



# Instruction Bulletin

## Limited Service Pump Controllers (Produced after July 18, 2006) Installation- Start Up - Service



This instruction is a guide for personnel involved with Maintenance, Engineering and approval of Fire Pump equipment. It provides an understanding of the Joslyn Clark controller operation, to aid in installing and start-up.

Operation, Installation and test requirements are specified by the National Fire Protection Association, Publications NFPA 20, NFPA 70, and NFPA 25 .

# GENERAL DESCRIPTION

All limited service pump controllers are designed to automatically start an electric driven Limited Service pump upon detection of a pressure drop in the fire protection system. It is intended to control single and 3-phase squirrel cage induction motors and includes Manual Start and Stop as well as Automatic Start by pressure decrease in the sprinkler system as sensed by the pressure sensor. Connections are provided for a Remote Start from Remote Pushbutton or other fire protection equipment (deluge, etc.). The combination automatic/non-automatic option provides a 10-minute automatic stop after automatic start but only after all starting causes have returned to normal.

The Limited Service Pump Controller complies with NFPA 20 chapter 10, section 7. The controller is UL Listed for Limited Service Applications.

The combination Limited Service pump controller with optional transfer switch complies with NFPA 20 standard chapter 10 and built in accordance with arrangement I according to chapter 10.

The optional automatic transfer switch is designed to monitor two power sources and connect the fire pump motor to the available source. Preference is given to the Normal Source.

## CATALOG NUMBER AND DESCRIPTION OF CONTROLLER

Joslyn Clark J.C.

### Limited Service Pump Controllers

### Catalog Number System

### D10663

**D**

**6**

**A**

**15**

**4** - **4**

**Other Modifications**  
See Modification Pages

**Additive Pump Controller Mods if Used.**  
**Blank** - Not Additive Controller

**Transfer Switch Mod**  
**T** Generator Alternate Supply  
**TU** Dual Utility or Oversize Generator

**Pressure Control & Recorder**  
**0** - No Pressure Control or Recorder  
**4** - 0-300 PSI, Fresh Water (std)  
**5** - 0-600 PSI, Fresh Water  
**7** - 0-300 PSI, Stainless Steel  
**8** - 0-600 PSI, Stainless Steel  
**N+** - Plus Indicates NTS Traceable Calibration

**D - Standard Controller**  
(with or without std modifications)

**Starter Type / Bulletin**  
**6** - C10663, Limited Service

**Controller Short Circuit Current Rating**  
in Symmetrical Amperes

<b>3P</b>	208V	240	380/415	460	575
<b>A</b>	18K	18K	14K	14K	14K
<b>B</b>	65k	65k	25K	25K	18K
<b>C</b>	100K	100K	100K	100K	100K
<b>1P</b>	208V	230			
<b>A</b>	18K	18K			
<b>B</b>	65k	65k			

**Motor Horsepower Ratings**

05= 1 HP**	08= 3 HP**	11= 10 HP	14= 25 HP
06= 1 1/2 HP**	09= 5 HP	12= 15 HP	15= 30 HP
07= 2 HP**	10= 7 1/2 HP	13= 20 HP	

\*\* Single Phase Only

**Supply (Motor) Voltage**

<b>2</b> - 200-208V, 3 Phase, 60 Hz	<b>6</b> - 380-400V, 3 Phase, 50 Hz
<b>3</b> - 220-240V, 3 Phase, 60 Hz	<b>7</b> - 415V, 3 Phase, 50 Hz
<b>4</b> - 440-480V, 3 Phase, 60 Hz	<b>8</b> - 380-400V, 3 Phase, 60 Hz
<b>5</b> - 500-600V, 3 Phase, 60 Hz	<b>3</b> - 230V, 1 Phase, 60 HZ

**Transfer Switch Mod**  
**T** Generator Alternate Supply  
**TU** Dual Utility or Oversize Generator

**Pressure Control & Recorder**  
**0** - No Pressure Control or Recorder  
**4** - 0-300 PSI, Fresh Water (std)  
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**7** - 0-300 PSI, Stainless Steel  
**8** - 0-600 PSI, Stainless Steel  
**N+** - Plus Indicates NTS Traceable Calibration

# INSTALLATION

The D10663 limited service pump controller is built in accordance with the Standard of the National Fire Protection Association for the Installation of Centrifugal Fire Pumps, NFPA 20 (Centrifugal Fire Pumps 2003 Edition). The controller is intended to be installed in accordance to NFPA 20-2003 and NFPA 70 – National Electrical Code.

## LOCATION

Controller shall be located as close as practical to the motor it controls and shall be within sight of the motor.

Controller shall be located or protected in such way that it will not be damaged by water escaping from the pump or pump connections. Current carrying parts of controller shall be not less than 12 in. (305 mm) above the floor level. Working clearances around controller shall comply with C22.1, Canadian Electrical Code, Article 26.302 or other local codes.

Controller shall be suitable for use in locations subject to a moderate degree of moisture, such as a damp basement. The pump room ambient temperature shall be between 41°F (5°C) and 122°F (50°C).

The standard controller enclosure is rated Type 2. It is the installer's responsibility to assure that either the standard enclosure meets the ambient conditions or that an enclosure with an appropriate rating has been provided.

## MOUNTING

The Limited Service pump controller shall be mounted in a substantial manner on a single noncombustible supporting structure.

The wall mounted controller shall be attached to the structure or wall using all four (4) mounting ears provided on the controller with hardware designed to support the weight of the controller at a height where current carrying parts are not less than 12 in. above floor level.

The floor mounted controller shall be attached to the floor using all holes provided on the mounting feet with hardware designed to support the weight of the controller. Mounting feet provide the necessary 12 in. (305 mm) clearance for current carrying parts.

A concrete slab is recommended to avoid water accumulation on the controller's feet.

# CONNECTIONS

## WATER CONNECTIONS

The threaded connection of the pressure sensor (1/2" NPT. F.) is flush with the bottom of the enclosure. See dimensions drawing for exact location. If the enclosure is based mounted, the pressure sensor connection is located on the side of the controller.

The pump start - stop pressure sensor (PS1) shall be connected to the system as per NFPA 20, Chapter 10-5.2.1 (b) and (c) and figure A-10-5.2.1 (a) and (b).

The optional low suction pressure switch (PS2) shall be connected to the suction side of the system following standard practice.

## ELECTRICAL WIRING AND CONNECTIONS

### TRANSFER SWITCH OVERCURRENT PROTECTIVE DEVICE

#### OPTION T (GENERATOR SET)

The overcurrent protective device on the alternate power source shall meet the NFPA 20; chapter 9-6.5.

*"Where protective devices are installed in the on-site power source circuits at the generator, such devices shall allow instantaneous pickup of the full pump room load."*

### IMPORTANT

**An external overcurrent protective device shall be installed to protect the alternate power source wiring. The alternate power side of the automatic transfer switch does not have any overcurrent protective device. Only an alternate power isolating switch (not a protective device) is provided within the transfer switch.**

### ELECTRICAL WIRING FROM SOURCES TO CONTROLLER

The electrical wiring between power sources and fire pump controller shall meet the NFPA 20, Chapter 9-3, Article 695 National Electrical Code, Section C, C22.1 Canadian Electrical Code, Section 32-200 or other local codes.

Electrical wiring shall be typically sized to carry at least 125% of the full load current of the pump motor.

Incoming power terminals on the controller are suitable to accept wire based on that selection with insulation not less than 60°C. (Refer to terminal diagram for terminal sizes.)

### ELECTRICAL WIRING FROM CONTROLLER TO PUMP MOTOR

The electrical wiring between fire pump controller and pump motor shall be in rigid, intermediate, or liquid tight flexible metal conduit or Type MI cable and meet the requirements of Article 695 National Electrical Code, Section E, C22.1 Canadian Electrical Code or other local codes.

