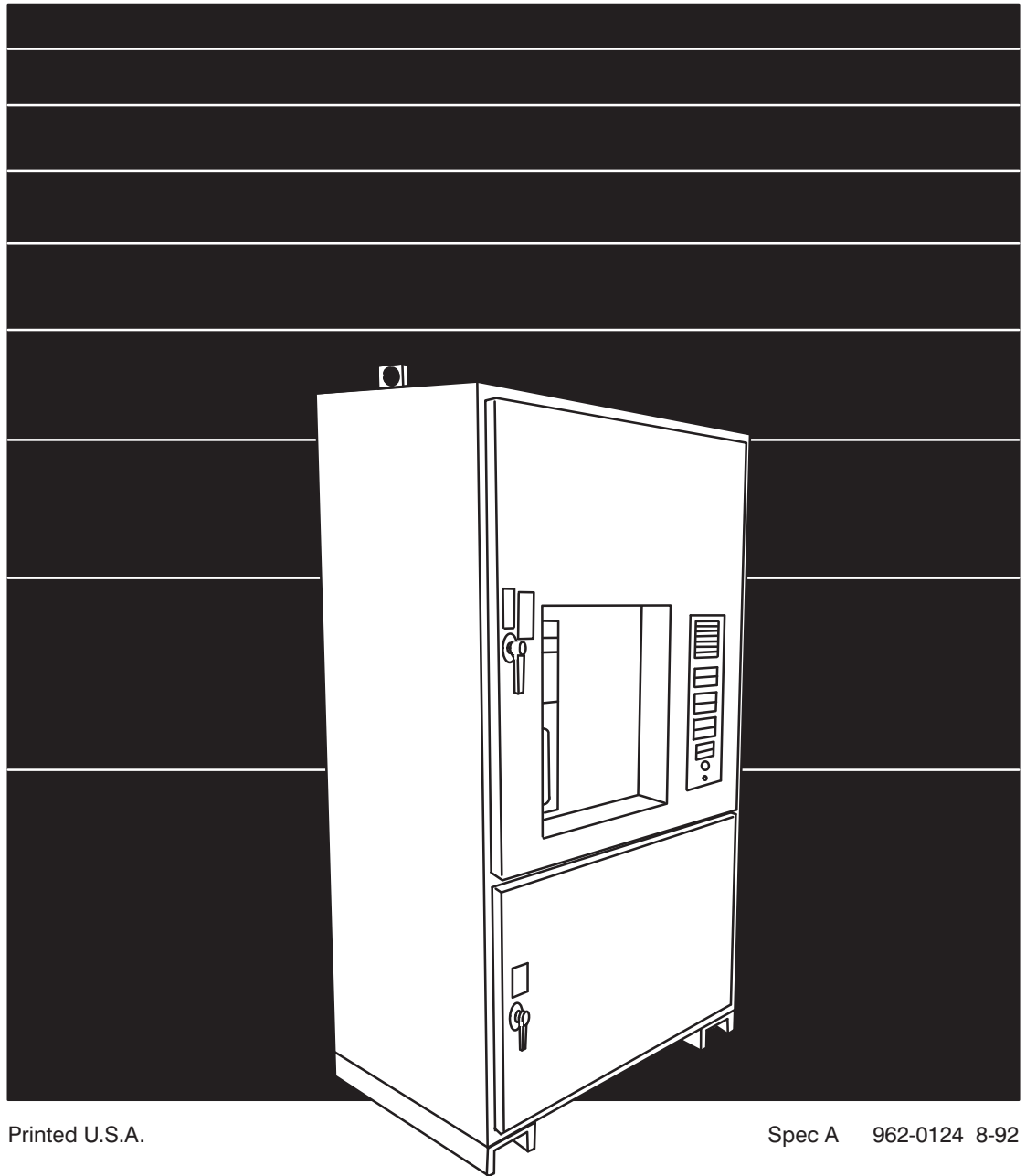




# Operator's Manual

**BT Bypass-Isolation Transfer Switches**  
**1200 - 3000 Ampere**  
**Utility-to-Utility**



Printed U.S.A.

Spec A 962-0124 8-92

# Table of Contents

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SECTION	TITLE	PAGE
	<b>SAFETY PRECAUTIONS</b> .....	ii
<b>1</b>	<b>INTRODUCTION</b> .....	1-1
	Operator's Manual .....	1-1
	BT Bypass-Isolation Transfer Switch .....	1-1
	Model Identification .....	1-2
	How to Obtain Service .....	1-2
<b>2</b>	<b>DESCRIPTION</b> .....	2-1
	Cabinet .....	2-2
	Automatic Transfer Switch .....	2-3
	Drawout-Isolation Mechanism .....	2-3
	Bypass Switch .....	2-5
	Electronic Control System .....	2-5
<b>3</b>	<b>OPERATION</b> .....	3-1
	Automatic Operation .....	3-1
	Isolating the Automatic Transfer Switch for Service .....	3-1
	Manual Operation of ATS .....	3-6
	Preventive Maintenance .....	3-7
<b>4</b>	<b>TROUBLESHOOTING</b> .....	4-1
	Transfer Switch Does Not Transfer Automatically .....	4-1
	Transfer Switch Does Not Retransfer Automatically .....	4-1

**⚠ WARNING**

***INCORRECT SERVICE OR REPLACEMENT OF PARTS CAN RESULT IN DEATH, SEVERE PERSONAL INJURY, AND/OR EQUIPMENT DAMAGE. SERVICE PERSONNEL MUST BE QUALIFIED TO PERFORM ELECTRICAL AND/OR MECHANICAL SERVICE.***

# Safety Precautions

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This manual includes the following symbols to indicate potentially dangerous conditions. Read the manual carefully and know when these conditions exist. Then take the necessary steps to protect personnel and the equipment.

**⚠ DANGER** *This symbol warns of immediate hazards that will result in severe personal injury or death.*

**⚠ WARNING** *This symbol refers to a hazard or unsafe practice that can result in severe personal injury or death.*

**⚠ CAUTION** *This symbol refers to a hazard or unsafe practice that can result in personal injury or product or property damage.*

High voltage in transfer switch components presents serious shock hazards that can result in severe personal injury or death. Read and follow these suggestions.

Keep the transfer switch cabinet closed and locked. Make sure only authorized personnel have the cabinet and operational keys.

Due to the serious shock hazard from high voltages within the cabinet, all service and adjustments to the transfer switch must be performed only by an electrician or authorized service representative.

If the cabinet must be opened for any reason, remove AC power to the automatic transfer switch. If the instructions require otherwise, use extreme caution due to the danger of shock hazard.

Place rubber insulative mats on dry wood platforms over metal or concrete floors when working on any electrical equipment. Do not wear damp clothing (particularly wet shoes) or allow skin surfaces to be damp when handling any electrical equipment.

Jewelry is a good conductor of electricity and should be removed when working on the electrical equipment.

Do not work on this equipment when mentally or physically fatigued, or after consuming any alcohol or drug that makes the operation of equipment unsafe.

# 1. Introduction

## OPERATOR'S MANUAL

This operator's manual provides information necessary for operation of a 1200- to 3000-ampere BT bypass-isolation transfer switch with an automatic utility-to-utility control. The utility-to-utility control automatically directs transfer of the load from one utility power source to another, providing nearly continuous power.

## BT BYPASS-ISOLATION TRANSFER SWITCH

The BT bypass-isolation transfer switch combines an automatic transfer switch, a manual bypass switch, and a drawout isolation mechanism in a single unit.

### Automatic Transfer Switch Function

Transfer switches are an essential part of a building's standby or emergency power system. The Normal power source (source 1) is backed up by an Emergency power source (source 2). A transfer switch supplies the electrical load with power from one of these two power sources.

