

MCx-xxxDC-10.31

(12-24 VDC; TTL Control for Multi-Turn Valves)

USER MANUAL

Contents

| | |
|-------------------------------|-----------|
| INSTALLATION | 2 |
| Mounting | 2 |
| Wiring | 2 |
| Power Supply and Current Draw | 3 |
| Control Signal and Feedback | 3 |
| OPERATION | 4 |
| DIP Switches | 4 |
| Functionality | 5 |
| Calibration | 6 |
| Troubleshooting | 6 |
| ACTUATOR DIMENSIONS | 7 |
| PART NUMBER BREAKDOWN | 9 |
| LABEL BREAKDOWN | 10 |

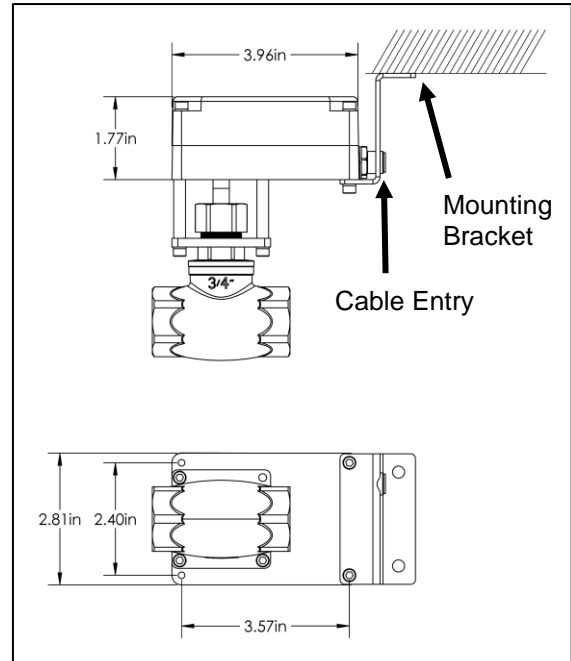


INSTALLATION

Mounting

In most cases, the actuator must be mounted and supported as shown in the image to the right. The mounting bracket is not supplied by Hanbay.

Exceptionally, the actuator may be suspended on the tubing itself but ONLY if the application is vibration free and the tubing is minimum 1/4" dia. stainless.



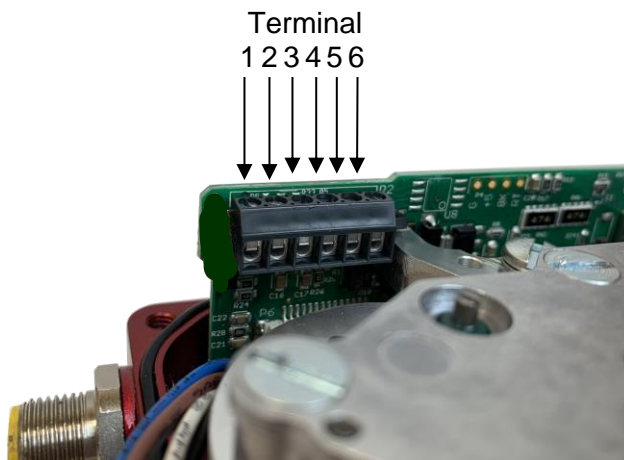
Wiring

The actuator comes standard with a Turck 6 position connector and a 20' cable with plug. Cut the cable to the length required and then connect according to the following wire color schematic:

Wire colour schematic for "Turck6" cable:

| Pin | Colour | Function |
|-----|--------|-------------|
| 6 | White | +24 VDC |
| 5 | Black | Power gnd. |
| 4 | Pink | Output TTL2 |
| 3 | Grey | Output TTL1 |
| 2 | Blue | Input TTL2 |
| 1 | Brown | Input TTL1 |

If the Turck cable is not included in your actuator, connect the wires to the corresponding pins on the terminal block as indicated in the schematic:



