

Altivar™ 660 Process Drive

Instruction Bulletin

NHA91297
03/2016

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 NHA60296 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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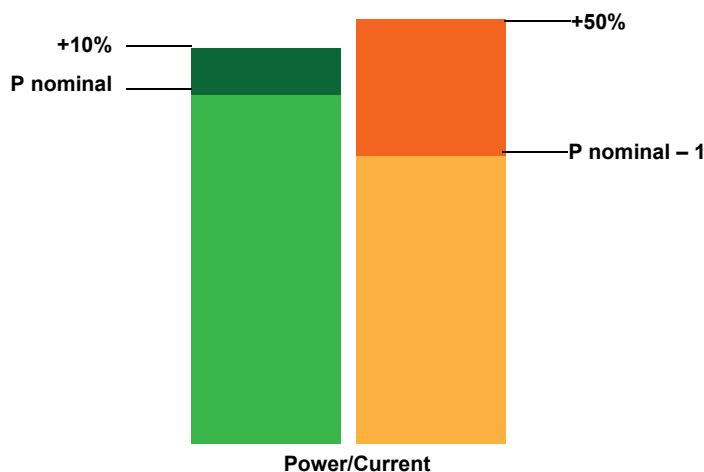
Section 1— Introduction

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*

NHA60296 contains important information on installation, operation, service, and maintenance of this product. Read NHA60296 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 to distinguish between the ATV660 Process Drive, the Altivar 630 (ATV630) open style drive, and application specific modes:

- 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, as used in this manual, refers to the ATV630 drive portion of the ATV660 Process Drive as defined by the National Electrical Code® (NEC®).
- 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.

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, Yellow Auto
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



Catalog Number / Numéro de Catálogo / Número de Catalogue ATV660D22T4N2ANWAANAGK		Volts 460 +10% / -15% Phase / Fase / Phase F (Hz) 60 Max Input Amps 21 Max Output Amps Series / Series / Series A Ambient Temp/ Temp Ambiente / Temp Ambiante 40°C
Short Circuit Current Rating (SCCR), RMS, Symmetrical Corriente Nominal de Cortocircuito (SCCR), Simétricos RCM Courant Nominal de Court-circuit (SCCR), RMS, Symétriques 100 KA		
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 / Cablage D’Alimentacion AWG Torque / Par de apriete / Couple de Serrage Line / Línea / Ligne #14-10 / #8-2/0 50 lb-in / 120 lb-in Load / Carga / Charge #12-4 26 lb-in		Wire Type and Temp Tipo y Temp de Conductor Type et Temp de Fil Cu 75 C
 by Schneider Electric Reference Manuals / Manual de Referencia / Manuel 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 mains 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	+14 to +104 °F (-10 to +40 °C), Type 1/12; +14 to +122 °F (-10 to +50 °C), Type 3R
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 or 3 per NEMA ICS-1 Annex A and IEC 60664-1
Operational test vibration	Conforming to IEC 60721-3-3-3M3 amplitude 1.5 mm peak to peak from 3–13 Hz 1 g from 13–200 Hz
Transit shock test	Conforming to National Safe Transit Association and International Safe Transit Association test for packages.
Operational shock	15 g, 11 ms
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) Softstarter: 1–60 s (definition in 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)

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.

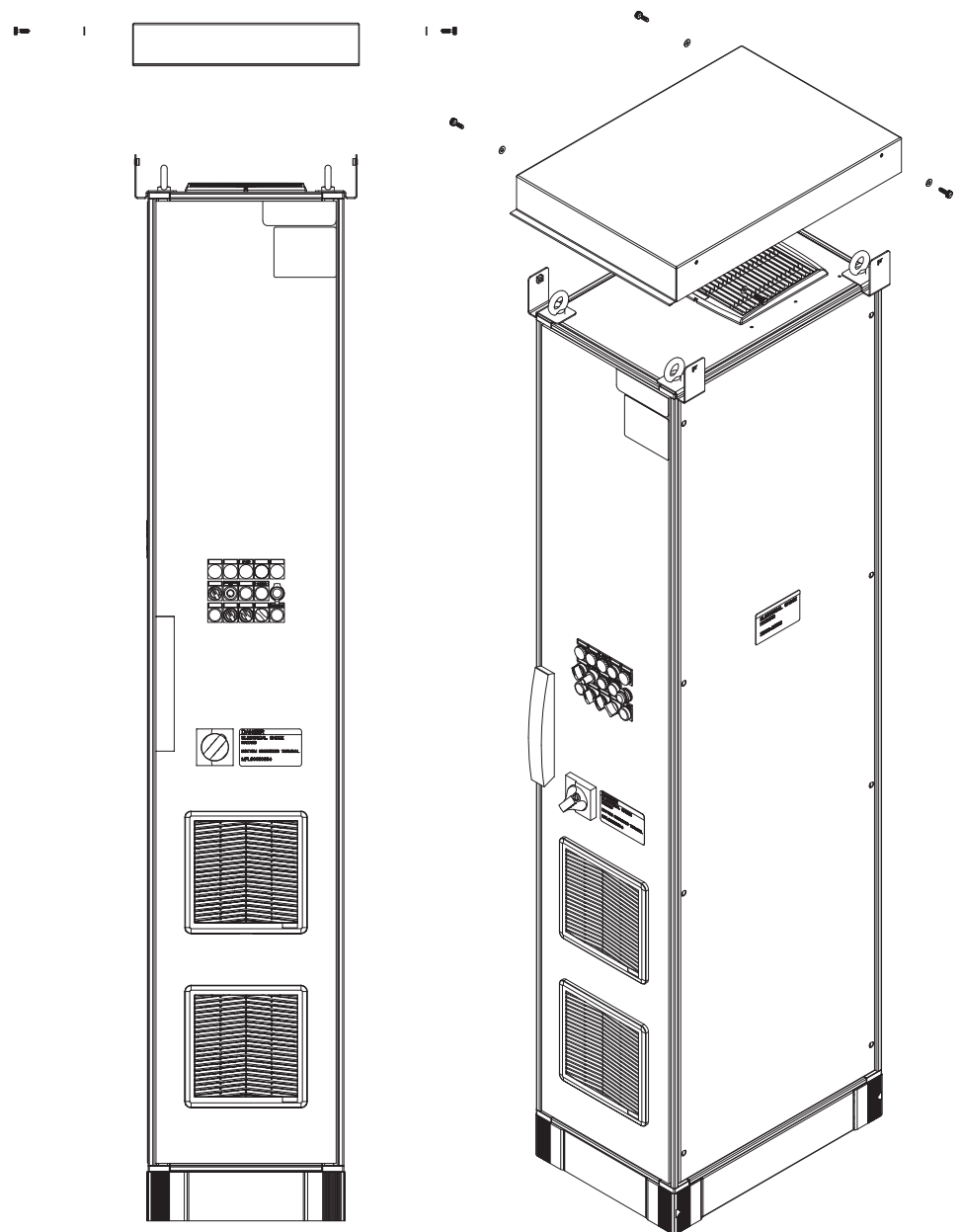
Table 8 – Approximate Weight by Feature Set

