



Smart solutions.
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Technical Catalogue

AC Drives



CG VFX/FDU 2.0
0.55 - 3000 kW, 230 - 690 V
Protection class: IP20, IP21 and IP54



SC Industrial Syndicate

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CG VFX/FDU 2.0

CG FDU/VFX 2.0 AC drives offer reliable, cost-efficient and user-friendly operation of your pumps, fans, compressors, crushers, mills, mixers or blowers. Full control process ensures an optimized operation, with reduced energy consumption and less downtime. The CG FDU/VFX also protects your equipment from damage and unnecessary wear. The complete range covers motor powers from 0.55 to 3,000 kW.

Features:

- Robust and certified IP54 metal construction as option offers cost-efficient installation close to the application.
- All drive sizes are delivered with built-in Category C3 EMC-filter as standard. C3 requirements are fulfilled with 80 m motor cable.
- UL (UL 840) and marine (DNV) approved version available.
- 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 and Turkish.
- Operation parameters can be set in your process units, for example m/sec, tons/h, cycles/min, m³/min and bar.
- Removable control panel with own memory means it is easy to transfer or copy settings.
- Liquid cooled version available for sizes above 90 A.



CG VFX 2.0

The CG VFX 2.0 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.

- Direct torque control reacts extremely quickly and eliminates disturbances due to abrupt load changes.
- Soft starts minimize start currents and full motor overload capacity is available from standstill.
- Integrated vector braking ensures quick and controlled stops, increasing productivity and safety.



CG FDU 2.0

The CG FDU 2.0 AC drive is specially developed for controlling variable torque loads such as flow and pressure applications. A unique monitoring functionality protects your process from damage and unplanned downtime. Typical applications are pumps, fans, compressors, and blowers

- Soft starts minimize start currents and linear stops prevent water hammer.
- One CG 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.

Typical motor power at mains voltage 400 V

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]	Rated current [A]	Power @ 400V [kW]	Rated current [A]		
VFX48-003	3.8	0.75	2.5	0.55	2.0	B	IP 54 wall mounted
VFX48-004	6.0	1.5	4.0	1.1	3.2		
VFX48-006	9.0	2.2	6.0	1.5	4.8		
VFX48-008	11.3	3	7.5	2.2	6.0		
VFX48-010	14.3	4	9.5	3	7.6		
VFX48-013	19.5	5.5	13.0	4	10.4		
VFX48-018	27.0	7.5	18.0	5.5	14.4		
VFX48-025	38	11	25	7.5	20	C2	IP 20 module
VFX48-030	45	15	30	11	24		
VFX48-036	54	18.5	36	15	29		
VFX48-045	68	22	45	18.5	36	D2	
VFX48-060	90	30	60	22	48		
VFX48-072	108	37	72	30	58		
VFX48-088	132	45	88	37	70	E2	
VFX48-106	127	55	106	45	85		
VFX48-142	170	75	142	55	114		
VFX48-171	205	90	171	75	137	F2	
VFX48-205	246	110	205	90	164		
VFX48-244	293	132	244	110	195		
VFX48-300	360	160	300	132	240	G	
VFX48-375	450	200	375	160	300		
VFX48-430	516	220	430	200	344	H	
VFX48-500	600	250	500	220	400		
VFX48-600	720	315	600	250	480	I	
VFX48-650	780	355	650	315	520		
VFX48-750	900	400	750	355	600	J	
VFX48-860	1032	450	860	400	688		
VFX48-1K0	1200	560	1000	450	800	KA	
VFX48-1K15	1380	630	1150	500	920		
VFX48-1K25	1500	710	1250	560	1000	K	
VFX48-1K35	1620	710	1350	600	1080		
VFX48-1K5	1800	800	1500	630	1200	L	
VFX48-1K75	2100	900	1750	800	1400		
VFX48-2K0	2400	1120	2000	900	1600	M	
VFX48-2K25	2700	1250	2250	1000	1800		
VFX48-2K5	3000	1400	2500	1120	2000	O	

