Tolomatic™
EXCELLENCE IN MOTION

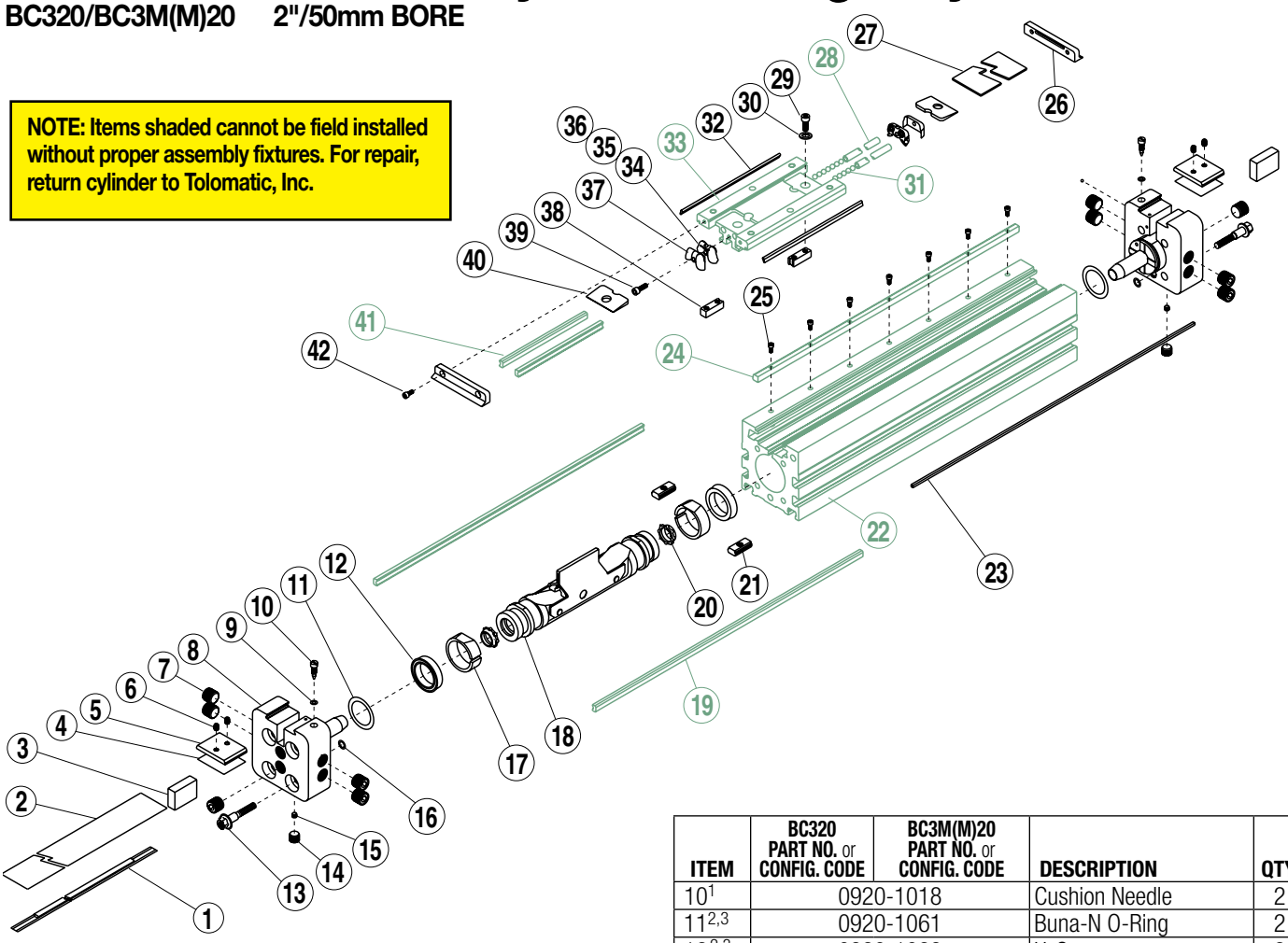
Parts Sheet

3420-4005_14
Replaced 3420-4004

BC3 Series™ Band Cylinder® Wedge Style

BC320/BC3M(M)20 2"/50mm BORE

NOTE: Items shaded cannot be field installed without proper assembly fixtures. For repair, return cylinder to Tolomatic, Inc.



Parts Listing

ITEM	BC320 PART NO. or CONFIG. CODE	BC3M(M)20 PART NO. or CONFIG. CODE	DESCRIPTION	QTY.
1[2,4]	NSBBC320	NSBBC3M20 NSBBC3MM20	Replacement Sealing Band (3420-1005)	1
2[2,4]	NDBBC320	NDBBC3M20 NDBBC3MM20	Replacement Dust Band (3420-1028)	1
3	3420-1030		Lower Clamp	2
4	3420-1045		Upper Clamp Pad	2
5	3420-1029		Upper Clamp	2
6	3415-1455	4410-1017	Set Screw	4
7[1]	0920-1029	4920-1029	Pipe Fitting	10
8[1]	3420-1007	–	Standard Head	2
	–	4420-1007	Metric Taper Head	2
	–	5420-1007	Metric Parallel Head	2
9[1,2,3]	0701-1003		Buna-N O-Ring	2

