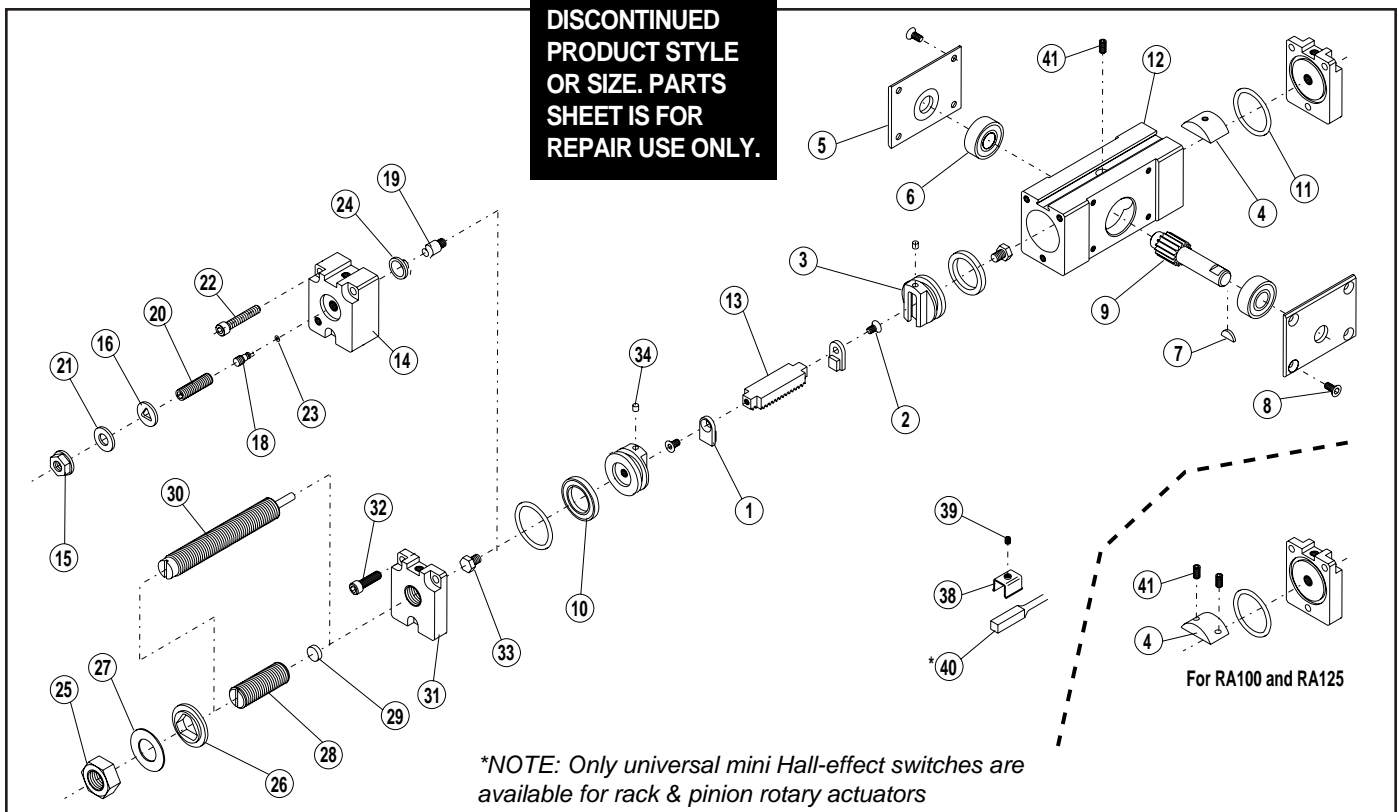


# Rack and Pinion Rotary Actuator

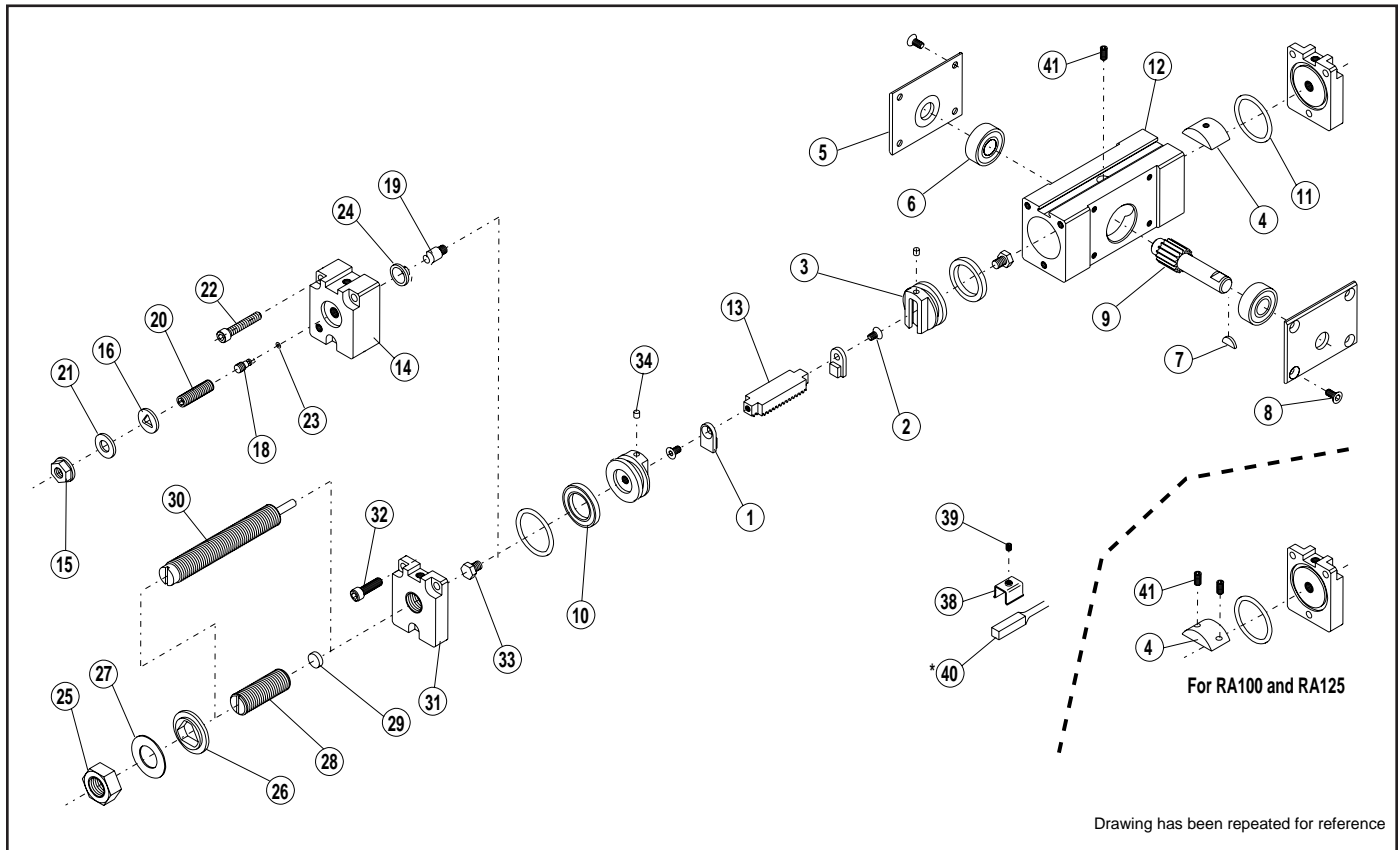
**RA075, RA100, RA125**

**DISCONTINUED  
PRODUCT STYLE  
OR SIZE. PARTS  
SHEET IS FOR  
REPAIR USE ONLY.**


**List of Parts**

ITEM	PART NO.	DESCRIPTION	RA075	RA100	RA125
1	1812-1022	Plate, Connector, RA075	2		
	1816-1022	Plate, Connector, RA100		2	
	1820-1122	Plate, Connector, RA125			2
2	1812-1003	FHSCS, 6-32 x .31 Black	2	2	2
3	1812-1021	Piston, RA 075	2		
	1816-1021	Piston, RA 100		2	
	1820-1121	Piston, RA 125			2
4	1812-1017	Block, Guide, RA075	1		
	1816-1017	Block, Guide, RA100		1	
	1820-1117	Block, Guide, RA125			1
5	1812-1008	Plate, Cover, RA075	2		
	1816-1008	Plate, Cover, RA100		2	
	1820-1108	Plate, Cover, RA125			2
6	1812-1010	Bearing, Ball, Radial, .25 (RA075)	2		
	0910-1386	Bearing, Ball, Radial, .38 (RA100)		2	
	0515-1147	Bearing, Ball, Radial, .50 (RA125)			2
7	1812-1015	Key, Woodruff #202.5 (RA075)	1		
	1816-1010	Key, Woodruff #303 (RA100)		1	
	1820-1115	Key, Woodruff #405 (RA125)			1
8	1812-1003	FHSCS, 6-32 x .31 Black	8	8	8
