



Advanced Test Equipment Rentals

www.atecorp.com 800-404-ATEC (2832)

# TS Series IV

5 kW to 45 kW Programmable DC Power Supply



LXI CE



**MAGNA-POWER  
ELECTRONICS**

www.magna-power.com

### Innovative and Scalable

Magna-Power Electronics TS Series combines the best of DC power processing with microprocessor embedded control. A combination of high and medium frequency power processing technologies improves response, shrinks package size, and reduces cost. TS Series power supplies are current-fed and are more tolerant to abusive loads than conventional switching power supplies. This technology allows the power supply to operate under short-circuit conditions, open-circuit conditions, and everything in between.

TS Series power supplies offer both master/slave parallel and series operation. This enables two or more power supplies to be placed in parallel for increased output current or in series for increased output voltage. With master/slave operation, power supplies operate at near equal voltage and current. The process of master/slaving power supplies is plug & play with the use of Magna-Power Electronics UID46 Option, which can be added at any time.

TS Series power supplies can operate as a voltage source or current source depending on the control settings and load conditions. If the power supply is operating as a voltage source and the load increases to a point beyond the current command setting, the power supply automatically crosses over to current mode control and operates as a current source at that setting.

### Attention to Power Quality

The TS Series power supplies contain circuitry to work harmoniously with other power equipment. Step-start contactors are used to keep inrush current below full scale operating current. Filter components lower current harmonic content emanating from the power supply and increase power factor to levels beyond 90%. Every power supply is tested at 90% to 125% nominal line to insure satisfactory operation even under the worst line voltage conditions.

### Designed for Safety

The TS Series power supplies have extensive diagnostic functions -- all of which, when activated, take command to shut down the system. Diagnostic functions include phase loss, excessive thermal conditions, over voltage trip, over current trip, fuse clearing, and program line. Program line monitors externally applied analog set point signals to insure they are within the specified range. Upon a diagnostic fault condition, main power is disconnected and the diagnostic condition is latched into memory. Pressing the clear key clears the memory. All diagnostic functions can be monitored through a rear connector. Furthermore, control functions can also

### KEY FEATURES:

- **Highest power density in market:**  
Up to 45 kW in a 9U package
- **Wide voltage and current range:**  
0-5 Vdc to 0-4000 Vdc and 0-1.2 Adc to 0-2700 Adc
- **Wide range of input voltages as standard:**  
From 208 Vac to 480 Vac at 50 Hz through 400 Hz
- **High Accuracy Programming and Monitoring**
- **37-pin optically isolated user I/O circuitry standard:**  
No additional isolation circuitry necessary
- **High efficiency operation:**  
Up to 88% efficiency under full load
- **RS232 interface standard with SCPI Commands:**  
GPIB, USB, Ethernet, RS485 interfaces optional
- **Optional LXI-certified ethernet communications:**  
Embedded web-server
- **OVT and OCT shutdown standard:**  
Mechanical contactors disconnect input mains
- **Certified LabWindows/CVI, LabView, and IVI Drivers**
- **Programmable Output Modulation:**  
With D panel, emulates user-defined power profiles
- **Automatic Voltage/Current Crossover**
- **Front Panel Calibration**

be set through the rear connector to allow simultaneous control of one or more TS Series units.

TS Series supplies have three levels of over voltage/current protection: shutdown of controlling insulated gate bipolar transistors (IGBT's), disconnect of main power, and input fuses. After an over voltage/current trip condition, the supply must be reset.



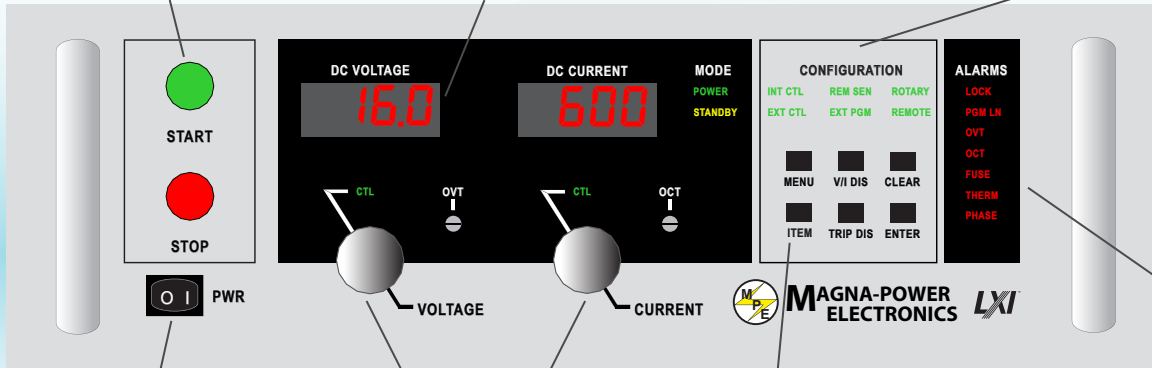
# TS Series IV

## Enhanced Front Panel Control

### A Version Front Panel

Switches main power on and off

Meters display voltage, current, over voltage protection, over current protection



Energizes control circuits without turning the main power on

Sets voltage and current in rotary mode

**FUNCTION KEYS**  
 MENU: Select function  
 V/I DIS: Displays V/I set points  
 CLEAR: Clear setting or reset fault

ITEM: Select item within function  
 TRIP DIS: Displays OVT and OCT setting  
 ENTER: Enter Setting

#### MODE AND CONFIGURATION

POWER: Indicates power output  
 STANDBY: Indicates control power only  
 INT CTL: Front panel controls enabled  
 EXT CTL: External controls enabled  
 REM SEN: Indicates remote sense  
 EXT PGM: External voltage/current control  
 ROTARY: Potentiometer voltage/current control  
 REMOTE: RS232 control enabled