ITEM	BC320 PART NO. or CONFIG. CODE	BC3M(M)20 PART NO. or CONFIG. CODE	DESCRIPTION	QTY.
10[1]	0920-1018		Cushion Needle	2
11[2,3]	0920-1061		Buna-N O-Ring	2
12[2,3]	0920-1028		U-Cup	2
13	0920-1087	4920-1047	Tapped Screw	8
14[1]	1004-1073	4915-1002	Pipe Plug	
15[1]	1014-1065	4910-1002	Pipe Plug	2
16[2,3]	1001-1021	1001-1021	Buna-N O-Ring	3
17[2, 3]	0920-1011		Wear Ring	2
18	3420-9000		Piston/Bracket Assembly w/magnet	1
19	3420-1023		Rail way	A/R
20[2, 3]	0920-1027		Cushion Seal	2
21	3420-1013		BC320 Nut	AR
22	3420-1506		Machined Tube	A/R
23[4]	NMBBC320	NMBBC3M20 NMBBC3MM20	Replacement Magnet Band (3420-1022)	2
24	3420-1495		Machined Wedge	1
25	0605-1045		Socket Head Cap Screw	A/R
26[2, 3]	3420-2024		End Cap	2

1 Items available as Standard Head Assembly #3420-9001, Metric Taper Head Assembly #4420-9001 and Metric Parallel Head Assembly #5420-9001.

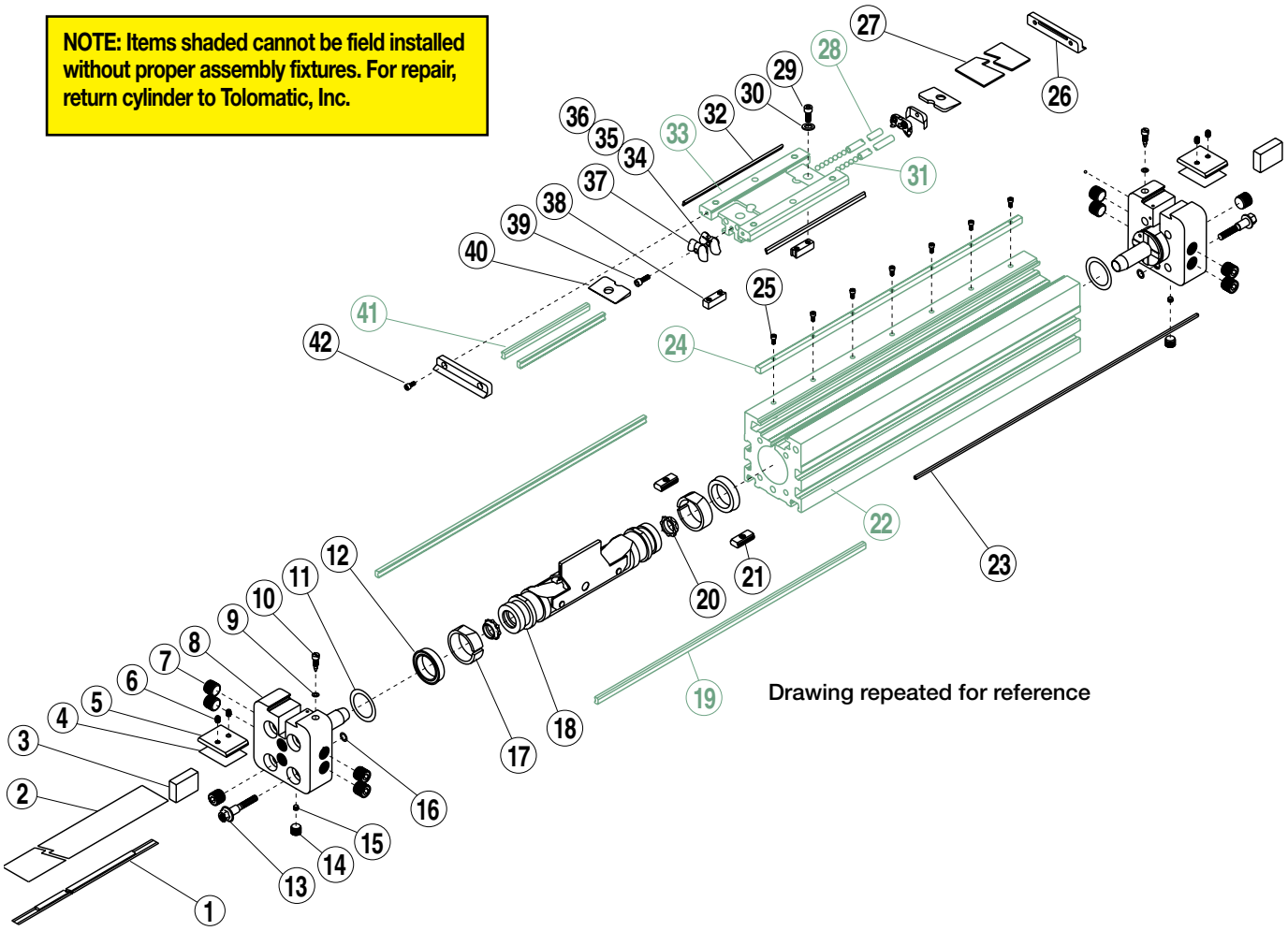
COMMON REPLACEMENT PARTS:

2 Repair Kit: Parts contained in Repair Kit RKBC320SK_ _ _

3 Seal Kit: Parts contained in Seal Kit #3420-9019

4 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 **DW**_ _ _ (note: follow the letters DW with the distance between the carriers in decimal inches.)

