

T60 REGULATOR REPAIR KIT INSTRUCTIONS

This PPI covers the repair of Series I and II T60 regulators using either a minor or major repair kit.

Important: Any maintenance, service or repair should be performed by trained and experienced service technicians. Proper tools and equipment should be used to prevent injury to the servicing technician, property or system components. Service repairs should always be performed in a safe environment and the technician should always wear protective clothing and eyewear to prevent injury.

The IMPCO PPI-68 repair kit instructions will provide the technician information to successfully repair Model T60 regulators. Always inspect the major casting pieces for damage, corrosion or cracks before attempting a service repair. Refer to the illustrations at right to properly identify the T60 as a Series I or II.

NOTE: The T60 Series I uses imperial screws and the Series II uses metric. Extra imperial and metric screws are included in the repair kits—be sure to use the correct screws when reassembling the regulator.

NOTE: Although identical in dimensions and appearance, the primary and secondary seats are made of different material. To differentiate the two seats, the secondary seat is red in color, or black but marked by a small white dot.

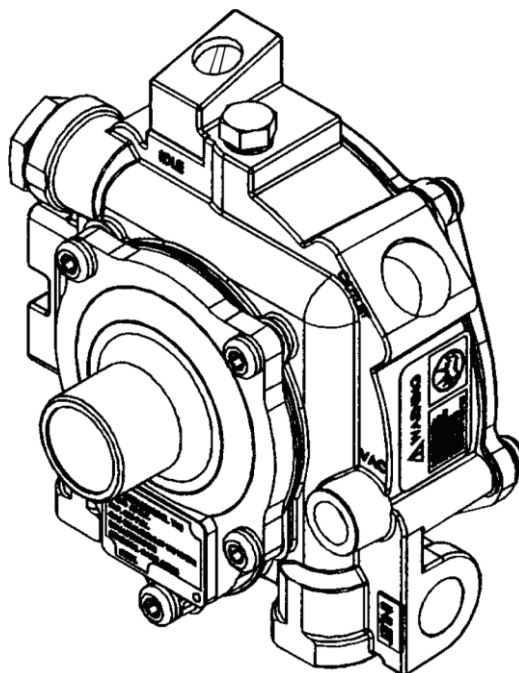


WARNING

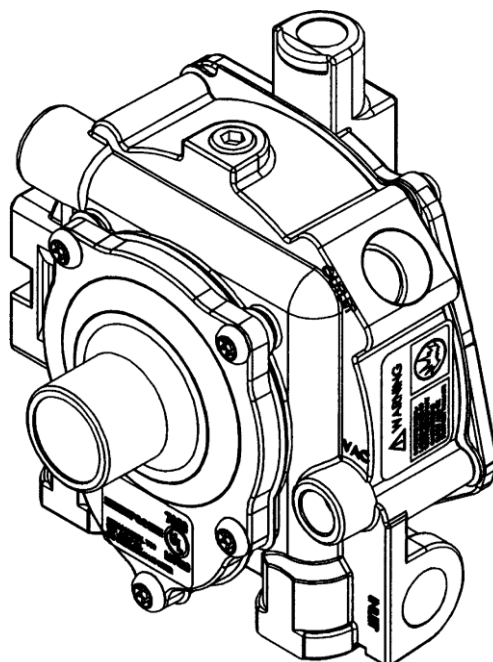
Do not use Teflon tape to seal any fuel fittings. Fragments of the tape may enter into the fuel system, causing damage or malfunction of critical fuel system components that may result in serious injury and/or property damage.

