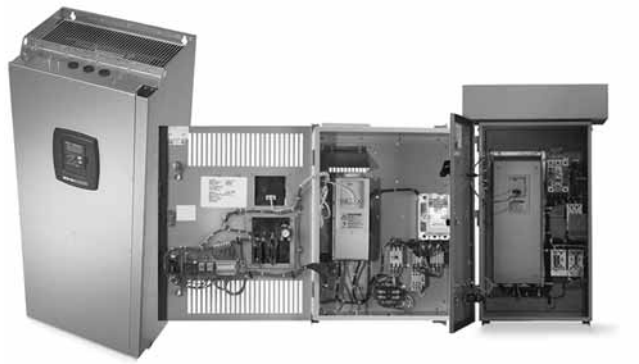
SVX9000 Drives



Contents

Product Overview

With the SVX9000 Series Sensorless Vector Control, Eaton's expanded Eaton drive offering now covers a complete line of PWM adjustable frequency (speed) drives in ratings from:

- 208V—3/4 to 100 hp I_H; 1 to 100 hp I_L
- 230V—3/4 to 100 hp I_H; 1 to 125 hp I_L
- 480V—1 to 1900 hp I_H; 1-1/2 to 2200 hp I_L
- 575V—2 to 2000 hp I_H; 3 to 2300 hp I_L

The Eaton family of drives includes DA1, DC1, H-Max, M-Max, SVX9000 and SPX9000. 9000X Series drive ratings are rated for either high overload (I_H) or low overload (I_L). I_L indicates 110% overload capacity for 1 minute out of 10 minutes. I_H indicates 150% overload capacity for 1 minute out of 10 minutes.

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

Application Description

Application Engineering

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

Motor Selection

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

Motor Torque vs. Speed Capability

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

Multiple Motor Operation

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

Special Types of Motors

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

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

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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**

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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.

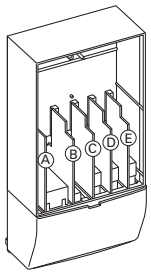
Options

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

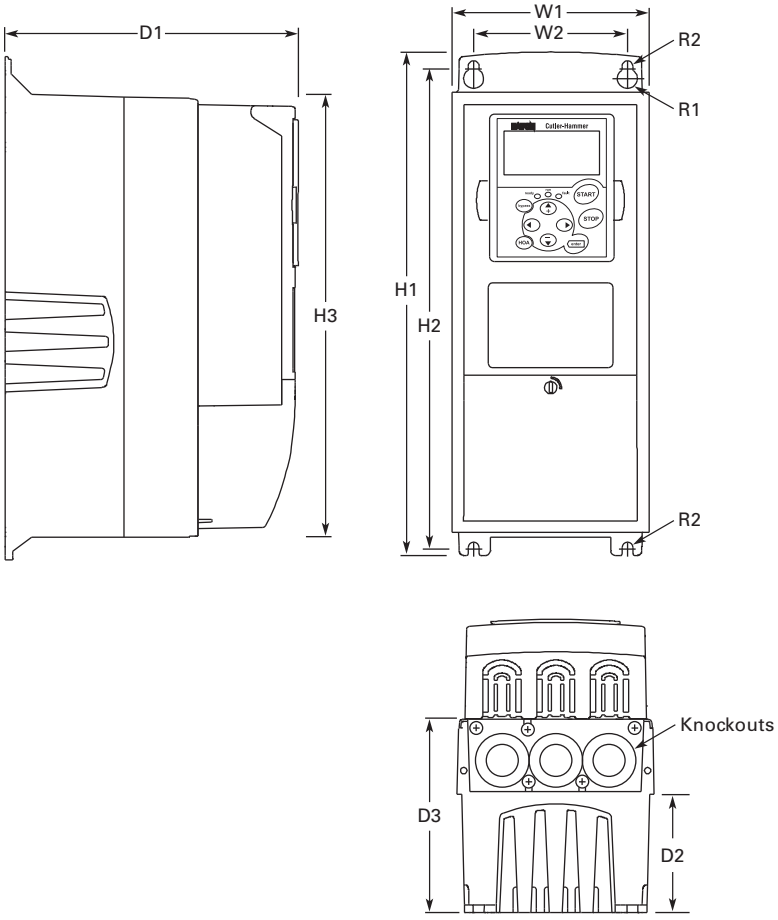
Description	Specification
Six–digital input programmable	24V: "0" ≤10V, "1" ≥18V,R_i >5 kohms
Two–analog input configurable w/jumpers	Voltage: 0–±10V, R_i >200 kohms Current: 0 (4)–20 mA, R_i = 250 ohms
Two–digital output programmable	Form C relays 250 Vac 30 Vdc 2 amp resistive
One–analog output programmable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

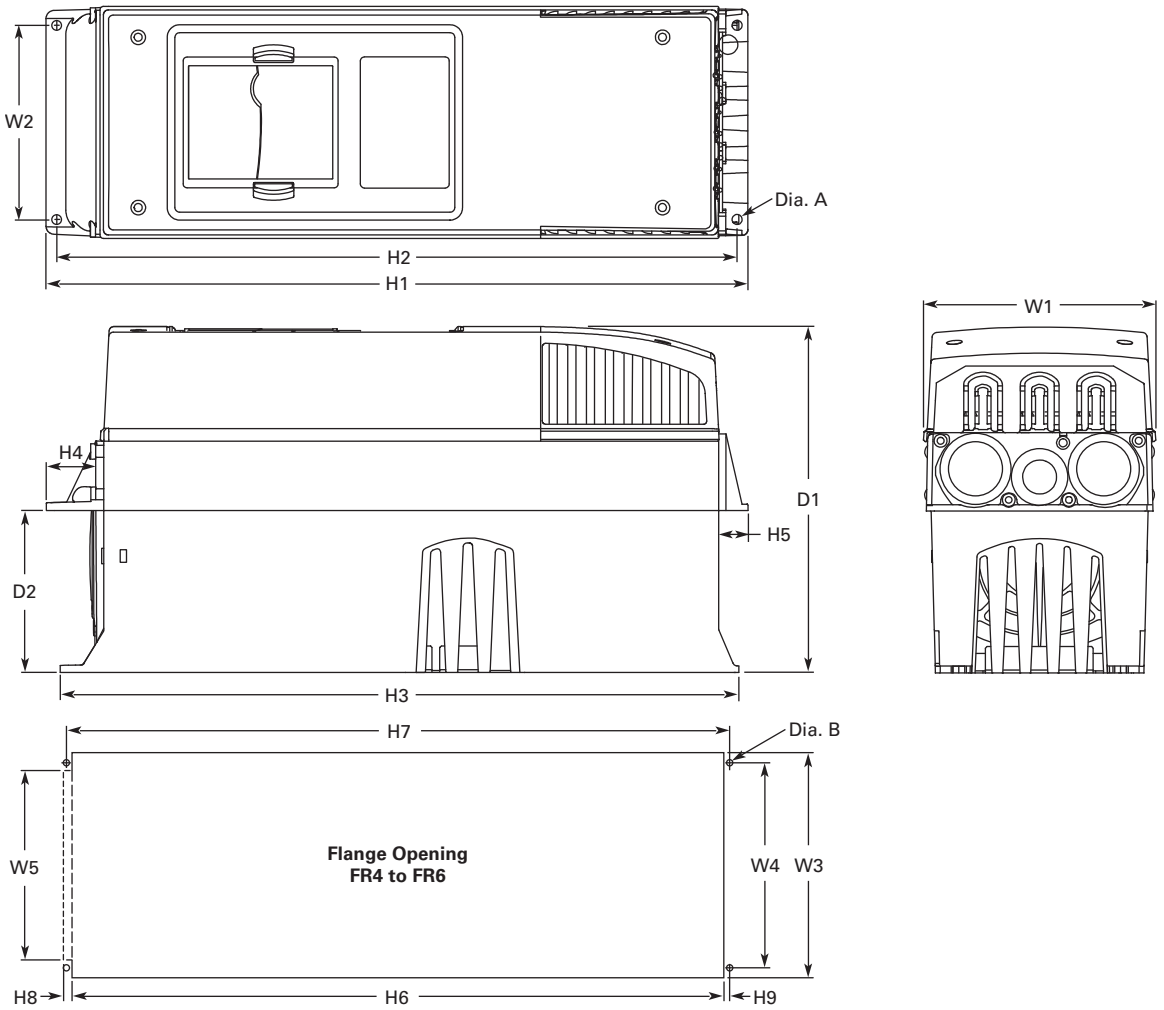
NEMA Type 1/IP21 and NEMA Type 12/IP54, FR4, FR5 and FR6



