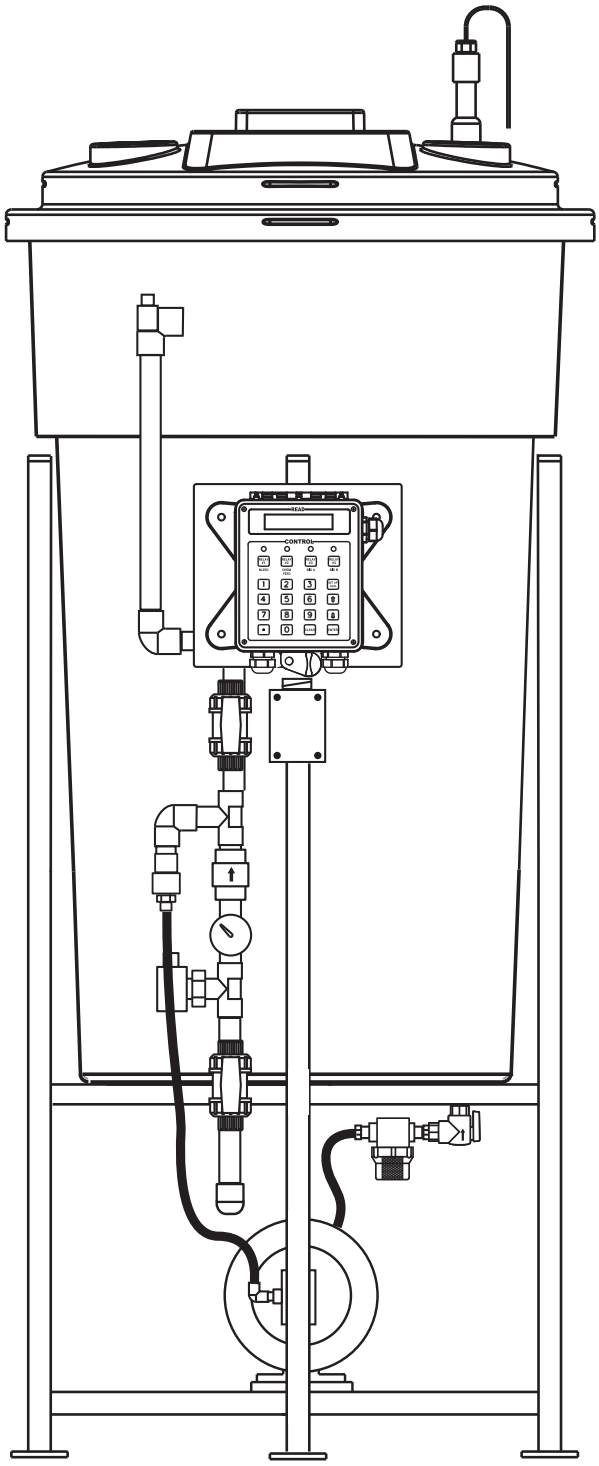
Advantage Controls

Manual

Model GF
Glycol Feeder



Installation
Maintenance
Repair
Manual

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5/2013

Advantage Controls

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Manufacturer's Product Warranty

Advantage Controls warrants units of its manufacture to be free of defects in material or workmanship. Liability under this policy extends for 24 months from date of installation. Liability is limited to repair or replacement of any failed equipment or part proven defective in material or workmanship upon manufacturer's examination. Removal and installation costs are not included under this warranty. Manufacturer's liability shall never exceed the selling price of equipment or part in question. Advantage disclaims all liability for damage caused by its products by improper installation, maintenance, use or attempts to operate products beyond their intended functionality, intentionally or otherwise, or any unauthorized repair. Advantage is not responsible for damages, injuries or expense incurred through the use of its products.

The above warranty is in lieu of other warranties, either expressed or implied. No agent of ours is authorized to provide any warranty other than the above.

30 Day Billing Memo Policy

Advantage Controls maintains a unique factory exchange program to ensure uninterrupted service with minimum downtime. If your unit malfunctions, call 1-800-743-7431, and provide our technician with Model and Serial Number information. If we are unable to diagnose and solve your problem over the phone, a fully warranted replacement unit will be shipped, usually within 48 hours, on a 30 Day Billing Memo.
This service requires a purchase order and the replacement unit is billed to your regular account for payment.

The replacement unit will be billed at current list price for that model less any applicable resale discount. Upon return of your old unit, credit will be issued to your account if the unit is in warranty. If the unit is out of warranty or the damage not covered, a partial credit will be applied based upon a prorated replacement price schedule dependent on the age of the unit. Any exchange covers only the controller or pump. Electrodes, liquid end components and other external accessories are not included.

I. Introduction

Digital Control

The Advantage Controls Digital Glycol feeder controller measures pressure in a closed loop system. The system pressure is displayed on the controller readout. The unit can be programmed to turn on the feed pump when the pressure drops to a predetermined reading (Cut in), and turn off when the pressure reaches a higher predetermined pressure (Cut out).

A limit timer is available to shut off the feed pump, should the pump run for longer than the predetermined limit time. Setting this timer to 0 disables this function.

An optional second relay is available if a solenoid value is used in place of a conventional pressure relief valve. The user can program this relay to activate and supply power to open a solenoid valve in the relief line.

All settings are entered into the controller through a simple front panel keypad which includes relay test keys.

Analog Control

The analog units are fully self contained system used to maintain glycol levels in a closed loop system. Glycol addition is controlled by an adjustable pressure switch within the control unit. Whenever system pressure drops below the preset level the glycol pump will activate. When system pressure increases past the differential, the control unit will shut the glycol feed off.

Several safety features are included to ensure that the glycol pump runs only when it is supposed to. A back flow prevention valve is installed in the pressure side of the pump. This prevents system water from backing up in to the feed tank when the glycol pump is off. A low level cut-off switch is provided to prevent the pump from running when the supply tank is empty. The cut-off switch also activates an alarm buzzer and throws the alarm dry contact relay. An adjustable pressure relief valve is installed in the discharge line. If system pressure increases beyond the limit set on the pressure relief valve, the valve opens, and the glycol solution is bypassed back into the solution tank. This feature prevents overpressuring the closed loop.

The control unit is housed in a NEMA 4X style enclosure, and is prewired to include all electrical connections to the pump and pressure switch. A 2-wire drop cord is provided to connect to the alarm dry contact if the user desires an additional alarm output.