The load is connected to the common of the transfer switch (Figure 1-1). Under normal conditions, the load is supplied with power from the Normal source (as illustrated). If the Normal power source is interrupted, the load is transferred to the Emergency power source. When Normal power returns, the load is retransferred to the Normal power source. The transfer and retransfer of the load are the two most basic functions of a transfer switch.

**Automatic Operation:** Automatic transfer switches, capable of automatic operation without operator involvement, perform the following basic functions:

1. Sense the interruption of the Preferred power source.
2. Transfer the load to the backup power source.
3. Sense the return of the Preferred power source.
4. Retransfer the load to the Preferred power source.

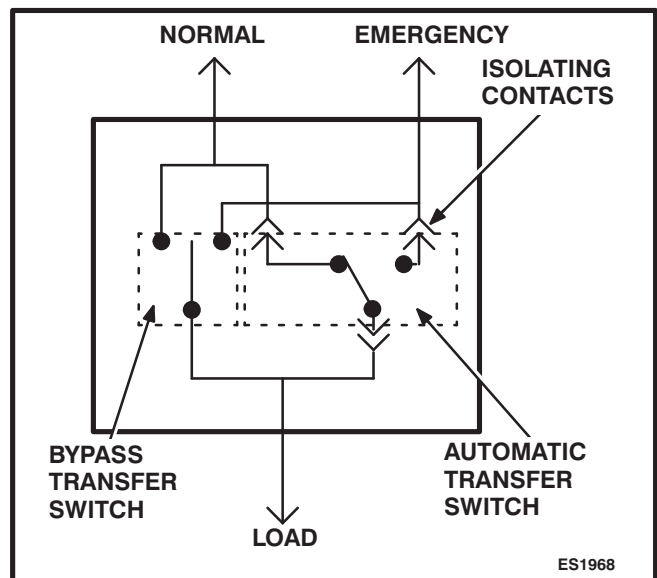


FIGURE 1-1. BT TRANSFER SWITCH (TYPICAL FUNCTION)

## **Bypass Switch Function**

The bypass switch allows the operator to manually connect the load to the available power source, bypassing the automatic transfer switch (Figure 1-1). When bypassed, the automatic transfer switch can be isolated for service or removal without causing a power interruption.

## **Drawout Isolation Mechanism**

The drawout isolation mechanism allows the automatic transfer switch to be withdrawn for testing or service. The transfer switch is connected to the load, power sources, and controls through isolation contacts. Turning a drawout cranking handle moves the automatic transfer switch and engages and disengages the isolation contacts to permit testing or service. If necessary, the switch can be removed for service.

## **MODEL IDENTIFICATION**

Identify your model by referring to the Model and Specification number as shown on the nameplate. Electrical characteristics are shown on the lower portion of the nameplate, which is located on the cabinet door.

If it is necessary to contact a dealer or distributor regarding the transfer switch, always give the complete Model, Specification, and Serial number. This information is necessary to properly identify your unit among the many types manufactured.

## **HOW TO OBTAIN SERVICE**

When the transfer switch requires servicing, contact your nearest dealer or distributor. Factory-trained Parts and Service representatives are ready to handle all your service needs.

If unable to locate a dealer or distributor, consult the Yellow Pages. Typically, our distributors are listed under:

**GENERATORS-ELECTRIC,  
ENGINES-GASOLINE OR DIESEL, OR  
RECREATIONAL VEHICLES-EQUIPMENT,  
PARTS AND SERVICE.**

For the name of your local Cummins®/Onan® or Onan-only distributor in the United States or Canada, call 1-800-888-ONAN. (This automated service utilizes touch-tone phones only.) By entering your area code and the first three digits of your local telephone number, you will receive the name and telephone number of the distributor nearest you.

For the name of your local Cummins-only distributor, or if you need more assistance, please call Onan Corporation, 1-612-574-5000, 7:30 A.M. to 4:00 P.M. Central Standard Time, Monday through Friday.

When contacting your distributor, always supply the complete Model Number and Serial Number as shown on the nameplate.

Cummins is a registered trademark of Cummins Engine Company.  
Onan is a registered trademark of Onan Corporation.

## 2. Description

This section describes the standard and optional components of the cabinet, the bypass operator panel, the automatic transfer switch, the bypass

switch, the isolation mechanism, and the electronic control system.

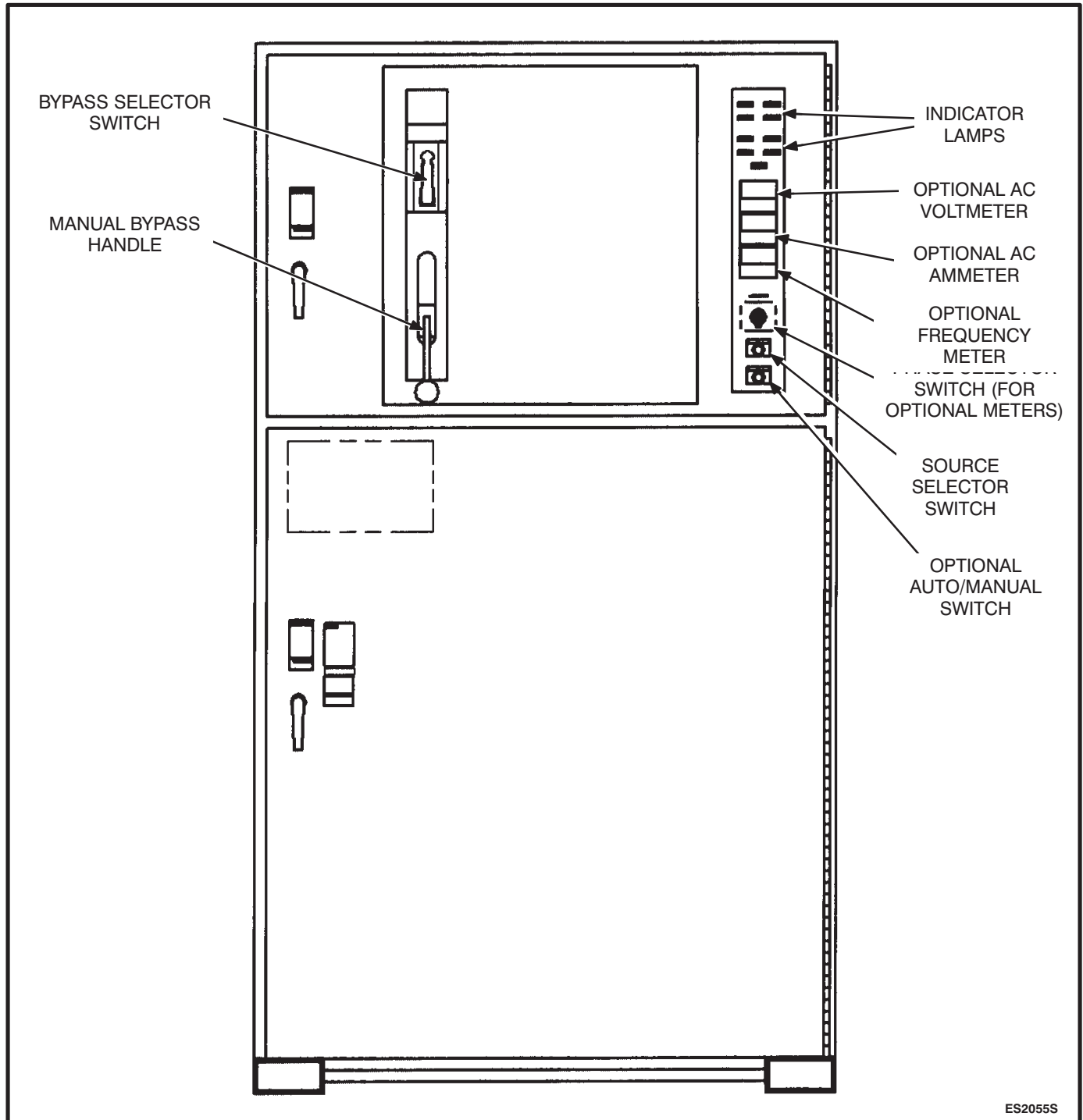


FIGURE 2-1. 1600- TO 3000-AMPERE CABINET WITH OPTIONS

## CABINET

The standard cabinet (Figure 2-1) meets the requirements for a UL Type 1 cabinet. This type is designated as a general-purpose, indoor cabinet.

