



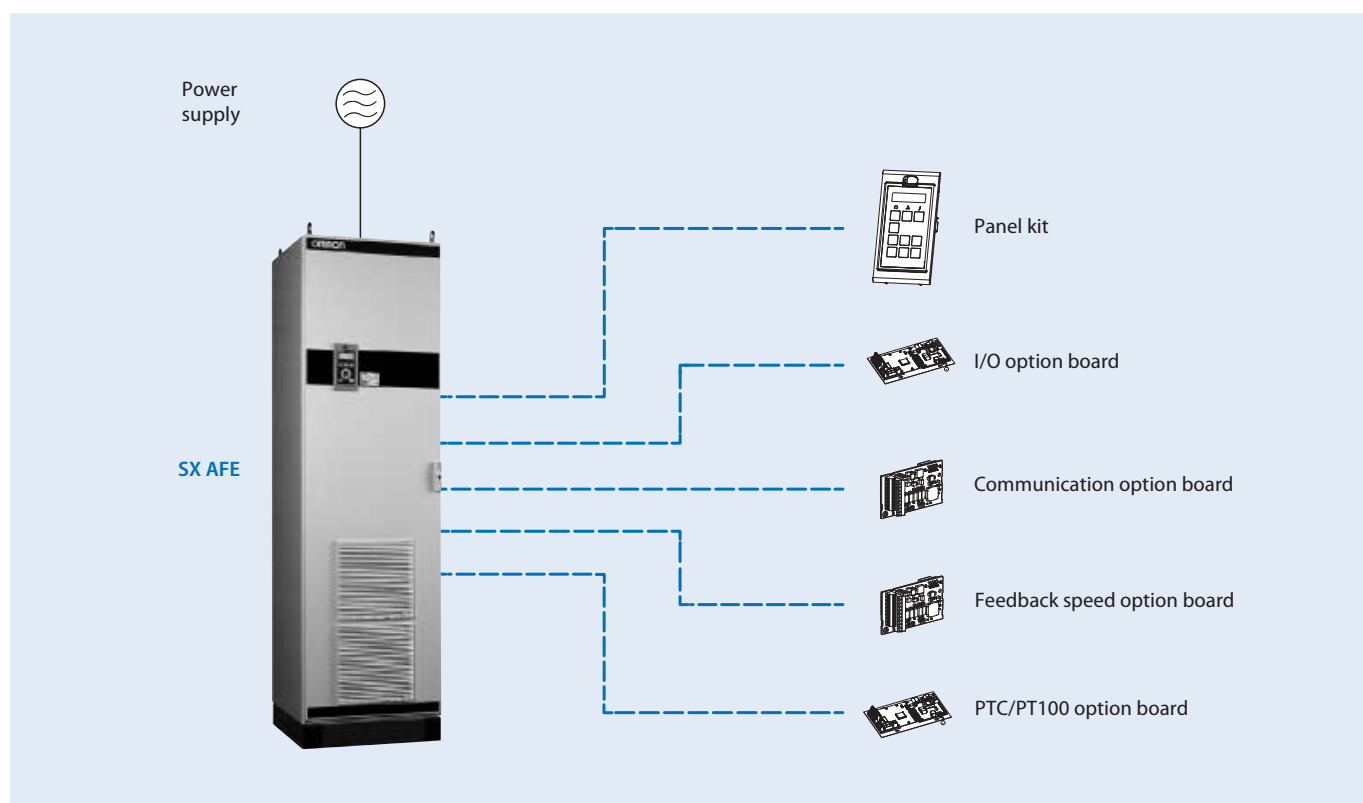
High performance Vector Control

- New operator with Real-Time Clock
- IM & PM motor 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 EN62061 standards STO SIL2
- Options flexibility: I/O's, Fieldbus, PTC/PT100
- Communication options: EtherCAT, PROFINET, Modbus, DeviceNet, PROFIBUS, Modbus TCP
- CE, UL, RoHS, EAC

