature, and the desired output frequency. Consult Figure 5 and follow these guidelines:

- For output frequencies higher than 125 Hz, the pulse frequency is increased automatically. For example, at 200 Hz output frequency, the pulse frequency is increased to 4 kHz. Consequently, consider a derating of 8% at a maximum ambient temperature of 40 °C.
- The overload capability of the enclosed drive is also reduced due to the reduction of the output current.
- At higher pulse frequencies, motor cable length must be reduced.
- For full shaft power, the motor size must not be more than one power rating higher than the drive.

NOTE: If the ambient temperature is too high, the pulse frequency is automatically reduced, which helps to prevent an overload of the drive (except in case of operation with sinusoidal motor filters).

Figure 5 – Current Reduction Depending on Ambient Temperature, Pulse Frequency, and Output



Ratings

Table 7 – Input and Output Current Ratings and Dissipated Heat, Normal Duty Operation

VAC	Rating		Drive Rating	Full Load Input Current (A)	Full Load Output Current (A)	Full Load Bypass Current (A)	Typical Dissipated Power at Rated Load (W)
	hp	kW					
230	1	0.7	U07	2.6	4.6	4.2	63
	2	1.5	U15	5	8	6.8	100
	3	2.2	U22	7.2	11.2	9.6	138
	5	3	U40	12.9	18.7	15.2	226
	7.5	5.5	U55	17.1	25.4	22	289
	10	7.5	U75	22.8	32.7	28	401
	15	11	D11	32.9	46.8	42	651
	20	15	D15	45.5	63.4	54	768
	25	18	D18	54.5	78.4	68	860
	30	22	D22	64.3	92.6	80	972
	40	30	D30	88.6	123	104	1231
	50	37	D37	107.8	149	130	1553
	60	45	D45	130.4	175	154	1789
460	1	0.7	U07	1.3	2.2	2.1	60
	2	1.5	U15	2.6	4	3.4	84
	3	2.2	U22	3.8	5.6	4.8	115
	5	3	U40	6.7	9.3	7.6	173
	7.5	5.5	U55	9.1	12.7	10	231
	10	7.5	U75	11.9	16.5	14	272
	15	11	D11	17	23.5	21	378
	20	15	D15	23.3	31.7	27	515
	25	18	D18	28.9	39.2	34	680
	30	22	D22	34.4	46.3	40	739
	40	30	D30	45.9	61.5	52	898
	50	37	D37	57.3	74.5	65	1072
	60	45	D45	69.1	88	77	1324
	75	55	D55	84.2	106	96	1418
	100	75	D75	112.7	145	124	1823
	125	90	D90	135.8	173	156	2120
	150	110	C11	195	211	180	2530
	200	130	C13	232	250	240	3150
	250	160	C16	277	302	302	4030
	300	200	C20	349	370	(1)	4380
	400	250	C25	432	477	(1)	5750
	500	310	C31	538	590	(1)	7810
	600	400	C40	681	730	(1)	9900
	700	500	C50	846	900	(1)	13330
	900	630	C63	1058	1140	(1)	16250

¹ Consult Schneider Electric.

Weights

⚠ WARNING

UNSTABLE LOAD

- Use extreme care when moving heavy equipment.
- Verify that the moving equipment is rated to handle the weight.
- When removing equipment from a shipping pallet, carefully balance and secure it using a safety strap.

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

Table 8 – Approximate Weight by Feature Set

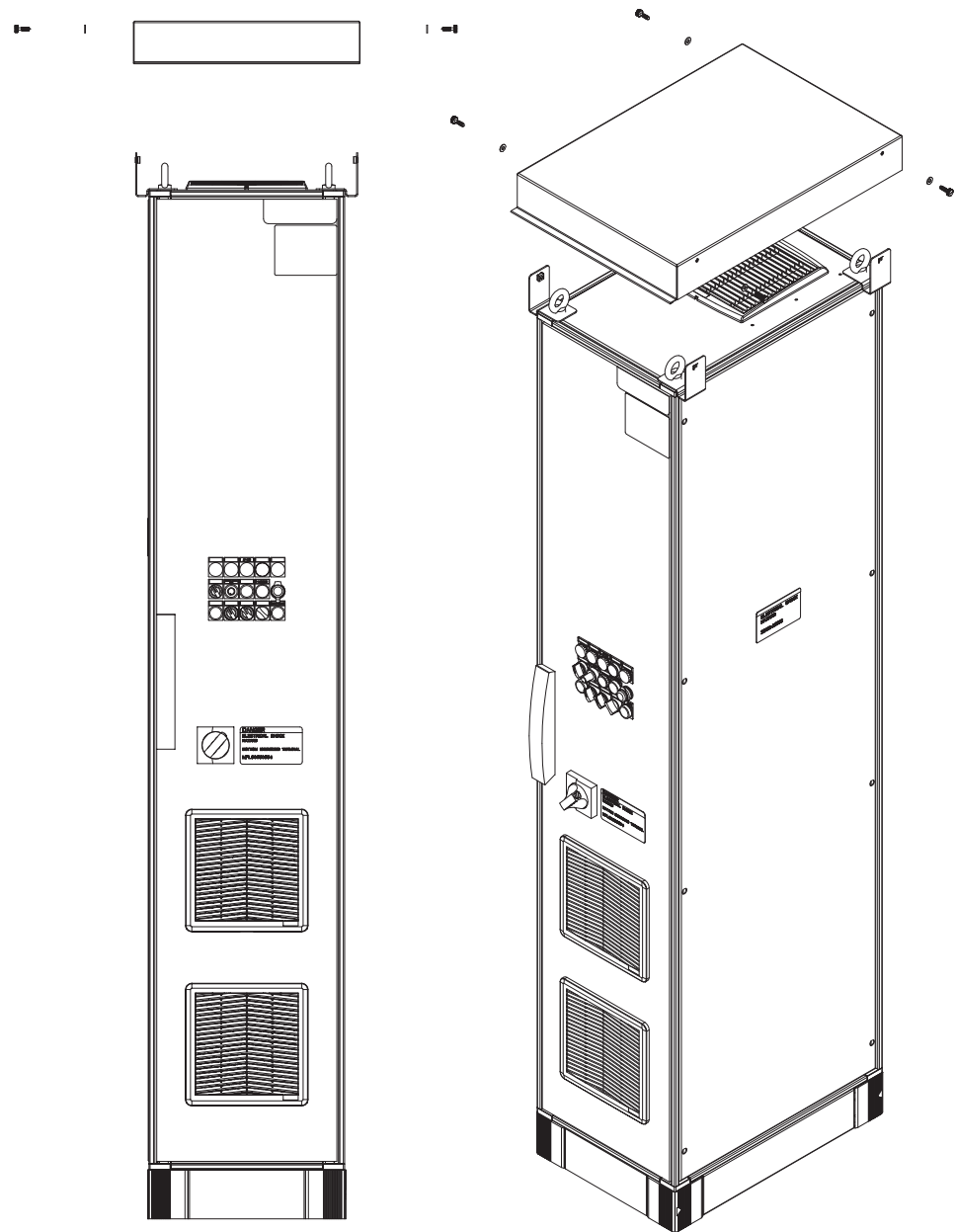
Voltage	hp	Process Drive System Weight lb (kg)
230	1–7.5	135 (61)
460	1–15	
230	10–15	175 (79.4)
460	20–30	
230	20–30	270 (122.5)
460	40–60	
230	40–60	550 (249.5)
460	75–125	
460	150–250	750 (340.2)
460	300–500	980 (444.5)
460	600–700	1550 (703.1)
460	900	2000 (907.2)

Accessing the Lifting Brackets

Type 3R floor mounted enclosed drives include a rain hood that covers the brackets provided for transporting and installing the equipment. Temporarily remove the rain hood to access the lifting brackets as follows:

1. Remove four thumb screws and lift the hood off the brackets as shown in Figure 6 on page 22.
2. After the enclosed drive is installed, replace the rain hood and hand tighten the thumb-screws.
3. For more information, refer to the instructions and precautions in 'Handling the Equipment' in instruction bulletin NHA60269, *Drive Systems Installation and Maintenance*.

Figure 6 – Removing the Rain Hood



Electrical Installation

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Read and understand the precautions in bulletin NHA60269, *Drives Systems Installation and Maintenance*, before performing any procedures in this bulletin.

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

Wire Range and Terminal Torque Requirements

Normal Duty, Line Side

Table 9 – Power Terminal Wire Range and Torque Requirements, Normal Duty, Line Side

Voltage	hp	Circuit Breaker	Line (L1, L2, L3)	
			Wire Range AWG (mm ²)	Torque lb-in (N•m)
230	1	HLL36015LU	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
230	2	HLL36015LU	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
230	3	HLL36025LU	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
230	5	HLL36030LU	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
230	7.5	HLL36050LU	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
230	10	HLL36060LU	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
230	15	HLL36070LU	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
230	20	HLL36090LU	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
230	25	HLL36110LU	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
230	30	HLL36125LU	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
230	40	JLL36175LU	4–4/0 (25–95)	225 (25)
230	50	JLL36225LU	3/0–350 (95–185)	225 (25)
230	60	JLL36250LU	3/0–350 (95–185)	225 (25)
460	1	HLL36015LU	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
460	2	HLL36015LU	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)

Table 9 – Power Terminal Wire Range and Torque Requirements, Normal Duty, Line Side *(continued)*

Voltage	hp	Circuit Breaker	Line (L1, L2, L3)	
			Wire Range AWG (mm ²)	Torque lb-in (N•m)
460	3	HLL36015LU	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
460	5	HLL36015LU	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
460	7.5	HLL36025LU	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
460	10	HLL36030LU	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
460	15	HLL36050LU	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
460	20	HLL36060LU	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
460	25	HLL36070LU	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
460	30	HLL36080LU	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
460	40	HLL36100LU	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
460	50	HLL36125LU	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
460	60	HLL36150LU	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
460	75	JLL36175LU	4–4/0 (25–95)	225 (25)
460	100	JLL36200LU	3/0–350 (95–185)	225 (25)
460	125	JLL36250LU	3/0–350 (95–185)	225 (25)
460	150–200	LLP36400U31X	(2) 2/0–500 (70–240)	275 (31)
460	250	LLP36600U31X	(2) 2/0–500 (70–240)	275 (31)
460	300	LLP36600U31X	(2) 2/0–500 (70–240)	275 (31)
460	400	PLP34080RE10	(3) 3/0–500 (95–240)	275 (31)
460	500	PLP34100U44ASARE10	(4) 3/0–500 (95–240)	275 (31)
460	600–700	PLP34120U44ASARE10	(4) 3/0–500 (95–240)	275 (31)
460	900	PLP34120U44ASARE10	(4) 3/0–500 (95–240)	275 (31)

Normal Duty, Load Side

Table 10 – Power Terminal Wire Range and Torque Requirements, Normal Duty, Load Side

Voltage	hp	Load, Enclosed Drive Only (T1, T2, T3)		Load with Bypass (T1, T2, T3)	
		Wire Range AWG (mm ²)	Torque lb-in (N•m)	Wire Range AWG (mm ²)	Torque lb-in (N•m)
230	1-7.5	14-6 (2.5-16)	15 (1.7)	14-10 (2.5-6)	15 (1.7)
230	10	14-10 (2.5-6)	22 (2.5)	14-8 (2.5-10)	15 (1.7)
		8-2 (10-35)	40 (4.5)	14-8 (2.5-10)	15 (1.7)
230	15	14-10 (2.5-6)	22 (2.5)	14-4 (2.5-25)	44 (5)
		8-2 (10-35)	40 (4.5)	2 (35)	70 (8)
230	20	6-2 (16-35)	44 (5)	14-4 (2.5-25)	44 (5)
		1-1/0 (35-50)	97 (11)	2 (35)	70 (8)
230	25	6-2 (16-35)	44 (5)	10-2 (6-35)	75 (9)
		1-1/0 (35-50)	97 (11)	10-2 (6-35)	75 (9)
230	30	6-2 (16-35)	44 (5)	6-3/0 (16-95)	200 (22.5)
		1-1/0 (35-50)	97 (11)	6-3/0 (16-95)	200 (22.5)
230	40-50	4-1/0 (25-50)	88 (10)	6-3/0 (16-95)	200 (22.5)
		2/0-300 (70-150)	159 (18)	6-3/0 (16-95)	200 (22.5)
230	60	4-1/0 (25-50)	88 (10)	(1)	(1)
		2/0-300 (70-150)	159 (18)	(1)	(1)
460	1-10	14-6 (2.5-16)	15 (1.7)	14-10 (2.5-6)	15 (1.7)
460	15	14-6 (2.5-16)	15 (1.7)	14-8 (2.5-10)	22.1 (2.5)
460	20	14-10 (2.5-6)	22 (2.5)	14-8 (2.5-10)	22.1 (2.5)
		8-2 (10-35)	40 (4.5)	14-8 (2.5-10)	22.1 (2.5)
460	25-30	14-10 (2.5-6)	22 (2.5)	14-4 (2.5-25)	44 (5)
		8-2 (10-35)	40 (4.5)	2 (35)	70 (8)
460	40	6-2 (16-35)	44 (5)	14-4 (2.5-25)	44 (5)
		1-1/0 (35-50)	97 (11)	2 (35)	70 (8)
460	50	6-2 (16-35)	44 (5)	10-2 (2.5-35)	75 (9)
		1-1/0 (35-50)	97 (11)	10-2 (2.5-35)	75 (9)
460	60	6-2 (16-35)	44 (5)	6-3/0 (16-95)	200 (22.5)
		1-1/0 (35-50)	97 (11)	6-3/0 (16-95)	200 (22.5)
460	75-100	4-1/0 (25-50)	88 (10)	6-3/0 (16-95)	200 (22.5)
		2/0-300 (70-150)	159 (18)	6-3/0 (16-95)	200 (22.5)
460	125	4-1/0 (25-50)	88 (10)	4-1/0 (25-50)	88 (10)
		2/0-300 (70-150)	159 (18)	2/0-300 (70-150)	159 (18)
460	150-250	(2) 4-500 (25-240)	500 (56.5)	(2) 4-500 (25-240)	500 (56.5)
460	300-500	(3) 4-500 (25-240)	500 (56.5)	(1)	(1)
460	600-700	(6) 3/0-750 (95-400)	550 (62)	(1)	(1)
460	900	(8) 3/0-750 (95-400)	550 (62)	(1)	(1)

¹ Consult Schneider Electric.

Heavy Duty, Line Side

Table 11 – Power Terminal Wire Range and Torque Requirements, Heavy Duty, Line Side

Voltage	hp	Circuit Breaker	Line (L1, L2, L3)	
			Wire Range AWG (mm ²)	Torque lb-in (N•m)
230	1	HLL36015LU	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
230	2	HLL36015LU	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
230	3	HLL36025LU	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
230	5	HLL36040LU	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
230	7.5	HLL36060LU	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
230	10	HLL36070LU	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
230	15	HLL36090LU	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
230	20	HLL36110LU	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
230	25	HLL36125LU	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
230	30	HLL36125LU	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
230	40	JLL36225LU	4–4/0 (25–95)	225 (25)
230	50	JLL36250LU	4–4/0 (25–95)	225 (25)
460	1	HLL36015LU	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
460	2	HLL36015LU	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
460	3	HLL36015LU	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
460	5	HLL36020LU	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
460	7.5	HLL36025LU	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
460	10	HLL36035LU	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
460	15	HLL36050LU	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
460	20	HLL36060LU	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)

Table 11 – Power Terminal Wire Range and Torque Requirements, Heavy Duty, Line Side *(continued)*

Voltage	hp	Circuit Breaker	Line (L1, L2, L3)	
			Wire Range AWG (mm ²)	Torque lb-in (N•m)
460	25	HLL36080LU	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
460	30	HLL36100LU	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
460	40	HLL36125LU	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
460	50	HLL36150LU	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
460	60	JLL36175LU	4–4/0 (25–95)	225 (25)
460	75	JLL36200LU	4–4/0 (25–95)	225 (25)
460	100	JLL36250LU	4–4/0 (25–95)	225 (25)
460	125–200	LLP36400U31X	(2) 2/0–500 (70–240)	275 (31)
460	250	LLP36600U31X	(2) 2/0–500 (70–240)	275 (31)
460	300	LLP36600U31X	(2) 2/0–500 (70–240)	275 (31)
460	400	PLP34100U44ASARE10	(3) 3/0–500 (95–240)	275 (31)
460	500	PLP34100U44ASARE10	(3) 3/0–500 (95–240)	275 (31)
460	600–700	PLP34120U44ASARE10	(4) 3/0–500 (95–240)	275 (31)

Heavy Duty, Load Side

Table 12 – Power Terminal Wire Range and Torque Requirements, Heavy Duty, Load Side

Voltage	hp	Load, Enclosed Drive Only (T1, T2, T3)		Load with Bypass (T1, T2, T3)	
		Wire Range AWG (mm ²)	Torque lb-in (N•m)	Wire Range AWG (mm ²)	Torque lb-in (N•m)
230	1–5	14–6 (2.5–16)	15 (1.7)	14–10 (2.5–6)	15 (1.7)
230	7.5	14–6 (2.5–16)	22 (2.5)	14–8 (2.5–10)	15 (1.7)
		8–2 (10–35)	40 (4.5)	14–8 (2.5–10)	15 (1.7)
230	10	14–10 (2.5–6)	22 (2.5)	14–4 (2.5–25)	44 (5)
		8–2 (10–35)	40 (4.5)	2 (35)	70 (8)
230	15	6–2 (16–35)	44 (5)	14–4 (2.5–25)	44 (5)
		1–1/0 (35–50)	97 (11)	2 (35)	70 (8)
230	20	6–2 (16–35)	44 (5)	10–2 (2.5–35)	75 (9)
		1–1/0 (35–50)	97 (11)	10–2 (2.5–35)	75 (9)
230	25	6–2 (16–35)	44 (5)	6–3/0 (16–95)	200 (22.5)
		1–1/0 (35–50)	97 (11)	6–3/0 (16–95)	200 (22.5)
230	30–40	4–1/0 (25–50)	88 (10)	6–3/0 (16–95)	200 (22.5)
		2/0–300 (70–150)	159 (18)	6–3/0 (16–95)	200 (22.5)
230	50	4–1/0 (25–50)	88 (10)	6–3/0 (16–95)	200 (22.5)
		2/0–300 (70–150)	159 (18)	6–3/0 (16–95)	200 (22.5)
460	1–7.5	14–6 (2.5–16)	15 (1.7)	14–10 (2.5–6)	15 (1.7)
460	10	14–6 (2.5–16)	15 (1.7)	14–8 (2.5–10)	22.1 (2.5)
460	15	14–10 (2.5–6)	22 (2.5)	14–8 (2.5–10)	22.1 (2.5)
		8–2 (10–35)	40 (4.5)	14–8 (2.5–10)	22.1 (2.5)
460	20	14–10 (2.5–6)	22 (2.5)	14–4 (2.5–25)	44 (5)
		8–2 (10–35)	40 (4.5)	2 (35)	70 (8)
460	25–30	6–2 (16–35)	44 (5)	14–4 (2.5–25)	44 (5)
		1–1/0 (35–50)	97 (11)	2 (35)	70 (8)
460	40	6–2 (16–35)	44 (5)	10–2 (2.5–35)	75 (9)
		1–1/0 (35–50)	97 (11)	10–2 (2.5–35)	75 (9)
460	50	6–2 (16–35)	44 (5)	6–3/0 (16–95)	200 (22.5)
		1–1/0 (35–50)	97 (11)	6–3/0 (16–95)	200 (22.5)
460	60–75	4–1/0 (25–50)	88 (10)	6–3/0 (16–95)	200 (22.5)
		2/0–300 (70–150)	159 (18)	6–3/0 (16–95)	200 (22.5)
460	100	4–1/0 (25–50)	88 (10)	4–1/0 (25–50)	88 (10)
		2/0–300 (70–150)	159 (18)	2/0–300 (70–150)	159 (18)
460	125–200	(2) 4–500 (25–240)	500 (56.5)	(2) 4–500 (25–240)	500 (56.5)
460	250–400	(3) 4–500 (25–240)	500 (56.5)	(1)	(1)
460	500–600	(6) 3/0–750 (95–400)	550 (62)	(1)	(1)
460	700	(8) 3/0–750 (95–400)	550 (62)	(1)	(1)

¹ Consult Schneider Electric.

