PM179 Rev 0 23/02/10

THOMSON™
POWER SYSTEMS

TS 970

AUTOMATIC TRANSFER SWITCH
WITH TSC 7320 CONTROLLER

INSTALLATION, OPERATING & SERVICE MANUAL

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1. PRODUCT REVISION HISTORY

The following information provides a historical summary of changes made to this product since the original release.

Operating & Service Manual Version

Rev 0 23/02/10	Original release.

Contact Thomson Power Systems, to obtain applicable instruction manuals or if in doubt about any matter relating to installation, operation or maintenance. Soft copy of the most current version is available at www.thomsonps.com.

NOTE: All information contained in this manual is for reference only and is subject to change without notice.

Related Product Instruction Manuals

- TS 970 Quick Start Instruction Manual (100A - 400A), PM176
- TS 970 Quick Start Instruction Manual (600A - 1200A), PM177
- TS 970 Specific Breaker Information for Withstand Current Ratings, PM167
- TSC 7320 Transfer Switch Controller, PM180

Contact Thomson Power Systems, to obtain these instruction manuals. Soft copy of the most current versions of these manuals are available at www.thomsonps.com.

2. EQUIPMENT STORAGE

The following procedures are required for correct storage of the transfer switch prior to installation.

2.1. *ENVIRONMENTAL CONDITIONS*

CAUTION

Failure to store and operate equipment under the specified environmental conditions may cause equipment damage and void warranty.

2.1.1. EQUIPMENT STORAGE

The transfer switch shall be stored in an environment with a temperature range not exceeding -4° to +158° Fahrenheit (-20° to +70° Celsius) and a humidity range not exceeding 5%-95% non-condensing. Before storing, unpack sufficiently to check for concealed damage. If concealed damage is found, notify the ATS supplier and the Carrier immediately. Repack with the original, or equivalent packing materials. Protect from physical damage. Do not stack. Store indoors in a clean, dry, well ventilated area

free of corrosive agents including fumes, salt and concrete/cement dust. Apply heat as necessary to prevent condensation.

2.1.2. EQUIPMENT OPERATING

The transfer switch shall be operated in an environment with a temperature range not exceeding +5° to +122° Fahrenheit (-15° to +50° Celsius) and a humidity range not exceeding 5%-95% non-condensing.

3. NOTES TO INSTALLER

DANGER

Arc Flash and Shock Hazard. Will cause severe injury or death.

Do not open equipment until ALL power sources are disconnected

This equipment must be installed and serviced only by qualified electrical personnel utilizing safe work practices and appropriate Personal Protective Equipment (PPE). Failure to do so may cause personal injury or death

3.1. *INSTALLATION CODES/PERMITS*

Suitable permits are required by local authorities having jurisdiction prior to installing standby generator sets and automatic transfer switches.

3.2. *APPLICATION*

The TS 970 Transfer Switch is Listed by Underwriters Laboratories (UL) to Safety Standard UL 1008 for Transfer Switches for Emergency Standby applications. This product is intended for installation and operation on legally required standby applications for emergency power systems as defined by the National Electrical Code (NEC).

The TS 970 is a power contactor transfer switch, as with all power contactor type transfer switches there must be upstream circuit breakers on the Utility side and the Generator side. Refer to list of applicable series breakers.

3.3. *INSTALLATION LOCATION*

The standard TS 970 100A - 400A transfer switch is designed for indoor and optional outdoor wall mounting with NEMA 3R rating. The standard TS 970 600A - 1200A transfer switch enclosure is indoor and optional outdoor free-standing with NEMA 3R rating. The transfer switch must be installed in an environment where the temperature range is within +5° to +122° Fahrenheit (-15° to +50° Celsius) and humidity range not exceeding 5%-95% non-condensing.

NOTE: The transfer switch must not be installed in a location where it is subjected to direct sunlight on the front of the transfer switch door. In these applications, an optionally available sun-shade kit must be installed.

3.4. *POWER CABLING*

All power cabling entering/exiting the enclosure must be installed in suitably sized conduit per NEC/CEC requirements. Ampacity, type and voltage rating of current carrying conductors must also comply with NEC/CEC requirements and local authorities having jurisdiction. To ensure satisfactory installation of this equipment, refer to manual ***SECTION 10*** Cable Terminal Information regarding power cable connection tightness requirements. All mechanical and electrical connections must be checked for tightness prior to placing this equipment in service to ensure proper operation and to validate applicable warranty coverage.

3.5. *CONTROL WIRING*

All control wiring for engine start, load shed, alarm and remote test must be installed in separate conduits from all power cabling and must utilize suitably sized conduits per NEC/CEC requirements. All control wiring shall be sized for minimum #18 AWG. Control wiring type and voltage rating must also comply with NEC/CEC requirements and local authorities having jurisdiction.

NOTE: All field wiring/communication cabling that may be field installed directly onto any ATS door mounted components must be suitably routed and protected across the door hinge to prevent possible mechanical damage upon door opening and/or door closing.

3.6. *GENERATOR SET AUTOMATIC OPERATION*

The TS 970 transfer switch operates in conjunction with any generator set with remote automatic starting capabilities utilizing a 2 wire, remote start control contact input. A dry contact is provided for remote generator starting control (contact closes to start generator and opens to stop generator).

3.7. *LOAD TYPES*

The standard TS 970 is suitable for control of motors, electric discharge lamps, tungsten filament lamps, and electric heating equipment where the sum of motor full-load ampere ratings and the ampere ratings of other loads do not exceed the ampere rating of the switch and the tungsten load does not exceed 30 percent of the switch rating.

3.8. *UPSTREAM OVER CURRENT PROTECTION*

TS 970 transfer switch models do not contain any integral over current protection and require upstream over current protection devices for both Utility and Generator sources.

3.9. *WITHSTAND/INTERRUPTING CURRENT RATINGS*

Refer to electrical ratings shown in ***SECTION 11*** for withstand/Interrupting current ratings. Short circuit currents listed for Standard type ATS are withstand ratings.

3.10. *TRANSFER SWITCHES WITH MULTI-TAP VOLTAGE CAPABILITY*

If the transfer switch has programmable multi-tap voltage capability (i.e. ATS Model Code with Voltage Code "Y"), confirm the transfer switch has been configured for the correct system voltage prior to installation.

WARNING

Failure to confirm and match transfer switch voltage with the system voltage could cause serious equipment damage.

The voltage selections and connections are shown on the drawings supplied with each transfer switch. The factory default settings will be indicated on the calibration label attached on the inside of the enclosure door. A blank label is included to record the applicable settings if the configuration is changed from the factory default settings.

To change the transfer switch voltage, refer to TS 970 System Voltage Change Procedure**,** Appendix B. Contact Thomson Power Systems for further information as may be required.

3.11. *REMOTE START CONTACT FIELD WIRING*

As a minimum, the remote engine start control field wiring shall conform to the local regulatory authority on electrical installations. Field wiring of a remote start contact from a transfer switch to a control panel should conform to the following guidelines to avoid possible controller malfunction and/or damage.

Minimum #14 AWG (2.5mm^2) wire size shall be used for distances up to 100ft (30m)[1]). For distances exceeding 100 ft. (30m) consult Thomson Power Systems

- Remote start contact wires should be run in a separate conduit.
- Avoid wiring near AC power cables to prevent pick-up of induced voltages.
- An interposing relay may be required if field-wiring distance is excessively long (i.e. greater than 100 feet (30m)) and/or if a remote contact has a resistance of greater than 5.0 ohms.
- The remote start contact must be voltage free (i.e. dry contact). The use of a powered contact will damage the transfer controller.

3.12. *DIELECTRIC TESTING*

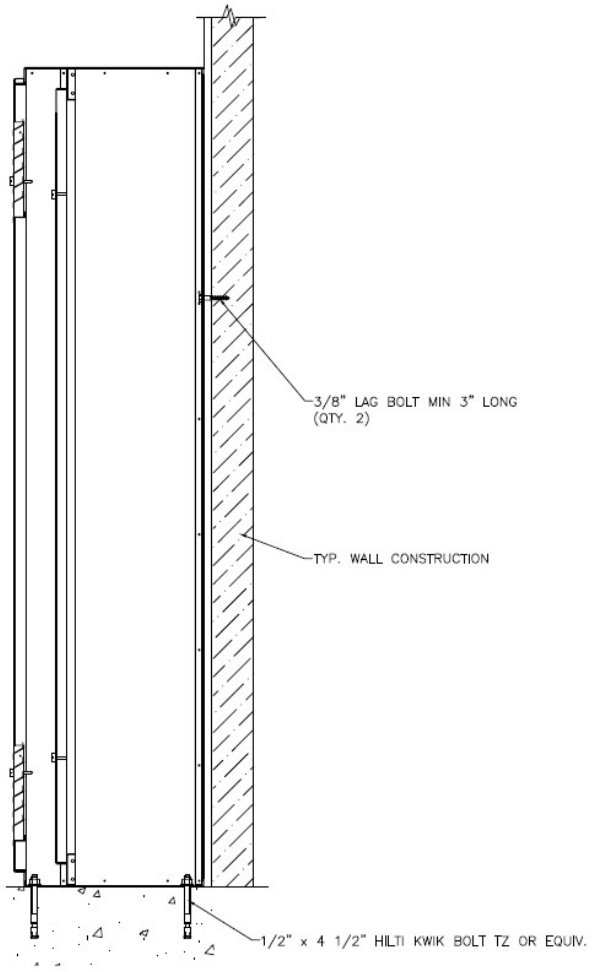
Do not perform any high voltage dielectric testing on the transfer switch with the TSC 900 controller connected into the circuit as serious damage will occur to the controller. All AC control fuses, DC control fuses and control circuit isolation plugs connected to the TSC 900 must be removed if high voltage dielectric testing is performed on the transfer switch.

3.13. *SEISMIC ANCHORING*

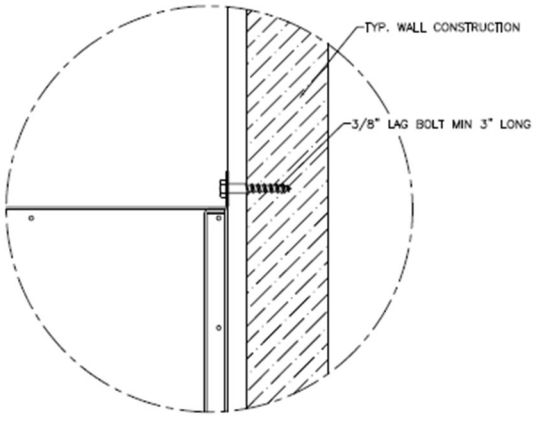
Model TS 970 Automatic Transfer Switches in "standard" enclosures are seismic certified under AC156 building code for non-structural components.

Standard enclosures are all transfer switch enclosures Thomson Power Systems offers in NEMA 1, NEMA 2, NEMA12 and NEMA 3R for the above listed product.

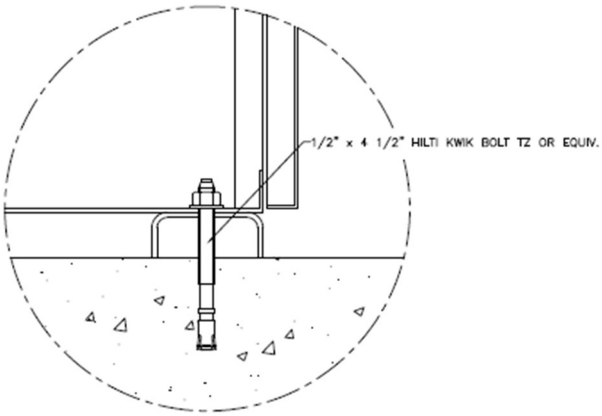
The transfer switch must be installed per the anchoring details provided for seismic qualification. The equipment can be mounted in alternate means and still qualify if a qualified Civil Engineer designs the alternate method of anchoring.



TYP. FLOOR/WALL ANCHORING
(REFER TO NOTE 5)



TYP. WALL ANCHORING



TYP. FLOOR ANCHORING

Anchoring Notes:

1. Anchoring must be designed according to IBC 2012 or latest version.

2. The anchoring details shown are recommended according to the seismic certification; design Engineer may use alternate anchors within the scope of IBC.

3. Wall anchors in concrete; use a typical concrete anchor as necessary.

4. Expansion anchors as shown. To be installed according to manufacturer's recommendation.

5. The 600-1200A NEMA 3R ATS enclosure is free standing (floor mounted only); If free standing it must be a minimum of 12" (305mm) away from pipes, conduits or other obstructions to allow for sway during a seismic event.

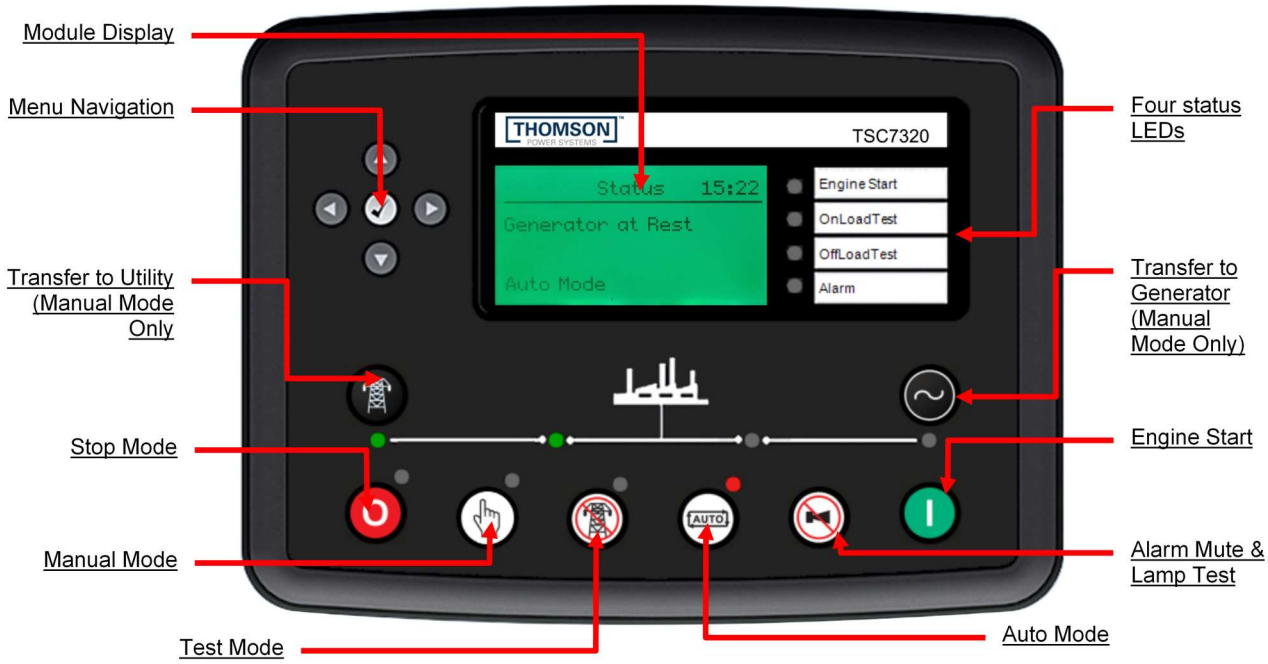
4. GENERAL DESCRIPTION

Thomson Power Systems TS 970 series of Automatic Transfer Switches employ two position power contactor unit and a microprocessor based controller to automatically transfer system load to a generator supply in the event of a utility supply failure. System load is then automatically re-transferred back to the utility supply following restoration of the utility power source to within normal operating limits.

