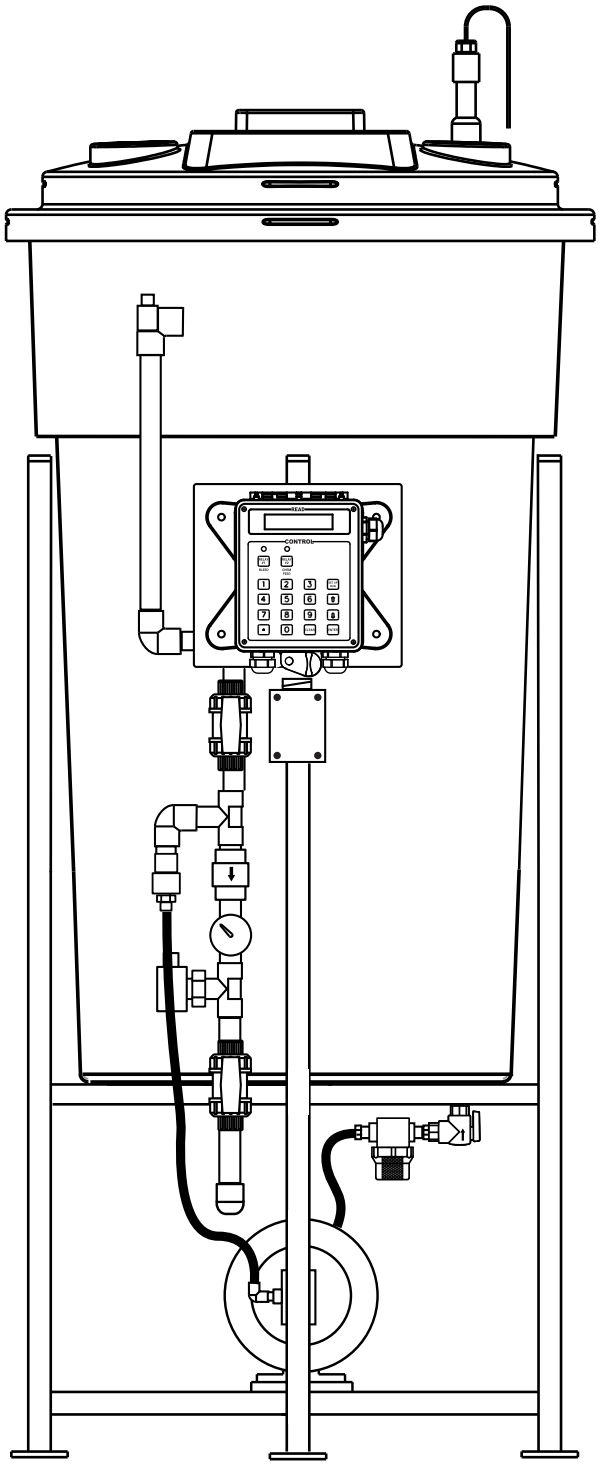
Advantage Controls — Manual

Model GF
Digital Glycol Feeder



Installation
Maintenance
Repair
Manual

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I. Introduction

The Advantage Controls Glycol Feed Systems are design to regulate pressure in closed loop Hydronic Heating and Cooling applications.

Advantage Controls micro-processor base controller reads a solid state pressure transducer, displays system pressure, and uses a 16 character keyboard for the entry of control parameters. The micro-processor has built in real-time clock and EEPROM back-up for all user settings, in case of power interruptions. Setting for all functions are made using the keyboard, readings are displayed on a back lit 16 character alphanumeric display.

Advantage Controls Glycol Feeders are stand alone pre-wired, pre-plumbed systems designed for ease of installation. Our systems are mounted on a powder coated steel frame with anchor points.

Advantage Controls Model Designation allows for a wide variety of configurations, operation and function of each Glycol Feed Systems this is dependent on your specific model number. Please check your model number against the selection guide for better understanding of your system.

Please read this instruction manual to become familiar with your system.

II. Model Numbering and General Specifications

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

TANK SELECTION
1 = 55 gallon poly
2 = 100 gallon poly
3 = 30 gallon poly
4 = 50 gallon carbon steel
7 = 150 gallon poly

STAND SELECTION
A = Powder Coated steel stand
B = Powder Coated steel stand w/ mixer bracket
D = Portable stand with built in rollers

PUMP SELECTION
*Dual pump sys. require 2 pump selections (i.e., -11)
0 = No pump
1 = 2.0 gpm at 150 PSI; ⅓ hp
2 = 3.3 gpm at 150 PSI; ½ hp
3 = 5.5 gpm at 100 PSI; ½ hp
4 = 10 gpm at 100 PSI; 1 hp

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
M = NANO w/ alarm buzzer & contact, ETL, 0-100 PSI sensor, single loop
G = XS controller w/ ETL listing, pressure sensor for single loop
H = XS controller w/ ETL listing, pressure sensor for dual loop
D = Pressure transducer, level wand and pump starter relay for use with separately ordered MegaTron or XS with 4-20mA input ability

OPTIONS
1 = 240V
5 = Position backcheck to use tank for expansion
C1= Communications card Internet (XS controller only)
C11= Communications card w/ Modbus TCP/IP
C1= Communications card w/ Bacnet TCP/IP (read only)
C1= Communications card w/ Bacnet (read/write)
H = 0-200 PSI pressure transducer and gague (per loop). Must use 150 PSI pump
M = Mixer controls (order mixer separate)
M1= Mixer controls with 1/20 HP bung mount mixer
O4= Four 4-20mA options (XS controller only)
Y = ON/OFF switch (included on control options E, G, & H)

Most units include poly tank and stand, low level switch with audible alarm (100db) with silence switch, dry contact alarm, pressure relief valve and 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). 16 character LCD, backlit display. EPROM memory.

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. The Standard prewired units are supplied with a 8 foot, 16 AWG, 3 wire grounded, 120 VAC USA power cord for incoming power.

NOTE: Liquid tight fittings and labeled signal lead cables are provided for all signal (low voltage) connections, low drum level and pressure transducer.