Ratings

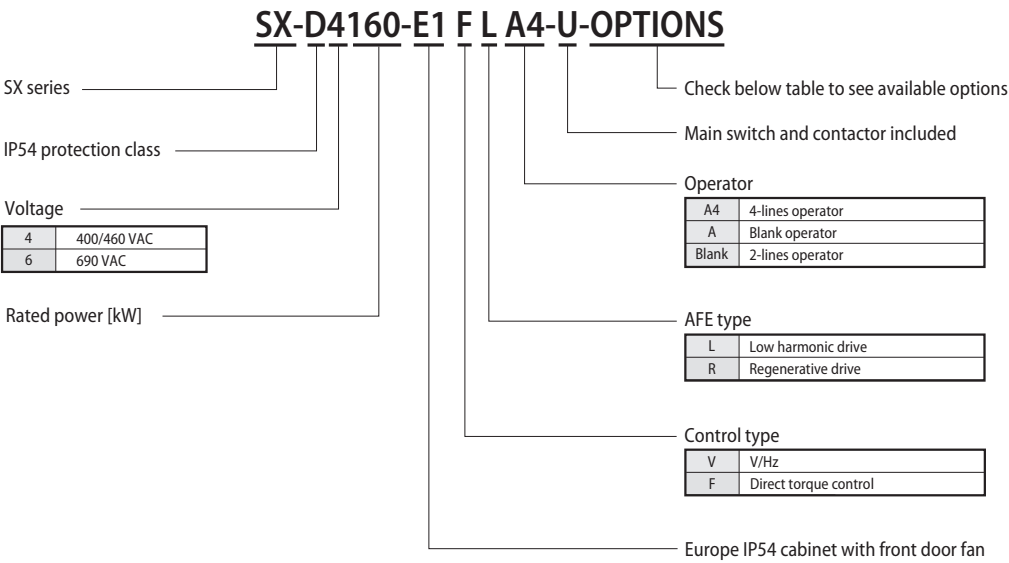
- 400 V class three-phase: 55 to 900 kW
- 690 V class three-phase: 110 to 1,100 kW

System configuration



Type designation

Drive with Regenerative Active Front End



Specifications

Common specifications

Model number: SX_			Specifications
General specifications	Motor control		AC motor, PM motor
	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	Drive	(0-1.2) * mains supply voltage
	Output DC voltage	DC Supply	(1.0-1.2) * $\sqrt{2}$ * mains supply voltage
	Output frequency	Drive	0 to 400 Hz
	Switching frequency	Drive	3 kHz (adjustable 1.5 to 6 kHz, SX-VL only)
		DC Supply	3 kHz (adjustable 3 to 6 kHz)
Ambient conditions	Efficiency at nominal load	Drive	97%
		DC Supply	98%
	Harmonics to supply, THDI		< 5%
	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

Drive 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																
	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	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 and main contactor or motor driven circuit breaker. Output choke is included from SX-D4160 model (for smaller sizes is optional).

Drive 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	800	900
	For ND setting	kW	110	132	160	250	315	355	450	560	710	1,000	1,100
Output characteristics	Max. output current	A	131	175	222	300	360	450	516	672	900	1,200	1,344
	Rated output current at HD	A	87	117	148	200	240	300	344	448	600	800	896
	Rated output current at ND	A	109	146	185	250	300	375	430	560	750	1,000	1,120
	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	410	430	540	870	870	910	1,350	1,390	On request		

Note: Assembled in IP54 cabinet including main switch and main contactor or motor driven circuit breaker. Output choke is included from SX-D6250 model (for smaller sizes is optional).

