Instructions for EATON
Residential Electric Fire Pump Controllers

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INSTALLATION & MAINTENANCE MANUAL FOR THE RESIDENTIAL ELECTRIC FIRE PUMP CONTROLLER

In order to familiarize yourself with the Residential Fire Pump Controller, please read the instruction manual thoroughly and carefully. Retain the manual for future reference.

1. Installation and Mounting of the Controller

Carefully unpack the controller and inspect thoroughly.

The controller should be located as close as is practical to the motor it controls and be within sight of the electric motor.

The controller is designed for either wall or floor mounting. Note that the controller is not free standing and must be mounted with feet or bolted securely to a wall. For dimensional and weight data please refer to the respective data sheets.

2. System Pressure Connection

The Residential Fire Pump Controller is equipped with a Pressure Switch. The controller is provided with a **¼" NPT** female system pressure connection located on the bottom, external side of the enclosure.

NOTE: Water lines to the pressure switch must be free from dirt and contamination.

The pressure should not exceed what the pressure switch is rated for.

3. Electrical Connections

All electrical connections should meet national and local electrical codes and standards.

The controller should be located or so protected that they will not be damaged by water escaping from pumps or pump connections. Current carrying parts of controllers shall be a minimum of 12 inches (305 mm) above the floor level.

- Prior to starting verify all data on the nameplate such as, catalog number, AC line voltage, grounding and system pressure.
- Inspect all electrical connections, components and wiring for any visible damage and correct as necessary. Ensure that all electrical connections are tightened before applying power to the controller.
- Refer to the appropriate field connection drawing included in this manual, for all wiring information pertaining to the incoming AC power supply and motor wiring.
- Install necessary conduit using proper methods and tools.
- Incoming AC line voltage is clearly marked L1, L2, and ground, with terminals located on the main terminal block.

3.1 Wire Sizes

- For control wiring, use #14 AWG wire for all electrical connections.

3.2 Electrical Checkout Instructions

WARNING:	***The following procedures should be carried out by a qualified electrician familiar with the electrical safety procedures associated with this product and its associated equipment.***

3.2.1 To ensure the pump does not start upon energizing the controller, disconnect the pressure switch (PS). With the controller isolated (circuit breaker CB open), disconnect the control wires from one connection of the pressure switch. If two wires must be removed from the connection, maintain the circuit between the wires by temporarily bolting the two wire lugs together with a machine screw and nut. Temporarily insulate the connection.

3.2.2 Adjust the pressure switch set point as described on page 3.

3.2.3 Starting and Stopping: With the controller isolated, reconnect the pressure switch. Energize the controller. If the system water pressure is lower than the pressure switch set-point pressure, the pump will start. If the controller is set up for fully automatic operation, the pump will stop when pressure is restored and the running period timer (RPT) has completed its time interval. If the controller is set up for semi-automatic operation, the "STOP" pushbutton must be operated to stop the pump.

For both automatic and semi-automatic operation, if the water pressure is not restored, the pump will stop while the “STOP” pushbutton is held closed. Upon releasing the “STOP” pushbutton, the pump will restart. Each time the “STOP” pushbutton is depressed the RPT timer resets.

If the pump does not start when the controller is energized, or after it has been stopped as described above, operate the "START" pushbutton and check that the pump starts. Operate the "STOP" pushbutton and check that the pump stops; running period timer RPT has no effect in this case.

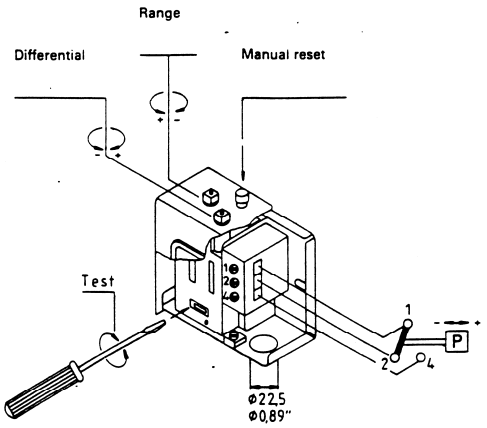
3.2.4 Running Period Timer: The RPT is factory set at 3 minutes. A calibrated dial is provided on the front of the timer to make any adjustments.