Motor power terminals on the controller are suitable to accept wire based on above selection with insulation not less than 60°C. (Refer to terminal diagram for terminal sizes.)

### PUBLICATIONS FOR REFERENCE

For assistance in selecting the proper size conductors, conduit, and other installation details, please refer to NEMA publications ICS-14 and ICS-15

## **ELECTRICAL WIRING FROM CONTROLLER TO GENERATOR SET**

The electrical wiring between the transfer switch and the generator (generator start signal) must be liquid tight flexible metal conduit or Type MI cable and meet the requirements of the National Electrical Code, C22.1 Canadian Electrical Code or other local codes.

Terminals on the controller are suitable to accept 12AWG / 2.5mm<sup>2</sup> wire (Refer to terminal diagram for terminal sizes.)

## **ELECTRICAL CONNECTIONS**

The dimension drawing shows the area suitable for incoming power and motor connections. No other location shall be used. Only watertight hub fittings shall be used when entering the cabinet to preserve the Type rating of the cabinet.

The installer is responsible for adequate protection of fire pump controller components against metallic debris or drilling chips. Failure to do so may cause injuries to personnel, damage the controller and subsequently void warranty.

## **INCOMING POWER CONNECTIONS**

Normal source incoming power is to be connected to terminals identified L1-L2 and L3 located on the isolating switch (IS).

Alternate source incoming power is to be connected to terminals identified A1-A2 and A3 located on the alternate isolating switch (AIS).

The limited service controller is phase sensitive thus; the incoming power leads must be connected in the correct phase order.

Refer to terminal diagram for terminal sizes.

Minimum bending space is provided in accordance with wire size for wires entering the cabinet from the wall opposite to the terminals.

## **MOTOR CONNECTIONS**

Motor leads are connected to T1-T2 and T3 located on the bottom of the main contactor M.

It is the responsibility of the installer to obtain connection information on the motor and to assure that the motor is connected as per motor manufacturer recommendations. Failure to do so may cause injuries to personnel, damage the motor and/or the controller and subsequently void warranty on both items.

Refer to terminal diagram for terminal sizes.

Minimum bending space is provided in accordance with wire size for wires entering the cabinet from the wall opposite to the terminals.

## **ALARM CONNECTIONS FOR REMOTE INDICATIONS**

Since these alarm connections are derived from control relays or motor contactor auxiliary contacts located inside a metallic enclosure with wiring that can pick up induction from the line voltage, an induced voltage can be present at the terminal connections. It is the responsibility of the alarm contractor to evaluate the potential danger for their equipment.

(NOTE: This induction problem is more likely to occur in 600 V. models.)

## **STANDARD ALARM CONTACT**

The following sets of alarm contacts are available in each pump controller to meet NFPA 20, Chapter 104.7, 10-8.2.1.2, 10-8.3.12, 10-8.3.14. These alarm circuits shall be powered by a separate reliable supervised power source not exceeding 125 V.

## **MOTOR RUNNING CONDITION**

A normally open and a normally closed contact of the Run contactor is provided. Rated for 10 A., 240 VAC.

The normally open contact is connected to terminals 13 and 14 and will close to signal motor run.

The normally closed contact is connected to terminals 13A and 14A and will open to signal motor run.

## **LOSS OF ANY PHASE OR POWER AT LINE TERMINALS OF MOTOR CONTACTOR**

SPDT contacts of the Power Available relay PAR are provided. Rated for 5A., 250V.

The normally open contacts (held in closed position when motor starter power is available) are connected to terminals 11 and 12 and will open to signal loss of power.

The normally closed contacts (held in open position when power is available) are connected to terminals 10-11 and will close to signal loss of any phase or power.

**PHASE REVERSAL AT LINE  
TERMINALS OF MOTOR  
CONTACTOR**

SPDT contacts of the Phase Reversal relay PRR are provided. Rated for 5A, 250V.

The normally open contacts are connected to terminals 76-77 and will close to signal phase reversal.

The normally closed contacts are connected to terminals 77-78 and will open to signal phase reversal.

**ALTERNATE POWER ISOLATING  
SWITCH IN OFF POSITION**

SPDT contacts of the Alternate Power Isolating Switch relay R1 are provided. Rated for 5A., 250 VAC.

The normally open contacts are located on terminals 55-56 and will close when Alternate Power Isolating Switch is in OFF position.

The normally closed contacts are located on terminals 56-57 and will open when the Alternate Power Isolating Switch is in the OFF position.

**GENERATOR START SIGNAL**

A normally open and a normally closed contact are provided to start the generator set. The contacts are rated 6A, 24Vdc.

The normally open contact is connected to terminals 51-52. The contact will close to start the generator set. The normally closed contact is

connected to terminals 53-54. The contact will open to start the generator.

This contact is interlocked with the Alternate Power Isolating Switch (AIS) to avoid starting signal when the Alternate Power Isolating Switch is in OFF position.

**TRANSFER SWITCH IN NORMAL  
POSITION**

A normally open and a normally closed contact to indicate the transfer switch position are provided. Rated for 10A., 240 VAC.

The contact connected to terminals 80-81 opens when transfer switch is in normal position (The load is connected to the normal power).

The contact connected to terminals 82-83 closes when transfer switch is in normal position (The load is connected to the normal power).

**STANDARD FIELD DEVICES  
PROVISION**

**REMOTE START SIGNAL  
CONNECTION**

Each electric Limited Service pump controller has provision for connection to a manual remote start station (remote start contact). This remote start contact shall be normally open and connected to terminals 1 and 2 on the main terminal strip. Contact closure will start the pump motor. Pump motor can only be stopped by the STOP push button on the controller.

## TYPE OF STARTING

### **MODEL D10663:**

All Limited Service Controllers are Across-the-Line type controllers. These controllers can only be used where the local Authority Having Jurisdiction accepts Limited Service Pump Controllers.

In an Across-the-Line start, full voltage is applied to the motor as soon as the controller receives a start command.

## AUTOMATIC TRANSFER SWITCH

### **OPTION T**

This model includes an alternate power isolating switch and an automatic transfer switch installed in a separated compartment attached to the Limited Service pump controller. This model is used when the alternate power source is fed from a generator set. A contact is provided to start the on-site standby generator set.

### **OPTION TU**

This model includes an alternate power isolating switch, a circuit breaker and an automatic transfer switch installed in a separated compartment attached to the Limited Service pump controller. This model is used when the alternate power source is fed from a second utility or from a large generator set. A contact is provided to start the generator set.

## **METHODS OF STARTING/STOPPING PUMP MOTOR**

The controllers are available as combination automatic / manual starting with provision for manual or automatic shutdown (automatic shutdown only possible after automatic start and all starting conditions have returned to a normal.)

### **WATER PRESSURE CONTROL**

The controller will start automatically on low pressure condition when detected by the pressure sensor, provided the controller was not already manually started. All controllers are set from the factory for manual stop, therefore, the motor can only be stopped by depressing the STOP push-button located on the controller. If the pressure is not re-established, releasing the STOP pushbutton will allow the pump to restart. If the running period timer is enabled and set at 10 minutes, the controller will automatically shutdown the motor after all starting causes have returned to normal. The motor can also be stopped by depressing the STOP push-button located on the controller after all starting causes have returned to normal.

### **MANUAL ELECTRIC CONTROL AT CONTROLLER**

The controller can be electrically manually started by depressing the START push-button on the controller independently of the pressure sensor and can only be stopped manually by depressing the STOP push-button located on the controller.

### **EMERGENCY-RUN MECHANICAL CONTROL AT CONTROLLER**

The controller may be started with a manual mechanical method by operating the handle labeled EMERGENCY START. This handle provides for an across-the-line start and non-automatic continuous running operation of the motor. This handle can be latched in the actuated position to keep the pump running.