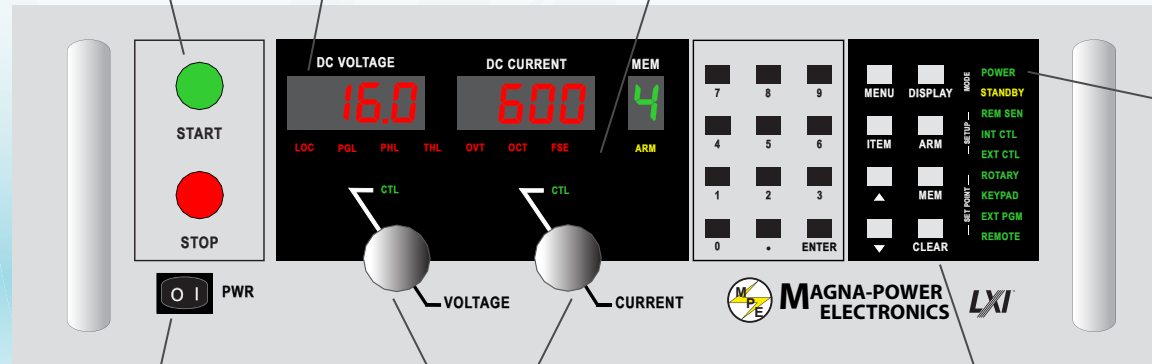
#### ALARMS

LOCK: Interlock  
 PGM LINE: External input beyond limits  
 OVT: Shows over voltage protection has tripped  
 OCT: Show over current protection has tripped  
 FUSE: Warns that a fuse has cleared  
 THERM: Indicates overheating  
 PHASE: Indicates a problem with the input voltage

### D Version Front Panel

Switches main power on and off

Meters display voltage, current, over voltage protection, over current protection



Energizes control circuits without turning the main power on

Sets voltage and current in rotary mode

**ALARMS**  
 LOCK: Interlock  
 PGM LINE: External input beyond limits  
 OVT: Shows over voltage protection has tripped

OCT: Show over current protection has tripped  
 FUSE: Warns that a fuse has cleared  
 THERM: Indicates overheating  
 PHASE: Indicates a problem with the input voltage

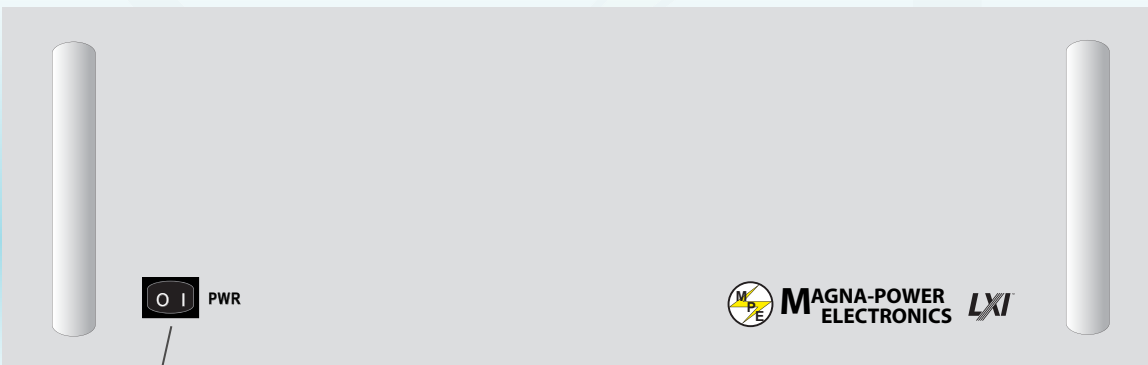
#### MODE AND CONFIGURATION

POWER: Indicates power output  
 STANDBY: Indicates control power only  
 INT CTL: Front panel controls enabled  
 EXT CTL: External controls enabled  
 REM SEN: Indicates remote sense  
 EXT PGM: External voltage/current control  
 ROTARY: Potentiometer voltage/current control  
 REMOTE: RS232 control enabled

**FUNCTION KEYS**  
 MENU: Select function  
 DISPLAY: Displays V/I set points  
 ITEM: Select item within function  
 ARM: arms power supply for auto sequencing through states stored in memory

ENTER: Enter Setting  
 CLEAR: Clear setting or reset fault  
 MEM: Sets memory  
 ▲ : Up  
 ▼ : Down

### C Version Front Panel



Energizes control circuits without turning the main power on

# TS Series IV

## Models and Ratings



| 5 kW Models |               |                            |                             |        |                                  |           |           |
|-------------|---------------|----------------------------|-----------------------------|--------|----------------------------------|-----------|-----------|
| Model       | Voltage (Vdc) | Current (A <sub>dc</sub> ) | Ripple (mV <sub>rms</sub> ) | Eff. % | Input Current (A <sub>ac</sub> ) |           |           |
|             |               |                            |                             |        | 208/240 V                        | 380/415 V | 440/480 V |
| TSA5-900    | 0-5           | 0-900                      | 50                          | 86     | 19                               | 10        | 9         |
| TSA8-600    | 0-8           | 0-600                      | 40                          | 86     | 19                               | 10        | 9         |
| TSA10-500   | 0-10          | 0-500                      | 40                          | 86     | 19                               | 10        | 9         |
| TSA16-300   | 0-16          | 0-300                      | 35                          | 86     | 19                               | 10        | 9         |
| TSA20-250   | 0-20          | 0-250                      | 40                          | 86     | 19                               | 10        | 9         |
| TSA32-150   | 0-32          | 0-150                      | 40                          | 86     | 19                               | 10        | 9         |
| TSA40-125   | 0-40          | 0-125                      | 40                          | 87     | 19                               | 10        | 9         |
| TSA50-100   | 0-50          | 0-100                      | 50                          | 87     | 19                               | 10        | 9         |
| TSA80-62    | 0-80          | 0-62                       | 60                          | 87     | 19                               | 10        | 9         |
| TSA100-50   | 0-100         | 0-50                       | 60                          | 87     | 19                               | 10        | 9         |
| TSA125-40   | 0-125         | 0-40                       | 100                         | 87     | 19                               | 10        | 9         |
| TSA160-31   | 0-160         | 0-31                       | 120                         | 87     | 19                               | 10        | 9         |
| TSA200-25   | 0-200         | 0-25                       | 125                         | 87     | 19                               | 10        | 9         |
| TSA250-20   | 0-250         | 0-20                       | 130                         | 88     | 19                               | 10        | 9         |
| TSA375-13   | 0-375         | 0-13                       | 170                         | 88     | 19                               | 10        | 9         |
| TSA400-12   | 0-400         | 0-12                       | 200                         | 88     | 19                               | 10        | 9         |
| TSA500-10   | 0-500         | 0-10                       | 220                         | 88     | 19                               | 10        | 9         |
| TSA600-8    | 0-600         | 0-8                        | 250                         | 88     | 19                               | 10        | 9         |
| TSA800-6    | 0-800         | 0-6                        | 300                         | 88     | 19                               | 10        | 9         |
| TSA1000-5   | 0-1000        | 0-5                        | 350                         | 88     | 19                               | 10        | 9         |
| TSA1500-3.3 | 0-1500        | 0-3.3                      | 400                         | 88     | 19                               | 10        | 9         |
| TSA2000-2.5 | 0-2000        | 0-2.5                      | 450                         | 88     | 19                               | 10        | 9         |
| TSA3000-1.6 | 0-3000        | 0-1.6                      | 500                         | 88     | 19                               | 10        | 9         |
| TSA4000-1.2 | 0-4000        | 0-1.2                      | 550                         | 88     | 19                               | 10        | 9         |

