



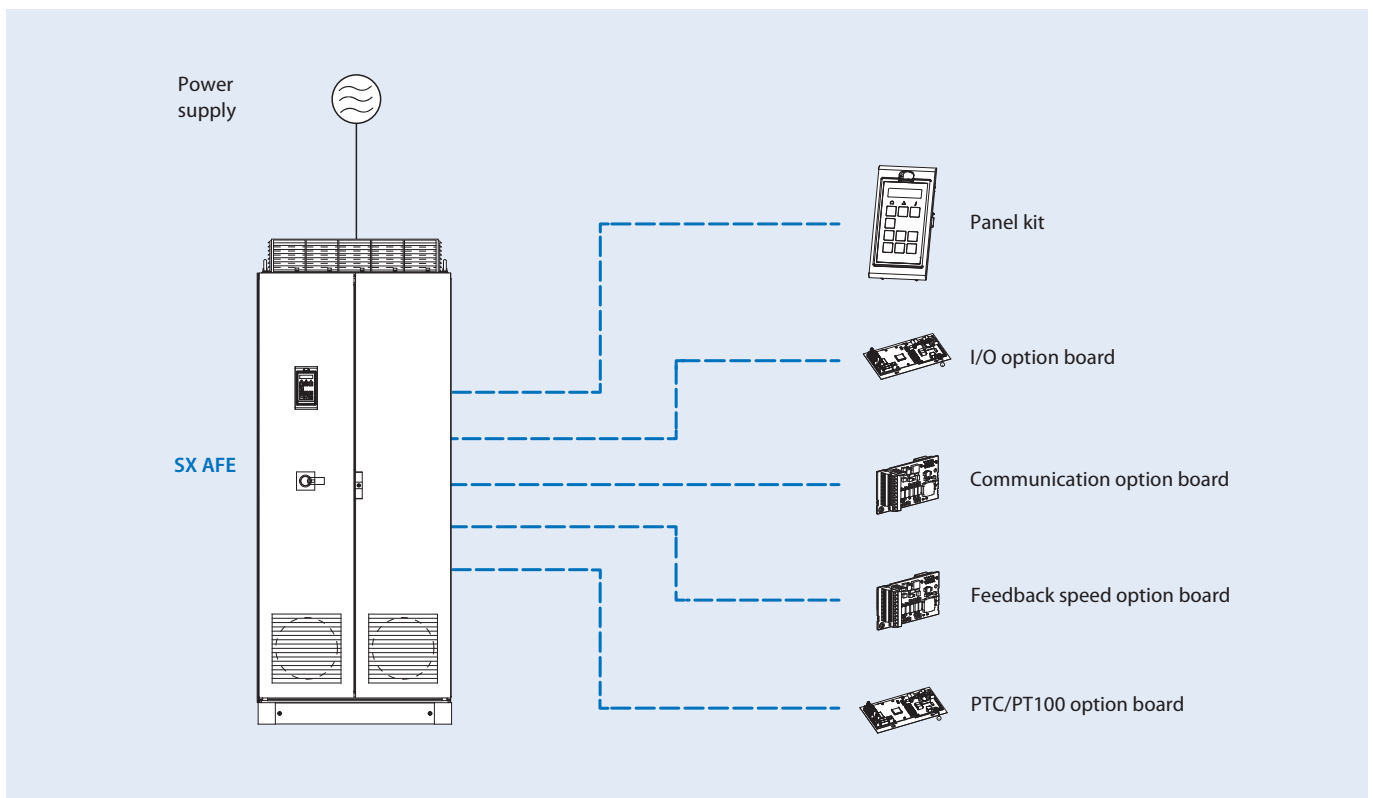
High performance Vector Control

- Low harmonic or regenerative drive
- IP54 full range
- Compact design and robustness
- Built-in filter (according to C3 class)
- Built-in fuses (from 200 kW)
- Safety according EN 13849-1 and EN 62061 standards
- Options flexibility: I/O's, Fieldbus, PTC/PT100
- Communication options: EtherCAT, PROFINET, Modbus, DeviceNet, PROFIBUS, Modbus TCP
- CE, UL, RoHS

