MANUAL FOR MODEL MP300 to MP700
ELECTRIC MOTOR DRIVEN
FIRE PUMP CONTROLLERS

Starting Serial No. "MA"

This manual provides General Information, Installation, Operation, Maintenance and System Set-Up Information for METRON Model Model MP300 through MP700 Electric Motor Driven Fire Pump Controllers.

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PART I: GENERAL INFORMATION

The basic function of the model MP Fire Pump Controller for electric motor driven fire pumps is to automatically start the fire pump electric motor upon a drop in pressure in the water main, or from a number of other demand signals. This controller provides alarm and/or alarm shutdown protection for various motor and power failures. Stopping of the motor after the demand period is over may be either manual or automatic. This controller also includes an automatic weekly test starting feature.

PART II: FUNCTIONS

Equipment is provided in the Controller to provide the following functions:

A. Automatic Starting From:
   a. Drop in water line pressure
   b. Operation of optional remote start switches, such as remote start switch, deluge valve switch, fire alarm switch, etc.
   c. Weekly test timer

B. OID – Operator Interface Device - Provided for display of alarm functions, system pressure, 3 phase AC volts, 3 phase motor current and alarm conditions, etc. Includes buttons for Auto, Test, Manual and Off. Also features a 4 line by 20 character LCD for display

C. Alarms and Signal Lights - Twelve (12) Standard lights are provided to give visual signals for; **"Power On", "System Fault"**, **"Phase Failure", "Phase Reversal"**, **"Pump Running", "Pump Failed to Start"**, **"Motor Overload"**, **"Low Pressure", "Motor Lockout", "Local Start", "Remote Start"** and **"Deluge Start".** When a transfer switch is supplied, additional lights are provided for **"Transfer Switch in Normal", "Transfer Switch in Emergency"** and **"Emergency Iso Sw Open".** In addition the mode buttons have LED's on the button indicating **"Auto", Manual", "Test",** or **"Off"** mode**.** 12 additional lights (9 when a transfer switch is supplied), configurable by the factory, are provided for **"Pump Room Alarms"**. An audible alarm horn is mounted on the front of the cubicle for sounding in the event of failure. Terminals are provided for remote failure indication of the following:
   "Power Available"
   "Phase Reversal"
   "Pump Running"
   "Controller Not in Auto"

D. A data logger is provided as standard to record system pressure along with numerous alarm conditions and system events. The data can be displayed on the OID or can be downloaded to a PC through the RS232, RS485 or USB port provided on the main system board or printed to the internal printer (if supplied).

E. A weekly test timer is supplied to automatically start the pump any set day of the week, at a set time of day, and a preset run time. See System Config Screen 106.

F. **"Start"** Push button – A green push button is provided on the exterior of the cabinet to manually start the pump. When this button is pressed, the motor will continue to run until it is stopped using the Stop push button.

G. **"Stop"** Push button - A red pushbutton is provided on the exterior of the cabinet to stop the pump in Automatic only after starting causes have returned to normal. This returns the controller to the automatic position. In the Manual mode this will also stop the pump after starting via the Start push button.

H. Cabinet - A heavy gauge steel cubicle encloses the controller.

PART III: OPERATION OF THE CONTROLLER

A. When the controller is in the **"Auto"** mode, the main circuit breaker and isolation switch are in the **"On"** position, the controller is in standby condition ready to start the pump automatically. A green pilot light above the **"Auto"** button will illuminate in this mode. Also, the Power On light should be ON indicating that all power is available and the controller is ready to start the pump.

When the water pressure drops below a level, which is set in System Config Screen 101, the Controller will actuate the starting sequence based on the Model of the controller selected in Screen 301. If the pump fails to start after a set time delay (Screen #103), the **"Pump Failed to Start"** light will illuminate, and the alarm horn will sound. In addition, the **"System Fault"** light will illuminate.

The panel is wired so that optional remote start switches may be used, such as Deluge Valve, Remote Start pushbutton, Fire Alarm switches, etc. The Deluge Valve Switch Option (Screen #124), is a normally closed switch that when opened starts the pump similar to the pressure drop start. In addition, when "Supervisory Power Failure Startup" feature is enabled (System Config Screen 116), the Controller will automatically start the pump upon loss of a Separate 120VAC Supervisory Power, after an adjustable time delay (System Config Screen 117).

If the pump stops while running, and there is still an auto start demand, the control will attempt to restart the pump. If the pump fails to start the **"Pump Failed to Start"** light will illuminate and the alarm will sound. If, while the pump is operating, the motor current exceeds a set overload value (Screen #319), the **"Motor Overload"** light will illuminate and the alarm will sound indicating motor overload.

The Controller may be configured as either **"Manual"** or **"Automatic"** stop as required (System Config Screen 104). **"Manual"** stop is set as standard. When Automatic stop is enabled the stop timer is preset at the factory to 10 minutes. Longer time settings can be set in System Config screen 105. When "Automatic Stop" is disabled, the pump will continue to run even though the pressure switch or other remote starting switch returns to its normal position. The pump can be stopped immediately only by pressing the stop button or by pressing the **Off** mode button. If set up for **"Automatic"** stop, the pump will be stopped automatically upon restoration to normal of whatever demand switch started the pump providing it has run at least 10 minutes or longer as set in System Config screen 105. If the demand period was less than the time set on the auto stop timer, the pump will continue to run until the timer times out and then will stop.

B. When the **"Test"** mode button is pressed for two or more seconds, the pump will be started by causing a drop in water pressure if the Solenoid Drain Valve Option (Screen #108) is selected. If the Solenoid Drain Valve Option is set to NO, the unit will start automatically similar to the Deluge Valve switch start feature. Failure alarm circuits will be operative in the **"Test"** mode. This method of starting provides a test of the Controller, thereby assuring proper operation when required. The pump will run continuously in this position until the **"Stop"** push button is pressed or the **"OFF"** mode button is pressed.

C. Periodic Self Testing - The Weekly Test Start Timer can be set to give test runs on any day of the week and time of day desired. A timing element is incorporated in the controls so that when the pump starts in this manner, it will run for a definite time before it shuts down. See System Config Screens 109 through 112 to set the starting time and length of pump running. See item B. above. The Weekly test feature will also use the Solenoid Drain Valve option to start the pump if it is enabled as described in B. above. If Screen #113 (Stop Motor During Test on Alarm) is set to Yes, the motor will be stopped should any alarm condition occur during the weekly test operation.

D. Provision for sequential starting is accomplished by the use of adjustable time delay on pressure drop starting or "Deluge Valve" starting. On Multiple Pump installations these timers are set sequentially and progressively longer in time to prevent more than one (1) pump from starting simultaneously with another pump. Failure of the lead pump to start will not prevent subsequent pumps from starting. The time delay on starting is set in System Config Screen 103.

E. **Emergency Manual Operation:** Emergency manual operation is provided in case of failure of control circuitry. This lever is manually moved to the "On" position and must be manually latched in the "ON" position or it will return to "Off" when released. The lever should be moved from the "Off" position to the "On" position in as quickly a motion as possible to prevent burning the contacts. The circuit breaker should be turned off to disconnect the circuit before releasing emergency lever. This lever is for emergency use only. A mechanical interlock switch is connected to the emergency lever to operate the contactor electrically when all circuitry is functioning properly. This is provided to prevent inadvertent slow closing of contactor and burning of contacts.

F. **Series MP400 Primary Resistance Start:** There are two contactors supplied along with a set of starting resistors. The starting contactor is connected in series with the resistors to reduce the voltage to the motor for a preset time. After this preset time delay (See Screen #314) the main contactor will close in parallel with the starting contactor and resistors and thus apply full voltage to the motor. If the motor is not connected for this test, there will be no voltage drop across the resistors and full voltage will appear at the output terminals of the contactors as soon as the starting contactor closes.

G. **Series MP420 Part-Winding Start:** There are two contactors for part-winding start. The start contactor will close immediately on demand and the other will close after a preset transition time delay (See Screen #314). Full voltage will be present at the output of both contactors.

H. **Series MP430 Wye-Delta Open Transition:** There are three contactors for wye-delta starting. The start contactor and the shorting contactor will close immediately on demand. This connects the motor leads in the wye configuration. After the transition time delay the shorting contactor opens and the run contactor closes, thus connecting the motor windings in the delta configuration. The motor will now run at full speed and deliver rated horsepower to the load.

