Transfer Switch TS850/890
TSC800 Controller
Training Manual

00000.VSD

1) GENERAL

Corporate Overview
Sales & Marketing Contacts
Agent & Distributor Contacts

2) MISCELLANEOUS

Work Safe Report

3) TRANSFER SWITCHES

TSC800 - Controller - Manual & data sheets.
TS850 Switch - Manual & drawings.
TSB850 - Bypass Switch - Manual & drawings.
TS890 - Switch - Manual & drawings.

4) ENGINE CONTROLLER

MEC20 Controller , Manual, data sheets & drawings.

5) SOFTWARE

THS 2000 Information & Manual

12.0 TRANSFER/BYPASS SYSTEMS

12.1 Transfer Switch Basics

.1) The automatic transfer switch (ATS) is the "heart" of the Standby Power Generation system or Emergency Power System. It is the first (and last!) link in the emergency power supply network. The ATS must:

(a) Sense the out of limits condition of the normal power source.

(b) Initiate the starting of the generator set.

(c) Disconnect the normal source from the load.

(d) Connect the generator set source to the load when its output is within acceptable limits (transfer load).

(e) Sense the return and stabilization of the normal source to within the desired limits.

(f) Retransfer loads from the generator set to the normal source.

(g) Provide off-load cool-down period for the generator set. (Optional)

(h) Signal the generator set to stop.

.2) In addition to the foregoing control and switching functions the ATS must also:

(a) Positively isolate the two sources to ensure **no** possibility of inadvertent paralleling.

(b) Allow (and withstand) system fault currents to pass through the switch contacts and power conductors from the source to the fault location.

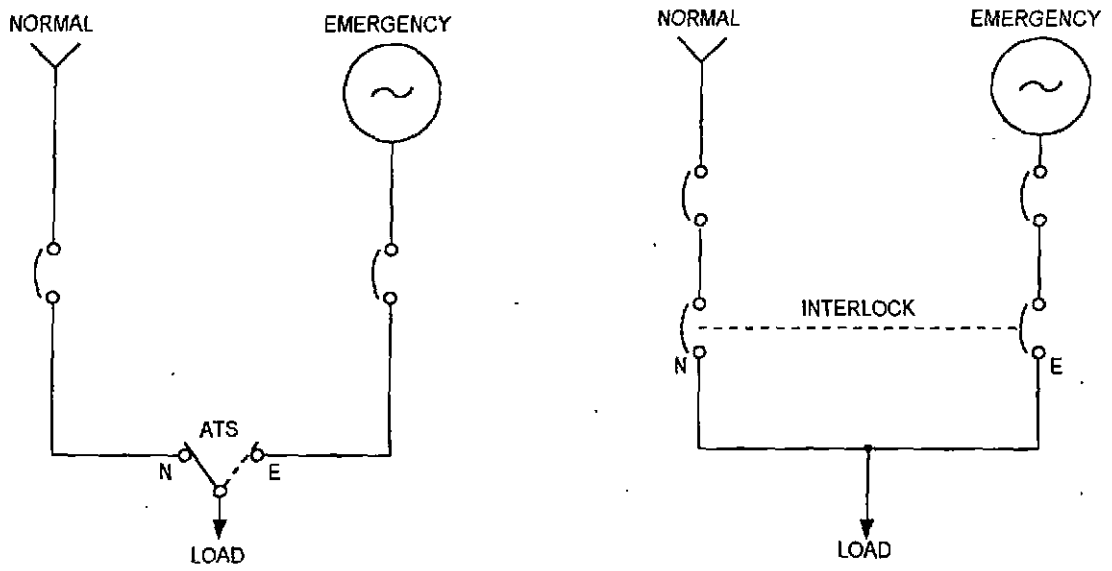
.3) There are many manufacturers and types of transfer switches. Some of the common transfer mechanisms utilized are:

(a) Interlocked Contactors. This scheme utilizes two standard industrial electrical contactors or motor starter contactors. Two contactors are mounted together and are **mechanically** and **electrically** interlocked so that **only** one contactor can be closed at any one time. Reversing motor starters are similarly arranged and it is common to utilize a standard

reversing motor starter as the basic mechanism for a transfer switch.

This type of switch is commonly built up using a wide variety of reversing contactors.

- Allen Bradley
- MTE
- Klockner Moeller
- Westinghouse
- GE
- etc.



(a) TWO POSITION ATS

(b) BREAKER TYPE ATS

FIGURE 12.1.1

(b) **Breaker Type ATS.** Mechanically interlocked electrically operated dual circuit breakers or switches. These are commonly non automatic (no thermal trips) molded case breakers or switches with single or multiple yoke drive arms or a walking beam type operator. These designs inherently incorporate a mechanical interlock means within the mechanical linkages or placement of the breakers/switches. Most common are Thomson Technology Inc. and Westinghouse Robonic. Many manufacturers use the basic Robonic mechanism with their own controls. Klockner

Moeller, Zenith, ITE and others also build ATS's with similar arrangement.

(c) **Two Position ATS**.Transfer contacts specifically arranged for ATS duty. Usually two sets of contacts on a common operating arm (or two mechanically linked operating arms) with a solenoid or motor operated positioner. Contacts are arranged so that one set opens before the other set closes.

This arrangement is typical of Asco electric Co. ATS's. Other firms such as Zenith, Onan, etc. build similar devices.

(d) High voltage transfer switches typically utilize appropriate standard high voltage contactors or power circuit breakers. Devices are arranged so as to permit mechanical interlocking.

(e) Low voltage transfer arrangements can also be built up using interlocked power circuit breakers.

12.2 Transfer Switch Sensing/Control Systems

.1) Normal source voltage sensing may be achieved in a variety of ways. The requirements are:

(a) Sense each line to line (or line to neutral) phase voltage.

(b) Provide for initiation of start up and transfer to generator source when any phase voltage deviates from normal by some amount.

(c) Relay(s) must sense when all phases return to within the normal range.

.2) Commercially available transfer switches usually include adjustable low voltage sensing relays (VSR). The VSRs are typically adjusted to pickup when the source voltage rises above 90% of nominal. The VSRs are typically adjusted to allow dropout should the sources voltage drop below 80% of nominal. All phases are required to rise above 90% of nominal before the system is considered normal, however only 1 phase needs to drop below 80% of nominal to become deemed out of limit.

Most systems utilize two relays to monitor 3 phases. These provides adequate protection for most site applications. However where 3 phase electric motors represent a large portion of the connected load, 3 separate VSRs with close differential can be

utilized. However even 3 separate VSRs may not sense for a partial low voltage condition on one phase. VSRs may not dropout in this condition resulting from regenerative voltage or Back EMF from a light loaded electric motor. Alternatively a 47N (phase balance) relay can be added to sense for this condition. The 47N relay can provide single phase protection for motors. Operating electric motors with a L-L voltage differential greater than 5-6% (recommended max.) will result in an increase in current flow for the motors to deliver the desired output. Premature motor failures will result.

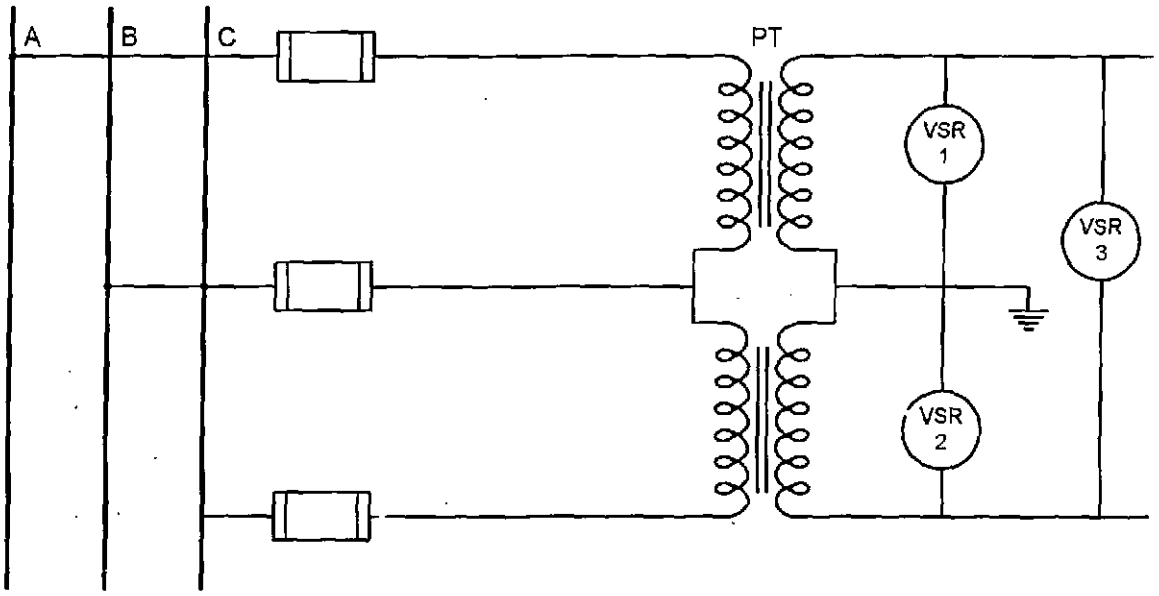


FIGURE 12.2.2

.3) Some systems utilize a "built-up" ATS consisting of reversing contactors or power circuit breakers. This type of ATS may incorporate a similar sensing arrangement as previously described or may include a 3 phase under/over voltage relay such as the Westinghouse CP reverse phase voltage relay or a Basler BE1-27/59/47 (under/over/neg. sequence) relay. These relays can provide for 3 phase monitoring with inverse time delay on low or high voltage conditions. Voltage pickup points are adjustable. The inverse time delay is not adjustable. The greater the deviation from the setpoint, the faster the relay will operate.

.4) The VSR contact(s) are used to initiate engine startup. There may be an additional start delay timer included to allow a delay of 2 or 3 seconds to avoid startup on momentary excursions. (Particularly if VSRs do not include time delay.)

.5) In some applications the emergency source voltage is also monitored, the same as normal source. If, while running, the emergency voltage exceeds adjustable high and low limits the generator set is shutdown. This monitoring is usually part of the engine/generator sensing devices, and is **not** actually part of the control or functioning of the ATS. It is an electrical protective device in the generator set controls.

.6) The ATS controls utilized, depend on the type of transfer mechanism.

(a) Electrically held contactor type ATS's require continuous control signal to maintain the required source. This is typical of reversing contactor type ATS's. These are typically utilized on single phase and some low power non critical 3 phase applications.

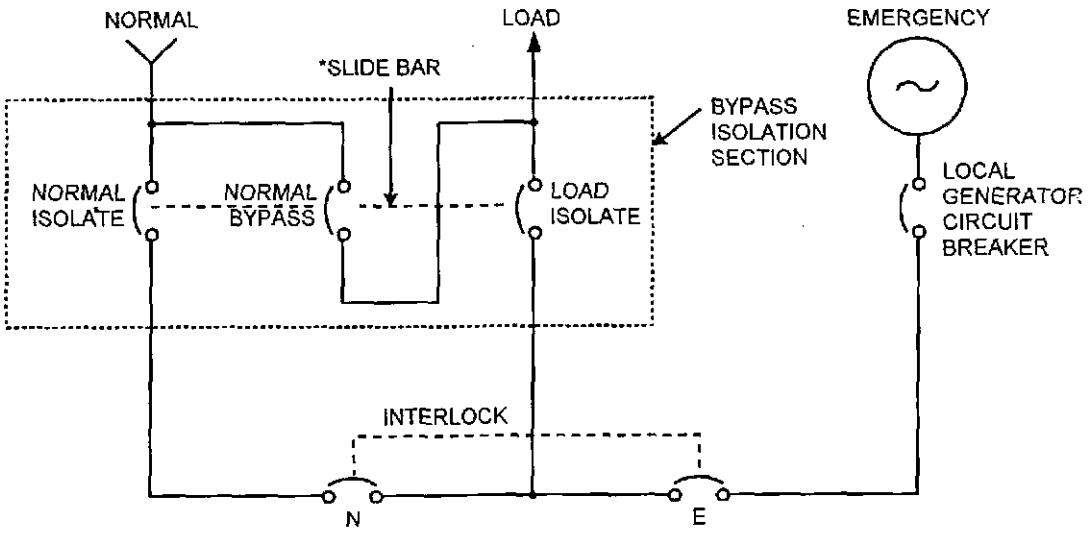
(b) Electrically operated, mechanically held ATS's require momentary open/close or pulse signals to the appropriate transfer mechanism. This is typical of TTI, Robonic or Asco type transfer switches.

(c) Electrically operated, electrically tripped contactor or breaker type ATS's require momentary close signals and momentary trip signals to both normal and emergency.

.7) Some systems require that the normal source be immediately disconnected on overvoltage conditions. This is readily accomplished with electrically held or tripped breaker or contactor type ATS's. For mechanically held ATS's it entails special circuitry or a separate device (such as an electrically operated normal source breaker).

Depending on the application it may be desirable to also immediately disconnect the normal source on a low voltage condition (rather than wait until emergency source is ready to assume the load). Again the method employed will depend on the ATS arrangement utilized.

12.3 Bypass System Basics



***NOTE:** SLIDE BAR ARRANGEMENT ALLOWS NORMAL BYPASS SWITCH TO CLOSE ONLY IF LOAD ISOLATE SWITCH IS OPEN.

FIGURE 12.3.1

.1) All transfer switches ultimately require service and maintenance. The switch must then be isolated from live sources, and may require physical removal. When connected loads cannot be disrupted, some alternative route for power flow to the load is required in order to service the transfer switch while maintaining power supply to the load.

Figure 12.3.1 depicts a common arrangement where draw-out breakers are utilized for the ATS. Two additional breakers are required to achieve the bypass capability. This arrangement only allows bypass with the normal source. The emergency source cannot be utilized while the ATS is being serviced.

.2) For some ATS's the bypass and isolation system requires a somewhat different approach as shown in *Figure 12.3.2.* Again, this arrangement does not allow for use of the emergency source during ATS maintenance.

.3) Another bypass isolation arrangement which includes either emergency or normal bypass is shown in *Figure 12.3.3.* This is of a Bumpless arrangement. To provide the bumpless transfer of the current source, the alternate source isolate switch must first be opened. Slide the slide bar to allow the bypass switch of the source to be bypassed (i.e. NB to bypass NI switch) to be closed; once

this breaker has been closed, the source and load isolate switches can be opened. With the switches in these positions, the transfer switch and it's controls are void of AC voltage. Should the power fail during service, the 2 bypass switches can be utilized as a manual transfer switch. The switches in the bypass arrangement have the same withstand ratings as the switches in the transfer switch.

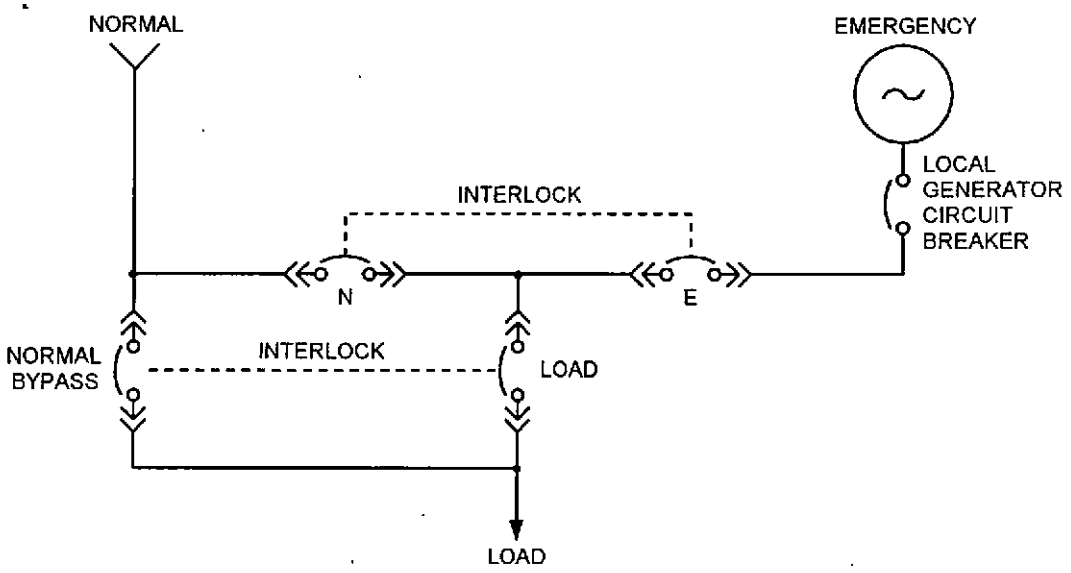
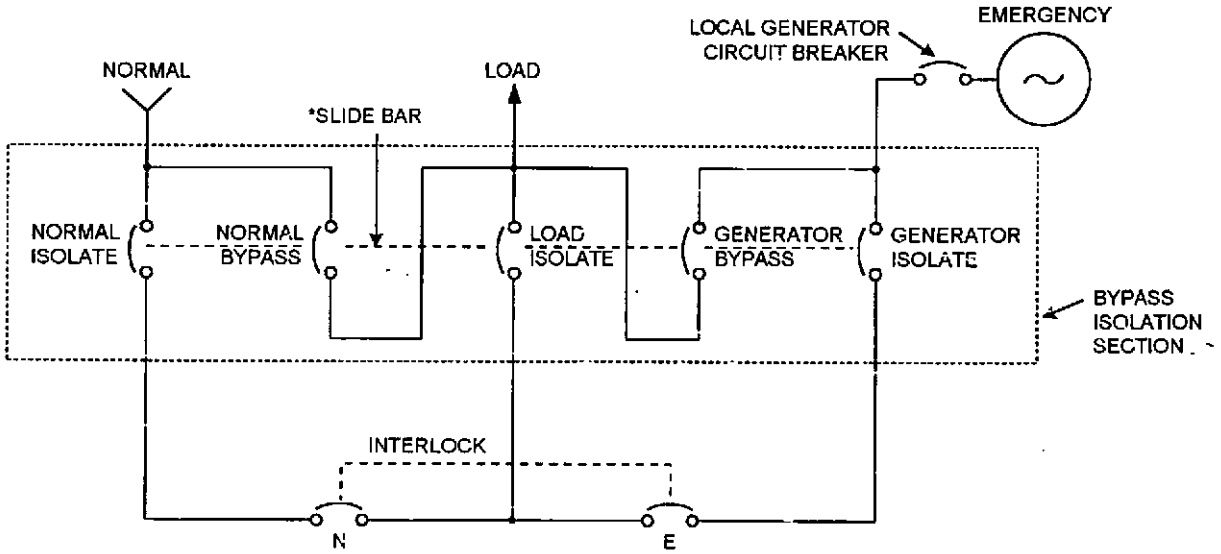


FIGURE 12.3.2



*NOTE: SLIDE BAR ARRANGEMENT ALLOWS BUMPLESS BYPASS FOR EITHER EMERGENCY OR NORMAL SOURCE, AND PERMITS MANUAL TRANSFER OPERATION WHILE SERVICING THE ATS.

FIGURE 12.3.3

.4) Bypass arrangements can be achieved with fixed or drawout breakers or with manual switches. The system protection devices and potential fault currents are a major factor in selecting the bypass arrangement. A properly confirgured bypass arrangement should remove all sources of voltage from the transfer switch controls and mechanism for servicing.

12.4 Low Voltage Systems (Under 750V)

.1) The following enclosed drawings depict some typical Low Voltage transfer and bypass arrangements. Both single line and control schematic diagrams are included for review and discussion.

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12.5 High Voltage Systems (Over 750v)

.1) Typical High Voltage transfer/bypass panel arrangements and related power, control and metering schematics are shown on enclosed drawings:

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12.6 Thomson Technology Inc. Equipment

.1) Thomson Technology Inc.(TTI) manufacture a complete range of low and high voltage transfer switches (up to 15kV).These can be supplied in various arrangements, electrically operated mechanically held, stored energy air circuit breaker and contactor type. A comprehensive arrangements of bypasses for the transfer switches are also available. TTI transfer switches and bypasses are specified and applied in a wide variety of applications. TTI product data enclosed includes:

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12.7 Westinghouse Robonic and Derivatives

.1) Westinghouse manufactures a low voltage Automatic Transfer switch using two mechanically interlocked molded case circuit breakers with an electrically operated (motor driven) walking beam operating mechanism.

Westinghouse also markets the basic switching mechanism (*breakers, operator and interlock*) to various electrical equipment manufacturers. They in turn build a completed transfer switch using their own sensing and controls, enclosure and optional accessories mated to the basic Robonic mechanism. (These are **not** Westinghouse Robonic transfer switches!)

Robonic switches (and derivatives) generally utilize non automatic circuit breakers (no long time overload trips).

Various bypass arrangements can be utilized to permit service.

Actual schematic drawings must be utilized for service, troubleshooting and adjustments.

12.8 Contactor Schemes

.1) Electrically held mechanically interlocked contactor arrangements are commonly utilized on a wide variety of systems, but typically limited to low amperage ranges. Since 1978 when CSA's standards were upgraded, contactor schemes have largely been eliminated because they generally have inadequate withstand ratings and are difficult to apply.

.2) Suitable contactors (and reversing starter contactors) are available from a number of manufacturers.

12.9 General

.1) The basic principles of all automatic transfer and bypass systems are similar. The methods and equipment utilized to achieve the results are many and varied. Different manufacturers using identical components will often utilize different methods to achieve the same result.

.2) All ATS electrical and troubleshooting must commence with actual diagrams and instructions for the specific ATS equipment.

12.10 Self Test

____ 1. A transfer switch must positively isolate the two sources from the load at all times and under all conditions. ☐ TRUE ☒ FALSE

____ 2. In an automatic transfer switch the priority position is usually the:
- ✓ (a) Normal source.
- ____ (b) Emergency source.
- ____ (c) Neutral or all open position.

____ 3. A single phase 3 wire (properly called 2 phase) transfer switch requires 3 voltage sensing relays to properly sense out of tolerance supply conditions. ☐ TRUE ☒ FALSE

____ 4. Electrically held contactor type transfer switches require:
- ____ (a) Mechanical interlocks.
- ____ (b) Continuous control power.
- X (c) Electrical interlocks.

____ 5. The voltage sensing relays of an ATS should normally be set to about:
- ____ (a) 90% drop out, 110% pickup.
- X (b) 80% drop out, 90% pickup.
- ____ (c) 30% drop out, 60% pickup.

____ 6. A transfer switch must have a frequency sensing relay on the normal and emergency sources. ☒ TRUE ☐ FALSE

____ 7. The purpose of a transfer bypass system is to permit ATS maintenance while powering the load. ☒ TRUE ☐ FALSE

____ 8. When using the bypass feature of a transfer and bypass panel, the bypass system will automatically transfer to the alternate source if one source fails. ☐ TRUE ☒ FALSE

____ 9. An ATS of a critical emergency power system should be functionally tested:
- X (a) Weekly.
- ____ (b) Monthly.
- ____ (c) Annually.
- ____ (d) At least every 5 years.

TSC 800

TRANSFER SWITCH CONTROLLER

(WITH REMOTE COMMUNICATION OPTION)

INSTALLATION, OPERATING & SERVICE MANUAL

PM049 REV 5 00/07/31

19214 - 94th Avenue, Surrey, B.C. Canada V4N 3E3 • Telephone (604) 888-0110
Telefax (604) 888-3381 • E-Mail: ttinfo@tti.bc.ca • www.thomsontechnology.com

TABLE OF CONTENTS

1. INSTALLATION

1.1. GENERAL INFORMATION

NOTE:
Installations should be done in accordance with all applicable electrical regulation codes as required.

The following installation guidelines are provided for general information only pertaining to typical site installations. For specific site installation information, consult Thomson Technology Inc. as required. **Note:** Factory installations of TTI supplied transfer switches that have been tested and proven may deviate from these recommendations.

1.2. NOTES TO INSTALLER

If the transfer switch has programmable/multi-tap system voltage capability (refer to electrical schematic), confirm the transfer switch has been configured for the system voltage.

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

If the transfer switch requires reconfiguring, the TSC 800 controller will require reprogramming as well.

CAUTION!!!
All installation and/or service work performed must be done by qualified personnel only. Failure to do so may cause personal injury or death.

1.3. MOUNTING LOCATION/INSTALLATION

The TSC 800 transfer controller is designed for mounting directly onto a transfer switch door. Considerations should be given for the following:

The controller should be installed in a dirt free, dry location away from extreme heat sources.

The LCD window should be installed at an optimum height for operator viewing.

Adequate space should be provided around the rear of the TSC 800 circuit board for control wiring.

Verify that the intended AC voltage input to the controller does not exceed the maximum allowable level on the control panel door as per the applicable control panels certification standard.

The TSC 800 controller can be installed onto a door of a transfer switch using two different methods:

- The first method requires a special door cutout for the LCD display and LED's as shown in FIGURE 5. This mounting method requires the Lexan faceplate to be mounted directly onto the door of the transfer switch enclosure via its adhesive tape on the rear of the Lexan. The controller must be disassembled to mount on the door, then re-assembled.
- The second method of controller mounting requires a factory supplied adapter faceplate as shown in FIGURE 6. This method only requires a simple large rectangular hole to be cut out of the door as shown in FIGURE 6(a). The controller is then inserted into this hole and the faceplate is mounted on top of the door with studs as supplied with the faceplate. Note: #8-32 AWG nuts will be required to attach the faceplate to the door.

1.4. AC VOLTAGE SENSING INPUT

The TSC 800 can accept direct AC voltage sensing inputs on the generator and utility supplies from 120-600Vac (nominal). **Note:** Direct input voltage sensing can only be used when the system utilizes a 3 phase, 4 wire distribution system which has the neutral conductor *solidly* grounded. For 3 phase, 3 wire systems (i.e. no neutral) or high voltage systems, potential transformers must be used. Refer to FIGURES 1-4 for voltage sensing connections.

1.5. AC CONTROL POWER INPUT

The TSC 800 is factory supplied for either 115Vac or 230Vac (nominal) control power input voltage. Independent AC control power is required from both utility and generator supplies. AC control power is utilized for internal TSC 800 control circuits and external control device loads. The TSC 800 requires approximately 12VA AC power for internal control circuits. The maximum external load is limited by output contact ratings (i.e. 10A resistive, 120VAC). Total AC control power requirements for each supply must be determined by adding both internal and external load requirements.

1.6. FOUR POSITION TEST SWITCH INPUTS (FTS4)

The function of the Four Position Test Switch Input is to allow operators to select various operating scenarios for test or maintenance purposes, inaddition to the use of the faceplate mounted pushbuttons.

NOTE: When an external FTS4 switch is used, the TSC 800 operation as selected from the faceplate pushbuttons will be overridden.

OFF: Disables the engine start output from the transfer switch. If the primary source is available, and within normal limits, the TSC 800 will initiate a transfer to the primary source. The transfer switch will not automatically transfer to the secondary (alternate) source should the primary source fail.

AUTO: All automatic functions are enabled.

ENGINE START: (No load test) An engine start signal will be initiated and will remain on until the FTS4 is placed in another position. The engine will start if the engine's auto start controller is in the "Auto" mode. If the primary source fails in this mode, and the secondary source is within parameters, the TSC 800 will initiate a transfer to the secondary source.

TEST: (Full load test) A primary source failure is simulated and an engine start signal will be initiated. When the secondary source is within normal limits, the TSC 800 will initiate a transfer to the secondary source. The system will remain in this state until the FTS4 is placed in another position or the secondary supply fails. Upon a secondary supply failure, if the primary supply is available, the TSC 800 will initiate a transfer to the primary supply.

1.7. OUTPUTS

The TSC 800 provides the following types of output circuits:

Engine Start Contact	Isolated Form C contact (10A, 120VAC Resistive)
Programmable Output Contact	Isolated Form C contact (10A, 120VAC Resistive)
Transfer to Utility Output	120VAC[1], 10A (Resistive) powered output contact
Transfer to Generator output	120VAC[1], 10A (Resistive) powered output contact
Pre/post-transfer to utility	120VAC[1], 3A (Resistive) powered output contact
Pre/post-transfer to generator	120VAC[1], 3A (Resistive) powered output contact
Load on utility	120VAC[1], 3A (Resistive) powered output contact
Load on generator	120VAC[1], 3A (Resistive) powered output contact

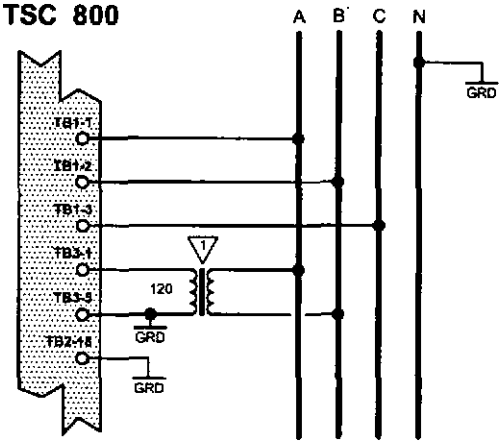
[1] **Note:** Output voltage is dependent upon AC control power input voltage (i.e. 120VAC or 230VAC nominal).

Interposing relays are required between the TSC 800 outputs and the end device if loads exceed the output current rating.

Transient suppression devices are required for all inductive devices sharing wiring or if physically located near the transfer switch controller.

For AC operated relays or solenoids, use a suitably rated metal oxide varistor (MOV) or capacitor/resistor suppressor.

TSC 800



VOLTAGE INPUTS

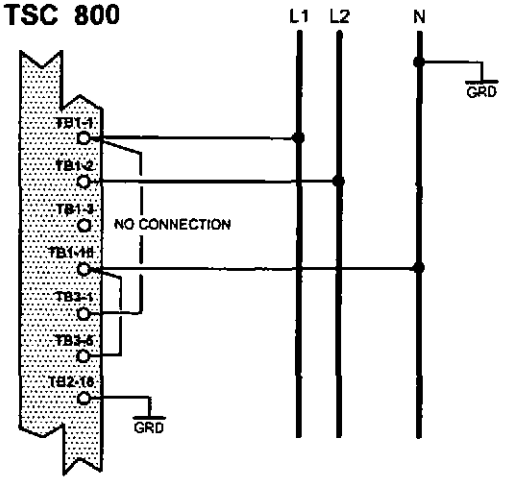
600VAC L-L, 347VAC L-N
480VAC L-L, 277VAC L-N
380VAC L-L, 220VAC L-N
208VAC L-L, 120VAC L-N

(1) PT REQUIRED FOR TRANSFER SWITCH MECHANISM POWER (MUST BE SIZED TO SUIT POWER REQUIREMENTS).

FIG:1
3Ø, 4W 208/380/480/600VAC DIRECT SENSING

NOTE: UTILITY VOLTAGE SENSING AND CONTROL POWER SHOWN ONLY.

TSC 800



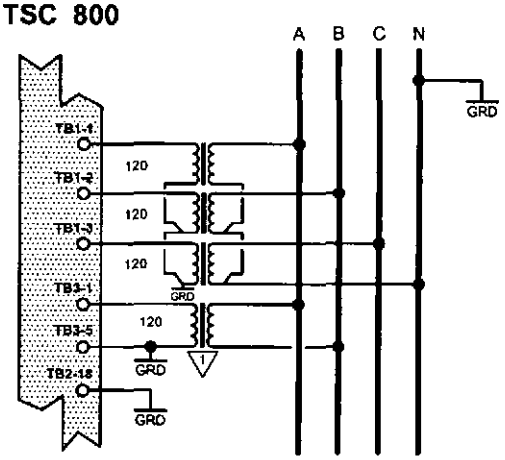
VOLTAGE INPUTS

240VAC L-L, 120VAC L-N

FIG:2
1Ø, 3W 120/240VAC DIRECT SENSING

NOTE: UTILITY VOLTAGE SENSING SHOWN ONLY.

TSC 800



SECONDARY PT VOLTAGE

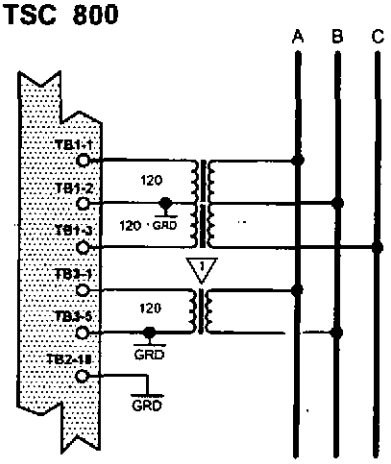
208VAC L-L, 120VAC L-N
120VAC L-L, 69VAC L-N

(1) PT REQUIRED FOR TRANSFER SWITCH MECHANISM POWER (MUST BE SIZED TO SUIT POWER REQUIREMENTS)

FIG:3
3Ø, 4W WYE PT's

NOTE: UTILITY VOLTAGE SENSING SHOWN ONLY.

TSC 800



SECONDARY PT VOLTAGE

120VAC L-L [NO NEUTRAL]

NOTE: ØB IS GROUNDED

(1) PT REQUIRED FOR TRANSFER SWITCH MECHANISM POWER (MUST BE SIZED TO SUIT POWER REQUIREMENTS).

FIG:4
3Ø, 3W DELTA PT's

NOTE: UTILITY VOLTAGE SENSING SHOWN ONLY.

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1.8. EXTERNAL PANEL CONTROL WIRING

As a minimum, all control wiring shall conform to the local regulatory authority on electrical installations. Specific wire sizes for typical circuits (of distances up to 100ft (30m)[1]) are as follows:

Utility or Generator Voltage Sensing	#14 AWG (2.5mm^2)
Transfer output signals	#14 AWG (2.5mm^2)
Remote Start Contact for Engine Controls	#14 AWG (2.5mm^2)

[1] For distances exceeding 100 ft. (30m) consult Thomson Technology Inc.

1.9. REMOTE START CONTACT FIELD WIRING

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.

1.8.1. Remote start contact wires (2 #14 AWG (2.5mm^2)) should be run in a separate conduit.

1.8.2. Avoid wiring near AC power cables to prevent pick-up of induced voltages.

1.8.3. 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.

1.8.4. The remote start contact must be voltage free (i.e. dry contact). The use of a "powered" contact will damage the transfer controller.

1.10. COMMMUNICATION CABLE

Communication cable wiring from the controller's com port must be suitably routed to protect it from sources of electrical interference. Guidelines for protection against possible electrical interference are as follows:

- Use high quality, 8 conductor shielded cable only with drain wire grounded at the controller end only.
- Route the communication cable at least 3 M (10') away from sources of electrical noise such as variable speed motor drives, high voltage power conductors, UPS systems, transformers, rectifiers etc.
- Use separate, dedicated conduit runs for all communication cables. Do not tightly bundle communication cables together in the conduit. Conduit should be ferromagnetic type near sources of possible electrical interference. The entire length of conduit should be grounded to building earth ground.

- When communication cables must cross over low or high voltage AC power conductors, the communication cables must cross at right angles and not in parallel with the conductors.

For additional information on protection against electrical interference, contact TTI factory.

1.11. FACEPLATE MOUNTING DIMENSIONS

Refer to FIGURE 5 for the TSC 800 faceplate mounting dimension information.

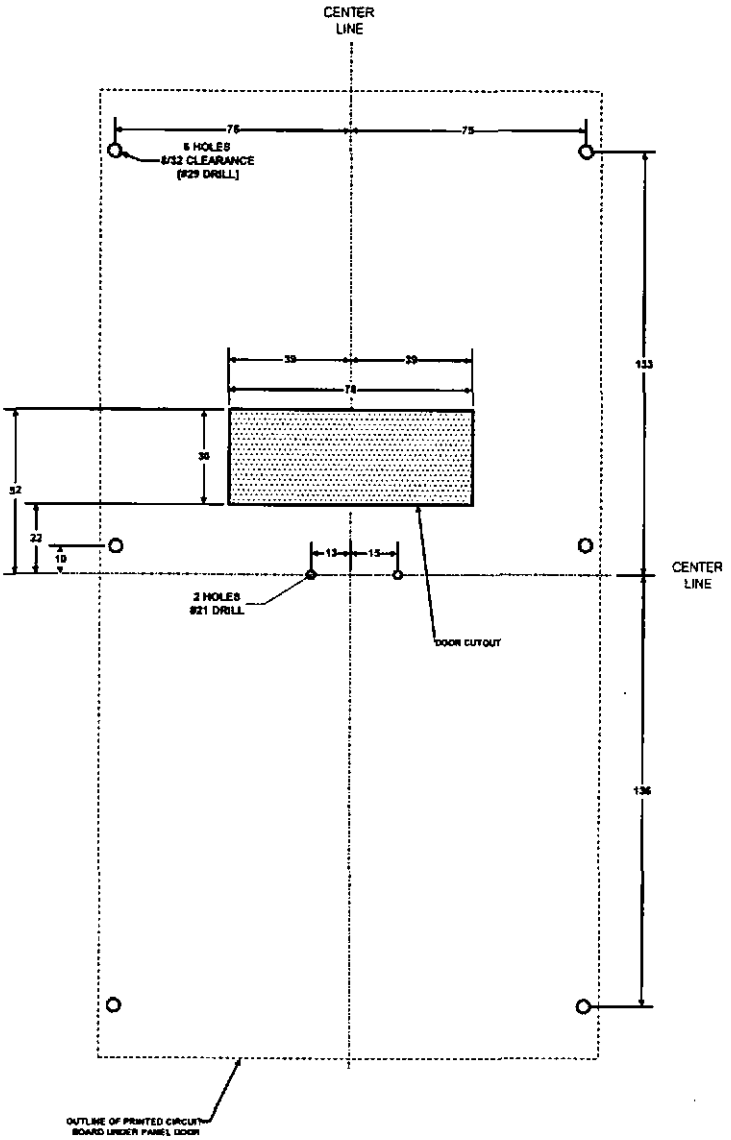

FIGURE 5
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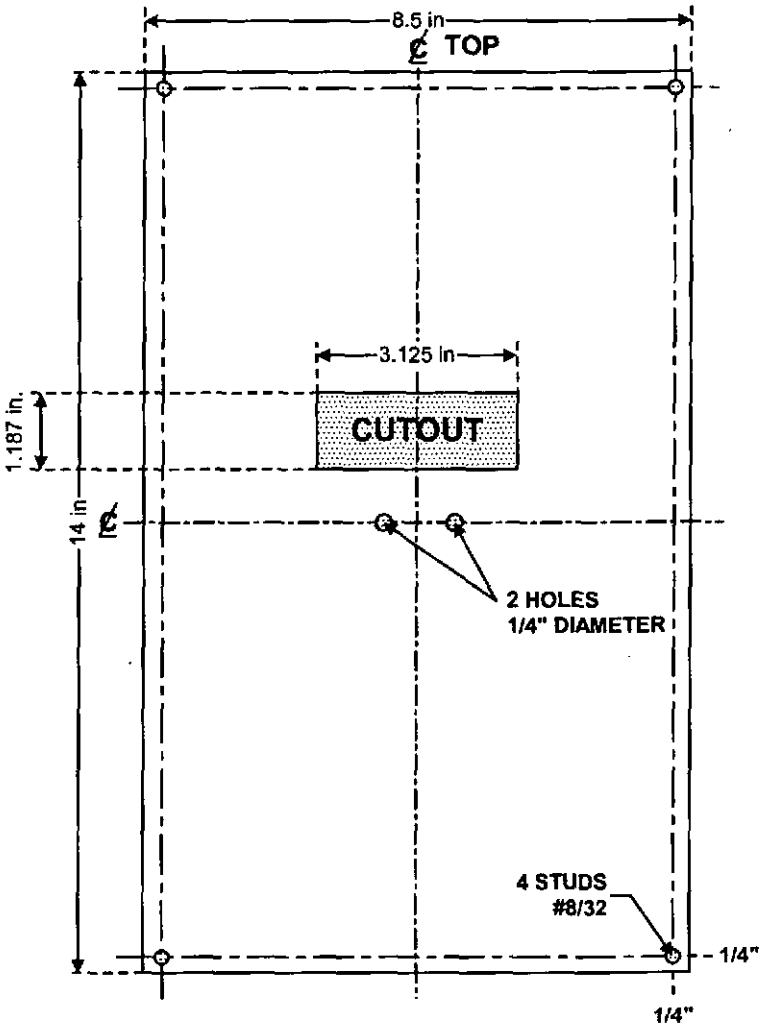

FIGURE 6: ADAPTER FACEPLATE

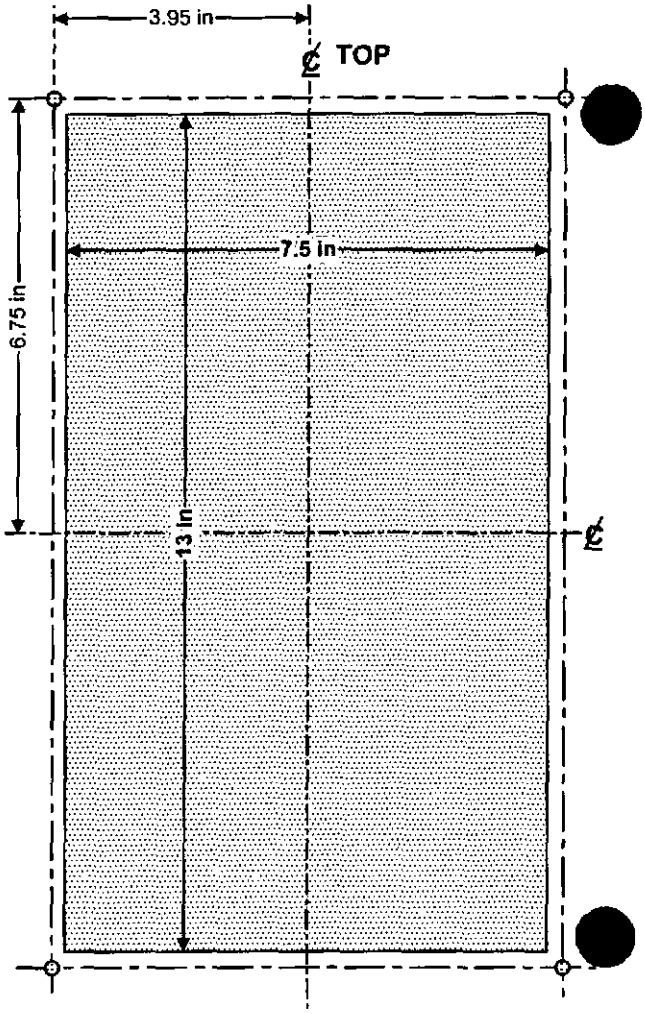

FIGURE 6(a):
DOOR CUTOUT FOR ADAPTER FACEPLATE

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1.12. DIELECTRIC TESTING

Do not perform any high voltage dielectric testing on the transfer switch with the TSC 800 controller connected into the circuit as serious damage will occur to the controller. All AC control fuses or control circuit isolation plugs connected to the TSC 800 must be removed if high voltage dielectric testing is performed on the transfer switch.

2. DESCRIPTION

The TSC 800 controller utilizes microprocessor-based design technology which provides high accuracy for all voltage sensing and timing functions. The **TSC 800** is factory configured to control all the operational functions and display features of the automatic transfer switch. All standard and optional control features of the **TSC 800** are fully programmable from the front panel LCD display and are security password protected. The LCD display screen prompts are in plain English, providing a user-friendly operator interface with many display options available. The microprocessor design provides many standard features which were previously only available as add-on optional features.

The TSC 800 controller consists of two parts; a Lexan faceplate which is mounted externally on the transfer switch door, and a printed circuit board (PCB) which is mounted inside the transfer switch door.

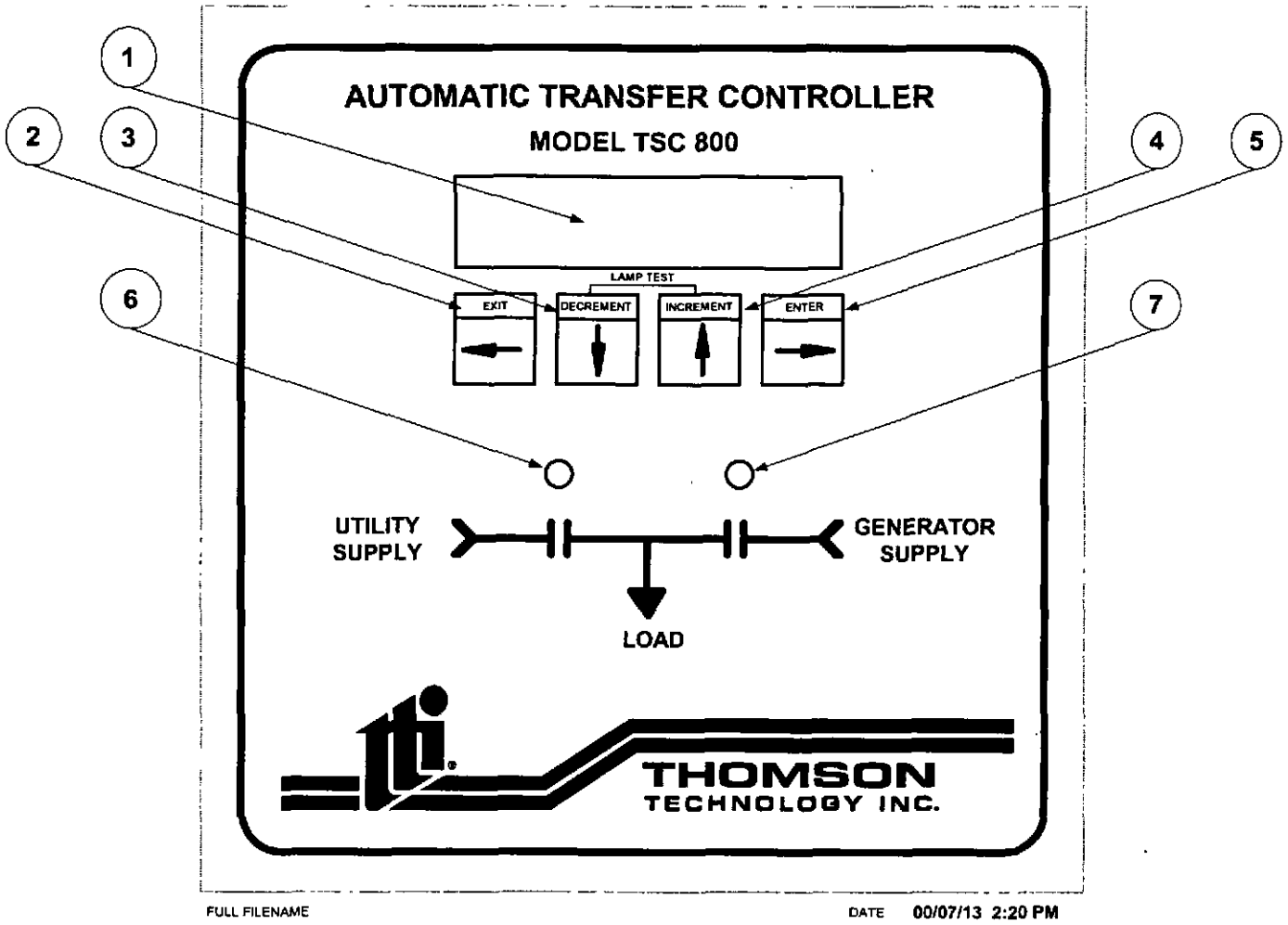


FIGURE 7

2.1. LEXAN FACEPLATE

The Lexan faceplate is shown as in FIGURE 7. The Lexan pushbuttons are connected to the main PCB via plug-in ribbon cable. The main features of the Lexan faceplate are described as follows with reference to FIGURE 7.

① LCD viewing window. The LCD display is mounted on the main PCB which is visible from the lexan faceplate.

② EXIT push-button. The EXIT function is used to scroll backwards through the status menus or programming prompts to the previous item. The EXIT function is used to "exit" the programming menu by holding this button down for approximately 2 seconds while in the programming mode.

③ DECREMENT push-button. The DECREMENT function is used to change a programming value while in the programming mode. When this push-button is held down, the displayed value will be "decremented" to a lower value as desired. Note: The longer the push-button is held down, the faster the value will be decremented.

④ INCREMENT push-button. The INCREMENT function is used to change a programming value while in the programming mode. When this push-button is held down, the displayed value will be "incremented" to a higher value as desired. Note: The longer the push-button is held down, the faster the value will be incremented.

⑤ ENTER push-button. The ENTER function is used to scroll forwards through the status menus or programming prompts to the next item. The ENTER function is used to "enter" a programming or test mode as well as accepting changed programming values. **Note:** In the programming mode, the longer the ENTER push-button is held down, the faster the next menu prompt will appear.

⑥ Load on Utility supply LED light viewing window

⑦ Load on Generator supply LED light viewing window

2.1.1. LAMP TEST

A lamp test feature is provided to test all LED lights as well as the LCD display. To activate the lamp test feature, simultaneously push the INCREMENT and DECREMENT push-buttons. All LED's and LCD display should illuminate for approximately 2 seconds then return to their original status.

