

DNR120-960TS Series



- Three Phase AC Input
- Up to 93% Efficiency
- Wide Adjustment Range
- Full Power $-40\text{ }^{\circ}\text{C}$ to $+60\text{ }^{\circ}\text{C}$
- Rugged Design for Industrial Applications
- Single Phase Input Operation (340-575 VAC)
- 3 Year Warranty

Specification

Input

Input Voltage	<ul style="list-style-type: none"> • 340-575 VAC 3 phase (single phase operation with 75% of rated output), 480-820 VDC
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"> • DNR120: 10.0 A, DNR240: 20.0 A, DNR480: 20.0 A, DNR960: 30.0 A, typical at 480 VAC, cold start
Power Factor	<ul style="list-style-type: none"> • 0.6 typical at 480 VAC input and nominal load, DNR960TS: 0.8 typical at 480 VAC input and nominal load
Earth Leakage Current	<ul style="list-style-type: none"> • 0.32 mA
Input Protection	<ul style="list-style-type: none"> • 3 internal fuses, DNR120TS, DNR240TS: T2.0 A, 600 VAC, DNR480TS: T3.15 A, 500 VAC, DNR960TS: T5.0 A, 500 VAC

Output

Output Voltage	<ul style="list-style-type: none"> • See table
Output Voltage Trim	<ul style="list-style-type: none"> • See table
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"> • 20 ms min at 480 VAC, DNR960TS: 15 ms min at 480 VAC
Line Regulation	<ul style="list-style-type: none"> • $\pm 1\%$
Load Regulation	<ul style="list-style-type: none"> • $\pm 1\%$ max ($\pm 5\%$ for units in parallel (not DNR120TS))
Parallel Operation	<ul style="list-style-type: none"> • 2 units can be connected in parallel (not DNR120TS), total power available is 90% of the rated current of each unit, minimum load per unit 10%, use Ishare connection for DNR960TS. Redundancy module DPM10 available for load currents up to 10 A, contact sales
Transient Response	<ul style="list-style-type: none"> • 4% max deviation recovering to within 1% in 2 ms for 50% load change
Ripple & Noise	<ul style="list-style-type: none"> • 100 mV pk-pk 20 MHz bandwidth, DNR960TS: 80 mV pk-pk 20 MHz bandwidth, (may increase at low temperature extremes)
Oversoltage Protection	<ul style="list-style-type: none"> • 120-145%, auto recovery
Overload Protection	<ul style="list-style-type: none"> • 110%-140%, constant current, auto recovery
Overtemperature Protection	<ul style="list-style-type: none"> • 100%-110%, on heatsink, auto recovery
Temperature Coefficient	<ul style="list-style-type: none"> • $\pm 0.03\%/^{\circ}\text{C}$
Short Circuit Protection	<ul style="list-style-type: none"> • Continuous trip and restart (hiccup mode) (DNR480TS switchable hiccup mode or power limited)

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	<ul style="list-style-type: none"> • DNR120TS: 70 kHz typical, DNR240TS: 25 kHz typical, DNR480TS: 80 kHz typical, DNR960TS: 52 kHz typical
Signals	<ul style="list-style-type: none"> • DC ON indicator LED Green, DC LOW indicator LED Red DC OK: normally open relay on 24V models
MTBF	<ul style="list-style-type: none"> • DNR120TS: 550 kHrs, 240TS: 500 kHrs 480TS: 420 kHrs, 960TS: 380 kHrs to 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"> • $-40\text{ }^{\circ}\text{C}$ to $70\text{ }^{\circ}\text{C}$ (DNR480TS $-30\text{ }^{\circ}\text{C}$), derate linearly from $60\text{ }^{\circ}\text{C}$ at $2.5\%/^{\circ}\text{C}$ ($3.5\%/^{\circ}\text{C}$ for DNR960TS), start up at $-35\text{ }^{\circ}\text{C}$ (DNR480TS $-20\text{ }^{\circ}\text{C}$) see derating curves
Cooling	<ul style="list-style-type: none"> • Convection-cooled with 25 mm free space all sides
Operating Altitude	<ul style="list-style-type: none"> • DNR120TS & DNR480TS 5000m, DNR960TS 3049m
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 axis, 6 faces, 3 shocks/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 4, 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% 500 ms, 60% 200 ms, $> 95\%$ 5000 ms Perf Criteria A, A, A
Safety Approvals	<ul style="list-style-type: none"> • EN62368-1, UL508, UL62368-1, cUL60950-1, Pollution Degree 2, UL60950-1, Oversoltage Category II, UL508 Oversoltage Category III, ANSI/ISA 12.12.01. (Class 1, Division 2 Groups A, B, C and D)