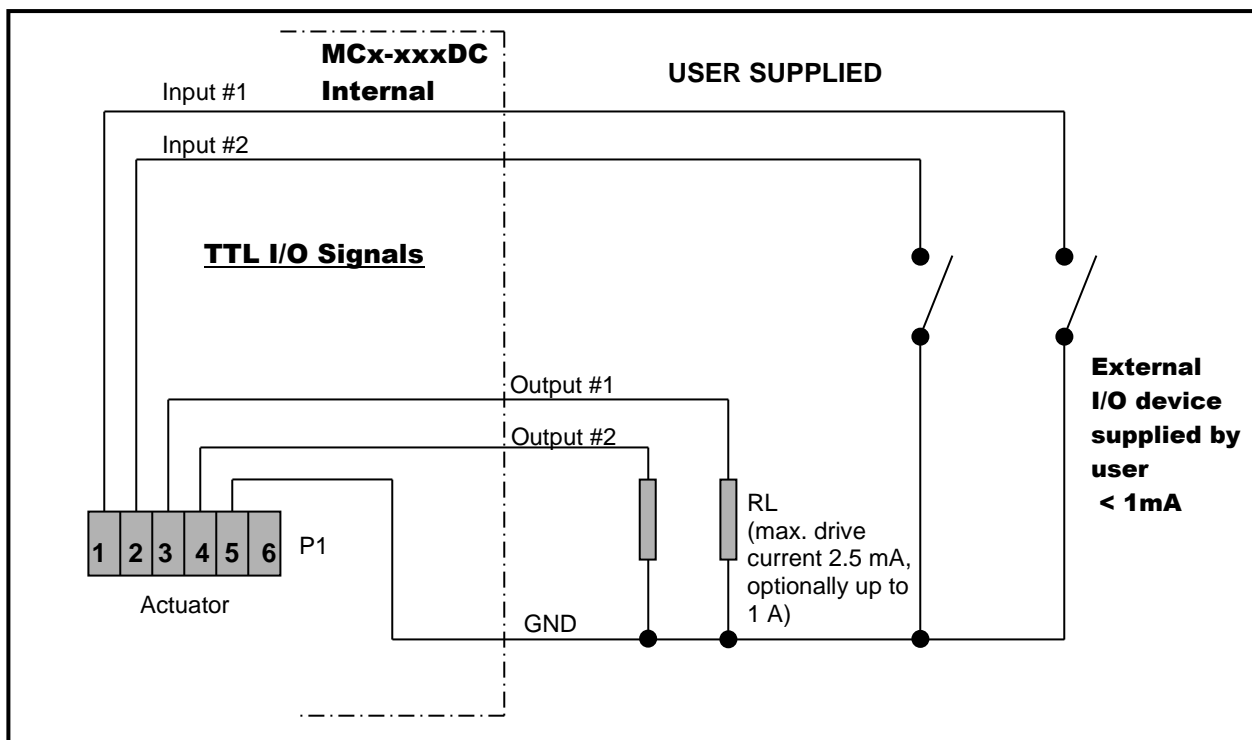
Power Supply and Current Draw

The **MCx-xxxDC** may be connected to voltages ranging within 12-24 VDC.

The current draw will range from minimum 100 mA to maximum 3 A while the actuator is active. When not moving, the actuator draws approx. 50 mA.

Control Signal and Feedback

Locate the correct connection terminals/wires, as shown on the previous page, then connect your input signal on positions 1 and 2 (brown and blue wires) as shown below. Feedback is connected to positions 3 and 4 (grey and pink wires).