Ratings

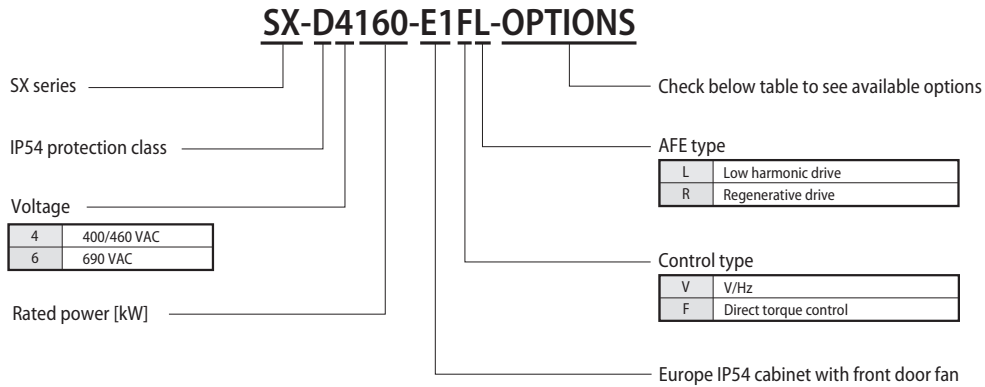
- 400 V class three-phase: 55 to 900 kW
- 690 V class three-phase: 110 to 1,100 kW

System configuration



Type designation

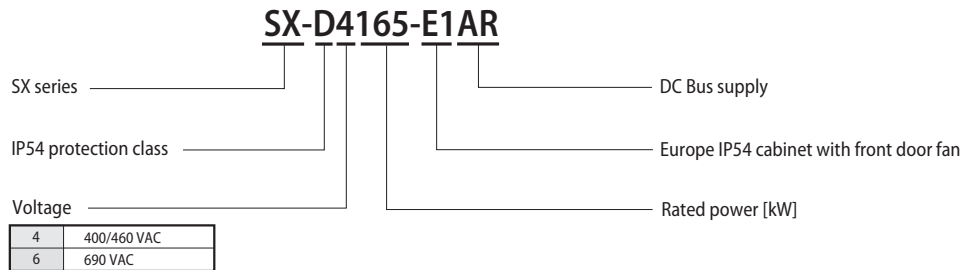
Inverter with Regenerative Active Front End



Options available

Options	Letter (? means no character)	Options	Letter (? means no character)
Control panel	? = Standard control panel (Std. PPU) A = Blank control panel (Blank PPU)	Option board position 1/2/3	? = No option H = Crane I/O I = Encoder J = PTC/PT100 K = Extended I/O
Built-in EMC filter	? = Standard EMC inside (Category C3) B = IT-Net (filter disconnected from ground)	Option board Fieldbus position 4	? = No option L = DeviceNet M = PROFIBUS-DP M1 = PROFINET N = RS232/485 O = Ethernet Modbus TCP O1 = EtherCAT
Standby power supply	? = Not included E = Standby power supply included	Liquid cooling	? = No liquid cooling P = Liquid cooling
Coated boards	? = No coating G = Coated boards	-	-

DC Supply with Regenerative Active Front End



Specifications

Common specifications

Model number: SX_		Specifications	
General specifications	Mains voltage	400 V models 380 to 460 V, +10%/–15%	
		690 V models 480 to 690 V, +10%/–15%	
	Frequency	48 to 52 Hz and 58 to 62 Hz	
	Input total power factor	1.0	
	Output AC voltage	Inverter (0-1.2) * mains supply voltage	
	Output DC voltage	DC Supply (1.0-1.2) *√2 * mains supply voltage	
	Output frequency	Inverter 0 to 400 Hz	
	Switching frequency	Inverter	3 kHz (adjustable 1.5 to 6 kHz, SX-VL only)
		DC Supply	3 kHz (adjustable 3 to 6 kHz)
	Efficiency at nominal load	Inverter	97%
DC Supply		98%	
Harmonics to supply, THDI		< 5%	
Ambient conditions	Ambient temperature	0 to 40°C, up to 45°C with derating	
	Ambient humidity	90% RH or less (without condensation)	
	Storage temperature	–20 to 60°C	
	Altitude	Up to 1,000 meters	
	Vibration / shock	According to IEC 600068-2-6, sinusoidal vibrations: 10<f<57 Hz, 0.075 mm, 57<f<150 Hz, 1 g	
	Contamination, according to IEC 60721-3-3	No electrically conductive dust allowed. Cooling air must be clean and free from corrosive materials. Chemical gases, class 3C2 (coated boards 3C3). Solid particles, class 3S2	
	Protection design	IP54 enclosure according to the EN 60529	