Larger sizes available on request

* Available for a limited time and as long as drive temperature permits. Rated data at 40 °C ambient temperature
 Note: calculate available 230 V motor power by multiplying the 400 V power value (kW) from table above with 0.575 or use motor rated current for drive selection. Example: VFX48-045, 22 kW x 0.575 = 12.6 kW at 230 V

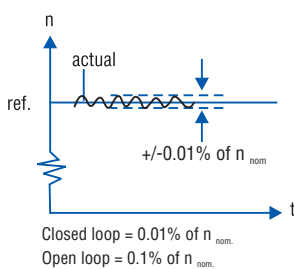
Typical motor power at mains voltage 690 V

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 @ 690V [kW]	Rated current [A]	Power @ 690V [kW]	Rated current [A]		
VFX69-090	108	90	90	75	72	F69	IP 54 wall mounted
VFX69-109	131	110	109	90	87		
VFX69-146	175	132	146	110	117		
VFX69-175	210	160	175	132	140		
VFX69-200	240	200	200	160	160		
VFX69-250	300	250	250	200	200	H69	IP 20 module
VFX69-300	360	315	300	250	240		
VFX69-375	450	355	375	315	300		
VFX69-400	480	400	400	315	320		
VFX69-430	516	450	430	315	344	I69	
VFX69-500	600	500	500	355	400		
VFX69-595	720	600	600	450	480		
VFX69-650	780	630	650	500	520	J69	
VFX69-720	864	710	720	560	576		
VFX69-800	960	800	800	630	640	KA69	
VFX69-905	1080	900	900	710	720		
VFX69-995	1200	1000	1000	800	800	K69	
VFX69-1K2	1440	1200	1200	900	960		
VFX69-1K4	1680	1400	1400	1120	1120	L69	
VFX69-1K6	1920	1600	1600	1250	1280		
VFX69-1K8	2160	1800	1800	1400	1440	N69	
VFX69-2K0	2400	2000	2000	1600	1600		
VFX69-2K2	2640	2200	2200	1700	1760	O69	
VFX69-2K4	2880	2400	2400	1900	1920		
VFX69-2K6	3120	2600	2600	2000	2080	P69	
VFX69-2K8	3360	2800	2800	2200	2240		
VFX69-3K0	3600	3000	3000	2400	2400	Q69	
						R69	
						S69	
						T69	

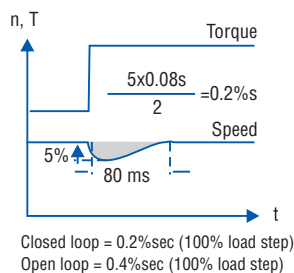
* Available for a limited time and as long as drive temperature permits. Rated data at 40 °C ambient temperature

Control performance for CG VFX 2.0 (Speed)

Speed control static accuracy (linearity):

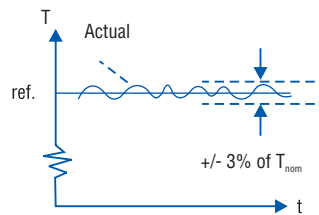


Speed Control dynamic accuracy (impact drop):

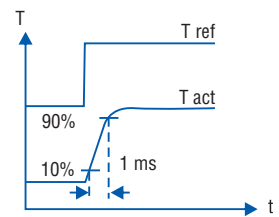


Control performance for CG VFX 2.0 (Torque)

Torque control static accuracy (linearity):



