PRESSURE REGULATOR E47-L47-S402-S417

INSTALLATION AND MAINTENANCE MANUAL











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1.Range:

ATTENTION

Before installation or performing any maintenance on the unit, carefully read this manual and strictly follow the instructions given.

This regulator must be installed, operated and maintained in agreement with the standards of the equipment where it's placed, local regulations and according to this manual's content.

Manufacturer is not responsible for damages due to misuse or wrong operating procedures due to a lack of knowledge of this manuals content.

- If any gas leak is detected, the gas supply must be shut off immediately and technical assistance must be contacted.

- Only a qualified technician should install or repair the regulator.

- When technical assistance or spare parts should be requested, the information shown on the regulator's identification plate (model - **serial number** – pressures - orifice diameter - flow) must be provided.

This equipment has been manufactured to operate safely and without risks, within the design conditions and only if the following points are met:

- 1. Installation, operation and maintenance are performed by skilled personnel, fully experienced with this type of equipment, and familiar with the contents of this manual. All activities should be carried out in strict adherence with the instructions given in this manual.
- 2. Operating conditions and in particular, pressure and temperature, are within the design specifications of the equipment..

Different use or modifications carried out not in accordance with manufacturer's written instructions are not allowed.

The user will be responsible for damages or injuries due to improper use; guarantee will be null and void in case of improper use.

This equipment contains pressurized parts, therefore any operation or maintenance activity shall be performed only by skilled and qualified personnel aware of the precautions to be taken. Before opening any part of the equipment make sure that pressure has been completely relieved.

2. Caution:

Before starting installation and maintenance operations carry out the following check list.

- 1. Personnel in charge of the activity is skilled, trained to this type of equipment and fully aware of the content of this manual.
- 2. All necessary preventive measures have been taken before starting the installation in accordance with this manual and local regulations.
- 3. Operator is equipped with necessary tools and supplies required to safely and correctly follow the procedures described.
- 4. All necessary spare parts are available and they are original spare parts of EQA S.A.I.C.





3. Installation:

Before installing the regulator, check it for any damage incurred during shipping and handling. Be sure there is no dirt inside its body.

It is highly recommended to install two pressure gauges, one upstream and one downstream of the regulator. Vent inlet pipe several times until no more dirt particles appear (this is the main cause of failures in start-ups).

Regulator must be installed in vertical position and main spring above pipe line (see Fig. 1). Gas flow must coincide with the arrow on body lower cover, as well as indicated connection pipes distances (see Fig. 1). The Venting holes should not be obstructed or exposed to rain or dust (If necessary, install a pipe that vents freely through a rooftop channeling). The regulator should also be protected from vehicular traffic.



(*) There must be a clear stretch of not less than 150 mm between the regulator outlet and any accessory or elbow in installation Ø pipes minimum: 1".

The venting hole must be checked periodically to verify it has no obstructions. It is recommended to have a dual regulation piping together with blocking valves upstream and downstream of each one to avoid a gas interruption while doing maintenance or reparations.



This equipment is designed for dry and clean non-corrosive gasses. Do not use liquids or gasses with solid particles.

All installation and operating procedures must be performed slowly. Avoid fast actions during opening and closing upstream and downstream valves. Do not exceed the pressure range specified on the regulator's identification plate

4. Star-up:

After completing installation, check that the upstream and downstream isolation valves, the downstream vent valve and any by-pass lines are closed.



Be sure to slowly introduce pressure into the system to prevent downstream overpressure due to potential rapid pressure increase. It is advisable to carry out start up with manometers appropriate the inlet pressure and outlet of the regulator to monitor this procedure.

- 1- Open upstream valve slowly. Normally the regulator stays in operation. Check outlet pressure is inside range printed on the nameplates. (Models 402 and 417).
- 2- If there isn't regulator downstream pressure reset this way::
 - a) Close downstream lock valve and open slightly atmosphere vent valve located upstream (if exists).
 - b) Unscrew reset, turn it and screw again in reassemble position "fig. 1" (upstream lock valve must be open).
 - c) Softly pull it letting a little gas flow to pass through the valve, until downstream pipe is full of gas.
 - d) Pull reset until is assembled (this is only possible when regulation pressure is inside established parameters).
 - e) Control that regulated pressure had reached set value. Then close vent valve.
 - f) f) Unscrew reset, turn it and screw again in initial position.
- 3- Check carefully all tubing connections for possible leakage. Remember that vibrations and shocks during transport may loosen fittings.



5. Adjustment:

To modify regulator outlet pressure (models 402 and 417), remove spring cover (400.00.13) and turn the spring pusher (400.00.12) clockwise to increase it and counter-clockwise to decrease it.







If you increase the outlet pressure, security elements such as relief valves, shutoff valves or pressure switches may act in case of overcoming their pressure settings.