Voltage	hp	Basic 6-Pulse 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 5 on page 21.
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 5 – 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	HLL36015	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
230	2	HLL36015	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
230	3	HLL36025	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
230	5	HLL36040	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
230	7.5	HLL36060	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
230	10	HLL36070	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
230	15	HLL36100	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
230	20	HLL36125	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
230	25	HLL36150	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
230	30	HLL36150	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
230	40–50	JLL36250	4–4/0 (21–95)	225 (25)
230	60	JLL36250	3/0–350 (95–185)	225 (25)
460	1	HLL36015	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
460	2	HLL36015	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	HLL36015	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
460	5	HLL36020	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
460	7.5	HLL36025	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
460	10	HLL36035	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
460	15	HLL36050	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
460	20	HLL36060	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
460	25	HLL36080	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
460	30	HLL36100	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
460	40	HLL36125	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
460	50	HLL36150	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
460	60	HLL36150	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
460	75	JLL36225	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
460	100	JLL36250	4–4/0 (21–95)	225 (25)
460	125	JLL36250	3/0–350 (95–185)	225 (25)
460	150–200	LLP36400U31X	(2) 2/0–500 (67–253)	275 (31)
460	250	LLP36600U31X	(2) 2/0–500 (67–253)	275 (31)
460	300	LLP36600U31X	(2) 2/0–500 (67–253)	275 (31)
460	400	PLP34080RE10	(3) 3/0–500 (95–253)	275 (31)
460	500	PLP34100RE10	(4) 3/0–500 (95–253)	275 (31)
460	600–700	PLP34120RE10	(4) 3/0–500 (95–253)	275 (31)
460	900	PLP34120RE10	(4) 3/0–500 (95–253)	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 (2.1-13)	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 (10-33)	40 (4.5)	14-8 (2.5-10)	15 (1.7)
230	15	14-10 (2.5-6)	22 (2.5)	14-4 (2.21)	44 (5)
		8-2 (10-33)	40 (4.5)	2 (33)	70 (8)
230	20	6-2 (13-33)	44 (5)	14-4 (2.21)	44 (5)
		1-1/0 (42-53)	97 (11)	2 (33)	70 (8)
230	25	6-2 (13-33)	44 (5)	10-2 (2.5-33)	75 (9)
		1-1/0 (42-53)	97 (11)	10-2 (2.5-33)	75 (9)
230	30	6-2 (13-33)	44 (5)	6-3/0 (13-95)	200 (22.5)
		1-1/0 (42-53)	97 (11)	6-3/0 (13-95)	200 (22.5)
230	40-50	4-1/0 (21-53)	88 (10)	6-3/0 (13-95)	200 (22.5)
		2/0-300 (67-151)	159 (18)	6-3/0 (13-95)	200 (22.5)
230	60	4-1/0 (21-53)	88 (10)	(1)	(1)
		2/0-300 (67-151)	159 (18)	(1)	(1)
460	1-10	14-6 (2.1-13)	15 (1.7)	14-10 (2.5-6)	15 (1.7)
460	15	14-6 (2.1-13)	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 (10-33)	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 (2.5-21)	44 (5)
		8-2 (10-33)	40 (4.5)	2 (33)	70 (8)
460	40	6-2 (13-33)	44 (5)	14-4 (2.5-21)	44 (5)
		1-1/0 (42-53)	97 (11)	2 (33)	70 (8)
460	50	6-2 (13-33)	44 (5)	10-2 (2.5-33)	75 (9)
		1-1/0 (42-53)	97 (11)	10-2 (2.5-33)	75 (9)
460	60	6-2 (13-33)	44 (5)	6-3/0 (13-95)	200 (22.5)
		1-1/0 (42-53)	97 (11)	6-3/0 (13-95)	200 (22.5)
460	75-100	4-1/0 (21-53)	88 (10)	6-3/0 (13-95)	200 (22.5)
		2/0-300 (67-151)	159 (18)	6-3/0 (13-95)	200 (22.5)
460	125	4-1/0 (21-53)	88 (10)	4-1/0 (21-53)	88 (10)
		2/0-300 (67-151)	159 (18)	2/0-300 (67-151)	159 (18)
460	150-250	(2) 4-500 (21-253)	500 (56.5)	(2) 4-500 (21-253)	500 (56.5)
460	300-500	(3) 4-500 (21-253)	500 (56.5)	(1)	(1)
460	600-700	(6) 3/0-750 (95-380)	550 (62)	(1)	(1)
460	900	(8) 3/0-750 (95-380)	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	HLL36015	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
230	2	HLL36015	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
230	3	HLL36025	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
230	5	HLL36040	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
230	7.5	HLL36060	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
230	10	HLL36070	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
230	15	HLL36100	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
230	20	HLL36125	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
230	25	HLL36150	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
230	30	HLL36150	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
230	40–50	JLL36250	4–4/0 (21–95)	225 (25)
460	1	HLL36015	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
460	2	HLL36015	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
460	3	HLL36015	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
460	5	HLL36020	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
460	7.5	HLL36025	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
460	10	HLL36035	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
460	15	HLL36050	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
460	20	HLL36060	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	HLL36080	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
460	30	HLL36100	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
460	40	HLL36125	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
460	50	HLL36150	14–10 (2.5–6)	50 (6)
			8–3/0 (10–95)	120 (14)
460	60	JLL36200	4–4/0 (21–95)	225 (25)
460	75	JLL36225	4–4/0 (21–95)	225 (25)
460	100	JLL36250	4–4/0 (21–95)	225 (25)
460	125–200	LLP36400U31X	(2) 2/0–500 (67–253)	275 (31)
460	250	LLP36600U31X	(2) 2/0–500 (67–253)	275 (31)
460	300	LLP36600U31X	(2) 2/0–500 (67–253)	275 (31)
460	400	PLP34080RE10	(3) 3/0–500 (95–253)	275 (31)
460	500	PLP34100RE10	(3) 3/0–500 (95–253)	275 (31)
460	600–700	PLP34120RE10	(4) 3/0–500 (95–253)	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 (2.1–13)	15 (1.7)	14–10 (2.5–6)	15 (1.7)
230	7.5	14–6 (2.1–13)	22 (2.5)	14–8 (2.5–10)	15 (1.7)
		8–2 (10–33)	40 (4.5)	14–8 (2.5–10)	15 (1.7)
230	10	14–10 (2.5–6)	22 (2.5)	14–4 (2.21)	44 (5)
		8–2 (10–33)	40 (4.5)	2 (33)	70 (8)
230	15	6–2 (13–33)	44 (5)	14–4 (2.21)	44 (5)
		1–1/0 (42–53)	97 (11)	2 (33)	70 (8)
230	20	6–2 (13–33)	44 (5)	10–2 (2.5–33)	75 (9)
		1–1/0 (42–53)	97 (11)	10–2 (2.5–33)	75 (9)
230	25	6–2 (13–33)	44 (5)	6–3/0 (13–95)	200 (22.5)
		1–1/0 (42–53)	97 (11)	6–3/0 (13–95)	200 (22.5)
230	30–40	4–1/0 (21–53)	88 (10)	6–3/0 (13–95)	200 (22.5)
		2/0–300 (67–151)	159 (18)	6–3/0 (13–95)	200 (22.5)
230	50	4–1/0 (21–53)	88 (10)	6–3/0 (13–95)	200 (22.5)
		2/0–300 (67–151)	159 (18)	6–3/0 (13–95)	200 (22.5)
460	1–7.5	14–6 (2.1–13)	15 (1.7)	14–10 (2.5–6)	15 (1.7)
460	10	14–6 (2.1–13)	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 (10–33)	40 (4.5)	14–8 (2.5–10)	22.1 (2.5)
460	20	14–10 (2.5–6)	22 (2.5)	14–4 (2.5–21)	44 (5)
		8–2 (10–33)	40 (4.5)	2 (33)	70 (8)
460	25–30	6–2 (13–33)	44 (5)	14–4 (2.5–21)	44 (5)
		1–1/0 (42–53)	97 (11)	2 (33)	70 (8)
460	40	6–2 (13–33)	44 (5)	10–2 (2.5–33)	75 (9)
		1–1/0 (42–53)	97 (11)	10–2 (2.5–33)	75 (9)
460	50	6–2 (13–33)	44 (5)	6–3/0 (13–95)	200 (22.5)
		1–1/0 (42–53)	97 (11)	6–3/0 (13–95)	200 (22.5)
460	60–75	4–1/0 (21–53)	88 (10)	6–3/0 (13–95)	200 (22.5)
		2/0–300 (67–151)	159 (18)	6–3/0 (13–95)	200 (22.5)
460	100	4–1/0 (21–53)	88 (10)	4–1/0 (21–53)	88 (10)
		2/0–300 (67–151)	159 (18)	2/0–300 (67–151)	159 (18)
460	125–200	(2) 4–500 (21–253)	500 (56.5)	(2) 4–500 (21–253)	500 (56.5)
460	250–400	(3) 4–500 (21–253)	500 (56.5)	(1)	(1)
460	500–600	(6) 3/0–750 (95–380)	550 (62)	(1)	(1)
460	700	(8) 3/0–750 (95–380)	550 (62)	(1)	(1)

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 (2.1–5.3)	20 (2.25)
		8 (10)	25 (2.8)
		6–4 (13–21)	35 (4)
460	1–125	14–10 (2.1–5.3)	20 (2.25)
		8 (10)	25 (2.8)
		6–4 (13–21)	35 (4)
460	150–900	8–250 (8.4–127)	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 (3.3–53.3 Al)	75 (8.5)	12–1/0 Al (3.3–53.3 Al)	50 (5.6)
		14–1/0 Cu (2.1–53.3 Cu)	75 (8.5)	14–1/0 Cu (2.1–53.3 Cu)	
460	1–60	12–1/0 Al (3.3–53.3 Al)	75 (8.5)	12–1/0 Al (3.3–53.3 Al)	50 (5.6)
		14–1/0 Cu (2.1–53.3 Cu)	75 (8.5)	14–1/0 Cu (2.1–53.3 Cu)	
230	50–60	4–300 (21.1–151)	250 (28.2)	8 (10)	40 (4.5)
				4–6 (13.3–21.1)	45 (5.1)
460	75–125	4–300 (21.1–151)	250 (28.2)	8 (10)	40 (4.5)
				4–6 (13.3–21.1)	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.C.)	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.

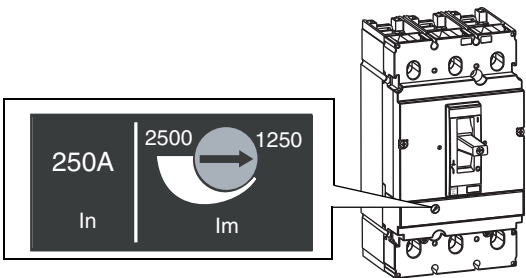
ATV630 Factory Settings

If the ATV630 drive 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 6 – 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 controller 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 7 and 8 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 7 – Routing the Remote Keypad on Floor Standing Enclosures

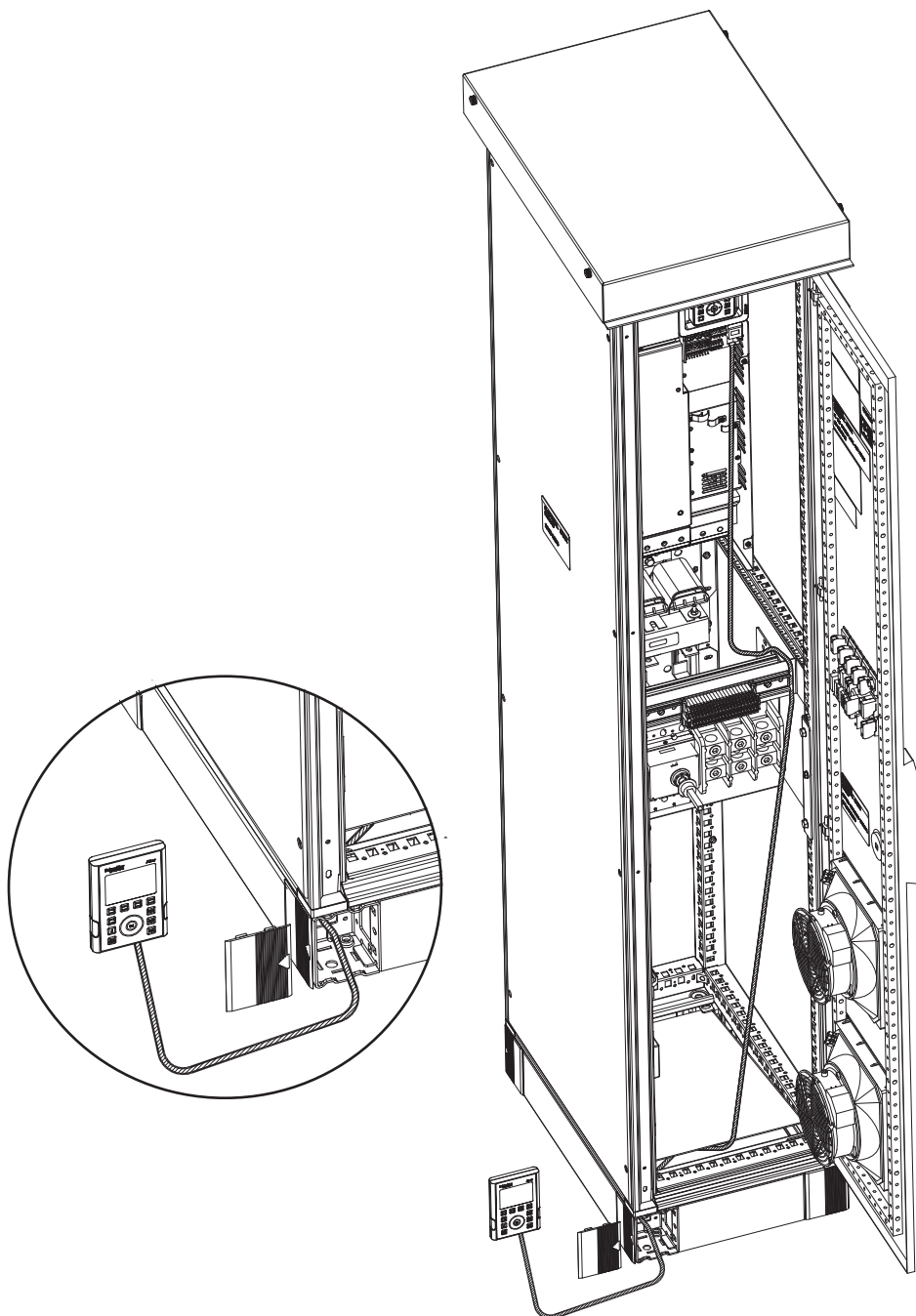
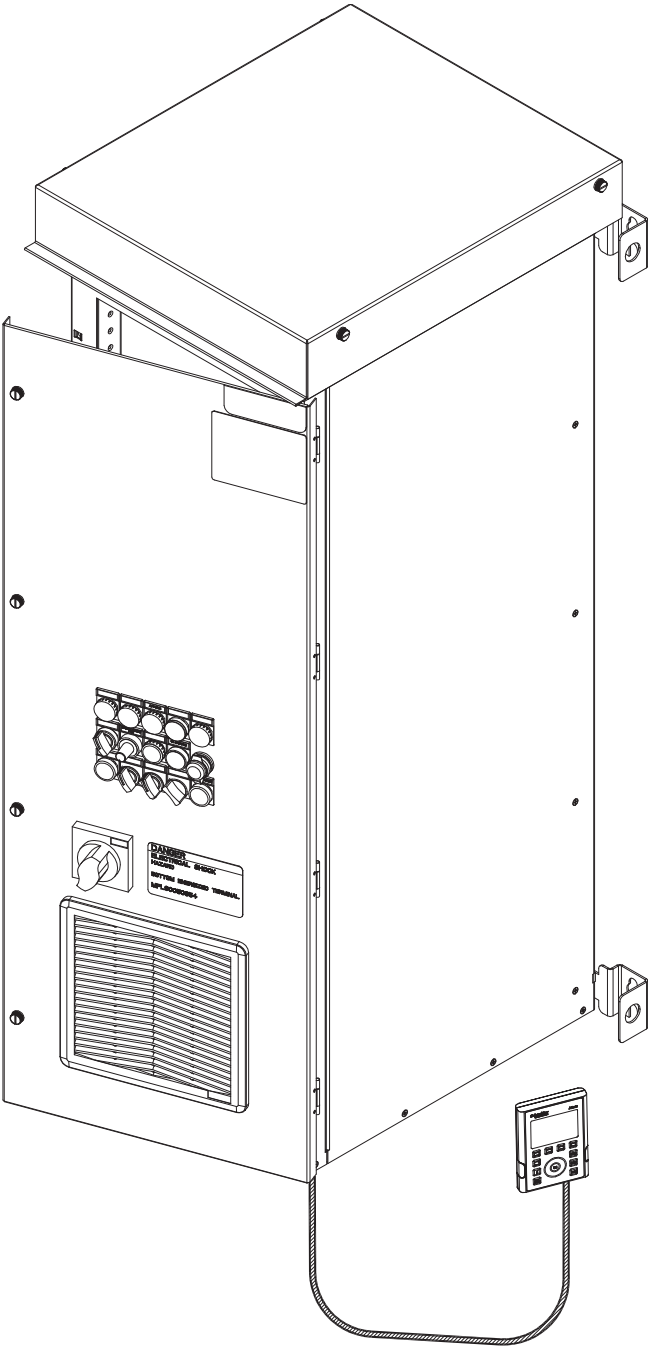


