INTERFACE SERIES

Installation & Operation Instructions

AFP

Phone: 1-888-967-5224
Website: workaci.com

GENERAL INFORMATION

The AFP allows an analog (voltage or current) signal to control a floating point actuator. It converts an analog signal into two relay contact outputs (one increase/one decrease). The isolated floating point output can be controlled by any one of nine analog input signal ranges (using an offset jumper). Upon power-up, the decrease relay will drive 100% of the chosen timing range to ensure that the output is at its minimum position. On a loss of power, the output relays will be open and no signal will be generated. The actuator will remain at the last commanded position unless it has "spring return". The AFP output rate of change (sixteen ranges, in eight versions) is DIP switch selectable.

MOUNTING INFORMATION

Circuit board may be mounted in any position. If circuit board slides out of snap track, a non-conductive "stop" may be required. Use only fingers to remove board from snap track. Slide out of snap track or push against side of snap track and lift that side of the circuit board to remove. Do not flex board. Use no tools.

WIRING INSTRUCTIONS

PRECAUTIONS

- **Remove power before wiring. Never connect or disconnect wiring with power applied.**
- **When using a shielded cable, ground the shield only at the controller end. Grounding both ends can cause a ground loop.**
- **It is recommended you use an isolated UL-listed class 2 transformer when powering the unit with 24 VAC. Failure to wire the devices with the correct polarity when sharing transformers may result in damage to any device powered by the shared transformer.**
- **If the 24 VDC or 24VAC power is shared with devices that have coils such as relays, solenoids, or other inductors, each coil must have an MOV, DC/AC Transorb, Transient Voltage Suppressor (ACI Part: 142583), or diode placed across the coil or inductor. The cathode, or banded side of the DC Transorb or diode, connects to the positive side of the power supply. Without these snubbers, coils produce very large voltage spikes when de-energizing that can cause malfunction or destruction of electronic circuits.**
- **All wiring must comply with all local and National Electric Codes.**