The standard TS 970 series Automatic Transfer Switch is rated for 100% system load and requires upstream over current protection.

4.1. *TSC 7320 ATS CONTROLLER*

The TS 870 series transfer switches use a type TSC 7320 microprocessor based controller, which provides all necessary control functions for fully automatic operation. The controller is equipped with 2.3" back-lit LCD display which provides operating status and controls



For further information on the TSC 7320 Transfer Controller, refer to separate instruction manual PM180.

4.2. *POWER CONTACTOR ATS*

TS 970 Series product line consist of two types of power contactor based on amperage size and optional features supplied with the ATS.

100 – 400A Power Contactor (Typical)

600 – 1200A Power Contactor (Typical)

100A – 1200A rated power contactors are operated by internal drive motor operators. The power contactor mechanism utilizes the power from the source to which the electrical load is being transferred. The TSC 900 transfer switch controller by default configured for fast In-phase open transition transfer sequences. User can inhibit fast In-phase transfer and provide a standard neutral position delay to allow adequate voltage decay during transfer operation to prevent out of phase transfers. The power contactor units are provided with 277VAC powered internal motor operators and open-and-close coils. Operating shaft, trip and select B control lever are provided on the face of the power contactor unit for Manual Operation.

NOTE

For the purpose of this manual, the following standard nomenclature is utilized.

Utility : To indicate the source of primary power

Generator : To indicate the source of standby power

Power Contactor : To indicate the Automatic Transfer Switch power contactor device

4.3. *PRODUCT MODEL CODE*

The type of TS 970 series transfer switch supplied is identified by way of a 21digit product code which appears on the equipment rating plate, or model, on the door of the transfer switch, and the transfer switch drawings. The model code structure and definitions are as follows:

1	2	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
T	S	9	7																

1-3. SERIES
TS - TRANSFER SWITCH

4 & 5. MODEL
97 - 970 SWITCH

6. POLES
3 - 3 POLE
4 - 4 POLE

7. CONFIGURATION TYPE
A - ATS

8 - 11. AMPERAGE
0100
0150
0200
0250
0400
0600
0800
1000
1200

12. APPLICATION
A - STANDARD

13. OPERATION TYPE
1 - OPEN TRANSITION

14 . SAFETY STANDARDS
C - UL 1008 / CSA 178

15 . VOLTAGE [4]

1ø 3 WIRE
D - 120/240[1]

3ø 4 WIRE (GROUNDED NEUTRAL)
E - 120/208[1]
F - 127/220[1]
G - 120/240[1] (DELTA)
H - 220/380 [1,2]
S - 230/400 [1,2]
J - 240/416[1]
K - 254/440[1]
M - 277/480[1]
Z - MULTIVOLTAGE (STOCK SWITCHES ONLY)[1]

3ø 3 WIRE
P - 208
Q - 220
R - 240
V - 480[3] (DELTA OPTION)

16. CONTROLLER
5 - TSC 900 c/w GHC Graphic Display
6 - TSC 7320 c/w LCD Text Display

17. ENCLOSURE TYPE
A - NEMA1, ASA #61 GRAY
D - NEMA3R SD, ASA #61 GRAY

18. UTILITY SWITCHING DEVICE
J - POWER CONTACTOR

19. GENERATOR SWITCHING DEVICE
J - POWER CONTACTOR

20. POWER CONNECTIONS
A - STANDARD

21. ATS CONNECTION CONFIGURATION
A - STANDARD

NOTES
[1] MULTI-VOLTAGE CAPABLE (208 - 480V)
[2] FOR 50 Hz APPLICATION
[3] REQUIRES 480V DELTA KIT OPTION
[4] 208V-240V MUST BE AVAILABLE PHASE TO PHASE

4.4. *TYPICAL COMMISSIONING PROCEDURES*

CAUTION

Commissioning procedures must be performed by qualified personnel only. Ensure the Automatic Transfer Switch (ATS) ATS Power Chassis and Voltage Sensing Isolation Plugs PL12 & PL 15 are disconnected prior to energizing the supply sources. Manually place the transfer switch mechanism in the neutral position prior to applying power. Failure to do so may result in equipment failure or personal injury.

NOTE: The Typical Automatic Transfer Switch Commissioning Procedures Model Series TS 970, Appendix A, is provided for general information only pertaining to typical site installations and applications.

Contact Thomson Power Systems for further information as may be required.

5. AUTOMATIC SEQUENCE OF OPERATION

5.1. *STANDARD ATS - OPEN TRANSITION*

When utility supply voltage drops below a preset nominal value (adjustable from 50% to 95% of nominal) on any phase, an engine start delay circuit is initiated and the transfer to utility supply signal will be removed (i.e. contact opening). Following expiry of the engine start delay period (adjustable from 0 to 30 sec.) an engine start signal (contact closure) will be given.

Once the engine starts, an engine warm-up timer will be initiated. Once the warm-up timer expires (adjustable from 0 to 60 min.), the Transfer to Generator Supply signal (contact closure) will be given to the power contactor mechanism. The load will then transfer from the utility supply to the generator supply via the motor operated mechanism.

The generator will continue to supply the load until the utility supply has returned. The retransfer sequence is completed as follows: when the utility supply voltage is restored to above 90% of nominal voltage on all phases, a transfer return delay circuit will be initiated. Following expiry of the Utility Return Timer (adjustable from 0 to 60 min), the Transfer to Generator Supply signal will be removed (contact opening), then the Transfer to Utility Supply signal (contact closure) will be given to the transfer switch mechanism. The ATS will then retransfer the load from the generator supply back to the utility supply.

NOTE: A neutral delay timer circuit if enabled will delay the transfer sequence in the neutral position until the neutral delay time period expires.

An engine cooldown timer circuit will be initiated once the load is transferred from the generator supply. Following expiry of the cooldown delay period (adjustable from 0 to 60 minutes), the engine start signal will be removed (contact opening) to initiate stopping of the generator set.

5.2. *TEST MODES*

The transfer switch may be tested utilizing the TSC 7320 test mode push buttons or remote power fail test input. A simulated utility power failure condition will be activated when the test mode is selected. The transfer switch will operate as per a normal utility power fail condition.

The transfer switch will remain on generator supply until the test mode is terminated. It will then immediately transfer back to the utility supply and then continue to operate the generator set for its cooldown period then stop.

NOTE: The transfer switch will automatically return to the utility supply (if within nominal limits) if the generator set fails while in the test mode.

5.2.1. ON LOAD TEST

To initiate an ATS On Load Test, press the test button on the TSC 7320 controller to enter test mode.

Next, press the gen start button (green), and the controller will start the generator and once it reaches the nominal voltage and frequency, the switch will be transferred to the generator and take over the load.

To stop the on-load test and return to normal, press the auto button, and the controller will start a utility return delay timer, and transfer back to the utility when the timer expires. The generator will continue to run until the cooling expires, and then it will turn off the generator.


Note :

Pushing the red stop button will initiate a return to Utility request followed by an engine stop. If the utility is available, the ATS will transfer to utility and stop the engine ignoring any countdown timers. If the Utility is not available, the controller will turn off the generator, and generate a *Mains Fail to Close Alarm*.

5.2.2. OFF LOAD TEST

To initiate an ATS off load test, press the manual button on the TSC 7320 controller to enter manual mode.

Next, press the gen start button (green), and the controller will start the generator, but the switch will NOT transfer to generator, even if the source is healthy.

To stop the off-load test and return to normal, press the STOP button, and the controller will turn off the generator. If the Auto mode button is pushed, the controller will start a countdown timer and then turn off the generator.


6. GENERAL NOTES ON SERVICING POWER CONTACTOR ATS

DANGER

Arc Flash and Shock Hazard. Will cause severe injury or death. Do not open equipment until ALL power sources are disconnected. This equipment must be installed and serviced only by qualified electrical personnel utilizing safe work practices and appropriate Personal Protective Equipment (PPE). Failure to do so may cause personal injury or death.

NOTE: Refer to *SECTION 4.2* of this manual for identification of Power Contactor type supplied for the Transfer Switch.

6.1. EQUIPMENT INSPECTION

When performing any service work on the power contactor ATS, it is imperative that the following be observed:

To maintain mechanical integrity, ensure that:

- All fasteners are adequately tightened.
- Power contactor arc chute are in good condition.
- Power contactor is free of dust, dirt, soot, grease, moisture and corrosion.

To maintain electrical integrity, ensure that:

- All electrical connections, especially power connections, are clean and adequately tightened. Corroded or loose power connections will cause destructive heating and may cause premature tripping.
- All insulating devices are in place and in good condition.
- No moisture or other contamination is present.
- Electrical conductors are adequately secured away from moving parts.

To maintain operational integrity, ensure that:

- All control devices are in good condition and correctly calibrated.
- All control devices including TSC 900 connectors are adequately secured in their plug-in fixtures.

6.2. RECOMMENDED MAINTENANCE

Only qualified personnel should undertake Service work. Failure to correctly maintain an automatic transfer switch may present a hazard to life and equipment. Full operational testing must be done prior to placing a transfer switch in service subsequent to any maintenance or repair. Any service work involving electrical components requires high-potential testing to ensure that required insulation levels have been maintained.

- Do not perform dielectric tests on the equipment with the control components in the circuit.
- Check if control components are tight in sockets.
- Periodically inspect all terminals (load, line and control) for tightness. Re-torque all bolts, nuts and other hardware. Clean or replace any contact surfaces which are dirty, corroded or pitted.
- Transfer switches should be in a clean, dry and moderately warm location. If signs of moisture are present, dry and clean transfer switch. If there is corrosion, try to clean it off. If cleaning is unsuitable, replace the corroded parts. Should dust and/or debris gather on the transfer switch, brush, vacuum, or wipe clean. Do not blow dirt into power contactor unit.
- Test the transfer switch operation. While the unit is exercising, check for freedom of movement, hidden dirt, corrosion or any excessive wear on the mechanical operating parts. Ensure that the power contactor unit operate without excessive noise.
- Verify all program settings on the TSC 900 Controller are as per the programming sheet supplied with the transfer switch.

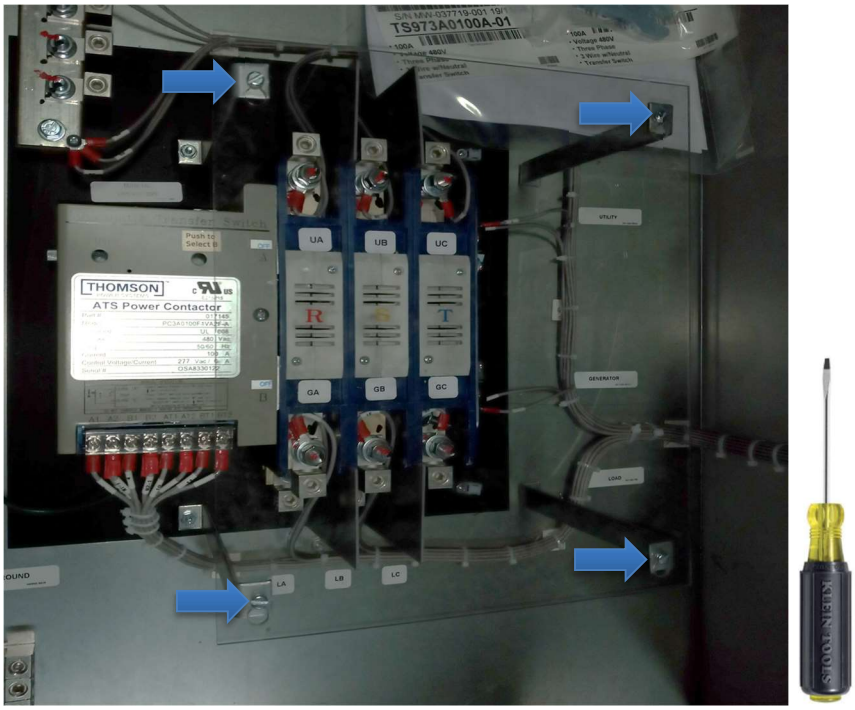
6.3. POWER CONTACTOR REPLACEMENT (100-400A)

DANGER

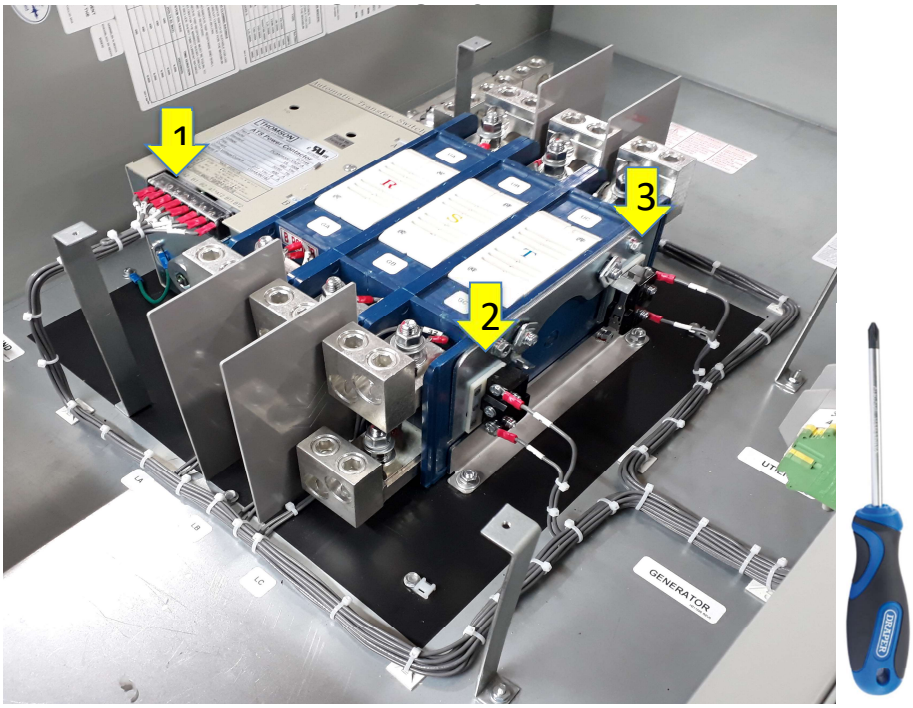
Do not open equipment until ALL power sources are disconnected

Appropriate Personal Protective Equipment (PPE) must be worn before handling heavy objects. Failure to do so may cause personal injury or death.