Figure 8 – Routing the Remote Keypad on Wall Mounted Enclosures



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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 mains power 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 AI1 (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 9 – Wall-Mounted Enclosures

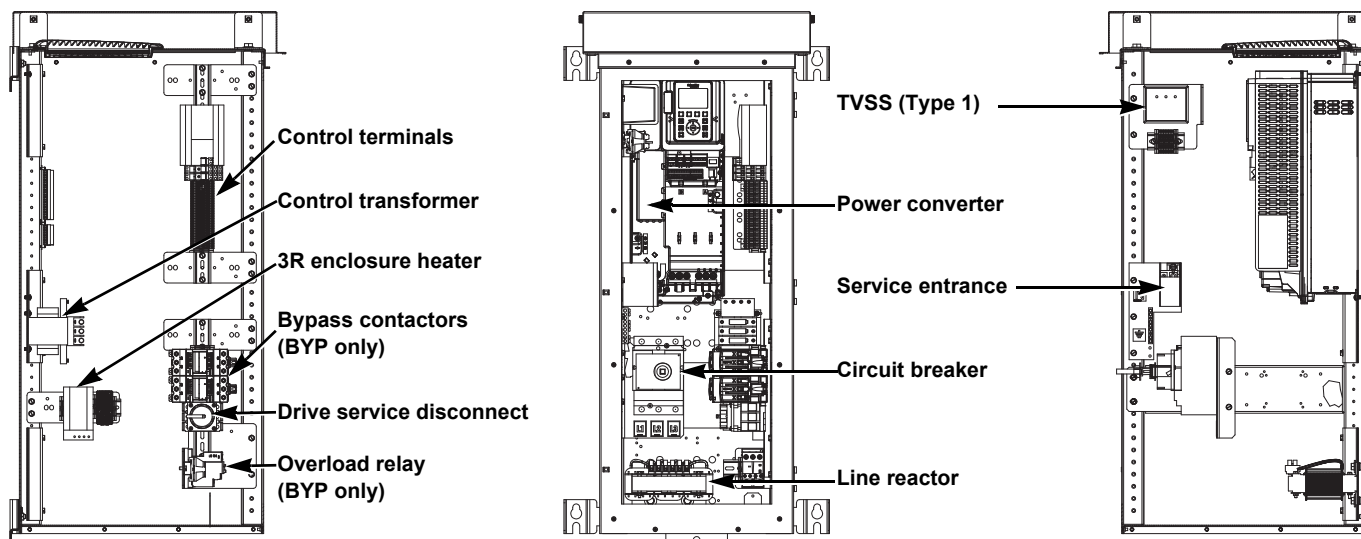
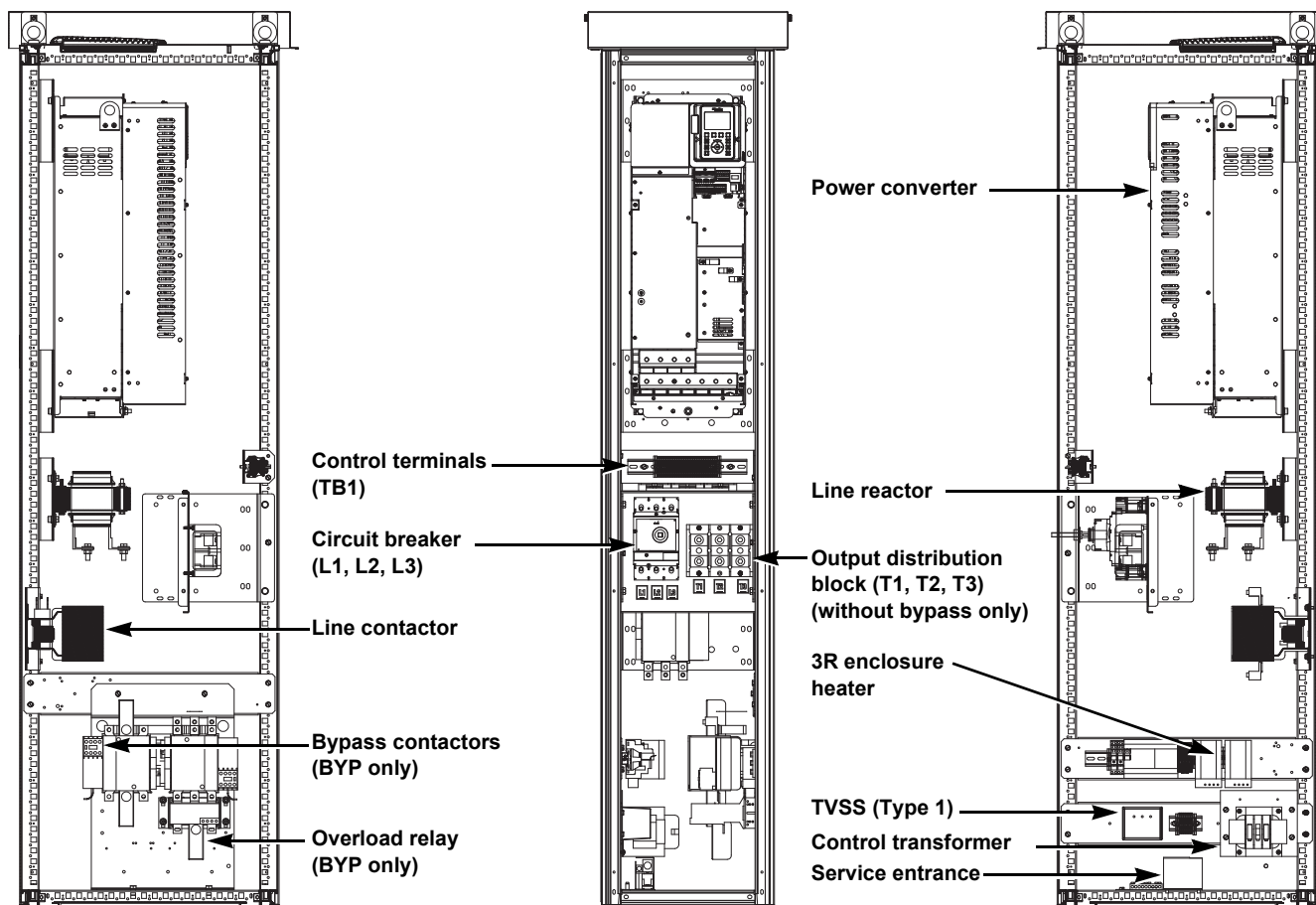