Inverter with Regenerative Active Front End 400 V class

Three-phase: SX-D4_		055	075	090	110	132	160	200	220	250	315	355	400	450	560	630	800	900	
Output power	For HD setting	kW	45	55	75	90	110	132	160	200	220	250	315	355	400	450	500	630	800
	For ND setting	kW	55	75	90	110	132	160	200	220	250	315	355	400	450	560	630	800	900
Output characteristics	Max. output current	A	131	175	210	252	300	360	450	516	600	720	780	900	1,032	1,200	1,440	1,800	2,100
	Rated output current at HD	A	87	117	140	168	200	240	300	344	400	480	520	600	688	800	960	1,200	1,400
	Rated output current at ND	A	109	146	175	210	250	300	375	430	500	600	650	750	860	1,000	1,200	1,500	1,750
	Output voltage	V	0 to Mains supply voltage																
Power supply	Max. output frequency	Hz	400 Hz																
	Rated input voltage and frequency		3-phase 380 to 460 V, 50/60 Hz																
	Allowable voltage fluctuation		10% to –15%																
Weight	kg	380	400	480	500	500	700	750	830	880	1,040	1,210	1,210	1,370	1,600	1,700	2,250	On request	

Note: Assembled in IP54 cabinet including main switch, main contactor and output choke.

Inverter with Regenerative Active Front End 690 V class

Three-phase: SX-D6_		110	132	160	250	315	355	450	560	710	1K0	1K1	
Output power	For HD setting	kW	90	110	132	200	250	315	355	450	600	900	
	For ND setting	kW	110	132	160	250	315	355	450	560	710	1,000	
Output characteristics	Max. output current	A	131	175	222	300	360	450	516	672	900	1,344	
	Rated output current at HD	A	87	117	148	200	240	300	344	448	600	896	
	Rated output current at ND	A	109	146	185	250	300	375	430	560	750	1,000	
	Output voltage	V	0 to Mains supply voltage										
Power supply	Max. output frequency	Hz	400 Hz										
	Rated input voltage and frequency		3-phase 480 to 690 V, 50/60 Hz										
	Allowable voltage fluctuation		10% to –15%										
Weight	kg	410	430	540	870	870	910	1,350	1,390	On request			

Note: Assembled in IP54 cabinet including main switch, main contactor or motor driven circuit breaker and output choke.

DC Supply with Regenerative Active Front End 400 V class

Three-phase: SX-D4_-E1AR			115	165	250	330	500	660	1K0
DC power	For ND setting	kW	115	165	250	330	500	660	1,000
	Max. input current	A	210	300	450	600	900	1,200	1,800
In/Out characteristics	Rated input current at ND	A	175	250	375	500	750	1,000	1,500
	Output voltage	V	0 to Mains supply voltage						
	Max. output frequency	Hz	400 Hz						
Power supply	Rated input voltage and frequency	3-phase 380 to 460 V, 50/60 Hz							
	Allowable voltage fluctuation	10% to -15%							
Weight	kg	290	400	560	660	830	1,100	1,600	

Note: Assembled in IP54 cabinet including main switch and main contactor.

DC Supply with Regenerative Active Front End 690 V class

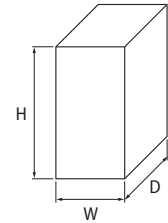
Three-phase: SX-D6_-E1AR			200	400	600	800	1K2
DC power	For ND setting	kW	200	400	600	800	1,200
	Max. input current	A	210	420	630	840	1,260
In/Out characteristics	Rated input current at ND	A	175	350	525	700	1,050
	Output voltage	V	0 to Mains supply voltage				
	Max. output frequency	Hz	400 Hz				
Power supply	Rated input voltage and frequency	3-phase 480 to 690 V, 50/60 Hz					
	Allowable voltage fluctuation	10% to -15%					
Weight	kg	320	590	860	On request		

Note: Assembled in IP54 cabinet including main switch and main contactor or motor driven circuit breaker.

Dimensions

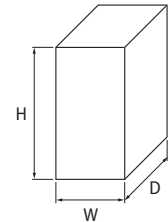
Inverter with Regenerative Active Front End

Voltage class	Inverter model	Dimensions in mm			Weight (kg)		
		H	W	D			
400 V	SX-D4055-E1_	2,250	800	600	380		
	SX-D4075-E1_				400		
	SX-D4090-E1_		900		480		
	SX-D4110-E1_				500		
	SX-D4132-E1_						
	SX-D4160-E1_		1,300		700		
	SX-D4200-E1_		1,500		750		
	SX-D4220-E1_				830		
	SX-D4250-E1_				880		
	SX-D4315-E1_		1,900		1,040		
	SX-D4355-E1_		2,200		1,210		
	SX-D4400-E1_						
	SX-D4450-E1_		2,500		1,370		
	SX-D4560-E1_		3,000		1,600		
	SX-D4630-E1_		3,300		1,700		
SX-D4800-E1_	4,500	2,250					
SX-D4900-E1_	On request						
690 V	SX-D6110-E1_	2,250	800	600	410		
	SX-D6132-E1_				430		
	SX-D6160-E1_		900		540		
	SX-D6250-E1_		1,800		870		
	SX-D6315-E1_						
	SX-D6355-E1_				910		
	SX-D6450-E1_		2,800		1,350		
	SX-D6560-E1_				1,390		
	SX-D6710-E1_		On request				
	SX-D61K0-E1_						
SX-D61K1-E1_							

