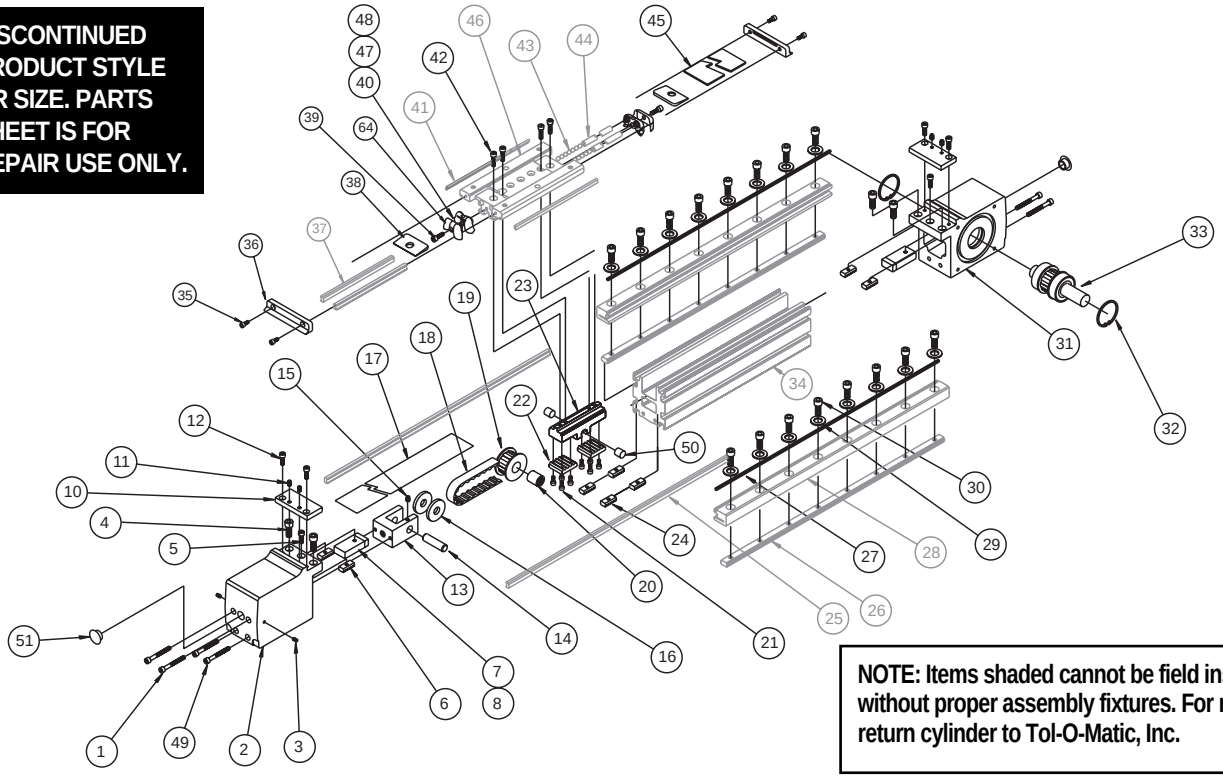
**3600-4086_01**
Replaced by
3600-4123
07-2001

# *Axidyne*® Belt-Drive Actuator

## B3B10/M3B10 1"/25mm Bore

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




**NOTE: Items shaded cannot be field installed without proper assembly fixtures. For repair, return cylinder to Tol-O-Matic, Inc.**

