

MODEL EV & PEV SERIES

TWO-STAGE REGULATOR REPAIR KIT INSTRUCTIONS

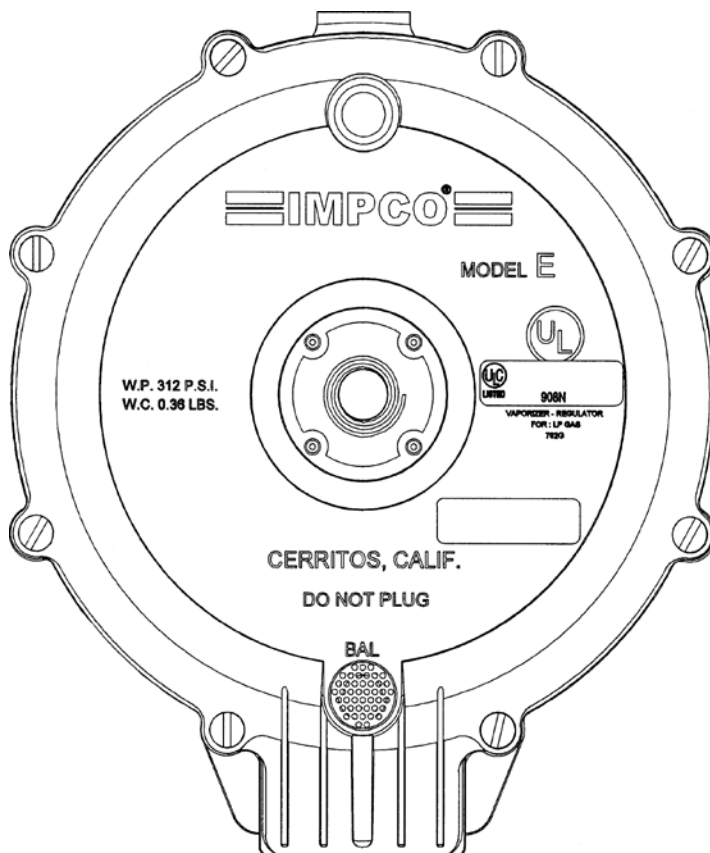
Important: Any maintenance, service or repair should be performed by trained and experienced service technicians. Proper tools and equipment should be used to prevent injury to the servicing technician, property or system components. Service repairs should always be performed in a safe environment and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

The IMPCO PPI-47 repair kit instructions will provide the technician information to successfully repair the model EV and PEV regulators. 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. Diaphragms are color coded and have different performance characteristics:

BLACK: Hydrin diaphragm material is the standard material and is well suited for the most common applications.

YELLOW: Silicone diaphragm material is the optional upgrade material that provides excellent flexibility in cold weather climates and is more resistant to chemical contamination.

BLUE: Fluorosilicone diaphragm material provides excellent high and low temperature durability with increased chemical resistance. This material is recommended for turbo applications.



Model EV Two Stage Regulator



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.

REPAIR KITS

PART #	DESCRIPTION
RK-EV	Repair Kit, Mod EV Hydrin
RK-PEV	Repair Kit, Mod PEV Hydrin
RK-PEV-2	Repair Kit, Mod PEV Silicone
RK-TPEV	Repair Kit, PEV Turbo Fluorosilicone

