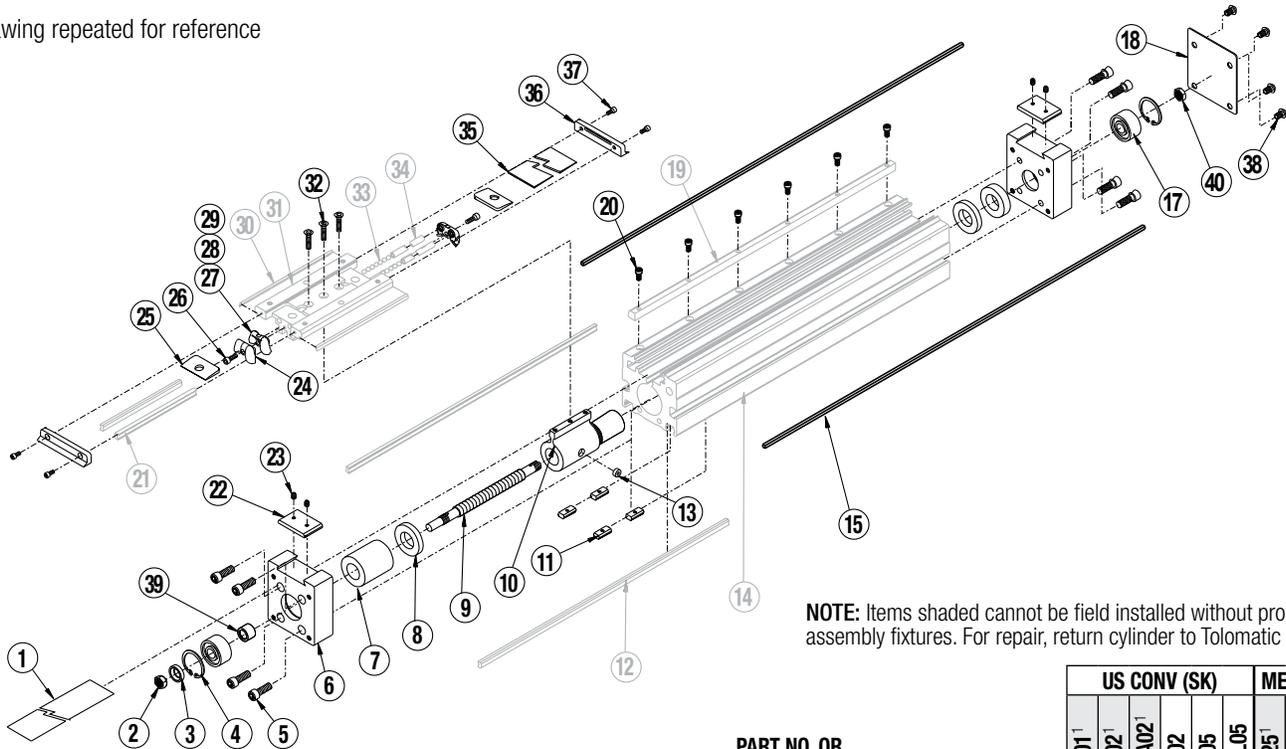


Drawing repeated for reference



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

ITEM	PART NO. OR CONFIG. CODE	DESCRIPTION	US CONV (SK)					METRIC (SM)				
			SN01 ¹	SN02 ¹	SNA02 ¹	BN02	BN05	BNL05	SN25 ¹	SN12 ¹	BN05	BNL05
11.	3420-1013	T-NUT (US CONV)	4	4	4	4	4	4	-	-	-	-
	4420-1013	T-NUT (METRIC)	-	-	-	-	-	-	4	4	4	4
12.	3420-1241	RAIL WAY	2	2	2	2	2	2	2	2	2	2
³ 13.	3420-1062	MAGNET	2	2	2	2	2	2	2	2	2	2
14.	3420-1508	MACHINED TUBE	1	1	1	1	1	1	-	-	-	-
	4420-1501	MACHINED TUBE	-	-	-	-	-	-	1	1	1	1
⁵ 15.	NMBB3S20_SK_	MAGNET BAND (US CONV)	2	2	2	2	2	2	2	2	2	2
	NMBB3S20_SM_	MAGNET BAND (METRIC)	2	2	2	2	2	2	2	2	2	2
17.	3420-1222	CONTACT BEARING	2	2	2	2	2	2	2	2	2	2
18.	3420-9054	HEAD END KIT (US CONV)	1	1	1	1	1	1	-	-	-	-
	4420-9054	HEAD END KIT (METRIC)	-	-	-	-	-	-	1	1	1	1
19.	3420-1496	MACHINED WEDGE	1	1	1	1	1	1	1	1	1	1
20.	0605-1045	SOCKET HEAD CAP SCREW	A/R	A/R	A/R	A/R	A/R	A/R	A/R	A/R	A/R	A/R
21.	3420-1024	CARRIER WAY	2	2	2	2	2	2	2	2	2	2
22.	3420-1219	UPPER CLAMP	2	2	2	2	2	2	-	-	-	-
	4420-1219	UPPER CLAMP	-	-	-	-	-	-	2	2	2	2
23.	3415-1455	SET SCREW (US CONV)	4	4	4	4	4	4	-	-	-	-
	4410-1017	SET SCREW (METRIC)	-	-	-	-	-	-	4	4	4	4
24.	3420-1069	PLT BALL RETURN	2	2	2	2	2	2	2	2	2	2

ITEM	PART NO. OR CONFIG. CODE	DESCRIPTION	US CONV (SK)					METRIC (SM)				
			SN01 ¹	SN02 ¹	SNA02 ¹	BN02	BN05	BNL05	SN25 ¹	SN12 ¹	BN05	BNL05
25.	3415-1047	UPPER BAND RAMP	2	2	2	2	2	2	2	2	2	2