## *List of Parts*

| Item | Part No. | Description | B3B10 | M3B10 |
|---|---|---|---|---|
| 1. | 3410-1413 | SHCS #8-32 x 1.5 LG | 2 | |
| | 4415-1063 | SHCS M4 x 0.7 x 45 | | 2 |
| 2. | 3410-1401 | Head, Idler | 1 | |
| | 4410-1401 | Head, Idler | | 1 |
| 3. | 2309-1028 | Set Screw #6-32 x .25 cup | 2 | |
| | 0610-1046 | Set Screw M4 x 0.7 x 6 x 6mm | | 2 |
| 4. | 0915-1016 | SHCS, #10-24 x .50 LG | 2 | |
| | 4415-1016 | SHCS, M5 x .8 x 16 | | 2 |
| 5. | 0915-1016 | SHCS, #10-24 x .50 LG | 4 | |
| | 4410-1077 | SHCS, M5 x .8mm x 10mm | | 4 |
| 6. | 3410-1013 | Nut, T, BC3 | 4 | |
| | 4410-1013 | Nut, T, BC3 | | 4 |
| 7. | 3410-1407 | Bumper Mount | 2 | |
| | 4410-1407 | Bumper Mount | | 2 |
| 8. | 3410-1415 | Rubber Cushion | 2 | 2 |
| 10. | 3410-1404 | Band Clamp | 2 | |
| | 4410-1404 | Band Clamp | | 2 |
| 11. | 3600-1129 | Set Screw, #6-32 x .19 | 4 | |
| | 7906-1029 | Set Screw, M5-0.8 x 6mm | | 4 |
| 12. | 0605-1046 | SHCS, #8-32 x 0.38, BLK | 4 | |
| | 4410-1077 | SHCS, M5 x .8mm x 10mm | | 4 |
| 13. | 3410-1411 | Yoke | 1 | |
| | 4410-1411 | Yoke, (Metric) | | 1 |

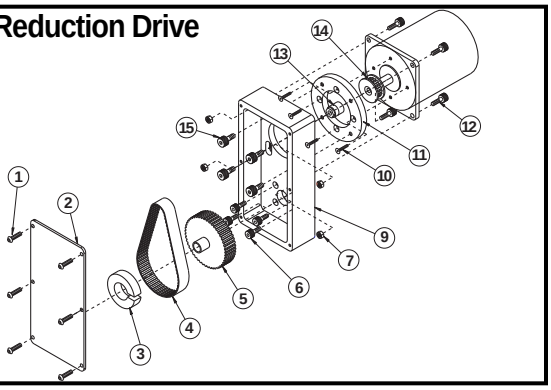
| Item | Part No. | Description | B3B10 | M3B10 |
|---|---|---|---|---|
| 14. | 3410-1410 | Shaft 3/8, x 1.313 long | 1 | 1 |
| 15. | 0515-1049 | Set Screw, #8-32 x 0.38, cup | 2 | |
| | 7906-1029 | Set Screw, M5-0.8 x 6mm | | 2 |
| 16. | 3410-1419 | Washer, Spacer, IIdler Pulley | 2 | 2 |
| 17. | 3410-1424 | Upper Dust Band | A/R | A/R |
| 18. | 3410-1421 | Belt, 5mm pitch, .5" wide, neoprene | A/R | A/R |
| 19. | 3410-1406 | Pulley, Idler, 5mm pitch 1" wide | 1 | 1 |
| 20. | 1001-1055 | Bearing, Needle, .38 ID,.56 OD, .62 W | 1 | 1 |
| 21. | 0910-1357 | SHCS, #4-40 x .31 | 8 | |
| | 4905-1005 | SHCS, M3 x 0.5 x 6 | | 8 |
| 22. | 3410-1409 | Belt Clamp, 5MM pitch 1" wide | 2 | 2 |
| 23. | 3410-1408 | Belt Bracket | 1 | |
| | 4410-1408 | Belt Bracket | | 1 |
| 24. | 3410-1013 | Nut | 4 | |
| | 4415-1013 | Nut | | 4 |
| 25. | 3410-1426 | Rail Way | A/R | A/R |
| 26. | 3410-1376 | Nut, Rail | A/R | A/R |
| 27. | 3410-1425 | Magnet, Band | A/R | A/R |
| 28. | 3410-1427 | Machined Rail | A/R | A/R |
| 29. | 3410-1048 | Washer | A/R | A/R |
| 30. | 3410-1229 | BHCS (TORX) 10-24 X .50 | A/R | A/R |
| 31. | 3410-1403 | Head, Drive | 1 | |

