



POWER CONNECTIONS: – THIS PRODUCT ACCEPTS 24 VDC OR 24 VAC 50/60 Hz POWER.

Be sure to follow all local electrical codes. Refer to wiring diagram for connection information. Make all connections with the power off.

- 1.) **24 VDC Power** – Refer to wiring diagram for connection information.
If the 24 VDC power is shared with devices that have coils such as relays, solenoids, or other inductors, each coil must have an MOV, DC Tranzorb, or diode placed across the coil or inductor. The cathode, or banded side of the DC Tranzorb or diode, connects to the positive side of the power supply.
- 2.) **24 VAC Power** – Refer to wiring diagram for connection information.
Check the wiring configuration of any other loads that may be connected to this transformer. If required by BAS or controller specification, the 24 VAC neutral can be earth grounded at the transformer. Analog input, digital input, and analog output circuits should not be earth grounded at two points. Any field device connected to this transformer must use the same common. If you are not sure of other field device configuration, use separate transformer for isolation. If the 24 VAC power is shared with other devices that have coils such as relays, solenoids, or other inductors, each coil must have an MOV, AC Tranzorb, or other spike snubbing device across each of the shared coils. Without these snubbers, coils produce very large voltage spikes when de-energizing that can cause malfunction or destruction of electronic circuits.
- 3.) You should measure the actual voltage output of the secondary. If the output is not fully loaded you may read a higher voltage than the circuit board can handle.

SETUP

Analog input signal ranges are jumper selectable by using Jumper J3, as shown on Page 1. The output of the AFP has two relays. One relay controls UP (increase), the other DOWN (decrease) depending, of course, on the actuator configuration. The rate of change these outputs make on the actuator are determined by DIP switch SW1 setting. Refer to “Rate of Change” Chart on Page 1 and set switches accordingly. Jumper J6 is to be in the CD mode at all times. Due to minor differences in the AFP timing range and product timing range, an error may develop between the commanded position and actual position of the actuator. There are two ways to calibrate the unit.

FIRST METHOD:

Remove power (via control relay or switch). When power is removed and reapplied the AFP will drive or stroke the actuator down 105% of selected timing range (200% on Version 2). Whenever the input on AFP Version 2 is within 2-5% of extreme up or down, the relay will activate for an additional time that is 100% of selected timing range. After the AFP has driven down (or up), it will return to the position commanded by the analog level of the input. The analog input can remain connected during a power reset. If the accumulated error is greater than 5% and the analog signal at 100%, this process may need to be repeated. Allow a 5 second or greater delay before power is applied.

SECOND METHOD:

The other way to calibrate the actuator is to drive the output to 0% and 100% of selected input range. Depending the direction and amount of developed error, it may be necessary to repeat this process. This calibration process should be done at a time when the large changes in the actuator position will not cause problems with the environment it is controlling. When power is applied to terminals +24V and (-), the “POWER” LED will light. When the AFP is not powered on terminals +24v and (-), both relays are open. Tranzorbs are incorporated in the output circuit of the AFP.

TROUBLE SHOOTING AND TESTING

- 1.) Make sure the input and offset jumper and output timing switches 3 and 4.
- 2.) Apply 24 VAC/VDC to the 24 (+) and (-) terminals, confirm the power LED is on and measure voltage to confirm proper voltage. A DC voltage can be measured from the Vout (+) terminal to the 24 (-) terminal. This voltage will vary depending on the supply voltage supplied. Voltage ranges will be from 21 to 25 VDC. Please note supply and Vout voltages if unit is not functioning properly. Contact technical support at ACI.
- 3.) Y2 will drive the actuator down 105% of selected range (200% on Version 2) if power is removed and reapplied. This is to assure the device being controlled is at 0% when command voltage is applied. Output will return to commanded position after this calibration process.

SETTING THE INPUT SIGNAL JUMPERS:

Refer to the input signal range and offset jumper settings shown in the diagram on page 1.