26.	1085-1075	SOCKET HEAD CAP SCREW (US CONV)	2	2	2	2	2	2	-	-	-	-
	0610-1033	SOCKET HEAD CAP SCREW (METRIC)	-	-	-	-	-	-	2	2	2	2
27.	3420-1014	BALL RETURN	2	2	2	2	2	2	2	2	2	2
28.	3420-1015	RIGHT BALL RACE	2	2	2	2	2	2	2	2	2	2
29.	3420-1032	LEFT BALL RACE	2	2	2	2	2	2	2	2	2	2
² 30.	3420-1025	WIPER	2	2	2	2	2	2	2	2	2	2
31.	3420-2021	MACHINED CARRIER	1	1	1	1	1	1	-	-	-	-
	4420-1235	MACHINED CARRIER	-	-	-	-	-	-	1	1	1	1
32.	3420-1223	FLATHEAD CAP SCREW (US CONV)	3	3	3	3	3	3	-	-	-	-
	4420-1011	FLATHEAD HEAD CAP SCREW (METRIC)	-	-	-	-	-	-	3	3	3	3
33.	3420-1009	BALL BEARING	92	92	92	92	92	92	92	92	92	92
34.	3420-1019	BALL RETURN TUBE	2	2	2	2	2	2	2	2	2	2
² 35.	3420-2022	CARRIER COVER	1	1	1	1	1	1	1	1	1	1
² 36.	3420-2024	END CAP	2	2	2	2	2	2	2	2	2	2
37.	0605-1046	SOCKET HEAD CAP SCREW (US CONV)	4	4	4	4	4	4	-	-	-	-
	4415-1001	SOCKET HEAD CAP SCREW (METRIC)	-	-	-	-	-	-	4	4	4	4
38.	1820-1001	SCS, BTN (US CONV)	4	4	4	4	4	4				
	4410-1719	SCS, BTN (METRIC)							4	4	4	4
39.	3420-2041	SLEEVE	1	1	1	1	1	1	1	1	1	1
40.	2410-1157	NUT	1	1	1	1	1	1	1	1	1	1

¹ Discontinued assembly. Contact help@tolomatic.com for available replacement parts

² Available in Repair Kit No. 3420-9049

³ Also included in nut bracket assembly (Item 10)
A/R = As Required

⁵ Replacement Magnet Band Kit ordering method: (includes 2 magnet bands) For long stroke lengths the magnet band is shipped in multiple pieces

