



Operating Manual for ATS-1000 Automatic Transfer Switch:

MC80003 – Hardwire 120 V-1000-2000,-4000,-6000,-8000 (15,20,30,40 A)

MC80004 – Plugs & Receptacles 120 V-1000-200x,-400x,-600x (15,20,30 A)

MC80005 – IEC 230 V-1000-3904,-5904 (15,20 A)

MC80006 – Plugs & Receptacles 208 V-1000-380x, -580x, -780x (15,20,30 A)

220, 240 V-1000-300x, -500x, -700x (15,20,30A)

MC80007 – Hardwire 208 V-1000-3800,-5800,-7800,-9800 (15,20,30,40 A)

220, 240 V-1000-3000, -5000, -7000, -9000 (15,20,30,40 A)

MC80008 – Hardwire 230 V-1000-3900, -5900, -7900, -9900 (15,20,30,40 A)

MC80003,4,5,6,7,8

Rev. 6, May, 2018

IMPORTANT SAFETY INSTRUCTIONS:

SAVE THESE INSTRUCTIONS – This manual contains important instructions for the ATS-1000 Series that should be followed during installation and maintenance.

Table of Contents	Page
1. GENERAL	5
1.1 Product Application	5
1.2 Safety Alerts	6
1.3 General ATS Series Description	7
1.4 Overall Dimensions.....	7
1.5 Construction.....	8
1.6 Rear Access	8
1.7 Component Locations	8
2. MAJOR COMPONENT/CIRCUIT DESCRIPTIONS	11
2.1 ATS Series System Architecture	11
2.2 ATS Circuit Boards	11
2.3 Input Primary/Backup Circuit Breakers.....	15
2.4 Audible Alarm Switch	15
3. INSTALLATION	16
3.1 Site Selection & Preparation.....	16
3.2 Required Tools.....	16
3.3 Unpacking & Inspection	16
3.4 Voltage Selection.....	17
3.5 Installing the ATS.....	17
3.6 AC Connections (Hardwire Versions).....	17
4. POWERING UP THE ATS SERIES	19
4.1 Start-Up & Functional (Electrical) Test Procedure.....	19
4.2 Testing w/Actual Load Equipment (Computer).....	20
4.3 Remote Status / Alarm Monitoring	20

4.4	Remote Enable Function.....	21
5.	REPAIRS, SERVICE & SPARE PARTS	21
5.1	ATS Series Field Repair (Recommended Replacement Parts)	21
5.2	Returning Defective Circuit Board(s) for Repair	22
5.3	Inventory Recommendations	22
6.	REFERENCE	23
6.1	Specifications.....	23
6.2	Product Configurations.....	29
6.3	TSi Power Contact Information.....	31

COPYRIGHT

Copyright © 2018 TSi Power Corporation. All rights reserved.

The information contained in this Document is the property of TSi Power Corporation and contains confidential and proprietary information owned by TSi Power Corporation. Any duplication or disclosure without the written approval of TSi Power Corporation is prohibited.

TRADEMARK

TSi Power, TSi, the TSi Logo and ATS-1000-15/20/30/40A are trademarks of TSi Power Corporation.

LIMITED WARRANTY

TSi Power Corporation warrants this product to be free from defects in materials and workmanship for two (2) years from the date of purchase from TSi or its authorized representatives. TSi will repair (or at its option, replace) any defective component(s) during this warranty period.

To make a request or claim for service under this limited warranty, the original purchaser must return the product, in the original shipping container or equivalent, to TSi or its authorized agent, accompanied by a written receipt showing the date of purchase and both the model name and serial number of the product.

Warranty does not cover transportation costs. Damage by misuse, accident or unauthorized tampering of the product is not covered by the warranty. NO OTHER WARRANTIES ARE EXPRESSED OR IMPLIED. TSI IS NOT LIABLE FOR CONSEQUENTIAL DAMAGES. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATE TO STATE.

LIMITATION OF LIABILITY

IN NO EVENT SHALL TSI POWER CORPORATION BE LIABLE FOR ANY DAMAGES WHATSOEVER (INCLUDING WITHOUT LIMITATION, DAMAGES FOR LOSS OF BUSINESS PROFITS, BUSINESS INTERRUPTION, LOSS OF BUSINESS INFORMATION, OR OTHER PECUNIARY LOSS) ARISING OUT OF THE USE OR INABILITY TO USE THIS PRODUCT, EVEN IF TSI OR ITS AGENT HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. SOME STATES DO NOT ALLOW THE LIMITATION OR EXCLUSION OF LIABILITY FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE EXCLUSIONS MAY NOT APPLY TO YOU.

REVISION

<u>NUMBER</u>	<u>DATE</u>	<u>REASON FOR REVISION</u>
0	January, 2014	Initial release
1	December, 2014	Revised Section 4 – Powering Up The ATS Series
2	February, 2015	Revised Paragraphs 4.32 and 4.33
3	September, 2015	Revised Section 3
4.	November, 2015	Updated Model Lineup
5.	March, 2018	Updated MC80006 and MC80007 Models
6.	May, 2018	Updated Spec Tables in Section 6

1. GENERAL

1.1 PRODUCT APPLICATION

The ATS series of automatic transfer switches is designed for applications where two or more autonomous power sources are available. The ATS can be utilized as single or multiple units for different levels of redundancy. Applications include but are not limited to telecom, computers, data centers, industrial control, automatic test equipment, oil exploration and utilities.

The ATS works with asynchronous or out-of-phase power sources which allows them to be used with a number of different sources. Customers with special requirements can be offered custom programming to address special use situations. The ATS is fed by two AC power sources. When the primary power source detector circuit senses a loss of power on that circuit, it immediately switches the load over to the backup power source in under one cycle. Upon return of primary power, the ATS will switch back in under one cycle. This is fast enough to be invisible to even the most sensitive equipment.

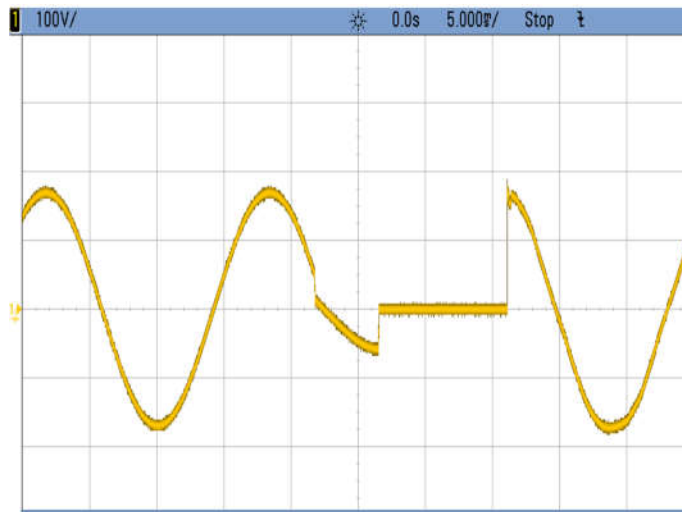


Figure 1: Typical transfer between primary and backup power



Figure 2: Front View of the Automatic Transfer Switch (ATS-1000-2000 Shown)

1.2 SAFETY ALERTS

SAFETY SIGNAL WORD DEFINITIONS

This document contains safety alert pictorial Symbols and Words that point out areas and procedures that require special attention with regards to safety. These Symbols and Words are defined in ANSI Z535.4-1998, Product Safety Signs and Labels.

DANGER:


DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING:

WARNING indicates a potentially hazardous situation which, if not avoided, will result in death or serious injury.

CAUTION:

CAUTION indicates an imminently hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

The safety alert pictorial symbol  appears in this document to make users aware of important operating and safety concerns.

NOTE: Specific models of the ATS Series may be ETL Listed to signify conformance with UL, CSA or CE requirements. For actual Listings see individual model specifications in Section 6.1. Users should install the ATS only where permitted and carefully follow the instructions in this manual.

WARNING:

The ATS Series receives power from two AC sources. To prevent any hazardous situations from occurring, always turn off both circuit breakers in the rear of the ATS unit (see Fig. 4), as well as the upstream circuit breakers protecting both AC input sources to the ATS unit before connecting or disconnecting the AC input and output wires to the input & output terminal blocks or connecting the plug cables from the rear of the ATS unit.

1.3 GENERAL ATS SERIES DESCRIPTION

- Accepts inputs from asynchronous sources and can be used with most supply voltages, including out-of-phase.
- Transfer time of under one cycle between sources is fast enough for even the most sensitive loads.
- Audible alarm with enable / disable switch provides for unattended security.
- LED status indicators for quick visual displays of fault conditions.
- Higher than 99% efficiency means substantial energy savings (when the ATS is used as a battery-less UPS).
- Remote monitoring is provided through a DB-9 port.
- Remote enable is provided through a DB-9 port.
- 70-90% reduction in both CAP-EX and OP-EX (when the ATS is used as a battery-less UPS).
- Built-in primary and backup rocker style circuit breakers are highly visible and easily accessible on rear of unit.
- The ATS allows redundant AC power to mission-critical equipment using any combination of UPS, backup generator or other available autonomous AC power sources.
- Sturdy steel enclosure can be rack, wall or floor mounted with optional mounting brackets.
- AC Inputs are galvanically isolated.
- RCD (Residual Current Device) compatible.

1.4 OVERALL DIMENSIONS

The ATS series enclosure dimensions are 16" (406mm) wide x 12" (305mm) deep x 3.25" (83mm) high – see Fig. 3.