I. **Series MP435 Wye-Delta Closed Transition:** The operation of the Series MP435 is almost the same as the Series MP430. There is an additional resistor contactor and a set of transition resistors which provides power to the motor windings during transition from the wye connection to the delta connection. After the transition time delay this contactor closes, which connects the resistors to the motor windings. After the resistor contactor closes the shorting contactor opens, which in turn allows the run contactor to close, thus connecting the motor windings in the delta configuration. The motor will now run at full speed and deliver rated horsepower to the load.

J. **Series MP450 Autotransformer Start:** There are three contactors for autotransformer starting. The start (autotransformer) contactor and the autotransformer neutral contactor will close immediately on demand. This connects the motor leads through the autotransformer to reduce the voltage to the motor. After the transition time delay the run contactor closes and then the start contactor and autotransformer neutral contactor open, thus connecting the motor to full voltage. The motor will now run at full speed and deliver rated horsepower to the load.

K. **Series MP700 Solid State Soft Start:** There are two contactors for solid state soft starting. The solid state starter line contactor will close immediately on demand and ramp the motor up to speed depending on the solid state starter configuration parameters. After the transition time delay the run contactor closes and bypasses the solid state starter, thus connecting the motor to full voltage. The motor will now run at full speed and deliver rated horsepower to the load. When the stop command is received and the controller is set up for the ramp stop option (Screen #106) the motor will ramp down in speed over a fixed time delay (Screen #107) until it stops.

Note: When using the emergency manual start handle, the soft start unit may display an "OCF" fault condition. This is normal. The unit is <u>not</u> malfunctioning. When the proper stop sequence is used according to paragraph E above, the fault condition will be cleared and the soft start unit will be ready for a normal start.

PART IV: INSTALLATION AND TEST PROCEDURE

A. INSTALLATION

The Fire Pump Controller has been assembled and wired at the factory in accordance with the highest workmanship standards. All circuits and functions have been thoroughly tested to assure correct operation when properly installed. The installer should be completely familiar with the external hookup of the pump junction box to the terminal bar in the Controller. All local electric codes should be used for proper installation, wiring and grounding of the controller prior to startup.

A weekly test drain solenoid valve may be provided to relieve water pressure to the pressure transducer thus initiating the start sequence. This test simulates an actual start demand. Since the Controller operates the drain valve only momentarily, a small amount of water is drained off. The water pressure sensing line to the Controller from the pump must be thoroughly flushed before connection to the Controller in order to remove chips, particles, or other matter, that could enter the plumbing components in the Controller.

Controllers configured with **"Automatic Stop"** enabled may be changed to **"Manual"** stop by disabling this feature in System Config Screen 104. If deluge valve switches are to be used for starting, enable the Deluge Valve Option in Config Screen 121 and connect the remote normally closed switch to terminals 74 and 111.

B. TEST PROCEDURE

All of the following tests should be made on each unit after installation. If each test is satisfactory, the operator may place the control switch in **"Auto"** mode and depend upon the panel operating properly when required. Also, any one or all of these tests may be carried out at any time after installation, if so desired. **NOTE: If the Supervisory Power Failure Start Option has been Enabled (Screen #116) and 115 Volts A.C. is not connected to Controller, the "System Fault" light will illuminate and the controller will start automatically after a time delay. The 115VAC must be turned on to prevent the pump from starting.**

INPUT/OUTPUT STATUS INDICATOR LIGHTS

Light Emitting Diodes (L.E.D.) lights have been installed on the microprocessor module to indicate the status of each input and output terminal. Status indication for the standard functions is given below:

Terminal Number (Microprocessor Func #)	**L.E.D. (light) "ON" Indication**
(Out 02)	Circuit Breaker Shunt Trip
(Out 03)	Start Contactor relay (if applicable)
(Out 04)	Run Contactor relay
(Out 05)	Start signal to Soft Start (Model MP700 only)
(Out 06)	Power to Soft Start (Model MP700 only)
(In 01)	Emergency Start lever activated
(In 02)	Start Pushbutton
(In 03)	Stop Pushbutton
(In 04)	Start Contactor closed
(In 05)	Run Contactor closed
(In 06)	Transfer Switch position (if applicable)
(In 07)	Transfer Switch ready to transfer (if applicable)
(In 08)	Transfer Switch Emergency Iso Switch Open (if applicable)

a. **AUTOMATIC STARTING TESTS:**

1. Place control in **"Auto"** position.
2. Bleed off pressure in system until pressure drops below the low set point.
3. Pump should start automatically and continue to run after pressure rises above the high set point, if arranged for **"Manual"** stop. If arranged for **"Automatic"** stop, pump will continue to run for time set on Auto Stop Timer and then stop.
4. Press the **"Stop"** push button to stop the pump.
5. Repeat tests for each demand switch such as deluge valve (if enabled), remote start, etc.

b. **PERIODIC WEEKLY START TEST:**

1. Pressure must be up and all other demand switches de-activated.
2. When the current day and time of day matches the settings in System Config screens 107 and 108, the solenoid drain valve will energize (if enabled and supplied, see screen #108) and the pump will start. It will continue to run for the amount of time set and then stop automatically.

c. **SETTING PROGRAM WEEKLY TEST TIME:** System Config screen 109 through 112.

d. **REMOTE START SWITCH CIRCUITS:** Field wiring terminals are provided on the controller so that optional remote start switches such as Remote Pushbutton Stations, Deluge Valve Switch, Fire Alarm Switches, etc., may be used to start the pump. Two (2) sets of terminals are provided. Terminals #112 and #31 are used for remote manual start push buttons (close to start). Terminals #111 and #31 are used for remote Deluge Valve Switch or other remote automatic start switches (open to start). Upon automatic start from this type of switch, the pump will be stopped either automatically after the demand switch de-activates and Pump Auto Stop Timer times out, or manually at the Controller. Terminals #111 and #31 must have a jumper installed if a remote Deluge switch is "Enabled" but not to be used. When the controller is shipped from the factory Deluge Valve start is Disabled (System Config screen 121).

e. **AC POWER FAILURE STARTING:** If this feature has been enabled it can be tested by disconnecting the supervisory power 115 V.A.C. to the Controller. After the preset time delay (which is specified in System Config screen 112), the Controller will commence starting of the pump. The **"System Fault"** LED will illuminate and the alarm will sound.

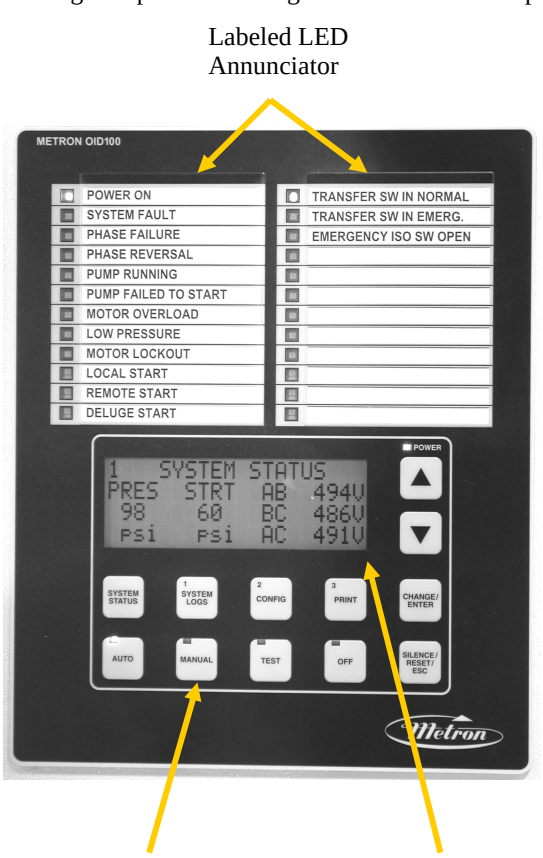
f. **NORMAL OPERATION – AUTOMATIC:** Press **"Auto"** mode button on OID. A green **"Automatic Mode"** light will illuminate and the pump will automatically start upon drop in pressure or operation of other start switches. If the Auto Stop Timer is disabled (Manual Stop) the pump must be turned off at the Controller. When the Auto Stop Timer is enabled, upon termination of the demand signal, the pump will run for the length of time left on the Auto Stop Timer and then will stop automatically.

g. **AN ADJUSTABLE SEQUENTIAL START TIMER IS SUPPLIED FOR MULTIPLE PUMP INSTALLATION:** Normally, the leading pump Controller will not have a delay timer and will commence starting of the pump immediately upon operation of a demand signal (other than Power Failure which is time delayed). The subsequent Controllers will have a time delay which is adjustable from 0 to 999 seconds. Each time delay should be set with progressively longer times on each subsequent pump. The recommended time interval is ten (10) to fifteen (15) seconds. This may be extended or shortened as required by the local authorities having jurisdiction.

h. **PUMP ROOM ALARMS:** Field terminals may be provided for various inputs from pump room alarms. These alarms include: Low Pump Room Temperature, Reservoir Low, Reservoir Empty, Low Suction Pressure, Relief Valve Discharge and/or Flow Meter On etc. A maximum of twelve (12) (or nine (9) if a transfer switch is supplied), pump room alarms is available. Each auxiliary alarm is configurable so that the alarm horn may or may not sound and the light will come on when the alarm sensor contacts close. These pump room alarms can be silenced with the "Silence" push button on the OID if they have been configured as silenceable.