Note: Single phase input current: 44 Aac for 208/240 Vac input (5 kW models only)

| 10 kW Models |               |                            |                             |        |                                  |           |           |
|--------------|---------------|----------------------------|-----------------------------|--------|----------------------------------|-----------|-----------|
| Model        | Voltage (Vdc) | Current (A <sub>dc</sub> ) | Ripple (mV <sub>rms</sub> ) | Eff. % | Input Current (A <sub>ac</sub> ) |           |           |
|              |               |                            |                             |        | 208/240 V                        | 380/415 V | 440/480 V |
| TSA10-900    | 0-10          | 0-900                      | 40                          | 86     | 36                               | 21        | 18        |
| TSA16-600    | 0-16          | 0-600                      | 35                          | 86     | 36                               | 21        | 18        |
| TSA20-500    | 0-20          | 0-500                      | 40                          | 86     | 36                               | 21        | 18        |
| TSA32-300    | 0-32          | 0-300                      | 40                          | 86     | 36                               | 21        | 18        |
| TSA40-250    | 0-40          | 0-250                      | 40                          | 87     | 36                               | 21        | 18        |
| TSA50-200    | 0-50          | 0-200                      | 50                          | 87     | 36                               | 21        | 18        |
| TSA80-125    | 0-80          | 0-125                      | 60                          | 87     | 36                               | 21        | 18        |
| TSA100-100   | 0-100         | 0-100                      | 60                          | 87     | 35                               | 20        | 17        |
| TSA125-80    | 0-125         | 0-80                       | 100                         | 87     | 35                               | 20        | 17        |
| TSA160-62    | 0-160         | 0-62                       | 120                         | 87     | 35                               | 20        | 17        |
| TSA200-50    | 0-200         | 0-50                       | 125                         | 87     | 35                               | 20        | 17        |
| TSA250-40    | 0-250         | 0-40                       | 130                         | 88     | 35                               | 20        | 17        |
| TSA375-27    | 0-375         | 0-27                       | 170                         | 88     | 35                               | 20        | 17        |
| TSA400-24    | 0-400         | 0-24                       | 200                         | 88     | 35                               | 20        | 17        |
| TSA500-20    | 0-500         | 0-20                       | 220                         | 88     | 35                               | 20        | 17        |
| TSA600-16    | 0-600         | 0-16                       | 250                         | 88     | 35                               | 20        | 17        |
| TSA800-12    | 0-800         | 0-12                       | 300                         | 88     | 35                               | 20        | 17        |
| TSA1000-10   | 0-1000        | 0-10                       | 350                         | 88     | 35                               | 20        | 17        |
| TSA1500-6.6  | 0-1500        | 0-6.6                      | 400                         | 88     | 35                               | 20        | 17        |
| TSA2000-5.0  | 0-2000        | 0-5.0                      | 450                         | 88     | 35                               | 20        | 17        |
| TSA3000-3.2  | 0-3000        | 0-3.2                      | 500                         | 88     | 35                               | 20        | 17        |
| TSA4000-2.4  | 0-4000        | 0-2.4                      | 550                         | 88     | 35                               | 20        | 17        |

Note: Single phase input current: 88 Aac for 208/240 Vac input (10 kW models only)

| 15 kW Models |               |                            |                             |        |                                  |           |           |
|--------------|---------------|----------------------------|-----------------------------|--------|----------------------------------|-----------|-----------|
| Model        | Voltage (Vdc) | Current (A <sub>dc</sub> ) | Ripple (mV <sub>rms</sub> ) | Eff. % | Input Current (A <sub>ac</sub> ) |           |           |
|              |               |                            |                             |        | 208/240 V                        | 380/415 V | 440/480 V |
| TSA16-900    | 0-16          | 0-900                      | 35                          | 86     | 54                               | 30        | 27        |
| TSA20-750    | 0-20          | 0-750                      | 40                          | 86     | 54                               | 30        | 27        |
| TSA32-450    | 0-32          | 0-450                      | 40                          | 86     | 54                               | 30        | 27        |
| TSA40-375    | 0-40          | 0-375                      | 40                          | 87     | 54                               | 30        | 27        |
| TSA50-300    | 0-50          | 0-300                      | 50                          | 87     | 54                               | 30        | 27        |
| TSA80-186    | 0-80          | 0-186                      | 60                          | 87     | 54                               | 30        | 27        |
| TSA100-150   | 0-100         | 0-150                      | 60                          | 87     | 53                               | 29        | 26        |
| TSA125-120   | 0-125         | 0-120                      | 100                         | 87     | 53                               | 29        | 26        |
| TSA160-93    | 0-160         | 0-93                       | 120                         | 87     | 53                               | 29        | 26        |
| TSA200-75    | 0-200         | 0-75                       | 125                         | 87     | 53                               | 29        | 26        |
| TSA250-60    | 0-250         | 0-60                       | 130                         | 88     | 53                               | 29        | 26        |
| TSA375-39    | 0-375         | 0-39                       | 170                         | 88     | 53                               | 29        | 26        |
| TSA400-36    | 0-400         | 0-36                       | 200                         | 88     | 53                               | 29        | 26        |
| TSA500-30    | 0-500         | 0-30                       | 220                         | 88     | 53                               | 29        | 26        |
| TSA600-24    | 0-600         | 0-24                       | 250                         | 88     | 53                               | 29        | 26        |
| TSA800-18    | 0-800         | 0-18                       | 300                         | 88     | 53                               | 29        | 26        |
| TSA1000-15   | 0-1000        | 0-15                       | 350                         | 88     | 53                               | 29        | 26        |
| TSA1500-9.9  | 0-1500        | 0-9.9                      | 400                         | 88     | 53                               | 29        | 26        |
| TSA2000-7.5  | 0-2000        | 0-7.5                      | 450                         | 88     | 53                               | 29        | 26        |
| TSA3000-4.8  | 0-3000        | 0-4.8                      | 500                         | 88     | 53                               | 29        | 26        |
| TSA4000-3.6  | 0-4000        | 0-3.6                      | 550                         | 88     | 53                               | 29        | 26        |

