emotron
DEDICATED DRIVE
A CG Product

TECHNICAL CATALOGUE
VARIABLE FREQUENCY DRIVES



EMOTRON VFX/FDU 2.1
0.37 - 3000 KW, 230 - 690 V
IP20, IP21 AND IP54

Optimized operation and full **control**



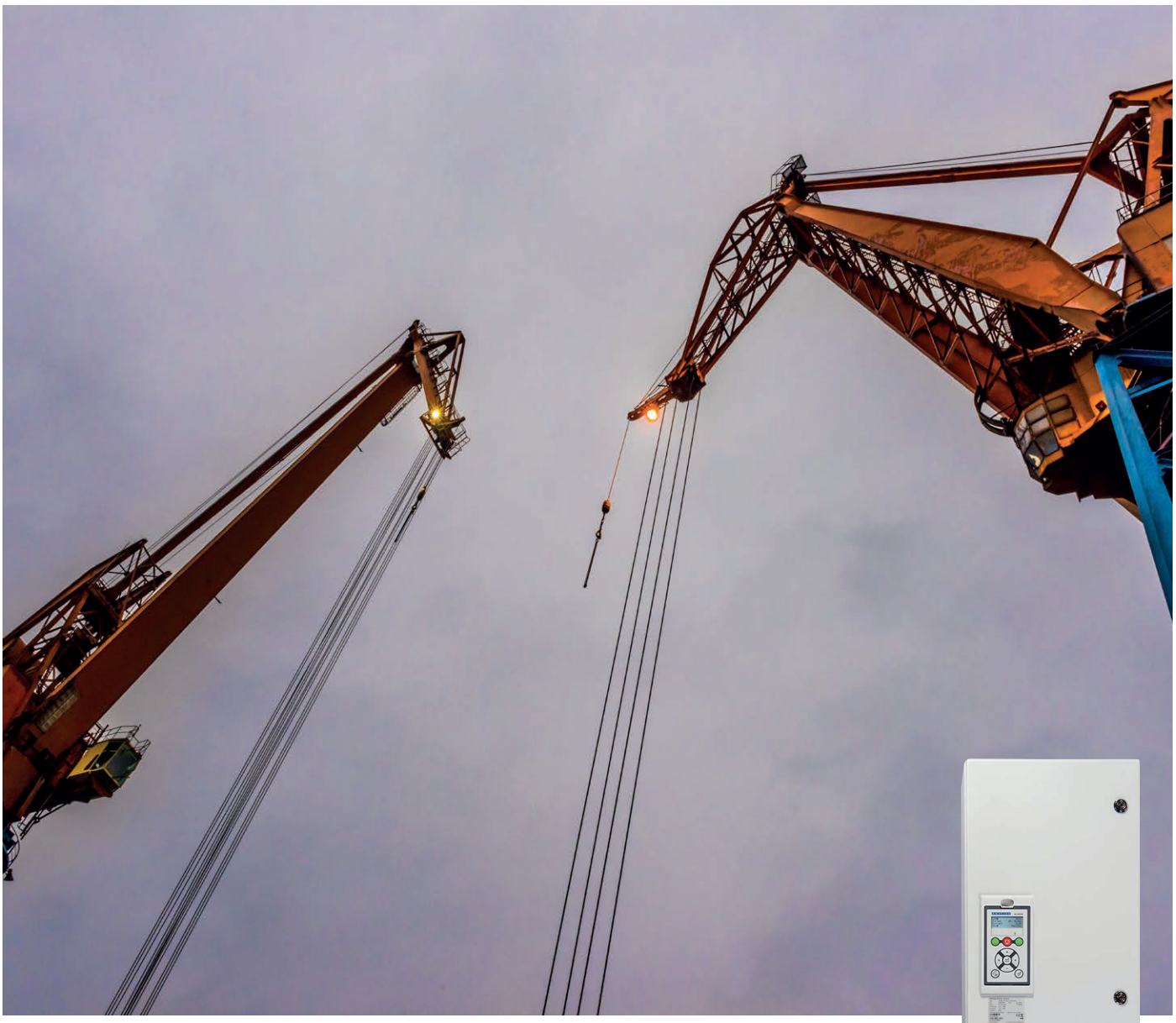
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General information overview for Emotron FDU 2.1 and VFX 2.1

Emotron FDU 2.1/VFX 2.1	IP20/21 Frame sizes C2 - FA2/C2(69)-F2(69)	IP54/20 Frame sizes B-H8/C69-T69
Power range	5.5 - 200 kW / 7.5 - 250 hp	0.37 - 3000 kW / 0.5 - 4000 hp
Voltage range	3 ph, 230 - 690 V	3 ph, 230 - 690 V
IP class	IP20/21	IP54/20
Control mode	VFX : Direct torque control or V/Hz, FDU: V/Hz	
DC choke	Standard	Standard
EMC filter	C3 is standard, C2 is optional	
Communication	RS-485 (Modbus RTU) is standard	
Coated boards	Standard	Standard
Detachable control panel - multilanguage	Standard	Standard
Options	Encoder, PTC/PT100, Extended IO Safe Torque Off (STO), External control panel, I/O interface (only VFX)	
Serial communication option	RS232/485 (Modbus RTU)	
Communication options	DeviceNet, Modbus/TCP, Profibus Profinet IO, EtherNet IP EtherCAT, CANopen	
Liquid cooling	N.a.	Optional for frame sizes E and up
IP21 top cover	Optional	N.a.

CE certification	All sizes	
UKCA certification	All sizes	
UL certification cULus certification	UL/cUL approved (480V)	
Marine certification		DNV, BV



Emotron VFX 2.1 High dynamics for demanding applications

The Emotron VFX 2.1 AC drive optimizes your process and prevents damage and downtime. The combination of direct torque control, accurate speed control, and efficient vector braking makes it the ideal solution for all dynamic and constant torque applications, such as cranes, crushers, mills, mixers, and centrifuges.

MAIN FEATURES

- Control panel with Real time clock. Optional Bluetooth & Wifi communication.
- Available as robust and certified IP54 metal construction or IP20/21 version.
- All drive sizes are delivered with a built-in Category C3 EMC-filter as standard. C3 requirements are tested with 80 m motor cable.
- Direct torque control reacts extremely quickly and eliminates disturbances due to abrupt load changes.
- Load monitor function included as standard.
- UL (UL 840) approved version available.
- Marine (DNV & BV) approved version available (only IP54).
- Integrated vector braking ensures quick and controlled stops, increasing productivity and safety.
- Built-in brake chopper is available as option for all sizes.
- Temp / Speed controlled fans assures less noise, a more even drive temperature and higher drive efficiency.
- Detachable multi-language control panel included as standard. Following languages are supported in the control panel: English, Swedish, Dutch, German, French, Spanish, Russian, Italian, Czech, Turkish and Polish.
- Operation parameters can be set in your process units, for example m/sec, tons/h or cycles/min.
- Removable control panel with own memory means it is easy to transfer or copy settings.
- Liquid cooled version available for sizes above 90 A.

Emotron VFX 2.1 - IP54 version

Typical motor power at 3-phase mains voltage 230 V (Model 48-430 and up also available as IP20).

VFX Model	Max. output current [A]*	Normal duty (120%, 1 min. every 10 min.)				Heavy duty (150%, 1 min. every 10 min.)			Frame size	IP class
		Power @ 230V [kW]	Power @ 230V [hp]	**Rated current [A]**	Power losses [kW]	Power @ 230V [kW]	Power @ 230V [hp]	Rated current [A]		
VFX48-003-54	3.8	0.37	0.5	**2.5**	0.08	0.37	0.5	2.0	B	IP54 wall mounted
VFX48-004-54	6.0	0.75	1	**4.0**	0.10	0.55	0.75	3.2		
VFX48-006-54	9.0	1.1	1.5	**6.0**	0.13	0.75	1	4.8		
VFX48-008-54	11.3	1.5	2	**7.5**	0.15	1.1	1.5	6.0		
VFX48-010-54	14.3	2.2	3	**9.5**	0.19	1.5	2	7.6		
VFX48-013-54	19.5	2.2	3	**13.0**	0.20	2.2	3	10.4		
VFX48-018-54	27.0	4	5	**18.0**	0.27	3	3	14.4		
VFX48-026-54	39	5.5	7.5	**26**	0.34	4	5	21	C	
VFX48-031-54	46	7.5	10	**31**	0.41	5.5	7.5	25		
VFX48-037-54	55	7.5	10	**37**	0.45	7.5	10	30		
VFX48-046-54	69	11	15	**46**	0.58	7.5	10	37		
VFX48-061-54	92	15	20	**61**	0.8	11	15	49	D	
VFX48-074-54	111	18.5	25	**74**	1.0	15	20	59		
VFX48-090-54	108	22	30	**90**	1.1	18.5	25	72	E	
VFX48-109-54	131	30	40	**109**	1.4	22	30	87		
VFX48-146-54	175	37	50	**146**	1.8	30	40	117		
VFX48-175-54	210	45	60	**175**	2.2	37	50	140		
VFX48-210-54	252	55	75	**210**	2.4	45	60	168	F	
VFX48-250-54	300	75	100	**250**	3.1	55	75	200		
VFX48-295-54	354	90	125	**295**	3.4	75	100	236		
VFX48-365-54	438	110	150	**365**	3.7	90	125	292	FA	
VFX48-430-IP	516	110	150	**430**	5.4	110	125	344	H	IP20 module or IP54 cabinet
VFX48-500-IP	600	160	200	**500**	6.2	110	150	400		
VFX48-590-IP	708	200	250	**590**	6.8	132	200	472	G2	
VFX48-660-IP	792	200	250	**660**	7.0	160	200	528	H2	
VFX48-730-IP	876	220	300	**730**	7.4	160	250	584		
VFX48-810-IP	972	250	350	**810**	9.4	200	250	648	G3	
VFX48-885-IP	1062	250	350	**885**	10.2	220	300	708		
VFX48-1010-IP	1212	315	400	**1010**	10.5	250	350	808	H3	
VFX48-1100-IP	1320	355	450	**1100**	11.1	250	350	880		
VFX48-1300-IP	1560	400	550	**1300**	13.3	315	450	1040	H4	
VFX48-1460-IP	1752	450	600	**1460**	14.8	355	500	1168		
VFX48-1710-IP	2052	560	750	**1710**	17.5	450	550	1368	H5	
VFX48-1820-IP	2148	600	800	**1820**	18.5	450	600	1456		
VFX48-2190-IP	2628	710	900	**2190**	22.2	560	750	1752	H6	
VFX48-2550-IP	3060	800	1100	**2550**	25.9	630	850	2040	H7	
VFX48-2920-IP	3504	900	1200	**2920**	29.6	750	1000	2336	H8	

Larger sizes available on request

* Available for a limited time and as long as drive temperature permits. Rated data at 40 °C ambient temperature

IP = Available as IP20 module or mounted in IP54 cabinet.

Emotron VFX 2.1 - IP54 version

Typical motor power at 3-phase mains voltage 400 V and 460 V (Model 48-430 and up also available as IP20).

