TECHNICAL CATALOGUE
EMOTRON FLOWDRIVE

FlowDrive™

EMOTRON FLOWDRIVE
0.37 - 200 KW, 230 - 690 V
IP20, IP21 AND IP54

emotron
DEDICATED DRIVE
A CG Product

Dedicated
waste water **drive**

Speed control offers great energy and maintenance savings. Emotron AC drives ensure high efficiency and reliability, whether your need is to adapt a pump's operation to variations in flow. Our AC drives Emotron FlowDrive are available in sizes 0.55-3000 kW, 230-690V and with protection class IP20, IP21 and IP54.

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General information overview for Emotron FlowDrive

Emotron FlowDrive	IP2Y Frame size A3 - C3	IP20/21 Frame sizes C2 - F2	IP54 Framesizes B - F
Power range	0.37 - 18.5 / 0.5 - 25 hp	5.5 - 160 kW / 7.5 - 250 hp	0.37 - 200 kW / 0.5 - 250 hp
Voltage range	230 - 480 V	230 - 480 V	230 - 690 V
IP class	IP20	IP20/21	IP54
Control mode	V/Hz		
AC/DC choke	Optional	Standard	Standard
EMC filter	C3 is standard C2 is optional		
Coated boards	Standard		
Detachable control panel - multilanguage	Standard	Standard	Standard
Options	PTC/RTC Extended IO Safe stop Standby supply	PTC/PT100 Extended IO Safe stop Standby supply External control panel RTC Real time clock	
Serial communication option	RS232/485	RS232/485	
Communication options	Profibus EtherCAT DeviceNet Modbus/TCP Profinet IO, 1-port and 2-port EtherNet IP, 2-port		
Liquid cooling	N.a.	N.a.	Optional for frame sizes E and up
IP21 top cover	N.a.	Optional	N.a.

CE certification	All sizes		
UL certification cULus certification		UL/cUL approval pending	UL/cUL approval
EAC	All sizes (pending)		

Emotron FlowDrive Dedicated waste water drive

The Emotron FlowDrive is specially developed for controlling waste water pumping stations. It continuously adapts motor speed to the level required, minimizing energy consumption and wear.

MAIN FEATURES

- Available as robust and certified IP54 metal construction or IP20/21 version.
- Fully automatic waste water reservoir level control.
- Best Efficiency Point (BEP) calculation for energy optimal operation.
- Efficiency is increased by using built-in cleaning functions; pump cleaning, sump cleaning, pipe cleaning.
- All drive sizes are delivered with built-in Category C3 EMC-filter as standard. Cat C2 as option.
- Coated board as standard
- Temp/Speed controlled fans assures less noise, a more even drive temperature and higher 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.
- Removable control panel with own memory means it is easy to transfer or copy settings.
- UL/cUL (UL 840) approved version available (not IP2Y).

Emotron FlowDrive - IP54 version

Typical motor power at mains voltage 230V, 400V and 460V.

Model	Max. output current [A]*	Normal duty (120%, 1 min. every 10 min.)					Frame size	IP class
		Rated current [A]	Power @ 230V [kW]	Power @ 230V [hp]	Power @ 400V [kW]	Power @ 460V [hp]		
FLD48-003-54	3.0	**2.5**	0.37	0.5	0.75	1	B	IP54 wall mounted
FLD48-004-54	4.8	**4.0**	0.75	1	1.5	2		
FLD48-006-54	7.2	**6.0**	1.1	1.5	2.2	3		
FLD48-008-54	9.0	**7.5**	1.5	2	3.	3		
FLD48-010-54	11.4	**9.5**	2.2	3	4	5		
FLD48-013-54	15.6	**13.0**	2.2	3	5.5	7.5		
FLD48-018-54	21.6	**18.0**	4	5	7.5	10		
FLD48-026-54	31	**26**	5.5	7.5	11	15	C	
FLD48-031-54	37	**31**	7.5	10	15	20		
FLD48-037-54	44	**37**	7.5	10	18.5	25		
FLD48-046-54	55	**46**	11	15	22	30		
FLD48-061-54	73	**61**	15	20	30	40	D	
FLD48-074-54	89	**74**	18.5	25	37	50		
FLD48-090-54	108	**90**	22	30	45	60	E	
FLD48-109-54	131	**109**	30	40	55	75		
FLD48-146-54	175	**146**	37	50	75	100		
FLD48-175-54	210	**175**	45	60	90	125		
FLD48-210-54	252	**210**	55	75	110	150	F	
FLD48-250-54	300	**250**	75	100	132	200		