### Indicator Lamps

There are nine indicator lamps on the cabinet door.

- Source 1 Available
- Source 2 Available
- Source 1 Connected
- Source 2 Connected
- Bypass Source 1
- Bypass Source 2
- ATS in Test
- ATS Isolated
- ATS Inhibit

The **Source 1 Available** and **Source 2 Available** lamps are lit whenever their corresponding power sources are producing power. These two lamps can be lit simultaneously.

The **Source 1 Connected** lamp is lit when the automatic transfer switch is in the **Source 1** (normal) position.

The **Source 2 Connected** lamp is lit when the automatic transfer switch is in the **Source 2** (emergency) position.

The **Bypass Source 1** lamp is lit whenever the bypass switch is connecting (bypassing) source 1 (normal) to the load.

The **Bypass Source 2** lamp is lit whenever the bypass switch is connecting (bypassing) source 2 (emergency) to the load.

The **ATS in Test** lamp is lit whenever the automatic transfer switch is in the Test position.

The **ATS Isolated** lamp is lit whenever the automatic transfer switch is in the Isolated position.

The **ATS Inhibit** lamp is lit whenever the automatic transfer switch is disabled by the limit switches and interlocks that respond to the operation of the bypass switch and the drawout/isolation mechanism.

The **ATS Inhibit** lamp is lit when the bypass switch is connected to the Normal or Emergency source and the ATS is in the Auto or Isolate position. When the bypass switch is connected to the Normal or Emergency source and the ATS is in the Test position, the **ATS Inhibit** lamp is **not** lit.

The **ATS Inhibit** lamp does not respond to the position of the Motor Disconnect switch.

### Source Selector Switch

This two-position switch is used to select which source is preferred and which source is the backup.

In the Source 1 position, the Normal power source supplies the load power until a power interruption occurs.

In the Source 2 position, the Emergency power source supplies the load power until a power interruption occurs.

### Optional Meter Package

The optional meter package includes an AC ammeter, an AC voltmeter, a frequency meter, and a phase selector switch.

**AC Voltmeter:** The voltmeter measures line-to-line voltage of the selected power source.

**AC Ammeter:** The ammeter measures the line currents of the load.

**Frequency Meter:** This meter measures the output frequency of the selected power source in hertz.

**Phase Selector Switch:** This switch is used to select the source and phase to be measured.

### Optional Auto/Manual Switch

The optional Auto/Manual switch is used to enable or disable the automatic retransfer function. This switch has two positions. In the Auto position, normal automatic retransfer is enabled. In the Manual position, automatic retransfer (from the non-preferred source back to the preferred source) is disabled; only manual retransfer (using the Preferred Source Selector switch) is possible. In the event of power source failure, however, the Power Sentry control logic will ignore the Auto/Manual switch and initiate retransfer to the other source.

**When the optional Auto/Manual switch is installed, the standard Source Selector Switch is replaced with a three-position, spring-return-to-center switch.**

## AUTOMATIC TRANSFER SWITCH

The automatic transfer switch (Figure 2-2) opens and closes the contacts that transfer the load between the two power sources. The main parts of the transfer switch discussed here are the contact assemblies, the linear actuator, the Motor Disconnect switch, and the auxiliary contacts.

### Contact Assemblies

The automatic transfer switch has either three or four poles. Three pole transfer switches are provided with a neutral bar. The contact assemblies make and break the current flow. When closed to either the Normal or the Emergency power source, the contacts are mechanically held. Electrical and mechanical interlocks prevent them from closing the load to a dead source or to both power sources at the same time.

### Linear Actuators

The linear actuators are the devices that move the contact assemblies between the Normal (source 1) power source and the Emergency (source 2) power source. Linear actuator operation is initiated automatically with automatic transfer switches. Refer to the Operation section.

### Motor Disconnect Switch

The Motor Disconnect toggle switch, on the accessory control panel, enables and disables the linear actuators. Place the switch in the Auto position to enable the linear actuators. Place the switch in the Off position to disable the linear actuators.

### Auxiliary Contacts

Auxiliary contacts are provided on the Normal and Emergency sides of the transfer switch. They are actuated by operation of the transfer switch during transfer and retransfer. The Normal side auxiliary contact switch is actuated when the transfer switch is in the Normal position. The Emergency side auxiliary contact switch is actuated when the transfer switch is in the Emergency position. The auxiliary contacts have current ratings of 10 amperes at 250 VAC. The contacts are wired to terminal block TB1.

## DRAWOUT-ISOLATION MECHANISM

The drawout-isolation mechanism allows the automatic transfer switch to be isolated for testing or service. Three sets of primary isolation contacts (Normal source, Emergency source, and Load) connect the switching contacts to the terminal lugs. A set of secondary isolation contacts connects the automatic transfer switch controls to the available power source.

### Drawout Cranking Handle

The drawout cranking handle is used to isolate and reconnect the automatic transfer switch. The cranking handle turns a gear drive that moves the transfer switch along a mechanically guided path. **The cranking handle will operate only when power is available, and when both the bypass and the automatic transfer switches are connected to the same source.**

### Drawout Position Indicator

The drawout mechanism can be latched in one of three positions: Auto, Test, and Isolate. The Drawout Position indicator shows which position the automatic transfer switch is in.

