# 120-960W Single Output Full Featured DIN Rail Mount Power Supplies

https://product.tdk.com/en/power/drf
www.emea.lambda.tdk.com/drf



Industrial Test Semi-Fab HazLoc Renewable

The DRF series provides full featured DIN Rail mount power supplies for industrial and process control applications. The series combines careful thermal design, reliability and compact dimensions with energy saving efficiencies of up to 95%. Conservatively rated electrolytic capacitor temperatures offer improved field life-times of up to 10 years. Available in four power levels, 120W, 240W, 480W and 960W, the series provides 24V outputs with a peak loading capability of 150% for up to four seconds. The models can be operated in parallel, have remote on/off and remote voltage adjustment. For operation in hazardous locations, the /HL option can be selected on the DRF120 to DRF480 models, which includes coating of the circuit boards for added protection.

| Features | Benefits |
|---|---|
| • High Efficiency, up to 95% | • Lowers Operating Costs and Improves Thermal Performance |
| • 150% Peak Power for Four Seconds | • Operates With Capacitive and Inductive Loads |
| • Long E-Capacitor Life (Up to 10 Years) | • Improved Field Life |
| • Low Off-Load Power Consumption | • Saves Energy |
| • Remote On/Off and Remote Output Control | • Supports Intelligent System Control |
| • Hazardous Location Option (/HL) | • Certified For Use in Explosive Atmospheres |

## Model Selector

| Model | Output Voltage (V) | Adjustment Range (V) | Max Current (A) | Max Power (W) | Peak Output Current (1) (A) | Peak Output Power (1) (W) |
|---|---|---|---|---|---|---|
| DRF120-24-1 | 24 | 24 - 28 | 5 | 120 | 7.5 | 180 |
| DRF240-24-1 | 24 | 24 - 28 | 10 | 240 | 15 | 360 |
| DRF480-24-1 | 24 | 24 - 28 | 20 | 480 | 30 | 720 |
| DRF960-24-1 | 24 | 24 - 28 | 40 | 960 | 60 | 1440 |

| DRF | 240 | -24 | -1 | /HL |
|---|---|---|---|---|
| Series | 120, 240, 480, 960W | 24V Output | Single phase | |

| | |
|---|---|
| **Blank** | No ATEX, IEC EX Certification or pcb coating |
| **/HL** | ATEX, IEC EX Certification (Including pcb coating). Not available for DRF960. |

## Related Products

| Type | Part Number(s) | Description |
|---|---|---|
| Buffer Module | DBM20 | 24V 20A Hold-Up DIN Rail Module |
| Redundancy Module | DRM40 | 20A to 40A DIN Rail Redundancy Module |
| Low power DIN rail power supplies | DRB15, 30, 50, 100 | 15 to 100W AC-DC DIN rail power supplies |
| Mid to high power DIN rail power supplies | DRB120, 240, 480 | 120 to 480W AC-DC DIN rail power supplies |
| Mid to high power 3-phase DIN rail power supplies | DRB-3 | 3- phase AC-DC DIN rail power supplies |
| DIN rail mount filters | RSMN | 3A to 30A 250Vac 2 stage filters with pulse attenuation |
| DIN rail mount filters | RSEV | 6A to 30A 250Vac 2 stage filters |
| RSEV DIN rail mounting kit | DIN-RSEV | RSEV DIN rail mounting kit |

