

Preferred Instruments

31-35 South St. Danbury, CT 06810
203-743-6741 www.preferredinstruments.com

UMP-xxx-FS Series 4-20mA Proportional Rotary Actuator Instruction Manual

General

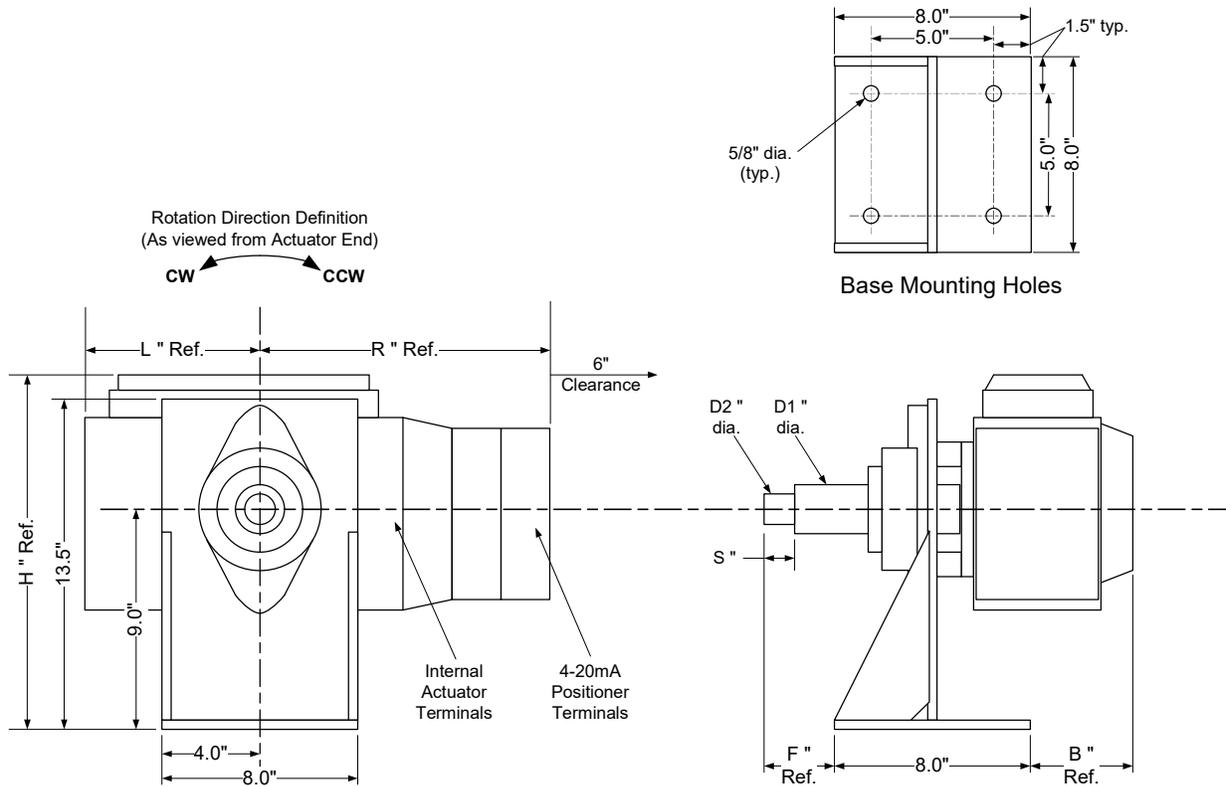
The UMP-xxx-FS is a 120 Vac rotary actuator with a 4-20mA input Positioner, 4-20mA feedback output, (2) auxiliary position switches, and an integral floor stand mount.

Ratings

Torque: See Table 1
Stroke: 90 degrees with mechanical end stops.
Power: 120 Vac, 60 Hz, 1 ph., Amps: See Table 1
Input: 4-20mA
Output: 4-20mA position feedback, internally powered, 600 ohm max load
Aux Switches: (2) Open and Closed, adjustable, 120Vac/10A
Environment: Nema 12, 32-122F (0-50C)

Table 1 Dimensions and Ratings

Model	Torque	Amps	H	L	R	F	B	D1	D2	S
UMP-072-FS	72 ft-lb	0.7	14.5"	4"	8.2"	1.9"	2.3"	1.188"	1.00"	1.25"
UMP-140-FS	140 ft-lb	1.1	14.5"	4.9"	9.1"	2.9"	2.7"	1.188"	1.5"	1.25"
UMP-280-FS	280 ft-lb	1.8	14.5"	4.9"	9.1"	2.9"	2.7"	1.188"	1.5"	1.25"
UMP-430-FS	430 ft-lb	1.9	14.5"	3.2"	11.9"	2.9"	3.9"	2.00"	2.0"	1.25"
UMP-720-FS	720 ft-lb	3.4	14.5"	3.2"	11.9"	2.9"	3.9"	2.00"	2.0"	1.25"



UMP-xxx-FS Dimensions

Installation

Mount in an indoor location that will not be exposed to excessive vibration or hose-down water sprays.