Grounding Bar and Lugs

Table 13 – Grounding Bar Wire Range and Torque Requirements

Voltage	hp (Normal Duty)	Grounding Bar and Grounding Lugs	
		Wire Range AWG (mm ²)	Torque lb-in (N•m)
230	1–60	14–10 (2.5–6)	20 (2.25)
		8 (10)	25 (2.8)
		6–4 (16–25)	35 (4)
460	1–125	14–10 (2.5–6)	20 (2.25)
		8 (10)	25 (2.8)
		6–4 (16–25)	35 (4)
460	150–900	8–250 (10–120)	200 (22.5)

Service Entrance

Table 14 – Service Entrance Wire Range and Torque Requirements

Voltage	hp	Main Neutral		Ground	
		Wire Range AWG (mm ²)	Torque lb-in (N•m)	Wire Range AWG (mm ²)	Torque lb-in (N•m)
230	1–40	12–1/0 Al (4–50 Al)	75 (8.5)	12–1/0 Al (4–50 Al)	50 (5.6)
		14–1/0 Cu (2.5–50 Cu)	75 (8.5)	14–1/0 Cu (2.5–50 Cu)	
460	1–60	12–1/0 Al (4–50 Al)	75 (8.5)	12–1/0 Al (4–50 Al)	50 (5.6)
		14–1/0 Cu (2.5–50 Cu)	75 (8.5)	14–1/0 Cu (2.5–50 Cu)	
230	50–60	4–300 (25–150)	250 (28.2)	8 (10)	40 (4.5)
				6–4 (16–25)	45 (5.1)
460	75–125	4–300 (25–150)	250 (28.2)	8 (10)	40 (4.5)
				6–4 (16–25)	45 (5.1)

Control Wiring

Connect the control wiring to terminal block TB1.

- The control terminals are rated 250 V, 12 A. Maximum wire size for the control terminals:
 - 12 AWG (2.5 mm²), one-wire
 - 16 AWG (1.5 mm²), two-wire
- Minimum tightening torque: 4.5 lb-in (0.5 N•m)
- The user terminals are designated on the wiring diagrams provided with the equipment.

Table 15 – TB1 User Terminal Connections

Function	Terminal	
Customer interlock (120 Vac) (+)	1	
Customer interlock (120 Vac)	2	
Customer interlock, bypass (120 Vac) (+)	1	
Customer interlock, bypass (120 Vac)	2A	
Auto mode remote start	3	4
AFC run status (N.C.)	5	7
AFC run status (N.O.)	6	7
AFC trip status (N.C.)	8	10
AFC trip status (N.O.)	9	10
4–20 mA (0-10 V) speed reference (common)	11	
4–20 mA (0-10 V) speed reference (+)	12	
4–20 mA (0-10 V) speed reference SHLD/GRD	13	
4–20 mA DC output speed SHLD/GRD	14	
4–20 mA DC output speed (+)	15	
4–20 mA DC output speed (common)	16	
Auto mode status (N.O.)	17	18
Bypass status (N.C.)	19	21
Bypass status (N.O.)	20	21
150 VA fused (3 A) (+)	22	
150 VA fused (3 A) (neutral)	23	

Section 3— Programming and Setup

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Read and understand the precautions in bulletin NHA60269, *Drives Systems Installation and Maintenance*, before performing any procedures in this bulletin.

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

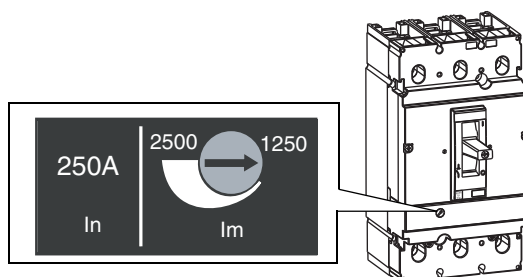
Factory Settings

If the power converter has been replaced or reset to the factory settings, you may need to adjust some parameter values. Parameter settings are included in the documentation provided with the equipment.

Adjusting the PowerPact™ Circuit Breaker Trip Settings

Some circuit breakers have trip settings that may need adjustment according to the application and motor type. For more information on trip setting adjustment, refer to the circuit breaker instruction bulletin provided with the equipment, or available for download from the Technical Library at www.schneider-electric.us.

Figure 7 – PowerPact J FLA and Im Dial



Overload Relay Adjustment

Always verify that the overload relay setting does not exceed the motor full load current or rated power converter current found on the nameplate, whichever is less.

Table 16 provides the adjustment range for overload relays according to horsepower rating and voltage. Contact Schneider Electric if the adjustment range does not meet the intended application.

Table 16 – Overload Relay Adjustment Range for Full Voltage Bypass Operation

hp	230 V	460 V
1	4–6	1.6–2.5
2	5.5–8	2.5–4
3	9–13	4–6
5	12–18	5.5–8
7.5	17–24	9–13
10	23–32	12–18
15	37–50	17–24

Table 16 – Overload Relay Adjustment Range for Full Voltage Bypass Operation *(continued)*

hp	230 V	460 V
20	48–65	23–32
25	55–70	30–40
30	60–100	30–40
40	90–150	48–65
50	90–150	55–70
60	1	60–100
75	—	60–100
100	—	90–150
125	—	132–220
150	—	132–220
200	—	200–330
250	—	200–330

¹ Consult Schneider Electric.

Programming Access with Type 3R Enclosure

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E®, CSA Z462, NOM-029-STPS, and other applicable regulations defining safe electrical work practices.
- This equipment must only be installed and serviced by qualified electrical personnel.
- Turn off all power supplying this equipment before working on or inside equipment.
- Always use a properly rated voltage sensing device to confirm power is off.
- Replace all devices, doors, and covers before turning on power to this equipment.

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

Type 3R enclosures come with a remote keypad and cable inside the enclosure. To program the process drive with this equipment:

1. Remove all power from the enclosed drive.
2. Turn the circuit breaker and handle assembly to the Off position and open the enclosure door.
3. Test for the absence of voltage.

NOTE: Verify that the voltage tester is functioning properly before and after testing for the absence of voltage.

4. Remove the remote keypad and cable from the enclosure.
5. Connect the remote keypad and cable to the drive.
6. Route the keypad cable between the bottom enclosure flange and the bottom of the door flange. See Figures 8 and 9 on pages 33–34.
7. Close and secure the enclosure door. Ensure that the keypad cable is not pinched by the door.

8. Close the disconnect means.
9. Program the drive with the keypad.
10. When programming is complete, remove all power then test for the absence of voltage.
11. Open the enclosure door and remove the remote keypad cable from the drive.
12. Place the remote keypad and cable inside the enclosure. Do not leave the remote keypad in the bottom of the enclosure.
13. Close and secure the enclosure door.

Figure 8 – Routing the Remote Keypad on Floor Standing Enclosures

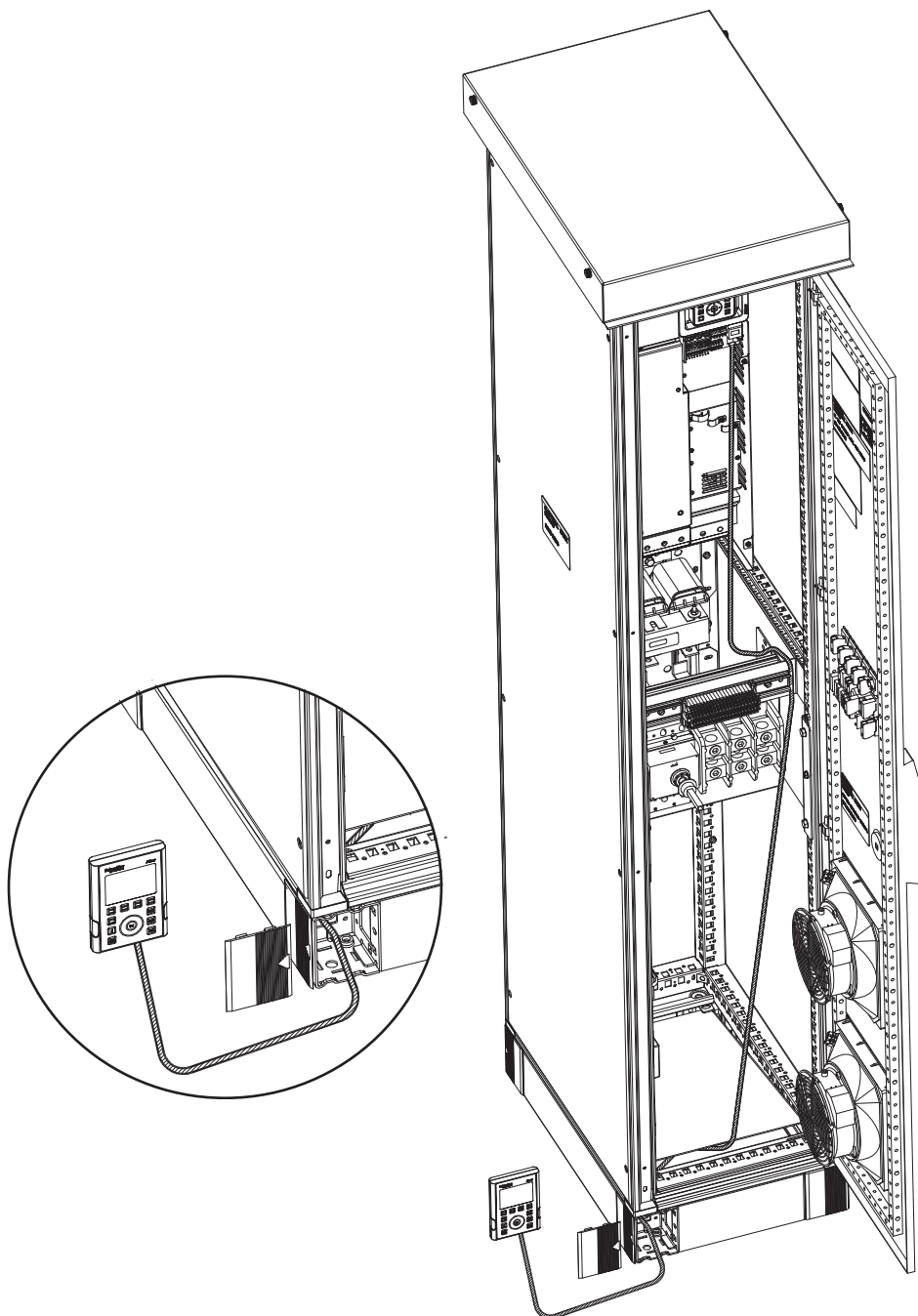
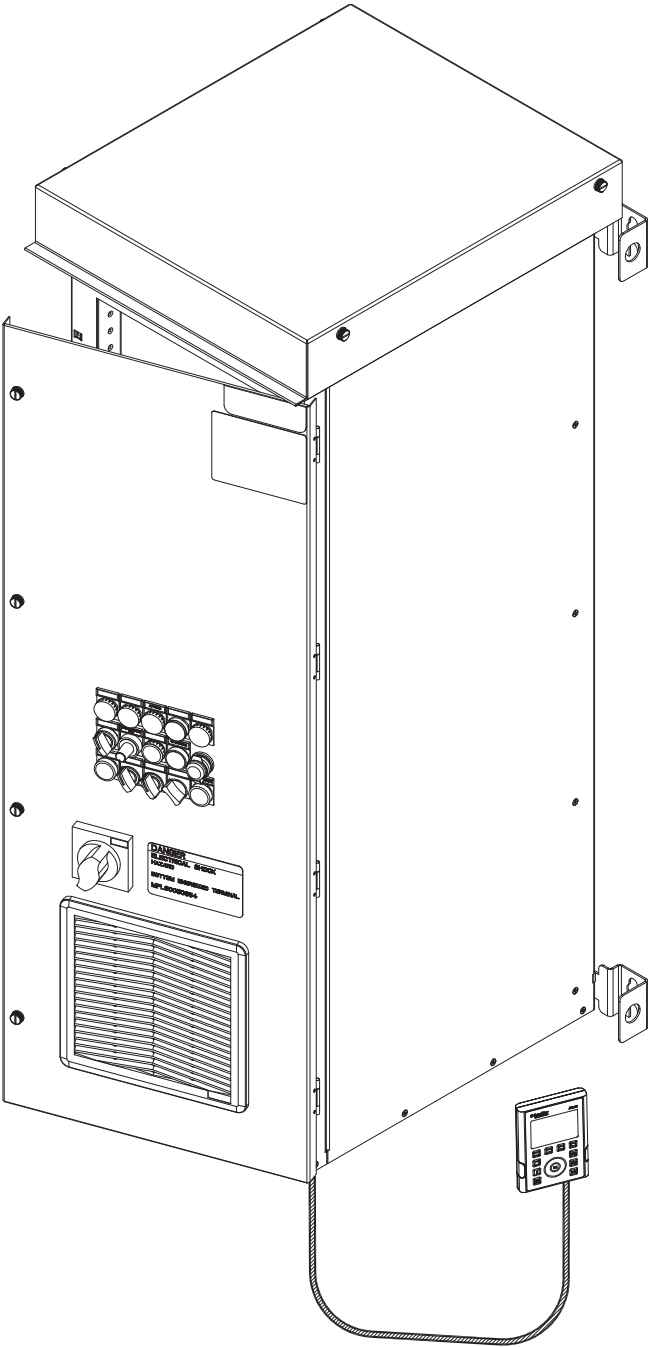


Figure 9 – Routing the Remote Keypad on Wall Mounted Enclosures

ENGLISH



Section 4—Circuit Operation and Options

Precautions

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Read and understand the precautions in bulletin NHA60269, *Drives Systems Installation and Maintenance*, before performing any procedures in this bulletin.

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

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Before operating the ATV660 process drive:

- Read and understand the *Altivar Process Programming Manual*, EAV64318, before changing any parameters from the factory defaults.
- If the ATV630 drive is re-initialized using the total or partial factory setting function, the drive must be reprogrammed to the values listed in Tables 17–21 (pages 36–37).
- If the drive or the main control board of the drive is replaced, the drive must be reprogrammed to the values listed in Tables 17–21 (pages 36–37) and in the order which they are given.

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

Programming the Power Converter

The ATV660 process drive system is factory configured as shown in Table 17 on page 36. Be sure to configure the drive's motor full-load current as shown on the motor nameplate. For additional programming information, see the Altivar 630 Programming Manual, EAV64318, available online at www.schneider-electric.com.

⚠ WARNING

LOSS OF CONTROL

Changes to the factory set parameters must be completed in the sequence given in Table 17 on page 36.

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

Changes to parameter factory settings must be completed in the order in which the parameters appear in Table 17 on page 36. Space is provided in the table for noting changes to the factory settings for your records.

Table 17 – Drive System without Full Voltage Bypass

Menu	Parameter	Description	Factory Setting	Custom Setting
1	bFr	Basic Frequency	60	
1	tFr	Max Frequency	60	
1	LSP	Low Speed	3	
5.2	SFr	Switching frequency	2.5	
5.5	Fr1b	REF. 1B CHANNEL	AI2	
5.5	rCb	REF. 1B SWITCHING	DI3	
5.5	tCt	2-wire type	LEL	
5.11	AI2T	AI2 TYPE	0A	
5.11	CrL2	AI2 min value	4	
5.11	AO1	AQ1 ASSIGNMENT	oFr	
5.11	AOL1	AQ1 min output	4	
5.11	r1	R1 ASSIGNMENT	FLt	
5.11	r2	R2 ASSIGNMENT	run	
5.12	FLr	Catch on the fly	YES	

Adjust the parameters shown in Tables 18–21 if these optional features are included with the equipment.

Table 18 – Drive System with Integral Full Voltage Bypass (Y10)

Menu	Parameter	Description	Factory Setting	Custom Setting
5.9	nSt	DI2 (Low Level)	DI2	

Table 19 – Drive system with Integral Passive Harmonic Filter (M09)

Menu	Parameter	Description	Factory Setting	Custom Setting
5.9	Ftd	Motor Freq Thd	1	
5.11	FtA	R3 Assignment	Motor frequency high threshold	
5.11	rId	R3 Delay time	2000	
5.12	EtF	Ext Error assign	DI6	

Table 20 – Drive System Configured For Heavy Duty (H06)

Menu	Parameter	Description	Factory Setting	Custom Setting
5.2	drt	Dual rating	HIGH	

Table 21 – Drive System Configured for 0-10 V Speed Reference (E14)

Menu	Parameter	Description	Factory Setting	Custom Setting
5.11	AI2T	AI2 TYPE	10u	

Power Circuit W: Without Bypass

The non-bypass power circuit provides a coordinated drive and circuit breaker package. It includes a number of possible power circuit additions including selection of harmonic and transient mitigation methods. Additional space is provided for engineered to order options and field installable equipment.

Power Circuit Y: With Integral Full Voltage Bypass

The bypass power circuit provides a coordinated drive and circuit breaker package and the flexibility and security of a full voltage bypass motor drive that is available at any time. A number of possible power circuit additions, including selection of harmonic and transient mitigation methods and options like the field service disconnect and line isolation contactor, are available in this power circuit configuration allowing for even greater reliability and serviceability. Additional space is provided for engineered to order options and field installable equipment.

The integral full voltage bypass starter includes a Class 10 bimetallic or solid-state overload relay and door-mounted overload relay reset button.

NOTICE

HAZARD OF EQUIPMENT DAMAGE

Switching between Drive mode and Bypass mode without allowing the motor to come to a complete stop is not recommended.

Failure to follow these instructions could result in equipment damage.

UL® Type 3R Operation

To prevent condensation on the inside of the cabinet, leave the process drive energized even when the motor is not running.

The enclosed drive has a UL 869A approved insulated ground neutral lug assembly and mounting bracket with a bonded enclosure ground wire suitable for use as service entrance rated equipment. Service Entrance Rating is not available with cUL Label.

Control Options

Mod A11: Hand-Off-Auto Selector Switch

Mod A11 provides a door-mounted Hand-Off-Auto selector switch for operating the drive system (two-wire control scheme).

- Hand mode is for local control. When Hand mode is selected, the drive starts the motor and speed command reference is provided by the door mounted speed potentiometer.
- Off mode commands the drive to stop the motor by freewheel stop (factory setting) or by deceleration ramp.

- Auto mode is for remote control. In Auto mode, the drive starts the motor when the user-supplied Start contact is closed between drive terminals 3 and 4. The drive stops the motor when the user-supplied Start contact is opened.

The speed command reference is provided by the speed control reference signal supplied to AI3 (factory set for 4-20 mA input).

Mod B11: Hand-Auto Selector Switch and Start-Stop Push Buttons

WARNING

INABILITY TO INITIATE A STOP

The Stop push button is only active in the Hand mode.

