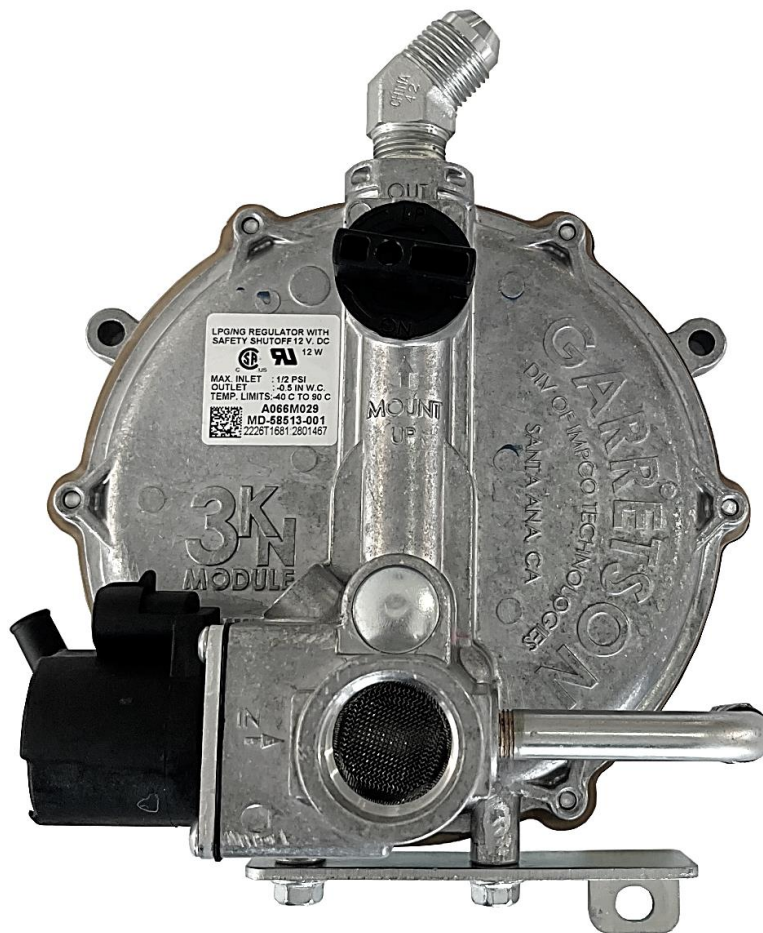




3KN REGULATOR SERVICE KIT INSTRUCTIONS

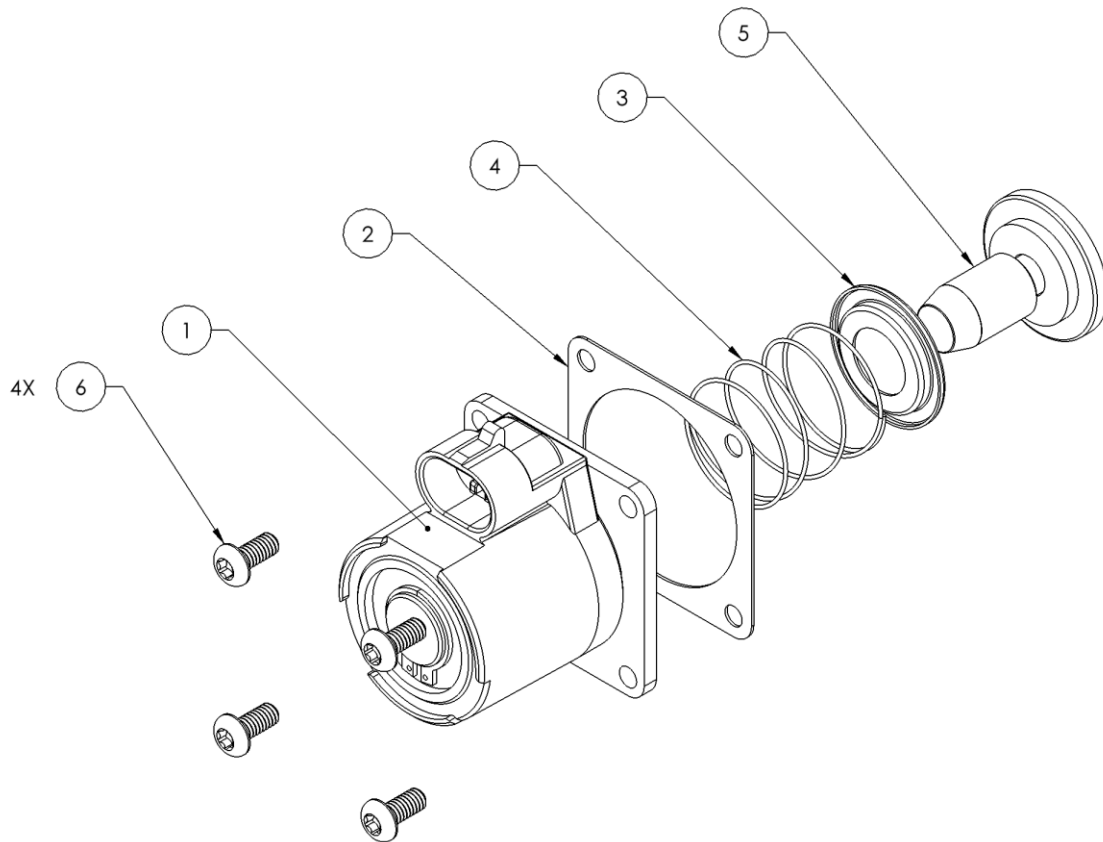
Kit Details – This Kit

	PART NUMBERS		FUEL
	REGULATOR ASSEMBLY	SERVICE KIT	
IMPCO	MD-58513-001	E2602030	LP or NG
CUMMINS	A072N617	A073A341	



3KN REGULATOR SERVICE KIT

	SERVICE KIT PART NUMBER
IMPCO	E2602030
CUMMINS	A073A341



Service Kit Components

ITEM #	DESCRIPTION	QTY
1	LOCK-OFF SOLENOID	1
2	GASKET	1
3	SPRING RETAINER WASHER	1
4	PLUNGER SPRING	1
5	PLUNGER ASSEMBLY	1
6	8-32 TORX SCREW	4
7	IMPCO REPAIR KITS STANDARD INSERT	1

SAFETY



WARNING:

- READ THE STATEMENTS BELOW BEFORE INSTALLING ANY ECONTROLS EQUIPMENT.
- IMPROPER INSTALLATION OR USE OF THIS PRODUCT MAY CAUSE SERIOUS INJURY, DEATH AND/OR PROPERTY DAMAGE.

ALL PROCEDURES DESCRIBED IN THIS SECTION SHOULD BE PERFORMED ONLY WHEN THE VEHICLE (IF APPLICABLE) IS IN NEUTRAL ON A LEVEL SURFACE AND THE PARKING BRAKE IS SET.

Natural Gas or LPG Installation in the US:

NFPA 37 Standard for the Installation and USE of Stationary Combustion Engines and Gas Turbines

