Product Selection Guide

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

Eaton 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.

Features

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/IP21**—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/IP21 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/IP54**—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/IP54 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 Type 3R**—Similar in design to NEMA Type 12/IP54 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.

- **MotoRx** This 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 ft 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.

SVX9000 Drives

Contents

SVX9000 Drives

Product Description

SVX9000 Series Adjustable Frequency Drives from Eaton's Electrical Sector 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/ IP54 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
- Hand-held auxiliary 24V 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/IP21 and NEMA Type 12/IP54 enclosures available, Frame Sizes FR4–FR9
- Open chassis FR10 and greater
- Standard option board configuration includes an A9 I/O board and an A2 relay output board installed in slots A and B

Standards and Certifications

Product

- IEC 61800-2

EMC (At Default Settings)

- Immunity: Fulfills all EMC immunity requirements; Emissions: EN 61800-3, LEVEL H

Safety

- UL 508C
- CE

Catalog Number Selection

SVX9000 Adjustable Frequency Drives

SVX 010 A 1 – 4 A 1 B 1 _ _ _ _ _ _

Product Family
SVX = Open drives
SPX = Open drives FR10 and 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 ③
0 = Chassis
1 = NEMA Type 1/IP21
2 = NEMA Type 12/IP54

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

Keypad
A = Alphanumeric

Input Options ①
1 = Three-phase, EMC H
2 = Three-phase, EMC N
4 = Three-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 ④

Options
Options appear in alphabetical order.

Extended I/O Card Options
B1 = 6 DI, 1 ext +24 Vdc/EXT +24 Vdc
B2 = 1 RO (NC-NO), 1 RO (NO), 1 therm
B4 = 1 AI (mA isolated), 2 AO (mA isolated), 1 ext +24 Vdc/EXT + 24 Vdc
B5 = 3 RO (NO)
B8 = 1 ext +24 Vdc/EXT +24 Vdc, 3 Pt100
B9 = 1 RO (NO), 5 DI 42–240 Vac input

Communication Cards
CA = Johnson Controls N2
CI = Modbus TCP
CJ = BACnet
CQ = 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

Notes

① All 230V drives and 480V drives up to 200 hp (IH) are only available with input option **1** (EMC Level H). 480V drives 250 hp (IH) 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 (IH) or larger are only available with input option **2**. 575V drives up to 150 hp (IH) are only available with input option **4** (EMC Level L).

② 480V drives up to 30 hp (IH) are only available with brake chopper option **B**. 480V drives 40 hp (IH) or larger come standard with brake chopper option **N**. 230V drives up to 15 hp (IH) 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). **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 Factory promise delivery. Consult sales office for availability.

Product Selection

2

230V SVX9000 Drives

SVX9000 Open Drives

208–240V, NEMA Type 1/IP21 Drives

Frame Size	hp (I_H)	Current (I_H)	hp (I_L)	Current (I_L)	Catalog Number
FR4	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	—	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	10	31	15	48	**SVX010A1-2A1B1**
	15	48	20	61	**SVX015A1-2A1B1**
FR7	20	61	25	75	**SVX020A1-2A1N1**
	25	75	30	88	**SVX025A1-2A1N1**
	30	88	40	114	**SVX030A1-2A1N1**
FR8	40	114	50	140	**SVX040A1-2A1N1**
	50	140	60	170	**SVX050A1-2A1N1**
	60	170	75	205	**SVX060A1-2A1N1**
FR9	75	205	100	261	**SVX075A1-2A1N1**
	100	261	125	300	**SVX100A1-2A1N1**

208–240V, NEMA Type 12/IP54 Drives

Frame Size	hp (I_H)	Current (I_H)	hp (I_L)	Current (I_L)	Catalog Number
FR4	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	—	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	10	31	15	48	**SVX010A2-2A1B1**
	15	48	20	61	**SVX015A2-2A1B1**
FR7	20	61	25	75	**SVX020A2-2A1N1**
	25	75	30	88	**SVX025A2-2A1N1**
	30	88	40	114	**SVX030A2-2A1N1**
FR8	40	114	50	140	**SVX040A2-2A1N1**
	50	140	60	170	**SVX050A2-2A1N1**
	60	170	75	205	**SVX060A2-2A1N1**
FR9	75	205	100	261	**SVX075A2-2A1N1**
	100	261	125	300	**SVX100A2-2A1N1**

480V SVX9000 Drives

SVX9000 Open Drives

380–500V, NEMA Type 1/IP21 Drives

Frame Size	hp (I_H)	Current (I_H)	hp (I_L)	Current (I_L)	Catalog Number
FR4	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	7-1/2	12	10	16	**SVX007A1-4A1B1**
	10	16	15	23	**SVX010A1-4A1B1**
	15	23	20	31	**SVX015A1-4A1B1**
FR6	20	31	25	38	**SVX020A1-4A1B1**
	25	38	30	46	**SVX025A1-4A1B1**
	30	46	40	61	**SVX030A1-4A1B1**
FR7	40	61	50	72	**SVX040A1-4A1N1**
	50	72	60	87	**SVX050A1-4A1N1**
	60	87	75	105	**SVX060A1-4A1N1**
FR8	75	105	100	140	**SVX075A1-4A1N1**
	100	140	125	170	**SVX100A1-4A1N1**
	125	170	150	205	**SVX125A1-4A1N1**
FR9	150	205	200	261	**SVX150A1-4A1N1**
	200	245	250	300	**SVX200A1-4A1N1**

380–500V, NEMA Type 12/IP54 Drives

Frame Size	hp (I_H)	Current (I_H)	hp (I_L)	Current (I_L)	Catalog Number
FR4	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	7-1/2	12	10	16	**SVX007A2-4A1B1**
	10	16	15	23	**SVX010A2-4A1B1**
	15	23	20	31	**SVX015A2-4A1B1**
FR6	20	31	25	38	**SVX020A2-4A1B1**
	25	38	30	46	**SVX025A2-4A1B1**
	30	46	40	61	**SVX030A2-4A1B1**
FR7	40	61	50	72	**SVX040A2-4A1N1**
	50	72	60	87	**SVX050A2-4A1N1**
	60	87	75	105	**SVX060A2-4A1N1**
FR8	75	105	100	140	**SVX075A2-4A1N1**
	100	140	125	170	**SVX100A2-4A1N1**
	125	170	150	205	**SVX125A2-4A1N1**
FR9	150	205	200	261	**SVX150A2-4A1N1**
	200	245	250	300	**SVX200A2-4A1N1**

SVX9000 Open Drives

380–500V, Open Chassis Drives

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

575V SVX9000 Drives

525–690V, NEMA Type 1/IP21 Drives

Frame Size	hp (I_H)	Current (I_H)	hp (I_L)	Current (I_L)	Catalog Number
FR6	2	3.3	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	30	34	40	41	**SVX030A1-5A4N1**
	40	41	50	52	**SVX040A1-5A4N1**
FR8	50	52	60	62	**SVX050A1-5A4N1**
	60	62	75	80	**SVX060A1-5A4N1**
	75	80	100	100	**SVX075A1-5A4N1**
FR9	100	100	125	125	**SVX100A1-5A4N1**
	125	125	150	144	**SVX125A1-5A4N1**
	150	144	—	170	**SVX150A1-5A4N1**
	—	170	200	208	**SVX175A1-5A4N1**

Note

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

SVX9000 Open Drives

525–690V, NEMA Type 12/IP54 Drives

Frame Size	hp (I_H)	Current (I_H)	hp (I_L)	Current (I_L)	Catalog Number
FR6	2	3.3	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	30	34	40	41	**SVX030A2-5A4N1**
	40	41	50	52	**SVX040A2-5A4N1**
FR8	50	52	60	62	**SVX050A2-5A4N1**
	60	62	75	80	**SVX060A2-5A4N1**
	75	80	100	100	**SVX075A2-5A4N1**
FR9	100	100	125	125	**SVX100A2-5A4N1**
	125	125	150	144	**SVX125A2-5A4N1**
	150	144	—	170	**SVX150A2-5A4N1**
	—	170	200	208	**SVX175A2-5A4N1**

525–690V, Open Chassis Drives

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

Accessories

Demo Drive and Power Supply

Demo Drive and Power Supply

Description	Catalog Number
9000X demo drive	**9000XDEMO**

NEMA Type 12/IP54 Conversion Kit

The NEMA Type 12/IP54 kit option is used to convert a NEMA Type 1/IP21 to a NEMA Type 12/IP54 drive. The NEMA Type 12/IP54 kit consists of a metal drive shroud, fan kit for some frames, adaptor plate and plugs.

NEMA Type 12/IP54 Conversion Kit

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

Flange Kits

Flange Kit NEMA Type 12/ IP54

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/IP54 fan components. Metal shroud not included.

Flange kits for NEMA Type 12/IP54 enclosure drive rating are determined by rating of drive.

Flange Kit NEMA Type 12/ IP54— Frames 4, 5 and 6 ①

Frame Size	Delivery Code	Catalog Number
FR4	W	**OPTTHRFR4**
FR5		**OPTTHRFR5**
FR6		**OPTTHRFR6**

Flange Kit NEMA Type 12/ IP54—Frames 4–9

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

Note

① For installation of an SVX9000 NEMA Type 1/IP21 drive into a NEMA Type 12/IP54 oversized enclosure.

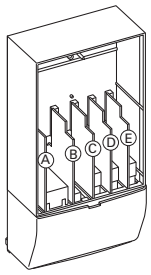
Options

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.

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.

Option Boards



Option Board Kits

Option Kit Description ①	Allowed Slot Locations ②	Field Installed Catalog Number	Factory Installed Option Designator	SVX Ready Programs Basic	Local/ Remote	Standard	MSS	PID	Multi-P.	PFC
Standard I/O Cards										
6 DI, 1 DO, 2 AI, 1AO, 1 +10 Vdc ref, 2 ext +24 Vdc/EXT +24 Vdc	A	**OPTA9**	—	■	■	■	■	■	■	■
2 RO (NC-NO)	B	**OPTA2**	—	■	■	■	■	■	■	■
Extended I/O Cards										
2 RO, therm—SPX only	B	**OPTA3**	**A3**	—	■	■	■	■	■	■
Encoder low volt +5V/15V/24V—SPX only	C	**OPTA4**	**A4**	—	■	■	■	■	■	■
Encoder high volt +15V/24V—SPX only	C	**OPTA5**	**A5**	—	■	■	■	■	■	■
Double encoder—SPX only	C	**OPTA7**	**A7**	■	■	■	■	■	■	■
6 DI, 1 DO, 2 AI, 1 AO—SPX only	A	**OPTA8**	**A8**	—	■	■	■	■	■	■
3 DI (encoder 10–24V), out +15V/+24V, 2 DO (pulse+direction)—SPX only	C	**OPTAE**	**AE**	■	■	■	■	■	■	■
6 DI, 1 ext +24 Vdc/EXT +24 Vdc	B, C, **D**, E	**OPTB1**	**B1**	—	—	—	—	—	■	■
1 RO (NC-NO), 1 RO (NO), 1 therm	B, C, **D**, E	**OPTB2**	**B2**	—	—	—	—	—	■	■
1 AI (mA isolated), 2 AO (mA isolated), 1 ext +24 Vdc/EXT +24 Vdc	B, C, **D**, E	**OPTB4**	**B4**	■	■	■	■	■	■	■
3 RO (NO)	B, C, **D**, E	**OPTB5**	**B5**	—	—	—	—	—	■	■
1 ext +24 Vdc/EXT +24 Vdc, 3 Pt100	B, C, **D**, E	**OPTB8**	**B8**	—	—	—	—	—	—	—
1 RO (NO), 5 DI 42–240 Vac input	B, C, **D**, E	**OPTB9**	**B9**	—	—	—	—	—	■	■
Communication Cards										
Modbus ③	D, **E**	**OPTC2**	**C2**	■	■	■	■	■	■	■
Johnson Controls N2 ③	D, **E**	**OPTC2**	**CA**	—	—	—	—	—	—	—
Modbus TCP	D, **E**	**OPTCI**	**CI**	■	■	■	■	■	■	■
BACnet	D, **E**	**OPTCJ**	**CJ**	■	■	■	■	■	■	■
EtherNet/IP	D, **E**	**OPTCQ**	**CQ**	■	■	■	■	■	■	■
PROFIBUS DP	D, **E**	**OPTC3**	**C3**	■	■	■	■	■	■	■
LonWorks	D, **E**	**OPTC4**	**C4**	■	■	■	■	■	■	■
PROFIBUS DP (D9 connector)	D, **E**	**OPTC5**	**C5**	■	■	■	■	■	■	■
CANopen (slave) ④	D, **E**	**OPTC6**	**C6**	■	■	■	■	■	■	■
DeviceNet	D, **E**	**OPTC7**	**C7**	■	■	■	■	■	■	■
Modbus (D9 type connector)	D, **E**	**OPTC8**	**C8**	■	■	■	■	■	■	■
Adapter—SPX only	D, **E**	**OPTD1**	**D1**	■	■	■	■	■	■	■
Adapter—SPX only	D, **E**	**OPTD2**	**D2**	■	■	■	■	■	■	■
RS-232 with D9 connection	D, **E**	**OPTD3**	**D3**	■	■	■	■	■	■	■

Notes

① AI = Analog Input; AO = Analog Output, DI = Digital Input, DO = Digital Output, RO = Relay Output

② Option card must be installed in one of the slots listed for that card. Slot indicated in bold is the preferred location.

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 120 ohms, and specific line delay of nominal 5 nS/m. 120 ohms 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 two-wire twisted shielded cable with two-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 OPTCI 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.

Control Panel Options

Factory Options

Description	Factory Installed Option Code	Field Installed NEMA Type 1/IP21 Catalog Number
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**

Miscellaneous Options

Description	Catalog Number
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 9000XDrive 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.	See **Page V6-T2-58**

Open Drive Options

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 additional dynamic braking resistor selections that are supplied separately. A list of common resistors are listed below and are complete indoor assemblies, include a pre-wired terminal block and a thermal switch, and are not UL Listed.

Duty Cycle

The duty cycle rating is based on a 60-second period. For example, the 20% duty cycle resistor can carry 100% current for 12 seconds out of every 60 seconds, while the 50% duty cycle resistor can carry 150% current for 30 seconds out of every 60 seconds.

Torque

If the braking torque required is less than 15%, dynamic braking is not required because the regenerated energy will be dissipated in the drive and motor losses.

Dynamic Brake Resistor—Catalog Number Selection

DBR – R100 – W0800

Dynamic Brake Resistor	Resistance	Rated Watts
	1D0 = 1.0 Ohms **100** = 100 Ohms	**0800** = 800 Watts **8000** = 8000 Watts **080K** = 80,000 Watts

230V Brake Resistors

Drive hp (CT/I_H)	Minimum Ohms	20% Duty Cycle, 100% Torque		50% Duty Cycle, 150% Torque	
		Catalog Number	Dimensions (Inches)	Catalog Number	Dimensions (Inches)
0.75	30.0	**DBR-R100-W0400**	12W x 5D x 5H	**DBR-R100-W0800**	12W x 7D x 5H
1	30.0	**DBR-R100-W0400**	12W x 5D x 5H	**DBR-R100-W0800**	12W x 7D x 5H
1.5	30.0	**DBR-R100-W0400**	12W x 5D x 5H	**DBR-R036-W1200**	12W x 10D x 5H
2	30.0	**DBR-R100-W0400**	12W x 5D x 5H	**DBR-R036-W1200**	12W x 10D x 5H
3	30.0	**DBR-R036-W0800**	12W x 7D x 5H	**DBR-R036-W2000**	12W x 16D x 5H
4	30.0	**DBR-R036-W0800**	12W x 7D x 5H	**DBR-R030-W2400**	19W x 10D x 5H
5	30.0	**DBR-R036-W0800**	12W x 7D x 5H	**DBR-R030-W2800**	19W x 13D x 5H
7.5	20.0	**DBR-R020-W1200**	12W x 10D x 5H	**DBR-R020-W4800**	26.5W x 13D x 5H
10	10.0	**DBR-R015-W1600**	12W x 13D x 5H	**DBR-R112-W6000**	26.5W x 13D x 5H
15	10.0	**DBR-R012-W2400**	19W x 10D x 5H	**DBR-R010-W9000**	28W x 10D x 10H
20	3.3	**DBR-R9D3-W3200**	19W x 10D x 5H	**DBR-R3D4-W012K**	28W x 10D x 10H
25	3.3	**DBR-R5D5-W4000**	26.5W x 10D x 5H	**DBR-R5D1-W015K**	28W x 16D x 10H
30	3.3	**DBR-R4D8-W4800**	26.5W x 10D x 5H	**DBR-R4D1-W020K**	28W x 16D x 10H
40	1.4	**DBR-R004-W6000**	26.5W x 13D x 5H	**DBR-R3D4-W025K**	30W x 18D x 16H
50	1.4	**DBR-R3D1-W7500**	26.5W x 16D x 5H	**DBR-R2D1-W030K**	30W x 18D x 24H
60	1.4	**DBR-R2D8-W9000**	26.5W x 16D x 5H	**DBR-R002-W036K**	30W x 18D x 24H
75	1.4	**DBR-R2D6-W012K**	28W x 10D x 10H	**DBR-R1D5-W045K**	30W x 18D x 32H
100	1.4	**DBR-R002-W015K**	28W x 16D x 10H	**DBR-R1D4-W060K**	30W x 18D x 40H

480V Brake Resistors

Drive hp (CT/I_H)	Minimum Ohms	20% Duty Cycle, 100% Torque		50% Duty Cycle, 150% Torque	
		Catalog Number	Dimensions (Inches)	Catalog Number	Dimensions (Inches)
1	63.0	**DBR-R100-W0400**	12W x 5D x 5H	**DBR-R100-W0800**	12W x 7D x 5H
1.5	63.0	**DBR-R100-W0400**	12W x 5D x 5H	**DBR-R100-W1200**	12W x 10D x 5H
2	63.0	**DBR-R100-W0400**	12W x 5D x 5H	**DBR-R100-W1200**	12W x 10D x 5H
3	63.0	**DBR-R100-W0800**	12W x 7D x 5H	**DBR-R100-W2000**	12W x 16D x 5H
5	63.0	**DBR-R100-W0800**	12W x 7D x 5H	**DBR-R100-W2800**	19W x 13D x 5H
6	63.0	**DBR-R100-W1200**	12W x 10D x 5H	**DBR-R070-W4000**	19W x 16D x 5H
7.5	63.0	**DBR-R100-W1200**	12W x 10D x 5H	**DBR-R063-W4800**	26.5W x 13D x 5H
10	63.0	**DBR-R063-W1600**	12W x 13D x 5H	**DBR-R063-W6000**	26.5W x 16D x 5H
15	42.0	**DBR-R042-W2400**	19W x 10D x 5H	**DBR-R042-W9000**	28W x 10D x 10H
20	21.0	**DBR-R030-W3200**	19W x 13D x 5H	**DBR-R023-W012K**	28W x 13D x 10H
25	21.0	**DBR-R030-W4000**	19W x 16D x 5H	**DBR-R021-W015K**	28W x 13D x 10H
30	14.0	**DBR-R020-W4800**	26.5W x 13D x 5H	**DBR-R014-W020K**	30W x 18D x 24H
40	6.5	**DBR-R112-W6000**	26.5W x 13D x 5H	**DBR-R007-W025K**	30W x 18D x 16H
50	6.5	**DBR-R013-W7500**	26.5W x 16D x 5H	**DBR-R8D5-W030K**	30W x 18D x 24H
60	6.5	**DBR-R010-W9000**	28W x 10D x 10H	**DBR-R7D3-W036K**	30W x 18D x 24H
75	3.3	**DBR-R009-W012K**	28W x 13D x 10H	**DBR-R3D3-W045K**	30W x 18D x 32H
100	3.3	**DBR-R5D1-W015K**	28W x 16D x 10H	**DBR-R004-W060K**	30W x 18D x 40H
125	3.3	**DBR-R4D1-W020K**	28W x 16D x 10H	**DBR-R004-W070K**	30W x 18D x 48H
150	3.3	**DBR-R3D4-W025K**	30W x 18D x 16H	**DBR-R3D5-W085K**	30W x 18D x 56H
200	3.3	**DBR-R3D3-W030K**	30W x 18D x 24H	**DBR-R3D3-W110K**	30W x 18D x 72H
250	1.4	**DBR-R2D5-W036K**	30W x 18D x 24H	①	—
300	1.4	**DBR-R1D5-W045K**	30W x 18D x 32H	①	—
350	1.4	**DBR-R1D4-W060K**	30W x 18D x 40H	①	—
400	0.9	**DBR-R1D4-W060K**	30W x 18D x 40H	①	—
500	0.9	**DBR-R0D9-W080K**	30W x 18D x 48H	①	—
550	0.9	**DBR-R001-W085K**	30W x 18D x 56H	①	—

Note

① Consult factory.

575V Brake Resistors

Drive hp (CT/I_H)	Minimum Ohms	20% Duty Cycle, 100% Torque		50% Duty Cycle, 150% Torque	
		Catalog Number	Dimensions (Inches)	Catalog Number	Dimensions (Inches)
2	100.0	**DBR-R100-W0400**	12W x 5D x 5H	**DBR-R100-W1200**	12W x 10D x 5H
3	100.0	**DBR-R100-W0800**	12W x 7D x 5H	**DBR-R100-W2000**	12W x 16D x 5H
4	100.0	**DBR-R100-W0800**	12W x 7D x 5H	**DBR-R100-W2400**	19W x 10D x 5H
5	100.0	**DBR-R100-W0800**	12W x 7D x 5H	**DBR-R100-W2800**	19W x 13D x 5H
7.5	100.0	**DBR-R100-W1200**	12W x 10D x 5H	**DBR-R100-W4800**	26.5W x 13D x 5H
10	30.0	**DBR-R063-W1600**	12W x 13D x 5H	**DBR-R063-W6000**	26.5W x 16D x 5H
15	30.0	**DBR-R042-W2400**	19W x 10D x 5H	**DBR-R042-W9000**	28W x 10D x 10H
20	30.0	**DBR-R030-W3200**	19W x 13D x 5H	**DBR-R030-W012K**	28W x 13D x 10H
25	30.0	**DBR-R030-W4000**	19W x 16D x 5H	**DBR-R030-W015K**	28W x 16D x 10H
30	18.0	**DBR-R020-W4800**	26.5W x 13D x 5H	**DBR-R020-W020K**	30W x 18D x 16H
40	18.0	**DBR-R030-W6000**	26.5W x 16D x 5H	**DBR-R184-W025K**	30W x 18D x 16H
50	9.0	**DBR-R013-W7500**	26.5W x 16D x 5H	**DBR-R012-W030K**	30W x 18D x 24H
60	9.0	**DBR-R010-W9000**	28W x 10D x 10H	**DBR-R010-W036K**	30W x 18D x 24H
75	9.0	**DBR-R009-W012K**	28W x 13D x 10H	**DBR-R009-W045K**	30W x 18D x 24H
100	7.0	**DBR-R013-W015K**	28W x 16D x 10H	**DBR-R8D4-W060K**	30W x 18D x 40H
125	7.0	**DBR-R8D2-W020K**	30W x 18D x 10H	**DBR-R007-W070K**	30W x 18D x 40H
150	7.0	**DBR-R007-W025K**	30W x 18D x 16H	**DBR-R006-W085K**	30W x 18D x 56H
175	7.0	**DBR-R007-W030K**	30W x 18D x 24H	**DBR-R007-W100K**	30W x 18D x 72H
200	2.5	**DBR-R3D3-W030K**	30W x 18D x 24H	**DBR-R2D6-W110K**	30W x 18D x 64H
250	2.5	**DBR-R2D5-W036K**	30W x 18D x 24H	**DBR-R003-W140K**	30W x 18D x 72H
300	2.5	**DBR-R3D3-W045K**	30W x 18D x 32H	①	—
400	1.7	**DBR-R002-W060K**	30W x 18D x 48H	①	—
450	1.7	**DBR-R1D8-W070K**	30W x 18D x 48H	①	—
500	1.7	**DBR-R002-W080K**	30W x 18D x 56H	①	—

Note

① Consult factory.

Replacement Parts

FR4 Spare Parts

Category	Description	Quantity/ Drive	230V Catalog Number	480V Catalog Number	575V Catalog Number
Control fan	NEMA Type 12 control fan ①	1	**PP01086**	**PP01086**	—
Control module ②	SVX control module	1	**CSBS0000000000**	**CSBS0000000000**	—
	Standard slot A I/O card	1	**OPTA9**	**OPTA9**	—
	Standard slot B I/O card	1	**OPTA2**	**OPTA2**	—
Converter	Power board ③	1	**VB00308-0004-2**	**VB00208-0003-5**	—
		1	**VB00308-0007-2**	**VB00208-0004-5**	—
		1	**VB00308-0008-2**	**VB00208-0005-5**	—
		1	—	**VB00208-0007-5**	—
		1	—	**VB00208-0009-5**	—
		1	—	**VB00410-0012-5-ARV**	—
Keypad ②	SVX/SPX keypad	1	**KEYPAD-LOC/REM**	**KEYPAD-LOC/REM**	—
Main fan ②	DC fan (main)	1	**PP01060**	**PP01060**	—
Other	Mounting kit, fixing kit	1	**FR00040**	**FR00040**	—
	Mounting kit, fixing kit, N12 ①	1	**FR00079**	**FR00079**	—
	Control cover, plastic, N1	1	**FR00006**	**FR00006**	—

FR5 Spare Parts

Category	Description	Quantity/ Drive	230V Catalog Number	480V Catalog Number	575V Catalog Number
Control fan	NEMA Type 12 control fan ①	1	**PP01088**	**PP01088**	—
Control module ②	SVX control module	1	**CSBS0000000000**	**CSBS0000000000**	—
	Standard slot A I/O card	1	**OPTA9**	**OPTA9**	—
	Standard slot B I/O card	1	**OPTA2**	**OPTA2**	—
Converter	Power board ③	1	**VB00313-0017-2**	**VB00213-0016-5**	—
		1	**VB00313-0025-2**	**VB00213-0022-5**	—
		1	**VB00313-0031-2**	**VB00213-0031-5**	—
Keypad ②	SVX/SPX keypad	1	**KEYPAD-LOC/REM**	**KEYPAD-LOC/REM**	—
Main fan ②	DC fan (main)	1	**PP01061**	**PP01061**	—
Other	Mounting kit, fixing kit	1	**FR00050**	**FR00050**	—
	Mounting kit, fixing kit, N12 ①	1	**FR00081**	**FR00081**	—
	Control cover, plastic, N1	1	**FR05011**	**FR05011**	—

Notes

① Only for NEMA Type 12/IP54 Type drives.
② Factory recommended spare parts.
③ Select one part number based on the amperage rating of the drive. Please contact EatonCare at 877-ETN-CARE for assistance.

FR6 Spare Parts

Category	Description	Quantity/ Drive	230V Catalog Number	480V Catalog Number	575V Catalog Number
Control fan	NEMA Type 12 control fan ①	1	**PP01049**	**PP01049**	—
Control module ②	SVX control module	1	**CSBS0000000000**	**CSBS0000000000**	**CSBS0000000000**
	Standard slot A I/O card	1	**OPTA9**	**OPTA9**	**OPTA9**
	Standard slot B I/O card	1	**OPTA2**	**OPTA2**	**OPTA2**
Converter	Power board ③	1	**VB00316-0048-2**	**VB00416-0038-5**	**VB00404-0004-6**
		1	**VB00316-0061-2**	**VB00416-0045-5**	**VB00404-0005-6**
		1	—	**VB00416-0061-5**	**VB00404-0007-6**
		1	—	—	**VB00404-0010-6**
		1	—	—	**VB00404-0013-6**
		1	—	—	**VB00404-0018-6**
		1	—	—	**VB00404-0022-6**
		1	—	—	**VB00404-0027-6**
		1	—	—	**VB00404-0034-6**
DC section	Bus capacitor	2	—	—	**S00930**
Keypad ②	SVX/SPX keypad	1	**KEYPAD-LOC/REM**	**KEYPAD-LOC/REM**	**KEYPAD-LOC/REM**
Main fan ②	DC fan (main)	1	**PP01062**	**PP01062**	—
Other	Mounting kit, fixing kit	1	**FR00060**	**FR00060**	**FR00060**
	Mounting kit, fixing kit, N12 ①	1	**FR00082**	**FR00082**	**FR00082**
	Control cover, plastic, N1	1	**FR06011**	**FR06011**	**FR06011**

FR7 Spare Parts

Category	Description	Quantity/ Drive	230V Catalog Number	480V Catalog Number	575V Catalog Number
Control fan	NEMA Type 12 control fan ①	1	**PP01049**	**PP01049**	**PP01049**
Control module ②	SVX control module	1	**CSBS0000000000**	**CSBS0000000000**	**CSBS0000000000**
	Standard slot A I/O card	1	**OPTA9**	**OPTA9**	**OPTA9**
	Standard slot B I/O card	1	**OPTA2**	**OPTA2**	**OPTA2**
Converter	Power board ③	1	**VB00319-0075-2**	**VB00619-0072-5**	**VB00419-0041-6**
		1	**VB00319-0088-2**	**VB00619-0087-5**	**VB00419-0052-6**
		1	**VB00319-0114-2**	**VB00619-0105-5**	—
DC section	Bus capacitor	2	—	—	**PP01041**
Keypad ②	SVX/SPX keypad	1	**KEYPAD-LOC/REM**	**KEYPAD-LOC/REM**	**KEYPAD-LOC/REM**
Main fan ②	DC fan (main)	1	**PP01063**	**PP01063**	**PP01063**
Other	Mounting kit, fixing kit	1	**FR07071**	**FR07071**	**FR07071**
	Mounting kit, fixing kit, N12 ①	1	**FR07072**	**FR07072**	**FR07072**
	Control cover, plastic, N1	1	**FR07011**	**FR07011**	**FR07011**

Notes

① Only for NEMA Type 12/IP54 Type drives.
② Factory recommended spare parts.
③ Select one part number based on the amperage rating of the drive. Please contact EatonCare at 877-ETN-CARE for assistance.

FR8 Spare Parts

Category	Description	Quantity/ Drive	230V Catalog Number	480V Catalog Number	575V Catalog Number
Control fan	NEMA Type 12 control fan ①	1	**CP01180**	**CP01180**	**CP01180**
Control module ②	SVX control module	1	**CSBS0000000000**	**CSBS0000000000**	**CSBS0000000000**
	Standard slot A I/O card	1	**OPTA9**	**OPTA9**	**OPTA9**
	Standard slot B I/O card	1	**OPTA2**	**OPTA2**	**OPTA2**
Converter	Power board ③	1	**VB00722-0140-2-ANV**	**VB00636-0140-4-ANV**	**VB00422-0062-5-ANV**
		1	**VB00722-0170-2-ANV**	**VB00636-0168-4-ANV**	**VB00422-0080-5-ANV**
		1	**VB00722-0205-2-ANV**	**VB00636-0205-4-ANV**	**VB00422-0100-5-ANV**
	IGBT	2	**PP01175**	**PP01175**	**PP01127**
DC section	Bus capacitor	4	**S00335**	**S00335**	**PP01041**
Inverter	Diode	3	**CP01268**	**CP01268**	**CP01373**
	Rectifier board	1	**VB00227**	**VB00227**	**VB00427**
Keypad ②	SVX/SPX keypad	1	**KEYPAD-LOC/REM**	**KEYPAD-LOC/REM**	**KEYPAD-LOC/REM**
Main AC fan	Fan AC	1	**PP01123**	**PP01123**	**PP01123**
	Fan fuse	2	**PP20202**	**PP20202**	**PP20202**
	Starting cap	1	**S00734**	**S00734**	**S00734**
	Fan driver board AC	1	**VB00599**	**VB00799**	**VB00799**
	Isolation transformer (fan)	1	**S0000113**	**S0000113**	**S0000113**
Main DC fan ②	DC fan	1	**PP00071**	**PP00071**	**PP00071**
	DC power supply	1	**S01016**	**S01016**	**S01016**
Other	Front cover, N12 ①	1	**FR08079**	**FR08079**	**FR08079**
	Conduit plate, N12	1	**FR08082**	**FR08082**	**FR08082**
	Front cover, N1	1	**FR08106**	**FR08106**	**FR08106**

Notes

① Only for NEMA Type 12/IP54 Type drives.
② Factory recommended spare parts.
③ Select one part number based on the amperage rating of the drive. Please contact EatonCare at 877-ETN-CARE for assistance.