*continued on page 2*

| Item | Part No. | Description | B3B10 | M3B10 |
|---|---|---|---|---|
| | 4410-1403 | Head, Drive | | 1 |
| 32. | 3410-1418 | Retaining Ring | 2 | 2 |
| 33. | 3410-9151 | Pulley, Shaft, Bearing Assembly | 1 | 1 |
| 34. | 3410-1422 | Tube, Machined | 1 | |
| | 4410-1422 | Tube, Machined | | 1 |
| 35. | 0605-1079 | SHCS, #4-40 x 0.25, BLK | 4 | |
| | 4905-1005 | SHCS, M3 x 0.5 x 6mm, BLK | | 4 |
| 36. | 3410-1011 | Cap, End, BC310 | 2 | 2 |
| 37. | 3410-1024 | Way, Carrier | 2 | 2 |
| 38. | 3410-1047 | Upper Band Ramp | 2 | 2 |
| 39. | 0910-1357 | SHCS, #4-40 x .31 | 2 | |
| | 4905-1012 | SHCS, M3 x 0.5 x 8mm, BLK | | 2 |
| 40. | 3410-1014 | Ball Return | 2 | 2 |
| 41. | 3415-1025 | Wiper | 2 | 2 |

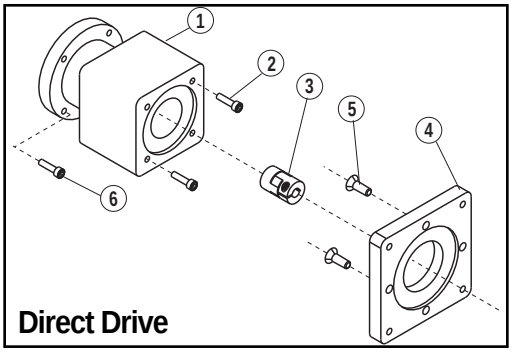
| Item | Part No. | Description | B3B10 | M3B10 |
|---|---|---|---|---|
| 42. | 0910-1166 | SHCS, #8-32 x 0.75, | 4 | |
| | 4415-1001 | SHCS, M4 x 0.7 x10 | | 4 |
| 43. | 3410-1009 | Ball | 116 | 116 |
| 44. | 3410-1019 | Ball Return Tube | 2 | 2 |
| 45. | 3410-1042 | Cover, Carrier | 1 | 1 |
| 46. | 3410-1006 | Machined Carrier | 1 | |
| | 4410-1006 | Machined Carrier | | 1 |
| 47. | 3410-1015 | Right Ball Race | 2 | 2 |
| 48. | 3410-1032 | Left Ball Race | 2 | 2 |
| 49. | 3410-1413 | SHCS, #8-31 x 1.5 | 4 | |
| | 4515-1063 | SHCS, M4 x .7 x 38mm | | 4 |
| 50. | 3415-1218 | Magnet | 2 | 2 |
| 51. | 3415-1218 | Cap, Plug, Æ .500 | 2 | 2 |
| 64. | 3410-1079 | PLT, Ball Return | 2 | 2 |