### **MANUAL ELECTRIC CONTROL AT REMOTE STATION**

The controller can be electrically manually started by the momentary closing of a remote contact independently of the pressure sensor and can only be manually stopped by depressing the STOP push-button located on the controller.

### **SEQUENCE STARTING**

In case of multiple pump application, it may be necessary to delay the starting of each motor in case of water pressure drop to prevent simultaneous starting of all motors. Sequential start time is available via software. The time period is adjustable from 0 to 99 seconds.

### **FIRE PROTECTION EQUIPMENT CONTROL**

When option "Deluge Valve" is enabled, the controller can be started by opening a normally closed contact (fail safe circuit) on the fire protection equipment (deluge valve) independent of the pressure sensor. The controller can only be manually stopped by the STOP push-button located on the controller but only after the fire protection equipment contact has returned to normal.



# FRONT PANEL ON CONTROLLER

Two displays are mounted into the limited service pump controller door. The top display shows the voltages applied to the controller and the currents drawn by the pump motor, elapsed running time and cycle counter. Along the bottom of the display are alarm condition indicators. The bottom display shows the pressure settings and System Pressure, real time clock and any pressure related alarm messages (i.e. Pump On Demand) .

## VOLTAGE / CURRENT DISPLAY

When powered, the controller shows four lines of information in the upper display. The top line shows Line to Line voltage for each of the three phases and frequency.

L1L2 indicates the line voltage between phase N1 and N2 (or phase A and B)

L2L3 indicates the line voltage between phase N2 and N3 (or phase B and C)

L3L1 indicates the line voltage between phase N3 and N1 (or phase C and A)

The second line shows each three phase current.

I1 indicates the line current drawn in phase 1 (A)

I2 indicates the line current drawn in phase 2 (B)

I3 indicates the line current drawn in phase 3 (C)

The third line shows the motor elapsed time in 0.0 hour format and a pump cycle counter (c).

The fourth line is reserved for status indicators.

Over Current: motor is in excess of 130% of full load current.

Under Current: motor current is less than 30% of full load current.

Over Voltage: system voltage is in excess of 110% of nominal.

Under Voltage: system voltage is less than 85% of nominal.

Phases Unbalanced: motor current is in excess of 3.5% out of balance.

Phase Loss: one or more phases are below 85% of nominal.

Failed to Start: motor current is less than 5% of motor full load current when motor should be operating.

Motor Running: Nominal motor full load current is sensed.

## 'RESET' PUSH BUTTON

When depressed, this push button clears any alarm indicators on the display.

## 'NORMAL POWER' INDICATORS

### POWER AVAILABLE

This LED indicates normal power acceptable on all 3 phases and phase sequence is correct. The power is acceptable if the voltage is greater than 85%.

### PHASE REVERSAL

This LED indicates phase reversal of the normal power source.

## PRESSURE DISPLAY

When powered, the display shows two lines of information. The top line normally displays the time and date. Any applicable status messages will alternate with the time display. The weekly test status is shown at the upper right of the display, "D" indicates the test timer is not enabled, "E" indicates the test timer is enabled.

The bottom line of the display shows the Cut Out (Stop) and Cut In (Start) pressure settings, the current system pressure and unit of measure, "P" for psi or "B" for bars.

## PUMP ON DEMAND

This LED indicates the pump was started on low system pressure.

## WEEKLY TEST

This LED indicates the pump is operating in the test mode.

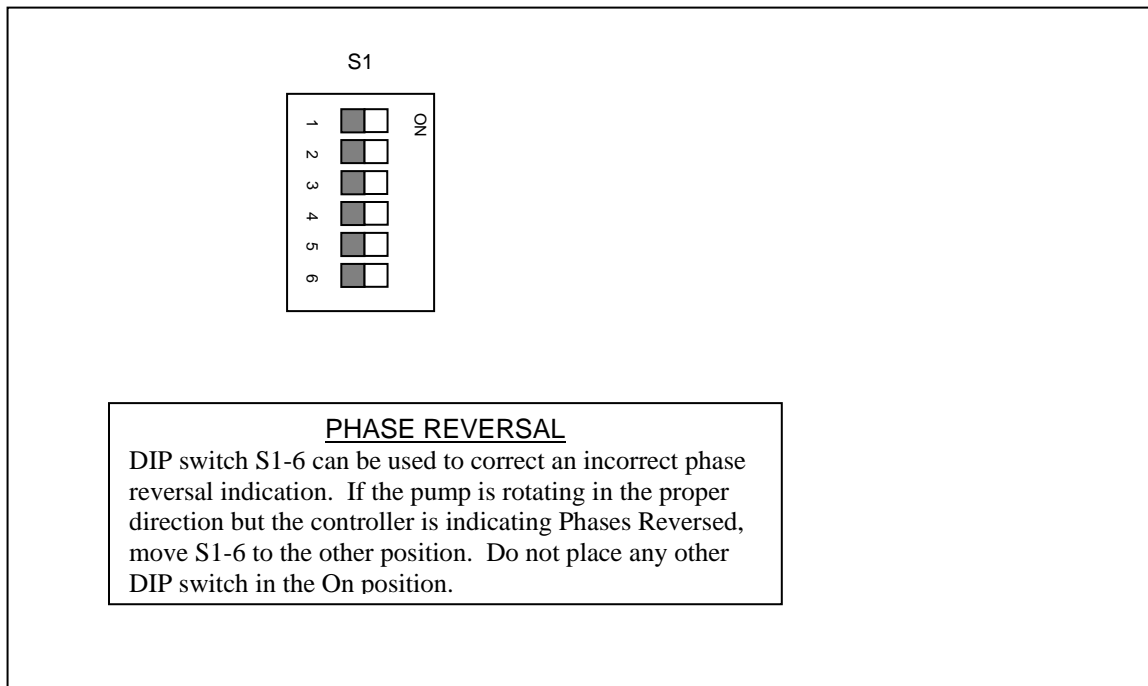
## SETTINGS

Caution! All settings must be made with the power present to the controller. Hazardous voltage is present in the controller which will cause severe personal injury or death. All personnel working with this equipment must be experienced or qualified to work around electrical equipment.

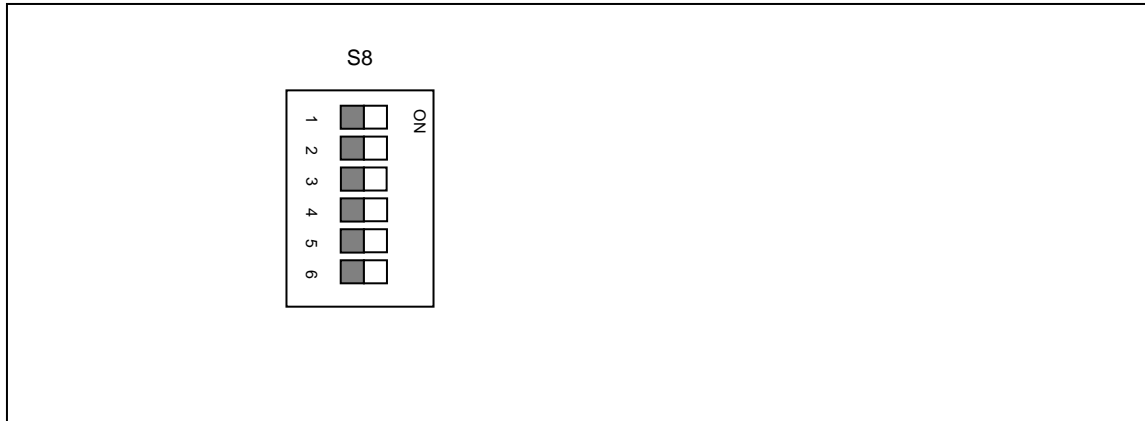
There are two circuit boards mounted to the back side of the door.

