WOODWARD

Product Manual 26842
(Revision A, 12/2019)
Original Instructions

QuickTrip Field Repair Procedure

Field Repair Manual

General Precautions

Read this entire manual and all other publications pertaining to the work to be performed before installing, operating, or servicing this equipment.

Practice all plant and safety instructions and precautions.

Failure to follow instructions can cause personal injury and/or property damage.

Revisions

This publication may have been revised or updated since this copy was produced. To verify that you have the latest revision, check manual *26455*, *Customer Publication Cross Reference and Revision Status & Distribution Restrictions*, on the *publications page* of the Woodward website:

http://www.woodward.com/

The latest version of most publications is available on the *publications page*. If your publication is not there, please contact your customer service representative to get the latest copy.

Proper Use

Any unauthorized modifications to or use of this equipment outside its specified mechanical, electrical, or other operating limits may cause personal injury and/or property damage, including damage to the equipment. Any such unauthorized modifications: (i) constitute "misuse" and/or "negligence" within the meaning of the product warranty thereby excluding warranty coverage for any resulting damage, and (ii) invalidate product certifications or listings.

Translated Publications

If the cover of this publication states "Translation of the Original Instructions" please note:

The original source of this publication may have been updated since this translation was made. Be sure to check manual *26455*, *Customer Publication Cross Reference and Revision Status & Distribution Restrictions*, to verify whether this translation is up to date. Out-of-date translations are marked with ⚠. Always compare with the original for technical specifications and for proper and safe installation and operation procedures.

Revisions— A bold, black line alongside the text identifies changes in this publication since the last revision.

Manual 26842

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Warnings and Notices

Important Definitions

This is the safety alert symbol used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

- **DANGER** - Indicates a hazardous situation, which if not avoided, will result in death or serious injury.
- **WARNING** - Indicates a hazardous situation, which if not avoided, could result in death or serious injury.
- **CAUTION** - Indicates a hazardous situation, which if not avoided, could result in minor or moderate injury.
- **NOTICE** - Indicates a hazard that could result in property damage only (including damage to the control).
- **IMPORTANT** - Designates an operating tip or maintenance suggestion.

⚠WARNING

Overspeed / Overtemperature / Overpressure

The engine, turbine, or other type of prime mover should be equipped with an overspeed shutdown device to protect against runaway or damage to the prime mover with possible personal injury, loss of life, or property damage.

The overspeed shutdown device must be totally independent of the prime mover control system. An overtemperature or overpressure shutdown device may also be needed for safety, as appropriate.

⚠WARNING

Personal Protective Equipment

The products described in this publication may present risks that could lead to personal injury, loss of life, or property damage. Always wear the appropriate personal protective equipment (PPE) for the job at hand. Equipment that should be considered includes but is not limited to:

- **Eye Protection**
- **Hearing Protection**
- **Hard Hat**
- **Gloves**
- **Safety Boots**
- **Respirator**

Always read the proper Material Safety Data Sheet (MSDS) for any working fluid(s) and comply with recommended safety equipment.

⚠WARNING

Start-up

Be prepared to make an emergency shutdown when starting the engine, turbine, or other type of prime mover, to protect against runaway or overspeed with possible personal injury, loss of life, or property damage.

Before starting any repair work, take care to follow the below precautions. Practice all plant and safety instructions and precautions. Failure to follow instructions can cause personal injury and/or property damage.

⚠WARNING

Take care not to damage the electronics covers' seals, the covers' surface, threads, or the QuickTrip housing mating surface while removing or replacing the covers.

WARNING

For Zone 1/2 products: Proper torque on all joints is required to ensure that the unit is sealed properly.

WARNING

For lifting and transportation, use lifting straps fitted through both lifting points on the product. Support the QuickTrip in a vertical position during transportation.

CAUTION

The surface of this product can become hot enough or cold enough to be a hazard. Use protective gear for product handling in these circumstances. Temperature ratings are included in the specification section of this manual.

WARNING

Do not remove any test port connection plugs when hydraulic supply pressure is applied. All required hydraulic connections must be made before hydraulic pressure is applied. Hydraulic test ports provided for use by authorized service personnel only.

WARNING

Failure to isolate each QuickTrip actuator cavity from the environment and from each other may result in an unintended explosion hazard.

WARNING

Failure to install the cover clamps may allow the electronics covers to unintentionally loosen, and may result in an unintended explosion hazard.

WARNING

To prevent possible serious personal injury, or damage to equipment, be sure all electric power and hydraulic pressure have been removed from the QuickTrip before beginning any maintenance or repairs.

WARNING

Due to typical noise levels in turbine environments, hearing protection should be worn when working on or around the QuickTrip.

WARNING

EXPLOSION HAZARD—Do not remove covers or connect/disconnect electrical connectors unless power has been switched off or the area is known to be non-hazardous.

WARNING

ELECTRICAL SHOCK HAZARD—Follow all local plant and safety instructions/precautions before proceeding with Troubleshooting the QuickTrip.

WARNING

The external ground lug shown on the installation drawing must be properly connected to ensure equipotential bonding. This will reduce the risk of electrostatic discharge in an explosive atmosphere.

Electrostatic Discharge Awareness

NOTICE

Electrostatic Precautions

Electronic controls contain static-sensitive parts. Observe the following precautions to prevent damage to these parts:

- **Discharge body static before handling the control (with power to the control turned off, contact a grounded surface and maintain contact while handling the control).**
- **Avoid all plastic, vinyl, and Styrofoam (except antistatic versions) around printed circuit boards.**
- **Do not touch the components or conductors on a printed circuit board with your hands or with conductive devices.**

To prevent damage to electronic components caused by improper handling, read and observe the precautions in Woodward manual *82715*, *Guide for Handling and Protection of Electronic Controls, Printed Circuit Boards, and Modules*.

Follow these precautions when working with or near the control.

1. Avoid the build-up of static electricity on your body by not wearing clothing made of synthetic materials. Wear cotton or cotton-blend materials as much as possible because these do not store static electric charges as much as synthetics.
2. Do not remove the printed circuit board (PCB) from the control cabinet unless absolutely necessary. If you must remove the PCB from the control cabinet, follow these precautions:
   - Do not touch any part of the PCB except the edges.
   - Do not touch the electrical conductors, the connectors, or the components with conductive devices or with your hands.
   - When replacing a PCB, keep the new PCB in the plastic antistatic protective bag it comes in until you are ready to install it. Immediately after removing the old PCB from the control cabinet, place it in the antistatic protective bag.

Chapter 1.
Scope & Supplies Required

Introduction

Refer to Woodward manual 26815 for complete Installation, Operation, and specification information.

The purpose of this document is to describe the steps necessary to replace the solenoid (LAT), solenoid rotor, electronics module (PCBA), rotor, return spring, and sight window in a Quick Trip Valve in the field. Included is a section at the end for recalibration of the valve.

Note that some repair procedures may require use of Woodward specialized tools. These tools are included in the Woodward kit listed below.

Table 1-1. Specialized Tools Kit P/N 8923-2192

P/N	Description	Quantity
1013-8658	LAT Installation/Removal Tool	1
1013-6604	Sight Window Spanner Torque Tool	1
1013-6603	Top Cover Spanner Torque Tool	1
1013-7082	Return Spring Wind Tool	1
1013-8807	Tool to engage top of shaft for spring torque check	1
1013-8688	Rotor Protection Sleeve	1

Available Repair Kits

Replacement part kits for the procedures described in this manual are listed in the following table.

Table 1-2. Replacement Kit P/N 8923-2142 Solenoid (LAT) Replacement Kit

P/N	Description	Quantity
5408-1029	LAT	1
1029-974	Screws for Silkscreen Cover	8
3621-1496	Standoffs for PCBA	8
1029-485	LAT Screws	4
2010-5327	Spacers	6
8923-1998	Connector Kit	1
2015-1153	Heat Shrink Tubing	4
1355-443	O-Ring for Top Cover	2
1298-1130	Cover Clamp	2
1029-372	Cover Clamp Screws	4
B26842	QuickTrip Field Repair Instructions	1

Table 1-3. Replacement Kit P/N 8923-2143 Sight Window Replacement Kit

P/N	Description	Quantity
3550-2015	Sight Window	1
1017-1058	Retaining Ring	2
B26842	QuickTrip Field Repair Instructions	1

Table 1-4. Replacement Kit P/N 8923-2144 Top Cover Replacement Kit

P/N	Description	Quantity
3550-1981	Top Cover	1
1355-443	O-Ring for Top Cover	2
3550-2015	Sight Window	1
1017-1058	Retaining Ring	2
1298-1130	Cover Clamp	2
1029-372	Cover Clamp Screws	4
B26842	QuickTrip Field Repair Instructions	1

Table 1.5 Replacement Kit P/N 8923-2690 Top Cover Replacement Kit (Painted)

P/N	Description	Quantity
1355-443	O-Ring for Top-Cover	1
1017-1072	Retaining Ring	1
3550-1981	Top Cover	1
3550-2015	Sight Window	1

Table 1-6. Replacement Kit P/N 8923-2145 Bottom Cover Replacement Kit

P/N	Description	Quantity
3550-1985	Bottom Cover	1
1031-1172	Screws for Bottom Cover	8
1355-301	O-Ring for Bottom Cover	2
1249-379	Dash 2 Plug for Bottom Cover	2
182620	O-Ring for Dash 2 Plug	2
B26842	QuickTrip Field Repair Instructions	1

Table 1-7. Replacement Kit P/N 8923-2146 PCBA Replacement Kit

P/N	Description	Quantity
1355-443	O-Ring for Top Cover	2
4349-5206	Silkscreen Cover	1
1029-974	Screws for Silkscreen Cover	8
3621-1496	Standoffs for PCBA	8
601-1507	PCBA	1
8923-1998	Connector Kit	1
1298-1130	Cover Clamp	2
1029-372	Cover Clamp Screws	4
B26842	QuickTrip Field Repair Instructions	1

Table 1-8. Replacement Kit P/N 8923-2147 Return Spring Replacement Kit

P/N	Description	Quantity
1031-1172	Screws for Bottom Cover	8
1355-301	O-Ring for Bottom Cover	2
3018-1037	Return Spring	1
1029-368	Return Spring Screws	6
B26842	QuickTrip Field Repair Instructions	1

Table 1-9. Replacement Kit P/N 8923-2191 Rotor Replacement Kit

P/N	Description	Quantity
1355-443	O-Ring for Top Cover	2
1029-974	Screws for Silkscreen Cover	4
3621-1496	Standoffs for PCBA	4
2010-5327	Spacers	4
2015-1153	Heatshrink Tubing	4
1298-1130	Cover Clamp	2
1029-372	Cover Clamp Screws	2
3594-1140	Rotor	1
1138-3043	Rotor Nut	2
1010-031	Rotor Washer	2
1503-0030	Shaft Key	2
B26842	QuickTrip Field Repair Instructions	1

Chapter 2.
Solenoid (LAT) or Top Cover Replacement

Procedure

The following procedure describes the detailed steps necessary to replace the solenoid (LAT) within any QuickTrip actuator.

Solenoid replacement procedure

Description	Photo Reference

Tools Required:

- 4mm hex key
- Spanner wrench or Woodward tool 1013-6603
- ¾" socket and wrench
- Philips screwdriver
- 2.5mm flat-bladed screwdriver
- 3mm hex key
- 6mm nut driver
- 10mm socket and wrench
- Woodward Tool 1013-8658 (LAT installation/removal)
- Torque wrench

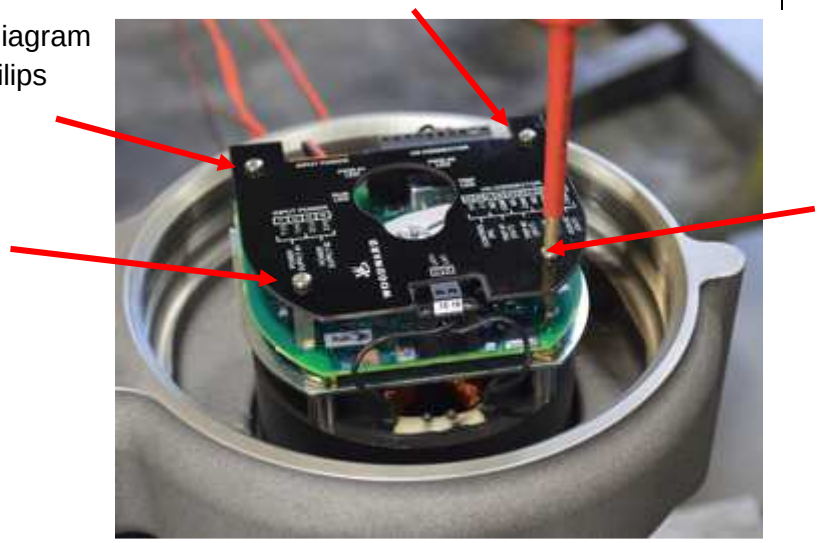
Warning: Before starting any repair work, read the applicable Warnings and Notices on page Error! Bookmark not defined..

1. Remove the cover clamp by removing the M5 screw using a 4mm hex driver.

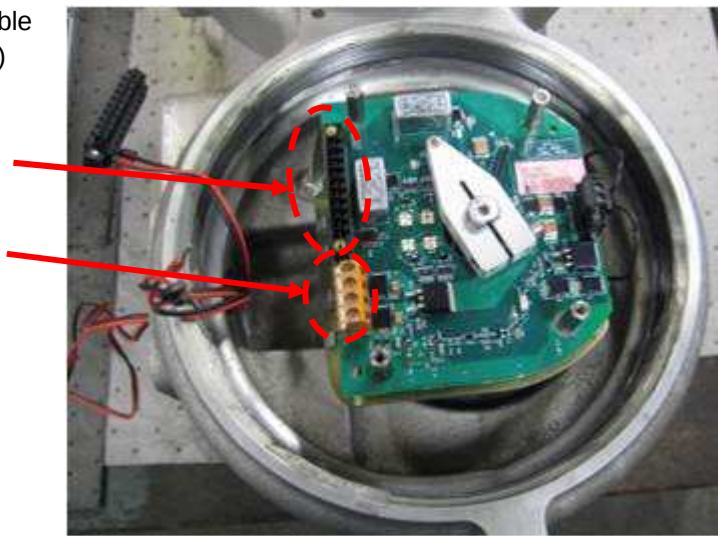
2. Remove electronics module cover using a spanner wrench (or Woodward tool 1013-6603). Make sure the O-ring is still installed on the cover, as it will be re-used. If the O-ring is damaged, the top cover replacement kit contains a replacement O-ring.

