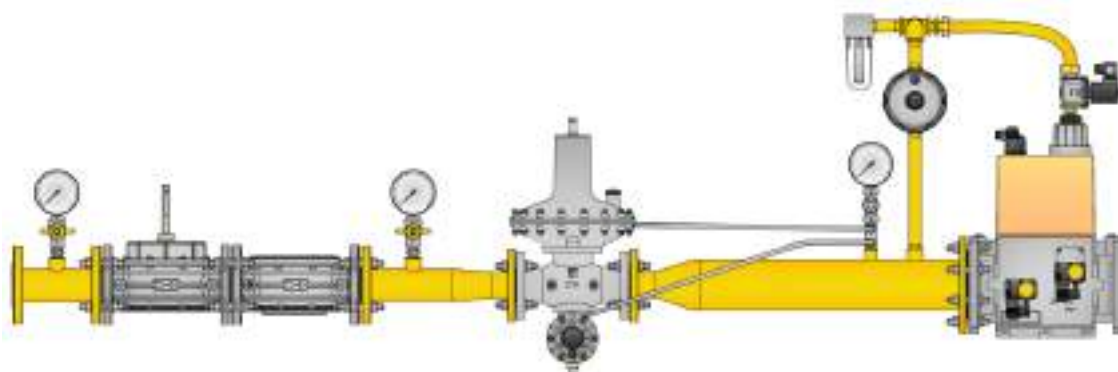
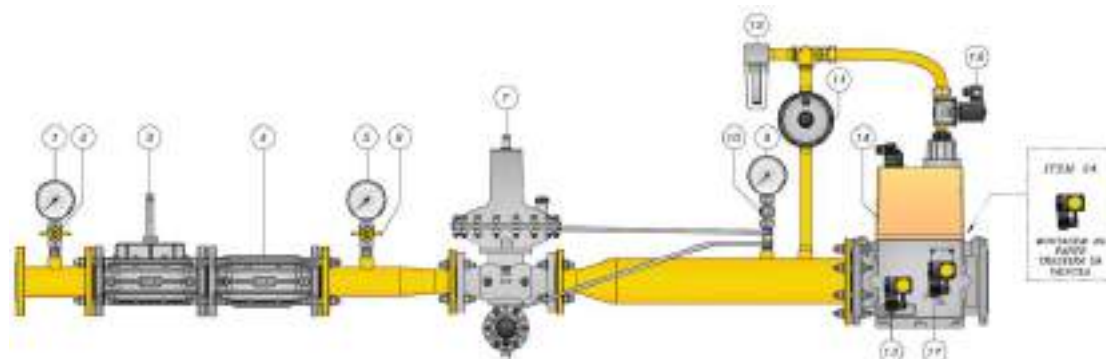


Manual

*Manual de instalação e operação dos componentes do rack de gás modelo **TAG-11001***



CAVALETE TAG -11001



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item 02	Válvula esfera	2
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item 04	Filtro de gás tipo FM	4
item 05	Manômetro de alta pressão	1
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Esse equipamento foi projetado, produzido e testado de acordo com a norma brasileira NBR-12313.



Prezado Cliente,

Obrigado por adquirir os produtos CPGAS.

Informamos que antes do despacho, toda a rede de gás foi montada em nossa empresa e devidamente testada com ar comprimido; porém, após a desmontagem, embalagem, transporte e montagem, algum dano pode ter ocorrido. Portanto, para sua segurança, após a montagem do cavalete em sua posição definitiva, sugerimos que o mesmo seja testado com ar comprimido a pressão de 2,0 bar na entrada da reguladora de pressão.

Todos os flanges e roscas devem ser testados com espuma para localização de vazamentos que, caso existente, devem ser totalmente eliminados antes do início da operação com gás.

Caso exista alguma dúvida, o manual em anexo foi elaborado para auxiliá-los; porém, a CPGAS disponibiliza um departamento de engenharia para dirimir quaisquer dúvidas inerentes aos produtos fornecidos e sua aplicação à luz da NBR 12.313.

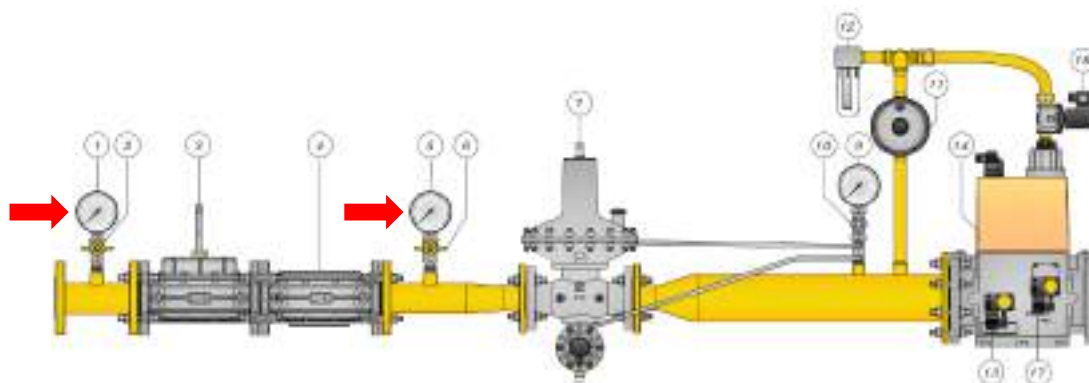
Atenciosamente,

Depto de Engenharia CPGÁS

Engenharia @cpgas.com.br

 **(011) 2095-7500**

Itens 01 e 05 – Manômetro de alta pressão



Pressure Gauges

Service intended

For water - level - indicator, heating, steam, sterilises, pressing equipment.

Design

EN 837-1

Nominal size

40, 50, 63, 80 and 100 mm

Accuracy class per EN 837-1 /5)

40, 50 and 63 mm: 1.6/2.5
 80 and 100 mm: 1.6

Scale ranges per EN 837-1/5

0/0.6 to 0/400 bar for 40mm
 0/0.6 to 0/40 bar with 2nd scale of mmH₂O/mws
 or other equivalent units of pressure or vacuum

Working pressure

Steady: $\frac{3}{4}$ of full scale value
 Fluctuating: $\frac{2}{3}$ of full scale value
 Short time: full scale value

Operating Temperature

Ambient: -40... +80 °C
 Medium: +60 °C maximum

Temperature error

Additional error when temperature of the pressure element deviates from +20 °C

Standard features

Pressure connection

Material: Alpaca
 Threaded entry (radial or back) per EN 837-1 /7.3
 40 mm: G $\frac{1}{8}$ A, 12/14 mm flats
 50 and 63 mm: G $\frac{1}{4}$ A, 14 mm flats
 up 80 mm: G $\frac{1}{2}$ A, 22 mm flats

Pressure element

Material: Cu-alloy
 ≤ 40 bar: C-type
 > 60 bar: helical type

Movement

Cu-alloy

Dial

40, 50, 63mm: white aluminium, white plastic, with pointer stop pin
 up 80mm: white aluminium, with pointer stop pin
 With black lettering

Protections: IP55-65



Pointer

Black plastic
 up 63mm: black aluminium

Case

black plastic / steel painted

Window

Crystal-clear plastic, snap-fit

Bezel ring

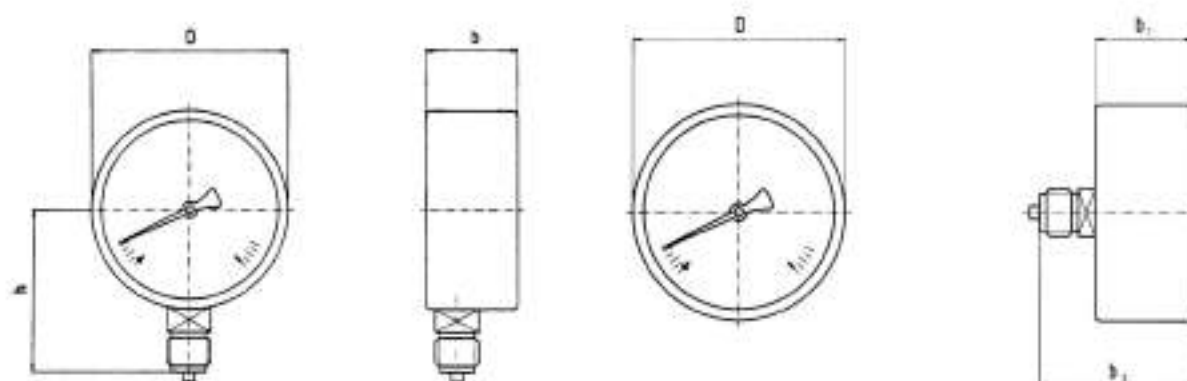
Only for steel case type, chromed steel

Optional extras

- Other pressure connection
- Black finish steel case / Bezel chromed ring
- Slip-on bezel
- 3-hole surface mounting flange
- Max temperature 300°C
- U bracket for clamp fixing
- Welding element in silver alloy
- Red pointer fixed on transparent or on dial
- Dragged pointer of MIN / MAX
- Throat element
- Cut glass
- Red mark
- Thread $\frac{1}{8}$ - $\frac{1}{4}$ - 9x1 - 10x1 : BSP - BSPT - NPT

Dimensions

Standard version



Nominal Size	Dimensions [mm]					Weight [g]
	h	b	b1	b2	D	
40	37	25	25	45	41	50
50	45	29	29	49	51	70
63	50	31	31	51	61	90
80	65	31	31	51	82	160
100	85	31	31	51	102	400

Ordering information

State:

Pressure gauge model / Nominal size / Scale range / Size of connection / Optional extras required

Specification and dimension given in this leaflet represent the state of engineering at the time of printing.
Modifications may take place and materials specified may be replaced by others without prior notice

MANROS Italy srl - C.so Vittorio Emanuele 208/I - 29121 PIACENZA (ITALY)

Factory: Via Bricchi 16 - 29013 Carpaneto P.no (Piacenza) Italy

Tel: +39 0523 859571 - Fax: +39 0523 852354 - Mobile: +39 335 7019302



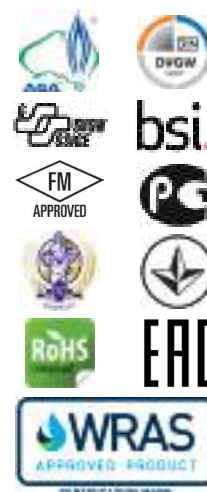
RUBINETTERIE UTENSILERIE BONOMI



s.84 EN331

full port 1/4"- 4"

hot forged brass ball valves



Quality:

- 24h 100% seal test guaranteed
- Dual sealing system allows valve to be operated in either direction making installation easier
- No metal-to-metal moving parts
- No maintenance ever required
- Handle clearly shows ball position
- Silicone-free lubricant on all seals
- Travel stops on body to avoid stresses at stem
- Chrome plated brass ball for longer life with rinse hole

Body:

- Hot forged sand blasted external nickel plated brass body and cap sealed with Loctite® or equivalent thread sealant
- Finest brass according to EN 12165 and EN 12164 (formerly DIN 17660 and UNI 5705-65) specifications

Stem:

- Blowout-proof nickel plated brass stem
- Two FPM O-rings at the stem for maximum safety

Seals:

- Pure PTFE self-lubricating seats with flexible-lip design

PED Directives:

- Assessment according to Pressure Equipment Directive 97/23 CE module B+D by Pascal (1115)



Threads:

- EN 10226-1, ISO 228 parallel female by female threads

Flow:

- Full port to DIN 3357 for maximum flow

Handle:

- Geomet® carbon steel handle with thick PVC dip coating. Handle coating offers both thermal and electrical protection

Working Pressure and Working Temperature:

- 40 Bar (600 PSI) up to 2", 30 Bar (450 PSI) over 2"
- non-shock cold working pressure
- -40°C (-40°F) / +170°C (+350°F)
- For use with dangerous fluids temperature rating is -20°C +60°C and pressure rating is 5 bar
- AS4617 Limitation for GAS: 2100 Kpa up to 2" and 1500 Kpa from 2. 1/2" to 4" rated working pressure and 0°C / +60°C temperature
- Warning: freezing of the fluid in the installation may severely damage the valve

Options up to 2" size:

- Stem extension
- T-handle
- AISI 430 stainless steel handle
- Taper male by parallel female threads up to 4"
- Oval lockable handle up to 2", round over 2"
- Patented locking device for valves up to 4"

Upon Request:

- AISI 316 stainless steel ball
- Glass filled PTFE seals
- Custom Design

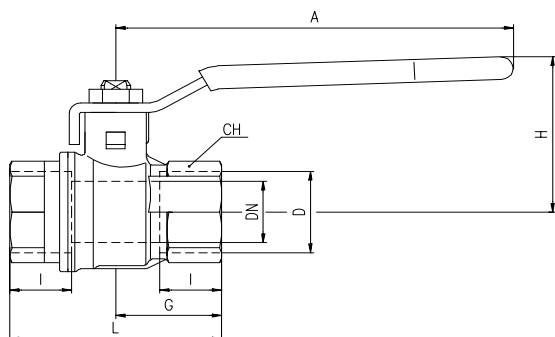
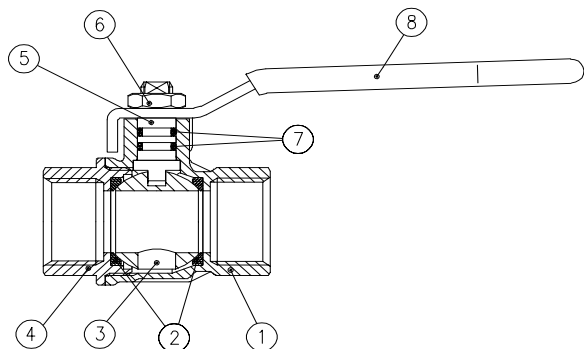
Approved by or in compliance with:

- The Australian Gas Association (Australia)
- Factory Mutual (United States)
- SVGW (Swiss)
- Water Regulations Advisory Scheme (United Kingdom)
- GOST-R (Russia)
- Hygiene and epidemic center in Moscow city (Russia)
- UkrSepro (Ukraine)

- BSI Group
- RoHS Compliant
- DIN-DVGW (Deutschland)
- EAC - Declaration of conformity (Russia-Kazakhstan-Belarus)

NOTE: Approvals apply to specific configurations/sizes only.

PART DESCRIPTION		Q.TY	MATERIAL
1	Nickel plated body (external nickel plated, unplated inside up to 2")	1	CW617N
2	Seat	2	PTFE
3	Chrome plated ball with rinse hole (the rinse hole is expected from 3/4" up to 2" sizes)	1	CW617N
4	Nickel plated end cap (external nickel plated, unplated inside up to 2")	1	CW617N
5	Nickel plated stem O-ring design	1	CW617N
6	Geomet® nut	1	CB4FF
7	O-Ring	2	FPM
8	Yellow PVC coated Geomet® steel handle	1	DD11



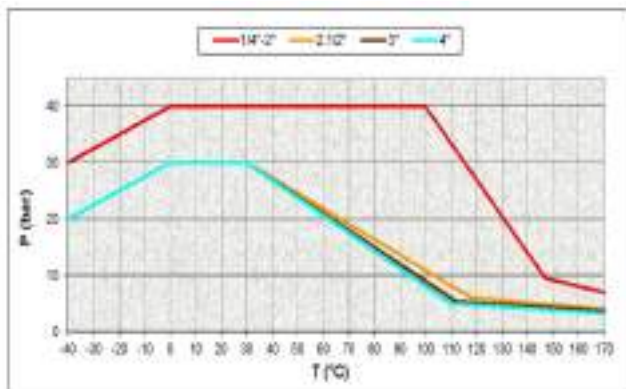
DN shows the nominal flow diameter. Actual flow diameter complies with full port DIN 3357 part 4. Stem configuration of valves over 2" is slightly different.

Code	S84B00	S84C00	S84D00	S84E00	S84F00	S84G00	S84H00	S84I00	S84L00	S84M00	S84N00
D (Inch)	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4
DN (mm.)	8	10	15	20	25	32	40	50	65	80	100
I (mm.)	12	12	15.5	17	21	23	23	26.5	32	35	41.5
L (mm.)	45	45	59	64	81	93	102	121	156	177	216
G (mm.)	22.5	22.5	29.5	32	40.5	46.5	51	60.5	78	88.5	108
A (mm.)	82	82	100	120	120	158	158	158	255	255	255
H (mm.)	38	38	43	50	54	73	79	86	132	140	154
CH (mm.)	20	20	25	31	40	49	54	68.5	85	99	125

Ask for additional information on the whole range of **RuB** valves and consult with your supplier for special applications.

Ball valves are marked CE on handle from 1.1/4" to 2", on body over 2" as follow: CE 1115 cat IIIB+D PS: 5 GAS TS1: -20°C TS2: +60°C

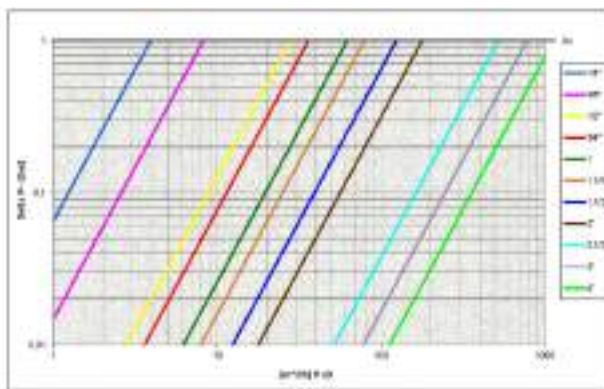
Pressure-Temperature Chart



AS4617 Limitations for GAS: 2100 Kpa up to 2" and 1500 Kpa from 2. 1/2" to 4" rated working pressure and 0°C +60°C temperature

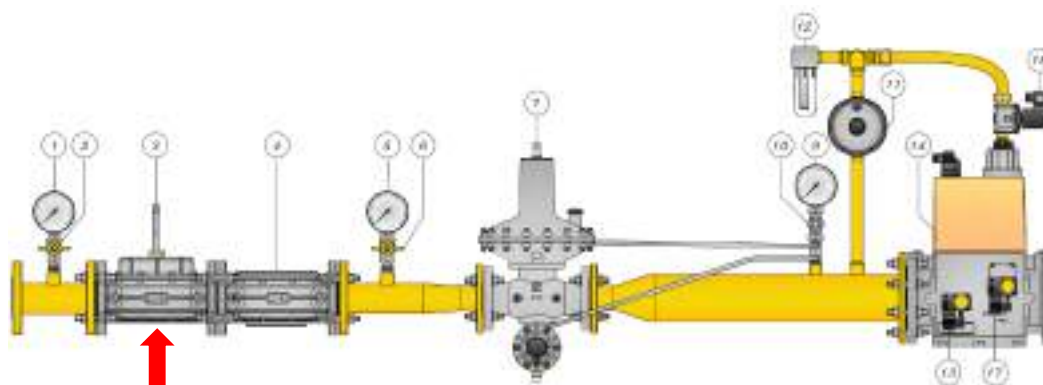
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Pressure Drop Chart



XCES84E - Rev: 3486

Item 03 – Válvula de bloqueio manual



VALVOLA A STRAPPO
JERK HANDLE ON/OFF VALVE
SOUPAPE A DECHIREMENT
VALVULA DE CORTE



CE 0497

MADE IN ITALY

	IT	EN	FR	ES
Pressione massima di esercizio Maximum operating pressure Pression maximum de fonctionnement Presión máxima de funcionamiento	2 - 6 bar			
Attacchi filettati / Threaded connections Raccords filetés / Conexiones roscadas	DN 15 - DN 20 - DN 25 - DN 32 - DN 40 - DN 50			
Attacchi flangiati/ Flanged connections Raccords à brides / Conexiones embreadas	DN 25* - DN 32 - DN 40 - DN 50 - DN 65 - DN 80 - DN 100 - DN 125 - DN 150			
	* su richiesta con flange girevoli	* with swivel flanges on request	* sur demande avec brides tournantes	* bajo petición con bridas locas
In conformità a In conformity with Conforme a Conforme	Direttiva PED 2014/68/UE	PED Directive 2014/68/EU	Directive PED 2014/68/UE	Directiva PED 2014/68/UE

IT

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EN

FR

ES

1.0 - GENERALITÀ

Il presente manuale illustra come installare, far funzionare e utilizzare il dispositivo in modo sicuro.

Le istruzioni per l'uso devono essere **SEMPRE** disponibili nell'impianto dove è installato il dispositivo.

ATTENZIONE: le operazioni di installazione/manutenzione devono essere eseguite da personale qualificato (come indicato in 1.3) utilizzando adeguati dispositivi di protezione individuale (DPI).

Per eventuali informazioni relative alle operazioni di installazione/manutenzione o in caso di problemi non risolvibili con l'utilizzo delle istruzioni è possibile contattare il produttore utilizzando indirizzo e recapiti telefonici riportati in ultima pagina.

1.1 - DESCRIZIONE

Dispositivo che permette di aprire o chiudere manualmente il passaggio di fluido all'interno della tubazione.

La possibilità di azionamento dell'intercettazione a distanza rende semplice, rapida e sicura la manovra di chiusura, se confrontata con i normali rubinetti a sfera. Per l'azionamento a distanza della valvola deve essere utilizzato un apposito kit (fornibile a parte su richiesta).

1.2 - LEGENDA SIMBOLI



PERICOLO: In caso di inosservanza possono essere procurati danni a beni materiali.



PERICOLO: In caso di inosservanza oltre a danni a beni materiali, possono essere procurati danni alle persone e/o animali domestici.



ATTENZIONE: Viene richiamata l'attenzione su dettagli tecnici rivolti al personale qualificato.

1.3 - PERSONALE QUALIFICATO

Trattasi di persone che:

- Hanno dimestichezza con l'installazione, il montaggio, la messa in servizio e la manutenzione del prodotto;
- Sono a conoscenza delle normative in vigore nella regione o paese in materia di installazione e sicurezza;
- Hanno istruzione sul pronto soccorso.



1.4 - USO DI PARTI DI RICAMBIO NON ORIGINALI

- In caso di manutenzione o sostituzione di componenti di ricambio devono essere utilizzati **SOLAMENTE** quelli indicati dal fabbricante. L'utilizzo di componenti differenti, oltre a far decadere la garanzia del prodotto, potrebbe compromettere il corretto funzionamento dello stesso.
- Il fabbricante non è responsabile di malfunzionamenti derivanti da manomissioni non autorizzate o utilizzo di ricambi non originali.



1.5 - UTILIZZO NON APPROPRIATO

- Il prodotto deve essere utilizzato unicamente allo scopo per il quale è stato costruito.
- Non è consentito l'utilizzo con fluidi differenti da quelli indicati.
- Non devono essere superati in nessun caso i dati tecnici indicati in targhetta. E' cura dell'utilizzatore finale o dell'installatore, adottare corretti sistemi a protezione dell'apparecchio che impediscano il superamento della pressione massima indicata in targhetta.
- Il fabbricante non è responsabile per danni causati da un utilizzo improprio dell'apparecchio.

2.0 - DATI TECNICI

- Impiego : gasolio, nafta, gas non aggressivi delle tre famiglie (gas secchi)
- Temperatura ambiente (TS) : -15 ÷ +100 °C
- Pressione massima di esercizio : 2 bar o 6 bar (vedere etichetta prodotto)
- Resistenza meccanica : Gruppo 2 secondo EN 13611
- Attacchi filettati Rp (corpi in ottone) : (DN 15 - DN 20) secondo EN 10226
- Attacchi filettati Rp : (DN 15 - DN 20 - DN 25 - DN 32 - DN 40 - DN 50) secondo EN 10226
- Attacchi flangiati accoppiabili con flange PN 16 : (DN 25* - DN 32 - DN 40 - DN 50 - DN 65 - DN 80 - DN 100 - DN 125 - DN 150) secondo ISO 7005
- Attacchi filettati NPT o flangiati ANSI 150 : richiedere fattibilità
- Chiusura istantanea della valvola
- In conformità a : Direttiva PED 2014/68/UE

* DN 25 con flangie girevoli

3.0 - MESSA IN FUNZIONE DEL DISPOSITIVO



3.1 - OPERAZIONI PRELIMINARI ALL'INSTALLAZIONE

- E' necessario chiudere il gas/fluido a monte della valvola prima dell'installazione;
- Verificare che la pressione di linea **NON SIA SUPERIORE** alla pressione massima dichiarata sull'etichetta del prodotto;
- Eventuali tappi di protezione (se presenti) vanno rimossi prima dell'installazione;
- Tubazioni e interni della valvola devono essere liberi da corpi estranei;

Se l'apparecchio è filettato:

- verificare che la lunghezza del filetto della tubazione non sia eccessiva per non danneggiare il corpo dell'apparecchio in fase di avvitamento;

Se l'apparecchio è flangiato:

- verificare che le controflange di ingresso e uscita siano perfettamente coassiali e parallele per evitare di sottoporre il corpo a inutili sforzi meccanici, calcolare inoltre lo spazio per l'inserimento della guarnizione di tenuta;
- Per le fasi di serraggio, è necessario munirsi di una o più chiavi dinamometriche tarate od altri utensili di bloccaggio controllati;

Procedure in comune (apparecchi filettati e flangiati):

- Devono essere rispettate le normative di sicurezza, vigenti nel paese di installazione, per quanto riguarda la movimentazione dei carichi. Qualora l'apparecchio da installare superi il peso consentito, deve essere previsto l'utilizzo di un adeguato ausilio meccanico e di adeguate imbracature. E' necessario, durante le fasi di movimentazione, adottare opportune precauzioni per non danneggiare/rovinare la superficie esterna dell'apparecchio.
- In caso di installazione all'esterno, è consigliato prevedere una tettoia di protezione per evitare che l'acqua piovana possa ossidare o danneggiare parti dell'apparecchio.



- In base alla geometria dell'impianto valutare il rischio di formazione di miscela esplosiva all'interno della tubazione;
- Se la valvola è installata in prossimità di altre apparecchiature o come parte di un insieme, è necessario valutare preliminarmente la compatibilità fra la valvola e tali apparecchiature.
- Prevedere una protezione da urti o contatti accidentali nel caso la valvola sia accessibile a personale non qualificato.



3.2 - INSTALLAZIONE (vedere esempio in 3.4)

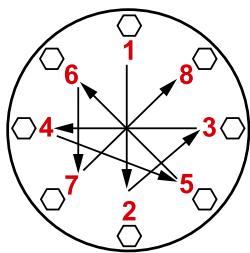
Apparecchi filettati:

- Assemblare il dispositivo avvitandolo, assieme alle opportune tenute, sull'impianto con tubi e/o raccordi le cui filettature siano coerenti con la connessione da assemblare.
- La freccia, indicata sul corpo (6) dell'apparecchio, deve essere rivolta verso l'utenza;

Apparecchi flangiati:

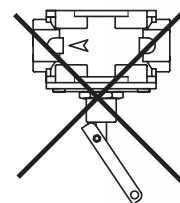
- Assemblare il dispositivo flangiandolo, assieme alle opportune tenute, all'impianto con tubi le cui flange siano coerenti con la connessione da assemblare. Le guarnizioni devono essere prive di difetti e devono essere centrate tra le flange;
- Se a guarnizioni inserite lo spazio rimanente è eccessivo non cercare di colmare il gap stringendo eccessivamente i bulloni dell'apparecchio;

- La freccia, indicata sul corpo (6) dell'apparecchio, deve essere rivolta verso l'utenza;
- Inserire all'interno dei bulloni le apposite rondelle per evitare danneggiamenti alle flange in fase di serraggio;
- Durante la fase di serraggio prestare attenzione a non "pizzicare" o danneggiare la guarnizione;
- Serrare i dadi o bulloni gradualmente, secondo uno schema "a croce" (vedere esempio sottoindicato);
- Serrarli, prima al 30%, poi al 60%, fino al 100% della coppia massima (vedere tabella sottostante secondo EN 13611);



Diametro	DN 25	DN 32	DN 40	DN 50	DN 65	DN 80	DN 100	DN 125	DN 150
Coppia max (N.m)	30	50	50	50	50	50	80	160	160

- Serrare nuovamente ogni dado o bullone in senso orario almeno una volta, fino al raggiungimento dell'uniformità della coppia massima;
- Procedure in comune (apparecchi filettati e flangiati):
- Il dispositivo può essere installato anche in posizione verticale senza che ne venga pregiudicato il corretto funzionamento. Non può essere posizionato capovolto (con la manopola di riarmo (1) rivolta verso il basso);
- Durante l'installazione evitare che detriti o residui metallici penetrino all'interno dell'apparecchio;
- Garantire un montaggio privo di tensioni meccaniche, è consigliato l'uso di giunti compensatori anche per sopperire alle dilatazioni termiche della tubazione;
- In caso sia prevista l'installazione dell'apparecchio in una rampa, è cura dell'installatore prevedere adeguati supporti o appoggi correttamente dimensionati, per sostenere e fissare l'insieme. Non lasciare, mai e per nessun motivo, gravare il peso della rampa solo sulle connessioni (filettate o flangiate) dei singoli dispositivi;
- In ogni caso dopo l'installazione verificare la tenuta dell'impianto;



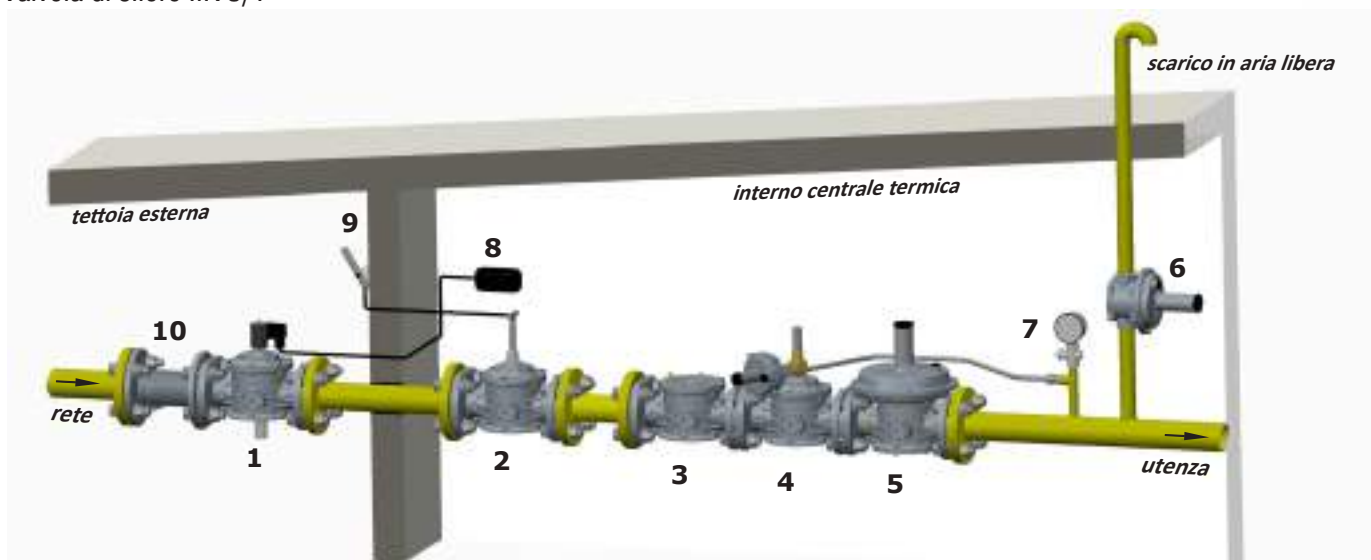
3.3 - INSTALLAZIONE IN LUOGHI A RISCHIO DI ESPLOSIONE (DIRETTIVA 2014/34/UE)

La valvola non è idonea per l'utilizzo in luoghi a rischio di esplosione.

3.4 - ESEMPI GENERICI DI INSTALLAZIONE

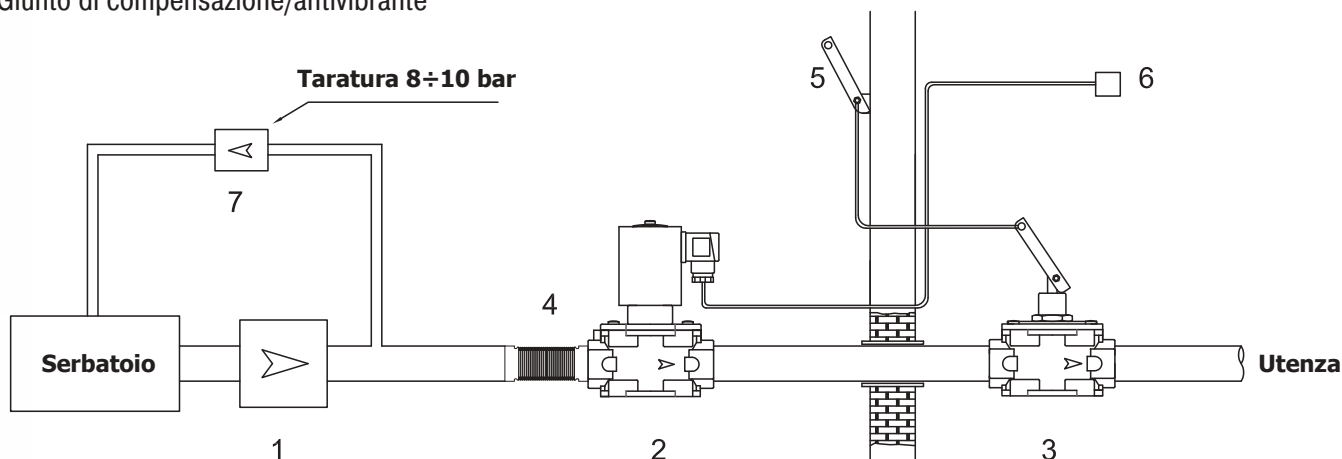
ESEMPIO 1 (impianto di adduzione gas)

1. Elettrovalvola a riarmo manuale M16/RM N.C.
2. **Valvola a strappo SM**
3. Filtro gas FM
4. Valvola di blocco OPSO serie MVB/1 MAX
5. Regolatore di pressione RG/2MC
6. Valvola di sfioro MVS/1
7. Manometro e relativo pulsante
8. Gas detector
9. Leva comando a distanza valvola a strappo SM
10. Giunto di compensazione/antivibrante



ESEMPIO 2 (impianto di adduzione nafta)

1. Valvola di fondo o di non ritorno
2. Elettrovalvola di intercettazione tipo MN28
- 3. Valvola a strappo SM**
4. Giunto di compensazione/antivibrante
5. Valvola di sfiato
6. Leva comando a distanza valvola a strappo SM
7. Dispositivo di comando elettrovalvola



4.0 - RIARMO MANUALE (apertura valvola)

Per riarmare la valvola:

- Portare la manopola di riarmo (1) da posizione “B” verso posizione “A” ed attendere qualche istante che si verifichi l’equilibrio di pressione tra monte e valle della valvola;
- Successivamente portare la manopola di riarmo (1) in posizione “A” (manopola verticale).



5.0 - PRIMA MESSA IN SERVIZIO



- Prima della messa in servizio verificare che tutte le indicazioni presenti in targhetta, inclusa la direzione del flusso, siano rispettate;
- Dopo aver pressurizzato in maniera graduale l’impianto, verificare la tenuta e il funzionamento della valvola.



5.1 - VERIFICHE PERIODICHE CONSIGLIATE

- Verificare con apposito strumento tarato che il serraggio dei bulloni sia conforme a quanto indicato in 3.2;
 - Verificare la tenuta delle connessioni flangiate/filettate sull’impianto;
 - Verificare la tenuta e il funzionamento della valvola e dell’eventuale comando a distanza;
- E’ cura dell’utilizzatore finale o dell’installatore definire la frequenza delle suddette verifiche in base alla gravità delle condizioni di servizio.



6.0 - MANUTENZIONE

Non sono previste operazioni di manutenzione interne all’apparecchio.

In caso sia necessario effettuare una ispezione interna è consigliato:

- Controllare anche l’integrità dell’otturatore (7) e, se necessario, sostituire l’organo di tenuta in gomma (8);
- Sostituire le guarnizioni prima di procedere al rimontaggio.



- In ogni caso, prima di effettuare qualsiasi operazione di smontaggio sull’apparecchio, assicurarsi che all’interno dello stesso non ci sia gas o fluido in pressione.

Terminate le operazioni di seguito descritte ripetere le procedure indicate al paragrafo 5.

7.0 - TRASPORTO, STOCCAGGIO E SMALTIMENTO

- Durante il trasporto il materiale deve essere trattato con cura, evitando che il dispositivo possa subire urti, colpi o vibrazioni;
- Se il prodotto presenta trattamenti superficiali (es. verniciatura, cataforesi, ecc) non devono essere danneggiati durante il trasporto;
- La temperatura di trasporto e di stoccaggio, coincide con quella indicata nei dati di targa;
- Se il dispositivo non viene installato subito dopo la consegna deve essere correttamente immagazzinato in un luogo secco e pulito;
- In ambienti umidi è necessario usare siccativi oppure il riscaldamento per evitare la condensa.
- Il prodotto, a fine vita, dovrà essere smaltito in conformità alla legislazione vigente nel paese in cui si esegue tale operazione.

8.0 - GARANZIA

Valgono le condizioni di garanzia stabilite col fabbricante al momento della fornitura.

Per danni causati da:

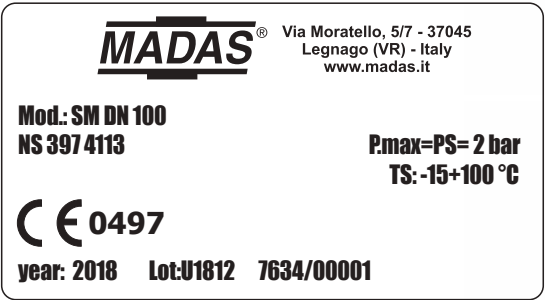
- Uso improprio del dispositivo;
 - Inosservanza delle prescrizioni indicate nel presente documento;
 - Inosservanza delle norme riguardanti l'installazione;
 - Manomissione, modifica e utilizzo di parti di ricambio non originali;
- non possono essere rivendicati diritti di garanzia o risarcimento danni.

Sono esclusi inoltre dalla garanzia i lavori di manutenzione, il montaggio di apparecchi di altri produttori, la modifica del dispositivo e l'usura naturale.

9.0 - DATI DI TARGA

In targa (vedere esempio a fianco) sono riportati i seguenti dati:

- Nome/logo e indirizzo del fabbricante
(eventuale nome/logo distributore)
- Mod.: = nome/modello dell'apparecchio seguito
dal diametro di connessione
- NS...(se presente) = Omologazione ministeriale
- P.max = Pressione massima alla quale è garantito il funzionamento del prodotto
- PS = Pressione massima ammissibile
- TS = Range di temperatura alla quale è garantito il funzionamento del prodotto
-  0497 = Conformità Dir. PED seguita dal n° dell'Organismo Notificato
- year = Anno di fabbricazione
- Lot = Numero matricola del prodotto (vedere spiegazione di seguito)
 - U1812 = Lotto in uscita anno 2018 settimana n° 12
 - 7634 = numero progressivo commessa riferito all'anno indicato
 - 00001 = numero progressivo riferito alla q.tà del lotto



1.0 - GENERAL INFORMATION

This manual shows you how to safely install, operate and use the device.

The instructions for use **ALWAYS** need to be available in the facility where the device is installed.

ATTENTION: installation/maintenance need to be carried out by qualified staff (as explained in section 1.3) using appropriate personal protective equipment (PPE).

For any information pertaining to installation/wiring/maintenance or in any case problems that cannot be resolved with the use of the instructions, it is possible to contact the manufacturer from the address and phone numbers provided on the last page.

1.1 - DESCRIPTION

It is a valve that allows to open or close manually the flow of the fluid inside the pipe.

Thanks to its total passage it has a small load loss and the remote interception operation makes the closing easier and faster than traditional ball valves. For the remote actuation of the valve a special kit must be used (available separately upon request).

1.2 - KEY OF SYMBOLS



DANGER: In the event of inobservance, this may cause damage to tangible goods.



DANGER: In the event of inobservance, this may cause damage to tangible goods, to people and/or pets.



ATTENTION: Attention is drawn to the technical details intended for qualified staff.

1.3 - QUALIFIED STAFF

These are people who:

- Are familiar with product installation, assembly, start-up and maintenance;
- Know the regulations in force in the region or country pertaining to installation and safety;
- Are trained in first aid.



1.4 - USING NON-ORIGINAL SPARE PARTS

- To perform maintenance or change parts **ONLY** manufacturer-recommended parts can be used. Using different parts not only voids the product warranty, it could compromise correct device operation.
- The manufacturer is not liable for malfunctions caused by unauthorised tampering or use of non-original parts.



1.5 - IMPROPER USE

- The product must only be used for the purpose it was built for.
- It is not allowed to use different fluids than those expressly stated.
- The technical data set forth on the rating plate must not be exceeded whatsoever. The end user or installer is in charge of implementing proper systems to protect the device, which prevent exceeding the maximum pressure indicated on the rating plate.
- The manufacturer is not responsible to damage caused by improper use of the device.

2.0 - TECHNICAL DATA

- Use : gasoil, naphta, non-aggressive gases of the three families (dry gases)
- Ambient temperature (TS) : -15 ÷ +100 °C
- Maximum operating pressure : 2 or 6 bar (see product label)
- Mechanical resistance : Group 2 according to EN 10226
- Rp Threaded connections (brass body) : (DN 15 - DN 20) secondo EN 10226
- Rp Threaded connections : (DN 15 - DN 20 - DN 25 - DN 32 - DN 40 - DN 50) according to EN 10226
- Flanged connections to be coupled with PN 16 flanges : (DN 25* - DN 32 - DN 40 - DN 50 - DN 65 - DN 80 - DN 100 - DN 125 - DN 150) according to ISO 7005
- NPT threaded or ANSI 150 flanged connections : request feasibility
- Quick closing valve
- In compliance with : PED Directive 2014/68/EU

* DN 25 with swivel flanges.

3.0 - COMMISSIONING THE DEVICE



3.1 - OPERATIONS PRIOR TO INSTALLATION

- It is necessary to close the gas upstream of the valve prior to installation;
 - Make sure that the line pressure **DOES NOT EXCEED** the maximum pressure declared on the product label;
 - Any protective caps (if any) must be removed prior to installation;
 - Valve pipes and insides must be clear of any foreign bodies;
- If the device is threaded:
- make sure that the pipe thread is not too long, to prevent damaging the body of the device when screwing it on;
- If the device is flanged:
- make sure the inlet and outlet counter-flanges are perfectly coaxial and parallel in order to prevent unnecessary mechanical stress to the body. Also calculate the space to insert the seal gasket;
 - With regard to tightening operations, equip yourself with one or two calibrated torque wrenches or other controlled locking tools;

Common procedures (threaded and flanged devices):

- The safety regulations on handling loads in force in the country of installation must be complied with. If the device to be installed exceeds the weight allowed, suitable mechanical equipment and adequate slings must be used. Necessary precautions must be taken during the handling phases so as not to damage/ruin the external surface of the device.
- With outdoor installation, it is advisable to install a protective roof to prevent rain from oxidising or damaging parts of the device.



- According to the plant geometry, check the risk of explosive mixture arising inside the piping;
- If the valve is installed near other devices or as part of an assembly, compatibility between the valve and this other device must be evaluated beforehand;
- Provide a protection against impacts or accidental contacts if the valve is accessible to unqualified personnel.



3.2 - INSTALLATION (see example in 3.4)

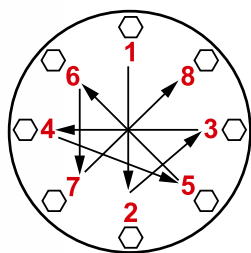
Threaded devices:

- Assemble the device by screwing it, with the due seals, onto the plant with pipes and/or fittings whose threads are consistent with the connection being attached;
- The arrow, shown on the body (6) of the device, needs to be pointing towards the application;

Flanged devices:

- Assemble the device by flanging it, with the due seals, onto the plant with pipes whose flanges are consistent with the connection being attached. The gaskets must be free from defects and must be centred between the flanges;
- If, after installing the gaskets, there is still an excessive space in between, do not try to reduce the said gap by excessively tightening the bolts of the device;

- The arrow, shown on the body (**6**) of the device, needs to be pointing towards the application;
- Insert the relative washers inside the bolts in order to prevent damage to the flanges during tightening;
- When tightening, be careful not to “pinch” or damage the gasket;
- Tighten the nuts or bolts gradually, in a “cross” order (see the example below);
- Tighten them, first by 30%, then by 60%, and finally 100% of the maximum torque (see the table below according to EN 13611);



Diameter	DN 25	DN 32	DN 40	DN 50	DN 65	DN 80	DN 100	DN 125	DN 150
Max. torque (N.m)	30	50	50	50	50	50	80	160	160

- Tighten each nut and bolt again clockwise at least once, until the maximum torque has been achieved uniformly;
- Common procedures (threaded and flanged devices):

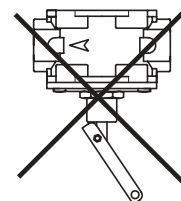
• The device can also be installed vertically without prejudicing correct operation. It cannot be put in upside down (with its reset handgrip in downward position);

• During installation, avoid debris or metal residues from getting into the device;

• To guarantee mechanical tension-free assembly, we recommend using compensating joints, which also adjust to the pipe's thermal expansion;

• If the device is to be installed in a ramp, it is the installer's responsibility to provide suitable supports or correctly sized supports, to properly hold and secure the assembly. Never, for any reason whatsoever, leave the weight of the ramp only on the connections (threaded or flanged) of the individual devices;

• In any case, following installation, check the tightness of the plant;



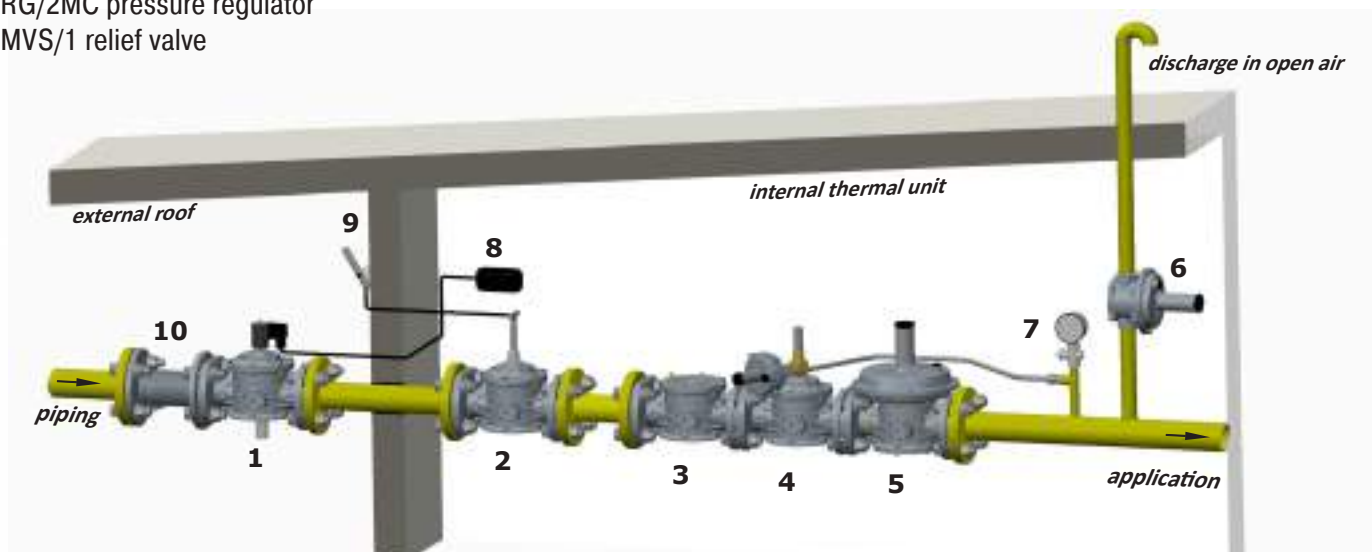
3.3 - INSTALLATION IN PLACES WHERE THERE IS THE RISK OF EXPLOSION (DIRECTIVE 2014/34/EU)

The valve is not suitable for use in potentially explosive areas.

3.4 - GENERIC EXAMPLES OF AN INSTALLATION

EXAMPLE 1 (gas plant)

1. M16/RM N.C. Manual reset solenoid valve
2. **SM jerk ON/OFF valve**
3. FM gas filter
4. OPSO series MVB/1 MAX shut off valve
5. RG/2MC pressure regulator
6. MVS/1 relief valve
7. Pressure gauge and relative button
8. Gas detector
9. SM remote jerk ON/OFF valve lever control
10. Expansion joint/anti-vibration mount



EXAMPLE 2 (naphta plant)

1. Bottom valve or non return valve

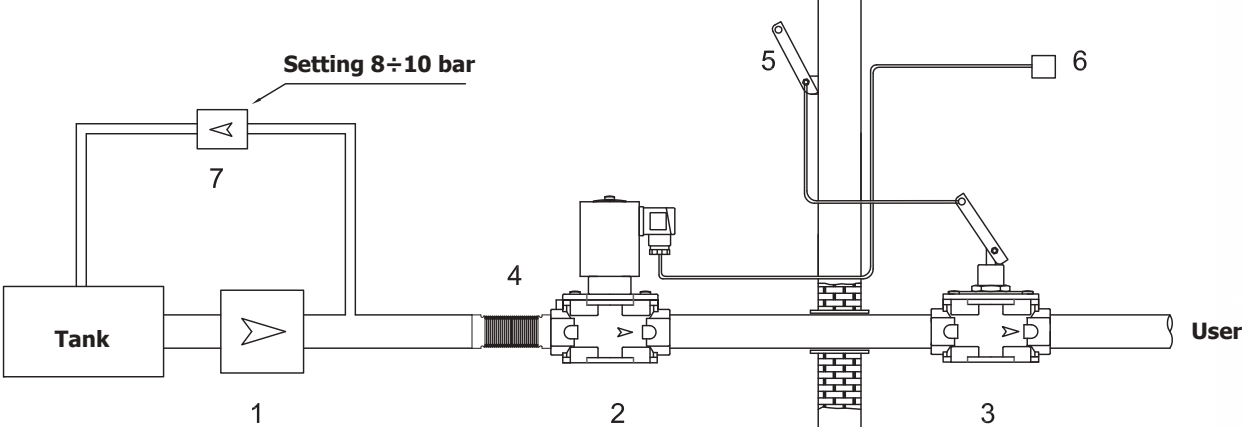
2. MN28 interception solenoid valve

3. SM jerk handle valve

4. Expansion joint/anti-vibration mount
5. Exhaust valve

6. SM jerk handle valve remote lever

7. Valve control



 4.0 - MANUEL RESET (valve opening)

- To reset the valve:
- Pull the reset handgrip (1), turn the reset hand-grip (1) from position “B” to position “A” and wait a few instants in order to get the pressure balance between upstream and downstream of the valve.
 - Subsequently bring the reset handle (1) in position “A” (vertical position).

 5.0 - FIRST START-UP

- 
- Before start-up make sure that all of the instructions on the rating plate, including the direction of flow, are observed;
 - After having gradually pressurised the system, check tightness and operation of the valve.

 5.1 - RECOMMENDED PERIODIC CHECKS

- Use a suitable calibration tool to ensure the bolts are tightened as indicated in 3.2;
 - Check tightness of the flanged/threaded connections on the system;
 - Check the tightness and operation of the valve and any remote control;
- It is the responsibility of the final user or installer to define the frequency of these checks based on the severity of the service conditions.

 6.0 - MAINTENANCE

No maintenance operations need to be carried out inside the device.

If an internal inspection is required, it is advisable to:

- Also check the integrity of the obturator (7) and, if necessary, replace the rubber seal (8);
- Replace the gaskets before reassembling.

- 
- In any case, before carrying out any dismantling operation on the device, make sure that there is no pressurised gas or fluid inside.

On completion of the operations described below, repeat the procedure indicated in paragraph 5.

7.0 - TRANSPORT, STORAGE AND DISPOSAL

- During transport the material needs to be handled with care, avoiding any impact or vibrations to the device;
- If the product has any surface treatments (ex. painting, cataphoresis, etc) it must not be damaged during transport;
- The transport and storage temperatures must observe the values provided on the rating plate;
- If the device is not installed immediately after delivery it must be correctly placed in storage in a dry and clean place;
- In humid facilities, it is necessary to use driers or heating to avoid condensation;
- At the end of its service life, the product is to be disposed of in compliance with the legislation in force in the country where this operation is performed.

8.0 - WARRANTY

The warranty conditions agreed with the manufacturer at the time of the supply apply.

For damage caused by:

- Improper use of the device;
- Failure to observe the requirements described herein;
- Failure to observe the regulations pertaining to installation;
- Tampering, modification and use of non-original spare parts;

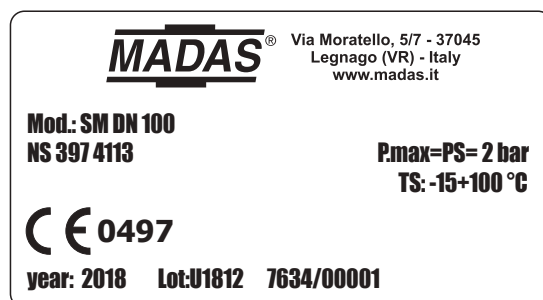
are not covered by the rights of the warranty or compensation for damage.

The warranty also excludes maintenance work, other manufacturers's assembling units, making changes to the device and natural wear.

9.0 - RATING PLATE DATA

The rating plate data (see example provided here) includes the following:

- Manufacturer's name/logo and address (possible distributor name/logo)
- Mod.: = device name/model followed by the connection diameter
- NS...(if it is present) = Ministerial approval
- P.max = Maximum pressure at which product operation is guaranteed
- PS = Maximum allowable pressure
- TS = Temperature range within which product operation is guaranteed
-  0497 = In compliance with PED Dir. followed by Notified Body No.
- year = Year of manufacture
- Lot = Product serial number (see explanation below)
 - U1812 = Lot issued in year 2018 in the 12th week
 - 7634 = progressive job order number for the indicated year
 - 00001 = progressive number referring to the quantity of the lot



1.0 - GÉNÉRALITÉS

Le présent manuel illustre comment installer et faire fonctionner le dispositif en toute sécurité.

Les instructions pour l'utilisation doivent **TOUJOURS** être disponibles dans le site de production où le dispositif est installé.

ATTENTION : les opérations d'installation/d'entretien doivent être effectuées par un personnel qualifié (comme indiqué au paragraphe 1.3) en utilisant des équipements de protection individuelle (E.P.I) adaptés.

Pour d'éventuelles informations relatives aux opérations d'installation/câblage/entretien ou en cas de problèmes ne pouvant pas être résolus avec les instructions, il est possible de contacter le fabricant en utilisant l'adresse et les numéros de téléphone reportés à la dernière page.

1.1 - DESCRIPTION

La soupape d'interception à déchirement de la série SM est fiable aussi dans les conditions de travail les plus difficiles. Avec son passage total elle a de basses pertes de charge, et la possibilité d'actionnement de l'interception à distance rend simple, rapide et sûre la manœuvre de fermeture, si elle est confrontée avec les robinets normaux à sphère. Pour le fonctionnement à distance de la vanne, un kit spécial doit être utilisé (disponible séparément sur demande).

1.2 - LÉGENDE DES SYMBOLES



DANGER : En cas de non-respect, il y a un risque de dommages matériels.



DANGER : En cas de non-respect, il se peut qu'il y ait non seulement des dommages matériels mais aussi des dommages aux personnes et/ou aux animaux domestiques.



ATTENTION : Nous attirons votre attention sur les détails techniques s'adressant au personnel qualifié.

1.3 - PERSONNEL QUALIFIÉ

Il s'agit de personnes qui :

- Sont familiarisées avec l'installation, le montage, la mise en service et l'entretien du produit;
- Connaissent les réglementations en matière d'installation et de sécurité, applicables dans leur région ou leur pays;
- Ont été formées sur les premiers secours.



1.4 - UTILISATION DE PIÈCES DE RECHANGE NON ORIGINALES

- En cas d'entretien ou de remplacement de composants de rechange, il ne faut utiliser **QUE** ceux indiqués par le Fabricant. L'utilisation de composants différents, en plus d'annuler la garantie du produit, pourrait compromettre le bon fonctionnement de celui-ci.
- Le fabricant n'est pas responsable de dysfonctionnements dérivant d'altérations non autorisées ou d'utilisation de pièces de rechange non originales.



1.5 - UTILISATION NON APPROPRIÉE

- Le produit doit être utilisé uniquement pour le but pour lequel il a été construit.
- Il n'est pas permis de l'utiliser avec des fluides différents de ceux indiqués.
- Les données techniques indiquées sur la plaque ne doivent en aucun cas être dépassées. Il appartient à l'utilisateur final ou à l'installateur d'adopter des systèmes adéquats de protection de l'appareil qui empêchent de dépasser la pression maximale nominale.
- Le Fabricant n'est pas responsable des dommages causés par un usage impropre de l'appareil.

2.0 - DONNÉES TECHNIQUES

- Emploi : gasoil, mazout, gaz non agressifs des trois familles (gaz secs)
- Température ambiante (TS) : -15 ÷ +100 °C
- Pression maximum de fonctionnement : 2 bar ou 6 bar (voir étiquette produit)
- Résistance mécanique : Groupe 2 selon la norme EN 13611
- Raccords filetés Rp (corps en laiton) : (DN 15 - DN 20) selon la norme EN 10226
- Raccords filetés Rp : (DN 15 - DN 20 - DN 25 - DN 32 - DN 40 - DN 50) selon la norme EN 10226
- Raccords à brides à coupler avec des brides PN 16 : (DN 25* - DN 32 - DN 40 - DN 50 - DN 65 - DN 80 - DN 100 - DN 125 - DN 150) selon la norme ISO 7005
- Raccords filetés NPT ou bridés ANSI 150 : demander la faisabilité
- Fermeture instantanée de la soupape
- Conformément à : Directive PED 2014/68/UE

* DN 25 avec brides tournantes.

3.0 - MISE EN SERVICE DU DISPOSITIF



3.1 - OPÉRATIONS PRÉALABLES À L'INSTALLATION

- Il est nécessaire de fermer le gaz en amont de la vanne avant l'installation ;
- Vérifier que la pression de ligne **NE DÉPASSE PAS** la pression maximum déclarée sur l'étiquette du produit ;
- D'éventuels bouchons de protection (si présents) doivent être ôtés avant l'installation ;
- Les conduites et intérieurs de la vanne doivent être libres de corps étrangers ;

Si l'appareil est fileté :

- vérifier que la longueur du filet du tuyau n'est pas excessive pour ne pas endommager le corps de l'appareil en phase de vissage ;

Si l'appareil est bridé :

- vérifier que les contre-brides d'entrée et sortie sont parfaitement parallèles pour éviter de soumettre le corps à des efforts mécaniques inutiles, calculer également l'espace pour l'insertion du joint d'étanchéité ;
- Pour les phases de serrage, une ou plusieurs clés dynamométriques calibrées ou autres outils de verrouillage contrôlés doivent être employés ;

Procédures en commun (appareils filetés et bridés) :

- Il est impératif de respecter les normes de sécurité en vigueur dans le pays d'installation, en ce qui concerne la manutention des charges. Si l'appareil à installer dépasse le poids admissible, il faut prévoir l'utilisation d'un équipement mécanique adéquat et d'élingues appropriées. Pendant les phases de manutention, il est nécessaire d'adopter des précautions opportunes pour ne pas endommager/abîmer la surface extérieure de l'appareil.
- En cas d'installation à l'extérieur, il est conseillé de prévoir un auvent de protection pour éviter que l'eau de pluie ne puisse oxyder ou endommager des pièces de l'appareil.



- En fonction de la géométrie de l'installation, évaluer le risque de formation de mélange explosif dans le tuyau ;
- Si la soupape est installée à proximité d'autres appareillages ou comme partie d'un ensemble, il est nécessaire d'évaluer au préalable la compatibilité entre la soupape et ces appareillages ;
- Si la soupape est accessible au personnel non qualifié, il faut prévoir une protection contre les collisions ou les contacts accidentels.



3.2 - INSTALLATION (voir l'exemple au 3.4)

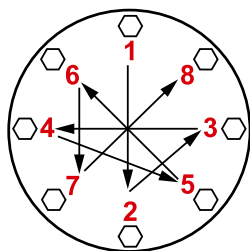
Appareils filetés :

- Assembler le dispositif en le vissant, avec les joints opportuns, sur l'installation avec des tuyaux et/ou des raccords dont les filetages sont cohérents avec la connexion à assembler ;
- La flèche, indiquée sur le corps (6) de l'appareil, doit être tournée vers l'application ;

Appareils bridés :

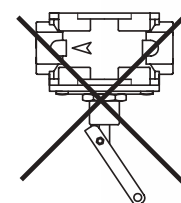
- Assemblez l'appareil en le bridant, avec les joints appropriés, à l'installation avec des tuyaux dont les brides sont compatibles avec la connexion à assembler. Les joints doivent être exempts de défauts et doivent être centrés entre les brides ;
- Si lorsque les joints sont insérés, l'espace restant est excessif ne pas essayer de le remplir en serrant trop les boulons de l'appareil ;

- La flèche, indiquée sur le corps (**6**) de l'appareil, doit être tournée vers l'application ;
- Insérez les rondelles appropriées à l'intérieur des boulons pour éviter d'endommager les brides pendant le serrage ;
- Pendant la phase de serrage, veillez à ne pas « pincer » ou endommager le joint ;
- Serrer les écrous ou les boulons progressivement, selon un schéma en croix (voir l'exemple ci-dessous) ;
- Serrez-les d'abord à 30 %, puis 60 %, jusqu'à 100 % du couple maximum (voir le tableau ci-dessous selon EN 13611) ;



Diamètre	DN 25	DN 32	DN 40	DN 50	DN 65	DN 80	DN 100	DN 125	DN 150
Couple max. (N.m)	30	50	50	50	50	50	80	160	160

- Serrer chaque écrou ou boulon dans le sens des aiguilles d'une montre au moins une fois jusqu'à ce que l'uniformité du couple maximal soit atteint ;
- Procédures en commun (appareils filetés et bridés) :
- Le dispositif peut également être installé en position verticale sans que le fonctionnement correct ne soit compromis. Il ne peut pas être positionné renversé ;
- Durant l'installation éviter que les déchets ou résidus métalliques ne pénètrent à l'intérieur de l'appareil (avec la manette de réarmement tournée vers le bas) ;
- Garantir un montage dépourvu de tensions mécaniques, il est conseillé d'utiliser aussi des joints compensateurs pour pallier les dilatations thermiques du tuyau ;
- Si l'installation de l'appareil est prévue dans une rampe, c'est à l'installateur de prévoir des supports adéquats ou des appuis correctement dimensionnés, pour soutenir et fixer l'ensemble. Ne jamais laisser, sous aucun prétexte, reposer le poids de la rampe uniquement sur les connexions (filetées ou bridées) de chaque dispositif ;
- Dans tous les cas, après la mise en place vérifier l'étanchéité de l'installation ;



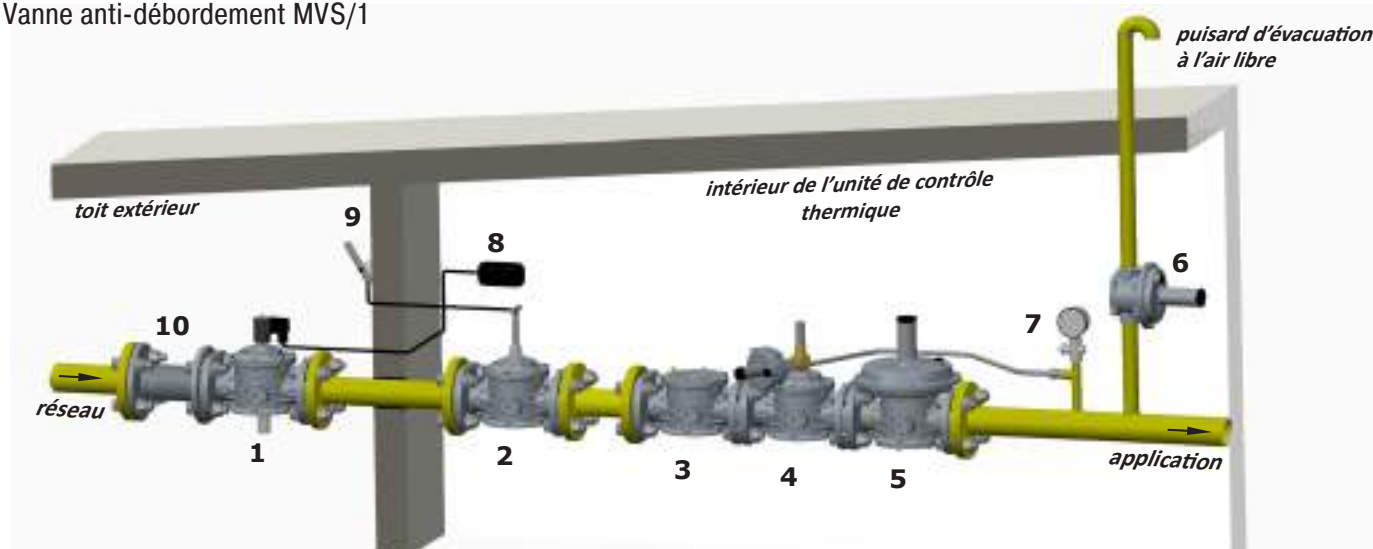
3.3 - INSTALLATION DANS DES LIEUX À RISQUE D'EXPLOSION (DIRECTIVE 2014/34/UE)

La soupape n'est pas adaptée à être utilisée dans des lieux exposés au risque d'explosion.

3.4 - EXEMPLES GÉNÉRAL D'INSTALLATION

EXEMPLE 1 (installations à induction à gaz)

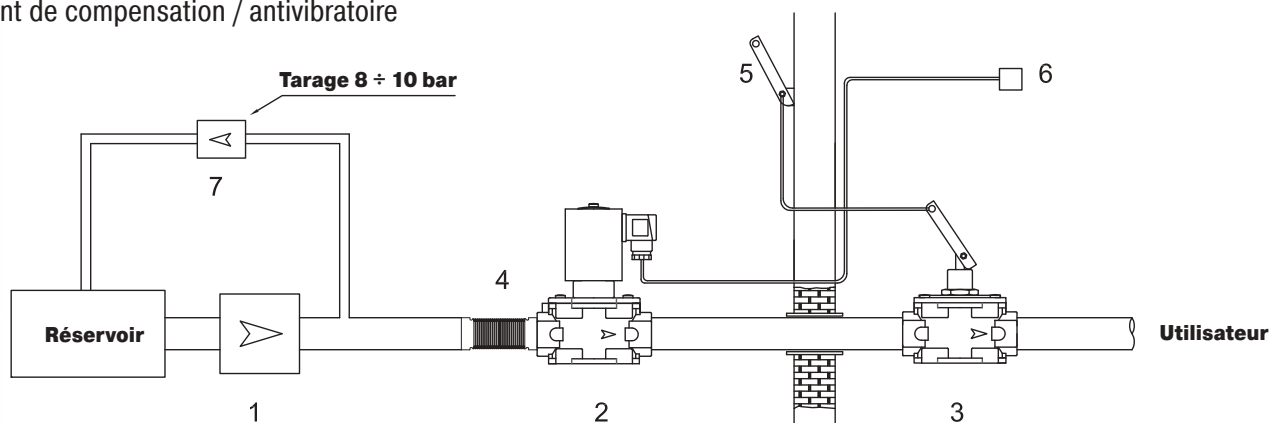
1. Électrovanne à réarmement manuel M16/RM N.C.
2. **Vanne à déchirement SM**
3. Filtre à gaz FM
4. Vanne de fermeture OPSO série MVB/1 MAX
5. Régulateur de pression RG/2MC
6. Vanne anti-débordement MVS/1
7. Manomètre et son bouton
8. Détecteur de gaz
9. Levier de commande à distance de la vanne à déchirement SM
10. Joint de compensation/antivibratoire



EXEMPLE 2 (installations à induction de mazout)

1. Soupape de fond ou de non retour
2. Electrovanne d'interception de type MN28
- 3. Soupape à déchirement SM**
4. Joint de compensation / antivibratoire

5. Soupape d'échappement
6. Levier de commande à distance soupape à déchirement SM
7. Dispositif de commande électrovanne



4.0 - REARME MANUAL (ouverture de la soupape)

Pour réarmer la soupape:

- porter le bouton du réarmement (**1**) de la position "B" à la position "A" et attendre quelques instants afin de se produire l'équilibre de pression entre l'amont et l'aval de la vanne.
- Suite porter le bouton du réarmement (**1**) à la position "A" (bouton verticale).



5.0 - PREMIÈRE MISE EN SERVICE



- Avant la mise en service, s'assurer que toutes les indications présentes sur la plaque, y compris la direction du flux, sont respectées ;
- Après avoir pressurisé progressivement l'installation, vérifier le joint d'étanchéité et le fonctionnement de la soupape.



5.1 - VÉRIFICATIONS PÉRIODIQUES CONSEILLÉES

- S'assurer, avec un instrument calibré approprié, que le serrage des boulons est conforme à ce qui est indiqué au 3.2 ;
 - Vérifier l'étanchéité des connexions à brides/filetées sur l'installation ;
 - Vérifiez l'étanchéité et le fonctionnement de la soupape et de toute commande à distance ;
- C'est à l'utilisateur final ou à l'installateur de définir la fréquence des susdites vérifications sur la base de la gravité des conditions de service.



6.0 - ENTRETIEN

Aucune opération d'entretien n'est prévue à l'intérieur de l'appareil.

Si une inspection interne est nécessaire, il est recommandé de:

- Vérifiez également l'intégrité du bouchon (**7**) et, si nécessaire, remplacez le rondelle d'étanchéité (**8**);
- Remplacez les joints avant de réassembler.



- Dans tous les cas, avant de procéder à tout démontage de l'appareil, assurez-vous qu'il ne contient pas de gaz ou de fluide sous pression.

Après avoir terminé les opérations décrites ci-dessous, répétez les procédures indiquées au paragraphe 5.

7.0 - TRANSPORT, STOCKAGE ET ÉLIMINATION

- Pendant le transport, le matériel doit être traité avec soin, en évitant que le dispositif ne puisse subir des chocs, des coups ou des vibrations ;
- Si le produit présente des traitements superficiels (ex. peinture, cataphorèse, etc.) ils ne doivent pas être endommagés pendant le transport ;
- La température de transport et de stockage coïncide avec celle indiquée dans les données de la plaque ;
- Si le dispositif n'est pas installé tout de suite après la livraison, il doit être correctement emmagasiné dans un lieu sec et propre ;
- En environnements humides, il est nécessaire d'utiliser des siccatifs ou bien le chauffage pour éviter la condensation ;
- Le produit, en fin de vie, devra être éliminé conformément à la législation en vigueur dans le pays où l'on exécute cette opération.

8.0 - GARANTIE

Il s'agit des conditions de garantie établies avec le fabricant lors de la fourniture.

Pour de dommages causés par:

- Un usage impropre du dispositif ;
- Le non-respect des prescriptions indiquées dans le présent document ;
- Le non-respect des règles concernant l'installation ;
- Altération, modification et utilisation de pièces de rechange non originales ;

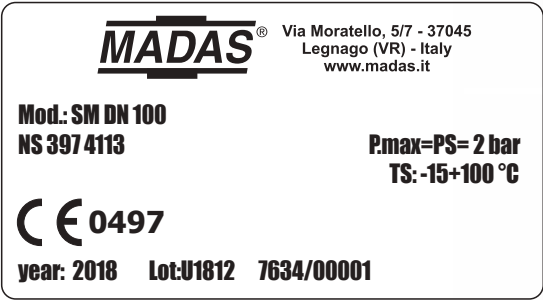
aucun droit de garantie ou de dédommagement ne peut être revendiqué.

Sont également exclus de la garantie les travaux d'entretien, le montage d'appareils d'autres producteurs, la modification du dispositif et l'usure naturelle.

9.0 - DONNÉES DE LA PLAQUE

Dans les données de la plaque (voir l'exemple ci-contre) sont reportées les données suivantes :

- Nom/logo et adresse du fabricant (éventuellement nom/logo du revendeur)
- Mod. : = nom/modèle de l'appareil suivi
par le diamètre de connexion
- NS...(si c'est présent) = Approbation ministérielle
- P.max = Pression maximum à laquelle le fonctionnement du produit est garanti
- PS = pression maximum admissible
- TS = Plage de température à laquelle le fonctionnement du produit est garanti
-  0497 = Conformité Dir. PED suivie du n° de l'Organisme Notifié
- year = Année de fabrication
- Lot = Numéro de série du produit (voir l'explication ci-dessous)
 - U1812 = Lot en sortie année 2018 semaine n° 12
 - 7634 = numéro progressif commande se référant à l'année indiquée
 - 00001 = numéro progressif se référant à la q.té du lot



1.0 - INFORMACIÓN GENERAL

Este manual ilustra cómo instalar y hacer funcionar el dispositivo de forma segura.

Las instrucciones de uso deben estar **SIEMPRE** disponibles en la instalación donde se encuentra el dispositivo.

ATENCIÓN: las operaciones de instalación/mantenimiento las debe realizar personal cualificado (como se indica en 1.3), utilizando equipos de protección individual (EPI) adecuados.

Para obtener más información respecto a las operaciones de instalación/cableado/mantenimiento o en caso de problemas que no se puedan solucionar usando las instrucciones, es posible ponerse en contacto con el fabricante a través de la dirección y los números de teléfono que aparecen en la última página.

1.1 - DESCRIPCIÓN

La válvula de interceptación de corte serie SM es fiable también en las condiciones de trabajo más gravosas. Con su paso total tiene bajas pérdidas de carga y la posibilidad de accionamiento de la interceptación a distancia simplifica, da rapidez y seguridad a la maniobra de cierre, si comparamos con los normales grifos. Para el accionamiento remoto de la válvula se debe usar un kit especial (disponible por separado a pedido).

1.2 - LEYENDA DE SÍMBOLOS



PRECAUCIÓN: En caso de incumplimiento, se pueden provocar daños en bienes materiales.



PRECAUCIÓN: En caso de incumplimiento, además de daños en bienes materiales, también pueden provocarse daños a las personas y/o animales domésticos.



ATENCIÓN: Se llama la atención sobre detalles técnicos dirigidos al personal cualificado.

1.3 - PERSONAL CUALIFICADO

Se trata de personal que:

- Está familiarizado con la instalación, el montaje, la puesta en servicio y el mantenimiento del producto;
- Conoce las normativas en vigor en la región o país en materia de instalación y seguridad;
- Ha recibido formación acerca de primeros auxilios.



1.4 - USO DE PARTES DE RECAMBIO NO ORIGINALES

- En caso de mantenimiento o sustitución de componentes de recambio, se deben usar **SOLO** los indicados por el fabricante. El uso de componentes diferentes, además de invalidar la garantía del producto, podría perjudicar su correcto funcionamiento;
- El fabricante se exime de toda responsabilidad por problemas de funcionamiento que se deriven de alteraciones no autorizadas o uso de recambios no originales.



1.5 - USO NO APROPIADO

- El producto se debe usar sólo para el fin para el que ha sido fabricado.
- No se permite el uso con fluidos que no sean los indicados.
- No se deben superar en ningún caso los datos técnicos indicados en la placa. El usuario final o el instalador tienen que adoptar sistemas correctos de protección del aparato, que impidan que se supere la presión máxima indicada en la placa.
- El fabricante no es responsable por los daños causados por un uso impropio del aparato.

2.0 - DATOS TÉCNICOS

- Uso : gasóleo, nafta, gases no agresivos de las tres familias (gases secos)
- Temperatura ambiente (TS) : -15 ÷ +100 °C
- Presión máxima de funcionamiento : 2 bar o 6 bar (véase la etiqueta del producto)
- Resistencia mecánica : Grupo 2 según EN 13611
- Conexiones roscadas Rp (cuerpo de latón) : (DN 15 - DN 20) según EN 10226
- Conexiones roscadas Rp : (DN 15 - DN 20 - DN 25 - DN 32 - DN 40 - DN 50) según EN 10226
- Conexiones embridadas acoplables con bridas PN 16 : (DN 25* - DN 32 - DN 40 - DN 50 - DN 65 - DN 80 - DN 100 - DN 125 - DN 150) según ISO 7005
- Conexiones roscadas NPT o embridadas ANSI 150 : consulte la disponibilidad
- Cierre rápido de la válvula
- De conformidad con : Directiva PED 2014/68/UE

* DN 25 con bridas giratorias.

3.0 - PUESTA EN FUNCIONAMIENTO DEL DISPOSITIVO



3.1 - OPERACIONES ANTES DE LA INSTALACIÓN

- Hay que cerrar el gas aguas arriba de la válvula, antes de la instalación;
- Compruebe que la presión de línea **NO SEA SUPERIOR** a la presión máxima declarada en la etiqueta del producto;
- Los posibles tapones de protección se deben quitar antes de la instalación;
- Las tuberías y partes interiores de la válvula no deben tener cuerpos extraños;

Si el aparato está roscado:

- Compruebe que la longitud de la rosca de la tubería no sea excesiva, para no dañar el cuerpo del aparato en fase de atornillado.

Si el aparato está embridado:

- Compruebe que las contrabridas de entrada y salida sean perfectamente coaxiales y paralelas, para evitar someter el cuerpo a esfuerzos mecánicos inútiles; además, calcule el espacio para introducir la junta de estanqueidad;
- Para las fases de apriete, es necesario procurarse una o varias llaves dinamométricas calibradas u otras herramientas de bloqueo controladas.

Procedimientos en común (aparatos roscados y embridados):

- Deben respetarse las normativas de seguridad relativas al desplazamiento de cargas, vigentes en el país de instalación. Si el aparato que hay que instalar supera el peso permitido, debe preverse el uso de una ayuda mecánica adecuada y de arneses adecuados. Durante las fases de desplazamiento, hay que adoptar las precauciones oportunas para no dañar/estropear la superficie externa del aparato.
- En caso de instalación en el exterior, se recomienda colocar un techo de protección para evitar que el agua de lluvia pueda oxidar o dañar partes del aparato.



- En función de la geometría de la instalación, evalúe el riesgo de formación de mezcla explosiva en el interior del conducto;
- Si la válvula se instala en proximidad de otros equipos o como parte de un conjunto, hay que evaluar previamente la compatibilidad entre la válvula y estos equipos;
- Prevea una protección contra golpes o contactos accidentales si la válvula está accesible a personal no autorizado.



3.2 - INSTALACIÓN (véase el ejemplo en el punto 3.4)

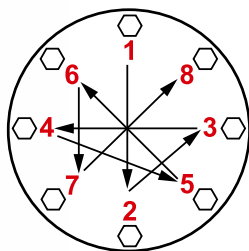
Aparatos roscados:

- Monte el dispositivo enroscándolo, insertando las juntas correspondientes, en la instalación con tubos y/o racores cuyas roscas encajen con la conexión que hay que acoplar.
- La flecha, indicada en el cuerpo (6) del aparato, debe estar dirigida hacia el punto de consumo;

Aparatos embridados:

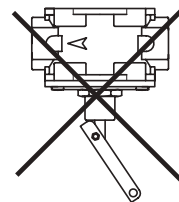
- Monte el dispositivo con bridas, insertando las juntas correspondientes, en la instalación con tuberías y/o racores cuyas bridas encajen con la conexión que hay que acoplar. Las juntas no deben tener defectos y deben estar centradas entre las bridas;
- Si con las juntas puestas el espacio que queda fuese excesivo, no trate de rellenarlo apretando excesivamente los pernos del aparato;

- La flecha, indicada en el cuerpo (6) del aparato, debe estar dirigida hacia el punto de consumo;
- Introduzca dentro de los pernos las arandelas correspondientes para evitar daños a las bridas en fase de apriete;
- Durante la fase de apriete, asegúrese de no “pellizcar” ni dañar la junta;
- Apriete las tuercas o pernos gradualmente, según un esquema “de cruz” (véase el ejemplo indicado abajo);
- Apriételos, primero al 30 %, después al 60 %, hasta el 100 % del par máximo (consulte la tabla de abajo según EN 13611);



Diámetro	DN 25	DN 32	DN 40	DN 50	DN 65	DN 80	DN 100	DN 125	DN 150
Par máximo (N.m)	30	50	50	50	50	50	80	160	160

- Apriete de nuevo cada tuerca o perno en el sentido de las agujas del reloj, por lo menos una vez, hasta llegar a la uniformidad del par máximo;
- Procedimientos en común (aparatos roscados y embridados):
- El dispositivo se puede instalar también en posición vertical sin que se perjudique su correcto funcionamiento. No se puede colocar volcado (con el mando de rearme dispuesto hacia abajo);
- Durante la instalación, evite que la suciedad o residuos metálicos penetren dentro del aparato;
- Garantice un montaje sin tensiones mecánicas; se recomienda el uso de juntas de compensación para absorber también las dilataciones térmicas de la tubería;
- Si se ha previsto la instalación del aparato en una rampa, es deber del instalador preparar soportes o apoyos adecuados, correctamente dimensionados, para sostener y fijar el conjunto. Nunca deje, por ningún motivo, que el peso de la rampa recaiga solamente sobre las conexiones (roscadas o embridadas) de cada uno de los dispositivos;
- En cualquier caso, después del montaje compruebe la estanqueidad de la instalación;



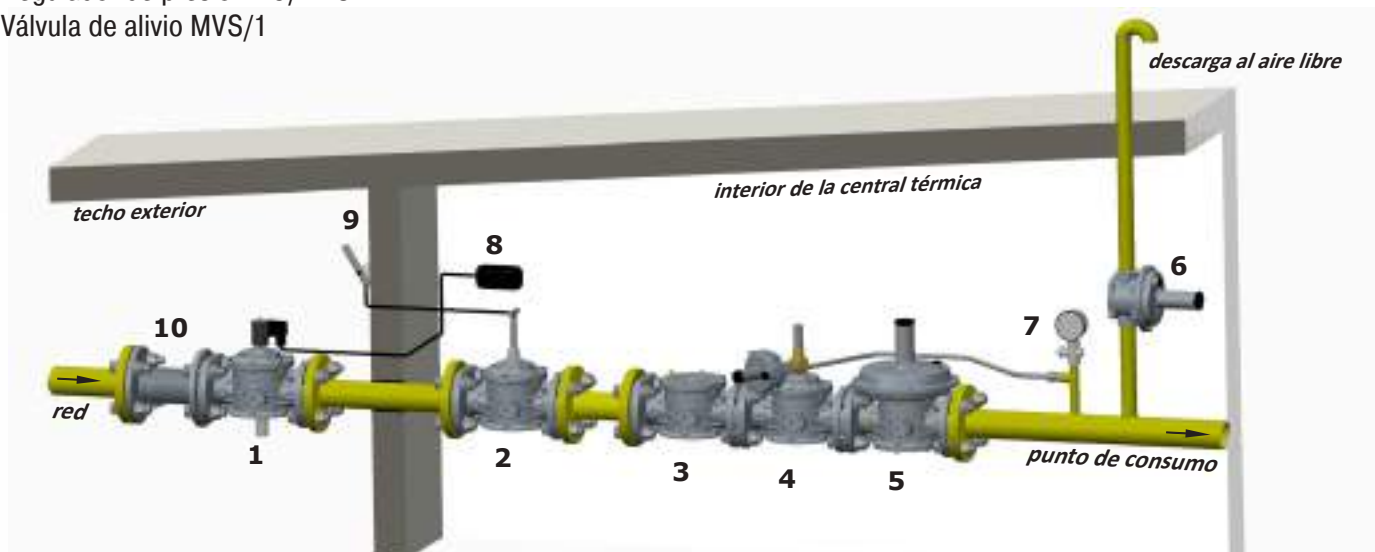
3.3 - INSTALACIÓN EN LUGARES CON RIESGO DE EXPLOSIÓN (DIRECTIVA 2014/34/UE)

La válvula no es idónea para el uso en lugares con riesgo de explosión.

3.4 - EJEMPLOS GENÉRICOS DE INSTALACIÓN

EJEMPLO 1 (instalaciones de aducción gas)

1. Electroválvula con rearme manual M16/RM N.C.
2. **Válvula de corte SM**
3. Filtro de gas FM
4. Válvula de seguridad por máxima OPSO serie MVB/1 MAX
5. Regulador de presión RG/2MC
6. Válvula de alivio MVS/1
7. Manómetro y válvula pulsadora correspondiente
8. Detección de gas
9. Palanca de mando a distancia válvula de corte SM
10. Junta de compensación/antivibración



EJEMPLO 2 (instalaciones de aducción nafta)

1. Válvula de fondo y no retorno

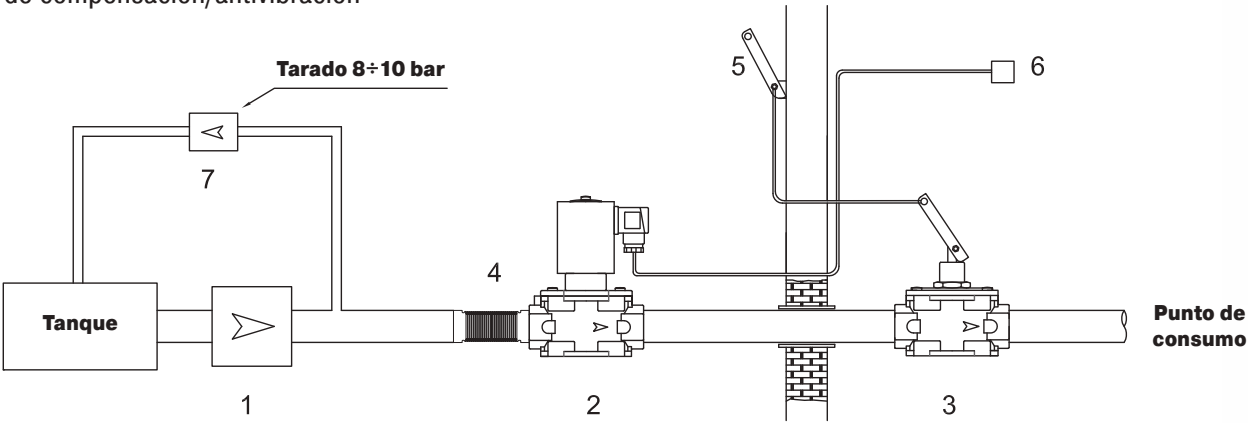
2. Electroválvula de interceptación serie MN28

3. Válvula de corte SM

4. Junta de compensación/antivibración
5. Válvula de alivio

6. Palanca para actuación de de la válvula de corte SM

7. Control válvula



4.0 - REARME MANUAL (apertura de la válvula)

- Para rearmar la válvula:
- girar el mando para restablecer (1) desde la posición «B» en posición «A» y esperar un tiempo para producir el equilibrio de presión entre aguas arriba y aguas abajo de la válvula.
 - A continuación, gire la perilla para restablecer (1) en la posición «A» (mando vertical).

5.0 - PRIMERA PUESTA EN SERVICIO

-
- Antes de la puesta en servicio, compruebe que se respeten todas las indicaciones presentes en la placa, incluida la dirección del flujo;
 - Después de presurizar de forma gradual la instalación, compruebe la estanqueidad y el funcionamiento de la válvula.

5.1 - COMPROBACIONES PERIÓDICAS RECOMENDADAS

- Compruebe con el instrumento específico calibrado, que el apriete de los pernos sea conforme con lo indicado en 3.2;
 - Compruebe la estanqueidad de las conexiones embridadas/roscadas en la instalación;
 - Compruebe la estanqueidad y el funcionamiento de la válvula y cualquier control remoto;
- Es deber del usuario final o del instalador determinar la frecuencia de dichas comprobaciones en función de la relevancia de las condiciones de servicio.

6.0 - MANTENIMIENTO

- No se prevén operaciones de mantenimiento a efectuar dentro del aparato.
- Si hubiera que realizar una inspección interna, se recomienda:
- Controlar también la integridad del obturador (7) y, si es necesario, sustituir el dispositivo de estanqueidad de goma (8);
 - Sustituir las juntas antes de proceder con el montaje de nuevo.

-
- En cualquier caso, antes de efectuar cualquier operación de desmontaje en el aparato, asegúrese de que en el interior del mismo no haya gas a presión.

Una vez acabadas las operaciones descritas a continuación, repita los procedimientos indicados en el apartado 5.

7.0 - TRANSPORTE, ALMACENAMIENTO Y ELIMINACIÓN

- Durante el transporte, el material debe tratarse con cuidado, evitando que el dispositivo se someta a choques, golpes o vibraciones;
- Si el producto tiene tratamientos superficiales (p. ej. pintura, cataforesis, etc.), los mismos no deben dañarse durante el transporte;
- La temperatura de transporte y almacenamiento debe coincidir con la indicada en los datos de la placa;
- Si el dispositivo no se instala inmediatamente después de la entrega, se debe almacenar correctamente en un lugar seco y limpio;
- En lugares húmedos es necesario usar secadores o bien calefacción para evitar la formación de condensación;
- El producto, al final de su vida útil, deberá eliminarse en conformidad con la legislación vigente en el país en el que se realiza esta operación.

8.0 - GARANTÍA

Valen las condiciones de garantía establecidas con el fabricante en el momento del suministro.

Por daños causados por:

- Uso impropio del dispositivo;
- Incumplimiento de las disposiciones indicadas en este documento;
- Incumplimiento de las normas relacionadas con la instalación;
- Alteración, modificación y uso de partes de repuesto no originales;

no se pueden reclamar derechos de garantía ni resarcimiento de daños.

Además, se excluyen de la garantía los trabajos de mantenimiento, el montaje de aparatos de otros fabricantes, la modificación del dispositivo y el desgaste natural.

9.0 - DATOS DE LA PLACA

En la información de la placa (véase el ejemplo de al lado) aparecen los siguientes datos:

- Nombre/logotipo y dirección del fabricante (eventual nombre/logotipo del distribuidor)
- Mod.: = nombre/modelo del aparato seguido del diámetro de conexión
- NS...(si està presente) = Aprobación ministerial
- P.max = Presión máxima en la que se garantiza el funcionamiento del producto
- PS = Presión máxima permisible
- TS = Intervalo de temperatura en el que se garantiza el funcionamiento del producto
-  0497 = Conformidad Dir. PED seguida por el n.º del Organismo Notificado
- year = Año de fabricación
- Lot = Número de matrícula del producto (véase la explicación a continuación)
 - U1812 = Lote en salida año 2018 semana n.º 12
 - 7634 = número progresivo de pedido referido al año indicado
 - 00001 = número progresivo referido a la cantidad del lote

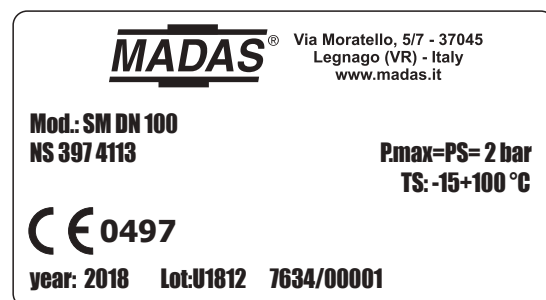


fig. 1
 Attacchi filettati
 Threaded connections
 Raccords filetés
 Conexiones roscadas

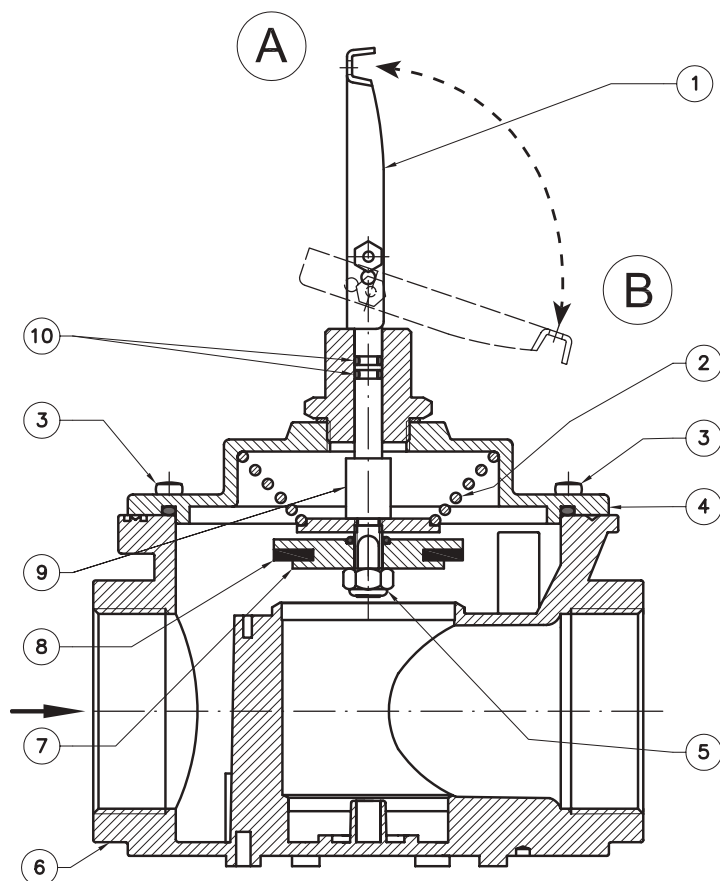
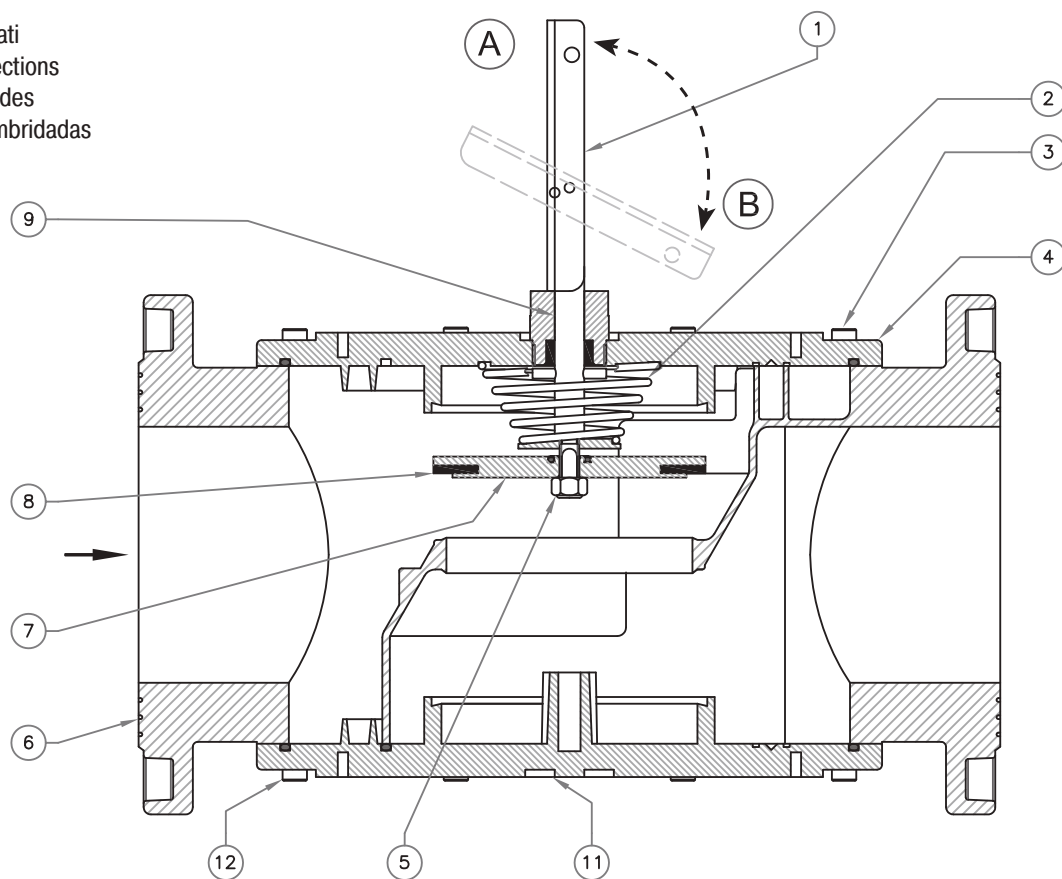


fig. 2
 Attacchi flangiati
 Flanged connections
 Raccords à brides
 Conexiones embridadas



IT

fig. 1 e 2

1. Manopola di riarmo
2. Molla di chiusura
3. Viti di fissaggio coperchio
4. Coperchio
5. Dado fissaggio otturatore
6. Corpo valvola
7. Otturatore
8. Rondella di tenuta
9. Perno centrale
10. O-Ring di tenuta
11. Fondello (solo su DN 100)
12. Viti fissaggio fondello (solo su DN 100)

EN

fig. 1 and 2

1. Reset handgrip
2. Closing spring
3. Cover fixing screws
4. Cover
5. Obturator locking nut
6. Body valve
7. Obturator
8. Seal washer
9. Central pin
10. Seal O Ring
11. Bottom (only DN 100 version)
12. Bottom fixing screws (on DN 100 only)

FR

fig. 1 et 2

1. Manette de réarmement
2. Ressort de fermeture
3. Vis de fixation du couvercle
4. Couvercle
5. Boulon de fixation d'obturateur
6. Corps de vanne
7. Obturateur
8. Rondelle d'étanchéité
9. Pivot central
10. Joint torique
11. Boîtier arrière (seulement sur DN 100)
12. Vis de fixation fond (seulement sur DN 100)

ES

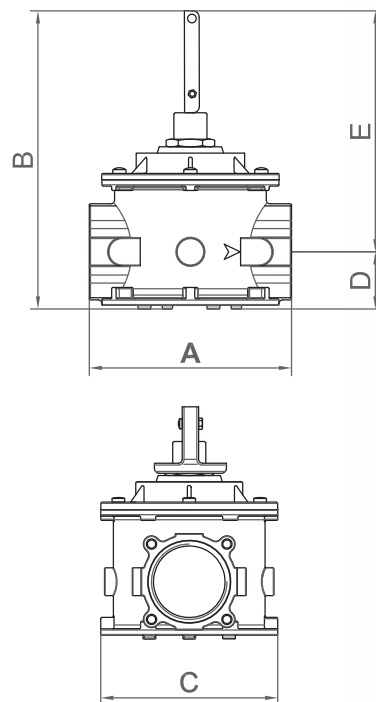
fig. 1 y 2

1. Botón de rearme
2. Muelle de cierre
3. Tornillos de fijación tapa
4. Tapa
5. Tuerca de fijación obturador
6. Cuerpo válvula
7. Obturador
8. Arandela de estanquidad
9. Eje central
10. Junta tórica de estanquidad
11. Tapa inferior (solo en DN 100)
12. Tornillos de fijación de la tapa inferior (solo en DN 100)

Tabella 1 - Table 1 - Tableau 1 - Tabla 1

Dimensioni di ingombro in mm - Overall dimensions in mm - Dimensions d'encombrement en mm - Dimensiones totales en mm

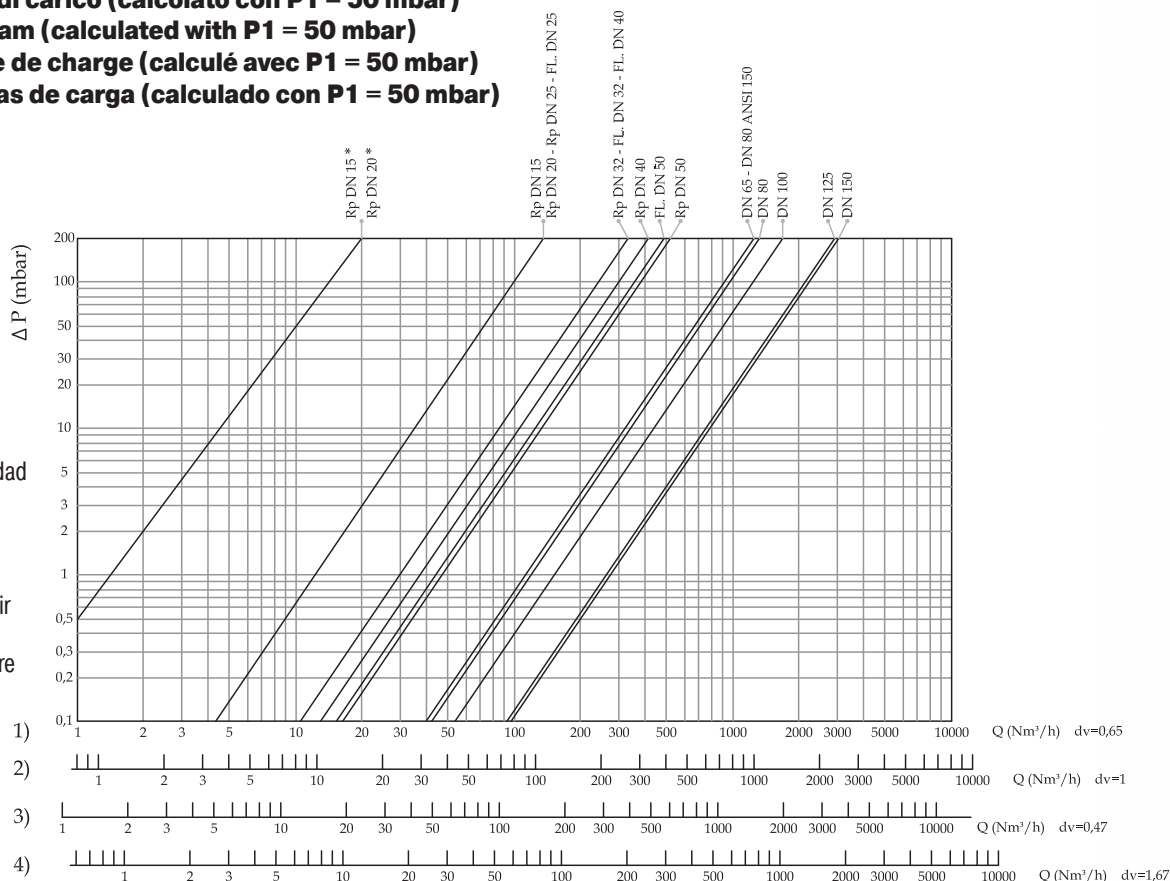
Attacchi filettati Threaded connections Raccords filetés Conexiones roscadas	Attacchi flangiati Flanged connections Raccords à brides Conexiones embrizadas	fori holes trous orificios	A	B=(D+E)	C	D	E
DN 15* - DN 20*	-		55	139	60	15	124
DN 15 - DN 20 - DN 25	-		120	180	94	29,5	150,5
-	DN 25		191	187	115	57,5	129,5
DN 32 - DN 40	-		160	213	140	37	176
DN 50	-		160	238	140	57,5	180,5
-	PN 16 - DN 32 FL	4	230	265	165	67,5	197,5
-	PN 16 - ANSI 150 DN 40 FL - DN 50 FL	4	230	265	165	67,5	197,5
-	PN 16 - ANSI 150 - DN 65	4	290	315	211	90	225
-	PN 16 - DN 80	8	310	322	211	97	225
-	ANSI 150 - DN 80	4	290	315	211	90	225
-	PN 16 - ANSI 150 - DN 100	8	350	322	254	105	217
-	PN 16 - ANSI 150 - DN 125	8	480	545	322	125	420
-	PN 16 - ANSI 150 - DN 150	8	480	550	322	130	420



* = corpo ottone (SMO) - brass body (SMO) - corps en laiton (SMO) - cuerpo de latón (SMO)

Le dimensioni sono indicative, non vincolanti - The dimensions are provided as a guideline, they are not binding
Les dimensions sont indicatives, non contractuelles - Las dimensiones son indicativas, no vinculantes

Diagramma perdite di carico (calcolato con P1 = 50 mbar)
Pressure drop diagram (calculated with P1 = 50 mbar)
Diagramme de perte de charge (calculé avec P1 = 50 mbar)
Diagrama de pérdidas de carga (calculado con P1 = 50 mbar)



IT

ATTACCHI FILETTATI NPT / NPT THREADED CONNECTIONS
RACCORDS FILETÉS NPT / CONEXIONES ROSCADAS NPT

richiedere fattibilità / request feasibility / demander la faisabilité / consulte la disponibilidad

Aggiungere la lettera
"N" dopo le cifre
indicanti gli attacchi

Add the letter "N" after
figures denoting the
connection

Ajouter la lettre "N"
après les chiffres
indiquant les connexions

Añadir la letra "N" a continuación
de las cifras que indican los
diámetros de conexión

Es. / E.g. / Ex. / Ej.
SM07**N**

EN

ATTACCHI FLANGIATI ANSI 150 / ANSI 150 FLANGED CONNECTIONS
RACCORDS À BRIDES ANSI 150 / CONEXIONES EMBRIDADAS ANSI 150

richiedere fattibilità / request feasibility / demander la faisabilité / consulte la disponibilidad

Aggiungere la lettera
"A" dopo le cifre
indicanti gli attacchi

Add the letter "A" after
figures denoting the
connection

Ajouter la lettre "A"
après les chiffres
indiquant les connexions

Añadir la letra "A" a continuación
de las cifras que indican los
diámetros de conexión

Es. / E.g. / Ex. / Ej.
SM50**A**

FR

BIOGAS

richiedere fattibilità / request feasibility / demander la faisabilité / consulte la disponibilité

Aggiungere la lettera
"B" dopo le cifre
indicanti gli attacchi

Add the letter "B" after
figures denoting the
connection

Ajouter la lettre "B"
après les chiffres
indiquant les connexions

Añadir la letra "B" a continuación
de las cifras que indican los
diámetros de conexión

Es. / E.g. / Ex. / Ej.
SM07**B**

CATAFORESI / CATAPHORESIS
CATAPHORÈSE / CATAFORESIS

Aggiungere la lettera
"K" dopo le cifre
indicanti gli attacchi

Add the letter "K" after
figures denoting the
connection

Ajouter la lettre "K"
après les chiffres
indiquant les connexions

Añadir la letra "K" a continuación
de las cifras que indican los
diámetros de conexión

Es. / E.g. / Ex. / Ej.
SM07**K**

COMBINAZIONI POSSIBILI / POSSIBLE COMBINATIONS
COMBINAISONS POSSIBLES / POSIBLES COMBINACIONES

È possibile combinare
tra di loro le versioni.