The upper circuit board monitors the voltage and current to the motor. The lower circuit board provides the pressure control and timer functions. DIP switches located on each board for various functions that may be required to set the controller.

DIP switch S1 is located on the right hand side of the upper board, the factory setting is shown below:



DIP Switch S8 is located on the right hand side of the lower circuit board, all switches are in the Off position from the factory. Switch S8-1 is used to unlock the pressure setting buttons. To unlock the buttons, move S8-1 to the On position. The pressure display will alternate a RESET DIPSWITCH message along with the system pressure as a reminder to place the switch back to the Off position after the adjustment have been made.



### **PRESSURE SETTING ADJUSTMENTS**

1. Place DIP switch S8-1 in the On (right) position, the pressure display will alternate a “RESET DIPSWITCH” message along with the system pressure.
2. Momentarily pressing the pressure setting button will increase the value by 1, holding the pressure setting button will increase the value by 10.
3. Set the Cut In (Start) and Cut Out (Stop) settings to the desired pressure. Note, the Cut In pressure will not exceed the Cut Out pressure setting and the Cut Out pressure will not go below the Cut In pressure setting.
4. The Cut Out pressure setting must be set below the maximum pressure that the pump is capable of producing or the pump will not stop.
5. Place the DIP switch S8-1 back in the Off (left) position to lock the settings.

### **TIMER ADJUSTMENTS**

The controller is factory set for automatic start and manual stopping of the pump by pressure changes in the sprinkler system. If the authority having jurisdiction allows for automatic stopping of the pump after all starting conditions have been satisfied, a running period timer is included with each controller and is adjustable from 0 to 999 seconds (approximately 16 <sup>3</sup>/<sub>4</sub> minutes). To enable and adjust the timer:

1. Push and hold the Cut In button on the face of the controller for 5 seconds, the display will change to the calendar display, do not release the Cut in button.
2. Press the Cut Out button twice to advance to the timer menu, the display will show on the top line, the present Off Time (Running Period Timer) setting is second and Stop setting (Manual or Automatic). The second line will display the current On Time (Sequential Start) setting in seconds.
3. Release the buttons.
4. Using the Cut In button, scroll to the value to be changed, use the Cut Out button to adjust the value.
5. Repeat this procedure to adjust all the desired values.
6. Using the Cut In button, scroll to the MANU setting, use the Cut In button to toggle between Manual or Automatic stop.
7. Use the Cut Out button to scroll to the SAVE selection, press the Cut Out button to save and exit this menu.

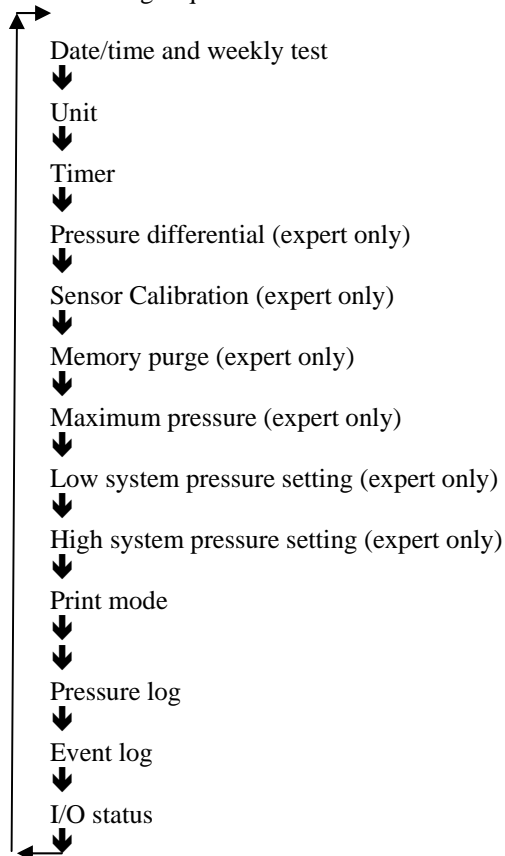
## PROGRAMMING THE PRESSURE CONTROL BOARD

The Pressure Control Board can be programmed by entering into different menus.

In each mode, the pushbuttons have same functionality:

- Cut-in push button moves the cursor to its next position.
- Cut-out push button increases the selected value, or activate the selected function (Save, Next, Purge,...)

Some menus are reserved for more skilled service persons. To have access to those specific menus, the dipswitch S8-2 (expert) must be activated. The standard menus are in the following sequence :



To have access to the first menu, the Cut-in pushbutton must be depressed more than 5 seconds.

To access the subsequent menus, press and hold the cut-in button for more than 5 seconds. When the time menu appears (5 sec.), maintain the cut-in button and press the cut-out button to scroll to

the next menu. When the menu desired appears, release both push-buttons.

If no key is hit for more than 30 seconds, the Pressure Control Board returns to the normal screen and the changes are not saved.

### **Calibration of Pressure Sensor**

This menu is accessible by expert only (dipswitch S8-2 on).

In this expert menu, the expert user can calibrate the pressure sensor on the site.

LO: 0023*ReadEXIT HI : 0500 ReadNEXT
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Important : this expert menu does not disappear automatically. The user must hit the EXIT or the SAVE box to return to normal screen.

The following procedure must be followed to perform the calibration.

**IMPORTANT : a high accuracy reference gauge must be connected to the system where it is representative to the pressure applied to the sensor.**

1. A low pressure must be applied to the system; the readout of the reference gauge must be entered in the menu after 'Lo' and the cursor must be moved to Read. The 'Cut Out' push button must be depressed to record this value. A "\*" appears in front of Read.
2. A high pressure must be applied to the system; the readout of the reference gauge must be entered in the menu after 'Hi' and the cursor must be moved to READ. The 'Cut Out' push button must be depressed to record this value. A "\*" appears in front of Read.

The cursor must be moved to 'NEXT' and the 'Cut Out' push button must be depressed.

A second window appears that give the result of the calibration (OFFSET and GAIN value).

Offset: 437 EXIT Gain: 15425 SAVE
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The cursor can directly be moved to SAVE.

When saving is executed, a message 'new calibration successful' appears for two seconds.

If the Exit is selected, a message 'Exit without changes' appears for two seconds.

In each screen, there is a possibility to exit this menu without modifying values.

Note : the larger is the difference between the low and high pressures, the better the calibration will be.

If the results of the calibration procedure are not satisfactory, the procedure can be repeated.

## TRANSFER SWITCH OPERATION SEQUENCE

### TRANSFER TO ALTERNATE POWER SOURCE

The Transfer to Alternate Power Source starts automatically when at least one of the following conditions applies:

- Normal Power voltage falls below 85% of nominal voltage,
- Normal Power Phase Reversal is detected,
- Transfer Switch Selector Switch (located on the front display) is maintained in the alternate position for over 8 seconds.

When an under voltage condition on any phase of the Normal Power source is detected by the sensor the 3 second normal power source outage delay timer starts counting.

If the normal source voltage rises above the sensor dropout setting before the 3 second time delay expires, the transfer sequence is cancelled. If the Normal Power source voltage is still below the sensor dropout setting (85%) when the time delay expires, the generator start relay is deactivated to start the generator set. At the same time, a voltage and frequency sensor begins monitoring the Alternate Power Source. The sensor will accept the alternate power source only when both voltage and frequency reach pre-set pickup value. An approximate 8 – 10 second time span occurs because the engine-driven generator cranks, starts, and runs up to nominal pickup value. .

When the Alternate Power Source is within acceptable limits (above 90% of the nominal voltage), the transfer to alternate power source is initiated.

