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SVX9000 Adjustable Frequency Drives

Contents

Note: Supplement to Publication No. CA08102001E — Tab 40.

SVX9000 Open Drives

Overview

With the SVX9000 series sensorless vector control, Eaton's expanded Cutler-Hammer® drive offering now covers a complete line of PWM adjustable frequency (speed) drives in ratings from:

- 208V — 3/4 to 100 hp I_H; 1 to 100 hp I_L
- 230V — 3/4 to 100 hp I_H; 1 to 100 hp I_L
- 480V — 1 to 1900 hp I_H; 1-1/2 to 2200 hp I_L
- 575V — 2 to 2000 hp I_H; 3 to 2300 hp I_L

The 9000X Family of Drives includes HVX9000, SVX9000, SLX9000 and SPX9000 drives. 9000X Series drive ratings are rated for either high overload (I_H) or low overload (I_L). I_L indicates 110% overload capacity for 1 minute out of 10 minutes. I_H indicates 150% overload capacity for 1 minute out of 10 minutes.

A full range of enclosure types and options are available to meet a wide array of applications — from simple variable torque to more complex industrial applications such as conveyors, mixers and machine controls.

Application Description

Application Engineering

Proper selection and application of all drive system components is essential to assure that an adjustable frequency drive system will safely and reliably provide the performance required for any given application. The party responsible for the overall design and operation of the facility must make sure that qualified personnel are employed to select all components of the drive system, including appropriate safety devices. Eaton's Cutler-Hammer AF Drives Application Engineering Department is prepared to provide assistance to answer any questions about the technical capabilities of Cutler-Hammer drives.

Motor Selection

The basic requirement of motor selection is to match the torque vs. speed capability of the motor to the torque vs. speed requirement of the driven load.

Motor Torque vs. Speed Capability

As the speed of a motor is reduced below its 60 Hz base speed, motor cooling becomes less effective because of the reduced speed of the self-cooling fan. This limitation determines the maximum torque for continuous operation at any operating speed. The maximum intermittent operating torque is determined by the motor's torque vs. current characteristics and the output current capability of the adjustable frequency controller.

Multiple Motor Operation

A number of motors can be connected in parallel to a single controller. Since the frequency of the power supplied by the controller is the same for each motor, the motors will always operate at the same speed. Application Engineering assistance must be requested for all multiple motor applications to assure compliance with all controller design limitations.

Special Types of Motors

Standard NEMA Designs A and B three-phase motors are the only motors recommended for use in the majority of applications, but other types of motors are occasionally used. If the existing motor used in the application or the motor proposed for use with the drive system is a type other than NEMA Design A or B, Application Engineering assistance must be requested to make certain that the drive is properly applied.

Controller Selection

The basic requirement of controller selection is to match the output current, voltage and frequency capabilities of the controller with the requirements of the connected motor.

Output Current

The controller must be selected and applied such that the average operating motor current and horsepower do not exceed the continuous current and horsepower ratings of the controller. The intermittent operating current must not exceed the intermittent current rating of the controller.

Motor Protection

Cutler-Hammer adjustable frequency drives include electronic motor overload protection circuits that are designed to meet the requirements of NEC article 430-2 provided that only one motor is connected to the output of the controller.

Output Voltage and Frequency

When they are shipped, AF controllers are adjusted to provide a maximum output voltage and frequency equivalent to the input line voltage and frequency. The controllers can be adjusted to operate above line frequency, but a hazard of personal injury or equipment damage may exist when the motor is operated above base speed. Before adjusting the drive to operate above line frequency, make sure that the motor and the driven machinery can safely be operated at the resulting speed.

Controller Features

Operator Control and Interface Requirements

Since there are many possible configurations and many ways of achieving a specific end result, it pays to consider the operator control and interface requirements carefully. A simplified and more economical drive package can often be achieved by selecting from standard product offerings rather than specifying a custom designed configuration.

Installation Compatibility

The successful application of an AC drive requires the assurance that the drive will be compatible with the environment in which it will be installed. In planning the installation, be sure to carefully consider the heat produced by the drive, the altitude and temperature limits and the need for clean cooling air. Other important considerations include acoustical noise, vibration, electromagnetic compatibility, power quality, controller input harmonic current and power distribution equipment requirements.

Auxiliary Equipment and Accessories

Adjustable drives are generally designed to have a motor directly connected to the controller output terminals with no other equipment connected in series or parallel. Motor starters, disconnect switches, surge absorbers, dv/dt suppression circuits, output chokes, output transformers and any other equipment under consideration for installation on the output of the controller should not be installed without first requesting Application Engineering assistance. Power factor correction capacitors must never, under any circumstances, be connected at the output of the controller. They would serve no useful purpose, and they may damage the controller.

Enclosure Definitions

- **NEMA Type 1** — Enclosures are intended for indoor use primarily to provide a degree of protection against contact with enclosed equipment and provide a degree of protection against a limited amount of falling dirt in locations where unusual service conditions do not exist. Top or side openings in the NEMA Type 1 enclosure allow for the free exchange of inside and outside air while meeting the UL rod entry and rust resistance design tests.
- **NEMA Type 12** — Enclosures are intended for indoor use primarily to provide a degree of protection against circulating dust, falling dirt and dripping noncorrosive liquids. To meet UL drip, dust and rust resistance tests, NEMA Type 12 enclosures have no openings to allow for the exchange of inside and outside air.
- **Chassis IP00** — Similar to Protected Chassis IP20 except power terminals are protected by plastic shielding only. Primarily intended to be mounted inside a surrounding protective enclosure.
- **NEMA 3R** — Similar in design to NEMA Type 12 except with more stringent design and test requirements.

Motor Protection

DV/DT and Peak Motor Voltage Solutions

Today's AFD products offer significantly improved performance, but at the potential cost of motor insulation stress. The fast switching time of the IGBT devices used in newer AFDs can cause a transmission line effect in the output power leads to the motor, leading to possibly damaging voltage levels. To meet this need, NEMA has introduced a motor in MG1, Part 31, which provides an insulation system designed to maintain normal motor life in AFD applications. For existing motors, a motor protection scheme is required for longer cable runs. Eaton offers three standard solutions for existing systems.

- **MotoR$_X$**
  This patented Cutler-Hammer solution provides an energy recovery system which clamps the peak motor voltage to a safe level for standard motors. This option is used when the distance between a single motor and the drive is 600 feet or less.
- **Output Line Reactor**
  This option provides an output line reactor, reducing the DV/DT of the AFD output voltage and lessening the transmission line effect, to lower the peak voltage at the motor terminals.

Product Availability Codes

The product availability codes indicate the type of facility (warehouse, Mod Center or factory) that the product will ship from and, if it is not in stock, the number of working days needed to assemble the product from receipt of the order to shipment from the designated facility. Please note that this lead-time does not include any in-transit time from our facility to your facility.

Table 1. Product Availability Codes

Codes	Description
W	Warehouse stocked item. Shipped on customer request date. If item is backordered, please check Vista/VISTALINE or contact your Customer Support Center for product availability.
F1	Factory assemble-to-order. Shipped from factory within 1 working day after receipt of order on Vista.
FA	Factory assemble-to-order. Shipped from factory within 2 – 3 working days after receipt of order on Vista.
FB	Factory assemble-to-order. Shipped from factory within 4 – 10 working days after receipt of order on Vista.
FC	Factory assemble-to-order. Shipped from factory within 11 – 15 working days after receipt of order on Vista.
FD	Factory assemble-to-order. Shipped from factory within 16 – 20 working days after receipt of order on Vista.
FP	Factory assemble-to-order. Shipped from factory on negotiated promise date.
MA	Mod Center assemble-to-order. Shipped from Mod Center within 1 – 3 working days after receipt of order on Vista.
MB	Mod Center assemble-to-order. Shipped from Mod Center within 4 – 10 working days after receipt of order on Vista.
MP	Mod Center assemble-to-order. Shipped from Mod Center on negotiated promise date.

Product availability codes contained herein for a given product may be quantity sensitive and are subject to change without notice. For the most current information, refer to the Product Identification Inquiry (PIN) screen on Vista.

SVX9000 Open Drives

SVX9000 Open Drives

Product Description

Cutler-Hammer® SVX9000 Series Adjustable Frequency Drives from Eaton's electrical business are the next generation of drives specifically engineered for today's commercial and industrial applications. The power unit makes use of the most sophisticated semiconductor technology and a highly modular construction that can be flexibly adapted to the customer's needs.

The input and output configuration (I/O) is designed with modularity in mind. The I/O is compromised of option cards, each with its own input and output configuration. The control module is designed to accept a total of five of these cards. The cards contain not only normal analog and digital inputs but also fieldbus cards.

These drives continue the tradition of robust performance, and raise the bar on features and functionality, ensuring the best solution at the right price.

Features

- Robust design — proven 500,000 hours MTBF
- Integrated 3% line reactors standard on drives from FR4 through FR9
- EMI/RFI Filters H standard up to 200 hp I_H 480V, 100 hp I_H 230V
- Simplified operating menu allows for typical programming changes, while programming mode provides control of everything
- Quick Start Wizard built into the programming of the drive ensures a smooth start-up
- Keypad can display up to three monitored parameters simultaneously
- LOCAL/REMOTE operation from keypad
- Copy/Paste function allows transfer of parameter settings from one drive to the next
- Standard NEMA Type 12 keypad on all drives
- The SVX can be flexibly adapted to a variety of needs using our pre-installed "Seven in One" Precision application programs consisting of:
  - ❑ Basic
  - ❑ Standard
  - ❑ Local/Remote
  - ❑ Multi Step Speed Control
  - ❑ PID Control
  - ❑ Multi-Purpose Control
  - ❑ Pump and Fan Control with Auto Change
- Additional I/O and communication cards provide plug and play functionality
- I/O connections with simple quick connection terminals
- UL Listed
- Hand-Held Auxiliary 240 Power Supply allows programming/monitoring of control module without applying full power to the drive
- Control logic can be powered from an external auxiliary control panel, internal drive functions and fieldbus if necessary
- Brake Chopper standard from:
  1 – 30 hp/380 – 500V
  3/4 – 15 hp/208 – 230V
- NEMA Type 1 and NEMA Type 12 enclosures available, Frame Sizes FR4 – FR9
- Open Chassis FR10 and greater
- NEMA Type 1 and NEMA Type 12 available in FR10 Freestanding design; NEMA Type 1 available in FR11 Freestanding design
- Standard option board configuration includes an A9 I/O board and an A2 relay output board installed in slots A and B

Technical Data and Specifications

Table 2. SVX9000 Specifications

Description	Specification
Input Ratings	
Input Voltage (V_{in})	+10% / -15%
Input Frequency (f_{in})	50/60 Hz (variation up to 45 – 66 Hz)
Connection to Power	Once per minute or less (typical operation)
High Withstand Rating	100 kAIC
Output Ratings	
Output Voltage	0 to V_{in}
Continuous Output Current	I_H rated 100% at 122°F (50°C), FR9 and below I_L rated 100% at 104°F (40°C), FR9 and below I_H/I_L 100% at 104°F (40°C), FR10 and above
Overload Current (I_H/I_L)	150% I_H, 110% I_L for 1 min.
Output Frequency	0 to 320 Hz
Frequency Resolution	.01 Hz
Initial Output Current (I_H)	250% for 2 seconds
Control Characteristics	
Control Method	Frequency Control (V/f) Open Loop: Sensorless Vector Control, Closed Loop: SPX9000 Drives Only
Switching Frequency Frame 4 – 6 Frame 7 – 12	Adjustable with Parameter 2.6.9 1 to 16 kHz; default 10 kHz 1 to 10 kHz; default 3.6 kHz
Frequency Reference	Analog Input: Resolution .1% (10-bit), accuracy ± 1% V/Hz Panel Reference: Resolution .01 Hz
Field Weakening Point	30 to 320 Hz
Acceleration Time	0 to 3000 sec.
Deceleration Time	0 to 3000 sec.
Braking Torque	DC brake: 30% x T_n (without brake option)
Ambient Conditions	
Ambient Operating Temperature	14°F (-10°C), no frost to 122°F (+50°C) I_H (FR4 – FR9) 14°F (-10°C), no frost to 104°F (+40°C) I_H (FR10 and up) 14°F (-10°C), no frost to 104°F (+40°C) I_L (all frames)
Storage Temperature	-40°F (-40°C) to 158°F (70°C)
Relative Humidity	0 to 95% RH, noncondensing, non-corrosive, no dripping water
Air Quality	Chemical vapors: IEC 721-3-3, unit in operation, class 3C2; Mechanical particles: IEC 721-3-3, unit in operation, class 3S2
Altitude	100% load capacity (no derating) up to 3280 ft. (1000m); 1% derating for each 328 ft. (100m) above 3280 ft. (1000m); max. 9842 ft. (3000m)
Vibration	EN 50178, EN 60068-2-6; 5 to 50 Hz, Displacement amplitude 1 mm (peak) at 3 to 15.8 Hz, Max. acceleration amplitude 1G at 15.8 to 150 Hz
Shock	EN 50178, EN 60068-2-27 UPS Drop test (for applicable UPS weights) Storage and shipping: max. 15G, 11 ms (in package)
Enclosure Class	NEMA 1/IP21 or NEMA 12/IP54, Open Chassis/IP20

Description	Specification
Standards	
Product	IEC 61800-2
Safety	UL 508C
EMC (at default settings)	Immunity: Fulfills all EMC immunity requirements; Emissions: EN 61800-3, LEVEL H
Control Connections	
Analog Input Voltage	0 to 10V, R = 200 kΩ (-10 to 10V joystick control) Resolution .1%; accuracy ±1%
Analog Input Current	0(4) to 20 mA; R_i - 250Ω differential
Digital Inputs (6)	Positive or negative logic; 18 to 30V DC
Auxiliary Voltage	+24V ±15%, max. 250 mA
Output Reference Voltage	+10V +3%, max. load 10 mA
Analog Output	0(4) to 20 mA; R_L max. 500Ω; Resolution 10 bit; Accuracy ±2%
Digital Outputs	Open collector output, 50 mA/48V
Relay Outputs	2 programmable Form C relay outputs Switching capacity: 24V DC / 8A, 250V AC / 8A, 125V DC / 0.4A
Protections	
Overcurrent Protection	Trip limit 4.0 x I_H instantaneously
Overvoltage Protection	Yes
Undervoltage Protection	Yes
Earth Fault Protection	In case of earth fault in motor or motor cable, only the frequency converter is protected
Input Phase Supervision	Trips if any of the input phases are missing
Motor Phase Supervision	Trips if any of the output phases are missing
Overtemperature Protection	Yes
Motor Overload Protection	Yes
Motor Stall Protection	Yes
Motor Underload Protection	Yes
Short Circuit Protection	Yes (+24V and +10V Reference Voltages)

Table 3. Standard I/O Specifications

Description	Specification
6 – Digital Input Programmable	24V: "0" ≤ 10V, "1" ≥ 18V,R_i > 5 kΩ
2 – Analog Input Configurable w/Jumpers	Voltage: 0 – ±10V, R_i > 200 kΩ Current: 0 (4) – 20 mA, R_i = 250 kΩ
2 – Digital Output Programmable	Form C Relays 250V AC 2 Amp or 30V DC2 Amp resistive
1 – Digital Output Programmable	Open collector 48V DC 50 mA
1 – Analog Output Programmable Configurable w/Jumper	0 – 20 mA, R_L < 500 ohms, resolution 10 Bits/0.1%

Catalog Number Selection

Table 4. Adjustable Frequency Drive Catalog Numbering System

SVX 010 A 1 – 4 A 1 B 1 _ _ _ _ _ _

Product Family

SVX = Open Drives
SPX = Open Drives FR10 & greater

Horsepower Rating

F07 = 3/4 hp	**800** = 800 hp
F15 = 1-1/2 hp	**900** = 900 hp
007 = 7-1/2 hp	**H10** = 1000 hp
010 = 10 hp	**H12** = 1200 hp
050 = 50 hp	**H13** = 1350 hp
125 = 125 hp	**H15** = 1500 hp
350 = 350 hp	**H16** = 1600 hp
700 = 700 hp	**H20** = 2000 hp

AFD Software Series

A = Standard Software

Enclosure ③④

0 = Chassis	**2** = NEMA Type 12
1 = NEMA Type 1	

Voltage Rating

2 = 230 (208 – 240) V
4 = 480 (380 – 500) V
5 = 575 (525 – 690) V

Keypad

A = Alphanumeric

Input Options ①

1 = 3-phase, EMC H
2 = 3-phase, EMC N
4 = 3-phase, EMC L

Brake Chopper Options ②

N = No Brake Chopper Circuit
B = Internal Brake Chopper Circuit

Board Modifications

1 = Standard Boards
2 = Conformal (Varnished) Coating ⑤

Options

Options appear in alphabetical order.

Extended I/O Card Options

B1 = 6 DI, 1 ext +24V DC/EXT +24V DC
B2 = 1 RO (NC/NO), 1 RO (NO), 1 Therm
B4 = 1 AI (mA isolated), 2 AO (mA isolated), 1 ext +24V DC/EXT + 24V DC
B5 = 3 RO (NO)
B8 = 1 ext +24V DC/EXT +24V DC, 3 Pt100
B9 = 1 RO (NO), 5 DI 42 – 240V AC Input

Communication Cards

CA = Johnson Controls N2
CI = Modbus TCP
CJ = BACnet
CK = Ethernet IP
C2 = Modbus
C3 = Profibus DP
C4 = LonWorks
C5 = Profibus DP (D9 Connector)
C6 = CanOpen (Slave)
C7 = DeviceNet
C8 = Modbus (D9 Type Connector)
D3 = RS-232 with D9 Connection

① All 230V Drives and 480V Drives up to 200 hp (I_H) are only available with Input Option **1** (EMC Level H). 480V Drives 250 hp (I_H) or larger are available with Input Option **2** (EMC Level N). 480V Drives are available with Input Option **4** (EMC Level L). 575V Drives 200 hp (I_H) or larger are only available with Input Option **2**. 575V Drives up to 150 hp (I_H) are only available with Input Option **4** (EMC Level L).

② 480V Drives up to 30 hp (I_H) are only available with Brake Chopper Option **B**. 480V Drives 40 hp (I_H) or larger come standard with Brake Chopper Option **N**. 230V Drives up to 15 hp (I_H) are only available with Brake Chopper Option **B**. 230V Drives 20 hp or larger come standard with Brake Chopper Option **N**. All 575V Drives come standard without Brake Chopper Option (**N**). **Note:** N = No Brake Chopper.

