SPA9000/SPN9000/SPI9000 Common DC Bus Drive Products

Contents

Product Description

Eaton offers a comprehensive range of common DC bus drive products. The product family covers a number of front-end units and inverter units in the entire power range from 1-1/2 to 2000 horsepower at 460V and 690V. The drive components are built on the SPX9000 technology.

Front-End Units

The front-end units convert a mains AC voltage and current into a DC voltage and current. The power is transferred from the mains to a common DC bus (and, in certain cases, vice versa).

The SPA (active front-end) unit is a bidirectional (regenerative) power converter for the front end of a common DC bus drive line up. An external LCL filter is used at the input. This unit is suitable in applications where low mains harmonics are required.

The SPN (non-regenerative front-end) unit is a uni-directional (motoring) power converter for the front-end of a common DC bus drive line-up. The device operates as a diode bridge using diode/thyristor components. A dedicated external choke is used at the input. The unit has the capacity to charge a common DC bus. This unit is suitable as a rectifying device when a "normal" level of harmonics is accepted and no regeneration to the mains is required.

Inverter Unit

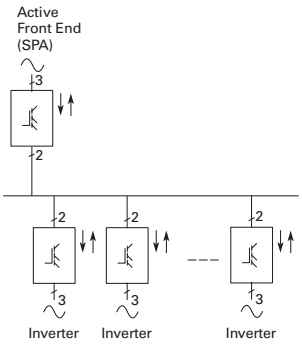
The SPI9000 Inverter Unit is a bidirectional DC-fed power inverter for the supply and control of AC motors. The inverter is supplied from a common DC bus drive line-up. A charging circuit is needed in case a connection to a live DC bus is required. The DC side charging circuit is integrated up to 75 kW (FR4–FR8) and external for higher power ratings (FI9–FI14).

Application Description

The common DC bus product portfolio fulfills all solution demands with a flexible architecture.

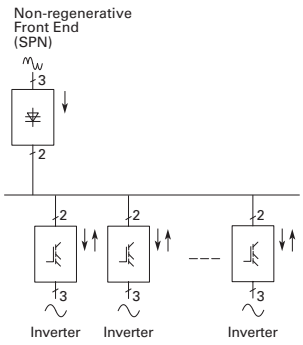
Front end units are selected according to the level of harmonics and power requirements. Typical drive system configurations are illustrated the following figures.

SPA + Inverters



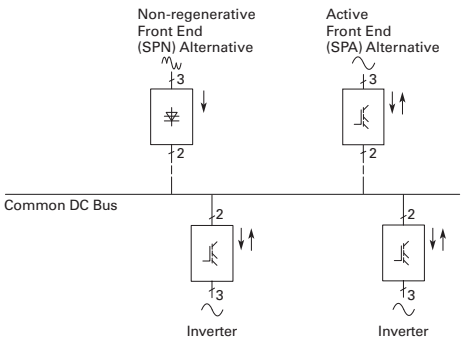
- Low harmonics, $-P_{mains} \approx +P_{mains}/P_{mains} \leq \Sigma P_{INU}$
- Suitable for almost every application

SPN + Inverters



- Low total mains power, $P_{mains} \leq \Sigma P_{INU}$
- Suitable e.g. for small processing line with un- and recoiler, em-stop coasting

Combination Configuration



Common DC bus components are used in a multitude of combinations. Drives which are braking can transfer the energy directly to the drives in motoring mode.

Product Comparison

Advantages over Conventional Front Ends

Eaton Front Ends vs. Conventional

	Non-Regenerative Front End	Active Front End	Conventional Regenerative Front End ①
Input device	Choke (L)	Filter (LCL)	Choke or auto-transformer (L)
Bridge type	Diode/thyristor bridge	IGBT bridge, two-level type	Anti-parallel connected thyristor bridge
Type of operation	Controlled half-bridge	High frequency modulation (1.5 to 3.6 kHz)	Firing angle controlled
Direction of power	Motoring	Motoring and regenerating	Motoring and regenerating
Charging	Constant current	External required	Usually internal
DC voltage	Nominal (approx. 1.35 alternative U_N)	Stable at +10% of nominal (approx. 110% of 1.35 alternative U_N)	Lowered DC voltage for commutation margin (e.g. 17% fi approx. 83% of 1.35 alternative U_N) or autotransformer on regenerative bridge
THD	Similar to six-pulse bridge normal <40%	Very low	Similar to six-pulse bridge or worse

Note

① Conventional regenerative front end (a.k.a. “anti-parallel thyristor bridge”) is not available from Eaton.