8A	1812-1003	FHSCS, 6-32 x .31 Black	1	1	1
9	1812-1012	Pinion, RA075	1		
	1816-1012	Pinion, RA100		1	

ITEM	PART NO.	DESCRIPTION	RA075	RA100	RA125
9	1820-1112	Pinion, RA125			1
10	1812-1011	U-Cup, Buna-N, 3/4 x 1/8, RA075	2		
	1001-1253	U-Cup, Buna-N, 1 x 1/8, RA100		2	
	1820-1111	U-Cup, Buna-N, 1-1/4 x 1/8, RA125			2
10	1812-1016	U-Cup, Viton, 3/4 x 1/8, RA075	2		
	1001-1119	U-Cup, Viton, 1 x 1/8, RA100		2	
	1820-1106	U-Cup, Viton, 1-1/4 x 1/8, RA125			2
11	1001-1130	O-Ring, Buna-N, -018, RA075	2		
	1816-1015	O-Ring, Buna-N, -022, RA100		2	
	3045-1003	O-Ring, EPR, -026, RA125			2
11	1812-1018	O-Ring, Viton, -018, RA075	2		
	1816-1006	O-Ring, Viton, -022, RA100		2	
	1820-1107	O-Ring, Viton, -026, RA125			2
12	1812-1004	Base, RA075-180	1		
	1816-1004	Base, RA100-180		1	
	1820-1104	Base, RA125-180			1
12	1812-1005	Base, RA075-360	1		
	1816-1005	Base, RA100-360		1	
	1820-1105	Base, RA125-360			1
13	1812-1013	Rack, RA075-180	1		
	1816-1013	Rack, RA100-180		1	
	1820-1113	Rack, RA125-180			1
	1812-1014	Rack, RA075-360	1		