## 3:1 Reduction Drive




## 3:1 Reduction Drive Parts Listing

| Item | Part No. | Description | MRB23X | MRS34X | MRV23X | MRB34X MRV34X | MRB40X |
|---|---|---|---|---|---|---|---|
| 1. | 0925-1030 | Pan Head Screw | 6 | 6 | 6 | 6 | 6 |
| 2. | 3420-1435 | Cover | 1 | 1 | 1 | 1 | 1 |
| 3. | 0520-1067 | Clamp Collar, .688 Bore | 1 | 1 | 1 | 1 | 1 |
| 4. | 3415-1441 | TMG Belt, 85T, 5mm P x 19mm | 1 | | | | 1 |
| | 3410-1441 | TMG Belt, 85T, 5mm P x 9mm W | | 1 | 1 | 1 | |
| 5. | 3415-1439 | TMG Pulley, 60T, 19mm W, DIA | 1 | | | | |
| | 3410-1439 | TMG Pulley, 60T, 9mm W, DIA | | 1 | 1 | 1 | 1 |
| 6. | 0707-1010 | SHCS, #10-24x0.63,BLK | 4 | 4 | 4 | 4 | 4 |
| | 4910-1004* | SHCS, M5x0.8 x 12, BLK | 4 | 4 | 4 | 4 | 4 |
| 7. | 2506-1007 | Nut, Jam | 4 | 4 | 4 | 4 | |
| 9. | 3420-1430 | Case, 3:1, Reduction, 23 FRM | 1 | | 1 | | |
| | 3420-1433 | Case, 3:1, Reduction, 34 FRM | | 1 | | 1 | |
| | 3420-1429 | Case, 3:1, Reduction, 40 FRM | | | | | 1 |
| 10. | 6000-1731 | SFHCS, 1/4-20-7/8, BLK | | | | | 4 |
| 11. | 0515-1488 | Adapter Plate, MRB 40x, RPM | | | | | 1 |
| 12. | 1024-7711 | SHCS, #10 24 x 0.88, BLK | 4 | 4 | 4 | 4 | |
| 13. | 0515-1181 | Trantorq, .375 BORE | | 1 | | | |
| | 0510-1111 | Trantorq, .250 BORE | 1 | | | | |
| 14. | 3415-1444 | TMG Pulley, 20T, 19mm W, DIA | 1 | | | | |
| | 3410-1440 | TMG Pulley, 20T, 9mm W, DIA .7 | | 1 | | | |
| | 3410-1437 | TMG Pulley, Keyed, 20T, 9mm W | | | 1 | 1 | |
| | 3420-1438 | TMG Pulley, Keyed, 20T, 19mm | | | | | 1 |
| 15. | 1310-1015 | SHCS, 1/4-20 x 1.00, BLK | | | | | 4 |




**Direct Drive**

**Gearhead**

**Motor**

## Direct Drive Parts Listing

| Item | Part No. | Description | MRS34X | MRB34X | MRV34X | MRB40X | MRS23_, MRV 23_, MRB23 W/GHJ20, GHJ21, GHK20 | MRV34_ W/GHJ30 | MRB34_, MR334 W/GHJ30, GHJ31, GHK30 | MRV34_ W/GHJ31 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. | 3410-1452 | Motor Adapter, Mach, B3B | 1 | | | | | | | |
| | 3410-1453 | Motor Adapter, Mach, B3B | | 1 | 1 | | | | | |
| | 3410-1457 | Motor Adapter, Mach, B3B | | | | 1 | | | | |
| | 3410-1455 | Motor Adapter, Mach, B3B | | | | | | 1 | 1 | 1 |
| | 3410-1456 | Motor Adapter, Mach, B3B | | | | | 1 | | | |
| 2. | 0910-1314 | SHCS, #10-24 x 0.75, BLK | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| 3. | 3600-9216 | Coupler, Guardian | 1 | | | | | | | |
| | 3600-6174 | Coupler, Zero-Max | | | 1 | | | | | |
| | 3600-6175 | Coupler, Zero-Max | | | | | | | | 1 |
| | 3420-9041 | Coupler, Guardian | | | | | | | 1 | |
| | 3600-6176 | Coupler, Zero-Max | | | | | | 1 | | |
| | 3600-6177 | Coupler, Zero-Max | | | | | 1 | | | |
| | 3600-9219 | Coupler, Guardian | | 1 | | | | | | |
| | 3600-9218 | Coupler, Guardian | | | | 1 | | | | |
| 4. | 3410-1445 | Motor Adaptor Plate, MRB40X | | | | 1 | | | | |
| 5. | 0920-1024 | SFCHS, 1/4-20 x .63, BLK | | | | 4 | | | | |
| 6. | 4415-1020* | SHCS, M5 x .8 x 20, BLK | 4 | 4 | 4 | 4 | | | | |
| | 0910-1314 | SHCS, #10-24 x .75, BLK | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |

**Note: For Belt Tensioner Kit,**
Please refer to part sheet number 3600-4602.

* Used on the M3B10 actuator.

## General Disassembly Instructions

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

Allen wrench set /Internal retaining ring pliers / Rubber hammer / Loctite #242

1. Remove any motor mounting hardware and/or adapter plates.

2. Release carrier assembly:
   Remove screws(35) from end caps(36) and remove end caps. Remove carrier cover(45). Loosen and remove dust band clamp(10) on idler and drive head by removing SHCS(12). Remove the dust band (17).