FR9 Spare Parts

Category	Description	Quantity/ Drive	230V Catalog Number	480V Catalog Number	575V Catalog Number
Control fan	50 mm fan	1	**PP09041**	**PP09041**	**PP09041**
	80 mm fan	1	**PP01068**	**PP01068**	**PP01068**
Control module ①	SVX control module	1	**CSBS0000000000**	**CSBS0000000000**	**CSBS0000000000**
	Standard slot A I/O card	1	**OPTA9**	**OPTA9**	**OPTA9**
	Standard slot B I/O card	1	**OPTA2**	**OPTA2**	**OPTA2**
Converter	Power module ②	1	**FR09-0261-2-ANV**	**FR09-0261-4-ANV**	**FR09-0125-5-ANV**
		1	**FR09-0300-2-ANV**	**FR09-0300-4-ANV**	**FR09-0144-5-ANV**
		1	—	—	**FR09-0170-5-ANV**
	Driver board	1	**S00583**	**S00583**	**S00583**
	Shunt board ②	6	—	**VB00535**	**VB00537**
		6	—	**VB00536**	**VB00542**
		6	—	—	**VB00543**
DC section	Balancing resistor	3	**PP00052**	**PP00052**	**PP00052**
	Bus capacitor	8	**S00335**	**S00335**	**PP01041**
	DC busbars DC–	1	**FR09043**	**FR09043**	**FR09043**
	DC busbars DC+	1	**FR09044**	**FR09044**	**FR09044**
	DC busbars connection	1	**FR09045**	**FR09045**	**FR09045**
	DC busbars +/– insulator	1	**FR09046**	**FR09046**	**FR09046**
	DC busbars –/con insulator	1	**FR09047**	**FR09047**	**FR09047**
Inverter	Rectifier module	1	**FR09826**	**FR09822**	**FR09823**
	Diode	3	**CP01268**	**CP01268**	**CP01268**
	Rectifier board	1	—	**VB00459**	**VB00460**
Keypad ①	SVX/SPX keypad	1	**KEYPAD-LOC/REM**	**KEYPAD-LOC/REM**	**KEYPAD-LOC/REM**
Main AC fan	Fan AC	1	**PP01080**	**PP01080**	**PP01080**
	Fan fuse	2	**PP20202**	**PP20202**	**PP20202**
	Starting cap	1	**S00465**	**S00465**	**S00465**
	Fan driver board AC	1	**VB00899**	**VB00399**	**VB00299**
	Isolation transformer (fan)	1	**PP09056**	**PP09055**	**PP09055**
Main DC fan ①	DC fan	1	**PP00072**	**PP00072**	**PP00072**
	DC power supply	1	**S01017**	**S01017**	**S01017**
Other	Front cover power	1	**FR09012**	**FR09012**	**FR09012**
	Front cover connection	1	**FR09013**	**FR09013**	**FR09013**
	Front power conduit	1	**FR09014**	**FR09014**	**FR09014**

Notes

① Factory recommended spare parts.

② Select one part number based on the amperage rating of the drive. Please contact EatonCare at 877-ETN-CARE for assistance.

FR10 Spare Parts

Category	Description	Quantity/ Drive	230V Catalog Number	480V Catalog Number	575V Catalog Number
Control	Fiber board	1	—	**S00451**	**S00451**
	ASIC board	1	—	**S00457**	**S00457**
Control fan	ASIC fan	1	—	**PP01096**	**PP01096**
Control module ①	SVX control module	1	—	**CPBS0000000000**	**CPBS0000000000**
	Standard slot A I/O card	1	—	**OPTA9**	**OPTA9**
	Standard slot B I/O card	1	—	**OPTA2**	**OPTA2**
Converter	Power module ②	1	—	**FR10-0385-4-ANV**	**FR10-0261-5-ANV**
		1	—	**FR10-0460-4-ANV**	**FR10-0325-5-ANV**
		1	—	**FR10-0520-4-ANV**	**FR10-0385-5-ANV**
		1	—	—	**FR10-0416-5-ANV**
	Driver board	1	—	**S00450**	**S00450**
	Driver adapter board	1	—	**VB00330**	**VB00330**
	Shunt board ②	6	—	**VB00497**	**VB00510**
		6	—	**VB00498**	**VB00511**
		6	—	**VB00537**	**VB00545**
Covers	Top cover	1	—	**FR10340**	**FR10340**
	Side cover	2	—	**FR10341**	**FR10341**
DC section	Balancing resistor	2	—	**PP13027**	**PP13028**
	DC busbars kit (right)	1	—	**S0000005**	**S0000005**
	Bus capacitor	12	—	**S00335**	**S00336**
Inverter	Rectifier module	1	—	**FR10823**	**FR10823**
	Charging resistor	1	—	**PP00066**	**PP00066**
	Diode	3	—	**PP01177**	**PP01177**
	Rectifier board	1	—	**S00591**	**S00592**
Keypad ①	SVX/SPX keypad	1	—	**KEYPAD-LOC/REM**	**KEYPAD-LOC/REM**
Main AC fan	Fan assembly (left)	1	—	**FR10846**	**FR10846**
	Fan assembly (right)	1	—	**FR10847**	**FR10847**
	Fan AC	2	—	**PP01080**	**PP01080**
	Fan fuse	4	—	**PP20202**	**PP20202**
	Starting cap	2	—	**S00528**	**S00528**
	Fan driver board AC	2	—	**VB00299**	**VB00299**
	Isolation transformer (left)	1	—	**FR10844**	**FR10844**
	Isolation transformer (right)	1	—	**FR10845**	**FR10845**
Main DC fan ①	DC fan	2	—	**PP00072**	**PP00072**
	DC power supply	2	—	**S01017**	**S01017**

Notes

① Factory recommended spare parts.

② Select one part number based on the amperage rating of the drive. Please contact EatonCare at 877-ETN-CARE for assistance.

FR11 Spare Parts

Category	Description	Quantity/ Drive	230V Catalog Number	480V Catalog Number	575V Catalog Number
Control	Fiber board	1	—	**S00451**	**S00451**
	ASIC board	1	—	**S00457**	**S00457**
Control fan	ASIC fan	1	—	**PP01096**	**PP01096**
Control module ①	SVX control module	1	—	**CPBS0000000000**	**CPBS0000000000**
	Standard slot A I/O card	1	—	**OPTA9**	**OPTA9**
	Standard slot B I/O card	1	—	**OPTA2**	**OPTA2**
Converter	Power module ②	1	—	**FR11-0590-4-ANV**	**FR11-0460-5-ANV**
		1	—	**FR11-0650-4-ANV**	**FR11-0502-5-ANV**
		1	—	**FR11-0730-4-ANV**	**FR11-0590-5-ANV**
	Driver board	1	—	**S00452**	**S00452**
	Driver adapter board	1	—	**VB00330**	**VB00330**
	Shunt board ②	9	—	**VB00513**	**VB00512**
		9	—	**VB00514**	**VB00546**
		9	—	**VB00538**	**VB00547**
Covers	Top cover	1	—	**FR11345**	**FR11345**
DC section	Balancing resistor	3	—	**PP13027**	**PP13027**
	DC busbars kit (right)	3	—	**S0000005**	**S0000005**
	Bus capacitor	18	—	**S00335**	**S00335**
Inverter	Rectifier module	1	—	**FR10823**	**FR10823**
	Diode	3	—	**PP01177**	**PP01177**
	Rectifier board	1	—	**S00591**	**S00591**
Keypad ①	SVX/SPX keypad	1	—	**KEYPAD-LOC/REM**	**KEYPAD-LOC/REM**
Main AC fan	Fan assembly (right)	3	—	**FR10847**	**FR10847**
	Fan AC	3	—	**PP01080**	**PP01080**
	Fan fuse	4	—	**PP20202**	**PP20202**
	Starting cap	3	—	**S00530**	**S00530**
	Fan driver board AC	3	—	**VB00299**	**VB00299**
	Isolation transformer (right)	3	—	**FR10845**	**FR10845**
Main DC fan ①	DC fan	2	—	**PP00072**	**PP00072**
	DC power supply	2	—	**S01017**	**S01017**

Notes

① Factory recommended spare parts.

② Select one part number based on the amperage rating of the drive. Please contact EatonCare at 877-ETN-CARE for assistance.

FR12 Spare Parts

Category	Description	Quantity/ Drive	230V Catalog Number	480V Catalog Number	575V Catalog Number
Control	Fiber board	2	—	**S00451**	**S00451**
	ASIC board	2	—	**S00457**	**S00457**
	Star coupler	1	—	**S00593**	**S00593**
Control fan	ASIC fan	2	—	**PP01096**	**PP01096**
Control module ①	SVX control module	1	—	**CPBS0000000000**	**CPBS0000000000**
	Standard slot A I/O card	1	—	**OPTA9**	**OPTA9**
	Standard slot B I/O card	1	—	**OPTA2**	**OPTA2**
Converter	Power module ②	1	—	**FR12-0820-4-ANV**	**FR12-0650-5-ANV**
		1	—	**FR12-0920-4-ANV**	**FR12-0750-5-ANV**
		1	—	**FR12-1030-4-ANV**	**FR12-0820-5-ANV**
	Driver board	2	—	**S00450**	**S00450**
	Driver adapter board	2	—	**VB00330**	**VB00330**
	Shunt board	12	—	**VB00498**	**VB00511**
Covers	Top cover	2	—	**FR10340**	**FR10340**
	Side cover	4	—	**FR10341**	**FR10341**
DC section	Balancing resistor	4	—	**PP13027**	**PP13027**
	DC busbars kit (right)	2	—	**S0000005**	**S0000005**
	Bus capacitor	24	—	**S00335**	**S00336**
Inverter	Rectifier module	2	—	**FR10823**	**FR10823**
	Diode	3	—	**PP01177**	**PP01177**
	Rectifier board	2	—	**S00591**	**S00591**
Keypad ①	SVX/SPX keypad	1	—	**KEYPAD-LOC/REM**	**KEYPAD-LOC/REM**
Main AC fan	Fan assembly (left)	2	—	**FR10846**	**FR10846**
	Fan assembly (right)	2	—	**FR10847**	**FR10847**
	Fan AC	4	—	**PP01080**	**PP01080**
	Fan fuse	8	—	**PP20202**	**PP20202**
	Starting cap	4	—	**S00528**	**S00528**
	Fan driver board AC	4	—	**VB00299**	**VB00299**
	Isolation transformer (left)	2	—	**FR10844**	**FR10844**
	Isolation transformer (right)	2	—	**FR10845**	**FR10845**
Main DC fan ①	DC fan	4	—	**PP00072**	**PP00072**
	DC power supply	4	—	**S01017**	**S01017**

Notes

① Factory recommended spare parts.

② Select one part number based on the amperage rating of the drive. Please contact EatonCare at 877-ETN-CARE for assistance.

FR13 Spare Parts

Category	Description	Quantity/ Drive	230V Catalog Number	480V Catalog Number	575V Catalog Number
Control	ASIC board	1	—	**S00457**	**S00457**
	ASIC assembly	1	—	**60S01030**	**60S01030**
Control fan	ASIC fan	1	—	**PP01096**	**PP01096**
Control module ①	SVX control module	1	—	**CPBS0000000000**	**CPBS0000000000**
	Standard slot A I/O card	1	—	**OPTA9**	**OPTA9**
	Standard slot B I/O card	1	—	**OPTA2**	**OPTA2**
Converter	Power module ②	3	—	**FI13-1150-4-ANV**	**FR13-1030-5-ANV**
		3	—	**FI13-1300-4-ANV**	**FR13-1180-5-ANV**
		3	—	**FI13-1450-4-ANV**	**FR13-920-5-ANV**
	Driver board	3	—	**S00454**	**S00454**
	Driver adapter board	2	—	**VB00330**	**VB00330**
	Shunt board ②	18	—	**VB00505**	**VB00516**
		18	—	**VB00514**	**VB00517**
		18	—	**VB00541**	**VB00547**
Covers	Top cover	3	—	**FI10001**	**FI10001**
	Side cover	3	—	**FI10003**	**FI10003**
DC section	Balancing resistor	6	—	**PP13034**	**PP13034**
	Bus capacitor	36	—	**S00335**	**S00336**
	DC busbars kit	3	—	**FI13329**	**FI13329**
Inverter	Rectifier module	2	—	**FR10823**	**FR10823**
	Diode	3	—	**PP01177**	**PP01177**
	Rectifier board	2	—	**S00591**	**S00591**
Keypad ①	SVX/SPX keypad	1	—	**KEYPAD-LOC/REM**	**KEYPAD-LOC/REM**
Main AC fan	Fan assembly (left)	3	—	**FI13301**	**FI13301**
	Fan AC	3	—	**PP01080**	**PP01080**
	Fan fuse	6	—	**PP20202**	**PP20202**
	Starting cap	3	—	**S00520**	**S00520**
	Fan driver board AC	3	—	**VB00299**	**VB00299**
	Isolation transformer	3	—	**PP10057**	**PP10057**
Main DC fan ①	DC fan	4	—	**PP00072**	**PP00072**
	DC power supply	4	—	**S01017**	**S01017**

Notes

① Factory recommended spare parts.

② Select one part number based on the amperage rating of the drive. Please contact EatonCare at 877-ETN-CARE for assistance.

FR14 Spare Parts

Category	Description	Quantity/ Drive	230V Catalog Number	480V Catalog Number	575V Catalog Number
Control	ASIC board	2	—	**S00457**	**S00457**
	Star coupler	1	—	**S00593**	**S00593**
	ASIC assembly	2	—	**60S01030**	**60S01030**
	Star coupler kit	1	—	**FR10860**	**FR10860**
Control fan	ASIC fan	2	—	**PP01096**	**PP01096**
Control module ①	SVX control module	1	—	**CPBS0000000000**	**CPBS0000000000**
	Standard slot A I/O card	1	—	**OPTA9**	**OPTA9**
	Standard slot B I/O card	1	—	**OPTA2**	**OPTA2**
Converter	Power module ②	1	—	**FR14-1770-4-ANV**	**FR14-1500-5-ANV**
		1	—	**FR14-2150-4-ANV**	**FR14-1900-5-ANV**
		1	—	**FR14-2700-4-ANV**	**FR14-2250-5-ANV**
	Driver board	6	—	**S00454**	**S00454**
	Driver adapter board	2	—	**VB00330**	**VB00330**
	Shunt board ②	36	—	**VB00541**	**VB00516**
		36	—	—	**VB00517**
Covers	Top cover	6	—	**FI10001**	**FI10001**
	Side cover	6	—	**FI10003**	**FI10003**
DC section	Balancing resistor	6	—	**PP13034**	**PP13034**
	Bus capacitor	72	—	**S00335**	**S00336**
	DC busbars kit	6	—	**FI13329**	**FI13329**
Inverter	Rectifier module	2	—	**FR10823**	**FR10823**
	Diode	3	—	**PP01177**	**PP01177**
	Rectifier board	2	—	**S00591**	**S00591**
Keypad ①	SVX/SPX keypad	1	—	**KEYPAD-LOC/REM**	**KEYPAD-LOC/REM**
Main AC fan	Fan assembly (left)	6	—	**FI13301**	**FI13301**
	Fan AC	6	—	**PP01080**	**PP01080**
	Fan fuse	12	—	**PP20202**	**PP20202**
	Starting cap	6	—	**S00520**	**S00520**
	Fan driver board AC	6	—	**VB00299**	**VB00299**
	Isolation transformer	6	—	**PP10057**	**PP10057**
Main DC fan ①	DC fan	6	—	**PP00072**	**PP00072**
	DC power supply	6	—	**S01017**	**S01017**

Notes

① Factory recommended spare parts.

② Select one part number based on the amperage rating of the drive. Please contact EatonCare at 877-ETN-CARE for assistance.

Technical Data and Specifications

SVX9000 Drives

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	0.01 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 1–16 kHz; default 10 kHz 1–10 kHz; default 3.6 kHz
Frequency reference	Analog input: Resolution 0.1% (10-bit), accuracy ±1% V/Hz Panel reference: Resolution 0.01 Hz
Field weakening point	30–320 Hz
Acceleration time	0–3000 sec.
Deceleration time	0–3000 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° to 158°F (–40° to 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
Control Connections	
Analog input voltage	0 to 10V, R = 200 kohms (–10 to 10V joystick control) resolution 0.1%; accuracy ±1%
Analog input current	0(4) to 20 mA; R_i—250 ohms differential
Digital inputs (6)	Positive or negative logic; 18 to 30 Vdc
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. 500 ohms; resolution 10 bit; accuracy ±2%
Digital outputs	Open collector output, 50 mA/48V
Relay outputs	Two programmable Form C relay outputs switching capacity: 24 Vdc/8A, 250 Vac/8A, 125 Vdc/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)

Standard I/O Specifications

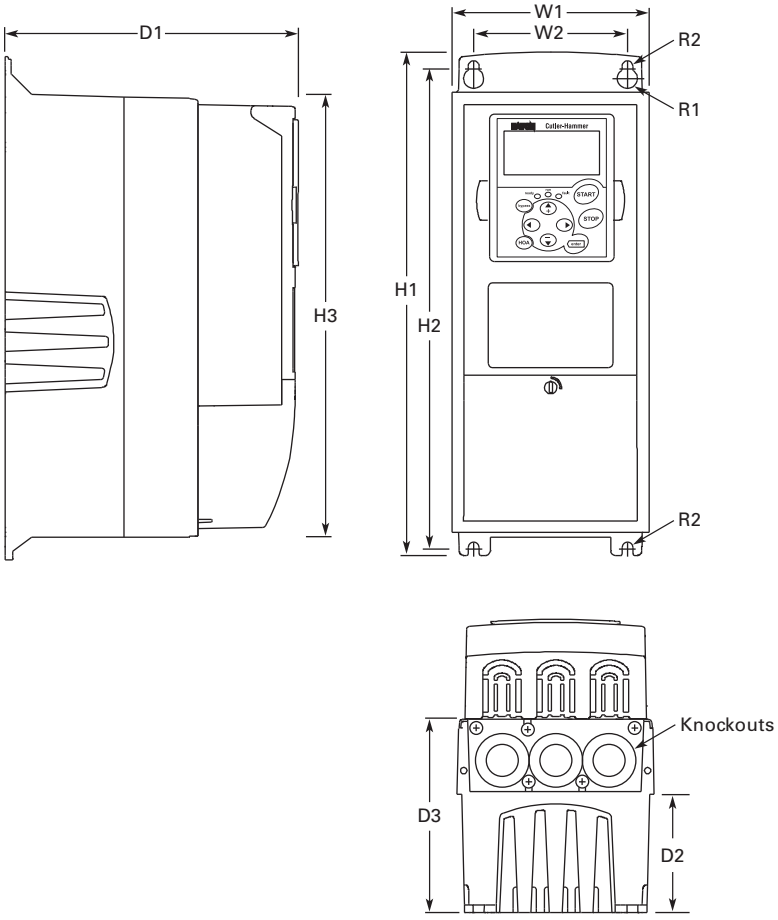
Description	Specification
Six–digital input programmable	24V: "0" ≤10V, "1" ≥18V,R_i >5 kohms
Two–analog input configurable w/jumpers	Voltage: 0–±10V, R_i >200 kohms Current: 0 (4)–20 mA, R_i = 250 ohms
Two–digital output programmable	Form C relays 250 Vac 30 Vdc 2 amp resistive
One–analog output programmable configurable w/jumper	0–20 mA, R_L max. 500 ohms 10 bits ±2%
One digital output programmable	Open collector 48 Vdc 50 mA

Dimensions

Approximate Dimensions in Inches (mm)

9000X Open Drives

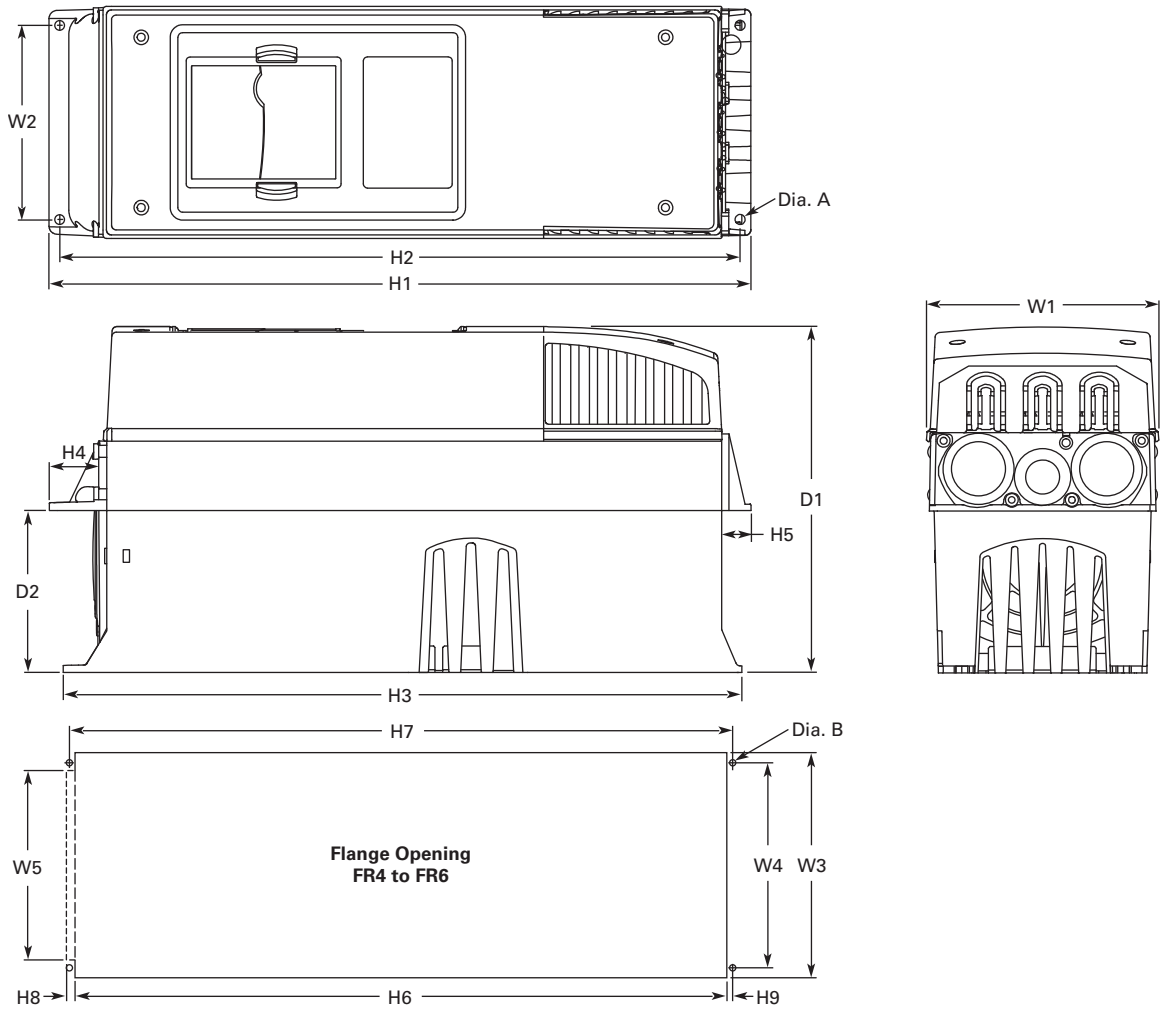
NEMA Type 1/IP21 and NEMA Type 12/IP54, FR4, FR5 and FR6



Voltage	hp (I_H)	H1	H2	H3	D1	D2	D3	W1	W2	R1 Dia.	R2 Dia.	Weight Lbs (kg)	Knockouts at Inches (mm) N1 (O.D.)
FR4													
230V	3/4–3	12.9 (327)	12.3 (313)	11.5 (292)	7.5 (190)	3.0 (77)	4.9 (126)	5.0 (128)	3.9 (100)	0.5 (13)	0.3 (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)	0.5 (13)	0.3 (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)	0.6 (15.5)	0.4 (9)	40.8 (19)	3 @ 1.5 (37)
480V	20–30												
575V	2–25												

Approximate Dimensions in Inches (mm)

NEMA Type 1/IP21 and NEMA Type 12/IP54 with Flange Kit, FR4, FR5 and FR6



FR4, FR5 and FR6 with Flange Kit

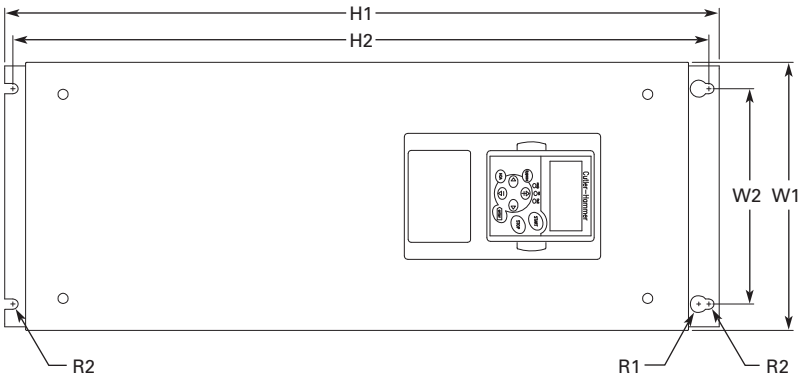
W1	W2	H1	H2	H3	H4	H5	D1	D2	Dia. A
FR4									
5.0 (128)	4.5 (113)	13.3 (337)	12.8 (325)	12.9 (327)	1.2 (30)	0.9 (22)	7.5 (190)	3.0 (77)	0.3 (7)
FR5									
5.6 (143)	4.7 (120)	17.0 (434)	16.5 (420)	16.5 (419)	1.4 (36)	0.7 (18)	8.4 (214)	3.9 (100)	0.3 (7)
FR6									
7.7 (195)	6.7 (170)	22.0 (560)	21.6 (549)	22.0 (558)	1.2 (30)	0.8 (20)	9.3 (237)	4.2 (106)	0.3 (7)

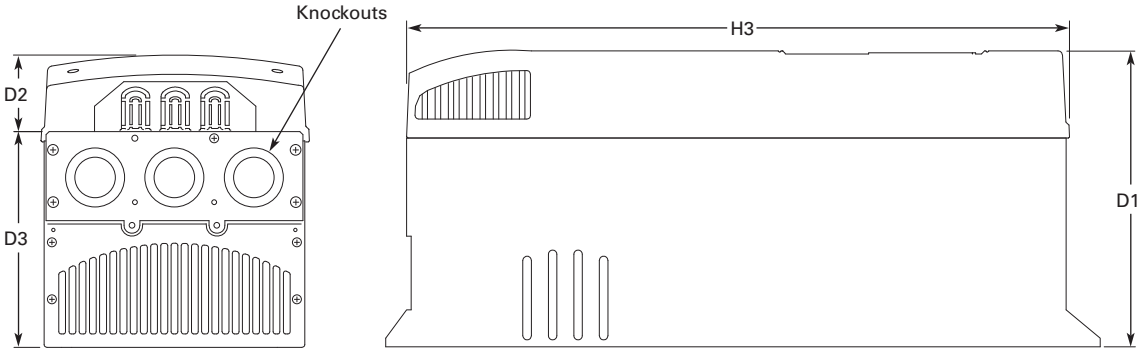
Flange Opening, FR4 to FR6

W3	W4	W5	H6	H7	H8	H9	Dia. B
FR4							
4.8 (123)	4.5 (113)	—	12.4 (315)	12.8 (325)	—	0.2 (5)	0.3 (7)
FR5							
5.3 (135)	4.7 (120)	—	16.2 (410)	16.5 (420)	—	0.2 (5)	0.3 (7)
FR6							
7.3 (185)	6.7 (170)	6.2 (157)	21.2 (539)	21.6 (549)	0.3 (7)	0.2 (5)	0.3 (7)

Approximate Dimensions in Inches (mm)

NEMA Type 1/IP21 and NEMA Type 12/IP54, FR7

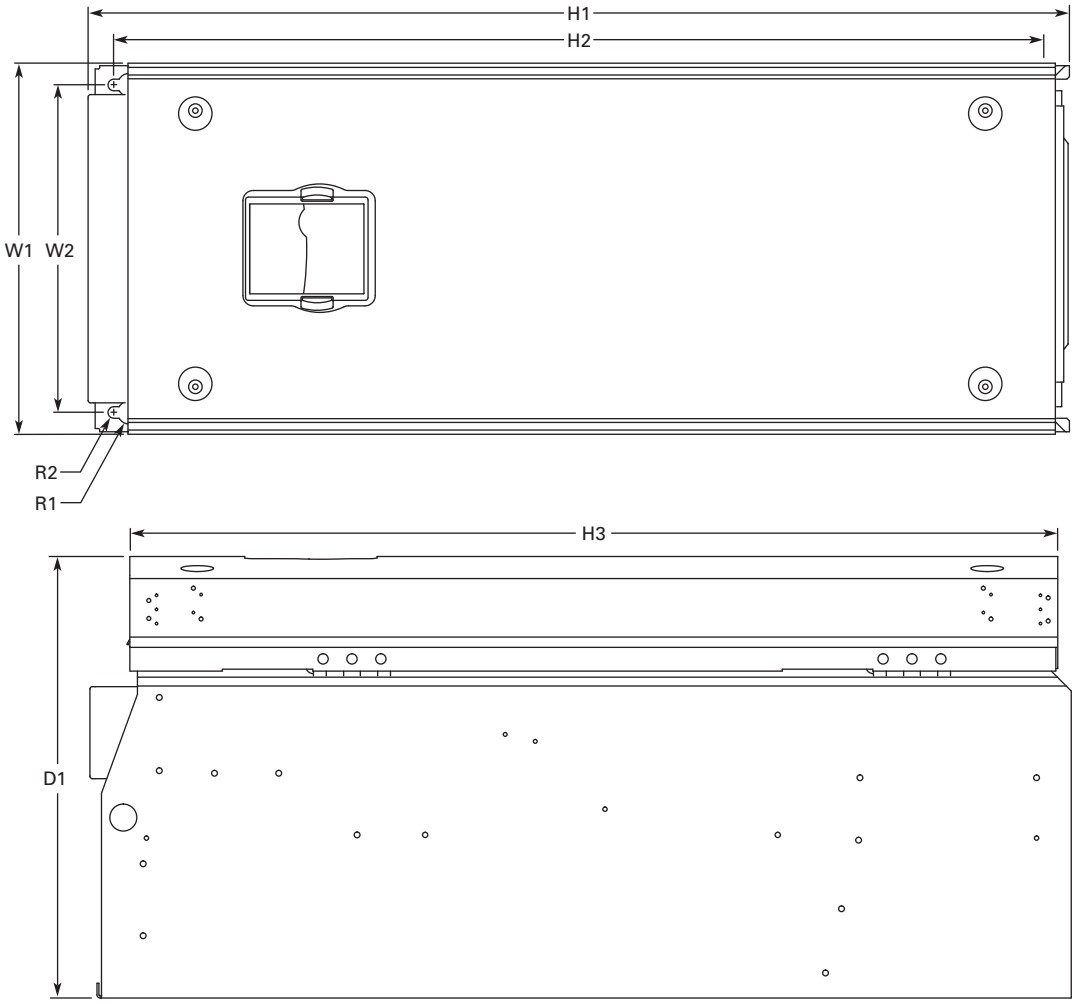




Voltage	hp (I_H)	H1	H2	H3	D1	D2	D3	W1	W2	R1 Dia.	R2 Dia.	Weight Lbs (kg)	Knockouts at Inches (mm) N1 (O.D.)
230V	20–30	24.8 (630)	24.2 (614)	23.2 (590)	10.1 (257)	3.0 (77)	7.3 (184)	9.3 (237)	7.5 (190)	0.7 (18)	0.4 (9)	77.2 (35)	3 at 1.5 (37)
480V	40–60												
575V	30–40												

Approximate Dimensions in Inches (mm)