Note: Single phase input current: 132 Aac for 208/240 Vac input (15 kW models only)

| 20 kW Models |               |                            |                             |        |                                  |           |           |
|--------------|---------------|----------------------------|-----------------------------|--------|----------------------------------|-----------|-----------|
| Model        | Voltage (Vdc) | Current (A <sub>dc</sub> ) | Ripple (mV <sub>rms</sub> ) | Eff. % | Input Current (A <sub>ac</sub> ) |           |           |
|              |               |                            |                             |        | 208/240 V                        | 380/415 V | 440/480 V |
| TSA16-1200   | 0-16          | 0-1200                     | 35                          | 86     | 72                               | 40        | 36        |
| TSA20-1000   | 0-20          | 0-1000                     | 40                          | 86     | 72                               | 40        | 36        |
| TSA32-600    | 0-32          | 0-600                      | 40                          | 86     | 72                               | 40        | 36        |
| TSA40-500    | 0-40          | 0-500                      | 40                          | 87     | 72                               | 40        | 36        |
| TSA50-400    | 0-50          | 0-400                      | 50                          | 87     | 72                               | 40        | 36        |
| TSA80-248    | 0-80          | 0-248                      | 60                          | 87     | 72                               | 40        | 36        |
| TSA100-200   | 0-100         | 0-200                      | 60                          | 87     | 71                               | 39        | 35        |
| TSA125-160   | 0-125         | 0-160                      | 100                         | 87     | 71                               | 39        | 35        |
| TSA160-124   | 0-160         | 0-124                      | 120                         | 87     | 71                               | 39        | 35        |
| TSA200-100   | 0-200         | 0-100                      | 125                         | 87     | 71                               | 39        | 35        |
| TSA250-80    | 0-250         | 0-80                       | 130                         | 88     | 71                               | 39        | 35        |
| TSA375-52    | 0-375         | 0-52                       | 170                         | 88     | 71                               | 39        | 35        |
| TSA400-48    | 0-400         | 0-48                       | 200                         | 88     | 71                               | 39        | 35        |
| TSA500-40    | 0-500         | 0-40                       | 220                         | 88     | 71                               | 39        | 35        |
| TSA600-32    | 0-600         | 0-32                       | 250                         | 88     | 71                               | 39        | 35        |
| TSA800-24    | 0-800         | 0-24                       | 300                         | 88     | 71                               | 39        | 35        |
| TSA1000-20   | 0-1000        | 0-20                       | 350                         | 88     | 71                               | 39        | 35        |
| TSA1500-13.2 | 0-1500        | 0-13.2                     | 400                         | 88     | 71                               | 39        | 35        |
| TSA2000-10.0 | 0-2000        | 0-10.0                     | 450                         | 88     | 71                               | 39        | 35        |
| TSA3000-6.4  | 0-3000        | 0-6.4                      | 500                         | 88     | 71                               | 39        | 35        |
| TSA4000-4.8  | 0-4000        | 0-4.8                      | 550                         | 88     | 71                               | 39        | 35        |

### Did you know?

Magna-Power Electronics power supplies:

- Are all designed, manufactured, and supported in the USA
- Can all be configured for master/slave parallel and series operation
- Come standard with I/O isolation
- Have an added power-processing stage for superior performance

# TS Series IV

## Models and Ratings (Continued)



### 25 kW Models

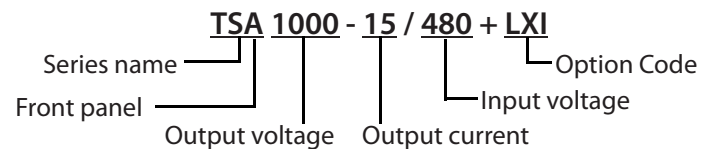
| Model        | Voltage (Vdc) | Current (Aac) | Ripple (mVrms) | Eff. % | Input Current (Aac) |           |           |
|--------------|---------------|---------------|----------------|--------|---------------------|-----------|-----------|
|              |               |               |                |        | 208/240 V           | 380/415 V | 440/480 V |
| TSA16-1500   | 0-16          | 0-1500        | 35             | 86     | 90                  | 50        | 45        |
| TSA20-1250   | 0-20          | 0-1250        | 40             | 86     | 90                  | 50        | 45        |
| TSA32-750    | 0-32          | 0-750         | 40             | 86     | 90                  | 50        | 45        |
| TSA40-625    | 0-40          | 0-625         | 40             | 87     | 90                  | 50        | 45        |
| TSA50-500    | 0-50          | 0-500         | 50             | 87     | 90                  | 50        | 45        |
| TSA80-310    | 0-80          | 0-310         | 60             | 87     | 90                  | 50        | 45        |
| TSA100-250   | 0-100         | 0-250         | 60             | 87     | 89                  | 49        | 44        |
| TSA125-200   | 0-125         | 0-200         | 100            | 87     | 89                  | 49        | 44        |
| TSA160-155   | 0-160         | 0-155         | 120            | 87     | 89                  | 49        | 44        |
| TSA200-125   | 0-200         | 0-125         | 125            | 87     | 89                  | 49        | 44        |
| TSA250-100   | 0-250         | 0-100         | 130            | 88     | 89                  | 49        | 44        |
| TSA375-65    | 0-375         | 0-65          | 170            | 88     | 89                  | 49        | 44        |
| TSA400-60    | 0-400         | 0-60          | 200            | 88     | 89                  | 49        | 44        |
| TSA500-50    | 0-500         | 0-50          | 220            | 88     | 89                  | 49        | 44        |
| TSA600-40    | 0-600         | 0-40          | 250            | 88     | 89                  | 49        | 44        |
| TSA800-30    | 0-800         | 0-30          | 300            | 88     | 89                  | 49        | 44        |
| TSA1000-25   | 0-1000        | 0-25          | 350            | 88     | 89                  | 49        | 44        |
| TSA1500-16.5 | 0-1500        | 0-16.5        | 400            | 88     | 89                  | 49        | 44        |
| TSA2000-12.5 | 0-2000        | 0-12.5        | 450            | 88     | 89                  | 49        | 44        |
| TSA3000-8.0  | 0-3000        | 0-8.0         | 500            | 88     | 89                  | 49        | 44        |
| TSA4000-6.0  | 0-4000        | 0-6.0         | 550            | 88     | 89                  | 49        | 44        |

