



■ Features

- Compliance to BS EN/EN50155 and BS EN/EN45545-2 railway standard
- Width only 85.5mm
- 2:1 wide input range
- -40~+80°C wide operating temperature
- 150% peak load capability
- Current sharing up to 1920W(3+1)
- DC output adjustable
- Cooling by free air convection
- Can be installed on DIN rail TS-35/7.5 or 15
- Protections: Short circuit / Overload / Over voltage / Over temperature / Input reverse polarity/ Input under voltage protection
- 4KVdc I/O isolation(Reinforced isolation)
- DC OK relay contact
- Remote ON-OFF control
- Operating attitude up to 5000 meters(Note.6)
- 3 years warranty

■ Applications

- Bus, tram, metro or railway system
- Industrial control system
- Semi-conductor fabrication equipment
- Factory automation
- Electro-mechanical
- Wireless network
- Telecom or datacom system

■ Description

DDR-480 series is a 480W DIN Rail type DC-DC converter with main features including DIN rail-type easy installation, ultra slim width (85.5mm), 2:1 wide input voltage, fanless design, -40~+80°C wide operating temperature, 4KVdc I/O isolation, 150% peak load, current sharing, DC OK, adjustable output voltage and full protective functions. This series of models has various input options: 16.8~33.6V / 33.6~67.2V / 67.2~154V and multiple output options: 12V / 24V / 48V and can be used for industrial & railway control, security control, communication system and other fields. Suitable applications include to DC buck/boost regulator, increasing system insulation level and voltage drop compensation along cable...etc.

■ Model Encoding

DDR - 480 B - 24

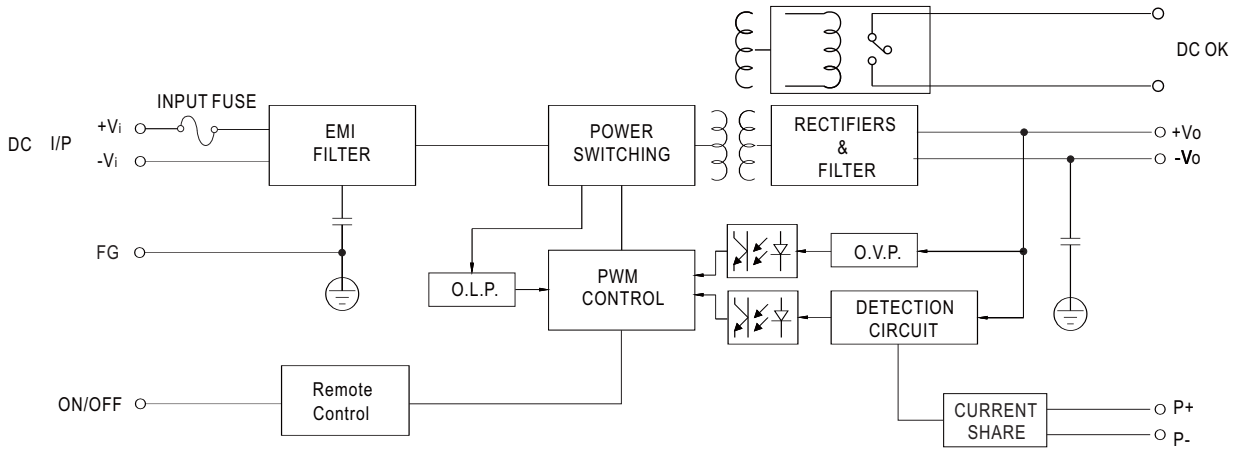
- Output voltage(12/24/48Vdc)
- Input voltage (B:16.8~33.6Vdc, C:33.6~67.2Vdc, D:67.2~154Vdc)
- Rated wattage
- Series name