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 (transducer, level, alarm, etc.) should never be run in conduit with high voltage wires.**

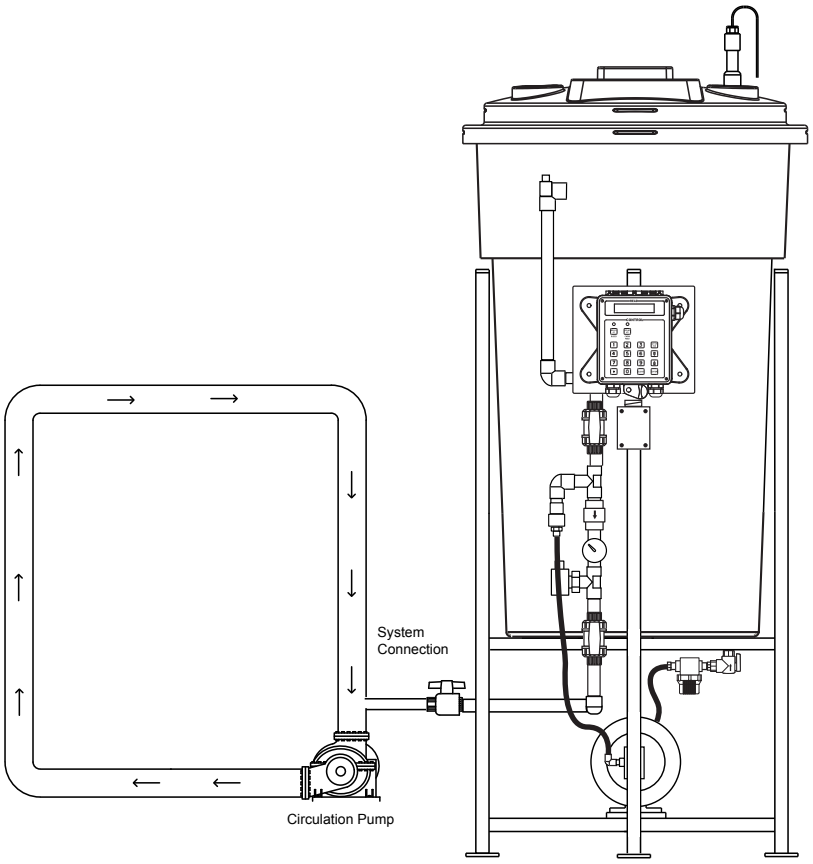
Mounting Instructions

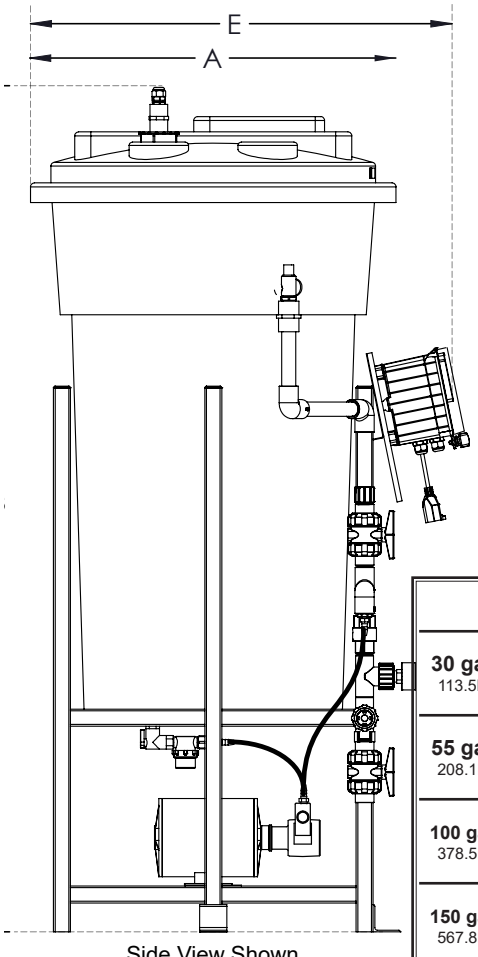
Select a mounting location that provides the operator easy access to the unit and a clear view of the controller. The location should be convenient to grounded electrical connections and system plumbing connections. Mount the glycol feeder stand to a level concrete pad using the ½" mounting holes in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

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 and Measurements



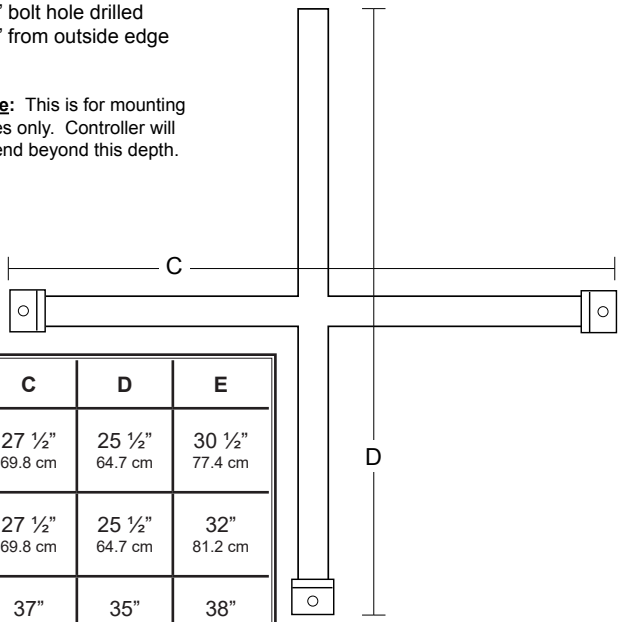


Side View Shown

GLYCOL STAND FOOT PRINT

1/4” bolt hole drilled
3/4” from outside edge

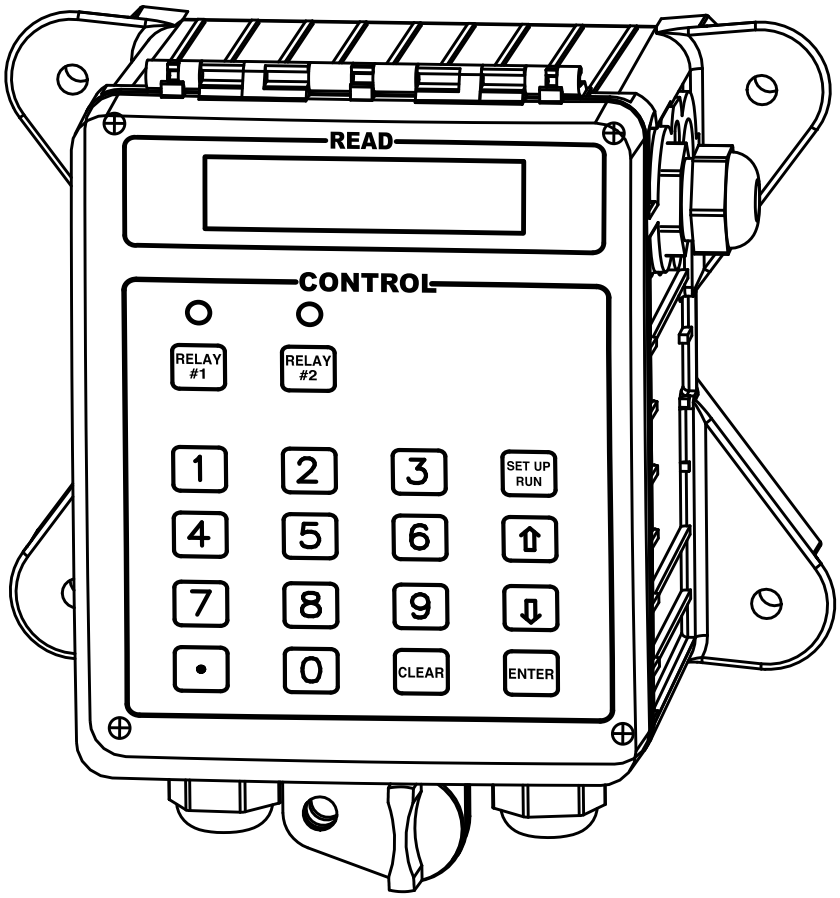
Note: This is for mounting holes only. Controller will extend beyond this depth.