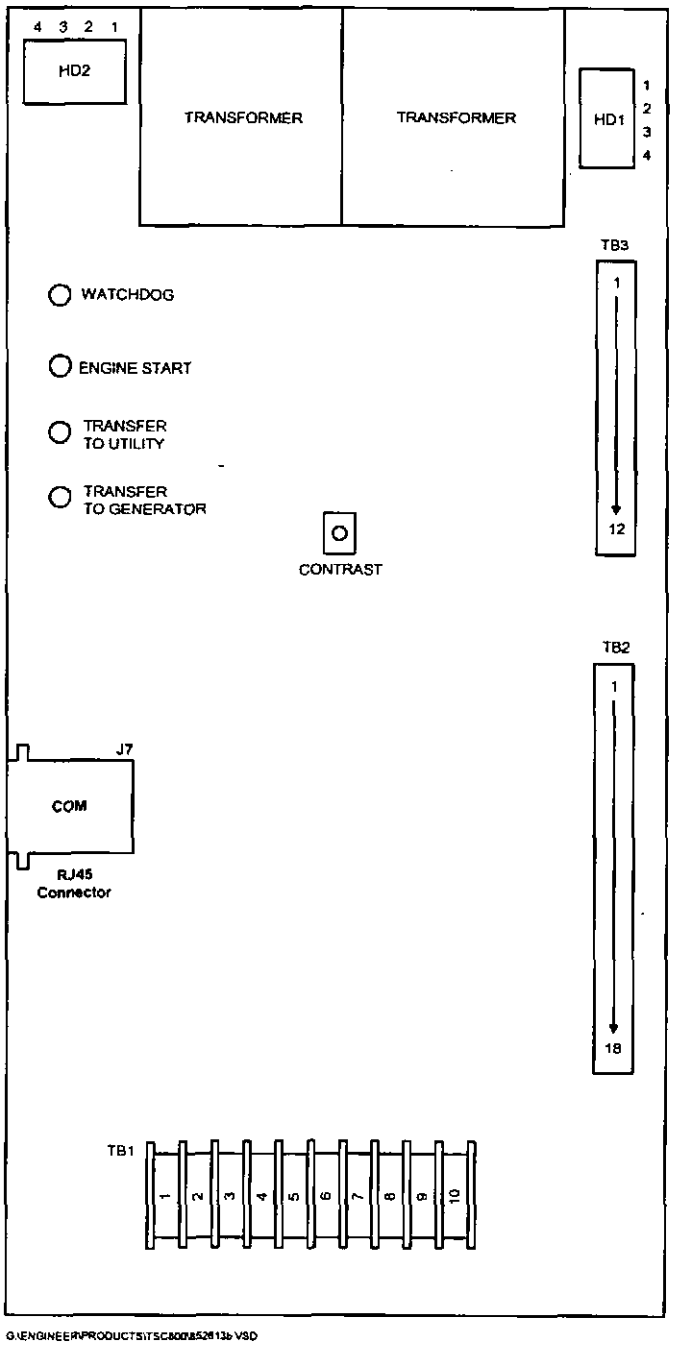


FIGURE 8

2.2. PRINTED CIRCUIT BOARD

The printed circuit board (PCB) is shown in FIGURE 8. The PCB contains the following user interface items:

2.2.1. VOLTAGE SELECTION

The voltage selection is made via two connector plugs which are located on the PCB and are identified as HD1 and HD2. A different plug assembly is required for a voltage change.

The TSC 800 is factory configured for a specific power supply voltage input as designated by voltage header plugs labeled as follows:

115V - designates a 115V power supply input voltage

230V - designates a 230V power supply input voltage

2.2.2. TERMINAL BLOCKS

Three terminal blocks are located on the PCB as follows:

TB1 high voltage sensing terminal block (120-600VAC)

WARNING

Voltage sensing circuits are capable of lethal voltages while energized. Standard safety procedures should be followed and be performed by qualified personnel only. Failure to do so may cause personnel injury and/or death.

TB2 transfer control terminal block for output contacts and low voltage inputs

TB3 transfer control terminal block for 115/230v input and output circuits

2.2.3. DIAGNOSTIC LED'S

The TSC 800 controller provides four diagnostic LED lights which are mounted on the rear of the printed circuit board as per FIGURE 8. Their functions are described as follows:

WATCHDOG — This LED flashes on and off at irregular intervals which indicates that the microprocessor is functioning normally.

TRANSFER TO UTILITY — This LED is illuminated whenever the TSC 800 is initiating a Transfer to Utility signal.

TRANSFER TO GEN — This LED is illuminated whenever the TSC 800 is initiating a Transfer to Generator signal.

ENGINE START — This LED is illuminated whenever the TSC 800 is initiating a Engine Start signal.

Note: All LED's will be illuminated whenever a lamp test function is performed.

2.2.4. COMMUNICATION PORT

A communication port is provided to interconnect to a remote communication system for remote monitoring and control of the transfer switch. Refer to section 3 for additional information.

2.2.5. CONTRAST ADJUSTMENT

A contrast adjustment potentiometer is located on the PCB and is factory set for ambient temperatures of 15° to 30° Celsius. For different ambient temperatures, consult the factory for adjustment procedures.

3. REMOTE COMMUNICATION OPTION

The TSC 800 transfer switch controller is available with an optional remote communication feature. The remote communication feature allows a TSC 800 controller to be monitored and controlled from a remote location via serial communication link to a personal computer (PC). PC's may be connected locally via serial communication cable to the TSC 800 or remotely via modem and telephone systems. Remote communication can be via customer supplied equipment or with an external communication interface module (CIM) as manufactured by Thomson Technology Inc.

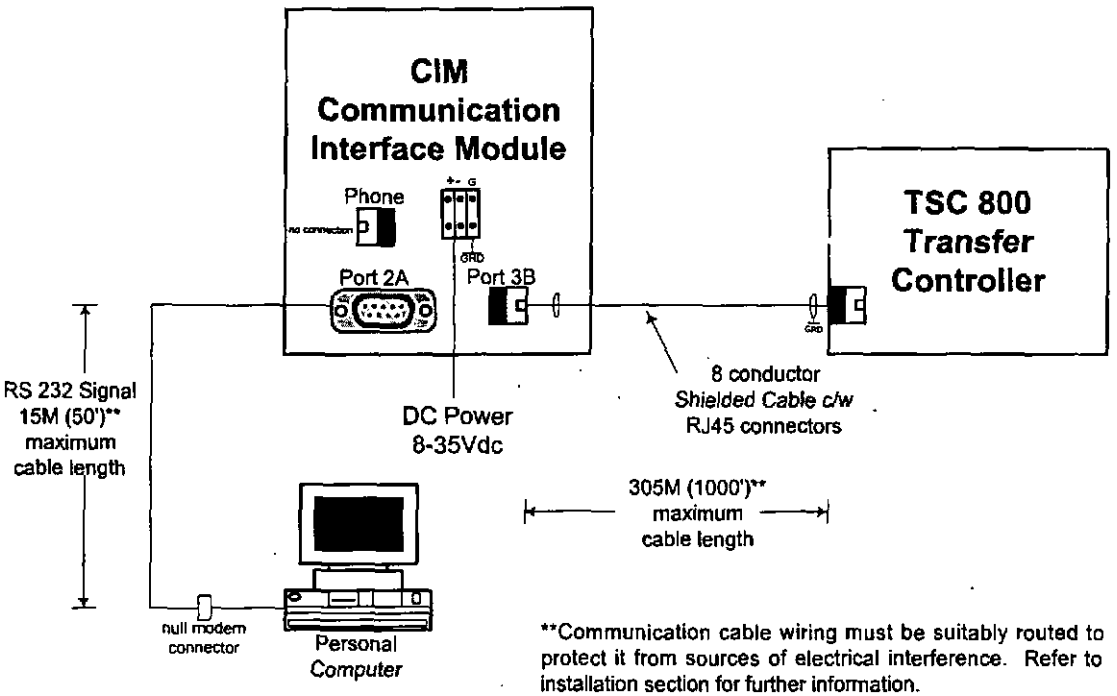
NOTE:

The CIM module may be located in the engine control panel provided the maximum distance between the CIM and TSC 800 controller is not exceeded as per the following information. Refer to the installation section of this manual for further information.

The CIM module utilizes an internal modem and contains Modbus™ protocol to interface with different remote monitoring software programs. Refer to separate literature for detailed information on the CIM module. The TSC 800 remote communication option must be ordered and be factory enabled prior to shipment. The communication feature cannot be user enabled once shipped from the factory.

The TSC 800 communication port utilizes a RS422 data transmission signal which is directly interconnected to the CIM module via 8 conductor, shielded cable with plug-in RJ45 connectors. Refer to FIGURES 9 & 10 for detailed information on direct connected or remote connected PC applications with CIM module.

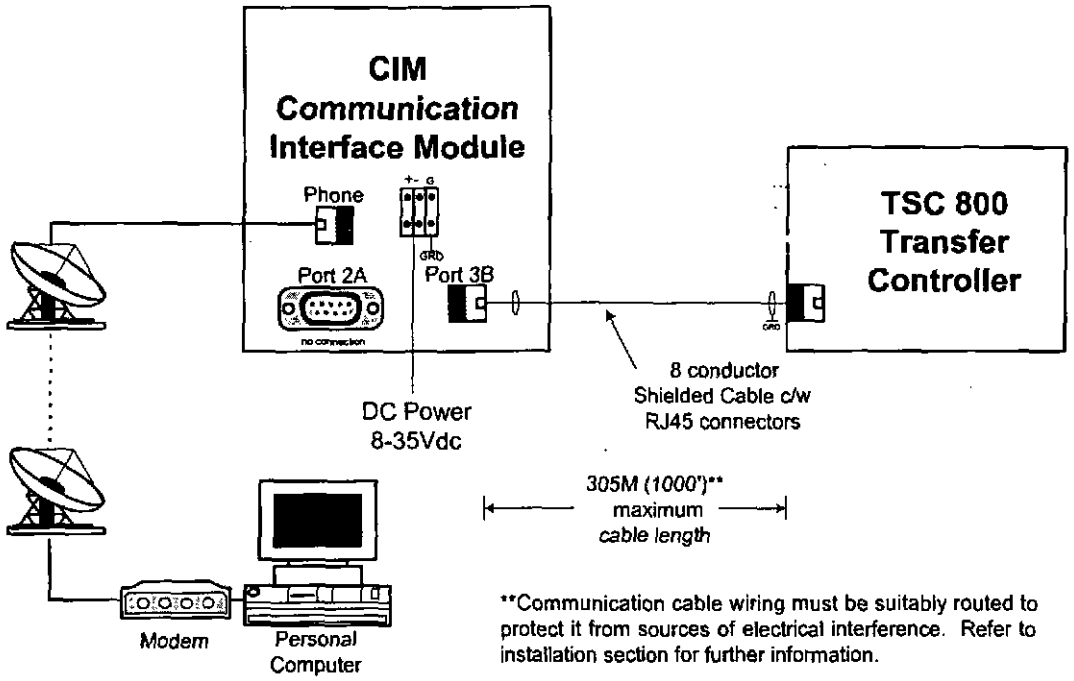
™ Trademarks belong to their respective parties.



**Communication cable wiring must be suitably routed to protect it from sources of electrical interference. Refer to installation section for further information.

G:\ENGINEER\PRODUCTS\TSC800\852621.VSD

FIGURE #9 TSC 800 WITH CIM MODULE & DIRECT CONNECTED PC (RS232)



**Communication cable wiring must be suitably routed to protect it from sources of electrical interference. Refer to installation section for further information.

G:\ENGINEER\PRODUCTS\TSC800\852622.VSD

FIGURE #10 TSC 800 WITH CIM MODULE & REMOTE CONNECTED PC

The TSC 800 RS422 communication port allows multiple TSC 800 controllers to be directly interconnected together to form a single network system. Up to 10 TSC 800 controllers may be interconnected to a single CIM module.

NOTE:

TSC 800 controllers and MEC 20 engine/generator controllers may be interconnected together via the same communication network provided the maximum number of controllers and interconnection distances are not exceeded. For additional information, refer to associated product instruction manuals.

Each TSC 800 controller is programmed with an unique communication node address number for the remote communication system to reference. The network system may be connected to a local PC or to a remote PC via telephone system and CIM module. Refer to FIGURE #11 for a typical TSC 800 network system with CIM module.

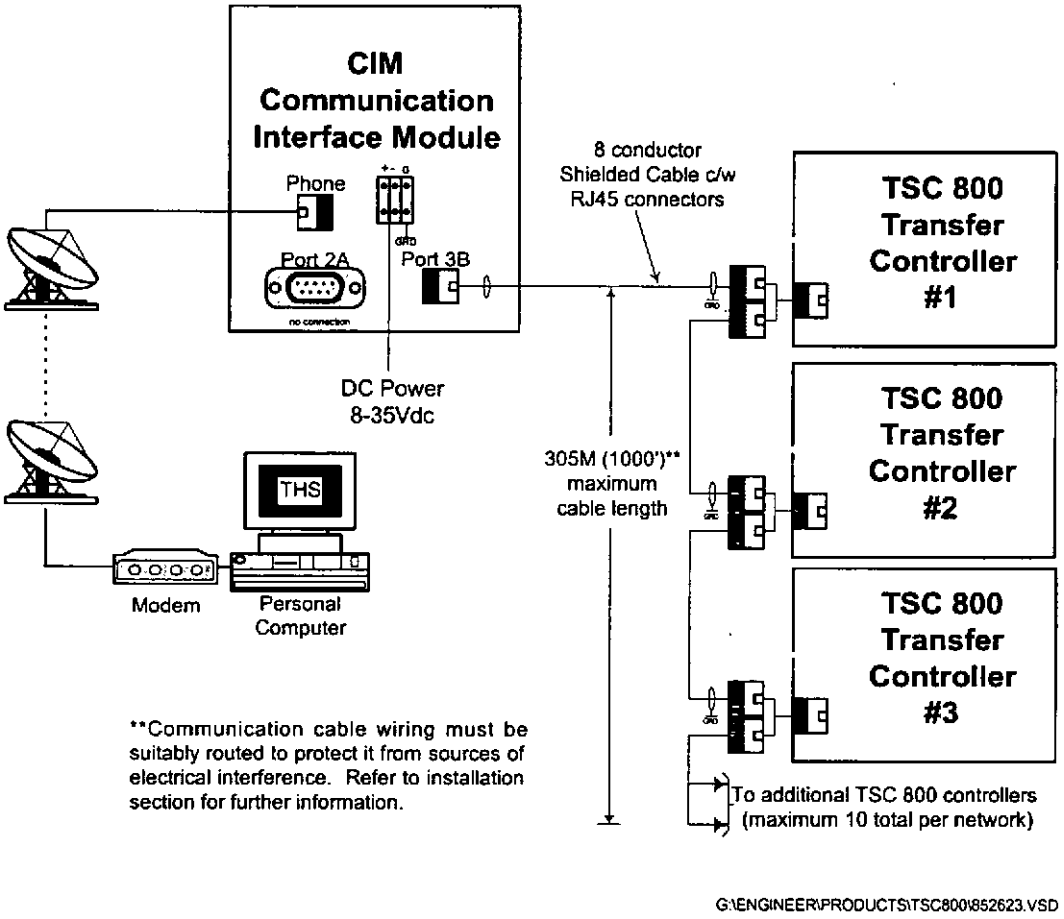
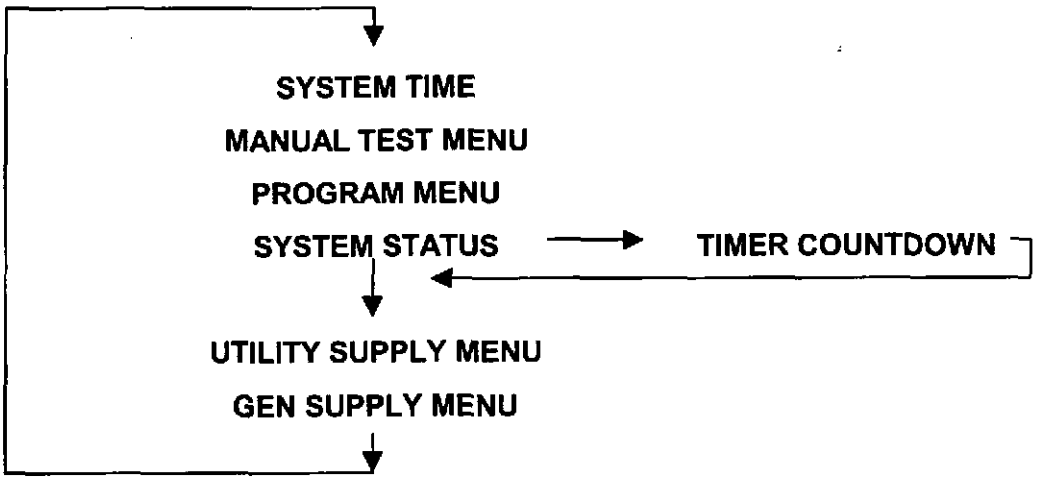


FIGURE #11 NETWORKED TSC 800 INTERCONNECTION DIAGRAM

4. TSC 800 DISPLAY MENUS

The TSC 800 contains a Liquid Crystal Display (LCD) which is visible on the front faceplate. The LCD has preprogrammed display menus which may be selected by pressing the *ENTER* or *EXIT* push-buttons in succession until the desired menu is displayed. The display menu types and order in which they are programmed are as follows:



4.1. SYSTEM TIME MENU

The system time menu is used to show current system time. The TSC 800 controller uses its internal time clock to reference when an automatic exercising operation (if pre-programmed) is to occur. To change the system time, refer to the "time clock adjustment" section of this manual.

LCD DISPLAY

SYSTEM TIME
MON① 12:24:31②

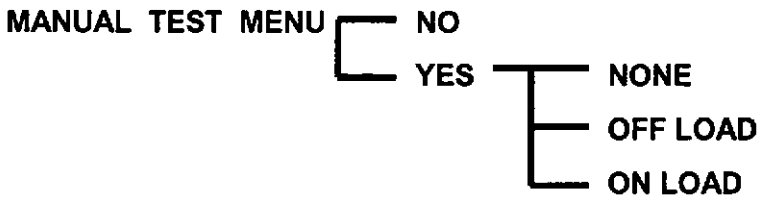
① Displays the day of the week

② Displays the current time in hours (24-hour clock): hour: min: seconds

4.2. MANUAL TEST MENU

The Manual Test Menu may be selected to initiate a specific type of generator testing operation.

The test sub-menus are organized as follows:



LCD DISPLAY

MAN TEST MENU
NO①

① Displays two messages which may be toggled between *YES* or *NO* by pressing the *INCREMENT* push-button. Their functions are described as follows:

- **NO** Testing operation menu is disabled when NO is displayed.
- **YES** Testing operation menu is enabled when YES is displayed and entered.

The following Test Mode options are provided:

NONE Testing operation is disabled when the NONE prompt is selected. To terminate a previously-set testing mode, select NONE and enter.

OFF LOAD When OFF LOAD prompt is selected and entered, the generator will immediately start and operate off load and will not permit a load transfer. **Note:** If the utility supply fails during this test mode, the generator will transfer on load. The generator will remain running until a different test mode is selected and entered.

ON LOAD When the ON LOAD prompt is selected and entered, the generator will immediately start and transfer on load. The generator will remain on load until a different test mode is selected and entered.

4.3. TSC 800 PROGRAM MENU

The programming menu is used to access the TSC 800's programmable functions such as time delays, voltage/frequency setpoints, calibration and time clock adjustments.

Access to the programming sub-menus can only be obtained with a security password number. The sub menus are organized as follows:

PROGRAMMING MENU ┬ **NO**
└ **YES** **PASSWORD**

LCD DISPLAY

① Displays two messages which may be toggled between YES or NO by pressing the *INCREMENT* push-button. Their functions are described as follows:

- **NO** Programming sub-menus are disabled when NO is displayed.
- **YES** Programming sub-menus are enabled when YES is displayed.

4.4. SYSTEM STATUS MENU

The system status menu provides the operator with information as to current status of both the utility and generator supplies.

> **NOTE:**
> The system status menu screen may be momentarily replaced with a time delay countdown screen when a transfer sequence is initiated. The display will automatically return to the previous menu following expiry of the timing sequence.

The system status sub-menus are organized as follows:

UTILITY ┬ **NORMAL**
├ **FAILED**
└ **READY**

GEN ┬ **OFF**
├ **NORMAL**
├ **OFF LOAD TEST**
├ **ON LOAD TEST**
├ **GEN SW OFF**
├ **FAILED**
└ **STARTING**

LCD DISPLAY

① Displays utility supply status conditions. There are three status conditions:

NORMAL Load is on the utility supply and the utility's voltage and frequency is normal.

FAILED Utility supply voltage and/or frequency is outside the nominal programmed limits(i.e. failed condition).

READY Load is on the generator supply and the utility supply is ready to transfer. This is a temporary condition due to either a test mode being selected or during a utility return time delay.

② Displays generator supply status conditions. There are seven status conditions as follows:

OFF Load is on the utility supply and the generator is off, ready to start upon utility failure condition.

NORMAL The generator is running due to a failed utility supply.

OFF LOAD TEST The generator is running off load due to manually initiated test mode via the front-panel push-buttons or exercise timer mode.

ON LOAD TEST The generator is running on load due to a manually initiated test mode via the front panel push-buttons or an automatic test mode as programmed in the time clock exercising menu.

GEN SW OFF The four position test switch has been set to the OFF position, disabling generator starting and transferring operation.

FAILED Generator is signaled to operate, however its voltage and/or frequency is outside the nominal programmed limits (i.e. failed condition).

STARTING Engine start signal has been initiated, and the TSC 800 sensors are waiting for generator voltage to build up.

4.5. TIMER COUNTDOWN MENUS

Timer countdown menus are automatically displayed when a specific time delay function occurs during a transfer sequence. When a time delay begins, the LCD display will indicate the time delay function name (e.g. GEN. START DELAY) and the current time remaining in the countdown sequence. When the timing function is complete, the LCD display will automatically change to either the next timing sequence countdown display or return to the original system status screen menu.

LCD DISPLAY

GEN START
DELAY① 45 SEC②

① Displays specific time delay function currently in operation

② Displays current time in seconds or minutes that are left in the specific timing sequence.

NOTE:
During a timer countdown sequence, a different display menu may be selected by pressing the *ENTER* push-button.

The following timer countdown screens are provided:

GEN START DELAY	**XX SEC.**
GEN WARMUP DELAY	**XX SEC.**
GEN COOLING DELAY	**XX SEC.**
UTILITY RETURN DELAY	**XX MIN.**
PRE-TRANSFER DELAY	**XX SEC.**
NEUTRAL DELAY	**XX SEC.**
POST-TRANSFER DELAY	**XX SEC.**

4.6. UTILITY SUPPLY MENU

The utility supply menu allows the operator to view the utility supply voltage and frequency values.

LCD DISPLAY

① Displays utility supply frequency in hertz (HZ). The frequency is displayed with a resolution of 1/10 of a hertz.

② Displays utility supply voltage as follows:

- 3-phase system: LINE TO LINE VOLTAGE--Phases A to B
- 1-phase system: LINE TO LINE VOLTAGE--Phases L1 to L2

③ Displays utility supply voltage as follows:

- 3-phase system: LINE TO LINE VOLTAGE--Phases B to C
- 1-phase system: LINE TO NEUTRAL VOLTAGE--Phases L1-N

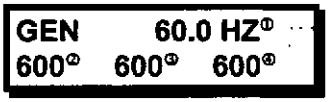
④ Displays utility supply voltage as follows:

- 3-phase system: LINE TO LINE VOLTAGE--Phases C-A
- 1-phase system: LINE TO NEUTRAL VOLTAGE--Phases L2-N

4.7. GENERATOR SUPPLY MENU

The generator supply menu allows the operator to view the generator supply voltage and frequency values.

LCD DISPLAY



① Displays generator supply frequency in hertz (HZ). The frequency is displayed with a resolution of 1/10 of a hertz.

② Displays generator supply voltage as follows:

- 3-phase system: LINE TO LINE VOLTAGE--Phases A to B
- 1-phase system: LINE TO LINE VOLTAGE--Phases L1 to L2

③ Displays generator supply voltage as follows:

- 3-phase system: LINE TO LINE VOLTAGE--Phases B to C
- 1-phase system: LINE TO NEUTRAL VOLTAGE--Phases L1-N

④ Displays generator supply voltage as follows:

- 3-phase system: LINE TO LINE VOLTAGE--Phases C-A
- 1-phase system: LINE TO NEUTRAL VOLTAGE--Phases L2-N

5. OPERATING INSTRUCTIONS

To operate the TSC 800 controller and associated transfer switch using the front faceplate push-buttons, refer to the following detailed operating instruction sub-section descriptions.

5.1. DISPLAY MENUS

The TSC 800 will display the last selected menu when normal utility or generator power is energized. To view another display menu, press the *ENTER* push-button to scroll to the next available menu. Keep pressing the ENTER push-button to view the complete list of display menu types. Note that the menu list will automatically loop back to the first menu item when the end of the list is reached.

5.2. TESTING INSTRUCTIONS

To perform a testing operation on the transfer switch using the front faceplate push-buttons, follow the procedure listed below.

To Initiate the Test Mode:

- Using the *ENTER* push-button, scroll to the **MANUAL TEST MENU.**
- Using the *INCREMENT* push-button, select the **YES** message and press the *ENTER* push-button.
- Using the *INCREMENT* push-button, select the **ON LOAD** or **OFF LOAD** test option as required.
- Press the *ENTER* push-button.

To Exit the Test Mode:

- Using the *ENTER* push-button, scroll to the **MANUAL TEST MENU.**
- Using the *INCREMENT* push-button, select the **YES** message and press the *ENTER* push-button.
- Using the *INCREMENT* push-button, select the **NONE** test option.
- Press the *ENTER* push-button.

5.3. TIME CLOCK ADJUSTMENT

To adjust the TSC 800 controllers internal time clock, follow the detailed procedure below. Note normal utility or generator power must be energized to enable adjustment.

- Using the *ENTER* push-button, scroll to the **PROGRAM MENU**.
- Using the *INCREMENT* push-button, select the **YES** message and press the *ENTER* push-button.
- Press the *ENTER* push-button when the **PASSWORD** message is displayed.
- Using the *INCREMENT* push-button, select the current ***day*** of the week message and press the *ENTER push*-button.
- Using the *INCREMENT* push-button, select the current ***hour*** of the day (i.e. 24 hour clock) and press the *ENTER push*-button.
- Using the *INCREMENT* push-button, select the current ***minute*** of the day (i.e. 60 minute) and press the *ENTER push*-button.
- Press the EXIT push-button and hold for 2 seconds to exit the time clock adjustment mode.

6. PROGRAMMING INSTRUCTIONS

Access to the programmable parameters of the **TSC 800** Transfer Controller is via a security password number. Three levels of security passwords are provided as described below:

READ ONLY MODE

User can view the programmable parameters only and cannot change any values. The Factory default number for the read-only level is one (1).

READ / WRITE MODE

User can view and modify any programming parameter as required. The Factory default number for the read/write level is two (2).

MASTER READ / WRITE MODE

User can view/modify any programming parameter as well as view/modify the security password level numbers. Consult TTI factory for master password number if required.

To enter the programming mode, follow the procedure as shown:

Select the Program Menu by scrolling through the display menus using the ENTER push-button. When displayed, use the INCREMENT push-button to select the YES prompt and push the ENTER button .

Use the INCREMENT or DECREMENT push-buttons to ramp the displayed number up or down to the desired password access number. Press the ENTER push-button when the correct number is displayed.

NOTE:
If an invalid number is entered, programming access will be limited to time clock adjustment only. To exit the programming mode, press the EXIT push-button and hold for two seconds until the display changes.

When the programming mode is accessed, the programming parameters will be displayed in the same order as the Programming Sheet. To skip over parameters that do not require changes, push and hold the ENTER push-button until the desired function is displayed. The EXIT push-button may be used to scroll backwards through the programming parameter loop.

To change a programmed parameter, use the INCREMENT or DECREMENT push-buttons to scroll through the available options or to adjust a value up or down to the desired number. When the desired option or number is displayed, press the ENTER push-button to accept the new value.

NOTE:
If the programming mode is terminated before the last change had been entered, the programming parameter will remain unchanged.

To exit the programming mode, press the EXIT push-button and hold for two seconds until the display changes.

6.1. EXERCISE TIMER

The TSC 800 controller has a built-in exercise timer which is programmable for a single occurrence, weekly exercise time period. The timer is fully programmable for time of day, duration of the test and type of test mode (i.e. On-Load or Off-Load). The exercise timer utilizes the TSC 800's internal time clock for referencing all timing functions. The time clock has a 10 minute power reserve feature to retain correct time settings during short duration utility power failures. Note: During any On-Load exercise test mode, the transfer switch will automatically re-transfer back to the utility supply if the generator set fails. To program the exercise timer prompts refer to the following descriptions:

6.1.1. AUTO TEST START DAY

Select the day of the week (e.g. Monday, Tuesday, etc.) that the generator set is to be started to begin its exercise period.

6.1.2. AUTO TEST START HOUR

Select the hour of the day (i.e. 0-23 hour) that the generator set is to be started to begin its exercise period.

6.1.3. AUTO TEST START MINUTE

Select the minute of the day (i.e. 0-59 minutes) that the generator set is to be started to begin its exercise period.

6.1.4. AUTO TEST STOP DAY

Select the day of the week (e.g. Monday, Tuesday, etc.) that the generator set is to be stopped following its exercise period.

6.1.5. AUTO TEST STOP HOUR

Select the hour of the day (i.e. 0-23 hour) that the generator set is to be stopped following its exercise period.

6.1.6. AUTO TEST STOP MINUTE

Select the minute of the day (i.e. 0 to 59 minutes) that the generator set is to be stopped following its exercise period.

6.1.7. AUTO TEST MODE

Select type of test mode desired. Three test modes are available as follows:

6.1.7.1. NONE: The exercise test mode is de-activated.

6.1.7.2. OFF LOAD: The generator set will be started during the exercise period but no transfer will occur. Note: the generator will transfer on load if the utility supply fails during the test period.

6.1.7.3. ON LOAD: The generator will be started and will transfer on load. Note: During the On-Load exercise test mode, the transfer switch will automatically re-transfer back to the utility supply if the generator set fails.

6.2. *SYSTEM CONFIGURATION*

The TSC 800 controller provides a flexible control system to allow specific operation for a wide range of power distribution types. To program the system configuration, refer to the following descriptions:

6.2.1. NODE ADDRESS

Set to unique controller address (1-255) for use with network connected TSC 800 controllers.

Note: This programming feature is only active when the remote communication option is enabled. Default setting for single TSC 800 applications is 1.

6.2.2. SYSTEM VOLTAGE

Set to nominal system voltage as expressed in "phase to phase" voltage.(i.e. a 347/600 volt system would be entered as "600". The programmable range of values is 120V-15,000V.

6.2.3. VOLTAGE SENSING RATIO

For direct voltage sensing wiring connections from 208 to 600 volts, enter a ratio of "1:1". When potential transformers are utilized for voltage sensing, enter the transformer ratio.(e.g. when using a 600:120 transformer, enter a ratio of "5:1".

6.2.4. SYSTEM FREQUENCY

Set to nominal system frequency of either 50 HZ or 60 HZ.

6.2.5. SYSTEM PHASES

Set to match the power distribution system used on the automatic transfer switch (i.e. either 1 phase or 3 phase system).

6.3. VOLTAGE SENSING

The TSC 800 controller provides 3-phase overvoltage and undervoltage sensing on both utility and generator supplies. Each sensor is individually programmable for pickup and dropout voltage setpoints (i.e. adjustable hysteresis) in addition to transient time delay settings. To program the voltage sensing features, refer to the following descriptions:

6.3.1. UTILITY UNDERVOLTAGE SENSOR PICKUP

Set to the desired utility undervoltage setpoint at which the internal voltage sensor *picks up* (i.e. the sensor energizes to a normal state when the utility voltage is above the setpoint). The setting is entered based on a phase to phase voltage value within a range of 70% to 100% of nominal system voltage. Note: The difference between the pickup and dropout setting is considered the dead band or hysteresis value.

6.3.2. UTILITY UNDERVOLTAGE SENSOR DROPOUT

Set to the desired utility undervoltage setpoint at which the internal voltage sensor *drops out* (i.e. the sensor de-energizes to an abnormal state when the utility voltage is below the setpoint). The setting is entered based on a phase to phase voltage value within a range of 70% to 100% of nominal system voltage. Note: The difference between the pickup and dropout setting is considered the dead band or hysteresis value.

6.3.3. UTILITY UNDERVOLTAGE SENSOR TIME DELAY (DROPOUT)

Select the desired utility undervoltage time delay setting. The setting is entered in seconds within a range of 0 to 10 seconds. If no delay is required, set this time delay to zero.

6.3.4. UTILITY OVERVOLTAGE SENSOR PICKUP

Note: *This feature is optional and must be factory ordered with the transfer switch.* Set to the desired utility overvoltage setpoint at which the internal voltage sensor *picks up* (i.e. the sensor energizes to an abnormal state when the utility voltage is above the setpoint). The setting is entered based on a phase to phase voltage value within a range of 100% to 130% of nominal system voltage. **Note:** The

difference between the pickup and dropout setting is considered the dead band or hysteresis value.

6.3.5.UTILITY OVERVOLTAGE SENSOR DROPOUT

Note: This feature is optional and must be factory ordered with the transfer switch. Set to the desired utility overvoltage setpoint at which the internal voltage sensor *drops out* (i.e. the sensor de-energizes to a normal state when the utility voltage is below the setpoint). The setting is entered based on a phase to phase voltage value within a range of 100% to 130% of nominal system voltage. **Note:** The difference between the pickup and dropout setting is considered the dead band or hysteresis value.

6.3.6.UTILITY OVERVOLTAGE SENSOR TIME DELAY (PICKUP)

Note: This feature is optional and must be factory ordered with the transfer switch. Select the desired utility overvoltage time delay setting. The setting is entered in seconds within a range of 0 to 5 seconds. If no delay is required, set this time delay to zero.

6.3.7.GENERATOR UNDERVOLTAGE SENSOR PICKUP

Set to the desired generator undervoltage setpoint at which the internal voltage sensor *picks up* (i.e. the sensor energizes to a normal state when the generator voltage is above the setpoint). The setting is entered based on a phase to phase voltage value within a range of 70% to 100% of nominal system voltage. **Note**: The difference between the pickup and dropout setting is considered the dead band or hysteresis value.

6.3.8.GENERATOR UNDERVOLTAGE SENSOR DROPOUT

Set to the desired generator undervoltage setpoint at which the internal voltage sensor *drops out* (i.e. the sensor de-energizes to an abnormal state when the generator voltage is below the setpoint). The setting is entered based on a phase to phase voltage value within a range of 70% to 100% of nominal system voltage. **Note**: The difference between the pickup and dropout setting is considered the dead band or hysteresis value.

6.3.9.GENERATOR UNDERVOLTAGE SENSOR TIME DELAY (DROPOUT)

Select the desired generator undervoltage time delay setting. The setting is entered in seconds within a range of 0 to 10 seconds. If no delay is required, set this time delay to zero.

6.3.10. GENERATOR OVERVOLTAGE SENSOR PICKUP

Note: This feature is optional and must be factory ordered with the transfer switch. Set to the desired generator overvoltage setpoint at which the internal voltage sensor *picks up* (i.e. the sensor energizes to an abnormal state when the generator voltage is above the setpoint). The setting is entered based on a phase to phase voltage value within a range of 100% to 130% of nominal system voltage. Note: The difference between the pick up and drop out setting is considered the dead band or hysteresis value.

6.3.11. GENERATOR OVERVOLTAGE SENSOR DROPOUT

Note: This feature is optional and must be factory ordered with the transfer switch. Set to the desired generator overvoltage setpoint at which the internal voltage sensor *drops out* (i.e. the sensor de-energizes to a normal state when the generator voltage is below the setpoint). The setting is entered based on a phase to phase voltage value within a range of 100% to 130% of nominal system voltage. **Note**: The difference between the pickup and dropout setting is considered the dead band or hysteresis value.

6.3.12. GENERATOR OVERVOLTAGE SENSOR TIME DELAY (PICKUP)

Note: This feature is optional and must be factory ordered with the transfer switch. Select the desired generator overvoltage time delay setting. The setting is entered in seconds within a range of 0 to 5 seconds. If no delay is required, set this time delay to zero.

6.4. *FREQUENCY SENSING*

The **TSC 800** controller provides under and over frequency sensing on both utility and generator supplies. Each sensor is individually programmable for pickup and dropout frequency setpoints (i.e. adjustable hysteresis) in addition to transient time delay settings. To program the frequency sensing features, refer to the following descriptions:

6.4.1. UTILITY UNDERFREQUENCY SENSOR

Note: This feature is optional and must be factory ordered with the transfer switch.

Set to the desired utility underfrequency setpoint at which the internal frequency sensor *drops out* (i.e. the sensor de-energizes to an abnormal state when the utility frequency is below the setpoint). The setting is entered in a frequency value within a range of 40.0 to 60.0 HZ.

6.4.2. UTILITY UNDERFREQUENCY SENSOR TIME DELAY (DROPOUT)

Note: This feature is optional and must be factory ordered with the transfer switch.

Select the desired utility underfrequency time delay setting. The setting is entered in seconds within a range of 0 to 10 seconds. If no delay is required, set this feature to zero.

6.4.3. UTILITY OVERFREQUENCY SENSOR

Note: This feature is optional and must be factory ordered with the transfer switch.

Set to the desired utility overfrequency setpoint at which the internal frequency sensor *picks up* (i.e. the sensor energizes to an abnormal state when the utility frequency is above the setpoint). The setting is entered in a frequency value within a range of 50.0 to 70.0 HZ.

6.4.4. UTILITY OVERFREQUENCY SENSOR TIME DELAY (PICKUP)

Note: This feature is optional and must be factory ordered with the transfer switch.

Select the desired utility overfrequency time delay setting. The setting is entered in seconds within a range of 0 to 5 seconds. If no delay is required, set this time delay to zero.

6.4.5. GENERATOR UNDERFREQUENCY SENSOR

Set to the desired generator underfrequency setpoint at which the internal frequency sensor *drops out* (i.e. the sensor de-energizes to an abnormal state when the generator frequency is below the setpoint). The setting is entered in a frequency value within a range of 40.0 to 60.0 HZ.

6.4.6. GENERATOR UNDERFREQUENCY SENSOR TIME DELAY (DROPOUT)

Select the desired generator underfrequency time delay setting. The setting is entered in seconds within a range of 0 to 10 seconds. If no delay is required, set this time delay to zero.

6.4.7. GENERATOR OVERFREQUENCY SENSOR

Set to the desired generator overfrequency setpoint at which the internal frequency sensor *picks up* (i.e. the sensor energizes to an abnormal state when the generator frequency is above the setpoint). The setting is entered in a frequency value within a range of 50.0 to 70.0 HZ.

6.4.8. GENERATOR OVERFREQUENCY SENSOR TIME DELAY (PICKUP)

Select the desired generator overfrequency time delay setting. The setting is entered in seconds within a range of 0 to 5 seconds. If no delay is required, set this time delay to zero.

6.5. TIME DELAYS

The TSC 800 provides many time delay control functions which are individually programmable as described below.

6.5.1. GENERATOR START DELAY

The generator (i.e. engine) start signal will be initiated following expiry of the start delay timer. Select desired generator start delay time in seconds. The range of setting is 0 to 60 seconds. If no delay is required, set this time delay to zero. **Note**: The output relay is normally energized when the utility power is within limits and de-energizes to start the generator.

6.5.2. GENERATOR WARM UP DELAY

A transfer to the generator supply will be initiated when the voltage and frequency are within limits and upon expiry of the warm up delay timer. Select desired generator warm up delay time in seconds. The range of settings is 0 to 1800 seconds. If no delay is required, set this time delay to zero.

6.5.3. GENERATOR COOLDOWN DELAY

The generator (i.e. engine) cooldown period will be initiated once the load has transferred from the generator supply. The engine start signal will be maintained until expiry of the cooldown delay timer. Select desired generator cooldown delay time in minutes. The range of settings is 0 to 30 minutes. If no delay is required, set this time delay to zero.

6.5.4. UTILITY RETURN DELAY

The utility return delay period will be initiated once the utility supply has returned within limits following a utility power failure condition. Select desired utility return delay time in minutes. The range of settings is 0 to 30 minutes. If no delay is required, set this time delay to zero. **Note**: The utility return delay will be bypassed should the generator fail during the time delay period.

6.5.5. PRE/POST TRANSFER DELAY (LDC)

Note: This feature is optional and must be factory ordered with the transfer switch.

The pre/post transfer delay period will be initiated upon a impending transfer in either direction. The pre/post transfer output relays will momentarily energize (as per the pre-transfer time setting) prior to a load transfer and will stay energized until the post-transfer delay time period expires. Select desired pre- and post-delay time in seconds. The range of settings is 0 to 30 seconds. If no delay is required, set this time delay to zero.

6.5.6. MINIMUM FIND NEUTRAL DELAY

The TSC 800 transfer control logic includes an adjustable time delay feature to compensate for the minimum time that a transfer switch mechanism takes to operate when load sensing voltage is lost due to a power failure. This time delay is set to a time value which is approximately *equal* to the time that the transfer mechanism typically takes to operate from one supply position to the neutral position. This feature is factory set to match the specific transfer switch mechanism as supplied with the unit.

6.5.7. MAXIMUM FIND NEUTRAL DELAY

The TSC 800 transfer control logic includes an adjustable time delay feature to compensate for the maximum time that a transfer switch mechanism takes to operate when load sensing voltage is used to detect the neutral position. This time delay is set to a time value which is *greater than* the typical time that the transfer mechanism typically takes to operate from one supply position to the neutral position. When the TSC 800 controller is supplied from the factory with a TTI transfer mechanism the Maximum Find Neutral Delay will be factory set for correct operation. Note: When the TSC 800 controller is supplied loose without a transfer mechanism, the Maximum Find Neutral Delay function must be user set for correct operation with the appicable transfer mechanism. For applications using electrically held contactors, the Maximum Find Neutral Delay function must typically be set for 0.0 seconds for correct operation.

6.5.8. NEUTRAL DELAY TIMER (NDT)

The neutral delay time period will be initiated once both of the supply breakers are open during a transfer sequence. Select desired neutral delay time in seconds. The range of settings is 0 to 60 seconds. If no delay is required, set

this time delay to zero. **Note**: The neutral delay will be bypassed should the operating power fail for longer than the timer setting.

NOTE: Model TS 890 transfer switches may use NDT timers which are external to the TSC 800 controller. In this case the TSC 800 NDT function is not used and must be set at zero seconds. Refer to TS 890 drawings for further information.

6.5.9. MAXIMUM TRANSFER TIME

The TSC 800 transfer control logic includes an adjustable time delay feature to detect when a transfer switch mechanism fails to operate. This time delay is set to a time value which is *greater than* the typical time that the transfer mechanism typically takes to operate from one supply position to the opposite supply position. This feature is factory set to match the specific transfer switch mechanism as supplied with the unit.

6.5.10. TRANSFER FAIL

Note: This feature is user selectable in TSC 800 software version 1.3 (or greater).

The TSC 800 transfer controller contains a "TRANSFER SWITCH FAIL" detection feature which is user selectable for enabled or disabled. Operating logic is as follows:

DISABLED: The "TRANSFER SWITCH FAIL" feature is disabled in this mode. The TSC 800 controller will not verify that the transfer mechanism has operated correctly.

ENABLED: The "TRANSFER SWITCH FAIL" feature is enabled in this mode. The TSC 800 controller will verify that the transfer switch mechanism has correctly transferred or is in the correct position. If the TSC 800 controller senses an abnormal condition (i.e. load voltage and transfer switch position contacts are not at the normal levels or states) the controller will activate an alarm message to the LCD display. The transferring output signals from the controller will be de-activated and the engine start contact will remain in its last state (before the alarm was activated). The controller has an internal 30 sec. timer to provide an alarm bypass to enable correct operating sequences. To reset the alarm condition, the "lamp test" function must be activated. Note: The "TRANSFER SWITCH FAIL" feature will typically be enabled when supplied from the factory.

6.5.11. TRANSFER LOGIC

Note: This feature is user selectable in TSC 800 software version 1.3 (or greater).

The TSC 800 transfer controller software contains a user selectable function for type of transfer logic required for specific applications. This feature will be factory set for specific type of application and transfer mechanism used and therefore should not require resetting.

Selectable operating logic is as follows:

MAINTAINED: The TSC 800 transfer output signals will stay in the 'MAINTAINED" energized state upon a source failure and will only de-energize when the alternate source becomes available. Note: the transfer output signal will de-energize upon a total loss of source voltage.

DROPOUT: The TSC 800 transfer output signals will "DROPOUT" (or de-energize) when the connected source goes out of normal voltage or frequency limits. The transfer output signal will only re-energize when the connected source returns to normal limits.

6.5.12. PROGRAMMABLE OUTPUT

The TSC 800 transfer controller includes a standard programmable output relay signal. The output relay energizes when one of the following conditions occurs. Note: Only one function may be programmed.

LOAD ON UTILITY	Output energizes when the utility transfer breaker is closed and load voltage is present.
LOAD ON GENERATOR	Output energizes when the generator transfer breaker is closed and load voltage is present.
LOAD SHED	Output energizes when generator is on load and frequency drops below underfrequency setpoint for longer than the time delay setting.
UTILITY SUPPLY NORMAL	Output relay energizes when the utility supply is energized and is within voltage and frequency limits.
FAIL TO TRANSFER	Output relay energizes when the transfer switch mechanism fails to operate for the given time delay period. Note: This output feature is only activated when the "TRANSFER SWITCH FAIL" feature is enabled. (Refer to programming item #11 for additional information.)

6.5.13. UTILITY FAIL CALLOUT

When the remote communication option is enabled, this programming prompt will appear. This feature may be enabled or disabled by programming selection.

ENABLED: The controller will initiate a callout signal via the communication port to a remote connected device when a Utility (Source 1) power failure is detected. The callout signal will be reset when the Utility (Source 1) power returns to normal condition.

DISABLED: The controller will not initiate a callout when a Utility (Source 1) power failure is detected.

6.5.14. LOAD ON GENERATOR CALLOUT

When the remote communication option is enabled, this programming prompt will appear. This feature may be enabled or disabled by programming selection.

ENABLED: The controller will initiate a callout signal via the communication port to a remote connected device when the load is connected to the generator supply. The callout signal will be reset when the load transfers back to the utility supply.

DISABLED: The controller will not initiate a callout when the load transfers to the generator supply.

6.5.15. TRANSFER FAIL CALLOUT

When the remote communication option is enabled, this programming prompt will appear. This feature may be enabled or disabled by programming selection.

ENABLED: The controller will initiate a callout signal via the communication port to a remote connected device when the transfer switch fails to operate. The callout signal will only reset when the "Fail to Transfer" alarm is manually reset via local push-buttons or with the remote communication software.

DISABLED: The controller will not initiate a callout when a "Fail to Transfer " alarm condition occurs.

6.5.16. AUTO TEST CALLOUT

When the remote communication option is enabled, this programming prompt will appear. This feature may be enabled or disabled by programming selection.

ENABLED: The controller will initiate a callout signal via the communication port to a remote connected device when a automated test is initiated at the controller via the TSC 800 exercise time clock. The callout signal will reset when the Auto Test condition is terminated.

DISABLED: The controller will not initiate a callout an Auto Test condition is initiated.

6.5.17. MAN TEST CALLOUT

When the remote communication option is enabled, this programming prompt will appear. This feature may be enabled or disabled by programming selection.

ENABLED: The controller will initiate a callout signal via the communication port to a remote connected device when a manual test is initiated at the controller via the TSC 800 push-buttons or external control switch. The callout signal will reset when the Manual Test condition is terminated.

DISABLED: The controller will not initiate a callout a Manual Test condition is initiated.

6.5.18. SWITCH NOT IN AUTO CALLOUT

When the remote communication option is enabled, this programming prompt will appear. This feature may be enabled or disabled by programming selection.

ENABLED: The controller will initiate a callout signal via the communication port to a remote connected device when the TSC 800 controllers' operating mode is "Not In Auto" as locally selected via the four position external control switch. The callout signal will reset when the control switch is returned to the Auto position.

DISABLED: The controller will not initiate a callout if the TSC 800 controller is not in the Auto mode of operation.

6.5.19. BACK LIGHT TIME OUT

The LCD back light function can be programmed so it will automatically turn off after the selected time.

6.6. *VOLTAGE SENSING CALIBRATION*

Voltage sensing calibration for the utility, generator and load sensors is provided by the TSC 800 software program. All voltage sensing circuits are factory calibrated to specific voltage levels prior to shipment of the transfer switch.

Should field calibration of any voltage sensing circuit be required, the following procedure may be used.

WARNING

Voltage sensing circuits are capable of lethal voltages while energized. Standard safety procedures should be followed and be performed by qualified personnel only. Failure to do so may cause personnel injury and/or death.

6.6.1. GENERAL

6.6.1.1. To access the TSC 800's software programming loop for programming, the program menu must be selected, the YES prompt entered and read/write security password level (or higher) must be entered.

6.6.1.2. Once the programming loop has been accessed, scroll to the voltage calibration screens as shown below.

UTIL AB① ZERO②

99③ 600V④

① Displays the selected supply's phase voltages to be calibrated.

② Displays the type of calibration function, either ZERO or SPAN.

③ Displays the calibration correction factor number (0-255) used to obtain the correct voltage reading. **Note**: To correctly calibrate any of the voltage sensors, the ZERO function must be calibrated before the SPAN function.

④ Displays the actual voltage measurement which will be the same value as shown on the TSC 800 display menus for generator or utility supplies. This voltage reading may be calibrated higher or lower by changing the correction factor number.

NOTE:

To accurately calibrate the TSC 800's voltage sensors, an external test voltage meter is required, with an accuracy of 0.5% or better.

6.6.2. UTILITY VOLTAGE CALIBRATION

To adjust the utility supply voltage sensors, perform the following procedure:

6.6.2.1.ZERO CALIBRATION

6.6.2.1.1.Energize the generator supply to power up the controller and de-energize the utility supply.

6.6.2.1.2.Scroll to the desired utility supply voltage phases with the **ZERO** function selected.

6.6.2.1.3.Use the INCREMENT or DECREMENT push-buttons to adjust the correction factor number while observing the displayed voltage level. Adjust the correction factor number to obtain 0 VAC on the display.

6.6.2.1.4.With the correct voltage displayed, press the ENTER push-button to accept the correction factor number. Record the correction factor number on the TSC 800 programming sheet for future reference if required.

6.6.2.1.5.Repeat the above procedure for all remaining phases of the utility supply as required.

6.6.2.2.SPAN CALIBRATION

6.6.2.2.1.Energize the utility supply voltage to the controller at nominal level. The generator supply may be de-energized.

6.6.2.2.2.In the programming mode, scroll to the desired utility supply voltage phases with the **SPAN** function selected.

6.6.2.2.3.Connect an external AC voltmeter of adequate voltage range and accuracy to the TSC 800 controller terminal associated with the voltage phases to be calibrated.

WARNING

Voltage sensing circuits are capable of lethal voltages while energized. Standard safety procedures should be followed and be performed by qualified personnel only. Failure to do so may cause personal injury and/or death.