   If only replacing the top cover, skip to step 24.

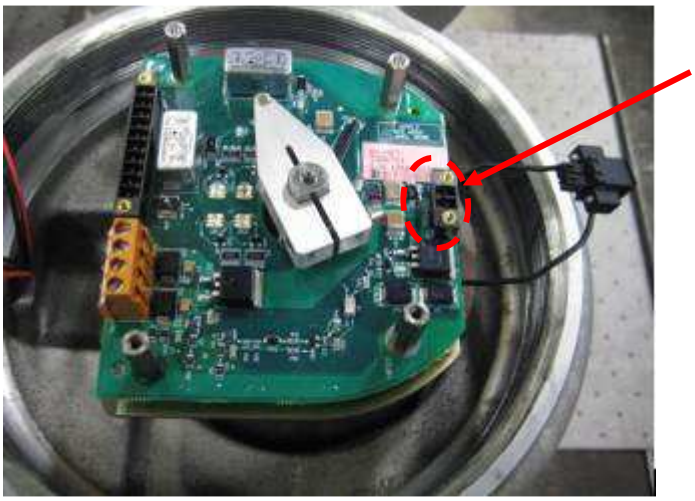
3. Remove top silkscreen wiring diagram cover by removing the four Philips screws.



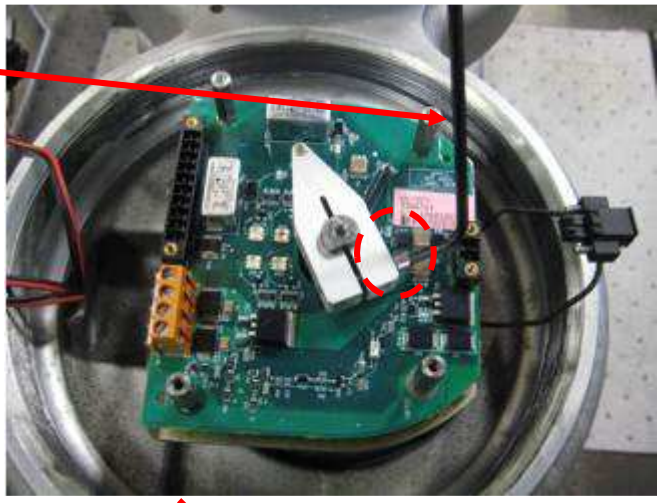
4. Disconnect the customer interface cable connections from PCB (TB1 and TB2) using 2.5mm flat-bladed screwdriver.



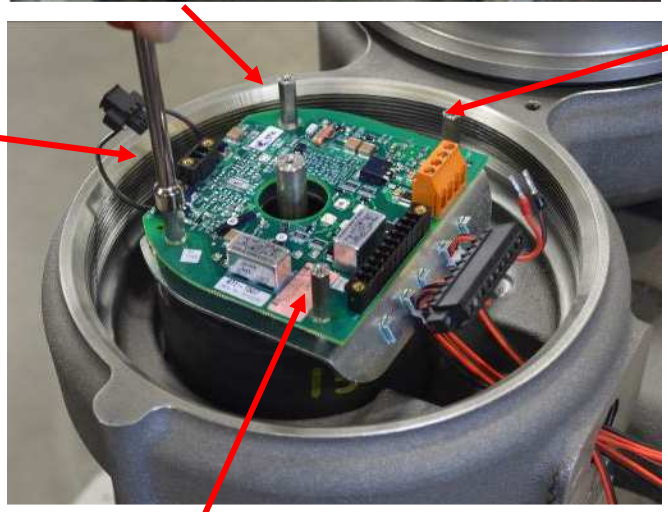
5. Disconnect the solenoid wiring connector (TB3) using 2.5mm flat-bladed screwdriver.



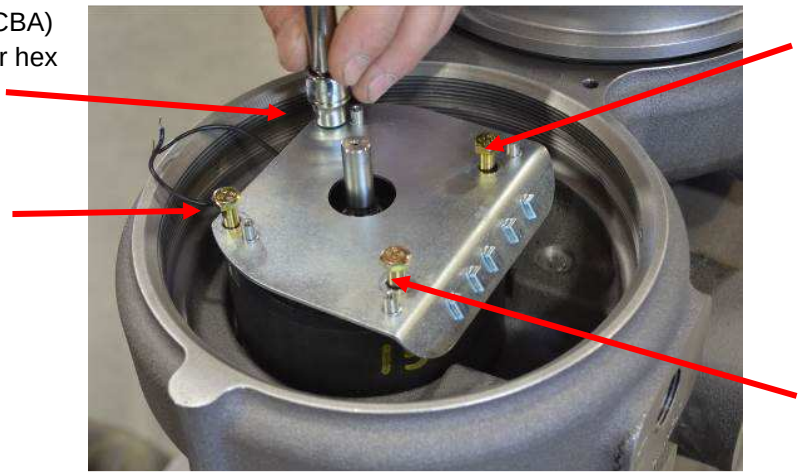
6. Remove position lever by loosening the M4 screw using a 3mm hex key.



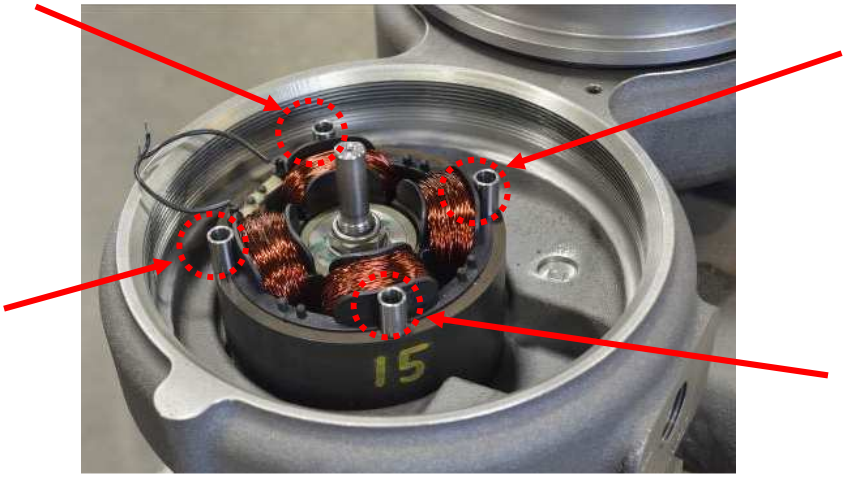
7. Remove electronics module (PCBA) by removing the four hex standoffs using a 6mm nut driver.



8. Remove the electronics module (PCBA) mounting plate by removing the four hex screws using a 10mm socket.



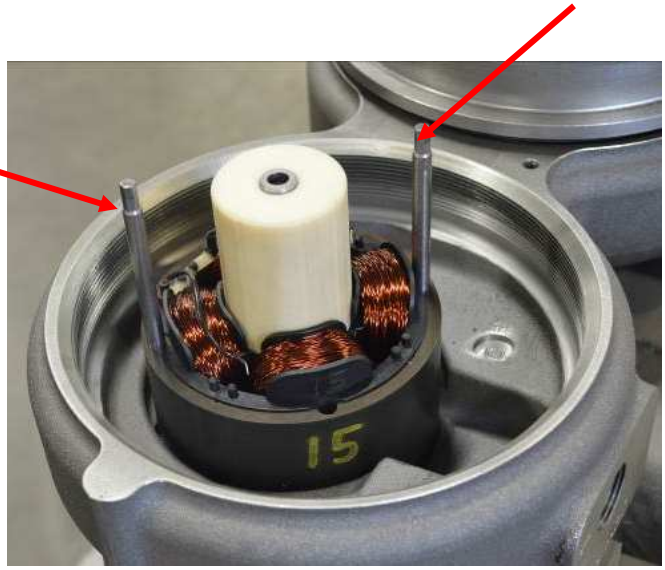
9. Note the position of the four tubular spacers at the outer diameter of the solenoid and remove them.



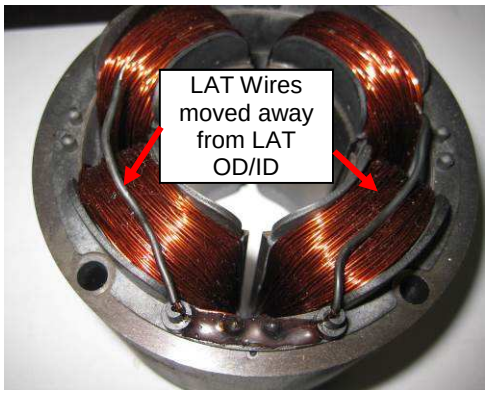
10. The solenoid coil may now be removed either by using the four hex screws as a handle for leverage against the magnetic attraction of the rotor or through using Woodward tool 1013-8658.
    Instructions for use of tool 1013-8658 (LAT removal):

- Thread steel guide rods down through LAT and into manifold and just snug them using a 1/8” nut driver. Rods should be positioned exactly as shown (the alternate position will not properly line up with the tool).

- Place nylon bushing onto shaft/rotor as shown, with metal bearing facing upwards.



- Move LAT wires away from LAT ID and OD, positioning them over the copper windings, so they are out of the way of the tool interface.



- Rotate knob at the top of tool 1013-8658 clockwise until the tip of the rod just protrudes from the bottom of the tool.

- Position tool 1013-8658 over the LAT with screws facing the QuickTrip conduit port.

- Orient the tool so that the steel guide rods align with the corresponding holes in the tool.

- Slowly turn the knob at the top of the tool counter-clockwise and guide the tool onto the rods and down over the LAT.

- Turn the know counter-clockwise until it stops and make sure the tool is all the way down onto the LAT, then tighten the four hex screws to grip the LAT within the tool, using a 3/16” hex key (if the screws are not accessible, the tool may be on backwards – turn the tool 180 degrees and repeat the above steps).

- Rotate the knob at the top of the tool clockwise, lifting the LAT out of the assembly and past the rotor magnet. Keep rotating the knob until the LAT fully clears the Rotor magnet and guide rods.

- Lift the tool/LAT off the guide rods and out of the unit.

- Loosen the screws on the tool to remove the LAT.

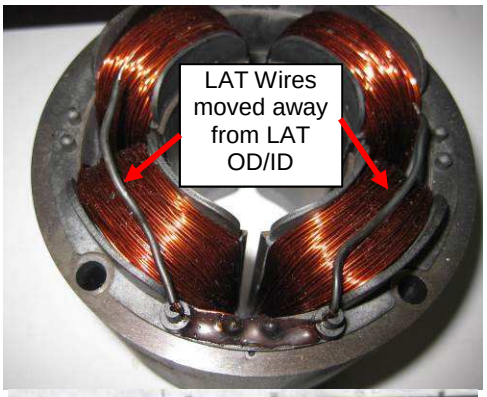
- Remove the steel guide rods from the housing.

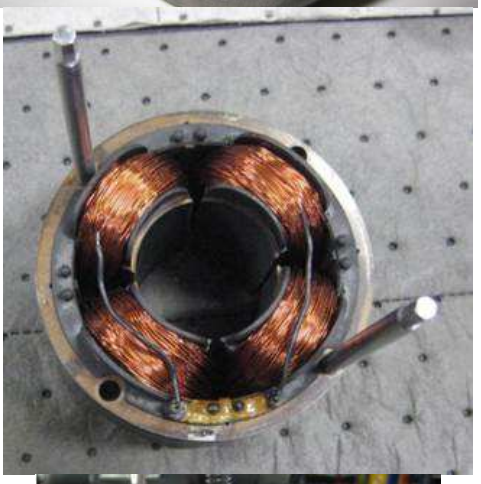
11. Install new solenoid coil into housing and over rotor either by using the four hex screws as a handle for leverage against the magnetic attraction of the rotor or through use of Woodward tool 1013-8658. Make sure the two solenoid wires are facing towards the front of the unit (away from the conduit port) and that the screw holes line up with the holes in the housing. The solenoid must be completely seated within the recess in the housing.
Instructions for use of 1013-8658 (LAT installation):

- Move LAT wires away from new LAT ID and OD, positioning them over the copper windings, so they are out of the way of the tool.

- Insert steel guide rods into new LAT, threaded ends first in the exact orientation shown (the alternate position will not properly line up with the tool) and provide the proper orientation in the housing.

- Align tool 1013-8658 over steel guide rods and down over LAT as far as it will go. The screws in the tool should be facing away from the side of the LAT where the wires protrude.