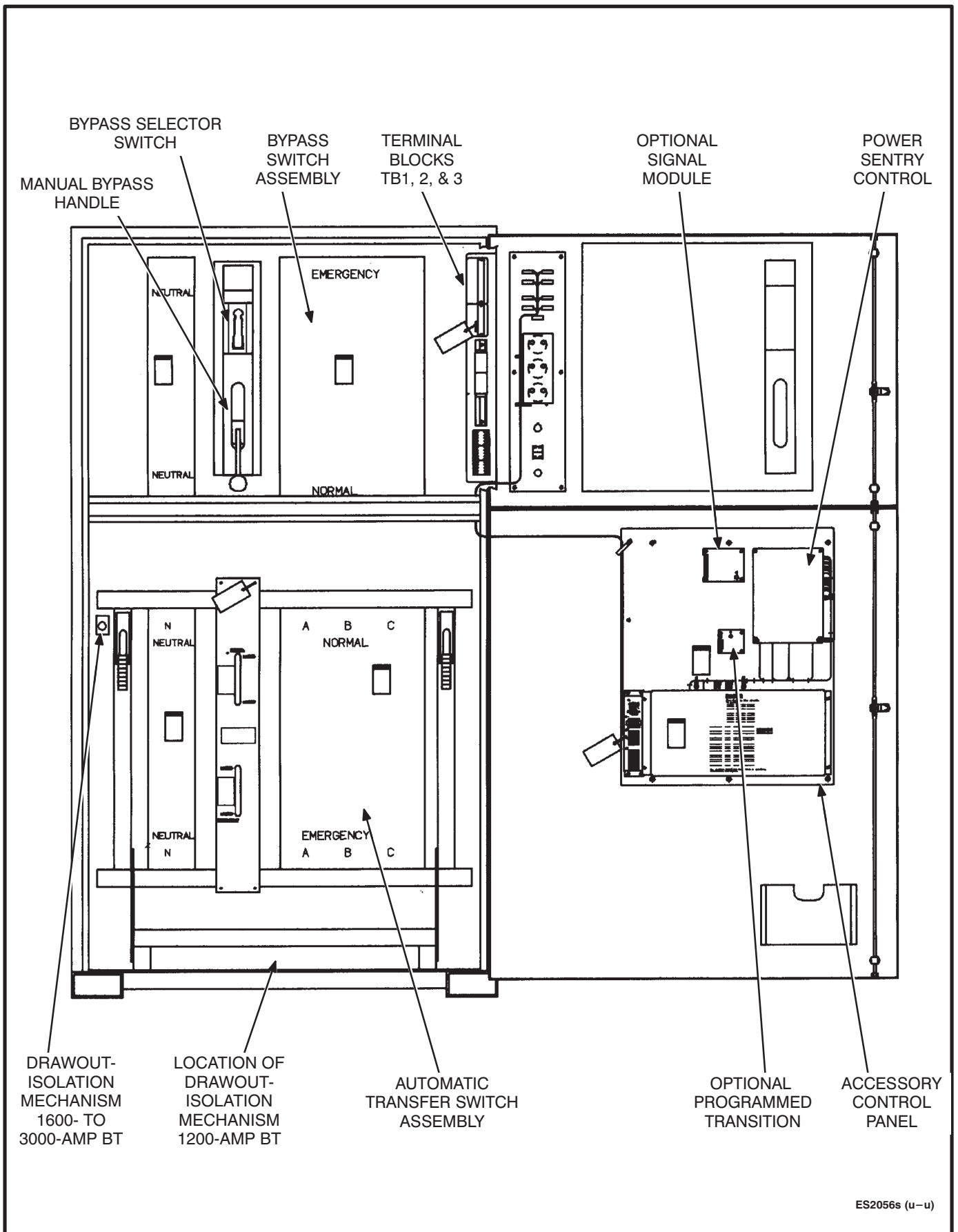
**In the Auto position**, both the primary and the secondary isolation contacts are closed. The automatic transfer switch is in its normal operating position.

**In the Test position**, the primary isolation contacts are open and the secondary isolation contacts are closed. The load-supplying contacts of the automatic transfer switch are out of service, but the Power Sentry control and the linear actuator are powered and fully operational. In this position, the control, the linear actuator, and the contact mechanisms can be tested.

**In the Isolate position**, both the primary and the secondary isolation contacts are open. Except for connector J12/P12, which must be manually disconnected, the automatic transfer switch mechanism is completely isolated from both the power and the control circuits and can be removed for service.

**⚠WARNING** *Improper removal of the automatic transfer switch can cause severe personal injury or death. Removal of the automatic transfer switch must only be performed by technically qualified personnel, following the procedures provided in this manual.*





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FIGURE 2-2. 1600- TO 3000-AMPERE INTERIOR/COMPONENTS

## BYPASS SWITCH

The bypass switch, located above the automatic transfer switch, is used to open and close the contacts that connect the load to the Normal or Emergency power source. **The manually operated bypass switch is mechanically and electrically interlocked to prevent the operator from manually closing the load to a dead source or to both sources at the same time.** Operation of the bypass switch is accomplished with the bypass switch operator handle and the Bypass Selector switch.

### Manual Bypass Handle and Bypass Selector Switch

The Manual Bypass handle is used in conjunction with the Bypass Selector switch. Before operating the Manual Bypass handle, the Bypass Selector switch must be turned to select the source that the bypass contacts are to be connected to. The operator can move the Manual Bypass handle, closing the bypass contacts to that source, without interrupting the load.

### Contact Assemblies

Like the automatic transfer switch, the bypass switch has either three or four poles. Three pole transfer switches are provided with a neutral bar. The contact assemblies are manually actuated to connect the load to one of the two power sources, bypassing the automatic transfer switch. When closed to either the Normal or the Emergency power source, the contacts are mechanically held.

### Auxiliary Contacts

Auxiliary contacts are provided on the Normal and Emergency sides of the bypass switch. The Normal side auxiliary contact switch is actuated when the bypass switch is in the Normal position. The Emergency side auxiliary contact switch is actuated when the bypass switch is in the Emergency position. The auxiliary contacts have current ratings of 10 amperes at 250 VAC. The contacts are wired to terminal block TB1.

## ELECTRONIC CONTROL SYSTEM

This section describes the standard and optional components of the electronic control system.

**⚠WARNING** *Improper calibration or adjustment of electronic control modules can cause death, severe personal injury, and equipment or property damage. Calibration and adjustment of these components must be performed by technically qualified personnel only.*

All calibration and adjustment procedures are described in the Installation manual (which was shipped with the transfer switch) and in the Service manual (which is available through your distributor).

The most important component of the electronic control system is the Power Sentry® control (Figure 2-2). The Power Sentry includes voltage sensing circuits, time delay circuits and control relays. There are also several adjustment potentiometers and indicator lamps on the Power Sentry. The adjustments must be performed only by qualified service personnel.

**⚠WARNING** *AC power within the cabinet and the rear side of the cabinet door presents a shock hazard that can cause severe personal injury or death. Use extreme caution to avoid touching electrical contacts when the cabinet door is open.*

**⚠WARNING** *Accidental actuation of the linear actuators can cause severe personal injury. Isolate the transfer switch, as described in the Operation section, before making any adjustments.*

Power Sentry is a registered trademark of Onan Corporation.

## Power Sentry Time Delays

**Transfer Time Delay:** This delay prevents "nuisance" transfers to the backup power source caused by brief line fluctuations. After the delay, the transfer switch transfers the load to the backup power source. It has an adjustable range of 0 to 120 seconds.

To set this time delay, align the slot on the potentiometer with the desired marking on the Power Sentry cover.

**Retransfer Time Delay:** This delay begins the moment the preferred source voltage and frequency return. After the delay, the transfer switch can retransfer the load to the preferred source. The delay allows the preferred source to stabilize before retransfer. It has an adjustable range of 0 to 30 minutes.

To set this time delay, align the slot on the potentiometer with the desired marking on the Power Sentry cover.

## Undervoltage Sensing

Two voltage sensors, one for the Normal side and one for the Emergency side, monitor source voltages for an undervoltage condition and generate signals, which are sent to the time delay module. If, for example, an undervoltage condition is sensed on the Normal source, the voltage sensor module sends a signal to the time delay module that initiates and controls the transfer of load.

The standard transfer switch has undervoltage sensing for all phases of the Normal and Emergency power sources.

## Overvoltage and Frequency Sensing Option

Overvoltage and frequency sensing are available as a single option.

**Overvoltage Sensing:** With optional overvoltage sensing, the Normal and Emergency sources are monitored for an overvoltage condition.

As with the standard undervoltage sensing, the voltage sensors signal the time delay module, which controls the transfer or retransfer sequence.

An adjustable time delay (0 to 120 seconds) overrides momentary overshoots in voltage.

To set this time delay, align the slot on the potentiometer with the desired marking on the Power Sentry cover.

**Frequency Sensing:** With optional frequency sensing, the Normal and Emergency sources are monitored for variations in frequency. The sensors determine whether the source is within an adjustable bandwidth.

As with the standard undervoltage sensing, the frequency sensors signal the time delay module, which controls the transfer or retransfer sequence.

An adjustable time delay (0 to 15 seconds) allows the control to ignore momentary dips or rises in frequency.

