

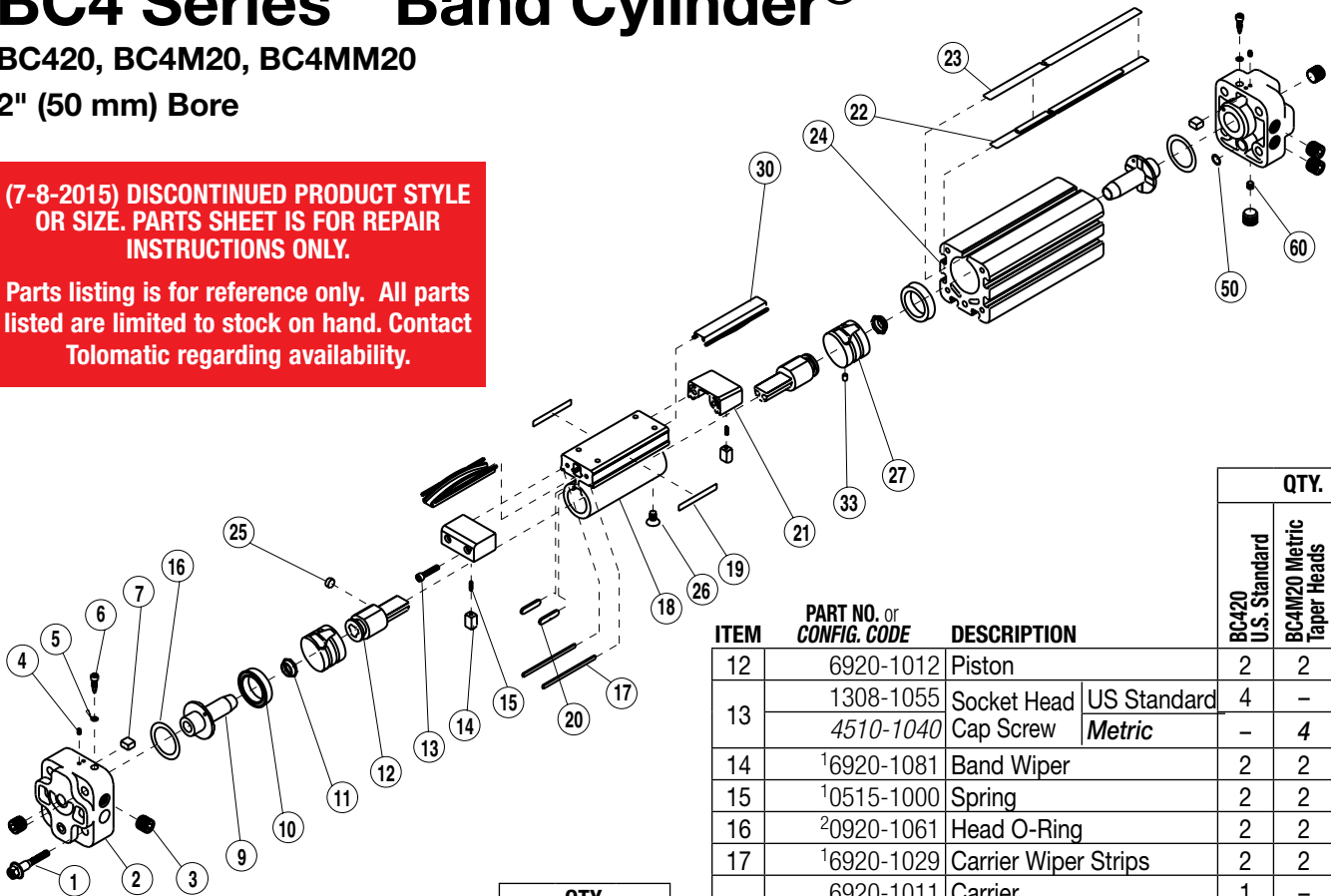
### BC4 Series™ Band Cylinder®

BC420, BC4M20, BC4MM20

2" (50 mm) Bore

**(7-8-2015) DISCONTINUED PRODUCT STYLE OR SIZE. PARTS SHEET IS FOR REPAIR INSTRUCTIONS ONLY.**

Parts listing is for reference only. All parts listed are limited to stock on hand. Contact Tolomatic regarding availability.