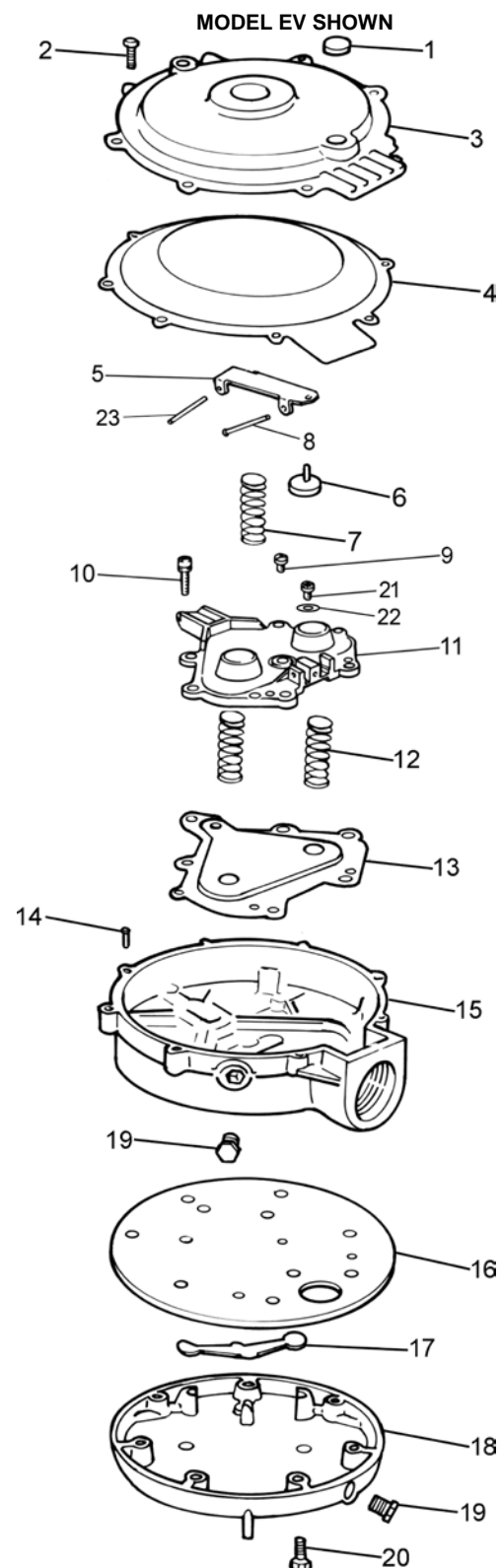
MODEL EV SERIES REGULATORS

ITEM #	PART #	DESCRIPTION
1	S7-1 (NSS)	Screen, Atmospheric Vent
2*	S1-3 (NSS)	Screw, 10-24 x 5/8" SEMS (8)
3	AC1-22-10298-001 (NSS)	Cover Assembly, front
4*	AD1-14-1 (1) (NSS)	Diaphragm, Secondary, Hydrin Model E
	AD1-23 (2) (NSS)	Diaphragm, Secondary, Silicone Model E
	AD1-23-4 (3) (NSS)	Diaphragm, Secondary, Fluorosilicone E
	AD1-14-2 (4) (NSS)	Diaphragm, Secondary, Hydrin PE
	AD1-23-2 (5) (NSS)	Diaphragm, Secondary, Silicone PE
5*	L1-86 (NSS)	Lever, Secondary w/ or w/o Hole (Including Secondary Seat)
6	S4-37 (NSS)	Seat, Secondary Standard
7**	S2-22	Spring, Secondary Regulator (Blue) Standard (EV only)
	S2-23	Spring, Secondary Regulator (Orange) Optional (EV only)
8	P1-7 (NSS)	Pin, Secondary Lever Fulcrum (Early Model)
	P1-8 (NSS)	Pin, Secondary Lever Fulcrum (Later Model)
9*	S1-40 (NSS)	Screw, 10-24 x 3/8" SEMS (2)
10*	S1-1555-002 (NSS)	Screw, 12-24 x 1.0" SEMS (7)
11	C1-20 (NSS)	Cover, Primary Diaphragm (Early Model)
	C1-50815-001 (NSS)	Cover, Primary Diaphragm (Later Model)
12	S2-13 (NSS)	Spring, Primary Regulator EV Only (2)
	S2-42 (NSS)	Spring, Primary Regulator PEV Only (2)
13*	AD1-15 (NSS)	Diaphragm Assembly, Primary
14*	P1-11 (NSS)	Pin, Primary Valve
15	AB1-20A-10307-001 (NSS)	Body, Regulator E Series
16*	G1-37 (NSS)	Gasket, Regulator Body
17*	S4-7 (NSS)	Seat, Primary
18	AB1-22 (NSS)	Body, Assembly, Regulator
19	P3-13 (NSS)	Plug, 1/8 NPT
20	S1-5 (NSS)	Screwm 1/4-20 x 5/8" Hex Head
21	S1-15960-004 (NSS)	Screw 8-32 x .25" (Later Model)
22	W1-14187-016 (NSS)	Flat Washer (Later Model)
23*	P1-8 (NSS)	Pin, Secondary Lever Fulcrum