## Specifications

| Model | | DRF120 | DRF240 | DRF480 | DRF960 |
|---|---|---|---|---|---|
| **Input** | | | | | |
| AC Input Voltage Range (Operating) | Vac | 85 - 264 | | | 180 - 264 |
| Nominal Input Voltage Range | Vac | 100 - 240 (Safety certified for 90 - 264Vac only) | | | 200-240 |
| Input Frequency | Hz | 47 - 63 (Note: Safety certified for 50/60Hz only) | | | |
| DC Input Voltage Range (2) | Vdc | 125 - 370 (Note: Safety certified for AC input only) | | | - |
| Input Current (115 / 230Vac) | A | 1.2 / 0.6 | 2.4 / 1.2 | 4.7 / 2.5 | - / 4.5 |
| Inrush Current (typ) (Cold Start) | A | 20 | | | |
| Leakage Current (240Vac, 60Hz) | mA | <1 | | | |
| Power Factor (115 / 230Vac) | - | 0.98 / 0.95 | 0.98 / 0.95 | 0.98 / 0.92 | - / 0.98 |
| Harmonic Compliance | - | Meets EN61000-3-2 Class A | | | |
| Standby Power Consumption (3) | W | <0.5 | <0.5 | <0.75 | <1 |
| Hold Up Time at 230Vac Input | ms | >20 | | | >10 |
| Efficiency (115 / 230Vac) | % | 89 / 91 | 92.5 / 94 | 92.5 / 94 | - / 95 |
| Average Efficiency (230Vac) (4) | % | 88.6 | 92.6 | 92 | - |
| Conducted & Radiated EMI | - | EN55032-B | | | |
| Immunity | - | See immunity table | | | |
| Safety Certifications and Markings | - | UL508 Listed, IEC/UL/CSA/EN62368-1 (DRF120-480 only), IEC/UL/CSA/EN61010-1 (DRF960 only), 60950-1, CE Mark and UKCA Mark /HL option: ATEX, IEC Ex. Class 1 Div 2, Group A, B, C, D (not available for DRF960) | | | |

## Immunity

| Test | Standard | Test Level | Criteria | Notes |
|---|---|---|---|---|
| ESD | EN61000-4-2 | 4kV contact 8kV air discharge | A | See full immunity reports on website |
| Radiated Susceptibility | EN61000-4-3 | 10V/m: 80MHz to 1GHz<br>3V/m 1.4GHz to 2GHz<br>1V/m 2GHz to 2.7GHz | A | |
| Electrical Fast Transient Burst | EN61000-4-4 | Input 2kV 5kHz<br>Output 1kV 5kHz<br>Signal contact 1kV 5kHz | A | |
| Surge | EN61000-4-5 | Input symmetrical (L-L) 2kV<br>Input asymmetrical (L-PE) 4kV<br>Output symmetrical (L-L) 0.5kV<br>Output asymmetrical (L-PE) 1kV | A | |
| Conducted Susceptibility | EN61000-4-6 | 10V | A | |
| Magnetic fields | EN61000-4-8 | 30A/m | A | |
| Voltage Dips and Input Interuptions | EN61000-4-11 | 230Vac at 30%, 50Hz<br>230Vac at 60%, 50Hz<br>230Vac at 100%, 50Hz<br>230Vac at 100%, 50Hz | A<br>A<br>A<br>C | |
| SEMI F47 Line Dip | SEMI F47 | - | - | >200Vac input, not applicable for the DRF960 model |