To set this time delay, align the slot on the potentiometer with the desired marking on the Power Sentry cover.

## Programmed Transition Option

The optional Program Transition module (Figure 2-3) is used to introduce a pause during transition. Programmed transition allows the transfer switch to assume a midtransition position for an adjustable interval of time. In this position, the load is **not** connected to either (Normal or Emergency) power source.

This feature allows residual voltage from inductive loads to decay to an acceptable level before transfer is completed. The length of time that the transfer switch is in the midposition can be adjusted from 0 to 7.5 seconds or 0 to 60 seconds, depending on the timer option. The proper adjustment is a function of the load.

To set the time delay, align the slot on the potentiometer with the desired marking on the faceplate (Figure 2-3).

If a time delay is desired, make sure that the Delay/No Delay switch is in the Delay position.

## Signal Module Option

The main function of the optional Signal Module (Figure 2-4) is to delay transfer (or retransfer) for a preset time while operating a signal contact to give warning that a transfer (or retransfer) is about to occur. This option is typically used in elevator applications.

This module also provides four other sets of form C signal contacts.

The Signal Module has one adjustable timer. The Elevator Signal delay controls the timing of two events. It delays transfer/retransfer and energizes the Elevator Transfer Signal relay during the delay period.

This time delay is adjustable over a range of 0 to 50 seconds.

To set the time delay, align the slot on the potentiometer with the desired marking on the faceplate (Figure 2-4).

If a time delay is desired, make sure that the Delay/No Delay switch is in the Delay position.

## Auxiliary Relays Option

Optional auxiliary relays provide contacts for energizing external alarms, remote indicators, and control equipment such as louver motors and water pumps.

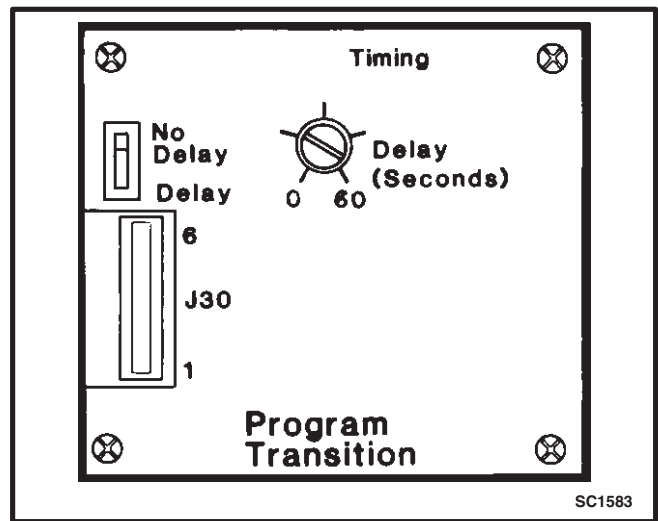


FIGURE 2-3. PROGRAM TRANSITION MODULE

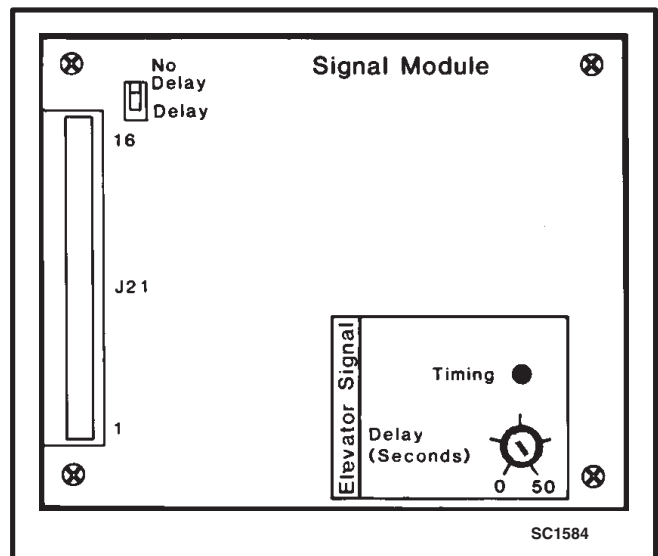


FIGURE 2-4. SIGNAL MODULE



# 3. Operation

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## AUTOMATIC OPERATION

Place control switches in the positions given below.

- **Manual Bypass mechanism:**  
Lower position. Both the **Bypass Source 1** and the **Bypass Source 2** indicator lamps are NOT illuminated.
- **Source Selector switch:** Source 1 for Normal power source; Source 2 for Emergency power source.
- **Motor Disconnect toggle switch:**  
Auto position

## ISOLATING THE AUTOMATIC TRANSFER SWITCH FOR SERVICE

**⚠WARNING** *Improper removal of the automatic transfer switch can cause severe personal injury or death. Removal of the automatic transfer switch must only be performed by technically qualified personnel, following the procedures provided in the Service manual.*

To isolate the automatic transfer switch for servicing, the operator must manually bypass the load to either the Normal source or to the Emergency source, and then crank the transfer switch out to the Isolated position.

The load can only be bypassed to the same source that the automatic transfer switch is connected to. Interlocks prevent the operator from bypassing the load to the opposite source or to a dead source.

**⚠WARNING** *AC power within the cabinet and the rear side of the cabinet door presents a shock hazard that can cause severe personal injury or death. Use extreme caution to avoid touching electrical contacts whenever the cabinet door is open.*

## To Bypass and Isolate the Automatic Transfer Switch:

1. Move the Motor Disconnect toggle switch (located on the accessory control panel) to the Off position to disable the automatic transfer switch linear actuators.
2. Insert the Manual Bypass handle into the bypass drive mechanism as shown in Figure 3-1. Turn the Bypass Selector switch to the desired position (Normal or Emergency) and move the Manual Bypass handle up. Check that the appropriate **Bypass Source 1** or **Bypass Source 2** lamp is lit. Check that the **ATS Inhibit** lamp is lit.
3. Rotate the drawout cranking handle (Figure 3-2) counterclockwise to move the automatic transfer switch to the Isolated position. Check that the automatic transfer switch position pointer is aligned with the word “Isolate” (Figure 3-3). Check that the **ATS Isolated** and **ATS Inhibit** lamps are lit. Return the drawout cranking handle to its stored position.

**The cranking handle will operate only when power is available, and when both the bypass and the automatic transfer switches are connected to the same source.**

4. Disconnect J12/P12 (Figure 3-4).

**⚠WARNING** *Improper removal of the automatic transfer switch can cause severe personal injury or death. Removal of the automatic transfer switch must only be performed by technically qualified personnel, following the procedures provided in the Service manual.*