Features

Standard Features

Feature	SPI9000 FR4, 6, 7	FR8	FI9–FI14	SPA FI9–FI14	SPN FI9
IP00	—	■	■	■	■
IP21	■	—	—	—	—
Air cooling	■	■	■	■	■
Standard board	■	■	■	■	
Varnished board	—	—	—	—	—
Alphanumeric keypad	■	■	■	■	—
EMC class T (EN 61800-3 for IT networks)	■	■	■	■	■
Safety CE/UL	■	■	■	■	■
Input choke	—	—	—	—	■
LCL filter	—	—	—	■	—
No integrated charging	—	—	■	■	—
Integrated charging (DC side)	■	■	—	—	■
Diode/thyristor rectifier	—	—	—	—	■
IGBT	■	■	■	■	—

Standards and Certifications

- CE
- UL
- cUL
- EN 61800-5-1 (2003)

Catalog Number Selection

Active Front End

SPA 205 A 0 – 4 A 3 N 1

Product Family
SPA = Active Front End

Current Rating

480V	575V
205 = 205A	**125** = 125A
385 = 385A	**325** = 325A
H10 = 1150A	**920** = 920A

Software Series
A = Standard

Enclosure Rating
0 = Chassis

Voltage Rating
4 = 480V
5 = 575V

Keypad
A = Alphanumeric

EMC Level
3 = ***IT*** network

Brake Chopper Options
N = No brake chopper circuit

Board Modifications
1 = Standard boards
2 = Varnished boards

2

Non-Regenerative Front End

SPN 510 A 0 – 4 A 3 N 1

Product Family
SPN = Non-regenerative front end

Current Rating
480V/575V
510 = 510A

Software Series
A = Standard

Enclosure Rating
0 = Chassis

Voltage Rating
4 = 480V
5 = 575V

Keypad
A = Alphanumeric

EMC Level
3 = ***IT*** network

Brake Chopper Options
N = No brake chopper circuit

Board Modifications
1 = Standard boards
2 = Varnished boards

SPI9000 Inverter Unit

SPI 016 A 1 – 4 A 3 N 1

Product Family
SPI = Inverter unit

Current Rating

480V (FR4–FR8)		575V (FR6–FR8)	
003 = 3.3A	**031** = 31A	**003** = 3.2A	**022** = 22A
007 = 7.6A	**038** = 38A	**004** = 4.5A	**027** = 27A
009 = 9A	**061** = 61A	**005** = 5.5A	**034** = 34A
012 = 12A	**071** = 72A	**007** = 7.5A	**041** = 41A
016 = 16A	**087** = 87A	**010** = 10A	**052** = 52A
023 = 23A	**105** = 105A	**013** = 13.5A	**062** = 62A
		018 = 18A	**080** = 80A
480V (FI9–FI13)		**575V (FI9–FI14)**	
140 = 140A	**730** = 730A	**100** = 100A	**502** = 502A
170 = 170A	**820** = 820A	**125** = 125A	**590** = 590A
205 = 205A	**920** = 920A	**144** = 144A	**650** = 650A
245 = 245A	**H10** = 1030A	**170** = 170A	**820** = 820A
300 = 300A	**H11** = 1150A	**208** = 207A	**920** = 920A
385 = 385A	**H13** = 1300A	**261** = 261A	**H10** = 1030A
460 = 460A	**H16** = 1600A	**325** = 325A	**H13** = 1300A
520 = 520A	**H19** = 1940A	**385** = 385A	**H15** = 1500A
590 = 590A	**H23** = 2300A	**460** = 460A	**H19** = 1900A
650 = 650A			

Software Series
A = Standard

Enclosure Rating
1 = NEMA Type 1/IP21
0 = Chassis

Voltage Rating
4 = 480V
5 = 575V

Keypad
A = Alphanumeric

EMC Level
3 = ***IT*** network

Brake Chopper Options
N = No brake chopper circuit

Board Modifications
1 = Standard boards
2 = Varnished boards

Product Selection

Common DC Bus Drive Products

SPA9000 Active Front End 480V

	Low Overload (AC Current)		High Overload (AC Current)		Imax	
Frame	**$I_{L\text{-}cont}$ (A)**	**I_{1min} (A)**	**$I_{H\text{-}cont}$ (A)**	**I_{1min} (A)**	**I_{2s} (A)**	**Catalog Number**
FI9	261	287	205	308	349	**SPA205A0-4A3N1**
FI10	460	506	385	578	693	**SPA385A0-4A3N1**
FI13	1300	1430	1150	1725	2070	**SPAH11A0-4A3N1**