ITEM	PART NO. or CONFIG. CODE	DESCRIPTION	QTY.		
			BC420 U.S. Standard	BC4M20 Metric Taper Heads	BC4MM20 Metric Parallel Heads
1	0920-1087	Head Bolt	8	-	-
	4920-1047	Head Bolt (Metric)	-	8	8
2	6920-9000	Standard Head Assembly	2	-	-
	7920-9000	US Standard Metric Taper	-	2	-
	8920-9000	Metric Parallel	-	-	2
3	30920-1029	Pipe Plug	A/R	-	-
	44920-1029	Pipe Plug (Metric Taper)	-	A/R	-
	55920-1006	Pipe Plug (Metric Parallel)	-	-	A/R
4	30915-1044	Set Screw	4	-	-
	454915-1044	Set Screw (Metric)	-	4	4
5	1,2,3,4,50701-1003	Cushion O-Ring	2	2	2
6	3,4,50920-1018	Cushion Needle	2	2	2
7	3,4,50920-1016	Band Wedge	2	2	2
9	3,4,50920-1158	Cushion Spear	2	2	2
10	1,20920-1028	Piston Seal	2	2	2
11	1,20920-1027	Cushion Seal	2	2	2

ITEM	PART NO. or CONFIG. CODE	DESCRIPTION	QTY.		
			BC420 U.S. Standard	BC4M20 Metric Taper Heads	BC4MM20 Metric Parallel Heads
12	6920-1012	Piston	2	2	2
13	1308-1055	Socket Head Cap Screw US Standard	4	-	-
	4510-1040	Metric	-	4	4
14	16920-1081	Band Wiper	2	2	2
15	10515-1000	Spring	2	2	2
16	20920-1061	Head O-Ring	2	2	2
17	16920-1029	Carrier Wiper Strips	2	2	2
18	6920-1011	Carrier	1	-	-
	7920-1011	Carrier (Metric)	-	1	1
19	6930-1042	BC4 Decal	2	2	2
20	16925-1002	Small Bearing Pucks	A/R	A/R	A/R
	16920-1003	Medium Bearing Pucks	A/R	A/R	A/R
	16920-1005	Large Bearing Pucks	A/R	A/R	A/R
21	6920-1082	End Cap	2	2	2
22	1,6NSBBC420	Replacement Seal Band (6920-1046) specify stroke	A/R	-	-
	1,6NSBBC4M20		-	A/R	-
	1,6NSBBC4MM20		-	-	A/R
23	1,6NDBBC420	Replacement Dust Band (6920-1045) specify stroke	A/R	-	-
	1,6NDBBC4M20		-	A/R	-
	1,6NDBBC4MM20		-	-	A/R
24	6RTBBC420	Replacement Tube (6920-1010) specify stroke	A/R	-	-
	6RTBBC4M20		-	A/R	-
	6RTBBC4MM20		-	-	A/R
25	6920-1002	Switch Magnet	1	1	1
26	0920-1024	Socket Head Flat Screw	6	6	6
27	16920-1008	Piston Bearing Sleeve	2	2	2
30	16920-1080	Band Ramp	2	2	2
33	6920-1014	Bearing Sleeve Pin	2	2	2
50	1,2,3,4,50701-1003	Face Seal O-Ring	2	2	2
60	1004-1073	Internal Pipe Plug	2	2	2

