



Safety First!

Throughout the installation phases and operation of this equipment, safety procedures take precedence over all other activities. Note:



1. Read and follow all instructions in this IOM.



2. Risk of electric shock! All wiring must be in accordance with applicable local codes, regulations and the NEC. Be aware that there may be hazardous voltages present which can shock, burn, or cause permanent injury or death.



3. Before handling electrical connections, disconnect power feeds. There may be multiple power feeds connected to this unit. Check all terminal connections carefully when servicing the actuator.



4. This is a mechanical gear train system with high torque outputs. Connected mechanical linkages can and will cause personal injury if the user encounters a pinch-point during movement.

Hazardous Location Rating

Class I, Division 1, Groups C, D T4

Class II, Division 1, Groups E, F & G T130°C

Class I, Zone 1, Ex db IIB T4 Gb (for Canada)

Class I, Zone 1, AEx db IIB T4 Gb (for US)

Class II, Zone 21, AEx tb IIIC T130°C Db (for US)

Ex tb IIIC T130°C Db (for Canada)

(Zones 20, 21 or 22 not applicable in Canada)

Handling & Storage:

1. This device is an electrically powered mechanical transmission system. It is comprised of a DC motor, an asynchronous AC motor, logic control PC boards, various discrete electronic components, and electrical storage devices, all of which are susceptible to damage from high humidity. For this reason, this device must be protected from direct contact with water and/or high humidity storage environments.

2. Protect the device from physical damage prior to and during installation.

3. If this product is installed in water valve systems and remains unpowered during construction phases, condensate will accumulate and possibly damage the product. This product MUST be powered up at all times once it is installed in active piping systems.

Installation - Hazardous Locations

1. Do NOT install in ambient temperatures exceeding 70°C/158°F

2. **DO NOT, under any circumstances, remove the actuator cover(s) while in a hazardous location with power still live inside the actuator.**

3. DO NOT install this actuator in a hazardous location that does not meet the actuator specification.

4. Mount, test and calibrate the actuator in a non-hazardous location.

5. DO NOT scratch, scar, or deform the flame path of the cover or base of the actuator. (See Fig 1)

6. Use conduit connections specifically designed to meet the hazardous location specification.

7. SEAL REQUIRED: Apply a conduit seal within 18" of the actuator enclosure for Class/Div installations.

8. SEAL REQUIRED: Apply a conduit seal within 2" of the actuator enclosure for Class/Zone installations.

Installation - General:

1. Confirm correct voltage and control before wiring and powering up this actuator.

2. This device has been permanently lubricated at time of assembly. Maintain proper lubrication level by ensuring the actuator is mounted with the top cover at or above horizontal. This device is NOT designed to mount with the top cover below horizontal.

3. Use approved conduit entry components to protect the interior of the unit from ingress of foreign materials (including water). Utilize drip loops to prevent conduit condensate from accumulating and entering the actuator through the EMT port(s).

4. Refer to the dimensional diagram (pg. 4) for proper clearance on all sides as well as the top cover clearance requirements. Determine proper access space for the manual override system.

5. When mounting this device to a valve or damper, ensure the mating between the valve stem (or coupling) is NOT deeper than the socket depth in the bottom of the actuator. Ensure bolts are of the proper length and thread during mounting. (See dimensional diagram pg. 4)

6. Ensure the actuator is concentrically mounted to the valve stem. Non-concentricity causes premature actuator or valve-stem seal failure, or actuator stalling due to high-torque during travel.

7. Use properly sized power supplies and wire gauge over distance to prevent actuator failure from stalling and overheating.

8. Refer to the wiring diagram sheet (folded and inserted under the actuator cover) for wiring connections. You can also scan the QR code above and navigate to the Max-Air website to obtain a full-size wiring diagram.

9. Do NOT parallel wire multiple on-off actuators to the same field control terminals. This WILL cause unexpected movement of the actuator(s), overheating and premature failure.

10. After installation and testing, do NOT operate the actuator with any covers removed.



11. It is recommended to operate the actuator for at least ten minutes once per month, at a minimum.

12. The internal heater is to be used in ALL applications.

This actuator has been factory calibrated to operate between 0° and 90°. Most quarter-turn products will not require recalibration of these settings.

Default Operating Mode:

This actuator leaves the factory with the following default settings: Unit is set for 90° travel, with terminal 3 as the drive CCW command, and terminal 4 as the drive CW command.

This manual is written for OCJ (Open/Close/Jog) control actuators with DC or single phase AC drive motors.

This actuator must be calibrated prior to being put into service. If this is a stand-alone actuator, follow all the steps given here after mounting the actuator to the driven device (valve, damper, or other). If this actuator has been factory mounted to the driven device, more than likely it has already been calibrated, and nothing further needs to be done.