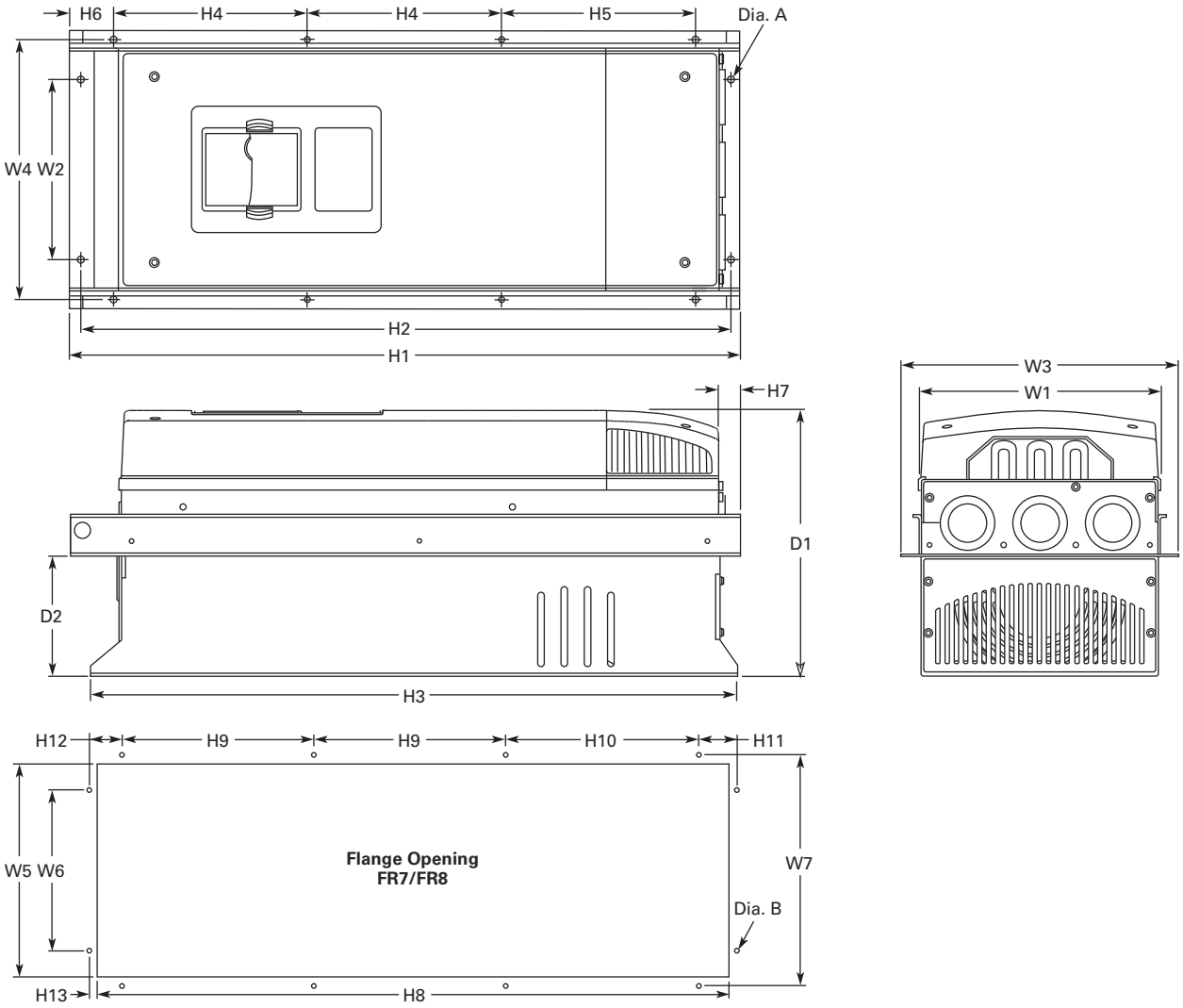
NEMA Type 1/IP21 and NEMA Type 12/IP54, FR8



Voltage	hp (I_H)	D1	H1	H2	H3	W1	W2	R1 Dia.	R2 Dia.	Weight Lbs (kg)
230V	40–60	13.5 (344)	30.1 (764)	28.8 (732)	28.4 (721)	11.5 (291)	10 (255)	0.7 (18)	0.4 (9)	127 (58)
480V	75–125									
575V	50–75									

Approximate Dimensions in Inches (mm)

NEMA Type 1/IP21 and NEMA Type 12/IP54, with Flange Kit, FR7 and FR8



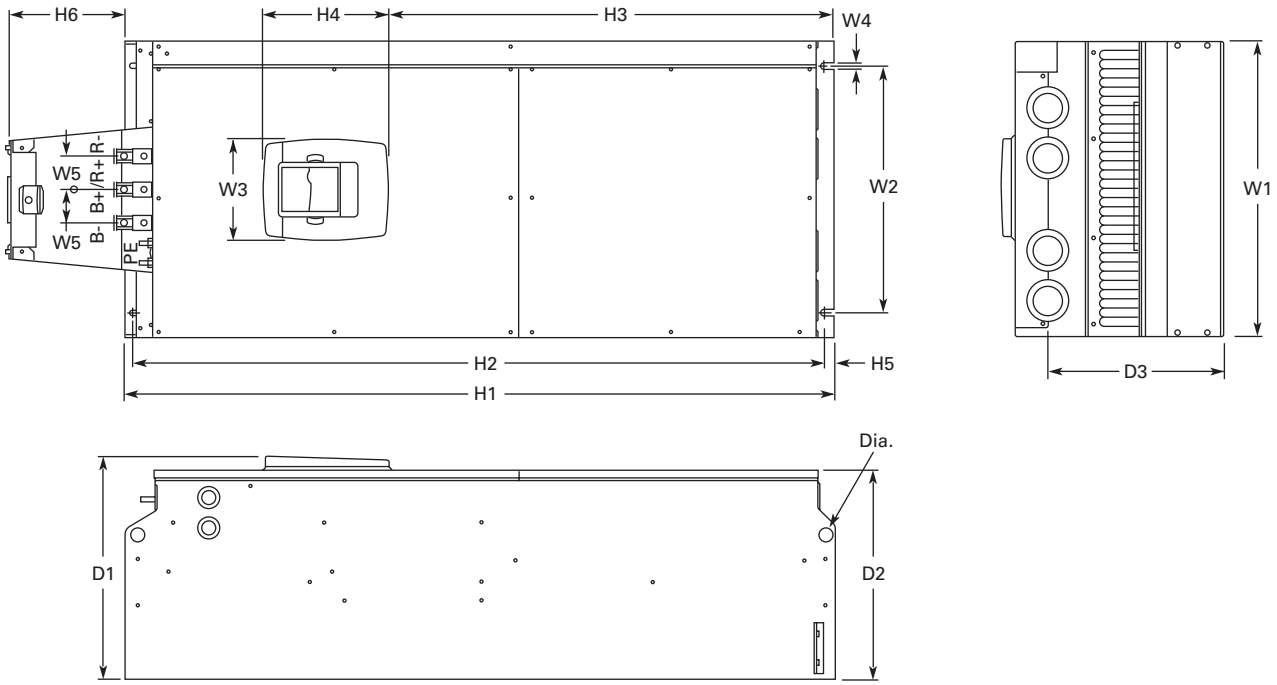
W1	W2	W3	W4	H1	H2	H3	H4	H5	H6	H7	D1	D2	Dia. A
FR7													
9.3 (237)	6.8 (175)	10.6 (270)	10.0 (253)	24.9 (652)	24.8 (632)	24.8 (630)	7.4 (189)	7.4 (189)	0.9 (23)	0.8 (20)	10.1 (257)	4.6 (117)	0.3 (6)
FR8													
11.2 (285)	—	14.0 (355)	13.0 (330)	32.8 (832)	—	29.3 (745)	10.2 (258)	10.4 (265)	1.7 (43)	2.2 (57)	13.5 (344)	4.3 (110)	0.4 (9)

Flange Opening, FR7 and FR8

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)	0.3 (6)
FR8									
11.9 (301)	—	13.0 (330)	31.9 (810)	10.2 (258)	10.4 (265)	—	—	1.3 (33)	0.4 (9)

Approximate Dimensions in Inches (mm)

NEMA Type 1/IP21 and NEMA Type 12/IP54 FR9



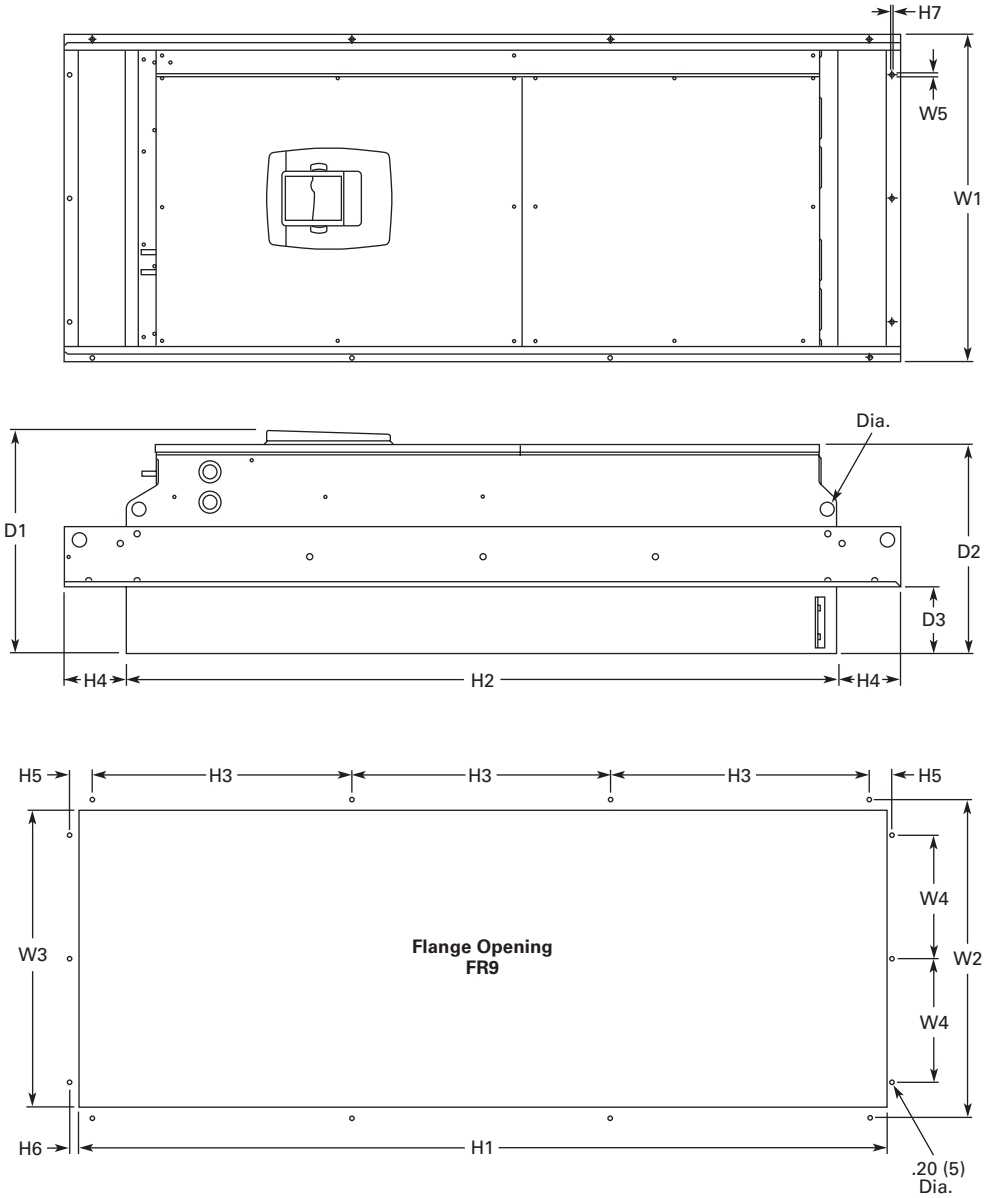
Voltage	hp (I_H)	W1	W2	W3	W4	H1	H2	H3	H4 ①	D1	D2	D3	Dia.	Weight Lbs (kg)
230V	75–100	18.9 (480)	15.7 (400)	0.4 (9)	2.1 (54)	45.3 (1150)	44.1 (1120)	0.6 (16)	7.4 (188)	14.2 (361.5)	13.4 (340)	11.2 (285)	0.8 (21)	321.9 (146)
480V	150–200													
575V	100–175													

Note

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

Approximate Dimensions in Inches (mm)

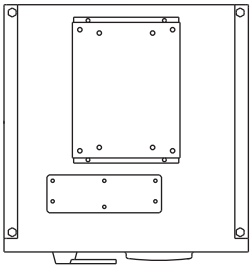
NEMA Type 1/IP21 and NEMA Type 12/IP54, FR9 with Flange Kit

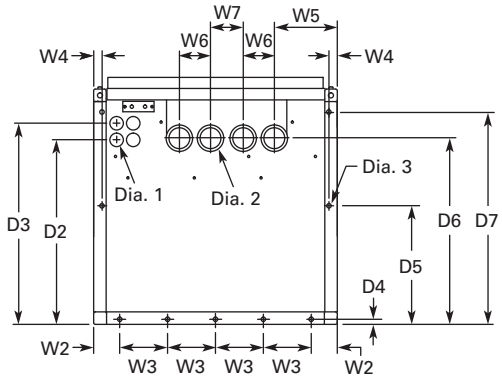


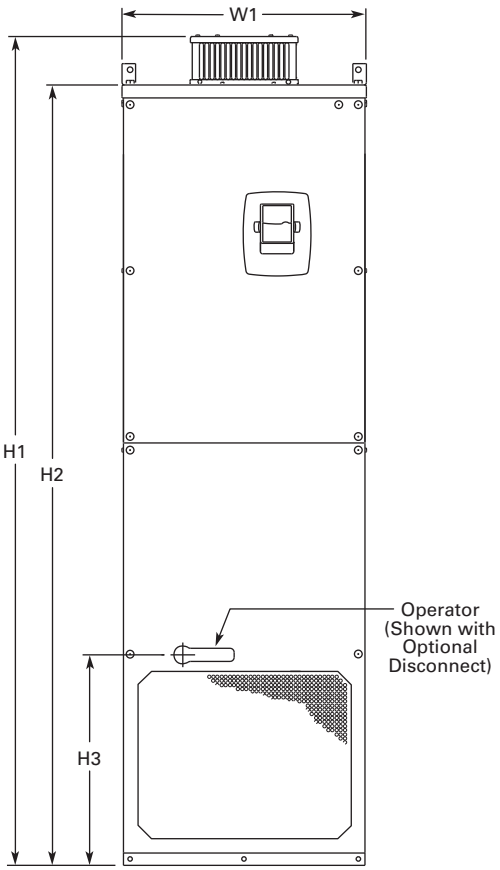
W1	W2	W3	W4	W5	H1	H2	H3	H4	H5	H6	H7	D1	D2	D3	Dia.
20.9 (530)	20.0 (510)	19.1 (485)	7.9 (200)	0.2 (5.5)	51.7 (1312)	45.3 (1150)	16.5 (420)	3.9 (100)	1.4 (35)	0.4 (9)	0.1 (2)	24.9 (362)	13.4 (340)	4.3 (109)	0.8 (21)

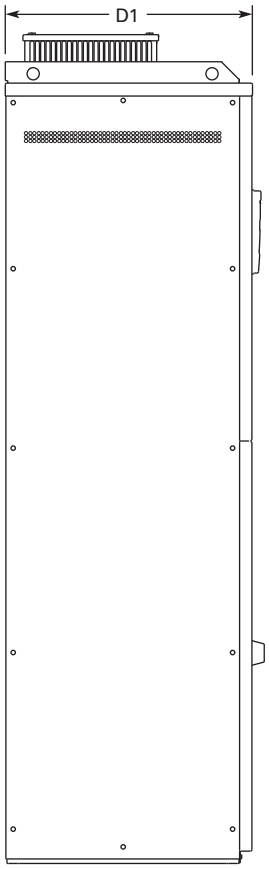
Approximate Dimensions in Inches (mm)

NEMA Type 1/IP21 and NEMA Type 12/IP54, FR10 Freestanding





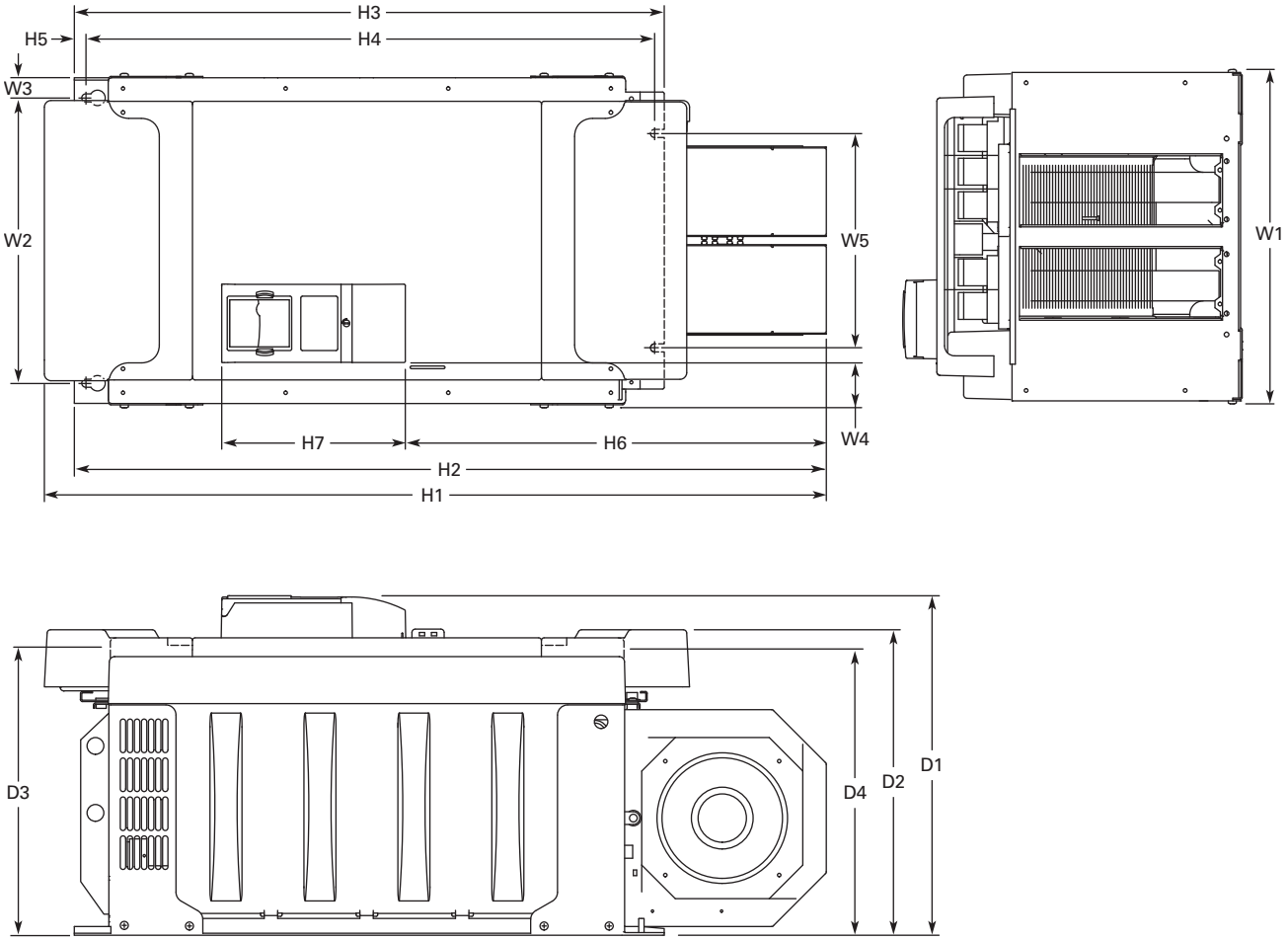




W1	W2	W3	W4	W5	W6	W7	H1	H2	H3	D1	D2	D3	D4	D5	D6	D7	Dia. 1	Dia. 2	Dia. 3	Weight Lbs (kg)
23.43 (595)	2.46 (62.5)	4.53 (115)	0.79 (20)	5.95 (151)	2.95 (75)	30.11 (79)	79.45 (2018)	74.80 (1900)	20.18 (512.5)	23.70 (602)	17.44 (443)	19.02 (483)	0.47 (12)	11.22 (285)	17.60 (447)	20.08 (510)	0.83 (21)	1.89 (48)	0.43 (11)	857 (389)

Approximate Dimensions in Inches (mm)

FR10 Open Chassis ①



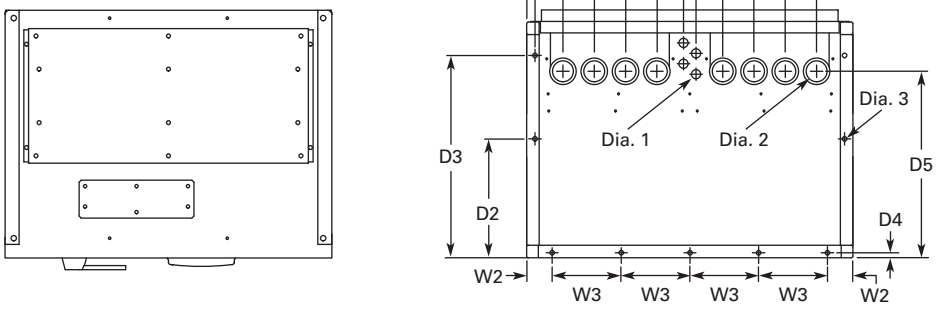
Voltage	hp (I_H)	W1	W2	W3	W4	W5	H1	H2	H3	H4	H5	H6	H7	D1	D2	D3	D4	Weight Lbs (kg)
480V	250–350	19.7 (500)	16.7 (425)	1.2 (30)	2.6 (67)	12.8 (325)	45.9 (1165)	44.1 (1121)	34.6 (879)	33.5 (850)	0.7 (17)	24.7 (627)	10.8 (275)	19.9 (506)	17.9 (455)	16.7 (423)	16.6 (421)	518 (235)
575V	200–300																	

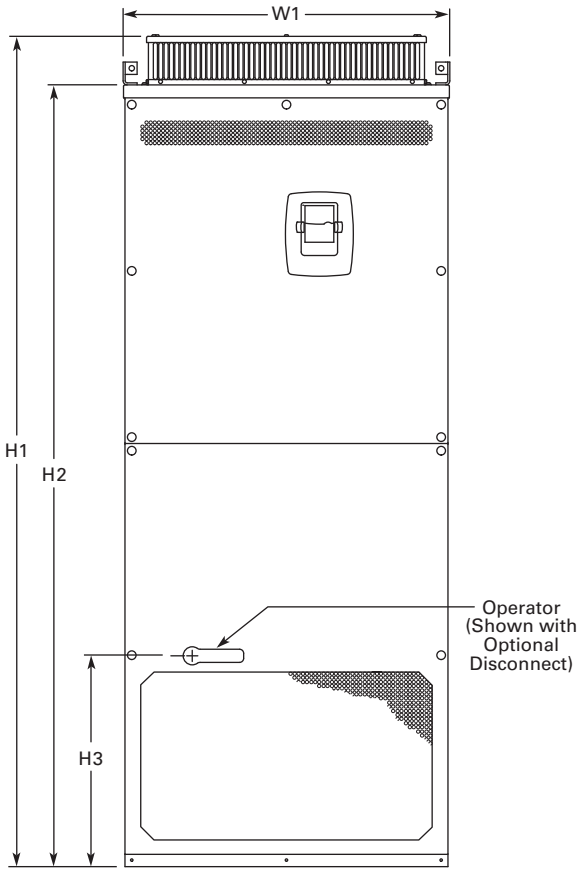
Note

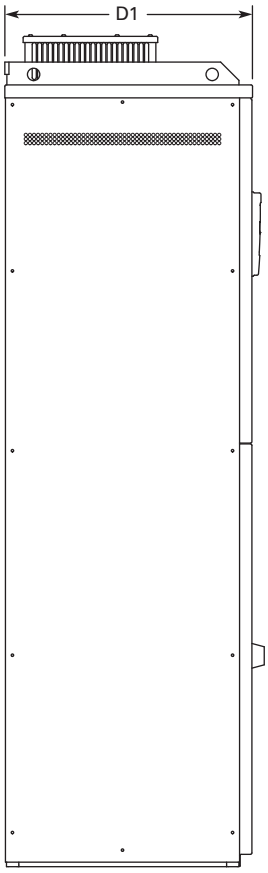
① 9000X FR12 is built of two FR10 modules. Please refer to SPX9000 installation manual for mounting instructions.

Approximate Dimensions in Inches (mm)

NEMA Type 1/IP21, FR11 Freestanding Drive



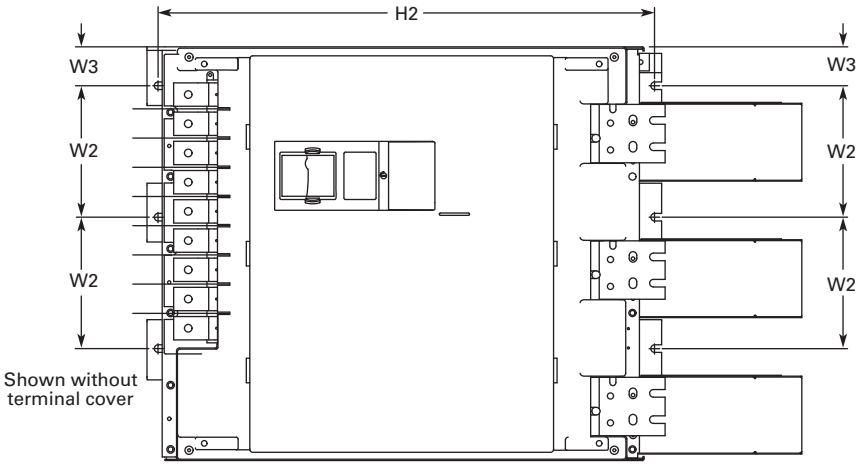


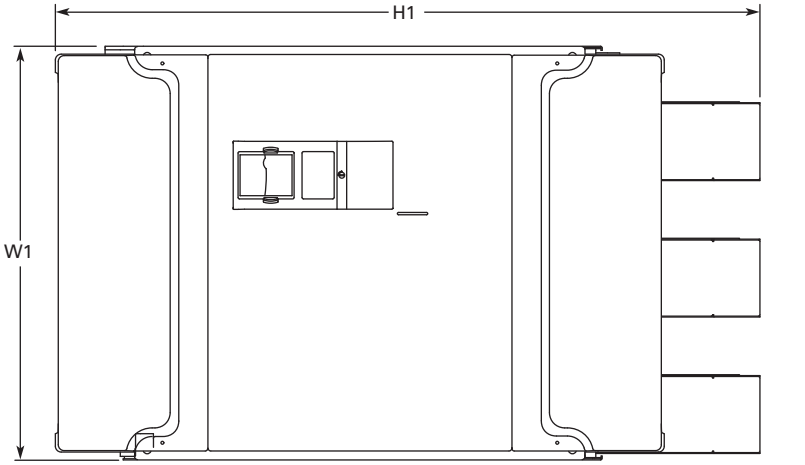


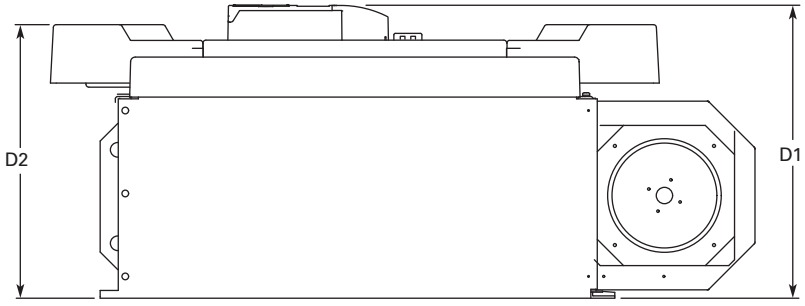
Voltage	hp (I_H)	W1	W2	W3	W4	W5	W6	W7	W8	H1	H2	H3	D1	D2	D3	D4	D5	Dia. 1	Dia. 2	Dia. 3	Weight Lbs (kg)
480	400–550	31.26 (794)	2.40 (61)	6.50 (165)	0.79 (20)	3.43 (87)	2.95 (75)	2.52 (64)	1.18 (30)	79.45 (2018)	74.80 (1900)	20.18 (512.5)	23.70 (602)	11.22 (285)	19.09 (485)	0.47 (12)	17.60 (447)	0.83 (21)	1.89 (48)	0.35 x 0.43 (9 x 11)	526 (239)

Approximate Dimensions in Inches (mm)

FR11 Open Chassis



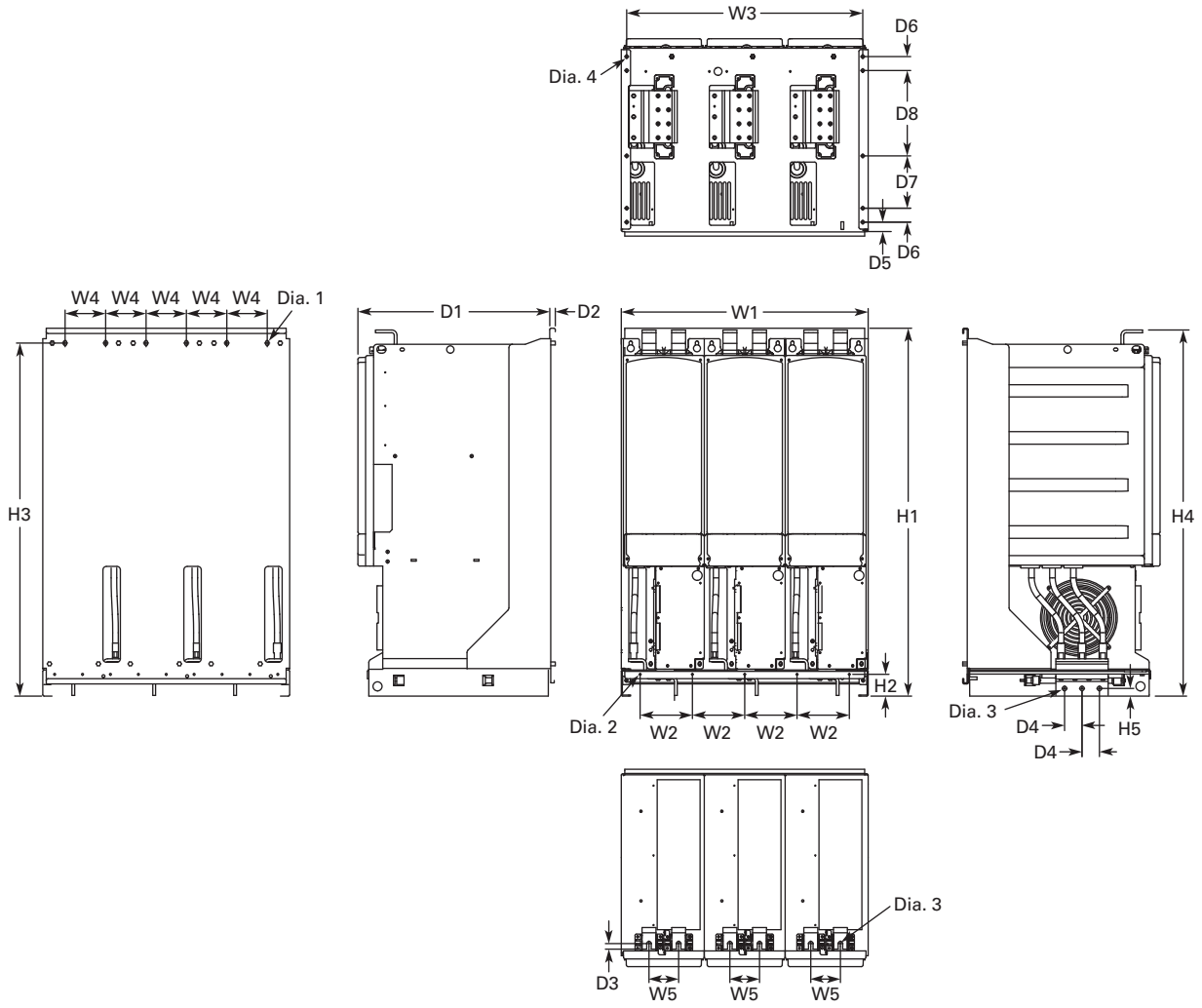




Voltage	hp (I_H)	W1	W2	W3	H1	H2	D1	D2	Weight Lbs (kg)
480V	400–550	27.9 (709)	8.86 (225)	2.6 (67)	45.5 (1155)	33.5 (850)	19.8 (503)	18.4 (468)	833 (378)
575V	400–500								

Approximate Dimensions in Inches (mm)

FR13, Open Chassis Inverter



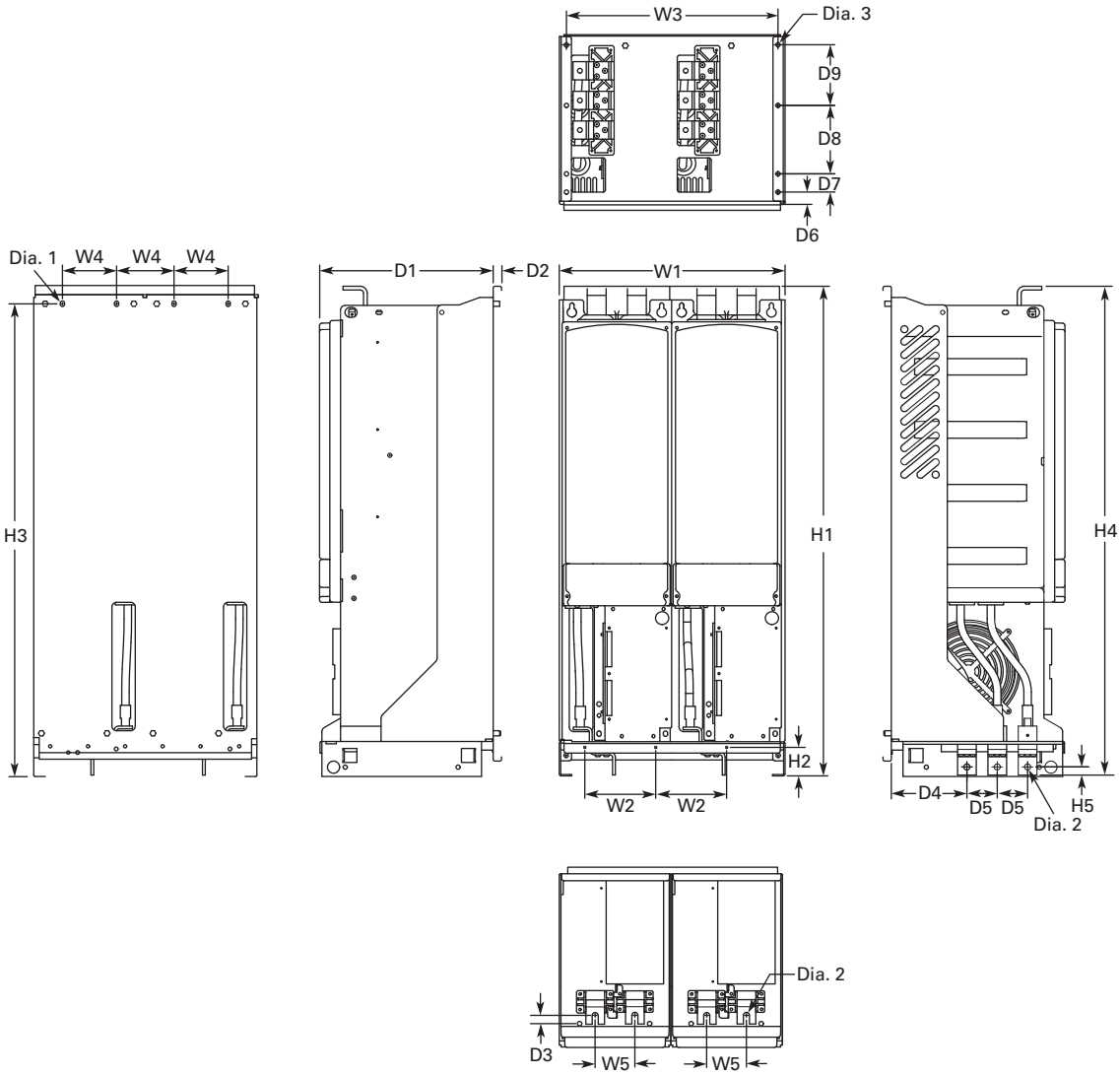
W1	W2	W3	W4	W5	H1	H2	H3	H4	H5	D1	D2	D3	D4	D5	D6	D7	D8	Dia. 1	Dia. 2	Dia. 3	Dia. 4	Weight Lbs (kg)
27.87 (708)	5.91 (150)	26.65 (677)	4.57 (116)	3.35 (85)	41.54 (1055)	2.46 (62.5)	39.86 (1012.5)	41.34 (1050)	0.79 (20)	21.77 (553)	0.51 (13)	0.63 (16)	1.97 (50)	1.06 (27)	1.57 (40)	5.91 (150)	9.64 (244.8)	0.35x0.59 (9x15)	0.18 (4.6)	0.51 (13)	0.37 (9.5)	683 (310)

Notes

9000X FR14 is built of two FR13 modules. Please refer to SPX9000 installation manual for mounting instructions.
FR13 is built from an inverter module and a converter module. Please refer to SPX9000 installation manual for mounting instructions.