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

Emotron FlowDrive - IP54 version

Typical motor power at mains voltage 525V, 575V and 690V.

Model	Max. output current [A]*	Normal duty (120%, 1 min. every 10 min.)				Frame size	IP class
		Rated current [A]	Power @ 525 V [kW]	Power @ 575 V [hp]	Power @ 690 V [kW]		
FLD52-003-54	3.0	**2.5**	1.1	-	-	B	IP54 wall mounted
FLD52-004-54	4.8	**4.0**	2.2	-	-		
FLD52-006-54	7.2	**6.0**	3	-	-		
FLD52-008-54	9.0	**7.5**	4	-	-		
FLD52-010-54	11.4	**9.5**	5.5	-	-		
FLD52-013-54	15.6	**13.0**	7.5	-	-		
FLD52-018-54	21.6	**18.0**	11	-	-		
FLD52-026-54	31	**26**	15	-	-	C	
FLD52-031-54	37	**31**	18.5	-	-		
FLD52-037-54	44	**37**	22	-	-		
FLD52-046-54	55	**46**	30	-	-		
FLD52-061-54	73	**61**	37	-	-	D	
FLD52-074-54	89	**74**	45	-	-		
FLD69-090 -54	108	**90**	55	75	90	F69	
FLD69-109-54	131	**109**	75	100	110		
FLD69-146-54	175	**146**	90	125	132		
FLD69-175-54	210	**175**	110	150	160		
FLD69-200-54	240	**200**	132	200	200		

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

Emotron FlowDrive - IP20 version

Typical motor power at mains voltage 230V, 400V and 460V.

Model	Max. output current [A]*	Normal duty (120%, 1 min every 10 min)					Frame size
		Rated current [A]	Power @ 230V [kW]	Power @230V [hp]	Power @ 400V [kW]	Power @460V [hp]	
FLD48-2P5-2Y	3.0	**2.5**	0.37	0.5	0.75	1	A3
FLD48-3P4-2Y	4.1	**3.4**	0.55	0.75	1.1	1.5	
FLD48-4P1-2Y	4.9	**4.1**	0.75	1	1.5	2	
FLD48-5P6-2Y	6.7	**5.6**	1.1	1.5	2.2	3	
FLD48-7P2-2Y	8.6	**7.2**	1.1	1.5	3.0	4	
FLD48-9P5-2Y	11.4	**9.5**	2.2	3	4.0	5	
FLD48-012-2Y	14.4	**12.**	2.2	3	5.5	7.5	
FLD48-016-2Y	19.2	**16**	4.0	5.5	7.5	10	B3
FLD48-023-2Y	27.6	**23**	5.5	7.5	11	15	
FLD48-032-2Y	37.2	**31**	7.5	10	15	20	C3
FLD48-038-2Y	45.6	**38**	11	15	18.5	25	
FLD48-025-20	30	**25**	5.5	7.5	11	15	C2
FLD48-030-20	36	**30**	7.5	10	15	20	
FLD48-036-20	43	**36**	7.5	10	18.5	25	
FLD48-045-20	54	**45**	11	15	22	30	
FLD48-058-20	72	**58**	15	20	30	40	
FLD48-072-20	86	**72**	18.5	25	37	50	D2
FLD48-088-20	106	**88**	22	30	45	60	
FLD48-105-20	127	**106**	30	40	55	75	
FLD48-142-20	170	**142**	37	50	75	100	E2
FLD48-171-20	205	**171**	45	60	90	125	
FLD48-205-20	246	**205**	55	75	110	150	F2
FLD48-244-20	293	**244**	75	100	132	200	
FLD48-293-20	352	**293**	90	125	160	250	