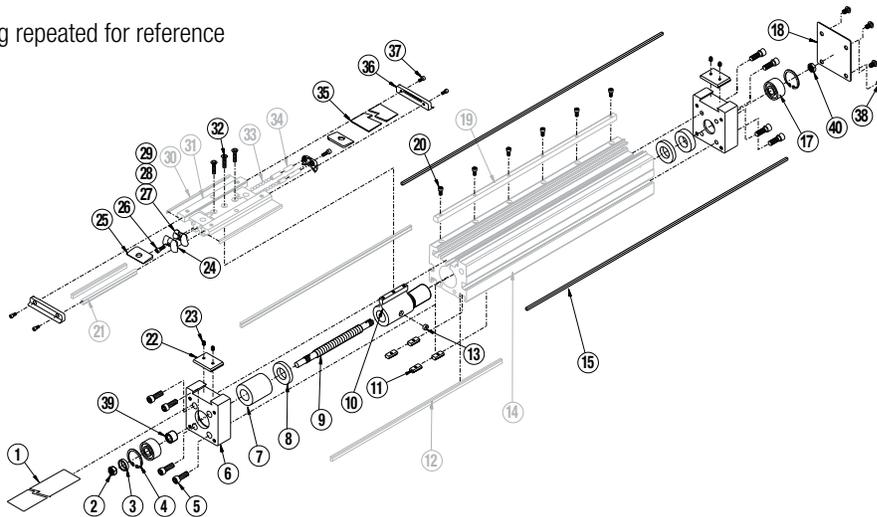
EXAMPLE: **NMBB3S20D SK 21.25 DC 7**

Lead Screw Model & Size Stroke Length Aux. Carrier

Auxiliary Carrier Option Note: If replacing a Lead Screw (9.), Band Magnet (15.) or Dust Band (11.) on an actuator that has an Auxiliary Carrier, be sure to add "DC ___" to the end of the configuration string when ordering. "DC" indicates the need for additional length and "___" indicates the measurement of space between carriers (in inches [SK] or millimeters [SM] as indicated earlier in the configuration string).

Dual 180 Carrier Option Note: If equipped with the optional dual 180 carrier, add the letter "D" between the Model & Size and Stroke Length.

Drawing repeated for reference



Main Unit Disassembly Instructions:

1. Remove Motor Hardware and Dust Band.

Remove any motor, reverse parallel, or gearhead hardware from the drive end of actuator. Loosen band clamp fasteners(23) and remove band both band clamps(22). Remove the carrier end cap fasteners(37) and end caps(36) from the carrier(30). Slide out the carrier cover(35) and remove the dust band(1).

2. Remove the Non-Drive end Head and Bearing.

Remove the non-drive end cap(18). Remove the non-drive end leadscrew nut(40), while holding the leadscrew from turning at the drive end. Do not allow the actuator carrier to bottom out on end of stroke. Remove head fasteners(5) from the non-drive end of actuator, remove that head(6). It is a slip fit between the bearing and leadscrew journal, but it may be necessary to 'pull' the head off w/ a puller tool as there may be some residual loctite holding the bearing on the leadscrew. Remove the bearing(17) from head by removing the snap ring(4).

3. Remove Leads Screw Assembly.

Remove carrier fasteners(32). Remove drive-end head fasteners(5), and remove leadscrew/head sub-assembly from actuator. Ballnut Style: *Caution is required if removal of the nut or leadscrew is required. Contact the factory for available parts and procedures. Plastic/Bronze Nut Style: The leadscrew may be threaded out of the nut assembly at this point. The nut and nut coupler are pinned and secured w/ Loctite at the factory. If nut is worn, and new nut assembly must be ordered.

4. Remove Lead Screw and Bearing from Head.

Secure the body of the leadscrew in a machinist vice or equivalent smooth jaw vice, then remove the locknut(2). Support the taper bushing (39) if possible and press the leadscrew out of bearing and bushing. The bearing is a press fit on screw journal, and the bushing locked on by means of a mating tapered interface. The snap ring(4) and the bearing(17) can now be removed from the head.