Torque control dynamic accuracy





Typical motor power at mains voltage 400 V

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]	Rated current [A]	Power @ 400V [kW]	Rated current [A]		
FDU48-003	3.0	0.75	2.5	0.55	2.0	B	IP 54 wall mounted
FDU48-004	4.8	1.5	4.0	1.1	3.2		
FDU48-006	7.2	2.2	6.0	1.5	4.8		
FDU48-008	9.0	3	7.5	2.2	6.0		
FDU48-010	11.4	4	9.5	3	7.6		
FDU48-013	15.6	5.5	13.0	4	10.4		
FDU48-018	21.6	7.5	18.0	5.5	14.4		
FDU48-025	30	11	25	7.5	20	C2	IP 20 module
FDU48-030	36	15	30	11	24		
FDU48-036	43	18.5	36	15	29		
FDU48-045	54	22	45	18.5	36	D2	
FDU48-060	72	30	60	22	48		
FDU48-072	86	37	72	30	58		
FDU48-088	106	45	88	37	70	E2	
FDU48-106	127	55	106	45	85		
FDU48-142	170	75	142	55	114		
FDU48-171	205	90	171	75	137	F2	
FDU48-205	246	10	205	90	164		
FDU48-244	293	132	244	110	195		
FDU48-300	360	160	300	132	240	G	
FDU48-375	450	200	375	160	300		
FDU48-430	516	220	430	200	344	H	
FDU48-500	600	250	500	220	400		
FDU48-600	720	315	600	250	480	I	
FDU48-650	780	355	650	315	520		
FDU48-750	900	400	750	355	600	J	
FDU48-860	1032	450	860	400	688		
FDU48-1K0	1200	560	1000	450	800	KA	
FDU48-1K15	1380	630	1150	500	920		
FDU48-1K25	1500	710	1250	560	1000	K	
FDU48-1K35	1620	710	1350	600	1080		
FDU48-1K5	1800	800	1500	630	1200	L	
FDU48-1K75	2100	900	1750	800	1400		
FDU48-2K0	2400	1120	2000	900	1600	M	
FDU48-2K25	2700	1250	2250	1000	1800		
FDU48-2K5	3000	1400	2500	1120	2000	O	

* Available for a limited time and as long as drive temperature permits. Rated data at 40 °C ambient temperature.
 Note: calculate available 230 V motor power by multiplying the 400 V power value (kW) from table above with 0.575 or use motor rated current for drive selection. Example: FDU48-045, 22 kW x 0.575 = 12.6 kW at 230 V

Typical motor power at mains voltage 690 V

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 @ 690V [kW]	Rated current [A]	Power @ 690V [kW]	Rated current [A]		
FDU69-090	108	90	90	75	72	F69	IP 54 wall mounted
FDU69-109	131	110	109	90	87		
FDU69-146	175	132	146	110	117		
FDU69-175	210	160	175	132	140		
FDU69-200	240	200	200	160	160		
FDU69-250	300	250	250	200	200	H69	IP 20 module
FDU69-300	360	315	300	250	240		
FDU69-375	450	355	375	315	300		
FDU69-400	480	400	400	315	320		
FDU69-430	516	450	430	315	344	I69	
FDU69-500	600	500	500	355	400		
FDU69-595	720	600	600	450	480		
FDU69-650	780	630	650	500	520	J69	
FDU69-720	864	710	720	560	576		
FDU69-800	960	800	800	630	640		
FDU69-905	1080	900	900	710	720	KA69	
FDU69-995	1200	1000	1000	800	800		
FDU69-1K2	1440	1200	1200	900	960	K69	
FDU69-1K4	1680	1400	1400	1120	1120	L69	
FDU69-1K6	1920	1600	1600	1250	1280	M69	
FDU69-1K8	2160	1800	1800	1400	1440	N69	
FDU69-2K0	2400	2000	2000	1600	1600	O69	
FDU69-2K2	2640	2200	2200	1700	1760	P69	
FDU69-2K4	2880	2400	2400	1900	1920	Q69	
FDU69-2K6	3120	2600	2600	2000	2080	R69	
FDU69-2K8	3360	2800	2800	2200	2240	S69	
FDU69-3K0	3600	3000	3000	2400	2400	T69	

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

Control performance for CG FDU 2.0 (V/Hz)

Speed control accuracy =
approximately 1% of n_{nom}
(slip frequency).