   Remove 4 SHCS's(42) that hold the carrier(46) to the belt bracket(23).

3. Remove idler head
   Loosen the two set screws(3). Remove 2 SHCS(1) in the ilder head that hold the tensioning yoke in. Remove 2 SHCS(49) that hold head to bottom of tube. Loosen SHCS(5) that hold head to top of tube. Remove head.

   Loosen 2 sets screws(15) in yoke that hold shaft in. Remove shaft from yoke.

4. Remove belt
   Remove SHCS(21) on both belt clamps(22) of belt bracket(23)

5. Remove drive head
   Remove 2 SHCS(49) that hold the head to the bottom of the tube. Loosen SHCS(5) that hold the head to the top of the tube. Remove head. Pull belt through actuator and head.

6. Optional removal of drive pulley/shaft(33) from drive head.
   **Note: Do not remove carrier(46) from rail system.**
   **Balls contained in rail way will fall out.**

## General Assembly Instructions

Any time SHCS are being installed, apply Loctite #242 to the threads.

1. If drive pulley/shaft(33) was removed. Fold belt in half (teeth facing each other) and slip loop end into drive head.

   Wrap belt in a loop and insert it into drive head. Teeth on belt to be facing each other.
   Slide pulley/shaft(33) into drive head. **Note: press shaft in straight as possible. Make sure it is all the way against the retaining ring on the other side of the head. Install retaining ring into groove in head.**

2. Mount drive head to actuator:
   Slide belt through tube and slide drive head onto tube using T-nuts as a guide. Install 2 SHCS(49) to hold head on bottom of tube. Tighten both SHCS(5) on top head.

A. Direct Drive Option: Attach motor spacer (1) to acuator with fasteners (2). Attach coupler (3) to motor shaft. Slide motor/coupler into motor spacer (1). Through alignment hole in motor spacer, fasten coupler to shaft with allen wrench.

B. Belt Reduction Option: Press a Bearing (#30) into the Drive Case (#21). Install and tighten the Reduction Housing to the left side of the Head, and large bore to the top, with four Socket Head Cap Screws (#23) & (#24) and Loctite #222. NOTE: This is the standard mount for the Motor and Reduction Housing. If application calls for a different mounting style, refer to Mounting Configuration diagrams in the Axidyne Belt-Drive Catalog. Insert the longer portion of the shaft of the Pulley/Shaft sub-assembly (#20) through the Head, through the bearing and into the Drive Case. Install the drive Belt over the Pulley. Install Axial Spacer (#22) onto the shaft protruding into the drive case. Install the large Reduction Pulley(#28), with the split hub facing out, onto the shaft protruding into the Drive Case until contact is made with Spacer (#22). There should be a 1/16" gap between the back of the pulley and the housing. The front of the split hub should be approximately flush with the end of the shaft when this gap is achieved.

   Install a Collar (#26) over the split hub of the gear and tighten into position. Slide the Motor/Pulley sub-assembly (#29), with the Motor Leads facing down, partially into the large bore on the top of the Drive Case from the Head side. Install the Reduction Belt (#27) over the two Pulleys in the reduction housing. Apply Loctite #222 to a Socket Head Cap Screw (#23) then thread it part way into the Reduction Case through one of the upper holes of the Motor Flange. Complete the insertion of the Motor/Pulley sub-assembly into the Reduction Housing by rotating the Motor around the Cap Screw until the snout of the Motor can be inserted into the bore of the Reduction Housing. Apply Loctite #222 to the remaining Socket Head Cap Screws, then insert them through the flange and tighten all four Screws. Place the Drive Case Cover (#25) onto the Reduction Case and secure with six Button Head Cap Screws (#7).

3. Mount idler head to actuator:
   Attach the belt(17) to the belt bracket(23) with the belt clamp(23) and SHCS(24). Place the idler pulley(19) inside the the belt loop. Install the idler shaft through the yoke(13) and the two spacer washers(16). Slide idler head onto tube using T-nuts as a guide. Install 2 SHCS(49) to hold head on bottom of tube. Tighten both SHCS(5) on top head. Install 2 SHCS(1) into yoke. Tighten both equal to achieve the desired belt tension. Note: Over tensioning of belt can cause it to stretch prematurely. Tighten both set screws(3).