** 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 FlowDrive

Mains voltage: *	FLD48	230-480 V** +10%/-15% (-10% at 230 V)
	FLD52	440-525 V**+10%/-15%
	FLD69	500-690 V** +10%/-15%
Mains frequency		45 to 65 Hz
Input total power factor		0.95 (IP20/21 & IP54), 0.7 - 0.8 (IP2Y)
Output voltage		0–Mains supply voltage:
Output frequency		0–400 Hz
Output switching frequency		3 kHz (FLD adjustable 1.5-6 kHz)
Efficiency at nominal load		97% for models 003 to 018 (IP20/21 & IP54) 98% for models 025 to 3K0 (IP20/21 & IP54) 93% for IP2Y frame sizes A3 & B3 95% for IP2Y frame size C3

** 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 to +40°C (32°F to 104°F) with derating max 50/55 °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 (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

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.

Standards

Market	Standard	Description
European	EMC Directive	2004/108/EC
	Low Voltage Directive	2006/95/EC
	WEEE Directive	2002/96/EC
All	EN 60204-1	Safety of machinery - Electrical equipment of machines Part 1: General requirements.
	EN(IEC)61800-3:2004	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 Ed. 2.0	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	Classification of environmental conditions. Air quality chemical vapours, unit in operation. Chemical gases 3C2, Solid particles 3S2. Optional with coated boards Unit in operation. Chemical gases Class 3C3, Solid particles 3S2.
	UL508C	UL Safety standard for Power Conversion Equipment
North & South America	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. (Former GOST R)

Operation at higher temperatures

Emotron AC drives are designed for nominal operation at maximum of 40°C ambient temperature.
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 +10 °C (max 50 °C for IP2Y)
-1% / degree Celsius to max +15 °C (max 55 °C for IP54 and IP20/21)

-0.55% / degree Fahrenheit to max +18 °F (max 122 °F for IP2Y)
-0.55% / degree Fahrenheit to max +27 °F (max 131 °F for IP54 and IP20/21)

Dimensions, weights and cooling air flow

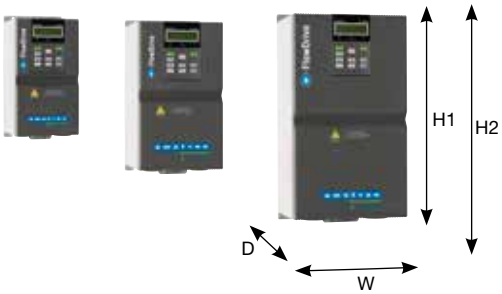
The tables below give an overview of the dimensions, weights, and the required air flow for cabinet mounting of the modules.
Drives with model numbers up to 48-293 are available as wall mounted modules; with the choice of an IP54 version (frame size B to F), and an IP20/21 version (frame size C2 to F2) that is also optimized for cabinet mounting.

Mechanical specifications for model FlowDrive - IP2Y and - 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
FLD48-2P5-2Y to -012-2Y	A3	220/287 x 120 x 169 (8.7/11.3 x 4.7 x 6.7)	-	2.6 (5.7)	39
FLD48-016-2Y to -023-2Y	B3	255/325 x 145 x 179 (9.8/12.8 x 5.7 x 7)	-	3.9 (8.6)	89
FLD48-032-2Y to -038-2Y	C3	335/407 x 190 x 187 (13.2/16 x 7.5 x 7.4)	-	5 (11)	177
FLD48-025 to 48-030	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
FLD48-036 to 48-058					170
FLD48-072 to 48-105	D2	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
FLD48-142to 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
FLD48-205 and 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)	68 (150)	800