II. Model Numbering and General Specifications

BUILD A MODEL **GF** - __ __ __ __ __ __ - __ __

TANK SELECTION
0 = No tank
1 = 55 gallon poly
2 = 100 gallon poly
3 = 30 gallon poly
4 = 50 gallon carbon steel
5 = 5 gallon (no stand, 30 gpd pump only)
6 = 15 gallon poly
7 = 150 gallon poly

STAND SELECTION
A = Painted steel stand
B = Painted steel stand w/ mixer bracket
C = Tank top mount (no tank included)
D = Portable stand with built in rollers
E = No stand (for 5 gal tanks)

PUMP SELECTION
***Dual pump sys. require 2 pump selections (i.e., -11)
0 = No pump
1 = 1.5 gpm at 100 PSI; 1/3 hp
2 = 3.75 gpm at 100 PSI; 1/2 hp
3 = 6.1 gpm at 60 PSI; 1/3 hp
4 = 10 gpm at 60 PSI; 1/2 hp
5 = 30 gpd at 100 PSI; solenoid driven

PUMP CONFIGURATION
A = Standard configuration
B = Alternating pumps for single loops (requires 2 pump selections)
C = Pump plumbed for transfer duty into tank

LOOP SELECTION
***Dual loop sys. require 2 loop selections (i.e., -11)
0 = No loop
1 = Sch 80 PVC loop; 100 PSI max; 100°F max
2 = Copper/brass loop; 100 PSI max; 180°F max
3 = Carbon steel loop; 100 PSI max

CONTROL SELECTION
A = **Digital controller** w/ 0-100 PSI 4-20mA output sensor for 30 gal & + sizes
B = **Analog controller** with 5-20 PSI switch for 30 gal & + sizes
C = **Analog controller** with 5-20 PSI switch for 5 gal tank
D = Pressure transducer, level wand and pump starter relay for use with separately ordered MegaTron or SS with 4-20mA input ability

OPTIONS
1 = 240V
2 = 4-20mA output of pressure on digital controller
3 = Solenoid valve for pressure relief on digital units
4 = 30-50 PSI pressure switch for analog units
5 = Position backcheck to use tank for expansion
H = 1/4" PVC pipe instead of pump suction tubing
M = Mixer controls (order mixer separate)
Y = ETL approval (only on units with controller option D)

Most units include 55 gal. (208 liter) poly tank and stand, low level switch with audible alarm, dry contact alarm, pressure relief valve and PVC plumbing assembly with pressure gauge.

Digital models display the actual loop pressure and allow for user settable control points from a pressure sensor rated for 5-100 psi (0.3-6.9 bar).

Analog models have analog switches for testing, LED indicator lights and a mechanical pressure switch.

Specifications

Electrical
- Input 120 VAC, 50/60 Hz
- Alarm Dry Contact
- Motor: 1/3 HP Pump: 1.5 GPM

Plumbing
- Standard Schedule 80 PVC
- Optional Copper or Black Iron

Enclosure
Heavy Duty NEMA 4X style, high impact thermoplastic with padlockable gasketed Lexan viewing door

Pressure Gauge 0-100 psi

Dimensions
(Standard 55 gal. tank stand & single pump)**:**
W 29.5" (74.93 cm)
H 5'3" (160.02 cm)
D 29.5" (74.93 cm)

(100 gal. tank stand and single pump):
W 37.0" (93.98 cm)
H 61.5" (156.21 cm)
D 39.8" (101.09 cm)

Shipping Weight
140 lbs (63.50 kg) approx.
(Single pump, 55 gal.)
165 lbs (74.84 kg) approx.
(Dual pump, 55 gal.)

III. Installation

Electrical Wiring

The standard digital glycol feeder controller has an internal regulated power supply that will operate in the range of approximately 100 to 250 VAC on the incoming wiring. Output relay(s) are protected with a replaceable fuse. Each relay's output voltage will equal incoming line voltage. Analog unit's power supply is linear operating off of 120VAC. Prewired units are supplied with a 16 AWG cable with 3-wire grounded USA 120 volt plug for incoming power.

NOTE: Liquid tight fittings and labeled signal lead cables are provided for all signal (low voltage) connections, low drum level and 4-20mA outputs.

⚠ WARNINGS:

1. **The controller should be connected to its own isolated circuit breaker and for best results the ground should be a true earth ground, not shared. Wiring must be done according to all applicable local codes.**

2. **Power (line voltage) must be disconnected while making any connections. If power is supplied to the unit, line voltage will be present on the relay cards.**

3. **Low voltage signal wires (probes, flow switch, water meter, etc.) should never be run in conduit with high voltage wires.**

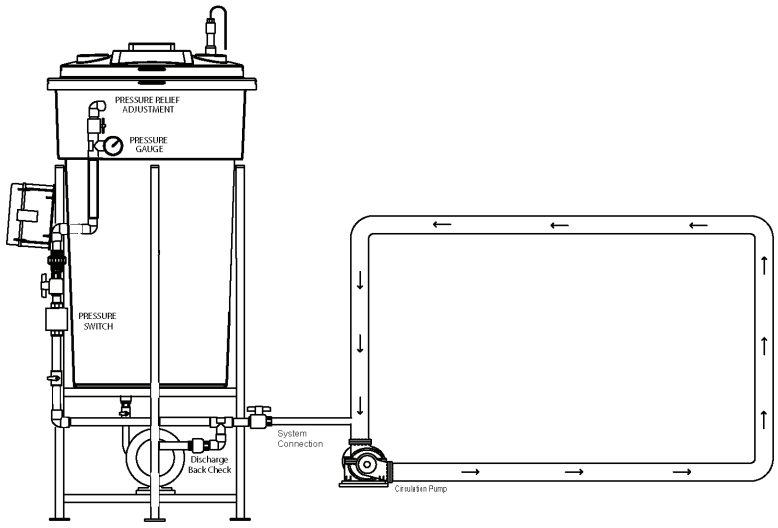
Mounting Instructions

Select a mounting location that provides the operator easy access to the unit and a clear view of the controller. The location should be convenient to grounded electrical connections and system plumbing connections. Mount the glycol feeder stand to a level concrete pad using the ½" mounting holes in the base of the stand. Concrete pad construction and anchoring bolts must comply with local building codes.

⚠ WARNING:

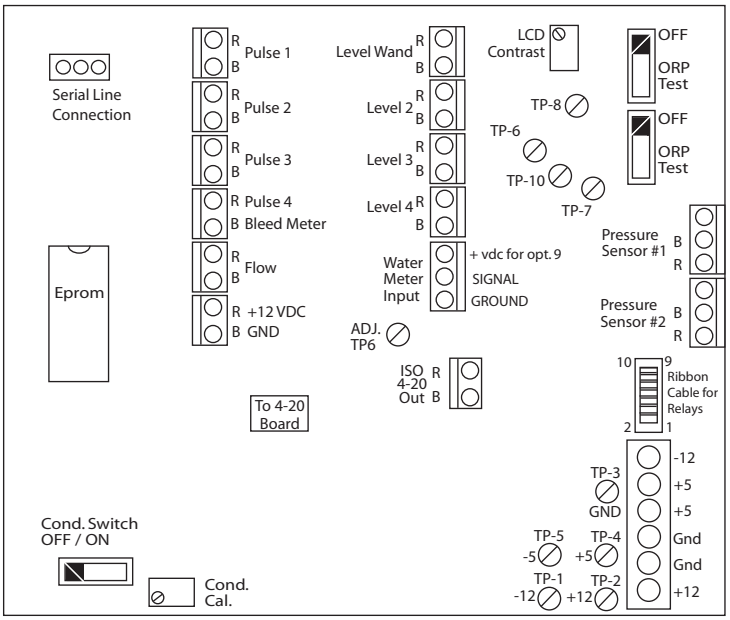
Avoid locations that expose the controller to direct sunlight, vapors, vibration, liquid spills or extreme temperatures; less than 0°F (-17.8°C) or greater than 120°F (50°C). EMI(electromagnetic interference) from radio transmissions and electric motors can also cause damage or interference and should be avoided.

