



# Service Manual

Our energy working for you.™



## Transfer Switch 40–1000 Amps

OTPCSEA (Spec A)  
OTPCSEB (Spec A)  
OTPCSEC (Spec A)  
OTPCSED (Spec A)

# Table of Contents

---

SECTION	TITLE	PAGE
<b>1. INTRODUCTION</b>		<b>1-1</b>
	About This Manual	1-1
	Transfer Switch Applications	1-3
	Transfer Switch Function	1-3
	Utility-to-Genset Operation	1-3
	Control Levels 1 and 2	1-3
	Model Identification	1-4
	How to Obtain Service	1-4
	How to Obtain Service	1-4
<b>2. COMPONENT DESCRIPTION</b>		<b>2-1</b>
	Cabinet	2-1
	Control Panel	2-1
	Bargraph Meter Panel	2-2
	AC Ammeter	2-2
	Power Meter	2-2
	Power Factor Meter	2-2
	Frequency Meter	2-2
	AC Voltmeter	2-2
	Switch Panel	2-2
	Indicator Lamps	2-2
	Source 1 Available and Source 2 Available	2-2
	Source 1 Connected	2-2
	Source 2 Connected	2-2
	Not in Auto	2-2
	Test/Exercise Active	2-3
	Membrane Buttons	2-3
	Test	2-3
	Override	2-3
	Reset/Lamp Test	2-3
	Digital Display	2-3
	Security Key Switch Option	2-3
	Electronic Control System	2-8
	Electronic Control Circuit Modules	2-8
	Motor Disconnect Switch	2-9
	Two-Wire Starting	2-10
	Auxiliary Contacts	2-10
	Remote Start-Stop Connections	2-10
	Programmed Transition	2-10
	Transfer Times	2-10
	Test With or Without Load	2-11
	Programmable Generator Exerciser	2-11
	Remote Test Switch	2-11
	Real-Time Clock	2-11
	Voltage Imbalance Sensor	2-12

SECTION	TITLE	PAGE
	Phase Rotation Sensor .....	2-12
	Loss of Single Phase Sensor .....	2-12
	Transfer Inhibit Input .....	2-13
	Retransfer Inhibit Input .....	2-13
	Electronic Control Options .....	2-14
	Auxiliary Relays Option .....	2-14
	Relay Module Option .....	2-14
	Load Current and Power Sensor Option .....	2-16
	Load Shed Option .....	2-16
	Battery Charger Options .....	2-17
	2-Amp Battery Charger .....	2-17
	15/12-Amp Battery Charger .....	2-18
	PowerCommand Network Interface Option .....	2-20
	Network Sequencer .....	2-21
	Network System Device Status .....	2-21
	Load Shed Option .....	2-22
	Load Sequencing Option .....	2-23
	Transfer Switch Assembly .....	2-23
	Contact Assemblies .....	2-23
	Linear Actuator .....	2-23
	Auxiliary Contacts .....	2-23
	Motor Disconnect Switch .....	2-23
	Removing and Replacing Electronic Control Components .....	2-23
<b>3. OPERATION</b> .....		<b>3-1</b>
	Functional Programs .....	3-1
	Programmed Transition .....	3-1
	Transfer Times .....	3-1
	Generator Exercise .....	3-1
	Test With or Without Load .....	3-1
	Transfer/Re-Transfer Inhibits .....	3-1
	Real-Time Clock .....	3-2
	Time Delays .....	3-2
	Time Delays .....	3-2
	Time Delay Engine Start (TDESa) .....	3-2
	Time Delay Engine Cooldown (TDECa) .....	3-2
	Time Delay Normal to Emergency (TDNE) .....	3-3
	Time Delay Emergency to Normal (TDEN) .....	3-3
	Time Delay Programmed Transition (TDPT) .....	3-3
	Elevator Time Delay (TDEL) .....	3-3
	Transfer Times .....	3-3
	Sensors .....	3-4
	Under-Voltage Sensing .....	3-4
	Over-Voltage Sensing .....	3-5
	Frequency Sensing .....	3-6
	Voltage Imbalance Sensor .....	3-7
	Phase Rotation Sensor .....	3-7
	Loss of Single Phase Sensor .....	3-7
	Sync Check Sensor .....	3-8