1. The bare actuator normally ships in the full CW (Closed) position. This can be verified by observing the top-mounted flat position indicator before the top cover is removed. When in the full CW position, the color showing is RED and "CLOSE" is visible thru the window. (Fig 2)

2. Do NOT apply power at this time.

3. Set the CW end of travel cam.

- a. Use the bottom-mounted 8mm hex manual override shaft to drive the actuator out to about 15~20 degrees open, then back to the desired CLOSED (CW) position. If you have driven the device too far, you must drive back out to 15~20 degrees before again approaching the correct CW stop. You cannot set the stop when driving in a CCW direction due to cam dwell angle.
- b. Using a 2.5mm hex key on CAM #2 (Fig 3), loosen the cam setscrew and rotate the cam CCW by pulling the hex key to the RIGHT a few degrees. Lightly snug up on the setscrew until resistance is felt against the cam shaft. Pull the hex key to the LEFT SLOWLY until you hear a "click" from the associated (#2) cam switch and snug up on the cam setscrew. Do not move the actuator. Do NOT overtighten the cam setscrew.

4. Set the CW auxiliary switch.

- a. Using the 2.5mm hex key on CAM #4 (Fig 4) loosen the cam setscrew and rotate the cam CCW by pulling the hex key to the RIGHT a few degrees. Lightly snug up on the setscrew until resistance is felt against the cam shaft. Pull the hex key to the LEFT SLOWLY until you hear a "click" from the associated (#4) cam switch and continue a few more degrees in the same direction. (This assures the AUX switch trips before the actuator reaches its end of travel). Snug up on the cam setscrew.

5. Set the CCW end of travel cam.

- a. Use the bottom-mounted 8mm hex manual override shaft to drive the actuator out to about 75~80 degrees open, and then slowly to the desired FULL OPEN (CCW) position. If you have driven the device too far, you must drive back out to 75~80 degrees before again approaching the correct CCW stop. You cannot set the stop when driving in a CW direction due to cam dwell angle.
- b. Using a 2.5mm hex key on CAM #1 (Fig 5), loosen the cam setscrew and rotate the cam CW by pulling the hex key to the LEFT a few degrees. Lightly snug up on the setscrew until resistance is felt against the cam shaft. Pull the hex key to the RIGHT SLOWLY until you hear a "click" from the associated (#1) cam switch and snug up on the cam setscrew. Do not move the actuator. Do NOT overtighten the cam setscrew.

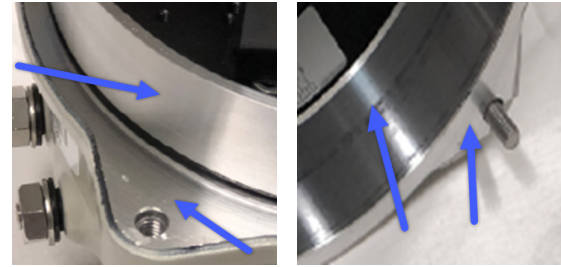


Fig 1 - Flame paths - Do NOT scratch, mar, dig or otherwise damage these surfaces!

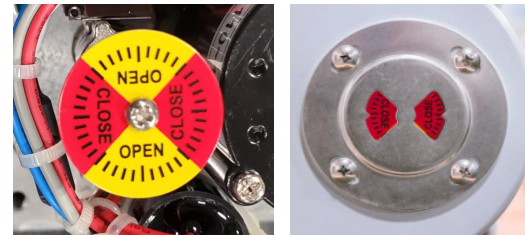


Fig 2 - Flat position indicator identifies the rotation angle of the actuator

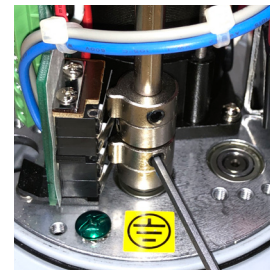


Fig 3 - CW EOT Cam adjustment

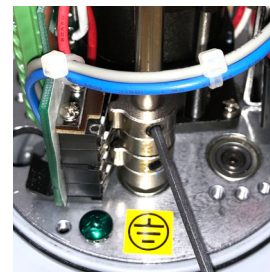


Fig 4 - CW AUX Cam adjustment



6. Set the CCW auxiliary switch.

a. Using a 2.5mm hex key on CAM #3 (Fig 6), loosen the cam setscrew and rotate the cam CW by pulling the hex key to the LEFT a few degrees. Lightly snug up on the setscrew until resistance is felt against the cam shaft. Pull the hex key to the RIGHT SLOWLY until you hear a "click" from the associated (#3) cam switch and continue a few more degrees in the same direction. (This assures the AUX switch trips before the actuator reaches its end of travel). Snug up on the cam setscrew.