3.2.5 Sequential Start Timer (Option): The sequential start timer is supplied in duplex pump systems. The lead pump starts as soon as there is a pressure drop, and the lag pump should be set for a 3 - 5 second sequential start delay.

3.3 Pressure Switch Setting Instructions

Before attempting to set the pressure switch, de-energize the fire pump controller by opening the Circuit Breaker. This is done for safety, and so that the fire pump will not start and interfere with the adjustment procedure.

ALCO Pressure Switch



1. Set the differential adjustment on the pressure switch to minimum by turning the Differential Adjusting Screw fully counter clockwise. Set the operating pressure to well below the required pump starting pressure. Turn the Range Adjusting Screw clockwise to reduce the pressure and observe the scale on the switch.

2. Bleed the fire protection water system until the pressure is reduced to the required pump starting pressure. Hold this pressure by closing the drain valve.

3. Slowly rotate the Range Adjusting Screw counter clockwise until a click is heard from the pressure switch. The switch is now set to the required pump starting pressure.

4. If it is necessary to re-adjust the differential, the operating pressure of the switch will also be changed and should be reset.

NOTE: The cut-in (start point) pressure is the cut-out (range adjusting setting) pressure minus the differential setting.

3.4 Circuit Breaker

When the circuit breaker (CB) is in its "OFF" position, the controller is isolated from the power supply and the controller door can be opened. The enclosure door should not be opened with the circuit breaker in the "ON" position, except by qualified electrical personnel.

The circuit breaker is used to disconnect a running pump motor if necessary. In addition, this thermal magnetic breaker provides overload and short circuit protection

If the breaker trips at the moment of starting the motor, check that the rating of the breaker matches the rating listed on the drawing inside the controller door. Check that the horsepower and voltage of the pump motor match the information listed on the drawing. If everything matches, contact the equipment supplier immediately.

If the breaker trips at any other time, the entire controller/pump system must be checked by a qualified electrician for electrical or mechanical overload, component failure or short circuit.

3.5 Emergency Handle

When pushed and turned counterclockwise, this handle mechanically closes the power contactor and starts the fire pump motor, provided there is electrical power available and the CB is closed.

The microswitch (MSH), is actuated early in the stroke of the emergency handle. The MSH attempts to close the contactor electrically before the power contacts can close mechanically by means of the handle. Without pushing the handle in the full stroke, the pump should continue to run and can be stopped by the STOP pushbutton. If the pump does not continue to run, or the contactor does not latch electrically, push and turn the handle counterclockwise to latch it in place. To turn off the pump, first turn off the CB and then unlatch the handle.

If the emergency starting handle must be used, as the only means to start the fire pump, this shows that there is some malfunction within the controller. The controller should be checked and repaired by a qualified electrician without delay, in order to regain full fire protection.

3.6 Contactor

The contactor connects the pump motor to the supply, under the control of the pressure switch, ''START' pushbutton(s) or emergency start handle.
Auxiliary contacts provide a signal for supervisory purposes to indicate that the pump is running.

3.7 Pilot Devices

The green "POWER ON" light should be illuminated at all times when the circuit breaker is closed. If it is not then either there is no supply power to the controller or the lamp is burned out. Corrective action should be taken immediately. The green “POWER ON” light also functions as the “START” pushbutton. The "START" pushbutton provides a manual start of the fire pump.

When the pump is running, the red “PUMP RUNNING” light should be illuminated. The red “PUMP RUNNING” light also functions as the “STOP” pushbutton. After a manual start, the "STOP" pushbutton must be used to stop the fire pump. In all fully automatic controllers, if the "START" pushbutton is operated while the pump is already running because of a pressure switch start, the manual stopping provisions take over and the "STOP" pushbutton must be used to stop the fire pump after pressure has been restored.

3.8 Pressure Switch

The pressure switch (PS) is the normal means of starting the fire pump in response to a lowering in water pressure in the fire protection system. The PS contact is closed on low pressure and open on normal water pressure.

3.9 Remote Start/Manual Start Relay

The remote start/manual start relay (1CR) is provided to facilitate the connection of a normally open remotely located starting contact. Installation of this relay allows the use of a remote starting contact rated at 120 volt, 60 Hz with a making capacity of 70 VA and a continuous capacity of 10 VA minimum.

