

## DNR120-960TS Series



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

## Specification

## Input

Input Voltage	• 340-575 VAC 3 phase (single phase operation with 75% of rated output), 480-820 VDC
Input Frequency	• 47-63 Hz
Input Current	• See tables
Inrush Current	• DNR120: 10.0 A, DNR240: 20.0 A, DNR480: 20.0 A, DNR960: 30.0 A, typical at 480 VAC, cold start
Power Factor	• 0.6 typical at 480 VAC input and nominal load, DNR960TS: 0.8 typical at 480 VAC input and nominal load
Earth Leakage Current	• 0.32 mA
Input Protection	• 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	• See table
Output Voltage Trim	• See table
Initial Set Accuracy	• $\pm 1\%$
Minimum Load	• No minimum load required
Start Up Delay	• $< 1$ s (may increase at low temperature extremes)
Start Up Rise Time	• $< 150$ ms
Hold Up Time	• 20 ms min at 480 VAC, DNR960TS: 15 ms min at 480 VAC
Line Regulation	• $\pm 1\%$
Load Regulation	• $\pm 1\%$ max ( $\pm 5\%$ for units in parallel (not DNR120TS))
Parallel Operation	• 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	• 4% max deviation recovering to within 1% in 2 ms for 50% load change
Ripple & Noise	• 100 mV pk-pk 20 MHz bandwidth, DNR960TS: 80 mV pk-pk 20 MHz bandwidth, (may increase at low temperature extremes)
Overvoltage Protection	• 120-145%, auto recovery
Overload Protection	• 110%-140%, constant current, auto recovery
Temperature Coefficient	• $\pm 0.03\%/^{\circ}\text{C}$
Short Circuit Protection	• Continuous trip and restart (hiccup mode) (DNR480TS switchable hiccup mode or power limited)

## General

Efficiency	• See table
Isolation	• 3000 VAC Input to Output, 1500 VAC Input to Ground, 500 VAC Output to Ground
Switching Frequency	• DNR120TS: 70 kHz typical, DNR240TS: 25 kHz typical, DNR480TS: 80 kHz typical, DNR960TS: 52 kHz typical
Signals	• DC ON indicator LED Green, DC LOW indicator LED Red DC OK: normally open relay on 24 V models
MTBF	• DNR120TS: 550 kHrs, 240TS: 500 kHrs 480TS: 420 kHrs, 960TS: 380 kHrs to Bellcore Issue 6, at $+40^{\circ}\text{C}$ , GB
DIN Rail	• Compatible with TS35/7.5 or TS35/15

## Environmental

Operating Temperature	• $-40^{\circ}\text{C}$ to $70^{\circ}\text{C}$ (DNR480TS $-30^{\circ}\text{C}$ ), derate linearly from $60^{\circ}\text{C}$ at $2.5\%/^{\circ}\text{C}$ ( $3.5\%/^{\circ}\text{C}$ for DNR960TS), start up at $-35^{\circ}\text{C}$ (DNR480TS $-20^{\circ}\text{C}$ ) see derating curves
Cooling	• Convection-cooled with 25 mm free space all sides
Operating Humidity	• 20-95% RH, non-condensing
Storage Temperature	• $-40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$
Shock	• 15 g, 11 ms, 3 axis, 6 faces, 3 shocks/face
Vibration	• 2 g, 10 Hz to 500 Hz, along X, Y & Z axis, 60 min/axis, mounted on rail

## EMC &amp; Safety

Emissions	• EN55022, Class B conducted & radiated
Harmonic Currents	• EN61000-3-2, Class A
Voltage Flicker	• EN61000-3-3
ESD Immunity	• EN61000-4-2, level 4 Perf Criteria A
Radiated Immunity	• EN61000-4-3, level 3 Perf Criteria A
EFT/Burst	• EN61000-4-4, level 4 Perf Criteria A
Surge	• EN61000-4-5, installation class 4, Perf Criteria A
Conducted Immunity	• EN61000-4-6, level 3 perf criteria A
Magnetic Field	• EN61000-4-8, level 4 perf criteria A
Dips & Interruptions	• EN61000-4-11, 30% 500 ms, 60% 200 ms, $> 95\%$ 5000 ms Perf Criteria A, A, A
Safety Approvals	• EN60950-1 UL508 UL60950-1 Pollution Degree 2, 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