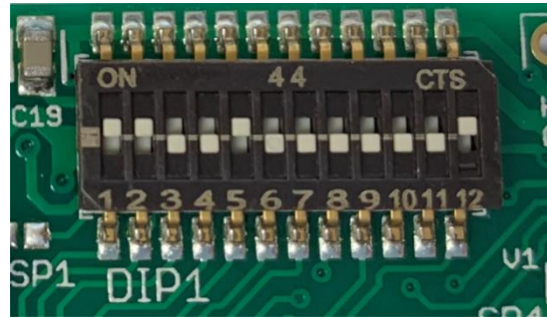


OPERATION

DIP Switches

The DIP switches allow you to change the settings on your actuator. To flip a switch, gently use a small flat-head screwdriver.

See the table below for DIP switch functionality.



In this example DIPs 1, 2, 5 and 12 are on.

| DIP 1 | DIP 2 | Description | Recommended Use |
|-------|-------|------------------|--------------------------------|
| Off | Off | Fastest settling | Use only for low torque valves |
| Off | On | Medium-fast | Typical setting |
| On | Off | Medium-slow | Typical setting |
| On | On | Slowest settling | Use for high torque valves |

DIP switches 1 and 2 set the actuator position control parameters. High settling speed settings are suitable for fast positioning of light valves. Longer settling times will allow heavier valves to reach their target positions; trying to use a fast settling setting on a high torque valve will increase current consumption when holding position, and cause heating of the motor.

| DIP 10 | DIP 11 | Torque description | Approximate stall current (A) | Approximate stall torque (in-lbs) | | | |
|--------|--------|--------------------|-------------------------------|-----------------------------------|-----------|-----------|-----------|
| | | | | MCL-xxxDC | MCM-xxxDC | MCH-xxxDC | MCF-xxxDC |
| Off | Off | Low | 1.0 | 63 | 212 | 430 | 715 |
| Off | On | Medium-low | 1.5 | 72 | 236 | 522 | 832 |
| On | Off | Medium-high | 2.0 | 77 | 243 | 525 | 949 |
| On | On | High | 3.0 | 83 | 247 | 532 | 1067 |

DIP switches 10 and 11 set the actuator torque. These settings are adapted to the valve at the factory. Worn-in valves may require a higher torque setting after some time. The actuator will use 100% of available torque to try and reach maximum speed.



Note: Medium-high and high settings require voltage supply minimum values as follows:

- Supply voltage needs to be min 14 VDC for medium-high
- Supply voltage needs to be 16 VDC for high
- When operating above 20 VDC and 66% power, Duty cycle is reduced to 50% - 25% maximum. At these levels, the electronics produce more heat which must be dissipated (depending on environmental temperature)

| | |
|-----------------|--|
| DIPs 3-8 | Reserved for custom functions. |
| DIP 9 | Run / Calibrate Putting DIP 9 into the off position will disable the actuator positioning control, and the motor will not move regardless of the input signals. When DIP 9 is moved back into the on position, the actuator will perform its homing routine, and then move to the position commanded by the input signals. |
| DIP 12 | DIP 12 sets the direction of rotation |

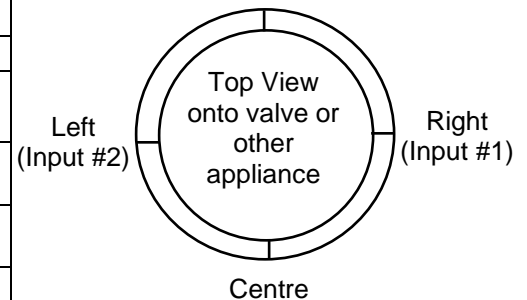
Functionality

The MCx-xxxDC operates as a continuous TTL. It can open or close to end positions, or move to the centre position.

Note that inputs 1 & 2 (pins 1 & 2) are HIGH by default – a LOW signal must be sent to change the value. Sending a HIGH signal may be harmful to the internal circuit board.