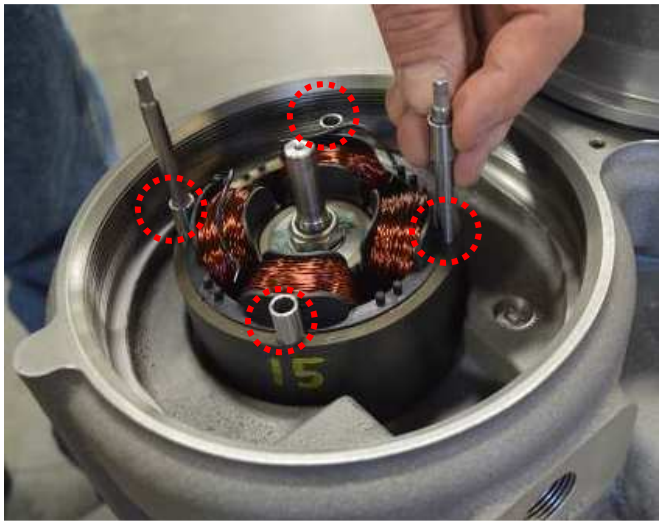




Step 11 continued:

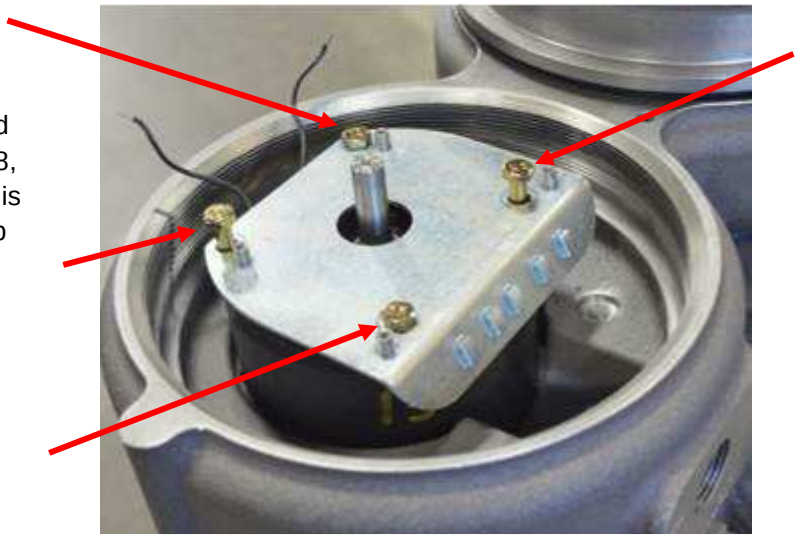
- Use a 3/16” hex key to tighten the four screws on tool to grip the LAT.
- Remove steel guide rods from tool and thread them into housing in the exact position shown. Just snug them using a 1/8” nut driver.
- Place nylon bushing onto shaft/rotor as shown, with metal bearing facing upwards.
- Set LAT/tool onto nylon bearing, aligning rod bearing with bearing in nylon tool
- Rotate knob at top of tool counter-clockwise until tool begins to engage the steel guide rods.
- Line up the steel guide rods with the corresponding holes in the tool until the tool slides freely down into the assembly as the knob rotates clock-wise.
- Continue rotating knob counter-clockwise until the LAT fully seats into housing. The bottom edge of the tool should be approximately 0.5” from the housing.
- Loosen the four screws in the tool and lift tool off of LAT.
- Remove nylon bushing.
- Move LAT wires back to a vertical position over where they originate.
- Leave the guide rods in place for now.

12. Place the four tubular spacers back on the outer diameter of the solenoid, making sure that each spacer is set into the semi-circular notch in the plastic flange and directly over each screw hole. If using tool 1013-8658, two spacers will go over the steel guide rods.



13. Gently place the electronics module (PCBA) mounting plate on top of these spacers, making sure not to knock them out of place. The rounded side of this plate must face towards the front of the QuickTrip unit (away from the conduit port).

14. Re-install each of the four hex screws through the mounting plate, spacer, and solenoid, threading them into the manifold by hand. If using tool 1013-8658, only install two hex screws at this time, then torque them, per step 15 below. Then remove the two steel guide rods and install the remaining two hex screws.



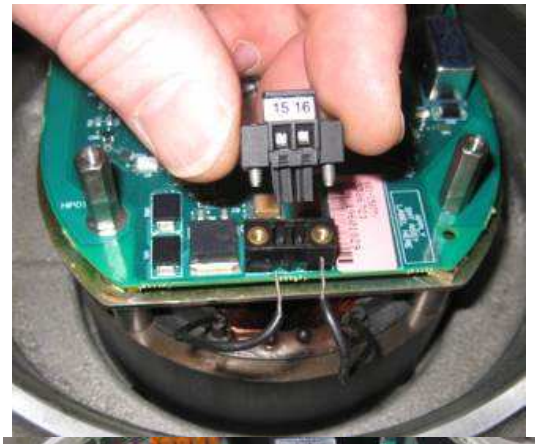
15. Torque the hex screws to 6.8-8 Nm (60-70 in-lbf) using a 10mm socket.

16. Place the electronics module on top of the mounting plate, lining up the screw holes in the electronics module with the four standoffs on the mounting plate. The rounded side of the electronics module must face towards the front of the QuickTrip unit (away from the conduit port).

17. Secure the electronics module to the mounting plate using the four hex standoffs. Torque the standoffs to 0.3-.5 Nm (2.5-4.5 in-lbf) using a 6mm nut driver.

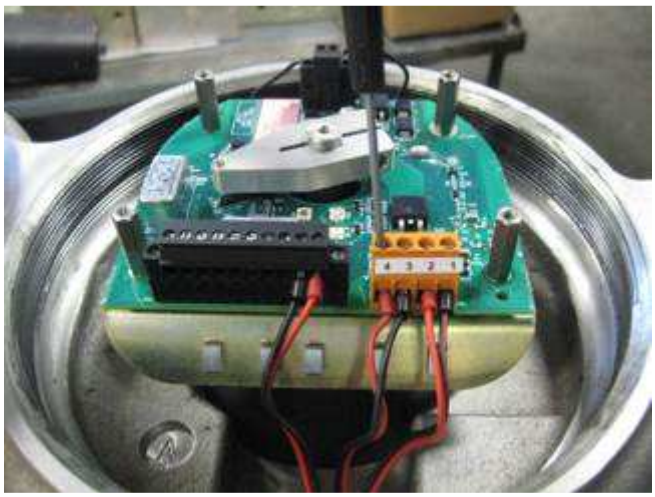
18. Note the orientation of the wires currently installed in the connector on the solenoid that was just removed. Remove the pluggable connector from the old solenoid and install the wires from the new solenoid into the connector in the same orientation (wires will connect to the terminal directly above each wire and do not cross the wires).

    Torque these screws to 0.2-0.25 Nm (1.75-2.25 in-lbf) using a 2.5mm flat-bladed screwdriver. Snap the terminal block into the mating connector on the electronics module (TB3). Tighten the terminal block flange screws to 0.5 Nm (4.4 in-lbf) using a 2.5mm flat-bladed screwdriver.



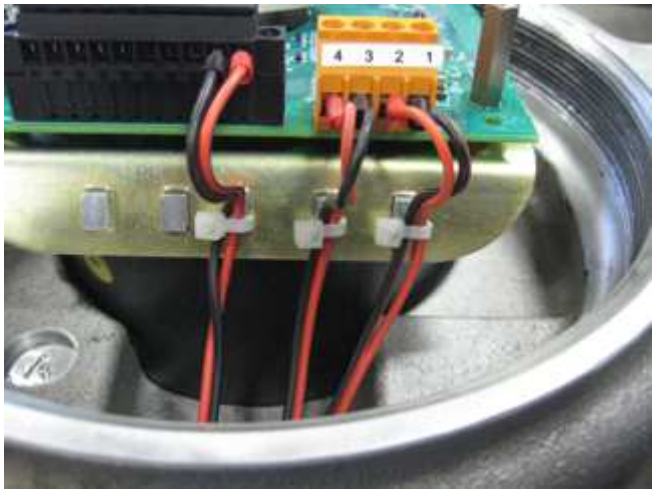
19. Re-install the customer interface cable connections to the electronics module (TB1 and TB2).

    Tighten the terminal block flange screws to 0.5 Nm (4.4 in-lbf) using a 2.5mm flat-bladed screwdriver.

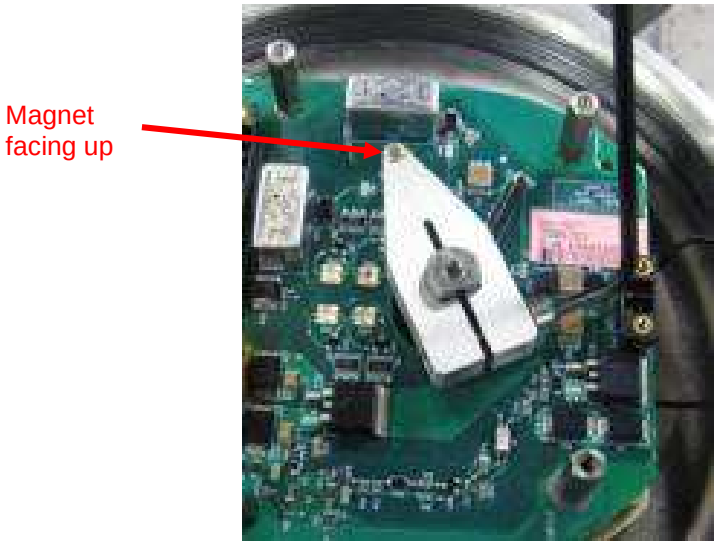


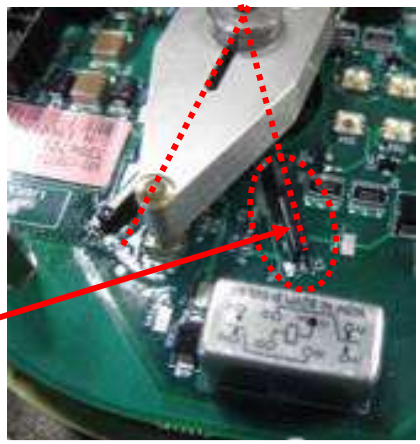
20. When wiring is complete, use plastic ratcheting wire ties to secure the wiring to the tie down points provided on the PCBA mounting plate. This helps prevent wire strain from being transmitted to the connection at the terminal block, to keep the wiring from chafing on the cover when tightening and under vibration.

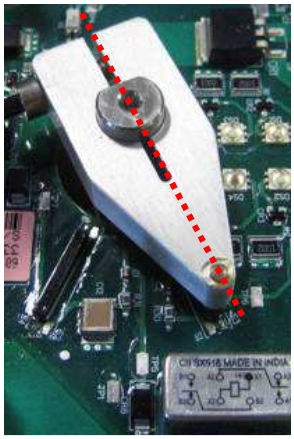
    Failure to secure the wiring could result in intermittent connections resulting in intermittent operation or shutdown conditions. Additional wire service length should be allowed between the tie down points and the connectors to reduce strain on the wire at the connector interface and to allow removal of the black pluggable connector.



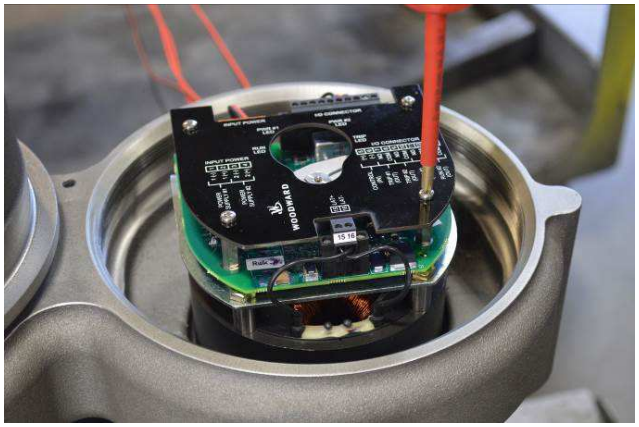
21. Re-install the position lever by placing it over the shaft, lining up the flat side of the lever with the flat on the shaft. Make sure the magnet is facing up, away from electronics module. Push the lever all the way down onto the shaft until it stops. Make sure to align the tip of the lever with the sensor on the PCBA (long component on PCBA – see photo). Tighten the screw and torque to 1.4-1.7 Nm (12-15 in-lbf) using a 3mm hex key.







22. Re-install the silkscreen wiring diagram cover by placing it onto the hex standoffs, lining up the four holes in the cover with the four standoffs. The rounded side of the cover should face towards the front of the QuickTrip unit (away from the conduit port).



23. Secure the cover with the four Philips screws and torque these to 0.3-.5 Nm (2.5-4.5 in-lbf) using a Philips screwdriver.

View image above

24. Ensure the O-ring is installed on the top cover and that it is un-damaged. Re-install the electronics module cover by carefully threading it into the manifold. Thread it as far as possible by hand, being careful to not cross-thread. Torque the cover to 54-82 Nm (40-60 ft-lbf) using a spanner wrench (or Woodward Tool # 1013-6603).

25. Re-install the cover clamp with M5 screw using a 4mm hex driver and torque to 2-2.7 Nm (18-24 in-lbf).

26. Follow the functional test procedure in Chapter 7 to verify unit functionality.

Chapter 3.
Electronics Module Replacement

Procedure

The following procedure describes the detailed steps necessary to replace the electronics module (PCBA) within any QuickTrip actuator.

Electronics module replacement procedure

Description	Photo Reference

Tools Required:

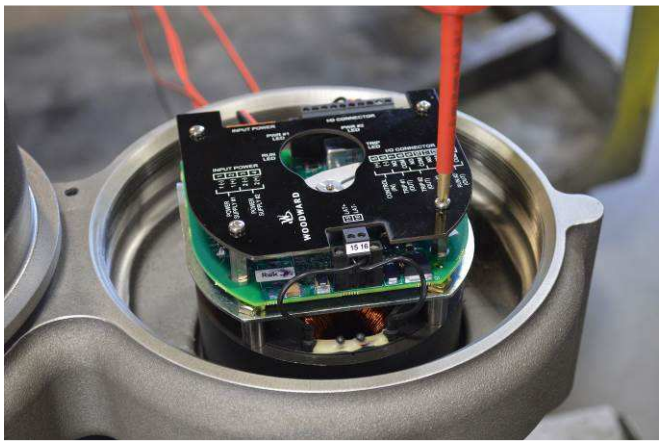
- 4mm hex key
- Spanner wrench or tool 1013-6603
- ¾" socket and wrench
- Philips screwdriver
- 2.5mm flat-bladed screwdriver
- 3mm hex key
- 6mm nut driver
- Torque wrench

Warning: Before starting any repair work, read the applicable Warnings and Notices on page Error! Bookmark not defined..