The transfer switch will remain in the alternate power source position until the normal source is

restored. If the test switch is used, the transfer switch will remain on alternate power source until the retransfer to normal delay times out.

### RETRANSFER TO NORMAL

The Retransfer to the Normal Power source starts when the voltage sensor detects restoration of the Normal Power Source within acceptable limits. The voltage level must rise above the pre-set pickup value (90%) on all phases before the sensor will accept the normal source.

When the normal source is accepted by the sensor, the retransfer to normal delay timer starts counting (factory set at 30 minutes). This delay can be by-passed by maintaining the Transfer Switch Selector Switch in the normal position until re-transfer occurs. This delay prevents the immediate load retransfer to the normal source. The delay insures that the normal source has stabilized before reconnection of Fire Pump Motor. If the normal source voltage falls below the pre-set dropout value before the time delay expires, the timing cycle is reset to zero. If the alternate power source fails during the timing cycle, the load is immediately returned to the normal source, if that source is acceptable.

The Automatic Transfer Switch is now feeding the Pump Motor from the Normal Power Source again.

Upon retransfer to the normal source, the 5 minute cooling timer starts counting to keep the engine running for a cool-down period. This delay is adjustable from 0-5 minutes.

After the time delay, the generator start relay is re-activated to shut down the engine-driven generator. All circuits are reset for any future normal source failure.

# **STANDARD CONTROLLER ALARM CONTACTS FOR REMOTE INDICATION**

All alarm contacts are rated for 250V 5A. maximum and are intended to be connected to a separate reliable power source not exceeding 125VAC.

## **MOTOR RUNNING CONDITION**

A normally open and a normally closed contact of the run contactor are provided. Rated for 10 A., 240 VAC.

The normally open contact is connected to terminals 13 and 14 and will close to signal motor run.

The normally closed contact is connected to terminals 13A and 14A and will open to signal motor run.

## **LOSS OF ANY PHASE OR POWER AT LINE TERMINALS OF MOTOR CONTACTOR**

SPDT contacts of the Power Available relay PAR are provided. Rated for 5A., 250 VAC. The normally open contacts (held in closed position when power is available) are located on terminals 11-12 and will open to signal loss of power.

The normally closed contacts (held in open position when power is available) are located terminals 10-11 and will close to signal loss of any phase or power.

## **PHASE REVERSAL**

SPDT contacts of the Phase Reversal relay PRR are provided. Rated for 5A, 250 VAC.

The normally open contacts are located on terminals 76-77 and will close to signal phase reversal.

The normally closed contacts are located on terminals 77-78 and will open to signal phase reversal.

## **ALTERNATE POWER ISOLATING SWITCH IN OFF POSITION**

SPDT contacts of the Alternate Power Isolating Switch relay R1 are provided. Rated for 5A., 250 VAC.

The normally open contacts are located on terminals 55-56 and will close when Alternate Power Isolating Switch is in OFF position.

The normally closed contacts are located on terminals 56-57 and will open when the Alternate Power Isolating Switch is in the OFF position.

## **GENERATOR START SIGNAL**

A normally open and a normally closed contact are provided to start the generator set. The contacts are rated 6A, 24Vdc.

The normally open contact is connected to terminals 51-52. The contact will close to start the generator set. The normally closed contact is connected to terminals 53-54. The contact will open to start the generator.

This contact is interlocked with the Alternate Power Isolating Switch (AIS) to avoid starting signal when the Alternate Power Isolating Switch is in off position.

## **TRANSFER SWITCH IN NORMAL POSITION**

A normally open and a normally closed contact to indicate the transfer switch position are provided. Rated for 10A., 240 VAC.

The contact connected to terminals 80-81 opens when transfer switch is in normal position (The load is connected to the normal power).

The contact connected to terminals 82-83 closes when transfer switch is in normal position (The load is connected to the normal power).

# COMMUNICATIONS

## USB PORT GENERAL

The controller can be connected to a USB port for Downloading the Event History and Recorded Pressure data. The EPSR driver is needed to communicate and can be easily downloaded from the Joslyn Clark website. Also, HyperTerminal, a program supplied with Windows ® is needed on the computer to retrieve the data.

## VERIFICATION OF USB PORT

Go to the Joslyn Clark website and under the "Download" section, download and save the EPSR Driver file. Run it after saving to your computer hard drive. Once installed, it is important to correctly set the computer to retrieve information from the controller. On the 'control panel', click « System ». Select « Hardware », click « Device manager »: Verify that there are two communication ports for 'EPSR USB Serial port'. If not, the installation of the driver has not been set correctly and must be redone. Remember which communication port number is used for the EPSR USB Serial port.

## RETRIEVING DATA

All information is retrieved via HyperTerminal software that is provided with all Windows ® versions.

## CONNECTION TO EPSR

Laptop communication Connect your laptop computer communication port to the EPSR USB port.

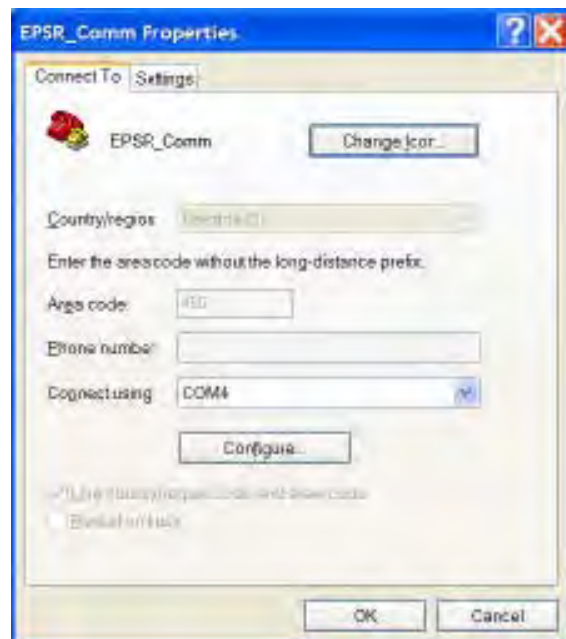
## OPENING HYPER TERMINAL

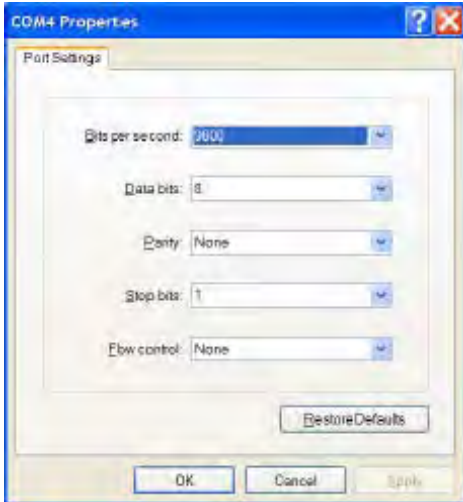
To communicate with the EPSR, communication software is required. The latest versions of Windows™ come standard with Hyper Terminal software. Select from the Windows™ Toolbar: "Start" – "all Program" – "Accessories" – "Communication" – "HyperTerminal" , or "Start" – "all Program" – "EPSR" – "EPSR\_comm.ht". *Note: This procedure might not be available on certain versions of software.* If your Hyper Terminal software

has already been configured to communicate with an EPSR, select this configuration. To access a previously configured communication, click "file – open" and then select the file.