It is possible to
combine the above
mentioned versions.

Les versions peuvent
être combinées entre
elles.

Es posible combinar las
versiones entre sí.

Es. / E.g. / Ex. / Ej.
SM07**BK**

NOTA: È possibile che alcuni modelli non siano disponibili nelle versioni suddette sia singole e/o combinate. È consigliato chiedere SEMPRE la fattibilità.

NOTE: It is possible certain models are not available on the above mentioned versions, both singles and/or combined too. We suggest to ask ALWAYS for the feasibility.

NOTE: Il est possible que certains modèles ne soient pas disponibles dans les versions uniques et / ou combinées susmentionnées. Il est recommandé de TOUJOURS demander la faisabilité.

NOTA: Puede suceder que algunos modelos no estén disponibles en las versiones citadas, ya sean individuales o combinadas. Se aconseja consultar SIEMPRE la viabilidad.

ES

SMO - SM

Attacchi filettati / Threaded connections / Raccords filetés / Conexiones roscadas

Attacchi Connections Raccords Conexiones	P. max = 2 bar	P. max = 6 bar
	Codice / Code / Code / Código	Codice / Code / Code / Código
DN 15*	SM002	-
DN 20*	SM003	-
DN 15	SM02	SM020000
DN 20	SM03	SM030000
DN 25	SM04	SM040000
DN 32	SM05	SM050000
DN 40	SM06	SM060000
DN 50	SM07	SM070000
* = corpo ottone - brass body - corps en laiton - cuerpo de latón		

SM

Attacchi flangiati / Flanged connections / Raccords à brides / Conexiones embridadas

Attacchi Connections Raccords Conexiones	P. max = 2 bar	P. max = 6 bar
	Codice / Code / Code / Código	Codice / Code / Code / Código
DN 25	SM25	SM250000
DN 32	SM32	SM320000
DN 40	SM40	SM400000
DN 50	SM50	SM500000
DN 65	SX08	SX080000
DN 80	SX09	SX090000
DN 100	SX10	SX100000
DN 125	SX11	SX110000
DN 150	SX12	SX120000

IT

EN

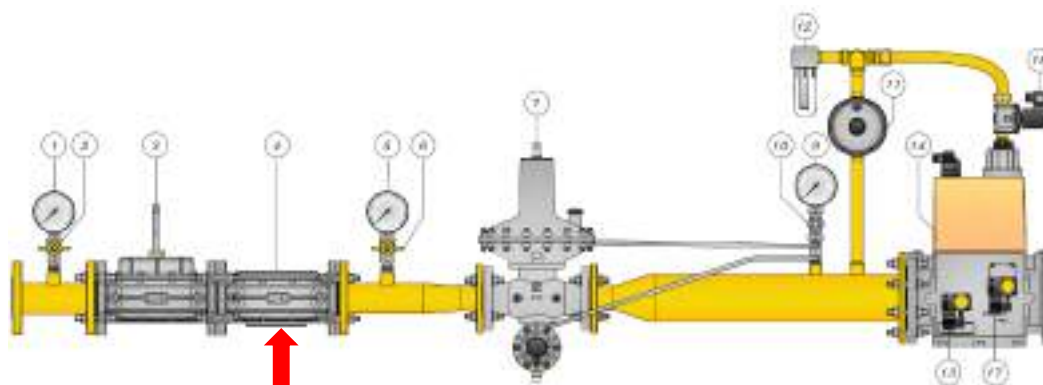
FR

ES

Ci riserviamo qualsiasi modifica tecnica e costruttiva.
We reserve the right to any technical and construction changes.
Nous nous réservons le droit de toute modification technique et constructive.
Nos reservamos el derecho de realizar cualquier cambio técnico y estructural.



Item 04 – Filtro para gás



FILTRO PER GAS / GAS FILTER / FILTRE POUR GAZ / FILTRO PARA GAS



CE-51AR1070

CE 0051
0497

MADE IN ITALY

	IT	EN	FR	ES
Pressione massima di esercizio Maximum operating pressure Pression maximum de fonctionnement Presión máxima de funcionamiento	2 - 6 bar			
Attacchi flangiati Flanged connections Raccords à brides Conexiones embridadas	DN 65 - DN 80 - DN 100 - DN 125 - DN 150 - DN 200 - DN 250 - DN 300			
Norma di riferimento Reference standard Norme de référence Patrón de referencia	EN 126			
In conformità a In conformity with Conforme a Conforme	Regolamento (UE) 2016/426 Direttiva PED 2014/68/UE	Regulation (EU) 2016/426 PED Directive 2014/68/EU	Règlement (UE) 2016/426 Directive PED 2014/68/UE	Reglamento (UE) 2016/426 Directiva PED 2014/68/UE

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Dimensioni (tabella 1) - Dimensions (table 1) - Dimensions (tableau 1) - Dimensiones (tabla 1) 30

Manometro differenziale indicatore di intasamento 31

Differential pressure gauge clogging indicator

Manometre differentiel indicateur d’obstruction

Manómetro diferencial indicador de obstrucción

Diagramma - Diagram - Diagramme - Diagrama Δp 32

Codifica prodotto / Product encoding / Codification du produit / Codificación del producto 34

EN

FR

ES

1.0 - GENERALITÀ

Il presente manuale illustra come installare, far funzionare e utilizzare il dispositivo in modo sicuro.
Le istruzioni per l'uso devono essere **SEMPRE** disponibili nell'impianto dove è installato il dispositivo.

ATTENZIONE: le operazioni di installazione/manutenzione devono essere eseguite da personale qualificato (come indicato in 1.3) utilizzando adeguati dispositivi di protezione individuale (DPI).

Per eventuali informazioni relative alle operazioni di installazione/manutenzione o in caso di problemi non risolvibili con l'utilizzo delle istruzioni è possibile contattare il produttore utilizzando indirizzo e recapiti telefonici riportati in ultima pagina.

1.1 - DESCRIZIONE

Dispositivo che trattiene le particelle di polvere trasportate dal gas e protegge gli elementi in pericolo (bruciatori, contatori, caldaie, regolatori di pressione, ecc.) da un rapido intasamento.

È composto da una cartuccia filtrante realizzata in materiale sintetico lavabile e completamente estraibile per una totale ispezione, pulizia e/o sostituzione.

Può essere fornito dotato di:

- prese di pressione e/o connessioni per il controllo della pressione e/o pressione differenziale;
- tappo o rubinetto per scarico condensa.
- predisposizione per manometro indicatore di intasamento;
- manometro indicatore di intasamento già installato.

Norme di riferimento: EN 126 – EN 13611.

1.2 - LEGENDA SIMBOLI



PERICOLO: In caso di inosservanza possono essere procurati danni a beni materiali.



PERICOLO: In caso di inosservanza oltre a danni a beni materiali, possono essere procurati danni alle persone e/o animali domestici.



ATTENZIONE: Viene richiamata l'attenzione su dettagli tecnici rivolti al personale qualificato.

1.3 - PERSONALE QUALIFICATO

Trattasi di persone che:

- Hanno dimestichezza con l'installazione, il montaggio, la messa in servizio e la manutenzione del prodotto;
- Sono a conoscenza delle normative in vigore nella regione o paese in materia di installazione e sicurezza;
- Hanno istruzione sul pronto soccorso.



1.4 - USO DI PARTI DI RICAMBIO NON ORIGINALI

- In caso di manutenzione o sostituzione di componenti di ricambio (es. organo filtrante, O-Ring, ecc.) devono essere utilizzati **SOLAMENTE** quelli indicati dal fabbricante. L'utilizzo di componenti differenti, oltre a far decadere la garanzia del prodotto, potrebbe compromettere il corretto funzionamento dello stesso.
- Il fabbricante non è responsabile di malfunzionamenti derivanti da manomissioni non autorizzate o utilizzo di ricambi non originali.



1.5 - UTILIZZO NON APPROPRIATO

- Il prodotto deve essere utilizzato unicamente allo scopo per il quale è stato costruito.
- Non è consentito l'utilizzo con fluidi differenti da quelli indicati.
- Non devono essere superati in nessun caso i dati tecnici indicati in targhetta. È cura dell'utilizzatore finale o dell'installatore, adottare corretti sistemi a protezione dell'apparecchio che impediscano il superamento della pressione massima indicata in targhetta.
- Il fabbricante non è responsabile per danni causati da un utilizzo improprio dell'apparecchio.

2.0 - DATI TECNICI

• Impiego	: gas non aggressivi delle tre famiglie (gas secchi)
• Temperatura ambiente (TS)	: -40 ÷ +70 °C
• Pressione massima di esercizio	: 2 o 6 bar (vedere etichetta prodotto)
• Resistenza meccanica	: Gruppo 2 (secondo EN 13611)
• Attacchi flangiati accoppiabili con flange PN 16	: (DN 65 - DN 80 - DN 100 - DN 125 - DN 150 - DN 200 - DN 250 - DN 300) ISO 7005 / EN 1092-1
• Attacchi flangiati ANSI 150	: su richiesta
• Organo filtrante*	: Filtraggio 10-20-50 µm (vedere etichetta prodotto)
• In conformità a	: Regolamento (UE) 2016/426 (Apparecchi che bruciano carburanti gassosi) Direttiva PED 2014/68/UE

* DN 125 - DN 150 - DN 200 - DN 250 - DN 300 solo 10 µm

3.0 - MESSA IN FUNZIONE DEL DISPOSITIVO



3.1 - OPERAZIONI PRELIMINARI ALL'INSTALLAZIONE

- E' necessario chiudere il gas a monte dell'apparecchio prima dell'installazione;
- Verificare che la pressione di linea **NON SIA SUPERIORE** alla pressione massima dichiarata sull'etichetta del prodotto;
- Eventuali tappi di protezione (se presenti) vanno rimossi prima dell'installazione;
- Tubazioni e interni dell'apparecchio devono essere liberi da corpi estranei;
- Verificare che le controflange di ingresso e uscita siano perfettamente coassiali e parallele per evitare di sottoporre il corpo a inutili sforzi meccanici, calcolare inoltre lo spazio per l'inserimento della guarnizione di tenuta;
- Per le fasi di serraggio, è necessario munirsi di una o più chiavi dinamometriche tarate od altri utensili di bloccaggio controllati;
- Tenere conto del fabbisogno di spazio per la sostituzione dell'organo filtrante.
- In caso di installazione all'esterno, è consigliato prevedere una tettoia di protezione per evitare che l'acqua piovana possa ossidare o danneggiare parti dell'apparecchio.



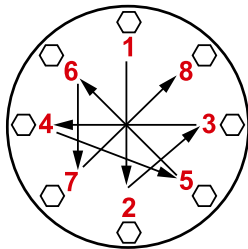
- In base alla geometria dell'impianto valutare il rischio di formazione di miscela esplosiva all'interno della tubazione;
- Se il filtro è installato in prossimità di altre apparecchiature o come parte di un insieme, è necessario valutare preliminarmente la compatibilità fra il filtro e tali apparecchiature;
- Prevedere una protezione da urti o contatti accidentali nel caso l'apparecchio sia accessibile a personale non qualificato.



3.2 - INSTALLAZIONE (vedere esempio in 3.4)

- Assemblare il dispositivo flangiandolo, assieme alle opportune tenute, all'impianto con tubi le cui flange siano coerenti con la connessione da assemblare. Le guarnizioni devono essere prive di difetti e devono essere centrate tra le flange;
- Se a guarnizioni inserite lo spazio rimanente è eccessivo non cercare di colmare il gap stringendo eccessivamente i bulloni dell'apparecchio;
- La freccia, indicata sul corpo (**3**) dell'apparecchio, deve essere rivolta verso l'utenza;
- Inserire all'interno dei bulloni le apposite rondelle per evitare danneggiamenti alle flange in fase di serraggio;
- Durante la fase di serraggio prestare attenzione a non "pizzicare" o danneggiare la guarnizione;

- Serrare i dadi o bulloni gradualmente, secondo uno schema “a croce” (vedere esempio sottoindicato);
- Serrarli, prima al 30%, poi al 60%, fino al 100% della coppia massima (vedere tabella sottostante secondo EN 13611);



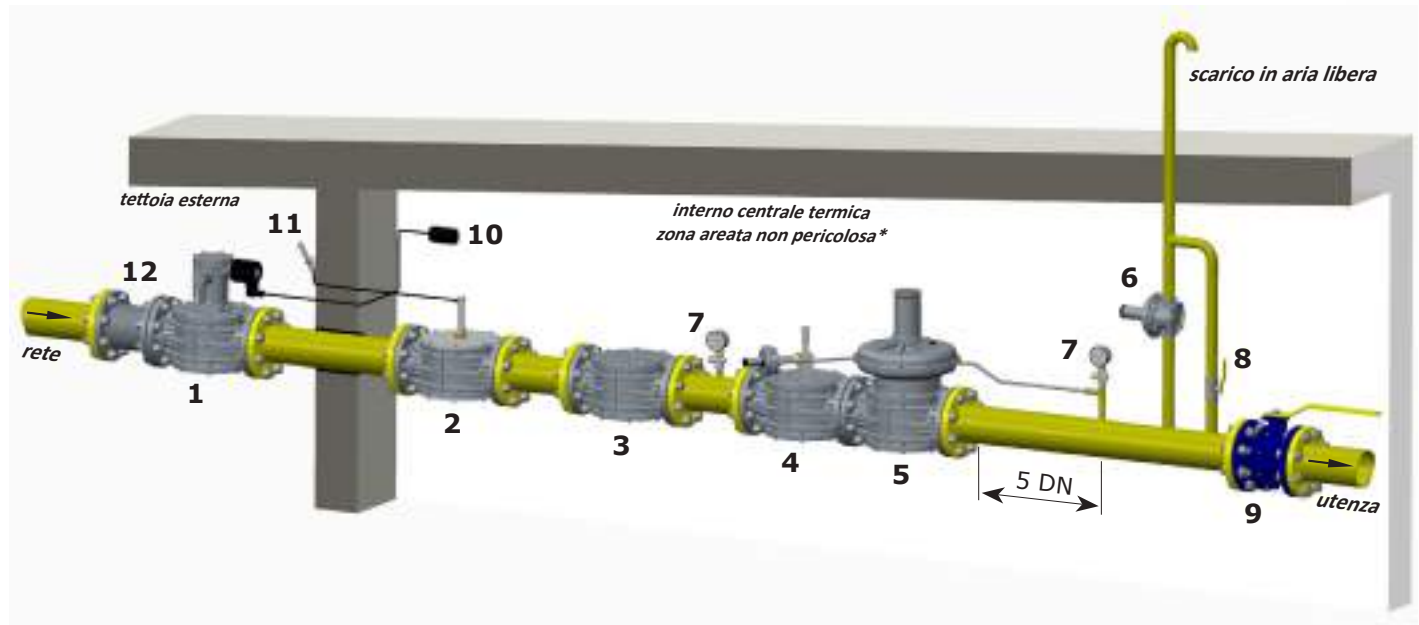
Diametro	DN 65	DN 80	DN 100	DN 125	DN 150	> DN 150
Coppia max (N.m)	50	50	80	160	160	160

- Serrare nuovamente ogni dado o bullone in senso orario almeno una volta, fino al raggiungimento dell’uniformità della coppia massima;
- Il filtro può essere installato in qualsiasi posizione purchè la freccia, indicata sul corpo (**3**) dell’apparecchio, sia rivolta verso l’utenza;
- Durante l’installazione evitare che detriti o residui metallici penetrino all’interno dell’apparecchio;
- Garantire un montaggio privo di tensioni meccaniche, è consigliato l’uso di giunti compensatori anche per sopperire alle dilatazioni termiche della tubazione;
- In caso sia prevista l’installazione dell’apparecchio in una rampa, è cura dell’installatore prevedere adeguati supporti o appoggi correttamente dimensionati, per sostenere e fissare l’insieme. Non lasciare, mai e per nessun motivo, gravare il peso della rampa solo sulle connessioni (filettate o flangiate) dei singoli dispositivi;
- In ogni caso dopo l’installazione verificare la tenuta dell’impianto;

3.4 - ESEMPIO GENERICO DI INSTALLAZIONE

1. Elettrovalvola a riarmo manuale M16/RM N.C.
2. Valvola a strappo SM
3. Filtro gas FM
4. Valvola di blocco OPSO serie MVB/1 MAX
5. Regolatore di pressione RG/2MC
6. Valvola di sfioro MVS/1

7. Manometro e relativo pulsante
8. Rubinetto di sfiato
9. Valvola a sfera
10. Gas detector
11. Leva comando a distanza valvola a strappo SM
12. Giunto di compensazione/antivibrante





4.0 - PRIMA MESSA IN SERVIZIO



- Prima della messa in servizio verificare che tutte le indicazioni presenti in targhetta, inclusa la direzione del flusso, siano rispettate;
- Dopo aver pressurizzato in maniera graduale l'impianto, verificare la tenuta e il funzionamento del filtro.



4.1 - VERIFICHE PERIODICHE CONSIGLIATE

- Verificare con apposito strumento tarato che il serraggio dei bulloni sia conforme a quanto indicato in 3.2;
- Verificare la tenuta delle connessioni flangiate/filettate sull'impianto;
- Verificare la tenuta e il funzionamento/efficienza del filtro;

E' cura dell'utilizzatore finale o dell'installatore definire la frequenza delle suddette verifiche in base alla gravità delle condizioni di servizio.



5.0 - MANUTENZIONE



- Prima di effettuare qualsiasi operazione di smontaggio sull'apparecchio, assicurarsi che all'interno dello stesso non ci sia gas in pressione.



SOSTITUZIONE DELL'ORGANO FILTRANTE (2)

- Togliere il coperchio (1) svitando le viti di fissaggio (5);
- Estrarre l'organo filtrante e verificarne le condizioni. Soffiarlo e pulirlo, se necessario provvedere alla sua sostituzione.
- Rimontarlo nella posizione iniziale controllando che sia sistemato tra le apposite guide (4) (vedere fig. 1-2-3);
- Verificare le condizioni dell'O-Ring di tenuta (6) del coperchio (1), se necessario sostituirlo (operazione consigliata);
- Verificare che l'O-Ring di tenuta (6) del coperchio (1) sia all'interno dell'apposita cava;
- Riposizionare il coperchio e fissarlo nella posizione originale prestando la massima attenzione a non "pizzicare" o danneggiare l'O-Ring di tenuta in fase di serraggio;
- Serrare le viti (5) gradualmente, secondo uno schema "a croce" fino al raggiungimento della coppia (tolleranza -15%) indicata nella tabella sotto. Servirsi di una chiave dinamometrica tarata per effettuare l'operazione.
- Verificare la tenuta corpo/coperchio.

Vite	M5		M6		M8		M10		M12	
	Zincato	Acc. INOX	Zincato	Acc. INOX	Zincato	Acc. INOX	Zincato	Acc. INOX	Zincato	Acc. INOX
Coppia max (N.m)	6	4,5	10	7,5	25	18,5	49,5	37	84,5	63,5

6.0 - TRASPORTO, STOCCAGGIO E SMALTIMENTO

- Durante il trasporto il materiale deve essere trattato con cura, evitando che il dispositivo possa subire urti, colpi o vibrazioni;
- Se il prodotto presenta trattamenti superficiali (es. verniciatura, cataforesi, ecc) non devono essere danneggiati durante il trasporto;
- La temperatura di trasporto e di stoccaggio, coincide con quella indicata nei dati di targa;
- Se il dispositivo non viene installato subito dopo la consegna deve essere correttamente immagazzinato in un luogo secco e pulito;
- In ambienti umidi è necessario usare siccativi oppure il riscaldamento per evitare la condensa.
- Il prodotto, a fine vita, dovrà essere smaltito in conformità alla legislazione vigente nel paese in cui si esegue tale operazione.

7.0 - GARANZIA

Valgono le condizioni di garanzia stabilite col fabbricante al momento della fornitura.
Per danni causati da:

- Uso improprio del dispositivo;
 - Inosservanza delle prescrizioni indicate nel presente documento;
 - Inosservanza delle norme riguardanti l'installazione;
 - Manomissione, modifica e utilizzo di parti di ricambio non originali;
- non possono essere rivendicati diritti di garanzia o risarcimento danni.
Sono esclusi inoltre dalla garanzia i lavori di manutenzione, il montaggio di apparecchi di altri produttori, la modifica del dispositivo e l'usura naturale.

8.0 - DATI DI TARGA

In targa (vedere esempio a fianco) sono riportati i seguenti dati:

- Nome/logo e indirizzo del fabbricante (eventuale nome/logo distributore)
- Mod.: = nome/modello dell'apparecchio seguito dal diametro di connessione
- CE-51AR1070 = numero pin di certificazione
- EN 126 = Norma di riferimento del prodotto
- P.max = Pressione massima alla quale è garantito il funzionamento del prodotto
- PS = Pressione massima ammissibile
- Filtering = Filtraggio
- TS = Range di temperatura alla quale è garantito il funzionamento del prodotto
-  = Conformità Regolamento 2016/426 seguito dal n° dell'Organismo Notificato
-  = Conformità Dir. PED seguita dal n° dell'Organismo Notificato
- year = Anno di fabbricazione
- Lot = Numero matricola del prodotto (vedere spiegazione di seguito)
 - U1812 = Lotto in uscita anno 2018 settimana n° 12
 - 7634 = numero progressivo commessa riferito all'anno indicato
 - 00001 = numero progressivo riferito alla q.tà del lotto



Via Moratello, 5/7 - 37045
Legnago (VR) - Italy
www.madas.it

Mod.: FM DN 200
CE-51AR1070 - EN 126
Filtering: 10 micron

P.max=PS= 6 bar
TS: -40+70 °C


0051
0497

year: 2018 Lot:U1812 7634/00001

9.0 - ESEMPIO DIMENSIONAMENTO FILTRO

Dati di impiego:
 $Q_n = 1210 \text{ [Nm}^3/\text{h]}$ Metano
 $P_i = 1,2 \text{ [bar]}$

Per utilizzare il diagramma è necessario convertire i dati di impiego alle condizioni del diagramma ($P_i=0$) e viceversa.

- Conversione alla portata alle condizione del diagramma:

$$Q_d \text{ [Nm}^3/\text{h]} = \left(\frac{Q_n \text{ [Nm}^3/\text{h]}}{P_i + 1 \text{ [bar]}} \right) = \left(\frac{1210 \text{ [Nm}^3/\text{h]}}{1,2 + 1 \text{ [bar]}} \right) = 550 \text{ [m}^3/\text{h]}$$

- Scelta del diametro del filtro:

Portate massime in m³/h di gas metano considerando una velocità max del flusso in tubazione di 20 m/s							
DN 65	DN 80	DN 100	DN 125	DN 150	DN 200	DN 250	DN 300
244 m³/h	370 m³/h	578 m³/h	903 m³/h	1300 m³/h	2312 m³/h	3613 m³/h	5203 m³/h

- Individuare sulla linea relativa al Gas utilizzato la portata Q_d e salire con una linea verticale fino ad incrociare la retta relativa al diametro selezionato (vedere diagramma esempio pag. 32);
- Dal punto appena identificato spostarsi verso sinistra fino ad incrociare l'asse del grafico rilevare il ΔP_d
- Conversione del ΔP_d rilevato sul diagramma alle condizioni di impianto:

$$\Delta P_r \text{ [mbar]} = \Delta P_d \text{ [mbar]} \times (P_i + 1) \text{ [bar]} = 6,5 \text{ [mbar]} \times (1,2 + 1) \text{ [bar]} = 14,3 \text{ [mbar]}$$

- Eseguire lo stesso procedimento nei diagrammi di pag. 32 e 33 per calcolare la perdita di carico dei filtri ai vari filtraggi (50 μm - 20 μm - 10 μm).

10.0 - MANOMETRO DIFFERENZIALE INDICATORE DI INTASAMENTO

10.1 - DESCRIZIONE

Manometro differenziale usato per indicare di grado di intasamento dei filtri a cartuccia.

È munito di un indice di massima a trascinamento (lancetta rossa) in grado di fornire il massimo valore di ΔP verificatosi. Può essere fornito già installato (come in fig. 5 e 6) o come accessorio da installare successivamente.

Generalmente viene fornito installato sui filtri come nella foto e come indicato in fig. 5, ovvero:

- freccia sul corpo filtro da sinistra verso destra;
- quadrante leggibile frontalmente;
- segno + sul retro a sinistra

È possibile fornirlo anche come indicato in fig. 6 (versione reverse "R"), ovvero:

- freccia sul corpo filtro da sinistra verso destra;
- quadrante leggibile dal lato opposto;
- segno + a sinistra (in questo caso i segni + e - sono indicati con apposite targhette).

Entrambi le versioni possono essere fornite anche con un sensore di prossimità incorporato per la trasmissione a distanza del segnale di massima pressione differenziale (versioni "S").

Il sensore è di tipo normalmente aperto e fornisce una segnalazione quando l'indicatore del ΔP raggiunge i 100 mbar.

Tarature diverse a richiesta.



10.2 - INSTALLAZIONE

Se il manometro differenziale indicatore di intasamento è fornito come accessorio, è necessario chiudere il gas prima dell'installazione.

Si consiglia il montaggio su filtri con predisposizione all'installazione del manometro ossia con 2 fori filettati G 1/8 (distanti tra di loro 55 mm) già presenti sul coperchio (vedere foto di copertina e fig. 5 e 6).

Se il filtro non ha questa predisposizione si deve effettuare un collegamento come indicato in fig. 7 utilizzando tubi e/o raccordi le cui filettature siano coerenti con la connessione da assemblare e idonei al gas di utilizzo.

Il filtro sul quale si installa il manometro deve essere munito almeno di una presa di pressione in entrata e una in uscita.

Dopo il montaggio effettuare un controllo funzionale e di tenuta.

Una volta installato il filtro (vedere foglio istruzioni relativo) prima di mettere in funzione l'impianto azzerare la lancetta rossa.

Con l'impianto in portata osservare il valore di ΔP a filtro nuovo.

Sostituire la cartuccia filtrante quando la pressione differenziale risulta raddoppiata rispetto al valore iniziale ottenuto col filtro nuovo.

10.3 - DATI TECNICI

- P. max manometro: 20 bar
- ΔP massimo standard: 150 mbar (differenti ΔP su richiesta)
- Temperatura ambiente: $-40 \div +60^\circ\text{C}$

Caratteristiche sensore di prossimità

- Tensione massima: 30 Vdc
- Corrente massima: 100 mA
- Grado di protezione: IP55
- Modo di protezione: EEx ia IIC T6
- Lunghezza cavi: 2 m

1.0 - GENERAL INFORMATION

This manual shows you how to safely install, operate and use the device.

The instructions for use **ALWAYS** need to be available in the facility where the device is installed.

ATTENTION: installation/maintenance needs to be carried out by qualified staff (as explained in section 1.3) by using suitable personal protective equipment (PPE).

For any information pertaining to installation/maintenance or in case of problems that cannot be solved with the instructions, contact the manufacturer by using the address and phone numbers provided on the last page.

1.1 - DESCRIPTION

A device that retains dust particles conveyed by the gas and protects the elements in danger (burners, counters, boilers, pressure regulators, etc.) from rapid clogging.

IT consists of a filter cartridge made of washable synthetic material and can be entirely removed for full inspection, cleaning and/or replacement.

It can be supplied equipped with:

- pressure test nipples and/or connections to control the pressure and/or differential pressure.
- cap or drain valve for condensation drainage.
- clogging indicator differential pressure gauge installation set-up;
- pressure gauge already installed.

Reference standards: EN 126 – EN 13611.

1.2 - KEY TO SYMBOLS



DANGER: Failure to observe this may cause damage to tangible goods.



DANGER: Failure to observe this may cause damage to tangible goods, injury to people and/or pets.



ATTENTION: Attention is drawn to the technical details intended for qualified staff.

1.3 - QUALIFIED STAFF

These are people who:

- Are familiar with product installation, assembly, start-up and maintenance;
- Know the regulations in force in the region or country pertaining to installation and safety;
- Have first-aid training.



1.4 - USING NON-ORIGINAL SPARE PARTS

- To perform maintenance or change spare parts (e.g. filter element, O-ring, etc.) **ONLY USE** manufacturer-recommended parts. Using different parts not only voids the product warranty, it could compromise correct operation of the device.
- The manufacturer is not liable for malfunctions caused by unauthorised tampering or use of non-original spare parts.



1.5 - IMPROPER USE

- The product must only be used for the purpose it was built for.
- It is not allowed to use fluids other than those expressly stated.
- The technical data set forth on the rating plate must not, under any circumstances, be exceeded. The end user or installer is in charge of implementing proper systems to protect the device, which ensure the maximum pressure indicated on the rating plate is not exceeded.
- The manufacturer is not responsible for any damage caused by improper use of the device.

2.0 - TECHNICAL DATA

• Use	: non-aggressive gases of the three families (dry gases)
• Ambient temperature (TS)	: -40 ÷ +70°C
• Maximum operating pressure	: 2 or 6 bar (see product label)
• Mechanical strength	: Group 2 (according to EN 13611)
• Flanged connections that can be coupled to PN 16 flanges	: (DN 65 - DN 80 - DN 100 - DN 125 - DN 150 - DN 200 - DN 250 - DN 300) ISO 7005 / EN 1092-1
• ANSI 150 flanged connections	: on request
• Filter element*	: Filtering 10-20-50 µm (see product label)
• In compliance with	: (EU) Regulation 2016/426 (Appliances burning gaseous fuels) PED Directive 2014/68/EU

* DN 125 - DN 150 - DN 200 - DN 250 - DN 300 only 10 µm

3.0 - COMMISSIONING THE DEVICE



3.1 - OPERATIONS PRIOR TO INSTALLATION

- It is necessary to close the gas upstream of the device prior to installation;
- Make sure that the line pressure **DOES NOT EXCEED** the maximum pressure declared on the product label;
- Protective caps (if any) must be removed prior to installation;
- Device pipes and insides must be clear of any foreign bodies;
- Make sure the inlet and outlet counter-flanges are perfectly coaxial and parallel in order to prevent unnecessary mechanical stress to the body. Also calculate the space to insert the seal gasket;
- With regard to tightening operations, equip yourself with one or two calibrated torque wrenches or other controlled locking tools;
- Consider the clearance requirements to replace the filter element;
- With outdoor installation, it is advisable to install a protective roof to prevent rain from oxidising or damaging parts of the device.



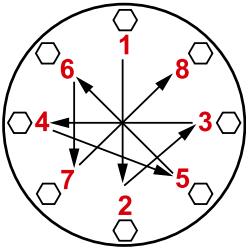
- According to the plant geometry, check the risk of an explosive mixture arising inside the piping;
- If the filter is installed near other devices or as part of an assembly, compatibility between the filter and these devices must be evaluated beforehand;
- Provide a protection against impacts or accidental contacts if the device is accessible to unqualified personnel.



3.2 - INSTALLATION (see example in 3.4)

- Assemble the device by flanging it, with the due seals, onto the plant with pipes whose flanges are consistent with the connection being attached. The gaskets must be free from defects and must be centred between the flanges;
- If, after installing the gaskets, there is still an excessive space in between, do not try to reduce said gap by excessively tightening the bolts of the device;
- The arrow, shown on the body (**3**) of the device, needs to be pointing towards the application;
- Insert the relative washers inside the bolts in order to prevent damage to the flanges during tightening;
- When tightening, be careful not to “pinch” or damage the gasket;

- Tighten the nuts or bolts gradually, in a “cross” pattern (see the example below);
- Tighten them, first by 30%, then by 60% and finally 100% of the maximum torque (see the table below according to EN 13611);



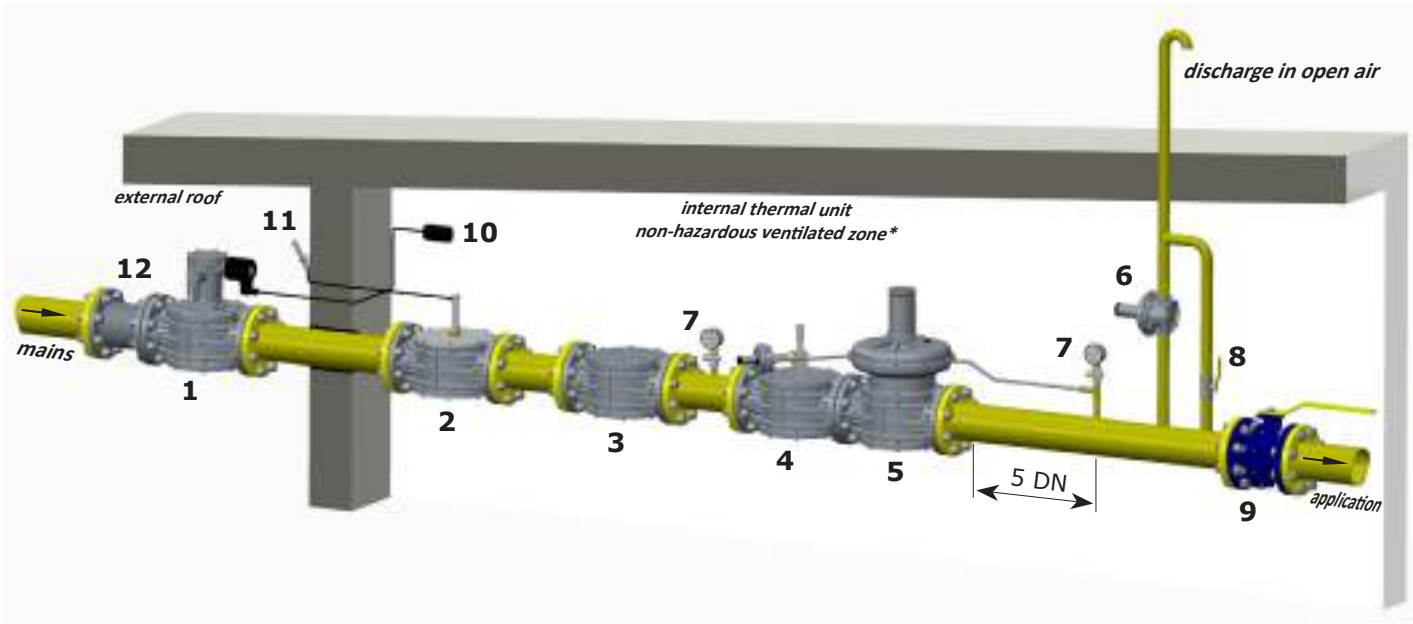
Diameter	DN 65	DN 80	DN 100	DN 125	DN 150	> DN 150
Max. torque (N.m)	50	50	80	160	160	160

- Tighten each nut and bolt again clockwise at least once, until the maximum torque has been achieved uniformly;
- The filter can be installed in any position as long as the arrow, indicated on the body (**3**) of the appliance, faces the application;
- During installation, avoid debris or metal residues from getting into the device;
- To guarantee mechanical tension-free assembly, we recommend using compensating joints, which also adjust to the pipe’s thermal expansion;
- If the device is to be installed in a ramp, it is the installer’s responsibility to provide suitable or correctly sized supports to hold and secure the assembly. Never, for any reason whatsoever, leave the weight of the ramp resting only on the connections (threaded or flanged) of the individual devices;
- In any case, following installation, check the tightness of the plant;

3.4 - GENERIC EXAMPLE OF AN INSTALLATION

1. M16/RM N.C. Manual reset solenoid valve
2. SM Jerk ON/OFF valve
3. FM gas filter
4. OPSO series MVB/1 MAX shut-off valve
5. RG/2MC pressure regulator
6. MVS/1 relief valve

7. Pressure gauge and relative button
8. Vent valve
9. Ball valve
10. Gas detector
11. SM remote jerk ON/OFF valve lever control
12. Expansion joint/anti-vibration mount





4.0 - FIRST START-UP



- Before start-up, make sure that all the instructions on the rating plate, including the direction of flow, are observed;
- After having gradually pressurised the system, check the tightness and operation of the filter.



4.1 - RECOMMENDED PERIODIC CHECKS

- Use a suitable calibration tool to ensure the bolts are tightened as indicated in 3.2;
- Check the tightness of the flanged/threaded connections on the system;
- Check the tightness and operation/efficiency of the filter;

The final user or installer is responsible for defining the frequency of these checks based on the severity of the service conditions.



5.0 - MAINTENANCE



- Before carrying out any dismantling operation on the device, make sure that there is no pressurised gas inside.



REPLACING THE FILTER ELEMENT (2)

- Remove the cover (**1**) by loosening the fastening screws (**5**);
- Extract the filter element and check its conditions. Blow it and clean it and, if necessary, replace it.
- Reassemble it in its initial position, checking that it is placed between the special guides (**4**) (see fig. 1-2-3);
- Check the conditions of the sealing O-ring (**6**) of the cover (**1**), and replace it if necessary (recommended);
- Make sure the O-ring (**6**) of the cover (**1**) is inside the provided groove;
- Reassemble the cover and secure it in its original position, being very careful not to “pinch” or damage the O-ring during tightening;
- Tighten the screws (**5**) gradually, following a “cross” pattern, until the torque (tolerance -15%) indicated in the table below is reached. Use a calibrated torque wrench to do this.
- Check the body/cover seal.

Screw	M5		M6		M8		M10		M12	
	Galvanised	Stainless Steel	Galvanised	Stainless Steel	Galvanised	Stainless Steel	Galvanised	Stainless Steel	Galvanised	Stainless Steel
Max. torque (N.m)	6	4.5	10	7.5	25	18.5	49.5	37	84.5	63.5

6.0 - TRANSPORT, STORAGE AND DISPOSAL

- During transport the material needs to be handled with care, avoiding any impact or vibrations to the device;
- If the product has any surface treatments (ex. painting, cataphoresis, etc.) it must not be damaged during transport;
- The transport and storage temperatures must observe the values provided on the rating plate;
- If the device is not installed immediately after delivery it must be correctly placed in storage in a dry and clean place;
- In humid facilities, it is necessary to use driers or heating to avoid condensation.
- At the end of its service life, the product is to be disposed of in compliance with the legislation in force in the country where this operation is performed.

7.0 - WARRANTY

The warranty conditions agreed with the manufacturer at the time of the supply apply.
For damage caused by:

- Improper use of the device;
 - Failure to observe the requirements described in this document;
 - Failure to observe the regulations pertaining to installation;
 - Tampering, modification and use of non-original spare parts;
- are not covered by the rights of the warranty or compensation for damage.
The warranty also excludes maintenance work, the assembly of devices of other manufacturers, making changes to the device and natural wear.

8.0 - RATING PLATE DATA

The rating plate data (see example provided here) includes the following:

- Manufacturer's name/logo and address (possible distributor name/logo)
- Mod.: = device name/model followed by the connection diameter
- CE-51AR1070 = certification pin number
- EN 126 = Product reference regulation
- P. max = Maximum pressure at which product operation is guaranteed
- PS = Allowable maximum pressure
- Filtering = Filtering
- TS = Temperature range within which product operation is guaranteed
- C€0051 = Compliance with (EU) Regulation 2016/426 followed by Notified Body No.
- C€0497 = In compliance with PED directive followed by the no. of the Notified Body
- year = Year of manufacture
- Lot = Product serial number (see explanation below)
 - U1812 = Lot issued in year 2018 in the 12th week
 - 7634 = progressive job order number for the indicated year
 - 00001 = progressive number referring to the quantity of the lot

MADAS[®]
Via Moratello, 5/7 - 37045
Legnago (VR) - Italy
www.madas.it

Mod.: FM DN 200
CE-51AR1070 - EN 126
Filtering: 10 micron
CE 0051
0497
year: 2018 Lot:U1812 7634/00001

P_{max}=PS= 6 bar
TS: -40+70 °C

9.0 - FILTER SIZING EXAMPLE

Usage data
Q_n = 1210 [Nm³/h] Methane
P_i = 1.2 [bar]

To use the diagram, you have to convert the usage data to the diagram conditions (P₁=0) and vice versa.

- Conversion to the flow rate at the diagram conditions:

$$Q_d \text{ [Nm}^3\text{/h]} = \left(\frac{Q_n \text{ [Nm}^3\text{/h]}}{P_i + 1 \text{ [bar]}} \right) = \left(\frac{1210 \text{ [Nm}^3\text{/h]}}{1.2 + 1 \text{ [bar]}} \right) = 550 \text{ [m}^3\text{/h]}$$

- Choosing the filter diameter:

Maximum flow rates in m³/h of methane gas considering a max flow speed through the pipes of 20 m/s							
DN 65	DN 80	DN 100	DN 125	DN 150	DN 200	DN 250	DN 300
244 m³/h	370 m³/h	578 m³/h	903 m³/h	1300 m³/h	2312 m³/h	3613 m³/h	5203 m³/h

- Identify the Q_d flow rate on the Gas line used and go up with a vertical line until you cross the straight line for the selected diameter (see example diagram on page 32);
- From this newly identified point, move left until you cross the graph axis and read the ΔP_d
- Converting the ΔP_d measured on the diagram at the system conditions:

$$\Delta P_r \text{ [mbar]} = \Delta P_d \text{ [mbar]} \times (P_i + 1) \text{ [bar]} = 6.5 \text{ [mbar]} \times (1.2 + 1) \text{ [bar]} = 14.3 \text{ [mbar]}$$

- Follow the same procedure in the diagrams on pages 32 and 33 to calculate the pressure drop of the filters to the various filtering points (50 μm -20 μm -10 μm).

KEY

- Q_n : Usage flow rate [Nm³/h]
- Q_d : Flow rate at the diagram conditions [m³/h]
- P_i : System pressure
- ΔP_d : ΔP measured on the diagram
- ΔP_r : ΔP normalised to the system condition
- P₁ : Diagram tracing pressure

10.0 - DIFFERENTIAL PRESSURE GAUGE CLOGGING INDICATOR

10.1 - DESCRIPTION

The differential pressure gauge used to point the clogging degree of the cartridge filters. It is equipped of adjust maximum index (red arrow) able to supply the best ΔP value occurred. Can be supplied already mounted (as in figure 5 and 6) or as accessory to be mounted later.

Generally it is supplied mounted on filters as the picture and stated fig. 5, namely:

- arrow on the filter body left to right;
- readable dial frontally;
- + mark on the back left

It is possible to supply it even as stated in in fig. 6 (reverse type "R"), namely:

- arrow on the filter body left to right;
- readable dial from the back;
- + mark on the left (in this case the marks + and – are specified with proper labels).

Both versions can be supplied with a built in proximity sensor too to transmit a maximum differential pressure signal from remote ("S" type).

The sensore is normally open type and supplies a signal when the ΔP pointer reaches 100 mbar point. Different settings on request.



10.2 - INSTALLATION

If the differential pressure gauge is supplied as accessory it is necessary to close the gas before installation.

We suggest the pressure gauge installation on filters with premounting connections then with 2 G 1/8 threaded holes (distance between them 55 mm) already present on the cover (see cover picture and fig. 5 and 6).

If the filter do not have this premounting connections you must do a connection as show in fig. 7 using pipes and/or connections having matching threads with the connection to be connected and suitable for gas use.

The filter on which the pressure gauge have to be mount must be equipe at least with an inlet and outlet pressure test point. After mounting make a working and a leak test.

Once the filter is mounted (see related instruction sheet) before the plant start up reset the red arrow.

Check the ΔP with new filter and with flow in the plant.

Replace the cartridge when the differential pressure is doubled comparing the original value obtained with new filter.

10.3 - TECHNICAL DATA

- Gauge P. max: 20 bar
- Standard maximum ΔP : 150 mbar (different ΔP on request)
- Environment temperature: $-40 \div +60$ °C

Proximity sensor features

- Maximum voltage: 30 Vdc
- Maximum power: 100 mA
- Protection degree: IP55
- Protection way: EEx ia IIC T6
- Cable length: 2 m

1.0 - GÉNÉRALITÉS

Le présent manuel illustre les procédures d'installation, de fonctionnement et d'utilisation du dispositif, en toute sécurité. Les instructions pour l'utilisation doivent **TOUJOURS** être disponibles dans le site de production où le dispositif est installé.

ATTENTION : les opérations d'installation/entretien doivent être effectuées par un personnel qualifié (comme indiqué au paragraphe 1.3) en utilisant des équipements de protection individuelle (E.P.I) adaptés.

Pour toute information relative aux opérations d'installation/entretien ou en cas de problèmes ne pouvant pas être résolus à l'aide des instructions, il est possible de contacter le fabricant en utilisant l'adresse et les numéros de téléphone reportés à la dernière page.

1.1 - DESCRIPTION

Dispositif qui retient les particules de poussière transportées par le gaz et qui protège les éléments en danger (brûleurs, compteurs, chaudières, régulateurs de pression, etc.) d'un colmatage rapide.

IL se compose d'une cartouche filtrante, réalisée en matière synthétique lavable et complètement amovible pour une inspection complète, le lavage et/ou un remplacement.

Il peut être fourni équipé de:

- prises de pression et/ou de connexions pour le contrôle de la pression et/ou de la pression différentielle.
- bouchon ou robinet pour le évacuation condensation.
- prédisposition installation manomètre différentiel indicateur obstruction;
- manomètre différentiel indicateur obstruction déjà installé.

Normes de référence : EN 126 – EN 13611.

1.2 - LÉGENDE DES SYMBOLES



DANGER : En cas de non-respect, il y a un risque de dommages matériels.



DANGER : En cas de non-respect, outre les dommages matériels, il peut y avoir des dommages aux personnes et/ou animaux domestiques.



ATTENTION : Nous attirons votre attention sur les détails techniques destinés au personnel qualifié.

1.3 - PERSONNEL QUALIFIÉ

Il s'agit de personnes qui :

- ont l'habitude d'installer, de monter, de mettre en service et d'entretenir le produit ;
- Connaissent les réglementations en matière d'installation et de sécurité, applicables dans leur région ou leur pays ;
- Ont été formées sur les premiers secours.



1.4 - UTILISATION DE PIÈCES DE RECHANGE NON ORIGINALES

- En cas d'entretien ou de remplacement de pièces de rechange (ex. organe filtrant, joint torique, etc.), n'utiliser **QUE** les pièces indiquées par le Fabricant. L'utilisation de composants différents fait non seulement déchoir la garantie du produit mais risque également de compromettre le bon fonctionnement de ce dernier.
- Le Fabricant n'est pas responsable des dysfonctionnements dérivant d'altérations non autorisées ou de l'utilisation de pièces de rechange qui ne sont pas originales.



1.5 - UTILISATION NON APPROPRIÉE

- Le produit doit être utilisé uniquement pour le but pour lequel il a été fabriqué.
- Il est interdit de l'utiliser avec des fluides autres que ceux indiqués.
- Les données techniques indiquées sur la plaque ne doivent en aucun cas être dépassées. Il appartient à l'utilisateur final ou à l'installateur d'adopter des systèmes adéquats de protection de l'appareil qui empêchent de dépasser la pression maximale indiquée sur la plaque.
- Le fabricant n'est pas responsable des dommages causés par un usage impropre de l'appareil.

2.0 - DONNÉES TECHNIQUES

- Emploi : gaz non agressifs des trois familles (gaz secs)
- Température ambiante (TS) : -40 ÷ +70 °C
- Pression maximum de fonctionnement : 2 ou 6 bar (voir l'étiquette du produit)
- Résistance mécanique : Groupe 2 (conformément à la norme EN 13611)
- Raccords à brides à coupler avec des brides PN 16 : (DN 65 - DN 80 - DN 100 - DN 125 - DN 150 - DN 200 - DN 250 - DN 300) ISO 7005/EN 1092-1
- Raccords à brides ANSI 150 : sur demande
- Organe filtrant* : Filtrage 10-20-50 µm (voir l'étiquette du produit)
- Conformément au : Règlement (UE) 2016/426 (Appareils qui brûlent des carburants gazeux) Directive PED 2014/68/UE

* DN 125 - DN 150 - DN 200 - DN 250 - DN 300 seulement 10 µm

3.0 - MISE EN FONCTION DU DISPOSITIF



3.1 - OPÉRATIONS PRÉALABLES À L'INSTALLATION

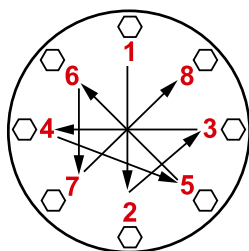
- Il est nécessaire de fermer le gaz en amont de l'appareil avant l'installation ;
 - Vérifier que la pression de ligne **NE DÉPASSE PAS** la pression maximum déclarée sur l'étiquette du produit ;
 - Tout bouchon de protection (si présent) doit être ôté avant l'installation ;
 - Les conduites et l'intérieur de l'appareil doivent être exempts de corps étrangers ;
 - Vérifier que les contre-brides d'entrée et sortie soient parfaitement coaxiales parallèles pour éviter de soumettre le corps à des efforts mécaniques inutiles, calculer en outre l'espace pour l'insertion du joint d'étanchéité ;
 - Pour les phases de serrage, il faut se munir d'une ou de plusieurs clés dynamométriques calibrées ou d'autres outils de verrouillage contrôlés ;
 - Prendre en compte le besoin d'espace pour remplacer l'organe filtrant ;
 - En cas d'installation à l'extérieur, il est conseillé de prévoir un auvent de protection pour éviter que l'eau de pluie ne puisse oxyder ou endommager des pièces de l'appareil.
- 
 - En fonction de la géométrie de l'installation, évaluer le risque de formation de mélange explosif dans le tuyau ;
 - Si le filtre est installé à proximité d'autres appareils ou en tant que partie d'un ensemble, il est nécessaire d'évaluer au préalable la compatibilité entre le filtre et ces appareils ;
 - Si l'appareil est accessible au personnel non qualifié, il faut prévoir une protection contre les collisions ou les contacts accidentels.



3.2 - INSTALLATION (voir l'exemple en 3.4)

- Assembler l'appareil en le bridant, avec les joints appropriés, à l'installation avec des tuyaux dont les brides sont compatibles avec la connexion à assembler. Les joints doivent être exempts de défauts et doivent être centrés entre les brides ;
- Lorsque les joints sont introduits, si l'espace qui reste est excessif, il ne faut pas essayer de le combler en serrant trop les boulons de l'appareil ;
- La flèche indiquée sur le corps (**3**) de l'appareil doit être tournée vers l'application ;
- Insérer les rondelles appropriées à l'intérieur des boulons pour éviter d'endommager les brides pendant le serrage ;
- Pendant la phase de serrage, veiller à ne pas « pincer » ni endommager le joint ;

- Serrer les écrous ou les boulons progressivement, selon un schéma « en croix » (voir l'exemple ci-dessous) ;
- Il faut d'abord les serrer à 30 %, puis à 60 %, jusqu'à 100 % du couple maximum (voir le tableau ci-dessous, conforme à la norme EN 13611) ;

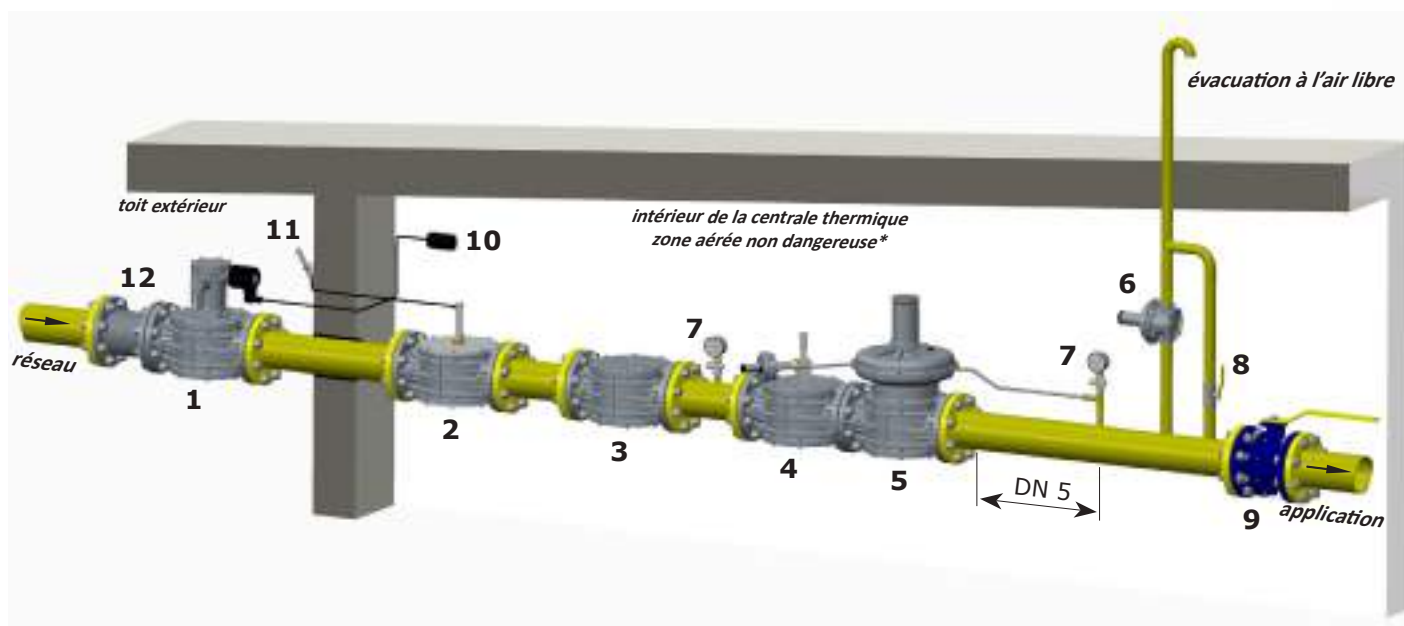


Diamètre	DN 65	DN 80	DN 100	DN 125	DN 150	> DN 150
Couple max (N.m)	50	50	80	160	160	160

- Serrer à nouveau chaque écrou ou boulon dans le sens des aiguilles d'une montre au moins une fois jusqu'à atteindre l'uniformité du couple maximal ;
- Le filtre peut être installé dans n'importe quelle position, à condition que la flèche située sur le corps (**3**) de l'appareil, soit tournée vers l'application ;
- Pendant l'installation, éviter que les déchets ou les résidus métalliques ne pénètrent à l'intérieur de l'appareil ;
- Garantir un montage dépourvu de tensions mécaniques, il est conseillé d'utiliser des joints compensateurs pour pallier aussi les dilatations thermiques du tuyau ;
- Si l'installation de l'appareil est prévue dans une rampe, l'installateur devra prévoir des supports adéquats ou des appuis correctement dimensionnés, pour soutenir et fixer l'ensemble. Ne jamais laisser, sous aucun prétexte, reposer le poids de la rampe uniquement sur les connexions (filetées ou bridées) de chaque dispositif ;
- Dans tous les cas, après la mise en place, vérifier l'étanchéité de l'installation ;

3.4 - EXEMPLE GÉNÉRAL D'INSTALLATION

- | | |
|---|--|
| 1. Électrovanne à réarmement manuel M16/RM N.C. | 7. Manomètre et son bouton |
| 2. Soupape à déchirement SM | 8. Fermer le robinet d'évacuation |
| 3. Filtre à gaz FM | 9. Vanne à bille |
| 4. Vanne de fermeture OPSO série MVB/1 MAX | 10. Détecteur de gaz |
| 5. Régulateur de pression RG/2MC | 11. Levier de commande à distance de la soupape à déchirement SM |
| 6. Vanne d'évacuation MVS/1 | 12. Joint de compensation/antivibratoire |





4.0 - PREMIÈRE MISE EN SERVICE



- Avant la mise en service, veiller à ce que toutes les indications présentes sur la plaque, y compris la direction du flux, soient respectées ;
- Après avoir pressurisé progressivement l'appareil, vérifier l'étanchéité et le fonctionnement du filtre.



4.1 - VÉRIFICATIONS PÉRIODIQUES CONSEILLÉES

- S'assurer, avec un instrument calibré approprié, que le serrage des boulons est conforme à ce qui est indiqué dans 3.2 ;
- Vérifier l'étanchéité des connexions à brides/filetées sur l'installation ;
- Vérifier l'étanchéité et le fonctionnement/l'efficacité du filtre ;

Il incombe à l'utilisateur final ou à l'installateur de définir la fréquence des inspections susmentionnées selon la lourdeur des conditions de service.



5.0 - ENTRETIEN



- Avant d'effectuer toute opération de démontage de l'appareil, veiller à ce qu'il n'y ait pas de gaz sous pression à l'intérieur de ce dernier.



REMPLACEMENT DE L'ORGANE FILTRANT (2)

- Ôter le couvercle (1) en desserrant les vis de fixation (5) ;
- Extraire l'organe filtrant et vérifier son état. Souffler dessus et le nettoyer, le remplacer si nécessaire.
- Le remonter dans sa position initiale en veillant à ce qu'il soit installé entre les guides spécifiques (4) (voir fig. 1-2-3) ;
- Vérifier l'état du joint torique d'étanchéité (6) du couvercle (1), le cas échéant, le remplacer (opération conseillée) ;
- Vérifier que le joint torique d'étanchéité (6) du couvercle (1) se trouve à l'intérieur de la cavité spécifique ;
- Replacer le couvercle et le fixer dans sa position d'origine, en faisant preuve de la plus grande attention pour ne pas « pincer » ou endommager le joint torique lors du serrage ;
- Serrer progressivement les vis (5) en suivant un schéma « en croix » jusqu'à l'obtention du couple (tolérance -15 %) indiqué dans le tableau ci-dessous. Se servir d'une clé dynamométrique étalonnée pour effectuer l'opération.
- Vérifier l'étanchéité du corps/couvercle.

Vis	M5		M6		M8		M10		M12	
	Galvanisé	Acier INOX	Galvanisé	Acier INOX	Galvanisé	Acier INOX	Galvanisé	Acier INOX	Galvanisé	Acier INOX
Couple max (N.m)	6	4,5	10	7,5	25	18,5	49,5	37	84,5	63,5

6.0 - TRANSPORT, STOCKAGE ET ÉLIMINATION

- Pendant le transport, le matériel doit être traité avec soin, en évitant que le dispositif ne puisse subir des collisions, des coups ou des vibrations ;
- Si le produit présente des traitements de surface (ex. peinture, cataphorèse, etc.), ils ne doivent pas être endommagés pendant le transport ;
- La température de transport et de stockage coïncide à celle indiquée dans les données nominales ;
- Si le dispositif n'est pas installé tout de suite après la livraison, il doit être correctement stocké dans un endroit sec et propre ;
- Dans des locaux humides, il est nécessaire d'utiliser des siccatis ou du chauffage pour éviter la condensation.
- Le produit, à la fin de sa vie utile, doit être éliminé conformément à la législation en vigueur dans le pays où cette opération est effectuée.

7.0 - GARANTIE

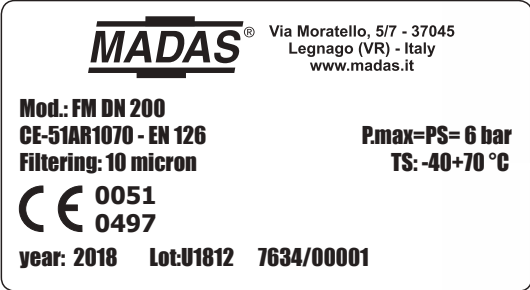
Les conditions de garantie qui s'appliquent sont celles qui sont établies avec le fabricant lors de la livraison.
Pour des dommages causés par :

- Un usage impropre du dispositif ;
 - Le non-respect des prescriptions indiquées dans le présent document ;
 - Le non-respect des règles concernant l'installation ;
 - L'altération, la modification et l'utilisation de pièces de rechange non originales ;
- aucun droit de garantie ou de dédommagement ne peut être revendiqué.
Sont également exclus de la garantie les travaux d'entretien, le montage d'appareils d'autres producteurs, la modification du dispositif et l'usure naturelle.

8.0 - DONNÉES NOMINALES

La plaque signalétique (voir l'exemple ci-contre) comporte les données suivantes :

- Nom/logo et adresse du fabricant (éventuellement nom/logo du revendeur)
- Mod. : = nom/modèle de l'appareil suivi du diamètre de connexion
- CE-51AR1070 = numéro PIN de certification
- EN 126 = Norme de référence du produit
- P.max = Pression maximum à laquelle le fonctionnement du produit est garanti
- PS = Pression maximale admissible
- Filtering = Filtrage
- TS = Plage de température à laquelle le fonctionnement du produit est garanti
-  0051 = Conformité au Règlement (UE) 2016/426 suivi du n° de l'Organisme Notifié
-  0497 = Conformité à la Dir. PED suivie du n° de l'Organisme Notifié
- year = Année de fabrication
- Lot = Numéro de série du produit (voir l'explication ci-dessous)
 - U1812 = Lot en sortie de l'année 2018 semaine n° 12
 - 7634 = numéro progressif de commande se référant à l'année indiquée
 - 00001 = numéro progressif se référant à la quantité du lot



9.0 - EXEMPLE DE DIMENSIONNEMENT DU FILTRE

Données d'utilisation :
 $Q_n = 1210 \text{ [Nm}^3\text{/h]}$ gaz méthane
 $P_i = 1,2 \text{ [bar]}$

Pour utiliser le diagramme, il faut convertir les données d'emploi en fonction des conditions du diagramme ($P_i=0$) et vice versa.

- Conversion au débit en fonction des conditions du diagramme :

$$Q_d \text{ [Nm}^3\text{/h]} = \left(\frac{Q_n \text{ [Nm}^3\text{/h]}}{P_i + 1 \text{ [bar]}} \right) = \left(\frac{1210 \text{ [Nm}^3\text{/h]}}{1,2 + 1 \text{ [bar]}} \right) = 550 \text{ [m}^3\text{/h]}$$

- Choix du diamètre du filtre :

Débits maximums en m³/h de gaz méthane en tenant compte d'une vitesse max. du débit dans le tuyau de 20 m/s							
DN 65	DN 80	DN 100	DN 125	DN 150	DN 200	DN 250	DN 300
244 m³/h	370 m³/h	578 m³/h	903 m³/h	1300 m³/h	2312 m³/h	3613 m³/h	5203 m³/h

- Repérer le débit Q_d sur la ligne du gaz utilisé et monter avec une ligne verticale jusqu'à croiser la ligne droite correspondant au diamètre sélectionné (voir le diagramme en exemple page 32) ;
- À partir du point qui vient d'être identifié, se déplacer à gauche jusqu'à croiser l'axe du graphique pour relever le ΔP_d
- Conversion du ΔP_d relevé sur le diagramme en fonction des conditions de l'installation :

$$\Delta P_r \text{ [mbar]} = \Delta P_d \text{ [mbar]} \times (P_i + 1) \text{ [bar]} = 6,5 \text{ [mbar]} \times (1,2 + 1) \text{ [bar]} = 14,3 \text{ [mbar]}$$

- Exécuter la même procédure sur les diagrammes des pages 32 et 33 afin de calculer la perte de charge des filtres aux différents filtrages (50 μm - 20 μm - 10 μm).

10.0 - MANOMETRE DIFFERENTIEL INDICATEUR D'OBSTRUCTION

10.1 - DESCRIPTION

Manomètre différentiel utilisé pour indiquer le degré d'obstruction des filtres à cartouche.

Il est équipé d'un indice de maximum à entraînement (aiguille rouge) capable de fournir la valeur maximale de ΔP qui s'est créée.

Peut être fourni déjà installé (comme sur fig. 5 et 6) ou comme accessoire à installer ensuite.

En général, il est fourni installé sur les filtres comme sur la photo et comme l'indique la fig. 5, c'est-à-dire :

- flèche sur le corps du filtre de gauche à droite ;
- cadran lisible frontalement ;
- signe + sur l'arrière à gauche

Il est possible de le fournir également comme indiqué sur la fig. 6 (version reverse "R"), c'est-à-dire :

- flèche sur le corps du filtre de gauche à droite;
- cadran lisible du côté opposé;
- signe + à gauche

(dans ce cas, les signes + et - sont indiqués avec les plaquettes appropriées).

Les deux versions peuvent être fournies également avec un capteur de proximité incorporé pour la transmission à distance du signal de pression différentielle maximale (versions "S").

Le capteur est de type normalement ouvert et fournit un signal quand l'indicateur du ΔP atteint les 100 mbar.

Paramétrages différents sur demande.



10.2 - INSTALLATION

S'il manomètre différentiel utilisé pour indiquer le degré d'obstruction est fourni comme accessoire, il est nécessaire de fermer le gaz avant l'installation.

Il est conseillé d'effectuer le montage sur les filtres avec prédisposition à l'installation, c'est-à-dire avec 2 des trous filetés G 1/8 (ayant une distance entre eux de 55 mm) déjà présents sur le couvercle (voir photo de couverture et fig. 5 et 6).

Si le filtre n'a pas cette prédisposition, il faut effectuer une connexion comme indiqué sur la fig. 7 en utilisant des tubes et/ou raccords dont les filetages sont corrects, avec la connexion à assembler et adaptés pour le gaz à utiliser.

Le filtre sur lequel on installe le manomètre doit être équipé au moins d'une prise de pression en entrée et d'une en sortie.

Après le montage, effectuer un contrôle de fonctionnement et d'étanchéité.

Une fois le filtre installé (voir feuillet d'instructions correspondant), avant de mettre en fonction l'installation, mettre à zéro l'aiguille rouge.

Avec l'installation en débit, observer la valeur de ΔP avec le nouveau filtre.

Remplacer la cartouche filtrante quand la pression différentielle est double par rapport à la valeur initiale obtenue avec le nouveau filtre.

10.3 - DONNEES TECHNIQUES

- P. max manomètre: 20 bar
- ΔP maximum standard: 150 mbar (différentes ΔP sur demande)
- Température ambiante : -40 ÷ +60 °C

Caractéristiques capteur de proximité

- Tension maximum : 30 Vdc
- Courant maximum : 100 mA
- Degré de protection : IP55
- Modalité de protection : EEx ia IIC T6
- Longueurs câbles : 2 m

1.0 - INFORMACIÓN GENERAL

Este manual ilustra cómo instalar, poner en funcionamiento y utilizar el dispositivo de forma segura.

Las instrucciones de uso deben estar **SIEMPRE** disponibles en la instalación donde se encuentra el dispositivo.

ATENCIÓN: las operaciones de instalación/mantenimiento las debe realizar personal cualificado (como se indica en 1.3), utilizando los equipos de protección individual (EPI) adecuados.

Para obtener más información relativa a las operaciones de instalación/mantenimiento o en caso de problemas que no se puedan solucionar usando las instrucciones, es posible ponerse en contacto con el fabricante a través de la dirección y los números de teléfono que aparecen en la última página.

1.1 - DESCRIPCIÓN

Dispositivo que retiene las partículas de polvo transportadas por el gas y protege a los elementos en peligro (quemadores, contadores, calderas, reguladores de presión, etc.) de una rápida obstrucción.

ESTÁ compuesto por un cartucho filtrante realizado de material sintético lavable y completamente extraíble para una inspección, limpieza y/o sustitución totales.

Puede equiparse con tomas de:

- presión y/o conexiones para el control de la presión y/o presión diferencial.
- tapón o grifo para la descarga de condensación;
- predisposición para instalación del manómetro diferencial indicador de obstrucción;
- manómetro diferencial indicador de obstrucción ya instalado.

Normas de referencia: EN 126 – EN 13611.

1.2 - LEYENDA DE SÍMBOLOS



PELIGRO: En caso de incumplimiento, pueden provocarse daños en bienes materiales.



PELIGRO: En caso de incumplimiento, además de daños en bienes materiales, también pueden provocarse daños a las personas y/o animales domésticos.



ATENCIÓN: Se llama la atención sobre los detalles técnicos dirigidos al personal cualificado.

1.3 - PERSONAL CUALIFICADO

Se trata de personal que:

- Está familiarizado con la instalación, el montaje, la puesta en servicio y el mantenimiento del producto;
- Conoce las normativas en vigor en la región o país, en materia de instalación y seguridad;
- Ha recibido formación acerca de primeros auxilios.



1.4 - USO DE PARTES DE RECAMBIO NO ORIGINALES

- En caso de mantenimiento o sustitución de componentes de recambio (ej. cartucho filtrante, junta tórica, etc.) deben utilizarse **SOLO** los indicados por el fabricante. El uso de componentes diferentes, además de invalidar la garantía del producto, podría perjudicar su correcto funcionamiento.
- El fabricante se exime de toda responsabilidad por problemas de funcionamiento que deriven de alteraciones no autorizadas o uso de recambios no originales.



1.5 - USO NO APROPIADO

- El producto se debe usar solo para el fin para el que ha sido fabricado.
- No se permite el uso con fluidos que no sean los indicados.
- No se deben superar en ningún caso, los datos técnicos indicados en la placa. El usuario final o el instalador tienen que adoptar sistemas correctos de protección del aparato, que impidan que se supere la presión máxima indicada en la placa.
- El fabricante no es responsable de los daños causados por un uso impropio del aparato.

2.0 - DATOS TÉCNICOS

- Uso : gases no agresivos de las tres familias (gases secos)
- Temperatura ambiente (TS) : -40 ÷ +70 °C
- Presión máxima de funcionamiento : 2 o 6 bar (véase la etiqueta del producto)
- Resistencia mecánica : Grupo 2 (según EN 13611)
- Conexiones embridadas acoplables con bridas PN 16 : (DN 65 - DN 80 - DN 100 - DN 125 - DN 150 - DN 200 - DN 250 - DN 300) ISO 7005 / EN 1092-1
- Conexiones embridadas ANSI 150 : bajo petición
- Cartucho filtrante* : Filtrado 10-20-50 µm (véase la etiqueta del producto)
- De conformidad con : Reglamento (UE) 2016/426 (Equipos que queman combustibles gaseosos) Directiva PED 2014/68/UE

* DN 125 - DN 150 - DN 200 - DN 250 - DN 300 solo 10 µm

3.0 - PUESTA EN FUNCIONAMIENTO DEL DISPOSITIVO



3.1 - OPERACIONES ANTES DE LA INSTALACIÓN

- Hay que cerrar el gas antes del aparato, antes de la instalación;
- Compruebe que la presión de línea **NO SEA SUPERIOR** a la presión máxima declarada en la etiqueta del producto;
- Los posibles tapones de protección (de estar presentes) se deben quitar antes de la instalación;
- Las tuberías y partes internas del aparato no deben tener cuerpos extraños;
- Compruebe que las contrabridas de entrada y salida estén perfectamente coaxiales y paralelas, para evitar someter el cuerpo a esfuerzos mecánicos inútiles; además, calcule el espacio para introducir la junta de estanqueidad;
- Para las fases de apriete, es necesario procurarse una o varias llaves dinamométricas calibradas u otras herramientas de bloqueo controladas;
- Tenga en cuenta el espacio necesario para la sustitución del cartucho filtrante;
- En caso de instalación en el exterior, se recomienda colocar un techo de protección para evitar que el agua de lluvia pueda oxidar o dañar partes del aparato.



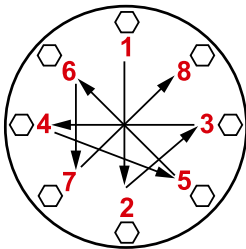
- En función de la geometría de la instalación, evalúe el riesgo de formación de mezcla explosiva en el interior del conducto;
- Si el filtro se instala en proximidad de otros equipos o como parte de un conjunto, hay que evaluar previamente la compatibilidad entre el filtro y estos equipos;
- Disponga de una protección contra golpes o contactos accidentales si el aparato está accesible a personal no cualificado.



3.2 - INSTALACIÓN (véase el ejemplo en el punto 3.4)

- Monte el dispositivo con bridas, insertando las juntas correspondientes, en la instalación con tuberías y/o racores cuyas bridas encajen con la conexión que hay que acoplar. Las juntas no deben tener defectos y deben estar centradas entre las bridas;
- Si con las juntas puestas el espacio que queda fuese excesivo, no trate de rellenarlo apretando excesivamente los pernos del aparato;
- La flecha, indicada en el cuerpo (**3**) del aparato, debe estar dirigida hacia el punto de consumo;
- Introduzca dentro de los pernos las arandelas correspondientes para evitar que las bridas se dañen en la fase de apriete;
- Durante la fase de apriete, asegúrese de no “pellizcar” ni dañar la junta;

- Apriete las tuercas o pernos gradualmente, según un esquema “de cruz” (véase el ejemplo indicado abajo);
- Apriételos, primero al 30 %, después al 60 %, hasta el 100 % del par máximo (consulte la tabla de abajo según EN 13611);



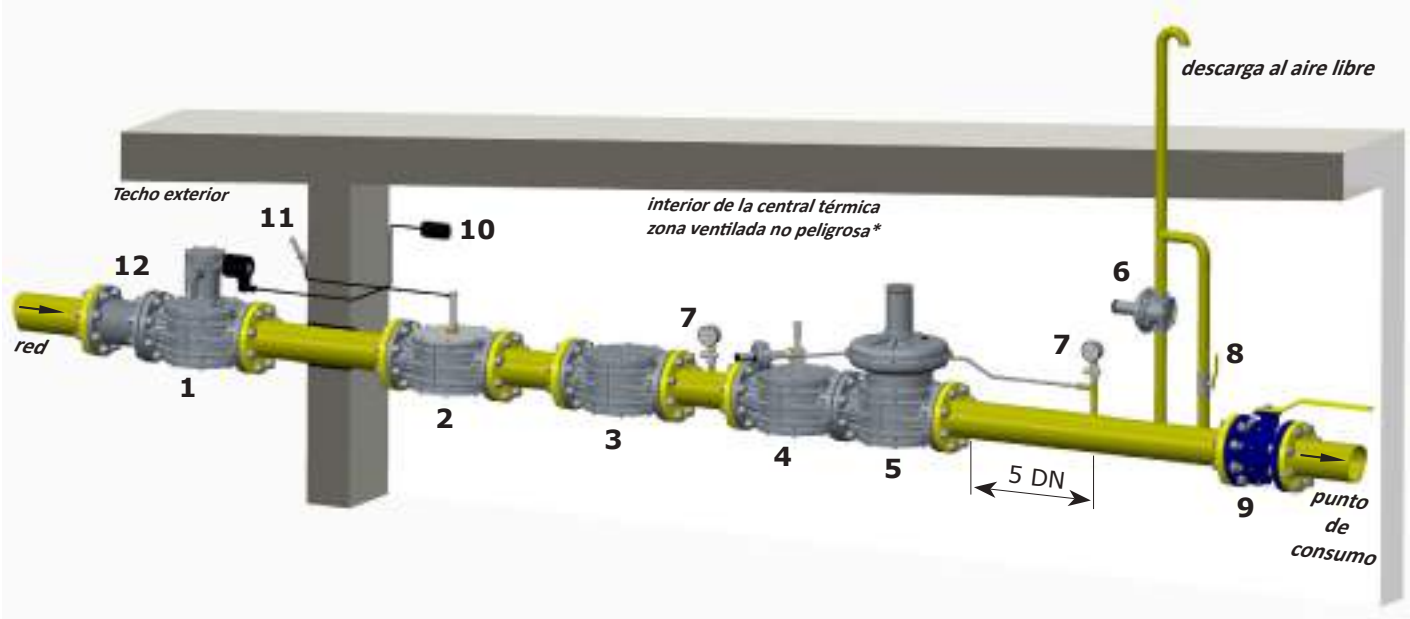
Diámetro	DN 65	DN 80	DN 100	DN 125	DN 150	> DN 150
Par máximo (N.m)	50	50	80	160	160	160

- Apriete de nuevo cada tuerca o perno a derechas, por lo menos una vez, hasta llegar a uniformar el par máximo;
- El filtro puede instalarse en cualquier posición siempre que la flecha, indicada en el cuerpo (**3**) del aparato, esté dirigida hacia el punto de consumo;
- Durante la instalación, evite que la suciedad o residuos metálicos penetren dentro del aparato;
- Garantice un montaje sin tensiones mecánicas; se recomienda el uso de juntas de compensación para absorber también las dilataciones térmicas de la tubería;
- Si se ha previsto la instalación del aparato en una rampa, es deber del instalador preparar soportes o apoyos adecuados, correctamente dimensionados, para sostener y fijar el conjunto. Nunca deje, por ningún motivo, que el peso de la rampa recaiga solamente sobre las conexiones (roscadas o embridadas) de cada uno de los dispositivos;
- En cualquier caso, después del montaje compruebe la estanqueidad de la instalación;

3.4 - EJEMPLO GENÉRICO DE INSTALACIÓN

1. Electroválvula con rearme manual M16/RM N.C.
2. Válvula de corte SM
3. Filtro de gas FM
4. Válvula de seguridad por máxima OPSO serie MVB/1 MAX
5. Regulador de presión RG/2MC
6. Válvula de alivio MVS/1

7. Manómetro y válvula pulsadora correspondiente
8. Grifo de alivio
9. Válvula de bola
10. Detector de gas
11. Palanca de mando a distancia válvula de corte SM
12. Junta de compensación/antivibración





4.0 - PRIMERA PUESTA EN SERVICIO



- Antes de la puesta en servicio, compruebe que se respeten todas las indicaciones presentes en la placa, incluida la dirección del flujo;
- Después de presurizar de forma gradual la instalación, compruebe la estanqueidad y el funcionamiento del filtro.



4.1 - COMPROBACIONES PERIÓDICAS RECOMENDADAS

- Compruebe con el instrumento específico calibrado, que el apriete de los pernos sea conforme con lo indicado en 3.2;
- Compruebe la estanqueidad de las conexiones embridadas/roscadas en la instalación;
- Compruebe la estanqueidad y el funcionamiento/eficiencia del filtro;

Es deber del usuario final o del instalador determinar la frecuencia de dichas comprobaciones en función de la relevancia de las condiciones de servicio.



5.0 - MANTENIMIENTO



- Antes de efectuar cualquier operación de desmontaje en el aparato, asegúrese de que en el interior del mismo no haya gas a presión.



SUSTITUCIÓN DEL CARTUCHO FILTRANTE (2)

- Quite la tapa (1) desenroscando los tornillos de fijación (5);
- Extraiga el cartucho filtrante y compruebe su estado. Sople sobre él y límpielo; si es necesario, sustitúyalo.
- Móntelo de nuevo en la posición inicial, controlando que quede colocado en las guías correspondientes (4) (véase la fig. 1-2-3);
- Compruebe las condiciones de la junta tórica de estanqueidad (6) de la tapa (1), si es necesario, sustitúyala (operación recomendada);
- Compruebe que la junta tórica de estanqueidad (6) de la tapa (1) esté dentro de la cavidad correspondiente;
- Vuelva a colocar la tapa y fíjela en la posición original, prestando la máxima atención en no “pellizcar” o dañar la junta tórica de estanqueidad en fase de ajuste;
- Apriete los tornillos (5) gradualmente, según un esquema “de cruz”, hasta alcanzar el par (tolerancia -15%) indicado en la tabla de al lado. Utilice una llave dinamométrica calibrada para efectuar la operación.
- Compruebe la estanqueidad del cuerpo/tapa.

Tornillo	M5		M6		M8		M10		M12	
	Galvani- zado	Acero INOX	Galvani- zado	Acero INOX	Galvani- zado	Acero INOX	Galvani- zado	Acero INOX	Galvani- zado	Acero INOX
Par máximo (N.m)	6	4,5	10	7,5	25	18,5	49,5	37	84,5	63,5

6.0 - TRANSPORTE, ALMACENAMIENTO Y ELIMINACIÓN

- Durante el transporte, el material debe tratarse con cuidado, evitando que el dispositivo se someta a choques, golpes o vibraciones;
- Si el producto tiene tratamientos superficiales (p. ej. pintura, cataforesis, etc.), los mismos no deben dañarse durante el transporte;
- La temperatura de transporte y almacenamiento debe coincidir con la indicada en los datos de la placa;
- Si el dispositivo no se instala inmediatamente después de la entrega, se debe almacenar correctamente en un lugar seco y limpio;
- En lugares húmedos es necesario usar secadores o bien la calefacción, para evitar la formación de condensación.
- El producto, al final de su vida útil, deberá eliminarse en conformidad con la legislación vigente en el país en el que se realiza esta operación.

7.0 - GARANTÍA

Valen las condiciones de la garantía establecidas con el fabricante en el momento del suministro.
Por daños causados por:

- el uso impropio del dispositivo;
 - el incumplimiento de las disposiciones indicadas en este documento;
 - incumplimiento de las normas relacionadas con la instalación;
 - la alteración, modificación y uso de piezas de recambio no originales;
- no se pueden reclamar derechos de garantía ni resarcimiento de daños.
Además, se excluyen de la garantía los trabajos de mantenimiento, el montaje de aparatos de otros fabricantes, la modificación del dispositivo y el desgaste natural.

8.0 - DATOS DE LA PLACA

En la placa (véase el ejemplo de al lado) aparecen los siguientes datos:

- Nombre/logotipo y dirección del fabricante (eventual nombre/logotipo del distribuidor)
- Mod.: = nombre/modelo del aparato seguido del diámetro de conexión
- CE-51AR1070 = número de pin de certificación
- EN 126 = Norma de referencia del producto
- P. max. = Presión máxima en la que se garantiza el funcionamiento del producto
- PS = Presión máxima admisible
- Filtering = Filtrado
- TS = Intervalo de temperatura en el que se garantiza el funcionamiento del producto
- CE0051 = Conformidad con el Reglamento 2016/426 seguida del n.º del Organismo Notificado
- CE0497 = Conformidad Dir. PED seguido del n.º del Organismo Notificado
- year = Año de fabricación
- Lot = Número de matrícula del producto (véase la explicación a continuación)
 - U1812 = Lote en salida año 2018 semana n.º 12
 - 7634 = número progresivo de pedido referido al año indicado
 - 00001 = número progresivo referido a la cantidad del lote

MADAS[®]
Via Moratello, 5/7 - 37045
Legnago (VR) - Italy
www.madas.it

Mod.: FM DN 200
CE-51AR1070 - EN 126
Filtering: 10 micron
CE0051
CE0497
year: 2018 Lot:U1812 7634/00001

Pmax=PS= 6 bar
TS: -40+70 °C

9.0 - EJEMPLO DIMENSIONES DEL FILTRO

Datos de utilización:
 $Q_n = 1210 \text{ [Nm}^3/\text{h]}$ Metano
 $P_i + 1,2 \text{ [bar]}$

Para usar el diagrama es necesario convertir los datos de uso a las condiciones del diagrama ($P_i=0$) y viceversa.

- Conversión al caudal y a las condiciones del diagrama:

$$Q_d \text{ [Nm}^3/\text{h]} = \left(\frac{Q_n \text{ [Nm}^3/\text{h]}}{P_i + 1 \text{ [bar]}} \right) = \left(\frac{1210 \text{ [Nm}^3/\text{h]}}{1,2 + 1 \text{ [bar]}} \right) = 550 \text{ [m}^3/\text{h]}$$

- Elección del diámetro del filtro:

Caudales máximos en m³/h de gas metano, considerando una velocidad máxima del flujo en tubería de 20 m por segundo							
DN 65	DN 80	DN 100	DN 125	DN 150	DN 200	DN 250	DN 300
244 m³/h	370 m³/h	578 m³/h	903 m³/h	1300 m³/h	2312 m³/h	3613 m³/h	5203 m³/h

- Localizar en la línea relativa al Gas utilizado, el caudal Q_d y subir con una línea vertical hasta cruzarse con la recta relativa al diámetro seleccionado (véase diagrama de ejemplo en la pág. 32);
- Desde el punto que se acaba de identificar moverse hacia la izquierda hasta cruzarse con el eje del gráfico, medir el ΔP_d
- Conversión del ΔP_d calculado con el diagrama Δp a las condiciones de la instalación:

$$\Delta P_r \text{ [mbar]} = \Delta P_d \text{ [mbar]} \times (P_i + 1) \text{ [bar]} = 6,5 \text{ [mbar]} \times (1,2 + 1) \text{ [bar]} = 14,3 \text{ [mbar]}$$

- Realice el mismo procedimiento en los diagramas de las páginas 32 y 33, para calcular la pérdida de carga de los filtros con las diferentes filtraciones (50 μm - 20 μm - 10 μm).

10.0 - MANÓMETRO DIFERENCIAL INDICADOR DE OBSTRUCCIÓN

10.1 - DESCRIPCIÓN

Manómetro diferencial utilizado para indicar el grado de obstrucción de los filtros de cartucho.

Está equipado con un indicador de máxima de arrastre (puntero rojo) que proporciona el valor máximo de ΔP registrado. Puede suministrarse ya instalado (como en las fig. 5 y 6) o como accesorio para instalar después.

Generalmente, se suministra ya instalado en los filtros, tal como se muestra en la foto y se indica en la fig. 5, esto es:

- flecha en la caja del filtro de izquierda a derecha;
- pantalla legible frontalmente;
- signo + en la parte posterior a la izquierda

También puede suministrarse como se indica en la fig. 6 (versión Reverse "R"), esto es:

- flecha en la caja del filtro de izquierda a derecha;
- pantalla legible desde el lado opuesto;
- signo + a la izquierda
- (en este caso, los signos + y – se indican con unas oportunas etiquetas).

Ambas versiones pueden suministrarse también con un sensor de proximidad incorporado para transmitir a distancia la señal de presión diferencial máxima (versiones "S").

Normalmente, el sensor es de tipo abierto y transmite una señal cuando el indicador de ΔP alcanza los 100 mbar. Calibraciones diferentes a petición del cliente.



10.2 - INSTALACIÓN

Si el manómetro diferencial utilizado para indicar el grado de obstrucción se suministra como accesorio, es necesario cortar el gas antes de la instalación.

Se aconseja montar el manómetro en filtros preparados para su instalación, es decir con 2 orificios roscados G 1/8 (separados entre ellos 55 mm) ya presentes en la tapa (véanse la foto de la cubierta y las fig. 5 y 6).

Si el filtro no está preparado para ello, debe realizarse un empalme, tal como se indica en la fig. 7, utilizando tubos y/o racores con roscados idóneos para la conexión en cuestión y para el gas de suministro.

El filtro en el que se instala el manómetro debe estar dotado al menos de una toma de presión de entrada y otra de salida.

Después del montaje, es necesario realizar un control de funcionamiento y de estanquidad.

Una vez instalado el filtro (véase la hoja de instrucciones correspondiente), antes de poner en marcha la instalación, debe ajustarse a cero el puntero rojo.

Con la instalación funcionando a su máxima capacidad, hay que observar el valor de ΔP con el filtro nuevo.

Cuando la presión diferencial se duplique con respecto al valor inicial obtenido con el filtro nuevo, será necesario sustituir el cartucho filtrante.

10.3 - DATOS TÉCNICOS

- P. máx del manómetro: 20 bar
- ΔP máximo standard: 150 mbar (ΔP diferentes a petición)
- Temperatura ambiente: $-40 \div +60$ °C

Características del sensor de proximidad

- Tensión máxima: 30 Vdc
- Corriente máxima: 100 mA
- Grado de protección: IP55
- Modo de protección: EEx ia IIC T6
- Longitud de los cables: 2 m

fig. 1
DN 65 - DN 80

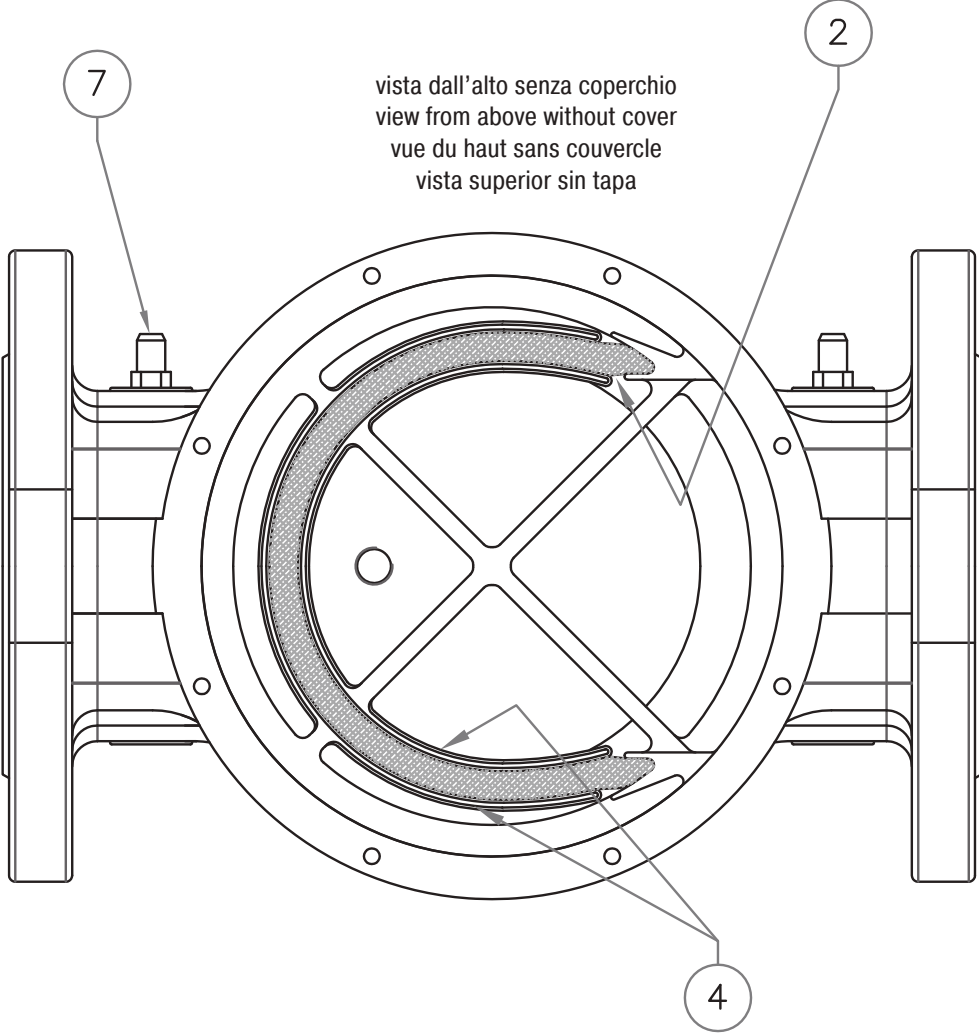
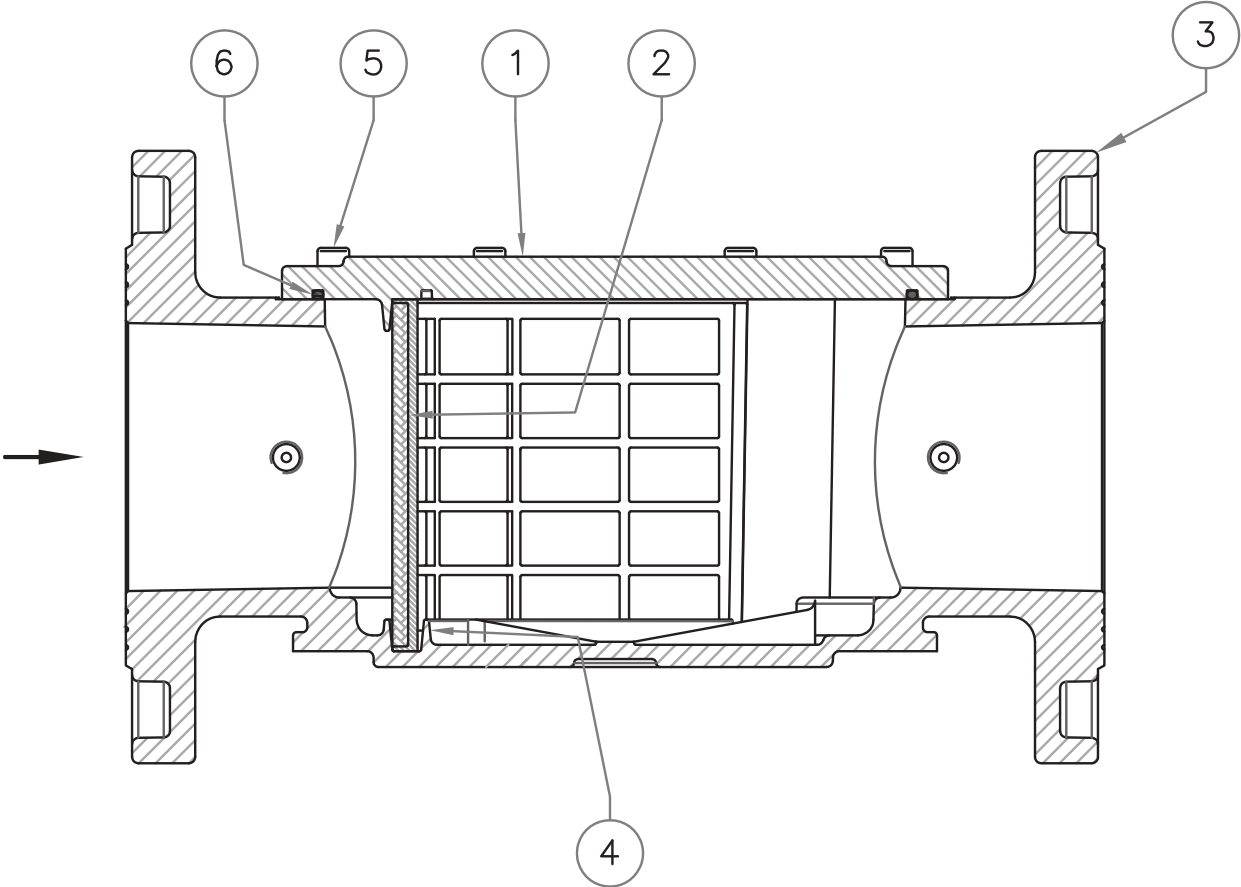


fig. 2
DN 100

IT

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FR

ES

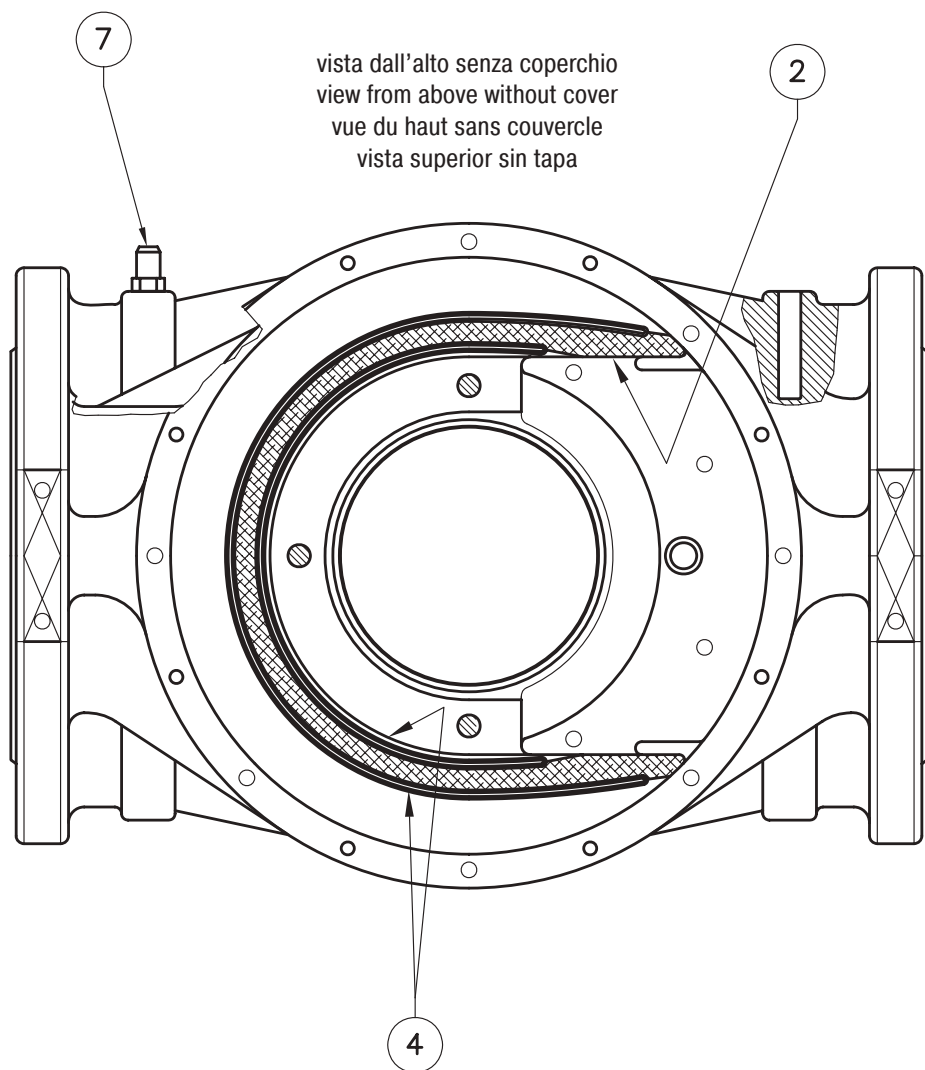
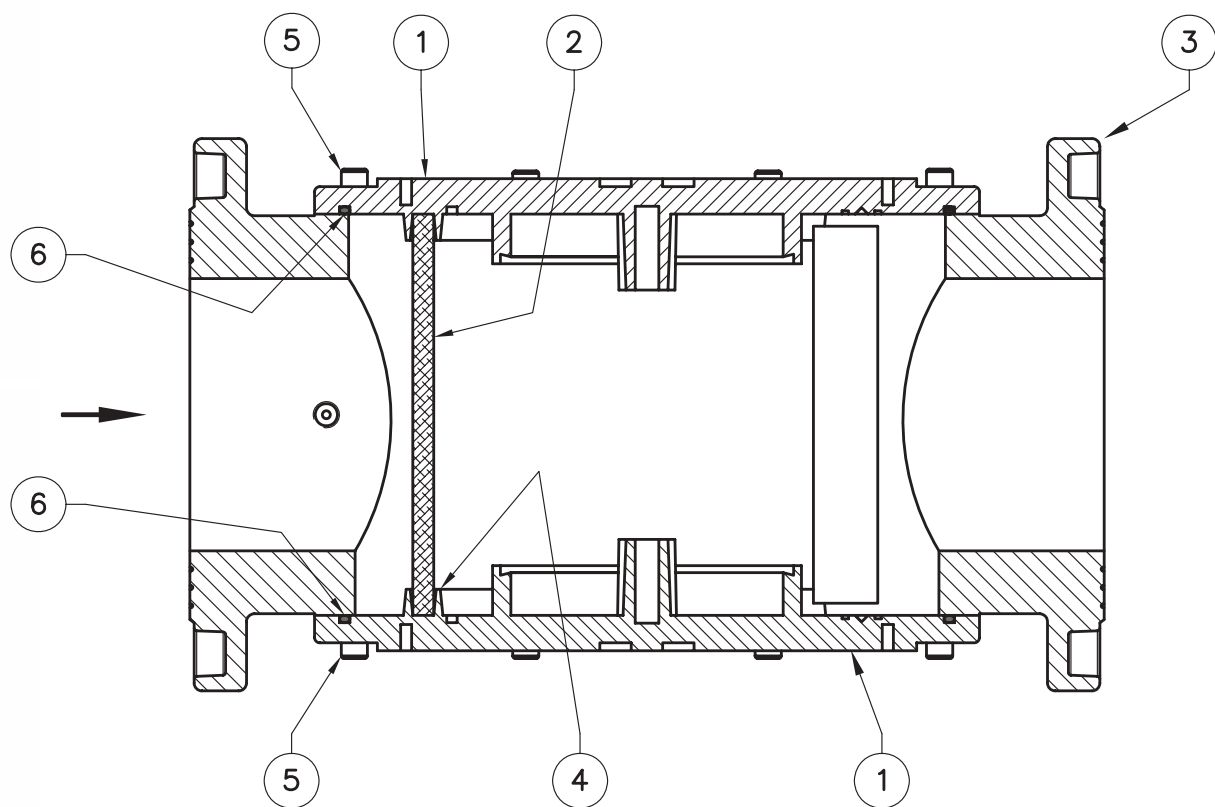


fig. 3
DN 125 - DN 150 - DN 200 - DN 250 - DN 300

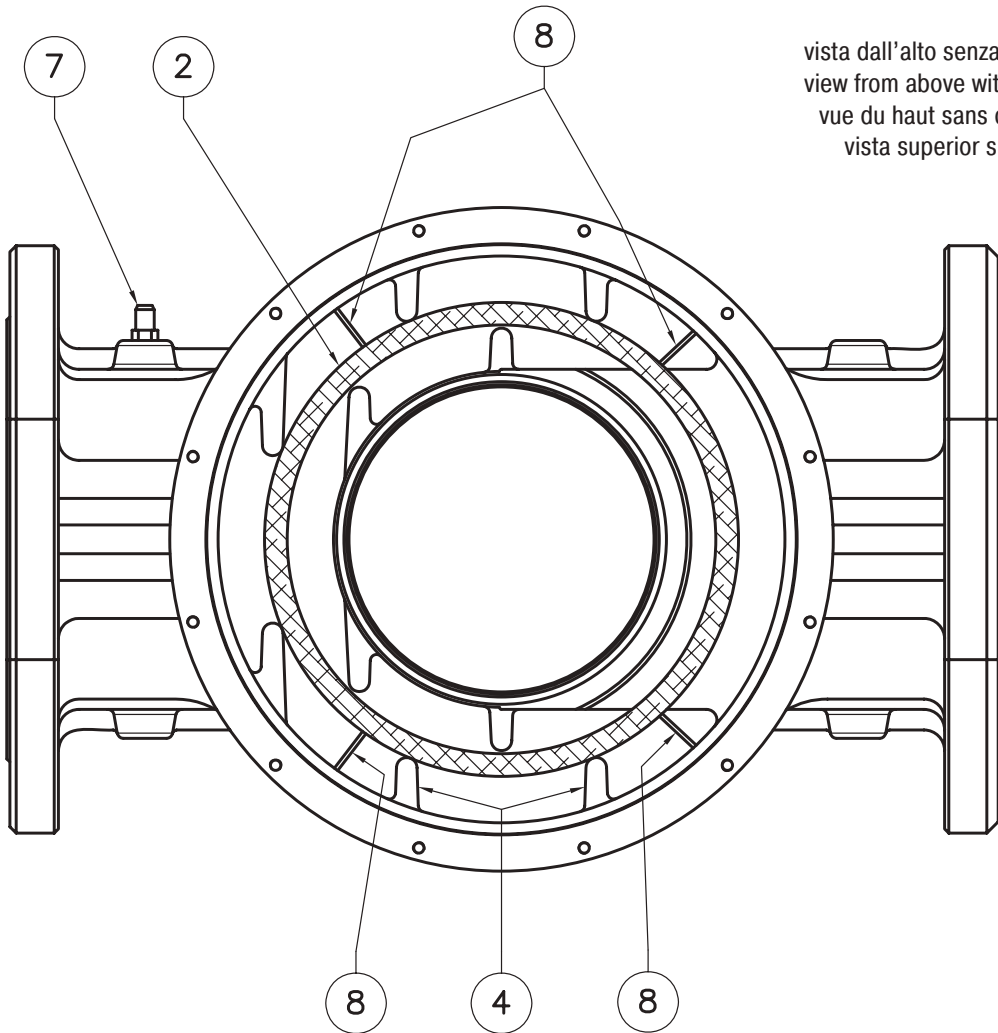
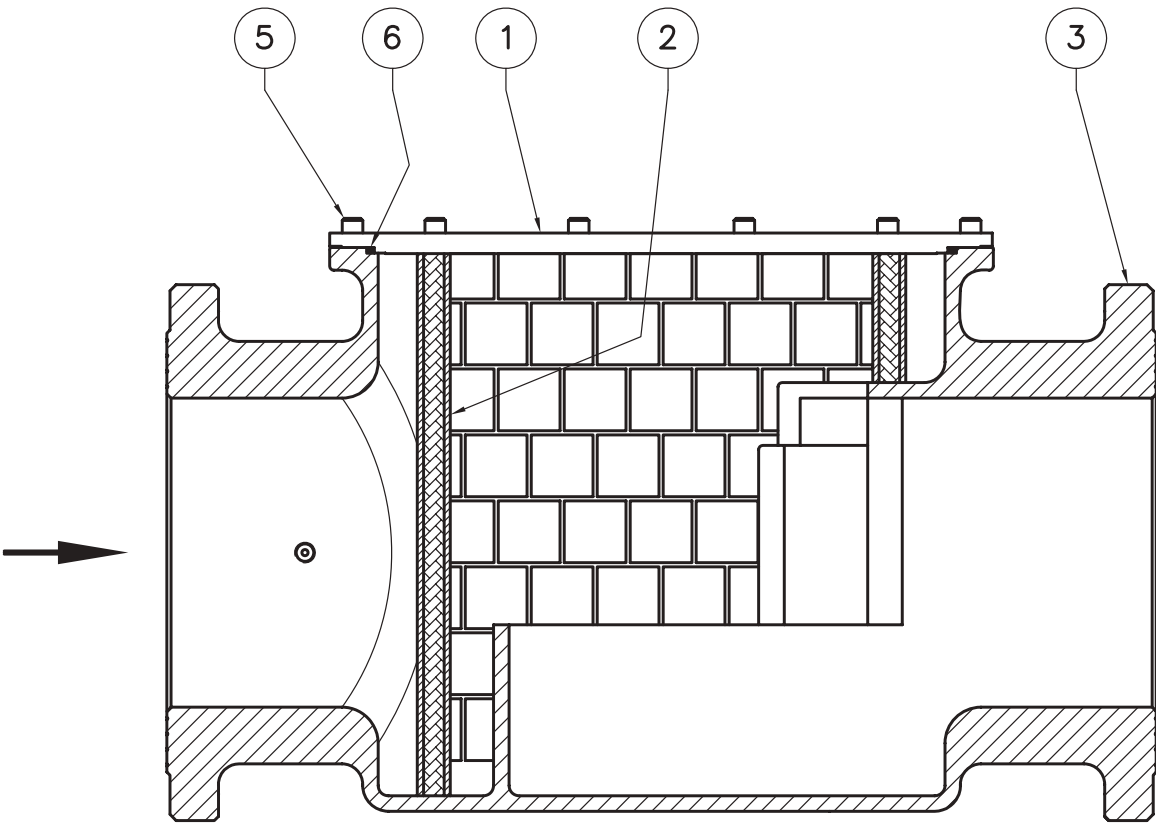


fig. 1, 2 e 3

- 1 - Coperchio / Fondello
- 2 - Organo filtrante
- 3 - Corpo
- 4 - Guide di sistemazione
- 5 - Viti di fissaggio
- 6 - O-Ring di tenuta
- 7 - Presa di pressione
- 8 - Alette speciali

fig. 1, 2 and 3

- 1 - Cover / Bottom
- 2 - Filter element
- 3 - Body
- 4 - Positioning guides
- 5 - Fastening screws
- 6 - O-ring
- 7 - Pressure test nipple
- 8 - Special fins

fig. 1, 2 et 3

- 1 - Couvercle/Fond
- 2 - Organe filtrant
- 3 - Corps
- 4 - Guides d'ajustement
- 5 - Vis de fixation
- 6 - Joint torique d'étanchéité
- 7 - Prise de pression
- 8 - Ailettes spéciales

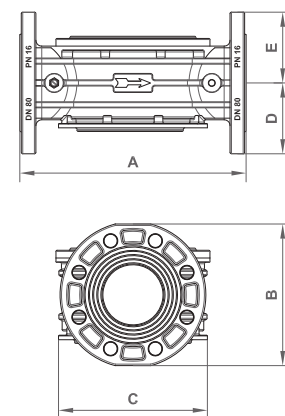
fig. 1, 2 y 3

- 1 - Tapa / Tapa inferior
- 2 - Cartucho filtrante
- 3 - Cuerpo
- 4 - Guías de ajuste
- 5 - Tornillos de fijación
- 6 - Junta tórica de estanqueidad
- 7 - Toma de presión
- 8 - Aletas especiales

Tabella 1 - Table 1 - Tableau 1 - Tabla 1

Dimensioni di ingombro in mm - Overall dimensions in mm - Mesures d'encombrement en mm - Dimensiones en mm

DN	Attacchi flangiati Flanged connections Fixations bridees Conexiones embridadas	P. max (bar)	fori holes trous orificios	A	B (D+E)	C	D	E
65	PN 16 - ANSI 150	2 - 6	4	290	180	211	90	90
80	PN 16	2 - 6	8	310	194	211	97	97
80	ANSI 150	2 - 6	4	290	180	211	90	90
100	PN 16 - ANSI 150	2 - 6	8	350	210	260	105	105
125	PN 16 - ANSI 150	2	8	480	300	328	125,5	173,5
125	PN 16 - ANSI 150	6	8	480	305	328	125,5	178,5
150	PN 16 - ANSI 150	2	8	480	304	328	130	174
150	PN 16 - ANSI 150	6	8	480	309	328	130	179
200	PN 16	2 - 6	12	600	382	450	165	217
200	ANSI 150	2 - 6	8	600	382	450	165	217
250	PN 16 - ANSI 150	2 - 6	12	673	457	510	198	259
300	PN 16 - ANSI 150	2 - 6	12	737	504	557	220	284

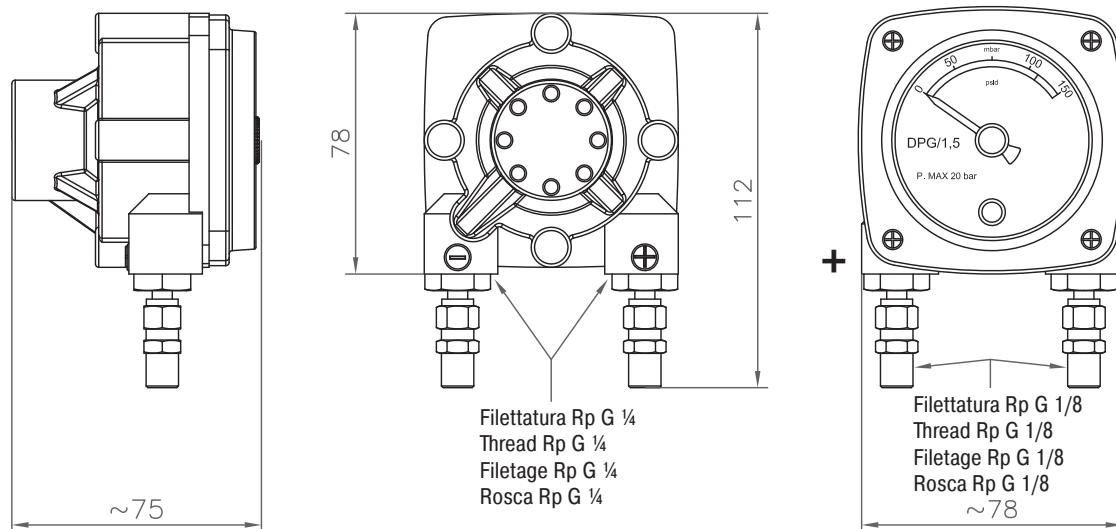


Le dimensioni sono indicative, non vincolanti - The dimensions are provided as a guideline, they are not binding
 Les dimensions sont indicatives, non contraignantes - Las dimensiones son indicativas, no vinculantes

Manometro differenziale indicatore di intasamento
Differential pressure gauge clogging indicator
Manometre différentiel indicateur d'obstruction
Manómetro diferencial indicador de obstrucción

Dimensioni di ingombro in mm - Overall dimensions in mm - Mesures d'encombrement en mm - Medidas de estorbo en mm

fig. 4



Nelle versioni con sensore di prossimità questa quota misura 90 mm
 In the proximity sensor version this measure is 90 mm
 Dans les versions avec capteur de proximité, cette valeur mesure 90 mm.
 En las versiones con sensor de proximidad esta altura es de 90 mm

fig. 5

Configurazione Standard
 Standard configuration
 Configuration Standard
 Configuración Estándar

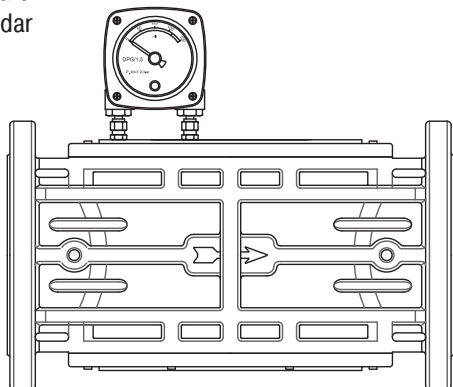


fig. 6

Configurazione "R" reverse
 Reverse "R" configuration
 Configuration Reverse "R"
 Versión Reverse "R"

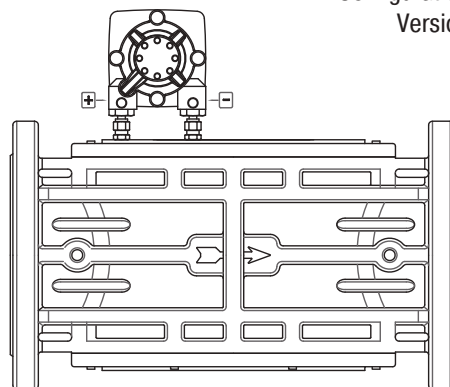
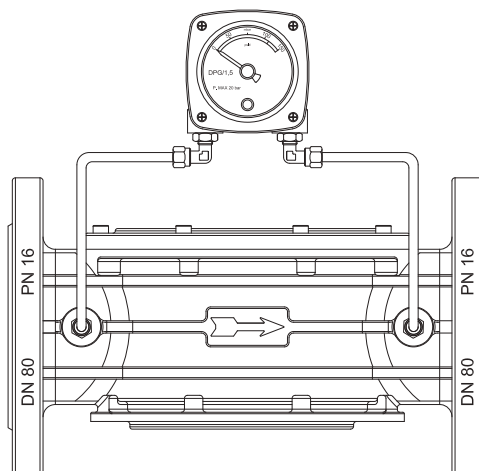


fig. 7

Installazione su filtro senza predisposizione
 Filter installation without premounting
 Installation du filtre sans prédisposition
 Instalación del filtro sin preparación.



