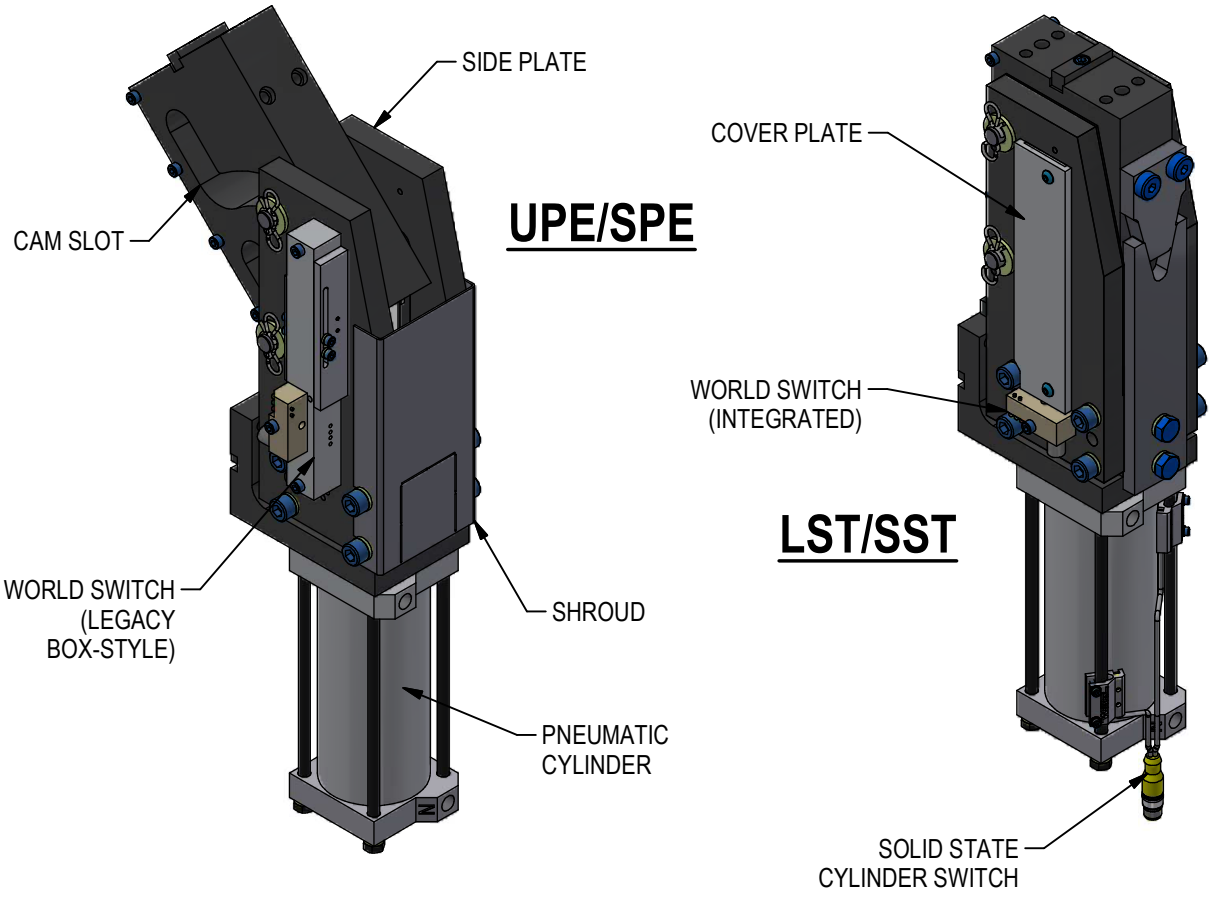
WELKER ENGINEERED PRODUCTS
ISO 9001 REGISTERED

MAINTENANCE MANUAL
UPE/SPE PART EJECTORS
LST/SST PART POSITIONERS



Welker Engineered Products 1401 Piedmont Troy, MI 48083 (800) 229-0890 www.welkerproducts.com

MAINTENANCE

SAFETY FIRST! MAINTENANCE SHOULD ONLY BE PERFORMED BY QUALIFIED PERSONNEL. PROPER SAFETY GEAR AND PROCEDURES MUST BE USED AT ALL TIMES. BEFORE PERFORMING MAINTENANCE, CUT OFF AIR SUPPLY TO THE UNIT, ENSURE THAT ALL AIR IS REMOVED AND THAT THERE ARE NO "TRAPPED AIR" CONDITIONS.

PREVENTATIVE MAINTENANCE: Regularly inspect unit to verify proper operation. Check for debris build up and clean as needed. Inspect all pneumatic, electrical, and mounting connections, making sure all connections are tight and secure. Routine replacement of cylinder seals is recommended.

CYLINDER: Welker pneumatic cylinders are lube free and require very little maintenance. Check for abnormal wear or damage. Plant air supply to the cylinder should be free of contaminants, filtered to a minimum of 50micron and have a water separator. Be sure fittings are in good condition. Seals are subject to wear under normal operating conditions. It is recommended to keep a spare cylinder seal kit or repair kit on hand.

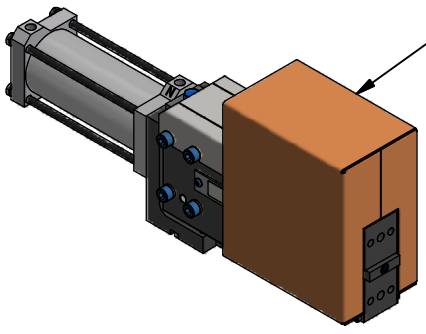
CYLINDER CLEVIS ASSEMBLY: Lubrication is required via the grease port (under side cover plate) 1CC of MOBIL XHP222 or equivalent every 6 months or 100,000 cycles, whichever comes first. NOTE: Clevis assembly with lube port is not present on older units.

SWITCH: Switches may fail and need replacement; it is recommended to keep a spare switch on hand.

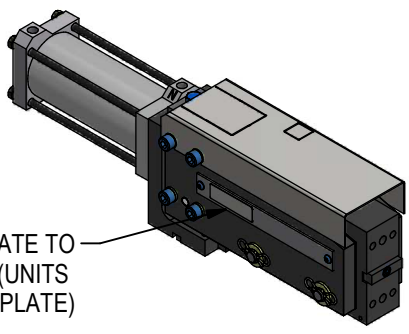
WELKER RECOMMENDS IN-PLANT RECERTIFICATION AFTER SERVICE/REPAIR/REPLACEMENT.

TROUBLESHOOTING

FAILURE	POSSIBLE CAUSE	SOLUTION
Tip plate does not extend/retract	Cylinder failure	Check plant air supply for proper pressure; too little will result in lack of cylinder movement. Seals may be worn, damaged or deteriorating. Replace as needed. If cylinder has been serviced, be sure tie rod nuts have been tightened to torque specifications. Check air supply and cylinder orifice for contamination.
	Switch failure	Check switch for proper operation. Replace as needed.
	Improper load	Check working load to be sure it is within recommended capacity.
	Tip plate/clevis failure	Inspect tip plate slots for wear. Maintain grease in slots and on tip plate. Inspect clevis assembly, replace if needed. Clevis pin and bearing are included in unit repair kit.
	Cam slot contamination	Clean out cam slot. If slot contamination is a recurring problem, consider adding extra tip plate shrouding (Shroud Option 1 in catalog). See illustration below. Cam slot contamination can also cause no read on switch by blocking full tip plate movement,.
Unit cycles too slow	Insufficient air pressure Roller failure	Check/correct air pressure. Check orifice/flow controls. Replace roller bearings.
Unit cycles too fast or throws part	No flow controls Flow controls not adjusted	Flow controls are required for all part ejectors and positioners. Flow controls must be adjusted by the customer to match application.



EXTRA TIP PLATE SHROUDING
RECOMMENDED FOR
MIG/ARC WELDING APPLICATIONS



REMOVE COVER PLATE TO
ACCESS LUBE PORT (UNITS
WITH STICKER ON COVER PLATE)

REPLACEMENT PARTS

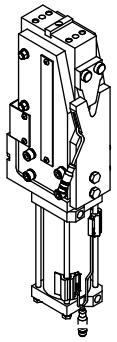
NOTE A: When ordering cylinders, repair kits and switches, please have the unit's Welker Job Number available and/or the cylinder model & serial number.