Approximate Dimensions in Inches (mm)

FR13, Open Chassis Converter



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	Weight Lbs (kg)
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)	0.69 (17.5)	14.69 (373)	0.51 (13)	0.73 (18.5)	6.42 (163)	2.56 (65)	1.06 (27)	1.57 (40)	5.91 (150)	5.24 (133)	0.35x0.59 (9x15)	0.51 (13)	0.37 (9.5)	295 (134)

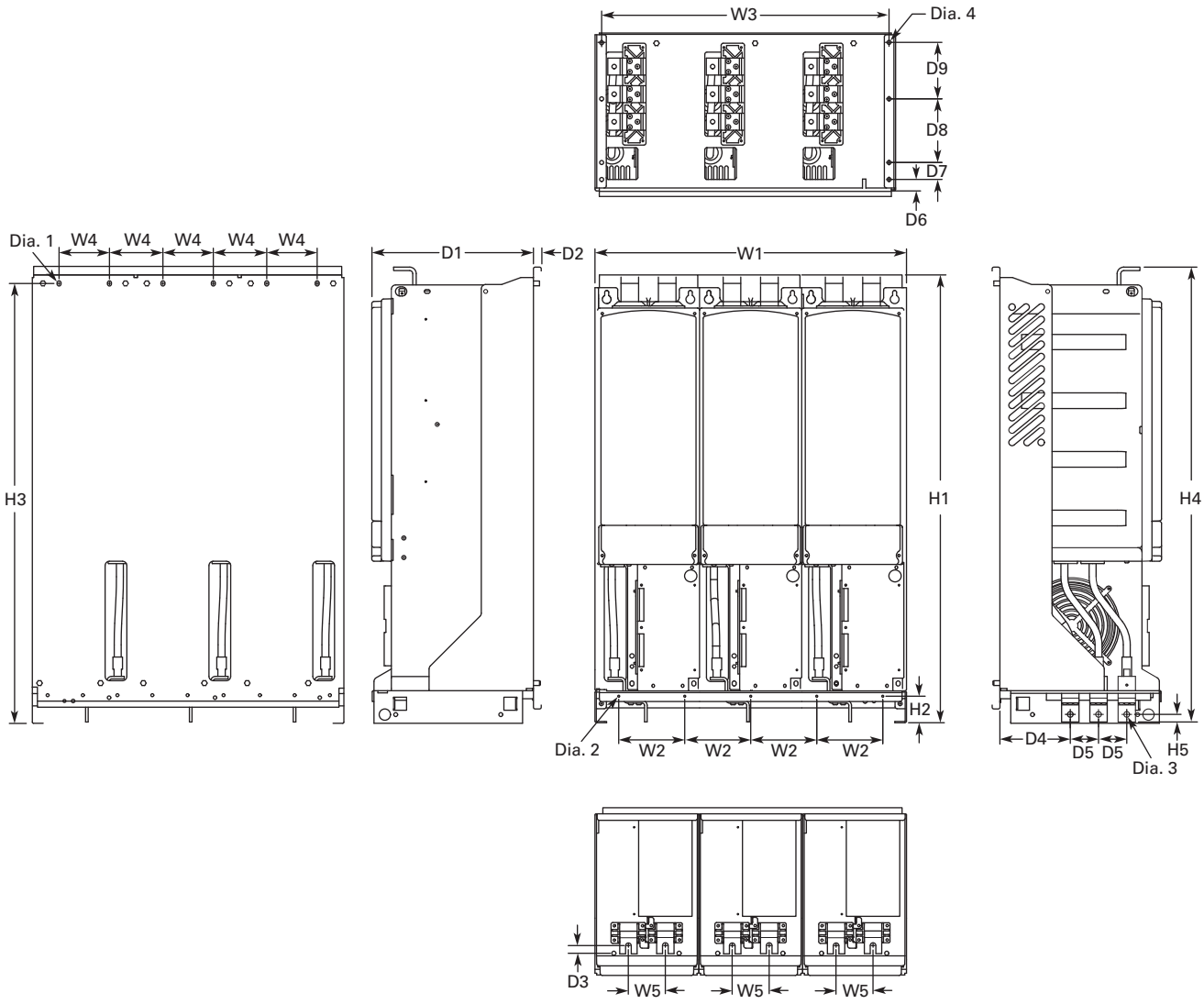
Number of Input Units

480V Catalog Number	hp	Input Modules
SPX800A0-4A2N1	800	2

690V Catalog Number	hp	Input Modules
SPX800A0-5A2N1	800	2
SPX900A0-5A2N1	900	2
SPXH10A0-5A2N1	1000	2

Approximate Dimensions in Inches (mm)

FR13, Open Chassis Converter—900/1000 hp 480V



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	Weight Lbs (kg)
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)	0.69 (17.5)	14.69 (373)	0.51 (13)	0.73 (18.5)	6.42 (163)	2.56 (65)	1.06 (27)	1.57 (40)	5.91 (150)	5.24 (133)	0.35x0.59 (9x15)	0.18 (4.6)	0.51 (13)	0.37 (9.5)	443 (201)

Number of Input Units

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

Approximate Dimensions in Inches (mm)

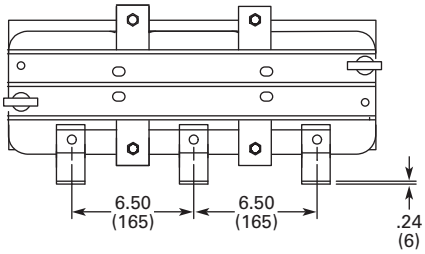
AC Choke Dimensions

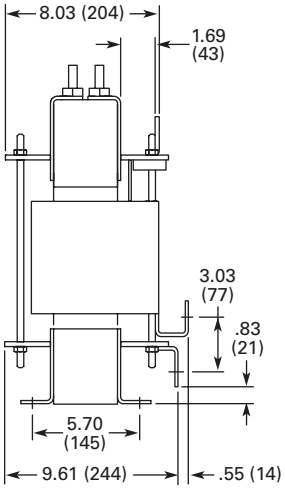
Choke Types

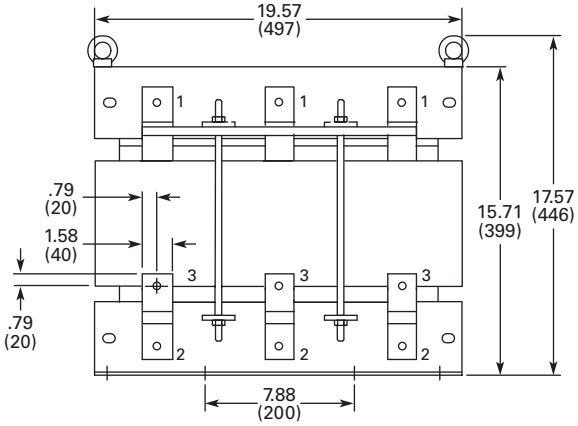
Catalog Number	Frame Size	Choke Type ①
Voltage Range 380–500V		
SPX 250 4	FR10	CHK0400
SPX 300 4		CHK0520
SPX 350 4		CHK0520
SPX 400 4	FR11	2 x CHK0400
SPX 500 4		2 x CHK0400
SPX 550 4		2 x CHK0400
SPX 600 4	FR12	2 x CHK0520
SPX 650 4		2 x CHK0520
SPX 700 4		2 x CHK0520
SPX 800 4	FR13	2 x CHK0400
SPX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

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

CHK0520





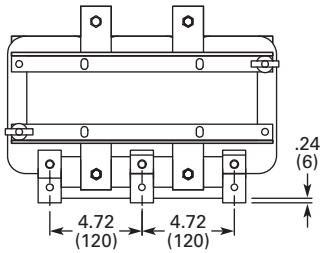


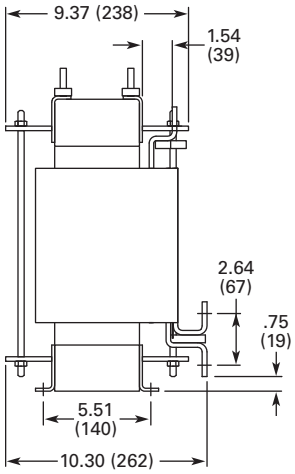
Note

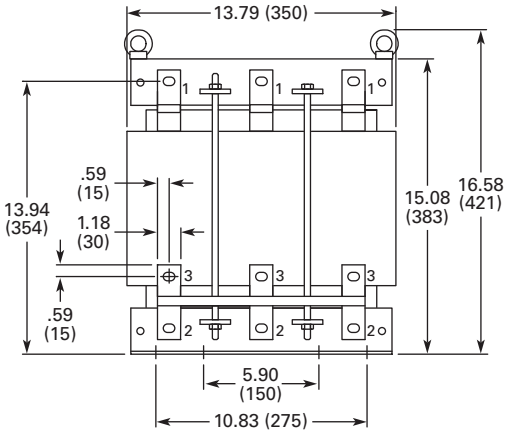
① Chokes are provided with all FR10–FR14 drives.

Approximate Dimensions in Inches (mm)

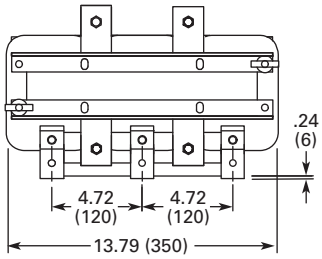
CHK0400

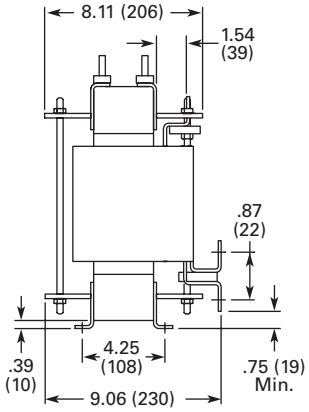


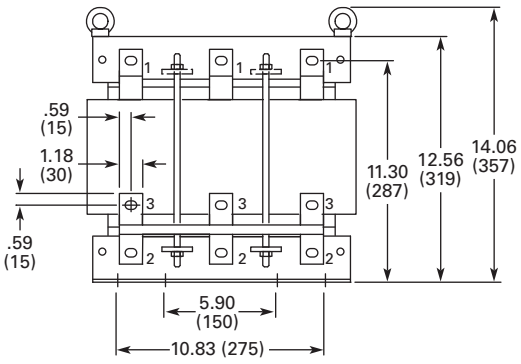




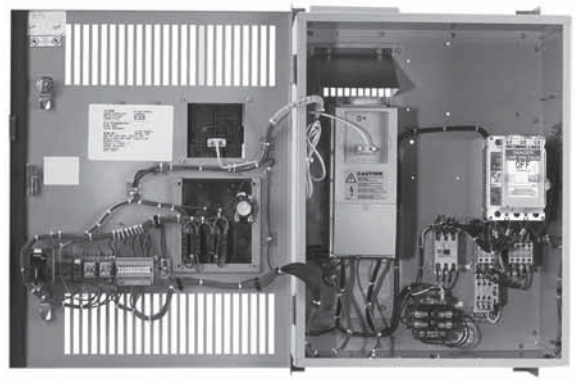
CHK0261







SVX9000 Enclosed Drives



Contents

SVX9000 Enclosed Drives

Product Description

- **Standard Enclosed—** covers a wide range of the most commonly ordered options. Pre-engineering eliminates the lead time normally associated with customer specific options.
- **Modified Standard Enclosed**—applies to specific customer requirements that vary from the standard enclosed offering, such as the need for an additional indicating light or minor modifications to drawings. *Consult your Eaton representative for assistance in pricing and lead time.*
- **Custom Engineered**—for those applications with more unique or complex requirements, these are individually engineered to the customer's needs. *Consult your Eaton representative for assistance in pricing and lead time.*

Features

- NEMA Type 1/IP21 or NEMA Type 12/IP54 enclosures
- Input voltage: 208V, 230V, 480V and 575V (consult factory)
- Complete range of control, network and power options
- Horsepower range:
  - 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 700 hp I_H; 1-1/2 to 800 hp I_L
- Padlockable disconnect

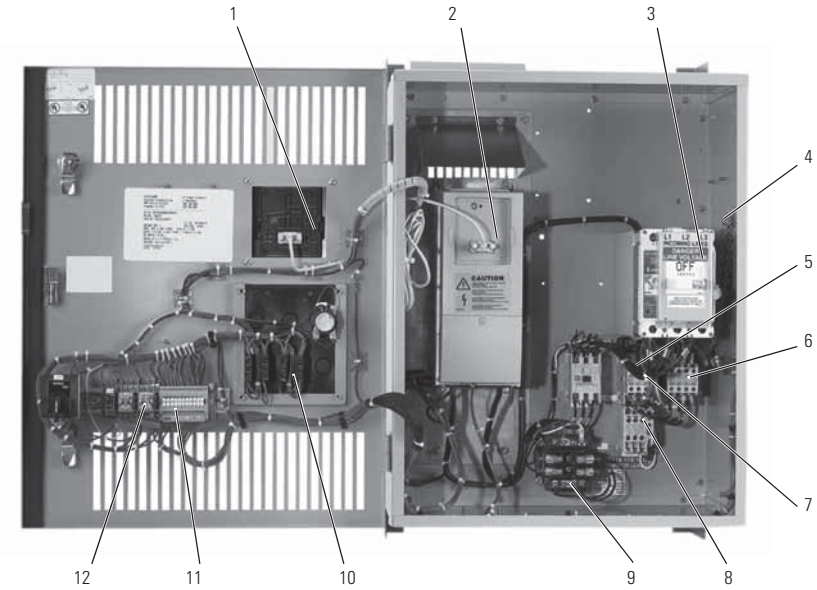
Standards and Certifications

- UL Listed
- cUL Listed

UL Listed c UL Listed

Product Identification

Enclosed 9000X Series Drive



1 Door mounted keypad (included as standard with bypass option)

2 SVX9000 variable frequency drive

3 Input disconnect
- Option P1

4 Input line fuses
- Option P3

5 Input contactor (included as standard with bypass option)

6 Output contactor
- Option PE (included as standard with bypass option)

7 Bypass contactor
- Option RA
- Option RB

8 Overload relay
- Option PH
- Option PI

9 115V control transformer
- Option KB

10 Bypass pilot lights and selector switches
- Option RA
- Option RB
- Option L2
- Option KF

11 Customer control and signal connection terminal block

12 Control relay

Catalog Number Selection

SVX9000 Enclosed NEMA Type 1/IP21 and NEMA Type 12/IP54 Drives

SVX F07 1 4 A A

Build Alphabetically and Numerically

Product Family
SVX = Enclosed drives

Horsepower Rating

F07 = 3/4 hp	**025** = 25 hp	**250** = 250 hp
001 = 1 hp	**030** = 30 hp	**300** = 300 hp
F15 = 1-1/2 hp	**040** = 40 hp	**350** = 350 hp
002 = 2 hp	**050** = 50 hp	**400** = 400 hp
003 = 3 hp	**060** = 60 hp	**500** = 500 hp
005 = 5 hp	**075** = 75 hp	**550** = 550 hp
007 = 7-1/2 hp	**100** = 100 hp	**600** = 600 hp
010 = 10 hp	**125** = 125 hp	**650** = 650 hp
015 = 15 hp	**150** = 150 hp	**700** = 700 hp
020 = 20 hp	**200** = 200 hp	**800** = 800 hp

Enclosure Rating
1 = NEMA Type 1/IP21
2 = NEMA Type 12/IP54
6 = NEMA Type 12/IP54 filtered

Voltage Rating
1 = 208V
2 = 230V
4 = 480V

Application—Torque/Braking ②
A = I_L/no brake chopper
B = I_L/internal brake chopper
D = I_H/no brake chopper
E = I_H/internal brake chopper

Enclosed Style
A = Enclosed drive

Enclosed Options ①④⑤		Type
K1	Door-mounted speed potentiometer ③	Control
K2	Door-mounted speed potentiometer with HOA selector switch ③	Control
K4	HAND/OFF/AUTO switch (22 mm)	Control
K5	MANUAL/AUTO ref switch (22 mm)	Control
K6	START/STOP pushbuttons (22 mm)	Control
KB	115V control transformer (500 VA)	Control
KF	Bypass test switch for RA and RB	Addl. bypass
KO	Standard elapsed time meter	Control
L1	POWER ON, RUN and FAULT pilot lights	Light
L2	Bypass pilot lights for RA, RB bypass options	Addl. bypass
LA	Green RUN light (22 mm)	Light
LD	Green STOP light (22 mm)	Light
LE	Red RUN light	Light
LF	Red STOP light (22 mm)	Light
LJ	White POWER ON light (22 mm)	Light
LU	Misc. light (22 mm)	Light
P1	Input circuit breaker	Input
P3	Input line fuses (200 kAIC)	Input
P8	SPD (50 kA per phase)	Input
PA	SPD (100 kA per phase)	Input
PE	Output contactor	Output
PF	Output filter (100–300 ft)	Output
PG	MotoRx (300–600 ft) 1000 V/µS DV/DT filter	Output
PH	Single overload relay	Output
PI	Dual overload relays	Output
PN	Dual overloads for bypass	Addl. bypass
RA	Manual HOA bypass controller	Bypass
RB	Manual IOB bypass controller	Bypass
RC	Auto transfer HOA bypass controller	Bypass
RD	Auto transfer IOB bypass controller	Bypass
S5	Floor stand 22 in	Enclosure
S6	Floor stand 12 in	Enclosure
S7	10 in expansion	Enclosure
S8	20 in expansion	Enclosure
S9	Space heater	Enclosure
SA	Space heater with CPT	Enclosure

Communication Options ⑥

C2 = Modbus	**C6** = CANopen (slave)	**CI** = Modbus TCP
C3 = PROFIBUS DP	**C7** = DeviceNet	**CJ** = BACnet
C4 = LonWorks	**C8** = Modbus (D9 type connector)	**CQ** = EtherNet/IP
C5 = PROFIBUS DP (D9 connector)	**CA** = Johnson Controls N2	**C3** = RS-232 with D9 connection

Control Options

B1 = 6 DI, 1 ext +24 Vdc/EXT +24 Vdc	**B5** = 3 RO (NO)
B2 = 1 RO (NC-NO), 1 RO (NO), 1 therm	**B8** = 1 ext +24 Vdc/EXT +24 Vdc, 3 Pt100
B4 = 1 AI (mA isolated), 2 AO (mA isolated), 1 ext +24 Vdc/EXT +24 Vdc	**B9** = 1 RO (NO), 5 DI 42–240 Vac input

Engineered Options

VB	Varnished boards

Notes

① Local/remote keypad is included as the standard control panel.
② Brake chopper is a factory installed option only, see drive options on **Page V6-T2-49**. External dynamic braking resistors not included. Consult factory.
③ Includes local/remote speed reference switch.
④ Some options are voltage and/or horsepower specific. Consult your Eaton representative for details.
⑤ See **Pages V6-T2-96** and **V6-T2-97** for descriptions.
⑥ See **Pages V6-T2-94** and **V6-T2-95** for complete descriptions.

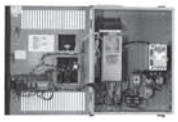
Product Selection

When Ordering

- Select a base catalog number that meets the application requirements—nominal horsepower, voltage and enclosure rating (the enclosed drive's continuous output amp rating should be equal to or greater than the motor's full load amp rating). The base enclosed package includes a standard drive, door mounted local/remote keypad and enclosure.
- If dynamic brake chopper or control/communication option is desired, change the appropriate code in the base catalog number.
- Select enclosed options. Add the codes as suffixes to the base catalog number in alphabetical and numeric order.
- **Read all footnotes**.

208V Drives

SVX9000 Enclosed Drives



Input Base Drives

Enclosure Size ①	hp	Current (A)	NEMA Type 1/IP21 Frame Size	NEMA Type 1/IP21 Base Catalog Number ②	NEMA Type 12/IP54 Frame Size	NEMA Type 12/IP54 Base Catalog Number ②
High Overload Drive and Enclosure						
0	3/4	3.7	4	**SVXF0711EA**	4	**SVXF0721EA**
	1	4.8		**SVX00111EA**		**SVX00121EA**
	1-1/2	6.6		**SVXF1511EA**		**SVXF1521EA**
	2	7.8		**SVX00211EA**		**SVX00221EA**
	3	11		**SVX00311EA**		**SVX00321EA**
	5	17.5	5	**SVX00511EA**	5	**SVX00521EA**
	7-1/2	25		**SVX00711EA**		**SVX00721EA**
1	10	31	6	**SVX01011EA**	6	**SVX01021EA**
	15	48		**SVX01511EA**		**SVX01521EA**
2	20	61	7	**SVX02011DA**	7	**SVX02021DA**
	25	75		**SVX02511DA**		**SVX02521DA**
	30	88		**SVX03011DA**		**SVX03021DA**
3	40	114	8	**SVX04011DA**	8	**SVX04021DA**
4	50	143	8	**SVX05011DA**	8	**SVX05021DA**
5	60	170	8	**SVX06011DA**	8	**SVX06021DA**
	75	211	9	**SVX07511DA**	9	**SVX07521DA**
	100	273		**SVX10011DA**		**SVX10021DA**
Low Overload Drive and Enclosure						
0	1	4.8	4	**SVX00111BA**	4	**SVX00121BA**
	1-1/2	6.6		**SVXF1511BA**		**SVXF1521BA**
	2	7.8		**SVX00211BA**		**SVX00221BA**
	3	11		**SVX00311BA**		**SVX00321BA**
	5	17.5	5	**SVX00511BA**	5	**SVX00521BA**
	7-1/2	25		**SVX00711BA**		**SVX00721BA**
	10	31		**SVX01011BA**		**SVX01021BA**
1	15	48	6	**SVX01511BA**	6	**SVX01521BA**
	20	61		**SVX02011BA**		**SVX02021BA**
2	25	75	7	**SVX02511AA**	7	**SVX02521AA**
	30	88		**SVX03011AA**		**SVX03021AA**
	40	114		**SVX04011AA**		**SVX04021AA**
3	50	—	8	**SVX05011AA**	8	**SVX05021AA**
4	60	170	8	**SVX06011AA**	8	**SVX06021AA**
5	75 ③	205	8	**SVX07511AA**	8	**SVX07521AA**
	100 ③	261	9	**SVX10011AA**	9	**SVX10021AA**

Notes

For brake chopper options, see **Page V6-T2-58**.

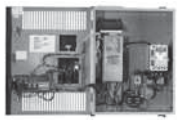
① See enclosure dimensions starting on **Page V6-T2-100**.

② Includes drive, local/remote keypad and enclosure.

③ These units are current rated (75 I_L hp 205 amps, 100 I_L hp 261 amps). They do not meet NEC ampere ratings.

230V Drives

SVX9000 Enclosed Drives



Input Base Drives

Enclosure Size ①	hp	Current (A)	NEMA Type 1/IP21 Frame Size	NEMA Type 1/IP21 Base Catalog Number ②	NEMA Type 12/IP54 Frame Size	NEMA Type 12/IP54 Base Catalog Number ②
High Overload Drive and Enclosure						
0	3/4	3.7	4	**SVXF0712EA**	4	**SVXF0722EA**
	1	4.8		**SVX00112EA**		**SVX00122EA**
	1-1/2	6.6		**SVXF1512EA**		**SVXF1522EA**
	2	7.8		**SVX00212EA**		**SVX00222EA**
	3	11		**SVX00312EA**		**SVX00322EA**
	5	17.5	5	**SVX00512EA**	5	**SVX00522EA**
	7-1/2	25		**SVX00712EA**		**SVX00722EA**
1	10	31	6	**SVX01012EA**	6	**SVX01022EA**
	15	48		**SVX01512EA**		**SVX01522EA**
2	20	61	7	**SVX02012DA**	7	**SVX02022DA**
	25	75		**SVX02512DA**		**SVX02522DA**
	30	88		**SVX03012DA**		**SVX03022DA**
3	40	114	8	**SVX04012DA**	8	**SVX04022DA**
4	50	140	8	**SVX05012DA**	8	**SVX05022DA**
5	60	170	8	**SVX06012DA**	8	**SVX06022DA**
	75	205	9	**SVX07512DA**	9	**SVX07522DA**
	100 ③	261		**SVX10012DA**		**SVX10022DA**
Low Overload Drive and Enclosure						
0	1	4.8	4	**SVX00112BA**	4	**SVX00122BA**
	1-1/2	6.6		**SVXF1512BA**		**SVXF1522BA**
	2	7.8		**SVX00212BA**		**SVX00222BA**
	3	11		**SVX00312BA**		**SVX00322BA**
	5	17.5	5	**SVX00512BA**	5	**SVX00522BA**
	7-1/2	25		**SVX00712BA**		**SVX00722BA**
	10	31		**SVX01012BA**		**SVX01022BA**
1	15	48	6	**SVX01512BA**	6	**SVX01522BA**
	20	61		**SVX02012BA**		**SVX02022BA**
2	25	75	7	**SVX02512AA**	7	**SVX02522AA**
	30	88		**SVX03012AA**		**SVX03022AA**
	40	114		**SVX04012AA**		**SVX04022AA**
3	50	140	8	**SVX05012AA**	8	**SVX05022AA**
4	60	170	8	**SVX06012AA**	8	**SVX06022AA**
5	75	205	8	**SVX07512AA**	8	**SVX07522AA**
	100 ③	261	9	**SVX10012AA**	9	**SVX10022AA**

Notes

For brake chopper options, see **Page V6-T2-58**.

① See enclosure dimensions starting on **Page V6-T2-100**.

② Includes drive, local/remote keypad and enclosure.

③ This unit is current rated (100 I_L hp 100 amps, 261 I_L hp). It is not hp rated. They do not meet NEC ampere ratings.

480V Drives

SVX9000 Enclosed Drives

Input Base Drives

Enclosure Size ①	hp	Current (A)	NEMA Type 1/IP21 Frame Size	NEMA Type 1/IP21 Base Catalog Number ②	NEMA Type 12/IP54 Frame Size	NEMA Type 12/IP54 Base Catalog Number ②
High Overload Drive and Enclosure						
0	1	2.2	4	**SVX00114EA**	4	**SVX00124EA**
	1-1/2	3.3		**SVXF1514EA**		**SVXF1524EA**
	2	4.3		**SVX00214EA**		**SVX00224EA**
	3	5.6		**SVX00314EA**		**SVX00324EA**
	5	7.6		**SVX00514EA**		**SVX00524EA**
	7-1/2	12	5	**SVX00714EA**	5	**SVX00724EA**
	10	16		**SVX01014EA**		**SVX01024EA**
	15	23		**SVX01514EA**		**SVX01524EA**
1	20	31	6	**SVX02014EA**	6	**SVX02024EA**
	25	38		**SVX02514EA**		**SVX02524EA**
	30	46		**SVX03014EA**		**SVX03024EA**
2	40	61	7	**SVX04014DA**	7	**SVX04024DA**
	50	72		**SVX05014DA**		**SVX05024DA**
	60	87		**SVX06014DA**		**SVX06024DA**
3	75	105	8	**SVX07514DA**	8	**SVX07524DA**
	100	140		**SVX10014DA**		**SVX10024DA**
4	125	170	8	**SVX12514DA**	8	**SVX12524DA**
5	150	205	9	**SVX15014DA**	9	**SVX15024DA**
	200	245		**SVX20014DA**		**SVX20024DA**
6, 8 ③④	250	300	10	**SVX25014DA**	10	**SVX25064DA**
	300	385		**SVX30014DA**		**SVX30064DA**
	350	460		**SVX35014DA**		**SVX35064DA**
8, 9 ④⑤	400	520	11	**SVX40014DA**	11	**SVX40064DA**
	500	590		**SVX50014DA**		**SVX50064DA**
	550	650		**SVX55014DA**		**SVX55064DA**
⑥	600	730	12	**SVX60014DA**	12	**SVX60064DA**
	650	820		**SVX65014DA**		**SVX65064DA**
	700	920		**SVX70014DA**		**SVX70064DA**

Notes

For brake chopper options, see **Page V6-T2-58**.

① See enclosure dimensions starting on **Page V6-T2-100**.

② Includes drive, local/remote keypad and enclosure.

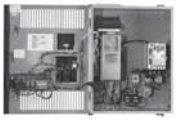
③ The smaller enclosure Size 6 accommodates only power options, input disconnect (P1) and input line fuses (P3). Bypass and other options require Size 8. Adding any standard control option will not require the larger enclosure.

④ For other options, consult factory.

⑤ The smaller enclosure Size 8 accommodates only power options, input disconnect (P1) and input line fuses (P3). Bypass and other options require Size 9. Adding any standard control option will not require the larger enclosure.

⑥ Consult factory.