VFX Model	Max. output current [A]*	Normal duty (120%, 1 min. every 10 min.)				Heavy duty (150%, 1 min. every 10 min.)			Frame size	IP class
		Power @ 400V [kW]	Power @ 460V [hp]	**Rated current [A]**	Power losses [kW]	Power @ 400V [kW]	Power @ 460V [hp]	Rated current [A]		
VFX48-003-54	3.8	0.75	1	**2.5**	0.09	0.55	1	2.0	B	IP 54 wall mounted
VFX48-004-54	6.0	1.5	2	**4.0**	0.11	1.1	1.5	3.2		
VFX48-006-54	9.0	2.2	3	**6.0**	0.14	1.5	2	4.8		
VFX48-008-54	11.3	3	3	**7.5**	0.17	2.2	3	6.0		
VFX48-010-54	14.3	4	5	**9.5**	0.22	3	3	7.6		
VFX48-013-54	19.5	5.5	7.5	**13.0**	0.24	4	5	10.4		
VFX48-018-54	27.0	7.5	10	**18.0**	0.31	5.5	7.5	14.4		
VFX48-026-54	39	11	15	**26**	0.38	7.5	10	21	C	
VFX48-031-54	46	15	20	**31**	0.45	11	15	25		
VFX48-037-54	55	18.5	25	**37**	0.50	15	20	30		
VFX48-046-54	69	22	30	**46**	0.64	18.5	25	37		
VFX48-061-54	92	30	40	**61**	0.9	22	30	49	D	
VFX48-074-54	111	37	50	**74**	1.0	30	40	59		
VFX48-090-54	108	45	60	**90**	1.2	37	50	72	E	
VFX48-109-54	131	55	75	**109**	1.5	45	60	87		
VFX48-146-54	175	75	100	**146**	2.0	55	75	117		
VFX48-175-54	210	90	125	**175**	2.4	75	100	140		
VFX48-210-54	252	110	150	**210**	2.7	90	125	168	F	
VFX48-250-54	300	132	200	**250**	3.3	110	150	200		
VFX48-295-54	354	160	250	**295**	3.6	132	200	236		
VFX48-365-54	438	200	300	**365**	4.0	160	250	292	FA	
VFX48-430-IP	516	220	350	**430**	5.5	200	250	344	H	IP20 module or IP54 cabinet
VFX48-500-IP	600	250	400	**500**	6.7	220	350	400		
VFX48-590-IP	708	315	500	**590**	7.2	250	400	472	G2	
VFX48-660-IP	792	355	550	**660**	7.4	250	450	528	H2	
VFX48-730-IP	876	400	600	**730**	8.0	315	500	584		
VFX48-810-IP	972	450	700	**810**	9.9	355	550	648	G3	
VFX48-885-IP	1062	500	750	**885**	10.8	400	600	708		
VFX48-1010-IP	1212	560	800	**1010**	11.1	450	700	808	H3	
VFX48-1100-IP	1320	630	900	**1100**	12.0	500	750	880		
VFX48-1300-IP	1560	710	1100	**1300**	14.3	560	800	1040	H4	
VFX48-1460-IP	1752	800	1250	**1460**	16.0	630	1000	1168		
VFX48-1710-IP	2052	900	1500	**1710**	18.9	750	1200	1368	H5	
VFX48-1820-IP	2184	1000	1600	**1820**	20.0	800	1250	1456		
VFX48-2190-IP	2628	1200	1900	**2190**	24.0	1000	1500	1752	H6	
VFX48-2550-IP	3060	1400	2100	**2550**	28.0	1120	1700	2040	H7	
VFX48-2920-IP	3504	1600	2500	**2920**	32.0	1300	2000	2336	H8	

Larger sizes available on request

* Available for a limited time and as long as drive temperature permits. Rated data at 40 °C ambient temperature

IP = Available as IP20 module or mounted in IP54 cabinet.

Emotron VFX 2.1 - IP54 version

Typical motor power at 3-phase mains voltage 525 V Model 69-250 and up also available as IP20).

VFX Model	Max. output current [A]*	Normal duty (120%, 1 min. every 10 min.)			Heavy duty (150%, 1 min. every 10 min.)		Frame size	IP class
		Power @525 V [kW]	**Rated current [A]**	Power losses [kW]	Power @525 V [kW]	Rated current [A]		
VFX52-003-54	3.8	1.1	**2.5**	0.10	1.1	2.0	B	IP54 wall mounted
VFX52-004-54	6.0	2.2	**4.0**	0.12	1.5	3.2		
VFX52-006-54	9.0	3	**6.0**	0.15	2.2	4.8		
VFX52-008-54	11.3	4	**7.5**	0.19	3	6.0		
VFX52-010-54	14.3	5.5	**9.5**	0.25	4	7.6		
VFX52-013-54	19.5	7.5	**13.0**	0.26	5.5	10.4		
VFX52-018-54	27.0	11	**18.0**	0.34	7.5	14.4		
VFX52-026-54	39	15	**26**	0.40	11	21	C	
VFX52-031-54	46	18.5	**31**	0.48	15	25		
VFX52-037-54	55	22	**37**	0.54	18.5	30		
VFX52-046-54	69	30	**46**	0.68	22	37		
VFX52-061-54	92	37	**61**	0.9	30	49	D	
VFX52-074-54	111	45	**74**	1.1	37	59		
VFX69-082-54	98	55	**82**	1.5	45	66	F69	
VFX69-090-54	108	55	**90**	1.7	45	72		
VFX69-109-54	131	75	**109**	2.0	55	87		
VFX69-146-54	175	90	**146**	2.6	75	117		
VFX69-175-54	210	110	**175**	3.0	90	140		
VFX69-200-54	240	132	**200**	3.4	110	160		
VFX69-250-IP	300	160	**250**	4.3	132	200	H69 (2)	IP20 module or IP54 cabinet
VFX69-300-IP	360	200	**300**	5.3	160	240		
VFX69-375-IP	450	250	**375**	6.4	200	300		
VFX69-400-IP	480	250	**400**	6.9	220	320		
VFX69-430-IP	516	300	**430**	7.7	250	344	I69 (3)	
VFX69-500-IP	600	315	**500**	8.6	300	400		
VFX69-595-IP	720	400	**600**	10.4	315	480		
VFX69-650-IP	780	450	**650**	11.3	355	520	J69 (4)	
VFX69-720-IP	864	500	**720**	12.4	400	576		
VFX69-800-IP	960	560	**800**	13.8	450	640		
VFX69-995-IP	1200	630	**1000**	17.3	500	800	KA69 (5)	
VFX69-1K2-IP	1440	800	**1200**	20.7	630	960	K69 (6)	
VFX69-1K4-IP	1680	1000	**1400**	24.2	800	1120	L69 (7)	
VFX69-1K6-IP	1920	1100	**1600**	27.6	900	1280	M69 (8)	
VFX69-1K8-IP	2160	1300	**1800**	31.1	1000	1440	N69 (9)	
VFX69-2K0-IP	2400	1400	**2000**	34.6	1100	1600	O69 (10)	
VFX69-2K2-IP	2640	1600	**2200**	38.0	1200	1760	P69 (11)	
VFX69-2K4-IP	2880	1700	**2400**	41.4	1400	1920	Q69 (12)	
VFX69-2K6-IP	3120	1900	**2600**	44.9	1500	2080	R69 (13)	
VFX69-2K8-IP	3360	2000	**2800**	48.4	1600	2240	S69 (14)	
VFX69-3K0-IP	3600	2200	**3000**	51.8	1700	2400	T69 (15)	

* Available for a limited time and as long as drive temperature permits. Rated data at 40 °C ambient temperature.
** Number in parenthesis, e.g. H69 (2), indicates number of parallel power modules.
IP = Available as IP20 module or mounted in IP54 cabinet.

Emotron VFX 2.1 - IP54 version

Typical motor power at 3-phase mains voltage 575 V and 690 V (Model 69-250 and up also available as IP20).

VFX Model	Max output current [A]*	Normal duty (120%, 1 min. every 10 min.)				Heavy duty (150%, 1 min. every 10 min.)			Frame size	IP class
		Power @ 575V [hp]	Power @ 690V [kW]	**Rated current [A]**	Power losses [kW]	Power @ 575 V [hp]	Power @ 690V [kW]	Rated current [A]		
VFX69-033-54	53	30	30	**33**	0.90	25	22	26	D69	
VFX69-042-54	67	40	37	**42**	1.08	30	30	34		
VFX69-050-54	80	50	45	**50**	1.14	40	37	40		
VFX69-058-54	93	60	55	**58**	1.30	40	45	46		
VFX69-082-54	98	75	75	**82**	1.8	60	55	66	F69	
VFX69-090-54	108	75	90	**90**	1.9	60	75	72		
VFX69-109-54	131	100	110	**109**	2.3	75	90	87		
VFX69-146-54	175	125	132	**146**	2.9	100	110	117		
VFX69-175-54	210	150	160	**175**	3.4	125	132	140		
VFX69-200-54	240	200	200	**200**	3.9	150	160	160		
VFX69-250-IP	300	250	250	**250**	4.9	200	200	200	H69 (2)	IP20 module or IP54 cabinet
VFX69-300-IP	360	300	315	**300**	6.0	250	250	240		
VFX69-375-IP	450	350	355	**375**	7.2	300	315	300		
VFX69-400-IP	480	400	400	**400**	7.7	300	315	320		
VFX69-430-IP	516	400	450	**430**	8.8	350	315	344	I69 (3)	
VFX69-500-IP	600	500	500	**500**	9.7	400	355	400		
VFX69-595-IP	720	600	600	**600**	11.6	500	450	480		
VFX69-650-IP	780	650	630	**650**	12.8	550	500	520	J69 (4)	
VFX69-720-IP	864	750	710	**720**	14.0	600	560	576		
VFX69-800-IP	960	850	800	**800**	15.5	650	630	640		
VFX69-905-IP	1080	950	900	**900**	17.5	750	710	720	KA69 (5)	
VFX69-995-IP	1200	1000	1000	**1000**	19.4	850	800	800		
VFX69-1K2-IP	1440	1200	1200	**1200**	23.2	1000	900	960	K69 (6)	
VFX69-1K4-IP	1680	1500	1400	**1400**	27.2	1200	1120	1120	L69 (7)	
VFX69-1K6-IP	1920	1700	1600	**1600**	31.1	1300	1250	1280	M69 (8)	
VFX69-1K8-IP	2160	1900	1800	**1800**	35.0	1500	1400	1440	N69 (9)	
VFX69-2K0-IP	2400	2100	2000	**2000**	38.8	1700	1600	1600	O69 (10)	
VFX69-2K2-IP	2640	2300	2200	**2200**	42.7	1800	1700	1760	P69 (11)	
VFX69-2K4-IP	2880	2500	2400	**2400**	46.6	2000	1900	1920	Q69 (12)	
VFX69-2K6-IP	3120	2700	2600	**2600**	50.5	2200	2000	2080	R69 (13)	
VFX69-2K8-IP	3360	3000	2800	**2800**	54.4	2400	2200	2240	S69 (14)	
VFX69-3K0-IP	3600	3200	3000	**3000**	58.3	2500	2400	2400	T69 (15)	

* Available for a limited time and as long as drive temperature permits. Rated data at 40 °C ambient temperature
** Number in parenthesis, e.g. H69 (2), indicates number of parallel power modules.
IP = Available as IP20 module or mounted in IP54 cabinet.

Emotron VFX 2.1 - IP20 version

Typical motor power at 3-phase mains voltage 230 V.

VFX Model	Max. output current [A]*	Normal duty (120%, 1 min every 10 min)				Heavy duty (150%, 1 min every 10 min)			Frame size
		Power @ 230V [kW]	Power @230V [hp]	**Rated current [A]**	Power losses [kW]	Power @ 230V [kW]	Power @230V [hp]	Rated current [A]	
VFX48-025-20	38	5.5	7.5	**25**	0.35	4	5	20	C2
VFX48-030-20	45	7.5	10	**30**	0.44	5.5	7.5	24	
VFX48-036-20	54	7.5	10	**36**	0.46	7.5	10	29	
VFX48-045-20	68	11	15	**45**	0.60	7.5	10	36	
VFX48-058-20**	68	15	20	**58**	0.77	11	15	46	
VFX48-060-20	90	15	20	**60**	0.8	11	15	48	D2
VFX48-072-20	108	18.5	25	**72**	0.9	15	20	58	
VFX48-088-20	132	22	30	**88**	1.2	18.5	25	70	
VFX48-105-20**	132	30	40	**105**	1.3	22	30	84	
VFX48-142-20	170	37	50	**142**	1.7	30	40	114	E2
VFX48-145-20	170	37	50	**145**	1.7	30	40	114	E4
VFX48-171-20**	205	45	60	**171**	2.1	37	50	137	E2
VFX48-174-20	205	45	60	**174**	2.1	37	50	137	E4
VFX48-205-20	246	55	75	**205**	2.3	45	60	164	F2
VFX48-244-20**	293	75	100	**244**	3.0	55	75	195	
VFX48-293-20	352	90	125	**293**	3.4	75	100	235	
VFX48-365-20***	438	110	150	**365**	3.7	90	125	292	FA2

Please note that frame size E4 is only available on the Indian market and is not UL or Marine approved

* Rated data at an ambient temperature of 50 °C without deration.

* Available during a limited time and as long as allowed by the drive temperature.

** Rated data at 40 °C without deration

*** Rated data at 45 °C without deration



Emotron VFX 2.1 - IP20 version

Typical motor power at 3-phase mains voltage 400 and 460 V.