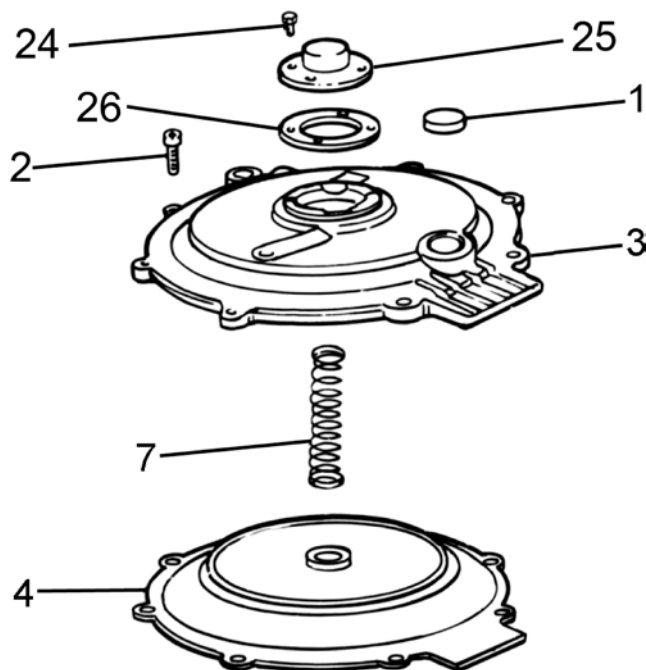
NSS-Not Serviced Separately

*Repair Kit Components

****Model EV Only** Two vapor outlet pressures are available. Orange secondary spring gives Neg. 0.50" w.c. (Neg 0.125 kPa) pressure. Blue secondary spring gives Neg. 1.5" w.c. (Neg. 0.374 kPa) pressure.



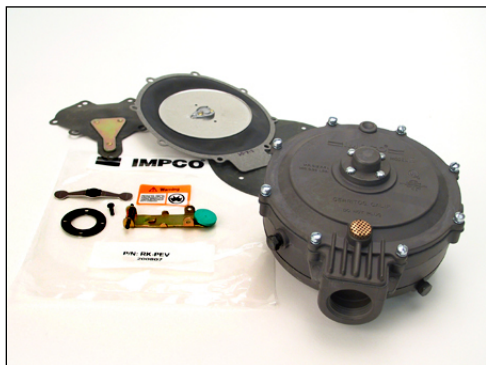
MODEL PEV SERIES REGULATORS



ITEM #	PART#	DESCRIPTION
1	S1-7 (NSS)	Screen, Atmospheric Vent
2*	S1-3 (NSS)	Screw, 10-24 x 5/8" SEMS (8)
3	C1-22-2 (NSS)	Cover Assembly
4*	AD1-14-2*	Diaphragm, Secondary, Hydrin
	AD1-23-2*	Diaphragm, Secondary, Silicone
7	S2-37	Spring, Secondary, PEV, PEV-1
	S2-109	Spring, Secondary, PEV-3
24*	S1-101* (NSS)	Screw, 6-32 x 1/4" SEMS (4)
25	H3-3 (NSS)	Housing, Spring
26*	G1-84 (NSS)	Gasket, Spring Housing