SVX9000 Enclosed Drives



Input Base Drives, continued

Enclosure Size ①	hp	Current (A)	NEMA Type 1/IP21 Frame Size	NEMA Type 1/IP21 Base Catalog Number ②	NEMA Type 12/IP54 Frame Size	NEMA Type 12/IP54 Base Catalog Number ②
Low Overload Drive and Enclosure						
0	1-1/2	3.3	4	**SVXF1514BA**	4	**SVXF1524BA**
	2	4.3		**SVX00214BA**		**SVX00224BA**
	3	5.6		**SVX00314BA**		**SVX00324BA**
	5	7.6		**SVX00514BA**		**SVX00524BA**
	7-1/2	12		**SVX00714BA**		**SVX00724BA**
	10	16	5	**SVX01014BA**	5	**SVX01024BA**
	15	23		**SVX01514BA**		**SVX01524BA**
	20	31		**SVX02014BA**		**SVX02024BA**
1	25	38	6	**SVX02514BA**	6	**SVX02524BA**
	30	46		**SVX03014BA**		**SVX03024BA**
	40	61		**SVX04014BA**		**SVX04024BA**
2	50	72	7	**SVX05014AA**	7	**SVX05024AA**
	60	87		**SVX06014AA**		**SVX06024AA**
	75	105		**SVX07514AA**		**SVX07524AA**
3	100	140	8	**SVX10014AA**	8	**SVX10024AA**
4	125	170	8	**SVX12514AA**	8	**SVX12524AA**
	150	205		**SVX15014AA**		**SVX15024AA**
5	200	261	9	**SVX20014AA**	9	**SVX20024AA**
	250	300		**SVX25014AA**		**SVX25024AA**
6, 8 ③④	300	385	10	**SVX30014AA**	10	**SVX30064AA**
	350	460		**SVX35014AA**		**SVX35064AA**
	400	520		**SVX40014AA**		**SVX40064AA**
8, 9 ④⑤	500	590	11	**SVX50014AA**	11	**SVX50064AA**
	550	650		**SVX55014AA**		**SVX55064AA**
	600	730		**SVX60014AA**		**SVX60064AA**
⑥	650	820	12	**SVX65014AA**	12	**SVX65064AA**
	700	920		**SVX70014AA**		**SVX70064AA**
	800	1030		**SVX80014AA**		**SVX80064AA**

Notes

For brake chopper options, see **Page V6-T2-58**.

① See enclosure dimensions starting on **Page V6-T2-100**.

② Includes drive, local/remote keypad and enclosure.

③ The smaller enclosure Size 6 accommodates only power options, input disconnect (P1) and input line fuses (P3). Bypass and other options require Size 8. Adding any standard control option will not require the larger enclosure.

④ For other options, consult factory.

⑤ The smaller enclosure Size 8 accommodates only power options, input disconnect (P1) and input line fuses (P3). Bypass and other options require Size 9. Adding any standard control option will not require the larger enclosure.

⑥ Consult factory.

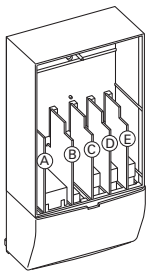
Options

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.

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.

Option Boards



Option Board Kits

Option Kit Description ①	Allowed Slot Locations ②	Field Installed Catalog Number	Factory Installed Option Designator	SVX Ready Programs Basic	Local/ Remote	Standard	MSS	PID	Multi-P.	PFC
Standard I/O Cards										
6 DI, 1 DO, 2 AI, 1AO, 1 +10 Vdc ref, 2 ext +24 Vdc/EXT +24 Vdc	A	**OPTA9**	—	■	■	■	■	■	■	■
2 RO (NC-NO)	B	**OPTA2**	—	■	■	■	■	■	■	■
Extended I/O Cards										
2 RO, therm—SPX only	B	**OPTA3**	**A3**	—	■	■	■	■	■	■
Encoder low volt +5V/15V/24V—SPX only	C	**OPTA4**	**A4**	—	■	■	■	■	■	■
Encoder high volt +15V/24V—SPX only	C	**OPTA5**	**A5**	—	■	■	■	■	■	■
Double encoder—SPX only	C	**OPTA7**	**A7**	■	■	■	■	■	■	■
6 DI, 1 DO, 2 AI, 1 AO—SPX only	A	**OPTA8**	**A8**	—	■	■	■	■	■	■
3 DI (encoder 10–24V), out +15V/+24V, 2 DO (pulse+direction)—SPX only	C	**OPTAE**	**AE**	■	■	■	■	■	■	■
6 DI, 1 ext +24 Vdc/EXT +24 Vdc	B, C, **D**, E	**OPTB1**	**B1**	—	—	—	—	—	■	■
1 RO (NC-NO), 1 RO (NO), 1 therm	B, C, **D**, E	**OPTB2**	**B2**	—	—	—	—	—	■	■
1 AI (mA isolated), 2 AO (mA isolated), 1 ext +24 Vdc/EXT +24 Vdc	B, C, **D**, E	**OPTB4**	**B4**	■	■	■	■	■	■	■
3 RO (NO)	B, C, **D**, E	**OPTB5**	**B5**	—	—	—	—	—	■	■
1 ext +24 Vdc/EXT +24 Vdc, 3 Pt100	B, C, **D**, E	**OPTB8**	**B8**	—	—	—	—	—	—	—
1 RO (NO), 5 DI 42–240 Vac input	B, C, **D**, E	**OPTB9**	**B9**	—	—	—	—	—	■	■
Communication Cards										
Modbus ③	D, **E**	**OPTC2**	**C2**	■	■	■	■	■	■	■
Modbus TCP	D, **E**	**OPTCI**	**CI**	■	■	■	■	■	■	■
BACnet	D, **E**	**OPTCJ**	**CJ**	■	■	■	■	■	■	■
EtherNet/IP	D, **E**	**OPTCQ**	**CQ**	■	■	■	■	■	■	■
Johnson Controls N2 ③	D, **E**	**OPTC2**	**CA**	—	—	—	—	—	—	—
PROFIBUS DP	D, **E**	**OPTC3**	**C3**	■	■	■	■	■	■	■
LonWorks	D, **E**	**OPTC4**	**C4**	■	■	■	■	■	■	■
PROFIBUS DP (D9 connector)	D, **E**	**OPTC5**	**C5**	■	■	■	■	■	■	■
CANopen (slave)	D, **E**	**OPTC6**	**C6**	■	■	■	■	■	■	■
DeviceNet	D, **E**	**OPTC7**	**C7**	■	■	■	■	■	■	■
Modbus (D9 type connector)	D, **E**	**OPTC8**	**C8**	■	■	■	■	■	■	■
Adapter—SPX only	D, **E**	**OPTD1**	**D1**	■	■	■	■	■	■	■
Adapter—SPX only	D, **E**	**OPTD2**	**D2**	■	■	■	■	■	■	■
RS-232 with D9 connection	D, **E**	**OPTD3**	**D3**	■	■	■	■	■	■	■

Notes

① AI = Analog Input; AO = Analog Output, DI = Digital Input, DO = Digital Output, RO = Relay Output

② Option card must be installed in one of the slots listed for that card. Slot indicated in bold is the preferred location.

③ OPTC2 is a multi-protocol option card.

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 120 ohms, and specific line delay of nominal 5 nS/m. 120 ohms 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 two-wire twisted shielded cable with two-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 OPTCI 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.

Control/Communication Option Descriptions

For availability, see Product Selection for base drive voltage required.

Available Control/Communications Options

Option	Description	Option Type
K1	**Door-Mounted Speed Potentiometer**—Provides the SVX9000 with the ability to adjust the frequency reference using a door-mounted potentiometer. This option uses the 10 Vdc reference to generate a 0–10V signal at the analog voltage input signal terminal. When the HOA bypass option is added, the speed is controlled when the HOA switch is in the HAND position. Without the HOA bypass option, a two-position switch (labeled local/remote) is provided on the keypad to select speed reference from the speed potentiometer or a remote speed signal.	Control
K2	**Door-Mounted Speed Potentiometer with HOA Selector Switch—**Provides the SVX9000 with the ability to start/stop and adjust the speed reference from door-mounted control devices or remotely from customer supplied inputs. In HAND position, the drive will start and the speed is controlled by the door-mounted speed potentiometer. The drive will be disabled in the OFF position. When AUTO is selected, the drive run and speed control commands are via user-supplied dry contact and 4–20 mA signal.	Control
K4	**HAND/OFF/AUTO Switch for Non-Bypass Configurations**—Provides a three-position selector switch that allows the user to select either a HAND or AUTO mode of operation. HAND mode is defaulted to k (keypad operation, and AUTO mode is defaulted to control from an external terminal source. These modes of operation can be configured via programming to allow for alternate combinations of start and speed sources. Start and speed sources include keypad, I/O and fieldbus.	Control
K5	**MANUAL/AUTO Speed Reference Switch**—Provides a door-mounted selector switch for MANUAL/AUTO speed reference.	Control
K6	**START/STOP Pushbuttons**—Provide door-mounted START and STOP pushbuttons for either bypass or non-bypass configurations.	Control
KB	**115V Control Transformer, 500 VA**—Provides a fused control power transformer with additional 500 VA at 115V for customer use.	Control
KF	**Bypass Test Switch for RB and RA**—Allows the user to energize the AF drive for testing while operating the motor on the bypass controller. The test switch is mounted on the inside of the enclosure door.	Addl. bypass
KO	**Standard Elapsed Time Meter**—Provides a door-mounted elapsed run time meter.	Control
L1	**POWER ON, RUN and FAULT Pilot Lights** —Provide a white POWER ON light that indicates power to the enclosed cabinet, a green RUN light that indicates the drive is running and a red FAULT light that indicates a drive fault has occurred.	Light
L2	**Bypass Pilot Lights for RA and RB Bypass Options**—A green MOTOR ON INVERTER light indicates when the motor is running in inverter mode and an amber MOTOR ON BYPASS light indicates when the motor is running in bypass mode. The lights are mounted on the enclosure door, above the switches.	Addl. bypass
LA	**Green RUN Light (22 mm)**—Provides a green RUN light that indicates the drive is running.	Light
LD	**Green STOP Light (22 mm)**—Provides a green STOP light that indicates the drive is stopped.	Light
LE	**Red RUN Pilot Light (22 mm)**—Provides a red RUN pilot light that indicates the drive is running.	Light
LF	**Red STOP Light (22 mm)**—Provides a red STOP light that indicates the drive is stopped.	Light
LJ	**White POWER ON Light (22 mm)**—Provides a white POWER ON light that indicates power to the enclosed cabinet.	Light
LU	**Misc. Light (22 mm)**—Provides a misc. "user defined" pilot light. User to define light function and color.	Light
P1	**Input Circuit Breaker**—Provides a means of short-circuit protection for the power cables between it and the SVX9000, and protection from high-level ground faults on the power cable. Allows a convenient means of disconnecting the SVX9000 from the line and the operating mechanism can be padlocked in the OFF position. This is factory mounted in the enclosure.	Input
P3	**Input Line Fuses Rated to 200 kAIC**—Provides high-level fault protection of the SVX9000 input power circuit from the load side of the fuses to the input side of the power transistors. This option consists of three 200 kA fuses, which are factory mounted in the enclosure.	Input
P8	**SPD (50 kA per Phase)**—Provides a surge protection device (SPD) connected to the line side terminals and is designed to clip line side transients. Rated for 50,000A.	Input
PA	**SPD (100 kA per Phase)**—Provides a surge protection device (SPD) connected to the line side terminals and is designed to clip line side transients. Rated for 100,000A.	Input
PE	**Output Contactor**—Provides a means for positive disconnection of the drive output from the motor terminals. The contactor coil is controlled by the drive's run or permissive logic. NC and NO auxiliary contacts rated at 10A, 600 Vac are provided for customer use. Bypass options **RB** and **RA** include an output contactor as standard. This option includes a low VA 115 Vac fused control power transformer and is factory mounted in the enclosure.	Output
PF	**Output Filter (100–300 ft)**—Used to reduce the transient voltage (DV/DT) at the motor terminals. The output filter is recommended for cable lengths exceeding 100 ft (30m) with a drive of 3 hp and above, for cable lengths of 33 ft (10m) with a drive of 2 hp and below, or for a drive rated at 525–690V. This option is mounted in the enclosure, and may be used in conjunction with a brake chopper circuit.	Output
PG	**MotoRX (300–600 ft) 1000 V/µS DV/DT Filter**—Used to reduce transient voltage (DV/DT) and peak voltages at the motor terminals. This option is comprised of a 0.5% line reactor, followed by capacitive filtering and an energy recovery/clamping circuit. Unlike the output filter (See option **PF**), the MotoRx recovers most of the energy from the voltage peaks, resulting in a lower voltage drop to the motor, and therefore conserving power. This option is used when the distance between a single motor and the drive is 300–600 ft (91–183m). *This option can not be used with the brake chopper circuit. The output filter (option **PF**) should be investigated as an alternative.*	Output
PH	**Single Overload Relay**—Uses a bimetallic overload relay to provide additional overload current protection to the motor on configurations without bypass options. It is included with the bypass configurations for overload current protection in the bypass mode. The overload relay is mounted within the enclosure, and is manually resettable. Heater pack included.	Output
PI	**Dual Overload Relays**—This option is recommended when a single drive is operating two motors and overload current protection is needed for each of the motors. The standard configuration includes two bimetallic overload relays, each sized to protect a motor with 50% of the drive hp rating. For example, a 100 hp drive would include two overload relays sized to protect two 50 hp motors. The relays are mounted within the enclosure, and are manually resettable. Heater packs not included.	Output
PN	**Dual Overloads for Bypass**—This option is recommended when a single drive is operating two motors in the bypass mode and overload current protection is needed for each of the motors. The standard configuration includes two bimetallic overload relays, each sized to protect a motor with 50% of the drive hp rating. For example, a 100 hp drive would include two overload relays sized to protect two 50 hp motors. The relays are mounted within the enclosure, and are manually resettable.	Addl. bypass

For availability, see Product Selection for base drive voltage required.

Available Control/Communications Options, continued

Option	Description	Option Type
RA	**Manual HOA Bypass Controller**—The manual HAND/OFF/AUTO (HOA)—3-contactor—bypass option provides a means of bypassing the SVX9000, allowing the AC motor to be operated at full speed directly from the AC supply line. This option consists of an input disconnect, a fused control power transformer, and a full voltage bypass starter with a door mounted HOA selector switch and an INVERTER/BYPASS switch. The HOA switch provides the ability to start and stop the drive in the inverter mode. For applications up to 100 hp, a Freedom Series IEC input contactor, a Freedom Series IEC output contactor, and a Freedom Series IEC starter with a bimetallic overload relay is included. For applications above 100 hp, an Advantage input contactor, an Advantage output contactor and an Advantage starter with electronic overload protection is included. The contactors are mechanically and electrically interlocked.	Bypass
RB	**Manual IOB Bypass Controller**—The manual INVERTER/OFF/BYPASS (IOB)—3-contactor—bypass option provides a means of bypassing the SVX9000, allowing the AC motor to be operated at full speed directly from the AC supply line. This option consists of an input disconnect, a fused control power transformer, and a full voltage bypass starter with a door mounted IOB selector switch. For applications up to 100 hp, a Freedom Series IEC input contactor, a Freedom Series IEC output contactor, and a Freedom Series IEC starter with a bimetallic overload relay is included. For applications above 100 hp, an Advantage input contactor, an Advantage output contactor and an Advantage starter with electronic overload protection is included. The contactors are mechanically and electrically interlocked.	Bypass
RC	**Auto Transfer HOA Bypass Controller**—The manual HAND/OFF/AUTO (HOA)—3-contactor—bypass option provides a means of bypassing the SVX9000, allowing the AC motor to be operated at full speed directly from the AC supply line. The circuitry provides an automatic transfer of the load to "across the line" operation after a drive trip. This option consists of an input disconnect, a fused control power transformer, and a full voltage bypass starter with a door mounted HOA selector switch and an INVERTER/BYPASS switch. The HOA switch provides the ability to start and stop the drive in either mode. For applications up to 100 hp, a Freedom Series IEC input contactor, a Freedom Series IEC output contactor, and a Freedom Series IEC starter with a bimetallic overload relay is included. For applications above 100 hp, an Advantage input contactor, an Advantage output contactor and an Advantage starter with electronic overload protection is included. The contactors are mechanically and electrically interlocked. Door-mounted pilot lights are provided which indicate bypass or inverter operation. A green light indicates when the motor is running in inverter mode and an amber light indicates when the motor is running in bypass mode. **WARNING**: The motor may restart when the overcurrent relay is reset when operating in bypass, unless the IOB selector switch is turned to the OFF position.	Bypass
RD	**Auto Transfer IOB Bypass Controller**—The auto INVERTER/OFF/BYPASS (IOB)—3-contactor—bypass option provides a means of bypassing the SVX9000, allowing the AC motor to be operated at full speed directly from the AC supply line. The circuitry provides an automatic transfer of the load to "across the line" operation after a drive trip. This option consists of an input disconnect, a fused control power transformer, and a full voltage bypass starter with a door mounted IOB selector switch. For applications up to 100 hp, a Freedom Series IEC input contactor, a Freedom Series IEC output contactor, and a Freedom Series IEC starter with a bimetallic overload relay is included. For applications above 100 hp, an Advantage input contactor, an Advantage output contactor and an Advantage starter with electronic overload protection is included. The contactors are mechanically and electrically interlocked. Door-mounted pilot lights are provided which indicate bypass or inverter operation. A green light indicates when the motor is running in inverter mode and an amber light indicates when the motor is running in bypass mode. **WARNING**: The motor may restart when the overcurrent relay is reset when operating in bypass, unless the IOB selector switch is turned to the OFF position.	Bypass
S5	**Floor Stand 22 in**—Converts a Size 1 or 2, normally wall mounted enclosure to a floor standing enclosure with a height of 22 in (558.8 mm).	Enclosure
S6	**Floor Stand 12 in**—Converts a Size 2, normally wall mounted enclosure to a floor standing enclosure with a height of 12 in (304.8 mm).	Enclosure
S7	**10 in Expansion**—In a Size 5 enclosure, the extension allows for bottom cable entry and additional space for customer mounted components. **NOTE:** Enclosure expansion rated NEMA Type 1/IP21 only.	Enclosure
S8	**20 in Expansion**—In a Size 5 enclosure, the extension allows for bottom cable entry and additional space for customer mounted components. When the output filter (option **PF**) is selected for a drive using a Size 5 enclosure, this expansion box is required and included in the option pricing. Enclosure expansion rated NEMA Type 1/IP21 only.	Enclosure
S9	**Space Heater**—Prevents condensation from forming in the enclosure when the drive is inactive or in storage. Includes a thermostat for variable temperature control. A 200W heater is installed in enclosures 0 and 1, and a 400W heater is installed in enclosures 2–5.	Enclosure
SA	**Space Heater with CPT**—Prevents condensation from forming in the enclosure when the drive is inactive or in storage. Includes a thermostat for variable temperature control. A 200W heater is installed in enclosures 0 and 1, and a 400W heater is installed in enclosures 2–5. Includes a 115V supply to power heater.	Enclosure

Enclosed Drive Options

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 **Page V6-T2-58** for dynamic braking resistors which are supplied separately. Resistors are not UL Listed.

For brake chopper circuit selection and adder—NEMA Type 1/IP21, NEMA Type 12/IP54, consult the factory

SVX Conversion Kit

Frame 4–7 ①

Frame Size	Enclosure Size	Delivery Code	Catalog Number
FR4	0	FB10	**OPTCON-SVXFR4-SZ00**
	1		**OPTCON-SVXFR4-SZ01**
FR5	0	FB10	**OPTCON-SVXFR5-SZ00**
	1		**OPTCON-SVXFR5-SZ01**
FR6	1	FB10	**OPTCON-SVXFR6-SZ01**
	2		**OPTCON-SVXFR6-SZ02**
FR7	2	FB10	**OPTCON-SVXFR7-SZ02**

Note

① The kit consists of a flange kit, adapter plate(s), hardware, remote keypad kit and SVX9000 decal.

Technical Data and Specifications

2

9000X Enclosed Drives

Description	NEMA Type 1/IP21 or NEMA Type 12/IP54 Specification
Primary Design Features	
45–66 Hz input frequency	Standard
Output: AC volts maximum	Input voltage base
Output frequency range	0–320 Hz
Initial output current (I_H)	250% for 2 seconds
Overload (1 minute [I_H/I_L])	150%/110%
Enclosure space heater	Optional
Oversize enclosure	Standard
Output contactor	Optional
Bypass motor starter	Optional
Listings	UL, cUL
Protection Features	
Incoming line fuses	Optional
AC input circuit disconnect	Optional
Line reactors (3%)	Standard
Phase rotation insensitive	Standard
EMI filter	Standard
Input phase loss protection	Standard
Input overvoltage protection	Standard
Line surge protection	Optional
Output short-circuit protection	Standard
Output ground fault protection	Standard
Output phase protection	Standard
Overtemperature protection	Standard
DC overvoltage protection	Standard
Drive overload protection	Standard
Motor overload protection	Standard
Programmer software	Optional
Local/remote keypad	Standard
Keypad lockout	Standard
Fault alarm output	Standard
Built-in diagnostics	Standard

Description	NEMA Type 1/IP21 or NEMA Type 12/IP54 Specification
Input/Output Interface Features	
Setup adjustment provisions	
Remote keypad/display	Standard
Personal computer	Standard
Operator control provisions	
Drive mounted keypad/display	Standard
Remote keypad/display	Standard
Conventional control elements	Standard
Serial communications	Optional
115 Vac control circuit	Optional
Speed setting inputs	
Keypad	Standard
0–10 Vdc potentiometer/voltage signal	Standard
4–20 mA Isolated	Configurable
4–20 mA Differential	Configurable
Analog outputs	
Speed/frequency	Standard
Torque/load/current	Programmable
Motor voltage	Programmable
Kilowatts	Programmable
0–10 Vdc signals	Configurable w/jumpers
4–20 mA DC signals	Standard
Isolated signals	Optional
Discrete outputs	
Fault alarm	Standard
Drive running	Standard
Drive at set speed	Programmable
Optional parameters	14
Dry contacts	1 (2 relays Form C)
Open collector outputs	1
Additional discrete outputs	Optional
Communications	
RS-232	Standard
RS-422/485	Optional
DeviceNet™	Optional
Modbus RTU	Optional
CANopen (slave)	Optional
PROFIBUS-DP	Optional
Lonworks®	Optional
Johnson Controls Metasys™ N2	Optional
EtherNet/IP	Optional
Modbus TCP	Optional
BACnet	Optional

9000X Enclosed Drives, continued

Description	NEMA Type 1/IP21 or NEMA Type 12/IP54 Specification
Performance Features	
Sensorless vector control	Standard
Volts/hertz control	Standard
IR and slip compensation	Standard
Electronic reversing	Standard
Dynamic braking	Optional ①
DC braking	Standard
PID setpoint controller	Programmable
Critical speed lockout	Standard
Current (torque) limit	Standard
Adjustable acceleration/deceleration	Standard
Linear or S curve accel/decel	Standard
Jog at preset speed	Standard
Thread/preset speeds	7 Standard, 15 Optional
Automatic restart	Selectable
Coasting motor start	Standard
Coast or ramp stop selection	Standard
Elapsed time meter	Optional
Carrier frequency adjustment	1–16 kHz
Standard Conditions for Application and Service	
Operating ambient temperature	0 to 40°C
Storage temperature	–40 to 60°C
Humidity (maximum), non-condensing	95%
Altitude (maximum without derate)	3300 ft (1000m)
Line voltage variation	+10/–15%
Line frequency variation	45–66 Hz
Efficiency	>96%
Power factor (displacement)	>0.94

Standard I/O Specifications

Description	Specification
Six–digital input programmable	24V: "0" ≤10V, "1" ≥18V,R_i >5 kohms
Two–analog input configurable w/jumpers	Voltage: 0–±10V, R_i >200 kohms Current: 0 (4)–20 mA, R_i = 250 ohms
Two–digital output programmable	Form C relays 250 Vac 30 Vdc 2 amp resistive
One–analog output programmable configurable w/jumper	0–20 mA, R_L max. 500 ohms 10 bits ±2%
One digital output programmable	Open collector 48 Vdc 50 mA

I/O Specifications for Control/Communication Options

Description	Specification
Analog voltage, input	0–±10V, R_i ≥200 kohms
Analog current, input	0 (4)–20 mA, R_i = 250 ohms
Digital input	24V: "0" ≤10V, "1" ≥18V, R_i >5 kohms
Auxiliary voltage	24V (±20%), max. 50 mA
Reference voltage	10V ±3%, max. 10 mA
Analog current, output	0 (4)–20 mA, R_L = 500 kohms resolution 10 bit, accuracy ≤±2%
Analog voltage, output	0 (2)–10V, R_L ≥1 kohms, resolution 10 bit, accuracy ≤±2%
Relay output	
Maximum switching voltage	300 Vdc, 250 Vac
Maximum switching load	8A/24 Vdc, 0.4A/300 Vdc, 2 kVA/250 Vac
Maximum continuous load	2A rms
Thermistor input	R_{trip} = 4.7 kohms
Encoder input	24V: "0" ≤10V, "1" ≥18V, R_i = 2.2 kohms 5V: "0" ≤2V, "1" ≥3V, R_i = 330 ohms

Note

① Some horsepower units include dynamic braking chopper as standard—refer to individual drive sections.

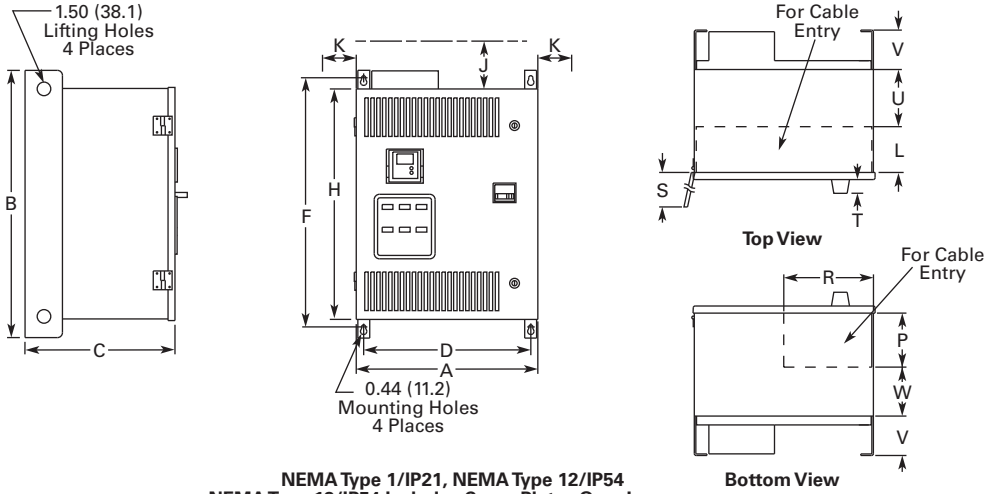
Dimensions

Approximate Dimensions in Inches (mm)

2

9000X Enclosed Drives

Size 0



NEMA Type 1/IP21, NEMA Type 12/IP54
NEMA Type 12/IP54 Includes Cover Plates Over Louvers

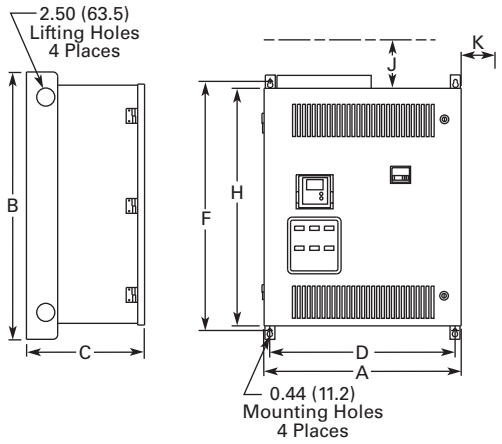
For reference only, dimensions are subject to change.

Wide	High	Deep	Mounting							Door Height	Min. Air Space	
A	B	C	D	D1	E	E1	F	G	G1	H	J	K
19.9 (504)	29.0 (737)	16.4 (416)	18.3 (465)	—	—	—	27.4 (695)	—	—	25.4 (644)	4.0 (102)	3.0 (76)

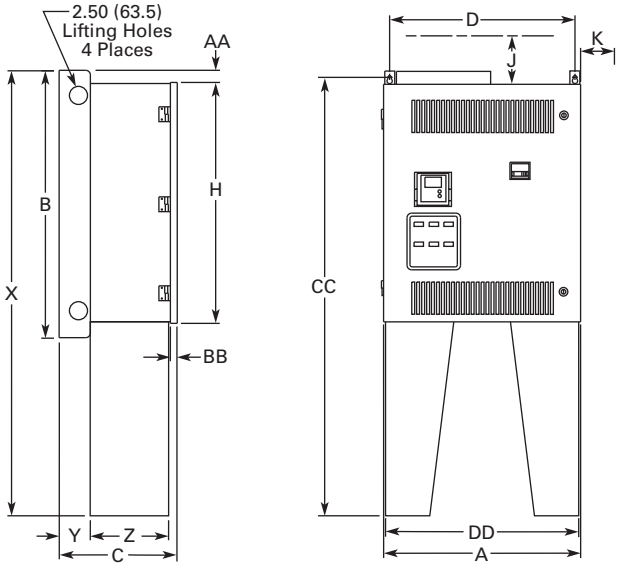
Cable Entry					Door Clearance	CB Handle				Max. Approx. Shipping Weight
L	M	N	P	R	S	T	U	V	W	Lbs (kg)
5.0 (127)	—	—	6.0 (152)	9.6 (245)	26.4 (669)	1.5 (38)	6.3 (160)	4.3 (108)	5.3 (134)	200 (91)

Approximate Dimensions in Inches (mm)

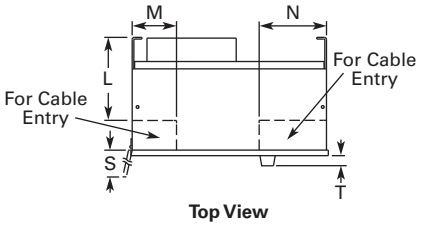
Size 1



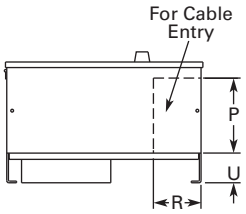
NEMA Type 1/IP21, NEMA Type 12/IP54
NEMA Type 12/IP54 Includes Cover Plates Over Louvers



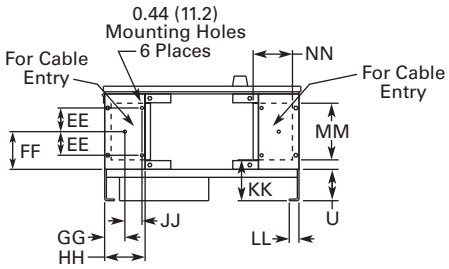
NEMA Type 1/IP21, NEMA Type 12/IP54
with Floor Stand



Top View



Bottom View



Bottom View
NEMA Type 1/IP21, NEMA Type 12/IP54
with Floor Stand

For reference only, dimensions are subject to change.