Typical Installation

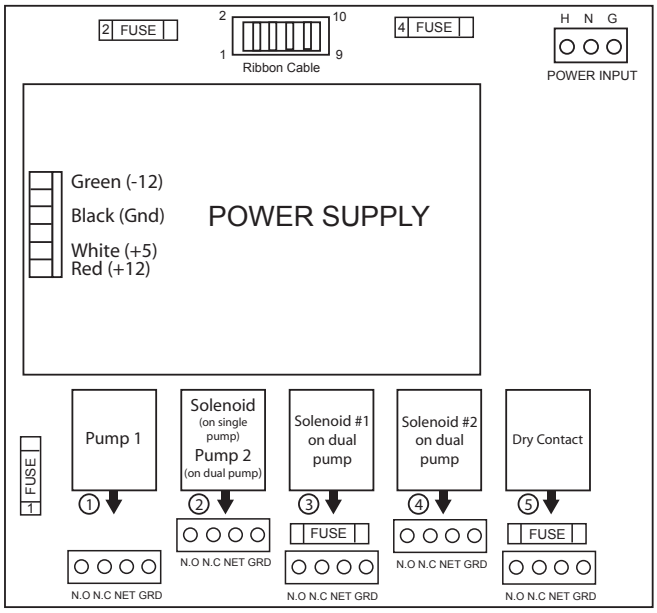


Conduit Layout for LCD Display

Logic Board

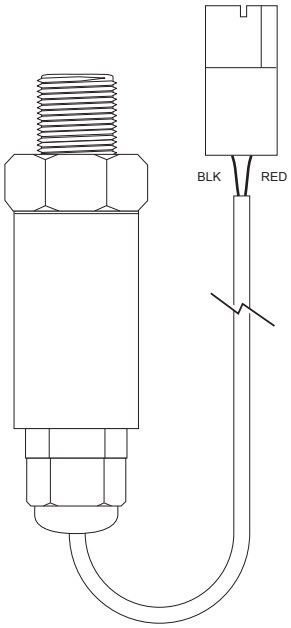


Relay / Power Board

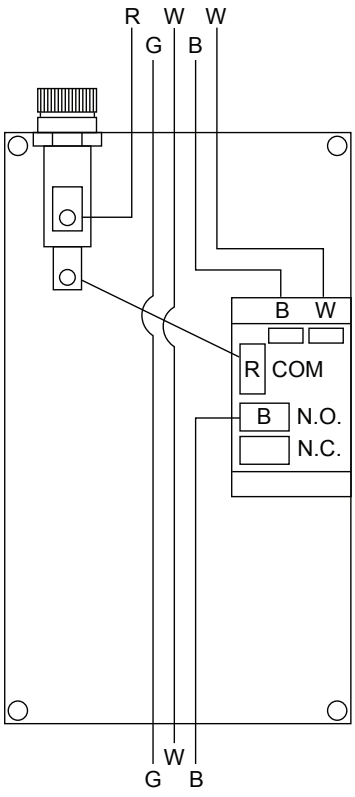


Digital Controller Wiring

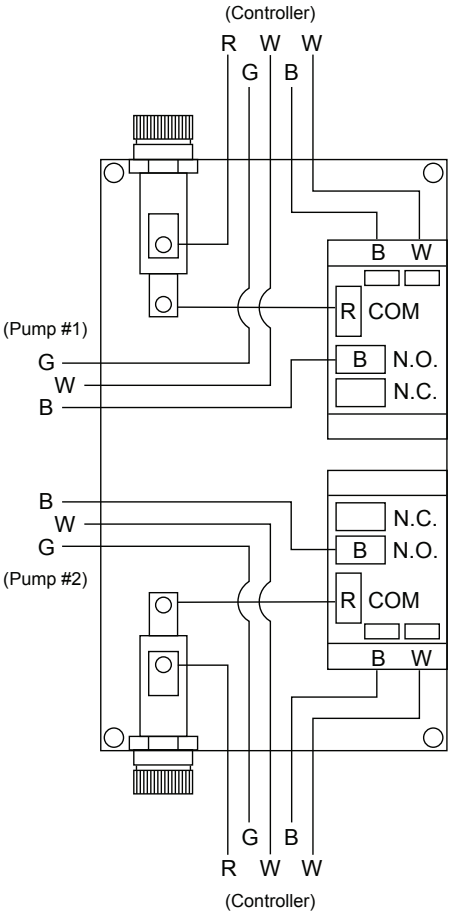
Pressure Sensor



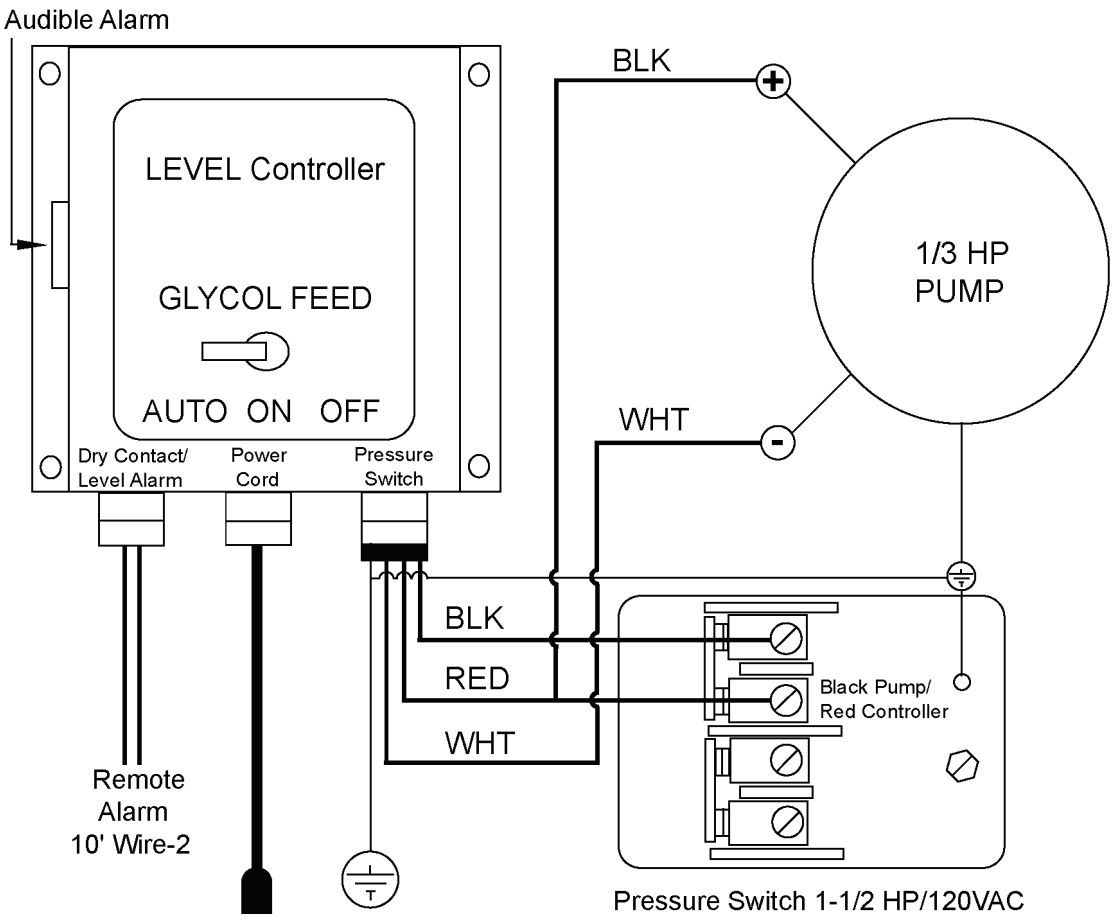
Single Loop - Fuse Box

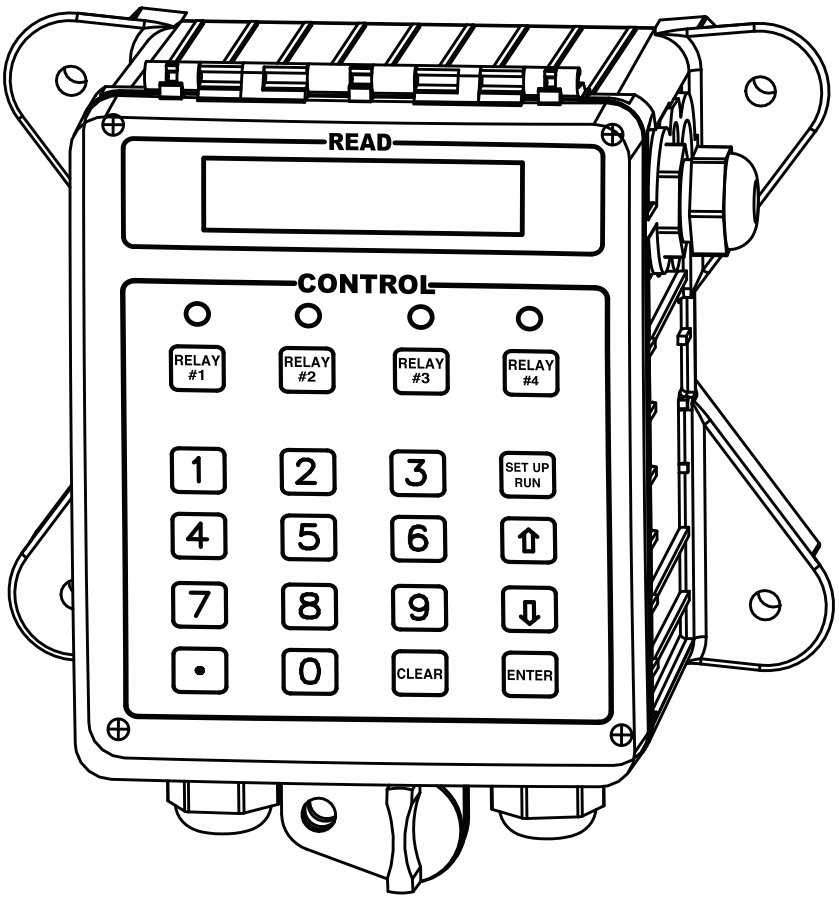


Dual Loop or Single Loop with 2 pumps - Fuse Box



Analog Controller Wiring





Digital Front Panel Drawing

IV. Digital Front Panel Description

READ: 1x16 (1/4") Alpha Numeric Display.

CONTROL: Relay 1, Relay 2, Relay 3, Relay 4 - HOA switches for control relays.

SET UP RUN **SET UP/RUN key** - System initializes into RUN mode. Press this switch to toggle the controller from SET UP mode to RUN mode.

UP/DOWN arrows - Used to change the display from one line to the next. All menus are circular, so when all items in a menu have been displayed, the display will return to the originally displayed item.

ENTER **ENTER key** - Used to access a menu and to log a changed value into the program.

CLEAR **CLEAR key** - Used to clear numerical values from items being changed in the SET UP mode.

• **DECIMAL key** - Used at certain places to change a function or displayed items. For example, when temperature is being displayed, pressing the DECIMAL key will change the reading from Fahrenheit to Celsius or visa versa.

1 **NUMERICAL keys** - Used to enter new values in the SET UP mode.

V. Digital System Operation Overview

MicroTron controllers have two modes of operation, RUN and SET UP. Both the RUN and SET UP menus are circular. Pressing the DOWN key in either menu will display the next line of information on the display. After the last item in a menu has been displayed, pressing the DOWN key will return the display to the top line of that menu.

RUN MODE - This mode is for normal operation. The control relays will only be automatically activated in this mode. In the RUN mode the display will read system values. If an alarm is present the display flashes with the alarm status.

The RUN menu will display values such as pressure, day, time, date and other values depending upon the features present on the unit. The unit will automatically return to the RUN mode if no keys are pressed for three minutes.

SET UP MODE - This mode is used to make adjustments to settings and readings on the controller. To access the SET UP mode from the RUN screen, press the SETUP/RUN key. Use the up or down arrow to scroll through the various SET UP menus. When you want to enter a specific SET UP menu, press the ENTER key. Once you have entered a SET UP sub menu you will be able to step through that menu's options with the down arrow key.