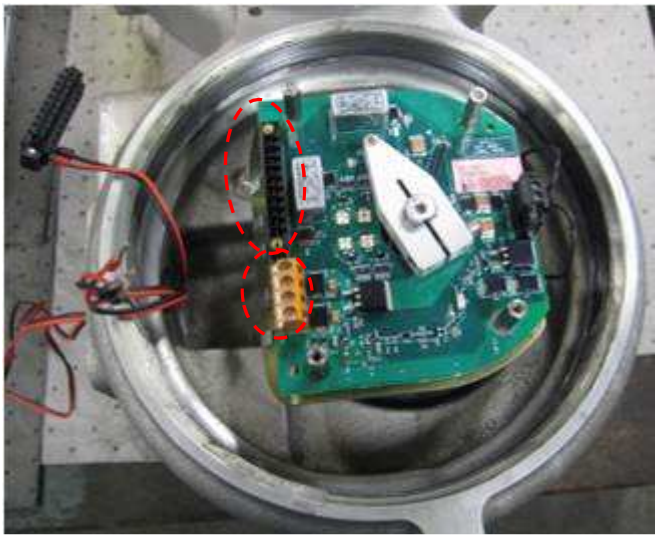
1. Remove the cover clamp by removing the M5 screw using a 4mm hex driver.

2. Remove electronics module cover using a spanner wrench (or Woodward tool 1013-6603).

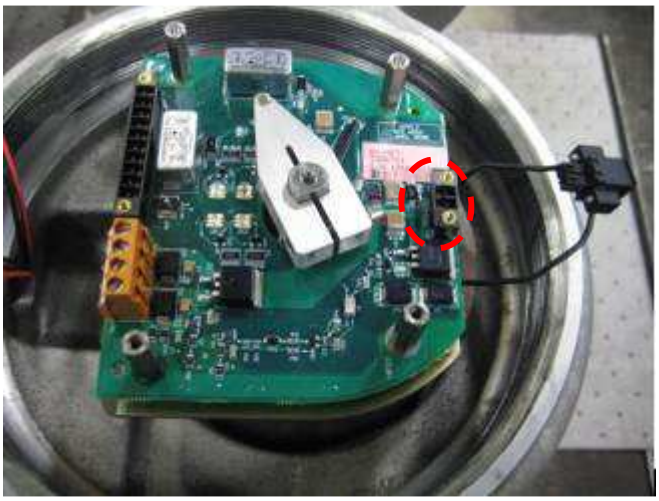
3. Remove top silkscreen wiring diagram cover by removing the four Philips screws.



4. Disconnect the customer interface cable connections from PCB (TB1 and TB2) using 2.5mm flat-bladed screwdriver.



5. Disconnect the solenoid wiring connector (TB3) using 2.5mm flat-bladed screwdriver.



6. Remove position lever by loosening the M4 screw using a 3mm hex key.

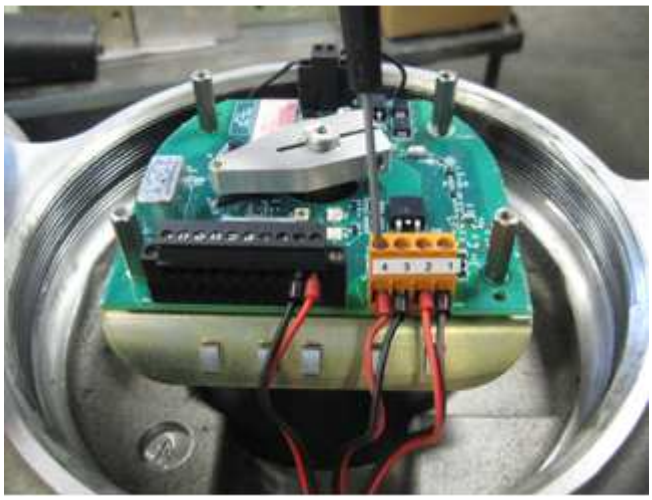
7. Remove electronics module (PCBA) by removing the four hex standoffs using a 10mm nut driver.

8. Place the new electronics module on top of the mounting plate, lining up the screw holes in the electronics module with the four standoffs on the mounting plate. The rounded side of the electronics module must face towards the front of the QuickTrip unit (away from the conduit port).

9. Secure the electronics module to the mounting plate using the four hex standoffs. Torque the standoffs to 0.3-.5 Nm (2.5-4.5 in-lbf) using a 6mm nut driver.

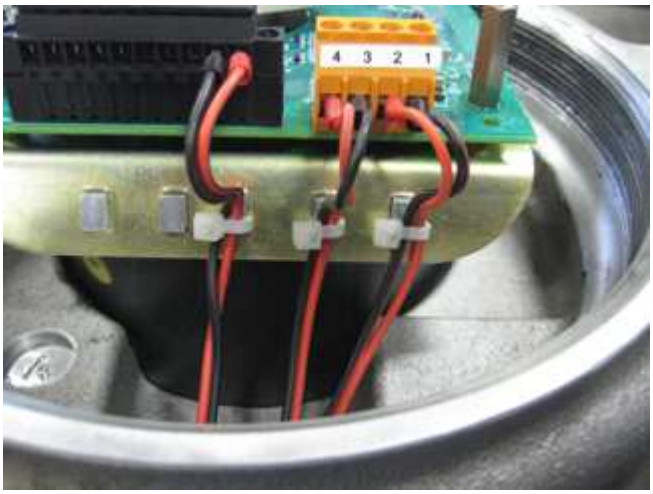
10. Plug the solenoid terminal block into the mating connector on the electronics module (TB3). Tighten the terminal block flange screws to 0.5 Nm (4.4 in-lbf) using a 2.5mm flat-bladed screwdriver.

11. Re-install the customer interface cable connections to the electronics module (TB1 and TB2). Tighten the terminal block flange screws to 0.5 Nm (4.4 in-lbf) using a 2.5mm flat-bladed screwdriver.

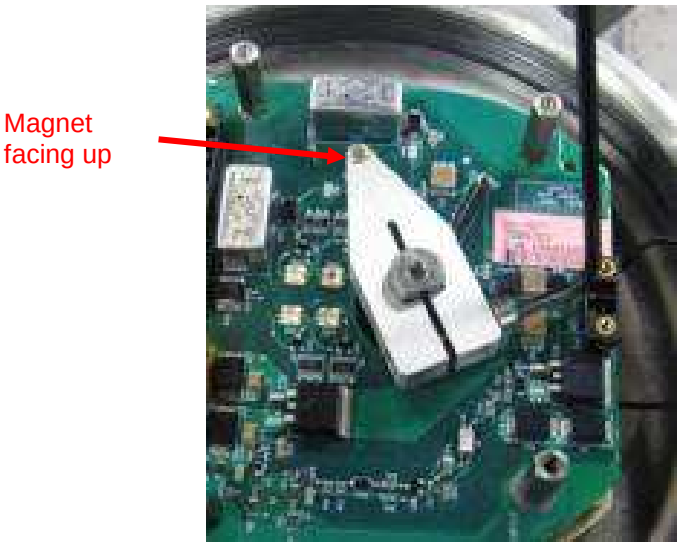


12. When wiring is complete, use plastic ratcheting wire ties to secure the wiring to the tie down points provided on the PCBA mounting plate. This helps prevent wire strain from being transmitted to the connection at the terminal block, to keep the wiring from chafing on the cover when tightening and under vibration.

    Failure to secure the wiring could result in intermittent connections resulting in intermittent operation or shutdown conditions. Additional wire service length should be allowed between the tie down points and the connectors to reduce strain on the wire at the connector interface and to allow removal of the black pluggable connector.

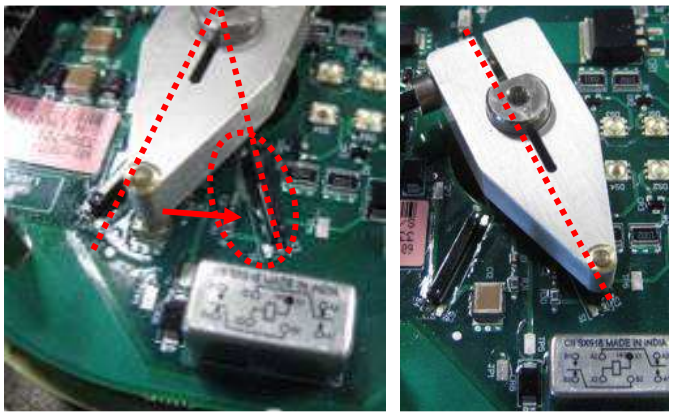


13. Re-install the position lever by placing it over the shaft, lining up the flat side of the lever with the flat on the shaft. Make sure the magnet is facing up, away from electronics module. Push the lever all the way down onto the shaft until it stops.

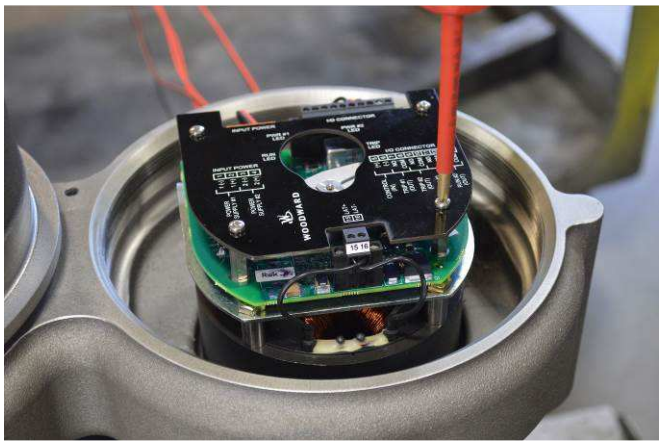


Step 13 continued:

Make sure to align the tip of the lever with the sensor on the PCBA (long component on PCBA – see photo). Tighten the screw and torque to 1.4-1.7 Nm (12-15 in-lbf) using a 3mm hex key.



14. Re-install the silkscreen wiring diagram cover by placing it onto the hex standoffs, lining up the four holes in the cover with the four standoffs. The rounded side of the cover should face towards the front of the QuickTrip unit (away from the conduit port).



15. Secure the cover with the four Philips screws and torque these to 0.3-.5 Nm (2.5-4.5 in-lbf) using a Philips screwdriver.

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16. Ensure the O-ring is installed on the top cover and that it is un-damaged. Re-install the electronics module cover by carefully threading it into the manifold. Thread it as far as possible by hand, being careful to not cross-thread. Torque the cover to 54-82 Nm (40-60 ft-lbf) using a spanner wrench (or Woodward Tool 1013-6603).

17. Re-install the cover clamp using the M5 screw using a 4mm hex driver and torque to 2-2.7 Nm (18-24 in-lbf).

18. Follow the functional test procedure in Chapter 7 to verify unit functionality.

Chapter 4.
Solenoid Rotor Replacement

Procedure

The following procedure describes the detailed steps necessary to replace the solenoid rotor within any QuickTrip actuator.

Solenoid rotor replacement procedure:

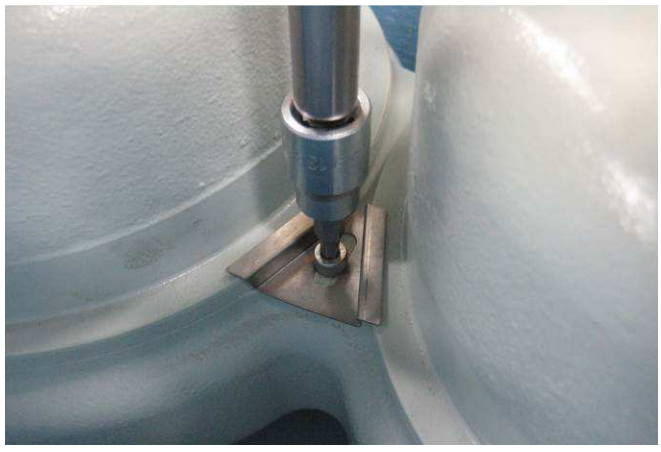
Description	Photo Reference

Tools Required:

- 4mm hex key
- Spanner wrench or Woodward tool 1013-6603
- Philips screwdriver
- 2.5mm flat-bladed screwdriver
- 3mm hex key
- 6mm nut driver
- 10mm socket and wrench
- Woodward Tool 1013-8658
- ¾" socket and wrench
- Pulley-puller tool
- Torque wrench

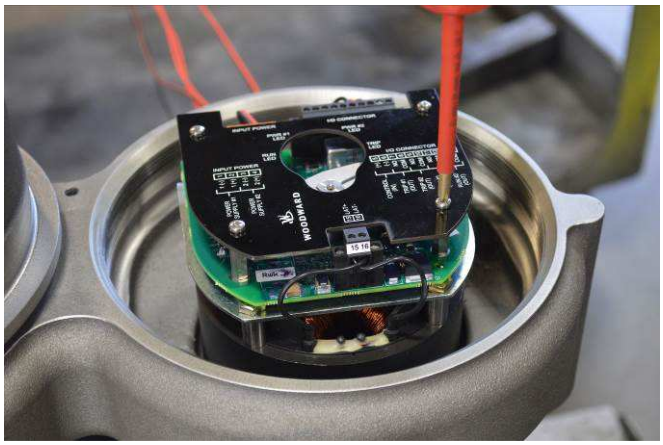
Warning: Before starting any repair work, read the applicable Warnings and Notices on page Error! Bookmark not defined.**.**