DC Supply with Regenerative Active Front End 400 V class

Three-phase: SX-D4 _E1ARA4			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						
Power supply	Max. output frequency	Hz	400 Hz						
	Rated input voltage and frequency		3-phase 380 to 460 V, 50/60 Hz						
Weight	Allowable voltage fluctuation		10% to -15%						
		kg	290	400	560	660	830	1,100	1,600

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

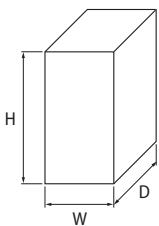
DC Supply with Regenerative Active Front End 690 V class

Three-phase: SX-D6 _E1ARA4			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				
Power supply	Max. output frequency	Hz	400 Hz				
	Rated input voltage and frequency		3-phase 480 to 690 V, 50/60 Hz				
Weight	Allowable voltage fluctuation		10% to -15%				
		kg	320	590	860	On request	

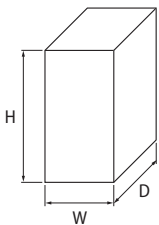
Note: Assembled in IP54 cabinet including main switch and main contactor or motor driven circuit breaker.

Dimensions

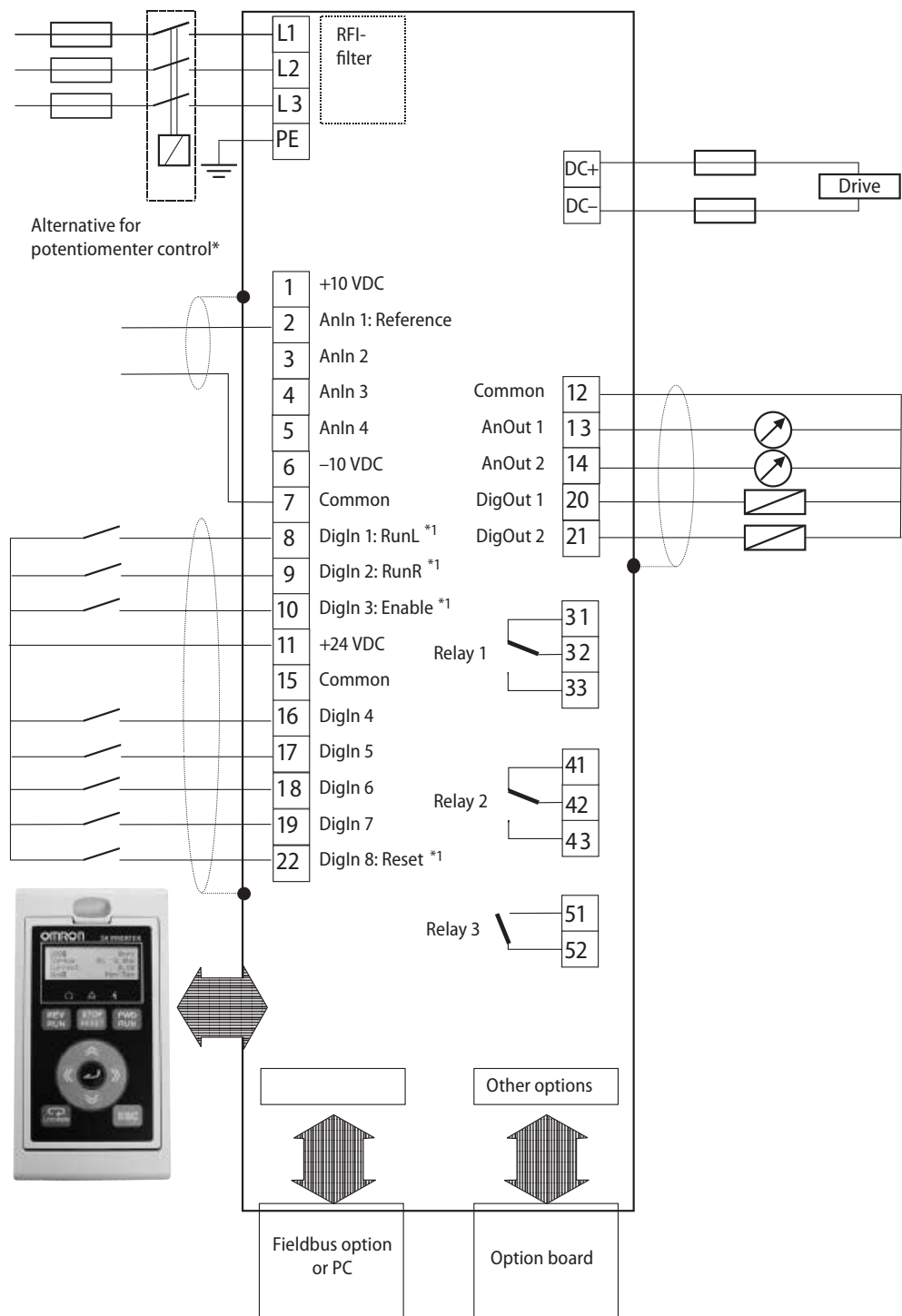
Drive with Regenerative Active Front End