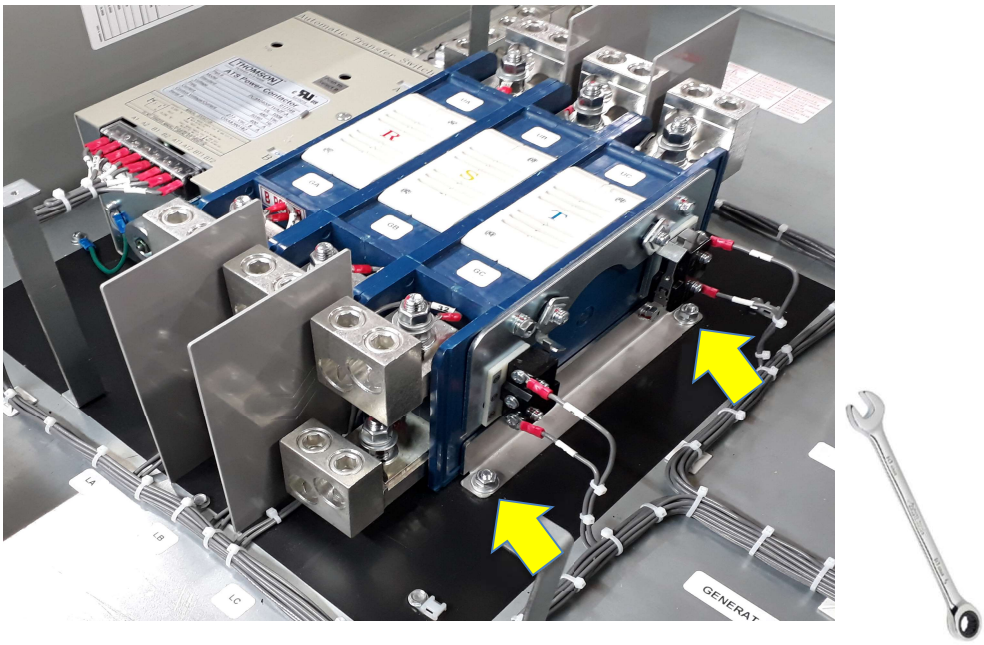
1. Using a flat screw driver, loosen screws holding the vinyl protector shown in the figure below.
2. Release the vinyl protector from the metal support basses by sliding it upwards, then pulling outwards to disconnect.



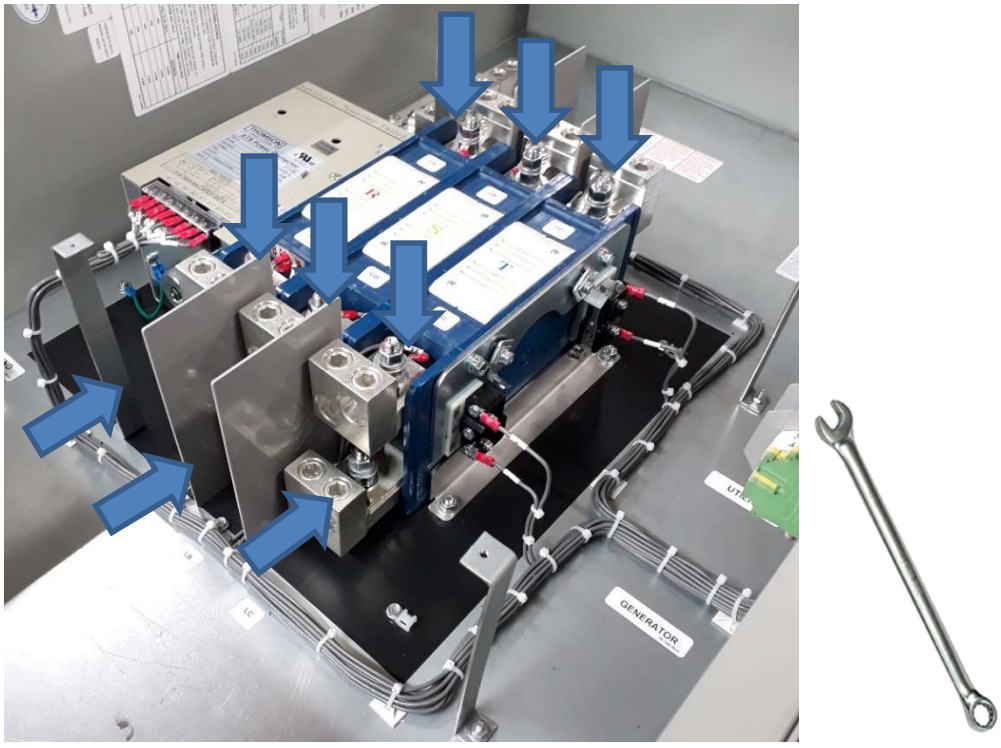
3. Disconnect harness connections on the power contactor (1) and limit switches (2 and 3) shown in the figure below. Use a cross screw driver.



4. Remove the bolts located at the base of the power contactor using a 7/16” wrench.



5. Loosen lug nut fasteners (9 in total) by using a 5/16” wrench. Disconnect all wire terminals.
   NOTE: Remember to note all wire locations for proper re-installation



6. Replace the power contactor then repeat steps 1 through 5 backwards to re-assemble the new contactor.

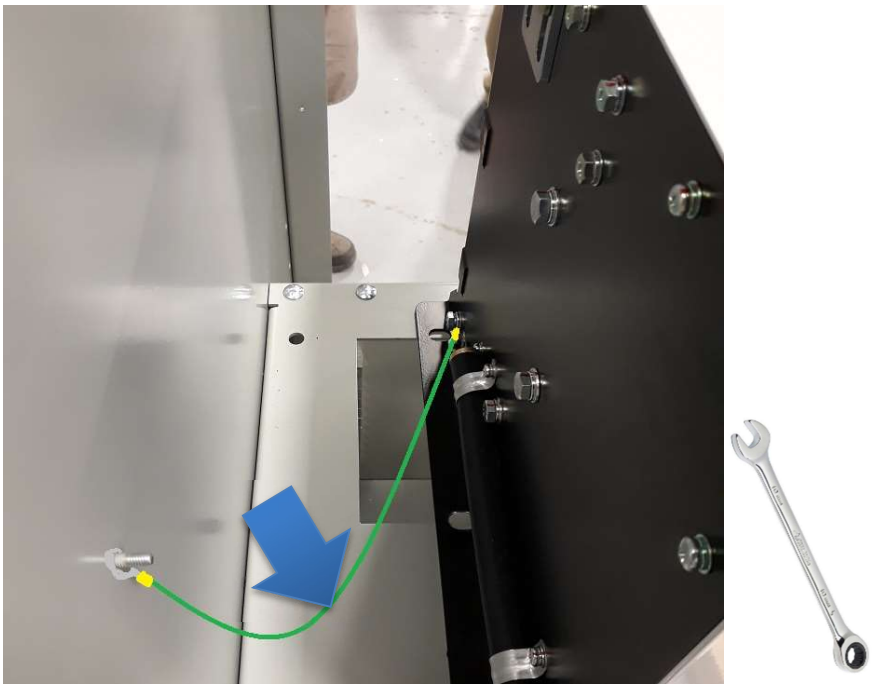
6.4. POWER CONTACTOR REPLACEMENT (600-1200A)

DANGER

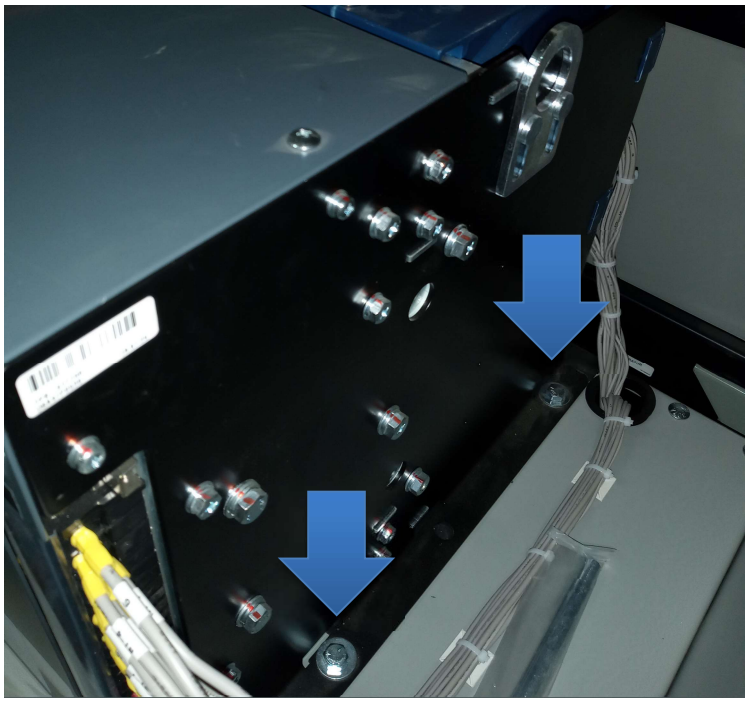
Do not open equipment until ALL power sources are disconnected

Appropriate Personal Protective Equipment (PPE) must be worn before handling heavy objects. Failure to do so may cause personal injury or death.

1. Remove nuts holding the wire located between the PC and the power contactor sheet metal at the left side of the panel. Use a 7/16” wrench tool.

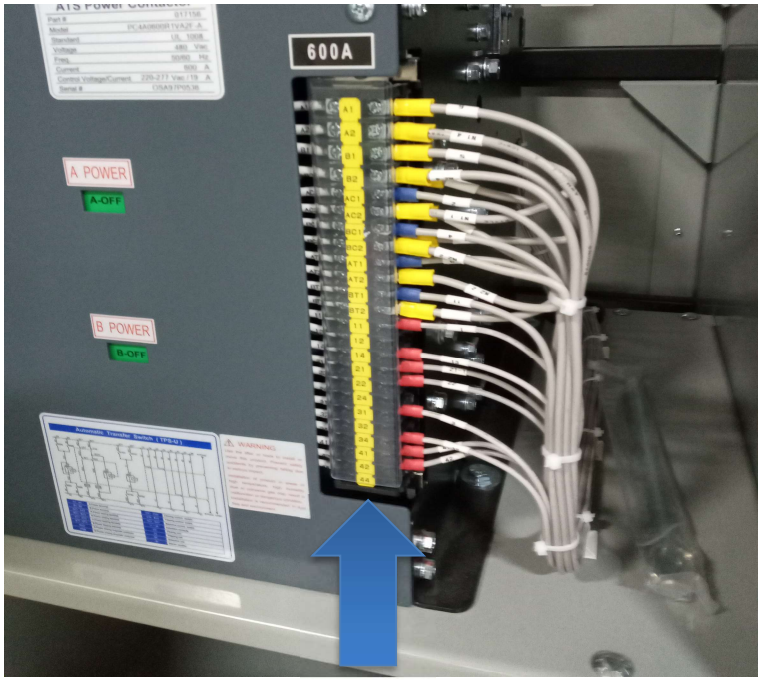


2. Remove all bolts, washers and nuts holding the base of the power contactor using a 3/8” wrench tool.

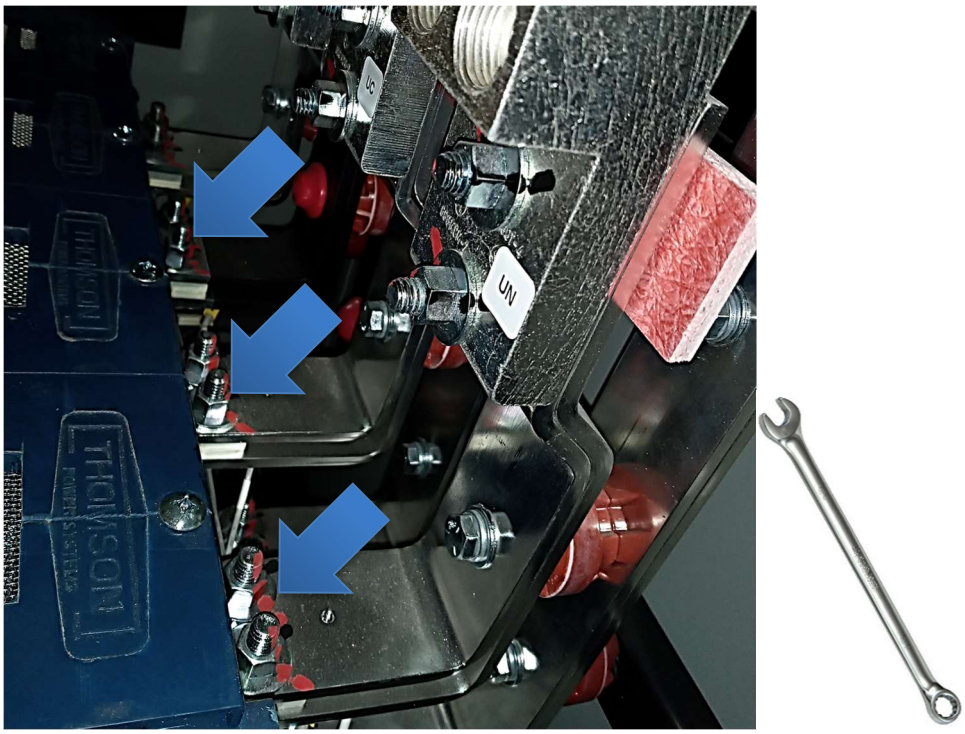


3. Disconnect all control wiring by loosening all wire terminals of the power contactor. Use a cross screw driver. Ensure all wires are successfully removed.