ITEM	PART NO.	DESCRIPTION	RA075	RA100	RA125
13	1816-1014	Rack, RA100-360		1	
	1820-1114	Rack, RA125-360			1
14	1812-1025	Plate, Cushion, RA075	1		
	1816-1025	Plate, Cushion, RA100		1	
	1820-1125	Plate, Cushion, RA125			1
15	1816-1020	Nut, Flange, 1/4-20	1	1	1
16	1816-1023	Seal, Thread, 1/4-20	1	1	1
18	1816-1027	Needle, Cushion	1	1	1
19	1816-1029	Spear, Cushion	1	1	1
20	2410-1019	Set Screw, 1/4-20 x .88, Flat	1	1	1
21	1004-1144	Washer, .281 x .500 x .056	1	1	1
22	1812-1002	SHCS, 6-32 x .88, Black RA075	3		
	1001-1065	SHCS, 6-32 x 1.00, Black RA100		3	
	0810-1201	SHCS, 10-24 x 1.00, Black RA125			3
23	0912-1101	O-Ring, Buna-N, -.002,	1	1	1
	1820-1116	O-Ring, Viton, -.002	1	1	1
24	0910-1184	Seal, Cushion, Buna-N 1" BC	1	1	1
	0910-1461	Seal, Cushion, Viton, 1" BC	1	1	1
25	2403-1057	Nut, Hex Jam, 3/8 - 32, RA075	1		
	1816-1018	Nut, Hex Jam, 1/2 - 20, RA100, RA125		1	1
26	1001-1287	Washer, .395 x .748 x .021, RA075	1		
	1810-1077	Washer, .55 x .75 x .025, RA100, RA125		1	1
27	2410-1074	Seal, Thread, 3/8, RA075	1		
	1816-1016	Seal, Thread, 1/2, RA100, RA125		1	1

