

### General

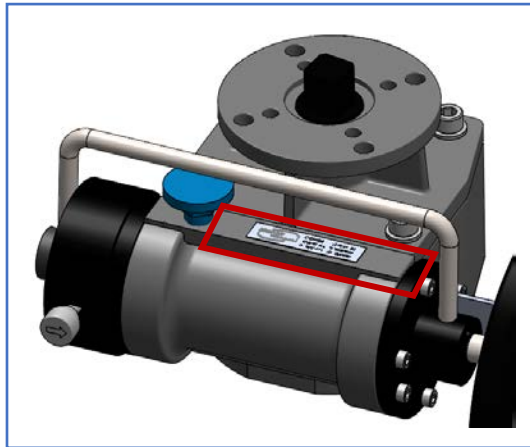
#### Product Description

Quarter-turn declutchable manual gear operator with handwheel, designed to mount between rotary valve and air/fluid powered actuator with ISO5211 standard mounting patterns. Clutch is typically disengaged during normal valve/actuator powered operation and only engaged to manually override the valve when power is removed from the actuator.

#### Markings & Identification

Metal tag fixed to the main body identifies:

- Part number
- Max torque output rating
- Top ISO mounting pattern
- Bottom ISO mounting pattern



#### Handling & Storage

Keep product in original packaging until time of installation. If prolonged storage is required, store in a cool, dry location protected from weather and humidity.

#### Specifications & Ratings

- IP67 Weatherproof Enclosure
- ISO5211 Mounting Top & Bottom
- **-4°F to +176°F** Ambient Temp Standard
  - **Down to -40°F** Low Temp Option
  - **Up to +248°F** High Temp Option
- Block & Bleed Max Pressure **116 PSIG [8 Bar]**

#### Torque Sizing Guidelines

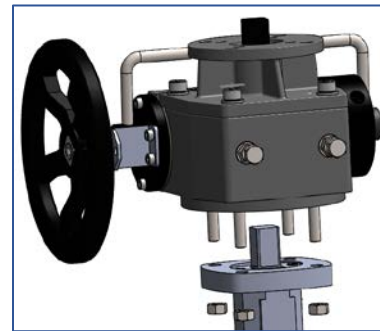
- Size gear operators at 5%-10% below rated Max Output Torque
- Use highest expected valve torque value
- For spring return applications, add actuator spring torque plus valve torque (gear operator must overcome valve torque plus spring force)

### Installation

#### Preparation

- Ensure valve, actuator, and declutchable gear operator are all in the same position (e.g. all closed or all open position)
- Ensure mating surfaces are free of debris
- Test fit mounting bolts/studs to ensure fit

#### Assembly to Valve



Gear operator is attached to valve by 4 or 8 bolts/studs (body tapped). A female drive is designed to accept a male valve stem or coupling w/ slip fit clearance.

**General Valve Fastener Recommendations** – Studs and nuts are preferred for easier alignment and assembly, but hex bolts are also acceptable. Flat washers are highly recommended.

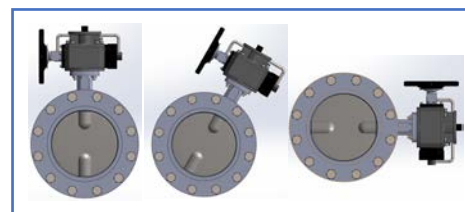
#### Valve Mtg. Fastener Threads (Body Tapped)

Part No.	ISO Bolt Circles #1/#2/#3	Metric Coarse Thread x Depth (mm)		
		ISO #1	ISO #2	ISO #3
GOW02	F05/F07	M6x9	M8x12	-
GOW06	F07/F10	M8x12	M10x15	-
GOW09	F07/F10/F12	M8x12	M10x15	M12x18
GOW12	F07/F10/F12	M8x12	M10x15	M12x18
GOW16	F10/F12	M10x15	M12x18	-
GOW20	F10/F12	M10x15	M12x18	-
GOW33	F12/F16	M12x18	M20x30	-
GOW40	F12/F16	M12x18	M20x30	-
GOW70	F16/F25 <sup>1</sup>	M20x30	M16x24 <sup>1</sup>	-

