

SERIES: VFK400W-DIN | **DESCRIPTION:** DC-DC CONVERTER

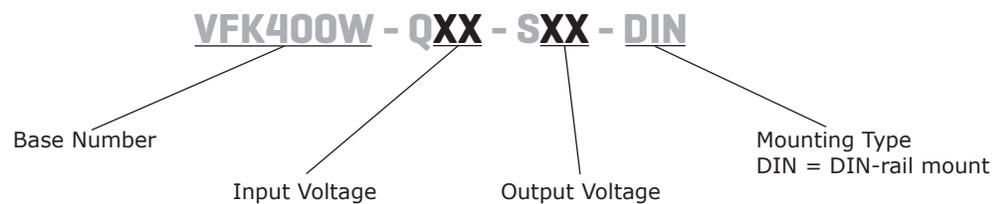
FEATURES

- up to 400 W isolated output
- rugged metal enclosure with integrated heat sink
- 4:1 input range (10~36 Vdc, 18~75 Vdc)
- single output from 12~48 Vdc
- 1,500 Vdc isolation
- over current, over temperature, over voltage, and short circuit protection
- remote on/off
- efficiency up to 87%
- comes with DIN-rail mount



| MODEL | input voltage range (Vdc) | output voltage (Vdc) | output current max (A) | output power max (W) | ripple and noise¹ max (mVp-p) | efficiency max (%) |
|----------------------------------|----------------------------------|-----------------------------|-------------------------------|-----------------------------|---|---------------------------|
| VFK400W-Q24-S12-DIN | 10~36 | 12 | 33.3 | 400 | 200 | 87 |
| VFK400W-Q24-S24-DIN | 10~36 | 24 | 16.7 | 400 | 240 | 86 |
| VFK400W-Q24-S48-DIN | 10~36 | 48 | 8.3 | 398 | 480 | 86 |
| VFK400W-Q48-S12-DIN ² | 20~75 | 12 | 33.3 | 400 | 200 | 87 |
| VFK400W-Q48-S24-DIN | 18~75 | 24 | 16.7 | 400 | 240 | 86 |
| VFK400W-Q48-S48-DIN | 18~75 | 48 | 8.3 | 398 | 480 | 86.5 |

Note: 1. Ripple and noise are measured at full load, 20 MHz BW with 10 μ F tantalum capacitor and 1 μ F ceramic capacitor across the output. The 48 Vdc output models require a 22 μ F aluminum capacitor and a 1 μ F ceramic capacitor across the output.
 2. An external input capacitor of 470 μ F is recommended to reduce input ripple voltage.

PART NUMBER KEY


INPUT

| parameter | conditions/description | min | typ | max | units |
|-------------------------|------------------------|--|----------|--------------|------------|
| operating input voltage | 24 Vdc input | 10 | 24 | 36 | Vdc |
| | 48 Vdc input | 12 Vdc output model 24/48 Vdc output models | 20 18 | 48 48 | 75 75 |
| under voltage shutdown | 24 Vdc input | power up power down | | 9.5 8.5 | Vdc Vdc |
| | 48 Vdc input | power up power down | | 17.8 15.5 | Vdc Vdc |
| CTRL ¹ | positive logic | models ON (>3.5 Vdc or open circuit) | | | |
| | | models OFF (0~1.2 Vdc) | | | |
| filter | pi filter | | | | |

Note: 1. Open collector refer to -Vin

OUTPUT

| parameter | conditions/description | min | typ | max | units |
|----------------------------|--------------------------------------|-----|-------|-------|-------|
| maximum output capacitance | for all models | | | 2,200 | μF |
| line regulation | measured from high line to low line | | | ±1 | % |
| load regulation | measured from full load to zero load | | | ±1 | % |
| voltage accuracy | | | | ±1.5 | % |
| adjustability | | 90 | | 105 | % |
| switching frequency | | | 250 | | kHz |
| transient response | 25% step load change | | | 500 | μs |
| temperature coefficient | | | ±0.03 | | %/°C |

PROTECTIONS

| parameter | conditions/description | min | typ | max | units |
|-----------------------------|--------------------------|-----|-----|-----|-------|
| short circuit protection | continuous | | | | |
| over current protection | % nominal output current | 110 | | 150 | % |
| over voltage protection | | 115 | | 140 | % |
| over temperature protection | shutdown | | 110 | | °C |