6.6.2.2.4. Use the INCREMENT or DECREMENT push-buttons to adjust the correction factor number while observing the displayed voltage level on the TSC 800. Adjust the correction factor number to obtain an identical voltage reading as measured with the external AC voltmeter.

6.6.2.2.5. With the correct voltage displayed, press the *ENTER* push-button to accept the correction factor number. Record the correction factor number on the TSC 800 programming sheet for future reference if required.

6.6.2.2.6. Repeat the above procedures for all remaining phases of the utility supply as required.

NOTE:

Once the span calibration setting has been done, do not readjust any zero calibration points as this will cause incorrect voltage readings.

7. TSC 800 PROGRAMMING DATA SHEETS

SUMMARY CONFIGURATION DATA SHEET

WORK ORDER #:		REV.		REV. DATE:	
INITIATED BY:		CUSTOMER:		DEFAULT PROGRAM #:	
DATE:		PROJECT:		TPS VERSION:	

NOTES:

SYSTEM AC INPUTS

SYSTEM AC VOLTS:_____ PHASES:____ FREQUENCY:_____ CONTROL TYPE:_____

DIGITAL DISPLAY FEATURES

☐ GEN AC VOLTAGE ☐ UTILIY AC VOLTAGE ☐ TIME CLOCK

☐ GEN AC FREQUENCY ☐ UTILITY AC FREQUENCY

STANDARD FEATURES

☐ Level 1 Features

- 3 phase Utility (SRC 1) Undervoltage Sensing
- 3 phase Gen (SRC 2) Undervoltage Sensing
- Generator Underfrequency Sensing
- Generator Start Delay Timer
- Generator Cooldown Timer
- Utility Return Timer
- Generator Warm-up Timer
- Automatic Exercise Timer
- Neutral Delay Timer

☐ Level 2 Features (Level 1 features plus)

- Utility/Gen 3 Phase Overvoltage Sensing
- Utility Overfrequency Sensing

☐ Level 3 Features (Level 1& 2 features plus)

- Dual Source Logic

OPTIONAL FEATURES

☐ Utility/Gen 3 Phase Overvoltage Sensing
☐ Utility Overfrequency Sensing
☐ Load Disconnect Contact
☐ COM Port Enabled

STANDARD PROGRAMMABLE OUTPUTS

OUTPUT NAME	OUTPUT FUNCTION
☐ Programmable Output	☐ Load on Gen
	☐ Load on Utility
	☐ Utility Normal
	☐ Transfer Fail
	☐ Load Shed

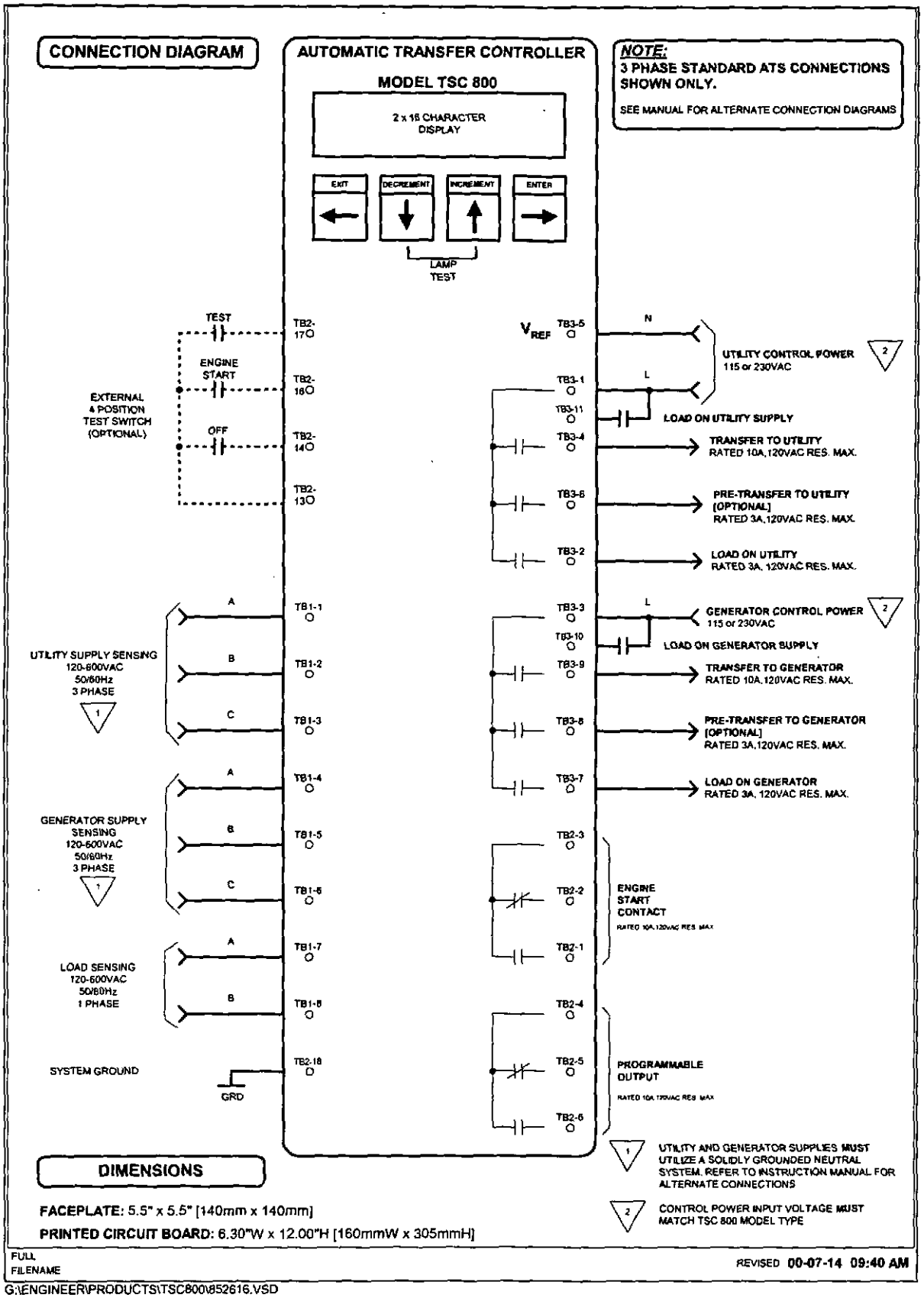
8. MAIN MENU PROGRAMMING SHEET

PARAMETER		VALUE	RANGE LOW		HIGH
CONTROL TYPE	STD ATS / DUAL SOURCE				
AUTO TEST START DAY					
AUTO TEST START HOUR					
AUTO TEST START MIN					
AUTO TEST STOP DAY					
AUTO TEST STOPHOUR					
AUTO TEST STOP MIN					
AUTO TEST MODE					
COMMUNICATION OPTION	toggle enabled/disabled				
NODE ADRESS	#		1		255
SYSTEM VOLTAGE	[***VAC]				
VOLTAGE SENSING RATIO	RATIO		1		208
SYSTEM FREQUENCY	[***Hz]		0		125
SYSTEM PHASES	TOGGLE 1 OR 3 PHASE				
UTILITY UNDERVOLTAGE SENSORS PICK UP	[***VAC]		0	to	0
UTILITY UNDERVOLTAGE SENSORS DROP OUT	[***VAC]		0	to	0
UTILITY UNDERVOLTAGE SENSORS TIME DELAY DROP OUT	[**SEC]		0	to	10
UTILITY OVERVOLTAGE SENSORS PICK UP	[***VAC]		0	to	0
UTILITY OVERVOLTAGE SENSORS DROP OUT	[***VAC]		0	to	0
UTILITY OVERVOLTAGE SENSORS TIME DELAY PICK UP	[**SEC]		0	to	5
UTILITY UNDER FREQUENCY SENSORS	[***Hz]		48.0	to	60.0
UTILITY UNDER FREQUENCY SENSORS TIME DELAY DROPOUT	[**SEC]		0	to	10
UTILITY OVER FREQUENCY SENSORS	[***Hz]		50.0	to	70.0
UTILITY OVER FREQUENCY SENSORS TIME DELAY PICK UP	[**SEC]		0	to	5
GENERATOR UNDERVOLTAGE SENSORS PICK UP	[***VAC]		0	to	0
GENERATOR UNDERVOLTAGE SENSORS DROP OUT	[***VAC]		0	to	0
GENERATOR UNDERVOLTAGE SENSORS TIME DELAY DROP OUT	[**SEC]		0	to	10
GENERATOR OVERVOLTAGE SENSORS PICK UP	[***VAC]		0	to	0
GENERATOR OVERVOLTAGE SENSORS DROP OUT	[***VAC]		0	to	0
GENERATOR OVERVOLTAGE SENSORS TIME DELAY PICK UP	[**SEC]		0	to	5
GENERATOR UNDER FREQUENCY SENSORS	[***Hz]		40.0	to	60.0
GENERATOR UNDER FREQUENCY SENSORS TIME DELAY DROP OUT	[**SEC]		0	to	10
GENERATOR OVER FREQUENCY SENSORS	[***Hz]		50.0	to	70.0
GENERATOR OVER FREQUENCY SENSORS TIME DELAY PICK UP	[**SEC]		0	to	5
GENERATOR START DELAY	[****SEC]		0	to	60
GENERATOR WARM-UP DELAY	[****SEC]		0	to	1800
GENERATOR COOLDOWN DELAY	[****MIN]		0	to	30
UTILITY RETURN DELAY	[****MIN]		0	to	30
PRE-TRANSFER DELAY	[****SEC]		0	to	30
MIN FIND NEUTRAL DELAY	[****SEC]		0.0	to	20.0
MAX FIND NEUTRAL DELAY	[****SEC]		0.0	to	20.0
NEUTRAL DELAY	[****SEC]		0	to	60
MAX TRANSFER TIME	[****SEC]		0	to	30
POST TRANSFER DELAY	[****SEC]		0	to	30
TRANSFER FAIL	toggle enabled/disabled				
TRANSFER OUTPUT LOGIC	toggle maintained/dropout				
PROGRAMMABLE OUTPUT	A=LD ON UTIL,B= LD ON GEN,C= LD SHED,D= UTIL NORMAL,E=FAIL TO XFER		A	to	E
UTILITY FAIL CALLOUT	toggle enabled/disabled				
LOAD ON GEN CALLOUT	toggle enabled/disabled				
TRANSFER FAIL CALLOUT	toggle enabled/disabled				
AUTO TEST CALLOUT	toggle enabled/disabled				
MAN TEST CALLOUT	toggle enabled/disabled				
SWITCH NOT IN AUTO CALLOUT	toggle enabled/disabled				
BACKLIGHT	[****SEC]		0	to	999

9. CALIBRATION DATA SHEET

UTILITY PHASE A - B ZERO	*[*CORRECTION FACTOR*]*		0 to 255
UTILITY PHASE A - B SPAN	*[*CORRECTION FACTOR*]*		0 to 255
UTILITY PHASE B - C ZERO	*[*CORRECTION FACTOR*]*		0 to 255
UTILITY PHASE B - C SPAN	*[*CORRECTION FACTOR*]*		0 to 255
UTILITY PHASE C - A ZERO	*[*CORRECTION FACTOR*]*		0 to 255
UTILITY PHASE C - A SPAN	*[*CORRECTION FACTOR*]*		0 to 255
GENERATOR PHASE A - B ZERO	*[*CORRECTION FACTOR*]*		0 to 255
GENERATOR PHASE A - B SPAN	*[*CORRECTION FACTOR*]*		0 to 255
GENERATOR PHASE B - C ZERO	*[*CORRECTION FACTOR*]*		0 to 255
GENERATOR PHASE B - C SPAN	*[*CORRECTION FACTOR*]*		0 to 255
GENERATOR PHASE C - A ZERO	*[*CORRECTION FACTOR*]*		0 to 255
GENERATOR PHASE C - A SPAN	*[*CORRECTION FACTOR*]*		0 to 255
LOAD PHASE A - B ZERO	*[*CORRECTION FACTOR*]*		0 to 255
LOAD PHASE A - B SPAN	*[*CORRECTION FACTOR*]*		0 to 255

10. TSC 800 TYPICAL CONNECTION DIAGRAM



11. TSC 800 SPECIFICATIONS

- POWER SUPPLY:
  - 115 or 230 VAC nominal (+10% -30%)
    - 50/60 Hz
    - 100ma nominal (no external load connected)

- VOLTAGE SENSING:
  - Direct 120-600 VAC nominal, single or three phase
  - 50/60 Hz
  - +/- 0.5% accuracy of setting @ 25°C

- OPERATING TEMPERATURE:
  - 0°C to +50°C

- OUTPUT CONTACTS (Form C, 10A,120/240VAC resistive)
  - Engine start
  - Programmable function (not available with dual source system logic)

- OUTPUT SIGNALS (120/240 VAC resistive load)
  - Transfer to utility 10A
  - Transfer to generator 10A
  - Pre/post-transfer to utility 3A
  - Pre/post-transfer to generator 3A
  - Load on utility 3A
  - Load on generator 3A

12. TROUBLESHOOTING

A number of problems can cause the TSC 800 controller not to function properly. Refer to the following list of typical problems. Consult the factory for any detailed information or for any problems not listed.

CAUTION!!!

Before opening the enclosure to perform any service task, it is imperative to isolate the transfer switch from any possible source of power. Failure to do so may result in serious personal injury or death due to electrical shock.

Service procedures must be undertaken by qualified personnel only!

Symptom	Possible Causes
- Will not re-transfer to utility source upon restoration	- a test mode has been activated (check TSC 800 status LCD display) - utility voltage or frequency is outside the pre-programmed limits (check utility source for adequate voltage & frequency) - a loose control connection - faulty contactor auxiliary contact - defective utility contactor coil - defective TSC 800 controller (verify output signals with circuit board mounted diagnostic LED's)
- Will not transfer to generator source upon failure of utility source	- generator set not producing enough voltage/frequency or output circuit breaker open - warm-up time delay function has not timed out yet (verify TSC 800 timer setting) - a loose control connection - faulty contactor auxiliary contact - defective generator contactor coil - defective TSC 800 controller (verify output signals with circuit board mounted diagnostic LED's)
- Transfer to generator source without a power failure in the utility source	- a test mode has been activated (check TSC 800 status LCD display) - defective TSC 800 controller (verify output signals with circuit board mounted diagnostic LED's) - loose or broken wire to the utility voltage sensing terminals on the TSC 800 controller
- Generator does not start up or stop when it should	- verify remote engine control panel is set for automatic mode
- No time delay when there should be	- verify time delay function in the TSC 800 program setting as per programming sheets as supplied with the transfer switch
- Engine runs for no apparent reason	- Verify the TSC 800 has not been set for test operation. If yes, select manual test "NONE". Refer to section 4.2 for operation details

DEFECTIVE COMPONENTS

Return defective components to Thomson Technology Inc. for repair. **Be sure to advise model and serial number of the transfer switch.**

13. NOTES

Level 1 Read only Level 2 Read/write Level 3 Read/write Security Passwords

TSC800

MICROPROCESSOR TRANSFER SWITCH CONTROLLER

SUMMARY CONFIGURATION DATA SHEET

TSC800 Software ver. 1.6

WORK ORDER #:	00000-00-01-TS	**REV.:**	0	**REV. DATE:**	99/05/10
INITIATED BY:	Admin	**CUSTOMER:**	TEST	**DEFAULT PROGRAM:**	P1-480
DATE:	99/05/10	**PROJECT NAME:**	DEFAULT / P1-480	**TPS VER:**	C
NOTES:					

SYSTEM AC INPUTS

SYSTEM AC VOLTS: 480	**PHASES:** 3	**FREQUENCY:** 60	**CONTROL TYPE:** STD ATS

DIGITAL DISPLAY FEATURES

☒ GENERATOR AC VOLTAGE	☒ UTILITY AC VOLTAGE	☒ TIME CLOCK
☒ GENERATOR FREQUENCY	☒ UTILITY FREQUENCY	

STANDARD FEATURES

Level 1 Features
3 Phase Utility (Src 1) Undervoltage Sensing
3 Phase Generator (Src 2) Undervoltage Sensing
Generator Underfrequency Sensing
Generator Start Delay Timer
Generator Cooldown Delay Timer
Utility Return Delay Timer
Generator Warm-up Timer
No Load Test PB Function
Full Load Test PB Function
Automatic Exercize Test Clock

OPTIONAL FEATURES

STANDARD PROGRAMMABLE OUTPUTS

OUTPUT NAME	OUTPUT TYPE
Programmable Output #1	LD on Gen

Main Menu Program
TSC800

TSC800 Software ver. 1.6

WORK ORDER:	00000-00-01-TS
REVISION #:	0
REVISION DATE:	99/05/10
START DATE:	99/05/10
START BY:	Admin
DEFAULT PROGRAM:	P1-480
TPS VERSION:	C

CUSTOMER: TEST
PROJECT: DEFAULT / P1-480
PRODUCT: TSC800

Control Type:	STD ATS		
Auto Test Start Day:	Sunday	☐	Day of the week
Auto Test Start Hour:	00	☐	00 - 23 hours
Auto Test Start Minute:	00	☐	00 - 59 minutes
Auto Test Stop Day:	Sunday	☐	Day of the week
Auto Test Stop Hour:	00	☐	00 - 23 hours
Auto Test Stop Minute:	00	☐	00 - 59 minutes
Auto Test Mode:	None	☐	None, On Load, or Off Load
Communications Option:	No	☐	Toggle between Yes/No
Node#Address:		☐	<- Option not enabled
System Voltage:	480	☐	Line to line voltage 120 - 15000
Voltage Sensing Ratio:	1	☐	1 - 208 ratio number
System Frequency:	60	☐	Toggle between 50/60 Hz
System Phases:	3	☐	Toggle between 1 & 3 phase
Util UV Pickup:	432	☐	335 - 480 VAC
Util UV Dropout:	384	☐	335 - 480 VAC
Util UV Dropout Delay:	1	☐	0 - 10 seconds
Util OV Pickup:		☐	<- Option not enabled
Util OV Dropout:		☐	<- Option not enabled
Util OV Pickup Delay:		☐	<- Option not enabled
Util UF:		☐	<- Option not enabled
Util UF Dropout Delay:		☐	<- Option not enabled
Util OF:		☐	<- Option not enabled
Util OF Pickup Delay:		☐	<- Option not enabled
Gen UV Pickup:	432	☐	335 - 480 VAC
Gen UV Dropout:	384	☐	335 - 480 VAC
Gen UV Dropout Delay:	5	☐	0 - 10 seconds
Gen OV Pickup:		☐	<- Option not enabled
Gen OV Dropout:		☐	*<- Option not enabled*
Gen OV Pickup Delay:		☐	<- Option not enabled
Gen UF:	57.0	☐	0 - 125 Hz
Gen UF Dropout Delay:	5	☐	0 - 10 seconds
Gen OF:	63.0	☐	0 - 125 Hz
Gen OF Pickup Delay:	5	☐	0 - 5 seconds
Gen Start Delay:	2	☐	0 - 60 seconds
Gen Warm up Delay:	2	☐	0 - 1800 seconds
Gen Cooldown Delay:	2	☐	0 - 30 minutes
Util Return Delay:	2	☐	0 - 30 minutes
Pre TransferDelay:		☐	<- Option not enabled
Min Find Neutral Time:	0.0	☐	0.0 - 20.0 seconds
Max Find Neutral Time:	6.0	☐	0.0 - 20.0 seconds
Neutral Delay:		☐	<- Option not enabled
MaxTransferTime:	15	☐	0 - 30 seconds
Post Transfer Delay:		☐	<- Option not enabled
Transfer Fail:	Enabled	☐	Toggle between Enable/Disable

1φ A/B
3φ A/B/C

☒ Indicates change from Default Program

Main Menu Program
TSC800

TSC800 Software ver. 1.6

CUSTOMER:	TEST
PROJECT:	DEFAULT / P1-480
PRODUCT:	TSC800

WORK ORDER:	00000-00-01-TS
REVISION #:	0
REVISION DATE:	99/05/10
START DATE:	99/05/10
START BY:	Admin
DEFAULT PROGRAM:	P1-480
TPS VERSION:	C

Transfer Output Logic:	Maintain	Toggle between Dropout/Maintain
Programmable Output:	LD on Gen	Choose from list
Util Fail Callout:		<- Option not enabled
Load on Gen Callout:		<- Option not enabled
Transfer Fail Callout:		<- Option not enabled
Auto Test Callout:		<- Option not enabled
Manl Test Callout:		<- Option not enabled
Switch Not in Auto Callout:		<- Option not enabled
Backlight:	120	0 - 999 seconds

Calibration
TSC800

TSC800 Software ver. 1.6

CUSTOMER: TEST
PROJECT: DEFAULT / P1-480
PRODUCT: TSC800

WORK ORDER: 00000-00-01-TS
REVISION #: 0
REVISION DATE: 99/05/10
START DATE: 99/05/10
START BY: Admin
DEFAULT PROGRAM: P1-480
TPS VERSION: C

Calibration:

Util AB Zero	0 - 255 Calibration correction number
Util AB Span	0 - 255 Calibration correction number
Util BC Zero	0 - 255 Calibration correction number
Util BC Span	0 - 255 Calibration correction number
Util CA Zero	0 - 255 Calibration correction number
Util CA Span	0 - 255 Calibration correction number
Gen AB Zero	0 - 255 Calibration correction number
Gen AB Span	0 - 255 Calibration correction number
Gen BC Zero	0 - 255 Calibration correction number
Gen BC Span	0 - 255 Calibration correction number
Gen CA Zero	0 - 255 Calibration correction number
Gen CA Span	0 - 255 Calibration correction number
Load AB Zero	0 - 255 Calibration correction number
Load AB Span	0 - 255 Calibration correction number

TSC800

MICROPROCESSOR TRANSFER SWITCH CONTROLLER

SUMMARY CONFIGURATION DATA SHEET

TSC800 Software ver. 1.6

WORK ORDER #:	00000-00-02-TS	**REV.:**	0	**REV. DATE:**	99/05/10
INITIATED BY:	Admin	**CUSTOMER:**	TEST	**DEFAULT PROGRAM:**	P2-480
DATE:	99/05/10	**PROJECT NAME:**	DEFAULT / P2 - 480	**TPS VER:**	C
NOTES:					

SYSTEM AC INPUTS

SYSTEM AC VOLTS:	480	**PHASES:**	3	**FREQUENCY:**	60	**CONTROL TYPE:**	STD ATS

DIGITAL DISPLAY FEATURES

☒ **GENERATOR AC VOLTAGE**	☒ **UTILITY AC VOLTAGE**	☒ **TIME CLOCK**
☒ **GENERATOR FREQUENCY**	☒ **UTILITY FREQUENCY**	

STANDARD FEATURES

Level 2 Features
3 Phase Utility (Src 1) Undervoltage Sensing
3 Phase Generator (Src 2) Undervoltage Sensing
Generator Underfrequency Sensing
Generator Start Delay Timer
Generator Cooldown Delay Timer
Utility Return Delay Timer
Generator Warm-up Timer
No Load Test PB Function
Full Load Test PB Function
Automatic Exercize Test Clock
Neutral Delay Timer
Utility (Src 1) Overvoltage Sensing (all phases)
Generator (Src 2) Overvoltage Sensing (all phases)
Utility (Src 1) Under/Over Frequency Sensing

OPTIONAL FEATURES

STANDARD PROGRAMMABLE OUTPUTS

OUTPUT NAME	OUTPUT TYPE
Programmable Output #1	LD on Gen

Main Menu Program
TSC800

TSC800 Software ver. 1.6

WORK ORDER:	00000-00-02-TS
REVISION #:	0
REVISION DATE:	99/05/10
START DATE:	99/05/10
START BY:	Admin
DEFAULT PROGRAM:	P2-480
TPS VERSION:	C

CUSTOMER: TEST
PROJECT: DEFAULT / P2 - 480
PRODUCT: TSC800

Control Type:	STD ATS		
Auto Test Start Day:	Sunday	☐	Day of the week
Auto Test Start Hour:	00	☐	00 - 23 hours
Auto Test Start Minute:	00	☐	00 - 59 minutes
Auto Test Stop Day:	Sunday	☐	Day of the week
Auto Test Stop Hour:	00	☐	00 - 23 hours
Auto Test Stop Minute:	00	☐	00 - 59 minutes
Auto Test Mode:	None	☐	None, On Load, or Off Load
Communications Option:	No	☐	Toggle between Yes/No
Node Address:		☐	<- Option not enabled
System Voltage:	480	☐	Line to line voltage 120 - 15000
Voltage Sensing Ratio:	1	☐	1 - 208 ratio number
System Frequency:	60	☐	Toggle between 50/60 Hz
System Phases:	3	☐	Toggle between 1 & 3 phase
Util UV Pickup:	432	☐	335 - 480 VAC
Util UV Dropout:	384	☐	335 - 480 VAC
Util UV Dropout Delay:	1	☐	0 - 10 seconds
Util OV Pickup:	528	☐	0 - 3000 VAC
Util OV Dropout:	518	☐	0 - 3000 VAC
Util OV Pickup Delay:	2	☐	0 - 5 seconds
Util UF:	58.0	☐	0 - 125 Hz
Util UF Dropout Delay:	2	☐	0 - 10 seconds
Util OF:	62.0	☐	0 - 125 Hz
Util OF Pickup Delay:	2	☐	0 - 5 seconds
Gen UV Pickup:	432	☐	335 - 480 VAC
Gen UV Dropout:	384	☐	335 - 480 VAC
Gen UV Dropout Delay:	5	☐	0 - 10 seconds
Gen OV Pickup:	528	☐	0 - 3000 VAC
Gen OV Dropout:	518	☐	0 - 3000 VAC
Gen OV Pickup Delay:	2	☐	0 - 5 seconds
Gen UF:	57.0	☐	0 - 125 Hz
Gen UF Dropout Delay:	5	☐	0 - 10 seconds
Gen OF:	63.0	☐	0 - 125 Hz
Gen OF Pickup Delay:	5	☐	0 - 5 seconds
Gen Start Delay:	2	☐	0 - 60 seconds
Gen Warmup Delay:	2	☐	0 - 1800 seconds
Gen Cooldown Delay:	2	☐	0 - 30 minutes
Util Return Delay:	2	☐	0 - 30 minutes
Pre TransferDelay:		☐	<- Option not enabled
Min Find Neutral Time:	0.0	☐	0.0 - 20.0 seconds
Max Find Neutral Time:	6.0	☐	0.0 - 20.0 seconds
Neutral Delay:	3	☐	0 - 60 seconds
MaxTransferTime:	15	☐	0 - 30 seconds
Post Transfer Delay:		☐	<- Option not enabled
Transfer Fail:	Enabled	☐	Toggle between Enable/Disable

☒ Indicates change from Default Program

Main Menu Program
TSC800

TSC800 Software ver. 1.6

CUSTOMER:	TEST
PROJECT:	DEFAULT / P2 - 480
PRODUCT:	TSC800

WORK ORDER:	00000-00-02-TS
REVISION #:	0
REVISION DATE:	99/05/10
START DATE:	99/05/10
START BY:	Admin
DEFAULT PROGRAM:	P2-480
TPS VERSION:	C

Transfer Output Logic:	Maintain	Toggle between Dropout/Maintain
Programmable Output:	LD on Gen	Choose from list
Util Fail Callout:		<- Option not enabled
Load on Gen Callout:		<- Option not enabled
Transfer Fail Callout:		<- Option not enabled
Auto Test Callout:		<- Option not enabled
Man Test Callout:		<- Option not enabled
Switch Not in Auto Callout:		<- Option not enabled
Backlight:	120	0 - 999 seconds

Calibration
TSC800

TSC800 Software ver. 1.6

CUSTOMER: TEST
PROJECT: DEFAULT / P2 - 480
PRODUCT: TSC800

WORK ORDER: 00000-00-02-TS
REVISION #: 0
REVISION DATE: 99/05/10
START DATE: 99/05/10
START BY: Admin
DEFAULT PROGRAM: P2-480
TPS VERSION: C

Calibration:

Util AB Zero	0 - 255 Calibration correction number
Util AB Span	0 - 255 Calibration correction number
Util BC Zero	0 - 255 Calibration correction number
Util BC Span	0 - 255 Calibration correction number
Util CA Zero	0 - 255 Calibration correction number
Util CA Span	0 - 255 Calibration correction number
Gen AB Zero	0 - 255 Calibration correction number
Gen AB Span	0 - 255 Calibration correction number
Gen BC Zero	0 - 255 Calibration correction number
Gen BC Span	0 - 255 Calibration correction number
Gen CA Zero	0 - 255 Calibration correction number
Gen CA Span	0 - 255 Calibration correction number
Load AB Zero	0 - 255 Calibration correction number
Load AB Span	0 - 255 Calibration correction number

TSC800

MICROPROCESSOR TRANSFER SWITCH CONTROLLER

SUMMARY CONFIGURATION DATA SHEET

TSC800 Software ver. 1.6

WORK ORDER #:	00000-00-03-TS	**REV.:**	0	**REV. DATE:**	99/05/10
INITIATED BY:	Admin	**CUSTOMER:**	TEST	**DEFAULT PROGRAM:**	P3-480
DATE:	99/05/10	**PROJECT NAME:**	DEFAULT / P3-480	**TPS VER:**	C
NOTES:					

SYSTEM AC INPUTS

SYSTEM AC VOLTS:	480	**PHASES:**	3	**FREQUENCY:**	60	**CONTROL TYPE:**	Dual Prime

DIGITAL DISPLAY FEATURES

☒ SRC #2 AC VOLTAGE	☒ SRC #1 AC VOLTAGE	☒ TIME CLOCK
☒ SRC #2 FREQUENCY	☒ SRC #1 FREQUENCY	

STANDARD FEATURES

Level 3 Features
Source 1 & 2 Under/Over Voltage Sensing (all phases)
Source 1 & 2 Under/Over Frequency Sensing
Source 1 & 2 Start Delay Timer
Source 1 & 2 Warmup Delay Timer
Source 1 & 2 Cooldown Delay Timer
Source 1 & 2 Return Delay Timer
No Load Test PB Function
Full Load Test PB Function
Automatic Exercize Test Clock
Preferential Source Selection

OPTIONAL FEATURES

Main Menu Program
TSC800 *TSC800 Software ver. 1.6*

WORK ORDER:	00000-00-03-TS
REVISION #:	0
REVISION DATE:	99/05/10
START DATE:	99/05/10
START BY:	Admin
DEFAULT PROGRAM:	P3-480
TPS VERSION:	C

CUSTOMER: TEST
PROJECT: DEFAULT / P3-480
PRODUCT: TSC800

Control Type:	Dual Prime		
Auto Test Start Day:	Sunday	☐	Day of the week
Auto Test Start Hour:	00	☐	00 - 23 hours
Auto Test Start Minute:	00	☐	00 - 59 minutes
Auto Test Stop Day:	Sunday	☐	Day of the week
Auto Test Stop Hour:	00	☐	00 - 23 hours
Auto Test Stop Minute:	00	☐	00 - 59 minutes
Auto Test Mode:	None	☐	None, On Load, or Off Load
Communications Option:	No	☐	Toggle between Yes/No
Node Address:		☐	<- Option not enabled
System Voltage:	480	☐	Line to line voltage 120 - 15000
Voltage Sensing Ratio:	1	☐	1 - 208 ratio number
System Frequency:	60	☐	Toggle between 50/60 Hz
System Phases:	3	☐	Toggle between 1 & 3 phase
Src #1 UV Pickup:	432	☐	335 - 480 VAC
Src #1 UV Dropout:	384	☐	335 - 480 VAC
Src #1 UV Dropout Delay:	5	☐	0 - 10 seconds
Src #1 OV Pickup:	528	☐	0 - 3000 VAC
Src #1 OV Dropout:	518	☐	0 - 3000 VAC
Src #1 OV Pickup Delay:	5	☐	0 - 5 seconds
Src #1 UF:	57.0	☐	0 - 125 Hz
Src #1 UF Dropout Delay:	5	☐	0 - 10 seconds
Src #1 OF:	63.0	☐	0 - 125 Hz
Src #1 OF Pickup Delay:	5	☐	0 - 5 seconds
Src #2 UV Pickup:	432	☐	335 - 480 VAC
Src #2 UV Dropout:	384	☐	335 - 480 VAC
Src #2 UV Dropout Delay:	5	☐	0 - 10 seconds
Src #2 OV Pickup:	528	☐	0 - 3000 VAC
Src #2 OV Dropout:	518	☐	0 - 3000 VAC
Src #2 OV Pickup Delay:	5	☐	0 - 5 seconds
Src #2 UF:	57.0	☐	0 - 125 Hz
Src #2 UF Dropout Delay:	5	☐	0 - 10 seconds
Src #2 OF:	63.0	☐	0 - 125 Hz
Src #2 OF Pickup Delay:	5	☐	0 - 5 seconds
Src #1 Start Delay:	2	☐	0 - 60 seconds
Src #1 Warmup Delay:	2	☐	0 - 1800 seconds
Src #1 Cooldown Delay:	2	☐	0 - 30 minutes
Src #2 Start Delay:	3	☐	0 - 60 seconds
Src #2 Warmup Delay:	5	☐	0 - 1800 seconds
Src #2 Cooldown Delay:	2	☐	0 - 30 minutes
Src #1 Return Delay:	2	☐	0 - 30 minutes
Src #2 Return Delay:	2	☐	0 - 30 minutes
PreTransfer Delay:		☐	<- Option not enabled
Min Find Neutral Time:	0.0	☐	0.0 - 20.0 seconds

Main Menu Program
TSC800

TSC800 Software ver. 1.6

CUSTOMER:	TEST
PROJECT:	DEFAULT / P3-480
PRODUCT:	TSC800

WORK ORDER:	00000-00-03-TS
REVISION #:	0
REVISION DATE:	99/05/10
START DATE:	99/05/10
START BY:	Admin
DEFAULT PROGRAM:	P3-480
TPS VERSION:	C

Max Find Neutral Time:	6.0	0.0 - 20.0 seconds
Neutral Delay:		<- Option not enabled
Max Transfer Time:	15	0 - 30 seconds
Post Transfer Delay:		<- Option not enabled
Transfer Fail:	Enabled	Toggle between Enable/Disable
Transfer Output Logic:	Maintain	Toggle between Dropout/Maintain
Programmable Output:		Option not Available
Util Fail Callout:		<- Option not enabled
Load on Gen Callout:		<- Option not enabled
Transfer Fail Callout:		<- Option not enabled
Auto Test Callout:		<- Option not enabled
Man Test Callout:		<- Option not enabled
Switch Not in Auto Callout:		<- Option not enabled
Backlight:	120	0 - 999 seconds

Calibration
TSC800

TSC800 Software ver. 1.6

CUSTOMER: TEST
PROJECT: DEFAULT / P3-480
PRODUCT: TSC800

WORK ORDER: 00000-00-03-TS
REVISION #: 0
REVISION DATE: 99/05/10
START DATE: 99/05/10
START BY: Admin
DEFAULT PROGRAM: P3-480
TPS VERSION: C

Calibration:

Src #1 AB Zero	☐	0 - 255 Calibration correction number
Src #1 AB Span	☐	0 - 255 Calibration correction number
Src #1 BC Zero	☐	0 - 255 Calibration correction number
Src #1 BC Span	☐	0 - 255 Calibration correction number
Src #1 CA Zero	☐	0 - 255 Calibration correction number
Src #1 CA Span	☐	0 - 255 Calibration correction number
Src #2 AB Zero	☐	0 - 255 Calibration correction number
Src #2 AB Span	☐	0 - 255 Calibration correction number
Src #2 BC Zero	☐	0 - 255 Calibration correction number
Src #2 BC Span	☐	0 - 255 Calibration correction number
Src #2 CA Zero	☐	0 - 255 Calibration correction number
Src #2 CA Span	☐	0 - 255 Calibration correction number
Load AB Zero	☐	0 - 255 Calibration correction number
Load AB Span	☐	0 - 255 Calibration correction number

TS 850

AUTOMATIC TRANSFER SWITCHES

INSTALLATION, OPERATING & SERVICE MANUAL

PM042 Rev 5 00/12/01

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TABLE OF CONTENTS

1. CAUTION!

Before opening the transfer switch enclosure to perform any service task, or to manually transfer the mechanism, it is imperative to isolate the transfer switch from any possible source of power. Failure to do so may result in serious personal injury or death due to electrical shock.

Service procedures must be undertaken by qualified personnel only!

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

Contact Thomson Technology Inc. for clarification of current revisions or if in doubt about any matter relating to installation, operation or maintenance.

NOTE: This manual makes reference to a 600A transfer switch model TS 850-TCK-600 which was introduced in August of Year 2000. For 600A transfer switches manufactured prior to this date (e.g. Model TS 850-TCJ-600) refer to manual revision 0 – 3

For detailed information on Dual Source systems (Option LEV-3 refer to Information Supplement PM043.

2. NOTES TO INSTALLER

To ensure satisfactory installation of this equipment be sure to observe "Recommended Connection Tightness" and "Requirements for Upstream Circuit Protective Devices" located in this manual.

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.

If the transfer switch has programmable multi-tap voltage capability (refer to electrical schematic), confirm the transfer switch has been configured for the 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 electrical schematics attached to each transfer switch. The factory default settings will be indicated on the calibration label attached on the inside of the enclosure door (supplied loose on open style models). 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 configuration the following must be accomplished:

- Change voltage taps of PT's to system voltage (refer to schematics)
- Change TSC 800 programming (refer to sections 6.2.2, 6.2.4, 6.2.5,6.3, and 6.4 of the TSC 800 instruction manual). The following settings may require reprogramming (depending on options purchased):
  - System voltage
  - System frequency
  - System phase
  - Utility undervoltage pickup (typically 90% of system voltage)
  - Utility undervoltage dropout (typically 80% of system voltage)
  - Utility overvoltage pickup (typically 110% of system voltage)
  - Utility overvoltage dropout (typically 105% of system voltage)
  - Utility underfrequency (typically 95% of system frequency)
  - Utility overfrequency (typically 105% of system frequency)
  - Generator undervoltage pickup (typically 90% of system voltage)
  - Generator undervoltage dropout (typically 80% of system voltage)
  - Generator overvoltage pickup (typically110% of system voltage)
  - Generator overvoltage dropout (typically 105% of system voltage)
  - Generator underfrequency (typically 95% of system frequency)
  - Generator overfrequency (typically 105% of system frequency)

Record any changed setting on the TSC 800 Programming Data Sheets for future reference.
Complete the blank calibration label and attach to the inside of the transfer switch enclosure door.

INSTALLATION OF OPEN TYPE TRANSFER SWITCHES - Please refer to the factory for additional information.

3. GENERAL DESCRIPTION

(See CAUTION! on Page #1)

The automatic transfer switch employs two moulded-case switching devices which may be:

a) non-automatic circuit interrupters ("type A" transfer switch)
b) automatic circuit interrupters with integral trip units; ("type B" transfer switch)

In this manual, the switching devices will be referred to as "breakers". The breakers are operated by a mechanism driven with an electric motor. The transfer switch provides automatic transfer of an electrical load to a standby power supply in the event of drop or loss of voltage of any or all phases of the primary power supply. Upon restoration of the primary supply, the electrical load is automatically retransfered to the primary power supply (after an adjustable time delay). All necessary control components for automatic transferring are located in the control compartment and on the enclosure door.

The transfer motor utilizes the power from the source to which the electrical load is being transferred. The mechanism provides a positive mechanical interlock to prevent both breakers from being closed at the same time. The mechanism is also designed to leave both breakers "trip free" in the closed position, permitting incorporation of overload and/or short-circuit protection in either or both breakers ("type B"). After tripping, the breaker of a "type B" transfer switch must be manually reset.

Note: For the purpose of this manual, the term UTILITY indicates the primary power, and the term GENERATOR indicates the standby power.

4. GENERAL THEORY OF OPERATION

4.1. STANDARD AUTOMATIC TRANSFER SWITCH

4.1.1. NORMAL OPERATION

When utility supply voltage drops below a preset nominal value (adjustable from 70% to 100% of nominal) on any phase, an engine start delay circuit will be 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 60 sec.) an engine start signal (contact closure) will be given.

Once the engine starts, the transfer switch controller will monitor the generator voltage and frequency levels. Once the generator voltage and frequency rises above preset values (adjustable from 70% to 100% of nominal), the engine warmup timer will be initiated. Once the warmup timer expires (adjustable from 0 to 60 sec.), the Transfer to Generator Supply signal (contact closure) will be given to the transfer switch mechanism. The load will then transfer from the utility supply to the generator supply via the motor driven mechanism. Note: An optional neutral delay timer circuit will delay the transfer sequence in the neutral position (i.e. both breakers open) until the selected time expires (adjustable from 0 to 60 sec.).

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 the preset values (adjustable from 70% to 100% of nominal) on all phases, a transfer return delay circuit will be initiated. Following expiry of the Transfer Return Timer (adjustable from 0 to 30 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 load will then retransfer the load from the generator supply back to the utility supply. Note: An optional neutral delay timer circuit will delay the transfer sequence in the neutral position (i.e. both breakers open) until the selected time expires (adjustable from 0 to 60 sec.).

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 30 min.), the engine start signal will be removed (contact opening) to initiate stopping of the generator set.

4.2. SERVICE ENTRANCE AUTOMATIC TRANSFER SWITCH

(Note: This applies only to service entrance transfer switches supplied with a Padlockable Disconnect Switch. Contact TTI for other types.)

4.2.1. NORMAL OPERATION

Under normal conditions, the load is energized from the utility supply through the closed utility transfer breaker. If the utility power fails, the generator will start and the load will be re-energized via the closed generator transfer breaker.

In the normal operating mode, the Service Disconnect switch shall be in the "energized" position.

4.2.2. SERVICE DISCONNECT PROCEDURE

To perform a service disconnect (i.e. to disconnect the utility and generator supplies), the following procedure is required:

1. Move the "Service Disconnect" control switch located on the door of the transfer switch to the "Disconnected" position.

2. Verify that the "Service Disconnected" pilot light is illuminated. *If the Light is illuminated, the service has been successfully disconnected and it is safe to perform any maintenance procedures as required*. In this condition, the transfer switch is in the neutral position, with both utility and transfer breakers open. The transfer switch will remain in this condition, regardless of condition of the utility and generator supplies (i.e. if the utility power fails, the generator will not receive a start condition, nor will the transfer switch move to the generator position). *If the Light is **not** illuminated, further procedures are required (refer to the following procedure #4).*

3. Attach safety lockout padlock to the "Service Disconnect" control switch to prevent unauthorized change in operating condition and verify transfer switch door is locked closed. If the door is not locked, turn and remove door key.

4. If the "Service Disconnected" pilot light is **not** illuminated, the service will **not** have been successfully disconnected and it is therefore **not** safe to perform any maintenance until the following additional procedures are performed:

Warning

*Qualified personnel must undertake the following procedures **only!** Failure to do so may result in **serious personal injury or death** due to electrical shock.*

- Open the door to the transfer switch using a suitable tool and opening the door lock with the key.
- Visually inspect the actual position of the transfer switch mechanism. *If the position of the transfer switch mechanism is clearly in the "neutral position", the service has been successfully disconnected.*

Notes: 1) If the position of the transfer switch mechanism is clearly in the "neutral position, the "service disconnected" pilot light may not have illuminated due to the following reasons:

a) Utility and generator supply voltages are not present (the pilot light requires AC supply voltage to be present).

b) The pilot light may be burnt out. The bulb should be immediately replaced with a suitably rated bulb.

c) Failure of one or more of the sensing/logic contacts. A qualified service technician is required to trouble shoot this specific condition. *Unplug the control circuit isolation plug to de-energize all AC power to* the control circuits. Note: The AC power conductors will still remain energized. Once the control circuit isolation plug is removed the "Service Disconnected" pilot light will not illuminate due to loss of control power.

Note: to return the transfer switch back to normal operation, the control circuit isolation plug must be reconnected for correct operation.

- The transfer switch door should then be securely closed using a suitable tool and locked in the closed position with the key. Once the transfer switch door has been positively locked closed and secured and only then is, it is safe to perform any maintenance procedures as required.
- *If the position of the transfer switch mechanism is **not** in the "neutral position" further procedures are required (refer to the following procedure)*

Warning

*Failure to positively lock closed and secure the transfer switch door may result in **serious personal injury or death** due to electrical shock.*

- If the position of the transfer switch mechanism is **not** in the "neutral position" the transfer switch mechanism must be manually operated as follows. To operate manually, pull the manual release plunger on the mechanism, releasing the motor drive rod from motor drive arm and move the knob and yoke to the marked **"Neutral"** position.

Warning

*Failure to move the mechanism to the Neutral Position may result in **serious personal injury or death** due to electrical shock.*

The transfer switch door should then be securely closed using a suitable tool and locked in the closed position with the key. Once the Transfer switch door has been positively locked closed and secured and only then is, it is safe to perform any maintenance procedures as required.

Warning

*Failure to positively lock closed and secure the transfer switch door may result in **serious personal injury or death** due to electrical shock.*

To re-energize the load, the padlock(s) should be removed from the "Service Disconnect" control switch, and move the switch to the "Energized" position. The transfer switch will immediately return to the utility or generator supply if within normal operating limits.

4.3. TEST CONDITION

The transfer switch may be tested utilizing the TSC 800 controller push-buttons or optional four position test switch. 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. Note the test mode is operator selectable for "On-Load" or "Off-Load" testing scenarios.

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. TYPE A AND TYPE B DEFINITIONS

"Type A" transfer switch means an automatic transfer switch that does not employ integral overcurrent devices.

"Type B" transfer switch means an automatic transfer switch that does employ integral overcurrent protection in at least one of its two breakers.

"Type A" transfer switches are not equipped with trip units, and require properly coordinated upstream protection. Information on closing and withstand ratings, and recommendations for maximum upstream protective devices for "type A" units are in this manual. (Note: Some "Type A" models employ "high-magnetic" trips in the breakers, however these are set to trip at a higher than normal current for that amperage circuit, therefore the possibility of tripping is very remote. Since these trips are not intended to provide overcurrent protection, but are rather employed to ensure the integrity of the transfer switch under all circumstances, they are still classed as "Type A").

"Type B" transfer switches are typically equipped with standard thermal-magnetic trips which will provide the required overload and short circuit protection. "Type B" can also be built using solid state trip breakers, which can include ground fault tripping as well as overload and short circuit protection.

It should be noted that a "Type B" transfer switch with overcurrent protection in only one breaker will require the same consideration for upstream protection in the feeder of the breaker with no trip (as applies to a "Type A" transfer switch).

6. GENERAL NOTES ON SERVICING MECHANISM

(See CAUTION! on Page #1)

When performing any service work on the transfer mechanism, it is imperative that the following be observed:

6.1.To maintain mechanical integrity, ensure that:

- All limit switches linkages are correctly adjusted to provide full travel of the breaker toggles *without* exerting unnecessary forces associated with excessive travel. Ensure that breakers travel far enough to reset any internal trip unit (it is more important for the toggle to go fully in the "off" direction, than in the "on" direction).
- Mechanical interlocking is correct one breaker must be well open before the other should close.
- All fasteners are adequately tightened.
- The operating linkages are not damaged or bent, and that all bearing points operate freely.

6.2.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 in "type B" units.
- 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.

6.3.To maintain operational integrity, ensure that:

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

Service work should be undertaken only by qualified personnel. 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.

7. STYLE "T" TRANSFER SWITCH MECHANISM - 400 - 1200 Amp

The transfer mechanism consists primarily of the transfer motor, a hub assembly, two operating rods and two breaker operating yokes.

The reversible transfer motor drives the hub assembly, which in turn moves the operating rods which are connected to the breaker operating yokes. The breaker toggles are set inside the yokes and are moved by them. There are two limit switches which are contacted by the operating yokes (one for each direction of travel) which disconnect the transfer motor power supply when the breakers have attained full travel. The operating point of these limit switches is determined by the adjuster screws located on the yokes. Should adjustment be required, it is advisable to consult TTI for further information.

The transfer switch mechanism has three possible positions:

a) Utility breaker closed and generator breaker open;

b) Generator breaker closed and utility breaker open;

c) Both utility and generator breakers open, but NEVER both utility and generator breakers closed at the same time.

7.1. MANUAL OPERATION (or to reset a typical breaker) (See CAUTION on Page 1)

Isolate the transfer switch from all sources of supply before opening the enclosure for manual operation. The control circuit isolation plug (PL12) should be unplugged to prevent subsequent operation.

To operate manually, pull the release plunger and operate the handle in the desired direction.

Automatic operation may be regained by replacing the isolation. The drive system is self engaging and will operate the transfer switch to the required position. (See manual operation instruction on front of transfer switch mechanism.)

8. STYLE "M" TRANSFER SWITCH MECHANISM - Maximum 250 Amp

The transfer mechanism consists of the transfer motor and drive assembly, which operates a common yoke which in turn operates both utility and generator breakers. Since the breakers are oriented opposite to each other, the action of turning one breaker off will result in turning the other breaker on. The geometry of the mechanism ensures that one breaker always opens before the other closes, thus maintaining the required mechanical interlocking.

The unidirectional motor, operating through the motor drive arm and rod assembly, which is normally held captive to the yoke via the manual release plunger assembly, acts upon the yoke drive arm. Both breaker toggles are set inside the common yoke and are moved by it. There are two limit switches which are contacted by the yoke at its extremes of travel, disconnecting the motor circuit at the point of full breaker toggle travel in the intended direction. Adjustment of the limit switches is accomplished by loosening the two mounting screws securing each switch and sliding them in the desired direction. Should adjustment be required it is advisable to consult TTI for further information.

The transfer switch mechanism has three possible positions:

a) Utility breaker closed and generator breaker open;

b) Generator breaker closed and utility breaker open;

c) Both utility and generator breakers open, but NEVER both utility and generator breakers closed at the same time.

8.1. MANUAL OPERATION (or to reset a typical breaker)

(See CAUTION! on Page #1)

Isolate the transfer switch from all sources of supply before opening the enclosure for manual operation. The control circuit isolation plug (PL12) should be unplugged to prevent subsequent operation.