QTY	STOCK*	DESCRIPTION	PART NUMBER
1		PNEUMATIC CYLINDER	CALL WELKER (SEE NOTE A)
		UPE REPLACEMENT CYLINDER 01-04, COMPLETE	WC-2182-UPE-TIP ANGLE-ACTUATOR(01-04)
		LST REPLACEMENT CYLINDER 01-04, COMPLETE	WC-2182-LST-TIP ANGLE-ACTUATOR(01-04)
	1	CYLINDER 01-04 REPAIR KIT	UPE-RK
	1	CYLINDER 05-08 REPAIR KIT	UPE-100-RK
		CYLINDER 01-04 SEAL KIT	UPE-CSK
		CYLINDER 05-08 SEAL KIT	UPE-100-CSK
2		TIP PLATE ROLLER BEARING ASSEMBLY (WITH PIN)	UPE-RB-ASSY
2		TIP PLATE ROLLER BEARING ASSEMBLY (WITHOUT PIN)	UPE45E09-ASSY
	1	V-BLOCK SWITCH FOR LST WITH MOUNT A	LST-VBS-A
	1	V-BLOCK SWITCH FOR LST WITH MOUNT B	LST-VBS-B
	1	V-BLOCK SWITCH FOR SST WITH MOUNT A	SST-VBS-A
	1	V-BLOCK SWITCH FOR SST WITH MOUNT B	SST-VBS-B
2		SIDE PLATE WITH COMPOSITE LINER	CALL WELKER (SEE NOTE A)
	1	CYLINDER CLEVIS PIN REPLACEMENT KIT	UPE-LST-CCP

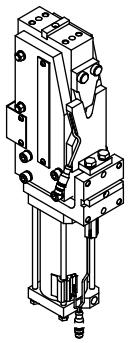
* RECOMMENDED SPARE PARTS TO KEEP IN STOCK

Original ordering part number	Replacement part number	Part Number	Manufacturer	Description All switches Quick Disconnect
AE / AR	**SWITCH SWA**	Ni2-Q6.5-AP6-0.1-FS 4.4X3/S304	Turck	4-Wire, 4-Pin, DC M12 X 1 (PNP)
BE / BR	**SWITCH SWB**	Ni2-Q6.5-ADZ32-0.1-FSB 5.4X4/S304	Turck	4-Wire, 5-Pin, AC/DC 1/2-20 (N.O.)
CE / CR	**SWITCH SWC**	Ni2-Q6.5-AN6-0.1-FS 4.4X3/S304	Turck	4-Wire, 4-Pin, DC M12 X 1 (NPN)
DE / DR	**SWITCH SWD**	NBN2-F581-100S6-E8-V1	Pepperl & Fuchs	4-Wire, 4-Pin, DC M12 X 1 (PNP)
EE / ER	**SWITCH SWE**	BES-Z02KR2-PSC20F-P100-S04-V	Balluff	3-Wire, 4-Pin, DC M12 X 1 (PNP)
HE / HR	**SWITCH SWH**	Ni2-Q6.5-0.1M-BDS-2AP6X3-H1141/S34	Turck	4-Wire, 4-Pin, DC M12 X 1 (PNP)
JE / JR	**SWITCH SWJ**	IN5374	Efector	3-Wire, 4-Pin, DC M12 X 1 (PNP)
SE / SR	**SWITCH SWS**	Ni2-Q6.5-AP6-0.16-FS 4.4X3/S304	Turck	4-Wire, 4-Pin, DC M12 X 1 (PNP)
TE / TR	**SWITCH SWT**	Ni2-Q6.5-ADZ32-0.16-FSB 5.4X4/S304	Turck	4-Wire, 5-Pin, AC/DC 1/2-20 (N.O.)
UE / UR	**SWITCH SWU**	Ni2-Q6.5-AN6-0.16-FS 4.4X3/S304	Turck	3-Wire, 4-Pin, DC M12 X 1 (NPN)
VE / VR	**SWITCH SWV**	NBN2-F581-160S6-E8-V1	Pepperl & Fuchs	4-Wire, 4-Pin, DC M12 X 1 (PNP)
WE / WR	**SWITCH SWW**	BES-Z02KR2-PSC20F-P165-S04-V	Balluff	3-Wire, 4-Pin, DC M12 X 1 (PNP)
YE / YR	**SWITCH SWY**	IN5375	Efector	3-Wire, 4-Pin, DC M12 X 1 (PNP)
ZE / ZR	**SWITCH SWZ**	WWS001A	WELKER	4-Wire, 4-Pin, DC M12 X 1 (PNP)
L3	**SWITCH L3**	SWITCH L3	WELKER	4-Wire, 4-Pin, DC M12 X 1 (PNP)
L5	**SWITCH L5**	MK5113	ifm Efector	3-Wire, 4-Pin, DC M12 X 1 (NPN)

LST SHOWN WITH V-BLOCK SWITCH & MOUNT A



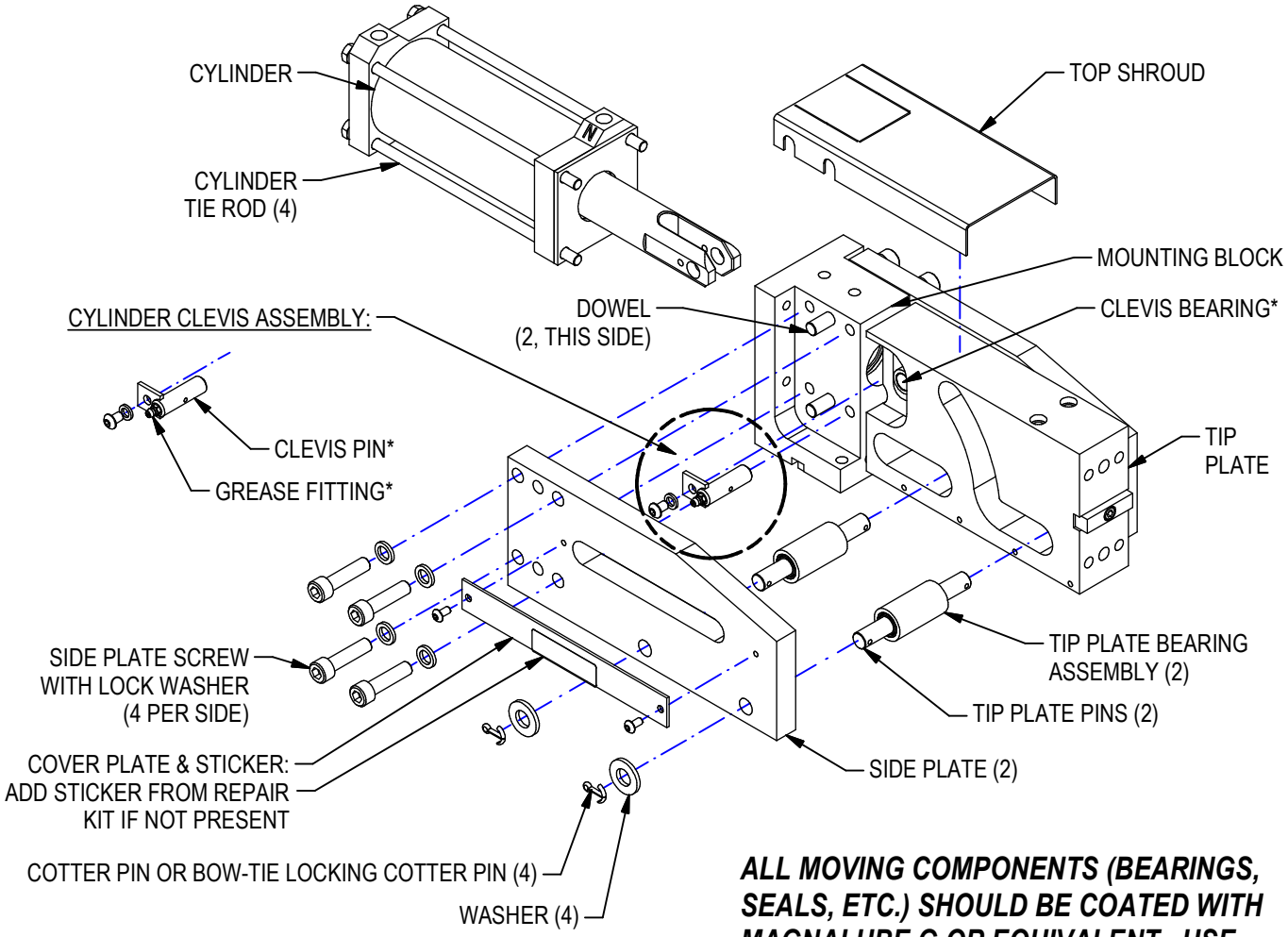
LST SHOWN WITH V-BLOCK SWITCH & MOUNT B



UNIT REPAIR KIT: UPE-RK & UPE-100-RK

Standard repair kit includes: Cylinder seal kit (UPE-CSK or UPE-100-CSK), clevis bearing, cylinder clevis assembly, tip plate roller bearing assembly (2), tip plate pins (2), cotter pin (4), and washer (4).
Below are instructions for unit repair; cylinder repair is on the next page.