## COMMUNICATION CONFIGURATION

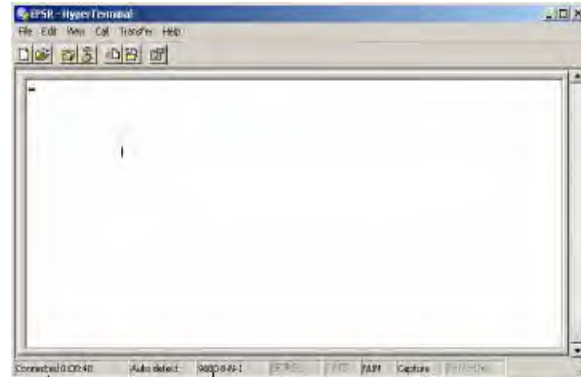
To be able to communicate with the EPSR, the communication parameters between the Limited Service Pump Controller and laptop computer must be identical. In the « New Connection » window, enter a connection name. Ex: "EPSR", Click on « OK » to validate. The «Connect to» window will open and in the «connect using» box, the USB com port must be entered». (See "verification of USB port)





Click 'configure' and verify the following Port settings: bits per second: 9600 - data bits: 8 - parity: none - stop bits: 1 - flow control: none

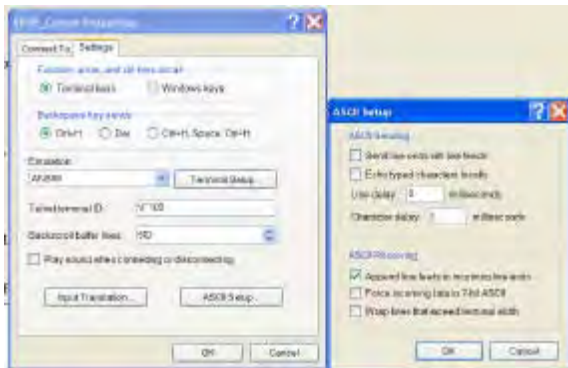
Click « OK » to validate



To capture text (save information as .txt file), the word Capture on the bottom must be highlighted.

To highlight Capture: select Transfer – Capture Text –

A window will open to select the destination file. With the help of the Browse function, enter the name of the destination file. The file name must be ended by '.txt'.



On the Settings windows, verify the following selection 'Terminal Keys' - Ctrl+H' - 'ANSI' - 'VT100' - '500'.

Click 'ASCII Setup and verify only 'Append line feeds to incoming line ends' is checked. Press "OK" to validate.

### **DOWNLOADING DATA**

Important, in this step, the data will appear on the screen. If this information needs to be saved, the Capture text must be active.

Verify the computer is correctly connected:

It is good practice to save the data with a name incorporating the date. Ex: my documents\20061024.txt (for October 24, 2006)

click « Start » to begin capturing. At that moment, all new incoming text will be saved in the destination.

Click "transfer-capture text-stop" to stop saving incoming text.

On the computer keyboard, hit the "1" key to get pressure value of sensor 1, or hit the "3" key to download pressure data's, or hit the "4" key to download last seven day resume with events

### **CLOSING HYPER TERMINAL**

Once the data has been downloaded, the communication can be disconnected. Click on File, select Exit Click on « YES » to disconnect



## **READING AND PRINTING OF THE DATA**

The downloaded data is saved in the destination file. This file is as .TXT type that can be read by "Notepad", "Word", "Lotus" and "Excel" and other software. Upon opening this file, for it to show in the file list, the ".TXT" file type needs to be selected. The data can be saved and printed using Word, Excel, and Notepad.

## **PRINTER, OPTIONAL**

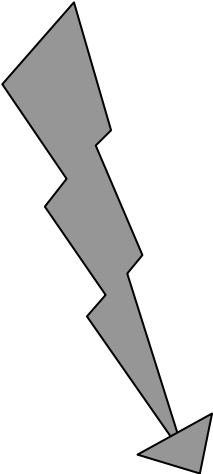
If the EPSR is connected to the Built-In thermal printer, the pressure data's can be printed.

A first hit of the 'Print' key will activate the printer. The printing starts with seven days resume of the pressure events.

A second hit of the 'print' key within the 15 seconds of the end of the printing will print a list (Text mode) or a continuous curve (Graph mode) of the pressure data, depending on the printout settings.

Pressure can be shown is kPa or PSI depending of EPSR settings

# START-UP AND TEST PROCEDURES

	<h2>DANGER</h2>
	<p><b><u>HAZARDOUS VOLTAGE IS PRESENT IN THE ENCLOSURE WHICH WILL CAUSE SEVERE PERSONAL INJURY OR DEATH.</u></b></p>
	<p><b>MAINTENANCE OR START UP SHOULD BE PERFORMED ONLY BY EXPERIENCED LICENSED ELECTRICIANS.</b></p> <p><b>ONLY QUALIFIED PERSONNEL SHOULD WORK ON OR AROUND THIS EQUIPMENT.</b></p>

## VERIFICATIONS

### ELECTRICAL INSTALLATION

A representative for the electrical contractor responsible for the installation shall be available on-site to assist during the verification of the following points and the actual start-up.

All electrical label ratings meet incoming power voltage and frequency as well as motor voltage, full load current and frequency.

All electrical connections in controller are tight. Retighten if necessary.

All electrical connections are properly completed and power is available. (See Field Connection Diagram for reference.)

### PIPING INSTALLATION

A representative for the sprinkler contractor responsible for the installation shall be available on-site to assist during the verification of the following points and the actual start-up.

All water connections are properly completed; water is available and free of dirt and/or contamination. (See Water Connections for reference.)

NOTE: Standard controllers have pressure sensor rated for fresh water only. If other conditions exist, make sure that the controller pressure sensor is compatible.

## LIMITED SERVICE PUMP START-UP

### ACTUAL START-UP

**IMPORTANT :** During the Limited Service pump side start-up, the transfer switch door must be kept closed, the isolating switch of the alternate source must be kept all the time in OFF position and secured with a padlock.

When powered up, the transfer switch will automatically switch into normal position and remains in this position. Note that the alarm will sound when the isolating switch of the alternate source is in off position, press the Silence button to acknowledge and silence the alarm. .

	<b><u>CHECK MOTOR ROTATION</u></b>	Required	N/A
<p><b>DANGER.</b> Hazardous voltage is present in the enclosure and will cause severe personal injury or death.</p> <p>Only experienced licensed electricians should perform start up. Only qualified personnel should work on or around this equipment.</p>	<ul style="list-style-type: none"> <li>◆ Turn normal power circuit breaker handle to the ON position. <ul style="list-style-type: none"> <li>• If the system pressure is above the cut out pressure setting (pressurized system), the motor will not start right away. If motor does not start, press the START pushbutton.</li> </ul> </li> <li>◆ Turn normal power circuit breaker handle to the OFF position as soon as motor starts to stop the motor.</li> <li>◆ Check the motor rotation. <ul style="list-style-type: none"> <li>• If the motor rotation is correct, no further adjustment is required, move to the next section.</li> </ul> </li> <li>◆ Correct the motor rotation. <ul style="list-style-type: none"> <li>• Motor rotation can be changed by reversing any two motor wires either at the motor junction box or on the motor connection terminals inside the controller. In both cases, the operator shall assure that the power is disconnected before proceeding. Special care shall be taken when the motor connections consist in more than three wires; in this case it is necessary to reverse connections on all the motor winding connections.</li> </ul> <p><u>NOTE: Under no circumstances shall the internal wiring of the controller be tampered with. Failure to comply will void warranty, may cause injuries and damage the controller. Only the wires directly feeding the motor can be reversed.</u></p> </li> <li>◆ Turn normal power circuit breaker handle to the ON position.</li> <li>◆ Check the motor rotation once more.</li> </ul>		
	<b><u>CHECK WRONG PHASE ROTATION INDICATION</u></b>		
	<ul style="list-style-type: none"> <li>◆ Turn normal power circuit breaker handle to the ON position. <ul style="list-style-type: none"> <li>• If the Phases Reversed red LED is off and the feeders are in the right phase sequence. No further adjustment is required, move to the next section.</li> <li>• If the Phases Reversal red LED is on, feeders and electronic module do not have the same sequence and the electronic boards needs to be adjusted. <ul style="list-style-type: none"> <li>- Turn normal power circuit breaker handle to the OFF position.</li> <li>- Open control panel door.</li> <li>- Locate the S1-8 dipswitch on the upper circuit board located on the door.</li> <li>- With a small screwdriver or pencil, change S1-8 (ABC-CBA) dipswitch from left to right.</li> <li>- Close controller panel door.</li> <li>- Turn normal power circuit breaker to the ON position.</li> <li>- Verify that Phase Reversed, LED is off.</li> </ul> </li> </ul> </li> </ul>		