③ 480V Drives 250 hp (I_H) and larger are available with enclosure style **0** (Chassis); 690V Drives 200 hp (I_H) and larger are available with enclosure style **0** (Chassis).

④ 480V and 690V FR10 Freestanding Drives are available with enclosure style **1** (NEMA Type 1) and enclosure style **2** (NEMA Type 12). FR11 Freestanding Drives only available with enclosure style **1** (NEMA Type 1).

⑤ Factory promise delivery. Consult Sales Office for availability.

Product Selection

230V SVX9000 Drives

Table 5. 208 – 240V, NEMA Type 1 Drive

Frame Size	Delivery Code	hp (I_H)	Current (I_H)	hp (I_L)	Current (I_L)	Catalog Number	Price U.S. $
FR4	W	3/4	3.7	1	4.8	**SVXF07A1-2A1B1**	
		1	4.8	1-1/2	6.6	**SVX001A1-2A1B1**	
		1-1/2	6.6	2	7.8	**SVXF15A1-2A1B1**	
		2	7.8	3	11	**SVX002A1-2A1B1**	
		3	11	—	12.5	**SVX003A1-2A1B1**	
FR5	W	—	12.5	5	17.5	**SVX004A1-2A1B1**	
		5	17.5	7-1/2	25	**SVX005A1-2A1B1**	
		7-1/2	25	10	31	**SVX007A1-2A1B1**	
FR6	W	10	31	15	48	**SVX010A1-2A1B1**	
		15	48	20	61	**SVX015A1-2A1B1**	
FR7	W	20	61	25	75	**SVX020A1-2A1N1**	
		25	75	30	88	**SVX025A1-2A1N1**	
		30	88	40	114	**SVX030A1-2A1N1**	
FR8	W	40	114	50	140	**SVX040A1-2A1N1**	
		50	140	60	170	**SVX050A1-2A1N1**	
		60	170	75	205	**SVX060A1-2A1N1**	
FR9	W	75	205	100	261	**SVX075A1-2A1N1**	
		100	261	—	—	**SVX100A1-2A1N1**	

Table 6. 208 – 240V, NEMA Type 12 Drive

Frame Size	Delivery Code	hp (I_H)	Current (I_H)	hp (I_L)	Current (I_L)	Catalog Number	Price U.S. $
FR4	F1	3/4	3.7	1	4.8	**SVXF07A2-2A1B1**	
		1	4.8	1-1/2	6.6	**SVX001A2-2A1B1**	
		1-1/2	6.6	2	7.8	**SVXF15A2-2A1B1**	
		2	7.8	3	11	**SVX002A2-2A1B1**	
		3	11	—	12.5	**SVX003A2-2A1B1**	
FR5	F1	—	12.5	5	17.5	**SVX004A2-2A1B1**	
		5	17.5	7-1/2	25	**SVX005A2-2A1B1**	
		7-1/2	25	10	31	**SVX007A2-2A1B1**	
FR6	F1	10	31	15	48	**SVX010A2-2A1B1**	
		15	48	20	61	**SVX015A2-2A1B1**	
FR7	W	20	61	25	75	**SVX020A2-2A1N1**	
		25	75	30	88	**SVX025A2-2A1N1**	
		30	88	40	114	**SVX030A2-2A1N1**	
FR8	FP	40	114	50	140	**SVX040A2-2A1N1**	
		50	140	60	170	**SVX050A2-2A1N1**	
		60	170	75	205	**SVX060A2-2A1N1**	
FR9	FP	75	205	100	261	**SVX075A2-2A1N1**	
		100	261	—	—	**SVX100A2-2A1N1**	

480V SVX9000 Drives

Table 7. 380 – 500V, NEMA Type 1 Drive

Frame Size	Delivery Code	hp (I_H)	Current (I_H)	hp (I_L)	Current (I_L)	Catalog Number	Price U.S. $
FR4	W	1	2.2	1-1/2	3.3	**SVX001A1-4A1B1**	
		1-1/2	3.3	2	4.3	**SVXF15A1-4A1B1**	
		2	4.3	3	5.6	**SVX002A1-4A1B1**	
		3	5.6	5	7.6	**SVX003A1-4A1B1**	
		5	7.6	—	9	**SVX005A1-4A1B1**	
		—	9	7-1/2	12	**SVX006A1-4A1B1**	
FR5	W	7-1/2	12	10	16	**SVX007A1-4A1B1**	
		10	16	15	23	**SVX010A1-4A1B1**	
		15	23	20	31	**SVX015A1-4A1B1**	
FR6	W	20	31	25	38	**SVX020A1-4A1B1**	
		25	38	30	46	**SVX025A1-4A1B1**	
		30	46	40	61	**SVX030A1-4A1B1**	
FR7	W	40	61	50	72	**SVX040A1-4A1N1**	
		50	72	60	87	**SVX050A1-4A1N1**	
		60	87	75	105	**SVX060A1-4A1N1**	
FR8	W	75	105	100	140	**SVX075A1-4A1N1**	
		100	140	125	170	**SVX100A1-4A1N1**	
		125	170	150	205	**SVX125A1-4A1N1**	
FR9	W	150	205	200	261	**SVX150A1-4A1N1**	
		200	245	250	300	**SVX200A1-4A1N1**	

Table 8. 380 – 500V, NEMA Type 1 Freestanding Drive

Frame Size	Delivery Code	hp (I_H)	Current (I_H)	hp (I_L)	Current (I_L)	Catalog Number	Price U.S. $
FR10	W	250	330	300	385	**SPX250A1-4A4N1**	
	FP	300	385	350	460	**SPX300A1-4A4N1**	
	W	350	460	400	520	**SPX350A1-4A4N1**	
FR11	FP	400	520	500	590	**SPX400A1-4A4N1**	
	FP	500	590	550	650	**SPX500A1-4A4N1**	
	FP	550	650	600	730	**SPX550A1-4A4N1**	

Note: Integrated fuses as standard. Limited option selection available; 115V Transformer (KB), Light Kit (L1), HOA (K4), Speed Potentiometer w/HOA (K2), Disconnect Switch (P2). See Enclosed 480V option selection.

Table 9. 380 – 500V, NEMA Type 12 Drive

Frame Size	Delivery Code	hp (I_H)	Current (I_H)	hp (I_L)	Current (I_L)	Catalog Number	Price U.S. $
FR4	F1	1	2.2	1-1/2	3.3	**SVX001A2-4A1B1**	
		1-1/2	3.3	2	4.3	**SVXF15A2-4A1B1**	
		2	4.3	3	5.6	**SVX002A2-4A1B1**	
		3	5.6	5	7.6	**SVX003A2-4A1B1**	
		5	7.6	—	9	**SVX005A2-4A1B1**	
		—	9	7-1/2	12	**SVX006A2-4A1B1**	
FR5	F1	7-1/2	12	10	16	**SVX007A2-4A1B1**	
		10	16	15	23	**SVX010A2-4A1B1**	
		15	23	20	31	**SVX015A2-4A1B1**	
FR6	F1	20	31	25	38	**SVX020A2-4A1B1**	
		25	38	30	46	**SVX025A2-4A1B1**	
		30	46	40	61	**SVX030A2-4A1B1**	
FR7	W	40	61	50	72	**SVX040A2-4A1N1**	
		50	72	60	87	**SVX050A2-4A1N1**	
		60	87	75	105	**SVX060A2-4A1N1**	
FR8	W	75	105	100	140	**SVX075A2-4A1N1**	
		100	140	125	170	**SVX100A2-4A1N1**	
		125	170	150	205	**SVX125A2-4A1N1**	
FR9	W	150	205	200	261	**SVX150A2-4A1N1**	
		200	245	250	300	**SVX200A2-4A1N1**	

Table 10. 380 – 500V, NEMA Type 12 Freestanding Drive

Frame Size	Delivery Code	hp (I_H)	Current (I_H)	hp (I_L)	Current (I_L)	Catalog Number	Price U.S. $
FR10	FP	250	330	300	385	**SPX250A2-4A4N1**	
	FP	300	385	350	460	**SPX300A2-4A4N1**	
	FP	350	460	400	520	**SPX350A2-4A4N1**	

Note: Integrated fuses as standard. Limited option selection available; 115V Transformer (KB), Light Kit (L1), HOA (K4), Speed Potentiometer w/HOA (K2), Disconnect Switch (P2). See Enclosed 480V option selection.

Table 11. 480V 380 – 500, Open Chassis Drive

Frame Size	Delivery Code	hp (I_H)	Current (I_H)	hp (I_L)	Current (I_L)	Catalog Number	Price U.S. $
FR10 ①	W	250	330	300	385	**SPX250A0-4A2N1**	
		300	385	350	460	**SPX300A0-4A2N1**	
		350	460	400	520	**SPX350A0-4A2N1**	
FR11	W	400	520	500	590	**SPX400A0-4A2N1**	
		500	590	—	650	**SPX500A0-4A2N1**	
		—	650	600	730	**SPX550A0-4A2N1**	
FR12	FP	600	730	—	820	**SPX600A0-4A2N1**	
	W	—	820	700	920	**SPX650A0-4A2N1**	
	FP	700	920	800	1030	**SPX700A0-4A2N1**	
FR13	FP	800	1030	900	1150	**SPX800A0-4A2N1**	
		900	1150	1000	1300	**SPX900A0-4A2N1**	
		1000	1300	1200	1450	**SPXH10A0-4A2N1**	
FR14	FP	1200	1600	1500	1770	**SPXH12A0-4A2N1**	
		1600	1940	1800	2150	**SPXH16A0-4A2N1**	
		1900	2300	2200	2700	**SPXH19A0-4A2N1**	

① FR10 – FR14 includes 3% line reactor, but it is not integral to chassis.

575V SVX9000 Drives

Table 12. 525 – 690V, NEMA Type 1 Drive

Frame Size	Delivery Code	hp (I_H)	Current (I_H)	hp (I_L)	Current (I_L)	Catalog Number	Price U.S. $
FR6	W	2	3.33	3	4.5	**SVX002A1-5A4N1**	
		3	4.5	—	5.5	**SVX003A1-5A4N1**	
		—	5.5	5	7.5	**SVX004A1-5A4N1**	
		5	7.5	7-1/2	10	**SVX005A1-5A4N1**	
		7-1/2	10	10	13.5	**SVX007A1-5A4N1**	
		10	13.5	15	18	**SVX010A1-5A4N1**	
		15	18	20	22	**SVX015A1-5A4N1**	
		20	22	25	27	**SVX020A1-5A4N1**	
		25	27	30	34	**SVX025A1-5A4N1**	
FR7	W	30	34	40	41	**SVX030A1-5A4N1**	
		40	41	50	52	**SVX040A1-5A4N1**	
FR8	W	50	52	60	62	**SVX050A1-5A4N1**	
		60	62	75	80	**SVX060A1-5A4N1**	
		75	80	100	100	**SVX075A1-5A4N1**	
FR9	W	100	100	125	125	**SVX100A1-5A4N1**	
		125	125	150	144	**SVX125A1-5A4N1**	
		150	144	—	170	**SVX150A1-5A4N1**	
		—	170	200	208	**SVX175A1-5A4N1**	

Table 13. 525 – 690V, NEMA Type 1 Freestanding Drive

Frame Size	Delivery Code	hp (I_H)	Current (I_H)	hp (I_L)	Current (I_L)	Catalog Number	Price U.S. $
FR10	FP	200	208	250	261	**SPX200A1-5A4N1**	
		250	261	300	325	**SPX250A1-5A4N1**	
		300	325	400	385	**SPX300A1-5A4N1**	
FR11	FP	400	385	450	460	**SPX400A1-5A4N1**	
		450	460	500	502	**SPX450A1-5A4N1**	
		500	502	550	590	**SPX500A1-5A4N1**	

Note: Integrated fuses as standard. Limited option selection available; 115V Transformer (KB), Light Kit (L1), HOA (K4), Speed Potentiometer w/HOA (K2), Disconnect Switch (P2). See Enclosed 480V option selection.

Table 14. 525 – 690V, NEMA Type 12 Drive

Frame Size	Delivery Code	hp (I_H)	Current (I_H)	hp (I_L)	Current (I_L)	Catalog Number	Price U.S. $
FR6	F1	2	3.33	3	4.5	**SVX002A2-5A4N1**	
		3	4.5	—	5.5	**SVX003A2-5A4N1**	
		—	5.5	5	7.5	**SVX004A2-5A4N1**	
		5	7.5	7-1/2	10	**SVX005A2-5A4N1**	
		7-1/2	10	10	13.5	**SVX007A2-5A4N1**	
		10	13.5	15	18	**SVX010A2-5A4N1**	
		15	18	20	22	**SVX015A2-5A4N1**	
		20	22	25	27	**SVX020A2-5A4N1**	
		25	27	30	34	**SVX025A2-5A4N1**	
FR7	FP	30	34	40	41	**SVX030A2-5A4N1**	
		40	41	50	52	**SVX040A2-5A4N1**	
FR8	FP	50	52	60	62	**SVX050A2-5A4N1**	
		60	62	75	80	**SVX060A2-5A4N1**	
		75	80	100	100	**SVX075A2-5A4N1**	
FR9	FP	100	100	125	125	**SVX100A2-5A4N1**	
		125	125	150	144	**SVX125A2-5A4N1**	
		150	144	—	170	**SVX150A2-5A4N1**	
		—	170	200	208	**SVX175A2-5A4N1**	

Table 15. 525 – 690V, NEMA Type 12 Freestanding Drive

Frame Size	Delivery Code	hp (I_H)	Current (I_H)	hp (I_L)	Current (I_L)	Catalog Number	Price U.S. $
FR10	FP	200 250 300	208 261 325	250 300 400	261 325 385	**SPX200A2-5A4N1** **SPX250A2-5A4N1** **SPX300A2-5A4N1**	

Note: Integrated fuses as standard. Limited option selection available; 115V Transformer (KB), Light Kit (L1), HOA (K4), Speed Potentiometer w/HOA (K2), Disconnect Switch (P2). See Enclosed 480V option selection.

Table 16. 525 – 690V, Open Chassis Drive

Frame Size	Delivery Code	hp (I_H)	Current (I_H)	hp (I_L)	Current (I_L)	Catalog Number	Price U.S. $
FR10	FP	200 250 300	208 261 325	250 300 400	261 325 385	**SPX200A0-5A2N1** **SPX250A0-5A2N1** **SPX300A0-5A2N1**	
FR11	FP	400 450 500	385 460 502	450 500 —	460 502 590	**SPX400A0-5A2N1** **SPX450A0-5A2N1** **SPX500A0-5A2N1**	
FR12	FP	— 600 700	590 650 750	600 700 800	650 750 820	**SPX550A0-5A2N1** **SPX600A0-5A2N1** **SPX700A0-5A2N1**	
FR13	FP	800 900 1000	820 920 1030	900 1000 1250	920 1030 1180	**SPX800A0-5A2N1** **SPX900A0-5A2N1** **SPXH10A0-5A2N1**	
FR14	FP	1350 1500 2000	1300 1500 1900	1500 2000 2300	1500 1900 2250	**SPXH13A0-5A2N1** **SPXH15A0-5A2N1** **SPXH20A0-5A2N1**	

9000X Series Option Board Kits

The 9000X Series drives can accommodate a wide selection of expander and adapter option boards to customize the drive for your application needs. The drive's control unit is designed to accept a total of five option boards (see **Figure 1**).

The 9000X Series factory installed standard board configuration includes an A9 I/O board and an A2 relay output board, which are installed in slots A and B.

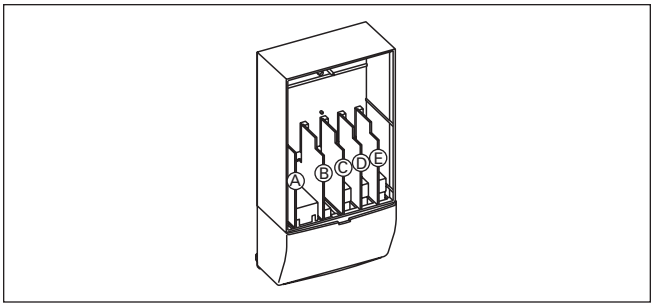

Figure 1. 9000X Series Option Boards

Table 17. Option Board Kits

Option Kit Description ②	Allowed Slot Locations ①	Field Installed		Factory Installed		SVX Ready Programs						
		Catalog Number	Price U.S. $	Option Designator	Adder U.S. $	Basic	Local/ Remote	Standard	MSS	PID	Multi-P.	PFC
Standard I/O Cards (See Figure 1)												
2 RO (NC/NO)	B	**OPTA2**		**—**		X	X	X	X	X	X	X
6 DI, 1 DO, 2 AI, 1AO, 1 +10V DC ref, 2 ext +24V DC/ EXT +24V DC	A	**OPTA9**		**—**		X	X	X	X	X	X	X
Extended I/O Card Options												
2 RO, Therm — SPX Only	B	**OPTA3**		**A3**		—	X	X	X	X	X	X
Encoder low volt +5V/15V/24V — SPX Only	C	**OPTA4**		**A4**		—	X	X	X	X	X	X
Encoder high volt +15V/24V — SPX Only	C	**OPTA5**		**A5**		—	X	X	X	X	X	X
Double encoder — SPX Only	C	**OPTA7**		**A7**		X	X	X	X	X	X	X
6 DI, 1 DO, 2 AI, 1 AO — SPX Only	A	**OPTA8**		**A8**		—	X	X	X	X	X	X
3 DI (Encoder 10 – 24V), Out +15V/+24V, 2 DO (pulse+direction) — SPX Only	C	**OPTAE**		**AE**		X	X	X	X	X	X	X
6 DI, 1 ext +24V DC/EXT +24V DC	B, C, **D**, E	**OPTB1**		**B1**		—	—	—	—	—	X	X
1 RO (NC/NO), 1 RO (NO), 1 Therm	B, C, **D**, E	**OPTB2**		**B2**		—	—	—	—	—	X	X
1 AI (mA isolated), 2 AO (mA isolated), 1 ext +24V DC/EXT +24V DC	B, C, **D**, E	**OPTB4**		**B4**		X	X	X	X	X	X	X
3 RO (NO)	B, C, **D**, E	**OPTB5**		**B5**		—	—	—	—	—	X	X
1 ext +24V DC/EXT +24V DC, 3 Pt100	B, C, **D**, E	**OPTB8**		**B8**		—	—	—	—	—	—	—
1 RO (NO), 5 DI 42 – 240V AC Input	B,C, **D**, E	**OPTB9**		**B9**		—	—	—	—	—	X	X
Communication Cards												
Modbus ③	D, **E**	**OPTC2**		**C2**		X	X	X	X	X	X	X
Johnson Controls N2 ③	D, **E**	**OPTC2**		**CA**		—	—	—	—	—	—	—
Modbus TCP	D, **E**	**OPTCI**		**CI**		X	X	X	X	X	X	X
BACnet	D, **E**	**OPTCJ**		**CJ**		X	X	X	X	X	X	X
Ethernet IP	D, **E**	**OPTCK**		**CK**		X	X	X	X	X	X	X
Profibus DP	D, **E**	**OPTC3**		**C3**		X	X	X	X	X	X	X
LonWorks	D, **E**	**OPTC4**		**C4**		X	X	X	X	X	X	X
Profibus DP (D9 Connector)	D, **E**	**OPTC5**		**C5**		X	X	X	X	X	X	X
CanOpen (Slave) ④	D, **E**	**OPTC6**		**C6**		X	X	X	X	X	X	X
DeviceNet	D, **E**	**OPTC7**		**C7**		X	X	X	X	X	X	X
Modbus (D9 Type Connector)	D, **E**	**OPTC8**		**C8**		X	X	X	X	X	X	X
Adapter — SPX Only	D, **E**	**OPTD1**		**D1**		X	X	X	X	X	X	X
Adapter — SPX Only	D, **E**	**OPTD2**		**D2**		X	X	X	X	X	X	X
RS-232 with D9 Connection	D, **E**	**OPTD3**		**D3**		X	X	X	X	X	X	X
Keypad												
9000X Series Local/ Remote Keypad (Replacement Keypad)	—	**KEYPAD-LOC/ REM**		**—**		—	—	—	—	—	—	—
9000X Series Remote Mount Keypad Unit (Keypad not included, includes 10 ft. cable, keypad holder, mounting hardware)	—	**OPTRMT -KIT-9000X**		**—**		—	—	—	—	—	—	—
9000X Series RS-232 Cable, 13 ft.	—	**PP00104**		**—**		—	—	—	—	—	—	—

① Option card must be installed in one of the slots listed for that card. Slot indicated in Bold is the preferred location.