The identification plate of the regulator should also be updated to compliment with correspondent regulations and to avoid possible confusions. (Consult on fabric).





6. Periodic functional checks:



Periodic functional checks ensure long lasting integrity of gas pressure regulators and safety shutoff valves (SSV).

These instructions represent the minimum level of inspection required to maintain long lasting integrity of gas pressure regulators and safety shut-off valves.

The following checks and preventive maintenance activities shall be performed and registered according to the user's quality system.

The intervals given here are intended as guidelines in the management of preventive maintenance. Very aggressive or demanding service conditions may require a reduction on the intervals proposed here. Critical services with high availability index may require interval reductions as well.



Establishing a suitable interval for performing periodic functional checks falls within the responsibility of the user (according to service conditions, criticality of service and local regulations)

PERIOD	ΑCTIVITY
1 year	Perform a complete series of functional checks.
3 years	Change dynamic seals and check diaphragms
5 years	Change all seals and diaph

The following functional checks are described.

- Regulator operation.
- Regulator tightness.
- Lock security valve operat.



In order to perform these periodic functional checks, the pressure-regulated line where the equipment is installed must be taken out of service. This line should be available for performing the periodical checks only.

7. Regulator functional check:

Close the downstream isolation valve VERY SLOWLY so that the regulator close and there is no overpressure in the downstream piping.

In order to verify if the movement of the regulator shutter is smooth, modify the opening degree of the vent valve, simulating changes in consumption.

If the movement of manometer is not smooth, but rough and bumping, it means that friction in the moving parts is too high and the regulator requires maintenance

8. Functional check of regulator tightness:

- a) Close VERY SLOWLY downstream isolation valve.
- b) Close SLOWLY downstream vent valve.
- c) Check that the outlet pressure is stable.
- d) If the pressure increases, it means that the regulator does not close perfectly.





9. Functional check lock segurity valve:

Following actions must be carried out according to functions installed in lock security valve.

9.1 MINIMUM SET POINT (Low pressure shutoff):

Reduce regulator set point until the valve is triggered. Check that shutoff pressure is within the range shown on the identification plate. Completely vent downstream pipe and then close lock and downstream vent valves. Check shutoff security valve tightness, verifying that its downstream pressure does not increase. Increase regulator set point. Using RESET, open VERY SLOWLY lock security valve to avoid overpressures. Reestablish set point of regulator.

9.2 MAXIMUM SET POINT (High pressure shutoff)

Increase regulator set point until valve is triggered. If regulator includes inner relief valve, is necessary to cover vent outlet. Check that shutoff pressure is within the range shown on the identification plate. Completely vent downstream pipe and then close lock and vent downstream valves. Check shutoff security valve tightness, verifying that its downstream pressure does not increase. Reduce regulator set point.

Using RESET, open VERY SLOWLY shutoff security valve to avoid overpressures

Reestablish set point of regulator.

10. Replacements:

They must be ordered according to the part numbers shown on the drawings and the serial number shown on the identification plate of the regulator.

11. Maintenance:

Before beginning any maintenance operation, follow the instructions below:

- Check that there are no parts under pressure between the two isolation valves.
- Close VERY SLOWLY downstream isolation valve to close the regulator.
- Close VERY SLOWLY upstream isolation valve.
- Completely vent the upstream and downstream pipes, with the downstream vent valve.
- ENSURE THAT THE SYSTEM IS COMPLETELY DE-PRESSURISED.

12. Inspection and part replacement:

A- MAIN AND COMPENSATED DIAPHRAGM REPLACEMENT

- 1- Close all valves after releasing any remaining pressure between the valves and the regulator...
- 2- Remove the spring cover (400.00.13), the spring pusher (400.00.12), the main spring (R83), the eight screws (INS.50.00) and remove diaphragm cover (400.00.02).







3- Measure and register relief spring pusher position (400.00.52) in respect of shutter holder upper end (400.02.04). Unscrew spring pusher and remove the spring (R97); then remove the diaphragm (400.02.08) and the diaphragm plate (400.00.16).







- 4- Replace main diaphragm (400.02.08).
- 5- Remove the nut (INS.50.08), the diaphragm holder (400.00.07), compensated diaphragm supporter (400.00.22) and compensated diaphragm (400.00.15).
- 6- Replace compensated diaphragm.



7- Assemble the unit following the instruction in reverse order and adjust the main spring (R83) according to the pressure indicated by corresponding manometer







B- SHUTTER REPLACEMENT:

- 1- Follow all the steps of point "A" until point 5 included.
- 2- Remove compensated diaphragm holder (400.00.06)
- 3- Remove inferior body cover (400.00.03) and shutter holder (400.02.04)
- 4- Replace the shutter (400.00.05)



- 5- Reassemble everything in reverse order that was disarmed, verifying the good assembling of the cover gasket, the shutter and the diaphragm.
- 6- Adjust main spring according to the pressure that indicates the correspondent manometer.