ITEM	PART NO.	DESCRIPTION	RA075	RA100	RA125
28	1812-1019	Screw, Bumper, RA075	1		
	1816-1019	Screw, Bumper, RA100, RA125		1	1
29	2406-1050	Bumper, Polyurethane, RA075	1		
	2410-1021	Bumper, Polyurethane, RA100, RA125		1	1
30	1812-1028	Shock, PMX-8 Sealed, RA075	1		
	1816-1028	Shock, PM25 Sealed, RA100, RA125		1	1
31	1812-1009	Plate, End, RA075	1		
	1816-1009	Plate, End, RA100, RA125		1	1
32	1207-1027	SHCS, 6-32 x .63, Black, RA075	3		
	2307-1021	SHCS, 8-32 x .63, Black, RA100, RA125		3	3
33	1816-1026	Screw, Hex, 10-24 x .25	2	2	2
34	0905-1109	Magnet Rod, .12 x .12 NEO 35	1	1	1
38	2503-1034	Clamp, Switch	1	1	1
39	3600-1831	Screw, Set	1	1	1
*40	3600-9092	Switch, Hall Sourcing, 5 Meter Lead	1	1	1
	3600-9094	Switch, Hall Sinking, 5 Meter Lead	1	1	1
	3600-9093	Switch, Hall Sourcing, Quick-disconn	1	1	1
	3600-9095	Switch, Hall Sinking, Quick-disconn	1	1	1
	2503-1025	5 meter lead w/ Connector	1	1	1
41	1812-1035	Set Screw, #10-32 x .19	1	2	2

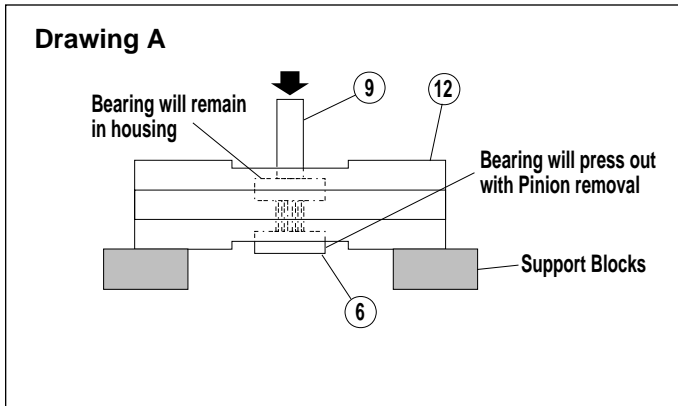
\*NOTE: Only universal mini Hall-effect switches are available for rack & pinion rotary actuators

**Seal Replacement Cushioned Head Assembly**

1. Remove Head Assembly (#14) from Rotary Actuator Body.
  2. Replace O-Ring Seal (#11) and Cushion Seal (#24).
  3. Remove Cushion Adjustment Screw (#18) and replace O-Ring (#23).
- NOTE: Apply light coat of Magnalube-G grease to seals before reassembly.

**Piston Seal Replacement**

1. Remove Head Assembly (#31) or (#14).
2. Remove Backlash Adjustment Screw(s) (#41).
3. Remove Bearing Plate Covers (#5).
4. Press Pinion (#9) out of the Housing (#12) (See drawing A).

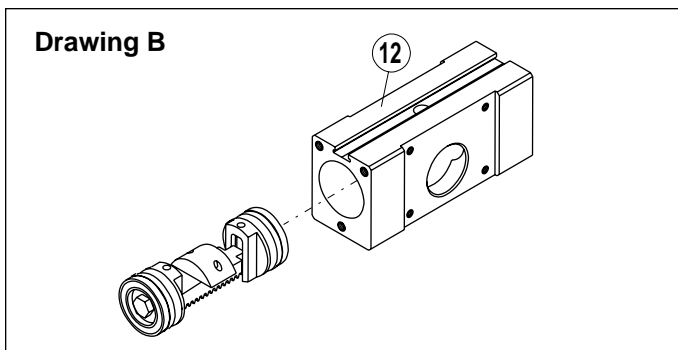


NOTE: One bearing (#6) will press out of the Housing when the Pinion is removed.

