

FINE CONTROLS (UK) LTD



Fine Controls have been supplying process controls & instrumentation equipment since 1994, & now serves an ever expanding customer base, both in the UK & globally.

We offer a full range of valve & instrumentation products & services, with our product range representing leading technologies & brands:

Flow: Flow Meters & Transmitters, Flow Switches, Flow Control Valves & Batch Control Systems

Temperature: Temperature Probes & Thermowells, Temperature transmitters, Temperature Regulators & Temperature Displays

Level: Level Transmitters & Switches

Pressure: Pressure Gauges & Transmitters, Precision & High Pressure Regulators & I-P Converters, Volume boosters.

Precision Pneumatics: Pressure Regulators, I-P Converters, Volume Boosters, Vacuum Regulators

Valves: Solenoid & Pneumatic Valves, Control Valves & Positioners, Actuated Ball, Globe or Diaphragm Valves & Isolation Valves

Services: Repair, Calibration, Panel Build, System Design & Commissioning

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INSTRUCTIONS: OPERATION AND INSTALLATION

PRESSURE REDUCING VALVE MODEL **M2**

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1. IDENTIFICATION PLATE LEGEND

a) CE marked is required in accordance with PED2014/68/UE

a) CE marked is NOT required in accordance with PED2014/68/UE

| | |
|-----------|---|
| SERIAL N. | VALVE IDENTIFICATION NUMBER. VALFONTA WILL NEEDS THIS NUMBER FOR SPARE PARTS OR COMMENTS RESPECT OF THIS VALVE. |
| MOD. | VALVE MODEL |
| DN | VALVE NOMINAL DIAMETER |
| PN | VALVE NOMINAL PRESSURE. |
| MEDIUM | FLUID |
| P.IN | INLET PRESSURE |
| P.OUT | OUTLET PRESSURE |
| BODY | BODY MATERIAL |
| KVS. | KV VALVE |

c) ATEX marked required according to DIRECTIVE 94/9/EC

| | |
|---|--|
| VALFONTA E 08915 € Badalona (ESPA•A) | |
| TYPE: | PRESSURE REDUCING VALVES SELF - ACTUATED |
| MANUFACTURING YEAR: 2014 | MANUFACTURING NUMBER: |
| II 2 G D | c IIC Tx c IIIC Tx,C |
| TECHNICAL FILE IN CUSTODY : LOM | CERTIFICATION NUMBER: LOM 14.034 U |

| Reference | Denomination |
|-----------|---|
| II 2 | ATEX category, zones 1 & 21 |
| G | Class I application (flammable liquids and gases) |
| D | Class II application (combustible dust) |
| c IIC | Safety construction protection mode for substances IIC |
| C IIIC | Safety construction protection mode for substances IIIC |
| Tx / Tx€C | Termal class according fluid temp. used |
| LOM | Number of certification from ExNB (LOM) |

SELF OPERATED PRESSURE REGULATORS

PRESSURE REDUCING VALVE **M2**

2. MAIN FEATURES

Self-actuating pressure reducing valve balancing by diaphragm used to provide a constant downstream still there being oscillations in inlet pressure.

Valve closes when outlet pressure increases.

This series of regulators is suitable for steam, compressed air, non-hazardous gases and liquids.

Actuator mounts diaphragm with intermediate reinforced lining.

Outlet pressure regulating range between 0,02 and 8 barg with different actuators.

Condensation tank (pot) is available and necessary for steam or fluid upper to 125°C, to protect the diaphragm against overheating.

The pressure reducing valve is not a safety valve, and then if necessary, an overpressure protection must be installed.

3. OPERATING

Medium flows through the valve as indicated by the arrow and force stem-piston-gasket (3 • 26 • 3b) to close the valve. Outlet pressure is controlled rotating the screw (14) in clockwise direction. This causes displacement of the spring (16), which itself acts on the diaphragm (19) and closing (30 and 31) opening the valve until it reaches the required downstream pressure.

Any variation on the upstream pressure will be absorbed by reducing by compensating piston (26) and downstream by the diaphragm (19).

