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I&M UT Series (Old Design)

*Installation & Maintenance Instructions for
Marwin UT Series Actuators ~ UT-0A, UT5-thru UT-7,
and UT-0 thru UT-4 Old Design*

Warning: Marwin Valve ball valves must only be used, installed, and repaired in accordance with these Installation & Maintenance Instructions. Observe all applicable public and company codes and regulations. In the event of leakage or other malfunction, call a qualified service person; continued operation may cause system failure or a general hazard.

Please read these instructions carefully!

Your Marwin Valve product will provide you with long, trouble-free service if it is correctly installed and maintained. Spending a few minutes now reading these instructions can save hours of trouble and downtime later. When making repairs, use only genuine Marwin Valve parts, available for immediate shipment from the factory.

Scope

This manual is intended as a guide to assist customers in the storage, installation, and maintenance of Marwin UT Series Pneumatic Actuators.

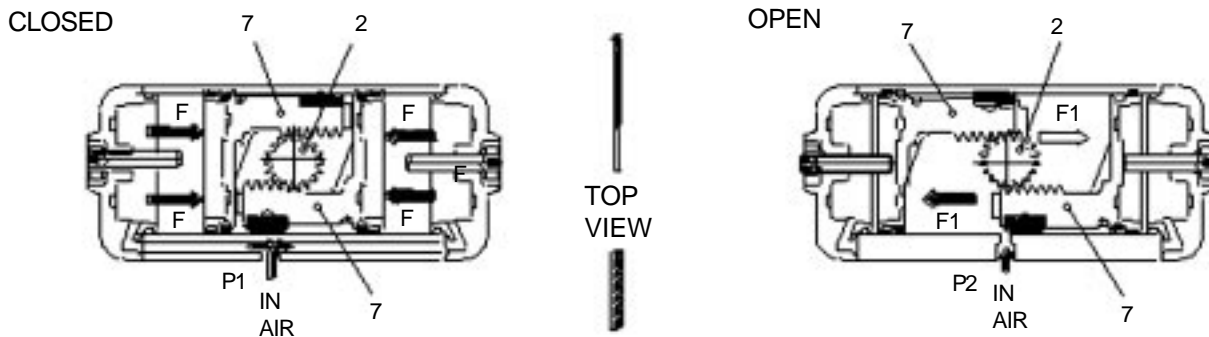
Main Characteristics

- **Maximum Air Supply:** 116 psi (8 bar)
- **Supply:** dry air (STANDARD). Other fluids or gases are possible if compatible with actuator materials.
- **Temperature:** from -4°F to +185°F (-20°C to +85°C) for standard version with NBR seals.
from -4°F to +320°F (-20°C to +150°C) for HIGH TEMP version (Viton seals).
from -40°F to +185°F (-40°C to +85°C) for LOW TEMP version.
- **Rotation:** 90° stroke with regulation +/-10° in open position.
- **Lubrication:** during assembly, for the actuator life.

Operating Principle

The Marwin UT pneumatic actuator is a quarter-turn rack and pinion type that transforms the linear motion of the pistons (7), due to the thrust caused by the pressure on the surface area, to a 90° rotary motion of the pinion (2).

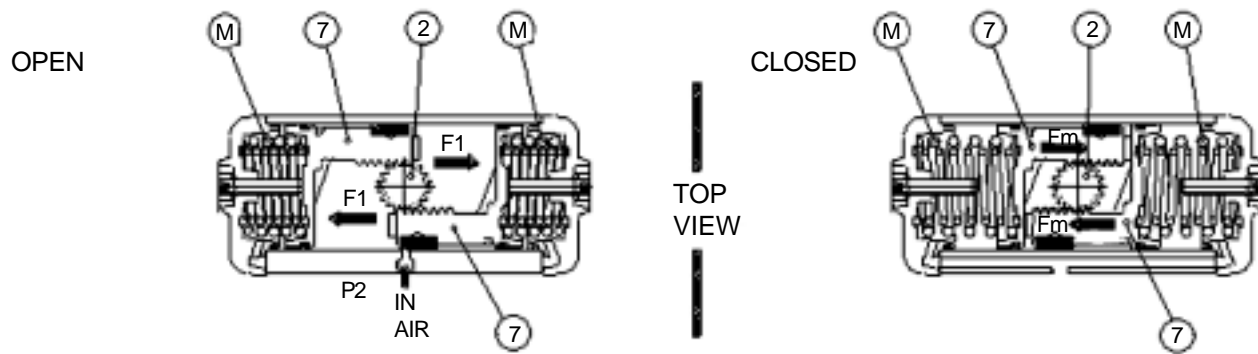
Double Acting



Pressurizing port **P1**, the external chambers fill up and the action of the pressure on the pistons surface creates a force (**F**) which pushes them toward the pinion, generating a torque with **CLOCKWISE ROTATION**.