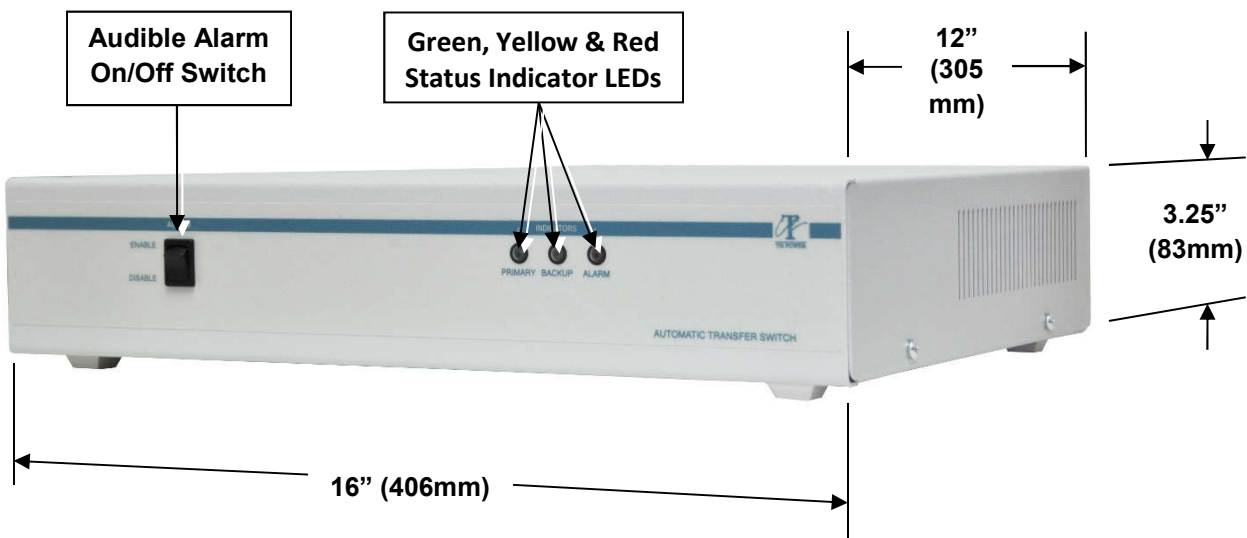


Figure 3: ATS Series Dimensions

1.5 CONSTRUCTION

The ATS series enclosure is constructed of 16 gauge (.062 in. thk.), galvaneal steel and finished with a cream colored polyester powder coating for long-lasting durability. The cover is easily removeable for servicing and optional brackets are available for various rack, wall or floor mounting configurations.

1.6 REAR ACCESS – See Figures, 4, 5 and 6

The DB-9 Connector, Primary and Backup circuit breakers and the Hardwire Termination compartments are accessed from the rear of the ATS Series enclosure.

1.6.1 TOP-DOWN VIEW OF COVER SHOWING MAIN IDENTIFICATION LABEL AND REAR COMPONENT LOCATIONS (for hardwire unit) – See Figure 4.

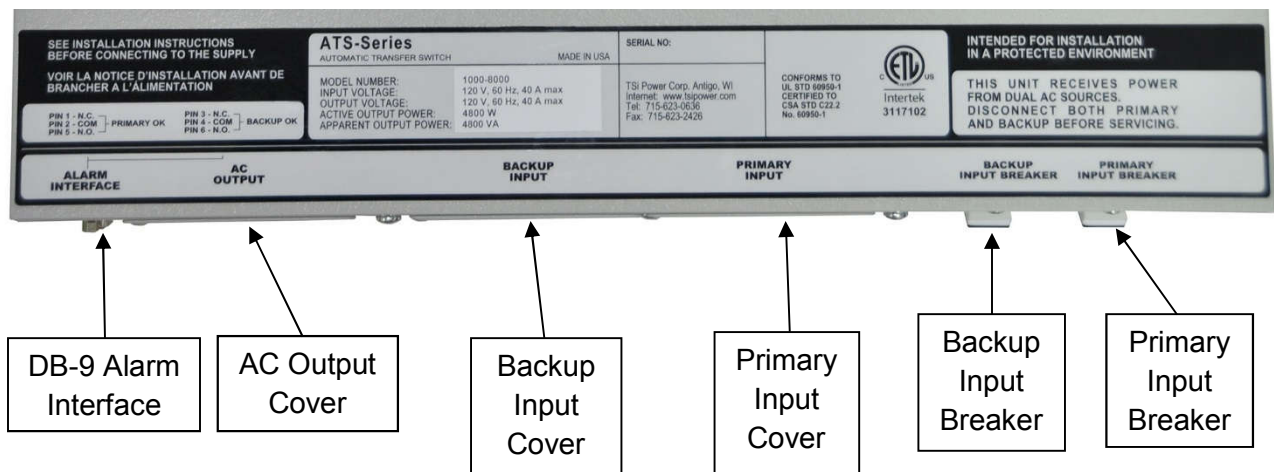


Figure 4: ATS-1000-8000 top-cover label showing rear compartments/components

1.7 COMPONENT LOCATIONS

1.7.1 TOP VIEW WITH COVER REMOVED - See Figures 5 and 6

Removing the top cover, exposes the main wiring and major components of the ATS Series. Before removing the top cover, make sure that both input circuit breakers are in the “OFF” position.

⚠ DANGER: If the unit has already been installed and prior to the removal of the top cover, make sure that both the **PRIMARY** and **BACKUP INPUT CONNECTORS** in the back of the unit have been disconnected (See Figures 5 and 6).

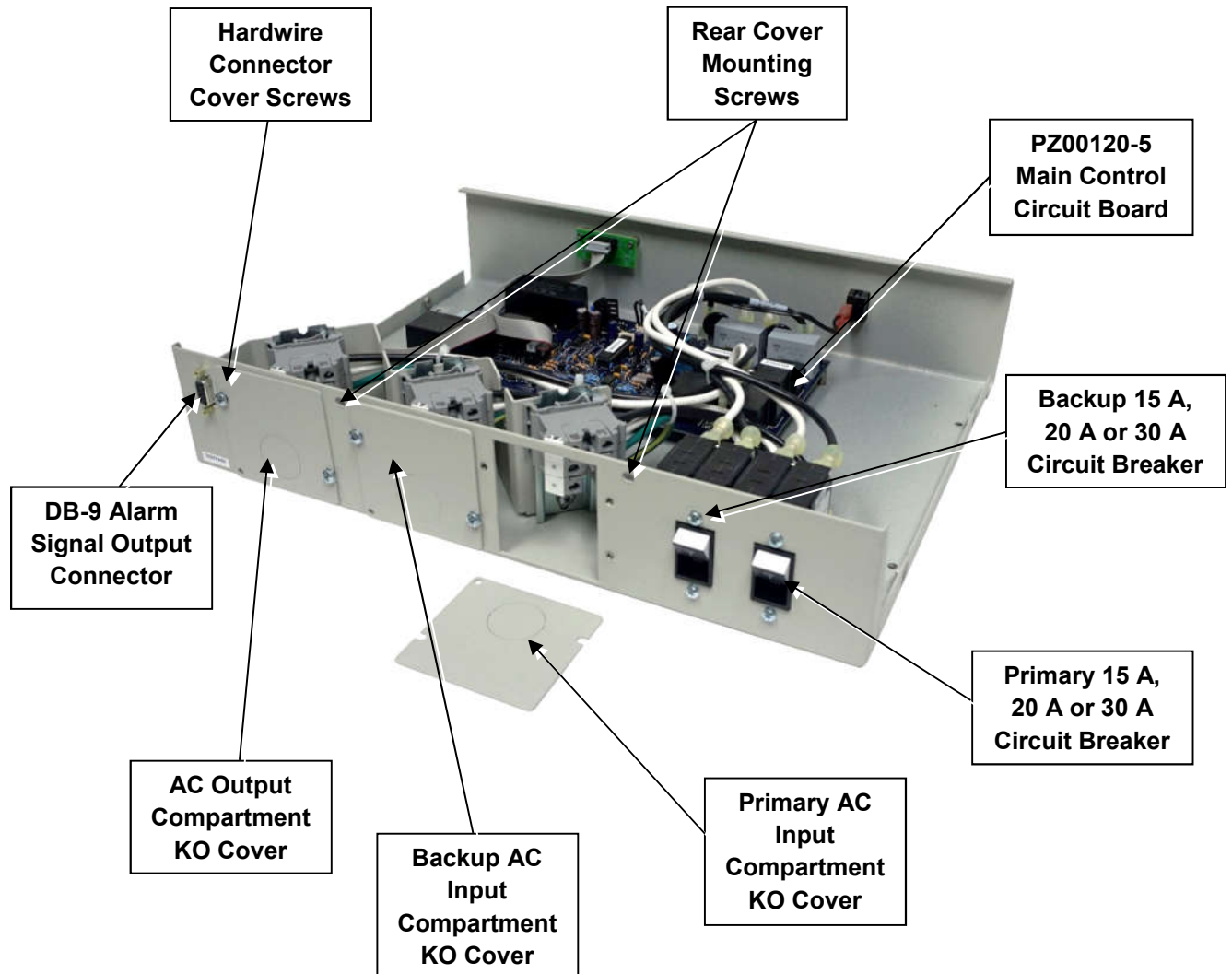


Figure 5: Rear view with top-cover removed showing Hardwired ATS-1000-15, 20 or 30 A models