SECTION	TITLE	PAGE
	Generator Tests, Exercises, and Exercise Exceptions .....	3-9
	Test With or Without Load .....	3-9
	Generator Set Start Test Without Load .....	3-9
	Generator Set Start Test With Load .....	3-9
	Real-Time Clock .....	3-9
	Sleep Mode .....	3-10
	Programmable Generator Set Exercises .....	3-10
	Setting Exercise(s) .....	3-11
	Setting Exercise Exception(s) .....	3-12
	Events .....	3-13
	Operation .....	3-13
	Automatic Operation .....	3-13
	Manual Operation .....	3-13
	With-Load Standby System Test .....	3-14
	Planned Maintenance .....	3-14

<b>4. DIGITAL DISPLAY MENU SYSTEM .....</b>	<b>4-1</b>
Main Menu .....	4-1
Password and Setup Menus .....	4-1
Navigation .....	4-1
Menu Descriptions .....	4-3
Source 1 and Source 2 Submenus .....	4-4
Load Submenus .....	4-5
Statistics Submenus .....	4-6
Events Submenus .....	4-7
Setup Submenus .....	4-8
Setup Menu Navigation and Description .....	4-9
Changing Setup Parameters .....	4-10
Saving or Canceling Setup Parameters .....	4-10
Sensor 1 and Sensor 2 Submenus .....	4-11
Sync Check Submenus .....	4-13
Time Delay Submenus .....	4-14
Test Submenus .....	4-15
Exercise Submenus .....	4-16
Exercise Exceptions Submenus .....	4-18
Mode Submenu .....	4-20
Clock Submenus .....	4-21
Sequencer Submenus .....	4-22
About Submenus .....	4-23
System Submenus .....	4-25
Active TD Submenus .....	4-26

<b>5. EVENTS .</b>	<b>5-1</b>
Event Types .....	5-1
Event History .....	5-1
Fault Events .....	5-1
Control Locked Out .....	5-1
Fail to Retransfer .....	5-1
Fail to Transfer .....	5-2
S1 Failed to Close .....	5-2
S1 Failed to Open .....	5-2
S2 Failed to Close .....	5-2

SECTION	TITLE	PAGE
	S2 Failed to Open .....	5-2
	Non-Fault Events .....	5-2
	Controller Loss of Power .....	5-2
	Emergency Start A .....	5-2
	Exercise in Progress .....	5-2
	Exercise Sequence .....	5-2
	Fail to Sync .....	5-3
	Generator A Common Alarm .....	5-3
	Load Sequencer Outputs (1-8) .....	5-3
	Network Wink .....	5-3
	Neutral Current Warning .....	5-3
	Not in Auto: ATS Motor Disconnected .....	5-3
	Not in Auto: Common Output (Network Only) .....	5-3
	Not in Auto: Load Shed .....	5-3
	Not in Auto: Retransfer Inhibit .....	5-3
	Not in Auto: Transfer Inhibit .....	5-3
	Phase Rotation Failure .....	5-4
	Service Tool Connected .....	5-4
	Source 1 Available .....	5-4
	Source 1 Connected or Bypassed Source 1 .....	5-4
	Source 1 Loss of Phase Failure .....	5-4
	Source 1 Over-Voltage Failure .....	5-4
	Source 1 Over/Under Frequency Failure .....	5-4
	Source 1 Under-Voltage Failure .....	5-4
	Source 1 Voltage Imbalance Failure .....	5-4
	Source 2 Available .....	5-4
	Source 2 Connected .....	5-4
	Source 2 Loss of Phase Failure .....	5-4
	Source 2 Over-Voltage Failure .....	5-4
	Source 2 Over/Under Frequency Failure .....	5-4
	Source 2 Under-Voltage Failure .....	5-4
	Source 2 Voltage Imbalance Failure .....	5-4
	Speed Adjust .....	5-4
	Sync Check Active .....	5-4
	Sync Enable .....	5-5
	Test In Progress .....	5-5
	Test Start A .....	5-5
	Time Delay Engine Cool-Down (TDEC) .....	5-5
	Time Delay Programmed Transition (TDPT) .....	5-5
	Time Delay Source 1 (N) to Source 2 (E) (TDNE) .....	5-5
	Time Delay Source 2 (E) to Source 1 (N) (TDEN) .....	5-5
	Time Delay Start A (TDES-A) .....	5-5
	Transfer Pending (TDEL) .....	5-5
<b>6.</b>	<b>TROUBLESHOOTING .....</b>	<b>6-1</b>
	InPower Service Tool .....	6-1
	About Network Applications and Customer Inputs .....	6-1
	Digital Module .....	6-1
	Power Module .....	6-2