**Note 1:** F25 requires 8 bolts, all other ISO patterns only 4.

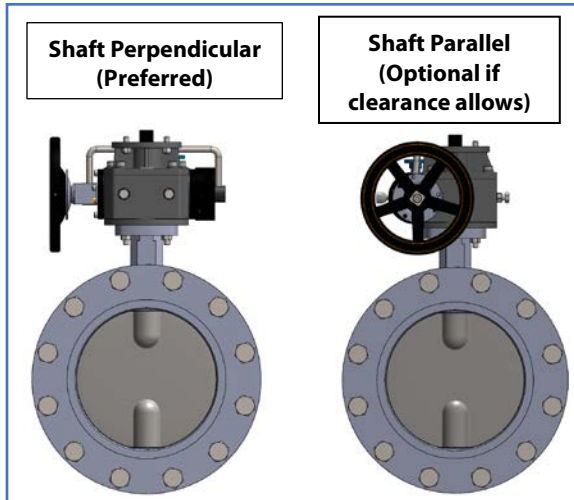
#### Valve Shaft Orientation

Gear operator may be used in horizontal or 45° off vertical positions if needed. Follow valve manufacturer's recommendations.

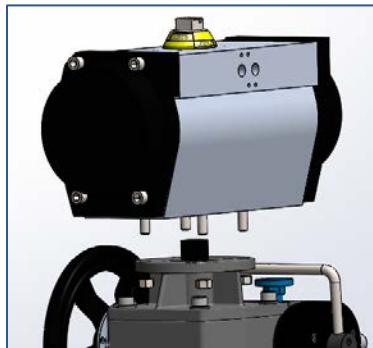


### Handwheel Orientation vs. Valve

Preferred orientation is with handwheel shaft perpendicular to pipeline to allow for operational clearance. If mounting parallel, test fit handwheel for proper clearance before tightening mounting bolts.



### Assembly to Actuator

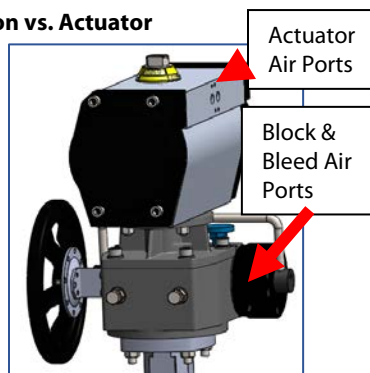


Actuator is attached to gear operator by 4 bolts/studs (body thru holes). A male drive on the gear operator is designed to insert into female actuator drive with slip fit clearance.

**General Actuator Fastener Recommendations** – Studs and nuts are preferred for easier alignment and assembly, but hex bolts are also acceptable. Flat washers are highly recommended.

### Handwheel Orientation vs. Actuator

Preferred orientation is with longest actuator dimension perpendicular to handwheel shaft to allow for clearance. Make sure actuator air ports are facing away from the handwheel.



### Max-Air Actuator Mtg. Fastener Recommendations<sup>1</sup>

Part No.	ISO Bolt Circles #1/#2	UNC Thread x Length (in)			
		ISO #1		ISO #2	
		Stud <sup>2</sup>	Screw	Stud <sup>2</sup>	Screw
GOW02	F05/F07	1/4 -20 x1.25	1/4-20 x0.75	5/16-18 x1.25	5/16-18 x0.75
GOW06	F07/F10	5/16-18 x1.50	5/16-18 x1.00	3/8-16 x1.75	3/8-16 x1.00
GOW09	F07/F10	5/16-18 x1.50	5/16-18 x1.00	3/8-16 x1.75	3/8-16 x1.00
GOW12	F07/F10	5/16-18 x1.50	5/16-18 x1.00	3/8-16 x1.75	3/8-16 x1.00
GOW16	F10/F12	3/8-16 x2.00	3/8-16 x1.25	1/2-13 x2.00	1/2-13 x1.25
GOW20	F10/F12	3/8-16 x2.00	3/8-16 x1.25	1/2-13 x2.00	1/2-13 x1.25
GOW33	F12/F16	1/2-13 x2.25	1/2-13 x1.50	3/4-10 x2.50	3/4-10 x1.75
GOW40	F12/F16	1/2-13 x2.25	1/2-13 x1.50	3/4-10 x2.50	3/4-10 x1.75
GOW70	F16/F25 <sup>3</sup>	3/4-10 x2.50	3/4-10 x1.75	-	-

**Note 1:** Fastener threads and lengths will vary by actuator manufacturer. Fasteners shown are for Max-Air MT series actuators.