REPAIR KIT PART NUMBERS

Part #	Description
T60-RK	Repair Kit-Minor
T60-RBK	Repair Kit-Major



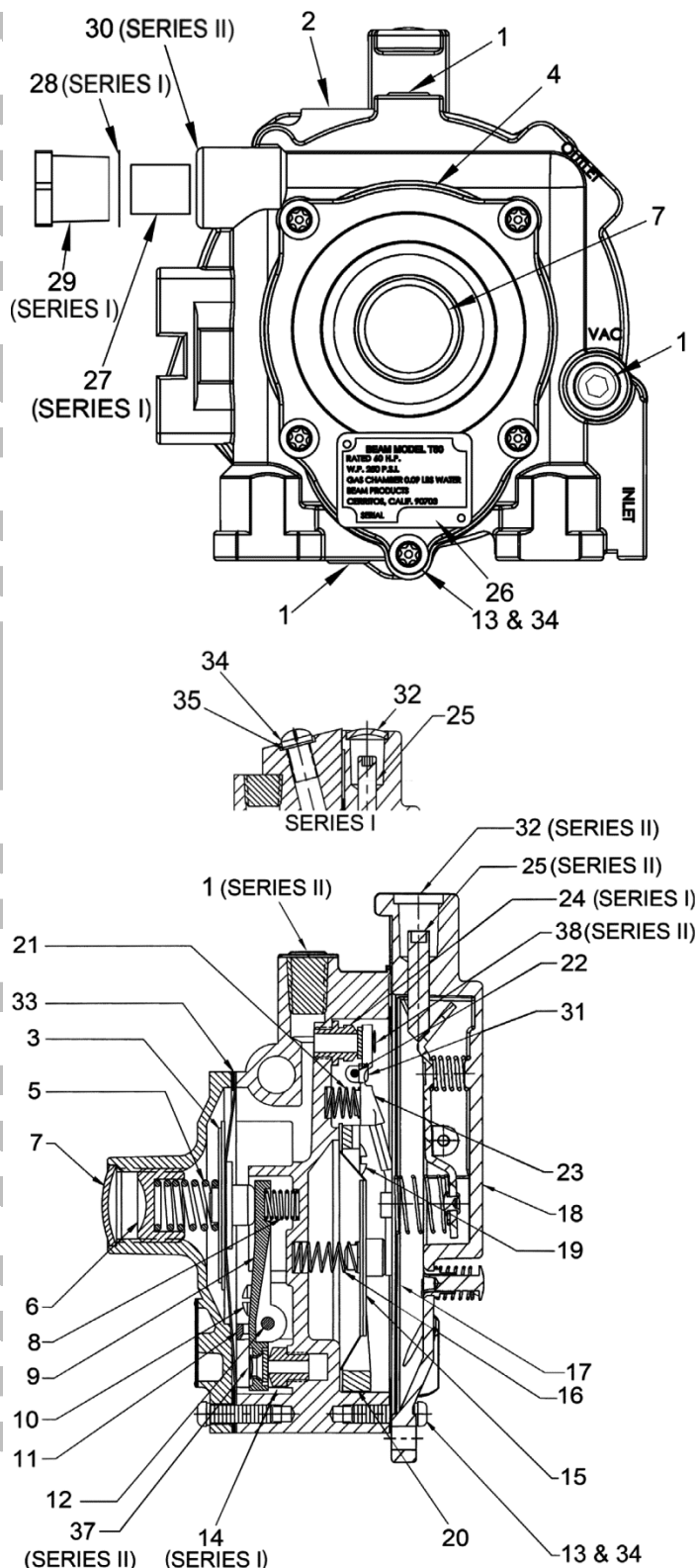
T60 Regulator, Series I



T60 Regulator, Series II

MODEL T60 REGULATORS

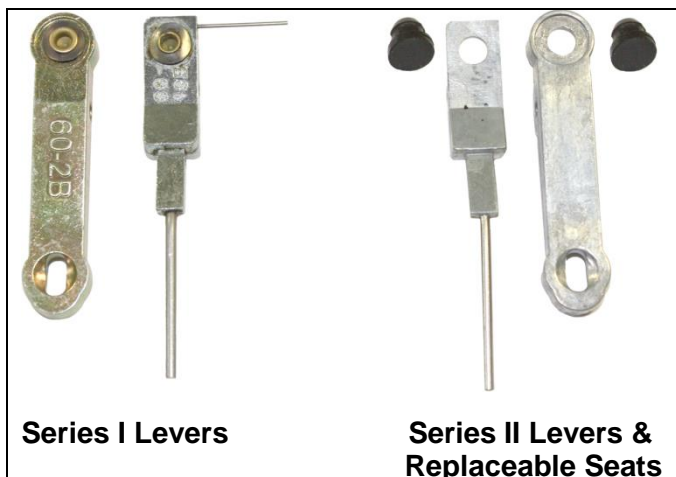
Item #	P/N	DESCRIPTION
1	P3-13	PLUG, 1/8-27 NPT* (1) (SERIES I)
	P3-16699-001	PLUG, 1/8 SOCKET HEAD STEEL (SERIES II)
2	NSS	CASTING, REGULATOR BODY
3	NSS	DIAPHRAGM ASSEMBLY* (1), (2)
4	NSS	COVER, PRIMARY REGULATOR
5	NSS	SPRING, PRIMARY* (1)
6	NSS	SCREW, RETAINER, ADJUSTABLE SPRING
7	P3-17956-8	PLUG, EXPANSION* (1), (2)
8	60-4	SPRING, PRIMARY LEVER* (1)
9	NSS	LEVER ASSY, PRIMARY* (1), (2) (SERIES I)
		LEVER ASSY, PRIMARY (SERIES II)
10	NSS	SCREW, FIL HD, 10-32 UNF-2A x .31 L (SERIES I)
		SCREW, M5 x 0.8 7.9 FIL HD, TORX (SERIES II)
11	NSS	BRIDGE, PRIMARY
12	NSS	PIN, PRIMARY PIVOT* (1)
13	NSS	SCREW, 10-32 x.62 TORX* (1) (SERIES I)
		SCREW, TORX TAMP RES M5 X16MM* (1), (2) (SERIES II)
14	NSS	ORIFICE, PRIMARY REGULATOR (SERIES I)
15	NSS	DIAPHRAGM ASSEMBLY, VACUUM LOCK* (1), (2)
16	NSS	SPRING, VACUUM LOCK* (1)
17	NSS	DIAPHRAGM, SECONDARY* (1), (2)
18	NSS	COVER ASSY (SERIES I)
		COVER ASSY W/PRIMER (SERIES I)
		COVER ASSY (SERIES II)
		COVER ASSY W/PRIMER (SERIES II)
		COVER ASSY, W/PRIMER & MTG TABS (SERIES II)
		COVER ASSY, W/MOUNTINGS TABS (SERIES II)
19	NSS	SCREW, PAN HD 10-32 x .38* (1) (SERIES I)
		SCREW, TORX TAMP RES M5 X16MM (SERIES II)
20	60-16	RING, VACUUM LOCK
21	NSS	SPRING, SECONDARY LEVER* (1)
22	NSS	PIN, SECONDARY PIVOT* (1)
23	NSS	LEVER ASSY, SECONDARY* (1), (2) (SERIES I)
		LEVER ASSY, SECONDARY (SERIES II)
24	NSS	ORIFICE, SECONDARY REGULATOR (SERIES I)
25	S1-17367	SCREW, ADJUSTMENT (SERIES I)
		SCREW, ADJUSTMENT* (1) (SERIES II)
26	NSS	LABEL
27	400-25	VALVE, NEOPRENE* (1), (2) (SERIES I)
28	NSS	WASHER, COPPER* (1), (2) (SERIES I)
29	NSS	PLUG, WATER CORE (SERIES I)
30	NSS	PLUG, FREEZE .50 DIS. X .38* (1)(SERIES II)
31	NSS	SCREW, PAN HD, 10-32 UNF-2A X .25 L* (1) (SERIES I)
		SCREW, TORX TAMP RES M5 X16MM* (1) (SERIES II)
32	P3-17956-1	PLUG, EXPANSION* (1), (2)
33	NSS	GASKET, DIAPHRAGM* (1), (2)
34	W1-5	WASHER, SPLIT LOCK* (1) (SERIES I)
35	NSS	SCREW, FIL HD 1/4-28 UNF-2A* (1) (SERIES I)
36	NSS	WASHER, COPPER-SPECIAL (SERIES I)
37	NSS	SEAT, T60* PRIMARY (1), (2) (SERIES II)
38	NSS	SEAT, T60* SECONDARY (1), (2) (SERIES II) WHITE DOT



Note that some components will vary among the different T-60 Models.