IT

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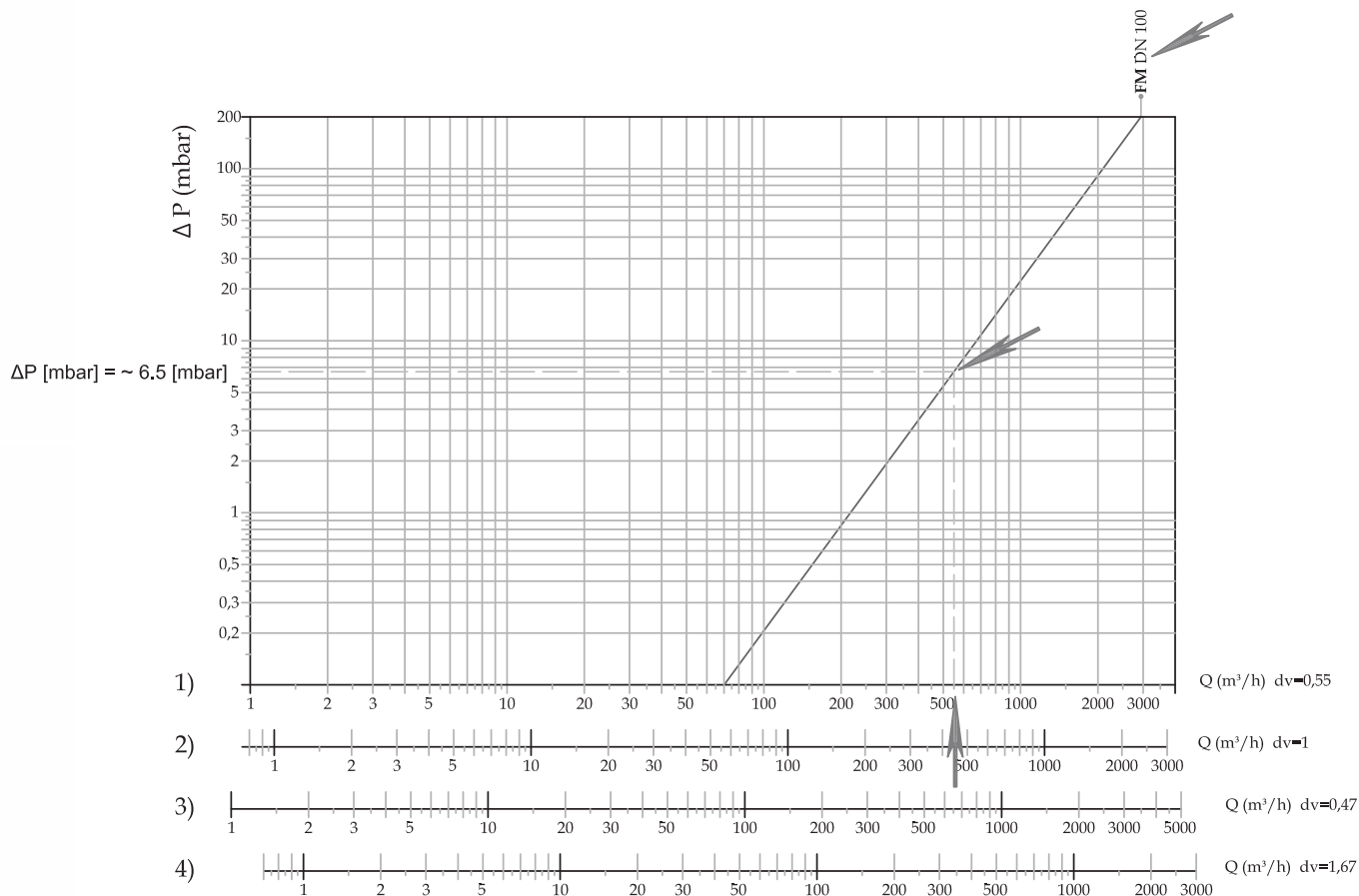
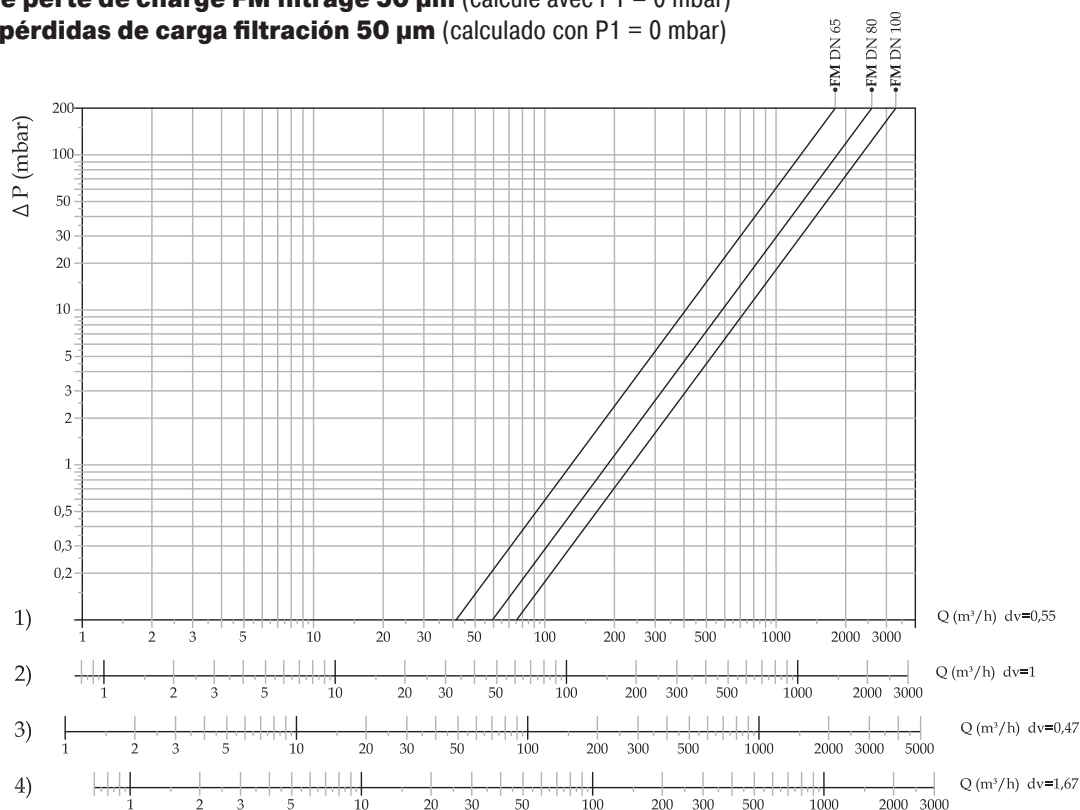


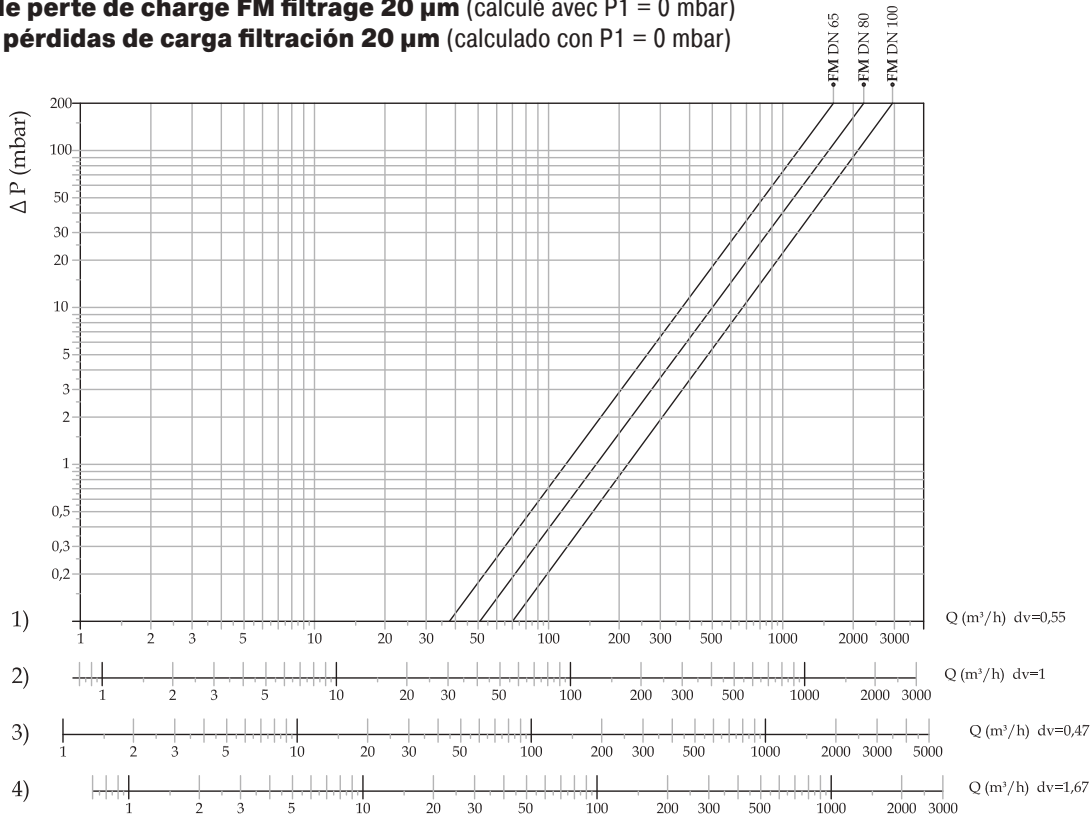
Diagramma perdite di carico FM filtraggio 50 μ m (calcolato con $P_1 = 0$ mbar)
FM pressure drop diagram filtering 50 μ m (calculated with $P_1 = 0$ mbar)
Diagramme de perte de charge FM filtrage 50 μ m (calculé avec $P_1 = 0$ mbar)
Diagrama de pérdidas de carga filtración 50 μ m (calculado con $P_1 = 0$ mbar)



1) metano - methane - méthane - metano 2) aria - air - air - aire
 3) gas di città - town gas - gaz de ville - gas ciudad 4) gpl - lpg - gaz liquide - gas líquido

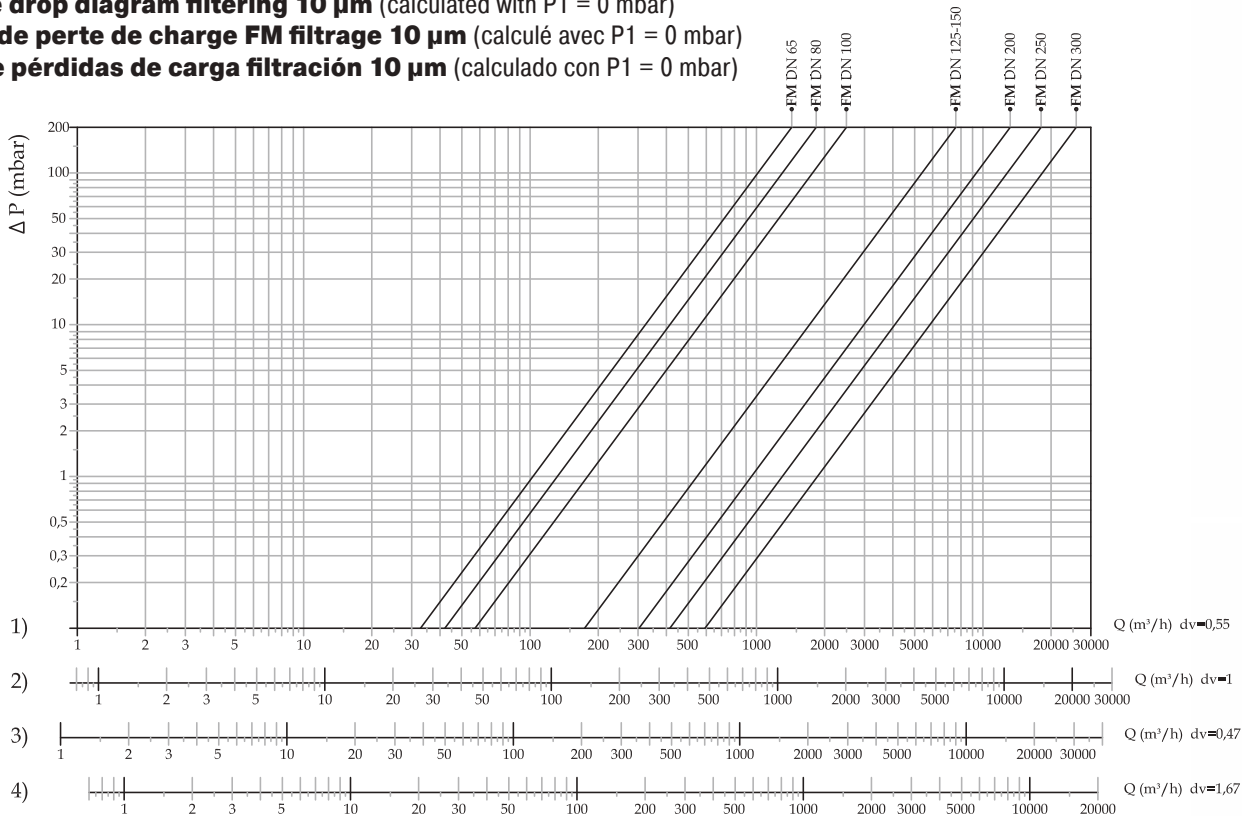
dv = densità relativa all'aria = density relative to the air = densité relative à l'air = densidad relativa del aire

Diagramma perdite di carico FM filtraggio 20 µm (calcolato con P1 = 0 mbar)
FM pressure drop diagram filtering 20 µm (calculated with P1 = 0 mbar)
Diagramme de perte de charge FM filtrage 20 µm (calculé avec P1 = 0 mbar)
Diagrama de pérdidas de carga filtración 20 µm (calculado con P1 = 0 mbar)



1) metano - methane - méthane - metano 2) aria - air - air - aire
 3) gas di città - town gas - gaz de ville - gas ciudad 4) gpl - lpg - gaz liquide - gas líquido
 dv = densità relativa all'aria = density relative to the air = densité relative à l'air = densidad relativa del aire

Diagramma perdite di carico FM filtraggio 10 µm (calcolato con P1 = 0 mbar)
FM pressure drop diagram filtering 10 µm (calculated with P1 = 0 mbar)
Diagramme de perte de charge FM filtrage 10 µm (calculé avec P1 = 0 mbar)
Diagrama de pérdidas de carga filtración 10 µm (calculado con P1 = 0 mbar)



1) metano - methane - méthane - metano 2) aria - air - air - aire
 3) gas di città - town gas - gaz de ville - gas ciudad 4) gpl - lpg - gaz liquide - gas líquido
 dv = densità relativa all'aria = density relative to the air = densité relative à l'air = densidad relativa del aire

IT

ATTACCHI FLANGIATI ANSI 150 / ANSI 150 FLANGED CONNECTIONS
RACCORDS À BRIDES ANSI 150 / CONEXIONES EMBRIDADAS ANSI 150
 richiedere fattibilità / request feasibility / demander la faisabilité / consulte la disponibilidad

Aggiungere la lettera "A" dopo le cifre indicanti gli attacchi	Add the letter "A" after figures denoting the connection	Ajouter la lettre "A" après les chiffres indiquant les connexions	Añadir la letra "A" a continuación de las cifras que indican los diámetros de conexión	Es. / E.g. / Ex. / Ej. FF09 A B50
---	---	--	---	---

EN

BIOGAS *
 richiedere fattibilità / request feasibility / demander la faisabilité / consulte la disponibilidad

Versioni idonee al BIOGAS: A-F-H-J-Q	BIOGAS versions: BIOGAS: A-F-H-J-Q	Versions BIOGAS: BIOGAS: A-F-H-J-Q	Versiones BIOGAS: A-F-H-J-Q	Es. / E.g. / Ex. / Ej. FF09 A50
--------------------------------------	------------------------------------	------------------------------------	-----------------------------	------------------------------------

FR

CATAFORESI / CATAPHORESIS / CATAPHORÈSE / CATAFORESIS

Aggiungere la lettera "K" dopo le cifre indicanti gli attacchi	Add the letter "K" after figures denoting the connection	Ajouter la lettre "K" après les chiffres indiquant les connexions	Añadir la letra "K" a continuación de las cifras que indican los diámetros de conexión	Es. / E.g. / Ex. / Ej. FF09 K B50
---	---	--	---	---

TAPPO PER SCARICO CONDENZA / CONDENSATION DRAIN CAP
BOUCHON POUR ÉVACUATION CONDENSATION / TAPÓN PARA LA DESCARGA DE CONDENSACIÓN

Aggiungere la lettera "T" dopo il modello	Add the letter "T" after model	Ajouter la lettre "T" après le modèle	Añadir la letra "T" a continuación del modelo	Es. / E.g. / Ex. / Ej. FF T 09 B50
--	---------------------------------------	--	--	--

RUBINETTO PER SCARICO CONDENZA / CONDENSATION DRAIN VALVE
ROBINET POUR ÉVACUATION CONDENSATION / GRIFO PARA LA DESCARGA DE CONDENSACIÓN

Aggiungere la lettera "R" dopo il modello	Add the letter "R" after model	Ajouter la lettre "R" après le modèle	Añadir la letra "R" a continuación del modelo	Es. / E.g. / Ex. / Ej. FF R 09 B50
--	---------------------------------------	--	--	--

ES

MANOMETRO DIFFERENZIALE INDICATORE DI INTASAMENTO / DIFFERENTIAL PRESSURE GAUGE CLOGGING INDICATOR
MANOMETRE DIFFERENTIEL INDICATEUR D'OBSTRUCTION / MANÓMETRO DIFERENCIAL INDICADOR DE OBSTRUCCIÓN

Aggiungere le lettere "MD" o "MDR" o "MDS" o "MDSR" dopo il modello (vedere pag. 40).	Add the letters "MD" or "MDR" or "MDS" or "MDSR" after model (see pag. 40).	Ajouter les lettres "MD" ou "MDR" ou "MDS" ou "MDSR" après le modèle (voir pag. 40).	Añadir las letras "MD" o "MDR" o "MDS" o "MDSR" a continuación del modelo (véase pag. 40).	Es. / E.g. / Ex. / Ej. FF MD 09 D50
---	---	--	--	---

* Versioni senza manometro differenziale indicatore di intasamento / Versions without differential pressure gauge clogging indicator
 Versions sans manometre differentiel indicateur d'obstruction / Versiones sin manómetro diferencial indicador de obstrucción

**PREDISPOSIZIONE INSTALLAZIONE MANOMETRO DIFFERENZIALE INDICATORE INTASAMENTO
CLOGGING INDICATOR DIFFERENTIAL PRESSURE GAUGE INSTALLATION SET-UP
PRÉDISPOSITION INSTALLATION MANOMÈTRE DIFFÉRENTIEL INDICATEUR OBSTRUCTION
PREDISPOSICIÓN PARA INSTALACIÓN DEL MANÓMETRO DIFERENCIAL INDICADOR DE OBSTRUCCIÓN**

Aggiungere le lettere
"PM" dopo il modello

Add the letters "PM"
after model

Ajouter les lettres
"PM" après le modèle

Añadir las letras "PM" a
continuación del modelo

Es. / E.g. / Ex. / Ej.
FFPM09 D50

**COMBINAZIONI POSSIBILI / POSSIBLE COMBINATIONS
COMBINAISONS POSSIBLES / POSIBLES COMBINACIONES**

È possibile combinare
tra di loro le versioni.

It is possible to combine
the above mentioned
versions.

Les versions peuvent
être combinées entre
elles.

Es posible combinar las
versiones entre sí.

Es. / E.g. / Ex. / Ej.
FF09AK B50

NOTA: É consigliato chiedere SEMPRE la fattibilità. / **NOTE:** We suggest to ask ALWAYS for the feasibility.

NOTE: Il est recommandé de TOUJOURS demander la faisabilité. / **NOTA:** Se aconseja consultar SIEMPRE la viabilidad.

MODELLI / MODELS / MODELES / VERSIONES

IT

- A = Senza prese di pressione o tappi
- B = 1 Presa di pressione G 1/8 in entrata
- C = 1 Presa di pressione G 1/4 in entrata
- D = Presa di pressione G 1/8 in entrata e uscita
- F = 1 Tappo G 1/8 in entrata
- H = Tappo G 1/8 in entrata e uscita
- I = 4 Tappi G 1/4
- J = Tappo G 1/4 in entrata e uscita
- L = 2 Prese di Pressione + 2 Tappi G 1/8
- M = Presa di pressione G 1/4 in entrata e uscita
- N = 4 Prese di pressione G 1/4
- O = 2 Prese di Pressione + 2 Tappi G 1/4
- Q = Tappo G 1/4 in entrata

EN

- A = Without pressure nipples or caps
- B = Inlet G 1/8 pressure nipple
- C = Inlet G 1/4 pressure nipple
- D = Inlet and outlet G 1/8 pressure nipple
- F = Inlet G 1/8 cap
- H = Inlet and outlet G 1/8 cap
- I = 4 G 1/4 caps
- J = Inlet and outlet G 1/4 cap
- L = 2 G 1/8 pressure nipples and 2 G 1/8 caps
- M = Inlet and outlet G 1/4 pressure nipple
- N = 4 G 1/4 pressure nipples
- O = 2 G 1/4 pressure nipples and 2 G 1/4 caps
- Q = Inlet G 1/4 cap

FR

- A = Sans prises de pression ou bouchons
- B = Prise de pression G 1/8 en 'entrée
- C = Prise de pression G 1/4 en 'entrée
- D = Prise de pression G 1/8 en entrée/sortie
- F = 1 Bouchon G 1/8 en entrée
- H = Bouchon G 1/8 en entrée/sortie
- I = 4 Bouchons G 1/4
- J = Bouchon G 1/4 en entrée/sortie
- L = 2 Prises de Pression + 2 Bouchons G 1/8
- M = Prise de pression G 1/4 en entrée/sortie
- N = 4 Prises de pression G 1/4"
- O = 2 Prises de pression + 2 Bouchons G 1/4
- Q = Bouchon G 1/4 en entrée

ES

- A = Sin tomas de presión o tapones
- B = 1 Toma de presión G 1/8 en entrada
- C = 1 Toma de presión G 1/4 en entrada
- D = Toma de presión G 1/8 en entrada/salida
- F = 1 Tapón G 1/8 en entrada
- H = Tapón G 1/8 en entrada/salida
- I = 4 Tapones G 1/4
- J = Tapón G 1/4 en entrada/salida
- L = 2 Tomas de presión + 2 Tapones G 1/8
- M = Toma de presión G 1/4 en entrada/salida
- N = 4 Tomas de presión G 1/4
- O = 2 Tomas de presión + 2 Tapones G 1/4
- Q = Tapón G 1/4 en entrada

IT

Configurazioni disponibili prese/attacchi / Available outlet/connection configurations
Configurations disponibles prises/raccords / Configuraciones disponibles tomas/conexiones

Attacchi / Connections / Raccords / Conexiones

Tipo
Type
Type
Tipo

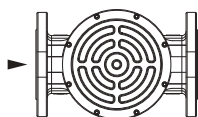
Modelli
Models
Modèles
Modelos

FM
DN 65 - DN 80
DN 125 - DN 150

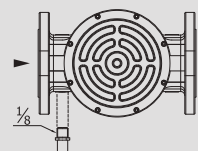
FM
DN 100

FM
DN 200 - DN 250 - DN 300

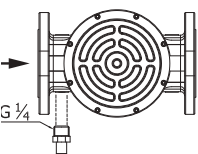
A



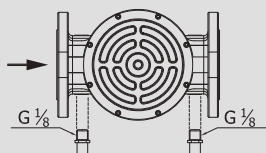
B



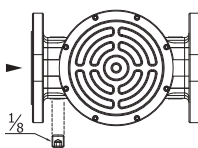
C



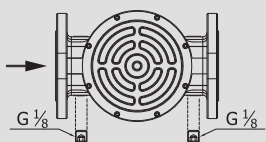
D



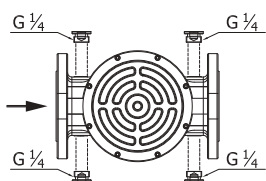
F



H



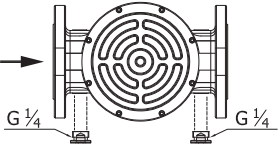
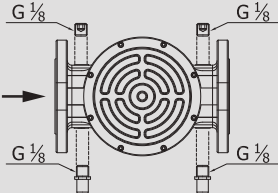
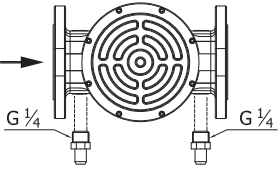
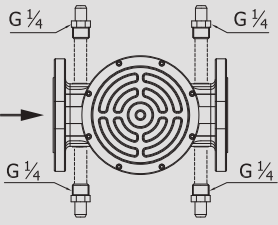
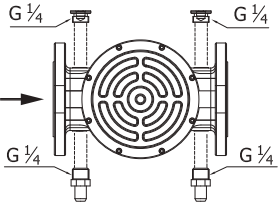
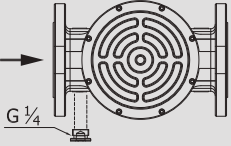
I



EN

FR

ES

Tipo Type Type Tipo	Modelli Models Modèles Modelos	Attacchi / Connections / Raccords / Conexiones		
		FM DN 65 - DN 80 DN 125 - DN 150	FM DN 100	FM DN 200 - DN 250 - DN 300
J				
L				
M				
N				
O				
Q				

IT

EN

FR

ES

IT

P. max 2 bar				
Attacchi flangiati / Flanged connections / Raccords à brides / Conexiones embridadas				
Attacchi Connections Raccords Conexiones	Filtraggio 50 micron 50 micron Filtering Filtrage 50 micron Filtración 50 micron	Filtraggio 20 micron 20 micron Filtering Filtrage 20 micron Filtración 20 micron	Filtraggio 10 micron 10 micron Filtering Filtrage 20 micron Filtración 20 micron	
	Codice / Code / Code / Código	Codice / Code / Code / Código	Codice / Code / Code / Código	
DN 65	FF08 <u>B</u> 50	FF08 <u>B</u> 20	FF08 <u>B</u> 10	

EN

DN 80	FF09 <u>B</u> 50	FF09 <u>B</u> 20	FF09 <u>B</u> 10	
DN 100	FF10 <u>C</u> 50	FF10 <u>C</u> 20	FF10 <u>C</u> 10	
DN 125	-	-	FF11 <u>B</u> 10	

FR

DN 150	-	-	FF12 <u>B</u> 10	
DN 200	-	-	FF13 <u>M</u> 10	
DN 250	-	-	FF14 <u>M</u> 10	
DN 300	-	-	FF15 <u>M</u> 10	

ES

NOTA: Codici riferiti alla configurazione standard MADAS. Sostituire la lettera sottolineata “B”, “C” o “M” dei codici indicati in tabella con la lettera corrispondente alla versione voluta (vedere pag. 35, 36 e 37).

NOTE: Codes referred to the standard MADAS configuration. Replace the underlined letter “B”, “C” or “M” of the codes indicated in the table with the letter for the required version (see pages 35, 36 and 37).

REMARQUE : Codes se référant à la configuration standard MADAS. Remplacer la lettre soulignée « B », « C » ou « M » des codes indiqué dans le tableau avec la lettre correspondante à la version souhaitée (voir les pages 35, 36 et 37).

NOTA: Códigos referidos a la configuración estándar MADAS. Sustituya la letra subrayada “B”, “C” o “M” de los códigos indicados en la tabla con la letra correspondiente a la versión deseada (véase las pág. 35, 36 y 37).

FM

38

Madas Technical Manual - 6|6.3 - REV. 0 of 10th Oct 2018

P. max 6 bar

Attacchi flangiati / Flanged connections / Raccords à brides / Conexiones embridadas

Attacchi Connections Raccords Conexiones	Filtraggio 50 micron 50 micron Filtering Filtrage 50 micron Filtración 50 micron	Filtraggio 20 micron 20 micron Filtering Filtrage 20 micron Filtración 20 micron	Filtraggio 10 micron 10 micron Filtering Filtrage 20 micron Filtración 20 micron
	Codice / Code / Code / Código	Codice / Code / Code / Código	Codice / Code / Code / Código
DN 65	FF080000 <u>B</u> 50	FF080000 <u>B</u> 20	FF080000 <u>B</u> 10
DN 80	FF090000 <u>B</u> 50	FF090000 <u>B</u> 20	FF090000 <u>B</u> 10
DN 100	FF100000 <u>C</u> 50	FF100000 <u>C</u> 20	FF100000 <u>C</u> 10
DN 125	-	-	FF110000 <u>B</u> 10
DN 150	-	-	FF120000 <u>B</u> 10
DN 200	-	-	FF130000 <u>M</u> 10
DN 250	-	-	FF140000 <u>M</u> 10
DN 300	-	-	FF150000 <u>M</u> 10

NOTA: Codici riferiti alla configurazione standard MADAS. Sostituire la lettera sottolineata "B", "C" o "M" dei codici indicati in tabella con la lettera corrispondente alla versione voluta (vedere pag. 35, 36 e 37).

NOTE: Codes referred to the standard MADAS configuration. Replace the underlined letter "B", "C" or "M" of the codes indicated in the table with the letter for the required version (see pages 35, 36 and 37).

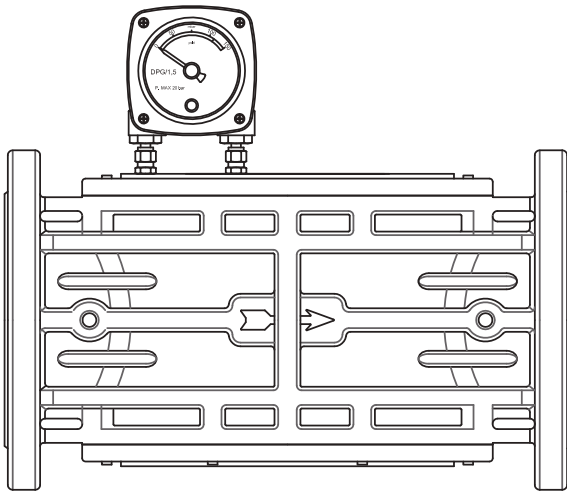
REMARQUE : Codes se référant à la configuration standard MADAS. Remplacer la lettre soulignée « B », « C » ou « M » des codes indiqués dans le tableau avec la lettre correspondante à la version souhaitée (voir les pages 35, 36 et 37).

NOTA: Códigos referidos a la configuración estándar MADAS. Sustituya la letra subrayada "B", "C" o "M" de los códigos indicados en la tabla con la letra correspondiente a la versión deseada (véase las pág. 35, 36 y 37).

FM (DN 65 ÷ DN 300)
 CON INDICATORE DI INTASAMENTO - WITH CLOGGING INDICATOR
 AVEC L'INDICATEUR D'OBSTRUCTION - CON INDICADOR DE OBSTRUCCIÓN
 (ΔP max 150 mbar)

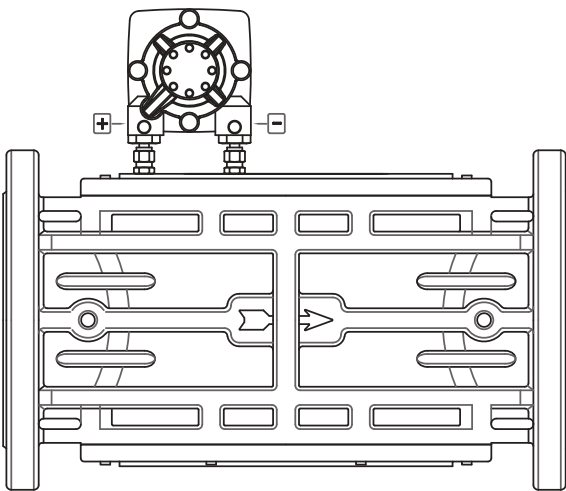
standard

- FFMD...
- FFMDS...



reverse

- FFMDR...
- FFMSR...



IT

MD = Manometro con quadrante lato destro corpo filtro
MDR = Manometro con quadrante lato sinistro corpo filtro
MDS = Manometro con quadrante lato destro corpo filtro + microswitch
MDSR = Manometro con quadrante lato sinistro corpo filtro + microswitch

EN

MD = Pressure gauge with face on filter body right side
MDR = Pressure gauge with face on filter body left side
MDS = Pressure gauge with face on filter body right side + microswitch
MDSR = Pressure gauge with face on filter body left side + microswitch

FR

MD = Manomètre avec cadran côté droit corps filtre
MDR = Manomètre avec cadran côté gauche corps filtre
MDS = Manomètre avec cadran côté droit corps filtre + micro-interrupteur
MDSR = Manomètre avec cadran côté gauche corps filtre + micro-interrupteur

ES

MD = Manómetro con cuadrante lado derecho del cuerpo del filtro
MDR = Manómetro con cuadrante lado izquierdo del cuerpo del filtro
MDS = Manómetro con cuadrante lado derecho del cuerpo del filtro + microinterruptor
MDSR = Manómetro con cuadrante lado izquierdo del cuerpo del filtro + microinterruptor

P. max 2 bar

Attacchi flangiati / Flanged connections / Raccords à brides / Conexiones embridadas

Attacchi Connections Raccords Conexiones	Filtraggio 50 micron 50 micron Filtering Filtrage 50 micron Filtración 50 micron	Filtraggio 20 micron 20 micron Filtering Filtrage 20 micron Filtración 20 micron	Filtraggio 10 micron 10 micron Filtering Filtrage 20 micron Filtración 20 micron
	Codice / Code / Code / Código	Codice / Code / Code / Código	Codice / Code / Code / Código
FM DN 65	FFMD08 <u>D</u> 50	FFMD08 <u>D</u> 20	FFMD08 <u>D</u> 10
FM DN 80	FFMD09 <u>D</u> 50	FFMD09 <u>D</u> 20	FFMD09 <u>D</u> 10
FM DN 100	FFMD10 <u>M</u> 50	FFMD10 <u>M</u> 20	FFMD10 <u>M</u> 10
FM DN 125	-	-	FFMD11 <u>D</u> 10
FM DN 150	-	-	FFMD12 <u>D</u> 10
FM DN 200	-	-	FFMD13 <u>M</u> 10
FM DN 250	-	-	FFMD14 <u>M</u> 10
FM DN 300	-	-	FFMD15 <u>M</u> 10

P. max 6 bar

Attacchi flangiati / Flanged connections / Raccords à brides / Conexiones embridadas

FM DN 65	FFMD080000 <u>D</u> 50	FFMD080000 <u>D</u> 20	FFMD080000 <u>D</u> 10
FM DN 80	FFMD090000 <u>D</u> 50	FFMD090000 <u>D</u> 20	FFMD090000 <u>D</u> 10
FM DN 100	FFMD100000 <u>M</u> 50	FFMD100000 <u>M</u> 20	FFMD100000 <u>M</u> 10
FM DN 125	-	-	FFMD110000 <u>D</u> 10
FM DN 150	-	-	FFMD120000 <u>D</u> 10
FM DN 200	-	-	FFMD130000 <u>M</u> 10
FM DN 250	-	-	FFMD140000 <u>M</u> 10
FM DN 300	-	-	FFMD150000 <u>M</u> 10

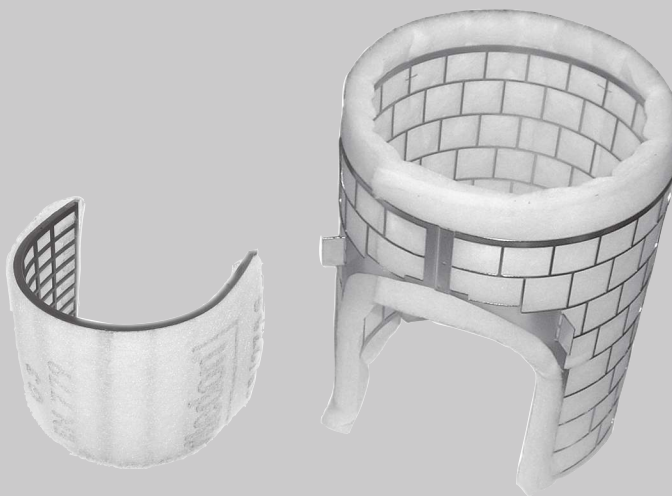
NOTA: Codici riferiti alla configurazione standard MADAS. Sostituire la lettera sottolineata "D" o "M" dei codici indicati in tabella con la lettera corrispondente alla versione voluta (vedere pag. 35, 36 e 37).

NOTE: Codes referred to the standard MADAS configuration. Replace the underlined letter "D" or "M" of the codes indicated in the table with the letter for the required version (see pages 35, 36 and 37).

REMARQUE : Codes se référant à la configuration standard MADAS. Remplacer la lettre soulignée « D » ou « M » des codes indiqué dans le tableau avec la lettre correspondante à la version souhaitée (voir les pages 35, 36 et 37).

NOTA: Códigos referidos a la configuración estándar MADAS. Sustituya la letra subrayada "D" o "M" de los códigos indicados en la tabla con la letra correspondiente a la versión deseada (véase las pág. 35, 36 y 37).

Cartucce filtranti - Filter cartridges - Cartouches filtrantes - Cartuchos filtrantes



Attacchi
Connections
Raccords
Conexiones

50 µm
Codice / Code / Code / Código

20 µm
Codice / Code / Code / Código

10 µm
Codice / Code / Code / Código

FM
DN 65 - DN 80

OF-0286

OF-0288

OF-0287

FM
DN 100

OF-0296

OF-0295

OF-0297

FM
DN 125 - DN 150

-

-

OF-1400

FM
DN 200

-

-

OF-0315

FM
DN 250

-

-

OF-0415

FM
DN 300

-

-

OF-1320

Manometro differenziale indicatore di intasamento
Differential pressure gauge clogging indicator
Manometre différentiel indicateur d'obstruction
Manómetro diferencial indicador de obstrucción



(ΔP max 150 mbar#)

Codice / Code / Code / Código

Tipo manometro
 Pressure gauge type
 Type manomètre
 Tipo de manómetro

KIT-MD DPG 1.5

Standard

KIT-MDR DPG 1.5

Reverse

KIT-MDS DPG 1.5

Standard + microswitch

KIT-MDSR DPG 1.5

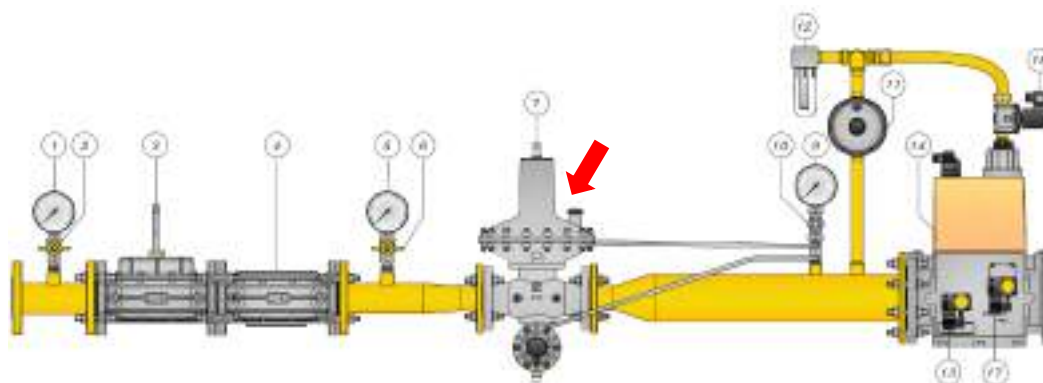
Reverse + microswitch

altri range su richiesta; si prega di contattare il nostro ufficio commerciale
 # different ranges on request; please contact our sales department
 # autres plages sur demande ; veuillez contacter notre service commercial
 # otros rangos bajo pedido; por favor, póngase en contacto con nuestro departamento comercial

Ci riserviamo qualsiasi modifica tecnica e costruttiva.
We reserve the right to any technical and construction changes.
Nous nous réservons le droit de toute modification technique et constructive.
Nos reservamos el derecho de realizar cualquier cambio técnico y estructural.



Item 07 – Válvula reguladora de pressão



Dival 600

Medium-low pressure gas regulator



Revision A

**USE, MAINTENANCE
AND WARNING
INSTRUCTIONS**

1 - INTRODUCTION

FOREWORD

All rights reserved. No part of this publication may be reproduced, distributed, translated into other languages or transmitted by any electronic or mechanical media, including photocopies, recording or any other storage and retrieval system, for any other purposes that are not exclusively the personal use of the buyer, without the express written permission of the Manufacturer.

The manufacturer is in no way responsible for the consequences of operations carried out in a manner not in accordance with the manual.

GENERAL REMARKS

All operating, maintenance instructions and recommendations described in this manual must be observed. In order to obtain the best performance and to keep the equipment in efficient condition, the manufacturer recommends that maintenance operations be carried out regularly.

It is of particular importance that the personnel responsible for the equipment be trained in its use, maintenance and application of the safety instructions and procedures indicated in this manual.

Revision: A

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1.1 - REVISION HISTORY

Revision index	Date	Revision contents
A	10/2022	

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2 - GENERAL INFORMATION

2.1 - MANUFACTURER IDENTIFICATION

Manufacturer	PIETRO FIORENTINI S.P.A.
Address	Via Enrico Fermi, 8/10 36057 Arcugnano (VI) - ITALY Tel. +39 0444 968511 Fax +39 0444 960468 www.fiorentini.com sales@fiorentini.com

Tab. 2.2

2.2 - IDENTIFICATION OF THE PRODUCT

Equipment	MEDIUM PRESSURE REGULATOR
Model	DIVAL 600

Tab. 2.3

2.3 - REGULATORY FRAMEWORK

PIETRO FIORENTINI S.P.A., with registered offices in Arcugnano (Italy) - Via E. Fermi, 8/10, declares under its sole responsibility that the equipment of the DIVAL 600 series described in this manual is designed, manufactured, tested and checked in compliance with the requirements of EN 334 standard on gas pressure regulators.

The equipment complies with the requirements of Directive 2014/68/EU ("Pressure Equipment Directive" PED). The assessment procedure adopted is in accordance with module H1 as per Annex III of the Directive.

NOTICE!

The declaration of conformity in its original version is delivered together with the equipment and this operating and warning manual.

2.4 - WARRANTY

PIETRO FIORENTINI S.P.A. guarantees that the equipment was manufactured using the best materials, with high quality workmanship, and complies with the quality requirements, specifications and performance set out in the order.

The warranty shall be considered null and void and PIETRO FIORENTINI S.P.A. shall not be liable for any damage and/or malfunctions:

- due to any acts or omissions of the purchaser or end-user, or any of their carriers, employees, agents, or any third party or entity;
- in the event that the purchaser, or a third party, makes changes to the equipment supplied by PIETRO FIORENTINI S.P.A. without the prior written approval of the latter;
- in the event of failure by the purchaser to comply with the instructions contained in this manual, as provided by PIETRO FIORENTINI S.P.A.

NOTICE!

The warranty conditions are specified in the commercial contract.

2.5 - SYMBOLS USED IN THE MANUAL

Symbol	Definition
	Symbol used to identify important warnings for the safety of the operator and/or equipment.
	Symbol used to identify information of particular importance in the instruction manual. The information may also concern the safety of the personnel involved in using the equipment.
	Obligation to consult the instruction manual/booklet. Indicates a requirement for the personnel to refer to (and understand) the operating and warning instructions of the machine before working with or on it.

Tab. 2.4

HAZARD!

Alerts to a hazard with a high level of risk, an imminent hazardous situation which, if not prevented, will result in death or severe damage.

WARNING!

Alerts to a hazard with a medium level of risk, a potentially hazardous situation which, if not prevented, may result in death or severe damage.

ATTENTION!

Alerts to a hazard with a low level of risk, a potentially hazardous situation which, if not prevented, could result in minor or moderate damage.

NOTICE!

Alerts to specific warnings, directions or notes of particular concern, that are not related to physical injury, as well as practices for which physical injury is not likely to occur.

2.6 - ADDRESSEES, SUPPLY AND STORAGE OF THE INSTRUCTION MANUAL

The instruction manual is intended for qualified technicians responsible for operating and managing the equipment throughout its service life.

It contains the necessary information to properly use the equipment and keep its functional and qualitative characteristics unchanged over time. All information and warnings for safe, correct use are also provided.

The instruction manual, as well as the declaration of conformity and/or test certificate, is an integral part of the equipment and must always accompany it whenever it is moved or resold. It is up to the user to keep this documentation intact for reference throughout the lifespan of the equipment.

WARNING!

Removing, rewriting or editing the pages of the manual and their contents is not allowed.

Keep the instruction manual near the equipment, in an accessible place known by all qualified technicians involved in using and running it.

PIETRO FIORENTINI S.p.A. shall not be held liable for any damage to people, animals and property caused by failure to adhere to the warnings and operating procedures described in this instruction manual.

2.7 - LANGUAGE

The original instruction manual was drawn up in Italian.

Any translations into additional languages are to be made from the original instruction manual.

HAZARD!

The Manufacturer is not responsible for any incomplete translations. If any inconsistency is found, please refer to the text of the original manual.

If inconsistencies are found or the text does not make sense:

- stop any actions;
- immediately contact the relevant offices of PIETRO FIORENTINI S.p.A.

WARNING!

PIETRO FIORENTINI S.p.A. shall be held liable for the information provided in the original manual only.

2.8 - NAMEPLATES APPLIED

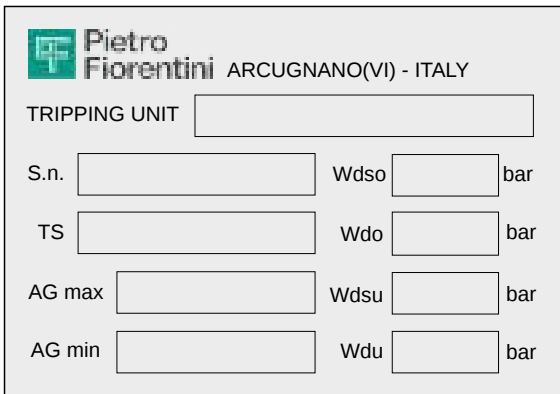
WARNING!

**Removing nameplates and/or replacing them with other plates is strictly not allowed.
Should the plates be unintentionally damaged or removed, the customer must notify
PIETRO FIORENTINI S.p.A.**

The equipment and its accessories are provided with nameplates (from Id.1 to Id.2).

The nameplates specify identification details of the equipment and its accessories to be provided, if necessary, to PIETRO FIORENTINI S.p.A.

“Tab. 2.5” shows the nameplates applied:

Id.	Type	Image
1	NAMEPLATE REGULATOR (EC version) AND REGULATOR WITH IN LINE MONITOR FUNCTION	
2	NAMEPLATE SLAM-SHUT VALVE	

Tab. 2.5

2.8.1 - GLOSSARY FOR NAMEPLATES

The terms and abbreviations used on nameplates are described in "Tab. 2.6":

Term	Description
AC	Accuracy class.
AG max	Slam-shut valve accuracy class due to pressure increase. "OPSO" (Overpressure shut-off).
AG min	Slam-shut valve accuracy class due to pressure decrease. "UPSO"(Underpressure shut off).
bpu	Range of inlet pressure for which the regulator ensures a given accuracy class.
CE	Marking certifying compliance with applicable European directives.
Cg	Flow rate coefficient.
Class	Alphanumeric designation used for reference purposes related to a combination of mechanical and dimensional characteristics for flanges, in accordance with the relevant parts of EN 1759 series, which includes the word Class followed by a dimensionless whole number.
DN	Nominal size of connections.
Fail safe mode	Regulator reaction mode (Fail open or Fail close).
Flange	Type of flanged connections or type of connection thread.
Fluid	Type of fluid compatible with the equipment.
ID no.	Number of the Notified Body participating in the conformity assessment of the equipment.
Pilot	Pilot family.
PS	Maximum permissible pressure for which the equipment was designed.
Pumax	Maximum inlet pressure at which the regulator can operate continuously under specific conditions.
REGULATOR	Equipment family.
SG	Shut-off pressure class.
Slam-shut device	Slam-shut valve family.
S.n.	Equipment serial number.
Strength type	Strength class: Integral strength or differential strength (DS).
T	Permissible temperature range (min. and max.) for which the equipment was designed.
Tripping unit	Pressure switch family.
Type	Accessory type and family.
Wd	Full setpoint range that can be obtained from the regulator by adjusting and/or replacing certain components (e.g. replacement of valve seat or control element, e.g. spring).
Wdo	Full setpoint range with regard to tripping caused by increased pressure in the pressure switch incorporated in the slam-shut valve. This range can be obtained by adjusting and/or replacing the components (for example, spring or sensitive element).
Wds	Full setpoint range that can be obtained from the regulator by adjusting but not replacing the components.
Wdso	Full setpoint range with regard to tripping caused by increased pressure in the pressure switch incorporated in the slam-shut valve. This range can be obtained by adjusting but not replacing the components.
Wdu	Full setpoint range with regard to tripping caused by decreased pressure in the pressure switch incorporated in the slam-shut valve. This range can be obtained by adjusting and/or replacing the components (for example, spring or sensitive element).

Term	Description
Wdsu	Full setpoint range with regard to tripping caused by decreased pressure in the pressure switch incorporated in the slam-shut valve. This range can be obtained by adjusting but not replacing the components.

Tab. 2.6

2.9 - GLOSSARY OF UNITS OF MEASUREMENT

Type of measurement	Unit of measurement	Description
Volumetric flow rate	Sm ³ /h	Standard cubic metres per hour
	Scfh	Standard cubic feet per hour
Pressure	bar	Unit of measurement in the CGS system
	psi	Pounds per square inch
	"wc	Water column inch
	Pa	Pascal
Temperature	°C	Degree centigrade
	°F	Fahrenheit degree
	K	Kelvin
Tightening torque	Nm	Newton-metre
	ft-lbs	Foot per pound
Sound pressure	dB	Decibel
Other measures	V	Volt
	W	Watt
	Ω	Ohm

Tab. 2.7

2.10 - QUALIFIED PROFESSIONAL FIGURES

Qualified operators in charge of using and managing the equipment throughout its technical service life:

Professional figure	Definition
Mechanical maintenance technician	Qualified technician able to: - perform preventive/corrective maintenance operations on all mechanical parts of the equipment subject to maintenance or repair; - access all device parts for visual inspection, equipment checks, adjustments and calibrations. The maintenance mechanical technician is not authorised to operate on live electrical systems (if any).
Electrical maintenance technician	Qualified technician able to: - perform preventive/corrective maintenance operations on all electrical parts of the device subject to maintenance or repair; - read wiring diagrams and check the correct functional cycle; - perform adjustments and operate on electrical systems for maintenance, repair and replacement of worn parts. The electrical maintenance technician can operate in the presence of voltage inside electrical panels, junction boxes, control equipment etc. only if he/she is deemed to be suitable (S.P.). For general requirements, refer to the IEC EN 50110-1:2014 standard.
Worker in charge of transport, handling, unloading and placement on site	Operator qualified to: - use lifting equipment; - handle materials and equipment. The equipment must be lifted and handled strictly in accordance with the instructions provided by the manufacturer as well as the regulations in force at the place where the equipment is installed.
Installer	Qualified operator able to: - carry out all the operations necessary to properly install the equipment; - perform all the operations necessary for the proper functioning of the equipment and the system in safety.
User's technician	Technician trained and authorised to use and manage the equipment for the activities for which it was supplied. They must: - be able to perform all operations required to properly run the equipment and the system, ensuring their own safety and that of any personnel on site; - have proven experience in properly using the equipment similar to that described in this instruction manual, and be trained, informed and instructed in this regard. The technician may carry out maintenance only if authorised/qualified to do so.

Tab. 2.8

3 - SAFETY

3.1 - GENERAL SAFETY WARNINGS

WARNING!

The equipment described in this instruction manual is:

- a device subjected to pressure in pressurised systems;
- normally installed in systems carrying flammable gases (for example: natural gas).

WARNING!

If the gas used is a combustible gas, the installation area of the equipment is defined as a “danger zone” as there are residual risks that potentially explosive atmospheres may be generated.

In “danger zones” and in close proximity thereto:

- there must not be any effective sources of ignition;
- smoking is not allowed.

ATTENTION!

Authorised operators must not carry out operations or services on their own initiative that do not fall within their competence.

Never operate the equipment:

- while under the influence of intoxicating substances such as alcohol;
- if you are using drugs that may lengthen reaction times.

NOTICE!

The employer must train and inform operators on how to behave during operations and on the equipment to be used.

Before installation, commissioning or maintenance, operators must:

- take note of the safety regulations applicable to the place of installation they are working in;
- obtain the necessary permits to operate when required;
- wear the personal protective equipment required by the procedures described in this instruction manual;
- ensure that the required collective protective equipment and safety information are available in the area they are operating in.

3.2 - PERSONAL PROTECTIVE EQUIPMENT

"Tab. 3.9" shows the personal protective equipment (PPE) and its description. An obligation is associated with each symbol.

Personal protective equipment means any equipment intended to be worn by the worker in order to protect them against one or several risks that are likely to threaten their safety or health during work.

For the operators in charge, depending on the type of work requested, the most appropriate PPE of the following will be reported and must be used:

Symbol	Meaning
	Obligation to use safety or insulated gloves. Indicates a requirement for the personnel to use safety or insulated gloves.
	Obligation to use safety goggles. Indicates a requirement for personnel to use protective goggles for eye protection.
	Obligation to use safety shoes. Indicates a requirement for the personnel to use accident-prevention safety shoes.
	Obligation to use noise protection equipment. Indicates a requirement for the personnel to use ear muffs or ear plugs to protect their hearing.
	Obligation to wear protective clothing. Indicates a requirement for the personnel to wear specific protective clothing.
	Obligation to use a protective mask. Indicates a requirement for the personnel to use respiratory masks in the event of a chemical risk.
	Obligation to use a protective helmet. Indicates a requirement for the personnel to use protective helmets.
	Obligation to wear high visibility vests. Indicates a requirement for the personnel to use high visibility vests.

Tab. 3.9

WARNING!

Each licensed operator is obliged to:

- take care of his/her own health and safety and that of other people in the workplace who are affected by his/her actions or omissions, in accordance with the training, instructions and equipment provided by the employer;
- appropriately use the PPE made available;
- immediately report to the employer, the manager or the person in charge any deficiencies in the equipment and devices, as well as any dangerous conditions they may become aware of.

3.3 - RESIDUAL RISKS

In accordance with the requirements of PED 2014/68/EU, point 1.2 of Annex I, below is an assessment of the risks associated with the equipment and an indication of the principles adopted for their prevention, according to the following classification:

- a) Elimination and/or reduction of the risk.
- b) Application of appropriate protective measures.
- c) Information to users about residual risks.

3.3.1 - TABLE SHOWING RESIDUAL RISKS DUE TO PRESSURE

Risk and hazard	Event and Cause	Effect and consequence	Solution and prevention
Pressurised gas leakage. Projection of metallic and non-metallic pressurised parts.	- Violent impact; - Impact (also due to falling, improper handling, etc.).	- Deformation; - Broken connections and, if pressurised, even burst.	a. Handling and installation with appropriate devices to avoid localised stress. b. Installation in suitable places and spaces with appropriate guards and packaging. c. Information in the instructions for use and warning.
Pressurised gas leakage. Projection of metallic and non-metallic pressurised parts.	Use of inappropriate fluids.	- Corrosion; - Embrittlement; - Explosion.	a. The user must check compliance of the used fluid with the specifications on the data plate.
Pressurised gas leakage. Projection of metallic and non-metallic pressurised parts.	Operation at temperatures below the minimum permissible temperature.	- Embrittlement; - Breakage; - Explosion.	a. Install in places where the temperature is not below the minimum permissible temperature and/or insulate the equipment adequately. b. The minimum temperature allowed is indicated on the data plate.
Pressurised gas leakage. Projection of metallic and non-metallic pressurised parts. Explosion.	Overpressure or exceedance of the rated limit values (maximum pressure allowed)	- Explosion; - Breaks; - Cracks; - Permanent deformations.	a. The device has appropriate design safety margins. b. The user must check the maximum pressure applicable to the equipment. c. The maximum allowable pressure is highlighted on the appropriate plate on the equipment.
Falling of the equipment.	Dangerous handling.	- Deformation; - Cracking; - Breakage.	b. The user must have suitably sized lifting equipment. c. The above requirements are referred to in the equipment use and warning manual.
Pressurised fluid leakage. Projection of metallic and non-metallic pressurised parts.	Incorrect fixing of the equipment.	- Deformation; - Breakage.	a. The device is equipped with unified type process connections and compression fittings. b. The user must ensure correct fixing to the line. c. Directions in the instructions for use and warning.
Explosion of the device. Pressurised fluid leakage. Projection of metallic parts.	Operation at temperatures above the maximum permissible temperature.	- Reduction of mechanical resistance and breakage of the device; - Explosion.	a. The user must equip the system with suitable safety and control devices. b. The maximum temperature allowed is indicated on the data plate.
Pressurised gas leakage.	Device maintenance with the system running.	Inappropriate opening of pressurised chambers.	a. The user must perform any maintenance with the equipment not in operation. b. The above requirements are referred to in the use and warning manual.

Risk and hazard	Event and Cause	Effect and consequence	Solution and prevention
Pressurised gas leakage. Projection of metallic and non-metallic pressurised parts.	External loads bearing on the device.	- Deformation; - Cracking and slot formation; - If under pressure, burst also.	a. With the exclusion of what is set out in the project, the user must verify that no additional concentrated load bears on the device.
Pressurised gas leakage. Projection of metallic and non-metallic pressurised parts.	Electrostatic potential, differential stray currents.	Corrosion localised in the device.	b. The user must equip the device with the necessary protection and earthing devices. c. The above requirements are referred to in the use and warning manual.
Pressurised gas leakage. Projection of metallic and non-metallic pressurised parts.	- Humidity; - Environments with aggressive atmosphere.	- Deterioration of external surfaces; - Corrosion.	a. The user must periodically check the state of conservation of the external surfaces. b. The above requirements are referred to in the use and warning manual.

Tab. 3.10

3.3.2 - TABLE OF RESIDUAL RISKS FOR POTENTIALLY EXPLOSIVE ATMOSPHERES

“Tab. 3.11” shows the conditions that can lead to the generation of a potentially explosive atmosphere respectively for:

- DIVAL 600 pressure regulator;
- the LA slam-shut valve.

Considering that the silencer does not have active functional parts, in this analysis it is considered an integral part of the DIVAL 600 regulator.

The table is valid for use with natural gas with a density of no more than 0.8; for different densities, the installation and environmental conditions must also be evaluated.

WARNING!

If the gas used is a combustible gas, the installation area of the equipment is defined as a “danger zone” as there are residual risks that potentially explosive atmospheres may be generated.

There must be no effective sources of ignition in “danger zones” and in close proximity thereto.

Operating conditions	Potentially explosive atmosphere	Normative references	Management measures included in the instructions for use and warning
First start-up	No	• During the production cycle and before the CE marking according to Directive 2014/68/EU, the external tightness of the equipment is checked at a value of 1.1 PS (in accordance with Standard EN 334). • Before commissioning, the external tightness of the portion of the system on which the equipment is installed is checked at a suitable pressure (in accordance with standards EN 12186 and EN 12279).	The instructions for use indicate the need to meet the requirements in Standards EN 12186 and EN 12279.
Operation in normal conditions	No	The indications in the previous point apply, in addition: • the equipment is installed outdoors or in an environment with natural ventilation (in accordance with Standards EN 12186 and EN 12279); • the installation is subject to surveillance according to current national rules/good practice/the equipment manufacturer's instructions (in accordance with the provisions of Standard EN 12186 and Standard EN 12279).	The instructions for use indicate that: • any environment in which the equipment is installed must meet the requirement of Standards EN 12186 and EN 12279; • periodic checks and maintenance must be carried out during surveillance in accordance with the national rules in force (if any), and with the specific manufacturer's recommendations.
Breakage of the control head diaphragm (malfunction)	No	This event must be considered a rare malfunction. All atmospheric pressure chambers delimited on at least one side by a diaphragm must be channelled to a safe area (in accordance with the provisions of Standard EN 12186 and Standard EN 12279).	The instructions for use indicate the need to meet the requirements of Standards EN 12186 and EN 12279.

Operating conditions	Potentially explosive atmosphere	Normative references	Management measures included in the instructions for use and warning
Breakage of other non-metallic parts (malfunction)	No	This type of malfunction is not reasonably expected as it involves static sealing (to the outside).	-
Decommissioning	No	- The pressure of the system section in which the equipment is installed must be reduced with appropriate vent lines channelled to a safe area (in accordance with the provisions of Standard EN 12186 and Standard EN 12279). - The residual gas must be discharged as indicated above.	The instructions for use indicate the need to meet the requirements of Standards EN 12186 and EN 12279
Reboot	No	- After reassembling the regulator, carry out an external leakage test at a convenient pressure value as specified by the manufacturer. - Before commissioning, the external sealing of the system portion on which the equipment is installed is checked at a suitable pressure (in accordance with the provisions of standards EN 12186 and EN 12279).	The instructions for use indicate: - the minimum conditions for testing internal leakage; - the need to meet the requirements of Standards EN 12186 and EN 12279.

Tab. 3.11

3.4 - OBLIGATIONS AND PROHIBITIONS

The following is a list of obligations and prohibitions to be observed for the safety of the operator.

It is mandatory to:

- carefully read and understand the instructions for use and warning;
- check whether the downstream equipment is suitably sized according to the performance required of the regulator in the actual operating condition;
- before installing the equipment, the data on the nameplates must be checked;
- Avoid violent shocks and impacts that could damage the equipment and, as a result, cause the pressure fluid to escape.

It is forbidden to:

- operate in various capacities on the equipment without the PPE indicated in the work procedures described in these use and warning instructions;
- operate in the presence of open flames or bring open flames close to the work area;
- smoke near the equipment or while working on it;
- use the equipment with parameters other than those indicated on the nameplate;
- use the equipment with fluids other than those indicated on the nameplate and in these use and warning instructions;
- use the equipment outside the operating temperature range specified on the nameplate and in these use and warning instructions;
- service the equipment with the system portion, on which it is installed, running;
- install or use the equipment in environments other than those specified in these instructions for use and warning.

3.5 - SAFETY PICTOGRAMS

The following safety pictograms may be shown on the equipment and/or packaging PIETRO FIORENTINI S.p.A.:

Symbol	Meaning
	Symbol used to identify an ELECTRICAL HAZARD.
	Symbol used to identify a GENERIC HAZARD.

Tab. 3.12

HAZARD!

It is absolutely forbidden to remove the safety pictograms on the equipment.

The user is required to replace the safety pictograms which, following wear, removal or tampering, are illegible.

3.6 - RISK LEVEL

Depending on the operating conditions, use and configuration required, the equipment may generate noise beyond the limits allowed by current legislation in the country of installation.

For the value of the noise generated by the equipment and further information, contact PIETRO FIORENTINI S.p.A.

ATTENTION!

The obligation to use earmuffs or ear plugs to protect the operator's hearing remains in the event that the noise in the installation environment of the equipment (depending on specific operating conditions) exceeds the value of 85 dBA.

4 - DESCRIPTION AND OPERATION

4.1 - GENERAL DESCRIPTION

The DIVAL 600 equipment is a direct acting pressure regulator for medium and low pressure which reduces the inlet gas pressure, keeping the downstream value stable even when the following varies:

- inlet pressure value;
- the required flow rate within the operating conditions of the equipment.

The main elements of the equipment are (see Fig. 4.1.):

Pos.	Description	Pos.	Description
1	Regulator body	7	Upper anti-pumping valve
2	Valve seat	8	Lever mechanism
3	Plug	9	Setting spring
4	Rod	10	Balancing block
5	Main diaphragm	11	Relief spring
6	Lower anti-pumping valve		

Tab. 4.13

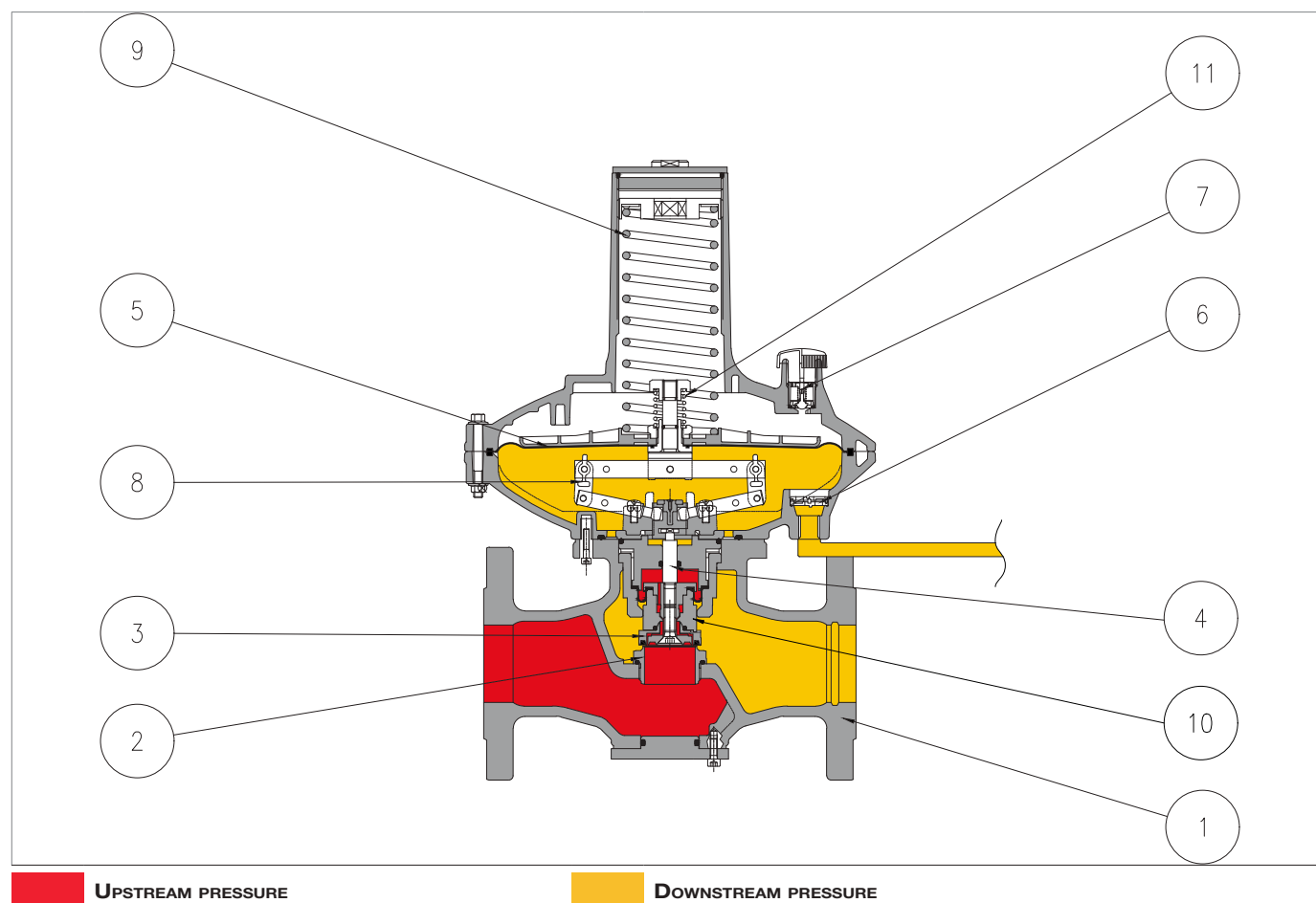


Fig. 4.1. General description DIVAL 600

4.1.1 - REGULATOR REACTION MODES

The DIVAL 600 equipment is a direct acting regulator with a “fail open” reaction (on-opening reaction), that is, it opens in the event of:

- breakage of main diaphragm
- downstream pressure signal missing.

4.2 - OPERATION

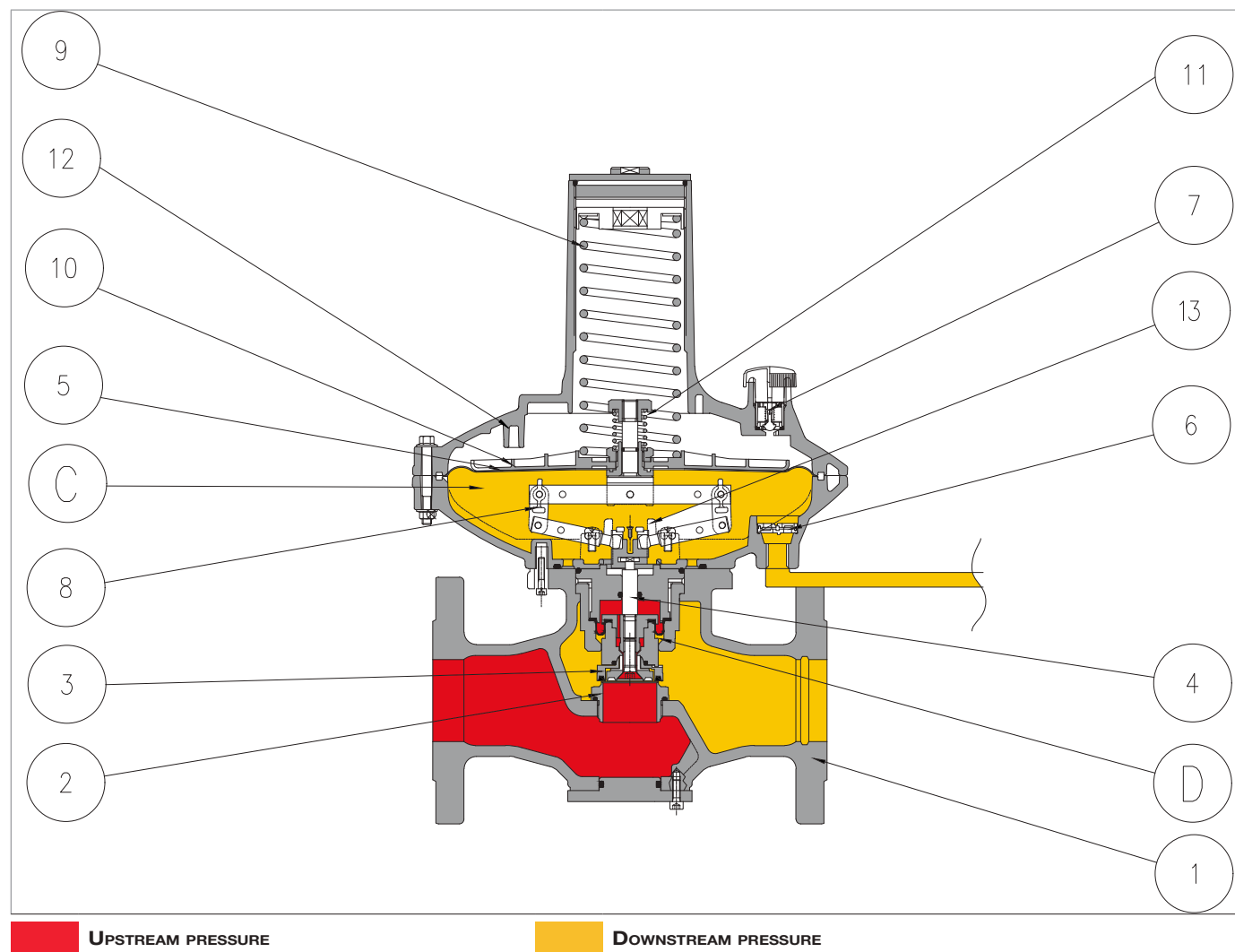


Fig. 4.2. Operation DIVAL 600

In the absence of pressure, the plug (3) is held in the open position by the spring thrust acting on the plug (3) through the engagement of the rod (4) by the lever mechanism (8).

The downstream pressure value (P_d) is regulated by comparing:

- the load of the setting spring (9)
- the thrust that the downstream pressure (P_d) itself exerts on the main diaphragm (5).

The main diaphragm (5) moves the rod (4) and the plug (3). The rod (4) moves perpendicularly with respect to the gas flow. In the case of zero flow, the plug (3) closes on the seat and allows the downstream pressure not to rise above the closing pressure value.

Under normal work conditions, the plug (3) positions itself so as to keep the pressure downstream (P_d) around the pre-established calibration value.

The position of the plug (3) is controlled by the movements of the main diaphragm (5). The forces which affect the position of the plug (3) are:

- towards the closed position: the thrust resulting from the downstream pressure (P_d) in the chamber (C) and in the chamber (D)
- towards the open position: the load of the setting spring (9).

Changes in the upstream pressure (P_u) do not substantially change the value of the downstream pressure (P_d) as the mobile equipment is balanced.

The DIVAL 600 regulator is equipped with two anti-pumping valves (6, 7) located in the sensing line of downstream pressure (P_d) and at the top of the regulator head.

The anti-pumping valves slow down the inflow and outflow of gas in the head during transitional phases. Their function is to minimise the effects caused by quick variations of the requested flow rate (quick variations of the downstream pressure (P_d)) on the behaviour of the regulator.

The limit switches (12, 13) positioned in the regulator head eliminate the effects of possible overpressure below the main diaphragm (5) or overloading of the adjusting spring (9), such as damage to the main diaphragm (5) or excessive load on the plug.

If, during operation, the following should occur:

Operating conditions	Operating consequences	Concluding outcome
Decrease in downstream pressure (P_d) for: • increase in the requested flow rate; • drop in pressure upstream (P_u).	The thrust on the main diaphragm (5) is less than the load on the setting spring (9) and moves the plug (3) towards the open position.	Increase in flow until the preset value of the downstream pressure (P_d) is restored.
Increased downstream pressure (P_d) due to: • drop in the requested flow rate; • increase in pressure upstream (P_u).	The thrust on the main diaphragm (5) is greater than the load on the setting spring (9) and moves the plug (3) towards the closed position.	Decrease in flow rate until the preset value of downstream pressure (P_d) is restored.

Tab. 4.14

4.3 - INTENDED USE

4.3.1 - ENVISAGED USE

The equipment in question is intended for:

Operation	Permitted	Not permitted	Work environment
Adjustment of the downstream pressure for:	Gaseous, and non-corrosive, fluids that have been filtered beforehand.	- Liquids. - Any product other than those permitted.	Installations for the transport and distribution of gas fuel to supply networks for: - civil use; - industrial use.

Tab. 4.15

The equipment in question is used as a main regulator and in-line monitor regulator.

It was designed to be used exclusively within the limits specified on the nameplate and according to the instructions and limits of use referred to in this manual.

Safe work conditions are as follows:

- use within the limits stated on the nameplate and in this manual;
- compliance with the user manual procedures;
- routine maintenance to be carried out when and how recommended;
- special maintenance to be carried out if required;
- do not tamper with and/or bypass the safety devices.

4.3.2 - REASONABLY FORESEEABLE MISUSE

Reasonably foreseeable misuse means the use of the equipment in a way not foreseen in the design phase but which can result from readily predictable human behaviour:

- corrosive fluids;
- fluids not properly treated upstream;
- liquids;
- instinctive reaction of an operator in the event of a malfunction, accident or breakdown while using the equipment;
- behaviour resulting from pressure to keep the equipment running under all circumstances;
- behaviour resulting from carelessness;
- behaviour resulting from the use of the equipment by unauthorised and unsuitable people;
- using the equipment in a manner other than that referred to under “4.3.1 - Envisaged use”.

Any use of the equipment other than the intended use must be previously approved in writing by PIETRO FIORENTINI S.p.A. If no written approval is provided, use shall be considered improper.

In the event of “improper use”, PIETRO FIORENTINI S.p.A. shall not be held liable for any damage caused to people or property, and any type of warranty on the equipment shall be deemed void.

4.3.3 - TYPES OF FLUIDS

The equipment works with combustible gases used:

- in pressure control stations according to EN 12186 or EN 12279;
- in transmission and distribution networks.
- in commercial and industrial plants (after checking by contacting the Manufacturer).

NOTICE!

The equipment may be also used with inert gases, subject to verification by contacting the manufacturer.

4.4 - TECHNICAL FEATURES/PERFORMANCE

The DIVAL 600 equipment is a regulator for medium and low pressure. The regulation system is balanced and guarantees a stable outlet pressure even when the inlet pressure varies.

The main specifications for this regulator are:

Technical features	
Maximum allowable pressure	Up to 20 bar
Ambient temperature range	-20 °C - +60 °C
Inlet gas temperature range	-20 °C + 60 °C
Inlet pressure range (bpu)	(Pd + 0.1) bar to 20 bar
Possible regulation range (Wd)	0.012 - 4.2 bar
Minimum differential pressure	0.1 bar
Accuracy class (AC)	up to 5 (depending on operating conditions)
Lock up pressure class (SG)	up to 10 (depending on operating conditions)
Connections	- Flanged: class 150 RF according to ASME B16.5 and ASME B16.42; PN16, 25 according to ISO 7005-1 and ISO 7005-2 - Threaded: Rp EN 10226-1, NPT ASME B1.20.1 (DN 2" only)

Tab. 4.16

Cg and K1 coefficients						
Heads	Ø280 BP / MP			Ø280 TR		
Size [inches]	1"	1" ½	2"	1"	1" ½	2"
Nominal diameter [mm]	25	40	50	25	40	50
Coefficient Cg	267	698	818	311	749	811
Coefficient K1	94	94	86	97	95	97

Tab. 4.17

4.5 - POSSIBLE CONFIGURATIONS

4.5.1 - CONTROL HEADS

“Tab. 4.18” lists the possible combinations of sizes and control heads for the equipment DIVAL 600.

		Size [inches] DN [mm]		
H E A D S		1" 25	1" ½ 40	2" 50
	BP / MP	Yes	Yes	Yes
	TR	Yes	Yes	Yes

Tab. 4.18

4.5.2 - ACCESSORIES

The DIVAL 600 equipment can have different configurations through the installation of the following accessories:

- Regulator with monitor function
- LA incorporated slam-shut valve.

The possible configurations are listed in “Tab. 4.19”:

DIVAL 600	Regulator-monitor	LA
Regulator-monitor	-	Yes
LA incorporated slam-shut valve	Yes	-

Tab. 4.19

The accessories can be installed directly at the factory or, at a later time, directly on site.



The installation of accessories is described in the relevant chapter of this manual.

4.5.3 - REGULATOR WITH MONITOR FUNCTION

The regulator with monitor function (1) is used to keep the downstream pressure value (P_d) within the preset limits in case of failure of the main regulator.

The regulator with monitor function is installed upstream of the main pressure regulator.

The regulator with monitor function has a balancing device designed so that it remains balanced even when the main regulator is in operation.

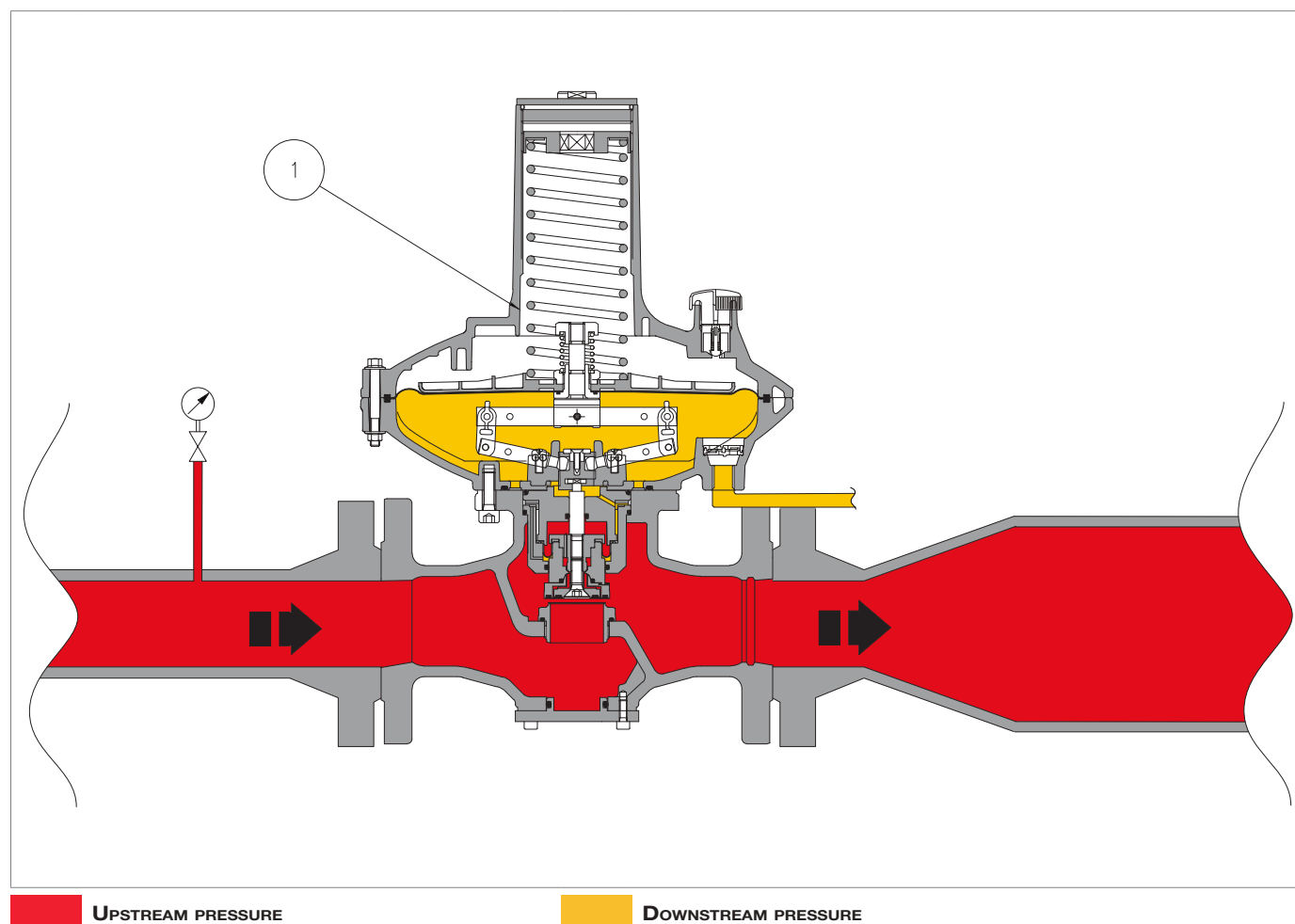


Fig. 4.3. Regulator with monitor function

OPERATION IN STAND-BY CONDITIONS

The regulator with monitor function is open during normal operation since it is calibrated higher than the calibration of the main regulator (2).

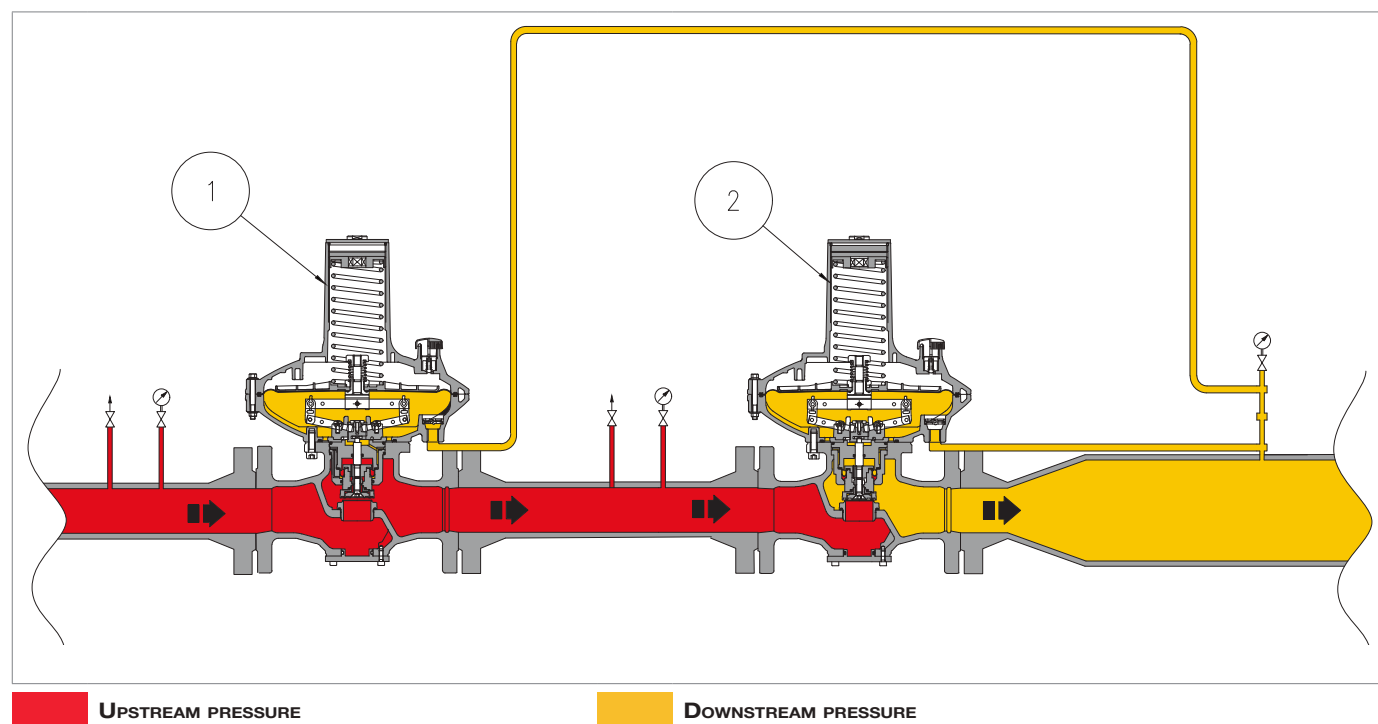


Fig. 4.4. In-line operation of regulator-monitor in stand-by conditions

OPERATION IN THE EVENT OF FAILURE OF THE MAIN REGULATOR

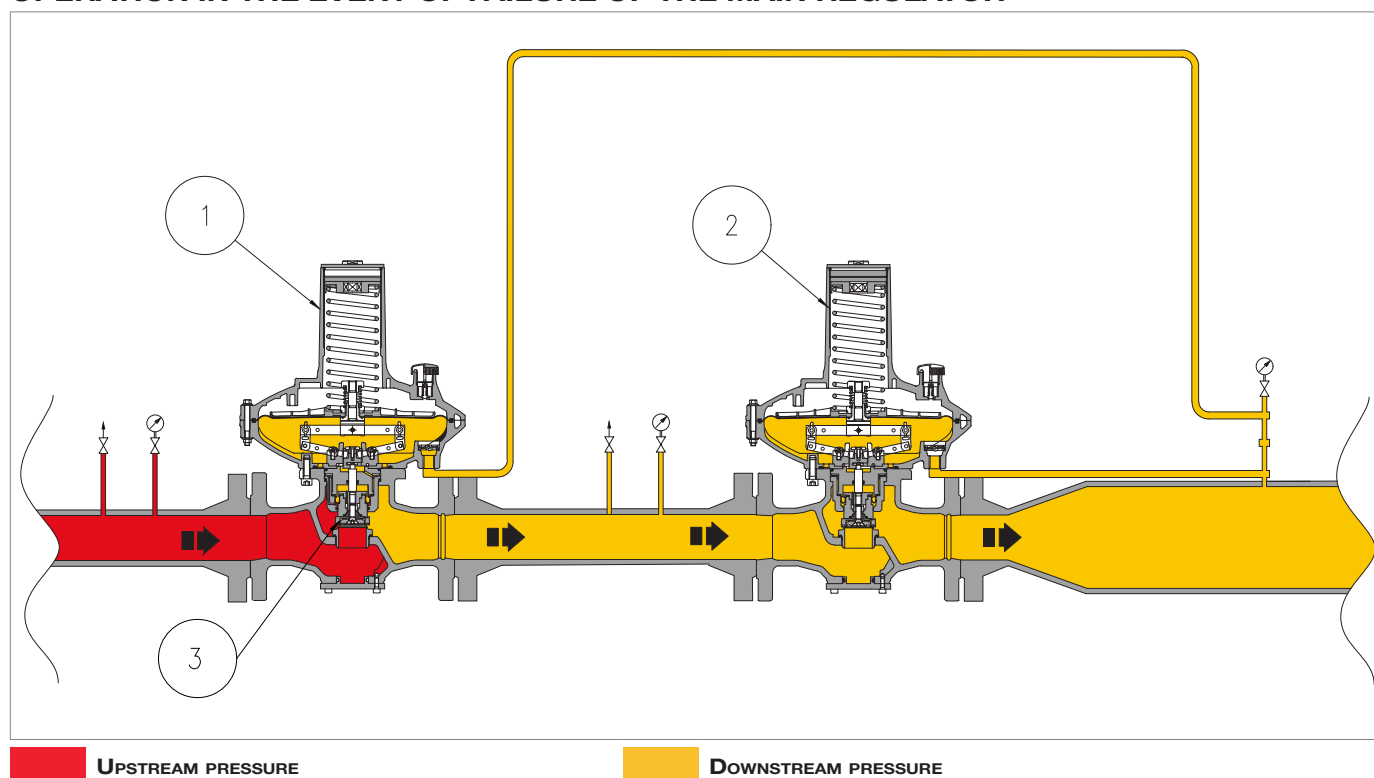


Fig. 4.5. Operation of regulator-monitor with main regulator in faulty conditions

In the event of failure of the main regulator (2), the regulator with monitor function (1) will intervene maintaining the downstream pressure value (P_d) within the established limit for its calibration.

If, during operation, the following should occur:

Operating conditions	Operating consequences	Concluding outcome
Decrease in downstream pressure (P_d) for: • increase in the requested flow rate; • drop in pressure upstream (P_u).	Unbalance that causes the plug (3) to open.	Increase in flow until the preset value of the downstream pressure (P_d) is restored.
Increased downstream pressure (P_d) due to: • drop in the requested flow rate; • increase in pressure upstream (P_u).	Unbalance that causes the plug (3) to close.	Decrease in flow rate until the preset value of downstream pressure (P_d) is restored.

Tab. 4.20

4.5.4 - SLAM-SHUT VALVE

The slam-shut valve is a safety device is used to shut off the gas flow if the pressure value at the control point exceeds the calibration value of the valve itself.

The slam-shut valve incorporated in the regulator consists of:

- a control system;
- the slam-shut device mechanism.

In the event of tripping, the slam-shut valve shuts off the supply to the regulator.

4.5.4.1 - LA INCORPORATED SLAM-SHUT VALVE

The LA incorporated slam-shut valve can be operated:

- by the intervention spring
- manually.

The main features of the LA incorporated slam-shut valve are:

- tripping due to downstream pressure increase and/or decrease;
- design pressure: 20 bar for all accessory components;
- local close button (can be omitted on request).

Slam-shut valve type		Set	Operating range (bar)	AG
LA	BP	max	0.03 - 0.18	10
		min	0.006 - 0.06	30
LA	MP	max	0.14 - 0.179	10
			0.18 - 0.45	5
		min	0.01 - 0.059	30
			0.06 - 0.24	10
LA	TR	max	0.25 - 1.29	10
			1.3 - 5.5	5
		min	0.1 - 3.5	10

Tab. 4.21

The incorporated LA slam-shut valve consists of (see fig. 4.6):

Pos.	Description		
1	Plug pad	6	Tripping spring due to pressure increase
2	Reset knob	7	Tripping spring due to pressure decrease
3	Coupling device	8	Spring support
4	Rod	9	Control shaft
5	Diaphragm	10	Sensor

Tab. 4.22

OPERATION

In the control head (C), the downstream pressure (Pd) acts on the diaphragm (5), which, integral with the control shaft (9), receives an antagonistic force via the springs (6, 7), which causes the pressure to rise or fall.

In the event of tripping due to a pressure surge:

- the downstream pressure (Pd) exceeds the calibration value
- the load on the diaphragm (6) increases until the resistance of the spring (6) is overcome
- movement to the open position of the drive shaft (9) moves the touch probe (10) via the cam, disengaging the lever mechanism.

In the event of a tripping due to pressure drop:

- the downstream pressure (Pd) drops below the calibration value
- the spring holder (7) stops the stroke
- movement to the closed position of the drive shaft (9) moves the touch probe (10) via the cam, disengaging the lever mechanism.

To reset the LA slam-shut valve:

- pull the reset knob (2) downwards until the lever mechanism is reengaged
- wait for the upstream pressure (Pu) to pass downstream of the plug (1), balancing it
- press the reset knob (2) into its seat.

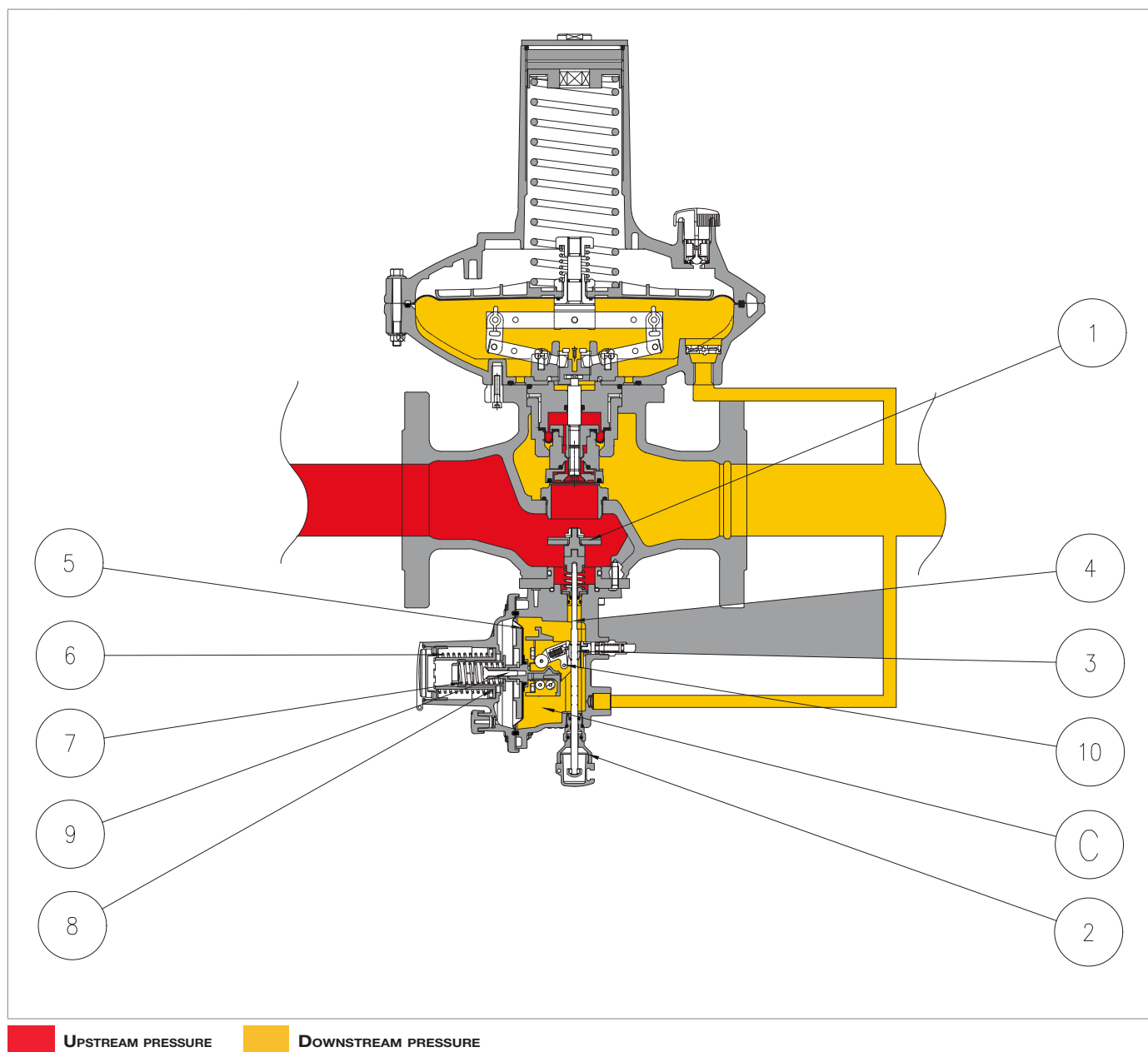


Fig. 4.6. DIVAL 600 with incorporated LA slam-shut valve

5 - TRANSPORT AND HANDLING

5.1 - SPECIFIC WARNINGS FOR TRANSPORT AND HANDLING

NOTICE!