NFPA 52 Vehicular Natural Gas Fuel Systems Code

NFPA 58 Liquefied Petroleum Gas Code

SERVICE TECHNICIANS AND USERS SHALL CAREFULLY READ AND ABIDE BY THE PROVISIONS SET FORTH IN NATIONAL FIRE PROTECTION ASSOCIATION PAMPHLET (NFPA) #37 FOR STATIONARY COMBUSTION ENGINE STANDARDS, NFPA #52 FOR NATURAL GAS FUEL SYSTEMS OR NFPA 58 FOR STORAGE, HANDLING, TRANSPORTATION AND USE OF LPG.

INSTALLERS: LPG INSTALLATIONS IN THE UNITED STATES MUST BE PERFORMED IN ACCORDANCE WITH FEDERAL, STATE, LOCAL LAWS AND NATIONAL FIRE PROTECTION ASSOCIATION PAMPHLET #58, STANDARD FOR STORAGE AND HANDLING OF LIQUEFIED PETROLEUM GASES, TO THE EXTENT THESE STANDARDS ARE NOT IN VIOLATION OF FEDERAL, STATE AND/OR LOCAL LAW.

COUNTRIES OUTSIDE OF USA: REFER TO THE GOVERNING AGENCIES OVERSEEING CNG AND PROPANE APPLICATIONS.

CNG INSTALLATIONS IN THE UNITED STATES: MUST BE PERFORMED IN ACCORDANCE WITH FEDERAL, STATE, LOCAL LAW AND NATIONAL FIRE PROTECTION ASSOCIATION PAMPHLET #52, COMPRESSED NATURAL GAS (CNG) VEHICULAR FUEL SYSTEMS, TO THE EXTENT THESE STANDARDS ARE NOT IN VIOLATION OF FEDERAL, STATE OR LOCAL LAW.