SPECIFICATION

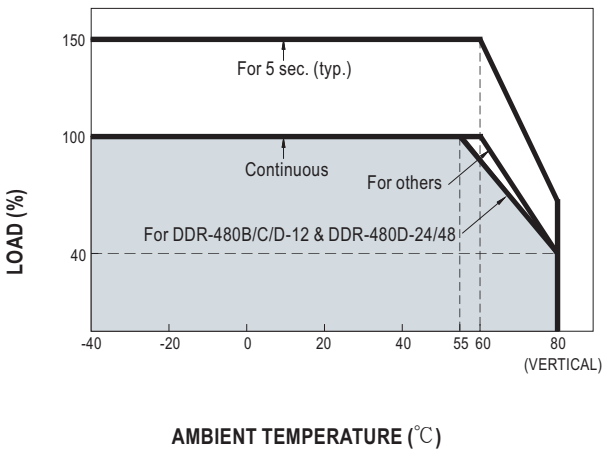
| MODEL | | DDR-480B-12 | DDR-480B-24 | DDR-480B-48 | DDR-480C-12 | DDR-480C-24 | DDR-480C-48 | DDR-480D-12 | DDR-480D-24 | DDR-480D-48 | |
|--------------------------------|--|---|---|-----------------------------|--|---|-------------|---|---------------|-------------|------------|
| OUTPUT | DC VOLTAGE | 12V | 24V | 48V | 12V | 24V | 48V | 12V | 24V | 48V | |
| | RATED CURRENT | 33.4A | 20A | 10A | 33.4A | 20A | 10A | 33.4A | 20A | 10A | |
| | CURRENT RANGE | 0 ~ 33.4A | 0 ~ 20A | 0 ~ 10A | 0 ~ 33.4A | 0 ~ 20A | 0 ~ 10A | 0 ~ 33.4A | 0 ~ 20A | 0 ~ 10A | |
| | RATED POWER | 400.8W | 480W | 480W | 400.8W | 480W | 480W | 400.8W | 480W | 480W | |
| | PEAK | CURRENT 5sec. | 50.1A | 30A | 15A | 50.1A | 30A | 15A | 50.1A | 30A | 15A |
| | | POWER 5sec. | 12Vo: 601.2W, 24Vo / 48Vo : 720W | | | | | | | | |
| | RIPPLE & NOISE (max.) | Note.2 | 100mVp-p | 120mVp-p | 150mVp-p | 100mVp-p | 120mVp-p | 150mVp-p | 100mVp-p | 120mVp-p | 150mVp-p |
| | VOLTAGE ADJ. RANGE | | 12 ~ 14V | 24 ~ 28V | 48 ~ 56V | 12 ~ 14V | 24 ~ 28V | 48 ~ 56V | 12 ~ 14V | 24 ~ 28V | 48 ~ 56V |
| | VOLTAGE TOLERANCE | Note.3 | ±1.0% | ±1.0% | ±1.0% | ±1.0% | ±1.0% | ±1.0% | ±1.0% | ±1.0% | ±1.0% |
| | LINE REGULATION | | ±0.5% | ±0.5% | ±0.5% | ±0.5% | ±0.5% | ±0.5% | ±0.5% | ±0.5% | ±0.5% |
| LOAD REGULATION | | ±1.0% | ±1.0% | ±1.0% | ±1.0% | ±1.0% | ±1.0% | ±1.0% | ±1.0% | ±1.0% | |
| SETUP, RISE TIME | | 500ms, 60ms | | | | | | | | | |
| HOLD UP TIME (Typ.) | | Please refer to page 6 hold up time (Load de-rating curve) | | | | | | | | | |
| INPUT | VOLTAGE RANGE | CONTINUOUS | 16.8 ~ 33.6Vdc | | | 33.6 ~ 67.2Vdc | | | 67.2 ~ 154Vdc | | |
| | | Note.4 100ms | 14.4 ~ 16.8Vdc | | | 28.8 ~ 33.6Vdc | | | 66 ~ 67.2Vdc | | |
| | EFFICIENCY (Typ.) | 90% | 91% | 90.5% | 91% | 92% | 92% | 91% | 92% | 93% | |
| | DC CURRENT (Typ.) | 23A @24Vdc | | | 11.2A @48Vdc | | | 5A @110Vdc | | | |
| | INRUSH CURRENT (Typ.) | 30A | | | | | | | | | |
| INTERRUPTION OF VOLTAGE SUPPLY | | EN50155: 2017-B/C/D type comply with S2 level (10ms)@ full load | | | | | | | | | |
| PROTECTION | OVERLOAD | Note.5 | Normally works within 150% rated output power for more than 5 seconds and then constant current protection 105~135% rated output power with auto-recovery | | | | | | | | |
| | OVER VOLTAGE | | 14.4 ~ 17.5V | 28.8 ~ 35V | 57.6 ~ 65V | 14.4 ~ 17.5V | 28.8 ~ 35V | 57.6 ~ 65V | 14.4 ~ 17.5V | 28.8 ~ 35V | 57.6 ~ 65V |
| | | | Protection type : Shut down o/p voltage, re-power on to recover | | | | | | | | |
| | OVER TEMPERATURE | | Shut down o/p voltage, re-power on to recover | | | | | | | | |
| | REVERSE POLARITY | | By internal, MOSFET, no damage, recovers automatically after fault condition is removed | | | | | | | | |
| UNDER VOLTAGE LOCKOUT | | 24Vin (B - type) :Power ON ≥ 16.8V , OFF ≤ 16.5V | | | 48Vin (C - type) :Power ON ≥ 33.6V , OFF ≤ 33V | | | 110Vin (D - type) :Power ON ≥ 67.2V , OFF ≤ 65V | | | |
| FUNCTION | DC OK REALY CONTACT RATINGS (max.) | 30Vdc/1A resistive load | | | | | | | | | |
| | CURRENT SHARING | Up to 1920W (3+1 units). Please refer to the Function Manual | | | | | | | | | |
| | REMOTE ON-OFF CONTROL | Please refer to the Function Manual | | | | | | | | | |
| ENVIRONMENT | WORKING TEMP. | -40 ~ +80°C (Refer to "Derating Curve") | | | | | | | | | |