- To stop the controller, open the disconnect switch or set the Hand-Off-Auto switch to Off.
- Use appropriate guarding or interlocking.

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

Mod B11 provides a door-mounted, Hand-Off-Auto selector switch, a Start push button, and a Stop push button (mixed mode control scheme).

- Hand mode is for local control. In Hand mode:
 - The Start push button commands the drive to start the motor.
 - The Stop push button commands the drive to stop the motor by freewheel stop (factory setting) or by deceleration ramp.
 - The speed command reference is provided by the door-mounted speed potentiometer.
- Off mode commands the drive to stop the motor by freewheel stop (factory setting) or by deceleration ramp.
- Auto mode is for remote control. In Auto mode, the drive starts the motor when the user-supplied Start contact is closed between drive terminals 3 and 4. The drive stops the motor when the user-supplied Start contact is opened. In Auto mode:
 - The Start push button **does not** command the drive to start the motor locally.
 - The Stop push button **does not** command the drive to stop the motor locally.
 - The speed command reference is provided by the speed control reference signal supplied to AI1 (factory set for 4-20 mA input).

Mod N11: No Control Operators

No door-mounted control operators are provided. Omit a control option selection when ordering to receive no operators.

Pilot Light Cluster Options

Mod A12: Pilot Light Cluster 1

Mod A12 provides red Run (On), green Run, and yellow Trip and Auto pilot lights for status enunciation.

Mod B12: Pilot Light Cluster 2

Mod B12 provides red Run (On), green Run, and yellow Trip pilot lights for status enunciation.

Mod N12: No Pilot Lights

No door-mounted lights are provided. Omit a pilot light option selection when ordering to receive no lights.

Miscellaneous Options

Mod A14: Door Mounted Ethernet Port

Provides a port on the door of the enclosed drive for making an Ethernet connection.

Mod B14: Line Contactor

This option is only available for Power Circuit Y (Bypass). It provides a factory-wired line contactor between the circuit breaker disconnect (or line reactor or harmonic filter when provided) and the power converter. When the line contactor is open, serial communication is disabled.

Mod E14: 0–10 V Auto Speed Reference

This option provides a 0–10 V user-supplied auto speed reference signal into the AI2 input, terminals 12 and 13 on terminal block TB1. The 0–10 V analog input is not optically isolated.

Mod F14: 1 N.O. (Form A) Auxiliary Auto Mode Contact

Mod F14 provides one Form A, normally open (N.O.) contact, rated 5 A at 120 Vac, wired to the terminal blocks. The contact(s) change state when the controller is placed in Auto (Remote) mode.

Mod G14: Type 1 Surge Protective Device

Mod G14 provides an integrated Type 1 supplementary voltage surge protective device to protect equipment in the event of transient voltage surges associated with some electrical power distribution systems. The SPD is suitable for peak surge currents up to 40 kA.

Mod H14: Type 2 Surge Protective Device

Mod H14 provides an integrated Type 2 supplementary voltage surge protective device (SPD) to protect equipment in the event of transient voltage surges associated with some electrical power distribution systems. The SPD is suitable for peak surge currents up to 80 kA.

Mod K14: 150 VA Control Power

Mod K14 provides additional VA capacity of the control power transformer to power field installable equipment and control circuits.

Mod L14: Push-to-Test Pilot Lights

This option provides a push-to-test feature on all pilot lights except Power On.

Mod P14: Permanent Wire Markers

Mod P14 provides permanent wire markers for control wires for use in identification and troubleshooting of control circuits.

Mod Q14: Trip Reset

Provides a push button signal to reset a drive trip or bypass overload trip. Mod Y10 Bypass must also be selected.

Mod S14: 50 °C Operation

Mod S14 provides a high ambient equipment rating above 40 °C (104 °F) to a maximum of 50 °C (122 °F) without derating.

Mod T14: Drive Input Disconnect Switch**⚠ DANGER****HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

Do not operate the switch under load with the door open.

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

This option provides an input line power disconnect switch between the mains power disconnect and the power converter. The Drive Input Disconnect Switch will disconnect line power to the power converter. The motor can run in bypass mode in the unlikely event the power converter becomes inoperative.

Mod U14: Wireway Cubicle

Mod U14 provides additional wireway space for floor-mounted equipment, especially where mains or motor conductors are feed from the top of the equipment.

Mod V14: Assembled in USA

Assembled in the United States is optional for wall mount units only. All floor standing units are assembled in the United States.

Mod X14: dv/dt Filter

Provides a factory mounted and wired dv/dt filter on the drive output for long motor lead lengths in excess of published guidelines.

Drive Communications and Expansion Cards

ATV660 process drives come factory configured with integral Modbus and Ethernet communications for the drive. The optional expansion cards described in this section are available for additional communication systems and feature configurations.

Mod A13: Profibus DP V1

Mod A13 provides a factory installed plug-in Profibus DP V1 card (VW3A3607). Connect to the Profibus DP card with one nine-pin female SUB-D connector.

Mod B13: CANopen Daisy Chain

Mod B13 provides a factory installed plug-in CANopen daisy chain card (VW3A3608). Connect to the CANopen daisy chain card with two RJ-45 ports.

Mod C13: DeviceNet

Mod C13 provides a factory installed plug-in DeviceNet card (VW3A3609). Connect to the DeviceNet card with one five-point terminal block.

Mod D13: CANopen SUB-D

Mod D13 provides a factory installed plug-in CANopen Sub-D9 card (VW3A3618). Connect to the CANopen Sub-D9 card with one nine-pin male SUB-D connector.

Mod E13: CANopen Open Style

Mod E13 provides a factory installed plug-in CANopen open style card (VW3A3628). Connect to the CANopen open style card with one five-point terminal block.

Mod F13: ProfiNet

Mod F13 provides a factory installed plug-in ProfiNet card (VW3A3627). Connect to the ProfiNet card with two RJ-45 ports.

Mod G13: Ethernet IP / Modbus TCP Dual Port

Mod G13 provides a factory installed plug-in Ethernet IP card (VW3A3720). Connect to the Ethernet IP card with two RJ-45 ports.

Mod C14: I/O Extension Card

Mod C14 provides a factory installed I/O expansion card (VW3A3203). The card expands the available I/O with an additional six logic inputs, two logic outputs, and two analog inputs.

Mod D14: Relay Output Card

Mod D14 provides a factory installed relay output card (VW3A3204). The card adds three normally open contacts that may be assigned within drive logic.

Section 5— Component Locations, and Dimensions

Component Locations

Figure 10 – Wall-Mounted Enclosures

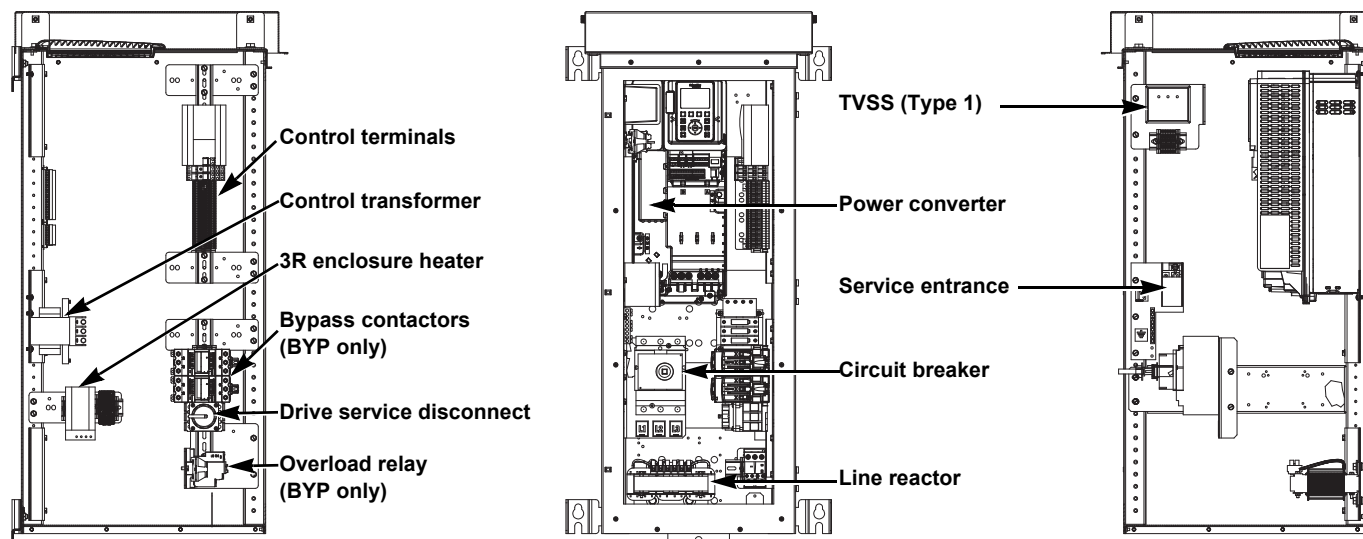


Figure 11 – Floor-Mounted Enclosures

75–125 hp (55–90 kw) @ 460 V, ND
 60–100 hp (45–75 kw) @ 460 V, HD
 40–60 hp (30–45 kw) @ 230 V, ND
 30–50 hp (22–37 kw) @ 230 V, HD

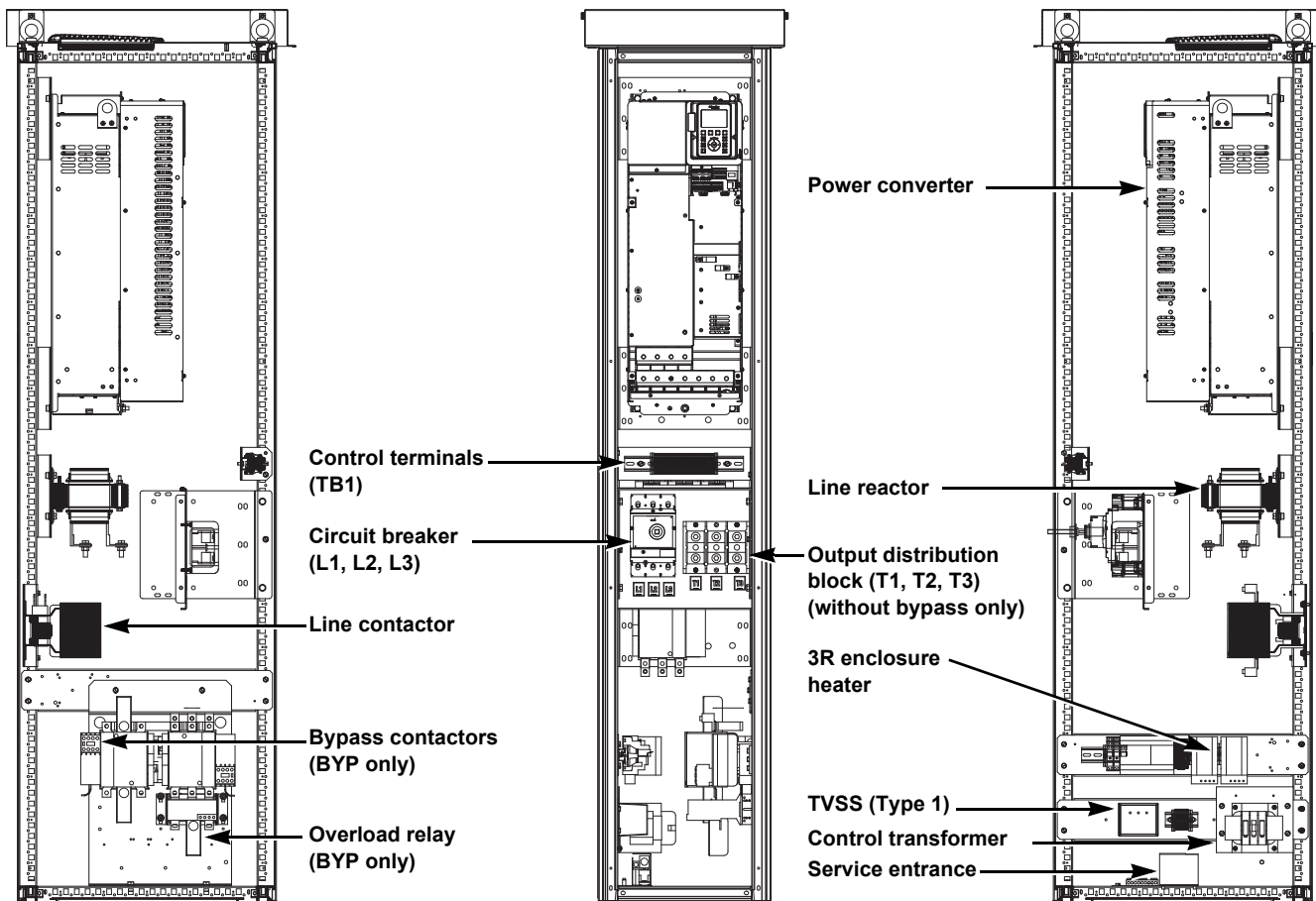
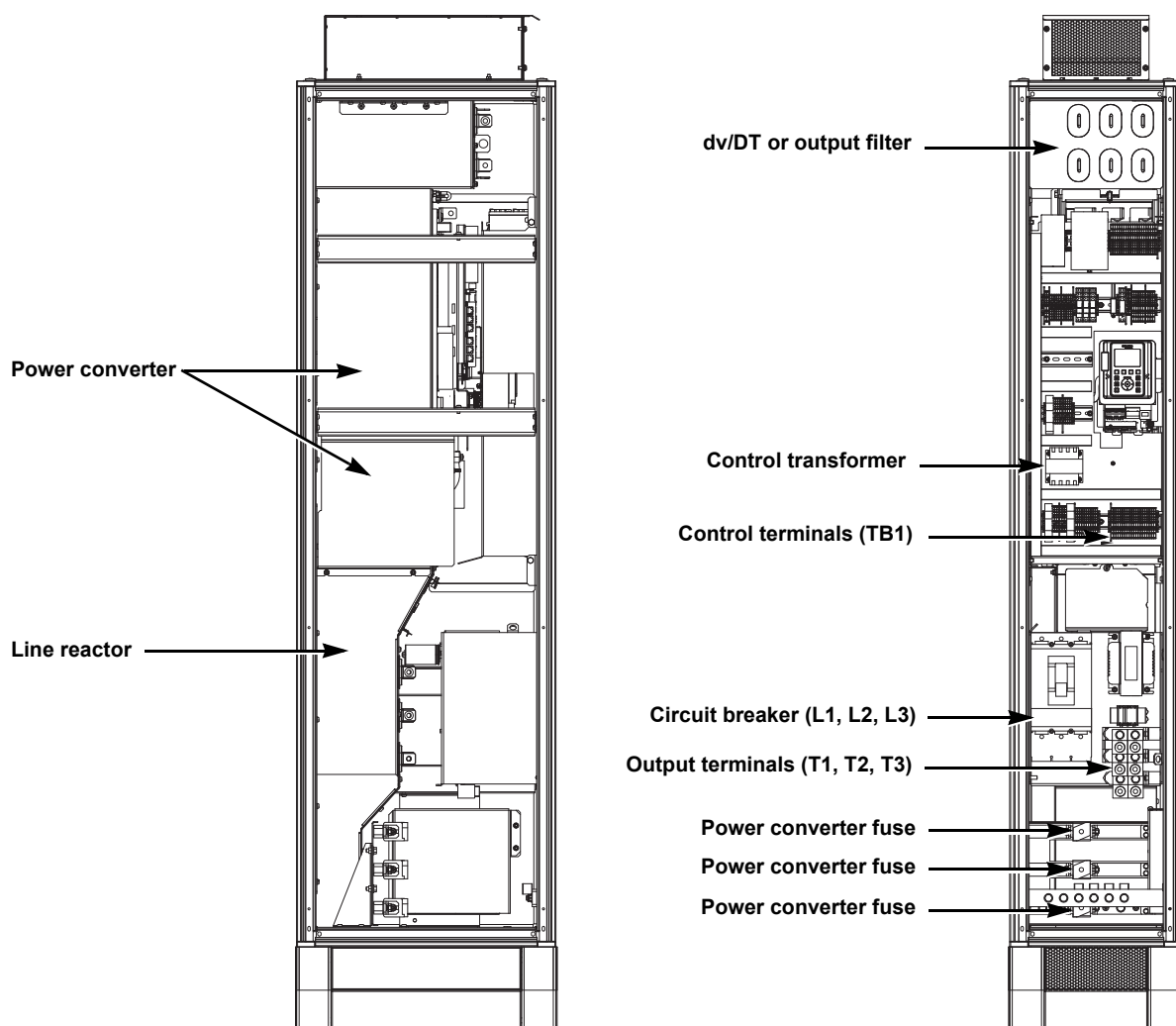


Figure 12 – Floor-Mounted Enclosures

150–250 hp (110–160 kw) @ 460 V, ND
125–200 hp (90–130 kw) @ 460 V, HD



Dimensions

Figure 13 – 600 mm Enclosure: Standard Drive without Harmonic Filter, Types 1 and 12

1–15 hp (0.75–11 kw) @ 460 V, ND
 0.5–10 hp (0.37–7.5 kw) @ 460 V, HD
 1–7.5 hp (0.75–5.5kw) @ 230 V, ND
 0.5–5 hp (0.4–4 kw) @ 230 V, HD

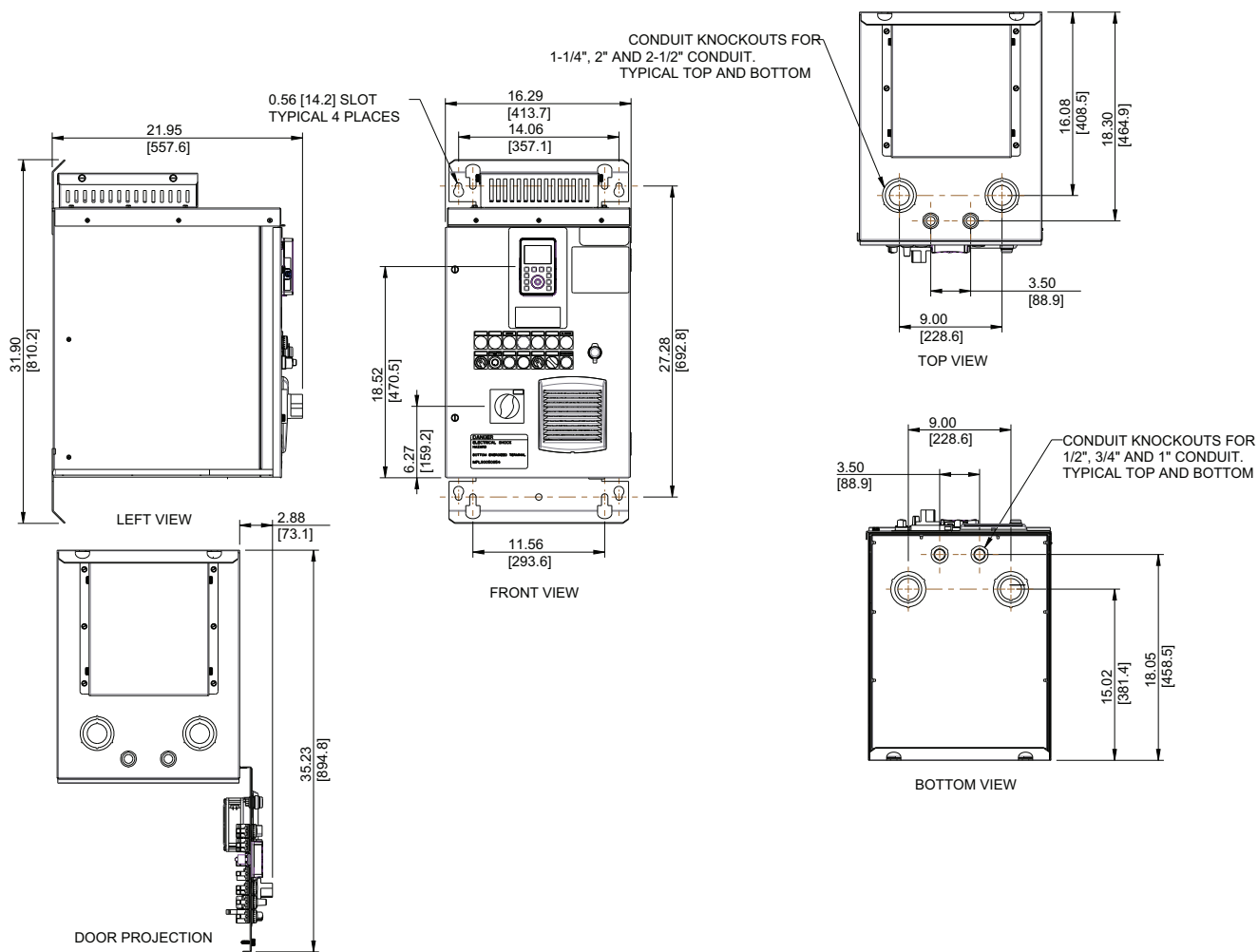


Figure 14 – 600 mm Enclosure: Standard Drive without Harmonic Filter, Type 3R

1–15 hp (0.75–11 kw) @ 460 V, ND
 0.5–10 hp (0.37–7.5 kw) @ 460 V, HD
 1–7.5 hp (0.75–5.5kw) @ 230 V, ND
 0.5–5 hp (0.4–4 kw) @ 230 V, HD

