

DNR Series



- Up to 90% Efficiency
- Wide Adjustment Range
- Parallel Function
- DC Standby Versions
- Full Power from $-40\text{ }^{\circ}\text{C}$ to $+60\text{ }^{\circ}\text{C}$
- 3 Year Warranty

Specification

Input

| | |
|-----------------------|---|
| Input Voltage | <ul style="list-style-type: none"> • 90-132/180-264 VAC, auto select, 210-375 VDC (DNR120AS, DNR240PS) • 90-264 VAC, 120-375 VDC (DNR480PS) |
| Input Frequency | <ul style="list-style-type: none"> • 47-63 Hz |
| Input Current | <ul style="list-style-type: none"> • See tables |
| Inrush Current | <ul style="list-style-type: none"> • 24/48 A at 115/230 VAC (DNR120) • 30/60 A at 115/230 VAC (DNR240) • 25/50 A at 115/230 VAC (DNR480) |
| Power Factor | <ul style="list-style-type: none"> • 0.7 typical (DNR120, DNR240) • 0.9 typical (DNR480) |
| Earth Leakage Current | <ul style="list-style-type: none"> • 0.8 mA max |
| Input Protection | <ul style="list-style-type: none"> • T3.15A, 250 VAC (DNR120) • T6.3A, 250 VAC (DNR240) • T10A, 250 VAC (DNR480) |

Output

| | |
|------------------------|---|
| Output Voltage | <ul style="list-style-type: none"> • See tables |
| Output Voltage Trim | <ul style="list-style-type: none"> • See tables |
| Initial Set Accuracy | <ul style="list-style-type: none"> • $\pm 1\%$ |
| Minimum Load | <ul style="list-style-type: none"> • No minimum load required |
| Start Up Delay | <ul style="list-style-type: none"> • $< 1\text{ s}$ (may increase at low temperature extremes) |
| Start Up Rise Time | <ul style="list-style-type: none"> • $< 150\text{ ms}$ |
| Hold Up Time | <ul style="list-style-type: none"> • 25/30 ms at 115/230 VAC |
| Line Regulation | <ul style="list-style-type: none"> • $\pm 0.5\%$ max |
| Load Regulation | <ul style="list-style-type: none"> • $\pm 1\%$ ($\pm 5\%$ for units in parallel) |
| Parallel Operation | <ul style="list-style-type: none"> • A maximum of 3 units can be paralleled (not with standby system). Total power available is 90% of the rated current of each unit. Minimum load per unit 10% |
| Transient Response | <ul style="list-style-type: none"> • 4% max deviation recovering to within 1% in 2 ms for a 50% load change |
| Ripple & Noise | <ul style="list-style-type: none"> • 50 mV pk-pk (DNR120) • 100 mV pk-pk (DNR240, DNR480) • 20 MHz bandwidth (may increase at low temperature extremes) |
| Overvoltage Protection | <ul style="list-style-type: none"> • Output clamps at 125-140% V_{nom}, auto recovery |
| Overload Protection | <ul style="list-style-type: none"> • 105-145% constant current, auto recovery • 120-165% constant current (DNR240) |
| Temp. Coefficient | <ul style="list-style-type: none"> • $\pm 0.03\%/^{\circ}\text{C}$ |

General

| | |
|-----------------------------|--|
| Efficiency | <ul style="list-style-type: none"> • See table |
| Isolation | <ul style="list-style-type: none"> • 3000 VAC Input to Output • 1500 VAC Input to Ground • 500 VAC Output to Ground |
| Switching Frequency Signals | <ul style="list-style-type: none"> • See table • DC ON indicator Green LED, DC LOW indicator Red LED • DC OK: 24 V and standby models |
| MTBF | <ul style="list-style-type: none"> • 430 kHrs typical Bellcore, Issue 6 at $+40\text{ }^{\circ}\text{C}$, GB |
| DIN Rail | <ul style="list-style-type: none"> • Compatible with TS35/7.5 or TS35/15 |