## Specifications

| Model | | DRF120-24-1 | DRF240-24-1 | DRF480-24-1 | DRF960-24-1 |
|---|---|---|---|---|---|
| **Output** | | | | | |
| Line Regulation | mV | <96 | | | |
| Load Regulation | mV | <240 | | | |
| Ripple & Noise | mV | <240 | | | |
| Temperature Coefficient | %/°C | <0.02 | | | |
| Minimum Load | - | No minimum load required | | | |
| Over Current Protection | % | >101 of peak current rating. Shutdown after 4 seconds | | | |
| Over Voltage Protection | V | 30 - 35.5 | | | 31.5 - 34 |
| Remote Voltage Adjustment | - | 5 - 6V external voltage adjusts the output from 24 - 28V | | | |
| Remote Sense | - | None | | | |
| Remote On/Off | - | When signal is low, the output is active | | | |
| DC OK Relay | - | Relay contact 30V/1A (closed if Vout > 80% of rated output voltage) | | | |
| LED Indicators | - | Green LED = DC is OK (>80% Nom). Red LED = Peak Load Operation | | | |
| Parallel Operation | - | Droop Mode. Refer to instruction manual | | | |
| **Environmental** | | | | | |
| Operating Temperature | °C | -25 to +70. Start up at -40. Derate linearly to 75% load above 60 (50 for the DRF960) | | | |
| Storage Temperature | °C | -40 to +85 | | | |
| Humidity (non condensing) | %RH | 5-95 (Operating & Storage) | | | |
| Cooling | - | Convection | | | |
| Altitude | m | 3,000 | | | |
| Withstand Voltage (For 1 minute) | Vac/Vdc | Input to Output 3,000Vac, Input to Ground 1,500Vac, Output to Ground 500Vdc (DRF960: 500Vac) | | | |
| Isolation Resistance | MΩ | >100 (500Vdc) at 25°C & 70%RH | | | |
| Vibration (Non operating) | - | 10-55Hz (sweep for 1 min.):19.6m/s$^2$ constant, X,Y,Z axis 1 hour each | | | |
| Shock | - | <196m/s$^2$ | | | |
| **Other** | | | | | |
| Weight (Typ) | g | 600 | 900 | 1300 | 1735 |
| Size (WxHxD) | mm | 36.5 x 123.4 x 115 | 49 x 123.4 x 115 | 82 x 123.4 x 115 | 110 x 123.4 x 139 |
| Size (WxHxD) | Inches | 1.44 x 4.86 x 4.53 | 1.93 x 4.86 x 4.53 | 3.23 x 4.86 x 4.53 | 4.33 x 4.86 x 5.47 |
| Case Material | - | Metal | | | |
| DIN Rail Type | - | TS-35/7.5 or TS-35/15 DIN Rails | | | |
| MTBF - JEITA (RCR-9102B)* | Hours | 140,001 | 123,911 | 112,108 | 1,103,504** |
| Warranty | Years | 5 | | | |

Notes

See website for detailed specifications, test methods and installation manual

* The JEITA RCR-9102B calculation method produces figures significantly lower than Telcordia. ** DRF960 calculated to IEC61709.

(1) Operating period at peak output current is 4 sec, max duty cycle <35% & < rated output power

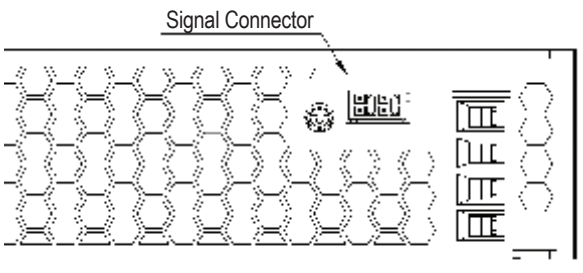
(2) Safety certified for AC input only

(3) Utilizing remote on/off function

(4) Measured at 25%, 50%, 75% and 100% load conditions

## Signal Connector Pin Assignment (DRF120 model shown)

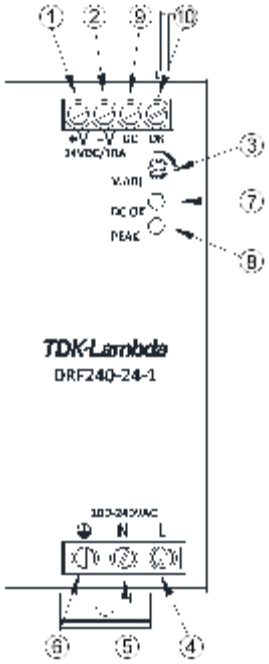
| PIN | Function | Detail |
|---|---|---|
| 1 | CB | For parallel operation cut the link between |
| 2 | CB-COM | pins 1 & 2 for droop mode current share |
| 3 | N/C | No connection |
| 4 | N/C | |
| 5 | CNT+ | Remote ON/OFF control, when CNT+ is pulled to |
| 6 | CNT- | TTL low the power supply turns ON, otherwise it turns OFF |
| 7 | PV | Programming voltage range 5-6V presets the output to 24-28V |
| 8 | COMM | |