NSS=Not Sold/Serviced Separately

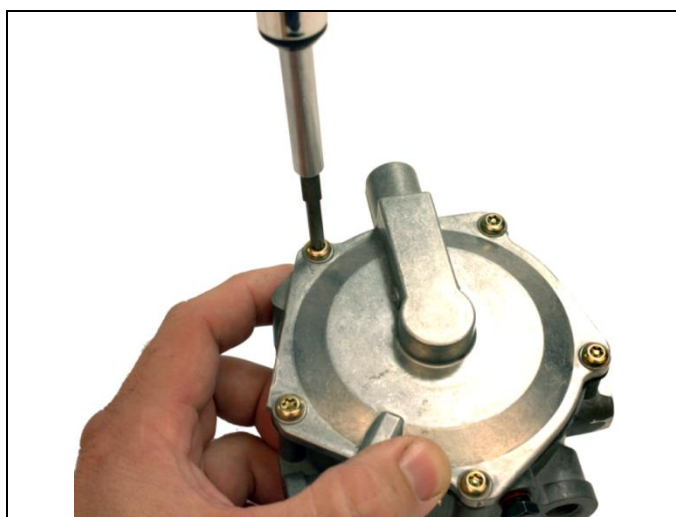
*Repair Kit. (1)=T60-RBK; (2)=T60-RK



WARNING

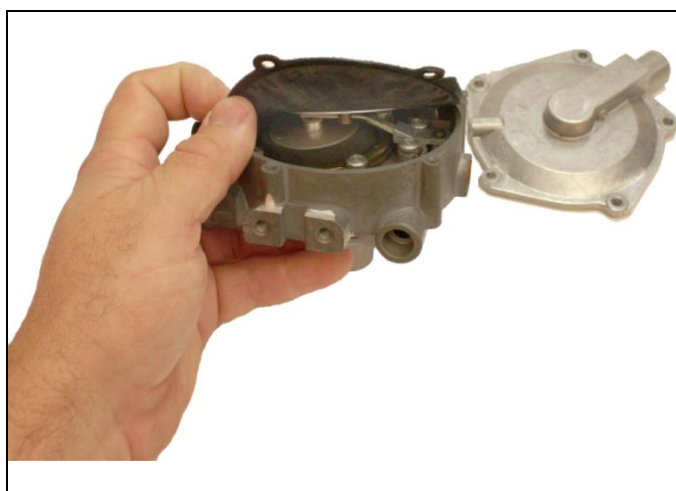
The primary and secondary levers and seats in the Series I and Series II regulators are different and are not interchangeable. The Series I seats are permanently mounted and included preassembled with the levers in the repair kits. The Series II seats are replaceable and are also included in the repair kits (the original levers are reused). Be sure to properly identify the regulator and correct lever and seat prior to assembly.

DISASSEMBLY INSTRUCTIONS



1. Remove the five cover screws (13) and washers (34) (Series I only), then lift the cover (18) off the regulator body (2) and secondary diaphragm (17). The cover may stick to the diaphragm. If necessary, tap on the edge of the cover with a screwdriver handle or a soft face hammer to loosen the cover.

Note: Do not attempt to use a screwdriver or other object to pry between the cover and the body. Prying with sharp objects may damage the sealing surface, rendering the regulator unusable.



2. After the cover (18) has been removed, lift up an edge of the diaphragm (17) and observe how it is attached to the secondary lever (23). If equipped with a vacuum-lock diaphragm (15), depress the vacuum diaphragm and slide the diaphragm off the lever.



3. Loosen the two screws (31) holding the secondary lever pivot pin (22) in place and remove pin, lever (23) and spring (21).



Vacuum Lock Models Only (Skip to Step 5 for models without a Vacuum Lock):

4. Remove the four screws (19) holding the vacuum-lock ring (20) and diaphragm (15) in place. Lift ring, diaphragm and spring (16) from regulator body (2).

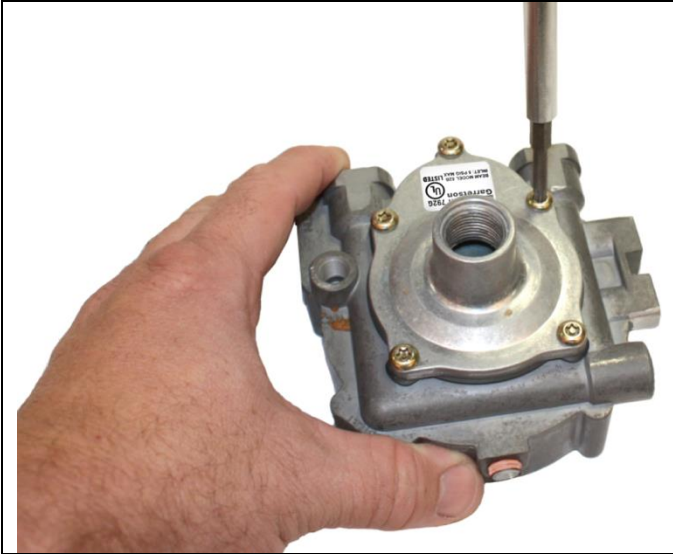


5. Remove the expansion plug (7) by drilling a small hole in the plug, carefully threading in a small sheet metal screw, then pulling the plug out using a slide hammer (as shown in the photo of Step 11). Once the plug is removed, also remove the primary pressure adjusting screw (6) and spring (5).



WARNING

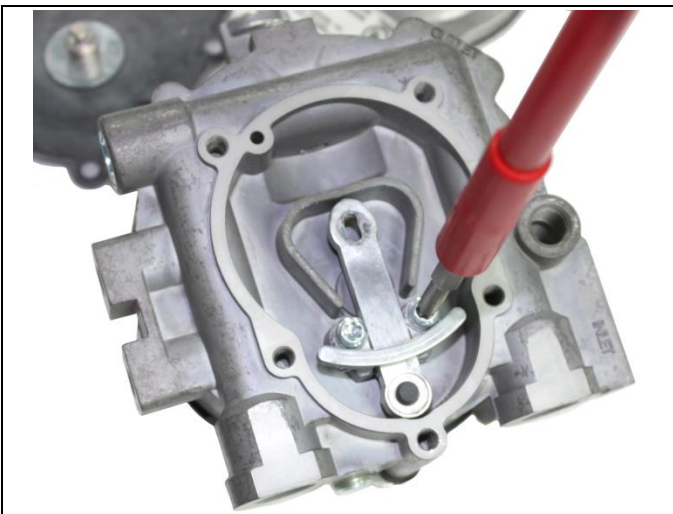
Use care when drilling the expansion plug hole by not drilling further into the retaining screw.