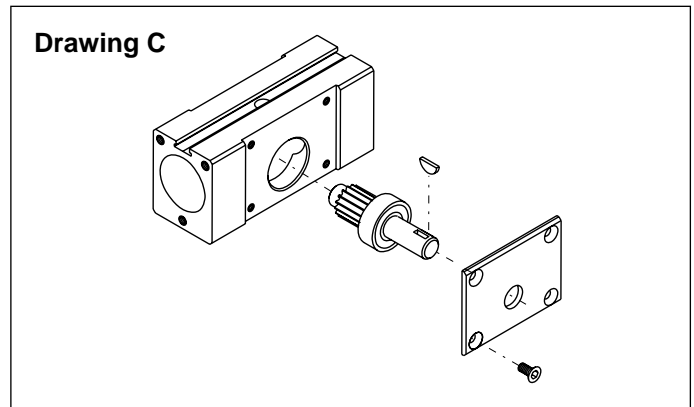
5. Press remaining Bearing (#6) out of Housing (#12).
6. Remove Piston and Rack Assembly parts; Plate Connector (#1), FHSCS (#2), Piston (#3), Guide Block (#4), U-Cup (#10), and Rack (#13).
7. Clean Piston, Rack and Pinion (#9). Install new U-cups (#10) onto Pistons and lubricate all components with Magnalube-G ® grease.

**Reassembly**

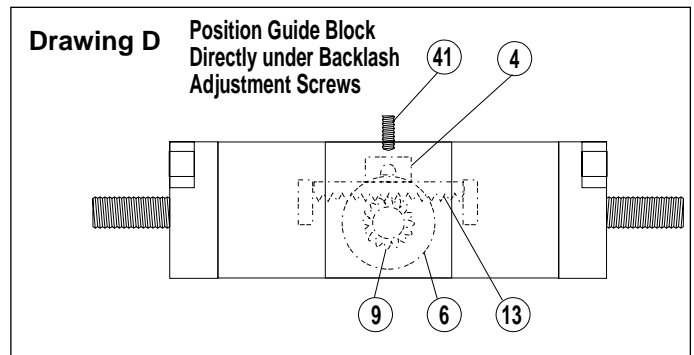
1. Insert Rack and Piston Assembly into the Housing (#12) bore. Make sure Guide Block (#4) is installed at the same time (See drawing B).



2. Center Piston Rack Assembly in the Housing and Install Pinion (#9) and Bearings (#6) with Pinion flat oriented as shown (See drawing C).



3. Install Bearing Plate Covers (#5) and Head Assembly.
4. Rotate Pinion to position Guide Block (#4) directly under the Backlash Adjustment Screw (#41) hole(s). (See drawing D).



5. Apply Loctite 242 to Adjustment Screw(s) (#41) and evenly install into the housing until they bottom out. Do not tighten. Rotate Pinion by hand and loosen or tighten both screws at an even rate to achieve desired backlash. Over tightening will result in binding.

**Testing**

1. Cycle the rotary actuator back and forth two times at full flow. Check for leakage, it should be zero.
2. Check breakaway per the chart below:

3/4" Bore	20 PSI or less breakaway
1" Bore	15 PSI or less breakaway
1-1/4" Bore	10 PSI or less breakaway

**LUBRICATION**

All Tolomatic Rack and Pinion Rotary Actuators are prelubricated at the factory. To ensure maximum life, the following guidelines should be followed.

1. Filtration– We recommend the use of dry, filtered air in our products. ‘Filtered air’ means a level of 10 Micron or less. ‘Dry’ means air should be free of appreciable amounts of moisture. Regular maintenance of installed filters will generally keep excess moisture in check.
2. External Lubricators (optional)– The factory prelubrication of Tolomatic Rack and Pinion Rotary Actuators will provide optimal performance without the use of external lubrication. However, external lubricators can further extend service life of pneumatic actuators if the supply is kept constant.

Oil lubricators, (mist or drop) should supply a minimum of 1 drop per 20 standard cubic feet per minute to the cylinder. As a rule of thumb, double that rate if water in the system is suspected. Demanding conditions may require more lubricant.

If lubricators are used, we recommend a non-detergent, 20cP @ 140°F 10-weight lubricant. Optimum conditions for standard cylinder operation is +32° to +125°F (+0° to 51.6°C).