Transport and handling must be carried out by personnel:

- qualified (specially trained);
- who are familiar with accident prevention and workplace safety regulations;
- authorised to use lifting equipment;
- in compliance with the regulations in force in the country of destination of the equipment.

Transport with forklift or crane

Operator qualification	Person in charge of transport, handling, unloading and placing on site
PPE required	  WARNING! The PPE listed in this table is related to the risk associated with the equipment. For the PPE required to protect against risks associated with the workplace, installation or operating conditions, please refer to: • the regulations in force in the country of installation; • <u>any information provided by the Safety Manager at the installation facility.</u>
Lifting equipment	Hoist crane, forklift truck or other suitable equipment.
Weights and dimensions of the equipment	For dimensions and weights please refer to "5.2 - Physical characteristics of the equipment".

Tab. 5.23

5.1.1 - PACKAGING AND FASTENERS USED FOR TRANSPORT

The transport packaging is designed and manufactured to avoid damage during normal transport, storage and handling. The equipment and spare parts must be kept in their packaging until they are installed.

Upon receiving the equipment:

- make sure that no part has been damaged during transport and/or handling;
- immediately report any damage found to PIETRO FIORENTINI S.p.A..

NOTICE!

PIETRO FIORENTINI S.p.A. shall not be liable for any damage to people or property caused by accidents due to failure to comply with the instructions provided in this manual.

“Tab. 5.24” shows the types of packaging used:

Ref.	Type of packaging	Image
A	Cardboard box	
B	Wooden box	
C	Pallet	

Tab. 5.24

5.2 - PHYSICAL CHARACTERISTICS OF THE EQUIPMENT

5.2.1 - DIVAL 600

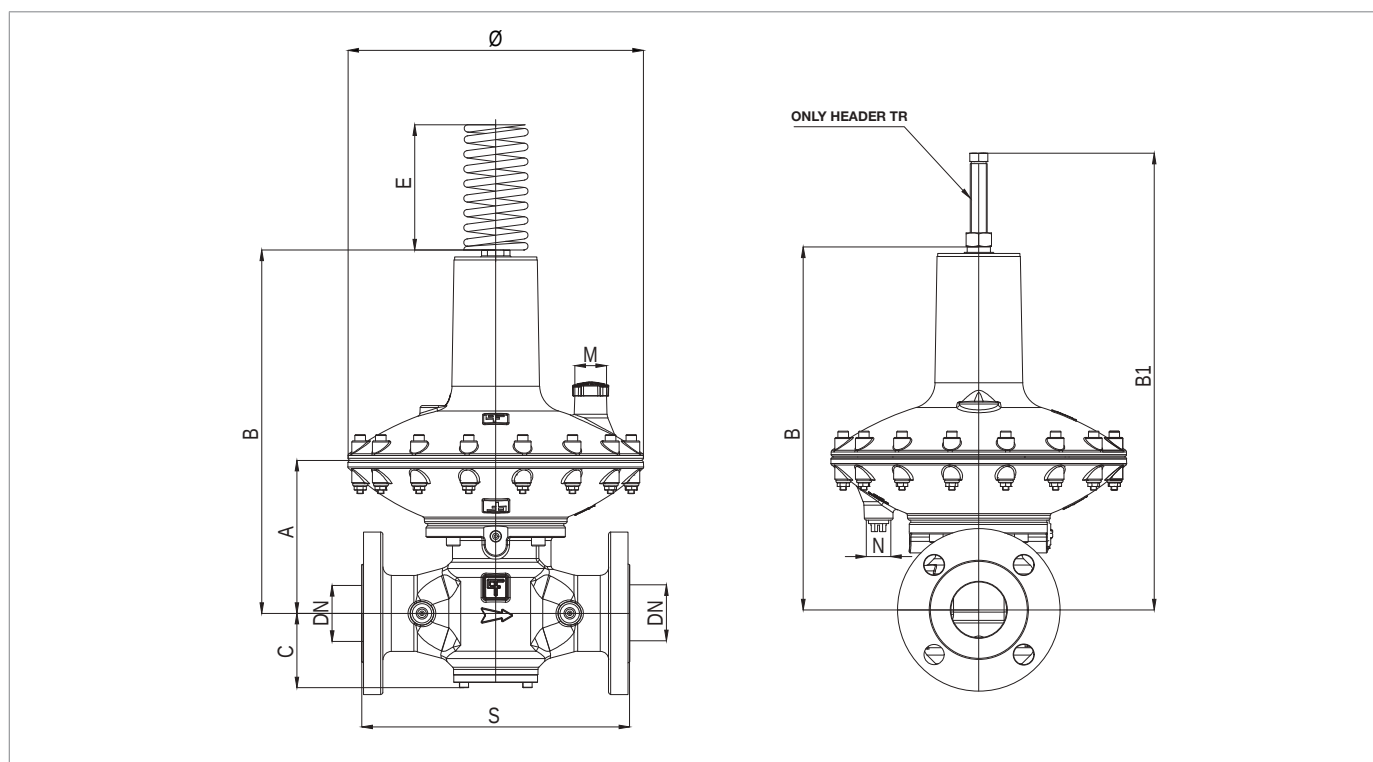


Fig. 5.7. DIVAL 600 physical characteristics

DIVAL 600 overall dimensions				
Size [inches]	1"	1" ½	2"	2" NPT
Nominal diameter [mm]	25	40	50	G 2"
S	183	222	254	152.4
Ø	280	280	280	280
A	145	145	145	145
B	346	346	346	346
B1	472	472	472	472
C	65	70	70	70
E	180	180	180	180
M	Rp 1/2"	Rp 1/2"	Rp 1/2"	Rp 1/2"
N	Rp 1/4"	Rp 1/4"	Rp 1/4"	Rp 1/4"
Connecting pneumatic connections	eØ 10mm x Øi 8mm			

Tab. 5.25

DIVAL 600				
Weight [kgf]	14	17.5	18.5	13.8

Tab. 5.26

5.2.2 - DIVAL 600 + LA

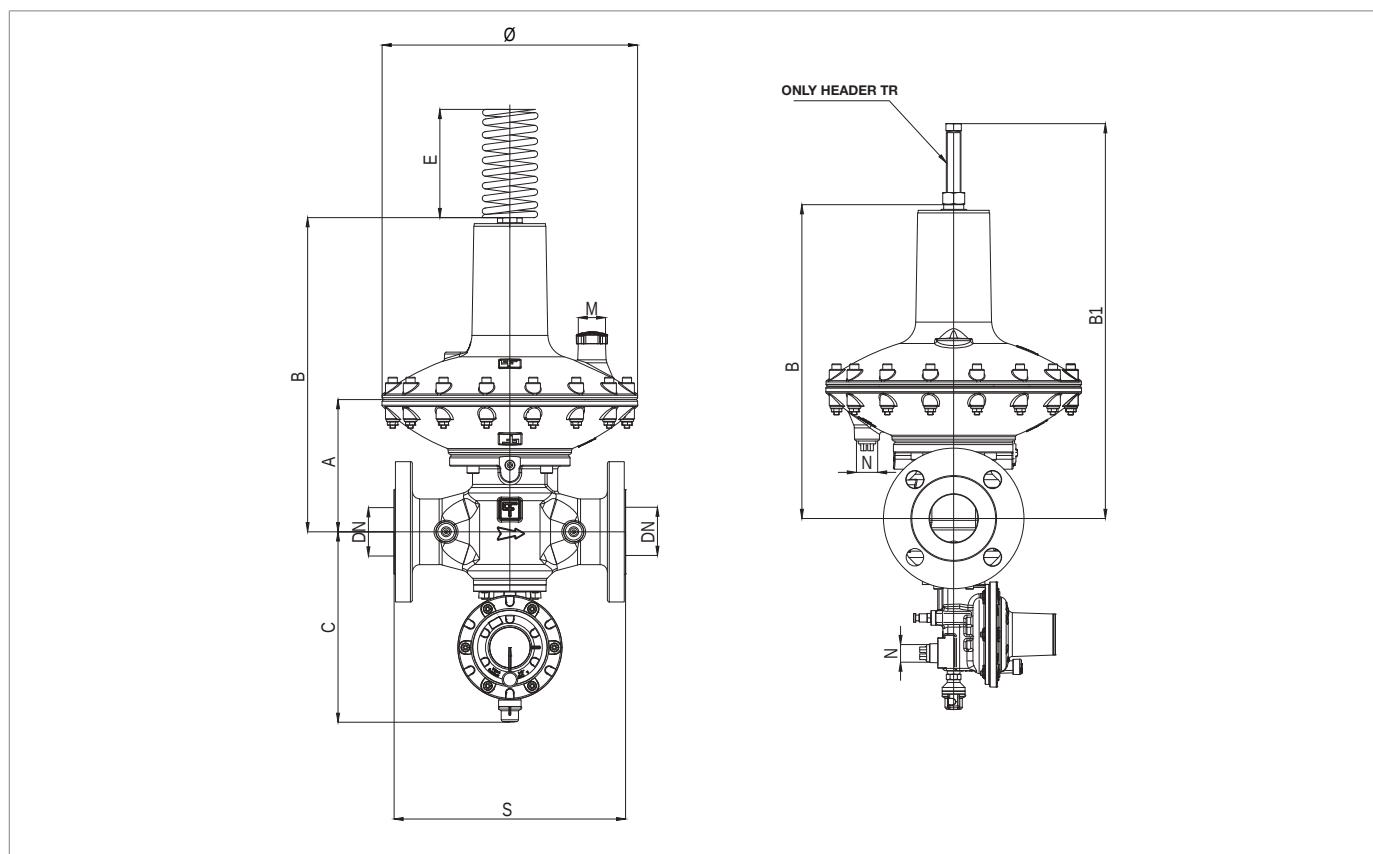


Fig. 5.8. Physical characteristics DIVAL 600 + LA

Overall dimensions DIVAL 600 + LA				
Size [inches]	1"	1" ½	2"	2" NPT
Nominal diameter [mm]	25	40	50	G 2"
S	183	222	254	152.4
Ø	280	280	280	280
A	145	145	145	145
B	346	346	346	346
B1	472	472	472	472
C	198	210	210	210
E	180	180	180	180
M	Rp 1/2"	Rp 1/2"	Rp 1/2"	Rp 1/2"
N	Rp 1/4"	Rp 1/4"	Rp 1/4"	Rp 1/4"
Connecting pneumatic connections	eØ 10mm x Øi 8mm			

Tab. 5.27

DIVAL 600 + LA				
Weight [kgf]	14.8	18.5	19.5	14.8

Tab. 5.28

5.3 - EQUIPMENT ANCHORING AND LIFTING METHOD

HAZARD!

Before moving the equipment, make sure that the capacity of the lifting equipment is suitable for the load.

WARNING!

Unloading, transport and handling activities must be carried out by operators qualified and specially trained:

- on accident prevention rules;
- on maximum safety in the workplace;
- on the use of lifting equipment.

ATTENTION!

Before moving the equipment:

- remove any movable or hanging component or firmly secure it to the load;
- protect fragile equipment;
- check that the load is stable.

5.3.1 - FORKLIFT HANDLING METHOD

HAZARD!

It is forbidden to:

- Do not transit under suspended loads;
- Do not move the load over the personnel operating in the site/plant area.

WARNING!

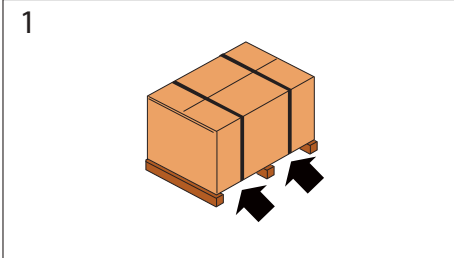
The following is not allowed on forklifts:

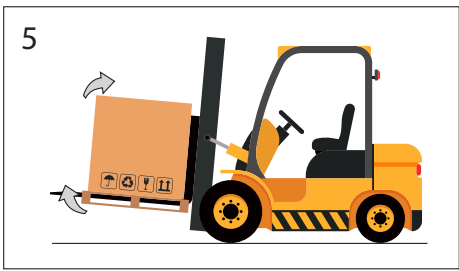
- carrying passengers;
- lifting people.

NOTICE!

Packaging must always be handled in a vertical position

Proceed as described at "Tab. 5.29":

Step	Action	Image
1	Place the forks of the forklift under the load surface.	
2	Make sure that the forks protrude from the front of the load (by at least 5 cm), far enough to eliminate any risk of the transported load tipping.	
3	Raise the forks until they are touching the load.  NOTICE! Fasten the load to the forks with clamps or similar devices if required.	
4	Slowly lift the load by a few dozen centimetres and check its stability, making sure that the centre of gravity of the load is positioned at the centre of the lifting forks.	

Step	Action	Image
5	Tilt the mast backwards (towards the driver's seat) to help the over-turning moment and to ensure greater load stability during transport.	5 
6	Adjust transport speed according to the type of floor and load, avoiding sudden manoeuvres. ⚠ WARNING! In case of: • obstacles along the path; • particular operating situations; hinder operator visibility, the assistance of a ground operator is required, standing outside the range of action of the lifting equipment, <u>with the task of signalling.</u>	-
7	Place the load in the chosen installation area.	-

Tab. 5.29

5.3.2 - CRANE HANDLING METHOD

WARNING!

It is mandatory to use CE marked chains, ropes and eyebolts or marked with conformity marks/markings in accordance with the regulations in force in the place of installation. Do not use chains connected to each other by bolts.

Always check that:

- the safety catch of the hook returns to the initial position;
- the ropes are in excellent condition and have adequate sections.

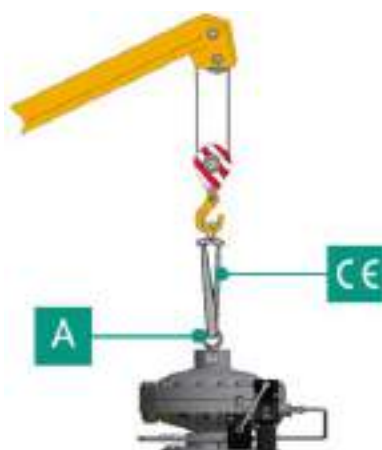
It is forbidden to:

- drag the load on the ground;
- operate near power lines;
- stand within the range of action of the crane.

NOTICE!

Packaging must be always handled in a vertical position.

The equipment must be handled using the lifting points provided on the equipment itself. For proper transport, follow the procedure in "Tab. 5.30":

Step	Action	Image
1	Attach the lifting rope or chain to the appropriate supports.  WARNING! The lifting point is sized for lifting only the equipment, and not other parts of the system connected to it.	
2	Slightly lift the load making sure the ropes or chains are secure.  NOTICE! Check whether the load is properly balanced.	
3	Handle the load avoiding sudden movements.	
4	Place the load in the chosen installation area.	

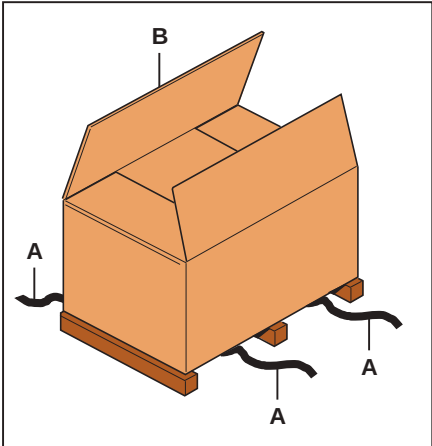
Tab. 5.30

5.4 - PACKAGING REMOVAL

Packaging removal	
Operator qualification	- Person in charge of transport, handling, unloading and placing on site; - Installer.
PPE required	  WARNING! The PPE listed in this table is related to the risk associated with the equipment. For the PPE necessary to protect against risks associated with the workplace or operating conditions, please refer to: - the regulations in force in the country of installation; <u>any information provided by the Safety Manager at the installation facility.</u>

Tab. 5.31

To unpack the equipment in a cardboard box, proceed as described in “Tab. 5.32”:

Step	Action	Image
1	Remove the straps (A).	
2	Remove the packaging cardboard (B).	
3	Remove the fasteners that secure the equipment to the base (if any).	
4	Move the equipment from the base to the place intended for it.  NOTICE! Have at least 2 operators manually move the equipment, if required due to its dimensions/weight.	

Tab. 5.32

NOTICE!

After removing all packaging materials, check for any anomalies.

If there are anomalies:

- do not install the equipment;
- contact PIETRO FIORENTINI S.p.A. and specify the details provided on the equipment nameplate.

5.4.1 - PACKAGING DISPOSAL

NOTICE!

Sort the various materials making up the packaging and dispose of them in compliance with the regulations in force in the country of installation.

5.5 - STORAGE AND ENVIRONMENTAL CONDITIONS

If the equipment needs to be stored for an extended period, the minimum environmental conditions for the intended storage are provided. Only by complying with these requirements can the declared performance be guaranteed:

Conditions	Data
Maximum storage period	Maximum 3 years.  NOTICE! For installations in later periods, see paragraph “5.5.1 - Pre-installation warnings after prolonged storage”.
Temperature	Not above 40°C
Humidity	Not above 70%
Radiation	Away from radiation sources according to UNI ISO 2230:2009

Tab. 5.33

5.5.1 - PRE-INSTALLATION WARNINGS AFTER PROLONGED STORAGE

For installations that have been stored for longer than 3 years, the condition of all rubber parts must be checked and, if found to be damaged, they must be replaced in order to ensure the correct functioning of the equipment.

For the replacement of the rubber parts of the equipment, please refer to “9.1 - General warnings”.

 NOTICE! PIETRO FIORENTINI S.p.A. recommends checking the condition of rubber parts in case of downtime or storage longer than 3 years.
--

6 - INSTALLATION

6.1 - INSTALLATION PRE-REQUISITES

6.1.1 - ALLOWED ENVIRONMENTAL CONDITIONS

WARNING!

To safely use the equipment, in full respect of the allowed environmental conditions, follow the data shown on the regulator plate and on any accessories (refer to paragraph “2.8 - Nameplates applied”).

The installation site must be suitable for the safe use of the equipment.

The installation area of the equipment must be properly lit to ensure proper operator visibility during working on the equipment.

NOTICE!

The equipment must operate in places that are properly lit by artificial lighting suitable for the protection of the operator (in compliance with UNI EN 12464-1:2011 and UNI EN 12464-2:2014). If maintenance work is to be performed in areas and/or parts that are poorly lit, it is mandatory to:

- use all the light sources of the installation plant;
- be equipped with a handheld lighting system or connected to the power mains, compliant with Directive 2014/34/EU (ATEX) for use in environments at risk of explosion.

6.1.2 - CHECKS BEFORE INSTALLATION

The equipment does not require any further upstream safety device for protection against any overpressure with respect to its **PS admissible pressure** when, for the upstream reduction station, the maximum incidental downstream pressure is:

$$MIPd \leq 1.1 \text{ PS}$$

MIPd = Maximum incidental downstream pressure value (for further information, see UNI EN 12186:2014).

ATTENTION!

If the installation of the equipment requires the application of compression fittings, these must be installed in accordance with the instructions of the Manufacturer of the fittings themselves.

The choice of fittings must be compatible with:

- the use specified for the equipment;
- the plant specifications when required.

Before installation, it must be ensured that:

- the expected dimensions of the installation site are compatible with those of the equipment;
- there are no impediments for the workers in charge of maintenance;
- the upstream and downstream pipes are at the same level and can bear the weight of the equipment;
- the inlet and outlet connections of the pipes are aligned on the flanges;
- the inlet and outlet connections of the equipment are clean and flawless;
- the inside of the upstream pipe is clean and free of processing residues such as welding slag, sand, paint residues, water, etc...

Installation

Operator qualification	Installer
PPE required	  WARNING! The PPE listed in this table is related to the risk associated with the equipment. For the PPE required to protect against risks associated with the workplace, installation or operating conditions, please refer to: • the regulations in force in the country of installation; • <u>any information provided by the Safety Manager at the installation facility.</u>
Equipment required	Please refer to the chapter "7 - Commissioning/maintenance equipment".

Tab. 6.34

6.2 - SPECIFIC SAFETY INSTRUCTIONS FOR THE INSTALLATION STEP

WARNING!

Before proceeding with installation, make sure that the upstream and downstream valves installed on the line are shut off.

WARNING!

Installation may also take place in areas where there is a risk of explosion, which implies that all necessary prevention and protection measures have to be taken.

For these measures, please refer to the regulations in force at the place of installation.

6.3 - GENERAL INFORMATION ON CONNECTIONS

The equipment must be installed in-line with an arrow on the body pointing to the gas flow direction.
In line installation, there must be (see Fig. 6.9 and 6.10):

Pos.	Description
1	1 shut-off valve upstream of the equipment.
2	2 vent valves one upstream and one downstream of the equipment.
3	2 pressure gauges one upstream and one downstream of the equipment.
4	1 pressure regulator .
5	1 shut-off valve downstream of the equipment.

Tab. 6.35

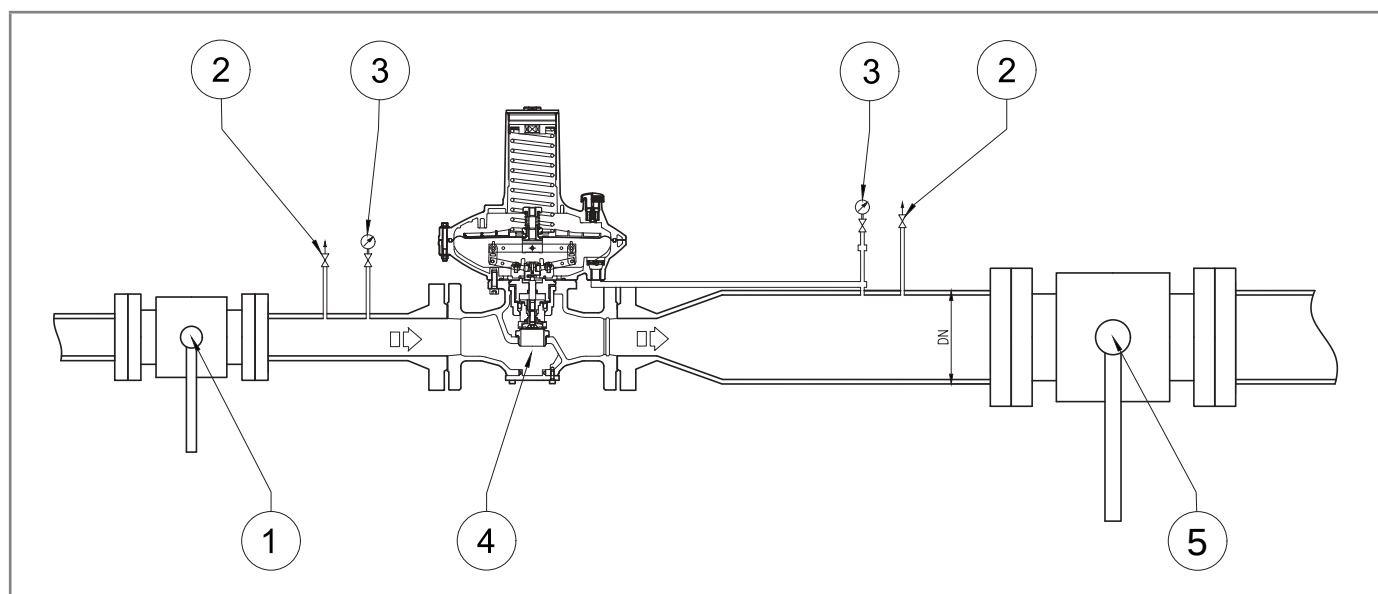


Fig. 6.9. In-line installation

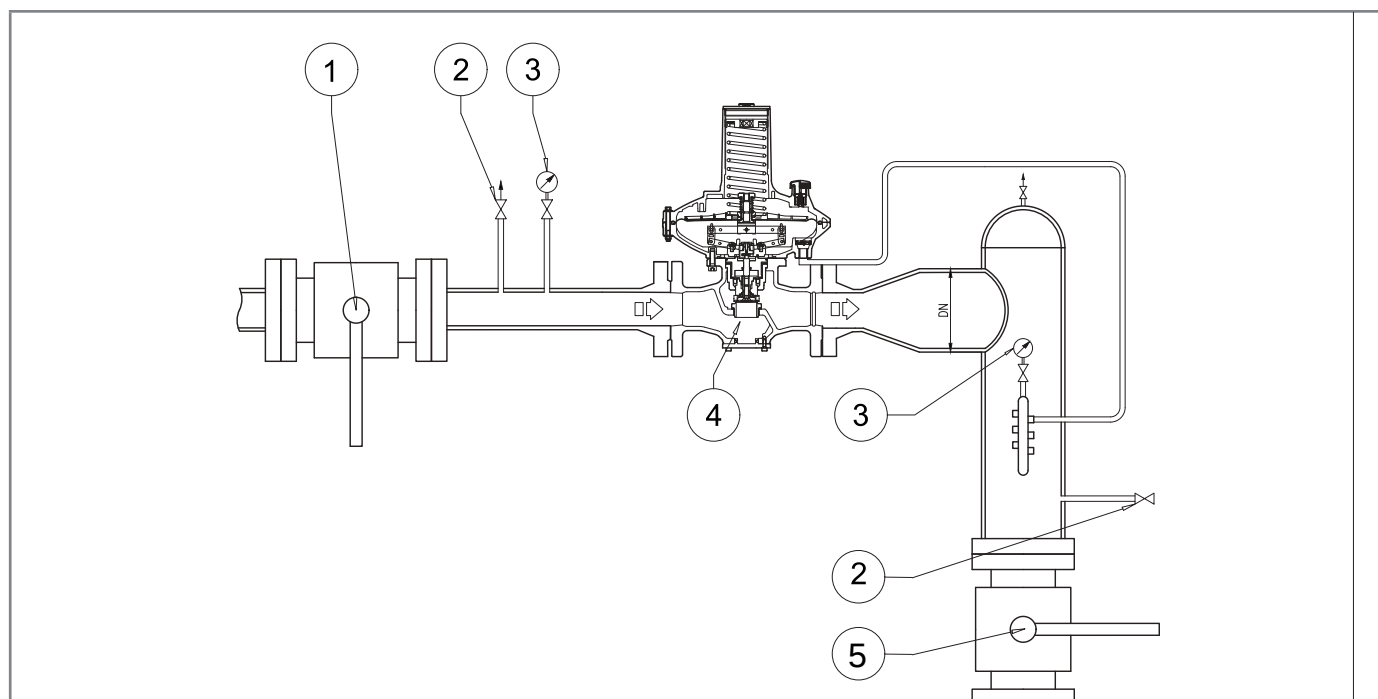


Fig. 6.10. Angle installation

! NOTICE!

When used in gas pressure reduction stations, the device must be installed at least according to the requirements of standards UNI EN 12186:2014 or UNI EN 12279:2007.

Equipment vents must be ducted in accordance with UNI EN 12186:2014 or UNI EN 12279:2007 or the standards in force at the place of installation of the equipment.

6.4 - REGULATOR INSTALLATION POSITIONS

Figure 6.11 and 6.12 illustrate typical regulator arrangements:

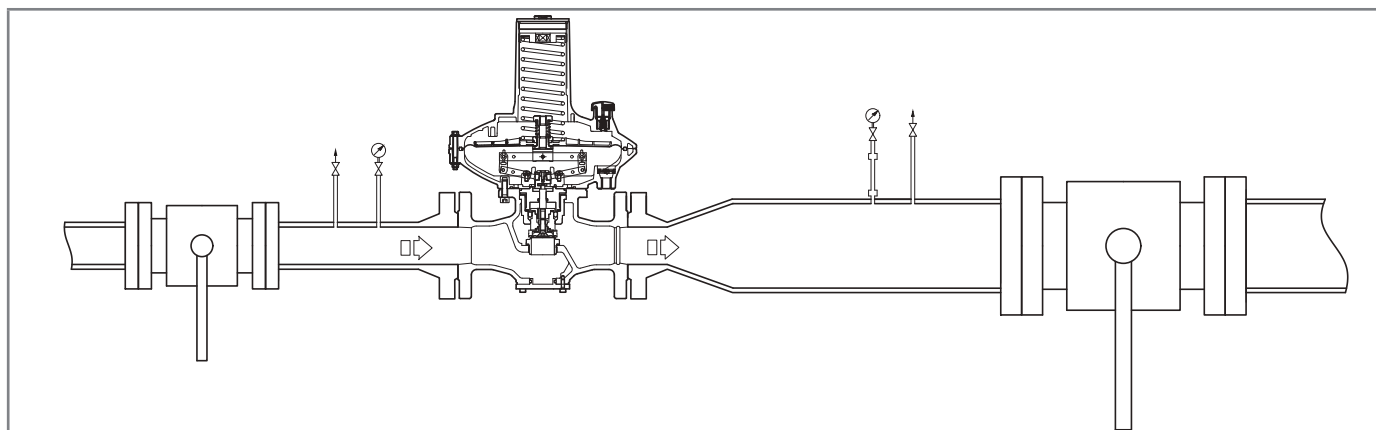


Fig. 6.11. Standard position

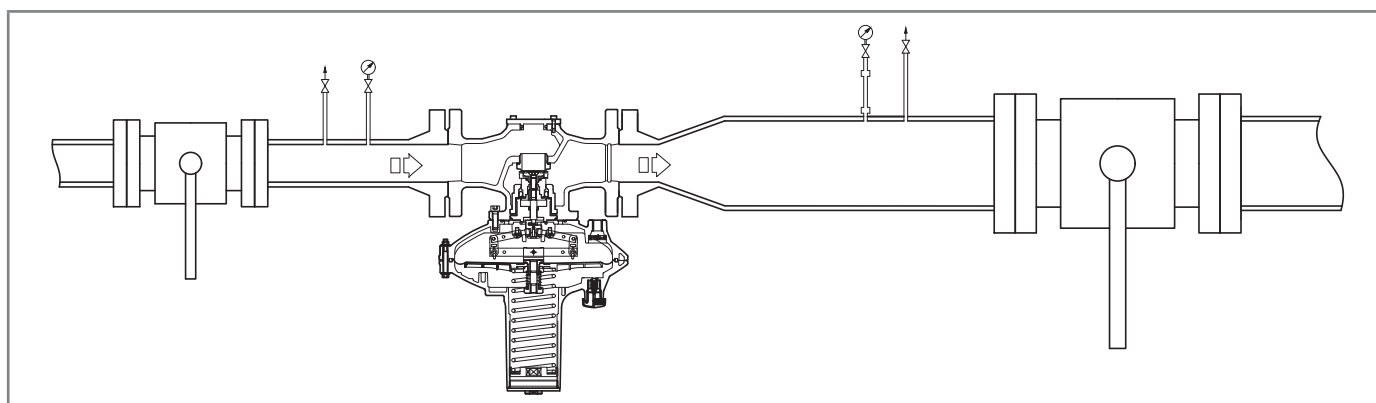


Fig. 6.12. Inverted position

6.5 - INSTALLATION PROCEDURES

6.5.1 - EQUIPMENT INSTALLATION PROCEDURES

Step	Action
1	Place the equipment in the section of the line designated for it.
2	Place the gaskets between the line flanges and the regulator flanges.
3	Insert the bolts into the appropriate holes of the connecting flanges.
4	Screw the bolts following the technical rules for tightening flanges.

Tab. 6.36

NOTICE!

For installation after maintenance, replace the seals.

6.5.2 - CONNECTION OF THE SENSING LINES TO THE DOWNSTREAM PIPING

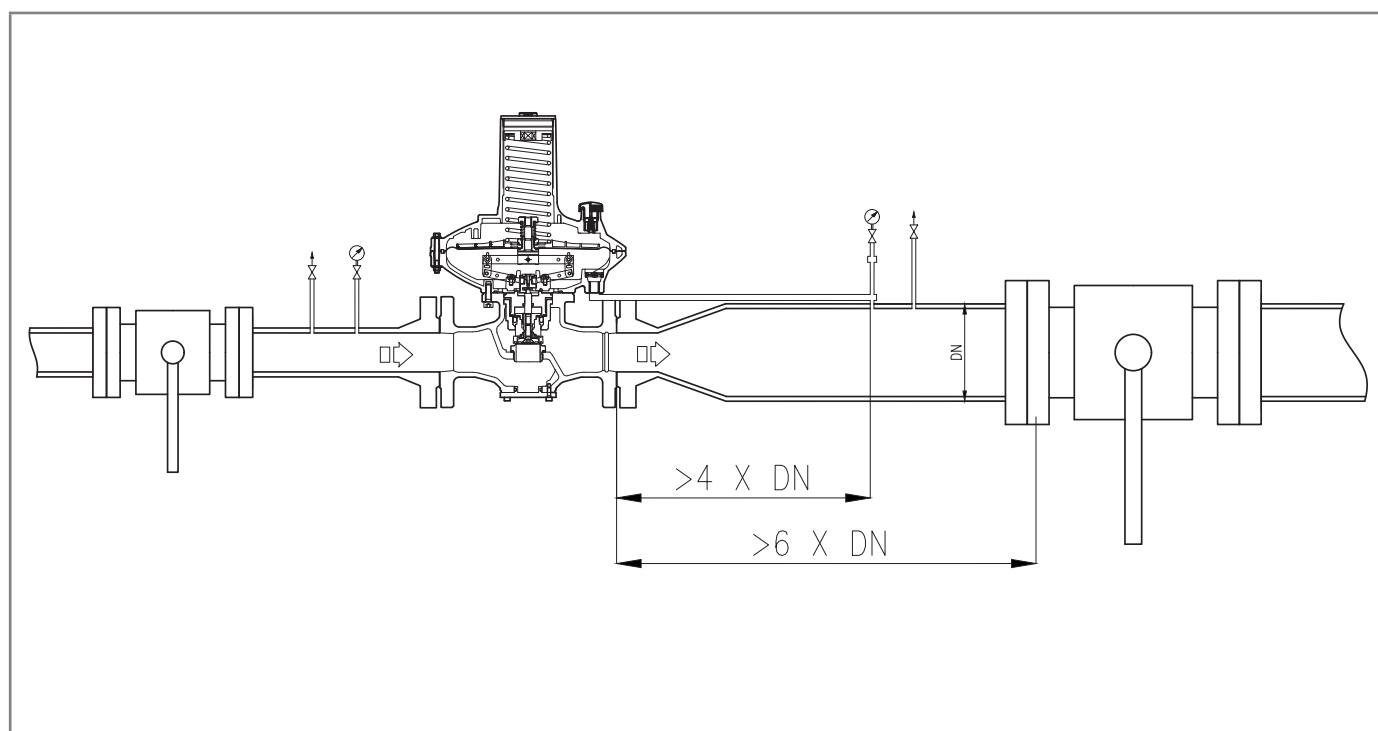


Fig. 6.13. Connection of sensing lines to the downstream piping

For proper adjustment, it is essential that:

- the downstream shut-off valve is placed at a distance of at least 6 times the nominal diameter of the pipe downstream of the regulator;
- the downstream sensing lines are placed on a straight section of pipe (with uniform diameter) having a length equal to at least 4 times the nominal diameter of the piping itself;
- the velocity of the pressurised fluid at the sampling point does not exceed the following values:

$V_{max} = 30 \text{ m/s}$ for $P_a > 5 \text{ bar}$

$V_{max} = 25 \text{ m/s}$ for $P_a < 5 \text{ bar}$

To calculate the flow rate, use the following formula:

$$V = 345,92 \times \frac{Q}{DN^2} \times \frac{1 - 0,002 \times Pd}{1 + Pd}$$

V = gas velocity in m/sec

Q = gas flow rate Stm³/h

DN = nominal pipe diameter in mm

Pd = regulator outlet pressure in barg

NOTICE!

All on-site pneumatic connections must have pipes with a minimum internal diameter of 8 mm.

To prevent the pneumatic connections of the sensing lines from collecting impurities and condensation, it is necessary that:

- the connections of the pneumatic connection are always welded to the top or horizontal axis of the pipe itself (refer to Fig. 6.14);
- the hole in the piping has no burrs or internal protrusions;
- the slope of the pneumatic connection is always 5-10% towards the downstream pipe connection.

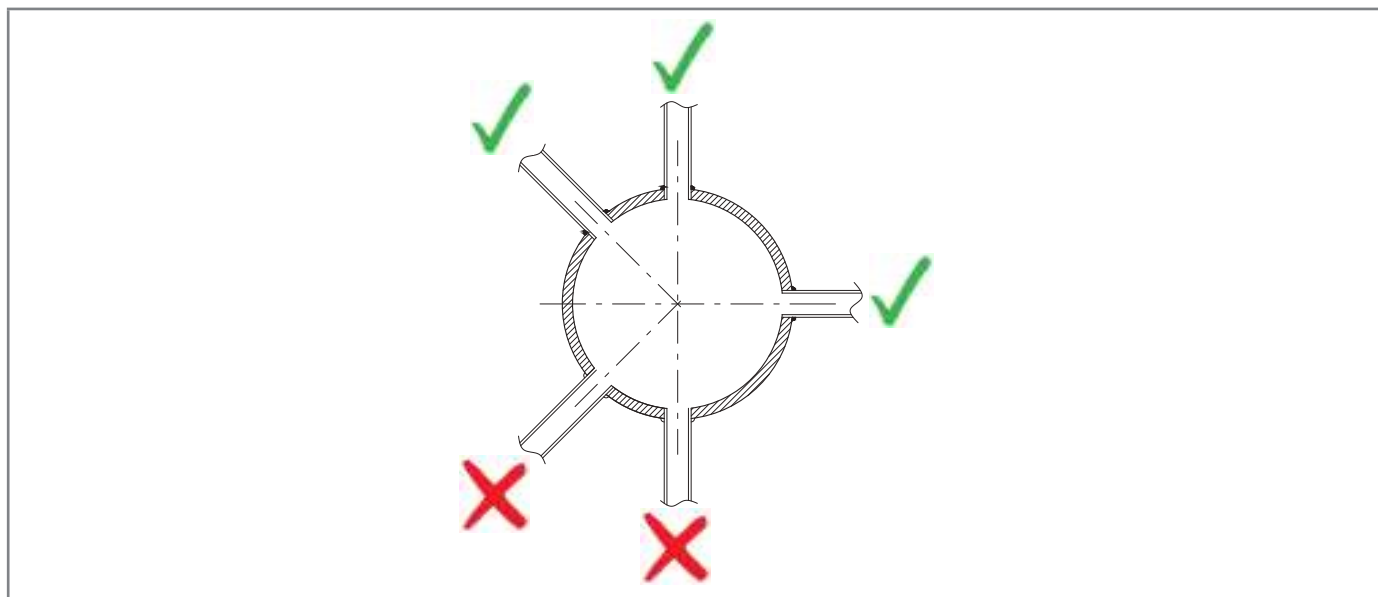


Fig. 6.14. Welded pipe connections

If there is a multiple sensing line, connect the equipment connections as shown below:

- 1 and 2 to the discharge outlet of the regulator control head and of the regulator in monitor function (when present);
- 3 and 4 free sensing lines;
- 5 and 6 to the sensing lines of the slam-shut valve (when present).

! NOTICE!

**If there is a multiple sensing line, it is not recommended to place shut-off valves on sensing lines.
In any case, follow the regulations in force in the place of installation and use of the equipment.**

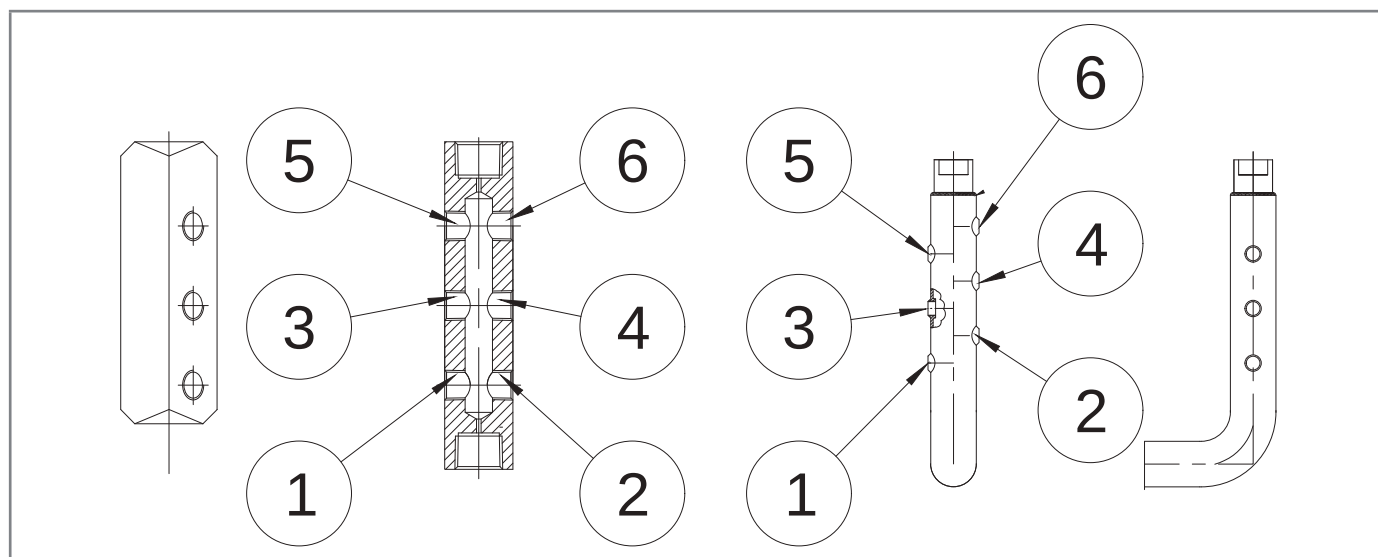


Fig. 6.15. Equipment connections

6.6 - POST-INSTALLATION AND PRE-COMMISSIONING CHECKS

When the equipment is operating, make sure that all connections are:

- properly secured/tightened to prevent any leakage during commissioning;
- connected correctly.

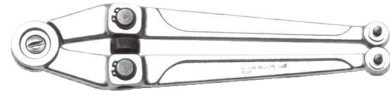
7 - COMMISSIONING/MAINTENANCE EQUIPMENT

7.1 - LIST OF EQUIPMENT

Use of commissioning/maintenance equipment	
Operator qualification	- Mechanical maintenance technician; - Electrical maintenance technician; - Installer; - User's technician.
PPE required	      WARNING! The PPE listed in this table is related to the risk associated with the equipment. For the PPE required to protect against risks associated with the workplace, installation or operating conditions, please refer to: - the regulations in force in the country of installation; - any information provided by the Safety Manager at the installation facility.

Tab. 7.37

The types of equipment required to commission and service the equipment are described in "Tab. 7.38":

Ref.	Equipment type	Image
A	Combination wrench	
B	Adjustable wrench	
C	Roller compass spanner	
D	Double ended bi-hex tubular socket wrench	
E	Bent male hex key	
F	Male T-handle hex wrench	

Ref.	Equipment type	Image
G	T-handle hex socket wrench	
H	Phillips screwdriver	
I	Slotted screwdriver	
L	O-ring extraction tool	
M	Circlip pliers	
N	Fiorentini special key	
O	Fiorentini special key	
P	Fiorentini special tool	
Q	Torx key	

Tab. 7.38

7.2 - EQUIPMENT NEEDED FOR THE DIFFERENT CONFIGURATIONS

Each table is distinguished by:

Term	Description
K./Wr.	Key, with reference to the equipment indicated in "Tab. 7.38".
Code	Code, referring to the equipment.
DN	Indicates the Nominal Diameter of the reference configuration.
L.	Length, referred to the equipment.
Ref.	Reference to the equipment.
Type	Type (size) or code of the equipment.

Tab. 7.39

DIVAL 600 REGULATOR WITH IN LINE MONITOR FUNCTION				
Equipment		Size [inches] DN [mm]		
Ref.	Type	1" 25	1" ½ 40	2" 50
A	K./Wr.	10 - 12 - 13 - 17 - 22 - 24		
D	K./Wr.	24 - 26 - 27 - 36 - 46		
E	K./Wr.	19		
F	K./Wr.	3 - 4 - 5 - 6 - 8		
G	K./Wr.	7 - 8 - 10		

Tab. 7.40

DIVAL 600 + LA				
Equipment		Size [inches] DN [mm]		
Ref.	Type	1" 25	1" ½ 40	2" 50
A	K./Wr.	10 - 12 - 13 - 17 - 22 - 24		
D	K./Wr.	24 - 26 - 27 - 36 - 46		
E	K./Wr.	19		
F	K./Wr.	3 - 4 - 5 - 6 - 8		
G	K./Wr.	7 - 8 - 10		
Q	Type	T 20		

Tab. 7.41

8 - COMMISSIONING

8.1 - GENERAL WARNINGS

8.1.1 - SAFETY REQUIREMENTS FOR COMMISSIONING

HAZARD!

During commissioning the risks associated with any discharges to the atmosphere of flammable or noxious gases must be evaluated.

HAZARD!

In case of installation on distribution networks for natural gas, consider the risk associated with explosive mixtures (gas/air) being formed inside the piping, if the line is not subjected to inerting.

WARNING!

During commissioning, any unauthorised personnel must keep away.
The no entry area has to be marked with signs and/or boundaries.

NOTICE!

Commissioning has to be carried out by authorised and qualified personnel.

The equipment and accessories (regulator with in-line monitor function, LA incorporated slam-shut valve) are supplied already calibrated.

NOTICE!

It is possible that for various reasons (e.g. vibrations during transport) the calibration of the equipment's accessories may vary, although within the values indicated on the identification plates.

Before commissioning the equipment, it is necessary to check that:

- all shut-off valves (inlet, outlet, any bypass) are closed;
- the gas is at a temperature within the limits specified on the data plate.

Commissioning

Operator qualification	• Installer; • Qualified technician.
PPE required	      WARNING! The PPE listed in this table is related to the risk associated with the equipment. For the PPE required to protect against risks associated with the workplace, installation or operating conditions, please refer to: • the regulations in force in the country of installation; • any information provided by the Safety Manager at the installation facility.
Equipment required	Please refer to the chapter “7 - Attrezzature per la messa in servizio/manutenzione”.

Tab. 8.42

8.2 - PRELIMINARY PROCEDURES FOR COMMISSIONING

HAZARD!

Before commissioning the equipment, it must be ensured that any source of explosion has been eliminated if there is such a danger.

WARNING!

Before commissioning, you need to make sure that the characteristics of the equipment are suitable for the conditions of use.

ATTENTION!

To protect the equipment from damage, never:

- pressurise the equipment through a valve located downstream of it;
- depressurise the equipment through a valve located upstream of it.

Commissioning can be carried out using two different procedures:

Commissioning types

Injection of an inert fluid	Pressurising the equipment by injecting an inert fluid (e.g. nitrogen) to avoid potentially explosive mixtures for services with combustible gases.  WARNING! During pressurisation, always check that the equipment has no leaks.
Direct injection	Direct injection of gas into pipes, keeping the gas velocity in the pipes as low as possible (maximum permitted value of 5 m/s).

Tab. 8.43

8.3 - PROPER COMMISSIONING CHECK

Completely sprinkle the equipment with a foaming solution (or equivalent control system) in order to check the tightness of the external surfaces of the regulator and the connections made during the installation.

8.4 - CALIBRATION OF EQUIPMENT AND ACCESSORIES INSTALLED

NOTICE!

To properly calibrate the equipment and accessories present, refer to the accuracy class indicated on the nameplates (see section "2.8 - Nameplates applied").

8.5 - REGULATOR COMMISSIONING PROCEDURE

In the application consisting of two pressure adjusting lines, it is advisable to commission one line at a time, starting with the line with the lowest set point.

The set point value is mentioned on the test certificate enclosed with each piece of equipment.

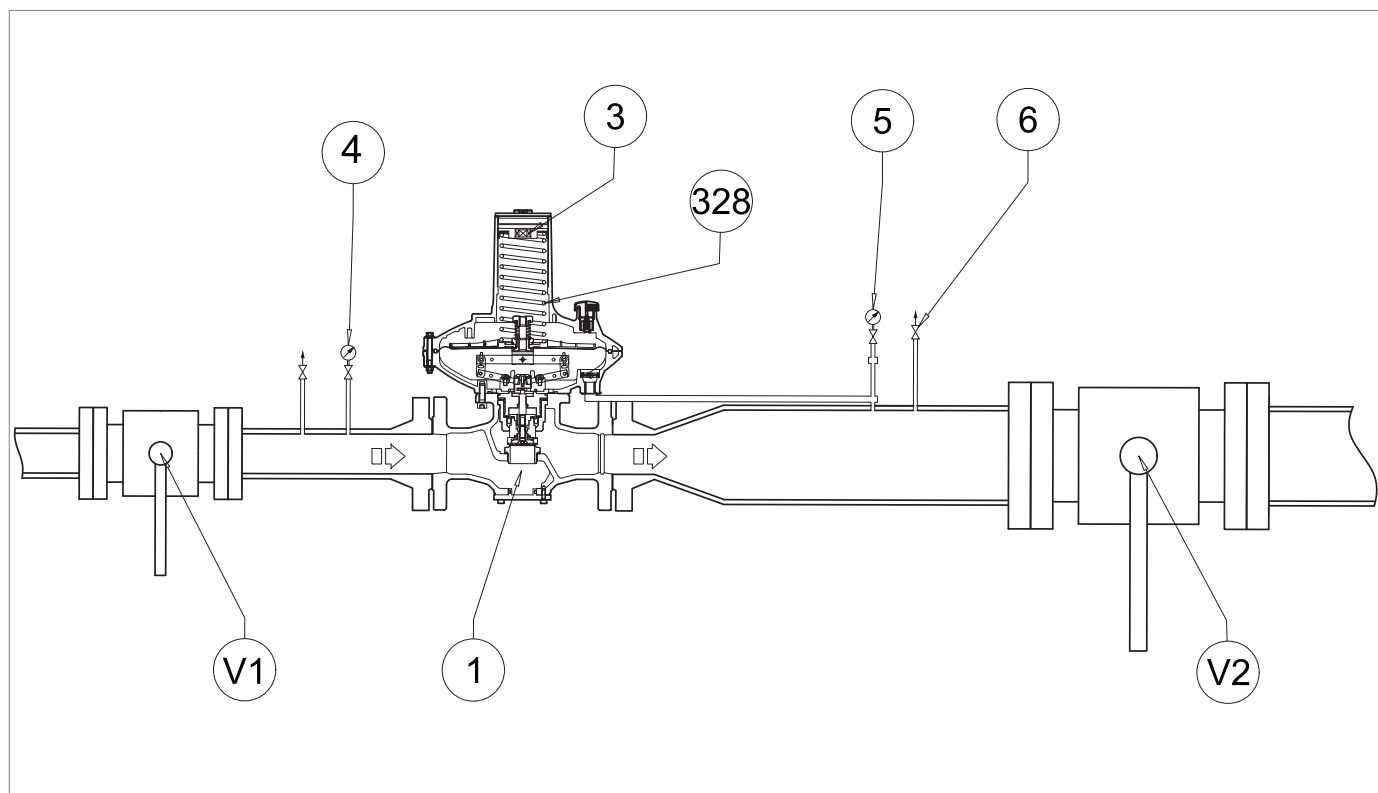


Fig. 8.16. Commissioning the DIVAL 600 regulator

Step	Action
1	Partially open the bleed cock (6).
2	Partially open the upstream shut-off valve (V1), checking that the downstream pressure (Pd) indicated on the downstream pressure gauge (5) does not exceed the required calibration value by over 50%.  NOTICE! In the first line pressurisation phase, the downstream pressure (Pd) indicated on the downstream pressure gauge (5) could exceed that required calibration value, depending on the response time of the regulator.  NOTICE! With regulators with calibration pressure up to 80 mbar, the response time is longer than that of regulators with calibration pressure above 80 mbar.
3	When the regulator is put into service, the downstream pressure (Pd) indicated on the downstream pressure gauge (5) will be equal to the calibration value of the regulator.
4	a - FOR INITIAL COMMISSIONING OF THE REGULATION LINE If the pressure downstream (Pd) is not at the required calibration value, proceed as follows: - downstream pressure value (Pd) lower than required calibration value: load the setting spring by turning the adjustment ring nut clockwise (3) - downstream pressure value (Pd) higher than required calibration value: load the setting spring by turning the adjustment ring nut anti-clockwise (3) b - AFTER MAINTENANCE OF THE REGULATION LINE - load the setting spring (328) and increase the pressure value of the main regulator (1) by turning the adjustment ring nut clockwise (3)
5	Check the downstream pressure (Pd) referring to the downstream pressure gauge (5).
6	Close the bleed cock (6).
7	Check that the downstream pressure (Pd), after an increment phase, does not exceed the closing pressure value (refer to the SG value displayed on the plate, see par. "2.8 - Nameplates applied").  NOTICE! If the pressure in the pipe section between the regulator and the downstream shut-off valve (V2) exceeds the closing pressure value, consult chapter "10 - Ricerca guasti e troubleshooting" to clear the causes of the malfunctions.
8	Check the tightness of all the fittings between the shut-off valves (V1, V2).  NOTICE! Check for leaks with a foaming agent.
9	In case of external leaks, eliminate the leak points and repeat the procedure from step 7.
10	Open downstream shut-off valve (V2) very slowly until the pipeline fills completely.  NOTICE! If the pressure of the downstream pipeline is lower than the calibration pressure, partially open the downstream shut-off valve (V2) so as to not to exceed the maximum flow rate value of the installation.

Tab. 8.44

8.6 - COMMISSIONING PROCEDURE OF REGULATION LINE: DIVAL 600 REGULATOR + DIVAL 600 REGULATOR WITH IN LINE MONITOR FUNCTION

NOTICE!

VALID FOR REGULATORS WITH DOWNSTREAM PRESSURE UP TO 80mbar

The setting spring (328.1) of the main regulator (1) must allow you to obtain the downstream pressure value (Pd) 10-20% higher than the calibration pressure value of the regulator with in-line monitor function (2).

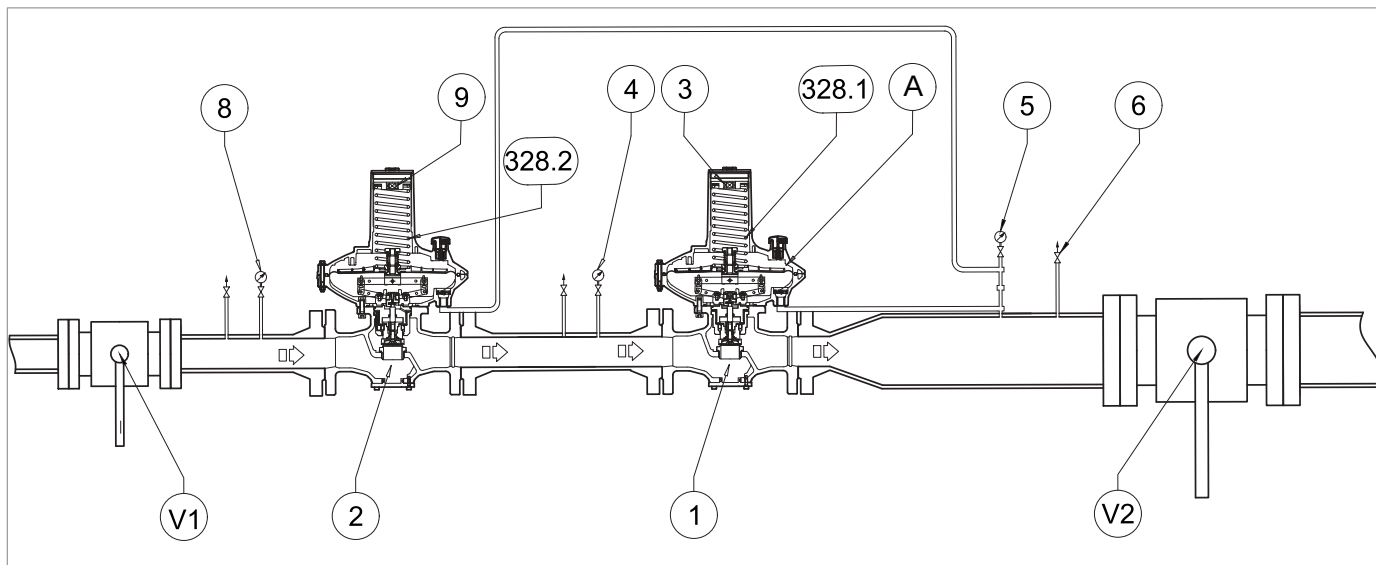
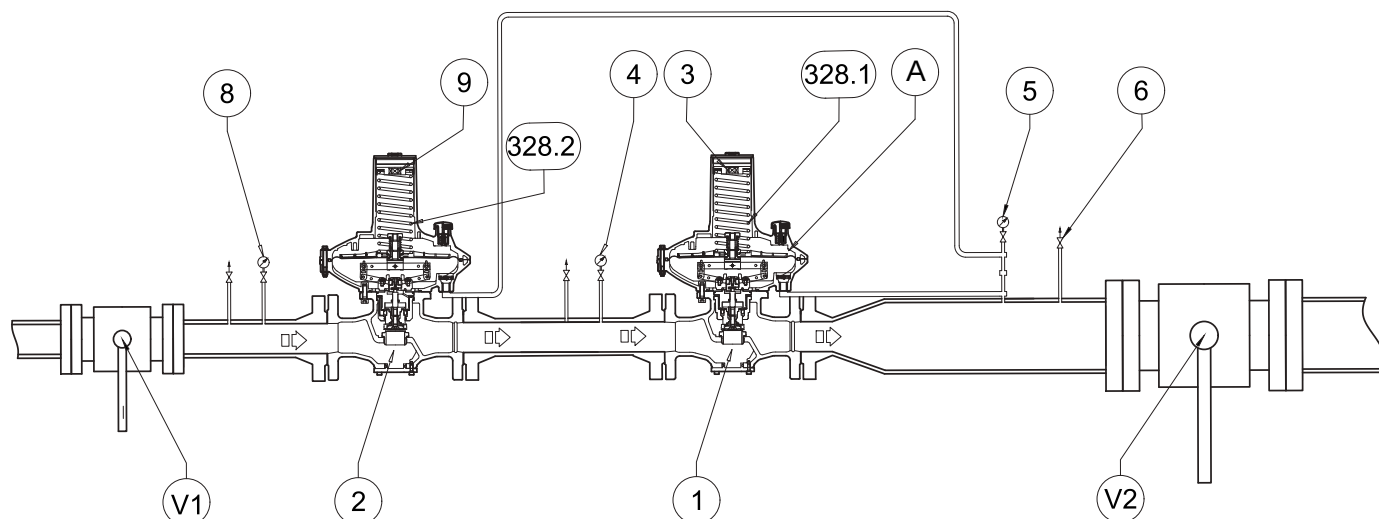


Fig. 8.17. Commissioning of DIVAL 600 regulator + regulator with in-line monitor function

Step	Action
1	Partially open the bleed cock (6).
2	Partially open the upstream shut-off valve (V1), checking that the downstream pressure (Pd) indicated on the downstream pressure gauge (5) does not exceed the required calibration value by over 50%.  NOTICE! In the first line pressurisation phase, the downstream pressure (Pd) indicated on the downstream pressure gauge (5) could exceed that required calibration value, depending on the response time of the main regulator (1).  NOTICE! With regulators with calibration pressure up to 80 mbar, the response time is longer than that of regulators with calibration pressure above 80 mbar.
3	When the main regulator (1) is put into service, the downstream pressure (Pd) indicated on the downstream pressure gauge (5) will be equal to the calibration value of the main regulator (1).
4	Check that the regulator with in-line monitor function (2) is fully open (100%).  NOTICE! The regulator with monitor function (2) is fully open, when the pressure indicated on the intermediate pressure gauge (4) is the same as the upstream pressure gauge (8).
5	Open the upstream shut-off valve (V1) completely.
6	Increase the downstream pressure value (Pd) beyond the calibration pressure of the regulator with monitor function (2), by turning the adjustment ring nut (3) of the main regulator (1) clockwise.  NOTICE! If the setting spring of the main regulator (1) does not reach a sufficient pressure to trip the regulator with in-line monitor function (2), pressurise the chamber (A) by using an external source (see par. "8.6.1 - Pressurising with external source").  NOTICE! The value of the pressure introduced by the external source can be up to 50% more than the calibration value of the regulator with in-line monitor function (2).
7	Check that the regulator with in-line monitor function (2) is running, checking that the pressure indicated on the intermediate pressure gauge (4) is comparable to the calibration value of the regulator with in-line monitor function (2).
8	a - FOR INITIAL COMMISSIONING OF THE REGULATION LINE If the downstream pressure (Pd) is not at the required calibration value for the regulator with in-line monitor function (2), proceed as follows: • downstream pressure value (Pd) lower than required calibration value: load the setting spring by turning the adjustment ring nut clockwise (9) • downstream pressure value (Pd) higher than required calibration value: load the setting spring by turning the adjustment ring nut anti-clockwise (9) b - AFTER MAINTENANCE OF THE REGULATION LINE • load the setting spring (328.2) and increase the pressure value of the regulator with monitor function (2) by turning the adjustment ring nut clockwise (9)
9	Check the calibration value of the regulator with in-line monitor function (2), referring to the downstream pressure gauge (5).  NOTICE! If the calibration pressure is not as pre-established, repeat steps 8a (first commissioning) or 8b (after maintenance).



Commissioning of DIVAL 600 regulator + regulator with in-line monitor function

Step	Action
10	Slowly close the bleed cock (6).
11	Check that the downstream pressure, after an increment phase, does not exceed the closing pressure value of the regulator with in-line monitor function (2) (refer to the SG value displayed on the plate, see par. "2.8 - Nameplates applied").  NOTICE! - If the downstream pressure exceeds the closing pressure value, refer to chapter "10 - Troubleshooting" to clear the causes of the malfunctions. - Check the pressure referring to the downstream pressure gauge (5).
12	Partially open the bleed cock (6).
13	Discharge the regulation spring of the main regulator (1) or disconnect the external pressure source from the chamber (A).
14	Check that the regulator with in-line monitor function (2) is fully open (100%).  NOTICE! The regulator with in-line monitor function (2) is fully open, when the pressure indicated on the intermediate pressure gauge (4) is the same as the upstream pressure gauge (8).
15	Check that the calibration pressure of the main regulator (1) is as pre-established by referring to the pressure value indicated on the downstream pressure gauge (5).
16	a - FOR INITIAL COMMISSIONING OF THE REGULATION LINE If the pressure downstream (Pd) is not at the required calibration value, proceed as follows: - downstream pressure value (Pd) lower than required calibration value: load the setting spring by turning the adjustment ring nut clockwise (3) - downstream pressure value (Pd) higher than required calibration value: load the setting spring by turning the adjustment ring nut anti-clockwise (3) b - AFTER MAINTENANCE OF THE REGULATION LINE - load the setting spring (328.1) and increase the pressure value of the main regulator (1) by turning the adjustment ring nut clockwise (3)
17	Slowly close the bleed cock (6).

Step	Action
18	Check that the downstream pressure, after an increment phase, does not exceed the closing pressure value of the main regulator (1) (refer to the SG value displayed on the plate, see par. "2.8 - Nameplates applied").  NOTICE! • If the downstream pressure exceeds the closing pressure value, refer to chapter "10 - Troubleshooting" to clear the causes of the malfunctions. • Check the pressure referring to the downstream pressure gauge (5).
19	Using a foaming agent, check all the joints between shut-off valves (V1, V2) for proper sealing.
20	In case of external leaks, eliminate the leak points and repeat the procedure from step 1.
21	Slowly open the downstream shut-off valve V2 until the piping has been completely filled.  NOTICE! • If the pressure of the downstream pipeline is lower than the calibration pressure, partially open the downstream shut-off valve (V2) so as to not to exceed the maximum flow rate value of the installation. • Check the pressure referring to the downstream pressure gauge (5).

Tab. 8.45

8.6.1 - PRESSURISING WITH EXTERNAL SOURCE

If the setting spring of the main regulator (1) does not reach a sufficient pressure to put into service the regulator with in-line monitor function (2), you may pressurise the chamber (A) of the control head of the main regulator (1) by using an external source.

Pressurisation can be done:

- with external lines;
- manually.

The introduced pressure is controlled by using pressure gauges or transducers.

To correctly discharge the introduced pressure, make sure there is an additional bleed cock (18).

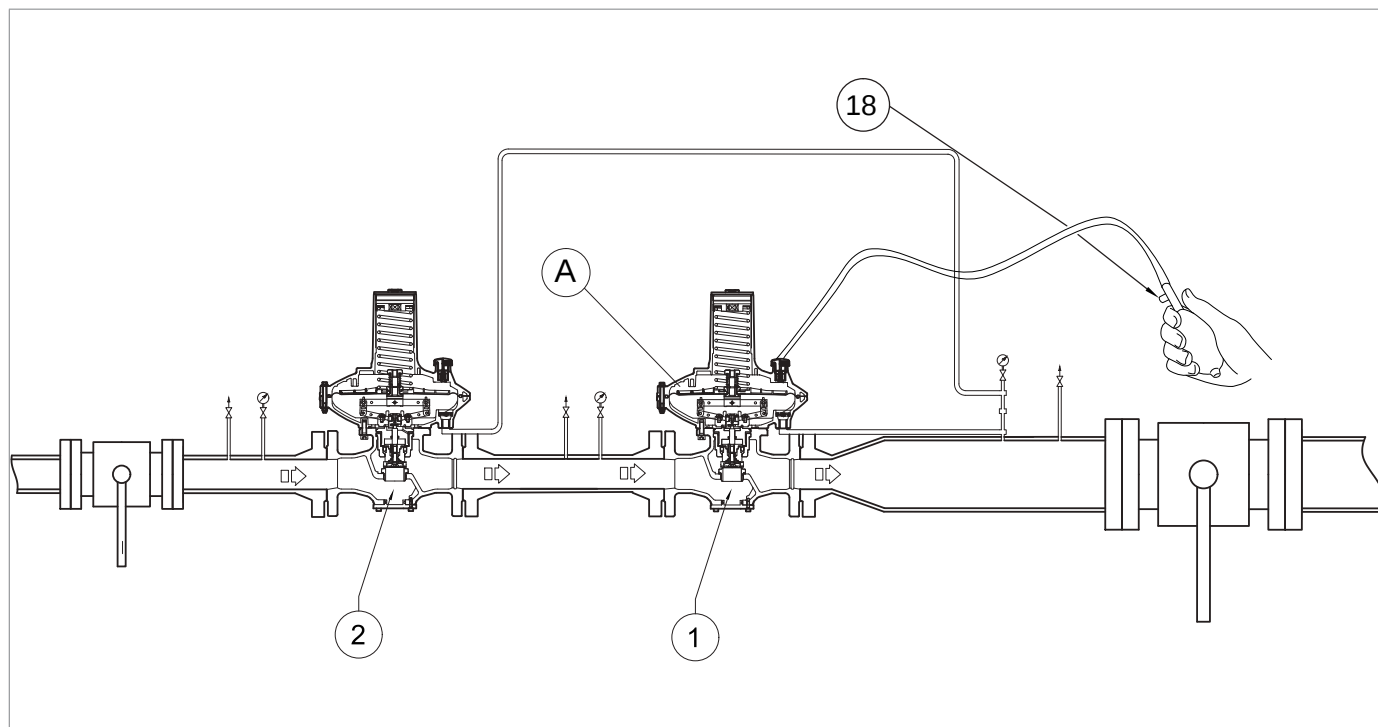


Fig. 8.18. Pressurising with external source (hand pump)

8.7 - COMMISSIONING PROCEDURE OF DIVAL 600 REGULATOR WITH LA SLAM-SHUT VALVE

8.7.1 - INTERNAL TIGHTNESS CHECK OF LA SLAM-SHUT VALVE

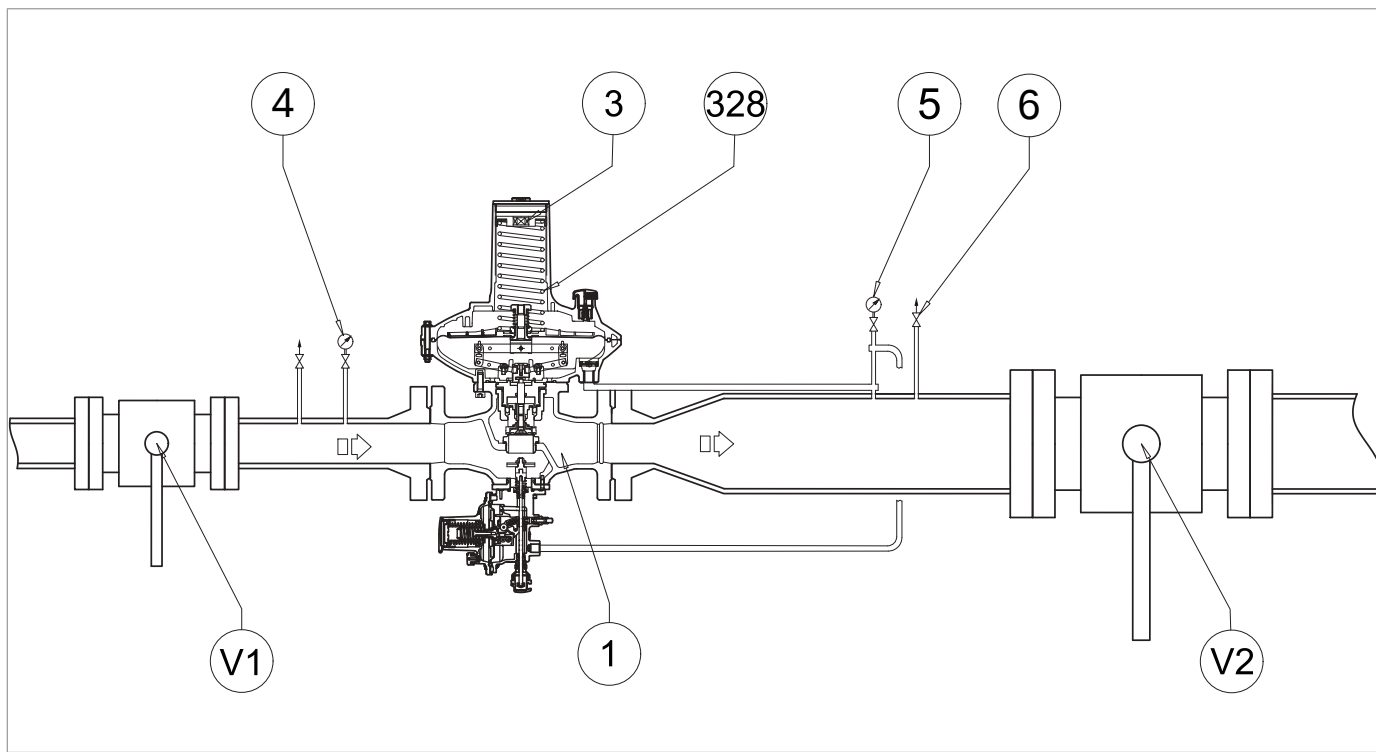


Fig. 8.19. Commissioning of the DIVAL 600 regulator with LA slam-shut valve

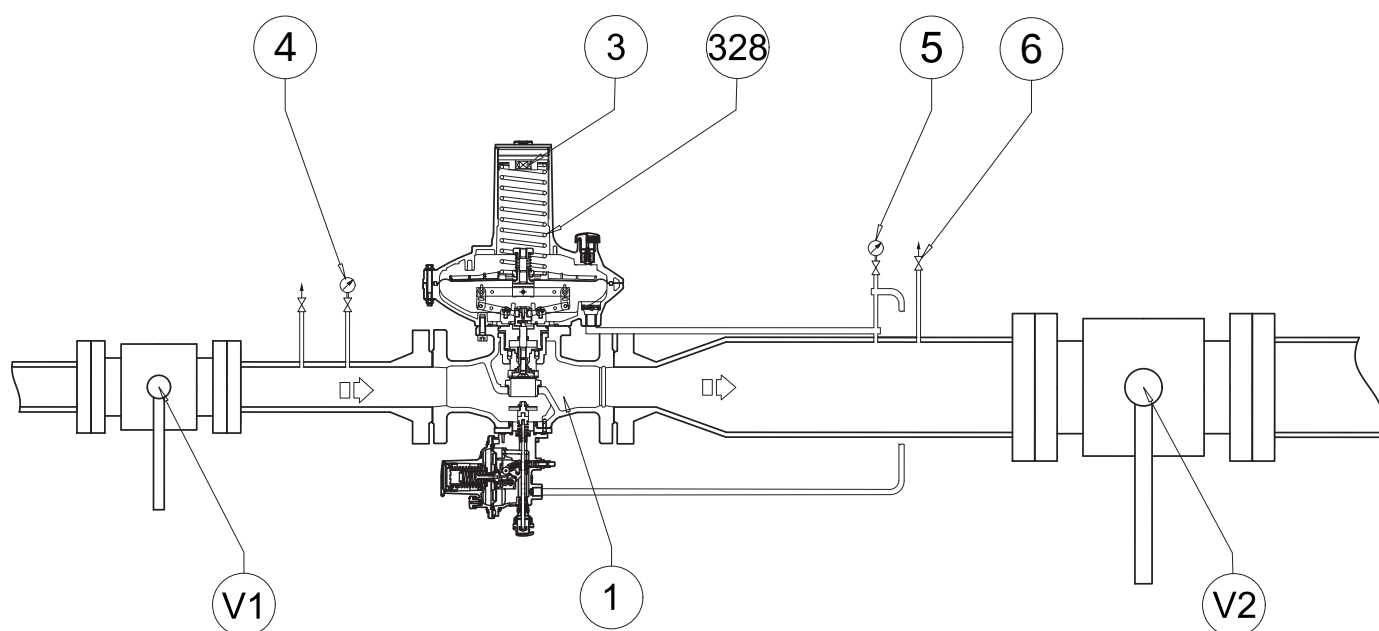
Step	Action
1	Check that the slam-shut valve is in the shut-off position.
2	Open the bleed cock (6) to fully discharge the downstream section.
3	Slowly open the upstream shut-off valve (V1).
4	Check the internal tightness of the slam-shut valve by means of the bleed cock (6). ! NOTICE! • Check the seal with a foaming substance; • In case of leaks, please refer to the chapter “10 - Ricerca guasti e troubleshooting” to clear the causes of malfunctions.

Tab. 8.46

8.7.2 - COMMISSIONING OF THE DIVAL 600 REGULATOR WITH LA SLAM-SHUT VALVE

For the following procedure, please refer to Figure 8.19 in par. "8.7.1 - Internal tightness check of LA slam-shut valve":

Step	Action
1	Make sure that the bleed cock (6) is partially open.
2	Check that the LA slam-shut valve is in the shut-off position.  NOTICE! If the LA slam-shut valve is in the open position, close it using the manual button (fig. 8.20, ref. 10).
3	Partially open the upstream shut-off valve (V1), checking the pressure indicated by the upstream pressure gauge (4).
4	Perform the internal tightness check of the LA slam-shut valve, referring to chapter "8.7.1 - Internal tightness check of LA slam-shut valve".  NOTICE! In case of leaks, please refer to the chapter "10 - Troubleshooting" to clear the causes of malfunctions.
5	Slowly pressurise the control line by turning the knob on the LA slam-shut valve (refer to "Operation", paragraph 4.5.4.1), checking that the downstream pressure (Pd) indicated on the downstream pressure gauge (5) does not exceed the required calibration value by over 50%.
6	When the regulator is put into service, the pressure on the downstream pressure gauge (5) will be equal to the calibration value of the main regulator.  NOTICE! In the first line pressurisation phase, the pressure on the downstream pressure gauge (5) could exceed the required calibration value, depending on the response time of the regulator.
7	Open the upstream shut-off valve (V1) completely.
8	Check calibrations of the pressure switch of the LA slam-shut valve by referring to paragraph "8.7.3 - Procedure for calibrating the pressure switch for the LA incorporated SLAM-SHUT VALVE".
9	a - FOR INITIAL COMMISSIONING OF THE REGULATION LINE If the pressure downstream (Pd) is not at the required calibration value, proceed as follows: - downstream pressure value (Pd) lower than required calibration value: load the setting spring by turning the adjustment ring nut clockwise (3) - downstream pressure value (Pd) higher than required calibration value: load the setting spring by turning the adjustment ring nut anti-clockwise (3) b - AFTER MAINTENANCE OF THE REGULATION LINE - load the setting spring (328) and increase the pressure value of the regulator (1) by turning the adjustment ring nut clockwise (3)
10	Check the downstream pressure (Pd) referring to the downstream pressure gauge (5).
11	Close the bleed cock (6).
12	Check that the downstream pressure (Pd), after an increment phase, does not exceed the closing pressure value (refer to the SG value displayed on the plate, see par. "2.8 - Nameplates applied").  NOTICE! If the pressure in the pipe section between the regulator and the downstream shut-off valve (V2) exceeds the closing pressure value, consult chapter "10 - Troubleshooting" to clear the causes of the malfunctions.



Commissioning of the DIVAL 600 regulator with LA slam-shut valve

Step	Action
13	Check the tightness of all the fittings between the shut-off valves (V1, V2). NOTICE! Check for leaks with a foaming agent.
14	If external leaks are noticed, eliminate the leak points and repeat the procedure from step 7.
15	Open downstream shut-off valve (V2) very slowly until the pipeline fills completely. NOTICE! If the pressure of the downstream pipeline is lower than the calibration pressure, partially open the downstream shut-off valve (V2) so as to not to exceed the maximum flow rate value of the installation.

Tab. 8.47

8.7.3 - PROCEDURE FOR CALIBRATING THE PRESSURE SWITCH FOR THE LA INCORPORATED SLAM-SHUT VALVE

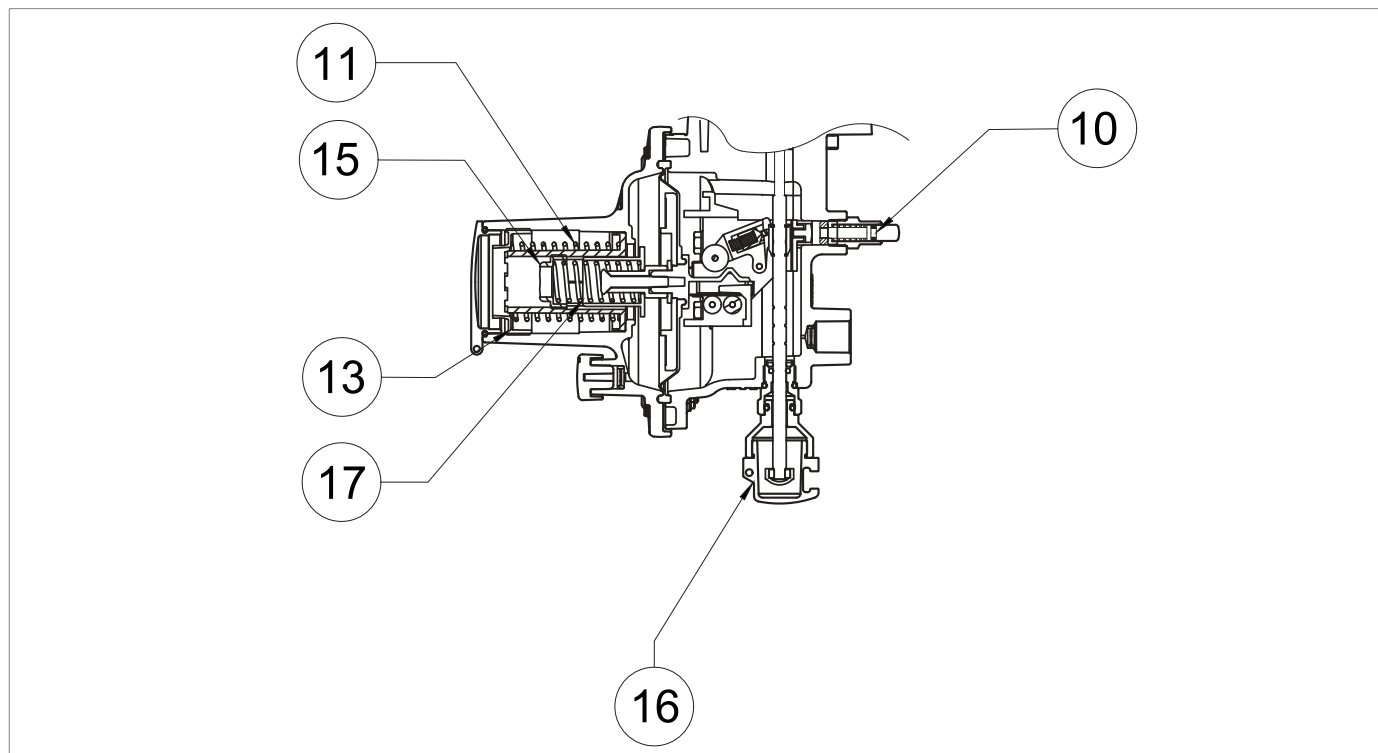


Fig. 8.20. Calibration of pressure switch for LA slam-shut valve

SPRING CALIBRATION FOR MAXIMUM PRESSURE TRIP

Step	Action
1	Increase the downstream pressure to the tripping value of the slam-shut valve, connecting an external pressure source to the bleed cock (fig. 8.16, ref. 6) placed on the downstream pipe, making sure to open an additional bleed cock (fig. 8.21, ref. 18).  NOTICE! Check the pressure referring to the downstream pressure gauge (fig. 8.16, ref. 5). If the slam-shut valve: • trips before the expected pressure value: screw in (clockwise) the adjustment ring nut (13) so as to further compress the spring (11); • does not trip at the expected pressure value: unscrew (anti-clockwise) the adjustment ring nut (13) so as to relieve the spring (11).
2	Decrease the pressure of the downstream section by opening the additional bleed cock (21, ref. 18) to bring it up to the calibration value of the main regulator.
3	Close the additional bleed cock (fig. 8.21, ref. 18).
4	Resetting the slam-shut valve by turning the reset knob (16).
5	Repeat steps 1-2-3-4 at least three times, observing the operating limits indicated on the nameplate.
6	Disconnect the external pressure source from the bleed cock (fig. 8.16, ref. 6).

Tab. 8.48

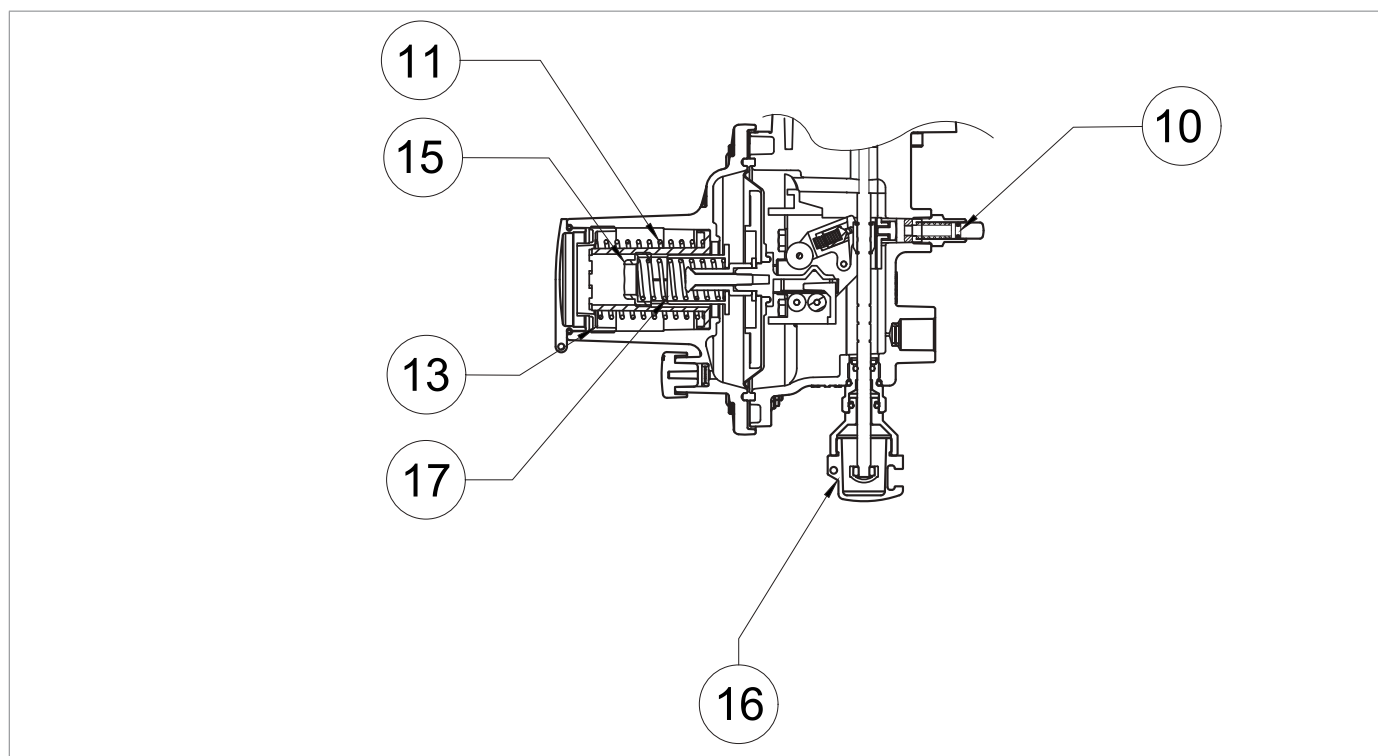


Fig. 8.20. Calibration of pressure switch for LA slam-shut valve

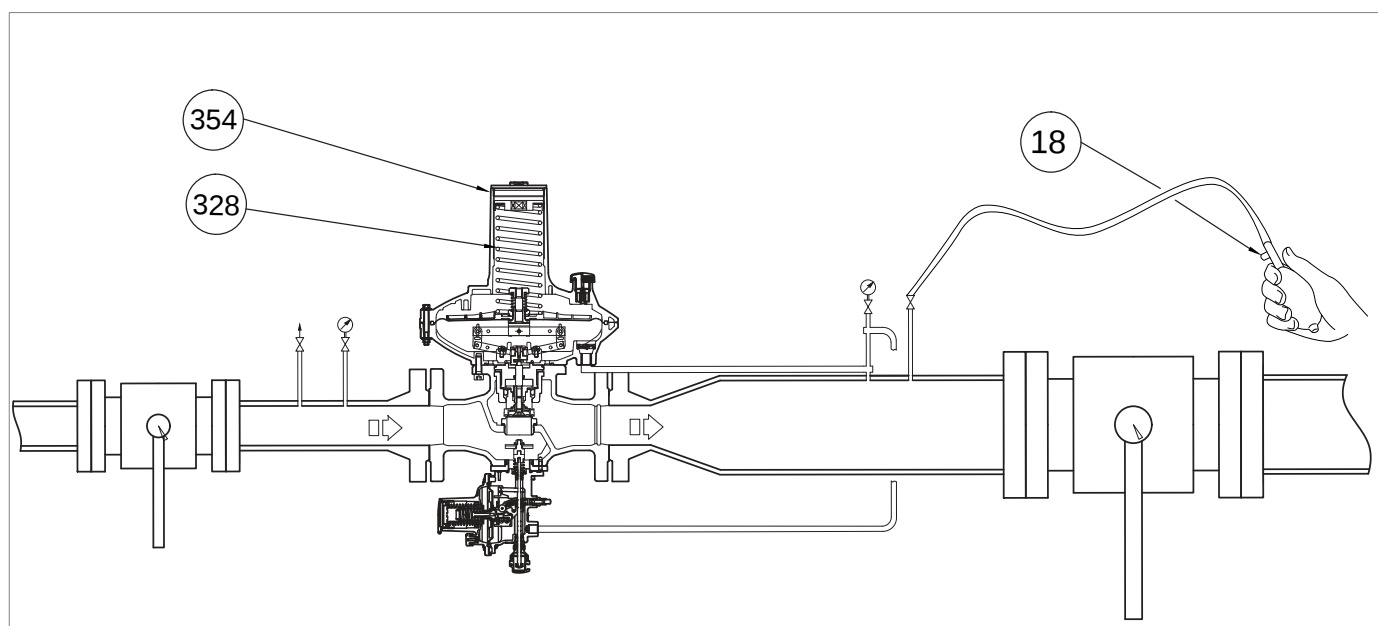


Fig. 8.21. Pressurising with external source for incorporated LA slam-shut valve

SPRING CALIBRATION FOR MINIMUM PRESSURE TRIP (IF PRESENT)

Step	Action
1	Partially open the bleed cock (fig. 8.16, ref. 6) to the atmosphere and keep it open for the next steps.
2	Turn the adjustment ring nut (fig. 8.16, ref. 3) of the regulator anti-clockwise to decrease the downstream pressure (Pd) to the minimum pressure required for tripping of the slam-shut valve.
3	If necessary, remove the closing cap (fig. 8.21, ref. 354) together with the adjustment ring nut and remove the regulation spring (fig. 8.21, ref. 328).  NOTICE! Check the tripping pressure value of the slam-shut valve indicated on the downstream pressure gauge (fig. 8.19, ref. 5).
4	If the slam-shut valve: - trips before the expected pressure value, unscrew (anticlockwise) the adjustment ring nut (fig. 8.20, ref. 15), to relieve the spring (fig. 8.20, ref. 17); - does not trip at the expected pressure value, screw in (clockwise) the adjustment ring nut (fig. 8.20, ref. 15) to further compress the spring (fig. 8.20, ref. 17).
5	After having checked that the slam-shut valve trips at the preset value, proceed as follows: - Close the air vent valve (fig. 8.16, ref. 6) - Position the regulation spring (fig. 8.21, ref. 328), the closing cap (fig. 8.21, ref. 354), and adjustment ring nut (fig. 8.16, ref. 3) - Slowly open the upstream shut-off valve (V1) until the downstream pressure value (Pd) reaches the calibration value of the regulator, referring to the downstream pressure gauge (fig. 8.16, ref. 5) - Close the upstream shut-off valve (V1) - Slowly and partially open the air vent valve (fig. 8.16, ref. 6) to decrease the downstream pressure referring to the downstream pressure gauge (fig. 8.16, ref. 5) until it reaches the minimum pressure tripping value - Check the minimum pressure spring for proper calibration by repeating steps 2-3-4 at least three times - Calibrate the main regulator referring to par. "8.5 - Regulator commissioning procedure"
6	Open the slam-shut valve by acting on the reset knob (fig. 8.20, ref. 16) and keep it open manually.
7	Turn the adjustment ring nut clockwise (fig. 8.16, ref. 3) to increase the downstream pressure to the regulator's setpoint.
8	Set the slam-shut valve by acting on the reset knob (fig. 8.20, ref. 16).
9	Close the bleed cock (fig. 8.16, ref. 6).

Tab. 8.49

COMMISSIONING THE REGULATOR

 NOTICE! Please refer to "8.5 - Regulator commissioning procedure" of this chapter.

8.8 - COMMISSIONING PROCEDURE OF REGULATION LINE: DIVAL 600 REGULATOR + DIVAL 600 REGULATOR WITH IN LINE MONITOR + LA SLAM-SHUT VALVE FUNCTION

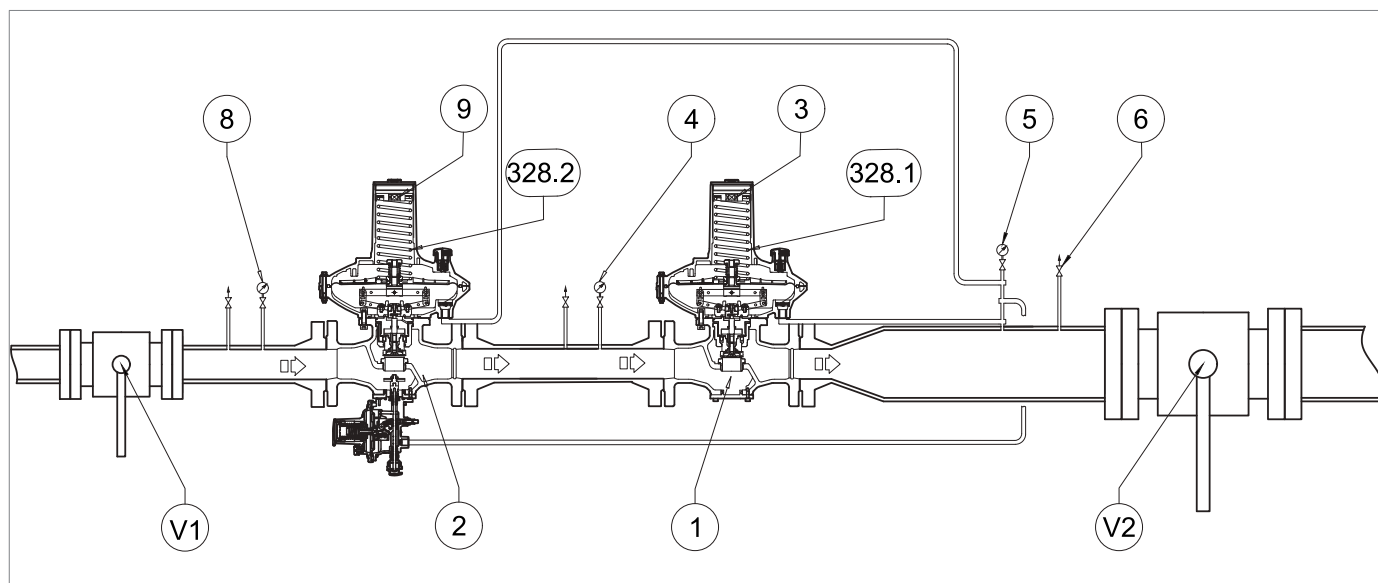
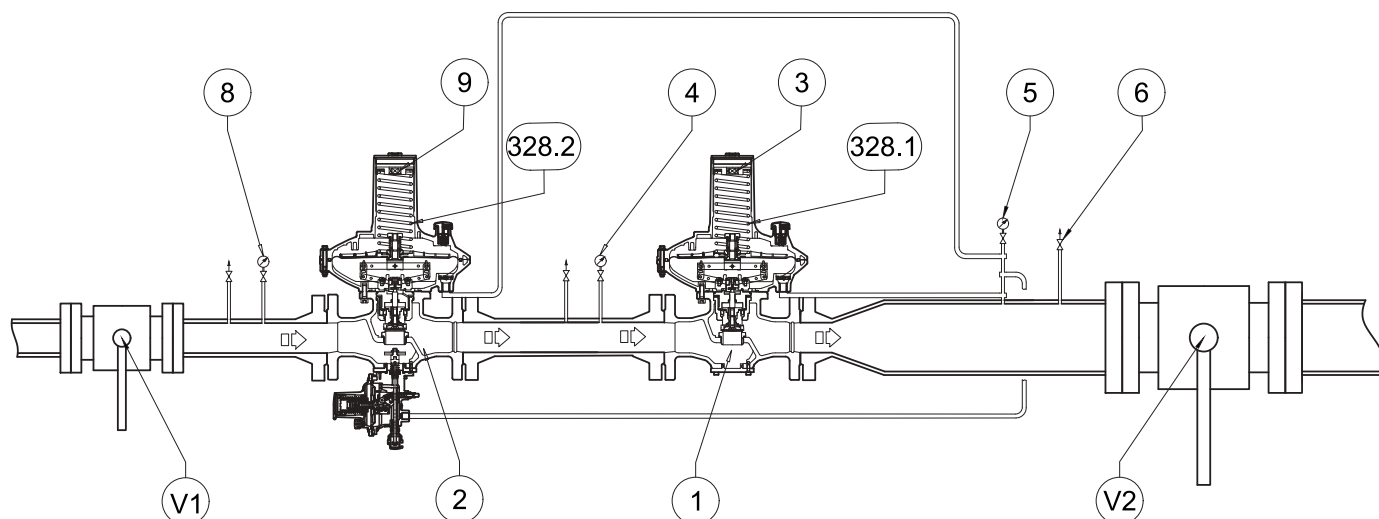


Fig. 8.22. Commissioning of DIVAL 600 regulator + regulator-monitor + LA

Step	Action
1	Make sure that the bleed cock (6) is partially open.
2	Check that the LA slam-shut valve is in the shut-off position. ! NOTICE! If the LA slam-shut valve is in the open position, close it using the manual button (fig. 8.20, ref. 10).
3	Slowly open the upstream shut-off valve (V1), checking the pressure indicated by the upstream pressure gauge (4).
4	Perform the internal tightness check of the LA slam-shut valve, referring to chapter "8.7.1 - Internal tightness check of LA slam-shut valve". ! NOTICE! In case of leaks, please refer to the chapter "10 - Troubleshooting" to clear the causes of mal-functions.
5	Make sure that the bleed cock (6) is partially open.
6	Slowly pressurise the regulation line, acting on the lever of the LA slam-shut valve (refer to section "Operation", paragraph 4.5.4.1), checking that the downstream pressure (Pd) indicated on the downstream pressure gauge (5) does not exceed the required calibration value by over 50%.
7	When the regulator is put into service, the pressure on the downstream pressure gauge (5) will be equal to the calibration value of the main regulator. ! NOTICE! In the first line pressurisation phase, the pressure on the downstream pressure gauge (5) could exceed the required calibration value, depending on the response time of the regulator.
8	Check calibrations of the pressure switch of the LA slam-shut valve by referring to paragraph "8.7.3 - Procedure for calibrating the pressure switch for the LA incorporated SLAM-SHUT VALVE".

Step	Action
9	 NOTICE! With regulators with calibration pressure up to 80 mbar, the response time is longer than that of regulators with calibration pressure above 80 mbar.
10	When the main regulator (1) is put into service, the downstream pressure (Pd) indicated on the downstream pressure gauge (5) will be equal to the calibration value of the regulator (1).
11	Check that the regulator with in-line monitor function (2) is fully open (100%).  NOTICE! The regulator with monitor function (2) is fully open, when the pressure indicated on the intermediate pressure gauge (4) is the same as the upstream pressure gauge (8).
12	Open the upstream shut-off valve (V1) completely.
13	Increase the downstream pressure value (Pd) beyond the calibration pressure of the regulator with monitor function (2), by turning the adjustment ring nut (3) of the main regulator (1) clockwise.  NOTICE! If the setting spring of the main regulator (1) does not reach a sufficient pressure to trip the regulator with in-line monitor function (2), pressurise the chamber (A) by using an external source (see par. "8.6.1 - Pressurising with external source").  NOTICE! The value of the pressure introduced by the external source can be up to 50% more than the calibration value of the regulator with in-line monitor function (2).
14	Check that the regulator with in-line monitor function (2) is running, checking that the pressure indicated on the intermediate pressure gauge (4) is equal to the calibration value of the regulator with in-line monitor function (2).
15	a - FOR INITIAL COMMISSIONING OF THE REGULATION LINE If the downstream pressure (Pd) is not at the required calibration value for the regulator with in-line monitor function (2), proceed as follows: • downstream pressure value (Pd) lower than required calibration value: load the setting spring by turning the adjustment ring nut clockwise (9) • downstream pressure value (Pd) higher than required calibration value: load the setting spring by turning the adjustment ring nut anti-clockwise (9) b - AFTER MAINTENANCE OF THE REGULATION LINE • load the setting spring (328.2) and increase the pressure value of the regulator with in-line monitor function (2) by turning the adjustment ring nut clockwise (9)
16	Check the calibration value of the regulator with in-line monitor function (2), referring to the downstream pressure gauge (5).  NOTICE! If the calibration pressure is not as pre-established, repeat steps 15a (first commissioning) or 15b (after maintenance).
17	Slowly close the bleed cock (6).



Commissioning of DIVAL 600 regulator + regulator-monitor + LA

Step	Action
18	Check that the downstream pressure, after an increment phase, does not exceed the closing pressure value of the regulator with in-line monitor function (2) (refer to the SG value displayed on the plate, see par. "2.8 - Nameplates applied").  NOTICE! - If the downstream pressure exceeds the closing pressure value, refer to chapter "10 - Troubleshooting" to clear the causes of the malfunctions. - Check the pressure referring to the downstream pressure gauge (5).
19	Partially open the bleed cock (6).
20	Discharge the regulation spring (328.1) of the main regulator (1) or disconnect the external pressure source from the chamber (A) (see par. "8.6.1 - Pressurising with external source").
21	Check that the regulator with in-line monitor function (2) is fully open (100%).  NOTICE! The regulator with monitor function (2) is fully open, when the pressure indicated on the intermediate pressure gauge (4) is the same as the upstream pressure gauge (8).
22	Check that the calibration pressure of the main regulator (1) is as pre-established by referring to the pressure value indicated on the downstream pressure gauge (5).
23	a - FOR INITIAL COMMISSIONING OF THE REGULATION LINE If the pressure downstream (Pd) is not at the required calibration value, proceed as follows: - downstream pressure value (Pd) lower than required calibration value: load the setting spring by turning the adjustment ring nut clockwise (3) - downstream pressure value (Pd) higher than required calibration value: load the setting spring by turning the adjustment ring nut anti-clockwise (3) b - AFTER MAINTENANCE OF THE REGULATION LINE - load the setting spring (328.1) and increase the pressure value of the main regulator (1) by turning the adjustment ring nut clockwise (3)
24	Slowly close the bleed cock (6).

Step	Action
25	Check that the downstream pressure, after an increment phase, does not exceed the closing pressure value of the main regulator (1) (refer to the SG value displayed on the plate, see par. "2.8 - Nameplates applied").  NOTICE! • If the downstream pressure exceeds the closing pressure value, refer to chapter "10 - Troubleshooting" to clear the causes of the malfunctions. • Check the pressure referring to the downstream pressure gauge (5).
26	Using a foaming agent, check all the joints between shut-off valves (V1, V2) for proper sealing.
27	If external leaks are noticed, eliminate the leak points and repeat the procedure from step 10.
28	Slowly open the downstream shut-off valve V2 until the piping has been completely filled.  NOTICE! • If the pressure of the downstream pipeline is lower than the calibration pressure, partially open the downstream shut-off valve (V2) so as to not to exceed the maximum flow rate value of the installation. • Check the pressure referring to the downstream pressure gauge (5).

Tab. 8.50

COMMISSIONING OF LA SLAM-SHUT VALVE

 NOTICE! Refer to paragraph "8.7.3 - Procedure for calibrating the pressure switch for the LA incorporated SLAM-SHUT VALVE".
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8.9 - DEVICE CALIBRATION

8.9.1 - PRESSURE SWITCH CALIBRATION FOR THE LA SLAM-SHUT VALVE

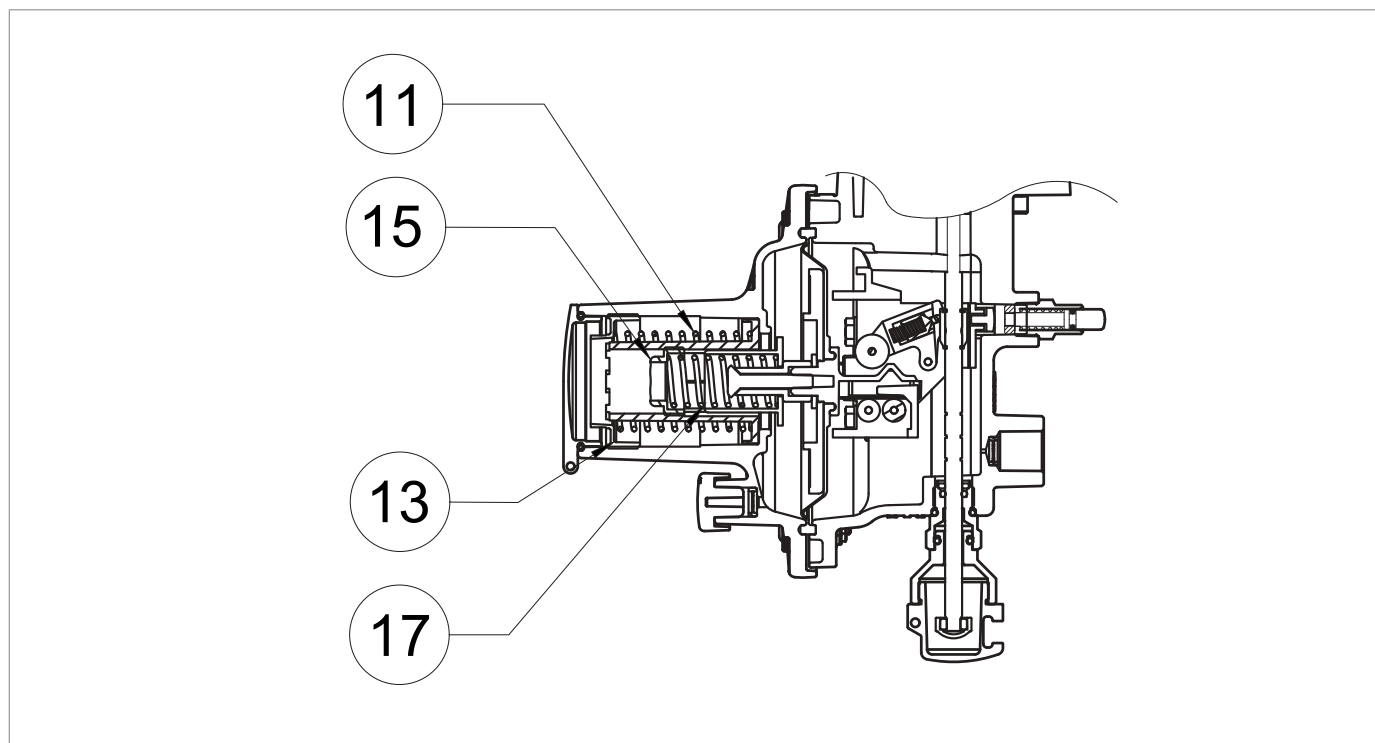


Fig. 8.23. Pressure switch calibration for the LA slam-shut valve

Turn the ring nut (13) for maximum tripping (11):

- anti-clockwise to decrease the slam-shut device tripping pressure;
- clockwise to increase the slam-shut device tripping pressure.