**1 Repair Kit:** Parts contained in Repair Kit RKBC4(M,MM)20SK\_ \_ \_

**2 Seal Kit:** Parts contained in Seal Kit #6920-9022

**3 Head Assy.:** Parts contained in Head Assembly #6920-9000

**4 Head Assy.:** Parts contained in Head Assembly #7920-9000

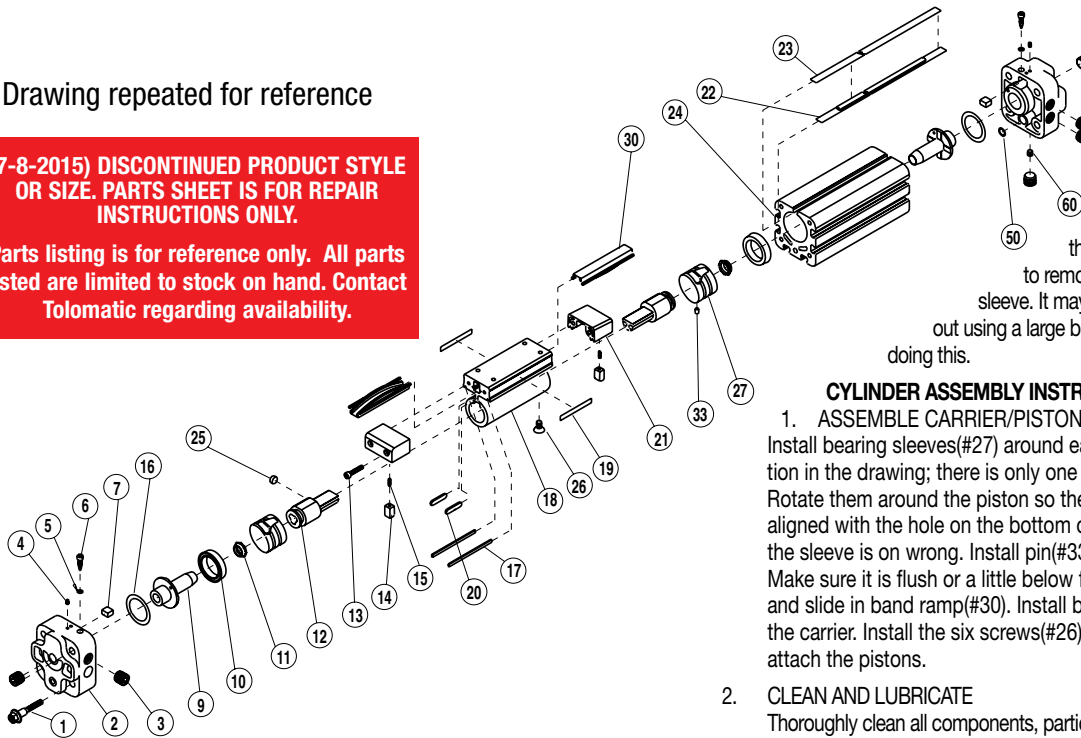
**5 Head Assy.:** Parts contained in Head Assembly #8920-9000

**6** After configuration code add: **SK\_ \_ \_** (note: the letters SK indicate stroke, follow these letters with the stroke length in decimal inches.) If the actuator has the dual carrier option add the code **DC\_ \_ \_** (note: follow the letters DC with the distance between the carriers in decimal inches.)

Drawing repeated for reference

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#### CYLINDER DISASSEMBLY INSTRUCTIONS

Begin with a clean work area. Make sure all replacement parts are available and have no visual damage or defects. The following tools are recommended for proper disassembly and assembly. (Exact wrench sizes will vary depending on cylinder size)

- Allen wrench set(std. or metric depending on unit)
- Socket wrench & socket set
- Torque Wrench(helpful, but not necessary)
- Digital or dial caliper
- Tin Snips

#### 1. GENERAL DISASSEMBLY:

- Remove band cylinder from attached machinery.
  - Remove any Foot Mounting hardware external Shock Absorbers, Tube Supports, Floating Mount or switches if present. Remove all Head Bolts (#1) and loosen the set screws (#4) on each cylinder Head (#2). Remove Heads.
  - Remove Screws (#13) from End Caps (#21). Slide out Carrier Wipers(#17) from carrier. Slide End Caps off Carrier(#21). Remove Band Wiper(#14) and Spring(#15). Remove top Dust Band (#23). Remove the Carrier Assembly (#18) from the Tube (#24).
- REMOVE SEAL BAND:**  
Dislodge the inner Sealing Band (#22) from its groove by gently pressing down on the band with an O-ring Pick or similar tool. (When doing so, take care that NO SCRATCHES are made in the tube bore slot.) Do not scratch or nick the sealing band. Remove Sealing Band (#22).
  - REMOVE CARRIER FROM CYLINDER:**  
Slide out carrier(#18) gently from the cylinder. Remove bearing pucks(#19) from both sides of carrier. Note: Do not discard these, they are matched for this particular carrier/tube combination and will be needed later. Use a caliper and make note of the thickness of each bearing and what side of the carrier it came from. This will be needed when installing these bearings again or new bearings.
  - REMOVE SEALING COMPONENTS FROM CARRIER:**  
Remove the piston seal(#10) from the both ends of the carrier(#18). Remove the Cushion Seal(#11) from both ends of the carrier.
  - DISASSEMBLE CARRIER/PISTON:**  
Remove screws(#26) that hold the piston ends(#12) into the carrier. Remove

band ramps(#30) from inside of the carrier. Remove piston bearing sleeves(#27) by first removing the pin(#33) that holds them into the piston. Note: the pin may be difficult to remove since it sits lower than the bearing sleeve. It may be necessary to expand the sleeve out using a large blade screwdriver. Use caution when doing this.