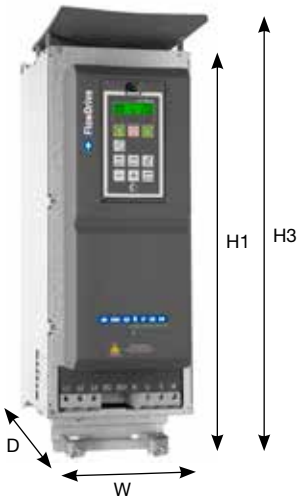
H1 = Enclosure height
H2 = Total height including cable interface
H3 = Total height including top cover
** without top cover*
*** with top cover*

IP2Y and IP20/21 version of Emotron FlowDrive



Frame size A3 | Frame size B3 | Frame size C3

Frame size C2
IP20



Frame size D2
IP21

Frame size E2
IP20

Frame size F2
IP20

Mechanical specifications for models FLD48/ FLD52/ FLD69 - IP54 version

Models	Frame size	IP54 Dim. H x W x D mm (in)	IP54 Weight kg (lb)	Air flow m3/hour
FLD48-003 to 018	B	350/416 x 203 x 200 (13.8/16.4 x 8 x 7.9)	12.5 (27.6)	75
FLD48-026 to 031	C	440/512 x178x292 (17.3/20.2 x 7 x 11.5)	24 (52.9)	120
FLD48-037 to 046				170
FLD48-061 to 074	D	545/590 x 220 x 295 (21.5/23.2 x 8.7 x 11.5)	32 (70.6)	170
FLD48-090 to 109	E	950 x 285 x 314 (37.4 x 11.2 x 12.4)	56 (123.5)	510
FLD48-146 to 175			60 (132.3)	
FLD48-210 to 250	F	950 x 345 x 314 (37.4 x 13.6 x 12.4)	74 (163.1)	800
FLD69-090 to 200	F69	1090 x 345 x 314 (42.9 x 13.6 x 12.4)	77 (169.8)	800

n/a = not applicable

FLD48/52:
Model 003 - 018 (B)

FLD48/52:
Model 026 - 046 (C)

FLD48/52:
Model 061 - 074 (D) (B)

FLD48:
Model 090 - 175 (E)

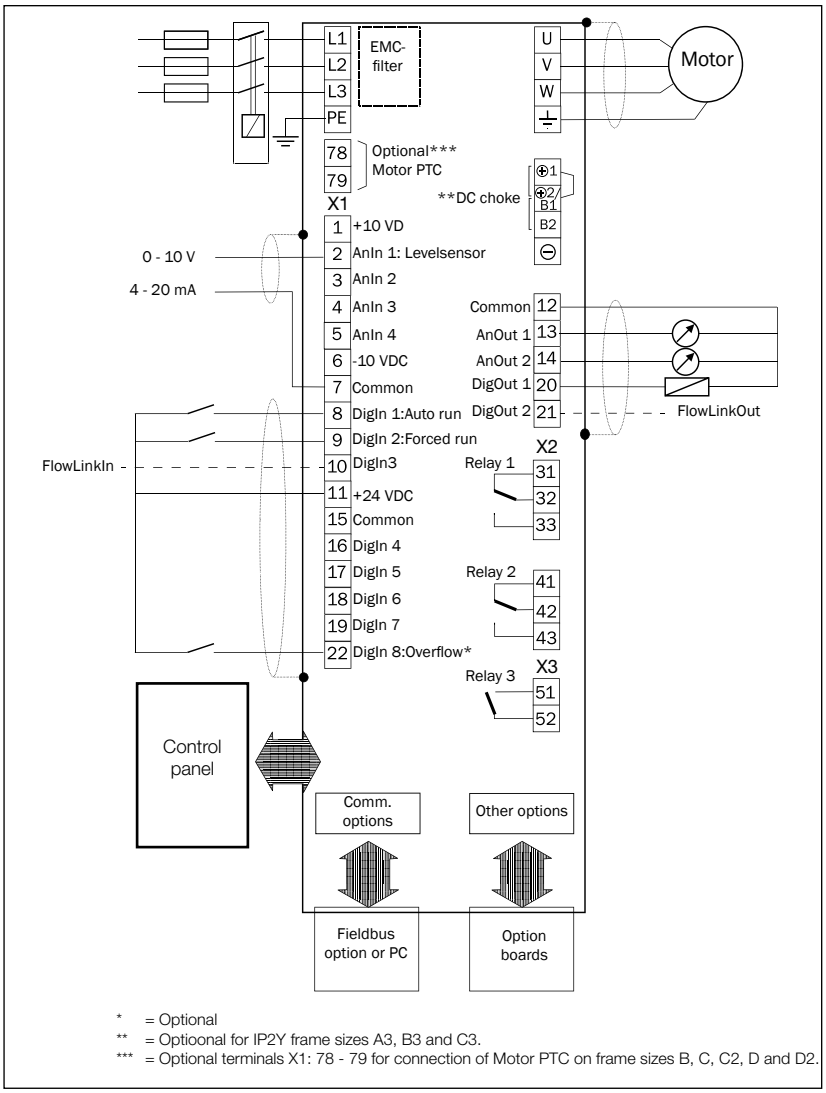
FLD48: Model 210 - 250 (F)
FLD69: Model 090 - 200 (F69)