| | WORKING HUMIDITY | 5 ~ 95% RH non-condensing | | | | | | | | | |
| | STORAGE TEMP., HUMIDITY | -40 ~ +85, 5 ~ 95% RH non-condensing | | | | | | | | | |
| | TEMP. COEFFICIENT | ±0.03%/°C (0 ~ 55°C) | | | | | | | | | |
| | VIBRATION | Component: 10 ~ 500Hz, 5G 10min./1cycle, 60min. each along X, Y, Z axes; Mounting: Compliance to IEC61373 | | | | | | | | | |
| | OPERATING ALTITUDE | Note.6 | 5000 meters / OVC II | | | | | | | | |
| SAFETY & EMC (Note 7) | SAFETY STANDARDS | UL 62368-1, IEC 62368-1, AS/NZS 62368-1, EAC TP TC 004 approved | | | | | | | | | |
| | WITHSTAND VOLTAGE | I/P-O/P:4KVdc I/P-FG:2.5KVdc O/P-FG:0.71KVdc | | | | | | | | | |
| | ISOLATION RESISTANCE | I/P-O/P, I/P-FG, O/P-FG:>100M Ohms / 500Vdc / 25°C / 70% RH | | | | | | | | | |
| | EMC EMISSION | Parameter | Standard | | | Test Level / Note | | | | | |
| | | Conducted | BS EN/EN55032 (CISRP32) | | | Class A | | | | | |
| | | Radiated | BS EN/EN55032 (CISRP32) | | | Class B | | | | | |
| | | Voltage Flicker | BS EN/EN61000-3-3 | | | ----- | | | | | |
| | | Harmonic Current | ----- | | | ----- | | | | | |
| | EMC IMMUNITY | BS EN/EN55035 | | | | | | | | | |
| | | Parameter | Standard | | | Test Level / Note | | | | | |
| | | ESD | BS EN/EN61000-4-2 | | | Level 3, 8KV air ; Level 3, 6KV contact; criteria A | | | | | |
| | | Radiated | BS EN/EN61000-4-3 | | | Level 3, 10V/m ; criteria A | | | | | |
| | | EFT / Burst | BS EN/EN61000-4-4 | | | Level 3, 2KV ; criteria A | | | | | |
| | | Surge | BS EN/EN61000-4-5 | | | Level 3, 1KV/Line-Line ; Level 3, 2KV/Line-Line-FG ; criteria A | | | | | |
| Conducted | | BS EN/EN61000-4-6 | | | Level 3, 10V ; criteria A | | | | | | |
| Magnetic Field | BS EN/EN61000-4-8 | | | Level 4, 30A/m ; criteria A | | | | | | | |
| RAILWAY STANDARD | Compliance to BS EN/EN45545-2 for fire protection ; Meet BS EN/EN50155 / IEC60571 including IEC61373 for shock & vibration, BS EN/EN50121-3-2 for EMC | | | | | | | | | | |
| OTHERS | MTBF | 750.3K hrs min. Telcordia SR-332 (Bellcore) ; 101.7K hrs min. MIL-HDBK-217F (25°C) | | | | | | | | | |
| | DIMENSION | 85.5*125.2*129.2mm (W*H*D) | | | | | | | | | |
| | PACKING | 1.375Kg;8pcs/12Kg/0.95CUFT | | | | | | | | | |
| NOTE | 1. All parameters NOT specially mentioned are measured at normal input (B:24Vdc , C:48Vdc , D:110Vdc) , rated load and 25°C of ambient temperature. 2. Ripple & noise are measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1μf & 47μf parallel capacitor. 3. Tolerance : includes set up tolerance, line regulation and load regulation. 4. Derating may be needed under low input voltage. Please check the derating curve for more details. 5. 150% 5 seconds, please refer to peak loading curves. 6. The ambient temperature derating of 3.5°C/1000m with fanless models and of 5°C/1000m with fan models for operating altitude higher than2000m(6500ft). 7. The power supply is considered as an independent unit, but the final equipment still need to re-confirm that the whole system complies with the EMC directives. For guidance on how to perform these EMC tests, please refer to "EMI testing of component power supplies." (as available on http://www.meanwell.com) ※ Product Liability Disclaimer : For detailed information, please refer to https://www.meanwell.com/serviceDisclaimer.aspx | | | | | | | | | | |