SECTION	TITLE	PAGE
	Control LED Indicators and Switch .....	6-2
	LED Indicators .....	6-2
	Exerciser Enable/Disable Switch .....	6-2
	Sequence of Events .....	6-3
	Transfer from Source 1 to Source 2 .....	6-3
	Transfer from Source 2 to Source 1 .....	6-4
	Troubleshooting Using Fault Codes .....	6-5
	Fault Events .....	6-5
	Fault Flash-Out .....	6-5
	Troubleshooting Warnings .....	6-5
	Fault Event Definitions .....	6-8
	Controller Checksum Error .....	6-8
	Low Controller Battery .....	6-8
	ATS Fail to Close: Re-Transfer .....	6-8
	ATS Fail to Close: Transfer .....	6-8
	Battery Charger Malfunction .....	6-8
	Network Communications Error .....	6-8
	Controller Loss of Power .....	6-8
	Troubleshooting With Symptoms .....	6-9
	Troubleshooting Warnings .....	6-9
	Clearing Faults .....	6-21
	Fault Alarm Output Connector .....	6-21
	Battery Charger Fails to Charge .....	6-23
	Battery Loses Charge .....	6-23
	Troubleshooting .....	6-24
	Loss of AC Power .....	6-24
	Replacing Fuses .....	6-24
<b>7.</b>	<b>CIRCUIT BREAKER TRIP UNIT SETUP AND ADJUSTMENTS .....</b>	<b>7-1</b>
	Introduction .....	7-1
	Trip Units Used with 150, 225, and 250 Amp Transfer Switches .....	7-2
	Tools Required .....	7-2
	General Information .....	7-2
	Protection .....	7-2
	Indicator light .....	7-2
	Test .....	7-2
	Installation .....	7-3
	Set Up Trip Unit .....	7-4
	Adjust Switch Settings .....	7-4
	Trip Units Used with 300, 400, and 600 Amp Transfer Switches .....	7-5
	General Information .....	7-5
	Introduction .....	7-5
	Trip Unit Settings .....	7-5
	Trip Unit Switches .....	7-5
	Long-Time Protection .....	7-5
	Instantaneous Protection .....	7-6
	Overload Indicator Light .....	7-7
	Trip Unit Testing .....	7-7
	Operation .....	7-7
	Switch Adjustment .....	7-7

SECTION	TITLE	PAGE
	Micrologic 3.0 Trip Unit .....	7-7
	Trip Unit Operation Verification .....	7-8
	Trip Unit Replacement .....	7-8
	Required Tools .....	7-9
	Preparation .....	7-9
	Trip Unit Replacement .....	7-9
	Circuit Breaker Accessory Cover Replacement .....	7-11
	Trip Unit Installation Check .....	7-11
	Trip Unit Setup .....	7-11
	Circuit Breaker Reconnection .....	7-11
	Adjustable Rating Plug Replacement .....	7-11
	Rating Plug Removal .....	7-12
	New Rating Plug Installation .....	7-12
	Trip Units Used with 800 and 1000 amp Transfer Switches .....	7-13
	Micrologic 6.0A Trip Unit .....	7-13
	Trip Unit Switches .....	7-13
	Long-Time Protection .....	7-13
	Short-Time Protection .....	7-14
	Instantaneous Protection .....	7-15
	Ground-Fault Protection .....	7-15
	Indicator Lights .....	7-16
	Overload Indicator Light .....	7-16
	Trip Indicator Lights .....	7-16
	Ammeter .....	7-16
	Ammeter .....	7-17
	Display .....	7-17
	Ammeter Measurements .....	7-17
	Accessing Information .....	7-17
	Operation .....	7-21
	Switch Setting Adjustment .....	7-21
	Micrologic 6.0A Trip Unit .....	7-21
	Trip Unit Resetting .....	7-21
	Trip Unit Status Check .....	7-22
	Trip Unit Replacement .....	7-22
	Rating Plug Removal .....	7-23
	Trip Unit Removal .....	7-23
	Trip Unit Replacement .....	7-23
	Trip Unit Installation Check .....	7-25
	Adjustable Rating Plug Replacement .....	7-26
	Rating Plug Removal .....	7-26
	New Rating Plug Installation .....	7-26
	Battery Replacement .....	7-27
	Circuit Breaker Disconnection .....	7-27
	Circuit Breaker Accessory Cover Removal .....	7-27
	Withstand Module Shifting .....	7-27
	Battery Replacement .....	7-27
<b>8.</b>	<b>CIRCUIT BREAKER REPLACEMENT / SERVICE .....</b>	<b>8-1</b>
	Circuit Breaker Removal/Replacement Procedure .....	8-1