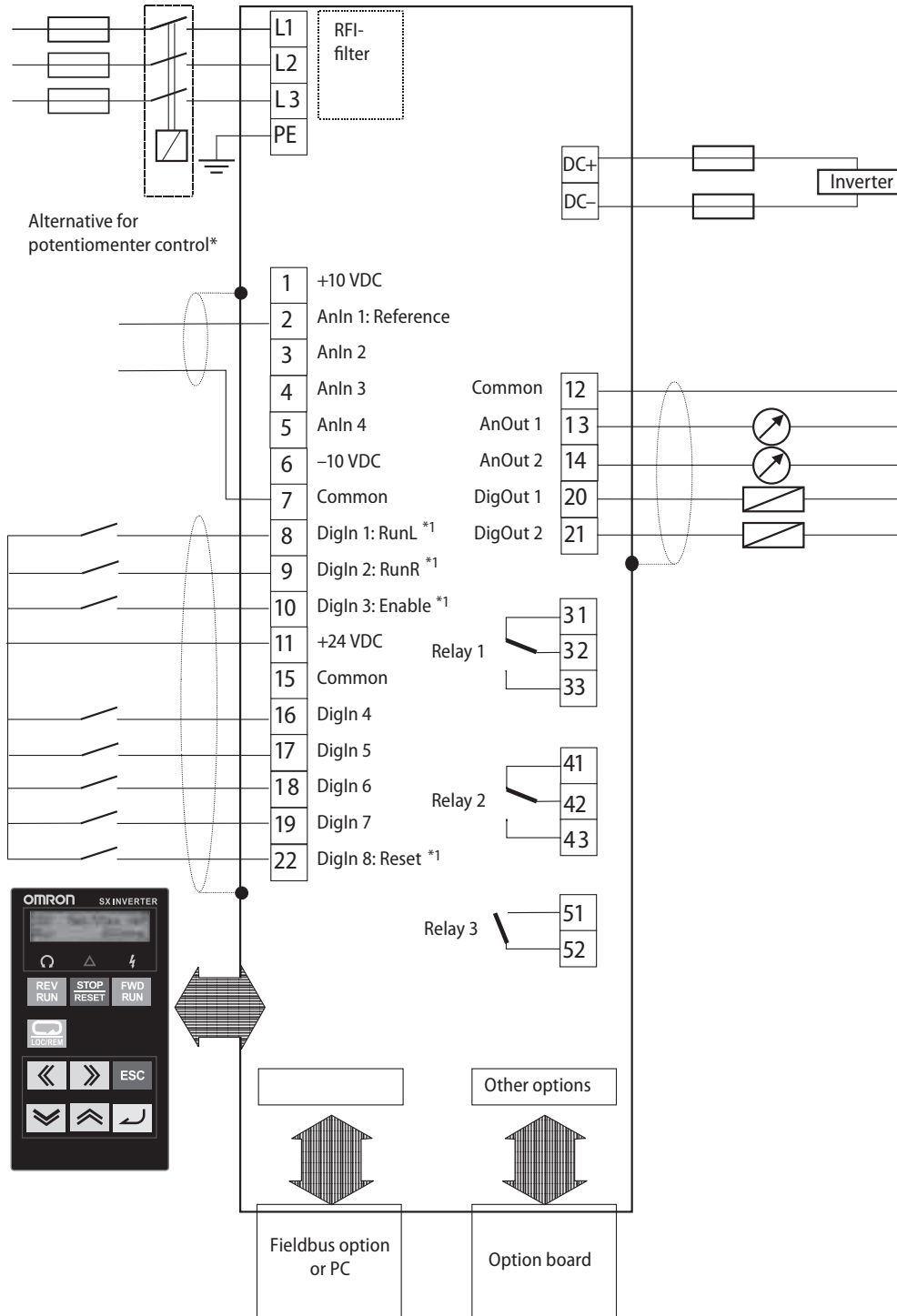


DC Supply with Regenerative Active Front End

Voltage class	AFR model	Dimensions in mm			Weight (kg)	
		H	W	D		
400 V	SX-D4115-E1AR	2,250	600	600	290	
	SX-D4165-E1AR		800		400	
	SX-D4250-E1AR		1,000		560	
	SX-D4330-E1AR		1,200		660	
	SX-D4500-E1AR		1,500		830	
	SX-D4660-E1AR		1,800		1,100	
	SX-D41K0-E1AR		2,700		1,600	
	SX-D6200-E1AR		2,250		800	600
SX-D6400-E1AR	1,200	590				
SX-D6600-E1AR	1,700	860				
SX-D6800-E1AR	On request					
SX-D61K2-E1AR						



Installation



*1 Default settings.