To operate manually, pull the manual release plunger, releasing the motor drive rod from the motor drive arm and push the yoke in the desired direction.

Automatic operation may be regained by turning the release plunger until locked and replacing the isolation plug. The mechanism drive will operate until the motor drive rod is engaged and the transfer switch yoke is moved into the required position. (See manual operation instruction on door of transfer switch mechanism).

9. RECOMMENDED MAINTENANCE (STYLE "T" & STYLE "M" MECHANISMS)

(See CAUTION! on Page #1)

9.1. DO NOT perform dielectric tests on the equipment with the control components in the circuit.

9.2. Check if control components are tight in sockets.

9.3. 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.

9.4. 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 breakers.

9.5. 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 breaker travel is correct.

9.6. Verify all program settings on the TSC 800 controller as per the programming sheet as supplied with the transfer switch.

9.7. Style "M": confirm that the yoke operates freely on the yoke pivot bushings. Should lubrication be required, apply medium weight (SAE 20) oil sparingly at these points.

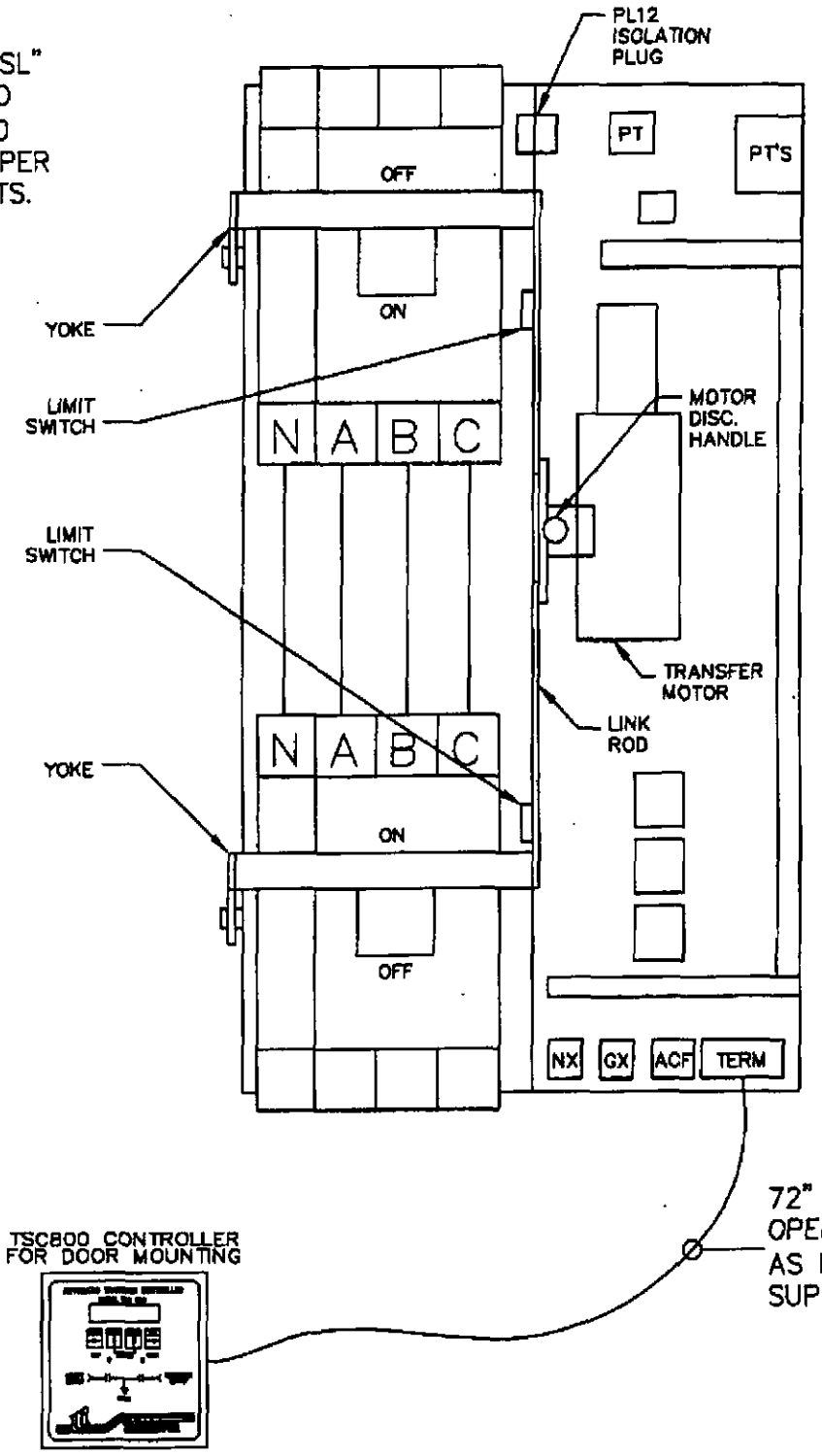
9.8. Style "T": ensure that the manual handle moves freely on the hub when the lock pin is disengaged. If lubrication is necessary, apply medium weight (SAE 20) oil sparingly.

9.9. Style "T": yoke pivot bearings and rod ends are permanently lubricated and do not require maintenance.

9.10. The motor and gearbox are permanently lubricated, and should not require attention under normal operating circumstances.

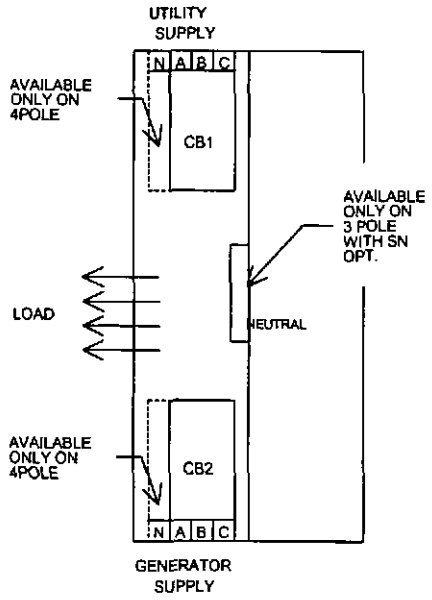
10. FRONT VIEW (TYPICAL) 3 / 4 POLE STYLE "T" TRANSFER MECHANISM

CONFIGURATION "SL" SHOWN. REFER TO DWG. EPA5015/30 FOR VARIATIONS PER JOB REQUIREMENTS.

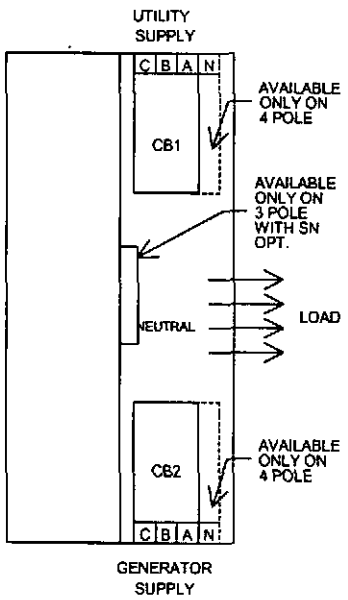


11. STYLE "T" CONFIGURATION OPTIONS

SL CONFIGURATION



XR CONFIGURATION

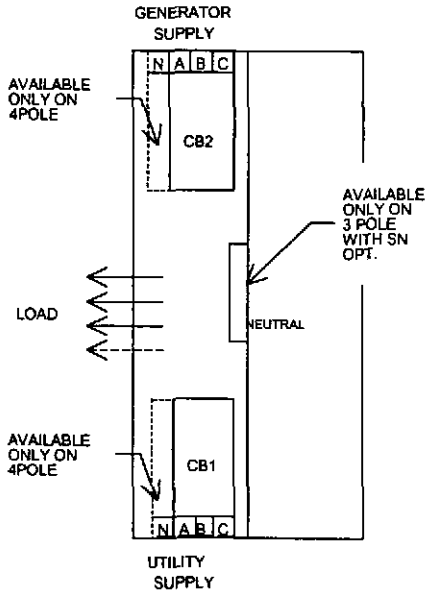


CHASSIS CONFIGURATION OPTION

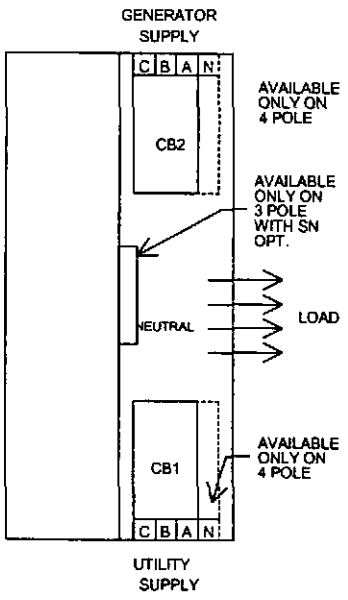
- ☐ SL
- ☐ SR
- ☐ XL
- ☐ XR

NOTE: FOR GENERAL LAYOUT ONLY, PHASING ORDER MAY CHANGE.
3 PHASE CONNECTION SHOWN. FOR SINGLE PHASE CONNECT TO A & B ONLY.

XL CONFIGURATION



SR CONFIGURATION



NOTE:
TYPICAL LOAD CONNECTIONS ONLY.
FOR EXACT LOCATIONS CONSULT FACTORY.

No.	REVISIONS	BY	AUTH	DATE
7	ADDED REFERENCE TO SINGLE PHASE CONNECTION.	RG	NS	96-01-15
6	UP-DATED TITLE BLOCK, ETC.	RG	NS	95-05-16

THOMSON TECHNOLOGY INC.

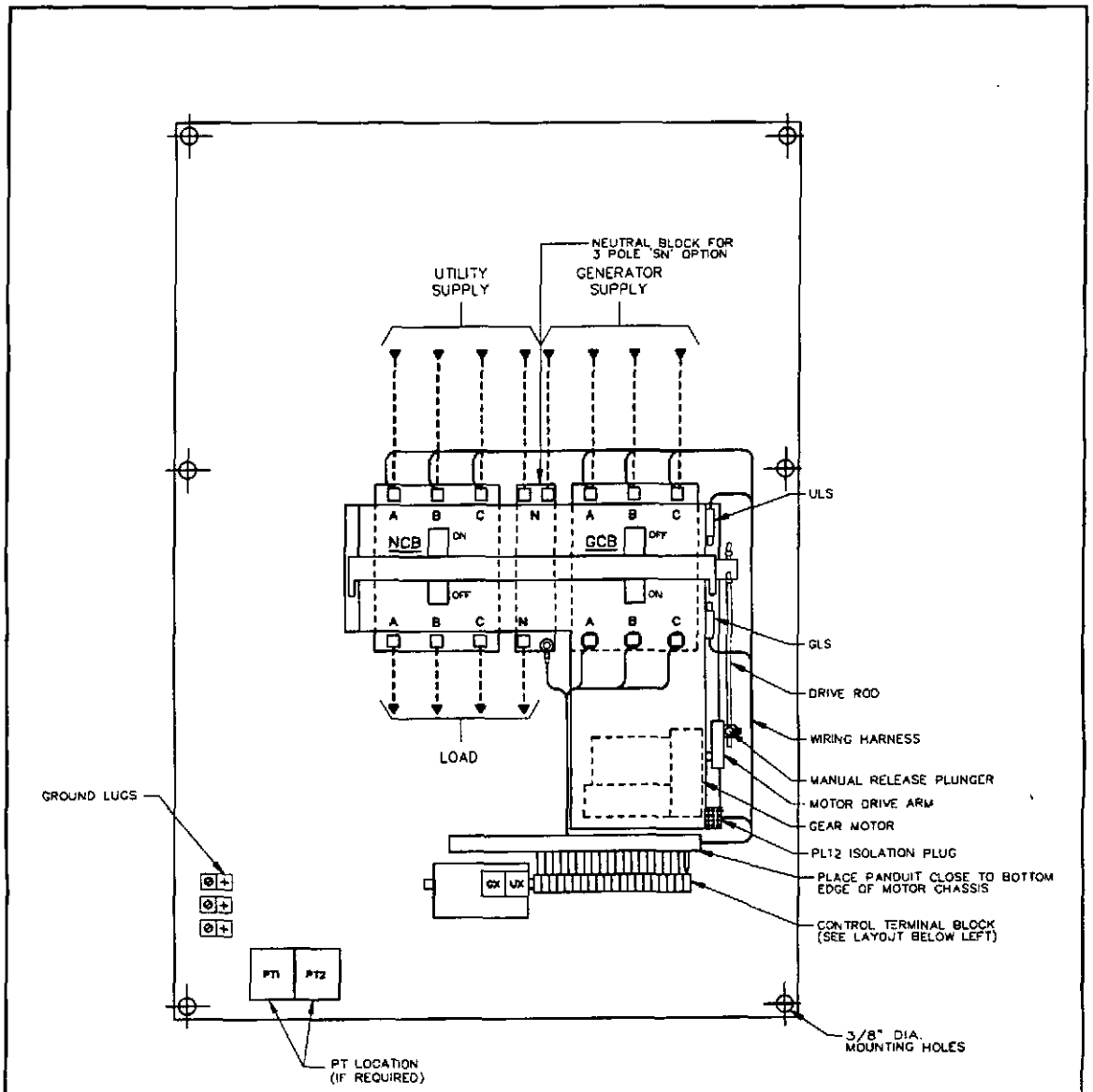
"T" STYLE
TRANSFER SWITCH
CONFIGURATIONS
STANDARD TRANSFER SWITCHES

CUSTOMER				
TTI				
CAD FILE NAME	DWN	AUTH	DATE	
A501530	RG	NS	88-05-24	
DRAWING No			SHEET	REV
EPA 5015/30			1/1	7

FORM CAD No. ASHT

12. FRONT VIEW (TYPICAL) 3 / 4 POLE STYLE "M" - 100/150/250A

TRANSFER MECHANISM



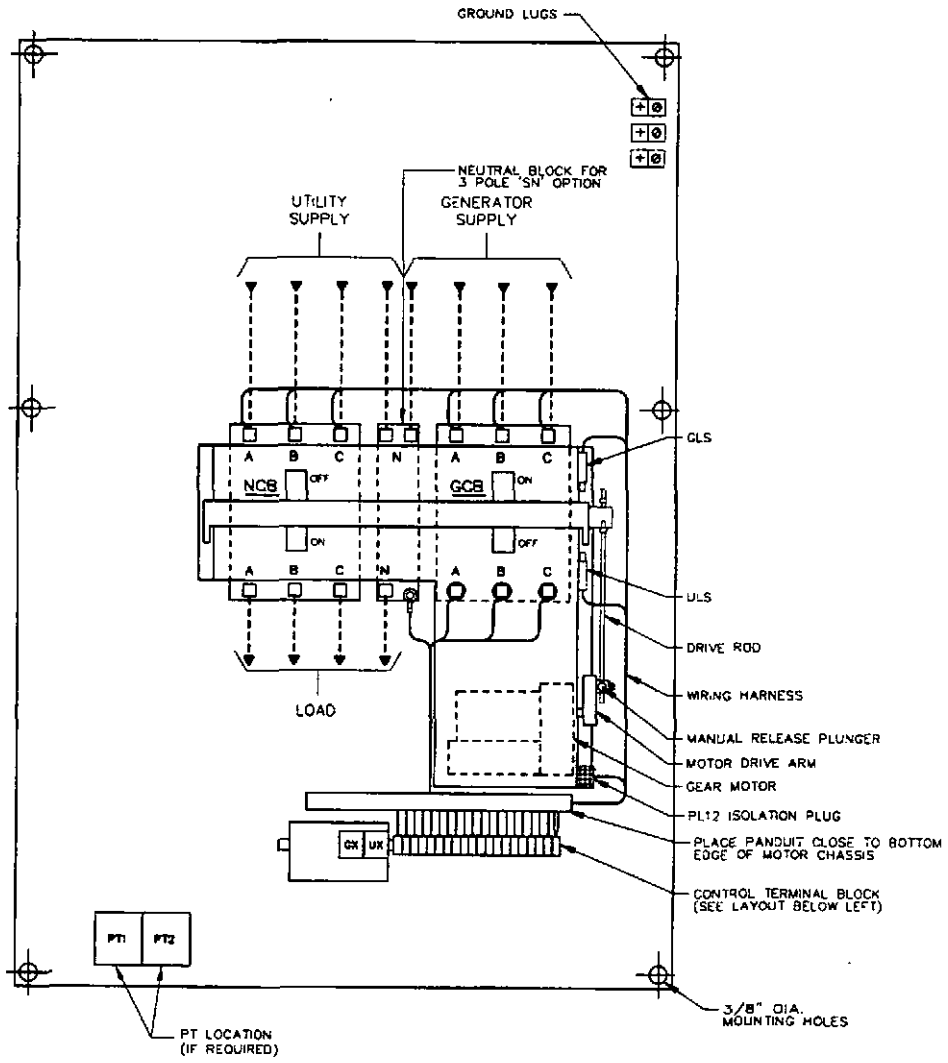
NOTE: 3 PHASE CONNECTION SHOWN.
FOR SINGLE PHASE CONNECT TO A & B ONLY

THOMSON TECHNOLOGY INC.	FRONT VIEW (TYPICAL) 3/4 POLE STYLE 'M' TRANSFER MECHANISM – 100/150/250A	CUSTOMER: TTI CAD FILE NAME: 7A001302 | DWN: SH | AUTH: GS | DATE: 00-01-27 DRAWING No.: 7A001302 | SHEET: 1/1 | REV: 0

FORM CAD No. ASHT

13. FRONT VIEW (TYPICAL) 3 POLE STYLE "M" - 200A

TRANSFER MECHANISM



NOTE: 3 PHASE CONNECTION SHOWN.
FOR SINGLE PHASE CONNECT TO A & B ONLY

THOMSON TECHNOLOGY INC.	FRONT VIEW (TYPICAL) 3 POLE STYLE 'M' TRANSFER MECHANISM – 200A	CUSTOMER: TTI CAD FILE NAME: 8A000301 | DWN: RG | AUTH: GS | DATE: 98–07–29 DRAWING No.: 8A000301 | SHEET: 1/1 | REV: 1

FORM CAD No. ASHT

14. TROUBLESHOOTING (See CAUTION! on Page #1)

Symptom	Possible Causes
- will not re-transfer to utility source upon restoration	- isolation plug out - a test mode has been activated (check TSC 800 status LCD display) - utility voltage or frequency is outside the pre-programmed limits (check utility source for adequate voltage & frequency) - a loose control connection - faulty motor limit switch - defective motor - defective TSC 800 controller (verify output signals with circuit board mounted diagnostic LED's)
- will not transfer to generator source upon failure of utility source	- isolation plug out - generator set not producing enough voltage/frequency or output circuit breaker open - warmup time delay function has not timed out yet (verify TSC 800 timer setting) - a loose control connection - faulty motor limit switch - defective motor - defective TSC 800 controller (verify output signals with circuit board mounted diagnostic LED's)
- transfer to generator source without a power failure in the utility source	- a test mode has been activated (check TSC 800 status LCD display) - defective TSC 800 controller (verify output signals with circuit board mounted diagnostic LED's)
- generator does not start up or stop when it should	- verify remote engine control panel is set for automatic mode
- no time delay when there should be	- verify time delay function in the TSC 800 program setting as per programming sheets as supplied with the transfer switch
- power is not available at the load terminals but the utility or generator breaker appears to be closed to a live source	- the breaker's trip unit (Type B style only) has tripped on a fault on the system. Correct the fault, and manually reset the breaker in the transfer switch by moving it off and then on again with the manual operating handle - limit switch incorrectly adjusted
- the transfer switch has completed a transfer, but the motor has overheated and the internal thermal protector has opened	- limit switch failure or improper adjustment has failed to disconnect motor - binding or jamming of the transfer mechanism

DEFECTIVE COMPONENTS

Return defective components to Thomson Technology Inc. for repair. Be sure to advise model and serial number of the transfer switch.

15. CABLE TERMINAL INFORMATION

CABLE TERMINAL INFORMATION AND RECOMMENDED TIGHTNESS

Basic Transfer Switch Style	Transfer Switch Rating (Amps)	Cable Terminal Rating				Connection Tightness (In-Lbs)	
		Utility & Generator Supply		Load & Neutral		Terminal Mounting Screw	Cable Clamp
		Qty Per Phase	Range	Qty Per Phase	Range		
MCE	100 150	1 1	#4–4/0 #4–4/0	1 1	#4–4/0 #4–4/0	-- 20	100 (Socket) 50 (Slot)
MS3	200	1	#6–350MCM	1	#6–350MCM	72	275
MCE	250	1	#1–350MCM	1	#1–350MCM	90	275
TCJ	400[1]	3	250–500MCM[3]	2	2/0–500MCM 4/0–500MCM	275	375
TCK	600[1]	3	250–500MCM[3]	2	2/0–500MCM 4/0–500MCM	275	375
TCK	800[1]	3	250–600 MCM	3	250–600 MCM	275	375
TCK	1000/1200[1]	4 4	3/0–500MCM 4/0–500MCM	4 4	3/0–500MCM 4/0–500MCM	275	375
TCK	1600[2]	4	#2–600MCM	4	#2–600MCM	275	375

1. Optional Terminal Ratings are available in some models – Consult TTI.
2. IEC only.
3. 600MCM lug size is available subject to restricted cable entry locations.

16. REQUIREMENTS FOR UPSTREAM CIRCUIT PROTECTIVE DEVICES

Closing and Withstand Rating (Amps RMS Sym) With Upstream Fuse Protection

Basic Model	Max. Voltage	Rated Current (A)	SHORT CIRCUIT CURRENT RATING (AVAILABLE SYMMETRICAL AMPS (RMS)[1]				
			With Upstream Circuit Breaker Protection			With Upstream Fuse Protection	
			@240V	@480V	@600V	@ Up to 600V	Fuse Type
TS 850 - MCE- 100	600	100	65,000	25,000	18,000	100,000	T, J
TS 850 - MCE- 150	600	150	65,000	25,000	18,000	100,000	T, J
TS 850 - MS3- 200	240	200	100,000	N/A	N/A	N/A	T, J
TS 850 - MCJL-250	600	250	65,000	35,000	25,000	100,000	T, J
TS 850 - TCJ- 400	600	400	65,000	35,000	25,000	100,000	T, J
TS 850 - TCK- 600	600	600	65,000	50,000	35,000	100,000	T, J
TS 850 - TCK- 800	600	800	65,000	50,000	35,000	100,000	Consult Factory
TS 850 - TCK-1000	600	1000	65,000	50,000	35,000	100,000	"
TS 850 - TCK-1200	600	1200	65,000	50,000	35,000	100,000	"

1. Standard ratings only are shown. Consult TTI for versions with higher short circuit current ratings.

Fuse ratings shown are maximum allowable to permit use of the transfer switch in application with available fault current not exceeding that shown. Consideration must be given to fuse sizing when fuses also provide overload protection.

Please refer to the factory for further information on upstream protection requirements if required.

17. NOTES

TSB 850

BYPASS ISOLATION SWITCHES

INSTALLATION, OPERATING & SERVICE MANUAL

PM051 Rev 4 00/12/01

19214 - 94th Avenue, Surrey, B.C. Canada V4N 3E3 • Telephone (604) 888-0110
Telefax (604) 888-3381 • E-Mail: ttinfo@tti.bc.ca • www.thomsontechnology.com

NOTE:
For detailed information on Dual Source systems (Option LEV-3) refer to Information Supplement PM043.

GENERAL DESCRIPTION

Bypass isolation switches are used in conjunction with automatic load transfer switches. They enable an operator to bypass a source to the load and isolate the transfer switch for maintenance or testing.

The mechanism utilizes molded case switching devices and a positive mechanical interlock to prevent two sources from being connected at the same time and true isolation of the transfer switch.

Thomson Technology Inc. offers three types of isolation-bypass switches.

1) SINGLE SIDED BYPASS MODEL TSBU 850 (Utility), TSBG 850 (Generator)

This device may be either a utility or generator side bypass. The bypass consists of a source isolate breaker (either utility or generator), a load isolate breaker and a source bypass breaker (either utility or generator). This device provides an interrupted bypass to the selected source. The alternate source must be isolated upstream to provide complete isolation of the transfer switch.

2) DOUBLE SIDED BYPASS (MODEL TSBD 850)

This device allows bypass to either source and complete isolation of the transfer switch. The bypass consists of two source isolate breakers, two source bypass breakers (both utility and generator sides) and a load isolate breaker. This switch provides for either an interrupted or uninterrupted bypass to either source. A test circuit allows for transfer switch operation in the bypassed mode.

CAUTION: **Before opening the transfer switch or bypass isolation enclosure to perform any service task or to manually transfer the mechanism, it is imperative to isolate the transfer switch from any possible source of power. Failure to do so may result in serious personal injury or death due to electrical shock.**

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

Contact Thomson Technology Inc. for clarification of current revision or if in doubt about any matter relating to installation, operation or maintenance.

NOTE TO INSTALLER

To ensure satisfactory installation of this equipment be sure to observe "Recommended Connection Tightness" and "Requirements for Upstream Circuit Protective Devices" located in this manual.

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.

If the transfer switch has programmable multi-tap voltage capability (refer to electrical schematic), confirm the transfer switch has been configured for the 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 electrical schematics attached to each transfer switch. The factory default settings will be indicated on the calibration label attached on the inside of the enclosure door (supplied loose on open style models). 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 configuration the following must be accomplished:

- Change voltage taps of PT's to system voltage (refer to schematics)
- Change TSC 800 programming (refer to sections 6.2.2, 6.2.4, 6.2.5,6.3, and 6.4 of the TSC 800 instruction manual). The following settings may require reprogramming (depending on options purchased):

➢ System voltage
➢ System frequency
➢ System phase
➢ Utility undervoltage pickup (typically 90% of system voltage)
➢ Utility undervoltage dropout (typically 80% of system voltage)
➢ Utility overvoltage pickup (typically 110% of system voltage)
➢ Utility overvoltage dropout (typically 105% of system voltage)
➢ Utility underfrequency (typically 95% of system frequency)
➢ Utility overfrequency (typically 105% of system frequency)
➢ Generator undervoltage pickup (typically 90% of system voltage)
➢ Generator undervoltage dropout (typically 80% of system voltage)
➢ Generator overvoltage pickup (typically110% of system voltage)
➢ Generator overvoltage dropout (typically 105% of system voltage)
➢ Generator underfrequency (typically 95% of system frequency)
➢ Generator overfrequency (typically 105% of system frequency)

Record any changed setting on the TSC 800 Programming Data Sheets for future reference. Complete the blank calibration label and attach to the inside of the transfer switch enclosure door.

GENERAL NOTES ON SERVICING

When performing any service work on the bypass isolation switch, it is imperative that the following be observed:

a) To maintain mechanical integrity, ensure that:

- Mechanical interlocking is correct and movement is free; proper sequence of breaker opening/closing must be maintained.
- All fasteners are adequately tightened.

b) To maintain electrical integrity, ensure that:

- All electrical connections are clean and adequately tightened.
- All insulating devices are in place and in good condition.
- No moisture or other contamination is present.

Service work should be undertaken only by qualified personnel. Failure to correctly maintain a bypass isolation switch may represent a hazard to life and equipment. Full operational testing must be done prior to placing a 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.

OPERATION

(Refer to the operating description for the model and type of equipment installed).

NOTE: a) In this manual, the breakers are designated as follows:

UI-Utility isolate:	This breaker isolates the utility supply input from the transfer switch.
GI-Generator isolate:	This breaker isolates the generator supply input from the transfer switch.
LI-Load isolate:	This breaker isolates the load from the transfer switch.
UB-Utility bypass:	This breaker connects the utility supply directly to the load.
GB-Generator bypass:	This breaker connects the generator supply directly to the load.

b) Normal position is defined as when neither source is bypassed and the load is being supplied from either source through the transfer switch.

1) SINGLE SIDED BYPASS (MODEL TSBU (Utility), TSBG (Generator))

NOTE: Transfer switch is not completely isolated unless isolate breakers and alternate supply breakers are open.

The sequence of operation for a utility side bypass is as follows:

- Normal position: Utility isolate (UI) and Load isolate (LI) closed; Utility bypass (UB) open.

- Before bypassing, turn engine control switch to OFF if startup is not desired and/or isolate generator circuit breaker to ensure complete transfer switch isolation.

- To bypass and isolate transfer switch: Open Utility isolate (UI) and Load isolate (LI).

- Move slidebar interlock to allow closure of Utility bypass (UB).

- Close UB.

- The load is now connected directly to the utility supply and the transfer switch is isolated from the utility supply. Isolation of the transfer switch from the generator supply must be done upstream.

- To return to normal position, reverse the above steps.

The sequence of operation for a generator side bypass is as follows:

- Normal position: Generator isolate (GI) and Load isolate (LI) closed; Generator bypass (GB) open.

- Before bypassing, the generator should be running and connected to the Load through the transfer switch (to ensure complete transfer switch isolation) and/or open utility supply feeder breaker.

- To bypass and isolate transfer switch: Open Generator isolate (GI) and Load isolate (LI).

- Move slidebar interlock to allow closure of Generator bypass (GB).

- Close GB.

- The load is now connected directly to the generator supply and the transfer switch is isolated from the generator supply. Isolation of the utility supply must be done upstream.

- To return to normal position, reverse the above steps.

2) DOUBLE SIDED BYPASS (MODEL TSBD)

The sequence of operation for uninterrupted bypass is as follows:

a) Utility Bypass

- Normal position: Utility isolate (UI), Generator isolate (GI) and Load isolate (LI) are closed; Utility bypass (UB) and Generator bypass (GB) are open.

- Before bypassing, turn engine control switch to OFF if startup is not desired.

- To bypass and isolate transfer switch: Open Generator isolate (GI).

- Move slidebar interlock to allow closure of Utility bypass (UB).

- Close UB. The utility source is now parallel connected to the load through the transfer switch and UB.

- Open Utility isolate (UI).

- Open Load isolate (LI). The transfer switch is now isolated from both sources and the load.

- If the lockable slidebar is used, move slidebar to isolate position and lock to prevent accidental energization of the transfer switch.

- To return to normal position, reverse the above steps.

b) **Generator Bypass**

NOTE: The generator should be running and connected to the load through the transfer switch.

- Normal position: Utility isolate (UI), Generator isolate (GI) and Load isolate (LI) are closed: Utility bypass (UB) and Generator bypass (GB) are open.

- To bypass and isolate transfer switch: Open Utility isolate (UI).

- Move slidebar interlock to allow closure of Generator bypass (GB).

- Close GB. The generator source is now parallel connected to the load through the transfer switch and GB.

- Open Generator isolate (GI).

- Open Load isolate (LI). The transfer switch is now isolated from both sources and the load.

- If the lockable slidebar is used, move slidebar to isolate position and lock to prevent accidental energization of the transfer switch.

CAUTION: In either mode, the transfer switch is not isolated unless all three isolation breakers (UI, LI, GI) are open.

The previous sequences are for uninterrupted bypass. An interrupted bypass can be accomplished by opening all isolation breakers prior to closing the selected bypass breaker.

Note:

The transfer switch may be tested in the bypassed mode by connecting the transfer to the test plug. *This allows for energization of the control circuits* ***only*** *for transfer switch function or* maintenance testing. **The neutral delay control feature of the transfer switch (if supplied) will not be functional while using the test plug.**

RECOMMENDED MAINTENANCE

1) *Do not perform dielectric tests on the equipment with any control components in* the circuit.

2) Periodically inspect all terminals (load, line) for tightness. Re-torque all bolts, nuts and other hardware.

3) Bypass isolation switches should be in clean, dry and indoor location. If signs of moisture are present, attempt to remove. If cleaning is unsuitable, replace the corroded parts. Should dust or debris gather on the switch, brush, vacuum or *wipe clean.* ***DO NOT*** *blow dirt into breakers or terminals.*

4) Check for ease and correctness of interlock movement.

DEFECTIVE COMPONENTS

Return defective components to Thomson Technology Inc. for repair. Be sure to advise model and serial number of the unit.

CABLE TERMINAL INFORMATION AND RECOMMENDED TIGHTNESS

Basic Transfer Switch Style	Transfer Switch Rating (Amps)	Cable Terminal Rating				Connection Tightness (In-Lbs)	
		Utility & Generator Supply		Load & Neutral		Terminal Mounting Screw	Cable Clamp
		Qty Per Phase	Range	Qty Per Phase	Range		
MCE	100 150	1 1	#4–4/0 #4–4/0	1 1	#4–4/0 #4–4/0	-- 20	100 (Socket) 50 (Slot)
MS3	200	1	#6–350MCM	1	#6–350MCM	72	275
MCE	250	1	#1–350MCM	1	#1--350MCM	90	275
TCJ	400[1]	3	250–500MCM[3]	2	2/0–500MCM 4/0–500MCM	275	375
TCK	600[1]	3	250–500MCM[3]	2	2/0–500MCM 4/0–500MCM	275	375
TCK	800[1]	3	250–600 MCM	3	250–600 MCM	275	375
TCK	1000/1200[1]	4 4	3/0–500MCM 4/0–500MCM	4 4	3/0–500MCM 4/0–500MCM	275	375
TCK	1600[2]	4	#2–600MCM	4	#2–600MCM	275	375

1. Optional Terminal Ratings are available in some models – Consult TTI.
2. IEC only.
3. 600MCM lug size is available subject to restricted cable entry locations.

REQUIREMENTS FOR UPSTREAM CIRCUIT PROTECTIVE DEVICES

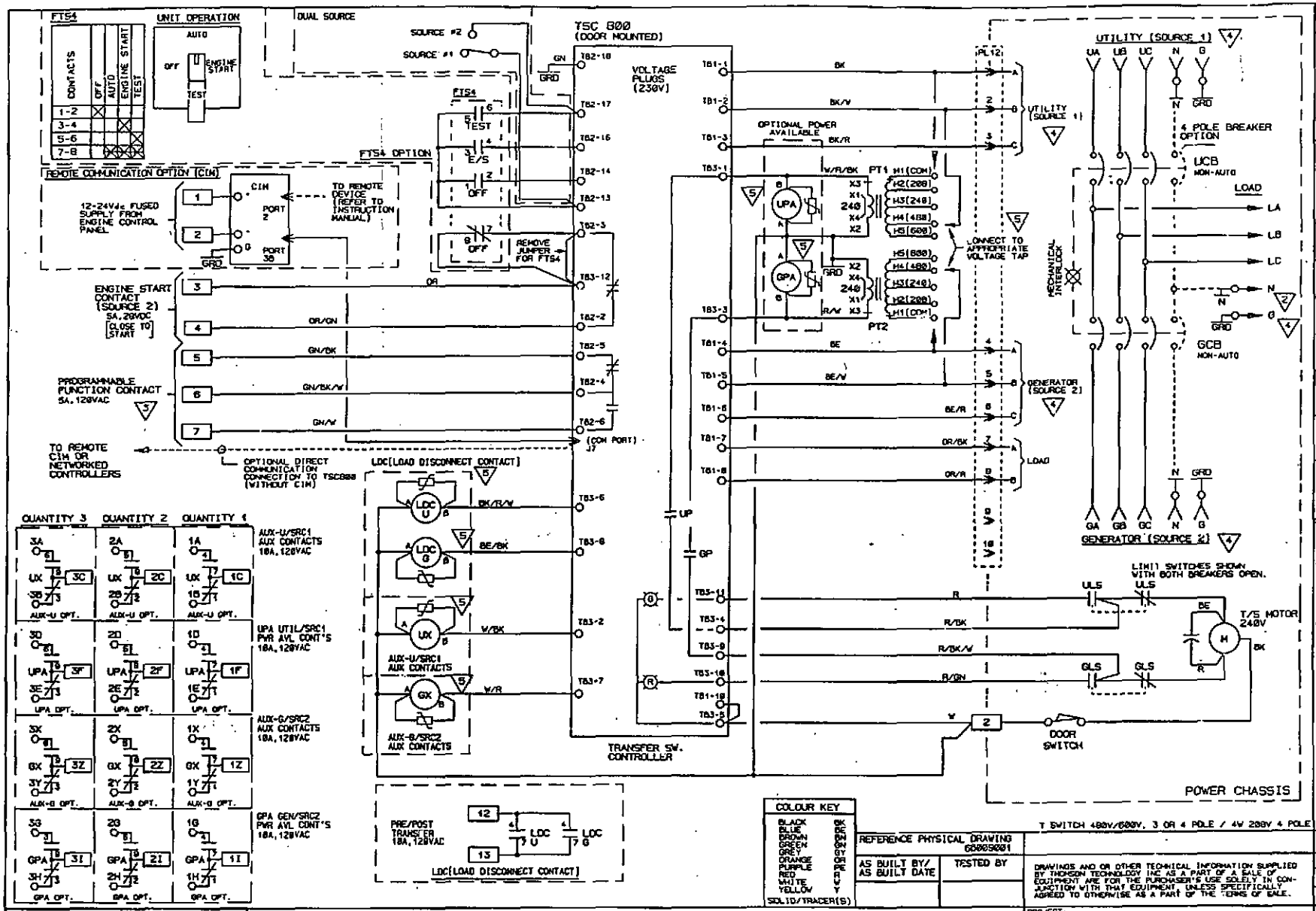
Closing and Withstand Rating (Amps RMS Sym) With Upstream Fuse Protection

Basic Model	Max. Voltage	Rated Current (A)	SHORT CIRCUIT CURRENT RATING (AVAILABLE SYMMETRICAL AMPS (RMS)[1]				
			With Upstream Circuit Breaker Protection			With Upstream Fuse Protection	
			@240V	@480V	@600V	@ Up to 600V	Fuse Type
TSB 850 - MCE-100	600	100	65,000	25,000	18,000	100,000	T, J
TSB 850 - MCE-150	600	150	65,000	25,000	18,000	100,000	T, J
TSB 850 - MS3-200	240	200	100,000	N/A	N/A	N/A	T, J
TSB 850 - MCJL-250	600	250	65,000	35,000	25,000	100,000	T, J
TSB 850 - TCJ-400	600	400	65,000	35,000	25,000	100,000	T, J
TSB 850 - TCJ-600	600	600	65,000	50,000	35,000	100,000	T, J
TSB 850 - TCK-800	600	800	65,000	50,000	35,000	100,000	Consult Factory
TSB 850 - TCK-1000	600	1000	65,000	50,000	35,000	100,000	"
TSB 850 - TCK-1200	600	1200	65,000	50,000	35,000	100,000	"

1. Standard ratings only are shown. Consult TTI for versions with higher short circuit current ratings.

Fuse ratings shown are maximum allowable to permit use of the transfer switch in application with available fault current not exceeding that shown. Consideration must be given to fuse sizing when fuses also provide overload protection.

Please refer to the factory for further information on upstream protection requirements, if required.



COLOUR KEY	
BLACK	BK
BLUE	BL
BROWN	BR
GREEN	GN
GREY	GY
ORANGE	OR
PURPLE	PR
RED	R
WHITE	W
YELLOW	Y

SOLID/TRACER(S)

REFERENCE PHYSICAL DRAWING 60005001	
AS BUILT BY/ AS BUILT DATE	TESTED BY

DRAWINGS AND OR OTHER TECHNICAL INFORMATION SUPPLIED BY THOMSON TECHNOLOGY INC AS A PART OF SALE OF EQUIPMENT ARE FOR THE PURCHASER'S USE SOLELY IN CONJUCTION WITH THAT EQUIPMENT UNLESS SPECIFICALLY AGREED TO OTHERWISE AS A PART OF THE TERMS OF SALE.

T SWITCH 480V/600V, 3 OR 4 POLE / 4V 208V 4 POLE

TRANSFER SWITCH WIRING OPTIONS

PROGRAMMABLE CONTACT [SELECT ONE ONLY]
- AUX-G[SRC2] [QTY 1] ☐
- AUX-U[SRC1] [QTY 1] ☐
- FAIL TO TRANSFER ☐

FTS4 ☐

CONTROL TYPE
- AUTOMATIC TRANSFER SWITCH ☐
- DUAL SOURCE ☐

AUX-G/SRC2 AUX CONTACTS [QTY] [MAX 3] ☐

AUX-U/SRC1 AUX CONTACTS [QTY] [MAX 3] ☐

UPA UTIL/SRC1 PWR AVL CONT'S [QTY] [MAX 3] ☐

GPA GEN/SRC2 PWR AVL CONT'S [QTY] [MAX 3] ☐

LDC[LOAD DISCONNECT CONTACT] ☐

REMOTE COMMUNICATION OPTION (WITH CIM) ☐

FOR TSC800 CONTROLLER OPTIONS, REFER TO PROGRAMMING SHEETS

2. SYSTEM MUST UTILIZE A SOLIDLY GROUNDED NEUTRAL
3. WHEN DUAL SOURCE OPTION SELECTED, PROGRAMMABLE CONTACT BECOMES SOURCE 1 ENGINE START CONTACT [TERMS 5 & 6 CLOSE TO START]
4. 3 PHASE CONNECTION SHOWN. FOR SINGLE PHASE CONNECT A AND B ONLY.
5. RELAY COILS 240VAC

PT TAP	VOLTAGE 208	240	480	600
H1	X	X		X
H2	X			
H3		X		
H4			X	
H5			X	X

X HIGH POLARITY MARKER

REFER TO MANUAL FOR CABLE CONNECTION INFORMATION

LEGEND
- ISOLATION PLUG
- OPT. OPTIONAL ITEMS

SCHEMATIC DIAGRAM AUTOMATIC TRANSFER SWITCH

THOMSON TECHNOLOGY INC.

MODEL TS 85_ - T___ - ___ A - ___

___ A, ___ V, ___ Ø, ___ W, ___ Hz

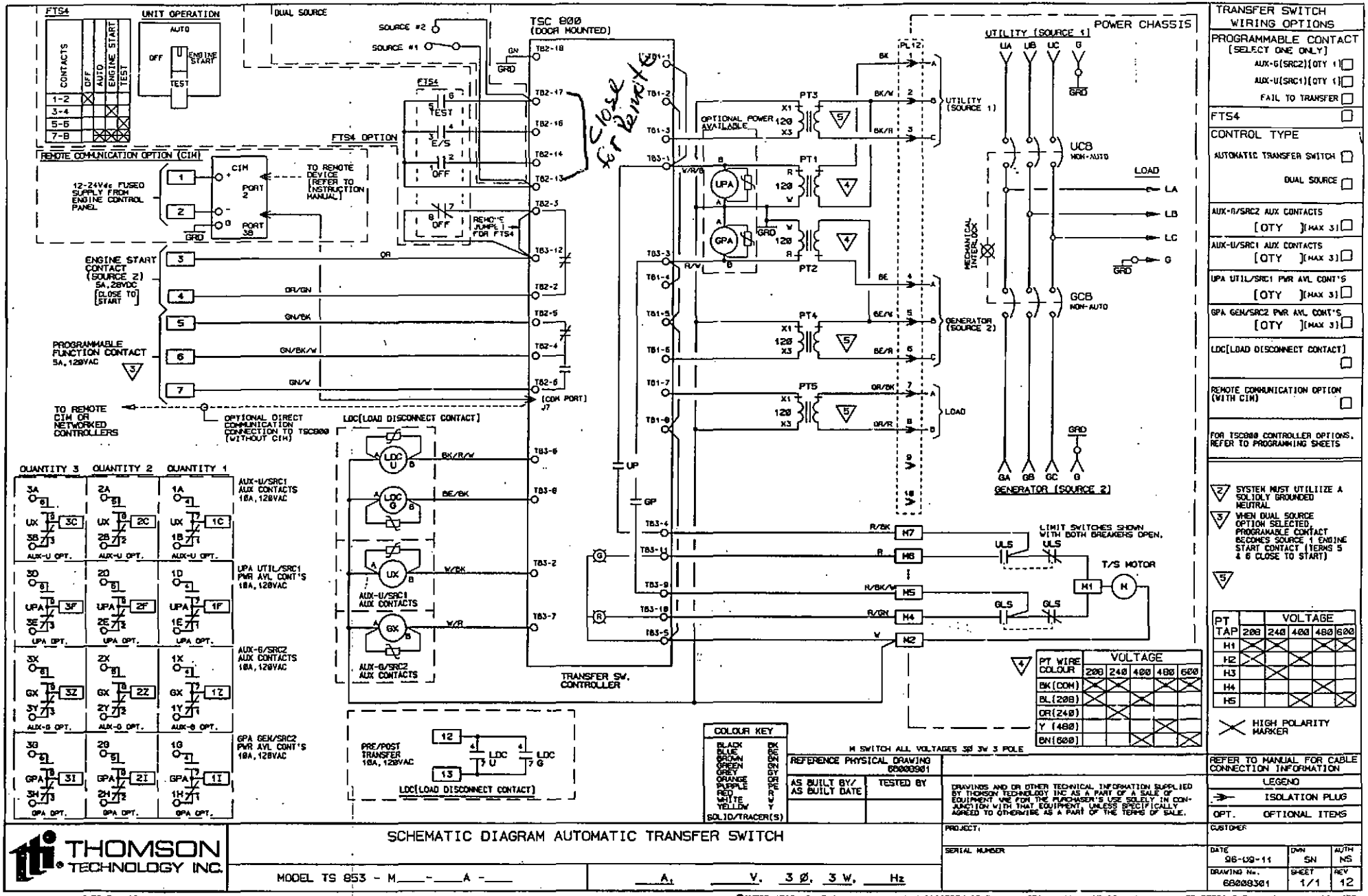
PROJECT:

CUSTOMER

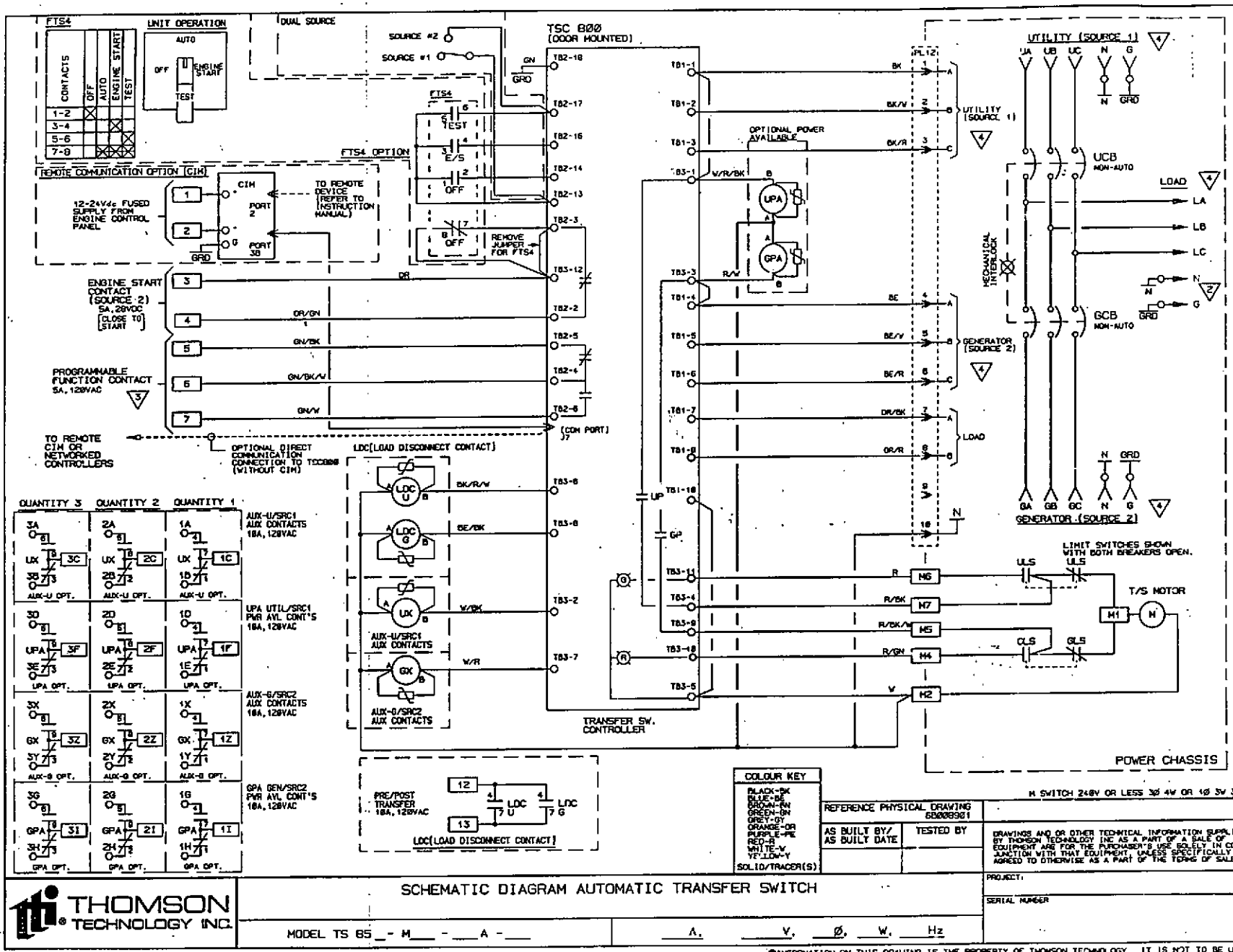
SERIAL NUMBER

DATE	DWN	AUTH
96-09-11	SN	NS
DRAWING No.	SHEET	REV
98000801	1/1	3

DRAWINGS SUBJECT TO CHANGE WITHOUT NOTICE.



DRAWINGS SUBJECT TO CHANGE WITHOUT NOTICE.



