

September 2024

# A/100 Series Self-Operated Regulators

## SUMMARY

Introduction .....	1
PED Categories and Fluid Group .....	1
Characteristics .....	2
Labelling .....	2
Overpressure Protection .....	2
Transport and Handling .....	3
ATEX Requirements .....	3
Slam-Shut Controller .....	3
Operation .....	3
Installation .....	4
Startup .....	5
Adjustment .....	5
Shutdown .....	5
Periodical Checks .....	5
Maintenance .....	5
Spare Parts .....	6
Parts List .....	6

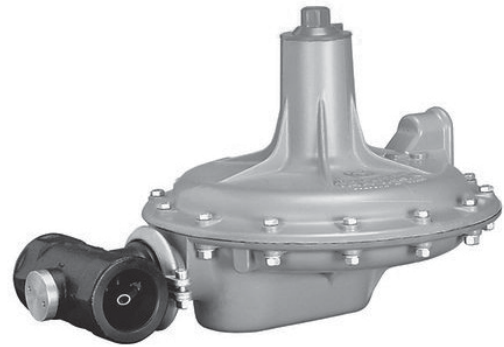


Figure 1. A/100 Series

## INTRODUCTION

### Scope of Manual

This manual provides instructions for installation, startup, maintenance and spare parts ordering for the A/100 Series self-operated regulators.

### Product Description

The A/100-Series (2 in. gas threaded connections) and the A/110 Series (DN 50 PN 16 flanged connections) are spring-loaded regulators featuring single seats and non-balanced valves, and are normally supplied with built-in filters. The series, which comes in both the standard and high pressure (AP) versions, includes the following models:

**A/101 and A/111:** without safety devices

**A/102 and A/112:** with outlet overpressure relief valve

**A/108 and A/118:** with outlet underpressure and/or overpressure independent, pneumatically controlled slam-shut valve (OS/66 actuator)

**A/109 and A/119:** same as the A/108 and A/118 models but fitted with an outlet overpressure relief valve.

## PED CATEGORIES AND FLUID GROUP

According to EN 14382, only in integral strength type and Class A configuration (when both over and under pressure protections are set up), the possible built-in safety shut-off device can be classified like a safety accessory according to PED.

The minimum PS between SSD valve and pilot shall be the PS of the safety accessory to comply the provisions of EN 14382 about integral strength type.

Downstream equipments, protected by possible built-in safety shut-off device (in its Class A and integral strength configuration) of this product, shall have technical features such as to be category per table below according Directive PED 2014/68/EU.

Table 1. PED Category for A/100 Series Regulators

PRODUCT SIZE	CATEGORY	FLUID GROUP
DN 50	I	1

Possible built-in pressure accessories (e.g. pilots OS66/) conform to Pressure Equipment Directive PED 2014/68/EU Article 4 section 3 and were designed and manufactured in accordance with sound engineering practice (SEP).

Per Article 4 section 3, these “SEP” products must not bear the CE marking.

# A/100 Series

## CHARACTERISTICS

### Body Sizes and End Connection Styles

DN 50 BSP inlet and outlet

DN 50 PN 16 UNI/DIN - Sliding flanges (available on request)

DN 50 ANSI CL150 - Sliding flanges (available on request)



## WARNING

The pressure/temperature limits indicated in this instruction manual or any applicable standard or code limitation should not be exceeded.

### Maximum Operating Inlet Pressure

A/102 • A/109: 8 bar

A/102-AP • A/109-AP: 8 bar

At average ambient temperature.