	A	B	C	D	E
30 gal 113.5L	23 ¾” 60.3 cm	51” 129.5 cm	27 ½” 69.8 cm	25 ½” 64.7 cm	30 ½” 77.4 cm
55 gal 208.1L	27 ½” 69.8 cm	65” 165.1 cm	27 ½” 69.8 cm	25 ½” 64.7 cm	32” 81.2 cm
100 gal 378.5L	31 ¼” 79.3 cm	66” 167.6 cm	37” 93.9 cm	35” 88.9 cm	38” 96.5 cm
150 gal 567.8L	37 ⅜” 94.6 cm	56 5⁄16” 143.04 cm	45” 114.3 cm	43” 109.2 cm	49 5⁄16” 125.3 cm

Start Up and Test Procedure / Recommendations

1. Before filling tank, be sure that the tank and the filter bowl are free of packing material and or construction debris.
2. Check plumbing as it may have become loose from vibrations during shipping.
3. Fill Tank
4. Open isolation valve to system.
5. If there are no leaks verify that the pressure gauge agrees with system pressure. This value may vary do to connection to Hydronic systems placement.
6. Before applying power to the controller, remove fuse from lower relay enclosure. (There will be two (2) fuses on dual pump system) Reasoning behind this is, factory settings may not agree with your system and this gives time for you to set your parameters before applying power to the pump or pumps.
7. Apply power to your system. Plug it in.
8. Once you are familiar with the controller from either reading the instruction manual or trial and error. Proceed with setting perimeters that are correct for your hydronic system.



Digital Front Panel Drawing

IV. Digital Front Panel Description

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

CONTROL: Relay 1, Relay 2 - 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. **Depending upon your model number, your unit may not use all of the SET UP options listed.**

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 30 seconds). You would need to key in a number of 0030 to make it 0 (zero) minutes and 30 seconds.

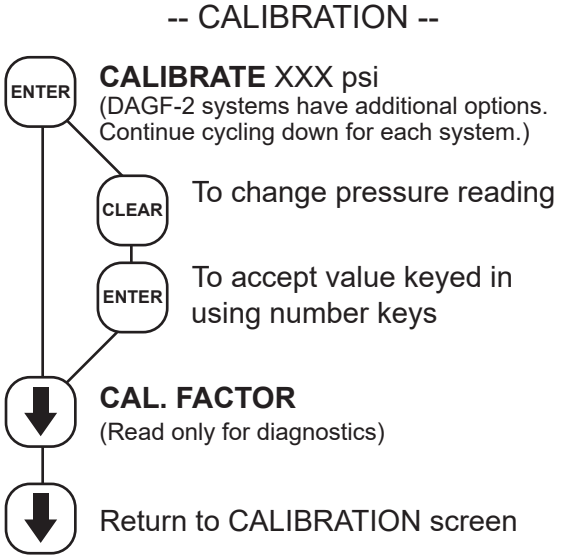
CALIBRATION

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.

CAL. FACTOR - This is a relative number used in diagnostics.

Normal Cal. Factor on valve is between 900-1500. Extreme values - above 1500 or below 800.



PRESSURE SET (1 & 2)

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.

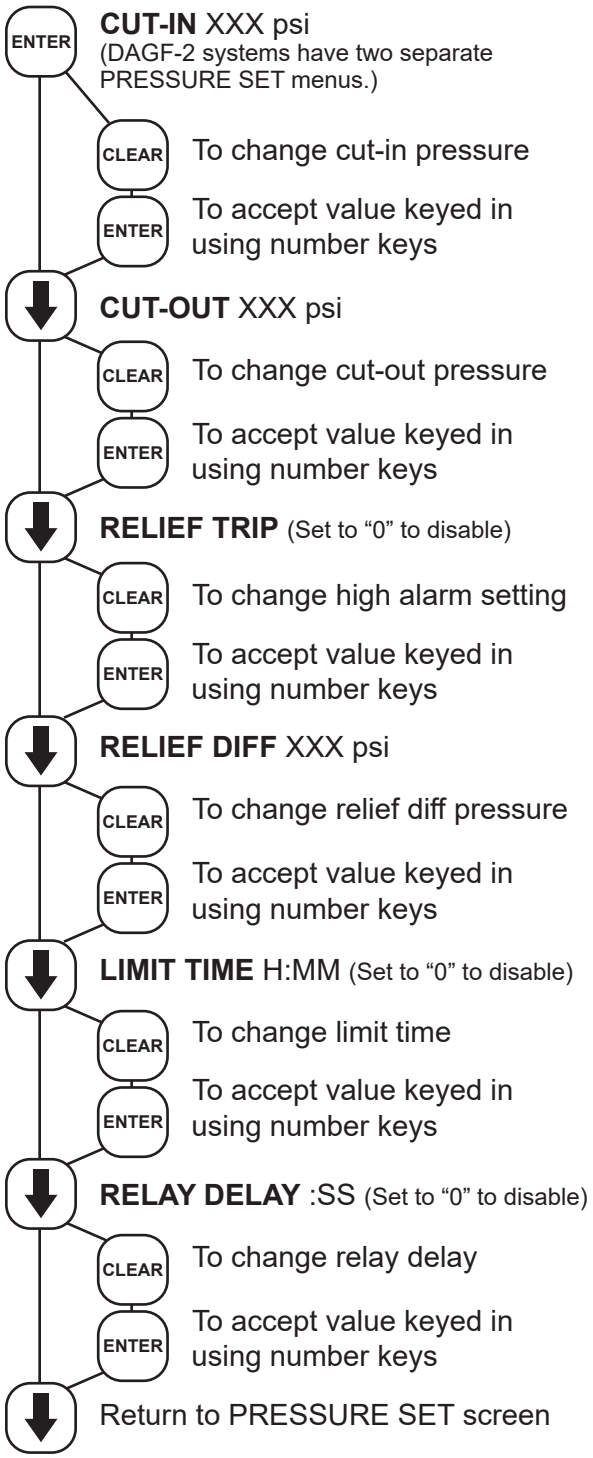
Note: Cut-out pressure must be at least 5 PSI greater than Cut-in pressure.