② AI = Analog Input; AO = Analog Output, DI = Digital Input, DO = Digital Output, RO = Relay Output

③ OPTC2 is a multi-protocol option card.

④ SPX9000 Drives only (FR10 and larger).

Modbus RTU Network Communications

The Modbus Network Card OPTC2 is used for connecting the 9000X Drive as a slave on a Modbus network. The interface is connected by a 9-pin DSUB connector (female) and the baud rate ranges from 300 to 19200 baud. Other communication parameters include an address range from 1 to 247; a parity of None, Odd or Even; and the stop bit is 1.

Profibus Network Communications

The Profibus Network Card OPTC3 is used for connecting the 9000X Drive as a slave on a Profibus-DP network. The interface is connected by a 9-pin DSUB connector (female). The baud rates range from 9.6K baud to 12M baud, and the addresses range from 1 to 127.

LonWorks Network Communications

The LonWorks Network Card OPTC4 is used for connecting the 9000X Drive on a LonWorks network. This interface uses Standard Network Variable Types (SNVT) as data types. The channel connection is achieved using a FTT-10A Free Topology transceiver via a single twisted transfer cable. The communication speed with LonWorks is 78 kBits/s.

CanOpen (Slave) Communications

The CanOpen (Slave) Network Card OPTC6 is used for connecting the 9000X Drive to a host system. According to ISO11898 standard cables to be chosen for CAN bus should have a nominal impedance of 120Ω, and specific line delay of nominal 5 nS/m. 120Ω line termination resistors required for installation.

DeviceNet Network Communications

The DeviceNet Network Card OPTC7 is used for connecting the 9000X Drive on a DeviceNet Network. It includes a 5.08 mm pluggable connector. Transfer method is via CAN using a 2-wire twisted shielded cable with 2-wire bus power cable and drain. The baud rates used for communication include 125K baud, 250K baud and 500K baud.

Johnson Controls Metasys™ N2 Network Communications

The OPTC2 fieldbus board provides communication between the 9000X Drive and a Johnson Controls Metasys™ N2 network. With this connection, the drive can be controlled, monitored and programmed from the Metasys system. The N2 fieldbus is available as a factory installed option and as a field installable kit.

Modbus/TCP Network Communications

The Modbus/TCP Network Card OPTCl is used for connecting the 9000X Drive to Ethernet networks utilizing Modbus protocol. It includes an RJ-45 pluggable connector. This interface provides a selection of standard and custom register values to communicate drive parameters. The board supports 10 Mbps and 100 Mbps communication speeds. The IP address of the board is configurable over Ethernet using a supplied software tool.

BACnet Network Communications

The BACnet Network Card OPTCJ is used for connecting the 9000X Drive to BACnet networks. It includes a 5.08 mm pluggable connector. Data transfer is Master-Slave/Token Passing (MS/TP) RS-485. This interface uses a collection of 30 Binary Value Objects (BVOs) and 35 Analog Value Objects (AVOs) to communicate drive parameters. The card supports 9.6, 19.2 and 38.4 Kbaud communication speeds and supports network addresses 1 – 127.

Ethernet/IP Network Communications

The Ethernet/IP Network Card OPTCK is used for connecting the 9000X Drive to Ethernet/Industrial Protocol networks. It includes an RJ-45 pluggable connector. The interface uses CIP objects to communicate drive parameters (CIP is “Common Industrial Protocol”, the same protocol used by DeviceNet). The board supports 10 Mbps and 100 Mbps communication speeds. The IP address of the board is configurable by Static, BOOTP and DHCP methods.

Options

Control Panel Options

Table 18. Control Panel Factory Options

Description	Factory Installed		Field Installed	
			NEMA Type 1	
	Option Code	Adder U.S. $	Catalog Number	Price U.S. $
Local/Remote Keypad SVX9000 Control Panel — This option is standard on all drives and consists of an RS-232 connection, backlit alphanumeric LCD display with nine indicators for the RUN status and two indicators for the control source. The nine pushbuttons on the panel are used for panel programming and monitoring of all SVX9000 parameters. The panel is detachable and isolated from the input line potential. Include LOC/REM key to choose control location.	**A**		**KEYPAD-LOC/REM**	
Keypad Remote Mounting Kit — This option is used to remote mount the SVX9000 keypad. The footprint is compatible to the SV9000 remote mount kit. Includes 10 ft. cable, keypad holder and mounting hardware.	**—**		**OPTRMT-KIT-9000X**	

Table 19. Miscellaneous Options

Description	Catalog Number	Price U.S. $
9000XDrive — A PC-based tool for controlling and monitoring of the SVX9000. Features include: loading parameters that can be saved to a file or printed, setting references, starting and stopping the motor, monitoring signals in graphical or text form, and real-time display. To avoid damage to the drive or computer, SVDrivecable must be used.	**9000XDRIVE**	
SVDrivecable — 6 ft. (1.8m) RS-232 cable (22 gauge) with a 7-pin connector on each end. Should be used in conjunction with the 9000X Drive option to avoid damage to the SVX9000 or computer. The same cable can be used for downloading specialized applications to the drive.	**SVDRIVECABLE**	
External Dynamic Braking Resistors — Used with the Dynamic Braking Chopper Circuit to absorb motor regenerative energy for stopping the load and to dissipate the energy flowing back into the drive. Resistors are separated into Standard Duty and Heavy-Duty. Standard Duty is defined as 20% duty or less with 100% braking torque, while Heavy-Duty is defined as 50% duty or less with 150% braking torque. *Consult factory.*	①	

① Consult factory.

Brake Chopper Options

The Brake Chopper Circuit option is used for applications that require dynamic braking. Dynamic Braking resistors are not included with drive purchase. Consult the factory for dynamic braking resistors which are supplied separately. Resistors are not UL Listed.

Table 20. Brake Chopper Circuit Adder — NEMA Type 1, NEMA Type 12, Chassis

hp (I_H)	Adder U.S. $		
	208 – 240V	380 – 500V	525 – 690V
2 3 5vt 5ct 7-1/2vt 7-1/2ct			
10 15 20 25 30 40			
50 60 75 100 125 150			

hp (I_H)	Adder U.S. $		
	208 – 240V	380 – 500V	525 – 690V
200vt 200ct 250 300 350 400			
450 500 550 600vt 600ct 700vt 700ct			
800 900 1000 1200 1350 1500 1600 2000			

Note: Delivery code is FP.

Table 21. Conformal (Varnished) Coating Adder — 208 – 240V, 380 – 500V, 525 – 690V
(See Catalog Number Description to order.)

Frame	Delivery Code	Adder U.S. $
FR4 FR5 FR6	FP FP FP	
FR7 FR8 FR9	FP FP FP	
FR10 FR11 FR12	FP FP FP	
FR13 FR14	FP FP	

Table 22. Conformal Coated Board Kits ②

Field Installed		Factory Installed	
Catalog Number	Price U.S. $	Option Designator	Adder U.S. $
OPT_V ④		③	

② See Option Catalog Numbers on **Page 11**.
③ Construct Catalog Numbers for factory installed per **Table 4** on **Page 6**.
④ Replace "__" with the correct Catalog Number from **Page 11**. Example: OPT**C2**V.

Accessories

Demo Drive and Power Supply

Table 23. Demo Drive and Power Supply

Description	Catalog Number	Price U.S. $
9000X Drive Demo	**9000XDEMO**	
Hand Held 24V Auxiliary Power Supply — used to supply power to the control module in order to perform keypad programming before the drive is connected to line voltage	**9000XAUX24V**	

NEMA Type 12 Conversion Kit

The NEMA Type 12 kit option is used to convert a NEMA Type 1 to a NEMA Type 12 drive. The NEMA Type 12 Kit consists of a metal drive shroud, fan kit for some frames, adaptor plate and plugs.

Table 24. NEMA Type 12 Conversion Kit

Frame Size	Delivery Code	Approximate Dimensions in Inches (mm)			Approximate Weight in Lb. (kg)	Catalog Number	Price U.S. $
		Length	Width	Height	Weight		
FR4	W	13 (330)	7 (178)	4 (102)	4 (1.8)	**OPTN12FR4**	
FR5	W	16 (406)	8 (203)	7 (178)	5 (2.3)	**OPTN12FR5**	
FR6	W	21 (533)	10 (254)	5 (127)	7 (3.2)	**OPTN12FR6**	

Flange Kits

Flange Kit Type 12

The flange kit is utilized when the power section is mounted through the back panel of an enclosure. Includes flange mount brackets and NEMA Type 12 fan components. Metal shroud not included.

Table 25. Flange Kit Type 12 — Frames 4, 5 and 6 ①

Frame Size	Delivery Code	Catalog Number	Price U.S. $
FR4	W	**OPTTHRFR4**	
FR5	W	**OPTTHRFR5**	
FR6	W	**OPTTHRFR6**	

① For installation of an SVX9000 NEMA Type 1 drive into a NEMA Type 12 oversized enclosure.

Flange Kit Type 1

Flange kits for NEMA 1 enclosure drive rating are determined by rating of drive.

Table 26. Flange Kit Type 1 — Frames 4 – 9 ②

Frame Size	Delivery Code	Catalog Number	Price U.S. $
FR4	FP	**OPTTHR4**	
FR5	FP	**OPTTHR5**	
FR6	FP	**OPTTHR6**	
FR7	FP	**OPTTHR7**	
FR8	FP	**OPTTHR8**	
FR9	FP	**OPTTHR9**	

② For installation of an SVX9000 NEMA Type 1 drive into a NEMA Type 1 oversized enclosure.

Flange Kit Type 12

Flange kits for NEMA 12 enclosure drive rating are determined by rating of drive.

Table 27. Flange Kit Type 12 — Frames 4 – 9 ③

Frame Size	Delivery Code	Catalog Number	Price U.S. $
FR4	FP	**OPTTHR4**	
FR5	FP	**OPTTHR5**	
FR6	FP	**OPTTHR6**	
FR7	FP	**OPTTHR7**	
FR8	FP	**OPTTHR8**	
FR9	FP	**OPTTHR9**	

③ For installation of an SVX9000 NEMA Type 12 drive into a NEMA Type 12 oversized enclosure.

Dimensions

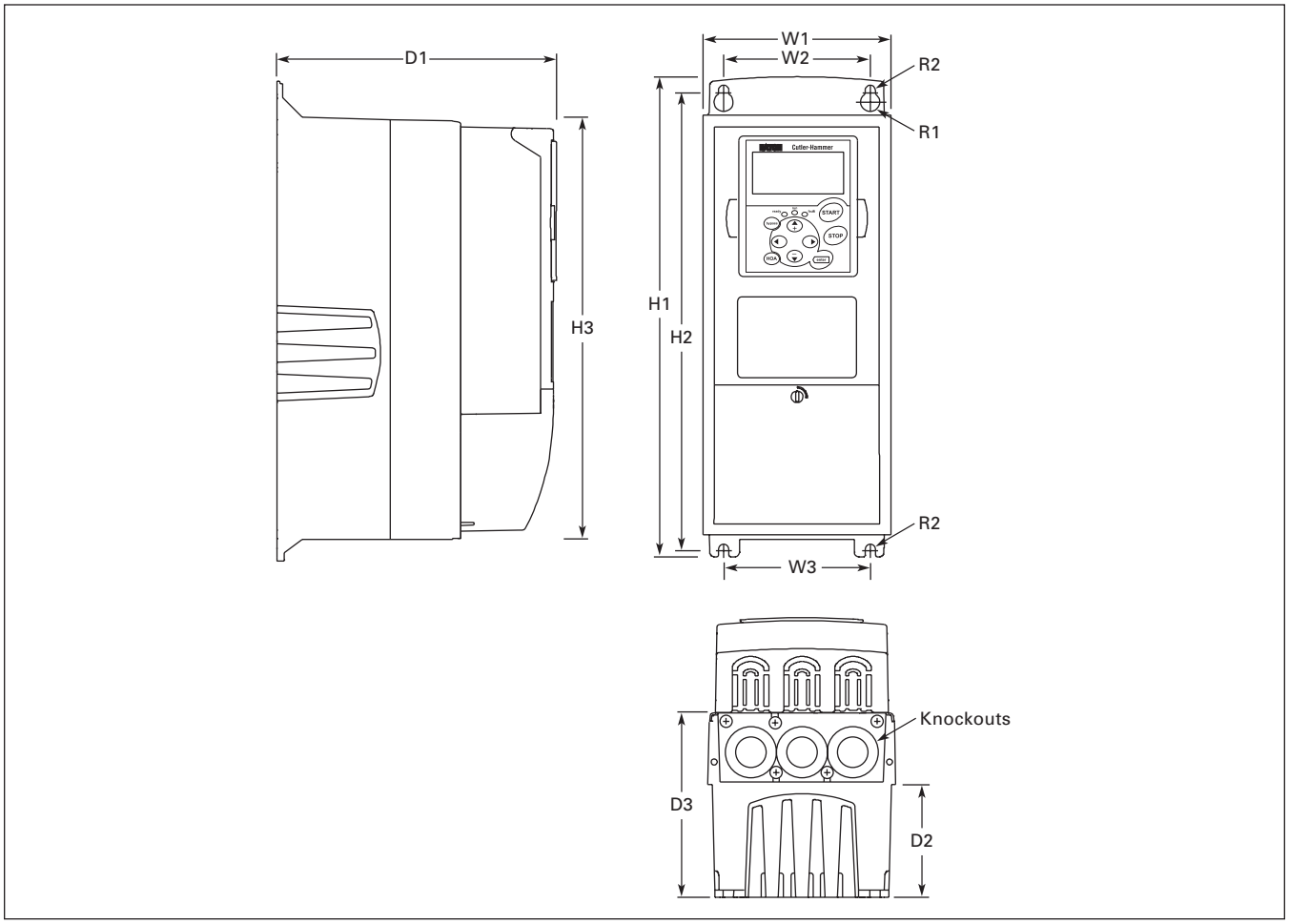

Figure 2. NEMA Type 1 and NEMA Type 12 9000X Drive Dimensions, FR4, FR5 and FR6

Table 28. 9000X Drive Dimensions

Frame Size	Voltage	hp (I_H)	Approximate Dimensions in Inches (mm)											Weight Lbs. (kg)	Knockouts @ Inches (mm)
			H1	H2	H3	D1	D2	D3	W1	W2	W3	R1 dia.	R2 dia.		N1 (O.D.)
FR4	230V	3/4 – 3	12.9 (327)	12.3 (313)	11.5 (292)	7.5 (190)	3.0 (77)	5.0 (126)	5.0 (128)	3.9 (100)	—	.5 (13)	.3 (7)	11.0 (5)	3 @ 1.1 (28)
	480V	1 – 5													
FR5	230V	5 – 7-1/2	16.5 (419)	16.0 (406)	15.3 (389)	8.4 (214)	3.9 (100)	5.8 (148)	5.6 (143)	3.9 (100)	—	.5 (13)	.3 (7)	17.9 (8)	2 @ 1.5 (37) 1 @ 1.1 (28)
	480V	7-1/2 – 15													
FR6	230V	10 – 15	22.0 (558)	21.3 (541)	20.4 (519)	9.3 (237)	4.2 (105)	6.5 (165)	7.6 (195)	5.8 (148)	—	.6 (15.5)	.4 (9)	40.8 (19)	3 @ 1.5 (37)
	480V	20 – 30													
	575V	2 – 25													