NOTE: Items shaded cannot be field installed without proper assembly fixtures. For repair, return cylinder to Tolomatic, Inc.



Parts Listing

ITEM	BC320 PART NO. or CONFIG. CODE	BC3M(M)20 PART NO. or CONFIG. CODE	DESCRIPTION	QTY.
27	3420-2022		Carrier Cover	1
28	3420-1019		Ball Return Tube	2
29	2317-1014	4415-1000	Socket Head Cap Screw	4
30	3415-1059	3415-1059	Washer	8
31	3420-1009		Ball	92
32[2,3]	3420-1025		BC320 Wiper	2
33	3420-2021	4420-1235	Machined Carrier	1
34	3420-1014		Ball Return	2
35	3420-1015		Right Ball Race	2
36	3420-1032		Left Ball Race	2
37	3420-1069		PLT, Ball Return	2

ITEM	BC320 PART NO. or CONFIG. CODE	BC3M(M)20 PART NO. or CONFIG. CODE	DESCRIPTION	QTY.
38	3420-1010	4420-1010	Piston Block	2
39	1085-1075	0610-1033	Socket Head Cap Screw	2
40	3415-1047		Upper Band Ramp	2
41	3420-1024		Carrier Way	2
42	0605-1046	4415-1001	Socket Head Cap Screw	A/R

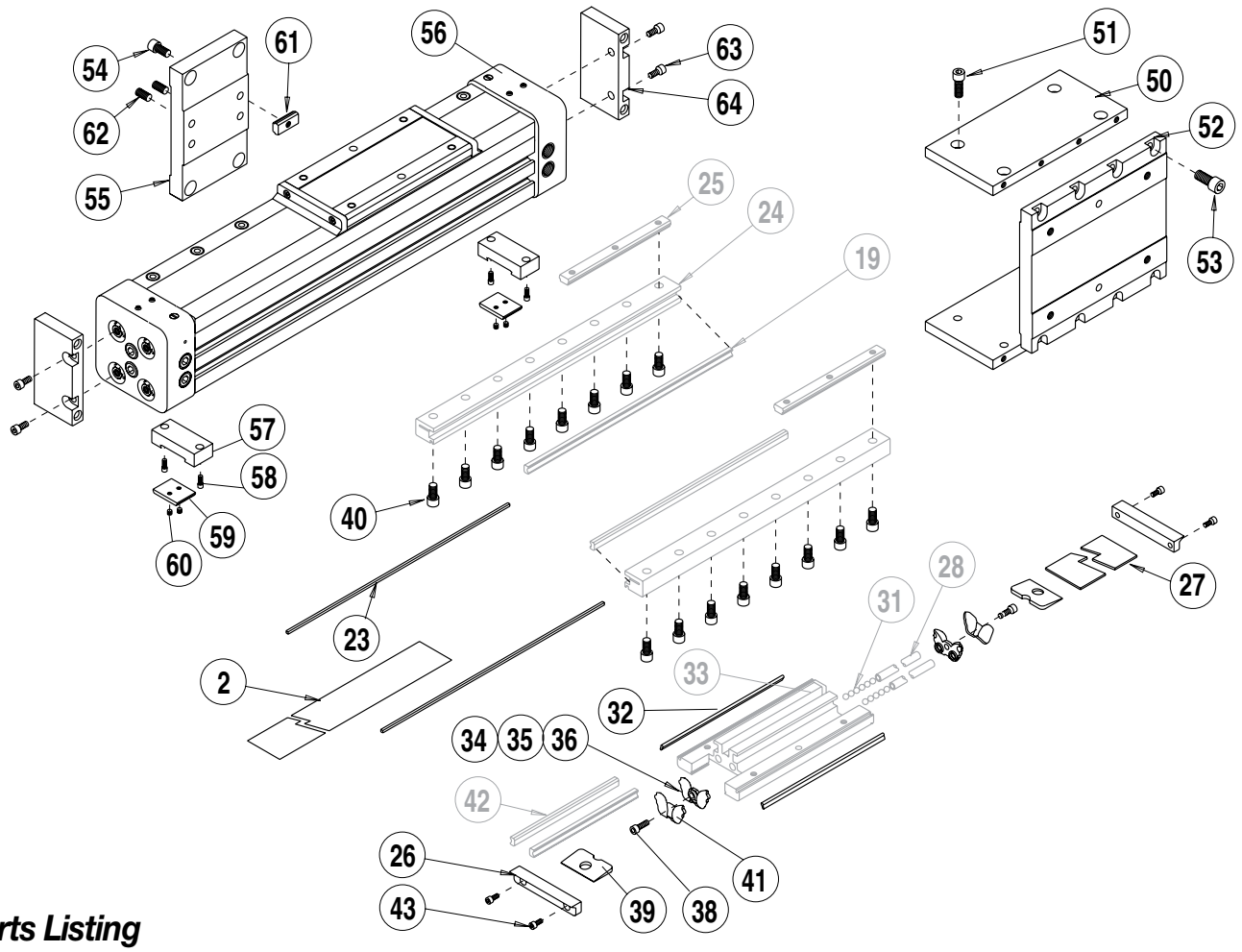
1 Items available as Standard Head Assembly #3420-9001, Metric Taper Head Assembly #4420-9001 and Metric Parallel Head Assembly #5420-9001.