Torque accuracy =
approximately 5% of T_{nom}
(20 - 100% speed).

IP54 version of CG VFX 2.0 and FDU 2.0



VFX/FDU48:
Model 003 - 018 (B)



VFX/FDU48:
Model 026 - 046 (C)



VFX/FDU48:
Model 061 - 074 (D)



VFX/FDU48:
Model 90 - 175 (E)



VFX/FDU48:
Model 210 - 250 (F)

The CG VFX/FDU drives are also available as IP54 version, in four different frame sizes. All having the same well proven features as the rest of the CG FDU 2.0 and VFX 2.0 family.

Main features :

- Robust and compact mechanical design with easy connections
- Built in DC-choke for reduced harmonics and max voltage utilization
- Integrated EMC filter Category C3 as standard
- Speed controlled fans for extended equipment lifetime
- Built in brake chopper as option

CG VFX/FDU 2.0 - IP54 version. Typical motor power at mains voltage 400 V

Model	Max. output current [A]*		Normal duty (120%, 1 min every 10 min)		Heavy duty (150%, 1 min every 10 min)		Frame size
	VFX	FDU	Power @ 400V [kW]	Rated current [A]	Power @ 400V [kW]	Rated current [A]	
48-026	39	31	11	26	7.5	21	C
48-031	46	37	15	31	11	25	
48-037	55	44	18.5	37	15	29.6	
48-046	69	55	22	46	18.5	37	
48-061	92	73	30	61	22	49	D
48-074	111	89	37	74	30	59	
48-090	108	108	45	90	37	72	E
48-109	131	131	55	109	45	87	
48-146	175	175	75	146	55	117	
48-175	210	210	90	175	75	140	
48-210	252	252	110	210	90	168	F
48-228	300	300	110	228	90	182	
48-250	300	300	132	250	110	200	

* Available for a limited time and as long as drive temperature permits. Rated data at 40°C ambient temperature. For VFX/FDU48 003-018 (B) - IP54, refer page 2 and 4 respectively.

General specifications for CG VFX/FDU 2.0

Mains voltage: *	VFX/FDU48	230-480 V** +10%/-15% (-10% at 230 V)
	VFX/FDU69	500-690 V** +10%/-15%
Mains frequency		45 to 65 Hz
Input total power factor		0.95
Output voltage		0–Mains supply voltage:
Output frequency		0–400 Hz
Output switching frequency		3 kHz (FDU adjustable 1.5-6 kHz)
Efficiency at nominal load		97% for models 003 to 018 98% for models 025 to 3K0

* 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
Atmospheric pressure	86–106 kPa
Relative humidity, non-condensing	0–90%
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, 57<f<150 Hz, 1g 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 without deration 480V AC drives, with derating 1%/100 m of rated current up to 4000 m 690V AC drives, with derating 1%/100 m of rated current up to 2000 m Coated boards required for 2000 - 4000m.
Parameter	Storage condition
Temperature	-20 to +60°C
Atmospheric pressure	86 –106 kPa
Relative humidity, non-condensing	0 – 90%

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 48-250 are available as wall mounted modules, with the choice of an IP54 version (frame size B to F), and an IP20/21 version (frame size C2 to F2) that is also optimized for cabinet mounting.

Mechanical specifications for models VFX/FDU48 - IP54 version

Models	Frame size	Dim. H1/H2 x W x D [mm] (Module)	Weight [kg]	Air flow [m ³ /hour]
003 to 018	B	350(416)x 203 x 200	12.5	75
026 to 031	C	440(512)x178x292	24	120
037 to 046	C	440(512)x178x292	24	170
061 to 074	D	545(590) x 220 x 295	32	170
090 to 109	E	950 x 285 x 314	56	510
146 to 175	E	950 x 285 x 314	60	510
210 to 250	F	950 x 345 x 314	74	800