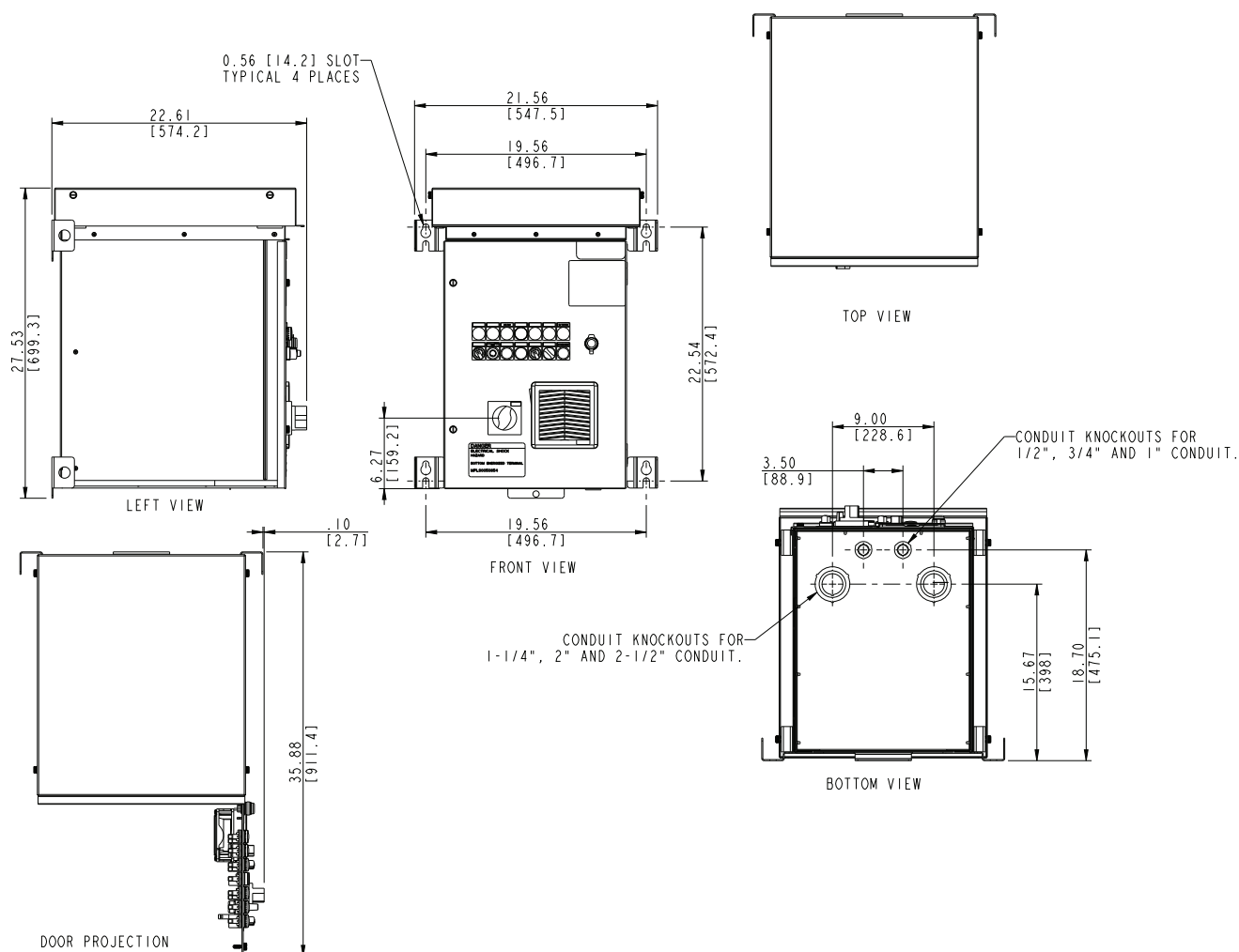


Figure 15 – 1000 mm Enclosure: Standard Drive without Harmonic Filter, Types 1 and 12

20–30 hp (15–22 kw) @ 460 V, ND
 15–25 hp (11–18.5 kw) @ 460 V, HD
 10–15 hp (7.5–11 kw) @ 230 V, ND
 7.5–10 hp (5.5–7.5 kw) @ 230 V, HD

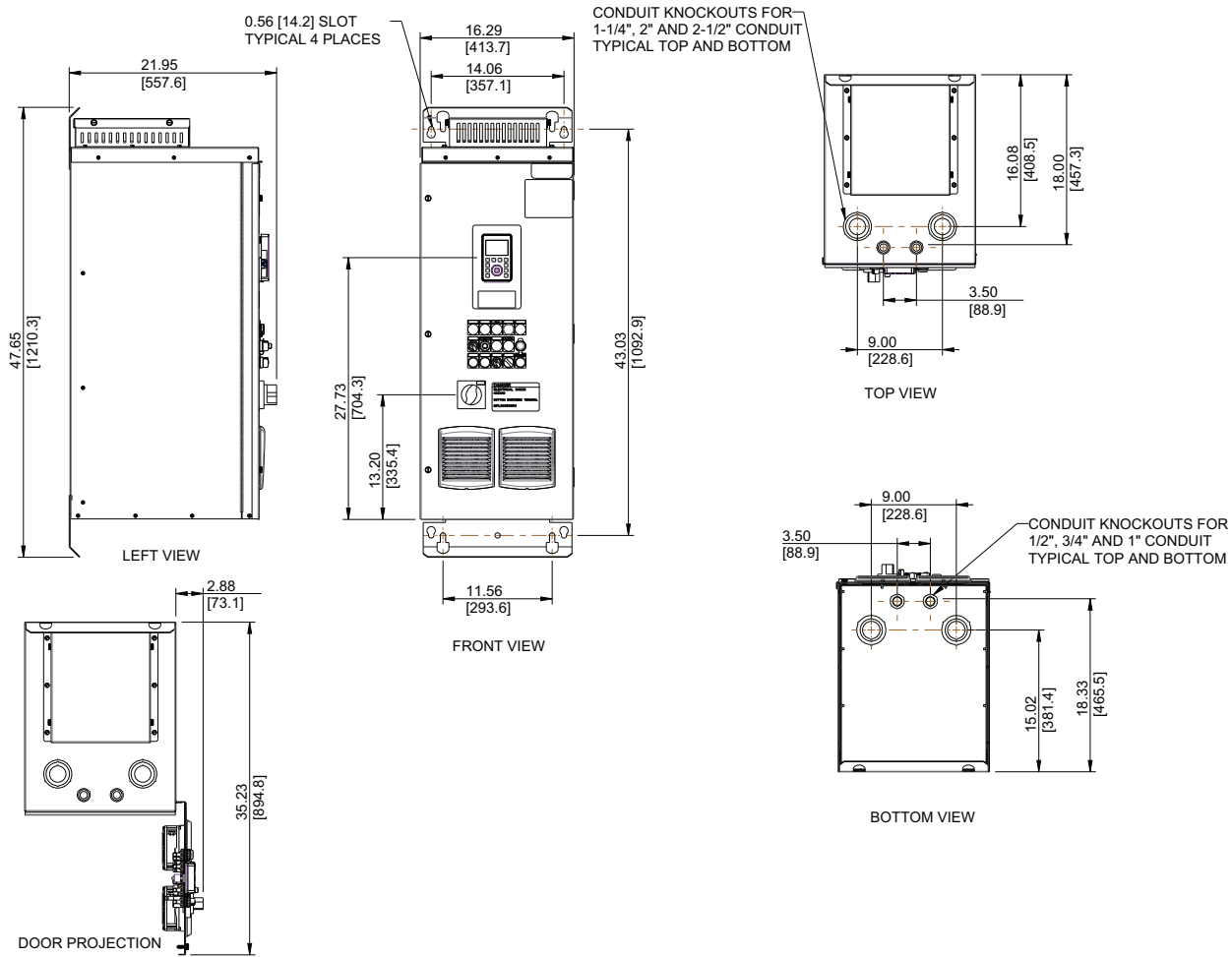


Figure 16 – 1000 mm Enclosure: Standard Drive without Harmonic Filter, Type 3R

20–30 hp (15–22 kw) @ 460 V, ND
 15–25 hp (11–18.5 kw) @ 460 V, HD
 10–15 hp (7.5–11 kw) @ 230 V, ND
 7.5–10 hp (5.5–7.5 kw) @ 230 V, HD

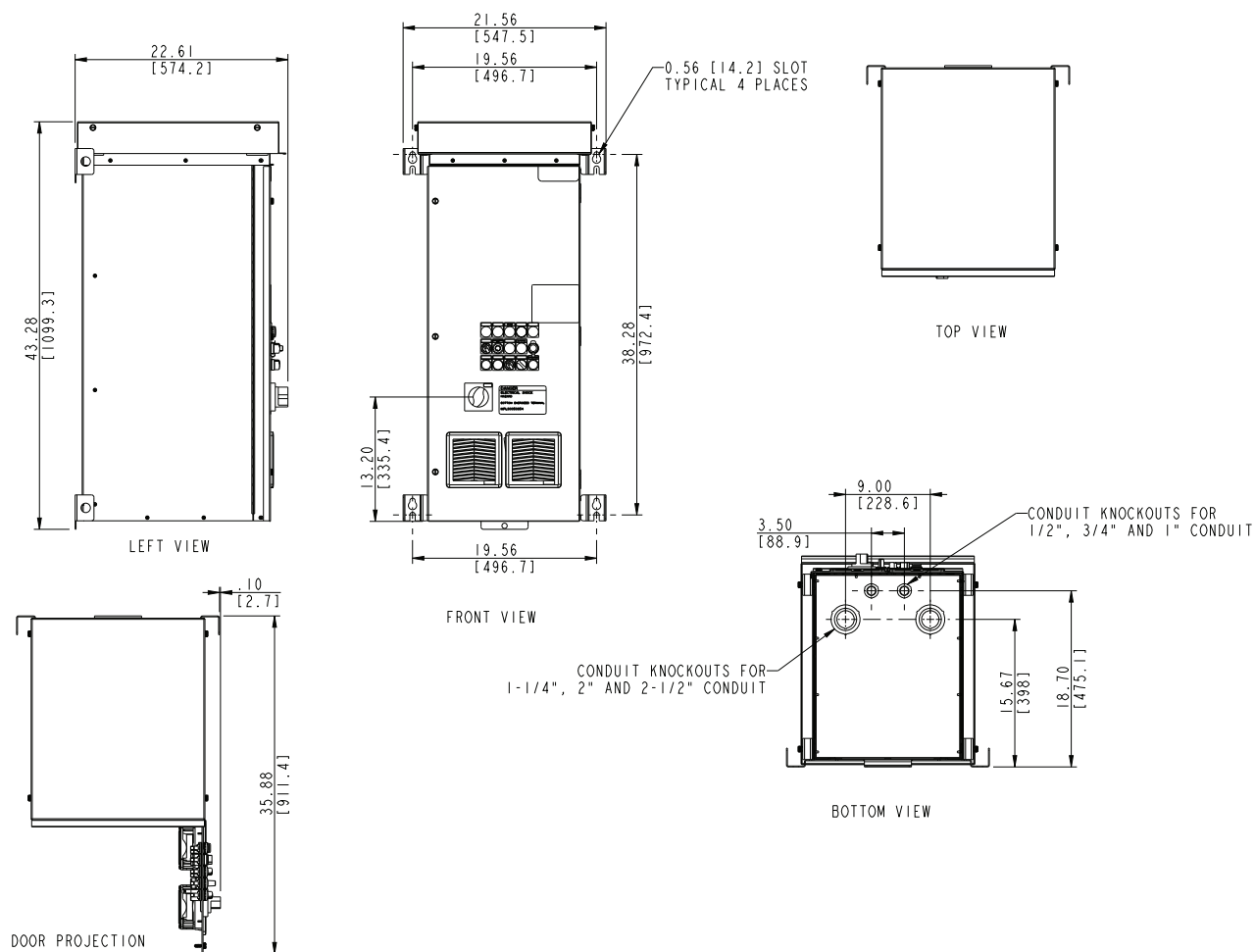


Figure 17 – 1200 mm Enclosure: Standard Drive without Harmonic Filter, Types 1 and 12

40–60 hp (30–45 kw) @ 460 V, ND
 30–50 hp (22–37 kw) @ 460 V, HD
 20–30 hp (15–22 kw) @ 230 V, ND
 15–25 hp (11–19 kw) @ 230 V, HD