### Outlet Set Pressure Ranges

A/102 • A/109: 10 to 60 mbar

A/102-AP • A/109-AP: 60 to 300 mbar

### Functional Features

Accuracy Class AC : up to  $\pm 5\%$

Lock-up Pressure Class SG : up to + 10%

### Slam-Shut Controller

Accuracy Class AG :  $\pm 5\%$

Response Time  $t_a$  :  $\leq 1$  second

### Temperature

Standard Version: Working  $-10^\circ$  to  $60^\circ\text{C}$

Low Temperature Version: Working  $-20^\circ$  to  $60^\circ\text{C}$

### Materials

Servomotor body: Aluminium

Cover: Aluminium

Body: Cast iron

Sleeve: Brass

Seat: Brass

Diaphragm: Fabric Nitrile (NBR)

Gaskets: Nitrile (NBR) rubber

## LABELLING

			Notified body XXXX	APPARECCHIO TIPO / DEVICE TYPE Note 1
MATRICOLA / ANNO SERIAL Nr. / YEAR	/ Note 2		DN1	
REAZIONE FAIL SAFE MODE	FAIL OPEN <input checked="" type="checkbox"/>	FAIL CLOSE <input type="checkbox"/>	DN2	
NORME ARMONIZ. HARMONIZED STD.	EN		Wds	bar
CLASSE DI PERDITA LEAKAGE CLASS		TIPO TYPE	Wdso	bar
CLASSE FUNZIONALE FUNCTIONAL CLASS		Cg	Wdsu	bar
FLUIDO GRUPPO FLUID GROUP	1	pmax	bar	DN seat DN sede
TS	Note 3	$^\circ\text{C}$	PS	bar PSD
				Bar PT= 1.5 x PS bar

Figure 2. Label for A/100 Series Regulators

**Note 1:** See "Characteristics"

**Note 2:** Year of manufacture

**Note 3:** Class 1:  $-10^\circ/60^\circ\text{C}$   
Class 2:  $-20^\circ/60^\circ\text{C}$

## OVERPRESSURE PROTECTION

The recommended maximum allowable pressures are stamped on the regulator nameplate.

If actual version hasn't a built-in safety shut-off device, some type of overpressure protection is needed if the actual outlet pressure exceeds the actual maximum operating outlet pressure rating.

Overpressure protection should also be provided if the regulator inlet pressure is greater than the maximum operating inlet pressure. Downstream side pressure after possible built-in SSD's intervention shall stay within the actual maximum operating set-up range to avoid anomalous back pressures that can damage the SSD's pilot.

Downstream overpressure protection shall be also provided if the SSD outlet pressure can be greater than the PS of the SSD pilot (differential strength type).

Regulator operation below the maximum pressure limitations does not preclude the possibility of damage from external sources or debris in the line.

The regulator should be inspected for damage after any overpressure condition.

## TRANSPORT AND HANDLING

Established transport and handling procedures shall be followed to avoid any damage on the pressure containing parts by shocks or anomalous stresses.

Built-up sensing lines and pressure accessories shall to be protected by shocks or anomalous stresses.

## ATEX REQUIREMENTS

If the provisions of EN 12186 & EN 12279, national regulations, if any, and specific manufacturer recommendations are not put into practice before installation and if purge by inert gas is not carried out before equipment's start-up and shut-down operations, a potential external and internal explosive atmosphere can be present in equipment & gas pressure regulating/measuring stations/installations.

If a presence of foreign material in the pipelines is foreseen and purge by inert gas is not carried out, the following procedure is recommended to avoid any possible external ignition source inside the equipment due to mechanical generated sparks:

- drainage to safe area via drain lines of foreign materials, if any, by inflow of fuel gas with low velocity in the pipe-work ( 5m/sec)

In any case,

- provisions of Directive 1999/92/EC and 89/655/EC shall be enforced by gas pressure regulating/measuring station/ installation's end user
- with a view to preventing and providing protection against explosions, technical and/or organizational measures appropriate to the nature of the operation shall be taken (e.g.: filling/exhausting of fuel gas of internal volume of the isolated part/entire installation with vent lines to safe area - 8.6.2 of EN 12186 & 7.4 of EN 12279, monitoring of settings with further exhaust of fuel gas to safe area, connection of isolated part/entire installation to downstream pipeline; ....)
- provision in 10.2.3 of EN 12186 and 9.3 12279 shall be enforced by pressure regulating/measuring station/ installation's end user
- external tightness test shall be carried out after each reassembly at installation site using testing pressure in accordance with national rules
- in case of selfop regulators diaphragm's incidental failure the amount of maximum flow to be vented can be calculated using the universal gas sizing equation, assuming inlet pressure = regulator's set-point, outlet pressure = atmospheric pressure and venting hole DN on the regulator's upper cover = 16 mm (Cg = 280).
- periodical check/maintenance for surveillance shall be carried out complying with national regulations, if any, and specific manufacturer recommendations.