Voltage class	Frame	Drive model	Dimensions in mm					
			H	W	D	Weight (kg)		
400 V	G	SX-D4055-E1_	2,250	800	600	380		
	G	SX-D4075-E1_				400		
	G	SX-D4090-E1_		900		480		
	H	SX-D4110-E1_				500		
	H	SX-D4132-E1_						
	I	SX-D4160-E1_		1,300		700		
	G46+G	SX-D4200-E1_		1,500		750		
	G46+H	SX-D4220-E1_				830		
	H46+H	SX-D4250-E1_				880		
	H46+I	SX-D4315-E1_		1,900		1,040		
	I46+I	SX-D4355-E1_		2,200		1,210		
	I46+I	SX-D4400-E1_						
	I46+J	SX-D4450-E1_		2,500		1,370		
	I46+J	SX-D4560-E1_		3,000		1,600		
	J46+KA	SX-D4630-E1_		3,300		1,700		
	K46+K	SX-D4800-E1_		4,500		2,250		
		K46+L	SX-D4900-E1_	On request				
690 V	H69	SX-D6110-E1_	2,250	800	600	410		
	H69	SX-D6132-E1_				430		
	H69	SX-D6160-E1_		900		540		
	H69+H69	SX-D6250-E1_		1,800		870		
	H69+H69	SX-D6315-E1_						
	H69+H69	SX-D6355-E1_				910		
	I69+I69	SX-D6450-E1_		2,800		1,350		
	I69+I69	SX-D6560-E1_				1,390		
		J69+J69	SX-D6710-E1_	On request				
		K69+KA69	SX-D61K0-E1_					
		K69+K69	SX-D61K1-E1_					

DC Supply with Regenerative Active Front End

Voltage class	Frame	AFR model	Dimensions in mm				
			H	W	D	Weight (kg)	
400 V	E46	SX-D4115-E1ARA4	2,250	600	600	290	
	F46	SX-D4165-E1ARA4		800		400	
	G46	SX-D4250-E1ARA4		1,000		560	
	H46	SX-D4330-E1ARA4		1,200		660	
	I46	SX-D4500-E1ARA4		1,500		830	
	J46	SX-D4660-E1ARA4		1,800		1,100	
	K46	SX-D41K0-E1ARA4		2,700		1,600	
690 V	F69	SX-D6200-E1ARA4	2,250	800	600	320	
	H69	SX-D6400-E1ARA4		1,200		590	
	I69	SX-D6600-E1ARA4		1,700		860	
	J69	SX-D6800-E1ARA4	On request				
	K69	SX-D61K2-E1ARA4					