### 45 kW Models

| Model        | Voltage (Vdc) | Current (Aac) | Ripple (mVrms) | Eff. % | Input Current (Aac) |           |           |
|--------------|---------------|---------------|----------------|--------|---------------------|-----------|-----------|
|              |               |               |                |        | 208/240 V           | 380/415 V | 440/480 V |
| TSA16-2700   | 0-16          | 0-2700        | 35             | 86     | 162                 | 90        | 81        |
| TSA20-2250   | 0-20          | 0-2250        | 40             | 86     | 162                 | 90        | 81        |
| TSA32-1350   | 0-32          | 0-1350        | 40             | 86     | 162                 | 90        | 81        |
| TSA40-1125   | 0-40          | 0-1125        | 40             | 87     | 162                 | 90        | 81        |
| TSA50-900    | 0-50          | 0-900         | 50             | 87     | 162                 | 90        | 81        |
| TSA80-558    | 0-80          | 0-558         | 60             | 87     | 162                 | 90        | 81        |
| TSA100-450   | 0-100         | 0-450         | 60             | 87     | 159                 | 87        | 78        |
| TSA125-360   | 0-125         | 0-360         | 100            | 87     | 159                 | 87        | 78        |
| TSA160-279   | 0-160         | 0-279         | 120            | 87     | 159                 | 87        | 78        |
| TSA200-225   | 0-200         | 0-225         | 125            | 87     | 159                 | 87        | 78        |
| TSA250-180   | 0-250         | 0-180         | 130            | 88     | 159                 | 87        | 78        |
| TSA375-117   | 0-375         | 0-117         | 170            | 88     | 159                 | 87        | 78        |
| TSA400-108   | 0-400         | 0-108         | 200            | 88     | 159                 | 87        | 78        |
| TSA500-90    | 0-500         | 0-90          | 220            | 88     | 159                 | 87        | 78        |
| TSA600-72    | 0-600         | 0-72          | 250            | 88     | 159                 | 87        | 78        |
| TSA800-54    | 0-800         | 0-54          | 300            | 88     | 159                 | 87        | 78        |
| TSA1000-45   | 0-1000        | 0-45          | 350            | 88     | 159                 | 87        | 78        |
| TSA1500-27.7 | 0-1500        | 0-27.7        | 400            | 88     | 159                 | 87        | 78        |
| TSA2000-22.5 | 0-2000        | 0-22.5        | 450            | 88     | 159                 | 87        | 78        |
| TSA3000-14.4 | 0-3000        | 0-14.4        | 500            | 88     | 159                 | 87        | 78        |
| TSA4000-10.8 | 0-4000        | 0-10.8        | 550            | 88     | 159                 | 87        | 78        |

### 30 kW Models

| Model        | Voltage (Vdc) | Current (Aac) | Ripple (mVrms) | Eff. % | Input Current (Aac) |           |           |
|--------------|---------------|---------------|----------------|--------|---------------------|-----------|-----------|
|              |               |               |                |        | 208/240 V           | 380/415 V | 440/480 V |
| TSA16-1800   | 0-16          | 0-1800        | 35             | 86     | 108                 | 60        | 54        |
| TSA20-1500   | 0-20          | 0-1500        | 40             | 86     | 108                 | 60        | 54        |
| TSA32-900    | 0-32          | 0-900         | 40             | 86     | 108                 | 60        | 54        |
| TSA40-750    | 0-40          | 0-750         | 40             | 87     | 108                 | 60        | 54        |
| TSA50-600    | 0-50          | 0-600         | 50             | 87     | 108                 | 60        | 54        |
| TSA80-372    | 0-80          | 0-372         | 60             | 87     | 108                 | 60        | 54        |
| TSA100-300   | 0-100         | 0-300         | 60             | 87     | 106                 | 58        | 52        |
| TSA125-240   | 0-125         | 0-240         | 100            | 87     | 106                 | 58        | 52        |
| TSA160-186   | 0-160         | 0-186         | 120            | 87     | 106                 | 58        | 52        |
| TSA200-150   | 0-200         | 0-150         | 125            | 87     | 106                 | 58        | 52        |
| TSA250-120   | 0-250         | 0-120         | 130            | 88     | 106                 | 58        | 52        |
| TSA375-78    | 0-375         | 0-78          | 170            | 88     | 106                 | 58        | 52        |
| TSA400-72    | 0-400         | 0-72          | 200            | 88     | 106                 | 58        | 52        |
| TSA500-60    | 0-500         | 0-60          | 220            | 88     | 106                 | 58        | 52        |
| TSA600-48    | 0-600         | 0-48          | 250            | 88     | 106                 | 58        | 52        |
| TSA800-36    | 0-800         | 0-36          | 300            | 88     | 106                 | 58        | 52        |
| TSA1000-30   | 0-1000        | 0-30          | 350            | 88     | 106                 | 58        | 52        |
| TSA1500-19.8 | 0-1500        | 0-19.8        | 400            | 88     | 106                 | 58        | 52        |
| TSA2000-15.0 | 0-2000        | 0-15.0        | 450            | 88     | 106                 | 58        | 52        |
| TSA3000-9.6  | 0-3000        | 0-9.6         | 500            | 88     | 106                 | 58        | 52        |
| TSA4000-7.2  | 0-4000        | 0-7.2         | 550            | 88     | 106                 | 58        | 52        |



### Model Ordering System

| Series Name | Front Panel | Output Voltage | Output Current | Input Voltage | Option Code(s)      |
|-------------|-------------|----------------|----------------|---------------|---------------------|
| XR          | A: Analog   | See Tables     | See Tables     | 208 SP        | +LXI                |
| TS          | D: Digital  |                |                | 240 SP        | +CAB1, +CAB2, +CAB3 |
| MS          | C: Computer |                |                | 208           | +GPIB               |
| MT          | Blank: XR   |                |                | 240           | +USB                |
|             |             |                |                | 380           | +RS485              |
|             |             |                |                | 415           | +WC                 |
|             |             | 440            | +HS            |               |                     |
|             |             | 480            | +UID46         |               |                     |
|             |             |                | +EMI           |               |                     |
|             |             |                | SP             |               |                     |