Main Unit Assembly Instructions:

1. Sub Assemble Head and Bearing to Lead Screw Assembly.

Install the bearing(17) into the head(6) and install snap ring(4). Position over the leadscrew and nearest the drive end, the longer spacer(7) and the bumper(8). Position taper bushing(39), then bearing/head over leadscrew. It is necessary to press the bearing onto the leadscrew, ensure that the load is only applied to the inner race of the bearing. If not equipped to perform this it will be necessary to purchase this preassembled from the factory. Apply loctite 242 to the exposed threads of the leadscrew and install the spherical washer(3) and locknut(2) onto the threads of the leadscrew. Torque the locknut to 550 in-lbs, while leadscrew is secured in a machinist vice, or other smooth jaw vice

2. Assemble Non-Drive end Head.

Slip bearing into the head, and install the snap ring, flat side of ring toward the bearing.

3. Assemble Lead Screw Assembly into the Tube.

Grease Leadscrew on both sides of Nut Assembly with a thin film of appropriate grease: either CHRISTOLUBE MCG 303, for solid nut actuators; or MOBIL HP MULTIPURPOSE PREMIUM GREASE for Ball Nut actuators. Install Leadscrew/Nut assembly in the tube such that as viewed from the motor end, the wedge side of tube is to the left.

4. Install Idle Head and Tighten Heads to Tube.

Attach and tighten the carrier(30) to the nut bracket(10). *On Auxiliary Carrier units, attach the nut bracket to the carrier nearest the motor end of the actuator. Attach the drive end Head to the end of Tube with four SHCS fasteners. Leave loose.

Position bumper and short spacer(if applicable) over the leadscrew and into the tube at the non-motor end. Attach the idle end head to the tube with 4 SHCS sliding the bearing over the journal of the leadscrew. Leave loose.

Move Carrier Assembly to motor-end of tube and tighten head bolts to 185-190 in-lbs. Support the actuator on the tube such that the head is free to float while tightening the head fasteners.

Move Carrier Assembly to non-motor end of tube and torque to 185-190 in-lbs. Support the actuator on the tube, such that the head is free to float while tightening the head fasteners.

5. Secure non-motor end of leadscrew.

Apply loctite 242 to the threads on the leadscrew and install the hexnut. Torque nut to 12-14 in-lbs.

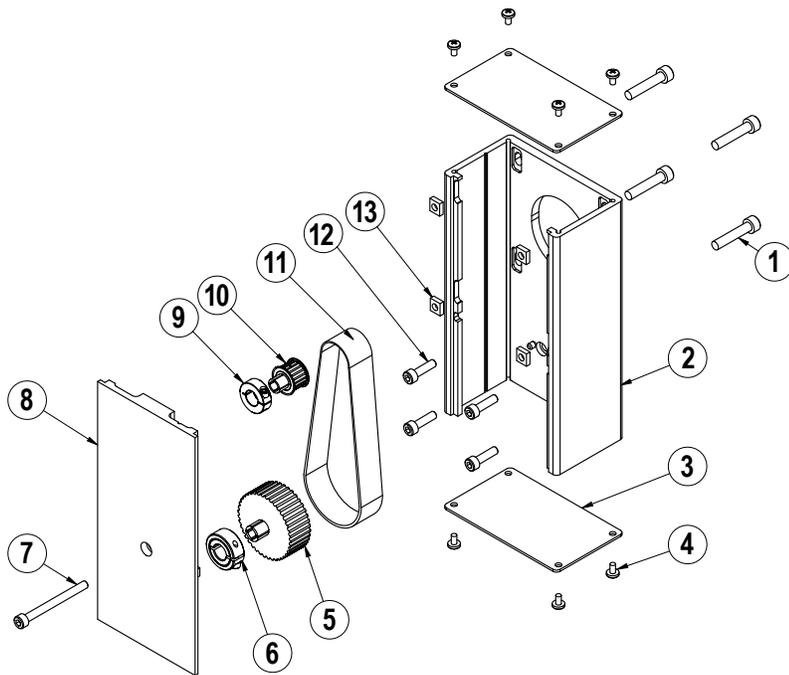
6. Lubricate Ballways and install Dust Band.

Lubricate full length of the ballways(12) with Mobil HP grease. Install Dust Band(1) over Carrier(30) centering it along the length of the actuator. Slide the carrier cover(35) into slots of the carrier, and secure end caps(36) to the carrier. With tin snips cut ends as need such that dust band is 1/16" in from ends of heads. Install the band clamps(22) to the heads, and tighten down the set screws(23) locking the band in place.