Figure 10 – Floor-Mounted Enclosures



Dimensions

Figure 11 – 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

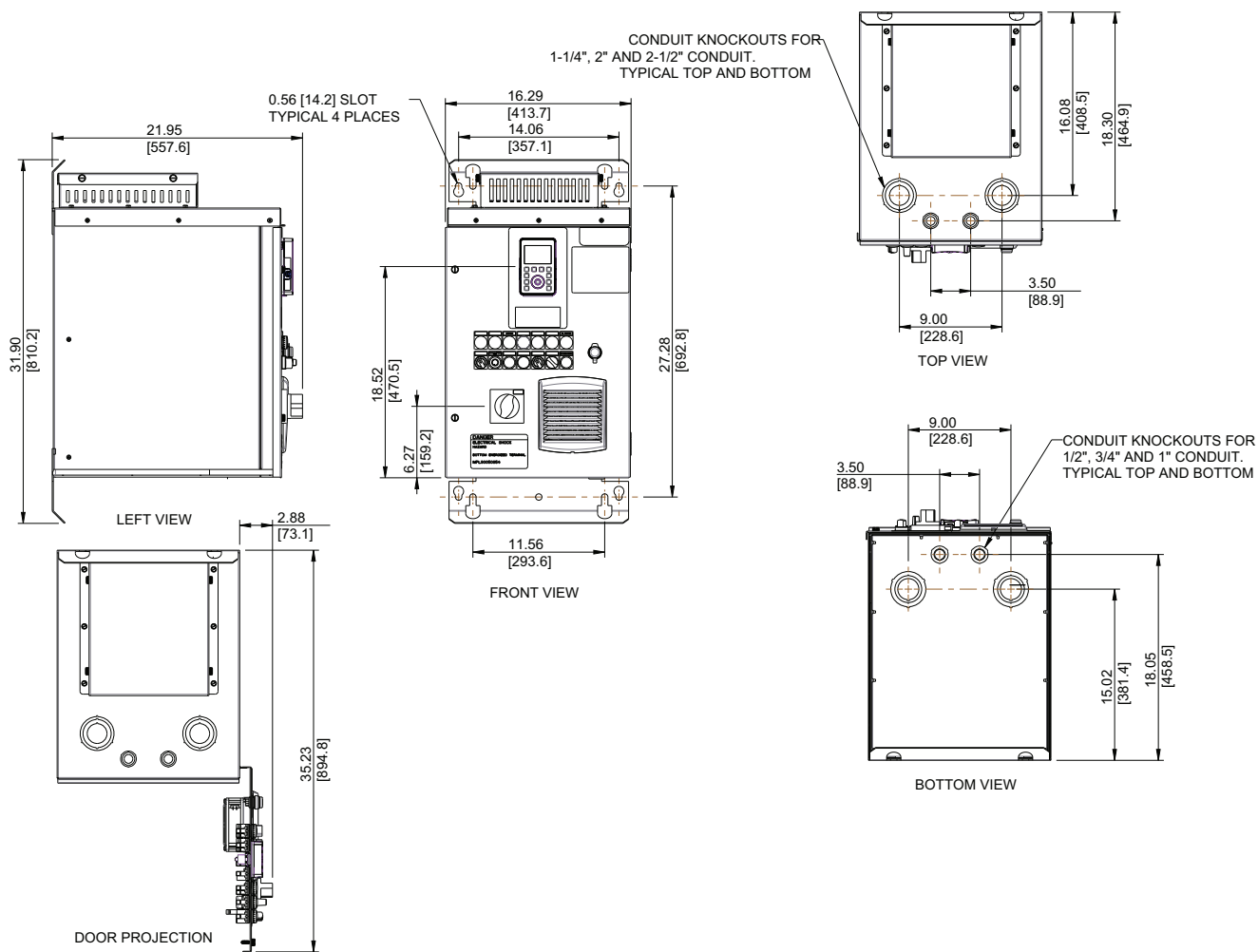


Figure 12 – 600 mm Enclosure: Standard Drive without Harmonic Filter, Type 3R

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

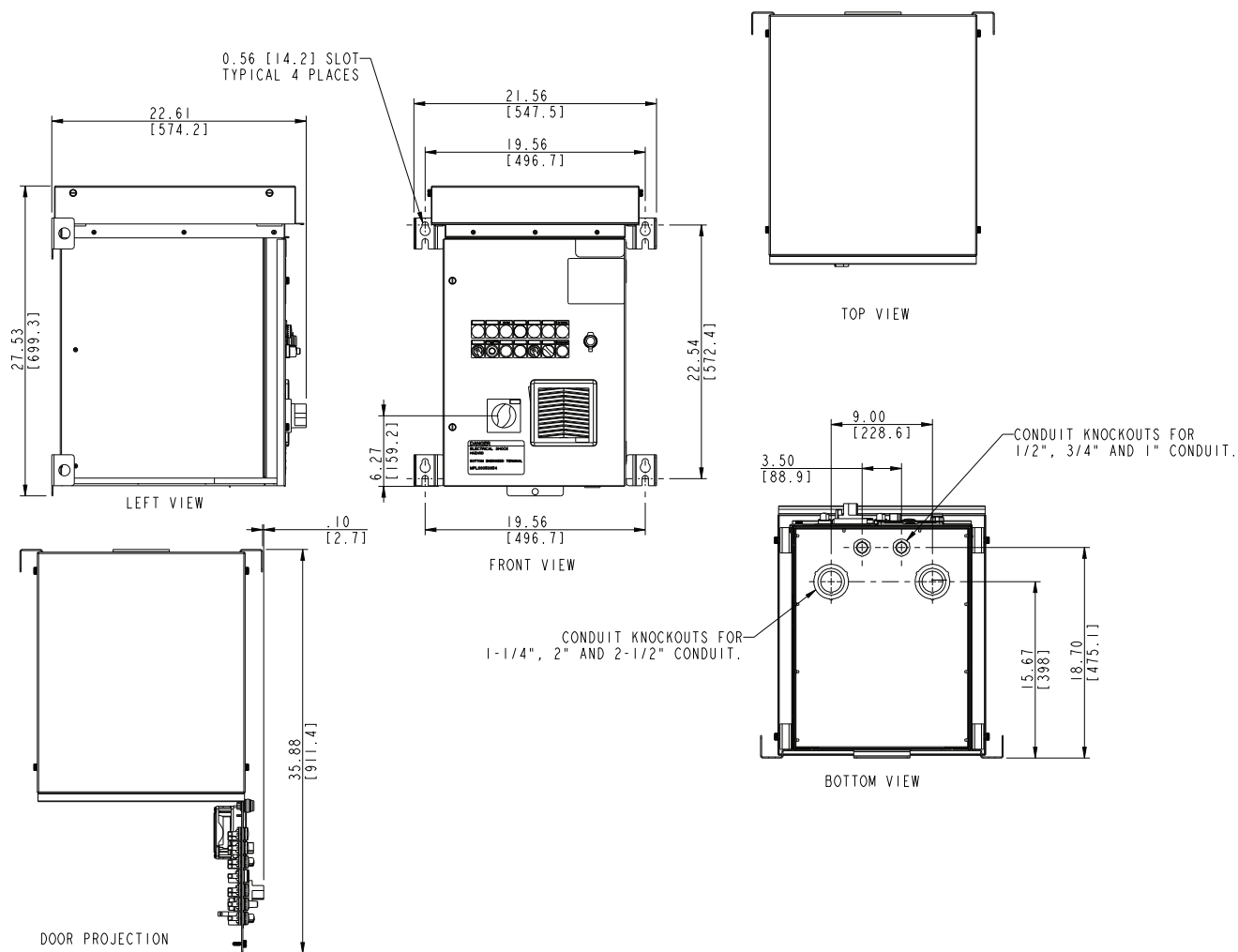


Figure 13 – 1000 mm Enclosure: Standard Drive without Harmonic Filter, Types 1 and 12

20–30 hp (15–22 kw) @ 460 V, ND
 15–25 hp (11–19 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

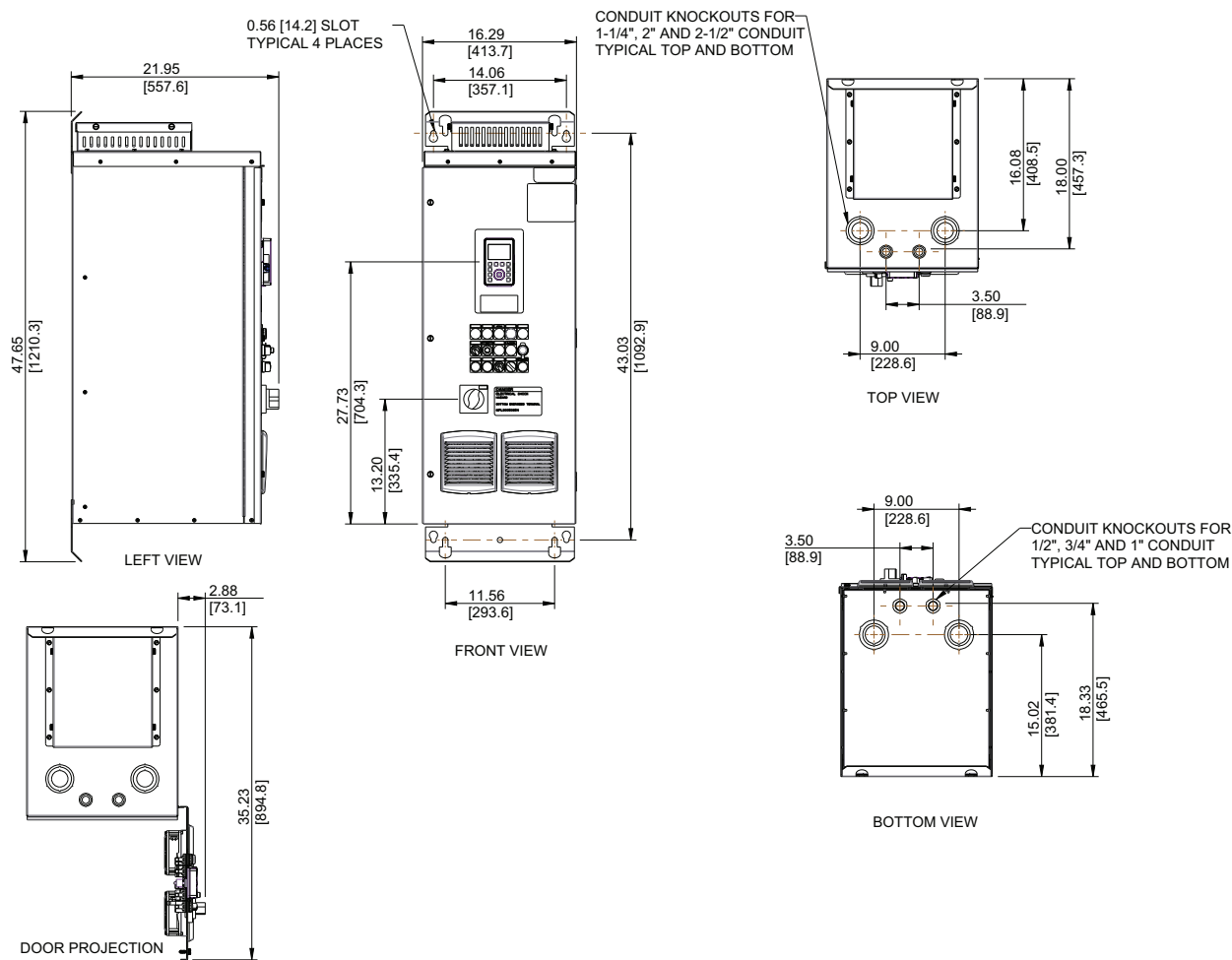


Figure 14 – 1000 mm Enclosure: Standard Drive without Harmonic Filter, Type 3R

20–30 hp (15–22 kw) @ 460 V, ND
 15–25 hp (11–19 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