Relays may be forced on while in the SET UP mode. Press the desired relay test key to force it on. Press it a second time to turn it off. Once the unit returns to the RUN mode, relays will activate automatically.

Description of SET UP Menu Screens

The SET UP menu is the main menu circle of set up sub-menus used to customize your unit to the particular parameters needed for your installation. Listed on the following pages is a description and menu map of each SET UP menu.

NOTES:

1. **Your unit may not have all of the SET UP menus listed depending upon your model number.**

2. **After you press ENTER or CLEAR to change a numerical value in the SET UP menu, use the number keys to define the new value. Press ENTER again to enter the new value.**

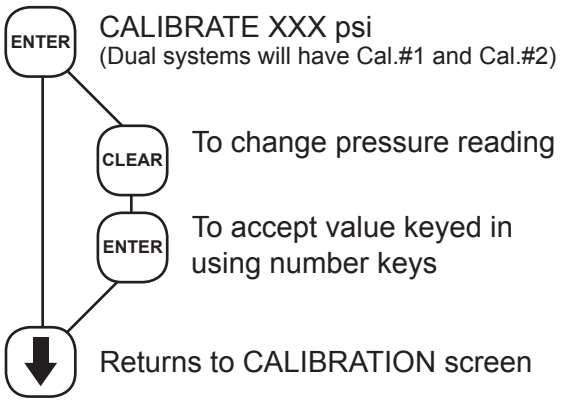
3. **When entering new numeric values, all available digits (characters) must be entered. The number of available digits depends upon the scale of operation. Position of cursor indicates number of digits to be entered.**

   For example, when entering a run time value for a timer in the minute and seconds scale (10:30 would equal 10 minutes and thirty seconds). You would need to key in a number of 0030 to make it 0 (zero) minutes and 30 seconds.

CALIBRATION

This menu is used to change the display system pressure. After the unit is properly installed and when power is supplied to the controller, the display will read PRESSURE XX psi. This will be the system pressure of the closed loop. A dual system controller will display P1 XX psi, and P2 XX psi, with P1 representing closed loop system 1 pressure and P2 representing closed loop system 2 pressure.

Press the Setup/Run key, and the display will read CALIBRATION, press CLEAR. The display will read calibration, followed by the current system pressure. To change this reading, press ENTER, and key in the correct psi reading. (note: you must enter three digits, as in 52 psi would be entered as 052. Press ENTER to accept the calibrated pressure entry.



PRESSURE SET

This menu is used to used to set the on and off pressures for the pump (or pumps in the case of a dual system). From the Run mode, press the Setup/ Run key. Press the down arrow until the display reads PRESSURE SET (or P1 set for a dual controller). Press ENTER. The display will read CUT-IN XX psi. Press CLEAR, and use the numerical keypad to key in the psi value at which you want the pump to activate (note: you must enter 3 digits as above).
Press ENTER to accept the new value.

Use the down arrow to scroll to CUT-OUT XX psi. Press ENTER. Press CLEAR, and key in the psi value at which you want the pump to shut off. Press ENTER to accept the new value.