VFX Model	Max. output current [A]*	Normal duty (120%, 1 min every 10 min)				Heavy duty (150%, 1 min every 10 min)			Frame size
		Power @ 400V [kW]	Power @460V [hp]	**Rated current [A]**	Power losses [kW]	Power @ 400V [kW]	Power @460V [hp]	Rated current [A]	
VFX48-025-20	38	11	15	**25**	0.39	7.5	10	20	C2
VFX48-030-20	45	15	20	**30**	0.48	11	15	24	
VFX48-036-20	54	18.5	25	**36**	0.51	15	20	29	
VFX48-045-20	68	22	30	**45**	0.66	18.5	25	36	
VFX48-058-20**	68	30	40	**58**	0.85	22	30	46	
VFX48-060-20	90	30	40	**60**	0.9	22	30	48	D2
VFX48-072-20	108	37	50	**72**	1.0	30	40	58	
VFX48-088-20	132	45	60	**88**	1.3	37	50	70	
VFX48-105-20**	132	55	75	**105**	1.4	45	60	84	
VFX48-142-20	170	75	100	**142**	1.9	55	75	114	E2
VFX48-145-20	170	75	100	**145**	1.9	55	75	114	E4
VFX48-171-20**	205	90	125	**171**	2.3	75	100	137	E2
VFX48-174-20	205	90	125	**174**	2.3	75	100	137	E4
VFX48-205-20	246	110	150	**205**	2.6	90	125	164	F2
VFX48-244-20**	293	132	200	**244**	3.2	110	150	195	
VFX48-293-20	352	160	250	**293**	3.6	132	200	235	
VFX48-365-20***	438	200	300	**365**	4.1	160	250	292	FA2

Please note that frame size E4 is only available on the Indian market and is not UL or Marine approved

* Rated data at an ambient temperature of 50 °C without deration.

* Available during a limited time and as long as allowed by the drive temperature.

** Rated data at 40 °C without deration

*** Rated data at 45 °C without deration



Emotron VFX 2.1 - IP20 version

Typical motor power at 3-phase mains voltage 575 V and 690 V.

VFX Model	Max. output current [A]*	Normal duty (120%, 1 min. every 10 min.)				Heavy duty (150%, 1 min. every 10 min.)			Frame size
		Power @ 575V [hp]	Power @ 690V [kW]	**Rated current [A]**	Power losses [kW]	Power @ 575 V [hp]	Power @ 690V [kW]	Rated current [A]	
VFX69-033-20	53	30	30	**33**	0.90	25	22	26	D2(69)
VFX69-042-20	67	40	37	**42**	1.08	30	30	34	
VFX69-050-20	80	50	45	**50**	1.14	40	37	40	
VFX69-058-20	93	60	55	**58**	1.30	40	45	46	

* Available for a limited time and as long as drive temperature permits. Rated data at 40 °C ambient temperature.





Emotron FDU 2.1 Secure the flow and save energy

The Emotron FDU 2.1 AC drive is specially developed for controlling variable torque loads such as flow and pressure applications. It continuously adapts motor speed to the level required, minimizing energy consumption and wear. A unique monitoring functionality protects your process from damage and unplanned downtime. Typical applications are pumps, fans, compressors, and blowers.

MAIN FEATURES

- Control panel with Real time clock. Optional Bluetooth & Wifi communication.
- Available as robust and certified IP54 metal construction or IP20/21 version.
- All drive sizes are delivered with built-in Category C3 EMC-filter as standard. C3 requirements are tested with 80 m motor cable.
- Soft starts minimize start currents and linear stops prevent water hammer.
- One Emotron FDU can control up to seven pumps/fans without external control systems.
- Energy saving function pauses the motor when it is not required to run to maintain pressure.
- Efficiency is increased by setting the pump to run at full speed at certain intervals to rinse out sludge.
- Temp/Speed controlled fans assures less noise, a more even drive temperature and higher efficiency.
- Load monitor function included as standard.
- Detachable multi-language control panel included as standard. Following languages are supported in the control panel: English, Swedish, Dutch, German, French, Spanish, Russian, Italian, Czech, Turkish and Polish.
- Operation parameters can be set in your process units, for example m3/min. and bar.
- Removable control panel with own memory means it is easy to transfer or copy settings.
- UL (UL 840) approved version available.
- Marine (DNV & BV) approved version available (only IP54).
- Liquid cooled version available for sizes above 90 A.

Emotron FDU 2.1 - IP54 version

Typical motor power at 3-phase mains voltage 230 V (Model 48-430 and up also available as IP20).

FDU Model	Max. output current [A]*	Normal duty (120%, 1 min. every 10 min.)				Heavy duty (150%, 1 min. every 10 min.)			Frame size	IP class
		Power @ 230V [kW]	Power @ 230V [hp]	**Rated current [A]**	Power losses [kW]	Power @ 230V [kW]	Power @ 230V [hp]	Rated current [A]		
FDU48-003-54	3.0	0.37	0.5	**2.5**	0.08	0.37	0.5	2.0	B	IP54 wall mounted
FDU48-004-54	4.8	0.75	1	**4.0**	0.10	0.55	0.75	3.2		
FDU48-006-54	7.2	1.1	1.5	**6.0**	0.13	0.75	1	4.8		
FDU48-008-54	9.0	1.5	2	**7.5**	0.15	1.1	1.5	6.0		
FDU48-010-54	11.4	2.2	3	**9.5**	0.19	1.5	2	7.6		
FDU48-013-54	15.6	2.2	3	**13.0**	0.20	2.2	3	10.4		
FDU48-018-54	21.6	4	5	**18.0**	0.27	3	3	14.4		
FDU48-026-54	31	5.5	7.5	**26**	0.34	4	5	21	C	
FDU48-031-54	37	7.5	10	**31**	0.41	5.5	7.5	25		
FDU48-037-54	44	7.5	10	**37**	0.45	7.5	10	30		
FDU48-046-54	55	11	15	**46**	0.58	7.5	10	37		
FDU48-061-54	73	15	20	**61**	0.8	11	15	49	D	
FDU48-074-54	89	18.5	25	**74**	1.0	15	20	59		
FDU48-090-54	108	22	30	**90**	1.1	18.5	25	72	E	
FDU48-109-54	131	30	40	**109**	1.4	22	30	87		
FDU48-146-54	175	37	50	**146**	1.8	30	40	117		
FDU48-175-54	210	45	60	**175**	2.2	37	50	140		
FDU48-210-54	252	55	75	**210**	2.4	45	60	168	F	
FDU48-250-54	300	75	100	**250**	3.1	55	75	200		
FDU48-295-54	354	90	125	**295**	3.4	75	100	236		
FDU48-365-54	438	110	150	**365**	3.7	90	125	292	FA	
FDU48-430-IP	516	110	150	**430**	5.4	110	125	344	H	IP20 module or IP54 cabinet
FDU48-500-IP	600	160	200	**500**	6.2	110	150	400		
FDU48-590-IP	708	200	250	**590**	6.8	132	200	472	G2	
FDU48-660-IP	792	200	250	**660**	7.0	160	200	528	H2	
FDU48-730-IP	876	220	300	**730**	7.4	160	250	584		
FDU48-810-IP	972	250	350	**810**	9.4	200	250	648	G3	
FDU48-885-IP	1062	250	350	**885**	10.2	220	300	708		
FDU48-1010-IP	1212	315	400	**1010**	10.5	250	350	808	H3	
FDU48-1100-IP	1320	355	450	**1100**	11.1	250	350	880		
FDU48-1300-IP	1560	400	550	**1300**	13.3	315	450	1040	H4	
FDU48-1460-IP	1752	450	600	**1460**	14.8	355	500	1168		
FDU48-1710-IP	2052	560	750	**1710**	17.5	450	550	1368	H5	
FDU48-1820-IP	2184	600	800	**1820**	18.5	450	600	1456		
FDU48-2190-IP	2628	710	900	**2190**	22.2	560	750	1752	H6	
FDU48-2550-IP	3060	800	1100	**2550**	25.9	630	850	2040	H7	
FDU48-2920-IP	3504	900	1200	**2920**	29.6	750	1000	2336	H8	

Larger sizes available on request

* Available for a limited time and as long as drive temperature permits. Rated data at 40 °C ambient temperature

IP = Available as IP20 module or mounted in IP54 cabinet.

Emotron FDU 2.1 - IP54 version

Typical motor power at 3-phase mains voltage 400 V and 460 V (Model 48-430 and up also available as IP20).

FDU Model	Max. output current [A]*	Normal duty (120%, 1 min. every 10 min.)				Heavy duty (150%, 1 min. every 10 min.)			Frame size	IP class
		Power @ 400V [kW]	Power @ 460V [hp]	**Rated current [A]**	Power losses [kW]	Power @ 400V [kW]	Power @ 460V [hp]	Rated current [A]		
FDU48-003-54	3.0	0.75	1	**2.5**	0.09	0.55	1	2.0	B	IP54 wall mounted
FDU48-004-54	4.8	1.5	2	**4.0**	0.11	1.1	1.5	3.2		
FDU48-006-54	7.2	2.2	3	**6.0**	0.14	1.5	2	4.8		
FDU48-008-54	9.0	3	3	**7.5**	0.17	2.2	3	6.0		
FDU48-010-54	11.4	4	5	**9.5**	0.22	3	3	7.6		
FDU48-013-54	15.6	5.5	7.5	**13.0**	0.24	4	5	10.4		
FDU48-018-54	21.6	7.5	10	**18.0**	0.31	5.5	7.5	14.4		
FDU48-026-54	31	11	15	**26**	0.38	7.5	10	21	C	
FDU48-031-54	37	15	20	**31**	0.45	11	15	25		
FDU48-037-54	44	18.5	25	**37**	0.50	15	20	30		
FDU48-046-54	55	22	30	**46**	0.64	18.5	25	37		
FDU48-061-54	73	30	40	**61**	0.9	22	30	49	D	
FDU48-074-54	89	37	50	**74**	1.0	30	40	59		
FDU48-090-54	108	45	60	**90**	1.2	37	50	72	E	
FDU48-109-54	131	55	75	**109**	1.5	45	60	87		
FDU48-146-54	175	75	100	**146**	2.0	55	75	117		
FDU48-175-54	210	90	125	**175**	2.4	75	100	140		
FDU48-210-54	252	110	150	**210**	2.7	90	125	168	F	
FDU48-250-54	300	132	200	**250**	3.3	110	150	200		
FDU48-295-54	354	160	250	**295**	3.6	132	200	236		
FDU48-365-54	438	200	300	**365**	4.0	160	250	292	FA	
FDU48-430-IP	516	220	350	**430**	5.5	200	250	344	H	IP20 module or IP54 cabinet
FDU48-500-IP	600	250	400	**500**	6.7	220	350	400		
FDU48-590-IP	708	315	500	**590**	7.2	250	400	472	G2	
FDU48-660-IP	792	355	550	**660**	7.4	250	450	528	H2	
FDU48-730-IP	876	400	600	**730**	8.0	315	500	584		
FDU48-810-IP	972	450	700	**810**	9.9	355	550	648	G3	
FDU48-885-IP	1062	500	750	**885**	10.8	400	600	708		
FDU48-1010-IP	1212	560	800	**1010**	11.1	450	700	808	H3	
FDU48-1100-IP	1320	630	900	**1100**	12.0	500	750	880		
FDU48-1300-IP	1560	710	1100	**1300**	14.3	560	800	1040	H4	
FDU48-1460-IP	1752	800	1250	**1460**	16.0	630	1000	1168		
FDU48-1710-IP	2052	900	1500	**1710**	18.9	750	1200	1368	H5	
FDU48-1820-IP	2184	1000	1600	**1820**	20.0	800	1250	1456		
FDU48-2190-IP	2628	1200	1900	**2190**	24.0	1000	1500	1752	H6	
FDU48-2550-IP	3060	1400	2100	**2550**	28.0	1120	1700	2040	H7	
FDU48-2920-IP	3504	1600	2500	**2920**	32.0	1300	2000	2336	H8	

Larger sizes available on request
* Available for a limited time and as long as drive temperature permits. Rated data at 40 °C ambient temperature.
IP = Available as IP20 module or mounted in IP54 cabinet.

Emotron FDU 2.1 - IP54 version

Typical motor power at 3-phase mains voltage 525 V (Model 69-250 and up also available as IP20).