M2 valves are perfectly suitable for controlling gases in the temperature range between -20 and +60°C (or 0 to 180°C when soft seal is PTFE+GR and diaphragm EPDM+PTFE).

| | |
|------------------------------------|--|
| Connections | Flanged DIN PN16/PN40 Flanged ANSI 150 / 300 Threaded BSP / NPT, consult |
| Sizes | DN15 to DN100 |
| Body material | Nodular Iron (GGG40.3) Carbon steel (GSC25N) Stainless steel (1.4408) |
| Max. permissible temperature | -10 to 80°C (gases y líquidos) Up 180°C (vapor) |
| Max. permissible upstream pressure | 25 barg |
| Trim material | Stainless steel AISI 316L |
| Diaphragm Material | EPDM-40°C to 125°C EPDM + PTFE 125°C to 180°C |
| Seal material | Soft seal NBR for liquids Graphited PTFE for air and steam |

This device must be installed by specialized personnel with knowledge and experience. They must know about the current regulations in order to judge the risks that may involve this work.
Important: Be sure that the valve and actuator never exceed the service temperature for which has been designed

Special ATEX instructions

- No limitation of use due to the ATEX substance.
- Limitations due to thermal class:

Class I (flammable liquids and gases)

| TEMPERATURE CLASS | MAX. SURFACE TEMPERATURE | APPROPRIATE FOR SUBSTANCES WITH IGNITION TEMPERATURE |
|-------------------|--------------------------|--|
| T1 | 450°C | Ti >450°C |
| T2 | 300°C | Ti >300°C |
| T3 | 200°C | Ti >200°C |
| T4 | 135°C | Ti >135°C |
| T5 | 100°C | Ti >100°C |
| T6 | 85°C | Ti >85°C |

- Class II (combustible dust)

$$T(x) f \frac{2}{3} MIT_{cloud}$$

$$T(x) f 5 \text{ mm } MIT_{layer} \bullet 75 \text{ K}$$

4. SCHEME

5. ASSEMBLY

The pipe must be cleaned carefully before installing the valve, to prevent that any small element or impurity may affect the reducing valve work.

It is also very important to install a strainer in front of the valve in order to protect it.

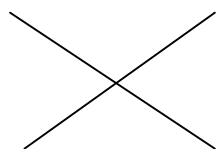
Reducing valve must be installed in a horizontal pipe and the direction of the flow should be in the same direction that shows the valve body.

When the steam is condensed, the pipe should be inclined to help with the evacuation.

Assembly Position

Standard position for any fluids and temperature above 0°C.

Position for gases and liquids when the temperature of the fluid does not exceed 80°C



This situation is not allowed because the valve will not work properly.

The supports holding the valve will be done in the pipe and as close as possible to the flanges but never fixed in the valve or the actuator, to eliminate unnecessary tensions.

Installation in bypass

If you install a valve in bypass, which is highly recommended, it must be spliced back to the main pipe after the control line, and with their check valves, according to the scheme:

Control Line

Pressure reducing valves will be supplied with the internal control line so external impulse pipe is not necessary.

However, if customer prefers an external impulse pipe or for steam service (mandatory), the control line must be connected to the main pipeline in downstream pressure, at least 1 meter from the valve, through a tube (10 x 1 mm).

If after the valve, there is a distributor, the connection of the control line must be connected to the distributor, although there are several meters between them.

If the reducing valve oscillates, it is recommended to install a needle valve in the control line.

Condensating Pot

The Condensating Pot will be only necessary for liquids with temperatures above 125°C and steam, in order to protect the membrane from overheating. The pot is always in the highest place of the pipe.

The connection of the control line of the pot to the main pipe will be made laterally to the center of it and with a slight slope to slide into the pipe.

All the connections of the actuator and the condensating pot are for a 10x1 tube.

The condensating pot should be filled with water to overflowing.

If the control line connection is placed over the outlet flange, the condenser pot must be installed according to this scheme:

If the connection of the control line is located below the outlet flange, the condenser pot installation should be according to the following scheme:

Start -up

If the steam or liquid flows over 125 °C is necessary to install and fill with water the condensating pot. Screw the cap and tight it.

Open the check valves slowly (to prevent water hammer).