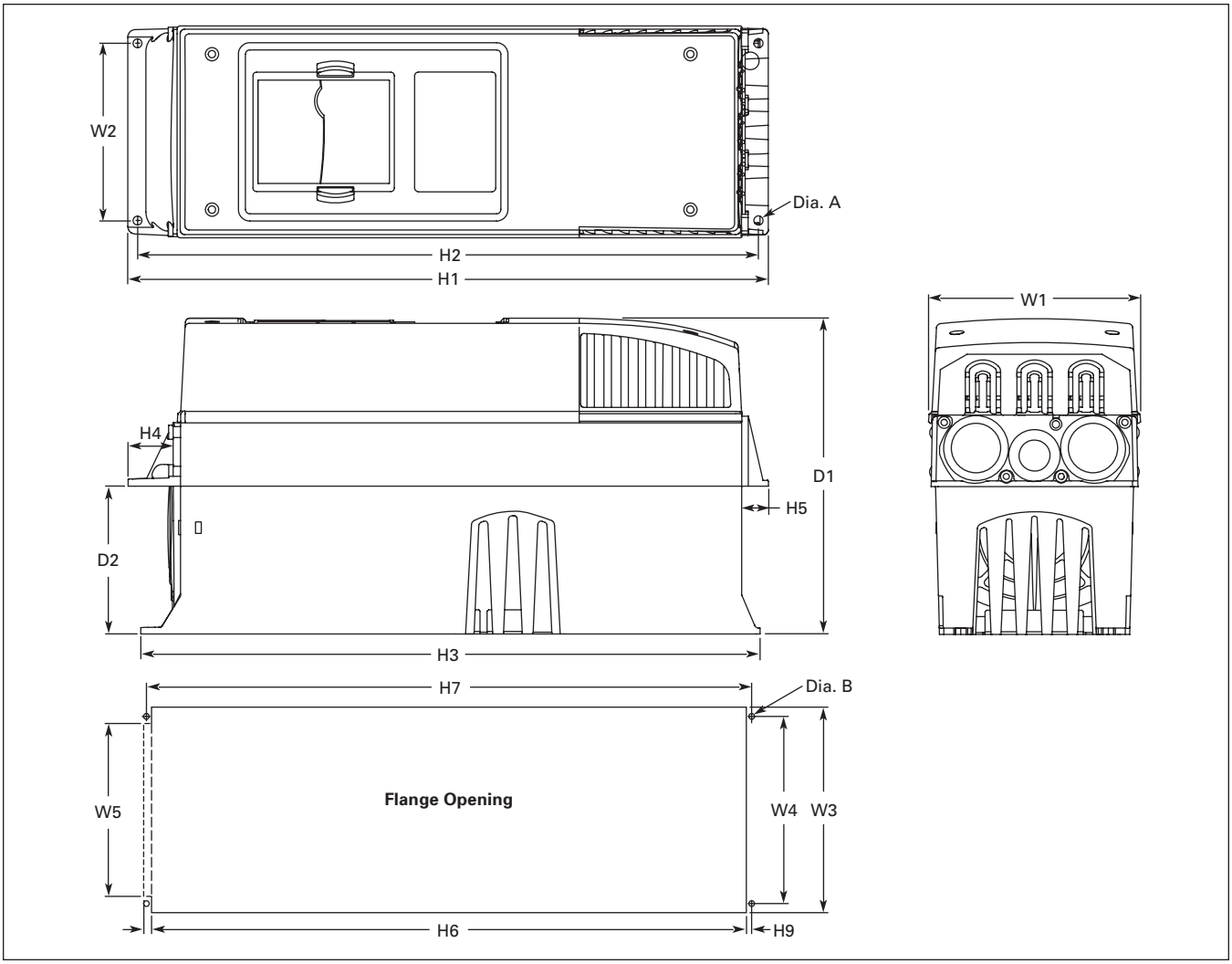

Figure 3. 9000X Dimensions, NEMA Type 1 and NEMA Type 12 with Flange Kit, FR4, FR5 and FR6

Table 29. Dimensions for 9000X, FR4, FR5 and FR6 with Flange Kit

Frame Size	Approximate Dimensions in Inches (mm)									
	W1	W2	H1	H2	H3	H4	H5	D1	D2	Dia. A
FR4	5.0 (128)	4.5 (113)	13.3 (337)	12.8 (325)	12.9 (327)	1.2 (30)	.9 (22)	7.5 (190)	3.0 (77)	.3 (7)
FR5	5.6 (143)	4.7 (120)	17.0 (434)	16.5 (420)	16.5 (419)	1.4 (36)	.7 (18)	8.4 (214)	3.9 (100)	.3 (7)
FR6	7.7 (195)	6.7 (170)	22.0 (560)	21.6 (549)	22.0 (558)	1.2 (30)	.8 (20)	9.3 (237)	4.2 (106)	.3 (7)

Table 30. Dimensions for the Flange Opening, FR4 to FR6

Frame Size	Approximate Dimensions in Inches (mm)							
	W3	W4	W5	H6	H7	H8	H9	Dia. B
FR4	4.8 (123)	4.5 (113)	—	12.4 (315)	12.8 (325)	—	.2 (5)	.3 (7)
FR5	5.3 (135)	4.7 (120)	—	16.2 (410)	16.5 (420)	—	.2 (5)	.3 (7)
FR6	7.3 (185)	6.7 (170)	6.2 (157)	21.2 (539)	21.6 (549)	.3 (7)	.2 (5)	.3 (7

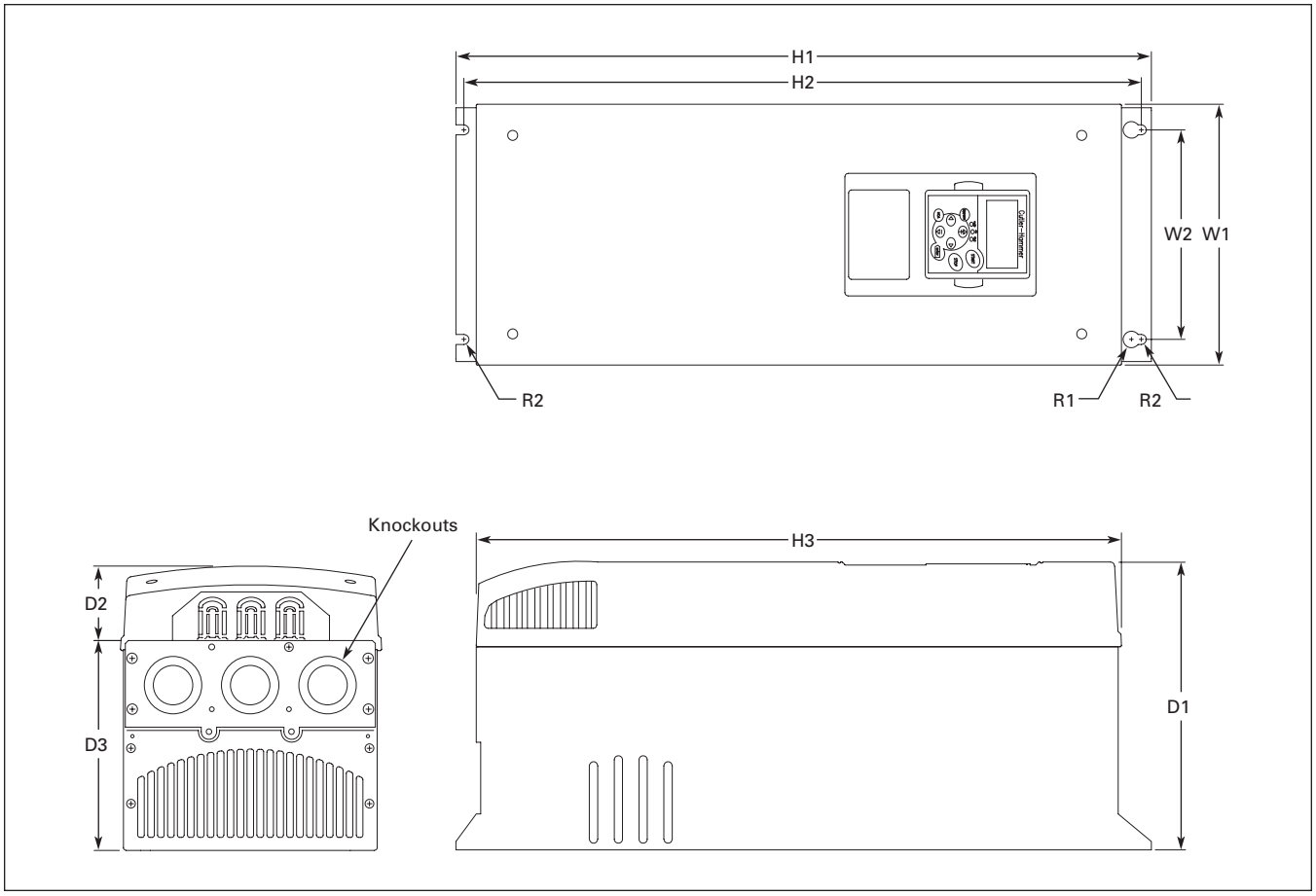

Figure 4. 9000X Dimensions, NEMA Type 1 and NEMA Type 12, FR7

Table 31. 9000X Drive Dimensions, FR7

Frame Size	Voltage	hp (I_H)	Approximate Dimensions in Inches (mm)										Weight lbs. (kg)	Knockouts @ Inches (mm)
			H1	H2	H3	D1	D2	D3	W1	W2	R1 dia.	R2 dia.		N1 (O.D.)
FR7	230V	20 – 30	24.8 (630)	24.2 (614)	23.2 (590)	10.1 (257)	3.0 (77)	7.3 (184)	9.3 (237)	7.5 (190)	.7 (18)	.4 (9)	77.2 (35)	3 @ 1.5 (37)
	480V	40 – 60												
	575V	30 – 40												

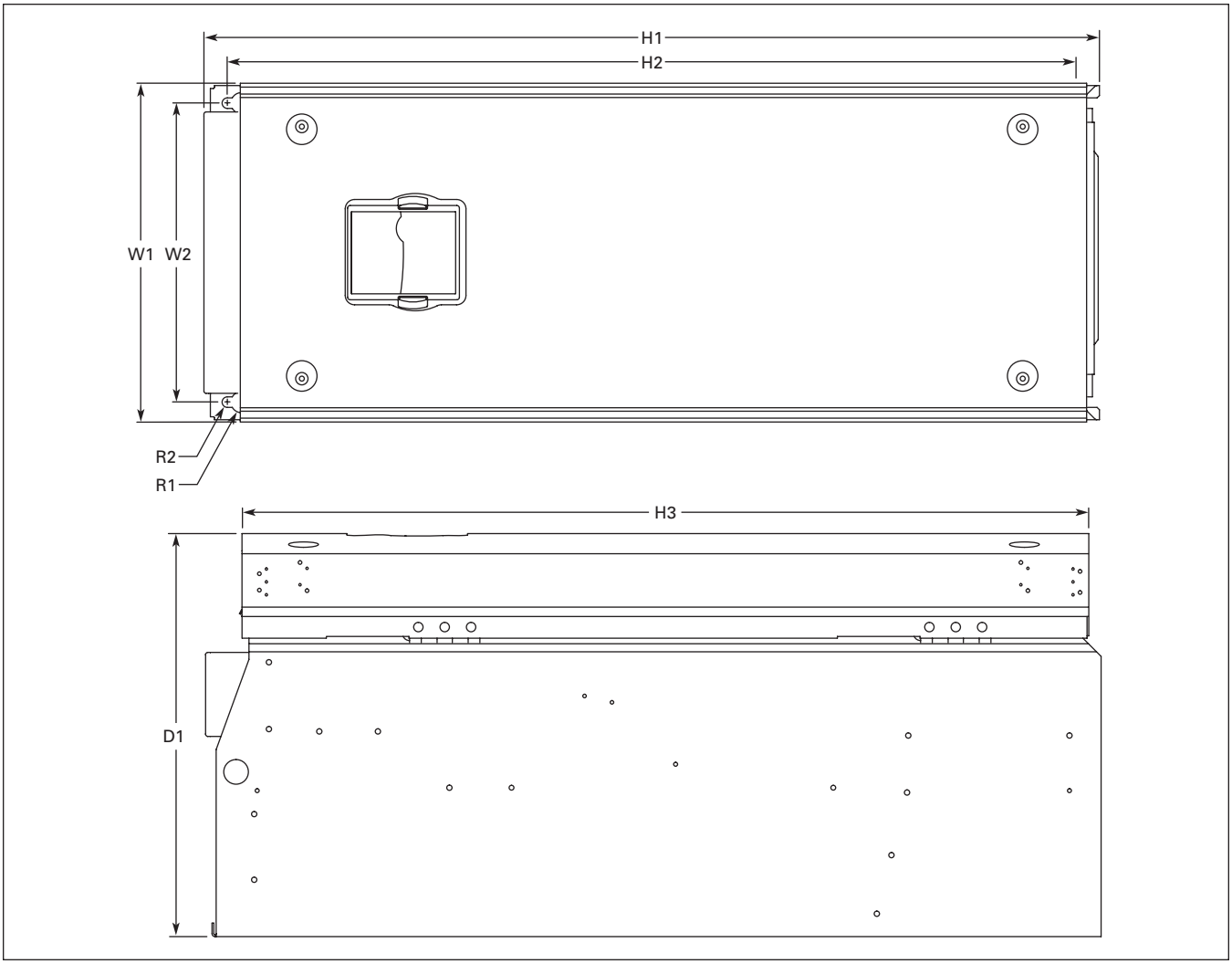

Figure 5. 9000X Dimensions, NEMA Type 1 and NEMA Type 12, FR8

Table 32. 9000X Drive Dimensions, FR8

Frame Size	Voltage	hp (I_H)	Approximate Dimensions in Inches (mm)								Weight lbs. (kg)
			D1	H1	H2	H3	W1	W2	R1 dia.	R2 dia.	
FR8	230V	40 – 60	13.5 (344)	30.1 (764)	28.8 (732)	28.4 (721)	11.5 (291)	10 (255)	.7 (18)	.4 (9)	127 (58)
	480V	75 – 125									
	575V	50 – 75									

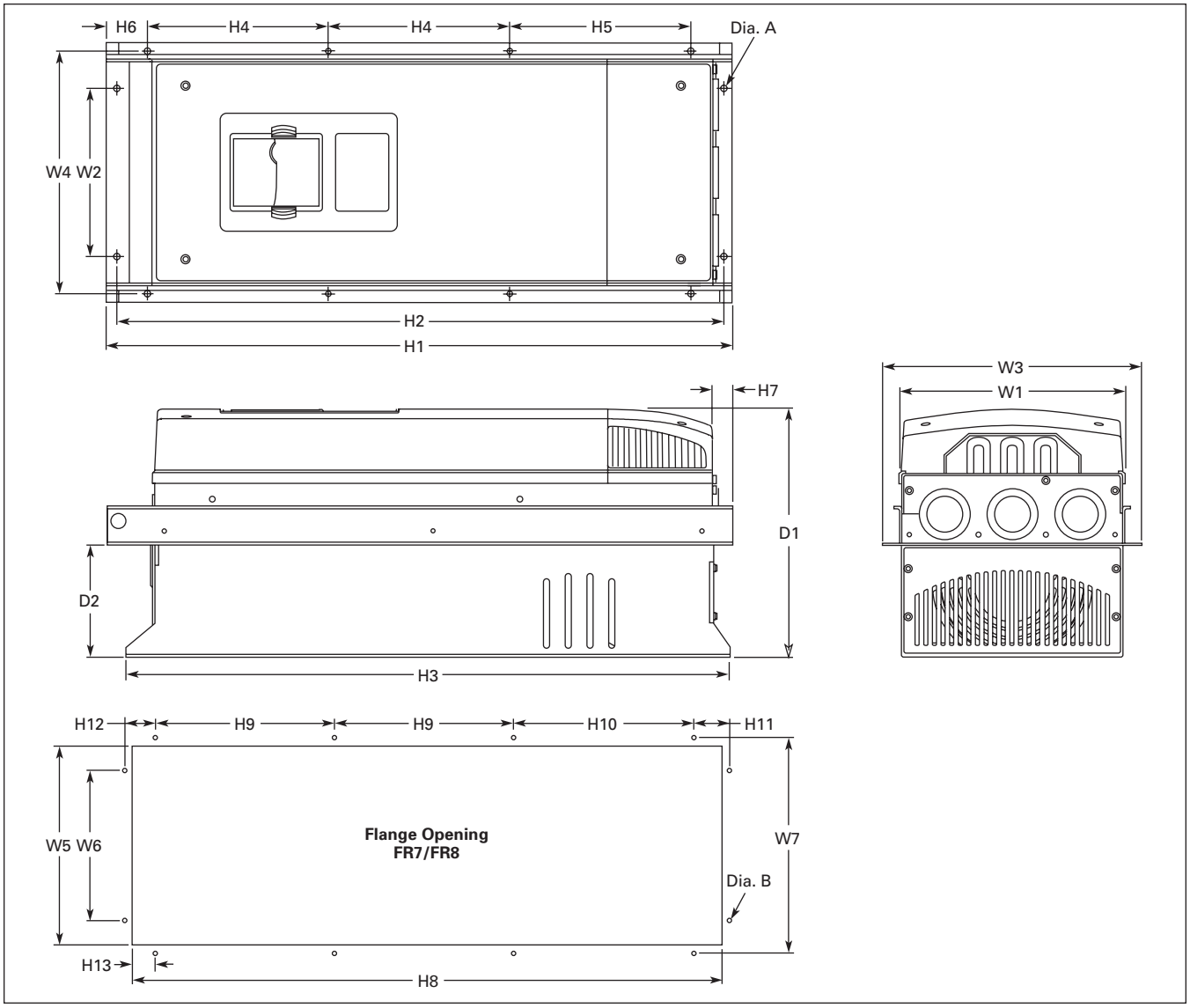

Figure 6. 9000X Dimensions, NEMA Type 1 and NEMA Type 12, with Flange Kit, FR7 and FR8

Table 33. Dimensions for 9000X, FR7 and FR8 with Flange Kit

Frame Size	Approximate Dimensions in Inches (mm)													
	W1	W2	W3	W4	H1	H2	H3	H4	H5	H6	H7	D1	D2	Dia. A
FR7	9.3 (237)	6.8 (175)	10.6 (270)	10.0 (253)	25.6 (652)	24.8 (632)	24.8 (630)	7.4 (189)	7.4 (189)	.9 (23)	.8 (20)	10.1 (257)	4.6 (117)	.3 (6)
FR8	11.2 (285)	—	14.0 (355)	13.0 (330)	32.8 (832)	—	29.3 (745)	10.2 (258)	10.4 (265)	1.7 (43)	2.2 (57)	13.5 (344)	4.3 (110)	.4 (9)

Table 34. Dimensions for the Flange Opening, FR7/FR8

Frame Size	Approximate Dimensions in Inches (mm)									
	W5	W6	W7	H8	H9	H10	H11	H12	H13	Dia. B
FR7	9.2 (233)	6.9 (175)	10.0 (253)	24.4 (619)	7.4 (189)	7.4 (189)	1.4 (35)	1.3 (32)	1.0 (25)	.3 (6)
FR8	11.9 (301)	—	13.0 (330)	31.9 (810)	10.2 (258)	10.4 (265)	—	—	1.3 (33)	.4 (9)