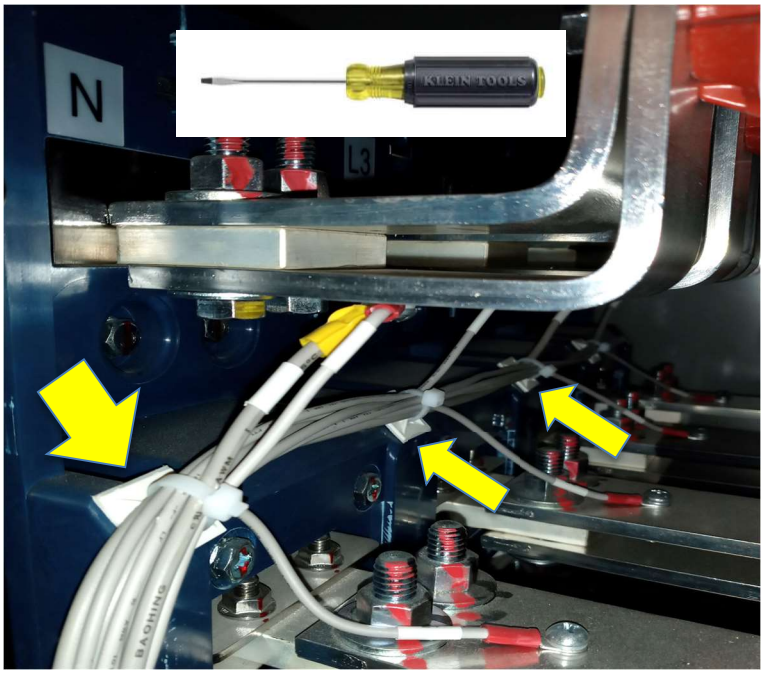
   NOTE: Please note wire locations before disconnecting for proper re-installation.



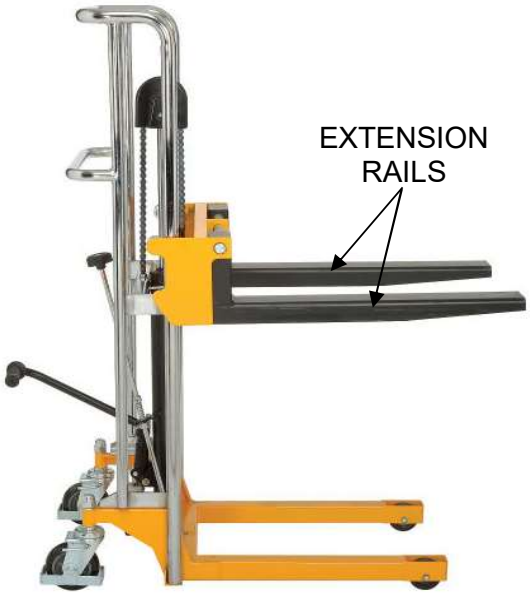
4. Remove all bolts holding the busbars to the power contactor as shown in figure below. Use a 3/8” wrench.



5. Using a flat screw driver, de-attach all sticky pads from the power contactor to release it from the harness.



6. Withdraw the contactor to its disconnected position away from the busbars.
7. Align the extension rails (shown below) of a scissor lift into the power contactor compartment.
8. Carefully pull the contactor onto the extension rails until it is completely withdrawn into the rails.
9. As the contactor is placed onto the rails, safely lower and slide away the scissor lift.



10. Replace the power contactor then repeat steps 1 through 6 backwards to re-assemble the new contactor.

7. ATS MANUAL OPERATING INSTRUCTIONS

DANGER

Arc Flash and Shock Hazard. Will cause severe injury or death. Do not open equipment until ALL power sources are disconnected. This equipment must be operated only by qualified electrical personnel utilizing safe work practices and appropriate Personal Protective Equipment (PPE). Failure to do so may cause personal injury or death.

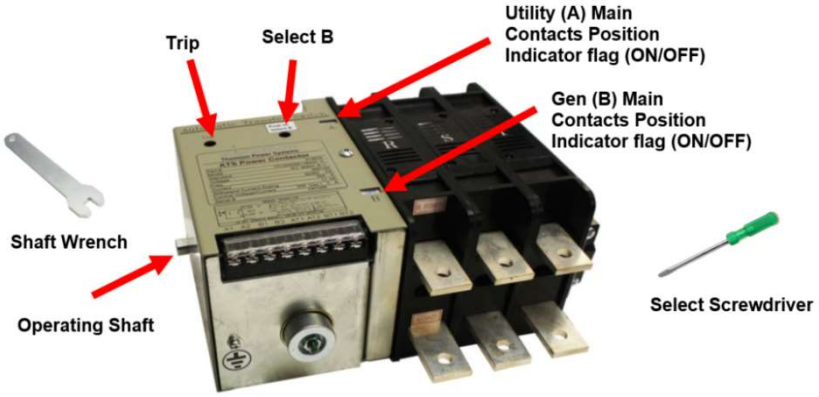
The transfer switch maybe operated manually for maintenance or emergency operation conditions provided both Utility and Generator supplies are de-energized prior to manual operation.



DANGER
HAZARD OF ELECTRICAL SHOCK, EXPLOSION, OR ARC FLASH
This equipment must be serviced only by qualified electrical personnel utilizing safe work practices and appropriate Personal Protective Equipment (PPE).
Many components of this equipment operate at line voltage.
DO NOT TOUCH. Use only electrically isolated tools.
Install and close all covers before applying power to this equipment
Do not open covers to equipment until ALL power sources are disconnected
Failure to do so may cause personal injury or death

7.1. 100A – 400A POWER CONTACTOR ATS MANUAL OPERATION

Shaft wrench and Trip / Select screwdriver are supplied loose with the transfer switch for manual operation.



Once both Utility and Generator supplies are de-energized the following procedure can be used to operate the Transfer Switch Manually.

7.1.1. MANUAL CLOSING TO UTILITY POSITION (SIDE A)

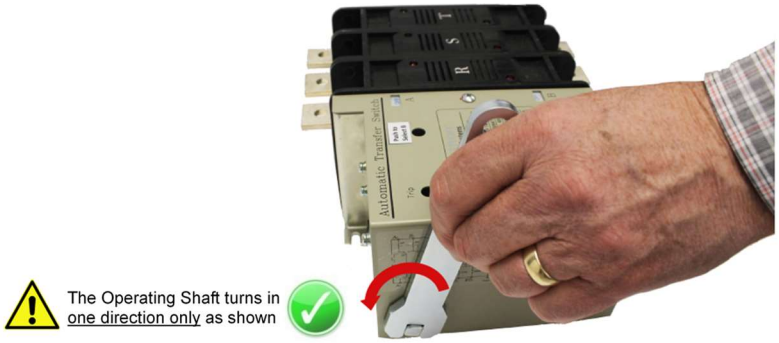
1. With all power de-energized, open ATS enclosure door and locate manual operation handles (Shaft wrench & Screwdriver).

2. Un-plug the ATS control isolation plug (PL-15) to prevent automatic operation (refer to **SECTION 8** for photo showing location of PL-15).

3. **Trip Open Generator (Side B) Main Contacts** by inserting the screwdriver into the "TRIP" hole as shown below and pushing until Gen Main Contacts open as shown by the Gen Position Indicator flag "OFF".

4. **Close Utility (Side A) Main Contacts** by attaching the shaft wrench onto the Power Contactor Operating Shaft as shown below and rotating the shaft wrench in the direction shown below until the Utility Main Contacts latch closed as shown by the Utility "ON" indicator.

   NOTE:
   - DO NOT over-torque the shaft wrench / operating shaft handle once position has been attained.
   - DO NOT turn the shaft wrench in the opposite direction as the operating shaft turns in one direction only.



5. Once ATS is manually operated to the Utility "ON" position, remove the shaft wrench & screwdriver from the Power Contactor and secure them away from any live power sources.

6. Close ATS door and re-energize Utility power to return power to the load.

7.1.2. MANUAL CLOSING TO GENERATOR POSITION (SIDE B)

1. With all power de-energized, open ATS enclosure door and locate manual operation handles (Shaft wrench & Screwdriver)

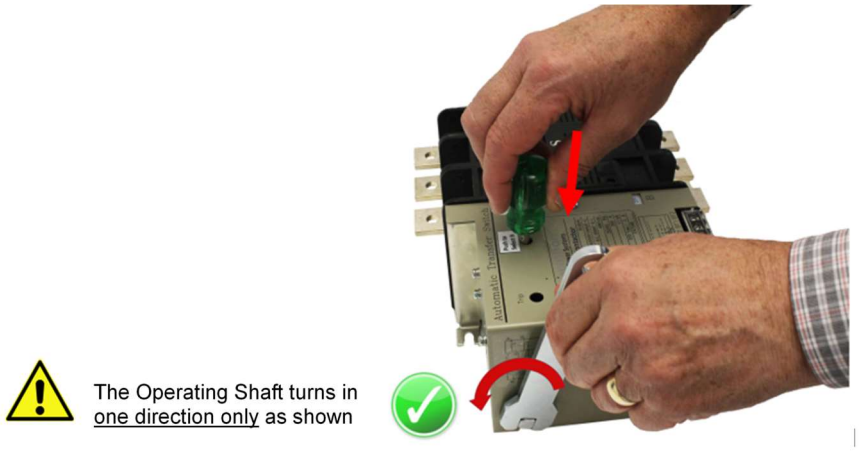
2. Un-plug the ATS control isolation plug (PL-15) to prevent automatic operation (refer to **SECTION 8** for photo showing location of PL-15).

3. **Trip Open Utility (Side A) Main Contacts** by inserting the screwdriver into the “TRIP” hole as shown below and pushing until Utility Main Contacts open as shown by the Utility Position Indicator flag “OFF”

4. **Close Generator (Side B) Main Contacts** by using both shaft wrench and screwdriver simultaneously as described below:

   Insert the screwdriver into the SELECT B hole and while pushing and holding the screwdriver in, attach the shaft wrench onto the Power Contactor Operating Shaft and rotate the shaft wrench in an upward direction until the Gen Main contacts latch closed as shown by the Generator Position Indicator flag “ON”.

   NOTE:
   - DO NOT over-torque the shaft wrench/operating shaft handle once position has been attained.
   - DO NOT force the shaft wrench in the opposite direction as shown as the operating shaft turns in one direction only.

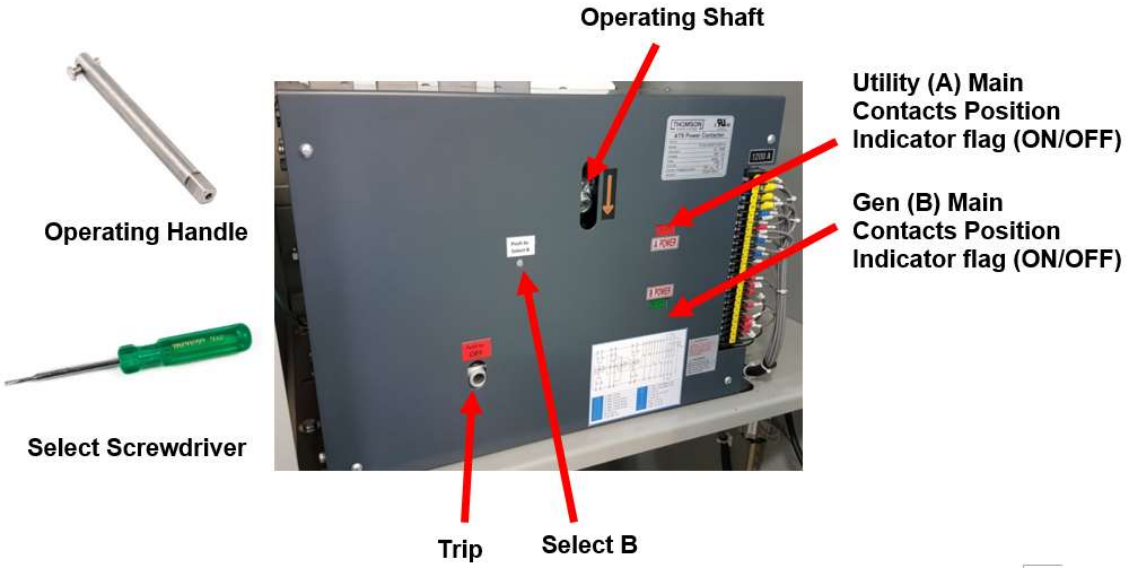


5. Once ATS is manually operated to the Generator “ON” position, remove the shaft wrench & screwdriver from the Power Contactor and secure them away from any live power sources.

6. Close ATS door and re-energize Generator power to return power to the load.

7.2. 600A – 1200A POWER CONTACTOR ATS MANUAL OPERATION

Operating handle and select screw driver are supplied loose with the transfer switch for manual operation.



Once both Utility and Generator supplies are de-energized the following procedure can be used to operate the Transfer Switch Manually.

7.2.1. MANUAL CLOSING TO UTILITY POSITION (SIDE A)

1. With all power de-energized, open ATS enclosure door and locate manual operation handles (Operating handle & Screwdriver).

2. Un-plug the ATS control isolation plug (PL-15) to prevent automatic operation (refer to **SECTION 9** for photo showing location of PL-15).