For special lubrication option grease, email help@tolomatic.com

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Christo-Lube® is a registered trademark of Lubrication Technology, Inc., www.lubricationtechnology.com
Loctite® is a registered trademark of the Loctite Corporation, www.loctite.com
Magnalube®-G is a registered trademark of the Carleton-Stuart Corporation, www.magnalube-g.com
Mobil grease® HP is a registered trademark of Mobil Oil Corporation, www.mobil.com

Reverse Parallel (RP) Mounting Option



ITEM	PART NO.	DESCRIPTION	QTY.
◊1.	CONFIGURED	MOTOR FASTENER	4
◊2.	CONFIGURED	RP HOUSING	1
◊3.	CONFIGURED	RP HOUSING END CAP	2
◊4.	CONFIGURED	END CAP SCREW	8
◊5.	CONFIGURED	DRIVE SHAFT PULLEY	1
◊6.	CONFIGURED	COLLAR CLAMP, DRIVE SHAFT	1
◊7.	CONFIGURED	RP COVER FASTENER	1
◊8.	CONFIGURED	RP COVER	1
◊9.	CONFIGURED	COLLAR CLAMP, MOTOR	1
◊10.	CONFIGURED	MOTOR PULLEY	1
◊11.	CONFIGURED	BELT	1
◊12.	CONFIGURED	RP PLATE FASTENER	4
◊13.	CONFIGURED	SQUARE NUT	4

◊ Part numbers varies depending on YMH (Your Motor Here). Contact help@tolomatic.com for replacement part numbers.

Disassembly Instructions

1. Remove End Caps (3), and release the tension on the Belt (11) by breaking loose the motor fasteners (1).
2. Remove the RP Cover (8).
3. The Belt (11) can now be removed along with the Motor.
4. Remove both Pulleys (10) and (5) from their respective shafts.
5. Remove the RP Housing (2) from the actuator head by removing the Fasteners (12).

Assembly Instructions

Note: Apply Loctite #242 to all fasteners upon installation

1. Install RP Housing (2) onto the actuator Head with Fasteners (12).
2. Install the Motor to the RP Housing with Fasteners (1) and Square Nuts (13). Do not tighten the fasteners at this time.
3. Locate the Belt (11) over the Pulleys (10) and (5) and slide both pulleys over their respective shafts. Tighten each pulley to its shaft with the Collar Clamps (9) and (6).
4. Position the Cover (8) in the mating slot of the RP case and install the Fasteners (7) to hold it in place. Take care not to overtighten. If the cover is deflected, it can interfere with the leadscrew.