PART V: OPERATOR INTERFACE DEVICE (OID) USE AND NAVIGATION

The Operator Interface Device (OID) provides visual indication of the alarms, status of system parameters, and an interface to change set points to configure the controller to operate appropriately for various installation requirements.



Common Tasks Performed Using The OID

Silencing Horn: If a horn is sounding and the alarm is silenceable, a quick press of the [SILENCE/RESET/ESC] will silence the horn (less than 1 second press).

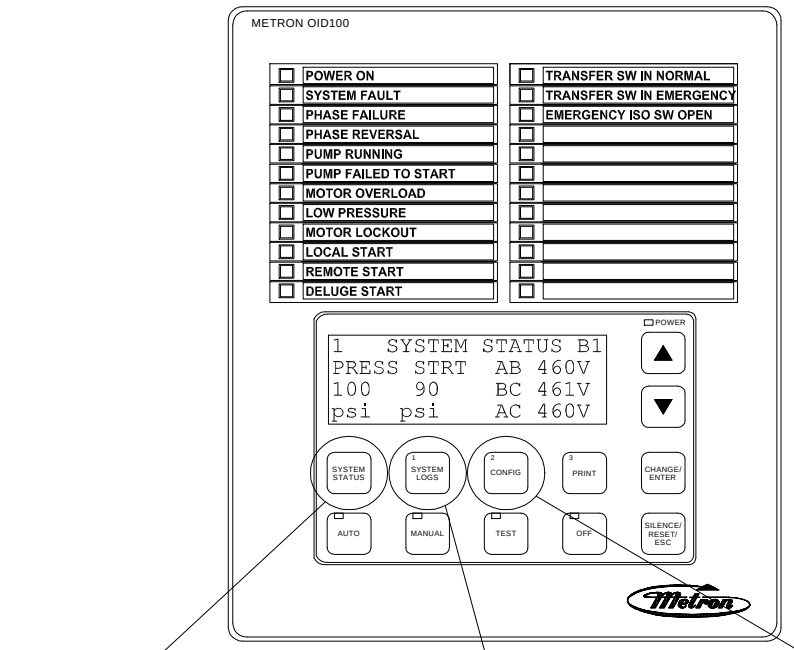
Resetting Alarms: If the alarm condition has cleared, press and hold the [SILENCE/RESET/ESC] button 2 to 5 seconds to reset alarms.

Operating Mode Change: The operational mode that the controller is in can be changed by pressing the [AUTO] [MANUAL] or [OFF] buttons. An LED will illuminate on the appropriate button indicating the mode of operation the controller is in.

Test Mode: When controller is in Auto Mode, pressing and holding the [TEST] button for two or more seconds will open the pressure drain solenoid thus dropping the pressure, which causes the controller to start the pump. Pressing and releasing the [TEST] button in Manual Mode directly controls the opening and closing of the drain solenoid. The pump will not automatically start when in Manual Mode.

Lamp Test: To illuminate and check all the OID LED's and the horn, press and hold the [SILENCE/RESET/ESC] button 5 or more seconds or until all the lights turn on.

OID Screen Map



1 SYSTEM STATUS B1
PRES STRT AB 460V
110 100 BC 461V
psi psi AC 460V

2 SYSTEM STATUS
Phase A 125 Amps
Phase B 124 Amps
Phase C 125 Amps

3 SYSTEM STATUS
Pump Countdown Tmr
0sec Until Start
0min Until Stop

4 SYSTEM STATUS
Countdown Timer
0sec Until Start
0min Until Start

5 SYSTEM STATUS
Controller Power
On Time: 18.5 Hrs
Mon10/20/04 17:53:26

6 SYSTEM STATUS
Firmware Ver SV 1.1
Commissioned Date:
10/15/04

SYSTEM LOGS
1) Alarm Log
2) Event Log
3) Pressure Log

1 ALARM LOG
Pump Failed To
Start Alarm Occurred
10/16/04 07:32:15

1 ALARM DETAILS
Pump Failed To
Start Alarm Occurred
10/16/04 07:32:15

1 ALARM DETAILS
Pressure: 83.2psi
System Auto:Yes
Pump Running:No

1 ALARM DETAILS
Phase A Amps 0
Phase B Amps 0
Phase C Amps 0

1 ALARM DETAILS
Phase AB Volt 460
Phase BC Volt 461
Phase AC Volt 464

1 EVENT LOG
System in Off
Mode Occurred
10/16/04 13:15:15

1 EVENT DETAILS
System in Off
Mode Occurred
10/16/04 13:15:15

1 EVENT DETAILS
Pressure: 83.2psi
System Auto:Yes
Pump Running:No

1 EVENT DETAILS
Phase A Amps 0
Phase B Amps 0
Phase C Amps 0

1 EVENT DETAILS
Phase AB Volt 460
Phase BC Volt 461
Phase AC Volt 464

PRESSURE LOG
10/16/04 17:52:45
112 psi
Skip Rate:[EACH]

PRESSURE LOG
10/16/04 17:52:30
112 psi
Skip Rate:[EACH]

PRESSURE LOG
10/16/04 17:52:15
113 psi
Skip Rate:[EACH]