COLOUR KEY
BLACK-BK
BLUE-BE
BROWN-BN
GREEN-GN
GREY-GY
ORANGE-OR
PURPLE-PE
RED-R
WHITE-W
YELLOW-Y
SOLID/TRACER(S)

REFERENCE PHYSICAL DRAWING 68008901	
AS BUILT BY/ AS BUILT DATE	TESTED BY

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PROJECT:

SERIAL NUMBER

H SWITCH 240V OR LESS 3Ø 4W OR 1Ø 3W 3POLE

TRANSFER SWITCH WIRING OPTIONS

PROGRAMMABLE CONTACT (SELECT ONE ONLY)
- AUX-G(SRC2)[QTY 1] ☐
- AUX-U(SRC1)[QTY 1] ☐
- FAIL TO TRANSFER ☐

FTS4 ☐

CONTROL TYPE
- AUTOMATIC TRANSFER SWITCH ☐
- DUAL SOURCE ☐

AUX-G/SRC2 AUX CONTACTS [QTY '][MAX 3] ☐

AUX-U/SRC1 AUX CONTACTS [QTY][MAX 3] ☐

UPA UTIL/SRC1 PWR AVL CONT'S [QTY][MAX 3] ☐

GPA GEN/SRC2 PWR AVL CONT'S [QTY][MAX 3] ☐

LDC(LOAD DISCONNECT CONTACT) ☐

REMOTE COMMUNICATION OPTION (WITH CIM) ☐

FOR TSC800 CONTROLLER OPTIONS, REFER TO PROGRAMMING SHEETS

2. SYSTEM MUST UTILIZE A SOLIDLY GROUNDED NEUTRAL
3. WHEN DUAL SOURCE OPTION SELECTED, PROGRAMABLE CONTACT BECOMES SOURCE 1 ENGINE START CONTACT (TERMS 5 & 6 CLOSE TO START)
4. 3 PHASE CONNECTION SHOWN, FOR SINGLE PHASE CONNECT A AND B ONLY.

REFER TO MANUAL FOR CABLE CONNECTION INFORMATION

LEGEND
- ISOLATION PLUG
- OPT. OPTIONAL ITEMS

CUSTOMER

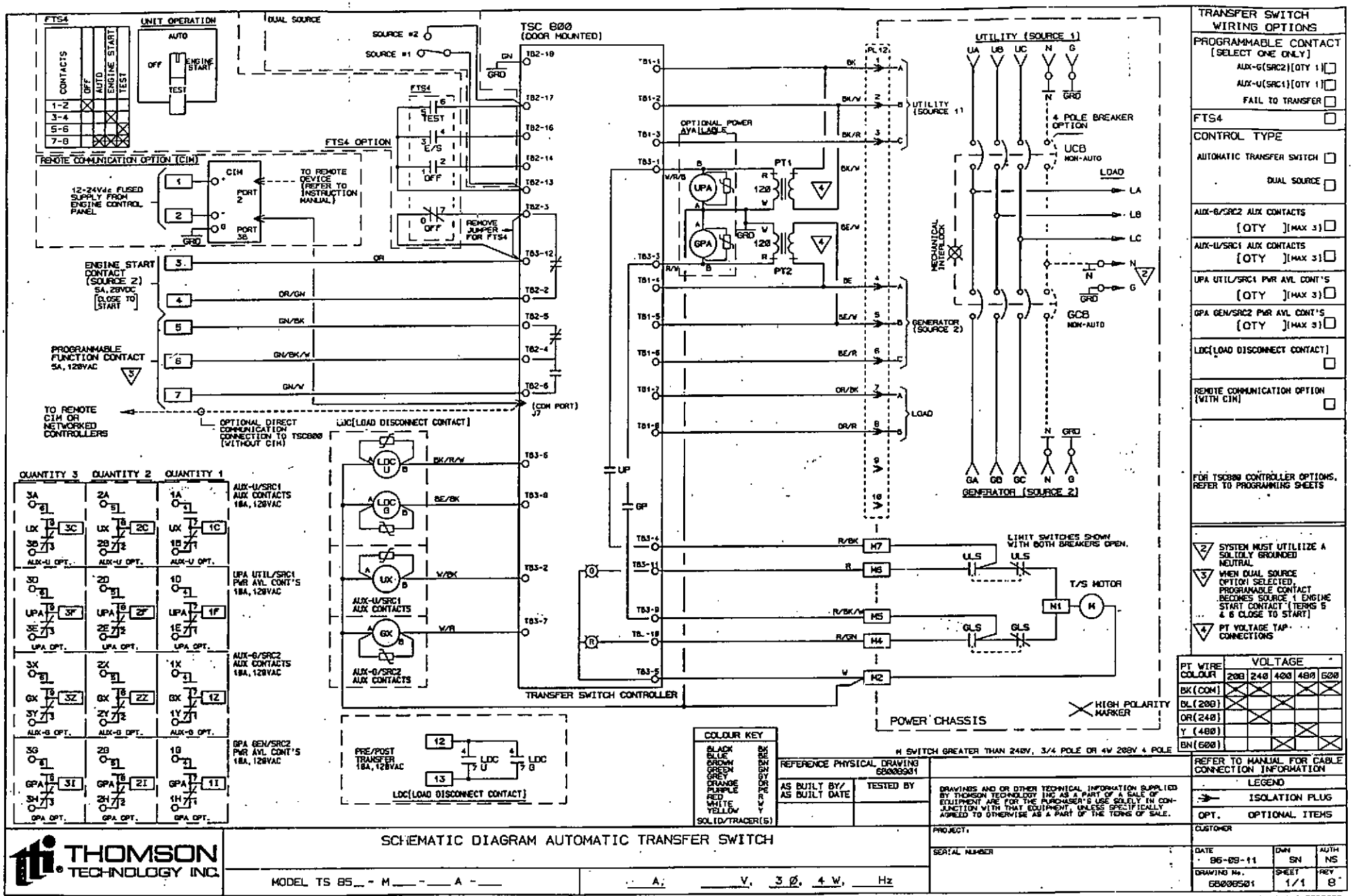
DATE	DWN	AUTH
96-09-11	SN	NS
DRAWING No.	SHEET	REV
68008401	1/1	6

SCHEMATIC DIAGRAM AUTOMATIC TRANSFER SWITCH

THOMSON TECHNOLOGY INC.

MODEL TS 85 _ - M___ - ___A - ___ ___A, ___V, ___Ø, ___W, ___Hz

DRAWINGS SUBJECT TO CHANGE WITHOUT NOTICE.

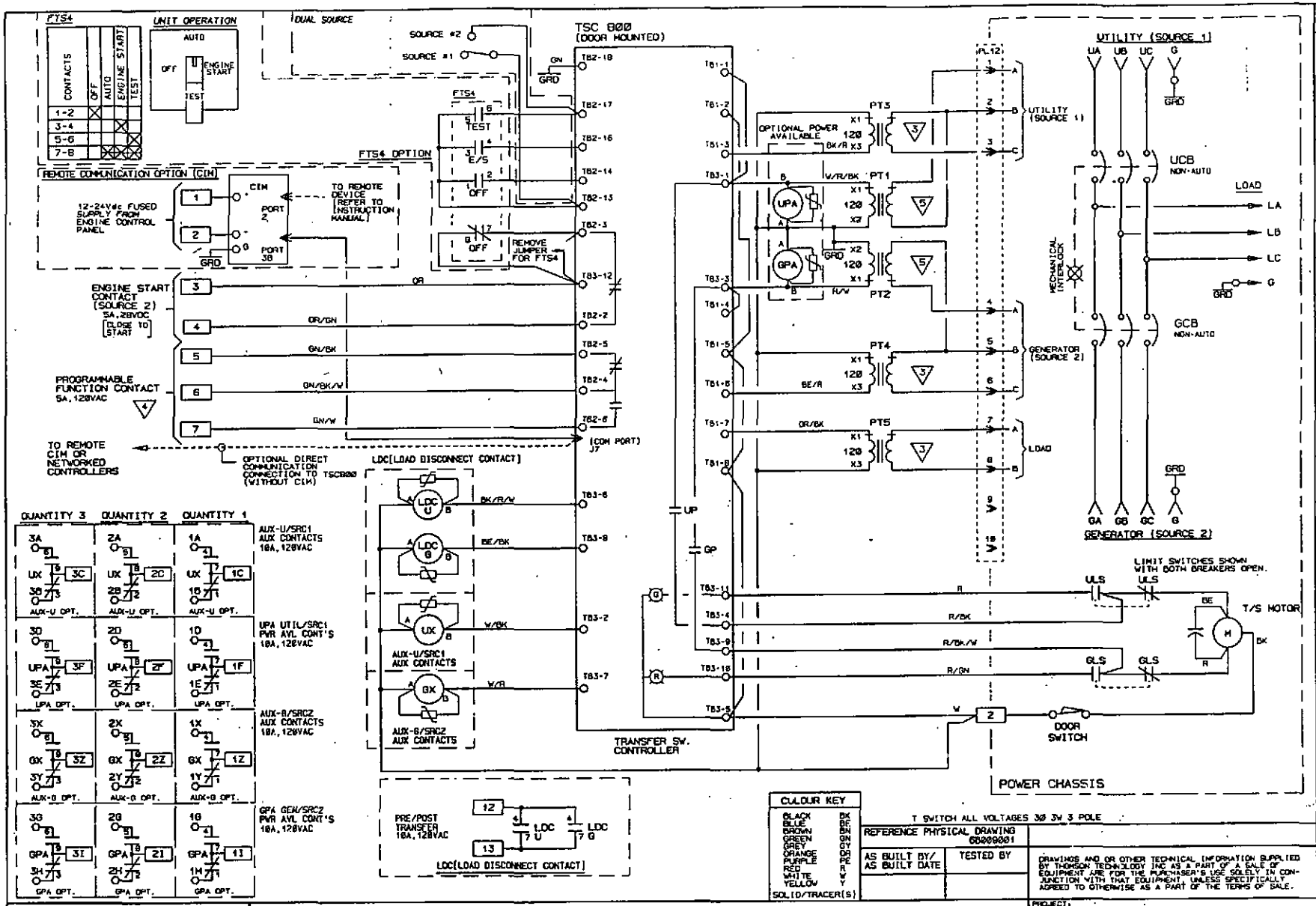


THOMSON TECHNOLOGY INC.

SCHEMATIC DIAGRAM AUTOMATIC TRANSFER SWITCH

MODEL TS 85__ - M___ - ___ A - ___ | ___ A; ___ V, 3 Ø, 4 W, ___ Hz

DRAWINGS SUBJECT TO CHANGE WITHOUT NOTICE.



PT TAP	VOLTAGE				
	208	240	420	480	600
H1	X			X	
H2	X				
H3		X			
H4				X	
H5			X		

COLOUR KEY	
BLACK	BK
BLUE	BE
BROWN	BN
GREEN	GN
GREY	GY
ORANGE	OR
PURPLE	PE
RED	R
WHITE	W
YELLOW	Y
SOLID/TRACER(S)	

T SWITCH ALL VOLTAGES 3Ø 3W 3 POLE

REFERENCE PHYSICAL DRAWING 68000001

AS BUILT BY/ AS BUILT DATE

TESTED BY

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PROJECT:

SERIAL NUMBER

CUSTOMER

SCHEMATIC DIAGRAM AUTOMATIC TRANSFER SWITCH

MODEL TS 853 - T____-____ A -____

____A, ____V, 3 Ø, 3 W, ____Hz

THOMSON TECHNOLOGY INC.

DRAWINGS SUBJECT TO CHANGE WITHOUT NOTICE.

TRANSFER SWITCH WIRING OPTIONS

PROGRAMMABLE CONTACT (SELECT ONE ONLY)

- AUX-G(SRC2)[QTY 1] ☐
- AUX-U(SRC1)[QTY 1] ☐
- FAIL TO TRANSFER ☐

FTS4 ☐

CONTROL TYPE

- AUTOMATIC TRANSFER SWITCH ☐
- DUAL SOURCE ☐

AUX-G/SRC2 AUX CONTACTS [QTY][MAX 3] ☐

AUX-U/SRC1 AUX CONTACTS [QTY][MAX 3] ☐

UPA UTIL/SRC1 PWR AVL CONT'S [QTY][MAX 3] ☐

GPA GEN/SRC2 PWR AVL CONT'S [QTY][MAX 3] ☐

LOC[LOAD DISCONNECT CONTACT] ☐

REMOTE COMMUNICATION OPTION (WITH CIM) ☐

FOR TSC800 CONTROLLER OPTIONS, REFER TO PROGRAMMING SHEETS

(3) PT VOLTAGE TAP CONNECTIONS

(4) WHEN DUAL SOURCE OPTION SELECTED, PROGRAMABLE CONTACT BECOMES SOURCE 1 ENGINE START CONTACT (TERMS 5 & 6 CLOSE TO START)

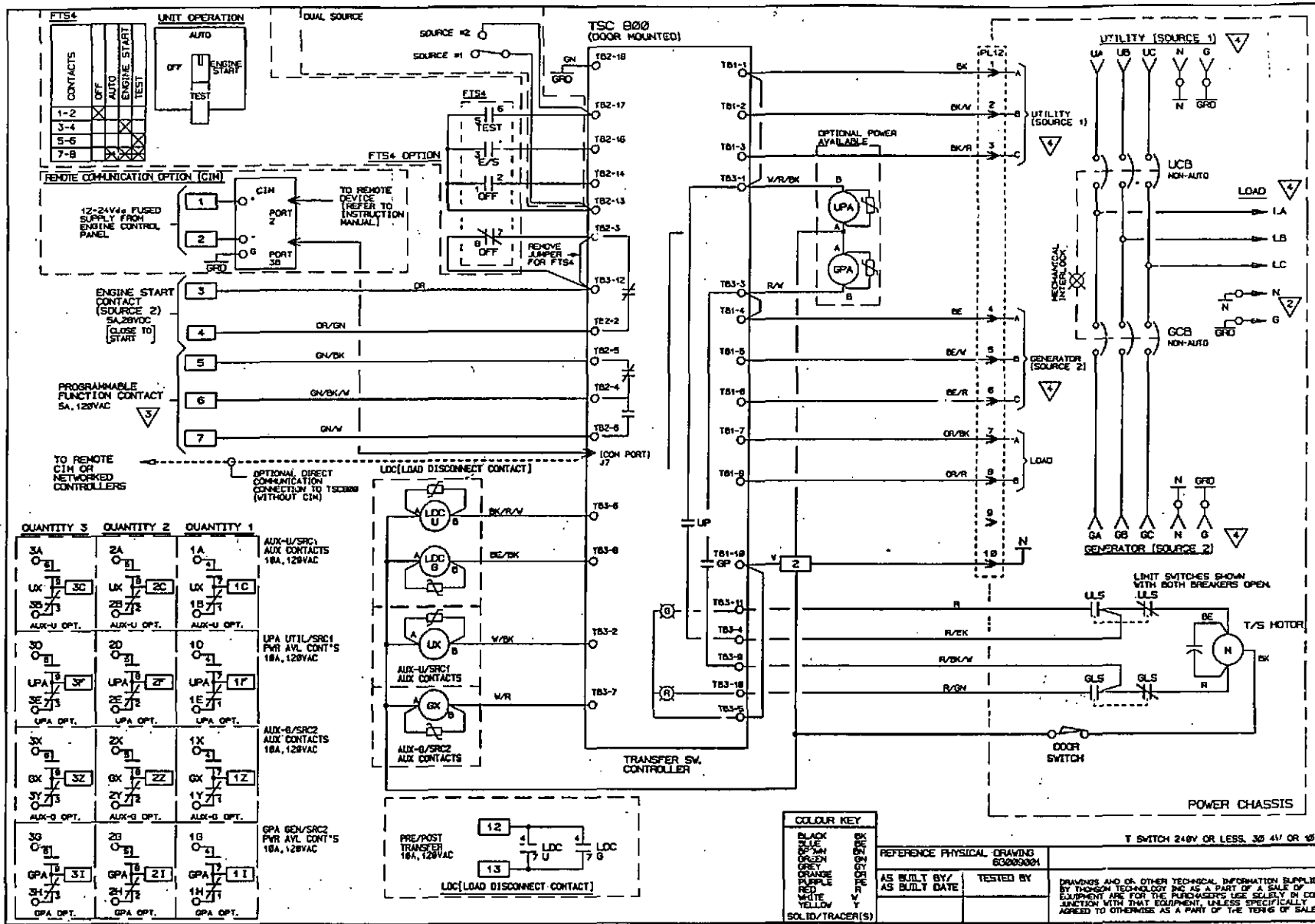
HIGH POLARITY MARKER

REFER TO MANUAL FOR CABLE CONNECTION INFORMATION

LEGEND

- ISOLATION PLUG
- OPT. OPTIONAL ITEMS

DATE	DWN	AUTH
98-09-11	SN	NS
DRAWING No.	SHEET	REV
68000601	1/1	10



T SWITCH 240V OR LESS, 3Ø 4W OR Ø 3W

TRANSFER SWITCH WIRING OPTIONS

PROGRAMMABLE CONTACT (SELECT ONE ONLY)
- AUX-G(SRC2)(QTY 1) ☐
- AUX-U(SRC1)(QTY 1) ☐
- FAIL TO TRANSFER ☐

FTS4 ☐

CONTROL TYPE
- AUTOMATIC TRANSFER SWITCH ☐
- DUAL SOURCE ☐

AUX-G/SRC2 AUX CONTACTS [QTY][MAX 3] ☐

AUX-U/SRC1 AUX CONTACTS [QTY][MAX 3] ☐

UPA UTIL/SRC1 PWR AVL CONT'S [QTY][MAX 3] ☐

GPA GEN/SRC2 PWR AVL CONT'S [QTY][MAX 3] ☐

LDC(LOAD DISCONNECT CONTACT) ☐

REMOTE COMMUNICATION OPTION (WITH CIM) ☐

FOR TSC800 CONTROLLER OPTIONS, REFER TO PROGRAMMING SHEETS

2. SYSTEM MUST UTILIZE A SOLIDLY GROUNDED NEUTRAL
3. WHEN DUAL SOURCE OPTION SELECTED, PROGRAMMABLE CONTACT BECOMES SOURCE 1 ENGINE START CONTACT (TERMS 5 & 6 CLOSE TO START)
4. 3 PHASE CONNECTION SHOWN, FOR SINGLE PHASE CONNECT A AND B ONLY.

REFER TO MANUAL FOR CABLE CONNECTION INFORMATION

LEGEND
- ISOLATION PLUG
- OPT. OPTIONAL ITEMS

REFERENCE PHYSICAL DRAWING 63009001

AS BUILT BY/ AS BUILT DATE | TESTED BY

THOMSON TECHNOLOGY INC.

SCHEMATIC DIAGRAM AUTOMATIC TRANSFER SWITCH

MODEL TS 85_ - T___ - ___A - ___

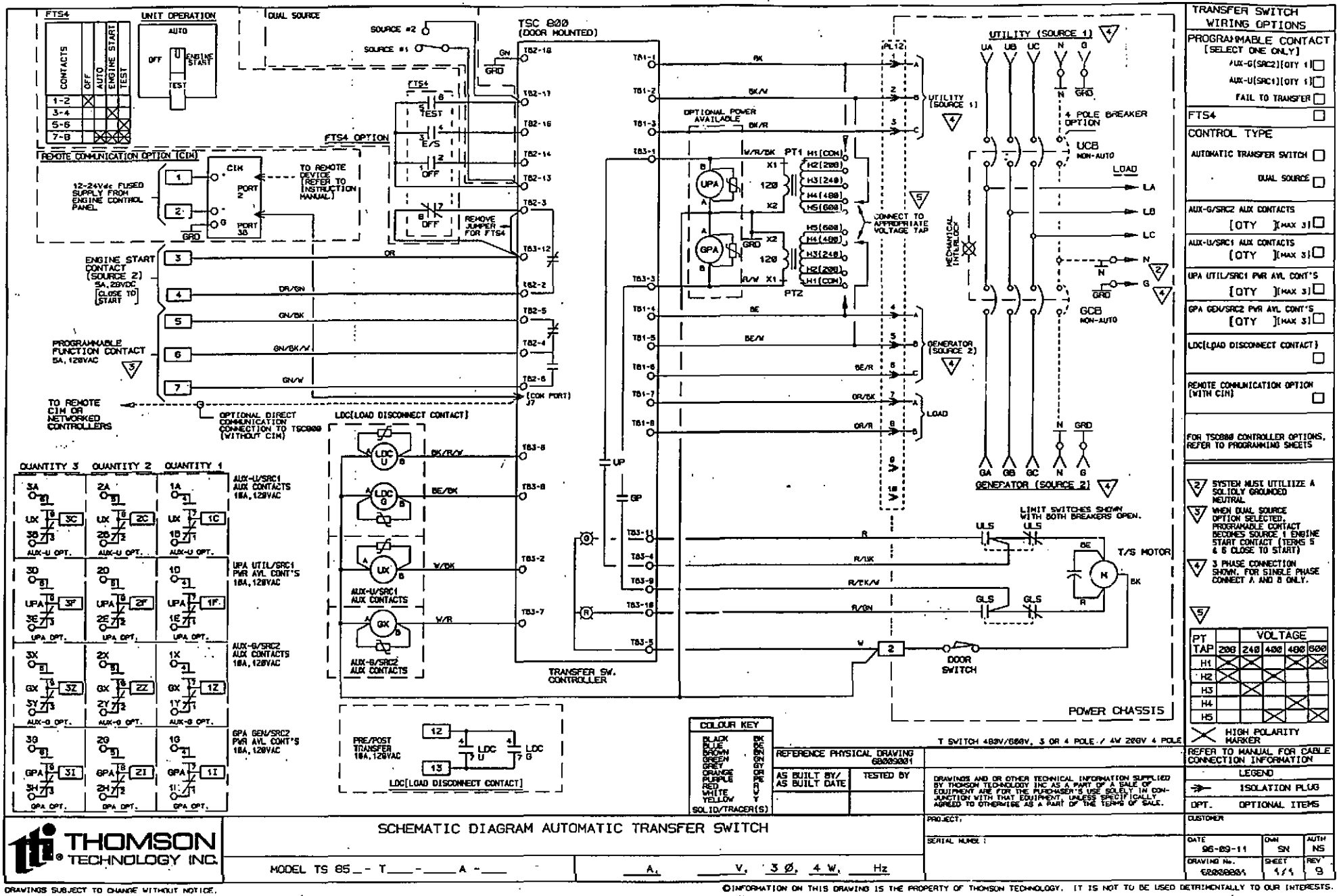
___A, ___V, ___Ø, ___W, ___Hz

PROJECT:

SERIAL NUMBER

CUSTOMER

DATE	DWN	AUTH
96-09-11	SN	NS
DRAWING No.	SHEET	REV
68008701	1/1	7



COLOUR KEY	
BLACK	BK
BLUE	BE
BROWN	BR
GREEN	GN
GREY	GY
ORANGE	OR
PURPLE	PR
RED	R
WHITE	W
YELLOW	Y

SOLID/TRACER(S)

T SWITCH 480V/600V, 3 OR 4 POLE / 4W 208V 4 POLE

REFERENCE PHYSICAL DRAWING 68003001	
AS BUILT BY/ AS BUILT DATE	TESTED BY

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TRANSFER SWITCH WIRING OPTIONS

PROGRAMMABLE CONTACT [SELECT ONE ONLY]
- AUX-G(SRC2)[QTY 1] ☐
- AUX-U(SRC1)[QTY 1] ☐
- FAIL TO TRANSFER ☐

FTS4 ☐

CONTROL TYPE
- AUTOMATIC TRANSFER SWITCH ☐
- DUAL SOURCE ☐

AUX-G/SRC2 AUX CONTACTS [QTY][MAX 3] ☐

AUX-U/SRC1 AUX CONTACTS [QTY][MAX 3] ☐

UPA UTIL/SRC1 PWR AVL CONT'S [QTY][MAX 3] ☐

GPA GEN/SRC2 PWR AVL CONT'S [QTY][MAX 3] ☐

LDC(LOAD DISCONNECT CONTACT) ☐

REMOTE COMMUNICATION OPTION (WITH CIM) ☐

FOR TSC800 CONTROLLER OPTIONS, REFER TO PROGRAMMING SHEETS

(2) SYSTEM MUST UTILIZE A SOLIDLY GROUNDED NEUTRAL.

(3) WHEN DUAL SOURCE OPTION SELECTED, PROGRAMMABLE CONTACT BECOMES SOURCE 1 ENGINE START CONTACT (TERMS 5 & 6 CLOSE TO START)

(4) 3 PHASE CONNECTION SHOWN. FOR SINGLE PHASE CONNECT A AND B ONLY.

(5)

PT TAP	VOLTAGE				
	208	240	480	488	600
H1	X	X		X	X
H2	X	X			
H3		X	X		
H4				X	X
H5				X	X

X HIGH POLARITY MARKER

REFER TO MANUAL FOR CABLE CONNECTION INFORMATION

LEGEND
- ISOLATION PLUG
- OPT. OPTIONAL ITEMS

CUSTOMER

PROJECT:

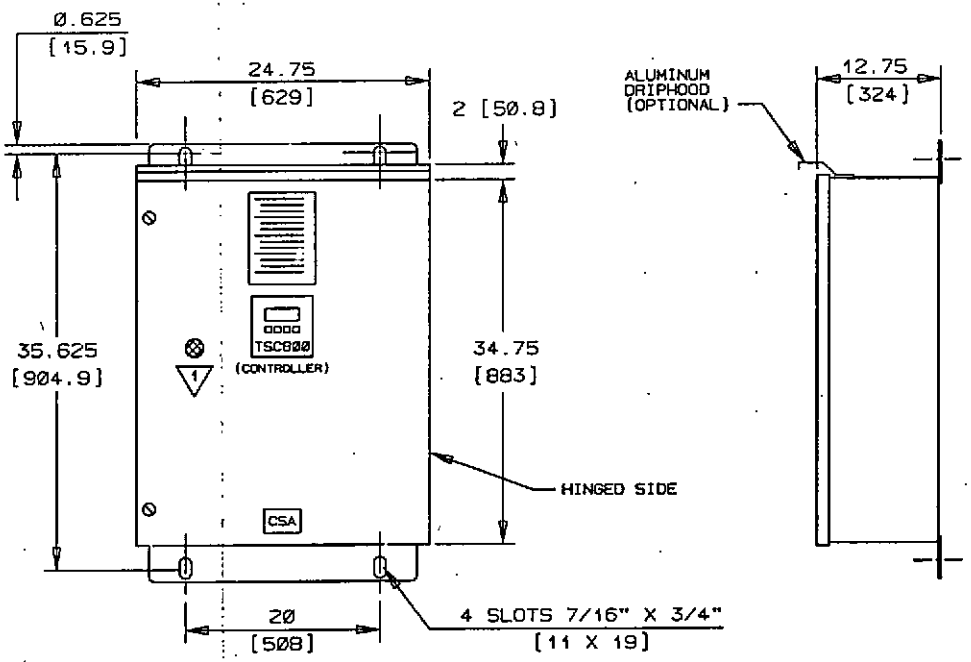
SERIAL NUMBER:

DATE	DWN	AUTH
96-09-11	SN	NS
DRAWING No. 68003001	SHEET 1/1	REV 9

SCHEMATIC DIAGRAM AUTOMATIC TRANSFER SWITCH

MODEL TS 85_ - T___ - ___ A - ___ ___A, ___V, 3 Ø, 4 W, ___Hz

THOMSON TECHNOLOGY INC.



(TYPICAL) FRONT VIEW

FINISH: ASA #61 GREY

SIDE VIEW

DIMENSIONS IN INCHES, [ ] = MILLIMETERS

- ☐ NEMA 1
- ☐ NEMA 1A C/W DRIPHOOD
- ☐ 100A
- ☐ 150A
- ☐ 250A

▽1 SWITCH FEATURES

- ☐ PREFERED SOURCE SELECTOR SWITCH (ONLY WITH DUAL STANDBY SOURCE SYSTEMS)
- ☐ OPTIONAL FOUR POSITION TEST SWITCH - FTS4 - ONLY WITH ATS SYSTEMS
- ☐ NO SWITCH REQUIRED

No.	REVISIONS	BY	AUTH	DATE
4	UPDATED TO LATEST ST'D.	RG	NS	97-11-21
3	ADDED SWITCH FEATURES	SN	NS	96-11-06
2	KNOCK DOWN BOX DESIGN	SN	NS	96-10-03
1	MODIFIED FOR TSC800	SN	NS	96-09-17

THOMSON TECHNOLOGY INC.

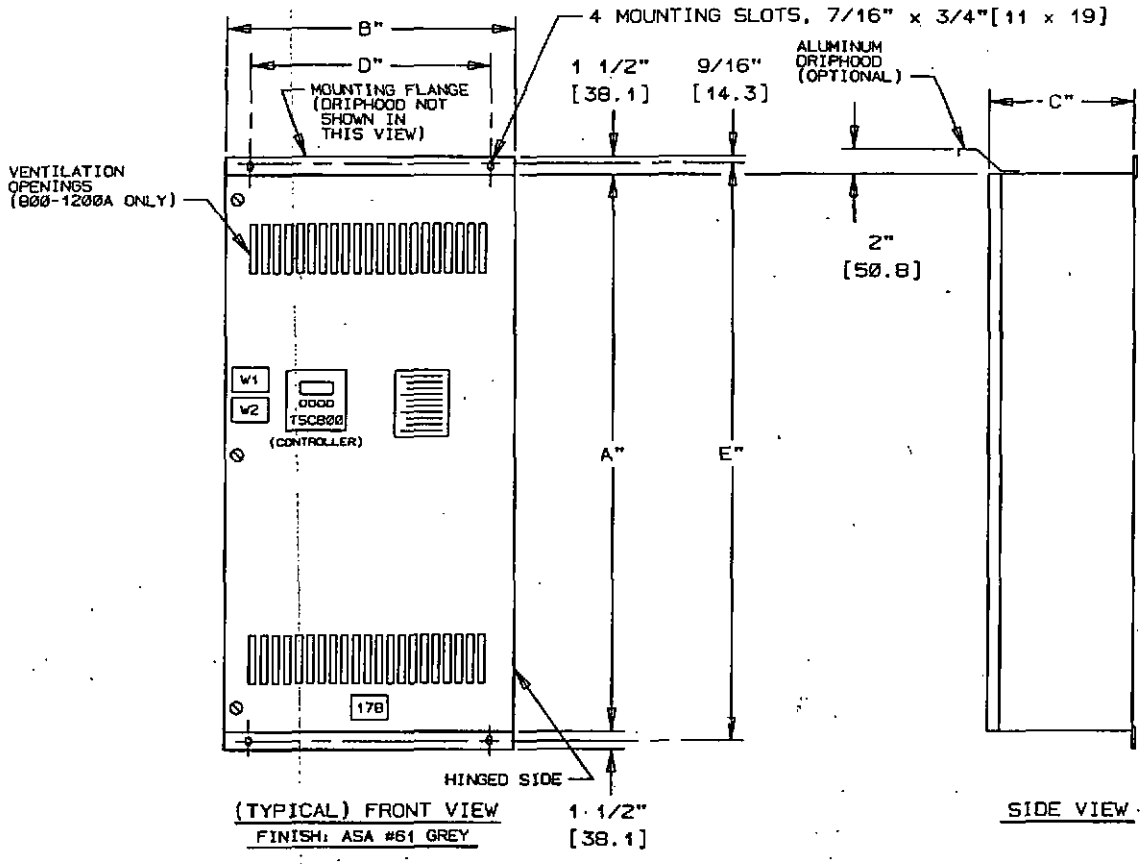
AUTOMATIC TRANSFER SWITCH ENCLOSURE DIMENSIONS MODEL TS 850M

100A, 150A, 250A

CUSTOMER

CAD FILE NAME	DWN	AUTH	DATE
68008901	SN	NS	96-10-03

DRAWING No.	SHEET	REV
68008901	1/1	5



- ☐ NEMA 1
- ☐ NEMA 1A C/W DRIPHOOD
- ☐ 250A
- ☐ 400A
- ☐ 600A
- ☐ 800A
- ☐ 1000A
- ☐ 1200A

TRANSFER SWITCH CONFIGURATION

- ☐ -SL
- ☐ -SR
- ☐ -XL
- ☐ -XR

SIZE(AMPS)	A	B	C	D	E
250A,400A,600A	57[1448]	30[762]	12[305]	26[660]	58.75[1492]
800A,1000A,1200A	84[2134]	34[864]	12[305]	30[762]	85.75[2178]

DIMENSIONS IN INCHES, [ ] = MILLIMETERS

No.	REVISIONS	BY	AUTH	DATE
5	800-1200A KNOCKDOWN ENC.	RG	BB	98-09-23
4	250-600A KNOCK DOWN ENC	MH	BD	98-06-22
3	PRODUCTION UPDATES	JC	BD	98-03-06
2	UPDATED TO LATEST ST'D.	RG	NS	97-11-21
1	MODIFIED FOR TSC800	SN	NS	96-09-16

THOMSON TECHNOLOGY INC.

AUTOMATIC TRANSFER SWITCH
ENCLOSURE DIMENSIONS
MODEL TS 850T
250 - 1200A

CUSTOMER

CAD FILE NAME	DWN	AUTH	DATE
68009001	SN	NS	96-09-16

DRAWING No.	SHEET	REV
6B009001	1/1	5

NOTES

1 - FOR TRANSFER SWITCH OPTIONS SEE DRAWINGS 68008301 or 68008401 or 68008501.

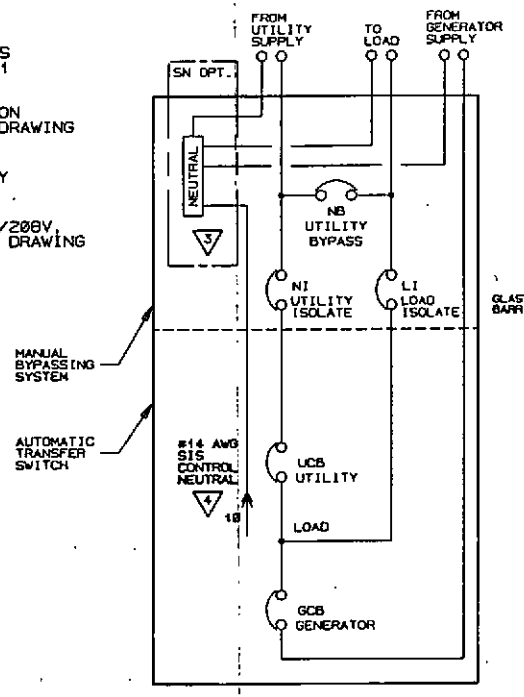
2 - FOR CLOSED TRANSITION UTILITY BYPASS SEE DRAWING 68009104.

3 - NEUTRAL PRESENT ONLY ON 3 POLE VERSIONS.

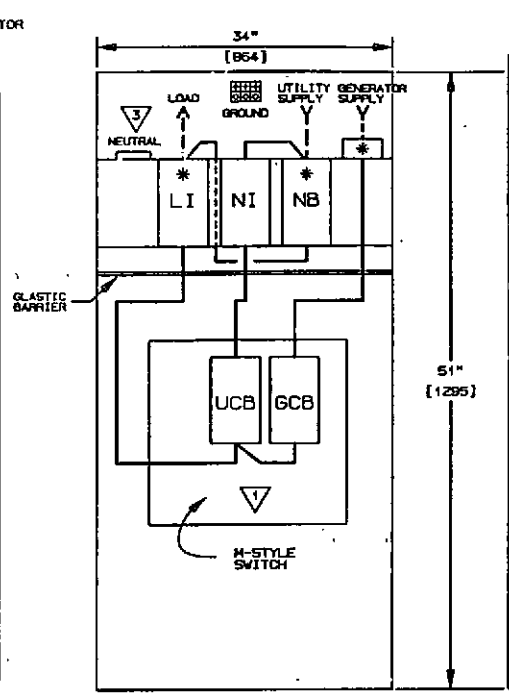
4 - PRESENT ONLY ON 120/208V, 240V 1Ø UNITS. REF. DRAWING 68008401.

BREAKER	BYPASS POSITION	NORMAL POSITION
NI		X
LI		X
NB	X	

X = BREAKER CLOSURE ALLOWED

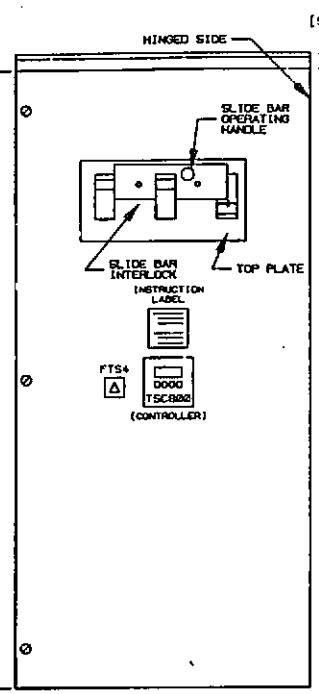


SINGLE LINE DIAGRAM



INTERIOR VIEW

✱ = CUSTOMER CONNECTION



FRONT VIEW

DEPTH : 12" [305]

COLOUR : ASA #61 GREY

DIMENSIONS IN [ ] = MILLIMETERS

SIDE VIEW

GROUND LUGS : 3 x 1C #6-2/0 Al/Cu (ALL UNITS).

NEUTRAL LUGS: FOR 3 POLE UNITS; 3 x 1C #6-2/0 Al/Cu.

LOAD, UTILITY & GENERATOR LUGS: (INCLUDING NEUTRAL LUGS IF 4 POLE) 1 x 1C #4-4/0 Cu ONLY PER POLE

M STYLE N-SIDE 100/150A 3 & 4 POLE

OPTIONS INCLUDED IN BYPASS SWITCH

ENCLOSURE OPTIONS

- EEMAC 1 ☐
- EEMAC 2 ☐
  c/w DRIPHOOD & GASKETING

SOLID NEUTRAL SN ☐

THREE POLE 3P ☐

FOUR POLE 4P ☐

AS BUILT BY/ AS BUILT DATE	TESTED BY

REFER TO MANUAL FOR CABLE CONNECTION INFORMATION

LEGEND

⇒ ISOLATION PLUG

OPT. OPTIONAL ITEMS

THOMSON TECHNOLOGY INC.

1 LINE DIAGRAM & PHYSICAL LAYOUT
AUTOMATIC TRANSFER SWITCH AND 3 BREAKER UTILITY BYPASS SYSTEM

MODEL TSBU 65__-MCE-_____-_____ ____A, ____V, ____Ø, ____W, ____Hz

PROJECT:

CUSTOMER

SERIAL NUMBER

DATE	DWN	AUTH
96-09-18	SN	NS
DRAWING No.	SHEET	REV
68009101	1/1	6

DRAWINGS SUBJECT TO CHANGE WITHOUT NOTICE.

NOTES

1 - FOR TRANSFER SWITCH OPTIONS SEE DRAWINGS 6B008301 or 6B008401 or 6B008501.

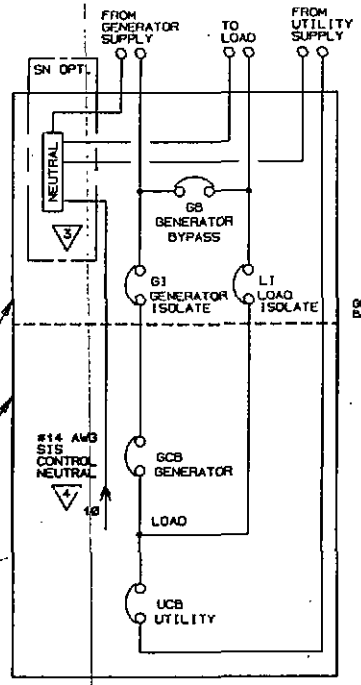
2 - FOR CLOSED TRANSITION GENERATOR BYPASS SEE DRAWING 6B009104.

3 - NEUTRAL PRESENT ONLY ON 3 POLE VERSIONS.

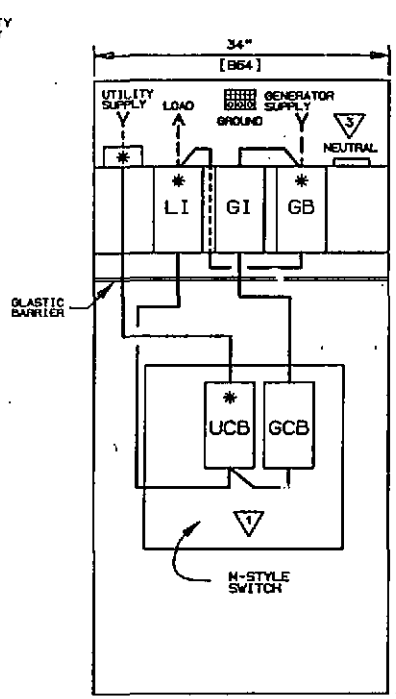
4 - PRESENT ONLY ON 120/208V, 240V 1Ø UNITS. REF. DRAWING 6B008401.

BREAKER	BYPASS POSITION	NORMAL POSITION
GI		X
LI		X
GB	X	

X = BREAKER CLOSURE ALLOWED

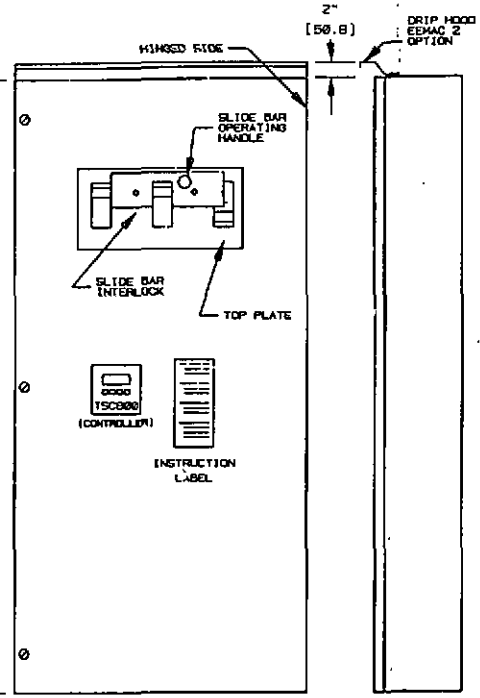


SINGLE LINE DIAGRAM



INTERIOR VIEW

✱ = CUSTOMER CONNECTION



FRONT VIEW

DEPTH : 12" [305]

COLOUR : ASA #61 GREY

DIMENSIONS IN [ ] = MILLIMETERS

SIDE VIEW

N STYLE 0-SIDE 100/150A 3 & 4 POLE

GROUND LUGS : 3 x 1C #6-2/0 Al/Cu (ALL UNITS). #1/0 X

NEUTRAL LUGS: FOR 3 POLE UNITS; 3 x 1C #6-2/0 Al/Cu X #1/0

LOAD, UTILITY & GENERATOR LUGS: (INCLUDING NEUTRAL LUGS IF 4 POLE). 1 x 1C #1-4/0 Cu ONLY PER POLE

OPTIONS INCLUDED IN BYPASS SWITCH

ENCLOSURE OPTIONS

- EEMAC 1 ☐
- EEMAC 2 c/w DRIPHOOD & GASKETING ☐

SOLID NEUTRAL SN ☐

THREE POLE 3P ☐

FOUR POLE 4P ☐

AS BUILT BY/ AS BUILT DATE	TESTED BY

REFER TO MANUAL FOR CABLE CONNECTION INFORMATION

LEGEND

⇥ ISOLATION PLUG

OPT. OPTIONAL ITEMS

PROJECT:

SERIAL NUMBER

CUSTOMER

THOMSON TECHNOLOGY INC.

1 LINE DIAGRAM & PHYSICAL LAYOUT
AUTOMATIC TRANSFER SWITCH AND 3 BREAKER GENERATOR BYPASS SYSTEM

MODEL TSBG 6S__-MCE-_____-_____ ____A, ____V, ____Ø, ____W, ____Hz

DATE	DWN	AUTH
96-09-18	SN	NS
DRAWING No.	SHEET	REV
6B009102	1/1	5

DRAWINGS SUBJECT TO CHANGE WITHOUT NOTICE.

NOTES

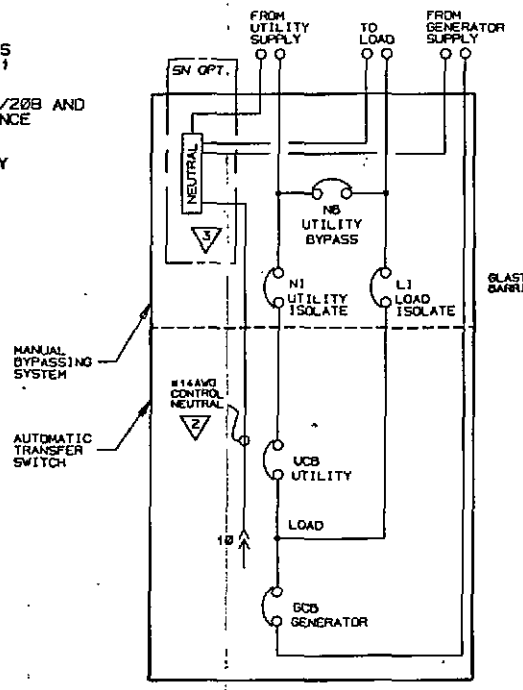
1 - FOR TRANSFER SWITCH OPTIONS SEE DRAWINGS 68000301 or 38000401 or 68008501.

2 - ONLY PRESENT ON 120/208 AND 240 1Ø UNITS REFERENCE DRAWING 68008401.

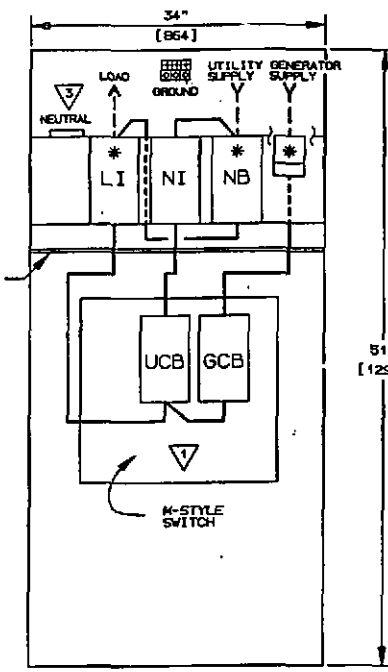
3 - NEUTRAL PRESENT ONLY ON 3 POLE VERSIONS.

BREAKER	BYPASS POSITION	NORMAL POSITION
NI		X
LI		X
NB	X	

X = BREAKER CLOSURE ALLOWED

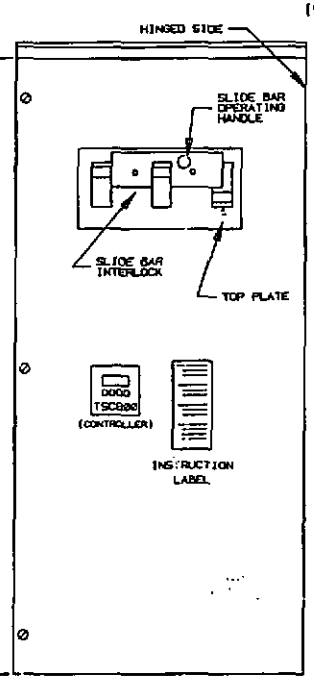


SINGLE LINE DIAGRAM



INTERIOR VIEW

* = CUSTOMER CONNECTION

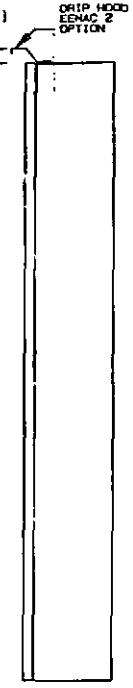


FRONT VIEW

DEPTH : 12" [305]

COLOUR : ASA #61 GREY

DIMENSIONS IN [ ] = MILLIMETERS



SIDE VIEW

OPTIONS INCLUDED IN BYPASS SWITCH

ENCLOSURE OPTIONS

- EEMAC 1 ☐
- EEMAC 2 c/w DRIPHOOD & GASKETING ☐

SOLID NEUTRAL SN ☐

THREE POLE 3P ☐

FOUR POLE 4P ☐

GROUND LUGS :	3 x 1C #6-2/0 Al/Cu
NEUTRAL LUGS:	3 POLE UNITS: 3 x 1C #6-350MCM Al/Cu
GENERATOR LUGS:	1 x 1C #6-250MCM Al/Cu PER POLE
LOAD AND UTILITY LUGS: (INCLUDING NEUTRAL LUGS IF 4 POLE)	1 x 1C #3-350MCM Al/Cu PER POLE

M STYLE N-SIDE 250A 3 & 4 POLE

AS BUILT BY/ AS BUILT DATE	TESTED BY

REFER TO MANUAL FOR CABLE CONNECTION INFORMATION

LEGEND

→ ISOLATION PLUG

OPT. OPTIONAL ITEMS

PROJECT:

CUSTOMER

SERIAL NUMBER

THOMSON TECHNOLOGY INC.

1 LINE DIAGRAM & PHYSICAL LAYOUT
AUTOMATIC TRANSFER SWITCH AND 3 BREAKER UTILITY BYPASS SYSTEM

MODEL TSBU 85__-MCJL-Z50__-_____ 250 A, _____ V, 3 Ø, _____ W, _____ Hz

DATE	DWN	AUTH
98-09-18	SN	NS
DRAWING No.	SHEET	REV
68009103	1/1	3

NOTES

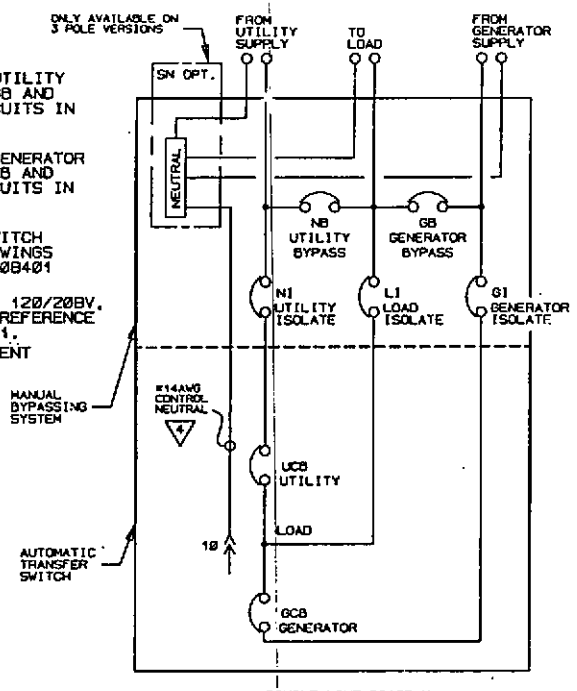
1 - FOR 4 BREAKER UTILITY BYPASS DELETE GB AND ASSOCIATED CIRCUITS IN BYPASS SWITCH.