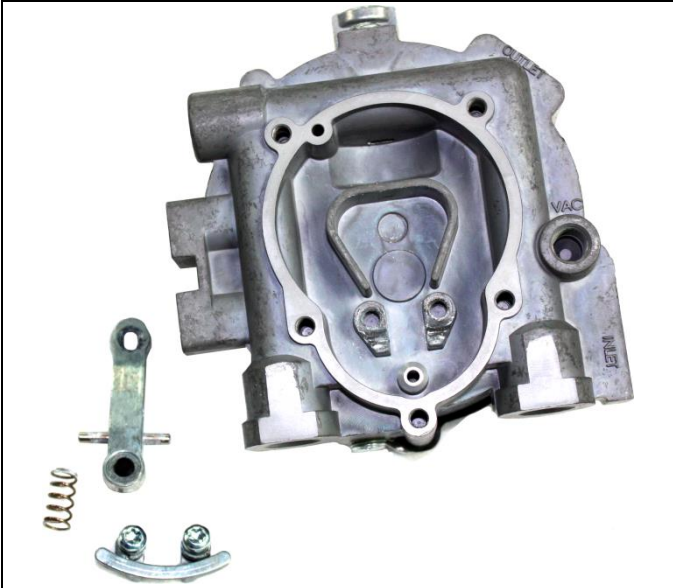
6. Remove the five primary cover screws (13) and washers (34)(Series I only), then lift the cover (4) off the regulator body (2).



7. Remove the cover (4), gasket (33) and primary diaphragm (3). Note that the primary diaphragm requires spinning 90 degrees to remove the primary diaphragm pin from the primary lever (9).



8. Remove the two screws (10) holding the primary lever bridge (11) in place.



9. Remove primary lever (9), pivot pin (12) spring (8), and primary bridge (11).



Series I only (Skip to Step 11 for Series II)

10. Remove the water core plug (29), copper washer (28) and neoprene plug (27) from the regulator body (2).



Series II only (Skip to Step 15 for Series I)

11. If the freeze plug (30) shows signs of corrosion or leakage, replace it with a new plug included in repair kit. To remove the freeze plug, drill a small hole into its center, thread in a sheet metal screw and remove using a slide hammer.



WARNING

Use care when drilling the freeze plug hole by not drilling further into the regulator body.



12. Remove the seats (37) of both the primary lever (9) and secondary lever (23) by cutting off the nub on the back of the seat.

REASSEMBLY OF REGULATOR

- Carefully clean and inspect all metal parts to be reused, including springs, levers, pivot pins and screws. Replace all parts that are included in the repair kit.
- Carefully clean the regulator body and inspect for cracks, corrosion or damage and examine the primary and secondary orifices for nicks, scratches or uneven wear. If any of these conditions are found, the regulator is not rebuildable and must be replaced.
- Wipe with a clean rag and inspect the primary section for foreign materials that might loosen and damage the soft face valves.
 - Clear out the inlet and outlet passages with compressed air, including the atmospheric vent on the secondary cover. Be sure no foreign material remains in these passages.



Series II only (Skip to Step 3 for Series I)

1. Inspect and identify the primary and secondary seats (To differentiate the two, the secondary seat is either red, or black but marked with a white dot). Do not swap the seats.



Primary Seat

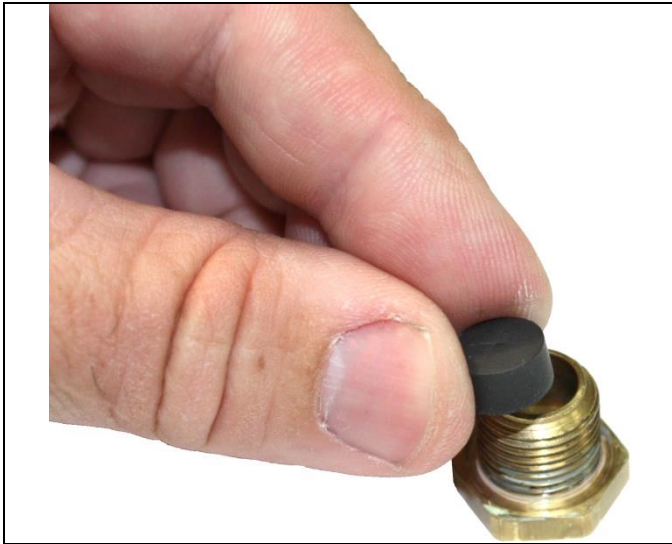


Secondary Seat

Press the primary (37) seat into the primary lever (9) and secondary seat (38) into the secondary lever (23), ensuring that both are properly seated.

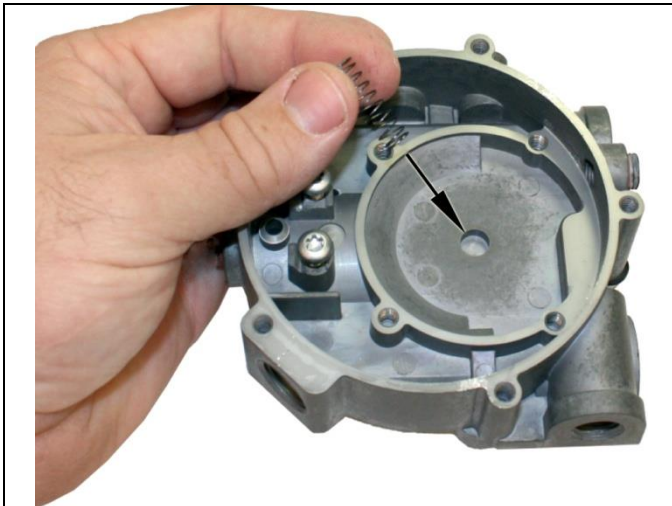


2. Apply Loctite 680 or equivalent to the perimeter of the freeze plug (30), then press in so the opened end is flush with the regulator body (2).