3.12 Low Suction (Option)

An additional pressure switch (LSPS) may be provided to signal low suction pressure by means of a white pilot light on the controller enclosure.

4. Operation of the Controller

4.1 Semi-Automatic or Automatic Operation

Controllers with a pressure switch, but with the Running Period Timer (RPT) disabled, are capable of semi-automatic operation only. Such controllers will start automatically in response to the pressure switch but must be manually stopped with the “STOP” pushbutton. Manual shutdown shall also be provided where required by the authority having jurisdiction.

Controllers fitted with the RPT option are capable of fully automatic operation. Such controllers will start automatically in response to the pressure switch and stop automatically when the pressure has been satisfied and the RPT has timed out. Provision is made to convert automatic controllers to semi-automatic operation by disabling the effect of the RPT. This is done by means of a jumper wire "b" between two points (3 & 3A) on the terminal block as shown on the controller drawing.

For both automatic and semi-automatic operation, if the water pressure is NOT restored, the pump will stop while the STOP pushbutton is held closed. Upon releasing the STOP pushbutton, the pump will restart. Note that the RPT will reset each time the STOP pushbutton is pressed.

Furthermore, if the controller is started manually, either by the local/ remote start pushbutton or emergency handle, then it MUST be stopped manually by depressing the STOP pushbutton.

4.2 Running Period Timer

The running period timer (RPT) in conjunction with the pressure switch (PS) performs the automatic stopping function in a fire pump controller after a start initiated by the pressure switch (PS). The RPT is set in the factory for a delay of 3 minutes. If the pressure switch (PS) responds to a loss of water pressure by closing its contact, the main contactor (M) is energized. The contactor is maintained energized through a normally closed, timed open RPT contact for the preset time interval even if the PS contact re-opens in the interim. At the end of the time interval, the RPT contact opens; if the PS contact is open at that point, meaning system pressure has been restored, M is de-energized and the pump stops. If the PS contact is still closed, M remains energized and the pump continues to run until the PS contact opens.

The purpose of the running period timer is to ensure that the pump motor is not subjected to frequent starts in response to a situation in which the pressure switch (PS) contact repeatedly closes and opens at short time intervals. RPT timing may be reduced for convenience in testing the controller by turning the dial on the front of the timer.

4.3 Sequential Start Timer (Option)

The sequential start timer (SST) delays the starting of the fire pump in response to the closing of the PS contacts. In duplex systems (SST standard on lag pump) it delays starting of the lag pump in addition to any delay added to the lead pump start. It does not delay a pushbutton or emergency handle start. This timing is accomplished by means of an electronic timing device. The timed contacts are used to delay starting the motor for a preset time after the PS contacts close.
This ensures that the starting inrush currents of all the pump motors are not simultaneously imposed on the power supply.

In addition, the provision of a sequential start timer on the lead pump, set to a few seconds delay, will prevent the pump controller from responding to momentary hydraulic transient pressure loss which would otherwise start the fire pump unnecessarily. (This feature may be considered as a "Time Delay Start" option.)

The sequential start timing device can provide a delay from 1-60 seconds. Adjustment is by means of a dial on the front of the timer. The lead pump would normally have its time delay set to minimum and the lag pump would have its time delay set to 5 seconds. If hydraulic transients are a problem, both timers can be adjusted for a few seconds extra time delay.