1. Remove shrouds and cylinder switch if applicable. Remove cover plate. Remove cotter pins & washers. Remove side plate screws & lock washers. Remove the side plate.
2. Remove cylinder clevis assembly*. Loosen cylinder tie rods (approx 20mm) to release cylinder from mounting block, noting port orientation.
3. Replace clevis bearing (in tip plate), greasing with Magnalube G or equivalent.
4. Remove tip plate roller pins. Replace tip plate roller bearing assemblies. Replace/install tip plate roller pins. Pack with Magnalube G or equivalent. >> *To replace cylinder seals & wiper, continue on next page* >>
5. Install cylinder to mounting block. Tighten cylinder tie rods to torques and pattern shown on Sheet 6.
6. Install switch dog and grease fitting to clevis pin. Switch dog replaces shoulder screw, if present.
7. Install cylinder clevis assembly. Make sure pin is thru clevis bearing in tip plate.
8. Coat tip plate surfaces and slots with Magnalube G or equivalent.
9. Lubricate clevis pin via grease fitting: 1CC of MOBIL XHP222 or equivalent. Install sticker to cover plate.
10. Install side plate with screws/lock washers. Secure rollers with cotter pins/washers. Use removable Loctite on all fasteners.



*INCLUDED IN CYLINDER CLEVIS PIN REPLACEMENT KIT

ALL MOVING COMPONENTS (BEARINGS, SEALS, ETC.) SHOULD BE COATED WITH MAGNALUBE G OR EQUIVALENT. USE REMOVABLE LOCTITE ON ALL FASTENERS.

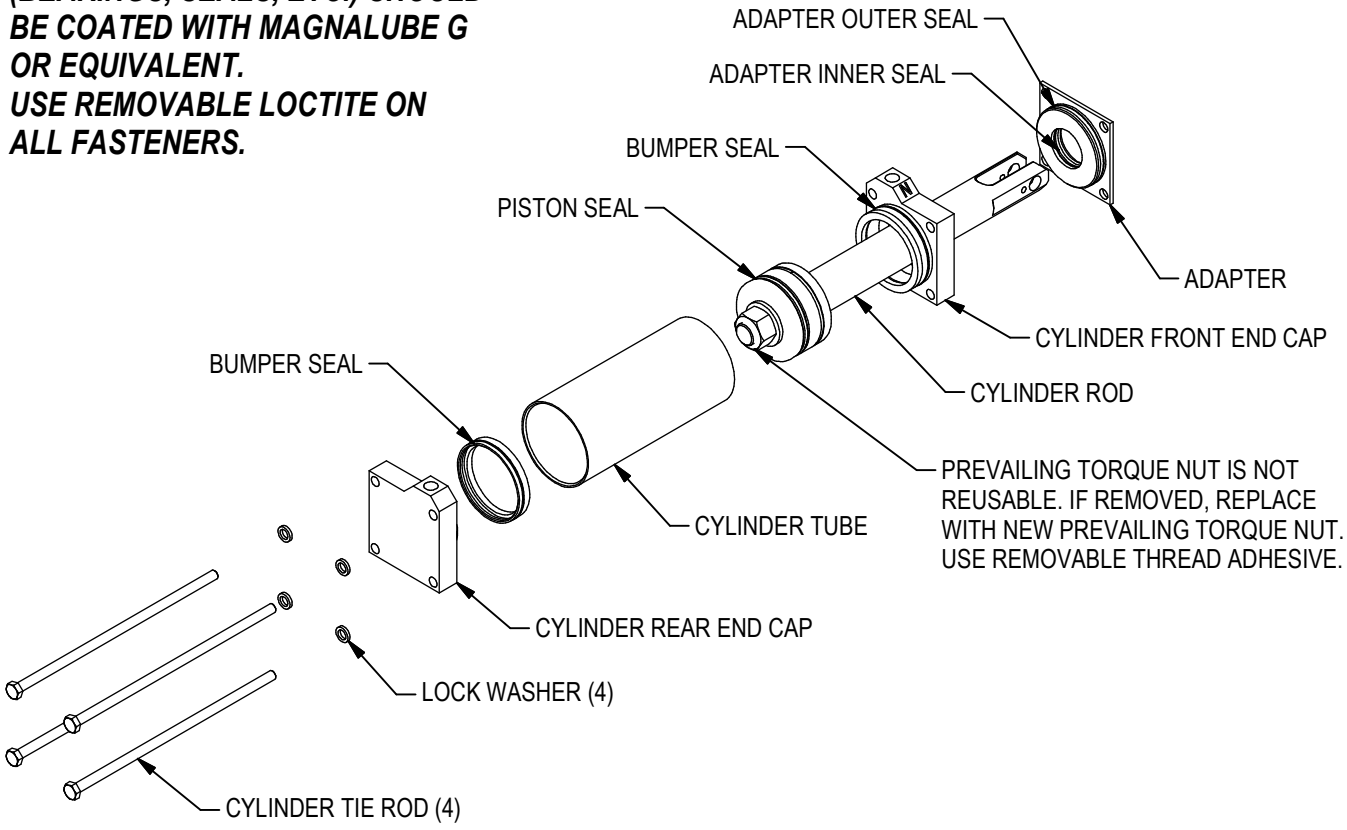
CYLINDER SEAL MAINTENANCE: UPE-CSK & UPE-100-CSK

Cylinder seal kit includes: Bumper seal (2), piston seal, adapter inner seal and adapter outer seal. Additional adapter seals and wiper are included with seal kits for double rod cylinders.
Seals should be replaced routinely to avoid cylinder failure. Please have cylinder model information and/or Welker job number ready when ordering seal kits or repair kits. This information is located on the unit's tag and on the cylinder.

NOTE: Always replace rod bearing when servicing cylinder (included in cylinder repair kit).

1. To access cylinder seals, please follow Step 1 and 2 of Unit Repair Kit instructions, Sheet 4.
2. Remove the cylinder tie rods & washers. Remove rear cap, tube and bumper seals. Clean seal grooves thoroughly. Replace bumper seals.
3. Remove piston seal using plastic or brass tool. NOTE ORIENTATION OF SEALS. Inspect parts for wear. Clean piston and install new seal.
4. Remove adapter. Replace adapter outer seal, adapter inner seal, and rod wiper.
5. Align adapter, front end cap, tube, and rear end cap on cylinder rod and install to mounting block with cylinder tie rods & lock washers. Be sure cylinder ports are in proper position and tube seals are seated properly in grooves, not being pinched.
6. Install cylinder clevis assembly.
7. Install side plates with screws/lock washers. Secure rollers with cotter pins/washers. Use removable Loctite on all fasteners. Tighten to torques and pattern shown on Sheet 6.

ALL CYLINDER COMPONENTS (BEARINGS, SEALS, ETC.) SHOULD BE COATED WITH MAGNALUBE G OR EQUIVALENT.
USE REMOVABLE LOCTITE ON ALL FASTENERS.



ADDITIONAL SEAL MAINTENANCE ~ DOUBLE ROD CYLINDERS

Two additional seals and wiper are included for double rod cylinders:

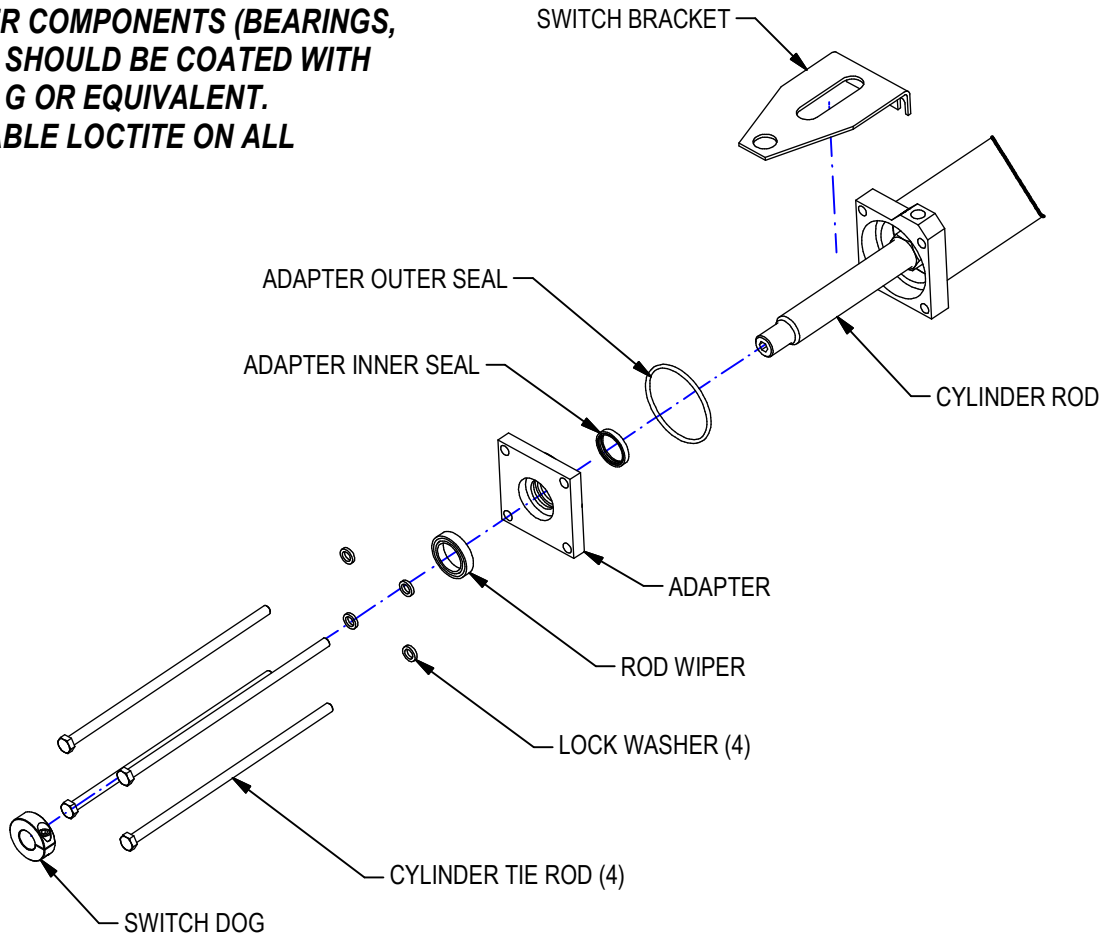
1. Remove switch dog.

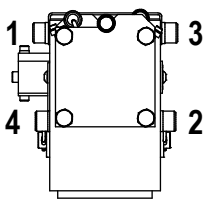
2. Remove the cylinder tie rods & lock washers. Remove switch bracket. Remove rear adapter.

3. Replace adapter inner seal, adapter outer seal and rod wiper.

4. Reassemble using removable Loctite on all fasteners. Tighten to torques and pattern shown below.

ALL CYLINDER COMPONENTS (BEARINGS, SEALS, ETC.) SHOULD BE COATED WITH MAGNALUBE G OR EQUIVALENT. USE REMOVABLE LOCTITE ON ALL FASTENERS.



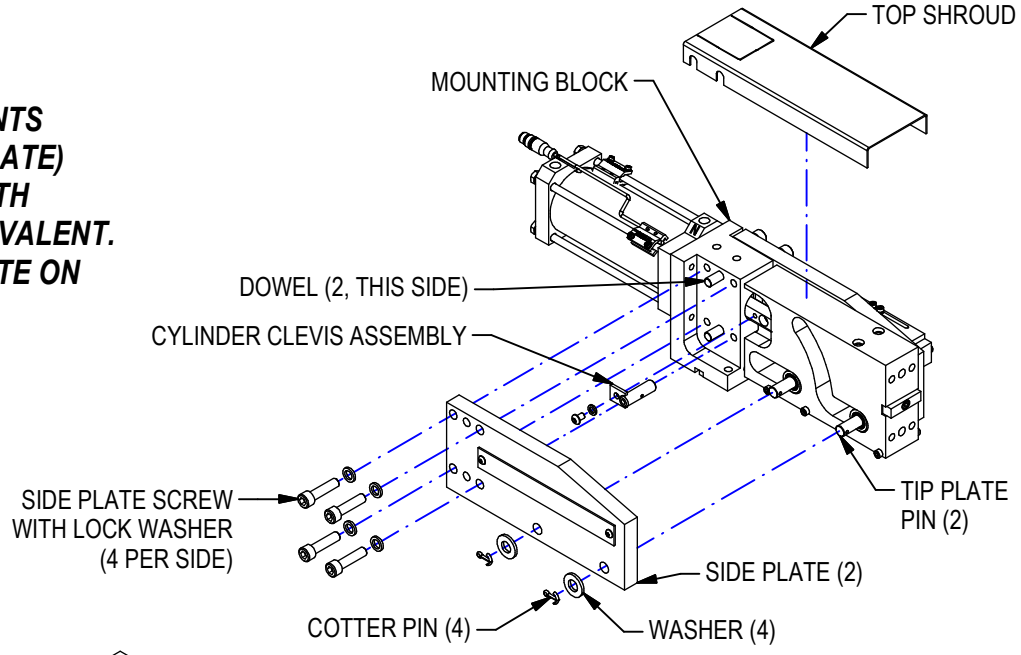


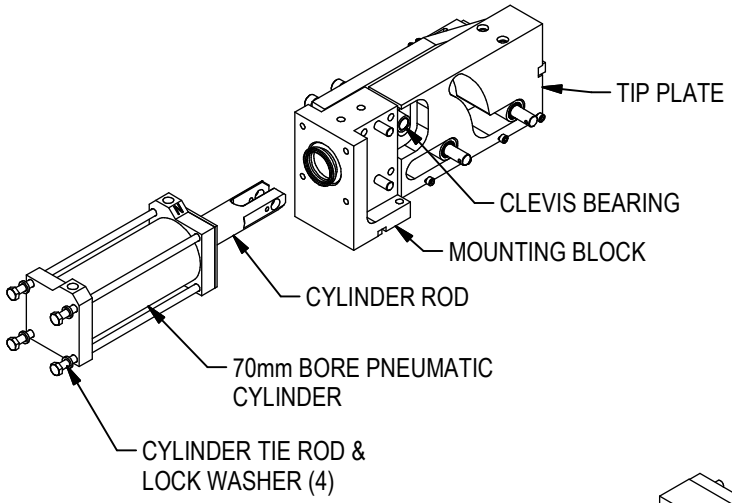
Tightening Torques for Metric Bolts (installed dry)				
	Steel		Aluminum	
M5	10 Nm	7.4 ft lb.	5 Nm	3.7 ft lb.
M6	19 Nm	14.0 ft lb.	9.5 Nm	7.0 ft lb.
M8	45 Nm	33.2 ft lb.	22.5 Nm	16.6 ft lb.
M10	89 Nm	65.6 ft lb.	44.5 Nm	32.8 ft lb.
M12	156 Nm	115.1 ft lb.	78 Nm	57.6 ft lb.

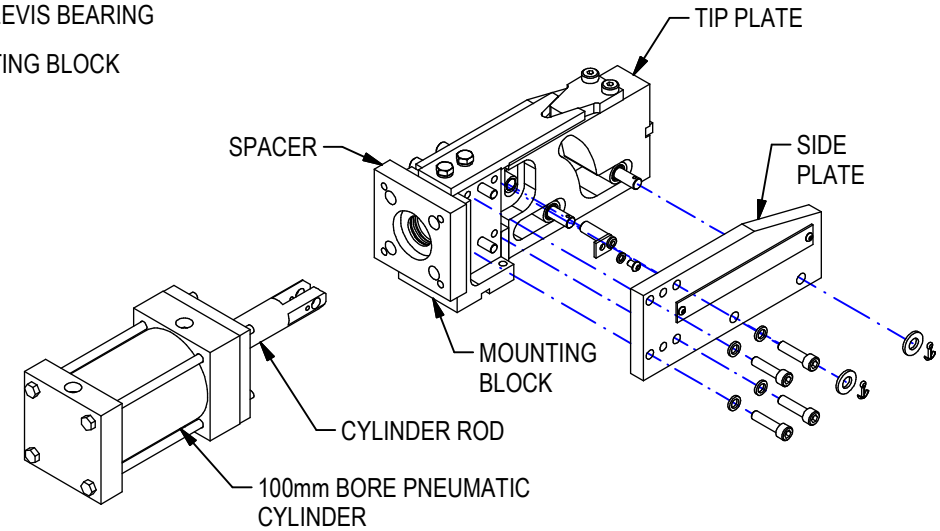
REPLACE CYLINDER

1. Remove shrouds if applicable. Remove cotter pins & washers. Note: tip plate pins will be loose.
2. Remove side plate screws & lock washers. Remove side plate; dowels remain in mounting block.
3. Remove clevis assembly. If unit has World Switch there will be a shoulder screw in clevis pin.
4. Remove cylinder switch if present, noting position on cylinder tie rods.
5. Loosen cylinder tie rods approx 20mm to release from mounting block. If unit has a 100mm bore cylinder it will be mounted to spacer.
6. Align new cylinder to mounting block. Install clevis pin making sure it's going thru clevis bearing in tip plate.
7. Secure cylinder to mounting block. Secure cylinder clevis assembly. Reassemble unit.
8. Apply grease to all moving components: Magnalube G or equivalent. Use removable Loctite on all fasteners.
9. Tighten to torques and pattern shown on Sheet 6.