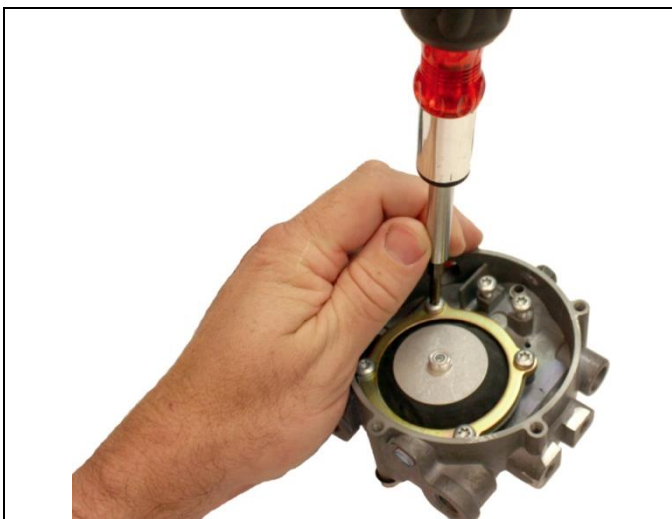
Series I only (Continue to Step 4 for Series II)

3. Insert the neoprene valve (27) with the cupped or open side down into the water core plug (29) and press all the way in until it contacts the back of the relief plug. Apply Loctite 567 or equivalent sealer on the threads of the relief plug, then slide the copper gasket (28) over the relief plug and insert the plug assembly into the regulator body (2). Torque to 25 ± 5 ft. lbs. (33.9 ± 6.8 N•m).

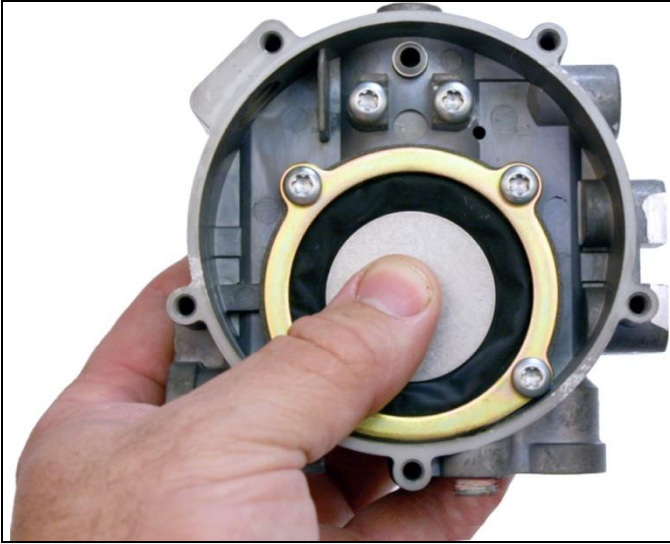


Vacuum Lock Models Only (Skip to Step 7 for models without a Vacuum Lock):

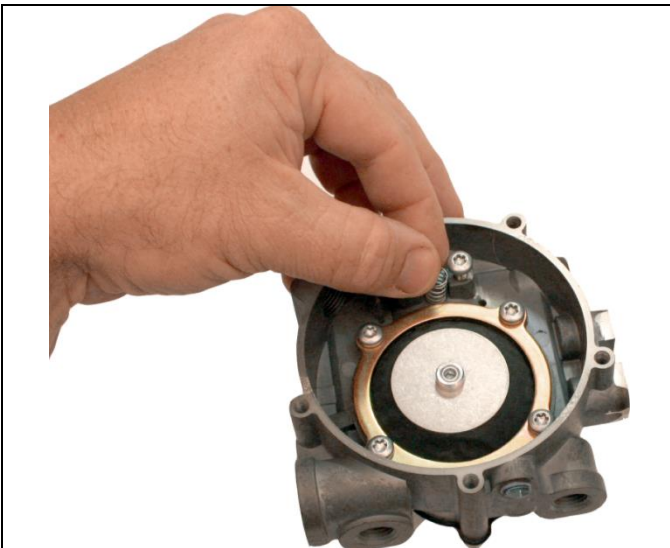
4. Place the vacuum lock spring (16) into the recess of the regulator body (2).



5. Place vacuum lock diaphragm (15) on top of spring (16), and position so the wide edge of the gasket is seated on the bottom (6 o'clock) position of the regulator body (2), while making sure the spring is properly seated over the diaphragm spring perch. Place the vacuum lock ring (20) over the diaphragm (15) rotating it to the same position as the diaphragm and align with screw holes. Insert four screws (19) and tighten evenly to 25 in. lbs. ± 5 in. lbs. (2.825 N•m ± 0.565 N•m).



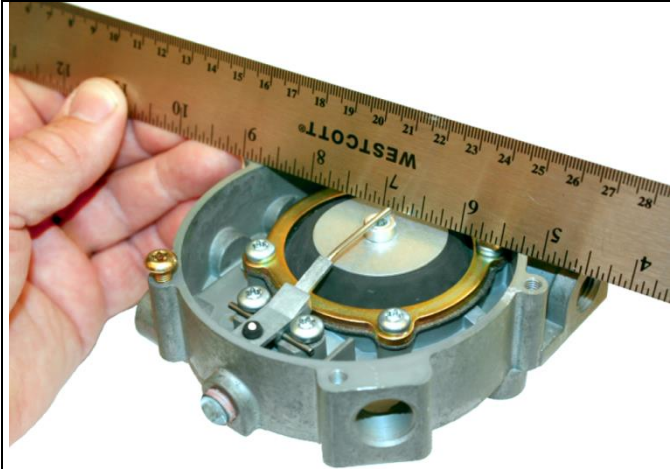
6. Push down on the vacuum-lock diaphragm (15) and hold a finger over the vacuum connection on the front of the regulator (below "VAC" on the regulator face). Release the diaphragm and the diaphragm will stay depressed and down against the regulator body (2) if there are no leaks. Pull up on the center of the diaphragm assembly for further leak inspection. Release your finger sealing the vacuum port and the diaphragm will rise with spring pressure. If the diaphragm rises when the vacuum connection is sealed, a leak exists. Inspect the diaphragm for tears and the regulator body (2) for damage. If the diaphragm is torn, it must be replaced. If damage is found in the regulator body, the regulator cannot be serviced and must be replaced.