FIGURE 1: DIMENSIONS

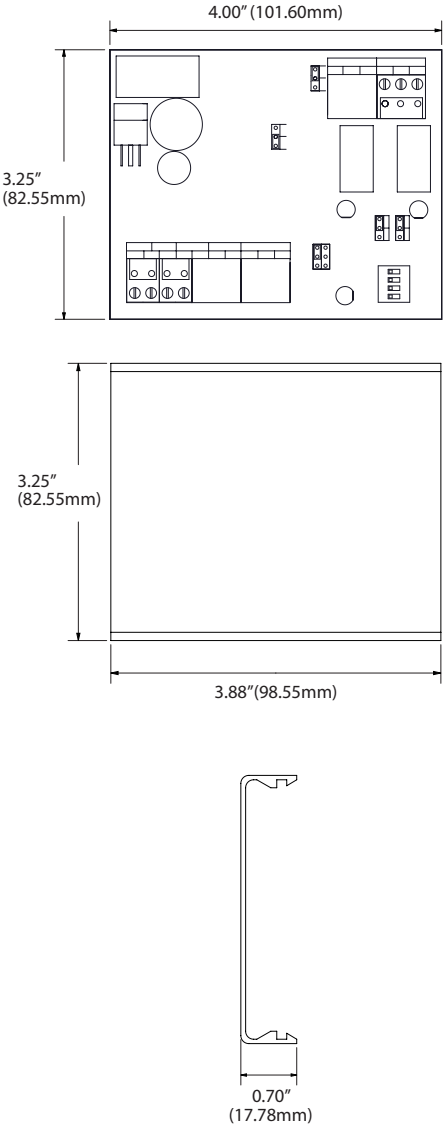

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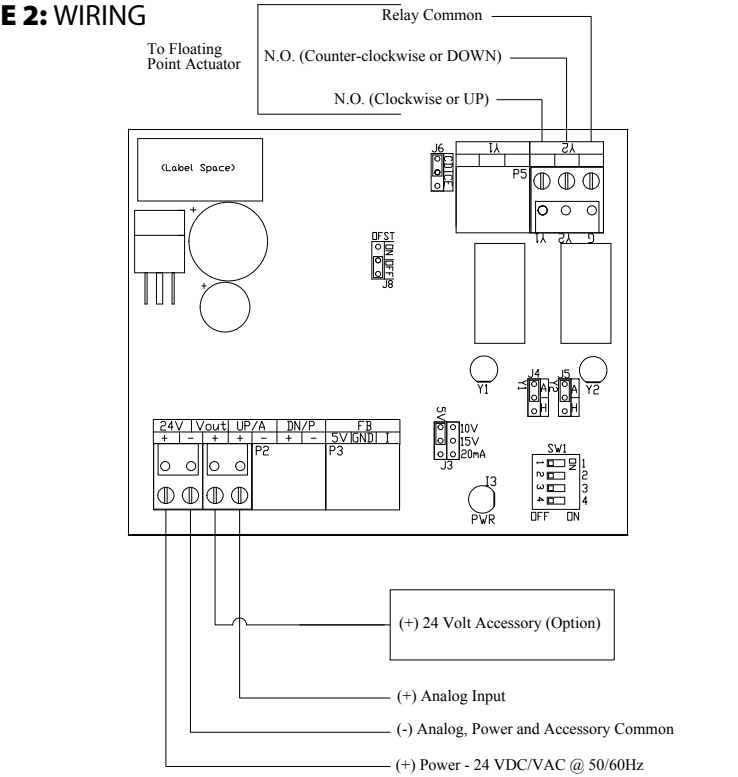
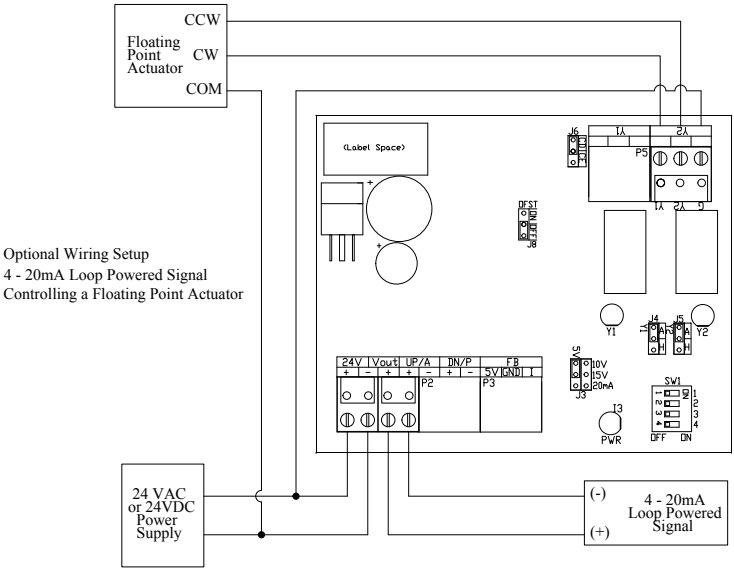
FIGURE 2: WIRING





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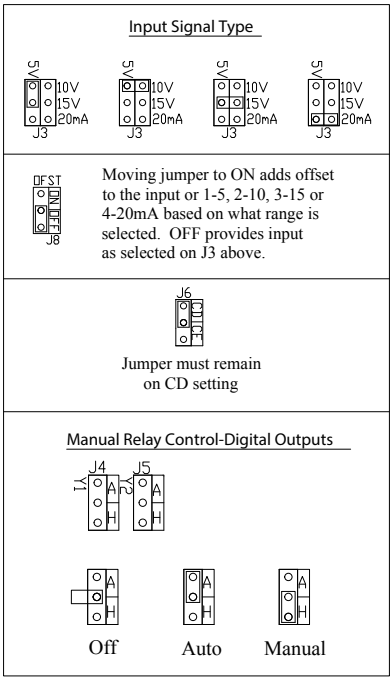
SETUP

Analog input signal ranges are jumper selectable by using Jumper J3, see **Figure 3**. 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 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.

FIGURE 3: JUMPER SETTINGS



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, 105% up on Version 7). 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.