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

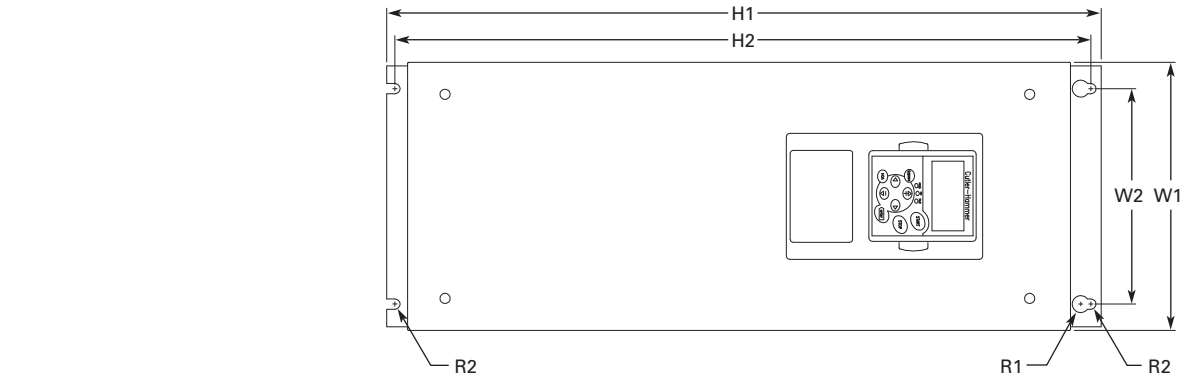
W1	W2	H1	H2	H3	H4	H5	D1	D2	Dia. A
FR4									
5.0 (128)	4.5 (113)	13.3 (337)	12.8 (325)	12.9 (327)	1.2 (30)	0.9 (22)	7.5 (190)	3.0 (77)	0.3 (7)
FR5									
5.6 (143)	4.7 (120)	17.0 (434)	16.5 (420)	16.5 (419)	1.4 (36)	0.7 (18)	8.4 (214)	3.9 (100)	0.3 (7)
FR6									
7.7 (195)	6.7 (170)	22.0 (560)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

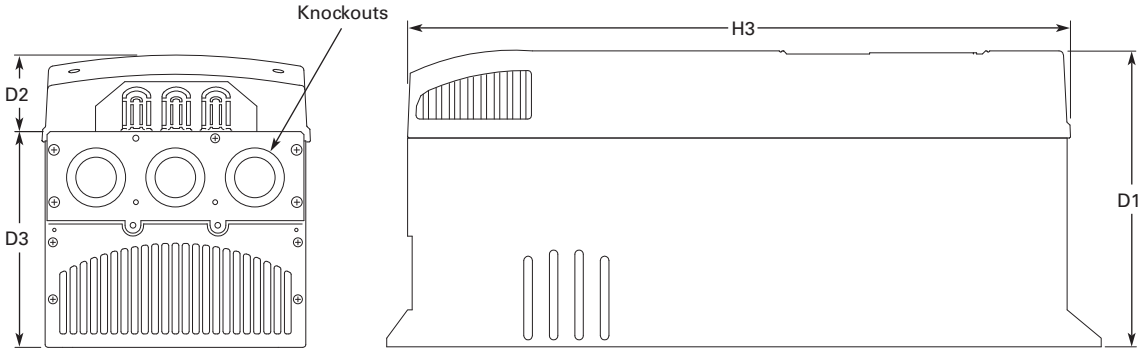
Flange Opening, FR4 to FR6

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

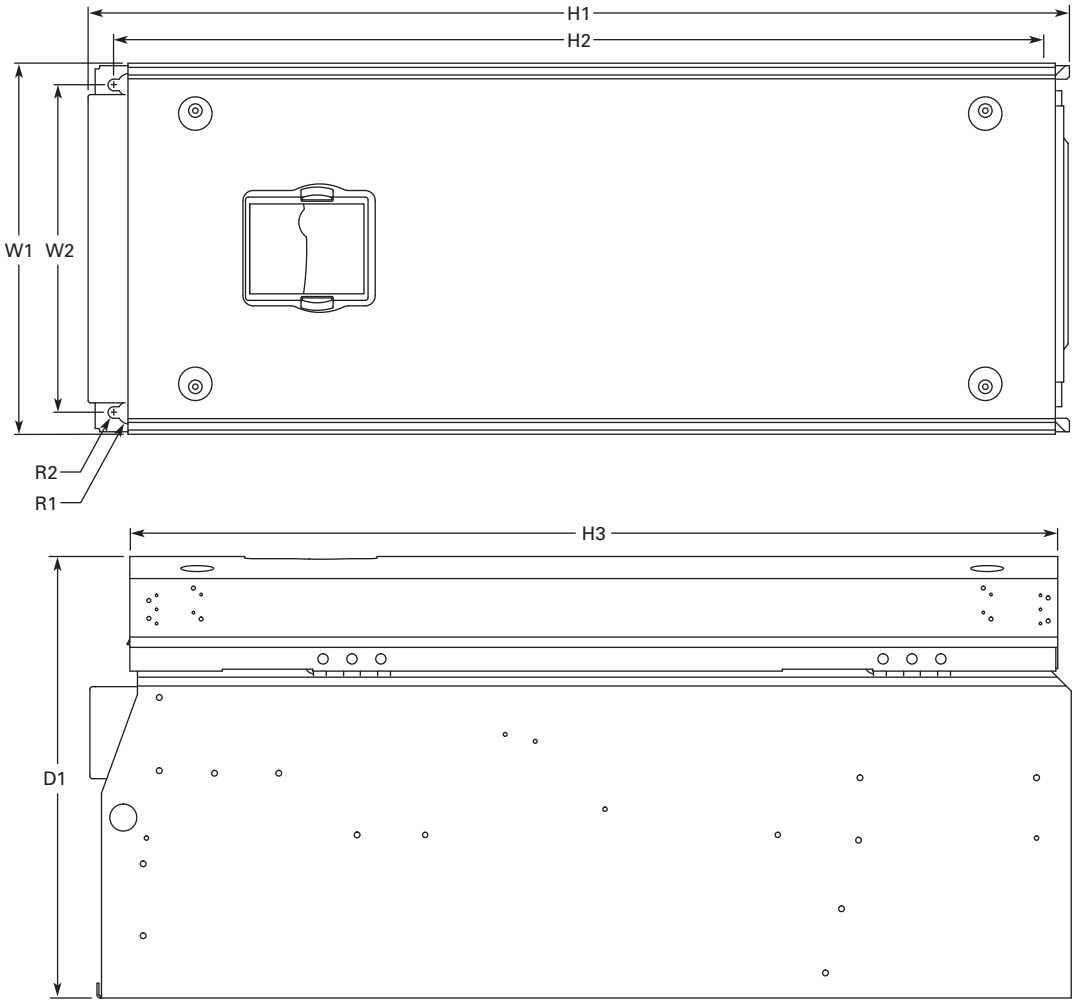




Voltage	hp (I_H)	H1	H2	H3	D1	D2	D3	W1	W2	R1 Dia.	R2 Dia.	Weight Lbs (kg)	Knockouts at Inches (mm) N1 (O.D.)
230V	20–30	24.8 (630)	24.2 (614)	23.2 (590)	10.1 (257)	3.0 (77)	7.3 (184)	9.3 (237)	7.5 (190)	0.7 (18)	0.4 (9)	77.2 (35)	3 at 1.5 (37)
480V	40–60												
575V	30–40												