#### CYLINDER ASSEMBLY INSTRUCTIONS

##### 1. ASSEMBLE CARRIER/PISTON:

Install bearing sleeves(#27) around each piston(#12). Note their orientation in the drawing; there is only one way they can go on the piston. Rotate them around the piston so the hole on the bottom of the sleeve is aligned with the hole on the bottom of the piston. If they are not aligned, the sleeve is on wrong. Install pin(#33) into the bottom of each piston. Make sure it is flush or a little below flush to the sleeve. Take carrier(#18) and slide in band ramp(#30). Install both pistons(#12) into each side of the carrier. Install the six screws(#26) on the bottom of the carrier to attach the pistons.

##### 2. CLEAN AND LUBRICATE

Thoroughly clean all components, particularly the tube bore slot and bands. Thoroughly lubricate the tube with RheoGel TEK664 grease. Apply light coat of grease to Sealing Band (#22) and Dust Band (#23).

##### 3. INSTALL SEALING BAND

**CAUTION:** Metal edges of Sealing Band are sharp. Exercise caution to avoid injury to yourself of the Band and Tube when inserting.

Carefully install Sealing Band (#22) by passing it sideways through the slot in the tube. Position Sealing Band, rubber up, on the bottom of the tube with equal length of band extending out both ends of the tube.

##### 4. INSTALL PISTON/CARRIER ASSEMBLY

Lubricate and install new Piston Seals(#10) (lip seals facing out) onto Piston(#12). Lubricate and install new Cushion Seals (#11) (small end facing out) into Piston ends and rotate to seat them in their grooves.

**NOTE:** If the cylinder will be used with optional shock absorber packages, do not install the Cushion Seals. Doing so will adversely affect shock performance. If unit has one shock only, the side of the piston that has the shock does not get a cushion seal.

##### 4. INSTALL CARRIER BEARINGS

Repair kits include 18 bearing pucks of 3 different thickness. A caliper can be used to separate bearings into like groups of thickness. The same combination of thickness of bearings should be used as what came off the carrier when it was removed. Press these new bearings into the side pockets of the carrier. Insert Piston/Carrier Assembly (#18) into tube and manually push the Carrier the full length of the Tube (#24). As this is done check that the fit of the Carrier is firm. **NOTE:** A tight fit will result in higher cylinder breakaway. Use your own discretion in determining performance requirements for your application. If fit is insufficient, select the next size bearing, larger or smaller as needed. Repeat until fit is correct.

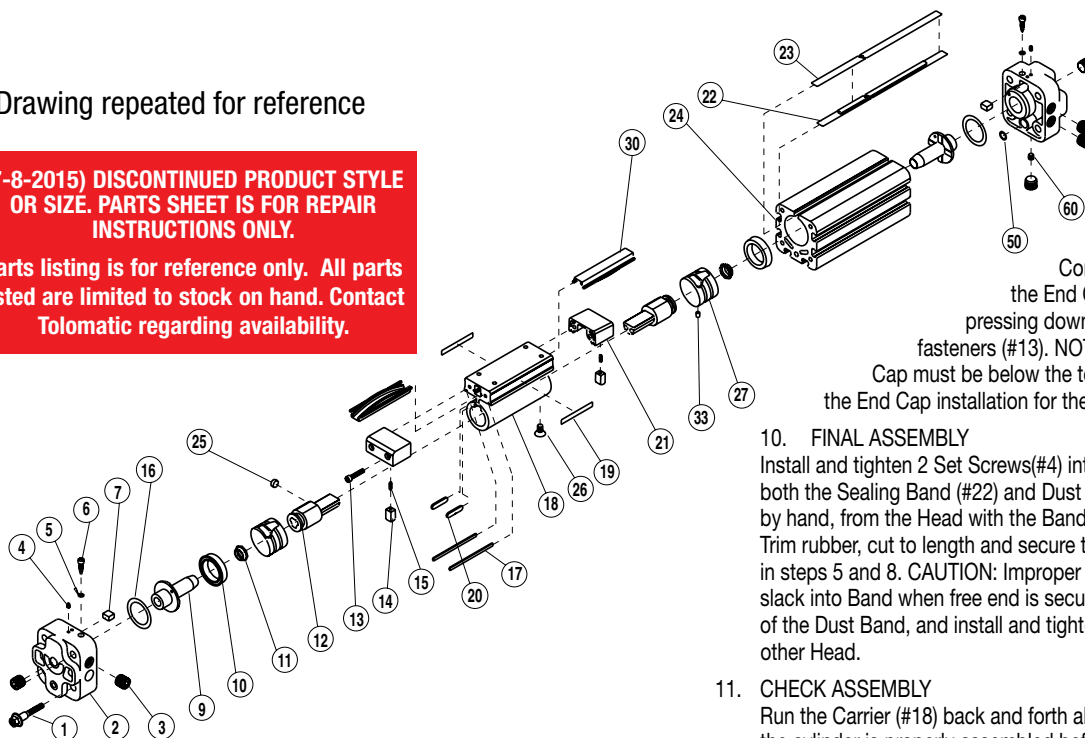
Remove Piston/Carrier Assembly (#18) and place a small amount of RheoGel TEK664 into the Cushion Seals (#11) then fill the outside of the Piston completely with grease. Install Piston/Carrier Assembly into Tube (#24) with Magnet facing the die mark that is located in the switch groove and feed the Sealing Band (#22) through the Piston/Carrier assembly. **NOTE:** Take care that the Piston Seal (#10) is not cut as the first end of the Piston is inserted into the Tube.