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

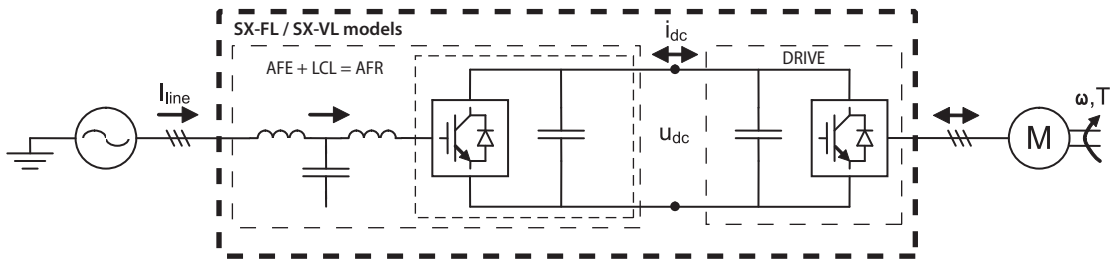
Type	No.	Signal name	Function (default)	Signal level
Analog input signals	1	+10 VDC	+10 VDC supply voltage	+10 VDC, max 10 mA
	2	AnIn 1	Process reference	0 to 10 VDC or 0/4 to 20 mA bipolar: -10 to 10 VDC or -20 to 20 mA
	3	AnIn 2	Off	
	4	AnIn 3	Dedicated for supply voltage measurement option	
	5	AnIn V 4	Dedicated for supply voltage measurement option	-10 VDC, max 10 mA
	6	-10 VDC	-10 VDC supply voltage	
	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	
Analog output signals	22	DigIn 8	RESET	
	12	Common	Signal ground	0 V
	13	AnOut 1	Min speed to max speed	0 to 10 VDC or 0/4 to 20 mA
Digital output signals	14	AnOut 2	0 to max torque	
	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

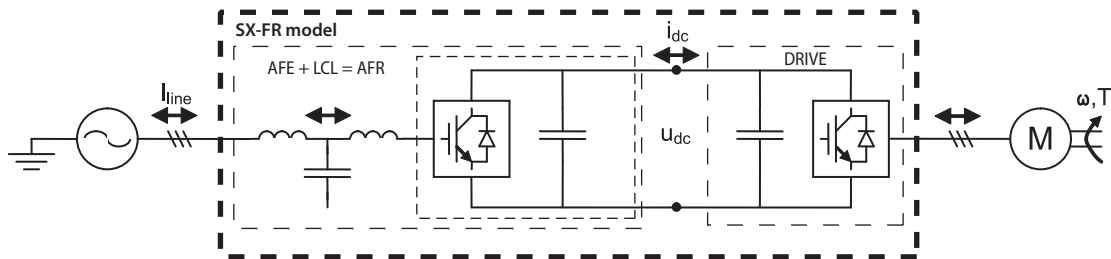
There are 3 configurations possible:

Drive with Regenerative Active Front End

Low harmonic drive

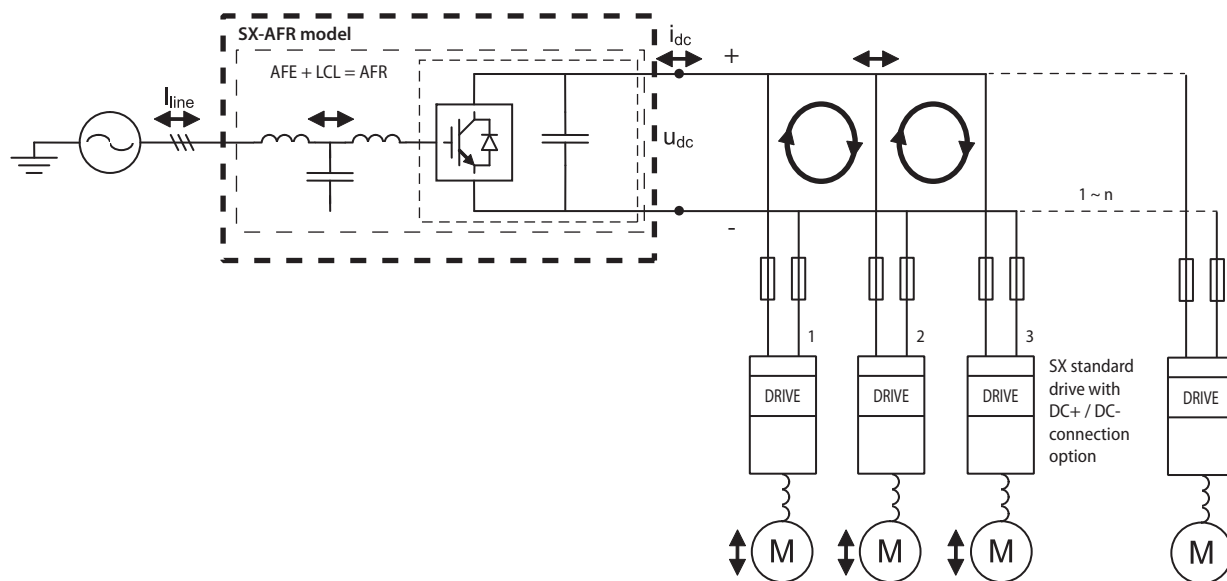


Regenerative + low harmonic drive



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

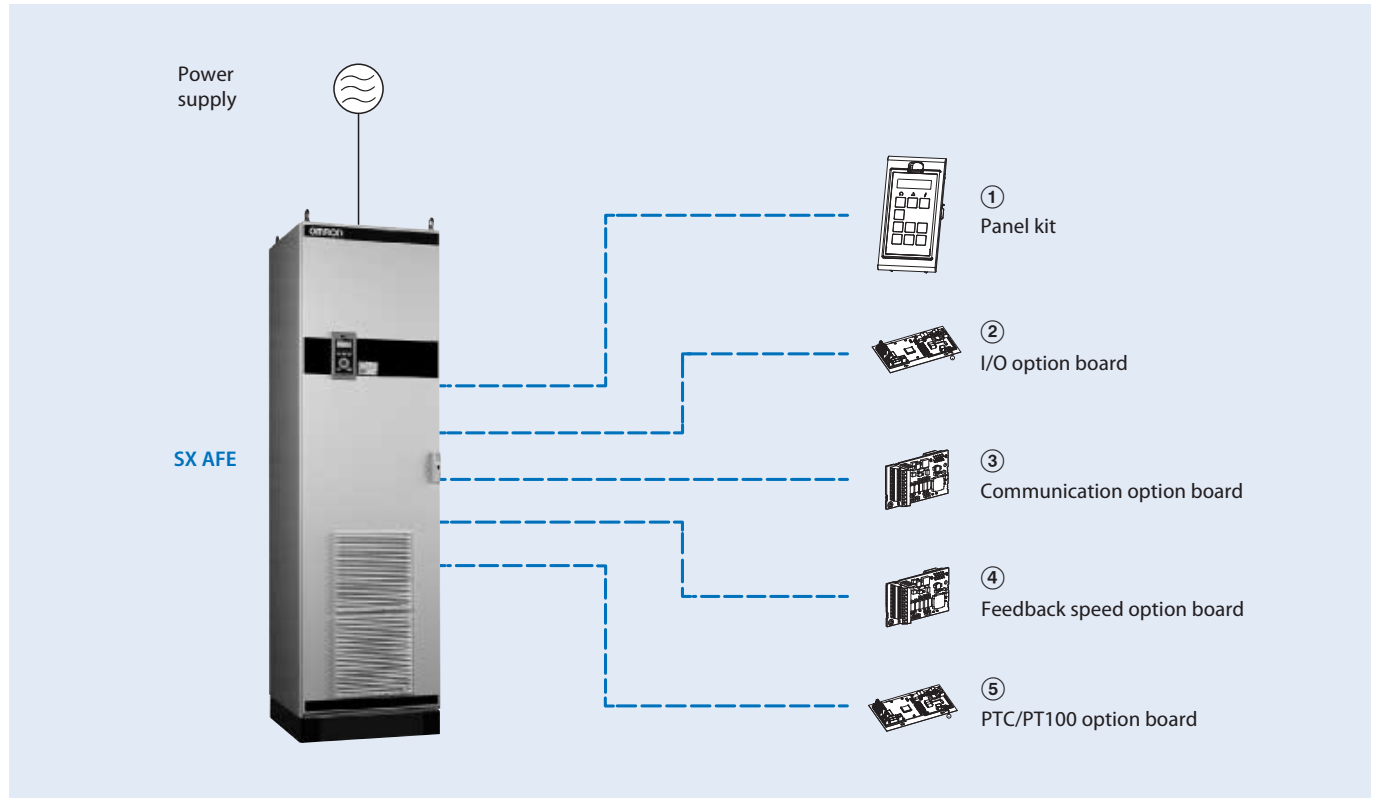
SX-D4200-E1FRA4: Regenerative + low harmonic vector control drive