Main circuit

Terminal	Name	Function (signal level)
L1, L2, L3	Main circuit power supply input	Used to connect line power to the drive
DC-, DC+	DC link connections	DC bus output
PE	Safety earth	Protected earth

Control circuit

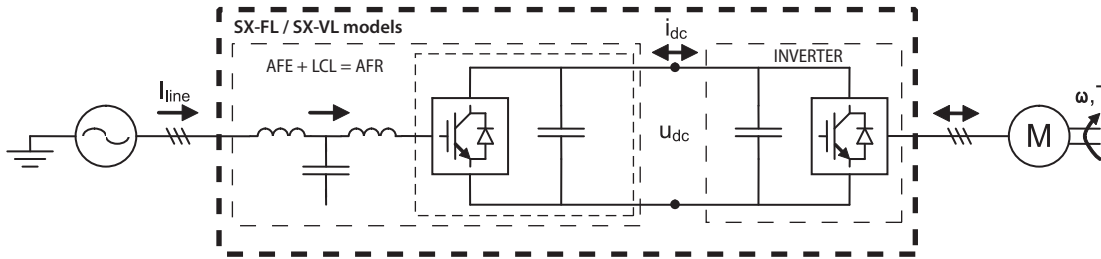
Type	No.	Signal name	Function (default)	Signal level
Analog input signals	1	+10 VDC	+10 VDC supply voltage	+10 VDC, max 10 mA
	2	AnIn 1	Process reference	0 to 10 VDC or 0/4 to 20 mA bipolar: -10 to 10 VDC or -20 to 20 mA
	3	AnIn 2	Off	
	4	AnIn 3	Dedicated for supply voltage measurement option	
	5	AnIn V 4	Dedicated for supply voltage measurement option	
	6	-10 VDC	-10 VDC supply voltage	-10 VDC, max 10 mA
	7	Common	Signal ground	0 V
Digital input signals	8	DigIn 1	RunL (reverse)	0 to 8/24 VDC
	9	DigIn 2	RunR (forward)	
	10	DigIn 3	Enable	
	11	+24 VDC	+24 VDC supply voltage	+24 VDC, 100 mA
	15	Common	Signal ground	0 V
	16	DigIn 4	Off	0 to 8/24 VDC
	17	DigIn 5	Off	
	18	DigIn 6	Off	
	19	DigIn 7	Off	
22	DigIn 8	RESET		
Analog output signals	12	Common	Signal ground	0 V
	13	AnOut 1	Min speed to max speed	0 to 10 VDC or 0/4 to 20 mA
	14	AnOut 2	0 to max torque	
Digital output signals	12	Common	Signal ground	0 V
	20	DigOut 1	Option (active when AFR is running)	24 VDC, 100 mA
	21	DigOut 2	LZ (trip pulse of 1 s)	
	31	N/C 1	Relay output 1	0.1 to 2 A 250 VAC or 42 VDC
	32	COM 1	N/C is opened when the relay is active (valid for all relays)	
	33	N/O 1	N/O is closed when the relay is active (valid for all relays)	
	41	N/C 2	Relay output 2	
	42	COM 2	Option (active when AFR is running)	
	43	N/O 2		
51	COM 2	Relay output 3		
52	N/O 3	Dedicated for main contactor K1		

Type configuration

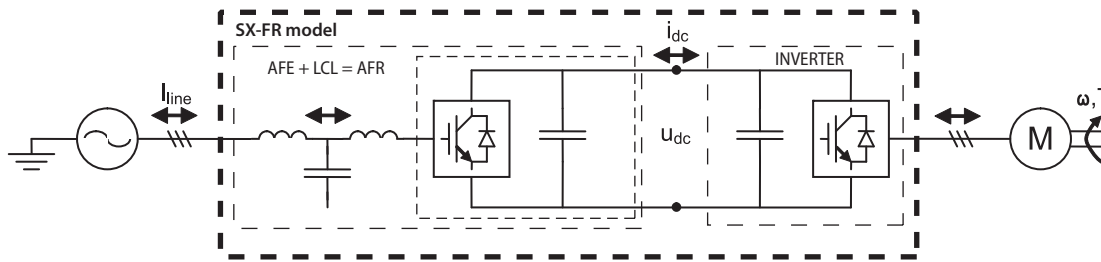
There are 3 configurations possible:

Inverter with Regenerative Active Front End

Low harmonic drive

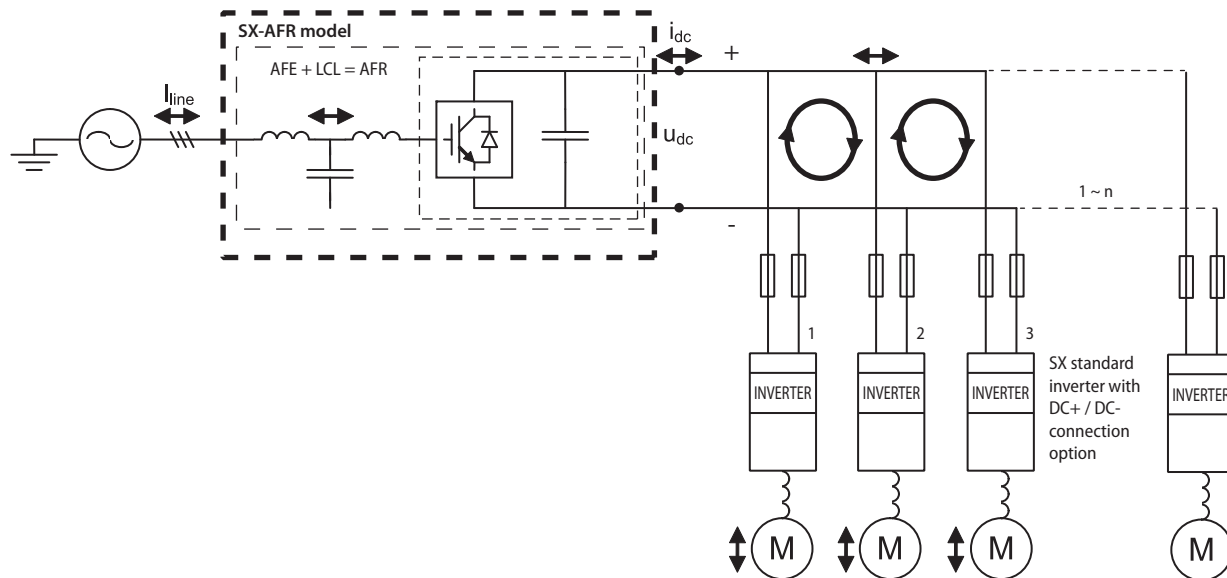


Regenerative + low harmonic drive



DC Supply with Regenerative Active Front End

Regenerative + low harmonic DC bus supply unit AFR

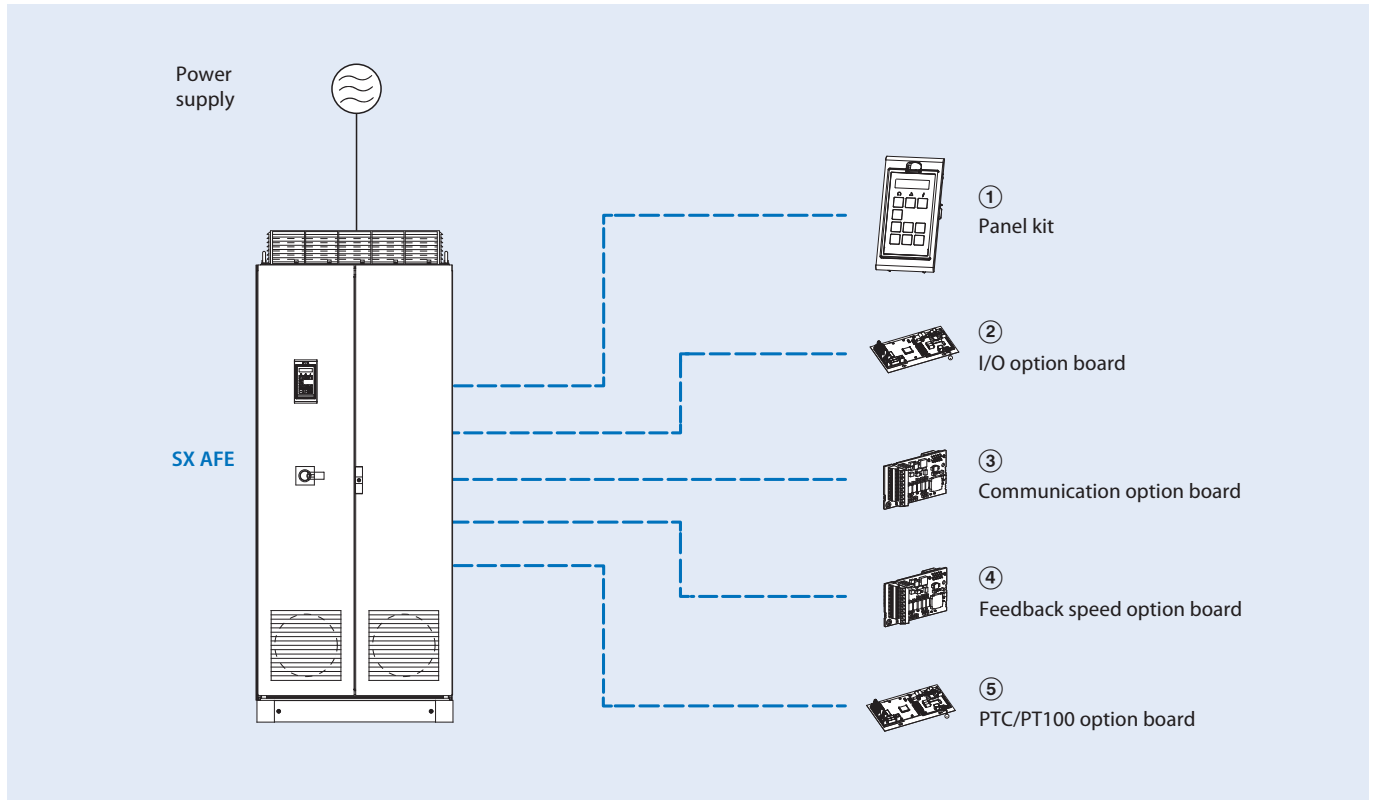


Type designation examples:

- SX-D4055-E1FL: Low harmonic vector control drive
- SX-D6160-E1VL: Low harmonic V/Hz control drive
- SX-D4200-E1FR: Regenerative + low harmonic vector control drive
- SX-D4330-E1AR: Regenerative + low harmonic DC bus supply unit (the inverter is not included).
The inverter should have the DC+ / DC- connection option.

Note: There is no physical difference between a regenerative drive and a low harmonic drive. The difference will be in the software of the drives.

Ordering information



Inverter with Regenerative Active Front End

Specifications				IP54 model			
				Low harmonic drive		Regenerative + low harmonic drive	
Voltage	Heavy duty		Normal duty	Direct torque control	V/F control	Direct torque control	
400 V	45 kW	87 A	55 kW	109 A	SX-D4055-E1FL	SX-D4055-E1VL	SX-D4055-E1FR
	55 kW	117 A	75 kW	146 A	SX-D4075-E1FL	SX-D4075-E1VL	SX-D4075-E1FR
	75 kW	140 A	90 kW	175 A	SX-D4090-E1FL	SX-D4090-E1VL	SX-D4090-E1FR
	90 kW	168 A	110 kW	210 A	SX-D4110-E1FL	SX-D4110-E1VL	SX-D4110-E1FR
	110 kW	200 A	132 kW	250 A	SX-D4132-E1FL	SX-D4132-E1VL	SX-D4132-E1FR
	132 kW	240 A	160 kW	300 A	SX-D4160-E1FL	SX-D4160-E1VL	SX-D4160-E1FR
	160 kW	300 A	200 kW	375 A	SX-D4200-E1FL	SX-D4200-E1VL	SX-D4200-E1FR