Manually slide Piston/Carrier Assembly (#18) the length of the Tube (#24) to seat the Sealing Band (#22) into the groove. As the end of the Piston exits the other end of the Tube, grease should be present on the Piston. If not, the tube was not properly greased. Wipe off excess grease.

## Drawing repeated for reference

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## 5. TRIM SEALING BAND

With tin snips, trim band to length indicated below. With a razor blade, remove rubber from extended band until flush with the end of tube.

Cylinder Size    Trim Length From Tube

BC420	1" (25.4 mm) (Tolerance of +/- .032")
BC425	1" (25.4 mm) (Tolerance of +/- .032")
BC430	.75" (19 mm) (Tolerance of +/- .032")
BC440	.75" (19 mm) (Tolerance of +/- .032")

## 6. INSTALL HEADS

Lubricate and install new O-Rings (#16) onto Heads (#2). Remove Cushion Needle Valve (#6) and lubricate and install new O-Rings (#5) onto Cushion Needle Valves. Insert Cushion Needle Valves (#6) back into Heads (#2). Set Band Clamp(#7) on trimmed end of Sealing Band. Insert Heads into Tube (#24) using a slight rocking motion. **DO NOT TWIST.** Twisting the Head during installation may cut the O-Ring resulting in excessive leakage during operation.

**NOTE:** When inserting heads, make sure band does not get pushed backwards into tube. Rubber on band must remain flush to the tube after head installation. Install Head Bolts (#1) into Heads (#2). Torque Head Bolts to 180-190 in-lbs(20.9 N-m).

## 7. SINGLE END PORT HEADS (Optional)

Grease and install O-Ring(#59) into pocket on Head(#3).

## 8. INSTALL DUST BAND

Install Band Ramp(#30) into the top of the Carrier. Clean Dust Band (#23) thoroughly with a clean cloth. Remove any rubber residue on the solid steel surface with a razor blade. Feed Dust Band over the Band Ramp inside the Carrier. Strip rubber from steel on one end of Dust Band to flush with the end of the Tube. With a tin snips, trim Band to the proper length.

Cylinder Size    Trim Length From Tube

BC420	1" (25.4 mm) (Tolerance of +/- .032")
BC425	1" (25.4 mm) (Tolerance of +/- .032")
BC430	.75" (19 mm) (Tolerance of +/- .032")
BC440	.75" (19 mm) (Tolerance of +/- .032")

## 9. INSTALL END CAPS

Slide in the 2 Carrier Wiper Strips(#17). Lightly lubricate the Band

Wiper (#14). Place a Spring (#15) into the hole of the Band Wiper and insert the Band Wiper into the End Cap (#21). Note: Band Wiper has a radius in one direction; it faces the carrier.

Compress the Band Wiper and insert the End Cap onto the Carrier (#18). While pressing down on the End Cap tighten End Cap fasteners (#13). **NOTE:** The top surface of the End Cap must be below the top surface of the Carrier. Repeat the End Cap installation for the other side of the carrier.