COMMON REPLACEMENT PARTS:

2 **Repair Kit:** Parts contained in Repair Kit RKBC320SK_ _ _

3 **Seal Kit:** Parts contained in Seal Kit #3420-9019

4 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 **DW**_ _ _ (note: follow the letters DW with the distance between the carriers in decimal inches.)



Parts Listing

ITEM	BC320D PART NO. or CONFIG. CODE	BC3M(M)20D PART NO. or CONFIG. CODE	DESCRIPTION	QTY.
2[4]	NDBBC320	NDBBC3M20 NDBBC3MM20	Replacement Dust Band (3420-1028)	1
19	3420-1023	3420-1023	Rail Way	2
23	NMBBC320	NMBBC3M20 NMBBC3MM20	Replacement Magnet Band (3420-1022)	2
24	3420-1020	3420-1020	Machined Rail	2
25	3420-1008	4420-1008	Rail Nut	AR
26	3420-2024	3420-2024	End Cap	2
27	3420-2022	3420-2022	Carrier Cover	1
28	3420-1019	3420-1019	Ball Return Tube	2
31	3420-1009	3420-1009	Ball	92
32	3420-1025	3420-1025	Wiper	2
33	3420-2021	4420-1235	Machined Carrier	1
34	3420-1014	3420-1014	Ball Return	2
35	3420-1015	3420-1015	Right Ball Race	2
36	3420-1032	3420-1032	Left Ball Race	2
38	1085-1075	0610-1033	Socket Head Cap Screw	2
39	3415-1047	3415-1047	Upper Band Ramp	2
40	3420-1077	4415-1018	Socket Head Cap Screw	AR
41	3420-1069	3420-1069	PLT Ball Return	2
42	3420-1024	3420-1024	Carrier Way	2
43	0605-1046	4415-1001	Socket Head Cap Screw	4

ITEM	BC320D PART NO. or CONFIG. CODE	BC3M(M)20D PART NO. or CONFIG. CODE	DESCRIPTION	QTY.
50	3420-1049	4420-1049	Plate, Conn., Dual Carrier	2
51	0920-1093	4415-1019	Socket Head Cap Screw	8
52	3420-1054	4420-1054	Plate, Dual Carrier	1
53	0920-1093	4415-1019	Socket Head Cap Screw	8
54	2317-1015	4920-1025	Socket Head Cap Screw	4
55	3420-1053	3420-1053	Tube Support	1
56	3420-1051	4420-1051	Head, Dual 180°	2
		5420-1051	Head, Dual 180°, Parallel Port	2
57	3420-1050	3420-1050	PLT, Band, Dual 180° Carrier	2
58	1004-1066	4515-1019	Socket Head Cap Screw	4
59	3420-1029	4420-1029	Clamp, Upper	2
60	3415-1455	4410-1017	Set Screw	4
61	3420-1013	4420-1013	Nut	4
62	3415-1219	3415-1219	Set Screw	2
63	1009-1065	4415-1019	Socket Head Cap Screw (each side)	2
64	3420-1052	3420-1052	Foot Mount, Dual 180° Carrier	1

4 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 **DW**_ _ _ (note: follow the letters DW with the distance between the carriers in decimal inches.)

CYLINDER DISASSEMBLY INSTRUCTIONS FOR INSTALLATION OF REPAIR KITS ONLY

1. Remove Band Cylinder from machinery.

2. Remove any foot mounting hardware external shock absorbers or switches if present. Remove the four Head Screws (13) and the two Set Screws (6) from each cylinder Head (8). Remove the Upper Clamp Pad (4), Upper Clamp (5) and Lower Clamp (3). Remove Heads.

3. Remove Screws (42) from End Caps (26) and slide End Caps off Carrier (33). Slide off Carrier Cover (27). Remove top Dust Band (2). Remove Screws (29) to release Piston Blocks (38). Slide Carrier (33) slightly either direction to remove Piston Blocks (38) and release Piston Bracket Assembly (18). Slide Piston Bracket Assembly out end of tube.

   CAUTION: DO NOT remove the Carrier or the rails. Ball Bearings will fall out as a result.

4. Dislodge the inner Sealing Band (1) 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.) Remove Sealing Band.

CYLINDER ASSEMBLY INSTRUCTIONS

1. CLEAN AND LUBRICATE
Thoroughly clean all components, particularly the tube bore slot and bands. Thoroughly lubricate the tube with Magnalube®-G grease.