When the pistons (7) are closed to the pinion, pressurizing air port **P2**, the internal chamber fills up and the action of the pressure on the pistons surface creates a force (**F1**) which pushes them toward the end caps, generating a torque with **COUNTERCLOCKWISE ROTATION**.

Spring Return



When the pistons (7) are closed to the pinion, pressurizing air port **P2**, the internal chamber fills up and the action of the pressure on the pistons surface creates a force (**F1**) which pushes them toward the end caps, generating a torque with **COUNTERCLOCKWISE ROTATION**.

In this position the springs are compressed. By depressurizing air port **P2**, the springs (**M**) start the unfolding phase creating a force (**Fm**), which pushes the pistons (7) toward the pinion, generating a torque with **CLOCKWISE ROTATION**.

Storage

For applications where the actuator is not put into immediate service, it is recommended that the actuator be kept in a clean and dry location with ample protection from the environment. For unmounted actuators, the original packing box helps in optimizing the storage.

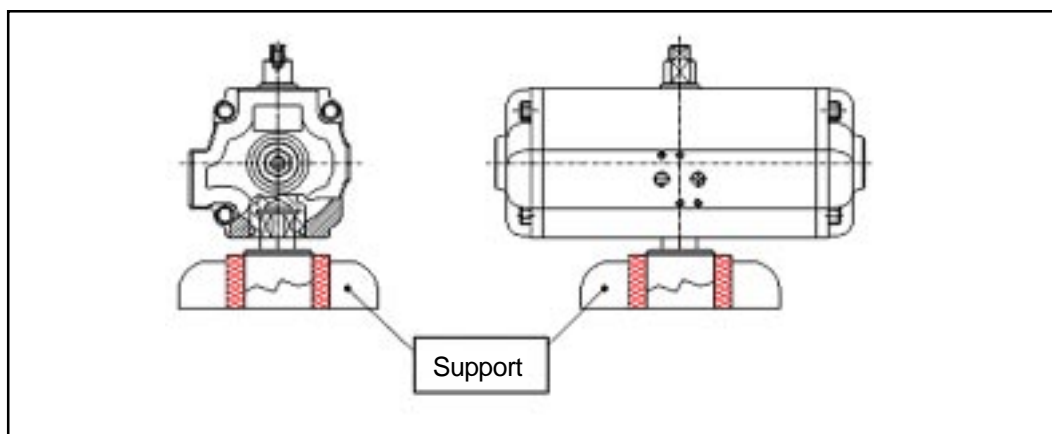
For a long storage period, we recommend periodically pressurizing the chambers to completely cycle the actuator. The actuators have two air ports, which should be plugged during storage to avoid any intrusion.

Maintenance

The lubrication used during the assembly of the actuator, and the self-lubricating material used in the guides, gives a life of one million cycles for normal working conditions. When replacing worn seals, it is recommended that the guides be replaced as well to ensure best actuator performance.

Disassembly

1. **Disconnect all pneumatic and electrical supplies from the actuator.**
2. Remove any accessory from the actuator that could be damaged.
3. Remove actuator from valve (noting the valve position, actuator position, and actuator orientation on the valve for correct reinstallation).
4. Place the actuator on a support with the same male drive of the pinion female connection, in order to execute easily the following steps:



- Before starting the disassembly, **verify** by the stamped marking on the body if the actuator is double acting (DA) or spring return (SR).