SPN9000 Non-Regenerative Front End 480V

	Low Overload (AC Current)		High Overload (AC Current)		Imax	
Frame	**$I_{L\text{-}cont}$ (A)**	**I_{1min} (A)**	**$I_{H\text{-}cont}$ (A)**	**I_{1min} (A)**	**I_{2s} (A)**	**Catalog Number**
FI9	520	572	460	690	828	**SPN460A0-4A3N1**

SPI9000 Inverter Unit 480V

	Low Overload (AC Current)		High Overload (AC Current)		Imax	
Frame	**$I_{L\text{-}cont}$ (A)**	**I_{1min} (A)**	**$I_{H\text{-}cont}$ (A)**	**I_{1min} (A)**	**I_{2s} (A)**	**Catalog Number**
FR4	4.3	4.7	3.3	5	6.2	**SPI003A1-4A3N1**
	9	9.9	7.6	11.4	14	**SPI007A1-4A3N1**
	12	13.2	9	13.5	18	**SPI009A1-4A3N1**
FR6	16	17.6	12	18	24	**SPI012A1-4A3N1**
	23	25.3	16	24	32	**SPI016A1-4A3N1**
	31	34	23	35	46	**SPI023A1-4A3N1**
	38	42	31	47	62	**SPI031A1-4A3N1**
	46	51	38	57	76	**SPI038A1-4A3N1**
FR7	72	79	61	92	122	**SPI061A1-4A3N1**
	87	96	72	108	144	**SPI072A1-4A3N1**
	105	116	87	131	174	**SPI087A1-4A3N1**
FR8	140	154	105	158	210	**SPI105A0-4A3N1**
FI9	170	187	140	210	280	**SPI140A0-4A3N1**
	205	226	170	255	336	**SPI170A0-4A3N1**
	261	287	205	308	349	**SPI205A0-4A3N1**
	300	330	245	379	444	**SPI245A0-4A3N1**
FI10	385	424	300	450	540	**SPI300A0-4A3N1**
	460	506	385	578	693	**SPI385A0-4A3N1**
	520	572	460	690	828	**SPI460A0-4A3N1**
FI12	590	649	520	780	936	**SPI520A0-4A3N1**
	650	715	590	885	1062	**SPI590A0-4A3N1**
	730	803	650	975	1170	**SPI650A0-4A3N1**
	820	902	730	1095	1314	**SPI730A0-4A3N1**
	920	1012	820	1230	1476	**SPI820A0-4A3N1**
	1030	1133	920	1380	1656	**SPI920A0-4A3N1**
FI13	1150	1265	1030	1545	1854	**SPIH10A0-4A3N1**
	1300	1430	1150	1720	2070	**SPIH11A0-4A3N1**
	1450	1595	1300	1950	2340	**SPIH13A0-4A3N1**
FI14	1770	1947	1600	2400	2880	**SPIH16A0-4A3N1**
	2150	2365	1940	2910	3492	**SPIH19A0-4A3N1**

Note

For filter and line reactor information, see **Page V6-T2-245**.

SPA9000 Active Front End 575V

	Low Overload (AC Current)		High Overload (AC Current)		Imax	
Frame	$I_{L\text{-}cont}$ (A)	I_{1min} (A)	$I_{H\text{-}cont}$ (A)	I_{1min} (A)	I_{2s} (A)	Catalog Number
FI9	144	158	125	188	213	**SPA125A0-5A3N1**
FI10	385	424	325	488	585	**SPA325A0-5A3N1**
FI13	1030	1133	920	1380	1656	**SPA920A0-5A3N1**

SPN9000 Non-Regenerative Front End 575V

	Low Overload (AC Current)		High Overload (AC Current)		Imax	
Frame	$I_{L\text{-}cont}$ (A)	I_{1min} (A)	$I_{H\text{-}cont}$ (A)	I_{1min} (A)	I_{2s} (A)	Catalog Number
FI9	600	660	510	732	888	**SPN510A0-5A3N1**