Approximate Dimensions in Inches (mm)

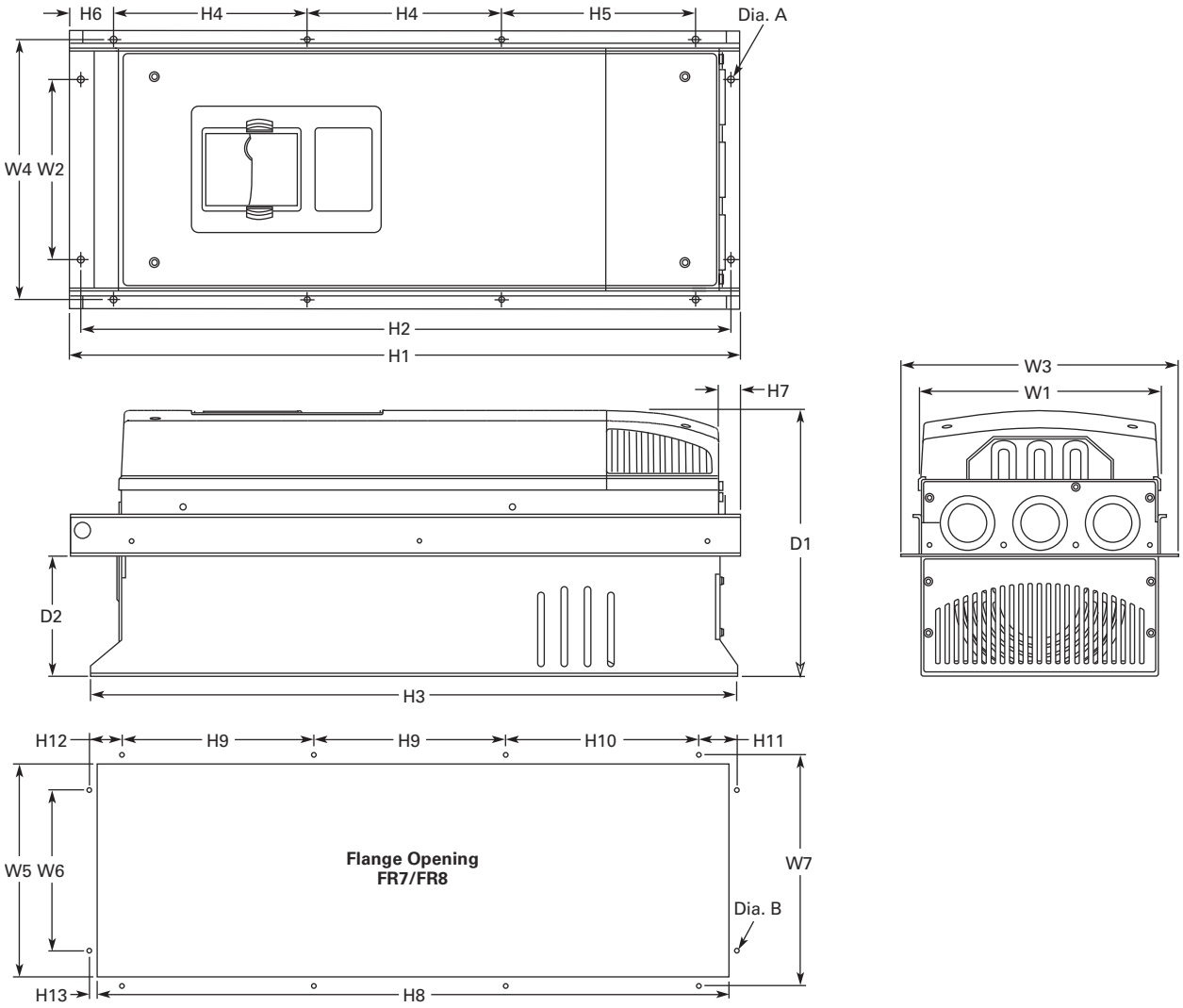
NEMA Type 1/IP21 and NEMA Type 12/IP54, FR8



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



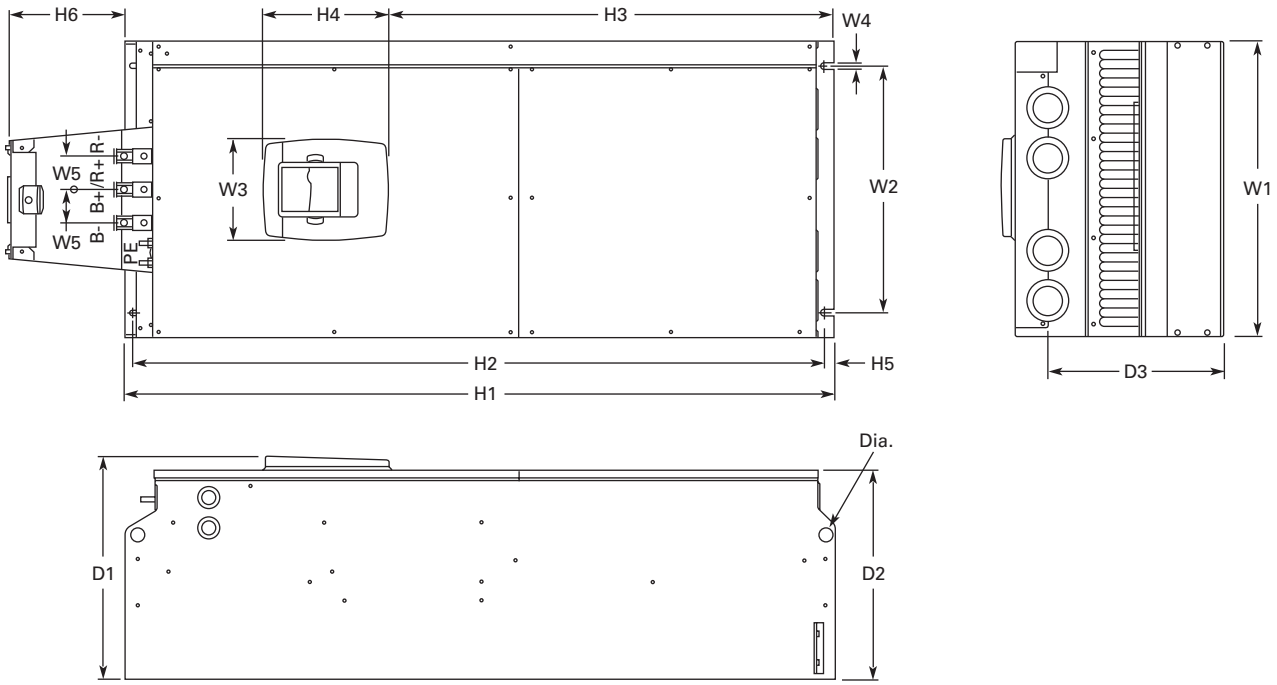
W1	W2	W3	W4	H1	H2	H3	H4	H5	H6	H7	D1	D2	Dia. A
FR7													
9.3 (237)	6.8 (175)	10.6 (270)	10.0 (253)	24.9 (652)	24.8 (632)	24.8 (630)	7.4 (189)	7.4 (189)	0.9 (23)	0.8 (20)	10.1 (257)	4.6 (117)	0.3 (6)
FR8													
11.2 (285)	—	14.0 (355)	13.0 (330)	32.8 (832)	—	29.3 (745)	10.2 (258)	10.4 (265)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



