



Instruction Sheet

Variable Speed - Analog Signal (00-VV) "00" and Load Match® Cartridge Circulators

102-142

SUPERSEDES: May 1, 2010

EFFECTIVE: October 1, 2010

Plant ID# 001-3810

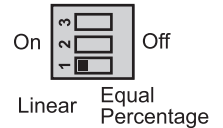
The Variable Speed - Analog Signal "00" Cartridge Circulator (00-VV) is a microprocessor-based pump designed to operate at different speeds based on an analog voltage signal input. Its ease of installation and operation allows for a wide variety of HVAC applications, such as maintaining a pressure differential or a setpoint temperature.

Sequence of Operation

Whenever the 00-VV is powered up, the green power LED turns on and the pump operates based on an analog input signal. The percent output (% OUT) LED flashes at different rates based on the speed of the pump. As the % OUT LED flashes faster it indicates a faster speed of the pump. A fully on LED indicates the pump is at 100% capacity.

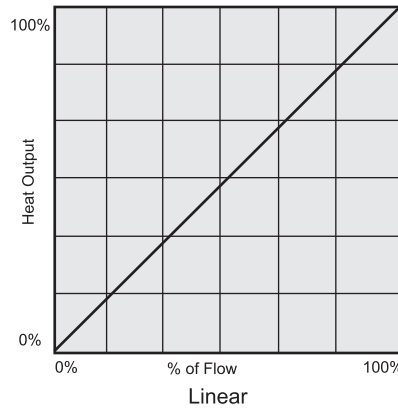
Output Characteristic (DIP switch 1)

The 00-VV accepts an analog signal in order to drive the pump at different speeds. The pump speed may be selected to change linearly or based on equal percentage characteristic. The output characteristic is selected via DIP switch 1.



Linear Characteristic

The linear output characteristic assumes there is a linear relationship between percent of flow of the pump and heat output of the terminal unit. Linear operation is typically used in applications in which the pump injects into a constant circulating loop, which includes the terminal unit.



Equal Percentage Characteristic

The equal percentage output characteristic assumes there is a non-linear relationship between percent of flow of the pump and heat output of the terminal unit. In order to achieve the desired linear output, the 00-VV provides an equal percentage output. Equal percentage operation is typically used in applications in which the pump injects directly into the terminal unit.

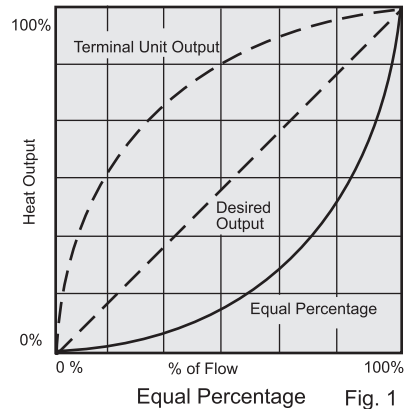


Fig. 1

Analog Signal (DIP switch 3)

The control accepts either a 0-10 V (dc) or 2-10 V (dc) signal. The signal range is selectable via the DIP switch number 3. Once a signal is applied, the pump speed varies based on the selected output characteristic.



2-10 V (dc) 0-10 V (dc)

0-10 V (dc) / 0-20 mA

Whenever the signal is 0 V (dc), the percent speed output of the pump is 0%, and it increases to 100% when a 10 V (dc) signal is present.

If a 0-20 mA signal is used, install the 500 ohm 1/4 W resistor across the (+) and (-) terminals as shown in figure 2. Whenever the signal is 0 mA, the percent speed output of the pump is 0%, and it increases to 100% when a 20 mA signal is present.

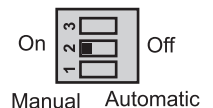
2-10 V (dc) / 4-20 mA

Whenever 2 V (dc) is present, the control operates the pump at 0% and it increases to 100% whenever 10 V (dc) signal is present.

If a 4-20 mA input signal is used, install the 500 ohm 1/4 W resistor across the (+) and (-) terminals as shown in figure 2. Whenever a 4 mA signal is present the pump operates at 0% output and it increases to 100% whenever 20 mA signal is present.

Manual / Automatic Operation (DIP switch 2)

The 00-VV allows the user to manually turn on the pump at full flow without an analog signal. This function is enabled by switching the DIP switch number 2 on.



Exercising

During long periods of no operation, the 00-VV is designed to exercise for 10 seconds every 3 days of no operation in order to prevent precipitate build-up in the pump. The % OUT LED turns on during the exercising function.