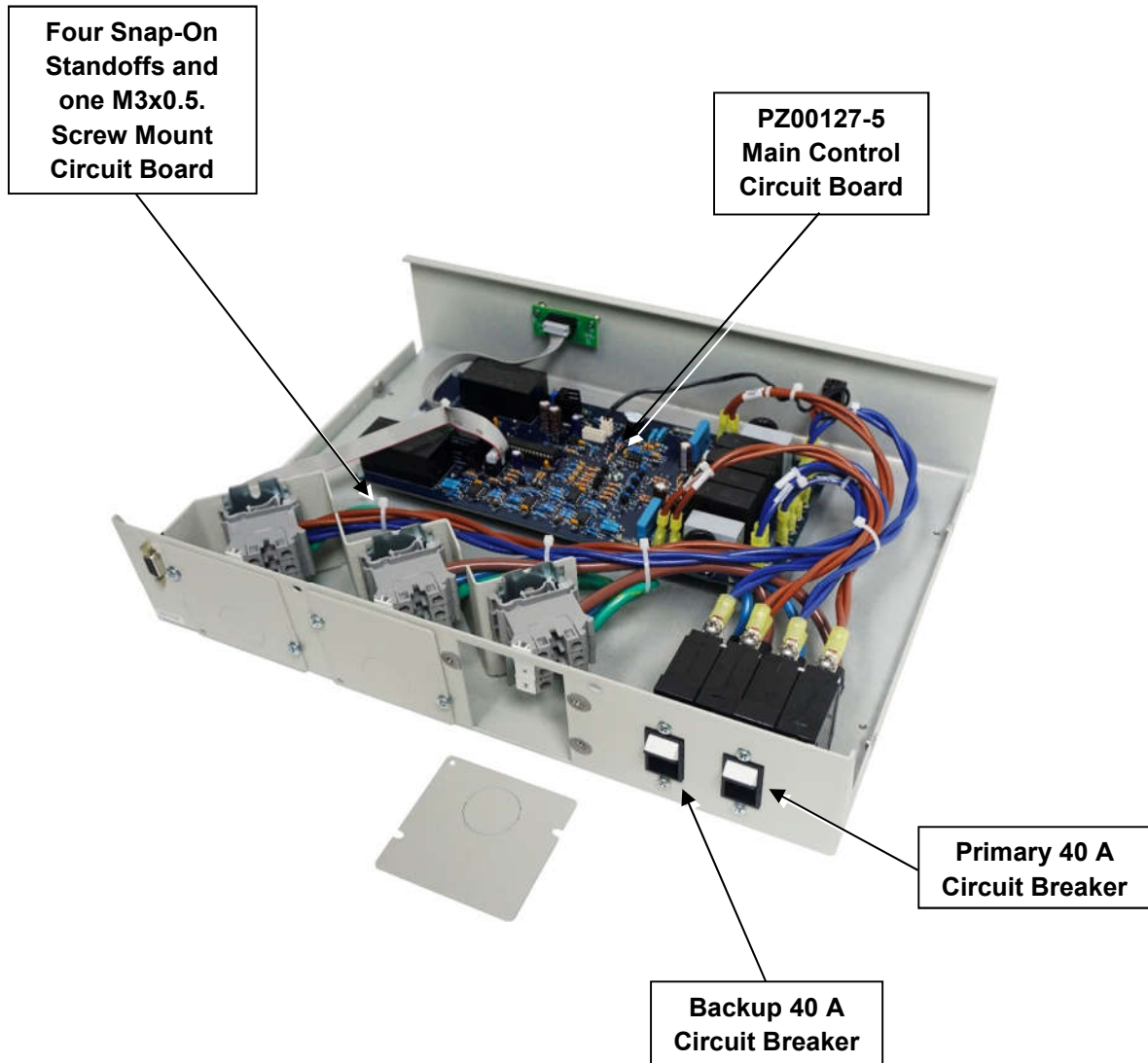


Figure 6: Rear view with top-cover removed showing Hardwired ATS-1000-models-40 A models

2. MAJOR COMPONENT/CIRCUIT DESCRIPTIONS

2.1 ATS SYSTEM ARCHITECTURE – See Figure 7.

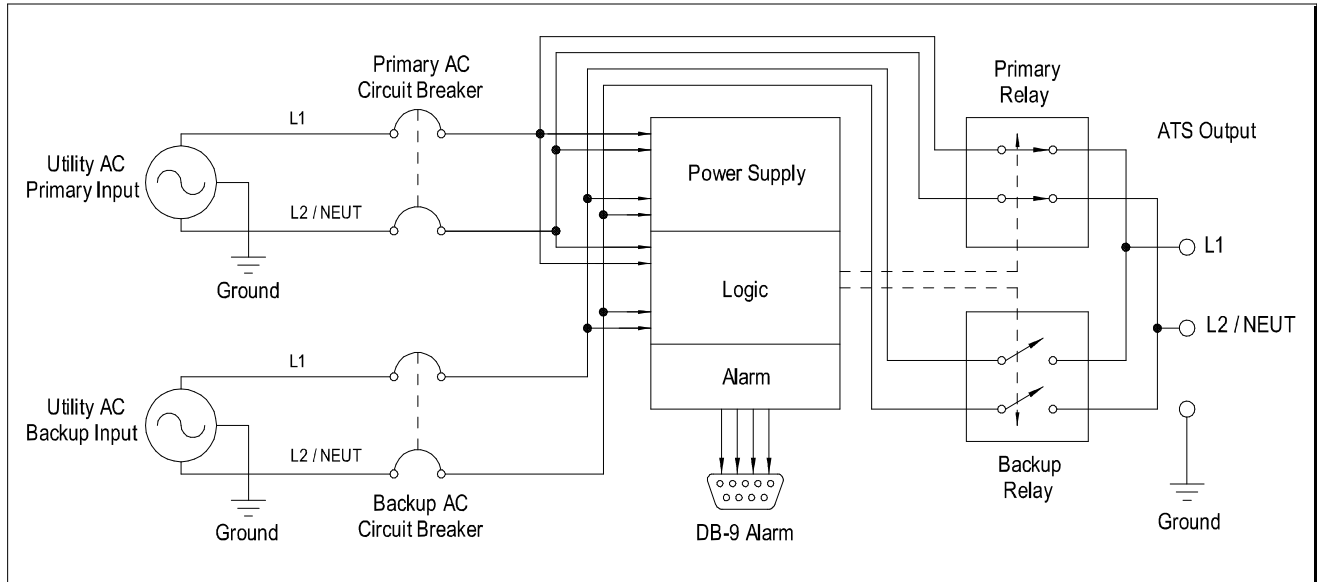


Figure 7: ATS-1000 System Architecture

2.2 ATS CIRCUIT BOARDS

2.2.1 Main Control Circuit Board Assemblies

Two main control circuit boards are used in the ATS Series. The PZ00120-5 is used in the 2000, 3000, 4000, 5000, 6000 and 7000 models, while the PZ00127-5 is used in the models 8000 and 9000. The circuit board assemblies are mounted to the chassis by means of four (4) snap-on standoffs and one M3x0.5 Screw, see Figures 5 and 8 or 6 and 9.

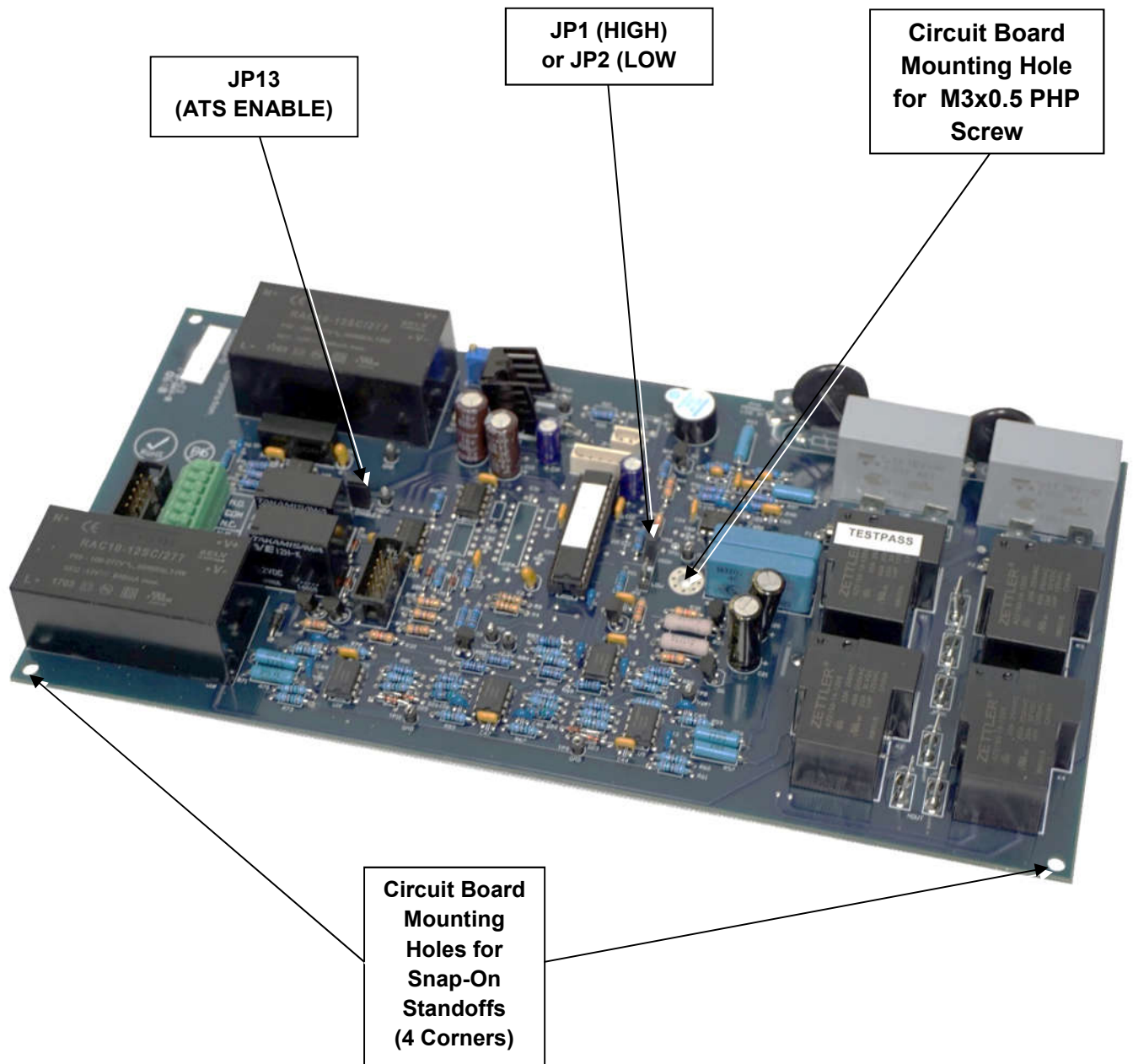


Figure 8: PZ00120-5 Main Control Circuit Board Assembly for ATS-1000-2xxx,-3xxx,-4xxx,-5xxx,-6xxx and -7xxx models