SX-D4330-E1ARA4: Regenerative + low harmonic DC bus supply unit (the drive is not included).

The drive 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



Drive 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-E1FLA4-U	SX-D4055-E1VLA4-U	SX-D4055-E1FRA4-U
	55 kW	117 A	75 kW	146 A	SX-D4075-E1FLA4-U	SX-D4075-E1VLA4-U	SX-D4075-E1FRA4-U
	75 kW	140 A	90 kW	175 A	SX-D4090-E1FLA4-U	SX-D4090-E1VLA4-U	SX-D4090-E1FRA4-U
	90 kW	168 A	110 kW	210 A	SX-D4110-E1FLA4-U	SX-D4110-E1VLA4-U	SX-D4110-E1FRA4-U
	110 kW	200 A	132 kW	250 A	SX-D4132-E1FLA4-U	SX-D4132-E1VLA4-U	SX-D4132-E1FRA4-U
	132 kW	240 A	160 kW	300 A	SX-D4160-E1FLA4-U	SX-D4160-E1VLA4-U	SX-D4160-E1FRA4-U
	160 kW	300 A	200 kW	375 A	SX-D4200-E1FLA4-U	SX-D4200-E1VLA4-U	SX-D4200-E1FRA4-U
	200 kW	344 A	220 kW	430 A	SX-D4220-E1FLA4-U	SX-D4220-E1VLA4-U	SX-D4220-E1FRA4-U
	220 kW	400 A	250 kW	500 A	SX-D4250-E1FLA4-U	SX-D4250-E1VLA4-U	SX-D4250-E1FRA4-U
	250 kW	480 A	315 kW	600 A	SX-D4315-E1FLA4-U	SX-D4315-E1VLA4-U	SX-D4315-E1FRA4-U
	315 kW	520 A	355 kW	650 A	SX-D4355-E1FLA4-U	SX-D4355-E1VLA4-U	SX-D4355-E1FRA4-U
	355 kW	600 A	400 kW	750 A	SX-D4400-E1FLA4-U	SX-D4400-E1VLA4-U	SX-D4400-E1FRA4-U
	400 kW	688 A	450 kW	860 A	SX-D4450-E1FLA4-U	SX-D4450-E1VLA4-U	SX-D4450-E1FRA4-U
	450 kW	800 A	560 kW	1,000 A	SX-D4560-E1FLA4-U	SX-D4560-E1VLA4-U	SX-D4560-E1FRA4-U
	500 kW	960 A	630 kW	1,200 A	SX-D4630-E1FLA4-U	SX-D4630-E1VLA4-U	SX-D4630-E1FRA4-U
	630 kW	1,200 A	800 kW	1,500 A	SX-D4800-E1FLA4-U	SX-D4800-E1VLA4-U	SX-D4800-E1FRA4-U
	800 kW	1,400 A	900 kW	1,750 A	SX-D4900-E1FLA4-U	SX-D4900-E1VLA4-U	SX-D4900-E1FRA4-U
690 V	90 kW	87 A	110 kW	109 A	SX-D6110-E1FLA4-U	SX-D6110-E1VLA4-U	SX-D6110-E1FRA4-U
	110 kW	117 A	132 kW	146 A	SX-D6132-E1FLA4-U	SX-D6132-E1VLA4-U	SX-D6132-E1FRA4-U
	132 kW	148 A	160 kW	185 A	SX-D6160-E1FLA4-U	SX-D6160-E1VLA4-U	SX-D6160-E1FRA4-U
	200 kW	200 A	250 kW	250 A	SX-D6250-E1FLA4-U	SX-D6250-E1VLA4-U	SX-D6250-E1FRA4-U
	250 kW	240 A	315 kW	300 A	SX-D6315-E1FLA4-U	SX-D6315-E1VLA4-U	SX-D6315-E1FRA4-U
	315 kW	300 A	355 kW	375 A	SX-D6355-E1FLA4-U	SX-D6355-E1VLA4-U	SX-D6355-E1FRA4-U
	355 kW	344 A	450 kW	430 A	SX-D6450-E1FLA4-U	SX-D6450-E1VLA4-U	SX-D6450-E1FRA4-U
	450 kW	448 A	560 kW	560 A	SX-D6560-E1FLA4-U	SX-D6560-E1VLA4-U	SX-D6560-E1FRA4-U
	600 kW	600 A	710 kW	750 A	SX-D6710-E1FLA4-U	SX-D6710-E1VLA4-U	SX-D6710-E1FRA4-U
	800 kW	800 A	1,000 kW	1,000 A	SX-D61K0-E1FLA4-U	SX-D61K0-E1VLA4-U	SX-D61K0-E1FRA4-U
	900 kW	896 A	1,100 kW	1,120 A	SX-D61K1-E1FLA4-U	SX-D61K1-E1VLA4-U	SX-D61K1-E1FRA4-U