The delivered regulator does not have a defined set point pressure because set point must be adjusted on starting up the plant. Adjust the set pressure (downstream pressure), turn the regulating screw. Compressing the spring (clockwise) increases the outlet pressure and decompressing the spring, decreases

Dimensions, Weight and Kv

| DN | 15 | 20 | 25 | 32 | 40 | 50 | 65 | 80 | 100 | |
|-----------------|-----|-----|------|------|------|------|-------|-------|-------|-------------------|
| Kv value | 3,5 | 5 | 9 | 13,5 | 22 | 32 | 57 | 82 | 115 | m ³ /h |
| A (EN PN40) | 130 | 150 | 160 | 180 | 200 | 230 | 290 | 350 | 350 | mm |
| A (ANSI 150 LB) | € | € | 7,25 | - | 8,75 | 10 | 10,86 | 13,88 | 352,5 | In. |
| A (ANSI 300 LB) | € | € | 7,76 | - | 9,25 | 10,5 | 11,5 | 14,49 | 368 | In. |
| H | 315 | 315 | 325 | 325 | 360 | 360 | 390 | 390 | 410 | mm |
| Approx. Weight | 8 | 9 | 12 | 13 | 15 | 20 | 30 | 42 | 55 | kg |

Approximate outlet pressure ranges (diameter D en mm.)

| DN | 15 | 20 | 25 | 32 | 40 | 50 | 65 | 80 | 100 |
|----------------|----------------|----|----|------|----|---------|----|----|-----|
| 20 - 40 mbar | D350 | | | | - | - | - | - | - |
| 30 - 100 mbar | D295 | | | D350 | | - | - | - | - |
| 0,08 • 0,3 bar | D295 | | | | | D350 | | | |
| 0,2 • 1,2 bar | D230 | | | | | D295 | | | |
| 0,8 • 3 bar | D195 | | | | | D230 | | | |
| 2 • 8 bar | D175 | | | | | D195 | | | |
| 5 • 20 bar | D175 - CONSULT | | | | | CONSULT | | | |

Technical data

| | | | |
|---|---|--------------|--|
| Nominal pressure | PN16-PN25-PN40 or CLASS 150 CLASS 300 | | |
| Nominal size | DN15 to DN50 | DN65 to DN80 | DN100 |
| Max. permissible differential pressure „p | 25 bar | 20 bar | 16 bar |
| Max. permissible temperature: body | Refer to technical sheet HT-101 | | |
| Max. permissible temperature: plug | metal: 180€C PTFE+GR: 180€C PEEK: 180€C EPDM, FPM: 150€C NBR: 80€C | | metal: 180€C PTFE+GR: 180€C PEEK: 180€C EPDM, FPM: 150€C NBR: 80€C |
| Max. permissible temperature: actuator | Diaphragm EPDM till 125€C Diaphragm EPDM+PTFE and condensation tank till 180€C | | |

6. POSSIBLE BREAKDOWNS

| Symptom | Possible Reason | Solution |
|---|--|---|
| You can not adjust the outlet pressure. | The actuator does not get pressure. | Clean or replace capture of control and check ...racords† of connection. |
| Outlet pressure rises above the set one. | Pressure port blocked. | Clean or replace capture of control and check ...racords† of connection. |
| | Actuator escape. | Inspect diaphragm and gaskets and replace them if they are damaged. |
| | Eroded seal. | Dismantle the actuator, springs and the body cover of the valve to inspect the seal. Replace it if it is necessary. |
| | Balancing gasket wear. | Dismantle the actuator, springs and the body cover of the valve to inspect the balancing gasket. Replace it if it is necessary. |
| In total charge, the outlet pressure is under the required one. | Submeasured valve for the requested load. | Check if the valve size is enough for that load. Replace it for a bigger DN valve. |
| It does not provide the total charge and the valve is properly dimensioned. | The valve does not reach the maximum path. | Consult with the manufacturer. |
| The flow is low and the outlet pressure oscillates. | Too big control line | Replace the 10x1 pipe for the 6x4 one, and all the racords necessary for his connection. |
| | Too big increasing pressure | Install two valves in series to reduce the reducing rate. |
| | The outlet pressure control line is very close to the valve. | Check that the line is at least 1 m. from any valve to avoid turbulences. |

Consult with manufacturer for any doubt or problem.