2 ALARM LOG
Supvr Power Failure
Alarm Cleared
10/16/04 07:09:48

3 ALARM LOG
Motor Overload
Alarm Occurred
10/16/04 06:49:03

2 EVENT LOG
Pump Failed To
Start Alarm Occurred
10/16/04 07:32:15

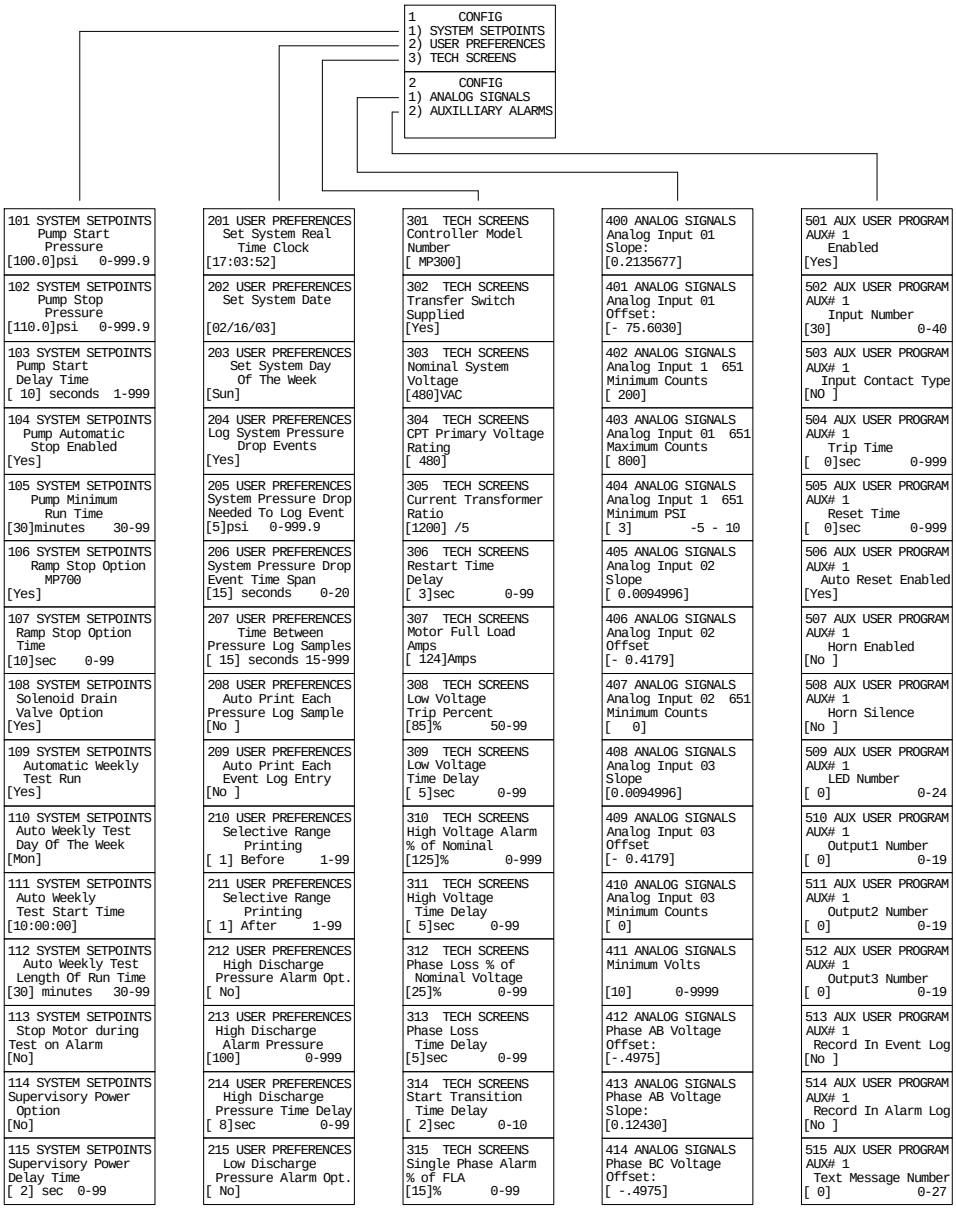
3 EVENT LOG
Supvr Power Failure
Alarm Cleared
10/16/04 07:09:48

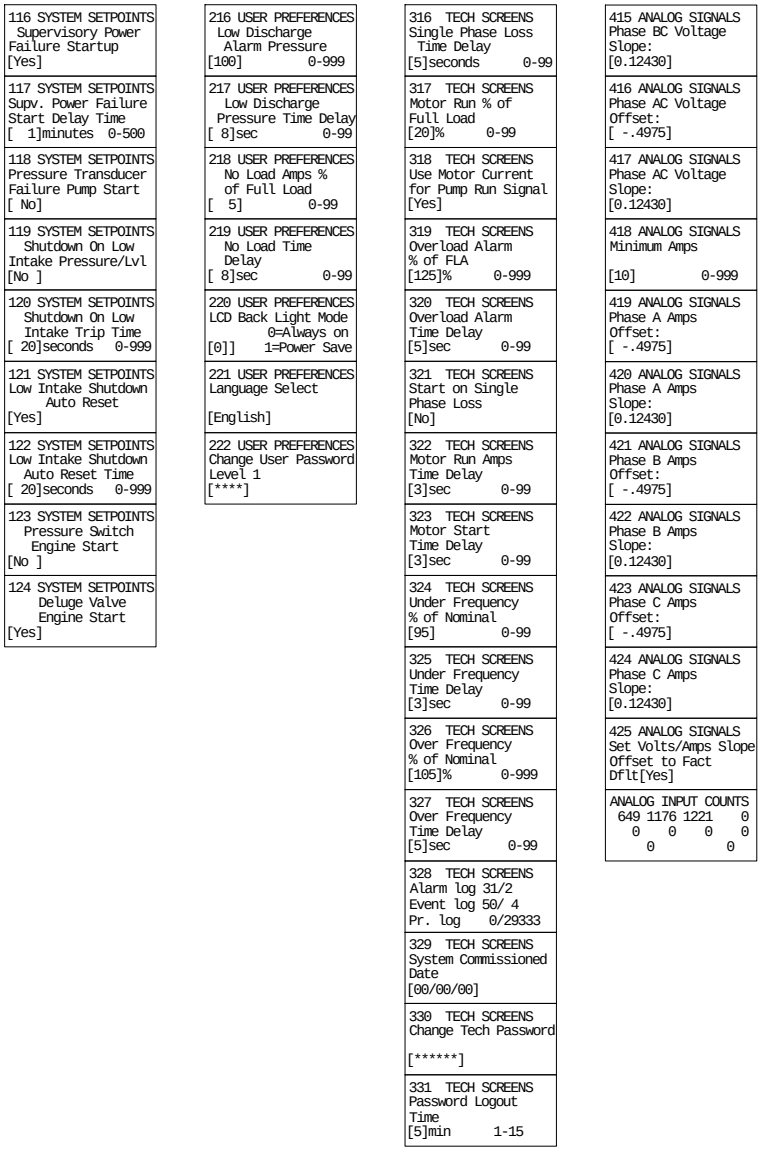
1 CONFIG
1) SYSTEM SETPOINTS
2) USER PREFERENCES
3) TECH SCREENS

2 CONFIG
1) ANALOG SIGNALS
2) AUXILLIARY ALARMS

Continued on next page.

OID Screen Map (continued)



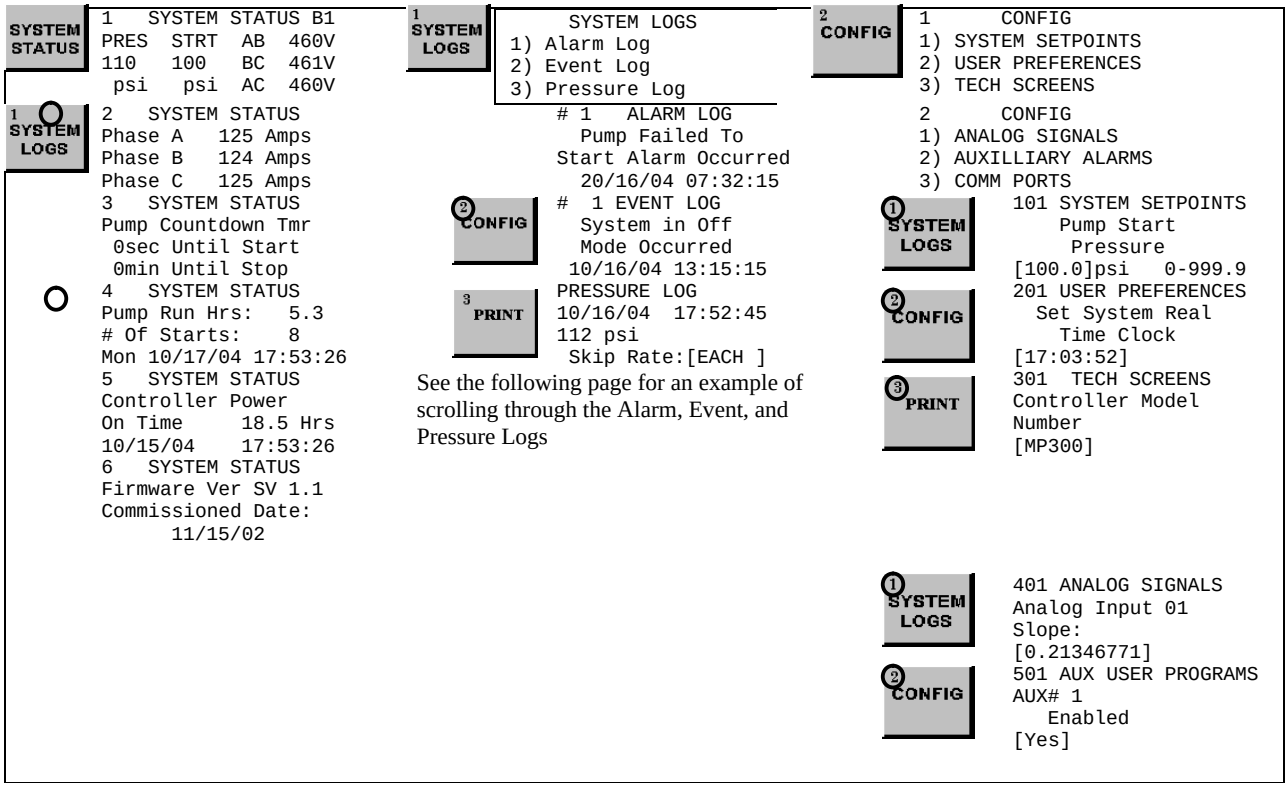


The [SYSTEM STATUS], [SYSTEM LOGS], and [CONFIG] buttons navigate the user to the top screen of a column of similarly grouped screens or menus.

