

# DRAN I20 SERIES

AC - DC DIN RAIL MOUNTABLE POWER SUPPLY  
INDUSTRIAL CONTROL EQUIPMENT



## FEATURES

- PFC FUNCTION AVAILABLE
- PARALLEL FUNCTION AVAILABLE (SWITCH)
- INPUT VOLTAGE 115/230VAC AUTO SELECT
- SELV COMPONENTS DESIGN
- 3 YEARS WARRANTY



## SELECTION CHART

**DRAN I20 - 24 x**

Wattage

12 : 12V OUT  
24 : 24V OUT  
48 : 48V OUT

A : SCREW TERMINAL TYPE  
B : DETACHABLE CONNECTOR TYPE  
AL / BL : CLASS 2 POWER (24V ONLY)

## MODEL LIST

| MODEL NO.                   | INPUT VOLTAGE | OUTPUT WATTAGE | OUTPUT VOLTAGE | OUTPUT CURRENT | EFF. (min.) | EFF. (typ.) |
|-----------------------------|---------------|----------------|----------------|----------------|-------------|-------------|
| <b>Single Output Models</b> |               |                |                |                |             |             |
| DRAN I20-12x                | 115 / 230 VAC | 120 WATTS      | + 12 VDC       | 10A            | 82%         | 84%         |
| DRAN I20-24x                | 115 / 230 VAC | 120 WATTS      | + 24 VDC       | 5A             | 84%         | 86%         |
| DRAN I20-24xL               | 115 / 230 VAC | 91 WATTS       | + 24 VDC       | 3.8A           | 83%         | 85%         |
| DRAN I20-48x                | 115 / 230 VAC | 120 WATTS      | + 48 VDC       | 2.5A           | 85%         | 87%         |

## 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                                  |                       | 55   |         | 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                   |      |         | MΩ        |  |
| Ambient temperature           | Operating at Vi nom                             | -35                   |      | + 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                      | 12V                   |      | 509,000 | Hours     |  |
|                               |   | 24V                   |      | 530,000 | Hours     |  |
|                               |   | AL / BL               |      | 659,000 | Hours     |  |
|                               |   | 48V                   |      | 600,000 | Hours     |  |
| Altitude during operation     | EN 60950-1                                      |                       |      | 5,000   | m         |  |
| Dimension                     | Screw terminal type                             | L124.5 x W64 x D123.6 |      |         | mm        |  |
|                               | Detachable connector type                       | L143.5 x W64 x D123.6 |      |         | mm        |  |
| Cooling                       | Free air convection                             |                       |      |         |           |  |
| Installation position         | Vertical ( other direction may derating using ) |                       |      |         |           |  |
| Pollution degree              |   | 2                     |      |         |           |  |

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## SPECIFICATION

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### INPUT SPECIFICATIONS

| Characteristics           | Conditions   |                     | min.                    | typ.        | max.      | unit |
|---------------------------|--|---------------------|-------------------------|-------------|-----------|------|
| Rated input voltage       | I <sub>o</sub> nom   |                     | 115 / 230 (auto select) |             |           | VAC  |
| Absolute input max. range | T <sub>a</sub> min ... T <sub>a</sub> max,<br>I <sub>o</sub> nom | AC in 115V selected | 90                      |             | 132       | VAC  |
|                           |  | AC in 230V selected | 180                     |             | 264       | VAC  |
|                           |  | DC in               | 210                     |             | 375       | VDC  |
| Input current             | V <sub>i</sub> : 115 / 230 VAC, I <sub>o</sub> nom               |                     |                         | 2.2 / 0.83  |           | A    |
|                           | AL, BL models  |                     |                         | 1.65 / 0.65 |           | A    |
| Rated input current       | V <sub>i</sub> : 90 / 180 VAC, I <sub>o</sub> nom                |                     |                         |             | 2.8 / 1.4 | A    |
|                           | AL, BL models  |                     |                         |             | 2.0 / 0.8 | A    |
| Line frequency            | V <sub>i</sub> nom, I <sub>o</sub> nom                           |                     | 47                      |             | 63        | Hz   |
| Inrush current            | V <sub>i</sub> : 115 / 230 VAC, I <sub>o</sub> nom               |                     |                         |             | 24 / 48   | A    |
| Power dissipation         | V <sub>i</sub> : 230 VAC, I <sub>o</sub> nom                     | 12V                 |                         | 24          |           | W    |
|                           |  | 24V                 |                         | 20          |           | W    |
|                           |  | AL / BL             |                         | 16          |           | W    |
|                           |  | 48V                 |                         | 19          |           | W    |
| Leakage current           | Input-Output   |                     |                         |             | 0.25      | mA   |
|                           | Input-FG   |                     |                         |             | 3.5       | mA   |
| Power factor (Passive)    | V <sub>i</sub> : 230VAC, I <sub>o</sub> nom                      |                     |                         | 0.7         |           |      |