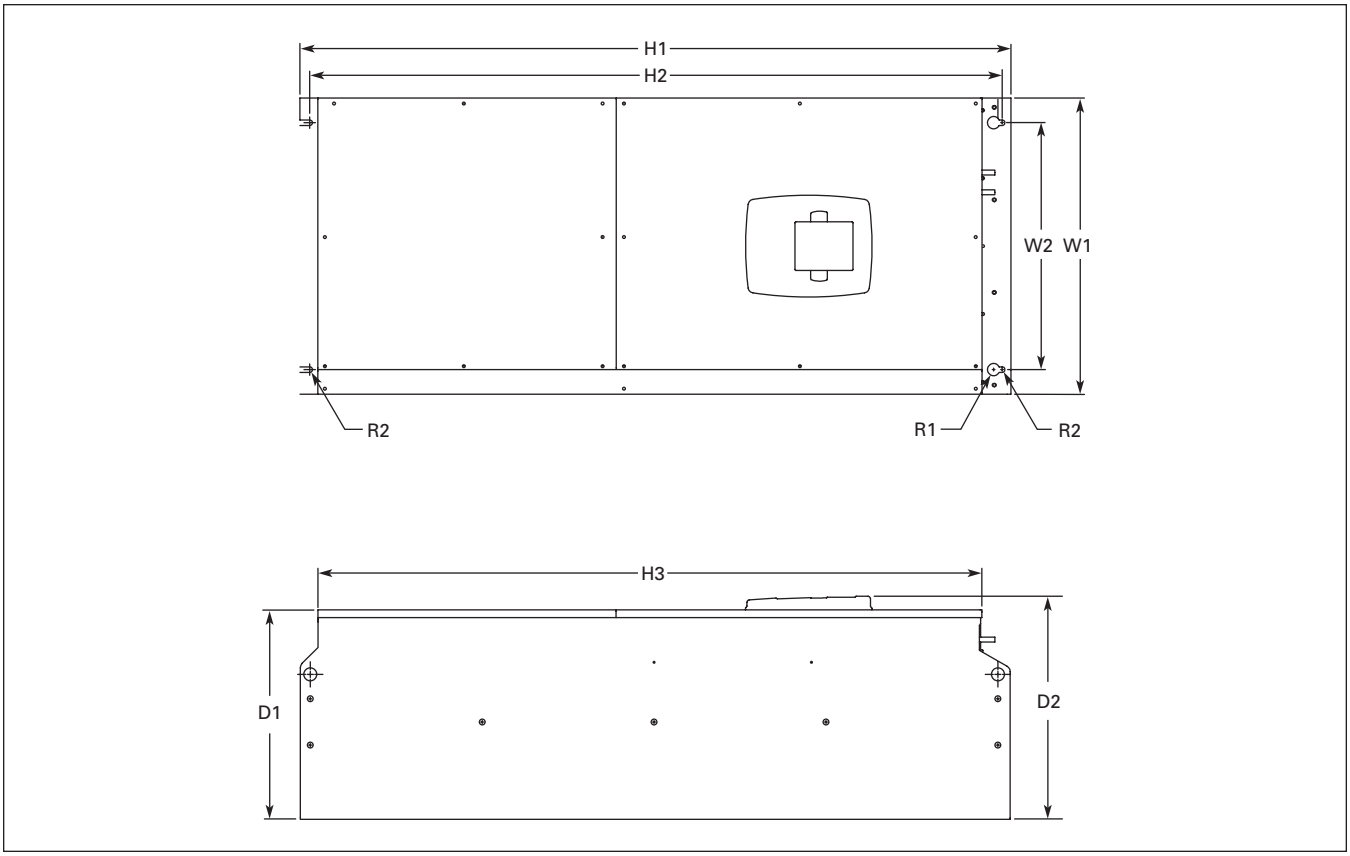

Figure 7. 9000X Dimensions, NEMA Type 1 and NEMA Type 12, FR9

Table 35. 9000X Drive Dimensions, FR9

Frame Size	Voltage	hp (I_H)	Approximate Dimensions in Inches (mm)									Weight lbs. (kg)
			H1	H2	H3	D1	D2	W1	W2	R1 dia.	R2 dia.	
FR9	230V	75 – 100	45.3 (1150)	44.1 (1120)	42.4 (1076)	13.4 (340)	14.3 (362)	18.9 (480)	15.7 (400)	.8 (20)	.4 (9)	321.9 (146)
	480V	150 – 200										
	575V	100 – 175										

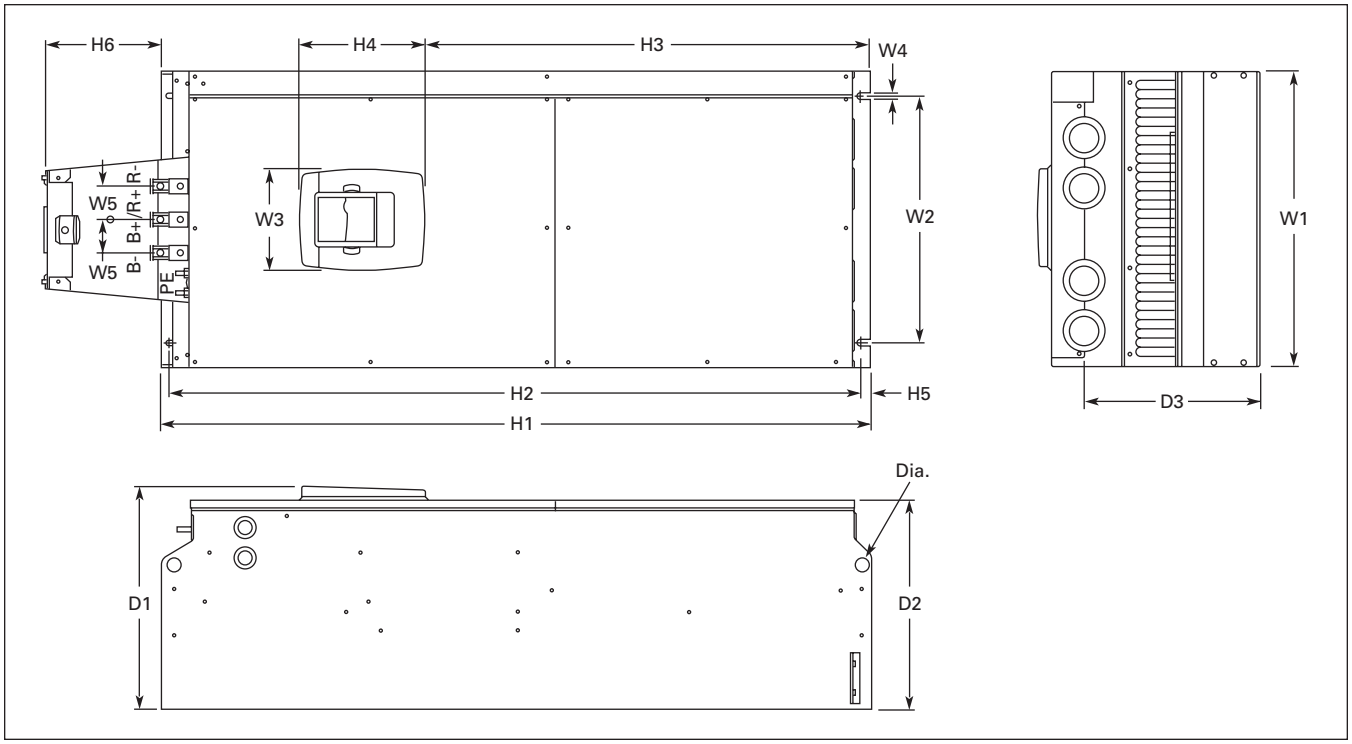

Figure 8. 9000X Dimensions, NEMA Type 1 and NEMA Type 12 FR9

Table 36. Dimensions for 9000X, FR9

Frame Size	Approximate Dimensions in Inches (mm)														
	W1	W2	W3	W4	W5	H1	H2	H3	H4	H5	H6 ①	D1	D2	D3	Dia.
FR9	18.9 (480)	15.7 (400)	6.5 (165)	.4 (9)	2.1 (54)	45.3 (1150)	44.1 (1120)	28.3 (721)	8.0 (205)	.6 (16)	7.4 (188)	14.2 (361.5)	13.4 (340)	11.2 (285)	.8 (21)

① Brake resistor terminal box (H6) included when brake chopper ordered.

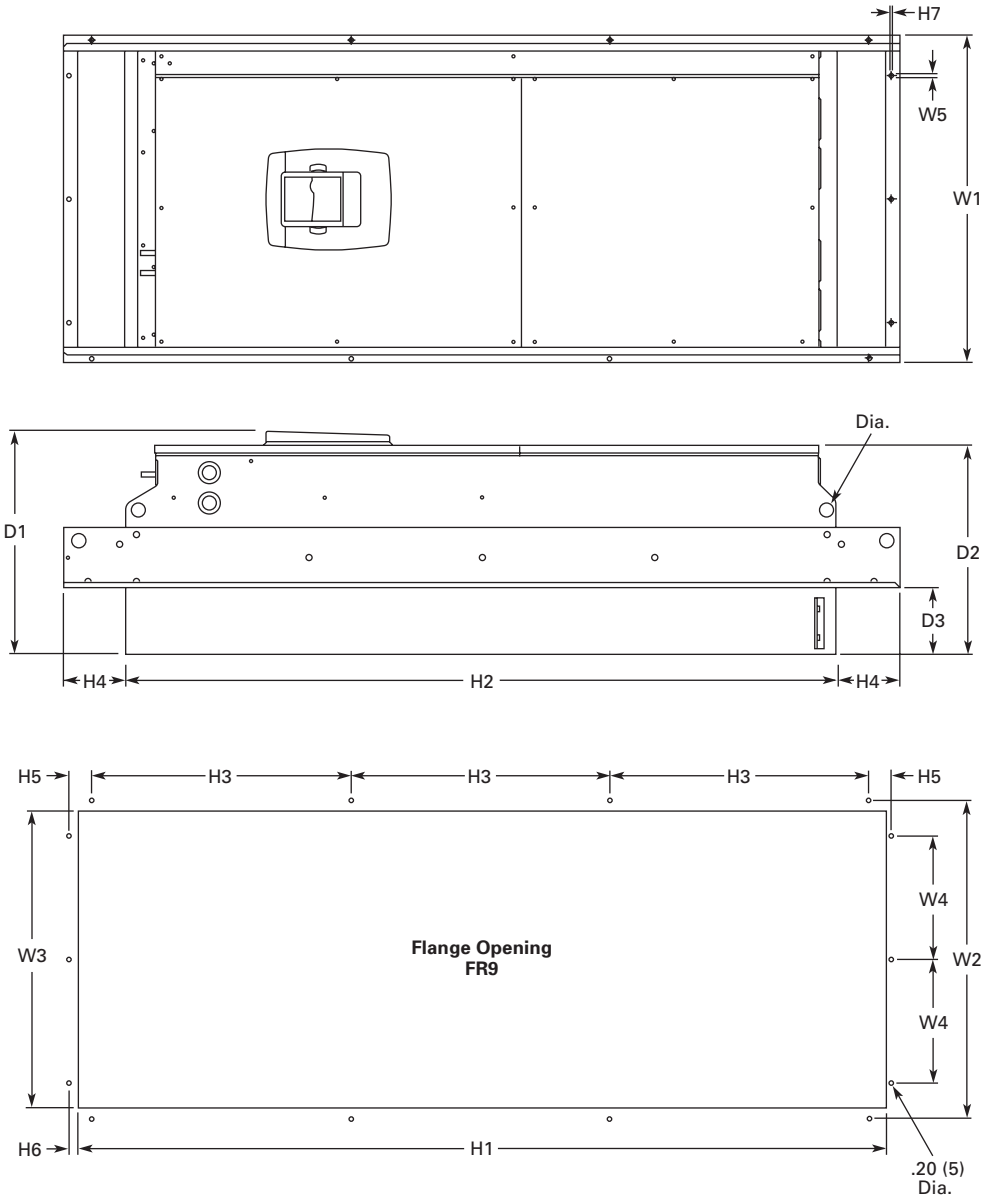

Figure 9. 9000X Dimensions, NEMA Type 1 and NEMA Type 12 FR9 with Flange Kit

Table 37. Dimensions for 9000X, FR9 with Flange Kit

Frame Size	Approximate Dimensions in Inches (mm)															
	W1	W2	W3	W4	W5	H1	H2	H3	H4	H5	H6	H7	D1	D2	D3	Dia.
FR9	20.9 (530)	20.0 (510)	19.1 (485)	7.9 (200)	.2 (5.5)	51.7 (1312)	45.3 (1150)	16.5 (420)	3.9 (100)	1.4 (35)	.4 (9)	.1 (2)	24.9 (362)	13.4 (340)	4.3 (109)	.8 (21)

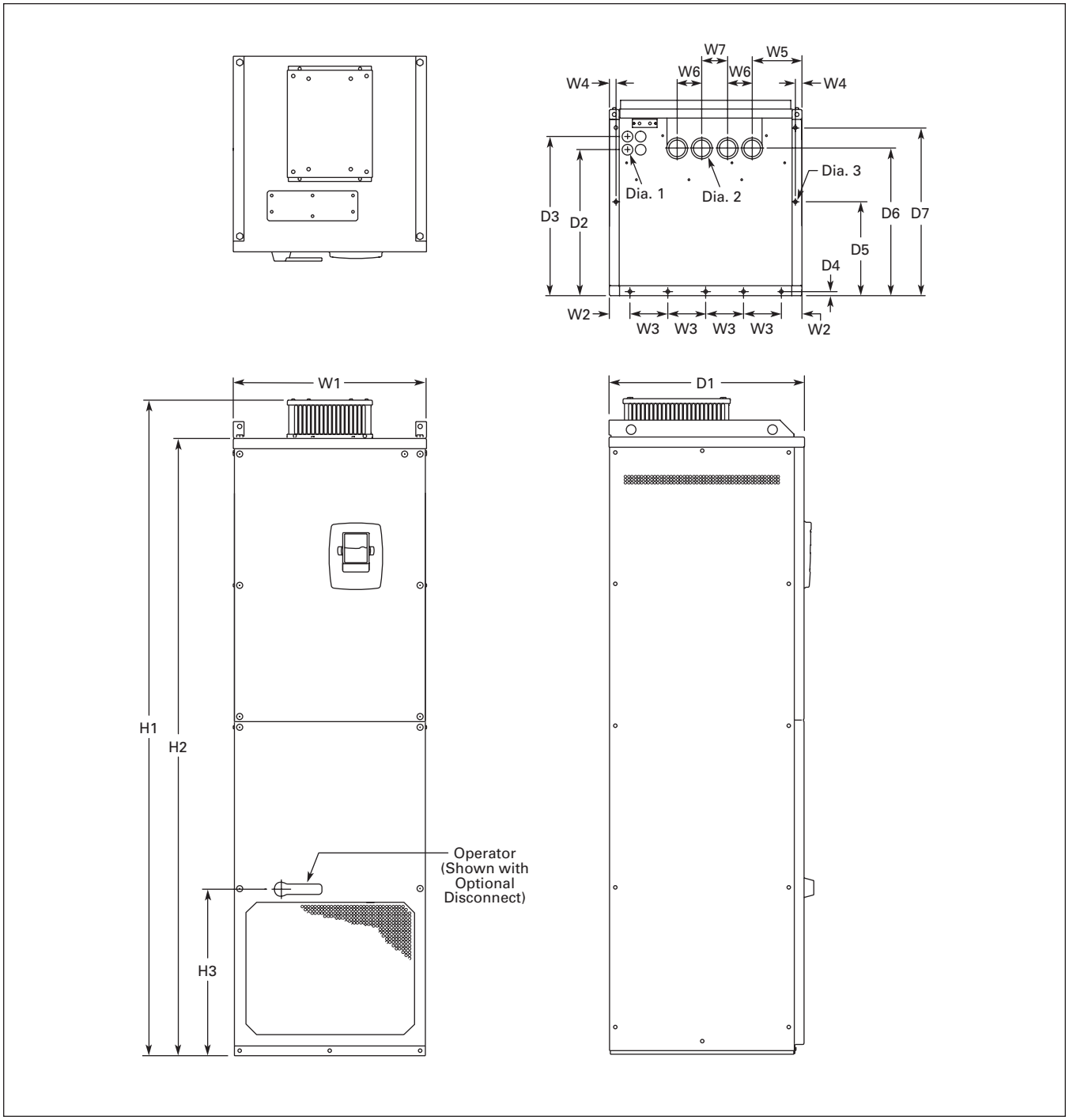

Figure 10. 9000X Dimensions, NEMA Type 1 and NEMA Type 12 FR10 Freestanding Drive

Table 38. Dimensions for 9000X, FR10 Freestanding Drive

Frame Size	Approximate Dimensions in Inches (mm)																				Weight lbs. (kg)
	W1	W2	W3	W4	W5	W6	W7	H1	H2	H3	D1	D2	D3	D4	D5	D6	D7	Dia. 1	Dia. 2	Dia. 3	
FR10	23.43 (595)	2.46 (62.5)	4.53 (115)	.79 (20)	5.95 (151)	2.95 (75)	3.11 (79)	79.45 (2018)	74.80 (1900)	20.18 (512.5)	23.70 (602)	17.44 (443)	19.02 (483)	.47 (12)	11.22 (285)	17.60 (447)	20.08 (510)	.83 (21)	1.89 (48)	.43 (11)	857 (389)