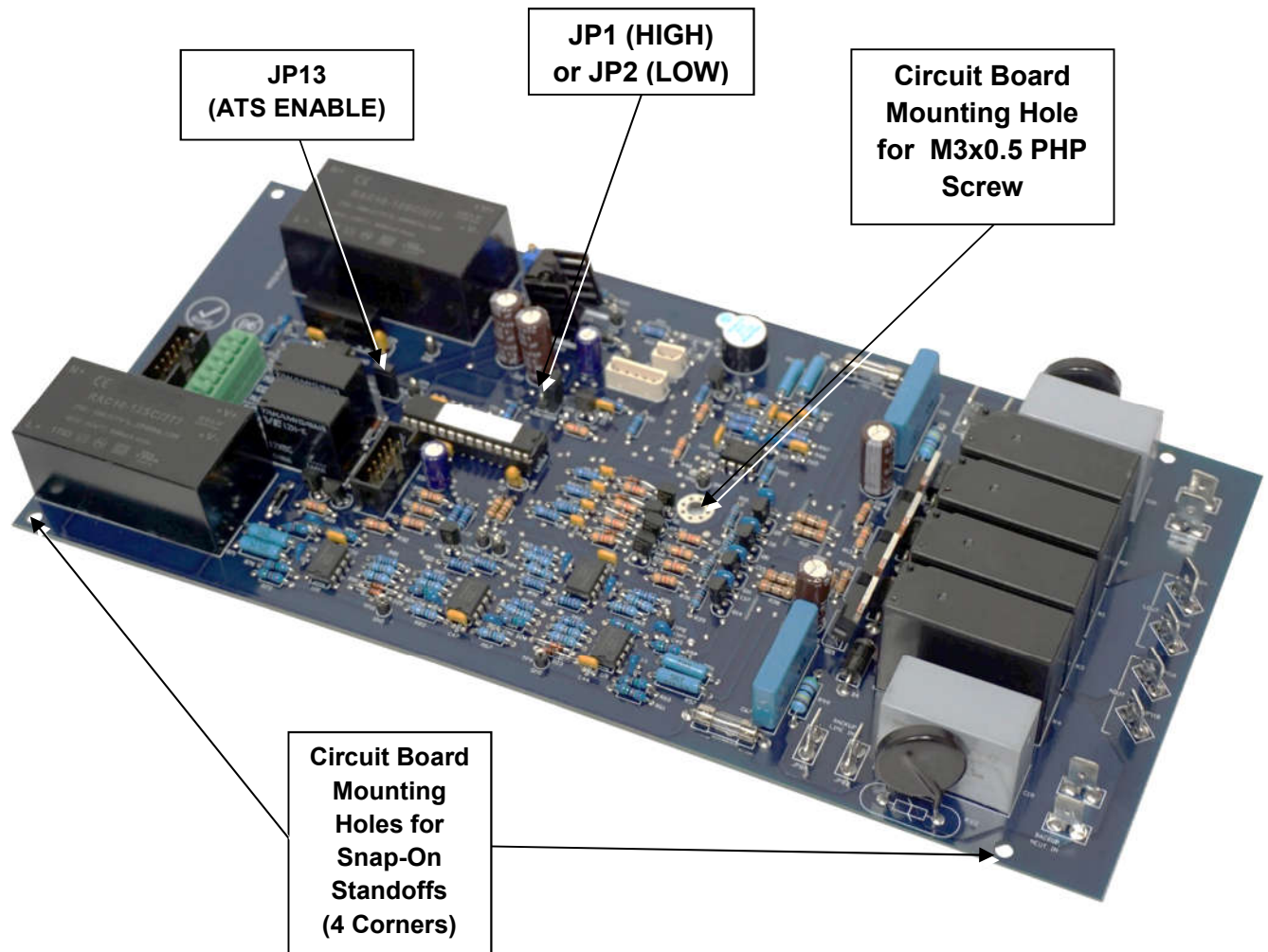


Figure 9: PZ00127-5 Main Control Circuit Board Assembly for ATS-1000-8xxx and -9xxx models

2.22 DISPLAY CIRCUIT BOARD ASSEMBLY

Three colored LEDs are located on the right side of the front panel of the ATS housing and attached by means of a ribbon cable and connector to the main control board. These LEDs, as shown in Figure 10 signify the following:

- Green “Primary” LED, ON, indicates Primary is driving the output.
- Yellow “Backup” LED, ON, indicates Backup is driving the output.
- Absence of either primary or backup AC source will be indicated by a flashing red “Alarm” LED indicator and audible buzzer (beeper) alarm.

Note: The audible alarm can be turned off by setting the Audible Alarm switch, located on the front panel, to the “OFF” position, see Figure 3.

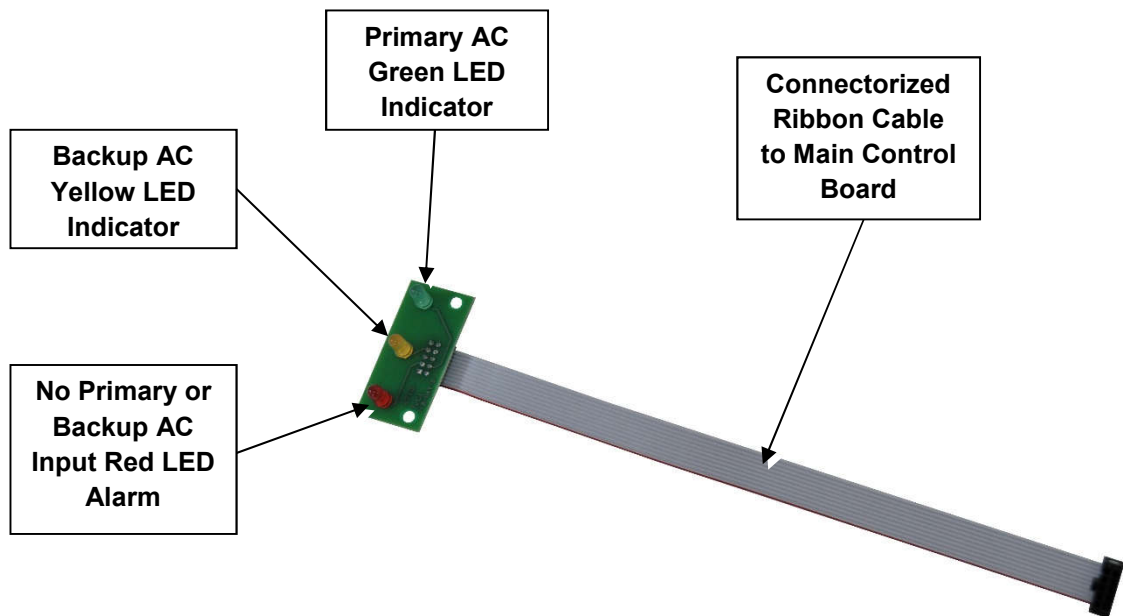


Figure 10: ATS Series Display Board Assembly

2.23 DB-9 ALARM PORT ASSEMBLY-See Figure 11

Signals can be transmitted by means of the DB-9 connector in the rear of the ATS unit that provide for remote monitoring of alarms and the remote enable function. See Figures 5 and 11. Pin assignments are outlined in section 4.3 and 4.45.



Figure 11: DB-9 Alarm Port Assembly

2.3 PRIMARY/BACKUP INPUT CIRCUIT BREAKERS-See Figure 12

One two-pole circuit breaker (located in the rear of the unit) connects the Primary AC to the ATS unit and another two-pole circuit breaker connects the Backup AC to the ATS unit.

Note: If the output load current exceeds 125% of the circuit breaker ratings (15, 20, 30 or 40A), then the input circuit breaker(s) will trip and prevent the possibility of overheating of the components or wires inside the ATS Series units. Reduce the load if the circuit breaker trips. If the circuit breaker trips, even without any load, then there is a faulty component on the board assembly. The Board assembly must then be repaired at the factory (or replaced in the field).



Figure 12: Primary & Backup Type AC Input Two-Pole Circuit Breaker (30A shown)

2.4 AUDIBLE ALARM SWITCH-See Figure 13



Figure 13: P/N SE00002 Audible Alarm On/Off Switch

3. INSTALLATION

IMPORTANT: ONLY QUALIFIED PERSONNEL SHOULD PERFORM THE INSTALLATION OF THIS PRODUCT.