LPG AND/OR NATURAL GAS INSTALLATIONS ON STATIONARY ENGINES: MUST BE PERFORMED IN ACCORDANCE WITH FEDERAL, STATE, LOCAL LAW AND NATIONAL FIRE PROTECTION ASSOCIATION PAMPHLET #37, STANDARD FOR THE INSTALLATION AND USE OF STATIONARY COMBUSTION ENGINES AND GAS TURBINES, TO THE EXTENT THESE STANDARDS ARE NOT IN VIOLATION WITH FEDERAL, STATE OR LOCAL LAW. FAILURE TO ABIDE BY THE ABOVE WILL VOID ANY ECONTROLS WARRANTY ON THE PRODUCTS AND MAY CAUSE SERIOUS INJURY OR PROPERTY DAMAGE.

SERVICE TECHNICIANS: DUE TO THE INHERENT DANGER OF GASEOUS FUELS, ECONTROLS PRODUCTS MUST NOT BE INSTALLED OR USED BY PERSONS NOT KNOWLEDGEABLE OF THE HAZARDS ASSOCIATED WITH THE USE OF GASEOUS FUELS. ANY MAINTENANCE, SERVICE OR REPAIR SHALL BE PERFORMED BY TRAINED AND EXPERIENCED SERVICE TECHNICIANS.

PROPER TOOLS AND EQUIPMENT: PROPER TOOLS AND EQUIPMENT MUST BE USED TO PREVENT INJURY TO THE SERVICING TECHNICIAN, PROPERTY OR SYSTEM COMPONENTS. SERVICE REPAIRS SHALL ALWAYS BE PERFORMED IN A SAFE ENVIRONMENT AND THE TECHNICIAN MUST ALWAYS WEAR PROTECTIVE CLOTHING TO PREVENT INJURY.

INSPECT PRIOR TO USE: ALWAYS INSPECT THE MAJOR CASTING PIECES FOR DAMAGE, CORROSION OR CRACKS BEFORE ATTEMPTING TO SERVICE AND/OR REPAIR. BE SURE THE REPAIR KIT PART NUMBER YOU ARE USING IS CORRECT FOR THE COMPONENT(S) BEING SERVICED.

NO TEFLON TAPE: DO NOT USE TEFLON TAPE TO SEAL ANY FUEL FITTINGS. FAILURE TO FOLLOW THIS WARNING MAY CAUSE THE REGULATOR TO LEAK INTERNALLY, POSSIBLY RESULTING IN SERIOUS INJURY, DEATH AND/OR PROPERTY DAMAGE AND MAY VOID ANY WARRANTY COVERAGE. SEE SECTION 4 FOR APPROVED SEALANTS.

SAFETY (CONTINUED)

READ BEFORE PERFORMING ANY SERVICE, MAINTENANCE OR REPAIR ON THE FUEL SYSTEM

There are safety regulations and standards that must be followed when installing or servicing gaseous fuel equipment on engines. It is highly recommended you obtain and read the following National Fire Protection Association (NFPA) guidelines:

- NFPA #37-Combustion Engines
- NFPA #52-CNG Vehicular Fuel Systems
- NFPA #54-National Fuel Gas Codes
- NFPA #58-LP Gas Storage
- NFPA #59-LP Gas Utility Plants
- NFPA #59A-LN Gas Storage and Handling

To order these documents, contact the National Fire Protection Agency at (800) 344-3555 or go to www.nfpa.org, expand the Codes and Standards menu, and click on Document List and Code Cycle Information to order online.

There are state standards and regulations enforced by the state fire marshal in most states.

There may be other local standards set by counties, cities and municipalities. Be sure to consult all regulatory agencies to assure adherence to all standards in enforcement.

Safety in the workplace is everyone's responsibility. Regardless of the type work you do, it is important that you pay attention to what you are doing for your safety and the safety of those around you.

The following points are things to keep in mind when working on internal combustion engines and gaseous fuel systems:

- Before working on any fuel system, study the NFPA standard for the fuel in use.
- Before working on any fuel system, read and understand all manufacturers' recommended procedures.
- Before working on any fuel system, make sure you have local code approved safety goggles, face shields, gloves and clothing.
- Before working on any fuel system, make sure there is adequate ventilation.
- Before working on any fuel system, turn OFF the fuel system supply valve and run the engine until it stalls by running out of fuel. If this is not possible, slowly bleed the fuel from all lines before working on the fuel system or engine.
- After working on any fuel system, perform a leak test before starting the engine.