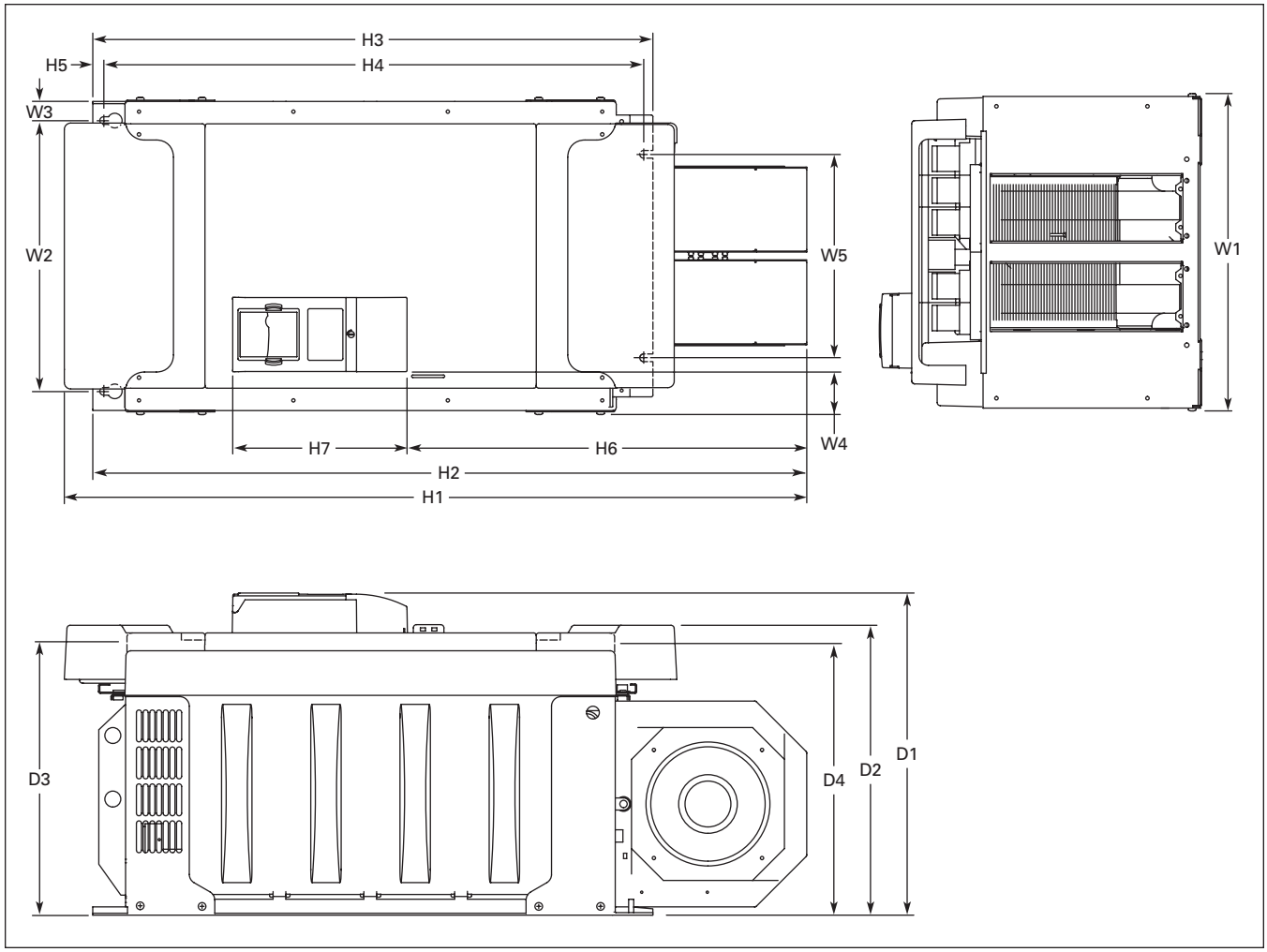

Figure 11. 9000X Dimensions, FR10 Open Chassis

Table 39. Dimensions for 9000X, FR10 Open Chassis

Frame Size	Voltage	hp (I_H)	Approximate Dimensions in Inches (mm)																Weight lbs. (kg)
			W1	W2	W3	W4	W5	H1	H2	H3	H4	H5	H6	H7	D1	D2	D3	D4	
FR10	480V	250 – 350	19.7 (500)	16.7 (425)	1.2 (30)	2.6 (67)	12.8 (325)	45.9 (1165)	44.1 (1121)	34.6 (879)	33.5 (850)	.7 (17)	24.7 (627)	10.8 (275)	19.9 (506)	17.9 (455)	16.7 (423)	16.6 (421)	518 (235)
	575V	200 – 300																	

Note: 9000X FR12 is built of two FR10 modules. Please refer to SPX9000 installation manual for mounting instructions.

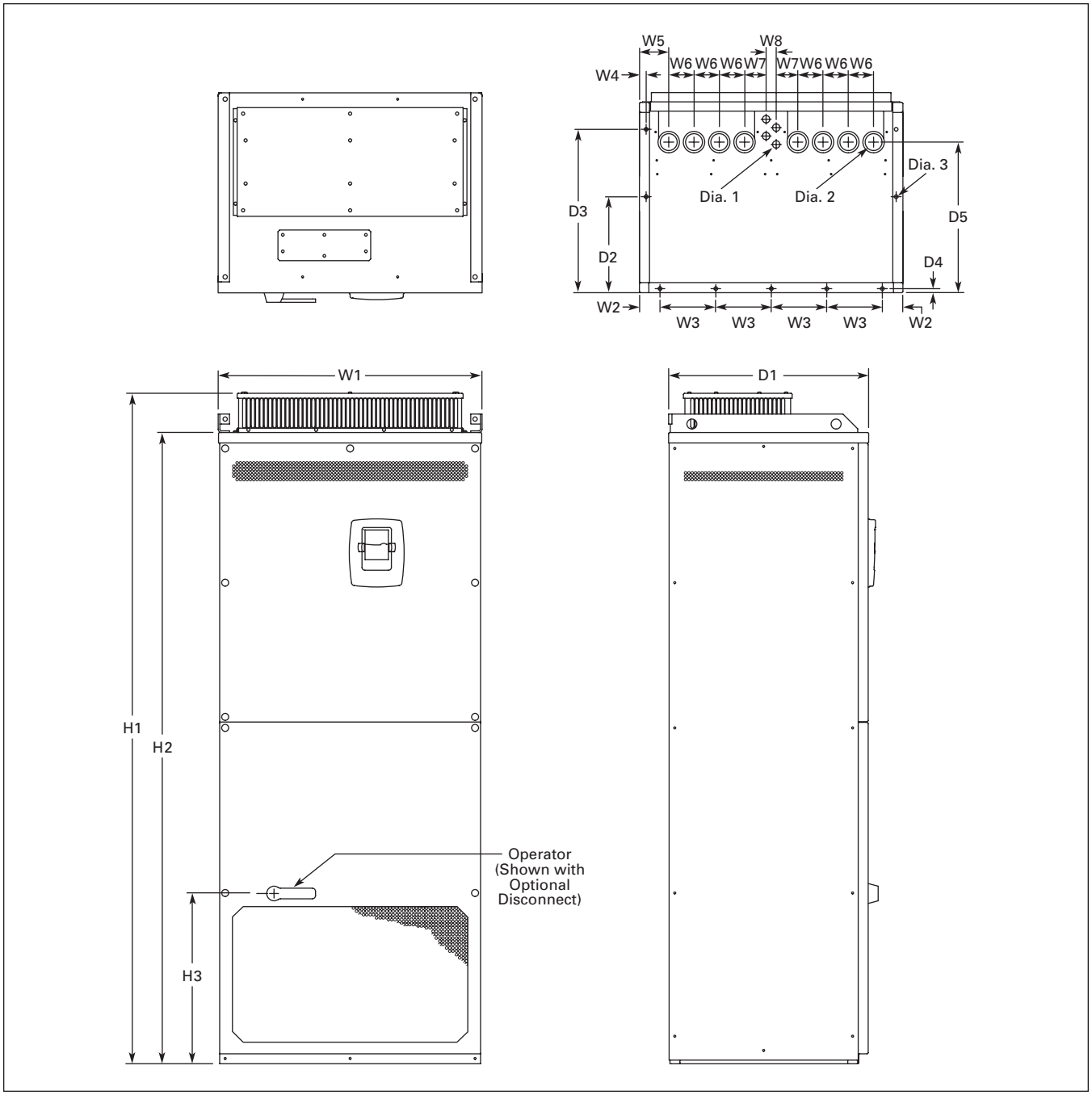

Figure 12. 9000X Dimensions, NEMA Type 1 FR11 Freestanding Drive

Table 40. Dimensions for 9000X, NEMA Type 1 FR11 Freestanding Drive

Frame Size	Voltage	hp (I_H)	Approximate Dimensions in Inches (mm)																			Weight lbs. (kg)
			W1	W2	W3	W4	W5	W6	W7	W8	H1	H2	H3	D1	D2	D3	D4	D5	Dia. 1	Dia. 2	Dia. 3	
FR11	480	400 – 550	31.26 (794)	2.40 (61)	6.50 (165)	.79 (20)	3.43 (87)	2.95 (75)	2.52 (64)	1.18 (30)	79.45 (2018)	74.80 (1900)	20.18 (512.5)	23.70 (602)	11.22 (285)	19.09 (485)	.47 (12)	17.60 (447)	.83 (21)	1.89 (48)	.35 x .43 (9 x 11)	526 (239)

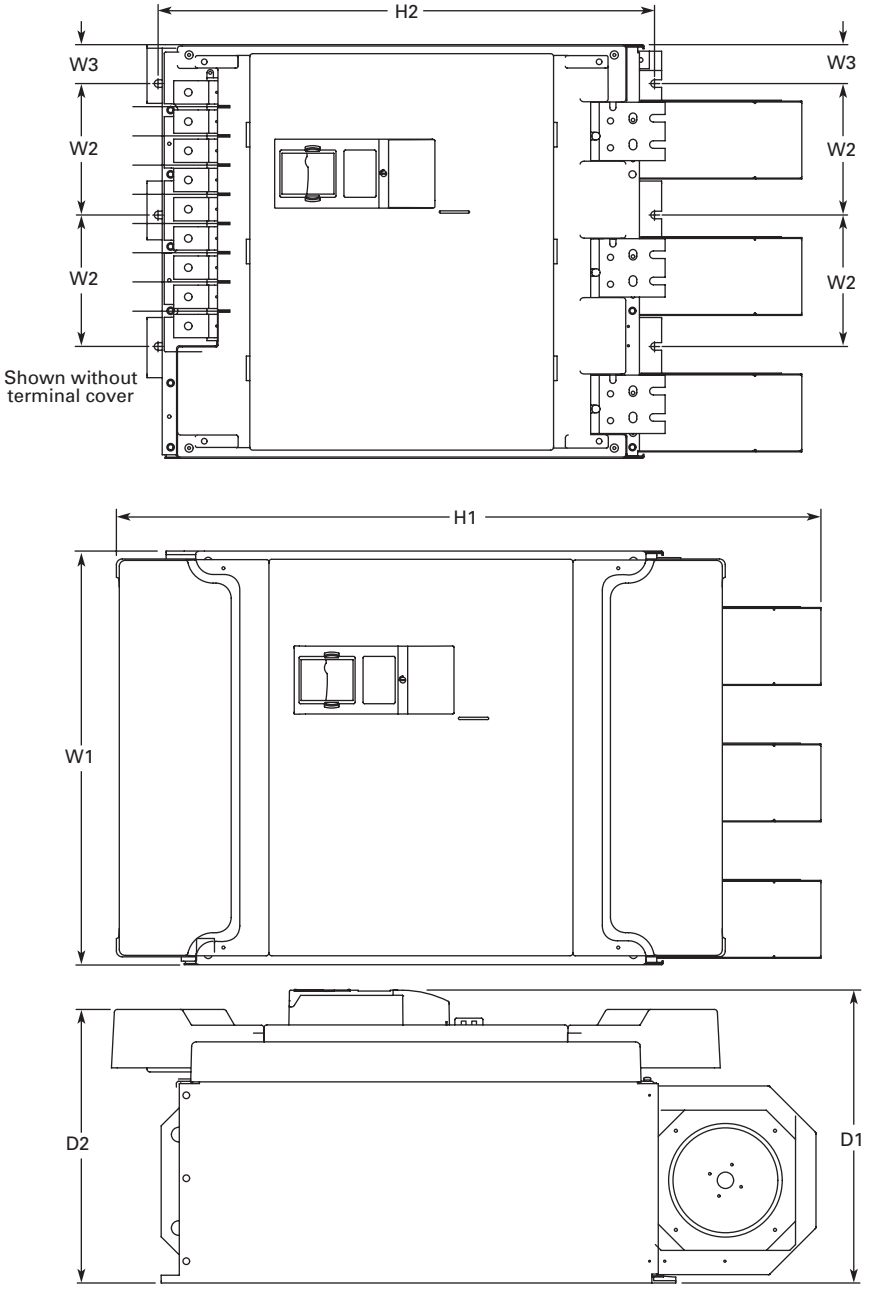

Figure 13. 9000X Dimensions, FR11 Open Chassis

Table 41. Dimensions for 9000X, FR11 Open Chassis

Frame Size	Voltage	hp (I_H)	Approximate Dimensions in Inches (mm)							Weight lbs. (kg)
			W1	W2	W3	H1	H2	D1	D2	
FR11	480V	400 – 550	27.9 (709)	8.86 (225)	2.6 (67)	45.5 (1155)	33.5 (850)	19.8 (503)	18.4 (468)	833 (378)
	575V	400 – 500								

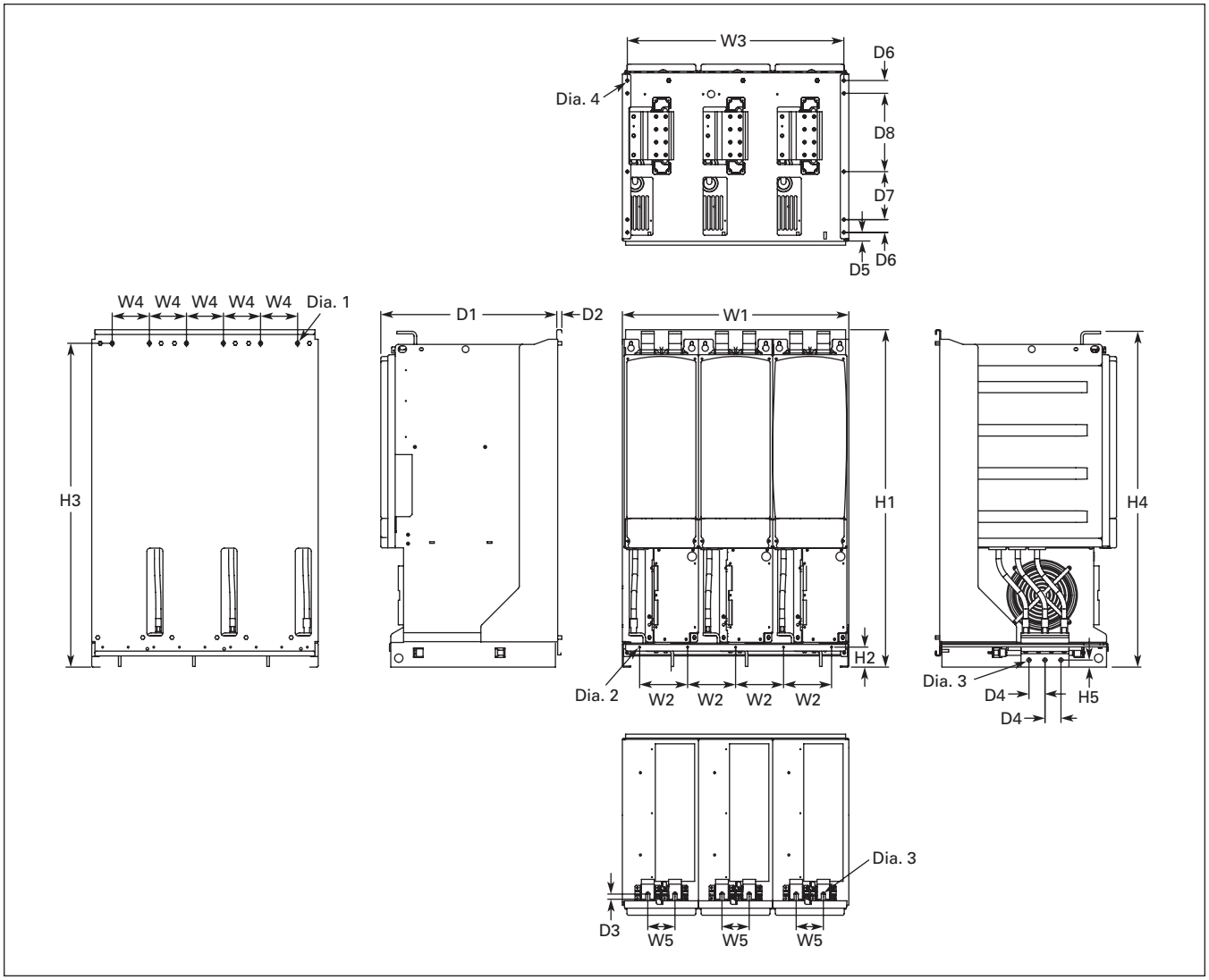

Figure 14. 9000X Dimensions, FR13 Open Chassis Inverter

Table 42. Dimensions for 9000X, FR13 Open Chassis Inverter

Frame Size	Approximate Dimensions in Inches (mm)																						Weight lbs. (kg)
	W1	W2	W3	W4	W5	H1	H2	H3	H4	H5	D1	D2	D3	D4	D5	D6	D7	D8	Dia. 1	Dia. 2	Dia. 3	Dia. 4	
FR13	27.87 (708)	5.91 (150)	26.65 (677)	4.57 (116)	3.35 (85)	41.54 (1055)	2.46 (62.5)	39.86 (1012.5)	41.34 (1050)	.79 (20)	21.77 (553)	.51 (13)	.63 (16)	1.97 (50)	1.06 (27)	1.57 (40)	5.91 (150)	9.64 (244.8)	.35x.59 (9x15)	.18 (4.6)	.51 (13)	.37 (9.5)	683 (310)

Note: 9000X FR14 is built of two FR13 modules. Please refer to SPX9000 installation manual for mounting instructions.

Note: FR13 is built from an inverter module and a converter module. Please refer to SPX9000 installation manual for mounting instructions.