Mounting

Use all 4 mounting holes to securely attach the UM-xxx-FS to a rigid foundation. Due to the high forces generated by this actuator, ensure that the lever arm and linkage used is strong enough for the attached load.

WARNING

The actuator output shaft can move unexpectedly.

Keeps hands, arms, legs, feet, head, etc... away from moving parts at all times.
Before applying power, disconnect the lever arm and linkage to prevent injury, or damage, when the actuator moves.

Wiring

Connect 120Vac to the "AC HOT" and "AC NEU" terminal on the positioner board. Connect the safety ground to the UMP-xxx-FS green wire.

Provide a local 120Vac power disconnect to prevent injury or damage during Setup, maintenance, and repairs.

Connect a powered 4-20mA position command signal to the positioner terminals:
 INPUT 4-20+ and 4-20-.

Optionally, connect the position feedback OUTPUT 4-20+ and 4-20- positioner terminals to the control system in order to monitor the UM-430 operation. The Output 4-20mA loop is powered by the positioner board's internal 24 Vdc supply.

Note: The Input 4-20- and Output 4-20- terminals are connected inside the positioner board.

Auxiliary position switches wire color code:
 Red: Common for both switches.
 Brown: Switch makes near full CCW.
 Yellow: Switch makes near full CW.

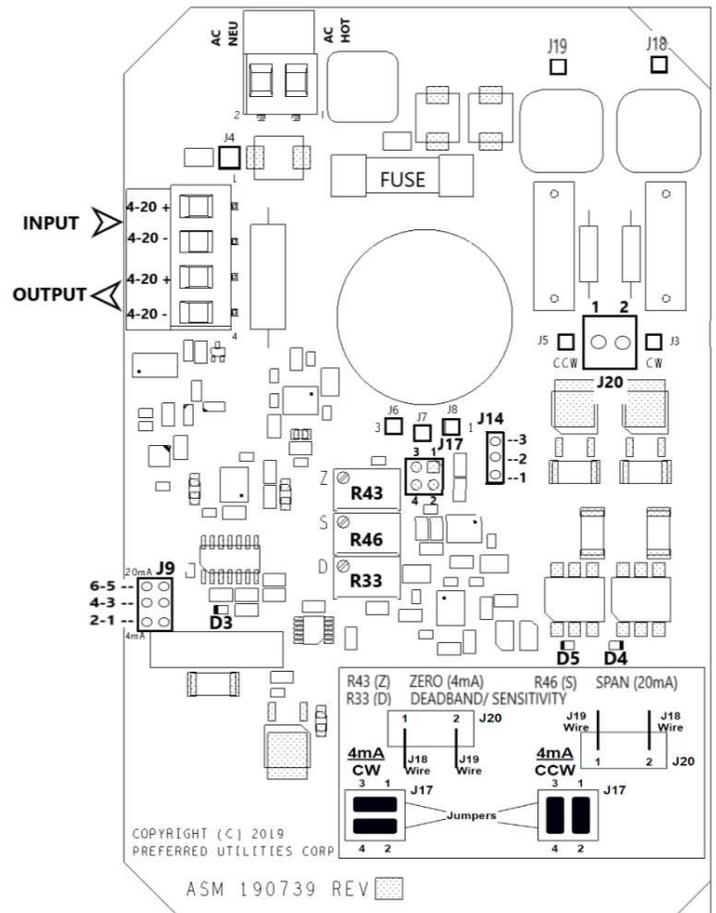
See the dimension drawing for the definition of the CW and CCW directions.

4mA Rotation Direction

The 4mA rotation direction is noted on the label inside the positioner. See the dimension drawing on page 1 for the definition of the CW and CCW directions.

The 4mA rotation direction was established during order entry and is determined by the orientation of the jumpers on J17 and the connector on J20.

If the UMP was ordered with the wrong rotation direction:
 See 'Changing 4mA Rotation' below.



4mA ROTATION = _____ (CW or CCW)

JUMPER = J14 (IF FEEDBACK POT WIPER FAILS)
 1-2 = DRIVE TOWARDS 4mA
 2-3 = DRIVE TOWARDS 20mA

JUMPER = J19 (IF INPUT SIGNAL FAILS)
 1-2 = DRIVE TOWARDS 4mA
 3-4 = DO NOT MOVE
 5-6 = DRIVE TOWARDS 20mA

LED LIGHTS

D3 = INPUT LOSS
 D4 = DRIVE TOWARDS 20mA
 D5 = DRIVE TOWARDS 4mA

FUSE = 3.15A 250VAC SLO-BLO 5x20MM

Setup

Before powering the UMP-xxx-FS, verify the 4mA rotation direction, and then set the jumpers (J9 & J14) to the desired operating modes.

J9 Loss of Input Signal Failure Mode:

This jumper determines what the actuator does when the Input signal drops below ~2mA.
LED "D3" turns ON when the Input signal is low (or open).

The actuator automatically resumes normal operation when the Input signal increases above ~2mA.