2. READY INNER SEALING BAND
Lubricate rubber strip on both sides of new Sealing Band (1) with Magnalube®-G grease. Slide Sealing Band (1) into cylinder Tube (22) with rubber portion facing up. Center band in Tube so equal lengths of Band extend out both ends.

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

3. INSTALL PISTON ASSEMBLY
Lubricate and install new U-Cups (12) (lip seals facing out) onto Piston ends (18). Lubricate and install new Cushion Seals (20) (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.

Lubricate and install new Wear Rings (17) onto the piston with the thinner edge and widest part of the flat inward, lining up the wider flat portion with the band ramp and the narrower flat portion with the flat on the Piston. Place a small amount of grease into the Cushion Seals on each end of the Piston. Fill indentations on both sides of the Piston Bracket Assembly (18) completely with grease and install into the cylinder Tube (22) feeding the Sealing Band (1) between the Piston and Bracket. If the cylinder is equipped for switches, it is important to note which side of the Piston Bracket Assembly (18) contains the Magnet, as switches must be attached to that side of the Tube. Slide the Piston Bracket Assembly (18) to the Carrier (33), slide the Carrier back over the Piston and continue to move the Piston Bracket Assembly the length of the tube to seat the sealing band in its groove. Wipe away excess grease.

NOTE: If Tube and Piston were greased properly, excess grease should be present as Piston exits end of tube.

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

Cylinder Size	*Trim Length From Tube*
2" (50 mm)	1.200" (30.48 mm) (Tolerance of +/- .032")

CAUTION: Bands inaccurately cut too long may cause serious injury to your hand when pressing the head onto the tube.

5. INSTALL HEADS
Lubricate and install new O-Rings (11) onto Head snouts. Lubricate and install new O-rings (16) into cross ports on Heads (8). Remove Cushion Needle Valve (10) and lubricate and install new O-Rings (9) onto Cushion Needle Valves. Insert Cushion Needle Valves (10) back into Heads (8). Insert heads into tube 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 (13) into heads (8). Torque Head Bolts (13) to 180-195 in.-lbs (20.34-22.03 Nm).

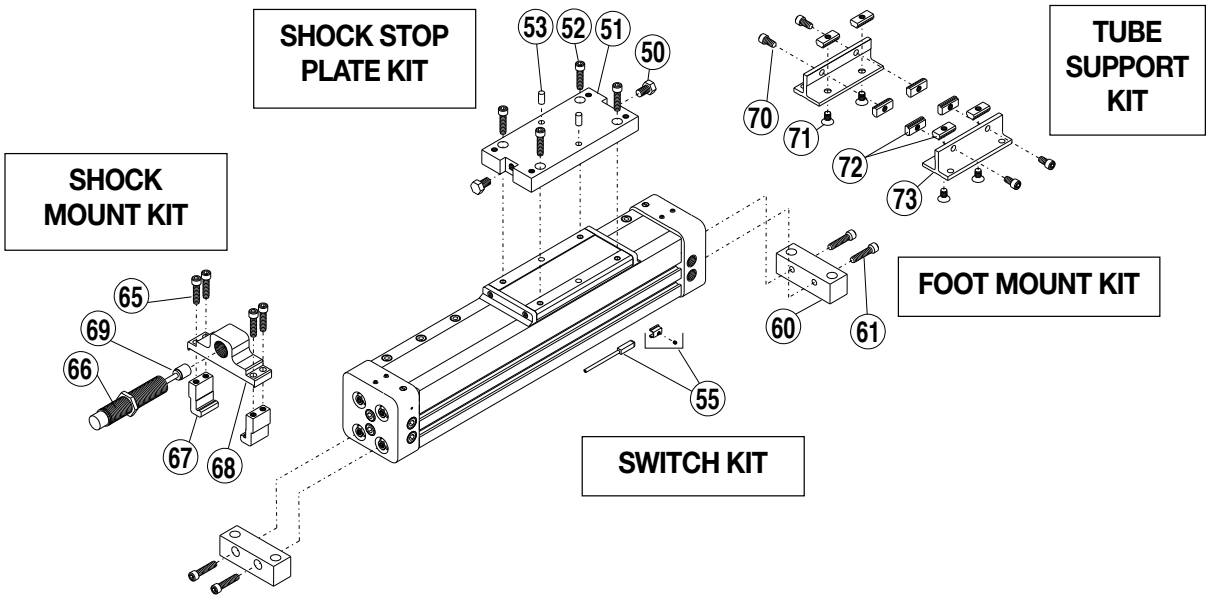
6. LUBRICATE BALLWAYS
Before installing the top Dust Band (2) lubricate the ballways with Mobil HP grease.

7. INSTALL CARRIER STOPS
Place a Piston Stop (38) on either side of the Piston Bracket Assembly (18), notch on Stop to face bracket. Slide the Carrier (33) over the Piston Bracket and Carrier Stops (38) until holes in the Carrier line up with holes in Piston Stops. Apply Loctite #242 on the Screws (29) and secure stops to the carrier. There should be no slack between stops and bracket.