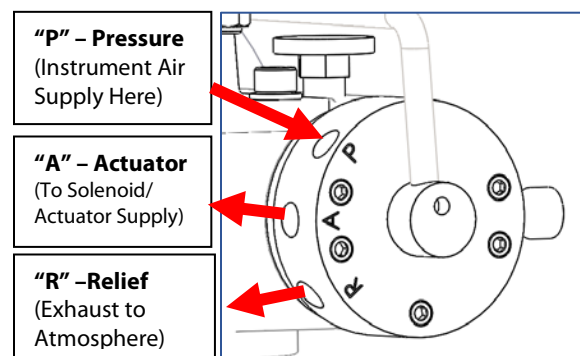
**Note 2:** Studs recommended for easier assembly, must be used with hex nut. Alternatively, screws may also be used. Flat washers are highly recommended.

**Note 3:** F25 requires 8 bolts, all other ISO patterns only 4.

### Integrated Block & Bleed Air Tubing (Optional)

GOW Series includes an integrated block & bleed valve triggered by the clutching mechanism which can be used. If using a separate block & bleed device, please follow manufacturer's instructions.

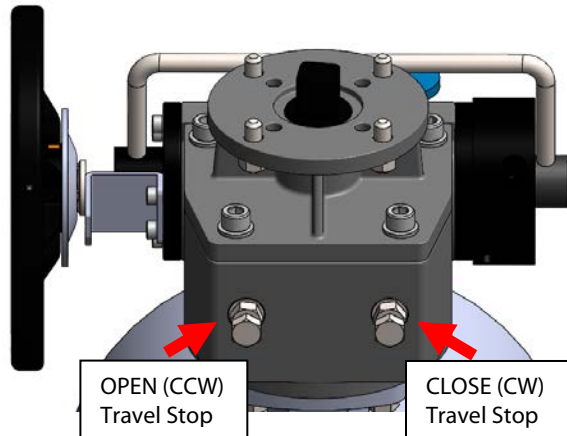
Air tubing from integrated block & bleed valve to actuator air ports should be as follows. If not using, leave ports plugged or install dust screens/filters.



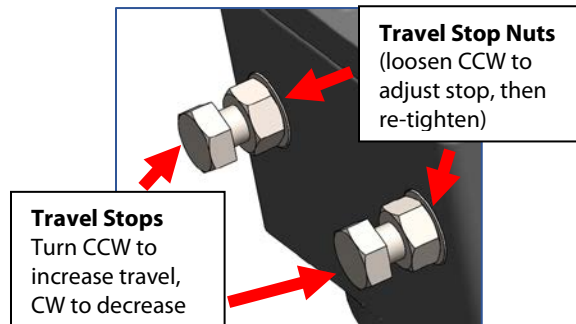
\*Note: Filter/regulator is recommended to ensure clean, dry air is supplied to block & bleed valve and actuator.

### Travel Stops Adjustment

Declutchable gear operator stops should be used to set the fully open and closed position of the valve, with actuator travel stops backed out as much as possible. Actuator travel stops should NOT be used as position stops with a declutchable gear operator, otherwise excessive manual override forces may be transmitted to actuator and cause damage.



Two travel stops independently control the final stopping positions of the valve. The left stop sets the open position (full CCW rotation), and the right stop sets the close position (full CW rotation).



*For example, if the valve is not closing all the way, the rotation in the closed direction needs to be increased (to close more). Loosen the CLOSE travel stop nut (on the right), and turn the CLOSE travel stop counter-clockwise (CCW). Manually operate the valve to test the new, adjusted closed position. Once the desired position is reached, tighten the travel stop nut to lock in place.*

### Commissioning

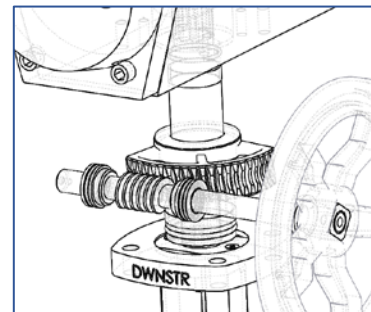
**Manual Stroke** – test stroke the valve/actuator/gear operator assembly to the full open and full closed positions, ensure smooth and unobstructed operation.

**Block & Bleed Function** – If using integrated block & bleed device or other isolation device, test function to ensure actuator pressure is relieved. Double check smooth operation and even resistance during manual override.

**Automatic Stroke** – Ensure that clutch is disengaged and operate the assembly with the actuator, using air supply as in normal automated operation. Check for smooth and complete valve operation.