■ Block Diagram

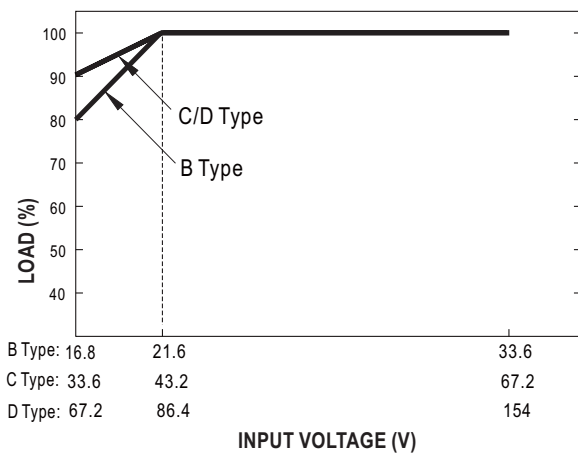
fosc : 65KHz



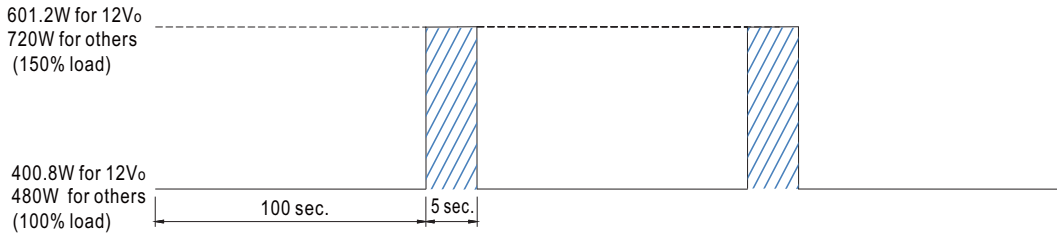
■ Derating Curve



■ Output derating VS Input Voltage



■ Peak Loading



■ DC OK Relay Contact

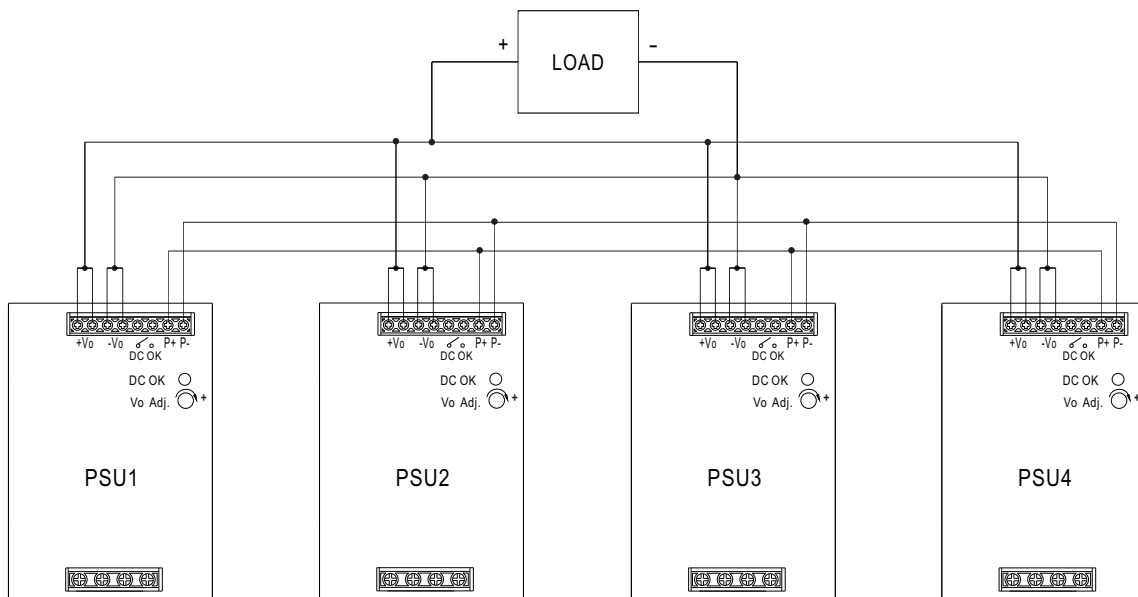
| | |
|------------------------|--------------------------|
| Contact Close | PSU turns on / DC OK. |
| Contact Open | PSU turns off / DC Fail. |
| Contact Ratings (max.) | 30V/1A resistive load. |

■ Function Manual

1. Current sharing

- (1) Parallel operation is available by connecting the units shown as below (P+,P- are connected mutually in parallel) :
- (2) The voltage difference among each output should be minimized that less than 0.2V is required.
- (3) The total output current must not exceed the value determined by the following equation (Output current at parallel operation)

$$=(\text{The rated current per unit}) \times (\text{Number of unit}) \times 0.9.$$
- (4) In parallel operation 4 units is the maximum, please consult the manufacture for other applications.
- (5) When in parallel operation, the minimum output load should be greater than 3% of total output load.
 (Min. load > 3% rated current per unit x number of unit)



2. Remote ON-OFF Control

※ The power supply can be turned ON-OFF by using the "Remote ON-OFF" function.

| | |
|-------------------------------|------------------|
| Remote ON-OFF (TB1 PIN2,4) | Output Status |
| Open or 5.5 ~ 10VDC | power supply ON |
| Short or 0 ~ 0.8VDC | power supply OFF |

