AUTOMATIC TRANSFER CONTROL
FOR A TWO SOURCE UTILITY-UTILITY

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Qualified Persons

WARNING

The equipment covered by this publication must be selected for a specific application and it must be operated and maintained by Qualified Persons who are thoroughly trained and knowledgeable in the installation, operation, and maintenance of underground power distribution equipment along with the associated hazards that may be involved. This publication is written only for such qualified persons and is not intended to be a substitute for adequate training and experience in safety procedures for this type of equipment. Proper installation is the responsibility of the operating and construction personnel and the utility performing and authorizing the work. Completion of these instructions implies no further warranty by the manufacturer.

A Qualified Person is defined in the National Electrical Code (NEC/NFPA-70) as:
One who has skills and knowledge related to the construction and operation of the electrical equipment and installations and has received safety training to recognize and avoid the hazards involved.

The specific electrical safety training requirements to be considered a qualified person are detailed in NFPA-70E, Article 110.1(D), Employee Training. Some of the requirements from the 2012 edition are shown in column at right. For the specific detailed training requirements for a Qualified Person make certain to refer to the most recent applicable edition.

These training requirements would include, but are not limited to, the following key points:
• The skills and techniques necessary to distinguish exposed energized parts from other parts of electrical equipment.
• The skills and techniques necessary to determine the proper approach distances corresponding to the voltages to which the qualified person will be exposed.
• The proper use of the special precautionary techniques, personal protective equipment, insulating and shielding materials, and insulated tools for working on or near exposed energized parts of electrical equipment.
• Tasks performed less often than once per year have additional training requirements.

These instructions are intended only for such qualified persons. They are not intended to be a substitute for adequate training and experience in safety procedures for this type of equipment. Additionally, the recommendations in this instruction bulletin are not intended to supersede or to take the place of established utility safety guidelines and established practices. If there is any question, consult with your foreman or supervisor, as appropriate.

Please refer to OSHA 29 CFR 1910.339 and NFPA 70E Articles 100 and 110.
SAFETY INFORMATION
Understanding Safety-Alert Messages

There are several types of safety-alert messages which may appear throughout this instruction bulletin as well as on labels attached to the pad-mounted switchgear. Familiarize yourself with these types of messages and the importance of the various signal words, as explained below.

DANGER

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

WARNING

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

CAUTION

CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE

NOTICE is used to address practices not related to physical injury.

SAFETY INSTRUCTIONS

Safety Instructions (or equivalent) signs indicate specific safety-related instructions or procedures.

DANGER

Federal Pacific Fuse Mountings in conjunction with appropriate fuses are designed to protect equipment and to disconnect faulted equipment from the system. The fuses cannot protect personnel from injury or electrocution if contact is made with energized circuits or hardware.

NOTICE

Thoroughly and carefully read this instruction bulletin before installation of the pad-mounted switchgear, before switching or operating the switches or fuse mountings in this equipment, and before performing any maintenance on the equipment.
**MOTOR AND SWITCH OPERATION**

**NOTICE**
If equipped with a UPS (Uninterruptible Power Supply), it must be powered on before any control operations can occur!

To power on the UPS, press and hold the ON/OFF button on UPS (located on the backside of the control panel) for two seconds until the UPS beeps and the green LED indicator is lit.

**Motor Operator**
Each motor operator provided has a Local/Remote switch. Each motor operator must be placed in the Remote mode for the automatic transfer controls to work properly. All electrical operation, such as opening and closing switches, should be performed through the OCS screen. See System Setup on page 4 for setup and operation.

The motor used to operate each load-break switch is capable of being decoupled in order to test the system without creating an outage. Decoupling the motor allows opening/closing the motor operator without opening/closing the load-break switch. It is very important to return the motor to the same position of the switch in order to recouple properly.

**NOTICE**
It is important to have the unit in the Manual Mode when coupling/decoupling the motor in order to prevent damage to yourself or the equipment.

**Switch Operation**
If no power is available to the automatic transfer controls and the motor operator batteries are discharged, the switch can be operated with the manual-operating handle provided.

**NOTICE**
Be sure to return both switches to their original states before couplings and returning unit to the Automatic Mode.

**SYSTEM OPERATION DESCRIPTION**

**NOTE:** All examples in 'System Operation Description' assume Source 1 is the preferred operating source and Source 2 is the stand-by source.

**Normal Operation**
In a two-source utility automatic transfer system both utility sources are available, the OCS is in the automatic mode, and the preferred source switch closed. In the following examples, Source 1 will be the preferred source and Source 2 will be on stand-by.