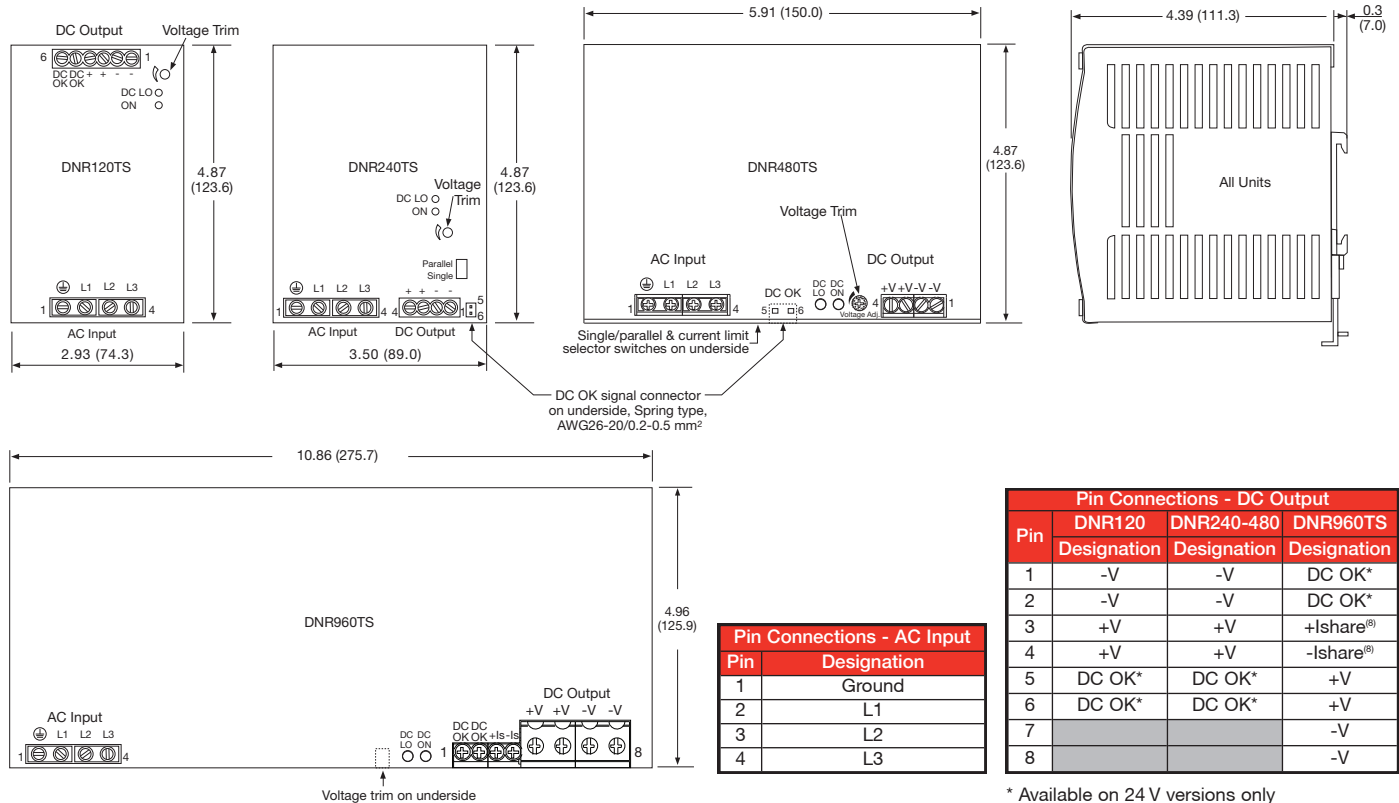
Models and Ratings

Output Voltage	Input Current (typ.)		Output Voltage Trim	Output Current ⁽¹⁾	Efficiency (typ.)	Model Number
	400 VAC	500 VAC				
12 V	0.36 A	0.30 A	11.4-14.5 V	10.0 A	87%	DNR120TS12
24 V	0.36 A	0.30 A	22.5-28.5 V	5.0 A	89%	DNR120TS24
24 V	0.65 A	0.55 A	22.5-28.5 V	10.0 A	90%	DNR240TS24-I
48 V	0.65 A	0.55 A	47.0-56.0 V	5.0 A	91%	DNR240TS48-I
24 V	1.10 A	0.93 A	22.5-28.5 V	20.0 A	90%	DNR480TS24-I
48 V	1.10 A	0.93 A	47.0-56.0 V	10.0 A	91%	DNR480TS48-I
24 V	1.72 A	1.50 A	22.5-28.5 V	40.0 A	92%	DNR960TS24-I
48 V	1.72 A	1.50 A	47.0-56.0 V	20.0 A	93%	DNR960TS48-I

Notes

1. Reduce by 25% for single phase input operation, (340-575 VAC).

Mechanical Details



Notes

- All dimensions in inches (mm).
- Tolerance: ±0.02 (0.5) maximum.
- Weight - DNR120TS: 1.76 lb (800 g) approx.
DNR240TS: 2.43 lb (1100 g) approx.
DNR480TS: 4.23 lb (1720 g) approx.
DNR960TS: 7.05 lb (3200 g) approx.
- Screw terminal: 10-24 AWG cable size.
- DC OK Relay rated at 60 VDC at 300 mA.
- Allow 0.98" (25 mm) clearance all round to ensure adequate ventilation.
- Connection screw maximum torque: Input: 9 lbs-in (1.0 Nm), Output (and signals DNR960TS): 5.5 lbs-in (0.6 Nm), Output (DNR960TS): 15.6 lbs-in (1.7 Nm).
- Connecting +Ishare and -Ishare between two power supplies will force the units to current share.

Derating Curves

