

# WRA480 SERIES

3PH AC - DC DIN RAIL MOUNTABLE POWER SUPPLY  
INDUSTRIAL CONTROL EQUIPMENT



## FEATURES

- 3 PHASE AC INPUT VOLTAGE
- SELV COMPONENTS DESIGN
- SHORT CIRCUIT PROTECTION
- INTERNAL INPUT FILTER
- OVER TEMPERATURE PROTECTION
- PARALLEL FUNCTION AVAILABLE (SWITCH)
- 3 YEARS WARRANTY



## SELECTION CHART

# WRA 480 - 24

Wattage

24 : 24V OUT     48 : 48V OUT

## MODEL LIST

| MODEL NO.                   | INPUT VOLTAGE        | OUTPUT WATTAGE | OUTPUT VOLTAGE | OUTPUT CURRENT | EFF. (min.) | EFF. (typ.) |
|-----------------------------|----------------------|----------------|----------------|----------------|-------------|-------------|
| <b>Single Output Models</b> |                      |                |                |                |             |             |
| WRA480-24                   | 3 $\phi$ 340~575 VAC | 480 WATTS      | + 24 VDC       | 20 A           | 88%         | 90%         |
| WRA480-48                   | 3 $\phi$ 340~575 VAC | 480 WATTS      | + 48 VDC       | 10 A           | 89%         | 91%         |

## SPECIFICATION

All Specifications Typical At Nominal Line, Full Load, 25°C Unless Otherwise Noticed

| GENERAL                       |   |               |                      |        |            |    |
|-------------------------------|---|---------------|----------------------|--------|------------|----|
| Characteristics               | Conditions                                      | min.          | typ.                 | max.   | unit       |    |
| Switching frequency           | Vi nom, Io nom                                  |               | 80                   |        | KHz        |    |
| Isolation voltage             | Input-Output                                    | 3,000 / 4,242 |                      |        | VAC / VDC  |    |
|                               | Input-FG  | 1,500 / 2,121 |                      |        | VAC / VDC  |    |
|                               | Output-FG                                       | 500 / 710     |                      |        | VAC / VDC  |    |
| Isolation resistance          | Input-Output, @ 500VDC                          | 100           |                      |        | M $\Omega$ |    |
| Ambient temperature           | Operating at Vi nom                             | -30           |                      | + 71   | °C         |    |
| Derating (see derating curve) | Vi nom, from +61 to +71°C                       |               |                      | 2.5    | % / °C     |    |
| Storage temperature           | Non operational                                 | -40           |                      | + 85   | °C         |    |
| Relative humidity             | Vi nom, Io nom                                  | 20            |                      | 95     | % RH       |    |
| Temperature coefficient       | Vi nom, Io min                                  |               |                      | ± 0.03 | % / °C     |    |
| MTBF                          | Bellcore Issue 6 @40°C, GB                      | 24V           | 412,000              |        | Hours      |    |
|                               |   | 48V           | 430,000              |        | Hours      |    |
| Altitude during operation     | EN 60950-1                                      |               |                      | 5,000  | m          |    |
| Dimension                     | Screw terminal type                             |               | L124 x W150 x D118.8 |        |            | mm |
| Cooling                       | Free air convection                             |               |                      |        |            |    |
| Installation position         | Vertical ( other direction may derating using ) |               |                      |        |            |    |
| Pollution degree              |   |               | 2                    |        |            |    |

| INPUT SPECIFICATIONS      |                            |      |                                    |      |      |  |
|---------------------------|----------------------------|------|------------------------------------|------|------|--|
| Characteristics           | Conditions                 | min. | typ.                               | max. | unit |  |
| Nominal voltage *1        |                            |      | 1 $\phi$ or 3 $\phi$ 380 / 480 VAC |      |      |  |
| Rated input voltage       | Io nom                     | 400  |                                    | 500  | VAC  |  |
| Absolute input max. range | Ta min ... Ta max,         | 340  |                                    | 575  | VAC  |  |
|                           | Io nom                     | 480  |                                    | 820  | VDC  |  |
| Input current             | Vi : 400 / 500 VAC, Io nom |      | 1.1 / 0.93                         |      | A    |  |
| Rated input current       | Vi : 340 VAC, Io nom       |      |                                    | 1.4  | A    |  |

\*1. Single phase input is permissible, but output load is derated to 75%



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### INPUT SPECIFICATIONS

| Characteristics        | Conditions           | min. | typ. | max. | unit |
|------------------------|----------------------|------|------|------|------|
| Line frequency         | Vi nom, lo nom       | 47   |      | 63   | Hz   |
| Inrush current         | Vi nom, lo nom       |      | 20   | 25   | A    |
| Power dissipation      | Vi : 400 VAC, lo nom | 24V  | 58   |      | W    |
|                        |                      | 48V  | 55   |      | W    |
| Leakage current        | Input-Output         |      |      | 0.25 | mA   |
|                        | Input-FG             |      |      | 3.5  | mA   |
| Power factor (Passive) | Vi nom, lo nom       |      | 0.65 |      |      |