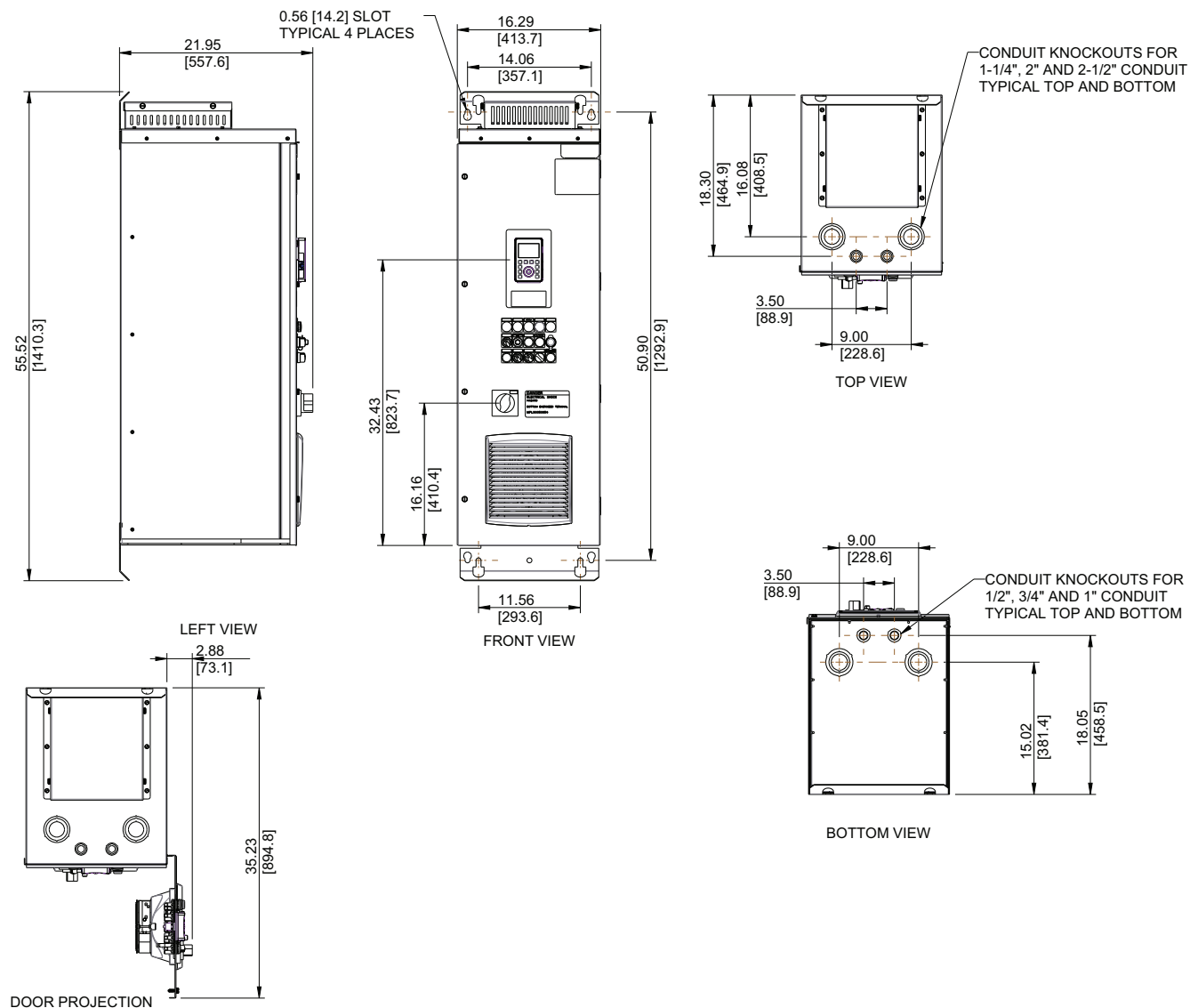


Figure 18 – 1200 mm Enclosure: Standard Drive without Harmonic Filter, Type 3R

40–60 hp (30–45 kw) @ 460 V, ND

30–50 hp (22–37 kw) @ 460 V, HD

20–30 hp (15–22 kw) @ 230 V, ND

15–25 hp (11–19 kw) @ 230 V, HD

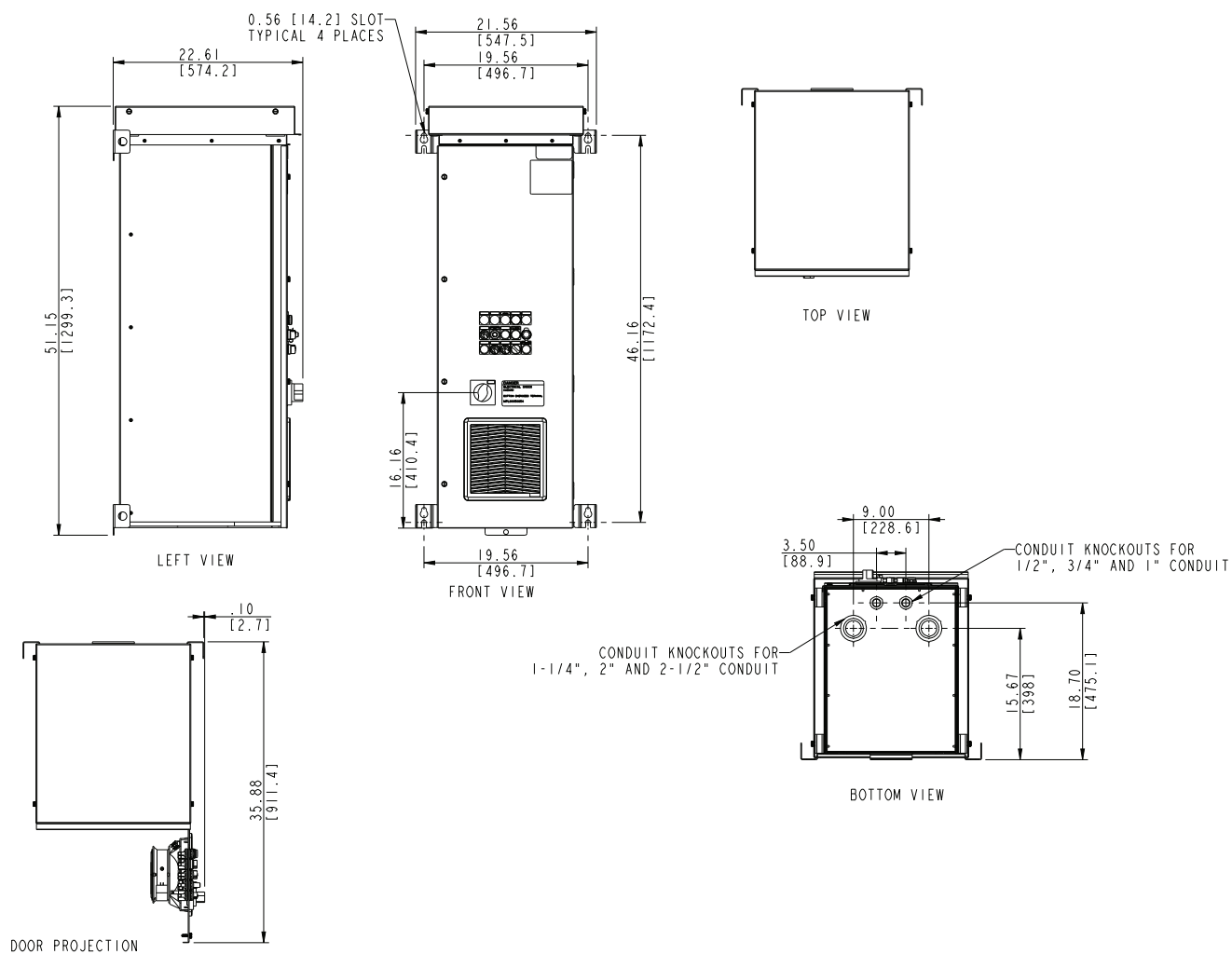
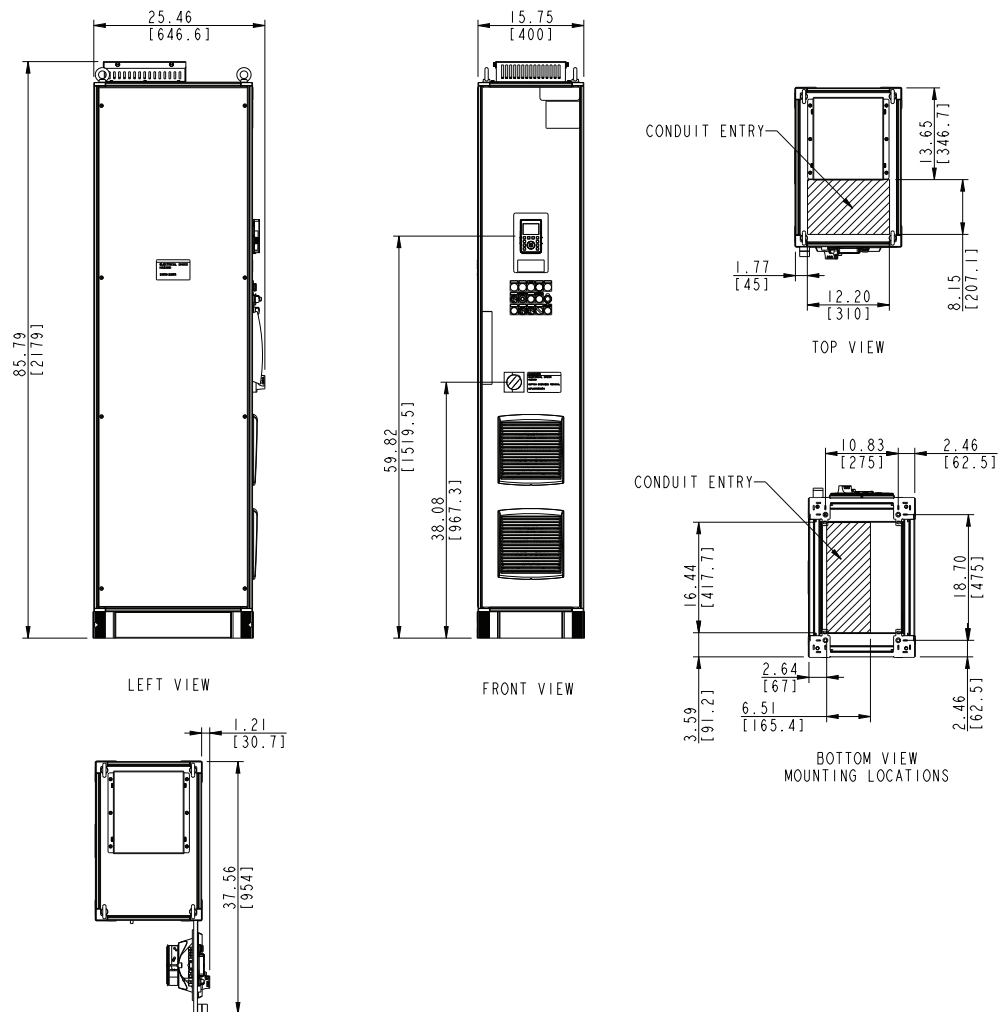


Figure 19 – 2000 mm Enclosure, Standard Drive without Harmonic Filter, Type 1

75–125 hp (55–90 kw) @ 460 V, ND
 60–100 hp (45–75 kw) @ 460 V, HD
 40–60 hp (30–45 kw) @ 230 V, ND
 30–50 hp (22–37 kw) @ 230 V, HD



NOTE: Harmonic Filter M09 is available from 40–100 hp HD and 40–125 hp ND @ 460 V. Adding the harmonic filter requires a floor standing unit 31.5 in. (800 mm) wide, with the same depth and height as shown above.

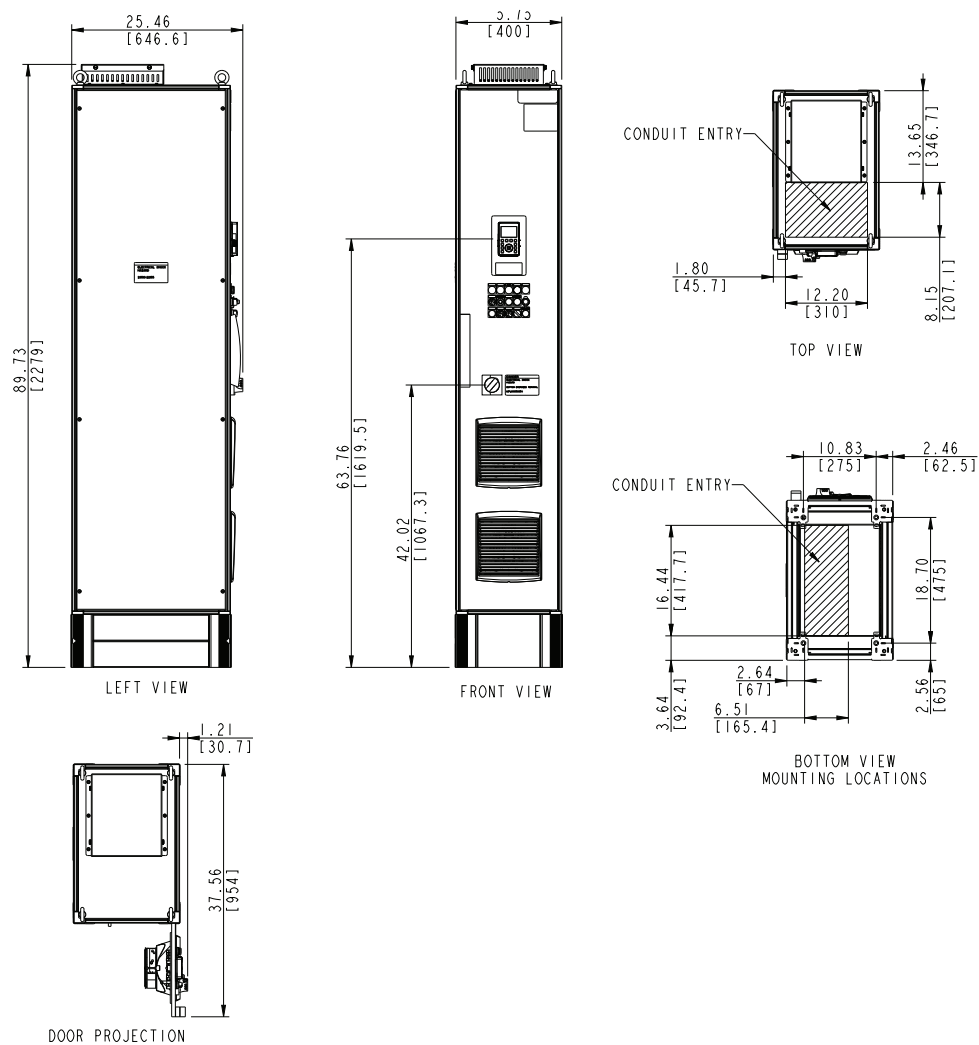
Figure 20 – 2000 mm Enclosure, Standard Drive without Harmonic Filter, Type 12

75–125 hp (55–90 kw) @ 460 V, ND

60–100 hp (45–75 kw) @ 460 V, HD

40–60 hp (30–45 kw) @ 230 V, ND

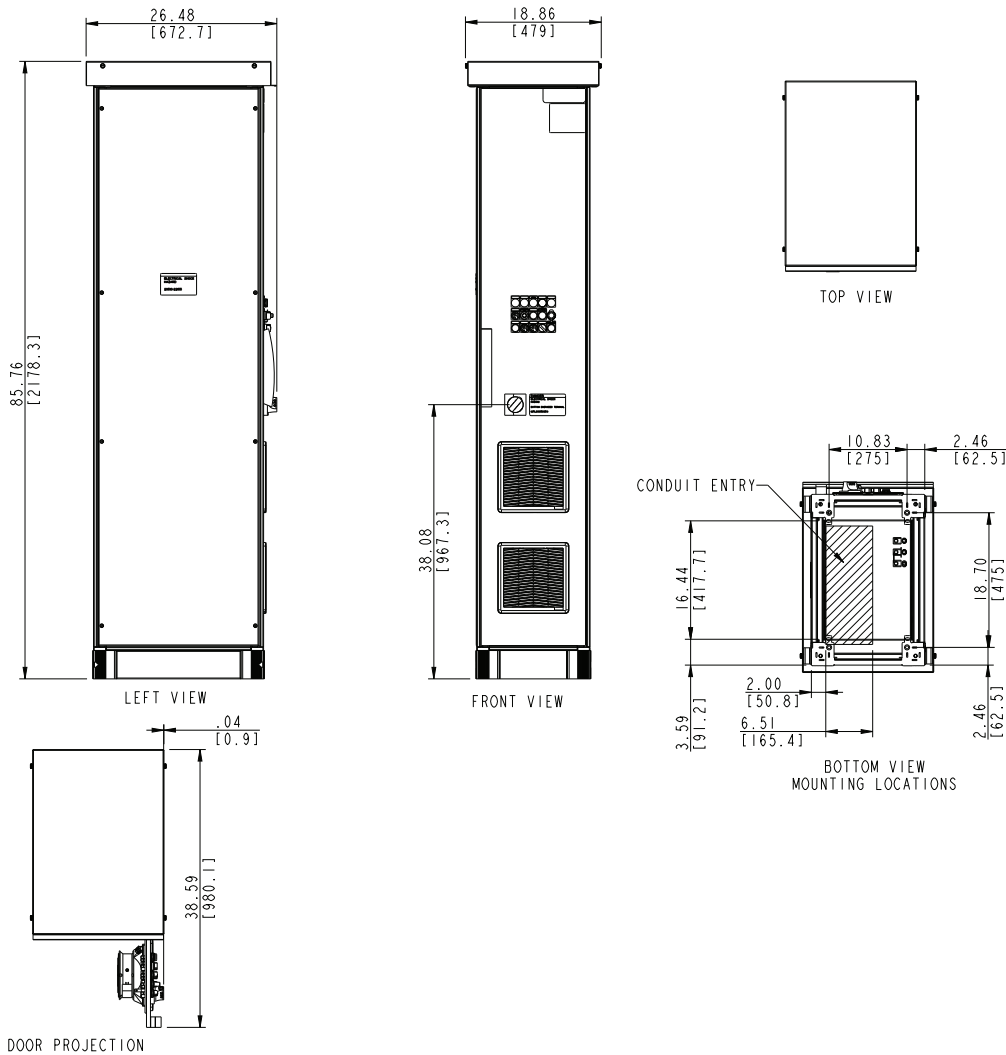
30–50 hp (22–37 kw) @ 230 V, HD



NOTE: Harmonic Filter M09 is available from 40–100 hp HD and 40–125 hp ND @ 460 V. Adding the harmonic filter requires a floor standing unit 31.5 in. (800 mm) wide, with the same depth and height as shown above.

Figure 21 – 2000 mm Enclosure, Standard Drive without Harmonic Filter, Type 3R

75–125 hp (55–90 kw) @ 460 V, ND
 60–100 hp (45–75 kw) @ 460 V, HD
 40–60 hp (30–45 kw) @ 230 V, ND
 30–50 hp (22–37 kw) @ 230 V, HD

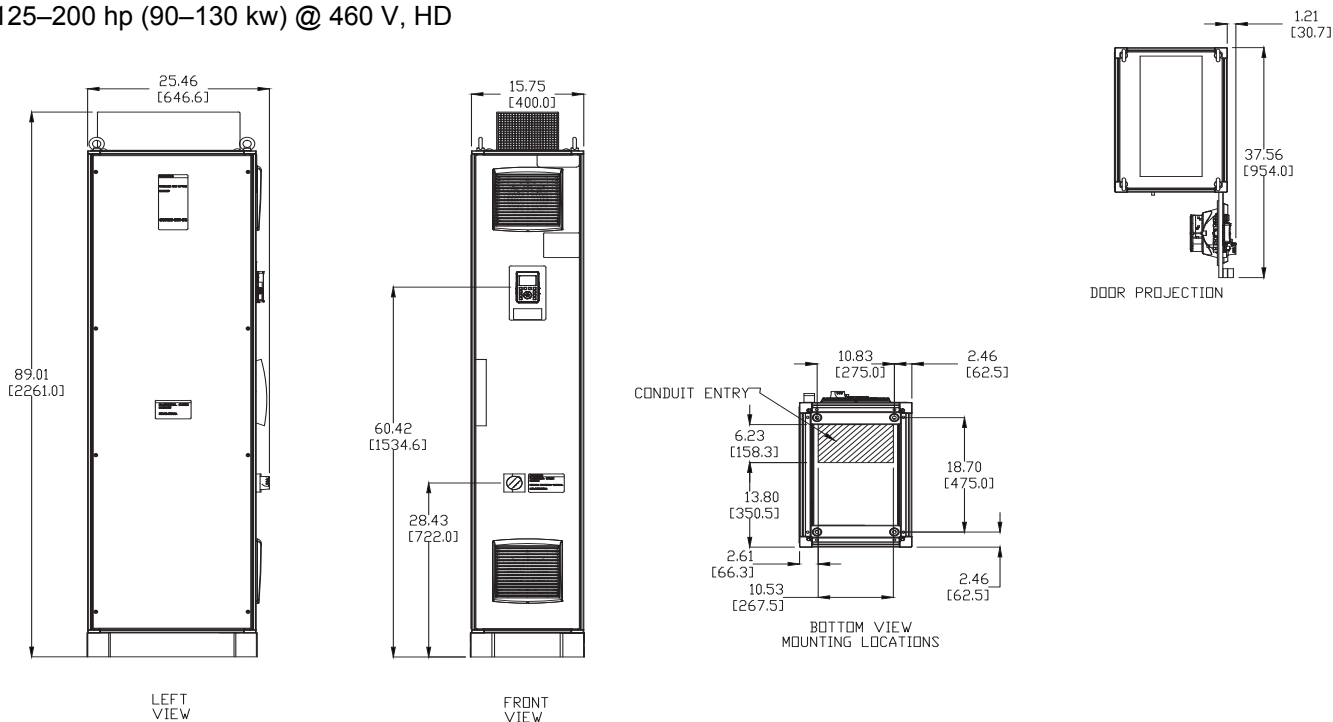


NOTE: Harmonic Filter M09 is available from 40–100 hp HD and 40–125 hp ND @ 460 V. Adding the harmonic filter requires a floor standing unit 31.5 in. (800 mm) wide, with the same depth and height as shown above.

Figure 22 – 2000 mm Enclosure, Standard Drive without Harmonic Filter, Type 1

150–250 hp (110–160 kw) @ 460 V, ND

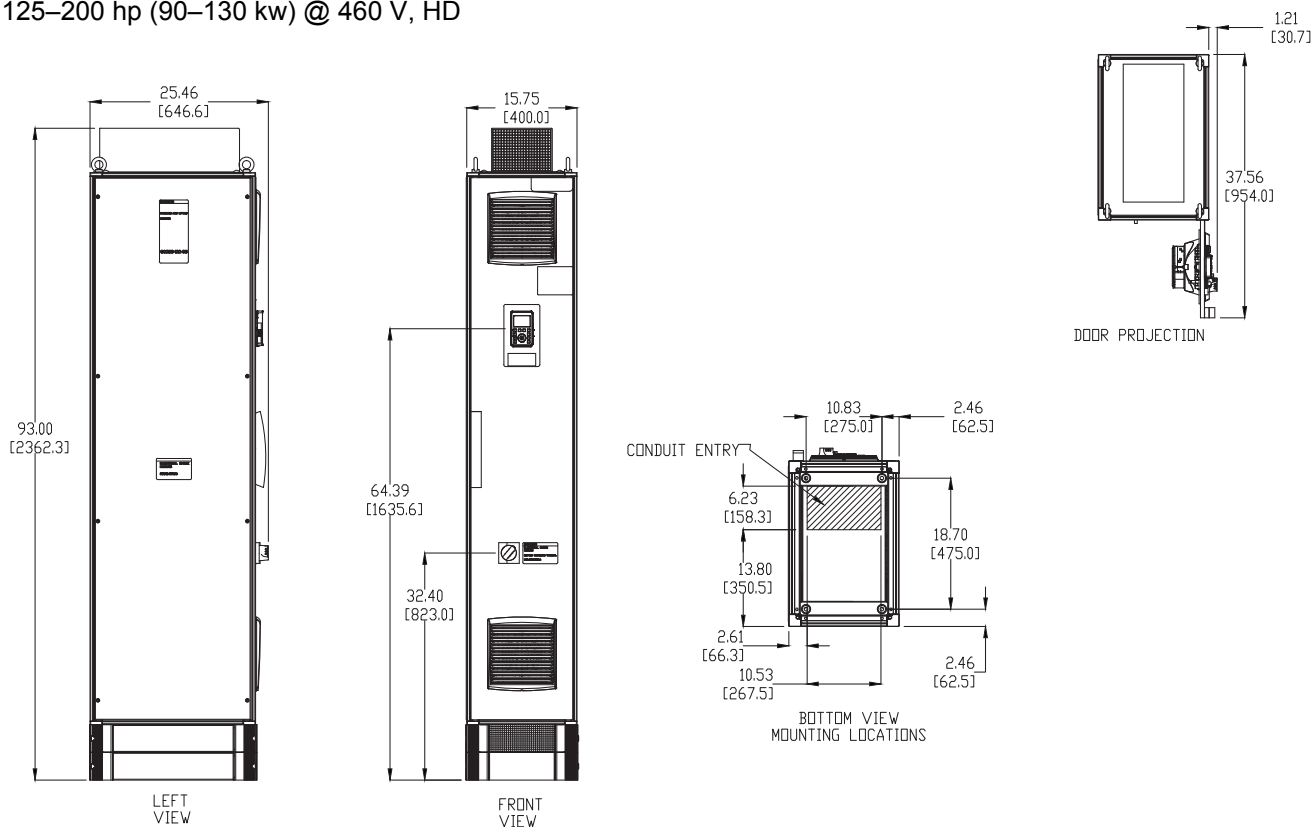
125–200 hp (90–130 kw) @ 460 V, HD

**NOTE:**

- Harmonic Filter M09 is available from 125–200 hp HD and 150–250 hp ND @ 460 V. Adding the harmonic filter requires a floor standing unit of 31.5–39.4 in. (800–1000 mm) wide, with the same depth and height as shown above.
- Bypass Y10 is available from 125–200 hp HD and 150–250 hp ND @ 460 V. Adding the bypass requires a floor standing unit of 31.5–39.4 in. (800–1000 mm) wide, with the same depth and height as shown above.
- Top entry cubicle MOD U14 requires a floor standing unit of 27.6 in. (700 mm) wide, with the same depth and height as shown above.
- Other options and combinations of these options can affect the enclosure width.