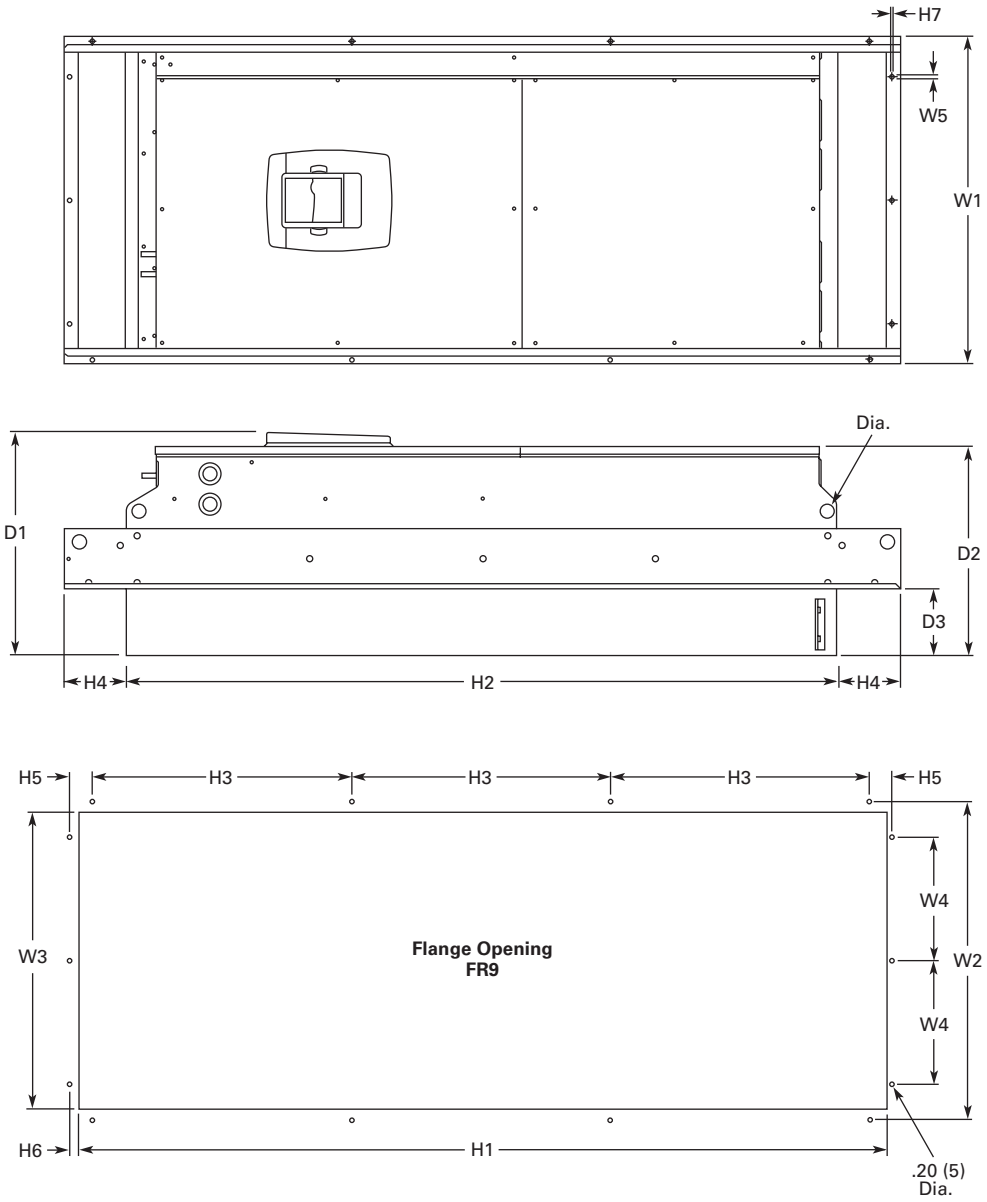
Voltage	hp (I_H)	W1	W2	W3	W4	H1	H2	H3	H4 ①	D1	D2	D3	Dia.	Weight Lbs (kg)
230V	75–100	18.9 (480)	15.7 (400)	0.4 (9)	2.1 (54)	45.3 (1150)	44.1 (1120)	0.6 (16)	7.4 (188)	14.2 (361.5)	13.4 (340)	11.2 (285)	0.8 (21)	321.9 (146)
480V	150–200													
575V	100–175													

Note

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

Approximate Dimensions in Inches (mm)

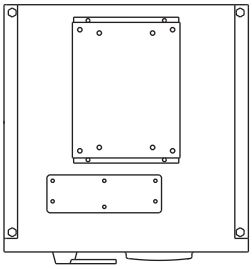
NEMA Type 1/IP21 and NEMA Type 12/IP54, FR9 with Flange Kit

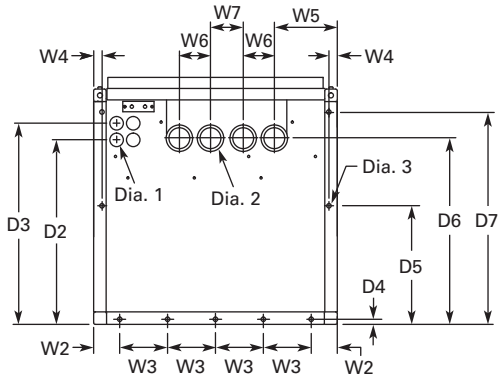


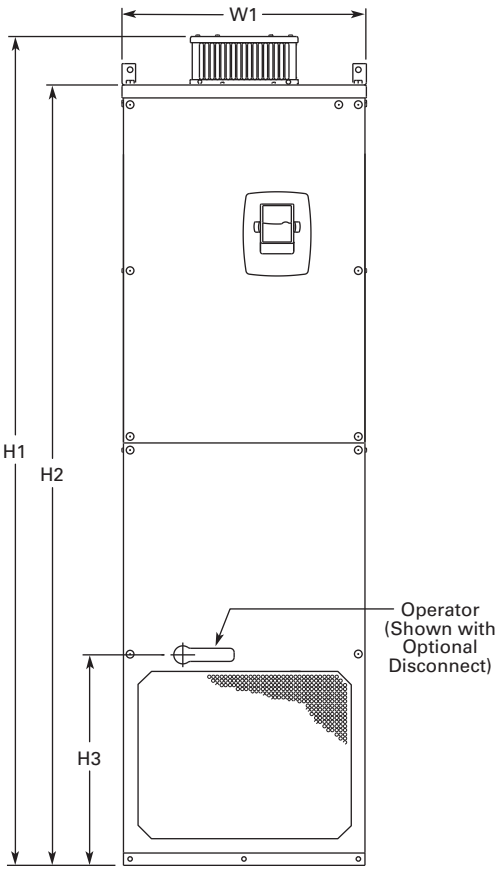
W1	W2	W3	W4	W5	H1	H2	H3	H4	H5	H6	H7	D1	D2	D3	Dia.
20.9 (530)	20.0 (510)	19.1 (485)	7.9 (200)	0.2 (5.5)	51.7 (1312)	45.3 (1150)	16.5 (420)	3.9 (100)	1.4 (35)	0.4 (9)	0.1 (2)	24.9 (362)	13.4 (340)	4.3 (109)	0.8 (21)