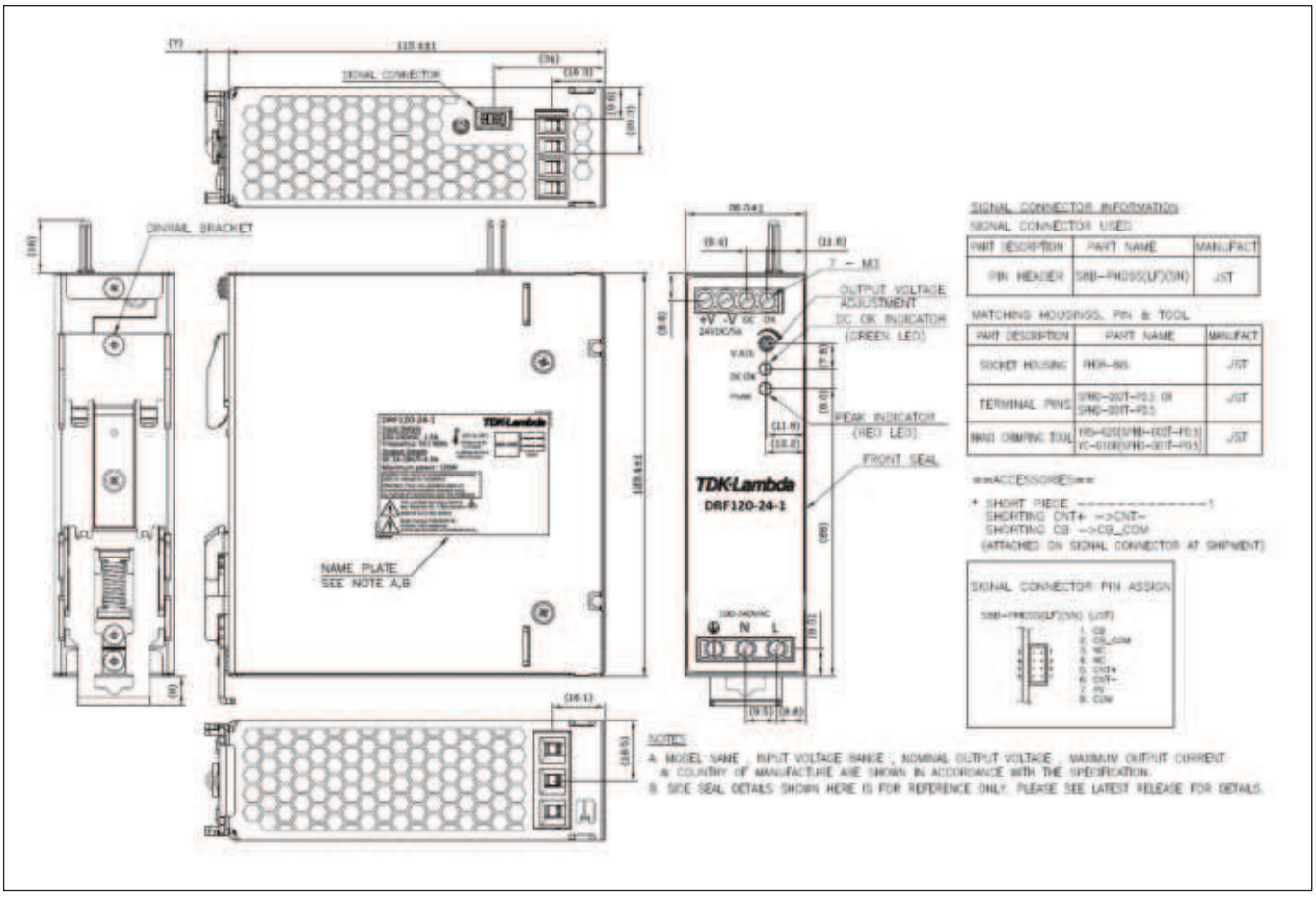

Signal Connector: please refer to instruction manual. Potentiometer on top of unit is for factory settings only. Please do not adjust.