8. INSTALL DUST BAND
Install the top Dust Band (2) over the Carrier (33) centering it along the length of the cylinder. Slide Carrier Cover (27) into slots on top of Carrier. Apply Loctite #242 to Screws (42) and secure End Caps (26) to ends of Carrier (33). With tin snips, cut ends of top band 1/16" in from outside edge of Head (8). Place a Lower Clamp (3) between the Sealing Band (1) and Dust Band (2). Place Upper Clamp Pad (4) and Upper Clamp (5) in each Head (8). Apply Loctite #242 to Set Screws (6) and insert in Upper Clamp (5). Torque set screws to 20-30 in.-lbs. to secure bands.

9. CHECK ASSEMBLY
Run the Carrier (33) 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 (20) were not installed.) Push the Carrier (33) 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 (10) is adjusted too far out.

10. REMOUNT
Before installing back in application, check your air lines to be sure they are in good condition and free of leaks. Remount and apply air. If external shock absorbers are not being used, readjustment of the Cushions may be necessary. Start by screwing the Cushion Needle Valve (10) all the way in but do not tighten, then back it out slightly. Cycle the cylinder and back the Cushion Needle Valve out as necessary to reduce the amount of cushion. This will prevent the load from slamming into an under adjusted cushion and prevent band damage caused from pressure spikes as a result of over tightening the Cushion Needle Valve.



ITEM	BC315 PART NO.	BC3M(M)15 PART NO.	DESCRIPTION	QTY.
SHOCK STOP PLATE KIT[1]				
KIT[1]	3420-9004	4420-9004	Shock Stop Plate Kit	
50	3415-1057	4415-1003	Impact Bolt	2
51	3420-1039	4420-1039	Shock Plate	1
52	1009-1065	4415-1019	Socket Head Cap Screw	4
53	0610-1044	0610-1044	Dowel Pin	2

SWITCH KIT

55

CONFIG. CODE ORDERING Mounting Hardware & FE conn. included	
CODE	**DESCRIPTION**
BT	Switch Kit, Reed, Form C, 5m
BM	Switch Kit, Reed, Form C, Male Conn.
RT	Switch Kit, Reed, Form A, 5m
RM	Switch Kit, Reed, Form A, Male Conn.
CT	Switch Kit, Triac, 5m
CM	Switch Kit, Triac, Male Conn.
KT	Switch Kit, Hall-effect, Sinking, 5m
KM	Switch Kit, Hall-effect, Sinking, Male Conn.
TT	Switch Kit, Hall-effect, Sourcing, 5m
TM	Switch Kit, Hall-effect, Sourcing, Male Conn.

NOTE: When ordered female connector & all mounting hardware is included

FOOT MOUNT KIT[2]				
KIT[2]	3420-9005	4420-9005	Foot Mount Kit (one end)	
KIT[2]	3420-9025	4420-9025	Dual 180° Carrier Foot Mount Kit (one end)	
60	3420-1052		Foot Mount	2
61	1009-1065	4415-1019	Socket Head Cap Screw	4
SHOCK MOUNT KIT WITHOUT SHOCK[3]				
KIT[3]	3420-9003	4420-9003	Shock Mount Kit - one side (hardware only, no shock)	
65	1004-1064	4420-1002	Socket Head Cap Screw	4
67	3420-1038	4420-1038	Clamping Hook	2
68	3420-1037	4420-1037	Shock Mount	1
SHOCK MOUNT KIT WITH SHOCK[4]				
KIT[4]	3420-9010	4420-9010	Shock Absorber Kit - one side (Light Duty Shock)	
KIT[4]	3420-9013	4420-9013	Shock Absorber Kit - one side (Heavy Duty Shock)	
65	1004-1064	4420-1002	Socket Head Cap Screw	4
66	0920-1068	4920-1068	Shock, Light Duty	1
	0920-1069	4920-1069	Shock, Heavy Duty	1
67	3420-1038	4420-1038	Clamping Hook	2
68	3420-1037	4420-1037	Shock Mount	1
69	0512-1018	0520-1018	Shock Stop Spacer	1
TUBE SUPPORT KIT[5]				
KIT[5]	3420-9006	4420-9006	Tube Support Kit	AR
KIT[5]	3420-9026	4420-9026	Dual 180° Carrier Tube Support Kit	AR
70	2307-1018	4415-1011	Socket Head Cap Screw	4
71	3415-1046	4415-1014	Flat Head Cap Screw	4
72	3420-1013	4420-1013	BC315 Nut	4
73	3420-1044	3420-1044	Tube Support	2
74	3420-1017	4420-1017	Tube Support Nut	2

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: SWBC320RT

(Hardware and Form A Reed switch with 5 meter lead for 2.0" bore BC3 band cylinder)

Service Parts Ordering NOTES:

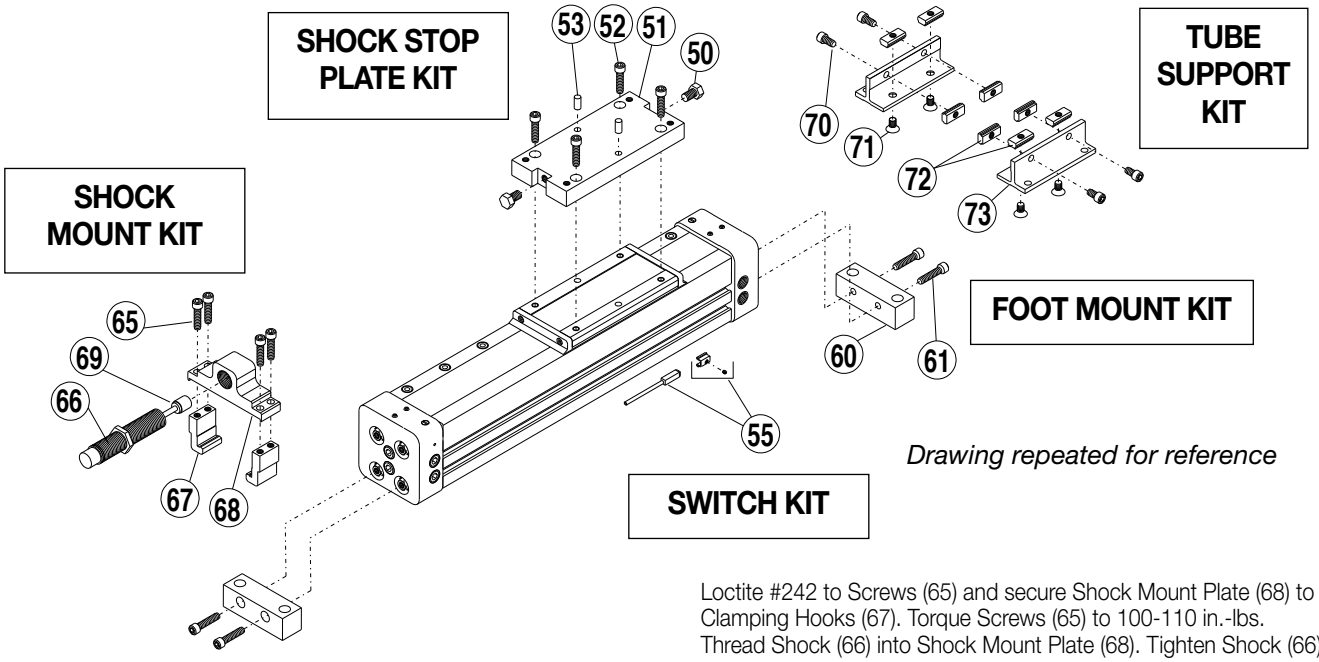
1 Shock Stop Plate Kit contains shock plate, impact bolts, screws and dowel pins.

2 Foot Mount Kit contains one bracket and mounting hardware.

3 Shock Mount Kit Without Shock contains one set of mounting hardware.

4 Shock Mount Kit With Shock contains one shock absorber and mounting hardware.

5 Tube Support Kit contains one tube support and mounting hardware.



Drawing repeated for reference

SINGLE-END PORTING

The BC3 Band Cylinder is uniquely designed for multiple port locations including single-end porting. The lower ports on the head assembly only function when used to cross port the cylinder for single-end porting.

To convert the BC3 cylinder to a single-end port:

1. Remove access Pipe Plug fitting (14) from the opposite head assembly that air lines will be installed into. Then remove the internal port Pipe Plug (15).
2. Reinstall access Pipe Plug (14) into the bottom of Head (8).
3. Remove pipe plug (7) from head where air lines will be installed.

NOTE: Use thread sealant when installing pipe plugs.

OPTIONAL ACCESSORY ASSEMBLY INSTRUCTIONS

1. SHOCK ABSORBERS

Slide a Clamping Hook (67) into each side of the Tube (21). Apply Loctite #242 to Screws (65) and secure Shock Mount Plate (68) to Clamping Hooks (67). Torque Screws (65) to 100-110 in.-lbs. Thread Shock (66) into Shock Mount Plate (68). Tighten Shock (66) to Shock Mount Plate (68) with Jam Nut. Apply Loctite #242 to Screws (52) and secure Shock Plate (51) to Carrier (32). Insert two Dowel Pins (53) into Shock Plate (51). Apply Loctite #242 to Impact Bolts (50) and thread into holes in ends of Shock Plate (51). Torque Impact Bolts (50) to 100-110 in.-lbs.

2. FOOT MOUNTS

Apply Loctite #242 to Screws (61) and secure Foot Mount (60) to each Head (8).

3. TUBE SUPPORTS

Two T-Nuts (74) are required on the bottom of Tube (22) and two T-Nuts (72) in the lower slots on tube sides. Tube Supports should be secured at the required distances determined for the application to prevent Tube deflection. Apply Loctite #242 to Screws (71) and secure Tube Supports (73) to tube aligning holes in T-Nuts with holes in Tube Supports.

4. SWITCHES

On assembled cylinder, Secure Switch to open port side of cylinder with a Hardware kit (clamp and screw).