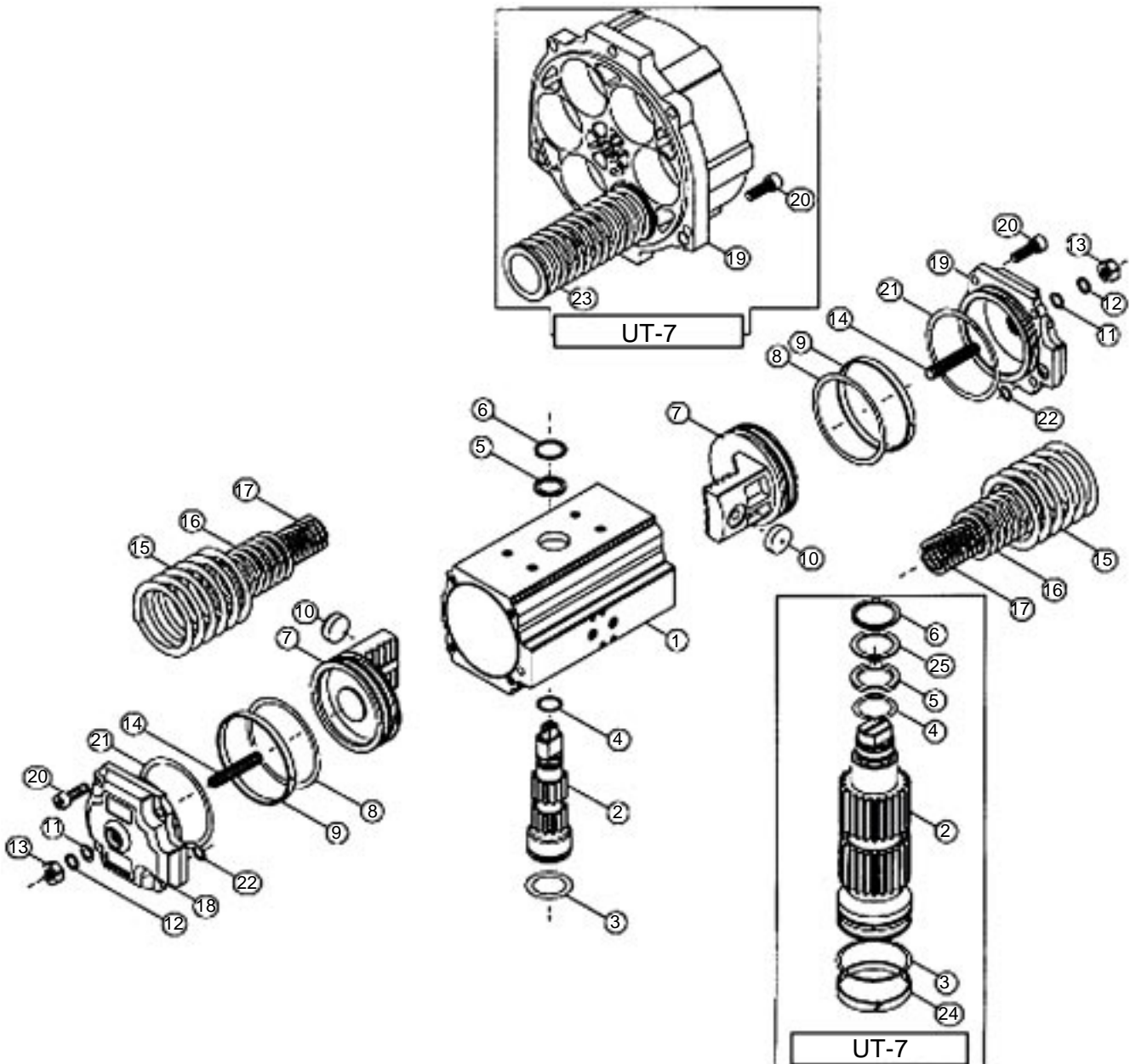
For DOUBLE ACTING actuator:

- Slowly remove the end caps screws (20) from each end cap (18-19) using a diagonal pattern).

FOR SPRING RETURN actuator:

- Slowly disengage the screws (20) part way from each end cap (18-19), to allow the springs to fully decompress. Use a diagonal pattern.
- Rotate the actuator body (1) in a clockwise direction in respect of the pinion (2), so that the pistons (7), pushing the adjustment screws (14), will eject the end caps (18-19), and that at the end of the rotation the pistons (7) will be disconnected from the pinion (2).
- Take out the pistons (7) from the body (1).
- Remove the pinion snap ring (6) from its place on the pinion (2).
- Take away the spacer ring (5).
- Remove the pinion (2), carefully from the body (1).