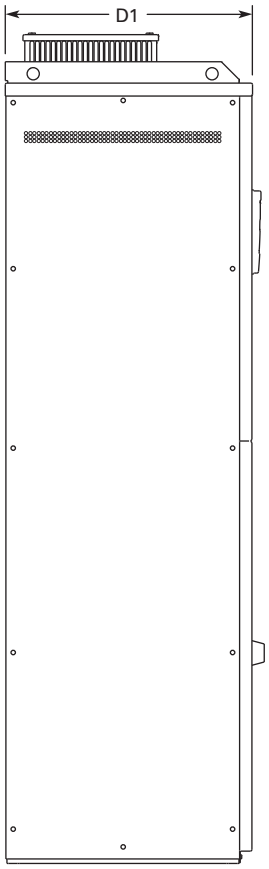
Approximate Dimensions in Inches (mm)

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





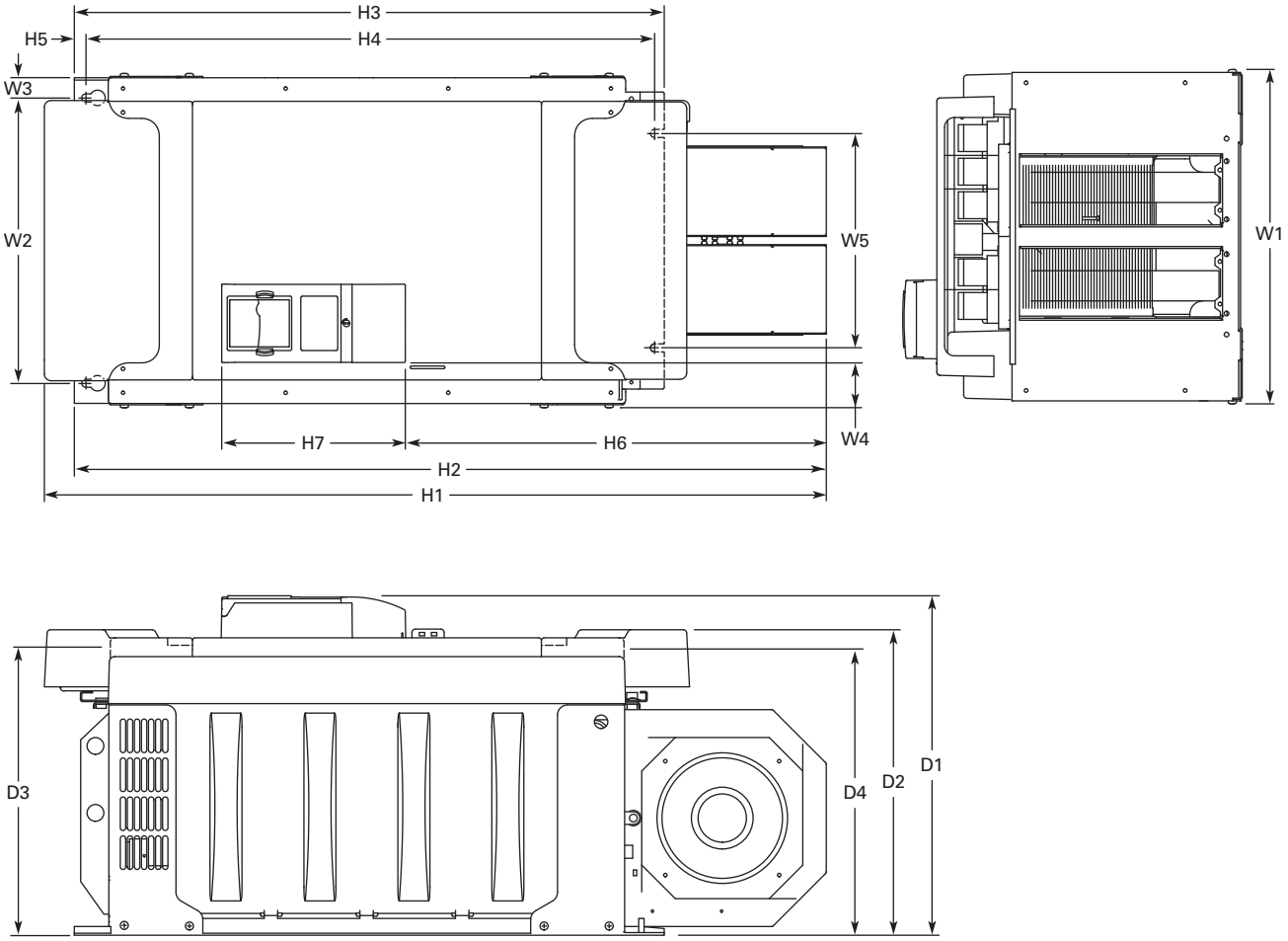




W1	W2	W3	W4	W5	W6	W7	H1	H2	H3	D1	D2	D3	D4	D5	D6	D7	Dia. 1	Dia. 2	Dia. 3	Weight Lbs (kg)
23.43 (595)	2.46 (62.5)	4.53 (115)	0.79 (20)	5.95 (151)	2.95 (75)	30.11 (79)	79.45 (2018)	74.80 (1900)	20.18 (512.5)	23.70 (602)	17.44 (443)	19.02 (483)	0.47 (12)	11.22 (285)	17.60 (447)	20.08 (510)	0.83 (21)	1.89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

Approximate Dimensions in Inches (mm)

FR10 Open Chassis ①



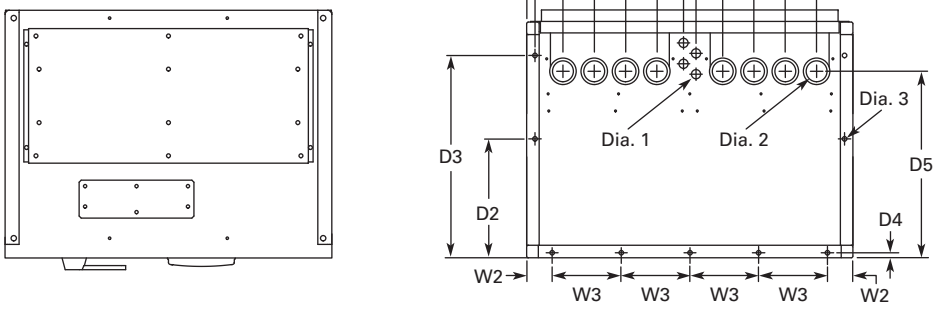
Voltage	hp (I_H)	W1	W2	W3	W4	W5	H1	H2	H3	H4	H5	H6	H7	D1	D2	D3	D4	Weight Lbs (kg)
480V	250–350	19.7 (500)	16.7 (425)	1.2 (30)	2.6 (67)	12.8 (325)	45.9 (1165)	44.1 (1121)	34.6 (879)	33.5 (850)	0.7 (17)	24.7 (627)	10.8 (275)	19.9 (506)	17.9 (455)	16.7 (423)	16.6 (421)	518 (235)
575V	200–300																	