## SLAM-SHUT CONTROLLER

The following controllers are used with A/100 series regulator with built-in slam-shut:

- OS/66 Series spring loaded controllers



Figure 3. OS/66 Slam-Shut Controller

Table 2. OS/66 Characteristics

MODEL	BODY RESISTANCE bar	OVERPRESSURE SET RANGE $W_{do}$ bar		UNDERPRESSURE SET RANGE $W_{du}$ bar	
		Min.	Max.	Min.	Max.
OS/66	6	0.022	0.6	0.007	0.45
OS/66-AP	6	0.2	5	0.1	2.5

### Materials

Body: Aluminium

Cover: Steel

Diaphragm: NBR rubber

For further informations please see the Instruction Manual D103657X012.

## OPERATION

The movements of the diaphragm are transmitted to the valve disk by the stem and the lever. The downstream pressure through the pulse pipe exerts a force under diaphragm and this force is counteracted by the adjusting spring.

The gas pressure on the diaphragm tends to close the valve disk; the antagonist action of the adjustment spring tends to open it. Under normal conditions the balance between these antagonist actions positions the valve disk in such a way as to ensure a constant pressure and therefore the downstream capacity.

Upon any capacity variation tending to cause an increase or decrease of pressure in relation to the pre-set pressure, the moving unit reacts and finds a new balance, so re-establishing the pressure.

Upon request the regulator is also provided with safety valve incorporated in the diaphragm; the adjustment at the pre-set value is performed by means of spring.

For the OS/66 slam-shut controller operation please see the D103657X012 instruction manual.

## INSTALLATION



### WARNING

Installation shall be in accordance with national standard for material use limitations in gas pressure reducing stations. Only qualified personnel should install or service a regulator. Regulators should be installed, operated, and maintained in accordance with international and applicable codes and regulations, and O.M.T. Tartarini instructions. If the regulator vents fluid or a leak develops in the system, it indicates that service is required. Failure to take the regulator out of service immediately may create a hazardous condition.

Personal injury, equipment damage, or leakage due to escaping fluid or bursting of pressure-containing parts may result if this regulator is over pressured or is installed where service conditions could exceed the limits given in the Specifications section, or where conditions exceed any ratings of the adjacent piping or piping connections. To avoid such injury or damage, provide pressure-relieving or pressure-limiting devices (as required by the appropriate code, regulation, or standard) to prevent service conditions from exceeding limits.

Additionally, physical damage to the regulator could result in personal injury and property damage due to escaping fluid. To avoid such injury and damage, install the regulator in a safe location. Before installation, check shall be done if service conditions are consistent with use limitations and if pilot set-up of possible built-in safety shut-off device are in accordance with service conditions of protected equipment.

All means for venting have to be provided in the assemblies where the pressure equipment are installed (ENs 12186 & 12279).

All means for draining have to be provided in the equipment installed before regulators & shut-off devices (ENs 12186 & 12279).

Further the ENs 12186 & 12279, where this product is used:

- provide the cathodic protection and electrical isolation to avoid any corrosion and
- in accordance with clause 7.3/7.2 of aforesaid standards, the gas shall be cleaned by proper filters/separators/scrubbers to avoid any technical & reasonable hazard of erosion or abrasion for pressure containing parts.

Pressure equipment in subject shall be installed in non-seismic area and hasn't to undergo fire and thunderbolt action.