3.1 SITE SELECTION & PREPARATION

- The ATS must be protected by an upstream branch circuit protector at 125% of the ATS current rating per the National Electric Code or per local electric codes if outside the United States (see ATS product ratings label for ATS current rating).
- This product is intended for installation in “A PROTECTED ENVIRONMENT ONLY”.
- The ATS Series is designed to be mounted in a rack or on a horizontal surface such as a desk, or be mounted to a floor or wall using the optional MK-5000C brackets with hardware.
- Note the following if an ATS without internal circuit breakers is being installed;
 - For permanently connected equipment, a readily accessible disconnect device shall be incorporated external to the equipment.
 - For pluggable equipment, the socket-outlet shall be installed near the equipment and shall be easily accessible.
 - For all units, an upstream circuit breaker for both the Primary and the Backup with the maximum current rating as shown on the ATS product label is required.



CAUTION: THE UNIT MUST BE PLACED IN A WELL - VENTILATED AREA TO PREVENT RISK OF FIRE DUE TO OVERHEATING. VENTILATION SLOTS MUST NOT BE OBSTRUCTED.

- Select an area with enough space to provide sufficient clearance around the unit to provide unrestricted access.

3.2 REQUIRED TOOLS

- Set of standard hand tools
- Wire stripper (for hardwired units)

3.3 UNPACKING & INSPECTION

3.31 The units are shipped in individual cartons and may come stacked on wooden pallets depending on the size of the order. In this configuration, the units are placed on the pallet, with protective material between them.

3.32 Carefully open the cartons, making sure not to damage the units, and remove the protective wrap and packing material.

3.33 Before the units are removed from the cartons, inspect them for physical damage.

3.34 If no damage is found, remove the units from the carton, open the top cover and again inspect for damage. If damage is found in either steps 3.33 or 3.34, do not accept the shipment and file a claim with the carrier. Contact TSi Power for assistance if necessary.

3.4 VOLTAGE SELECTION

3.41 If you have a 208, 220 or 240 V ATS the voltage selection can be changed. The factory setting is either set to HIGH (220 to 240 V) or LOW (208 V) depending on what ATS model was ordered. If the factory preset is not desired, performing the following steps will change the voltage transfer points.

3.42 Make sure both Primary and Backup AC sources to the ATS are de-energized.

3.43 Remove the ATS case cover.

3.44 Locate the jumper at JP1 (HIGH) or JP2 (LOW). See figure 8 or 9.

3.45 To change the voltage selection simply move the Jumper from the JP1 (HIGH) to JP2 (LOW) position or JP2 (LOW) to JP1 (HIGH) position (depending on the factory preset of your ATS).

3.46 Replace ATS case cover.

3.5 INSTALLING THE ATS

3.51 After the unit has been unpacked and inspected, attach any rack mounting brackets that may have optionally been ordered to the ATS. Mount the ATS to the desired location on the rack using the #10-32 UNF that have been provided (see Fig 14 for Front and Center Rack-Mount Kits – MK5000C for Wall or Floor mount Kit not shown). If customer has metric equivalent rack holes, M5X.8 screws should be used. If rack mounting brackets have not been ordered, place the unit at the desired location near the load.

Note: Make sure that the unit has sufficient surrounding space to provide ample air movement for ventilation.

3.6 AC CONNECTIONS (HARDWIRE VERSIONS)

NOTES:

- 1) Torque terminations from min. 1.5 Nm to max. 1.8 Nm (min. 13.28 in-lb to max. 15.93 in-lb).
- 2) Be sure to follow electric safety and installation codes in the country of use.

3.61 Make sure that the up-stream Primary and Backup AC sources are de-energized (switched **OFF**).

- 3.62** Incoming Primary and Backup Power Input, as well as, AC Power Output is through the circular hole in the rear plates of the unit. Remove these rear plates and save hardware before proceeding.
- 3.63** For units w/15 A Circuits Breakers use minimum 14 AWG (2.5mm²) wire [preferably 12 AWG (4mm²)]
For units w/20 A Circuit Breakers use minimum 12 AWG (4mm²) wire [preferably 10 AWG (6mm²)]
For units w/30 A Circuit Breakers use minimum 10 AWG (6mm²) wire [preferably 8 AWG (10mm²)]
For units w/40 A Circuit Breakers use minimum 8 AWG (10mm²) wire
For both power and earth conductors, TSi Power also recommends using stranded copper wire with a 105 °C insulation system.
- 3.64** Allow for sufficient wire length to reach the wiring terminals and leave enough slack to reduce the stress in the wires. Note: Two wires plus ground are required for primary and backup input and ATS output.
- 3.65** Strip approximately 3/8" (10 mm) insulation from the end of each of the three (3) sets of wires and terminate them in the wiring terminals as follows.
- 3.66** Using a slotted screwdriver, terminate the incoming primary wires on the terminal blocks behind the rear cover marked "Primary Input". These terminals are marked as follows:
- **LI** for primary input line (or **L1in** for primary input phase 1)
 - **NI** for primary input neutral (or **L2in** for primary input phase 2)
 - **PE** for primary input protective earth (European systems); **G** for primary input earth ground (North-American systems)
- 3.67** Using a slotted screwdriver, terminate the incoming backup wires on the terminal blocks behind the rear cover marked "Backup Input". These terminals are marked as follows:
- **LI** for backup input line (or **L1in** for backup input phase 1)
 - **NI** for backup input neutral (or **L2in** for backup input phase 2)
 - **PE** for backup input protective earth (European systems); **G** for backup input earth ground (North-American systems)
- 3.68** Using a slotted screwdriver, terminate the outgoing wires on the terminal blocks behind the rear cover marked "AC Output". These terminals are marked as follows:
- **LO** for AC output (or **L1out** for AC output phase 1)
 - **NO** for AC neutral output (or **L2out** for AC output phase 2)

- **PE** for output protective earth (European systems); **G** for output earth ground (North-American systems)
- 3.69** Carefully insert each wire into the appropriate slot, taking care to ensure that all strands are inserted properly. Tighten the terminal screw using a slotted screwdriver and torque terminations from minimum 1.5 Nm to maximum 1.8 Nm (min. 13.28 in-lb to max. 15.93 in-lb). Perform a pull test to make sure the connection is secure. Do not apply excessive torque to make sure that the terminal screws are not damaged. Note that failure to follow these instructions can lead to malfunction or short circuit.

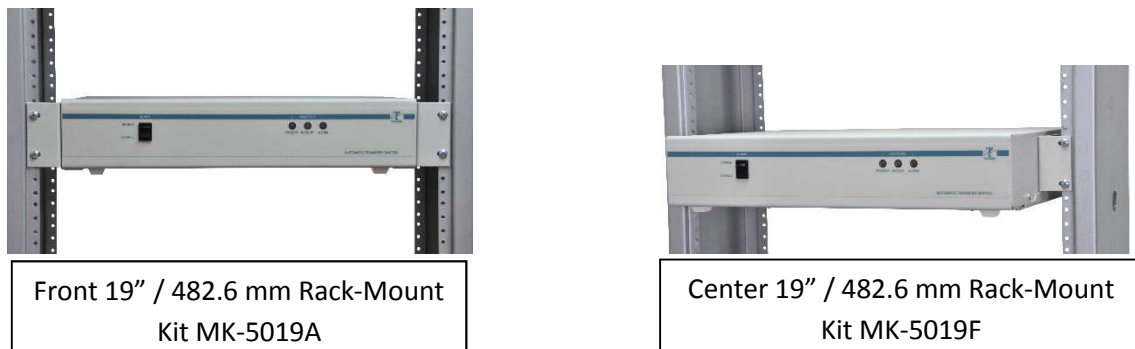


Figure 14: Two 19" / 482.6 mm Rack-Mounting Options for ATS Series

4. POWERING UP THE ATS SERIES



Before proceeding to the next step, make sure that both the ATS's internal Primary and Backup circuit breakers are in the **OFF** position.

4.1 START-UP & FUNCTIONAL (ELECTRICAL) TEST PROCEDURE

(1) Connect (or plug-in) both the Primary and Backup AC input connections (if using a hardwired ATS model this was performed during step 3.6) and energize (turn on) the up-stream Primary and Backup AC sources.


Important Note: Make sure that both Primary and Backup AC input voltages and frequencies match those specified on the product label affixed to the ATS unit (see Figure 4). The ATS will only operate when the input voltage is within specified voltage and when the frequency is within $\pm 5\%$ of that specified. Both primary and backup must be the same nominal frequency.

(2) Turn on the Backup AC circuit breaker in the rear of the ATS unit. Make sure that the audible alarm switch (in front of the ATS unit) is in the "ENABLE" position.

- (3) The yellow LED should turn on and the alarm sound must turn ON (red alarm LED must turn on: green LED must be OFF).
- (4) Turn on the Primary AC input circuit breaker in the rear of the ATS unit.
- (5) The green LED must turn on after several seconds. The yellow LED, red LED and alarm (sound) must turn off.
- (6) Turn off the Primary AC input circuit breaker. The green LED must turn off. The yellow Backup LED must turn ON and the red alarm LED and alarm (sound) must turn ON.
- (7) Turn on the Primary AC input circuit breaker. After several seconds, the ATS must return to the normal operating condition as noted in (5).
- (8) Turn off the Backup AC input circuit breaker.
- (9) The green LED must remain ON and the red alarm LED and alarm sound must turn ON (the yellow LED will already be OFF if the unit is operating from the Primary AC source).
- (10) Turn on the Backup input circuit breaker. After several seconds, the ATS must return to the normal operating condition as noted in (5).
- (11) De-energize (turn off) both the Primary and Backup AC sources.