FDU Model	Max. output current [A]*	Normal duty (120%, 1 min. every 10 min.)			Heavy duty (150%, 1 min. every 10 min.)		Frame size	IP class
		Power @ 525 V [kW]	Rated current [A]	Power losses [kW]	Power @ 525 V [kW]	Rated current [A]		
FDU52-003-54	3.0	1.1	**2.5**	0.10	1.1	2.0	B	IP54 wall mounted
FDU52-004-54	4.8	2.2	**4.0**	0.12	1.5	3.2		
FDU52-006-54	7.2	3	**6.0**	0.15	2.2	4.8		
FDU52-008-54	9.0	4	**7.5**	0.19	3	6.0		
FDU52-010-54	11.4	5.5	**9.5**	0.25	4	7.6		
FDU52-013-54	15.6	7.5	**13.0**	0.26	5.5	10.4		
FDU52-018-54	21.6	11	**18.0**	0.34	7.5	14.4		
FDU52-026-54	31	15	**26**	0.40	11	21	C	
FDU52-031-54	37	18.5	**31**	0.48	15	25		
FDU52-037-54	44	22	**37**	0.54	18.5	29.6		
FDU52-046-54	55	30	**46**	0.68	22	37		
FDU52-061-54	73	37	**61**	0.9	30	49	D	
FDU52-074-54	89	45	**74**	1.1	37	59		
FDU69-082 -54	98	55	**82**	1.5	45	66	F69	
FDU69-090 -54	108	55	**90**	1.7	45	72		
FDU69-109-54	131	75	**109**	2.0	55	87		
FDU69-146-54	175	90	**146**	2.6	75	117		
FDU69-175-54	210	110	**175**	3.0	90	140		
FDU69-200-54	240	132	**200**	3.4	110	160		
FDU69-250-IP	300	160	**250**	4.3	132	200	H69 (2)	IP20 module or IP54 cabinet
FDU69-300-IP	360	200	**300**	5.3	160	240		
FDU69-375-IP	450	250	**375**	6.4	200	300		
FDU69-400-IP	480	250	**400**	6.9	220	320		
FDU69-430-IP	516	300	**430**	7.7	250	344	I69 (3)	
FDU69-500-IP	600	315	**500**	8.6	300	400		
FDU69-595-IP	720	400	**600**	10.4	315	480		
FDU69-650-IP	780	450	**650**	11.3	355	520	J69 (4)	
FDU69-720-IP	864	500	**720**	12.4	400	576		
FDU69-800-IP	960	560	**800**	13.8	450	640		
FDU69-995-IP	1200	630	**1000**	17.3	500	800	KA69 (5)	
FDU69-1K2-IP	1440	800	**1200**	20.7	630	960	K69 (6)	
FDU69-1K4-IP	1680	1000	**1400**	24.2	800	1120	L69 (7)	
FDU69-1K6-IP	1920	1100	**1600**	27.6	900	1280	M69 (8)	
FDU69-1K8-IP	2160	1300	**1800**	31.1	1000	1440	N69 (9)	
FDU69-2K0-IP	2400	1400	**2000**	34.6	1100	1600	O69 (10)	
FDU69-2K2-IP	2640	1600	**2200**	38.0	1200	1760	P69 (11)	
FDU69-2K4-IP	2880	1700	**2400**	41.4	1400	1920	Q69 (12)	
FDU69-2K6-IP	3120	1900	**2600**	44.9	1500	2080	R69 (13)	
FDU69-2K8-IP	3360	2000	**2800**	48.4	1600	2240	S69 (14)	
FDU69-3K0-IP	3600	2200	**3000**	51.8	1700	2400	T69 (15)	

* Available for a limited time and as long as drive temperature permits. Rated data at 40 °C ambient temperature.
** Number in parenthesis, e.g. H69(2), indicates number of parallel power modules.
IP = Available as IP20 module or mounted in IP54 cabinet.

Emotron FDU 2.1 - IP54 version

Typical motor power at 3-phase mains voltage 575 V and 690 V (Model 69-250 and up also available as IP20).

FDU Model	Max. output current [A]*	Normal duty (120%, 1 min. every 10 min.)				Heavy duty (150%, 1 min. every 10 min.)			Frame size	IP class
		Power @ 575V [hp]	Power @ 690V [kW]	Rated current [A]	Power losses [kW]	Power @ 575V [hp]	Power @ 690V [kW]	Rated current [A]		
FDU69-033-54	53	30	30	**33**	0.90	25	22	26	D69	IP54 wall mounted
FDU69-042-54	67	40	37	**42**	1.08	30	30	34		
FDU69-050-54	80	50	45	**50**	1.14	40	37	40		
FDU69-058-54	93	60	55	**58**	1.30	40	45	46		
FDU69-082-54	98	75	75	**82**	1.8	60	55	66	F69	
FDU69-090-54	108	75	90	**90**	1.9	60	75	72		
FDU69-109-54	131	100	110	**109**	2.3	75	90	87		
FDU69-146-54	175	125	132	**146**	2.9	100	110	117		
FDU69-175-54	210	150	160	**175**	3.4	125	132	140		
FDU69-200-54	240	200	200	**200**	3.9	150	160	160		
FDU69-250-IP	300	250	250	**250**	4.9	200	200	200	H69 (2)	IP20 module or IP54 cabinet
FDU69-300-IP	360	300	315	**300**	6.0	250	250	240		
FDU69-375-IP	450	350	355	**375**	7.2	300	315	300		
FDU69-400-IP	480	400	400	**400**	7.7	300	315	320		
FDU69-430-IP	516	400	450	**430**	8.8	350	315	344	I69 (3)	
FDU69-500-IP	600	500	500	**500**	9.7	400	355	400		
FDU69-595-IP	720	600	600	**600**	11.6	500	450	480		
FDU69-650-IP	780	650	630	**650**	12.8	550	500	520	J69 (4)	
FDU69-720-IP	864	750	710	**720**	14.0	600	560	576		
FDU69-800-IP	960	850	800	**800**	15.5	650	630	640		
FDU69-905-IP	1080	950	900	**900**	17.5	750	710	720	KA69 (5)	
FDU69-995-IP	1200	1000	1000	**1000**	19.4	850	800	800		
FDU69-1K2-IP	1440	1200	1200	**1200**	23.2	1000	900	960	K69 (6)	
FDU69-1K4-IP	1680	1500	1400	**1400**	27.2	1200	1120	1120	L69 (7)	
FDU69-1K6-IP	1920	1700	1600	**1600**	31.1	1300	1250	1280	M69 (8)	
FDU69-1K8-IP	2160	1900	1800	**1800**	35.0	1500	1400	1440	N69 (9)	
FDU69-2K0-IP	2400	2100	2000	**2000**	38.8	1700	1600	1600	O69 (10)	
FDU69-2K2-IP	2640	2300	2200	**2200**	42.7	1800	1700	1760	P69 (11)	
FDU69-2K4-IP	2880	2500	2400	**2400**	46.6	2000	1900	1920	Q69 (12)	
FDU69-2K6-IP	3120	2700	2600	**2600**	50.5	2200	2000	2080	R69 (13)	
FDU69-2K8-IP	3360	3000	2800	**2800**	54.4	2400	2200	2240	S69 (14)	
FDU69-3K0-IP	3600	3200	3000	**3000**	58.3	2500	2400	2400	T69 (15)	

* Available for a limited time and as long as drive temperature permits. Rated data at 40 °C ambient temperature.
** Number in parenthesis, e.g. H69 (2), indicates number of parallel power modules.
IP = Available as IP20 module or mounted in IP54 cabinet.

Emotron FDU 2.1 - IP20 version

Typical motor power at 3-phase mains voltage 230 V.

FDU Model	Max. output current [A]*	Normal duty (120%, 1 min every 10 min)				Heavy duty (150%, 1 min every 10 min)			Frame size
		Power @ 230V [kW]	Power @230V [hp]	Rated current [A]	Power losses (kW)	Power @ 230V [kW]	Power @230V [hp]	Rated current [A]	
FDU48-025-20	30	5.5	7.5	**25**	0.35	4	5	20	C2
FDU48-030-20	36	7.5	10	**30**	0.44	5.5	7.5	24	
FDU48-036-20	43	7.5	10	**36**	0.46	7.5	10	29	
FDU48-045-20	54	11	15	**45**	0.60	7.5	10	36	
FDU48-058-20**	68	15	20	**58**	0.77	11	15	46	
FDU48-072-20	86	18.5	25	**72**	0.9	15	20	58	D2
FDU48-088-20	106	22	30	**88**	1.2	18.5	25	70	
FDU48-105-20**	126	30	40	**105**	1.3	22	30	84	
FDU48-142-20	170	37	50	**142**	1.7	30	40	114	E2
FDU48-145-20	170	37	50	**145**	1.7	30	40	114	E4
FDU48-171-20**	205	45	60	**171**	2.1	37	50	137	E2
FDU48-174-20	205	45	60	**174**	2.1	37	50	137	E4
FDU48-205-20	246	55	75	**205**	2.3	45	60	164	F2
FDU48-244-20**	293	75	100	**244**	3.0	55	75	195	
FDU48-293-20	352	90	125	**293**	3.4	75	100	235	
FDU48-365-20***	438	110	150	**365**	3.7	90	125	292	FA2

Please note that frame size E4 is only available on the Indian market and is not UL or Marine approved

Rated data at an ambient temperature of 50 °C without deration.

* Available during a limited time and as long as allowed by the drive temperature.

** Rated data at 40 °C without deration

*** Rated data at 45 °C without deration



Emotron FDU 2.1 - IP20 version

Typical motor power at 3-phase mains voltage 400 and 460 V.

FDU Model	Max. output current [A]*	Normal duty (120%, 1 min every 10 min)				Heavy duty (150%, 1 min every 10 min)			Frame size
		Power @ 400V [kW]	Power @460V [hp]	Rated current [A]	Power losses [kW]	Power @ 400V [kW]	Power @460V [hp]	Rated current [A]	
FDU48-025-20	30	11	15	**25**	0.39	7.5	10	20	C2
FDU48-030-20	36	15	20	**30**	0.48	11	15	24	
FDU48-036-20	43	18.5	25	**36**	0.51	15	20	29	
FDU48-045-20	54	22	30	**45**	0.66	18.5	25	36	
FDU48-058-20**	68	30	40	**58**	0.85	22	30	46	
FDU48-072-20	86	37	50	**72**	1.0	30	40	58	D2
FDU48-088-20	106	45	60	**88**	1.3	37	50	70	
FDU48-105-20**	127	55	75	**105**	1.4	45	60	84	
FDU48-142-20	170	75	100	**142**	1.9	55	75	114	E2
FDU48-145-20	170	75	100	**145**	1.9	55	75	114	E4
FDU48-171-20**	205	90	125	**171**	2.3	75	100	137	E2
FDU48-174-20	205	90	125	**174**	2.3	75	100	137	E4
FDU48-205-20	246	110	150	**205**	2.6	90	125	164	F2
FDU48-244-20**	293	132	200	**244**	3.2	110	150	195	
FDU48-293-20	352	160	250	**293**	3.6	132	200	235	
FDU48-365-20 ***	438	200	300	**365**	4.1	160	250	292	FA2

Please note that frame size E4 is only available on the Indian market and is not UL or Marine approved
Rated data at an ambient temperature of 50 °C without deration.
* Available during a limited time and as long as allowed by the drive temperature.
** Rated data at 40 °C without deration
*** Rated data at 45 °C without deration



Emotron FDU 2.1- IP20 version

Typical motor power at 3-phase mains voltage 575 V and 690 V.

FDU Model	Max. output current [A]*	Normal duty (120%, 1 min. every 10 min.)				Heavy duty (150%, 1 min. every 10 min.)			Frame size
		Power @ 575V [hp]	Power @ 690V [kW]	**Rated current [A]**	Power losses [kW]	Power @ 575 V [hp]	Power @ 690V [kW]	Rated current [A]	
FDU69-033-20	53	30	30	**33**	0.90	25	22	26	D2(69)
FDU69-042-20	67	40	37	**42**	1.08	30	30	34	
FDU69-050-20	80	50	45	**50**	1.14	40	37	40	
FDU69-058-20	93	60	55	**58**	1.30	40	45	46	

* Available for a limited time and as long as drive temperature permits. Rated data at 40 °C ambient temperature.



General specifications

General specifications for Emotron VFX/FDU 2.1

Mains voltage: *	VFX/FDU48	3-ph, 230-480 V** +10%/-15% (-10% at 230 V)
	VFX/FDU52	3-ph, 230-525 V**+10%/-15%
	VFX/FDU69	3-ph, 400-690 V** +10%/-15%
Mains frequency		45 to 65 Hz
Input total power factor		0.95 (IP20/21 & IP54)
Output voltage		0–Mains supply voltage:
Output frequency		0–599 Hz
Output switching frequency		3 kHz (48-293/295/365 = 2kHz), FDU adjustable 1.5-6 kHz
Efficiency at nominal load		97% for models 002 to 018 (IP20/21 & IP54) 98% for models 025 to 3K0 (IP20/21 & IP54)

* Available for both grounded, corner grounded, and isolated supply (TN and IT nets).
**Nominal voltage selected with parameter.