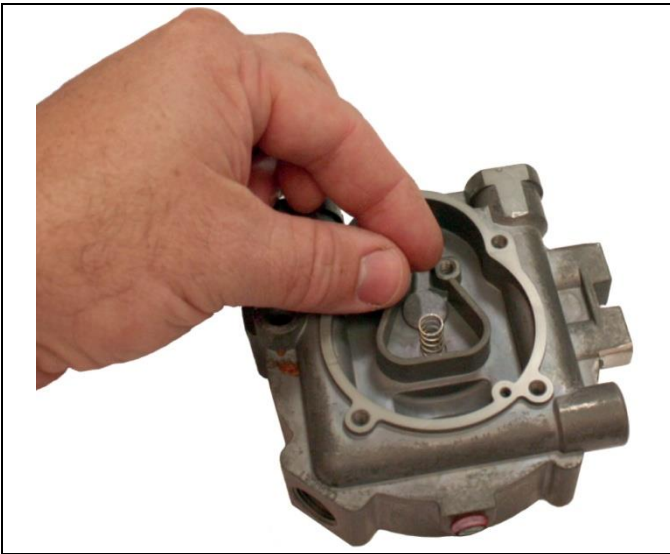
7. Place secondary valve spring (21) in the spring recess of the regulator body (2) near the secondary orifice.



8. Place a small amount (thin film) of petroleum jelly (Vaseline) on the surface of the secondary seat. Install the secondary lever (23), pivot pin (22) and two screws (31). Tighten screws evenly to 25 in. lbs. ± 5 in. lbs. ($2.83 \text{ N}\cdot\text{m} \pm 0.57 \text{ N}\cdot\text{m}$).

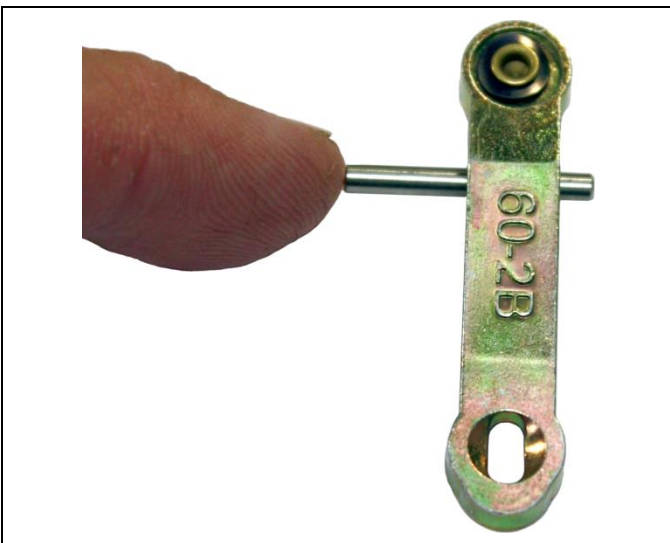


9. Inspect the height of the secondary lever (23). Using a ruler or straight edge, verify that the tip or end of the lever rod is level or flush with the top of the regulator body (2). If the lever requires adjusting, DO NOT bend while installed (bending may damage the valve seat). Remove the lever, bend, reinstall, then recheck lever height.



10. Lay the regulator body (2) flat on a clean working surface with the primary section up. Place the primary spring (8) in the recess as shown.

NOTE: Repair kit T60-RK does not include the primary spring; T60-RBK does.

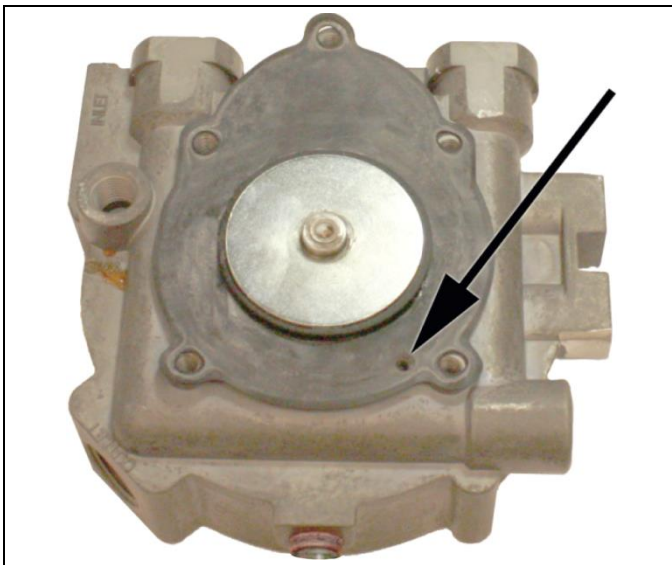


11. Insert primary pin (12) into the primary lever (9).

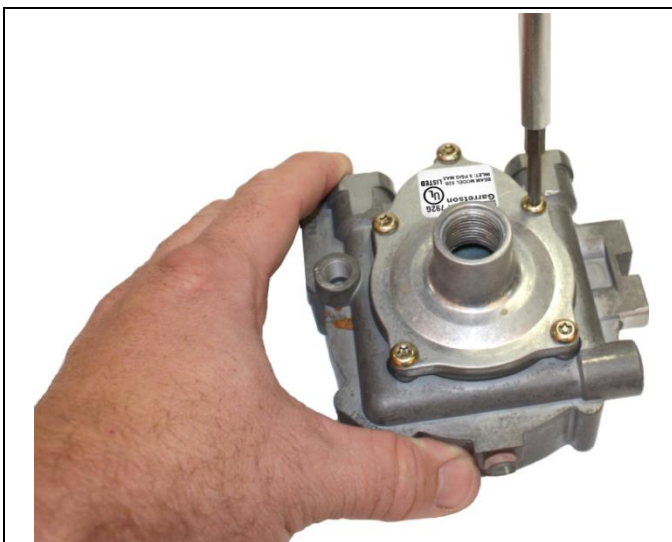
NOTE: The Series I lever is shown on the left. The Series I lever is included in both minor and major repair kits preassembled with the seat riveted into place.