A Taco resource – saving product

Wiring and Troubleshooting

WARNING: Wiring connections must be made in accordance with all applicable electrical codes.

CAUTION: To prevent electrical shock, disconnect electric power to system at main fuse or circuit breaker box until installation is complete. When a service switch is installed, more than one disconnect switch may be required to deenergize this device for servicing.

Powering the Pump

Insert the line voltage wires through the knockout of the enclosure and connect the Live wire to the H terminal and the Neutral wire to the N terminal. Ensure that no power is present during this process.

For your safety and protection of permanent damage to the microprocessor, this PC board includes a fuse wire. If the fuse wire blows, contact a Taco representative. Once power is applied, the power LED is turned on.

Analog Signal

0-10 V (dc) or 2-10 V (dc)

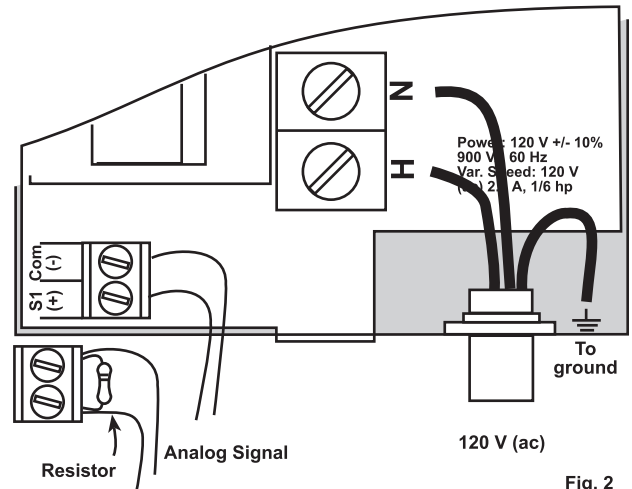
Connect the positive line of the analog signal into the (+) terminal and the negative wire into the (-) terminal.

To test the voltage input signal place a voltmeter between the (+) and (-) terminals.

0-20 mA or 4-20 mA

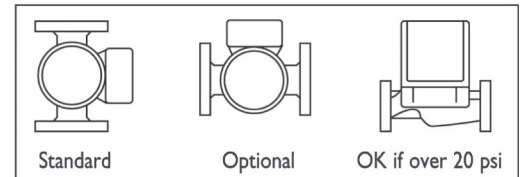
Connect the positive line of the analog signal into the (+) terminal and the negative wire into the (-) terminal. Connect the 500 ohm 1/4 W resistor across the (+) and (-) terminals.

To test the current input signal, place an ammeter in series between the (+) terminal and the positive wire from the signal control.



APPLICATION

1. Maximum operating pressure: 125 psi (862 kPa) on all "00" Series Circulators, 200 psi (1379 kPa) on all LoadMatch Circulators.
2. Maximum water temperature not to exceed nameplate rating.
3. Cast iron circulators are to be used for closed loop systems. Bronze circulators are to be used for open loop, fresh water, or potable water systems.
4. Taco Cartridge circulator pumps are for indoor use only – employer uniquement a l'intérieur.



INSTALLATION

1. Mounting position – Circulator must be mounted with the motor in a horizontal position. It may be mounted vertically with the motor up, provided that the system pressure is at least 20 psi (138 kPa).
2. Rotating body – Body has an arrow on the front that indicates direction of flow. To rotate body, remove the four body bolts, rotate body and replace bolts. Make sure that the junction box is NOT located underneath the circulator. (The junction box must NOT be located in the 6 o'clock position, as viewed from the motor end.)
3. Electrical connections – Observe all applicable codes when connecting to power supply. The motor is impedance protected, and does not require overload protection. The pump cannot run backwards.

WARNING: Do not use in swimming pool or spa areas; pump has not been investigated for this application.

WARNING: In the event the retaining screws have been pulled out of the housing, DO NOT replace them. Use of any other screw may short out the stator windings, creating a risk of electrical shock.

CAUTION: When installing electrical connections, do not apply mechanical loads to the capacitor box; otherwise, retaining screws may be pulled out of the housing, making circulator unusable.

CAUTION: Installations at higher elevations over 5000 feet must have higher fill pressure of 20 psi to prevent pump cavitation and flashing. Premature failure may result. Adjust expansion tank pressure to equal fill pressure. A larger size expansion tank may be required.