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 25 for connection data and default settings

User interface data



X1	Name:	Function (Default):
1	+10 V	+10 VDC Supply voltage
2	AnIn1	Level sensor
3	AnIn2	Off
4	AnIn3	Off
5	AnIn4	Off
6	-10 V	-10VDC Supply voltage
7	Common	Signal ground
8	DigIn 1	Auto run
9	DigIn 2	Forced run
10	DigIn 3	FlowLinkIn
11	+24 V	+24VDC Supply voltage
12	Common	Signal ground
13	AnOut 1	Speed
14	AnOut 2	Torque
15	Common	Signal ground
16	DigIn 4	Off
17	DigIn 5	Off
18	DigIn 6	Off
19	DigIn 7	Off

X1	Name:	Function (Default):
20	DigOut 1	Ready
21	DigOut 2	FlowLinkOut
22	DigIn 8	Overflow level switch (optional)

X2	Name:	Function (Default):
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	Name:	Function (Default):
51	COM 3	Relay 3 Output=Not used
52	N/O 3	

All inputs and outputs are programmable.

Standard options

Standard options for Emotron FlowDrive

STANDARD OPTION	IP2Y Frame sizes A3 - C3 All boards are coated. Support for 2 option boards and one communication option		IP20/21 and IP54 Frame sizes C2 - F2 and B - F All boards are uncoated, available as coated on request. Support for 3 option boards and one communication option	
	Part no.	Remark	Part no.	Remark
RTC Board	Not available, see PTC & RTC board		01-3876-15	Max 1 RTC board
I/O board	01-6070-01		01-3876-01	
PTC/PT100 board	Not available		01-3876-08	Max 1 PTC/PT100 board
PTC & RTC board	01-6070-08		Not available	
RS232/485	01-6070-07		01-3876-04	
Standby power supply	01-6070-00		Available as factory built in option	
Safe stop	01-6070-02		Available as factory built in option	
Fieldbus - Profibus	01-6070-05		01-3876-05	
Fieldbus - DeviceNet	01-6070-06		01-3876-06	
Ethernet - Modbus TCP	01-6070-09		01-3876-09	
Ethernet - Modbus/TCP M12	01-6070-14		01-3876-14	
Ethernet - EtherCAT®	01-6070-10		01-3876-10	
Ethernet - Profinet IO 1-port	01-6070-11		01-3876-11	
Ethernet - Profinet IO 2-port	01-6070-12		01-3876-12	
Ethernet - EtherNet IP 2-port	01-6070-13		01-3876-13	

RTC board

RTC (Real Time Clock) function for FlowDrive
Makes it possible to start functions at desired date, time or weekday.

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.

PTC & RTC board

1 PTC isolated input conforming DIN 44081/44082. Max 6 PTC thermistors can be connected in series to PTC input.
RTC (Real Time Clock) function for FlowDrive
Makes it possible to start functions at desired date, time or weekday.