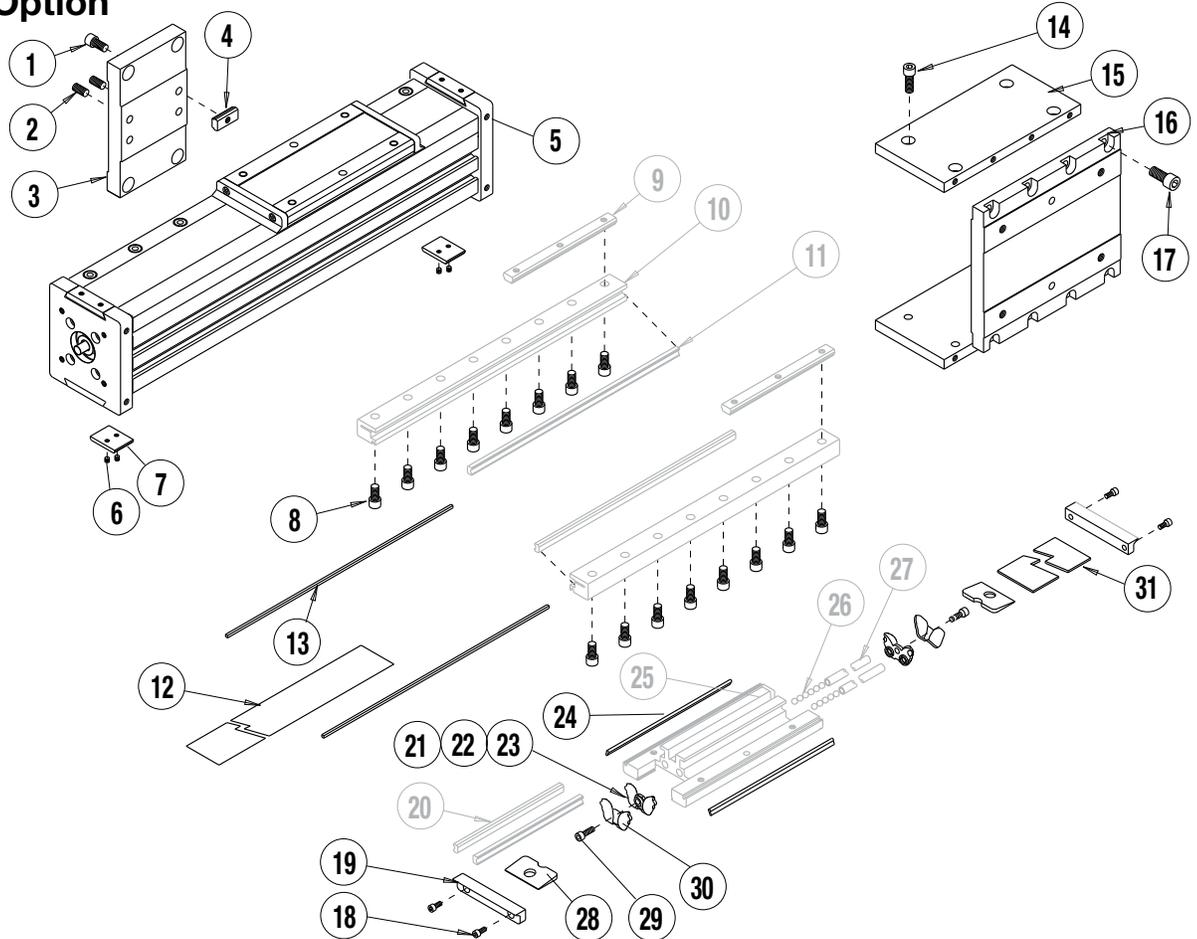
5. Tension the Belt (11) by pulling the motor away from the drive shaft with the appropriate tension force shown in the chart below. While tensioning, the actuator should be positioned so the weight of the motor does not affect the belt tension. Tighten the Motor Fasteners (1) while the tensioning force is applied to the motor.

SMALLEST SHAFT DIAMETER (Motor or Actuator)		TOTAL WEIGHT TO APPLY	
Inches	mm	lbs	kgs
0.18 to 0.259	4.572 to 6.579	13	5.902
0.260 to 0.499	6.604 to 12.675	22	9.988
0.500 to 0.625	12.7 to 15.875	31	14.074
0.625 and larger	15.875 and larger	40	18.160

Additional tips are found in Tolomatic [Electric Actuator Motor Mounts Technical Note # 3600-4203](#).

6. Verify that there is clearance between the inside of the RP case and each pulley. Verify the pulleys are aligned to each other.
7. Install both End Caps (3) with the Screws (4) to finalize the assembly.

Dual 180° Option



ITEM	US CONV (SK)	METRIC (SM)	DESCRIPTION	QTY
1.	2317-1015	4920-1025	SOCKET HEAD CAP SCREW	4
2.	3415-1219	3415-1219	SET SCREW	2
3.	3420-1053	3420-1053	TUBE SUPPORT	1
4.	3420-1013	4420-1013	T-NUT	4
5.	3420-1267	4420-1218	HEAD, DUAL 180°	2
◇ 6.	CONFIGURED	CONFIGURED	SET SCREW	4
7.	3420-1219	4420-1219	CLAMP, UPPER	2
8.	3420-1077	4415-1018	SOCKET HEAD CAP SCREW	AR
9.	3420-1008	4420-1008	RAIL NUT	AR
10.	3420-1020	3420-1020	MACHINED RAIL	AR
11.	3420-1023	3420-1023	RAIL WAY	AR
12.	NDBB3S20_SK_	NDBB3S20_SM_	DUST BAND	1
13.	3420-1022	3420-1022	BAND MAGNET	AR
14.	0920-1093	4415-1019	SOCKET HEAD CAP SCREW	8
15.	3420-1049	4420-1049	PLATE, CONN., DUAL CARRIER	2
16.	3420-1054	4420-1054	PLATE, DUAL CARRIER	1
17.	0920-1093	4415-1019	SOCKET HEAD CAP SCREW	8
18.	0605-1046	4415-1001	SOCKET HEAD CAP SCREW	4