**Loss of Preferred Source**
Loss of the preferred source will cause the Pref Src Loss Timer (See Parameters Setup on page 5) to begin timing. If the preferred source returns before the timer finishes, the system returns to normal. If the timer finishes and the preferred source is not available, the unit will transfer to Source 2 (Stand-by Source).

**Return of Preferred Source**
The system is now operating on Source 2 (Stand-by Source). Once the preferred source is re-established, the Source Return Timer begins (See Parameters Setup on page 5). Once the source return timer is finished and the OCS determines that Source 1 is still available, the unit will transfer back to the preferred source and will return to normal operation.

**Transfer on Unbalanced Voltage Condition**
If any source side fuses blow on Source 1 creating a “single phase” or “open phase” condition to the load, the OCS determines that Source 1 is unavailable and transfers to Source 2. Once Source 1 returns and the OCS determines it is good, the unit will transfer back to the preferred source.

**Over-Current Conditions**
Within the Automatic transfer system there are two internal modes:
1. **Suspend Mode (Suspends Manual/Automatic Mode Operation)**
2. **Lockout Mode (Locks out any operation until reset)**

**Suspend Mode (OC Detected)**
A passing transient such as a motor starting or a load side protective device clearing initiates an over-current condition. Once an over-current is detected, OC Lockout Timer (See Parameters Setup on page 5) begins and the system goes into the suspend mode. Once the OC Lockout Timer times out, the system checks to see if voltage is present. If voltage is present and the over-current condition is gone, the system returns to normal. If the over-current condition is still present, the system stays in suspend mode and repeats the timing cycle.

**Lockout Mode (OC Lockout)**
A fault that has been cleared by a source side protective device will place the unit in the Lockout Mode. Once an over-current is detected, the system goes into the Suspend Mode (see previous paragraph). Once the OC Lockout Timer (See Parameters Setup on page 5) times out, the system checks to see if voltage is present. If voltage is not present, meaning the fault has been cleared, then both switches will be opened and locked out.

**To reset the over-current lockout:**
1. Clear the fault that caused the over-current.
2. Press RESET OC LOCKOUT key.
3. Manually close the preferred source switch.
4. Place the unit in the automatic mode.
SYSTEM SETUP

Main Screen
If the main screen is solid black, the screen saver is active. Press anywhere on the screen to activate the Main Menu. The Main Menu is the starting point for making selections. To select an option, press the desired item on the screen.

Time/Date
Press the appropriate field to enter the time or date. This must be entered in order to time/date stamp all Event Log information.

Screen Resolution
Pressing the ↑↓ keys will adjust the brightness of the screen.
PARAMETERS SETUP
First, press the Parameters Setup key. This will display the password screen.

Press the Password key to highlight a number entry screen. The default password for the system is “1234”. The password cannot be changed. After entering the password, press the enter key to proceed. If you make a mistake, press the ESC key and begin again. Once the password is entered, the Parameters Setup Screen will display.

Pref Src Loss Timer
The Preferred Source Loss Timer is the amount of time the unit will wait before transferring to the stand-by source.

Pref Source Return Timer
When the preferred source has returned, the unit will wait before transferring back to the preferred source.

Return Voltage
The voltage minimum at which a source becomes unavailable.

Low Voltage
The voltage minimum at which a source becomes unavailable.

Unbalance Voltage
The voltage difference between phases.

Preferred Source
The source that primarily feeds the system. The other source will be on stand-by.

Auto/Hold Return
When preferred source returns, the return source timer will time out. This setting allows an automatic return to the preferred source or wait on someone to press the RESET HOLD RETURN key.

Over-Current Value
The level of current that determines an over-current condition.

Over-Current Lockout Timer
The amount of time allowed for an over-current condition. A motor starting may cause an inrush of current for a few seconds, this time delay is designed to distinguish the transients from the actual over-current.

OC Lockout Enabled/Disabled
Enables or disables the over-current lockout feature.
MOTOR OPERATOR STATUS
Press the motor operator status key.

Battery Charger Alarm
This indicator shows either "Normal" or "Fault". This alarm ???

Battery Alarm
This indicator shows either "Normal" or "Fault". A fault occurs when the motor's battery voltage has dropped below 11.8VDC.

Motor No Go
The No Go function of the motor is essentially a torque limiter. If the motor cannot turn it will shut off instead of destroying any mechanical components. The "Fault" indication may also occur if there is insufficient power from the batteries.

