Graf Aqua Controller Programming & Setup to use with 3-way valve for back-up systems
Back-up System Overview

The Graf Aqua Control and Three way valve combined will automate the operation of a backup water supply in a rainwater collection system. When the level in the tank is low the valve will automatically switch to the municipal water supply.

The Graf Aqua control uses an electronic level sensor and sensor control box mounted in the tank. The sensor and sensor control box detect the level of water based on the sensor length. The controller translates that signal and in turn is used to produce a graphical display of the water level from 0 to 100 %. The controller has several programmable functions based on that percentage that can then be used to provide signals to connected devices via 24vac output terminals labeled 1, 2, 3 and 4 in the controller.
Rainflo Water Systems LLC
8731 Ardmore Street Suite 300
Chesapeake, VA 23320
Tel: 757-102-2133 Fax: 770-169-2577

Rainflo Aqua Control and 3 Way Valve Wiring Diagram

Note:
Set Backup On/Off Program:
Terminal 1 for NO (Normally Open)
Terminal 2 for NC (Normally Closed)

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Add a footer
This is the Graf Aqua Controller Box
Box contents include: Graf Aqua Controller display unit, Sensor control box, tank level sensor, transformer power supply 24VAC, and fittings/parts bag. 3-Way valve shipped separate.
Sensor box wiring and installation in tank

Sensor and sensor control box are installed as shown in this photo. Once wired install sensor box cover. The sensor box should be mounted a minimum of 4 inches from the highest possible water level in tank.

Sensor should be installed so the stainless steel sensor weight is suspended 1 inch from bottom of tank. You will need to measure the length of the wires from the sensor box to the sensor weight for control sensor calibration. (explained on slide 22)
• Once sensor is installed in tank the data wire (2 strand, shielded, 18 gauge, outdoor rated) should be routed to the Aqua Controller. This wire should be run to the Aqua Control unit in its own conduit. Running the data cable in another high voltage conduit can cause interference with the signal.

• Graf Aqua Controller should be mounted indoors or in a similar dry location.

• If outdoor installation is required a weather rated enclosure can be purchased from RainHarvest Systems.
The knockouts used for wiring grommets should be scored all the way around with utility knife and remove for wiring. Then install the included grommets and tighten as shown.
• The 3-way valve should be located in an upright position and in a protected enclosure not more than 150’ from the controller. An 18 gauge or heavier, 3 strand SOOW (outdoor) type wire, should be used to run between the controller and the valve. Remember, the longer the distance the larger the wire. Voltage drop must be taken into consideration when sizing wire. The water tight grommets should be utilized on the valve to avoid any moisture from entering the housing. There is more than one terminal strip in the Bonomi valve. The terminal strip needed for valve turning operation is labeled “F” and “1 2 3”. The wiring from the Aqua Control will be connected to these terminals. The other terminal strips are for signal outputs and will not be used.

• Tinning all wires is recommended if you have the ability to do so.
Manual control knob. Valve can be rotated 360 degrees with this knob.

Either rainwater supply or municipal water supply

Valve position pointer indicates the state of the connection directly below. In this example, the right hand side is open to the output.

Either rainwater supply or municipal water supply

Output to irrigation system or other
Making Connections Inside 3-Way-Valve

Remove red dial with 2.5mm hex wrench

Loosen (4) screws to remove 3-way valve cover
Strip wires back roughly half an inch. Wire size should be 16 or 18 gauge SOOW type wire to ensure water tight seal.
Pull wires through roughly 4 inches

Connect black wire to terminal 1

Connect white wire to terminal 2

Connect green wire to terminal 3
Tighten grommet onto black wire

Use a bolt or other fitting to seal the unused side opening to prevent any moisture from getting inside
Wiring Of Aqua Control

Sensor Box wiring to display unit. Easier to wire before the others.

Wiring power supply transformer and sensor box to Aqua Control display unit.
3-way-valve wiring to Aqua Control display unit

3 wire connection from 3-way valve at display unit. Note: Green and black wires may need to be reversed depending on orientation of municipal and rainwater connections on 3-way valve.
Programming Controller for use with 3-way Valve
Start-up screen

Press and hold menu button for 5 seconds

Use arrows to scroll to DEVICE ADJUSTMENT

Press OK
First setting is language, English is default, scroll to next setting, which is UNITS and default is inches.

MEASURING LENGTH: Press OK and the number will flash indicating selection, enter tank sensor length taken from measuring the sensor wires in tank. Then press OK once length is correct.

After setting the length and pressing OK scroll to OPERATION TERM.1 and press OK.
The default setting of PUMP NO will be flashing. Using arrow keys change to BACKUP NC and press OK.

Scroll to OPERATION TERM.2 where the default setting is BACKUP NC, change this to BACKUP NO, press OK.

This completes the DEVICE ADJUSTMENT settings.

The controller uses the BACKUP function to control the 3 way valve operation. This function has two states, BACKUP ON (which when activated, is indicated on the front of the unit by an LED located beside the spigot icon) and BACKUP OFF. The default settings for this function are on at 10% and off at 12%, but you can make these settings any logical amounts you need in the SWITCHING POINTS menu. When the level in the tank reaches 10%, the backup function is activated and will energize terminal 1 and that will cause the 3 way valve to rotate. Conversely, when the water level moves up to 12%, the backup function will turn off, terminal 2 will be energized and the valve will rotate in the opposite direction.

Important note: If the BACKUP ON and BACKUP OFF percentages need to be raised it will be necessary to change the REFILL OFF setting to a number higher than what the desired BACKUP ON setting is.