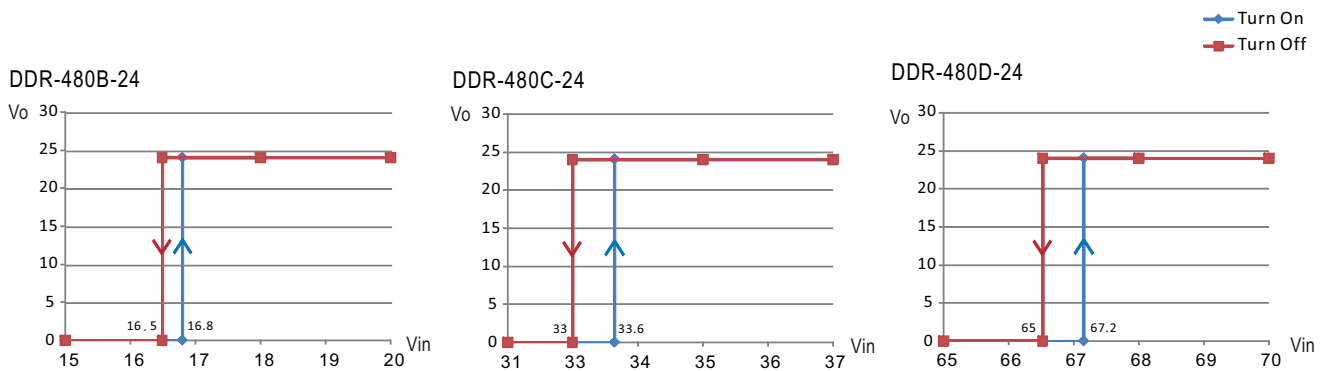
■ Input Fuse

There is one fuse connected in series to the positive input line, which is used to protect against abnormal surge. Fuse specifications of each model are shown as below.

| Type | Fuse Type | Reference and Rating |
|------|-----------|----------------------------|
| B | Time-Lag | Conquer MST, 10A, 250V *5 |
| C | Time-Lag | Conquer MST, 8A, 250V *3 |
| D | Time-Lag | Conquer MST, 6.3A, 250V *2 |

■ Input Under-Voltage Protection

If input voltage drops below V_{imin} , the internal control IC shuts down and there is no output voltage. It recovers automatically when input voltage reaches above V_{imin} , please refer to the curve below.

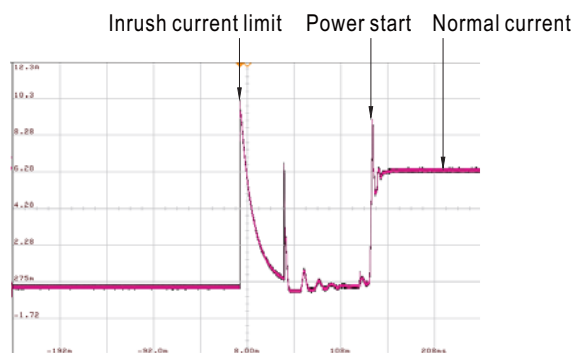


■ Input Reverse Polarity Protection

There are two MOSFETs connected in series to the negative input line. If the input polarity is connected reversely, the MOSFETs open and there will be no output to protect the unit.

■ Inrush Current

Inrush current is suppressed by a resistor during the initial start-up, and then the resistor is bypassed by MOSFETs to reduce power consumption after accomplishing the start-up.



■ Hold-up Time

• EN50155:2017 version- B/C/D type comply with S2 level (10ms) @ full load , please refer to the table and curves show below for the hold-up time specification.

| Model \ Load | 100% load | 70% load | other load |
|-----------------|-----------|-----------|--------------|
| B type (24Vin) | 10ms min. | 16ms min. | figure 1,2,3 |
| C type (48Vin) | 11ms min. | 17ms min. | figure 4,5,6 |
| D type (110Vin) | 16ms min. | 24ms min. | figure 7,8,9 |