Motor Local/Remote Sw
In order for the OCS to operate the motor operator, it must be in the "Remote" position. If necessary, it is possible to operate the motor operators with their own open close switches in the Local mode, however, this is not advised. All operation should be performed through the OCS screen.

Motor Coupler Position
The coupler shall be "Coupled" for all normal operation. Decoupling the motor from the switch should only be used to prevent an outage. The unit will not be able to open/close the load interrupter switches if the unit is left in the decoupled state.

NOTICE
Place unit in the Manual Mode before decoupling to prevent injury.
LOCAL OPERATION
Press the base operations key.

Source 1 & 2 Indication
The top fields will indicate source availability, switch position, and motor position.

Open/Close Sw
These buttons will only allow opening/closing the motor/switch assembly if the unit is in the manual mode. These keys do not work in the Automatic mode.

Operating Mode
Selection between the Manual and Automatic mode. Before placing unit in the Automatic Mode, it is necessary to first have the preferred source switch/motor closed.

Reset Hold Return
Allows the unit to Automatically return to the preferred source (See Parameters Setup on page 5).

TEST MENU
NOTE: Simulations must be performed in the AUTOMATIC MODE.

To verify the Automatic Mode operation, use the simulation keys.

Sim Src1 Loss
Simulates the loss of voltage on Source 1.

Sim Src2 Loss
Simulates the loss of voltage on Source 2.

Sim OC without Source Loss
Simulates a passing transient or Suspend Mode (Refer to Over-Current Conditions on page 3 under "Systems Operations Description").

Sim OC With Source Loss
Simulates an Over-Current Lockout (Refer to Over-Current Conditions on page 3 under "Systems Operations Description").

NOTICE
Tests may be performed in the decoupled mode to prevent outages. Be sure to place controller in the Manual Mode before coupling/decoupling the mechanisms. Be sure in recoupling that the switch and motor positions are equal (example: Switch Open and Motor Open or Switch Closed and Motor Closed) then return the unit to the Automatic Mode.
PLACING THE UNIT IN SERVICE
To place the unit in service.

Verify the Operation Sequence
Use the Simulation Screen (Refer to Local Operation on page 7 to verify)

Close Preferred Source Switch
Place Unit in the Manual Mode and Close the Preferred Source Switch.

Place Unit in the Automatic Mode
Verify that Motor Operators are coupled and place unit in the Automatic Mode (Refer to Motor Operator Status on page 6).

VIEWING REAL TIME DATA
Use the Status Screen to view switch positions, motor positions, counters, modes, and status of unit.

VIEW VOLTAGE/CURRENT LEVELS
Use the View Voltage/Current levels to see the system voltage and current.
**VIEW/EDIT EVENT LOGGER**

The Event Logger holds up to 150 Events. A list of possible events is shown at right.

**Downloading Event Data**
This is an option that will allow downloading the information from the screen to a large laptop computer. (This item is optional)

**View Event Logger Data**
Allows the user to scroll through multiple screens of time/date stamped data to view transfer time and status information.

**Clear Event Logger Data**
If necessary, the event log registers can be cleared. This is often used if the download feature is used. Otherwise, the registers will continue to overwrite themselves as the 150 Events become filled.

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**Event List**
Below is a list of possible events that will be listed in the event log.