7. After setting the end-of-travel cams and switches, check the operation of the actuator in response to your input signals to make sure operation is as intended. After verification that all settings are correct, generate a drive CW command to drive the actuator to its full CW position, and wait for it to stop.

This completes the calibration of the actuator.

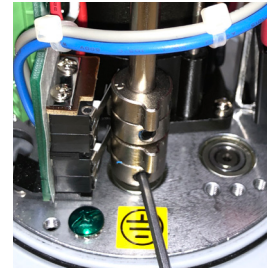


Fig 5 - CCW EOT Cam adjustment

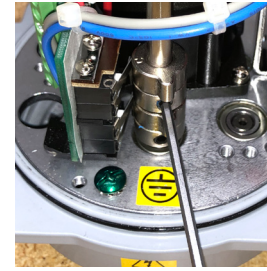
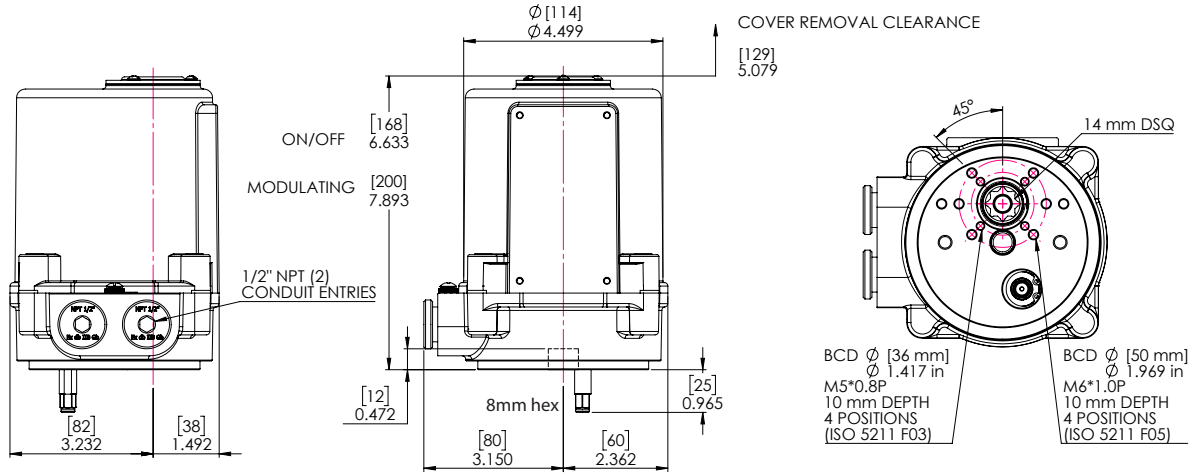


Fig 6 - CCW AUX Cam adjustment



Dimensional Drawing



Specifications

		MX A003
Supply	Torque Output (in-lb / Nm)	310 in-lbs / 35Nm
24V	Starting Current - DC Amps	2.0A
	Running Current - DC Amps	1.4A
	Speed (90°) @DC, seconds @ rated load	18 sec
	Motor, Voltage, Type, Class	24VDC 2-Pole Brush, Class F
	Motor Power	10W
	Duty Cycle	100% (EN 60034) / Class A/B/C (ISO 22153)
120V	Starting Current - AC Amps	2.0A
	Running Current - AC Amps	0.7A
	Speed (90°) @60Hz, seconds @ rated load	12 sec
	Motor, Voltage, Type, Class	120VAC Split-Phase TENV Class F
	Motor Power	10W
	Duty Cycle	100% (EN 60034) / Class A/B/C (ISO 22153)
230V	Starting Current - AC Amps	3.0A
	Running Current - AC Amps	0.4A
	Speed (90°) @60Hz, seconds @ rated load	15 sec
	Motor, Voltage, Type, Class	230VAC Split-Phase TENV Class F
	Motor Power	10W
	Duty Cycle	100% (EN 60034) / Class A/B/C (ISO 22153)
ALL	Environmental Rating	NEMA 4/4X & IP68
	Electrical Entry	1/2" EMT x 2
	Control	Open/Close/Jog, Modulating, 2 Position, 3 Position
	Auxiliary Switch - End of Travel	(2) Form C Volt-Free, Shared Common, Rated 3A @ 250vac, 0.5A @ 30VDC
	Ambient Operating Range	-22°F~+158°F (-30°C~+70°C)
	Humidity Range	0-95% RH
	Altitude Limit	9850 ft / 3000 m
	Weight (kg / lbs)	2 kg / 4.4 lbs

* All Amperage and speed specifications based on Open/Close Standard Duty motors @ 40°C ambient.

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