Version #1 - Program AFP_0101.hex 30, 60, or 90 seconds				
Switch (SW1)	1	2	3	4
30 sec.	-	-	Off	On
60 sec.	-	-	Off	Off
90 sec.	-	-	On	Off
Version #2 - Program AFP_0201.hex 120, 150 or 180 seconds				
Switch (SW1)	1	2	3	4
120 sec.	-	-	Off	On
150 sec.	-	-	Off	Off
180 sec.	-	-	On	Off
Drives actuator 200% of range if power is reapplied				
Version #3 - Program AFP_0301.hex 14, 16.5 or 19 seconds				
Switch (SW1)	1	2	3	4
14 sec.	-	-	Off	On
16.5 sec.	-	-	Off	Off
19 sec.	-	-	On	Off
Version #4 - Program AFP_0401.hex 30, 60, or 90 seconds				
Switch (SW1)	1	2	3	4
30 sec.	-	-	Off	On
60 sec.	-	-	Off	Off
90 sec.	-	-	On	Off
Relay stays on at Min. & Max. voltage				
Version #5 - Program AFP_0501.hex 90, 135, or 180 seconds				
Switch (SW1)	1	2	3	4
90 sec.	-	-	Off	On
135 sec.	-	-	Off	Off
180 sec.	-	-	On	Off
Relay stays on with 5% of Max. or Min. input voltage. No overshoot on Max. or Min. input voltage				
Version #6 - Program AFP_0601.hex 18, 75, or 360 seconds				
Switch (SW1)	1	2	3	4
18 sec.	-	-	Off	On
75 sec.	-	-	Off	Off
360 sec.	-	-	On	Off
Version #7 - Program AFP_0701.hex 30, 60, or 90 seconds				
Switch (SW1)	1	2	3	4
30 sec.	-	-	Off	On
60 sec.	-	-	Off	Off
90 sec.	-	-	On	Off
Drives actuator 105% up if power is reapplied				
Version #8- Program AFP_0801.hex 46, 240, or 600 seconds				
Switch (SW1)	1	2	3	4
46 sec.	-	-	Off	On
240 sec.	-	-	Off	Off
600 sec.	-	-	On	Off

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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.

TROUBLESHOOTING & 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, 105% up on Ver 7) 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.

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 it lit. Contact tech support if the output is not functioning.

TEST PROCEDURE (Version 1, 2, 3, 5, 6, 7 & 8)

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.

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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.

Example: 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.

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PRODUCT SPECIFICATIONS

SENSOR NON-SPECIFIC INFORMATION	
Supply Voltage:	24 VAC or 24 VDC, (+/- 10%), 50/60 Hz
Supply Current:	105 mA maximum without 24 VDC auxiliary output 190 mA maximum with 24 VDC auxiliary output
Input Voltage Signal Range:	0-5 VDC, 0-10 VDC, 0-15 VDC
Input Current Signal Range:	0-20 mA
Analog Voltage Signal Input Range with Offset Jumper:	1-5 VDC, 2-10 VDC, 3-15 VDC
Analog Current Signal Input Range with Offset Jumper:	4-20 mA
Input Impedances (Nominal):	Voltage @ 10,000Ω Nominal / Current @ 250Ω nominal
Output (Floating Point):	Two relay contact outputs (Increase / Decrease)
Relay Contact Rating:	Dry Contact, Form C, 2A maximum @ 24 VDC
Relay Electrical Life:	100,000 operations minimum
Relay Mechanical Life:	1,000,000 operation
Connections:	90° Pluggable Screw Terminal Blocks
Wire Size:	16 (1.31 mm²) to 26 AWG (0.129 mm²)
Terminal Block Torque Rating:	0.5 Nm (Minimum); 0.6 Nm (Maximum)
Operating Temperature Range:	35 to 120°F (1.7 to 48.9°C)
Operating Humidity Range:	10 to 95% non-condensing
Storage Temperature:	-20 to 150°F (-28.9 to 65.5°C)
Snaptrack Material:	Polyvinyl Chloride (PVC)

WARRANTY

The ACI AFP Series is covered by ACI's Two (2) Year Limited Warranty, which is located in the front of ACI'S SENSORS & TRANSMITTERS CATALOG or can be found on ACI's website: www.workaci.com.

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