### OUTPUT SPECIFICATIONS

| Characteristics                                     | Conditions  |               | min.   | typ. | max.  | unit |
|---|---|---------------|--|------|-------|------|
| Output voltage accuracy (Adjusted before shipment)  | V <sub>i</sub> nom, I <sub>o</sub> max  |               | 0  |      | + 1   | %    |
| Minimum load  | V <sub>i</sub> nom  |               | 0  |      |       | %    |
| Line regulation                                     | I <sub>o</sub> nom, V <sub>i</sub> min ... V <sub>i</sub> max   |               |  |      | ± 0.5 | %    |
| Load regulation                                     | V <sub>i</sub> nom,<br>I <sub>o</sub> min ... I <sub>o</sub> nom  | single mode   |  |      | ± 1   | %    |
|   |   | parallel mode |  |      | ± 5   | %    |
| Voltage trim range                                  | V <sub>i</sub> nom, 0.8 I <sub>o</sub> nom  | 12V           | 11.4   |      | 14.5  | VDC  |
|   |   | 24V           | 22.5   |      | 28.5  | VDC  |
|   |   | AL / BL       | 22.5   |      | 24.5  | VDC  |
|   |   | 48V           | 45   |      | 55    | VDC  |
| Rated continuous loading                            | V <sub>i</sub> nom  | 12V           | 10 A @ 12Vdc / 8.2 A @ 14.5 Vdc                    |      |       |      |
|   |   | 24V           | 5 A @ 24Vdc / 4.2 A @ 28.5 Vdc                     |      |       |      |
|   |   | AL / BL       | 3.8 A @ 24Vdc / 3.7 A @ 24.5 Vdc                   |      |       |      |
|   |   | 48V           | 2.5 A @ 48Vdc / 2.1 A @ 55 Vdc                     |      |       |      |
| Hold up time  | V <sub>i</sub> : 115 / 230 VAC, I <sub>o</sub> nom  |               | 25 / 30  |      |       | ms   |
| Turn on time  | V <sub>i</sub> nom, I <sub>o</sub> nom  |               |  |      | 1,000 | ms   |
|   | V <sub>i</sub> nom, I <sub>o</sub> nom → 12V model : with 7000 μF CAP<br>24V, 48V models : with 3500 μF CAP |               |  |      | 1,500 | ms   |
| Rise time   | V <sub>i</sub> nom, I <sub>o</sub> nom  |               |  |      | 150   | ms   |
|   | V <sub>i</sub> nom, I <sub>o</sub> nom → 12V model : with 7000 μF CAP<br>24V, 48V models : with 3500 μF CAP |               |  |      | 500   | ms   |
| Fall time   | V <sub>i</sub> nom, I <sub>o</sub> nom  |               |  |      | 150   | ms   |
| Transient recovery time                             | V <sub>i</sub> nom, I <sub>o</sub> ~ 0.5 I <sub>o</sub> nom   |               |  |      | 2     | ms   |
| Ripple & noise                                      | V <sub>i</sub> nom, I <sub>o</sub> nom, BW = 20MHz  |               |  |      | 50    | mV   |
| Power back immunity                                 | V <sub>i</sub> nom, I <sub>o</sub> nom  | 12V           | 18   |      |       | VDC  |
|   |   | 24V           | 35   |      |       | VDC  |
|   |   | 48V           | 63   |      |       | VDC  |
| Capacitor load                                      | V <sub>i</sub> nom, I <sub>o</sub> nom  | 12V           |  |      | 7,000 | μF   |
|   |   | 24V, 48V      |  |      | 3,500 | μF   |
| DC ON indicator threshold at start up (Green LED)   | V <sub>i</sub> nom, I <sub>o</sub> nom  | 12V           | 10   |      | 11.2  | VDC  |
|   |   | 24V           | 17.6   |      | 19.4  | VDC  |
|   |   | 48V           | 37   |      | 43    | VDC  |
| DC LOW indicator threshold after start up (Red LED) | V <sub>i</sub> nom, I <sub>o</sub> nom  | 12V           | 10   |      | 11.2  | VDC  |
|   |   | 24V           | 17.6   |      | 19.4  | VDC  |
|   |   | 48V           | 37   |      | 43    | VDC  |
| Parallel operation                                  | 0.1 I <sub>o</sub> min ~ 0.9 I <sub>o</sub> max (Except AL / BL models)                                     |               |  |      | 3     | unit |
| Efficiency  | V <sub>i</sub> nom, I <sub>o</sub> nom, P <sub>o</sub> / P <sub>i</sub>                                     |               | Up to 87%, See model list and typ efficiency curve |      |       |      |