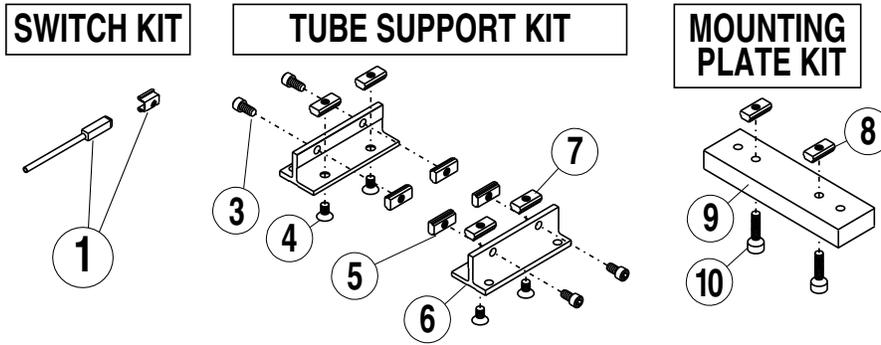
ITEM	US CONV (SK)	METRIC (SM)	DESCRIPTION	QTY
19.	3420-2024	3420-2024	END CAP	2
20.	3420-1024	3420-1024	CARRIER WAY	2
21.	3420-1014	3420-1014	BALL RETURN	2
22.	3420-1015	3420-1015	RIGHT BALL RACE	2
23.	3420-1032	3420-1032	LEFT BALL RACE	2
24.	3420-1025	3420-1025	WIPER	2
25.	3420-2021	4420-1235	MACHINED CARRIER	1
26.	3420-1009	3420-1009	BALL	92
27.	3420-1019	3420-1019	BALL RETURN TUBE	2
28.	3415-1047	3415-1047	UPPER BAND RAMP	2
29.	1085-1075	0610-1033	SOCKET HEAD CAP SCREW	2
30.	3420-1069	3420-1069	PLT BALL RETURN	2
31.	3420-2022	3420-2022	CARRIER COVER	1

◇ Part number varies depending on YMH (Your Motor Here). Contact help@tolomatic.com for replacement part number.

Auxiliary Carrier Option Note: If replacing a Dust Band (12.) on an actuator that has an Auxiliary Carrier, add "DC ___" between Stroke Length and Motor Code. "DC" indicates the need for additional length and "___" indicates the measurement of space between carriers (in inches [SK] or millimeters [SM] as indicated earlier in the configuration string).

Dual 180 Carrier Option Note: If equipped with the optional dual 180 carrier, add the letter "D" between the Model & Size and Stroke Length.

Dual 180 —
 4 Replacement Dust Band ordering method: **NDBB3S20D SK [] [] [] [] [] [] DC []**
EXAMPLE: NDBB3S20D SK21.25DC7
 Dust Band — Model & Size — Stroke Length — Aux. Carrier



Optional Accessories Parts Listing

ITEM	
SWITCH KIT	
CONFIG. CODE ORDERING	
CODE	DESCRIPTION
BT	SWITCH KIT, REED, FORM C, 5M
BM	SWITCH KIT REED, FORM C, QUICK DISCONNECT
RT	SWITCH KIT, REED, FORM A, 5M
RM	SWITCH KIT, REED, FORM A, QUICK DISCONNECT
CT	SWITCH KIT, TRIAC, 5M
CM	SWITCH KIT, TRIAC, QUICK DISCONNECT
KT	SWITCH KIT, HALL-EFFECT, SINKING, 5M
KM	SWITCH KIT, HALL-EFFECT, SINKING, QUICK DISCONNECT
TT	SWITCH KIT, HALL-EFFECT, SOURCING, 5M
TM	SWITCH KIT, HALL-EFFECT, SOURCING, QUICK DISCONNECT
NOTE: Switch bracket, set screw, & mating QD cable is included	