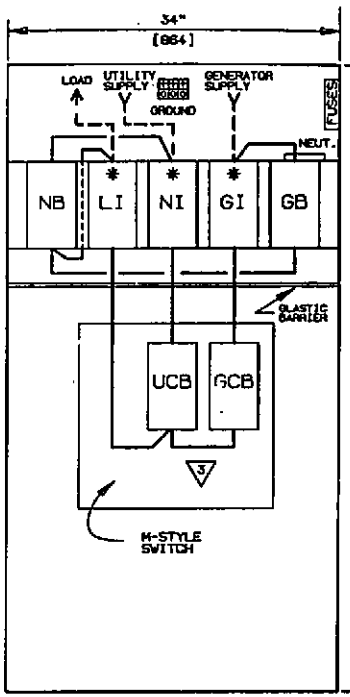
2 - FOR 4 BREAKER GENERATOR BYPASS DELETE NB AND ASSOCIATED CIRCUITS IN BYPASS SWITCH.

3 - FOR TRANSFER SWITCH OPTIONS SEE DRAWINGS 68008301 or 68008401 or 68008501.

4 - PRESENT ONLY ON 120/208V, 240V 1Ø UNITS. REFERENCE DRAWING 68008401.

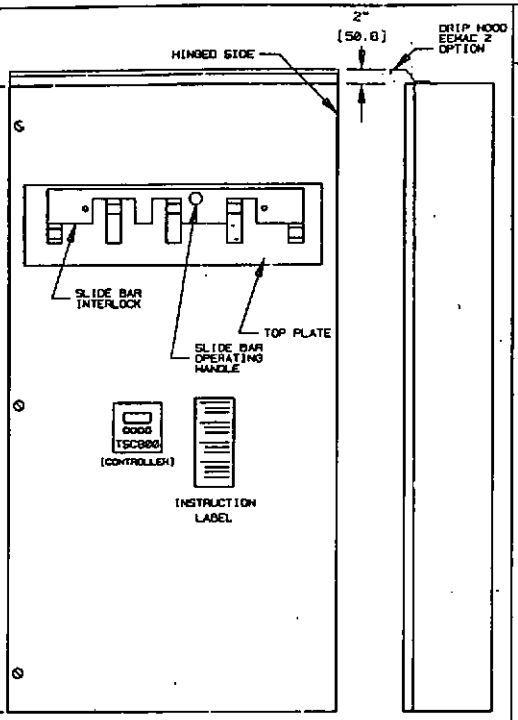
5 - C LINE NOT PRESENT ON 1Ø SYSTEMS.





INTERIOR VIEW

* = CUSTOMER CONNECTION



FRONT VIEW

DEPTH : 12" [305]

COLOUR : ASA #61 GREY

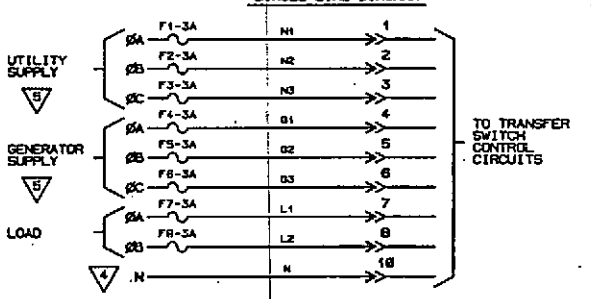
DIMENSIONS IN [ ] = MILLIMETERS

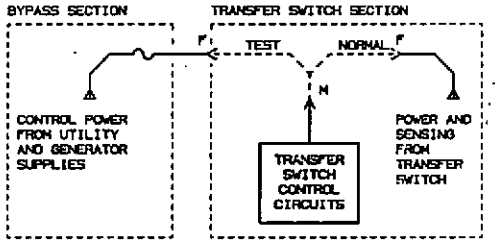
SIDE VIEW

BREAKER	INTERLOCK BAR POSITION				
	UTILITY BYPASS	TRANSITION INTERLOCKING			GENERATOR BYPASS
	1	2	3	4	5
NI		X	X		
NB	X	X			
LI		X	X	X	
GB				X	X
GI			X	X	

X = BREAKER CLOSURE ALLOWED

SINGLE LINE DIAGRAM





CAUTION: WHEN THE TEST CABLE IS CONNECTED, THE TRANSFER SWITCH CONTROL CIRCUITS ARE LIVE! ONLY QUALIFIED PERSONNEL SHOULD PERFORM TEST!

GROUND LUGS : 3 x 1C #6-2/0 Al/Cu (100-250A UNITS)

NEUTRAL LUGS: FOR 100A & 150A 3 POLE UNITS: 3 x 1C #6-2/0 Al/Cu

FOR 250A, 3 POLE UNITS: 3 x 1C #6-350MCM Al/Cu

LOAD, UTILITY & GENERATOR LUGS: (INCLUDING NEUTRAL LUGS IF 4 POLE) 1 x 1C #4-4/0 Cu ONLY PER POLE (100/150A UNITS)

1 x 1C #3-350MCM Al/Cu PER PHASE (250A, 3 POLE UNITS)

M STYLE 100/150A 3&4P, 250A 3P ONLY

OPTIONS INCLUDED IN BYPASS SWITCH

ENCLOSURE OPTIONS

- -EEMAC 1 ☐
- -EEMAC 2 c/= DRIPHOOD & GASKETING ☐

SOLID NEUTRAL SN ☐

UTILITY 4 BREAKER BYPASS U4B ▽1 ☐

GENERATOR 4 BREAKER BYPASS G4B ▽2 ☐

THREE POLE 3P (ALL UNITS) ☐

FOUR POLE 4P (100/150A ONLY) ☐

AS BUILT BY/ AS BUILT DATE	TESTED BY

REFER TO MANUAL FOR CABLE CONNECTION INFORMATION

LEGEND

→ ISOLATION PLUG

OPT. OPTIONAL ITEMS

THOMSON TECHNOLOGY INC.

1 LINE DIAGRAM & PHYSICAL LAYOUT
AUTOMATIC TRANSFER SWITCH AND 5 BREAKER BYPASS SYSTEM

MODEL TSBD 6S__-M___-_____-_____

_____A, _____V, ____Ø, ____W, ____Hz

PROJECT:

CUSTOMER

SERIAL NUMBER

DATE	DWN	AUTH
96-09-18	SN..	NS
DRAWING No.	SHEET	REV
68009104	1/1	5

DRAWINGS SUBJECT TO CHANGE WITHOUT NOTICE.

NOTES

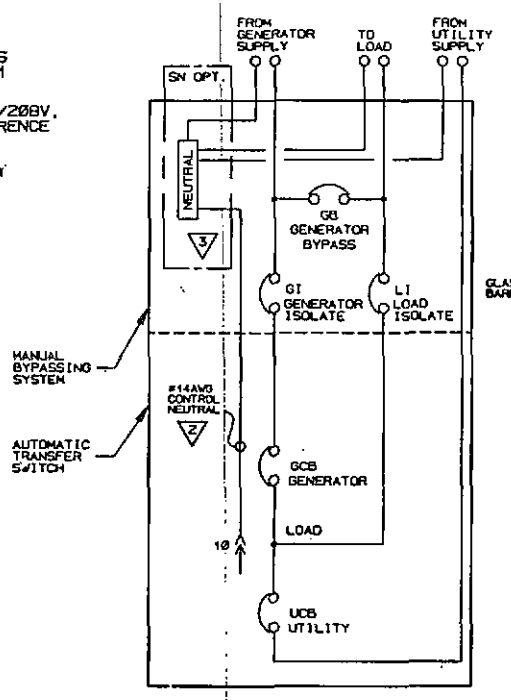
1 - FOR TRANSFER SWITCH OPTIONS SEE DRAWINGS 68008301 or 68008401 68008501.

2 - PRESENT ONLY ON 120/208V, 240V 1Ø UNITS, REFERENCE DRAWING 68008401.

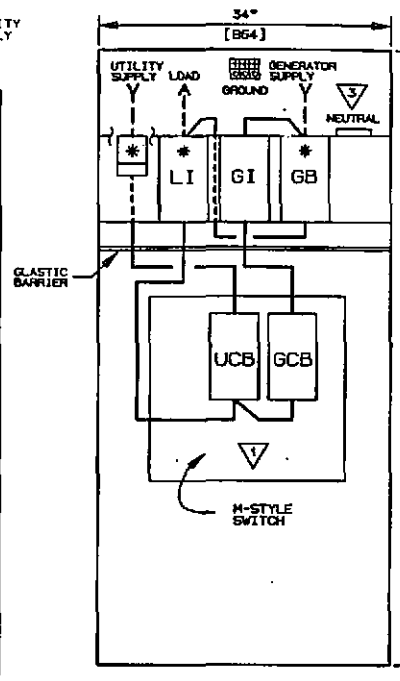
3 - NEUTRAL PRESENT ONLY ON 3 POLE VERSIONS.

BREAKER	BYPASS POSITION	NORMAL POSITION
GI		X
LI		X
GB	X	

X = BREAKER CLOSURE ALLOWED

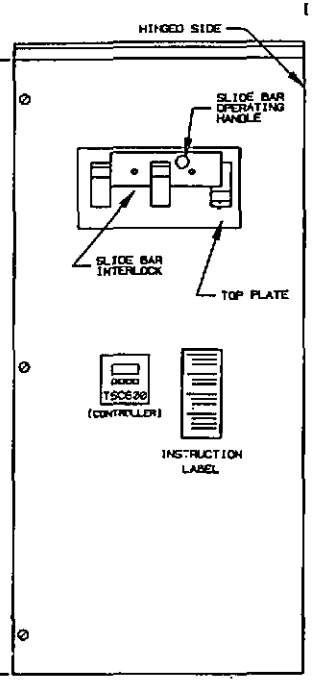


SINGLE LINE DIAGRAM



INTERIOR VIEW

✱ = CUSTOMER CONNECTION

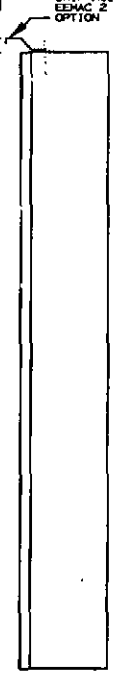


FRONT VIEW

DEPTH : 12" [305]

COLOUR : ASA #61 GREY

DIMENSIONS IN [ ] = MILLIMETERS



SIDE VIEW

H STYLE 0-SIDE 250A 3 & 4 POLE

OPTIONS INCLUDED IN BYPASS SWITCH

ENCLOSURE OPTIONS

- EEMAC 1 ☐
- EEMAC 2 c/w DRIPHOOD & GASKETING ☐

SOLID NEUTRAL SN ☐

THREE POLE 3P ☐

FOUR POLE 4P ☐

GROUND LUGS :	3 x 1C #6-2/0 Al/Cu
NEUTRAL LUGS:	3 POLE UNITS: 3 x 1C #6-350MCM Al/Cu
UTILITY LUGS:	1 x 1C #6-250MCM Al/Cu PER POLE
LOAD AND GENERATOR LUGS: (INCLUDING NEUTRAL LUGS IF 4 POLE)	1 x 1C #3-350MCM Al/Cu PER POLE

AS BUILT BY/ AS BUILT DATE | TESTED BY

REFER TO MANUAL FOR CABLE CONNECTION INFORMATION

LEGEND

⊸ ISOLATION PLUG

OPT. OPTIONAL ITEMS

THOMSON TECHNOLOGY INC.

1 LINE DIAGRAM & PHYSICAL LAYOUT
AUTOMATIC TRANSFER SWITCH AND 3 BREAKER GENERATOR BYPASS SYSTEM

MODEL TSBG 85__-MCJL-250__-_____ | 250 A, _____ V, 3 Ø, ___ W, ___ Hz

PROJECT:

SERIAL NUMBER

CUSTOMER

DATE	DWN	AUTH
98-06-18	SN	NS

DRAWING No.	SHEET	REV
68008105	1/1	3

DRAWINGS SUBJECT TO CHANGE WITHOUT NOTICE.

NOTES

1 - BYPASS SWITCH BREAKERS ARE MECHANICALLY INTERLOCKED THROUGH A SLIDE BAR INTERLOCK. BYPASS IS CLOSED(OR OPEN) TRANSITION (SEE CHART AT RIGHT).

2 - TRANSFER SWITCH BREAKERS ARE MECHANICALLY INTERLOCKED SO THAT ONLY ONE BREAKER IS CLOSED AT A TIME.

3 - FOR 4 BREAKER UTILITY BYPASS, DELETE GB AND ASSOCIATED CIRCUITS IN BYPASS SWITCH.

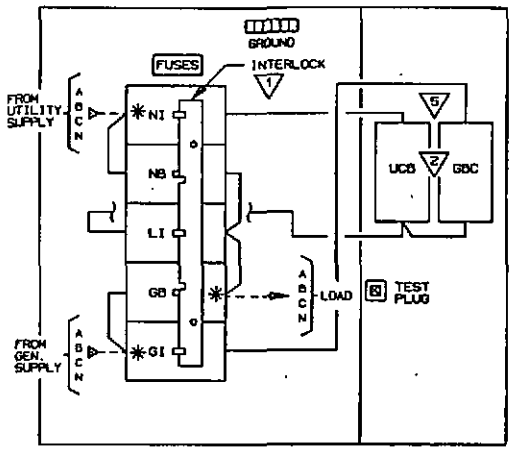
4 - FOR 4 BREAKER GENERATOR BYPASS DELETE NB AND ASSOCIATED CIRCUITS IN BYPASS SWITCH.

5 - FOR TRANSFER SWITCH OPTIONS SEE DRAWINGS 68008301 or 68008401 or 68008501.

6 - PRESENT ONLY ON 120/208V, 240V 1Ø UNITS, REFERENCE DRAWING 68008401.

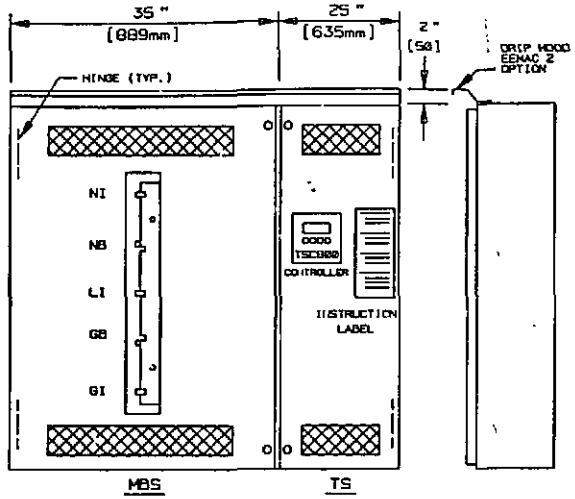
BREAKER	INTERLOCK POSITION				
	UTILITY BYPASS	TRANSITION INTERLOCKING			GENERATOR BYPASS
	1	2	3	4	5
NI		X	X		
NB	X	X			
LI		X	X	X	
GB				X	X
GI			X	X	

X = BREAKER CLOSURE ALLOWED



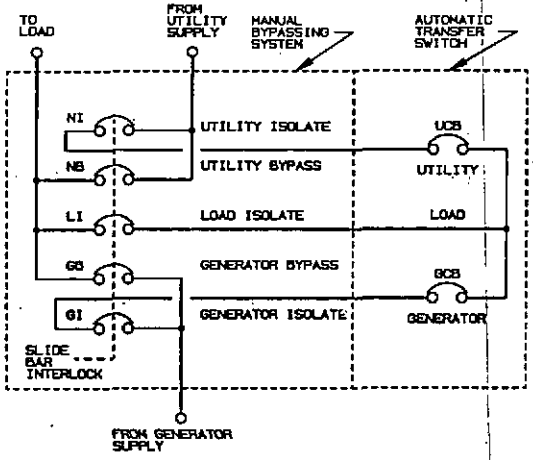
INTERIOR VIEW

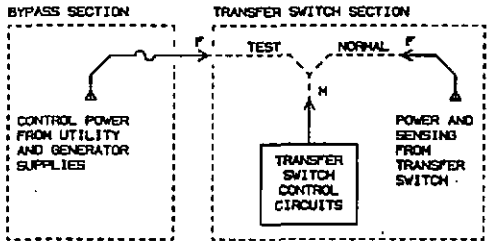
* = CUSTOMER CONNECTION



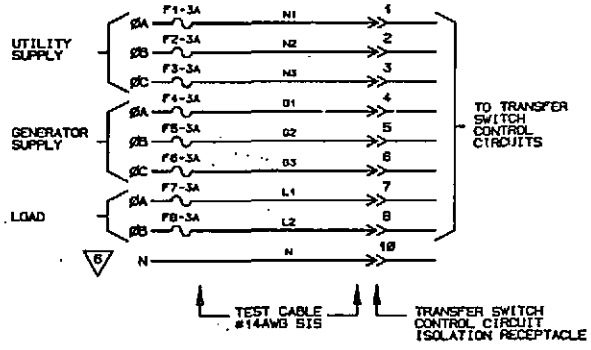
FRONT VIEW

SIDE VIEW





CAUTION: WHEN THE TEST CABLE IS CONNECTED, THE TRANSFER SWITCH CONTROL CIRCUITS ARE LIVE! ONLY QUALIFIED PERSONNEL SHOULD PERFORM TEST!



ENCLOSURE DATA

HEIGHT: 66" [1676mm]
WIDTH: 60" [1524mm]
DEPTH: 14" [356mm] (INCLUDING 1" [25.4mm] DOOR)
COLOUR: ASA #61 GREY

CONNECTION DATA

GROUND LUGS: 6 x 1C #6-2/0 Al./Cu.
LOAD, UTILITY & GENERATOR LUGS: 1 x 1C #3-350MCM Al/Cu PER POLE.

OPTIONS INCLUDED IN BYPASS SWITCH

ENCLOSURE OPTIONS
- EEMAC 1 ☐
- EEMAC 2 c/w DRIPHOOD & GASKETING ☐

FOUR POLE 4P ☒

UTILITY 4 BREAKER BYPASS U4B ▽3 ☐

GENERATOR 4 BREAKER BYPASS G4B ▽4 ☐

AS BUILT BY/ AS BUILT DATE	TESTED BY

REFER TO MANUAL FOR CABLE CONNECTION INFORMATION

LEGEND
- ISOLATION PLUG
- OPT. OPTIONAL ITEMS

THOMSON TECHNOLOGY INC.

1 LINE DIAGRAM & PHYSICAL LAYOUT
AUTOMATIC TRANSFER SWITCH AND 5 BREAKER BYPASS SYSTEM

MODEL TSBD 854-MCJL-250__ - _____ | 250 A. _____ V. 3 Ø. _____ W. _____ Hz

PROJECT:

SERIAL NUMBER

CUSTOMER

DATE	DWN	AUTH
96-09-10	SN	NS
DRAWING No.	SHEET	REV
68009106	1/1	3

DRAWINGS SUBJECT TO CHANGE WITHOUT NOTICE.

NOTES

1 - IF SN OPTION IS USED THEN BOTH NEUTRAL BLOCKS MUST BE ELECTRICALLY CONNECTED.

2 - TRANSFER SWITCH BREAKERS ARE MECHANICALLY INTERLOCKED SO THAT ONLY ONE BREAKER IS CLOSED AT A TIME.

3 - BYPASS SWITCH BREAKERS ARE MECHANICALLY INTERLOCKED THROUGH A SLIDE BAR INTERLOCK. BYPASS SWITCH IS OPEN TRANSITION (SEE CHART BELOW).

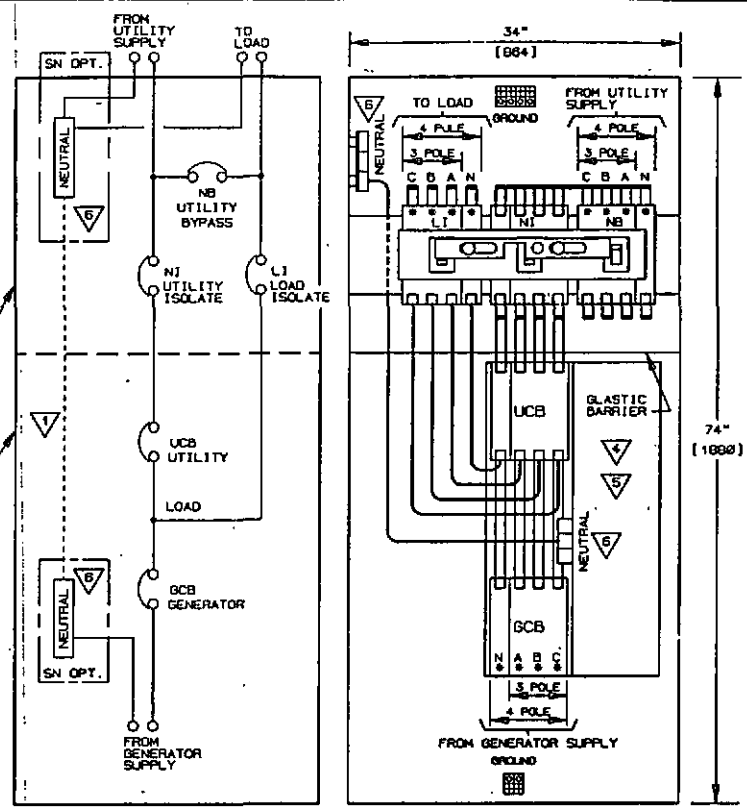
4 - FOR TRANSFER SWITCH OPTIONS SEE DRAWINGS 68008601 or 60008701 68008801.

5 - TRANSFER SWITCH BUILT IN CONFIGURATION "SL".

6 - NEUTRALS PRESENT ONLY ON 3 POLE VERSIONS.

BREAKER	BYPASS POSITION	NORMAL POSITION
NI		X
LI		X
NB	X	

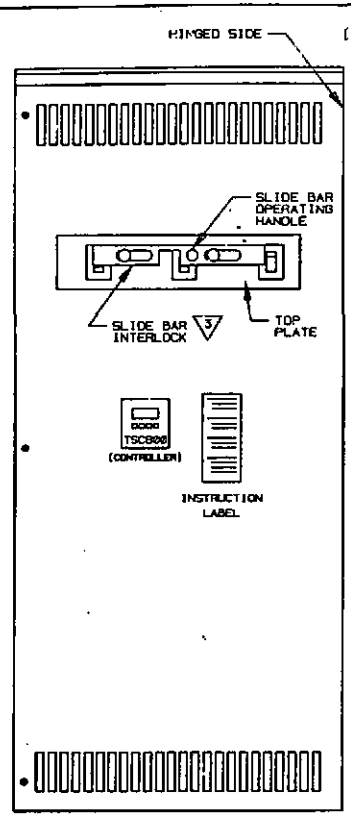
X = BREAKER CLOSURE ALLOWED



SINGLE LINE DIAGRAM

INTERIOR VIEW

* = CUSTOMER CONNECTION

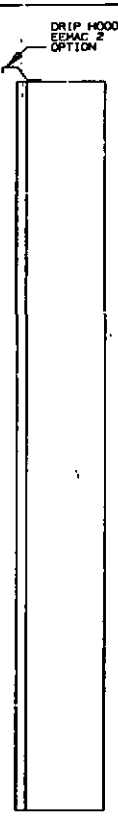


FRONT VIEW

DEPTH : 12" [305]

COLOUR : ASA #61 GREY

DIMENSIONS IN [ ] = MILLIMETERS



SIDE VIEW

GROUND LUGS: FOR 400A UNITS; 3 x 1C #6-2/0 Al/Cu.
FOR 600A UNITS; 8 x 1C #6-250MCM Al/Cu.

LOAD, UTILITY & GENERATOR LUGS: (INCLUDING NEUTRAL LUGS IF 4 POLE) FOR 400 & 600A UNITS; 1 x 1C 2/0-500MCM Cu or 2C 2/0-350MCM Cu or 2C 4/0-500MCM Al PER POLE.

OPTIONS INCLUDED IN BYPASS SWITCH

ENCLOSURE OPTIONS
- EEMAC 1 ☐
- EEMAC 2 c/w DRIPHOOD & GASKETING ☐

SOLID NEUTRAL (1) SN ☐

THREE POLE 3P (ALL UNITS) ☐

FOUR POLE 4P (400/600A ONLY) ☐

TRANSFER SWITCH CONFIGURATION
- SL ☐
- SR ☐
- XL ☐
- XR ☐

T STYLE N-SIDE 400/600A 3 & 4 P.

AS BUILT BY/ AS BUILT DATE	TESTED BY

REFER TO MANUAL FOR CABLE CONNECTION INFORMATION

LEGEND
- ISOLATION PLUG
- OPT. OPTIONAL ITEMS

THOMSON TECHNOLOGY INC.

1 LINE DIAGRAM & PHYSICAL LAYOUT
AUTOMATIC TRANSFER SWITCH AND 3 BREAKER UTILITY BYPASS SYSTEM

MODEL TSBU 86__-T__ _-_____-_____

_____A, _____V, ____Ø, ____W, ____Hz

PROJECT:

SERIAL NUMBER

CUSTOMER

DATE	DWN	AUTH
96-09-18	SN	NS
DRAWING No.	SHEET	REV
68009201	1/1	2

DRAWINGS SUBJECT TO CHANGE WITHOUT NOTICE.

NOTES

1 - IF SN OPTION IS USED THEN BOTH NEUTRAL BLOCKS MUST BE ELECTRICALLY CONNECTED.

2 - TRANSFER SWITCH BREAKERS ARE MECHANICALLY INTERLOCKED SO THAT ONLY ONE BREAKER IS CLOSED AT A TIME.

3 - BYPASS SWITCH BREAKERS ARE MECHANICALLY INTERLOCKED THROUGH A SLIDE BAR INTERLOCK. BYPASS SWITCH IS OPEN TRANSITION (SEE CHART BELOW).

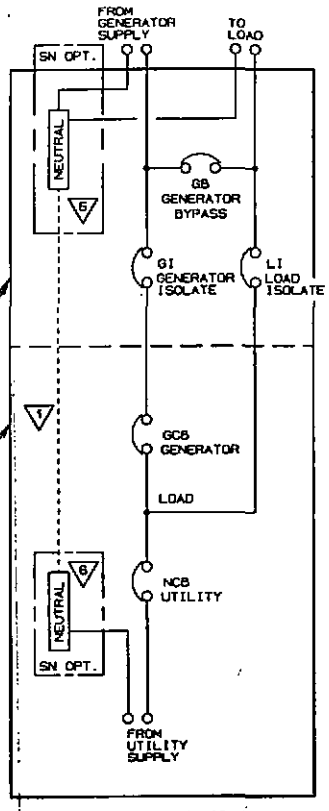
4 - FOR TRANSFER SWITCH OPTIONS SEE DRAWINGS 68008601 or 68008701 68008801.

5 - TRANSFER SWITCH BUILT IN CONFIGURATION "XL".

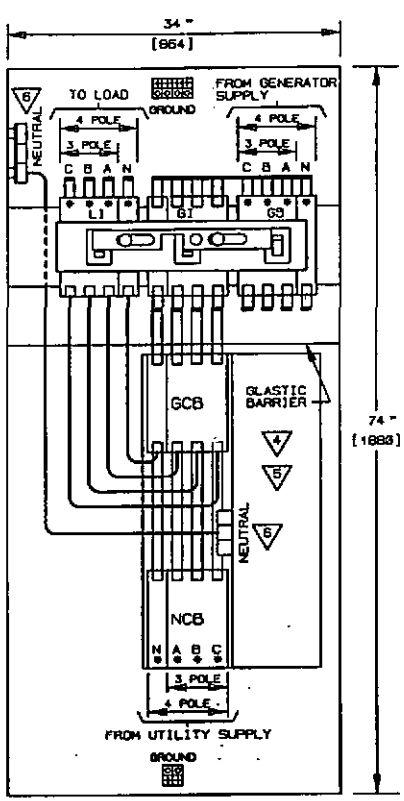
6 - NEUTRALS PRESENT ONLY ON 3 POLE VERSIONS.

BREAKER	BYPASS POSITION	NORMAL POSITION
GI		X
LI		X
GB	X	

X = BREAKER CLOSURE ALLOWED

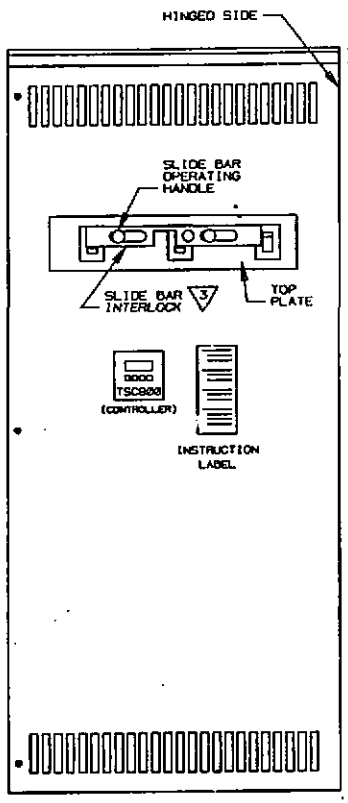


SINGLE LINE DIAGRAM



INTERIOR VIEW

* = CUSTOMER CONNECTION



FRONT VIEW

DEPTH : 12" [305]

COLOUR : ASA #61 GREY

DIMENSIONS IN [ ] = MILLIMETERS

SIDE VIEW

GROUND LUGS: FOR 400A UNITS: 3 x 1C #6-2/0 Al/Cu.
FOR 600A UNITS: 6 x 1C #6-250MCM Al/Cu.

LOAD, UTILITY & GENERATOR LUGS: (INCLUDING NEUTRAL LUGS IF 4 POLE) FOR 400 & 600A UNITS: 1 x 1C 2/0-500MCM Cu or 2C 2/0-350MCM Cu or 2C 4/0-500MCM Al PER POLE.

T STYLE 0-SIDE 400/600A 3 & 4 P.

OPTIONS INCLUDED IN BYPASS SWITCH

ENCLOSURE OPTIONS
- EEMAC 1 ☐
- EEMAC 2 c/w DRIPHOOD & GASKETING ☐

SOLID NEUTRAL ▽ SN ☐

THREE POLE 3P [ALL UNITS] ☐

FOUR POLE 4P [400/600A ONLY] ☐

TRANSFER SWITCH CONFIGURATION
- SL ☐
- SR ☐
- XL ☐
- XR ☐

AS BUILT BY/ AS BUILT DATE	TESTED BY

REFER TO MANUAL FOR CABLE CONNECTION INFORMATION

LEGEND
- ISOLATION PLUG
- OPT. OPTIONAL ITEMS

THOMSON TECHNOLOGY INC.

1 LINE DIAGRAM & PHYSICAL LAYOUT
AUTOMATIC TRANSFER SWITCH AND 3 BREAKER GENERATOR BYPASS SYSTEM

MODEL TSBG ES__-T___-_____-_____ ____A, ____V, ____Ø, ____W, ____Hz

PROJECT:

SERIAL NUMBER

CUSTOMER

DATE	DWN	AUTH
96-09-18	SN	NS
DRAWING No.	SHEET	REV
68009202	1/1	2

DRAWINGS SUBJECT TO CHANGE WITHOUT NOTICE.

NOTES

1 - BYPASS SWITCH BREAKERS ARE MECHANICALLY INTERLOCKED THROUGH A SLIDE BAR INTERLOCK. BYPASS IS CLOSED(OR OPEN) TRANSITION (SEE CHART AT RIGHT).

2 - TRANSFER SWITCH BREAKERS ARE MECHANICALLY INTERLOCKED SO THAT ONLY ONE BREAKER IS CLOSED AT A TIME.

3 - FOR 4 BREAKER UTILITY BYPASS, DELETE GB AND ASSOCIATED CIRCUITS IN BYPASS SWITCH.

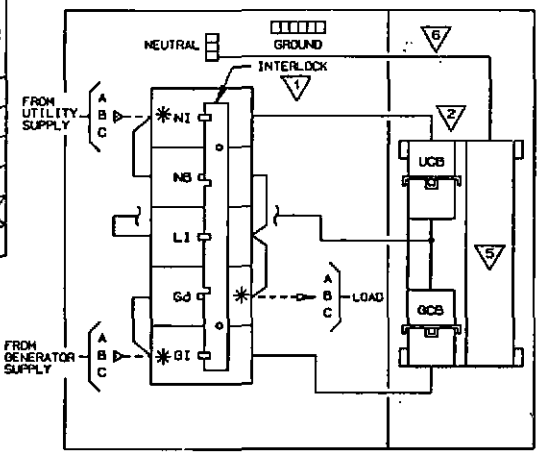
4 - FOR 4 BREAKER GENERATOR BYPASS DELETE NB AND ASSOCIATED CIRCUITS IN BYPASS SWITCH.

5 - FOR TRANSFER SWITCH OPTIONS SEE DRAWINGS 68008601 or 68008701 68008801.

6 -NEUTRAL CONTROL REQUIRED ON 120/208/240V 3 POLE MODELS SEE DRAWING 68008701.

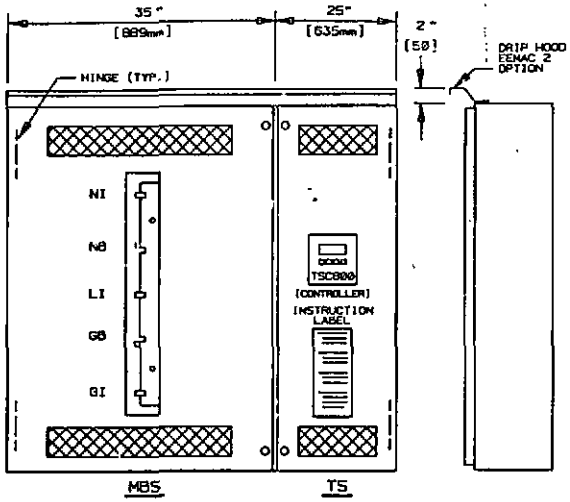
BREAKER	INTERLOCK POSITION: UTILITY BYPASS	TRANSITION INTERLOCKING 1	2	3	4	GENERATOR BYPASS 5
NI		X	X			
NB	X	X				
LI		X	X	X		
GB				X	X	
GI			X	X		

X = BREAKER CLOSURE ALLOWED



INTERIOR VIEW

* = CUSTOMER CONNECTION



FRONT VIEW

SIDE VIEW

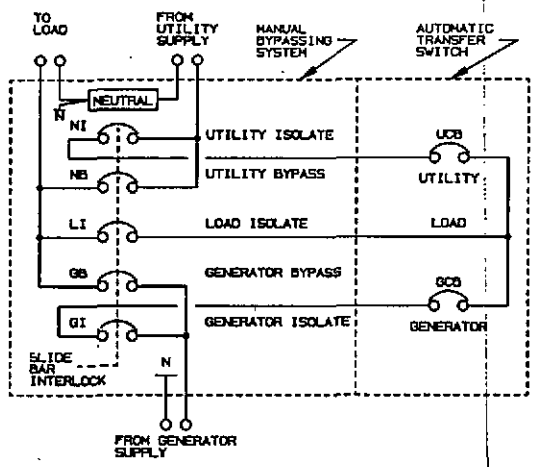
ENCLOSURE DATA

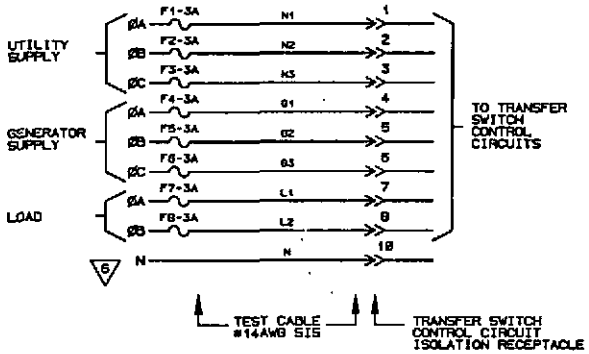
HEIGHT: 66" [1676mm]
WIDTH: 60" [1524mm]
DEPTH: 14" [356mm] (INCLUDING 1" (25.4mm) DOOR)
COLOUR: ASA #61 GREY

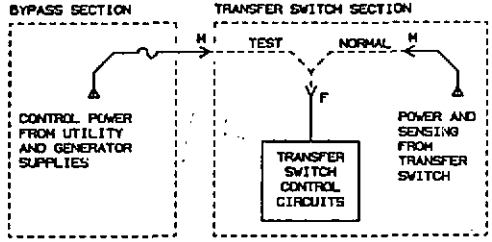
CONNECTION DATA

GROUND LUGS: FOR 400A UNITS: 6 x 1C #6-2/0 Al/Cu
FOR 600A UNITS: 6 x 1C #6-250MCM Al/Cu

NEUTRAL, LOAD, UTILITY AND GENERATOR LUGS: FOR 400 & 600A UNITS: 1 x 1C 2/0-500MCM Cu or 2C 2/0-350MCM Cu or 2C 4/0-500MCM Al PER PHASE.







CAUTION: WHEN THE TEST CABLE IS CONNECTED, THE TRANSFER SWITCH CONTROL CIRCUITS ARE LIVE! ONLY QUALIFIED PERSONNEL SHOULD PERFORM TEST!

T STYLE 400/600A 3 POLE ONLY

OPTIONS INCLUDED IN BYPASS SWITCH

ENCLOSURE OPTIONS
- EEMAC 1 ☐
- EEMAC 2 ☐ c/w DRIPHOOD & GASKETING

SOLID NEUTRAL SN ☐

UTILITY 4 BREAKER BYPASS U4B ▽3 ☐

GENERATOR 4 BREAKER BYPASS G4B ▽4 ☐

THREE POLE 3P ☐

TRANSFER SWITCH CONFIGURATION
- SL ☐
- SR ☐
- XL ☐
- XR ☐

AS BUILT BY/ AS BUILT DATE	TESTED BY

REFER TO MANUAL FOR CABLE CONNECTION INFORMATION

LEGEND
- ⇒ ISOLATION PLUG
- OPT. OPTIONAL ITEMS

THOMSON TECHNOLOGY INC.

1 LINE DIAGRAM & PHYSICAL LAYOUT
AUTOMATIC TRANSFER SWITCH AND 5 BREAKER BYPASS SYSTEM

MODEL TSBD 853-TCJ-_____-_____ _____A, _____V, _____Ø, _____W, _____Hz

PROJECT:

SERIAL NUMBER

CUSTOMER

DATE	DWN	AUTH
96-09-18	SN	NS
DRAWING No.	SHEET	REV
68009206	1/1	3

NOTES

1 - BYPASS SWITCH BREAKERS ARE MECHANICALLY INTERLOCKED THROUGH A SLIDE BAR INTERLOCK. BYPASS IS CLOSED(OR OPEN) . TRANSITION (SEE CHART AT RIGHT).

2 - TRANSFER SWITCH BREAKERS ARE MECHANICALLY INTERLOCKED SO THAT ONLY ONE BREAKER IS CLOSED AT A TIME.

3 - FOR 4 BREAKER UTILITY BYPASS, DELETE GB AND ASSOCIATED CIRCUITS IN BYPASS SWITCH.

4 - FOR 4 BREAKER GENERATOR BYPASS, DELETE NB AND ASSOCIATED CIRCUITS IN BYPASS SWITCH.

5 - FOR TRANSFER SWITCH OPTIONS SEE DRAWINGS 68008601 or 68008701 68008801.

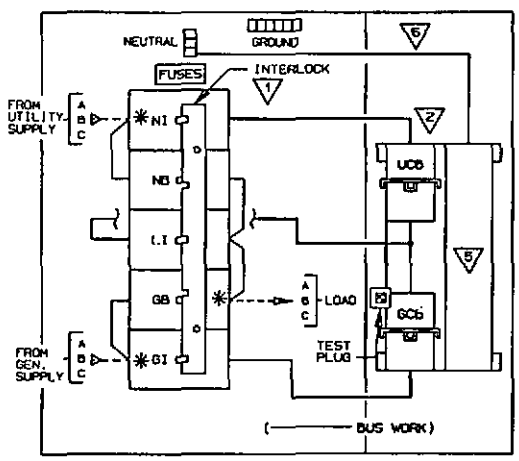
6 - NEUTRAL CONTROL REQUIRED ON 120/208/240V 3 POLE MODELS REFERENCE DRAWING 68008701.

7 - FOR 3 BREAKER UTILITY BYPASS, DELETE GB, GI AND ASSOCIATED CIRCUITS IN BYPASS SWITCH.

8 - FOR 3 BREAKER GENERATOR BYPASS DELETE NB, NI AND ASSOCIATED CIRCUITS IN BYPASS SWITCH.

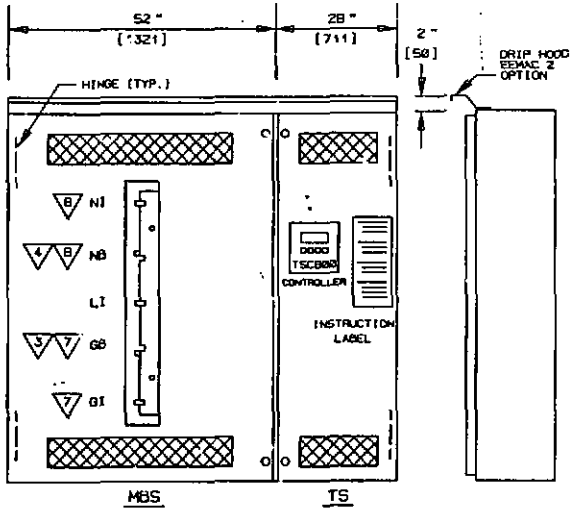
BREAKER	INTERLOCK POSITION: UTILITY BYPASS	TRANSITION INTERLOCKING 1	2	3	4	GENERATOR BYPASS 5
NI		X	X			
NB	X	X				
LI		X	X	X		
GB			X	X	X	
GI			X	X		

X = BREAKER CLOSURE ALLOWED



INTERIOR VIEW

* = CUSTOMER CONNECTION



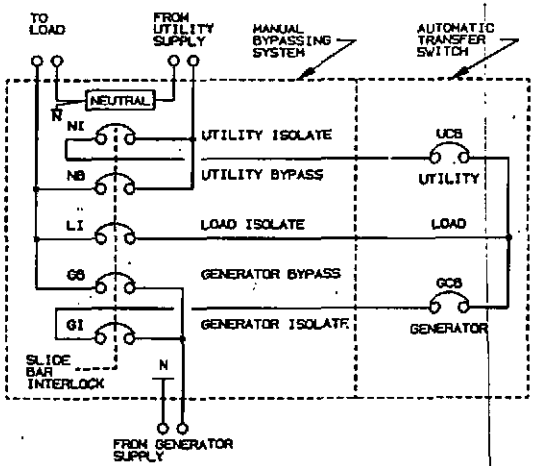
FRONT VIEW SIDE VIEW

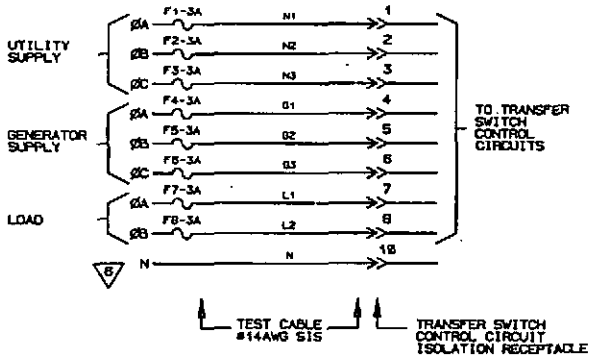
ENCLOSURE DATA

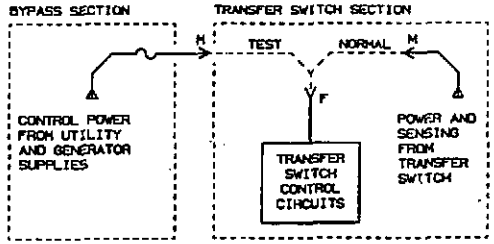
HEIGHT: 74" [1880mm]
WIDTH: 80" [2032mm]
DEPTH: 17" [432mm] [INCLUDING 1" (25.4mm) DOOR]
COLOUR: ASA #61 GREY

CONNECTION DATA

SUPPLY/LOAD: FOR 800A UNITS; 1 - 3C 2/0-400MCM Al/Cu PER PHASE
FOR 1000 & 1200A UNITS; 1 - 4C 3/0-500MCM Al/Cu PER PHASE
NEUTRAL: FOR 800A UNITS; 3 - 3C 2/0-400MCM Al/Cu
FOR 1000 & 1200A UNITS; 3 - 4C 3/0-500MCM Al/Cu
GROUND: 9 - 1C #6-250MCM Al/Cu ALL UNITS







CAUTION: WHEN THE TEST CABLE IS CONNECTED, THE TRANSFER SWITCH CONTROL CIRCUITS ARE LIVE! ONLY QUALIFIED PERSONNEL SHOULD PERFORM TEST!

T STYLE 800A, 1000A, 1200A 3 POLE ONLY

OPTIONS INCLUDED IN BYPASS SWITCH

ENCLOSURE OPTIONS
- NEMA 1 ☐
- NEMA 2 c/w DRIPHOOD & GASKETING ☐

UTILITY 4 BREAKER BYPASS U4B (3) ☐
GENERATOR 4 BREAKER BYPASS G4B (4) ☐
UTILITY 3 BREAKER BYPASS U3B (7) ☐
GENERATOR 3 BREAKER BYPASS G3B (8) ☐
SOLID NEUTRAL SN ☐
THREE POLE 3P ☐

TRANSFER SWITCH CONFIGURATION
- SL ☐
- SR ☐
- XL ☐
- XR ☐

AS BUILT BY/ AS BUILT DATE	TESTED BY

REFER TO MANUAL FOR CABLE CONNECTION INFORMATION

LEGEND
→ ISOLATION PLUG
OPT. OPTIONAL ITEMS

THOMSON TECHNOLOGY INC.

1 LINE DIAGRAM & PHYSICAL LAYOUT
AUTOMATIC TRANSFER SWITCH AND BREAKER BYPASS SYSTEM

MODEL TSB__ 853-TCK-_____-_____ _____A, _____V, ___Ø, ___W, ___Hz

PROJECT:
SERIAL NUMBER
CUSTOMER

DATE	DWN	AUTH
96-03-18	SN	NS
DRAWING No.	SHEET	REV
68009207	1/1	4

DRAWINGS SUBJECT TO CHANGE WITHOUT NOTICE.

NOTES

1 - BYPASS SWITCH BREAKERS ARE MECHANICALLY INTERLOCKED THROUGH A SLIDE BAR INTERLOCK. BYPASS IS CLOSED(OR OPEN) TRANSITION (SEE CHART AT RIGHT).

2 - TRANSFER SWITCH BREAKERS ARE MECHANICALLY INTERLOCKED SO THAT ONLY ONE BREAKER IS CLOSED AT A TIME.

3 - FOR 4 BREAKER UTILITY BYPASS, DELETE GB AND ASSOCIATED CIRCUITS IN BYPASS SWITCH.

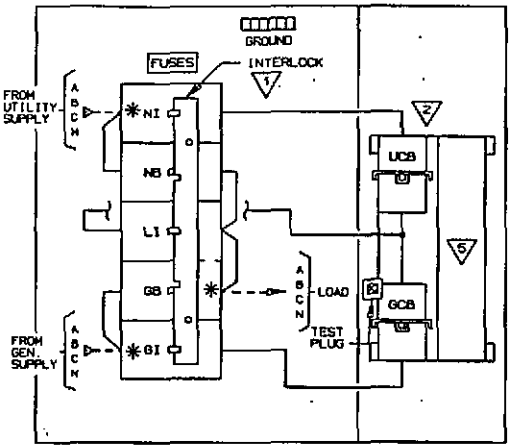
4 - FOR 4 BREAKER GENERATOR BYPASS DELETE NB AND ASSOCIATED CIRCUITS IN BYPASS SWITCH.

5 - FOR TRANSFER SWITCH OPTIONS SEE DRAWINGS 68008601 or 68008701 68008801.

6 - REQUIRED ONLY FOR 120/208V 240V 1Ø. SEE REEFERENCE DRAWING 68008701.