1. Remove the cover clamp by removing the M5 screw using a 4mm hex driver.

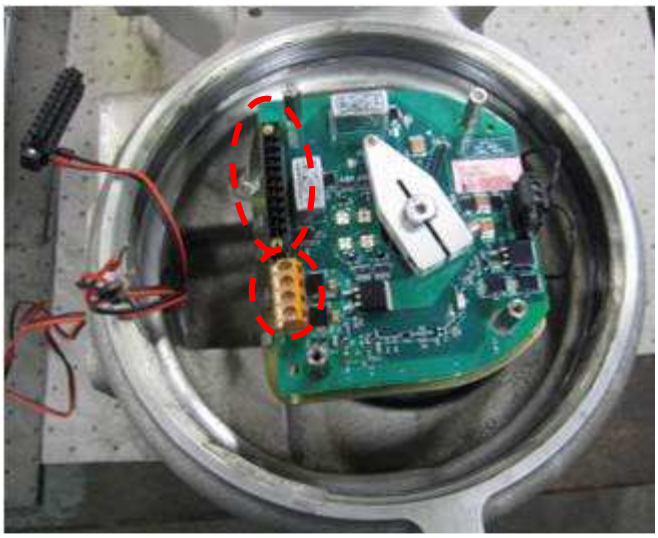


2. Remove electronics module cover using a spanner wrench (or Woodward tool 1013-6603).

3. Remove top silkscreen wiring diagram cover by removing the four Philips screws.



4. Disconnect the customer interface cable connections from PCB (TB1 and TB2) using a 2.5mm flat-bladed screwdriver.



5. Disconnect the solenoid wiring connector (TB3) using a 2.5mm flat-bladed screwdriver.

6. Remove position lever by loosening the M4 screw using a 3mm hex key.

7. Remove electronics module (PCBA) by removing the four hex standoffs using a 6mm nut driver.

8. Remove the electronics module (PCBA) mounting plate by removing the four hex screws using a 10mm socket.

9. Note the position of the four tubular spacers at the outer diameter of the solenoid and remove them.

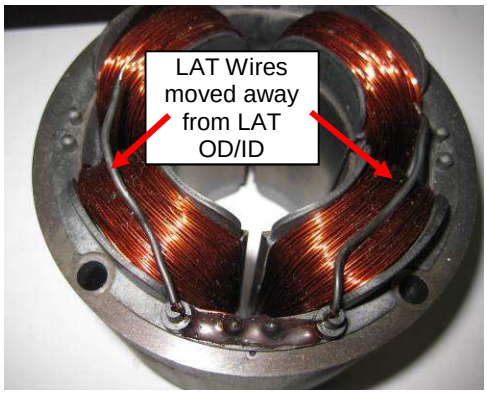
10. The solenoid coil may now be removed either by using the four hex screws as a handle for leverage against the magnetic attraction of the rotor or through use of Woodward Tool 1013-8658.

    Instructions for use of tool 1013-8658 (LAT removal):

    - Thread steel guide rods down through LAT and into manifold and just snug them using a 1/8” nut driver. Rods should be positioned exactly as shown (the alternate position will not properly line up with the tool)
    - Place nylon bushing onto shaft/rotor as shown, with metal bearing facing upwards

Step 10 continued:

- Move LAT wires away from LAT ID and OD, positioning them over the copper windings, so they are out of the way of the tool interface



- Rotate knob at the top of tool 1013-8658 clockwise until the tip of the rod just protrudes from the bottom of the tool.

- Position tool 1013-8658 over the LAT with screws facing the QuickTrip conduit port.

- Orient the tool so that the steel guide rods align with the corresponding holes in the tool.

- Slowly turn the knob at the top of the tool counter-clockwise and guide the tool onto the rods and down over the LAT.

- Turn the know counter-clockwise until it stops and make sure the tool is all the way down onto the LAT, then tighten the four hex screws to grip the LAT within the tool, using a 3/16” hex key (if the screws are not accessible, the tool may be on backwards – repeat the above steps, turning the tool 180 degrees).

- Rotate the knob at the top of the tool clockwise, lifting the LAT out of the assembly and past the rotor magnet. Keep rotating the knob until the LAT fully clears the Rotor magnet and guide rods.

- Lift the tool/LAT off the guide rods and out of the unit.

- Loosen the screws to remove the LAT.

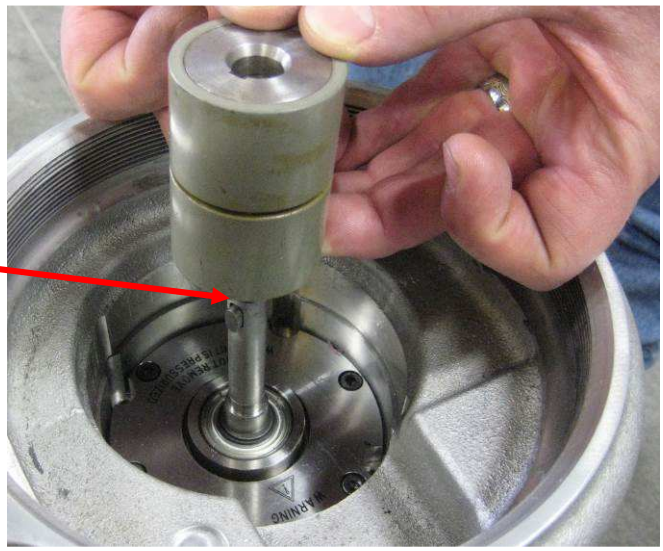
- Remove the steel guide rods from the housing.

- Remove the nylon bushing.

11. Remove the hex nut securing the rotor to the shaft using a ¾" socket. Remove the washer from the top of the rotor.

12. Remove the rotor through use of a pulley puller tool. Be sure to capture the key aligning the shaft to the rotor for re-use in the next step.

13. Install the new rotor by placing it onto shaft, making sure to align the groove in the rotor ID with the key in the shaft. Press it down as far as it will go by hand.



14. The rotor is a slight press fit onto the shaft. Install the washer and the hex nut and use a ¾" socket wrench to thread the nut down onto the shaft, forcing the rotor all the way onto the shaft. When the nut firmly seats against the rotor, indicating the rotor is pressed all the way onto the shaft, torque the nut to 13.5-16 Nm (10-12 ft-lbf).

15. Re-install solenoid coil (or new solenoid coil) into housing and over rotor either by using the four hex screws as a handle for leverage against the magnetic attraction of the rotor or through use of Woodward tool 1013-8658. Ensure the two solenoid wires are facing towards the front of the unit (away from the conduit port) and that the screw holes line up with the holes in the housing. The solenoid must be completely seated within the housing.

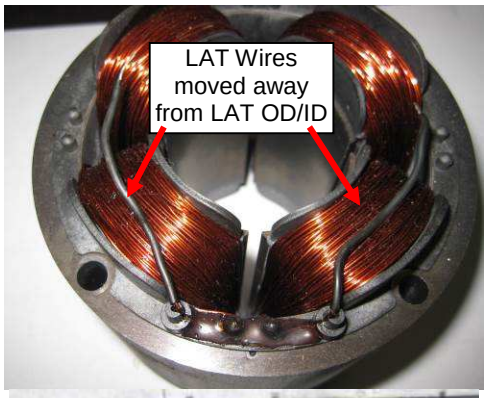
    Instructions for use of 1013-8658 (LAT installation):

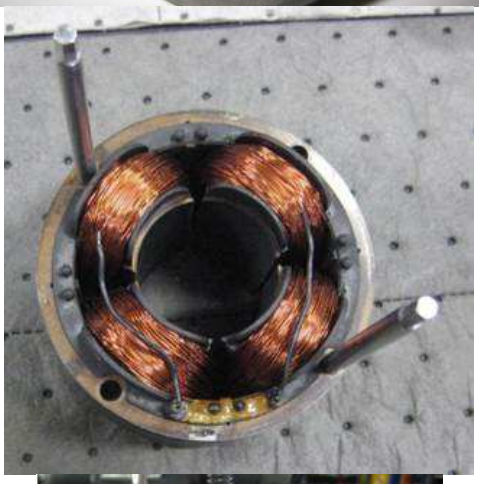
- Move LAT wires away from new LAT ID and OD, positioning them over the copper windings, so they are out of the way of the tool
- Insert steel guide rods into new LAT, threaded ends first in the exact orientation shown (the alternate position will not properly line up with the tool)

- Align tool 1013-8658 over steel guide rods and down over LAT as far as it will go. The screws should be facing away from the side of the LAT where the wires protrude

- Use a 3/16” hex key to tighten the four screws on tool to grip LAT

- Remove steel guide rods from tool and thread them into housing in the exact position shown. Just snug them using a 1/8” nut driver.



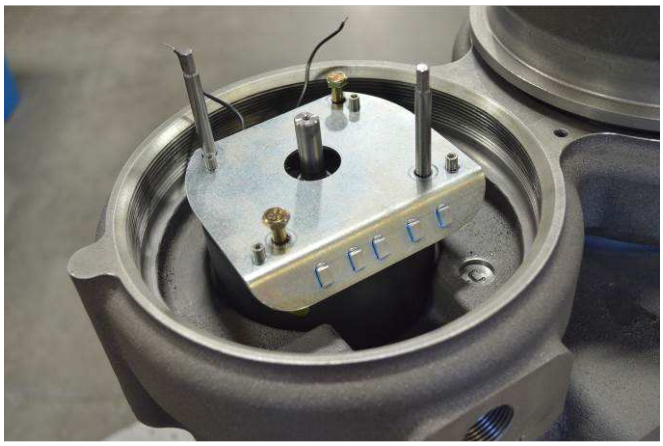


Step 15 continued:

- Place nylon bushing onto shaft/rotor as shown, with metal bearing facing upwards.
- Set LAT/tool onto nylon bearing, aligning rod bearing with bearing in nylon tool
- Rotate knob at top of tool counter-clockwise until tool begins to engage the steel guide rods.
- Line up the steel guide rods with the corresponding holes in the tool until the tool slides freely down into the assembly as the knob rotates clock-wise.
- Continue rotating knob counter-clockwise until the LAT fully seats into housing. The bottom edge of the tool should be approximately 0.5” from the housing.
- Loosen the four screws in the tool and lift tool off of LAT.
- Remove nylon bushing.
- Move LAT wires back to a vertical position over where they originate.
- Leave the guide rods in place for now.

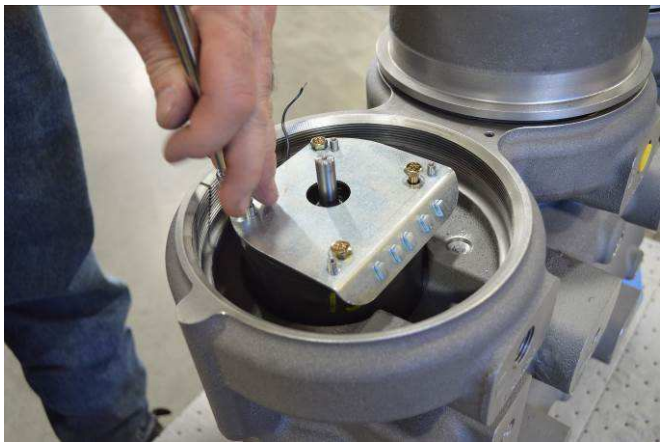
16. Place the four tubular spacers back on the outer diameter of the solenoid, making sure that each spacer is set into the semi-circular notch in the plastic flange and directly over each screw hole. If using tool 1013-8658, two of the spacers will be installed over the steel guide rods.

17. Gently place the electronics module (PCBA) mounting plate on top of these spacers, making sure not to knock them out of place. The rounded side of this plate must face towards the front of the QuickTrip unit (away from the conduit port).



18. Re-install each of the four hex screws through the mounting plate, spacer, and solenoid, threading them into the manifold by hand. If using tool 1013-8658, only install two hex screws at this time, then torque them, per step 15 below. Remove the two steel guide rods and install the remaining two hex screws.

19. Torque the hex screws to 6.8-8 Nm (60-70 in-lbf) using a 10mm socket.



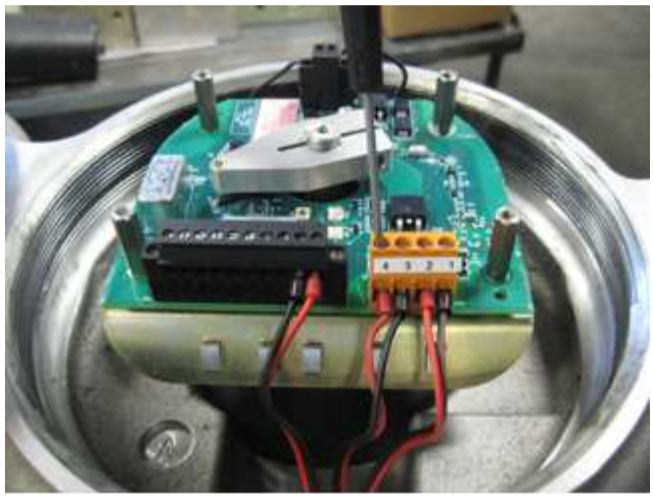
20. Place the electronics module on top of the mounting plate, lining up the screw holes in the electronics module with the four standoffs on the mounting plate. The rounded side of the electronics module must face towards the front of the QuickTrip unit (away from the conduit port).

21. Secure the electronics module to the mounting plate using the four hex standoffs. Torque the standoffs to 0.3-.5 Nm (2.5-4.5 in-lbf) using a 6mm nut driver.

22. Note the orientation of the wires currently installed in the connector on the solenoid that was removed. Remove the pluggable connector from the old solenoid and install the wires from the new solenoid into the connector in the same orientation (wires will connect to the terminal directly above each wire and do not cross the wires).

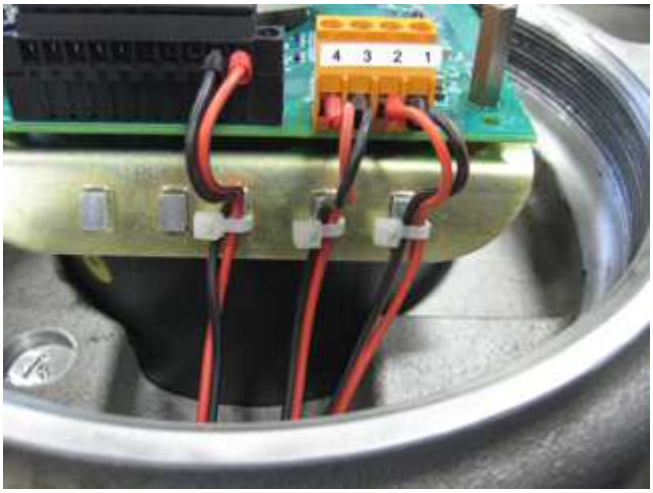
    Torque these screws to 0.2-0.25 Nm (1.75-2.25 in-lbf) using a 2.5mm flat-bladed screwdriver. Snap the terminal block into the mating connector on the electronics module (TB3). Tighten the terminal block flange screws to 0.5 Nm (4.4 in-lbf) using a 2.5mm flat-bladed screwdriver.