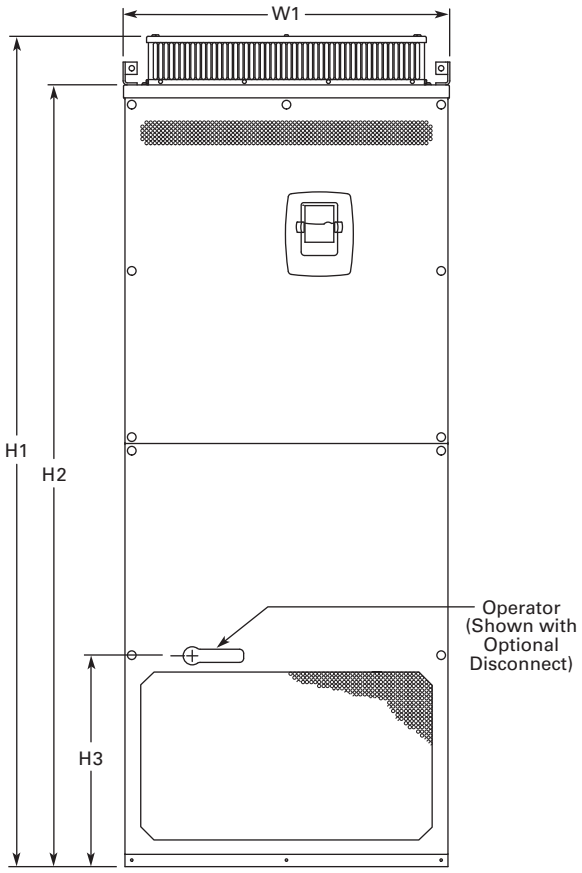
Note

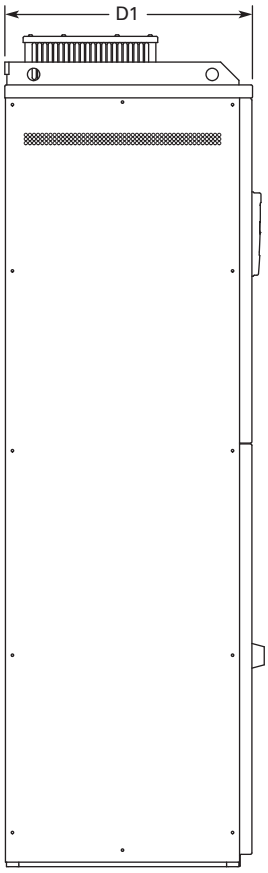
① 9000X FR12 is built of two FR10 modules. Please refer to SPX9000 installation manual for mounting instructions.

Approximate Dimensions in Inches (mm)

NEMA Type 1/IP21, FR11 Freestanding Drive



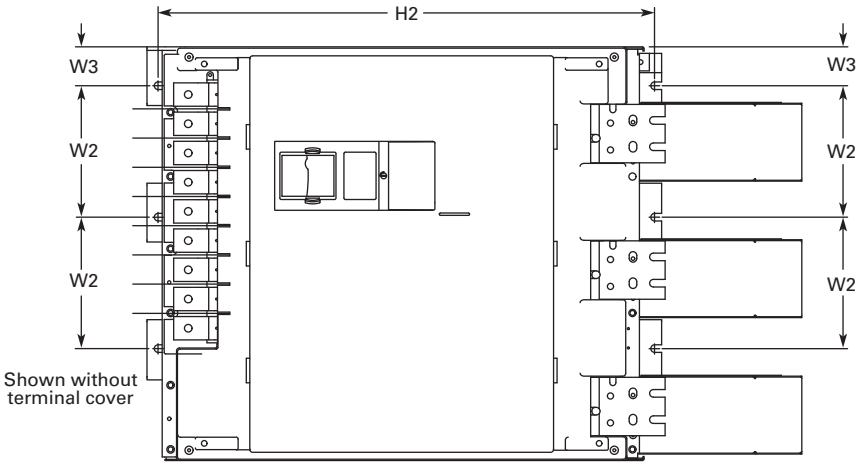


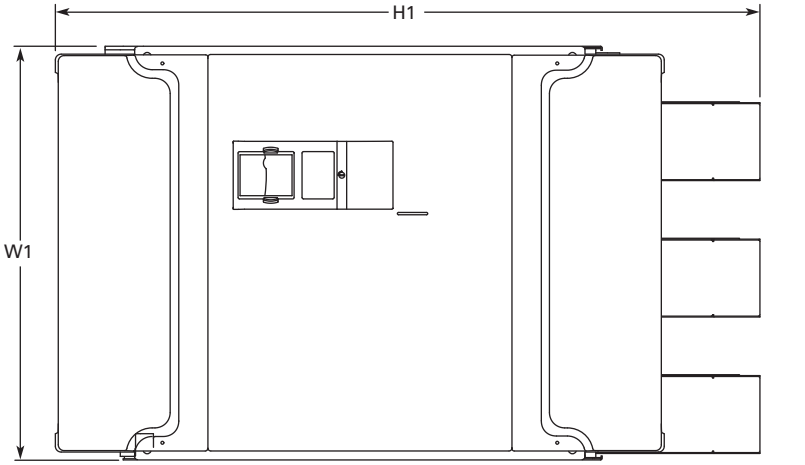


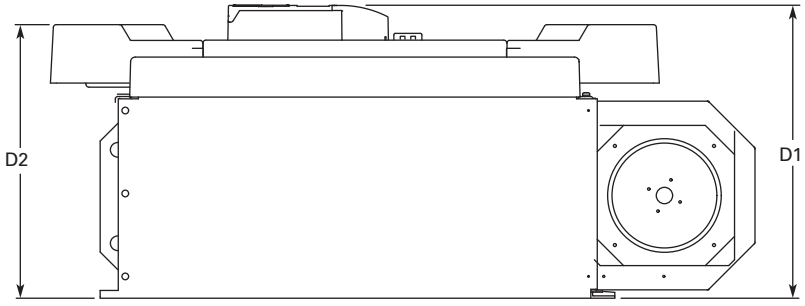
Voltage	hp (I_H)	W1	W2	W3	W4	W5	W6	W7	W8	H1	H2	H3	D1	D2	D3	D4	D5	Dia. 1	Dia. 2	Dia. 3	Weight Lbs (kg)
480	400–550	31.26 (794)	2.40 (61)	6.50 (165)	0.79 (20)	3.43 (87)	2.95 (75)	2.52 (64)	1.18 (30)	79.45 (2018)	74.80 (1900)	20.18 (512.5)	23.70 (602)	11.22 (285)	19.09 (485)	0.47 (12)	17.60 (447)	0.83 (21)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

Approximate Dimensions in Inches (mm)