Clean out all pipelines before installation of the regulator and check to be sure the regulator has not been damaged or has collected foreign material during shipping.

For threaded bodies, apply pipe compound to the male pipe threads.

For flanged bodies, use suitable line gaskets and approved piping and bolting practices. Install the regulator in any position desired, unless otherwise specified, but be sure flow through the body is in the direction indicated by the arrow on the body.

Installation must be done avoiding anomalous stresses on the body and using suitable joint means according equipment dimensions and service conditions.

For a correct and safe use of the connections check also Instruction Manual and Bulletin before installation.

User has to check and carry out any protection suitable for assembly's specific environment.

**Note:** It is important that the regulator be installed so that the vent hole in the spring case is unobstructed at all times.

For outdoor installations, the regulator should be located away from vehicular traffic and positioned so that water, ice, and other foreign materials cannot enter the spring case through the vent.

Avoid placing the regulator beneath eaves or downspouts, and be sure it is above the probable snow level.

- Install the regulator in a covered area and, in any case, protect it against weather agents.
- Make sure that data shown on regulator plate is compatible with actual operating requirements.
- Check that regulator is mounted so that gas flows in the direction indicated by the arrow.

### Setting

1. Install a pressure gauge downstream of regulator in order to measure outlet pressure. In case of pressure adjustment being required, rotate ring nut (key 2) (or cap (key 52) in high-pressure models) clockwise to increase pressure or anticlockwise to diminish it.
2. Check relief valve setting by carrying out the steps outlined in section 5.2 above. In case of pressure adjustments being required, use nut (key 6).
3. If required set point is at considerable variance with respect to factory-preset value, replacement of spring (key 3) with a more appropriate one may be necessary. Whenever spring is replaced, also check setting of the actuator (if installed).

## STARTUP

The regulator and/or slam-shut controller is factory set at approximately the midpoint of the spring range or the pressure requested, so an initial adjustment may be required to give the desired results.

With proper installation completed and relief valves properly adjusted, slowly open the upstream and downstream line valves.

- a. Slightly and very slowly open the outlet cut-off valve.
- b. In case of models fitted with slam-shut valve, relatch the valve by first loosening cap and then screwing it onto the stem, after which pull cap outwards until a click is heard, indicating that balls are duly engaged.
- c. Slightly and very slowly open the inlet cut-off valve.
- d. Wait for outlet pressure to stabilize.
- e. Finally, slowly open inlet and outlet cut-off valves fully.

## ADJUSTMENT

To change the outlet pressure, remove the closing cap (key 1) and turn the adjusting nut (key 2) clockwise to increase outlet pressure or counter clockwise to decrease pressure.

Monitor the outlet pressure with a test gauge during the adjustment.

Remount the closing cap (key 1).

## SHUTDOWN



### WARNING

**To avoid personal injury resulting from sudden release of pressure, isolate the regulator from all pressure before attempting disassembly and release trapped pressure from the equipment and pressure line.**

**In case of disassembly of main pressure retaining parts for checks and maintenance procedures, external and internal tightness tests have to be done according applicable codes.**

## PERIODICAL CHECKS



### CAUTION

**It is recommended that checks be made periodically on the efficiency of the regulator and pilots.**

## Regulator Checking

Slowly close the outlet cut-off valve and check pressure in the length of pipe between the regulator and the valve.

If the system is functioning properly, an increase in outlet pressure will be noticed due to lock-up pressure, after which pressure will stabilize.

If, on the contrary, outlet pressure continues increasing, the system is not functioning properly due to improper valve disk tightness. In this case, close the valve located upstream of regulator and carry out maintenance procedures.

## Relief Valve Checking (if installed)

1. Close the valve located downstream of regulator.
2. Connect a manual pump or other similar device to a previously fitted impulse connection between the regulator and the valve and raise the pressure until relief valve is activated, i.e. until gas is released from vent.

## Slam-Shut Controller Checking (if installed)

See the Instruction Manual D103657X012.