## INITIAL START-UP

	<u>INITIAL START-UP</u>	Required	N/A
<p>Only experienced licensed electricians should perform start up. Only qualified personnel should work on or around this equipment.</p>	<ul style="list-style-type: none"> <li>◆ Turn the normal power circuit breaker handle to the ON position.               <ul style="list-style-type: none"> <li>- If the system pressure is above the cut in pressure setting (pressurized system), the motor will not start.</li> <li>- If the system pressure is under cut out pressure setting (under-pressurized system), the motor starts automatically to build up pressure.</li> </ul> </li> <li>◆ The system is ready for further tests.</li> </ul>		

## MANUAL START TEST

	Required	N/A
<p><b><u>START FROM START PUSHBUTTON PB1</u></b></p> <ul style="list-style-type: none"> <li>◆ Press the START pushbutton on the controller, relay CR1 will energize and the pump motor will start regardless of the system pressure and continues to run. (No possibility of automatic stop.)</li> <li>◆ Measure and record on the Start-up report form the current drawn by the motor on phase 1, 2 and 3 under no load condition and full load condition.</li> <li>◆ Press STOP pushbutton on the controller, CR1 drops out and the pump motor will stop.</li> </ul>		
<p><b><u>START FROM EMERGENCY START HANDLE</u></b></p> <ul style="list-style-type: none"> <li>◆ Raise the EMERGENCY START handle and latch it to its ON position. The pump motor will always regardless of the system pressure and continues to run (no possibility of automatic stop even when the handle is released to its OFF position).</li> <li>◆ Press STOP pushbutton on the controller, pump motor will not stop.</li> <li>◆ Turn the normal power circuit breaker off.</li> <li>◆ Put EMERGENCY START handle back to OFF position</li> <li>◆ Turn the normal power circuit breaker on..</li> </ul>		
<p><b><u>START FROM REMOTE START STATION</u></b></p> <ul style="list-style-type: none"> <li>◆ If the remote start circuit consists of a momentary pushbutton or contact: <ul style="list-style-type: none"> <li>• Press the remote START pushbutton or initiate closure of the remote start contact, relay CR1 energizes and the pump motor will start regardless of the system pressure and continues to run. (No possibility of automatic stop.)</li> <li>• Press STOP pushbutton on the controller, CR1 drops out and the pump motor will stop.</li> </ul> </li> <li>◆ If the remote start circuit consists of a maintained contact: <ul style="list-style-type: none"> <li>• Initiate closure of the remote start contact, relay CR1 energizes and the pump motor will start regardless of the system pressure and continues to run. (No possibility of automatic stop.)</li> <li>• Initiate opening of the remote contact. (No possibility of automatic or manual stop if contact remains closed unless the circuit breaker is turned off.)</li> <li>• Press STOP pushbutton on the controller, CR1 drops out and the pump motor will stop.</li> </ul> </li> </ul>		
<p><b><u>START FROM FIRE EQUIPMENT CONTROL (DELUGE VALVE)</u></b></p> <ul style="list-style-type: none"> <li>◆ Initiate opening of the contact, the pump motor will start regardless of the system pressure and continues to run. (No possibility of automatic stop.)</li> <li>◆ Initiate closure of the contact. (No possibility of automatic or manual stop if contact remains opened unless the circuit breaker is turned off.)</li> <li>◆ Press the STOP pushbutton, the pump motor will stop.</li> </ul>		

## AUTOMATIC START TEST

	<b><u>WATER PRESSURE CONTROL</u></b>		
<p><b>DANGER.</b> Hazardous voltage is present in the enclosure and will cause severe personal injury or death.</p> <p>Only experienced licensed electricians should perform start up. Only qualified personnel should work on or around this equipment.</p>	<p><b><u>MANUAL SHUTDOWN MODE</u></b></p> <ul style="list-style-type: none"> <li>◆ Simulate a pressure drop in the system by draining water off the pressure sensing line.</li> <li>◆ The pressure sensor automatically starts the pump motor when the pressure falls below the cut-in setting energizing relay ASR, dropping out relay CR2.</li> <li>◆ Verify that the pump motor starts at the desired pressure. If not, readjust the cut-in start pressure.</li> <li>◆ Let the pump build up pressure. Press the STOP pushbutton. Relay ASR drops out, CR2 energizes and the pump motor will stop. If it refuses to stop, the pressure sensor cut-out setting needs to be readjusted to a lower value.</li> </ul> <p><b><u>AUTOMATIC SHUTDOWN MODE</u></b></p> <p>NFPA20 §10-5.4: 'Automatic shutdown shall not be permitted where the pump constitutes the sole supply of a fire sprinkler or standpipe system or where the authority having jurisdiction has required manual shutdown '</p> <ul style="list-style-type: none"> <li>◆ Simulate a pressure drop in the system by draining water off the pressure sensing line. The pressure sensor automatically starts the pump motor when the pressure falls below the cut-in setting energizing relay ASR, dropping out relay CR2</li> <li>◆ Verify that the pump motor starts at the desired pressure. If not, refer to above for readjustment</li> <li>◆ Let the pump build up pressure.</li> <li>◆ 10 minutes after the pressure has reached the cut out setting, relay ASR drops out, CR2 energizes and the pump motor will automatically stop.</li> </ul> <p>The pump motor can be stopped before the expiration of the run period delay by pressing the STOP push button if the pressure is higher than the cut out setting.</p> <p><b><u>WEEKLY AUTOMATIC EXERCISE CYCLES</u></b></p> <p><b><u>IMPORTANT:</u> It is the responsibility of the operator to be sure that his system accepts unsupervised test. Certain pumping systems need water flow in the system otherwise the pump can be damaged by overheating.</b></p> <ul style="list-style-type: none"> <li>– Verify the time clock setting.</li> <li>– Program a new short start-stop test cycle.</li> <li>– At the beginning of the new test cycle, the pump motor will start and run continuously and the drain solenoid valve (if installed) will be energized and water will be drained.</li> <li>– At the end of the test cycle, the pump motor will stop automatically and the drain solenoid valve will be de-energized.</li> <li>– Reprogram the time clock to the desired exercising schedule.</li> </ul>		

## TEST ALARM CONDITIONS

		Required	N/A
	<p><b><u>PHASE LOSS ALARM CONDITION</u></b></p> <ul style="list-style-type: none"> <li>◆ Simulate a power failure by switching the circuit breaker handle to OFF position.                             <ul style="list-style-type: none"> <li>• Verify the control relay PAR is de-energized, the closed to alarm contacts on terminals 10-11 are closed, the open to alarm contacts on terminals 11-12 are open.</li> </ul> </li> <li>◆ Restore the power by switching the circuit breaker back on                             <ul style="list-style-type: none"> <li>• Verify the control relay PAR is energized, the closed to alarm contacts on terminals 10-11 are open, the open to alarm contact on terminals 11-12 are closed.</li> </ul> </li> </ul>		
	<p><b><u>PUMP RUN ALARM CONDITION</u></b></p>		
	<ul style="list-style-type: none"> <li>◆ Start the pump by pressing the START pushbutton.                             <ul style="list-style-type: none"> <li>• Verify the closed to alarm contacts on terminals 13-14 are closed, the open to alarm contacts on terminals 13A-14A are open. when the pump is running.</li> </ul> </li> <li>◆ Stop the pump by pressing the STOP pushbutton.                             <ul style="list-style-type: none"> <li>• Verify the closed to alarm contacts on terminals 13-14 are open, the open to alarm contacts on terminals 13A-14A are closed when the pump is at rest.</li> </ul> </li> </ul>		

# LIMITED SERVICE PUMP TROUBLESHOOTING HINTS

The following troubleshooting hints are intended to solve common field problems by qualified and authorized personnel only. This list is not exhaustive. If the problem is not solved with the following hints, please do not hesitate to contact factory.