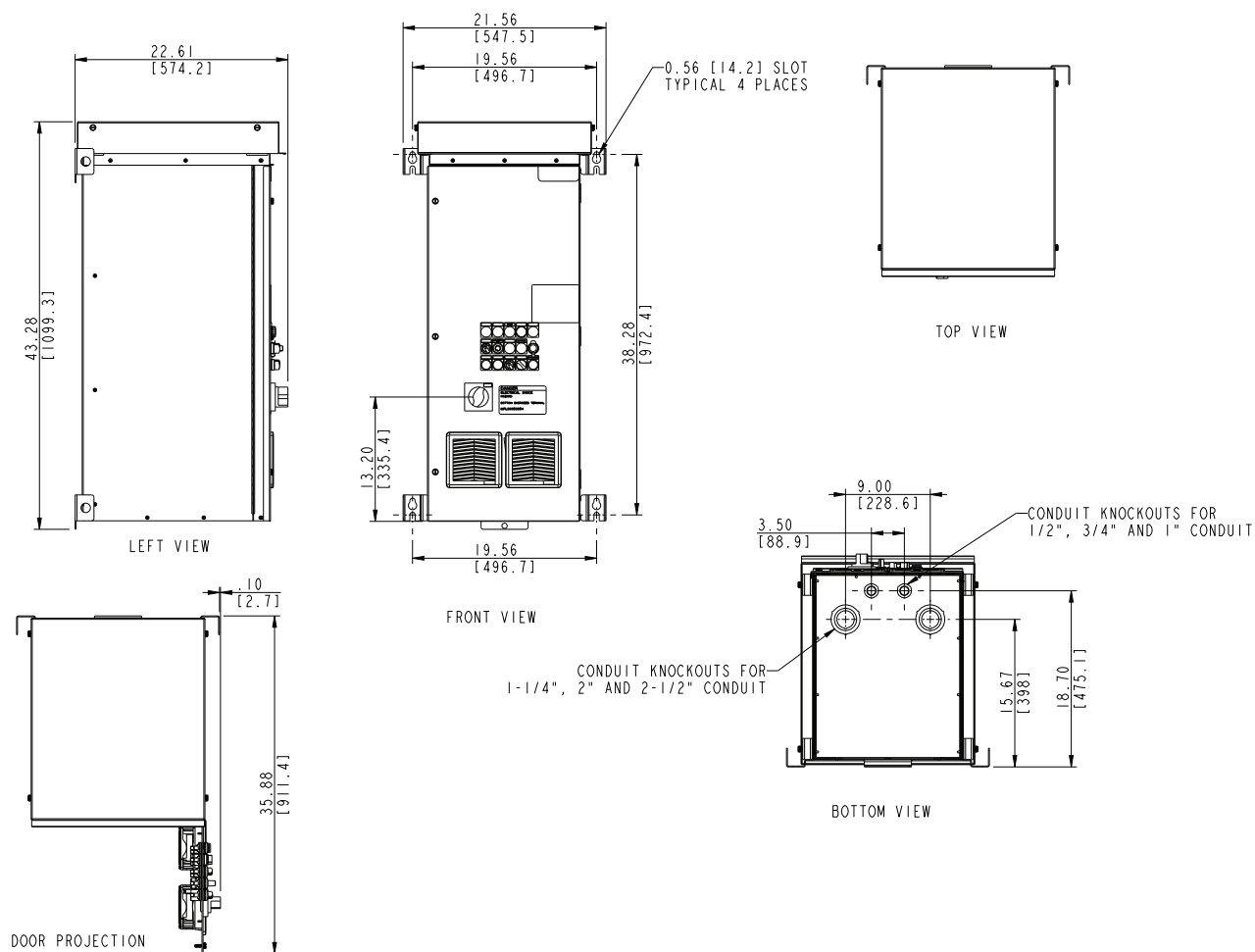


Figure 15 – 1200 mm Enclosure: Standard Drive without Harmonic Filter, Types 1 and 12