4.2 TESTING WITH ACTUAL LOAD EQUIPMENT (SUCH AS COMPUTERS, PLC, TELECOM EQUIPMENT, ETC.)

If the above test steps (1) through (10) are performed and the ATS is functioning properly, then actual load equipment can be connected to (or plugged into) the output terminal block (or output receptacle).

 **CAUTION: To avoid electric shock or accidents, ensure that both Primary & Backup AC sources are de-energized before making the wire connection to the AC sources.**

4.3 REMOTE STATUS / ALARM MONITORING

- 4.31** A DB-9 female connector in the rear of the unit provides status / alarm signals for remote monitoring of the status of the ATS.

Primary AC Input Status DB-9 Pins are: 5 NO 1 NC 2 COM

Backup AC Input Status DB-9 Pins are: 6 NO 3 NC 4 COM

- 4.32** When Primary AC Input is present and IN SPECIFICATION, there is an OPEN circuit between pin 5 and pin 2. When Primary AC input is OUT OF SPECIFICATION, there is a CLOSED circuit between pin 5 and pin 2.

4.33 When Backup AC Input is present and IN SPECIFICATION, there is an OPEN circuit between pin 6 and pin 4. When Backup AC input is OUT OF SPECIFICATION, there is a CLOSED circuit between pin 6 and pin 4.

4.34 Maximum voltage and current that can be used for monitoring the status and alarm of the ATS Series is 120 VDC (VAC), 1 A (maximum DB-9 connector rating).

4.4 REMOTE ENABLE FUNCTION

4.41 A DB-9 female connector in the rear of the unit provides pins for remotely turning the ATS on and off. The standard ATS unit has the remote enable disabled. The remote enable can be enabled by performing the following steps.

4.42 Make sure both Primary and Backup AC sources to the ATS are de-energized.

4.43 Remove the ATS case cover.

4.44 Locate and remove the jumper from JP13 (ATS ENABLE). See figure 8 or 9.

4.45 Replace ATS case cover. The ATS can now be turned on by a short across Pin 8 (REMOTE ENABLE) and Pin 9 (REMOTE COM) of the DB-9 connector. The ATS is turned off by an open across Pin 8 (REMOTE ENABLE) and Pin 9 (REMOTE COM) of the DB-9 connector.

5. REPAIRS, SERVICE & SPARE PARTS

5.1 ATS SERIES FIELD REPAIR

The ATS Series is designed to facilitate quick replacement of circuit boards in the field. Therefore, trouble shooting procedures described in this manual are limited to visual inspection and circuit board replacement only. Actual component-level troubleshooting, repair and calibration require the completion of a full training course at TSi. For most customers, the most cost effective way to repair it is to simply replace the board assembly. Spare parts can be ordered from TSi directly. The Replacement Parts Table below provides correct part numbers and descriptive information. Please contact TSi prior to ordering so that the correct parts for each particular version of the ATS-1000 Series will be ordered.

TABLE of RECOMMENDED REPLACEMENT PARTS

Part Number	Description	Comments
PZ00120-5	Main Control Board assembly for ATS-1000-2, -3, -4, -5, -6 or -7000 models	Customer must provide voltage, amperage & Frequency options
PZ00127-5	Main Control Board assembly for ATS-1000-8000 or -9000 models	Customer must provide voltage, amperage & Frequency options
PZ00115-1	Display Board assembly for ATS Series	
WA04013	Alarm port assembly for ATS Series	
SE00002	Audible Alarm Switch for ATS Series	
FC00073	Circuit Breaker (250 V, 15 A)	ATS-1000-2000,-3000 Models
FC00063	Circuit Breaker (250 V, 20 A)	ATS-1000-4000,-5000 Models
FC00064	Circuit Breaker (250 V, 30 A)	ATS-1000-6000,-7000 Models
FC00065	Circuit Breaker (250 V, 40 A)	ATS-1000-8000,-9000 Models

5.2 RETURNING DEFECTIVE CIRCUIT BOARD(s) for REPAIR

- Contact TSi via telephone, fax or e-mail to obtain a Return Material Authorization number (RMA). TSi Power requires the 8 digit serial number in the order to determine the warranty status of the unit and to issue a correct RMA number.
- Make sure that returned circuit boards are properly protected with anti-static bubble packs and packed in a sturdy shipping box.
- Mark shipping box with RMA number, using indelible marker pen. Shipping costs, duty and brokerage costs are the responsibility of the customer.

5.3 INVENTORY RECOMMENDATIONS for CUSTOMERS w/LARGE NUMBERS OF ATS UNITS

Since a board exchange is the quickest way to repair an ATS Series failed circuit board, TSi recommends that customers keep at least 3-5% (one board for every 20 or 30 ATS units) in spare boards.

6. REFERENCE

6.1 SPECIFICATIONS

6.1.1 MC80003 ATS SERIES HARDWIRE, 120 V, 1000-15, 20, 30 OR 40 A MODELS

SPECIFICATION	ATS-1000-2000	ATS-1000-4000	ATS-1000-6000	ATS-1000-8000
ELECTRICAL				
VA at 120 V	1800	2400	3600	4800
Current rating	15 A	20 A	30 A	40 A
Switching technology	Mechanical relays			
INPUT				
Voltage range	120 V; 92 - 132 V ± 2.5 % nominal			
Frequency range	47 to 63 Hz, Caution: Both sources must use same nominal frequency			
Transfer time	Under one cycle			
Input / output wire size	14 AWG (2.08 mm ²)	12 AWG (3.3 mm ²)	10 AWG (5.26 mm ²)	8 AWG (8.36 mm ²)
AC input and output connections	Hardwire terminals (standard Hardwired units must be installed by a qualified electrician)			
OUTPUT				
Voltage / Current	120 V / 15, 20, 30 or 40A			
Load regulation	1 % from no load to full load			
Power efficiency	99 % or higher			
AC distribution	Hardwire terminals (standard Hardwired units must be installed by a qualified electrician)			
LED indicators:	Green: Primary output, Yellow: Backup output, Red: No primary or backup AC			
Audible alarm	Buzzer beeps when loss of primary or backup AC occurs			
Audible alarm on / off	Enable / Disable switch			
Alarm contacts	Rear-mounted DB-9 connector sends loss of primary / backup AC			
PHYSICAL				
Dimensions: Inches / mm	W: 16" / 406 mm H: 3.25" / 83 mm D: 12" / 305 mm			
Weight: lbs / kg	12 lbs / 5.45 kg			
Front mount kit for rack: 19" / 23" / 24" / 482.6 / 584.2 / 609.6 mm	MK-5019A / MK-5023A / MK-5024A			
Center mount kit for rack: 19" / 23" / 24" / 482.6 / 584.2 / 609.6 mm	MK-5019F / MK-5023F / MK-5024F			
Wall or floor mount kit	MK-5000C			
ENVIRONMENTAL				
Ambient temperature	32° to 104° F / 0° to 40° C			
AGENCY APPROVALS				
Safety	UL 60950-1 Issue: 2007/03/27 Ed:2 UL Standard for Safety Information Technology Equipment - Safety - Part 1: General Requirements - CSA C22.2#60950-1 Issued: 2007/03/01 Ed:2 Information Technology Equipment Safety Part 1: General Requirements			
WARRANTY				
Warranty	Two year limited warranty covers parts and labor			

TSi Power's ongoing product improvement process makes specifications subject to change. Other companies product names herein are for identification purposes only and may be trademarks of their respective companies.



6.12 MC80004 ATS SERIES PLUGS AND RECEPTACLES, 120 V, 1000-15, 20 OR 30 A MODELS

SPECIFICATION	ATS-1000-200X	ATS-1000-400X	ATS-1000-600X
ELECTRICAL			
VA at 120 V:	1800	2400	3600
Current rating	15 A	20 A	30 A
Switching technology	Mechanical relays		
INPUT			
Voltage range	120 V; 92 -132 V ± 2.5 % nominal		
Frequency range	47 to 67 Hz, Caution: Both sources must use same nominal frequency		
Transfer time	Under one cycle		
Plug models: -2002 / -2003 / -2004 Plug models: -4002 / -4003 / -40 04 Plug models: -6002 / -6003 Plug models: -xxxx	5-15P / L5-15P / IEC 60320 C14 5-20P / L5-20P / IEC 60320 C20 5-30P / L5-30P Other configurations available		
OUTPUT			
Voltage / Current	120 V / 15 / 20 / 30 A		
Load regulation	1 % from no load to full load		
Power efficiency	99 % or higher		
Receptacle models: -2002 / -2003 / -2004 Receptacle models: -4002 / -4003 / -4004 Receptacle models: -6002 / -6003 Receptacle models: -xxxx	5-15R / L5-15R / IEC 60320 C13 5-20R / L5-20R / IEC 60320 C19 5-30R / L5-30R Other configurations available		
LED indicators: Green / Yellow / Red	Primary output / Backup output / No primary or backup AC		
Audible alarm	Buzzer beeps when loss of primary or backup AC occurs		
Audible alarm on / off	Enable / Disable switch		
Alarm contacts	Rear-mounted DB-9 connector sends loss of primary / backup AC		
PHYSICAL			
Dimensions: Inches / mm	W: 16" / 406 mm H: 3.25" / 83 mm D: 12" / 305 mm		
Weight: lbs / kg	12 lbs / 5.45 kg		
Front mount kit for rack: 19" / 23" / 24" / 482.6 / 584.2 / 609.6 mm Center mount kit for rack: 19" / 23" / 24" / 482.6 / 584.2 / 609.6 mm Wall or floor mount kit	MK-5019A / MK-5023A / MK-5024A MK-5019F / MK-5023F / MK-5024F MK-5000C		
ENVIRONMENTAL			
Ambient temperature	32° to 104° F / 0° to 40° C		
AGENCY			
Safety	UL 60950-1 Issue: 2007/03/27 Ed:2 UL Standard for Safety Information Technology Equipment - Safety - Part 1: General Requirements - CSA C22.2#60950-1 Issued: 2007/03/01 Ed:2 Information Technology Equipment Safety Part 1: General Requirements		
WARRANTY			
Warranty	Two year limited warranty covers parts and labor		

TSi Power's ongoing product improvement process makes specifications subject to change. Other companies product names herein are for identification purposes only and may be trademarks of their respective companies.