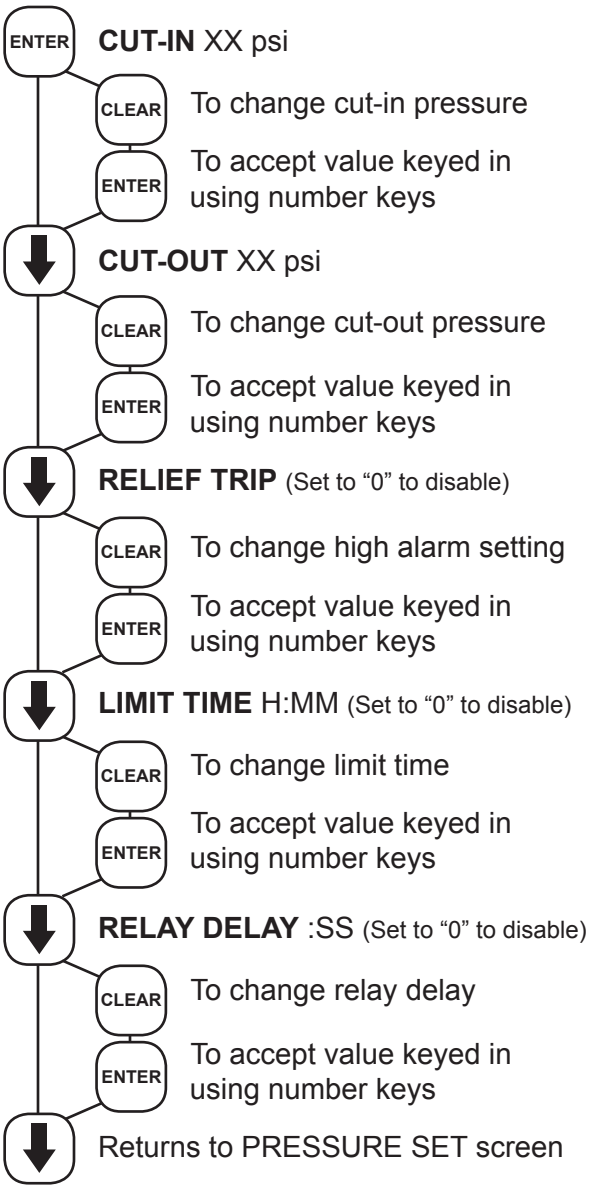
Note: Cut-out pressure must be at least 5 PSI greater than Cut-in pressure.

Press the down arrow, the display will read RELIEF TRIP XX psi. If this is set to something other than 000, the unit will activate a second relay within the controller when the relief trip point is exceeded (over pressure). To set, press CLEAR, then use the number keys to key in the desired trip point value.
Press ENTER to accept the new value.

RELIEF TRIPS: 55 psi for High Pressure
30 psi for Low Pressure

Press the down arrow, the display will read LIMIT TIME X:XX. If this is set at anything other than 0:00, the pump will only be allowed to run for the amount of time set. This is to prevent possible damage to the pump in the event of malfunction. To change the limit time, press CLEAR, then use the number keys to key in the desired limit time value. Press ENTER to accept the new value.

NOTES: Dual controllers will have additional system options noted as #1 and #2



DUAL PUMP OPERATION FOR ONE PLUMBING LOOP (OPTION B)

MicroTron digital glycol feeders with option B include a redundant glycol feed pump. By default, pump #1 will be the active pump. To select pump #2 as the active pump, perform the following steps:

1. Using the front panel keypad, press the HOA key labeled RELAY #1 or the HOA key labeled RELAY #3. The display will read OUTPUT: PUMP 1 (or OUTPUT: PUMP 2 if pump #2 had been previously selected).
2. Press the ENTER key to toggle the activation mode between pump #1 and pump #2.
3. Press the SETUP RUN key to accept the pump selection and return to the normal operating mode.

CLOCK SET

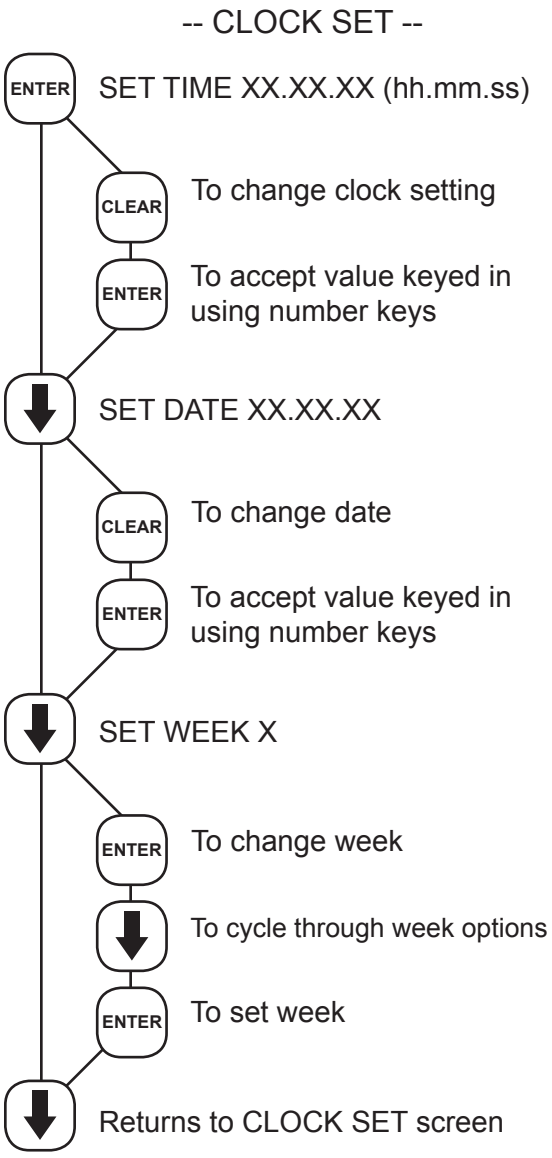
The CLOCK SET menu is for adjusting the time, date and day of the week.

After entering a new value, hit the ENTER key to accept the value and advance.

The clock time is based on a 24 hour clock. So, a time of 1 pm would be shown as 13.00.00.

NOTES:

If unit doesn't have a biocide timer, there will not be a SET WEEK selection.



SYSTEM SET MENU

This menu is used to configure the controller to specific operational needs. All of the items in this menu may not apply depending on the controller model but will always be present.

NOTE: Do not use this menu to make calibration adjustments. Use the Calibration screen.

PASSWORD - If a value of 0000 is entered, a password is not required. If a password is entered, it must be used to operate the controller. If the first digit is zero, relays may be activated without a password.

RESET WATER METER COUNT - Does not apply unless the unit has selectable feed timer.

DRY CONTACT HEAD - Select a contacting head water meter or a hall effect paddle wheel meter. Anytime this setting is changed the GAL/PULSE value will need to be re-entered.