3. **Trip Open Generator (Side B) Main Contacts** by inserting the operating handle into the “TRIP” lever as shown below and pushing until Gen Main Contacts open as shown by the Gen Position Indicator flag “OFF”.

4. **Close Utility (Side A) Main Contacts** by inserting the operating handle onto the Power Contactor Operating Shaft and move in the direction shown below until the Utility Main Contacts latch closed as shown by the Utility “ON” indicator.

   NOTE:
   - DO NOT over-torque the Shaft Operating Shaft handle once position has been attained

5. Once ATS is manually operated to the Utility “ON” position, remove the operating handle from the Power Contactor and secure them away from any live power sources.

6. Close ATS door and re-energize Utility power to return power to the load.

7.2.2. MANUAL CLOSING TO GENERATOR POSITION (SIDE B)

1. With all power de-energized, open ATS enclosure door and locate manual operation handles (Operating handle & Screwdriver).

2. Un-plug the ATS control isolation plug (PL-15) to prevent automatic operation (refer to **SECTION 9** for photo showing location of PL-15).

3. **Trip Open Utility (Side A) Main Contacts** by inserting the operating handle into the “TRIP” lever as shown below and pushing until Utility Main Contacts open as shown by the Utility Position Indicator flag “OFF”.

4. **Close Generator (Side B) Main Contacts** by using both operating handle and screwdriver simultaneously as described below:

   Insert the screwdriver into the SELECT B hole and while pushing and holding the screwdriver in, insert the operating handle onto the Power Contactor Operating Shaft and move in the direction shown below until the Gen Main contacts latch closed as shown by the Generator Position Indicator flag “ON”.

   NOTE:

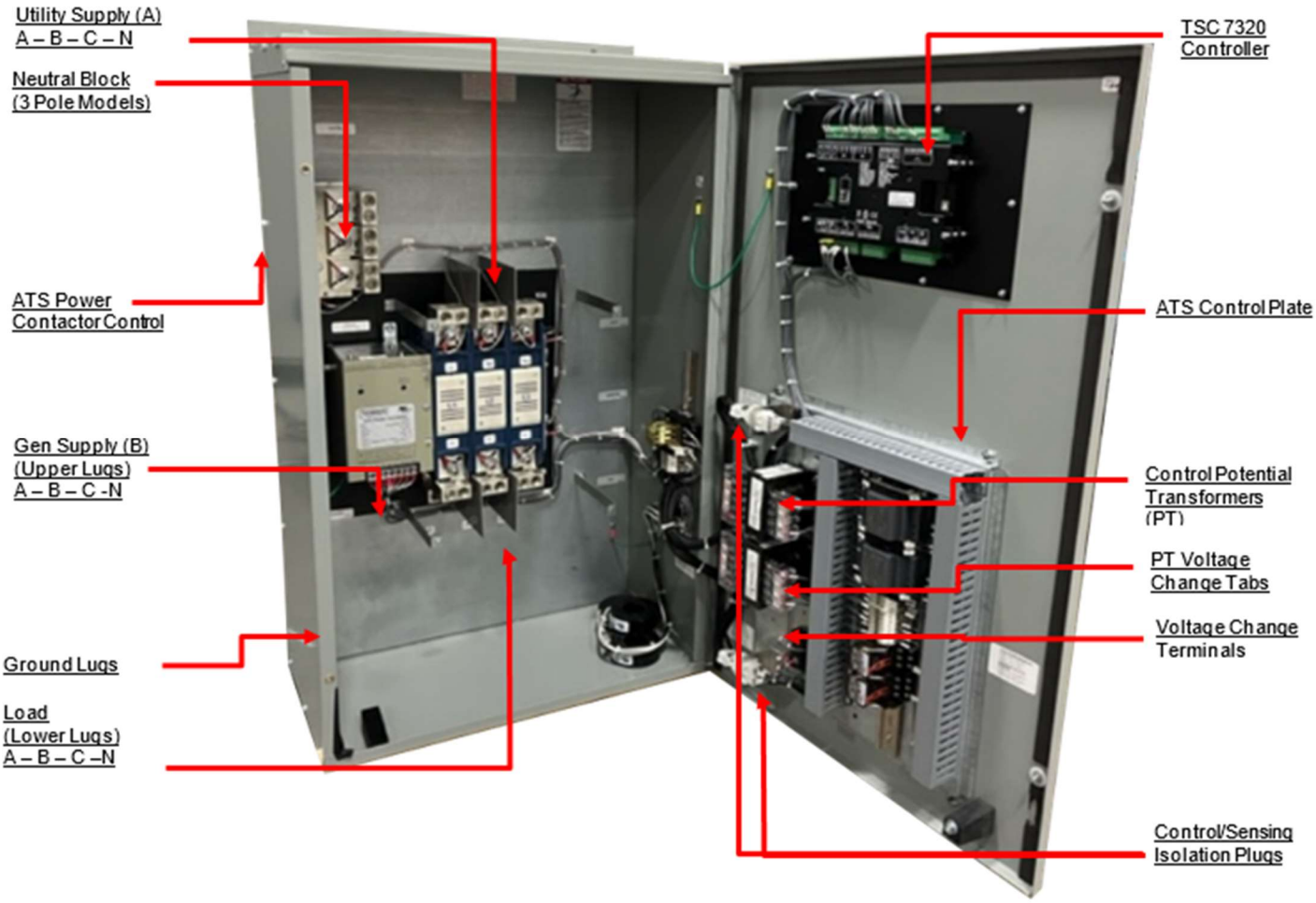
   - DO NOT over-torque the operating shaft handle once position has been attained.



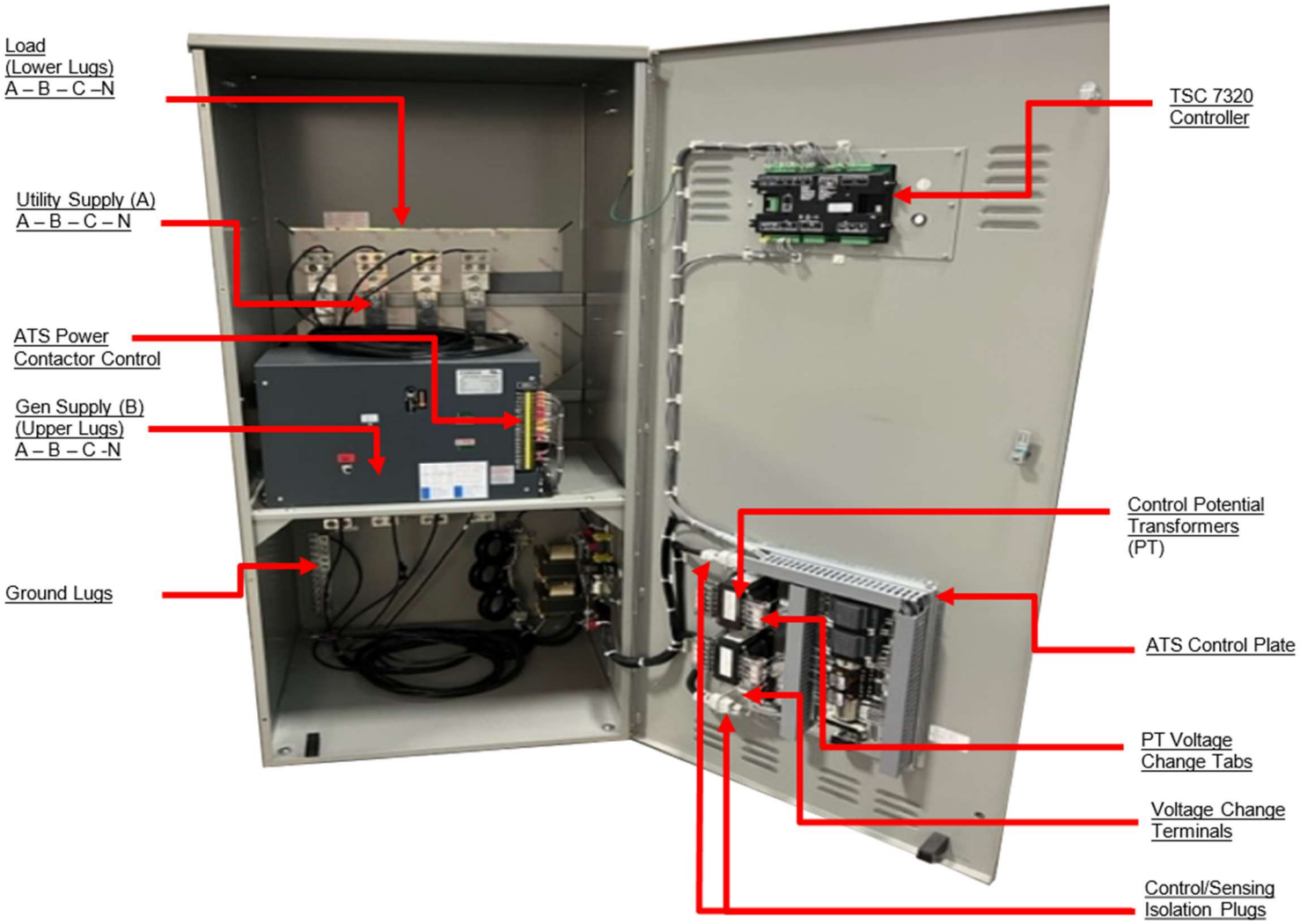
5. Once ATS is manually operated to the Generator “ON” position, remove the operating handle & screwdriver from the Power Contactor and secure them away from any live power sources.

6. Close ATS door and re-energize Generator power to return power to the load.

8. ISOMETRIC VIEW - 3 / 4 POLE, 100A - 400A ATS (TYPICAL)



9. ISOMETRIC VIEW - 3 / 4 POLE, 600A - 1200A ATS (TYPICAL)



10. CABLE TERMINAL INFORMATION

BASIC MODEL	TERMINAL RATING		CONNECTION TIGHTNESS (In-lbs.)	
	QTY PER PHASE	RANGE	TERMINAL MOUNTING SCREW	CABLE CLAMP
TS 97xA-0100	1	#6-300 MCM	120	50
TS 97xA-0150	1	#6-300 MCM	120	120
TS 97xA-0200	1	#6-300 MCM	150	275
TS 97xA-0250	1	#6-300 MCM	150	275
TS 97xA-0400[1]	2	2/0-500MCM	72	275
TS 97xA-0600[1]	4	#4-600MCM	72	275
TS 97xA-0800[1]	4	#4-600MCM	110	375
TS 97xA-1000[1]	4	#4-600MCM	110	375
TS 97xA-1200[1]	4	#4-600MCM	375	375

1. Optional terminal ratings are available in some models – Consult Thomson Power Systems.

2. For other model types not shown, contact Thomson Power Systems for further information.

11. SHORT CIRCUIT WITHSTAND AND CLOSING RATINGS (ANY BREAKER)

MODEL	RATED CURRENT (AMPS)	MAX VOLTAGE (VAC)	WITHSTAND CURRENT RATING AMPS (RMS)[1]			
			WCR 50mS (RMS SYM)	WCR 17mS (RMS SYM)	SPECIFIC BREAKER (RMS SYM)	WCR HRC FUSE (RMS SYM)
TS 97xA-0100	100A	480V	5,000	5,000	35,000	200,000
TS 97xA-0150	150A	480V	14,000	14,000	65,000	200,000
TS 97xA-0200	200A	480V	14,000	14,000	65,000	200,000
TS 97xA-0250	250A	480V	14,000	14,000	65,000	200,000
TS 97xA-0400	400A	480V	14,000	14,000	65,000	200,000
TS 97xA-0600	600A	480V	35,000	85,000	200,000	200,000
TS 97xA-0800	800A	480V	42,000	100,000	100,000	200,000
TS 97xA-1000	1000A	480V	42,000	100,000	100,000	200,000
TS 97xA-1200	1200A	480V	50,000	100,000	100,000	200,000

1. For other model types not shown, contact Thomson Power Systems for further information.

Note : Refer PM167 supplement document for short-circuit withstand / closing and short time ratings specific circuit breaker manufacturer and type listing.

12. GROUND FAULT SITE TEST REQUIREMENTS

Per NEC and UL1008, a ground fault protected system shall be performance tested when first installed on site. A written record of this shall be made and be available to the authority having jurisdiction. A form is provided at the back of this manual for this purpose – see ***SECTION 17***.

Confirm and record actual trip set points in the form provided which is to be made available on request by inspection authority.

12.1. *PERFORMANCE TEST*

Qualified Field Service technicians require a calibrated current injection test apparatus and must be knowledgeable in breaker testing to provide primary neutral CT injection up to or greater than the trip set point as selected by the responsible party. As indicated in the NEC, the maximum setting of the ground fault protection shall be 1200 amps, and the maximum time delay shall be 1 second for ground faults equal to or greater than 3000 amps.

The inspection authority should be contacted to confirm actual test requirements as these may vary by region or local code requirements.

The interconnected system shall be evaluated to ensure compliance with the appropriate schematic drawings. The proper location of sensors and power cabling shall be determined. The grounding points of the system shall be verified to determine that ground paths do not exist that would bypass the sensors. The use of high-voltage testers and resistance bridges may be required. A simulated fault current is to be generated by a coil around the sensors. The reaction of the circuit-interrupting device is to be observed for correct response. The results of the test are to be recorded on the test form provided.

13. TROUBLESHOOTING

DANGER

Arc Flash and Shock Hazard. Will cause severe injury or death.