## 10. FINAL ASSEMBLY

Install and tighten 2 Set Screws(#4) into one Head. Work the slack out of both the Sealing Band (#22) and Dust Band (#23) by moving the Carrier by hand, from the Head with the Bands retained to the opposite Head. Trim rubber, cut to length and secure the free end of Bands as described in steps 5 and 8. **CAUTION:** Improper cut length of Band may introduce slack into Band when free end is secured. Make sure all the slack is out of the Dust Band, and install and tighten down Set Screws(#4) on the other Head.

## 11. CHECK ASSEMBLY

Run the Carrier (#18) back and forth along the full stroke to make certain the cylinder is properly assembled before applying air. Before mounting cylinder back in application, check the cylinder's internal cushions. (If optional shock absorber kits are being used, this step can be eliminated as Cushion Seals (#11) were not installed.) Push the Carrier (#18) to one end. You should feel the Cushion decelerate the Carrier before the Cushion bottoms out. If the Carrier slams into the end of the cylinder, either the Cushion Seals have not been properly installed or the Cushion Needle Valve (#6) is adjusted too far out. Adjust Cushion Needle if required.

## OPTIONAL ACCESSORY ASSEMBLY INSTRUCTIONS

## 1. SHOCK ABSORBERS

Install screws (#72) into Shock Stop Plate (#71) onto Carrier. Secure Shock Mounting Plates (#69) to Heads with Screws (#67). Screw the Shock Absorber (#68) into the Shock Mounting Plate. Attach the cylinder to air lines and under low pressure cycle the Carrier to one end of the cylinder. Adjust the Shock Absorber nearest the Carrier to bottom out the Shock at its fullest stroke. Then back out the Shock one full turn and tighten the Jam Nut. Repeat if necessary for the other end of the cylinder.

## 2. FOOT MOUNTS

Install Screws (#65) and secure Foot Mount (#64) to each Head.

## 3. TUBE SUPPORTS

Install 4 T-Nuts (#61) are required on the bottom of Tube. Tube Supports should be secured at the required distances determined for the application to prevent Tube deflection. Install Screws (#63) and secure Tube Supports (#62) to tube aligning holes in T-Nuts with holes in Tube Supports.

## 4. FLOATING MOUNT

Place Pin (#73), flat side towards carrier, between the two center holes as shown. Place Floating Mounting Clamp (#74) over pin and secure to the Carrier with Screws (#75). Place Floating Mount Bracket (#76) over pin.

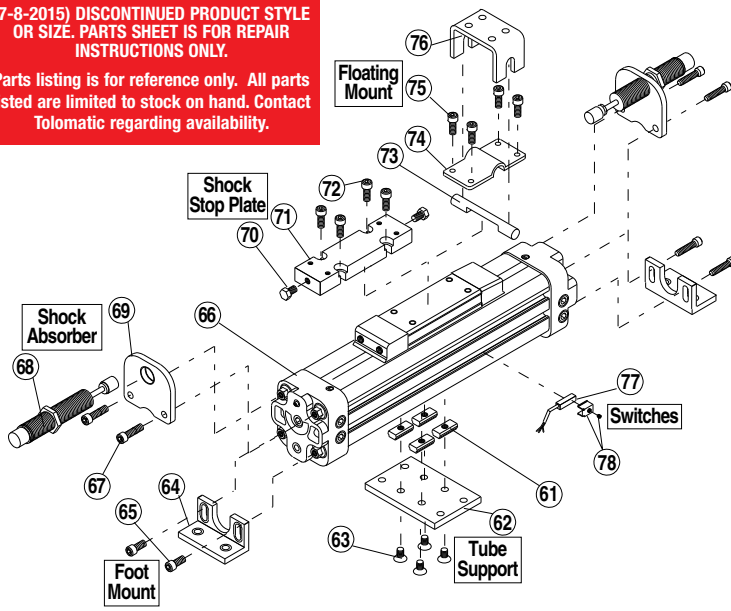
## 5. SWITCHES

**NOTE:** Form A Reed Switches should not be used in TTL logic circuits. A voltage drop caused by the L.E.D. indicator will result. For applications where TTL circuits are used, please contact the factory.

**WARNING:** An ohmmeter is recommended for testing Reed Switches. NEVER use an incandescent light bulb as a high current rush may damage the switch. Reed and TRIAC switches are only recommended for signaling position, not directly powering solenoids. For shifting a solenoid, a relay or resistor is recommended between it and the Reed Switch. Switch ratings must not be exceeded at any time.