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

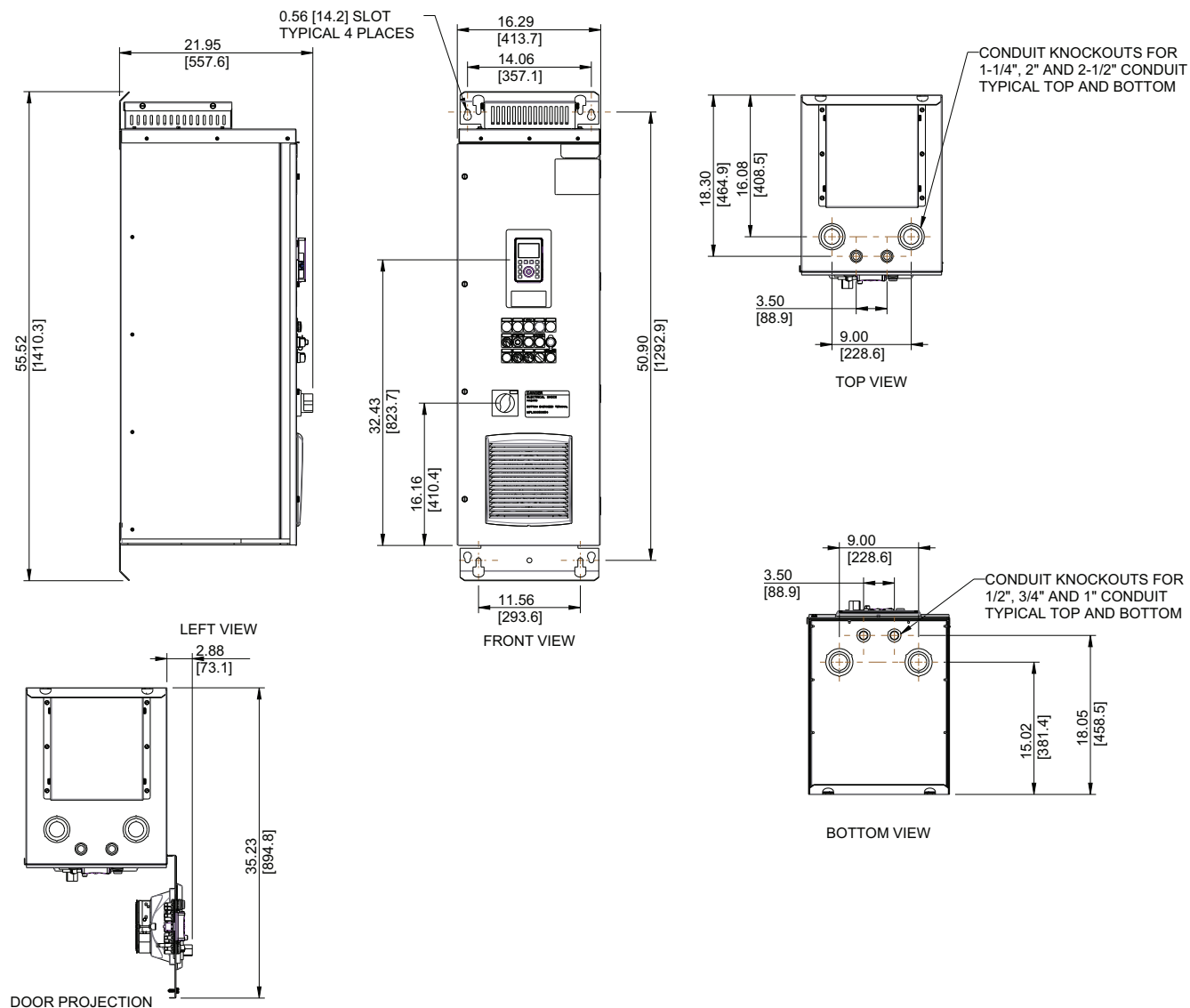


Figure 16 – 1200 mm Enclosure: Standard Drive without Harmonic Filter, Type 3R

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

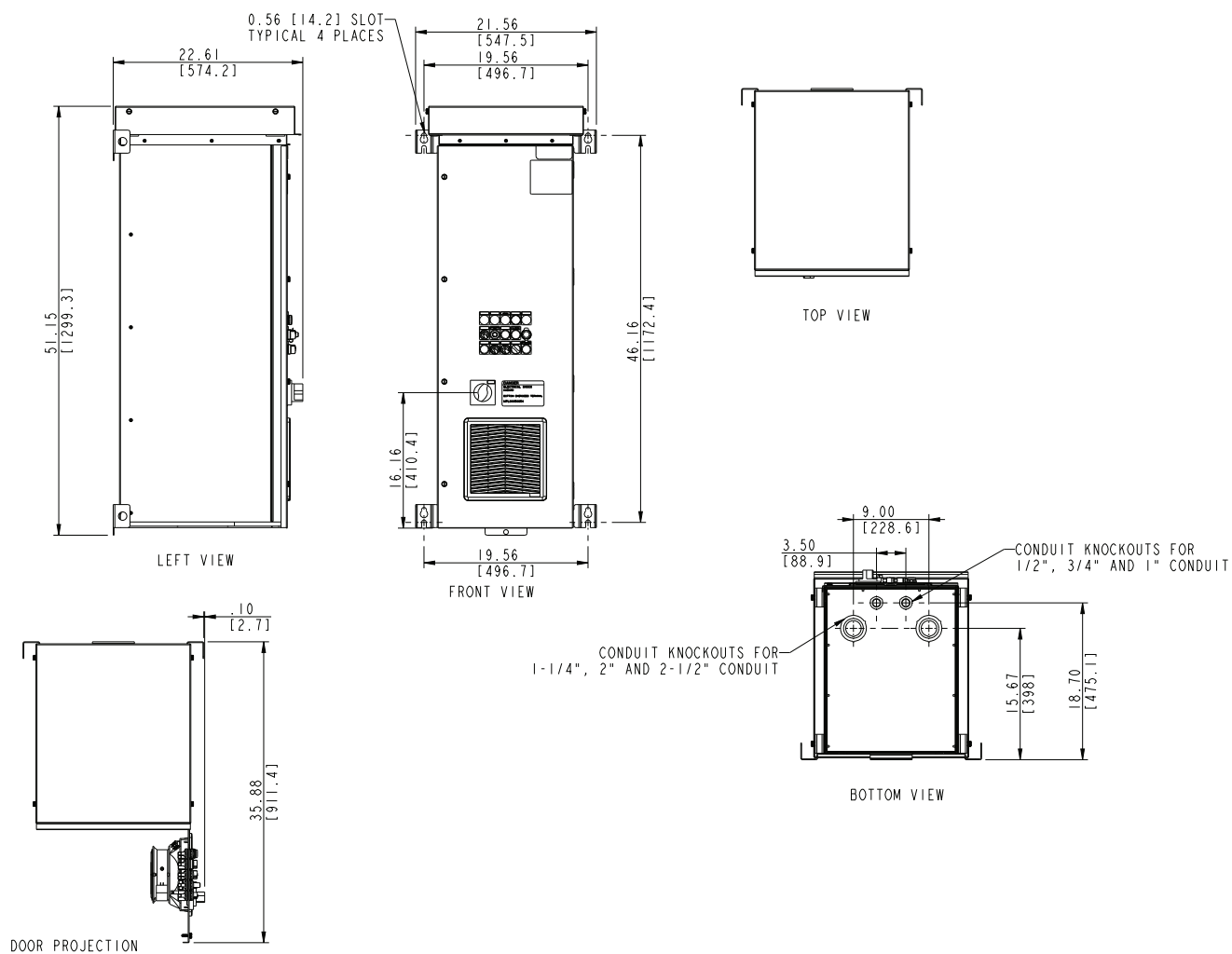


Figure 17 – 2000 mm Enclosure, Standard Drive without Harmonic Filter, Type 1

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

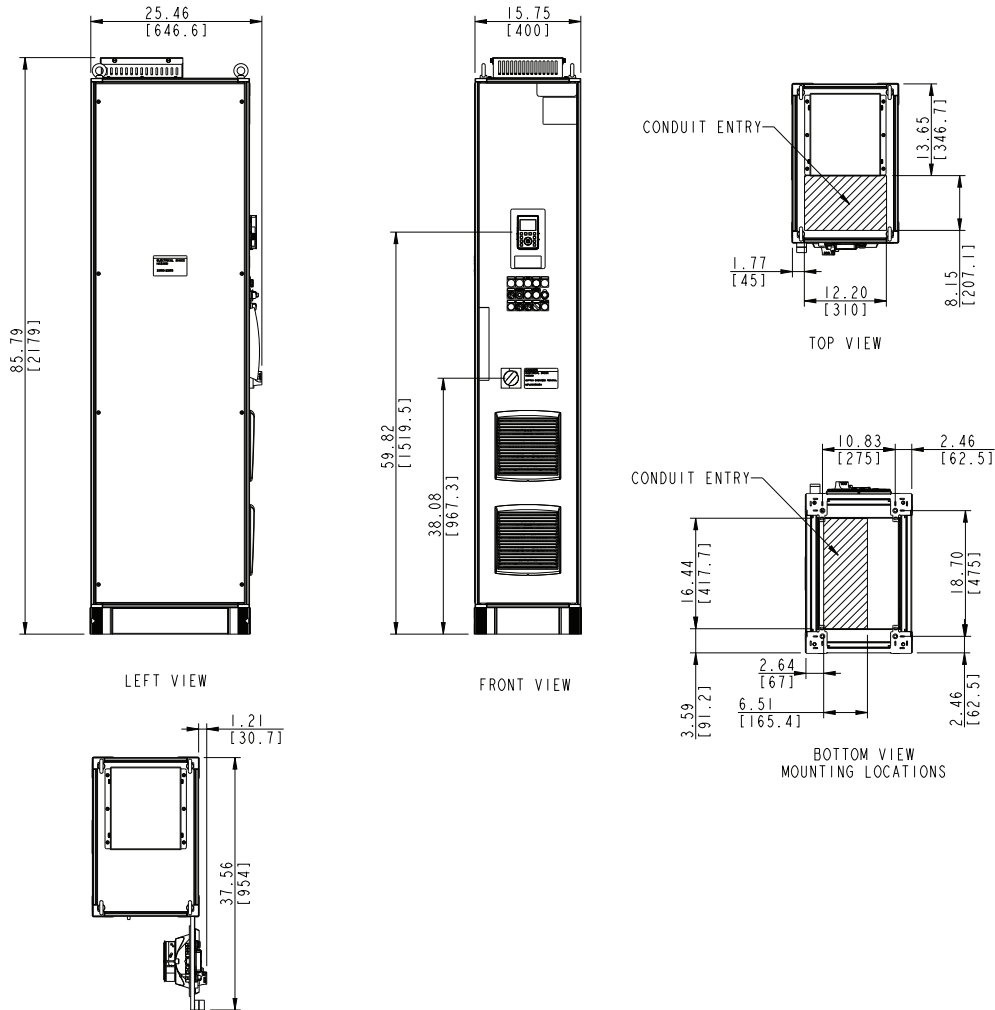


Figure 18 – 2000 mm Enclosure, Standard Drive without Harmonic Filter, Type 12

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

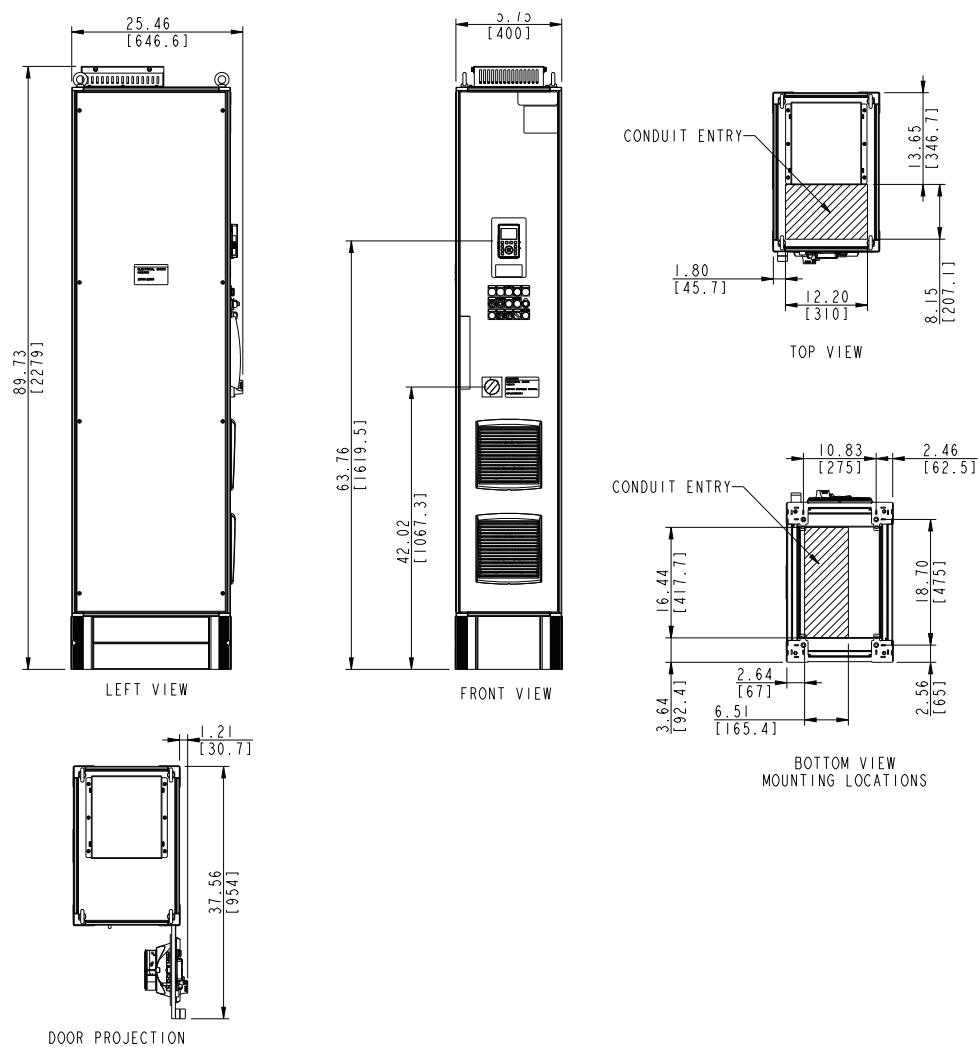


Figure 19 – 2000 mm Enclosure, Standard Drive without Harmonic Filter, Type 3R

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

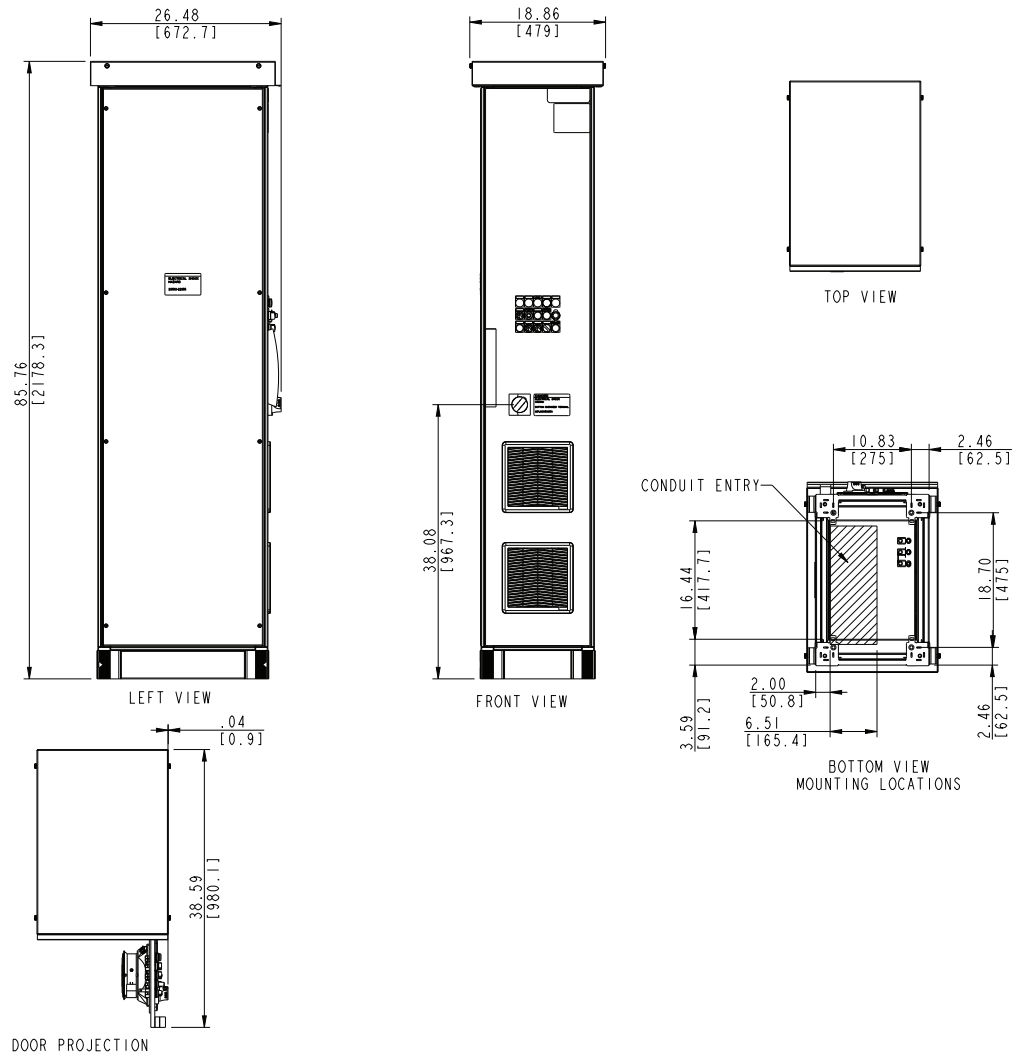


Figure 20 – 2000 mm Enclosure, Standard Drive without Harmonic Filter, Type 1

150–250 hp @ 460 V

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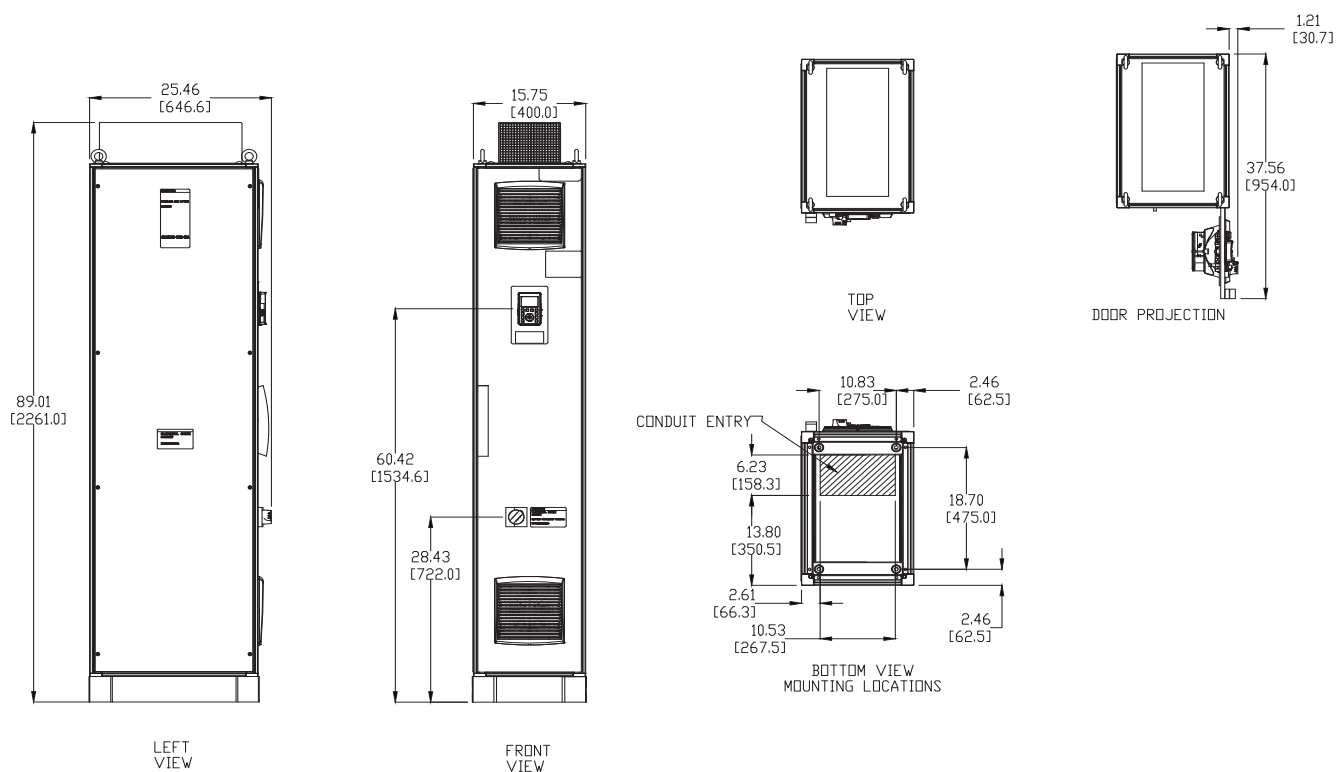