SYSTEM STATUS: The [SYSTEM STATUS] button can be pressed at any time to return the screen to the home System Status screen #1. System Status screens display the real time information variables about the pump system.

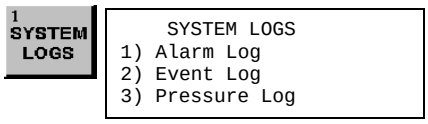
SYSTEM LOGS: The [SYSTEM LOGS] button displays the System Logs menu. Once the menu is displayed, buttons with numbers on them can be used to enter the selected data log. See the following page for details on navigating the System Logs.

CONFIGURATION: The [CONFIG] button displays the Config menu which groups the different types of set points that configure the system to operate in the desired manner. Use the [UP] and [DOWN] buttons to scroll between the two menu screens. Buttons with numbers on them can be used to enter the selected configuration screen group. See the System Setpoint Definitions section for descriptions on the functionality of each set point.

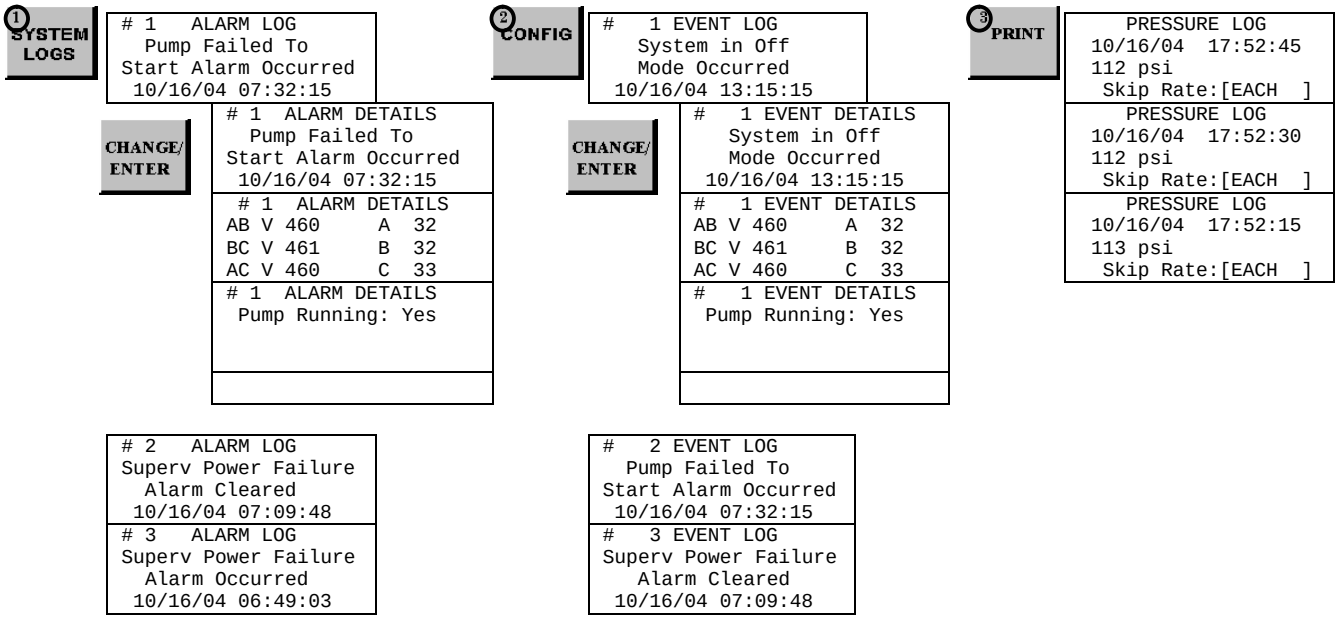


See the following page for an example of scrolling through the Alarm, Event, and Pressure Logs

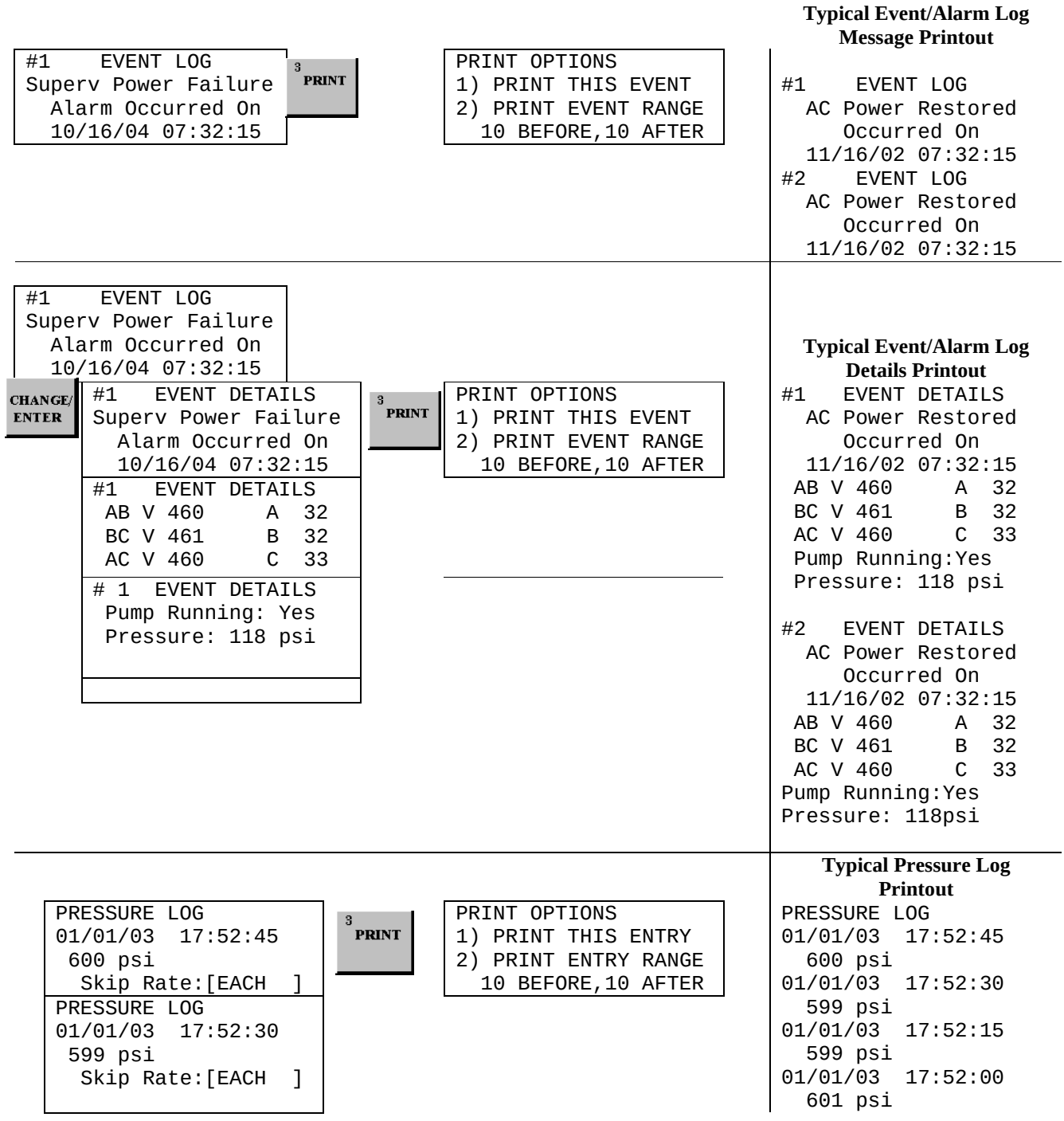
SYSTEM LOGS: The Model MP Electric controller has three separate data logs; 1) alarm log, 2) event log, and 3) pressure log. The alarm log is a subset of the event log and only displays the last ten alarms that have occurred or cleared. The event log records all alarm and system function type events



SYSTEM LOGS: The [UP] and [DOWN] arrow buttons can be used to scroll through the three data logs. The [CHANGE/ENTER] button enters and exits the alarm/event details in either the Alarm or Event logs. In the Pressure Log the [CHANGE/ENTER] button changes the skip rate used to scroll through the logged pressure readings.