23. Re-install the customer interface cable connections to the electronics module (TB1 and TB2). Tighten the terminal block flange screws to 0.5 Nm (4.4 in-lbf) using a 2.5mm flat-bladed screwdriver.



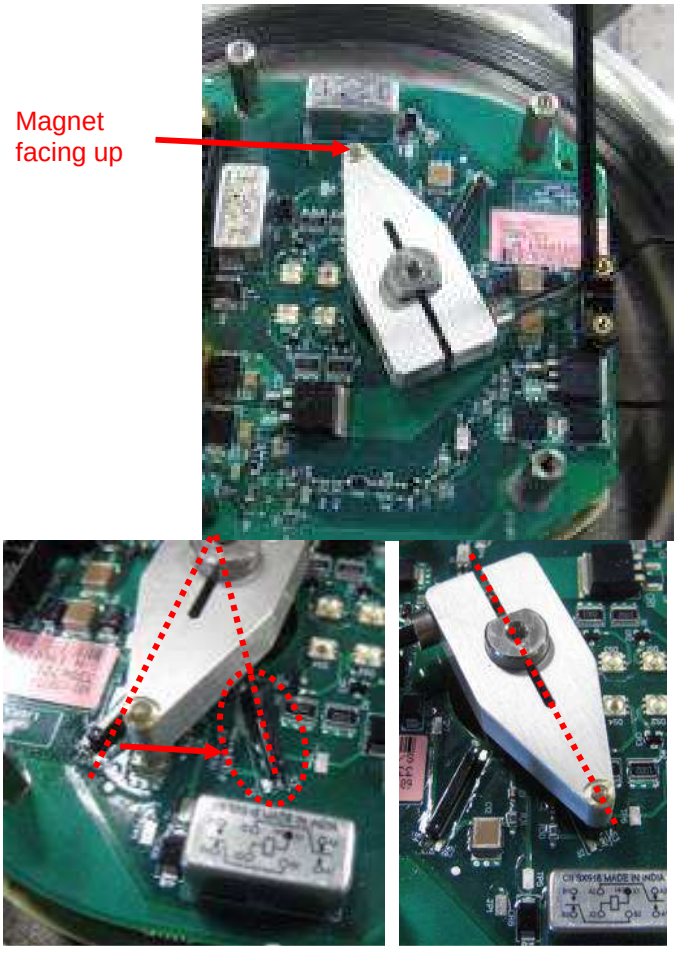
24. When wiring is complete, use plastic ratcheting wire ties to secure the wiring to the tie down points provided on the PCBA mounting plate. This helps prevent wire strain from being transmitted to the connection at the terminal block and to keep the wiring from chafing on the cover when tightening and under vibration.

    Failure to secure the wiring could result in intermittent connections resulting in intermittent operation or shutdown conditions. Additional wire service length should be allowed between the tie down points and the connectors to reduce strain on the wire at the connector interface and to allow removal of the black pluggable connector.

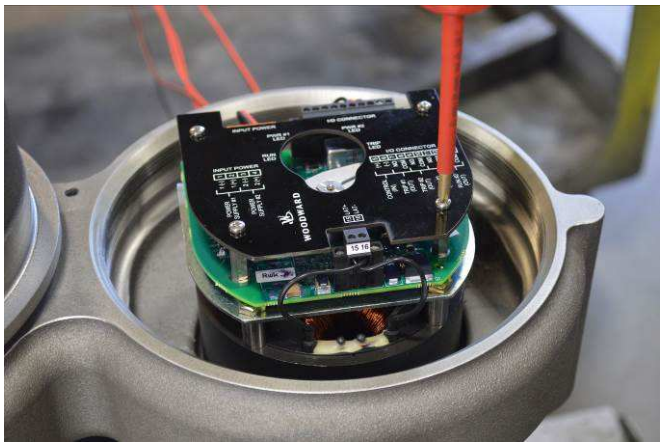


25. Re-install the position lever by placing it over the shaft, lining up the flat side of the lever with the flat on the shaft. Make sure the magnet is facing up, away from electronics module. Push the lever all the way down onto the shaft until it stops.

    Make sure to align the tip of the lever with the sensor on the PCBA (long component on PCBA – see photo). Tighten the screw and torque to 1.4-1.7 Nm (12-15 in-lbf) using a 3mm hex key.



26. Re-install the silkscreen wiring diagram cover by placing it onto the hex standoffs, lining up the four holes in the cover with the four standoffs. The rounded side of the cover should face towards the front of the QuickTrip unit (away from the conduit port).

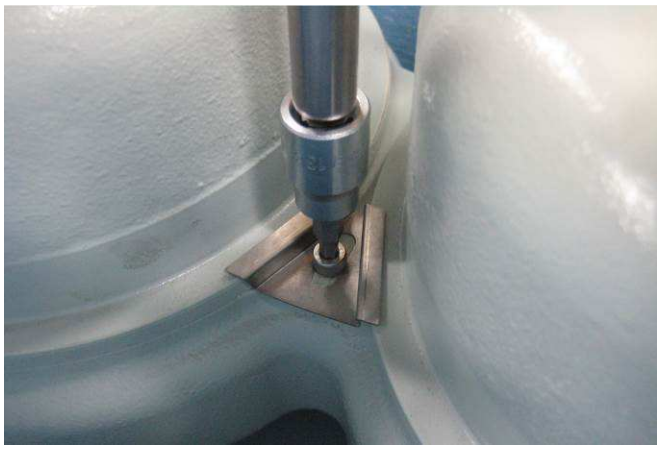


27. Secure the cover with the four Philips screws and torque these to 0.3-.5 Nm (2.5-4.5 in-lbf) using a Philips screwdriver.

View image above

28. Ensure the O-ring is installed on the top cover and that it is un-damaged. Re-install the electronics module cover by carefully threading it into the manifold. Thread it as far as possible by hand, being careful to not cross-thread. Torque the cover to 54-82 Nm (40-60 ft-lbf) using a spanner wrench (or Woodward Tool # 1013-6603).

29. Re-install the cover clamp using the M5 screw using a 4mm hex driver and torque to 2-2.7 Nm (18-24 in-lbf).



30. Follow the functional test procedure in Chapter 7 to verify unit functionality.

Chapter 5.
Return Spring or Bottom Cover Replacement

Procedure

The following procedure describes the detailed steps necessary to replace the return spring within any QuickTrip actuator.

Return Spring replacement procedure

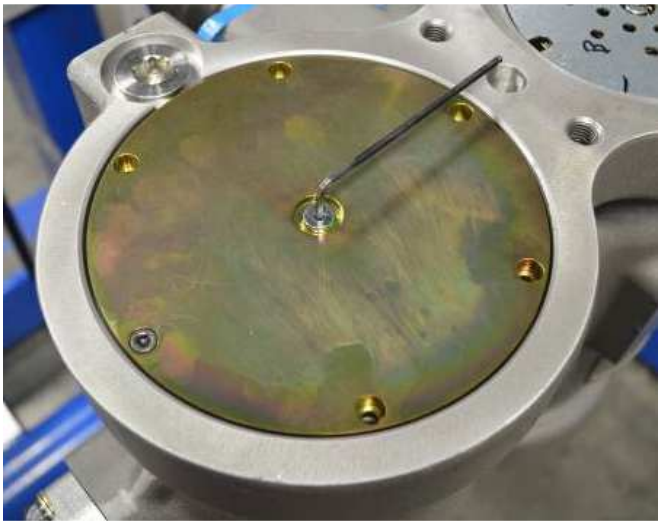
Procedure	Photo Reference

Tools Required:

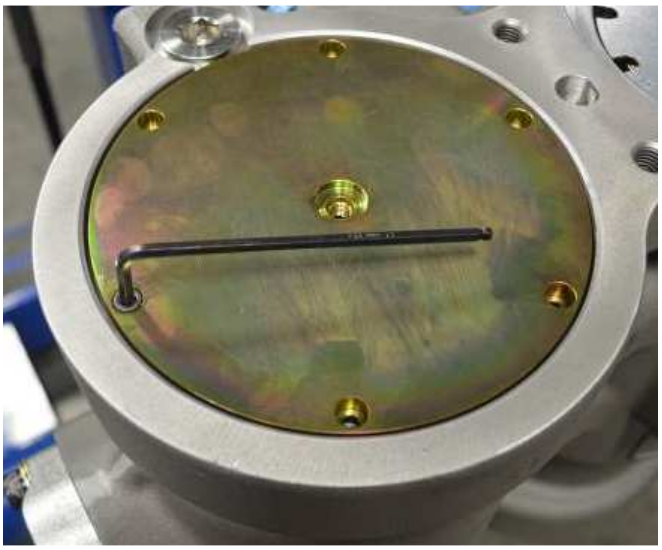
- 1/8” hex key
- 4mm hex key
- 3mm hex key
- Permanent marker
- Woodward tool 1013-8795 (spring wind tool)
- Dial-type torque wrench
- Woodward tool 1013-8807
- Torque wrench

Warning: Before starting any repair work, read the applicable Warnings and Notices on page Error! Bookmark not defined.**.**

1. Remove dash 2 plug from bottom cover to allow any trapped hydraulic oil to drain from lower spring cavity. Use a 1/8” hex key.



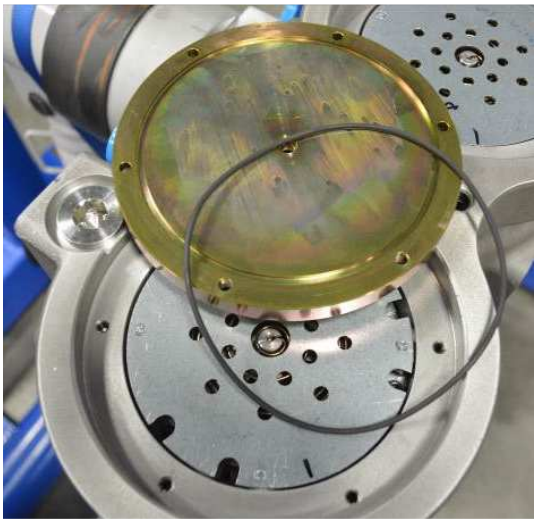
2. Remove the six M5 screws from the bottom cover using a 4mm hex key.



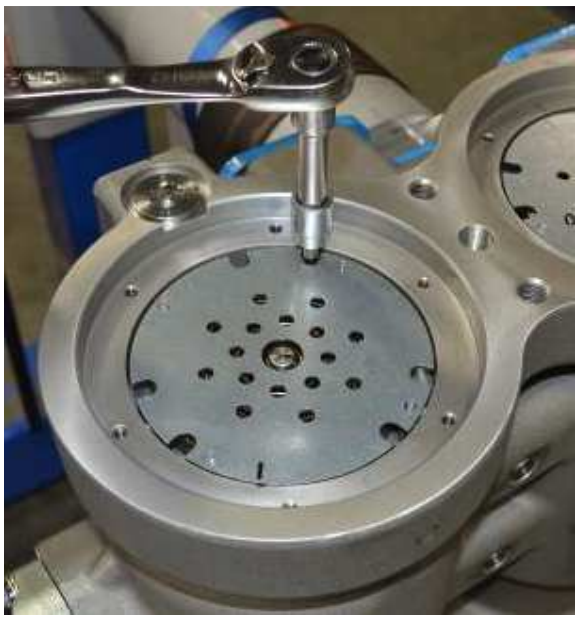
3. Remove the bottom cover, making sure to capture the sealing O-ring on the bottom cover for re-use.

   An extra O-ring is included in the bottom cover replacement kit in case the O-ring is damaged.

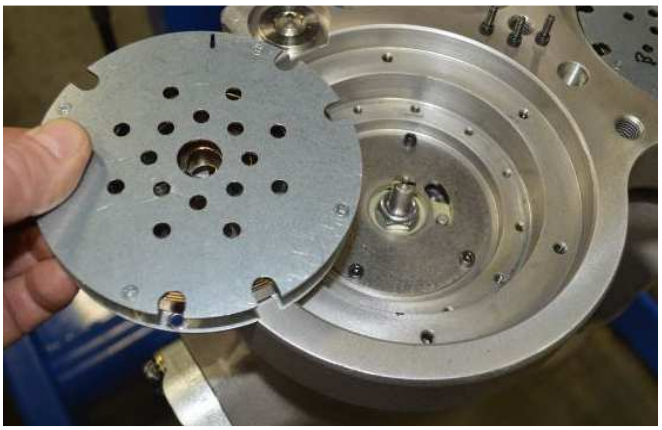
   If only replacing the bottom cover, skip to step 13.



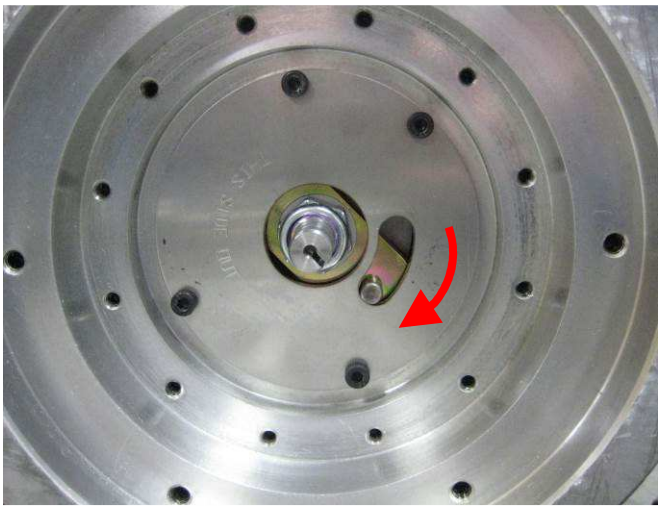
4. Hold the return spring in place to prevent it from unwinding while removing the three M4 screws securing the return spring assembly to the housing. Use a 3mm hex key. The spring is preloaded to a torque of 2 Nm (18 in-lbf). Once the screws are removed, release pressure on the spring to allow it to slowly unwind (counter-clockwise) to a neutral state.