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## SPECIFICATION

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### CONTROL AND PROTECTION

| Characteristics                   | Conditions  | min.                     | typ. | max. | unit |
|-----------------------------------|---|--------------------------|------|------|------|
| Input fuse                        |   | T3.15A / 250VAC internal |      |      |      |
| Internal surge voltage protection | IEC 61000-4-5                                     | Varistor                 |      |      |      |
| Rated over load protection        | Vi nom (see typ current limited curve)            | 110                      |      | 145  | %    |
|                                   | AL / BL   | 102                      |      | 108  | %    |
| Power Rdy<br>(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 Io nom (Auto Recovery)                | 12V                      | 15   | 16.8 | V    |
|                                   |   | 24V                      | 30   | 33   | V    |
|                                   |   | 48V                      | 60   | 66   | V    |
|                                   |   | AL / BL                  | 24.5 | 25.5 | V    |
| Output short circuit              |   | Fold forward             |      |      |      |
| Degree of protection              |   | IP20                     |      |      |      |

### APPROVALS AND STANDARDS

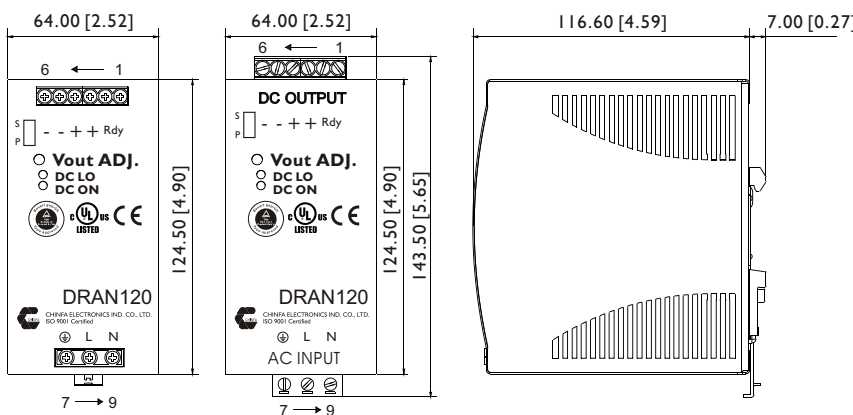
|                      |  |
|----------------------|--|
| UL / cUL             | UL 508 Listed<br>UL 60950-1, UL 1310 Class 2 Power (24AL/BL models only) Recognized<br>ISA 12.12.01(Class I, Division 2, Groups A, B, C and D)   |
| TUV                  | EN 60950-1<br>EN 61558-1, EN 61558-2-16 (meet EN 60204-1)  |
| CE                   | EN 61000-6-3, EN 55032 Class B, EN 61000-3-2 Class D, 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 |
| CCC                  | 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                 | 124.5 x 64 x 123.6 mm (4.9 x 2.52 x 4.87 inches)  |
|               | Detachable connector type           | 143.5 x 64 x 123.6 mm (5.65 x 2.52 x 4.87 inches) |
| Case material | Metal                               |   |
| Weight        | 920g                                |   |
| Packing       | 1.02kg ; 20 pcs / 21.5kg / 2.01CUFT |   |

### 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
  - Screw terminal:
    - 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
- Detachable connector:
  - AWG24-12 (0.2~2.5mm<sup>2</sup>) flexible / solid cable,
  - Input connector can withstand torque at maximum 4.5 pound-inches.
  - Output connector can withstand torque at maximum 7 pound-inches.
  - 4~5 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] |