6.13 MC80005 ATS SERIES IEC, 230 V, 1000-15 OR 20 A MODELS

SPECIFICATION	ATS-1000-3904	ATS-1000-5904
ELECTRICAL		
VA at 230 V	3450	4600
Current rating	15 A	20 A
Switching technology	Mechanical relays	
INPUT		
Voltage range	230 V; 184 - 264 V \pm 2.5 % nominal	
Frequency range	47 to 63 Hz, Caution: Both sources must use same nominal frequency	
Transfer time	Under one cycle	
AC input and output connections	IEC60320 C-14	IEC60320 C-20
OUTPUT		
Voltage / Current	230 V / 15, 20A	
Load regulation	1 % from no load to full load	
Power efficiency	99 % or higher	
AC distribution	IEC60320 C-13	IEC60320 C-19
LED indicators:	Green: Primary output, Yellow: Backup output, Red: No primary or backup AC	
Audible alarm	Buzzer beeps when loss of primary or backup AC occurs	
Audible alarm on / off	Enable / Disable switch	
Alarm contacts	Rear-mounted DB-9 connector sends loss of primary / backup AC	
PHYSICAL		
Dimensions: mm / inches	W: 406 mm / 16" H: 83 mm / 3.25" D: 305 mm / 12"	
Weight: kg / lbs	5.45 kg / 12 lbs	
Front mount kit for rack: 482.6 / 584.2 / 609.6 mm / 19" / 23" / 24"	MK-5019A / MK-5023A / MK-5024A	
Center mount kit for rack: 482.6 / 584.2 / 609.6 mm / 19" / 23" / 24"	MK-5019F / MK-5023F / MK-5024F	
Wall or floor mount kit	MK-5000C	
ENVIRONMENTAL		
Ambient temperature	0° to 40° C (32° to 104° F)	
AGENCY APPROVALS		
Safety	EN 60950-1	
EMC	Radiated: EN55022-1 Immunity: EN55024	
WARRANTY		
Warranty	Two year limited warranty covers parts and labor	

TSi Power's ongoing product improvement process makes specifications subject to change. Other companies product names herein are for identification purposes only and may be trademarks of their respective companies.



6.14 MC80006 ATS SERIES PLUGS AND RECEPTACLES, 208, 220 OR 240 V, 1000-15, 20 OR 30 A MODELS

SPECIFICATION	ATS-1000-380x	ATS-1000-580x	ATS-1000-780x	ATS-1000-300x	ATS-1000-500x	ATS-1000-700x
ELECTRICAL						
VA at 208 V	3120	4160	6240			
VA at 220 V				3300	4400	6600
VA at 240 V				3600	4800	7200
Current rating	15 A	20 A	30 A	15 A	20 A	30 A
Switching technology	Mechanical relays					
INPUT						
Voltage range: 208 V	208 V; 166 - 239 V \pm 2.5 % nominal					
Voltage range: 220 V or 240 V				220 V or 240 V; 184 - 264 V \pm 2.5 % nominal		
Frequency range	47 to 63 Hz, Caution: Both sources must use same nominal frequency					
Transfer time	Under one cycle					
Plug models: -3x02 / -3x03 / -3x04	6-15P / L6-15P / IEC 60320 C14					
Plug models: -5x02 / -5x03 / -5x04	6-20P / L6-20P / IEC 60320 C20					
Plug models: -7x02 / -7x03	6-30P / L6-30P					
Plug models: -xxxx	Other configurations available					
OUTPUT						
Voltage / Current	208 V / 15, 20, 30 A			220 V / 240 V / 15, 20, 30 A		
Load regulation	1 % from no load to full load					
Power efficiency	99 % or higher					
Receptacle models: -3x02 / -3x03 / -3x04	6-15R / L6-15R / IEC 60320 C13					
Receptacle models: -5x02 / -5x03 / -5x04	6-20R / L6-20R / IEC 60320 C19					
Receptacle models: -7x02 / -7x03	6-30R / L6-30R					
Receptacle models: -xxxx	Other configurations available					
LED indicators:	Green: Primary output, Yellow: Backup output, Red: No primary or backup AC					
Audible alarm	Buzzer beeps when loss of primary or backup AC occurs					
Audible alarm on / off	Enable / Disable switch					
Alarm contacts	Rear-mounted DB-9 connector sends loss of primary / backup AC					
PHYSICAL						
Dimensions: Inches / mm	W: 16" / 406 mm H: 3.25" / 83 mm D: 12" / 305 mm					
Weight: lbs / kg	12 lbs / 5.45 kg					
Front mount kit for rack: 19" / 23" / 24" / 482.6 / 584.2 / 609.6 mm	MK-5019A / MK-5023A / MK-5024A					
Center mount kit for rack: 19" / 23" / 24" / 482.6 / 584.2 / 609.6 mm	MK-5019F / MK-5023F / MK-5024F					
Wall or floor mount kit	MK-5000C					
ENVIRONMENTAL						
Ambient temperature	32° to 104° F / 0° to 40° C					
AGENCY APPROVALS						
Safety	UL 60950-1 Issue: 2007/03/27 Ed:2 UL Standard for Safety Information Technology Equipment - Safety - Part 1: General Requirements - CSA C22.2#60950-1 Issued: 2007/03/01 Ed:2 Information Technology Equipment Safety Part 1: General Requirements					
WARRANTY						
Warranty	Two year limited warranty covers parts and labor					

TSi Power's ongoing product improvement process makes specifications subject to change. Other companies product names herein are for identification purposes only and may be trademarks of their respective companies.



6.15 MC80007 ATS SERIES HARDWIRE, 208, 220 and 240 V, 1000-15, 20, 30 OR 40 A MODELS

SPECIFICATION	ATS-1000-3800	ATS-1000-5800	ATS-1000-7800	ATS-1000-9800	ATS-1000-3000	ATS-1000-5000	ATS-1000-7000	ATS-1000-9000
ELECTRICAL								
VA at 208 V	3120	4160	6240	8320				
VA at 220 V					3300	4400	6600	8800
VA at 240 V					3600	4800	7200	9600
Current rating	15 A	20 A	30 A	40 A	15 A	20 A	30 A	40 A
Switching technology	Mechanical relays							
INPUT								
Voltage range:	208 V; 166 - 239 V ± 2.5 % nominal							
Voltage range: 220 V or 240 V					220 or 240 V; 184 - 264 V ± 2.5 % nominal			
Frequency range	47 to 63 Hz, Caution: Both sources must use same nominal frequency							
Transfer time	Under one cycle							
AC input connection	Hardwire (standard Hardwired units must be installed by a qualified electrician)							
OUTPUT								
Voltage / Current	208 V / 15, 20, 30 or 40A				220 or 240 V / 15, 20, 30 or 40 A			
Load regulation	1 % from no load to full load							
Power efficiency	99 % or higher							
AC distribution	Hardwire terminals (standard Hardwired units must be installed by a qualified electrician)							
LED indicators:	Green: Primary output, Yellow: Backup output, Red: No primary or backup AC							
Audible alarm	Buzzer beeps when loss of primary or backup AC occurs							
Audible alarm on / off	Enable / Disable switch							
Alarm contacts	Rear-mounted DB-9 connector sends loss of primary / backup AC							
PHYSICAL								
Dimensions: Inches / mm	W: 16" / 406 mm H: 3.25" / 83 mm D: 12" / 305 mm							
Weight: lbs / kg	12 lbs / 5.45 kg							
Front mount kit for rack: 19" / 23" / 24" / 482.6 / 584.2 / 609.6 mm	MK-5019A / MK-5023A / MK-5024A							
Center mount kit for rack: 19" / 23" / 24" / 482.6 / 584.2 / 609.6 mm	MK-5019F / MK-5023F / MK-5024F							
Wall or floor mount kit	MK-5000C							
ENVIRONMENTAL								
Ambient temperature	32° to 104° F / 0° to 40° C							
AGENCY APPROVALS								
Safety	UL 60950-1 Issue: 2007/03/27 Ed:2 UL Standard for Safety Information Technology Equipment - Safety - Part 1: General Requirements - CSA C22.2#60950-1 Issued: 2007/03/01 Ed:2 Information Technology Equipment Safety Part 1: General Requirements							
WARRANTY								
Warranty	Two year limited warranty covers parts and labor							

TSi Power's ongoing product improvement process makes specifications subject to change. Other companies product names herein are for identification purposes only and may be trademarks of their respective companies.