NSS-Not Serviced Separately

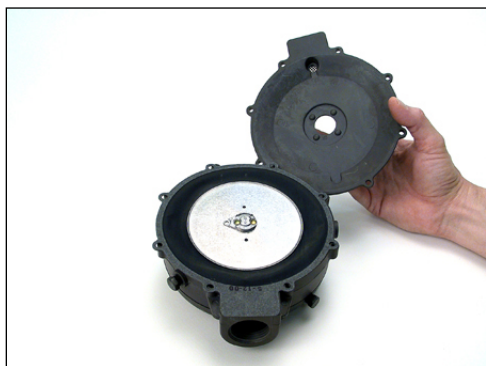
REBUILD INSTRUCTIONS



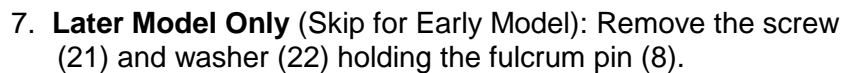
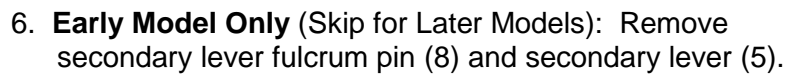
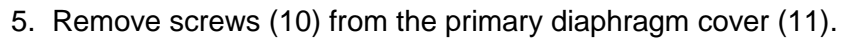
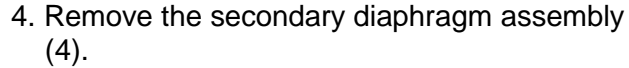
1. Under normal conditions, installation of a complete repair kit should be necessary only at the time of a major engine overhaul or when the converter has been out of service for an extended period of time. Each kit includes the necessary gaskets, diaphragms, seals and some replacement screws.

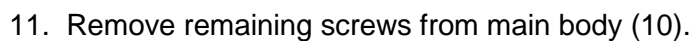
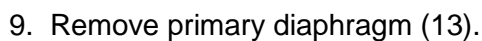
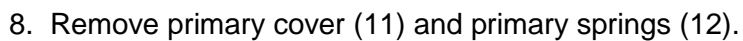


2. **PEV Only** (Skip for EV): Remove the spring retainer housing cover screws (23) and cover (24). Remove the housing gasket (25) and secondary spring (7).



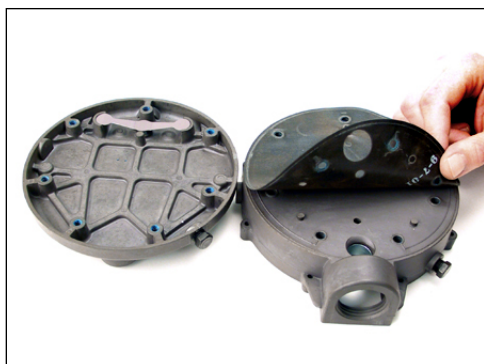
3. Remove the cover screws (2) and the cover (3) from the regulator.







12. Separate upper main body (15) from lower body (18).



13. Remove body gasket (16).



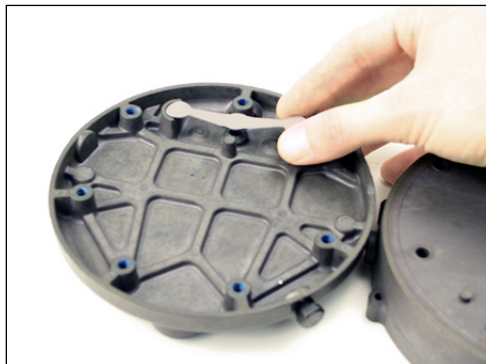
14. Remove primary seat (17).

REASSEMBLY OF REGULATOR

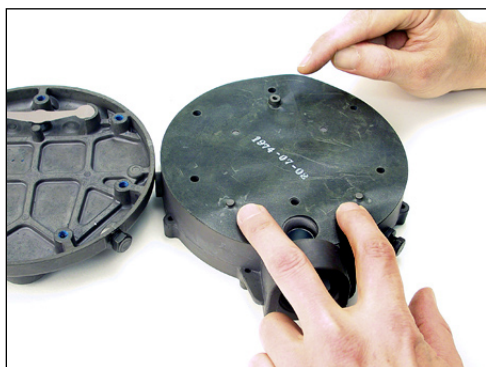
- Carefully clean and inspect all metal parts; springs, levers, pivot pins and screws. Replace all parts that are included in the repair kit.
- Carefully clean the body casting and inspect all sealing surfaces. Wipe with a clean rag. Inspect the primary section for foreign materials that might loosen and damage the soft face valves.
- Clear out the inlet and outlet passages with compressed air. Be sure no foreign material remains in these passages.
- Inspect the primary orifice and the secondary orifice for nicks, scratches or uneven wear.

IMPORTANT!

If the primary or secondary seats show any of the above mentioned conditions, the regulator is not rebuildable and must be replaced.