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. Press the down arrow, the display will read RELAY DELAY XX. This function is for slowing the response of system pressure reading, delaying the relay action where your system pressure is somewhat erratic.

-- PRESSURE SET (1 & 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

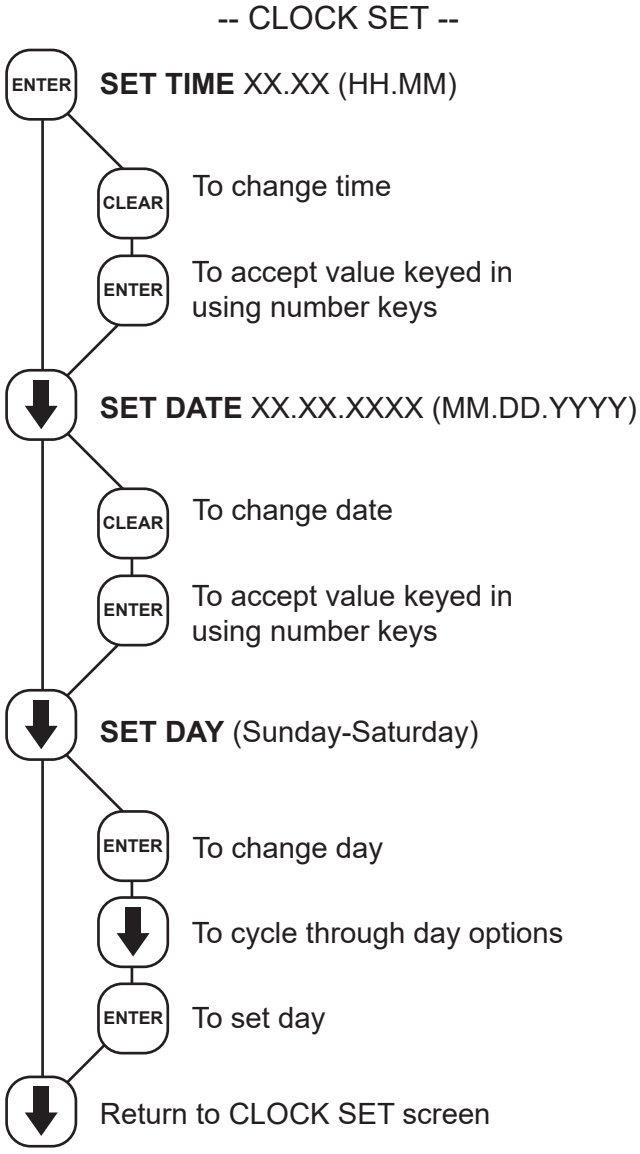
This menu is for adjusting the time, date and day of the week.

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 1:00 pm would be shown as 13.00.

NOTES:

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



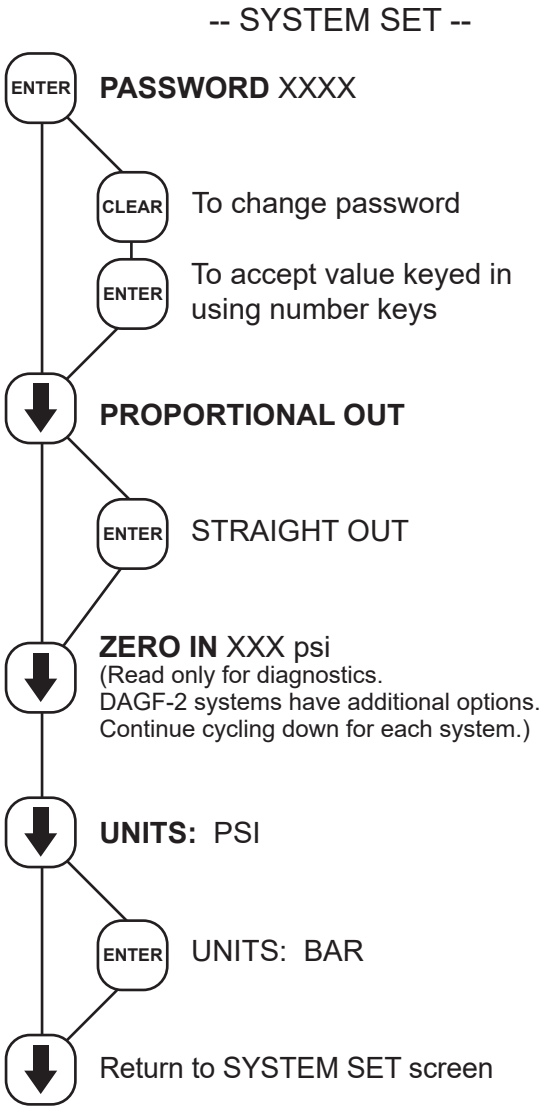
SYSTEM SET

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. Some features disabled and does not apply on this model.

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.

ZERO IN - CAUTION! This this function is used only when there is zero or no pressure at the sensor (Pressure Transducer). If ENTER BUTTON is pushed when there is pressure at the sensor the accuracy of the controller will be greatly effected. Refer to troubleshooting section at end of manual.