Environmental conditions

Parameter	Normal operation
Nominal ambient temperature	0°C - 40°C (32°F - 104°F). For size D69/D2(69): 0°C - 45°C (32°F - 113°F). With derating max 55°C
Atmospheric pressure	86–106 kPa (12.5 - 15.4 PSI)
Relative humidity according to IEC 60721-3-3	Class 3K4, 5...95% and no condensing
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.
Vibrations	According to IEC 60068-2-6, Sinusoidal vibrations: 10<f<57 Hz, 0.075 mm (0.00295 ft) 57<f<150 Hz, 1g (0,035 oz) Frame sizes B to D2: IEC 60721-3-3 3M4 (2 - 9 Hz, 3.0mm and 9 - 20Hz, acc. 1g (10m/s^2)
Altitude	0–1000 m (0 - 3280 ft) 480V AC drives, with derating 1%/100 m (328 ft) of rated current up to 4000 m (13123 ft) 690V AC drives, with derating 1%/100 m (328 ft) of rated current up to 2000 m (6562) ft Coated boards required for 2000 - 4000 m(6562 - 13123 ft).

Parameter	Storage condition
Temperature	-20 to +60 °C (-4 to + 140 °F)
Atmospheric pressure	86–106 kPa (12.5 - 15.4 PSI)
Relative humidity according to IEC 60721-3-1	Class 1K4, max. 95% and no condensing and no formation of ice.



VFX/FDU48:
Model 430 - 730 (H/G2/H2)

VFX/FDU69:
Model 250 - 400 (H69)



VFX/FDU48:
Model 810 - 1100 (G3/H3)

VFX/FDU69:
Model 430 - 595 (I69)

Standards

Market	Standard	Description
European	EMC Directive	2014/30/EU
	Low Voltage Directive	2014/35/EU
	WEEE Directive	2012/19/EU
	Ecodesign Directive	2009/125/EC
	RoHS II Directive	2011/65/EU
	RED Directive	2014/53/EU
Great Britain (England, Scotland, Wales) UKCA	ECR	Electromagnetic Compatibillty Regulation - 2016/1091
	EESR	Electrical Equipment (Safety) Regulation - 2016/1101
	EERPEI	Ecodesign for Energy - Related Products and Energy Information Regulation - 2021/745
	RUCHSEEE	Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment - 2012/3032
	RER	Radio Equipment Regulations - 2017/1206
All	EN 60204-1:2018	Safety of machinery - Electrical equipment of machines Part 1: General requirements.
	EN IEC 61800-3:2018	Adjustable speed electrical power drive systems Part 3: EMC requirements and specific test methods. **EMC Directive: Declaration of Conformity and CE marking**
	EN(IEC)61800-5-1: 2007 + A1:2017 + A11:2021	Adjustable speed electrical power drive systems Part 5-1. Safety requirements - Electrical, thermal and energy. **Low Voltage Directive: Declaration of Conformity and CE marking**
	IEC 60721-3-3:2019	Classification of environmental conditions. Air quality chemical vapours, unit in operation. Chemical gases Class 3C3, Solid particles 3S2.
	EN 50581:2012	Restriction of hazardous substances
North & South America	ULC508C	UL Safety standard for Power Conversion Equipment
	USL	USL (United States Standards - Listed) complying with the requirements of UL508C Power Conversion Equipment
	UL 840	UL Safety standard for Power Conversion Equipment. Insulation coordination including clearances and creepage distances for electrical equipment.
	CNL	CNL (Canadian National Standards - Listed) complying with the requirements of CAN/CSA C22.2 No. 14-10 Industrial Control Equipment.
Russian	EAC	For all sizes.

Operation at higher temperatures

Emotron AC drives are designed for nominal operation at maximum of 40°C ambient temperature.
Frame size D69/D2(69) rated at max 45°C.
However, for most models, it is possible to use the AC drive at higher temperatures with reduced output rating (derating).

Possible derating

Derating of output current is possible with
-1% / degree Celsius to max +15 °C (max 55 °C for IP54 and IP20/21)
-0.55% / degree Fahrenheit to max +27 °F (max 131 °F for IP54 and IP20/21)

Dimensions, weights and cooling air flow

The tables below give an overview of the dimensions, weights, and the required air flow for cabinet mounting of the modules.
Drives with model numbers up to 48-365 are available as wall mounted modules; with the choice of an IP54 version (frame size B to FA), and an IP20/21 version (frame size C2 to FA2) that is also optimized for cabinet mounting.
Models from 48-430/69-250 and up consist of 2 to 15 paralleled power electronic building blocks (PEBBs), which can be delivered in standard IP54 cabinets, or be cabinet/panel mounted as a conformity to IP20.

Mechanical specifications for models VFX/FDU48/69 - IP20/21 version

Models	Frame size	Dim. H1/H2 x W x D mm (in) IP20*	Dim. H1/H3 x W x D mm (in) IP21**	Weight kg (Lbs) IP20/IP21	Air flow m3/hour	Noise level
48-025 to 48-030 / 69-002 to 69-013	C2	446 / 536 x 176 x 267 (17.2/21.1 x 6.9 x 10.5)	438 / 559 x 196 x 282 (17.2/22 x 7.7 x 11.1)	17 (37.5)	120	60
48-036 to 48-058 / 69-018 to 69-025					170	60
48-060 to 48-105 / 69-033 to 69-058	D2/D2(69)	545 / 658 x 220 x 291 (21.5/25.9 x 8.7 x 11.5)	545 / 670 x 240 x 307 (21.5/26.4 x 9.5 x 12.1)	30 (66)	170	60
48-142 to 48-171	E2	956 / 956 x 275 x 294 (37.6/37.6 x 10.8 x 11.6)	956 / 956 x 275 x 323 (37.6/37.6 x 10.8 x 12.7)	53 (117)	510	72
48-145 and 48-174	E4	822 / 822 x 263 x 318 (32.4 x 10.4 x 12.5)	-	TBD	TBD	TBD
48-205 to 48-293	F2	956 / 956 x 335 x 294 (37.6/37.6 x 13.2 x 11.6)	956 / 956 x 335 x 323 (37.6/37.6 x 13.2 x 12.7)	69 (152)	800	72
48-365	FA2	1090/ 1250 x 335 x 306 (42.9/49.5 x 13.2 x 12.1)		84 (185)	1020	82

H1 = Enclosure height H2 = Total height including cable interface H3 = Total height including top cover
* without top cover
** with top cover
Please note that frame size E4 is only available on the Indian market and is not UL or Marine approved

IP20/21 version of Emotron VFX 2.1 and FDU 2.1

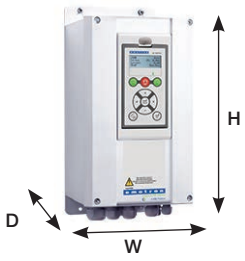


Frame size C2 IP20 | Frame size D2/D2(69) IP21 | Frame size E4 IP20 | Frame size E2 IP20 | Frame size F2 IP20 | Frame size FA2 IP20

Mechanical specifications for models VFX/FDU48 and VFX/FDU52 - IP54 version

Models (48- or 52-)	Frame size	IP20/21 Dim. H x W x D mm (mm)	IP54 Dim. H x W x D / D1 mm (in)	IP20/21 Weight kg (lb)	IP54 Weight kg (lb)	Air flow m3/hour	Noise level IP20 (dBA)
003 to 018	B	n/a	350/416 x 203 x 203 (13.8/16.4 x 8 x 7.9)	-	12.5 (27.6)	75	-
026 to 031	C	n/a	440/512 x178x292 (17.3/20.2 x 7 x 11.5)	-	24 (52.9)	120	-
037 to 046						170	-
061 to 074	D	n/a	545/590 x 220 x 295 (21.5/23.2 x 8.7 x 11.5)	-	32 (70.6)	170	-
090 to 109	E	n/a	950 x 285 x 314 (37.4 x 11.2 x 12.4)	-	56 (123.5)	510	-
146 to 175					60 (132.3)		
210 to 295	F	n/a	950 x 345 x 314 (37.4 x 13.6 x 12.4)	-	75 (165.4)	800	-
365	FA	n/a	1395 x 345 x 365 (54.9 x 13.6 x 14.4)	-	95 (209)	1020	-
430 to 500	H	1036 x 500 x 450 (40.8 x 19.7x 17.7)	2200 x 600 x 600 / 680 (86.6 x 23.6 x 23.6/26.8)	170 (374.8)	380 (837.8)	1600	75
590	G2	1036x500x450 (40.8 x 19.7 x 17.7)	2200x600x600/680 (86.6 x 23.6 x 23.6/26.8)	170 (374.8)	400 (882)	2500	75
660, 730	H2	1176x500x450 (46.3 x 19.7 x 17.7)	2200x600x600/680 (86.6 x 23.6 x 23.6/26.8)	190 (419)	420 (926)	2700	85
810, 885	G3	1036x730x450 (40.8 x 28.7 x 17.7)	2200x1000x600/680 (86.6 x 39.4 x 23.6/26.8)	240 (529)	550 (1213)	3250	77
1010, 1100	H3	1176x730x450 (46.3 x 28.7 x 17.7)	2200x1000x600/680 (86.6 x 39.4 x 23.6/26.8)	280 (617)	590 (1300)	4050	87
1300, 1460	H4	1176x(500+500)x450 (46.3 x 39.4 x 17.7)	2200x1200x600/680 (86.6 x 47.2 x 23.6/26.8)	380 (838)	840 (1852)	5400	87
1710, 1820	H5	1176x(730+500)x450 (46.3 x 48.4 x 17.7)	2200x1600x600/680 (86.6 x 63.0 x 23.6/26.8)	470 (1036)	1010 (2227)	6750	88
2190	H6	1176x(730+730)x450 (46.3 x 57.5 x 17.7)	2200x2000x600/680 (86.6 x 78.7 x 23.6/26.8)	560 (1235)	1180 (2602)	8100	88
2550	H7	1176x(500+730+500)x450 (46.3 x 68.1 x 17.7)	2200x2200x600/680 (86.6 x 86.6 x 23.6/26.8)	660 (1455)	1430 (3153)	9450	89
2920	H8	1176x(730+500+730)x450 (46.3 x 77.2 x 17.7)	2200x2600x600/680 (86.6 x 102.4 x 23.6/26.8)	750 (1654)	1600 (3528)	10800	89

1) IP20 module for cabinet mounting. n/a = not applicable
D1 = Cabinet depth including inlet filter



VFX/FDU48/52: Model 003 - 018 (B)



VFX/FDU48/52: Model 026 - 046 (C)



VFX/FDU48/52: Model 061 - 074 (D)

Mechanical specifications for models VFX/FDU69 - IP54 version

Models (69-)	Frame size	IP20/21 Dim. H x W x D mm (mm)	IP54 Dim. H x W x D / D1 mm (in)	IP20/21 Weight kg (lb)	IP54 Weight kg (lb)	Air flow m3/hour	Noise level IP20 (dBA)
033 to 058	D69	–	545/590 x 220 x 295 (21.5/23.2 x 8.7 x 11.6)	–	32 (70.5)	170	-
082 to 200	F69	–	1090 x 345 x 314 (42.9 x 13.6 x 12.4)	–	77 (169.8)	800	-
250 to 400	H69 (2xF69)	1176 x 500 x 450 (46.3 x 19.7 x 17.7)	2200 x 600 x 600 / 680 (86.6 x 23.6 x 23.6 /26.8)	176 (388)	399 (879.6)	1600	-
430 to 595	I69 (3xF69)	1176 x 730 x 450 (46.3 x 28.7 x 17.7)	2200 x 1000 x 600/680 (86.6 x 39.4 x 23.6/26.8)	257 (566.6)	563 (1241)	2400	-
650 to 800	J69 (2xH69)	1176 x 1100 x 450 (46.3 x 43.3 x 17.7)	2200 x 1200 x 600 / 680 (86.6 x 47.2 x 23.6 /26.8)	352 (776)	773 (1704)	3200	76
905 to 995	KA69 (H69+I69)	1176 x 1365 x 450 (46.3 x 53.7 x 17.7)	2200 x 1600 x 600/680 (86.6 x 63.0 x 23.6/26.8)	433 (954.6)	937 (2066)	4000	78
1K2	K69 (2xI69)	1176 x 1630 x 450 (46.3 x 64.2 x 17.7)	2200 x 2000 x 600/680 (86.6 x 70.9 x 23.6/26.8)	514 (1133)	1100 (2425)	4800	79
1K4	L69 (2xH69+I69)	1176 x 2000 x 450 (46.3 x 78.7 x 17.7)	2200 x 2200 x 600/680 (86.6 x 86.6 x 23.6/26.8)	609 (1343)	1311 (2890)	5600	79
1K6	M69 (H69+2xI69)	1176 x 2230 x 450 (46.3 x 87.8 x 17.7)	2200 x 2600 x 600/680 (86.6 x 102.4 x 23.6/26.8)	690 (1521)	1481 (3265)	6400	79
1K8	N69 (3xI69)	1176 x 2530 x 450 (46.3 x 99.6 x 17.7)	2200 x 3000 x 600/680 (86.6 x 118.1 x 23.6/26.8)	771 (1700)	1651 (3640)	7200	80
2K0	O69 (2xH69+2xI69)	1176 x 2830 x 450 (46.3 x 111.4 x 17.7)	2200 x 3200 x 600/680 (86.6 x 126.0 x 23.6/26.8)	866 (1909)	1849 (4076)	8000	80
2K2	P69 (H69+3xI69)	1176 x 3130 x 450 (46.3 x 123.2 x 17.7)	2200 x 3600 x 600/680 (86.6 x 141.7 x 23.6/26.8)	947 (2088)	2050 (4519)	8800	81
2K4	Q69 (4xI69)	1176 x 3430 x 450 (46.3 x 135 x 17.7)	2200 x 4000 x 600/680 (86.6 x 157.5 x 23.6/26.8)	1028 (2266)	2214 (4881)	9600	81
2K6	R69 (2xH69+3xI69)	1176 x 3730 x 450 (46.3 x 146.9 x 17.7)	2200 x 4200 x 600/680 (86.6 x 165.4 x 23.6/26.8)	1123 (2476)	2423 (5342)	10400	82
2K8	S69 (H69+4xI69)	1176 x 4030 x 450 (46.3 x 158.7 x 17.7)	2200 x 4600 x 600/680 (86.6 x 181.1 x 23.6/26.8)	1204 (2654)	2613 (5761)	11200	82
3K0	T69 (5xI69)	1176 x 4330 x 450 (46.3 x 170.5 x 17.7)	2200 x 5000 x 600/680 (86.6 x 196.8 x 23.6/26.8)	1285 (2833)	2777 (6122)	12000	82