Printing System Log Data: The following applies if a printer has been installed or a PC is connected to the RS232, RS485 or USB com ports using the appropriate cable. When the [PRINT] button is pressed when looking at data in one of the three logs, a menu for what is to be printed is displayed. Pressing [1] prints just the alarm/event/pressure reading currently being displayed. Pressing [2] prints a range of data before and after the currently displayed alarm/event/pressure reading currently displayed. The range can be changed in the User Preferences setpoints 210 and 211. To download the Log Data using the USB port, log onto Metron's web site at www.metroninc.com and click on the Fire Pump Controller link. Then click on the "Click Here to Download Metron's USB application" link. Install this onto your PC. If you use the RS232 port to download the data, use Microsoft windows Hyperlink program and configure for Baud Rate as 9600, Data bits as 8, Parity as None, Stop Bits as 1 and Flow Control as None. When the print button on the OID is pressed, data will be sent to the PC via the port you have connected to.



CONFIGURATION SCREENS: All parameters that control the operation of the controller can be viewed and changed within the Configuration set point screens. Each set point is protected by a user password to prevent unauthorized changes. The system set points are separated into five different group
s.


```
1      CONFIG
1) SYSTEM SETPOINTS
2) USER PREFERENCES
3) TECH SCREENS
```

```
2      CONFIG
1) ANALOG SIGNALS
2) AUXILLIARY ALARMS
```

1) SYSTEM SETPOINTS (Level 1 password): These setpoints adjust the conditions for starting and stopping the pump.
2) USER PREFERENCES (Level 1 password): These setpoints adjust settings not related to pump operation.
3) TECH SCREENS (Level 2 password): These setpoints are for factory/technician purposes only and are used to fine tune special systems.

1) ANALOG SIGNALS (Level 2 password): These setpoints calibrate the analog pressure, voltage and amp readings.
2) AUXILLIARY ALARMS (Level 2 password): These 12 user programs are used to setup any auxiliary signals that need to be monitored.

Changing Values:

1) Navigate to the configuration set point screen that contains the value that needs to be changed.
2) Press [CHANGE/ENTER]. If a password has not been entered for a while, the "ENTER PASSWORD" screen will be displayed. Use the [1] [2] and [3] buttons to enter the appropriate password.
3) Once the correct password level has been attained, the "CHANGE VALUE" screen for the value to be changed will be displayed. An underscore cursor will appear beneath the first digit on the entry.

   Use [UP] or [DOWN] arrow buttons to scroll the value of the digit with the cursor. Press [CHANGE/ENTER] to accept each digit's entry. The cursor will move to the right so the next digit can be changed. Pressing [SILENCE/RESET/ESC] or the [SYSTEM STATUS] button will exit change mode without changing the original value.

Example of how to change a setpoint value:

```
101 SYSTEM SETPOINTS
    Pump Start
     Pressure
[100.0]psi   0-999.9
```


```
ENTER PASSWORD:
****
```

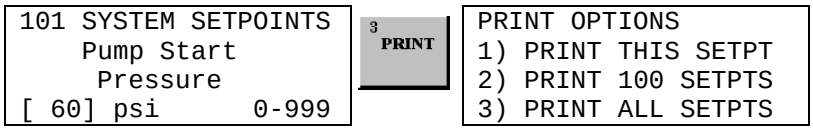
Press the [1], [2], or [3] keys to enter the password.

```
101 CHANGE VALUE
    Pump Start
     Pressure
[ 60] psi      0-999
```

Press the [UP] and [DOWN] arrow keys to change each digit at the cursor, press [CHANGE/ENTER] to accept the digit and move the cursor to the right. Press [SILENCE/RESET/ESC] to escape the change value screen and to keep the original value.

Printing Configuration Setpoints: The following applies if a printer has been installed or a PC is connected to the RS232 com port using a null modem cable. When the [PRINT] button is pressed while looking at a configuration setpoint screen, a menu for what is to be printed is displayed. Pressing [1] prints just the set point screen currently being displayed. Pressing [2] prints all the set points in the section of set points currently displayed. Pressing [3] prints all the set point screens of all five set point sections.

NOTE: when printing all set points, only Aux#01 User Programs 501 through 515 will be printed. To print any of the remaining eleven aux alarm settings, press [PRINT] when inside the appropriate Aux alarm and select [2] for "2) PRINT 500 SETPTS." The 501 through 515 Aux User Programs for that aux alarm will be printed.



Typical Configuration Setpoint Printout

```
101 SYSTEM SETPOINTS
    Pump Start
     Pressure
[ 60] psi      0-999

102 SYSTEM SETPOINTS
    Pump Stop
     Pressure
[ 90] psi      0-999

103 SYSTEM SETPOINTS
 Pump Start Delay
       Time
[ 10] seconds  0-999
      "      "
      "      "
      "      "
509  AUX USER PROGRAMS
Aux Alarm #01
2nd Control Output
[ 0]          12-25

510  AUX USER PROGRAMS
Aux Alarm #01
3rd Control Output
[ 0]          12-25
```

PART VI: SYSTEM SET POINT DEFINITIONS

Configure System Setpoints	
101 SYSTEM SETPOINTS Pump Start Pressure [60] psi 0-999	If system pressure is at or below this setting the pump will start if the system is in Auto mode.
102 SYSTEM SETPOINTS Pump Stop Pressure [90] psi 0-999	If system pressure is at or above this setting and the pump is running in Auto mode, the pump can be stopped using the stop pushbutton or can automatically stop if auto stop is enabled in setting 104.
103 SYSTEM SETPOINTS Pump Start Delay Time [10] seconds 1-999	This time setting delays the start of the pump in Auto mode when a low pressure condition or deluge valve start signal is received. This setting is normally used for multiple pump installations where sequencing of pump starting is desired.
104 SYSTEM SETPOINTS Pump Automatic Stop Enabled [Yes]	When enabled, the pump will stop automatically after all starting demands have been satisfied. The timer set in 105 below must also time out before the pump will stop.
105 SYSTEM SETPOINTS Pump Minimum Run Time [10]minutes 1-99	The minimum run time that the pump must run before stopping automatically. Must be set to at least 10 minutes per NFPA 20. Only active if 104 above is set to Enabled.
106 SYSTEM SETPOINTS Ramp Stop Option Time M700 [Yes]	When set to “Yes" and the controller is set for Model MP700, the controller will stop the pump in a controlled ramp down over the time set in screen 107. When set to No, the controller will stop the pump and let it coast to a stop.
107 SYSTEM SETPOINTS Ramp Stop Option Time M700 [10] 0-99	The time that a Model MP700 controller will control the stopping of the motor in the ramp down mode. Note: This must be set to a time longer than the ramp stop time on the soft start unit.
108 SYSTEM SETPOINTS Solenoid Drain Valve Option [No]	The optional solenoid drain valve is used in the Manual Test Mode and the Automatic Weekly test mode to initiate starting of the pump by draining pressure off the sensing line.
109 SYSTEM SETPOINTS Automatic Weekly Test Run [No]	When this feature is enabled, the pump will start the pump at the predetermined time each week as set in the following screens and run it for the time set in screen 112.
110 SYSTEM SETPOINTS Auto Weekly Test Test Day Of The Week [Mon]	The day of the week that the pump will be started automatically each week if the option is enabled in screen 109.
111 SYSTEM SETPOINTS Auto Weekly Test Start Time [00:00:00]	The time of day that the pump will be started automatically each week if the option is enabled in screen 109.