DDR-480B-12

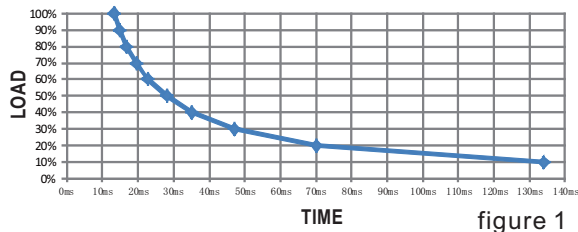


figure 1

DDR-480B-24

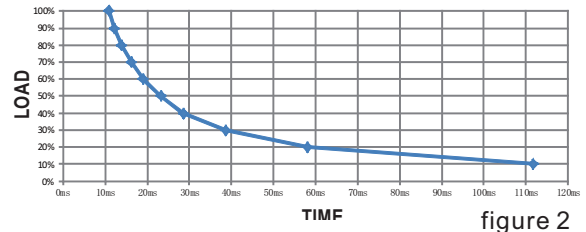


figure 2

DDR-480B-48

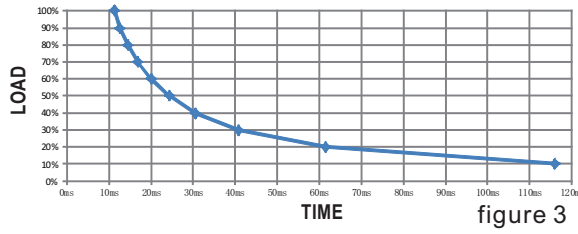


figure 3

DDR-480C-12

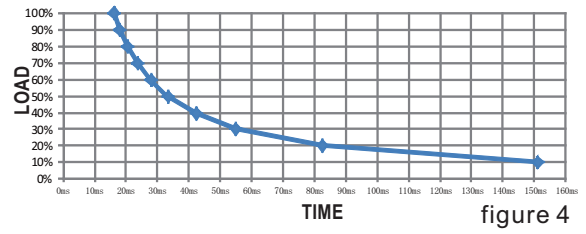


figure 4

DDR-480C-24

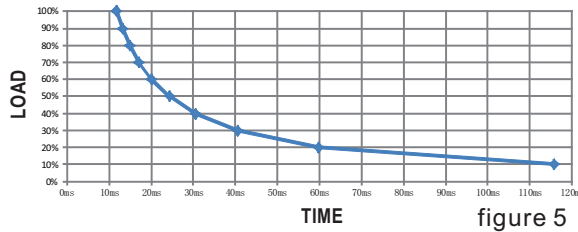


figure 5

DDR-480C-48

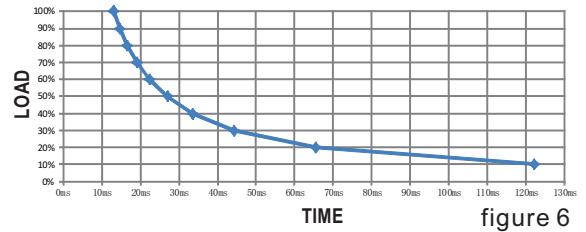


figure 6

DDR-480D-12

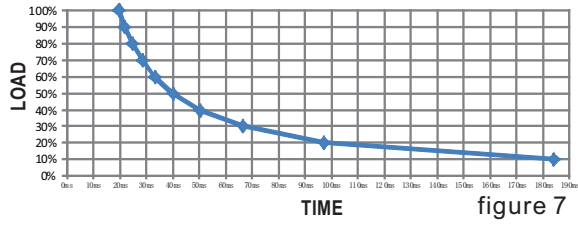


figure 7

DDR-480D-24

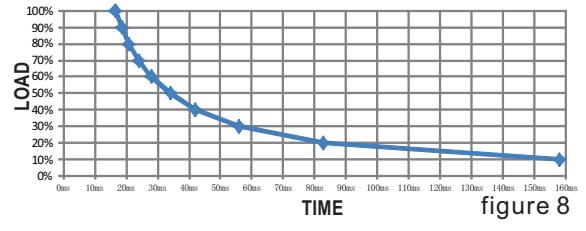


figure 8

DDR-480D-48

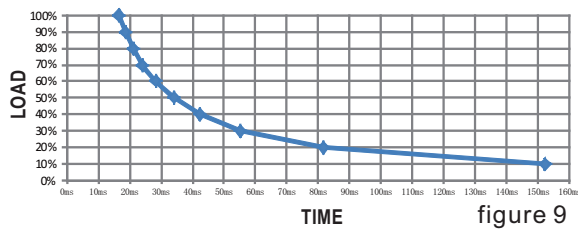
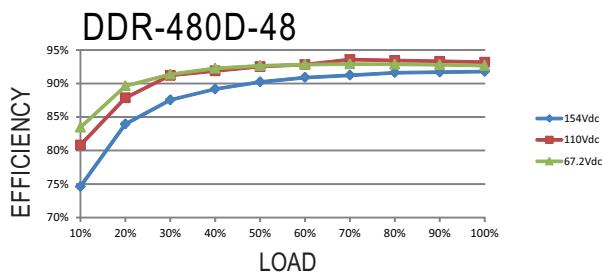
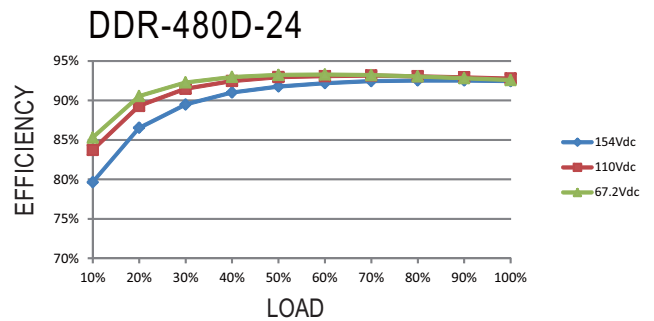
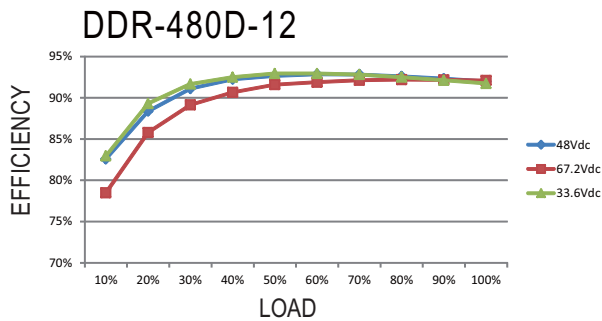
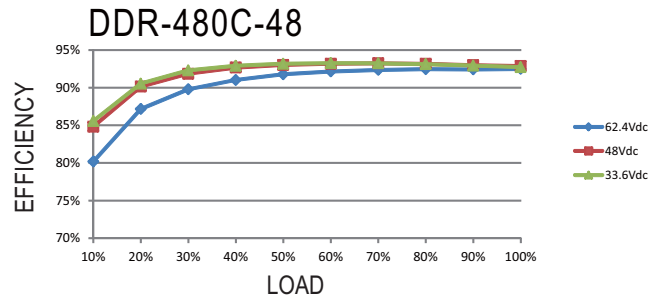
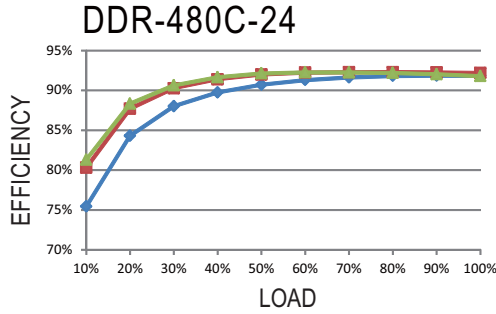
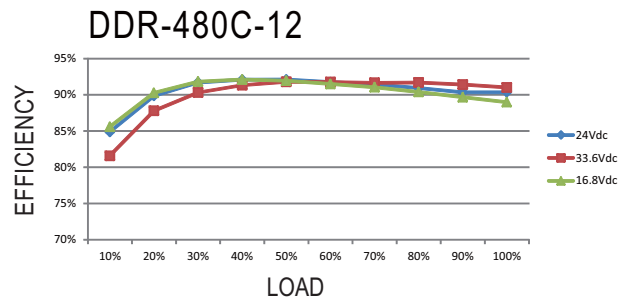
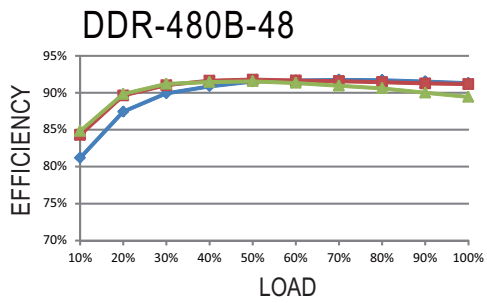
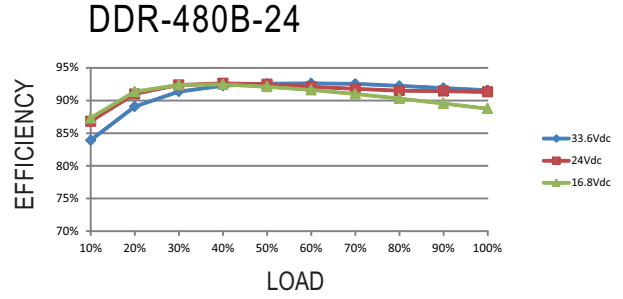
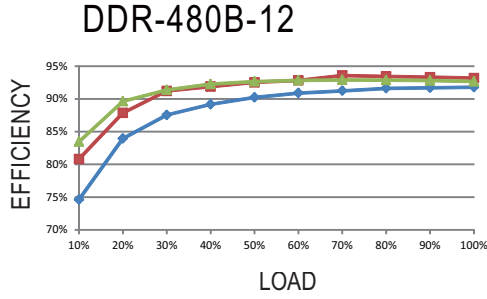


figure 9

■ Efficiency vs Load & Vin Curve

The efficiency vs load & Vin curves of each model are shown as below.



■ Immunity to Environmental Conditions

| Test method | Standard | Test conditions | Status |
