

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 |
| <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 according to IEC 60721-3-3 | Class 3K4, 5...95% and no condensing |

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|---|--|
| Contamination, 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: 10<f<57 Hz, 0.075 mm (0.00295 ft) 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 | 1 ½ 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 |
| 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 (∞) | +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 |
| <i>Digital outputs: 2 channels</i> | |
| 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) |
| <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 |

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+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 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. 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. 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 416x 230x 230 (mm).



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