6.16 MC80008 ATS SERIES HARDWIRE, 230 V, MODELS 1000-15, 20, 30, OR 40 A MODELS

SPECIFICATION	ATS-1000-3900	ATS-1000-5900	ATS-1000-7900	ATS-1000-9900
ELECTRICAL				
VA at 230 V	3450	4600	6900	9200
Current rating	15 A	20 A	30 A	40 A
Switching technology	Mechanical relays			
INPUT				
Voltage range	230 V; 184 - 264 V \pm 2.5 % nominal			
Frequency range	47 to 63 Hz, Caution: Both sources must use same nominal frequency			
Transfer time	Under one cycle			
Input / output wire size	\varnothing 1.63 mm \varnothing 2.08 mm ²	\varnothing 2.05 mm \varnothing 3.3 mm ²	\varnothing 2.59 mm \varnothing 5.26 mm ²	\varnothing 3.26 mm \varnothing 8.36 mm ²
AC input and output connections	Hardwire terminals (standard Hardwired units must be installed by a qualified electrician)			
OUTPUT				
Voltage / Current	230 V / 15, 20, 30 or 40A			
Load regulation	1 % from no load to full load			
Power efficiency	99 % or higher			
AC distribution	Hardwire terminals (standard Hardwired units must be installed by a qualified electrician)			
LED indicators:	Green: Primary output, Yellow: Backup output, Red: No primary or backup AC			
Audible alarm	Buzzer beeps when loss of primary or backup AC occurs			
Audible alarm on / off	Enable / Disable switch			
Alarm contacts	Rear-mounted DB-9 connector sends loss of primary / backup AC			
PHYSICAL				
Dimensions: mm / inches	W: 406 mm / 16" H: 83 mm / 3.25" D: 305 mm / 12"			
Weight: kg / lbs	5.45 kg / 12 lbs			
Front mount kit for rack: 482.6 / 584.2 / 609.6 mm / 19" / 23" / 24"	MK-5019A / MK-5023A / MK-5024A			
Center mount kit for rack: 482.6 / 584.2 / 609.6 mm / 19" / 23" / 24"	MK-5019F / MK-5023F / MK-5024F			
Wall or floor mount kit	MK-5000C			
Ambient temperature	0° to 40° C / 32° to 104° F			
AGENCY APPROVALS				
Safety	EN 60950-1			
EMC	Radiated: EN55022-1 Immunity: EN55024			
WARRANTY				
Warranty	Two year limited warranty covers parts and labor			

TSi Power's ongoing product improvement process makes specifications subject to change. Other companies product names herein are for identification purposes only and may be trademarks of their respective companies.



6.2 PRODUCT CONFIGURATIONS

The table below shows the different product configurations (Model Numbers) that are available in the ATS Series. Each model number is comprised of the 1000 Family Identifier followed by a four digit suffix, which signifies the Model configuration. These model configurations relate to the amps, voltage, frequency, input and output type and cord descriptive information that comprises the product to be ordered. For example: **Part # ATS-1000-2003** is a 15 A, 120 V, 50/60 Hz, ATS-1000 unit with L5-15P (JP00055) input Plug and L5-15R output Receptacle and 182.88 cm (6 foot) long Cord (WI40302).

TSI P/N	Amps	Voltage	Freq.	Input type	Output type	Cord
ATS-1000-2000	15	120 V	50/60 Hz	Hardwire (JP00067)	Hardwire (JP00067)	N/A
ATS-1000-2002	15	120 V	50/60 Hz	5-15P (WD00006)	5-15R (JP00155)	6'
ATS-1000-2003	15	120 V	50/60 Hz	L5-15P (JP00055)	L5-15R (JP00056)	182.88cm (6') (WI40302)
ATS-1000-2004	15	120 V	50/60 Hz	IEC320 C-14 (JP00015)	IEC320 C-13 (JP00101)	Optional
ATS-1000-3002	15	220 V, 240V	50/60 Hz	6-15P (JP00042)	6-15R (JP00043)	182.88cm (6') (WI40302)
ATS-1000-3003	15	220 V, 240V	50/60 Hz	L6-15P (JP00046)	L6-15R (JP00059)	182.88cm (6') (WI40302)
ATS-1000-3004	15	220 V, 240V	50/60 Hz	IEC320 C-14 (JP00015)	IEC320 C-13 (JP00101)	Optional
ATS-1000-3802	15	208 V	50/60 Hz	6-15P (JP00042)	6-15R (JP00043)	182.88cm (6') (WI40302)
ATS-1000-3803	15	208 V	50/60 Hz	L6-15P (JP00046)	L6-15R (JP00059)	182.88cm (6') (WI40302)
ATS-1000-3804	15	208 V	50/60 Hz	IEC320 C-14 (JP00015)	IEC320 C-13 (JP00101)	Optional
ATS-1000-3900	15	230 V	50/60 Hz	Hardwire (JP00067)	Hardwire (JP00067)	N/A
ATS-1000-3904	15	230 V	50/60 Hz	IEC320 C-14 (JP00015)	IEC320 C-13 (JP00101)	Optional
ATS-1000-4000	20	120 V	50/60 Hz	Hardwire (JP00067)	Hardwire (JP00067)	N/A
ATS-1000-4002	20	120 V	50/60 Hz	5-20P (JP00027)	5-20R (JP00090)	182.88cm (6') (WI40301)
ATS-1000-4003	20	120 V	50/60 Hz	L5-20P (JP00048)	L5-20R (JP00047)	182.88cm (6') (WI40301)
ATS-1000-4004	20	120 V	50/60 Hz	IEC60320 C-20 (JP00100)	IEC60320 C-19 (JP00121)	Optional
ATS-1000-5002	20	220 V, 240V	50/60 Hz	6-20P (JP00025)	6-20R (JP00039)	182.88cm (6') (WI40301)
ATS-1000-5003	20	220 V, 240V	50/60 Hz	L6-20P (JP00035)	L6-20R (JP00034)	182.88cm (6') (WI40301)
ATS-1000-5004	20	220 V, 240V	50/60 Hz	IEC60320 C-20 (JP00100)	IEC60320 C-19 (JP00121)	Optional
ATS-1000-5802	20	208 V	50/60 Hz	6-20P (JP00025)	6-20R (JP00039)	182.88cm (6') (WI40301)
ATS-1000-5803	20	208 V	50/60 Hz	L6-20P (JP00035)	L6-20R (JP00034)	182.88cm (6') (WI40301)
ATS-1000-5804	20	208 V	50/60 Hz	IEC60320 C-20 (JP00100)	IEC60320 C-19 (JP00121)	Optional
ATS-1000-5900	20	230 V	50/60 Hz	Hardwire (JP00067)	Hardwire (JP00067)	N/A
ATS-1000-5904	20	230 V	50/60 Hz	IEC60320 C-20 (JP00100)	IEC60320 C-19 (JP00121)	Optional
ATS-1000-6000	30	120 V	50/60 Hz	Hardwire (JP00067)	Hardwire (JP00067)	N/A
*ATS-1000-6001	30	120 V	50/60 Hz	Hardwire (JP00067)	Hardwire (JP00067)	N/A
TSI P/N	Amps	Voltage	Freq.	Input Type	Output Type	Cord

TSi P/N	Amps	Voltage	Freq.	Input Type	Output Type	Cord
ATS-1000-6002	30	120 V	50/60 Hz	5-30P (JP00029)	5-30R (JP00028)	182.88cm (6') (WI50301)
ATS-1000-6003	30	120 V	50/60 Hz	L5-30P (JP00033)	L5-30R (JP00032)	182.88cm (6') (WI50301)
ATS-1000-7000	30	220 V, 240V	50/60 Hz	Hardwire (JP00067)	Hardwire (JP00067)	N/A
*ATS-1000-7001	30	220 V, 240V	50/60 Hz	Hardwire (JP00067)	Hardwire (JP00067)	N/A
ATS-1000-7002	30	220 V, 240V	50/60 Hz	6-30P (JP00031)	6-30R (JP00030)	182.88cm (6') (WI50301)
ATS-1000-7003	30	220 V, 240V	50/60 Hz	L6-30P (JP00036)	L6-30R (JP00037)	182.88cm (6') (WI50301)
ATS-1000-7000	30	208 V	50/60 Hz	Hardwire (JP00067)	Hardwire (JP00067)	N/A
*ATS-1000-7001	30	208 V	50/60 Hz	Hardwire (JP00067)	Hardwire (JP00067)	N/A
ATS-1000-7002	30	208 V	50/60 Hz	6-30P (JP00031)	6-30R (JP00030)	182.88cm (6') (WI50301)
ATS-1000-7003	30	208 V	50/60 Hz	L6-30P (JP00036)	L6-30R (JP00037)	182.88cm (6') (WI50301)
ATS-1000-7900	30	230 V	50/60 Hz	Hardwire (JP00067)	Hardwire (JP00067)	N/A
ATS-1000-8000	40	120 V	50/60 Hz	Hardwire (JP00067)	Hardwire (JP00067)	N/A
ATS-1000-9000	40	220 V, 240 V	50/60 Hz	Hardwire (JP00067)	Hardwire (JP00067)	N/A
ATS-1000-9800	40	208 V	50/60 Hz	Hardwire (JP00067)	Hardwire (JP00067)	N/A
ATS-1000-9900	40	230 V	50/60 Hz	Hardwire (JP00067)	Hardwire (JP00067)	N/A

*Units do not have circuit breakers

Note: P/N in brackets such as (WI50301) represents TSi P/N for identification.

6.3 TSi POWER CONTACT INFORMATION

TSi Power Corporation
1103 West Pierce Avenue
Antigo, WI 54409, USA
Toll-Free Tel: 800-874-3160 (for USA & Canada only)
Tel: +1-715-623-0636
Fax: +1-715-623-2426
URL: www.tsipower.com E-mail: sales@tsipower.com