	200 kW	344 A	220 kW	430 A	SX-D4220-E1FL	SX-D4220-E1VL	SX-D4220-E1FR
	220 kW	400 A	250 kW	500 A	SX-D4250-E1FL	SX-D4250-E1VL	SX-D4250-E1FR
	250 kW	480 A	315 kW	600 A	SX-D4315-E1FL	SX-D4315-E1VL	SX-D4315-E1FR
	315 kW	520 A	355 kW	650 A	SX-D4355-E1FL	SX-D4355-E1VL	SX-D4355-E1FR
	355 kW	600 A	400 kW	750 A	SX-D4400-E1FL	SX-D4400-E1VL	SX-D4400-E1FR
	400 kW	688 A	450 kW	860 A	SX-D4450-E1FL	SX-D4450-E1VL	SX-D4450-E1FR
	450 kW	800 A	560 kW	1,000 A	SX-D4560-E1FL	SX-D4560-E1VL	SX-D4560-E1FR
690 V	500 kW	960 A	630 kW	1,200 A	SX-D4630-E1FL	SX-D4630-E1VL	SX-D4630-E1FR
	630 kW	1,200 A	800 kW	1,500 A	SX-D4800-E1FL	SX-D4800-E1VL	SX-D4800-E1FR
	800 kW	1,400 A	900 kW	1,750 A	SX-D4900-E1FL	SX-D4900-E1VL	SX-D4900-E1FR
	90 kW	87 A	110 kW	109 A	SX-D6110-E1FL	SX-D6110-E1VL	SX-D6110-E1FR
	110 kW	117 A	132 kW	146 A	SX-D6132-E1FL	SX-D6132-E1VL	SX-D6132-E1FR
	132 kW	148 A	160 kW	185 A	SX-D6160-E1FL	SX-D6160-E1VL	SX-D6160-E1FR
	200 kW	200 A	250 kW	250 A	SX-D6250-E1FL	SX-D6250-E1VL	SX-D6250-E1FR
	250 kW	240 A	315 kW	300 A	SX-D6315-E1FL	SX-D6315-E1VL	SX-D6315-E1FR
	315 kW	300 A	355 kW	375 A	SX-D6355-E1FL	SX-D6355-E1VL	SX-D6355-E1FR
	355 kW	344 A	450 kW	430 A	SX-D6450-E1FL	SX-D6450-E1VL	SX-D6450-E1FR
450 kW	448 A	560 kW	560 A	SX-D6560-E1FL	SX-D6560-E1VL	SX-D6560-E1FR	
600 kW	600 A	710 kW	750 A	SX-D6710-E1FL	SX-D6710-E1VL	SX-D6710-E1FR	
800 kW	800 A	1,000 kW	1,000 A	SX-D61K0-E1FL	SX-D61K0-E1VL	SX-D61K0-E1FR	
900 kW	896 A	1,100 kW	1,120 A	SX-D61K1-E1FL	SX-D61K1-E1VL	SX-D61K1-E1FR	