Turn the ring nut (15) for minimum tripping (17):

- anti-clockwise to decrease the slam-shut device tripping pressure;
- clockwise to increase the slam-shut device tripping pressure.

NOTICE!

For calibration ranges, please refer to chapter “13 - Calibration tables”.

9 - MAINTENANCE AND FUNCTIONAL CHECKS

9.1 - GENERAL WARNINGS

HAZARD!

- Maintenance work must be carried out by qualified personnel trained on safety in the workplace and authorised to carry out equipment-related activities.
- Each maintenance operation requires in-depth and specialised knowledge of the equipment, the necessary operations, the associated risks and the correct procedures to operate safely.
- Repair or maintenance work not provided for in this manual may be carried out only if approved by PIETRO FIORENTINI S.p.A.. PIETRO FIORENTINI S.p.A. shall not be held liable for damage to persons or property resulting from operations other than those described herein or carried out in ways other than as indicated.

WARNING!

Before conducting any work, make sure that the line on which the equipment is installed:

- has been shut off downstream and upstream;
- has been discharged.

WARNING!

In case of doubt, do not perform any work. Contact PIETRO FIORENTINI S.p.A. for the necessary clarifications.

Managing and/or using the equipment includes operations that are necessary as a result of normal use such as:

- inspection and checks;
- functional checks;
- routine maintenance;
- special maintenance.

NOTICE!

Maintenance work is strictly related to:

- the quality of the conveyed gas (impurities, humidity, gasoline, corrosive substances);
- the effectiveness of filtration;
- the equipment conditions of use.

To properly run the equipment, one should:

- follow the service frequency referred to in the manual for functional checks and routine maintenance.
- not exceed the time interval between one service and the next. The time interval is to be understood as the maximum acceptable; it can, however, be shortened;
- promptly check the causes of any anomalies such as excessive noise, leakage of fluids or similar and remedy them. The timely removal of any causes of anomaly and/or malfunction prevents further damage to the equipment and ensures operator safety;

Before beginning disassembly of the equipment, make sure that:

- the spare parts and parts used in replacements have adequate requirements to ensure the original performance of the equipment. Use original, compliant spare parts;
- the operator must have the necessary equipment (see chapter “7 - Commissioning/maintenance equipment”).

NOTICE!

The recommended spare parts are unambiguously identified with tags indicating:

- **the assembly drawing number of the equipment where they are installed (see Chapter “12 - Recommended spare parts”);**
- **The position specified in the assembly drawing of the equipment.**

The equipment maintenance operations are divided, from an operational point of view, into three main categories:

Commissioning and maintenance operations

Periodic checks and inspections	All those checks that the operator must carry out on a regular basis to ensure that the equipment is in proper working order.
Routine maintenance	All those operations that the operator must preventively carry out to ensure proper operation of the device over time. Routine maintenance includes: • inspection; • control; • adjustment; • cleaning; • lubrication; • replacement; of all spare parts.
Special maintenance	All those operations to be carried out by the operator as required by the equipment.

Tab. 9.51

9.2 - PERIODICALLY CHECKING AND INSPECTING THE EQUIPMENT FOR PROPER OPERATION

Periodic checks and inspections	
Operator qualification	Mechanical maintenance technician
PPE required	  WARNING! The PPE listed in this table is related to the risk associated with the equipment. For the PPE required to protect against risks associated with the workplace, installation or operating conditions, please refer to: - the regulations in force in the country of installation; <u>any information provided by the Safety Manager at the installation facility.</u>

Tab. 9.52

“Tab. 9.53” lists checks and verifications, i.e. operations that do not require any manual intervention on the individual equipment.

Some items thereof can be replaced remotely using suitable remote control tools. The following is listed below:

Activity description	Equipment/accessories involved	Evaluation criterion	Minimum frequency
Significant performance check*	Pressure regulators	- No fluctuations in the adjusted pressure. - Significant pressure values within pre-set limits.	Monthly
	Gas flow slam-shut type safety devices (external position indicator)	Fully open position.	
	Stand-by monitor (external position indicator)	Fully open position.	
Visual inspection of the equipment outside condition	All	- No visible damage. - External surface protection as per UNI 9571-1:2012.	Half-yearly

Tab. 9.53

* These checks may be carried out remotely if there is a remote control system capable of analysing the significant performance of the equipment and of sending alerts/alarms when pre-set thresholds are reached.

9.3 - ROUTINE MAINTENANCE

9.3.1 - GENERAL SAFETY WARNINGS

HAZARD!

- Put the equipment in a safe condition (close the downstream shut-off valve and then the upstream one, and drain the line completely);
- ensure that the pressure upstream and downstream of the equipment is “0”.

NOTICE!

Before installing new sealing elements (o-rings, diaphragm, etc.), they must be checked for integrity.

9.3.2 - REPLACEMENT FREQUENCY FOR COMPONENTS SUBJECT TO WEAR

NOTICE!

The following provisions shall apply to equipment components only.

The non-metallic parts of the equipment concerned are divided into the following two categories:

Preventive maintenance work

Category 1	Parts subject to wear and/or abrasion, where: - wear and tear means the normal degradation of a part after prolonged use under normal operating conditions; - abrasion is the mechanical action on the surface of the affected part resulting from the passage of gas under normal operating conditions.
Category 2	Parts subject to aging only, including parts that also require lubrication and/or cleaning.

Tab. 9.54

NOTICE!

Check, within the minimum frequency specified in “Tab. 9.55”, the available components for wear/abrasion/aging.

Category	Part description	Evaluation criterion	Minimum replacement frequency
1	Valve seat sealing rings and non-metallic plugs	Pressure regulators	6 years
		Safety devices	
		Pressure safety system equipment	
1	Non-metallic parts with internal sealing function of valve seats and accessories of individual equipment	Pilots	6 years
		Pre-regulators	
		Accelerators	
		Any others	
1	Non-metallic parts with a sealing function between parts, at least one of which is in motion under normal working/operating conditions	Pressure regulators	6 years
		Gas flow slam-shut type safety devices	
		Relief devices with discharge to atmosphere	
1	Non-metallic parts with sealing function involved in disassembly operations during maintenance	Equipment subject to maintenance	6 years
2	Non-metallic parts providing feedback (sensing elements) of the controlled pressure of safety equipment	Safety equipment and/or accessories	6 years
2	Non-metallic parts with sealing and performance functions (diaphragms) of equipment	Pressure regulators and accessories	6 years
		Gas flow slam-shut type safety devices	6 years
		Relief device with discharge to atmosphere	6 years

Category	Part description	Evaluation criterion	Minimum replacement frequency
2	Non-metallic parts of equipment with an internal sealing function: under normal operating conditions during maintenance	Relief valves	6 years
		Regulation lines disconnection equipment	If there are proven leaks
2	Non-metallic parts with a static sealing function only	Various equipment	If there are proven leaks
2	Lubricating parts	Shut-off valves	Yearly
		Other equipment	Yearly
2	Filter elements	Filters	As needed

Tab. 9.55

9.4 - ROUTINE MAINTENANCE PROCEDURES

Routine maintenance	
Operator qualification	Operator qualification
PPE required	      WARNING! The PPE listed in this table is related to the risk associated with the equipment. For the PPE required to protect against risks associated with the workplace, installation or operating conditions, please refer to: - the regulations in force in the country of installation; <u>any information provided by the Safety Manager at the installation facility.</u>
Equipment required	Please refer to the chapter “7 - Commissioning/maintenance equipment”.

Tab. 9.56

9.4.1 - TIGHTENING TORQUES

9.4.1.1 - TIGHTENING TORQUES FOR DIVAL 600 REGULATOR

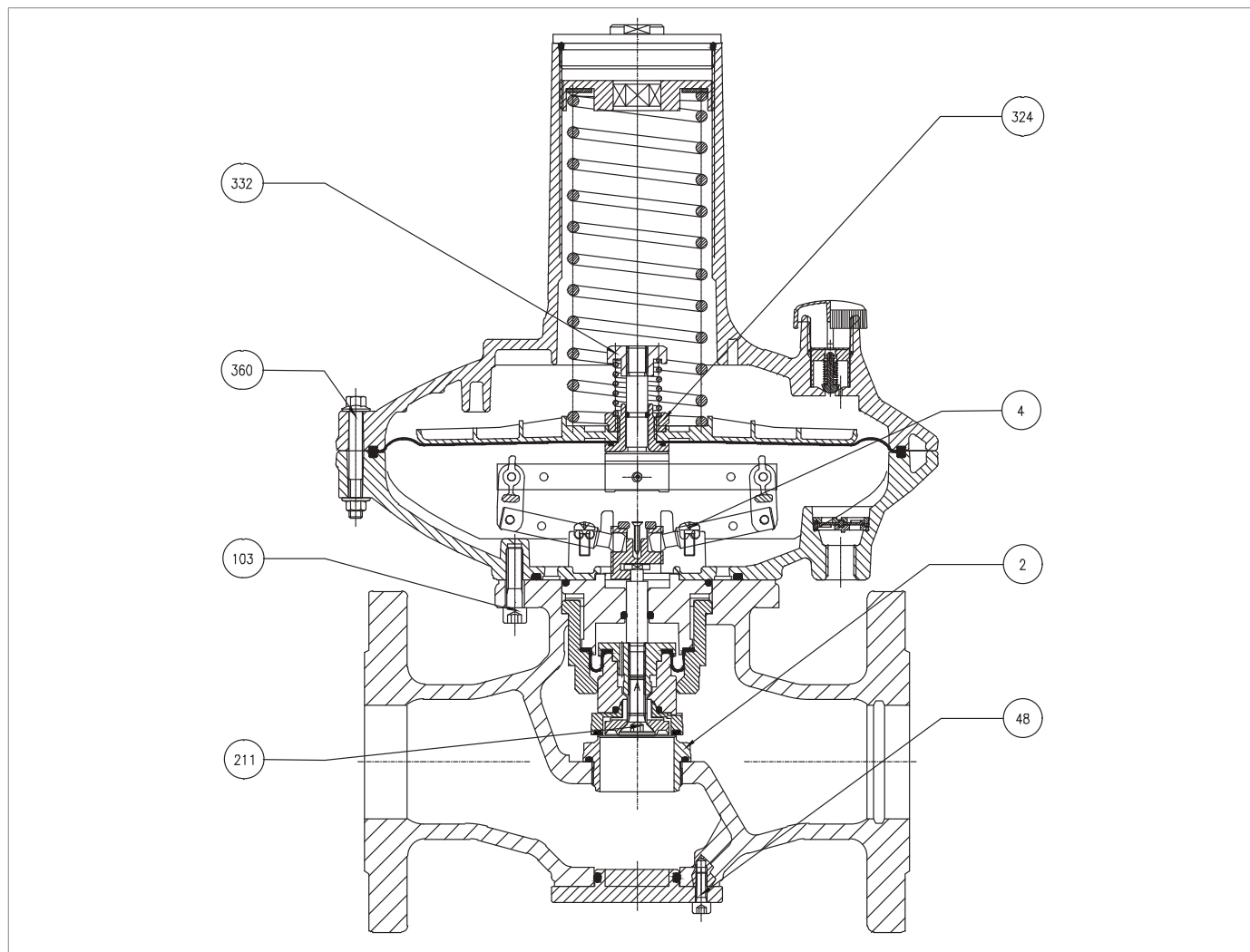


Fig. 9.24. Tightening torques DIVAL 600

DIVAL 600 1" ; 1" ½; 2" - BP, MP, TR HEADS

Pos.	Description	Torque (Nm)	Torque (ft - lb)
2	Valve seat	50	36
4	Screw M5x14 UNI 5931	4	2
48	Screw M5x12 UNI 8111	4	2
103	Screw M8X25 UNI 5931	14	10
211	Screw M8x25 UNI 5933	14	10
324	Fixing nut	14	10
332	Fixing nut	4	2
360	Screw M6x50 DIN 6921	9	6

Tab. 9.57

9.4.1.2 - TIGHTENING TORQUES OF REGULATOR WITH MONITOR FUNCTION

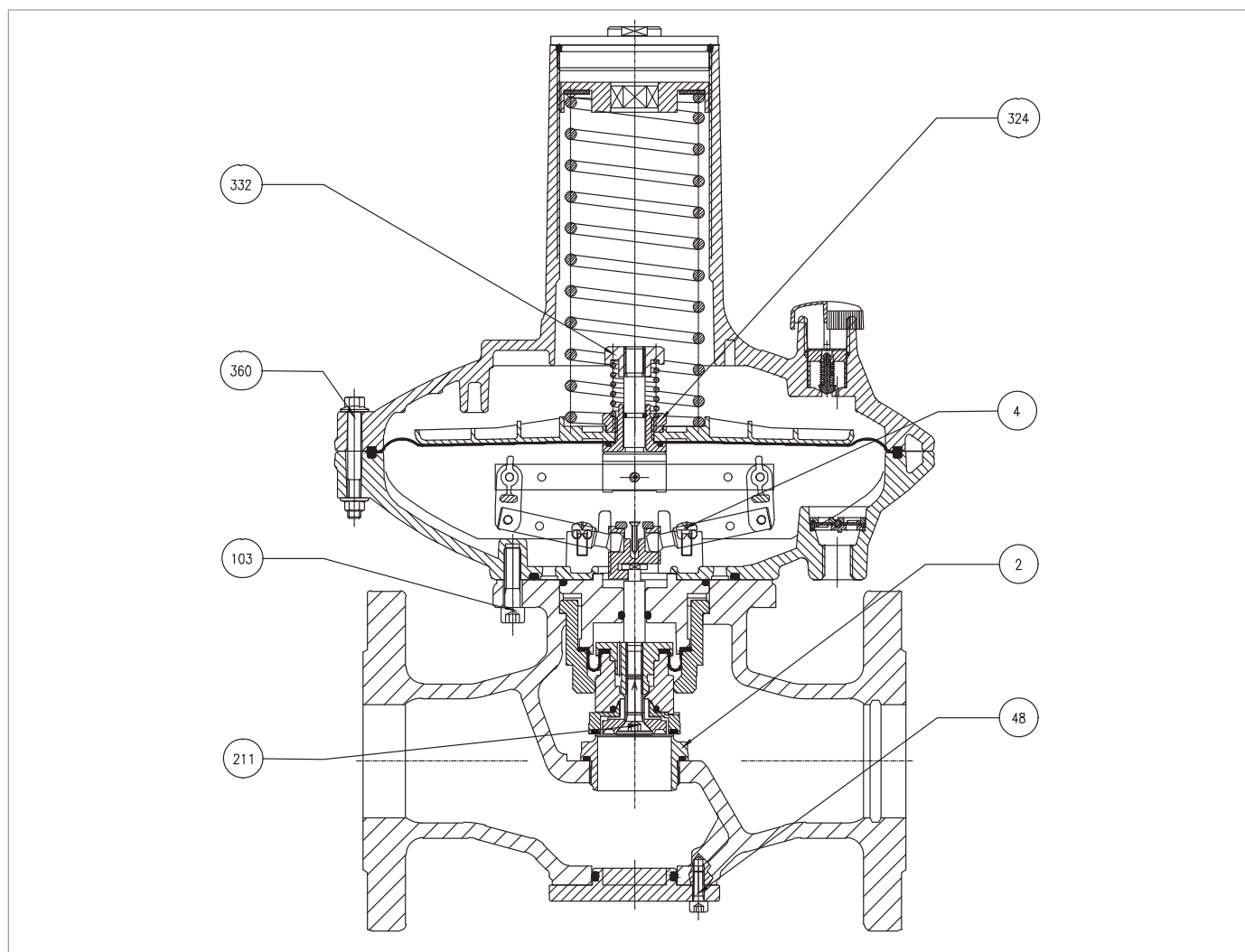


Fig. 9.25. Regulator with monitor function tightening torques

DIVAL 600 WITH MONITOR FUNCTION

Pos.	Description	Torque (Nm)	Torque (ft - lb)
2	Valve seat	50	36
4	Screw M5x14 UNI 5931	4	2
48	Screw M5x12 UNI 8111	4	2
103	Screw M8X25 UNI 5931	14	10
211	Screw M8x25 UNI 5933	14	10
324	Fixing nut	14	10
332	Fixing nut	4	2
360	Screw M6x50 DIN 6921	9	6

Tab. 9.58

9.4.1.3 - TIGHTENING TORQUE LA SLAM-SHUT VALVE

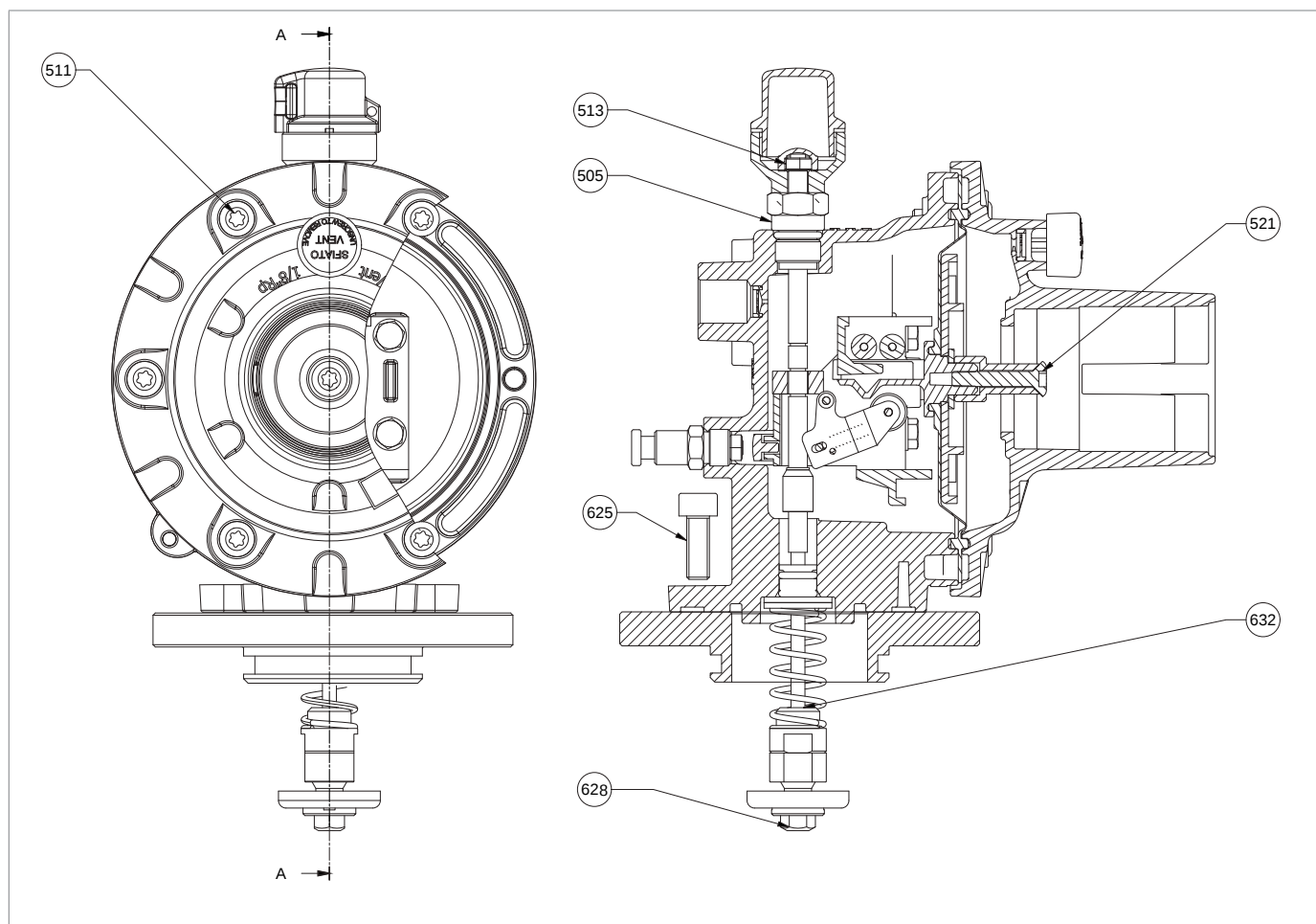


Fig. 9.26. LA Slam-shut valve tightening torques

LA 1" ; 1" ½; 2 - BP, MP, TR HEADS

Pos.	Description	Torque (Nm)	Torque (ft - lb)
505	Rod guide	4.5	3.3
511	TSC M5X20 TORX screw	2.5	1.8
513	M4 nut UNI 5588	1.5	0.8
521	TGS M4X27 TORX screw	4.5	3.3
625	Screw M5X14	4	3
628	Locking nut	1.5	1.1
632	Bushing	1.5	1.1

Tab. 9.59

9.4.3 - REPLACING ELEMENTS SUBJECT TO WEAR AND ABRASION

9.4.3.1 - INITIAL OPERATIONS

ATTENTION!

Before carrying out any work, it is important to ensure that the line on which the regulator is installed has been shut off upstream and downstream, and discharged.

ATTENTION!

During assembly, make sure to tighten the screws as per the tables (tightening torques), according to the size for which maintenance is being carried out.

Proceed as follows:

Step	Action
1	Unscrew the conical fittings to disconnect all power sockets and sensing lines of the regulator.

Tab. 9.60

9.4.3.2 - CROSS DIAGRAM FOR TIGHTENING SCREWS

To tighten the screws, when required by the maintenance procedure, refer to the following diagram:

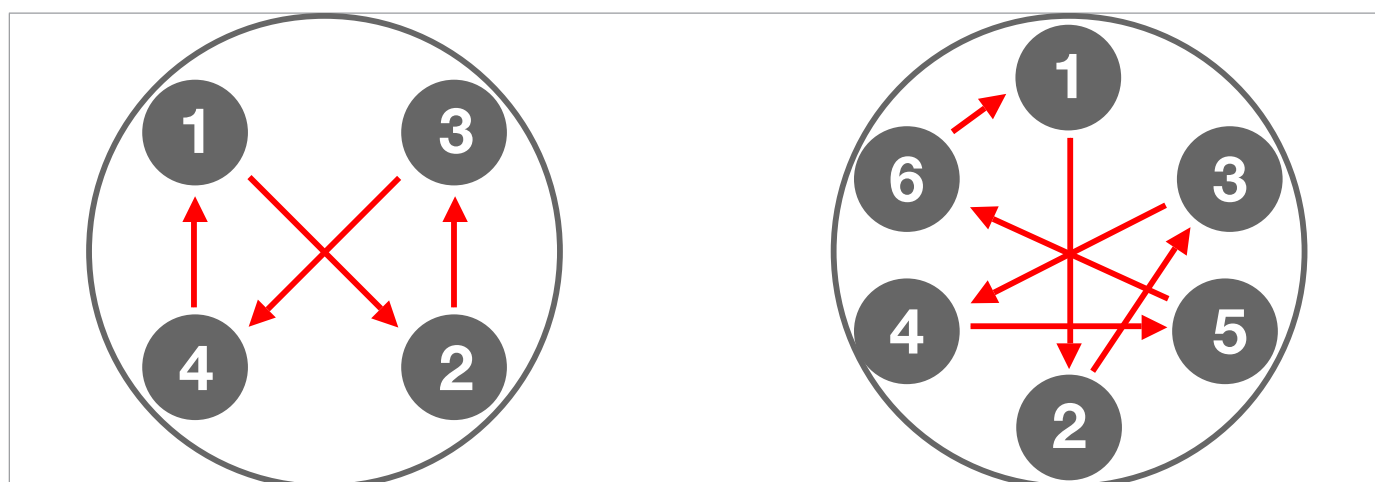


Fig. 9.27. Cross diagram

9.4.5 - REGULATOR DIVAL 600

9.4.5.1 - DIVAL 600 REGULATOR 1" BP/MP HEAD

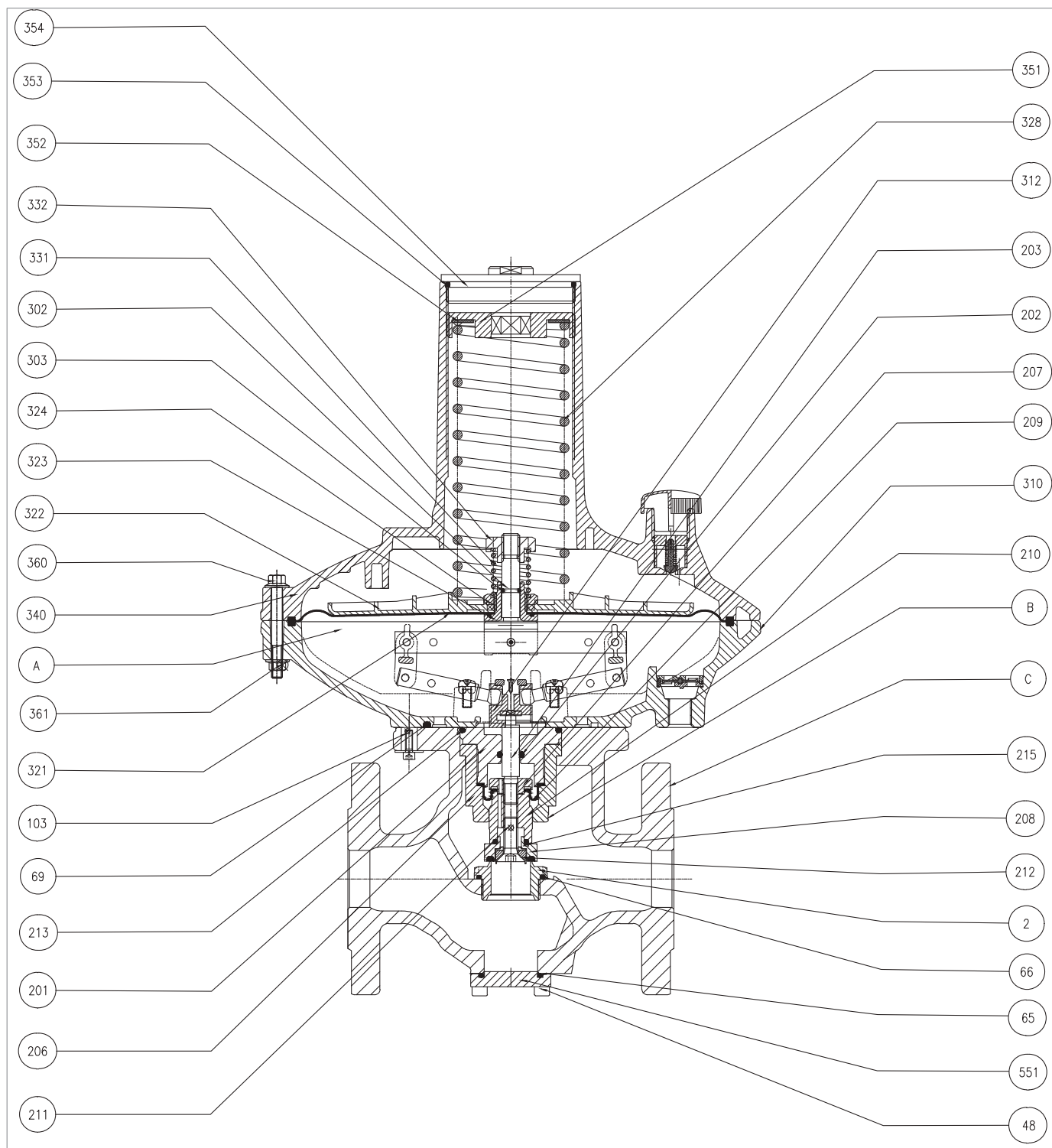
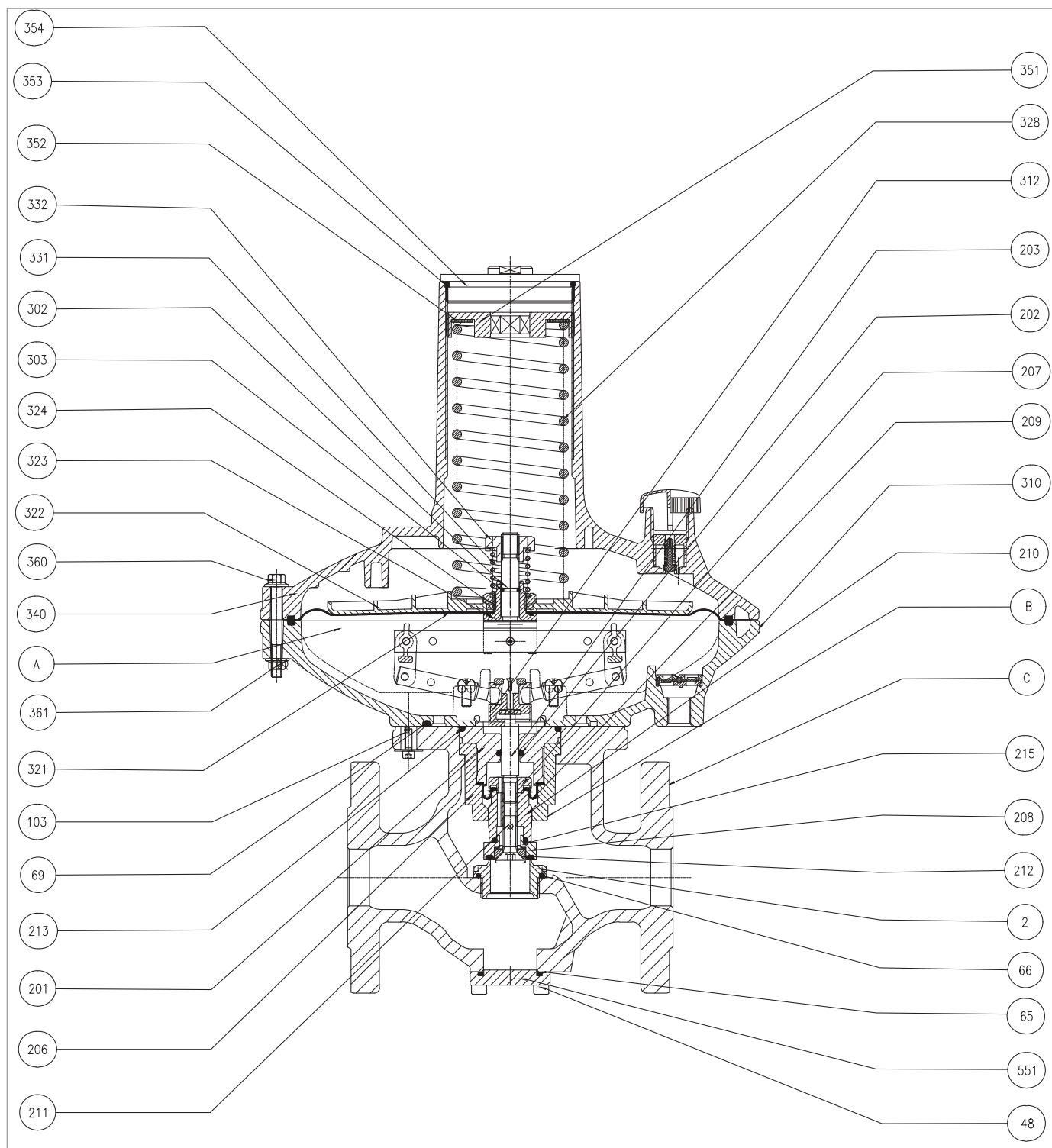


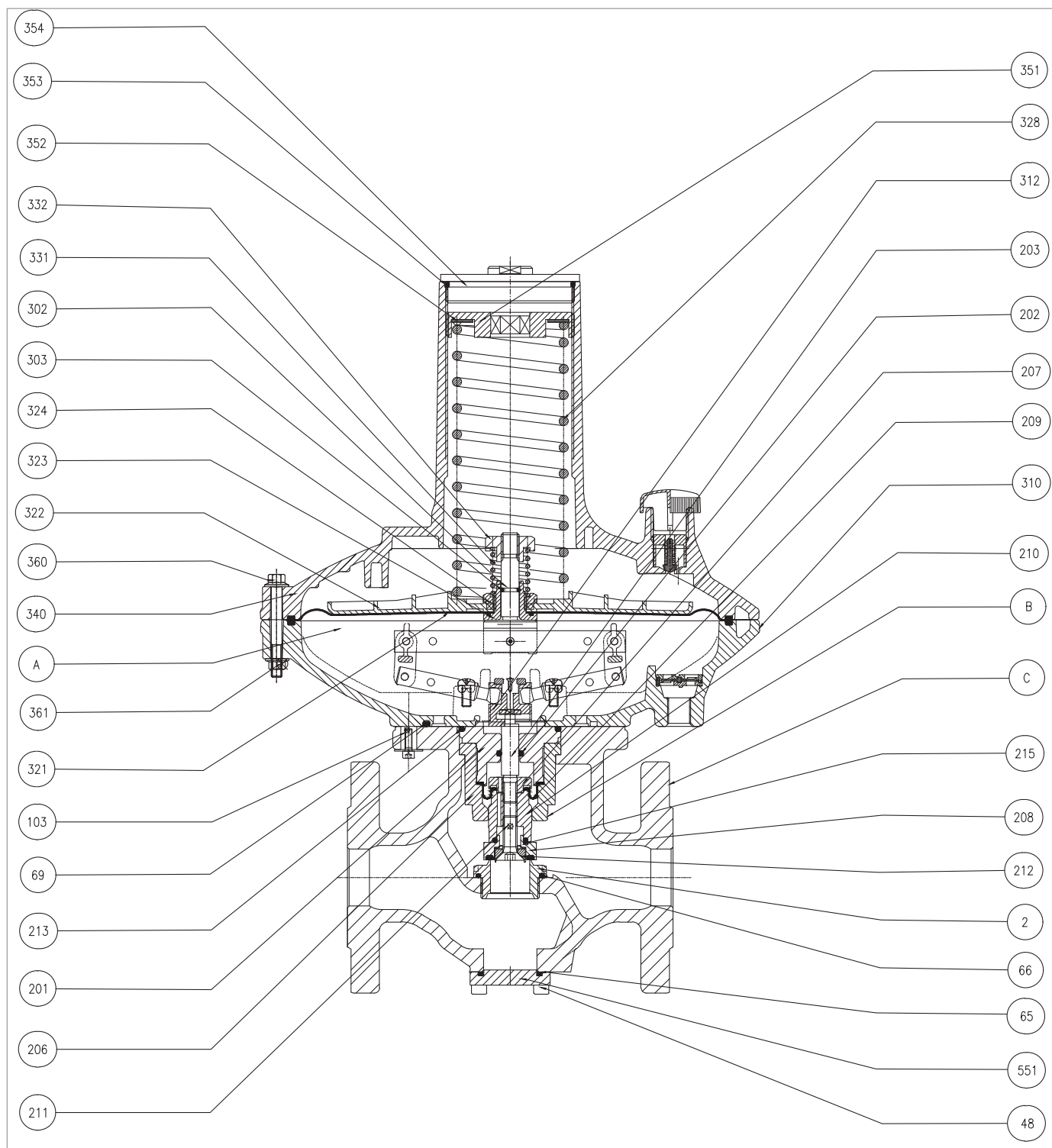
Fig. 9.28. DIVAL 600 Regulator 1", BP/MP head

Step	Action
1	Unscrew and remove the cap (354).
2	Remove the O-ring (353) and replace it, taking care to lubricate it with synthetic grease.  NOTICE! Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.
3	Unscrew and remove the ring nut (351) together with the washer (352).  NOTICE! Turn the ring nut anti-clockwise.
4	Remove the regulation spring (328).
5	Unscrew and remove the screws (103) securing the control head (A) to the body (C).
6	Remove the control head (A) together with the balancing block (B).
7	Separate the balancing block (B) from the control head (A).  NOTICE! Follow the direction of the arrow on the lower cover (310).
8	Unscrew and remove the nuts (361).
9	Undo and remove the screws (360).
10	Remove the upper cover (340) from the lower cover (310).
11	Unscrew and remove the locking nut (332).
12	Pull out the spring (331) of the relief valve.
13	Pull the diaphragm support assembly (321, 322, 323, 324) off the rod (302).
14	Remove the O-ring (303) and replace it, taking care to lubricate it with synthetic grease.  NOTICE! Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.
15	Unscrew and remove the locking nut (324).  NOTICE! During this phase, keep the diaphragm support (323) still.
16	Remove the diaphragm protection disc (322).
17	Remove and replace the main diaphragm (321).
18	Fit the diaphragm protection disc (322).
19	Insert and secure the locking nut (324), according to the tightening torques: • "Tab. 9.57"  NOTICE! During this phase, keep the diaphragm support (323) still.
20	Position the diaphragm support assembly (321, 322, 323, 324, 390) in the rod (302).
21	Insert the spring (331) of the relief valve.
22	Insert and fix the nut (332) according to the following tightening torques: • "Tab. 9.57"
23	Place the upper cover (340) on the lower cover (310).  NOTICE! Follow the orientation of the anti-pumping valve when positioning the cover.



DIVAL 600 Regulator 1", BP/MP head

Step	Action
24	Insert and fix the screws (360) together with the nuts (361) according to the following tightening torques: • “Tab. 9.57”  NOTICE! Screw in as shown in the diagram at “9.4.3.2 - Cross diagram for tightening screws”.
25	Unscrew and remove the fixing screw (211).  NOTICE! During this phase, keep the rod (203) still.
26	Remove the plug (208) together with the O-ring (215) and plug ring (212).
27	Remove the O-ring (215) and replace it, taking care to lubricate it with synthetic grease.  NOTICE! Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.
28	Pull out the bushing (206).
29	Remove the spacer (210).
30	Remove the diaphragm (209).
31	Remove the O-ring (213) and replace it, taking care to lubricate it with synthetic grease.  NOTICE! Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.
32	Slide off the diaphragm protection disc (207).  NOTICE! During this phase, keep the rod (203) still.
33	Slide the rod guide (201) off the rod (203).
34	Remove the O-ring (202) and replace it, taking care to lubricate it with synthetic grease.  NOTICE! Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.
35	Insert the rod guide (201) into the rod (203).
36	Put the diaphragm protection disc (207) back in place.  NOTICE! During this phase, keep the rod (203) still.
37	Insert the diaphragm (209) onto the diaphragm protection disc (207).
38	Place the spacer (210) in the rod (203).
39	Position the O-ring (215) and the bushing (206).
40	Insert plug (208), plug ring (212) on spacer (210).
41	Insert and fix the screw (211) according to the tightening torques: • “Tab. 9.57”  NOTICE! When fastening, align the mechanical stop on the surface.
42	Unscrew and remove the valve seat (2) together with the O-ring (66).



DIVAL 600 Regulator 1", BP/MP head

Step	Action
43	Remove the O-ring (66) and replace it, taking care to lubricate it with synthetic grease.  NOTICE! Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.
44	Insert the valve seat (2) together with the O-ring (66) into the body (C) according to the tightening torques: • “Tab. 9.57”
45	Remove the O-ring (69) and replace it, taking care to lubricate it with synthetic grease.  NOTICE! Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.
46	Position the balancing block (B) in the control head (A).  NOTICE! In the opposite direction indicated by the arrow on the lower cover (310).
47	Position the control head (A) and the balancing block (B) in the housing (C).
48	Insert and fasten the screws (103) that secure the control head (A) to the body (C) according to the tightening torques: • “Tab. 9.57”  NOTICE! Screw in as shown in the diagram at “9.4.3.2 - Cross diagram for tightening screws”.
49	Insert the regulation spring (328).
50	Insert and secure the adjustment ring nut (351) together with the washer (352).
51	Insert and secure the plug (354) together with the O-ring (353).
52	Undo and remove the lower screws (48).
53	Remove the flange (551) together with the O-ring (65).
54	Remove the O-ring (65) and replace it, taking care to lubricate it with synthetic grease.  NOTICE! Before inserting the replacement O-rings, clean the retaining slots with a cleaning solution.
55	Position the flange (551) together with the O-ring (65).
56	Insert and fix the lower screws (48) according to the following tightening torques: • “Tab. 9.57”  NOTICE! Screw in as shown in the diagram at “9.4.3.2 - Cross diagram for tightening screws”.

Tab. 9.61

WARNING!

Ensure that all parts have been fitted correctly.

9.4.5.2 - DIVAL 600 REGULATOR 1" TR HEAD

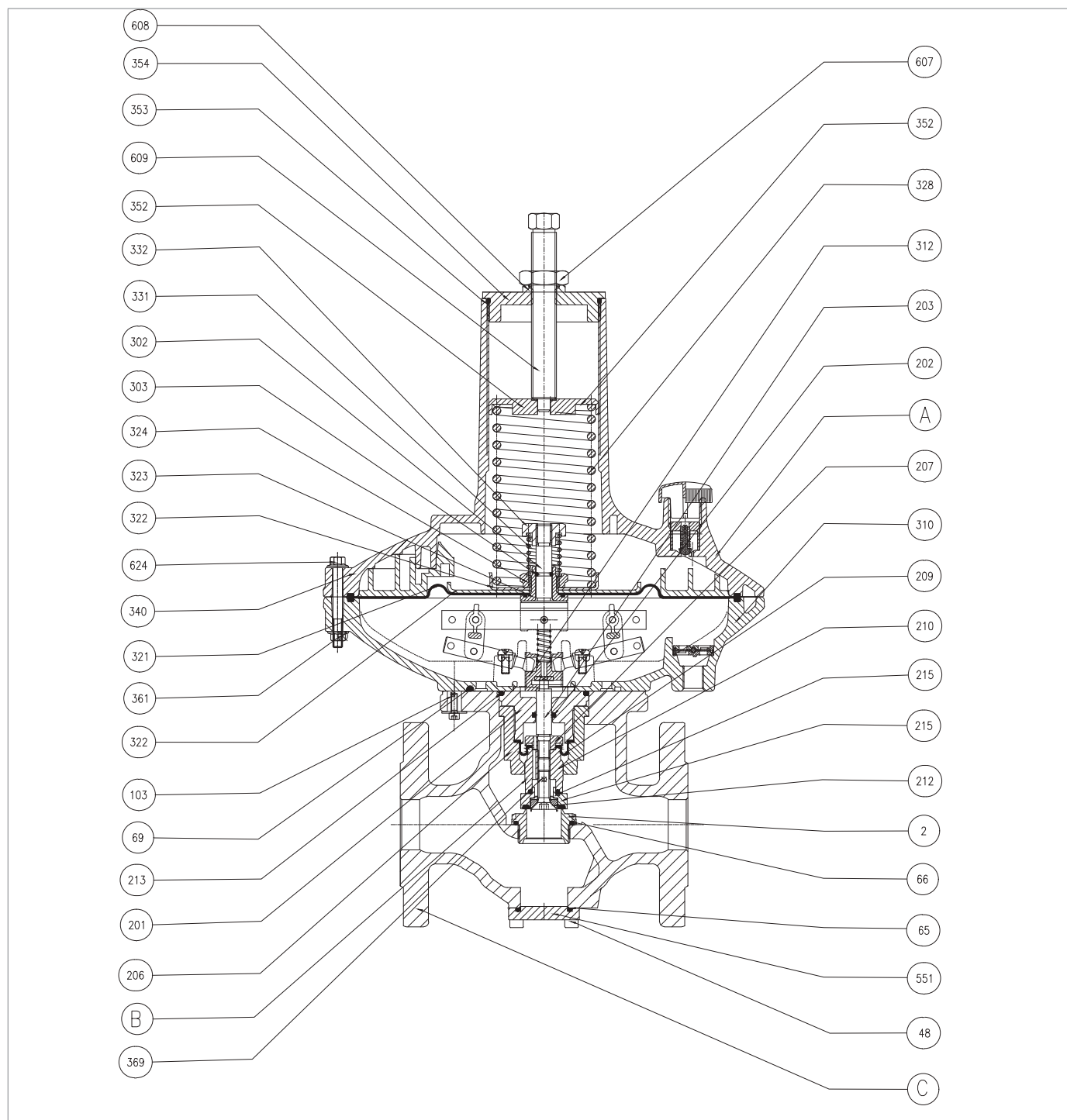
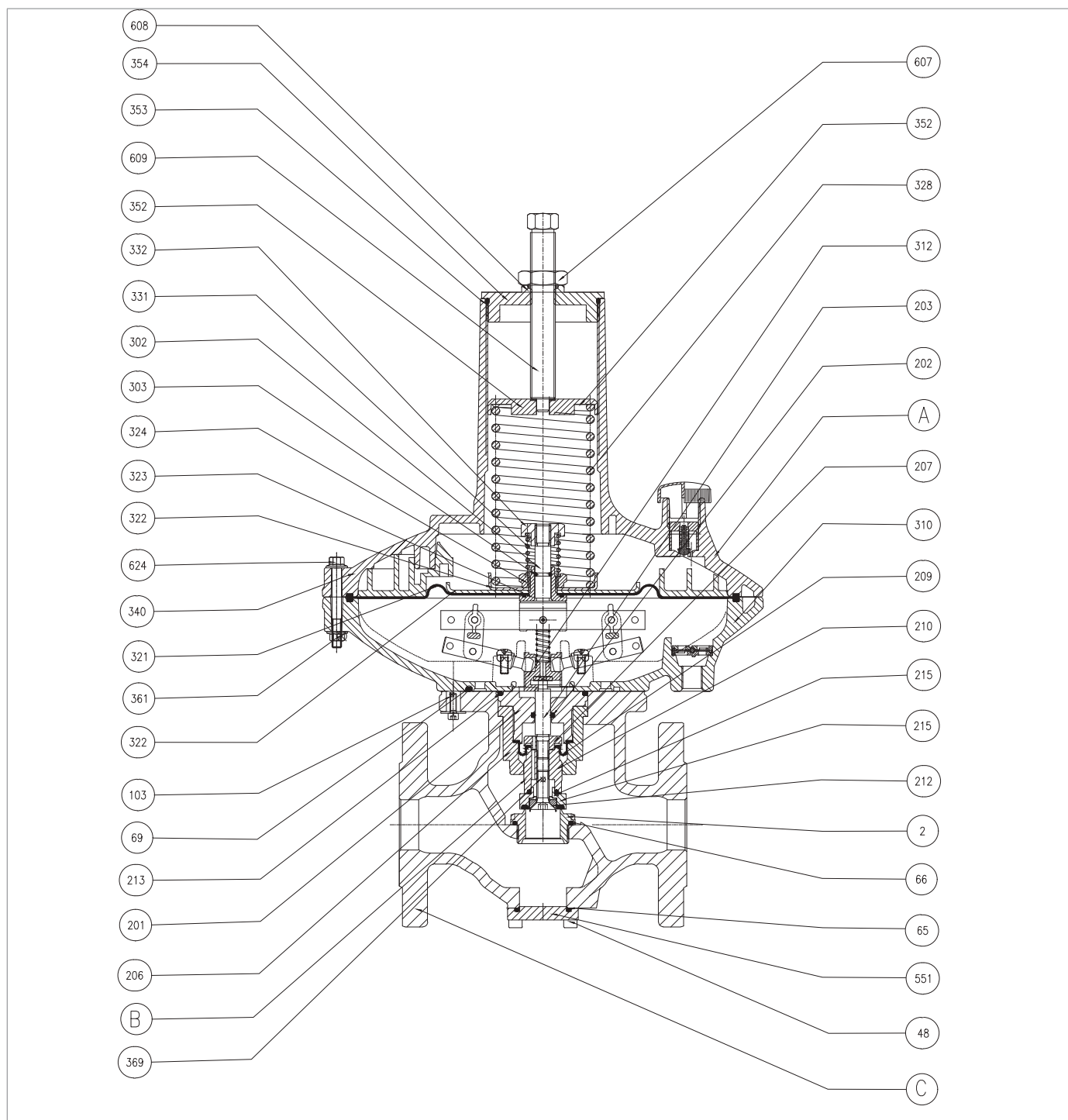


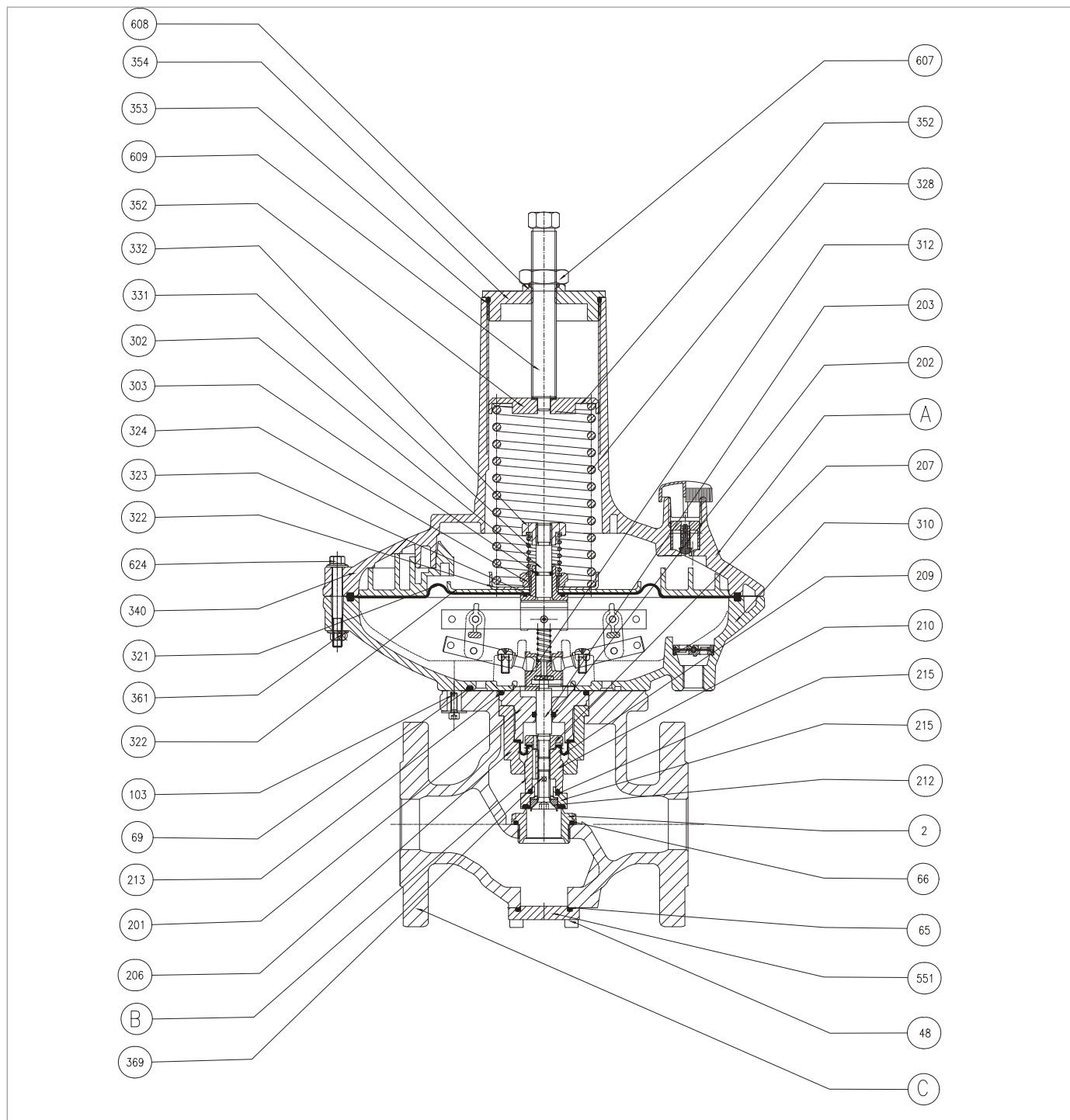
Fig. 9.29. DIVAL 600 Regulator 1", TR head

Step	Action
1	Unscrew and remove the adjusting screw (609) together with the locking nut (607).
2	Remove and replace the O-rings (353, 608), taking care to lubricate them with synthetic grease.  NOTICE! Before inserting the replacement O-rings, clean the retaining slots with a cleaning solution.
3	Remove the spring guide disc (610) together with the washer (352).
4	Remove the regulation spring (328).
5	Unscrew and remove the screws (103) securing the control head (A) to the body (C).
6	Remove the control head (A) together with the balancing block (B).
7	Separate the balancing block (B) from the control head (A).  NOTICE! Follow the indication of the arrow.
8	Unscrew and remove the nuts (361).
9	Undo and remove the screws (360).
10	Remove the upper cover (340) from the lower cover (310).
11	Unscrew and remove the locking nut (332).
12	Pull out the spring (331) of the relief valve.
13	Pull the diaphragm support assembly (321, 322, 323, 324) off the rod (302).
14	Remove the O-ring (303) and replace it, taking care to lubricate it with synthetic grease.  NOTICE! Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.
15	Unscrew and remove the locking nut (324).  NOTICE! During this phase, keep the diaphragm support (323) still.
16	Remove the diaphragm protection disc (322).
17	Remove and replace the main diaphragm (321).
18	Fit the diaphragm protection disc (322).
19	Insert and secure the locking nut (324), according to the tightening torques: • "Tab. 9.57"  NOTICE! During this phase, keep the diaphragm support (323) still.
20	Position the diaphragm support assembly (321, 322, 323, 324, 390) in the rod (302).
21	Insert the spring (331) of the relief valve.
22	Insert and fix the nut (332) according to the following tightening torques: • "Tab. 9.57"
23	Place the upper cover (340) on the lower cover (310).  NOTICE! Follow the orientation of the anti-pumping valve when positioning the cover.



DIVAL 600 Regulator 1", TR head

Step	Action
24	Insert and fix the screws (360) together with the nuts (361) according to the following tightening torques: • “Tab. 9.57” ! NOTICE! Screw in as shown in the diagram at “9.4.3.2 - Cross diagram for tightening screws”.
25	Unscrew and remove the fixing screw (211). ! NOTICE! During this phase, keep the rod (203) still.
26	Remove the plug (208) together with the O-ring (215) and plug ring (212).
27	Remove the O-ring (215) and replace it, taking care to lubricate it with synthetic grease. ! NOTICE! Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.
28	Remove the bushing (206).
29	Unscrew the spacer (210)
30	Remove the diaphragm (209).
31	Remove the O-ring (213) and replace it, taking care to lubricate it with synthetic grease. ! NOTICE! Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.
32	Unscrew the diaphragm protection disc (207). ! NOTICE! During this phase, keep the rod (203) still.
33	Slide the rod guide (201) off the rod (203).
34	Remove the O-ring (202) and replace it, taking care to lubricate it with synthetic grease. ! NOTICE! Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.
35	Insert the rod guide (201) into the rod (203).
36	Put the diaphragm protection disc (207) back in place. ! NOTICE! During this phase, keep the rod (203) still.
37	Insert the diaphragm (209) onto the diaphragm protection disc (207).
38	Insert and secure the spacer (210).
39	Position the O-ring (215) and the bushing (206).
40	Insert plug (208), plug ring (212) on spacer (210).
41	Insert and fix the screw (211) according to the tightening torques: • “Tab. 9.57” ! NOTICE! When fastening, align the mechanical stop on the surface.
42	Unscrew and remove the valve seat (2) together with the O-ring (66).



DIVAL 600 Regulator 1", TR head

Step	Action
43	Remove the O-ring (66) and replace it, taking care to lubricate it with synthetic grease.  NOTICE! Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.
44	Insert the valve seat (2) together with the O-ring (66) into the body (C) according to the tightening torques: • “Tab. 9.57”
45	Remove the O-ring (69) and replace it, taking care to lubricate it with synthetic grease.  NOTICE! Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.
46	Position the balancing block (B) in the control head (A).  NOTICE! In the opposite direction indicated by the arrow on the lower cover (310).
47	Position the control head (A) and the balancing block (B) in the housing (C).
48	Insert and fasten the screws (103) that secure the control head (A) to the body (C) according to the tightening torques: • “Tab. 9.57”  NOTICE! Screw in as shown in the diagram at “9.4.3.2 - Cross diagram for tightening screws”.
49	Insert the regulation spring (328).
50	Insert the spring guide disc (610) together with washer (352).
51	Insert and secure the cap (354) together with the O-rings (353, 608).
52	Insert the adjusting screw (609) together with the locking nut (607) into the cap (354).
53	Undo and remove the lower screws (48).
54	Remove the flange (551) together with the O-ring (65).
55	Remove the O-ring (65) and replace it, taking care to lubricate it with synthetic grease.  NOTICE! Before inserting the replacement O-rings, clean the retaining slots with a cleaning solution.
56	Position the flange (551) together with the O-ring (65).
57	Insert and fix the lower screws (48) according to the following tightening torques: • “Tab. 9.57”  NOTICE! Screw in as shown in the diagram at “9.4.3.2 - Cross diagram for tightening screws”.

Tab. 9.62

WARNING!

Ensure that all parts have been fitted correctly.

9.4.5.3 - DIVAL 600 REGULATOR 1" ½ 2" BP/MP HEAD

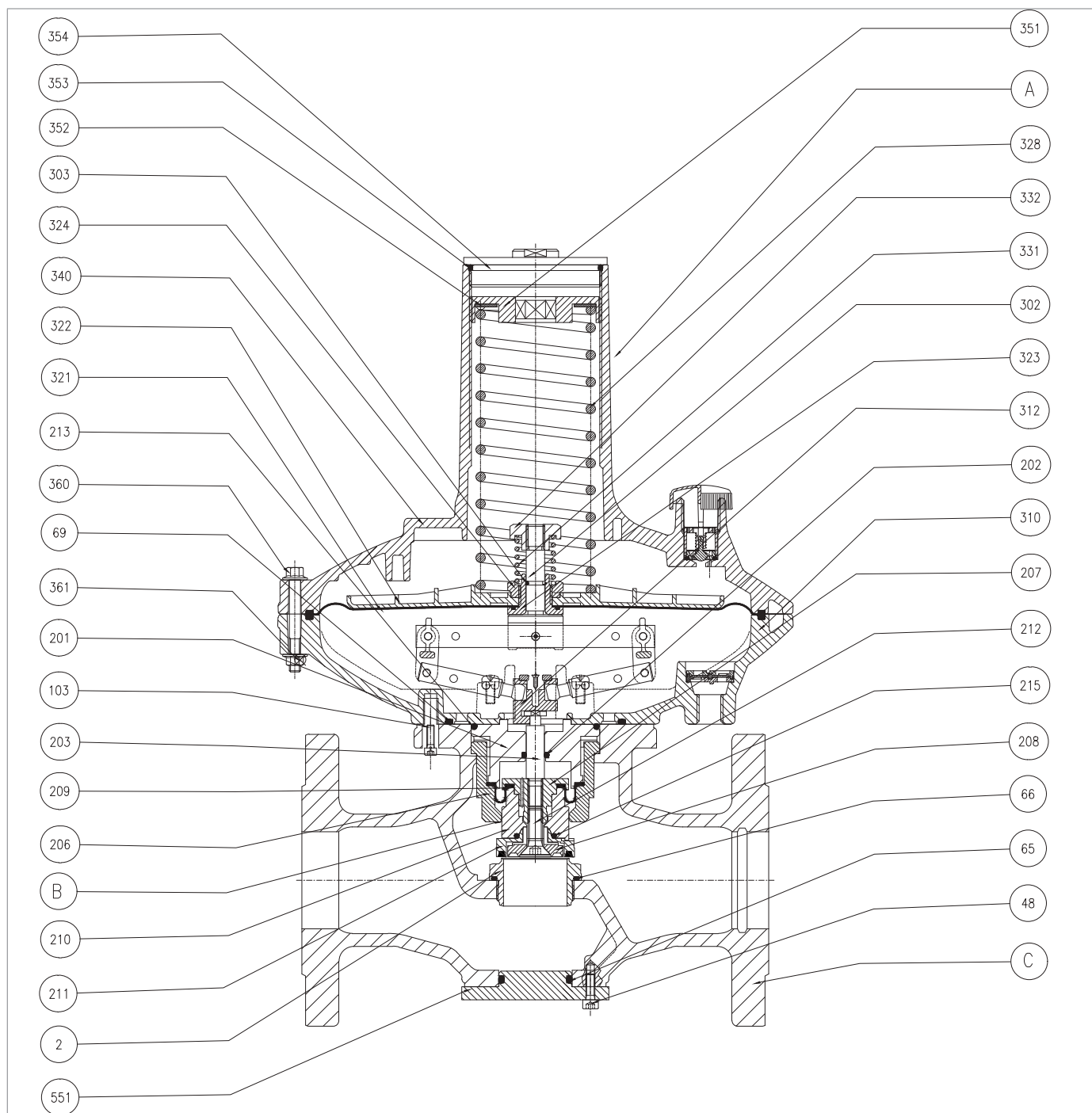
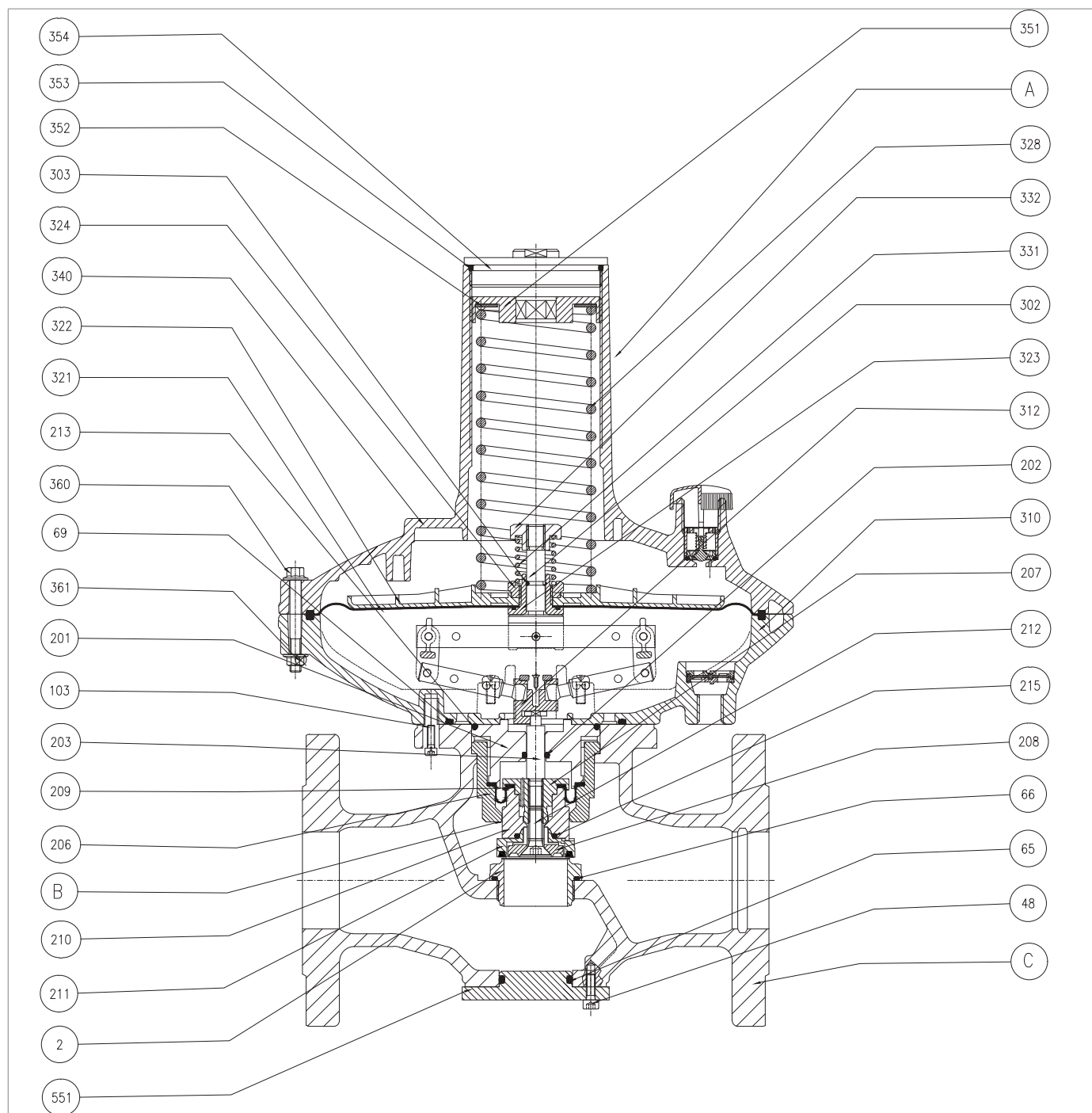


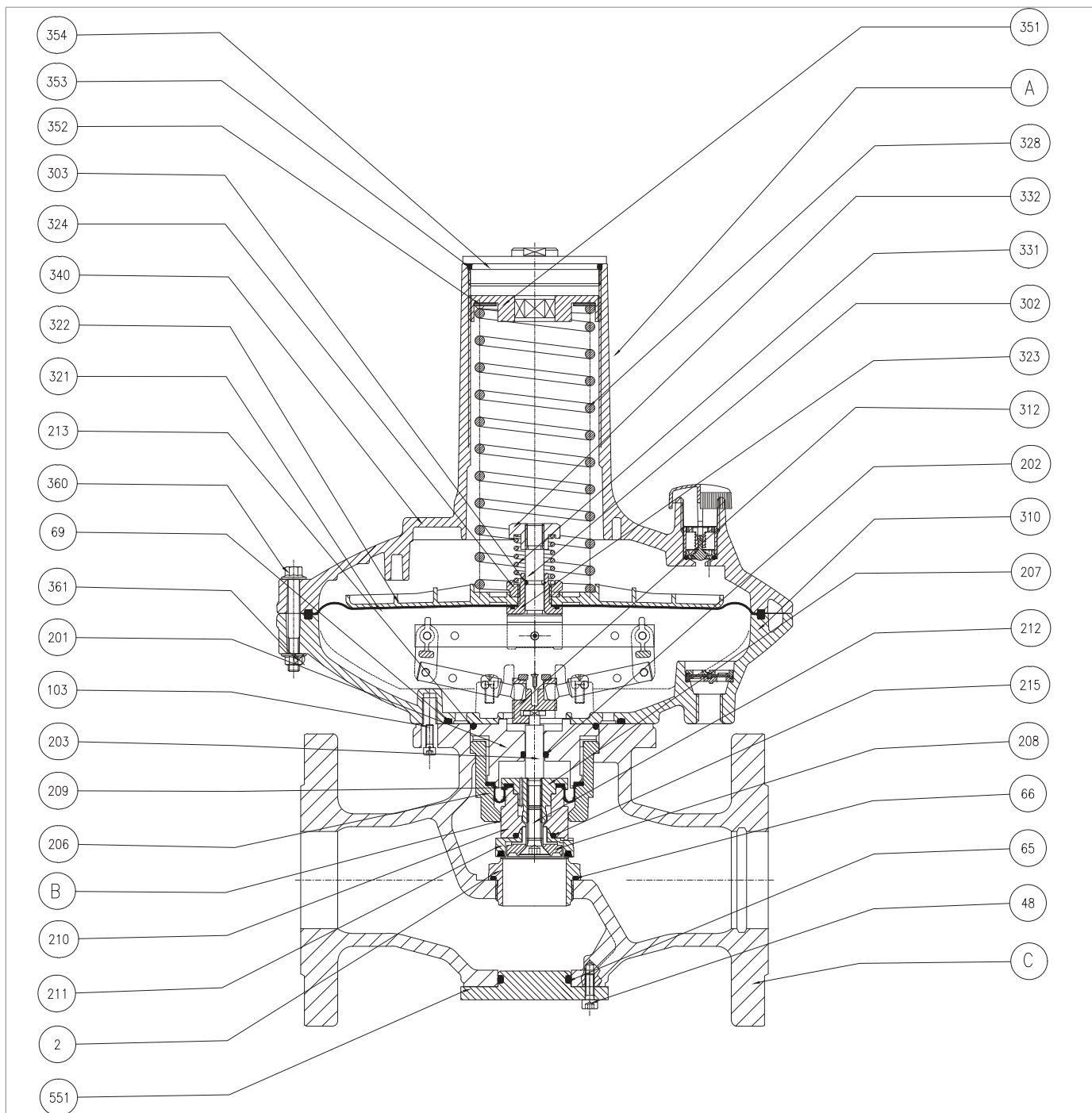
Fig. 9.30. DIVAL 600 regulator 1" ½ 2", BP/MP head

Step	Action
1	Unscrew and remove the cap (354).
2	Remove the O-ring (353) and replace it, taking care to lubricate it with synthetic grease.  NOTICE! Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.
3	Unscrew and remove the ring nut (351) together with the washer (352).  NOTICE! Turn the ring nut anti-clockwise.
4	Remove the regulation spring (328).
5	Unscrew and remove the screws (103) securing the control head (A) to the body (C).
6	Remove the control head (A) together with the balancing block (B).
7	Separate the balancing block (B) from the control head (A).  NOTICE! Follow the indication of the arrow.
8	Unscrew and remove the nuts (361).
9	Undo and remove the screws (360).
10	Remove the upper cover (340) from the lower cover (310).
11	Unscrew and remove the locking nut (332).
12	Pull out the spring (331) of the relief valve.
13	Pull the diaphragm support assembly (321, 322, 323, 324) off the rod (302).
14	Remove the O-ring (303) and replace it, taking care to lubricate it with synthetic grease.  NOTICE! Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.
15	Unscrew and remove the locking nut (324).  NOTICE! During this phase, keep the diaphragm support (323) still.
16	Remove the diaphragm protection disc (322).
17	Remove and replace the main diaphragm (321).
18	Fit the diaphragm protection disc (322).
19	Insert and secure the locking nut (324), according to the tightening torques: • "Tab. 9.57"  NOTICE! During this phase, keep the diaphragm support (323) still.
20	Position the diaphragm support assembly (321, 322, 323, 324, 390) in the rod (302).
21	Insert the spring (331) of the relief valve.
22	Insert and fix the nut (332) according to the following tightening torques: • "Tab. 9.57"
23	Place the upper cover (340) on the lower cover (310).  NOTICE! Follow the orientation of the anti-pumping valve when positioning the cover.



DIVAL 600 regulator 1" ½ 2", BP/MP head

Step	Action
24	Insert and fix the screws (360) together with the nuts (361) according to the following tightening torques: • “Tab. 9.57” ! NOTICE! Screw in as shown in the diagram at “9.4.3.2 - Cross diagram for tightening screws”.
25	Unscrew and remove the fixing screw (211). ! NOTICE! During this phase, keep the rod (203) still.
26	Remove the plug (208) together with the O-ring (215) and plug ring (212).
27	Remove the O-ring (215) and replace it, taking care to lubricate it with synthetic grease. ! NOTICE! Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.
28	Remove the bushing (206), spacer (210) and diaphragm (209).
29	Remove the O-ring (213) and replace it, taking care to lubricate it with synthetic grease. ! NOTICE! Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.
30	Unscrew the diaphragm protection disc (207). ! NOTICE! During this phase, keep the rod (203) still.
31	Slide the rod guide (201) off the rod (203).
32	Remove the O-ring (202) and replace it, taking care to lubricate it with synthetic grease. ! NOTICE! Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.
33	Insert the rod guide (201) into the rod (203).
34	Put the diaphragm protection disc (207) back in place. ! NOTICE! During this phase, keep the rod (203) still.
35	Insert the diaphragm (209) onto the diaphragm protection disc (207).
36	Position the plug support (210) together with the O-ring (215) and the bushing (206).
37	Insert plug (208), plug ring (212) on spacer (210).
38	Insert and fix the screw (211) according to the tightening torques: • “Tab. 9.57” ! NOTICE! When fastening, align the mechanical stop on the surface.
39	Remove the O-ring (66) and replace it, taking care to lubricate it with synthetic grease. ! NOTICE! Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.
40	Unscrew and remove the valve seat (2) together with the O-ring (66).



DIVAL 600 regulator 1" ½ 2", BP/MP head

Step	Action
41	Insert the valve seat (2) together with the O-ring (66) into the body (C) according to the tightening torques: • “Tab. 9.57”
42	Remove the O-ring (69) and replace it, taking care to lubricate it with synthetic grease.  NOTICE! Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.
43	Position the balancing block (B) in the control head (A).  NOTICE! In the opposite direction indicated by the arrow on the lower cover (310).
44	Position the control head (A) and the balancing block (B) in the housing (C).
45	Insert and fasten the screws (103) that secure the control head (A) to the body (C) according to the tightening torques: • “Tab. 9.57”  NOTICE! Screw in as shown in the diagram at “9.4.3.2 - Cross diagram for tightening screws”.
46	Insert the regulation spring (328).
47	Insert and secure the adjustment ring nut (351) together with the washer (352).
48	Insert and secure the plug (354) together with the O-ring (353).
49	Undo and remove the lower screws (48).
50	Remove the flange (551) together with the O-ring (65).
51	Remove the O-ring (65) and replace it, taking care to lubricate it with synthetic grease.  NOTICE! Before inserting the replacement O-rings, clean the retaining slots with a cleaning solution.
52	Position the flange (551) together with the O-ring (65).
53	Insert and fix the lower screws (48) according to the following tightening torques: • “Tab. 9.57”  NOTICE! Screw in as shown in the diagram at “9.4.3.2 - Cross diagram for tightening screws”.

Tab. 9.63

WARNING!

Ensure that all parts have been fitted correctly.

9.4.5.4 - DIVAL 600 REGULATOR 1" ½ ; 2" TR HEAD

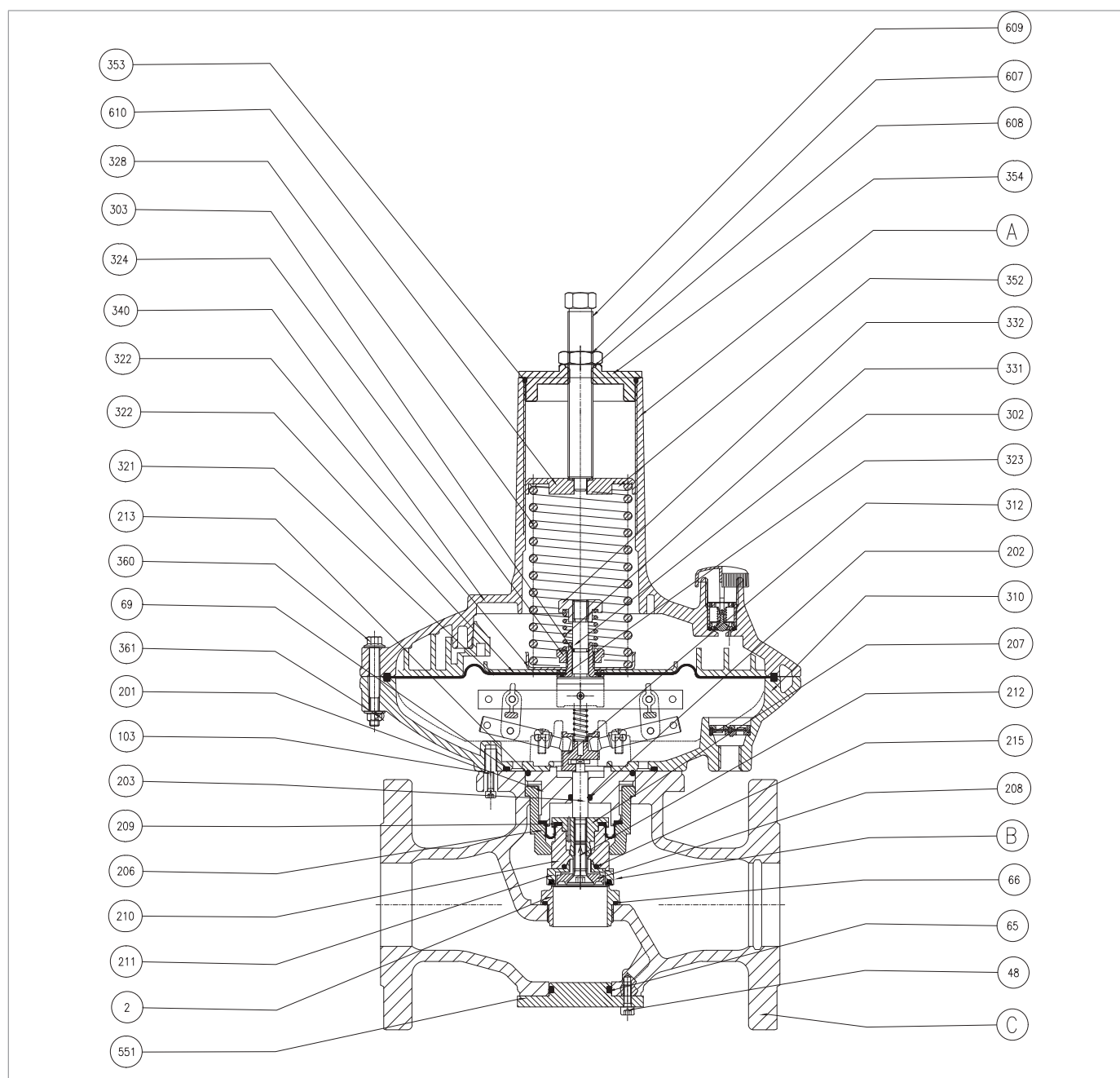
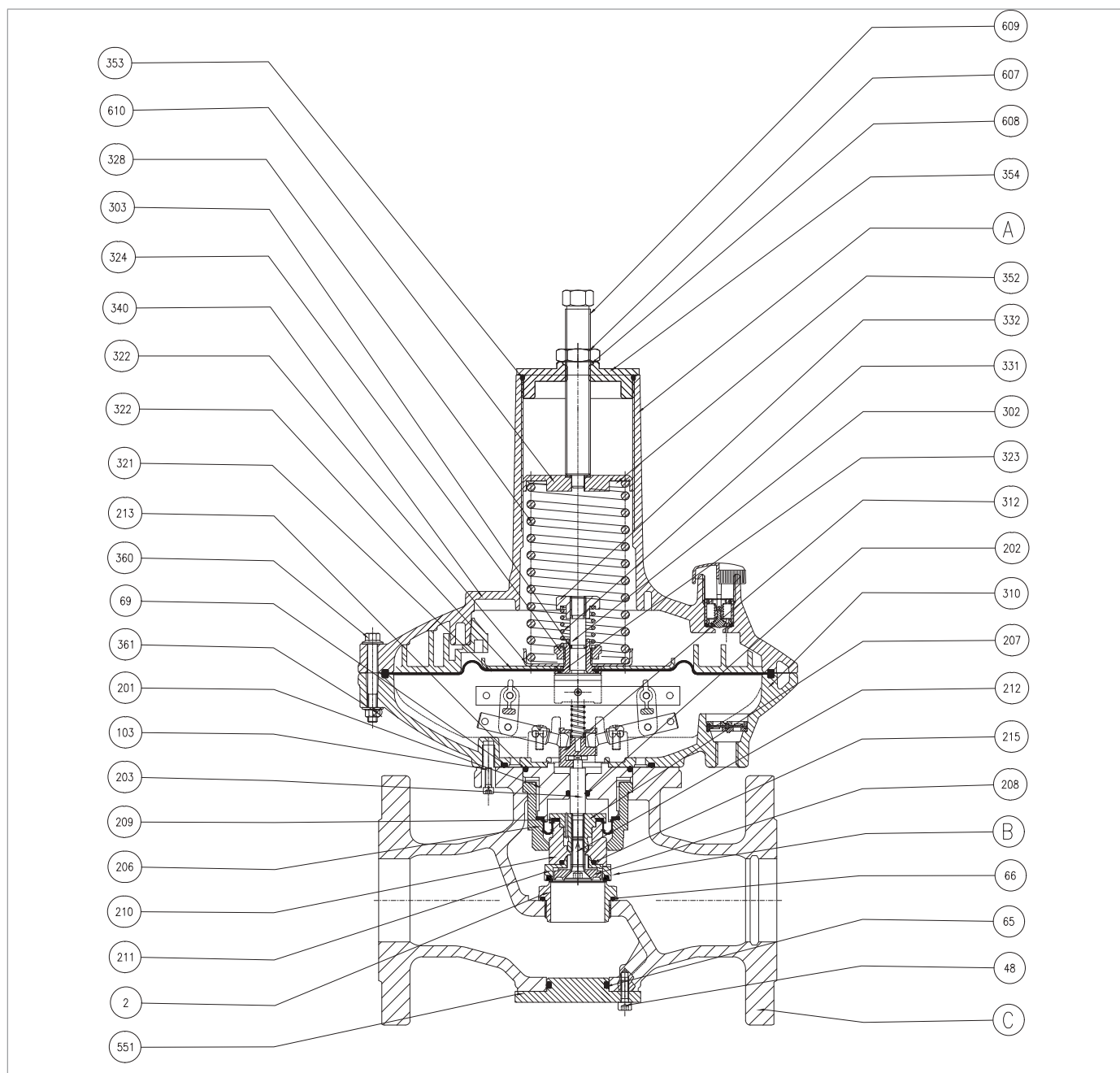


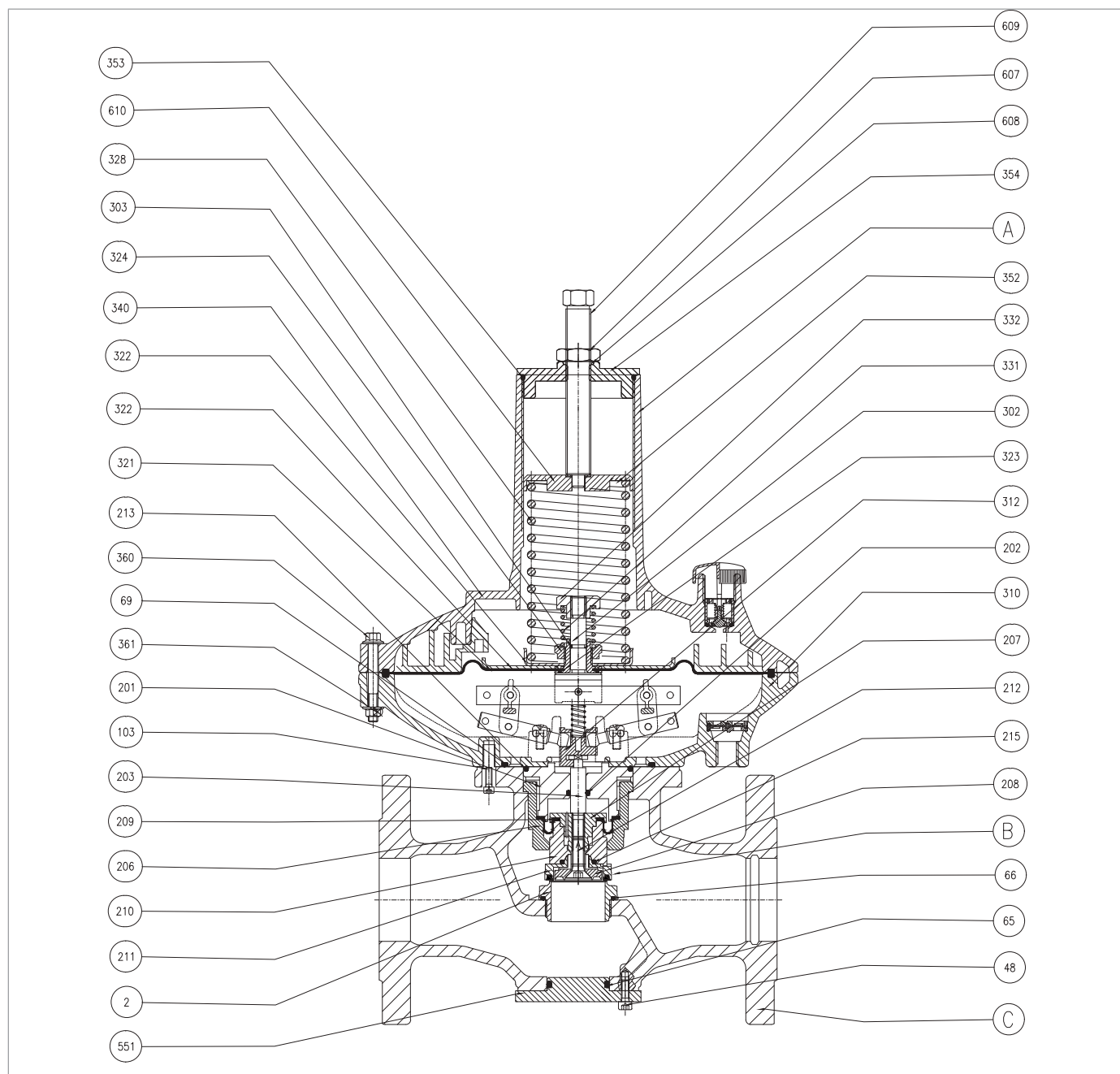
Fig. 9.31. DIVAL 600 Regulator 1" ½ ; 2", TR head

Step	Action
1	Unscrew and remove the adjusting screw (609) together with the locking nut (607).
2	Remove and replace the O-rings (353, 608), taking care to lubricate them with synthetic grease. ! NOTICE! Before inserting the replacement O-rings, clean the retaining slots with a cleaning solution.
3	Remove the spring guide disc (610) together with the washer (352).
4	Remove the regulation spring (328).
5	Unscrew and remove the screws (103) securing the control head (A) to the body (C).
6	Remove the control head (A) together with the balancing block (B).
7	Separate the balancing block (B) from the control head (A). ! NOTICE! Follow the indication of the arrow.
8	Unscrew and remove the nuts (361).
9	Undo and remove the screws (360).
10	Remove the upper cover (340) from the lower cover (310).
11	Unscrew and remove the locking nut (332).
12	Pull out the spring (331) of the relief valve.
13	Pull the diaphragm support assembly (321, 322, 323, 324) off the rod (302).
14	Remove the O-ring (303) and replace it, taking care to lubricate it with synthetic grease. ! NOTICE! Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.
15	Unscrew and remove the locking nut (324). ! NOTICE! During this phase, keep the diaphragm support (323) still.
16	Remove the diaphragm protection disc (322).
17	Remove and replace the main diaphragm (321).
18	Fit the diaphragm protection disc (322).
19	Insert and secure the locking nut (324), according to the tightening torques: • "Tab. 9.58" ! NOTICE! During this phase, keep the diaphragm support (323) still.
20	Position the diaphragm support assembly (321, 322, 323, 324, 390) in the rod (302).
21	Insert the spring (331) of the relief valve.
22	Insert and fix the nut (332) according to the following tightening torques: • "Tab. 9.58"
23	Place the upper cover (340) on the lower cover (310). ! NOTICE! Follow the orientation of the anti-pumping valve when positioning the cover.



DIVAL 600 Regulator 1" 1/2 ; 2", TR head

Step	Action
24	Insert and fix the screws (360) together with the nuts (361) according to the following tightening torques: • “Tab. 9.58” ! NOTICE! Screw in as shown in the diagram at “9.4.3.2 - Cross diagram for tightening screws”.
25	Unscrew and remove the fixing screw (211). ! NOTICE! During this phase, keep the rod (203) still.
26	Remove the plug (208) together with the O-ring (215) and plug ring (212).
27	Remove the O-ring (215) and replace it, taking care to lubricate it with synthetic grease. ! NOTICE! Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.
28	Remove the bushing (206), spacer (210) and diaphragm (209).
29	Remove the O-ring (213) and replace it, taking care to lubricate it with synthetic grease. ! NOTICE! Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.
30	Unscrew the diaphragm protection disc (207). ! NOTICE! During this phase, keep the rod (203) still.
31	Slide the rod guide (201) off the rod (203).
32	Remove the O-ring (202) and replace it, taking care to lubricate it with synthetic grease. ! NOTICE! Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.
33	Insert the rod guide (201) into the rod (203).
34	Put the diaphragm protection disc (207) back in place. ! NOTICE! During this phase, keep the rod (203) still.
35	Insert the diaphragm (209) onto the diaphragm protection disc (207).
36	Position the plug support (210) together with the O-ring (215) and the bushing (206).
37	Insert plug (208), plug ring (212) on spacer (210).
38	Insert and fix the screw (211) according to the tightening torques: • “Tab. 9.58” ! NOTICE! When fastening, align the mechanical stop on the surface.
39	Unscrew and remove the valve seat (2) together with the O-ring (66).
40	Remove the O-ring (66) and replace it, taking care to lubricate it with synthetic grease. ! NOTICE! Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.



DIVAL 600 Regulator 1" 1/2 ; 2", TR head

Step	Action
41	Insert the valve seat (2) together with the O-ring (66) into the body (C) according to the tightening torques: • “Tab. 9.58”
42	Remove the O-ring (69) and replace it, taking care to lubricate it with synthetic grease.  NOTICE! Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.
43	Position the balancing block (B) in the control head (A).  NOTICE! In the opposite direction indicated by the arrow on the lower cover (310).
44	Position the control head (A) and the balancing block (B) in the housing (C).
45	Insert and fasten the screws (103) that secure the control head (A) to the body (C) according to the tightening torques: • “Tab. 9.58”  NOTICE! Screw in as shown in the diagram at “9.4.3.2 - Cross diagram for tightening screws”.
46	Insert the regulation spring (328).
47	Insert the spring guide disc (610) together with washer (352).
48	Insert and secure the cap (354) together with the O-rings (353, 608).
49	Insert the adjusting screw (609) together with the locking nut (607) into the cap (354).
50	Undo and remove the lower screws (48).
51	Remove the flange (551) together with the O-ring (65).
52	Remove the O-ring (65) and replace it, taking care to lubricate it with synthetic grease.  NOTICE! Before inserting the replacement O-rings, clean the retaining slots with a cleaning solution.
53	Position the flange (551) together with the O-ring (65).
54	Insert and fix the lower screws (48) according to the following tightening torques: • “Tab. 9.58”  NOTICE! Screw in as shown in the diagram at “9.4.3.2 - Cross diagram for tightening screws”.

Tab. 9.64

WARNING!

Ensure that all parts have been fitted correctly.

9.4.8 - LA SLAM-SHUT VALVE

9.4.8.1 - LA SLAM-SHUT VALVE 1" - 2" BP/MP

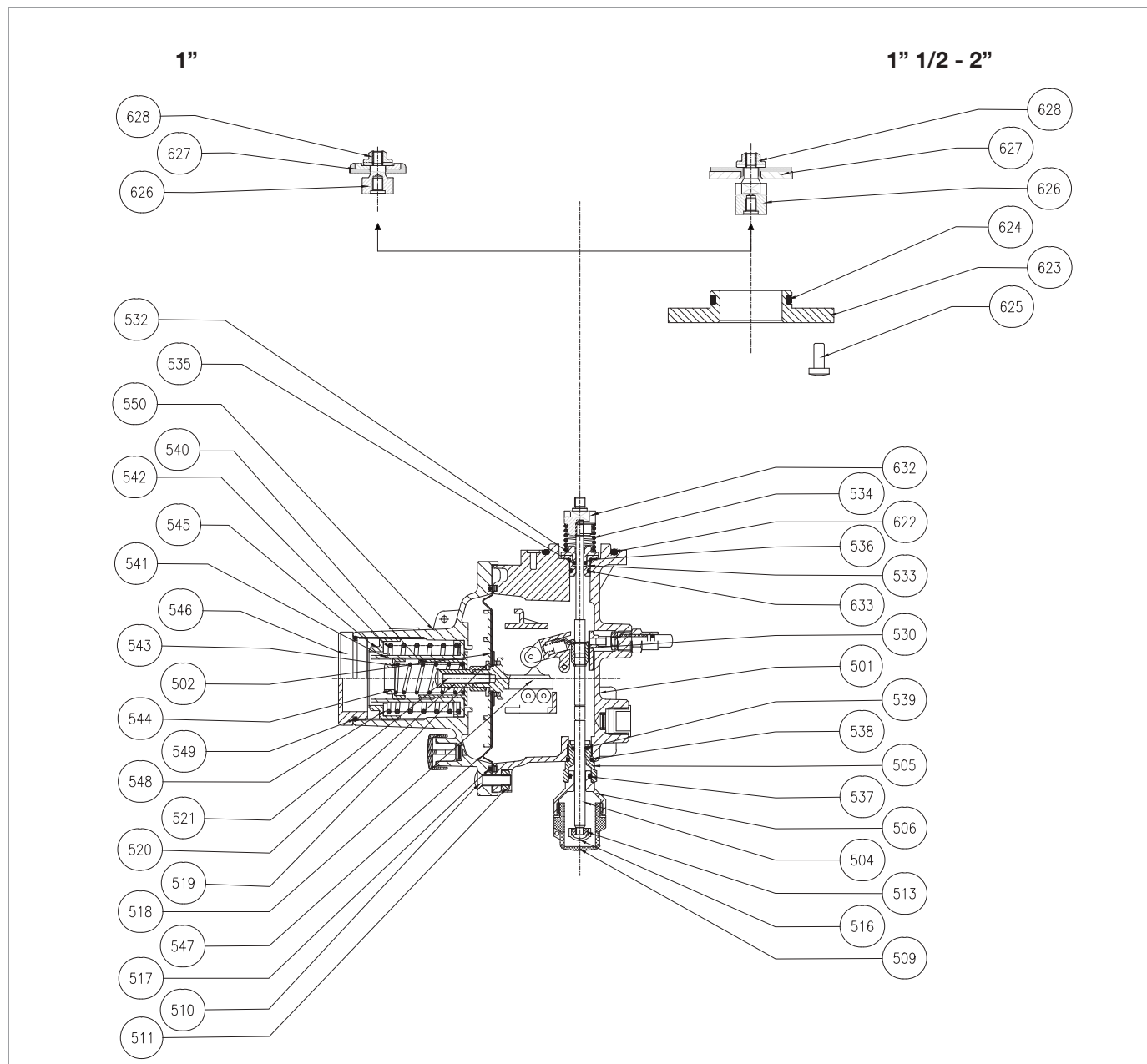
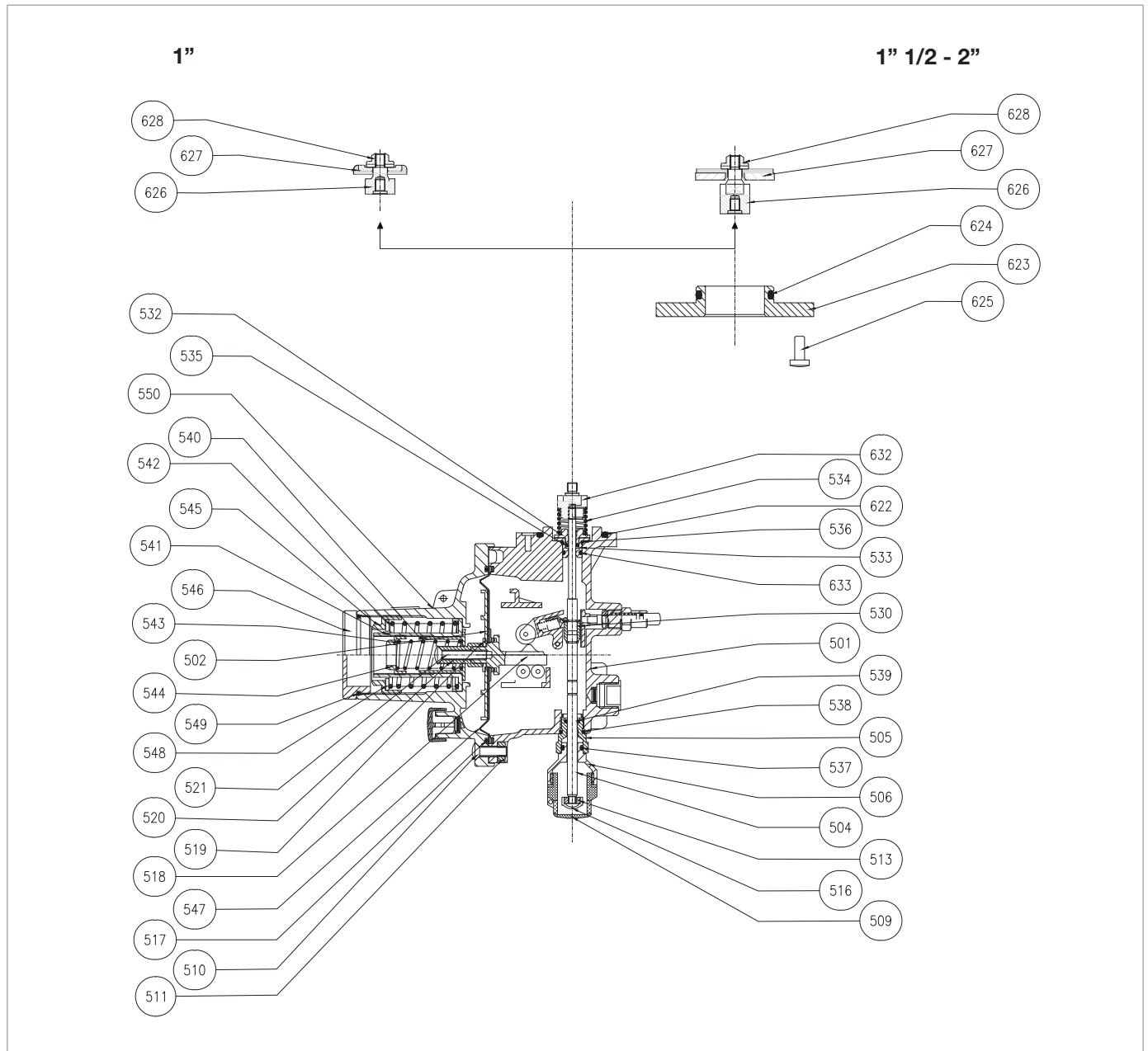


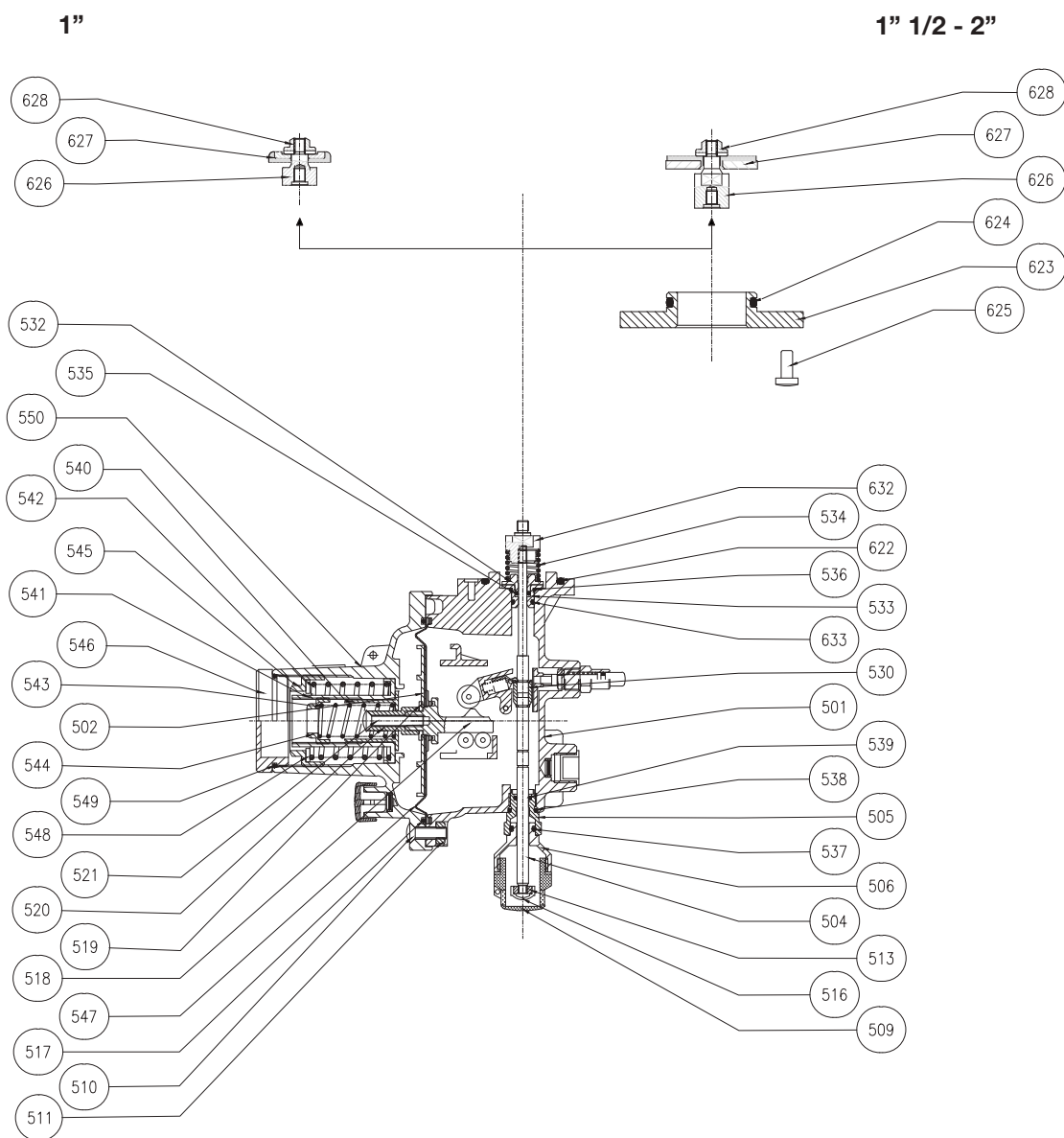
Fig. 9.32. LA slam-shut valve 1" - 2" BP/MP

Step	Action
1	 ATTENTION! Before servicing, remove the LA slam-shut valve by unscrewing the screws (48) on the regulator (refer to “9.4.5 - Regulator DIVAL 600”).
2	Unscrew and remove the locking nut (628).  NOTICE! During this step, hold the spacer (626) in place.
3	Remove and replace the plug (627).
4	APPLICABLE TO SIZES 1" ½ - 2" ONLY Undo and remove the screws (625).
5	APPLICABLE TO SIZES 1" ½ - 2" ONLY Remove the flange (623).
6	APPLICABLE TO SIZES 1" ½ - 2" ONLY Remove the O-ring (624) and replace it, taking care to lubricate it with synthetic grease.  NOTICE! Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.
7	Remove the O-ring (622) and replace it, taking care to lubricate it with synthetic grease.  NOTICE! Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.
8	Unscrew and remove the cap (509).
9	Remove the cap (516).
10	Unscrew and remove the locking nut (513).
11	Remove the bushing (632).  NOTICE! During this phase, keep the rod (504) still.
12	Slide the rod (504) in the direction of the reset.
13	Pull off the knob (506).  NOTICE! During this phase, keep the rod (504) still.
14	Unscrew and remove the rod guide (505) together with the O-rings (537, 538, 539).
15	Replace the O-rings (537, 538, 539), lubricating them with synthetic grease.  NOTICE! Before inserting the replacement O-rings, clean the retaining slots with a cleaning solution.
16	Insert the rod guide (505) together with the O-rings (537, 538, 539), according to the tightening torques: • “Tab. 9.59”
17	Insert and secure the knob (506).
18	Remove the washer (532).
19	Remove the rod guide (533) together with O-rings (535, 536, 633).