1. Pump refuses to start in all starting modes.
  - Check if the circuit breaker handle is in the ON position. If the handle is in OFF position, move it to the ON position. If in Trip position, have an electrician verify the controller and motor connection for possible short circuit before resetting.
  - Check if line power on all phases is available to the controller.
  - Check if pump motor is properly connected.
2. Pump refuses to start in all starting modes except with emergency handle locked in On position.
  - Check the motor starter power components (contactors, contactor coil, ...).
3. Pump refuses to start on a drop of system pressure.
  - Check if the system pressure sensor PS1 is piped properly and if water is available and exempt of dirt.
  - Check if the cut in and cut out pressure threshold are adjusted properly.
  - Check the auto start relay CR2.
  - Sequential start timer may be adjusted and the pump starts after the sequential start delay (See setting section).
4. Pump refuses to start with start push button or remote start signal.
  - Check manual start relay CR1.
  - Check if remote start signal is properly connected to terminals 1 and 24. (Remote contact should close to start the pump).
5. Pump starts in all modes but refuses to stay ON after being started with the emergency handle.
  - Check limit switch LS1 on emergency handle.
    - Check manual start relay CR1.
    - Check deluge switch contact (contact should close upon flow detection between terminals 3 and 38).
6. Circuit breaker trips when motor starts:
  - Verify the motor connection and motor for any short circuits or grounds.
  - Check compatibility of controller with motor (voltage, HP, frequency).
  - Check if a lock rotor condition exists.
  - On some motors, the magnetizing current may be higher than the circuit breaker magnetic trip setting (usually set around 13 times the motor full load current). Contact factory for possibility of adjustment.
7. Pump motor starts immediately when circuit breaker is turned on and does not stop when stop push button is activated.
  - Check if system pressure is below cut out pressure.
  - Check if emergency handle is locked in ON position.
  - Check if remote start signal is calling for the pump motor to run.
  - Check if the weekly test is calling for the pump motor to run.
8. Pump motor starts automatically on pressure drop but refuses to stop when system pressure is restored.
  - Check cut out pressure. If it is adjusted to a pressure higher than the pump capacity, it will never reset and therefore will prevent the pump from stopping.
  - Check if system is set for manual shut down only, if so the pump stops only by pressing Stop push button.



# TRANSFER SWITCH TROUBLESHOOTING HINTS

The following troubleshooting hints are intended to solve common field problems by qualified and authorized personnel only. This list is not exhaustive. If the problem is not solved with the following hints, please do not hesitate to contact factory.

Problems	Check in numerical sequence
Generator set does not start on Normal Power failure.	<ol style="list-style-type: none"> <li>1. Confirm Alt-Isolating Switch is Closed.</li> <li>2. Generator set starts only if normal power failure lasts over 5 seconds.</li> <li>3. Check wiring to engine start contacts (terminals 51, 52, 53 or 54).</li> <li>4. Generator starting control must be in automatic position. Batteries must be charged and connected.</li> </ol>
Generator set does not start when Transfer Switch Test is operated.	<ol style="list-style-type: none"> <li>1. Hold the switch until generator starts. (8 to 10 Seconds)</li> <li>2. Verify generator has started</li> <li>3. Check wiring to engine start contacts (terminals 51, 52, 53 or 54).</li> <li>4. Generator starting control must be in automatic position. Batteries must be charged and connected.</li> </ol>
When Normal Power fails or when Transfer Switch test switch is operated, Generator set starts and runs but transfer to Alternate Power source fails.	<ol style="list-style-type: none"> <li>1. Wait for transfer time delay (set at 10 sec) to time out</li> <li>2. Verify if alternate power is accepted by the sensor               <ol style="list-style-type: none"> <li>a. Generator frequency must be at least 57Hz (for 60Hz systems) or 47Hz (for 50Hz systems)</li> <li>b. Phase to phase voltage between A1-A2-A3 must be higher than 90% of nominal voltage.</li> </ol> </li> <li>3.</li> </ol>
Normal Power is available, but Retransfer to Normal Power source fails.	<ol style="list-style-type: none"> <li>1. Wait for retransfer to normal delay (factory set at 30 minutes) to time out.</li> <li>2. Verify if Normal power available indicator is ON               <ol style="list-style-type: none"> <li>a. Phase to phase voltage between L1-L2-L3 must be higher than 90% of nominal voltage.</li> </ol> </li> <li>3. The transfer is disabled when alternate source is in wrong phase rotation. Verify the phase rotation of the alternate source.</li> <li>4.</li> </ol>
Generator set does not stop after retransfer to the Normal Source.	<ol style="list-style-type: none"> <li>1. Wait for the 5-minute unloaded running delay (cool down timer) to time out or press 'bypass time delay'.</li> <li>2. Check the generator is not running its own cooling time delay..</li> </ol>

# PREVENTIVE MAINTENANCE AND TEST

Limited Service pump controllers are an important part of your fire protection system. They require a minimum preventive maintenance but must be periodically inspected and their operation simulated to assure constant performance.

**NOTE: Only qualified and authorized personnel must do this maintenance.**

<b>VISUAL INSPECTION</b>	OK	N/A
Inspect cleanliness of controller.		
Remove any object from the top of controller.		
Dust and clean the controller.		
Inspect controller for any evidence of corrosion outside.		
Inspect controller for any evidence of corrosion inside.		
Check for leaks in pressure sensor and piping.		
Inspect door for proper alignment and function of door locks		
Inspect circuit breaker handle for proper operation		
Inspect circuit breaker handle for interlock with door		
Inspect shunt trip installation		
Inspect emergency start handle operation		
Verify operation of limit switch on emergency start handle		
Inspect tightness of all connections		
Inspect tightness of all terminal jumpers		
Inspect controller grounding		
Inspect harness mechanical attachment		
Inspect relays, contactors, and timers for any evidence of damage.		
Inspect motor contactor power contacts.		
Inspect tightness of all mounting nuts and screws.		

<b>OPERATIONAL INSPECTION</b>	<b>OK</b>	<b>N/A</b>
Check wrong phase rotation indication.		
Check motor rotation.		
Start from start push button		
Start from emergency start handle.		
Start from remote start station. (If connected.)		
Start from weekly test (Option no. A5.)		
Start from fire equipment control (deluge valve). (Option no. A3 and/or B16)		
Start from water pressure control.		
Verify sequential start (Option no. A2.).		
Start from flow switch. (Option no. A4.)		
Verify lock out provision from other equipment. (Option no. A6.)		
Verify interlock provision to other equipment. (Option no. A7.)		
Verify low suction alarm condition. (Option no. B7 and/or C5.)		
Verify low discharge alarm condition. (Option no. B9 and/or C6.)		
Verify low reservoir level alarm condition. (Option no. B18 and/or C10.)		
Verify permanent load shedding signal. (Option no. E1.)		
Verify temporary load shedding signal. (Option no. E2.)		
Verify permanent & temporary load shedding signal. (Option no. E3.)		

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