## Front Panel View and Connections (DRF240 model shown)

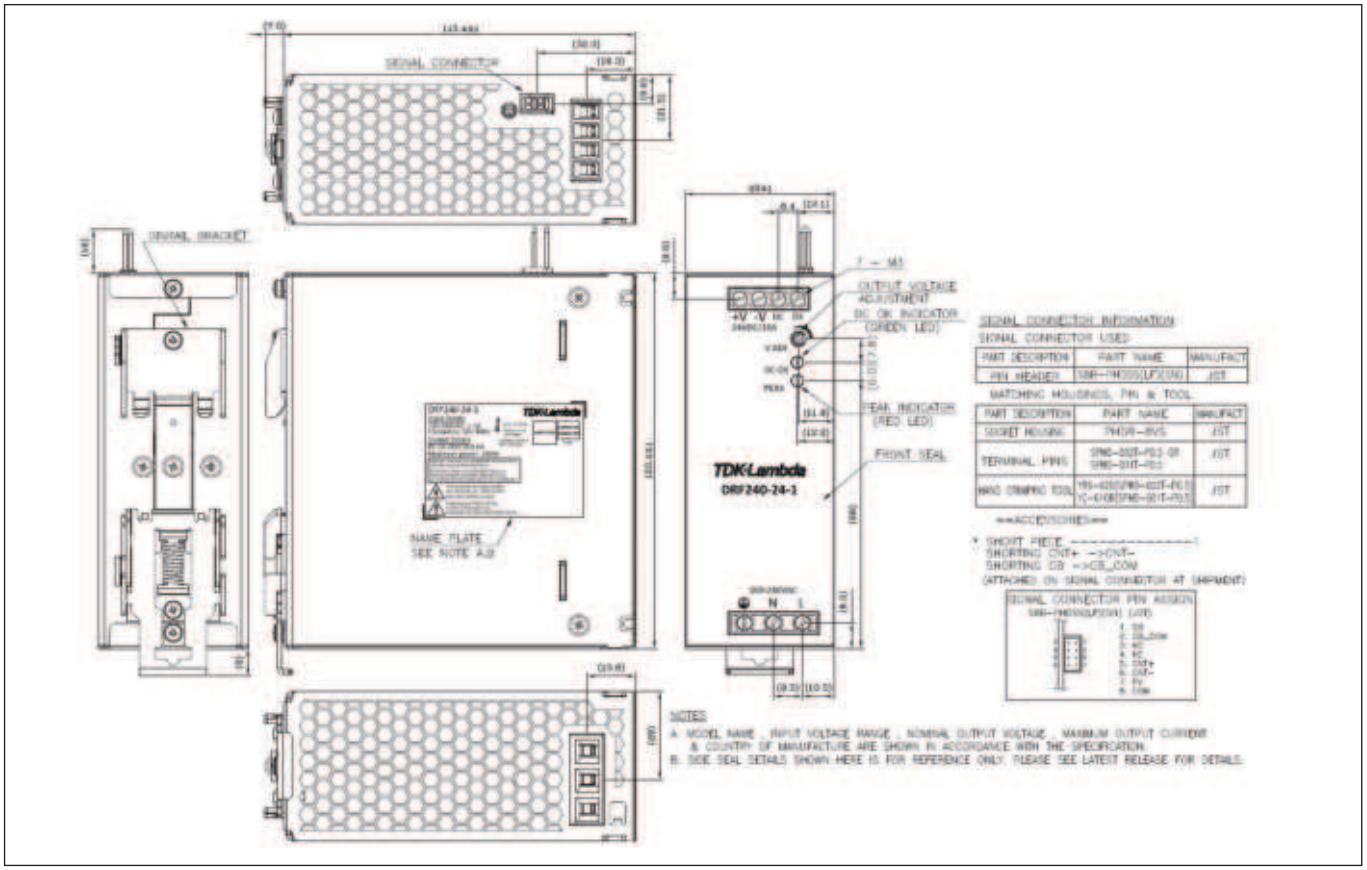
| Terminal | Connection |
|---|---|
| 1 | +V: +Output terminal |
| 2 | -V: - Output terminal |
| 3 | V.ADJ: Output voltage adjust trimmer<br>The output voltage rises when trimmer is turned clockwise. |
| 4 | L: AC Input terminal. Live line (fuse in line) |
| 5 | N: AC Input terminal. Neutral line |
| 6 | ⏚: Protective Earth<br>Connect to safety ground of apparatus or equipment. |
| 7 | DC OK :<br>Green LED lights when Output Voltage on and within specification |
| 8 | PEAK :<br>Red LED lights when Output Current peaks |
| 9 | DC OK: Relay contact |
| 10 | DC OK : Relay contact |