Continuous TTL opening and closing function

| Input #1 (Pin 1) | Input #2 (Pin 2) | Action taken |
|--|----------------------|---|
| Low | High | Moves in clockwise [closes the valve] |
| High | Low | Moves in counterclockwise [opens the valve] |
| Low | Low | Moves to midway point between fully open and fully closed |
| High | High | Does not move |
| The feedback of the MCx-xxxDC is as follows | | |
| Output #1 (Pin 3) | Output #2 (Pin 4) | Meaning High = 4.5 VDC Low = 0.8 VDC |
| High | High | Actuator is standing still or moving in its range |
| High | Low | Actuator has stopped moving because the valve is fully closed |
| Low | High | Actuator has stopped moving because the valve is fully open |
| Low | Low | Actuator has stopped moving because the valve is at the midway point |



Direction of rotation and using input 1

To change the direction of rotation on the actuator change the setting on DIP 12 and cycle power to the actuator.

Calibration

The center position calibration routine can be initiated by switching DIP 9 momentarily “off” then “on”. This will cause the actuator to go through a series of movements to determine the fully open and fully closed positions of the valve. This function should be used if the valve was decoupled from the actuator or if the actuator was turned manually while the power was off.

Troubleshooting

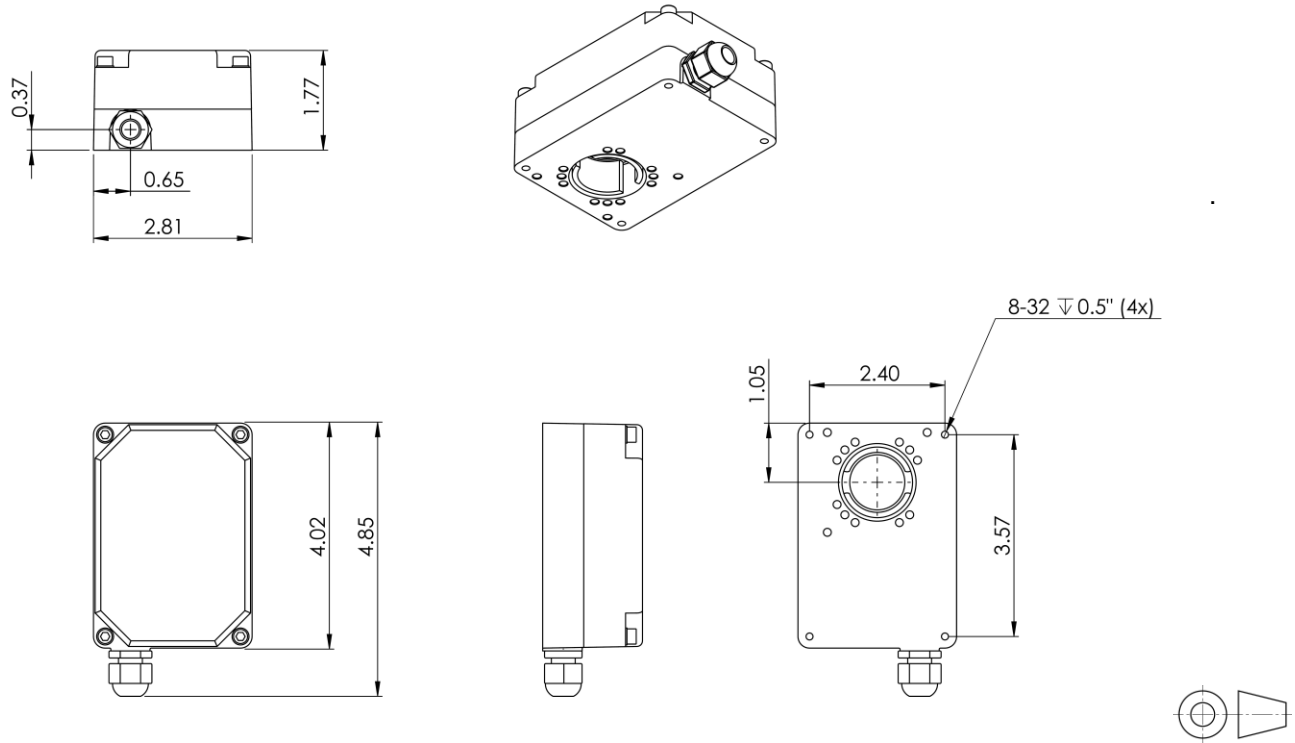
Upon noticing a problem, your first step should almost always be to recalibrate the actuator by toggling DIP 9 while the actuator is powered. This alone can solve basic problems.