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ITEM	PART NO.	DESCRIPTION	QTY.		
			BC420 U.S. Standard	BC4M20 Metric Taper Rc Heads	BC4MM20 Metric Parallel G Heads
<b>TUBE SUPPORTS<sup>1</sup></b>					
KIT <sup>1</sup>	6920-9002	Tube Support Kit <sup>1</sup> US Standard	A/R	–	–
	7920-9002	Tube Support Kit <sup>1</sup> Metric	–	A/R	A/R
61	3420-1013	BC420 Nut	4	–	–
	4420-1013	BC420 Nut (Metric)	–	4	4
62	6920-1013	Tube Support	1	1	1
63	6920-1083	Flat Head Screw	4	–	–
	6920-1084	Flat Head Screw (Metric)	–	4	4
<b>FOOT MOUNT</b>					
KIT <sup>2</sup>	6920-9003	Foot Mount Kit <sup>2</sup> US Standard	A/R	–	–
	7920-9003	Foot Mount Kit <sup>2</sup> Metric	–	A/R	A/R
64	6920-1018	Foot Mount	2	2	2
65	1104-1011	Socket Head Screw	2	–	–
	4925-1033	Socket Head Screw (Metric)	–	2	2
<b>SINGLE END PORTING</b>					
66	6920-9017	Single End Porting Head	1	–	–
	7920-9017	Single End Porting Head	–	1	–
	8920-9017	Single End Porting Head	–	–	1

**Service Parts Ordering NOTES:**

- 1 A minimum of 2 (two) Tube Supports required per cylinder
- 2 Foot Mount Kit contains two foot mount brackets and mounting hardware
- 3 Shock Mount Kit contains one set of mounting hardware only
- 4 Shock Absorber Kit contains one Shock Absorber and mounting hardware
- 5 Standard end-of-stroke shock absorbers are designed to operate without the assistance of the standard band cylinder cushion. To ensure proper shock absorber performance, make sure the air cushion is disabled.

A/R = As Required

ITEM	PART NO.	DESCRIPTION	QTY.			
			BC420 U.S. Standard	BC4M20 Metric Taper Rc Heads	BC4MM20 Metric Parallel G Heads	
<b>SHOCK ABSORBERS<sup>5</sup></b>						
KIT <sup>3</sup>	6920-9024	Shock Mount	US Standard	A/R	–	
	7920-9024	Kit <sup>3</sup> (Hardware Only)	Metric	–	A/R	
KIT <sup>4</sup>	6920-9020	Shock Absorber Kit <sup>4</sup>	Heavy Duty	US Standard	A/R	
	7920-9020		Metric	–	A/R	
	6920-9005	Light Duty	US Standard	A/R	–	
	7920-9005		Metric	–	A/R	
67	1009-1065	Socket Head Screw		4	–	
	4415-1019	Socket Head Screw (Metric)		–	4	
68	0920-1069	Heavy Duty Shock		1	–	
	4920-1069	Heavy Duty Shock (Metric)		–	1	
	0920-1068	Light Duty Shock		1	–	
	4920-1068	Light Duty Shock (Metric)		–	1	
69	6920-1017	Shock Mounting Plate	US Standard	1	–	
	7920-1017		Metric	–	1	
70	6920-1024	Shock Impact Bolt		2	2	
71	6920-1019	Shock Stop Plate	US Standard	1	–	
	7920-1019		Metric	–	1	
72	1009-1065	Socket Head Screw		4	–	
	4415-1019	Socket Head Screw (Metric)		–	4	
<b>FLOATING MOUNT</b>						
KIT	6920-9004	Floating Mount Kit US Standard		1	–	
	7920-9004	Floating Mount Kit Metric		–	1	
73	6920-1021	Floating Mount Pin		1	1	
74	6920-1059	Floating Mount Clamp		1	1	
75	2307-1018	Socket Head Screw		4	–	
	4415-1011		Socket Head Screw (Metric)		–	4
76	0920-1037	Floating Mount Bracket		1	1	
<b>SWITCHES</b>						
		<b>PART NUMBER ORDERING</b>	<b>CONFIG. CODE ORDERING</b>			
		No Mounting Hardware or FE conn. included	Mounting Hardware & FE conn. included			
	<b>PART NO.</b>	<b>DESCRIPTION</b>	<b>CODE</b>			
77	3600-9084	Switch Only, Reed, Form C, 5m	BT			
	3600-9085	Switch Only, Reed, Form C, Male Conn.	BM			
	3600-9082	Switch Only, Reed, Form A, 5m	RT			
	3600-9083	Switch Only, Reed, Form A, Male Conn.	RM			
	3600-9086	Switch Only, Triac, 5m	CT			
	3600-9087	Switch Only, Triac, Male Conn.	CM			
	3600-9090	Switch Only, Hall-effect, Sinking, 5m	KT			
	3600-9091	Switch Only, Hall-effect, Sinking, Male Conn.	KM			
	3600-9088	Switch Only, Hall-effect, Sourcing, 5m	TT			
	3600-9089	Switch Only, Hall-effect, Sourcing, Male Conn.	TM			
		2503-1025	Connector (Female) 5 meter lead			
	NOTE: When ordered by Config. Code Female connector & all mounting hardware is included					
	78	3420-9999	Hardware Kit (Clamp & Screw)		1	1