LA slam-shut valve 1" - 2" BP/MP

Step	Action
20	Remove and replace the O-rings (535, 536, 633), taking care to lubricate them with synthetic grease. ! NOTICE! Before inserting the replacement O-rings, clean the retaining slots with a cleaning solution.
21	Insert the rod guide (533) together with the O-rings (535, 536, 633).
22	Fit the washer (532).
23	Insert the rod (504) in the opposite direction to the reset.
24	Place the spring (534) in the washer (532). ! NOTICE! During this phase, keep the rod (504) still.
25	Position and secure the bushing (632) on the rod (504).
26	Position and secure the spacer (626). ! NOTICE! During this step, hold the bushing (632) in place.
27	Fit the plug (627).
28	Insert and secure the locking nut (628) according to the tightening torques: • "Tab. 9.59" ! NOTICE! Apply threadlocker glue
29	APPLICABLE TO SIZES 1" ½ - 2" ONLY Position the flange (623) in the body (501).
30	APPLICABLE TO SIZES 1" ½ - 2" ONLY Insert and fix the screws (625) according to the following tightening torques: • "Tab. 9.59" ! NOTICE! Screw in as shown in the diagram at "9.4.3.2 - Cross diagram for tightening screws".
31	Insert and secure the locking nut (513) according to the tightening torques: • "Tab. 9.59"
32	Position the cap (516).
33	Insert and fix the cap (509).
34	Unscrew the cap (546) together with the O-ring (549).
35	Remove the O-ring (549) and replace it, taking care to lubricate it with synthetic grease. ! NOTICE! Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.
36	Unscrew the adjustment ring nut (545).
37	Pull out the maximum spring (542).
38	Remove spring holder (541).
39	Remove the spring guide (540). ! NOTICE! If fitted, remove the minimum spring (543).
40	Unscrew and remove the screws (510) together with the nuts (511).



LA slam-shut valve 1" - 2" BP/MP

Step	Action
41	Remove the cover (550) from the body (501).
42	Remove the diaphragm assembly: diaphragm (547), diaphragm protection disc (502), washer (519), diaphragm support (518), compression bushing (520), locking screw (521).
43	Undo and remove the locking screw (521). ! NOTICE! During this phase, keep the diaphragm support (518) still.
44	Unscrew and remove the compression bushing (520).
45	Remove the washer (519).
46	Remove the diaphragm protection disc (502).
47	Replace the diaphragm (547).
48	Fit the diaphragm protection disc (502).
49	Position washer (519).
50	Set compression bushing (520).
51	Insert and secure the clamping screw (521) in the diaphragm holder, according to the tightening torques: • “Tab. 9.59”
52	Place diaphragm assembly.
53	Insert cover (550) into body (501).
54	Insert and fix the screws (510) together with the nuts (511) according to the tightening torques: • “Tab. 9.59” ! NOTICE! Screw in as shown in the diagram at “9.4.3.2 - Cross diagram for tightening screws”.
55	Insert spring guide (540).
56	Insert spring holder (541).
57	Insert the maximum spring (542).
58	Insert and fasten adjustment ring nut (545)
59	Insert and secure the cap (546) together with the O-ring (549).
60	! ATTENTION! After maintenance, insert the LA slam-shut valve by fastening the screws (48) of the regulator (9.4.3), according to the tightening torques • “Tab. 9.59” ! NOTICE! Screw in as shown in the diagram at “9.4.3.2 - Cross diagram for tightening screws”.

Tab. 9.65

! WARNING!

Ensure that all parts have been fitted correctly.

9.4.8.2 - LA SLAM-SHUT VALVE 1" - 2" TR

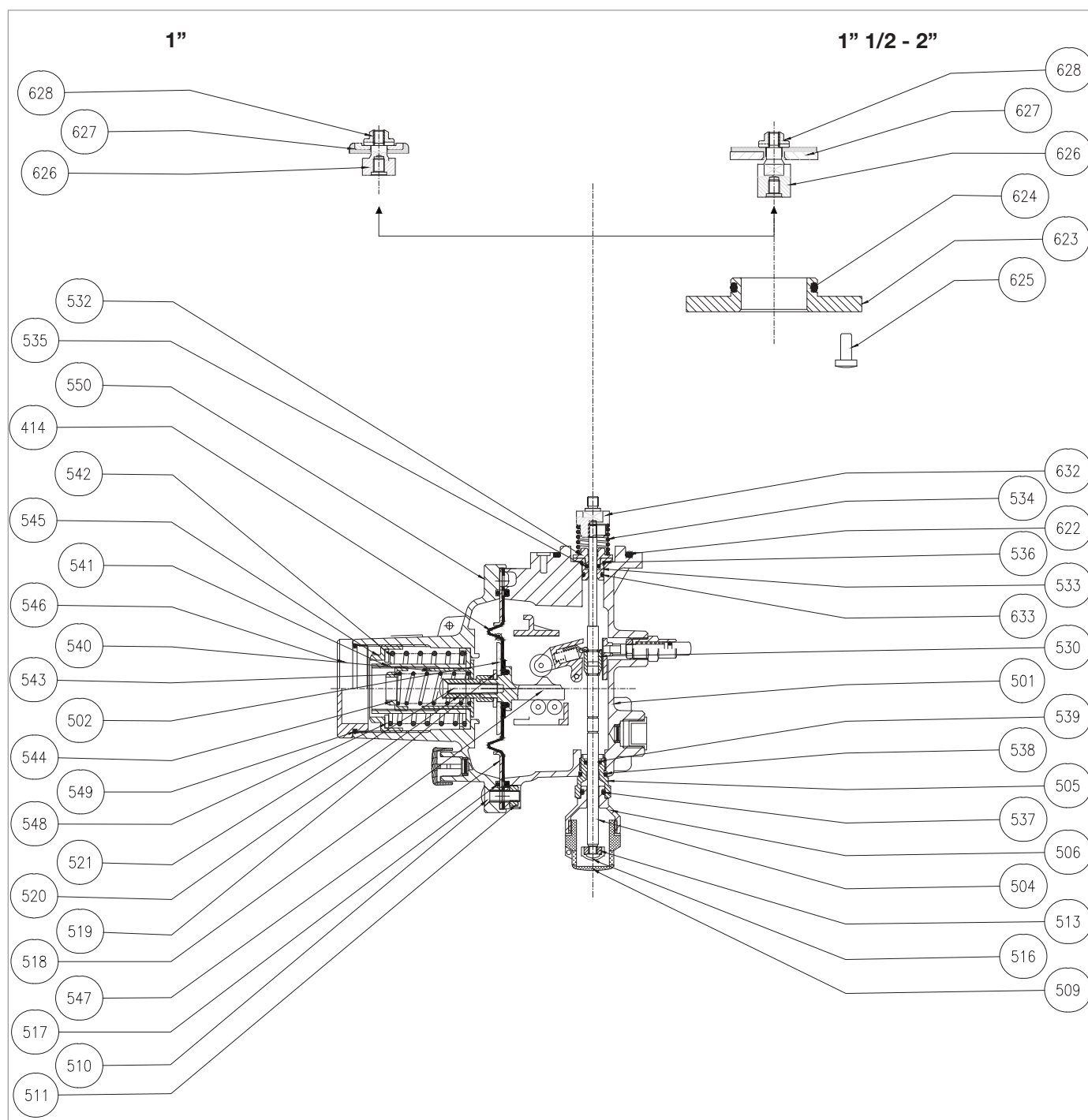
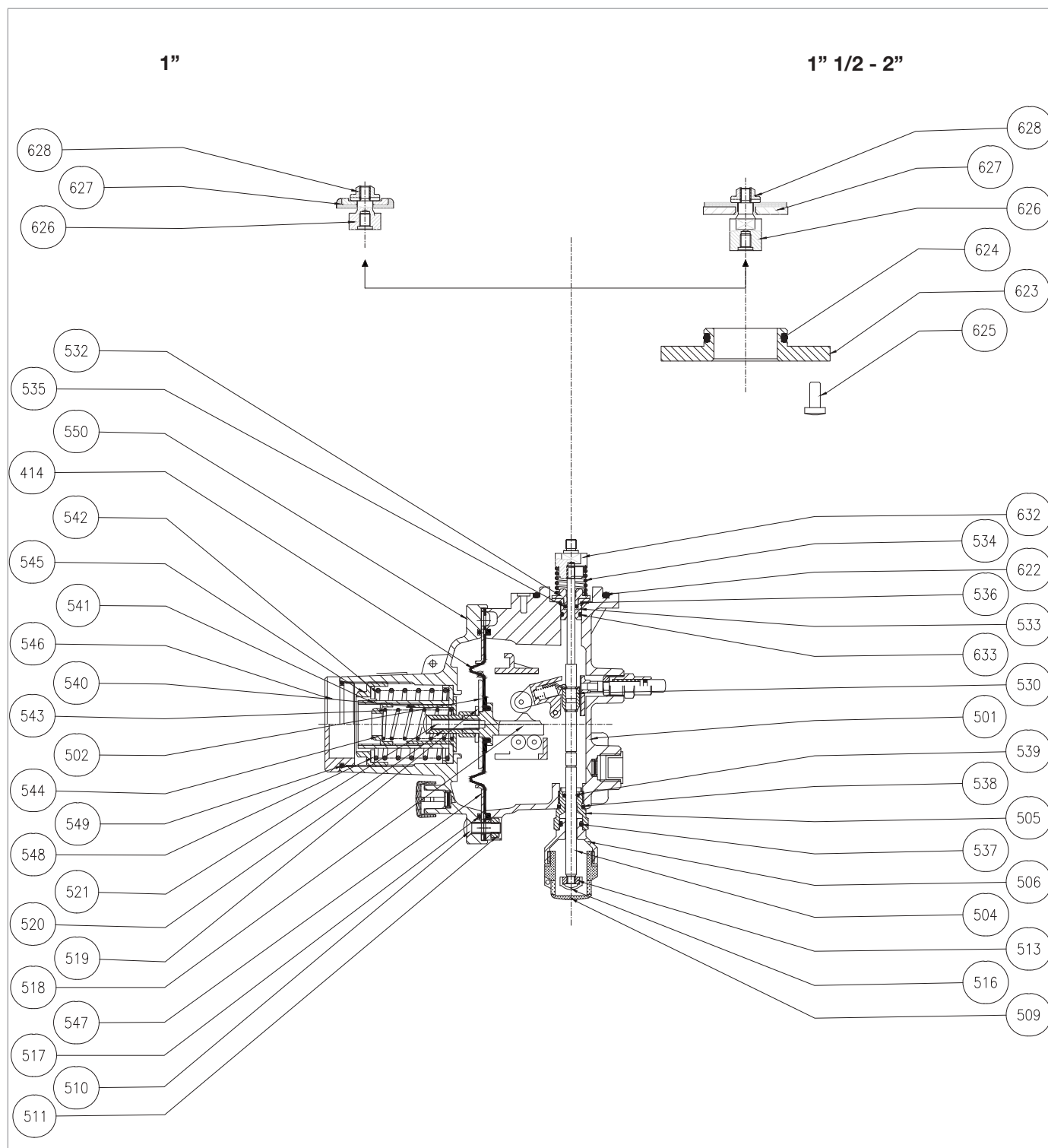


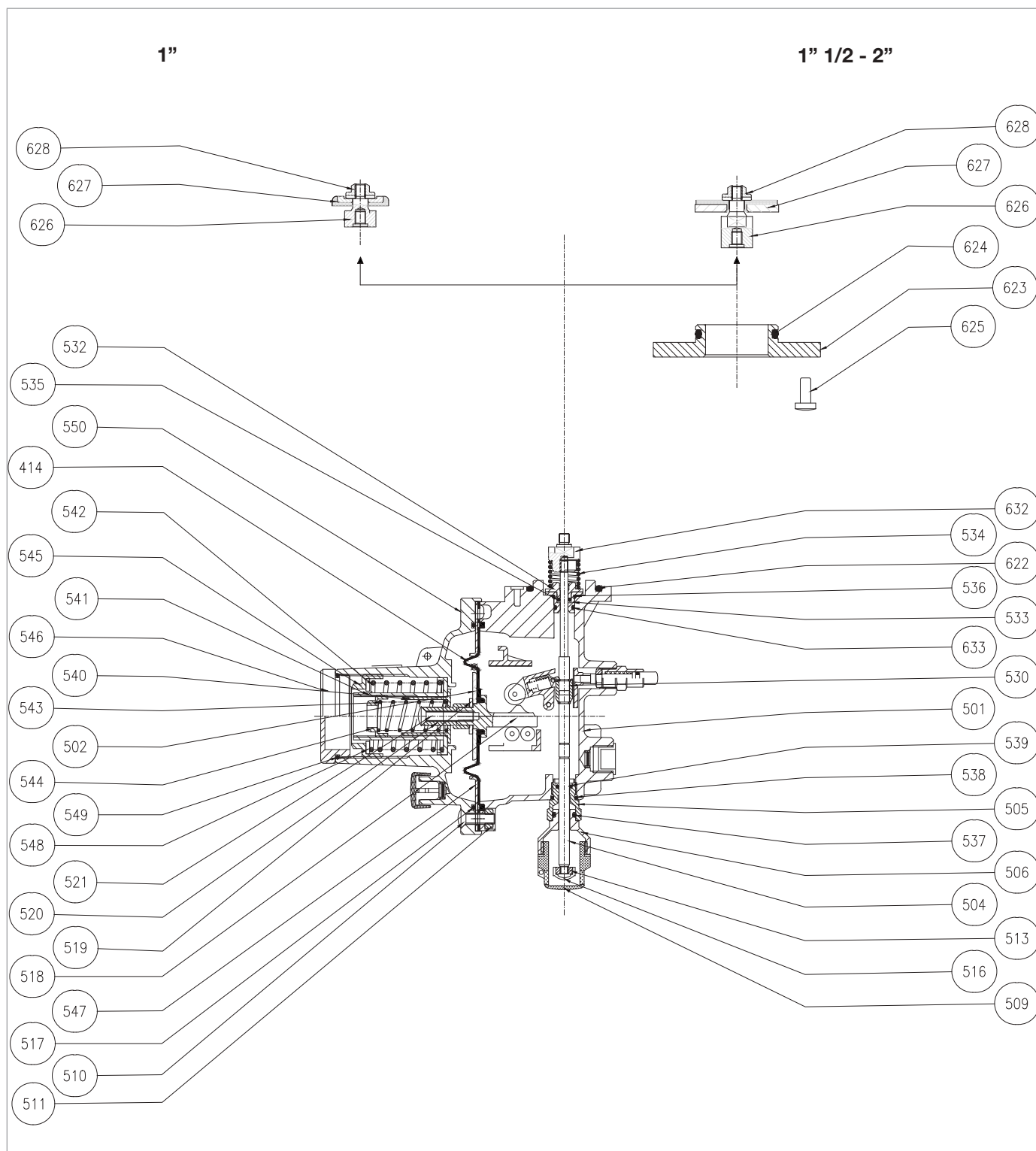
Fig. 9.33. LA slam-shut valve 1" - 2" TR

Step	Action
1	 ATTENTION! Before servicing, remove the LA slam-shut valve by unscrewing the screws (48) on the regulator (refer to “9.4.5 - Regulator DIVAL 600”).
2	Unscrew and remove the locking nut (628).  NOTICE! During this step, hold the spacer (626) in place.
3	Remove and replace the plug (627).
4	APPLICABLE TO SIZES 1" ½ - 2" ONLY Undo and remove the screws (625).
5	APPLICABLE TO SIZES 1" ½ - 2" ONLY Remove the flange (623).
6	APPLICABLE TO SIZES 1" ½ - 2" ONLY Remove the O-ring (624) and replace it, taking care to lubricate it with synthetic grease.  NOTICE! Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.
7	Remove the O-ring (622) and replace it, taking care to lubricate it with synthetic grease.  NOTICE! Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.
8	Unscrew and remove the cap (509).
9	Remove the cap (516).
10	Unscrew and remove the locking nut (513).
11	Remove the bushing (632).  NOTICE! During this phase, keep the rod (504) still.
12	Slide the rod (504) in the direction of the reset.
13	Unscrew and remove the knob (506).  NOTICE! During this phase, keep the rod (504) still.
14	Unscrew and remove the rod guide (505) together with the O-rings (537, 538, 539).
15	Replace the O-rings (537, 538, 539), lubricating them with synthetic grease.  NOTICE! Before inserting the replacement O-rings, clean the retaining slots with a cleaning solution.
16	Insert rod guide (505) together with O-rings (537, 538, 539).
17	Insert and secure the knob (506).
18	Remove the washer (532).
19	Remove the rod guide (533) together with O-rings (535, 536, 633).



LA slam-shut valve 1" - 2" TR

Step	Action
20	Remove and replace the O-rings (535, 536, 633), taking care to lubricate them with synthetic grease. ! NOTICE! Before inserting the replacement O-rings, clean the retaining slots with a cleaning solution.
21	Insert the rod guide (533) together with the O-rings (535, 536, 633).
22	Fit the washer (532).
23	Insert the rod (504) in the opposite direction to the reset.
24	Place the spring (534) in the washer (532). ! NOTICE! During this phase, keep the rod (504) still.
25	Position and secure the bushing (632) on the rod (504).
26	Position and secure the spacer (626). ! NOTICE! During this step, hold the bushing (632) in place.
27	Fit the plug (627).
28	Insert and secure the locking nut (628) according to the tightening torques: • "Tab. 9.59" ! NOTICE! Apply threadlocker glue
29	APPLICABLE TO SIZES 1" ½ - 2" ONLY Position the flange (623) in the body (501).
30	APPLICABLE TO SIZES 1" ½ - 2" ONLY Insert and fix the screws (625) according to the following tightening torques: • "Tab. 9.59" ! NOTICE! Screw in as shown in the diagram at "9.4.3.2 - Cross diagram for tightening screws".
31	Insert and secure the locking nut (513) according to the tightening torques: • "Tab. 9.59"
32	Position the cap (516).
33	Insert and fix the cap (509).
34	Unscrew the cap (546) together with the O-ring (549).
35	Remove the O-ring (549) and replace it, taking care to lubricate it with synthetic grease. ! NOTICE! Before inserting the replacement O-ring, clean the retaining slots with a cleaning solution.
36	Unscrew the adjustment ring nut (545).
37	Pull out the maximum spring (542).
38	Remove spring holder (541).
39	Remove the spring guide (540). ! NOTICE! If fitted, remove the minimum spring (543).
40	Unscrew and remove the screws (510) together with the nuts (511).



LA slam-shut valve 1" - 2" TR

Step	Action
41	Remove the cover (550) from the body (501).
42	Remove the diaphragm assembly: diaphragm (547), diaphragm protection disc (502), washer (519), diaphragm support (518), compression bushing (520), locking screw (521).
43	Undo and remove the locking screw (521).  NOTICE! During this phase, keep the diaphragm support (518) still.
44	Unscrew and remove the compression bushing (520).
45	Remove the washer (519).
46	Remove the diaphragm protection disc (502).
47	Replace the diaphragm (547).
48	Fit the diaphragm protection disc (502).
49	Position washer (519).
50	Set compression bushing (520).
51	Insert and secure the clamping screw (521) in the diaphragm holder, according to the tightening torques: • “Tab. 9.59”
52	Place diaphragm assembly.
53	Insert cover (550) into body (501).
54	Insert and fix the screws (510) together with the nuts (511) according to the tightening torques: • “Tab. 9.59”
55	Insert spring guide (540).
56	Insert spring holder (541).
57	Insert the maximum spring (542).
58	Insert and fasten adjustment ring nut (545)
59	Insert and secure the cap (546) together with the O-ring (549).
60	 ATTENTION! After maintenance, insert the LA slam-shut valve by fastening the screws (48) of the regulator (9.4.3), according to the tightening torques • “Tab. 9.59”  NOTICE! Screw in as shown in the diagram at “9.4.3.2 - Cross diagram for tightening screws”.

Tab. 9.66

WARNING!

Ensure that all parts have been fitted correctly.

9.4.10 - PROCEDURE FOR RECOMMISSIONING AFTER MAINTENANCE

NOTICE!

For the re-commissioning procedure, please follow the instructions in section “8.5 - Regulator commissioning procedure”

10 - TROUBLESHOOTING

Listed below are the cases (causes and tripping) that could occur in the form of malfunctions of various kinds over time. These situations depend on the conditions of the gas as well as on the natural ageing and wear of the materials.

10.1 - GENERAL WARNINGS

HAZARD!

Maintenance work must be carried out by qualified personnel:

- trained on workplace safety also based on the regulations in force in the place of installation of the work equipment;
- qualified and authorised to carry out activities related to the equipment.

WARNING!

PIETRO FIORENTINI S.p.A. shall not be held liable for any damage to people and property due to services:

- other than those described;
- performed according to methods other than those specified;
- carried out by unsuitable personnel.

NOTICE!

If an operating fault occurs and qualified personnel are not available for the specific service, call the PIETRO FIORENTINI S.p.A. Authorised Assistance Centre

10.2 - OPERATOR QUALIFICATION SPECIFICATION

Commissioning	
Operator qualification	• Mechanical maintenance technician; • Electrical maintenance technician; • Installer; • User's technician.
PPE required	      WARNING! The PPE listed in this table is related to the risk associated with the equipment. For the PPE required to protect against risks associated with the workplace, installation or operating conditions, please refer to: • the regulations in force in the country of installation; • <u>any information provided by the Safety Manager at the installation facility.</u>
Equipment required	Please refer to the chapter "7 - Commissioning/maintenance equipment".

Tab. 10.67

10.3 - TROUBLESHOOTING PROCEDURES

For proper troubleshooting, proceed as follows:

- close the downstream shut-off valves;
- refer to the troubleshooting tables listed below.

10.4 - TROUBLESHOOTING TABLES

NOTICE!

See chapter “9 - Maintenance and functional checks” for pictures of the regulator DIVAL 600 and its accessories.

10.4.1 - TROUBLESHOOTING DIVAL 600 REGULATOR

Failure	Possible causes	Intervention
No sealing or zero flow rate	Valve seat (2) damaged	Replace
	Plug (211) damaged	Replace
	O-ring (202) damaged	Replace
	O-ring (213) damaged	Replace
	O-ring (215) damaged	Replace
	Diaphragm (209) damaged	Replace
	Dirt or presence of foreign bodies in the sealing area	Clean
Pumping	Plug rod assembly friction	Clean and replace if needed
	Blocked anti-pumping valves	Clean and replace if needed
	Reduced downstream volumes	Increase the volume
Downstream pressure increases on delivery	Broken or damaged diaphragm (321)	Replace
	Broken or damaged diaphragm (209)	Replace

Tab. 10.68

10.4.2 - LA SLAM-SHUT VALVE TROUBLESHOOTING

Failure	Possible causes	Intervention
Slam-shut valve failed to trip	Rod (501) locked in opening	Clean and reposition if needed
External leak	Broken diaphragm (517)	Replace
Downstream pressure (Pd) increases in open valve position	O-ring (521) not sealing	Replace
	O-ring (523) not sealing	Replace
	Rod (501) damaged	Replace
Downstream pressure (Pd) increases in closed valve position	O-ring (521) not sealing	Replace
	Rod (501) damaged	Replace
	Reinforced gasket (528) damaged	Replace
	Valve seat (102) damaged	Replace
	Damaged valve seat O-ring (104)	Replace
Slam-shut valve failed to trip due to pressure increase	Broken diaphragm (517)	Replace
Slam-shut valve failed to trip due to pressure decrease	Broken diaphragm (517)	Replace

Tab. 10.69

11 - UNINSTALLATION AND DISPOSAL

11.1 - GENERAL SAFETY WARNINGS

HAZARD!

Make sure that there are no potentially explosive ignition sources in the work area set up to uninstall and/or dispose of the equipment.

WARNING!

Before proceeding with uninstallation and disposal, make the equipment safe by disconnecting it from any power supply.

11.2 - QUALIFICATION OF THE OPERATORS IN CHARGE

Commissioning

Operator qualification	Installer
PPE required	  WARNING! The PPE listed in this table is related to the risk associated with the equipment. For the PPE required to protect against risks associated with the workplace, installation or operating conditions, please refer to: - the regulations in force in the country of installation; - any information provided by the Safety Manager at the installation facility.
Equipment required	Please refer to the chapter "7 - Commissioning/maintenance equipment".

Tab. 11.70

11.3 - UNINSTALLATION

ATTENTION!

Before uninstalling the equipment, completely drain the fluid in the reduction line and inside the equipment.

NOTICE!

For equipment uninstallation procedures, please refer to the installation procedures (see chapter "6 - installation"), proceeding in reverse order.

11.4 - INFORMATION REQUIRED IN CASE OF RE-INSTALLATION

NOTICE!

Should the equipment be reused after uninstallation, refer to chapters:

- "6 - installation";
- "8 - Commissioning".

11.5 - DISPOSAL INFORMATION

NOTICE!

Bear in mind that the laws in force in the country of installation must be complied with. Illegal or improper disposal involves the application of the penalties provided for by the legislation in force in the country of installation.

NOTICE!

Proper disposal prevents damage to humans and the environment and promotes the reuse of precious raw materials.

The equipment was manufactured with materials that can be recycled by specialised companies. For proper disposal of the equipment, proceed as specified in “Tab. 11.71”:

Step	Action
1	Set up a large work area free from obstacles where to safely dismantle the equipment.
2	Sort the various components by type of material for easier recycling through separate collection.
3	Send the materials obtained in Step 2 to a specialised company.

Tab. 11.71

The equipment in any configuration consists of the following materials:

Material	Disposal/recycling indications
Plastic	It must be dismantled and disposed of separately.
Lubricants/Oils	They must be collected and delivered to the appropriate specialised and authorised collection and disposal centres.
Steel/Cast Iron	Disassemble and collect separately. It must be recycled through the specific collection centres.
Stainless steel	Disassemble and collect separately. It must be recycled through the specific collection centres.
Aluminium	Disassemble and collect separately. It must be recycled through the specific collection centres.
Pneumatic/electric components	They must be dismantled in order to be reused if they are still in good condition or, if possible, overhauled and recycled.

Tab. 11.72

NOTICE!

Please refer to the chapter “9 - Maintenance and functional checks” to better identify the composition of the equipment and its parts.

12 - RECOMMENDED SPARE PARTS

12.1 - GENERAL WARNINGS

NOTICE!

If non-original spare parts are used, PIETRO FIORENTINI S.p.A. their declared performance cannot be guaranteed.

It is recommended to use PIETRO FIORENTINI S.p.A. original spare parts

PIETRO FIORENTINI S.p.A. shall not be held liable for any damage caused by using non-original parts.

12.2 - HOW TO REQUEST SPARE PARTS

NOTICE!

For specific information, please refer to the sales network of PIETRO FIORENTINI S.p.A.

13 - CALIBRATION TABLES

13.1 - CALIBRATION TABLES

The spring setting ranges for the DIVAL 600 regulator are shown in the tables below:

DIVAL 600 BP 1" DN 25							
Pos.	Spring item code	Spring colour	d	Lo	De	Min.	Max.
1	2701345	Yellow	3.5	180	65	0.012	0.017
	2700525	Orange	2	40	22		
2	2701620	Orange	4	180	65	0.018	0.028
	2700525	Orange	2	40	22		
3	2701860	Red	4.5	180	65	0.029	0.045
	2700525	Orange	2	40	22		
4	2702190	Green	5	180	65	0.046	0.07
	2700645	Red	2.3	40	22		
5	2702370	Black	5.5	180	65	0.071	0.115
	2700645	Red	2.3	40	22		
6	2702540	Blue	6	180	65	0.116	0.165
	2700645	Red	2.3	40	22		
7	2702730	Sky blue	6.5	180	65	0.166	0.26
	2700645	Red	2.3	40	22		
8	2702950	Brown	7	180	65	0.261	0.34
	2700645	Red	2.3	40	22		

d = Wire Diameter (mm) **Lo** = Spring Length (mm) **De** = External Diameter (mm) **Min./Max.** = pressure (bar)

Tab. 13.73

DIVAL 600 BP 1" DN 25 (INVERTED)							
Pos.	Spring item code	Spring colour	d	Lo	De	Min.	Max.
1	2701345	Yellow	3.5	180	65	0.009	0.013
	2700525	Orange	2	40	22		
2	2701620	Orange	4	180	65	0.014	0.024
	2700525	Orange	2	40	22		
3	2701860	Red	4.5	180	65	0.025	0.041
	2700525	Orange	2	40	22		
4	2702190	Green	5	180	65	0.042	0.065
	2700645	Red	2.3	40	22		
5	2702370	Black	5.5	180	65	0.066	0.11
	2700645	Red	2.3	40	22		
6	2702540	Blue	6	180	65	0.111	0.165
	2700645	Red	2.3	40	22		
7	2702730	Sky blue	6.5	180	65	0.166	0.26
	2700645	Red	2.3	40	22		
8	2702950	Brown	7	180	65	0.261	0.34
	2700645	Red	2.3	40	22		

d = Wire Diameter (mm) **Lo** = Spring Length (mm) **De** = External Diameter (mm) **Min./Max.** = pressure (bar)

Tab. 13.74

DIVAL 600 BP | 1" ½ ; 2" | DN 40; 50

Pos.	Spring item code	Spring colour	d	Lo	De	Min.	Max.
1	2701345	Yellow	3.5	180	65	0.012	0.017
	2700525	Orange	2	40	22		
2	2701620	Orange	4	180	65	0.018	0.028
	2700525	Orange	2	40	22		
3	2701860	Red	4.5	180	65	0.029	0.045
	2700525	Orange	2	40	22		
4	2702190	Green	5	180	65	0.046	0.07
	2700645	Red	2.3	40	22		
5	2702370	Black	5.5	180	65	0.071	0.085
	2700645	Red	2.3	40	22		

d = Wire Diameter (mm) **Lo** = Spring Length (mm) **De** = External Diameter (mm) **Min./Max.** = pressure (bar)

Tab. 13.75

DIVAL 600 BP | 1" ½; 2" | DN 40; 50 (INVERTED)

Pos.	Spring item code	Spring colour	d	Lo	De	Min.	Max.
1	2701345	Yellow	3.5	180	65	0.009	0.015
	2700525	Orange	2	40	22		
2	2701620	Orange	4	180	65	0.014	0.024
	2700525	Orange	2	40	22		
3	2701860	Red	4.5	180	65	0.025	0.041
	2700525	Orange	2	40	22		
4	2702190	Green	5	180	65	0.042	0.065
	2700645	Red	2.3	40	22		
5	2702370	Black	5.5	180	65	0.066	0.085
	2700645	Red	2.3	40	22		

d = Wire Diameter (mm) **Lo** = Spring Length (mm) **De** = External Diameter (mm) **Min./Max.** = pressure (bar)

Tab. 13.76

DIVAL 600 MP 1" ½; 2" DN 40; 50							
Pos.	Spring item code	Spring colour	d	Lo	De	Min.	Max.
1	2702370	Black	5.5	180	65	0.8	0.11
	2700645	Red	2.3	40	22		
2	2702540	Blue	6	180	65	0.116	0.165
	2700645	Red	2.3	40	22		
3	2702730	Sky blue	6.5	180	65	0.166	0.26
	2700645	Red	2.3	40	22		
4	2702950	Brown	7	180	65	0.261	0.34
	2700645	Red	2.3	40	22		

d = Wire Diameter (mm) **Lo** = Spring Length (mm) **De** = External Diameter (mm) **Min./Max.** = pressure (bar)

Tab. 13.77

DIVAL 600 MP 1" ½; 2" DN 40; 50 (INVERTED)							
Pos.	Spring item code	Spring colour	d	Lo	De	Min.	Max.
1	2702370	Black	5.5	180	65	0.08	0.11
	2700645	Red	2.3	40	22		
2	2702540	Blue	6	180	65	0.111	0.165
	2700645	Red	2.3	40	22		
3	2702730	Sky blue	6.5	180	65	0.166	0.26
	2700645	Red	2.3	40	22		
4	2702950	Brown	7	180	65	0.261	0.314
	2700645	Red	2.3	40	22		

d = Wire Diameter (mm) **Lo** = Spring Length (mm) **De** = External Diameter (mm) **Min./Max.** = pressure (bar)

Tab. 13.78

DIVAL 600 TR | 1" ; 1" ½ ; 2" | DN 25; 40; 50

Pos.	Spring item code	Spring colour	d	Lo	De	Min.	Max.
1	2702940	Sky blue	7	150	65	0.3	0.65
	2700999		3	37	22		
2	2703125	White/yellow	7.5	150	65	0.651	0.92
	2700999		3	37	22		
3	2703325	White/orange	8	150	65	0.921	1.15
	2700999		3	37	22		
4	2703685	White/Green	9	150	65	1.151	2.2
	2700999		3	37	22		
5	2704180	White/Black	10.5	147	65	2.201	4.2
	2700999		3	37	22		

d = Wire Diameter (mm) **Lo** = Spring Length (mm) **De** = External Diameter (mm) **Min./Max.** = pressure (bar)

Tab. 13.79

DIVAL 600 TR | 1" ; 1" ½ ; 2" | DN 25; 40; 50 (INVERTED)

Pos.	Spring item code	Spring colour	d	Lo	De	Min.	Max.
1	2702940	Sky blue	7	150	65	0.3	0.65
	2700999		3	37	22		
2	2703125	White/yellow	7.5	150	65	0.651	0.92
	2700999		3	37	22		
3	2703325	White/orange	8	150	65	0.921	1.15
	2700999		3	37	22		
4	2703685	White/Green	9	150	65	1.151	2.2
	2700999		3	37	22		
5	2704180	White/Black	10.5	147	65	2.201	4.2
	2700999		3	37	22		

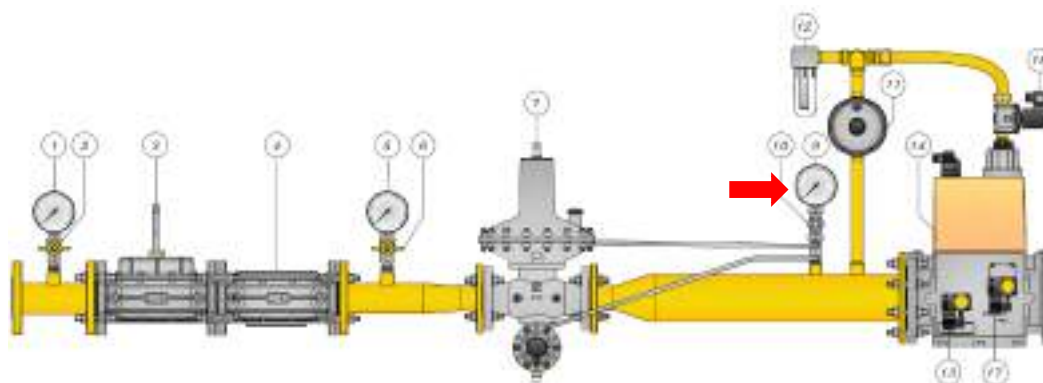
d = Wire Diameter (mm) **Lo** = Spring Length (mm) **De** = External Diameter (mm) **Min./Max.** = pressure (bar)

Tab. 13.80

TM0023ENG



Item 09 – Manômetro de baixa pressão



Pressure Gauges

Service intended

Suitable for dry and gaseous media that will not attack copper alloy parts.

Design

EN 837-3

Nominal size

63, 80, 100 mm

Accuracy class per EN 837-3/6

1.6

Scale ranges per EN 837-3/5

63, 80 mm: 0/25 to 0/600 mbar

100mm: 0/6 to 0/600 mbar

or other equivalent units of pressure or vacuum

Working pressure

Steady: full scale value

Fluctuating: 0.9 x full scale value

Operating Temperature

Ambient: -20... +60 °C

Medium: +100 °C maximum

Temperature error

Additional error when temperature of the pressure element deviates from +20 °C

Rising temperature: +0.3%/10K of true scale value

Falling temperature: -0.3%/10K of true scale value

Standard features

Pressure connection

Material: Cu-alloy

Threaded entry per DIN 26 288, G $\frac{1}{4}$ A, 14mm flats

63 mm: G $\frac{1}{4}$ B (male), 14mm flats

80, and 100 mm: G $\frac{1}{2}$ B (male), 22mm flats

Pressure element

Material: Cu-alloy

Sealing ring

NBR (Buna rubber)

Movement

Cu-alloy

Zero adjustment

Through window

Dial

White aluminium with black lettering

Protections

IP45



Pointer

Black aluminium

Case

Steel painted

Window

Crystal clear plastic

Bezel ring

Chromed steel

Optional extras

-Other pressure connection

-Slip-on bezel

-3-hole surface mounting flange

-U bracket for clamp fixing

-Red pointer fixed on transparent or on dial

-Dragged pointer of MIN / MAX

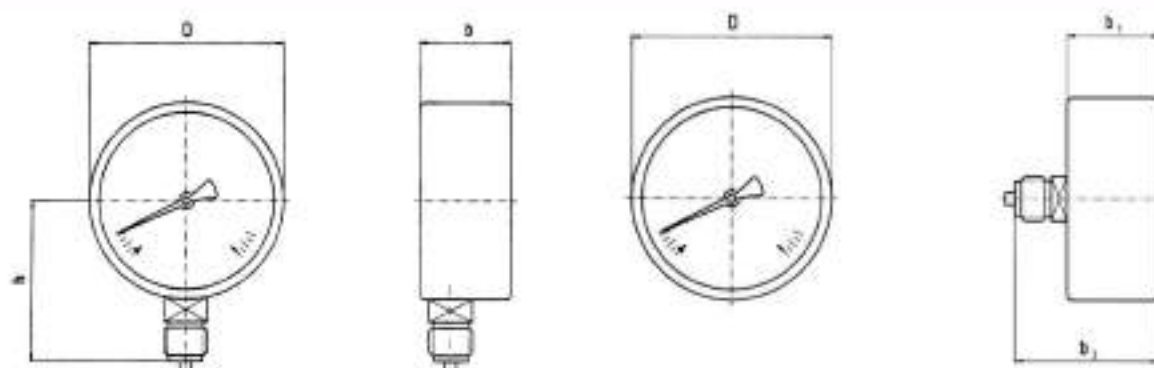
-Throat element

-Red mark

-Thread $\frac{1}{8}$ - $\frac{1}{4}$ - 9x1 - 10x1 : BSP - BSPT - NPT

Dimensions

Standard version



Nominal Size	Dimensions [mm]					Weight [g]
	h	b	b1	b2	D	
63	50	26	26	45	63	190
80	65	34	34	68	82	400
100	88	48	48	86	105	660

Ordering information

State:

Pressure gauge model / Nominal size / Scale range / Size of connection / Optional extras required

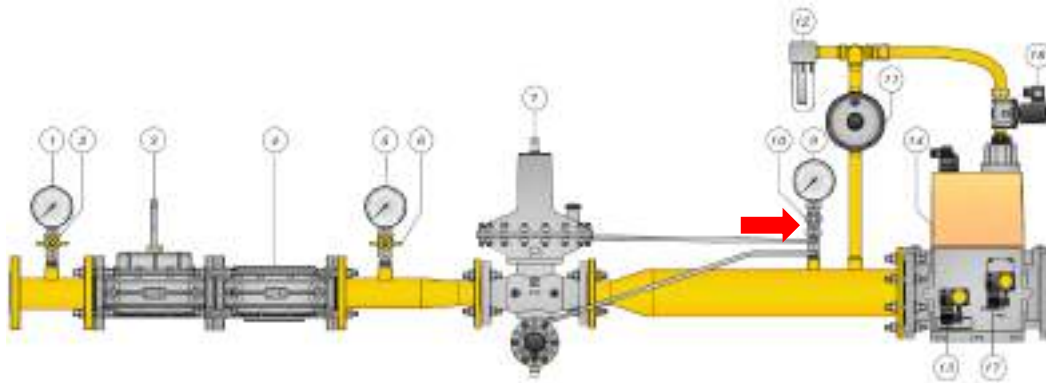
Specification and dimension given in this leaflet represent the state of engineering at the time of printing. Modifications may take place and materials specified may be replaced by others without prior notice

MANROS Italy srl - C.so Vittorio Emanuele 208/I - 29121 PIACENZA (ITALY)

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Item 10 – Válvula push-button





Mess-, Regel- und
Überwachungsgeräte
für Haustechnik,
Industrie und Umweltschutz

Lindenstraße 20
DE-74363 Güglingen
Telefon: +49(0)7135-102-0
Telefax: +49(0)7135-102-147
E-Mail: info@afriso.de
Internet: www.afriso.de

Betriebsanleitung
Operating Manual
Instructions de service



Manometerdruckknopfhahn
Push-button stop cock
Robinet à bouton pression de manomètre

Typ/Type	Art.-Nr./Product no./Référence
Rp ½	63031
Rp ¼	63089

-  Vor Gebrauch lesen!
Read instructions before using device!
A lire avant toute utilisation !
-  Alle Sicherheitshinweise beachten!
Observe all safety information!
Tenir compte de toutes les indications relatives à la sécurité !
-  Für künftige Verwendung aufbewahren!
Keep instructions for future use!
A conserver pour une réutilisation future !



07.2006
854.099.0220



Produktbeschreibung

Manuell betätigbarer Manometerdruckknopfhahn zur zeitweisen Druckübertragung auf ein Manometer.

Technische Daten

Parameter	Wert
Nennweite	DN 15
Betriebsüberdruck für Medium Gas	Max. 5 bar
Betriebstemperatur	0 °C bis 70 °C
Umgebungstemperatur	-20 °C bis 60 °C
Anschluss	Rp 1/2
Durchflussrichtung	Durch Pfeil gekennzeichnet
Dichtheitsklasse	Klasse 1

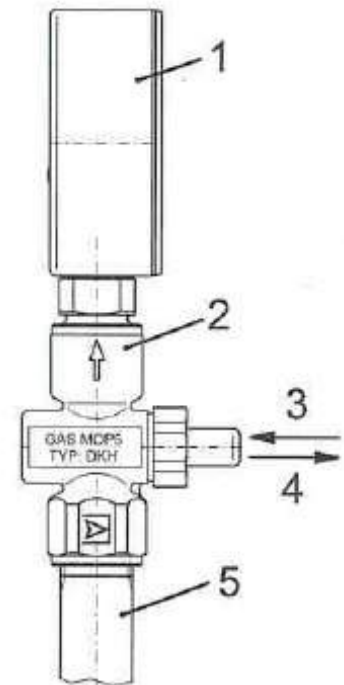
Montage und Inbetriebnahme

Einbaulage beliebig.

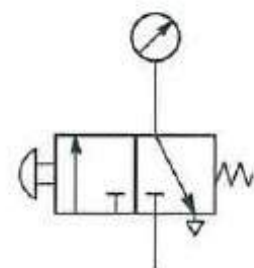
1. Druckknopfhahn auf ein T-Stück der Gas-Zuleitung dicht aufschrauben. Durchflussrichtung beachten!
2. Manometer dicht einschrauben.
Dichtungswerkstoffe: DIN 3535 T3, T4; DIN 30660/30661; Profildichtung aus Cu

Betrieb

1. Durch Betätigung des federgespannten Druckknopf-Kolbens bis zum Endanschlag wird der Weg des Systemdrucks zum Manometer freigegeben und die Druckanzeige kann zu diesem Zeitpunkt abgelesen werden.
2. Nach dem Loslassen des Druckknopfes geht dieser durch Federdruck in seine Ausgangslage zurück, trennt den Systemdruck zum Manometer und entlastet gleichzeitig das Manometer.



- 1 Manometer
- 2 Druckknopfhahn
- 3 Druck anzeigen
- 4 Druck entlasten
- 5 Zuleitung



Schaltschema



Product description

Manually operated gauge push-button stop cock for temporary application of pressure to a pressure gauge.

Technical specifications

Parameter	Value
Nominal diameter	DN 15
Operating overpressure for medium gas	Max. 5 bar
Operating temperature	0 °C to 70 °C
Ambient temperature	-20 °C to 60 °C
Connection	Rp ½
Direction of flow	Marked by arrow
Tightness class	Class 1

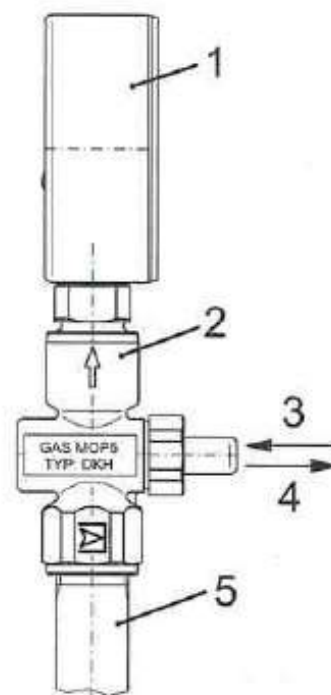
Mounting and commissioning

Any installation position possible.

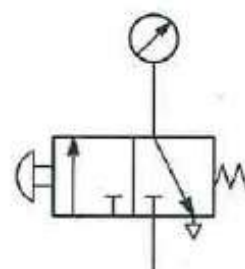
1. Tightly screw the push-button stop cock to a T piece of the gas supply. Pay attention to the direction of flow!
2. Tightly screw in the gauge.
Sealing materials: DIN 3535 T3, T4; DIN 30660/30661; Cu profile seal

Operation

1. When the spring-suspended push button piston is pushed all the way down, the way for the system pressure to the gauge is opened and the pressure can be indicated.
2. When you release the push button, the spring moves it back to the initial position. This interrupts the system pressure to the gauge and relieves the gauge at the same time.



- 1 Gauge
- 2 Push button tap
- 3 Indicate pressure
- 4 Relieve pressure
- 5 Supply



Wiring diagram

F

Description

Robinet à bouton pression de manomètre pour la transmission temporaire de la pression à un manomètre.

Caractéristiques techniques

Paramètre	Valeur
Section nominale	DN 15
Surpression de service admissible pour gaz	Max. 5 bars
Température de service	0 °C à 70 °C
Température ambiante	-20 °C à 60 °C
Branchement	Rp ½
Sens du passage	Indiqué par la flèche
Classe d'étanchéité	Classe 1

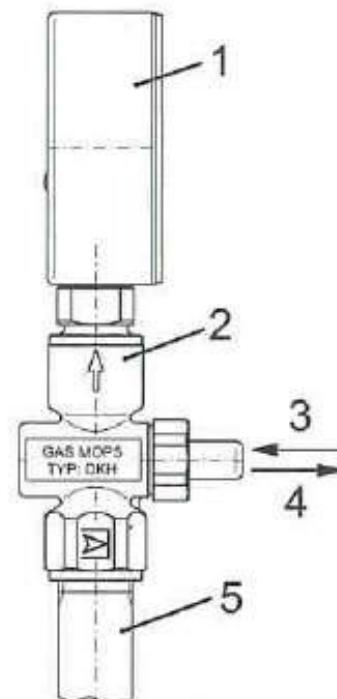
Instructions de montage

Toutes les positions de montage sont possibles.

1. Bien visser le robinet à bouton pression sur un T de l'alimentation en gaz. Respecter le sens de passage !
2. Bien visser le manomètre.
Matériau du joint : DIN 3535 T3, T4; DIN 30660/30661; Joint profilé en Cu.

Fonctionnement

1. L'actionnement du piston du bouton pression à tension de ressort jusqu'à la butée libère le chemin de la pression système vers le manomètre et il est alors possible de relever la pression.
2. Lorsque l'on relâche le bouton pression, la pression du ressort le fait revenir sur sa position de départ. Il coupe ainsi la pression système vers le manomètre et détend, en même temps, le manomètre.



- 1 Manomètre
- 2 Robinet à bouton pression
- 3 Indication de la pression
- 4 Détente
- 5 Alimentation

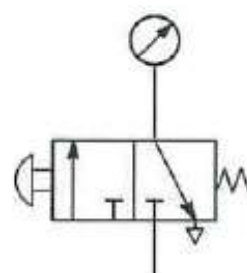
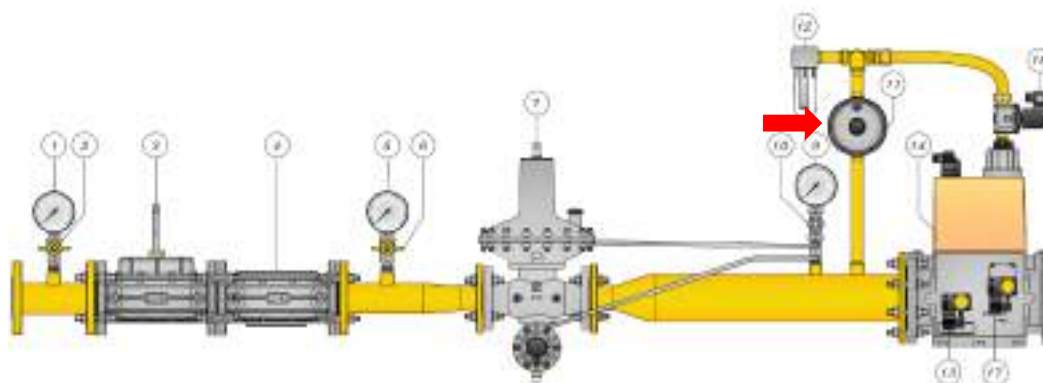


Schéma des connexions

Item 11 – Válvula de alívio



VALVOLA DI SFIORO
RELIEF VALVE
SOUPAPE D'EFFLEUREMENT
VÁLVULA DE ALIVIO



MVS/1
P. max 1 - 1,5 - 2,5 bar



MVS/1 - G 1/4
P. max 1 bar



MVSP/1
P. max 1 bar



MVSP/1
P. max 7 bar



MVS/1
P. max 6 bar

CE II 2G - II 2D

CE 0497

MADE IN ITALY

	IT	EN	FR	ES
Pressione massima di esercizio Maximum operating pressure Pression maximum de fonctionnement Presión máxima de funcionamiento	1 - 1,5 - 2,5 - 6 - 7 bar			
Attacchi filettati / Threaded connections Raccords filetés / Conexiones roscadas	DN 8 - DN 15 - DN 20 - DN 25 - DN 32 - DN 40 - DN 50			
Attacchi flangiati / Flanged connections Raccords à brides / Conexiones embrizadas	DN 25* - DN 32 - DN 40 - DN 50			
	* su richiesta con flange girevoli	* with swivel flanges on request	* sur demande avec brides tournantes	* bajo petición con bridas locas
In conformità a In conformity with Conforme a Conforme	Direttiva PED 2014/68/UE	PED Directive 2014/68/EU	Directive PED 2014/68/UE	Direttiva PED 2014/68/UE

IT

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FR

ES

1.0 - GENERALITÀ

Il presente manuale illustra come installare, far funzionare e utilizzare il dispositivo in modo sicuro.
Le istruzioni per l'uso devono essere **SEMPRE** disponibili nell'impianto dove è installato il dispositivo.

ATTENZIONE: le operazioni di installazione/manutenzione devono essere eseguite da personale qualificato (come indicato in 1.3) utilizzando adeguati dispositivi di protezione individuale (DPI).

Per eventuali informazioni relative alle operazioni di installazione/manutenzione o in caso di problemi non risolvibili con l'utilizzo delle istruzioni è possibile contattare il produttore utilizzando indirizzo e recapiti telefonici riportati in ultima pagina.

1.1 - DESCRIZIONE

Dispositivo che ha il compito di assorbire e scaricare all'esterno, in aria libera, i picchi di pressione (colpi d'ariete). Per la loro capacità di scarico le valvole di sfioro trovano ideale collocazione in tutte le utenze, civili ed industriali, di gas metano, butano, propano, ed altri gas non corrosivi.

1.2 - LEGENDA SIMBOLI



PERICOLO: In caso di inosservanza possono essere procurati danni a beni materiali.



PERICOLO: In caso di inosservanza oltre a danni a beni materiali, possono essere procurati danni alle persone e/o animali domestici.



ATTENZIONE: Viene richiamata l'attenzione su dettagli tecnici rivolti al personale qualificato.

1.3 - PERSONALE QUALIFICATO

Trattasi di persone che:

- Hanno dimestichezza con l'installazione, il montaggio, la messa in servizio e la manutenzione del prodotto;
- Sono a conoscenza delle normative in vigore nella regione o paese in materia di installazione e sicurezza;
- Hanno istruzione sul pronto soccorso.



1.4 - USO DI PARTI DI RICAMBIO NON ORIGINALI

- In caso di manutenzione o sostituzione di componenti di ricambio (es. molle di taratura, ecc.) devono essere utilizzati **SOLAMENTE** quelli indicati dal fabbricante. L'utilizzo di componenti differenti, oltre a far decadere la garanzia del prodotto, potrebbe compromettere il corretto funzionamento dello stesso.
- Il fabbricante non è responsabile di malfunzionamenti derivanti da manomissioni non autorizzate o utilizzo di ricambi non originali.



1.5 - UTILIZZO NON APPROPRIATO

- Il prodotto deve essere utilizzato unicamente allo scopo per il quale è stato costruito.
- Non è consentito l'utilizzo con fluidi differenti da quelli indicati.
- Non devono essere superati in nessun caso i dati tecnici indicati in targhetta. E' cura dell'utilizzatore finale o dell'installatore, adottare corretti sistemi a protezione dell'apparecchio che impediscano il superamento della pressione massima indicata in targhetta.
- Il fabbricante non è responsabile per danni causati da un utilizzo improprio dell'apparecchio.

2.0 - DATI TECNICI

- Impiego : gas non aggressivi delle tre famiglie (gas secchi)
- Temperatura ambiente (TS) : -15 ÷ +60 °C
- Pressione massima di esercizio : 1 - 1,5 - 2,5 - 6 - 7 bar (vedere etichetta prodotto)
- Resistenza meccanica : Gruppo 2 (secondo EN 13611)
- Attacchi filettati Rp : (DN 8 - DN 15 - DN 20 - DN 25 - DN 32 - DN 40 - DN 50) secondo EN 10226
- Attacchi flangiati accoppiabili con flange PN 16 : (DN 25* - DN 32 - DN 40 - DN 50) secondo ISO 7005 / EN 1092-1
- Attacchi filettati NPT o flangiati ANSI 150 : su richiesta
- In conformità a : Direttiva PED 2014/68/UE - Direttiva ATEX 2014/34/UE

* DN 25 con flange girevoli.

2.1 - INDIVIDUAZIONE MODELLI

MVS/1 : Valvola di sfioro - P.max 1 - 1,5 - 2,5 - 6 bar

MVSP/1 : Valvola di sfioro Compact - P.max 1 - 7 bar

3.0 - MESSA IN FUNZIONE DEL DISPOSITIVO



3.1 - OPERAZIONI PRELIMINARI ALL'INSTALLAZIONE

- E' necessario chiudere il gas a monte della valvola prima dell'installazione;
- Verificare che la pressione di linea **NON SIA SUPERIORE** alla pressione massima dichiarata sull'etichetta del prodotto;
- Eventuali tappi di protezione (se presenti) vanno rimossi prima dell'installazione;
- Tubazioni e interni della valvola devono essere liberi da corpi estranei;

Se l'apparecchio è filettato:

- verificare che la lunghezza del filetto della tubazione non sia eccessiva per non danneggiare il corpo dell'apparecchio in fase di avvitamento;

Se l'apparecchio è flangiato:

- verificare che le controflange di ingresso e uscita siano perfettamente coassiali e parallele per evitare di sottoporre il corpo a inutili sforzi meccanici, calcolare inoltre lo spazio per l'inserimento della guarnizione di tenuta;
- Per le fasi di serraggio, è necessario munirsi di una o più chiavi dinamometriche tarate od altri utensili di bloccaggio controllati;
- In caso di installazione all'esterno, è consigliato prevedere una tettoia di protezione per evitare che l'acqua piovana possa ossidare o danneggiare parti dell'apparecchio.



- In base alla geometria dell'impianto valutare il rischio di formazione di miscela esplosiva all'interno della tubazione;
- Se la valvola è installata in prossimità di altre apparecchiature o come parte di un insieme, è necessario valutare preliminarmente la compatibilità fra la valvola e tali apparecchiature;
- Prevedere una protezione da urti o contatti accidentali nel caso l'elettrovalvola sia accessibile a personale non qualificato.



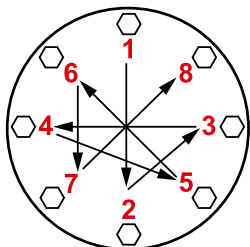
3.2 - INSTALLAZIONE (vedere esempio in 3.4)

Apparecchi filettati:

- Assemblare il dispositivo avvitandolo, assieme alle opportune tenute, sull'impianto con tubi e/o raccordi le cui filettature siano coerenti con la connessione da assemblare.
- Non usare il collo del coperchio superiore (**15**) come leva per l'avvitamento ma servirsi dell'apposito utensile;
- La freccia, indicata sul corpo (**8**) dell'apparecchio, deve essere rivolta verso l'utenza;
- Convogliare lo scarico della valvola all'esterno, in zona areata non pericolosa.

Apparecchi flangiati:

- Assemblare il dispositivo flangiandolo, assieme alle opportune tenute, all'impianto con tubi le cui flange siano coerenti con la connessione da assemblare. Le guarnizioni devono essere prive di difetti e devono essere centrate tra le flange;
- Se a guarnizioni inserite lo spazio rimanente è eccessivo non cercare di colmare il gap stringendo eccessivamente i bulloni dell'apparecchio;
- Le valvole di sfioro vengono installate a valle dei regolatori e possono essere installate in qualsiasi posizione.
- Inserire all'interno dei bulloni le apposite rondelle per evitare danneggiamenti alle flange in fase di serraggio;
- Durante la fase di serraggio prestare attenzione a non "pizzicare" o danneggiare la guarnizione;
- Serrare i dadi o bulloni gradualmente, secondo uno schema "a croce" (vedere esempio sottoindicato);
- Serrarli, prima al 30%, poi al 60%, fino al 100% della coppia massima (vedere tabella sottostante secondo EN 13611);



Diametro	DN 25	DN 32	DN 40	DN 50
Coppia max (N.m)	30	50	50	50

- Serrare nuovamente ogni dado o bullone in senso orario almeno una volta, fino al raggiungimento dell'uniformità della coppia massima;

Procedure in comune (apparecchi filettati e flangiati):

- Durante l'installazione evitare che detriti o residui metallici penetrino all'interno dell'apparecchio;
- Garantire un montaggio privo di tensioni meccaniche, è consigliato l'uso di giunti compensatori anche per sopperire alle dilatazioni termiche della tubazione;
- In caso sia prevista l'installazione dell'apparecchio in una rampa, è cura dell'installatore prevedere adeguati supporti o appoggi correttamente dimensionati, per sostenere e fissare l'insieme. Non lasciare, mai e per nessun motivo, gravare il peso della rampa solo sulle connessioni (filettate o flangiate) dei singoli dispositivi;
- In ogni caso dopo l'installazione verificare la tenuta dell'impianto;

3.3 - INSTALLAZIONE IN LUOGHI A RISCHIO DI ESPLOSIONE (DIRETTIVA 2014/34/UE)

La valvola è conforme alla Direttiva 2014/34/UE come apparecchio del gruppo II, categoria 2G e come apparecchio del gruppo II, categoria 2D; come tale è idonea per essere installata nelle zone 1 e 21 (oltre che nelle zone 2 e 22) come classificate nell'allegato I alla Direttiva 99/92/CE.

La valvola non è idonea per l'utilizzo nelle zone 0 e 20 come definite nella già citata Direttiva 99/92/CE.

Per determinare la qualifica e l'estensione delle zone pericolose si veda la norma CEI EN 60079-10-1.

L'apparecchio, se installato e sottoposto a manutenzione nel pieno rispetto di tutte le condizioni e istruzioni tecniche riportate nel presente documento, non costituisce fonte di pericoli specifici: in particolare, in condizioni di normale funzionamento, è prevista, da parte della valvola, l'emissione in atmosfera di sostanza infiammabile solo occasionalmente.

Convogliare lo scarico della valvola all'esterno, in zona areata non pericolosa.

La valvola può essere pericolosa rispetto alla presenza nelle sue vicinanze di altre apparecchiature in caso di guasto, sia della membrana di funzionamento (**11**) che della membrana di sicurezza (**5**): in tal caso (e solo in questo) costituisce una sorgente di emissione di atmosfera esplosiva di grado continuo e, come tale, può originare zone pericolose 0 come definite nella Direttiva 99/92/CE.

In condizioni di installazione particolarmente critica (luoghi non presidiati, carenza di manutenzione, scarsa disponibilità di ventilazione) e, soprattutto in presenza nelle vicinanze della valvola di potenziali fonti di innesco e/o apparecchiature pericolose nel funzionamento ordinario in quanto suscettibili di originare archi elettrici o scintille, è necessario valutare preliminarmente la compatibilità fra la valvola e tali apparecchiature.

In ogni caso è necessario prendere ogni precauzione utile ad evitare che la valvola sia origine di zone 0: ad esempio verifica periodica annuale di regolare funzionamento, possibilità di modificare il grado di emissione della sorgente o di intervenire sullo scarico all'esterno della sostanza esplosiva.

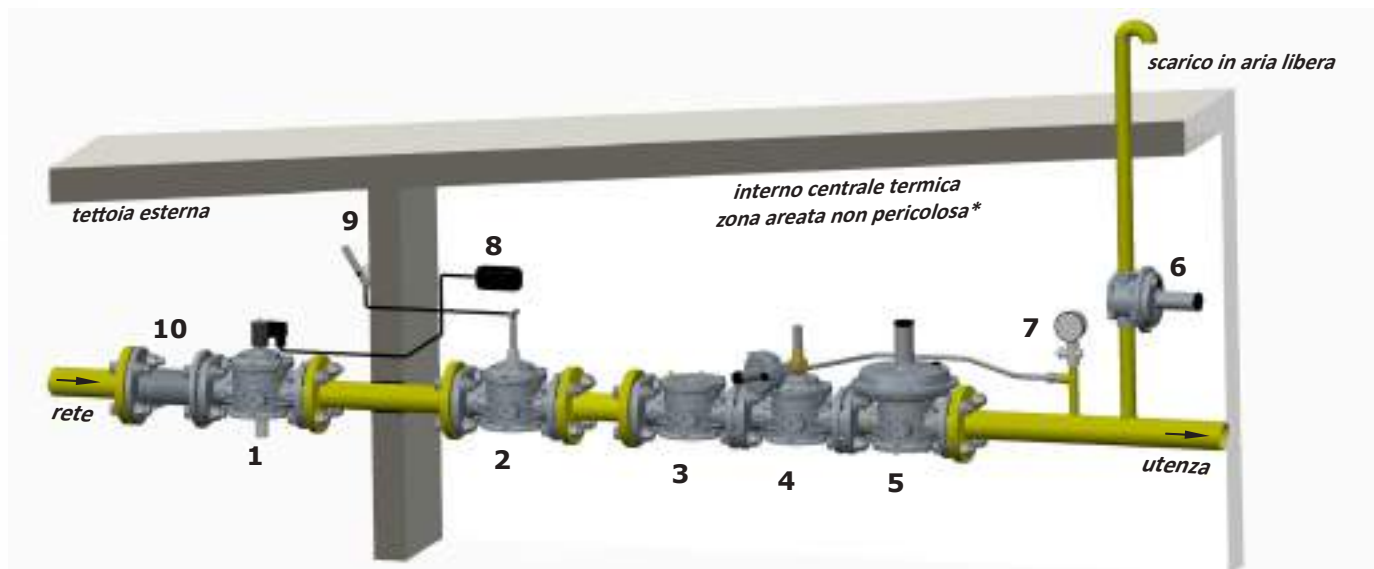
A tal fine è possibile collegare all'esterno tramite un apposito tubo il foro filettato del coperchio superiore (**15**) togliendo il tappo antipolvere (**4**). La connessione del foro filettato può essere G 1/4 o G 3/8 (vedere indicazioni su fig. 1, 2, 3, 4 e 5).

3.4 - ESEMPIO GENERICO DI INSTALLAZIONE

1. Elettrovalvola a riarmo manuale M16/RM N.C.
2. Valvola a strappo SM
3. Filtro gas FM
4. Valvola di blocco OPSO serie MVB/1 MAX
5. Regolatore di pressione RG/2MC

6. Valvola di sfioro MVS/1

7. Manometro e relativo pulsante
8. Gas detector
9. Leva comando a distanza valvola a strappo SM
10. Giunto di compensazione/antivibrante



* se la zona è classificata ATEX seguire quanto indicato in 3.3



4.0 - PRIMA MESSA IN SERVIZIO



- Prima della messa in servizio verificare che tutte le indicazioni presenti in targhetta, inclusa la direzione del flusso, siano rispettate;
- Dopo aver pressurizzato in maniera graduale l'impianto, verificare la tenuta e il funzionamento della valvola.



4.1 - VERIFICHE PERIODICHE CONSIGLIATE

- Verificare con apposito strumento tarato che il serraggio dei bulloni sia conforme a quanto indicato in 3.2;
- Verificare la tenuta delle connessioni flangiate/filettate sull'impianto;
- Verificare la tenuta e il funzionamento della valvola;

E' cura dell'utilizzatore finale o dell'installatore definire la frequenza delle suddette verifiche in base alla gravità delle condizioni di servizio.



5.0 - TARATURA

Esempio di taratura per una valvola di sfioro installata a valle di un regolatore RG/2MC:

- pressione uscita regolatore: 20 mbar
- taratura valvola di blocco: 50 mbar
- taratura valvola di sfioro: 40 mbar

Procedere nel seguente modo (vedi fig. 1):

- Svitare e rimuovere il tappo di chiusura (1);
- Avvitare al massimo la vite di regolazione (2);
- Regolare la pressione di uscita del regolatore (per mezzo dell'apposita vite di regolazione) al valore di pressione di sfioro voluta (in questo caso 40 mbar);
- Svitare la vite di regolazione (2) della valvola di sfioro finchè quest'ultima inizia a scaricare gas;
- A questo punto la valvola è tarata, ripristinare quindi il valore di taratura del regolatore (in questo caso 20 mbar) e chiudere i tappi di chiusura dei dispositivi.



5.1 - SOSTITUZIONE DELLA MOLLA



L'operazione deve essere effettuata senza la presenza di gas all'interno della valvola.

Per sostituire la molla:

- Svitare e rimuovere il tappo (1) dal coperchio superiore (15);
- Svitare completamente e rimuovere la vite di regolazione (2);
- Rimuovere (se presente) la rondella per molla;
- Estrarre dal coperchio superiore (15) la molla (14) e sostituirla con la nuova molla;
- Posizionare nuovamente la rondella sopra la nuova molla;
- Avvitare la vite di regolazione (2) e, dopo aver avviato l'impianto come indicato in 4.0, effettuare la taratura al valore desiderato come indicato in 5.0;
- Riavvitare il tappo (1) ed eventualmente sigillarlo in quella posizione utilizzando (se presenti) gli appositi fori sigillo;

• **NOTA:** L'operazione non si effettua nelle versioni con P.max = 6 bar (vedere fig. 7).



6.0 - MANUTENZIONE



- Non sono previste operazioni di manutenzione interne dell'apparecchio. Nel caso sia necessario effettuare delle operazioni interne all'apparecchio (cambio molla, sostituzione membrane, ecc.) si consiglia di contattare l'Ufficio Tecnico. In ogni caso prima di effettuare qualsiasi operazione di smontaggio sull'apparecchio, assicurarsi che all'interno dello stesso non ci sia gas in pressione.

7.0 - TRASPORTO, STOCCAGGIO E SMALTIMENTO

- Durante il trasporto il materiale deve essere trattato con cura, evitando che il dispositivo possa subire urti, colpi o vibrazioni;
- Se il prodotto presenta trattamenti superficiali (es. verniciatura, cataforesi, ecc.) non devono essere danneggiati durante il trasporto;
- La temperatura di trasporto e di stoccaggio, coincide con quella indicata nei dati di targa;
- Se il dispositivo non viene installato subito dopo la consegna deve essere correttamente immagazzinato in un luogo secco e pulito;
- In ambienti umidi è necessario usare siccativi oppure il riscaldamento per evitare la condensa.
- Il prodotto, a fine vita, dovrà essere smaltito in conformità alla legislazione vigente nel paese in cui si esegue tale operazione.

8.0 - GARANZIA

Valgono le condizioni di garanzia stabilite col fabbricante al momento della fornitura.

Per danni causati da:

- Uso improprio del dispositivo;
- Inosservanza delle prescrizioni indicate nel presente documento;
- Inosservanza delle norme riguardanti l'installazione;
- Manomissione, modifica e utilizzo di parti di ricambio non originali;

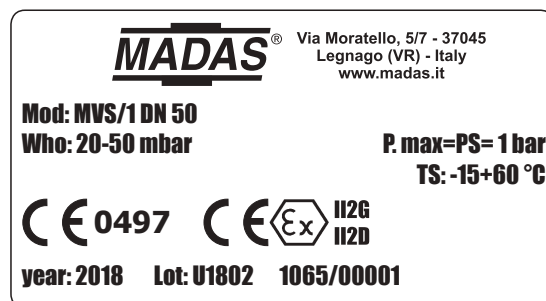
non possono essere rivendicati diritti di garanzia o risarcimento danni.

Sono esclusi inoltre dalla garanzia i lavori di manutenzione, il montaggio di apparecchi di altri produttori, la modifica del dispositivo e l'usura naturale.

9.0 - DATI DI TARGA

In targa (vedere esempi a fianco) sono riportati i seguenti dati:

- Nome/logo e indirizzo del fabbricante
(eventuale nome/logo distributore)
- Mod.: = nome/modello dell'apparecchio
seguito dal diametro di connessione
- P.max = Pressione massima alla quale è garantito il funzionamento del prodotto
- PS = Pressione ammissibile
- Who = Range pressione di sfioro
- TS = Range di temperatura alla quale è garantito il funzionamento del prodotto
-  = Conformità Dir. PED seguita dal n° dell'Organismo Notificato
-  = Conformità Dir. ATEX seguita dal modo di protezione
- year = Anno di fabbricazione
- Lot = Numero matricola del prodotto (vedere spiegazione di seguito)
 - U1802 = Lotto in uscita anno 2017 settimana n° 45
 - 1065 = numero progressivo commessa riferito all'anno indicato
 - 00001 = numero progressivo riferito alla q.tà del lotto



1.0 - GENERAL INFORMATION

This manual shows you how to safely install, operate and use the device.

The instructions for use **ALWAYS** need to be available in the facility where the device is installed.

ATTENTION: installation/maintenance needs to be carried out by qualified staff (as explained in section 1.3) by using suitable personal protective equipment (PPE).

For any information pertaining to installation/maintenance or in case of problems that cannot be solved with the instructions, contact the manufacturer at the address and phone numbers provided on the last page.

1.1 - DESCRIPTION

Device that has the task of absorbing and discharging pressure peaks (water hammers) outside in the open air.

Due to their discharge capacity, the relief valves are ideal for use in all civil and industrial utilities involving methane, butane, propane gases and other non-corrosive gases.

1.2 - KEY TO SYMBOLS



DANGER: In the event of inobservance, this may cause damage to tangible goods.



DANGER: In the event of inobservance, this may cause damage to tangible goods, to people and/or pets.



ATTENTION: Attention is drawn to the technical details intended for qualified staff.

1.3 - QUALIFIED STAFF

These are people who:

- Are familiar with product installation, assembly, start-up and maintenance;
- Know the regulations in force in the region or country pertaining to installation and safety;
- Have first-aid training.



1.4 - USING NON-ORIGINAL SPARE PARTS

- To perform maintenance or change parts (e.g. calibration springs, etc.) **ONLY** manufacturer-recommended spare parts must be used. Using different parts not only voids the product warranty, it could compromise correct device operation.
- The manufacturer is not liable for malfunctions caused by unauthorised tampering or use of non-original spare parts.



1.5 - IMPROPER USE

- The product must only be used for the purpose it was built for.
- It is not allowed to use fluids other than those expressly stated.
- The technical data set forth on the rating plate must not, under any circumstances, be exceeded. The end user or installer is in charge of implementing proper systems to protect the device, which ensure that the maximum pressure indicated on the rating plate is not exceeded.
- The manufacturer is not responsible for any damage caused by improper use of the device.

2.0 - TECHNICAL DATA

- Use : non-aggressive gases of the three families (dry gases)
- Ambient temperature (TS) : -15 ÷ +60 °C
- Maximum operating pressure : 1 - 1,5 - 2,5 - 6 - 7 bar (see product label)
- Mechanical strength : Group 2 (according to EN 13611)
- Rp Threaded connections : (DN 8 - DN 15 - DN 20 - DN 25 - DN 32 - DN 40 - DN 50) according to EN 10226
- Flanged connections that can be coupled to PN 16 flanges : (DN 25* - DN 32 - DN 40 - DN 50) according to ISO 7005 / EN 1092-1
- NPT threaded or ANSI 150 flanged connections : on request
- In compliance with : PED Directive 2014/68/EU - ATEX Directive 2014/34/EU

* DN 25 with swivel flanges.

2.1 - MODEL IDENTIFICATION

MVS/1 : Relief valve - Max P. 1 - 1.5 - 2.5 - 6 bar

MVSP/1 : Compact Relief valve - Max P. 1 - 7 bar

3.0 - COMMISSIONING THE DEVICE



3.1 - OPERATIONS PRIOR TO INSTALLATION

- It is necessary to close the gas upstream of the valve prior to installation;
- Make sure that the line pressure **DOES NOT EXCEED** the maximum pressure declared on the product label;
- Any protective caps (if any) must be removed prior to installation;
- Valve pipes and insides must be clear of any foreign bodies;
 - If the device is threaded:
 - make sure that the pipe thread is not too long, to prevent damaging the body of the device when screwing it on;
 - If the device is flanged:
 - make sure the inlet and outlet counter-flanges are perfectly coaxial and parallel in order to prevent unnecessary mechanical stress to the body. Also calculate the space to insert the seal gasket;
 - With regard to tightening operations, equip yourself with one or two calibrated torque wrenches or other controlled locking tools;
- With outdoor installation, it is advisable to install a protective roof to prevent rain from oxidising or damaging parts of the device.
 - According to the plant geometry, check the risk of an explosive mixture arising inside the piping;
 - If the valve is installed near other devices or as part of an assembly, compatibility between the valve and this other device must be evaluated beforehand;
 - Provide protection against impact or accidental contacts if the solenoid valve is accessible to unqualified personnel.



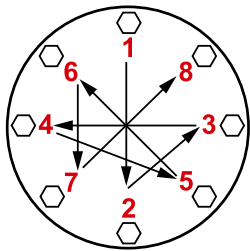
3.2 - INSTALLATION (see example in 3.4)

Threaded devices:

- Assemble the device by screwing it, with the due seals, onto the plant with pipes and/or fittings whose threads are consistent with the connection being attached.
- Do not use the neck of the top cover (**15**) as a lever to help you screw it on, but only use the specific tool;
- The arrow, shown on the body (**8**) of the device, needs to be pointing towards the application;
- Convey the valve discharge outside, in a non-hazardous ventilated area.

Flanged devices:

- Assemble the device by flanging it, with the due seals, onto the plant with pipes whose flanges are consistent with the connection being attached. The gaskets must be free from defects and must be centred between the flanges;
- If, after installing the gaskets, there is still too much space in between, do not try to reduce said gap by excessively tightening the bolts of the device;
- The relief valves are installed downstream of the regulators and can be installed in any position.
- Insert the relative washers inside the bolts in order to prevent damage to the flanges during the tightening stage;
- When tightening, be careful not to “pinch” or damage the gasket;
- Tighten the nuts or bolts gradually, in a “cross” pattern (see the example below);
- Tighten them, first by 30%, then by 60% and finally 100% of the maximum torque (see the table below according to EN 13611);



Diameter	DN 25	DN 32	DN 40	DN 50
Max. torque (N.m)	30	50	50	50

- Tighten each nut and bolt again clockwise at least once, until the maximum torque has been achieved uniformly;

Common procedures (threaded and flanged devices):

- During installation, avoid debris or metal residues from getting into the device;
- To guarantee mechanical tension-free assembly, we recommend using compensating joints, which also adjust to the pipe’s thermal expansion;
- If the device needs to be installed in a ramp, it is the installer’s responsibility to provide suitable supports or correctly sized supports to properly hold and secure the assembly. Never, for any reason whatsoever, leave the weight of the ramp resting only on the connections (threaded or flanged) of the individual devices;
- In any case, following installation, check the tightness of the plant;

3.3 - INSTALLATION IN PLACES WHERE THERE IS THE RISK OF EXPLOSION (DIRECTIVE 2014/34/EU)

The valve complies with Directive 2014/34/EU as group II equipment, category 2G and as group II equipment, category 2D; consequently, it is suited for installation in zones 1 and 21 (besides zones 2 and 22) as classified in Annex I of Directive 99/92/EC.

The valve is not suitable for use in zones 0 and 20, as defined in aforementioned Directive 99/92/EC.

To determine the qualification and size of the danger zones, please refer to standard IEC EN 60079-10-1.

If installed and subject to maintenance in full compliance with all conditions and technical instructions provided in this manual, the device does not pose a source of specific hazards: in particular, under conditions of normal operation, the valve is expected to emit a flammable substance into the atmosphere only occasionally.

Convey the valve discharge outside, in a non-hazardous ventilated area.

The valve can be dangerous with respect to the presence of other equipment nearby in case of failure, of the operating membrane (11) and of the safety membrane (5): in this case (and only in this case) it constitutes a source of emission of explosive atmosphere of continuous degree and, as such, it can originate dangerous zones 0 as defined in the Directive 99/92/EC.

In particularly critical installation conditions (unattended areas, poor maintenance or poor ventilation) and especially if there are potential sources of ignition and/or hazardous equipment near the valve in regular operation, as they may generate electric arcs or sparks, a preliminary assessment of the compatibility between the valve and such equipment must be carried out.

In any case, every useful precaution must be adopted so as to prevent the valve from generating zones 0: for example, annually verify regular operation, possibility of changing the degree of emission of the source or intervening on the external explosive substance discharge.

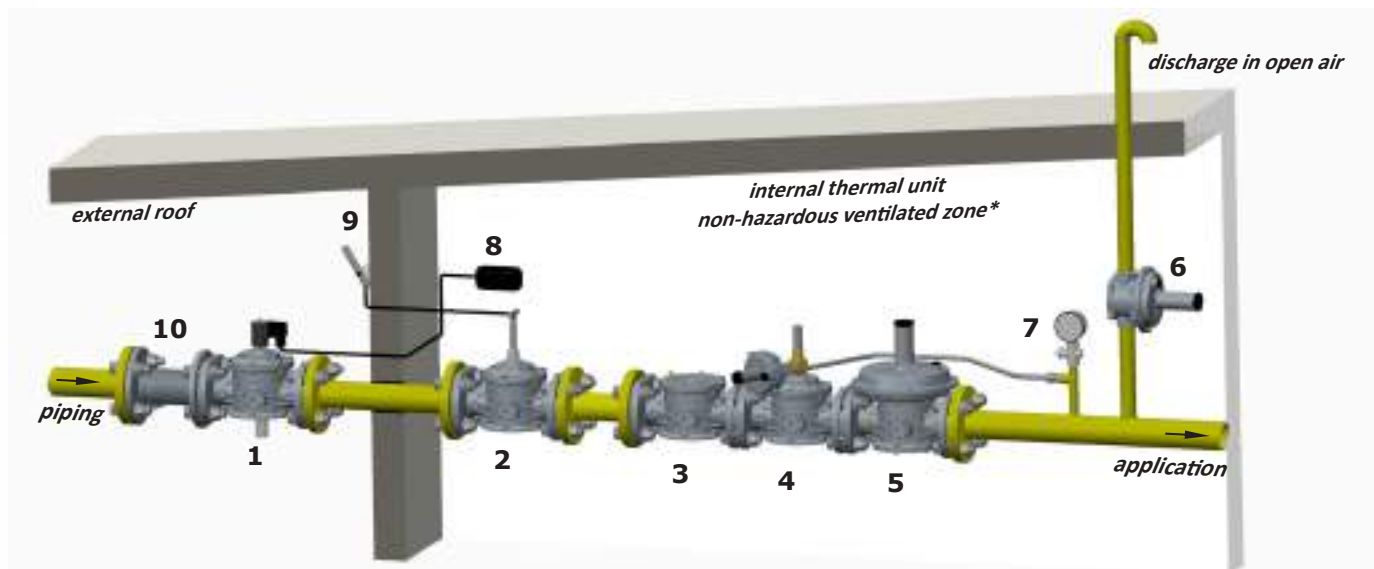
For this purpose the threaded hole of the top cover (15) can be connected to the outside (using appropriate fittings and pipe) by removing the dust cap (4). The threaded hole connection can be G 1/4 or G 3/8 (see indications in fig. 1, 2, 3, 4 and 5).

3.4 - GENERIC EXAMPLE OF AN INSTALLATION

1. M16/RM N.C. Manual reset solenoid valve
2. SM jerk ON/OFF valve
3. FM gas filter
4. OPSO series MVB/1 MAX shut off valve
5. RG/2MC pressure regulator

6. MVS/1 relief valve

7. Pressure gauge and relative button
8. Gas detector
9. SM remote jerk ON/OFF valve lever control
10. Expansion joint/anti-vibration mount



* if the zone is ATEX classified follow the indications of 3.3



4.0 - FIRST START-UP



- Before start-up, make sure that all the instructions on the rating plate, including the direction of flow, are observed;
- After having gradually pressurised the system, check the tightness and operation of the valve.



4.1 - RECOMMENDED PERIODIC CHECKS

- Use a suitable calibrated tool to ensure the bolts are tightened as indicated in 3.2;
- Check the tightness of the flanged/threaded connections on the system;
- Check the tightness and operation of the valve;

The final user or installer is responsible for defining the frequency of these checks based on the severity of the service conditions.



5.0 - CALIBRATION

Calibration example for a relief valve installed downstream of a RG/2MC regulator:

- regulator outlet pressure: 20 mbar
- block valve calibration: 50 mbar
- relief valve calibration: 40 mbar

Proceed as follows (see fig. 1):

- Loosen and remove the closing cap (1);
- Tighten the adjustment screw (2) to the maximum;
- Adjust the regulator outlet pressure (using the adjustment screw) to the desired relief pressure value (in this case 40 mbar);
- Loosen the adjustment screw (2) of the relief valve until it starts to discharge gas;
- The valve is now calibrated, restore the calibration valve of the regulator (in this case 20 mbar) and close the closing caps of the devices.



5.1 - REPLACING THE SPRING



The step must be carried out without gas inside the valve.

Replace the spring as follows:

- Unscrew and remove the cap (**1**) from the top cover (**15**);
- Completely loosen and remove the adjustment screw (**2**);
- Remove the spring washer (if any);
- Remove the spring (**14**) from the top cover (**15**) and replace it with the new spring;
- Place the washer on the new spring again;
- Tighten the adjustment screw (**2**) and after starting the system as shown in 4.0, perform calibration to the desired value shown in 5.0;
- Screw the cap (**1**) back on and if necessary, seal it in that position using the appropriate seal holes (if present);

• **NOTE:** The operation is not carried out in versions with max P. = 6 bar (see fig. 7).



6.0 - MAINTENANCE



- No maintenance operations need to be carried out inside the device. If it is necessary to perform operations inside the device (spring change, membrane replacement, etc.) we recommend contacting the Technical Department. In any case, before carrying out any dismantling operation on the device, make sure that there is no pressurised gas inside.

7.0 - TRANSPORT, STORAGE AND DISPOSAL

- During transport the material needs to be handled with care, avoiding any impact or vibrations to the device;
- If the product has any surface treatments (ex. painting, cataphoresis, etc) it must not be damaged during transport;
- The transport and storage temperatures must observe the values provided on the rating plate;
- If the device is not installed immediately after delivery it must be correctly placed in storage in a dry and clean place;
- In humid facilities, it is necessary to use driers or heating to avoid condensation.
- At the end of its service life, the product must be disposed of in compliance with the legislation in force in the country where this operation is performed.

7.0 - WARRANTY

The warranty conditions agreed with the manufacturer at the time of the supply apply.

Damage caused by:

- Improper use of the device;
- Failure to observe the requirements described in this document;
- Failure to observe installation rules;
- Tampering, modification and use of non-original spare parts;

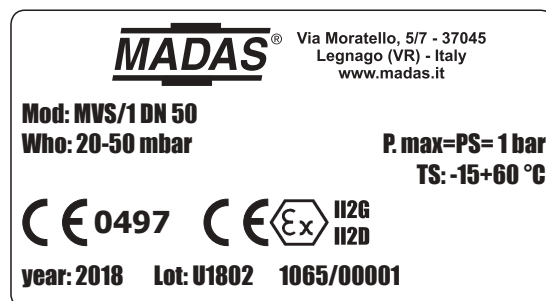
are not covered by the rights of the warranty or compensation for damage.

The warranty also excludes maintenance work, the assembly of devices of other manufacturers, making changes to the device and natural wear.

9.0 - RATING PLATE DATA

The rating plate data (see examples provided here) includes the following:

- Manufacturer's name/logo and address
(any distributor name/logo)
- Mod.: = device name/model
followed by the connection diameter
- P.max = Maximum pressure at which product operation is guaranteed
- PS = Allowable pressure
- Who = Relief pressure range
- TS = Temperature range that product operation is guaranteed within
-  = In compliance with PED directive followed by the no. of the Notified Body
-  = In compliance with ATEX Dir. followed by the protection mode
- year = Year of manufacture
- Lot = Product serial number (see explanation below)
 - U1802 = Lot issued in year 2017 in the 45th week
 - 1065 = progressive job order number for the specified year
 - 00001 = progressive number referring to the quantity of the lot



1.0 - GÉNÉRALITÉS

Le présent manuel décrit les procédures sécuritaires d'installation et de fonctionnement du dispositif.

Les instructions d'utilisation doivent **TOUJOURS** être disponibles dans le site de production où le dispositif est installé.

ATTENTION : les opérations d'installation/entretien doivent être effectuées par un personnel qualifié (comme indiqué au paragraphe 1.3) en utilisant des équipements de protection individuelle (É.P.I.) adaptés.

Pour toute information relative aux opérations d'installation/entretien ou en cas de problèmes ne pouvant pas être résolus à l'aide des instructions, il est possible de contacter le fabricant en utilisant l'adresse et les numéros de téléphone reportés à la dernière page.

1.1 - DESCRIPTION

Dispositif qui a la fonction d'absorber et d'évacuer à l'extérieur, dans l'air libre, les pics de pression (coups de bélier). Pour leur capacité d'évacuation, les vannes d'évacuation peuvent être appliquées dans tous les dispositifs, civils et industriels, gaz méthane, butane, propane et d'autres gaz non corrosifs.

1.2 - LÉGENDE DES SYMBOLES



DANGER : En cas de non-respect, il y a un risque de dommages matériels.



DANGER : En cas de non-respect, il se peut qu'il y ait non seulement des dommages matériels mais aussi des dommages aux personnes et / ou aux animaux domestiques.



ATTENTION : Ce signal attire l'attention sur les détails techniques s'adressant au personnel qualifié.

1.3 - PERSONNEL QUALIFIÉ

Il s'agit de personnes qui :

- Ont l'habitude d'installer, de monter, de mettre en service et d'entretenir le produit ;
- Connaissent les réglementations en matière d'installation et de sécurité, applicables dans leur région ou leur pays ;
- Ont été formées sur les premiers secours.



1.4 - UTILISATION DE PIÈCES DE RECHANGE NON ORIGINALES

- En cas d'entretien ou de remplacement des pièces de rechange (ex. ressorts d'étalonnage, etc.), utiliser **UNIQUEMENT** celles indiquées par le fabricant. L'utilisation de composants différents fait non seulement déchoir la garantie du produit mais risque également de compromettre le bon fonctionnement de ce dernier.
- Le fabricant n'est pas responsable des dysfonctionnements dérivant d'altérations non autorisées ou de l'utilisation de pièces de rechange non originales.



1.5 - UTILISATION NON APPROPRIÉE

- Le produit doit être utilisé uniquement pour le but pour lequel il a été construit.
- Il est interdit de l'utiliser avec des fluides autres que ceux indiqués.
- Les données techniques indiquées sur la plaque ne doivent en aucun cas être dépassées. Il appartient à l'utilisateur final ou à l'installateur d'adopter des systèmes adéquats de protection de l'appareil qui empêchent de dépasser la pression maximale indiquée sur la plaque.
- Le Fabricant n'est pas responsable des dommages causés par un usage impropre de l'appareil.

2.0 - DONNÉES TECHNIQUES

- Emploi : gaz non agressifs des trois familles (gaz secs)
- Température ambiante (TS) : -15 ÷ +60 °C
- Pression maximum de fonctionnement : 1 - 1,5 - 2,5 - 6 - 7 bar (voir l'étiquette du produit)
- Résistance mécanique : Groupe 2 (selon la norme EN 13611)
- Raccords filetés Rp : (DN 8 - DN 15 - DN 20 - DN 25 - DN 32 - DN 40 - DN 50) selon la norme EN 10226
- Raccords à brides à coupler avec des brides PN 16 : (DN 25* - DN 32 - DN 40 - DN 50) selon ISO 7005 / EN 1092-1
- Raccords filetés NPT ou à brides ANSI 150 : sur demande
- Conformément aux : Directive PED 2014/68/UE - Directive ATEX 2014/34/UE

* DN 25 avec brides tournantes.

2.1 - IDENTIFICATION DES MODÈLES

MVS/1 : Vanne d'évacuation - P.max 1 - 1,5 - 2,5 - 6 bar

MVSP/1 : Vanne d'évacuation Compact - P.max 1 - 7 bar

3.0 - MISE EN FONCTION DU DISPOSITIF



3.1 - OPÉRATIONS PRÉALABLES À L'INSTALLATION

- Il est nécessaire de fermer le gaz en amont de la vanne avant l'installation ;
- Vérifier que la pression de ligne **NE DÉPASSE PAS** la pression maximum déclarée sur l'étiquette du produit ;
- Tout bouchon de protection (le cas échéant) doit être ôté avant l'installation ;
- Les conduites et les intérieurs de la vanne doivent être débarrassés des corps étrangers ;

Si l'appareil est fileté :

- vérifier que la longueur du filet du tuyau ne soit pas excessive pour ne pas endommager le corps de l'appareil en phase de vissage ;

Si l'appareil est bridé :

- vérifier que les contre-brides d'entrée et sortie soient parfaitement parallèles pour éviter de soumettre le corps à des efforts mécaniques inutiles, calculer également l'espace pour l'insertion du joint d'étanchéité ;
- Pour les phases de serrage, il faut se munir d'une ou de plusieurs clés dynamométriques calibrées ou d'autres outils de serrage contrôlés ;
- En cas d'installation à l'extérieur, il est conseillé de prévoir un toit de protection pour éviter que l'eau de pluie ne puisse oxyder ou endommager des composants de l'appareil.



- En fonction de la géométrie de l'équipement, évaluer le risque de formation d'un mélange explosif dans le tuyau ;
- Si la vanne est installée à proximité d'autres équipements ou comme partie d'un ensemble, il est nécessaire d'évaluer au préalable la compatibilité entre la vanne et ces équipements ;
- Si l'électrovanne est accessible au personnel non qualifié, il faut prévoir une protection contre les collisions ou les contacts accidentels.



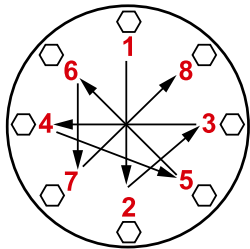
3.2 - INSTALLATION (voir l'exemple au 3.4)

Appareils filetés :

- Assembler le dispositif en le vissant, avec les joints opportuns, sur l'équipement avec des tuyaux et/ou des raccords dont les filetages sont compatibles avec la connexion à assembler.
- Ne pas utiliser le col du couvercle supérieur (**15**) comme levier pour le vissage mais se servir de l'outil spécifique ;
- La flèche indiquée sur le corps (**8**) de l'appareil doit être tournée vers l'application ;
- Acheminer l'évacuation de la vanne vers l'extérieur, dans la zone aérée non dangereuse.

Appareils bridés :

- Assembler l'appareil en le bridant, avec les joints appropriés, à l'équipement avec des tuyaux dont les brides sont compatibles avec la connexion à assembler. Les joints doivent être exempts de défauts et doivent être centrés entre les brides ;
- Lorsque les joints sont introduits, si l'espace qui reste est excessif, il ne faut pas essayer de le combler en serrant trop les boulons de l'appareil ;
- Les vannes d'évacuation sont installées en aval des régulateurs et elles peuvent être installées dans n'importe quelle position.
- Insérer les rondelles appropriées à l'intérieur des boulons pour éviter d'endommager les brides pendant le serrage ;
- Pendant la phase de serrage, veiller à ne pas « pincer » ni endommager le joint ;
- Serrer les écrous ou les boulons progressivement, selon un schéma en croix (voir l'exemple ci-dessous) ;
- Il faut d'abord les serrer à 30 %, puis à 60 %, jusqu'à 100 % du couple maximum (voir le tableau ci-dessous, conforme à la norme EN 13611) ;



Diamètre	DN 25	DN 32	DN 40	DN 50
Couple max. (N.m)	30	50	50	50

- Serrer à nouveau chaque écrou ou boulon dans le sens horaire au moins une fois jusqu'à atteindre l'uniformité du couple maximal ;

Procédures en commun (appareils filetés et à brides) :

- Pendant l'installation, éviter que des déchets ou des résidus métalliques ne pénètrent à l'intérieur de l'appareil ;
- Garantir un montage dépourvu de tensions mécaniques, il est conseillé d'utiliser aussi des joints compensateurs pour pallier les dilatations thermiques du tuyau ;
- Si l'installation de l'appareil est prévue dans une rampe, c'est à l'installateur de prévoir des supports adéquats ou des appuis correctement dimensionnés, pour soutenir et fixer l'ensemble. Ne jamais laisser, sous aucun prétexte, reposer le poids de la rampe uniquement sur les connexions (filetées ou bridées) de chaque dispositif ;
- Dans tous les cas, après la mise en place, vérifier l'étanchéité de l'installation ;

3.3 - INSTALLATION DANS DES LIEUX À RISQUE D'EXPLOSION (DIRECTIVE 2014/34/UE)

La vanne est conforme à la Directive 2014/34/UE comme appareil du groupe II, catégorie 2G et comme appareil du groupe II, catégorie 2D ; en tant que tel, elle est indiquée pour être installée dans les zones 1 et 21 (en plus des zones 2 et 22) comme classées dans l'annexe I de la Directive 99/92/CE.

La vanne ne peut pas être utilisée dans les zones 0 et 20 définies dans la directive 99/92/CE.

Pour déterminer la qualification et l'extension des zones dangereuses, consulter la norme CEI EN 60079-10-1.

S'il est installé et soumis à l'entretien en respectant pleinement toutes les conditions et instructions techniques reportées dans ce document, l'appareil ne constitue aucune source de dangers spécifiques : en particulier, en conditions de fonctionnement normal, l'émission en atmosphère de substance inflammable est prévue par la vanne uniquement occasionnellement.

Acheminer l'évacuation de la vanne vers l'extérieur, dans la zone aérée non dangereuse.

En cas de panne, la vanne peut être dangereuse pour les appareils qui se trouvent à proximité, aussi bien pour la membrane de fonctionnement (11) que pour la membrane de sécurité (5) : dans ce cas (et seulement dans ce cas), elle représente une source d'émission d'atmosphère explosive de degré continu et, en tant que telle, peut engendrer des zones dangereuses 0 au sens de la Directive 99/92/CE.

Dans des conditions d'installation particulièrement critiques (lieux non surveillés, carence d'entretien, mauvaise disponibilité de ventilation) et, surtout en présence, à proximité de la vanne, de potentielles sources d'amorce et/ou d'appareils dangereux lors du fonctionnement ordinaire car susceptibles de créer des arcs électriques ou des étincelles, il faut tout d'abord évaluer la compatibilité entre la vanne et ces appareils.

Quoi qu'il en soit, il faut prendre toutes les précautions utiles pour éviter que la vanne soit l'origine de zones 0 : par exemple, vérification périodique annuelle du bon fonctionnement, possibilité de modifier le degré d'émission de la source ou d'intervenir sur l'évacuation de la substance explosive à l'extérieur.

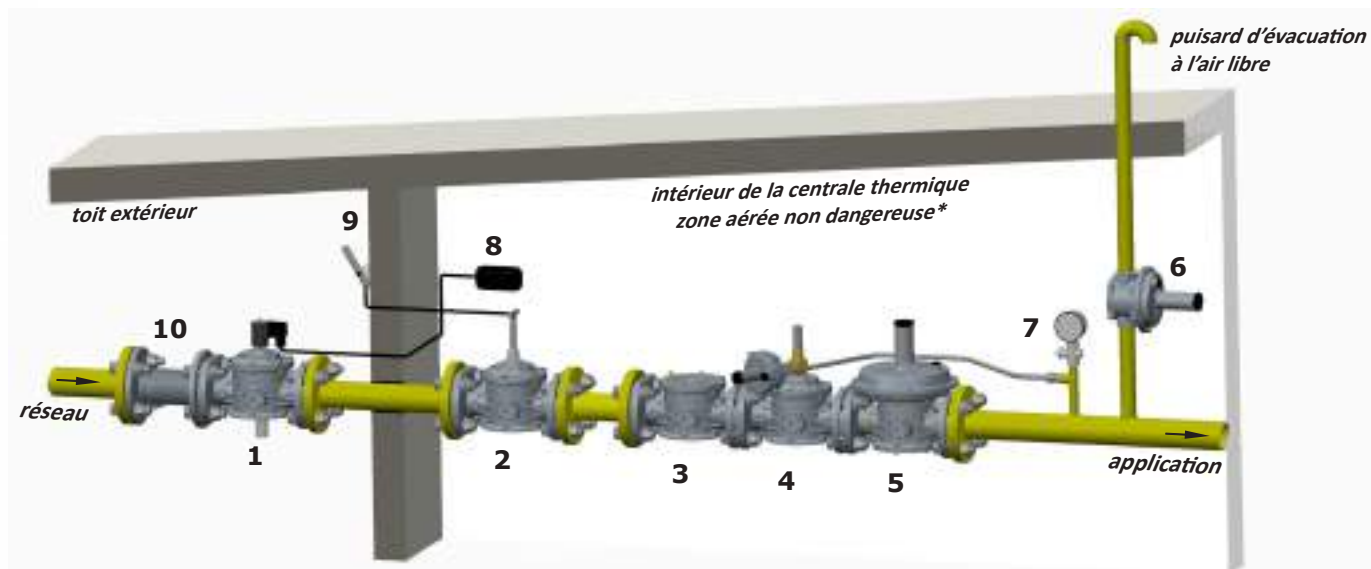
À telle fin, il est possible de raccorder à l'extérieur, au moyen d'un tuyau approprié, le trou fileté du couvercle supérieur (15) en retirant le bouchon anti-poussière (4). La connexion du trou fileté peut être G 1/4 ou G 3/8 (voir les indications des fig. 1, 2, 3, 4 et 5).

3.4 - EXEMPLE GÉNÉRAL D'INSTALLATION

1. Électrovanne à réarmement manuel M16/RM N.C.
2. Vanne à déchirement SM
3. Filtre à gaz FM
4. Vanne de fermeture OPSO série MVB/1 MAX
5. Régulateur de pression RG/2MC

6. Vanne d'évacuation MVS/1

7. Manomètre et bouton correspondant
8. Détecteur de gaz
9. Levier de commande à distance de la vanne à déchirement SM
10. Joint de compensation/antivibratoire



* si la zone est classée ATEX, suivre les indications fournies en 3.3



4.0 - PREMIÈRE MISE EN SERVICE



- Avant la mise en service, veiller à ce que toutes les indications présentes sur la plaque, y compris le sens du flux, soient respectées ;
- Après avoir pressurisé progressivement l'appareil, vérifier l'étanchéité et le fonctionnement de la vanne.



4.1 - VÉRIFICATIONS PÉRIODIQUES CONSEILLÉES

- À l'aide d'un instrument calibré approprié, veiller à ce que le serrage des boulons soit conforme aux indications fournies au paragraphe 3.2 ;
- Vérifier l'étanchéité des connexions à brides/filetées sur l'équipement ;
- Vérifier l'étanchéité et le fonctionnement de la vanne ;

Il incombe à l'utilisateur final ou à l'installateur de définir la fréquence des vérifications susmentionnées selon la lourdeur des conditions de fonctionnement.



5.0 - ÉTALONNAGE

Exemple d'étalonnage pour une vanne d'évacuation installée en aval d'un régulateur RG/2MG :

- pression de sortie du régulateur : 20 mbar
- étalonnage de la vanne d'arrêt : 50 mbar
- étalonnage de la vanne d'évacuation : 40 mbar

Procéder de la manière suivante (voir fig. 1) :

- Dévisser et ôter le bouchon de fermeture (1) ;
- Visser à fond la vis de réglage (2) ;
- Régler la pression de sortie du régulateur (au moyen de la vis de réglage) à la valeur de pression d'évacuation souhaitée (dans ce cas 40 mbar) ;
- Dévisser la vis de réglage (2) de la vanne d'évacuation jusqu'à ce qu'elle commence à évacuer du gaz ;
- À ce point, la vanne est étalonnée, ensuite restaurer la valeur d'étalonnage du régulateur (dans ce cas 20 mbar) et fermer les bouchons de fermeture des dispositifs.



5.1 - REMPLACEMENT DU RESSORT



L'opération doit être effectuée sans la présence de gaz autour de la vanne.

Pour remplacer le ressort :

- Dévisser et retirer le bouchon (**1**) du couvercle supérieur (**15**) ;
- Dévisser complètement et ôter la vis de réglage (**2**) ;
- Retirer la rondelle pour ressort (si présente) ;
- Extraire du couvercle supérieur (**15**) le ressort (**14**) et le remplacer par le nouveau ressort ;
- Replacer la rondelle sur le nouveau ressort ;
- Visser la vis de réglage (**2**) et, après avoir vissé l'installation comme indiqué en 4.0, régler la pression de sortie à la valeur souhaitée comme indiqué en 5.0 ;
- Revisser le bouchon (**1**) et, éventuellement, le sceller dans cette position en utilisant (s'ils sont présents) les trous spécifiques de scellage ;

• **REMARQUE** : L'opération ne s'effectue pas dans les versions avec $P_{max} = 6 \text{ bar}$ (voir fig. 7).



6.0 - ENTRETIEN



- Aucune opération d'entretien n'est prévue à l'intérieur de l'appareil. S'il est nécessaire d'effectuer des opérations à l'intérieur de l'appareil (changement du ressort, remplacement des membranes, etc.), il est conseillé de contacter le Service Technique. Quoiqu'il en soit, avant d'effectuer toute opération de démontage de l'appareil, veiller à ce qu'il n'y ait pas de gaz sous pression à l'intérieur de ce dernier.

7.0 - TRANSPORT, STOCKAGE ET ÉLIMINATION

- Pendant le transport, le matériel doit être traité avec soin, en évitant que le dispositif ne puisse subir des chocs, des coups ou des vibrations ;
- Si le produit présente des traitements de surface (ex. peinture, cataphorèse, etc.), ils ne doivent pas être endommagés pendant le transport ;
- La température de transport et de stockage coïncide avec celle indiquée dans les données nominales ;
- Si le dispositif n'est pas installé tout de suite après la livraison, il doit être correctement stocké dans un endroit sec et propre ;
- Dans des locaux humides, il est nécessaire d'utiliser des siccateurs ou du chauffage pour éviter la condensation.
- Le produit, en fin de vie, doit être éliminé conformément à la législation en vigueur dans le pays de réalisation de cette opération.

8.0 - GARANTIE

Les conditions de garantie qui s'appliquent sont celles qui sont établies avec le Fabricant lors de la livraison.

Pour les dommages causés par :

- Un usage impropre du dispositif ;
- Le non-respect des prescriptions indiquées dans le présent document ;
- Le non-respect des règles concernant l'installation ;
- L'altération, la modification et l'utilisation de pièces de rechange non originelles ;

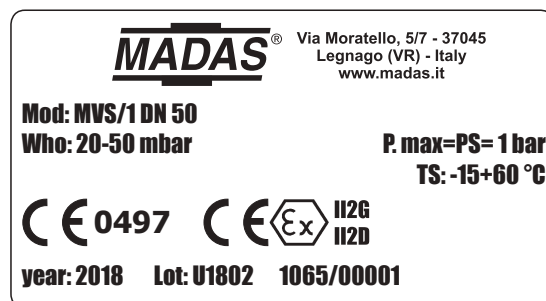
aucun droit de garantie ou de dédommagement ne peut être revendiqué.

Sont également exclus de la garantie les travaux d'entretien, le montage d'appareils d'autres producteurs, la modification du dispositif et l'usure naturelle.

9.0 - DONNÉES NOMINALES

Sur la plaque signalétique (voir l'exemple ci-contre)
sont reportées les données suivantes :

- Nom/logo et adresse du fabricant
(éventuel nom/logo du distributeur)
- Mod. : = nom/modèle de l'appareil
suivi du diamètre de connexion
- P.max = Pression maximum à laquelle le fonctionnement du produit est garanti
- PS = Pression admissible
- Who = Plage de pression d'évacuation
- TS = Plage de température à laquelle le fonctionnement du produit est garanti
-  = Conformité à la Directive PED suivie du n° de l'Organisme Notifié
-  = Conformité à la Directive ATEX suivie du mode de protection
- year = Année de fabrication
- Lot = Numéro de série du produit (voir l'explication ci-dessous)
 - U1802 = Lot en sortie année 2017 semaine n° 45
 - 1065 = numéro progressif de commande se référant à l'année indiquée
 - 00001 = numéro progressif se référant à la quantité du lot



1.0 - INFORMACIÓN GENERAL

Este manual muestra cómo instalar, hacer funcionar y usar el dispositivo de forma segura.

Las instrucciones de uso deben estar **SIEMPRE** disponibles en la instalación donde se encuentra el dispositivo.

ATENCIÓN: las operaciones de instalación/mantenimiento las deben realizar el personal cualificado (tal y como se indica en el punto 1.3), utilizando los equipos de protección individual (EPI) adecuados.