ALL MOVING COMPONENTS (BEARINGS, PINS, TIP PLATE) SHOULD BE COATED WITH MAGNALUBE G OR EQUIVALENT. USE REMOVABLE LOCTITE ON ALL FASTENERS.

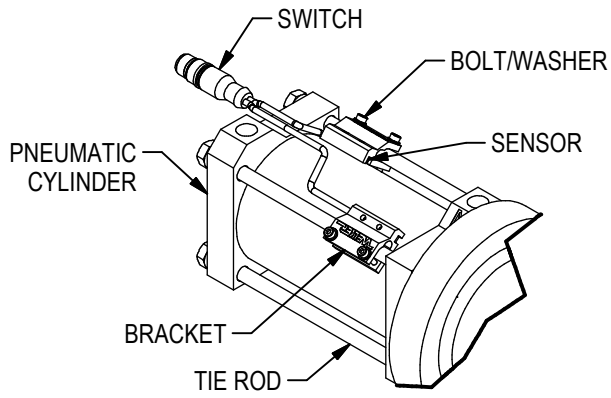


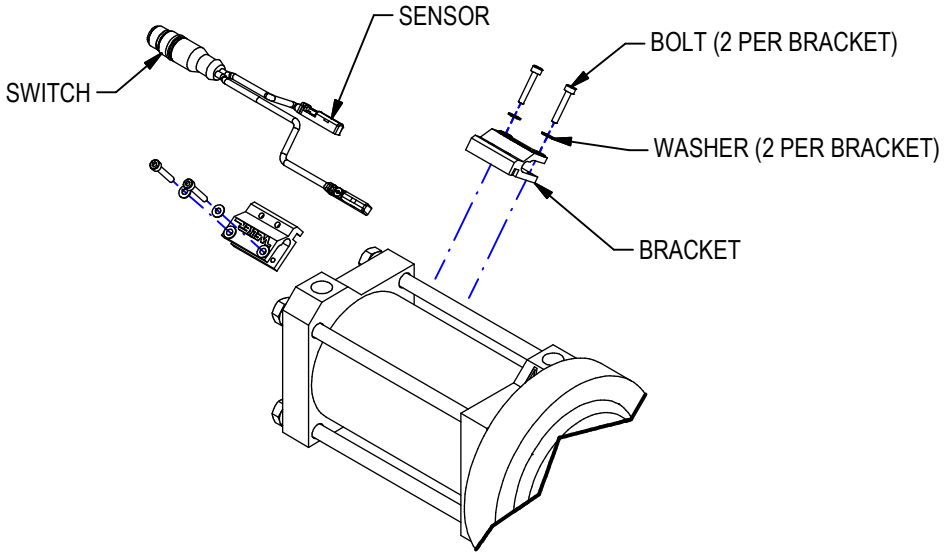


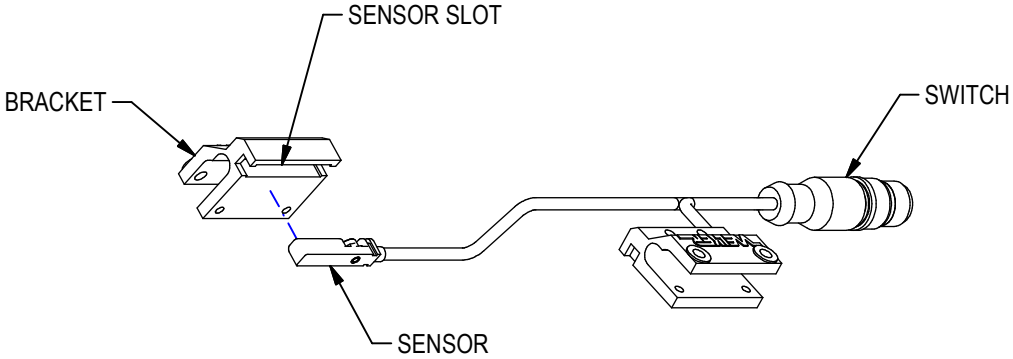


REPLACING TIE ROD CYLINDER SWITCH

1. **BEFORE REMOVING OLD SWITCH: NOTE SENSOR PLACEMENT!** FOR SWITCHES WITH TWO SENSORS, EACH WILL BE TAGGED WITH A BAND AROUND THE WIRE INDICATING S1 AND S2 (OR S01 AND S02).
2. TO REMOVE SWITCH, REMOVE BOLTS AND WASHERS FROM BRACKET. SLIDE BRACKET OUT FROM TIE ROD.
3. SENSOR IS SNAPPED INTO BRACKET. REMOVE.
4. INSTALL NEW SWITCH SENSOR FLUSH INTO BRACKET, BEING CAREFUL TO MATCH SENSOR CORRECTLY TO LOCATION ON CYLINDER.
5. LOCATE BRACKET TO CYLINDER, SLIDE ON TO TIE ROD. SECURE WITH BOLTS & WASHERS.
6. TEST SWITCH.

