## TEC®

### **Product data sheet Emotron**

### Variable speed drive FDU48-046-54/ 22KW/ 380-480V

### **Main Features**

- NEW Control panel with Real time clock. Optional Bluetooth 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 fulfilled with 80 m motor cable (IP2Y= 25m).
- 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 (not IP2Y).
- Marine (DNV-GL & BV) approved version available (not IP2Y, IP2x).
- Liquid cooled version available for sizes above 90 A



## **Product data sheet**

## GENERAL SPECIFICATION

Component name	FDU48-046-54	
Suitable Motor Capacity	22	
Capacity(KW)	22	
Rated Output Current(A)	46	
Maximum Output Current(A)	55	
Input Voltage Range(V)	Three-phase 230~480V, 50/60Hz	
Allowable Voltage Fluctuation	-15%~ +10%	
Output Voltage range(V)	Three-phase 0~480V	
Mains Frequency (Hz)	45 to 65	
Output Switching Frequency (kHz)	3	
Input Power Factor (%)	0.95	
Environmental conditions		
Nominal ambient temperature	0°C - 40°C (32°F- 104°F)	
Atmospheric pressure	86–106 kPa ( 12.5 - 15.4 PSI)	
Relative humidity		
according to IEC 60721-3-3	Class 3K4, 595% and no condensing	
Contamination,	No electrically conductive dust allowed. Cooling air must be clean	
according to IEC 60721-3-3	and free from corrosive materi-als. Chemical gases, class 3C2	
	(coated boards 3C3). Solid particles, class 3S2.	
Component name	VFX48-2K5-54	
Vibrations	According to IEC 60068-2-6, Sinusoidal vibrations:	
	10 <f<57 (0.00295="" 0.075="" ft)<="" hz,="" mm="" td=""></f<57>	
	57 <f<150 (0,035="" 1g="" hz,="" oz)<="" td=""></f<150>	
Alaites de	0. 1000 ··· (0. 2200 ft) ···································	
Altitude	0–1000 m (0 - 3280 ft) with derating 1%/100 m (328 ft) of rated current	
Storage temperature	-20 to +60 °C (-4 to + 140 °F)	
Storage atmospheric pressure	86–106 kPa (12.5 - 15.4 PSI)	
Storage relative humidity according	Class 1K4, max. 95% and no condensing and no formation of ice.	
to IEC60721-3-1	Glass Tivi, max. 95% and no condensing and no formation of fee.	
Basic I/O Data		
Control signal inputs: Analogue (differe	ntial), 4 channels	
Analogue voltage/current	0-±10 V/0-20 mA via switch	
Max. input voltage	+30 V	
Input impedance	$20 \text{ k}\Omega$ (voltage), 250 Ω (current)	
Resolution	11 bits + sign	
Hardware accuracy	0.5% type + 1 ½ LSB fsd	
Non-linearity	1½ LSB	
Digital inputs: 8 channels		
Input voltage	High >9 VDC, Low<4 VDC	
Max. input voltage	+30 VDC	
Input impedance	<3.3 VDC: 4.7 kΩ , ≥3.3 VDC: 3.6 kΩ	



# **Product data sheet**

Signal delay	≤8 ms	
Control signal outputs: Analogue, 2 channels		
Output voltage/current	0-10 V/0-20 mA via software setting	
Max. output voltage	+15 V @5 mA cont.	
Short-circuit current (∞)	+15 mA (voltage) +140 mA (current)	
Output impedance	10 Ω (voltage)	
Resolution	10 bit	
Maximum load impedance for current	500 Ω	
Hardware accuracy	1.9% type fsd (voltage), 2.4% type fsd (current)	
Offset	3 LSB	
Non-linearity	2 LSB	
Digital outputs: 2 channels		
Output voltage	High>20 VDC @50 mA, >23 VDC open	
	Low<1 VDC @50 mA	
Short-circuit current (∞)	100 mA max (together with +24 VDC)	
Relays, 3pcs		
Contacts	0.1 - 2 A/Umax 250 VAC or 42 VDC	
Reference voltages		
+10 VDC	+10 VDC @10 mA short-circuit current +30 mA max	
-10 VDC	-10 VDC @10 mA	
+24 VDC	+24 VDC short-circuit current +100 mA max (together with Digital Outputs)	