**Switch Ordering NOTES:**

To order field retrofit switch and hardware kits for all Tolomatic actuators: SW (Then the model and bore size, and type of switch required)

**Example: SWBC420RT**

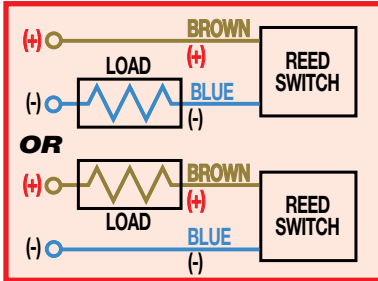
(Hardware and Form A Reed switch with 5 meter lead for 2" bore BC4 band cylinder)



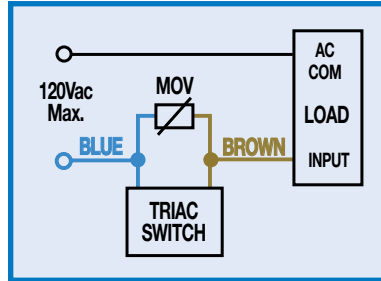
Mounting hardware is required if replacing switch for any actuator manufactured before 7/1/97

**WIRING DIAGRAMS**

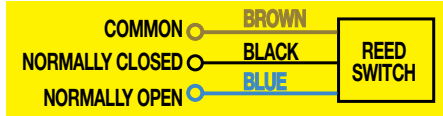
**R T & R M DC REED, FORM A**



**C T & C M AC REED, TRIAC**

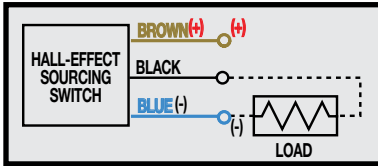


**B T & B M DC REED, FORM C**

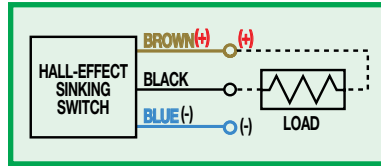


Some actuators may require switch mounting on a specific side of the assembly. Call Tolomatic for details.

**T T & T M HALL-EFFECT, SOURCING, PNP**



**K T & K M HALL-EFFECT, SINKING, NPN**



**INSTALLATION INFORMATION**



**THE NOTCHED FACE OF THE SWITCH INDICATES THE SENSING SURFACE AND MUST FACE TOWARD THE MAGNET.**

**REPLACEMENT OF QD SWITCHES MANUFACTURED BEFORE JULY 1, 1997:** It will be necessary to replace or rewire the female end coupler.

**CURRENT Quick disconnect Wiring**

**BLACK SIGNAL**

**OLD Quick disconnect Wiring**

**BLACK SIGNAL**

2503-1025 Female Connector 5M

**LUBRICATION AND MAINTENANCE**

All Tolomatic BC4 Band Cylinders are prelubricated at the factory. To ensure maximum cylinder life, the following guidelines should be followed.

- 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.
- External Lubricators (optional)**  
The factory prelubrication of Tolomatic Band Cylinders 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 +150°F (+0° to 65.5°C).

- NOTE: Use of external lubricators may 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 premature wear.
- 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.
  - Bearing lubrication**  
The bearing system is prelubricated at the factory with a high quality RheoGel TEK664 grease. Relubrication is recommended every .5-1 million cycles using RheoGel TEK664 grease.
  - Cushion Adjustment**  
Adjust the cushion needles in the cylinder heads carefully to obtain a smooth, hesitation free deceleration for your particular application. If there are questions on proper adjustment, please consult Tolomatic.

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