## MAINTENANCE (SEE FIGURE 4)



### WARNING

**All maintenance procedures must be carried out only by qualified personnel. If necessary, contact our technical support representatives or our authorized dealers.**

The regulator and its pressure accessories are subject to normal wear and must be inspected periodically and replaced if necessary.

The frequency of inspection/checks and replacement depends upon the severity of service conditions and according to applicable National or Industry codes, standards and regulations/recommendations.

In accordance with applicable National or Industry codes, standards and regulations/recommendations, all hazards covered by specific tests after final assembling before applying the CE marking, shall be covered also after every subsequent reassembly at installation site, in order to ensure that the equipment will be safe throughout its intended life.

Before proceeding with any maintenance work, shutoff the gas upstream and downstream from the regulator, also ensure that there is no gas under pressure inside the body by loosening the upstream and downstream connections.

Upon completion, check for leaks using suds.



# A/100 Series

**Table 3. General Troubleshooting for A/100 Series**

CAUSE	ACTIONS
no gas flowing downstream of regulator	Gas is being regularly fed into the regulator.
	The actuator is properly latched (only in models fitted with slamshut valve).
gas pressure decreasing on the outlet side of the regulator	Sufficient gas is being fed into the regulator.
	Regulator capacity is compatible with desired flow rate.
	The inlet filter is not clogged.
	The spring is not broken.
gas pressure increasing on the outlet side of the regulator or safety devices (relief valve or slamshut valve) being activated	Seal pad (key 19) or seat (key 20) are not worn.
	The seal pad is properly clean as dirt build-up may prevent regular functioning of the valve.
	The diaphragm (key 13) is not damaged or broken.

## Cleaning the Filter

Remove plug (key 25) or (key 50), slide out filter (key 22) and clean it with petrol. Reassemble the parts by carrying out the above steps in reverse order, taking care not to “pinch” the O-ring (key 26).

## General Maintenance

- Remove screws (key 48) and clamp (key 30) in order to take off diaphragm case. Check O-rings (keys 31 and 28).
- Remove plug (key 25) or (key 50) and filter (key 22) and slide out valve seat (key 20). If seat is worn or scored, replace it. Check O-rings (keys 21 and 26).
- Check pad (key 19).
- Remove cap (key 1), ring nut (key 2) and spring (key 3), taking care to mark the exact position of the ring nut for remounting. In high-pressure models, loosen ring nut (key 55) and remove cap (key 52), taking care to mark its position.
- Remove screws (key 40) and take off cover (key 4).
- Remove the diaphragm assembly from the diaphragm case.
- Strip diaphragm assembly down into its various components. In the models fitted with relief valve, unscrew nut (key 5) and remove spring (key 8), taking care to mark the height of the preloaded spring in order to reassemble it in its original position, thus ensuring proper setting of the relief valve. For all other models, simply remove nut (key 5).
- Check diaphragm (key 13), seal (key 35), relief valve (key 59) and O-ring (key 58). Replace any worn or damaged parts.

## Reassembling

Reassemble parts by carrying out the steps outlined Maintenance section in reverse order. Upon reassembling, make sure that each part moves freely. Moreover, take care that:

- All the seals are lubricated with MOLYKOTE 55 M. Use utmost care to ensure against any damage during reassembling.