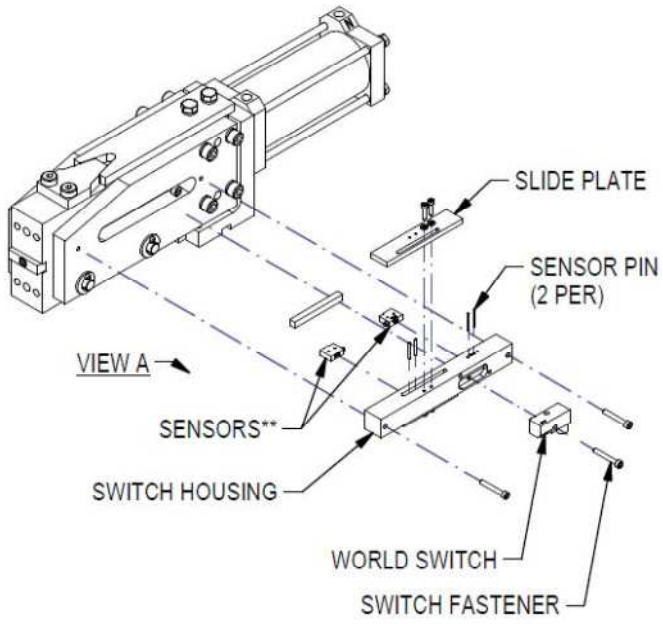


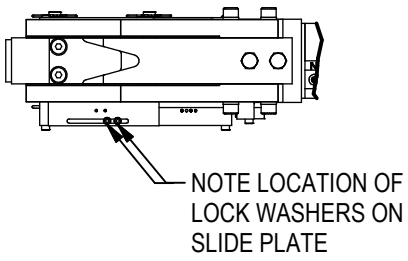


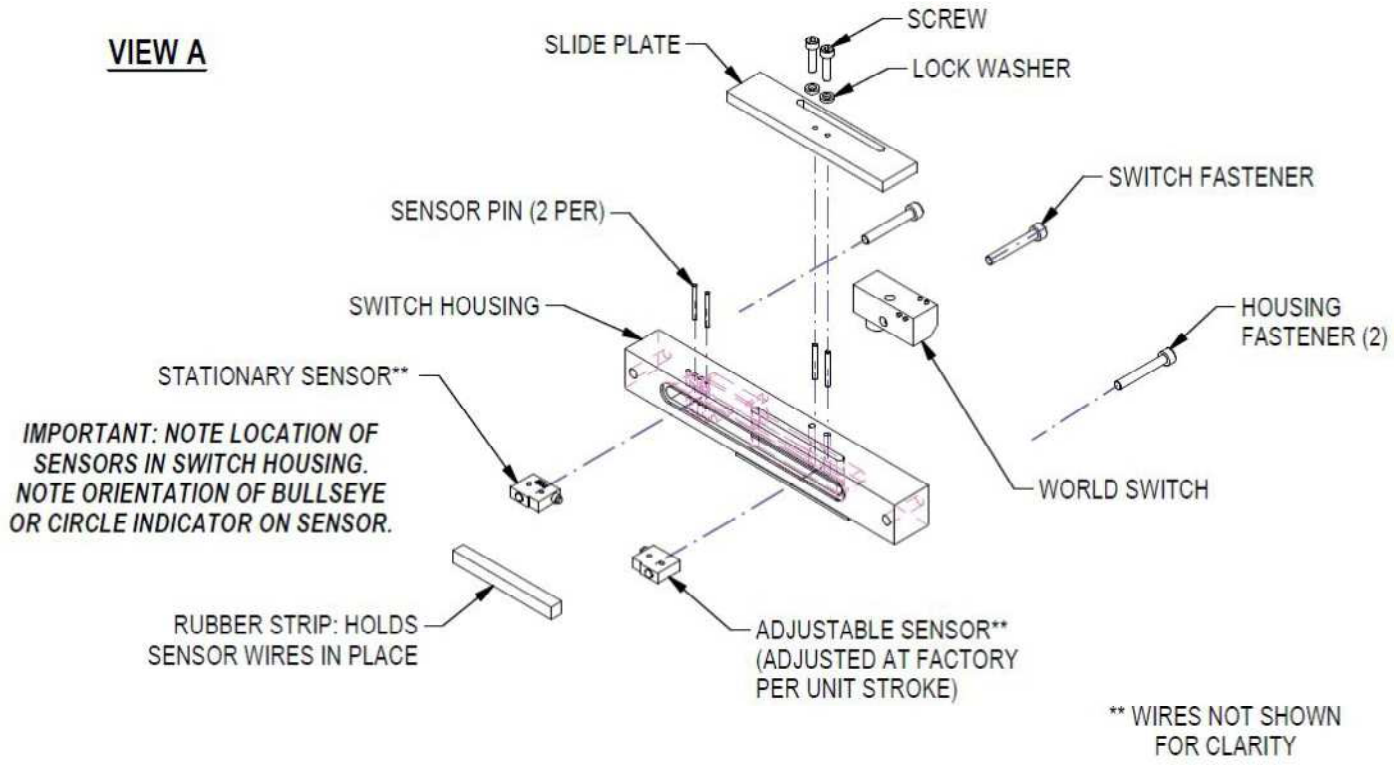


REPLACING BOX-STYLE WORLD SWITCH: LST & UPE

1. REMOVE SWITCH CONNECTOR. REMOVE SWITCH HOUSING FROM SIDE PLATE (2 SCREWS).
2. REMOVE SMALL RUBBER STRIP THAT HOLDS SENSOR WIRES IN PLACE.
3. BEFORE REMOVING SWITCH SENSORS: TRACE OUTLINE OF LOCK WASHERS ON SWITCH HOUSING TO EASILY LOCATE NEW SENSOR.
4. NOTE LOCATION OF SENSORS IN SWITCH HOUSING. NOTE ORIENTATION OF BULLSEYE OR CIRCLE INDICATOR ON SENSOR. (TAKE PHOTO FOR REFERENCE)
5. REMOVE SLIDE PLATE. SENSOR PINS ARE PRESS FIT INTO PLATE AND WILL COME OUT OF ADJUSTABLE SENSOR UPON REMOVAL.
6. REMOVE SENSOR PINS FROM STATIONARY SENSOR.
7. REMOVE SWITCH FASTENER FROM SWITCH HOUSING. REMOVE SWITCH AND SENSORS.
8. INSTALL NEW SENSORS & SWITCH TO PROPER LOCATION AND ORIENTATION. SECURE LOOSE WIRES INTO SWITCH HOUSING WITH RUBBER STRIP.
9. CLEAN SURFACES. INSTALL REASSEMBLED SWITCH HOUSING TO UNIT SIDE PLATE WITH HOUSING FASTENERS (2).
10. INSTALL CONNECTOR TO SWITCH. TEST SWITCH.





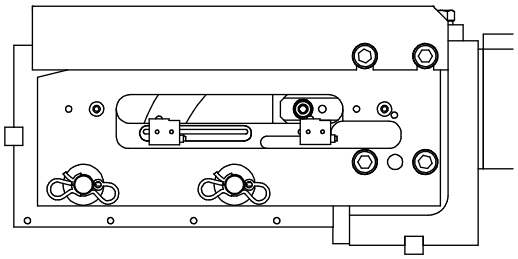


REPLACING INTEGRATED WORLD SWITCH VERSION-1: LST & UPE

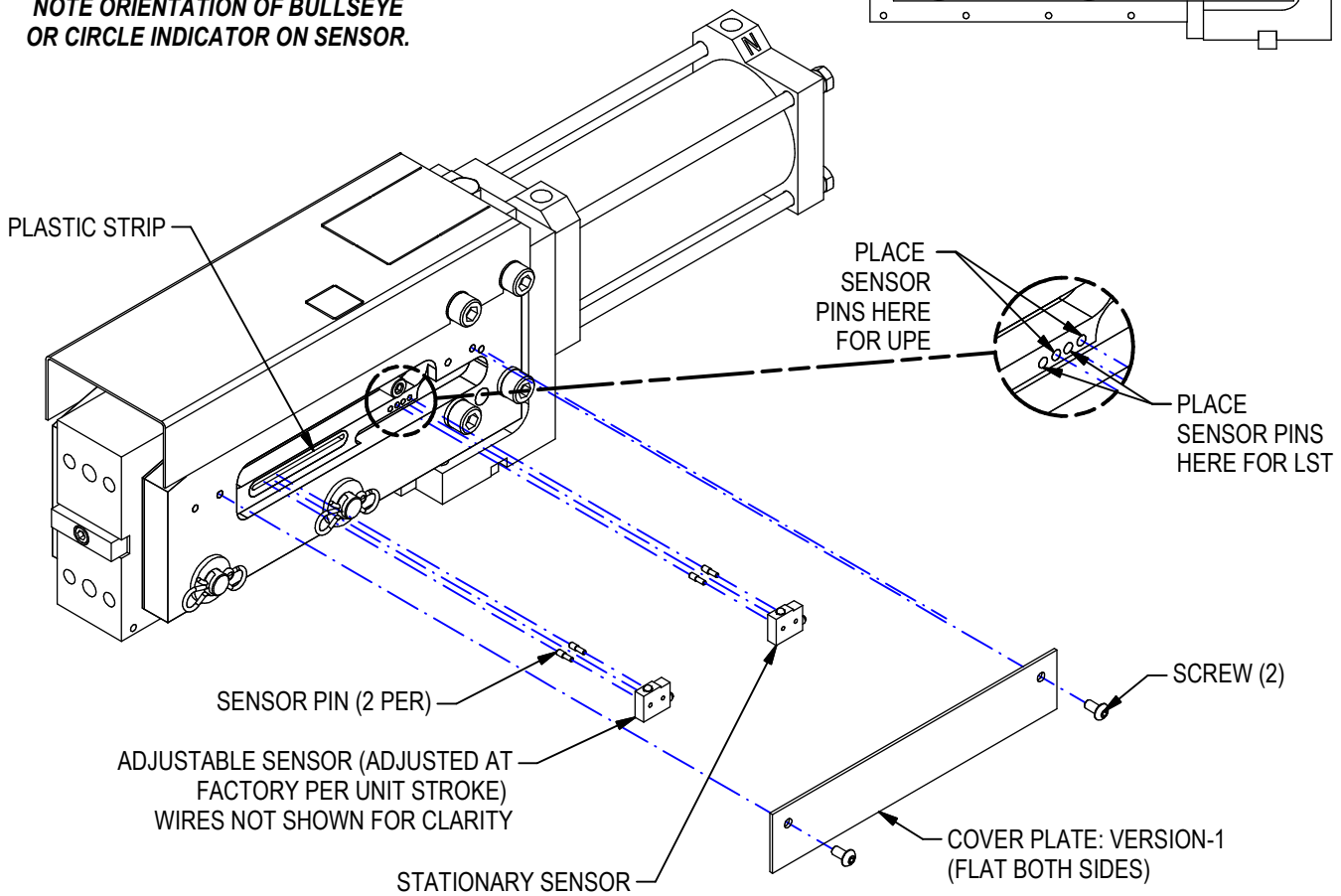
VERSION-1 COVER PLATE IS FLAT ON BOTH SIDES. VERSION-2 COVER PLATE HAS SENSOR MOUNT.

1. REMOVE SWITCH CONNECTOR. REMOVE COVER PLATE FROM SIDE PLATE (2 SCREWS).
2. BEFORE REMOVING SWITCH SENSORS: NOTE LOCATION OF SENSORS IN SWITCH HOUSING. NOTE ORIENTATION OF BULLSEYE OR CIRCLE INDICATOR ON SENSOR. (TAKE PHOTO FOR REFERENCE). TRACE OUTLINE OF ADJUSTABLE SENSOR ON SWITCH HOUSING TO EASILY LOCATE NEW SENSOR.
3. SENSOR PINS ARE PRESS FIT INTO PLASTIC STRIP AND WILL COME OUT OF ADJUSTABLE SENSOR UPON REMOVAL.
4. REMOVE SENSOR PINS FROM STATIONARY SENSOR.
5. REMOVE SWITCH FASTENER FROM SWITCH HOUSING. REMOVE SWITCH AND SENSORS. NOTE: A SMALL RUBBER WIRE RETAINER MAY BE IN PLACE, DEPENDING ON THE SWITCH.
6. INSTALL NEW SENSORS & SWITCH TO PROPER LOCATION AND ORIENTATION. SECURE LOOSE WIRES BEING SURE WIRES DO NOT INTERFERE WITH INTERNAL SWITCH DOG SHOULDER SCREW. USE WIRE RETAINER IF PRESENT.
7. CLEAN SURFACES. INSTALL COVER PLATE TO UNIT SIDE PLATE WITH SCREWS (2).
8. INSTALL CONNECTOR TO SWITCH. TEST SWITCH.