### Operation

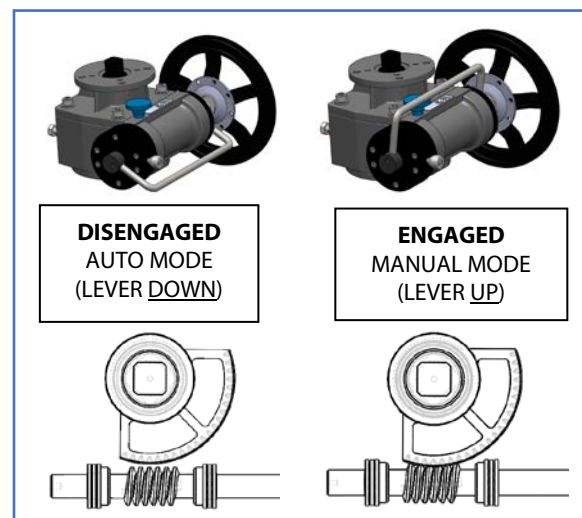
#### Valve/Actuator/Gear Operator Engagement



Valve, actuator, and segment gear are always permanently engaged when assembled. The clutch DOES NOT disconnect the actuator from the valve.

#### Clutch Lever Mechanism

Clutch Lever engages or disengages the worm gear with the segment gear, so that the segment gear spins freely. The gear operator travel stops limit the travel of the segment gear, thereby limiting rotation of the whole actuator/valve assembly.



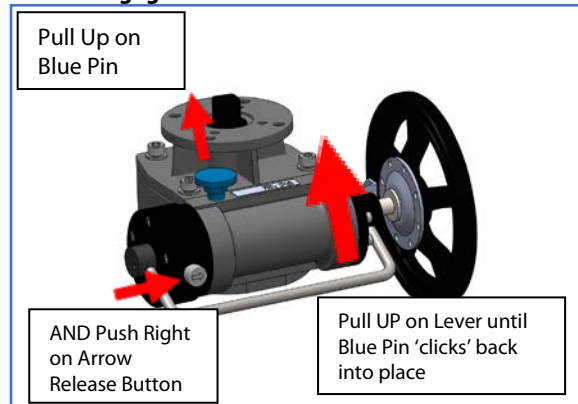
### Block and Bleed Device Recommended

A block and bleed device should be used to relieve actuator air pressure during manual operation. If using integrated block & bleed valve, this automatically happens when engaging the clutch.

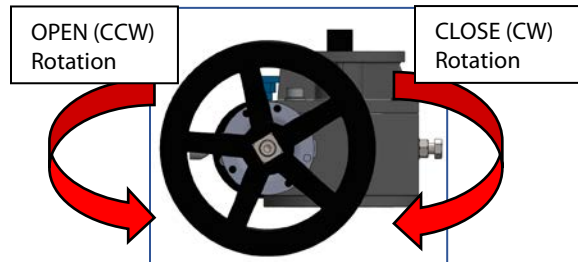
### Manual Operation (Lever UP)

Engage clutch to operate valve w/ handwheel.

#### How to Engage Clutch



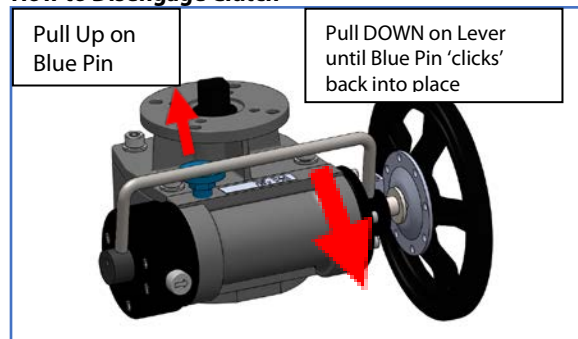
#### Handwheel Direction



### Automated Operation (Lever DOWN)

ALWAYS Disengage clutch when not manually operating to allow actuator to open and close valve properly.

#### How to Disengage Clutch



**\*Note: For spring return actuators, return actuator to relaxed spring position before disengaging clutch**

### Torque Ratings

**DO NOT EXCEED MAX TORQUE RATINGS BELOW.**

**DO NOT USE CHEATER BAR ON HANDWHEEL.**

Exceeding Max Input torque or Max Rim Pull may damage the gear operator shaft or gearing.