SPI9000 Inverter Unit 575V

	Low Overload (AC Current)		High Overload (AC Current)		Imax	
Frame	$I_{L\text{-}cont}$ (A)	I_{1min} (A)	$I_{H\text{-}cont}$ (A)	I_{1min} (A)	I_{2s} (A)	Catalog Number
FR6	4.5	5	3.2	5	6.4	**SPI003A1-5A3N1**
	5.5	6	4.5	7	9	**SPI004A1-5A3N1**
	7.5	8	5.5	8	11	**SPI005A1-5A3N1**
	10	11	7.5	11	15	**SPI007A1-5A3N1**
	13.5	15	10	15	20	**SPI010A1-5A3N1**
	18	20	13.5	20	27	**SPI013A1-5A3N1**
	22	24	18	27	36	**SPI018A1-5A3N1**
	27	30	22	33	44	**SPI022A1-5A3N1**
	34	37	27	41	54	**SPI027A1-5A3N1**
FR7	41	45	34	51	68	**SPI034A1-5A3N1**
	52	57	41	62	82	**SPI041A1-5A3N1**
FR8	62	68	52	78	104	**SPI052A0-5A3N1**
	80	88	62	93	124	**SPI062A0-5A3N1**
	100	110	80	120	160	**SPI080A0-5A3N1**
FI9	125	138	100	150	200	**SPI100A0-5A3N1**
	144	158	125	188	213	**SPI125A0-5A3N1**
	170	187	144	216	245	**SPI144A0-5A3N1**
	208	229	170	255	289	**SPI170A0-5A3N1**
FI10	261	287	208	312	375	**SPI208A0-5A3N1**
	325	358	261	392	470	**SPI261A0-5A3N1**
	385	424	325	488	585	**SPI325A0-5A3N1**
FI12	460	506	385	578	693	**SPI385A0-5A3N1**
	502	552	460	690	828	**SPI460A0-5A3N1**
	590	649	502	753	904	**SPI502A0-5A3N1**
	650	715	590	885	1062	**SPI590A0-5A3N1**
	750	825	650	975	1170	**SPI650A0-5A3N1**
FI13	920	1012	820	1230	1476	**SPI820A0-5A3N1**
	1030	1133	920	1380	1656	**SPI920A0-5A3N1**
	1180	1298	1030	1464	1755	**SPIH10A0-5A3N1**
FI14	1500	1650	1300	1950	2340	**SPIH13A0-5A3N1**
	1900	2090	1500	2250	2700	**SPIH15A0-5A3N1**
	2250	2475	1900	2782	3335	**SPIH19A0-5A3N1**

Note

For filter and line reactor information, see **Page V6-T2-245**.

LCL Filters

LCL Filters for Active Front End (480V)

Amps	Catalog Number	Amps	Catalog Number
10	**REG 10 5 0**	270	**REG 270 5 0**
18	**REG 18 5 0**	410	**REG 410 5 0**
32	**REG 32 5 0**	580	**REG 580 5 0**
48	**REG 48 5 0**	840	**REG 840 5 0**
75	**REG 75 5 0**	1160	**REG 1160 5 0**
110	**REG 110 5 0**	1480	**REG 1480 5 0**
180	**REG 180 5 0**		

LCL Filters for Active Front End (690V)

Amps	Catalog Number	Amps	Catalog Number
14	**REG 14 6 0**	287	**REG 287 6 0**
23	**REG 23 6 0**	390	**REG 390 6 0**
35	**REG 35 6 0**	460	**REG 460 6 0**
52	**REG 52 6 0**	620	**REG 620 6 0**
85	**REG 85 6 0**	780	**REG 780 6 0**
122	**REG 122 6 0**	920	**REG 920 6 0**
185	**REG 185 6 0**	1180	**REG 1180 6 0**

Line Reactor

Line Reactor for Non-Regenerative Front End (480/575VV)