### Low Voltage, High Current Models

| Model      | Voltage (Vdc) | Current (Aac) | Ripple (mVrms) | Eff. % | Size | Input Current (Aac) |           |           |
|------------|---------------|---------------|----------------|--------|------|---------------------|-----------|-----------|
|            |               |               |                |        |      | 208/240 V           | 380/415 V | 440/480 V |
| TSA5-1800  | 0-5           | 0-1800        | 50             | 86     | 6U   | 38                  | 22        | 18        |
| TSA8-1200  | 0-8           | 0-1200        | 40             | 86     | 6U   | 38                  | 22        | 18        |
| TSA10-1000 | 0-10          | 0-1000        | 40             | 86     | 6U   | 38                  | 22        | 18        |
| TSA5-2700  | 0-5           | 0-2700        | 50             | 86     | 9U   | 57                  | 33        | 27        |
| TSA10-1800 | 0-10          | 0-1800        | 40             | 86     | 6U   | 72                  | 42        | 36        |
| TSA10-2700 | 0-10          | 0-2700        | 40             | 86     | 9U   | 108                 | 63        | 48        |

### Options

| Title                                    | Option Code         |
|--|---------------------|
| LXI TCP/IP Ethernet Interface (Internal) | +LXI                |
| Cabinet and Integration                  | +CAB1, +CAB2, +CAB3 |
| IEEE 488.2 GPIB Interface (Internal)     | +GPIB               |
| USB Edgeport Interface (External)        | +USB                |
| RS-485DSS Interface (External)           | +RS485              |
| High Isolation Output                    | +ISO                |
| Water Cooling                            | +WC                 |
| High Slew Rate Output                    | +HS                 |
| UID46: Universal Interface Device        | +UID46              |
| 208/240 Vac single-phase input (5 kW)    | SP                  |

# TS Series IV

## Specifications



| Input  |  |
|--|--|
| <b>Nominal Voltage</b><br>3 phase, 3 wire + ground | 208 VAC 3 $\phi$ (operating range 187 - 229 VAC)<br>240 VAC 3 $\phi$ (operating range 216 - 264 VAC)<br>380 VAC 3 $\phi$ (operating range 342 - 418 VAC)<br>415 VAC 3 $\phi$ (operating range 373 - 456 VAC)<br>440 VAC 3 $\phi$ (operating range 396 - 484 VAC)<br>480 VAC 3 $\phi$ (operating range 432 - 528 VAC) |
| <b>1 phase, 2 wire + ground</b>                    | 208 VAC 1 $\phi$ (operating range 187 - 229 VAC)<br>240 VAC 1 $\phi$ (operating range 216 - 264 VAC)   |
| <b>Frequency</b>                                   | 50 Hz - 400 Hz (operating range 45 Hz - 440 Hz)  |
| <b>Power Factor</b>                                | > 92% at maximum power for 3 $\phi$ models<br>> 70% at maximum power for 1 $\phi$ models   |

| Physical   |              |  |            |                     |
|------------|--------------|--|------------|---------------------|
| Power (kW) | Input Phases | Size (H" x W" x D")                        | Rack Units | Weight              |
| 5 kW       | 3 $\phi$     | 5.25 x 19 x 24 in (13.3 x 48.3 x 61.0 cm)  | 3U         | 74 lbs (33.60 kg)   |
| 10 kW      | 3 $\phi$     | 5.25 x 19 x 24 in (13.3 x 48.3 x 61.0 cm)  | 3U         | 94 lbs (42.64 kg)   |
| 15 kW      | 3 $\phi$     | 5.25 x 19 x 24 in (13.3 x 48.3 x 61.0 cm)  | 3U         | 114 lbs (51.71 kg)  |
| 20 kW      | 3 $\phi$     | 10.25 x 19 x 24 in (26.0 x 48.3 x 61.0 cm) | 6U         | 197 lbs (89.36 kg)  |
| 25 kW      | 3 $\phi$     | 10.25 x 19 x 24 in (26.0 x 48.3 x 61.0 cm) | 6U         | 217 lbs (98.43 kg)  |
| 30 kW      | 3 $\phi$     | 10.25 x 19 x 24 in (26.0 x 48.3 x 61.0 cm) | 6U         | 237 lbs (107.50 kg) |
| 45 kW      | 3 $\phi$     | 15.75 x 19 x 24 in (40.0 x 48.3 x 61.0 cm) | 9U         | 349 lbs (158.30 kg) |
| 5 kW       | 1 $\phi$     | 5.25 x 19 x 24 in (13.3 x 48.3 x 61.0 cm)  | 3U         | 75 lbs (34.02 kg)   |
| 10 kW      | 1 $\phi$     | 10.25 x 19 x 24 in (26.0 x 48.3 x 61.0 cm) | 6U         | 150 lbs (68.04 kg)  |
| 15 kW      | 1 $\phi$     | 15.75 x 19 x 24 in (40.0 x 48.3 x 61.0 cm) | 9U         | 225 lbs (102.1 kg)  |

| Control Limits                                   |  |
|--|--|
| <b>Remote Sense Limits</b>                       | 3% maximum voltage drop from output to load<br>(Remote sense only available on models $\leq$ 1000 Vdc) |
| <b>Period Programming Limits</b>                 | Minimum period: 10 msec<br>Maximum Period: 9997 sec or 2.77 hours                                      |
| <b>Digital control inputs and outputs limits</b> | Input voltage: 0 to 5 V<br>Output voltage: 0 to 5 V, 5 mA drive capacity                               |

| Programming Levels and Accuracy of Full Scale |                   |                   |               |               |
|---|-------------------|-------------------|---------------|---------------|
|   | Voltage Set Point | Current Set Point | OVT Set Point | OCT Set Point |
| <b>Remote Analog Programming Accuracy</b>     | $\pm 0.075\%$     | $\pm 0.075\%$     | $\pm 0.075\%$ | $\pm 0.075\%$ |
| <b>Digital Programming Accuracy</b>           | $\pm 0.075\%$     | $\pm 0.075\%$     | $\pm 0.075\%$ | $\pm 0.075\%$ |
| <b>Remote Analog Programming Levels</b>       | 0 - 10.0 V        | 0 - 10.0 V        | 0 - 10.0 V    | 0 - 10.0 V    |

| Monitoring Levels and Accuracy of Full Scale |                |                |
|--|----------------|----------------|
|  | Output Voltage | Output Current |
| <b>Remote Analog Monitoring Accuracy</b>     | $\pm 0.2\%$    | $\pm 0.2\%$    |
| <b>Digital Monitoring Accuracy</b>           | $\pm 0.2\%$    | $\pm 0.2\%$    |
| <b>Remote Analog Monitoring Levels</b>       | 0 - 10.0 V     | 0 - 10.0 V     |