C- FILTER CLEANING OR REPLACEMENT:

If necessary, filter can be cleaned without disassembling the regulator, doing the following:

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- a) Close regulator upstream lock valve and vent the pipe. (Upstream and downstream the regulator)
- b) Disconnect connection pipe between the shutoff and the regulator
- c) Clean or replace the filter. (400.00.04)
- d) Reassemble inferior cover (400.00.03) in regulator body verifying the good housing of the shutter holder (400.00.04) and the gasket (400.0014).
- e) Start up the regulator and verify there are not gas loses in the disassembled sections .







13. General exploded:

Parts list regulator 402:

POS.

	PART N°	DESCRIPCION
1	400.19.01	Body 3/4" BSP
1	400.25.01	Body 1" BSP
2	400.00.02	Diaphragm cover
3	400.00.03	Cover
4	400.02.04	Shutter holder (With relief)
5	400.00.05	Shutter (*)
6	400.00.06	Compensated diaphragm holder
7	400.00.07	Diaphragm holder
8	400.02.08	Diaphragm (for relief) (*)
11	R83	Main spring
11	R84	Main spring
11	R85	Main spring
11	R86	Main spring
11	R87	Main spring
11	R88	Main spring
12	400.00.12	Spring pusher
13	400.00.13	Spring cover
14	400.00.14	Cover gasket (*)
15	400.00.15	Compensated diaphragm (*)
16	400.00.16	Diaphragm plate
17	INS.50.08	Self-braking nut M5X0,8
18	OR2027N70	O'ring spring cover (*)
19	INS.50.00	Allen screw M5x0,8 L:12mm
21	400.00.21	Vent
22	400.00.22	Compensated diaphragm holder
44	400.00.44	Filter (50µm) (*)
46	400.00.46	Pressure tap
51	R97	Vent spring
52	400.00.52	Relief spring pusher

* Products included in the spare part kit











Parts list regulator 417/E47/L47::

POS.	Nº DE PIEZA	DESCRIPCION
1	417.19.01	Shutoff body 3/4" BSP
1	417.25.01	Shutoff body 1" BSP (E47)
2	400.00.02	Diaphragm cover
3	400.00.03	Cover
4	400.02.04	Shutter holder (With relief)
5	400.00.05	Shutter (*)
6	400.00.06	Compensated diaphragm holder
7	400.00.07	Diaphragm holder
8	400.02.08	Diaphragm for relief (*)
11	R83	Main spring (E47)
11	R84	Main spring
11	R85	Main spring
11	R86	Main spring
11	R87	Main spring
11	R88	Main spring
12	400.00.12	Spring pusher
13	400.00.13	Spring cover
14	400.00.14	Cover gasket (*)
15	400.00.15	Compensated diaphragm (*)
16	400.00.16	Diaphragm plate
17	INS.50.08	Self braking nut M5X0,8
18	OR2027N70	O'ring Spring cover (*)
19	INS.50.00	Allen screw M5x0,8 L:12mm
21	400.00.21	Vent
22	400.00.22	Compensated diaphragm holder
24	417.00.24	Shutoff inferior cover
25	417.00.25	Shutoff diaphragm cover
26	417.00.26	High pressure shutoff spring pusher
27	417.00.27	Low pressure shutoff spring pusher
28	417.00.28	Shutoff spring guide
29	417.00.29	High and low shutoff spring guide (E47)
29	417.01.29	High pressure shutoff diaphragm guide
32	OR2006N70	Shutoff supplement O´ring (*)
33	417.00.33	Shutoff diaphragm holder
34	OR2008N70	Shutoff stem O'ring (*)
35	OR2142N70	Shutoff supplement O´ring (*)
36	R89	High pressure shutoff spring (*)
36	R90	High pressure shutoff spring
36	R91	High pressure shutoff spring
36	R92	High pressure shutoff spring
36	R93	High pressure shutoff spring
36	R94	High pressure shutoff spring





R95	High pressure shutoff spring
INS.50.37	Steel balls Ø2,5
417.00.39	Shutoff stem
417.00.40	Shutoff shutter (*)
INS.50.01	Allen screw M5x0,8 L:25mm
417.00.43	Shutoff shutter spring supporter
400.00.44	Filter (50 um) (*)
400.00.46	Pressure tap
417.00.48	Shutoff spring cover
INS.95.88	Shutoff shutter Seeger
417.00.50	Reset
R97	Vent spring
400.00.52	Relief spring pusher
417.00.53	Shutoff shutter holder
	R95INS.50.37417.00.39417.00.40INS.50.01417.00.43400.00.44400.00.46417.00.48INS.95.88417.00.50R97400.00.52417.00.53

* Products included in the spare part kit







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