Mechanical specifications for models VFX/FDU48 IP20 version

Models (48-)	Frame size	Dim. H x W x D [mm] (Module)		Weight [kg]	Air flow [m ³ /hour]
025 to 030	C2	446 (530) x 176 x 266*	446 (539) x 176 x 272**	17	120
036 to 045					170
060 to 088	D2	545 (630) x 220 x 282*	545 (639) x 220 x 282**	30	170
106 to 171	E2	952 (952) x 275 x 313		53	510
205 and 244	F2	952 (952) x 335 x 313		68	800
300 to 375	G	1036 x 500 x 390		140	1020
430 to 500	H	1036 x 500 x 450		170	1600
600 to 750	I	1036 x 730 x 450		248	2400
860 to 1K0	J	1036 x 1100 x 450		340	3200
1K15 to 1K25	KA	1036 x 1365 x 450		418	4000
1K35 to 1K5	K	1036 x 1630 x 450		496	4800
1K75	L	1036 x 2000 x 450		588	5600
2K0	M	1036 x 2230 x 450		666	6400
2K25	N	1036 x 2530 x 450		744	7200
2K5	O	1036 x 2830 x 450		836	8000

* without top cover

** with top cover - IP21 version

Dimensions in parenthesis are dimensions including cable interface.

Mechanical specifications for models VFX/FDU69 - IP20 version

Models (69-)	Frame size	Dim. H x W x D [mm] (Module)		Weight [kg]	Air flow [m ³ /hour]
090 to 200*	F69	1090 x 345 x 314		77	800
250 to 400	H69	1176 x 500 x 450		176	1600
430 to 595	I69	1176 x 730 x 450		257	2400
650 to 800	J69	1176 x 1100 x 450		352	3200
905 to 995	KA69	1176 x 1365 x 450		433	4000
1K2	K69	1176 x 1630 x 450		514	4800
1K4	L69	1176 x 2000 x 450		609	5600
1K6	M69	1176 x 2230 x 450		690	6400
1K8	N69	1176 x 2530 x 450		771	7200
2K0	O69	1176 x 2830 x 450		866	8000
2K2	P69	1176 x 3130 x 450		947	8800
2K4	Q69	1176 x 3430 x 450		1028	9600
2K6	R69	1176 x 3730 x 450		1123	10400
2K8	S69	1176 x 4030 x 450		1204	11200
3K0	T69	1176 x 4330 x 450		1285	12000

*IP54 version

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 software setting +30 V 20 k Ω (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 switch +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 V _{DC} open Low < 1 V _{DC} @ 50 mA 100 mA max (together with +24 V _{DC})
Relays, 3 pcs	
Contacts	0.1 – 2 A/U _{max} 250 V _{AC} or 42 V _{DC}
Reference voltages	
+10V _{DC} -10V _{DC} +24V _{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" for connection data and default settings.