### OUTPUT SPECIFICATIONS

| Characteristics                                     | Conditions                        | min.          | typ.   | max.  | unit |
|---|-----------------------------------|---------------|--|-------|------|
| Output voltage accuracy (Adjusted before shipment)  | Vi nom, lo max                    | 0             |  | + 1   | %    |
| Minimum load  | Vi nom                            | 0             |  |       | %    |
| Line regulation                                     | lo nom, Vi min ...Vi max          |               |  | ± 1   | %    |
| Load regulation                                     | Vi nom, lo min ...lo nom          | single mode   |  | ± 1   | %    |
|   |                                   | parallel mode |  | ± 5   | %    |
| Voltage trim range                                  | Vi nom, 0.8 lo nom                | 24V           | 22.5   | 28.5  | VDC  |
|   |                                   | 48V           | 47   | 56    | VDC  |
| Rated continuous loading                            | Vi nom                            | 24V           | 20 A @ 24Vdc / 16.8 A @ 28.5Vdc                    |       |      |
|   |                                   | 48V           | 10 A @ 48Vdc / 8.5 A @ 56Vdc                       |       |      |
| Hold up time  | Vi nom , lo nom                   | 20            |  |       | ms   |
| Turn on time  | Vi nom, lo nom                    |               |  | 1,000 | ms   |
|   | Vi nom, lo nom → with 7000 μF CAP |               |  | 1,500 | ms   |
| Rise time   | Vi nom, lo nom                    |               |  | 150   | ms   |
|   | Vi nom, lo nom → with 7000 μF CAP |               |  | 500   | ms   |
| Fall time   | Vi nom, lo nom                    |               |  | 150   | ms   |
| Transient recovery time                             | Vi nom, I ~ 0.5 lo nom            |               |  | 2     | ms   |
| Ripple & noise                                      | Vi nom, lo nom, BW = 20MHz        |               |  | 100   | mV   |
| Power back immunity                                 | Vi nom, lo nom                    | 24V           | 35   |       | VDC  |
|   |                                   | 48V           | 63   |       | VDC  |
| Capacitor load                                      | Vi nom, lo nom                    | 24V           |  | 7,000 | μF   |
| DC ON indicator threshold at start up (Green LED)   | Vi nom, lo nom                    | 24V           | 17.6   | 19.4  | VDC  |
|   |                                   | 48V           | 37   | 43    | VDC  |
| DC LOW indicator threshold after start up (Red LED) | Vi nom, lo nom                    | 24V           | 17.6   | 19.4  | VDC  |
|   |                                   | 48V           | 37   | 43    | VDC  |
| Parallel operation                                  | 0.1 lo min ~ 0.9 lo max           |               |  | 2     | unit |
| Efficiency  | Vi nom, lo nom, Po / Pi           |               | Up to 91%, See model list and typ efficiency curve |       |      |

### CONTROL AND PROTECTION

| Characteristics                   | Conditions  | min.                                       | typ. | max. | unit |
|-----------------------------------|---|--|------|------|------|
| Input fuse                        |   | T3.15 A / 500 VAC internal / phase         |      |      |      |
| Internal surge voltage protection | IEC 61000-4-5   | Varistor                                   |      |      |      |
| Rated over load protection        | Vi nom (see typ current limited curve)  | 110  |      | 135  | %    |
| Power Rdy (for 24V model only)    | Threshold voltage of contact closed(at start up)  | 17.6                                       |      | 19.4 | VDC  |
|                                   | Electrical isolation  | 500  |      |      | VDC  |
|                                   | Contact rating at 60VDC   |  |      | 0.3  | A    |
| Over voltage protection           | Vi nom, 0.8 lo nom (Auto Recovery)  | 24V  | 30   | 33   | VDC  |
|                                   |   | 48V  | 60   | 66   | VDC  |
| Output short circuit              | Continuous  | Fold forward                               |      |      |      |
|                                   | Discontinuous   | Delay 3S shut-down. After 30S Auto-restart |      |      |      |
| Over temperature                  | Detect on heat sink, shut down O/P voltage, recovers automatically after temperature goes down. | 100  |      | 110  | °C   |
| Degree of protection              |   | IP20                                       |      |      |      |