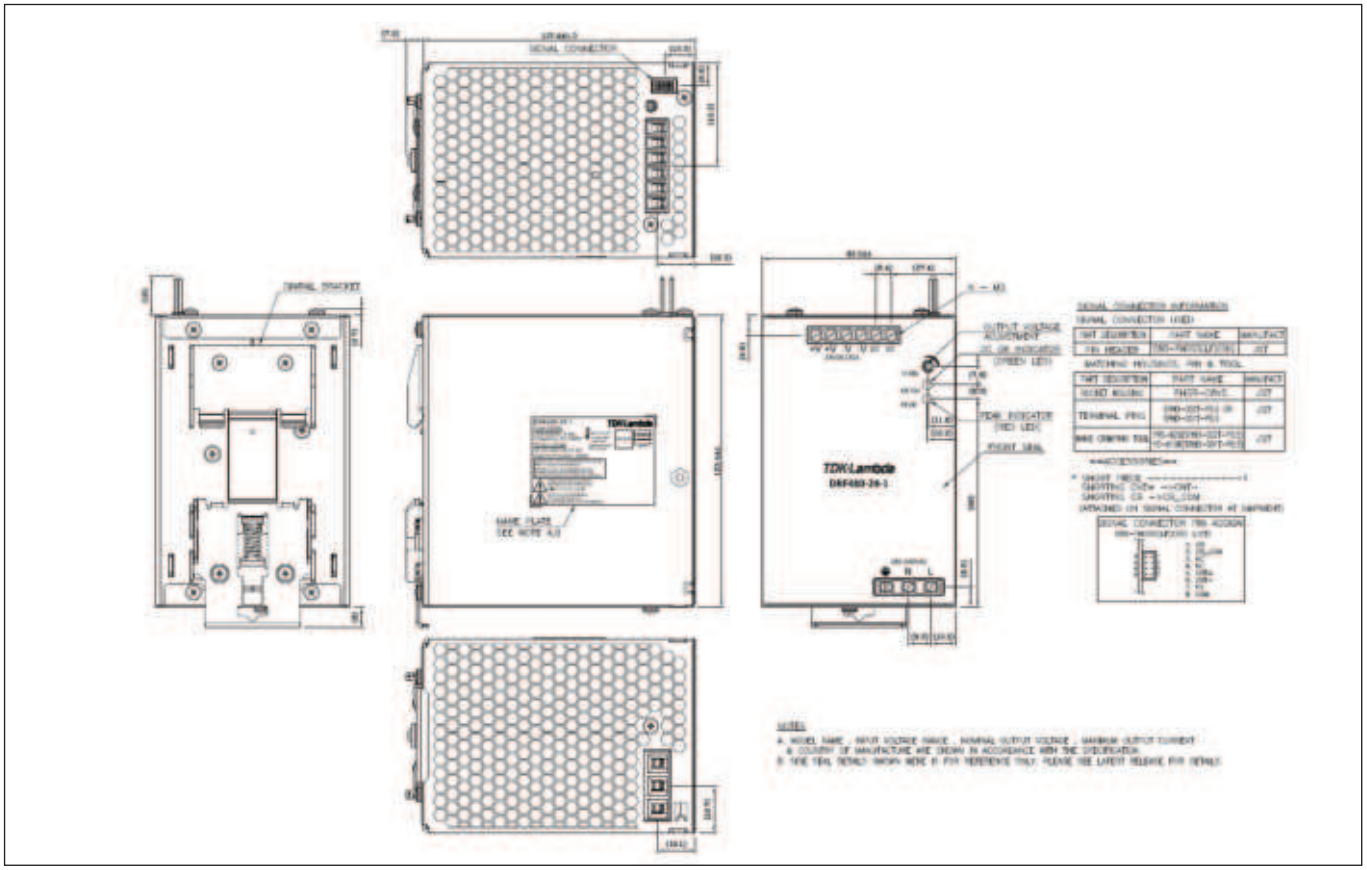

## DRF120 Outline Drawing



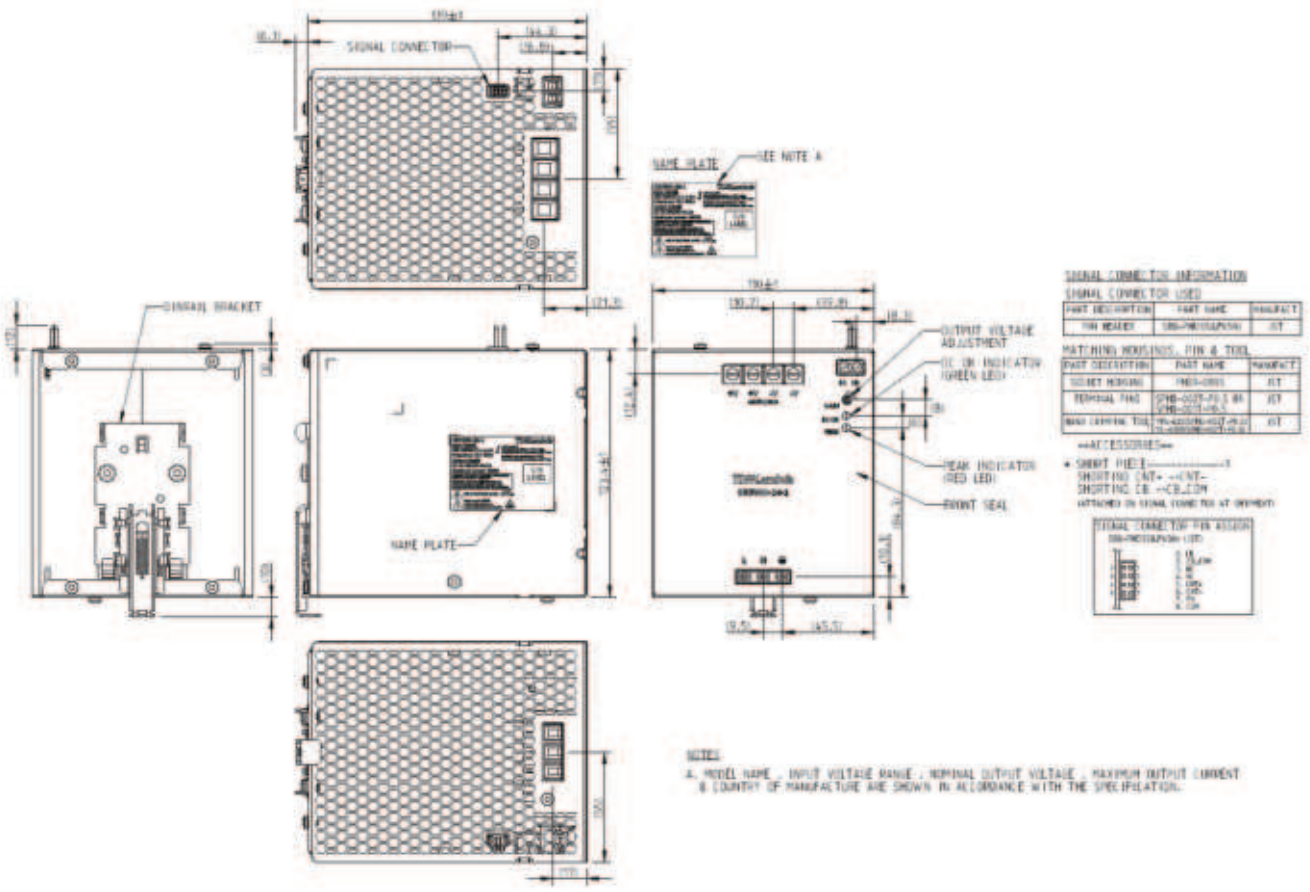
## DRF240 Outline Drawing




## DRF480 Outline Drawing



## DRF960 Outline Drawing



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