Figure 22 – 2000 mm Enclosure, Standard Drive without Harmonic Filter, Type 1

300–500 hp @ 460 V

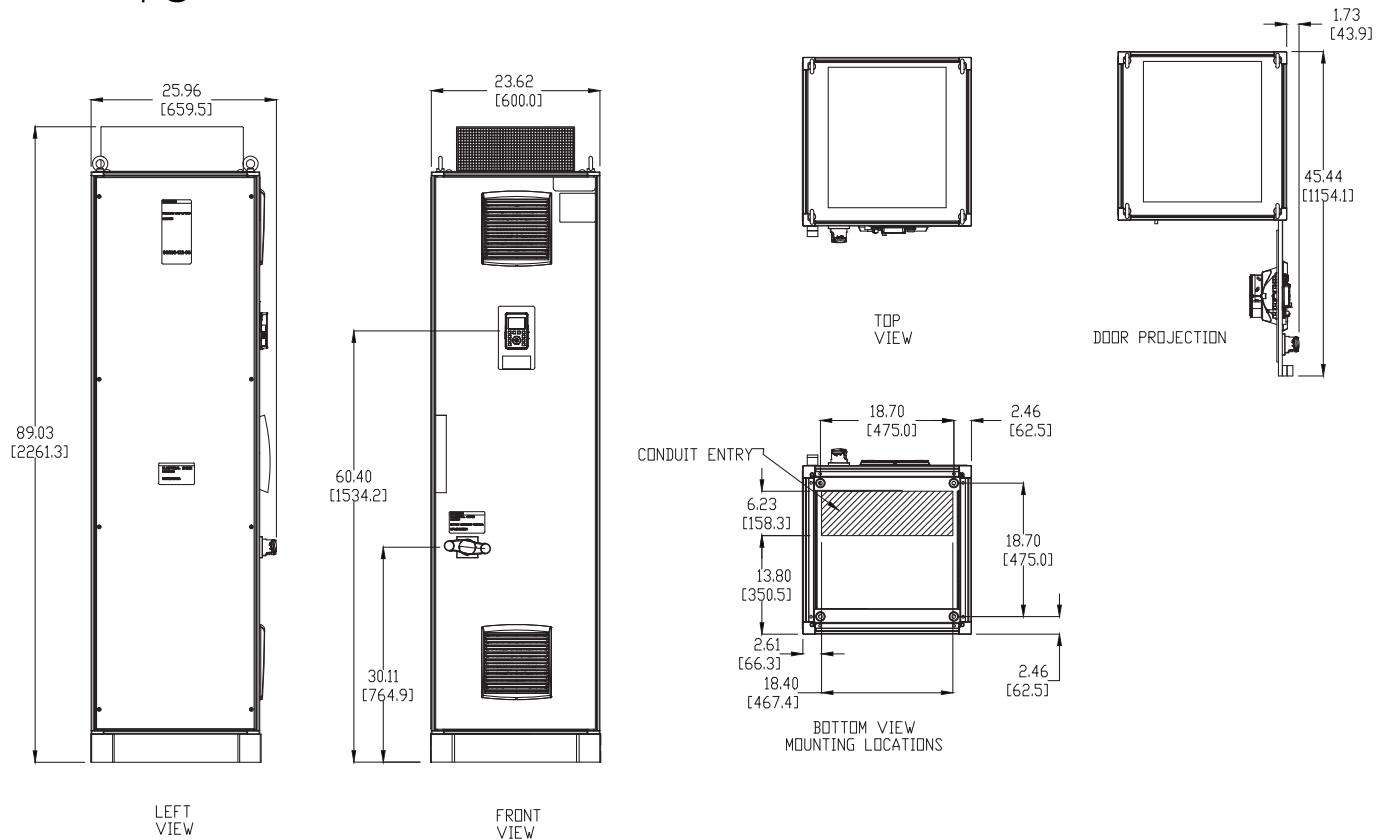
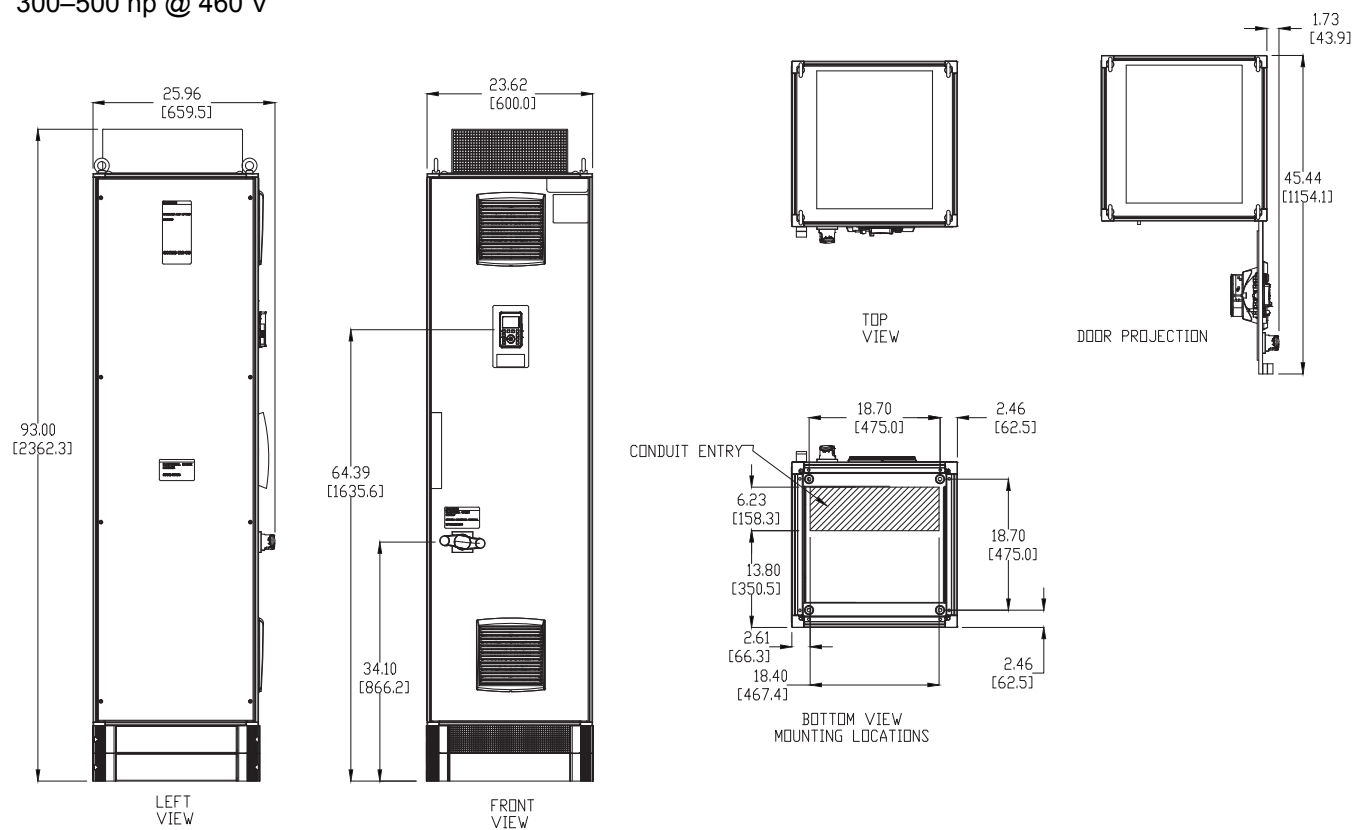


Figure 23 – 2000 mm Enclosure, Standard Drive without Harmonic Filter, Type 12

300–500 hp @ 460 V

**Table 22 – Overall Dimensions**

hp (Normal Duty)	230 V	460 V	Width		Depth		Height	
			in.	mm	in.	mm	in.	mm
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 – Recommended Renewable Parts

Description	Catalog Number
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 [1]
	ZB5AV6 Mounting collar with light module [2]
	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 [1]
	ZB5AV6 Mounting collar with light module [2]
	25501-00005 LED
	65170-166-42 AFC Run legend plate
	ZBZ32 Legend plate holder
Pilot light mounting collar with light module	ZB5AV6
Pilot light mounting collar with light module, and 1 N.O. and 1 N.C. contact for p-t-t	ZB5AW065
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	NSYCVF85M115PF
Fan with filter, 270 mm x 250 mm	NSYCVF300M115PF
Fan filter for 170 mm x 150 mm fan	NSYCAF125

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

Table 23 – Recommended Renewable Parts *(continued)*

Description	Catalog Number
Fan filter for 270 mm x 250 mm fan	NSYCAF223
Advanced drive keypad	VW3A1111
Remote keypad adapter	VW3A1112
ATV600 control block, all ratings	VX4B600100
RFI filter board, 400 V / 150–900 hp normal duty, 125–700 hp heavy duty	VX4FPMC1180N4
Inverter board, 110 kW / 400 V	VX4IPMC11N4
Inverter board, 132 kW / 400 V	VX4IPMC13N4
Inverter board, 160 kW / 400 V	VX4IPMC16N4
Power board, 110–800 kW / 400 V	VX4PPMC1180N4
Supply board, 110–800 kW / 400 V	VX4XPMC1180N4
Fuse set, 3 pieces, 250 A, URD30	VX5FUPM0250
Fuse set, 3 pieces, 315 A, URD30	VX5FUPM0315
Fuse set, 3 pieces, 400 A, URD30	VX5FUPM0400
Connection cables, CMP6 to CMI1	VX5XPM001
DC supply for fans, 48 Vdc	VX5XPM002
Power electronic fan kit, 48 Vdc	VX5VPM001
Enclosure door fan, 48 Vdc	VX5VPM002
Enclosure grid filter pad, 223 x 223 mm	NSYCAF223
Enclosure grid filter pad, 291 x 291 mm	NSYCAF291
Primary control fuses standard 460 V	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	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 230 V	25430-20200 (no bypass, bypass 15 hp and lower) 25430-20500 (bypass 20 hp and up)
Secondary control fuses standard 230 V	25430-20140 (no bypass, bypass 15 hp and lower) 25430-20350 (bypass 20 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

Table 23 – Recommended Renewable Parts *(continued)*

Description	Catalog Number
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
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 normal duty 1 hp, 460 V	ATV630U15N4
Power converter normal duty 2 hp, 460 V	ATV630U22N4
Power converter normal duty 3 hp, 460 V	ATV630U30N4
Power converter normal duty 5 hp, 460 V	ATV630U55N4
Power converter normal duty 7.5 hp, 460 V	ATV630U75N4
Power converter normal duty 10 hp, 460 V	ATV630D11N4
Power converter normal duty 15 hp, 460 V	ATV630D15N4
Power converter normal duty 20 hp, 460 V	ATV630D18N4