Amps	Watts Losses	Catalog Number
600	493	**CHK600**

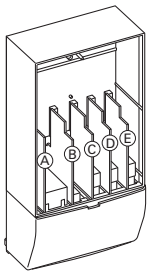
Options

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										
2 RO (NC-NO)	B	**OPTA2**	—	■	■	■	■	■	■	■
6 DI, 1 DO, 2 AI, 1AO, 1 +10 Vdc ref, 2 ext +24 Vdc/EXT +24 Vdc	A	**OPTA9**	—	■	■	■	■	■	■	■
Extended I/O Cards										
2 RO, therm	B	**OPTA3**	**A3**	—	■	■	■	■	■	■
Encoder low volt +5V/15V24V	C	**OPTA4**	**A4**	—	■	■	■	■	■	■
Encoder high volt +15V/24V	C	**OPTA5**	**A5**	—	■	■	■	■	■	■
Double encoder	C	**OPTA7**	**A7**	■	■	■	■	■	■	■
6 DI, 1 DO, 2 AI, 1 AO	A	**OPTA8**	**A8**	—	■	■	■	■	■	■
3 DI (encoder 10–24V), out +15V/+24V, 2 DO (pulse+direction)	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**	—	—	—	—	—	■	■
SPI, absolute encoder	C	**OPTBB**	**BB**	—	—	—	—	—	—	—
Communication Cards ③										
Modbus	D, **E**	**OPTC2**	**C2**	■	■	■	■	■	■	■
Johnson Controls N2	D, **E**	**OPTC2**	**CA**	—	—	—	—	—	—	—
Modbus TCP	D, **E**	**OPTCI**	**CI**	■	■	■	■	■	■	■
BACnet	D, **E**	**OPTCJ**	**CJ**	■	■	■	■	■	■	■
Ethernet IP	D, **E**	**OPTCK**	**CK**	■	■	■	■	■	■	■
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	D, **E**	**OPTD1**	**D1**	■	■	■	■	■	■	■
Adapter	D, **E**	**OPTD2**	**D2**	■	■	■	■	■	■	■
RS-232 with D9 connection	D, **E**	**OPTD3**	**D3**	■	■	■	■	■	■	■
Keypad										
9000X Series local/remote keypad (replacement keypad)	—	**KEYPAD-LOC/REM**	—	—	—	—	—	—	—	■
9000X Series remote mount keypad unit (keypad not included, includes 10 ft cable, keypad holder, mounting hardware)	—	**OPTRMT-KIT-9000X**	—	—	—	—	—	—	—	—
9000X Series RS-232 cable, 13 ft	—	**PP00104**	—	—	—	—	—	—	—	—

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.

Technical Data and Specifications

SPA9000/SPN9000/SPI9000

Description	Specification
Supply Connection	
Input voltage U_{in} (AC) front end modules	380–500 Vac/525–690 Vac –10% to 10%
Input voltage U_{in} (DC) inverter	465–800 Vdc/640–1100 Vdc –0% to 0%, the waviness of the inverter supply voltage, formed in rectification of the electric network's alternating voltage in basic frequency, must be less than 50V peak-to-peak
Output voltage U_{out} (AC) inverter	3 ~ 0–U_{in}/1.4
Output voltage U_{out} (DC) active front end module	10.10 x 1.35 x U_{in} (factory default)
Output voltage U_{out} (DC) non-regenerative front end module	1.35 x U_{in}
Ambient Conditions	
Ambient operating temperature	14 (no frost) to 122°F (–10 to 50°C): I_H 14 (no frost) to 104°F (–10 to 40°C): I_L
Storage temperature	–40 to 158°F (–40 to 70°C)
Relative humidity	0 to 95% RH, non-condensing, 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 1000m 1% derating for each 100m above 1000m; max. 3000m
Vibration	5–150 Hz
EN50178/EN60068-2-6	Displacement amplitude 0.25 mm (peak) at 3–15.8 Hz Max acceleration amplitude 1G at 15.8–150 Hz
Shock EN50178, EN60068-2-27	UPS Drop Test (for applicable UPS weights) Storage and shipping: max 15G, 11 ms (in package)
Cooling capacity required	Approximately 2%
Cooling air required	FR4 41 cfm, FR6 250 cfm, FR7 250 cfm, FR8 383 cfm FI9 677 cfm, FI10 824 cfm, FI12 1648 cfm, FI13 2472 cfm
Unit enclosure class	FR4–FR7 NEMA Type 1/IP21; FR8, FI9–FI14 chassis (IP00)
EMC (at fault settings)	
Immunity	Fulfill all EMC immunity requirements
Safety	
Approvals	CE, UL, cUL, EN 61800-5-1 (2003), see unit nameplate for more detailed approvals
Control Connections	
Analog input voltage	0–10V, R_i = 200 kohms, (–10V to 10V joystick control) Resolution 0.1%, accuracy ±1%
Analog input current	0(4)–20 mA, R_i = 250 ohms differential
Digital inputs	6, positive or negative logic; 18–30 Vdc
Auxiliary voltage	+24V, ±15%, max. 250 mA
Output reference voltage	+10V, +3%, max. load 10 mA
Analog output	0(4)–20 mA; RL max. 500 ohms; resolution 10 bits Accuracy ±2%
Digital outputs	Open collector output, 50 mA/48V
Relay outputs	2 programmable change-over relay outputs Switching capacity: 24 Vdc/8A, 250 Vac/8A, 125 Vdc/0.4A Min. switching load: 5V/10 mA