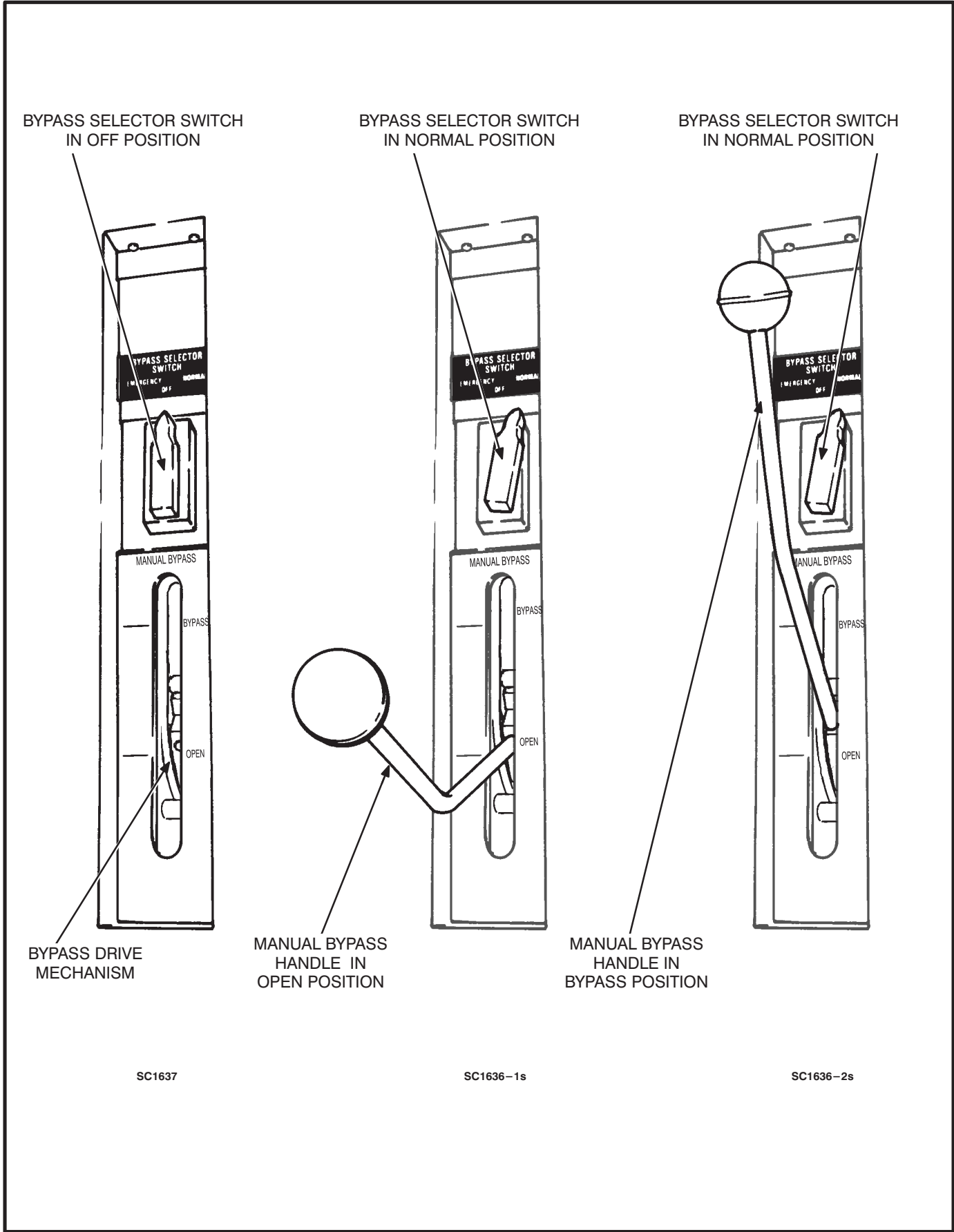
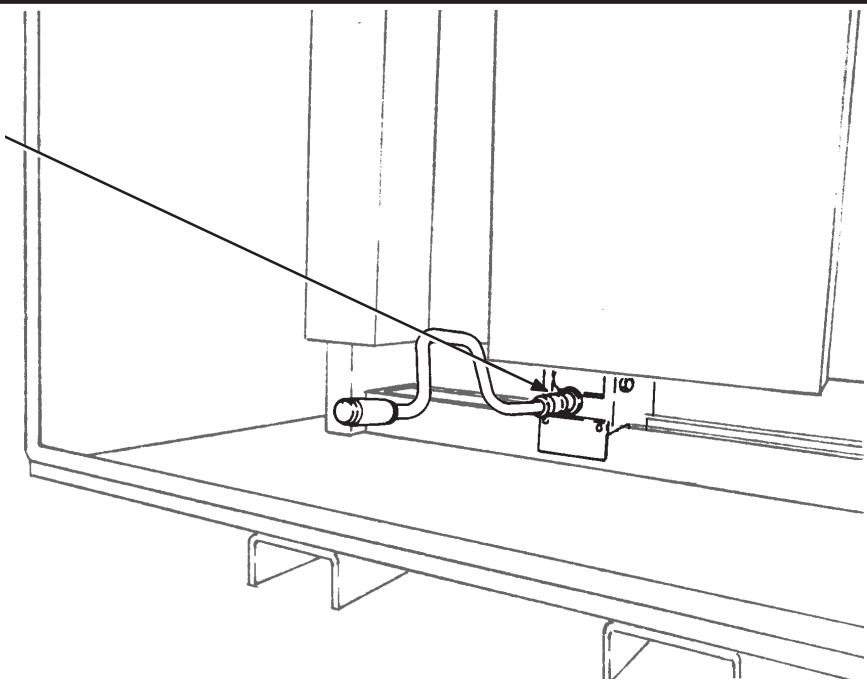
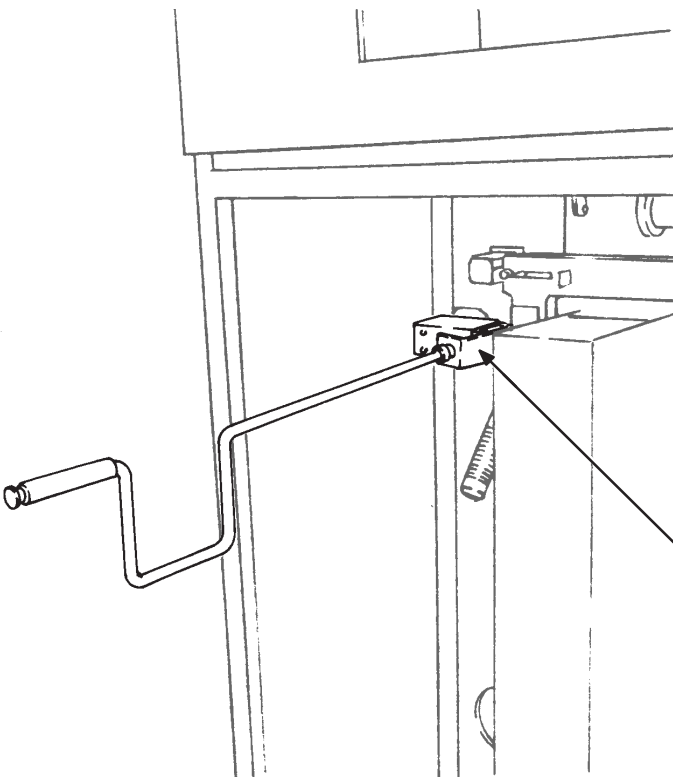