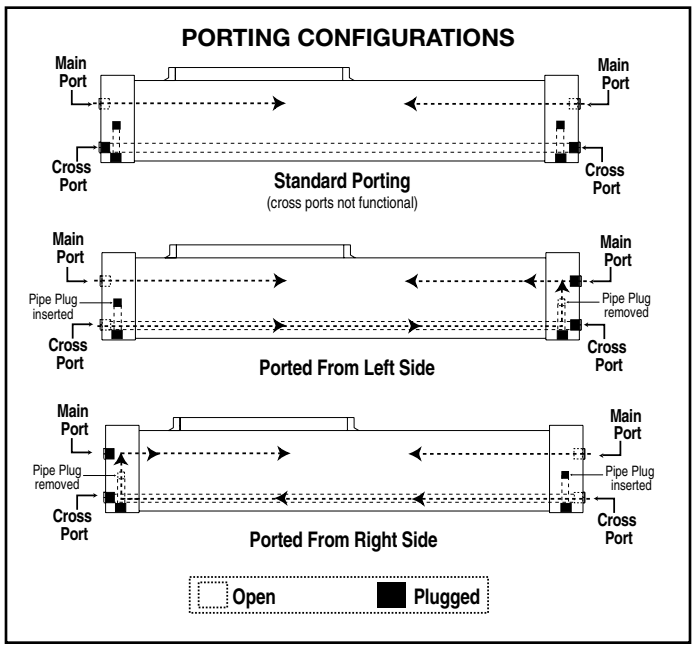
NOTE: Form A Reed Switches should not be used in TTL logic circuits. A voltage drop caused by the L.E.D. indicator will result.For applications where TTL circuits are used, please contact the factory.

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 signalling position, not directly powering soleniods. 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.

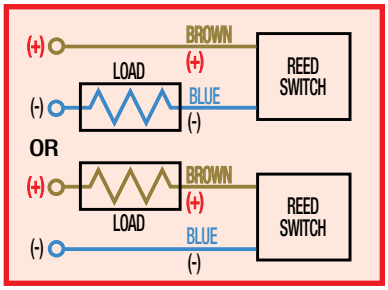
NOTE: For Hall Effect Switch Magnet, be sure the S pole of the magnet (indicated with black dot) is facing toward the switch (down).

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

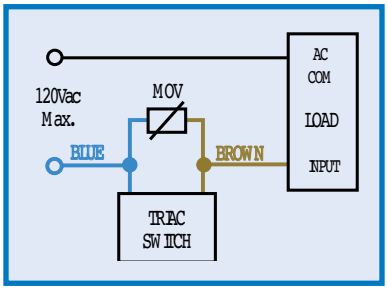


WIRING DIAGRAMS

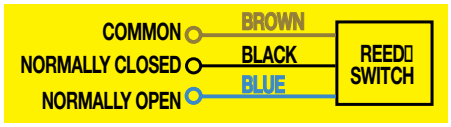
RT & RM DC REED, FORM A



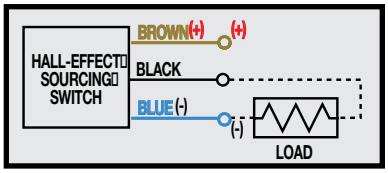
CT & CM AC REED, TRIAC



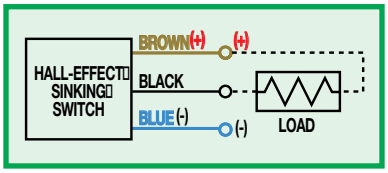
BT & BM DC REED, FORM C



TT & TM HALL-EFFECT, SOURCING, PNP



KT & KM HALL-EFFECT, SINKING, NPN



INSTALLATION INFORMATION

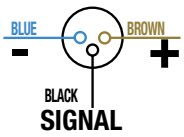
THE NOTCHED FACE OF THE SWITCH INDICATES THE SENSING SURFACE AND MUST FACE TOWARD THE MAGNET.

THE NOTCHED GROOVE IN THE ACTUATOR INDICATES THE GROOVE TO INSTALL THE SWITCH. CONTACT TOLOMATIC IF SWITCHES ARE REQUIRED ON ANOTHER SIDE OF ACTUATOR.

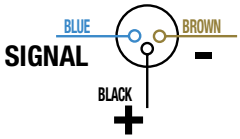
Some actuators may require switch mounting on a specific side of the assembly. Call Tolomatic for details.

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



OLD
Quick disconnect Wiring



Female Connector 5M

LUBRICATION AND MAINTENANCE

All Tolomatic BC3 Band Cylinders are prelubricated at the factory. To ensure maximum cylinder 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 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.

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.

4. **Bearing lubrication**
   The bearing system is prelubricated at the factory with Mobil HP grease. Relubrication is recommended every .5-1 million cycles using a lithium-soap base grease for optimal bearing performance. To relubricate, remove Set Screws (6), Upper Clamp (5) and Upper Clamp Pad (4). Lift back Dust band (2) and apply grease directly to the stationary ball ways.

5. **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.

Tolomatic™
EXCELLENCE IN MOTION
COMPANY WITH QUALITY SYSTEM CERTIFIED BY DNV = ISO 9001 =
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