Do not open equipment until ALL power sources are disconnected

This equipment must be installed and serviced only by qualified electrical personnel utilizing safe work practices and appropriate Personal Protective Equipment (PPE). Failure to do so may cause personal injury or death

13.1. *GENERAL TROUBLESHOOTING*

MALFUNCTIONS	PROBABLE CAUSES	CORRECTIVE ACTIONS
Will not re-transfer to utility source upon restoration	Utility Return Time (mains transient) delay period in TSC 7320 has not yet expired.	Verify TSC 7320 time delay setting
	A Load Test mode has been activated locally or remotely	Check TSC 7320 load test LED status indicators
	An Exercise Test mode has been activated by the TSC 7320 scheduler	Check TSC 7320 status screen for Exercise Test is active
Will not re-transfer to utility source upon restoration	Utility supply is not operating at correct voltage or frequency levels.	Verify correct nominal levels the utility source should be operating at and compare to TSC 7320 settings for under/over voltage, voltage phase balance and under/over frequency
	TSC 7320 has incorrect utility voltage or frequency settings for the ATS.	Re-Program TSC 7320 with correct settings as required for voltage or frequency.
Will not transfer to generator source upon failure of utility source	Utility Phase Rotation is not matched with Generator supply (first time transfer).	Check Generator & Utility Voltage Phase rotation matches on TSC 7320 GHC Utility & Generator Voltage Pages. If power cabling has non-matching phase rotation, reverse power conductors on one phase on one of the supplies
	TSC 7320 utility voltage sensing connection plug (38,39,40,41) is unplugged	Verify all TSC 7320 connectors are fully inserted
	ATS Power Chassis & Voltage Sensing Isolation Plugs (PL12 or PL15) are unplugged	Verify both PL12 & PL15 connectors are fully inserted
	TSC 7320 has “Transfer Fail” alarm activated.	Determine cause of alarm and rectify before TSC 7320 controller is reset
	Defective Power contactor unit close coil	Refer to Power Contactor unit Troubleshooting Section
	Defective Power contactor unit trip coil	Refer to Power Contactor unit Troubleshooting Section
	Faulty Power contactor unit	Refer to Power Contactor unit Troubleshooting Section
Will not transfer to generator source upon failure of utility source (con’t)	A loose control wire connection	Check all wiring connections in the ATS
	Defective TSC 7320 controller	Verify TSC 7320 has 24VDC control power applied to the battery power input (1,2), then press and hold the lamp test button, and ensure all 12 LED lights on the front panel light up

		If defective, return to Thomson Power systems using RMA process
	Faulty Power Contactor unit auxiliary contact	Verify Generator & Utility auxiliary contacts are operating correctly
	Transfer Mode selector is not in “Auto” position	Turn Transfer Mode selector to “Auto” position
	Warm-up time delay function has not timed out yet	Verify TSC 900 timer setting
	Generator set output circuit breaker which feeds ATS is open	Close generator set output circuit breaker
	Generator supply is not operating at correct voltage or frequency levels.	Verify correct nominal levels the generator should be operating at and compare to TSC 7320 Settings for under/over voltage, voltage phase balance and under/over frequency
Will not transfer to generator source upon failure of utility source	TSC 7320 has incorrect generator voltage or frequency settings for the ATS.	Re-Program TSC 7320 with correct settings as required for voltage or frequency.
	Generator Phase Rotation may not match Utility supply (First Time Transfer).	Check Generator & Utility Voltage Phase rotation matches on TSC 7320 GHC Utility & Generator Voltage Pages. If power cabling has non-matching phase rotation, reverse power conductors on one phase on one of the supplies
	TSC 7320 Generator voltage sensing connection plug (34,35,36,37) is unplugged	Verify all TSC 7320 connectors are fully inserted
	ATS Power Chassis & Voltage Sensing Isolation Plugs (PL12 or PL15) are unplugged	Verify both PL12 & PL15 connectors are fully inserted
	TSC 7320 has “Transfer Fail” alarm activated.	Determine cause of alarm and rectify before resetting the alarm at TSC 7320
	Defective Power contactor unit close coil	Refer to Power Contactor unit Troubleshooting Section
	Defective Power contactor unit trip coil	Refer to Power Contactor unit Troubleshooting Section
Will not transfer to generator source upon failure of utility source (con’t)	Faulty Power contactor unit	Refer to Power Contactor unit Troubleshooting Section
	Transfer Mode selector is not in “Auto” position	Turn Transfer Mode selector to “Auto” position

Transfer to generator source without a power failure in the utility source		
	A loose control wire connection	Check all wiring connections in the ATS
	Defective TSC 7320 controller	Verify TSC 7320 has 24VDC control power applied to the battery power input (1,2), then press and hold the lamp test button, and ensure all 12 LED lights on the front panel light up If defective, return to Thomson Power systems using RMA process
	Faulty Power Contactor unit auxiliary contact	Verify Generator & Utility auxiliary contacts are operating correctly
	A Load Test mode has been activated locally or remotely	Check TSC 7320 Home Page status indicators
	An Exercise Test mode has been activated by the TSC 7320 scheduler	Check TSC 7320 status screen for Exercise Test is active
	Utility supply is not operating at correct voltage or frequency levels.	Verify correct nominal levels the utility source should be operating at and compare to TSC 7320 settings for under/over voltage, voltage phase balance and under/over frequency
	TSC 7320 has incorrect utility voltage or frequency settings for the ATS.	Re-Program TSC 7320 with correct settings as required for voltage or frequency.
Transfer to generator source without a power failure in the utility source ***Generator does not start or stop when it should***	Utility power switching device has tripped open due to an over current condition and TSC 7320 “Mains Breaker Tripped” alarm is displayed.	Determine cause of alarm and rectify before TSC 7320 is reset.
	A loose control wire connection	Check all wiring connections in the ATS
	Defective TSC 7320 controller	Verify TSC 7320 has 24VDC control power applied to the battery power input (1,2), then press and hold the lamp test button, and ensure all 12 LED lights on the front panel light up If defective, return to Thomson Power systems using RMA process
	Remote engine control panel is not set to automatic mode	Verify remote engine control panel is set for automatic operation
Generator does not start or stop when it should ***No time delay when there should be***	Engine start contact is wired incorrectly from ATS to engine control panel	Verify engine start contact is wired correctly from ATS to engine control panel
	TSC 7320 Engine start contact connection plug (30,31) is unplugged	Verify all TSC 7320 connectors are fully inserted
	Defective TSC 7320 controller	Verify TSC 7320 has 24VDC control power applied to the battery power input (1,2), then press and hold the

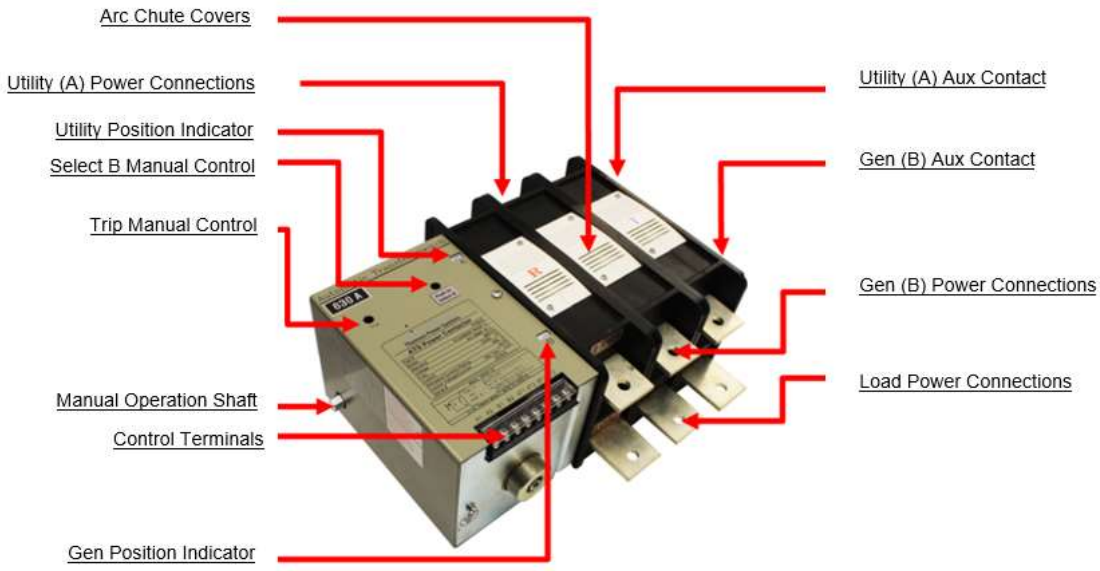
		lamp test button, and ensure all 12 LED lights on the front panel light up If defective, return to Thomson Power systems using RMA process
	Engine Start and/or Cooldown timers may be duplicated in both ATS control and Engine control Panel	Disable timers in Engine control panel.
	Incorrect TSC 7320 time delay setting	Verify TSC 7320 timer setting
TS 7320 Display is not showing any system information	Defective TS 7320 controller	Verify TSC 7320 has 24VDC control power applied to the battery power input (1,2), then press and hold the lamp test button, and ensure all 12 LED lights on the front panel light up If defective, return to Thomson Power systems using RMA process
TS 7320 Display is not showing any system information	TSC 7320 controller is not powered from 24Vdc aux supply	The TSC 720 controller needs 24Vdc aux power all the time. Verify Low power buffer module provides proper 24Vdc supply to TSC 7320 controller.

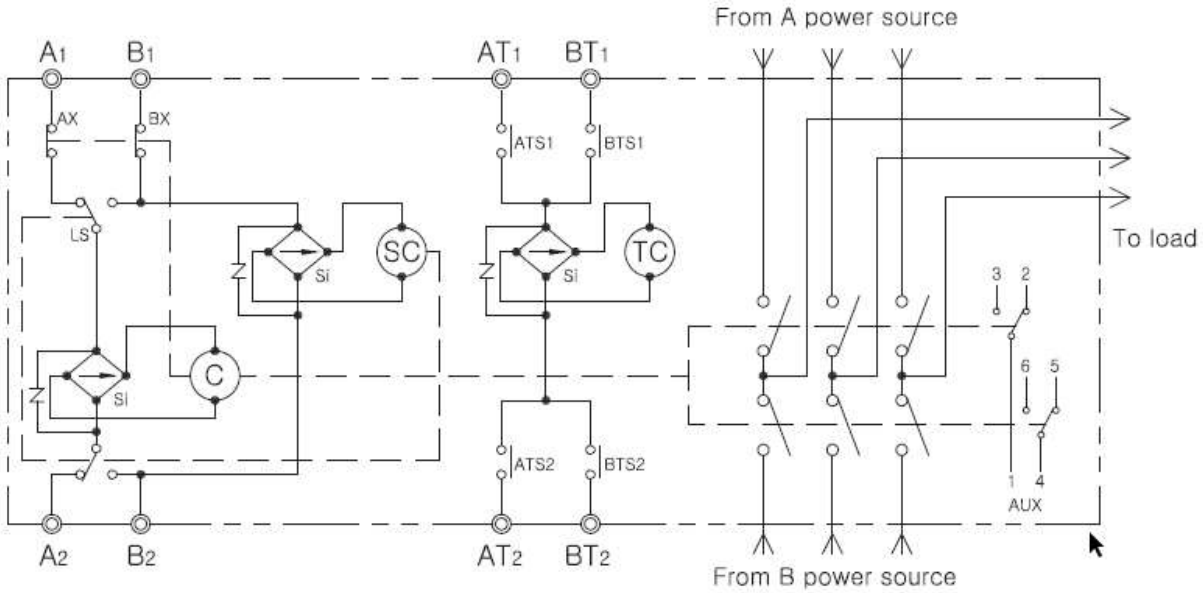
NOTE

There are no user serviceable components located on the TSC 7320 printed circuit board. If the TSC 7320 controller is deemed to be defective, they must be returned to the Thomson Power Systems Factory for repair or replacement. Please refer to Product Return Policy section of this manual further information on product return procedures required.

13.2. *POWER CONTACTOR UNIT DRAWING*

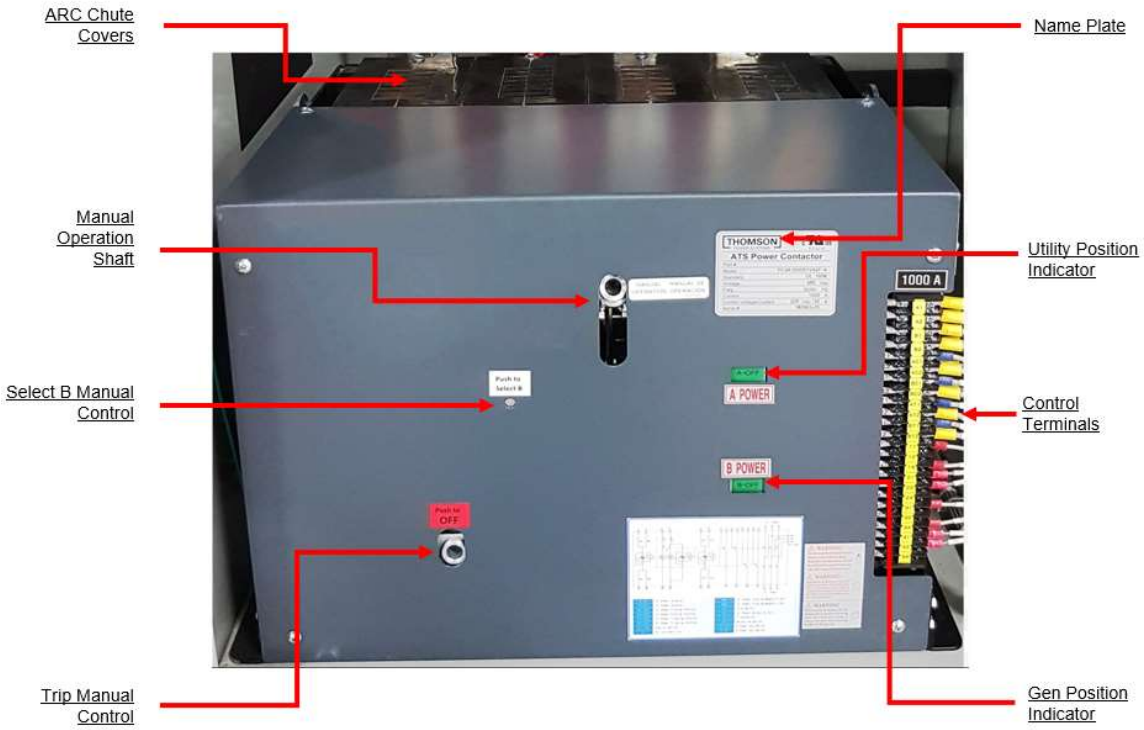
13.2.1. 100A – 400A POWER CONTACTOR (TYPICAL)