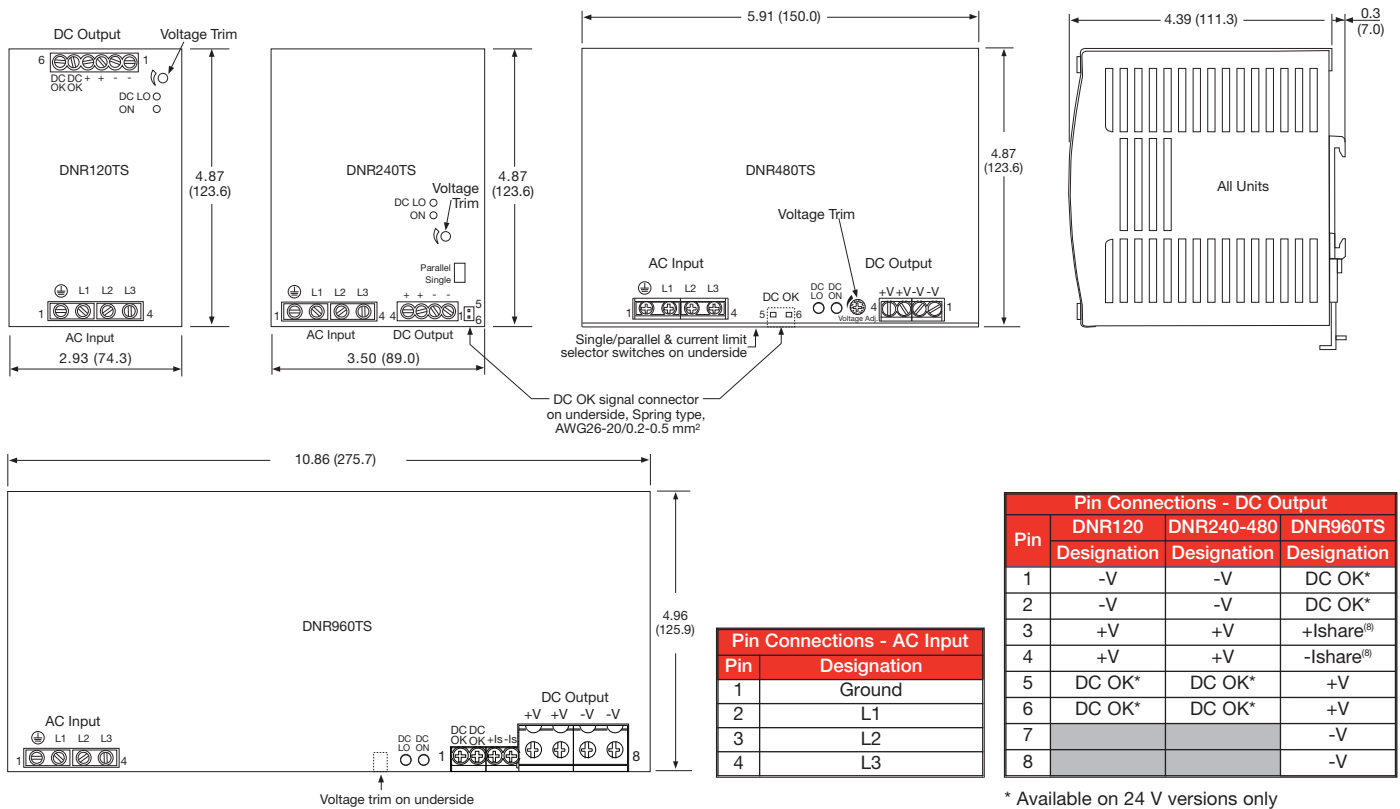
**DNR120-960TS** **XP**

Output Voltage	Input Current (typ.)		Output Voltage Trim	Output Current <sup>(1)</sup>	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).

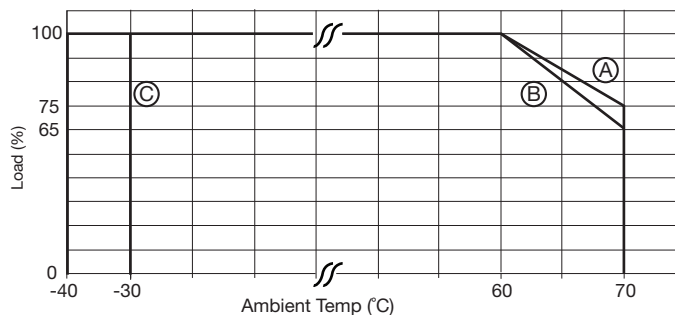
## Mechanical Details



### 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: 5.5 lbs-in (0.6 Nm).
- Connecting +Ishare and -Ishare between two power supplies will force the units to current share.

## Derating Curves



- (A) DNR120-240TS
- (B) DNR960TS
- (C) DNR480TS