

## Product data sheet Emotron

### Variable speed drive FDU48-1K25-IP/ 710KW/ 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 m<sup>3</sup>/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

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### GENERAL SPECIFICATION

| Component name  | FDU48-1K25-IP  |
|---|--|
| Suitable Motor Capacity<br>Capacity(KW)                           | 710  |
| Rated Output Current(A)   | 1250   |
| Maximum Output Current(A)   | 1500   |
| 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   |
| <i>Environmental conditions</i>                                   |  |
| Nominal ambient temperature                                       | 0°C - 40°C (32°F- 104°F)   |
| Atmospheric pressure  | 86–106 kPa ( 12.5 - 15.4 PSI)  |
| Relative humidity<br>according to IEC 60721-3-3                   | Class 3K4, 5...95% and no condensing   |
| Contamination,<br>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. |
| Component name  | VFX48-2K5-54   |
| Vibrations  | According to IEC 60068-2-6, Sinusoidal vibrations:<br>10<f<57 Hz, 0.075 mm (0.00295 ft)<br>57<f<150 Hz, 1g (0,035 oz)  |
| 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 to IEC60721-3-1               | Class 1K4, max. 95% and no condensing and no formation of ice.   |
| <i>Basic I/O Data</i>   |  |
| <i>Control signal inputs: Analogue (differential), 4 channels</i> |  |
| 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   |
| <i>Digital inputs: 8 channels</i>                                 |  |
| 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  |

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

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

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  $n_{nom}$   
(slip frequency).

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

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## GENERAL WIRING DIAGRAM



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| 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:    | Function (Default):   |
| 31 | N/C 1    | Relay 1 Output= Trip.<br>Active when the AC drive is 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). |
| 32 | COM 1    |   |
| 33 | N/O 1    |   |
| 41 | N/C 2    | Relay 2 Output= Ready.<br>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    |   |

## DRIVE DIMENSIONS

(Hx Wx D): preliminary 2250x 1500x 600 (mm).



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