DIAGNOSTICS

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

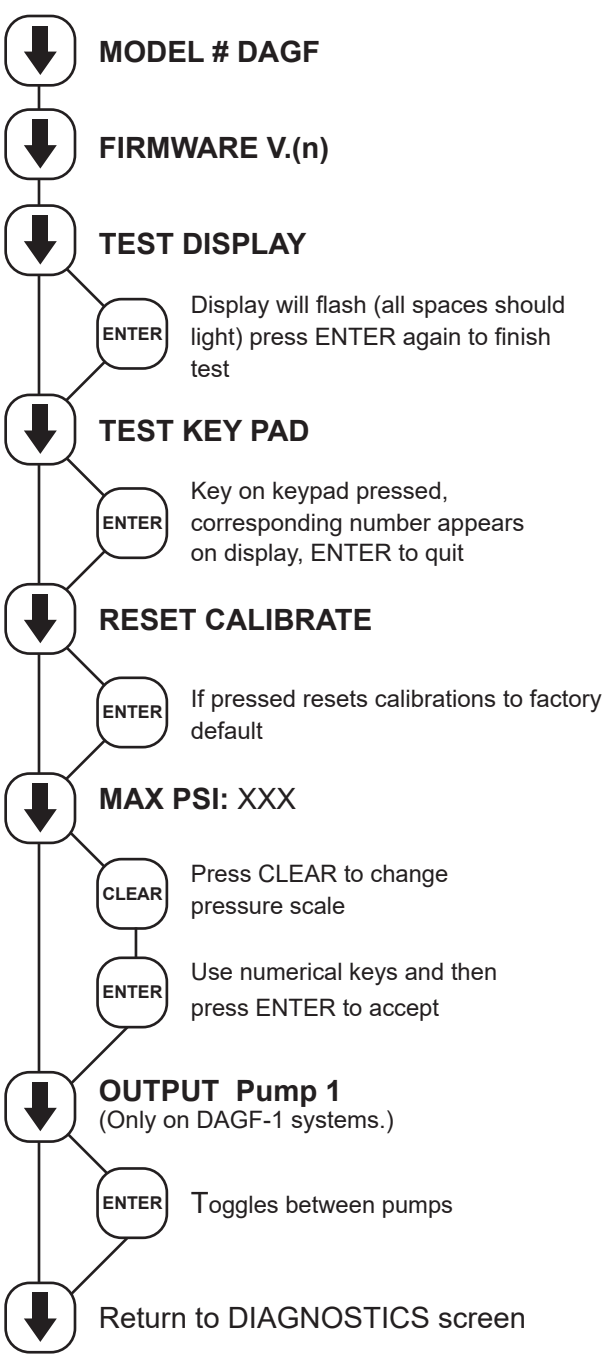
TEST DISPLAY - Press ENTER and all pixels will flash. Make a visual check to see that all pixels are lit.

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 - CAUTION! Pressing ENTER Button here will reset calibration data to factory defaults. You will need to reset or verify all setting after doing this.

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 ***(DAGF-1 models only)***
This is used in conjunction with feeders with Option B, dual pump system. This allows the operator to switch from pump one to pump two when option E is specified.



LEVEL SET

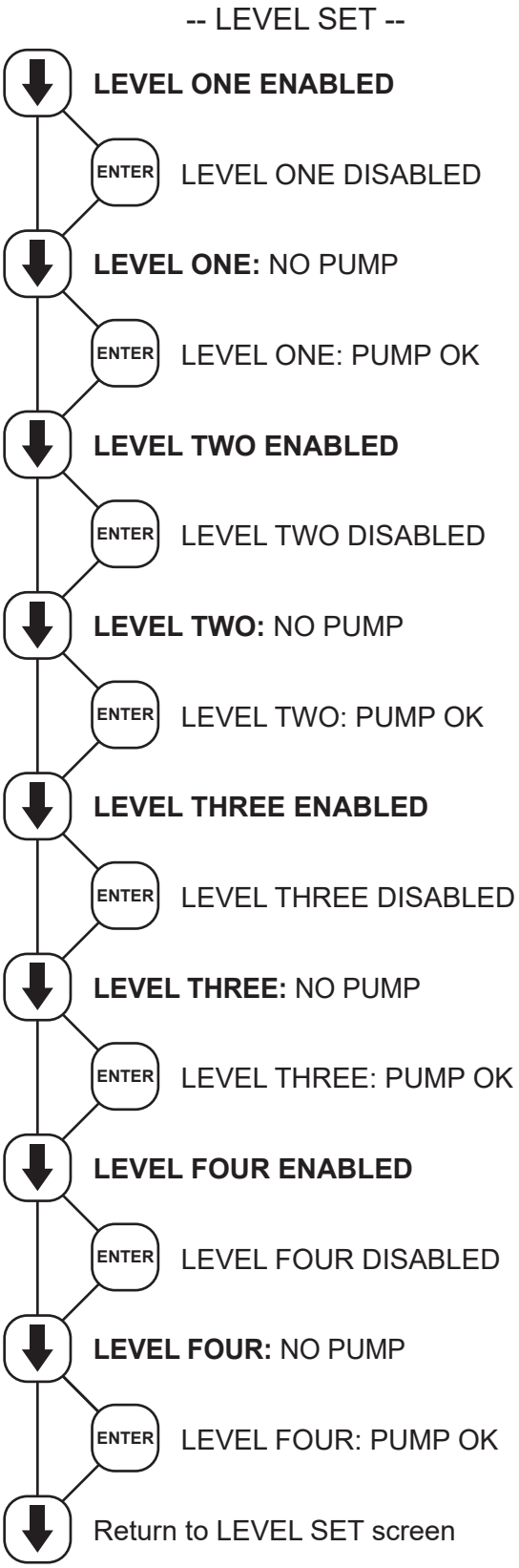
LEVEL ENABLE - Enable and Disable options allow for the activation or deactivation of the control logic that governs the input of the level wand(s). Up to four level wands can be used simultaneously.

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

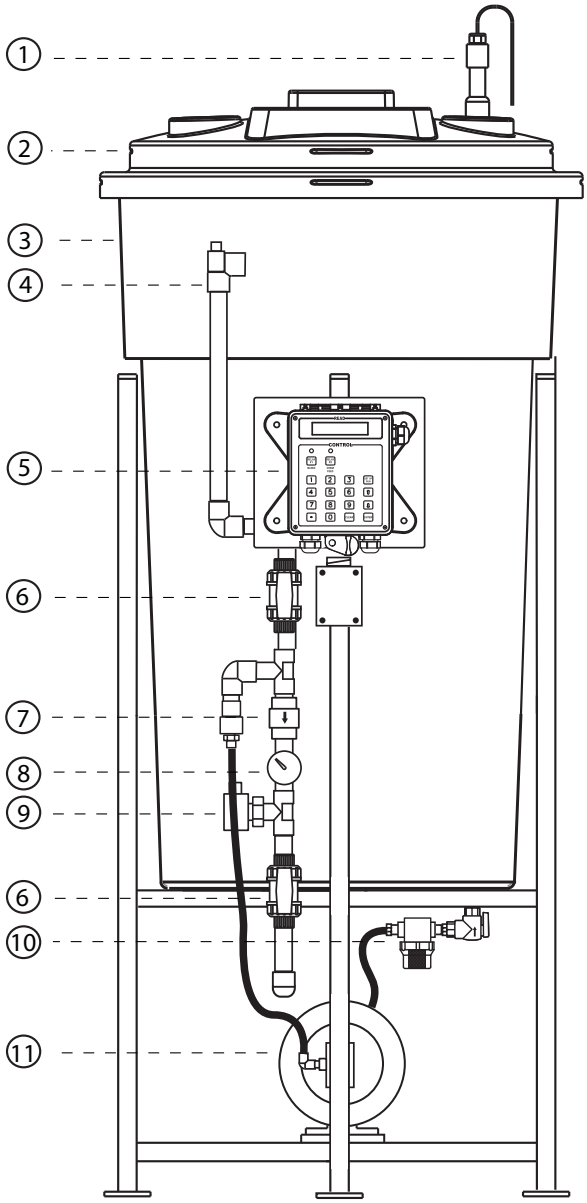
When the “No Pump” option is selected, by pressing ENTER on the keypad, the high voltage relay output(s) will deactivate upon the level wand being triggered.