Actuator Parts



SPRING SETTING				
From UT-0 to UT-4				
Set	External Spring	Central Spring	Internal Spring	Air Supply, psi/(bar)
01	1	—	1	36-44 / 25-3
02	2	—	—	44-58 / 3-4
03	1	—	2	44-73 / 3-5
04	2	—	1	58-80 / 4-5.5
05	2	—	2	73-87 / 5-6

SPRING SETTING				
For UT-5 and UT-6				
Set	External Spring	Central Spring	Internal Spring	Air Supply, psi/(bar)
01	—	2	—	36-44 / 2.5-3
02	2	—	—	44-58 / 3-4
03	1	2	—	44- 73 / 3-5
04	2	—	2	58-80 / 4-5.5
05	2	2	—	73-87 / 5-6
06	2	2	2	87- 102 / 6-7

Pretensioned Springs No. of Springs for Each Side		
For UT-7		
Set	Side 1	Side 2
01	2	3
02	3	3
03	3	4
04	4	4
05	4	5
06	5	5
07	5	6
08	6	6

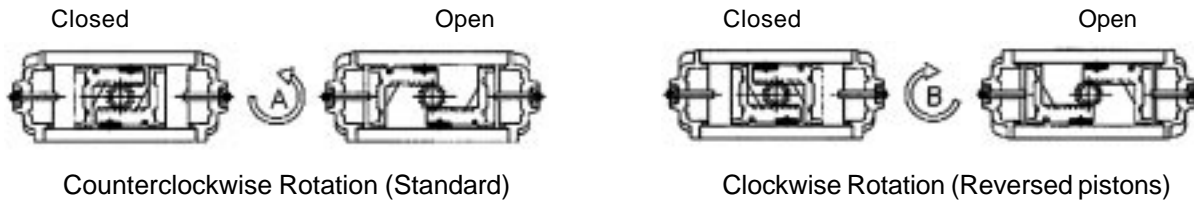
Material Specifications					
Pos./Item	Description	Material	Treatment	Quantity DA	Quantity SR
1	Body	Extruded Aluminum	Hard Anodized	1	1
2	Anti-blowout Pinion	Steel	Nickel Plated	1	1
3	Lower Pinion O-Ring	NBR 70 Shore		1	1
4*	Top Pinion O-Ring	NBR 70 Shore		1	1
5*	Pinion Spacer Ring	PTFE 15% Graphite		1	1
6	Piston Snap Ring	Steel	Nickel Plated	1	1
7	Piston	Die Cast Aluminium		2	2
8*	Piston O-Ring	NBR 70 Shore		2	2
9*	Antifriction Ring	PTFE 15% Graphite		2	2
10*	Piston Thrust Block	PTFE 15% Graphite**		2 4 6	2 4 6
11*	Stop Bolt O-Ring	NBR 70 Shore		2	2
12	Stop Bolt Washer	Stainless Steel A2		2	2
13	Stop Bolt Retaining Nut	Stainless Steel A2		2	2
14	Stop Bolt	Stainless Steel A2		2	2
15	External Spring	Steel	Zinc Phosphate	See Table	
16	Central Spring	Steel	Zinc Phosphate		
17	Internal Spring	Steel	Zinc Phosphate		
18	Left End Cap	Die Cast Aluminum	Painted	1	1
19	Right End Cap	Die Cast Aluminum	Painted	1	1
20	End Cap Fixing Screw	Stainless Steel A2		8 - 12	8 - 12
21*	End Cap O-Ring	NBR 70 Shore		2	2
22*	O-Ring for Air Supply Hole	NBR 70 Shore		2	2
23	Compressed Spring (UT-7 only)	Steel	Zinc Phosphate	0	12
24*	Antifriction Ring	PTFE 15% Graphite		1	1
25	Washer	Stainless Steel A2		1	1

* Parts Subject to wear ** For UT-3.5 to UT-6: Delrin + MO52 [2]: Valid UT-0 and UT-1 [6] - 12: Valid for UT-7