Figure 23 – 2000 mm Enclosure, Standard Drive without Harmonic Filter, Type 12

150–250 hp (110–160 kw) @ 460 V, ND
 125–200 hp (90–130 kw) @ 460 V, HD

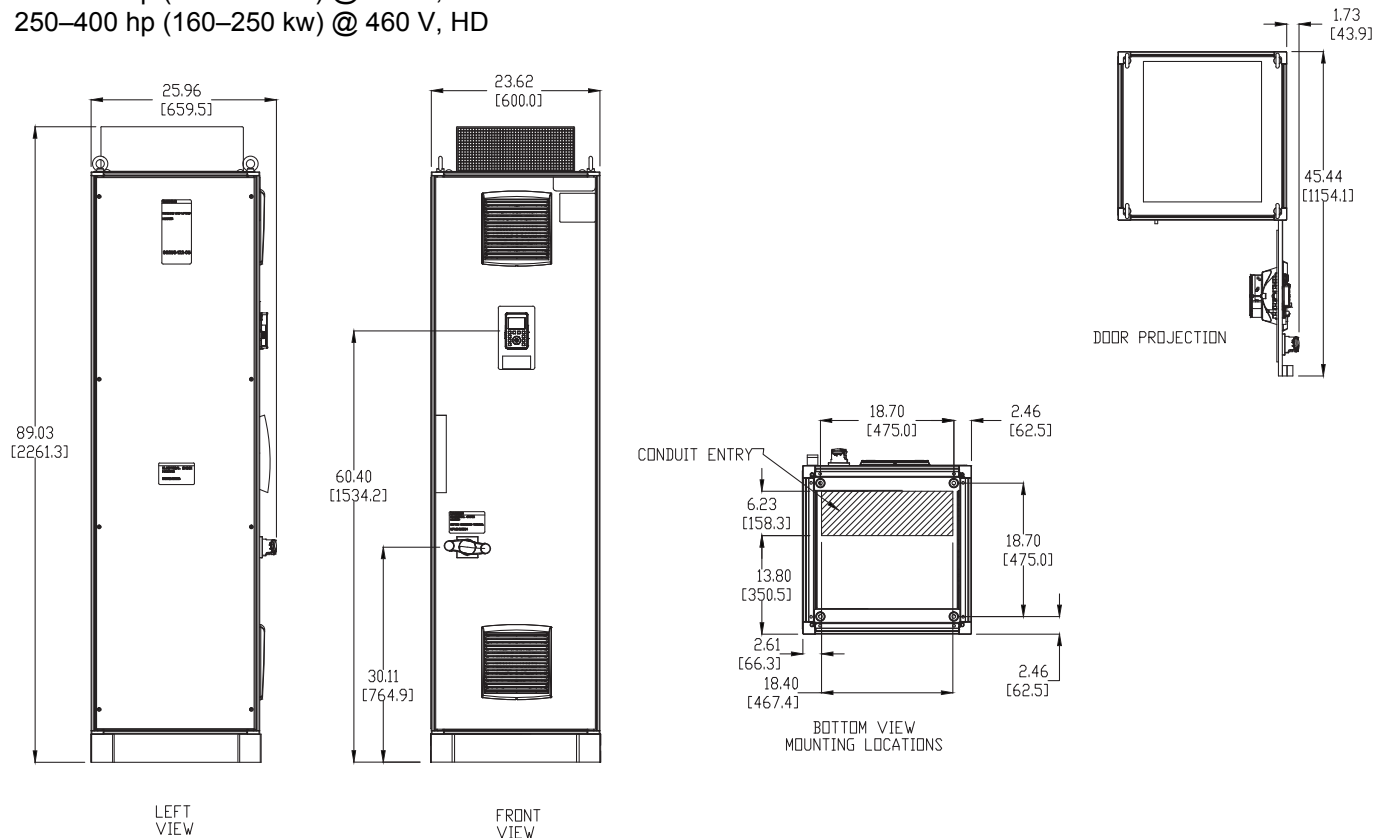
**NOTE:**

- Harmonic Filter M09 is available from 125–200 hp HD and 150–250 hp ND @ 460 V. Adding the harmonic filter requires a floor standing unit of 31.5–39.4 in. (800–1000 mm) wide, with the same depth and height as shown above.
- Bypass Y10 is available from 125–200 hp HD and 150–250 hp ND @ 460 V. Adding the bypass requires a floor standing unit of 31.5–39.4 in. (800–1000 mm) wide, with the same depth and height as shown above.
- Top entry cubicle MOD U14 requires a floor standing unit of 27.6 in. (700 mm) wide, with the same depth and height as shown above.
- Other options and combinations of these options can affect the enclosure width.

Figure 24 – 2000 mm Enclosure, Standard Drive without Harmonic Filter, Type 1

300–500 hp (200–310 kw) @ 460 V, ND

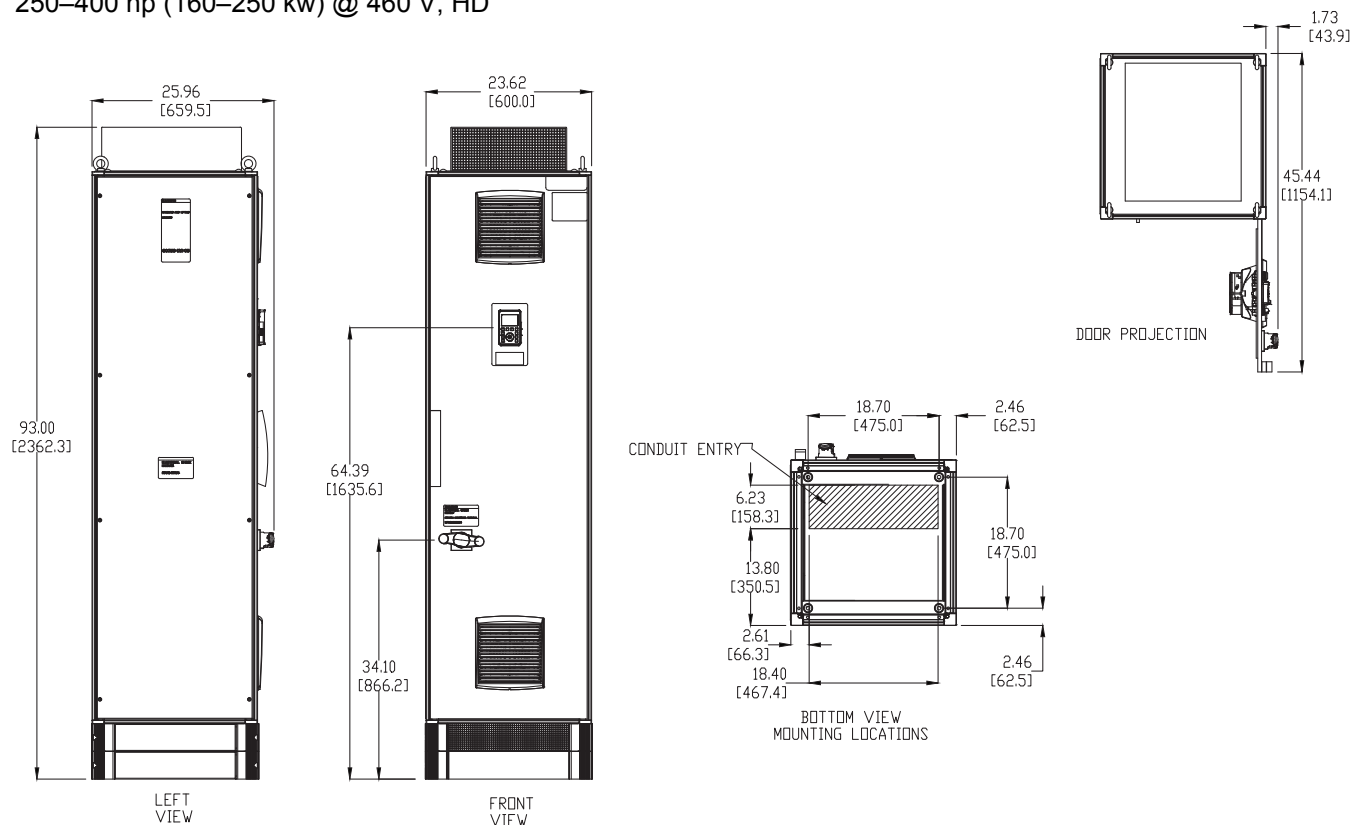
250–400 hp (160–250 kw) @ 460 V, HD

**NOTE:**

- Harmonic Filter M09 is available from 250–400 hp HD and 300–500 hp ND @ 460 V. Adding the harmonic filter requires a floor standing unit of 47.3–63 in. (1200–1600 mm) wide, with the same depth and height as shown above.
- Top entry cubicle MOD U14 requires a floor standing unit of 35.3 in. (900 mm) wide, with the same depth and height as shown above.
- Other options and combinations of these options can affect the enclosure width.

Figure 25 – 2000 mm Enclosure, Standard Drive without Harmonic Filter, Type 12

300–500 hp (200–310 kw) @ 460 V, ND
 250–400 hp (160–250 kw) @ 460 V, HD

**NOTE:**

- Harmonic Filter M09 is available from 250–400 hp HD and 300–500 hp ND @ 460 V. Adding the harmonic filter requires a floor standing unit of 47.3–63 in. (1200–1600 mm) wide, with the same depth and height as shown above.
- Top entry cubicle MOD U14 requires a floor standing unit of 35.3 in. (900 mm) wide, with the same depth and height as shown above.
- Other options and combinations of these options can affect the enclosure width.

Figure 26 – 2000 mm Enclosure, Standard Drive without Harmonic Filter, Type 1

600–700 hp (400–500 kw) @ 460 V, ND
 500–600 hp (310–400 kw) @ 460 V, HD

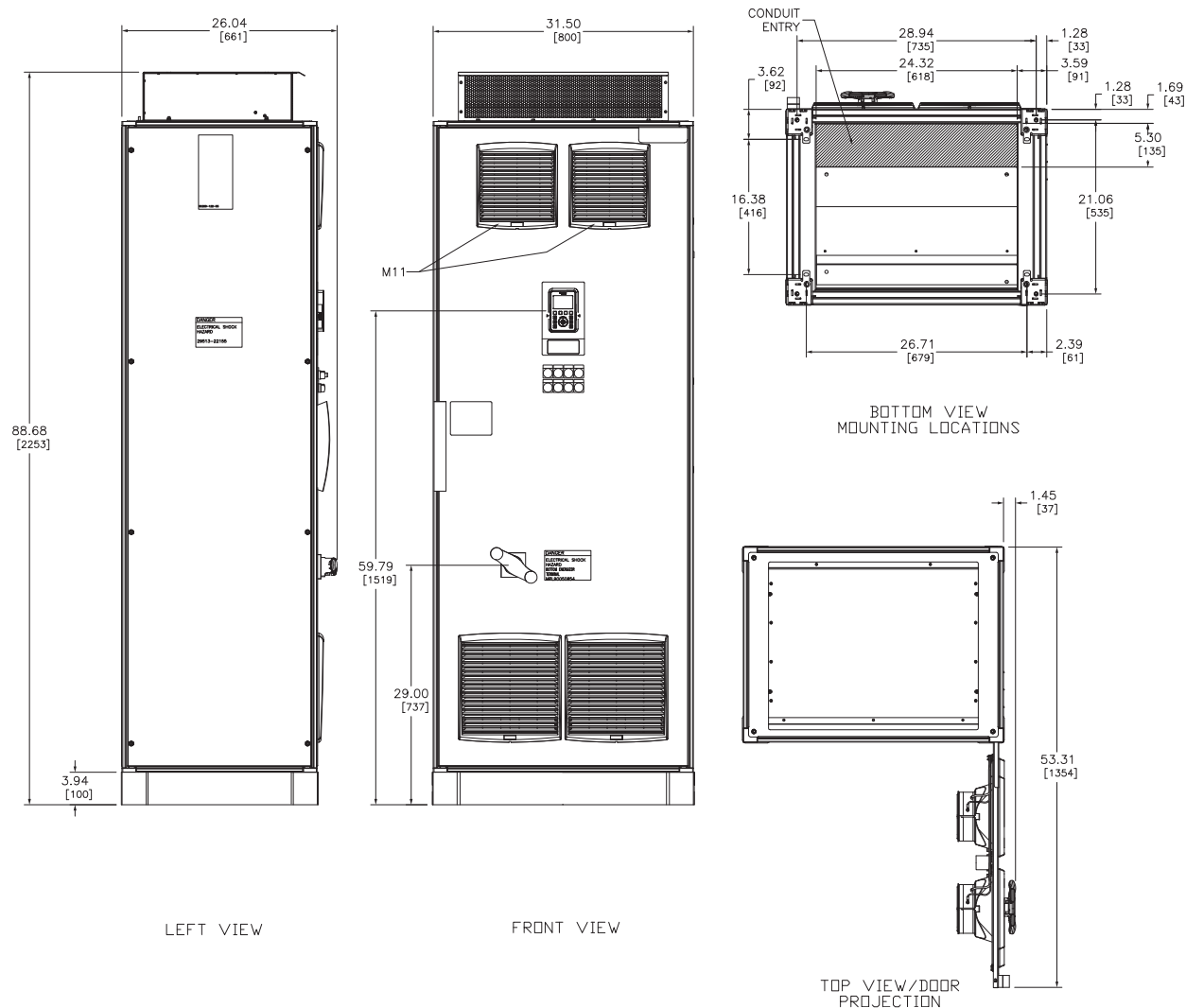


Figure 27 – 2000 mm Enclosure, Standard Drive without Harmonic Filter, Type 12

600–700 hp (400–500 kw) @ 460 V, ND
 500–600 hp (310–400 kw) @ 460 V, HD

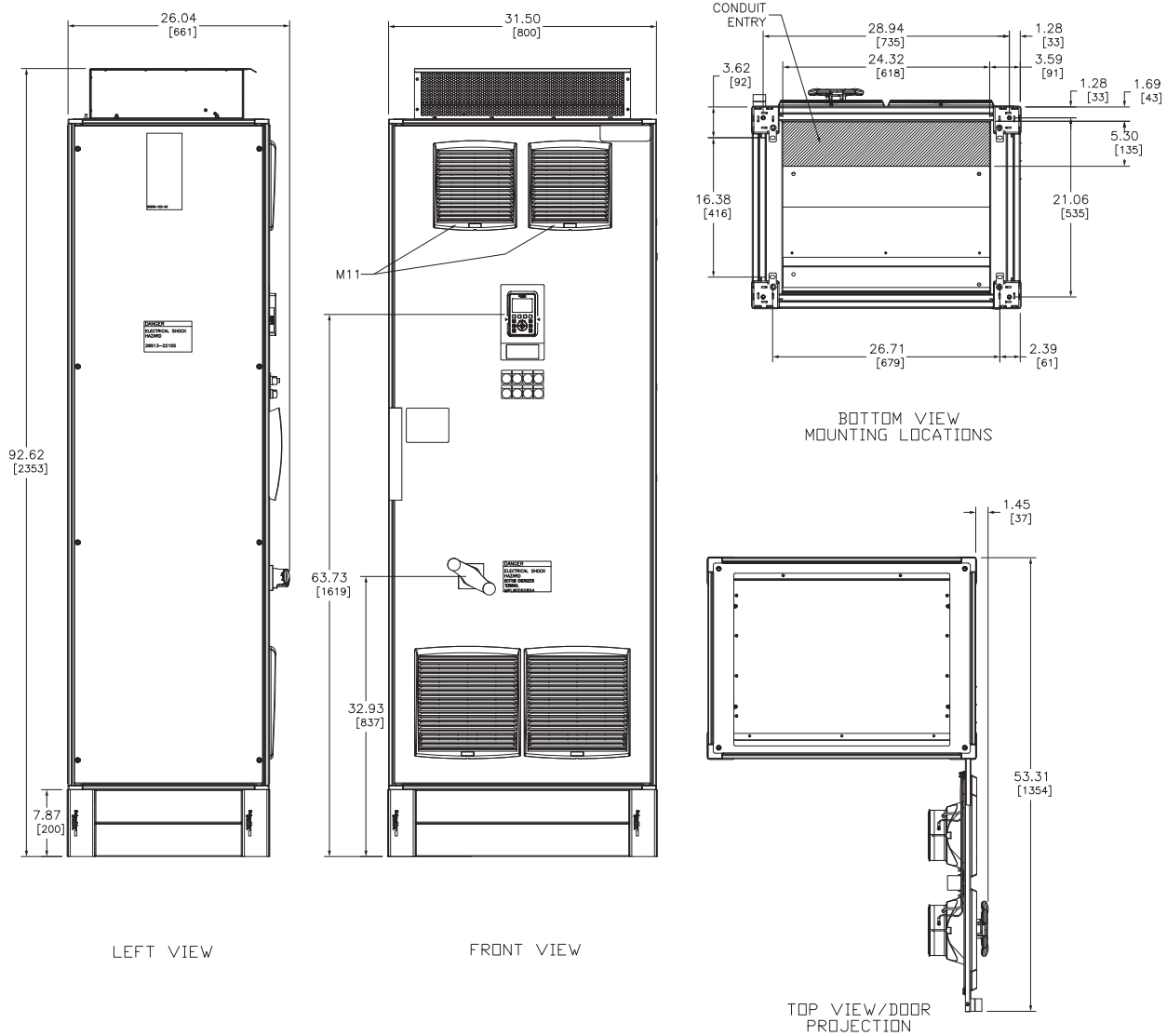


Table 22 – Overall Dimensions

hp (Normal Duty)	230 V	460 V	Width		Depth		Height	
			mm	in.	mm	in.	mm	in.
1–7.5	X		413.7	16.29	557.8	21.95	810.2	31.90
1–15		X	413.7	16.29	557.8	21.95	810.2	31.90
10–15	X		413.7	16.29	557.8	21.95	1210.3	47.65
20–30		X	413.7	16.29	557.8	21.95	1210.3	47.65
20–30	X		413.7	16.29	557.8	21.95	1410.3	55.52
40–60		X	413.7	16.29	557.8	21.95	1410.3	55.52
40–60	X		400	15.75	646.6	25.46	2179	85.8
75–125		X	400	15.75	646.6	25.46	2179	85.8
150–250		X	400	15.75	646.6	25.46	2362.2	93
300–500		X	600	23.62	646.6	25.46	2362.2	93
600–700		X	800	31.50	646.6	25.46	2362.2	93
900		X	1200	47.24	646.6	25.46	2362.2	93

Section 6— Renewable Parts and Maintenance

Renewable Parts

Schneider Electric provides a limited number of renewable parts for the ATV660 Process drive. Before replacing any parts, consult your local field sales representative. Renewable parts must be installed by qualified personnel familiar with the equipment being replaced.