SIDE VIEW WITH COVER PLATE REMOVED:



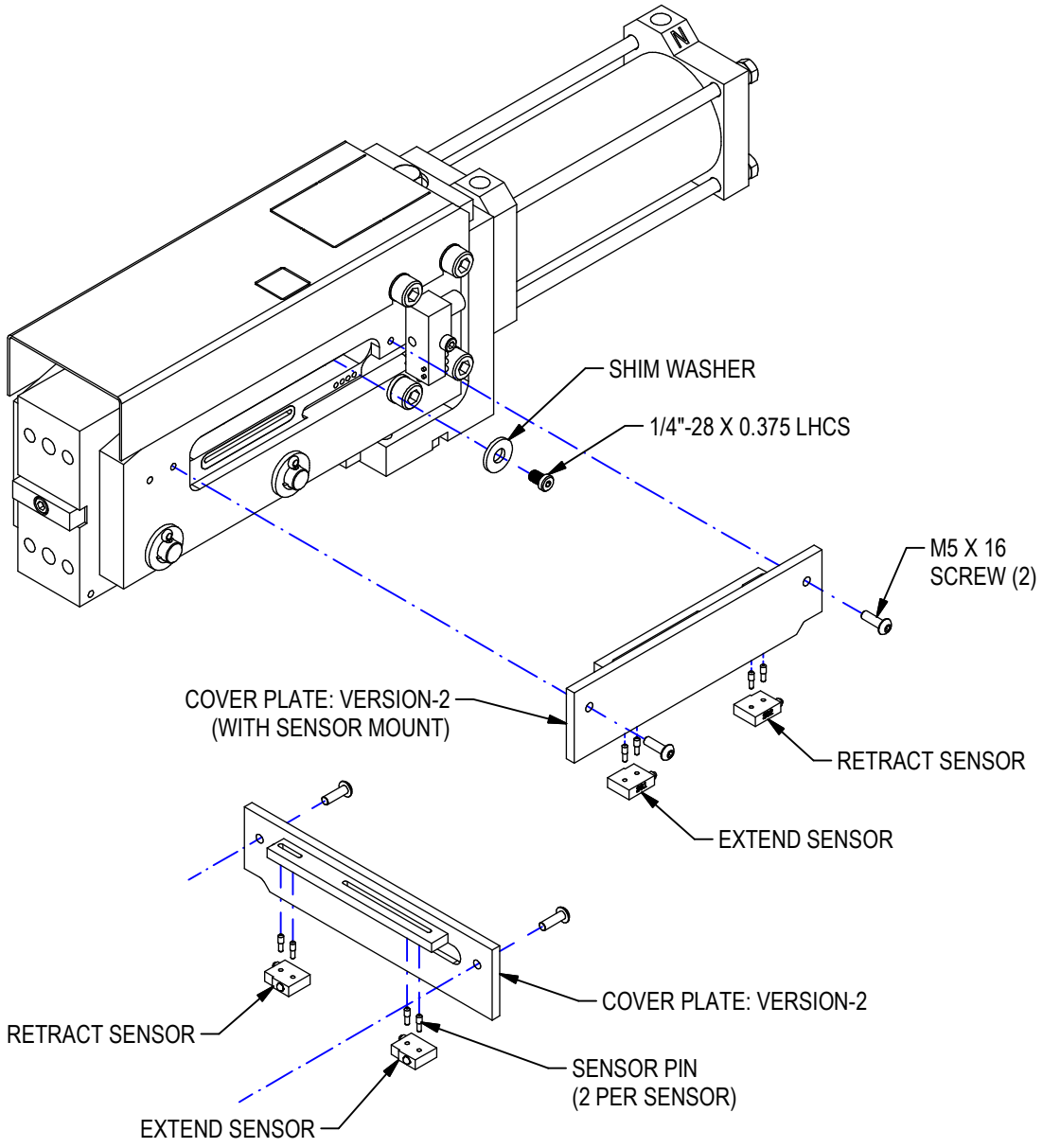
IMPORTANT: NOTE LOCATION OF SENSORS IN SWITCH HOUSING. NOTE ORIENTATION OF BULLSEYE OR CIRCLE INDICATOR ON SENSOR.



REPLACING INTEGRATED WORLD SWITCH VERSION-2: LST & UPE

VERSION-1 COVER PLATE IS FLAT ON BOTH SIDES. VERSION-2 COVER PLATE HAS SENSOR MOUNT.

1. REMOVE SWITCH CONNECTOR. REMOVE COVER PLATE FROM SIDE PLATE (2 SCREWS).
2. BEFORE REMOVING SWITCH SENSORS: NOTE LOCATION OF SENSORS IN SWITCH HOUSING. NOTE ORIENTATION OF BULLSEYE OR CIRCLE INDICATOR ON SENSOR. (TAKE PHOTO FOR REFERENCE). TRACE OUTLINE OF ADJUSTABLE SENSOR TO EASILY LOCATE NEW SENSOR.
3. REMOVE SENSOR PINS.
4. REMOVE SWITCH FASTENER FROM SWITCH HOUSING. REMOVE SWITCH AND SENSORS.
5. INSTALL SENSORS & SWITCH TO PROPER LOCATION AND ORIENTATION.
6. CLEAN SURFACES. INSTALL COVER PLATE TO UNIT SIDE PLATE WITH SCREWS (2).
7. INSTALL CONNECTOR TO SWITCH. TEST SWITCH.



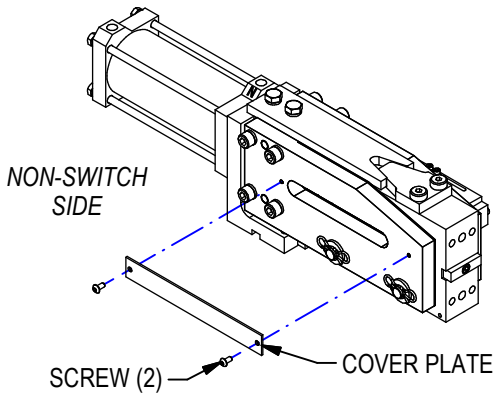
RELOCATING BOX-STYLE WORLD SWITCH: LST & UPE

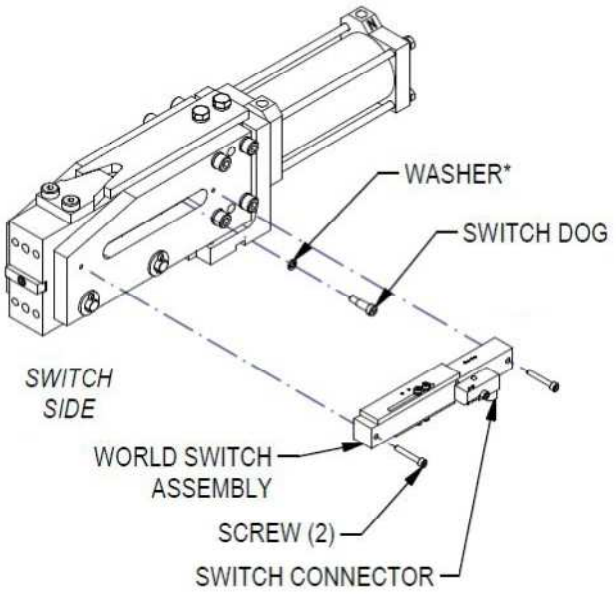
NOTES:

NEW TIP PLATE SHROUD IS REQUIRED WHEN RELOCATING WORLD SWITCH FROM ONE SIDE TO THE OTHER.