1) IP20 module for cabinet mounting.
n/a = not applicable
D1 = Cabinet depth including inlet filter



VFX/FDU48: Model 090 - 175 (E)



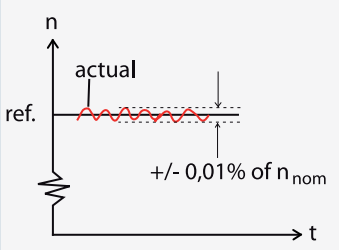
VFX/FDU48: Model 210 - 295 (F)
VFX/FDU69: Model 082 - 200 (F69)



VFX/FDU48: Model 430 - 500 (H) IP20 module

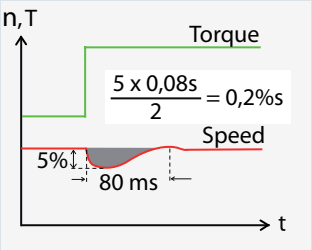
Control performance for Emotron VFX 2.1 (Speed)

Speed control static accuracy (linearity):



Closed loop = 0.01% of n_{nom}.
Open loop = 0.1% of n_{nom}.

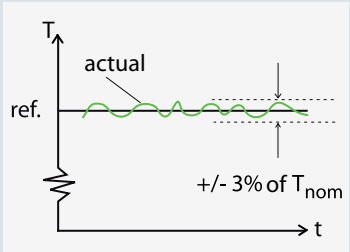
Speed Control dynamic accuracy (impact drop):



Closed loop = 0.2%sec (100% load step)
Open loop = 0.4%sec (100% load step)

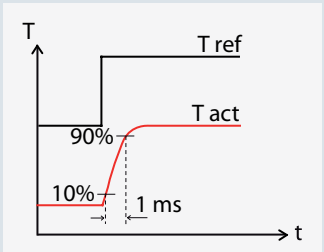
Control performance for Emotron VFX 2.1 (Torque)

Torque control static accuracy (linearity):



Closed loop: <3% of T_{nom}
Open loop: <3% for speeds 10 - 100% of rated, and <10% at zero speed (% of n_{nom}).

Torque control dynamic accuracy:



Closed and open loop:
100% torque step rise time = 1 ms.

Control performance for Emotron FDU 2.1 (V/Hz)

Speed control accuracy = approximately 1% of nnom (slip frequency).

Torque accuracy = approximately 5% of Tnom (20 - 100% speed).

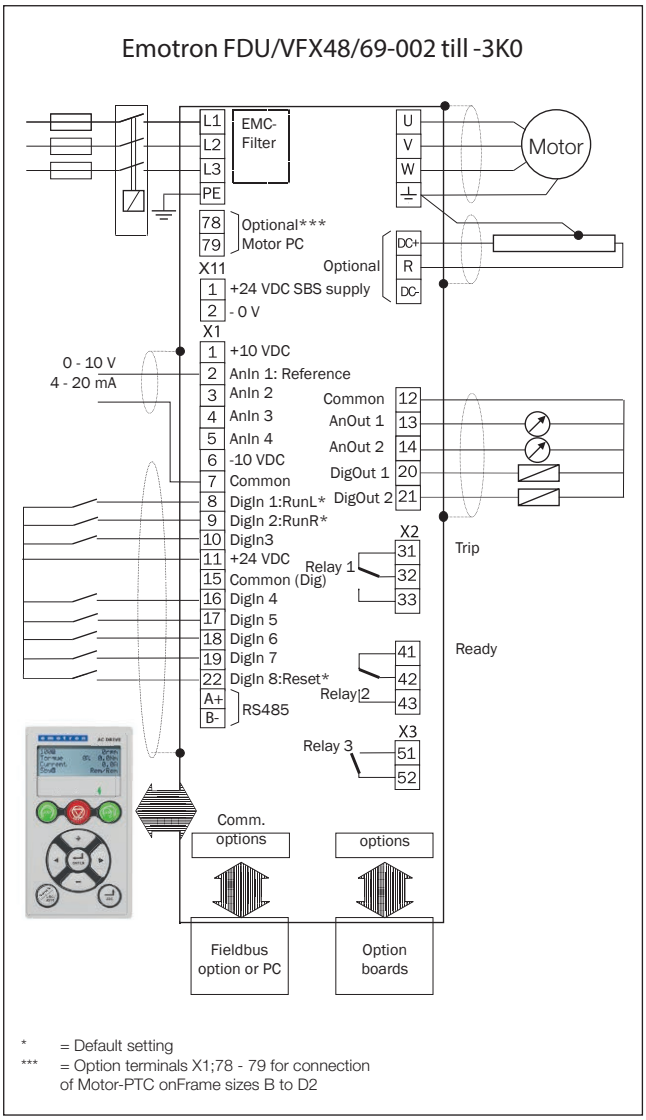
Basic I/O data

Control signal inputs: Analogue (differential), 4 channels	
Analogue voltage/current Max. input voltage Input impedance Resolution Hardware accuracy Non-linearity	0-±10 V/0-20 mA via switch +30 V 20 kΩ (voltage) 250 Ω (current) 11 bits + sign 0.5% type + 1 ½ LSB fsd 1½ LSB
Digital: 8 channels	
Input voltage Max. input voltage Input impedance Signal delay	High>9 V_{DC} Low<4 V_{DC} +30 V_{DC} <3.3 V_{DC}: 4.7 kΩ , ≥3.3 V_{DC}: 3.6 kΩ ≤8 ms
Control signal outputs: Analogue, 2 channels	
Output voltage/current Max. output voltage Short-circuit current (∞) Output impedance Resolution Maximum load impedance for current Hardware accuracy Offset Non-linearity	0-10 V/0-20 mA via software setting +15 V @5 mA cont. +15 mA (voltage) +140 mA (current) 10 Ω (voltage) 10 bit 500 Ω 1.9% type fsd (voltage), 2.4% type fsd (current) 3 LSB 2 LSB
Digital, 2 channels	
Output voltage Short-circuit current (∞)	High>20 V_{DC} @50 mA, >23 VDC open Low<1 V_{DC} @50 mA 100 mA max (together with +24 V_{DC})
Relays, 3 pcs	
Contacts	0.1 – 2 A/Umax 250 VAC or 42 V_{DC}
Reference voltages	
+10 V_{DC} -10 V_{DC} +24 V_{DC}	+10 V_{DC} @10 mA short-circuit current +30 mA max -10 V_{DC} @10 mA +24 V_{DC} short-circuit current +100 mA max (together with Digital Outputs)

See “User interface data” on page 26 for connection data and default settings



User interface data



X1	Name:	Function (Default):
1	+10 V	+10 VDC Supply voltage
2	AnIn1	Speed reference
3	AnIn2	Not used
4	AnIn3	Not used
5	AnIn4	Not used
6	-10 V	-10VDC Supply voltage
7	Common	Signal ground
8	DigIn 1	RunL
9	DigIn 2	RunR
10	DigIn 3	Not used
11	+24 V	+24VDC Supply voltage
12	Common	Signal ground
13	AnOut 1	Min speed to max speed
14	AnOut 2	0 to max torque
15	Common	Signal ground
16	DigIn 4	Not used
17	DigIn 5	Not used
18	DigIn 6	Not used
19	DigIn 7	Not used

X1	Name:	Function (Default):
20	DigOut 1	Ready
21	DigOut 2	Brake/No trip
22	DigIn 8	Reset
A+	A+	RS-485 Differential transmit and receive (Modbus RTU)
B-	B-	

X2	Name:	Function (Default):
31	N/C 1	Relay 1 output=Trip Active when the AC drive is in a TRIP condition.
32	COM 1	
33	N/O 1	
41	N/C 2	Relay 2 Output=Ready Active when the AC drive is ready to start
42	COM 2	
43	N/O 2	

X3	Name:	Function (Default):
51	COM 3	Relay 3 Output=Not used
52	N/O 3	

All inputs and outputs are programmable.

Standard options

For Emotron VFX/FDU 2.1

STANDARD OPTION	IP20/21 and IP54/20 Frame sizes C2 - FA2 and D69 - F69/D2(69) - F2(69) All boards are coated. Support for 3 option boards and one communication option	
	Part no.	Remark
Extended digital I/O board	01-3876-01	Max 3 I/O boards 3 extra relay outputs (NO/P/NC) 3 extra digital, programmable inputs.
Encoder board	01-3876-03	Max 1 Encoder board Differential enconder input suitable for 5V and 24V encoders, range 5-16384 pulse/rotation
PTC/PT100 board	01-3876-08	1 PTC input confirmning DIN 44081/44082. 3 PT100 input, 4-wire, confirmning EN 60751
RS232/RS485 Isolated	01-3876-04	Isolated RS232/485 serial communication board (RS485 standard in 2.1 drives)
Standby power supply	Standard built - in input on control board	
Safe Torque Off (STO)	Available as factory built in option IP20 and IP54	
I/O interface 24V (for cranes)	590060DSV	I/O interface for crane control signals for VFD+DSV15/35
I/O interface 230V (for cranes)	590059DSV	I/O interface for crane control signals for VFD+DSV15/35
Fieldbus - Profibus	01 - 3876 - 05	Fieldbus option Profibus DP V1
Fieldbus - DeviceNet	01 - 3876 - 06	Fieldbus option DeviceNet
Fieldbus - CANopen	01 - 3876 - 16	Fieldbus option CANopen
Ethernet – Modbus/TCP 1-port	01 - 3876 - 09	Industrial Ethernet option with Modubs/TPC protocol, RJ45 connector
Ethernet – Modbus/TCP 2-port	01 - 3876 - 17	Industrial Ethernet option with Modubs/TPC protocol, RJ45 connector, 2-port
Ethernet – EtherCAT	01 - 3876 - 10	Industrial Ethernet option EtherCAT (CoE)
Ethernet – Profinet IO 1-port	01 - 3876 - 11	Industrial Ethernet option Profinet IO (RT), 1-port
Ethernet – Profinet IO 2-port	01 - 3876 - 12	Industrial Ethernet option Profinet IO (RT), 2-port
Ethernet – ProfiNet S2, 2-port	01 - 3876 - 18	Industrial Ethernet option Profinet S2, 2-port
Ethernet – ProfiNet IP, 2-port	01 - 3876 - 13	Industrial Ethernet option Profinet IP, 2-port

I/O board



3 extra relay outputs (230 VAC/5 A NO/NC). 3 extra 24 V /3.2 kΩ (AC or DC) differential digital inputs, all programmable. Inputs providing 50 VAC/DC isolation between channels. Maximum 3 I/O boards can be built -in per AC drive.

Encoder board



Differential encoder input suitable for 5 V (TTL) or 24 V (HTL) incremental encoders, range 5-16384 pulses/revolution. Inputs min 9 kΩ. Max frequency = 100 kHz. For single ended or differential type of encoders (A/B, A'/B'). Selectable encoder supply voltage output 5 VDC or 24 VDC.