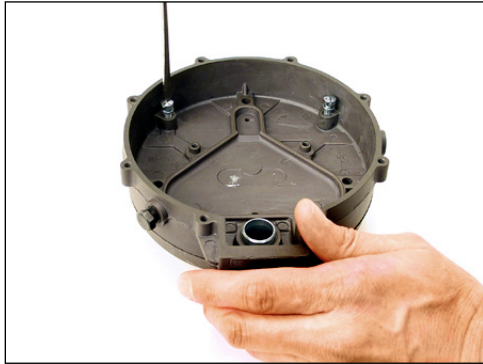
15. Install new primary seat (17) to lower body (18) with rubber face down towards the primary orifice.



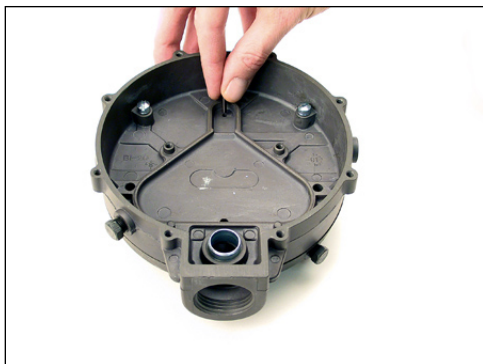
16. Install new gasket (16) to main body. Be sure to align the gasket as shown using the dowels and primary pin channel to retain the gasket.



17. While holding the outer edges of the main body gasket (16), place the upper body (15) on top of the lower body (18) with seat installed. Align the screw holes and be sure the gasket is flat around the circumference of the body.



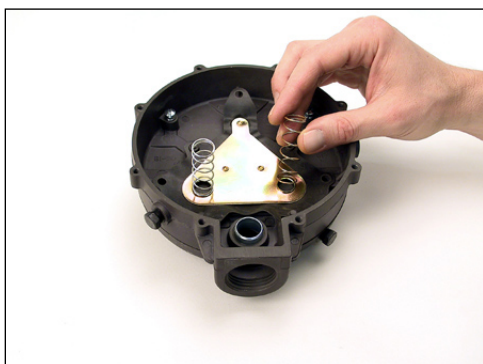
18. Install the screws (10), and tighten them until they are snug, to retain the two pieces for now.



19. Install new primary pin (14).



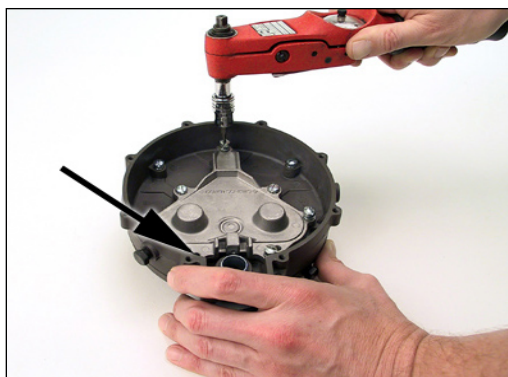
20. Install new primary diaphragm (13) using dowel locators to align and retain as shown.



21. Install primary springs (12) using spring locators to align and retain as shown.



22. Press primary cover (11) in place over the primary springs (12) and diaphragm assembly (13). Insert the two inner screws (9) in the location shown and torque to 22-28 in-lbs. (2.5-3.2 Nm).



23. **Early Models:** Replace and tighten screws (10) except for the one shown in left photo. Starting at one side of the regulator body, use a diagonal pattern to torque each screw (10) to 35-45 in-lbs. (4.0-5.1 Nm).

Later Models: Replace and tighten screws (10). Starting at one side of the regulator body (15), use a diagonal pattern and torque all screws (10) to 35-45 in-lbs. (4.0-5.1 Nm).



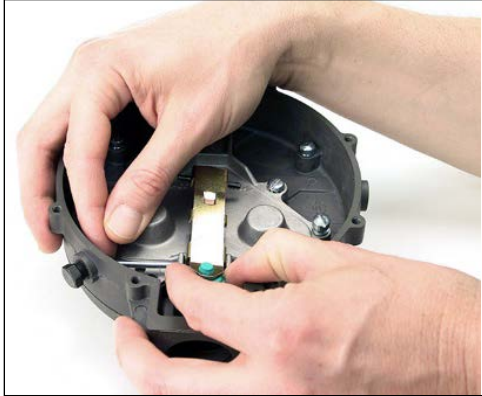
24. Slide the pin through the larger of the two hole openings of the lever (5) and place over a socket that will support the area of the lever around the hole. Using a hammer, knock in the pin (26) through the smaller hole until it is even on both sides.