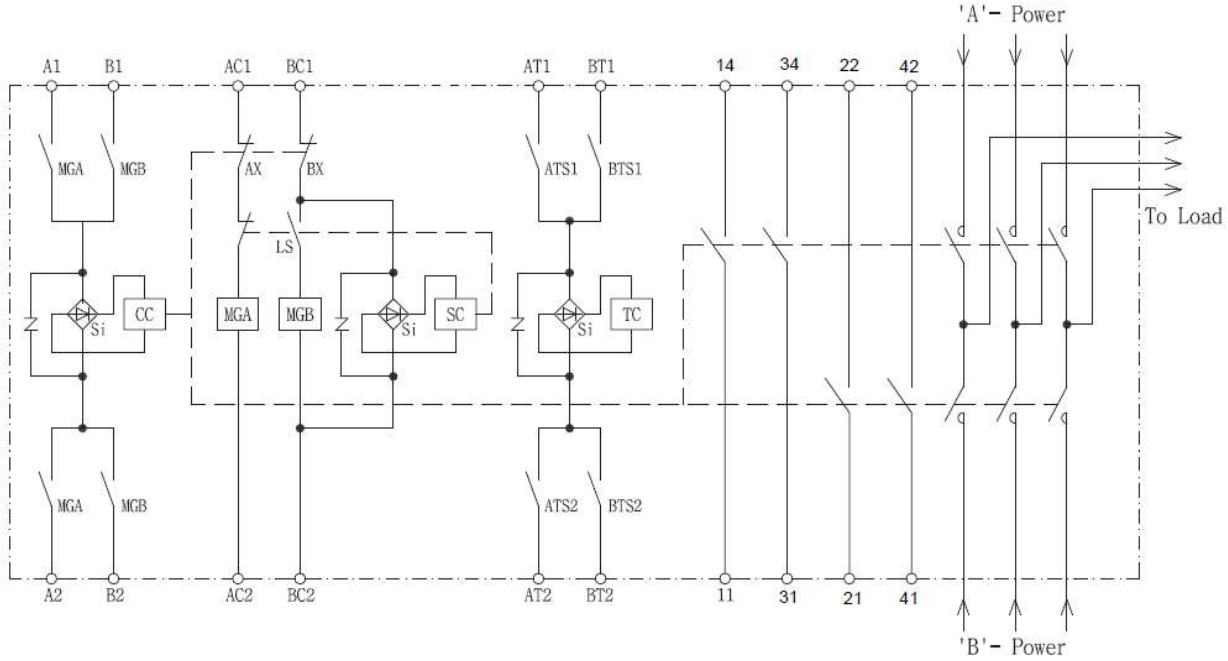




A1, A2	A-Power Closing Terminal	C	Closing Coil
B1, B2	B-Power Closing Terminal	SC	Selective Coil
AT1, AT2	A-Power Tripping Terminal	TC	Tripping Coil
BT1, BT2	B-Power Tripping Terminal	AX, BX	Control Switch
AUX	AUX Switch	ATS1, ATS2 BTS1, BTS2	Trip Control Switch
Si	Silicon Rectifier	LS	Selective Switch

13.2.2. 600A – 1200A POWER CONTACTOR (TYPICAL)





A1, A2	A-Power Terminal	MGA	A-Power Closing Magnetic Coil
B1, B2	B-Power Terminal	MGB	B-Power Closing Magnetic Coil
AC1, AC2	A-Power Closing Terminal	CC	Closing Coil
BC1, BC2	B-Power Closing Terminal	SC	B-Power Selective Coil
AT1, AT2	A-Power Tripping Terminal	TC	Tripping Coil
BT1, BT2	B-Power Tripping Terminal	LS	Selective Switch
AX, BX	AUX Switch	11~16	A-Power AUX Switch
Si	Silicon Rectifier	31~36	B-Power AUX Switch

14. REPLACEMENT PARTS

Replacement parts are available for the transfer switch as follows:

NOTE

When ordering replacement parts please provide the following information:

- Transfer Switch Model code
(e.g. TS 973A0400A1CM5AJJAA)

- Transfer Switch Serial Number (e.g. W-083456)

The above information can be found on the transfer switch equipment rating plate located on the outside of the ATS door

Component Description	Thomson Power Systems Part Number	Comments
TSC 7320 Controller Service Replacement	TSC7320SR	Must change the controller settings via the front panel prior to use. Refer to TSC 7320 Instruction Manual.
120VAC 10A Auxiliary Plug-in, 11 pin Square Relay	006161	Must ensure coil voltage is correct
24VDC 10A Auxiliary Plug-in Relay, 11 pin Square (UX/GX)	004095	Must ensure coil voltage is correct
100VA Control Transformer	009997	Change PT tabs to match panel voltage before installing

For other parts not listed, please contact Thomson Power Systems.

15. PRODUCT RETURN POLICY

Thomson Power Systems uses a Return Material Authorization (RMA) process. Please complete the Return Authorization Request Form (available on our web page) for return of goods, warranty replacement/repair of defective parts, or credit consideration and fax to the appropriate department.

Returns only: Email sales@thomsonps.com

Warranty replacement/Warranty Repair: Email support@thomsonps.com

Upon receipt of your request, Thomson Power Systems will confirm with a copy of our Order Acknowledgement via fax advising the RMA number which should be used to tag the defective controller prior to shipment.

16. NOTES

17. PERFORMANCE TEST FORM

This form should be retained by those in charge of the building electrical installation in order to be available to the authority having jurisdiction.

Date	Personnel	Tests performed	Comments
		Interconnection evaluation	
		Grounding point evaluation	
		Fault current test:	
		Ground fault settings - _____	
		Simulated current - _____	
		Results - _____	

APPENDIX "A"

THOMSON POWER SYSTEMS™	**TYPICAL TS 870 ATS COMMISSIONING PROCEDURES (S-Style 100A-800A)**

NOTE

The following commissioning procedures are provided for general information only pertaining to typical site installation and applications. Contact Thomson Power Systems for further information as may be required.

A) Pre-Energization Checks

1. Verify the generator and utility supply voltages match the model of the ATS ordered. If a different voltage is required, refer to procedure in Appendix B for voltage change programming procedure.
2. Confirm power cable size is correct for the lugs supplied in the transfer switch (line, load, and neutral) and are properly torqued.
3. Confirm transfer switch has been adequately grounded per NEC/CEC requirements.
4. Confirm power cables have been Insulation Resistance Tested to ensure no cross phase connections or conduction to ground.
5. Check to ensure there is no mechanical damage.
6. Check to ensure no packaging materials or tools are left inside the transfer switch.
7. Verify control wiring connected to terminal blocks are properly installed (i.e. no frayed ends, screws are tight, no damage, etc.).
8. Ensure ATS Power Chassis & Voltage Sensing Isolation Plugs (PL12 & PL15) are inserted and all TSC 7320 Controller plugs are inserted prior to operation.
9. Visually verify the transfer switch mechanism is closed in the utility position as indicated on the mechanism cover.
10. Verify correct control wire interconnects have been installed to the generator set auto start/stop controls.

    NOTE: The ATS Engine Start contact closes to start the engine and opens to stop the engine.

11. Ensure the inside of the transfer switch is clean from all dust, and other foreign materials.
12. Close ATS enclosure door and tighten all door screws.

APPENDIX "A"

THOMSON POWER SYSTEMS™	**TYPICAL TS 870 ATS COMMISSIONING PROCEDURES (S-Style 100A-800A)**

13. Visually verify on the transfer switch enclosure that there are no gaps, holes, or potential for water ingress.

B) Equipment Energization

DANGER

HAZARD OF ELECTRICAL SHOCK, EXPLOSION, OR ARC FLASH

This equipment must be serviced only by qualified electrical personnel utilizing safe work practices and appropriate Personal Protective Equipment (PPE). Many components of this equipment operate at line voltage. DO NOT TOUCH. Use only electrically isolated tools. Failure to do so may cause personal injury or death

14. Confirm Utility, Generator and loads can be energized in a safe manner.
15. Energize utility supply and wait approximately 20 seconds for the TSC 7320 controller to successfully perform an initial boot-up process. A Thomson Power Systems Logo will be displayed during the booting process. THOMSON POWER SYSTEMS™

    NOTE: Under normal operation, TSC 7320 controller will not re-boot due to use of an external control power reservoir circuit. The Low Power Buffer (LPB) maintains DC control power during Utility power failures, allowing the controller to start the gen and transfer to it without rebooting.

16. Confirm utility voltage on the TSC 7320 DISPLAY Home page is matching with the rating of the ATS. If the voltage is not matching, refer to Appendix B, TS 870 system voltage change procedure of this manual to modify the controller settings. If the voltage is matching, the ATS will automatically transfer to the Utility source.
17. To make any changes to the TSC 7320 controller settings, please refer to PM180 TSC 7320 controller O&M manual or PM176 / PM177 TS 970 quick start guide (100A-400A or 600A – 1200A) for details.

    Note: The default factory PIN is "1 1 1 1"
18. Set the TSC 7320 Internal time clock – With the TSC 7320 powered on, Enter the restricted area of the settings, and find the page with the "Display" heading. If the date and time is not listed, the up or down navigation button may need to be pressed to show the setting

APPENDIX "A"

THOMSON POWER SYSTEMS	TYPICAL TS 870 ATS COMMISSIONING PROCEDURES (S-Style 100A-800A)

19. Press the center checkmark button and one section will start to flash. Use the up or down navigation keys to change the value of the flashing setting, and the left and right keys to change which part of the setting is going to be changed

20. Change all parts of the time and date to match the desired values and press the center checkmark when finished. Hold the center checkmark to exit the editor mode.

21. Verify the status of the following indicator lights on the TSC 7320 front panel:
    - Utility Source Green LED is "ON" when the voltage is healthy and available
    - Load on Utility Green LED is "ON" when the load is connected to the utility
22. Run the generator manually and confirm generator voltage on the TSC 7320 display, the voltage is displayed on the "Generator" page. Verify the measured voltage is correct and matches the rating of the ATS.
23. With generator still running, confirm generator phasing matches that of the Utility supply by viewing the "Generator" page, and using the up or down navigation buttons to find the "Gen Phase Sequence" page. If phase rotation does not match, de-energize ATS and re-confirm supply rotation and power wiring is correct.

NOTE

On 3 Phase Systems, the TSC 7320 ATS controller has Phase Rotation miss-match protection. For the ATS to successfully transfer between sources, both the Utility and Generator Source Phase rotation must be matched. Phase rotation on both sources can be either positive rotation (i.e. A-B-C) or negative rotation (C-B-A) via programming selection on the TSC 7320.

APPENDIX "A"

THOMSON™ POWER SYSTEMS	**TYPICAL TS 870 ATS COMMISSIONING PROCEDURES (S-Style 100A-800A)**

24. Verify the TSC 7320 front panel Generator Source green LED is "ON"

25. To confirm automatic starting and load transferring of the generator, perform an On-Load test as described in section M(e). Press the "Test mode" button, and then press the green "Start" button. The generator will start and transfer on load per Automatic Sequence. The following lights on the TSC 7320 front panel should be on: Engine Start, Gen Source LED and Load on Gen LED.
26. To stop the generator and transfer load back to the utility supply, press the "Auto" button to return to auto mode. The load will re-transfer back to the utility power as per Automatic Sequence.
27. Perform a utility power outage test by opening the upstream utility feeder breaker to the ATS. The TSC 7320 front panel Utility available LED will turn off; the generator set will start after the 2-second engine start delay has expired and the generator will start and transfer on load as per Automatic Sequence.
28. Return Utility supply voltage to the ATS by re-closing the upstream utility breaker. The load should re-transfer back to the utility supply as per Automatic Sequence.

APPENDIX "B"

THOMSON POWER SYSTEMS	**TS 970 SYSTEM VOLTAGE CHANGE PROCEDURE**

The following procedures must be followed to change the ATS from the factory default AC voltage setting of 480VAC 3 Phase 4 Wire to 120/208V or 127/240V 3 phase 4 wire.

NOTE: this procedure requires 3 components to be changed for proper operation:

1. Terminal Block Jumper Change (Contactor Coil Voltage)
2. ATS Potential Transformer Tap Change
3. TSC 7320 Controller Software Programming

A) Terminal Block Jumper Change (Contactor Coil Voltage)

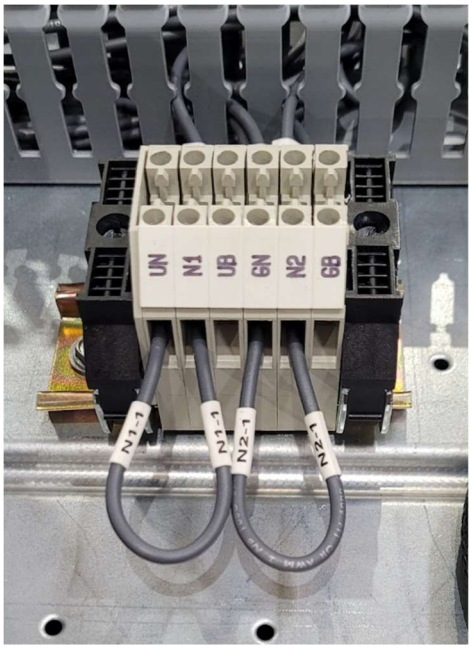
De-energize all AC Power, open the ATS door and locate TB2 terminal blocks on the lower left corner of the Potential Transformer control plate as per the photos shown below:

100A – 400A Models **600A – 1200A Models**

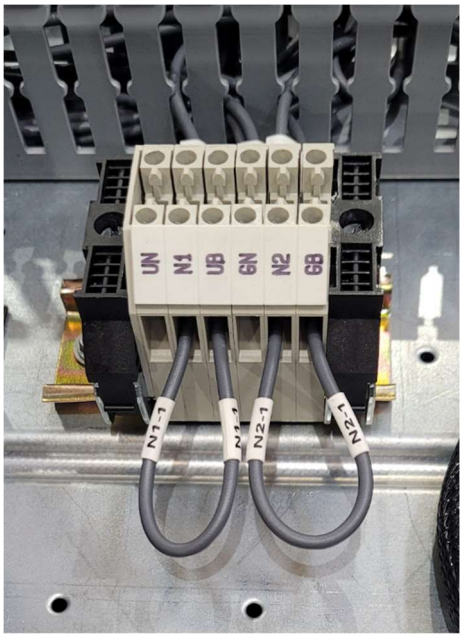
APPENDIX “B”

TS 970 SYSTEM VOLTAGE CHANGE PROCEDURE

The following factory default jumper locations are for 277/480V applications:
Connections are: N1 to UN, and N2 to GN



For 120/240V applications, the connections are:
N1 to UN, and N2 to GN



WARNING: For 277/480V applications, move the jumper back to N1-UN and N2-GN. Failure to do so will cause the damage to the contactor coil.