SECTION	TITLE	PAGE
	Disconnect AC Power .....	8-1
	Reconnecting AC Power (When Finished) .....	8-1
	H-Frame Circuit Breaker Replacement (40, 70, and 125 Amp Transfer Switches) 8-2	
	D-Frame Circuit Breaker Replacement (150, 225, and 250 Amp Transfer Switches) .....	8-4
	P-Frame Circuit Breaker Replacement (300, 400, and 600 Amp Transfer Switches) .....	8-6
	Circuit Breaker Planned Maintenance .....	8-8
	Inspection and Preventative Maintenance .....	8-8
	Guidelines .....	8-8
	Procedures .....	8-8
	Thermographic Inspection .....	8-10
<b>9.</b>	<b>TRANSFER SWITCH SERVICE .....</b>	<b>9-1</b>
	General .....	9-1
	Removing and Replacing Electronic Control Components .....	9-1
	Membrane Switch Test .....	9-1
	Power Module Test .....	9-3
	Power Module 1 .....	9-3
	Power Module 2 .....	9-4
	Digital Board Replacement .....	9-5
	Initial Calibration .....	9-5
	Setup with a Capture File .....	9-5
	Setup Without a Capture File .....	9-5
	After the Setup is Completed .....	9-5
	Switch Assembly Removal/Replacement Procedure .....	9-8
	Disconnect AC Power .....	9-8
	Reconnecting AC Power (When Finished) .....	9-8
	Linear Actuator Removal and Replacement (40 to 125 Amperes, Three Pole Transfer Switches Only) .....	9-9
	Removing Actuator .....	9-9
	Replacing Actuator .....	9-9
	Block and Cross-Bar Assembly Removal and Replacement (40 to 125 Amperes, Three Pole Transfer Switches Only) .....	9-11
	Removing the Block and Cross-Bar Assembly (Normal or Emergency) .....	9-11
	Replacing the Block and Cross-Bar Assembly .....	9-12
	Auxiliary Switch Removal and Replacement (40 to 125 Amperes, Three Pole Transfer Switches Only) .....	9-15
	Removing Auxiliary Switch Assembly .....	9-15
	Replacing Auxiliary Switch Assembly .....	9-15
	Linear Actuator Removal and Replacement (150 to 260 Amperes Transfer Switches and 40 to 125 Amperes, Four Pole Transfer Switches) .....	9-17
	Removing Actuator .....	9-17
	Replacing Actuator .....	9-17
	Block and Cross-Bar Assembly Removal and Replacement (150 to 260 Amperes Transfer Switches and 40 to 125 Amperes, Four Pole Transfer Switches) .....	9-20
	Removing the Block and Cross-Bar Assembly (Normal or Emergency) .....	9-20
	Replacing Block and Cross-Bar Assembly .....	9-23
	Auxiliary Switch Removal and Replacement (150 to 260 Amperes Transfer Switches and 40 to 125 Amperes, Four Pole Transfer Switches) .....	9-24
	Removing Auxiliary Switch Assembly .....	9-24