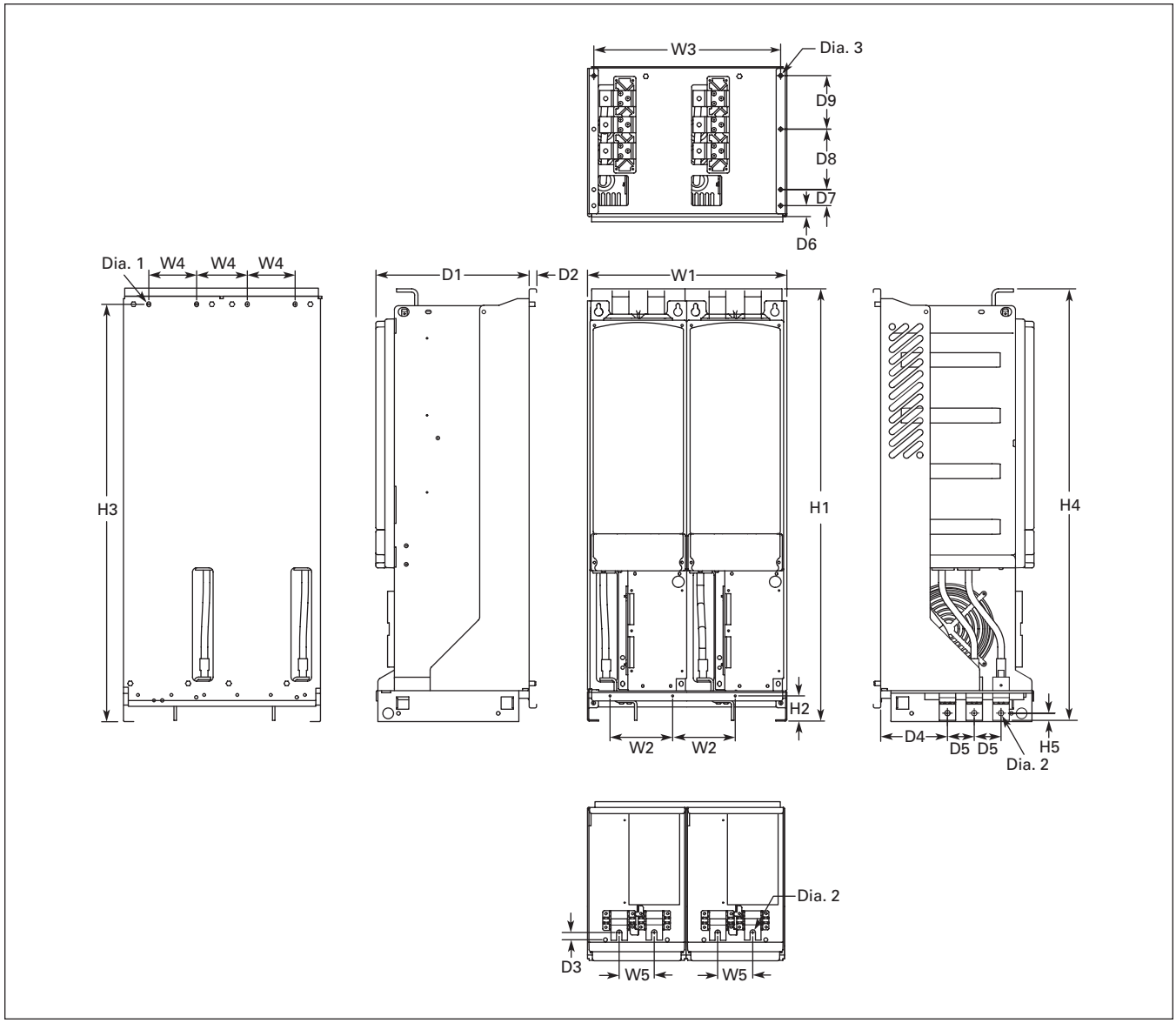

Figure 15. 9000X Dimensions, FR13 Open Chassis Converter

Table 43. FR13 — Number of Input Units

480V	hp	Input Modules	690V	hp	Input Modules
SPX800A0-4A2N1	800	2	**SPX800A0-5A2N1**	800	2
			SPX900A0-5A2N1	900	2
			SPXH10A0-5A2N1	1000	2

Table 44. Dimensions for 9000X, FR13 Open Chassis Converter

Frame Size	Approximate Dimensions in Inches (mm)																						Weight lbs. (kg)
	W1	W2	W3	W4	W5	H1	H2	H3	H4	H5	D1	D2	D3	D4	D5	D6	D7	D8	D9	Dia. 1	Dia. 2	Dia. 3	
FR13	18.74 (476)	5.91 (150)	17.52 (445)	4.57 (116)	3.35 (85)	41.54 (1055)	2.46 (62.5)	39.86 (1012.5)	41.34 (1050)	.69 (17.5)	14.69 (373)	.51 (13)	.73 (18.5)	6.42 (163)	2.56 (65)	1.06 (27)	1.57 (40)	5.91 (150)	5.24 (133)	.35x.59 (9x15)	.51 (13)	.37 (9.5)	295 (134)

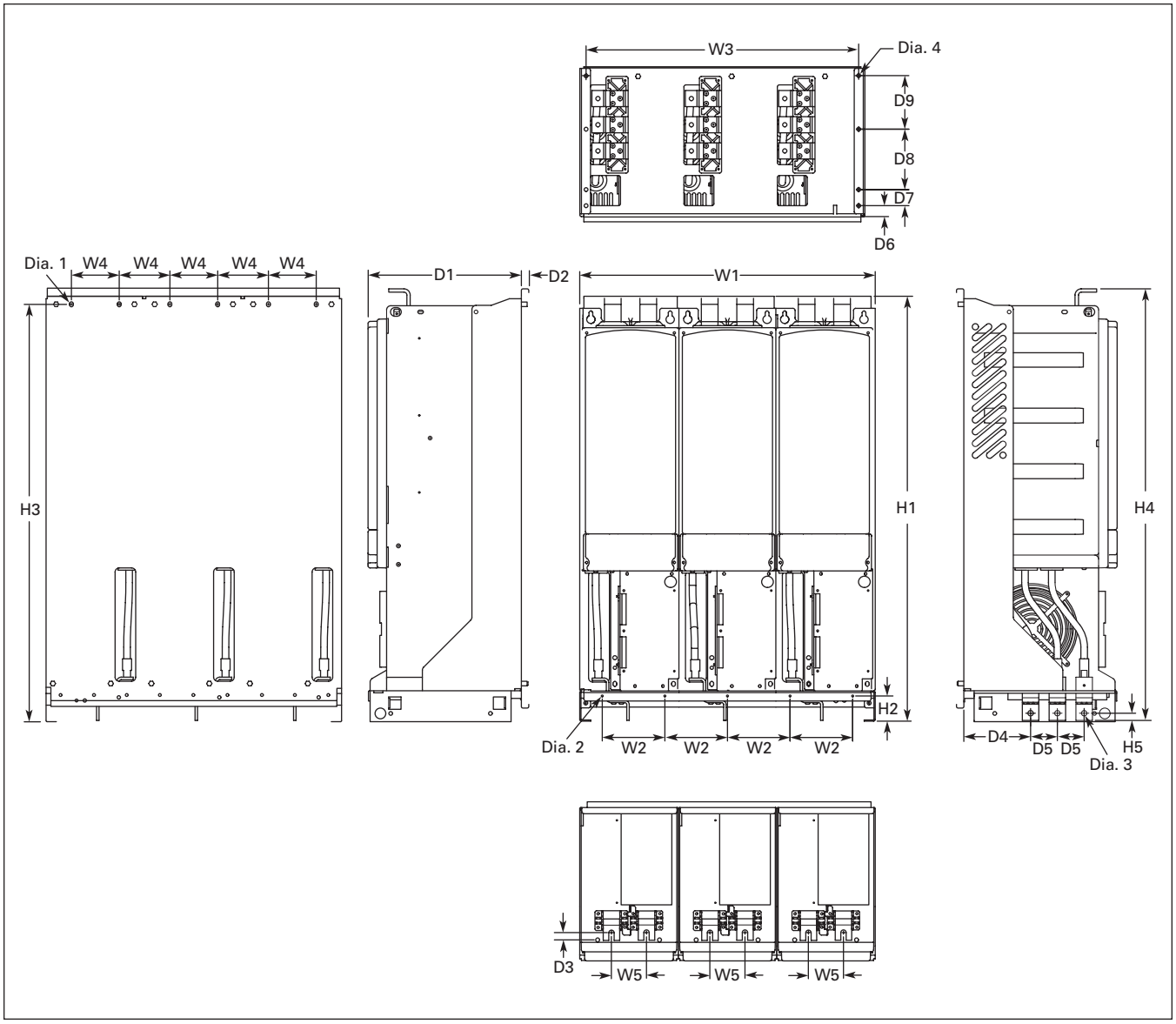

Figure 16. 9000X Dimensions, FR13 Open Chassis Converter — 900/1000 hp 480V

Table 45. FR13 — Number of Input Units

480V	hp	Input Modules
SPX900A0-4A2N1	900	3
SPXH10A0-4A2N1	1000	3

Table 46. Dimensions for 9000X, FR13 Open Chassis Converter — 900/1000 hp 480V

Frame Size	Approximate Dimensions in Inches (mm)																							Weight lbs. (kg)
	W1	W2	W3	W4	W5	H1	H2	H3	H4	H5	D1	D2	D3	D4	D5	D6	D7	D8	D9	Dia. 1	Dia. 2	Dia. 3	Dia. 4	
FR13	27.87 (708)	5.91 (150)	26.65 (677)	4.57 (116)	3.35 (85)	41.54 (1055)	2.46 (62.5)	39.86 (1012.5)	41.34 (1050)	.69 (17.5)	14.69 (373)	.51 (13)	.73 (18.5)	6.42 (163)	2.56 (65)	1.06 (27)	1.57 (40)	5.91 (150)	5.24 (133)	.35x.59 (9x15)	.18 (4.6)	.51 (13)	.37 (9.5)	443 (201)

Table 47. Choke Types

Catalog Number	Frame Size	Choke Type ①
Voltage Range 380 – 500V		
SPX 250 4 SPX 300 4 SPX 350 4	FR10 FR10 FR10	CHK0400 CHK0520 CHK0520
SPX 400 4 SPX 500 4 SPX 550 4	FR11 FR11 FR11	2 x CHK0400 2 x CHK0400 2 x CHK0400
SPX 600 4 SPX 650 4 SPX 700 4	FR12 FR12 FR12	2 x CHK0520 2 x CHK0520 2 x CHK0520
SPX 800 4 SPX 900 4 SPX H10 4	FR13 FR13 FR13	2 x CHK0400 3 x CHK0520 3 x CHK0520
SPX H12 4 SPX H16 4	FR14 FR14	4 x CHK0520 6 x CHK0400
Voltage Range 525 – 690V		
SPX 200 5 SPX 250 5 SPX 300 5	FR10 FR10 FR10	CHK0261 CHK0400 CHK0400
SPX 400 5 SPX 450 5 SPX 500 5	FR11 FR11 FR11	CHK0520 CHK0520 2 x CHK0400
SPX 550 5 SPX 600 5 SPX 700 5	FR12 FR12 FR12	2 x CHK0400 2 x CHK0400 2 x CHK0400
SPX 800 5 SPX 900 5 SPX H10 5	FR13 FR13 FR13	2 x CHK0400 2 x CHK0400 2 x CHK0400
SPX H13 5 SPX H15 5	FR14 FR14	4 x CHK0400 6 x CHK0400

① Chokes are provided with all FR10 – FR14 drives.

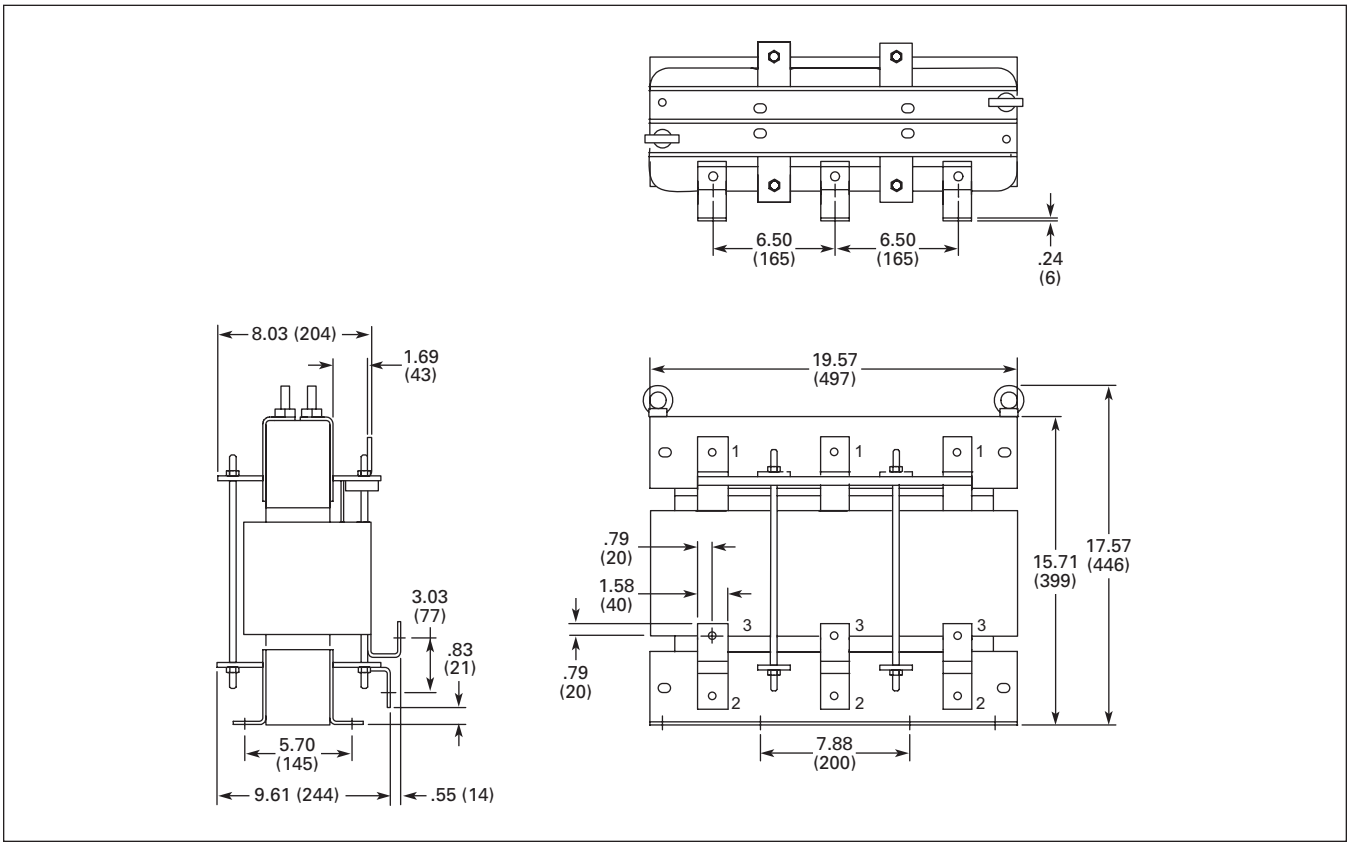

Figure 17. Dimensions of AC Choke CHK0520 in Inches (mm)

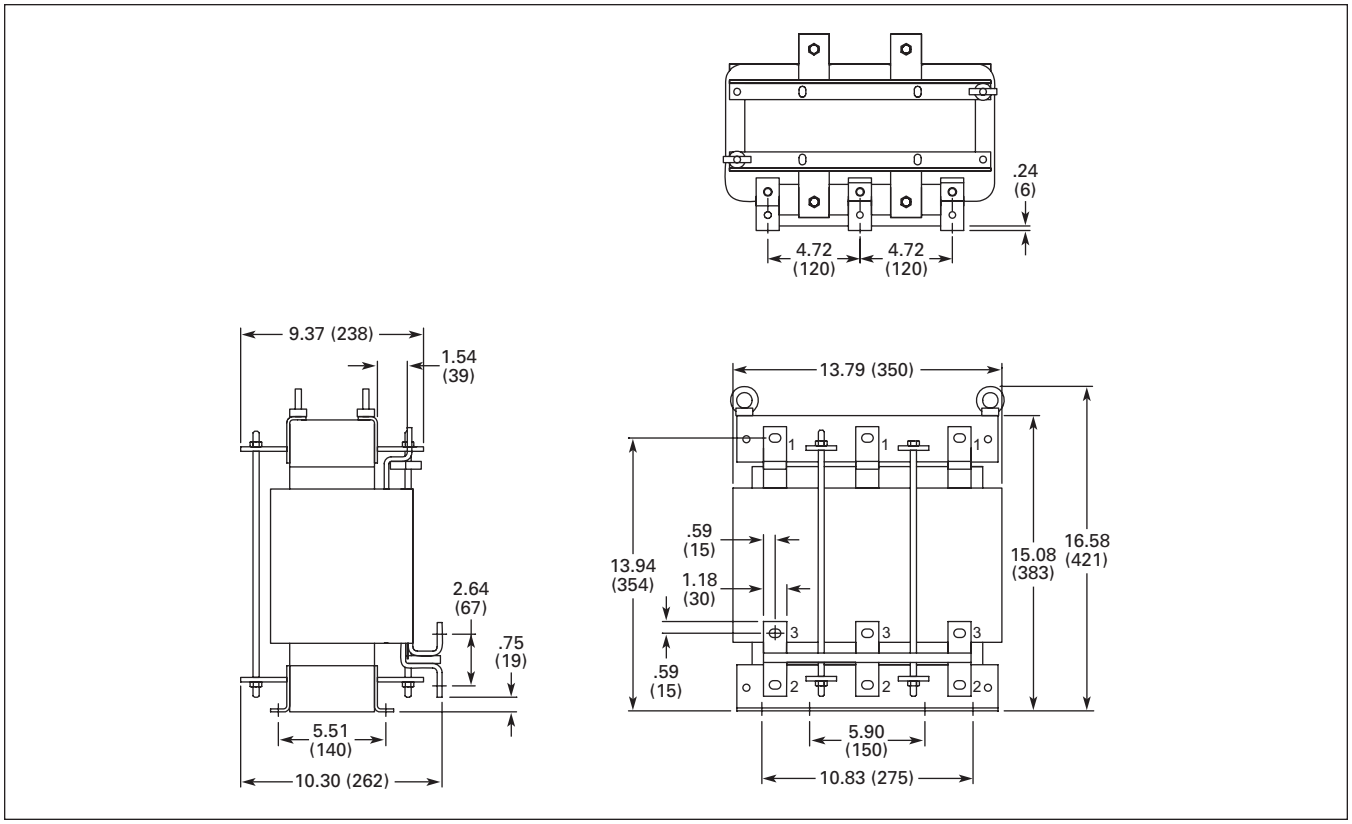

Figure 18. Dimensions of AC Choke CHK0400 in Inches (mm)