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APPENDIX "B"

THOMSON POWER SYSTEMS™

TS 970 SYSTEM VOLTAGE CHANGE PROCEDURE

B) ATS Potential Transformer Tap Change

DANGER

HAZARD OF ELECTRICAL SHOCK, EXPLOSION, OR ARC FLASH

This equipment must be serviced only by qualified electrical personnel utilizing safe work practices and appropriate Personal Protective Equipment (PPE).

Many components of this equipment operate at line voltage. DO NOT TOUCH. Use only electrically isolated tools.

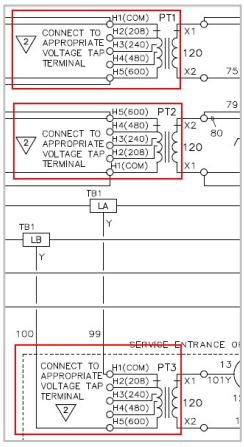
Install and close all covers before applying power to this equipment

Do not open covers to equipment until ALL power sources are disconnected

1. Ensure all power sources are de-energized and are safely Locked-out from service prior to opening the transfer switch enclosure door.

2. Disconnect AC Sensing and ATS Power Chassis Circuit Isolation Plugs PL12 & PL15.

3. Change voltage transformer primary taps settings as follows to match new system voltage on all potential transformers (PTs). (Refer to wiring schematic diagram below).

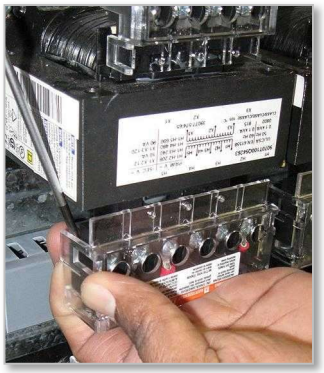


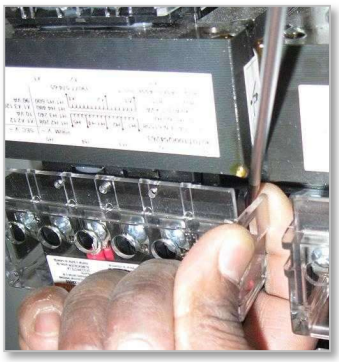
4. Carefully remove the potential transformer high voltage side covers by prying up on the edge of the cover with a ¼" Flat Head Blade screwdriver and lifting off.

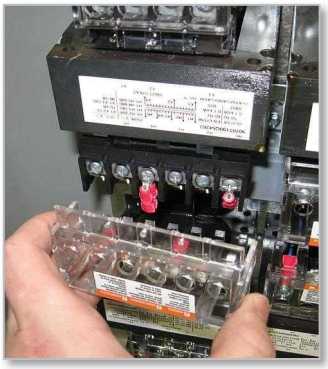
APPENDIX "B"

THOMSON POWER SYSTEMS

TS 970 SYSTEM VOLTAGE CHANGE PROCEDURE



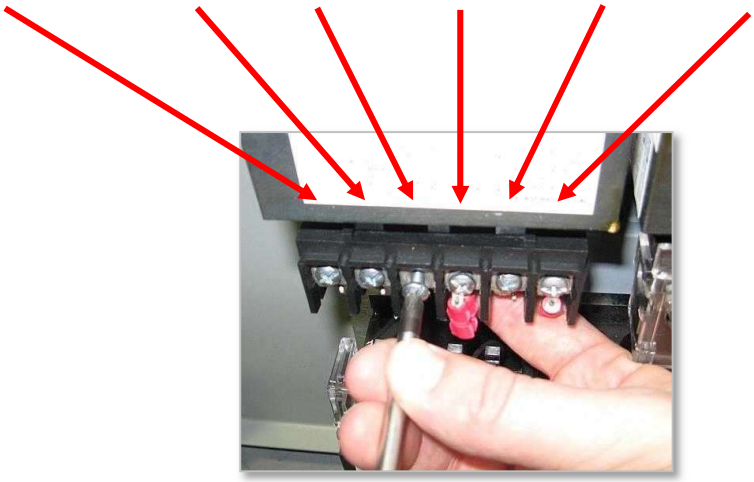




NOTE: You can also use your finger to pry up on the edge of the PT cover.

5. Remove the screw on the PT Tap which is the correct voltage selected for the application (i.e. H2-208V, H3-240V, H4-480V or H5-600V)

H6-Not Used H5-600V H4-480V H3-240V H2-208V H1 (Never Changes)



CAUTION: Brace PT terminal block with your hand when loosening or tightening ANY screws.

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6. Remove the screw and red ring terminal connected to the incorrect (existing) PT voltage terminal. Install the screw and red ring terminal to the new selected PT Tap Terminal based on required voltage and tighten while supporting the terminal block. Make sure the ring terminal is not misaligned or the PT cover will not fit back on.

7. Install the extra screw back onto the old PT location and tighten.

CAUTION
Confirm that PT screws are correctly tightened, and do not put strain on the PT Tap wires.

8. Replace the PT cover. PT covers should 'snap' in place, confirm they are installed correctly by gently "twisting" the PT cover. DO NOT use excessive force.

9. Repeat the steps 1 to 8 for all Potential Transformers.

C) TSC 7320 Voltage Change Procedure

To change system voltage on the TSC 7320 controller, the transfer switch can be energized or de-energized to change the system voltage. If the transfer switch is energized, please ensure the

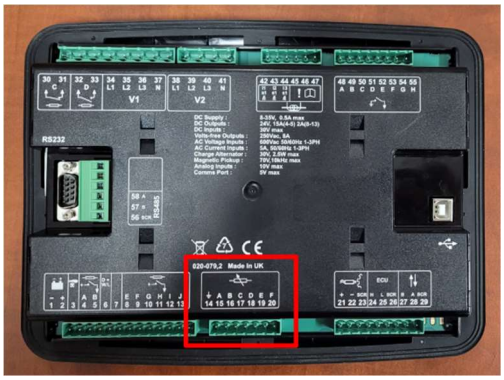
APPENDIX “B”

THOMSON POWER SYSTEMS	TS 970 SYSTEM VOLTAGE CHANGE PROCEDURE

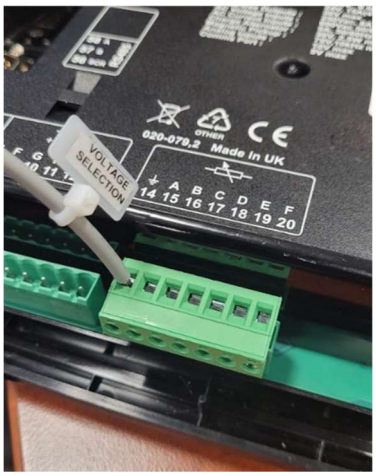
mechanism is in the utility position, and place the controller in “Stop” mode by pushing the red button in the lower left corner. It is recommended to de-energize the transfer switch to mitigate any hazardous conditions. Always proceed with caution and follow the steps below to change the voltage.

NOTE: All system voltage changes are ONLY done via connecting a designated wire to a different terminal on the TSC 7320 controller. All alarm values are ONLY changed via software programming.

1. **Locating the PIN:** First find PINs 14 to 20 on the backside of the TSC 7320 controller. There will be a wire connected to PIN 14, and that wire will have a label specifying it is the voltage selection wire.



2. **Removing the wire:** Using a small flat head screwdriver, loosen the terminal screw for PIN 14, and remove the voltage selection wire out of PIN 14.

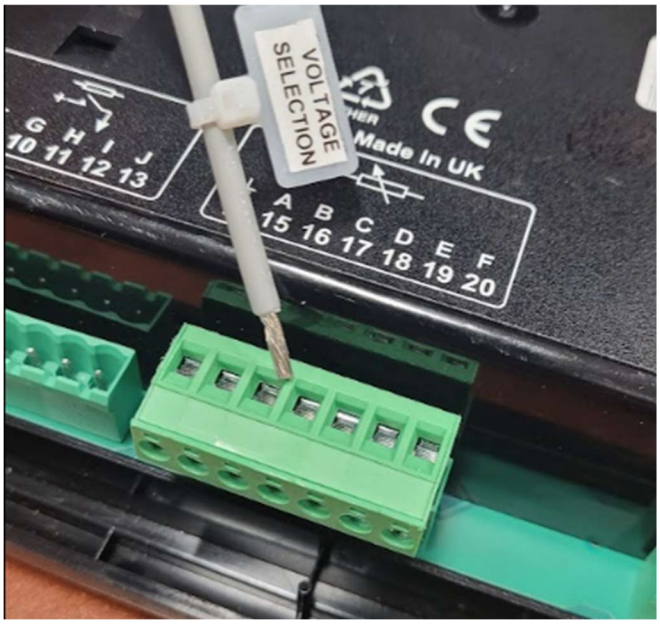


3. **Choosing voltage configuration:** There are 5 separate inputs that dictate the different configurations, and they are listed in the table below. Select one of the options below based

on the ATS requirements. The contactors control inputs are rated for ~220VAC. Only use compatible voltage configurations.

Inputs	Pin No.	Descriptions
GROUND	14	480V 3PH 4W CONFIGURATION
ANALOGUE INPUT A	15	120/240V 1PH 3W CONFIGURATION
ANALOGUE INPUT B	16	208V 3PH 4W CONFIGURATION
ANALOGUE INPUT C	17	240V 3PH 4W CONFIGURATION
ANALOGUE INPUT D	18	600V 3PH 4W (DO NOT USE)
ANALOGUE INPUT E	19	110V 1PH 2W CONFIGURATION (DO NOT USE)

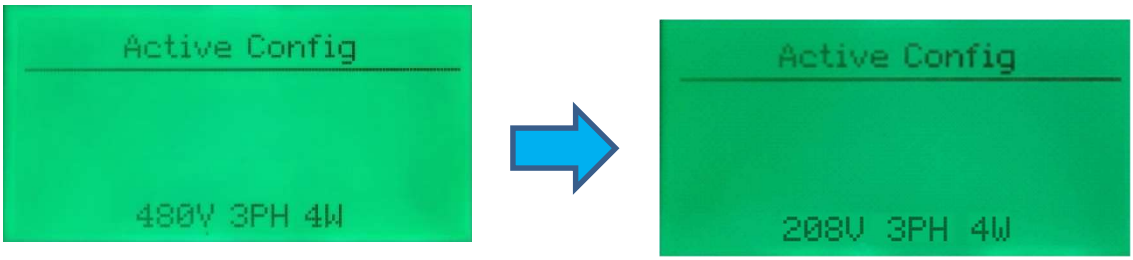
4. **Inserting the wire:** Insert the voltage selection wire into the desired terminal and tighten the screw on the terminal. The terminals are rated for 4.5in-lbs of torque, do NOT over tighten the terminal screw. The photo below shows the selection wire near PIN 15 (B) for selecting a 208V 3PH 4W configuration.



5. **Checking config:** If the panel is not energized, turn on the power and energize the transfer switch. After the controller boots-up, use the left or right navigation keys to find the "Mains" page, and use the up and down navigation keys to find the "Active Config" page. If the controller is properly registering the changed input, the screen should display the desired configuration, and NOT the default 480V configuration. In this case, the 208V configuration has been selected.

APPENDIX "B"

THOMSON POWER SYSTEMS	**TS 970 SYSTEM VOLTAGE CHANGE PROCEDURE**



6. **Complete:** The voltage change procedure is now complete. If the voltage settings need to be adjusted from their default values, please refer to PM180 TSC 7320 controller O&M manual or PM176 / PM177 TS 970 quick start guide (100A-400A or 600A – 1200A) for details on entering the restricted area of the settings, and how to change values. Otherwise, proceed to energize the ATS to confirm proper operation as per procedure listed in Appendix A.

APPENDIX "C"

THOMSON™ POWER SYSTEMS	SEISMIC CERTIFICATE

Seismic Source International Seismic-Source.com

CERTIFICATE OF SEISMIC COMPLIANCE

SSI Listed

IAS ACCREDITED Inspection Agency

This is to signify that

Thomson Power Systems

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Langley, BC V1M 3B1

has tested the following product per the referenced test standard, and passed functionality requirements:
Series TS 970 Automatic Transfer Switch

Scope of Certification:
Product Type: ATS
Mfg Series/Make: TS 970
Mfg Model: See Table 1
Mounting: Rigid wall & floor Mounted
Public Report No: P23055-Trans-04

Codes and Standards:
IBC 2009, 2012, 2015, 2018
ASCE 7-05, 7-10, 7-16
ICCES AC-156-2015

Maximum Design Loads:
SDS(g)= 2.5
Fp/Wp= 1.88
Weight(lbs)= 150 to 695
Dimensions: See Table 1
Ip= 1.5
z/h= 1.0
AFLXH= 3.2
AFLXV= 1.68

Test Lab: ETL, Dallas, TX
Qualification Agency: Petra Seismic Design

Notes:
Certification valid for testing compliance of units in scope. Equipment must be installed, mounted, seismically braced and anchored per mfg instructions. Equipment must only be used as intended. Certification verifies that representative product line units have been shake tested per referenced codes and standards and confirmed to function after the test. Not a product Listing or Label. Only testing included in scope. Certificate does not guarantee the equipment will remain compliant to other standards (i.e. ETL,UL, etc.) after a seismic event. See Public Report for complete explanation of qualification, limits, and requirements.

Certificate No.: TP01-COC-1902,r1
Certificate date: September 5, 2019 Expires: September 5, 2022

Robert E Simmons, PE, CEO

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