Remember:

- LPG is heavier than air and will sink to the lowest level. Avoid areas where escaped fuel may collect and all sources of ignition.
- Natural Gas is lighter than air and will rise to the highest point. Avoid areas near overhead heaters and all other sources of ignition.

REBUILD INSTRUCTIONS

The IMPCO by EControls repair kit instructions will provide the technician information to successfully replace the Lockoff Solenoid on 3KN regulators.

Under normal conditions, installation of a complete repair kit should be necessary only at the time of a major engine overhaul or when the regulator has been out of service for an extended period of time. Each kit includes the necessary components needed to complete the rebuild. In addition, the following tools are required:

- T20 and T15 Torx screwdrivers
- Calibrated torque wrench with T15 fitting
- Lint-free swabs/Q-Tips
- Isopropyl alcohol (or approved equivalent)
- Loctite 242 threadlocker (or approved equivalent)
- Xiameter PMX-200 silicone fluid (or approved equivalent)
- SNOOP liquid leak detector (or approved alternative)
- Tweezers or pick



WARNING:

Do not use Teflon tape to seal any fuel fittings. Failure to follow this warning may cause the regulator to leak internally, that may cause serious injury and/or property damage.



IMPORTANT:

Always inspect the major casting pieces for damage, corrosion, or cracks before attempting a service repair. Be sure the repair kit part number you are using is correct for the regulator being serviced.

SECTION 1: REGULATOR REBUILD

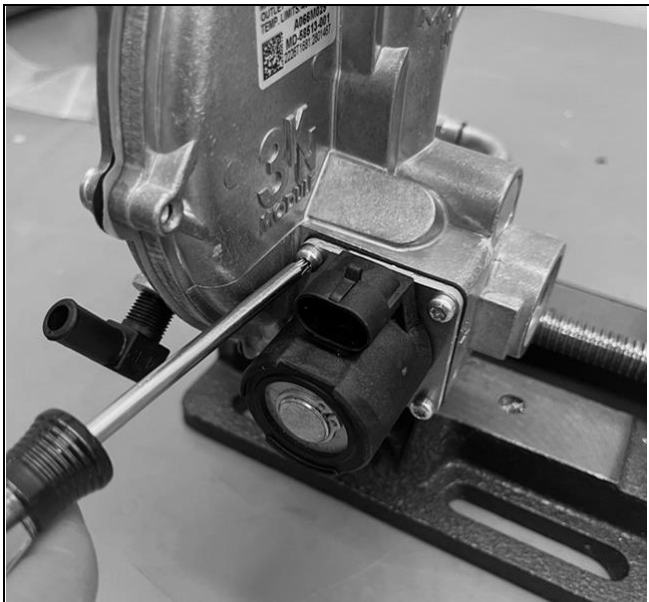
The following instructions apply when rebuilding 3KN regulators that are still installed on the generator. The regulator shown in a vise in the images below represents the orientation when installed on the generator.



IMPORTANT:

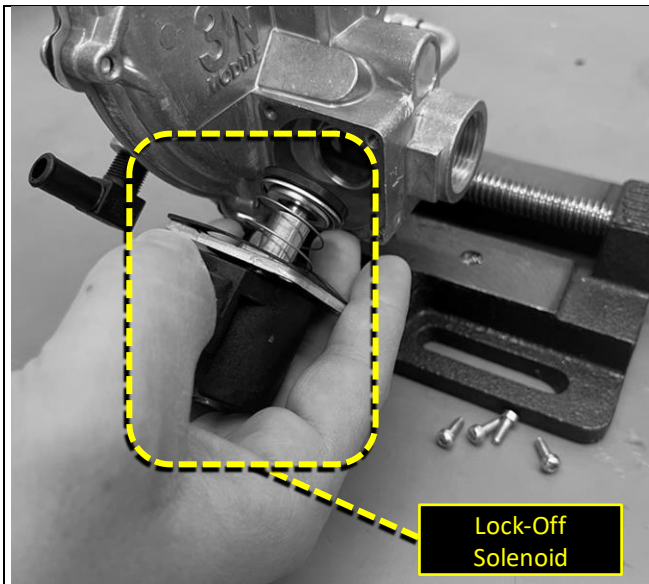
Replace all parts that are included in the repair kits.