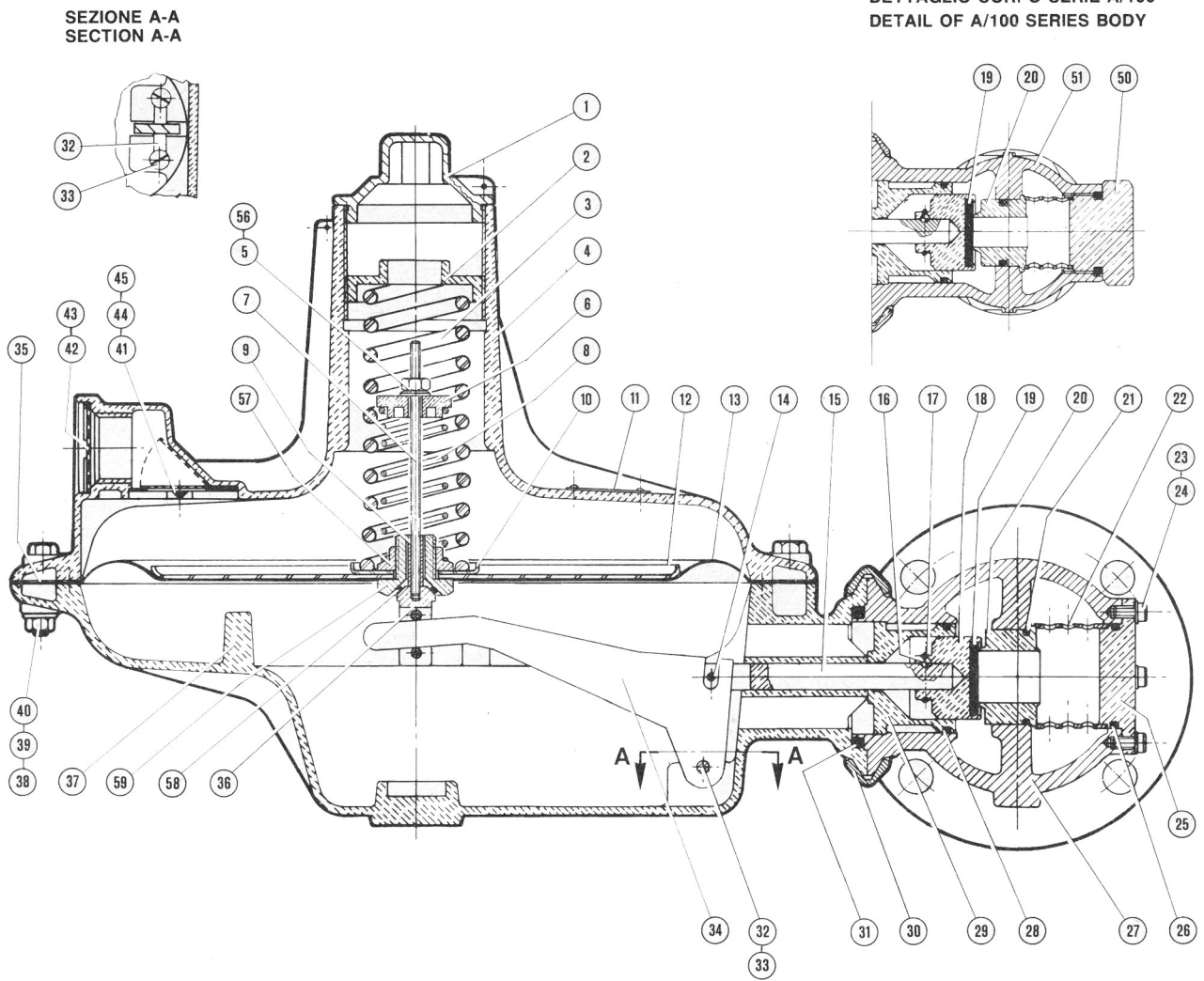
- Diaphragm (key 13) is properly reassembled by lubricating it with some grease and by carefully fitting it into the case (key 37).
- All screws are duly tightened in order to ensure proper sealing.
- Check for leaks using suds.

## SPARE PARTS

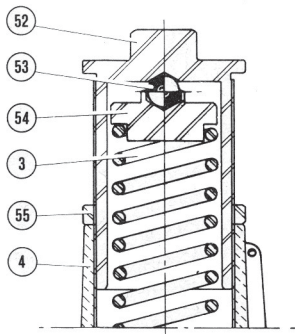
Spare parts storage shall be done by proper procedures according to national standard/rules to avoid over aging or any damage.