RS232/RS485 isolated

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

Standard options for Emotron FlowDrive

Fieldbus and Ethernet boards

Typical drive response time = 10 ms (not including any fieldbus & 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

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

Ethernet - Modbus/TCP M12

Industrial Ethernet option module for Modbus/TCP protocol. M12 type connector.
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 - 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 Profinet IO (RT) protocol. 1 x RJ45 type connector.
Baud rate: 100 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. 01-3957-21 (Size B)
01-3957-31 (Size C/C2)
01-3957-01 (Size D/D2 and up)

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. 01-3957-20 (Size B)
01-3957-30 (Size C/C2)
01-3957-00 (Size D/D2 and up)

Standby power supply

Standby power supply board for AC drive type IP2Y, frame sizes A3, B3 and C3
To be connected to external 24 V AC/DC supply voltage. If the main power is switched off, the control board, control panel and the connected options, for example fieldbus communication, will continue to operate.

Safe stop

Safe stop (STO) board for AC drive type IP2Y, frame sizes A3, B3 and C3
Extra built-in inputs and outputs for emergency stop circuit (Safe Torque Off), conforming with the norms EN-IEC 62061:2005 SIL2 and EN-ISO 13849-1:2006

Standard options for Emotron FlowDrive

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 - 6A (M16 - M20)	B
01-4601-22	8 - 10A (M16 - M25)	
01-4601-23	13 - 18A (M16 - M32)	
01-4399-01	26 - 31A (M12 - M32)	C
01-4399-00	37 - 46A (M12 - M40)	
01-4833-00	61 - 74A (M20 - M50)	D

Factory mounted options for Emotron FlowDrive

Standby power supply

Built-in standby power supply board.
To be connected to external 24 V AC/DC supply voltage. If the main power is switched off, the control board, control panel and the connected options, for example fieldbus communication, will continue to operate.
Part no: 01-3954-00
Part no: 01-3954-50 (coated)

Safe stop

Safe stop for size B to D2 (uses 1 of the 3 option positions)

Safe stop for size E, E2 and up

Extra built-in inputs and outputs for emergency stop circuit (Safe Torque Off), conforming with the norms EN-IEC 62061:2005 SIL2 and EN-ISO 13849-1:2006

DC+ /DC- connection

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

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.

Extended options for Emotron FlowDrive

Extended EMC filter 90-300A

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
FLD48-090	3F480-100.230	325x150x107	7.1	IP20[1]
FLD48-109	3F480-125.230	345x175x127	10	IP20[1]
FLD48-146	3F480-150.230	375x175x135	10	IP20[1]
FLD48-175	3F480-180.230	490x170x158	13.5	IP00[2]
FLD48-210	3F480-220.230	490x170x158	13.5	IP00[2]
FLD48-250	3F480-250.230	490x230x158	18.2	IP00[2]
FLD48-300	3F480300.230	490x230x158	18.2	IP00[2]

1=Screw terminal (protected)
2=Busbar terminals

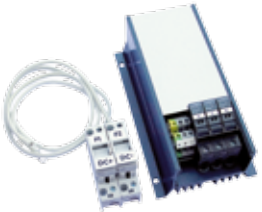
Output choke (dU/dt)

Output chokes (supplied separately) are recommended above app. 100 m cable length for all single drives. Consult your supplier in case of paralleled drives. Due to the switching of output voltage, high capacitive peak currents will run through the parasitic capacitances between the phases and to earth. Screened cables have more parasitic capacitances. Output chokes should be installed as close as possible to the drive output. Output chokes also limits voltage peaks at motor winding.
Rated voltage = 800 V, IP00 units. Suitable for up to IP23 cabinet installation.
Max. 40°C ambient temperature.