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.

Note: Levels 2, 3 and 4 are a built in function of the MicroTron control platform. Not used on glycol feeder models.



VI. Parts List



Parts List

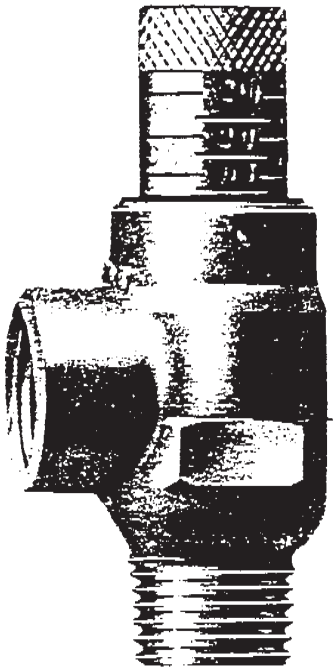
1. Level wand for 30 gl = **ALL-S30**; 55 gl = **ALL-S42**
2. Tank lid for 30 gl = **LID-30-C1D**; 55 gl = **LID-55-C1D**
3. Tank for 30gl = **AGF-APCT-30;** for 55 gl = **AGF-APCT-55**
4. Pressure relief valve = **AGF-PRV**
5. Controller (for selection A) = **DALL-GF-V**
6. Isolation valve = **BV-3/4** for PVC; **GV-3/4** for copper
7. Back check = **CKV-3/4PP** for PVC; **CKV-3/4B** for copper
8. Pressure gauge = **AGF-PG**
9. Pressure transducer = **AGF-PTD**
10. Suction shut-off and strainer assembly = **AGF-SUCTION**
11. Pump = **991F41** (for selection 1); **992MJ07** (for selection 2)

Note: This list covers most of our popular models. For models not covered, consult factory.

No. 530
Calibrated Pressure Relief Valve

Features

- A calibrated adjustment feature for setting the valve to the relief pressure required.
- All Bronze construction
- All stainless steel springs



Specifications

Sizes ½" and ¾" (15 and 20 MM)
Inlet (bottom) is male threaded, NPT
Outlet (side) is female threaded, NPT.

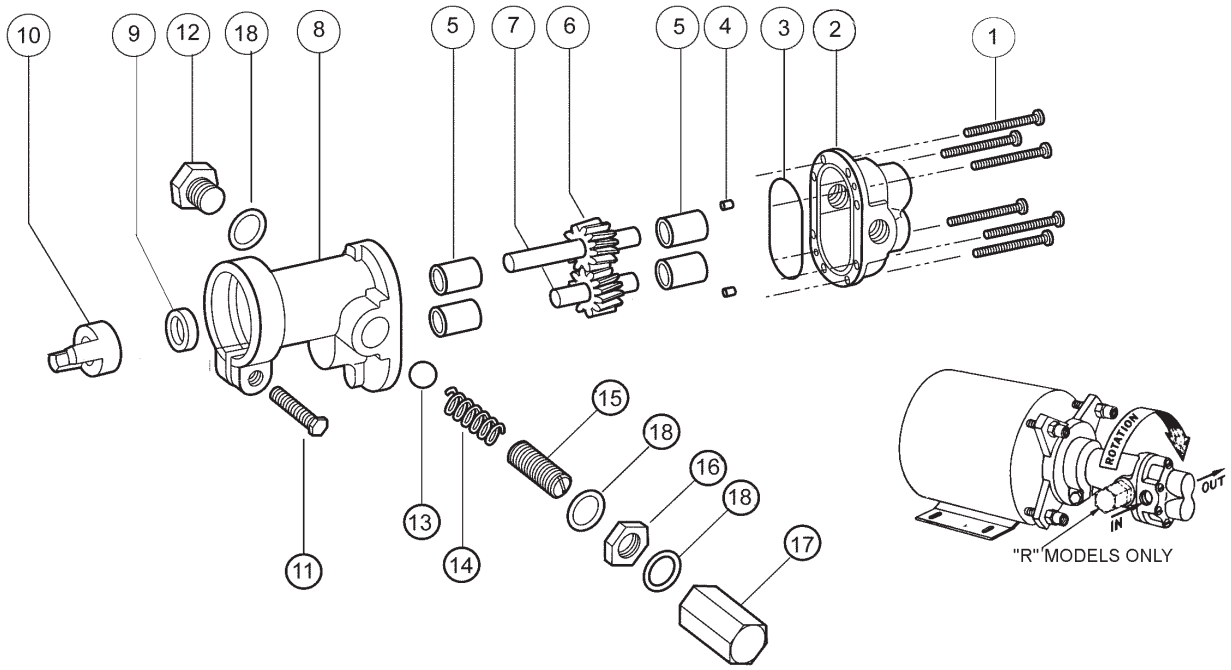
Design

Wats No. 530 is spring operated bronze relief valve designed to be used as protection against excessive pressure of water, oil or air.
This device is designed for emergency safety relief and shall not be used as an operation control.
Buna-N disc on machined body seat.

Application

Ideally suited as a by-pass thermal expansion relief valve.
There are a wide variety of applications where the valve is used as a protective device. One such application would be on various pipelines.

Parts List



	1	2	3*	4	5*	6*	7*	8	9*#	10	11	12	13	14	15	16	17	18
	Screw	Body	O-Ring	Dowel Pin	Bearing	Drive Gear Assy	Idle Gear Assy	Cover	Lip Seal	Coupling	Screw	Plug Nut	Ball	Spring	Adj. Screw	Locknut	Bypass Nut	Fiber Washer
Pump No.	6 Req'd	1 Req'd	1 Req'd	2 Req'd	4 Req'd	1 Req'd	1 Req'd	1 Req'd	1 Req'd	1 Req'd	1 Req'd	1 Req'd	1 Req'd	1 Req'd	1 Req'd	1 Req'd	1 Req'd	3 Req'd
N991	7733	9300NB5N	9797-033	8885	5024	32149	32110	9303NN2N	5007	5604	5595	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N991R	7733	9300NB5N	9797-033	8885	5024	32149	32110	9303NN2B	5007	5604	5595	1838	5803	1840	5237	5240	5239	6533