<table>
<thead>
<tr>
<th>Function</th>
<th>Event Description</th>
<th>Function</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source Availability</td>
<td>Src1 Available</td>
<td>OC Detect Src1, Ph1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Src1 Not Available</td>
<td>OC Detect Src1, Ph2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Src2 Available</td>
<td>OC Detect Src1, Ph3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Src2 Not Available</td>
<td>OC Detect Src2, Ph1</td>
<td></td>
</tr>
<tr>
<td>Switch</td>
<td>Src1 Sw Open</td>
<td>OC Detect Src2, Ph2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Src1 Sw Closed</td>
<td>OC Detect Src2, Ph3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Src2 Sw Open</td>
<td>OC Lockout Timer</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Src2 Sw Closed</td>
<td>OC Detect Reset</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Press to Open Sw1</td>
<td>OC Lockout Disabled</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Press to Close Sw1</td>
<td>OC Lockout Enabled</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Press to Open Sw2</td>
<td>OC Lockout</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Press to Close Sw2</td>
<td>Sim Src1 Volt Loss</td>
<td></td>
</tr>
<tr>
<td>Motor Operator</td>
<td>M01 Charge Alarm</td>
<td>Sim Src2 Volt Loss</td>
<td></td>
</tr>
<tr>
<td></td>
<td>M01 Batt Alarm</td>
<td>OC W Src Loss Sim</td>
<td></td>
</tr>
<tr>
<td></td>
<td>M01 NO GO</td>
<td>OC W/O Src Loss Sim</td>
<td></td>
</tr>
<tr>
<td></td>
<td>M01 Local</td>
<td>Reset Hold Return</td>
<td></td>
</tr>
<tr>
<td></td>
<td>M01 Remote</td>
<td>Reset OC Lockout</td>
<td></td>
</tr>
<tr>
<td></td>
<td>M01 Coupled</td>
<td>Automatic Mode</td>
<td></td>
</tr>
<tr>
<td></td>
<td>M01 Decoupled</td>
<td>Manual Mode</td>
<td></td>
</tr>
<tr>
<td></td>
<td>M01 Charge Alarm</td>
<td>Auto Return</td>
<td></td>
</tr>
<tr>
<td></td>
<td>M01 Batt Alarm</td>
<td>Hold Return</td>
<td></td>
</tr>
<tr>
<td></td>
<td>M01 NO GO</td>
<td>Open Transition</td>
<td></td>
</tr>
<tr>
<td></td>
<td>M01 Local</td>
<td>Close Transition</td>
<td></td>
</tr>
<tr>
<td></td>
<td>M01 Remote</td>
<td>Pref Src Set to Src1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>M01 Coupled</td>
<td>Pref Src Set to Src2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>M01 Decoupled</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Scrolling through the event screens allows viewing of the time stamped information on the screen without the use of a laptop. The time-stamp consists of the Hours, Minutes, and Seconds; Month, Day, Year, and the description of the event included.

To clear or reset the event logger, press the Clear/Reset Event Log key.
DOWNLOADING EVENTS WITH A PC

Install the OPC Lite software and copy the Eventlog.xls spreadsheet to the desktop of a laptop (both programs included with manual on CD). Connect the RS-232 cable from computer to the OCS (MJ1 Port).

Open the Cscan OPC Lite Software and check to see if the OCS is online. If not, click the Bring Nodes Online button.
Once the OCS is recognized by the laptop, minimize the CScan OPC Lite Software and open the Excel spreadsheet titled **Eventlog.xls**.

The spreadsheet may ask you if you want to enable macros, click **Enable Macro’s**. The spreadsheet may also ask you if you wish to update links, click **Yes**. This will cause the spreadsheet to download the real time data contained in the registers of the OCS.

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**CAUTION**

Save Eventlog.xls under a different name. **Do not** overwrite the Eventlog.xls file!
<table>
<thead>
<tr>
<th>PROBLEM</th>
<th>POSSIBLE SOLUTION</th>
</tr>
</thead>
</table>
| Processor has no lights showing, screen not running.         | • Screen Saver On (Need to touch screen)  
• Check for 24VDC at OCS  
• Check control Fuses  
• Check Power Supply                                                                 |
| Neither Manual nor Automatic Mode showing                    | • Unit in Over-Current Lockout (May Need Reset)  
• Check Status Screen                                                                                                                                |
| Can’t Re-Couple Switch                                       | • Check Switch position vs. Mechanism position, they must be the same (both open or both closed).  
• Use the Handle to align the switch and coupler while OCS in the manual mode or power disconnected. |
| Can’t Close Switch                                            | • Verify Mode is in Manual  
• Mechanism may be decoupled                                                                                                                         |
| Neither Source is Available                                  | • Check View Voltage Levels  
• Check Voltage Parameters (Low & Return Voltage)  
• Check Control Fuses  
• Verify PTs and Primary Fuses are good                                                                            |
| Motor Doesn’t Operate                                         | • Check Operation in Manual Mode  
• Check Control Fuses  
• Check DC Power Supply  
• Check Motor  
• Check I/O Card                                                                                                           |
| Failed to Transfer                                           | • Make sure Unit is in Automatic Mode  
• Make sure Motor/Switches are in the proper position and coupled  
• Check Loss/Return Timer Settings                                                                                                      |
ADDENDUM

The following screens have been added to the program:

A graphics screen has been added to give a visual indication of the status of the equipment.
A green color indicates that there is no voltage present.
A red color indicates the presence of voltage and gives the status of the switches.
The Main Menu has been edited to include a new button to access a graphic screen.
Every effort is made to ensure that customers receive an up-to-date instruction manual on the use of Federal Pacific products; however, from time to time, modifications to our products may without notice make the information contained herein subject to alteration.