DC Supply with Regenerative Active Front End

Specifications			Order code
Voltage	Normal duty		
400 V	115 kW	175 A	SX-D4115-E1AR
	165 kW	250 A	SX-D4165-E1AR
	250 kW	375 A	SX-D4250-E1AR
	330 kW	500 A	SX-D4330-E1AR
	500 kW	750 A	SX-D4500-E1AR
	660 kW	1,000 A	SX-D4660-E1AR
	1,000 kW	1,500 A	SX-D41K0-E1AR
690 V	200 kW	175 A	SX-D6200-E1AR
	400 kW	350 A	SX-D6400-E1AR
	600 kW	525 A	SX-D6600-E1AR
	800 kW	700 A	SX-D6800-E1AR
	1,200 kW	1,050 A	SX-D61K2-E1AR

① Panel kit

Description		Function	Order code
Panel kit	Panel kit	Complete panel kit including operator	SX-OP02-00-E
	Blank panel kit	Complete panel kit including a blank operator	SX-OP02-01-E
Operator	Handheld control panel	Complete handheld control panel	SX-OPHH-00-E
	Digital operator	Inverter digital operator	SX-OP01-00-E
	Blank operator	Inverter blank operator	SX-OP01-11-E

② I/O option board

Description	Function	Order code
Additional I/O option	Provides 3 extra relay outputs and 3 additional digital inputs	01-3876-01
Crane option	Dedicated option board for crane application, including additional I/O and functions	01-3876-07

③ Communication option board

Description	Function	Order code
RS232/485	MODBUS RTU serial communication by RS232 or RS485 interface with galvanic isolation	01-3876-04
PROFIBUS-DP	Used for operating the inverter through PROFIBUS-DP communication with the host controller	01-3876-05
DeviceNet	Used for operating the inverter through DeviceNet communication with the host controller	01-3876-06
Modbus/TCP, Ethernet	Used for operating the inverter through Modbus/TCP communication with the host controller	01-3876-09
EtherCAT	Used for operating the inverter through EtherCAT communication with the host controller	01-3876-10
PROFINET (1-port)	Used for operating the inverter through PROFINET communication with the host controller	01-3876-11
PROFINET (2-ports)		01-3876-12

④ Encoder feedback option board

Description	Function	Order code
Encoder option	Used for connection of the actual motor speed via encoder Up to 100 kHz with TTL and HTL incremental encoders with 5/24 V power supply	01-3876-03

⑤ PTC/PT100 option board

Description	Function	Order code
Thermal protection	Allows to connect a motor thermistor to the inverter	01-3876-08

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.

To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.