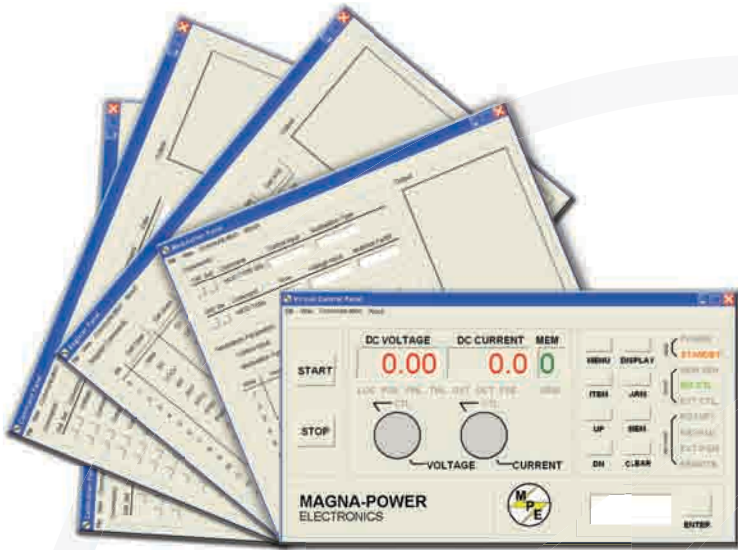
| Output                          |  |
|---------------------------------|--|
| <b>Ripple</b>                   | See Model Charts   |
| <b>Line Regulation</b>          | Voltage Mode: $\pm 0.004\%$ of full scale<br>Current Mode: $\pm 0.02\%$ of full scale  |
| <b>Load Regulation</b>          | Voltage Mode: $\pm 0.01\%$ of full scale<br>Current Mode: $\pm 0.04\%$ of full scale   |
| <b>Load Transient Response</b>  | 2 ms to recover within $\pm 1\%$ of regulated output, with a 50% to 100% or 100% to 50% step load change   |
| <b>Efficiency</b>               | $\geq 86\%$ (See Model Charts)   |
| <b>Stability</b>                | $\pm 0.10\%$ for 8 hrs. after 30 min. warmup   |
| <b>Isolation</b>                | User inputs and outputs: referenced to earth ground.<br><br>Maximum input voltage to ground: $\pm 2500$ VAC.<br><br>Maximum output voltage to ground:<br>$\pm 1000$ Vdc for models less than or equal to 1000 Vdc,<br>$\pm (2000 \text{ Vdc} + V_o/2)$ for models greater than 1000 Vdc or with High Isolation Option where $V_o$ is the power supply's max. output voltage. |
| <b>Maximum Slew Rate</b>        | Standard Models:<br>100 ms for output voltage change from 0 to 63%,<br>100 ms for output current change from 0 to 63%.<br><br>With High Slew Rate Option:<br>4 ms for output voltage change from 0 to 63%,<br>8 ms for output current change from 0 to 63%.  |
| <b>Bandwith</b>                 | Standard Models:<br>3 Hz with remote analog voltage programming,<br>2 Hz with remote analog current programming.<br><br>With High Slew Rate Option:<br>60 Hz with remote analog voltage programming,<br>45 Hz with remote analog current programming.  |
| <b>Analog Output Impedances</b> | Voltage output monitoring: 100 ohm,<br>Current output monitoring: 100 ohm,<br>+10V Ref: 1 ohm.   |

| Environmental                   |  |
|---------------------------------|--|
| <b>Operating Temperature</b>    | 0 °C to 50 °C  |
| <b>Storage Temperature</b>      | -25 °C to 85 °C  |
| <b>Ambient Temperature</b>      | 0 to 50 °C   |
| <b>Temperature Coefficient</b>  | 0.04 % / °C of maximum output voltage,<br>0.06 % / °C of maximum output current.   |
| <b>Air Cooling</b>              | Side air inlet, rear exhaust   |
| <b>Water Cooling (Optional)</b> | 25°C maximum inlet temperature<br>1.5 GPM minimum flow rate for 15 kW units,<br>3.0 GPM minimum flow rate for 20 to 30 kW units<br>4.5 GPM minimum flow rate for 45 kW units<br>80 PSI maximum pressure<br>1/4" NPT female pipe size for 15 kW units,<br>1/2" NPT female pipe size for 20 kW to 45 kW. |

Note: Specifications are subject to change without notice. For three-phase configurations, specifications are line-to-line. Unless otherwise noted, input voltages and currents are specified for three-phase configurations.

# TS Series IV

## Reliable Control Technology



### Remote Interface Software

The Remote Interface Software ships with all TS Series power supplies. The software provides the user with an easy and intuitive method to operate a Magna-Power Electronics' power supply with computer control. The Remote Interface Software has six windows:

- Virtual Control Panel
- Command Panel
- Register Panel
- Calibration Panel
- Firmware Panel
- Modulation Panel

The Virtual Control Panel emulates the TS Series front panel, the Command panel programs and reads SCPI commands with user friendly buttons, the Register Panel programs and reads registers, the Calibration Panel enables calibration of the digital potentiometers, the Firmware Panel enables the program stored internal to the power supply to be upgraded, and the Modulation Panel eases programming of modulation parameters.

### Power Source Emulation

Output modulation enables Magna-Power Electronics' power supplies to emulate a variety of user-defined power sources, such as *Fuel Cells*, *Photovoltaic Arrays*, *Batteries*, etc. The power supplies follow an I-V curve programmed either through Magna-Power's Remote Interface Software (modulation panel), LabVIEW with certified NI LabVIEW drivers, or through other programming means using SCPI commands.

### Isolated External I/O for Automation

Using the rear 37-pin I/O connector, the TS Series power supplies can be completely controlled and monitored using external signals. The voltage, current, over voltage trip, and over current trip set points are set by applying a 0-10 Vdc analog signals. Each diagnostic condition is given a designated pin, which reads 5 Vdc when high. Also, the power supply features an external interlock, which when enabled, allows the power supply to be tied in with other emergency stop equipment. All these pins are isolated to earth-ground as standard--no additional isolation circuitry necessary.

### LXI-Compliant Embedded Ethernet

LXI is an instrumentation platform based on industry standard Ethernet technology designed to provide modularity, flexibility and performance to small- and medium-sized systems. LXI's advantages are exemplified in its compact, flexible package providing high-speed I/O and reliable measurements. These features meet the needs of R&D and manufacturing engineers delivering electronics for the aerospace/defense, automotive, industrial, and medical markets.