Table 23 – Recommended Renewable Parts *(continued)*

Description	Catalog Number
Power converter normal duty 25 hp, 460 V	ATV630D22N4
Power converter normal duty 30 hp, 460 V	ATV630D30N4
Power converter normal duty 40 hp, 460 V	ATV630D37N4
Power converter normal duty 50 hp, 460 V	ATV630D45N4
Power converter normal duty 60 hp, 460 V	ATV630D55N4
Power converter normal duty 75 hp, 460 V	ATV630D75N4
Power converter normal 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

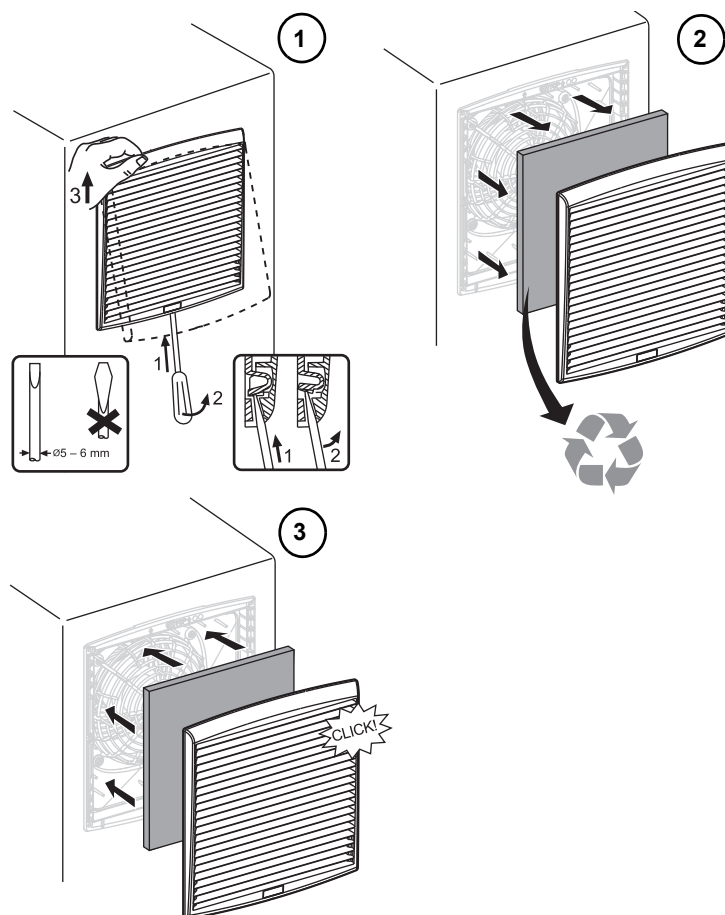
a number of environmental factors. Select a maintenance cycle that is appropriate for your installation conditions.

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 24.
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 24 – 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.

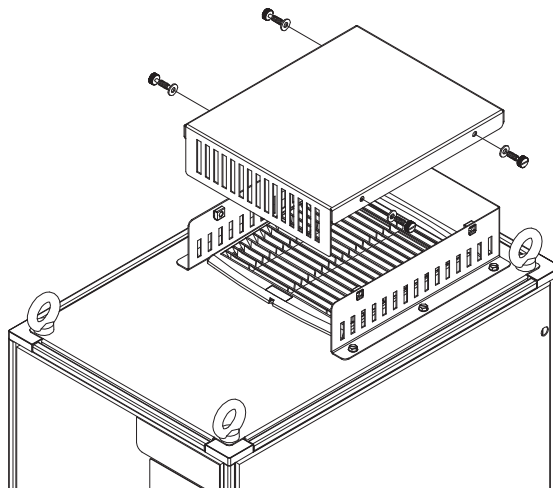
NOTE: Verify that the voltage tester is functioning properly before and after testing for the absence of voltage.

4. For Type 3R equipment, refer to “Accessing the Lifting Brackets” on page 20 and follow the instructions for removing the rain hood.

For Type 12 equipment, remove the vent grill as illustrated in Figure 25.

5. Service (clean or replace) the exhaust fan filter following the instructions on page 60 for the front filters. Always replace the rain hood or top cover and thumb screws after cleaning or replacing the filter.

Figure 25 – 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 26 on page 64.
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 27 on page 64.
7. Reconnect the fan's power supply and the grounding cable.

Figure 26 – Removing the Door Fan

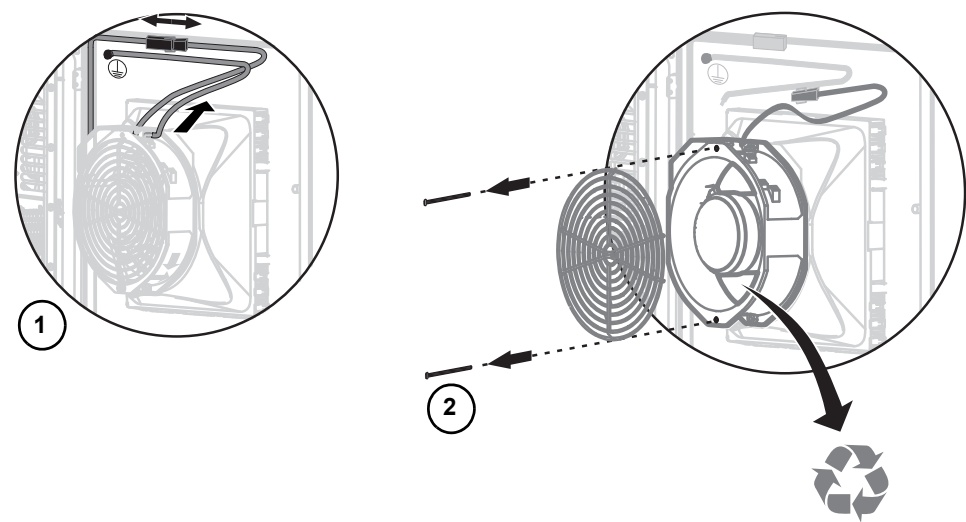
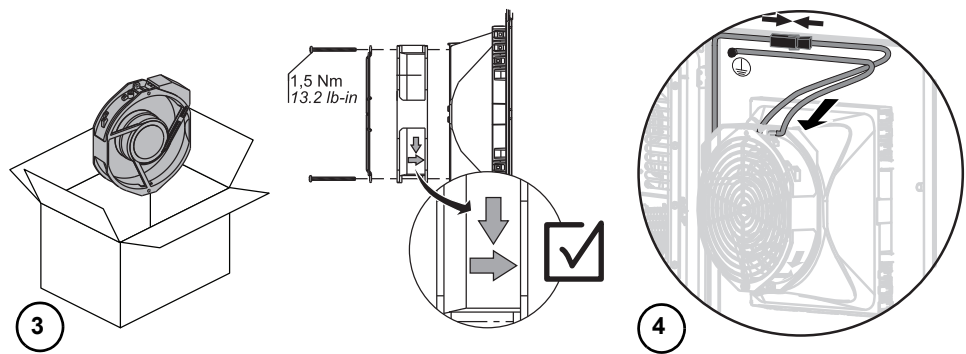


Figure 27 – Installing the New Door Fan



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.

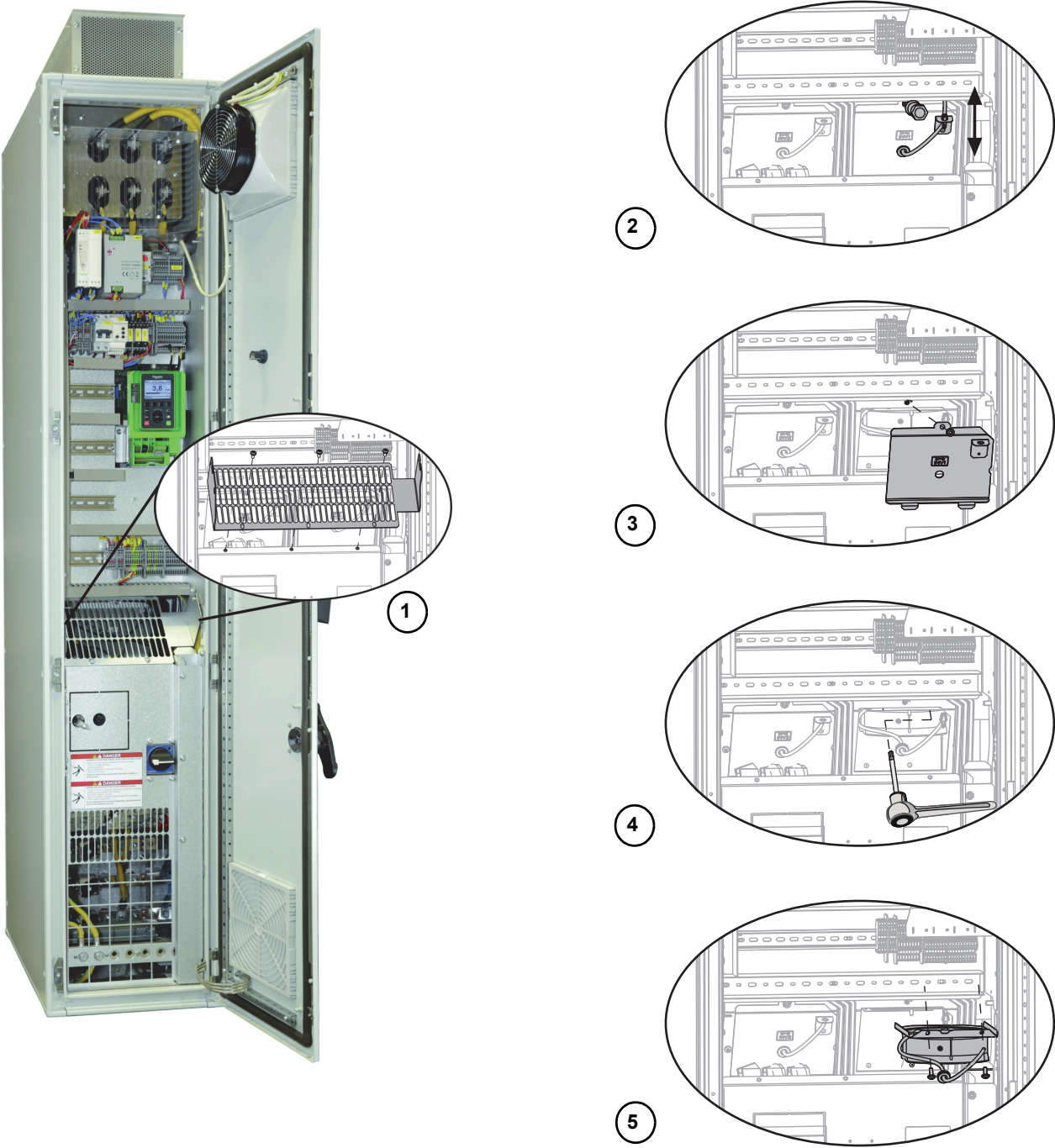
To replace the power fan on 150 hp devices and higher (see Figure 28 on page 66):

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 28 – Installing the Power Fan



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