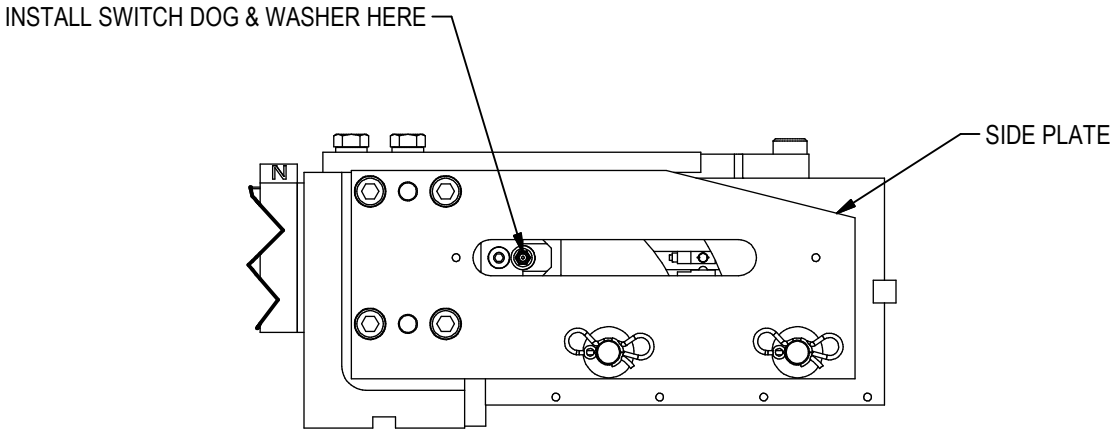
INTEGRATED WORLD SWITCH CANNOT BE RELOCATED.

1. REMOVE SHROUD, IF APPLICABLE.
2. REMOVE COVER PLATE FROM NON-SWITCH SIDE (2 SCREWS).
3. REMOVE CONNECTOR FROM WORLD SWITCH.
4. REMOVE SWITCH HOUSING FROM SIDE PLATE (2 SCREWS). NOTE SMALL RUBBER STRIP THAT HOLDS SENSOR WIRES IN PLACE.
5. REMOVE SWITCH DOG SHOULDER SCREW AND WASHER.
6. CLEAN DEBRIS FROM SURFACES.
7. INSTALL SWITCH DOG SHOULDER SCREW AND WASHER TO NEW SWITCH LOCATION. WASHER MUST BE INSTALLED FOR SWITCH TO OPERATE CORRECTLY.
8. INSTALL SWITCH HOUSING TO SIDE PLATE WITH SCREWS (2). SECURE LOOSE WIRES INTO SWITCH HOUSING WITH RUBBER STRIP. SWITCH CONNECTOR WILL BE FACING OPPOSITE DIRECTION (UP OR DOWN).
9. INSTALL COVER PLATE TO NON-SWITCH SIDE PLATE (2 SCREWS).
10. INSTALL CONNECTOR TO SWITCH. TEST SWITCH.
11. INSTALL NEW SHROUD, IF APPLICABLE.



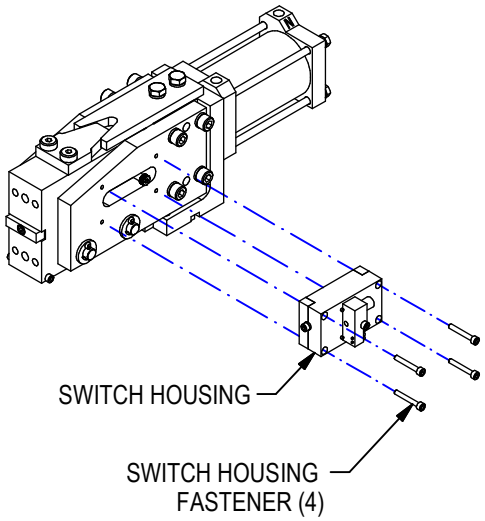


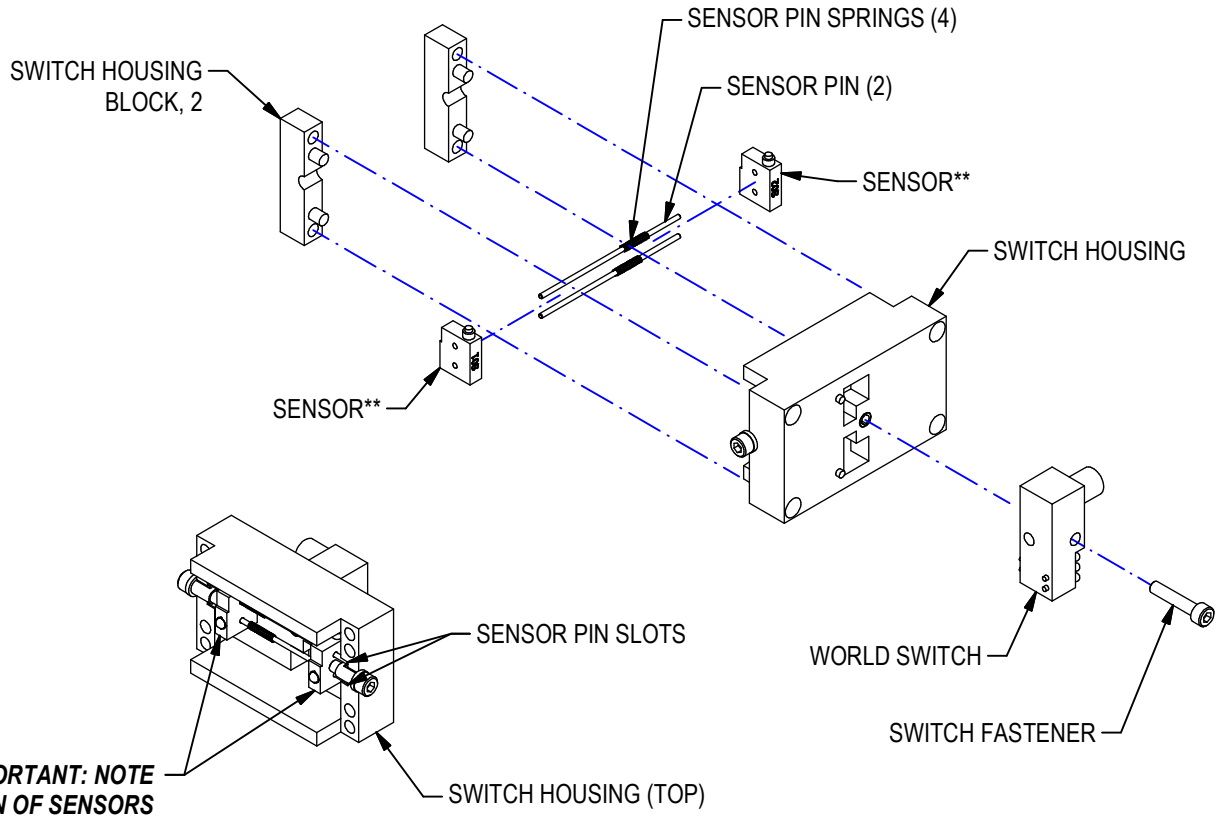
*WASHER: ONE-HALF OF AN M6 NORDLOCK WASHER IS INSTALLED AT FACTORY. IF WASHER IS LOST DURING MAINTENANCE USE M6 WASHER 1mm THICK.



REPLACING WORLD SWITCH: SST & SPE

1. REMOVE SHROUD (IF APPLICABLE). REMOVE SWITCH HOUSING FROM TIP PLATE (4 SCREWS).
2. NOTE LOCATION OF SENSORS IN SWITCH HOUSING. NOTE ORIENTATION OF BULLSEYE OR CIRCLE INDICATOR ON SENSOR. (TAKE PHOTO FOR REFERENCE)
3. SEPARATE SWITCH HOUSING FROM BLOCKS. REMOVE SENSOR/SENSOR PIN ASSEMBLY.
4. REMOVE SENSORS FROM SENSOR PINS, LEAVING SPRINGS ON PINS.
5. REMOVE SWITCH FASTENER FROM SWITCH HOUSING. REMOVE SWITCH AND SENSORS.
6. INSTALL NEW SENSORS & SWITCH TO PROPER LOCATION AND ORIENTATION. SENSOR PINS REST IN SLOTS AT EITHER END OF SWITCH HOUSING.
7. CLEAN ANY DEBRIS FROM UNIT TIP PLATE. INSTALL REASSEMBLED SWITCH HOUSING TO UNIT TIP PLATE WITH HOUSING FASTENERS (4)





IMPORTANT: NOTE LOCATION OF SENSORS IN SWITCH HOUSING. NOTE ORIENTATION OF BULLSEYE OR CIRCLE INDICATOR ON SENSOR.

** WIRES NOT SHOWN FOR CLARITY

REPLACE SIDE PLATE

Units designed for horizontal applications have composite-lined side plates, which are wear items.

1. Remove shrouds, if applicable. Remove cover plate.
2. Remove World Switch housing, if applicable (2 screws). Note the rubber strip in switch housing that holds sensor wires in place.
3. Remove cotter pins & washers. Remove side plate screws & lock washers. Remove the side plate.
4. Clean side plate contact surfaces. Do not remove grease from inside of tip plate slots. If grease is contaminated, remove and pack with Magnalube G or equivalent.
5. Install side plate with screws/lock washers. Secure rollers with cotter pins/washers.
6. Install cover plate (2 screws) or World Switch housing.
7. Use removable Loctite on all fasteners.
8. Tighten fasteners to torques shown on chart, sheet 6.