FIGURE 3-1. MANUAL BYPASS OPERATION

**DRAWOUT MECHANISM LOCATION  
1200-AMP BT**



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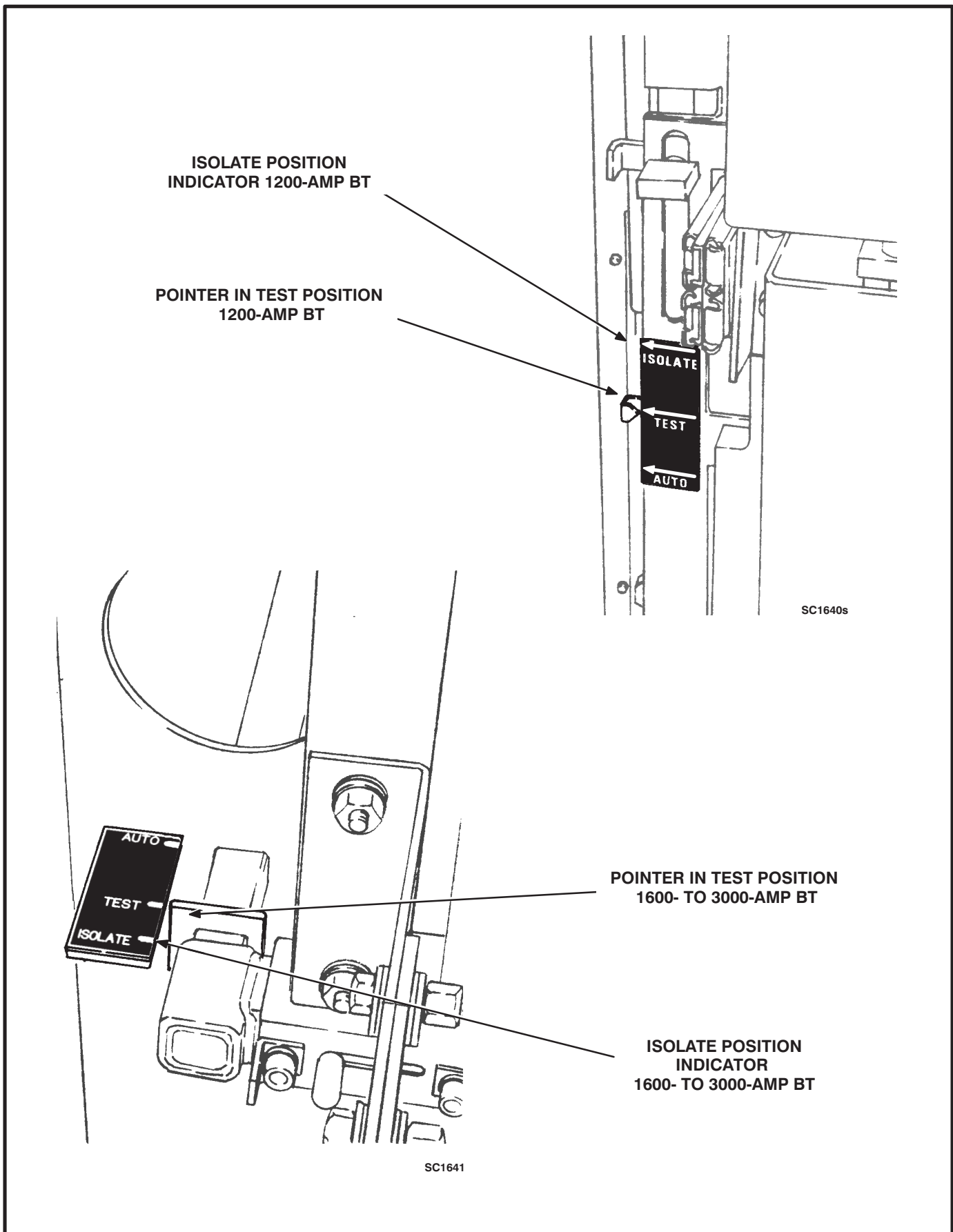


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**DRAWOUT MECHANISM LOCATION  
1600- TO 3000-AMP BT**

**FIGURE 3-2. DRAWOUT CRANKING OPERATION**





**ISOLATE POSITION  
INDICATOR 1200-AMP BT**

**POINTER IN TEST POSITION  
1200-AMP BT**

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**POINTER IN TEST POSITION  
1600- TO 3000-AMP BT**

**ISOLATE POSITION  
INDICATOR  
1600- TO 3000-AMP BT**

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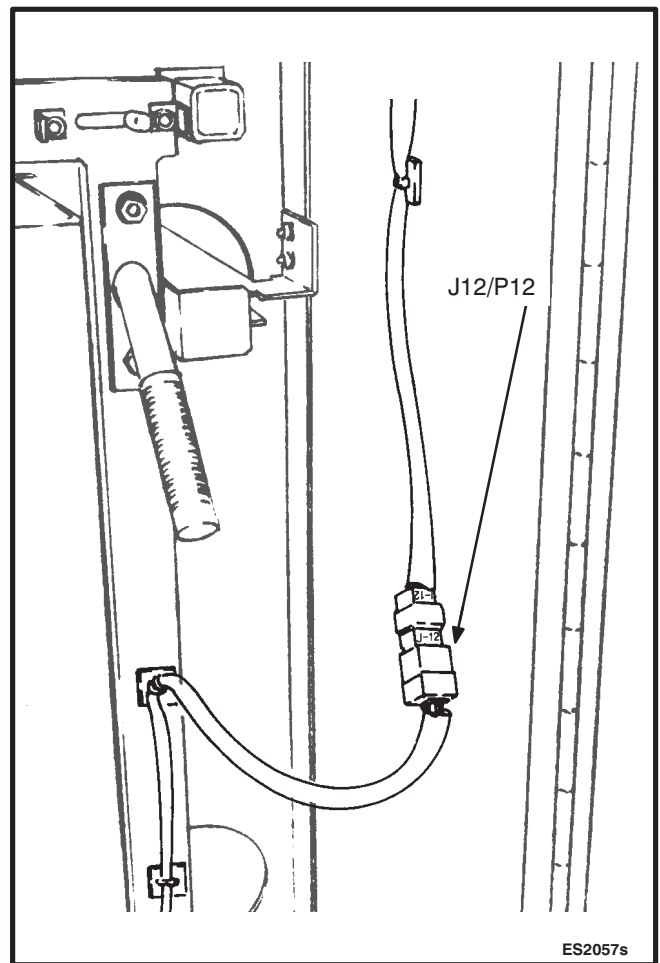
**FIGURE 3-3. AUTO/TEST/ISOLATE POSITION POINTER**

**To Reconnect the Automatic Transfer Switch:**

1. Move the automatic transfer switch to the same source as the bypass switch.
2. Connect J12/P12 (Figure 3-4).
3. Rotate the drawout cranking handle clockwise to move the automatic transfer switch back to the Test position. Check that the automatic transfer switch position pointer is aligned with the word "Test." Check that the **ATS in Test** lamp is lit. Check that the **ATS Inhibit** lamp is not lit.
4. Rotate the drawout cranking handle clockwise to move the automatic transfer switch back to the Auto position. Check that the automatic transfer switch position pointer is aligned with the word "Auto." Return the drawout cranking handle to its stored position.
5. Move the Motor Disconnect toggle switch (located on the accessory control panel) to the Auto position to enable the automatic transfer switch linear actuators. Close the cabinet door.
6. Move the Manual Bypass handle down. Check that the **ATS Inhibit**, **Bypass Source 1** and **Bypass Source 2** indicator lamps are **not** lit. Return the Manual Bypass handle to its stored position.

**After the automatic transfer switch is returned to the Auto position, the Motor Disconnect toggle switch is moved to the Auto position, and the bypass switch is moved to the open (disconnected) position, the automatic transfer switch will respond to transfer/retransfer signals from the Power Sentry control.**

7. Close and lock the cabinet door.



**FIGURE 3-4. CONNECTOR J12/P12**

## MANUAL OPERATION OF ATS

The automatic transfer switch has operator handles that are intended for maintenance use only. Manual operation must be performed by qualified personnel under **NO-LOAD CONDITIONS ONLY**.

**⚠WARNING** *Manual operation of the transfer switch under load presents a shock hazard that can cause severe personal injury or death. For this reason, do not attempt to perform manual operation of the transfer switch when it is under load.*

### Manual Transfer to The Emergency Position

1. Bypass and isolate the automatic transfer switch as described in this section. Make sure the Motor Disconnect switch is in the Off position.

**⚠WARNING** *Manual operation of the transfer switch under load presents a shock hazard that can cause severe personal injury or death. For this reason, do not attempt to perform manual operation of the transfer switch when it is energized by either Normal or Emergency power sources.*

2. A manual operating handle is provided with the transfer switch. The handle is a steel rod or tube, with a knob or hand grip on one end. On standard transfer switches (Figure 3-5), there are two manual operator slots—one for the Normal contacts and one for the Emergency contacts.