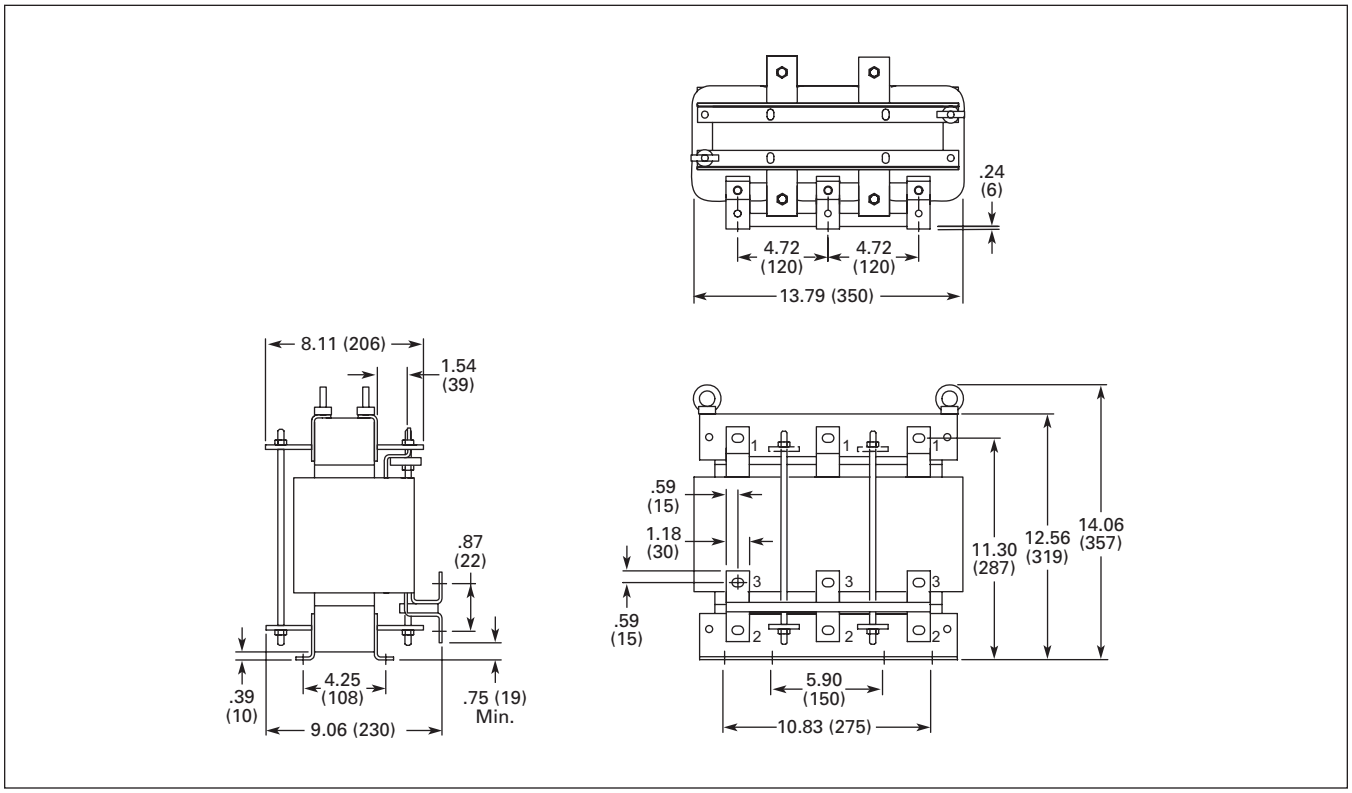

Figure 19. Dimensions of AC Choke CHK0261 in Inches (mm)

Spare Units & Replacement Parts

Table 48. 9000X Spare Units – SVX9000, 208 – 690V, Frames 4 – 12

Description	Catalog Number	Price U.S. $
Control Unit – Includes the control board, blue base housing, installed SVX9000 software program and blue flip cover. Does not include any OPT boards or keypad. See **Figure 1** and **Table 17** (**Page 11**) for standard and option boards and keypad.	**CSBS0000000000**	

Table 49. 9000X Series Replacement Parts — SVX9000 Drives, 208 – 240V

Frame:	4					5			6		7			8			Delivery Code	Catalog Number	Price U.S. $
hp (I_H):	3/4	1	1-1/2	2	3	5 ①	5	7-1/2	10	15	20	25	30	40	50	60			
Control Board																			
	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	W	**VB00252**	
Power Boards																			
	1																FB	**VB00308-0004-2**	
		1															FB	**VB00308-0007-2**	
			1														FB	**VB00308-0008-2**	
				1													FB	**VB00310-0011-2**	
					1												FB	**VB00310-0012-2**	
						1											FB	**VB00313-0017-2**	
							1										FB	**VB00313-0025-2**	
								1									FB	**VB00313-0031-2**	
									1								FB	**VB00316-0048-2**	
										1							FB	**VB00316-0061-2**	
											1						FB	**VB00319-0075-2**	
												1					FB	**VB00319-0088-2**	
													1				FB	**VB00319-0114-2**	
														1			FB	**VB00322-0140-2**	
															1		FB	**VB00322-0170-2**	
																1	FB	**VB00322-0205-2**	
Electrolytic Capacitors																			
	2	2	2														W	**PP01000**	
				2	2												W	**PP01001**	
						2	2										W	**PP01002**	
								2									W	**PP01003**	
									2	2							W	**PP01004**	
											2	2	2	4	4		W	**PP01005**	
																4	W	**PP01099**	
Cooling Fans																			
	1	1	1	1	1												W	**PP01060**	
						1	1	1									W	**PP01061**	
									1	1							W	**PP01062**	
											1	1	1				W	**PP01063**	
														1	1	1	FC	**PP01123** ②	
	1	1	1	1	1												W	**PP01086**	
						1	1	1	1	1							FC	**PP01088**	
											1	1	1				W	**PP01049**	
														1	2	2	FC	**CP01180**	
														1	1	1	FC	**PP08037**	

① I_L only; has no corresponding I_H rated hp rating.

② PP00061 capacitor not included in main fan; please order separately.

Table 49. 9000X Series Replacement Parts — SVX9000 Drives, 208 – 240V (Continued)

Frame:	4					5			6		7			8			Delivery Code	Catalog Number	Price U.S. $
hp (I_H):	3/4	1	1-1/2	2	3	5 ①	5	7-1/2	10	15	20	25	30	40	50	60			
IGBT Modules																			
	1	1															W	CP01304	
			1														W	CP01305	
				1	1	1											W	CP01306	
							1										W	CP01307	
								1									W	CP01308	
									1								W	PP01022	
										1							W	PP01023	
											1						W	PP01024	
												1					W	PP01025	
													1				W	PP01029	
														1			W	PP01026	
															1	1	W	PP01027	
Choppers/Rectifiers																			
									1								W	CP01367	
										1							W	CP01368	
Diode/Thyristor Modules																			
											3	3	3				W	PP01035	
														3	3	3	W	CP01268	
Rectifying Boards																			
											1	1	1				W	VB00242	
														1	1	1	W	VB00227	

① I_L only; has no corresponding I_H rated hp rating.

Table 50. 9000X Series Replacement Parts — FR4 – FR9 SVX9000 Drives, 380 – 500V

Frame:	4						5			6			7			8			9		Delivery Code	Catalog Number	Price U.S. $
hp (I_H):	1	1-1/2	2	3	5	7-1/2 ②	7-1/2	10	15	20	25	30	40	50	60	75	100	125	150	200			
Control Board																							
	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	W	VB00252	
Power Boards																							
	1																				FB	VB00208-0003-5	
		1																			FB	VB00208-0004-5	
			1																		FB	VB00208-0005-5	
				1																	FB	VB00208-0007-5	
					1																FB	VB00208-0009-5	
						1															FB	VB00210-0012-5	
							1														FB	VB00213-0016-5	
								1													FB	VB00213-0022-5	
									1												FB	VB00213-0031-5	
										1											FB	VB00216-0038-5	
											1										FB	VB00216-0045-5	
												1									FB	VB00216-0061-5	
													1								FB	VB00219-0072-5	
														1							FB	VB00219-0087-5	
															1						FB	VB00219-0105-5	
																1					FB	VB00236-0140-5	
																	1				FB	VB00236-0168-5	
																		1			FB	VB00236-0205-5	
Electrolytic Capacitors																							
	2	2	2	2																	W	PP01000	
					2	2															W	PP01001	
							2	2													W	PP01002	
									2												W	PP01003	
										2	2	2									W	PP01004	
													2	2	2	4	4	4	8	8	W	PP01005	

② I_L only; has no corresponding I_H rated hp rating.

Table 50. 9000X Series Replacement Parts — FR4 – FR9 SVX9000 Drives, 380 – 500V (Continued)

Frame:	4						5			6			7			8			9		Delivery Code	Catalog Number	Price U.S. $
hp (I_H):	1	1-1/2	2	3	5	7-1/2 ①	7-1/2	10	15	20	25	30	40	50	60	75	100	125	150	200			
Cooling Fans																							
	1	1	1	1	1	1															W	**PP01060**	
							1	1	1												W	**PP01061**	
										1	1	1									W	**PP01062**	
													1	1	1						W	**PP01063**	
																1	1	1			FC	**PP01123** ②	
																			1	1	FC	**PP01080** ③	
	1	1	1	1	1	1															W	**PP01086**	
							1	1	1												FC	**PP01088**	
										1	1	1	1	1	1						W	**PP01049**	
																1	1	1			FC	**CP01180**	
																			1 ④	2	W	**PP01068**	
																			1	1	FC	**PP09051**	
IGBT Modules																							
	1	1	1																		W	**CP01304**	
				1	1																W	**CP01305**	
						1	1														W	**CP01306**	
								1													W	**CP01307**	
									1												W	**CP01308**	
										1											W	**PP01020**	
											1										W	**PP01022**	
												1									W	**PP01023**	
													1								W	**PP01024**	
														1							W	**PP01025**	
															1						W	**PP01029**	
																1					W	**PP01026**	
																	1	1			W	**PP01027**	
Chopper/Rectifiers																							
										1	1										W	**CP01367**	
												1									W	**CP01368**	
Diode/Thyristor Modules																							
													3	3	3						W	**PP01035**	
																3	3	3			W	**CP01268**	
																			3	3	W	**PP01037**	
Rectifying Boards																							
													1	1	1						W	**VB00242**	
																1	1	1			W	**VB00227**	
																			1	1	W	**VB00459**	
Rectifying Module Sub-assembly																							
																			1	1	W	**FR09810**	
Power Module Sub-assemblies																							
																			1		W	**FR09-150-4-ANS** ⑤	
																				1	W	**FR09-200-4-ANS** ⑤	

① I_L only; has no corresponding I_H rated hp rating.
② PP00061 capacitor not included in main fan; please order separately.
③ PP00011 capacitor not included in main fan; please order separately.
④ For FR9 NEMA Type 12 you need two PP01068 internal fans.
⑤ See **Table 54** for details.

Table 51. 9000X Series Replacement Parts — FR10 – FR12 SVX9000 Drives, 380 – 500V

Frame:	10			11			12			Delivery Code	Catalog Number	Price U.S. $
hp (I_H):	250	300	350	400	500	550	600	650	700			
Control Board												
1	1	1	1	1	1	1	1	1	W	**VB00561** ①	
Shunt Boards												
6									FC	**VB00537**	
	6								FC	**VB00497**	
		6				12	12	12	FC	**VB00498**	
			9						FC	**VB00538**	
				9					FC	**VB00513**	
					9				FC	**VB00514**	
Driver Boards												
			3	3	3				FC	**VB00489**	
1	1	1				2	2	2	FC	**VB00487**	
Driver Adapter Board												
1	1	1				2	2	2	FC	**VB00330**	
ASIC Board												
1	1	1	1	1	1	2	2	2	FC	**VB00451**	
Feedback Interface Board												
						2	2	2	FC	**VB00448**	
Star Coupler Board												
						1	1	1	FC	**VB00336**	
Power Modules												
1	1	1	2	2	2	2	2	2	FC	**FR10820** ②	
2	2	2							FC	**FR10828**	
1									FC	**FR10-250-4-ANS** ③	
	1								FC	**FR10-300-4-ANS** ③	
		1				2	2	2	FC	**FR10-350-4-ANS** ③	
			3						FC	**FR11-400-4-ANS** ③	
				3					FC	**FR11-500-4-ANS** ③	
					3				FC	**FR11-550-4-ANS** ③	
Electrolytic Capacitors												
2	2	2	3	3	3	4	4	4	FC	**PP00060**	
12	12	12	18	18	18	24	24	24	FC	**PP01005**	
Fuses												
1	1	1	1	1	1	2	2	2	FC	**PP01094**	
2	2	2	2	2	2	4	4	4	FC	**PP01095**	
Cooling Fans and Isolation Transformers												
2	2	2	3	3	3	4	4	4	FC	**VB00299**	
2	2	2	3	3	3	4	4	4	FC	**PP01080** ④	
2	2	2				4	4	4	FC	**PP01068**	
1	1	1	1	1	1	2	2	2	FC	**PP01096**	
1	1	1				2	2	2	FC	**FR10844**	
1	1	1	3	3	3	2	2	2	FC	**FR10845**	
1	1	1				2	2	2	FC	**FR10846**	
1	1	1	3	3	3	2	2	2	FC	**FR10847**	
Rectifying Board												
1	1	1	2	2	2	2	2	2	FC	**VB00459**	

① SPX9000 Drives only (FR10 and larger).
② Rectifying board not included.
③ See **Table 54** for details.
④ PP00060 capacitor not included in main fan; please order separately.

Table 52. 9000X Series Replacement Parts — FR6 – FR9 SVX9000 Drives, 525 – 690V

Frame:	6									7		8			9				Delivery Code	Catalog Number	Price U.S. $
hp (I_H):	2	3	5 ①	5	7-1/2	10	15	20	25	30	40	50	60	75	100	125	150	200 ①			
Control Board																					
	1	1	1	1	1	1	1	1	1	1	1					1	1	1	W	**VB00252**	
Driver Board																					
	1																		FB	**VB00404-0004-6**	
		1																	FB	**VB00404-0005-6**	
			1																FB	**VB00404-0007-6**	
				1															FB	**VB00404-0010-6**	
					1														FB	**VB00404-0013-6**	
						1													FB	**VB00404-0018-6**	
							1												FB	**VB00404-0022-6**	
								1											FB	**VB00404-0027-6**	
									1										FB	**VB00404-0034-6**	
Power Boards																					
										1									FB	**VB00419-0041-6**	
											1								FB	**VB00419-0052-6**	
												1							FB	**VB00422-0062-6**	
													1						FB	**VB00422-0080-6**	
														1					FB	**VB00422-0100-6**	
Power Modules																					
															1				FC	**FR09-100-5-ANS** ②	
																1			FC	**FR09-125-5-ANS** ②	
																	1		FC	**FR09-150-5-ANS** ②	
																		1	FC	**FR09-175-5-ANS** ②	
Electrolytic Capacitors																					
	2	2	2	2	2	2	2	2	2										FC	**PP01093**	
										2	2	4	4		8	8	8	8	FC	**PP01041**	
														4					FC	**PP01040**	
Fuses																					
												1	1	1	1	1	1	1	W	**PP01094**	
												2	2	2	2	2	2	2	W	**PP01095**	
Cooling Fans																					
	1	1	1	1	1														W	**PP01061**	
						1	1	1	1										W	**PP01062**	
										1	1								W	**PP01063**	
												1	1	1					FC	**PP01123**	
	1	1	1	1	1	1	1	1	1	1	1								W	**PP01049**	
												1	1	1					FC	**CP01180**	
															1	1	1	1 ③	W	**PP01068**	
															1	1	1	1	FC	**PP01080**	
Fan Power Supply																					
																1	1	1	FC	**VB00299**	
IGBT Modules																					
	3	3	3	3	3	3	3	3	3										FC	**PP01091**	
										1	1								FC	**PP01089**	
												1	1	1					FC	**PP01127**	
IGBT/Diode (Brake)																					
	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	FC	**PP01040**	
Diode Module																					
	1	1	1	1	1	1	1	1	1										FC	**PP01092**	
Diode/Thyristor Modules																					
										3	3								FC	**PP01071**	
															3	3	3	3	FC	**PP01072**	
Rectifying Boards																					
										1	1								FC	**VB00442**	
															1	1	1	1	FC	**VB00460**	
Rectifying Module Sub-assemblies																					
																1	1	1	W	**FR09810**	
																1	1	1	FC	**FR09811**	

① I_L only; has no corresponding I_H rated hp rating.

② See **Table 54** for details.

③ For NEMA Type 12, two PP01068 internal fans are needed.

Table 53. 9000X Series Replacement Parts — FR10 – FR12 SVX9000 Drives, 525 – 690V

Frame:	10			11			12			Delivery Code	Catalog Number	Price U.S. $
hp (I_H):	200	250	300	400	450	500	550	600	700			
Component Boards												
1	1	1	1	1	1	1	1	1	W	**VB00561** ①	
1	1	1	1	1	1	2	2	2	FC	**VB00451**	
6									FC	**VB00545**	
	6								FC	**VB00510**	
		6				12	12	12	FC	**VB00511**	
1	1	1				2	2	2	FC	**VB00330**	
1	1	1				2	2	2	FC	**VB00487**	
			3	3	3				FC	**VB00489**	
			9						FC	**VB00546**	
				9					FC	**VB00547**	
					9				FC	**VB00512**	
						2	2	2	FC	**VB00448**	
						1	1	1	FC	**VB00336**	
Power Modules												
1	1	1	2	2	2	2	2	2	FC	**FR10821** ②	
2	2	2							FC	**FR10829**	
1									FC	**FR10-200-5-ANS** ③	
	1								FC	**FR10-250-5-ANS** ③	
		1				2	2	2	FC	**FR10-300-5-ANS** ③	
			3						FC	**FR11-400-5-ANS** ③	
				3					FC	**FR11-450-5-ANS** ③	
					3				FC	**FR11-500-5-ANS** ③	
Electrolytic Capacitors												
2	2	2	3	3	3	4	4	4	FC	**PP00060**	
12	12	12	18	18	18	24	24	24	FC	**PP01099**	
Fuses												
1	1	1	1	1	1	2	2	2	FC	**PP01094**	
2	2	2	2	2	2	4	4	4	FC	**PP01095**	
Cooling Fans and Isolation Transformers												
2	2	2	3	3	3	4	4	4	FC	**VB00299**	
2	2	2	3	3	3	4	4	4	FC	**PP01080** ④	
2	2	2				4	4	4	FC	**PP01068**	
1	1	1	1	1	1	2	2	2	FC	**PP01096**	
1	1	1				2	2	2	FC	**FR10844**	
1	1	1	3	3	3	2	2	2	FC	**FR10845**	
1	1	1				2	2	2	FC	**FR10846**	
1	1	1	3	3	3	2	2	2	FC	**FR10847**	
Fan Power Supply												
						1	1	1	FC	**VB00299**	
Rectifying Boards												
1	1	1	2	2	2	2	2	2	FC	**VB00460**	

① SPX9000 Drives only (FR10 and larger).
② Rectifying board not included.
③ See **Table 54** for details.
④ PP00060 capacitor not included in main fan; please order separately.

Table 54. Power Module Catalog Number Matrix

FR10 – 000 – 4 – A N S

Frame Code

Horsepower
Example: **150** = 150 hp
(See **Table 4** on **Page 6**.)

Voltage
4 = 380 – 500V
5 = 525 – 690V

Cooling Type
A = Air

Brake Option
N = No Brake Chopper
B = Brake Chopper

Varnishing
S = Standard **V** = Varnished