Environmental

| | |
|-----------------------|--|
| Operating Temperature | <ul style="list-style-type: none"> • DNR120: $-35\text{ }^{\circ}\text{C}$ to $+70\text{ }^{\circ}\text{C}$, derate linearly from $+60\text{ }^{\circ}\text{C}$ at $2.5\%/^{\circ}\text{C}$, start up at $-30\text{ }^{\circ}\text{C}$ • DNR240: $-40\text{ }^{\circ}\text{C}$ to $+70\text{ }^{\circ}\text{C}$, derate linearly from $+60\text{ }^{\circ}\text{C}$ at $2.5\%/^{\circ}\text{C}$, start up at $-35\text{ }^{\circ}\text{C}$ • DNR480: $-40\text{ }^{\circ}\text{C}$ to $+70\text{ }^{\circ}\text{C}$, derate linearly from $+55\text{ }^{\circ}\text{C}$ at $2.5\%/^{\circ}\text{C}$, start up at $-35\text{ }^{\circ}\text{C}$ (see derating curves) |
| Cooling | <ul style="list-style-type: none"> • Convection-cooled with 25mm free space all sides |
| Operating Altitude | <ul style="list-style-type: none"> • 5000m |
| Operating Humidity | <ul style="list-style-type: none"> • 20-95% RH, non-condensing |
| Storage Temperature | <ul style="list-style-type: none"> • $-40\text{ }^{\circ}\text{C}$ to $+85\text{ }^{\circ}\text{C}$ |
| Shock | <ul style="list-style-type: none"> • 15 g, 11 ms, 3 axes, 6 faces, 3 shocks per face |
| Vibration | <ul style="list-style-type: none"> • 2 g, 10 Hz to 500 Hz, along X, Y & Z axis, 60 min/axis, mounted on rail |

EMC & Safety

| | |
|----------------------|---|
| Emissions | <ul style="list-style-type: none"> • EN55022, class B conducted & radiated |
| Harmonic Currents | <ul style="list-style-type: none"> • EN61000-3-2, class A |
| Voltage Flicker | <ul style="list-style-type: none"> • EN61000-3-3 |
| ESD Immunity | <ul style="list-style-type: none"> • EN61000-4-2, level 4 Perf Criteria A |
| Radiated Immunity | <ul style="list-style-type: none"> • EN61000-4-3, level 3 Perf Criteria A |
| EFT/Burst | <ul style="list-style-type: none"> • EN61000-4-4, level 4 Perf Criteria A |
| Surge | <ul style="list-style-type: none"> • EN61000-4-5, installation class 3, Perf Criteria A |
| Conducted Immunity | <ul style="list-style-type: none"> • EN61000-4-6, level 3 Perf Criteria A |
| Magnetic Field | <ul style="list-style-type: none"> • EN61000-4-8, level 4 Perf Criteria A |
| Dips & Interruptions | <ul style="list-style-type: none"> • EN61000-4-11, 30% 10 ms, 60% 100 ms, 100% 5000 ms Perf Criteria A, A, B |
| Safety Approvals | <ul style="list-style-type: none"> • EN62368-1, UL508, UL62368-1, cUL60950-1, Pollution Degree 2, CE Mark, UL60950-1, Overvoltage Category II, UL508 Overvoltage Category III, ANSI/ISA 12.12.01. (Class 1, Division 2 Groups A, B, C and D) |

Models and Ratings

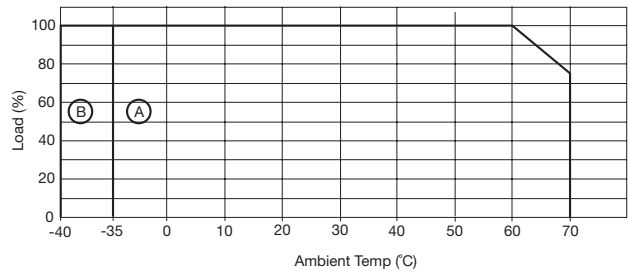
| Output Voltage | Input Current (typ.) | | Output Voltage Trim | Output Current | Efficiency (typ.) | Typical Switching Frequency | Model Number |
|----------------|----------------------|---------|---------------------|----------------|-------------------|-----------------------------|-----------------------------|
| | 115 VAC | 230 VAC | | | | | |
| 12 V | 2.20 A | 0.83 A | 11.4-14.5 V | 10.0 A | 84% | 80 kHz | DNR120AS12-I ⁽¹⁾ |
| 24 V | 2.20 A | 0.83 A | 22.5-28.5 V | 5.0 A | 86% | 80 kHz | DNR120AS24-I ⁽¹⁾ |
| 48 V | 2.20 A | 0.83 A | 45.0-55.0 V | 2.5 A | 87% | 80 kHz | DNR120AS48-I ⁽¹⁾ |
| 24 V | 4.00 A | 1.55 A | 22.5-28.5 V | 10.0 A | 89% | 40 kHz | DNR240PS24-I ⁽¹⁾ |
| 48 V | 4.00 A | 1.55 A | 47.0-56.0 V | 5.0 A | 90% | 40 kHz | DNR240PS48-I ⁽¹⁾ |
| 24 V | 4.90 A | 2.50 A | 22.5-28.5 V | 20.0 A | 89% | 65 kHz | DNR480PS24-I ⁽¹⁾ |
| 48 V | 4.90 A | 2.50 A | 47.0-56.0 V | 10.0 A | 90% | 65 kHz | DNR480PS48-I ⁽¹⁾ |