Section 1.1 Regulator Disassembly



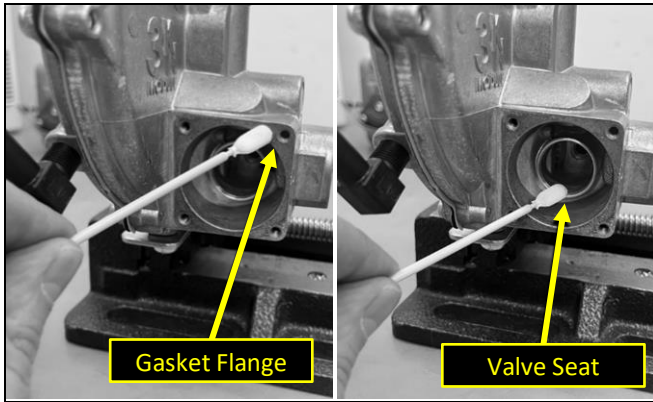
1. Using a T20 Torx screwdriver, remove the four (4) 8-32 TORX SCREWS holding the lock-off valve to the regulator.

Discard the screws.

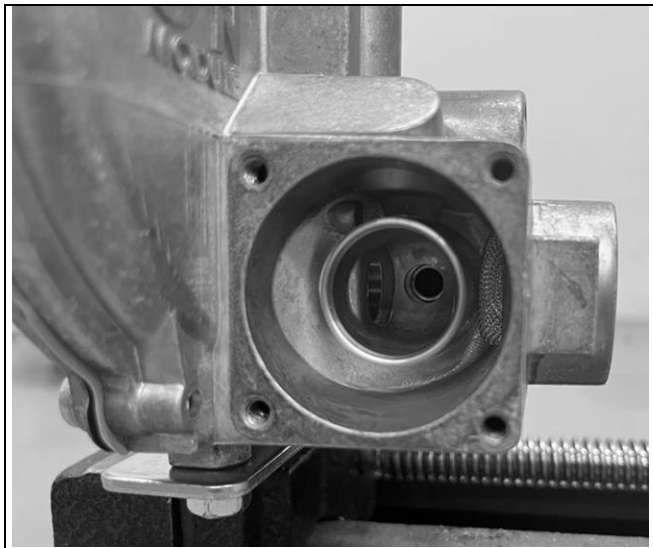


2. Remove all LOCK-OFF SOLENOID components from the regulator, as well as the sealing gasket.

Discard these components.

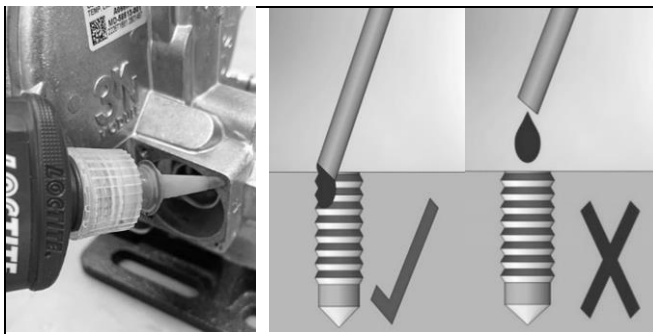


3. Using a lint-free Q-Tip and isopropyl alcohol, thoroughly clean both the gasket flange and the lock-off valve seat surfaces of the regulator body. Inspect both surfaces for chips or dents that would affect sealing – if any are identified, the complete regulator will need to be replaced.

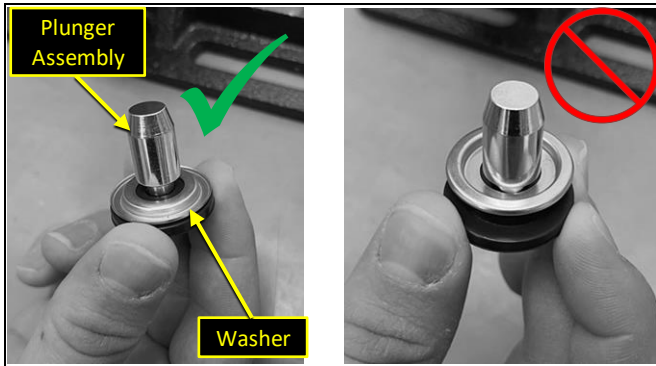


4. Inspect lock-off bore and screw taps for any residual debris or material; if present, carefully remove with tweezers or pick. DO NOT spray with compressed shop air to remove.