First, insert the handle in the slot for the Normal contacts and open the Normal contacts. Then, insert the handle in the slot for the Emergency contacts and close the Emergency contacts.

Be certain to push the handle all the way to the LOCK position. A distinct over-center locking action can be felt. Return the handle to its storage position.

3. If the transfer switch is not functioning correctly. Call your dealer or distributor immediately.

### Manual Transfer to The Normal Position

1. Bypass and isolate the automatic transfer switch as described in this section. Make sure the Motor Disconnect switch is in the Off position.

**⚠WARNING** *Manual operation of the transfer switch under load presents a shock hazard that can cause severe personal injury or death. For this reason, do not attempt to perform manual operation of the transfer switch when it is energized by either Normal or Emergency power sources.*

2. A manual operating handle is provided with the transfer switch. The handle is a steel rod or tube, with a knob or hand grip on one end. On standard transfer switches (Figure 3-5), there are two manual operator slots—one for the Normal contacts and one for the Emergency contacts.

First, insert the handle in the slot for the Emergency contacts and open the Emergency contacts. Then, insert the handle in the slot for the Normal contacts and close the Normal contacts. Be certain to push the handle all the way to the LOCK position. A distinct over-center locking action can be felt. Return the handle to its storage position.

3. If the transfer switch is not functioning correctly. Call your dealer or distributor immediately.

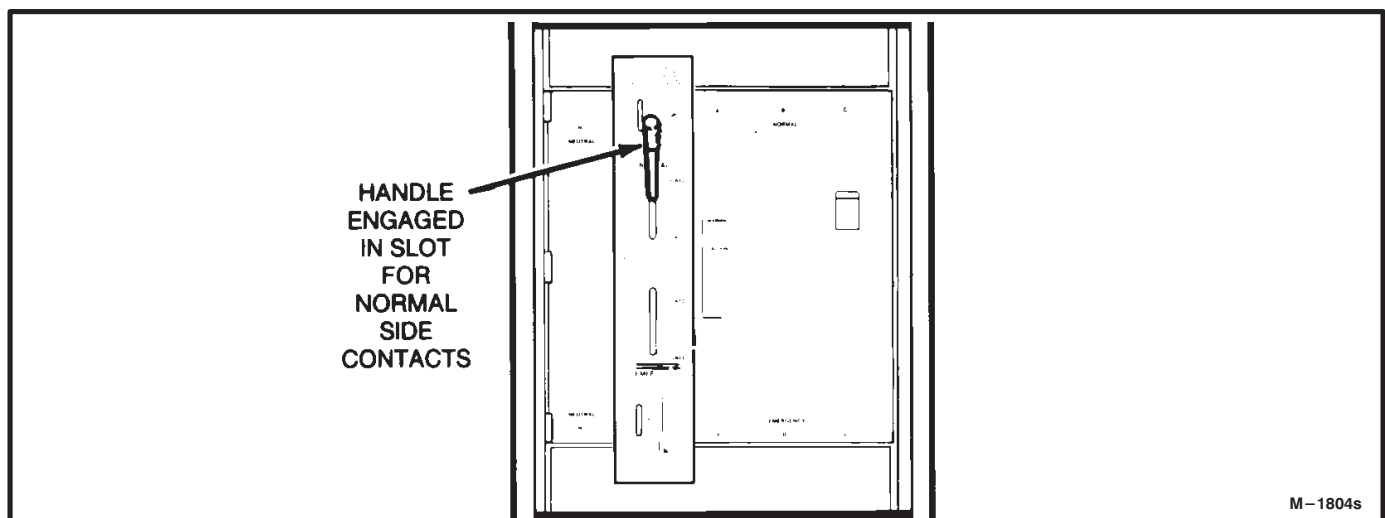


FIGURE 3-5. MANUAL OPERATION

## PREVENTIVE MAINTENANCE

Performing the yearly preventive maintenance procedures in Table 3-1 will result in operational reliability of the transfer switch.

The following procedures must only be performed by technically qualified personnel, following the procedures provided in the Service manual (962–0515). **If repair or replacement of components is necessary, call your dealer or distributor.**

**⚠WARNING** *AC power within the cabinet and the rear side of the cabinet door presents a shock hazard that can cause severe personal injury or death. In addition, incorrect installation, service, or parts replacement can result in severe personal injury, death, and/or equipment damage. Therefore, all corrective service procedures must only be performed by technically qualified personnel, following the procedures provided in the Service manual (962–0515).*

**⚠WARNING** *The transfer switch presents a shock hazard that can cause severe personal injury or death unless all AC power is removed. Be sure to disconnect AC line power before servicing.*

TABLE 3-1. ANNUAL PREVENTIVE MAINTENANCE

### 1. DISCONNECT ALL SOURCES OF AC POWER:

Disconnect both the Normal and the Emergency AC power sources from the transfer switch before continuing.

### 2. CLEAN

- a. Thoroughly dust and vacuum all controls, meters, switching mechanism components, interior buswork, and connecting lugs.
- b. Close the cabinet door and wash **exterior** surfaces with a damp sponge (mild detergent and water). **Do not allow water to enter the cabinet, especially at meters, lamps, and switches.**

### 3. INSPECT

- a. Check buswork and supporting hardware for carbon tracking, cracks, corrosion, or any other types of deterioration. If repair or replacement is necessary, call your dealer or distributor.
- b. Check stationary and movable contacts. If contact replacement is necessary, the procedures are described in sections 5 and 6 of the Service manual (962–0515).
- c. Check system hardware for loose connections. Tighten as indicated in step 4.
- d. Check cams, gears, and primary disconnects. If the lubricant is contaminated, clean it off and apply additional lubricant as described in the Service manual (962–0515).
- e. Check all control wiring and power cables (especially wiring between or near hinged doors) for signs of wear or deterioration.
- f. Check all control wiring and power cables for loose connections. Tighten as indicated in step 4.
- g. Check the cabinet interior for loose hardware. Tighten as indicated in step 4.

### 4. PERFORM ROUTINE MAINTENANCE

- a. Tighten buswork, control wiring, power cables, and system hardware, as necessary. Hardware torque values are given in sections 5 and 6 of the Service manual (962–0515).
- b. Retorque all cable lug connections. Lug torque values are listed on a decal near the transfer switch lugs.

### 5. CONNECT AC POWER AND CHECK OPERATION

- a. Connect both AC power sources.
- b. Test system operation. Close and lock the cabinet door.



# 4. Troubleshooting

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The following procedures describe preliminary troubleshooting checks. If the trouble persists, call your dealer or distributor.

**⚠WARNING** *AC power within the cabinet and the rear side of the cabinet door presents a shock hazard that can cause severe personal injury or death. For this reason; do not touch or allow clothing, tools, or jewelry to contact exposed electrical terminals whenever the cabinet door is open. Make sure you are standing on a dry, insulating surface.*

## **Transfer Switch Does Not Transfer Automatically**

1. Is the Source Selector switch in the correct position?
2. Has the transfer time delay expired?
3. Has the programmed transition time delay (if equipped) expired?
4. Is backup source voltage sufficient to trigger the backup source voltage sensor?

## **Transfer Switch Does Not Retransfer Automatically**

1. Is the Source Selector switch in the correct position?
2. Has the retransfer time delay expired?
3. Has the programmed transition time delay (if equipped) expired?
4. Is preferred source voltage sufficient to trigger the preferred source voltage sensor?



**Cummins Power Generation**  
1400 73rd Avenue N.E.  
Minneapolis, MN 55432  
1-800-888-6626  
763-574-5000 International Use  
Fax: 763-528-7229

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