If the actuator does not move, try following these steps:

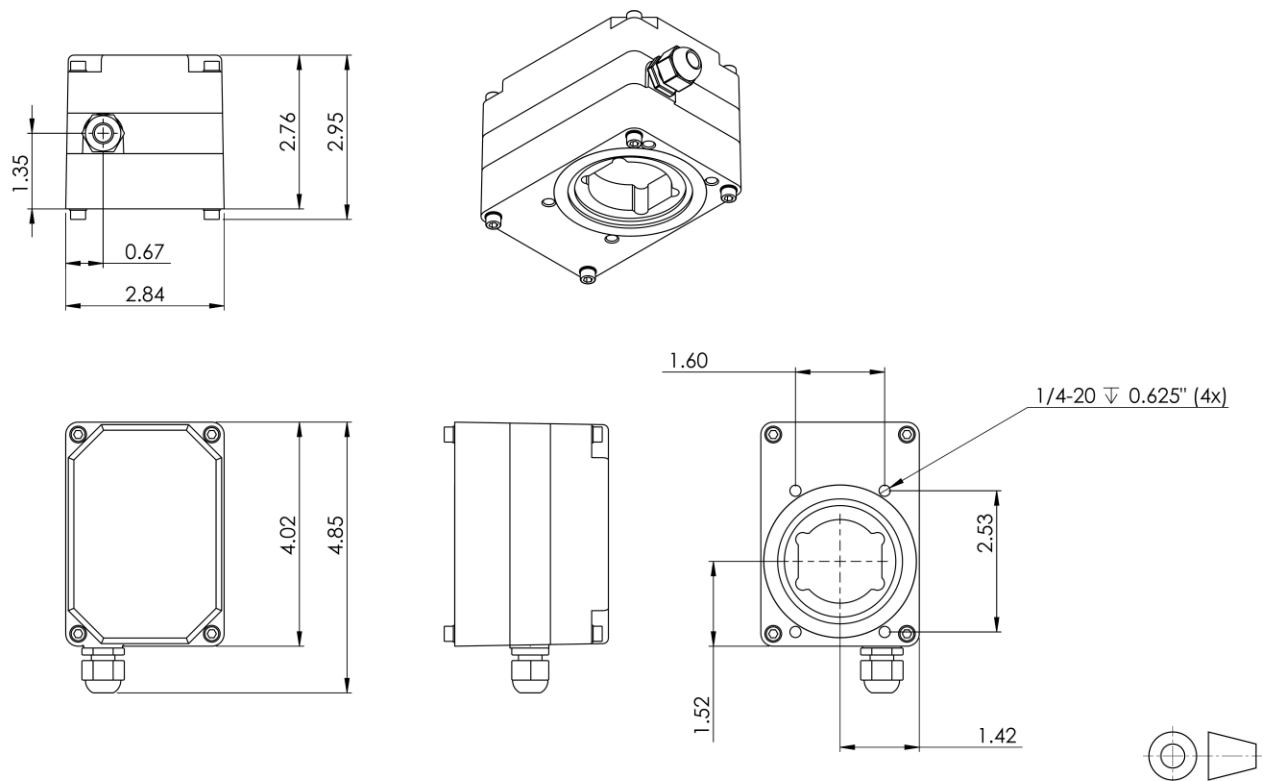
- 1) Re-calibrate the actuator. This will move the actuator regardless of what signal it is receiving.
- 2) A sticking valve may be the problem. Remove the valve from the actuator, and re-test the actuator.
- 3) Remove power. Re-check the wiring and the power/signal apparatus. Power actuator, and re-calibrate. If the problem persists, please call Hanbay for technical support.