ATEX requirements

- **IMPORTANT!** The respective national regulations as well as general engineering rules governing the installation and operation of equipment in explosive atmospheres must be observed.
- The valves are ATEX category "II 2 GD" according to 100a ATEX Directive (94/9/EC).
- **IMPORTANT!** The device can only be used in potentially explosive locations Class I (gases, vapors or liquids) Zones 1 and 2 and Class II (combustible dusts) areas 21 and 22, according to the specifications in the Directive 1999/92/EC , as well as the Electro technical Regulations.

Electrostatic discharges

Under certain conditions, electrostatic discharges that are capable of ignite explosive atmospheres, can be produced. The most important measure of protection is equipotential bonding of all conductive parts and earthing.

In order to avoid electrostatics discharges, the installation of devices and control elements must be earthing.

- **IMPORTANT!** Connecting the valves to process: it should be ensured electrical continuity of $<10^6$ Ω.
- **IMPORTANT!** National regulations on maintenance, service, inspection and repair of apparatus and equipment for explosive atmospheres, as well as general engineering rules must be observed.

COMMISSIONING

IMPORTANT! User is the only responsible for a safe use of the devices.

In use, parts that affect the explosion protection of the valves must be checked and act accordingly, f.e.:

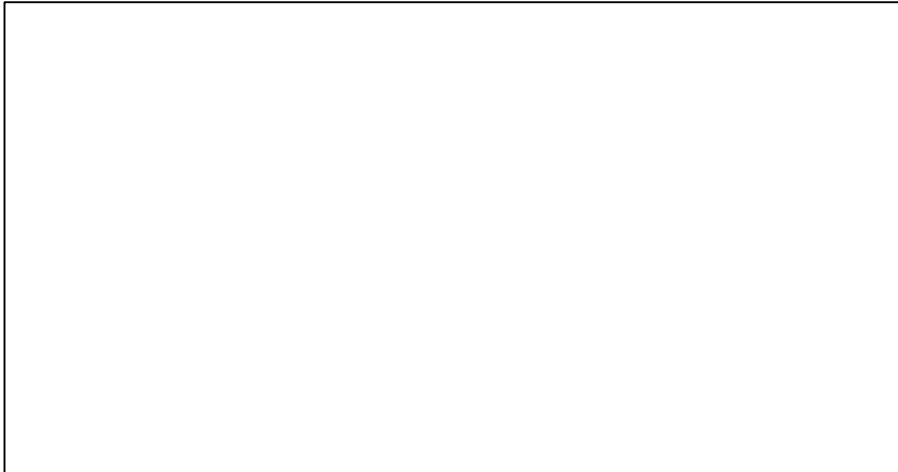
- Fixing Elements -screws, nuts, shafts, etc.- see technical documentation of the product supplied. It must be ensure its tightening, proper operation and / or change when necessary. After 2.500h of working or 6 natural months (whichever comes first).
- The seals will be replaced by original spare parts: every 25,000 hours or when periodic inspections result said (the lower range).
- Any other action arising from inspection and maintenance plan, set by the user
- **IMPORTANT!** If repainting the valves and / or spare parts, ensure there is no paint on moving parts, mounting flange and closure sealing.

INSPECTIONS

- **IMPORTANT!** National Regulations must be observed. It is user's responsibility to establish an inspection and maintenance plan for these devices in order to ensure their proper use.
- Inspections must be performed by "qualified staff,, because of the kind of equipment and / or installation.
- Purposes can be used to guide the requirements of the UNE-EN 60079-17, in order to establish the inspection plan.
- **IMPORTANT!** When inspections are "Detailed" or it is degree is ...Close,, the devices will be completely shut out.