4. Lubricate ballways:
   Before installing the top dust band(17), lubricate the ballways with #2 Lithium grease.

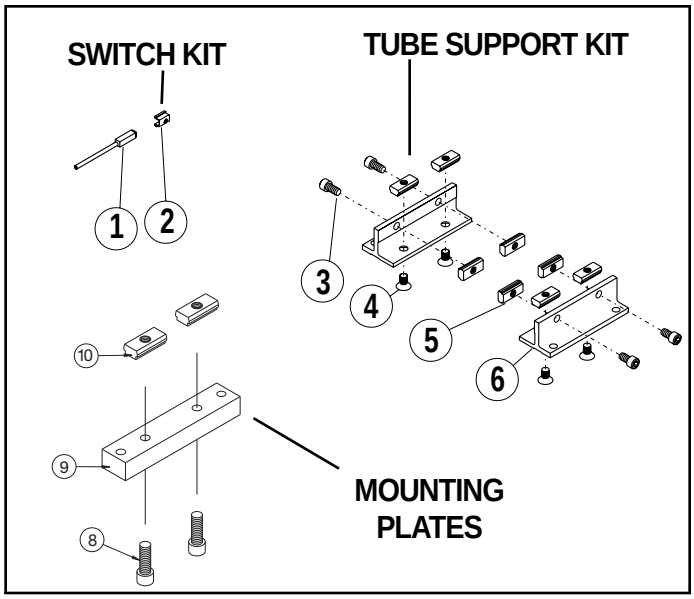
5. Attach Carrier to Belt Bracket:
   Mount carrier(46) to belt bracket(23) with 4 SHCS(42).

6. Trim and Install Dust Band:
   Install dust band(17) over carrier(46) centering it along the length of the actuator. With a tin snips, cut band down 1/16" from the heads. Slide carrier cover(45) into slots on top of carrier. Install carrier endcaps(36) with SHCS. Loosely install band clamps(10) onto each head with SHCS(12). Slide carrier to one end of actuator, and tighten SHCS(12). Slide carrier to other end of actuator and repeat.

7. Test Procedure:
   The torque required to rotate the drive shaft should not exceed the following limits:

| | Single Carrier | Auxiliary Carrier & Dual 180° |
|---|---|---|
| B3B10: | 80 IN-OZ | 120 IN-OZ |
| B3B15: | 160 IN-OZ | 200 IN-OZ |
| B3B20: | 240 IN-OZ | 300 IN-OZ |

8. Re-attach any motor adapter plates and/or hardware with actuator.




**SWITCH TYPE CODE**

| | | | |
|---|---|---|---|
| **BT** | (Form C Reed Switch with 5-meter lead) | **CM** | (TRIAC Switch with 5-meter lead and QD) |
| **BM** | (Form C Reed Switch with 5-meter lead and QD) | **TT** | (Hall Effect (PNP) Sourcing Switch 5M) |
| **RT** | (Form A Reed Switch with 5-meter lead) | **TM** | (Hall Effect (PNP) Sourcing Switch Male Conn) |
| **RM** | (Form A Reed Switch with 5-meter lead and QD) | **KT** | (Hall Effect (NPN) Sinking Switch 5M) |
| **CT** | (TRIAC Switch with 5-meter lead) | **KM** | (Hall Effect (NPN) Sinking Switch MAL) |

All Switch Kits come with 1 switch and mounting hardware.

**HARDWARE ONLY KIT:** 3410-9999

**QUICK-DISCONNECTS:** 2503-1025 Female Connector 5M

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.