112 SYSTEM SETPOINTS Auto Weekly Test Length of Run Time [10] minutes 0-99	The length of time the pump will run when started on automatic weekly test. Must be set for a minimum of 10 minutes per NFPA 20..
113 SYSTEM SETPOINTS Stop Motor Duing Test on Alarm. [Yes]	When this feature is enabled, the controller will stop the pump during the automatically weekly test or the manual test mode should any alarm occur, such as motor overload.
114 SYSTEM SETPOINTS Supervisory Power Option [Yes]	When this option is enabled, the controller will monitor a separate 120VAC power source for availability and alarm on it's failure.
115 SYSTEM SETPOINTS Supervisory Power Delay Time [15] seconds 0-999	The amount of time the controller will wait until sounding the alarm on loss of the 120VAC Supervisory power source. This is used to override momentary outages.
116 SYSTEM SETPOINTS Supervisory Power Failure Startup [No]	When this option is enabled along with the Supvisory Power Option in screen 114, the controller will start the pump on loss of the Supervisory Power after the delays set in screen 117.
117 SYSTEM SETPOINTS Supervisory Power Start Time Delay [1]minutes 0-999	The amount of time the controller will delay starting of the pump on loss of the 120VAC Supervisory power source.
118 SYSTEM SETPOINTS Pressure Transducer Failure Pump Start [Yes]	If enabled, the controller will start the pump if a failure of the pressure transducer is detected.
119 SYSTEM SETPOINTS Shutdown on Low Intake Pressure/Lvl [No]	If enabled, the controller will stop the pump when a normally closed contact closes indicating low suction pressure or low reservoir/tank level.
120 SYSTEM SETPOINTS Shutdown on Low Intake Trip Time [5]seconds 0-99	The time delay that the Low Intake condition must be active before pump will stop on the condition.
121 SYSTEM SETPOINTS Low Intake Shutdown Auto Reset [No]	If enabled, the pump will restart if there is a demand, after the Low Intake condition is cleared. If set to No, the Reset button must be pressed before the pump will restart.
122 SYSTEM SETPOINTS Low Intake Shutdown Auto Reset Time [5]seconds 0-99	The time delay that the Low Intake condition must be cleared before the pump will be allowed to be restarted automatically. This prevents cycling of the pump on and off.
123 SYSTEM SETPOINTS Pressure Switch Pump Start [No]	When this is set to Yes and a mechanical pressure switch is connected to the field terminals, the pump will start when this switch closes.

124 SYSTEM SETPOINTS Deluge Valve Pump Start [No]	If enabled this setting activates the logic to monitor an optional deluge valve dry contact opening (ie normally closed contact that opens to start pump) that will start the pump if system is in Auto mode.

Configure User Preferences

201 USER PREFERENCES Set System Real Time Clock [17:03:52]	Set the current controller clock (24 hour clock).
202 USER PREFERENCES Set System Date [12/31/99]	Set the current controller date.
203 USER PREFERENCES Set System Day Of The Week [Monday]	Set the local day of the week.
204 USER PREFERENCES Log System Pressure Drop Events [Yes]	When this feature is enabled, the controller will log the current system pressure in the event log when system pressure has dropped below the set pressure value. Typically set to "No" as not to needlessly fill up the event log.
205 USER PREFERENCES System Pressure Drop Needed to Log Event [60.0]psi 0-999	The desired pressure setting that will cause a log of system pressure in addition to the normal periodic logging of system pressure.
206 USER PREFERENCES System Pressure Drop Event Time Span [5] seconds 0-20	The amount of time the pressure must be above the pressure setting in screen 205 before the Pressure Drop Event is logged as being cleared.
207 USER PREFERENCES Time Between Pressure Log Samples [15] seconds 15-999	The frequency at which system pressure is automatically logged. Normally set to 15 seconds. Lower values will increase the number of logged pressures and fill up the memory in a shorter period of time.
208 USER PREFERENCES Auto Print Each Pressure Log Sample [No]	When set to Yes, each pressure log entry will be printed as it occurs. This should be set to No to save printer paper and wear on the printer.
209 USER PREFERENCES Auto Print Each Event Log Entry [No]	When set to Yes, each event log entry will be printed as it occurs. This should be set to No to save printer paper and wear on the printer.
210 USER PREFERENCES Selective Range Printing [1] Before 1-99	This setting will determine the start point of print range of the pressure, alarm, or event log based on which log entry is currently being viewed.
211 USER PREFERENCES Selective Range Printing [1] After 1-99	This setting will determine the stop point of print range of the pressure, alarm, or event log based on which log entry is currently being viewed.
212 USER PREFFENCES High Discharge Pressure Alarm Option [No]	This setting is used to monitor the system pressure and sound an alarm if it rises above a preset pressure.

Configure User Preferences (continued)

213 USER PREFERENCES High Discharge Pressure Alarm Pressure [185] psi 0-999	The pressure at or above which will cause a High Pressure alarm condition
214 USER PREFERENCES High Discharge Alarm Pressure Time Delay [5]seconds 0-99	The amount of time the pressure must be at or above the set pressure before the alarm condition is activated.
215 USER PREFFENCES Low Discharge Pressure Alarm Option [No]	This setting is used to monitor the system pressure and turn on the LOW PRESSURE LED and sound an alarm if it drops below a preset pressure.
216 USER PREFERENCES Low Discharge Pressure Alarm Pressure [45] psi 0-999	The pressure at or below which will cause a Low Pressure alarm condition
217 USER PREFERENCES Low Discharge Alarm Pressure Time Delay [5]seconds 0-99	The amount of time the pressure must be at or below the set pressure before the alarm condition is activated.
218 USER PREFERENCES No Load Amps % Of FLA [10] 0-99	The % of motor full load current at which or below that will cause an event to be logged indicating a No Load Motor Condition.
218 USER PREFERENCES No Load Time Delay [5]seconds 0-99	The amount of time the motor current must be at or below the set level before the event condition is logged.
220 USER PREFERENCES LCD Back Light Mode 0=Always on [0]] 1=Power Save	Set to Always on or to Power Save if it is desired to have the backlight automatically shut off when no buttons have been pressed for a preset period of time.
221 USER PREFERENCES Language Select [English]	Set to English or Spanish
222 USER PREFERENCES Change User Password Level 1 [****]	Used to set the password necessary to access the System config screens.

PART VIII: ALARM AND EVENT LOG MESSAGES

The following is a sample of the possible messages that could be recorded within either the alarm or event logs.

Phase Failure Alarm Occurred/ Alarm Cleared	Phase Failure declared when all three phases of the incoming power is present not within the limits set in the configuration screens.
Pump Failed to Start Alarm Occurred Start Alarm Cleared	Controller attempted to start pump in Auto mode but the pump failed to start (ie a pump run signal was never received). Controller must be put in OFF mode to reset this alarm.
Pressure Transducer Alarm Occurred/ Alarm Cleared	The pressure signal from the pressure transducer has fallen outside normal operating range potentially indicating a problem with the transducer or its wiring.
Stop pushbutton Pressed in	An operator pressed the Stop pushbutton.
Pump Started / running Stopped	Pump was started or stopped in either Auto or Manual mode.
Motor Lockout Sig Occurred Cleared	A remote motor lockout signal was received or cleared.
Remote Start Sig Occurred Cleared	A remote start signal was received or cleared.
System in Auto Mode Occurred	System was placed in Auto mode.
System in Off Mode Occurred	System was placed in Off mode.
System in Manual Mode Occurred	System was placed in Manual mode.
Auto Test Start Occurred	An automatic pump test sequence was started while in Auto mode by either the weekly program clock function or a user pressing the [TEST] button for 2 or more seconds
Alarm Reset Button Occurred	A user did an alarm reset by pressing and holding the [SILENCE/RESET/ESC] button for 2 to 5 seconds.
Low Pressure Start Occurred Cleared	A low pressure start was attempted because of a low pressure reading from the transducer or optional pressure switch while in Auto mode.
Low Press Condition Occurred Cleared	System pressure dropped below the start pressure or the optional pressure switch indicates a low pressure condition. This can be logged in all modes of operation.
Deluge Start Occurred Cleared	A deluge start signal was received while in Auto mode.
Controller Reboot Occurred	Power was restored to the microprocessor.
Pressure Drop Occurred Cleared	If setpoint #204 is set to yes, this event gets recorded when the system pressure drops below the setting in setpoint #205.
Low Intake Pressure Shutdown Occurred Shutdown Cleared	If the low intake shutdown option is enabled in setpoint #119, a low suction signal will stop the pump.
Auxiliary Alarm Occurred Cleared	Indicates one of the aux alarms occurred as programmed in the user programs and was set to record in the event or alarm log but the text message assigned was 0. See Aux Alarm Text List Messages below for possible auxiliary alarm messages.