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### APPROVALS AND STANDARDS

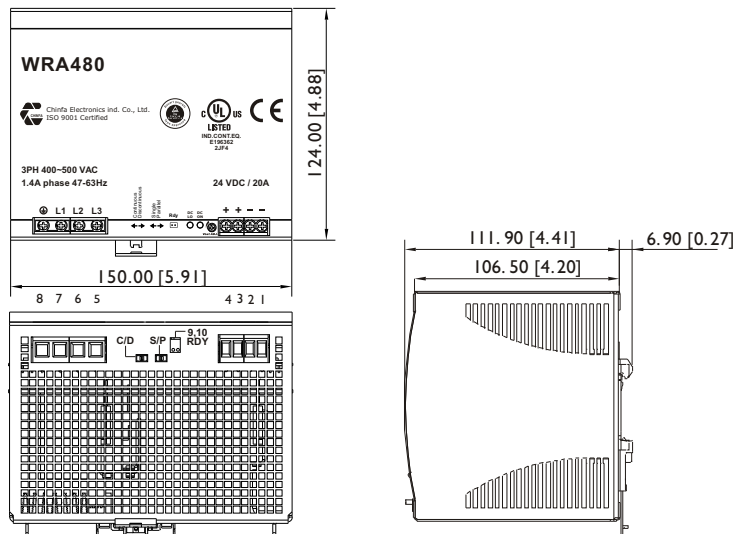
|                      |  |
|----------------------|--|
| UL / cUL             | UL 508 Listed<br>UL 60950-1 Recognized<br>ISA 12.12.01(Class I, Division 2, Groups A, B, C and D)  |
| TUV                  | EN 60950-1<br>EN 61558-1, EN 61558-2-16 (meet EN 60204-1)  |
| CE                   | EN 61000-6-3, EN 55022 class B, EN 61000-3-2, EN 61000-3-3<br>EN 61000-6-2, EN 55024, EN 61000-4-2 Level 4, EN 61000-4-3 Level 3<br>EN 61000-4-4 Level 4, EN 61000-4-5 L-N Level 3, L / N-FG Level 4<br>EN 61000-4-6 Level 3, EN 61000-4-8 Level 4, EN 61000-4-11<br>ENV 50204 Level 2, EN 61204-3 |
| CQC                  | GB4943.1, GB9254, GB17625.1  |
| Vibration resistance | meet IEC 60068-2-6 (Mounting on rail : 10-500 Hz, 2G, along X, Y, Z each Axis, 60 min for each Axis )  |
| Shock resistance     | meet IEC 60068-2-27 (15G, 11ms, 3 Axis, 6 Faces, 3 times for each Face)  |

### PHYSICAL CHARACTERISTICS

|               |  |
|---------------|--|
| Case size     | Screw terminal type 124 x 150 x 118.8 mm (4.88 x 5.91 x 4.68 inches) |
| Case material | Metal  |
| Weight        | 1720g  |
| Packing       | 2kg ; 8pcs / 17.5kg / 2.17CUFT                                       |

### MECHANISM & PIN CONFIGURATION

mm [inch]



#### CONSTRUCTION

Easy snap-on mounting onto the DIN-Rail (TS35/7.5 or TS35/15), unit sits safely and firmly on the rail.

#### INSTALLATION

Ventilation / Cooling  
Normal convection  
All sides 25mm free space  
For cooling recommended  
Connector size range  
AWG24-10 (0.2~4mm<sup>2</sup>) flexible / solid cable,  
-Input connector can withstand torque at maximum 9 pound-inches.  
-Output connector can withstand torque at maximum 5.5 pound-inches.  
8 m/m stripping at cable end recommends  
Use copper conductors only, 60 / 75°C