Standard Options for VFX/FDU 2.0

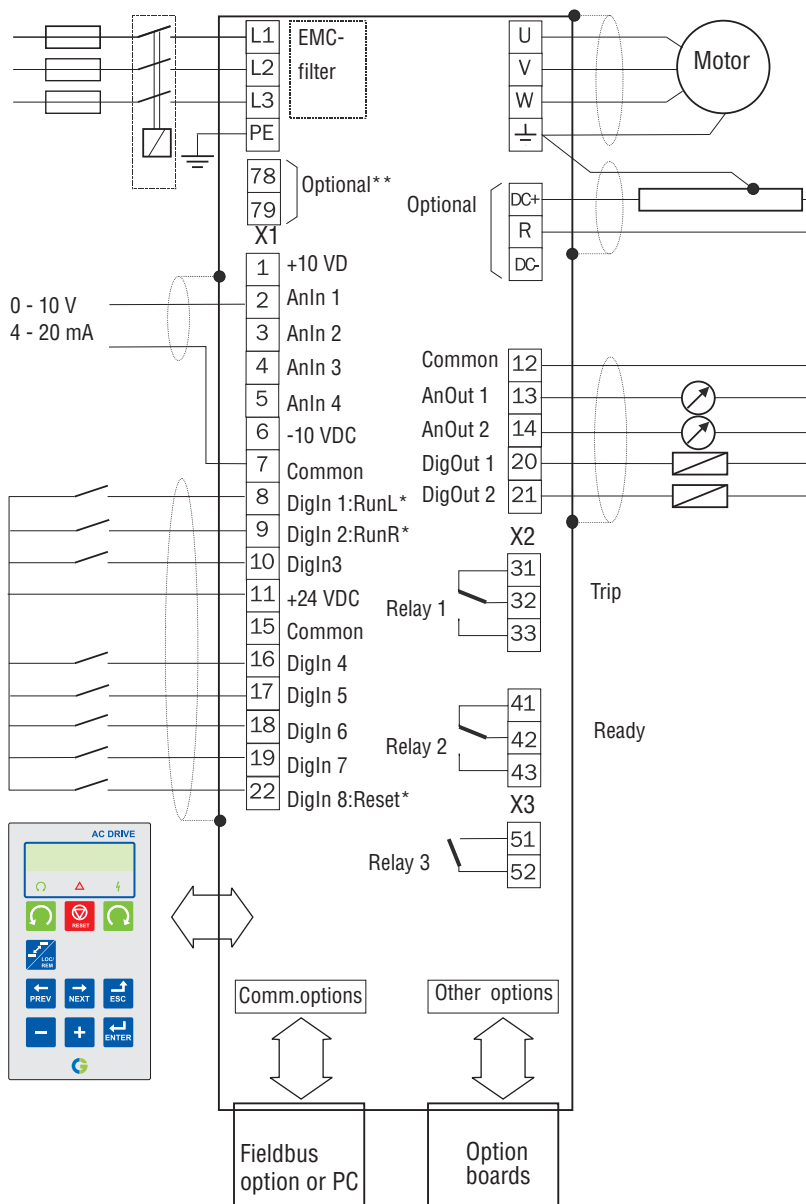
- I/O board: 3 relay outputs & 3 programmable digital Inputs
- Encoder board: TTL/HTL for incremental encoders
- PTC/PT100 board
- Crane option board (VFX): CRIO board, Crane interface board
- Fieldbus: Profibus, Devicenet
- Ethernet: Modbus/TCP, EtherCAT®, Profinet IO 1-port, Profinet IO 2-port
- RS232/RS485 Isolated boards
- Glands for frame size B, C and D
- Control Panel Kit, with control/blank keypad
- CGSoftCom: for PC interface and control

Factory mounted options for VFX/FDU 2.0 *

- Standby power supply board
- Safestop
- Brake chopper
- DC+/DC- connection
- Blank keypad

* Can be incorporated only during ordering of the AC Drive module.

User interface data



X1	Name:	Function (Default):
1	+10 V	+10 VDC Supply voltage
2	AnIn 1	Speed reference
3	AnIn 2	Not used
4	AnIn 3	Not used
5	AnIn 4	Not used
6	-10 V	-10VDC Supply voltage
7	Common	Signal ground
8	DigIn 1	Run L
9	DigIn 2	Run R
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
20	DigOut 1	Ready
21	DigOut 2	Brake/No trip
22	DigIn 8	Reset
X2		
31	N/C 1	Relay 1 output=Trip Active when the AC drive is in a TRIP condition. N/C is opened when the relay is active (valid for all relays) N/O is closed when the relay is active (valid for all relays)
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		
51	COM 3	Relay 3 Output=Not used
52	N/O 3	

* = Default selection

** = Optional terminals X1: 78 - 79 for connection of Motor-PTC on Frame sizes B to D2.

All inputs and outputs are programmable.

Control panel

A detachable multi-language control panel is included as standard.

Following languages are supported in the control panel:

English, Swedish, Dutch, German, French, Spanish, Russian, Italian, Czech and Turkish.