SAFETY AND COMPLIANCE

| parameter | conditions/description | min | typ | max | units |
|----------------------|---|-------|-----|-----|-------|
| isolation voltage | for 1 minute: input to output; input to case; output to case | 1,500 | | | Vdc |
| isolation resistance | | 10 | | | MΩ |
| RoHS | 2011/65/EU (CE) | | | | |

ENVIRONMENTAL

| parameter | conditions/description | min | typ | max | units |
|-----------------------|------------------------|-----|-----|-----|-------|
| operating temperature | see derating curves | -40 | | 85 | °C |
| storage temperature | | -55 | | 105 | °C |

MECHANICAL

| parameter | conditions/description | min | typ | max | units |
|---------------|--|-----|------|-----|-------|
| dimensions | 7.83 x 5.00 x 2.11 (199.0 x 127.0 x 53.6 mm) | | | | inch |
| case material | steel and aluminum extrusion | | | | |
| weight | | | 1.53 | | kg |

MECHANICAL DRAWING

units: inch[mm]

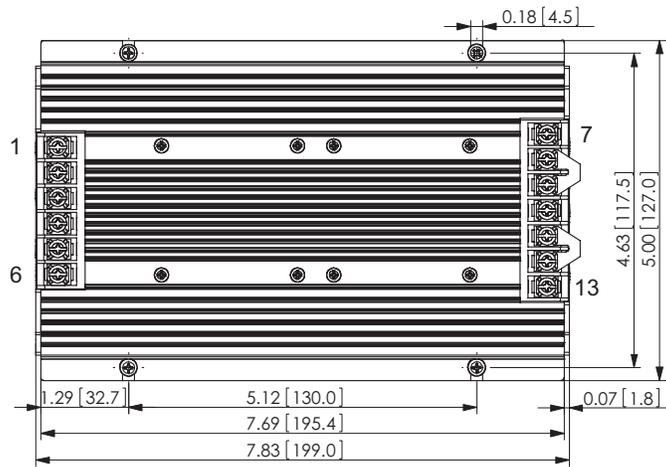
tolerance: X.XX = ±0.02[±0.5]
 X.XXX = ±0.010[±0.25]

wire range: 22~12 AWG

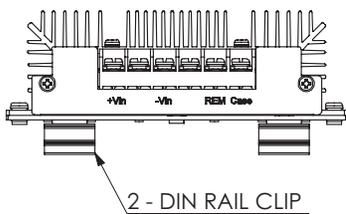
screw size: #6-32

mounts to TS35 rails

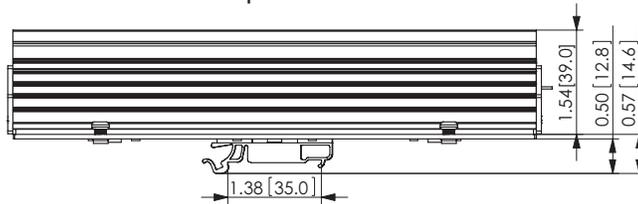
| PIN CONNECTIONS | |
|-----------------|----------|
| PIN | FUNCTION |
| 1, 2 | +Vin |
| 3, 4 | -Vin |
| 5 | REM |
| 6 | CASE |
| 7, 8 | +Vout |
| 9 | +S |
| 10 | TRIM |
| 11 | -S |
| 12, 13 | -Vout |