ACTUATOR DIMENSIONS

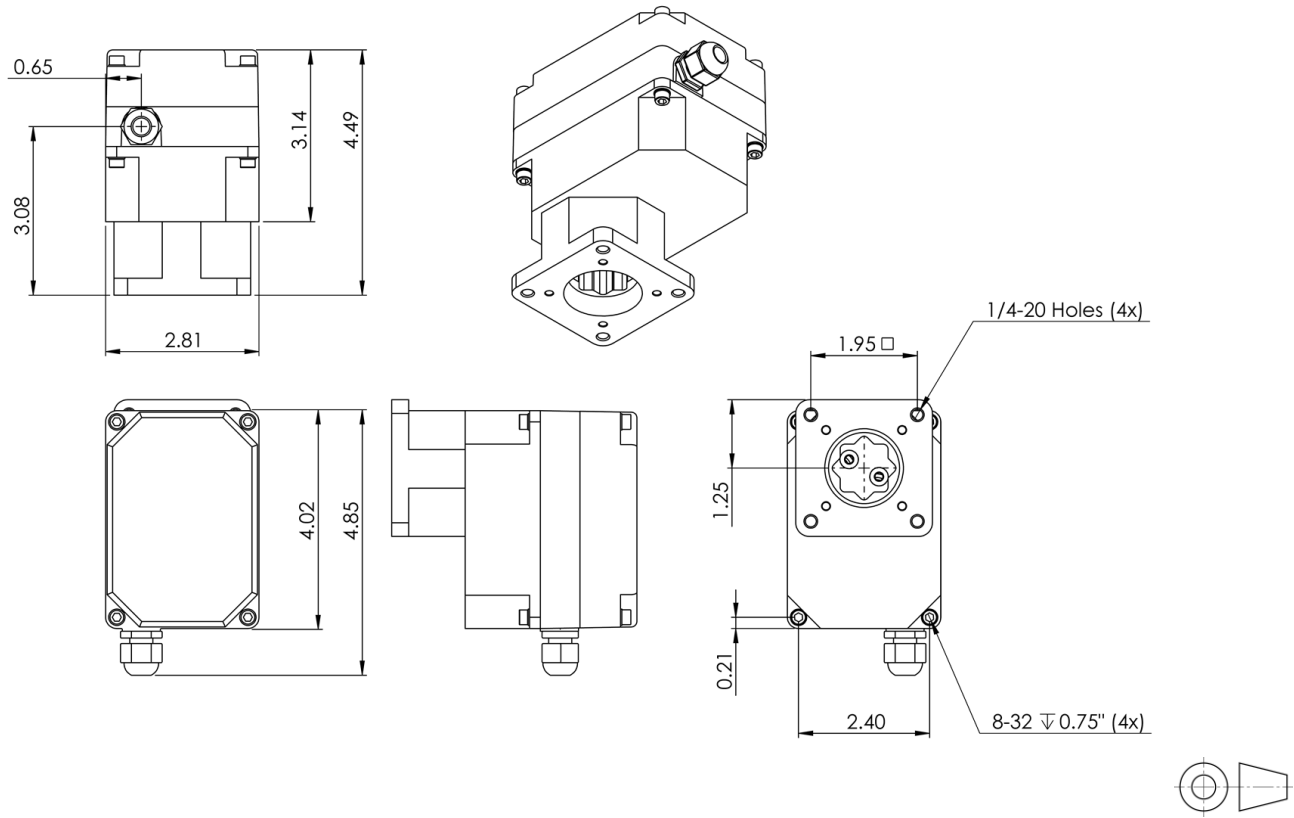
MCJ, MCL & MCM -xxxDC models



MCH-xxxDC models



MCF-xxxDC models



PART NUMBER BREAKDOWN

Full Hanbay Part Number: **M** **C** - - **DC** - -

| | Base Enclosure | Continuous or Discrete | Gear Train | Special Options | Enclosure Options | Wiring | Thermal Management | PCB | Mounting Kit | Valve Part Number |
|-----------|--|------------------------|------------|-----------------|-------------------|--------|--------------------|-----|--------------|------------------------------------|
| M | | | - | - | | | | | - | Valve Manufacturer's Part # / CU # |
| M | M-Series | | | | | | | | | |
| C | Continuous | | | | | | | | | |
| D | Discrete | | | | | | | | | |
| J | Extra Low Torque | | | | | | | | | |
| L | Low Torque | | | | | | | | | |
| M | Medium Torque | | | | | | | | | |
| H | High Torque (Add. Gear Stage) | | | | | | | | | |
| F | F-Gear Stage (Add. Gear Stage) | | | | | | | | | |
| AB | Analog Signal Board | | | | | | | | | |
| AI | Analog Signal Board Isolated Input | | | | | | | | | |
| AF | Analog Signal Board Isolated with Feedback | | | | | | | | | |
| DC | Continuous TTL Input Board | | | | | | | | | |
| DT | TTL Input Board with 5 V Integrated Feedback (0 or 24 V output available) | | | | | | | | | |
| AS | Modbus Control with Feedback | | | | | | | | | |
| 0 | No Option | | | | | | | | | |
| H | Internal Heater | | | | | | | | | |
| F | External Fan | | | | | | | | | |
| 0 | Cable Gland (Specify Cable & length at added cost) | | | | | | | | | |
| 4 | Custom Dual Gauge Cable, 10ft. | | | | | | | | | |