|------------------------------|---|---|-----------|
| Cooling Test | EN 50155 section 12.2.3 (Column 2, Class TX) EN 60068-2-1 | Temperature: -40°C Dwell Time: 2 hrs/cycle | No damage |
| Dry Heat Test | EN 50155 section 12.2.4 (Column 2, Class TX) EN 50155 section 12.2.4 (Column 3, Class TX & Column 4, Class TX) EN 60068-2-2 | Temperature: 70°C / 85°C Duration: 6 hrs / 10min | PASS |
| Damp Heat Test, Cyclic | EN 50155 section 12.2.5 EN 60068-2-30 | Temperature: 25°C~55°C Humidity: 90%~100% RH Duration: 48 hrs | PASS |
| Vibration Test | EN 50155 section 12.2.11 EN 61373 | Temperature: 19°C Humidity: 65% Duration: 10 mins | PASS |
| Increased Vibration Test | EN 50155 section 12.2.11 EN 61373 | Temperature: 19°C Humidity: 65% Duration: 5 hrs | PASS |
| Shock Test | EN 50155 section 12.2.11 EN 61373 | Temperature: 21 ± 3°C Humidity: 65 ± 5% Duration: 30ms*18 | PASS |
| Low Temperature Storage Test | EN 50155 section 12.2.3 (Column 2, Class TX) EN 60068-2-1 | Temperature: -40°C Dwell Time: 16 hrs | PASS |
| Salt Mist Test | EN 50155 section 12.2.10 (Class ST4) | Temperature: 35°C ± 2°C Duration: 48 hrs | PASS |