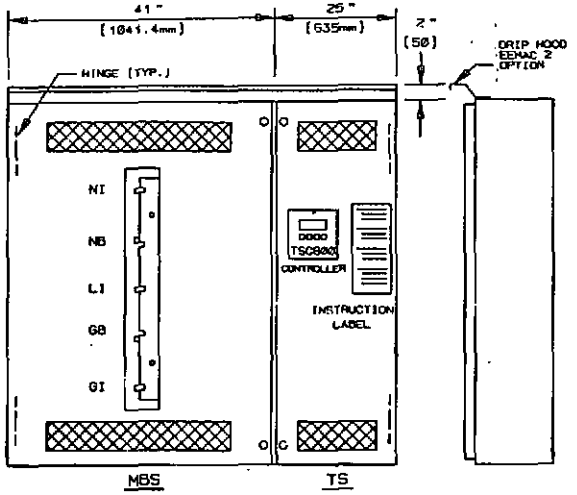
BREAKER	INTERLOCK POSITION				
	UTILITY BYPASS	TRANSITION INTERLOCKING			GENERATOR BYPASS
	1	2	3	4	5
NI		X	X		
NB	X	X			
LI		X	X		
GB				X	X
GI		X	X		

X = BREAKER CLOSURE ALLOWED



INTERIOR VIEW

✱ = CUSTOMER CONNECTION



FRONT VIEW

SIDE VIEW

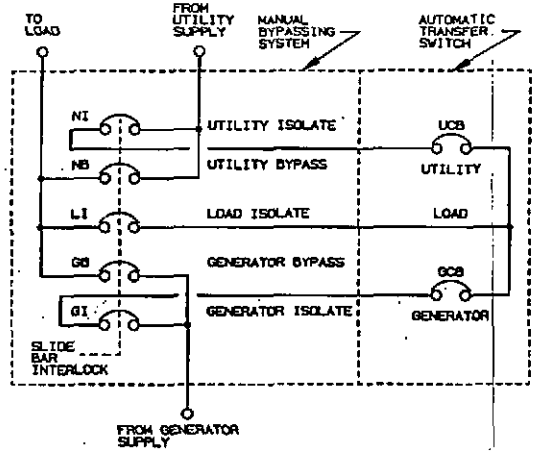
ENCLOSURE DATA

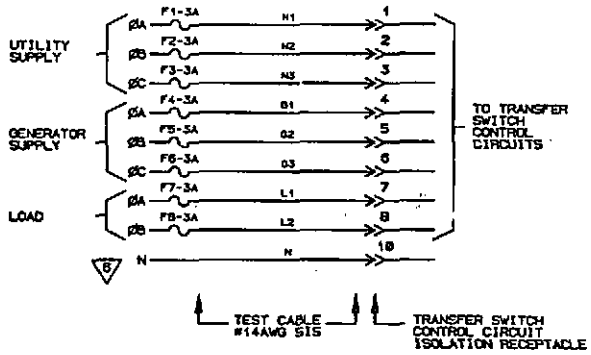
HEIGHT: 76" [1930mm]
WIDTH: 66" [1676mm]
DEPTH: 17" [432mm] (INCLUDING 1" [25.4mm] DOOR)
COLOUR: ASA #61 GREY

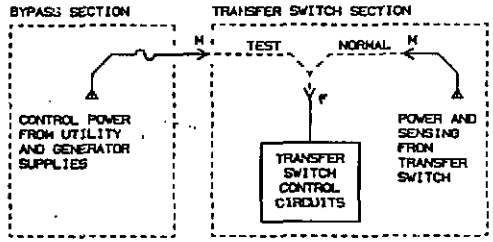
CONNECTION DATA

GROUND LUGS: FOR 400A UNITS; 5 x 1C #6-2/0 Al/Cu
FOR 600A UNITS; 6 x 1C #6-250MCM Al/Cu

LOAD, UTILITY & GENERATOR LUGS: FOR 400 & 600A UNITS; 1 x 1C 2/0-500MCM Cu or 2C 2/0-350MCM Cu or 2C 4/0-500MCM Al PER POLE







CAUTION: WHEN THE TEST CABLE IS CONNECTED, THE TRANSFER SWITCH CONTROL CIRCUITS ARE LIVE! ONLY QUALIFIED PERSONNEL SHOULD PERFORM TEST!

T STYLE 400/600A 4P ONLY

OPTIONS INCLUDED IN BYPASS SWITCH

ENCLOSURE OPTIONS
- EEMAC 1 ☐
- EEMAC 2 c/w DRIPHOOD & GASKETING ☐

FOUR POLE 4P ☒

UTILITY 4 BREAKER BYPASS U4B (3) ☐

GENERATOR 4 BREAKER BYPASS G4B (4) ☐

TRANSFER SWITCH CONFIGURATION
- SL ☐
- SR ☐
- YL ☐
- XR ☐

AS BUILT BY/ AS BUILT DATE	TESTED BY

REFER TO MANUAL FOR CABLE CONNECTION INFORMATION

LEGEND
- ISOLATION PLUG
- OPT. OPTIONAL ITEMS

THOMSON TECHNOLOGY INC.

1 LINE DIAGRAM & PHYSICAL LAYOUT
AUTOMATIC TRANSFER SWITCH AND 5 BREAKER BYPASS SYSTEM

MODEL TSBO 854-T___-_____-_____ ____A, ____V, 3 Ø, ____W, ____Hz

PROJECT:

SERIAL NUMBER

CUSTOMER

DATE	DWN	AUTH
96-05-19	SN	NS

DRAWING No.	SHEET	REV
68009208	1/1	3

DRAWINGS SUBJECT TO CHANGE WITHOUT NOTICE.

NOTES

1 – BYPASS SWITCH BREAKERS ARE MECHANICALLY INTERLOCKED THROUGH A SLIDE BAR INTERLOCK. BYPASS IS CLOSED(OR OPEN) TRANSITION (SEE CHART AT RIGHT).

2 – TRANSFER SWITCH BREAKERS ARE MECHANICALLY INTERLOCKED SO THAT ONLY ONE BREAKER IS CLOSED AT A TIME.

3 – FOR 4 BREAKER UTILITY BYPASS, DELETE GB AND ASSOCIATED CIRCUITS IN BYPASS SWITCH.

4 – FOR 4 BREAKER GENERATOR BYPASS DELETE NB AND ASSOCIATED CIRCUITS IN BYPASS SWITCH.

5 – FOR TRANSFER SWITCH OPTIONS SEE SCHEMATIC DIAGRAM.

6 – NEUTRAL CONTROL REQUIRED ON 120/208/240V 1 OR 3 POLE MODELS.

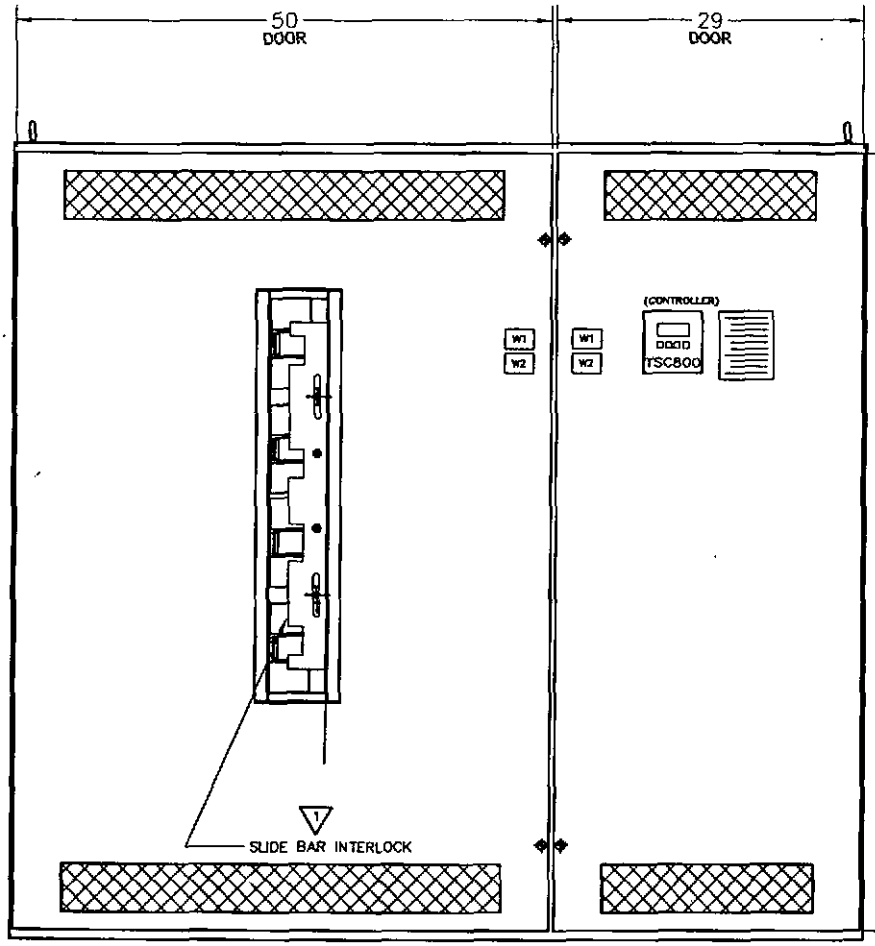
BREAKER	INTERLOCK POSITION: UTILITY BYPASS	TRANSITION INTERLOCKING 1	2	3	4
NI			X	X	
NB		X	X		
LI			X	X	X
GI				X	X

X – BREAKER CLOSURE ALLOWED

CONNECTION DATA

SUPPLY/LOAD: FOR 800A UNITS:
1 – 3C 2/0–400MCM Al/Cu PER PHASE / NEUTRAL

GROUND: FOR 800A UNITS:
9C #6–250MCM Al/Cu



FRONT VIEW

FOIL LABEL (TYPICAL)
SILVER LETTERS ON RED BACKGROUND

W1

WARNING
MORE THAN ONE LIVE CIRCUIT SEE DIAGRAM

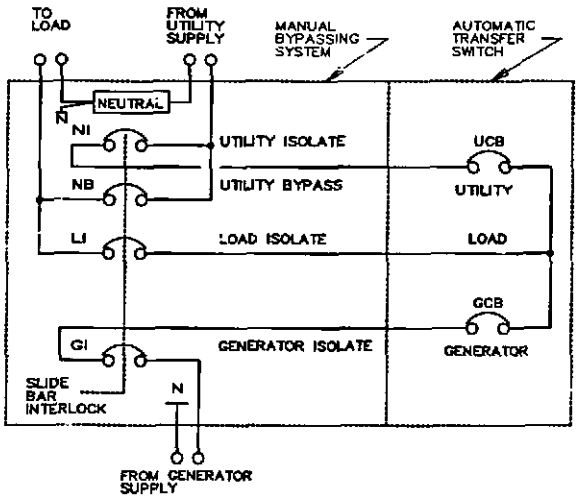
AVERTISSEMENT
PLUS D'UN CIRCUIT SOUS TENSION VOIR SCHEMA

W2

WARNING
DISCONNECT ALL SOURCES OF SUPPLY BEFORE SERVICING

AVERTISSEMENT
COUPER TOUTES LES SOURCES D'ALIMENTATION AVANT DE FAIRE L'ENTRETIEN ET LES REPARATIONS

STAND



6

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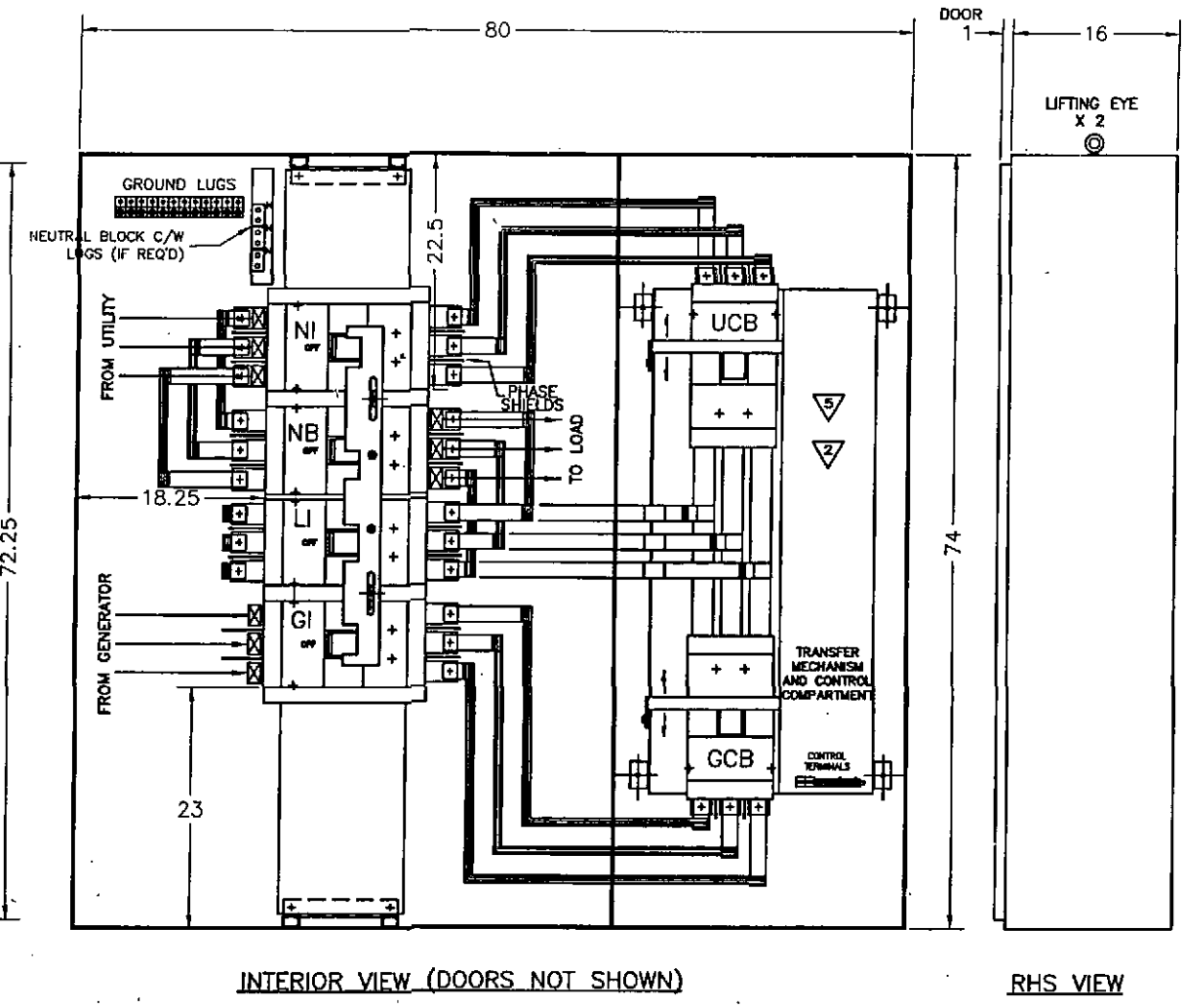
☐ MULTIPLE UNIT WORK ORDER
☐ RELEASED FOR INFORMATION
AUTH. BY: _____ DATE: _____

DRAWING No.	REFERENCE DRAWINGS	No.	REVISIONS



INTERIOR VIEW (DOORS NOT SHOWN)

RHS VIEW

ENCLOSURE TYPE

- [x] NEMA 1
- [ ] NEMA 2 C/W DRIPHOOD

COLOUR: ASA-61 GREY

SIZE (AMPS)

- [x] 800A
- [ ] 1000A
- [ ] 1200A

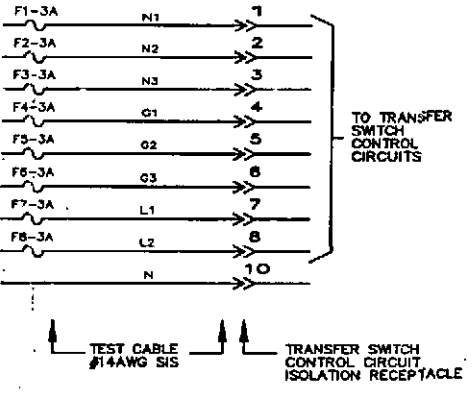
- [x] 3 POLE ONLY
- [x] SOLID NEUTRAL

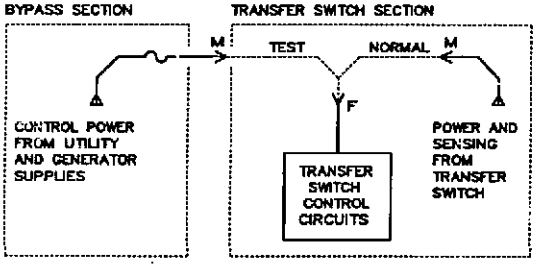
- [x] ▽3 UTILITY 4 BREAKERS BYPASS
- [ ] ▽4 GENERATOR 4 BREAKERS BYPASS

TRANSFER SWITCH CONFIGURATION

- [x] -SL
- [ ] -SR
- [ ] -XL
- [ ] -XR

ARD 3Ø, 4W "SL" CONFIGURATION SHOWN





CAUTION: WHEN THE TEST CABLE IS CONNECTED, THE TRANSFER SWITCH CONTROL CIRCUITS ARE LIVE!
ONLY QUALIFIED PERSONNEL SHOULD PERFORM TEST!

SPECIAL REQUIREMENTS:

BY	AUTH	DATE

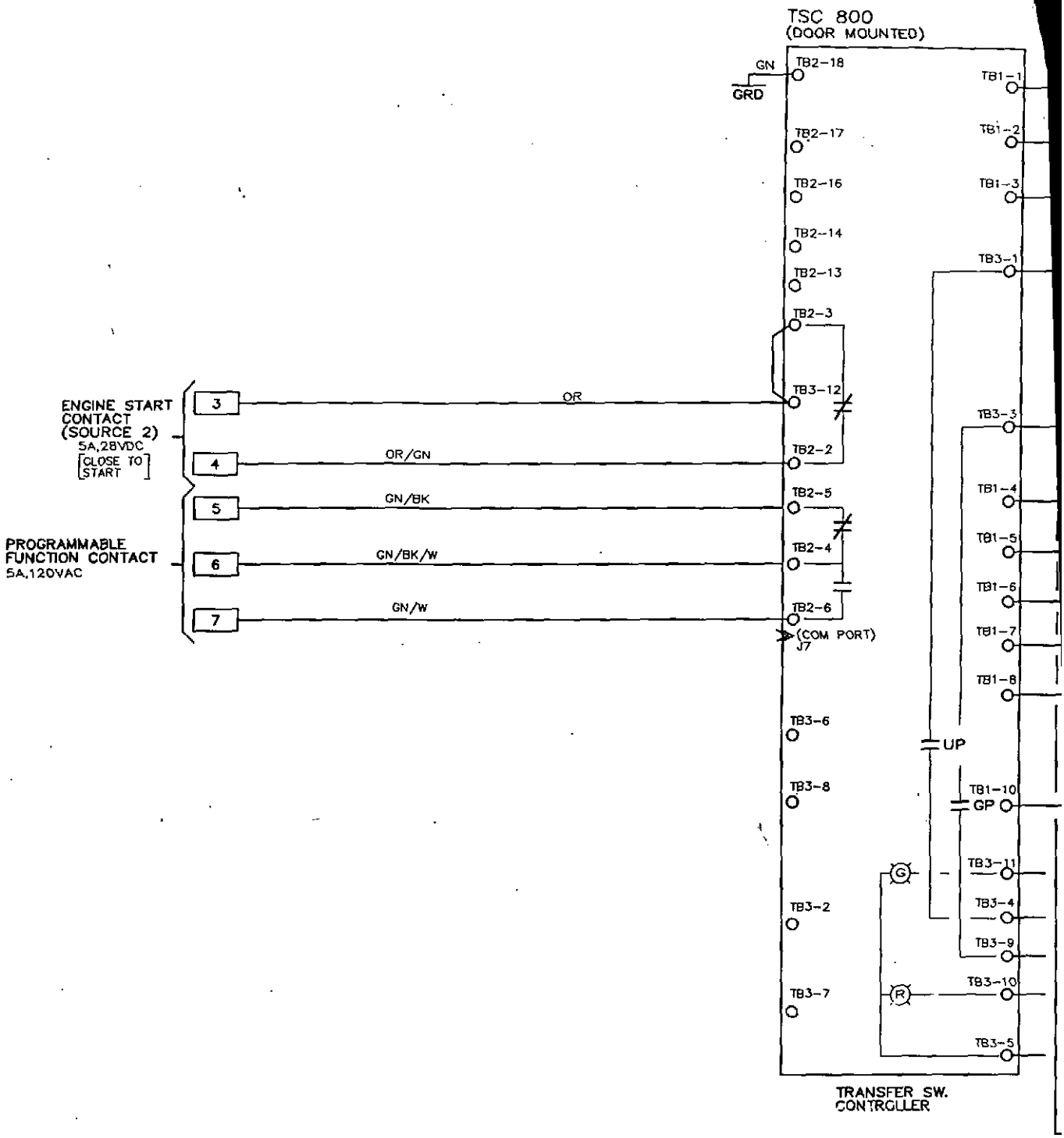
THOMSON TECHNOLOGY INC.

ATS & 4 BREAKER BYPASS SYSTEM
MODEL TSBU-850
1-LINE DIAGRAM, LAYOUT & INSTALLATION DETAILS
800, 1000, 1200A

CUSTOMER

DWN BY	AUTH BY	DATE	REV
SH	BD	00-09-11	0

DRAWING No. ELB14444_01_01_01 SHEET 1/2



☐ APPROVED FOR CONSTRUCTION
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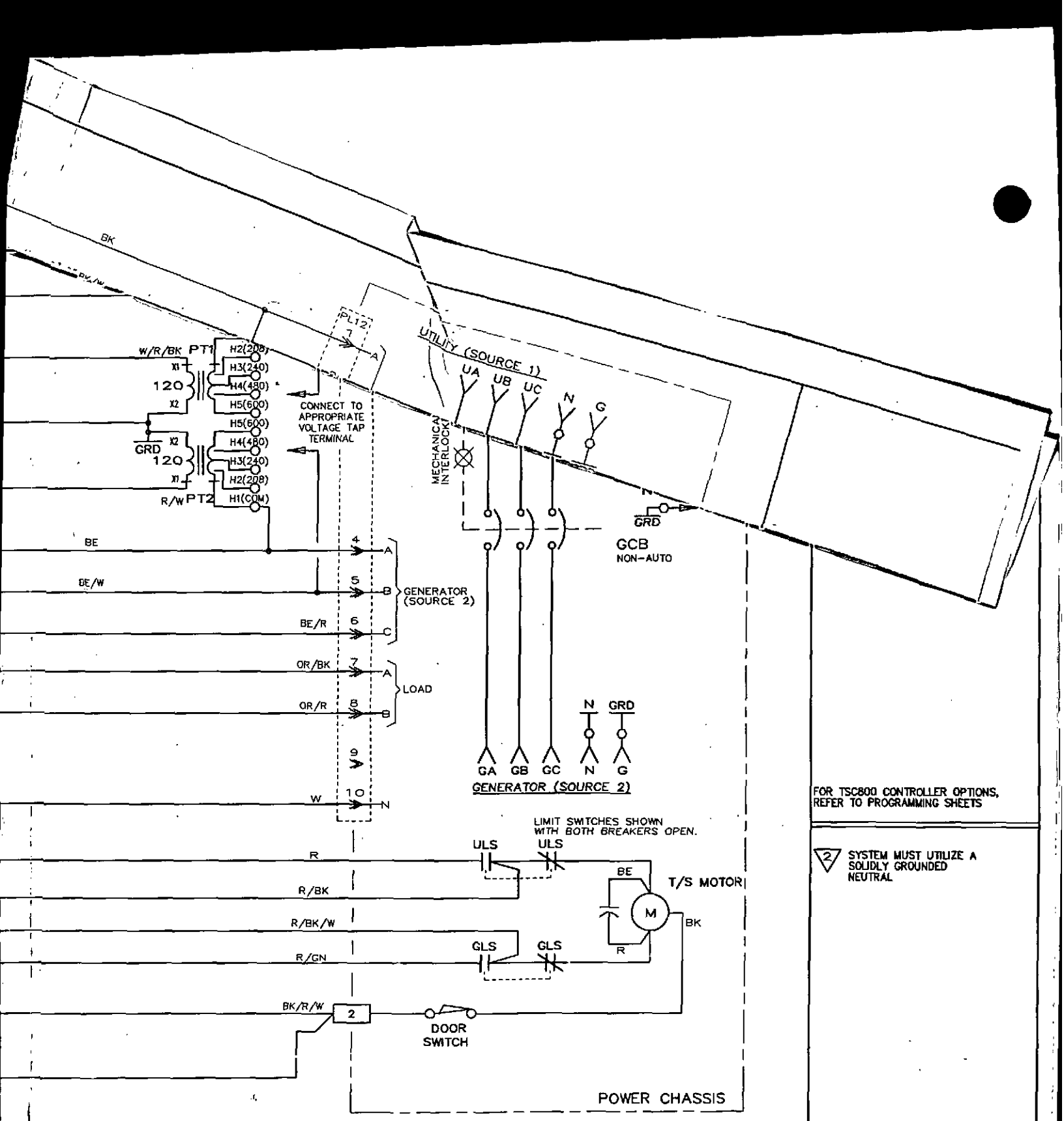
☐ MULTIPLE UNIT WORK ORDER
☐ RELEASED FOR INFORMATION
AUTH. BY: _____ DATE: _____



FOR TSC800 CONTROLLER OPTIONS, REFER TO PROGRAMMING SHEETS

2 SYSTEM MUST UTILIZE A SOLIDLY GROUNDED NEUTRAL

COLOUR KEY	
BLACK	BK
BLUE	BE
BROWN	BN
GREEN	GN
GREY	GY
ORANGE	OR
PURPLE	PE
RED	R
WHITE	W
YELLOW	Y
SOLID/TRACER(S)	

THOMSON® TECHNOLOGY INC.

SCHEMATIC DIAGRAM
AUTOMATIC TRANSFER SWITCH
MODEL TS 853-TCK-800A-208

800A 208V 3φ 4W 60Hz

CUSTOMER

DWN BY	AUTH BY	DATE	REV
SH	BD	00-09-11	0

DRAWING No. ELB14444 01 01 02

SHEET 2/2

FOIL LABEL
BLACK LETTERS ON
SILVER BACKGROUND

SERVICE DISCONNECT INSTRUCTIONS

TO DISCONNECT UTILITY AND GENERATOR SUPPLIES:

*MOVE SERVICE DISCONNECT SWITCH TO THE "DISCONNECTED" POSITION

*LOCK OFF SERVICE DISCONNECT SWITCH WITH SUITABLE PADLOCK

*VERIFY LOAD IS DISCONNECTED VIA ILLUMINATED "SERVICE DISCONNECTED" LIGHT. IF LIGHT IS NOT ILLUMINATED, REFER TO INSTRUCTION MANUAL

*LOCK ENCLOSURE DOOR CLOSED AND REMOVE KEY.

TO RE-ENERGIZE TRANSFER SWITCH:

*REMOVE APPLICABLE PADLOCKS AND MOVE SERVICE DISCONNECT SWITCH BACK TO THE "ENERGIZED" POSITION

*REPLACE ENCLOSURE DOOR KEY IF FUTURE ACCESS REQUIRED.

*RESET TSC800 CONTROLLER IF DISPLAYING 'TRANSFER FAILURE'.

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☐ MULTIPLE UNIT WORK ORDER
☐ RELEASED FOR INFORMATION
AUTH. BY: _____ DATE: _____

DRAWING No.	REFERENCE DRAWINGS	No.	REVISIONS
		2	CHANGE TO 3 PHASE
		1	AS BUILT

P2

W3

WARNING

TO ENSURE SAFETY OF PERSONNEL, DOOR MUST BE LOCKED CLOSED WHEN USING THE "SERVICE DISCONNECT" SWITCH TO ISOLATE LOAD CIRCUITS.

FASTEN DOOR SECURELY WITH SCRWS BEFORE LOCKING

2X3/4 (TYPICAL)
WHITE LETTERS ON
BLACK BACKGROUND

S1

SERVICE DISCONNECT

ENERGIZED DISCONNECTED

QTY = 1

L1

SERVICE DISCONNECTED

QTY = 1

BY	AUTH	DATE
SH	BD	00-10-02
SH	BD	00-06-07

THOMSON® TECHNOLOGY INC.

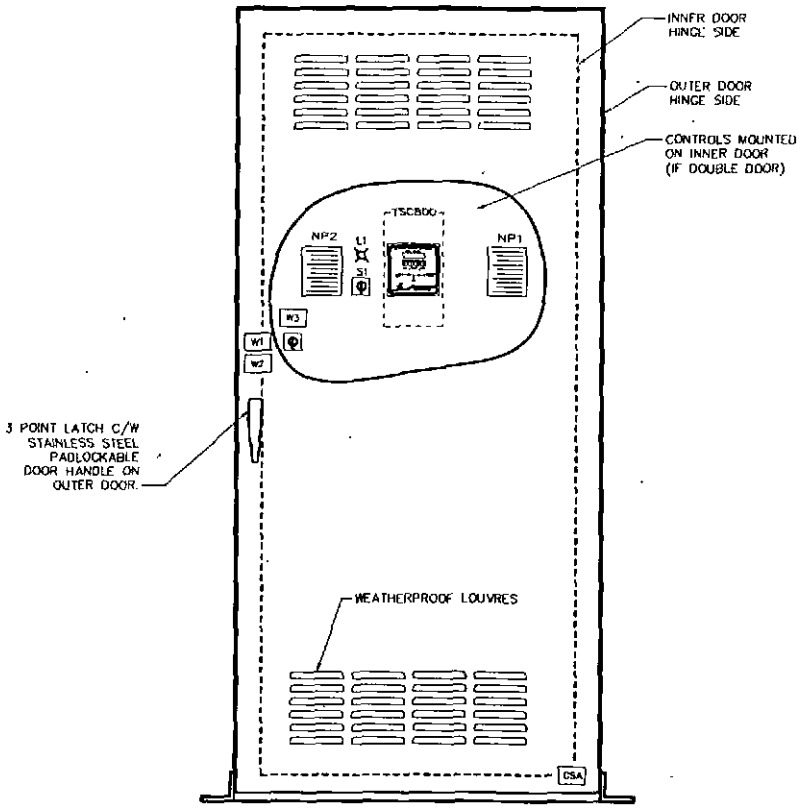
LABEL DETAILS
SERVICE ENTRANCE
TRANSFER SWITCH

CUSTOMER

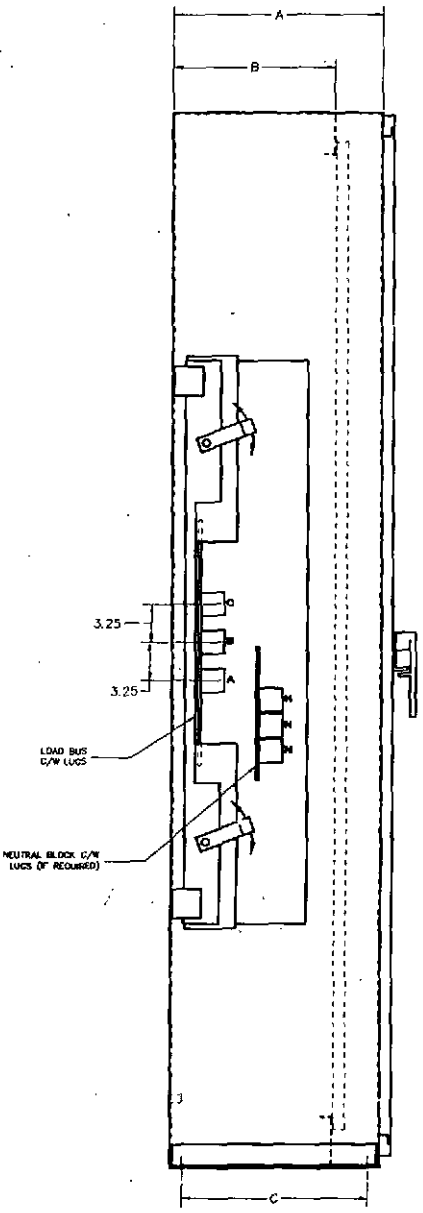
DWN BY	AUTH BY	DATE	REV
SH	BD	00-04-26	2

DRAWING No. ELB13985_01_01

SHEET 2/3



FRONT VIEW (TYPICAL)



LEFT SIDE VIEW

GROUND LUGS: FOR 800A UNITS:
9C #6–250MCM Al/Cu.

FOR 1000 & 1200A UNITS:
12C #6–250MCM Al/Cu.

LOAD, UTILITY & GENERATOR LUGS: FOR 800A UNITS:
1–3C 2/0–400MCM Al/Cu.
PER PHASE / NEUTRAL

FOR 1000 & 1200A UNITS:
1–4C 3/0–500MCM Al/Cu.
PER PHASE / NEUTRAL

FOIL LABEL (TYPICAL)
SILVER LETTERS ON RED BACKGROUND

W1

WARNING
MORE THAN ONE LIVE CIRCUIT SEE DIAGRAM

AVERTISSEMENT
PLUS D'UN CIRCUIT SOUS TENSION VOIR SCHEMA

W2

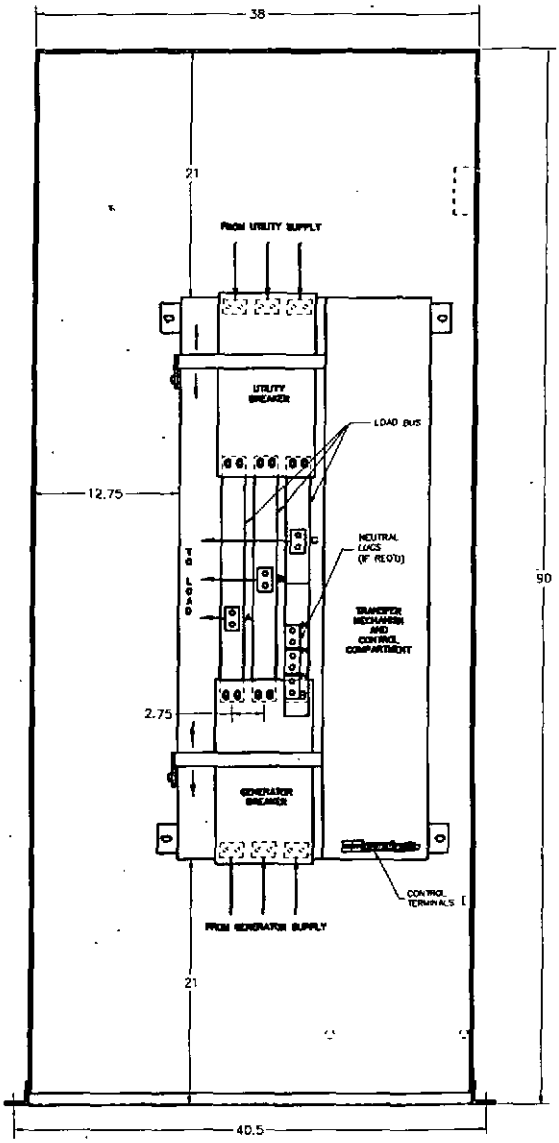
WARNING
DISCONNECT ALL SOURCES OF SUPPLY BEFORE SERVICING

AVERTISSEMENT
COUPER TOUTES LES SOURCES D'ALIMENTATION AVANT DE FAIRE L'ENTRETIEN ET LES REPARATIONS

MATERIAL: 12GA. C.R.S. or H.R. P & O EXCEPT AS SPECIFIED.
CONSTRUCTION: FULLY WELDED, NEMA 3R, WEATHERPROOF.
FINISH: PAINTED EXTERIOR ENAMEL, ASA #61 GREY.

☐ APPROVED FOR CONSTRUCTION
☐ MASTER COPY ☐ REFERENCE COPY ____ OF ____
☐ MULTIPLE UNIT WORK ORDER
☐ RELEASED FOR INFORMATION
AUTH. BY: _____ DATE: _____

DRAWING No.	REFERENCE DRAWINGS	No	REVISIONS
		2	CHANGE TO 3 PHASE
		1	AS BUILT



FRONT VIEW

DOOR NOT SHOWN

ENCLOSURE TYPE

- ☐ NEMA 3R (SINGLE DOOR)
- ☒ NEMA 3R (DOUBLE DOOR)

SIZE (AMPS)

- ☐ 400A (S.E. ONLY)
- ☐ 600A (S.E. ONLY)
- ☒ 800A
- ☐ 1000A
- ☐ 1200A

- ☒ 3 POLE
- ☐ 4 POLE
- ☒ SOLID NEUTRAL

TRANSFER SWITCH CONFIGURATION

- ☒ -SL
- ☐ -SR
- ☐ -XL
- ☐ -XR

DIMENSION	SINGLE DOOR	DOUBLE DOOR
A	14"	18"
B	N/A	14"
C	12"	16"

NOTE: STANDARD "SL" CONFIGURATION SHOWN;
UTILITY SUPPLY ON TOP, LOAD OUT LEFT;
3Ø/4W SYSTEM WITH SOLIDLY GROUNDED NEUTRAL

SPECIAL REQUIREMENTS:

BY	AUTH	DATE
SH	BD	00-10-02
SH	BD	00-06-07

THOMSON TECHNOLOGY INC.

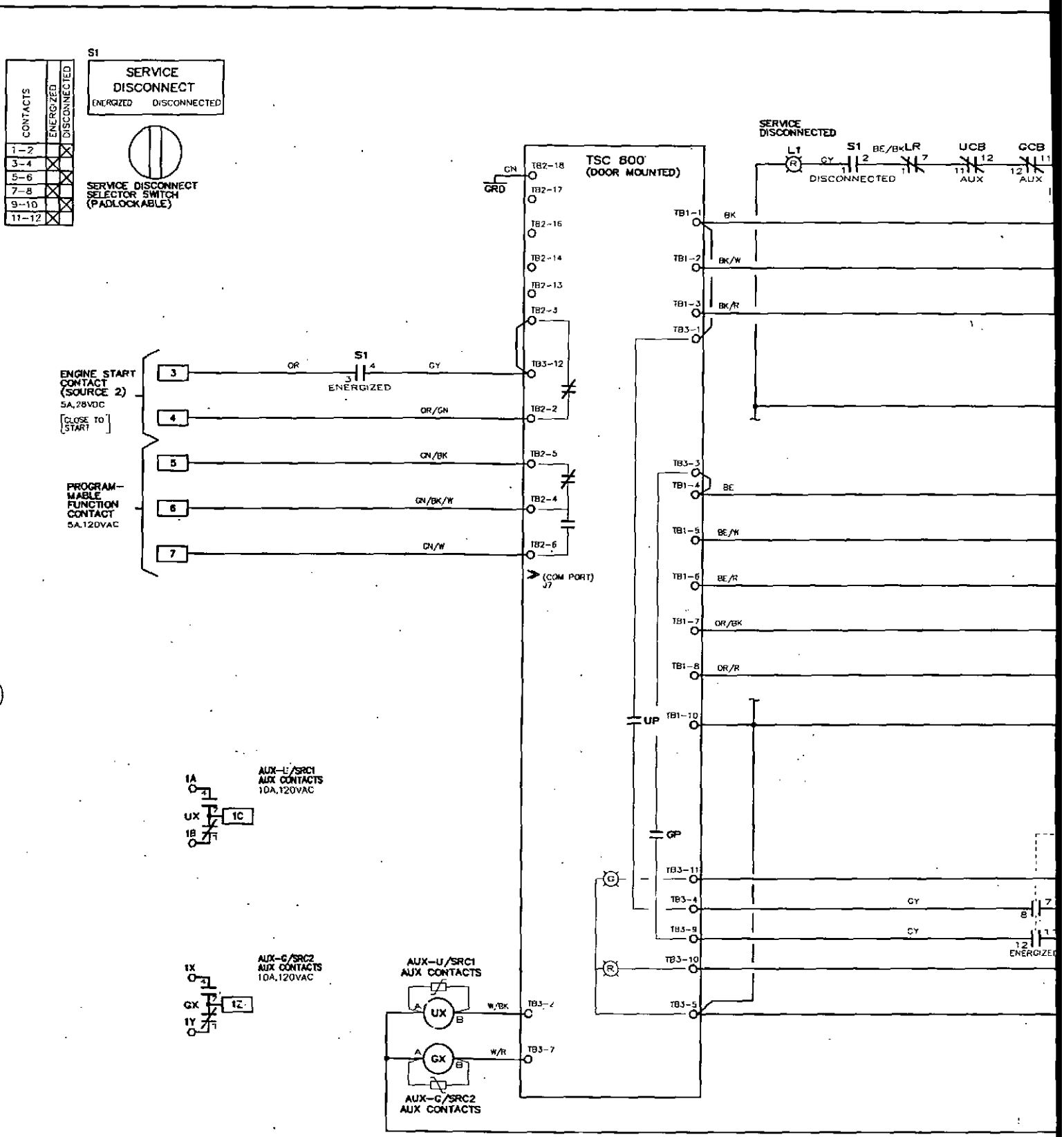
AUTOMATIC TRANSFER SWITCH
MODEL TS 850T
PHYSICAL LAYOUT AND INSTALLATION DETAILS

CUSTOMER

DWN BY	AUTH BY	DATE	REV
SH	BD	00-04-26	2

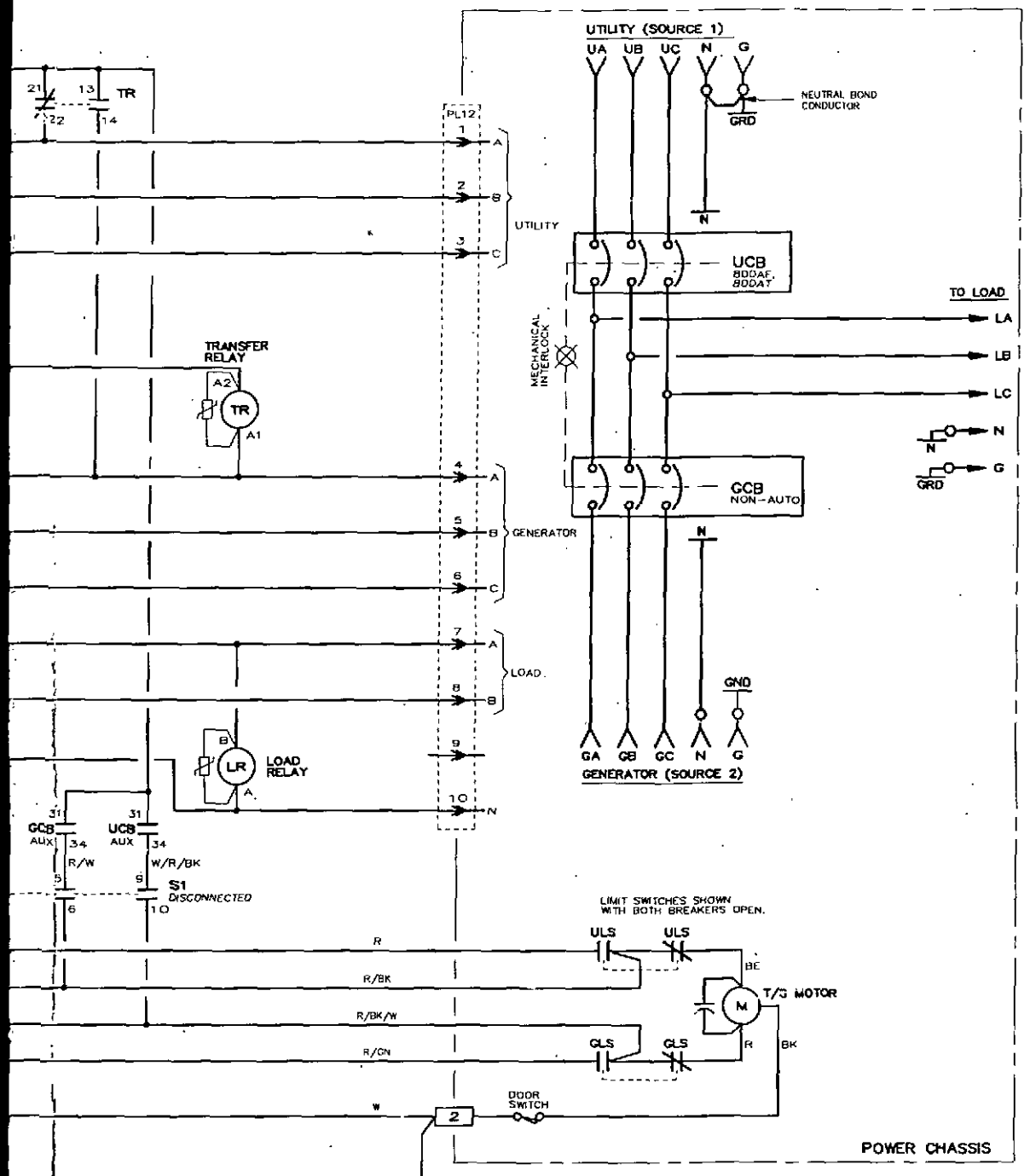
DRAWING No. ELB13985_01_01

SHEET 1/3



☐ APPROVED FOR CONSTRUCTION
☐ MASTER COPY ☐ REFERENCE COPY ____ OF ____
☐ MULTIPLE UNIT WORK ORDER
☐ RELEASED FOR INFORMATION
AUTH. BY: _____ DATE: _____

DRAWING No.	REFERENCE DRAWINGS	No.	REVISIONS
		2	CHANGE TO 3 PHASE
		1	AS BUILT



Trip units are fixed unless specified

FOR TSC800 CONTROLLER OPTIONS, REFER TO PROGRAMMING SHEETS

1 SYSTEM MUST UTILIZE A SOLIDLY GROUNDED NEUTRAL

4 HIGH POLARITY MARKER

PT TAP	VOLTAGE				
	208	240	400	480	600
H1	X	X		X	X
H2	X	X	X		
H3		X			
H4				X	
H5			X		X

COLOUR KEY	
BLACK	BK
BLUE	BE
BROWN	BN
GREEN	GN
GREY	GY
ORANGE	OR
PURPLE	PE
RED	R
WHITE	W
YELLOW	Y
SOLID/TRACER(S)	

BY	AUTH	DATE
SH	BD	00-10-02
SH	BD	00-06-07

THOMSON TECHNOLOGY INC.

SCHEMATIC DIAGRAM
AUTOMATIC TRANSFER SWITCH
MODEL TS 853-TCK-800B-208-SE
800A, 208V, 3ø 4W, 60Hz

CUSTOMER

DWN BY	AUTH BY	DATE	REV
SH	BD	00-04-26	2

DRAWING No. ELB13985_01_01 SHEET 3/3

TS 890

AUTOMATIC TRANSFER SWITCH

INSTALLATION, OPERATING, & SERVICE MANUAL

PM045 Rev 3 00/02/29

19214 - 94th Avenue, Surrey, B.C. Canada V4N 3E3 • Telephone (604) 888-0110
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TABLE OF CONTENTS

1. CAUTION!

Before opening the transfer switch enclosure to perform any service task, or to manually transfer the mechanism, it is imperative to isolate the transfer switch from any possible source of power. Failure to do so may result in serious personal injury or death due to electrical shock.

Service procedures must be undertaken by qualified personnel only!

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

Contact Thomson Technology Inc. for clarification of current revisions or if in doubt about any matter relating to installation, operation or maintenance.
This revision Instruction Manual is intended for TS 890 Transfer Switch products which have been manufactured subsequent to the revision date. For products manufactured previous to this date contact Thomson Technology to obtain applicable manuals.

2. NOTE TO INSTALLER

To ensure satisfactory installation of this equipment be sure to observe "Recommended Connection Tightness" and "Requirements for Upstream Circuit Protective Devices" located in this manual.

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.
If the transfer switch has programmable multi-tap voltage capability (refer to electrical schematic), confirm the transfer switch has been configured for the 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 electrical schematics attached to each transfer switch. The factory default settings will be indicated on the calibration label attached on the

inside of the enclosure door (supplied loose on open style models). 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 configuration the following must be accomplished:

- Change voltage taps of PT's to system voltage (refer to schematics)
- Change TSC 800 programming (refer to sections 6.2.2, 6.2.4, 6.2.5,6.3, and 6.4 of the TSC 800 instruction manual). The following settings may require reprogramming (depending on options purchased):
  - System voltage
  - System frequency
  - System phase
  - Utility undervoltage pickup (typically 90% of system voltage)
  - Utility undervoltage dropout (typically 80% of system voltage)
  - Utility overvoltage pickup (typically 110% of system voltage)
  - Utility overvoltage dropout (typically 105% of system voltage)
  - Utility underfrequency (typically 95% of system frequency)
  - Utility overfrequency (typically 105% of system frequency)
  - Generator undervoltage pickup (typically 90% of system voltage)
  - Generator undervoltage dropout (typically 80% of system voltage)
  - Generator overvoltage pickup (typically 110% of system voltage)
  - Generator overvoltage dropout (typically 105% of system voltage)
  - Generator underfrequency (typically 95% of system frequency)
  - Generator overfrequency (typically 105% of system frequency)

Record any changed setting on the TSC 800 Programming Data Sheets for future reference.

Complete the blank calibration label and attach to the inside of the transfer switch enclosure door.

INSTALLATION OF OPEN TYPE TRANSFER SWITCHES - Please refer to the factory for additional information.

3. GENERAL DESCRIPTION

(See **CAUTION!** on Page #1)

The automatic transfer switch employs two moulded-case switching devices which may be:

a) non-automatic circuit interrupters ("type A" transfer switch)
b) automatic circuit interrupters with integral trip units; ("type B" transfer switch)

In this manual, the switching devices will be referred to as "breakers". The breakers are independently operated by motor operated mechanisms within each breaker. The transfer switch provides automatic transfer of an electrical load to a standby power supply in the event of drop or loss of voltage of any or all phases of the primary power supply. Upon restoration of the primary supply, the electrical load is automatically retransferred to the primary power supply (after an adjustable time delay). All necessary control components for automatic transferring are located in the control compartment and on each associated breaker.

The transfer motor utilizes the power from the source to which the electrical load is being transferred. The mechanism provides a positive mechanical interlock to prevent both breakers from being closed at the same time. The mechanism is also designed to leave both breakers "trip free" in the closed position, permitting incorporation of overload and/or short-circuit protection in either or both breakers ("type B"). After tripping, the breaker of a "type B" transfer switch must be manually reset.

Note: For the purpose of this manual, the term UTILITY indicates the primary power, and the term GENERATOR indicates the standby power.

4. GENERAL SEQUENCE OF OPERATION

4.1. TYPE A TRANSFER SWITCH

When utility supply voltage drops below a preset nominal value (70-100% of rated adjustable) on any phase, an engine start delay circuit will be initiated and the transfer to utility supply signal will be removed (i.e. contact opening). Following expiry of the engine start delay period an engine start signal (contact closure) will be given.

Once the engine starts, the transfer switch controller will monitor the generator's output voltage. Once the generator voltage and frequency rises above preset values (70 - 100% nominal adjustable), the transfer to generator supply signal (contact closure) will be given to

the transfer switch mechanism. This will trip open the utility supply breaker and following a neutral time delay period (0 - 10 sec adjustable) will close the generator supply breaker to re-energize the load.

The generator will continue to supply the load until the utility supply has returned and the retransfer sequence is completed as follows: When the utility supply voltage is restored to above the preset values (70 - 100% of rated adjustable) on all phases, a transfer return delay circuit will be initiated. Following expiry of the transfer return timer (0 - 30 min. adjustable), the transfer to generator supply signal will be removed (contact opening). This will trip open the generator supply breaker and following a neutral time delay period (0 - 10 sec adjustable) will close the utility supply breaker to re-energize the load.

An engine cooldown timer circuit will be initiated once the load is transferred from the generator supply. Following expiry of the cooldown delay period (0 - 30 min. adjustable) the engine start signal will be removed (contact opening) to initiate stopping of the generator set.