**NOTE: Use of external lubricators will wash away the factory installed lubrication. External lubricants must be maintained in a constant supply or the results will be a dry actuator prone to failure.**

3. Sanitary environments– Oil mist lubricators must dispense ‘Food Grade’ lubricants to the air supply. Use fluids with ORAL LD50 toxicity ratings of 35 or higher such as Multitherm® PG-1 or equivalent. Demanding conditions can require a review of the application.

**SWITCHES**

On assembled cylinder, Secure Switch to open port side of rotary actuator with a Clamp and Screw.

**NOTE:** For Hall Effect Switch Magnet, be sure the S pole of the magnet (indicated with black dot) is facing toward the switch.

**TO ORDER RETROFIT KITS:** SW (then the model number and base size, and code for type of switch needed):  
**EXAMPLE: SWRA100KY**

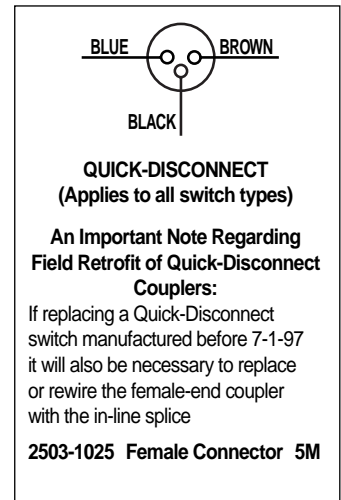
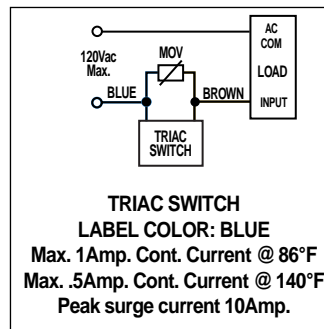
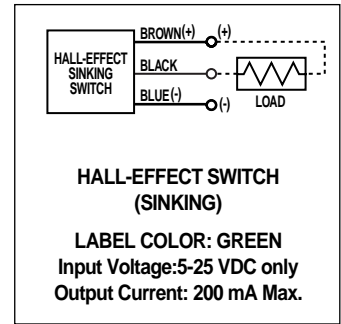
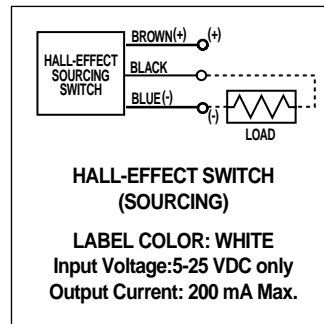
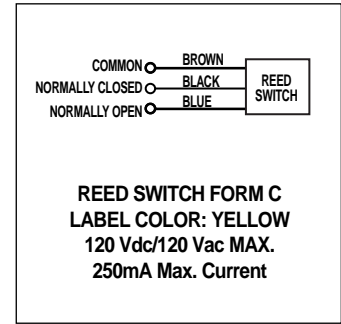
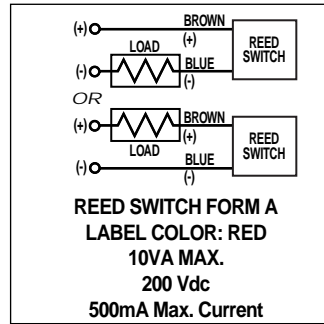
All Switch Kits come with 1 switch and mounting hardware.

**QUICK-DISCONNECTS:**

2503-1025 Female Connector 5M

SWITCH TYPE CODE	
<b>KY</b>	(Hall-effect Switch (Sinking) 5-meter lead)
<b>KX</b>	(Hall-effect Switch (Sinking) 5-meter lead and QD)
<b>TY</b>	(Hall-effect Switch (Sourcing) 5-meter lead)
<b>TX</b>	(Hall-effect Switch (Sourcing) 5-meter lead and QD)

**UNIVERSAL SWITCH WIRING DIAGRAMS AND LABEL COLOR CODING**



**NOTE:** The side of the switch with the groove indicates the sensing surface. This must face toward the magnet.

For complete Switch Performance Data, refer to the Tolomatic Pneumatic Products Catalog 9900-4000

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