Section 1.2 Rebuild / Re-Assembly of Regulator

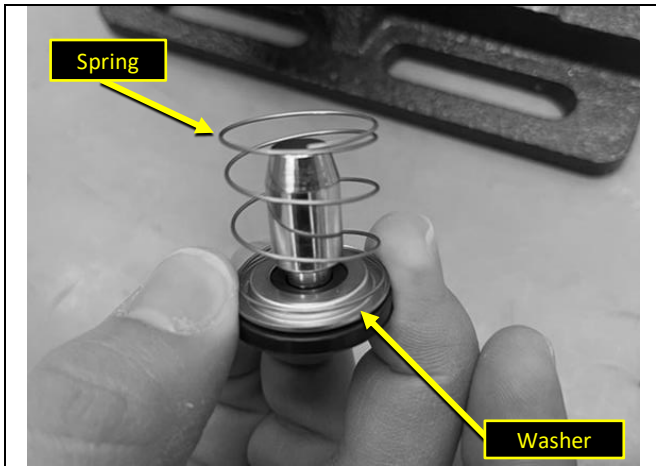


5. Add Loc-Tite 242 or approved alternative to the lock-off flange bolt hole threads. DO NOT get Loc-Tite anywhere else on the flange.

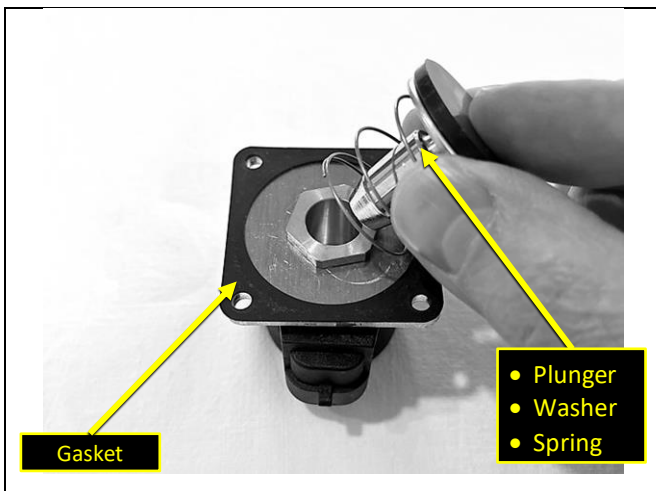


6. Orient the SPRING RETAINER WASHER as shown and place on the PLUNGER ASSEMBLY.

IMPORTANT: Ensure SPRING RETAINER WASHER is oriented correctly before placing on PLUNGER ASSEMBLY.



7. Place the SPRING on the SPRING RETAINER WASHER.

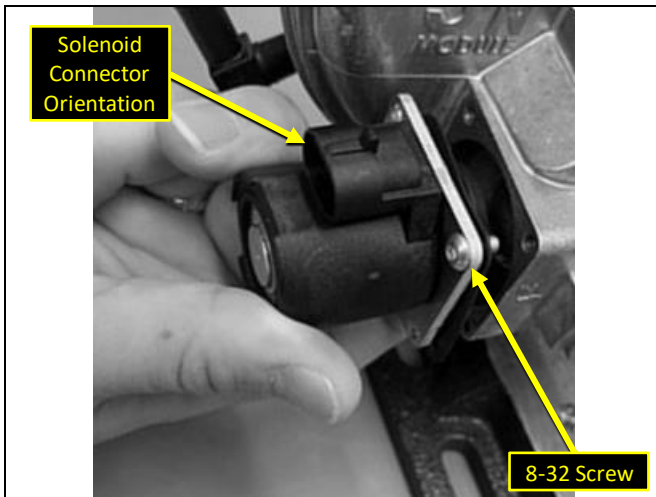


8. Carefully place the GASKET on the flange face. Make sure the GASKET screw holes line up with the (4) screw holes in the flange.

Hold the PLUNGER, SPRING RETAINER WASHER, and SPRING together and insert the PLUNGER into the plunger bore of the LOCKOFF housing. Make sure the spring is centered both in the SPRING RETAINER WASHER groove and around the LOCKOFF bore hex.