Notes

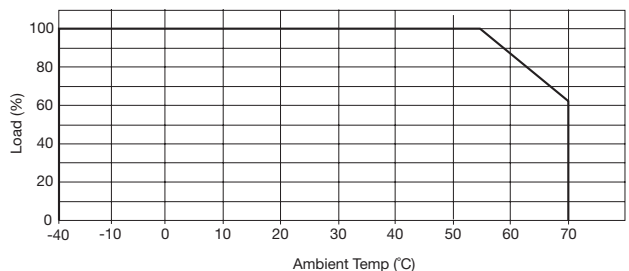
1. For DC standby, remove '-I' and add '#' to the end of the model number. Available for OEM quantities, contact sales.

Derating Curves

DNR120 (A) - 240 (B)

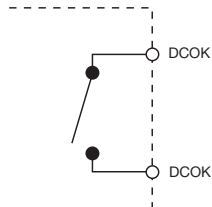


DNR480PS



DC OK

Volt free contact closed when voltage at unit output is within specification. In standby system configured as shown this voltage may be provided by the PSU or battery.

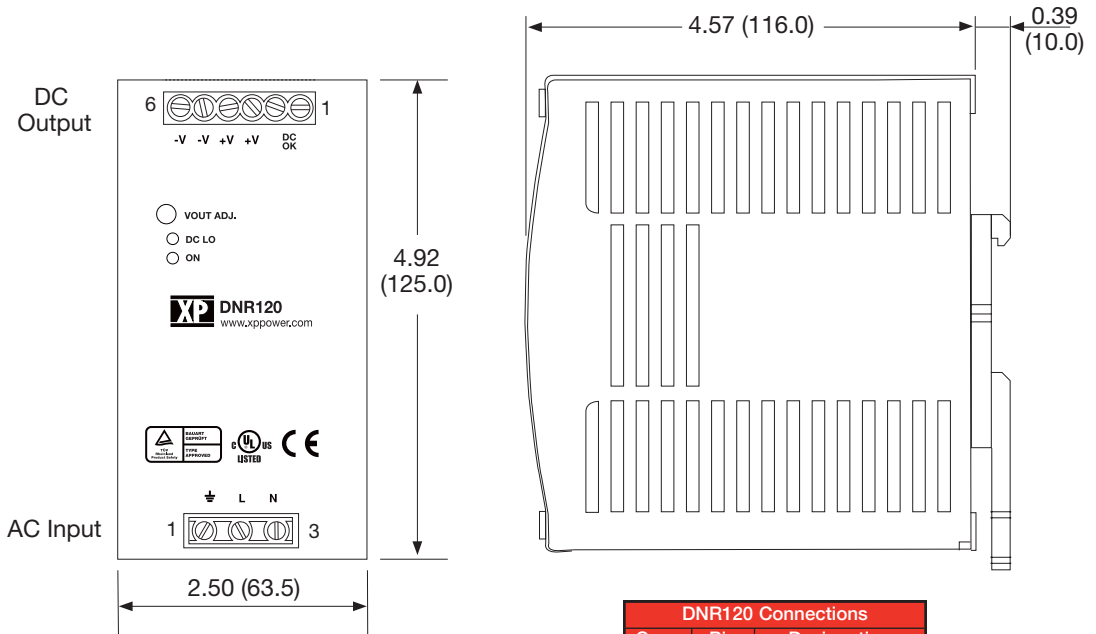


Open = Output fail
Closed = Output good

Contact Rating: 0.3 A at 60 VDC
500 VDC isolation

Mechanical Details

120 W Models



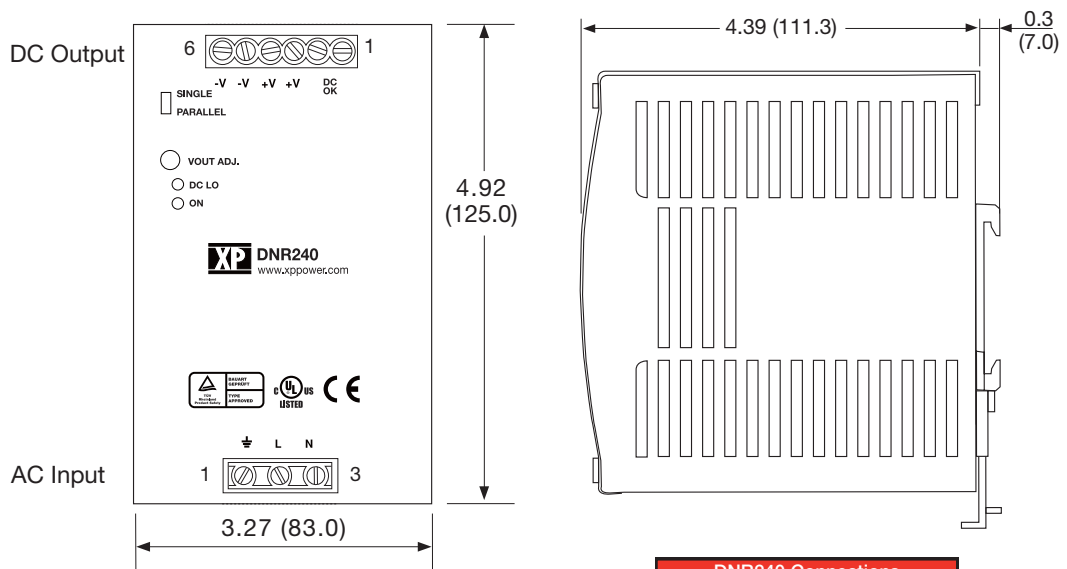
Notes

1. All dimensions in inches (mm).
2. Weight 2.0 lb (920 g) approx.
3. Tolerance: ± 0.02 (0.5) maximum.
4. Screw terminal: 10-24 AWG cable size.
5. Connection screw maximum torque: Input: 9 lbs-in (1.0 Nm), Output: 5.5 lbs-in (0.6 Nm)

| DNR120 Connections | | |