Table 23 – Renewable Parts

Description	Catalog Number
Ethernet IP / Modbus TCP ^[1]	VW3A3720
Profinet I/O ^[1]	VW3A3627
Profibus DP ^[1]	VW3A3607
CANopen 2XRJ45 ^[1]	VW3A3608
DeviceNet ^[1]	VW3A3609
CANopen SUB-D9 ^[1]	VW3A3618
CANopen open style with screw terminals ^[1]	VW3A3628
Extended I/O module ^[1]	VW3A3203
Extended relay module ^[1]	VW3A3204
AC coil for LC1F150	LX1FF095
AC coil for LC1F185	LX1FG095
AC coil for LC1F265	LX1FH1272
AC coil for LC1F330	LX1FH1272
AC coil for LC1F400	LX1FJ110
Pilot light, red Power On	ZB5AV04 Red pilot light head
	ZB5AV6 Mounting collar with light module
	25501-00003 LED
	65170-166-24 Power On legend plate
	ZBZ32 Legend plate holder
Pilot light, yellow Auto Mode Tripped	ZB5AV05 Amber pilot light head
	ZB5AV6 Mounting collar with light module
	25501-00004 LED
	65170-166-39 Trip legend plate or 65170-166-08 Auto legend plate
	ZBZ32 Legend plate holder
Pilot light, green AFC Run	ZB5AV03 Green pilot light head
	ZB5AV6 Mounting collar with light module
	25501-00005 LED
	65170-166-42 AFC Run legend plate
Pilot light mounting collar with light module	ZBZ32 Legend plate holder
	ZB5AV6
Pilot light mounting collar with light module, and 1 N.O. and 1 N.C. contact for p-t-t	ZB5AW065

¹ Field replacement of option boards resets the power converter to the factory defaults. You must reconfigure it per the elementary diagram provided.

Table 23 – Renewable Parts *(continued)*

Description	Catalog Number
Hand-Off-Auto selector switch assembly	ZB5AD3 Three-position selector switch
	ZB5AZ009 Mounting collar
	(2) ZBE205 Contact blocks (1 N.C. and 1 N.O.)
	65170-166-17 Hand-Off-Auto legend plate
	ZBZ32 Legend plate holder
Speed potentiometer	ATVPOT25K Speed potentiometer assembly
Stop/Start push buttons	ZB5AA2 Black push button
	ZB5AA4 Red push button
	ZB5AZ101 Mounting collar w/ contact block (1 N.O.)
	ZB5AZ102 Mounting collar w/ contact block (1 N.C.)
	65170-166-31 Start legend plate
	65170-166-09 Stop legend plate
	(2) ZBZ32 Legend plate holders
Fan with filter, 170 mm x 150 mm, 115 Vac 460 V / 1–30 hp ND, 1–25 hp HD, Type 1 & 12 230 V / 1–15 hp ND, 1–10 hp HD, Type 1 & 12	NSYCVF85M115PF
Fan with filter, 270 mm x 250 mm, 115 Vac 460 V / 40–120 hp ND, 30–100 hp HD, Type 1 & 12 230 V / 20–60 hp ND, 15–50 hp HD, Type 1 & 12	NSYCVF300M115PF
Fan filter, 170 mm x 150 mm 460 V / 1–30 hp ND, 1–25 hp HD 230 V / 1–15 hp ND, 1–10 hp HD	NSYCAF125
Fan filter, 270 mm x 250 mm 460 V / 40–900 hp ND, 30–700 hp HD 230 V / 20–60 hp ND, 15–50 hp HD	NSYCAF223
Enclosure grill filter, 270 mm x 250 mm 460 V / 150–250 hp ND, 125–200 hp HD	NSYCAF223
Power electronic fan kit, 48 Vdc 460 V / 150–900 hp ND 125–700 hp HD	VX5VPM001
Enclosure door fan, 270 mm x 250 mm, 48 Vdc 460 V / 150–900 hp ND 125–700 hp HD	VX5VPM002
Door fan, 320 mm x 320 mm (when supplied)	11677154055
Door fan filter, 320 mm x 320 mm, pack of 5	18611600037
Roof fan, 470 mm x 470 mm (when supplied)	11681152055
Roof fan filter, 470 mm x 470 mm, pack of 20	18611600039
Advanced drive keypad	VW3A1111
Remote keypad adapter	VW3A1112

Table 23 – Renewable Parts *(continued)*

Shading designates renewable parts that are only available through Schneider Electric Services. Contact Schneider Electric for these parts.

Description	Catalog Number
ATV600 control block, all ratings	VX4B600100
RFI filter board, 460 V / 150–900 hp ND 125–700 hp HD	VX4FPMC1180N4
Inverter board, 460 V / 150 hp (110 kW)	VX4IPMC11N4
Inverter board, 460 V / 200 hp (132 kW)	VX4IPMC13N4
Inverter board, 460 V / 250 hp (160 kW)	VX4IPMC16N4
Power board, 460 V / 150–900 hp ND, 125–700 hp HD	VX4PPMC1180N4
Supply board, 460 V / 110–630 kW 460 V / 150–900 hp ND, 125–700 hp HD	VX4XPMC1180N4
Connection cables, CMP6 to CMI1	VX5XPM001
DC supply for fans, 48 Vdc	VX5XPM002
Inverter Brick 460 V / 150–250 hp	VX5IBPMC1116N4
Rectifier Brick 460 V / 150–250 hp	VX5RBPMC1116N4
Fuse set, 3 pcs, 250 A, URD30 460 V / 125 hp HD, 150 hp ND, 250 hp HD, 300 hp ND	VX5FUPM0250
Fuse set, 3 pcs, 315 A, URD30 460 V / 150 hp HD, 200 hp ND, 300 hp HD, 400 hp ND, 500 hp HD, 600 hp ND	VX5FUPM0315
Fuse set, 3 pcs, 350 A, URD30 460 V / 200 hp HD, 250 hp ND, 400 hp HD, 500 hp ND, 600 hp HD, 700 hp ND, 700 hp HD, 900 hp ND	VX5FUPM0350
Primary control fuses standard 460 V, Type 1 and 12	25430-20100 (no bypass 125 hp and lower, bypass 15 hp and lower)
	25430-20250 (bypass 20–125 hp)
	25430-20320 (any 150–500 hp)
	25430-20700 (any 600–900 hp)
Secondary control fuses standard 460 V, Type 1 and 12	25430-20140 (no bypass 125 hp and lower, bypass 15 hp and lower)
	25430-20350 (bypass 20–125 hp)
	25430-20400 (any 150–250 hp)
	25430-20700 (any 300–500 hp)
	25430-21000 (any 600–900 hp)
Primary control fuses standard 460 V with Mod K14 (additional 150 VA), Type 1 and 12	25430-20250 (no bypass 125 hp and lower, bypass 15 hp and lower)
	25430-20500 (bypass 20–125 hp)
	25430-20320 (any 150–250 hp and 900 hp)
	25430-20700 (any 300–500 hp)
	25430-21000 (any 600–900 hp)

Table 23 – Renewable Parts *(continued)*

Description	Catalog Number
Secondary control fuses standard 460 V with Mod K14 (additional 150 VA), Type 1 and 12	25430-20350 (no bypass 125 hp and lower, bypass 15 hp and lower)
	25430-20700 (bypass 20–125 hp)
	25430-20400 (any 150–250 hp)
	25430-20700 (any 300–500 hp)
	25430-21000 (any 600–900 hp)
	25430-20500 (900 hp)
Primary control fuses standard 460 V, Type 3R	25430-20500 (any 125 hp and lower)
Secondary control fuses standard 460 V, Type 3R	25430-20700 (any 125 hp and lower)
Primary control fuses standard 460 V with Mod K14 (additional 150 VA), Type 3R	25430-20500 (no bypass 125 hp and lower bypass 60 hp and lower)
	25430-20800 (bypass 70–125hp)
Secondary control fuses standard 460 V with Mod K14 (Additional 150 VA), Type 3R	25430-20700 (no bypass 125 hp and lower, bypass 60 hp and lower)
	25430-21000 (bypass 70–125 hp)
Primary control fuses standard 230 V, Type 1 and 12	25430-20200 (no bypass, bypass 15 hp and lower)
	25430-20500 (bypass 20 hp and up)
Secondary control fuses standard 230 V, Type 1 and 12	25430-20140 (no bypass, bypass 15 hp and lower)
	25430-20350 (bypass 20 hp and up)
Primary control fuses standard 230 V with Mod K14 (additional 150 VA), Type 1 and 12	25430-20500 (no bypass 60 hp and lower bypass 7.5 hp and lower)
	25430-20350 (bypass 10 hp and up)
Secondary control fuses standard 230 V with Mod K14 (additional 150 VA), Type 1 and 12	25430-20350 (no bypass 60 hp and lower bypass 7.5 hp and lower)
	25430-20700 (bypass 10 hp and up)
Primary control fuses standard 230 V, Type 3R	25430-20350 (any 60 hp and lower)
Secondary control fuses standard 230 V, Type 3R	25430-20700 (any 60 hp and lower)
Primary control fuses standard 230 V with Mod K14 (additional 150 VA), Type 3R	25430-20350 (no bypass 60 hp and lower, bypass 30 hp and lower)
Secondary control fuses standard 230 V with Mod K14 (additional 150 VA), Type 3R	25430-20700 (no bypass 60 hp and lower, bypass 30 hp and lower)
	25430-21000 (bypass 40 hp and up)
Power converter normal duty 1h p, 230 V	ATV630U07M3
Power converter normal duty 2 hp, 230 V	ATV630U15M3
Power converter normal duty 3 hp, 230 V	ATV630U22M3
Power converter normal duty 5 hp, 230 V	ATV630U40M3
Power converter normal duty 7.5 hp, 230 V	ATV630U55M3
Power converter normal duty 10 hp, 230 V	ATV630U75M3
Power converter normal duty 15 hp, 230 V	ATV630D11M3
Power converter normal duty 20 hp, 230 V	ATV630D15M3
Power converter normal duty 25 hp, 230 V	ATV630D18M3
Power converter normal duty 30 hp, 230 V	ATV630D22M3

Table 23 – Renewable Parts *(continued)*

Description	Catalog Number
Power converter normal duty 40 hp, 230 V	ATV630D30M3
Power converter normal duty 50 hp, 230 V	ATV630D37M3
Power converter normal duty 60 hp, 230 V	ATV630D45M3
Power converter heavy duty 1 hp, 230 V	ATV630U15M3
Power converter heavy duty 2 hp, 230 V	ATV630U22M3
Power converter heavy duty 3 hp, 230 V	ATV630U30M3
Power converter heavy duty 5 hp, 230 V	ATV630U55M3
Power converter heavy duty 7.5 hp, 230 V	ATV630U75M3
Power converter heavy duty 10 hp, 230 V	ATV630D11M3
Power converter heavy duty 15 hp, 230 V	ATV630D15M3
Power converter heavy duty 20 hp, 230 V	ATV630D18M3
Power converter heavy duty 25 hp, 230 V	ATV630D22M3
Power converter heavy duty 30 hp, 230 V	ATV630D30M3
Power converter heavy duty 40 hp, 230 V	ATV630D37M3
Power converter heavy duty 50 hp, 230 V	ATV630D45M3
Power converter normal duty 1 hp, 460 V	ATV630U07N4
Power converter normal duty 2 hp, 460 V	ATV630U15N4
Power converter normal duty 3 hp, 460 V	ATV630U22N4
Power converter normal duty 5 hp, 460 V	ATV630U40N4
Power converter normal duty 7.5 hp, 460 V	ATV630U55N4
Power converter normal duty 10 hp, 460 V	ATV630U75N4
Power converter normal duty 15 hp, 460 V	ATV630D11N4
Power converter normal duty 20 hp, 460 V	ATV630D15N4
Power converter normal duty 25 hp, 460 V	ATV630D18N4
Power converter normal duty 30 hp, 460 V	ATV630D22N4
Power converter normal duty 40 hp, 460 V	ATV630D30N4
Power converter normal duty 50 hp, 460 V	ATV630D37N4
Power converter normal duty 60 hp, 460 V	ATV630D45N4
Power converter normal duty 75 hp, 460 V	ATV630D55N4
Power converter normal duty 100 hp, 460 V	ATV630D75N4
Power converter normal duty 125 hp, 460 V	ATV630D90N4
Power converter heavy duty 1 hp, 460 V	ATV630U15N4
Power converter heavy duty 2 hp, 460 V	ATV630U22N4
Power converter heavy duty 3 hp, 460 V	ATV630U30N4
Power converter heavy duty 5 hp, 460 V	ATV630U55N4
Power converter heavy duty 7.5 hp, 460 V	ATV630U75N4
Power converter heavy duty 10 hp, 460 V	ATV630D11N4
Power converter heavy duty 15 hp, 460 V	ATV630D15N4
Power converter heavy duty 20 hp, 460 V	ATV630D18N4
Power converter heavy duty 25 hp, 460 V	ATV630D22N4
Power converter heavy duty 30 hp, 460 V	ATV630D30N4
Power converter heavy duty 40 hp, 460 V	ATV630D37N4
Power converter heavy duty 50 hp, 460 V	ATV630D45N4

Table 23 – Renewable Parts *(continued)*

Description	Catalog Number
Power converter heavy duty 60 hp, 460 V	ATV630D55N4
Power converter heavy duty 75 hp, 460 V	ATV630D75N4
Power converter heavy duty 100 hp, 460 V	ATV630D90N4

Maintenance Intervals

Table 24 – Recommended Maintenance Intervals¹

Component	Interval:	
	In Operating Hours	In Years
Power part fan	35,000	4
Enclosure door fan	35,000	4
Filter mats	—	Clean once every six months, replace all every four years.

¹ Intervals are from date of commissioning and may vary depending on the ambient conditions.

Servicing the Front Fan Filters (without Rain Hood)

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E®, CSA Z462, NOM-029-STPS, and other applicable regulations defining safe electrical work practices.
- This equipment must only be installed and serviced by qualified electrical personnel.
- Turn off all power supplying this equipment before working on or inside equipment.
- Always use a properly rated voltage sensing device to confirm power is off.
- Replace all devices, doors, and covers before turning on power to this equipment.

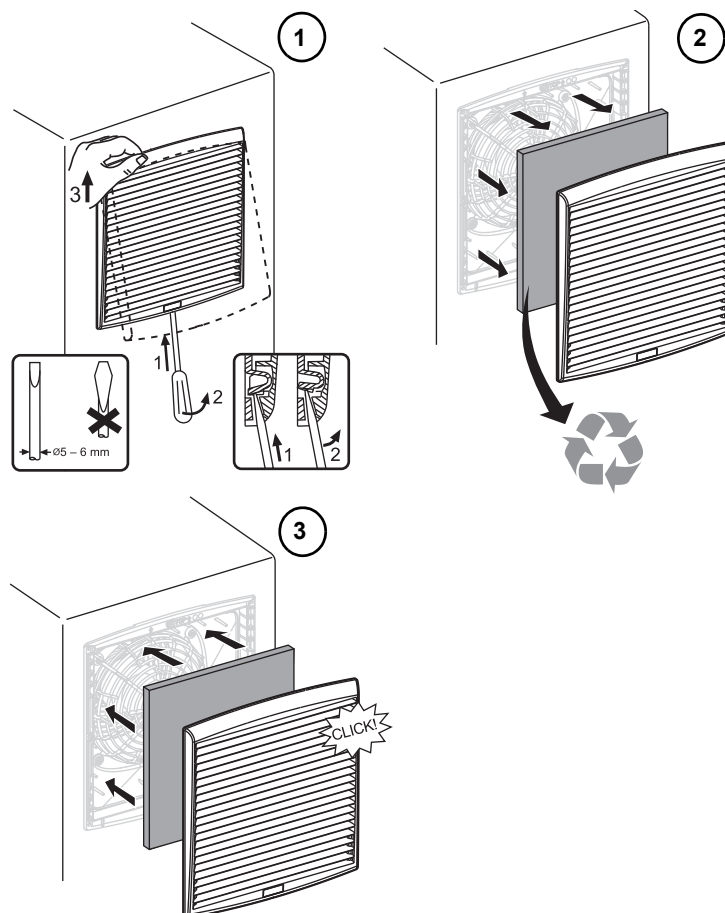
Failure to follow these instructions will result in death or serious injury.

The ATV660 process drive includes filtered forced air ventilation that prevents excess dust or debris from entering the enclosure. The filters require periodic maintenance and replacement. Replacement or cleaning of filters is suggested once every six months at minimum, but the frequency may increase depending on a number of environmental factors. Select a maintenance cycle that is appropriate for your installation conditions.

1. Remove all power from the enclosed drive.
2. Turn the circuit breaker and handle assembly to the Off position and open the enclosure door.
3. Test for the absence of voltage.

NOTE: Verify that the voltage tester is functioning properly before and after testing for the absence of voltage.

4. Unlock the air outlet grill with a flat head screwdriver and lift the grill to the top. See Figure 28.
5. Remove the grill and filter mat. Discard the filter mat.
6. Press the air outlet grill and the new filter mat into the cut out until it locks with an audible noise.

Figure 28 – Changing Front Filters

Servicing the Exhaust Fan Filter

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E®, CSA Z462, NOM-029-STPS, and other applicable regulations defining safe electrical work practices.
- This equipment must only be installed and serviced by qualified electrical personnel.
- Turn off all power supplying this equipment before working on or inside equipment.
- Always use a properly rated voltage sensing device to confirm power is off.
- Replace all devices, doors, and covers before turning on power to this equipment.

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

Service of the exhaust filter is typically not required unless environmental conditions are especially dusty or the equipment has not been operated for an extended period of time. To access the exhaust fan filter:

1. Remove all power from the enclosed drive.
2. Turn the circuit breaker and handle assembly to the Off position and open the enclosure door.
3. Test for the absence of voltage.

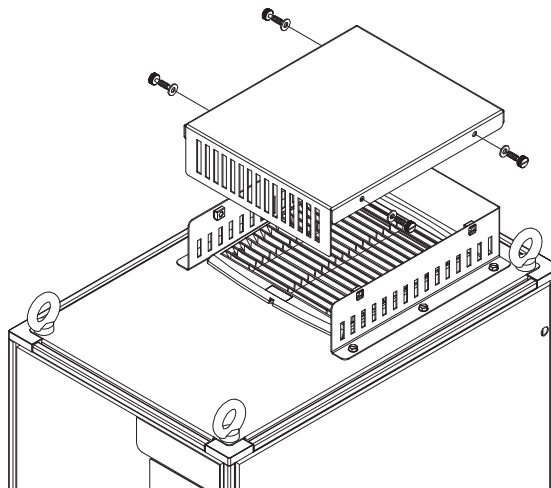
NOTE: Verify that the voltage tester is functioning properly before and after testing for the absence of voltage.