Aux Alarm Text List Messages

0	Auxiliary Alarm
1	Low Pump Room Temp
2	Reservoir Low
3	Reservoir Empty
4	Reservoir High
5	Flow Meter On
6	Relief Valve Open
7	Low Suction Pressure
8	High Pump Room Temp
9	Low Firewater Press
10	Low Purge Pressure
11	Low Gear Oil Press
12	High Gear Oil Temp
13	High Vibration
14	Gas Detection
15	Emergency Power On
16	Pump Room Door Ajar

List of possible internal variables used as inputs for aux alarm user programs.

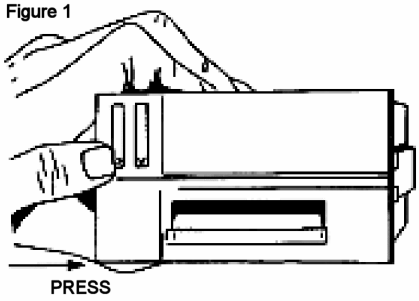
30	Pump Running
31	Power Available
32	Phase Reversal
33	Motor Overload
34	Remote Start
35	Local Start
36	Pump On Demand, Fire Condition
37	System Fault
38	Auto Mode
39	Manual Mode
40	Off Mode
41	Pressure Transducer Fault
42	Pump Failed to Start
43	Low Intake Shutdown Alarm
44	Supervisory Power Failure
45	Soft Start Fault
46	Low Pressure
47	Auto Weekly Test Start
48	Under Frequency
49	Over Frequency
50	Low Zone/Hi Zone Contacts
51	High Discharge Pressure
52	No Load Condition
53	Future

APPENDIX 1 - PRINTER OPERATION

Operator Information
There are two buttons on the front panel of the printer. One button operates the front door latch, the other controls the paper feed.

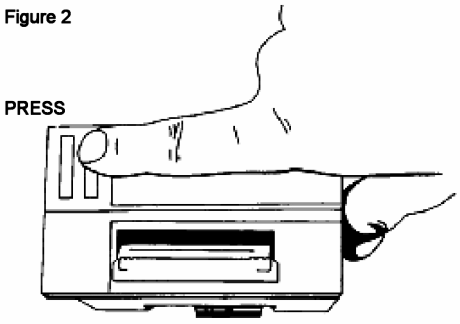
Door Latch:
With the printer mounted in data mode attitude (paper emerging downwards) so that the two control buttons are at upper left, to open the front door of the printer, press the door latch (the outermost of the two buttons) sideways towards the other button, using thumb or forefinger (see Figure 1). This will release the latch and the door can be swung outwards to expose the paper roll.

Figure 1



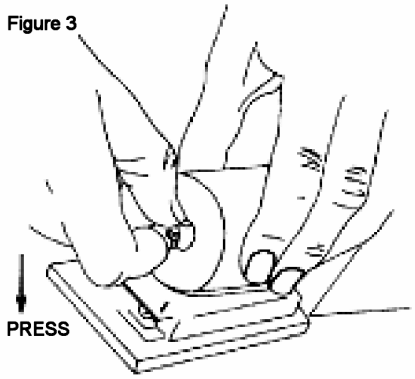
Paper Feed Button.
With the printer in data mode attitude press the top part of the innermost button to activate paper feed (see Figure 2). This will continue for as long as the button is held down.

Figure 2



Paper Roll Replacement:
Open the printer door as described above and swing the door open to expose the paper roll.
If any paper remains in the printer, tear the end off against the paper tear bar and carefully pull the remaining paper backwards, from the rear of the mechanism mounting chassis, until the free end emerges. Press the paper roll retaining button inwards using the thumb and forefinger (see figure 3) and remove the empty roll. Take a new roll of paper, and separate the end from the rest of the roll. Remove any damaged or gummed part of the paper, and cut the free end squarely with a pair of scissors or a knife, leaving a clean straight edge to present to the printer mechanism.

Figure 3



Thread the new roll past the retention button onto the spindle with the paper unspooling in an anticlockwise direction when viewed from the open end. (See Figure 4). Press the paper feed actuator arm (at upper left in data mode) until the mechanism grips the paper and pulls it through to the front of the printer. (See Figure 5).

Turn the paper roll so that any loose turns are

Figure 4

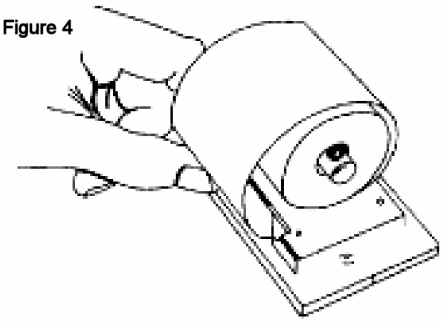
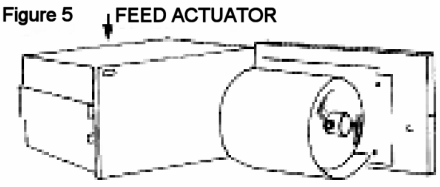


Figure 5



wound snugly against the roll. Close the printer door.
More paper may now be fed through by pressing the paper feed button on the front panel. (See Figure 2).

Ribbon Cartridge Replacement:
Tear off any paper emerging from the printer.

Open the printer door by pressing the door latch inwards.
Place forefinger against the lower edge of the mechanism mounting chassis and thumb against the base of the door (see Figure 6).

Carefully press the door and chassis in vertically opposite directions until the catch is released. Do not pull the door and chassis apart without first releasing the catch.
Swing the chassis back, leaving the door fully

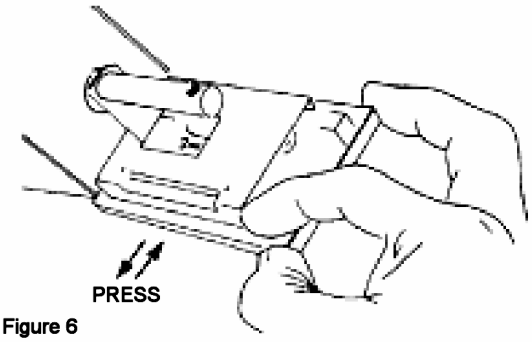


Figure 6

open. This will expose the printer mechanism and ink ribbon cartridge.
Press down on the end of the ink ribbon cartridge marked 'PUSH' (see Figure 7) and carefully remove the used cartridge.

Fit a replacement cartridge, ensuring that the paper lies between the ribbon and the steel printer platen.

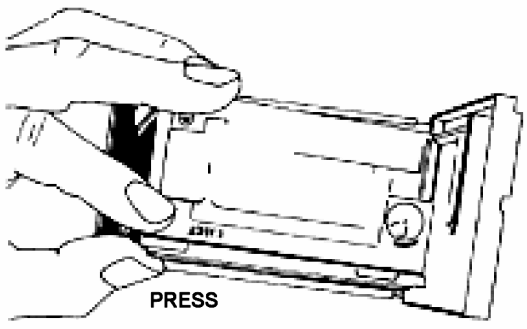
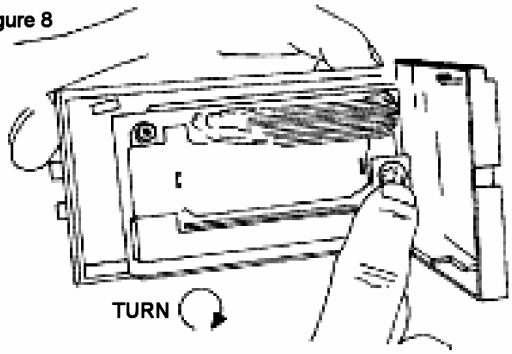


Figure 7

Check that the ribbon cartridge spindle is correctly seated over the printer ribbon drive shaft, and snap the cartridge into place.

Ensure that the ribbon is taut and parallel to the paper.
If necessary tighten the ribbon by turning the faceted disc clockwise using fingernail (see Figure 8).

Figure 8



If there is some paper protruding from the front of the printer mechanism, ensure that it will pass clearly through the guide channel and past the tear bar before snapping the chassis shut against the back of the door.

Turn the paper roll by hand so that any loose turns are wound snugly against the roll.
Close the door and check that the paper flows freely, using the paper feed button.

For paper and printer ribbon refills, contact the Metron Inc. factory.