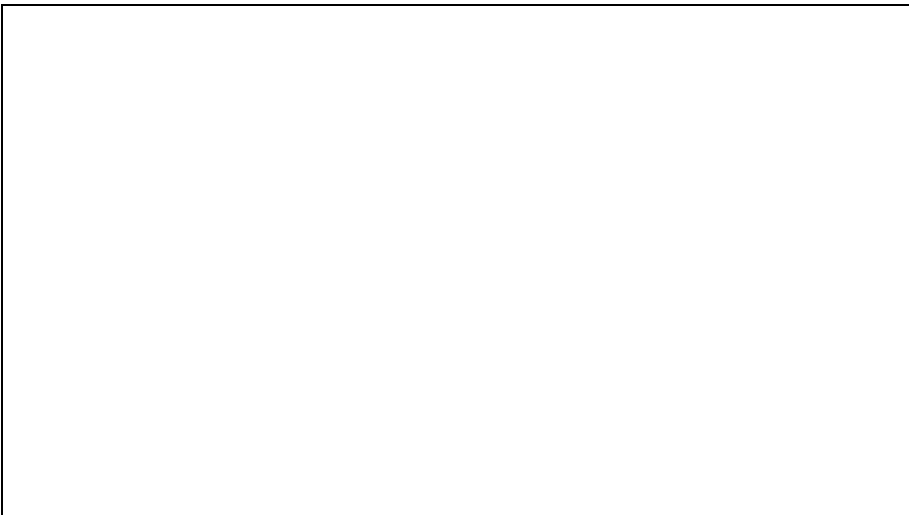
7. INSTALLATION DRAWINGS

WATER AND NEUTRAL GASES



- 1.- Isolation Valve
- 2.- Filter
- 3.- Inlet pressure gauge
- 4.- Outlet pressure gauge
- 5.- Reducing Valve M2
- 6.- Safety Valve
- 8.- Impulse pipeline (optionally)

STEAM



- 1.- Isolation Valve
- 2.- Filter
- 3.- Inlet pressure gauge
- 4.- Outlet pressure gauge
- 5.- Reducing Valve M2
- 6.- Safety Valve
- 7.- Condensating tank
- 8.- Impulse pipeline (mandatory)

DISMANTLING AND ASSEMBLING THE VALVE

- a. Unscrew completely the adjusting screw (14) to loosen the spring.
- b. Ensure that there is no pressure in the pipe line and the temperature of valve and pipe is ambient.
- c. Remove and clean control line (internal control line, it's not necessary).
- d. Unscrew bolts (20) and nuts (7).
- e. Remove upper actuator (11) and regulating spring (16). If necessary, replace diaphragm (19) and their o-rings (8):
 - i. Unscrew nuts (10) with a wrench, when we fasten the screw (17) with an allen wrench.
 - ii. Lift the cover (9) and replace diaphragm (19) and their o-rings (8) and reassemble.
- f. Unscrew bolt group (17) -diaphragm support (22) anticlockwise direction, fasten the stem (18).
- g. Remove the spring (23), unscrew and replace nut (6) with special tool to prevent the damage and lift the actuator (21).
- h. Unscrew cover bolts (4) and we lift the guide (27).
- i. Lift and replace, if necessary, cover-body gasket (25).
- j. With a special tool (request to VALFONTA a drawing) unscrew seal (2) and remove rest of valve parts.
- k. In a workbench replace seat (28) and compensating gasket (26) if necessary.
- l. Check the seal to assure is not damaged.
- m. Clean and reassembly.

MAINTENANCE

Spare parts are subject to normal wear. They must be inspected and replaced when necessary.

The frequency of the inspections and maintenance depends on the severity of the service conditions. This section provides instructions about replacement, packing, stem, plug and seat.

All maintenance operations can be performed with the valve body installed.

Before any maintenance, ensure the valve is depressurised and clear of media, and isolate it both upstream and downstream. Be sure the temperature isn't dangerous.

IMPORTANT! Use only genuine parts or recommended by VALFONTA, SL

8. RECEIPT ON SITE

ATTENTION! Transport and storage of these devices should be in their original packaging.

RECEIPT ONSITE

When receiving the equipment on site, it should be unpacked to check that they agree with the request and delivery notes. At least, verification shall be performed:

- Visual,
- Mechanical

After these checks, if it will not be installed immediately, it will keep in dry and protected atmosphere.

Visual Inspection

Check that during transport, unloading and installation, the devices have not been damaged.

Mechanical Verification

Check all moving parts of the apparatus, as well as screws and other elements fulfill their mission.

IMPORTANT! If is observed abnormality during these guidelines reception, contact urgently VALFONTA to clarify responsibilities and put the devices in correct status.

The contents of that document are subject to change without notice.