Para obtener más información relativa a las operaciones de instalación / mantenimiento o en caso de problemas que no se puedan solucionar usando las instrucciones, puede ponerse en contacto con el fabricante a través de la dirección y los números de teléfono que aparecen en la última página.

1.1 - DESCRIPCIÓN

Dispositivo cuya función es absorber y descargar hacia el exterior, al aire libre, los picos de presión (golpes de ariete). Gracias a su capacidad de descarga, las válvulas de alivio son ideales para todo tipo de usos, civiles e industriales, de gas metano, butano, propano y otros gases no corrosivos.

1.2 - LEYENDA DE SÍMBOLOS



PELIGRO: En caso de incumplimiento, pueden provocarse daños en bienes materiales.



PELIGRO: En caso de incumplimiento, además de daños en bienes materiales, también pueden provocarse daños a las personas y/o animales domésticos.



ATENCIÓN: Se destacan los detalles técnicos dirigidos al personal cualificado.

1.3 - PERSONAL CUALIFICADO

Es el personal que:

- Está familiarizado con la instalación, el montaje, la puesta en servicio y el mantenimiento del producto;
- Conoce las normativas vigentes en la región o país, en materia de instalación y seguridad;
- Ha recibido formación sobre primeros auxilios.



1.4 - USO DE PIEZAS DE RECAMBIO NO ORIGINALES

- En caso de mantenimiento o sustitución de recambios (por ejemplo, muelles de calibración, etc.) se deben usar **SOLO** los indicados por el fabricante. El uso de componentes diferentes, además de invalidar la garantía del producto, podría perjudicar su correcto funcionamiento.
- El fabricante se exime de toda responsabilidad por problemas de funcionamiento que deriven de manipulaciones no autorizadas o uso de recambios no originales.



1.5 - USO NO PREVISTO

- El producto se debe usar solo para el fin para el que ha sido fabricado.
- No se permite el uso con fluidos que no sean los indicados.
- No se deben superar en ningún caso, los datos técnicos indicados en la placa. El usuario final o el instalador tienen que adoptar los sistemas correctos de protección del aparato, que impidan que se supere la presión máxima indicada en la placa.
- El fabricante no es responsable de los daños causados por un uso inadecuado del aparato.

2.0 - DATOS TÉCNICOS

- Uso : gases no agresivos de las tres familias (gases secos)
- Temperatura ambiente (TS) : -15 ÷ +60 °C
- Presión máxima de funcionamiento : 1 - 1,5 - 2,5 - 6 - 7 bares (véase la etiqueta del producto)
- Resistencia mecánica : Grupo 2 (según norma EN 13611)
- Conexiones roscadas Rp : (DN 8 - DN 15 - DN 20 - DN 25 - DN 32 - DN 40 - DN 50) según la norma EN 10226
- Conexiones embridadas acoplables con bridas PN 16 : (DN 25* - DN 32 - DN 40 - DN 50) según la norma ISO 7005 / EN 1092-1
- Conexiones roscadas NPT o embridadas ANSI 150 : bajo pedido
- De conformidad con : Directiva PED 2014/68/UE - Directiva ATEX 2014/34/UE

* DN 25 con bridas giratorias.

2.1 - IDENTIFICACIÓN DE MODELOS

MVS/1 : Válvula de alivio - P. máx. 1 - 1,5 - 2,5 - 6 bares

MVSP/1 : Válvula de alivio Compact - P. máx. 1 - 7 bares

3.0 - PUESTA EN FUNCIONAMIENTO DEL DISPOSITIVO



3.1 - OPERACIONES ANTES DE LA INSTALACIÓN

- Se debe cerrar el gas en la entrada de la válvula, antes de la instalación;
- Compruebe que la presión de línea **NO SEA SUPERIOR** a la presión máxima declarada en la etiqueta del producto;
- Los posibles tapones de protección (si los hubiere) se deben quitar antes de la instalación;
- Las tuberías y partes internas de la válvula no deben tener cuerpos extraños;

Si el aparato está roscado:

- Compruebe que la longitud de la rosca de la tubería no sea excesiva, para no dañar el cuerpo del aparato en fase de atornillado;

Si el aparato está embridado:

- Compruebe que las contrabridas de entrada y salida sean perfectamente coaxiales y paralelas, para evitar someter el cuerpo a esfuerzos mecánicos inútiles; además, calcule el espacio para introducir la junta de estanqueidad;
- Para las fases de apriete, es necesario disponer de una o varias llaves dinamométricas calibradas u otras herramientas de bloqueo controladas;
- En caso de instalación en el exterior, se recomienda disponer de un techo de protección para evitar que el agua de la lluvia pueda oxidar o dañar las piezas del aparato.



- En función de la geometría de la instalación, evalúe el riesgo de formación de mezcla explosiva en el interior del conducto;
- Si la válvula se instala cerca de otros equipos o como parte de un conjunto, hay que evaluar previamente la compatibilidad entre la válvula y dichos equipos;
- Coloque una protección contra golpes o contactos accidentales en caso de que la electroválvula sea accesible para el personal no cualificado.



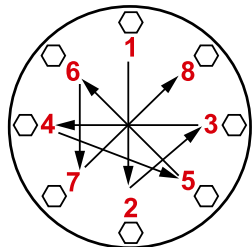
3.2 - INSTALACIÓN (véase el ejemplo en el punto 3.4)

Aparatos roscados:

- Monte el dispositivo enroscándolo, junto con las juntas correspondientes, en la instalación con tubos y/o racores cuyas roscas encajen con la conexión que se desea acoplar.
- No use el cuello de la tapa superior (**15**) como palanca para atornillar, sino utilice la herramienta adecuada;
- La flecha, indicada en el cuerpo (**8**) del aparato, debe estar dirigida hacia el punto de consumo;
- Canalice la descarga de la válvula hacia el exterior, en una zona ventilada que no sea peligrosa.

Aparatos embridados:

- Monte el dispositivo mediante bridas, junto con las juntas correspondientes, en la instalación con tuberías y/o racores cuyas bridas encajen con la conexión que desea acoplar. Las juntas no deben tener defectos y deben estar centradas entre las bridas;
- Si con las juntas puestas, el espacio que queda fuese excesivo, no trate de rellenarlo apretando excesivamente los pernos del aparato;
- Las válvulas de alivio se instalan en la salida de los reguladores y pueden colocarse en cualquier posición.
- Introduzca dentro de los pernos las arandelas correspondientes para evitar que las bridas se dañen en la fase de apriete;
- Durante la fase de apriete, asegúrese de no “pellizcar” ni dañar la junta;
- Apriete las tuercas o pernos gradualmente, según un patrón “en cruz” (véase el ejemplo indicado abajo);
- Apriételos, primero al 30 % y después al 60 %, hasta el 100 % del par máximo (consulte la tabla de abajo según la norma EN 13611);



Diámetro	DN 25	DN 32	DN 40	DN 50
Par máximo (N.m)	30	50	50	50

- Apriete de nuevo cada tuerca o perno en sentido horario, por lo menos una vez, hasta alcanzar la uniformidad del par máximo;

Procedimientos en común (aparatos roscados y embridados):

- Durante la instalación, evite que la suciedad o los residuos metálicos penetren en el aparato;
- Garantice un montaje sin tensiones mecánicas; se recomienda el uso de juntas de compensación para absorber también las dilataciones térmicas de la tubería;
- Si se ha previsto la instalación del aparato en una rampa, el instalador debe preparar los soportes o apoyos adecuados, correctamente dimensionados, para sostener y fijar el conjunto. Nunca deje, bajo ningún concepto, que el peso de la rampa recaiga únicamente sobre las conexiones (roscadas o embridadas) de cada uno de los dispositivos;
- En cualquier caso, después del montaje compruebe la estanqueidad de la instalación;

3.3 - INSTALACIÓN EN LUGARES CON RIESGO DE EXPLOSIÓN (DIRECTIVA 2014/34/UE)

La válvula cumple con la Directiva 2014/34/UE como aparato del grupo II, categoría 2G y como aparato del grupo II, categoría 2D; como tal, es idónea para instalarse en las zonas 1 y 21 (además de las zonas 2 y 22), tal y como se clasifican en el anexo I de la Directiva 99/92/CE.

La válvula no debe utilizarse en las zonas 0 y 20, de acuerdo con las disposiciones de la mencionada Directiva 99/92/CE. Para determinar la clasificación y la extensión de las zonas peligrosas, consulte la norma CEI EN 60079-10-1.

El aparato, si se instala y se somete a mantenimiento respetando todas las condiciones e instrucciones técnicas referidas en este documento, no genera peligros específicos; especialmente, bajo condiciones de funcionamiento normal, se prevé que la válvula emita a la atmósfera sustancias inflamables solo de forma ocasional.

Canalice la descarga de la válvula hacia el exterior, en una zona ventilada que no sea peligrosa.

La válvula puede ser peligrosa si hay otros equipos cerca de la misma en caso de avería, tanto de la membrana de funcionamiento (11) como de la membrana de seguridad (5): en tal caso (y no solo en este caso), constituye una fuente de emisión de atmósfera explosiva de grado continuo y, como tal, puede originar zonas peligrosas 0, tal y como se define en la Directiva 99/92/CE.

Se puede evaluar previamente la compatibilidad entre la válvula y dichos aparatos, bajo condiciones de instalación especialmente críticas (lugares sin vigilancia, falta de mantenimiento, escasa disponibilidad de ventilación) y, sobre todo cerca de fuentes potenciales de ignición y/o aparatos peligrosos durante su funcionamiento normal, ya que son susceptibles de originar arcos eléctricos o chispas.

En cualquier caso, es necesario tomar todas las precauciones útiles para evitar que la válvula origine zonas 0: por ejemplo, comprobación periódica anual de su funcionamiento regular, posibilidad de modificar el grado de emisión de la fuente o intervenir en la descarga al exterior de la sustancia explosiva.

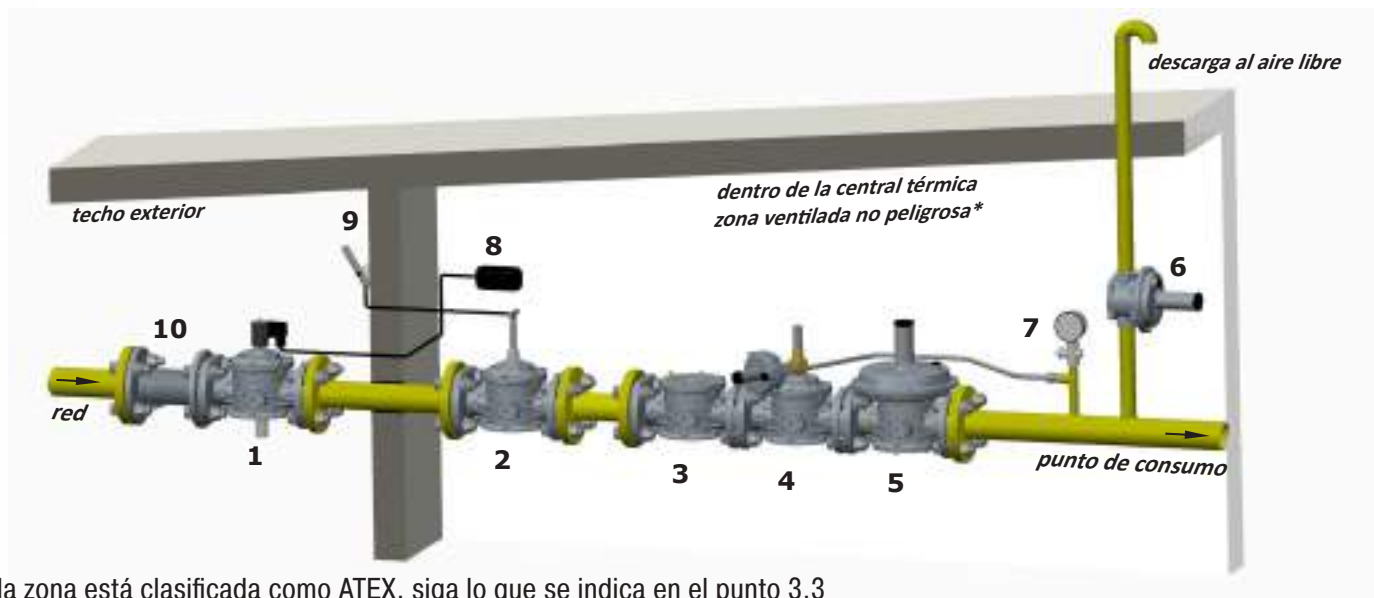
Para ello, se puede conectar en el exterior, mediante el tubo correspondiente, el orificio roscado de la tapa superior (15) quitando el tapón antipolvo (4). La conexión del orificio roscado puede ser G 1/4 o G 3/8 (consulte las indicaciones en las figuras 1, 2, 3, 4 y 5).

3.4 - EJEMPLO GENÉRICO DE INSTALACIÓN

1. Electroválvula con rearme manual M16/RM N.C.
2. Válvula de corte SM
3. Filtro de gas FM
4. Válvula de seguridad por máxima OPSO serie MVB/1 MAX
5. Regulador de presión RG/2MC

6. Válvula de alivio MVS/1

7. Manómetro y botón correspondiente
8. Detección de gas
9. Palanca de mando a distancia de la válvula de corte SM
10. Junta de compensación/antivibración



*si la zona está clasificada como ATEX, siga lo que se indica en el punto 3.3



4.0 - PRIMERA PUESTA EN SERVICIO



- Antes de la puesta en servicio, compruebe que se respetan todas las indicaciones presentes en la placa, incluida la dirección del flujo;
- Después de presurizar de forma gradual la instalación, compruebe la estanqueidad y el funcionamiento de la válvula.



4.1 - COMPROBACIONES PERIÓDICAS RECOMENDADAS

- Compruebe con el instrumento específico calibrado, que el apriete de los pernos sea conforme con lo indicado en el punto 3.2;
- Compruebe la estanqueidad de las conexiones embridadas/roscadas en la instalación;
- Compruebe la estanqueidad y el funcionamiento de la válvula;

Es deber del usuario final o del instalador determinar la frecuencia de dichas comprobaciones en función de la gravedad de las condiciones de servicio.



5.0 - CALIBRACIÓN

Ejemplo de calibración de una válvula de alivio instalada en la salida de un regulador RG/2MC:

- presión de salida del regulador: 20 milibares
- calibración de la válvula de bloqueo: 50 milibares
- calibración de la válvula de alivio: 40 milibares

Proceda de la siguiente forma (véase la fig. 1):

- Desenrosque y quite el tapón de cierre (1);
- Apriete al máximo el tornillo de regulación (2);
- Regule la presión de salida del regulador (mediante el tornillo de regulación correspondiente) en el valor de presión de alivio deseado (en este caso es de 40 milibares);
- Desenrosque el tornillo de regulación (2) de la válvula de alivio hasta que esta última comience a descargar gas;
- Llegado a este punto, la válvula está calibrada. Restablezca el valor de calibración del regulador (en este caso es de 20 milibares) y cierre los tapones de cierre de los dispositivos.



5.1 - SUSTITUCIÓN DEL MUELLE



La operación debe realizarse sin la presencia de gas en el interior de la válvula.

Para sustituir el muelle:

- Desenrosque y quite el tapón **(1)** de la tapa superior **(15)**;
- Desenrosque por completo y quite el tornillo de regulación **(2)**;
- Quite (si lo hubiere) la arandela del muelle;
- Extraiga el muelle **(14)** de la tapa superior **(15)** y sustitúyalo por otro nuevo;
- Coloque de nuevo la arandela sobre el muelle nuevo;
- Atornille el tornillo de regulación **(2)** y, después de haber puesto en marcha la instalación como se indica en el punto 4.0, realice la calibración al valor deseado, tal y como se indica en el punto 5.0;
- Enrosque el tapón **(1)** y, si es necesario, séllelo en esa posición utilizando (si los hubiere) los orificios de sellado correspondientes;

• **NOTA:** La operación no se realiza en las versiones con P. máx. = 6 bares (véase la fig. 7).



6.0 - MANTENIMIENTO



- No se prevén operaciones de mantenimiento a realizar dentro del aparato. En caso de que sea necesario realizar operaciones dentro del aparato (cambio del muelle, sustitución de las membranas, etc.), se recomienda contactar con el Departamento Técnico. En cualquier caso, antes de realizar cualquier operación de desmontaje en el aparato, asegúrese de que en el interior del mismo no haya gas a presión.

7.0 - TRANSPORTE, ALMACENAMIENTO Y ELIMINACIÓN

- Durante el transporte, el material debe tratarse con cuidado, evitando que el dispositivo se someta a choques, golpes o vibraciones;
- Si el producto tiene tratamientos superficiales (ej. pintura, cataforesis, etc.), estos no deben dañarse durante el transporte;
- La temperatura de transporte y almacenamiento debe coincidir con la indicada en los datos de la placa;
- Si el dispositivo no se instala inmediatamente tras la entrega, se debe almacenar correctamente en un lugar seco y limpio;
- En lugares húmedos es necesario usar secadores o bien calefacción, para evitar la formación de condensación.
- El producto, al final de su vida útil, deberá eliminarse conforme a la legislación vigente en el país en el que se realiza dicha operación.

8.0 - GARANTÍA

Valen las condiciones de garantía establecidas con el fabricante en el momento del suministro.

Para daños causados por:

- El uso inadecuado del dispositivo;
- El incumplimiento de las disposiciones indicadas en este documento;
- El incumplimiento de las normas relacionadas con la instalación;
- La alteración, modificación y uso de las piezas de recambio no originales;

No se pueden reclamar derechos de garantía ni indemnización por daños.

Además, se excluyen de la garantía los trabajos de mantenimiento, el montaje de aparatos de otros fabricantes, la modificación del dispositivo y el desgaste natural.

9.0 - DATOS DE LA PLACA

En la placa (véase los ejemplos de al lado) aparecen los siguientes datos:

- Nombre/logotipo y dirección del fabricante
(eventualmente nombre/logotipo del distribuidor)
- Mod.: = nombre/modelo del aparato
seguido del diámetro de conexión
- P. max = Presión máxima en la que se garantiza el funcionamiento del producto
- PS = Presión admisible
- Who = Rango de la presión de alivio
- TS = Intervalo de temperatura en el que se garantiza el funcionamiento del producto
-  = Conforme a la Directiva PED seguido del n.º del Organismo Notificado
-  = Conforme a la Directiva ATEX seguida del modo de protección
- year = Año de fabricación
- Lot = Número de matrícula del producto (véase la explicación a continuación)
 - U1802 = Lote del año de salida 2017 semana n° 45
 - 1065 = número progresivo de pedido referido al año indicado
 - 00001 = número progresivo referido a la cantidad del lote

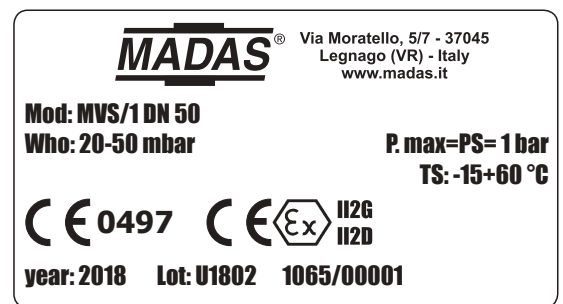
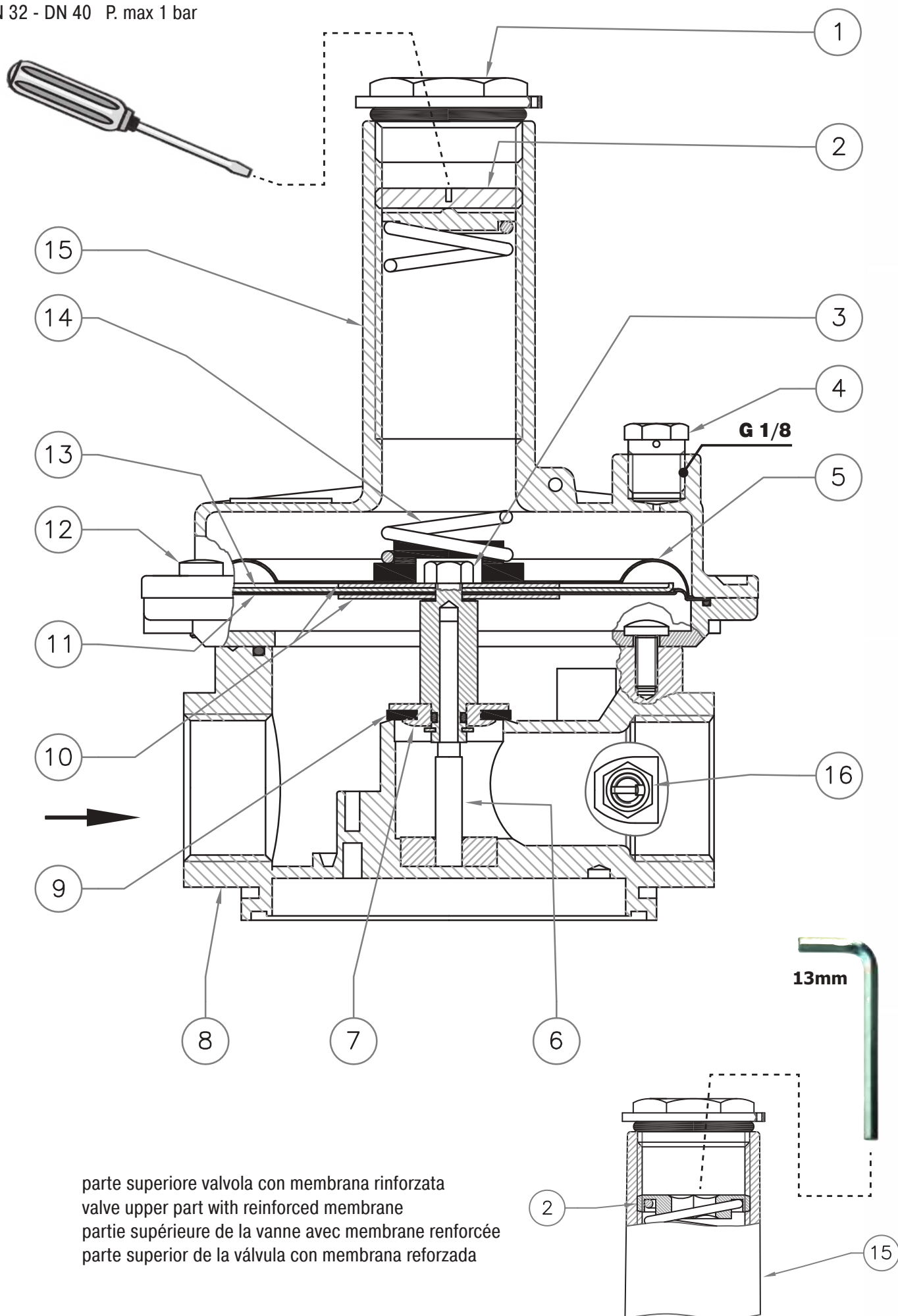


fig. 1

MVS/1

DN 20 - DN 25 - P. max 1 - 1,5 - 2,5 bar

DN 32 - DN 40 P. max 1 bar



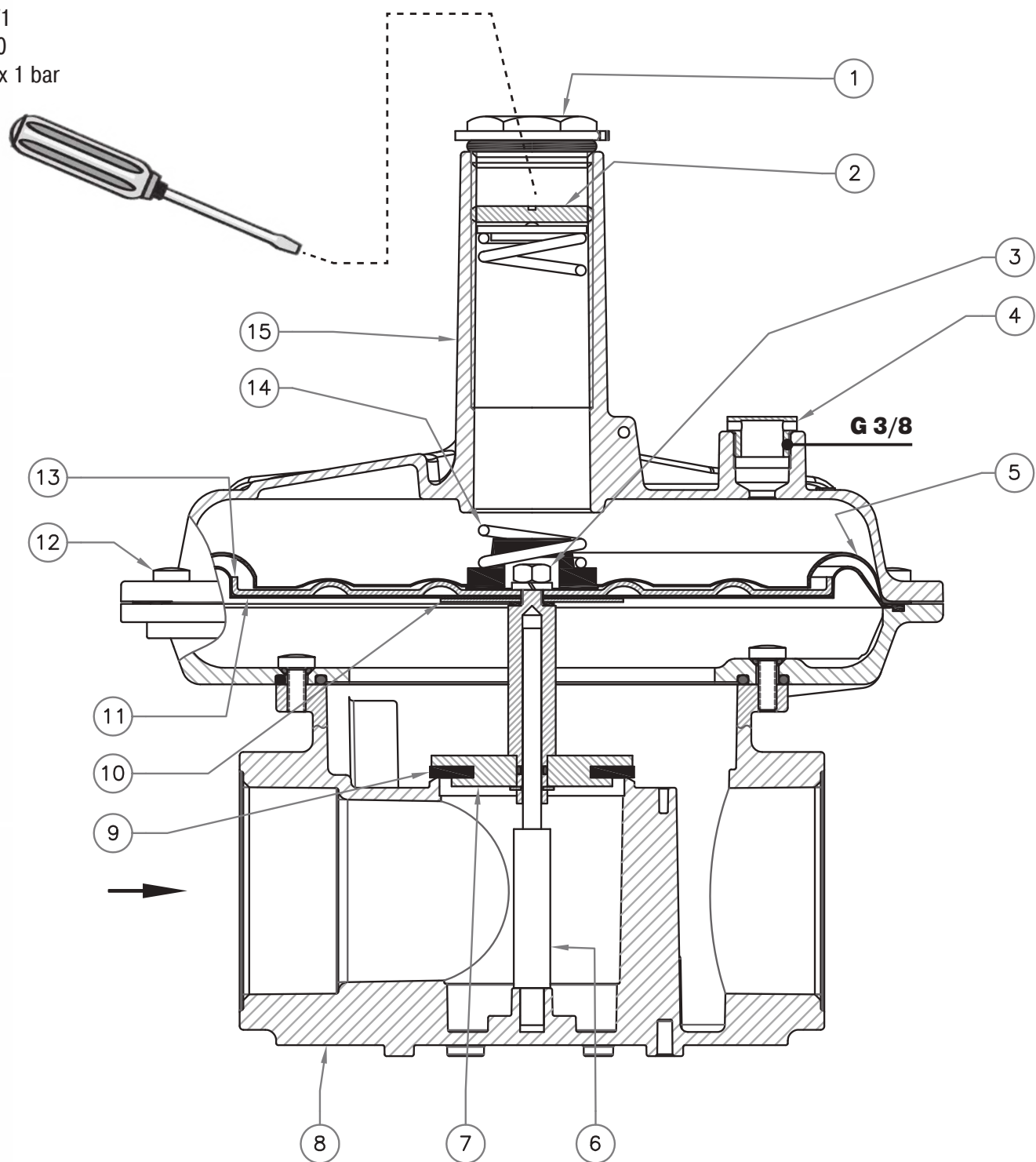
IT

EN

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ES

fig. 2
MVS/1
DN 50
P. max 1 bar



parte superiore valvola con membrana rinforzata
valve upper part with reinforced membrane
partie supérieure de la vanne avec membrane renforcée
parte superior de la válvula con membrana reforzada

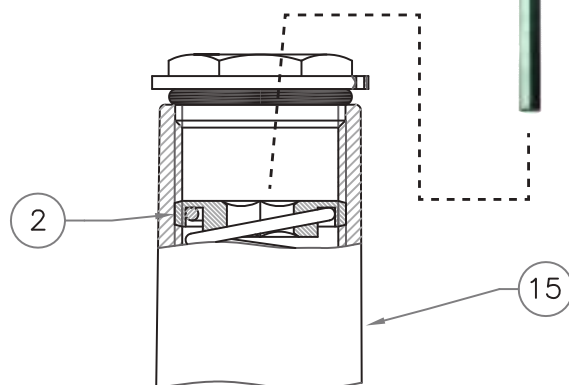
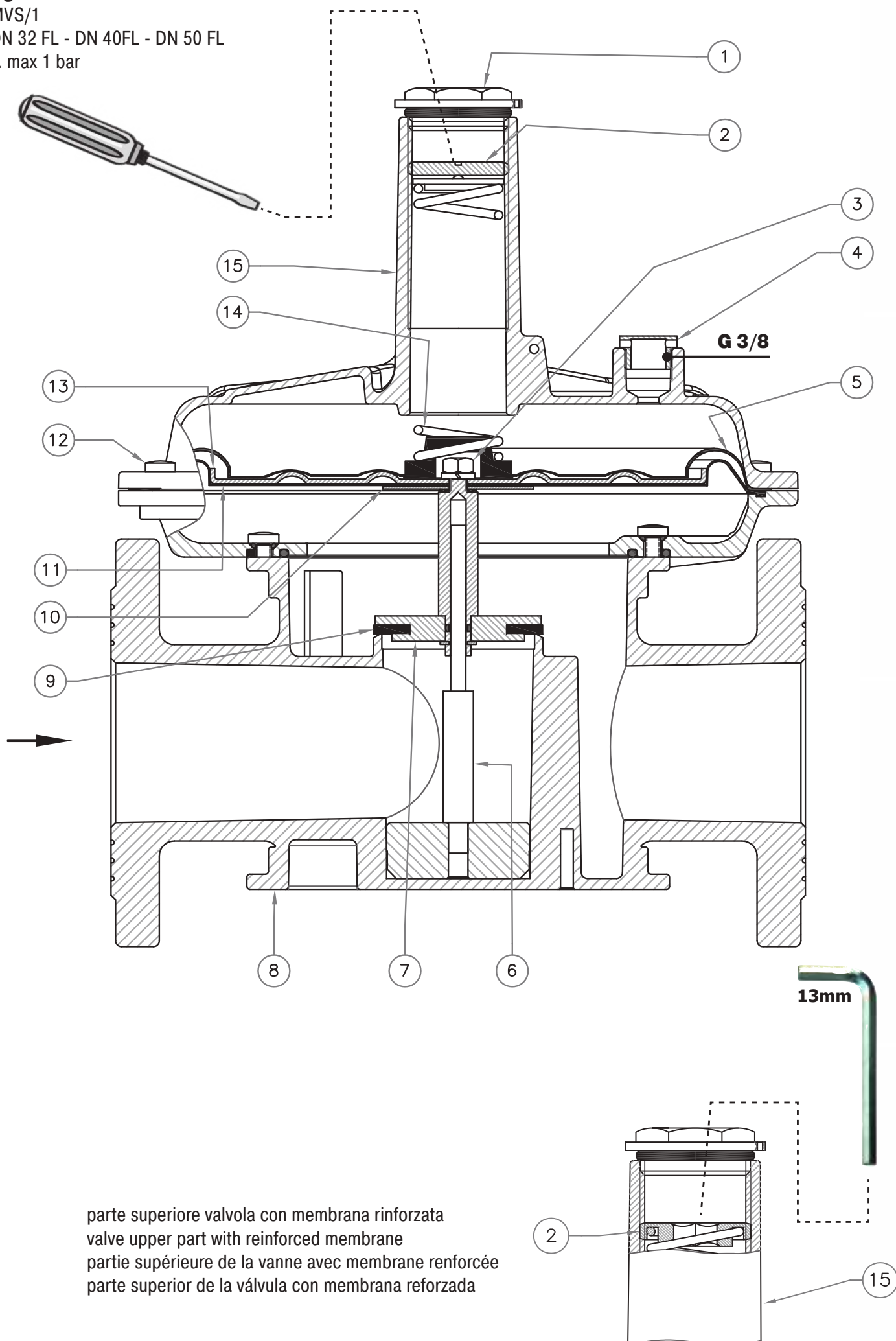


fig. 3

MVS/1

DN 32 FL - DN 40FL - DN 50 FL

P. max 1 bar



IT

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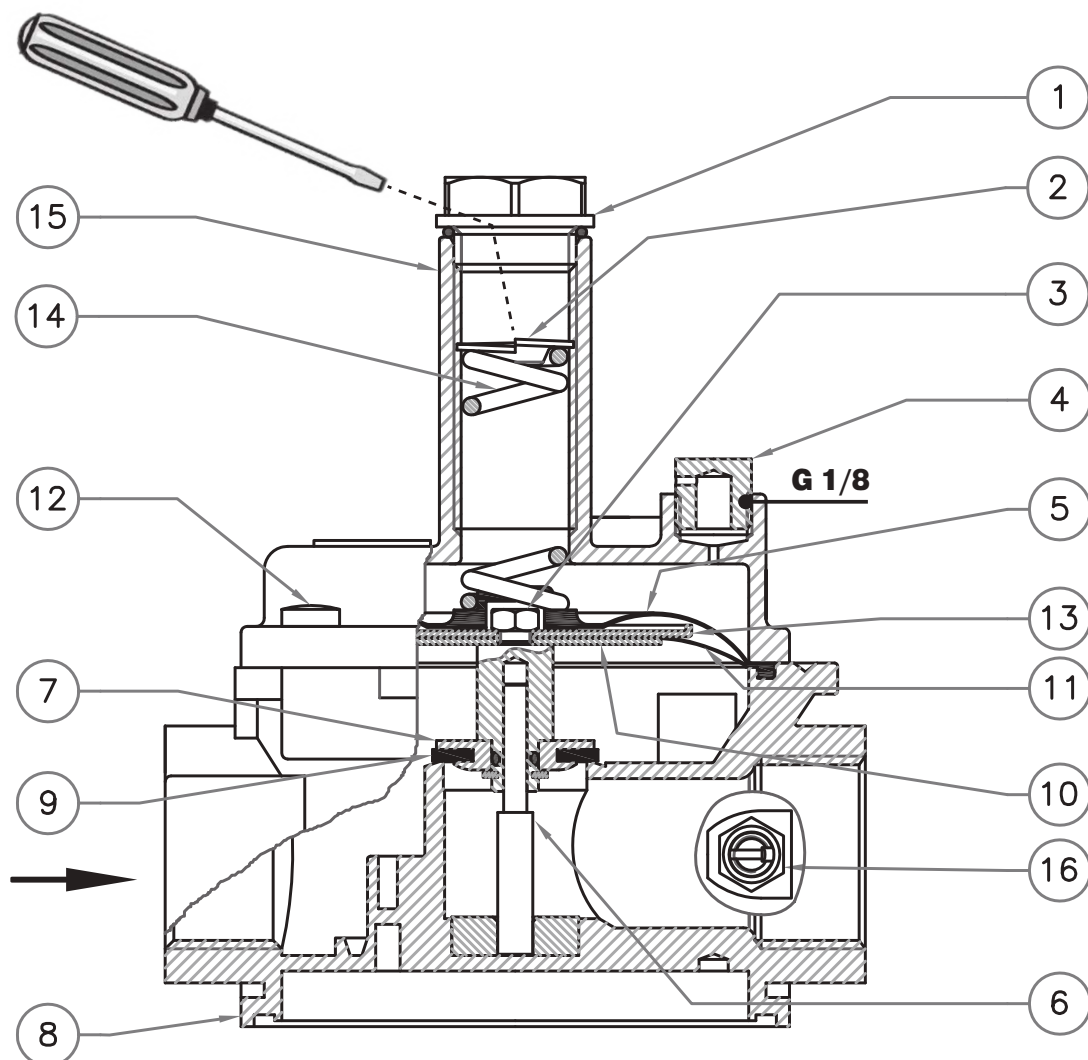
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fig. 4

MVSP/1 (Compact)
DN 15 - DN 20 - DN 25
P. max 1 bar

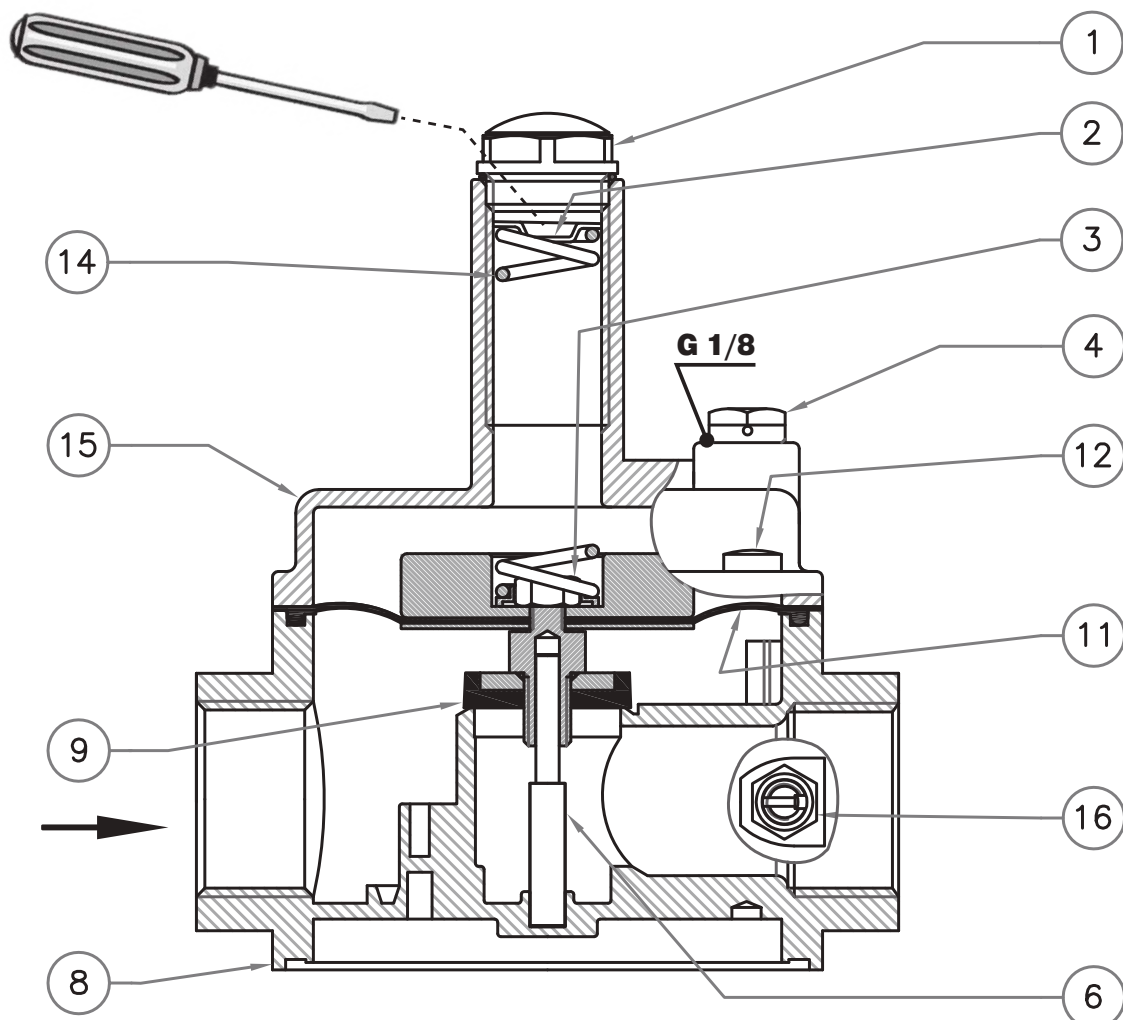


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fig. 5

MVSP/1 (Compact)
DN 20 - DN 25
P. max 7 bar



ES

fig. 6

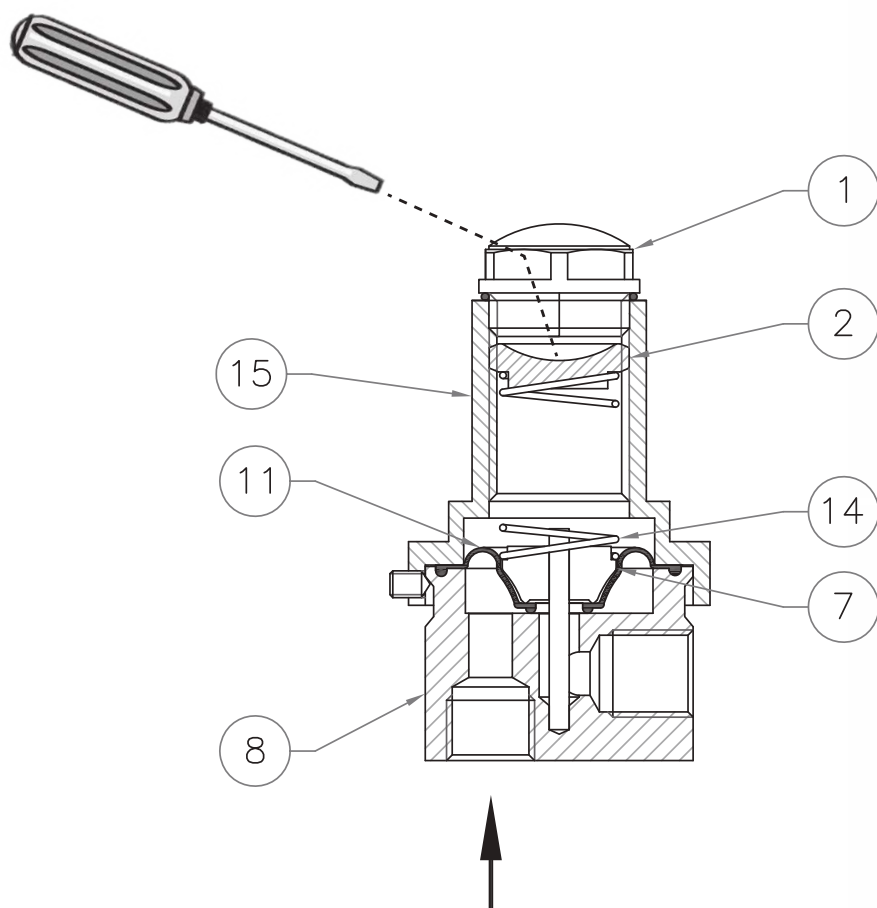
MVS/1 - P. max 1 bar

Versione con attacchi G 1/4

G 1/4 connections version

Version avec fixations G 1/4

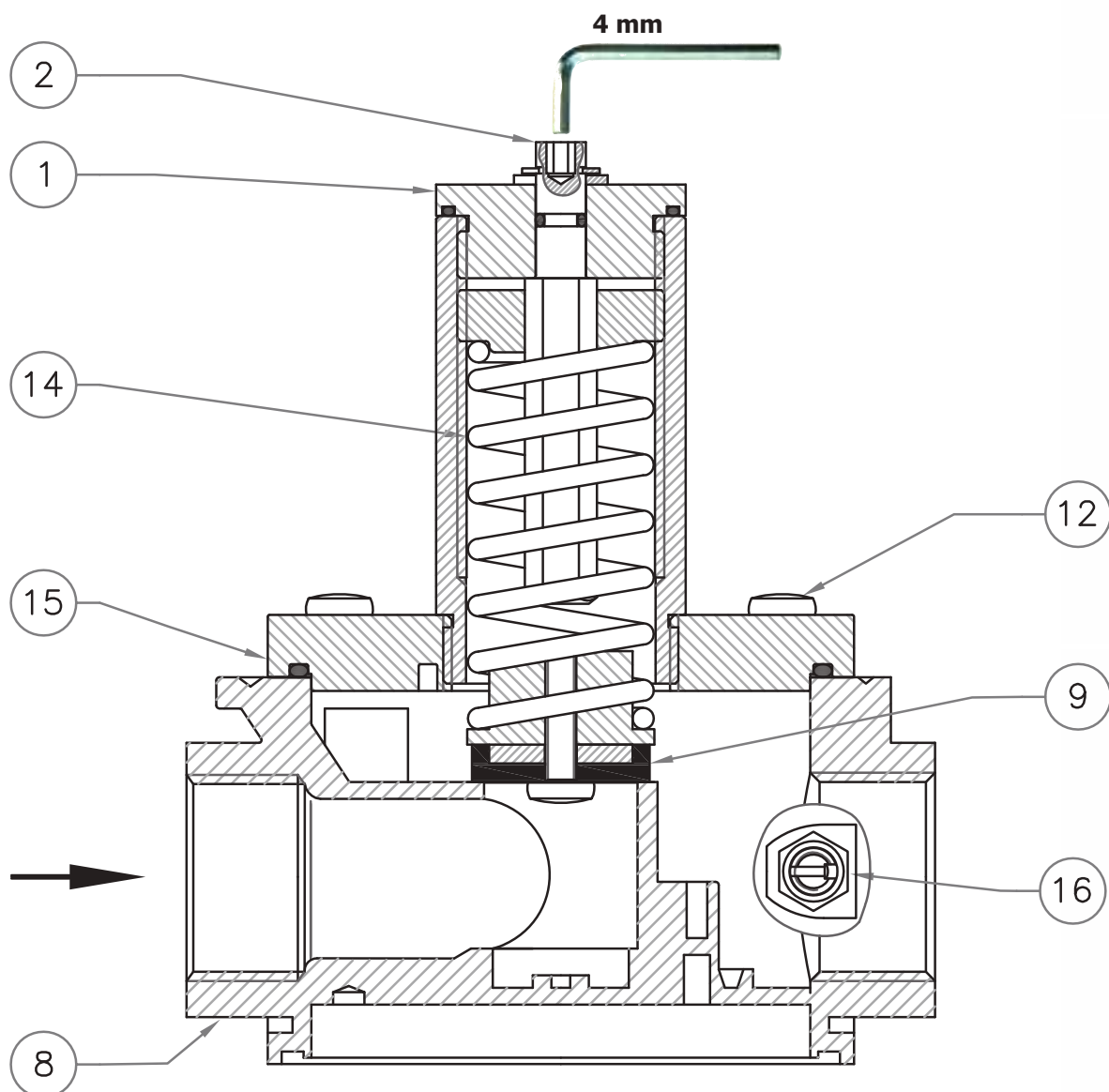
Versiones con conexiones G 1/4

**fig. 7**

MVS/1

DN 20 - DN 25

P. max 6 bar



IT

EN

FR

ES

IT

fig. 1, 2, 3, 4, 5, 6 e 7

1. Tappo di chiusura
2. Vite di regolazione taratura
3. Dado blocca membrana
4. Tappo antipolvere
5. Membrana di sicurezza
6. Perno guida centrale
7. Otturatore
8. Corpo
9. Rondella di tenuta
10. Dischi per membrana
11. Membrana di funzionamento
12. Viti di fissaggio coperchio superiore
13. Disco superiore per membrana
14. Molla di taratura
15. Coperchio superiore
16. Presa di pressione (optional)

EN

fig. 1, 2, 3, 4, 5, 6 and 7

1. Closing cap
2. Calibration adjustment screw
3. Membrane locking nut
4. Dust cap
5. Safety membrane
6. Central guide pin
7. Obturator
8. Body
9. Sealing washer
10. Membrane discs
11. Working membrane
12. Top cover clamping screws
13. Top disk for diaphragm
14. Calibration spring
15. Top cover
16. Pressure outlet (optional)

FR

fig. 1, 2, 3, 4, 5, 6 et 7

1. Bouchon de fermeture
2. Vis de réglage étalonnage
3. Écrou bloc membrane
4. Bouchon anti-poussière
5. Membrane de sécurité
6. Pivot guide central
7. Obturateur
8. Corps
9. Rondelle d'étanchéité
10. Disques pour membrane
11. Membrane de fonctionnement
12. Vis de fixation du couvercle supérieur
13. Disque supérieur pour membrane
14. Ressort d'étalonnage
15. Couvercle supérieur
16. Prise de pression (en option)

ES

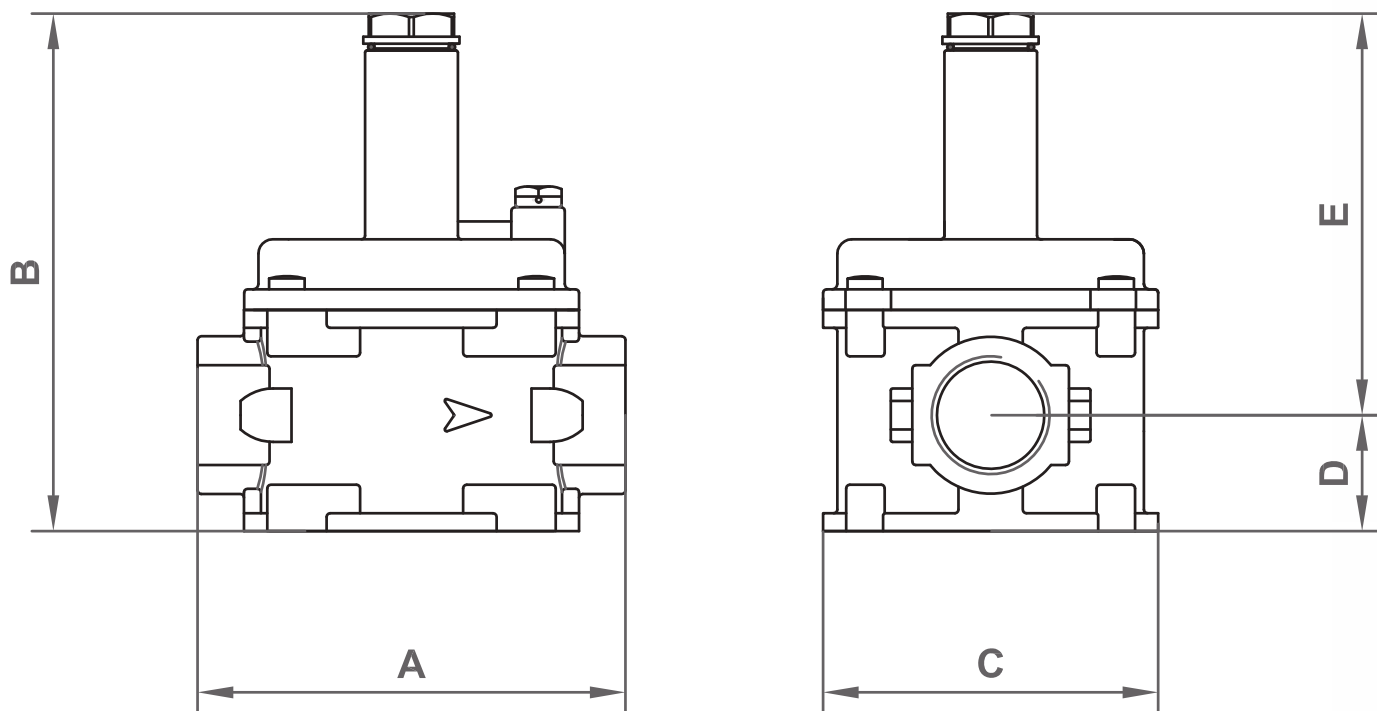
fig. 1, 2, 3, 4, 5, 6 y 7

1. Tapón de cierre
2. Tornillo de regulación de calibración
3. Tuerca de bloqueo de la membrana
4. Tapón antipolvo
5. Membrana de seguridad
6. Perno de guía central
7. Obturador
8. Cuerpo
9. Arandela de estanqueidad
10. Discos para membrana
11. Membrana de funcionamiento
12. Tornillos de fijación de la tapa superior
13. Disco superior para membrana
14. Muelle de calibración
15. Tapa superior
16. Toma de presión (opcional)

Tabella 1a - Table 1a - Tableau 1a - Tabla 1a

Dimensioni di ingombro in mm - Overall dimensions in mm - Mesures d'encombrement en mm - Dimensiones en mm

Attacchi filettati Threaded connections Raccords filetés Conexiones roscada	Attacchi flangiati Flanged connections Raccords à bride Conexiones embridadas	fori holes trous orificios	P. max (bar)	A	B=(D+E)	C	D	E
DN 8	-	-	1	-	81	45	-	-
DN 15 - DN 20 - DN 25 MVSP/1 Compact	-	-	1	120	144	94	29	115
DN 20 - DN 25	-	-	6	120	148	94	29	119
DN 20 - DN 25 MVSP/1 Compact	-	-	7	120	144	94	29	115
-	PN 16 - ANSI 150 DN 25	4	6	191	176	140	57,5	118,5

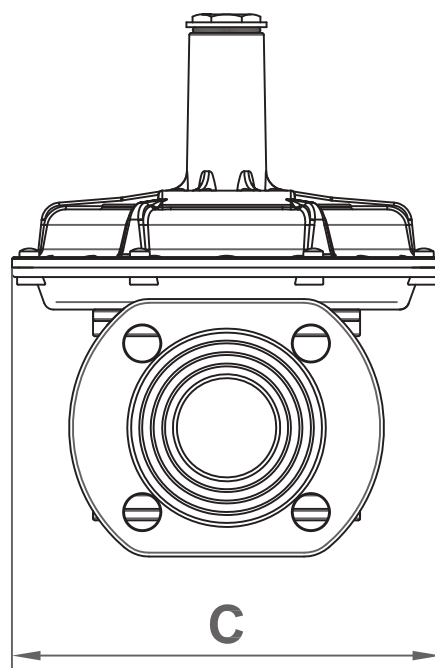
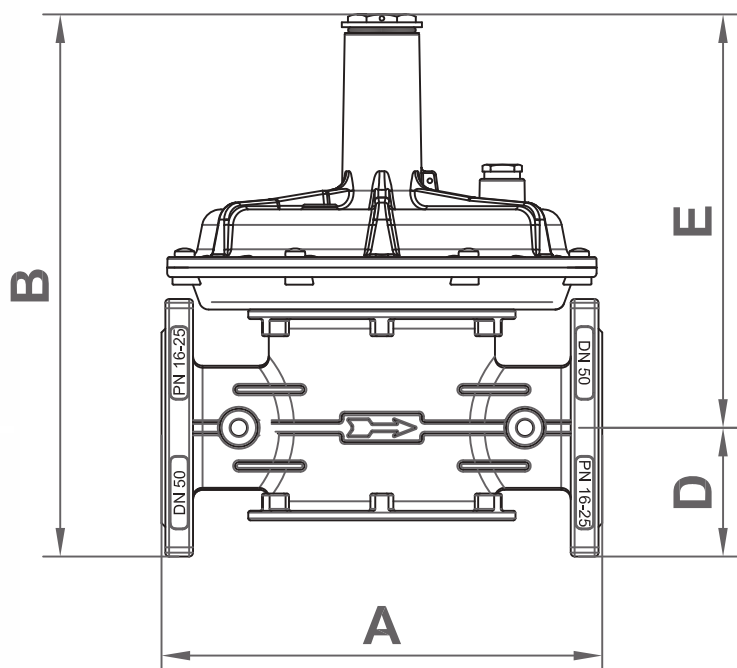


Le dimensioni sono indicative, non vincolanti - The dimensions are provided as a guideline, they are not binding
 Les dimensions sont indicatives, non contraignantes - Las dimensiones son indicativas, no vinculantes

Tabella 1b - Table 1b - Tableau 1b - Tabla 1b

Dimensioni di ingombro in mm - Overall dimensions in mm - Mesures d'encombrement en mm - Dimensiones en mm

Attacchi filettati Threaded connections Raccords filetés Conexiones roscada	Attacchi flangiati Flanged connections Raccords à bride Conexiones embridadas	fori holes trous orificios	P.max	A	B=(D+E)	C	D	E
DN 20 - DN 25	-	-	1 1,5 2,5	120	192	140	29	163
-	PN 16 - ANSI 150 DN 25	4	1 1,5 2,5	191	212	140	57,5	154,5
DN 32 - DN 40	-	-	1	160	196	140	37	159
-	PN 16 DN 32 FL	4	1	230	285	225	67,5	217,5
-	PN 16 - ANSI 150 DN 40 FL - DN 50 FL	4	1	230	285	225	67,5	217,5
DN 50	-	-	1	160	257	225	45	212

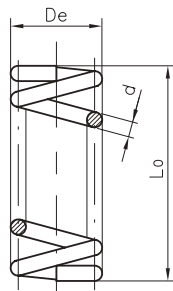


Le dimensioni sono indicative, non vincolanti - The dimensions are provided as a guideline, they are not binding
Les dimensions sont indicatives, non contraignantes - Las dimensiones son indicativas, no vinculantes

Tabella 2 - Table 2 - Tableau 2 - Tabla 2

Modello Model Modèle Modelo	Attacchi - Connections Raccords - Conexiones		P.max (bar)	Caratteristiche molle di taratura - Setting spring data - Caracteristiques des ressorts de tarage - Características muelles de tarado		
	Filettati Threaded Filetés Roscas	Flangiati Flanged A brides Embridadas		Codice Code Code Código	Dimensioni in mm Dimensions in mm Mesures en mm Dimensiones en mm (d x De x Lo x it)	Taratura Setting Tarage Tarado (mbar)
MVS/1 (G 1/4)	DN 8	-	1	MO-0104	0,8x17x40x6	40 ÷ 90
				MO-0153	0,9x17x45x7	80 ÷ 180
				MO-0204	1x17x22x4	100 ÷ 360
				MO-0223	1x17x70x10	280 ÷ 500
MVSP/1 compact	DN 15	-	1	MO-0213	1,3x17x55x8	18 ÷ 70
				MO-0215	1,8x18,4x45x8,5	30 ÷ 120
				MO-2150	2x17x54x9	70 ÷ 260
	DN 20 - DN 25	-	1	MO-0213	1,3x17x55x8	18 ÷ 80
				MO-0215	1,8x18,4x45x8,5	40 ÷ 160
				MO-2150	2x17x54x9	100 ÷ 300
	DN 20 - DN 25	-	7	MO-2160	2,2x17,5x66x11	50 ÷ 450
				MO-2170	1,6x17x71x15	40 ÷ 160
				MO-0220	1,8x18x74x11	70 ÷ 300
MVS/1	DN 20 - DN 25	DN 25 FL	1	MO-2160	2,2x17,5x66x11	200 ÷ 600
				MO-0500	1,6x29x115x12	16 ÷ 37
				MO-0825	2,2x29x100x12	30 ÷ 110
				MO-0900	2,5x29x140x18,5	100 ÷ 160
				MO-0970	2,5x29x155x16	140 ÷ 215
				MO-1305	3,5x29,8x98x11,5	215 ÷ 500
			1,5	MO-2550	4x29x98x8	200 ÷ 1000*
			2,5	MO-2580	4,6x29,4x95x9	700 ÷ 2100*
			6	-	-	300 ÷ 6000
	DN 32 - DN 40		1	MO-0825	2,2x29x100x12	30 ÷ 110
				MO-0900	2,5x29x140x18,5	110 ÷ 170
				MO-0970	2,5x29x155x16	160 ÷ 300*
				MO-1305	3,5x29,8x98x11,5	260 ÷ 500*
	DN 50	DN 32 FL DN 40 FL DN 50 FL	1	MO-0900	2,5x29x140x18,5	20 ÷ 50
				MO-1305	3,5x29,8x98x11,5	35 ÷ 135
				MO-1300	3,5x29,8x150x16	130 ÷ 200
				MO-2550	4x29x98x8	200 ÷ 400*
				MO-2580	4,6x29,4x95x9	320 ÷ 500*

it= numero di spire totali
it= total number of turns
it= nombre total de spires
it= número total de espiras



* = Versione con membrana rinforzata - Version with reinforced diaphragm - Version avec membrane renforcée - Versión con membrana reforzada

Le tarature contrassegnate con * non sono intercambiabili con le versioni standard (quelle senza *).

Settings marked with * are not interchangeable with standard settings (the one without *).

Les étalonnages marqués avec * ne sont pas interchangeables avec les versions standards (ceux sans *).

Las calibraciones marcadas con * no son intercambiables con las versiones estándar (aquellas sin *).

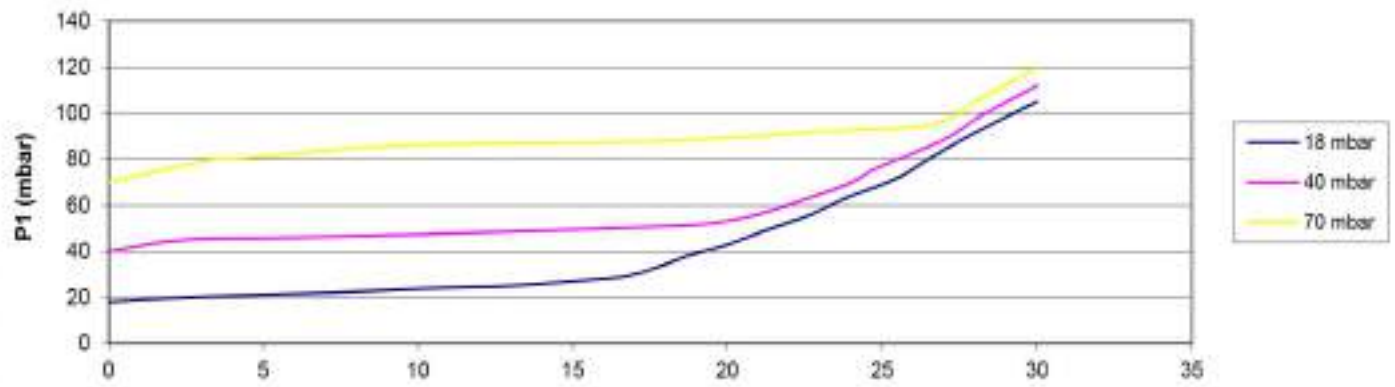
CURVE - CURVES - COURBES - CURVAS

(MVSP/1 DN 15 COMPACT)

P.max 1 bar

IT

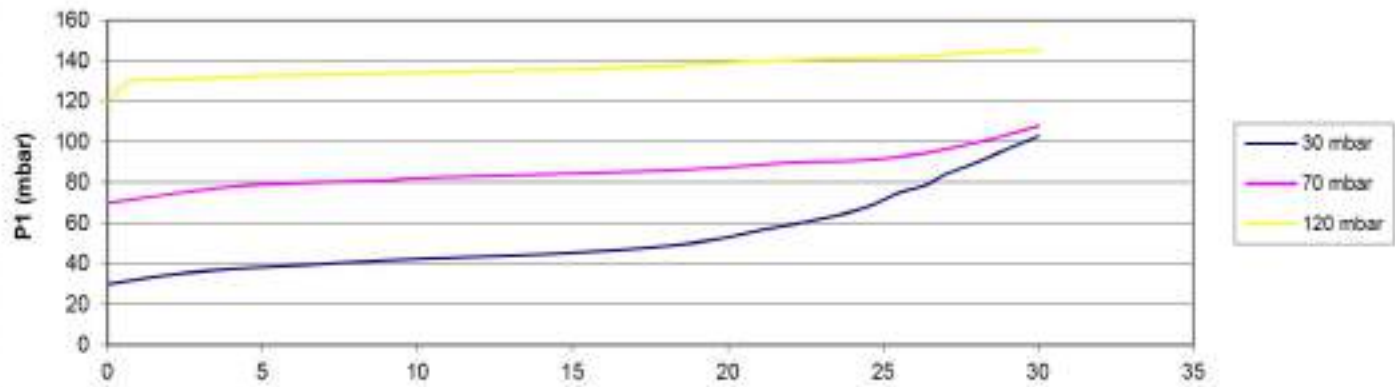
Range 18÷70 mbar



Portata (Nm³/h aria) - Flow rate (Nm³/h air) - Debit (Nm³/h air) - Caudal (Nm³/h aire)

EN

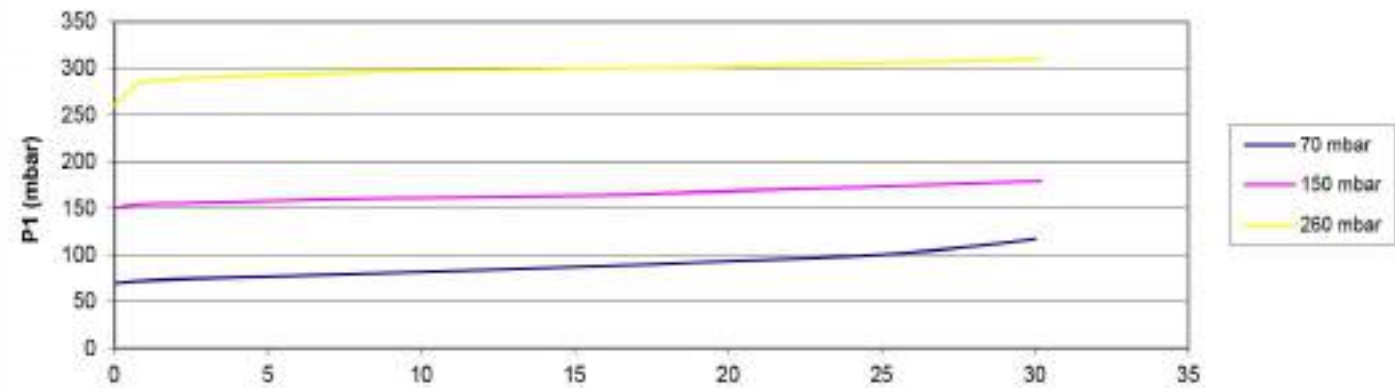
Range 30÷120 mbar



Portata (Nm³/h aria) - Flow rate (Nm³/h air) - Debit (Nm³/h air) - Caudal (Nm³/h aire)

FR

Range 80÷260 mbar



Portata (Nm³/h aria) - Flow rate (Nm³/h air) - Debit (Nm³/h air) - Caudal (Nm³/h aire)

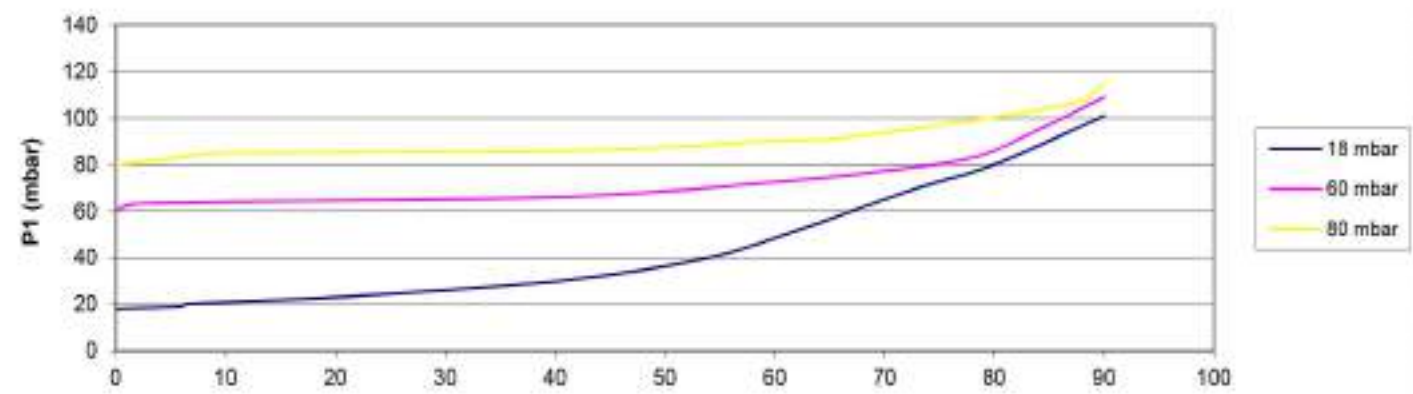
ES

CURVE - CURVES - COURBES - CURVAS

(MVSP/1 DN 25 COMPACT)

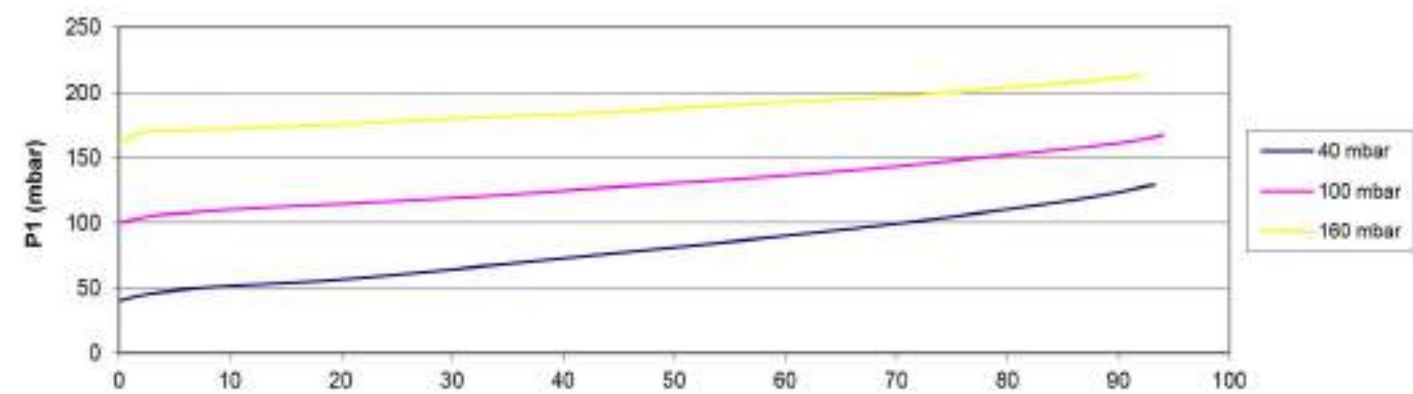
P.max 1 bar

Range 18+80 mbar



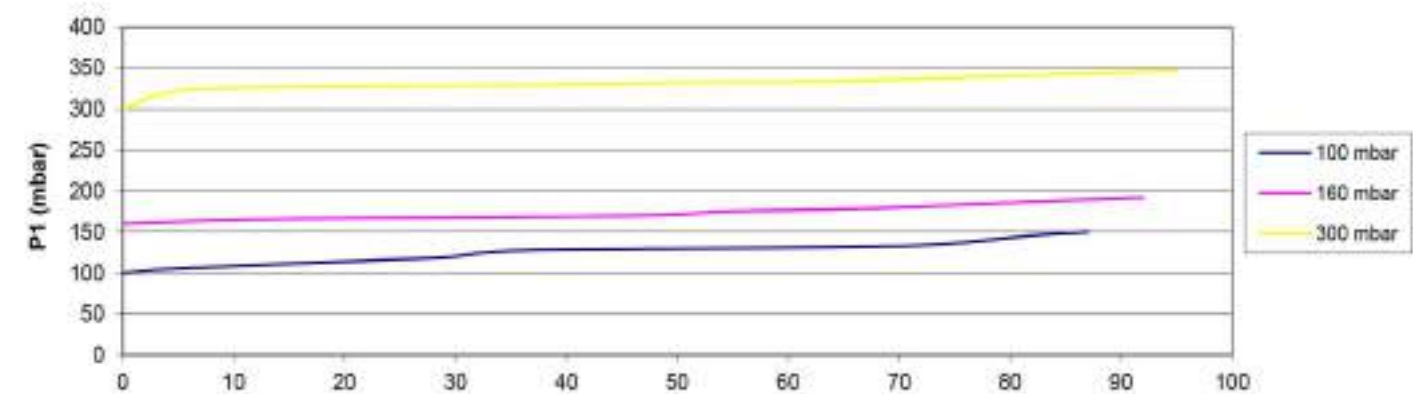
Portata (Nm³/h aria) - Flow rate (Nm³/h air) - Debit (Nm³/h air) - Caudal (Nm³/h aire)

Range 40+160 mbar



Portata (Nm³/h aria) - Flow rate (Nm³/h air) - Debit (Nm³/h air) - Caudal (Nm³/h aire)

Range 100+300 mbar



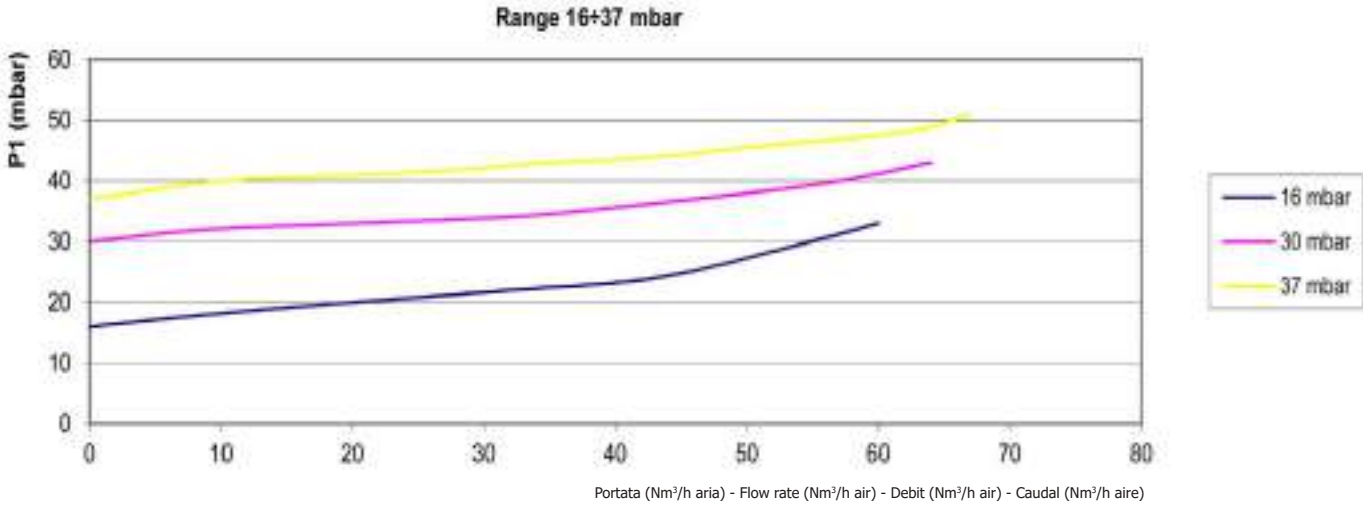
Portata (Nm³/h aria) - Flow rate (Nm³/h air) - Debit (Nm³/h air) - Caudal (Nm³/h aire)

CURVE - CURVES - COURBES - CURVAS

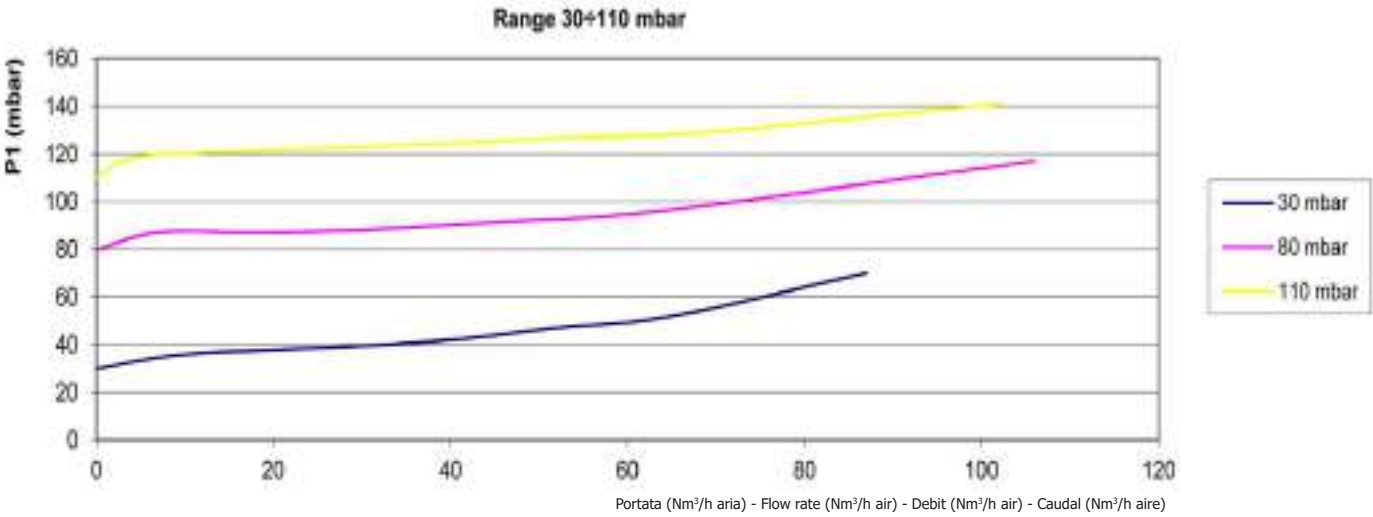
(MVS/1 DN 20 - DN 25 STANDARD)

P.max 1 bar

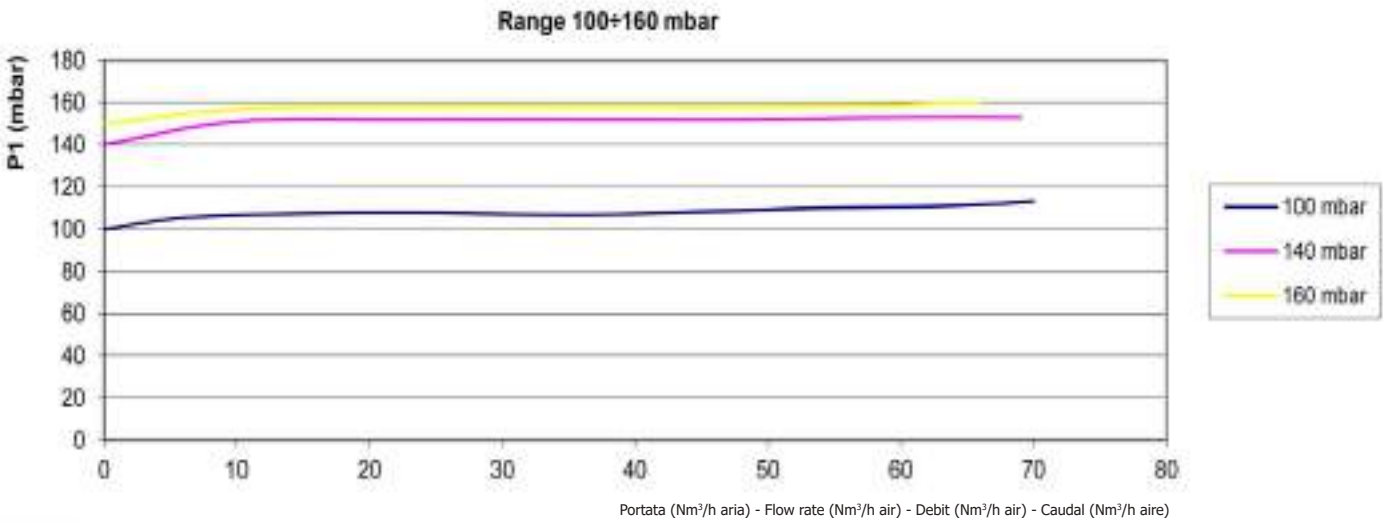
IT



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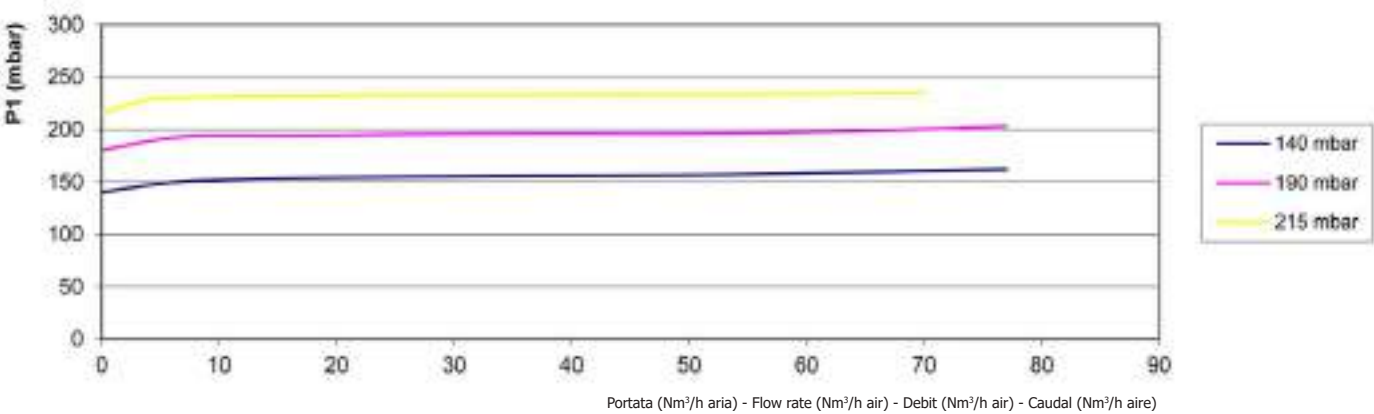
ES

CURVE - CURVES - COURBES - CURVAS

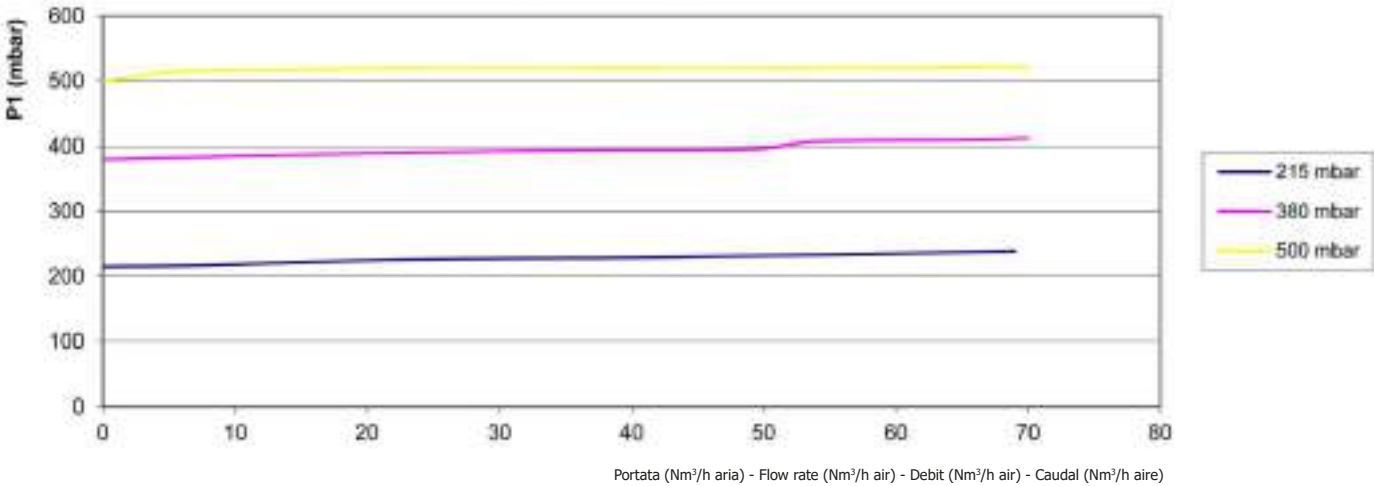
(MVS/1 DN 20 - DN 25 STANDARD)

P.max 1 bar

Range 140+215 mbar

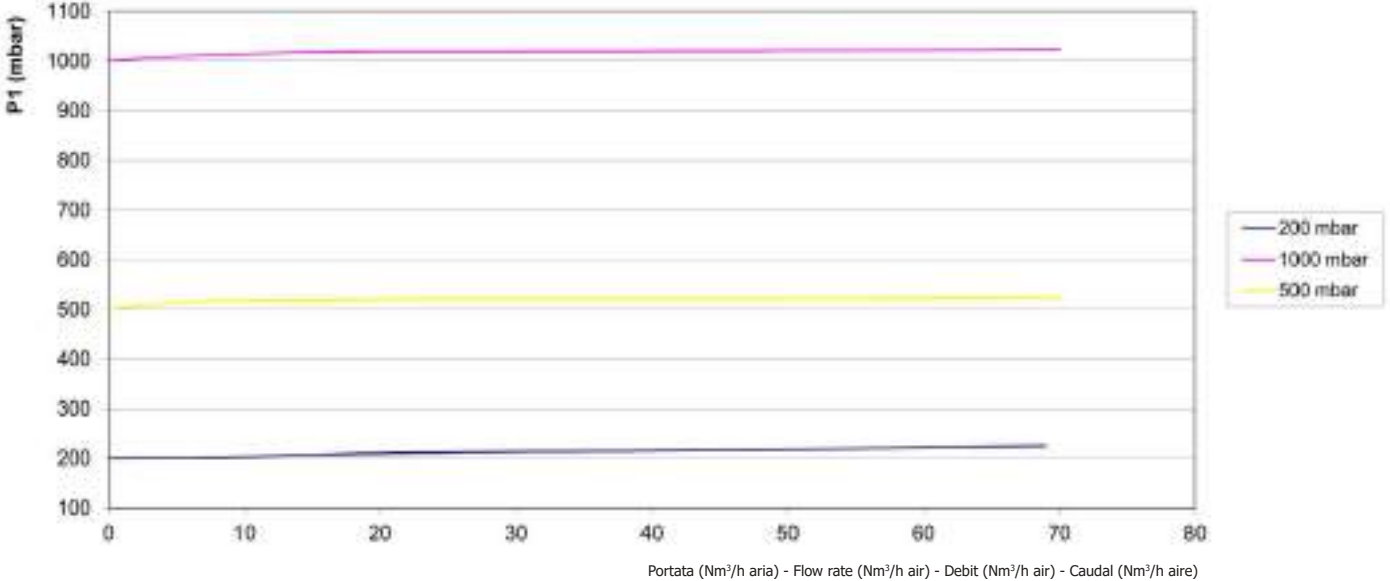


Range 215+500 mbar



(P.max 1,5 bar)

Range 200+1000 mbar



IT

EN

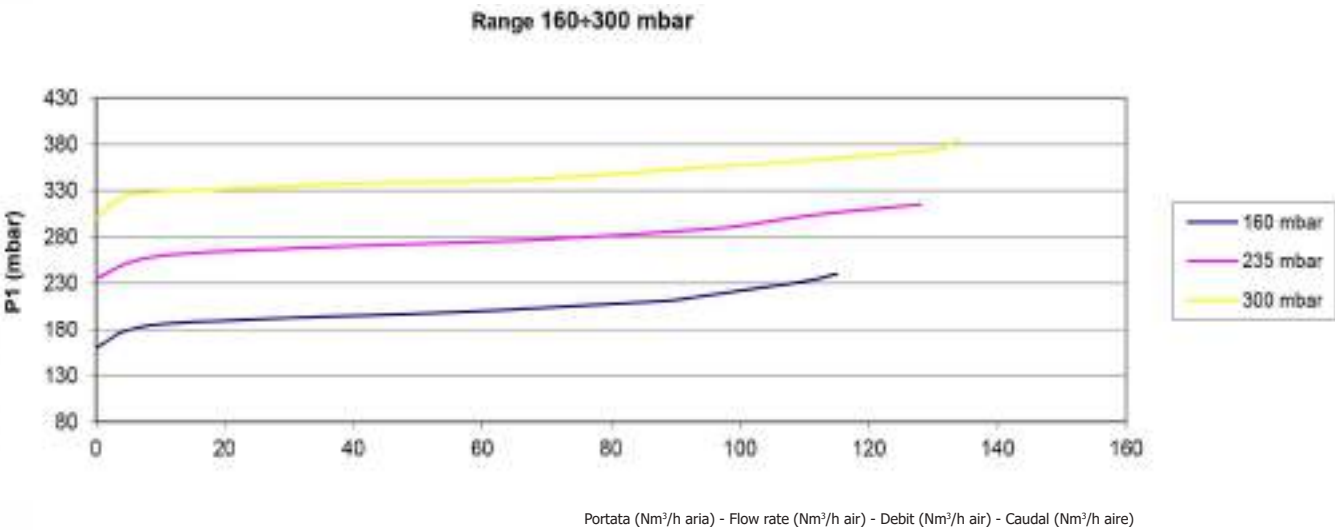
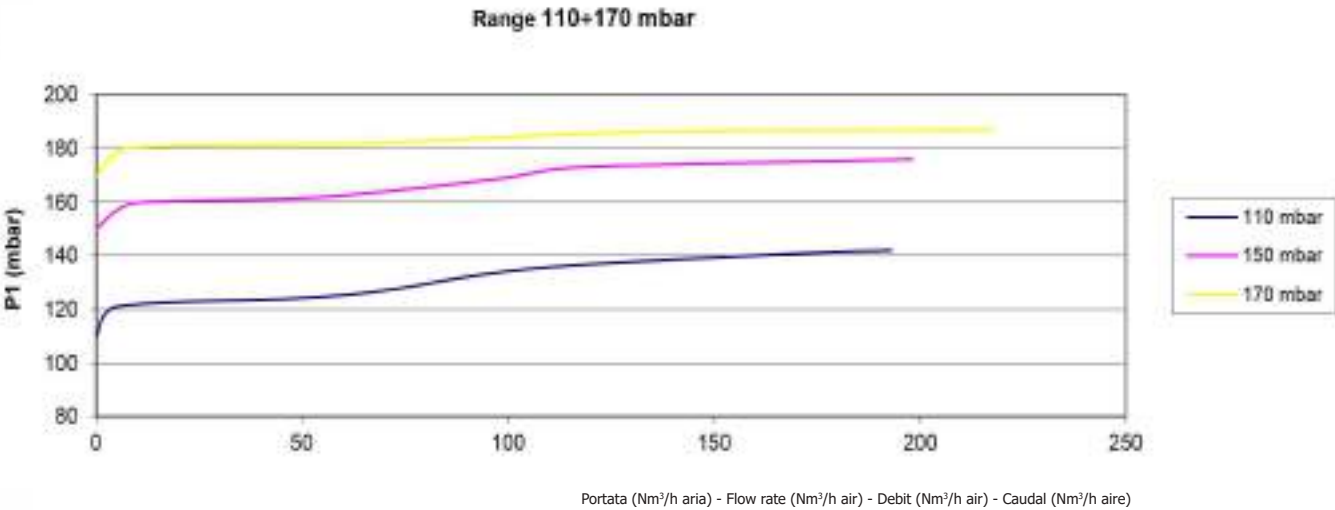
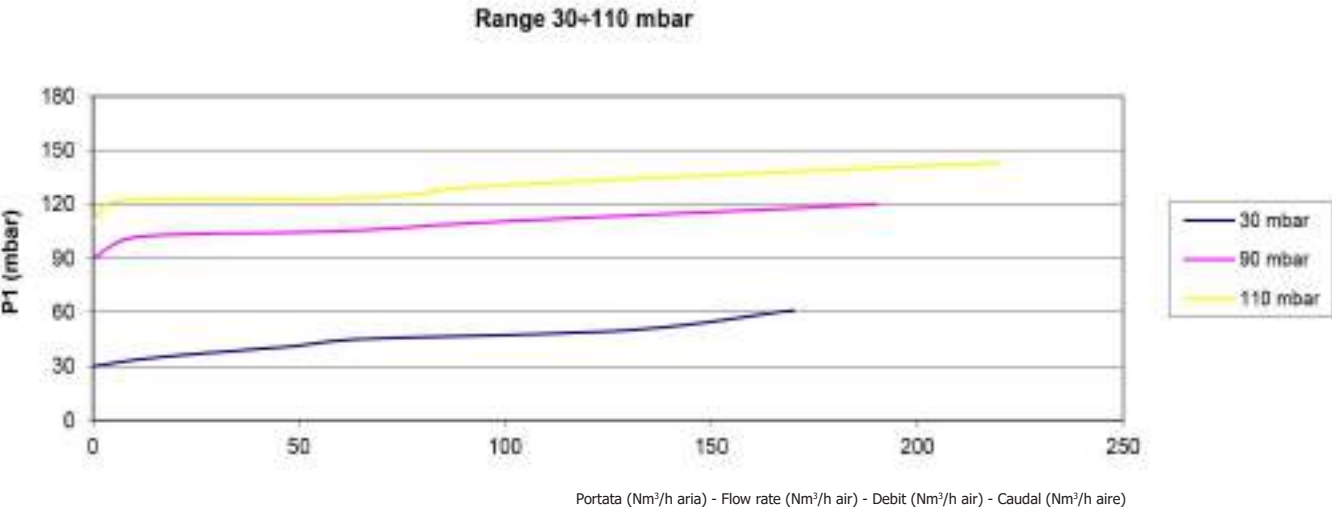
FR

ES

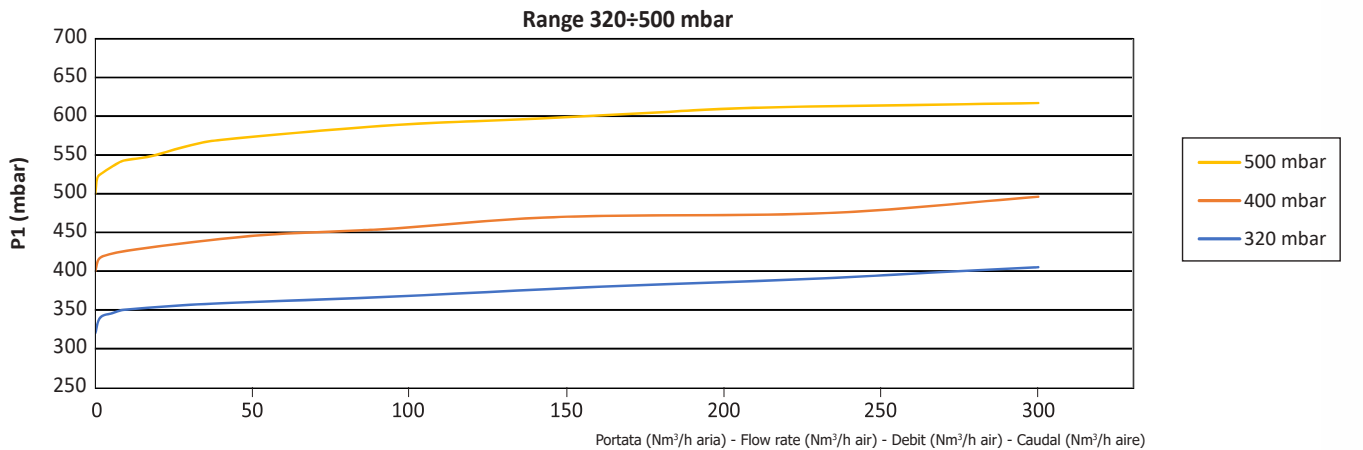
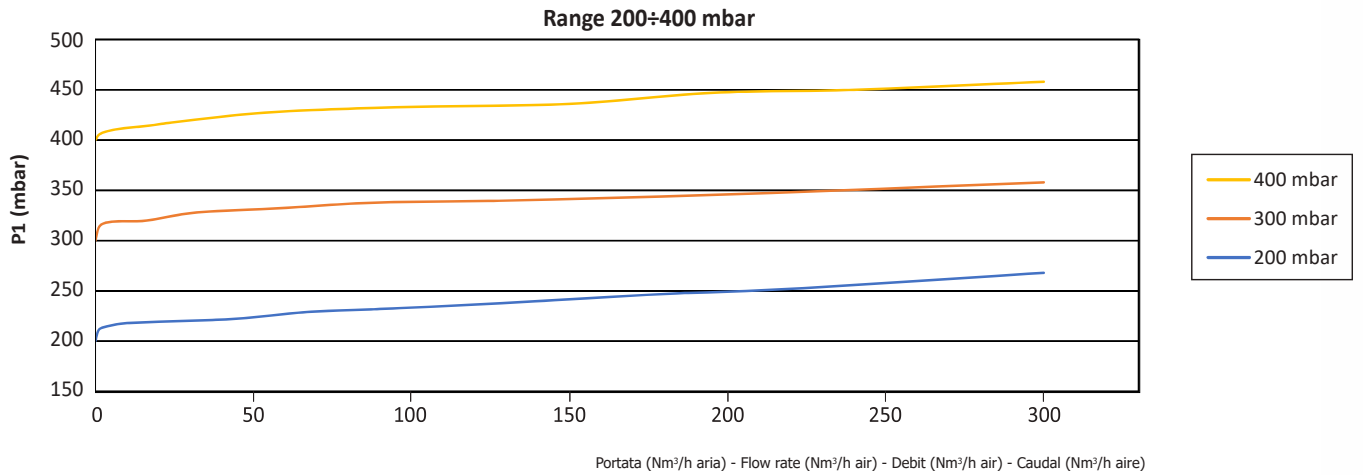
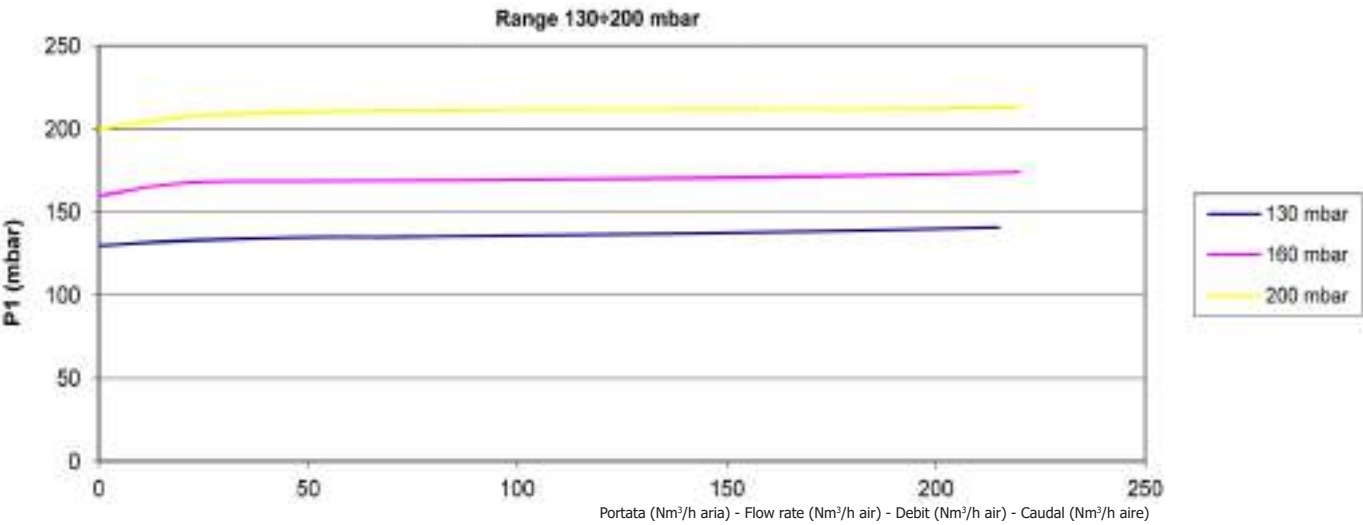
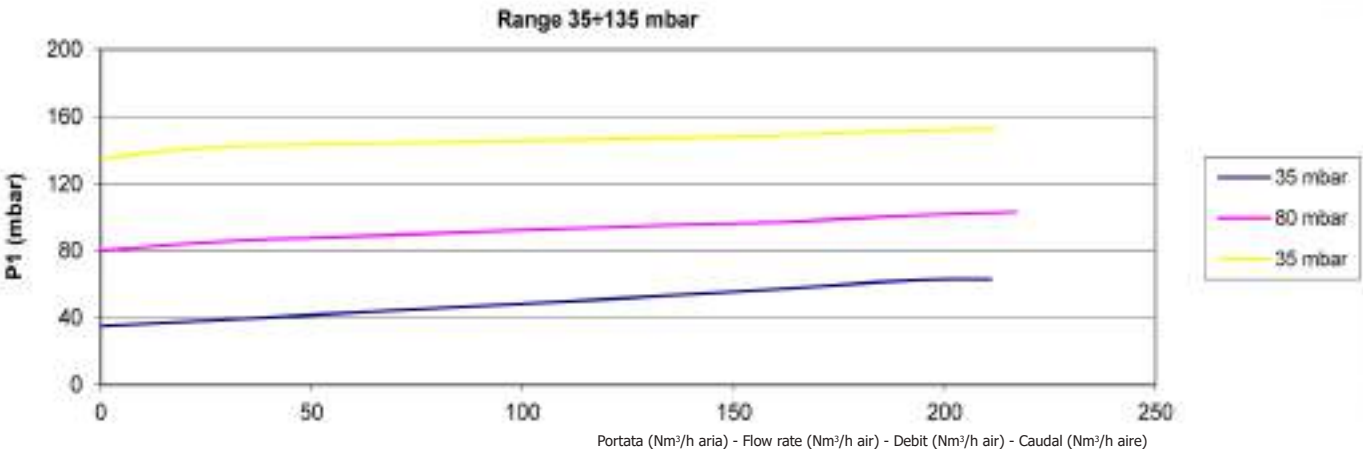
CURVE - CURVES - COURBES - CURVAS

(MVS/1 DN 32 - DN 40)

P.max 1 bar



CURVE - CURVES - COURBES - CURVAS
(MVS/1 DN 50 Rp - DN 32 FL - DN 40 FL - DN 50 FL)
P.max 1 bar



CURVE - CURVES - COURBES - CURVAS

(MVSP/1 DN 20 - DN 25)

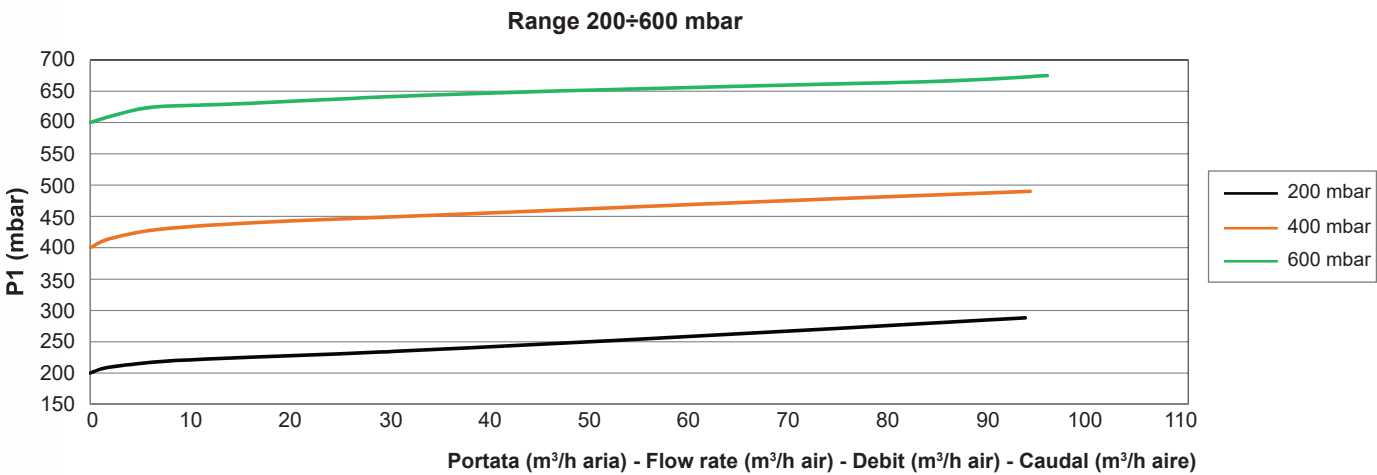
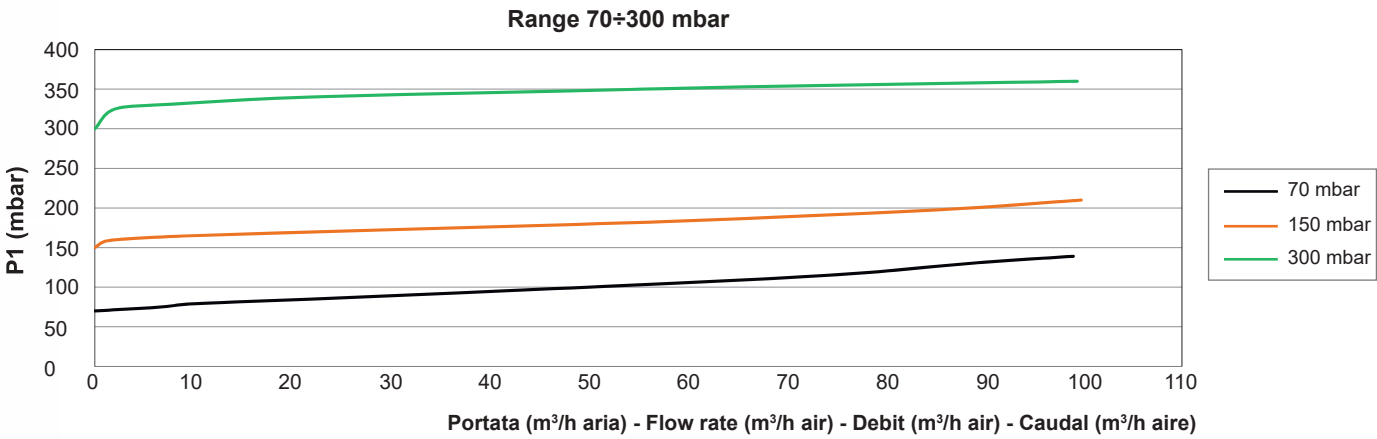
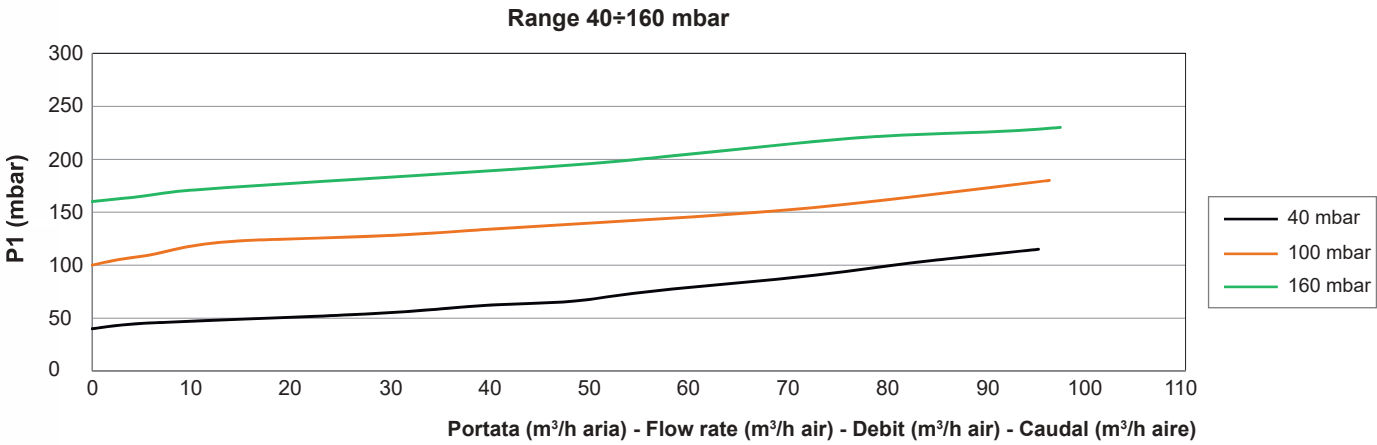
P.max 7 bar

IT

EN

FR

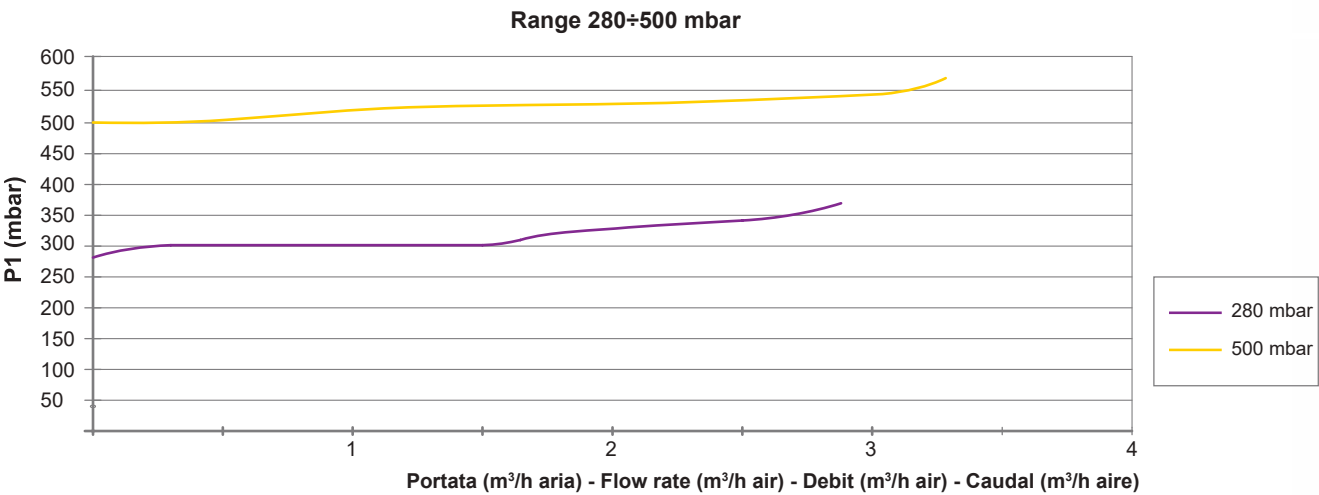
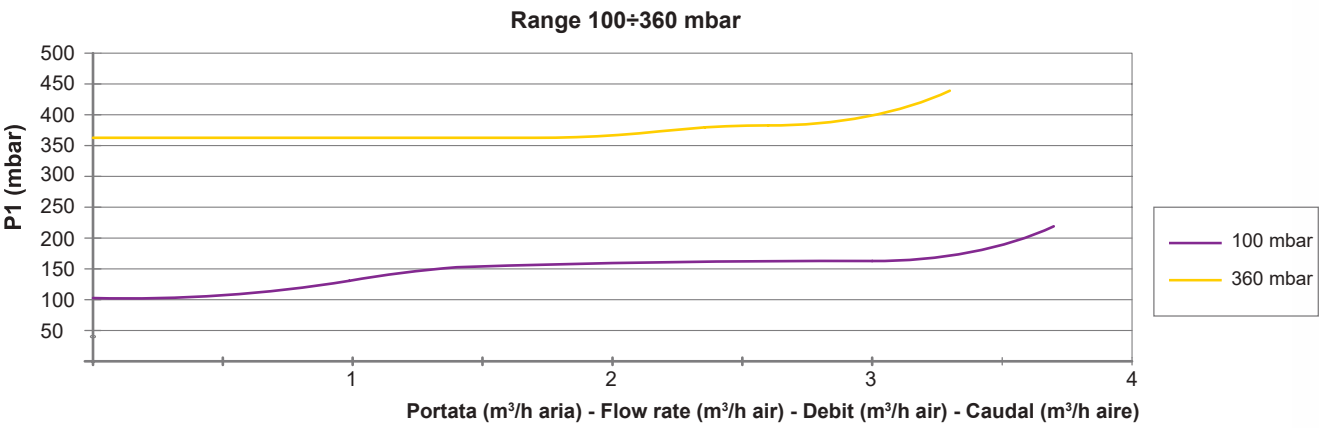
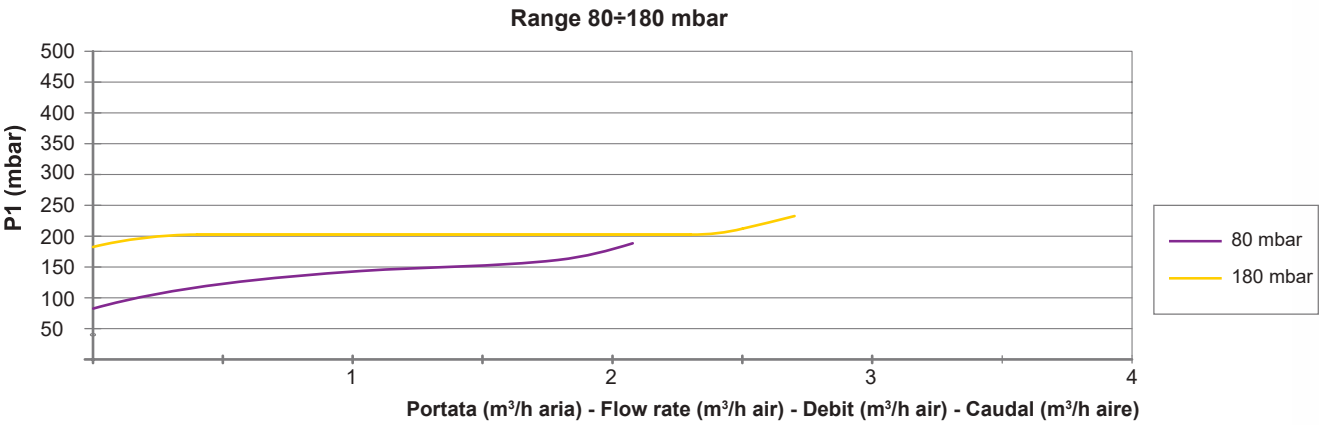
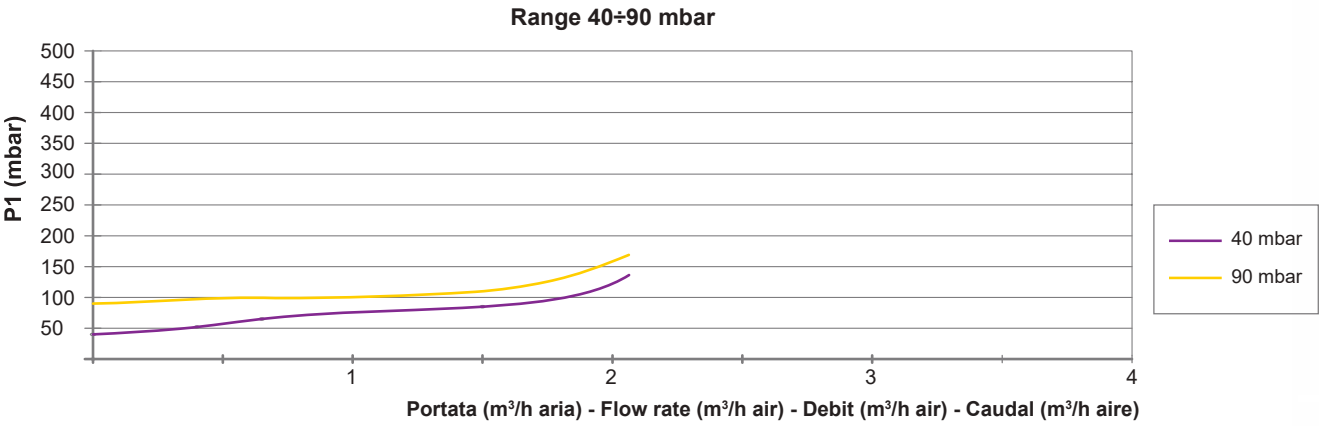
ES



CURVE - CURVES - COURBES - CURVAS

(MVS/1 DN 8)

P.max 1 bar



ATTACCHI FILETTATI NPT / NPT THREADED CONNECTIONS
RACCORDS FILETÉS NPT / CONEXIONES ROSCADAS NPT

richiedere fattibilità / request feasibility / demander la faisabilité / consulte la disponibilidad

Aggiungere la lettera "N" dopo le cifre indicanti gli attacchi	Add the letter "N" after figures denoting the connection	Ajouter la lettre "N" après les chiffres indiquant les connexions	Añadir la letra "N" a continuación de las cifras que indican los diámetros de conexión	Es. / E.g. / Ex. / Ej. VS04 N 040
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ATTACCHI FLANGIATI ANSI 150 / ANSI 150 FLANGED CONNECTIONS
RACCORDS À BRIDES ANSI 150 / CONEXIONES EMBRIDADAS ANSI 150

richiedere fattibilità / request feasibility / demander la faisabilité / consulte la disponibilidad

Aggiungere la lettera "A" dopo le cifre indicanti gli attacchi	Add the letter "A" after figures denoting the connection	Ajouter la lettre "A" après les chiffres indiquant les connexions	Añadir la letra "A" a continuación de las cifras que indican los diámetros de conexión	Es. / E.g. / Ex. / Ej. VS25 A 040
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BIOGAS

richiedere fattibilità / request feasibility / demander la faisabilité / consulte la disponibilidad

Aggiungere la lettera "B" dopo la lettera indicante la configurazione	Add the letter "B" after the letter denoting the configuration	Ajouter la lettre "B" après la lettre indiquant la configuration	Añadir la letra "B" a continuación de la letra que indica la configuración	Es. / E.g. / Ex. / Ej. VS04 B 040
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ELASTOMERI IN FKM (Viton) / ELASTOMERS IN FKM (Viton)
ÉLASTOMÈRES EN FKM (Viton) / ELASTÓMEROS DE FKM (Viton)

Aggiungere la lettera "V" dopo la lettera indicante la configurazione per avere rondella tenuta in FKM.	Add the letter "V" after the letter denoting the configuration to get the sealing washer in FKM.	Ajouter la lettre "V" après la lettre indiquant la configuration pour obtenir rondelle de tenue en FKM.	Añadir la letra "V" a continuación de la letra que indica la configuración para obtener arandela de estanquidad en FKM.	Es. / E.g. / Ex. / Ej. VS04 V 040 VS04 W 040
Aggiungere la lettera "W" dopo la lettera indicante la configurazione per avere rondella tenuta e membrana di funzionamento in FKM.	Add the letter "W" after the letter denoting the configuration to get the sealing washer and working diaphragm in FKM.	Ajouter la lettre "W" après la lettre indiquant la configuration pour obtenir rondelle de tenue et membrane de fonctionnement en FKM.	Añadir la letra "W" a continuación de la letra que indica la configuración para obtener arandela de estanquidad y membrana de trabajo en FKM.	