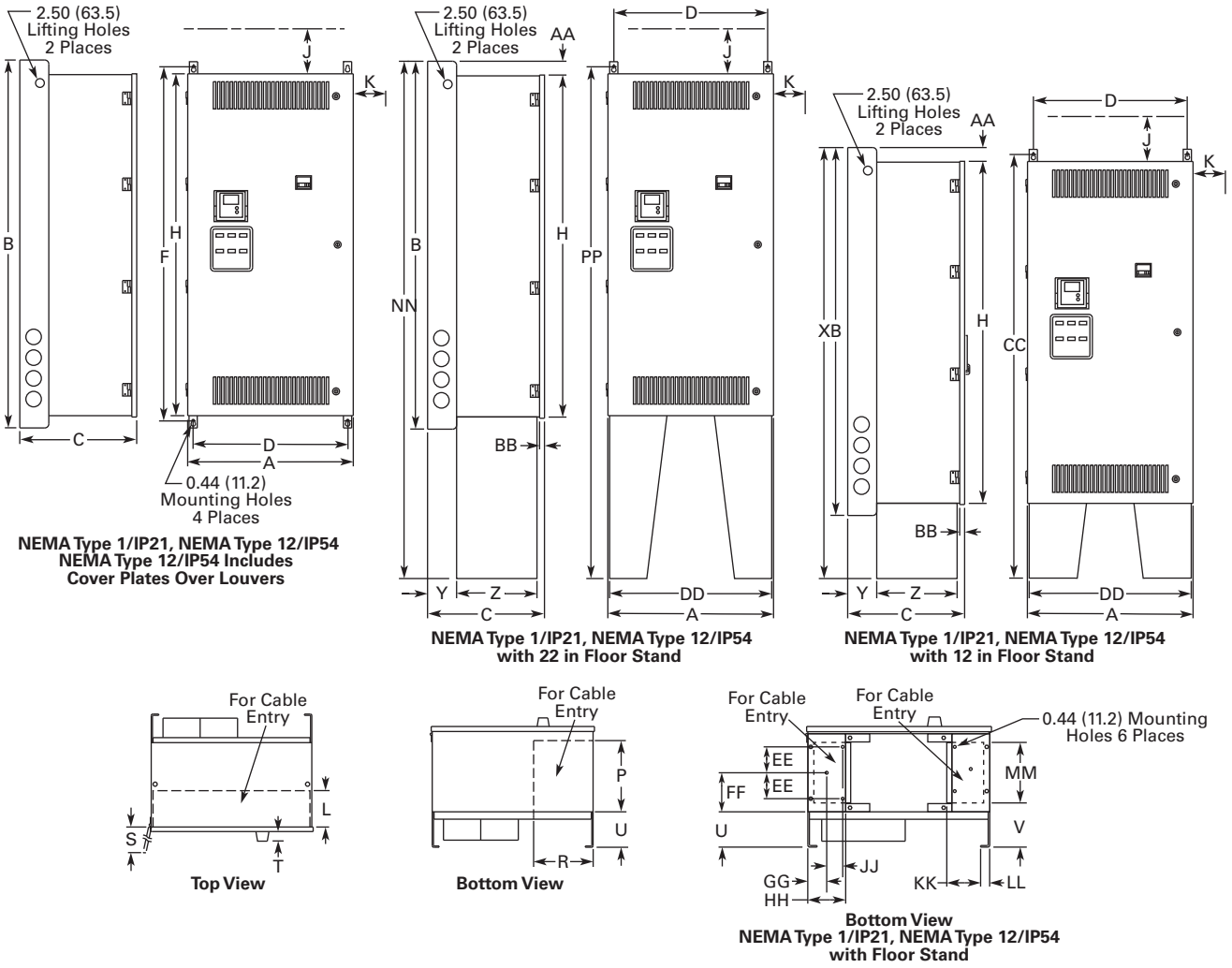
Wide	High	Deep	Mounting							Door Height	Min. Air Space	
A	B	C	D	D1	E	E1	F	G	G1	H	J	K
26.4 (669)	36 (914)	16.3 (414)	24.8 (630)	—	—	—	34.0 (864)	—	—	32.4 (822)	4.0 (102)	3.0 (76)

Cable Entry					Door Clearance	CB Handle				Max. Approx. Shipping Weight
L	M	N	P	R	S	T	U	V	W	Lbs (kg)
11.0 (279)	6.0 (152)	9.0 (229)	10.0 (254)	6.5 (165)	26.4 (669)	1.5 (38)	4.3 (108)	—	—	230 (104)

Floor Stand																					
X	Y	Z	AA	BB	CC	DD	EE	FF	GG	HH	JJ	KK	LL	MM	NN	PP	RR	SS	TT	UU	VV
56.0 (1422)	4.3 (108)	11.1 (281)	1.8 (46)	0.8 (19)	55.2 (1402)	26.0 (660)	3.5 (90)	5.5 (141)	3.0 (76)	6.0 (152)	2.0 (51)	5.4 (136)	1.1 (28)	8.8 (224)	5.4 (137)	—	—	—	—	—	—

Approximate Dimensions in Inches (mm)

Size 2



NEMA Type 1/IP21, NEMA Type 12/IP54
NEMA Type 12/IP54 Includes
Cover Plates Over Louvers

NEMA Type 1/IP21, NEMA Type 12/IP54
with 22 in Floor Stand

NEMA Type 1/IP21, NEMA Type 12/IP54
with 12 in Floor Stand

Top View

Bottom View

Bottom View
NEMA Type 1/IP21, NEMA Type 12/IP54
with Floor Stand

For reference only, dimensions are subject to change.

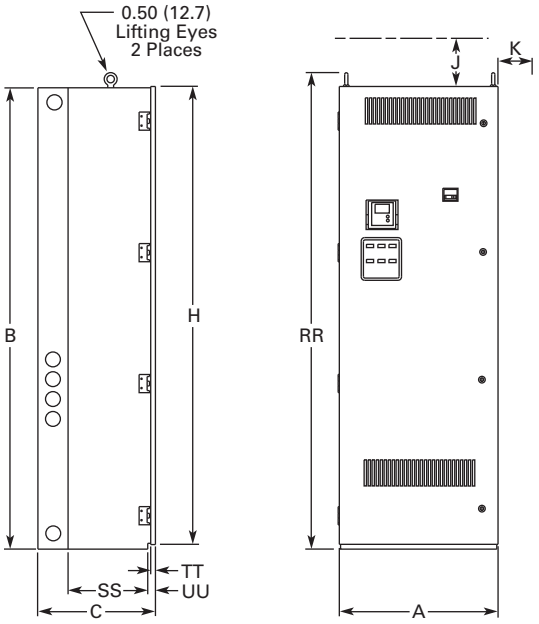
Wide	High	Deep	Mounting							Door Height	Min. Air Space	
A	B	C	D	D1	E	E1	F	G	G1	H	J	K
26.4 (669)	59.0 (1499)	19.4 (492)	24.8 (630)	—	—	—	57.0 (1448)	—	—	55.4 (1406)	4.0 (102)	3.0 (76)

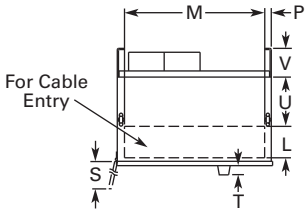
Cable Entry					Door Clearance	CB Handle				Max. Approx. Shipping Weight
L	M	N	P	R	S	T	U	V	W	Lbs (kg)
5.9 (149)	—	—	12.4 (315)	9.5 (241)	26.4 (669)	1.5 (38)	4.8 (121)	5.9 (151)	—	380 (173)

Floor Stand																				
X	Y	Z	AA	BB	CC	DD	EE	FF	GG	HH	JJ	KK	LL	MM	NN	PP	RR	SS	TT	UU	VV
69.0 (1753)	4.8 (121)	13.6 (344)	1.8 (46)	0.8 (19)	68.2 (1732)	26.0 (660)	4.8 (121)	6.8 (172)	3.0 (76)	6.0 (152)	2.0 (51)	5.0 (127)	1.1 (28)	11.3 (288)	79.0 (2007)	78.2 (1986)	—	—	—	—	—

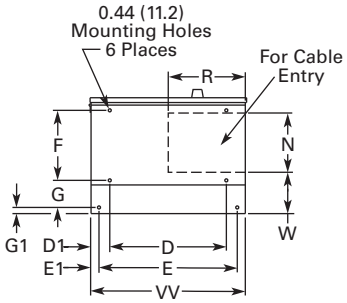
Approximate Dimensions in Inches (mm)

Size 3





Top View



Bottom View

NEMA Type 1/IP21, NEMA Type 12/IP54
NEMA Type 12/IP54 Includes Cover Plates Over Louvers

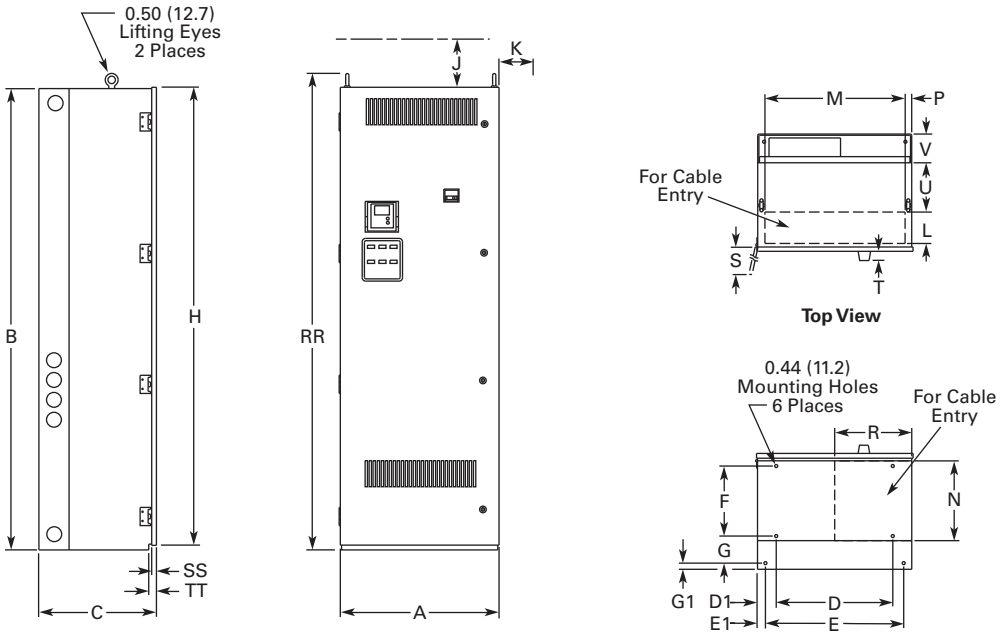
For reference only, dimensions are subject to change.

Wide	High	Deep	Mounting							Door Height	Min. Air Space	
A	B	C	D	D1	E	E1	F	G	G1	H	J	K
26.4 (671)	77.0 (1956)	19.4 (493)	19.5 (495)	3.3 (83)	23.0 (584)	1.5 (38)	11.7 (298)	5.5 (140)	0.9 (24)	76.4 (1939)	4.0 (102)	3.0 (76)

Cable Entry					Door Clearance	CB Handle									Max. Approx. Shipping Weight
L	M	N	P	R	S	T	U	V	W	RR	SS	TT	UU	VV	Lbs (kg)
5.3 (133)	23.4 (594)	10.0 (254)	1.3 (32)	12.9 (328)	26.4 (669)	1.5 (38)	8.0 (203)	4.8 (121)	6.8 (173)	79.5 (2018)	13.40 (340)	0.8 (19)	1.3 (32)	26.0 (660)	690 (313)

Approximate Dimensions in Inches (mm)

Size 4



Top View

Bottom View

NEMA Type 1/IP21, NEMA Type 12/IP54
NEMA Type 12/IP54 Includes Cover Plates Over Louvers

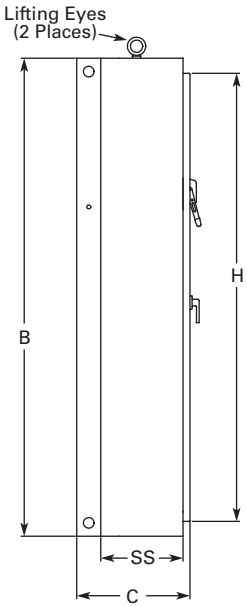
For reference only, dimensions are subject to change.

Wide	High	Deep	Mounting							Door Height	Min. Air Space	
A	B	C	D	D1	E	E1	F	G	G1	H	J	K
26.4 (671)	90.0 (2286)	19.4 (493)	19.5 (495)	3.3 (83)	23.0 (584)	1.5 (38)	11.7 (298)	5.5 (140)	0.9 (24)	89.4 (2270)	4.0 (102)	3.0 (76)

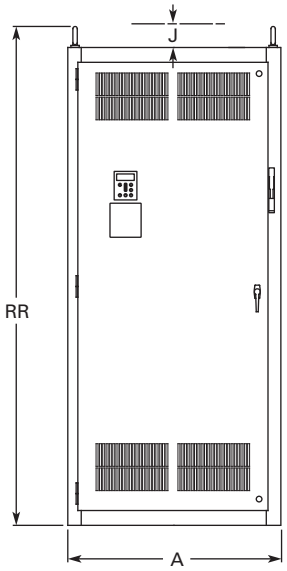
Cable Entry					Door Clearance	CB Handle									Max. Approx. Shipping Weight
L	M	N	P	R	S	T	U	V	W	RR	SS	TT	UU	VV	Lbs (kg)
5.3 (133)	23.4 (594)	13.8 (351)	1.0 (25)	11.2 (286)	26.4 (669)	1.5 (38)	8.0 (204)	4.8 (121)	—	92.5 (2349)	0.8 (19)	1.3 (32)	—	—	825 (375)

Approximate Dimensions in Inches (mm)

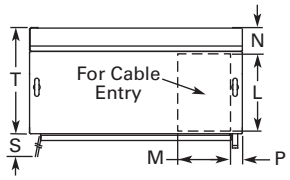
Size 5



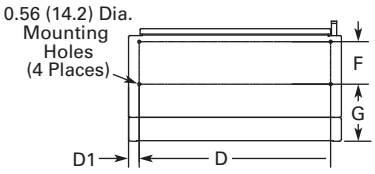
Side View



Front View
NEMA Type 1/IP21

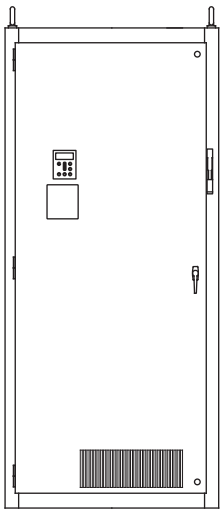


Top View



Bottom View

	I_L hp
208/230V	75
	100
480V	200
	250



Front View
NEMA Type 12/IP54

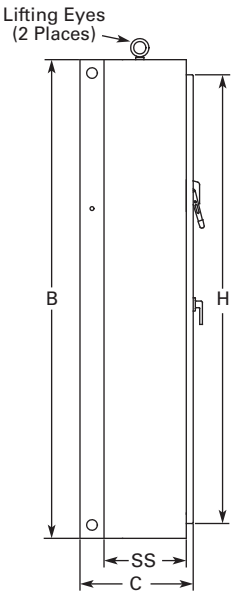
For reference only, dimensions are subject to change.

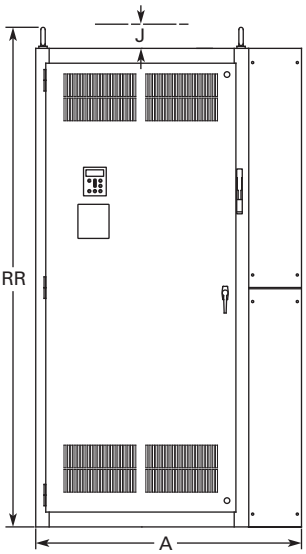
Wide	High	Deep	Mounting							Door Height	Min. Air Space	
A	**B**	**C**	**D**	**D1**	**E**	**E1**	**F**	**G**	**G1**	**H**	**J**	**K**
40.0 (1016)	90.0 (2286)	21.3 (541)	36.0 (914)	2.0 (51)	—	—	8.0 (203)	10.8 (273)	—	84.4 (2143)	4.0 (102)	—

Cable Entry					Door Clearance										Max. Approx. Shipping Weight
L	**M**	**N**	**P**	**R**	**S**	**T**	**U**	**V**	**W**	**RR**	**SS**	**TT**	**UU**	**VV**	**Lbs (kg)**
15.0 (381)	10.0 (254)	4.8 (122)	2.0 (51)	—	36.3 (921)	20.0 (508)	—	—	—	94.0 (2387)	15.5 (394)	—	—	—	1275 (579)

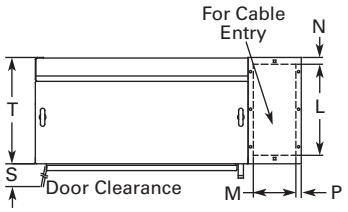
Approximate Dimensions in Inches (mm)

Size 5-1P

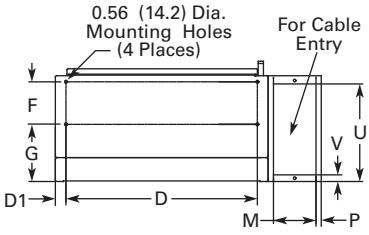




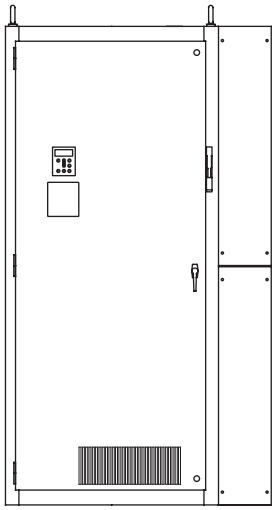
Front View
NEMA Type 1/IP21



Top View



Bottom View



Front View
NEMA Type 12/IP54

	I_L hp
208/230V	75
	100
480V	200
	250

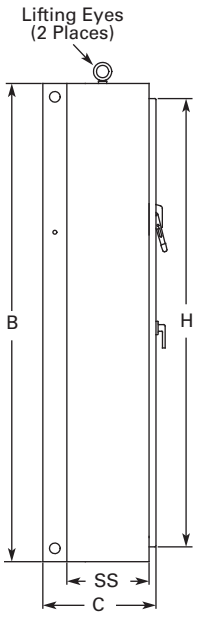
For reference only, dimensions are subject to change.

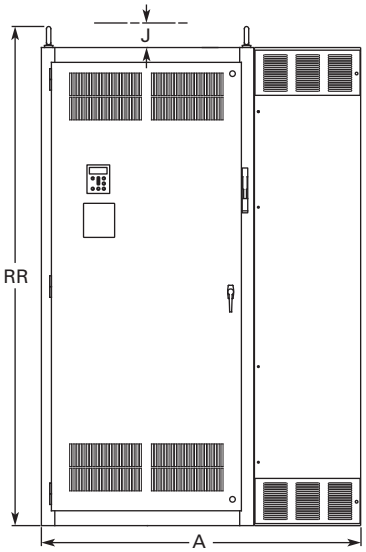
Wide	High	Deep	Mounting							Door Height	Min. Air Space	
A	**B**	**C**	**D**	**D1**	**E**	**E1**	**F**	**G**	**G1**	**H**	**J**	**K**
50.0 (1270)	90.0 (2286)	21.3 (541)	36.0 (914)	2.0 (51)	—	—	8.0 (203)	10.8 (273)	—	84.4 (2143)	4.0 (102)	—

Cable Entry					Door Clearance										Max. Approx. Shipping Weight
L	**M**	**N**	**P**	**R**	**S**	**T**	**U**	**V**	**W**	**RR**	**SS**	**TT**	**UU**	**VV**	**Lbs (kg)**
17.1 (435)	8.0 (203)	1.3 (33)	1.0 (25)	—	36.3 (921)	20.0 (508)	18.4 (466)	1.3 (32)	—	94.0 (2387)	15.5 (394)	—	—	—	1375 (624)

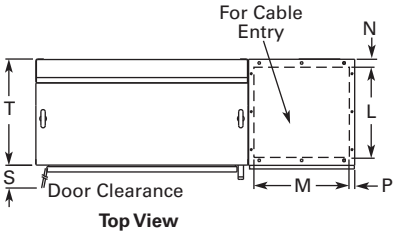
Approximate Dimensions in Inches (mm)

Size 5-2P

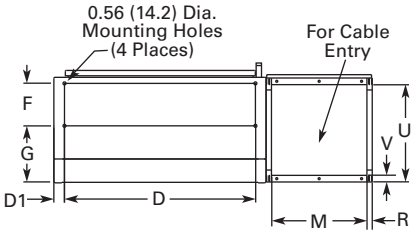




Front View
NEMA Type 1/IP21

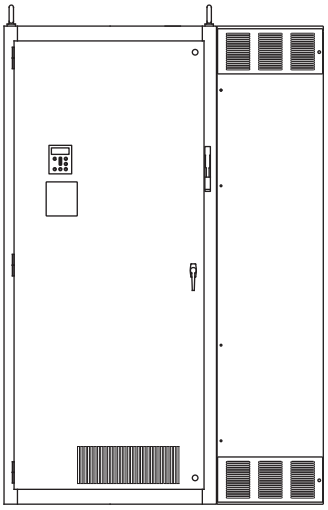


Top View



Bottom View

	I_L hp
208/230V	75
	100
480V	200
	250



Front View
NEMA Type 12/IP54

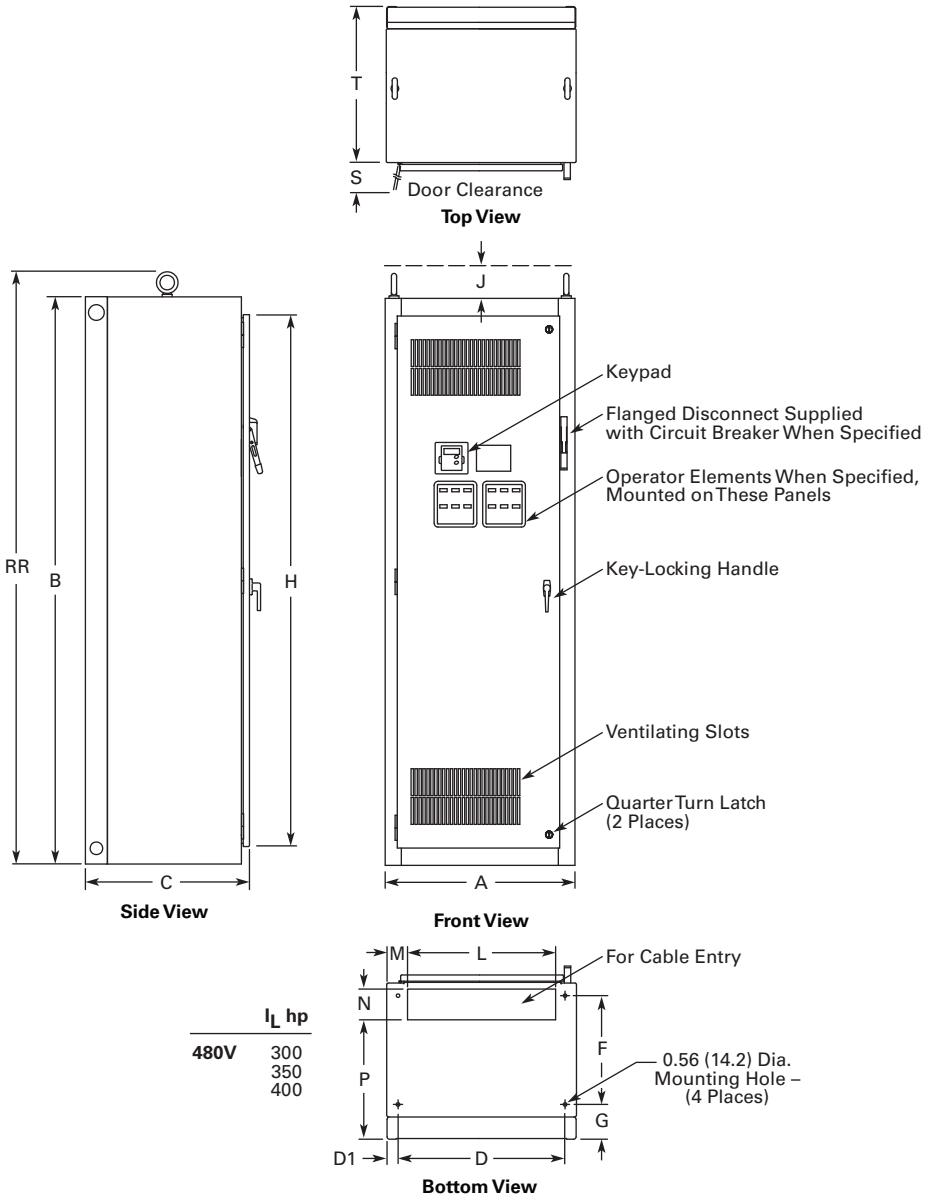
For reference only, dimensions are subject to change.

Wide	High	Deep	Mounting							Door Height	Min. Air Space	
A	**B**	**C**	**D**	**D1**	**E**	**E1**	**F**	**G**	**G1**	**H**	**J**	**K**
Enclosure Size 5-2P												
60.0 (1524)	90.0 (2286)	21.3 (541)	36.0 (914)	2.0 (51)	—	—	8.0 (203)	10.8 (273)	—	84.4 (2143)	4.0 (102)	—

Cable Entry					Door Clearance										Max. Approx. Shipping Weight
L	**M**	**N**	**P**	**R**	**S**	**T**	**U**	**V**	**W**	**RR**	**SS**	**TT**	**UU**	**VV**	**Lbs (kg)**
17.0 (432)	18.0 (457)	1.5 (38)	1.0 (25)	0.9 (23)	36.3 (921)	20.0 (508)	18.4 (466)	1.3 (32)	—	94.0 (2387)	15.5 (394)	—	—	—	1585 (720)

Approximate Dimensions in Inches (mm)

Size 6



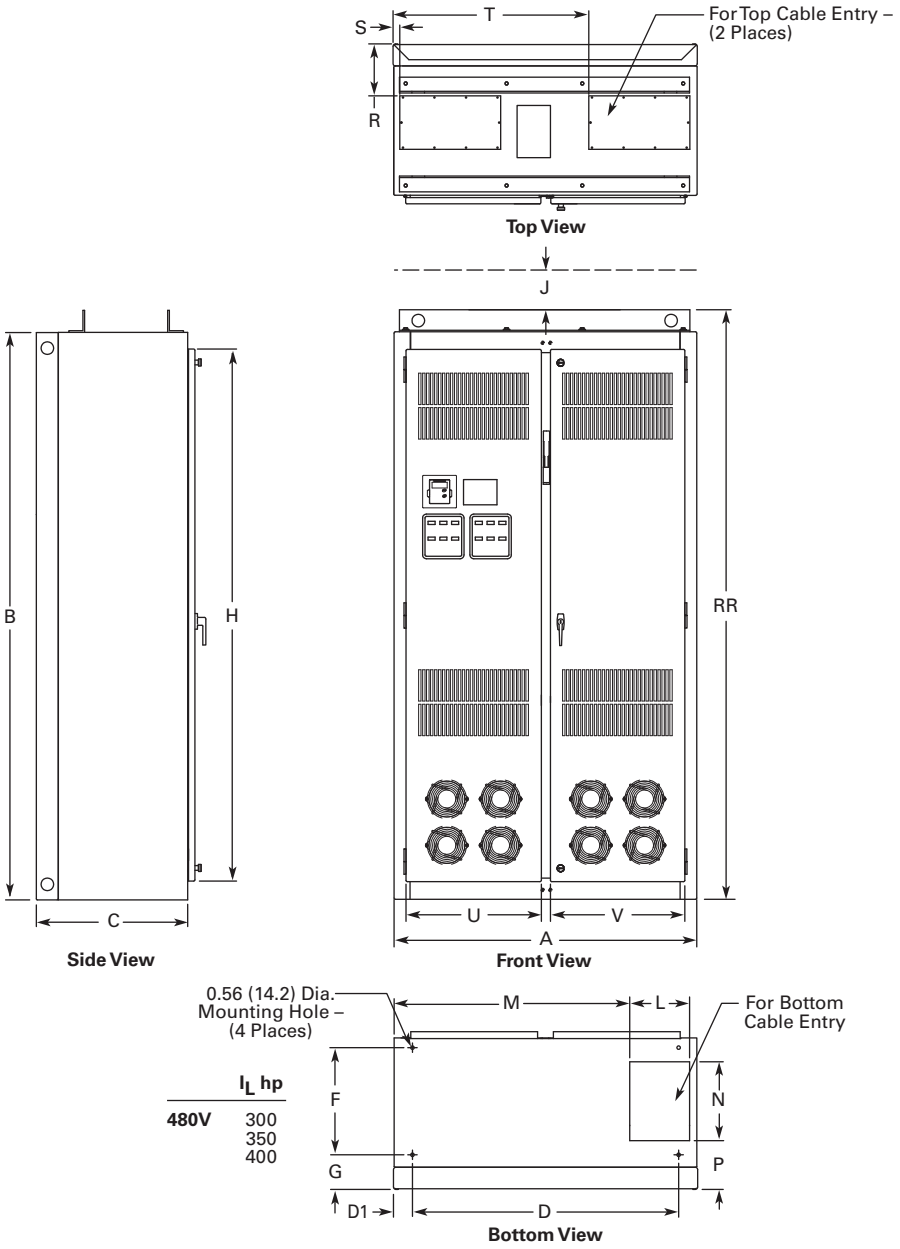
For reference only, dimensions are subject to change. See **Page V6-T2-92**, notes 3 and 5 for enclosure and option selection.

Wide	High	Deep	Mounting							Door Height	Min. Air Space	
A	B	C	D	D1	E	E1	F	G	G1	H	J	K
30.0 (762)	90.0 (2286)	26.0 (660)	26.5 (673)	1.8 (46)	—	—	17.3 (438)	5.5 (140)	—	84.4 (2143)	4.0 (102)	—

Cable Entry					Door Clearance										Max. Approx. Shipping Weight
L	M	N	P	R	S	T	U	V	W	RR	SS	TT	UU	VV	Lbs (kg)
23.5 (597)	3.3 (84)	4.5 (114)	19.3 (490)	—	26.2 (667)	24.8 (629)	—	—	—	93.9 (2386)	—	—	—	—	1500 (681)

Approximate Dimensions in Inches (mm)

Size 8



I_L hp	
480V	300
	350
	400

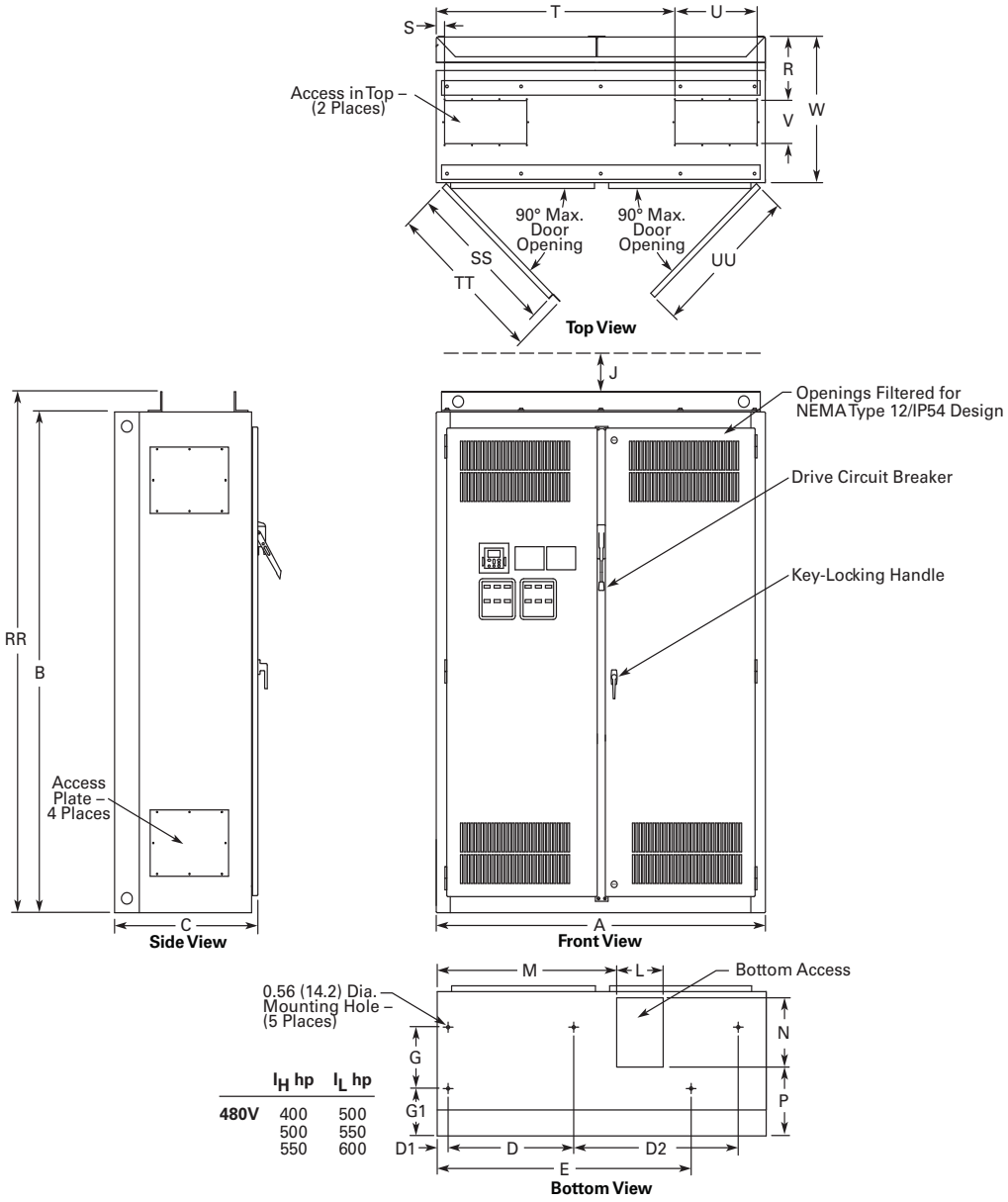
For reference only, dimensions are subject to change. See **Page V6-T2-92**, notes 3 and 5 for enclosure and option selection.

Wide	High	Deep	Mounting							Door Height	Min. Air Space	
A	B	C	D	D1	E	E1	F	G	G1	H	J	K
48.0 (1219)	90.0 (2286)	24.0 (610)	42.2 (1072)	3.0 (77)	—	—	—	5.5 (139)	—	84.4 (2143)	4.0 (102)	—

Cable Entry															Max. Approx. Shipping Weight
L	M	N	P	R	S	T	U	V	W	RR	SS	TT	UU	VV	Lbs (kg)
9.5 (241)	37.5 (952)	12.5 (318)	7.7 (196)	8.3 (210)	1.3 (32)	31.0 (787)	21.5 (545)	21.3 (541)	—	93.5 (2375)	—	—	—	—	2000 (908)

Approximate Dimensions in Inches (mm)

Size 9



For reference only, dimensions are subject to change. See **Page V6-T2-92**, notes 3 and 5 for enclosure and option selection.

