

SUPPLEMENTAL INSTRUCTIONS

DIGI-FIRE REDUCED VOLTAGE STARTER WITH PUMP CONTROL

1.0 SYSTEM DESCRIPTION

- 1.1 The Digi-Fire Starter with Pump Control Option is designed to minimize or totally eliminate the surges or hammering that occur, in Centrifugal pumping systems, during starting and stopping. This system is similar to the standard Digi-Fire control with the extended ramps option but has added features for particularly critical applications.
- 1.2 The Digi-Fire Starter monitors and controls both motor current and voltage during the starting and stopping sequences. This method provides smooth stepless control as well as protecting the motor and control in the event of severe overload, locked rotor, or control failure.
- 1.3 The Digi-Fire Starter employs a unique control technique during deceleration of the pump motor. When a stop command is initiated, the Digi-Fire reduces the voltage, to the motor, until a point is reached where the motor speed begins to decrease. The Digi-Fire then controls the rate of change of power to the motor to bring it smoothly thru the point where pump output is reduced to near zero. At that point the Digi-Fire ramps down to a minimum output level and shuts off.

2.0 SYSTEM COMPONENTS

- 2.1 Digi-Fire Solid State Reduced Voltage Starter and rated for system voltage, pump horsepower and starting requirements.
- 2.2 Digi-Fire Master Board, PN: 08-1028 (Rev F and higher) -007A.
- 2.3 Voltage Feedback Board, PN: 08-1276B and up.
- 2.4 Pump Control Board, PN: 08-1282A and up.

3.0 MASTER BOARD ADJUSTMENTS

- 3.1 The Master Board comes set up for pump control applications. On most applications only one (1) control will require adjustment.
- 3.2 Current Limit 2 (P18) control sets the maximum current that will be provided to the motor. During the starting and stopping sequences P18 is usually set to provide a maximum of 400% full load amps to the motor as it is accelerated to full speed or decelerated from full speed to stop. P18 may be set lower than 400% if motor starting currents are consistently less under all normal operating conditions.
- 3.3 Current Limit 2 (P18) may be adjusted per the following chart. These settings are based on the factory setting of Current Limit 1 (P1) at 20.

<u>Motor FLA</u>	<u>Digi-Fire Size</u>	<u>P18</u>
60	3	60
75	4	30
100	4	45
125	4	65
150	5	30
175	5	40
200	5	45
250	5	65
300	6	30
350	6	40
400	6	45
450	6	55
500	6	65
600	7	30
700	7	40
800	7	45
900	8	55
1000	8	65

3.4 Factory settings for Pump Control Systems.

3.4.1 Switch Settings

DS1-1	ON	CS1	OFF
DS1-2	OFF	CS2	ON
DS1-3	ON	CS3	OFF
DS1-4	ON	CS4	ON

3.4.2 Linear Controls

P1	20
P3	30
P4	FULL CW
P5	FULL CW
P6	60
P7	11 O'clock
P8	FULL CW
P9	60
P16	100
P17	FULL CW
P18	SEE CHART 3.3

3.5 The factory settings described in paragraph 3.5 may be adjusted to suit any unusual system requirements. Refer to the Digi-Fire Starter manual for instructions.

4.0 PUMP CONTROL BOARD ADJUSTMENTS

4.1 The Initial Voltage control (P21) sets the starter output voltage at turn on. This control overrides the acceleration control only at the beginning of the ramp. This feature causes the motor to begin to rotate and accelerate sooner after initial turn on. P21 has been factory set at 50. Turning the control clockwise increases the turn on voltage.

4.2 The Acceleration control (P22) has a range of 1 to 60 seconds. P22 has been factory set 50, to provide a 25 - 30 second ramp time. Turning the control clockwise decreases the ramping time.

4.0 PUMP CONTROL BOARD ADJUSTMENTS cont.

- 4.3 The primary Deceleration control (P23) has a range of 1 to 40 seconds. P23 has been factory set 50, to provide a 12 - 15 second ramp time. Turning the control clockwise decreases the ramping time.
- 4.4 The secondary Deceleration adjustment (DS2) sets the pump speed check ratio. This ratio is the change in the rate of deceleration that occurs while the pump is actually slowing down. Refer to the speed check ratio range chart (Figure 1) below. The pump control board is factory set for a speed check ratio of 16:1. Increasing the ratio extends the deceleration time.

Speed Check Ratio Range

Note: X = ON
O = OFF

SPEED CHECK RATIO	DS2		
	1	2	3
4:1	X	X	X
8:1	O	X	X
12:1	X	O	X
16:1	O	O	X
20:1	X	X	O
24:1	O	X	O
28:1	X	O	O
32:1	O	O	O

Figure 1

4.5 Typical Set Up

Control

P21 = 50

P22 = 50

P23 = 50

DS2 - 1 = OFF

DS2 - 2 = OFF

DS2 - 3 = ON

Response

Initial voltage = 100 VAC

Acceleration = 25 seconds

Primary deceleration = 12 seconds

Speed check ratio = 16:1

4.0 PUMP CONTROL BOARD ADJUSTMENTS cont.

4.6 Factory Calibration

P24 (CAL) has been set at the factory and should not be field adjusted.

5.0 CAUTIONS

5.1 During set up and calibration of the starter allow 5 - 10 minutes between starts for the motor and starter to cool down.

5.2 When this extended time ramping is utilized, the operator should check to ensure that the motor is not overheating during start.

5.3 If motor overheating does occur the ramps will have to be shortened or auxiliary cooling for the motor will have to be provided.