Voltage Input:

Connect the “+” or positive wire to the “UP/A+” terminal. Connect the common to the “24V-” terminal. Apply a voltage from control source. Measure the voltage at the input terminals. If the commanded voltage is not present, remove the “+” or positive wire and measure from + wire to the “24V-” terminal. If no voltage is measured, check wiring from controller. If voltage disappears or is reduced when connected to the AFP. Confirm input jumper is set to voltage mode and remove input wires. Remove power from unit and measure the resistance from “Vout+” to “24V-” terminals. Resistance in the voltage modes will be around 10K Ohms and

greater. If input is shorted contact tech support at ACI. If not shorted remove the controller input common and connect power only to AFP. NOTE: Place meter in voltage mode and measure VAC and VDC from analog input common wire to power supply common. If any voltage is measured in DC or AC a ground loop most likely exists. Use a separate 24V transformer for the AFP and let common float.

Current Input:

Confirm the input jumper is in the 20mA mode. Measured input resistance is around 250 Ohms. Connect "+" or positive wire to "UP/A+" and input "-" or common to "24V-". Apply mA signal. Place meter in voltage and measure voltage across "UP/A+" and "24V-". 4mA is equal to 1 volt and 20mA is equal to 5 volts. Use Ohms Law to find voltage from current. Current x 250 Ohms = Volts.

Sample: 12mA (or 0.012) x 250 Ohms = 3 Volts. If no voltage is present, check wiring for open. Current cannot exist without voltage present unless the input is dead shorted. If problem still persist see the "Note" in voltage section.

TESTING THE OUTPUT:

Note: Output is contact closure only.

Placing J4 or J5 in the H position will close the corresponding contacts or the output. Never place both at the same time. Confirm the resistance operation of meter and connect meter only to the corresponding output terminal. "G" terminal is common for both. Resistance can be measured now. A "dead" or "near dead" short should be measured when the output has been placed in the "H" position. Confirm the appropriate LED is lit. Contact tech support if the output is not functioning.

TEST PROCEDURE (Version 1, 2, 3, 5, & 6):

Set the input jumpers to the required input signal settings. Set all the output switches to OFF. Place jumper J6 CD/CE in the center position or remove (do not discard or lose jumper). With power and input only connected, ramp input signal from 0 to 100% or in steps of 20%.

Y2 will turn on from 25 – 49% of set range. Y1 will turn on and Y2 will turn off from 50 – 73% of set range. Both relays will be on at 74% or greater. This test confirms the unit is functional and operating correctly. Reset timing switches to desired range and J6 to the CD position. Reconnect input and output connections and retry application. Contact tech support if application problems still exist.

TEST PROCEDURE (Version 4 ONLY):

Set the input jumpers to the required input signal settings. Set all the output switches to OFF. Place jumper J6 CD/CE in the center position or remove (do not discard or lose jumper). With power and input only connected, ramp input signal from 0 to 100% or in steps of 20%.

Both relays will be on at 0-25%. Y1 will turn on from 25 – 49% of set range. Y2 will turn on and Y1 will turn off from 50 – 73% of set range. Both relays will be off at 74% or greater. This test confirms the unit is functional and operating correctly. Reset timing switches to desired range and J6 to the CD position. Reconnect input and output connections and retry application. Contact tech support if application problems still exist.

<p>Power Supply Voltage: 24 VDC or 24 VAC ± 10%, 50/60 Hz</p> <p>Power Consumption: 105mA maximum without auxiliary DC use 190mA maximum with auxiliary DC use</p> <p>Analog Inputs (Jumper Selectable): 0-5 VDC, 0-10 VDC, 0-15 VDC, 0-20mA</p> <p>Input Impedance (Nominal): Voltage / 10,000 Ohms Current / 250 Ohms</p> <p>Output: Floating Point: Two relay contact outputs (Increase/Decrease)</p> <p>Regulated Power Output (for user): 24 VDC, 48mA maximum</p>	<p>Rates of Change (DIP switch selectable): Version 1 – 30, 60, or 90 seconds Version 2 – 120, 150, or 180 seconds Version 3 – 14, 16.5, or 19 seconds Version 4 – 30, 60, or 90 seconds (but relay stays on at minimum and maximum position) Version 5 – 90, 135, or 180 seconds (see page 1 chart) Version 6 – 18, 75, or 360 seconds</p> <p>Relay Contacts: Type: Form C, Gold-clad silver Rating: 2 Amp maximum resistive @ 24V Electrical Life: 100,000 operations</p>
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