Wide	High	Deep	Mounting							Door Height	Min. Air Space	
A	B	C	D	D1	E	E1	F	G	G1	H	J	K
60.0 (1524)	90.0 (2286)	260.1 (664)	22.9 (582)	2.0 (51)	30.0 (762)	44.3 (1125)	10.6 (270)	10.6 (270)	8.2 (208)	—	4.0 (102)	—

Cable Entry															Max. Approx. Shipping Weight
L	M	N	P	R	S	T	U	V	W	RR	SS	TT	UU	VV	Lbs (kg)
8.5 (216)	32.7 (831)	12.0 (305)	11.9 (303)	9.8 (249)	1.5 (38)	43.5 (1105)	15.0 (381)	7.5 (191)	25.0 (635)	93.5 (2375)	27.4 (696)	290.1 (738)	270.1 (687)	—	2500 (1135)

SVX9000 VFD Pump Panels

Contents

SVX9000 VFD Pump Panels

Product Description

- **Standard Enclosed**—covers a wide range of the most commonly ordered options. Pre-engineering eliminates the lead time normally associated with customer specific options.
- **Modified Standard Enclosed**—applies to specific customer requirements that vary from the Standard Enclosed offering, such as the need for an additional indicating light or minor modifications to drawings. *Consult your Eaton representative for assistance in pricing and lead time.*
- **Custom Engineered**—for those applications with more unique or complex requirements, these are individually engineered to the customer's needs. *Consult your Eaton representative for assistance in pricing and lead time.*

Features

- NEMA Type 12/IP54 or NEMA Type 3R enclosures
- Input voltage: 208V, 230V, 480V and 575V (consult factory)
- Complete range of control, network and power options
- Horsepower range:
  - 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 350 hp I_H; 1-1/2 to 400 hp I_L
- Padlockable disconnect
- Single-phase input available

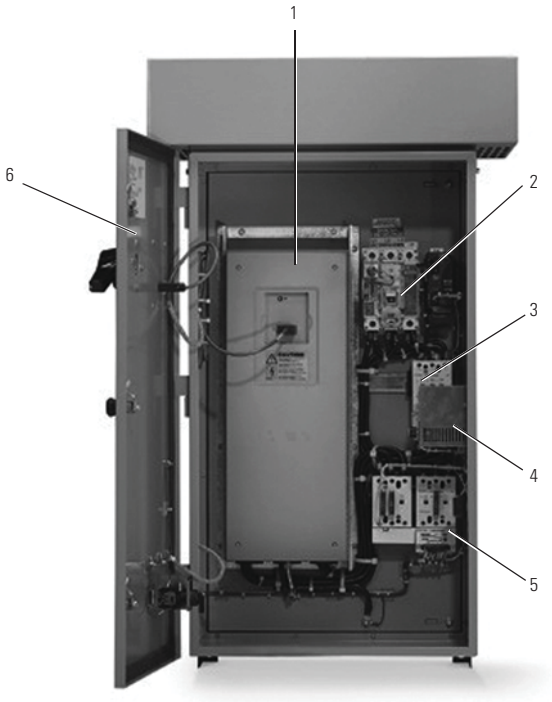
Standards and Certifications

- UL Listed
- cUL Listed

UL Listed c UL Listed

Product Identification

SVX9000 Pump Application



1 SVX9000 variable frequency drive
2 Input disconnect Option P1
3 Input contactor (included as standard with bypass option)
4 Space heater Option S9
5 Bypass contactor Option RA/RB
6 Door-mounted keypad (included as standard)

Catalog Number Selection

2

SVX9000 Enclosed NEMA Type 12/IP54/3R Drive

SVX 010 2 4 E P

Build Alphabetically and Numerically

Product Family

SVX = Enclosed drives

Horsepower Rating

F07 = 3/4 hp	**015** = 15 hp	**100** = 100 hp
001 = 1 hp	**020** = 20 hp	**125** = 125 hp
F15 = 1-1/2 hp	**025** = 25 hp	**150** = 150 hp
002 = 2 hp	**030** = 30 hp	**200** = 200 hp
003 = 3 hp	**040** = 40 hp	**250** = 250 hp
005 = 5 hp	**050** = 50 hp	**300** = 300 hp
007 = 7-1/2 hp	**060** = 60 hp	**350** = 350 hp
010 = 10 hp	**075** = 75 hp	**400** = 400 hp

Enclosure Rating

2 = NEMA Type 12/IP54
3 = NEMA Type 3R

Voltage Rating

Three-phase	Single-phase
1 = 208V	**J** = 230V
2 = 230V	**K** = 480V
4 = 480V	

Application—Torque/Braking ②

A = I_L/no brake chopper
B = I_L/internal brake chopper
D = I_H/no brake chopper
E = I_H/internal brake chopper

Enclosed Style

P = Pumping application

Enclosed Options ①④⑤		Type
K1	Door-mounted speed potentiometer ③	Control
K2	Door-mounted speed potentiometer with HOA selector switch ③	Control
K5	MANUAL/AUTO reference switch (22 mm)	Control
K6	START and STOP pushbuttons (22 mm)	Control
K9	(2) Factory installed auxiliary contacts	Power
L1	POWER ON, RUN and Fault pilot lights	Light
L2	Bypass pilot lights for RA bypass option ⑦	Addl. bypass
LD	Green STOP light	Light
LE	Red RUN light	Light
LU	Misc. light (22 mm)	Light
LW	PTT light (22 mm)	Light
P1	Input circuit breaker	Input
P3	Input line fuses (200 kAIC)	Input
P8	SPD (50 kA per phase)	Input
PA	SPD (100 kA per phase)	Input
PE	Output contactor	Output
PF	Output filter	Output
PG	MotoRX (300–600 ft) 1000 V/µS DV/DT filter	Output
RA	Manual HOA bypass controller ⑦	Bypass
S5	Floor stand 22 in	Enclosure
S9	Space heater w/out CPT	Enclosure
SA	Space heater w/CPT	Enclosure
SB	Socket type control relay	Enclosure
SE	On-delay timer	Enclosure
SF	Off-delay timer	Enclosure

Communication Options ⑥

C2 = Modbus
C3 = PROFIBUS DP
C4 = LonWorks
C5 = PROFIBUS DP (D9 connector)
C6 = CANopen (slave)
C7 = DeviceNet
C8 = Modbus (D9 type connector)
CA = Johnson Controls N2
CI = Modbus TCP
CJ = BACnet
CQ = EtherNet/IP
D3 = RS-232 with D9 connection

Control Options

B1 = 6 DI, 1 ext +24 Vdc/EXT +24 Vdc
B2 = 1 RO (NC-NO), 1 RO (NO), 1 therm
B4 = 1 AI (mA isolated), 2 AO (mA isolated), 1 ext +24 Vdc/EXT +24 Vdc
B5 = 3 RO (NO)
B8 = 1 ext +24 Vdc/EXT +24 Vdc, 3 Pt100
B9 = 1 RO (NO), 5 DI 42–240 Vac input

Notes

① Local/remote keypad is included as the standard control panel.
② Brake chopper is a factory installed option only, see drive options on **Page V6-T2-49**. External dynamic braking resistors not included. See Page **V6-T2-58**.
③ Includes local/remote speed reference switch.
④ Some options are voltage and/or horsepower specific. Consult your Eaton representative for details.
⑤ See **Page V6-T2-120** for descriptions.
⑥ See **Pages V6-T2-118** and **V6-T2-119** for complete descriptions.
⑦ Bypass options applicable only in the pump panel three-phase design.

Product Selection

When Ordering

- Select a base catalog number that meets the application requirements—nominal horsepower, voltage and enclosure rating (the enclosed drive's continuous output amp rating should be equal to or greater than the motor's full load amp rating). The base enclosed package includes a standard drive, door mounted local/remote keypad and enclosure.
- If dynamic brake chopper or control/communication option is desired, change the appropriate code in the base catalog number.
- Select enclosed options. Add the codes as suffixes to the base catalog number in alphabetical and numeric order.
- **Read all footnotes**.

208V Drives

SVX9000 Enclosed Drives

Pump Panel Style (Three-Phase)

Enclosure Size ①	hp	NEMA Type 12/IP54 Frame Size	NEMA Type 12/IP54 Base Catalog Number ②	NEMA Type 3R Frame Size	NEMA Type 3R Base Catalog Number ②
High Overload Drive and Enclosure					
A	3/4	4	**SVXF0721EP**	4	**SVXF0731EP**
	1		**SVX00121EP**		**SVX00131EP**
	1-1/2		**SVXF1521EP**		**SVXF1531EP**
	2		**SVX00221EP**		**SVX00231EP**
	3	5	**SVX00321EP**	5	**SVX00331EP**
	5		**SVX00521EP**		**SVX00531EP**
	7-1/2		**SVX00721EP**		**SVX00731EP**
	10	6	**SVX01021EP**	6	**SVX01031EP**
	15		**SVX01521EP**		**SVX01531EP**
B	20	7	**SVX02021DP**	7	**SVX02031DP**
	25		**SVX02521DP**		**SVX02531DP**
	30		**SVX03021DP**		**SVX03031DP**
C	40	8	**SVX04021DP**	8	**SVX04031DP**
	50		**SVX05021DP**		**SVX05031DP**
	60		**SVX06021DP**		**SVX06031DP**
F	75	9	—	9	**SVX07531DP**
	100		—		**SVX10031DP**
Low Overload Drive and Enclosure					
A	1	4	**SVX00121BP**	4	**SVX00131BP**
	1-1/2		**SVXF1521BP**		**SVXF1531BP**
	2		**SVX00221BP**		**SVX00231BP**
	3		**SVX00321BP**		**SVX00331BP**
	5	5	**SVX00521BP**	5	**SVX00531BP**
	7-1/2		**SVX00721BP**		**SVX00731BP**
	10		**SVX01021BP**		**SVX01031BP**
	15	6	**SVX01521BP**	6	**SVX01531BP**
	20		**SVX02021BP**		**SVX02031BP**
B	25	7	**SVX02521AP**	7	**SVX02531AP**
	30		**SVX03021AP**		**SVX03031AP**
	40		**SVX04021AP**		**SVX04031AP**
C	50	8	**SVX05021AP**	8	**SVX05031AP**
	60		**SVX06021AP**		**SVX06031AP**
	75		**SVX07521AP**		**SVX07531AP**
F	100	9	—	9	**SVX10031AP**
	125		—		**SVX12531AP**

Notes

① Enclosure dimensions starting on **Page V6-T2-124**.
② Includes drive, local/remote keypad and enclosure.

230V Drives

SVX9000 Enclosed Drives

Pump Panel Style (Three-Phase)

Enclosure Size ①	hp	NEMA Type 12/IP54 Frame Size	NEMA Type 12/IP54 Base Catalog Number ②	NEMA Type 3R Frame Size	NEMA Type 3R Base Catalog Number ②
High Overload Drive and Enclosure					
A	3/4	4	**SVXF0722EP**	4	**SVXF0732EP**
	1		**SVX00122EP**		**SVX00132EP**
	1-1/2		**SVXF1522EP**		**SVXF1532EP**
	2		**SVX00222EP**		**SVX00232EP**
	3	5	**SVX00322EP**	5	**SVX00332EP**
	5		**SVX00522EP**		**SVX00532EP**
	7-1/2		**SVX00722EP**		**SVX00732EP**
	10	6	**SVX01022EP**	6	**SVX01032EP**
	15		**SVX01522EP**		**SVX01532EP**
B	20	7	**SVX02022DP**	7	**SVX02032DP**
	25		**SVX02522DP**		**SVX02532DP**
	30		**SVX03022DP**		**SVX03032DP**
C	40	8	**SVX04022DP**	8	**SVX04032DP**
	50		**SVX05022DP**		**SVX05032DP**
	60		**SVX06022DP**		**SVX06032DP**
F	75	9	—	9	**SVX07532DP**
	100		—		**SVX10032DP**
Low Overload Drive and Enclosure					
A	1	4	**SVX00122BP**	4	**SVX00132BP**
	1-1/2		**SVXF1522BP**		**SVXF1532BP**
	2		**SVX00222BP**		**SVX00232BP**
	3		**SVX00322BP**		**SVX00332BP**
	5	5	**SVX00522BP**	5	**SVX00532BP**
	7-1/2		**SVX00722BP**		**SVX00732BP**
	10		**SVX01022BP**		**SVX01032BP**
	15	6	**SVX01522BP**	6	**SVX01532BP**
	20		**SVX02022BP**		**SVX02032BP**
B	25	7	**SVX02522AP**	7	**SVX02532AP**
	30		**SVX03022AP**		**SVX03032AP**
	40		**SVX04022AP**		**SVX04032AP**
C	50	8	**SVX05022AP**	8	**SVX05032AP**
	60		**SVX06022AP**		**SVX06032AP**
	75		**SVX07522AP**		**SVX07532AP**
F	100	9	—	9	**SVX10032AP**
	125		—		**SVX12532AP**

Notes

① Enclosure dimensions starting on **Page V6-T2-124**.

② Includes drive, local/remote keypad and enclosure.

230V Drives, continued

SVX9000 Enclosed Drives

Pump Panel Style (Single-Phase)

Enclosure Size ①	hp	NEMA Type 12/IP54 Frame Size	NEMA Type 12/IP54 Base Catalog Number ②	NEMA Type 3R Frame Size	NEMA Type 3R Base Catalog Number ②
Low Overload Drive and Enclosure					
A	3/4	4	**SVXF072JBP**	4	**SVXF073JBP**
	1		**SVX0012JBP**		**SVX0013JBP**
	2	5	**SVX0022JBP**	5	**SVX0023JBP**
	3		**SVX0032JBP**		**SVX0033JBP**
	5		**SVX0052JBP**		**SVX0053JBP**
	7-1/2	6	**SVX0072JBP**	6	**SVX0073JBP**
	10		**SVX0102JBP**		**SVX0103JBP**
B	15	7	**SVX0152JBP**	7	**SVX0153JBP**
	20		**SVX0202JAP**		**SVX0203JAP**
C	25	8	**SVX0252JAP**	8	**SVX0253JAP**
	30		**SVX0302JAP**		**SVX0303JAP**
	40		**SVX0402JAP**		**SVX0403JAP**

Notes

① Enclosure dimensions starting on **Page V6-T2-124**.

② Includes drive, local/remote keypad and enclosure.

480V Drives

SVX9000 Enclosed Drives

Pump Panel Style (Three-Phase)

Enclosure Size ①	hp	NEMA Type 12/IP54 Frame Size	NEMA Type 12/IP54 Base Catalog Number ②	NEMA Type 3R Frame Size	NEMA Type 3R Base Catalog Number ②
High Overload Drive and Enclosure					
A	1	4	**SVX00124EP**	4	**SVX00134EP**
	1-1/2		**SVXF1524EP**		**SVXF1534EP**
	2		**SVX00224EP**		**SVX00234EP**
	3		**SVX00324EP**		**SVX00334EP**
	5		**SVX00524EP**		**SVX00534EP**
	7-1/2	5	**SVX00724EP**	5	**SVX00734EP**
	10		**SVX01024EP**		**SVX01034EP**
	15		**SVX01524EP**		**SVX01534EP**
	20	6	**SVX02024EP**	6	**SVX02034EP**
	25		**SVX02524EP**		**SVX02534EP**
B	30	7	**SVX03024EP**	7	**SVX03034EP**
	40		**SVX04024DP**		**SVX04034DP**
	50		**SVX05024DP**		**SVX05034DP**
	60		**SVX06024DP**		**SVX06034DP**
C	75	8	**SVX07524DP**	8	**SVX07534DP**
	100		**SVX10024DP**		**SVX10034DP**
	125		**SVX12524DP**		**SVX12534DP**
F	150	9	—	9	**SVX15034DP**
	200		—		**SVX20034DP**
	250	10	—	10	**SVX25034DP**
	300		—		**SVX30034DP**
	350		—		**SVX35034DP**
	400	11 ③	—	11	**SVX40034DP**
	500		—		**SVX50034DP**
Low Overload Drive and Enclosure					
A	1-1/2	4	**SVXF1524BP**	4	**SVXF1534BP**
	2		**SVX00224BP**		**SVX00234BP**
	3		**SVX00324BP**		**SVX00334BP**
	5		**SVX00524BP**		**SVX00534BP**
	7-1/2		**SVX00724BP**		**SVX00734BP**
	10	5	**SVX01024BP**	5	**SVX01034BP**
	15		**SVX01524BP**		**SVX01534BP**
	20		**SVX02024BP**		**SVX02034BP**
	25	6	**SVX02524BP**	6	**SVX02534BP**
	30		**SVX03024BP**		**SVX03034BP**
B	40	7	**SVX04024BP**	7	**SVX04034BP**
	50		**SVX05024AP**		**SVX05034AP**
	60		**SVX06024AP**		**SVX06034AP**
	75		**SVX07524AP**		**SVX07534AP**
C	100	8	**SVX10024AP**	8	**SVX10034AP**
	125		**SVX12524AP**		**SVX12534AP**
	150		**SVX15024AP**		**SVX15034AP**
F	200	9	—	9	**SVX20034AP**
	250		—		**SVX25034AP**
	300	10	—	10	**SVX30034AP**
	350		—		**SVX35034AP**
	400		—		**SVX40034AP**
	500	11 ③	—	11	**SVX50034AP**
	600		—		**SVX60034AP**

Notes

① Enclosure dimensions starting on **Page V6-T2-124**.
② Includes drive, local/remote keypad and enclosure.
③ FR11 has limited power options available.

480V Drives, continued

SVX9000 Enclosed Drives

Pump Panel Style (Single-Phase)

Enclosure Size ①	hp	NEMA Type 12/IP54 Frame Size	NEMA Type 12/IP54 Base Catalog Number ②	NEMA Type 3R Frame Size	NEMA Type 3R Base Catalog Number ②
Low Overload Drive and Enclosure					
A	3/4	4	**SVXF072KBP**	4	**SVXF073KBP**
	1		**SVX0012KBP**		**SVX0013KBP**
	2		**SVX0022KBP**		**SVX0023KBP**
	3		**SVX0032KBP**		**SVX0033KBP**
	5	5	**SVX0052KBP**	5	**SVX0053KBP**
	7-1/2		**SVX0072KBP**		**SVX0073KBP**
	10		**SVX0102KBP**		**SVX0103KBP**
	15	6	**SVX0152KBP**	6	**SVX0153KBP**
	20		**SVX0202KBP**		**SVX0203KBP**
B	25	7	**SVX0252KAP**	7	**SVX0253KAP**
	30		**SVX0302KAP**		**SVX0303KAP**
C	40	8	**SVX0402KAP**	8	**SVX0403KAP**
	50		**SVX0502KAP**		**SVX0503KAP**
	60		**SVX0602KAP**		**SVX0603KAP**

Notes

① Enclosure dimensions starting on **Page V6-T2-124**.

② Includes drive, local/remote keypad and enclosure.

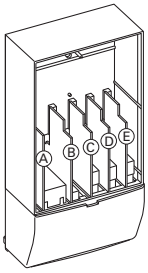
Options

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.

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.

Option Boards



Option Board Kits

Option Kit Description ①	Allowed Slot Locations ②	Field Installed Catalog Number	Factory Installed Option Designator	SVX Ready Programs Basic	Local/ Remote	Standard	MSS	PID	Multi-P.	PFC
Standard I/O Cards										
6 DI, 1 DO, 2 AI, 1AO, 1 +10 Vdc ref, 2 ext +24 Vdc/EXT +24 Vdc	A	**OPTA9**	—	■	■	■	■	■	■	■
2 RO (NC-NO)	B	**OPTA2**	—	■	■	■	■	■	■	■
Extended I/O Cards										
6 DI, 1 ext +24 Vdc/EXT +24 Vdc	B, C, **D**, E	**OPTB1**	**B1**	—	—	—	—	—	■	■
1 RO (NC-NO), 1 RO (NO), 1 therm	B, C, **D**, E	**OPTB2**	**B2**	—	—	—	—	—	■	■
1 AI (mA isolated), 2 AO (mA isolated), 1 ext +24 Vdc/EXT +24 Vdc	B, C, **D**, E	**OPTB4**	**B4**	■	■	■	■	■	■	■
3 RO (NO)	B, C, **D**, E	**OPTB5**	**B5**	—	—	—	—	—	■	■
1 ext +24 Vdc/EXT +24 Vdc, 3 Pt100	B, C, **D**, E	**OPTB8**	**B8**	—	—	—	—	—	—	—
1 RO (NO), 5 DI 42–240 Vac input	B, C, **D**, E	**OPTB9**	**B9**	—	—	—	—	—	■	■
Communication Cards										
Modbus ③	D, **E**	**OPTC2**	**C2**	■	■	■	■	■	■	■
Modbus TCP	D, **E**	**OPTCI**	**CI**	■	■	■	■	■	■	■
BACnet	D, **E**	**OPTCJ**	**CJ**	■	■	■	■	■	■	■
EtherNet/IP	D, **E**	**OPTCQ**	**CQ**	■	■	■	■	■	■	■
Johnson Controls N2 ③	D, **E**	**OPTC2**	**CA**	—	—	—	—	—	—	—
PROFIBUS DP	D, **E**	**OPTC3**	**C3**	■	■	■	■	■	■	■
LonWorks	D, **E**	**OPTC4**	**C4**	■	■	■	■	■	■	■
PROFIBUS DP (D9 connector)	D, **E**	**OPTC5**	**C5**	■	■	■	■	■	■	■
CANopen (slave)	D, **E**	**OPTC6**	**C6**	■	■	■	■	■	■	■
DeviceNet	D, **E**	**OPTC7**	**C7**	■	■	■	■	■	■	■
Modbus (D9 type connector)	D, **E**	**OPTC8**	**C8**	■	■	■	■	■	■	■
RS-232 with D9 connection	D, **E**	**OPTD3**	**D3**	■	■	■	■	■	■	■

Notes

① AI = Analog Input; AO = Analog Output, DI = Digital Input, DO = Digital Output, RO = Relay Output

② Option card must be installed in one of the slots listed for that card. Slot indicated in bold is the preferred location.

③ OPTC2 is a multi-protocol option card.

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 120 ohms, and specific line delay of nominal 5 nS/m. 120 ohms 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 two-wire twisted shielded cable with two-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 OPTCI 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.

Control/Communication Option Descriptions

For availability, see Product Selection for base drive voltage required.

Available Control/Communications Options

Option	Description	Option Type
K1	**Door-Mounted Speed Potentiometer—**Provides the SVX9000 with the ability to adjust the frequency reference using a door-mounted potentiometer. This option uses the 10 Vdc reference to generate a 0–10V signal at the analog voltage input signal terminal. When the HOA bypass option is added, the speed is controlled when the HOA switch is in the HAND position. Without the HOA bypass option, a two-position switch (labeled local/remote) is provided on the keypad to select speed reference from the Speed Potentiometer or a remote speed signal.	Control
K2	**Door-Mounted Speed Potentiometer with HOA Selector Switch—**Provides the SVX9000 with the ability to start/stop and adjust the speed reference from door-mounted control devices or remotely from customer supplied inputs. In HAND position, the drive will start and the speed is controlled by the door-mounted speed potentiometer. The drive will be disabled in the OFF position. When AUTO is selected, the drive run and speed control commands are via user-supplied dry contact and 4–20 mA signal.	Control
K5	**MANUAL/AUTO Speed Reference Switch**—Provides a door-mounted selector switch for MANUAL/AUTO speed reference.	Control
K6	**START and STOP Pushbuttons (22 mm)**—START (green) STOP (red). Provide door-mounted START and STOP pushbuttons for either bypass or non-bypass configurations.	Control
K9	**(2) Factory Installed Auxiliary Contacts**—Provide two NO/NC auxiliary contacts.	Power
L2	**Bypass Pilot Lights for RA and RB Bypass Options**—A green MOTOR ON INVERTER light indicates when the motor is running in inverter mode and an amber MOTOR ON BYPASS light indicates when the motor is running in bypass mode. The lights are mounted on the enclosure door, above the switches.	Addl. bypass
LD	**Green STOP Light (22 mm)**—Provides a green STOP light that indicates the drive is stopped.	Light
LE	**Red RUN Pilot Light (22 mm)**—Provides a red RUN pilot light that indicates the drive is running.	Light
LU	**Misc. Light (22 mm)**—Provides a misc. “user defined” pilot light. User to define light function and color.	Light
LW	**PTT (Push-To-Test) Light (22 mm)**—Provides misc. “user defined” PTT pilot light. User to define light function and color.	Light
P1	**Input Circuit Breaker**—Provides a means of short-circuit protection for the power cables between it and the SVX9000, and protection from high-level ground faults on the power cable. Allows a convenient means of disconnecting the SVX9000 from the line and the operating mechanism can be padlocked in the OFF position. This is factory mounted in the enclosure.	Input
P3	**Input Line Fuses Rated to 200 kAIC**—Provide high-level fault protection of the SVX9000 input power circuit from the load side of the fuses to the input side of the power transistors. This option consists of three 200 kA fuses, which are factory mounted in the enclosure.	Input
P8	**SPD (50 kA per Phase)**—Provides a surge protection device (SPD) connected to the line side terminals and is designed to clip line side transients. Rated for 50,000A.	Input
PA	**SPD (100 kA per Phase)**—Provides a surge protection device (SPD) connected to the line side terminals and is designed to clip line side transients. Rated for 100,000A.	Input
PE	**Output Contactor**—Provides a means for positive disconnection of the drive output from the motor terminals. The contactor coil is controlled by the drive’s run or permissive logic. NC and NO auxiliary contacts rated at 10A, 600 Vac are provided for customer use. Bypass option **RA** includes an output contactor as standard. This option includes a low VA 115 Vac fused control power transformer and is factory mounted in the enclosure.	Output
RA	**Manual HOA Bypass Controller**—The Manual HAND/OFF/AUTO (HOA)—3-contactor—bypass option provides a means of bypassing the SVX9000, allowing the AC motor to be operated at full speed directly from the AC supply line. This option consists of an input disconnect, a fused control power transformer, and a full voltage bypass starter with a door mounted HOA selector switch and an INVERTER/BYPASS switch. The HOA switch provides the ability to start and stop the drive in the inverter mode. For applications up to 100 hp, a Freedom Series IEC input contactor, a Freedom Series IEC output contactor, and a Freedom Series IEC starter with a bimetallic overload relay is included. For applications above 100 hp, an Advantage input contactor, an Advantage output contactor and an Advantage starter with electronic overload protection is included. The contactors are mechanically and electrically interlocked.	Bypass
RB	**Manual IOB Bypass Controller**—The manual INVERTER/OFF/BYPASS (IOB)—3-contactor—bypass option provides a means of bypassing the SVX9000, allowing the AC motor to be operated at full speed directly from the AC supply line. This option consists of an input disconnect, a fused control power transformer, and a full voltage bypass starter with a door mounted IOB selector switch. For applications up to 100 hp, a Freedom Series IEC input contactor, a Freedom Series IEC output contactor, and a Freedom Series IEC starter with a bimetallic overload relay is included. For applications above 100 hp, an Advantage input contactor, an Advantage output contactor and an Advantage starter with electronic overload protection is included. The contactors are mechanically and electrically interlocked.	Bypass
S5	**Floor Stand 22 in**—Converts a Size A or B, normally wall mounted enclosure to a floor standing enclosure with a height of 22 in (558.8 mm).	Enclosure
S9	**Space Heater without CPT**—Prevents condensation from forming in the enclosure when the drive is inactive or in storage. Includes a thermostat for variable temperature control. A 200W heater is installed in enclosures A and B, and 400W heater is installed in enclosures C and D. Requires a customer supplied 115V remote supply source.	Enclosure
SA	**Space Heater with CPT**— Prevents condensation from forming in the enclosure when the drive is inactive or in storage. Includes a thermostat for variable temperature control. A 200W heater is installed in enclosures A and B, and 400W heater is installed in enclosures C and D. Provided with CPT connected to load side of input disconnect.	Enclosure
SB	**Ice Cube Style Control Relay**—Provides misc. “user defined” 4PDT control relay. Requires user to define functionality.	Enclosure
SE	**On-Delay Timer (Delay on Make)**—Provides misc. “user defined” time delay relay. Requires user to define functionality and time setting requirement.	Enclosure
SF	**Off-Delay Timer (Delay on Break)**—Provides misc. “user defined” time delay relay. Requires user to define functionality and time setting requirement.	Enclosure

Technical Data and Specifications

9000X VFD Pump Panels

Description	NEMA Type 12/IP54 or NEMA Type 3R Specification
Primary Design Features	
45–66 Hz input frequency	Standard
Output (AC volts maximum)	Input voltage base
Output frequency range	0–320 Hz
Initial output current (I_H)	250% for 2 seconds
Overload (1 minute [I_H/I_L])	150%/110%
Enclosure space heater	Optional
Oversize enclosure	Standard
Output contactor	Optional
Bypass motor starter	Optional
Listings	UL, cUL
Protection Features	
Incoming line fuses	Optional
AC input circuit disconnect	Optional
Line reactors (3%)	Standard
Phase rotation insensitive	Standard
EMI filter	Standard—Thru Frame 9
Input phase loss protection	Standard
Input overvoltage protection	Standard
Line surge protection	Optional
Output short-circuit protection	Standard
Output ground fault protection	Standard
Output phase protection	Standard
Overtemperature protection	Standard
DC overvoltage protection	Standard
Drive overload protection	Standard
Motor overload protection	Standard
Programmer software	Optional
Local/remote keypad	Standard
Keypad lockout	Standard
Fault alarm output	Standard
Built-in diagnostics	Standard

Description	NEMA Type 12/IP54 or NEMA Type 3R Specification
Input/Output Interface Features	
Setup adjustment provisions	
Remote keypad/display	Standard
Personal computer	Standard
Operator control provisions	
Drive mounted keypad/display	Standard
Remote keypad/display	Standard
Conventional control elements	Standard
Serial communications	Optional
115 Vac control circuit	Optional
Speed setting inputs	
Keypad	Standard
0–10 Vdc potentiometer/voltage signal	Standard
4–20 mA isolated	Configurable
4–20 mA differential	Configurable
Analog outputs	
Speed/frequency	Standard
Torque/load/current	Programmable
Motor voltage	Programmable
Kilowatts	Programmable
0–10 Vdc signals	Configurable w/jumpers
4–20 mA DC signals	Standard
Isolated signals	Optional
Discrete outputs	
Fault alarm	Standard
Drive running	Standard
Drive at set speed	Programmable
Optional parameters	14
Dry contacts	1 (2 relays Form C)
Open collector outputs	1
Additional discrete outputs	Optional
Communications	
RS-232	Standard
RS-422/485	Optional
DeviceNet™	Optional
Modbus RTU	Optional
CANopen (slave)	Optional
PROFIBUS-DP	Optional
Lonworks®	Optional
Johnson Controls Metasys™ N2	Optional
EtherNet/IP	Optional
Modbus TCP	Optional
BACnet	Optional

9000X VFD Pump Panels, continued

Description	NEMA Type 12/IP54 or NEMA Type 3R Specification
Performance Features	
Sensorless vector control	Standard
Volts/hertz control	Standard
IR and slip compensation	Standard
Electronic reversing	Standard
Dynamic braking	Optional ①
DC braking	Standard
PID setpoint controller	Programmable
Critical speed lockout	Standard
Current (torque) limit	Standard
Adjustable acceleration/deceleration	Standard
Linear or S curve accel/decel	Standard
Jog at preset speed	Standard
Thread/preset speeds	7 Standard, 15 Optional
Automatic restart	Selectable
Coasting motor start	Standard
Coast or ramp stop selection	Standard
Elapsed time meter	Optional
Carrier frequency adjustment	1–16 kHz
Standard Conditions for Application and Service	
Operating ambient temperature	0 to 40°C
Storage temperature	–40 to 60°C
Humidity (maximum), non-condensing	95%
Altitude (maximum without derate)	3300 ft (1000m)
Line voltage variation	+10/–15%
Line frequency variation	45–66 Hz
Efficiency	>96%
Power factor (displacement)	0.96

Standard I/O Specifications

Description	Specification
Six–digital input programmable	24V: "0" ≤10V, "1" ≥18V,R_i >5 kohms
Two–analog input configurable w/jumpers	Voltage: 0–±10V, R_i >200 kohms Current: 0 (4)–20 mA, R_i = 250 ohms
Two–digital output programmable	Form C relays 250 Vac 30 Vdc 2 amp resistive
One–analog output programmable configurable w/jumper	0–20 mA, R_L max. 500 ohms 10 bits ±2%
One digital output programmable	Open collector 48 Vdc 50 mA

I/O Specifications for Control/Communication Options

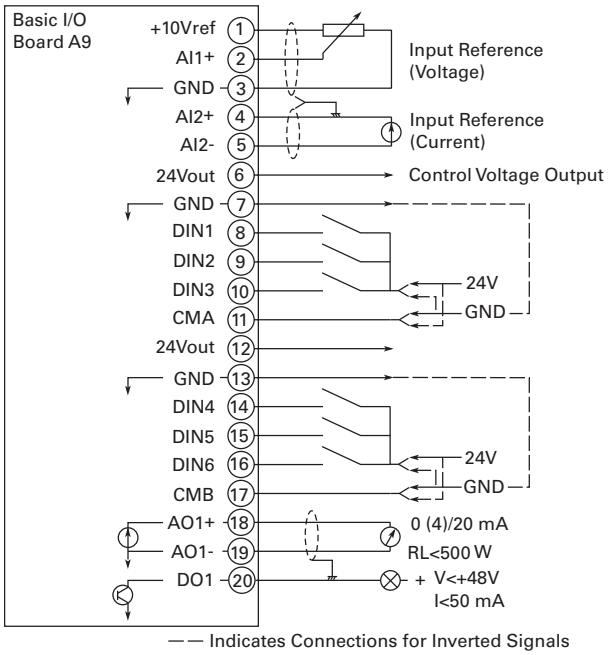
Description	Specification
Analog voltage, input	0–±10V, R_i ≥200 kohms
Analog current, input	0 (4)–20 mA, R_i = 250 ohms
Digital input	24V: "0" ≤10V, "1" ≥18V, R_i >5 kohms
Auxiliary voltage	24V (±20%), max. 50 mA
Reference voltage	10V ±3%, max. 10 mA
Analog current, output	0 (4)–20 mA, R_L = 500 kohms, resolution 10 bit, accuracy ≤±2%
Analog voltage, output	0 (2)–10V, R_L ≥1 k kohms, resolution 10 bit, accuracy ≤±2%
Relay output	
Maximum switching voltage	300 Vdc, 250 Vac
Maximum switching load	8A/24 Vdc, 0.4A/300 Vdc, 2 kVA/250 Vac
Maximum continuous load	2A rms
Thermistor input	R_{trip} = 4.7 kohms

Note

① Some horsepower units include dynamic braking chopper as standard—refer to individual drive sections.