**TO ORDER RETROFIT KITS:** SW (then the model number and base size, and code for type of switch needed: **EXAMPLE: SWB3B10RM**

## Optional Accesories Parts Listing

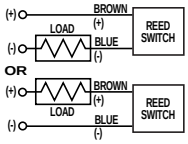
| Item | Part No. | Description | Qty. |
|---|---|---|---|
| | | **SWITCH KIT** | |
| 2. | 3410-9999 | Switch Hardware Kit | A/R |
| 1. | 3600-9082 | Switch, Reed, Form A, 5M Wire | A/R |
| | 3600-9083 | Switch, Reed, Form A, Male Connect | A/R |
| | 3600-9084 | Switch, Reed, Form C, 5M Wire | A/R |
| | 3600-9085 | Switch, Reed, Form C, Male Connect | A/R |
| | 3600-9086 | Switch, Triac, 5M Wire | A/R |
| | 3600-9087 | Switch, Triac, Male Connect | A/R |
| | 3600-9988 | Switch, Sourcing(PNP), Hall Effect, 5M | A/R |
| | 3600-9989 | Switch, Sourcing(PNP), Hall Effect, MA | A/R |
| | 3600-9090 | Switch, Sinking(NPN), Hall Effect, 5M | A/R |
| | 3600-9091 | Switch, Sinking(NPN), Hall Effect, MAL | A/R |
| | | **TUBE SUPPORT KIT** | |
| 3. | 3410-1012 | SHCS, #10-24 x 0.44 | 4 |
| | 4410-1077 | SHCS, M5 x 0.8mm x 10mm | 4 |
| 4. | 2006-1063 | SFHCS, #10-24 x 0.38 | 4 |
| | 4410-1016 | SFHCS, M5 x 0.8 x 10 | 4 |
| 5. | 3410-1013 | B3C310 Nut | 8 |
| | 4410-1013 | BC3M10 Metric Nut | 8 |
| 6. | 3410-1044 | BC310 Tube Support | 2 |
| | | **MOUNTING PLATES** | |
| 8. | 0915-1016 | SFHCS, #10-24 x 0.50 | 4 |
| | 4415-1016 | SFHCS, M5 x 8 x 16mm | 4 |
| 9. | 3410-1332 | Mounting Plate, B3S, 0.50 | 2 |
| 10. | 3410-1013 | Nut | 4 |
| | 4410-1013 | Nut, Metric | 4 |

**REED SWITCHES**

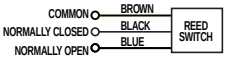
**NOTE:** Form A Reed Switches should not be used in TTL logic circuits. A voltage drop caused by the L.E.D. indicator will result. For applications where TTL circuits are used, please contact the factory.

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

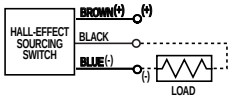
**UNIVERSAL SWITCH WIRING DIAGRAMS AND LABEL COLOR CODING**




**REED SWITCH FORM A**
**LABEL COLOR: RED**
**10VA MAX.**
**200 Vdc**
**500mA Max. Current**

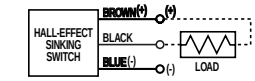



**REED SWITCH FORM C**
**LABEL COLOR: YELLOW**
**120 Vdc/120 Vac MAX.**
**250mA Max. Current**



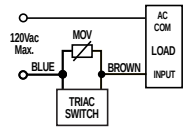

**HALL-EFFECT SWITCH**
**(SOURCING)**

**LABEL COLOR: WHITE**
**Input Voltage:5-25 VDC only**
**Output Current: 200 mA Max.**

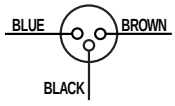



**HALL-EFFECT SWITCH**
**(SINKING)**

**LABEL COLOR: GREEN**
**Input Voltage:5-25 VDC only**
**Output Current: 200 mA Max.**




**TRIAC SWITCH**
**LABEL COLOR: BLUE**
**Max. 1Amp. Cont. Current @ 86°F**
**Max. .5Amp. Cont. Current @ 140°F**
**Peak surge current 10Amp.**




**QUICK-DISCONNECT**
**(Applies to all switch types)**

**An Important Note Regarding Field Retrofit of Quick-Disconnect Couplers:** If replacing a Quick-Disconnect switch manufactured before 7-1-97 it will also be necessary to replace or rewire the female-end coupler with the in-line splice.

**2503-1025 Female Connector 5M**

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

For complete Reed and TRIAC Switch Performance Data, refer to the Fluid Power Catalog # 9900-4000.

**TOL-O-MATIC, INC.**
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