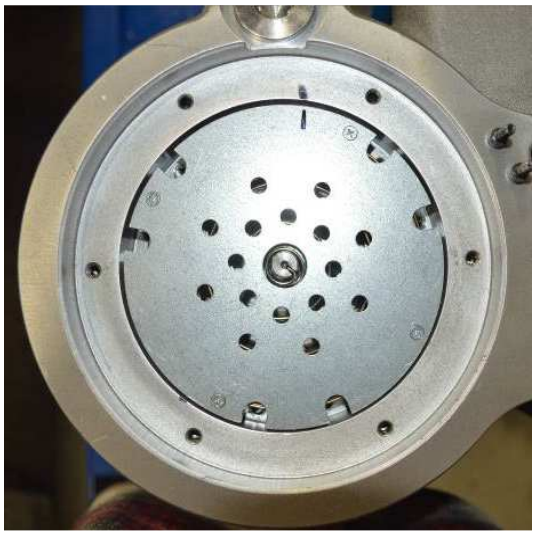
5. Remove the return spring from the shaft and housing.



6. Rotate the shaft clockwise as viewed from the bottom of QuickTrip (full open position), until the stop pin contacts the end of travel in the stop plate as shown.

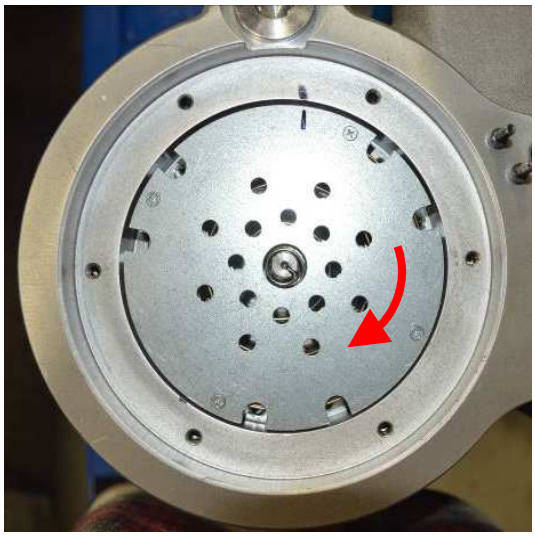


7. Install the new return spring, inserting spring “tang” into slot in shaft, ensuring lettering “WIND DIRECTION” and arrow are visible and facing down (unit orientation).

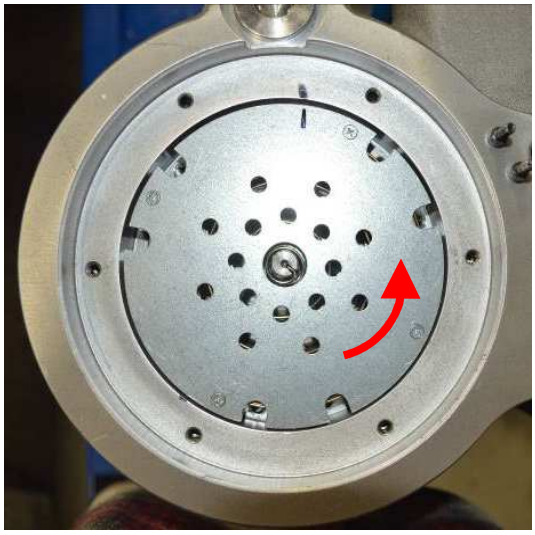


8. Use a permanent marker to place a mark anywhere on the outer circumference of the return spring, and then place another mark on the QuickTrip housing, directly adjacent to the mark on the spring assembly as a reference point for winding.

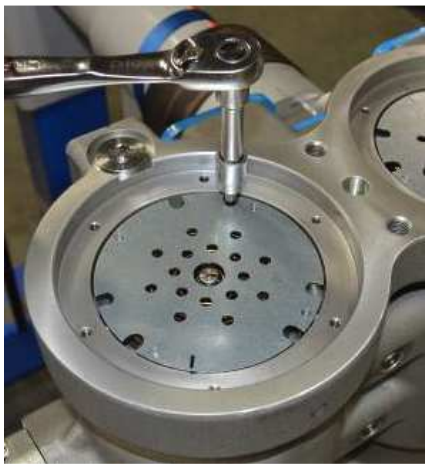
9. Rotate the spring clockwise approximately 1-3/4 turns, either by hand or by using Woodward tool 1013-8795, as viewed from the bottom of QuickTrip (in the direction of the arrow marked on the bottom of the spring assembly). Use the marks from the previous step as a reference for winding the spring.



10. From this position, rotate the spring counter-clockwise as viewed from the bottom of QuickTrip (opposite from the direction of the arrow marked on the bottom of the spring assembly) so that mounting holes in the spring line up with the nearest mounting holes in the housing.



11. Hold the spring in this position, while inserting the three M4 screws into the three spring assembly mounting holes. Torque the screws to 2.25-2.7 Nm (20-24 in-lbf).

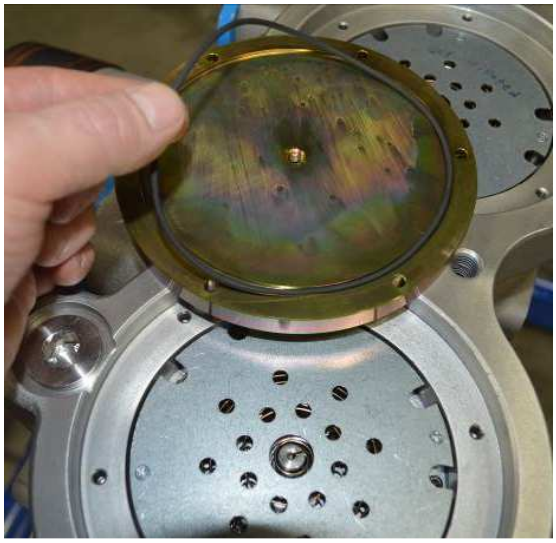


12. Verify proper spring torque setting attached to the top of the QuickTrip shaft and a dial-type torque wrench by using Woodward tool 1013-8807 to rotate the top of the shaft clockwise, just off the hard stop. Read the torque value on the dial and ensure it is within the range of 16-18 in-lbf. If the spring torque is too high, rotate the spring counter-clockwise to the next set of holes in the housing to loosen it. If the spring torque is too low, rotate the spring clockwise to the next set of holes in the housing to tighten it.

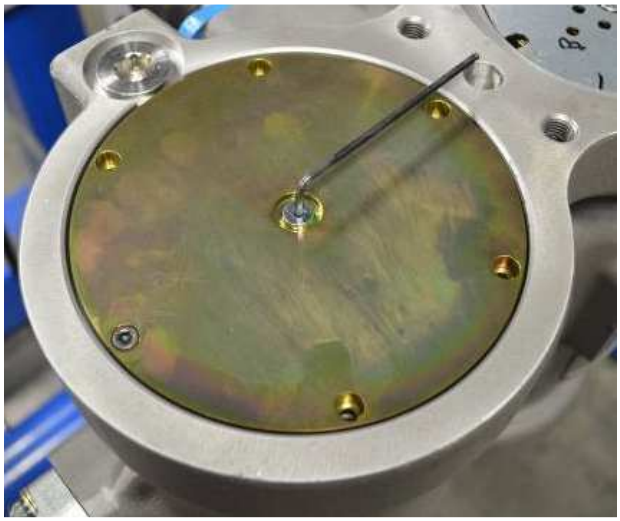
In order to access the shaft to perform the above torque test, follow the instructions in Chapter 3, Electronics Module Replacement; Steps 1-6 (note that steps 4 and 5 removing the wiring to TB1 and TB2 can be skipped).

Once finished with the torque test, follow the instructions in Chapter 3, Electronics Module Replacement, Steps 10-17 (note that steps 10, 11 and 12 reconnecting the wiring to TB1 and TB2, can be skipped, if the wiring was not removed for the above step).

13. Re-install the bottom cover, ensuring the O-ring is carefully seated in the O-ring groove. Install the six M5 screws and torque to 3.1-3.8 Nm (28-34 in-lbf).



14. Re-install the dash 2 plug in the bottom cover, ensuring the O-ring is present on the plug. Torque the plug to 1.3-2.7 Nm (1-2 ft-lbf).



15. Follow the functional test procedure in Chapter 7 to verify unit functionality.

Chapter 6.
Sight Window Cleaning/Replacement

Procedure:

The following procedure describes the detailed steps necessary to clean or replace the sight window within any QuickTrip actuator.

Sight window cleaning/replacement procedure:

Procedure	Photo Reference

Tools Required:

- Spanner tool or Woodward Tool 1013-6604
- Small flat-bladed screwdriver
- ¾" socket and wrench
- Torque wrench

Warning: Before starting any repair work, read the applicable Warnings and Notices on page Error! Bookmark not defined..

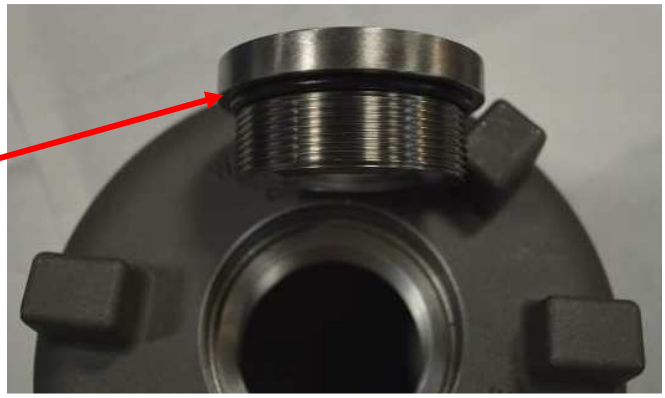
1. Remove the spiral wound retaining ring from the top of the sight glass. This is done by using a small flat-bladed screwdriver to access the notch at the end of the retaining ring and prying it out and away from the QuickTrip cover. Use a second smaller screwdriver to continue to pry out the remainder of the ring around its circumference in a clockwise direction.

Note: Removal of the top cover is not necessary to perform this procedure.

2. Use a spanner wrench or a specially designed tool (1013-6604) to unscrew (counter-clockwise) the sight window from the QuickTrip top cover.

3. The sight window may now be cleaned using isopropyl alcohol or other glass cleaner, or replaced entirely.

4. Make sure the O-ring seal is installed on the sight glass housing just under the top flange.



5. Re-install the sight window by carefully threading it into the QuickTrip top cover (clockwise). Use a spanner wrench or specially designed tool (1013-6604) to tighten the sight glass into the cover, making sure not to cross-thread or otherwise damage the threads.

6. Torque the sight window to 75-81 Nm (55-60 ft-lbf).

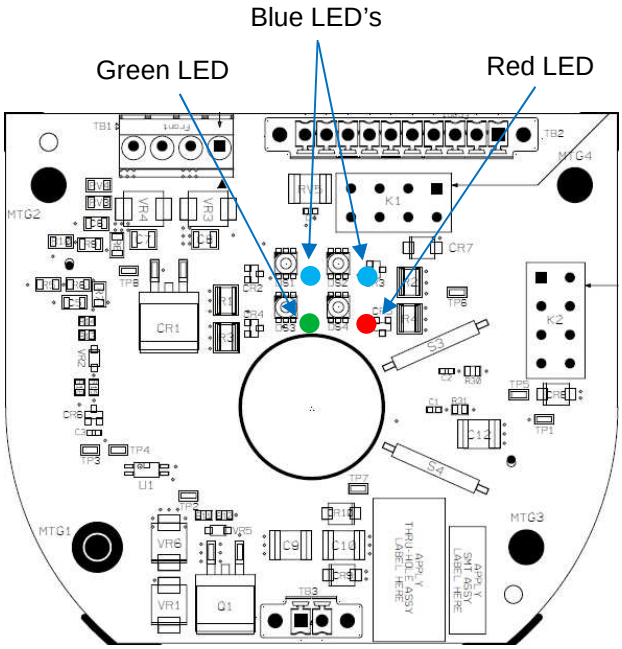
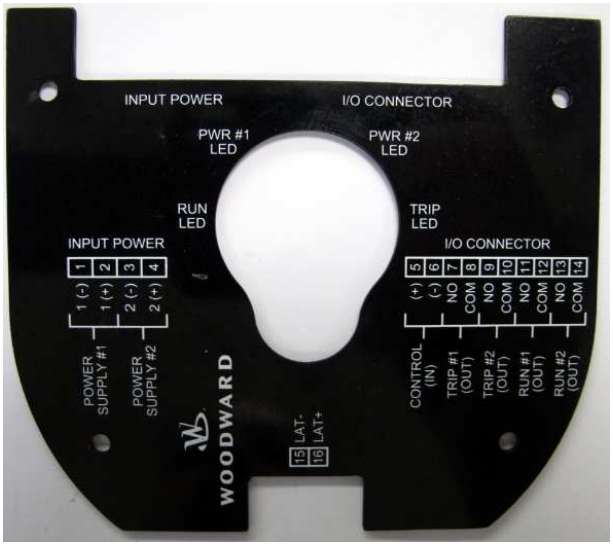
7. Re-install the spiral wound retaining ring into the groove in the QuickTrip top cover. This may be done by separating the ring coils and inserting one end of the ring into the groove. Continue to wind the remainder of the ring into the groove, pressing down around the circumference of the ring in a counter-clockwise direction until the entire ring is inserted into the groove.