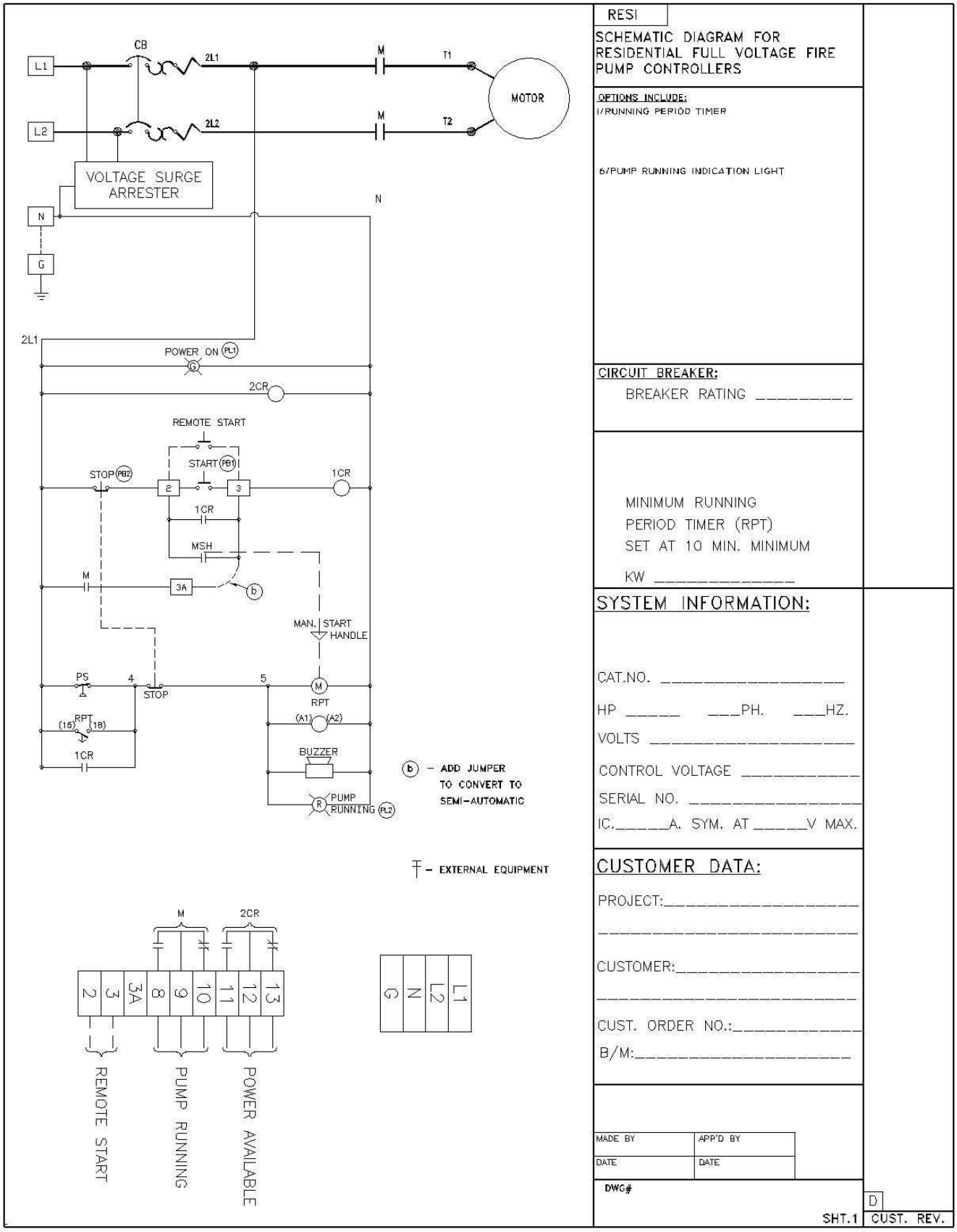
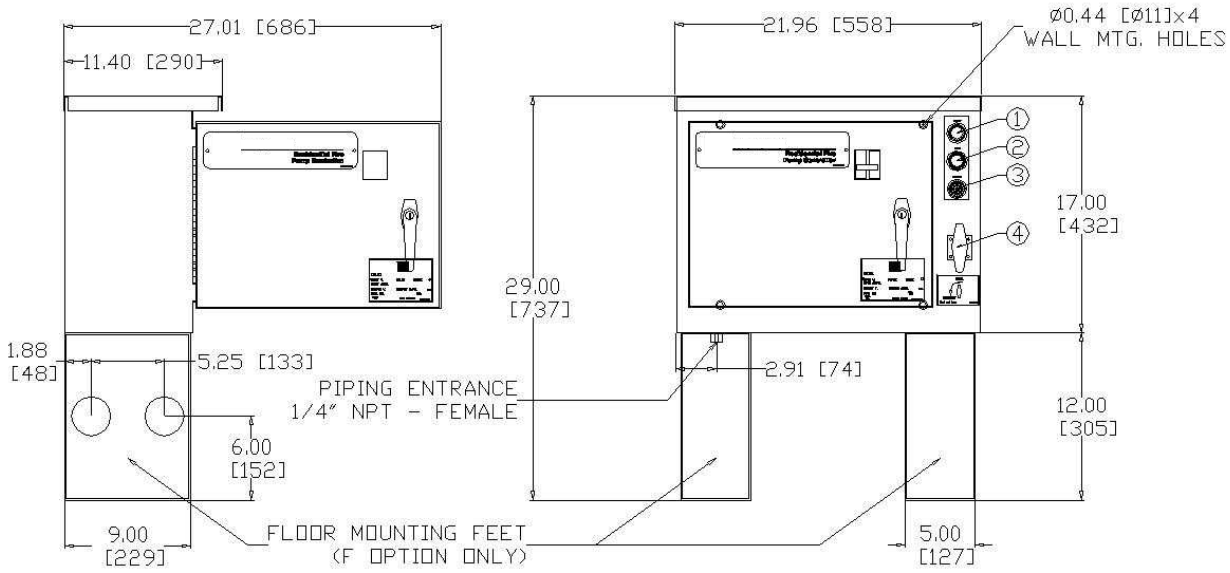