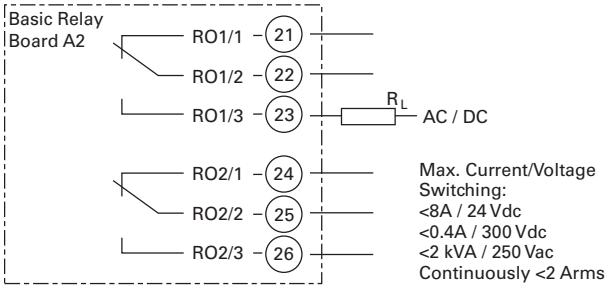
Wiring Diagrams

A9 Board Control Wiring

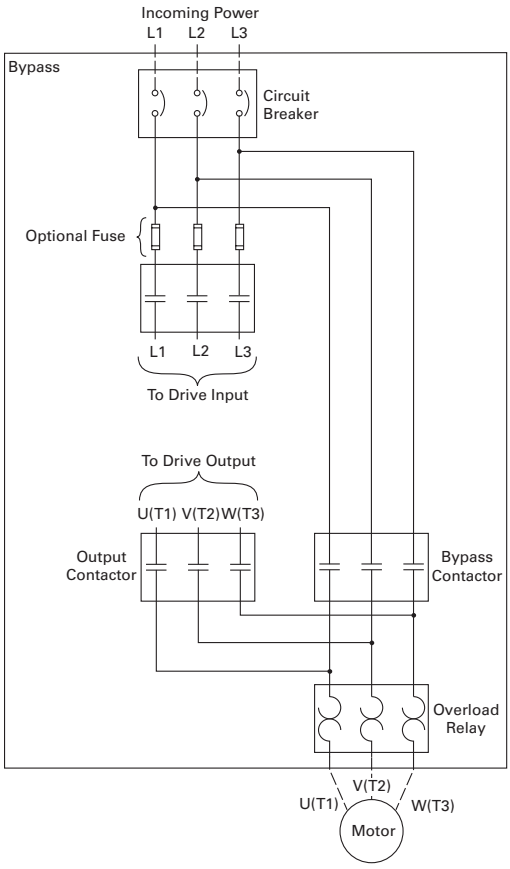


—— Indicates Connections for Inverted Signals

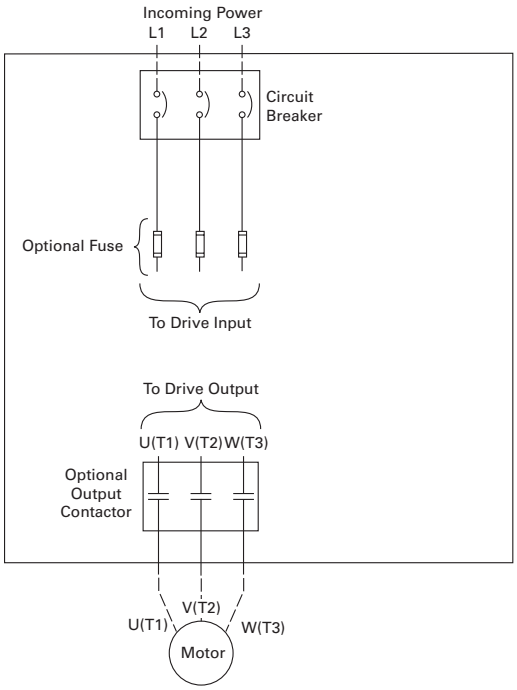
A2 Board Control Wiring



SVX9000 Pump Panel Bypass Power Wiring



SVX9000 Pump Panel Disconnect Power Wiring



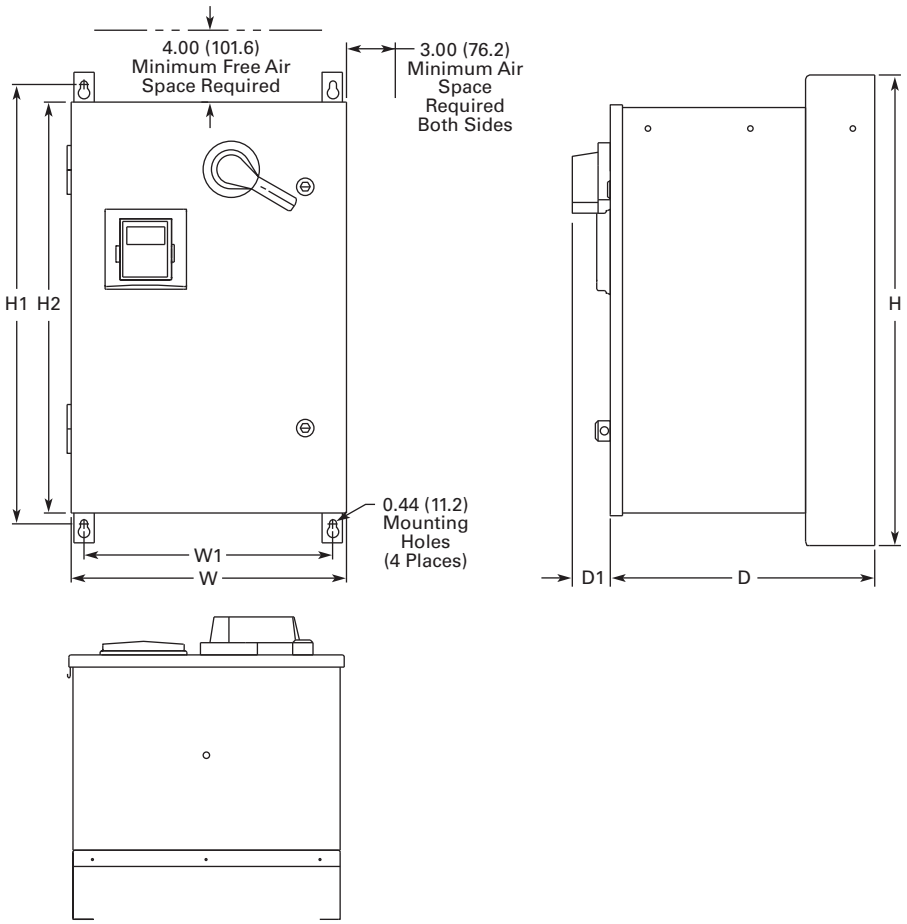
Dimensions

Approximate Dimensions in Inches (mm)

2

SVX9000 Pump Application Drives

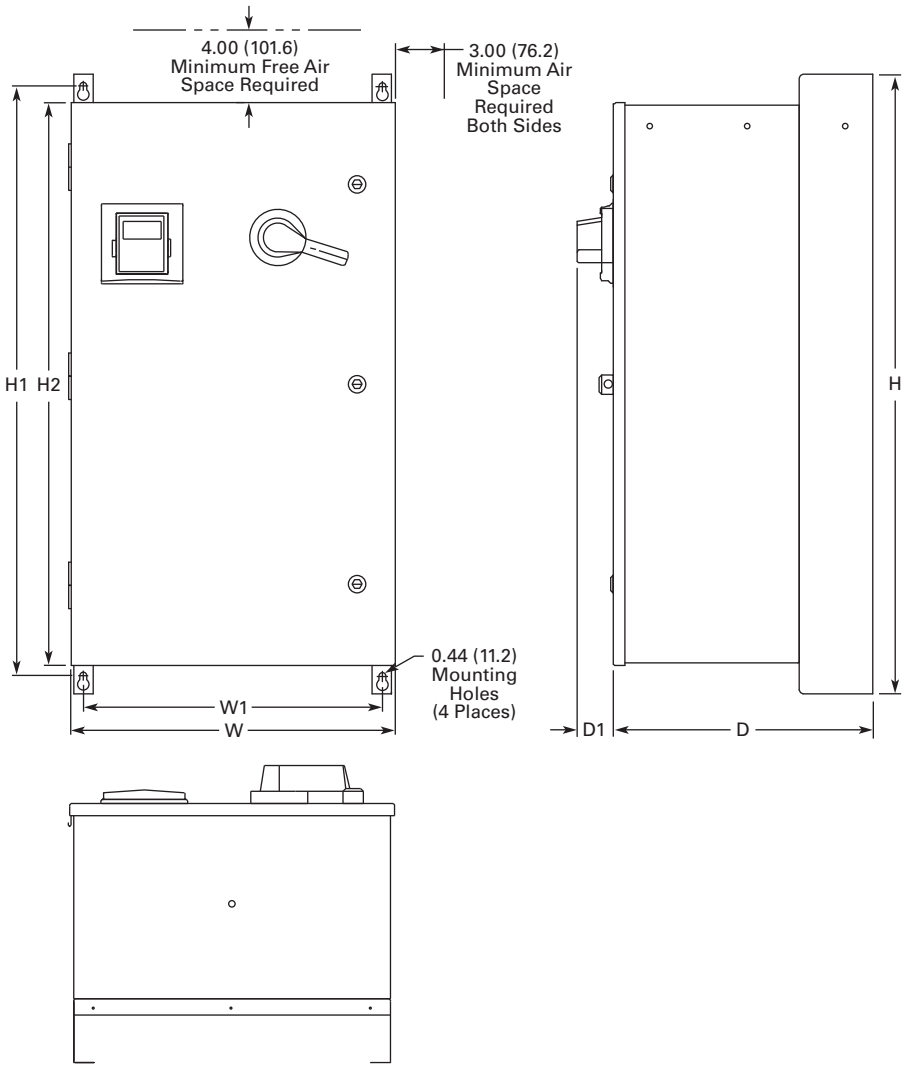
Enclosure Box A NEMA Type 12/IP54



Voltage AC	hp (I_H)	hp (I_L)	H	H1	H2	W	W1	D	D1	Approx. Weight Lbs (kg)	Approx. Shipping Weight Lbs (kg)
Three-Phase											
208V	3/4–10	1–15	29.00 (736.6)	27.00 (685.8)	25.35 (643.9)	16.92 (429.8)	15.30 (388.6)	16.26 (413.0)	2.34 (59.4)	120 (54)	160 (73)
230V	3/4–10	1–15									
480V	1–25	1–30									
Single-Phase											
230V	—	3/4–10	29.00 (736.6)	27.00 (685.8)	25.35 (643.9)	16.92 (429.8)	15.30 (388.6)	16.26 (413.0)	2.34 (59.4)	120 (54)	160 (73)
480V	—	3/4–20									

Approximate Dimensions in Inches (mm)

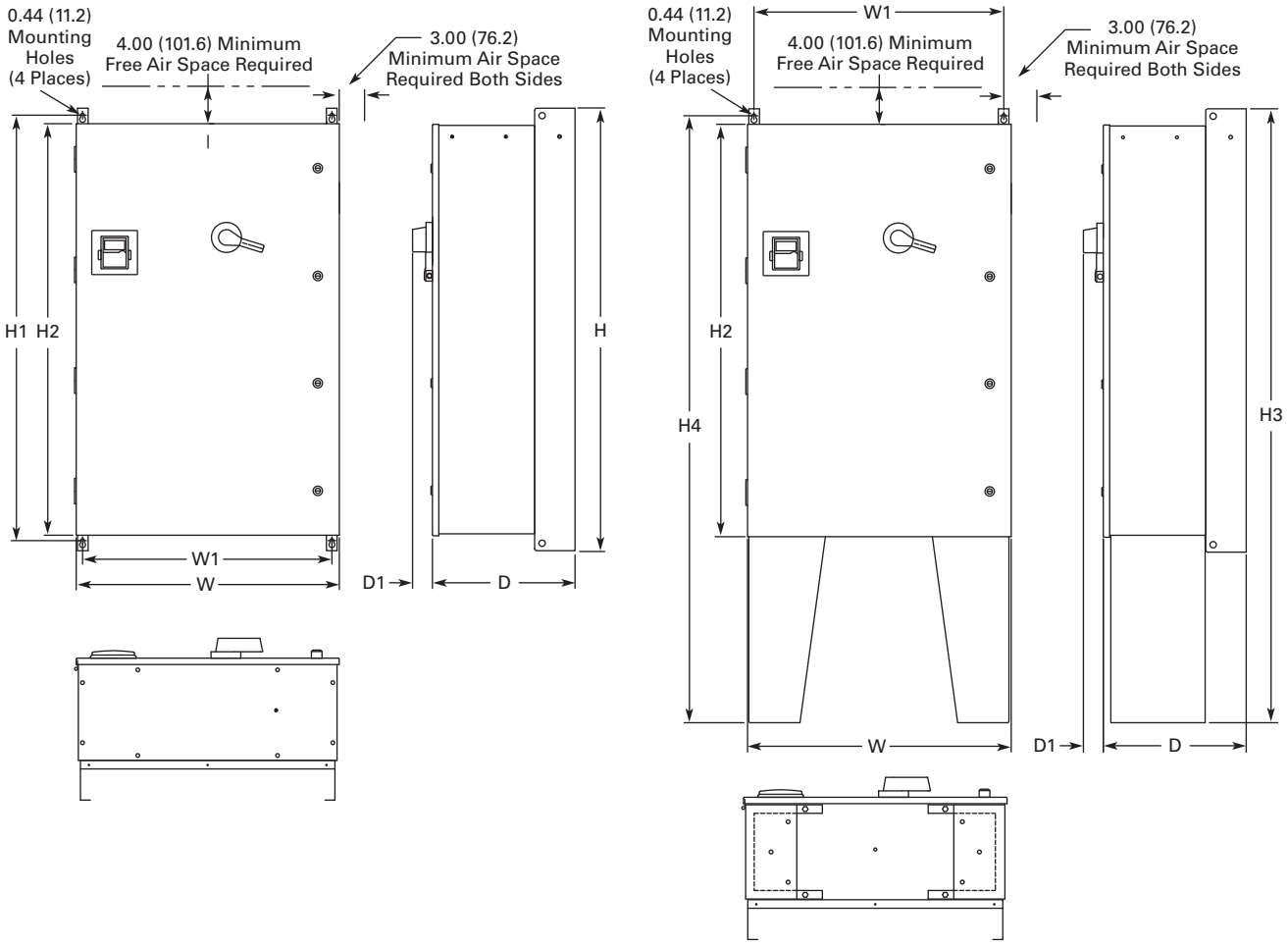
Enclosure Box B NEMA Type 12/IP54



Voltage AC	hp (I_H)	hp (I_L)	H	H1	H2	W	W1	D	D1	Approx. Weight Lbs (kg)	Approx. Shipping Weight Lbs (kg)
Three-Phase											
208V	15–25	20–30	40.00 (1016.0)	38.00 (965.2)	36.35 (923.3)	20.92 (531.4)	19.30 (490.2)	16.76 (425.7)	2.34 (59.4)	185 (84)	229 (104)
230V	15–25	20–30									
480V	30–60	40–75									
Single-Phase											
230V	—	15–20	40.00 (1016.0)	38.00 (965.2)	36.35 (923.3)	20.92 (531.4)	19.30 (490.2)	16.76 (425.7)	2.34 (59.4)	185 (84)	229 (104)
480V	—	25–30									

Approximate Dimensions in Inches (mm)

Enclosure Box C NEMA Type 12/IP54



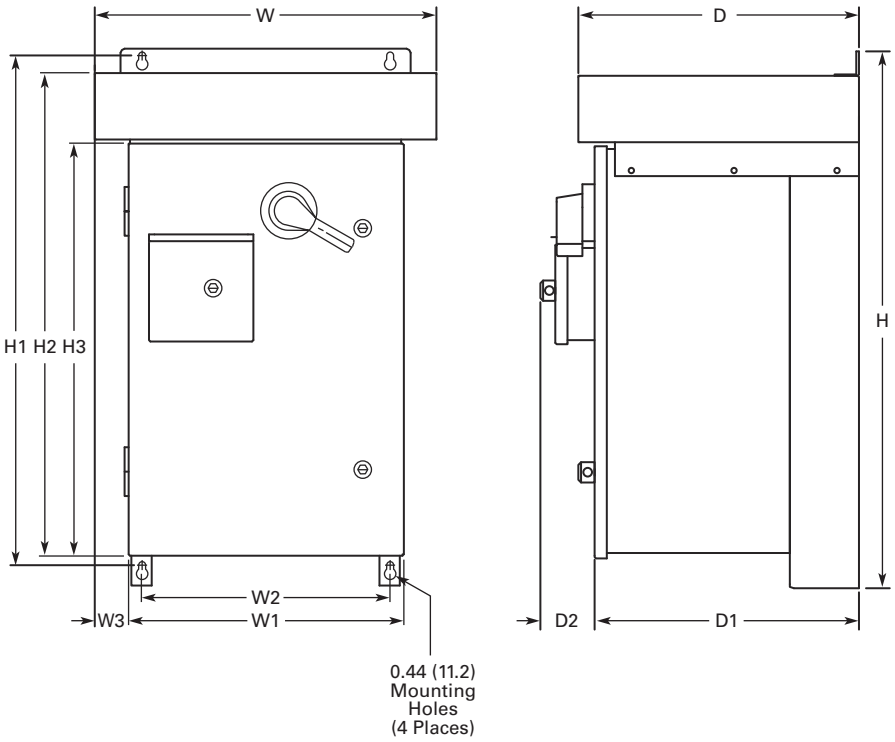
Voltage AC	hp (I_H)	hp (I_L)	H	H1	H2	H3	H4	W	W1	D	D1	Approx. Shipping Weight Lbs (kg)
Three-Phase												
208V	30–50	40–60	52.00 (1320.8)	50.00 (1270.0)	48.35 (1228.1)	72.00 (1828.8)	71.19 (1808.2)	30.92 (785.4)	29.30 (744.2)	16.78 (426.2)	2.34 (59.4)	①
230V	30–50	40–60										
480V	75–125	100–150										
Single-Phase												
230V	—	25–40	52.00 (1320.8)	50.00 (1270.0)	48.35 (1228.1)	72.00 (1828.8)	71.19 (1808.2)	30.92 (785.4)	29.30 (744.2)	16.78 (426.2)	2.34 (59.4)	①
480V	—	40–60										

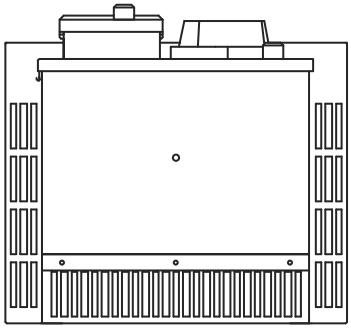
Note

① Consult factory.

Approximate Dimensions in Inches (mm)

Enclosure Box A NEMA Type 3R

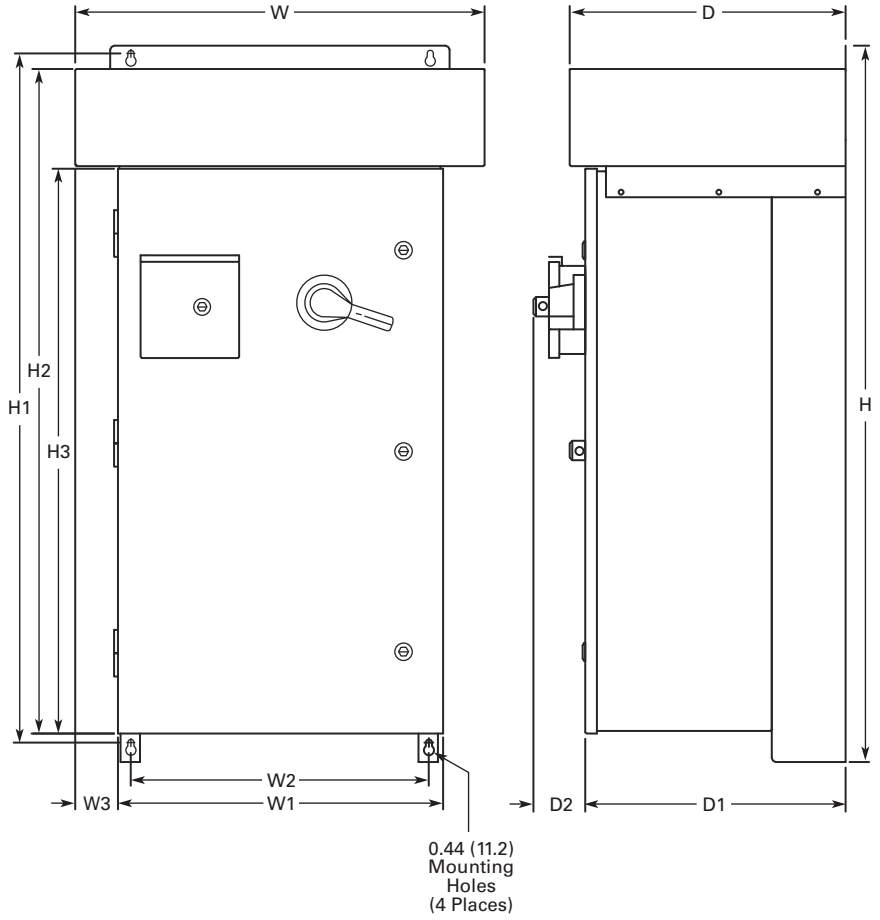


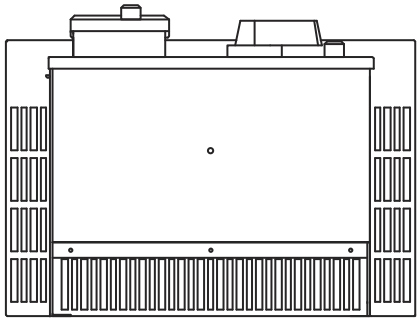


Voltage AC	hp (I_H)	hp (I_L)	H	H1	H2	H3	W	W1	W2	W3	D	D1	D2	Approx. Weight Lbs (kg)	Approx. Shipping Weight Lbs (kg)
Three-Phase															
208V	3/4–10	1–15	33.00 (838.2)	31.36 (796.5)	29.67 (753.6)	25.35 (643.9)	21.05 (534.7)	16.92 (429.8)	15.30 (388.6)	2.07 (52.6)	17.24 (437.9)	16.26 (413.0)	3.31 (84.1)	170 (77)	215 (98)
230V	3/4–10	1–15													
480V	1–25	1–30													
Single-Phase															
230V	—	3/4–10	33.00 (838.2)	31.36 (796.5)	29.67 (753.6)	25.35 (643.9)	21.05 (534.7)	16.92 (429.8)	15.30 (388.6)	2.07 (52.6)	17.24 (437.9)	16.26 (413.0)	3.31 (84.1)	170 (77)	215 (98)
480V	—	3/4–20													

Approximate Dimensions in Inches (mm)

Enclosure Box B NEMA Type 3R

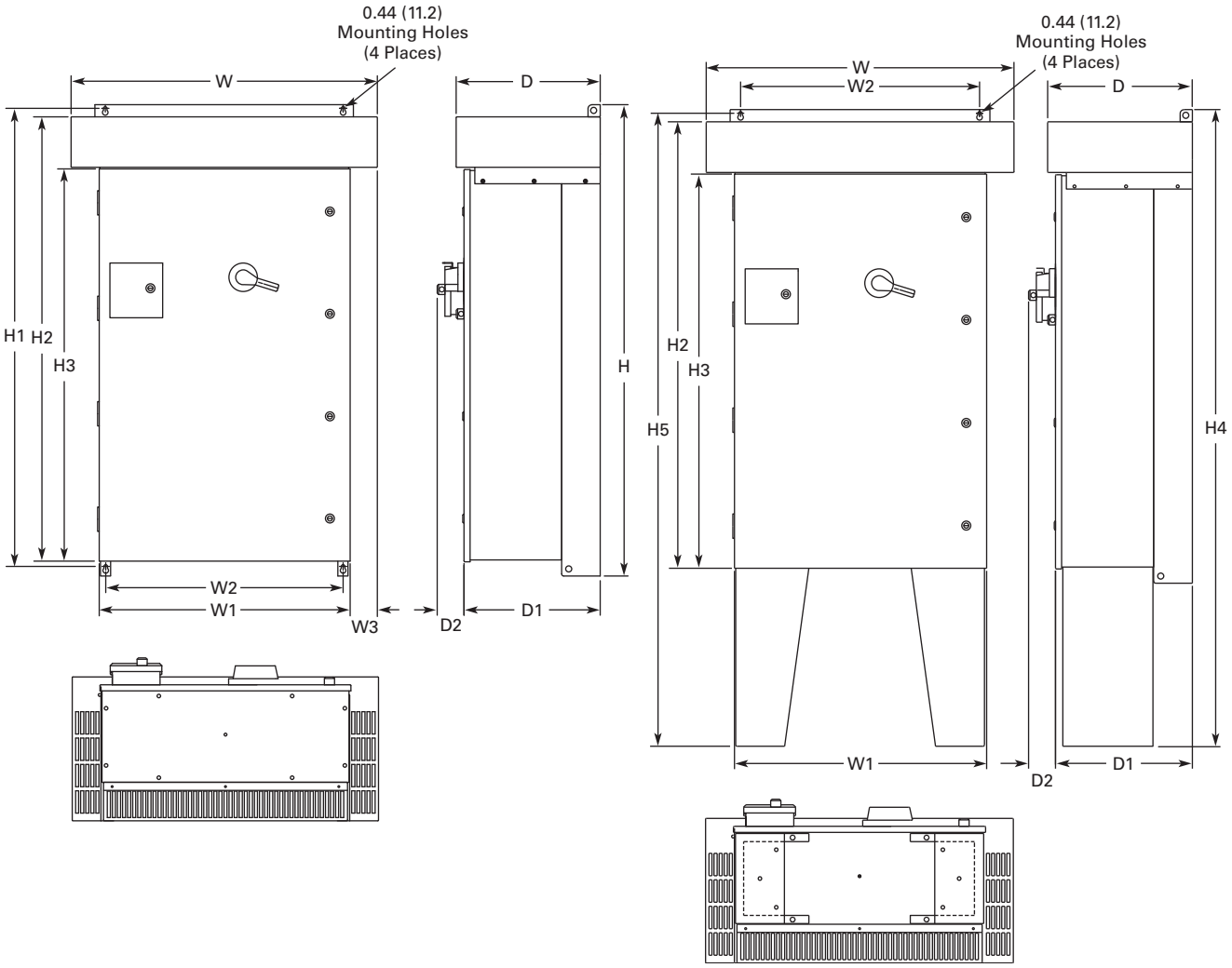




Voltage AC	hp (I_H)	hp (I_L)	H	H1	H2	H3	W	W1	W2	W3	D	D1	D2	Approx. Weight Lbs (kg)	Approx. Shipping Weight Lbs (kg)
Three-Phase															
208V	15–25	20–30	46.09 (1170.7)	44.45 (1129.0)	42.77 (1086.4)	36.35 (923.3)	26.31 (668.3)	20.92 (531.4)	19.30 (490.2)	2.69 (68.3)	17.74 (450.6)	16.76 (425.7)	3.31 (84.1)	235 (107)	290 (132)
230V	15–25	20–30													
480V	30–60	40–75													
Single-Phase															
230V	—	15–20	46.09 (1170.7)	44.45 (1129.0)	42.77 (1086.4)	36.35 (923.3)	26.31 (668.3)	20.92 (531.4)	19.30 (490.2)	2.69 (68.3)	17.74 (450.6)	16.76 (425.7)	3.31 (84.1)	235 (107)	290 (132)
480V	—	25–30													

Approximate Dimensions in Inches (mm)

Enclosure Box C NEMA Type 3R



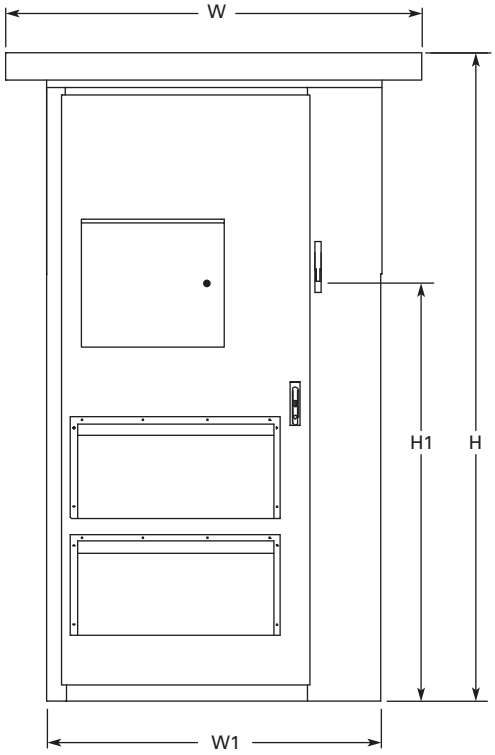
Voltage AC	hp (I_H)	hp (I_L)	H	H1	H2	H3	H4	H5	W	W1	W2	W3	D	D1	D2	Approx. Weight Lbs (kg)
Three-Phase																
208	30–50	40–60	58.09 (1475.5)	56.45 (1433.8)	54.77 (1391.2)	48.35 (1228.1)	78.09 (1983.5)	77.64 (1972.1)	37.73 (958.3)	30.92 (785.4)	29.30 (744.2)	3.34 (84.8)	17.74 (450.6)	16.77 (426.0)	3.31 (84.1)	①
230	30–50	40–60														
480	75–125	100–150														
Single-Phase																
230V	—	25–40	58.09 (1475.5)	56.45 (1433.8)	54.77 (1391.2)	48.35 (1228.1)	78.09 (1983.5)	77.64 (1972.1)	37.73 (958.3)	30.92 (785.4)	29.30 (744.2)	3.34 (84.8)	17.74 (450.6)	16.77 (426.0)	3.31 (84.1)	①
480V	—	40–60														

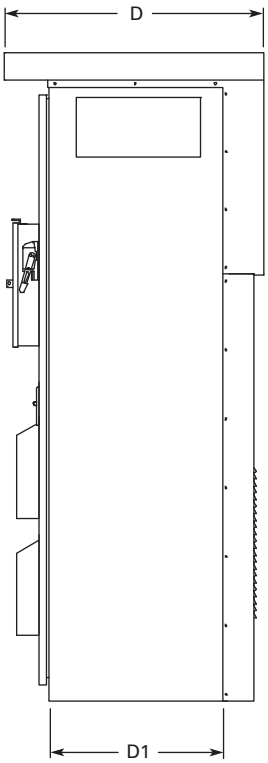
Note

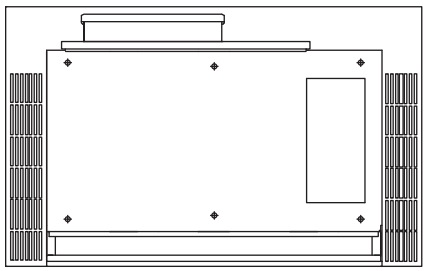
① Consult factory.

Approximate Dimensions in Inches (mm)

Enclosure Size F







H	H1	W	W1	D	D1	Approximate Weight Lbs (kg)	Approximate Shipping Weight Lbs (kg)
93.58 (2376.9)	69.51 (1765.60)	60.00 (1524.0)	48.00 (1219.2)	37.50 (952.5)	26.00 (660.4)	1700 (771)	1850 (839)