4. Fill system with tap water – The system must be filled before operating the circulator. The bearings are water lubricated and should not be allowed to operate dry. Filling the system will result in immediate lubrication of the bearings. It is always good practice to flush a new system of foreign matter before starting the circulator.
5. Circulator operation – Operate the circulator for 5 minutes immediately after filling system to purge remaining air from the bearing chamber. This is especially important when installing the circulator during the off-season.

CAUTION: 1. The addition of petroleum based fluids or certain chemical additives to systems utilizing TACO equipment voids the warranty.
2. Use supply wires suitable for 90°C – ATTENTION: Employer des fils d'alimentation adequats pour 90°C.

WARNING: To avoid electrical shock, disconnect the power supply to the circulator and the main electrical unit.

REPLACING CARTRIDGE ASSEMBLY

1. Disconnect the electrical supply.
2. Reduce system pressure to 0 psi and allow system to return to room temperature. Isolate the circulator by closing the service valves or draining the system.
3. Remove the body bolts and swing motor assembly away from the body.
4. Pull cartridge out of the motor housing.
5. Install replacement cartridge, making sure that the cover plate is between the cartridge flange and motor.
6. Make sure the replacement cartridge corresponds to the full circulator product number. A complete parts list is available from your local plumbing supply wholesaler.
7. Reassemble the circulator using the new gasket and bolts supplied.
8. Follow the "Installation" procedure to start up the circulator.

REPLACING INTEGRAL FLOW CHECK (IFC) ASSEMBLY (if applicable)

1. Disconnect the electrical supply.
2. Reduce system pressure to 0 psi and allow system to return to room temperature. Isolate the circulator by closing the service valves or draining the system.
3. Remove the body bolts and swing motor assembly away from the body.
4. Remove IFC, using needle nose pliers.
5. Install replacement IFC by pressing valve into casing until it is firmly seated.
6. Reassemble the circulator using the new gasket and bolts supplied.
7. Follow the "Installation" procedure to start up the circulator.

REPLACING CIRCUIT BOARD

1. Disconnect the electrical supply and all field wiring to the circuit board.
2. Unplug the 3-pin plastic connector that connects the motor to the circuit board.
3. Bend the lip of the capacitor base to ease the removal of the circuit board. Pull the circuit board up and out.
4. Reverse directions to install the new circuit board.

Notes

LIMITED WARRANTY STATEMENT

Taco, Inc. will repair or replace without charge (at the company's option) any Taco 00 Series circulator or circulator part which is proven defective under normal use within three (3) years from the date of manufacture.

In order to obtain service under this warranty, it is the responsibility of the purchaser to promptly notify the local Taco stocking distributor or Taco in writing and promptly deliver the subject product or part, delivery prepaid, to the stocking distributor. For assistance on warranty returns, the purchaser may either contact the local Taco stocking distributor or Taco. If the subject product or part contains no defect as covered in this warranty, the purchaser will be billed for parts and labor charges in effect at time of factory examination and repair.

Any Taco product or part not installed or operated in conformity with Taco instructions or which has been subject to misuse, misapplication, the

addition of petroleum-based fluids or certain chemical additives to the systems, or other abuse, will not be covered by this warranty.

If in doubt as to whether a particular substance is suitable for use with a Taco product or part, or for any application restrictions, consult the applicable Taco instruction sheets or contact Taco at (401-942-8000).

Taco reserves the right to provide replacement products and parts which are substantially similar in design and functionally equivalent to the defective product or part. Taco reserves the right to make changes in details of design, construction, or arrangement of materials of its products without notification.

TACO OFFERS THIS WARRANTY IN LIEU OF ALL OTHER EXPRESS WARRANTIES. ANY WARRANTY IMPLIED BY LAW INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS IS IN EFFECT ONLY FOR THE DURA-

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THE ABOVE WARRANTIES ARE IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR STATUTORY, OR ANY OTHER WARRANTY OBLIGATION ON THE PART OF TACO.

TACO WILL NOT BE LIABLE FOR ANY SPECIAL, INCIDENTAL, INDIRECT OR CONSEQUENTIAL DAMAGES RESULTING FROM THE USE OF ITS PRODUCTS OR ANY INCIDENTAL COSTS OF REMOVING OR REPLACING DEFECTIVE PRODUCTS.

This warranty gives the purchaser specific rights, and the purchaser may have other rights which vary from state to state. Some states do not allow limitations on how long an implied warranty lasts or on the exclusion of incidental or consequential damages, so these limitations or exclusions may not apply to you.

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