TEC

Product data sheet Emotron

Variable speed drive FDU69-018-54/ 15KW/ 400-690V

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 | FDU69-018-54 | |
|--|---|--|
| Suitable Motor Capacity | 15 | |
| Capacity(KW) | 15 | |
| Rated Output Current(A) | 18 | |
| Maximum Output Current(A) | 29 | |
| Input Voltage Range(V) | Three-phase 400~ 690V, 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 d'a | 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) | |

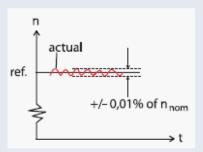




PERFORMANCE

Control performance for Emotron VFX 2.0 (Speed)

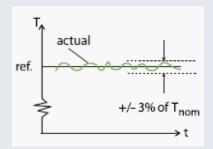
Speed control static accuracy (linearity):



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

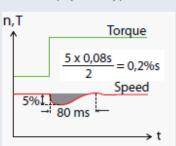
Control performance for Emotron VFX 2.0 (Torque)

Torque control static accuracy (linearity):

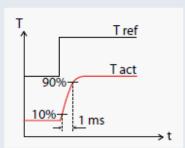


Closed loop: <3% of T_{nom}
Open loop: <3% for speeds 10 - 100% of rated, and <10% at zero speed (% of n_{nom}).

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.

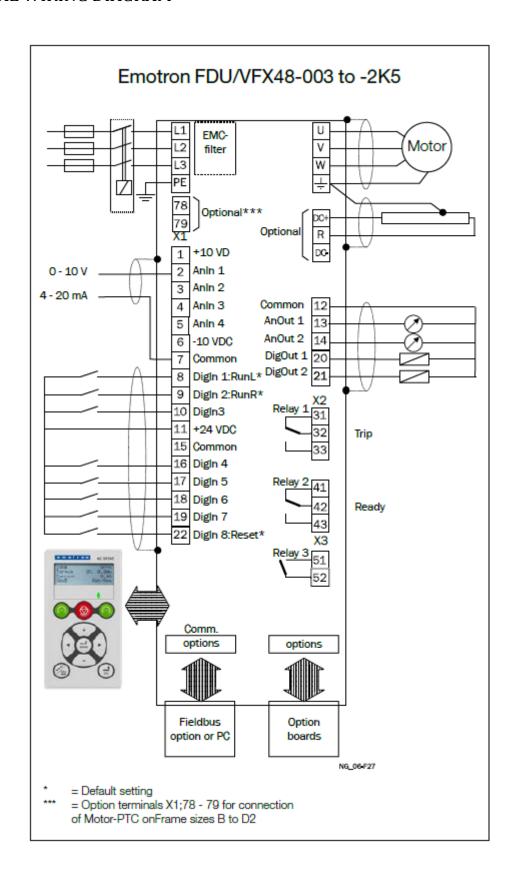
Control performance for Emotron FDU 2.0 (V/Hz)

Speed control accuracy = approximately 1% of 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 314 (mm).