4.2. TYPE B TRANSFER SWITCH

The general sequence of operation for a type B transfer switch is identical to the type A transfer switch except for the following conditions:

4.2.1. Overcurrent Trip of Utility Transfer Breaker

Should the utility transfer breaker (UCB) contain an overcurrent trip device and it is activated due to an overcurrent condition on the load, the transfer switch logic will issue an engine start signal and will force a transfer to the generator supply (if within normal voltage and frequency limits). The transfer to the generator supply will occur irrespective of the utility supply voltage condition. The generator will remain on load until the UCB "tripped" indicator (on the breaker) is manually reset and the utility supply is within normal limits. **Note**: Type B transfer switches will be supplied with the above logic as standard. Other optional logic configurations may be installed on the transfer switch. Contact the TTI factory for further information.

4.2.2. Overcurrent Trip of Generator Transfer Breaker

Should the generator transfer breaker (GCB) contain an overcurrent trip device and it is activated due to an overcurrent condition on the load, the transfer switch logic will cause a transfer to the utility supply (if within normal voltage and frequency limits). The transfer to the utility supply will occur irrespective of the generator supply voltage condition. The transfer switch will not transfer to the generator supply should a subsequent utility failure occur until the GCB "tripped" indicator (on the breaker) is manually reset and the generator supply is within normal limits. **Note**: Type B transfer switches will be supplied with the above logic as standard. Other optional logic configurations may be installed on the transfer switch. Contact the TTI factory for further information.

4.3. SERVICE ENTRANCE RATED TRANSFER SWITCH

(Note: This applies only to service entrance transfer switches supplied with a Padlockable Disconnect Switch. Contact TTI for other types.)

4.3.1. Normal Operation

Under normal conditions, the load is energized from the utility supply through the closed utility transfer breaker. If the utility power fails, the generator will start and the load will be re-energized via the closed generator transfer breaker.

In the normal operating mode, the Service Disconnect switch shall be in the "energized" position.

4.3.2. SERVICE DISCONNECT PROCEDURE

To perform a service disconnect (i.e. to disconnect the utility and generator supplies), the following procedure is required:

1. Move the "Service Disconnect" control switch located on the door of the transfer switch to the "Disconnected" position.
2. Verify that the "Service Disconnected" pilot light is illuminated. *If the Light is illuminated, the service has been successfully disconnected and it is safe to perform any maintenance procedures as required*. In this condition, the transfer switch is in the neutral position, with both utility and transfer breakers open. The transfer switch will remain in this condition, regardless of condition of the utility and generator supplies (i.e. if the utility power fails, the generator will not receive a start condition,

nor will the transfer switch move to the generator position). *If the Light is **not** illuminated, further procedures are required (refer to the following procedure #4).*

3. Attach safety lockout padlock to the "Service Disconnect" control switch to prevent unauthorized change in operating condition and verify transfer switch door is locked closed. If the door is not locked, turn and remove door key.

4. If the "Service Disconnected" pilot light is **not** illuminated, the service will **not** have been successfully disconnected and it is therefore **not** safe to perform any maintenance until the following additional procedures are performed:

> ***Warning***
> Qualified personnel must undertake the following procedures **only!** Failure to do so may result in **serious personal injury or death** due to electrical shock.

- Open the door to the transfer switch using a suitable tool and opening the door lock with the key.
- Visually inspect the actual position of the transfer switch mechanism. *If the position of the transfer switch mechanism is clearly in the "neutral position", the service has been successfully disconnected.*

Notes: 1) If the position of the transfer switch mechanism is clearly in the "neutral position, the "service disconnected" pilot light may not have illuminated due to the following reasons:

a) Utility and generator supply voltages are not present (the pilot light requires AC supply voltage to be present).

b) The pilot light may be burnt out. The bulb should be immediately replaced with a suitably rated bulb.

c) Failure of one or more of the sensing/logic contacts. A qualified service technician is required to trouble shoot this specific condition. Unplug the control circuit isolation plug to de-energize all AC power to the control circuits. Note: The AC power conductors will still remain energized. Once the control circuit isolation plug is removed the "Service Disconnected" pilot light will not illuminate due to loss of control power.

Note: to return the transfer switch back to normal operation, the control circuit isolation plug must be reconnected for correct operation.

- The transfer switch door should then be securely closed using a suitable tool and locked in the closed position with the key. Once the transfer switch door has been positively locked closed and secured and only then is, it is safe to perform any maintenance procedures as required.
- *If the position of the transfer switch mechanism is **not** in the "neutral position" further procedures are required (refer to the following procedure)*

> **Warning**
> Failure to positively lock closed and secure the transfer switch door may result in **serious personal injury or death** due to electrical shock.

- If the position of the transfer switch mechanism is **not** in the "neutral position" the transfer switch mechanism must be manually operated as follows. To operate manually, pull the manual release plunger on the mechanism, releasing the motor drive rod from motor drive arm and move the knob and yoke to the marked **"Neutral"** position.

> **Warning**
> Failure to move the mechanism to the Neutral Position may result in **serious personal injury or death** due to electrical shock.

The transfer switch door should then be securely closed using a suitable tool and locked in the closed position with the key. Once the Transfer switch door has been positively locked closed and secured and only then is, it is safe to perform any maintenance procedures as required.

> **Warning**
> Failure to positively lock closed and secure the transfer switch door may result in **serious personal injury or death** due to electrical shock.

To re-energize the load, the padlock(s) should be removed from the "Service Disconnect" control switch, and move the switch to the "Energized" position. The transfer switch will immediately return to the utility or generator supply if within normal operating limits.

5. TYPE A AND TYPE B DEFINITION

"Type A" transfer switch means an automatic transfer switch that does not employ integral overcurrent devices.

"Type B" transfer switch means an automatic transfer switch that does employ integral overcurrent protection (in at least one of its two breakers).

"Type A" transfer switches are not equipped with trip units, and require properly coordinated upstream protection. Information on closing and withstand ratings, and recommendations for maximum upstream protective devices for "type A" units are in this manual. (Some "type A" models do employ "high-magnetic" trips in the breakers, however these are set to trip at a higher than normal current for that amperage circuit, so that the possibility of tripping is very remote. Since these trips are not intended to provide overcurrent protection, but are rather employed to ensure the integrity of the transfer switch under all circumstances, they are still classed as "type A").

"Type B" transfer switches are typically equipped with standard thermal-magnetic trips which will provide the required overload and short circuit protection. "Type B" can also be built using solid state trip breakers, which can include ground fault tripping as well as overload and short circuit protection.

It should be noted that a "type B" transfer switch with overcurrent protection in only one breaker will require the same consideration for upstream protection in the feeder of the breaker with no trip (as applies to a "type A" transfer switch).

6. GENERAL NOTES ON SERVICING

(See **CAUTION!** on Page #1)

When performing any service work it is imperative that the following be observed:

6.1. To maintain mechanical integrity, ensure that:

- All linkages are correctly adjusted.
- Mechanical interlocking is correct - it should not be possible to close a breaker without first opening the other breaker.
- All fasteners are adequately tightened.
- The operating linkages are not damaged or bent, and that all bearing points operate freely.

6.2. To maintain electrical integrity, ensure that:

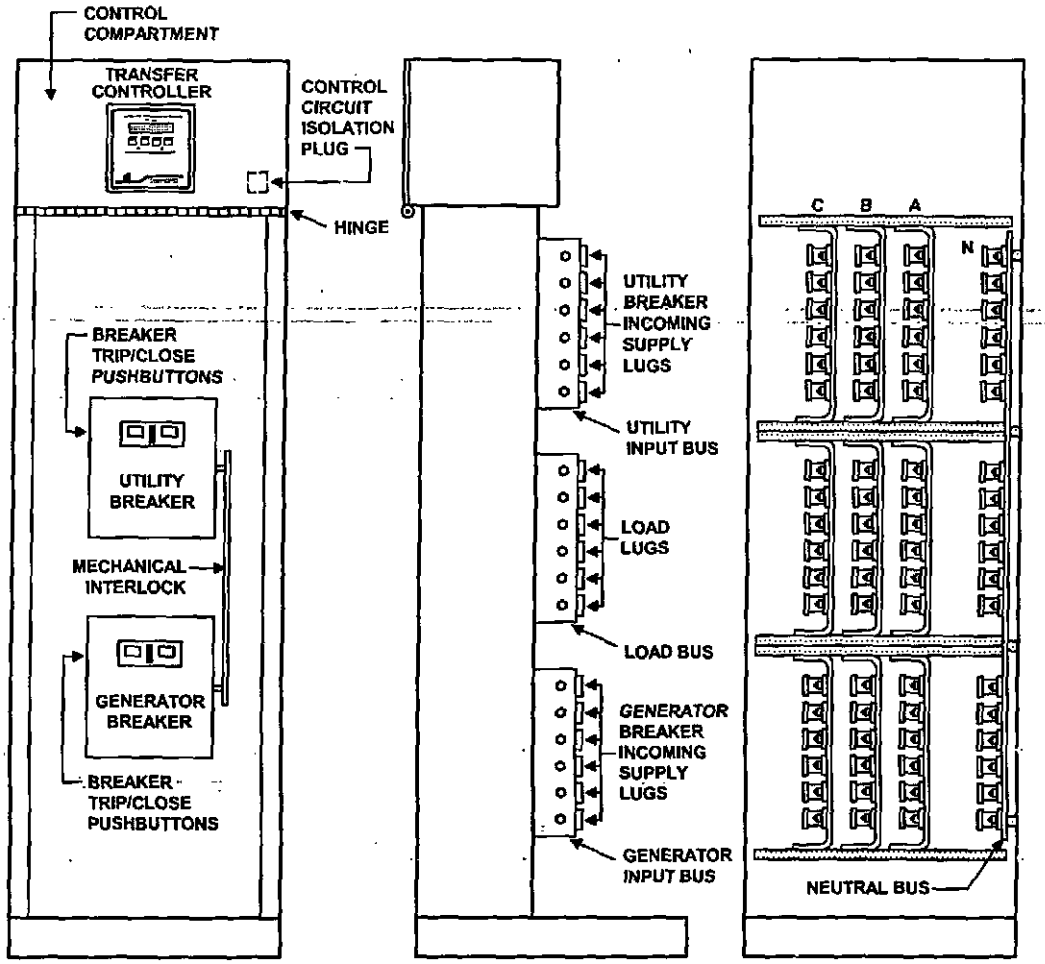
- All electrical connections, especially power connections, are clean and adequately tightened. Corroded or loose power connections will cause destructive heating, and may cause premature tripping in the type "B" units.
- All insulating devices are in place and in good condition.
- No moisture or other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

6.3. To maintain operational integrity, ensure that:

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

Service work should be undertaken only by qualified personnel. Failure to correctly maintain an automatic transfer switch may represent 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.

7. TRANSFER SWITCH MECHANISM DRAWING



8. TS 890 TRANSFER MECHANISM - 800 THROUGH 3200 AMP

The transfer mechanism consists of two electrically operated breakers and a mechanical interlock.

The transfer switch mechanism has three possible positions:

a) The utility breaker closed and the generator breaker open;
b) The generator breaker closed and the utility breaker open;
c) Both the utility and the generator breakers open, but **NEVER** both the utility and generator breakers closed at the same time.

8.1. MANUAL OPERATION

(See **CAUTION!** on Page#1)

Isolate the transfer switch from both sources of power before opening the enclosure for manual switching!

9. TRANSFER MODE SELECTOR

This is a two position selector switch that selects the required mode of operation of the transfer switch as described below.

9.1. **AUTO:** This selects automatic operation of the transfer switch. The transfer breakers will automatically open/close as detailed in the sequence of operation.

9.2. **MAN:** This position inhibits automatic operation. The transfer switch breakers must be manually operated via pushbuttons located on the face of the circuit breakers to open/close them as required.

To transfer manually to generator - turn the transfer mode selector to MANUAL, trip T/S utility breaker, close T/S generator breaker, using breaker trip/close pushbuttons.

To transfer manually to utility - trip T/S generator breaker, close T/S utility breaker using breaker trip/close pushbuttons.

10. RECOMMENDED MAINTENANCE

(See **CAUTION!** on Page # 1)

10.1. DO NOT perform dielectric tests on the equipment with the control components in the circuit.

10.2. Check if control components are tight in sockets.

10.3. 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.

10.4. Transfer switches should be in clean, dry and moderately warm locations. 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 the breaker or terminals.

10.5. Test the transfer switch operation. While the unit is exercising, check for freedom of movement, hidden dirt or corrosion and any excessive wear on the mechanical operating parts.

10.6. Check all adjustable control components (time delay and voltage sensing relays) for correct settings.

11. TROUBLESHOOTING

(See **CAUTION!** on Page #1)

Symptom	Possible Causes
- will not re-transfer to utility source upon restoration	- control wiring isolation plug is removed - a test mode has been activated (check TSC 800 status LCD display) - transfer mode selector is not in "auto" position - utility voltage or frequency is outside the pre-programmed limits (check utility source for adequate voltage & frequency) - a loose control connection - faulty circuit breaker (refer to Circuit Breaker Troubleshooting) - defective TSC 800 controller (verify output signals with circuit board mounted diagnostic LED's)
- will not transfer to generator source upon failure of utility source	- control wiring isolation plug is removed - generator set not producing enough voltage/frequency or output circuit breaker open - warmup time delay function has not timed out yet (verify TSC 800 timer setting) - transfer mode selector is not in "auto" position - a loose control connection - faulty circuit breaker (refer to Circuit Breaker Troubleshooting) - defective TSC 800 controller (verify output signals with circuit board mounted diagnostic LED's)
- transfer to generator source without a power failure in the utility source	- a test mode has been activated (check TSC 800 status LCD display) - defective TSC 800 controller (verify output signals with circuit board mounted diagnostic LED's)
- generator does not start up or stop when it should	- verify remote engine control panel is set for automatic mode
- no time delay when there should be	- verify time delay function in the TSC 800 program setting as per programming sheets as supplied with the transfer switch
- power is not available at the load terminals but the utility or generator breaker appears to be closed to a live source	- the breaker's trip unit (Type B style only) has tripped on a fault on the system. Correct the fault, and manually reset the breaker in the transfer switch.

DEFECTIVE COMPONENTS

Return defective components to Thomson Technology Inc. for repair. Be sure to advise model and serial number of the transfer switch.

12. CIRCUIT BREAKER TROUBLESHOOTING

MALFUNCTIONS	PROBABLE CAUSES	CORRECTIVE ACTIONS
The circuit breaker cannot be opened locally.	- Open push-button locked. - Faulty mechanism or main circuits bonded.	- Remove the locking. - Contact TTI Service Department.
The circuit breaker cannot be manually closed.	- Circuit breaker closing on short-circuit.	- Clear the fault. Check circuit breaker condition before putting back into operation.
	- Fault trip indicator-button not reset . (Type B T/S's)	- Reset fault trip indicator-button.
	- Circuit breaker not fully connected. (drawout type only)	- Connect circuit breaker fully.
	- Anti-pumping function.	- Cut the closing release XF power supply, then resupply the XF.
	- Circuit breaker not charged.	- Check the geared motor power supply (U>0.85 Un). Check the power supply circuit. Attempt a manual recharging. Replace the geared motor if necessary. (Contact TTI Service Dept.)
	- Closing release XF continuously supplied.	- Cut the closing release XF power supply and try again to close the breaker only if it is ready to close.
	- Shunt release MX supplied.	- Locate the causes of this power supply. Cut the MX power supply, then try to close with the XF.
	- Undervoltage release (instantaneous or delayed) not supplied or faulty.	- Supply the MN at U>0.85 Un, then try to close with the XF. If impossible, check with the escutcheon removed, that the MN is drawing properly. If not, replace it.
	- Circuit breaker locked in "open" position.	- Remove the locking.
	- Circuit breaker interlocked.	- Check whether this refusal to close is not normal.
The circuit breaker does not recharge electrically.	- Geared motor supply voltage too low (<0.85 Un).	- Apply a voltage U<0.85 Un. Check the geared motor electrical circuit. Attempt to recharge manually. If problem: mechanism is faulty. Contact TTI Service Dept. If okay: geared motor faulty. Replace it.
It is impossible to insert the racking handle to connect or to disconnect the circuit breaker.	- There is a padlock or a key-lock for connected or disconnected position. There is a racking interlock.	- Remove disabling.
	- The extraction rails or the breaker is not completely pushed in.	- Push the rails or the breaker completely in.

MALFUNCTIONS	PROBABLE CAUSES	CORRECTIVE ACTIONS
It is impossible to extract the right side rail (on chassis alone) or the breaker.	- The racking handle is remained inserted.	- Remove the racking handle and put it in its storage.
	- The breaker is not completely disconnected. - There is a padlock or a key-lock for connected or disconnected position. There is a racking interlock.	- Disconnect the breaker. - Remove disabling.

It is impossible to extract the circuit breaker whenever it is charged.	- There is an extraction locking when breaker is charged.	- Discharge the circuit breaker (open, close then open again the circuit breaker).
		- If the circuit breaker is equipped with MN or MNR or MNRI:
		  - cut the supply of MCH
		  - come back in test position
		  - supply the MN (or if it is impossible, remove the front cover and then release MN).
		  - close the circuit breaker.
		  - draw out the circuit breaker.

It is impossible to rack in the circuit breaker.	- The chassis does not correspond with the circuit breaker. - The plastic ties which hold clusters during transport are not removed. - The clusters positions are not correct. - There is a safety shutters locking.	- Fit fouling-plate on your chassis and breakers to avoid new mistakes. - Remove the plastic ties. - Put them in order again. - Remove this locking.

13. REQUIREMENTS FOR UPSTREAM CIRCUIT PROTECTIVE DEVICES

Short Circuit Current Rating (Amps RMS Sym)

STANDARD MODELS (*Type A*)

Basic Model	Maximum Voltage	Rated Current (A)	Closing Rating (kA peak)	Short Circuit Current Rating (kA RMS)
TS 890 - 800A	600	800	105	50
TS 890 - 1000A	600	1000	105	50
TS 890 - 1200A	600	1200	105	50
TS 890 - 1600A	600	1600	105	50
TS 890 - 2000A	600	2000	105	50
TS 890 - 2500A	600	2500	105	50
TS 890 - 3200A	600	3200	105	50

STANDARD MODELS (*Type B*)

Basic Model	Maximum Voltage	Rated Current (A)	Closing Rating (kA peak)	Short Circuit Current Rating (kA RMS)
TS 890 - 800B	600	800	105	150
TS 890 - 1000B	600	1000	105	150
TS 890 - 1200B	600	1200	105	150
TS 890 - 1600B	600	1600	105	150
TS 890 - 2000B	600	2000	143	143
TS 890 - 2500B	600	2500	143	143
TS 890 - 3200B	600	3200	143	143

Please refer to the factory for further information on upstream protection requirements, if required.

INSTALLATION OF OPEN TYPE TRANSFER SWITCHES - Please refer to the factory for additional information.

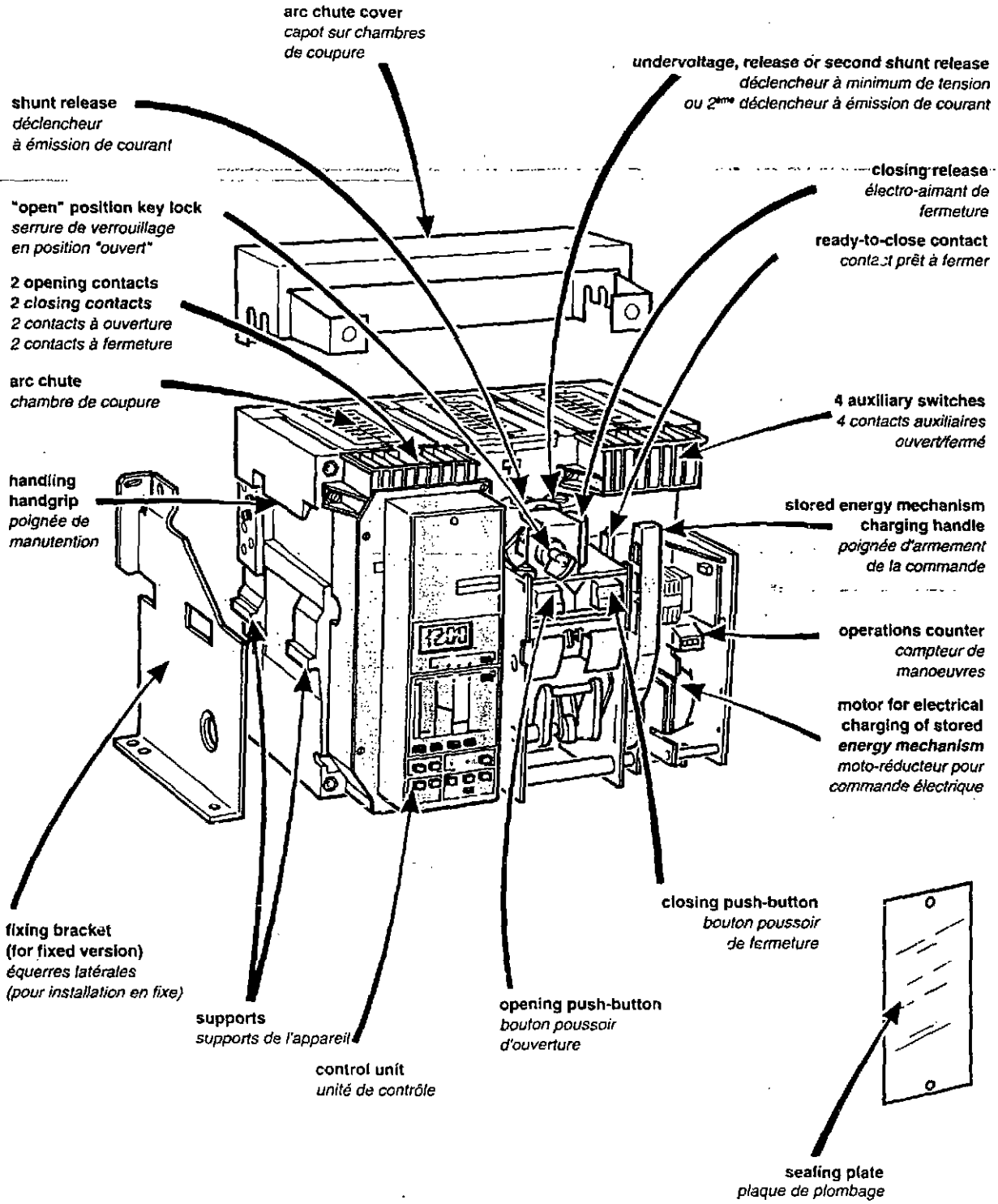
14. CABLE LUG TIGHTENING TORQUE VALUES

TIGHTENING TORQUE IN INCH POUNDS

LUG TYPE	CABLE CLAMP
TA - 2/0	180
TA - 3/0	250
TA - 4/0	250
TA - 250	325
TA - 350	325
TA - 500	375
TA - 600	375
TA - 800	375
TA - 750	375
TA - 800	500
TA - 1000	500

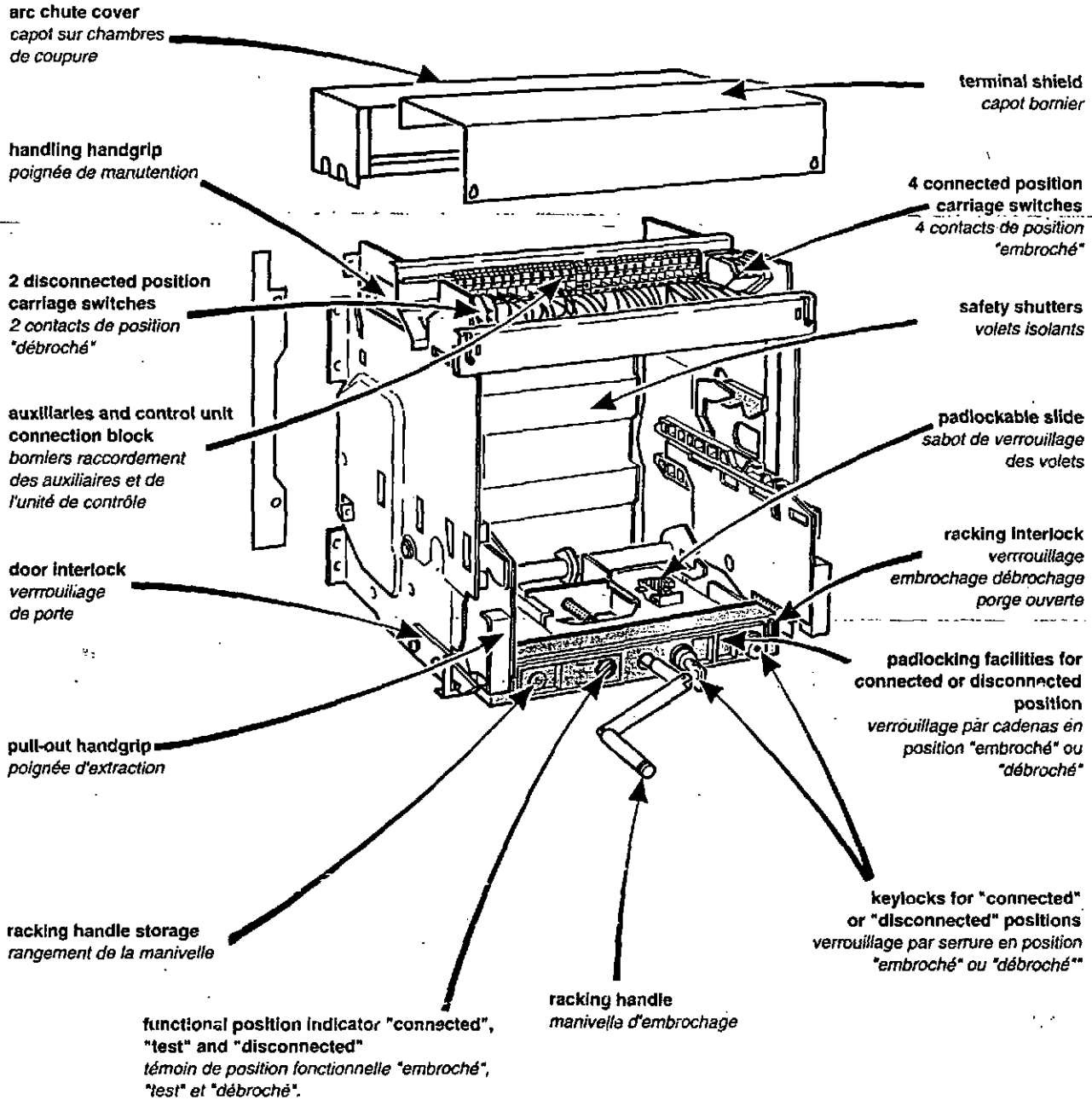
15. CIRCUIT BREAKER DRAWING

circuit-breaker
disjoncteur



16. DRAWOUT CHASSIS ENGINEERING DRAWING

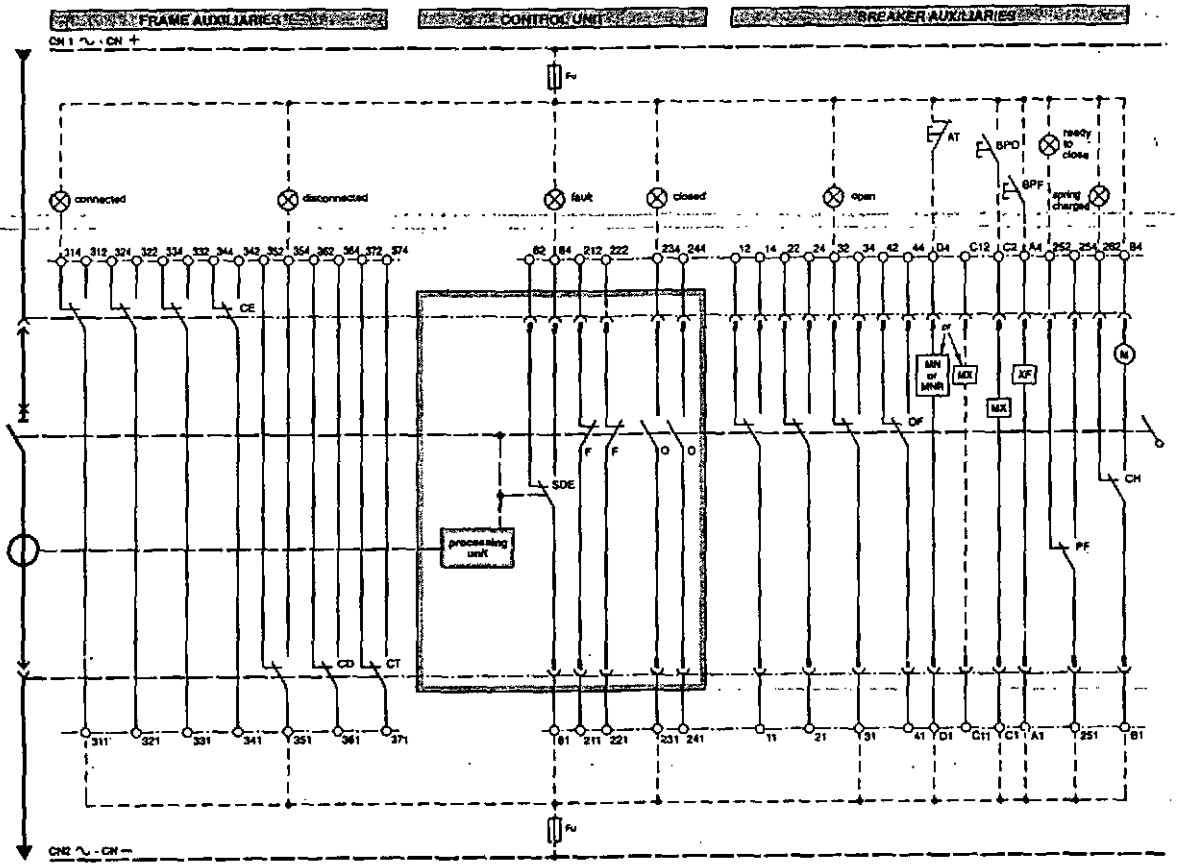
chassis
châssis



17. WIRING DIAGRAM ENGINEERING DRAWING.

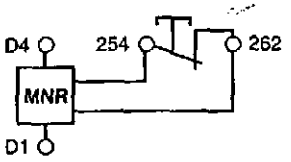
wiring diagrams

general diagram
for basic version
STR 08 to 58



Fu : fuse 2A
AT : emergency off
BPO : open pushbutton
BPF : close pushbutton
CE : "connected" position contact (10A/240V AC)
M : spring charging motor (180VA)
XF : closing release (20VA)
MX : shunt release (20VA)
MN : undervoltage release (20VA)
MNR : time delayed undervoltage release (20VA)
OF : auxiliary changeover contacts (10A/240V AC)
O : 2 auxiliary NO contacts (10A/240V AC)
F : 2 auxiliary NC contacts (10A/240V AC)
SDE : fault trip indication contact (10A/240V AC)(exept STR 08)
CH : "spring charged" contact (10A/240V AC)
PF : *ready to close contact* (10A/240V AC) (closing possible if *breaker is open, not locked and* operating mechanism charged)
CD : "disconnected" position contact (10A/240V AC)
CT : "test" position contact (10A/240V AC)

MNR wiring for instantaneous tripping



Use the terminals 262 ("spring charged contact") and 254 (normally open contact of the PF)

18. NOTES

FOIL LABEL (TYPICAL)
SILVER LETTERS ON
RED BACKGROUND

W1

WARNING
MORE THAN ONE LIVE CIRCUIT
SEE DIAGRAM

AVERTISSEMENT
PLUS D'UN CIRCUIT SOUS
TENSION VOIR SCHÉMA

W2

WARNING
DISCONNECT ALL SOURCES OF
SUPPLY BEFORE SERVICING

AVERTISSEMENT
COUPER TOUTES LES SOURCES
D'ALIMENTATION AVANT DE FAIRE
L'ENTRETIEN ET LES REPARATIONS

2 X 6" (TYPICAL)

NP1

258-342
480V AUTOMATIC
TRANSFER SWITCH
(FEED TO PDC #3)

3/4 X 2" (TYPICAL)

TMS

TRANSFER
MODE

AUTO MANUAL

1 X 3" (TYPICAL)

UCB

UTILITY
TRANSFER
BREAKER

GCB

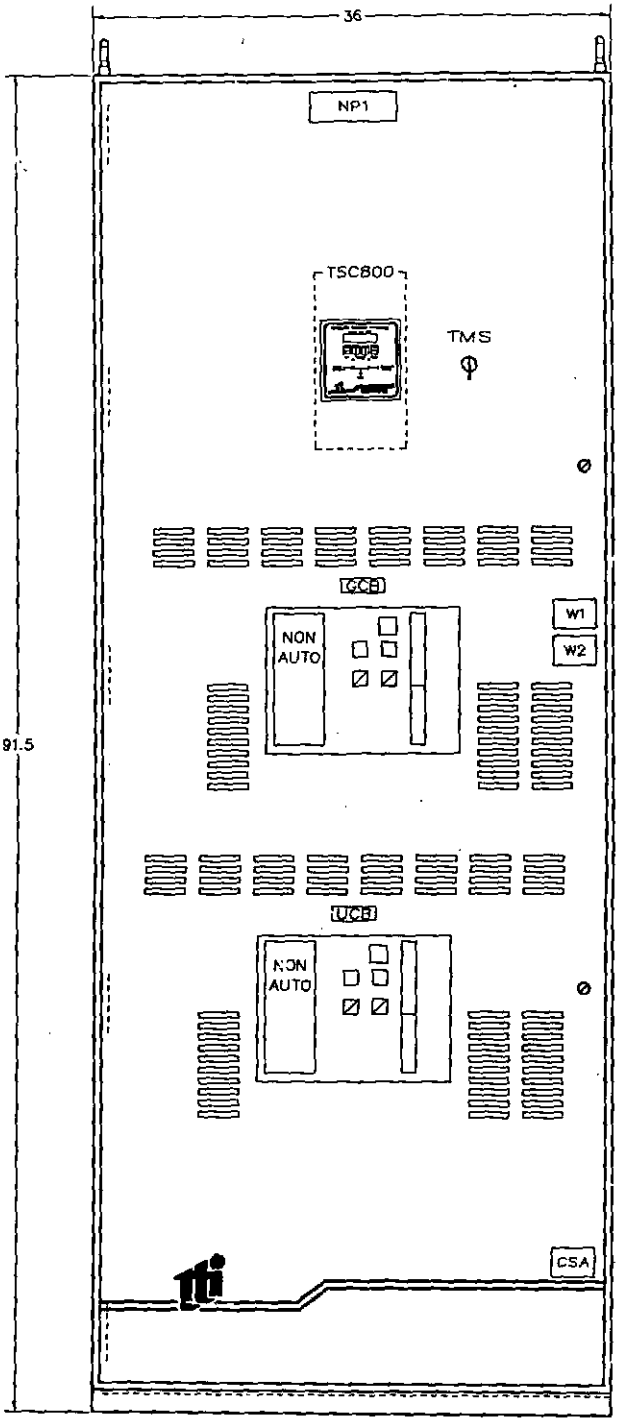
GENERATOR
TRANSFER
BREAKER

NOTES:

1) SWITCHBOARD SUPPLIED IN ONE PIECE.
2) FRONT AND REAR ACCESS REQUIRED.
3) EXTERIOR PAINT ASA #61 GREY.
4) MAIN BUS RATEING 2000A, 480, BRACED AT 75KA
5) ALL BUS WILL BE COPPER.
6) UTILITY CIRCUIT BREAKER IS M/G MASTERPACT 3P, 2000, NON-AUTO, ELECTRICLLY OPERATED, FIXED TYPE.
7) GENERATOR CIRCUIT BREAKER IS M/G MASTERPACT 3P, 2000, NON-AUTO, ELECTRICLLY OPERATED, FIXED TYPE.
8) AUTO TRANSFER SWITCH WIRING SHALL BE #18-14 AWG TEW.
9) NAMEPLATES TO BE BLACK WITH WHITE LETTERS.
10) ENCLOSURE TYPE NEMA 1 CONSTRUCTION.
11) GROUND LUGS 12 X #6 - 250MCM

2000A

12) EMERGENCY SOURCE CABLES TOP ENTRY, LUGS 2 HOLE LONG BARRELL = 1 X 1000MCM PER PHASE
13) LOAD CABLES TOP ENTRY, LUGS 2 HOLE LONG BARRELL = 3 X 1000MCM PER PHASE
14) UTILITY CABLES BOTTOM ENTRY, LUGS 2 HOLE LONG BARRELL = 6 X 1000MCM PER PHASE

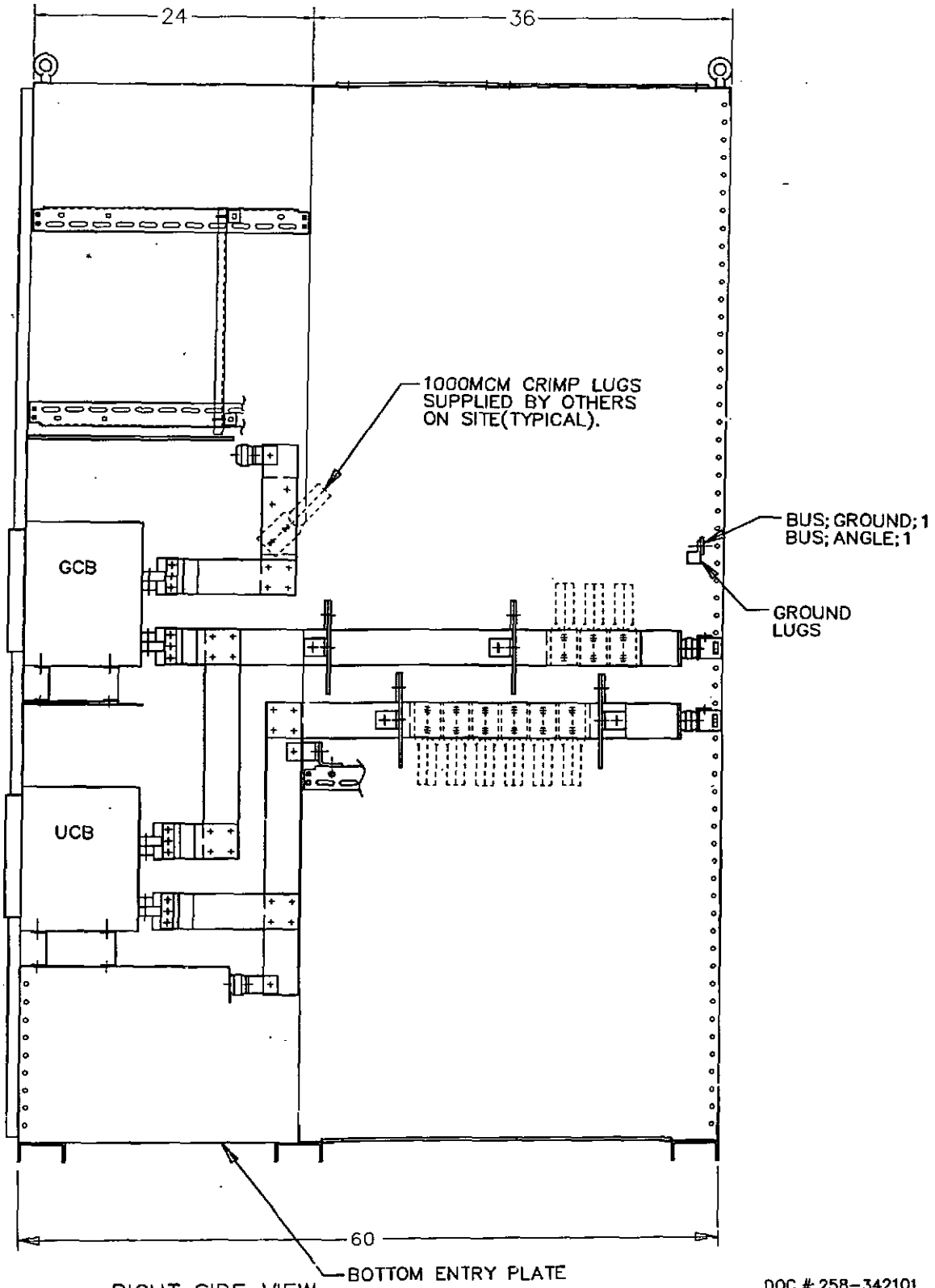


FRONT VIEW
FINISH ASA #61 GREY

EQUIPMENT N
LOCATION: M

☐ APPROVED FOR CONSTRUCTION
☐ MASTER COPY ☐ REFERENCE COPY ____ OF ____
☐ MULTIPLE UNIT WORK ORDER
☐ RELEASED FOR INFORMATION
AUTH. BY: _____ DATE: _____

DRAWING No.	REFERENCE DRAWINGS	No.	REVISIONS
		2	AS BUILT
		1	CUSTOMER MODIFICATION



RIGHT SIDE VIEW

O: 258-342
CC ROOM NO 2

DOC.#: 258-342101

	BY	AUTH	DATE
	LM	BD	00-08-03
S	MC	BD	00-06-19
	BY	AUTH	DATE

THOMSON® TECHNOLOGY INC.

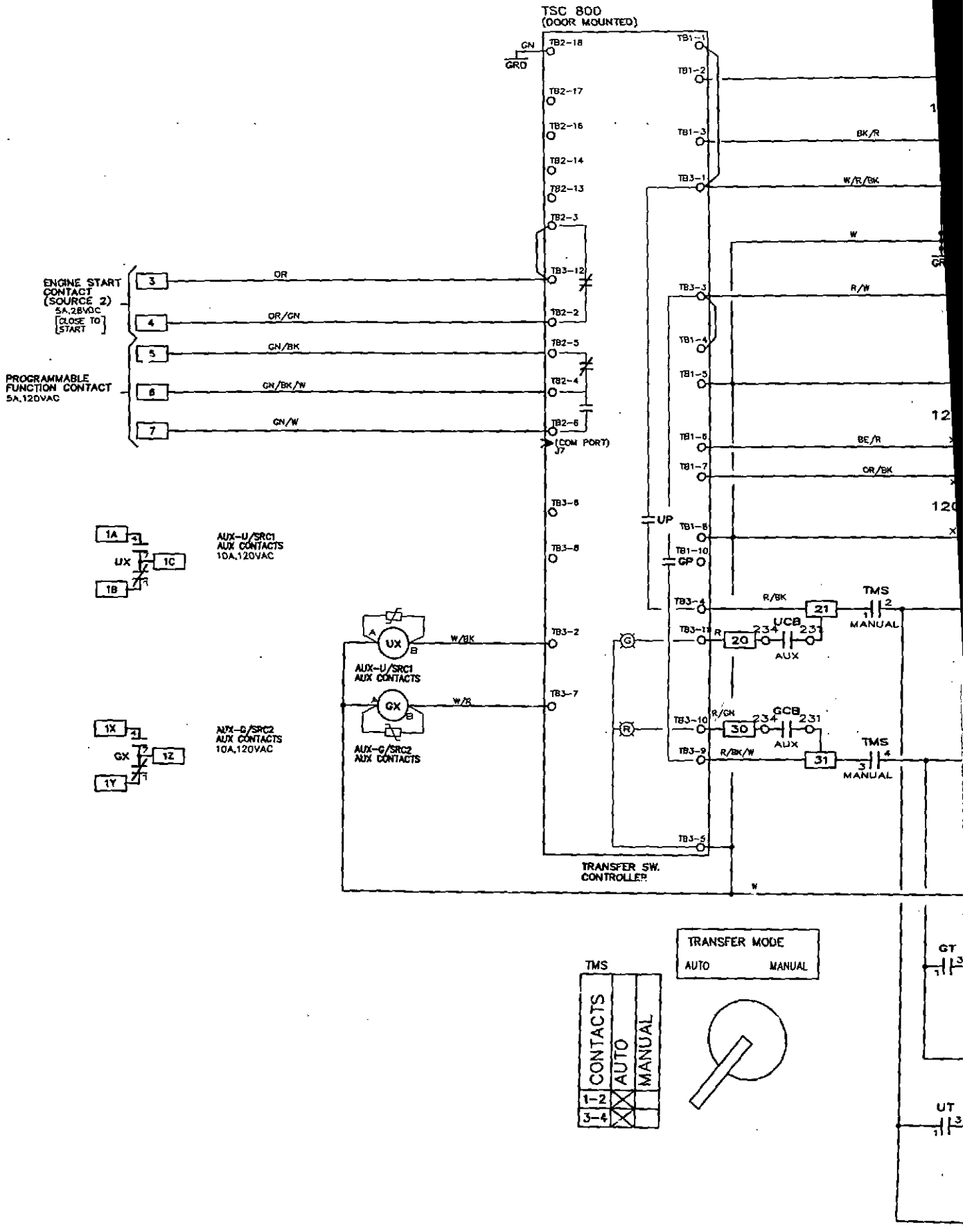
AUTOMATIC TRANSFER SWITCH
MODEL TS 890
PHYSICAL LAYOUT
2000A/FOOTNER FOREST

CUSTOMER

DWN BY	AUTH BY	DATE	REV
MC	BD	00-05-11	1

DRAWING No. ELB14004_01_01_01

SHEET 1/2



☐ APPROVED FOR CONSTRUCTION
☐ MASTER COPY ☐ REFERENCE COPY ____ OF ____
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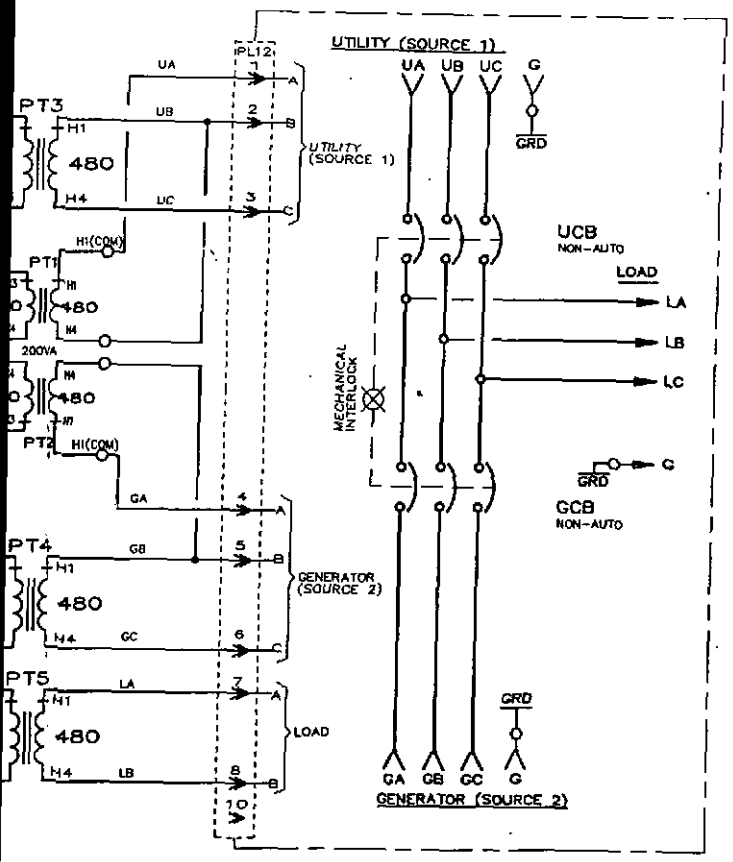
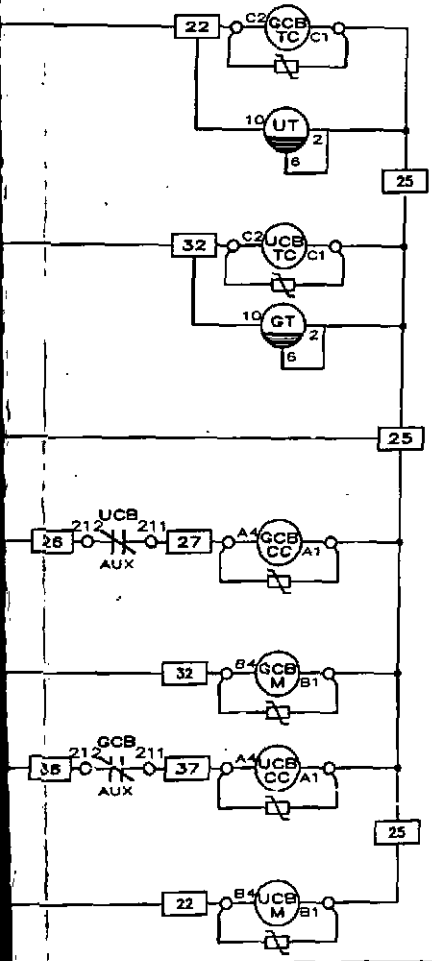
		1	AS BUILT





LEGEND	
CC	BREAKER CLOSING COIL
GCB	GENERATOR TRANSFER BREAKER
GT	TRANSFER TO GENERATOR TIMER
GX	LOAD ON GENERATOR RELAY
M	BREAKER CHARGING MOTOR
PL12	WIRE CONNECTING PLUG
TC	BREAKER TRIP COIL
TMS	TRNASFER MODE SWITCH
TSC	TRANSFER SWITCH CONTROLLER
UCB	UTILITY TRANSFER BREAKER
UT	TRANSFER TO UTILITY TIMER
UX	LOAD ON UTILITY RELAY

COLOUR KEY	
BLACK	BK
BLUE	BE
BROWN	BN
GREEN	GN
GREY	GY
ORANGE	OR
PURPLE	PE
RED	R
WHITE	W
YELLOW	Y
SOLID/TRACER(S)	

Side Access
Rear Access

FOR TSC800 CONTROLLER OPTIONS, REFER TO PROGRAMMING SHEETS

DOC#: 258-342101

AS BUILT BY/ AS BUILT DATE	TESTED BY

BY	AUTH	DATE
LM	BD	00-08-03

THOMSON TECHNOLOGY INC.

SCHEMATIC DIAGRAM
AUTOMATIC TRANSFER SWITCH
TS 893-2000A-480-3W-75-F

2000A, 480V, 3ø, 3W, 60Hz

CUSTOMER

DWN BY	AUTH BY	DATE	REV
MC	BD	00-05-11	1

DRAWING No. ELB14004_01_01_02

SHEET 2/2