#Seal #5007 is Standard Buna N, #7580 is Viton(R)**-Teflon (R)**

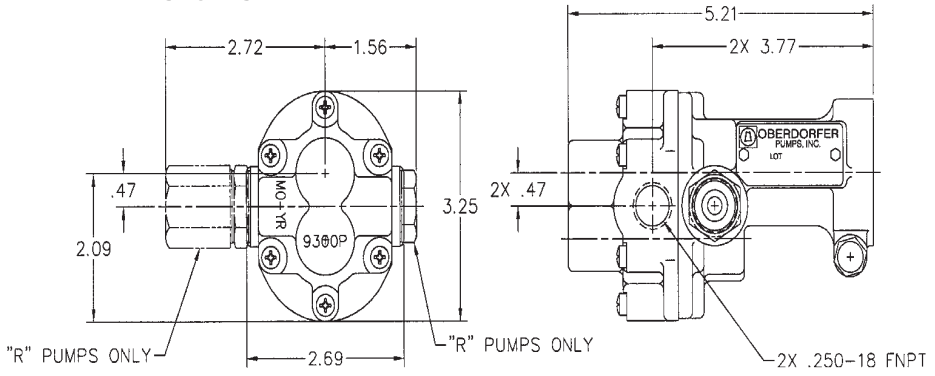
*Repair Kit contains items 3, 5, 6, 7 & 9. Repair Kit for N991(R) is #10640.

VARIATIONS

Pump No.	9[1,2] Lip Seal 1 Req'd	Repair Kit [2]
N991S5	7580	11318
N991RS5	7580	11318

Adapter Kit	Kit Number	Description
M	10562	48 Frame
N	10816	56 Frame
P	11722	S56 Frame
Q	11331	56C Frame (to ¾ HP)
F	11332	IEC71
----	-----	Adapterless- Modified 48

DIMENSIONS

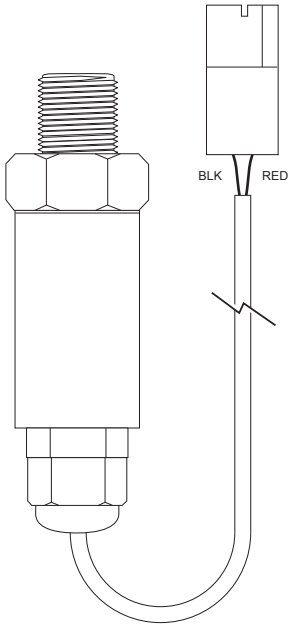


*Viton® or equivalent FKM will be used.
Viton® is a registered trademark of DuPont Dow Elastomers.
*Teflon® or equivalent PTFE will be used. Teflon® is a registered trademark of DuPont.

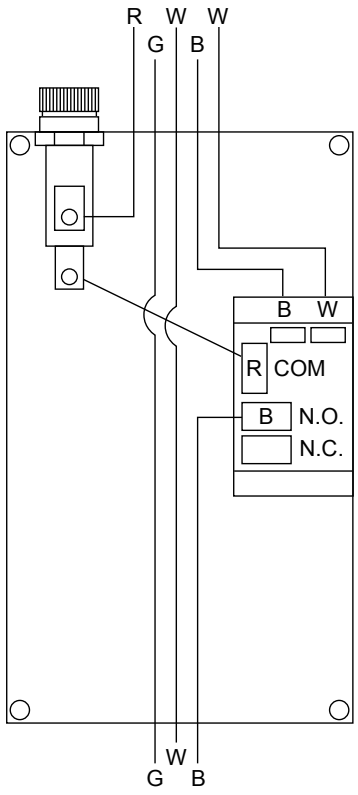
Specifications are subject to change without notice.