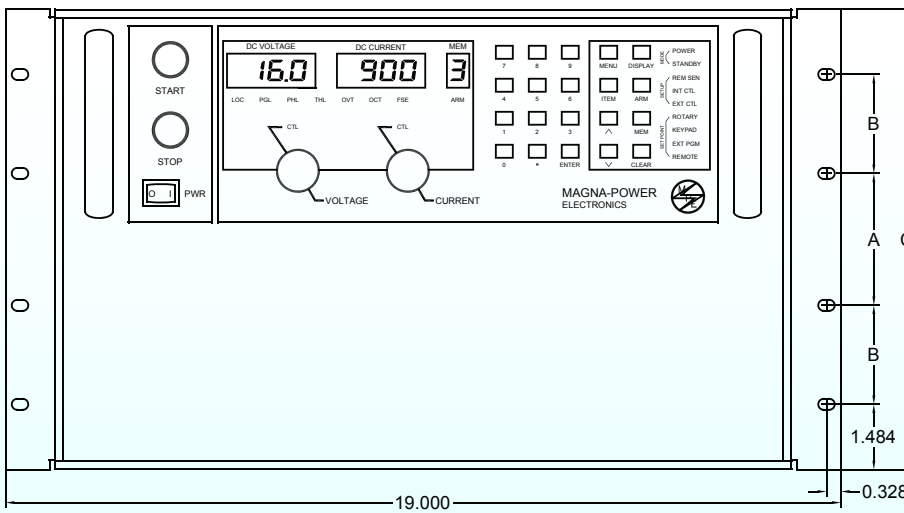
Certified to the LXI Standard (Class C), the TS Series Ethernet option includes an embedded web-server, allowing web browser power supply control and monitoring from virtually anywhere.



# TS Series IV

## Size Diagrams - Air-cooled Models

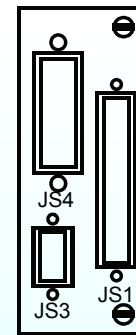
### Front Panel



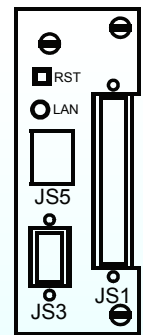
### Dimensions (Inches) 3φ Units

| POWER | A                 | B                 | C                  |
|-------|-------------------|-------------------|--------------------|
| 5 kW  | 2.250 (5.715 cm)  | N/A               | 5.219 (13.26 cm)   |
| 10 kW | 2.250 (5.715 cm)  | N/A               | 5.219 (13.26 cm)   |
| 15 kW | 2.250 (5.715 cm)  | N/A               | 5.219 (13.26 cm)   |
| 20 kW | 3.000 (7.620 cm)  | 2.250 (5.715 cm)  | 10.469 (26.591 cm) |
| 25 kW | 3.000 (7.620 cm)  | 2.250 (5.715 cm)  | 10.469 (26.591 cm) |
| 30 kW | 3.000 (7.620 cm)  | 2.250 (5.715 cm)  | 10.469 (26.591 cm) |
| 45 kW | 4.750 (12.065 cm) | 4.000 (10.160 cm) | 15.719 (39.926 cm) |

### Interfaces

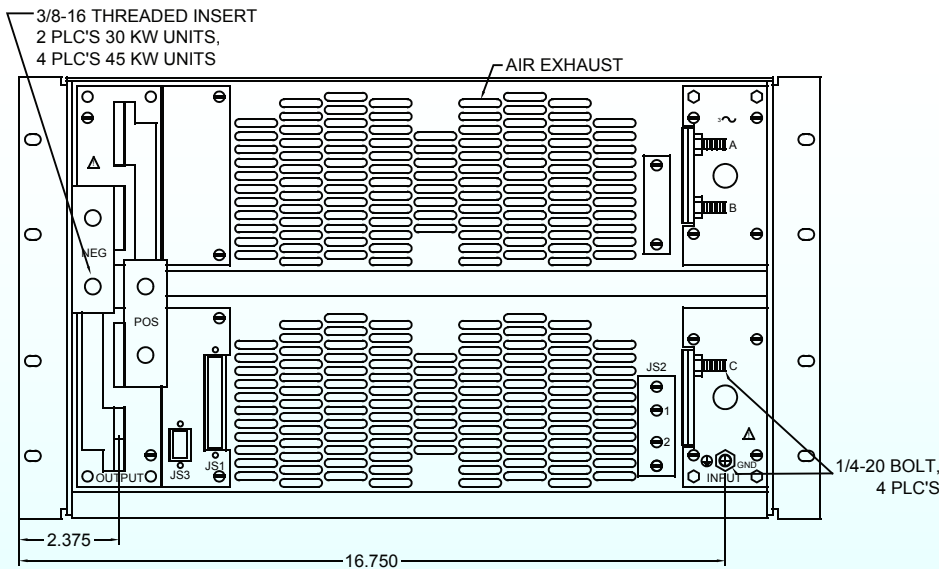


OPTIONAL IEEE-488 INTERFACE



OPTIONAL ETHERNET INTERFACE

### Rear Panel



### Connector JS1

| TERM | PARAMETER     | TERM | PARAMETER     |
|------|---------------|------|---------------|
| 1    | REF GND       | 20   | REF GND       |
| 2    | REF GND       | 21   | +10V REF      |
| 3    | VREF EXT      | 22   | IREF EXT      |
| 4    | TVREF EXT     | 23   | TIREF EXT     |
| 5    | VO2           | 24   | IO2           |
| 6    | +2.5V REF CAL | 25   | VMOD          |
| 7    | GND           | 26   | +5V           |
| 8    | POWER         | 27   | PGM LINE      |
| 9    | THERMAL       | 28   | STANDBY       |
| 10   | INTERLOCK     | 29   | PHASE LOSS    |
| 11   | CUR CTL       | 30   | VOLT CTL      |
| 12   | STANDBY/ALM   | 31   | RESERVE       |
| 13   | ALM           | 32   | OCT           |
| 14   | EXT CTL       | 33   | INT CTL       |
| 15   | FUSE          | 34   | OVT           |
| 16   | RESERVE       | 35   | RESERVE       |
| 17   | START         | 36   | ARM           |
| 18   | CLEAR         | 37   | INTERLOCK SET |
| 19   | STOP          |      |               |

### Connector JS2

| TERM | PARAMETER |
|------|-----------|
| 1    | VO1REM-   |
| 2    | VO1REM+   |

### Connector JS3

| TERM | PARAMETER |
|------|-----------|
| 1    | NC        |
| 2    | RX        |
| 3    | TX        |
| 4    | DTR       |
| 5    | GND       |
| 6    | DSR       |
| 7    | RTS       |
| 8    | CTS       |
| 9    | NC        |

### Side Panel