Assembly

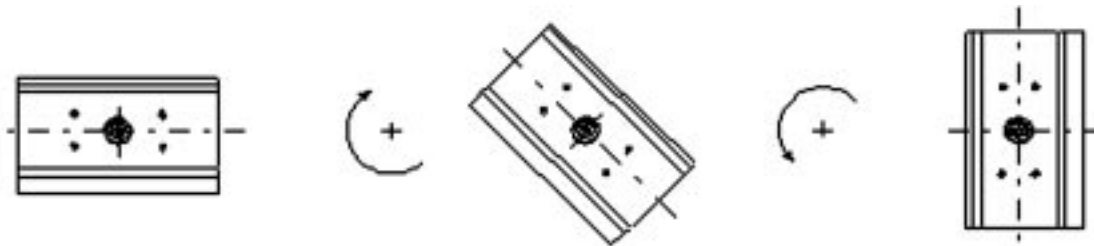
1. Clean the components before proceeding with the assembly.
2. Grease lightly the internal chamber of the body (1) and the seals on the pistons. We suggest the use of an extreme pressure lithium based grease such as **Kluber Centoplex 2 EP**.
3. Carefully insert the pinion (2) into the body (1), so that the two pinion flat surfaces are parallel to the axis of the body, and secure with spacer ring (5) and pinion snap ring (6).
4. Insert the pistons (pre assembled and greased) into the body as shown here below.

Assembly Possibilities — Top View



5. Push the pistons (7) into the body (1) until the piston teeth are stopped by the teeth of the pinion (2).
6. Keeping a soft pressure with the hands on the pistons (7), rotate the body (1) in clockwise rotation in respect to the pinion (2) until feeling two clicks, when the pistons engage with the pinion (2).
7. Now rotate the body (1) in counterclockwise rotation, and verify that at the end of the rotation the two pinion flats surfaces are at right angles to the axis of the body.

Note: Correct assembly gives symmetric stroke of the pistons, which can be verified by measuring distance from each end face of the body. These distances should be equal.



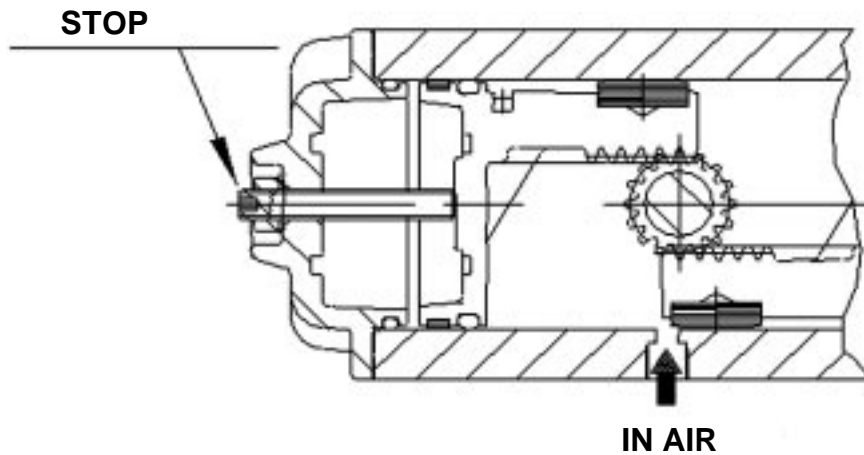
FOR DOUBLE ACTING ACTUATORS

8. Assemble the end caps (18-19) to the body (1) with the screws (20), using a diagonal bolting pattern.

FOR SPRING RETURN ACTUATORS

8. **With the pistons in the CLOSED position**, insert the springs in spring set (M) into the body (1), putting them in the piston recess (7). Then assemble the end cap (18-19) on the springs. Center the end cap recess on the springs. Assemble the screws (20), using a diagonal bolting pattern to tighten each screw a little at a time, so that the springs are uniformly compressed, until end cap (18) is completely closed. **Note: A press and guard are suggested for performing this operation on actuator sizes UT-5 and UT-6.**
9. Repeat the operation on the other side.
10. Operate the actuator to verify the correct functioning before re-installing it.

Stroke Adjustment



Adjusting the stop bolt reduces or increases the piston stroke and opening rotation.

Stroke adjustment procedure (when pistons are in open position):

- Remove air supply or move the pistons to the closed position
- Adjust one bolt only
- Move the pistons to the open position and verify the new adjustment
- Repeat this operation until desired adjustment is achieved.
- Restore air supply, and adjust the second bolt until it touches the piston.



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