ITEM	US CONV (SK)	METRIC (SM)	DESCRIPTION	QTY.
TUBE SUPPORT KIT				
	3420-9006	4420-9006	KIT INCLUDES ALL PARTS LISTED BELOW	
3	2317-1015	4415-1011	SHCS, 5/16-18 X .63/ M8 X 1.25 X 12	4
4	3415-1046	4415-1014	SFHCS, 1/4-20 X .44/ M6 X 1 X 10	4
5	3420-1013	4420-1013	B3S20 NUT	4
6	3420-1044	3420-1044	TUBE SUPPORT	2
7	3420-1013	4420-1013	B3S20 NUT	4
MOUNTING PLATE KIT				
	3420-9056	4420-9030	KIT INCLUDES ALL PARTS LISTED BELOW	
8	3420-1013	4420-1013	T-NUT	2
9	3420-1232	3420-1232	MOUNTING PLATE 1/2"	1
10	2307-1018	4415-1011	SOCKET HEAD CAP SCREW	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)



REPLACEMENT SWITCH MODEL SWITCH CODE

(Hardware and Form A Reed switch with 5 meter lead for 1" size B3S actuator)

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

OPTIONAL ACCESSORY ASSEMBLY INSTRUCTIONS

1. TUBE SUPPORTS. Four T-Nuts (5, 7) are required on each side of the Tube, two T-Nuts on bottom of Tube and two in 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 (3, 4) and secure Tube Supports (6) to Tube aligning holes in T-Nuts with holes in Tube Supports.

2. Switches. Secure Switch (1) to magnet side of Tube with Switch Clamp (2) and Set Screw.

3. 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.

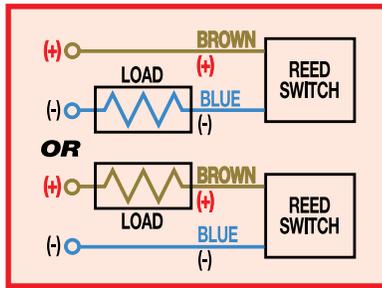
WARNING: An ohmmeter is recommended for testing Reed Switches. NEVER use an incandescent light bulb as a high current rush may damage the switch.

Reed and TRIAC switches are only recommended for signalling 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.

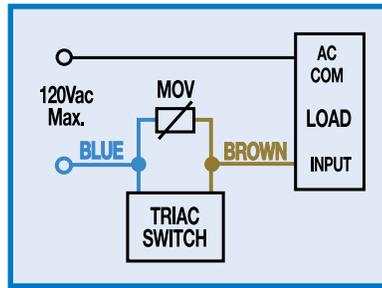
NOTE: For Hall Effect Switch Magnet, be sure the S pole of the magnet (indicated with black dot) is facing toward the switch (down).

WIRING DIAGRAMS

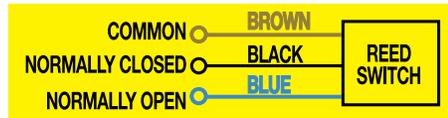
R T & R M DC REED, FORM A



C T & C M AC REED, TRIAC

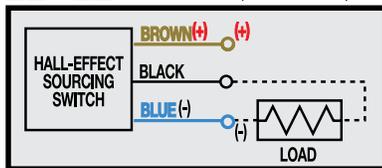


B T & B M DC REED, FORM C

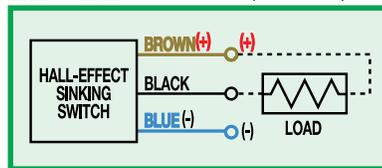


Some actuators may require switch mounting on a specific side of the assembly. Call Tolomatic for details.

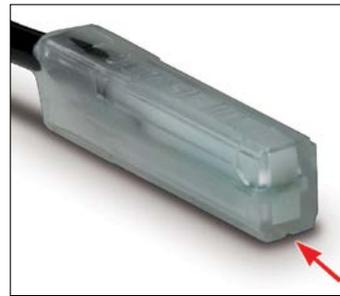
T T & T M HALL-EFFECT, SOURCING, PNP



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.



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