PTC/PT100 board



1 PTC isolated input conforming DIN 44081/44082. Max 6 PTC thermistors can be connected in series to PTC input.
Also including 3 PT100 inputs, 2/3/4-wire, conforming EN 60751.

I/O interface



Isolated I/O-Interface for control signals Between (existing) crane controls and VFX-inverter via RS485

- Available for 230VAC and 24VDC
- LED indication for all inputs and outputs

HxWxD: 192x46x118

RS232/RS485 isolated



Isolated RS232/RS485 serial communication board. For Modbus/RTU communication protocol.
Baud rates: 2400 - 38400 bits/s supported.

Note: RS485 standard built-in on control board

Standard options for Emotron VFX/FDU 2.1

Fieldbus and Ethernet boards

Typical drive response time = 10 ms (not including any ethernet delays).





Fieldbus - Profibus

Fieldbus option module for Profibus DP or DP V1 communication. Use 9-pin D-sub connector. Baud rates: 9.6 kbits/s - 12 Mbits/s supported.

Fieldbus - DeviceNet

Fieldbus option module for DeviceNet communication.
Baud rates: 125 - 500 kbits/s supported.

Ethernet - Modbus/TCP 1-port

Industrial Ethernet option module for Modbus/TCP protocol. RJ45 type connector.
Baud rates: 10 or 100 Mbits/s supported.

Ethernet - Modbus/TCP 2-port

Industrial Ethernet option module for Modbus/TCP protocol. M12 type connectors, 2-port.
Baud rates: 10 or 100 Mbits/s supported.

Ethernet - Profinet IO 1-port

Industrial Ethernet option module for Profinet IO (RT) protocol. RJ45 type connector.
Baud rate: 100 Mbits/s

Ethernet - Profinet IO 2-port

Industrial Ethernet option module for Profinet IO (RT) protocol. 2 x RJ45 type connectors.
Baud rate: 100 Mbits/s

Ethernet - Profinet IO S2, 2-port

Industrial Ethernet option Profinet S2 , 2 port

Ethernet - EtherCAT®

Industrial Ethernet option module for EtherCAT protocol.
2 x RJ45 type connectors (IN and OUT).
Baud rate: 100 Mbits/s

Ethernet - EtherNet IP 2-port

Industrial Ethernet option module for EtherNet IP protocol. 2 x RJ45 type connector.
Baud rate: 100 Mbits/s

Fieldbus - CANopen

Fieldbus option module for CANopen communication. CANopen certified, compliant with profile DS301 V4.02 . Use 9-pin D-sub connector. Baud rates 10 kbit/s - 1 Mbits/s.

Control panel kit, incl. blank panel



External control panel IP54 suitable for mounting on a cabinet door. This option is to be used in combination with an AC drive module ordered with a built-in control panel.
Part no.
01-6878-40 (Size B)
01-6879-40 (Size C)
01-6880-40 (Size D and up)

01-7211-00 (IP2X units. Without PPU)

Control panel kit, incl. control panel



External control panel IP54 suitable for mounting on a panel door. This option is to be used in combination with an AC drive module ordered with a blank control panel.
Part no.
01-6878-00 Std PPU (Size B)
01-6878-10 PPU w Bluetooth (Size B)
01-6878-20 PPU w Wifi (Size B)
01-6879-00 Std PPU (Size C)
01-6879-10 PPU w Bluetooth (Size C)
01-6879-20 PPU w Wifi (Size C)
01-6880-00 Std PPU (Size D and up)
01-6880-10 PPU w Bluetooth (Size D and up)
01-6880-20 PPU w Wifi (Size D and up)

Handheld Control Panel HCP 2.0



Handheld control panel with full functionality. Easy to connect to the AC drive for temporary use during e.g. commissioning and service. The HCP 2.0 enables setting of parameters and viewing of actual values and fault logger. It also offers the possibility to copy parameter data from one AC drive to other AC drives.
Part no. 01-5039-30 (complete with cable)

Standard options for Emotron VFX/FDU 2.1

EmoSoftCom



Connect a PC with a standard RS232 cable under the control panel on the front. EmoSoftCom PC software makes it possible to perform signal recordings and save/load parameter backup data, for example during service & maintenance.

Glands for IP54 frame sizes B, C and D



Gland kits are available for size B, C, and D. Metal EMC glands are used for motor and brake resistor cables.

Part No	Current	Frame size
01-4601-21	3 - 6 A (M16 - M20)	B
01-4601-22	8 - 10 A (M16 - M25)	
01-4601-23	13 - 18 A (M16 - M32)	
01-4399-01	26 - 31 A (M12 - M32)	C
01-4399-00	37 - 46 A (M12 - M40)	
01-4833-00	61 - 74 A (M20 - M50)	D
01-7248-00	2 - 10A (M20 - M25)	C69
01-7248-10	13 - 25A (M20 - M32)	
01-7247-00	33 - 58A (M20 - M40)	D69

Control panel with Bluetooth or Wifi comm.



New 4-line PPU with Bluetooth or Wifi communication, used whith "EmoDrive" commissioning and maintenance App (for iPhone and Android phones).



Factory mounted options for Emotron VFX/FDU 2.1

Blank control panel



Blank panel instead of control panel (to maintain IP54). Indication LED's for Power, Run and Trip available.

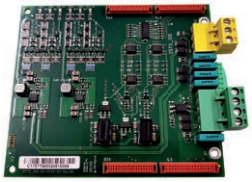
EMC filter class C2

EMC filter according to EN61800-3:2004 class C2 - 1st environment restricted distribution. For sizes B to D2. Integrated inside the drive module.
Note: EMC filter according to class C3 - 2nd environment included as standard in all drive units.

PTC

Factory mounted, isolated motor PTC input conforming to DIN44081/44082.
Available with size B to D2. Use PTC/PT100 option board if additional inputs are needed.

Option board for safety function Safe Torque Off (STO)



One OSTO_100 option board for implementing Safe Torque Off functionality in all Emotron FDU/VFX 2.1 frame sizes, mounted underneath Option mounting plate.

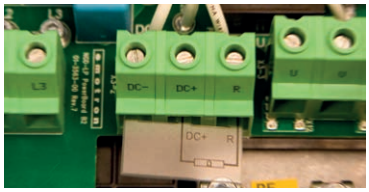
Extra built-in safety inputs (supporting OSSD technology) for activating Safe Torque Off (STO) status, and a STO-status feedback output. Conform to the machine safety norms EN-IEC 61508:2010 / EN-IEC 61205:2005 up to SIL3, and EN-ISO 13849-1:2008 up to PLe category 4.

Brake chopper

All Emotron VFX/FDU drives can be fitted with an optional built-in brake chopper.
Brake choppers are rated for continuos braking at drive rated load (IP20/21 & IP54).
This option can not be after mounted. The brake resistor must be mounted outside the AC drive.
(See page 33 for Brake resistor option).

DC+ /DC- connection

DC+/DC- terminals for external connection of the Emotron VFX/FDU drive DC link. This option is required if using the Overshoot clamp.



Extended options for Emotron VFX/FDU 2.1

Extended EMC filter 90-660A



EMC filter according to EN61800-3:2004 class C2 - 1st environment, restricted distribution. From frame size E. Rated voltage=480 V, 50/60 Hz.
Max. 40 °C ambient temperature.

Drive model	Filter type	Dimensions HxWxD [mm]	Weight [kg]	Enclosure	Power losses (W)
VFX/FDU48-090	3F480-100.260	336x75x200	6.2	IP20[1]	29
VFX/FDU48-109	3F480-125.260	336x75x200	6.5	IP20[1]	32
VFX/FDU48-146	3F480-150.260	380x90x220	9.8	IP20[1]	35
VFX/FDU48-175	3F480-180.260	410x200x120	10.9	IP00[2]	11
VFX/FDU48-210	3F480-220.260	410x200x120	10.3	IP00[2]	12
VFX/FDU48-250	3F480-250.260	410x200x120	9.9	IP00[2]	13
VFX/FDU48-300	3F480320.260	410x200x120	10.6	IP00[2]	17
VFX/FDU48-375	3F480-400.260	480x240x150	16.5	IP00[2]	20
VFX/FDU48-430	3F480-500.260	480x240x150	17.2	IP00[2]	27
VFX/FDU48-500	3F480-500.260	480x240x150	17.2	IP00[2]	27
VFX/FDU48-590	3F480-630.260	480x240x150	16.0	IP00[2]	36
VFX/FDU48-660	3F480-700.260	520x240x180	21.6	IP00[2]	42

1=Screw terminal (protected)
2=Busbar terminals

Output choke (dU/dt)

Output chokes (supplied separately) are recommended above approx. 100 m cable length for all single drives.

Consult your supplier for paralleled drives. Due to the switching frequency, high capacitive peak currents will flow through the parasitic capacitances between phases and earth. Screened cables have more parasitic capacitances. Output chokes should be installed as close as possible to the drive output.

Output chokes also limit voltage peaks at the motor winding.

Rated voltage = 800 V, IP00 units. Suitable for up to IP23 cabinet installation. Max. 40°C ambient temperature.

When connecting multiple Power Electronic Building Blocks (PEBBs) in parallel, use one output filter per PEBB.

Part no.	Nominal current (I_N) A/Phase	Inductance L [mH]	Weight [kg]	Connection [mm2]	Dimensions HxWxD [mm]	Power losses (W)
74052020M	2.8	1.5	1.9	4.0	110x77x52	25
74052021M	4.4	1.0	1.9	4.0	110x77x52	30
74052022M	6.6	0.7	1.9	4.0	110x77x52	35
74052023M	11	0	2.6	4.0	126x95x70	40
74052024M	14.3	0.3	2.5	4.0	126x95x70	45
74052025M	18.2	0.3	3.0	4.0	147x119x72	60
74052026M	26.4	0.175	3.0	4.0	147x119x82	70
74052028M	32	0.15	4.4	10	171x160x96	90
74052029M	65	0.1	6.1	35	197x144x104	90
74052036M	90	0.1	8.3	35	235x175x133	140
74052039M	146	0.05	12.6	50	257x200x158	200
74052044M	175	0.05	22.5	M10	203x189x150	250
74052065L3M	275	0.032	23.3	M12	220x254x165	260
74052068L3M	365	0.021	23.8	M12	220x254x165	300

Part no.	Nominal current (A)	min cable length (m)	max cable length (m)	max cable length (m)	max cable length (m)	max cable length (m)
		for ≤ 500 V/µs	1,5 kHz	3 kHz	6 kHz	10 kHz
74052020M	2.8	0	75	40	25	15
74052021M	4.4	0	80	40	25	15
74052022M	6.6	5	85	55	30	20
74052023M	11	10	100	60	30	20
74052024M	14.3	10	100	60	30	20
74052025M	18.2	15	110	65	35	20
74052026M	26.4	15	120	70	35	
74052028M	32	20	140	80	40	
74052029M	65	30	150	90	40	
74052036M	90	40	160	100	45	
74052039M	146	50	180	110	60	
74052044M	175	55	180	120	60	
74052065L3M	275	60	200	130		
74052068L3M	365	70	220	140		

Nominal voltage U=800V

Max. switching frequency inverter

10 kHz AD 0,75-7,5

6 kHz AD 11 - 90

3 kHz AD 132- 199

Max. Output frequency inverter

200 Hz AD 0,75-199

Note! For 12-pulse solutions, contact your supplier.

Overshoot clamp

Together with the output choke, the overshoot clamp limits the voltage to the motor.
For rated voltages 380 - 690 V.
H x W x D = 250 x 145 x 95 mm
Part no.
052163 (size B–F/F2/F69)
052220 (H and up)



Sine wave filter

NOTE: Only for use with FDU drives

Sine filter 500V

For use with drives up to and including 500V.