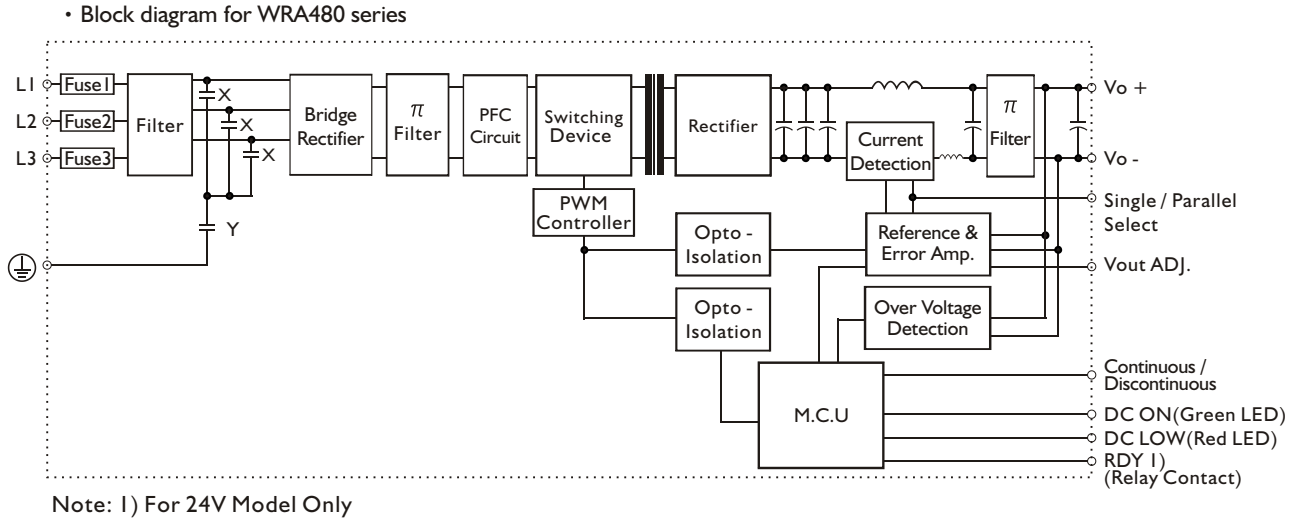
#### GENERAL TOLERANCE

|                              |             |
|------------------------------|-------------|
| 0.00[0.00] - 30.00[1.18]     | ±0.30[0.01] |
| 30.00[1.18] - 120.00[4.72]   | ±0.50[0.02] |
| 120.00[4.72] - 400.00[15.75] | ±0.80[0.03] |

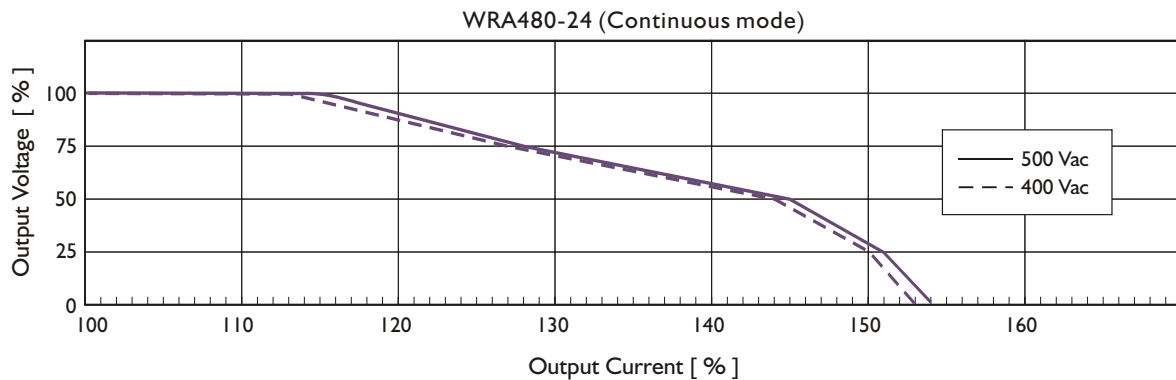
### PIN ASSIGNMENT

| PIN NO. |       | Designation | Description   |
|---------|-------|-------------|---|
| 1, 2    | OUT   | V -         | Negative output terminal  |
| 3, 4    |       | V +         | Positive output terminal  |
| 5       |       | L3          | Input terminals   |
| 6       | IN    | L2          | Input terminals   |
| 7       |       | L1          | Input terminals   |
| 8       |       | ⊕           | Ground this terminal to minimize high-frequency emissions                               |
| 9       | OUT   | RDY         | A normal open relay contact for DC ON level control<br>(Never connect except 24V model) |
| 10      |       | DC ON       | Operation indicator LED   |
|         | OTHER | DC LO       | DC LOW voltage indicator LED  |
|         |       | Vout ADJ.   | Trimmer-potentiometer for Vout adjustment   |
|         |       | S / P       | Single / Parallel select switch   |
|         |       | C / D       | Continuous / Discontinuous  |

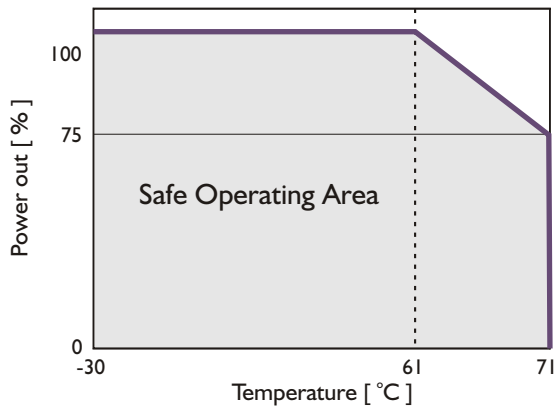
## CIRCUIT SCHEMATIC



## TYP. CURRENT LIMITED CURVE



## DERATING CURVE



## TYP. EFFICIENCY CURVE