12. Place a small amount (thin film) of petroleum jelly (Vaseline) on the surfaces of the primary seat. Install the lever pin (12), primary lever (9) and the primary bridge (11) with two screws (10). Tighten screws evenly to 25 in. lbs. ± 5 in. lbs. ($2.82 \text{ N}\cdot\text{m} \pm 0.56 \text{ N}\cdot\text{m}$). pin



13. Place the primary diaphragm (3) on top of the regulator body (2), then spin the diaphragm 90 degrees and insert the primary diaphragm pin into the oval hole in the primary lever (9). Once inserted, rotate the diaphragm back so it aligns to the body and screw holes. Note that the breather hole must line up with the breather passage in the regulator body (2), as shown in the photo.



14. Place the gasket (33) on top of diaphragm (3) and install primary cover (4) and five screws (13). Torque evenly to 30 in. lbs. ± 5 in. lbs. ($3.39 \text{ N}\cdot\text{m} \pm 0.565 \text{ N}\cdot\text{m}$).

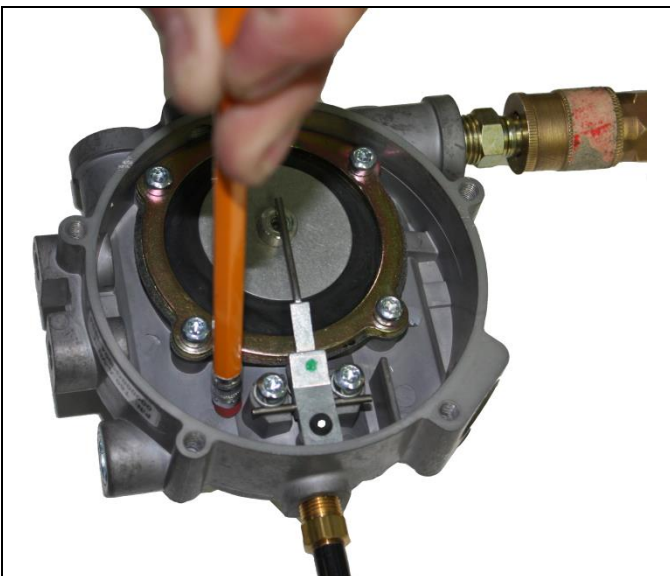


15. Install the primary pressure spring (5) and screw in the spring retainer (6) about four turns.

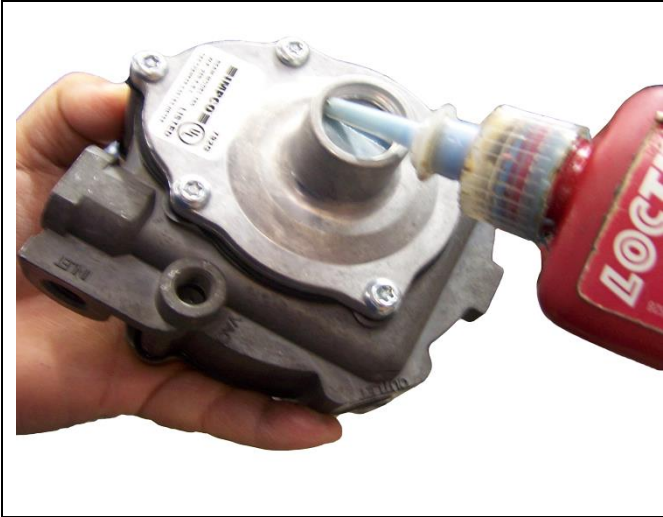


16. Remove plug (1) in the primary test port and insert a 1/8" NPT to hose barb adapter and attach a pressure gauge to test port.* SLOWLY turn on air pressure to 90-100 psi (621-689kPa) and using a screwdriver, adjust the spring retainer (6) until the primary pressure is between 4 and 5 psi (27.6-34.5 kPa).

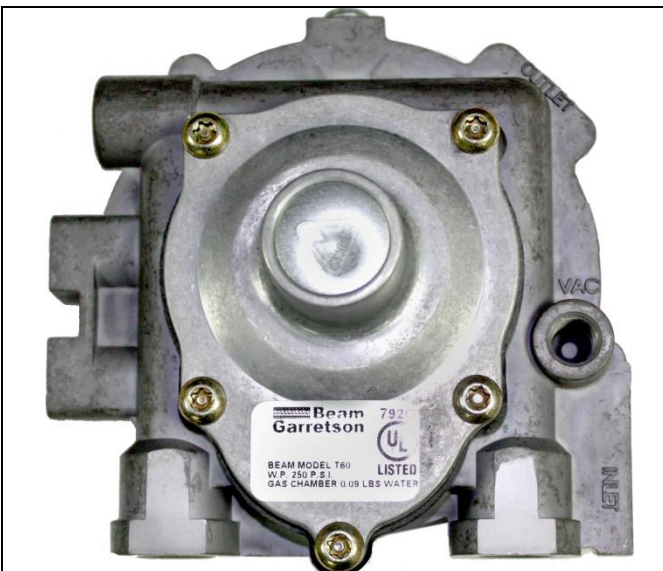
NOTE: Hose barb and pressure gauges are included IMPCO ITK test kits.