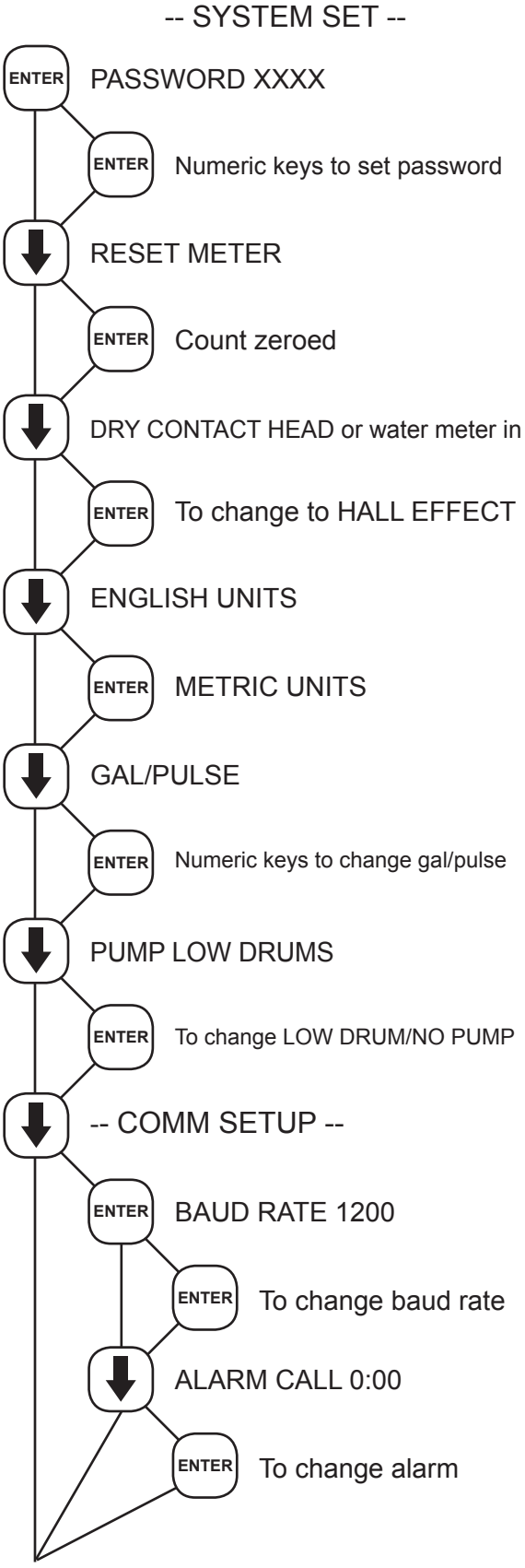
GAL/PULSE - If a feed timer is using a contacting head water meter this tracks make-up volume by entering the number of gallons a contact equals. Use • key to change to pulse/gal for flowmeter.

LOW DRUM NO PUMP / PUMP LOW DRUMS - If unit has low level alarms, allows the associated feed timer to be forced off when drum is low. *Must be set to low drum no pump for level wand to turnoff pump

COMM Setup:

BAUD RATE - For units ordered with the serial line or modem option.

ALARM CALL - For units with modem.

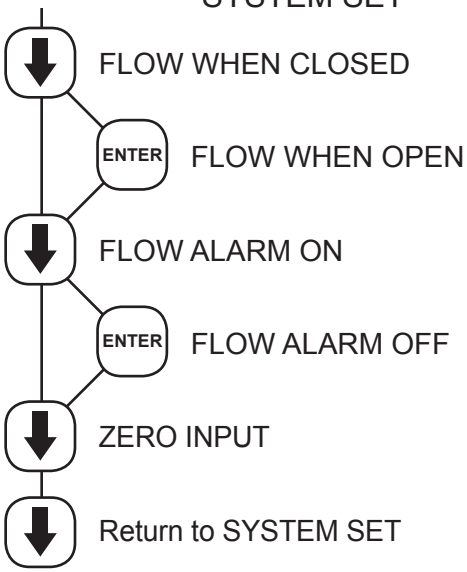


System Set continued on next page.

FLOW WHEN CLOSED - For flow switches.

FLOW ALARM - With FLOW ALARM ON when the system loses flow, an alarm signal can be sent. FLOW ALARM OFF means that no alarm signal is sent in the event of loss of system flow.

ZERO INPUT - Select the 0 psi input: use this to calibrate a new sensor.



DIAGNOSTICS MENU

This menu is used to select, enter and test the following items.

MODEL NUMBER - Read only screen.

FIRMWARE VERSION NUMBER - Read only screen. Have both available for service

TEST DISPLAY -Press ENTER and all pixels will flash. Make a visual check to see that all pixels are lit.

TEST KEYPAD - Press ENTER, then press each individual key to test its function. NOTE: Pressing the SET UP/RUN key returns display to the main menu. Pressing ENTER again returns to TEST KEYPAD.

RESET CALIBRATE - Resets ALL calibration data to factory default calibration.

A / D TEMP - Shows the raw analog to digital value for the temperature reading.

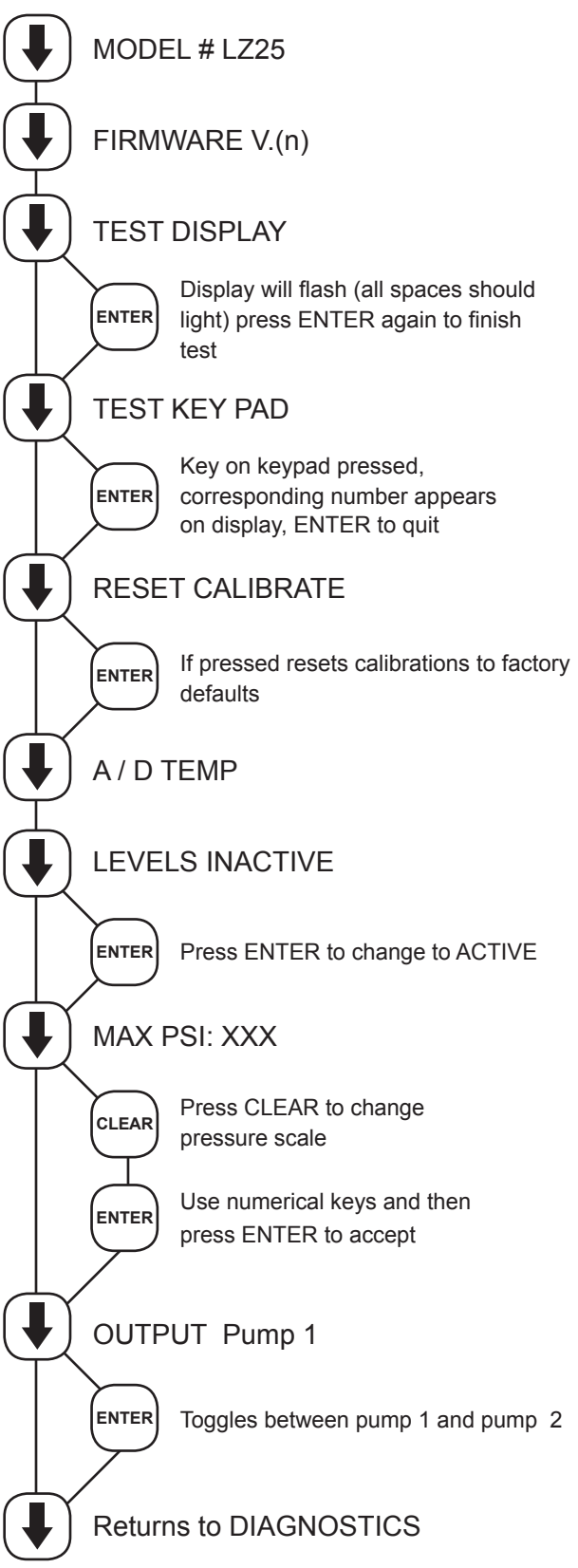
This screen aids in troubleshooting, please have this information available if you require service concerning conductivity readings.