| 5 | TURCK 5 Position Connector w. 20' Cable and Plug | | | | | | | | | |
| 6 | TURCK 6 Position Connector w. 20' Cable and Plug | | | | | | | | | |
| 7 | TURCK 5 Position Connector Only | | | | | | | | | |
| 8 | TURCK 8 Position Connector w. 20' Cable and Plug (Special) | | | | | | | | | |
| 0 | Standard Red Alloy Enclosure | | | | | | | | | |
| M | Manual Override | | | | | | | | | |
| S | Stainless Steel Enclosure | | | | | | | | | |
| N | Black Alloy Enclosure | | | | | | | | | |
| 0 | No Special Options | | | | | | | | | |
| HT | High Temperature Kit | | | | | | | | | |
| B | Battery Backup | | | | | | | | | |
| G | G-Stage Gate Valve (with MCM or MCL) | | | | | | | | | |
| L1 | Linear 16 TPI | | | | | | | | | |
| L2 | Linear 8 TPI | | | | | | | | | |
| M | Manual Override (When M in Enclosure Option is not usable) | | | | | | | | | |
| AC | 110-240 VAC Power Supply | | | | | | | | | |
| BS | Bottom Stop | | | | | | | | | |

LABEL BREAKDOWN

Firmware Version

AF-1.05
 AB-1.05
 AS-1.05

MM = Multiturn
 MML = Multiturn Low Torque
 MMUL = Multiturn Extra Low Torque
 QM = Quarter turn
 QM97 = Quarter turn 97°

DT-2.01
 DC-2.01
 DT-4.06 (Obsolete since 2019)
 M-Dx V2.31

Actuator Supply Voltage

12-24 VDC @ 3.0 A or
 110-240 VAC @ 1.5 A

Circuit Board Version

Ax-8.09
 Dx-10.31
 Dx-4.10 (Obsolete since 2019)
 Px-10.3

Actuator Series

M-Series or R-Series



Actuator Part Number

Refer to part number breakdown for available options.

QR Code

Scan this QR code for a direct link to the user manual for your unit!

Actuator Serial Number

This serial number is unique for each individual unit and is directly tied to your order/invoice number.