9. Use a lint-free Q-Tip to apply a thin layer of Xiameter PMX-200 silicone fluid (or equivalent) to the sealing surface of the PLUNGER ASSEMBLY



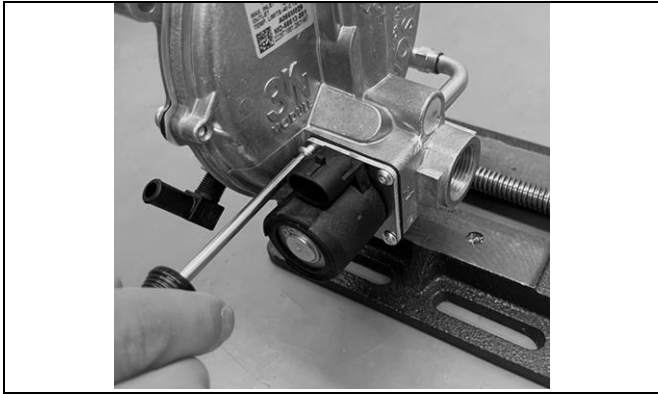
10. Place a single (1) 8-32 screw in the LOCK-OFF SOLENOID flange screw hole as shown, and carefully place the complete LOCK-OFF SOLENOID assembly against the regulator body flange face.

IMPORTANT: Ensure that the solenoid connector is oriented facing up as shown, and that the gasket is flat and not wrinkled or bent when assembling.



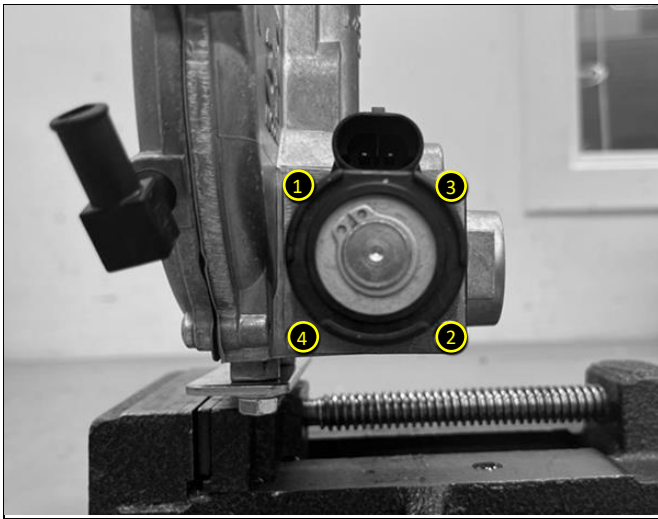
11. Use a T15 Torx screwdriver to hand-tighten the 8-32 TORX SCREW until snug.

IMPORTANT: Ensure that the screw is not installed at an angle, to minimize chances of stripping the screw threads.



12. Straighten the GASKET to properly align the GASKET screw holes with the regulator body flange screw holes. Hand-start the remaining (3) 8-32 TORX SCREWS into the screw holes in the regulator body.

IMPORTANT: Ensure that the screws are not installed at an angle, to minimize chances of stripping the screw threads.



13. Use a calibrated torque wrench fitted with a T-15 head to tighten the 8-32 TORX SCREWS in the cross pattern shown to $3.39 \pm 0.34 \text{ N*m}$ ($30 \pm 3 \text{ in*lb}$).

SECTION 2: Regulator Post-Rebuild Test

After reassembly, verify regulator functionality according to the following steps:

- 1) Start engine.
- 2) Perform an external leak test by applying SNOOP liquid leak detector (or approved alternative) to the LOCK-OFF SOLENOID gasket joint (as well as any other regulator connections that were re-tightened during the rebuild). Address any leaks detected during this step before proceeding.
- 3) Perform an engine functional test to ensure the engine is functioning to specification across the entire operation range.
- 4) Test the 3KN regulator for internal leakage:
 - a. Disconnect the LOCK-OFF SOLENOID connector and verify that the engine stops.
 - b. Remove the TEST PRESSURE PORT PLUG from the regulator and test for leakage across the LOCK-OFF SOLENOID valve. This may be done either by applying soapy water to the test pressure port and looking for any bubbles to form, or by connecting a flexible tube to the test pressure port and submerging in a cup of water.
 - c. Replace the TEST PRESSURE PORT PLUG, re-start the engine and perform a quick external check on the plug that was just replaced.