■ EN45545-2 Fire Test Conditions

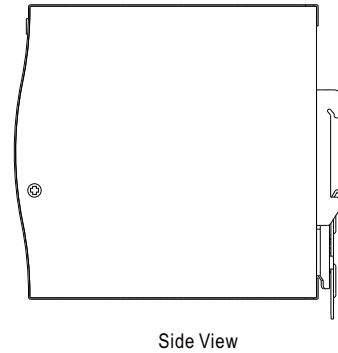
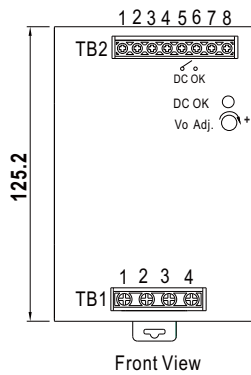
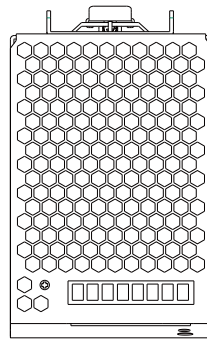
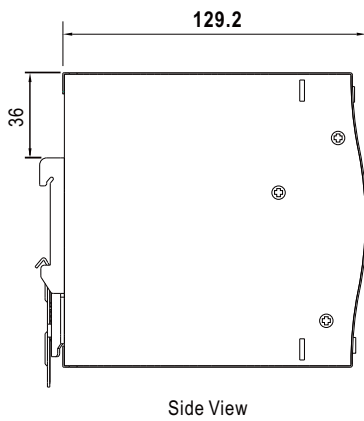
| Test Items | | Hazard Level | | | |
|------------|---------------------|---------------------------------------|------|------|------|
| | Items | Standard | HL1 | HL2 | HL3 |
| R22 | Oxygen index test | EN 45545-2:2013 EN ISO 4589-2:1996 | PASS | PASS | PASS |
| | Smoke density test | EN 45545-2:2013 EN ISO 5659-2:2006 | PASS | PASS | PASS |
| | Smoke toxicity test | EN 45545-2:2013 NF X70-100:2006 | PASS | PASS | PASS |
| R24 | Oxygen index test | EN 45545-2:2013 EN ISO 4589-2:1996 | PASS | PASS | PASS |
| R25 | Glow-wire test | EN 45545-2:2013 EN 60695-2-11:2000 | PASS | PASS | PASS |
| R26 | Vertical flame test | EN 45545-2:2013 EN 60695-11:2003 | PASS | PASS | PASS |

■ **Mechanical Specification**

Case No. 984F Unit:mm

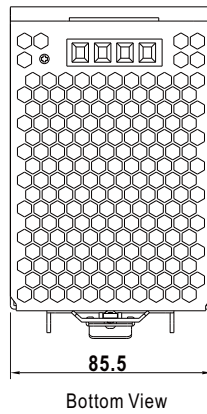
Terminal Pin No. Assignment (TB2)

| Pin No. | Assignment |
|---------|------------------------|
| 1,2 | DC output +Vo |
| 3,4 | DC output -Vo |
| 5,6 | DC OK Relay Contact |
| 7,8 | P+,P-(Current sharing) |

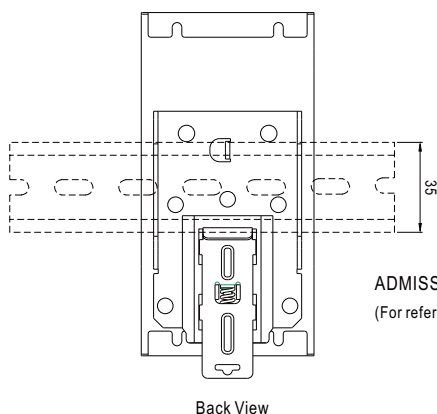


Terminal Pin No. Assignment (TB1)

| Pin No. | Assignment |
|---------|---------------|
| 1 | FG Ⓟ |
| 2 | DC input -Vin |
| 3 | DC input +Vin |
| 4 | Remote ON/OFF |



■ **Installation Instruction**



ADMISSIBLE DIN-RAIL: TS35/7.5 OR TS35/15
 (For reference only. Not included with unit.)

This series fits DIN rail TS35/7.5 or TS35/15.
 For installation details, please refer to the Instruction manual.