LEVELS INACTIVE - Press ENTER to select between having level alarms active or inactive.

Note: Must be LEVELS ACTIVE for LOW LEVEL ALARM to work properly.

MAX PSI: XXX - This allows you to set the maximum psi. The max setting should correspond to the max pressure rating of the transducer. On the standard model, this is 100 psi. This setting allows the controller to be used with pressure transducers with “other” output ranges. Press CLEAR to change the pressure scale. Use numerical keys and then press ENTER to accept.

OUTPUT Pump 1 - This is used in conjunction with feeders with Option B, dual pump system. This alows the operator to switch from pump one to pump two when option E is specified.



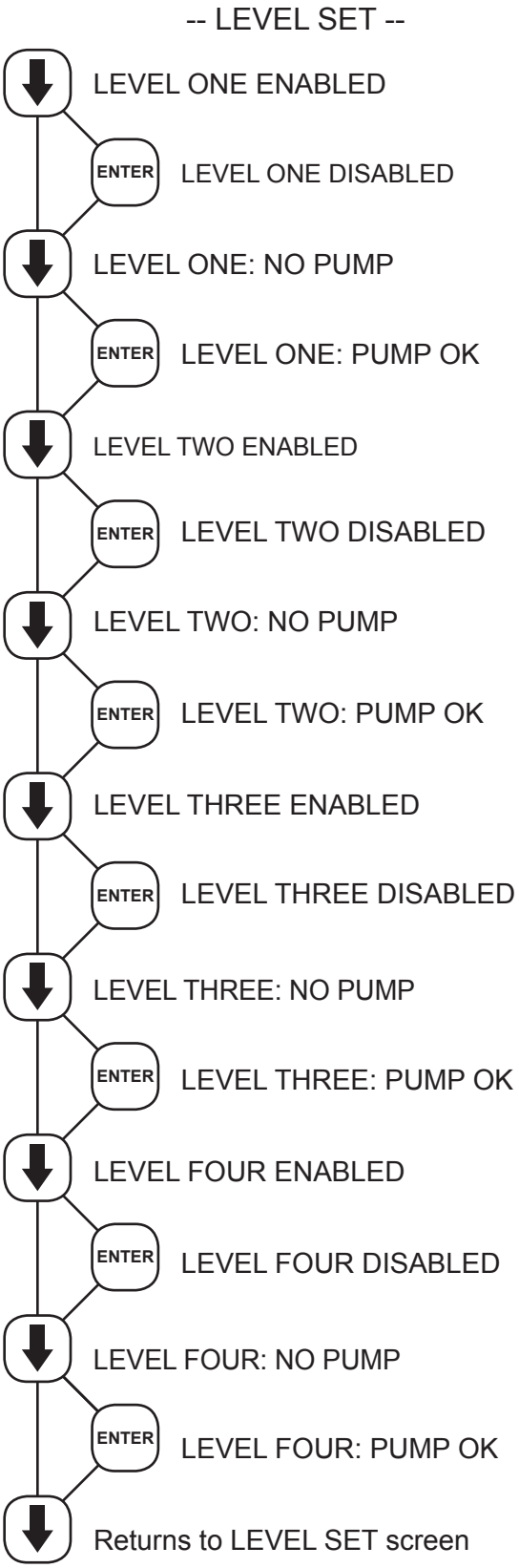
LEVEL SET MENU

LEVEL ENABLE - Enable and Disable options allow for the activation or deactivation of the control logic that governs the input of the level wand(s). Up to four level wands can be used simultaneously.

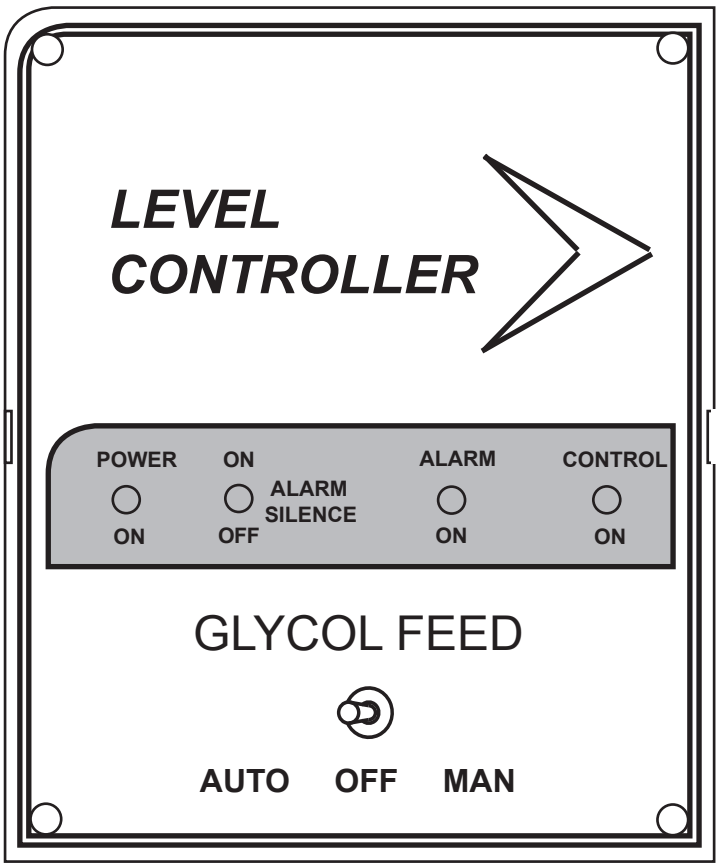
LEVEL: PUMP - Each level wand, in the Enabled state, can be used to control the high voltage relay output(s) of the controller.

When the “No Pump” option is selected, by pressing ENTER on the keypad, the high voltage relay output(s) will deactivate upon the level wand being triggered.

When the “Pump OK” option is selected, by pressing ENTER on the keypad, the high voltage relay output(s) will not deactivate upon the level wand being triggered but an alarm message will appear on the display of the controller that reads: Possible Dry Pump.



VI. Analog System Operation Overview



Analog Model

Front Panel Description

POWER ON LED Lights whenever the controller is powered.

ALARM SILENCE Switch disables the audible alarm when moved to the "OFF" position.

ALARM ON LED Lights when alarm condition exists.

CONTROL ON LED Lights when system is feeding glycol

A.O.M. Switch **AUTO**matic position Used for normal (controlled) operation.

OFF position	Pump cannot operate, regardless of all other conditions present.
MANual position	Overrides the pressure and low level cut-off switches and runs the pump.