SECTION	TITLE	PAGE
	Replacing Auxiliary Switch Assembly .....	9-24
	Linear Actuator Removal and Replacement (300 to 600 Amperes) .....	9-26
	Removing Actuator .....	9-26
	Replacing Actuator .....	9-26
	Block and Cross-Bar Assembly Removal and Replacement (300 to 600 Amperes) .....	9-29
	Removing the Block and Cross-bar Assembly (Normal or Emergency)	9-29
	Replacing the Block and Cross-bar Assembly (Normal or Emergency)	9-32
	Auxiliary Switch Removal and Replacement (300 to 600 Amperes) .....	9-33
	Removing Auxiliary Switch Assembly .....	9-33
	Replacing Auxiliary Switch Assembly .....	9-34
	Linear Actuator Removal and Replacement (800 and 1000 Amperes) ....	9-35
	Removing Actuator .....	9-35
	Replacing Actuator .....	9-35
	Block and Cross-Bar Assembly Removal and Replacement (800 and 1000 Amperes) .....	9-39
	Removing the Block and Cross-bar Assembly (Normal or Emergency)	9-39
	Replacing the Block and Cross-bar Assembly (Normal or Emergency)	9-43
	Auxiliary Switch Removal and Replacement (800 and 1000 Amperes) ....	9-44
	Removing Auxiliary Switch Assembly .....	9-44
	Replacing Auxiliary Switch Assembly .....	9-45
	Mis-Wired Current Transformers .....	9-46

<b>10. SCHEMATICS</b> .....	<b>10-1</b>
Power Module 1 and 2 (Pin-Outs) .....	10-2
Power Module 1 and 2 AC Power Connections (Pin-Outs) .....	10-2
Digital Module Level 1 and 2 (Pin-Outs) .....	10-3
Typical Interconnection Diagram 630–1974 (Sheet 1 of 10) .....	10-5
Typical Interconnection Diagram 630–1974 (Sheet 2 of 10) .....	10-6
Typical Interconnection Diagram 630–1974 (Sheet 3 of 10) .....	10-7
Typical Interconnection Diagram 630–1974 (Sheet 4 of 10) .....	10-8
Typical Interconnection Diagram 630–1974 (Sheet 5 of 10) .....	10-9
Typical Interconnection Diagram 630–1974 (Sheet 6 of 10) .....	10-10
Typical Interconnection Diagram 630–1974 (Sheet 7 of 10) .....	10-11
Typical Interconnection Diagram 630–1974 (Sheet 8 of 10) .....	10-12
Typical Interconnection Diagram 630–1974 (Sheet 9 of 10) .....	10-13
Typical Interconnection Diagram 630–1974 (Sheet 10 of 10) .....	10-14
Typical Level 2 Wiring Diagram 626–2311 (Sheet 1 of 5) .....	10-15
Typical Level 2 Wiring Diagram 626–2311 (Sheet 2 of 5) .....	10-16
Typical Level 2 Wiring Diagram 626–2311 (Sheet 3 of 5) .....	10-17
Typical Level 2 Wiring Diagram 626–2311 (Sheet 4 of 5) .....	10-18
Typical Level 2 Wiring Diagram 626–2311 (Sheet 5 of 5) .....	10-19
Typical Level 1 Wiring Diagram 626–2303 (Sheet 1 of 5) .....	10-20
Typical Level 1 Wiring Diagram 626–2303 (Sheet 2 of 5) .....	10-21
Typical Level 1 Wiring Diagram 626–2303 (Sheet 3 of 5) .....	10-22
Typical Level 1 Wiring Diagram 626–2303 (Sheet 4 of 5) .....	10-23
Typical Level 1 Wiring Diagram 626–2303 (Sheet 5 of 5) .....	10-24
Circuit Breaker Wiring Diagram 630–3641 (Sheet 1 of 2) .....	10-25
Circuit Breaker Wiring Diagram 630–3641 (Sheet 2 of 2) .....	10-26
Power Module 1 PCB Assembly .....	10-27

**BUY NOW**

**Then Instant Download  
the Complete Manual  
Thank you very much!**