Part no	Model	Power [kW]	Rated current [A]	Power loss at 100% load [W]	Weight [kg]	Dimensions HxWxD [mm]	Protection class
01-7781-00	PSF53-0005	1.5	5	45	6.4	188x178x136	IP20
01-7781-01	PSF53-0008	2	8	70	7.6	214x219x149	IP20
01-7781-02	PSF53-0011	4	11	90	10.8	215x219x169	IP20
01-7781-03	PSF53-0015	5.5	15	110	12.7	233x243x164	IP20
01-7781-04	PSF53-0021	7.5	21	140	15.8	242x243x179	IP20
01-7781-05	PSF53-0027	7.5	27	170	23.8	195x316x250	IP20
01-7781-06	PSF53-0035	12.5	35	195	24.4	214x291x246	IP20
01-7781-07	PSF53-0040	12.5	40	220	28.9	235x316x250	IP20
01-7781-08	PSF53-0052	18.5	52	260	30.9	250x316x250	IP20
01-7781-09	PSF53-0065	22	65	310	41.5	241x352x285	IP20
01-7781-10	PSF53-0077	25	77	350	40.4	266x352x270	IP20
01-7781-11	PSF53-0100	30	100	410	58.7	314x360x297	IP20
01-7781-12	PSF53-0125	45	125	450	68.9	314x360x314	IP20
01-7781-13	PSF53-0156	55	156	550	78.4	369x420x330	IP20
01-7781-14	PSF53-0187	60	187	620	91.9	367x420x349	IP20
01-7781-15	PSF53-0210		210	750	127	365x420x474	IP20
01-7781-16	PSF53-0240	75	240	850	121	472x420x419	IP20
01-7781-17	PSF53-0302	110	302	935	158	506x420x444	IP20
01-7781-18	PSF53-0360	132	360	1050	175	508x420x474	IP20
01-7781-19	PSF53-0420	150	420	1200	195	568x420x474	IP20
01-7781-20	PSF53-0480	175	480	1350	216	641x480x539	IP20
01-7781-21	PSF53-0520	175	520	1400	244	607x480x563	IP20
01-7781-22	PSF53-0590	200	590	1500	259	638x480x569	IP20
01-7781-23	PSF53-0640	225	640	1650	284	628x480x514	IP20
01-7781-24	PSF53-0720	250	720	1750	302	748x480x524	IP20
01-7781-25	PSF53-0840	300	840	1850	338	758x480x549	IP20
01-7781-26	PSF53-1000	355	1000	2650	415	912x550x575	IP20
01-7781-27	PSF53-1220	450	1220	3100	469	922x550x600	IP20
01-7781-28	PSF53-1460	500	1460	3500	565	931x550x720	IP20

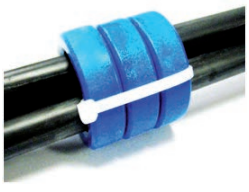
Rated voltage= 500 V ±25%, 50/60 Hz
Fundamental frequency (without derating): 0-80 Hz
Switching frequency: 2-10 kHz
Rated ambient temp. 45°C ambient temperature.
Protection class: IP00 = no enclosure and busbar connections. (IP20/IP23/IP54 optional)
Voltage drop: approximately 8% at rated current, 50 Hz.
Overload: 150% for 1min/10 min.
Max altitude without derating: 1000m
Max cable length, shielded: 1500m

Sine filter 690V

Part no	Model	Power [kW]	Rated current [A]	Power loss at 100% load [W]	Weight [kg]	Dimensions HxWxD [mm]	Protection class
01-7782-00	PSF63-0005	2	5	80	7.1	189x178x152	IP20
01-7782-01	PSF63-0007	3	7	110	8.4	215x219x149	IP20
01-7782-02	PSF63-0009	4	9	125	11.7	215x219x169	IP20
01-7782-03	PSF63-0012	5.5	12	150	15.8	234x243x174	IP20
01-7782-04	PSF63-0018	7.5	18	190	22.8	261x267x200	IP20
01-7782-05	PSF63-0022	11	22	210	26.5	280x291x236	IP20
01-7782-06	PSF63-0027	12.5	27	230	32.5	306x291x230	IP20
01-7782-07	PSF63-0035	15	35	300	41.8	350x316x250	IP20
01-7782-08	PSF63-0042	20	42	375	50.6	297x352x285	IP20
01-7782-09	PSF63-0055	25	55	470	62	333x352x295	IP20
01-7782-10	PSF63-0065	30	65	520	65	347x360x265	IP20
01-7782-11	PSF63-0080	40	80	650	91	440x360x290	IP20
01-7782-12	PSF63-0100	50	100	710	110	463x420x299	IP20
01-7782-13	PSF63-0125	60	125	780	126	466x420x343	IP20
01-7782-14	PSF63-0144	60	144	850	156	464x420x369	IP20
01-7782-15	PSF63-0192	90	192	1050	183	529x480x396	IP20
01-7782-16	PSF63-0242	110	242	1350	206	598x480x487	IP20
01-7782-17	PSF63-0290	132	290	1500	252	645x480x443	IP20
01-7782-18	PSF63-0340	160	340	1850	267	601x480x543	IP20
01-7782-19	PSF63-0390	175	390	1950	284	637x480x483	IP20
01-7782-20	PSF63-0430	200	430	1750	270	591x480x480	IP20
01-7782-21	PSF63-0480	225	480	1950	327	676x640x480	IP20
01-7782-22	PSF63-0580	275	580	2300	364	678x640x505	IP20
01-7782-23	PSF63-0680	315	680	2500	680	795x640x575	IP20
01-7782-24	PSF63-0780	355	780	2800	780	715x640x575	IP20
01-7782-25	PSF63-0880	425	880	3100	880	821x640x575	IP20
01-7782-26	PSF63-0960	475	960	3350	960	809x640x660	IP20
01-7782-27	PSF63-1160	550	1160	3700	1160	935x640x656	IP20

Rated voltage: 690V
Fundamental frequency (without derating): 0-70 Hz
Switching frequency: 1,5-10 kHz
Overload: 150%, 1min/10min
Rated ambient temp: 45 deg C
Protection class: IP00 (IP20/IP23/IP54 optional)
Voltage drop: Approximate 9,5%
Max altitude without derating: 1000m
Max cable length, shielded: 1500m

Common mode filter



Common mode filters are mainly used to reduce common mode currents in motors (typically used with motors >size 280).
Common mode filters can prevent damage of motor bearings.
All three motor phases (without shield) are to be routed through common mode filter rings. These filters can also be used to reduce EMC emissions in supply cables.
Di = 35mm, Dy = 59mm, L = 55mm, m = 0,35kg.
Part no. 052213 (size H to H8 and H69 to T69 require one Common mode filter per PEBB).

Extended options for Emotron VFX/FDU 2.1

Brake resistors



VPR= Compact – IP54 with 0.75 m shielded cable.
BEGT= Resistor with stainless steel alloy grid – IP20 or IP23 with thermo contact.
For dynamic braking by connection to the drive brake chopper output (optional)

Type	Resistor power [kW] in % duty cycle					Dimensions H x W x D [mm]	
	100 (>1.5 min)	60 (1 min < t ≤1.5 min)	40 (≤ 1 min)	25	6	IP54	
VPR 200-__R	0.2		0.47	0.74	3.6	200x60x31	–
VPR 300-__R	0.3		0.705	1.11	5.4	250x60x31	–
VPR 400-__R	0.4		0.94	1.48	7.2	301x60x31	–
VPR 500-__R	0.5		1.175	1.85	9.0	370x60x31	–
DEGT1VPR1000S_R-S	1		2.0	3.7	13.0	542x98x170	–
						IP20	IP23
BEGT 13#05-__R	2.5	3.25	4.25	6.25	21.0	301x483x326	500x483x326
BEGT 13#08-__R	4.0	5.2	6.8	10.0	34.0	301x483x326	500x483x326
BEGT 13#10-_R_	5.0	6.5	8.5	12.5	42.5	301x483x326	500x483x326
BEGT 14#15-_R_	7.5	9.8	12.7	18.7	64.0	301x483x426	500x483x426
BEGT 15#20-_R_	10.0	13.0	17.0	25.0	85.0	301x483x526	500x483x526
BEGT 17#30-_R_	15.0	19.5	25.5	37.5	127.0	301x483x740	500x483x740
BEGT 25#40-_R_	20.0	26.0	34.0	50.0	170.0	601x484x526	800x484x526
BEGT 27#60-_R_	30.0	39.0	51.0	75.0	255.0	601x484x736	800x484x736
BEGT 37#90-_R_	40.0	52.0	68.0	100.0	340.0	1021x484x736	1181x484x736
BEGT 47#120-_R_	50.0	65.0	85.0	125.0	425.0	1321x483x736	301x483x736
2xBEGT 27#60-_R_	60.0	78.0	102.0	150.0	510.0	2x(601x484x736)	2x(800x484x736)
2xBEGT 37#78-_R_	70.0	91.0	119.0	175.0	600.0	2x(1021x484x736)	2x(1181x484x736)
2xBEGT 37#90-_R_	80.0	104.0	136.0	200.0	680.0	2x(1021x484x736)	2x(1181x484x736)
2xBEGT 47#120-_R_	100.0	130.0	170.0	250.0	850.0	2x(1321x483x736)	2x(1481x483x736)

= 2: IP20, example BEGT 13205
= 4: IP23, example BEGT 13405
__R: resistance in ohm, example 26R=26 ohm
_R_: resistance in ohm, example 6R5=6.5 ohm
t : Braking time

Liquid cooling

Drive modules in frame sizes E to H8 and F69 - T69 are available in a liquid cooled version. These units are designed for connection to a liquid cooling system, normally a heat exchanger of liquid-liquid or liquid-air type. Heat exchanger is not part of the liquid cooling option. Drive units with parallel power modules (frame size H - T69) are delivered with a dividing unit for connection of the cooling system. The drive units are equipped with rubber hoses with leak-proof quick couplings.

Filter selection guide

Phenomenon	FILTERS				
	Common mode filter	Output choke	Output choke & overshoot clamp	Sine wave filter	All-pole sine wave filter
Common mode currents	Effective	Limited effect	Limited effect	Effective	Very effective
Bearing currents	Effective				Very effective
Voltage spikes U-V-W		Limited effect	Very effective	Very effective	Very effective
Voltage spikes U-PE		Limited effect	Effective	Limited effect	Very effective
dU/dt		Effective	Effective	Very effective	Very effective
Minimize motor audible noise		Limited effect	Limited effect	Effective	Effective
EMC conducted emission	Limited effect	Limited effect	Limited effect	Effective	Very effective

Recommendations with the different supply voltages up to and including 480 V

Situation		FILTERS				
		Common mode filter	Output choke	Output choke & overshoot clamp	Sine wave filter	All-pole sine wave filter
Not rated, delicate or difficult positioned motors		X			X	
Motor in frame size >280		X				
IEC 60034-17 motor			X			
IEC 60034-25 curve A motor	Cable lengths 0-100m**					
	Cable lengths 100-200m		X			
	Cable lengths 200-500m				X	
Dynamic use with frequently raised DC voltage (braking)				X		
Unshielded cables *						X

X = advised solution for this setup

Recommendations with the different supply voltages from 500 V - 690 V

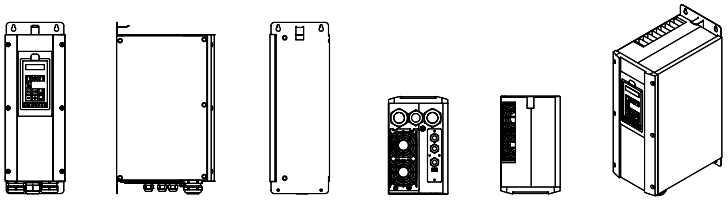
Situation		FILTERS				
		Common mode filter	Output choke	Output choke & overshoot clamp	Sine wave filter	All-pole sine wave filter
Not rated, delicate or difficult positioned motors		X			X	
Motor in frame size >280		X				
3 kV isolation windings **						
IEC 60034-25 curve B motor	Cable lengths 0-100m**					
	Cable lengths 100-200m			X		
	Cable lengths 200-500m				X	
Dynamic use with frequently raised DC voltage (braking)				X		
Unshielded cables *						X

X = advised solution for this setup

Remarks

Cable lengths should always be as short as possible.
The table is based on correct EMC wiring with shielded cable and proper EMC installation.
Voltage drop over the complete system must be less than 10% of the main supply.
Sine wave filters are only for use with V/HZ control mode.
* Conducted interference limits on unshielded motor - lines according to EN61800-3, table 16.
** No marks in a row, means that there is no need to take precautions.

CAD drawings available on the web



2D and 3D CAD drawings for Emotron AC drives, softstarters and monitors are available via our website. These will assist anyone working with our products, for example, consultants, installers or machine builders. Visit **www.emotron.com** for direct access to all CAD documents.

We put all our energy into saving yours

About CG Drives & Automation (Emotron)

CG Drives & Automation has developed, manufactured and delivered efficient and reliable motor control equipment for over 40 years under the brand of Emotron. Since 2011 we form a part of CG Power and Industrial Solutions Ltd., a global pioneering leader in the management and application of electrical energy.

At CG Drives & Automation we use our know-how to create technical solutions that fit your requirements, and our personal commitment to make them work in practice.

Simplicity and reliability are keywords applying to our products and solutions, as well as the service and support that our committed professionals provide.

CG Drives & Automation has five core markets with sites in the Nordics, India, Germany, the Netherlands, MEA and a dedicated partner network worldwide.

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