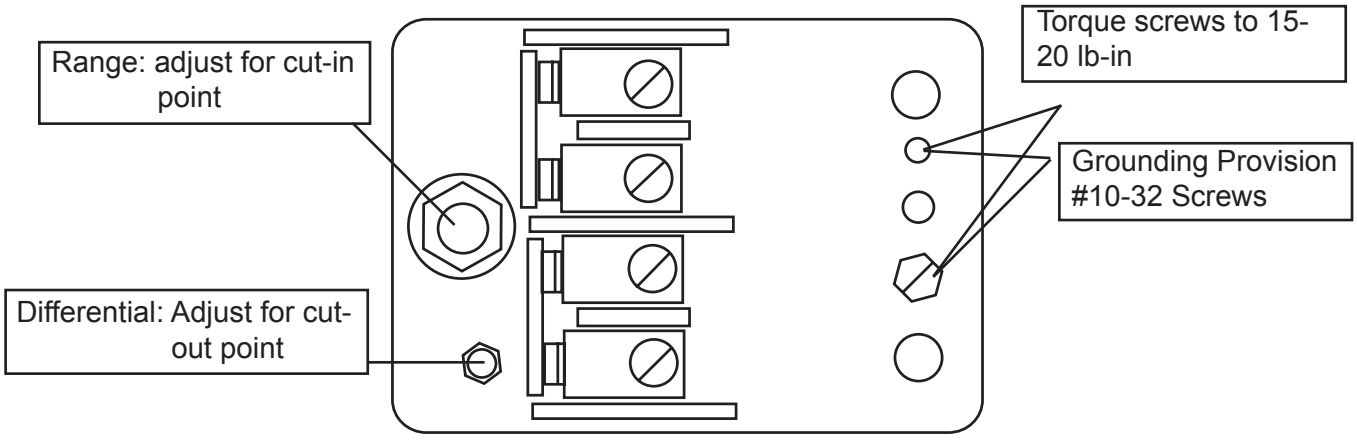
***The control panel is equipped with an automatic-off-manual, (A.O.M.) switch to facilitate operation and setup of the glycol feeder.**

VII. Analog Start up and Test

Pressures noted will change for analog units with high pressure switch.

With the solution tank full, the control switched off and plumbing connections complete.

1. Close the isolation valve to the system.
2. Insure that the isolation valve at the bottom of the flow assembly is open.
3. Insure that the isolation valve between the pump and tank is open (This valve is important, the pump is the only part that ever needs service. If you don't have a valve to isolate the pump, you will have to drain the tank.
4. Plug the power cord into a grounded, 120 VAC, receptacle.
5. Remove the cover from the pressure switch.
6. Watch the pressure gauge. It should read zero.
7. Switch control to AUTO.
8. Pump should start;
    a. Pressure will increase. Watch the gauge.
    b. As the pressure rises above 20 psi, the pump should stop.
9. Adjust the pressure relief valve so the pressure decreases. Solution should return to the tank.



Pressure Switch

10. As the pressure falls below 5-10 psi the pump will start. Test the level switch during this cycling to the pump by loosening the wand and raising it above the solution level. the alarm should sound and the pump should shut off. Return the wand to normal depth and the alarm will silence and the pump begin cycling. Adjust the main spring adjustment on the pressure switch to achieve your desired cut in pressure. the cut in pressure usually is determined by the status pressure of the closed system to which the feeder is connected.
11. Adjust the differential adjustment on the pressure switch to control cut out pressure.
12. Adjust the pressure relief valve so pressure increases and solution no longer returns to the tank. The setting of the pressure relief valve is usually determined as the pressure you want your system never to exceed. In adjusting to this desired pressure you may need to switch the control briefly to manually increase pressure to insure proper setting.

Reference Chart % Propylene Glycol

Weight % Propylene Glycol	Volume % Propylene Glycol	Freeze Point°F	Refractive Index N_D 77°F	Degree Brix	Boiling Point °F @760MM Hg
20	19.4	19.9	1.3565	15.4	213°F
21	20.4	19.0	1.3575	16.0	
22	21.4	28.0	1.3586	16.7	
23	22.4	17.0	1.3598	17.4	
24	23.4	16.0	1.3611	18.4	
25	24.4	15.0	1.3621	18.8	214°F
26	25.3	14.0	1.3632	19.6	
27	26.4	13.0	1.3643	20.2	
28	27.4	12.0	1.3654	20.8	
29	28.4	11.0	1.3664	21.4	
30	29.4	9.1	1.3674	22.0	216°F
31	30.4	8.0	1.3685	22.7	
32	31.4	7.0	1.3700	23.6	
33	32.4	6.0	1.3714	24.4	
34	33.5	4.0	1.3729	25.3	
35	34.4	3.0	1.3742	26.1	217°F
36	35.5	1.0	1.3755	26.9	
37	36.5	0	1.3765	27.5	
38	37.5	-2.0	1.3775	28.0	
39	38.5	-4.0	1.3785	28.5	
40	39.6	-5.0	1.3796	29.1	219°F
41	40.6	-7.0	1.3806	29.6	
42	41.6	-9.0	1.3816	30.2	
43	42.6	-11.0	1.3826	30.7	
44	43.7	-13.00	1.3837	31.3	
45	44.7	-15.0	1.3847	31.8	220°F
46	45.7	-17.0	1.3857	32.4	
47	46.8	-19.0	1.3868	33.0	
48	47.8	-22.0	1.3878	33.5	
49	48.9	-25.0	1.3889	34.1	
50	49.9	-29.0	1.3899	34.7	222°F
51	50.9	-31.0	1.3911	35.5	
52	51.9	-33.0	1.3922	35.9	
53	53.0	-37.0	1.3936	36.6	
54	54.0	-40.00	1.3947	37.2	
55	55.0	-43.6	1.3961	38.0	
56	56.0	-46.0	1.3968	38.4	
57	57.0	-50.0	1.3891	39.1	
58	58.0	-53.0	1.39911	39.6	
58	59.0	-57.0	1.4002	40.3	
60	60.0	-60.0	1.4012	40.7	225°F

Reference Chart % Ethylene Glycol

Weight % Ethylene Glycol	Volume % Ethylene Glycol	Freeze Point°F	Refractive Index N_D 77°F	Degree Brix	Boiling Point °F @760MM Hg
20	18.1	17.0	1.3525	13.0	216°F
21	19.2	16.5	1.3536	13.7	
22	20.1	16.0	1.3546	14.3	
23	21.0	14.0	1.3555	14.8	
24	22.0	13.0	1.3565	15.4	
25	22.9	12.0	1.3575	16.0	218°F
26	23.9	11.0	1.3585	16.6	
27	24.8	10.0	1.3590	17.0	
28	25.8	9.0	1.3606	17.7	
29	26.7	8.0	1.3615	18.5	
30	27.7	7.0	1.3625	19.0	220°F
31	28.7	5.0	1.3636	22.8	
32	29.6	4.0	1.3645	23.4	
33	30.6	2.0	1.3645	20.9	
34	31.6	1.0	1.3666	21.5	
35	32.6	0.0	1.3677	22.2	221°F
36	33.5	-1.0	1.3686	22.8	
37	34.5	-3.0	1.3696	23.4	
38	35.5	-4.0	1.3707	24.0	
39	36.5	-5.0	1.3718	24.6	
40	37.5	-8.0	1.3728	28.2	224°F
41	38.5	-9.0	1.3729	29.1	
42	39.5	-11.0	1.3750	26.5	
43	40.5	-13.0	1.3760	27.2	
44	41.5	-15.0	1.3770	27.7	
45	42.5	-17.0	1.3780	28.2	225°F
46	44.0	-20.0	1.3796	29.1	
47	45.0	-22.0	1.3806	29.6	
48	46.0	-24.0	1.3818	30.2	
49	47.1	-26.0	1.3828	30.8	
50	48.0	-28.0	1.3837	31.3	227°F
51	49.1	-31.0	1.3848	31.9	
52	50.1	-35.0	1.3858	32.5	
53	51.2	-36.0	1.3869	33.1	
54	52.2	-38.0	1.3880	33.6	
55	53.2	-43.0	1.3889	34.1	227°F
56	54.3	-45.0	1.3968	38.4	
57	55.3	-50.0	1.3909	35.2	
58	56.3	-52.0	1.3919	35.7	
58	57.4	-54.0	1.3930	36.4	
60	68.4	-58.4	1.3939	36.8	230°F

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