# TEC

### **Product data sheet Emotron**

## Variable speed drive VFX48-013-54/4KW/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 a built-in Category C3 EMC-filter as standard. C3 requirements are fulfilled with 80 m motor cable (IP2Y= 25m).
- 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 (not IP2Y).
- Marine (DNV-GL & BV) approved version available (not IP2Y, IP2x).
- Integrated vector braking ensures quick and controlled stops, increasing productivity and safety.
- Built-in brake chopper is standard for IP2Y models and available as option for all other.
- 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.

#### GENERAL SPECIFICATION

Component name	VFX48-013-54
Suitable Motor Capacity Capacity(KW)	4
Rated Output Current(A)	10.4
Maximum Output Current(A)	19.5
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



# **Product data sheet**

Commonant name	No electrically conductive dust allowed. Cooling air must be clean 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>
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	, a sala sa ga a sa
Basic I/O Data	
Control signal inputs: Analogue (differen	ntial). 4 channels
Analogue voltage/current	0-±10 V/0-20 mA via switch
Max. input voltage	+30 V
Input impedance	20 kΩ (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	172 L3D
	High > 0 VDC Love 4 VDC
Input voltage	High >9 VDC, Low<4 VDC +30 VDC
Max. input voltage	
Input impedance	<3.3 VDC: 4.7 kΩ , ≥3.3 VDC: 3.6 kΩ
Signal delay	≤8 ms
Control signal outputs: Analogue, 2 char	
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	$10 \Omega$ (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 2.4/11 250.1/4.0 42.1/10.0
	0.1 – 2 A/Umax 250 VAC or 42 VDC
	0.1 - 2 A/Umax 250 VAC or 42 VDC
Reference voltages +10 VDC	+10 VDC @10 mA short-circuit current +30 mA max

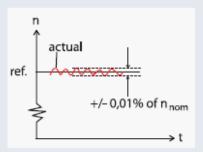


+24 VDC	+24 VDC short-circuit current +100 mA max (together with
	Digital Outputs)

#### **PERFORMANCE**



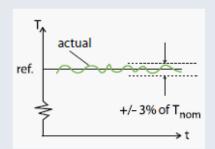
Speed control static accuracy (linearity):



 $\begin{aligned} &\text{Closed loop} = 0.01\% \text{ of } n_{\text{nom}}. \\ &\text{Open loop} = 0.1\% \text{ of } n_{\text{nom}}. \end{aligned}$ 

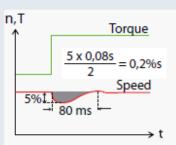
### Control performance for Emotron VFX 2.0 (Torque)

Torque control static accuracy (linearity):

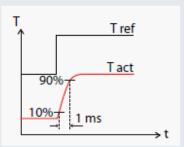


Closed loop: <3% of T<sub>nom</sub>
Open loop: <3% for speeds 10 - 100% of rated, and <10% at zero speed (% of n<sub>nom</sub>).

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.





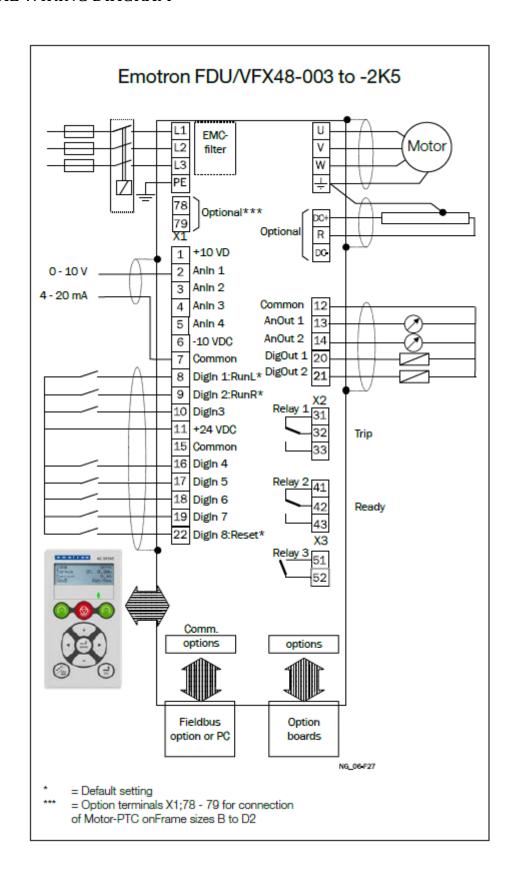
## Control performance for Emotron FDU 2.0 (V/Hz)

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 416x 230x 230 (mm).