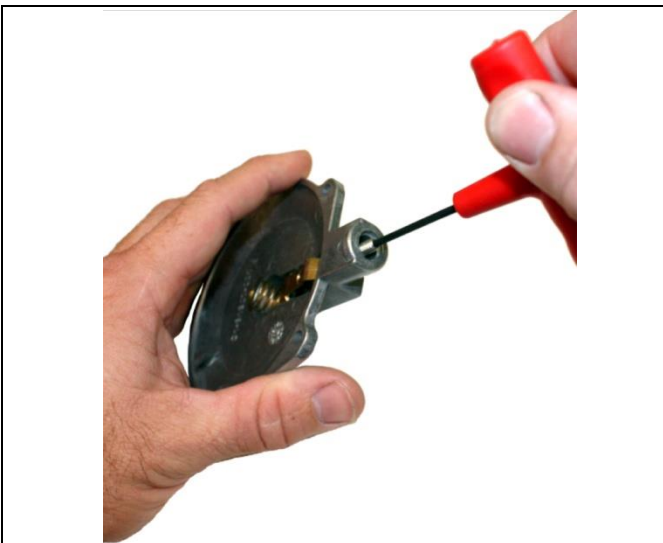
17. Test the primary diaphragm (3) by plugging the breather vent (the small 1/8" or 3.1mm diameter hole in the regulator body (2) located near the top and right side of the secondary lever. Using the eraser end of a pencil, block the vent and observe the primary pressure. The pressure should not change. If the pressure increases, the primary pressure seat or diaphragm is not sealing properly and leaking. In this case, the rebuild has failed and the regulator must be replaced.



18. Apply two drops, one each on opposite sides (180° apart) of the threads on the primary pressure adjustment.



19. Once tested to ensure no leaks exist and a stable pressure between 4 and 5 PSI (27.6-35.5 kPa) is obtained, remove the test port fitting and replace the primary test port plug (1) at the top of the regulator. Apply Loctite 567 or equivalent thread sealer, then torque to 1-2 turns past finger tight. Replace the tamper resistant plug (7) on to the primary cover (4).



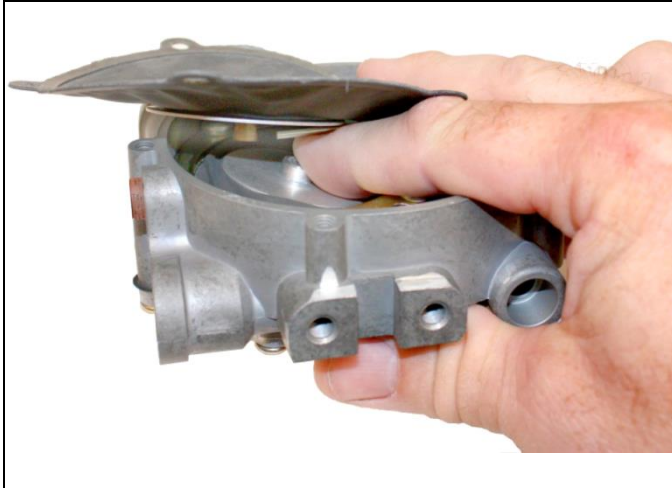
Idle Screw Models Only (Continue to next Step for models without an Idle Screw):

20. Remove the tamper resistance plug covering the idle screw (32) (refer to the process shown in Step 11). Replace the idle screw (25) by unscrewing it counterclockwise. Install the new idle screw, turning it until the screw makes contact with the lever, then make one additional turn.

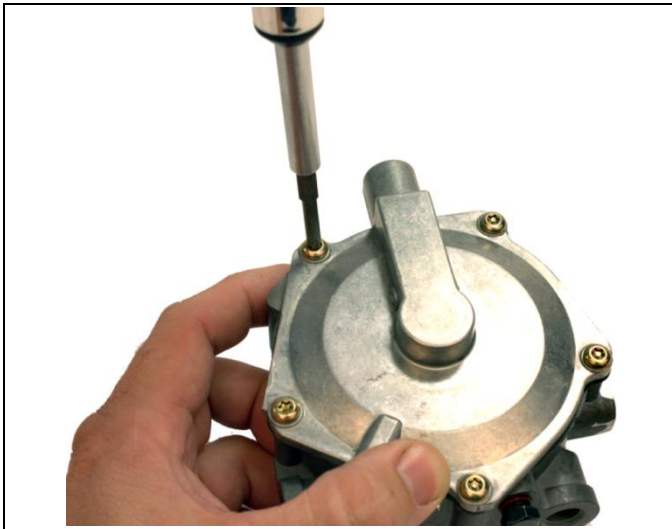


WARNING

Use care when drilling the expansion plug hole by not drilling further into the idle screw or regulator body.



21. Place the secondary diaphragm (23) on the regulator body (2) so the straight edge of diaphragm is at the top (12 o'clock position). Placing your finger between the vacuum lock diaphragm (15) and the secondary lever (23), depress the diaphragm, lift the lever then slide the lever rod through the center pin of the diaphragm.



22. Place the secondary diaphragm (17) so the straight edge is at the top of the regulator, then place the cover (18) on the regulator body and align the screw holes. Carefully start all five screws (13) and washers (34)(Series I only) through the cover and diaphragm holes, then tighten evenly to 30 in. lbs. \pm 5 in. lbs. (3.29 N•m \pm 0.57 N•m).

23. Install the regulator.

NOTE: The atmospheric vent (small opening on the edge of the back cover) must be at the lower 45° position when mounted.

24. Leak check all fittings, covers and fuel connections using an electric leak detector or a commercial leak detector solution:
- Run the engine until it is at full operating temperature.
 - Reset idle mixture carbon monoxide (CO) percent to factory specifications.
 - Replace idle mixture tamper-resistant cap (32).

WARNING:

IMPROPER INSTALLATION OR USE OF THIS PRODUCT MAY CAUSE SERIOUS INJURY, DEATH AND/OR PROPERTY DAMAGE

Natural Gas or LPG Installations 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 IMPCO WARRANTY ON THE PRODUCTS AND MAY CAUSE SERIOUS INJURY OR PROPERTY DAMAGE.

SERVICE TECHNICIANS DUE TO THE INHERENT DANGER OF GASEOUS FUELS, IMPCO 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.

PROPOSITION 65 WARNING:  THIS PRODUCT CAN EXPOSE YOU TO CHEMICALS INCLUDING NICKEL, WHICH IS KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER. FOR MORE INFORMATION GO TO www.P65Warnings.ca.gov