Chapter 7.
Functional Test

Procedure

The following procedure describes the detailed steps necessary to functionally test QuickTrip following replacement of the LAT, LAT rotor, electronics module (PCBA), or return spring.

Functional Test procedure:

Procedure	Photo reference
Repair in a Zone 1 or Zone 2 environment	
If performing this repair in a Zone 1 or Zone 2 environment use the trip system control (such as ProTech TPS) to evaluate the proper function of the unit through the control interface. If using ProTech TPS, perform the following procedure.	
First, ensure the unit repair is complete and that all covers are in place and properly torqued. Apply power to the QuickTrip unit and verify the following: • Verify that both blue LED's on the electronics module light up (if using dual redundant power supplies, otherwise only one LED will be lit) • Verify that the red trip LED is lit to indicate the valve is in a tripped position • Use the ProTech TPS to ensure the trip annunciation from QuickTrip is in a TRUE state. • Use the ProTech TPS to reset the module and energize the actuator that was just repaired, then verify the following: - Verify that both blue LED's on the electronics module are still lit (if using dual redundant power supplies, otherwise only one LED will be lit). - Verify that the green run LED is lit to indicate the valve has rotated to the run (closed) position. - Use the ProTech TPS to ensure the run annunciation from QuickTrip is in a TRUE state. - Check trip time by tripping the unit and check the trip time log. The trip time	

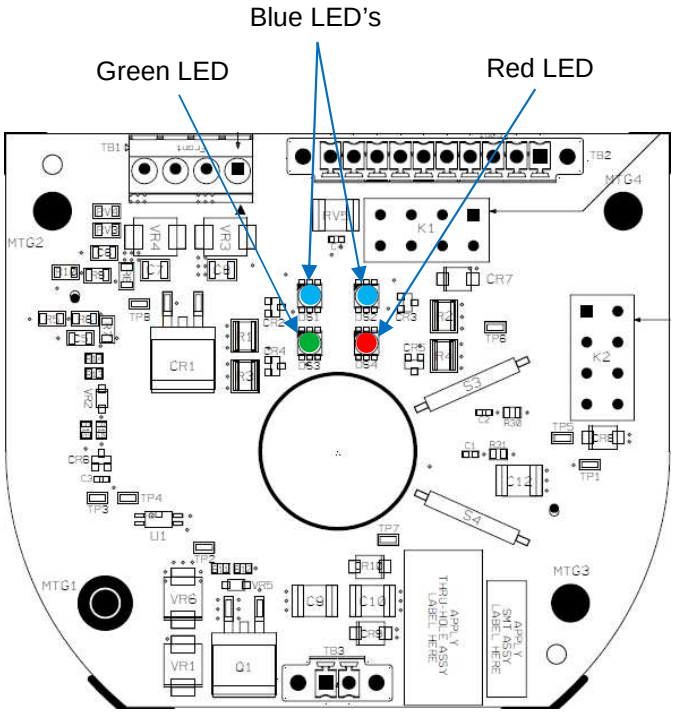
should be less than 50ms.

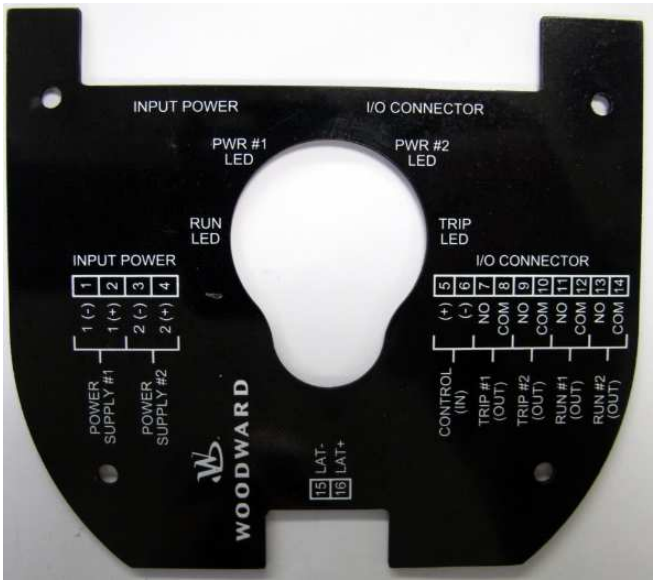
- Run an auto-sequence test with ProTech TPS and verify that the trip header pressure remains above the system trip pressure during the entire test.

Repair in ordinary location (non-Zone 1 or non-Zone 2 environment)

For non-Zone 1 and non-Zone 2 environments: Use a power supply to supply 24 VDC power to both power inputs on the power input terminals 1 & 2 and 3 & 4 and verify the following:

- Verify that both blue LED's on the electronics module light up (if using dual redundant power supplies, otherwise only one LED will be lit).
- Verify that the red trip LED is lit to indicate the valve is in a tripped position.
- Use an ohmmeter to verify the trip outputs are active (pins 7 & 8 should show continuity and pins 9 & 10 should show continuity)
- Apply 24VDC to the control input to energize the LAT (pins 5 & 6) and verify the following:
  - Verify that both blue LED's on the electronics module are still lit (if using dual redundant power supplies, otherwise only one LED will be lit).
  - Verify that the green run LED is lit to indicate the valve has rotated to the run (closed) position.
  - Use an ohmmeter to verify the run outputs are active (pins 11 & 12 should show continuity and pins 13 & 14 should show continuity).
  - Check trip time by tripping the unit using the control interface (such as ProTech TPS) and check the trip time log. The trip time should be less than 50ms.
  - Run an auto-sequence test with ProTech TPS and verify that the trip header pressure remains above the system trip pressure during the entire test.





Chapter 8.
Product Support and Service Options

Product Support Options

If you are experiencing problems with the installation, or unsatisfactory performance of a Woodward product, the following options are available:

- Consult the troubleshooting guide in the manual.
- Contact the manufacturer or packager of your system.
- Contact the Woodward Full Service Distributor serving your area.
- Contact Woodward technical assistance (see “How to Contact Woodward” later in this chapter) and discuss your problem. In many cases, your problem can be resolved over the phone. If not, you can select which course of action to pursue based on the available services listed in this chapter.

OEM or Packager Support: Many Woodward controls and control devices are installed into the equipment system and programmed by an Original Equipment Manufacturer (OEM) or Equipment Packager at their factory. In some cases, the programming is password-protected by the OEM or packager, and they are the best source for product service and support. Warranty service for Woodward products shipped with an equipment system should also be handled through the OEM or Packager. Please review your equipment system documentation for details.

Woodward Business Partner Support: Woodward works with and supports a global network of independent business partners whose mission is to serve the users of Woodward controls, as described here:

- A **Full Service Distributor** has the primary responsibility for sales, service, system integration solutions, technical desk support, and aftermarket marketing of standard Woodward products within a specific geographic area and market segment.
- An **Authorized Independent Service Facility (AISF)** provides authorized service that includes repairs, repair parts, and warranty service on Woodward's behalf. Service (not new unit sales) is an AISF's primary mission.

A current list of Woodward Business Partners is available at **www.woodward.com/directory**.

Product Service Options

The following factory options for servicing Woodward products are available through your local Full-Service Distributor or the OEM or Packager of the equipment system, based on the standard Woodward Product and Service Warranty (5-01-1205) that is in effect at the time the product is originally shipped from Woodward or a service is performed:

- Replacement/Exchange (24-hour service)
- Flat Rate Repair
- Flat Rate Remanufacture

Replacement/Exchange: Replacement/Exchange is a premium program designed for the user who is in need of immediate service. It allows you to request and receive a like-new replacement unit in minimum time (usually within 24 hours of the request), providing a suitable unit is available at the time of the request, thereby minimizing costly downtime. This is a flat-rate program and includes the full standard Woodward product warranty (Woodward Product and Service Warranty 5-01-1205).

This option allows you to call your Full-Service Distributor in the event of an unexpected outage, or in advance of a scheduled outage, to request a replacement control unit. If the unit is available at the time of the call, it can usually be shipped out within 24 hours. You replace your field control unit with the like-new replacement and return the field unit to the Full-Service Distributor.

Charges for the Replacement/Exchange service are based on a flat rate plus shipping expenses. You are invoiced the flat rate replacement/exchange charge plus a core charge at the time the replacement unit is shipped. If the core (field unit) is returned within 60 days, a credit for the core charge will be issued.

Flat Rate Repair: Flat Rate Repair is available for the majority of standard products in the field. This program offers you repair service for your products with the advantage of knowing in advance what the cost will be. All repair work carries the standard Woodward service warranty (Woodward Product and Service Warranty 5-01-1205) on replaced parts and labor.

Flat Rate Remanufacture: Flat Rate Remanufacture is very similar to the Flat Rate Repair option with the exception that the unit will be returned to you in “like-new” condition and carry with it the full standard Woodward product warranty (Woodward Product and Service Warranty 5-01-1205). This option is applicable to mechanical products only.

Returning Equipment for Repair

If a control (or any part of an electronic control) is to be returned for repair, please contact your Full-Service Distributor in advance to obtain Return Authorization and shipping instructions.

When shipping the item(s), attach a tag with the following information:
- Return authorization number
- Name and location where the control is installed
- Name and phone number of contact person
- Complete Woodward part number(s) and serial number(s)
- Description of the problem
- Instructions describing the desired type of repair

Packing a Control

Use the following materials when returning a complete control:
- Protective caps on any connectors
- Antistatic protective bags on all electronic modules
- Packing materials that will not damage the surface of the unit
- At least 100 mm (4 inches) of tightly packed, industry-approved packing material
- A packing carton with double walls
- A strong tape around the outside of the carton for increased strength

NOTICE

To prevent damage to electronic components caused by improper handling, read and observe the precautions in Woodward manual 82715, *Guide for Handling and Protection of Electronic Controls, Printed Circuit Boards, and Modules*.

Replacement Parts

When ordering replacement parts for controls, include the following information:

- The part number(s) (XXXX-XXXX) that is on the enclosure nameplate
- The unit serial number, which is also on the nameplate

Engineering Services

Woodward offers various Engineering Services for our products. For these services, you can contact us by telephone, by email, or through the Woodward website.

- Technical Support
- Product Training
- Field Service

Technical Support is available from your equipment system supplier, your local Full-Service Distributor, or from many of Woodward's worldwide locations, depending upon the product and application. This service can assist you with technical questions or problem solving during the normal business hours of the Woodward location you contact. Emergency assistance is also available during non-business hours by phoning Woodward and stating the urgency of your problem.

Product Training is available as standard classes at many of our worldwide locations. We also offer customized classes, which can be tailored to your needs and can be held at one of our locations or at your site. This training, conducted by experienced personnel, will assure that you will be able to maintain system reliability and availability.

Field Service engineering on-site support is available, depending on the product and location, from many of our worldwide locations or from one of our Full-Service Distributors. The field engineers are experienced both on Woodward products as well as on much of the non-Woodward equipment with which our products interface.

For information on these services, please contact us via telephone, email us, or use our website: **www.woodward.com**.

Contacting Woodward's Support Organization

For the name of your nearest Woodward Full-Service Distributor or service facility, please consult our worldwide directory at **www.woodward.com/directory**, which also contains the most current product support and contact information.

You can also contact the Woodward Customer Service Department at one of the following Woodward facilities to obtain the address and phone number of the nearest facility at which you can obtain information and service.

Products Used in Electrical Power Systems

Facility	Phone Number
Brazil	+55 (19) 3708 4800
China	+86 (512) 6762 6727
Germany:	
Kempen	+49 (0) 21 52 14 51
Stuttgart	+49 (711) 78954-510
India	+91 (124) 4399500
Japan	+81 (43) 213-2191
Korea	+82 (51) 636-7080
Poland	+48 12 295 13 00
United States	+1 (970) 482-5811

Products Used in Engine Systems

Facility	Phone Number
Brazil	+55 (19) 3708 4800
China	+86 (512) 6762 6727
Germany	+49 (711) 78954-510
India	+91 (124) 4399500
Japan	+81 (43) 213-2191
Korea	+82 (51) 636-7080
The Netherlands	+31 (23) 5661111
United States	+1 (970) 482-5811

Products Used in Industrial Turbomachinery Systems

Facility	Phone Number
Brazil	+55 (19) 3708 4800
China	+86 (512) 6762 6727
India	+91 (124) 4399500
Japan	+81 (43) 213-2191
Korea	+82 (51) 636-7080
The Netherlands	+31 (23) 5661111
Poland	+48 12 295 13 00
United States	+1 (970) 482-5811

Technical Assistance

If you need to contact technical assistance, you will need to provide the following information. Please write it down here before contacting the Engine OEM, the Packager, a Woodward Business Partner, or the Woodward factory:

General

Your Name _____

Site Location _____

Phone Number _____

Fax Number

Prime Mover Information

Manufacturer _____

Turbine Model Number _____

Type of Fuel (gas, steam, etc.) _____

Power Output Rating _____

Application (power generation, marine, etc.) _____

Control/Governor Information

Control/Governor #1

Woodward Part Number & Rev. Letter _____

Control Description or Governor Type _____

Serial Number

Control/Governor #2

Woodward Part Number & Rev. Letter _____

Control Description or Governor Type _____

Serial Number

Control/Governor #3

Woodward Part Number & Rev. Letter _____

Control Description or Governor Type _____

Serial Number

Symptoms

Description _____

_____

If you have an electronic or programmable control, please have the adjustment setting positions or the menu settings written down and with you at the time of the call.

Revision History

Changes in Revision A—

- Reformatted table titles into table captions in Chapter 1
- Inserted Table 1-5

Released

We appreciate your comments about the content of our publications.

Send comments to: icinfo@woodward.com

Please reference publication 26842.

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Email and Website—www.woodward.com

Woodward has company-owned plants, subsidiaries, and branches, as well as authorized distributors and other authorized service and sales facilities throughout the world.

Complete address / phone / fax / email information for all locations is available on our website.