- Drive toward 4mA direction: Jumper 1-2
- Stop, Do not Move: Jumper 3-4
- Drive toward 20mA direction: Jumper 5-6

J14 Bad Feedback Pot Wiper Failure Mode:

This jumper determines what the actuator does when the Feedback Pot Wiper is open circuit (dirty or bad pot).

- Drive toward 4mA direction: Jumper 1-2
- Drive toward 20mA direction: Jumper 2-3

Verify the 4mA Rotation Direction:

- Before applying 120 Vac power: Disconnect the lever arm and linkage to prevent injury, or damage, when the actuator moves.
- Disconnect the Input 4-20+ field wire.
- Set J9 to the 3-4 position (Stop When Input Signal is Lost).
- Apply 120Vac to the positioner. Actuator should not move until J9 is moved.
- Move J9 to the 1-2 position (actuator will move in the "4mA" direction).
- Verify that the actuator output shaft moves in the direction indicated on the Positioner label.
- If desired, Move J9 to 5-6 position to move the actuator in the 20mA direction.
- To Stop the actuator mid-stroke: Disconnect 120Vac power or Set J9 to the 3-4 position.
 - Note: Actuator will move when jumper is not connected to any J9 pins
- Disconnect 120Vac and then re-connect the Input 4-20+ field wire.
- If the 4mA Rotation Direction is incorrect, see "Changing 4mA Rotation Direction" below.

Changing 4mA Rotation Direction

- Disconnect the 120Vac power.
- Unscrew the positioner cover from the actuator in order to expose the positioner board.
- Change the jumpers and plug described below to suit the desired 4mA Rotation Direction:

CW = 4mA		CCW = 4mA	
J18	PIN 1 (J20)	J18	PIN 2 (J20)
J19	PIN 2 (J20)	J19	PIN 1 (J20)
J17	1-3 & 2-4	J17	1-2 & 3-4

4mA = CW



4mA = CCW



- Ensure both orientations for J17 and J20 are in the correct and matching positions for the actuator to operate properly.
- **You must re-calibrate the 4-20mA Feedback Output (described on Pg.4) before putting the actuator into service.**

Setting the Auxiliary Switches

The Aux switches are located underneath the cover that displays the OPEN – CLOSE disk indicator. There are (4) limit switches. The upper 2 switches are the Auxiliary Switches. Adjust the Upper Cam for the desired trip points.

NOTE: The bottom 2 switches are the End of Travel switches. These are factory set for the maximum 90-degree stroke. The actuator has mechanical stops just outside this range. If the bottom two End of Travel Switch cams are mis-adjusted in the field, this can cause permanent actuator damage.

Calibrating the 4-20mA Feedback Output / Changing the Stroke

Trim pots R43 and R46 calibrate the 4-20mA feedback signal based on the actuator's shaft position. These trim pots do NOT affect the 4-20mA Input signal. During operation, the Input signal is compared against the 4-20mA feedback signal. Therefore, the 4-20mA feedback output calibration determines actuator positions when the Input signal varies from 4 to 20mA.

This procedure can be used to reduce the stroke to less than 90 degrees. The stroke can not exceed 90 degrees due to the mechanical stops in the actuator.

Procedure:

1. Disconnect the lever arm and linkage to prevent injury, or damage, when the actuator moves.
2. Disconnect the Input 4-20 "+" field wire.
3. Set J9 to the 3-4 position (Stop When Input Signal is Lost).
4. Apply 120VAC to the positioner. Actuator should not move until J9 is moved.
5. Move J9 to 5-6 position to move the actuator in the 20mA direction.
6. Stop the actuator when it is at the desired "20mA" calibration position (typically where the limit switch stops the actuator).
7. Adjust R46 until the Output 4-20mA measures 20.00mA.
8. Move J9 to the 1-2 position (actuator will move in the "4mA" direction).
9. Stop the actuator when it is at the desired "4mA" calibration position (typically where the limit switch stops the actuator).
10. Adjust R43 until the Output 4-20mA measures 4.00mA.
11. Repeat steps 5-10 several times until both are correct.
12. Reconnect the input wiring, lever arm and linkage.
13. Slowly move the actuator from the 4mA to the 20 mA positions and watch for any interferences or binding. Ensure that the actuator is not driving the linkage into a hard stop at either end of travel.

Adjust the Sensitivity/Deadband Trimpot (R33)

Trimpot R33 adjusts the positioner sensitivity/deadband. If the positioner is too sensitive, the actuator can hunt back and forth excessively near the desired position. If the positioner is not sensitive enough, the actuator will stop short on either side of the desired position.

R33 should be adjusted with the servo connected to the valve, damper, etc.... because this resistance allows for a tighter sensitivity setting. Test by varying the Input command from above and below the same target signal value. If the actuator hunts, decrease the sensitivity. If the actuator stops to far away from the desired position, increase the sensitivity.

Turn R33 CCW to increase sensitivity. Turn R33 CW to decrease sensitivity.

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