VII. Digital Controller Wiring

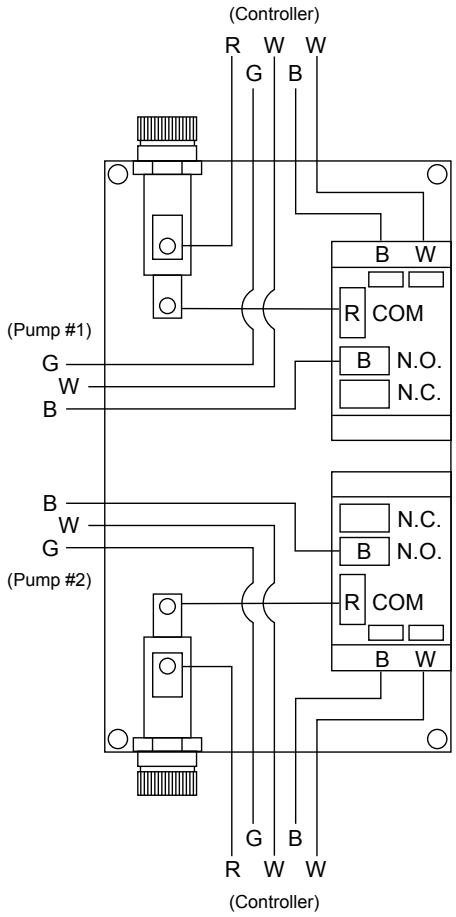
Pressure Sensor



Single Loop - Fuse Box

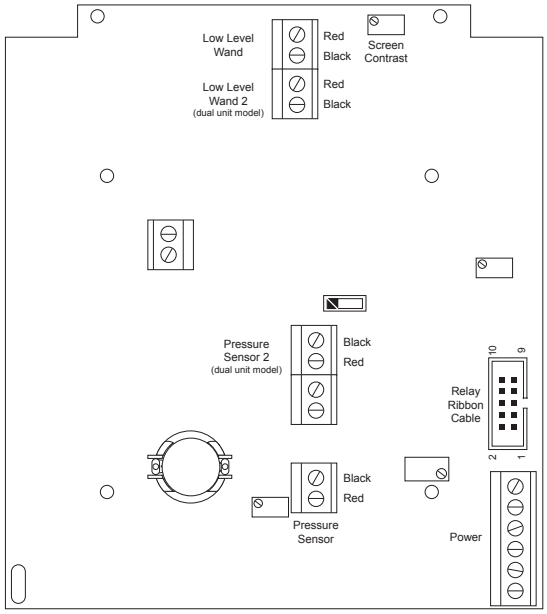


Dual Loop or Single Loop with 2 pumps - Fuse Box

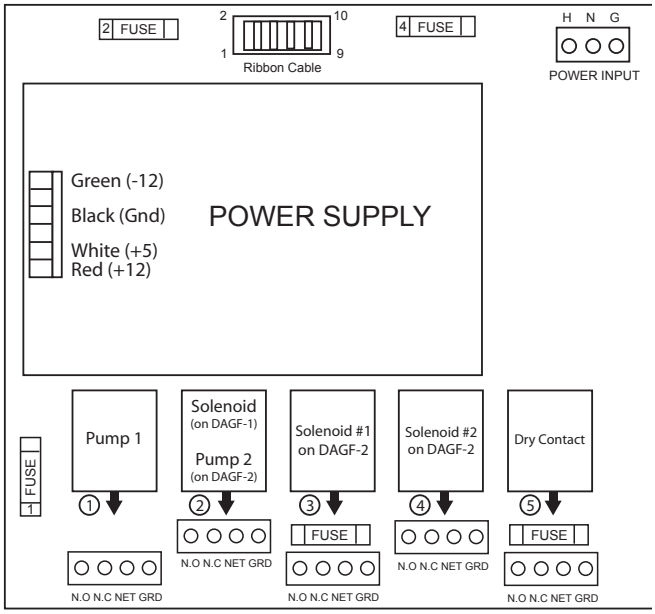


Conduit Layout for LCD Display

Logic Board



Relay / Power Board



VIII. Troubleshooting & Maintenance

The Advantage Glycol Feeder is designed for many years of trouble free operation. Should a problem occur, refer to the following chart to help identify the problem. If replacement is required, follow the procedures listed in the Warranty and Factory Service portion of this manual.

NO POWER TO UNIT, POWER PRESENT AT RECEPTACLE

This happens if the power cord is tripped over or gets caught and pulled by accident.

1. First disconnect plug from live receptacle.
2. Next you will need Phillips #2 driver to remove face plate
3. Face plates are snug fitting and it may require a small standard driver in the slot at the side of the panel to get it moving.
4. Once the panel is free, let it hang down out of view of the enclosure opening.
5. Locate the connector inside of the enclosure for power this is a GREEN three (3) terminal with screw downs.
6. Reconnect to RELAY / POWER BOARD (Drawing on page 20)
7. Before replacing the panel, do a quick visual of all connections and wiring to ensure no other damage has occurred.
8. Replace panel and secure.
9. Plug in power cord and proceed with Start-up.
10. Your power issue was not corrected.
    Record Model /Serial Numbers and Call Customer Service 1 (800) 743-7431.

PUMP WILL NOT RUN. BLOWS FUSE WHEN ENERGIZED

This usually is cause by having some debris in the gears of the pump.

1. Before removing the pump head loosen the six head screw a half turn.
2. Replace blown fuse and energize pump.
3. If this corrects issue, de-energize pump, tighten six screw, proceed with Star-Up.
4. If this doesn't solve issue the pump head should be removed and inspected for particles. Because of tolerance in the gears it doesn't take a big particle to freeze the motor.
5. Before removing the head be sure to close the suction line valve.
6. It is not necessary to remove tubing.
7. Remove the six (6) head screws.
8. Be aware of the seal ring as you remove the head.
9. With your fingers turn the gears to insure that the motor is not seized.
10. If the gears turn freely you may power the pump for a short period to prove rotation.
11. If the gears do not turn freely, but they do turn, try powering the pump for short period.
12. If there is rotation. Replace the Pump Head, being careful to align gasket.
13. If the pump motor is frozen, it is best to replace the entire pump.

PUMP DOES NOT RUN WHEN INDICATOR IS ILLUMINATED

1. Check fuse and that the fuse holder cap is secure
2. Check pump wiring.
3. Check level of fluid / depth of level wand.
4. Does power down and up fix issue?
   - If Yes, there is a limit time set in the PRESSURE SET Menu.
   - If No, the most likely cause is a loose wire inside of control enclosure. (See NO POWER TO UNIT, POWER PRESENT AT RECEPTACLE 1 thru 10 above)

PUMP DOES NOT SHUT OFF WHEN TANK IS EMPTY

1. First verify that in LEVEL SET Menu that level one(1) is active.
2. Level is not Active, press enter to change to active. This should end issue.
3. Level is Active. Disconnect level wand connection. Alarm should sound and pump stop.

- If Yes, inspect end of level wand for debris or damage, replace if needed. (The float at bottom of the wand should have free movement, up and down.
- If No, inspect wire for damage. If no damage visible inspect internal wiring. (See NO POWER TO UNIT, POWER PRESENT AT RECEPTACLE 1 thru 10 above)

4. If no resolution is found, record Serial / Model numbers and call customer service

LOW LEVEL ALARM STAYS ON

1. Disconnect level wand connection and short across connectors with screw driver. (this is low voltage and not dangerous)
2. This turns off the alarm. There is a problem with the wand itself.
3. Inspect the float end of the level wand.
4. If the float is free moving replace wand.
5. Shorting the connecter does not turn off alarm. Inspect internal wiring. (See NO POWER TO UNIT, POWER PRESENT AT RECEPTACLE 1 thru 10 above)
6. Still no resolution record Model / Serial numbers and call customer service.

READING ZERO WILL NOT CALIBRATE

1. Isolate glycol feeder from system pressure by closing isolation valve.
2. Release pressure at the sensor by either valve or loosening union.
3. With pressure at zero press ENTER.
4. Controller will than display CALIBRATE.
5. Open Isolation Valve to reestablish pressure to Sensor.
6. Press enter and key in correct pressure.
7. Press enter key and the correct value should display after brief moment.

Maintenance

Maintenance and care will depend upon the usage and environment in which the system is subjected to. The following is the suggested regular maintenance required to keep the glycol feed system operating properly:

TANK AND PLUMBING

Periodically check the piping and tubing to insure proper discharge of the glycol solution. The strainer should be periodically checked for clogging and wear. The level wand should be removed and cleaned to prevent clogging.

GEAR PUMP

Check for proper operation. If any pump/motor noises, leaks or changes in operation are detected, the pump should be removed and examined by a certified technician. Gear pump repairs can be difficult and should only be attempted by qualified personnel. Improper repairs or assembly can result in pump failure and nullification of the warranty. No lubrication is required.

PRESSURE RELIEF VALVE

Periodic checking and replacement of the adjustment seal is the only maintenance required.

IX. 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 12 months from date of installation for all aspects of the glycol feeder with the controller only covered for an additional 12 months. 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.

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

Get the Advantage in Water Treatment Equipment

Advantage Controls can give you the *Advantage* in products, knowledge and support on all of your water treatment equipment needs.

- Cooling Tower Controllers
- Boiler Blow Down Controllers
- Blow Down Valve Packages
- Bleed Valves
- Water Meters
- Metering Pumps
- Corrosion Coupon Racks
- Solution Tanks
- Solid Feed Systems
- Bypass Feeders
- Filter Equipment
- Glycol Feed Systems
- Pre-Fabricated Systems