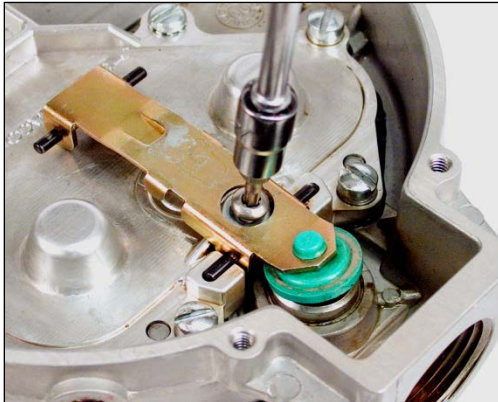
25. Inspect the tabs on the lever (5) to verify they are not bent and the pin (26) is centered.



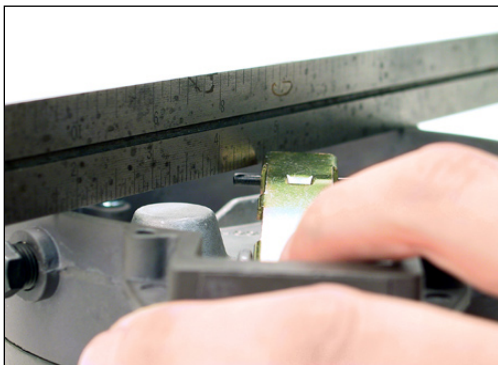
26. Insert the seat (6) by pressing the nub through the hole in the lever (5).



27. **Early Models Only** (Skip for Later Models): Replace the secondary lever and seat assembly (5 & 6) and fulcrum pin (8).



28. **Later Models Only** (Skip for Early Models): Insert the screw (21) and washer (22) securing the fulcrum pin (8). Secure the screw until snug.



29. Check secondary lever height. While holding the secondary seat (5) lightly against the secondary orifice. Measure the distance using a straight edge between the top of the lever pin and body casting edge. The lever height must be set to $\frac{1}{32}$ of an inch (2.4mm) below the top of the casting. If the lever height is incorrect, continue to Step 30. Once the lever height is correct, skip to Step 31.

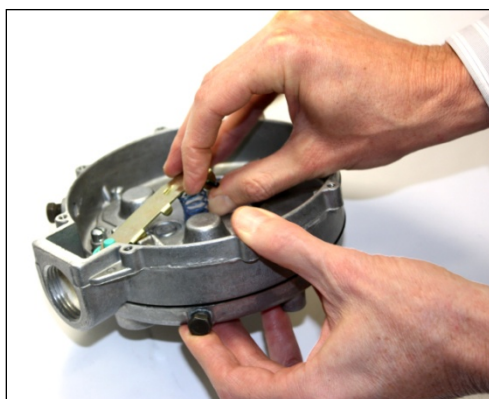


30. If necessary, remove the fulcrum pin (8) and lever (5) and bend slightly if required. Do not attempt to bend the lever when installed--unnecessary force on the lever may damage the secondary seat (6).

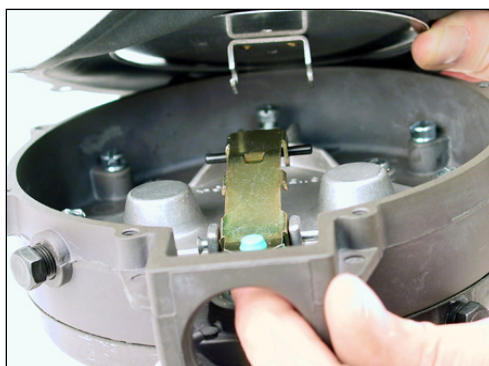


31. **Early Models:** Once the lever height is correctly set, replace the remaining screw (10) and torque to 35-45 in-lbs. (4.0-5.1 Nm).