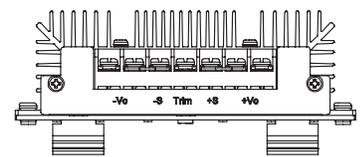
Top View



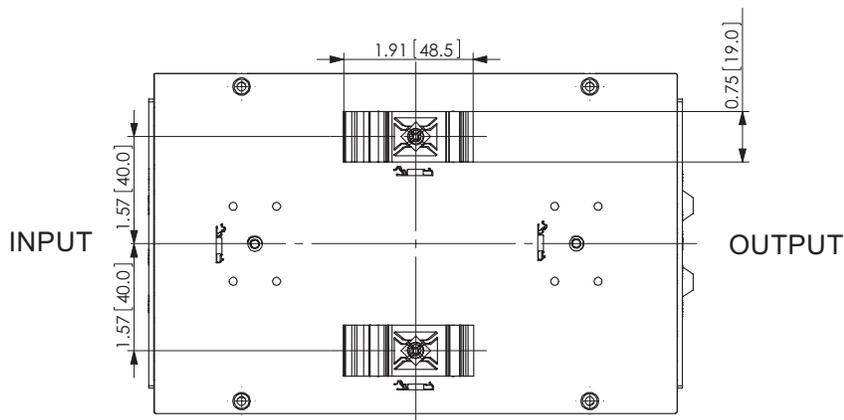
Front View



Side View



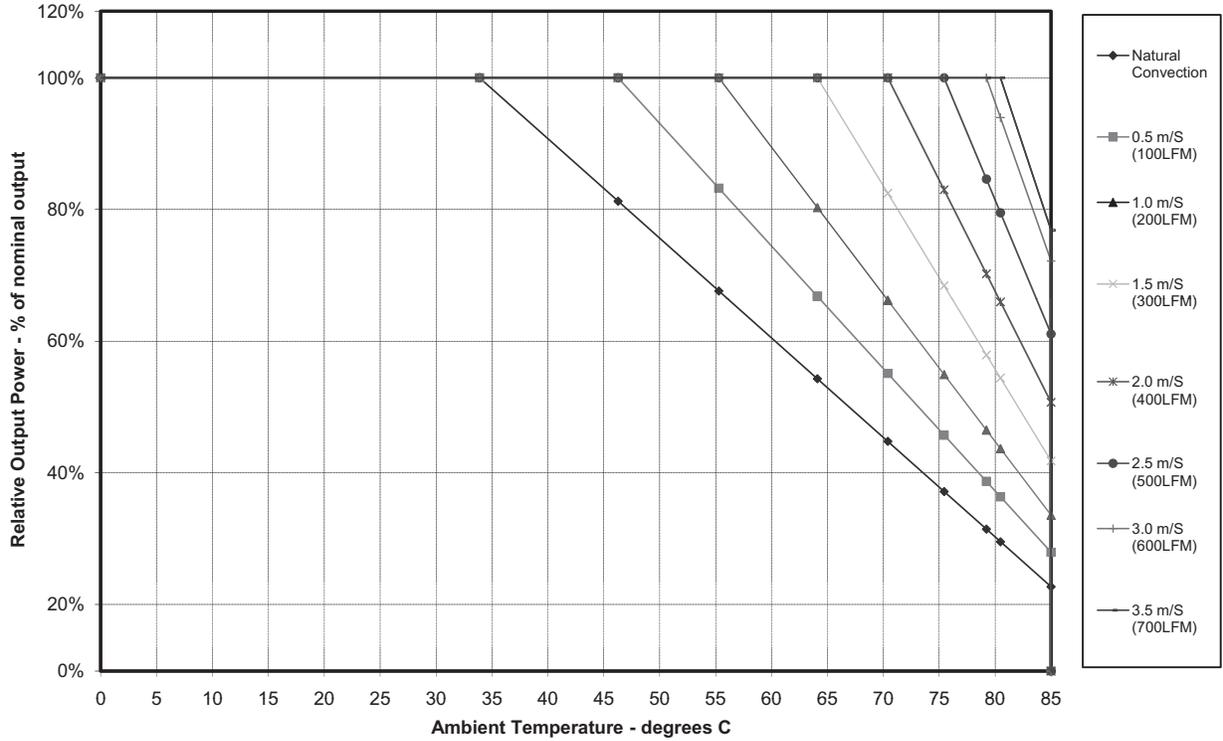
Back View



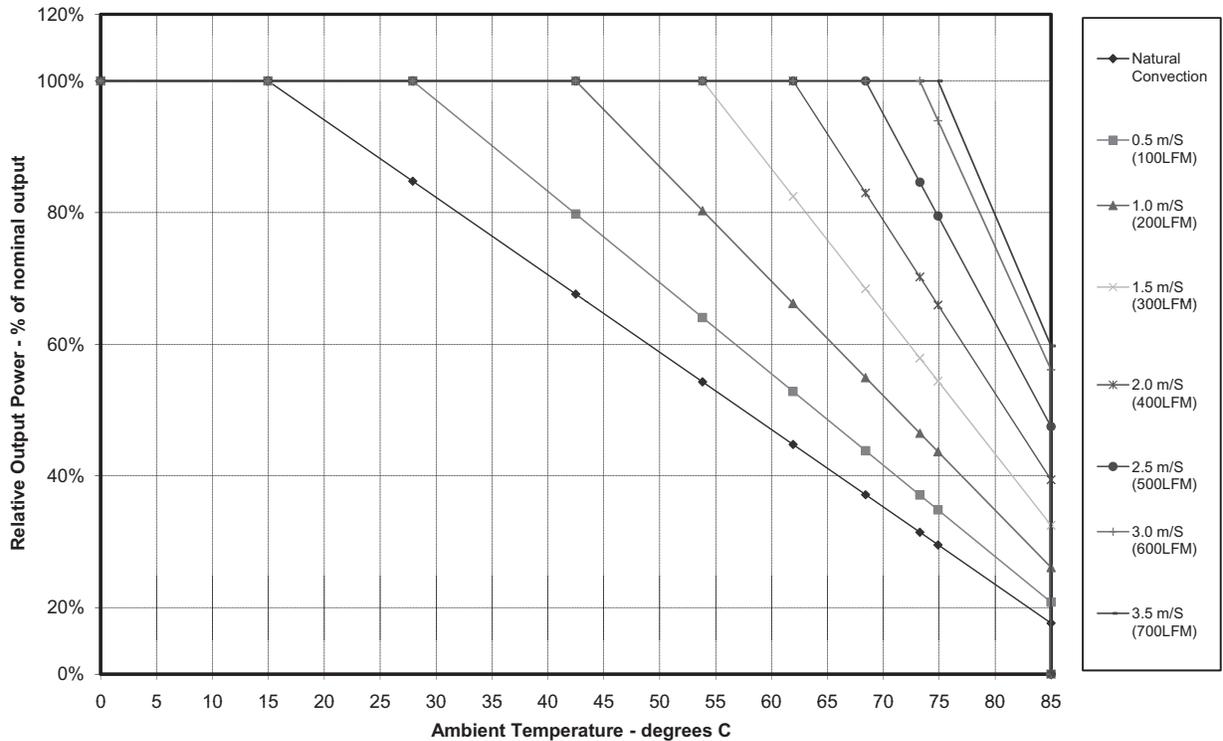
Bottom View

DERATING CURVES

VFK400W-DIN Power Derating Curves At Nominal Input
(Includes VFK400W-Q24-S12-DIN and all 48 Vdc input models)



VFK400W-DIN Power Derating Curves At Nominal Input
(Includes VFK400W-Q24-S24-DIN and VFK400W-Q24-S48-DIN)



APPLICATION NOTES

1. Output Voltage Trimming

Leave open if not used.

Figure 1
Application Circuit for Trim pin

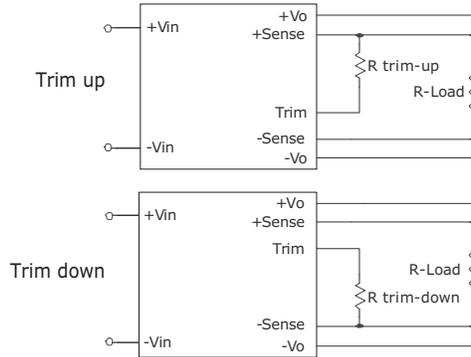


Table 1
Trim Up Resistor Values (MΩ)¹

| Desired Vout (%Vout) Nom. Vout (Vdc) | 101% | 102% | 103% | 104% | 105% |
|---|------|------|------|------|------|
| 12 | 2.2 | 1.6 | 1.2 | 0.82 | 0.68 |
| 24 | 4.3 | 3.3 | 2.2 | 1.6 | 1.5 |
| 48 | 10 | 6.8 | 4.8 | 3.9 | 3.5 |

Table 2
Trim Down Resistor Values (KΩ)

| Desired Vout (%Vout) Nom. Vout (Vdc) | 90% | 92% | 94% | 96% | 98% |
|---|-----|-----|-----|-----|-----|
| 12 | 9 | 12 | 22 | 51 | 100 |
| 24 | 12 | 22 | 51 | 100 | 300 |
| 48 | 22 | 32 | 49 | 100 | 300 |

Note: 1. VFK400W-Q48-S12-DIN model requires minimum input voltage of 21.6 Vdc in order to trim between 100~105%.

Note: All specifications measured at 25°C, nominal input voltage, and full load unless otherwise noted.

REVISION HISTORY

| rev. | description | date |
|------|------------------------|------------|
| 1.0 | initial release | 01/03/2014 |
| 1.01 | changed DIN-rail mount | 06/16/2014 |

The revision history provided is for informational purposes only and is believed to be accurate.



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