RESI
SCHEMATIC DIAGRAM FOR RESIDENTIAL FULL VOLTAGE FIRE PUMP CONTROLLERS
OPTIONS INCLUDE:
1/RUNNING PERIOD TIMER
6/PUMP RUNNING INDICATION LIGHT
CIRCUIT BREAKER:
BREAKER RATING _____
MINIMUM RUNNING PERIOD TIMER (RPT) SET AT 10 MIN. MINIMUM
KW _____
SYSTEM INFORMATION:
CAT.NO. _____
HP _____ ___PH. ___HZ.
VOLTS _____
CONTROL VOLTAGE _____
SERIAL NO. _____
IC._____A. SYM. AT _____V MAX.
CUSTOMER DATA:
PROJECT:_____
CUSTOMER:_____
CUST. ORDER NO.:_____
B/M:_____
MADE BY
APP'D BY
DATE
DATE
DWG#
SHT.1
D
CUST. REV.
CB
L1
L2
2L1
2L2
M
T1
T2
MOTOR
VOLTAGE SURGE ARRESTER
N
G
2L1
POWER ON PL1
2CR
REMOTE START
START PB1
STOP PB2
1CR
MSH
3A
MAN. START HANDLE
PS
STOP
RPT
BUZZER
PUMP RUNNING PL2
ADD JUMPER TO CONVERT TO SEMI-AUTOMATIC
EXTERNAL EQUIPMENT
2 3 3A 8 9 10 11 12 13
G N L2 L1
REMOTE START
PUMP RUNNING
POWER AVAILABLE

FIGURE #1

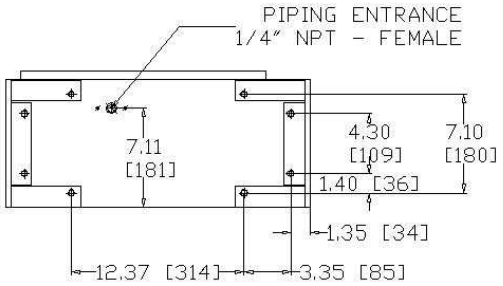
EATON

Fire Pump Controller Dimensions & Shipping Weights
Residential

RESI



① -START PUSHBUTTON / POWER ON LIGHT
② -STOP PUSHBUTTON / PUMP RUNNING LIGHT
③ -BUZZER
④ -MSH (EMERGENCY START HANDLE)
⑤ -MAIN POWER SWITCH



	Motor Hp	Line Voltage	Withstand Rating		Approx. Weight Lbs. [Kg]
			Standard	Intermediate	
	1-10	230V S/P	10,000	22,000	125 [55]

NOTE:
1. ALL ENCLOSURES FINISHED IN FIRE PUMP RED
2. CABLE ENTRANCE EITHER TOP OR BOTTOM
3. STANDARD ENCLOSURE TYPE NEMA 2
4. ADD 12" IN HEIGHT FOR OPTIONAL FLOOR STANDS

DIMENSIONS IN INCHES AND [MILLIMETERS]

EATON

FIGURE #2