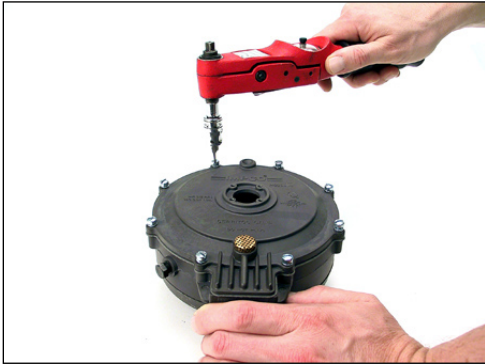
Later Models: Remove screw (21) and washer (22). Apply Loctite 242 to screw threads and torque to 17-23 in-lbs. (1.9-2.6 Nm). Refer to photo in Step 28.



32. **EV Only** (Skip for PEV): Slip the spring (7) under the secondary lever (5) making sure it is retained by the two tabs at the sides and the single tab punched through the top of the lever.



33. Replace the secondary diaphragm (4) engaging the slotted link to lever pin shown.



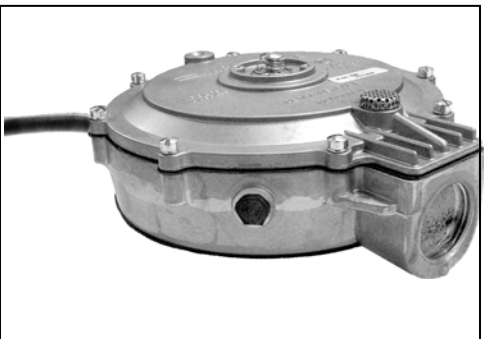
34. Install the cover (3) to the body aligning the screw holes. Install screws (2) finger tight, then torque to 25-35 in-lbs. (2.8-4.0 Nm), using a diagonal pattern.



35. **PEV Only** (Skip for EV): Place the secondary spring (7) on the secondary diaphragm (4) perch. Install the gasket (25).



36. **PEV Only** (Skip for EV): Align the spring retainer housing screw holes to the cover (3) and insert cover screws (23). Torque to 7-11 in-lbs. (0.8-1.2 Nm).



37. **EV Only:** Apply 100 psi (6.9 Bar) of air pressure to the inlet side of the regulator and test for leaks. Draw a soap bubble across the regulator outlet to verify that no air is flowing through the outlet. If air escapes, the rebuild has failed and the regulator must be replaced. Actuate the primer button and the soap bubble should burst and air flow should be noted at the regulator outlet. Use soap and/or a commercial leak detector solution to inspect the gasket seals around the perimeter of the converter for leaks. If no leaks are found, the repair is now complete.

PEV Only: Pressurize the PEV with 100 psi (6.9 Bar) compressed air and the regulator should free flow. Slowly



reduce the flow at the outlet port (a one inch NPT PVC pipe plug with a 1/8" or 3mm hole drilled in the center is ideal for this test). Check for leaks around the PEV body gasket and test port plugs using a liquid leak detector solution. Verify or reset final outlet pressure for adjustable PEV units. If no leaks are found, the repair is now complete.



WARNING:

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

SERVICE TECHNICIANS AND USERS SHOULD CAREFULLY READ AND ABIDE BY THE PROVISIONS SET FORTH IN NATIONAL FIRE PROTECTION ASSOCIATION PAMPHLET #37 FOR STATIONARY ENGINES, #52 FOR CNG VEHICULAR FUEL SYSTEMS OR #58 FOR LPG SYSTEMS.

INSTALLERS LPG INSTALLATIONS IN THE UNITED STATES MUST BE DONE IN ACCORDANCE WITH FEDERAL, STATE AND 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 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 DONE IN ACCORDANCE WITH FEDERAL, STATE AND 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 DONE IN ACCORDANCE WITH FEDERAL, STATE AND LOCAL LAW AND NATIONAL FIRE PROTECTION ASSOCIATION PAMPHLET #37, STATIONARY COMBUSTION ENGINES AND GAS TURBINE ENGINES, 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 SHOULD NOT BE INSTALLED OR USED BY PERSONS NOT KNOWLEDGEABLE OF THE HAZARDS ASSOCIATED WITH THE USE OF GASEOUS FUELS. ANY MAINTENANCE, SERVICE OR REPAIR SHOULD BE PERFORMED BY TRAINED AND EXPERIENCED SERVICE TECHNICIANS.

PROPER TOOLS AND EQUIPMENT 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 TO PREVENT INJURY.

INSPECT BEFORE USE 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 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.