SPA9000/SPN9000/SPI9000, continued

Description	Specification
Protections	
Overvoltage protection	480V/911 Vdc, 575V/1200 Vdc
Undervoltage protection	480V/333 Vdc, 575V/460 Vdc
Ground fault protection	In case of ground fault in motor or motor cable, only the inverter is protected
Motor phase supervision	Trips if any of the output phases is missing
Overcurrent protection	Yes
Unit overtemperature protection	Yes
Motor overload protection	Yes
Motor stall protection	Yes
Motor underload protection	Yes
Short circuit protection of 24V and 10V reference voltages	Yes

Input Fuses

SHT fuses can be assembled into same-size DIN fuse base.

SPA9000/SPN9000/SPI9000

Module Component	Frame	Bussman Fuse Type (aR)	Size	U_N (V)	I_N (A)	Qty.
Inverter Units						
SPI003A1-4	FR4	170M1560	0	690	20	2
SPI007A1-4	FR4	170M1562	0	690	63	2
SPI009A1-4	FR4	170M1562	0	690	63	2
SPI012A1-4	FR6	170M1565	0	690	63	2
SPI016A1-4	FR6	170M1565	0	690	63	2
SPI023A1-4	FR6	170M1565	0	690	63	2
SPI031A1-4	FR6	170M1567	0	690	100	2
SPI038A1-4	FR6	170M1567	0	690	100	2
SPI061A1-4	FR7	170M1570	0	690	200	2
SPI072A1-4	FR7	170M1570	0	690	200	2
SPI087A1-4	FR7	170M1571	0	690	250	2
SPI105A0-4	FR8	170M3819	DIN1	690	400	2
SPI140A0-4	FR8	170M3819	DIN1	690	400	2
SPI170A0-4	FR8	170M3819	DIN1	690	400	2
SPI205A0-4	FI9	170M6812	DIN3	690	800	2
SPI245A0-4	FI9	170M6812	DIN3	690	800	2
SPI300A0-4	FI10	170M8547	3SHT	690	1250	2
SPI385A0-4	FI10	170M8547	3SHT	690	1250	2
SPI460A0-4	FI10	170M8547	3SHT	690	1250	2
SPI520A0-4	FI12	170M8547	3SHT	690	1250	2 x 2
SPI590A0-4	FI12	170M8547	3SHT	690	1250	2 x 2
SPI650A0-4	FI12	170M8547	3SHT	690	1250	2 x 2
SPI730A0-4	FI12	170M8547	3SHT	690	1250	2 x 2
SPI820A0-4	FI12	170M8547	3SHT	690	1250	2 x 2
SPI920A0-4	FI12	170M8547	3SHT	690	1250	2 x 2
SPIH10A0-4	FI13	170M8547	3SHT	690	1250	6
SPIH11A0-4	FI13	170M8547	3SHT	690	1250	6
SPIH13A0-4	FI13	170M8547	3SHT	690	1250	6
SPIH16A0-4	FI14	170M8547	3SHT	690	1250	2 x 6
SPIH19A0-4	FI14	170M8547	3SHT	690	1250	2 x 6
SPIH23A0-4	FI14	170M8547	3SHT	690	1250	2 x 6

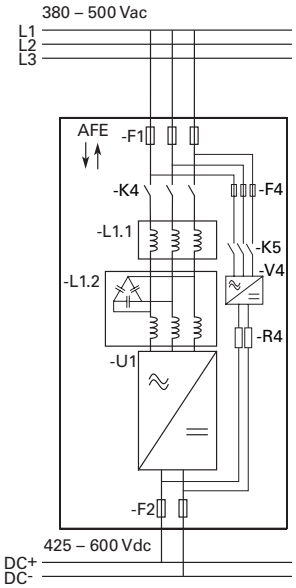
SHT fuses can be assembled into same-size DIN fuse base.