|--------------------|-----|-------------|
| Conn | Pin | Designation |
| AC Input | 1 | Ground |
| | 2 | Line |
| | 3 | Neutral |
| DC Output | 1 | DC OK * |
| | 2 | DC OK * |
| | 3 | Positive |
| | 4 | Positive |
| | 5 | Negative |
| | 6 | Negative |

* 24 V & standby models only.

240 W Models



Notes

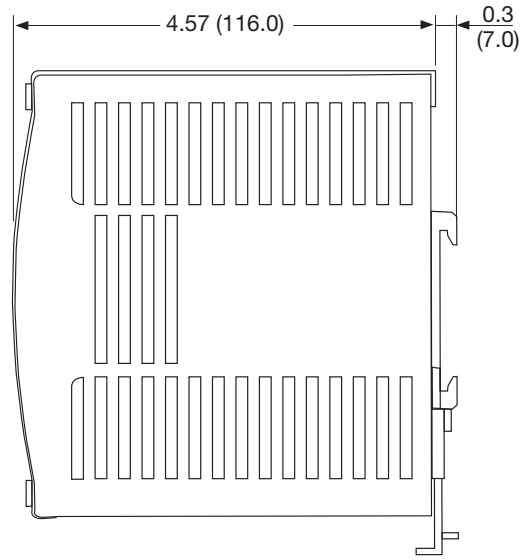
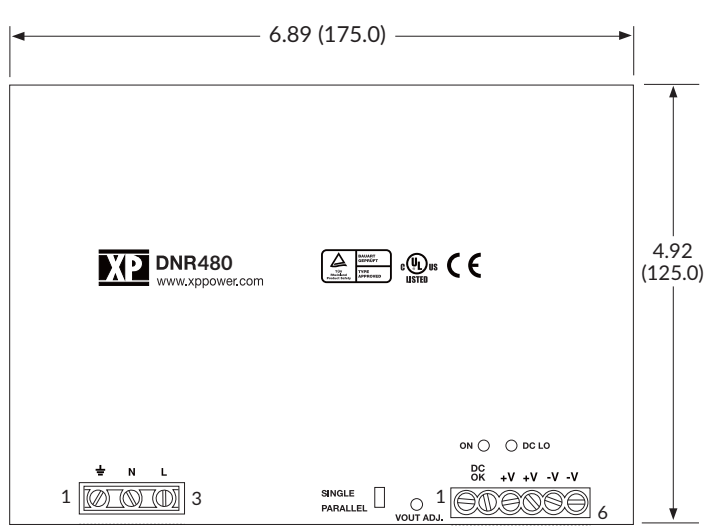
1. All dimensions in inches (mm).
2. Weight 3.0 lb (1360 g) approx.
3. Tolerance: ± 0.02 (0.5) maximum.
4. Screw terminal: 10-24 AWG cable size.
5. Connection screw maximum torque: Input: 9 lbs-in (1.0 Nm), Output: 5.5 lbs-in (0.6 Nm)

| DNR240 Connections | | |
|--------------------|-----|-------------|
| Conn | Pin | Designation |
| AC Input | 1 | Ground |
| | 2 | Line |
| | 3 | Neutral |
| DC Output | 1 | DC OK* |
| | 2 | DC OK* |
| | 3 | Positive |
| | 4 | Positive |
| | 5 | Negative |
| | 6 | Negative |

* 24 V & standby models only.