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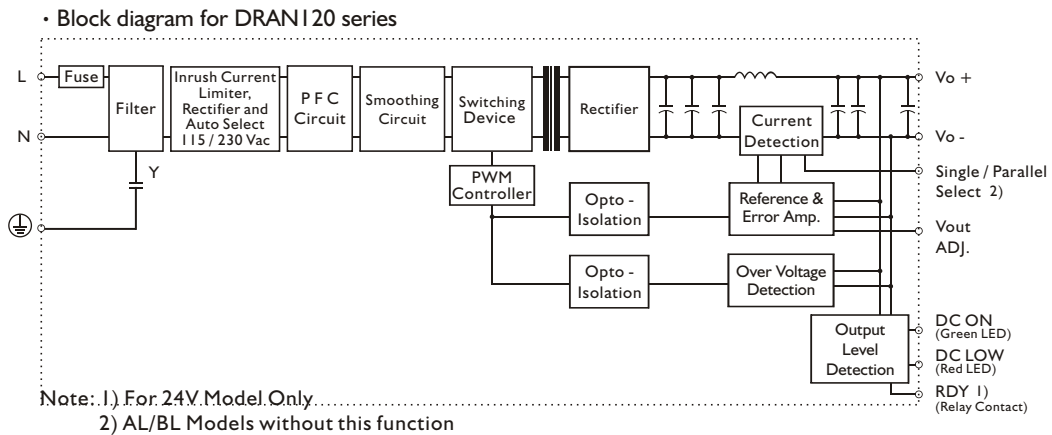
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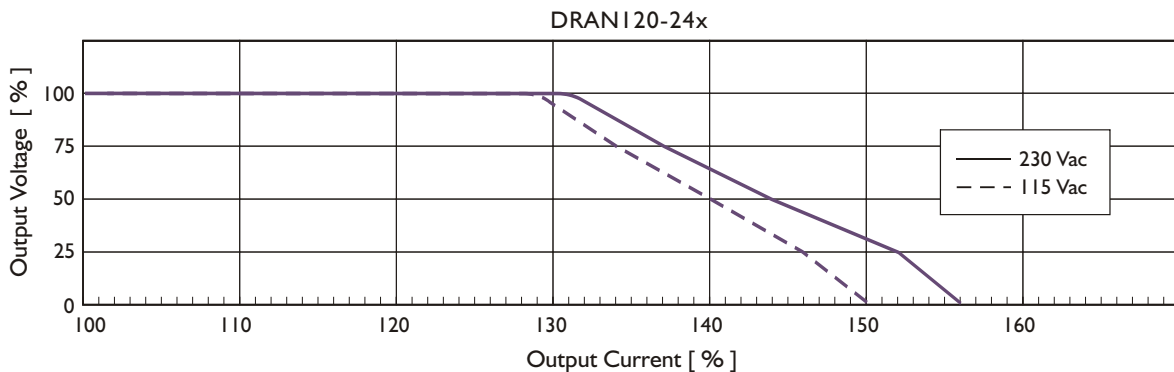
## PIN ASSIGNMENT

| PIN NO. | Designation | Description  |
|---------|-------------|--|
| 1       | OUT         | RDY  |
| 2       |             | A normal open relay contact for DC ON level control (Never connect except 24V model) |
| 3, 4    |             | V +  |
| 5, 6    |             | V -  |
| 7       | IN          | ⊕  |
| 8       |             | L  |
| 9       |             | N  |
|         | OTHER       | DC ON  |
|         |             | DC LO  |
|         |             | Vout ADJ.  |
|         |             | S / P  |

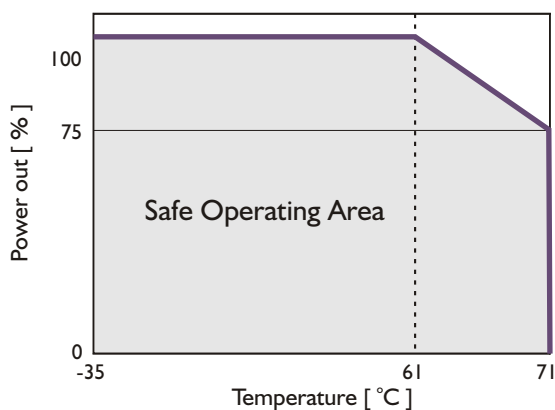
## CIRCUIT SCHEMATIC



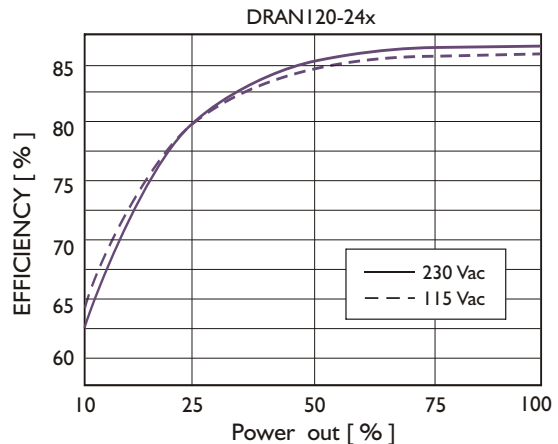
## TYP. CURRENT LIMITED CURVE



## DERATING CURVE



## TYP. EFFICIENCY CURVE



For pricing or any further information, please contact Omni Instruments Ltd.

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