SPA9000/SPN9000/SPI9000, continued

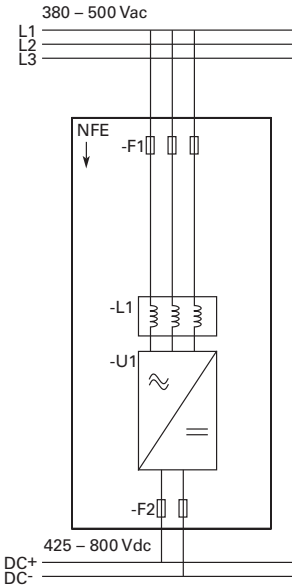
Module Component	Frame	Bussman Fuse Type (aR)	Size	U_N (V)	I_N (A)	Qty.
Active Front Ends						
SPA205A0-4	FI9	170M6202	3SHT	1250	500	3
SPA385A0-4	FI10	170M6277	3SHT	1250	1000	3
SPAH10A0-4	FI13	170M6277	3SHT	1250	1000	3 x 3
Non-Regenerative Front Ends						
SPN468A0-4	FI9	170M8547	3SHT	690	1250	3

Wiring Diagrams

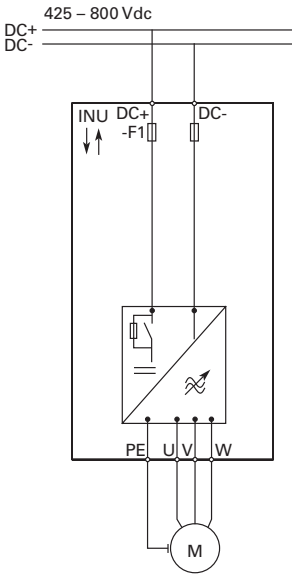
SPA9000—Active Front End



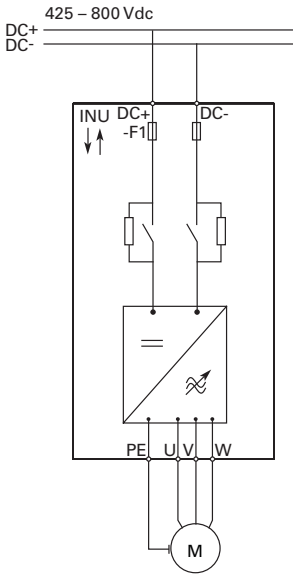
SPN9000—Non-Regenerative Front End



SPI9000—Inverter Unit (FR4–FR8)



SPI9000—Inverter Unit (FI9–FI14)



Dimensions

Approximate Dimensions in Inches (mm)

SPA9000/SPN9000/SPI9000

Frame	Height	Width	Depth	Weight Lbs (kg)
Active Front Ends				
FI9	40.6 (1030)	9.4 (239)	14.6 (372)	148 (67)
FI10	40.6 (1032)	9.4 (239)	21.7 (552)	220 (100)
FI12	40.6 (1032)	2 x 9.4 (2 x 239)	21.7 (552)	441 (200)
FI13	40.6 (1032)	27.9 (708)	21.8 (553)	674 (306)
FI14	40.6 (1032)	2 x 27.9 (2 x 708)	21.8 (553)	1348 (612)
Non-Regenerative Front Ends				
FI9	40.6 (1030)	9.4 (239)	14.6 (372)	148 (67)
Inverter Units				
FR4	11.5 (292)	5.0 (128)	7.5 (190)	11 (5)
FR6	20.4 (519)	7.7 (195)	9.3 (237)	35 (16)
FR7	23.3 (591)	9.3 (237)	10.1 (257)	64 (29)
FR8	29.8 (758)	11.4 (289)	13.5 (344)	106 (48)
FI9	40.6 (1030)	9.4 (239)	14.6 (372)	148 (67)
FI10	40.6 (1032)	9.4 (239)	21.7 (552)	220 (100)
FI12	40.6 (1032)	2 x 9.4 (2 x 239)	21.7 (552)	441 (200)
FI13	40.6 (1032)	27.9 (708)	21.8 (553)	674 (306)
FI14	40.6 (1032)	2 x 27.9 (2 x 708)	21.8 (553)	1348 (612)