Mechanical Details

480 W Models



Notes

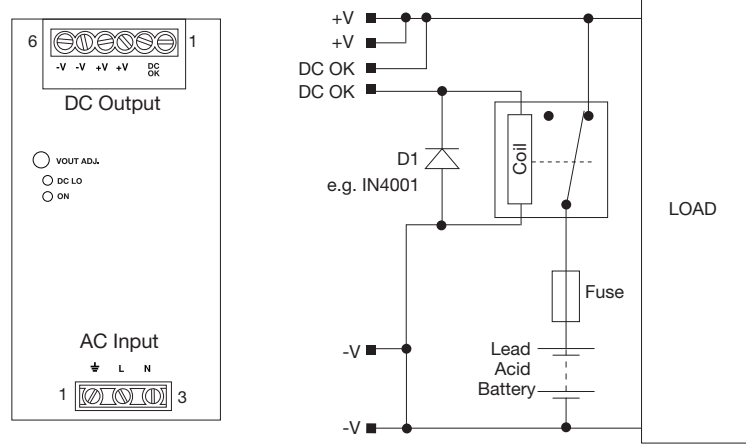
1. All dimensions in inches (mm).
2. Weight 4.2 lb (1920 g) approx.
3. Tolerance: ± 0.02 (0.5) maximum.
4. Screw terminal: 10-24 AWG cable size.
5. Connection screw maximum torque: Input: 9 lbs-in (1.0 Nm), Output: 5.5 lbs-in (0.6 Nm)

| DNR480PS Connections | | |
|----------------------|-----|-------------|
| Conn | Pin | Designation |
| AC Input | 1 | Ground |
| | 2 | Neutral |
| | 3 | Line |
| DC Output | 1 | DC OK* |
| | 2 | DC OK* |
| | 3 | Positive |
| | 4 | Positive |
| | 5 | Negative |
| | 6 | Negative |

* 24 V and standby models only.

Standby Versions

Maximum current drain from battery by PSU when inactive 22 mA.



| DNR120-480 Connections | | | | | |
|------------------------|-----|-------------|-----------|----------|-------------|
| Conn | Pin | Designation | Conn | Pin | Designation |
| AC Input | 1 | Ground | DC Output | 1 | DC OK |
| | 2 | Line | | 2 | DC OK |
| | 3 | Neutral | | 3 | Positive |
| | | | 4 | Positive | |
| | | | 5 | Negative | |
| | | | 6 | Negative | |

Notes

1. Suffix # indicates DC standby version.
2. With AC in, unit provides power to the load and to charge the battery. The DC OK signal acts by sensing a voltage on +V and holds the relay closed.
3. With loss of AC in, battery voltage is present on +V. DC OK signal holds the relay closed. Battery supplies power to the load.
4. As the battery discharges, its voltage falls. When this falls below the level shown in the table the DC OK signal switches off to allow the relay to open to disconnect and protect the battery.
5. Available for OEM quantities, contact sales.

| Output Set Voltages For Standby Versions | | | | |
|--|---------|------------------|---------|------------------|
| Model ^(1,5) | Voltage | DC OK Signal Off | Current | DC OK Shutoff |
| DNR120AS12# | 13.6 V | 10.30-11.30 V | 8.8 A | 10.8 V $\pm 5\%$ |
| DNR120AS24# | 27.2 V | 21.10-22.10 V | 4.4 A | 21.6 V $\pm 5\%$ |
| DNR120AS48# | 54.5 V | 42.70-43.70 V | 2.2 A | 43.2 V $\pm 5\%$ |
| DNR240PS24# | 27.2 V | 21.10-22.10 V | 8.8 A | 21.6 V $\pm 5\%$ |
| DNR240PS48# | 54.5 V | 42.70-43.70 V | 4.4 A | 43.2 V $\pm 5\%$ |
| DNR480PS24# | 27.2 V | 21.10-22.10 V | 17.6 A | 21.6 V $\pm 5\%$ |
| DNR480PS48# | 54.5 V | 42.70-43.70 V | 8.8 A | 43.2 V $\pm 5\%$ |