## PARTS LIST

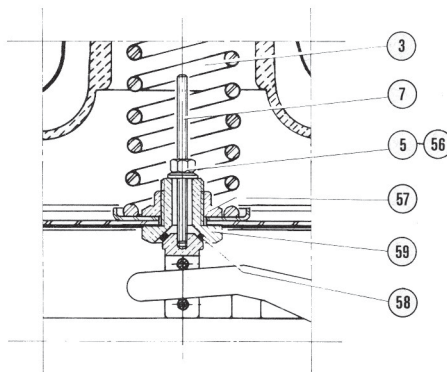
Key	Description
1	Closing cap
2	Adjusting nut
3	Spring
4	Cover
5	Nut
6	Spring carrier
7	Stem
8	Spring
9	Bushing
10	Plate
11	Data plate
12	Plate
13*	Diaphragm
14	Spring pin
15	Forked stem
16	Ball
17	Lock ring
18	Pad holder
19*	Pad
20	Seat
21*	O-ring
22	Filter spacer
23	Washer
24	Screw
25	Flanged plug
26*	O-ring
27	Flanged body
28*	O-ring
29	Bushing
30	Clamp
31*	O-ring
32	Pin
33	Screw
34	Lever
35*	Gasket
36	Relief valve stem
37	Body
38	Nut
39	Washer
40	Screw
41	Clip



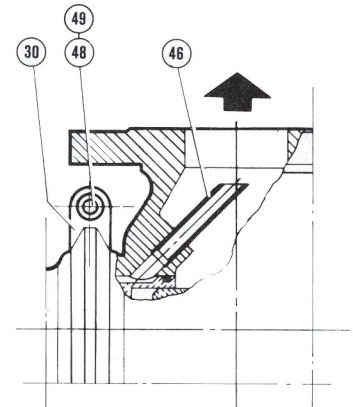
**DETTAGLIO VALIDO PER  
VERSIONE ALTA PRESSIONE  
DETAIL OF  
HIGH PRESSURE VERSION**



**DETTAGLIO VALIDO PER  
A/101 A/108 A/111 A/118  
DETAIL OF  
A/101 A/108 A/111 A/118**



**DETTAGLIO PRESA DI IMPULSO  
DETAIL OF IMPULSE PIPE**



**Figure 4. A/100 Series Regulator**

# A/100 Series

---

42 Snap ring  
43 Net  
44 Frame  
45 Lid  
46 Pipe  
48 Screw  
49 Nut  
50 Threaded plug  
51 Threaded body  
52 Cap  
53 Ball  
54 Spring holder  
55 Ring nut  
56 Washer  
57 Relief valve ring  
58\* O-ring

59 Relief valve  
61\* Pad unit  
62 Pad holder  
63 Shaft  
64\* O-ring  
65\* O-ring  
66 Spring carrier  
67 Spring  
68 Plug  
69 Snap ring

Rubber parts marked with (\*) are supplied in the "spare parts kit", recommended as stock. To order the kit it is necessary to communicate to us the type of the regulator and its serial number.

 [Webadmin.Regulators@emerson.com](mailto:Webadmin.Regulators@emerson.com)

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## Emerson

### Americas

McKinney, Texas 75070 USA  
T +1 800 558 5853  
+1 972 548 3574

### Europe

Bologna 40013, Italy  
T +39 051 419 0611

### Asia Pacific

Singapore 128461, Singapore  
T +65 6770 8337

### Middle East and Africa

Dubai, United Arab Emirates  
T +971 4 811 8100

*O.M.T. Officina Meccanica Tartarini S.R.L., Via P. Fabbri 1, I-40013 Castel Maggiore (Bologna), Italy  
R.E.A 184221 BO Cod. Fisc. 00623720372 Part. IVA 00519501209 N° IVA CEE IT 00519501209,  
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*Francel SAS, 3 Avenue Victor Hugo, CS 80125, Chartres 28008, France  
SIRET 552 068 637 00057 APE 2651B, N° TVA : FR84552068637, RCS Chartres B 552 068 637,  
SAS capital 534 400 Euro*

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