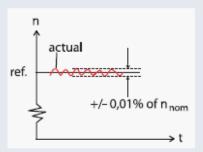




#### **PERFORMANCE**

#### Control performance for Emotron VFX 2.0 (Speed)

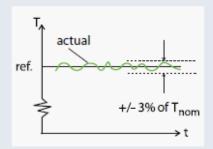
Speed control static accuracy (linearity):



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

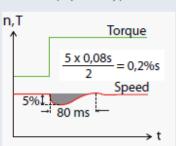
#### Control performance for Emotron VFX 2.0 (Torque)

Torque control static accuracy (linearity):

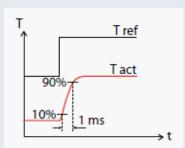


Closed loop: <3% of T<sub>nom</sub>
Open loop: <3% for speeds 10 - 100% of rated, and <10% at zero speed (% of n<sub>nom</sub>).

Speed Control dynamic accuracy (impact drop):



Closed loop = 0.2%sec (100% load step) Open loop = 0.4%sec (100% load step) Torque control dynamic accuracy:



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

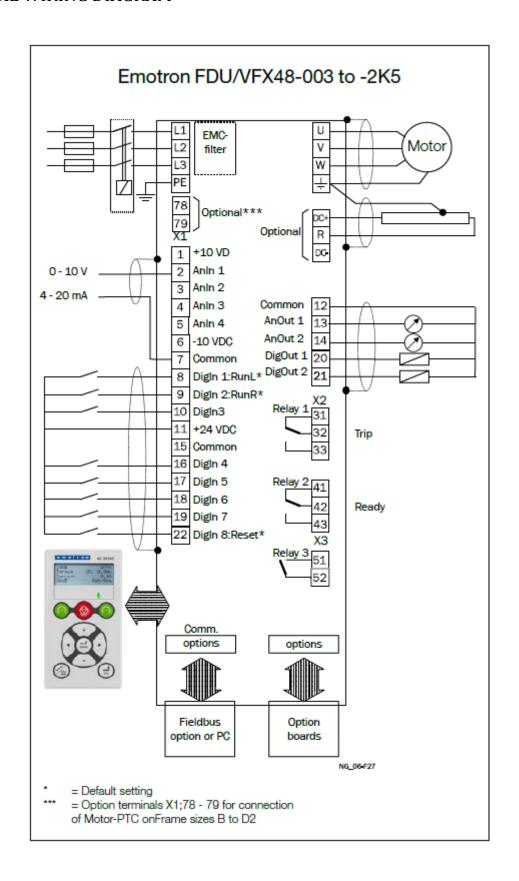
#### Control performance for Emotron FDU 2.0 (V/Hz)

Speed control accuracy = approximately 1% of nnom (slip frequency). Torque accuracy = approximately 5% of Tnom (20 - 100% speed).





#### GENERAL WIRING DIAGRAM







X1	Name:	Function (Default):
1	+10V	+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	-10V	-10VDC Supply voltage
7	Common	Signal ground
8	DigIn 1	RunL
9	DigIn 2	RunR
10	DigIn 3	Not Used
11	+24VDC	+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
X2	Name:	
31	N/C 1	Relay 1 Output= Trip.
32	COM 1	Active when the AC drive is
33	N/O 1	in a Trip condition. The N/C is opened when the relay is active (valid for all relays). The N/O is closed when the relay is active (valid for all relays).
41	N/C 2	Relay 2 Output= Ready.
42	COM 2	Active when the AC drive is
43	N/0 2	ready to start.
Х3	Name:	Function (Default):
51	COM 3	Relay 3 Output= Not used.
52	N/0 3	

### **DRIVE DIMENSIONS**

(Hx Wx D): preliminary 512x 178x 292 (mm).