Nominal current (I_N) A/Phase	L [mH]	Weight [kg]	Dimensions HxWxD [mm]	Part no.
2.8	1.5	0.6	60x78x95	473160 00
4.4	1	0.6	60x78x95	473161 00
6.6	0.65	0.6	60x78x95	473162 00
11	0.4	1	65x96x105	473163 00
14.3	0.3	1	65x96x105	473164 00
18.2	0.25	1.2	74x96x105	473165 00
26.4	0.175	1.2	74x96x105	473166 00
32	0.15	1.7	84x125x140	473167 00
65	0.1	4	105x155x205	473168 00
90	0.1	8.4	120x90x235	473169 00
146	0.05	10.2	140x190x260	473170 00
175	0.05	13.4	160x210x180	473171 00
275	0.032	18.4	170x230x200	473172 00
275 (flat mounting)	0.032	18.4	193x254x162	74052065L2
320	0.025	18.9	170x230x200	473173 00

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)



Sine wave filter

Rated voltage= 400 V ±25%, 50/60 Hz (690 V on request).
Max. 40°C ambient temperature. IP20= with enclosure and screw terminals. IP00=no enclosure and busbar connections.
Voltage drop approximately 25 V at rated current, 50 Hz.
Overload: 110% for 5 min, 150% for 2 min or 200% for 30 s.
For further information see filter selection guide, page 19

Filter type 3AFS400-	Protection class	Power [kW]	Nom. current (I_N) A/Phase	Power loss [W]	Weight [kg]	Dimensions HxWxD [mm]
002.5	IP20	0.75	2.5	75	5	190x165x160
004	IP20	1.5	4	90	5	190x165x160
007	IP20	2.2	7	125	7	250x162x162
010	IP20	4	10	165	9	250x162x162
013	IP20	5.5	13	190	12	250x162x162
016	IP20	7.5	16	220	13	300x210x180
025	IP20	11	25	250	18	300x250x210
035	IP20	15	35	275	25	300x270x235
010	IP00	4	10	165	9	195x200x115
013	IP00	5.5	13	190	12	225x200x115
016	IP00	7.5	16	220	13	225x240x135
025	IP00	11	25	250	18	270x250x160
035	IP00	15	35	275	25	270x250x160
050	IP00	22	50	320	45	280x300x250
063	IP00	30	63	550	49	270x300x370
080	IP00	37	80	380	65	324x360x320
100	IP00	45	100	530	65	324x360x320
125	IP00	55	125	650	85	335x390x320
150	IP00	75	150	580	119	440x480x340
180	IP00	90	180	760	131	440x480x340
250	IP00	132	250	600	135	420x420x390
300	IP00	160	300	1000	140	420x420x390

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.
Part no. 052213

Liquid cooling

Drive modules in frame sizes E, F and F69 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. 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

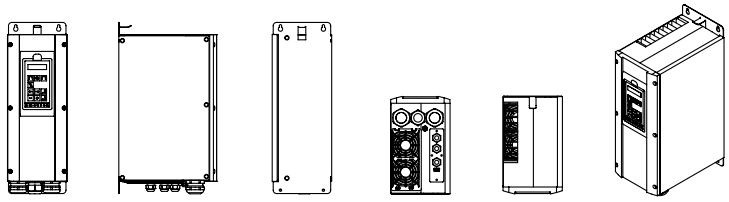
X = advised solution for this setup

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.

* 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.cgglobal.com** or **www.emotron.com** for direct access to all CAD documents.

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TECHNICAL CENTRES

NORDIC
CG Drives & Automation
Mörsaregatan 12
Box 222 25
SE-250 24 HELSINGBORG
Sweden
Phone: +46 42 16 99 00
Fax: +46 42 16 99 49
info.se@cgglobal.com

CENTRAL EUROPE
(Germany, Austria, Switzerland)
CG Drives & Automation
Gießerweg 3
D-38855 WERNIGERODE
Germany
Phone: +49 (0)3943-920 50
Fax: +49 (0)3943-920 55
info.de@cgglobal.com

BENELUX
CG Drives & Automation
Polakkers 5
5531 NX BLADEL
Postbus 132
5530 AC BLADEL
The Netherlands
Phone: +31 (0)497 389 222
Fax: +31 (0)497 386 275
info.nl@cgglobal.com

CG Drives & Automation Technical catalogue FlowDrive 01-6167-01, 2015-11