FR11 Open Chassis



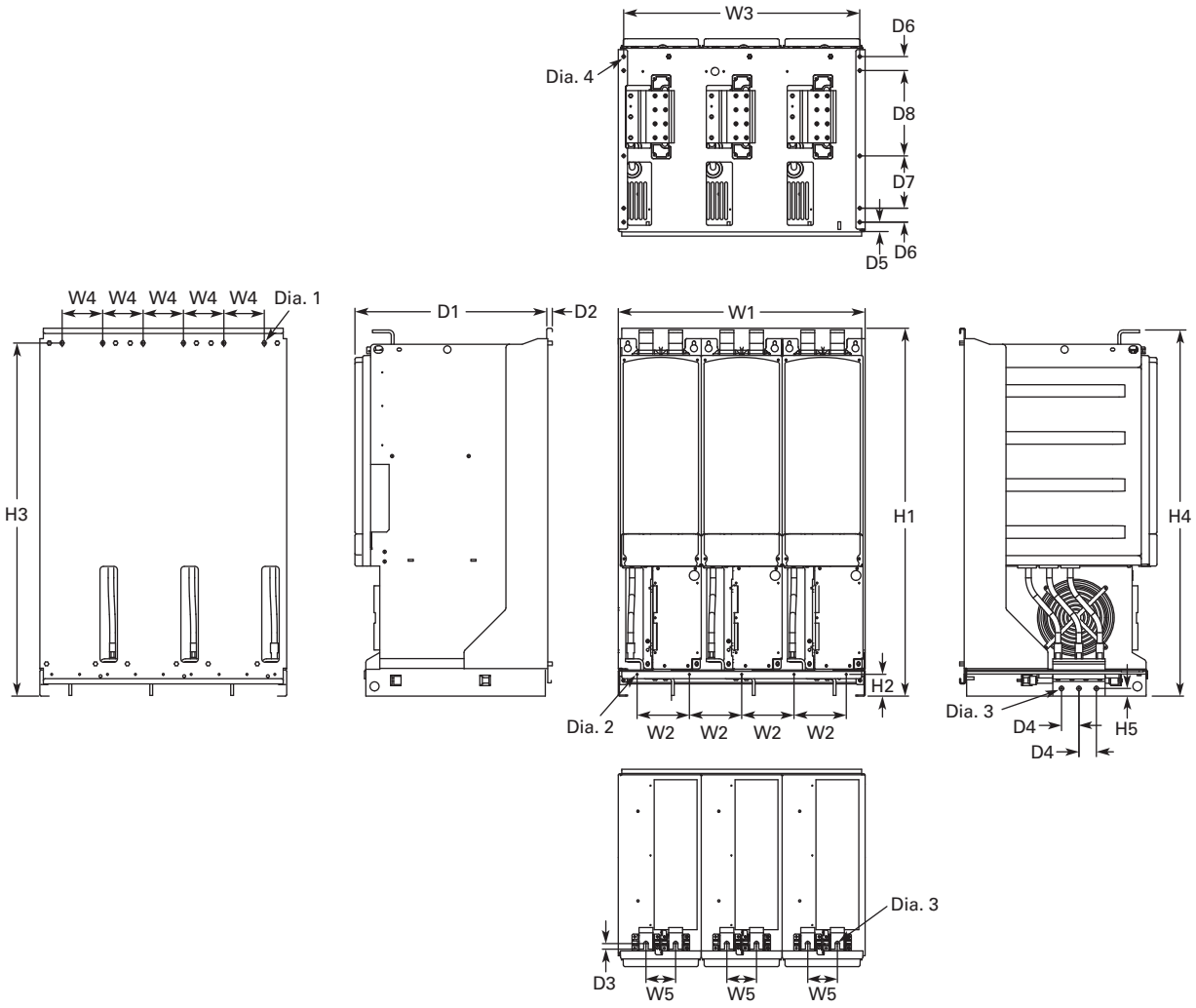




Voltage	hp (I_H)	W1	W2	W3	H1	H2	D1	D2	Weight Lbs (kg)
480V	400–550	27.9 (709)	8.86 (225)	2.6 (67)	45.5 (1155)	33.5 (850)	19.8 (503)	18.4 (468)	833 (378)
575V	400–500								

Approximate Dimensions in Inches (mm)

FR13, Open Chassis Inverter



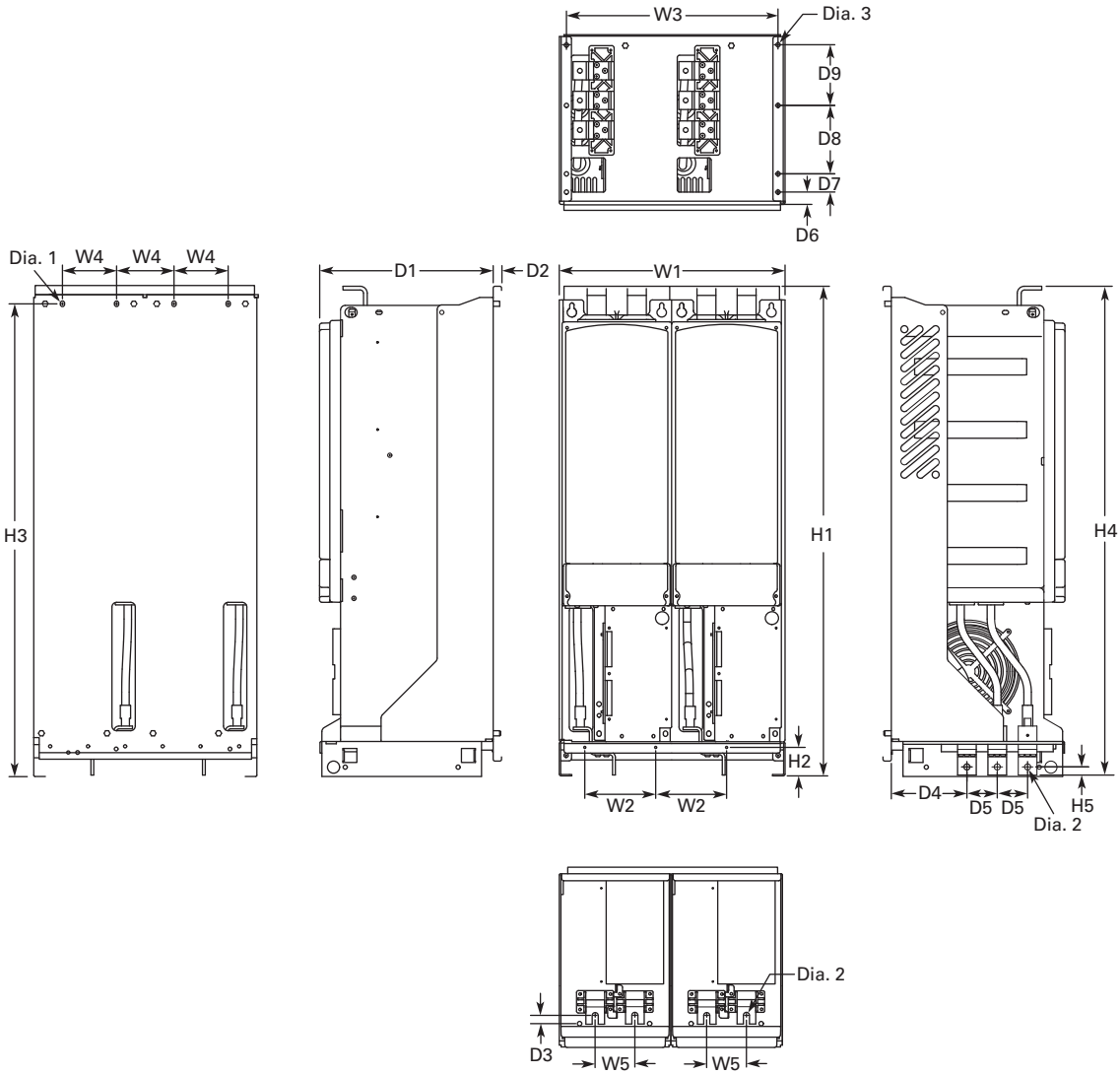
W1	W2	W3	W4	W5	H1	H2	H3	H4	H5	D1	D2	D3	D4	D5	D6	D7	D8	Dia. 1	Dia. 2	Dia. 3	Dia. 4	Weight Lbs (kg)
27.87 (708)	5.91 (150)	26.65 (677)	4.57 (116)	3.35 (85)	41.54 (1055)	2.46 (62.5)	39.86 (1012.5)	41.34 (1050)	0.79 (20)	21.77 (553)	0.51 (13)	0.63 (16)	1.97 (50)	1.06 (27)	1.57 (40)	5.91 (150)	9.64 (244.8)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