4. For Type 3R equipment, refer to “Accessing the Lifting Brackets” on page 21 and follow the instructions for removing the rain hood.

For Type 12 equipment, remove the vent grill as illustrated in Figure 29.

5. Service (clean or replace) the exhaust fan filter following the instructions on page 68 for the front filters. Always replace the rain hood or top cover and thumb screws after cleaning or replacing the filter.

Figure 29 – Accessing the Exhaust Fan Filters on Type 12 Equipment



Replacing the Door Fans

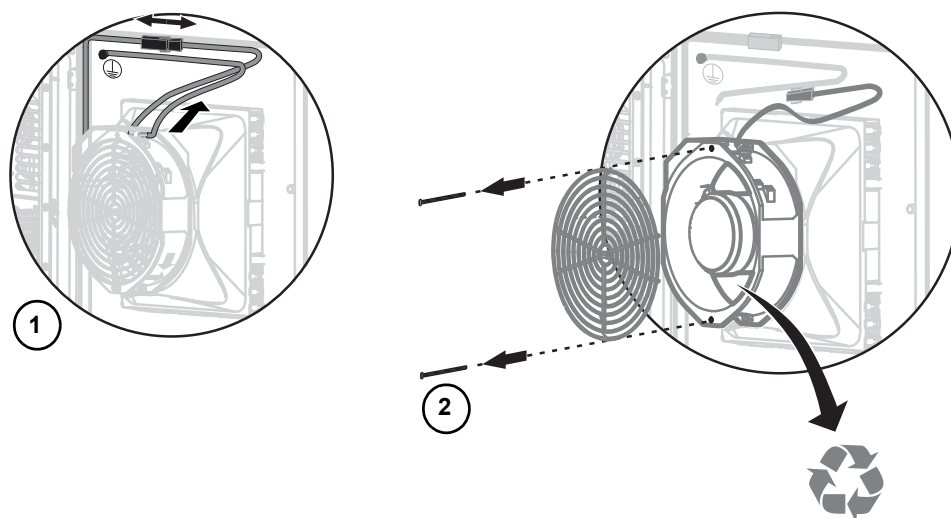
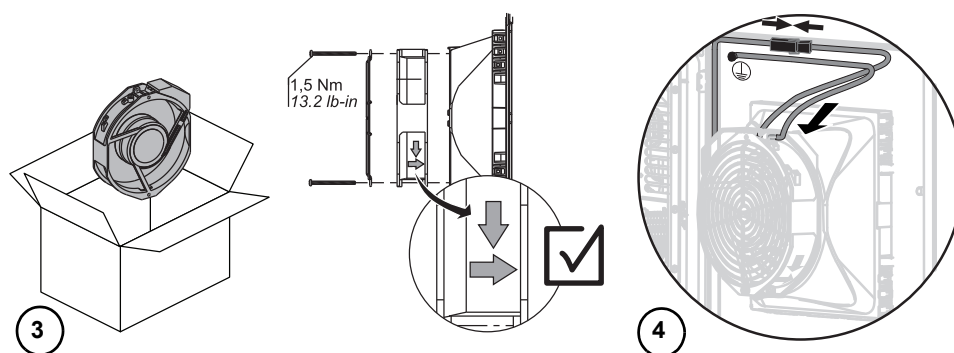
⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E®, CSA Z462, NOM-029-STPS, and other applicable regulations defining safe electrical work practices.
- This equipment must only be installed and serviced by qualified electrical personnel.
- Turn off all power supplying this equipment before working on or inside equipment.
- Always use a properly rated voltage sensing device to confirm power is off.
- Replace all devices, doors, and covers before turning on power to this equipment.

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

1. Remove all power from the enclosed drive.
2. Turn the circuit breaker and handle assembly to the Off position and open the enclosure door.
3. Test for the absence of voltage.
NOTE: Verify that the voltage tester is functioning properly before and after testing for the absence of voltage.
4. Remove the grounding cable and disconnect the fan's power supply. See Figure 30 on page 72.
5. Remove two screws, lift the grill from the fan, and remove the fan from the housing. Discard the fan but save the grill and screws to reinstall with the new fan.
6. Position the new fan so that the direction arrows point to the fan housing. Affix the fan and grill to the housing using the two screws. See Figure 31 on page 72.
7. Reconnect the fan's power supply and the grounding cable.

Figure 30 – Removing the Door Fan**Figure 31 – Installing the New Door Fan**

Replacing the Power Fan

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

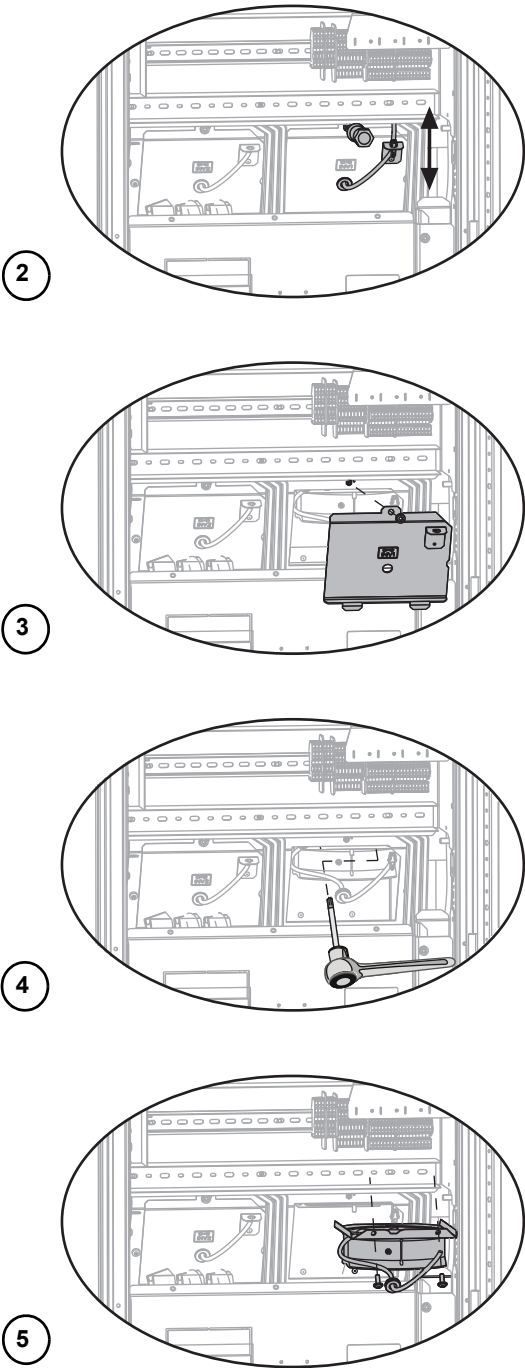
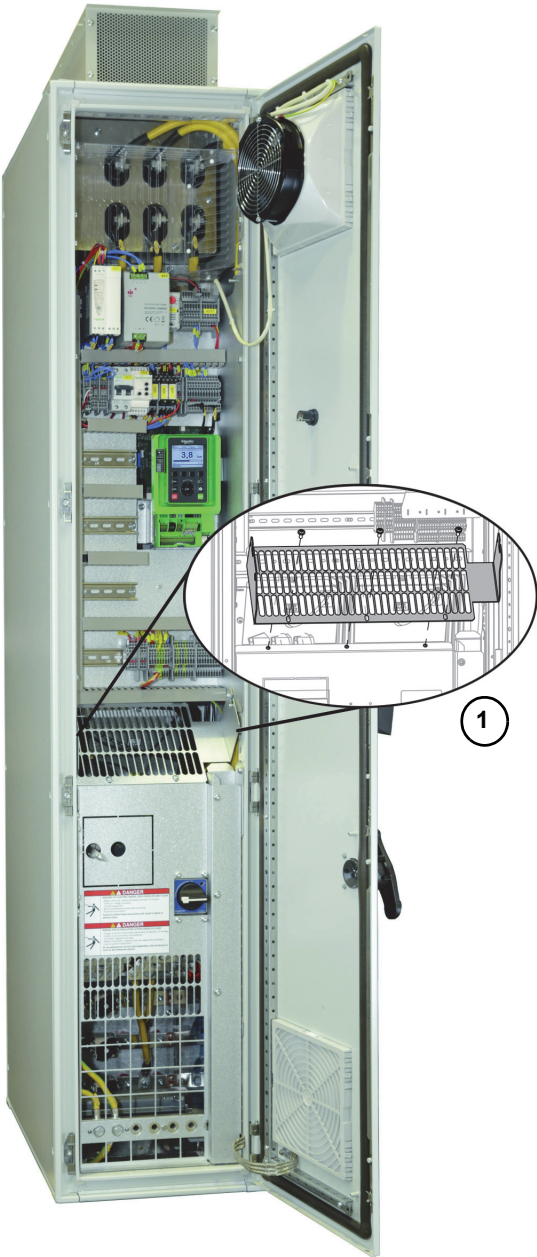
- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E®, CSA Z462, NOM-029-STPS, and other applicable regulations defining safe electrical work practices.
- This equipment must only be installed and serviced by qualified electrical personnel.
- Turn off all power supplying this equipment before working on or inside equipment.
- Always use a properly rated voltage sensing device to confirm power is off.
- Replace all devices, doors, and covers before turning on power to this equipment.

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

To replace the power fan on 150 hp devices and higher (see Figure 32 on page 74):

1. Remove all power from the enclosed drive.
2. Turn the circuit breaker and handle assembly to the Off position and open the enclosure door.
3. Test for the absence of voltage.
NOTE: Verify that the voltage tester is functioning properly before and after testing for the absence of voltage.
4. Loosen the screws from the fan's protective cover, if provided.
5. Disconnect the power cable from the fan and the protective cover. Loosen the Torx® screw from the cover.
6. Swivel the fan cover forward and remove it from the anchorage. Press the power cable, including the grommet, through the middle hole in the fan cover. Remove the fan cover.
7. Loosen the two M6 Torx screws at the fan housing.
8. After loosening the Torx screws, pull the fan to the front.
9. Install the new fan by following the preceding steps in reverse order. Secure the fan with the two M6 Torx screws. Torque the screws to 49 lb-in (5.5 N•m).

Figure 32 – Installing the Power Fan



Technical Support

For product post sale technical support please contact the Drive Products Support Group between the hours of 8:00 am and 8:00 pm Eastern time.

EMERGENCY technical phone support is available for inoperable machinery 24 hours a day, 365 days a year.

Toll free	1-888-778-2733 Option # 1 (Technical Support) and then Option # 4 (AC Drives and Soft Starters)
E-mail	drive.products.support@schneider-electric.com
Fax	919-217-6508

ENGLISH

Appendix A—Zelio™ Smart Relay Ladder Logic

The Zelio Smart Relay controls the power converter's output contactor and the bypass contactor when Bypass (Mod Y10) is selected. Figure 33 on pages 78–79 contains a diagram of the default Zelio Smart Relay program and Table 25 is a timing chart.

Custom requests may result in a program that differs from the one illustrated in Figure 33. If you have requested custom programming, review the drawings supplied with the process drive.

Table 25 – Zelio Smart Relay Ladder Logic Timers

Timer	Description	Function	Time (s)
T1	Power on delay	A: Active, control held down	6.0
T2	Open delay	C: Off delay	2.0
T3	AFC run delay	A: Active, control held down	5.0
T4	AFC contactor time delay	A: Active, control held down	3.0
T5	Bypass contactor time delay	A: Active, control held down	3.0
T6	Drive trip signal delay	A: Active, control held down	2.0
T7	Start with Line contactor	B: On pulse one shot	6.0

Figure 33 – Zelio Smart Relay Program

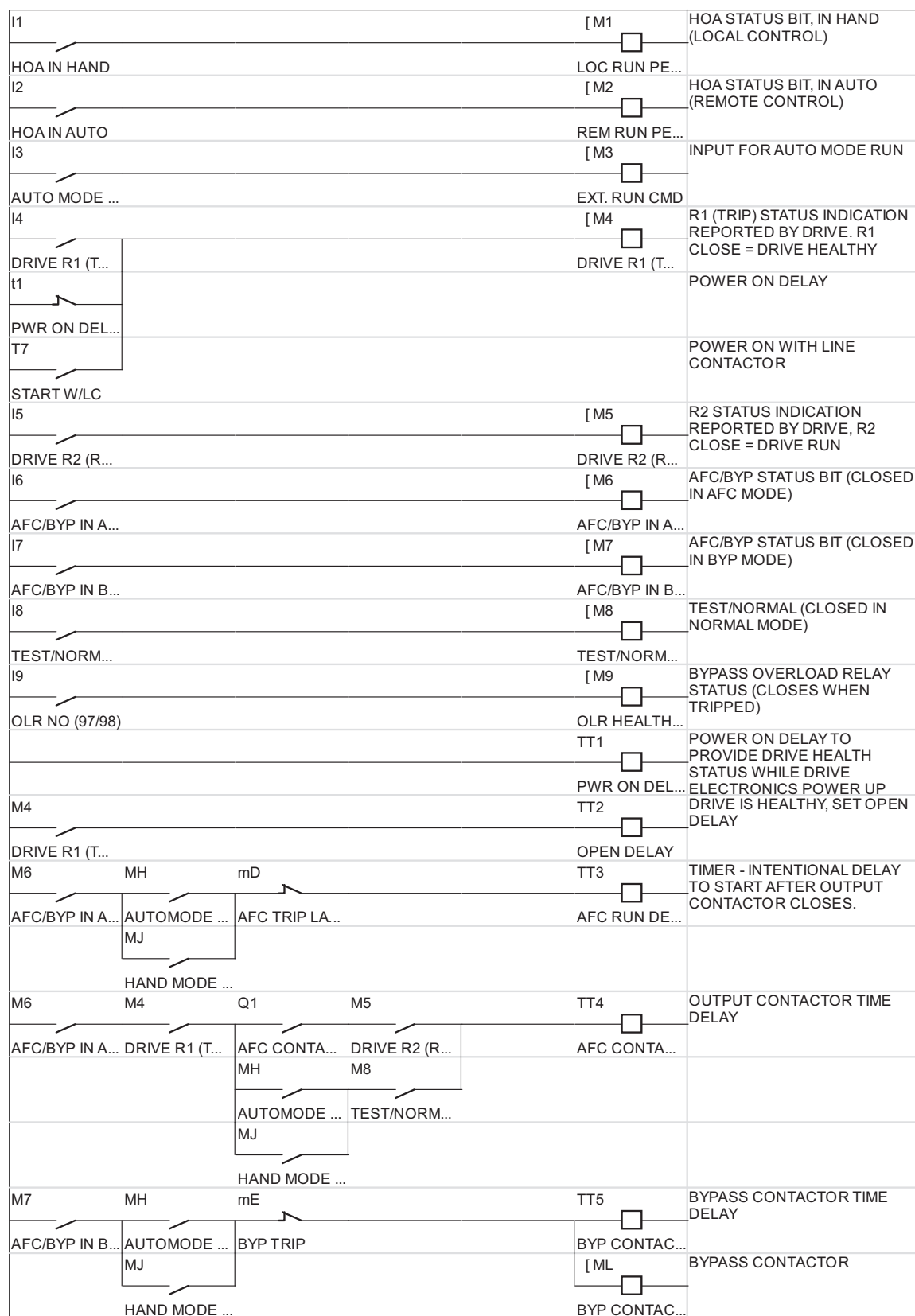
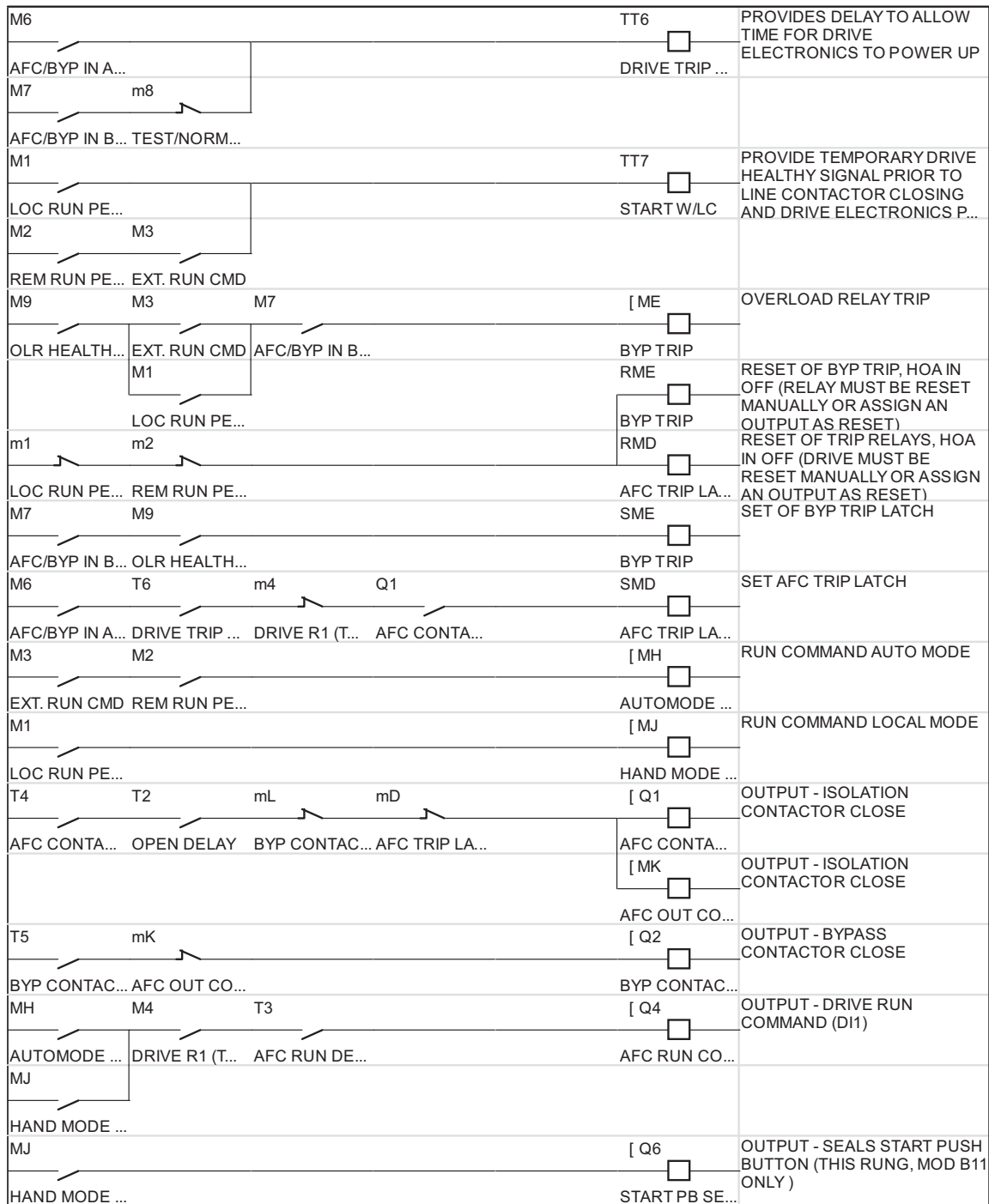


Figure 33 – Zelio Smart Relay Program (continued)



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NHA91297 Rev. 02, 08/2016
Replaces NHA91297 Rev. 01, 03/2016