DC Supply with Regenerative Active Front End

Specifications			Order code
Voltage	Normal duty		
400 V	115 kW	175 A	SX-D4115-E1ARA4-U
	165 kW	250 A	SX-D4165-E1ARA4-U
	250 kW	375 A	SX-D4250-E1ARA4-U
	330 kW	500 A	SX-D4330-E1ARA4-U
	500 kW	750 A	SX-D4500-E1ARA4-U
	660 kW	1,000 A	SX-D4660-E1ARA4-U
	1,000 kW	1,500 A	SX-D41K0-E1ARA4-U
690 V	200 kW	175 A	SX-D6200-E1ARA4-U
	400 kW	350 A	SX-D6400-E1ARA4-U
	600 kW	525 A	SX-D6600-E1ARA4-U
	800 kW	700 A	SX-D6800-E1ARA4-U
	1,200 kW	1,050 A	SX-D61K2-E1ARA4-U

① Panel kit

Description		Function	Order code
Panel kit	Panel kit	Complete panel kit including 4-lines operator (frame D and higher)	SX-OP04K-00-E
		Complete panel kit including 2-lines operator	SX-OP02-00-E
	Blank panel kit	Complete panel kit including a blank operator (frame D and higher)	SX-OP04K-51-E
		Complete panel kit including a blank operator (frame B)	SX-OP04K-71-E
		Complete panel kit including a blank operator (frame C)	SX-OP04K-81-E
Operator	Handheld control panel	Complete handheld control panel	SX-OPHH-00-E
	Digital operator	Drive digital 4-lines operator	SX-OP04-00-E
		Drive digital 2-lines operator	SX-OP01-00-E
	Blank operator	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 drive through PROFIBUS-DP communication with the host controller	01-3876-05
DeviceNet	Used for operating the drive through DeviceNet communication with the host controller	01-3876-06
Modbus/TCP, Ethernet	Used for operating the drive through Modbus/TCP communication with the host controller	01-3876-09
EtherCAT	Used for operating the drive through EtherCAT communication with the host controller	01-3876-10
PROFINET (1-port)	Used for operating the drive 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 drive	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.