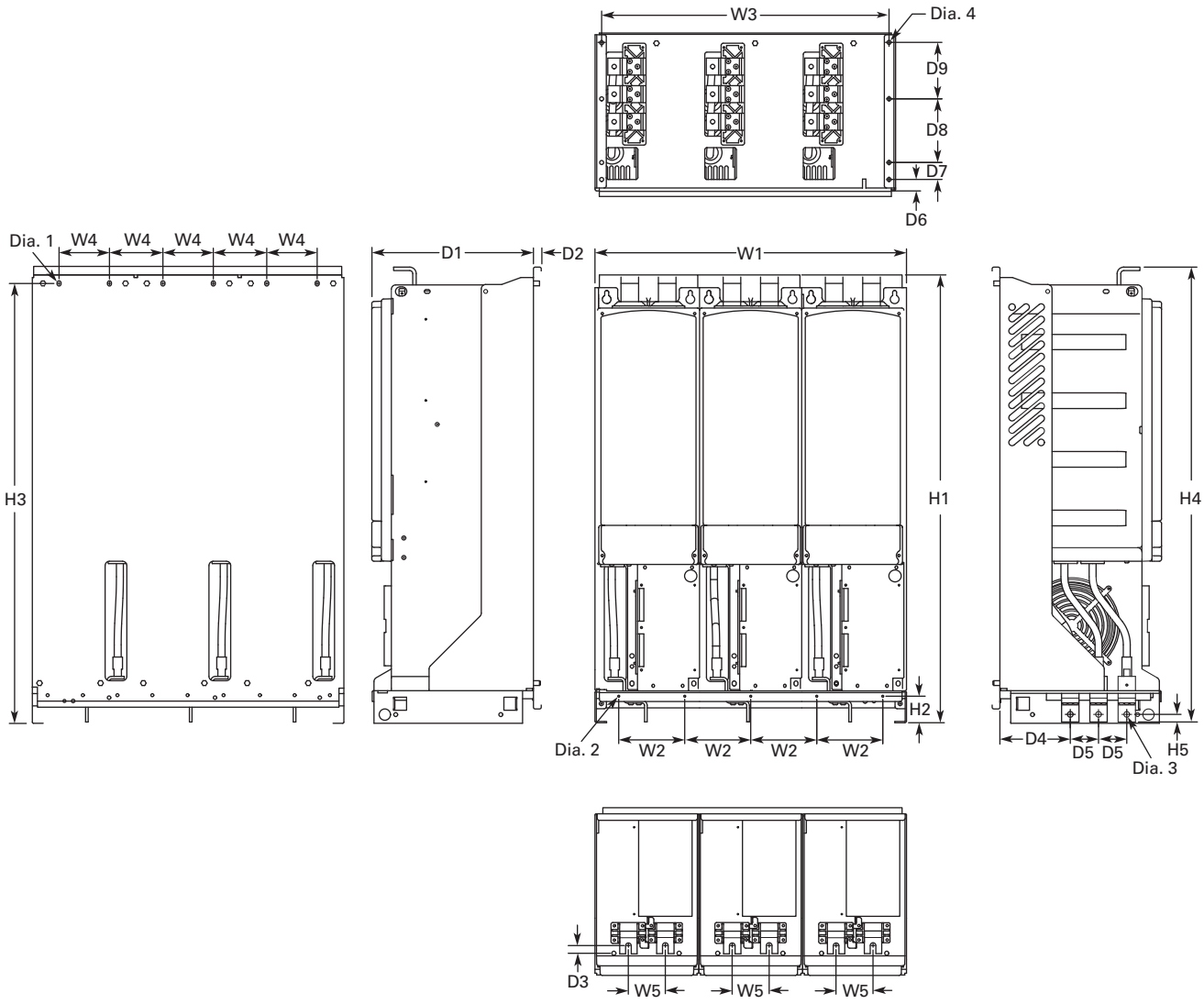
Number of Input Units

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)

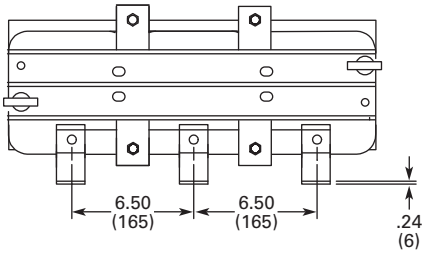
AC Choke Dimensions

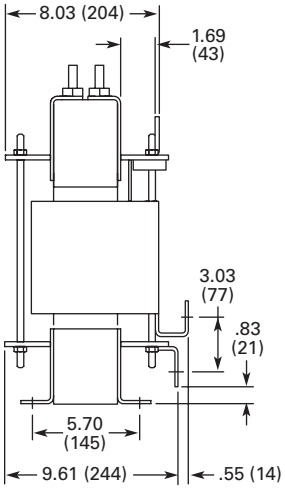
Choke Types

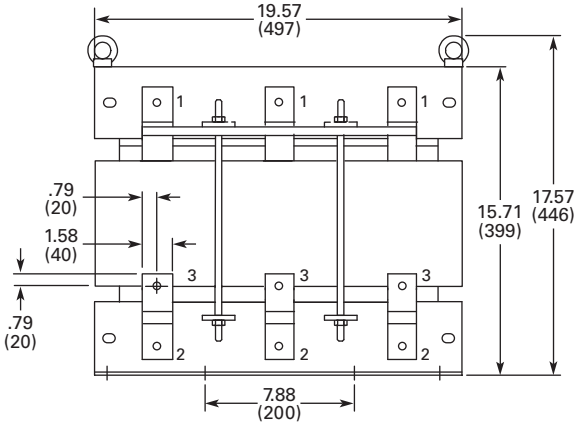
Catalog Number	Frame Size	Choke Type ①
Voltage Range 380–500V		
SPX 250 4	FR10	CHK0400
SPX 300 4		CHK0520
SPX 350 4		CHK0520
SPX 400 4	FR11	2 x CHK0400
SPX 500 4		2 x CHK0400
SPX 550 4		2 x CHK0400
SPX 600 4	FR12	2 x CHK0520
SPX 650 4		2 x CHK0520
SPX 700 4		2 x CHK0520
SPX 800 4	FR13	2 x CHK0400
SPX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





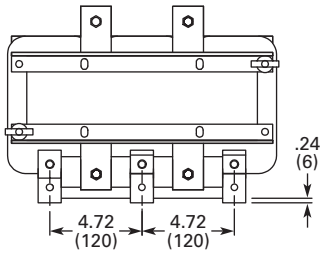


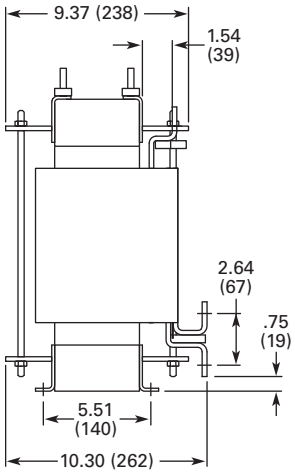
Note

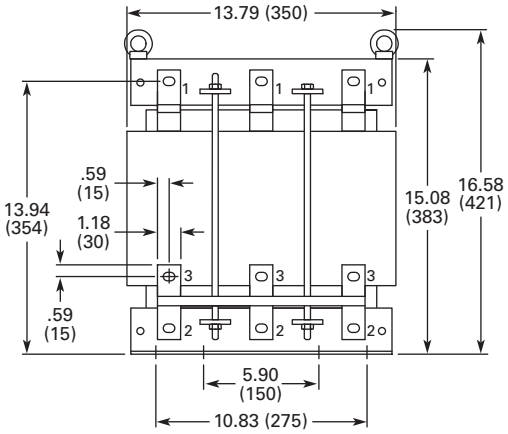
① Chokes are provided with all FR10–FR14 drives.

Approximate Dimensions in Inches (mm)

CHK0400







CHK0261