Part No.	Standard Handwheel Diameter (in)	Max Output (in-lbs)	Max Input (in-lbs)	Max Rim Pull (lbs-f)
GOW02	7.9	1770	195	50
GOW06	7.9	5310	372	94
GOW09	9.8	7966	620	126
GOW12	11.8	10621	850	144
GOW16	13.8	14161	708	103
GOW20	15.7	17701	885	112
GOW33	23.6	29207	1682	142
GOW40	27.6	35403	2036	148
GOW70	19.7	61955	974	99

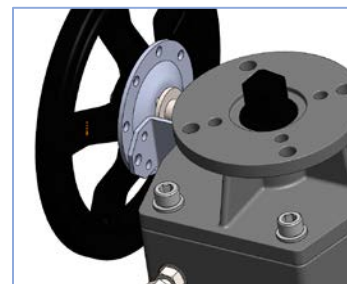
## Safety

### Auto Mode Safety

Ensure clutch is disengaged when not operating manually, otherwise actuator will not be able to open or close the valve.

### Lockout/Tagout

Locking plate is provided standard for lockout/tagout to prevent unwanted MANUAL operation (lock/tag not provided).



### Manual Mode Safety

DO NOT use excessive force on the handwheel and DO NOT use a cheater bar, otherwise damage to equipment or injury may occur. If resistance is excessive, see troubleshooting section.

### Block & Bleed Recommended

Use a block and bleed device and/or cutoff electrical power to the actuator during manual operation to prevent damage to actuator.

### Maintenance

#### Recommended

Gear operator is pre-lubricated at the factory and internal gearing and bearings are sealed in an IP67 rated enclosure. No regular lubrication or maintenance is needed.

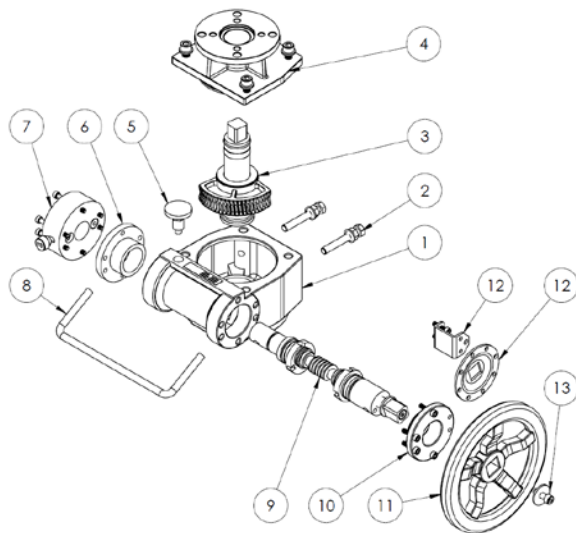
#### Removal

Ensure air supply and/or power is removed from actuator, tubing or wiring is disconnected and safely remove actuator first. Then, remove declutchable gear operator with the valve in a safe position for maintenance.

#### Repair

Please contact Max-Air Technology to determine if parts are under warranty and if repairs are needed. Factory may require return of parts for inspection and/or repair.

### Exploded Parts List



No.	Description	Material
1	Body	Coated WCB
2	Travel Stops	304 SS
3	Segment Gear Assembly	Plated Steel
4	Cover	Coated WCB
5	Locking Pin Assembly	Alum/Steel
6	Left Worm Bearing Cap	Aluminum
7	Block & Bleed Valve	Coated Steel
8	Clutch Lever	Plated Steel
9	Worm Gear Assembly	Plated Steel
10	Right Worm Bearing Cap	Coated Steel
11	Handwheel	Cast Iron
12	Handwheel Locking Plates	Coated Steel
13	Handwheel Retainer Screw	304 SS

### Troubleshooting

Problem	Cause	Solution
Gear operator handwheel won't move	Valve, actuator and gear operator not operating in same quadrant	Double check that all components are assembled in the same position (e.g. all closed or all open)
	Poor segment gear and worm gear engagement	Jiggle handwheel back and forth while engaging clutch
	Gear operator undersized (not enough torque)	Double check gear torque vs. valve torque
Gear operator extremely difficult to open or close	Actuator is still pressurized	Bleed actuator air supply (e.g. using block and bleed device)
	Gear operator undersized (not enough torque)	Double check gear torque vs. valve torque
Actuator won't move	Clutch is engaged	Disengage clutch
	Valve, actuator and gear operator not operating in same quadrant	Double check that all components are assembled in the same position (e.g. all closed or all open)
Gear operator or actuator won't open or close all the way	Gear operator or actuator travel stops need adjustment	Adjust actuator travel stops out all the way and use gear operator stops to set full open/close positions
Clutch won't disengage	Spring return actuator springs are in compression	Return actuator springs to relaxed state before disengaging

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