CATAFORESI / CATAPHORESIS
CATAPHORÈSE / CATAFORESIS

Aggiungere la lettera "K" dopo le cifre indicanti gli attacchi	Add the letter "K" after figures denoting the connection	Ajouter la lettre "K" après les chiffres indiquant les connexions	Añadir la letra "K" a continuación de las cifras que indican los diámetros de conexión	Es. / E.g. / Ex. / Ej. VS04 K 040
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COMBINAZIONI POSSIBILI / POSSIBLE COMBINATIONS
COMBINAISONS POSSIBLES / POSIBLES COMBINACIONES

È possibile combinare tra di loro le versioni. Non serve indicare "BV" in quanto "B" include "V"	It is possible to combine the above mentioned versions. It is not needed to state "BV" as the letter "B" includes "V" too	Les versions peuvent être combinées entre elles. Il n'est pas nécessaire d'indiquer "BV" car "B" comprend "V"	Es posible combinar las versiones entre sí. No es necesario indicar "BV" , dado que "B" incluye "V"	Es. / E.g. / Ex. / Ej. VS04 BK 040
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NOTA: È possibile che alcuni modelli non siano disponibili nelle versioni suddette sia singole e/o combinate. È consigliato chiedere SEMPRE la fattibilità.

NOTE: It is possible certain models are not available on the above mentioned versions, both singles and/or combined too. We suggest to ask ALWAYS for the feasibility.

NOTE: Il est possible que certains modèles ne soient pas disponibles dans les versions uniques et / ou combinées susmentionnées. Il est recommandé de TOUJOURS demander la faisabilité.

NOTA: Puede suceder que algunos modelos no estén disponibles en las versiones citadas, ya sean individuales o combinadas. Se aconseja consultar SIEMPRE la viabilidad.

MVS/1 - MVSP/1

Attacchi Connections Raccords Conexiones	P.max (bar)	Taratura Setting Tarage Tarado (mbar)	Attacchi filettati Threaded connections Raccords filetés Conexiones roscadas		Attacchi flangiati Flanged connections Raccords à brides Conexiones embridadas	
			Codice / Code / Code / Código		Codice / Code / Code / Código	
DN 8	1	40 ÷ 90	VS01	005		
	1	80 ÷ 180	VS01	010		
	1	100 ÷ 360	VS01	020		
	1	280 ÷ 500	VS01	030		
DN 15 Compact	1	18 ÷ 70	VSP02	010		
	1	30 ÷ 120	VSP02	020		
	1	70 ÷ 260	VSP02	030		
DN 20 Compact	1	18 ÷ 80	VSP03	010		
	1	40 ÷ 160	VSP03	020		
	1	100 ÷ 300	VSP03	030		
	1	50 ÷ 450	VSP030022			
	7	40 ÷ 160	VSP030000	010		
	7	70 ÷ 300	VSP030000	020		
	7	200 ÷ 600	VSP030000	030		
DN 25 Compact	1	18 ÷ 80	VSP04	010		
	1	40 ÷ 160	VSP04	020		
	1	100 ÷ 300	VSP04	030		
	1	50 ÷ 450	VSP040022			
	7	40 ÷ 160	VSP040000	010		
	7	70 ÷ 300	VSP040000	020		
	7	200 ÷ 600	VSP040000	030		
DN 20	1	16 ÷ 37	VS03	005		
	1	30 ÷ 110	VS03	010		
	1	100 ÷ 160	VS03	020		
	1	140 ÷ 215	VS03	030		
	1	215 ÷ 500	VS03	040		
	1,5	200 ÷ 1000*	VS030022	010		
	2,5	700 ÷ 2100*	VS030022	020		
DN 25	1	16 ÷ 37	VS04	005	VS25	005
	1	30 ÷ 110	VS04	010	VS25	010
	1	100 ÷ 160	VS04	020	VS25	020
	1	140 ÷ 215	VS04	030	VS25	030
	1	215 ÷ 500	VS04	040	VS25	040
	1,5	200 ÷ 1000*	VS040022	010	VS250022	010
	2,5	700 ÷ 2100*	VS040022	020	VS250022	020

* = Versione con membrana rinforzata - Version with reinforced diaphragm - Version avec membrane renforcée - Versión con membrana reforzada

IT

MVS/1				
Attacchi Connections Raccords Conexiones	P.max (bar)	Taratura Setting Tarage Tarado (mbar)	Attacchi filettati Threaded connections Raccords filetés Conexiones roscadas	Attacchi flangiati Flanged connections Raccords à brides Conexiones embridadas
			Codice / Code / Code / Código	Codice / Code / Code / Código
DN 32	1	30 ÷ 110	VS05 010	
	1	110 ÷ 170	VS05 020	
	1	160 ÷ 300*	VS050022 010	
	1	260 ÷ 500*	VS050022 020	

EN

DN 40	1	30 ÷ 110	VS06 010	
	1	110 ÷ 170	VS06 020	
	1	160 ÷ 300*	VS060022 010	
	1	260 ÷ 500*	VS060022 020	
DN 32	1	20 ÷ 50		VS32 005
	1	35 ÷ 135		VS32 010
	1	130 ÷ 200		VS32 020
	1	200 ÷ 400*		VS320022 010
	1	320 ÷ 500*		VS320022 020
DN 40	1	20 ÷ 50		VS40 005
	1	35 ÷ 135		VS40 010
	1	130 ÷ 200		VS40 020
	1	200 ÷ 400*		VS400022 010
	1	320 ÷ 500*		VS400022 020
DN 50	1	20 ÷ 50	VS07 005	VS50 005
	1	35 ÷ 135	VS07 010	VS50 010
	1	130 ÷ 200	VS07 020	VS50 020
	1	200 ÷ 400*	VS070022 010	VS500022 010
	1	320 ÷ 500*	VS070022 020	VS500022 020

FR

* = Versione con membrana rinforzata - Version with reinforced diaphragm - Version avec membrane renforcée - Versión con membrana reforzada

ES

MVS/1				
Attacchi Connections Raccords Conexiones	P.max (bar)	Taratura Setting Tarage Tarado (bar)	Attacchi filettati Threaded connections Raccords filetés Conexiones roscadas	Attacchi flangiati Flanged connections Raccords à brides Conexiones embridadas
			Codice / Code / Code / Código	Codice / Code / Code / Código
DN 20	6	0,3 ÷ 6	VS030000	-
DN 25	6	0,3 ÷ 6	VS040000	VS250000

RICAMBI / SPARE PARTS / PIÈCES DE RECHANGE / PIEZAS DE REPUESTO

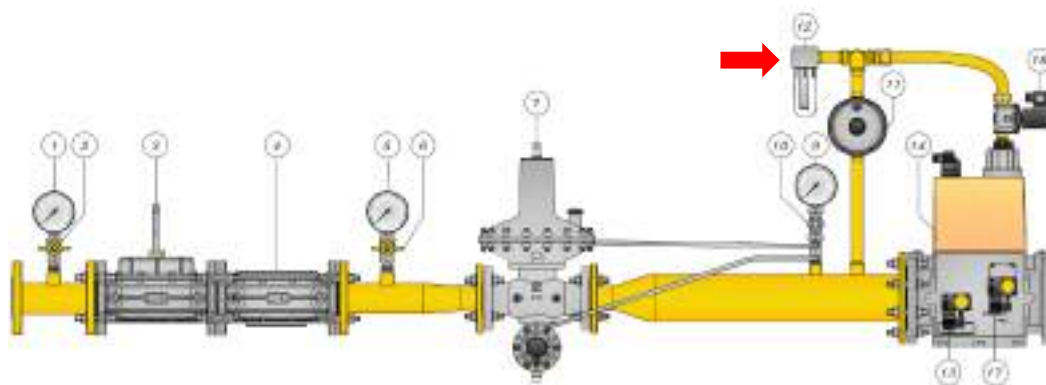
Attacchi - Connections Raccordi - Conexiones		P.max (bar)	Taratura Setting Tarage Tarado (mbar)	Kit membrane - Diaphragms kit Kit de membrana - Kit de membrana
Filettati Threaded Filetés Roscadas	Flangiati Flanged A brides Embridadas			Codice Code Code Código
DN 8	-	1	40 ÷ 90	KIT-MEVS 8
			80 ÷ 180	
			100 ÷ 360	
			280 ÷ 500	
DN 15 compact	-	1	18 ÷ 70	KIT-MEVB
			30 ÷ 120	
			70 ÷ 260	
			18 ÷ 80	
DN 20 - DN 25 compact	-	1	40 ÷ 160	KIT-MEVB
			100 ÷ 300	
			50 ÷ 450	
DN 20 - DN 25 compact	-	7	40 ÷ 160	KIT-MEVSP-7 25
			70 ÷ 300	
			200 ÷ 600	
DN 20 - DN 25	DN 25 FL	1	16 ÷ 37	KIT-MEVS 25
			30 ÷ 110	
			100 ÷ 160	
			140 ÷ 215	
		1,5	215 ÷ 500	KIT-MEVS 25-R
			200 ÷ 1000*	
			700 ÷ 2100*	
DN 32 - DN 40		1	30 ÷ 110	KIT-MEVS 25
			110 ÷ 170	
			160 ÷ 300*	
			260 ÷ 500*	
DN 50		1	20 ÷ 50	KIT-MEVS 50
			35 ÷ 135	
			130 ÷ 200	
			200 ÷ 400*	
			320 ÷ 500*	
-	DN 32 FL DN 40 FL DN 50 FL	1	20 ÷ 50	KIT-MEVS 50
			35 ÷ 135	
			130 ÷ 200	
			200 ÷ 400*	
			320 ÷ 500*	

* = Versione con membrana rinforzata - Version with reinforced diaphragm - Version avec membrane renforcée - Versión con membrana reforzada

Ci riserviamo qualsiasi modifica tecnica e costruttiva.
We reserve the right to any technical and construction changes.
Nous nous réservons le droit de toute modification technique et constructive.
Nos reservamos el derecho de realizar cualquier cambio técnico y estructural.



Item 12 – Detector visual de vazamento



DETECTOR VISUAL DE VAZAMENTO (BORBULHADOR)

Função:

Detectar vazamento em linha de respiro / suspiro da rede de gás atendendo á NBR 12.313.

Materiais de construção:

Corpo em alumínio
Copo em policarbonato
Vedação em borracha NBR

Descritivo de funcionamento:

Após corretamente instalado (verifique a seta de fluxo) e com o copo preenchido até a metade do seu volume com água ou glicerina, qualquer quantidade de gás que passar pelo borbulhador, formará bolhas, as quais indicarão a existência de vazamento.

Modelos:

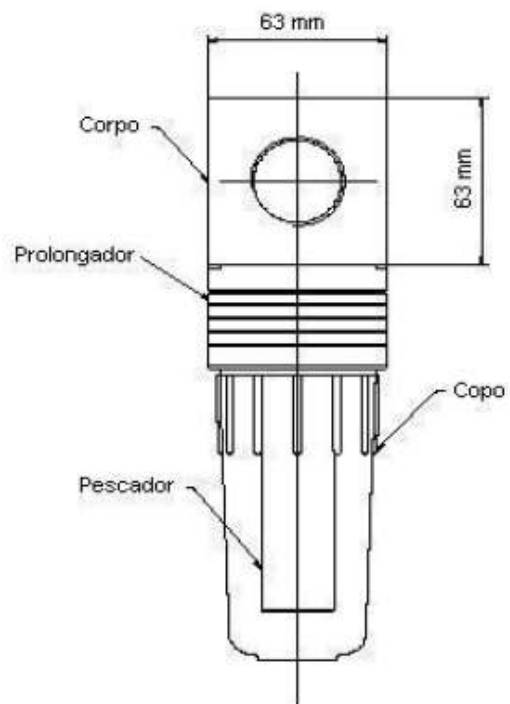
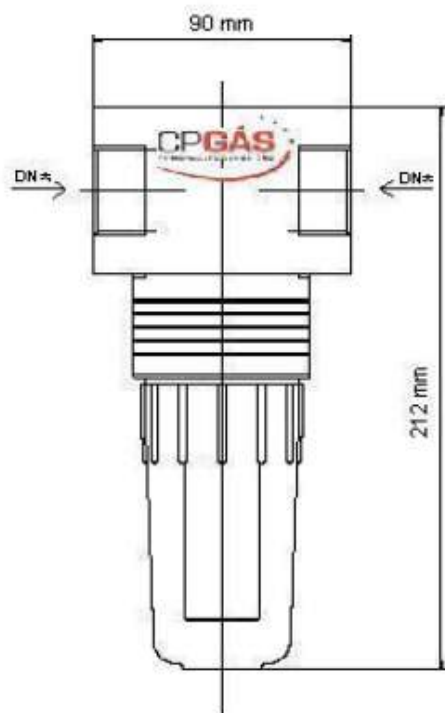
MOD.	DN	TIPO
SDV-01	15	R
SDV-02	20	R
SDV-03	25	R

Rosca tipo BSP

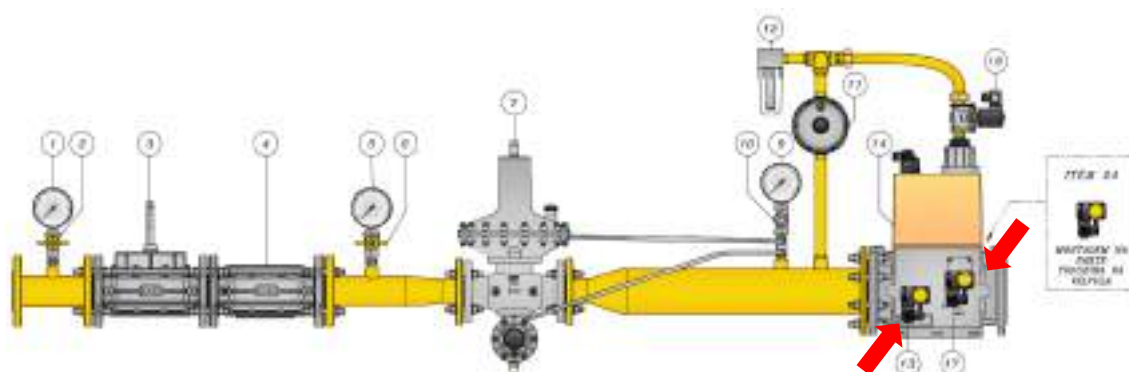
Certificados:

Por não se tratar de equipamento sujeito a pressão, o mesmo não requer qualquer tipo de certificação.

Dimensões básicas:



Itens 13, 17 e 24 – Pressostatos de mínima, máxima e estanqueidade



Compact pressure switch for multiple actuators

GW...A5
GW...A5/1

DUNGS®
Combustion Controls

5.02



Technical description

The GW...A5 pressure switch is a compact pressure switch as per EN 1854 for DUNGS multiple actuators.

The pressure switches are suitable for switching a circuit on, off or over on changes in actual pressure relative to the set switching point (reference value).

The switching point can be set easily and quickly using a setting wheel provided with a scale without using a pressure gauge.

Application

Pressure switches for DUNGS multiple actuators GasMultiBloc and DMV double solenoid valve which can be either mounted directly on housing or by using an adapter.

Suitable for gases of families 1,2,3 and other neutral gaseous media.

Approvals

EC type testing certificate as per:

- EC-Gas Appliances Regulation
- EC-Pressure Equipment Directive

Pressure switch class "S" as per EN 1854.

Approvals in other important gas-consuming countries.

Functional description
Single-acting pressure switch in over-pressure range.
The pressure switches operate without any power supply.

Switching response
GW...A5
Short response time during pressure fluctuations.

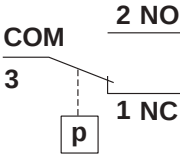
GW...A5/1
Slow response time during short-term pressure fluctuations by additional damping nozzle.

Pressure Switch
The GW...A5 is a single-acting pressure switch acting in pressure range. The control unit responds to pressure. If the set reference value is exceeded or undershot, the circuit is switched on, off or over.

Switching function

As pressure rises:
1 NC opens, 2 NO closes

As pressure falls:
1 NC closes, 2 NO opens

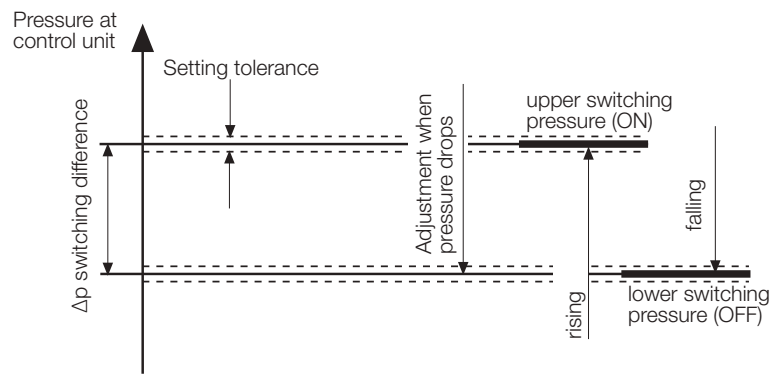


Specifications

Max. operating pressure	GW 3 A5 - GW 150 A5 GW 500 A5	500 mbar (50 kPa) 600 mbar (60 kPa)		
Pressure connection	O ring flange connection on underside of pressure switch			
Measuring connection	ø 9, length 10 mm, with screw plug			
Temperature range	Ambient temperature Medium temperature Storage temperature	-15 °C to +70 °C -15 °C to +70 °C -30 °C to +80 °C		
Materials	Housing: Switch: Diaphragms: Switching contact:	Aluminium die casting Polyamide NBR Ag		
Switching voltage	AC eff. min. 24 V DC min. 24 V	max. 250 V max. 48 V		
Nominal current	GW 10...500 A5 AC eff. max. 10 A	GW 3 A5 AC eff. max. 6 A		
Switching current	AC eff. max. 6 A AC eff. max. 3 A AC eff. DC DC	at cos φ 1 at cos φ 0,6 min. 20 mA min. 20 mA max. 1 A	AC eff. max. 4 A AC eff. max. 2 A AC eff. DC DC	at cos φ 1 at cos φ 0,6 min. 20 mA min. 20 mA max. 1 A
Electrical connection	Plug connection for line sockets as per DIN EN 175 301-803, 3-pin, protection insulated without ground connection			
Degree of protection	IP 54 as per IEC 529 (EN 60529)			
Setting tolerance	±15% switching point deviation referred to reference value, adjusted at pressure rises , vertical diaphragm position			
Deviation	Permissible deviation of the set value ≤ ± 15 % in the service life test according to EN 1854			

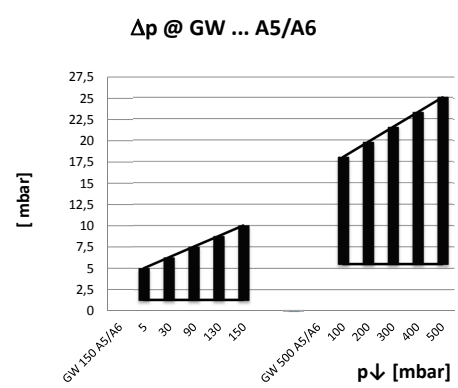
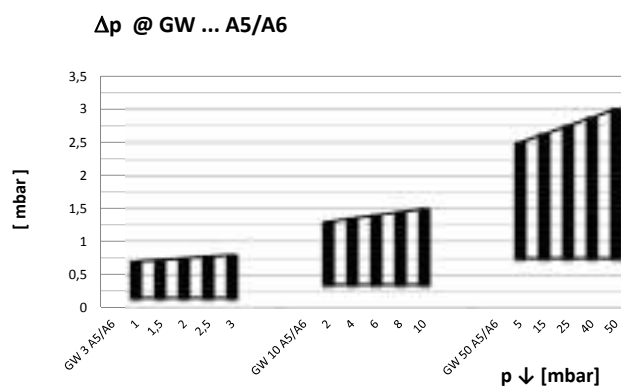
Definition of Δp switching difference

The Δp switching difference is the pressure difference between the upper and lower switching pressure.



Switching difference Δp @ GW...A5/A6

Depending on the corresponding set value ($p \downarrow$)



Installation position



Standard installation position;
if different observe the change
in switching point:

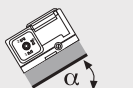
GW 3...50 A5 max. $\pm 0,6$ mbar
GW 150 A5 max. ± 1 mbar
GW 500 A5 max. ± 3 mbar



In the horizontal installation position the switching pressure
is increased.

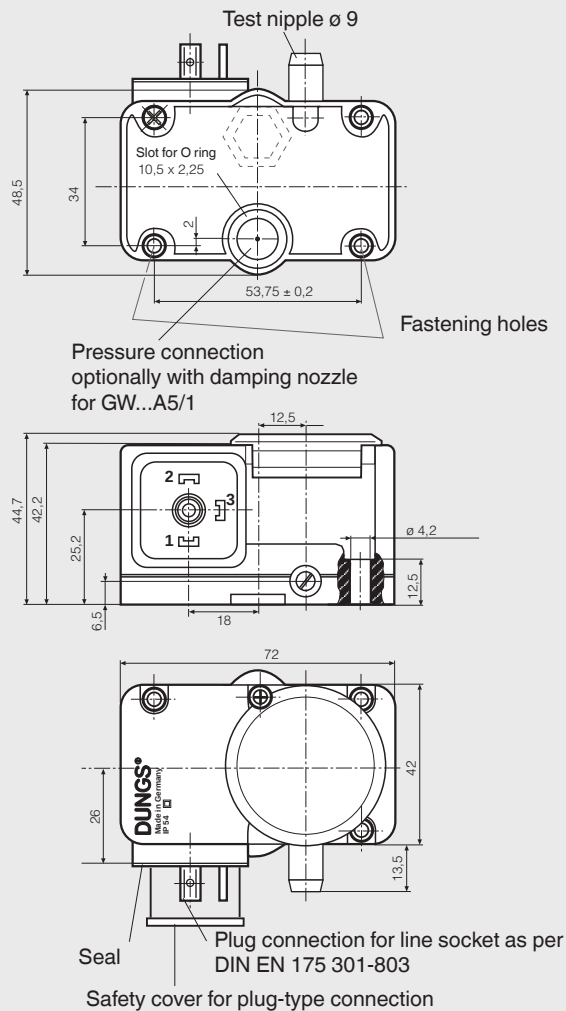


When the pressure switch is mounted horizontally overhead, its switch-
ing pressure decreases.

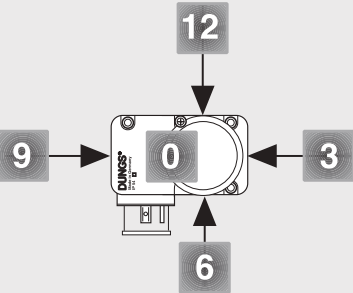


When the pressure switch is mounted in an intermediate position, its
switching pressure deviates.

Dimensions [mm]



Designation

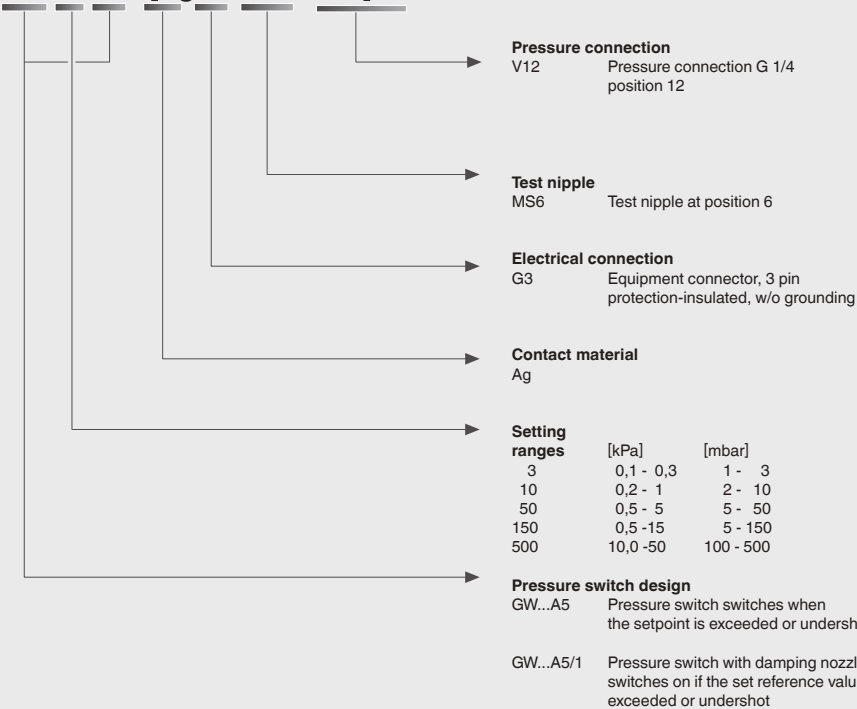


Order example

Pressure switch design
Pressure Switch GW...A5
Setting range
0,5 - 15 kPa (5 - 150 mbar)
Contact material
Ag
Electrical connection
Equipment connector
Pressure connection
At position 12
Test nipple
MS 6

GW 150 A5 [Ag-G3-MS6-V12]

GW 150 A5 [Ag-G3-MS6-V12]



Brief technical data 1 kPa = 10 mbar = 1000 Pa ≈ 100 mm WS

Type	Version [AG-G3-MS6-V12]	Order No.	Order No.	Setting range		Switching difference Δp			
		1 piece	100 pieces	[mbar]	max.	p ↓ min.	p ↓ max.		
GW...A5 pressure switch	GW 3 A5	272 362	—	1 - 3	± 15 %		≤ 0,7	≤ 0,8	
	GW 10 A5	272 350	225 938	2 - 10	± 15 %		≤ 1,3	≤ 1,5	
	GW 50 A5	272 340	225 939	5 - 50	± 15 %		≤ 2,5	≤ 3	
	GW 150 A5	272 339	225 940	5 - 150	± 15 %		≤ 5	≤ 10	
	GW 500 A5	272 349	227 639	100 - 500	± 15 %		≤ 18	≤ 25	
with mounting kit									
GW...A5/1 pressure switch	GW 10 A5/1	241 245	—	2 - 10	± 15 %		≤ 1,3	≤ 1,5	
	GW 50 A5/1	241 246	—	5 - 50	± 15 %		≤ 2,5	≤ 3	
	GW 150 A5/1	241 247	—	5 - 150	± 15 %		≤ 5	≤ 10	
	GW 500 A5/1	241 248	—	100 - 500	± 15 %		≤ 18	≤ 25	
with damping orifice and mounting kit									

Accessories	Order-No.	for Type	Nominal diameters
Mounting kit (2 x M4x20, 1 x O-ring)	223 280		
Adapter p _{Br}	273 777	MB-D ...405 - 420 MB-Z ...405 - 420 DMV- ...503 - 520	Rp 3/8 - Rp 2 Rp 3/8 - Rp 2 Rp 3/8 - Rp 2
Adapter on threaded flange (G 1/8)	221 630	MB- ...405-412 DMV- ... SV- ...505-520	Rp 3/8 - Rp 1 1/4 Rp 3/8 - Rp 2
Adapter kit for GW ... A5 with G 1/4 connection	222 982	DMV- ... MB- ...415-420	Rp 3/8 - Rp 2
Special adapter on request		MB- ... DMV- ... MVD- ...	DN 40 - DN 125 Rp 3/8 - DN 150
Line socket 3-pin + E grey GDMW	210 318		

**Compact pressure switch
for multiple actuators**

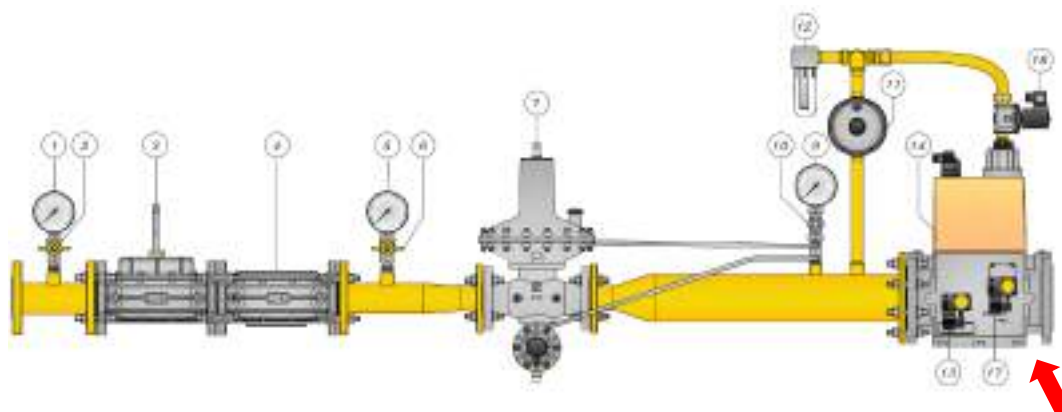
**GW...A5
GW...A5/1**

We reserve the right to make any changes in the interest of technical progress.

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Telephone +49 7181-804-0
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D-73602 Schorndorf, Germany
e-mail info@dungs.com
Internet www.dungs.com**

Item 14 – Válvula solenoide dupla NF



Dual Modular Safety Shutoff Valves

DMV-D/11 Series DMV-DLE/11 Series



Two normally closed safety shutoff valves in one housing; each with the following approvals.

CSA Certified

- ANSI Z21.21
- CSA 6.5
- Marked C/I
- File # 157406

FM Approved

- Class 7411
- File # J.I. 3007653

Commonwealth of Massachusetts Approved Product

- Approval code G1-1107-35
- Gas Safety Shutoff Valve

EU Gas Appliance Regulation

- EN161

Codes and Standards

This product is intended for installations covered by but not limited to NFPA 86, NFPA 37, CSA B149.1, CSA B149.3 and CSA 149.6

DUNGS is an ISO 9001 manufacturing facility.



Description

The DUNGS Dual Modular Valve (DMV) combines two safety shutoff valves in one compact housing, which can be wired independently or in parallel.

Valve 1 (V1) of the DMV-D and DMV-DLE series is fast opening and fast closing. Valve 2 (V2) of the DMV-D is fast opening, while V2 of the DMV-DLE is slow-opening for smoother light-off. Max. flow adjustment on V1 provides variable main flow on both models.

Internal profiles and compact design optimize flow and provide a low pressure drop.

Directly mounting the following DUNGS accessories creates a compact valve train without additional piping:

- High and low gas pressure switches
- Valve proving system
- 1" NPT Vent line adapter

Application

The DUNGS DMV is recommended for industrial and commercial heating applications that require two safety shutoff valves. The DMV Dual Modular Valve is suitable for dry natural gas, propane, butane, air and other inert gases. Suitable for up to 0.1% by volume, dry H₂S.

A "dry" gas has a dew point lower than +15 °F and its relative humidity is less than 60 %.

DMV-D.../11 Two normally closed safety shutoff valves in one housing. V1 and V2 are fast opening, fast closing. Adjustable max. flow with V2.

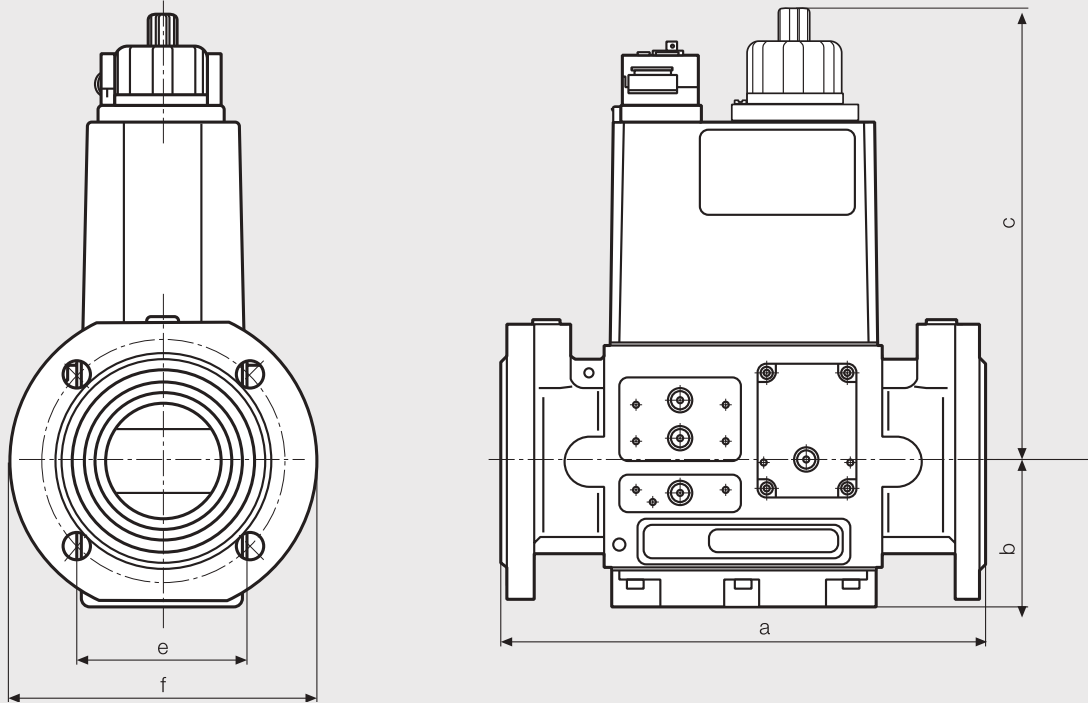
DMV-DLE.../11 Two normally closed safety shutoff valves in one housing. V1 fast opening, fast closing. V2 is slow opening, fast closing. Adjustable max. flow and adjustable initial lift with V2.

Specifications

Flange sizes	DN 40 (1 1/2") 50 (2") 65 (2 1/2") 80 (3") 100 (4") 125 (5") Connection flange as per DIN 2501 Part 1, to fit pre-weld flanges as per DIN 2633 (PN 16) DN 40 to DN 125, ISO 7005 - 1 (PN 16), or ISO 7005 - 2 (PN 16).
Max. operating pressure	7 PSI (500 mbar) CSA, FM, CE (Class A)
Max. body pressure	15 PSI (1000 mbar)
Max. close off pressure	7 PSI (500 mbar) CSA, FM, CE (Class A)
Electrical ratings (+10 % / -15 %)	110 - 120 VAC @ 50 - 60 Hz and 24 VDC. Part numbers listed on page 3. 220 - 240 VAC @ 50 - 60 Hz
Enclosure rating	NEMA Type 12
Electrical connection	DIN-connector with 1/2" NPT conduit adapter (order separately)
Operating time	100 % duty cycle
Closing time	< 1 s
Opening time (to max. flow)	DMV-D.../11 V1 & V2 < 1 s DMV-DLE.../11 V1 < 1 s; V2 Adjustable to approx. 10 to 20 s at 70 °F
Initial lift adjustment	Adjustable on V2 DLE only; 0 to 70 % of total flow; 0 to 25% of stroke
Max. flow adjustment	Adjustable on V1 <10 to 100 % of total flow; <10 to 100% of stroke
Materials in contact with gas	Housing: Aluminium, Steel; free of non-ferrous metals Sealings on valve seats: NBR-based rubber
Ambient temperature rating	+5 °F to +140 °F (-15 °C to +60 °C)
Installation position	Safety shut off valve from vertically upright to horizontal
Gas strainer (standard)	Installed in the housing upstream V1 (23 mesh)
Position indication (order separately)	CPI 400 with indication lamps and SPDT interlock switch or Visual indicator (VI)
Test ports / Pressure switch mounting ports	G 1/8 ISO 228 ports available on both sides. Each side has two ports upstream V1, one between V1 and V2, one downstream V2. G 1/4 ISO 228 on both flanges, upstream of V1, downstream of V2
Valve proving system	VPS 504; mounts directly to either side of DMV

Power Ratings					
Version	Coil Type	Approx. Power Rating [VA] @ 120 VAC	Approx. Power Rating [VA] @ 24 VDC	Approx. Current [A] @ 120 VAC	Approx. Current [A] @ 24 VDC
DMV-D(LE) 5040/11	1212	90	70	0.74	2.6
DMV-D(LE) 5050/11	1212	90	70	0.74	2.6
DMV-D(LE) 5065/11	1411	110	90	0.92	3.8
DMV-D(LE) 5080/11	1511	110	95	0.92	4.0
DMV-D(LE) 5100/11	1611	135	95	1.12	4.0
DMV-D(LE) 5125/11	1711	200	155	1.68	6.5

Dimensions inch (mm)

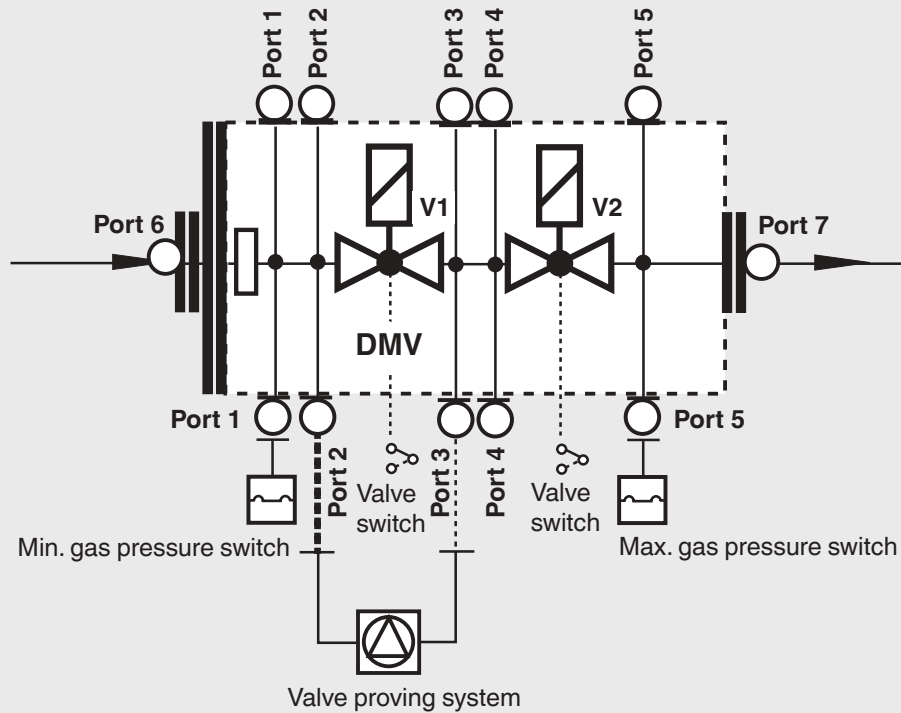


Type		110 - 120 VAC @ 50 - 60 Hz Order No.	24 VDC Order No.	P _{max.} [PSi]	Connection DN	Dimensions [inch] Dimensions [mm]					Weight [lbs] [kg]
						a	b	c	e	f	
DMV-D	5040/11	226061	226063	7	DN 40	9.5 240	2.5 62,5	7.6 192	3.9 100	5.9 150	17.2 7,8
DMV-D	5050/11	226064	226066	7	DN 50	9.5 240	2.9 73	7.6 192	3.9 100	6.5 165	18.3 8,3
DMV-D	5065/11	226067	226069	7	DN 65	11.4 290	3.4 87	9.9 251	4.0 102	7.3 185	32.2 14,6
DMV-D	5080/11	226070	226072	7	DN 80	12.2 310	4.1 104	11.5 293	5.1 129	7.9 200	52.0 23,6
DMV-D	5100/11	226073	226075	7	DN 100	13.8 350	4.7 119	13.0 331	5.6 143	8.7 220	67.5 30,6
DMV-D	5125/11	226076	226078	7	DN 125	15.8 400	5.6 142	16.2 412	6.3 161	10.0 255	111.6 50,6
DMV-DLE	5040/11	226115	226117	7	DN 40	9.5 240	2.5 62,5	8.7 220	3.9 100	5.9 150	17.4 7,9
DMV-DLE	5050/11	226118	226120	7	DN 50	9.5 240	2.9 73	8.7 220	3.9 100	6.5 165	18.5 8,4
DMV-DLE	5065/11	226102	226103	7	DN 65	11.4 290	3.4 87	10.6 269	4.0 102	7.3 185	32.6 14,8
DMV-DLE	5080/11	226104	226106	7	DN 80	12.2 310	4.1 104	12.3 312	5.1 129	7.9 200	53.1 24,1
DMV-DLE	5100/11	226112	226114	7	DN 100	13.8 350	4.7 119	15.1 382	5.6 143	8.7 220	68.6 31,1
DMV-DLE	5125/11	226108	226110	7	DN 125	15.8 400	5.6 142	18.2 462	6.3 161	10.0 255	112.7 51,1

Equipment variants of DMV.../11 double solenoid valve, single-stage mode	DMV 5040/11 - DMV 5125/11	X	standard
DMV-D	X	(X)	on request
DMV-DLE	X	-	not possible
Sieve	X		
Gas pressure switch can be mounted: on flange	X Possible using a pipe nipple		
downstream of sieve	(X)		
downstream of valve 2	(X)		
Valve V1, double-seat	X		
Valve V2, double-seat	X		
Valves opening separately	X		
G 3/4 ignition gas flange can be mounted	(X)		

Required Flanges & Accessories						
Body Size	Flange Description	# of Holes per Flange	* Flange Order No.	Bolt size	**Bolt Order No.	***Gasket Order No.
DMV-D(LE) 5040/11	1 1/2" ISO Flanged	4	227137	M16x55	135930	267463
DMV-D(LE) 5050/11	2" ISO Flanged	4	227138	M16x65	135930	267464
DMV-D(LE) 5065/11	2 1/2" ISO Flanged	4	227139	M16x65	135930	267465
DMV-D(LE) 5065/11	2 1/2" ISO to NPT	4	243690	M16x65	135930	267465
DMV-D(LE) 5080/11	3" ISO Flanged	8	227140	M16x65	135930	267466
DMV-D(LE) 5080/11	3" ISO to NPT	8	243219	M16x65	135930	267466
DMV-D(LE) 5100/11	4" ISO Flanged	8	227141	M16x65	135930	267467
DMV-D(LE) 5125/11	5" ISO Flanged	8	227142	M16x75	148830	267468
*When a control is used alone, one mating flange is needed for each end, for a total of two flanges. When one control is bolted to another, such as an FRS to a DMV, one mating flange is needed for each end, for a total of two flanges. **includes one bolt, one lock washer, and one nut. ***one gasket needed for each flange connection.						

Dual Modular Valve (DMV) system



Additional Accessories

VPS 504

Valve proving system (approved by some authorities having jurisdiction in lieu of vent valve and “proof of closure” e.g. FM and Swiss Re).

GAO/GMH/GML A2 pressure switch

Position indication

CPI 400 with indication lamps and SPDT interlock switch, or Visual indicator (VI)

DMK butterfly control valve

Mounts directly downstream of DMV to modulate gas flow. Requires actuator. Use DMA actuator with DMK butterfly valve.

Adapters

- 1/4" NPT adapter (225047)
- 1/2" NPT Pilot gas adapter; Check flow requirements. (225043)
- G 1/8" Test nipple (219008)
- 1" NPT Vent line adapter (243760)

Pressure drop for other gases

To determine the pressure drop when using a gas other than natural gas, use the flow formula below and f value located in the table below to determine

the “corrected” flow rate in CFH through the valve for the other gas used. For example, when using propane, divide the volume (CFH) of propane required for the application by the calculated value

f (f = 0.66 for propane). Use this “corrected” flow rate and the flow curve on the next page to determine pressure drop for propane.

Determining equivalent flow through valves using another gas

$$\dot{V}_{\text{gas used}} = \dot{V}_{\text{Natural gas}} \times f$$

$$f = \sqrt{\frac{\text{Density of Natural gas}}{\text{Density of gas used}}}$$

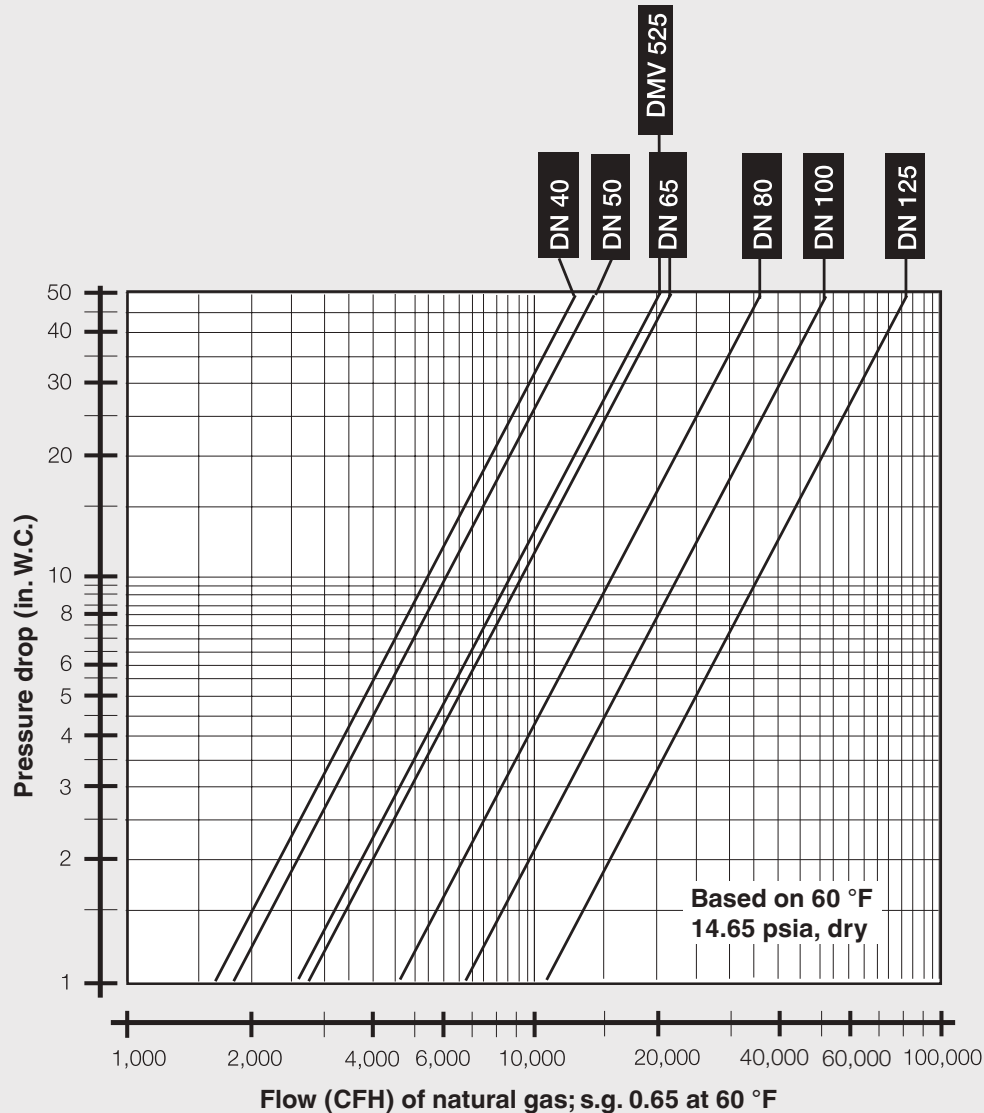
Type of gas	Density [kg/m³]	s.g.	f
Natural gas	0.81	0.65	1.00
Butane	2.39	1.95	0.58
Propane	1.86	1.50	0.66
Air	1.24	1.00	0.80

**Dual Modular Safety
Shutoff Valves**

**DMV-D/11 Series
DMV-DLE/11 Series**

DUNGS®
Combustion Controls

Flow curve

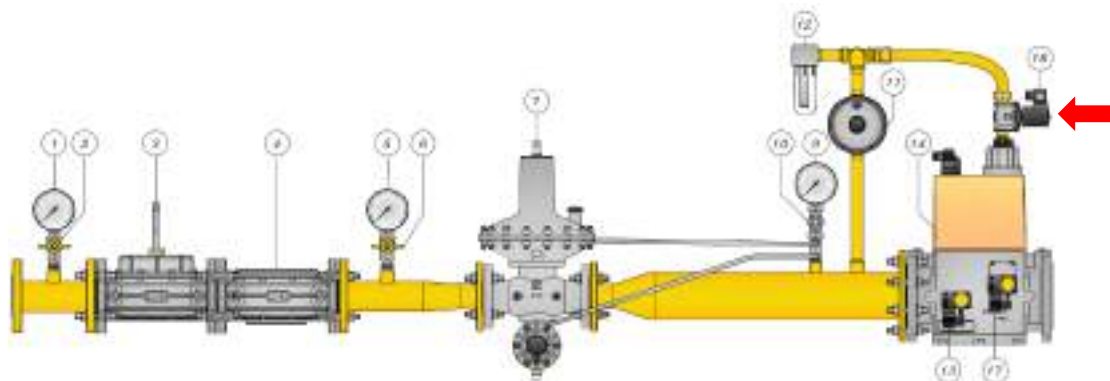


We reserve the right to make any changes in the interest of technical progress.

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Item 18 – Válvula solenoide simples NA



ELETTROVALVOLE AUTOMATICHE DI SFIATO
AUTOMATIC RELIEF SOLENOID VALVES
ELECTROVANNES AUTOMATIQUES D'EFFLEUREMENT
ELECTROVÁLVULAS DE ALIVIO AUTOMÁTICAS



CE 0497

MADE IN ITALY

	IT	EN	FR	ES
Pressione massima di esercizio Maximum operating pressure Pression maximum de fonctionnement Presión máxima de funcionamiento	0,36 - 1 - 3 - 6 bar			
Attacchi filettati / Threaded connections Raccords filetés / Conexiones roscadas	DN 15 - DN 20 - DN 25 - DN 32 - DN 40			
Attacchi flangiati / Flanged connections Raccords à brides / Conexiones embreadas	DN 25* - DN 32 - DN 40 - DN 50			
	* su richiesta con flange girevoli	* with swivel flanges on request	* sur demande avec brides tournantes	* bajo petición con bridas locas
Norma di riferimento Reference standard Norme de référence Patrón de referencia	EN 16304 - EN 13611			
In conformità a In conformity with Conforme a Conforme	Direttiva PED 2014/68/UE	PED Directive 2014/68/EU	Directive PED 2014/68/UE	Directiva PED 2014/68/UE

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EN

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FR

ES

1.0 - GENERALITÀ

Il presente manuale illustra come installare, far funzionare e utilizzare il dispositivo in modo sicuro.

Le istruzioni per l'uso devono essere **SEMPRE** disponibili nell'impianto dove è installato il dispositivo.

ATTENZIONE: le operazioni di installazione/cablaggio/manutenzione devono essere eseguite da personale qualificato (come indicato in 1.3) utilizzando adeguati dispositivi di protezione individuale (DPI).

Per eventuali informazioni relative alle operazioni di installazione/cablaggio/manutenzione o in caso di problemi non risolvibili con l'utilizzo delle istruzioni è possibile contattare il produttore utilizzando indirizzo e recapiti telefonici riportati in ultima pagina.

1.1 - DESCRIZIONE

Elettrovalvole automatiche di sfiato per bruciatori ed apparecchi a gas. Aprono in assenza di tensione, chiudono se alimentate elettricamente.

Possono essere fornite (a seconda del modello) di CPI SWITCH (Closed Position Indicator) o OPI SWITCH (Open Position Indicator). Ulteriori informazioni riguardanti la fattibilità di CPI/OPI SWITCH sono riportate in 6.0.

Norme di riferimento: EN 16304 - EN 13611.

1.2 - LEGENDA SIMBOLI



PERICOLO: In caso di inosservanza possono essere procurati danni a beni materiali.



PERICOLO: In caso di inosservanza oltre a danni a beni materiali, possono essere procurati danni alle persone e/o animali domestici.



ATTENZIONE: Viene richiamata l'attenzione su dettagli tecnici rivolti al personale qualificato.

1.3 - PERSONALE QUALIFICATO

Trattasi di persone che:

- Hanno dimestichezza con l'installazione, il montaggio, la messa in servizio e la manutenzione del prodotto;
- Sono a conoscenza delle normative in vigore nella regione o paese in materia di installazione e sicurezza;
- Hanno istruzione sul pronto soccorso.



1.4 - USO DI PARTI DI RICAMBIO NON ORIGINALI

- In caso di manutenzione o sostituzione di componenti di ricambio (es. bobina, connettore, ecc.) devono essere utilizzati **SOLAMENTE** quelli indicati dal fabbricante. L'utilizzo di componenti differenti, oltre a far decadere la garanzia del prodotto, potrebbe compromettere il corretto funzionamento dello stesso.
- Il fabbricante non è responsabile di malfunzionamenti derivanti da manomissioni non autorizzate o utilizzo di ricambi non originali.



1.5 - UTILIZZO NON APPROPRIATO

- Il prodotto deve essere utilizzato unicamente allo scopo per il quale è stato costruito.
- Non è consentito l'utilizzo con fluidi differenti da quelli indicati.
- Non devono essere superati in nessun caso i dati tecnici indicati in targhetta. E' cura dell'utilizzatore finale o dell'installatore, adottare corretti sistemi a protezione dell'apparecchio che impediscano il superamento della pressione massima indicata in targhetta.
- Il fabbricante non è responsabile per danni causati da un utilizzo improprio dell'apparecchio.

2.0 - DATI TECNICI

• Impiego	: gas non aggressivi delle tre famiglie (gas secchi)
• Temperatura ambiente (TS)	: -20 ÷ +60 °C
• Tensioni di alimentazione (DN 15 - DN 20 - DN 25)	: 12 Vdc - 12 V/50 Hz - 24 Vdc - 24 V/50 Hz - 110 V/50-60 Hz - 230 V/50-60 Hz*
• Tensioni di alimentazione (DN 32 - DN 40 - DN 50)	: 24 Vdc - 24 V/50 Hz - 110 V/50-60 Hz - 230 V/50-60 Hz*
• Tolleranza su tensione di alimentazione	: -15% ... +10%
• Cablaggio elettrico	: pressacavo M20x1,5
• Potenza assorbita	: vedere tabelle 2a - 2b - 2c
• Pressione massima di esercizio	: 0,36 - 1 - 3 - 6 bar (vedi etichetta prodotto)
• Grado di protezione	: IP65
• Resistenza meccanica	: Gruppo 2
• Attacchi filettati Rp	: (DN 15 - DN 20 - DN 25 - DN 32 - DN 40) secondo EN 10226
• Attacchi flangiati accoppiabili con flange PN 16	: (DN 25** - DN 32 - DN 40 - DN 50) secondo ISO 7005
• Attacchi filettati NPT o flangiati ANSI 150	: richiedere fattibilità
• In conformità a	: Direttiva PED 2014/68/UE (versioni aventi P.max 1 - 3 - 6 bar) Directiva EMC 2014/30/UE - Directiva LVD 2014/35/UE Directiva RoHS II 2011/65/UE

* Solo monofase, l'apparecchio non funziona se alimentato con tensione trifase.

** DN 25 con flange girevoli.

2.1 - INDIVIDUAZIONE MODELLI

EVAP/NA	: DN 15 - 20 - 25	P. max 360 mbar
EVAP-1/NA	: DN 15 - 20 - 25	P. max 1 bar
EVAP-3/NA	: DN 15 - 20 - 25	P. max 1 bar
EVAP-6/NA	: DN 15 - 20 - 25	P. max 6 bar
EVA-1/NA	: DN 32 - 40 - 50	P. max 1 bar
EVA-3/NA	: DN 32 - 40 - 50	P. max 3 bar
EVA-6/NA	: DN 32 - 40 - 50	P. max 6 bar

3.0 - MESSA IN FUNZIONE DEL DISPOSITIVO



3.1 - OPERAZIONI PRELIMINARI ALL'INSTALLAZIONE

- E' necessario chiudere il gas a monte della valvola prima dell'installazione;
- Verificare che la pressione di linea **NON SIA SUPERIORE** alla pressione massima dichiarata sull'etichetta del prodotto;
- Eventuali tappi di protezione (se presenti) vanno rimossi prima dell'installazione;
- Tubazioni e interni della valvola devono essere liberi da corpi estranei;

Se l'apparecchio è filettato:

- verificare che la lunghezza del filetto della tubazione non sia eccessiva per non danneggiare il corpo dell'apparecchio in fase di avvitamento;

Se l'apparecchio è flangiato:

- verificare che le controflange di ingresso e uscita siano perfettamente coassiali e parallele per evitare di sottoporre il corpo a inutili sforzi meccanici, calcolare inoltre lo spazio per l'inserimento della guarnizione di tenuta;
- Per le fasi di serraggio, è necessario munirsi di una o più chiavi dinamometriche tarate od altri utensili di bloccaggio controllati;

Procedure in comune (apparecchi filettati e flangiati):

- In caso di installazione all'esterno, è consigliato prevedere una tettoia di protezione per evitare che l'acqua piovana possa danneggiare le parti elettriche dell'apparecchio.
- Prima di effettuare connessioni elettriche verificare che la tensione di rete corrisponda con la tensione di alimentazione indicata sull'etichetta del prodotto;
- Scollegare l'alimentazione prima di procedere al cablaggio;
- In base alla geometria dell'impianto valutare il rischio di formazione di miscela esplosiva all'interno della tubazione;
- Se l'elettrovalvola è installata in prossimità di altre apparecchiature o come parte di un insieme, è necessario valutare preliminarmente la compatibilità fra l'elettrovalvola e tali apparecchiature.
- Evitare di installare l'elettrovalvola in prossimità di superfici che potrebbero essere danneggiate dalla temperatura della bobina;
- Prevedere una protezione da urti o contatti accidentali nel caso l'elettrovalvola sia accessibile a personale non qualificato.



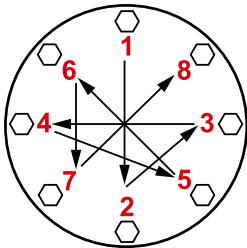
3.2 - INSTALLAZIONE (vedere esempio in 3.4)

Apparecchi filettati:

- Assemblare il dispositivo avvitandolo, assieme alle opportune tenute, sull'impianto con tubi e/o raccordi le cui filettature siano coerenti con la connessione da assemblare.
- Non usare la bobina (2) come leva per l'avvitamento ma servirsi dell'apposito utensile;
- La freccia, indicata sul corpo (8) dell'apparecchio, deve essere rivolta verso l'utenza;

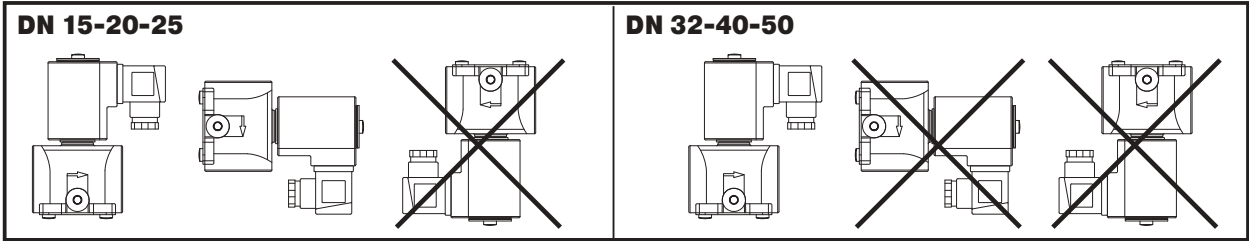
Apparecchi flangiati:

- Assemblare il dispositivo flangiandolo, assieme alle opportune tenute, all'impianto con tubi le cui flange siano coerenti con la connessione da assemblare. Le guarnizioni devono essere prive di difetti e devono essere centrate tra le flange;
- Se a guarnizioni inserite lo spazio rimanente è eccessivo non cercare di colmare il gap stringendo eccessivamente i bulloni dell'apparecchio;
- La freccia, indicata sul corpo (8) dell'apparecchio, deve essere rivolta verso l'utenza;
- Inserire all'interno dei bulloni le apposite rondelle per evitare danneggiamenti alle flange in fase di serraggio;
- Durante la fase di serraggio prestare attenzione a non "pizzicare" o danneggiare la guarnizione;
- Serrare i dadi o bulloni gradualmente, secondo uno schema "a croce" (vedere esempio sottoindicato);
- Serrarli, prima al 30%, poi al 60%, fino al 100% della coppia massima (vedere tabella sottostante secondo EN 13611);



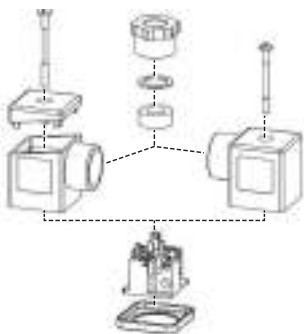
Diametro	DN 25	DN 32	DN 40	DN 50
Coppia max (N.m)	30	50	50	50

- Serrare nuovamente ogni dado o bullone in senso orario almeno una volta, fino al raggiungimento dell'uniformità della coppia massima;
- Procedure in comune (apparecchi filettati e flangiati):
- Per posizioni di installazione vedere lo schema sottostante;



- Durante l'installazione evitare che detriti o residui metallici penetrino all'interno dell'apparecchio;
- Garantire un montaggio privo di tensioni meccaniche, è consigliato l'uso di giunti compensatori anche per sopperire alle dilatazioni termiche della tubazione;

- In caso sia prevista l'installazione dell'apparecchio in una rampa, è cura dell'installatore prevedere adeguati supporti o appoggi correttamente dimensionati, per sostenere e fissare l'insieme. Non lasciare, mai e per nessun motivo, gravare il peso della rampa solo sulle connessioni (filettate o flangiate) dei singoli dispositivi;
- In ogni caso dopo l'installazione verificare la tenuta dell'impianto;
- Non è consentito il cablaggio con cavi collegati direttamente alla bobina. Usare **SEMPRE e SOLO** il connettore indicato dal fabbricante;
- Prima di cablare il connettore (**11**), svitare completamente e rimuovere la vite centrale (**12**). Usare gli appositi terminali per cavi (vedere figure sotto). **NOTA:** Le operazioni di cablaggio del connettore (**1**) devono essere eseguite avendo cura di garantire il grado IP65 del prodotto;
- Cablare il connettore (**1**) con cavo 3x0,75mm² Ø esterno da 6,2 a 8,1 mm. Il cavo da utilizzare deve essere in doppia guaina, idoneo per uso esterno, con tensione minima 500V e temperatura di almeno 120°C;
- Collegare all'alimentazione i morsetti 1 e 2 e il cavo di terra al morsetto $\pm$. **IMPORTANTE:** con alimentazioni 12 e 24 Vdc è necessario rispettare la polarità: (connettori normali: pin1 connettore = $\oplus$ / pin2 connettore = $\ominus$); (connettori con energy saving: pin1 connettore = $\ominus$ / pin2 connettore = $\oplus$);
- Fissare il connettore (**11**) alla bobina (**2**) serrando (coppia consigliata 0,4 N.m $\pm$ 10%) la vite centrale (**12**);
- La valvola deve essere collegata a terra o tramite la tubazione o mediante altri mezzi (es. ponti a cavi).



3.3 - INSTALLAZIONE IN LUOGHI A RISCHIO DI ESPLOSIONE (DIRETTIVA 2014/34/UE)

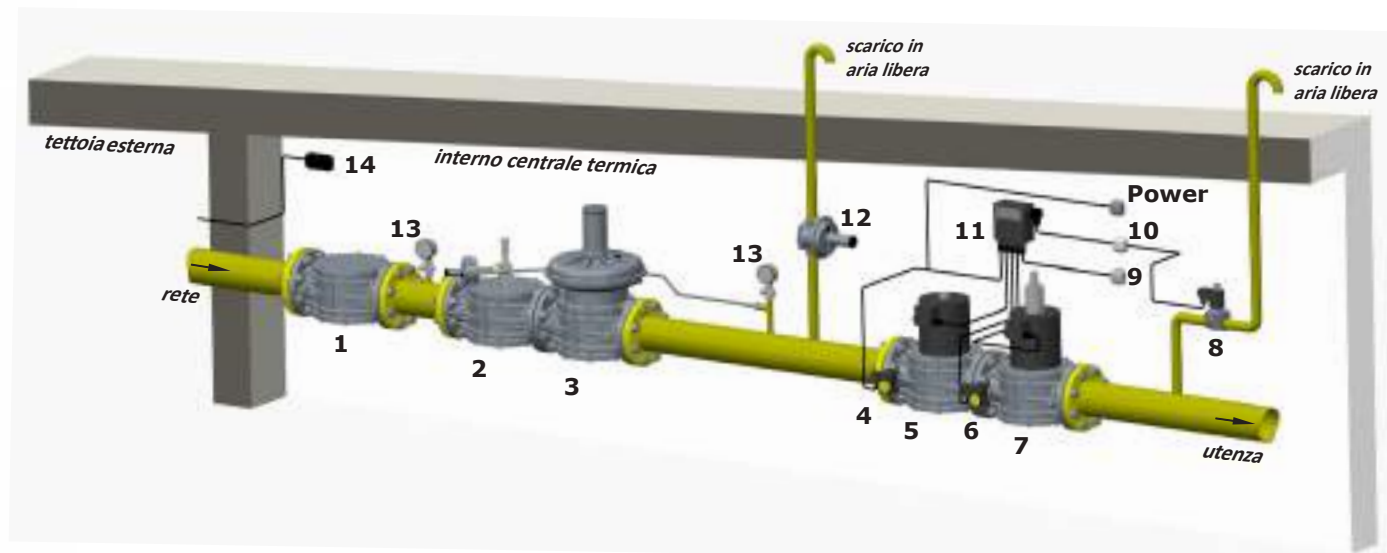
L'elettrovalvola non è idonea per l'utilizzo in luoghi a rischio di esplosione.

3.4 - ESEMPIO GENERICO DI INSTALLAZIONE (Rampa Bruciatore)

1. Filtro gas FM
2. Valvola di blocco OPSO serie MVB/1 MAX
3. Regolatore di pressione RG/2MC
4. Pressostato di minima pressione
5. Elettrovalvola automatica EVP/NC ad apertura rapida
6. Pressostato di massima pressione
7. Elettrovalvola automatica EVPS/NC ad apertura lenta

8. Elettrovalvola automatica di sfiato EVA...NA

9. Reset esterno
10. Burner control
11. Dispositivo controllo tenuta MTC10
12. Valvola di sfioro MVS/1
13. Manometro e relativo pulsante
14. Gas detector





4.0 - PRIMA MESSA IN SERVIZIO



- Prima della messa in servizio verificare che tutte le indicazioni presenti in targhetta, inclusa la direzione del flusso, siano rispettate;
- Dopo aver pressurizzato in maniera graduale l'impianto, verificare la tenuta e il funzionamento dell'elettrovalvola, alimentando/disalimentando elettricamente il connettore **SOLO SE** connesso alla bobina.

NOTA IMPORTANTE: Non usare il connettore come interruttore per aprire/chiudere l'elettrovalvola.



4.1 - VERIFICHE PERIODICHE CONSIGLIATE

- verificare con apposito strumento tarato che il serraggio dei bulloni sia conforme a quanto indicato in 3.2;
- verificare la tenuta delle connessioni flangiate/filettate sull'impianto;
- verificare la tenuta e il funzionamento dell'elettrovalvola;

E' cura dell'utilizzatore finale o dell'installatore definire la frequenza delle suddette verifiche in base alla gravità delle condizioni di servizio.



5.0 - MANUTENZIONE

Non sono previste operazioni di manutenzione interne all'apparecchio.

Nel caso si renda necessaria la sostituzione della bobina e/o della scheda elettronica/connettore:



- Prima di effettuare qualsiasi operazione accertarsi che l'apparecchio non sia alimentato elettricamente;
- Dato che la bobina è idonea anche per alimentazione permanente, il riscaldamento della bobina in caso di servizio continuo è un fenomeno del tutto normale. E' consigliabile evitare il contatto a mani nude con la bobina dopo un alimentazione elettrica continua superiore a 20 minuti. In caso di manutenzione aspettare il raffreddamento della bobina o eventualmente usare idonee protezioni;

NOTA: nel caso sia necessario sostituire la bobina (**2**) in conseguenza a un guasto elettrico è consigliato sostituire anche il connettore (**11**). Le operazioni di sostituzione bobina e/o connettore devono essere eseguite avendo cura di garantire il grado IP65 del prodotto.



5.1 - SOSTITUZIONE DEL CONNETTORE

- Svitare completamente e rimuovere la vite centrale (**12**), successivamente sganciare il connettore (**11**) dalla bobina (**2**);
- Dopo aver rimosso il cablaggio elettrico interno esistente, cablare il nuovo connettore e fissarlo alla bobina come indicato in 3.2;



5.2 - SOSTITUZIONE DELLA BOBINA

- Svitare completamente e rimuovere la vite centrale (**12**), successivamente sganciare il connettore (**11**) dalla bobina (**2**);
- Svitare la vite (o dado) o rimuovere il seeger (**1**) di bloccaggio della bobina (**2**) e rimuoverla dal canotto assieme alle apposite guarnizioni/dischetti;
- Inserire nel canotto la nuova bobina + guarnizioni + dischetti e fissare il tutto tramite l'apposita vite (o dado o seeger);

6.0 - CPI SWITCH / OPI SWITCH

Il microswitch di segnalazione posizione di chiusura (CPI SWITCH) è un sensore di prossimità magnetico con contatto normalmente aperto. Fornisce una segnalazione alla chiusura dell'otturatore della valvola.

Se l'elettrovalvola è fornita col il CPI in dotazione, la posizione del sensore è già calibrata e fissa, quindi, per farlo funzionare è sufficiente collegarlo elettricamente.

Nel caso sia fornito a parte e installato successivamente su una elettrovalvola con predisposizione, seguire le indicazioni riportate al paragrafo 6.2 nel manuale istruzioni relativo al CPI.

OPI SWITCH invece, fornisce una segnalazione quando la valvola è aperta.

Nella tabella a pagina seguente è indicata la fattibilità di CPI/OPI in relazione ai diametri.

Per caratteristiche tecniche CPI e OPI vedere relativi manuali istruzioni.

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Fattibilità CPI/OPI					
DN	P.max (bar)	Predisposizione CPI	CPI	OPI	CPI + OPI
15-20-25	0,36	✗	✗	✗	✗
15-20-25	1-3-6	✓	✓	✓	✗
32-40-50	1-3-6	✓	✓	✗	✓
Le versioni OPI e CPI+OPI sono fornibili unicamente da fabbrica. Per queste 2 versioni non è prevista la versione con predisposizione.					

7.0 - TRASPORTO, STOCCAGGIO E SMALTIMENTO

- Durante il trasporto il materiale deve essere trattato con cura, evitando che il dispositivo possa subire urti, colpi o vibrazioni;
- Se il prodotto presenta trattamenti superficiali (es. verniciatura, cataforesi, ecc) non devono essere danneggiati durante il trasporto;
- La temperatura di trasporto e di stoccaggio, coincide con quella indicata nei dati di targa;
- Se il dispositivo non viene installato subito dopo la consegna deve essere correttamente immagazzinato in un luogo secco e pulito;
- In ambienti umidi è necessario usare siccativi oppure il riscaldamento per evitare la condensa.
- Il prodotto, a fine vita, dovrà essere smaltito in conformità alla legislazione vigente nel paese in cui si esegue tale operazione.

8.0 - GARANZIA

Valgono le condizioni di garanzia stabilite col fabbricante al momento della fornitura.

Per danni causati da:

- Uso improprio del dispositivo;
- Inosservanza delle prescrizioni indicate nel presente documento;
- Inosservanza delle norme riguardanti l'installazione;

non possono essere rivendicati diritti di garanzia o risarcimento danni.

Sono esclusi inoltre dalla garanzia i lavori di manutenzione, il montaggio di ricambi o pezzi non originali, la modifica del dispositivo e l'usura naturale.

9.0 - DATI DI TARGA

Nei dati di targa (vedere esempio a fianco) sono riportati i seguenti dati:

- Nome/logo e indirizzo del fabbricante (eventuale nome/logo distributore)
- Mod.: = nome/modello dell'apparecchio seguito dal diametro di connessione
- P.max = Pressione massima alla quale è garantito il funzionamento del prodotto
- PS = Pressione massima ammissibile
- IP... = Grado di protezione
- 230V.... = Tensione di alimentazione, frequenza (se Vac), seguite dall'assorbimento elettrico
- Esempio indicazione assorbimento elettrico: 55/16 VA indica 55 VA allo spunto, 16 VA a regime
- TS = Range di temperatura alla quale è garantito il funzionamento del prodotto
-  0497 = Conformità Dir. PED seguita dal n° dell'Organismo Notificato
- year = Anno di fabbricazione

- Lot = Numero matricola del prodotto (vedere spiegazione di seguito)
 - U1804 = Lotto in uscita anno 2018 settimana n° 4
 - 2185 = numero progressivo commessa riferito all'anno indicato
 - 00001 = numero progressivo riferito alla q.tà del lotto

MADAS ®		Via Moratello, 5/7 - 37045 Legnago (VR) - Italy www.madas.it
Mod.: EVA-1/NA DN 50		P.max=PS= 1 bar
IP65 - 230 V/50-60 Hz 55/16 VA		TS: -20+60 °C
		 0497
year: 2018	Lot: U1804	2185/00001

1.0 - GENERAL INFORMATION

This manual shows you how to safely install, operate and use the device.

The instructions for use **ALWAYS** need to be available in the facility where the device is installed.

ATTENTION: installation/wiring/maintenance need to be carried out by qualified staff (as explained in section 1.3) using appropriate personal protective equipment (PPE).

For any information pertaining to installation/wiring/maintenance or in any case problems that cannot be solved with the instructions, contact the manufacturer by using the address and phone numbers provided on the last page.

1.1 - DESCRIPTION

Automatic venting solenoid valves for burners and gas appliances. They open when not powered, they close when powered electrically.

They can be supplied (depending on the model) with CPI SWITCH (Closed Position Indicator) or OPI SWITCH (Open Position Indicator). Further information regarding the CPI/OPI SWITCH is available in 6.0.

Reference standards: EN 16304 - EN 13611.

1.2 - KEY TO SYMBOLS



DANGER: In the event of non compliance, this may cause damage to property.



DANGER: In the event of non compliance, this may cause damage to property, as well as harming people and/or pets.



ATTENTION: Attention is drawn to the technical details intended for qualified personnel.

1.3 - QUALIFIED PERSONNEL

These are people who:

- Are familiar with product installation, assembly, commissioning and maintenance;
- Know the regulations in force in the region or country pertaining to installation and safety;
- Are trained on first aid.



1.4 - USING NON-ORIGINAL SPARE PARTS

- To perform maintenance or change spare parts (e.g. coil, connector, etc.) **ONLY** manufacturer-recommended parts can be used. Using different parts not only voids the product warranty, but might impair correct operation.
- The manufacturer is not liable for malfunctions caused by unauthorised tampering or use of non-original spare parts.



1.5 - IMPROPER USE

- The product must only be used for the purpose it was built for.
- It is not allowed to use fluids other than those expressly stated.
- The technical data set forth on the rating plate must not, under any circumstances, be exceeded. The end user or installer is in charge of implementing proper systems to protect the device, which ensure that the maximum pressure indicated on the rating plate is not exceeded.
- The manufacturer is not responsible for any damage caused by improper use of the device.

2.0 - TECHNICAL DATA

• Use	: non-aggressive gases of the three families (dry gases)
• Ambient temperature (TS)	: -20 ÷ +60°C
• Power supply voltage (DN 15 - DN 20 - DN 25)	: 12 Vdc - 12 V/50 Hz - 24 Vdc - 24 V/50 Hz - 110 V/50-60 Hz - 230 V/50-60 Hz*
• Power supply voltage (DN 32 - DN 40 - DN 50)	: 24 Vdc - 24 V/50 Hz - 110 V/50-60 Hz - 230 V/50-60 Hz*
• Power supply tolerance	: -15% ... +10%
• Electric wiring	: cable gland M20x1.5
• Absorbed power	: see tables 2a - 2b - 2c
• Maximum operating pressure	: 0.36 - 1 - 3 - 6 bar (see product label)
• Protection rating	: IP65
• Mechanical strength	: Group 2
• Rp Threaded connections	: (DN 15 - DN 20 - DN 25 - DN 32 - DN 40) according to EN 10226
• Flanged connections that can be coupled to PN 16 flanges	: (DN 25** - DN 32 - DN 40 - DN 50) according to ISO 7005
• NPT threaded or ANSI 150 flanged connections	: request feasibility
• In compliance with	: PED Directive 2014/68/EU (versions with max P. 1 - 3 - 6 bar) Directive EMC 2014/30/EU - Directive LVD 2014/35/EU Directive RoHS II 2011/65/EU

* Only single-phase, the device does not work if powered with three-phase voltage.

** DN 25 with swivel flanges.

2.1 - MODEL IDENTIFICATION

EVAP/NA	: DN 15 - 20 - 25	max P. 360 mbar
EVAP-1/NA	: DN 15 - 20 - 25	max P. 1 bar
EVAP-3/NA	: DN 15 - 20 - 25	max P. 1 bar
EVAP-6/NA	: DN 15 - 20 - 25	max P. 6 bar
EVA-1/NA	: DN 32 - 40 - 50	max P. 1 bar
EVA-3/NA	: DN 32 - 40 - 50	max P. 3 bar
EVA-6/NA	: DN 32 - 40 - 50	max P. 6 bar

3.0 - COMMISSIONING THE DEVICE



3.1 - OPERATIONS PRIOR TO INSTALLATION

- It is necessary to close the gas upstream of the valve prior to installation;
- Make sure that the line pressure **DOES NOT EXCEED** the maximum pressure declared on the product label;
- Protective caps (if any) must be removed prior to installation;
- Valve pipes and insides must be clear of any foreign bodies;

If the device is threaded:

- make sure that the pipe thread is not too long, to prevent damaging the body of the device when screwing it on;

If the device is flanged:

- make sure the inlet and outlet counter-flanges are perfectly coaxial and parallel in order to prevent unnecessary mechanical stress to the body. Also calculate the space to insert the seal gasket;
- With regard to tightening operations, equip yourself with one or two calibrated torque wrenches or other controlled locking tools;

Common procedures (threaded and flanged devices):

- With outdoor installation, it is advisable to provide a protective roof to prevent rain from damaging the electrical parts of the device.
- Prior to carrying out any electrical wiring operations, make sure that the mains voltage matches the supply voltage indicated on the product label;
- Cut off power prior to proceeding with wiring;
- According to the plant geometry, check the risk of an explosive mixture arising inside the piping;
- If the solenoid valve is installed near other devices or as part of an assembly, compatibility between the solenoid valve and this other device must be evaluated beforehand.
- Avoid installing the solenoid valve near surfaces that could be damaged by the coil's temperature;
- Provide protection against impact or accidental contacts if the solenoid valve is accessible to unqualified personnel.



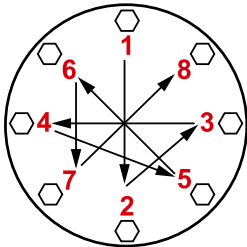
3.2 - INSTALLATION (see example in 3.4)

Threaded devices:

- Assemble the device by screwing it, with the due seals, onto the plant with pipes and/or fittings whose threads are consistent with the connection being attached.
- Do not use the coil (2) as a lever to help you screw it on, only use the specific tool;
- The arrow, shown on the body (8) of the device, must be pointing towards the application;

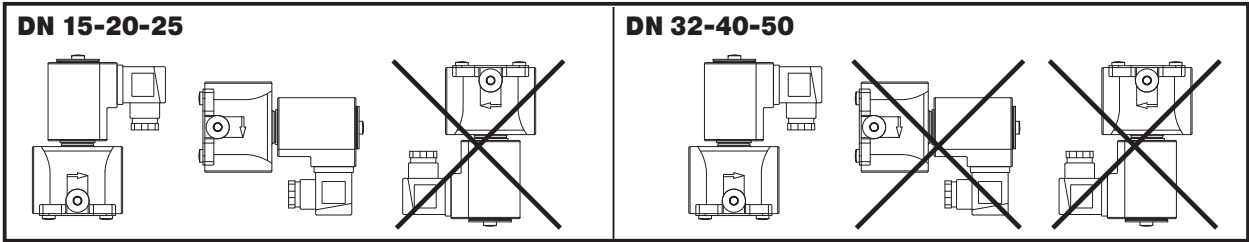
Flanged devices:

- Assemble the device by flanging it, with the appropriate seals, onto the system with pipes whose flanges are consistent with the connection being attached. The gaskets must not have any defects and must be centred between the flanges;
- If, after installing the gaskets, there is still an excessive space in between, do not try to reduce said gap by excessively tightening the bolts of the device;
- The arrow, shown on the body (8) of the device, needs to be pointing towards the application;
- Insert the relative washers inside the bolts in order to prevent damage to the flanges during tightening;
- When tightening, be careful not to "pinch" or damage the gasket;
- Tighten the nuts or bolts gradually, in a "cross" pattern (see the example below);
- Tighten them, first by 30%, then by 60%, and finally 100% of the maximum torque (see the table below according to EN 13611);



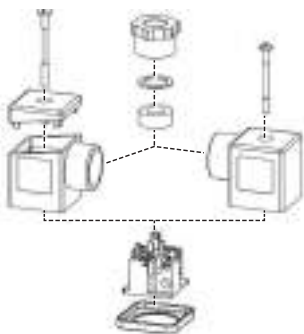
Diameter	DN 25	DN 32	DN 40	DN 50
Max. torque (N.m)	30	50	50	50

- Tighten each nut and bolt again clockwise at least once, until the maximum torque has been achieved uniformly;
- Common procedures (threaded and flanged devices):
- For installation positions see the diagram below;



- During installation, prevent debris or metal residues from getting into the device;
- To guarantee mechanical tension-free assembly, we recommend using compensating joints, which also adjust to the pipe's thermal expansion;

- If the device needs to be installed in a ramp, it is the installer's responsibility to provide suitable supports or correctly sized supports to properly hold and secure the assembly. Never, for any reason whatsoever, allow the weight of the manifold to bear only on the connections (threaded or flanged) of the individual devices;
- In any case, following installation, check the tightness of the plant;
- Wiring cannot have cables connected directly to the coil. **ALWAYS and ONLY** use the connector identified by the manufacturer;
- Before wiring the connector (**11**), fully unscrew and remove the central screw (**12**). Use the designated cable terminals (see figures below). **NOTE:** Connector wiring (**1**) needs to be carried out taking care to ensure the product's IP65 degree of protection;
- Wire the connector (**1**) with 3x0.75mm² cable for external Ø 6.2 to 8.1 mm. The cable must be in double sheath, suitable for outdoor use, with a minimum voltage of 500V and a temperature of at least 120°C;
- Connect terminals 1 and 2 to the power supply and the earth cable to terminal $\pm$. **IMPORTANT:** respect the polarity with 12 and 24 Vdc power supplies:
 (normal connectors: pin1 connector = $\oplus$ / pin2 connector = $\ominus$);
 (normal connectors: pin1 connector = $\ominus$ / pin2 connector = $\oplus$);
- Secure the connector (**11**) to the coil (**2**) by tightening (recommended tightening torque 0.4 N.m $\pm$ 10%) the centre screw (**12**);
- The valve needs to be earthed either through the pipe or through other means (e.g. cable jumpers).



3.3 - INSTALLATION IN PLACES WHERE THERE IS THE RISK OF EXPLOSION (DIRECTIVE 2014/34/EU)

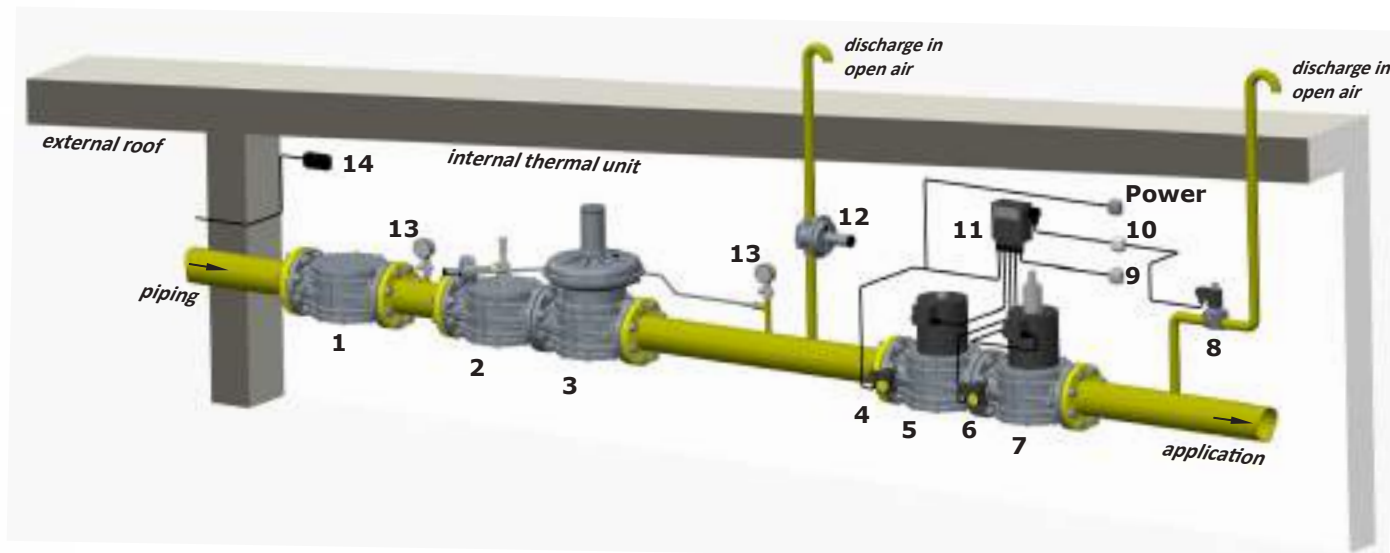
The solenoid valve is not suitable for use in potentially explosive areas.

3.4 - GENERIC EXAMPLE OF AN INSTALLATION (Burner Ramp)

1. FM gas filter
2. OPSO series MVB/1 MAX shut off valve
3. RG/2MC pressure regulator
4. Minimum pressure switch
5. EVP/NC automatic solenoid valve with fast opening
6. Maximum pressure switch
7. EVPS/NC automatic solenoid valve with slow opening

8. Automatic venting solenoid valve EVA...NA

9. External reset
10. Burner control
11. MTC10 leak test device
12. MVS/1 relief valve
13. Pressure gauge and relative button
14. Gas detector





4.0 - FIRST START-UP



- Before start-up, make sure that all the instructions on the rating plate, including the direction of flow, are observed;
- After having gradually pressurised the system, check tightness and operation of the solenoid valve, electrically powering/disconnecting the connector **ONLY IF** connected to the coil.

IMPORTANT NOTE: Do not use the connector as a switch to open/close the solenoid valve.



4.1 - RECOMMENDED PERIODIC CHECKS

- use a suitable calibrated tool to ensure the bolts are tightened as indicated in 3.2;
- check tightness of the flanged/threaded connections on the system;
- check tightness and operation of the solenoid valve;

The final user or installer is responsible for defining the frequency of these checks based on the severity of the service conditions.



5.0 - MAINTENANCE

No maintenance operations need to be carried out inside the device.

If the coil and/or electronic board/connector need to be replaced:



- Before performing any operation, make sure that the device is not electrically powered;
- Since the coil is also suitable to be permanently powered, coil heating in case of continuous operation is an entirely normal phenomenon. It is advisable to avoid touching the coil with bare hands after continuously powered longer than 20 minutes. In case of maintenance, wait for the coil to cool down or, if necessary, use suitable protections;

NOTE: if the coil (**2**) needs to be changed following an electrical failure, we recommend changing the connector (**11**) as well. The coil and/or connector replacement operations need to be carried out taking care to ensure the product's IP65 degree of protection.



5.1 - REPLACING THE CONNECTOR

- Fully unscrew and remove the central screw (**12**), then remove the connector (**11**) from the coil (**2**);
- When you have taken out the existing internal electrical wiring, wire the new connector and secure it to the coil, as shown in 3.2;



5.2 - REPLACING THE COIL

- Fully unscrew and remove the central screw (**12**), then remove the connector (**11**) from the coil (**2**);
- Loosen the screw (or nut) or remove the Seeger ring (**1**) that locks the coil (**2**) and take it out from the armature assembly along with the gaskets/discs;
- Place the new coil + gaskets + discs inside the armature assembly and secure with the relative screw (or nut or Seeger ring);

6.0 - CPI SWITCH / OPI SWITCH

The microswitch that signals the closed position (CPI SWITCH) is a magnetic proximity sensor with normally open contact. It provides a signal when the valve obturator closes.

If the solenoid valve comes with the CPI, the position of the sensor is already calibrated and set, therefore, for operation you simply need to connect it to the power supply.

If it comes separately and is installed at a later time on a solenoid valve with CPI set-up, follow the instructions provided in paragraph 6.2 in the CPI instruction manual.

While the OPI SWITCH provides a warning when the valve is open.

The table on the next page shows the feasibility of CPI/OPI in relation to diameters.

For CPI and OPI technical features, see the relative instruction manuals.

CPI/OPI feasibility					
DN	Max P. (bar)	Set-up CPI	CPI	OPI	CPI + OPI
15-20-25	0.36	✗	✗	✗	✗
15-20-25	1-3-6	✓	✓	✓	✗
32-40-50	1-3-6	✓	✓	✗	✓
OPI and CPI+OPI versions can only be supplied from the factory. For these 2 versions, the version with set-up is not envisaged.					

7.0 - TRANSPORT, STORAGE AND DISPOSAL

- During transport the material needs to be handled with care, avoiding any impact or vibrations to the device;
- If the product has any surface treatments (e.g. painting, cataphoresis, etc), it must not be damaged during transport;
- The transport and storage temperatures must observe the values provided on the rating plate;
- If the device is not installed immediately after delivery, it must be correctly placed in storage in a dry and clean place;
- In humid facilities, it is necessary to use driers or heating to avoid condensation.
- At the end of its service life, the product must be disposed of in compliance with the legislation in force in the country where this operation is performed.

8.0 - WARRANTY

The warranty conditions agreed with the manufacturer at the time of the supply apply.

Damage caused by:

- Misuse of the device;
- Failure to comply with the requirements set out in this document;
- Failure to observe the regulations pertaining to installation;

the rights of the warranty or compensation for damage cannot be claimed.

The warranty also excludes maintenance work, the assembly of parts or non-original spare parts, making changes to the device and natural wear.

9.0 - RATING PLATE DATA

The rating plate data (see example provided here) includes the following:

- Manufacturer's name/logo and address (possible distributor name/logo)
- Mod.: = device name/model followed by the connection diameter
- P. max = Maximum pressure at which product operation is guaranteed
- PS = Allowable maximum pressure
- IP... = Protection rating
- 230V.... = Power supply voltage, frequency (if Vac), followed by the electrical absorption

Example of electrical absorption indication: 55/16 VA indicates 55 VA at start, 16 VA at steady state

- TS = Temperature range within which product operation is guaranteed
-  0497 = Compliance with PED directive followed by the no. of the Notified Body
- year = Year of manufacture
- Lot = Product serial number (see explanation below)
 - U1804 = Lot issued in 2018 in the 4th week
 - 2185 = progressive job order number for the indicated year
 - 00001 = progressive number referring to the quantity of the lot

MADAS ®		Via Moratello, 5/7 - 37045 Legnago (VR) - Italy www.madas.it
Mod.: EVA-1/NA DN 50		P.max=PS= 1 bar
IP65 - 230 V/50-60 Hz 55/16 VA		TS: -20+60 °C
year: 2018 Lot:U1804 2185/00001		 0497

1.0 - GÉNÉRALITÉS

Le présent manuel illustre les procédures d'installation et de fonctionnement du dispositif, en toute sécurité.

Les instructions pour l'utilisation doivent **TOUJOURS** être disponibles dans le site de production où le dispositif est installé.

ATTENTION : les opérations d'installation/de câblage/d'entretien doivent être effectuées par un personnel qualifié (comme indiqué au paragraphe 1.3) en utilisant des équipements de protection individuelle (E.P.I) adaptés.

Pour toute information relative aux opérations d'installation/câblage/entretien, ou en cas de problèmes ne pouvant pas être résolus avec les instructions, il est possible de contacter le Fabricant en utilisant l'adresse et les numéros de téléphone reportés à la dernière page.

1.1 - DESCRIPTION

Électrovannes automatiques de purge pour brûleurs et appareils à gaz. Elles ouvrent en l'absence de tension, elles ferment si elles sont alimentées électriquement.

Elles peuvent être équipées (selon le modèle) d'un CPI SWITCH (Closed Position Indicator) ou OPI SWITCH (Open Position Indicator). Le chapitre 6.0 fournit de plus amples informations sur la faisabilité des dispositifs CPI/OPI SWITCH.

Normes de référence : EN 16304 - EN 13611.

1.2 - LÉGENDE DES SYMBOLES



DANGER : En cas de non-respect, il existe un risque de dommages matériels.



DANGER : Le non-respect entraîne non seulement des dommages matériels mais aussi des dommages aux personnes et/ou aux animaux domestiques.



ATTENTION : Attire l'attention sur les détails techniques s'adressant au personnel qualifié.

1.3 - PERSONNEL QUALIFIÉ

Il s'agit de personnes qui :

- Ont l'habitude d'installer, de monter, de mettre en service et d'entretenir le produit ;
- Connaissent les réglementations en matière d'installation et de sécurité, applicables dans leur région ou leur pays ;
- Ont été formées quant aux premiers soins.



1.4 - UTILISATION DE PIÈCES DE RECHANGE NON ORIGINALES

- En cas d'entretien ou de remplacement de composants de pièces de rechange (ex. bobine, connecteur, etc.), il ne faut utiliser **QUE** ceux indiqués par le Fabricant. L'utilisation de composants différents fait non seulement déchoir la garantie du produit mais risque également de compromettre le bon fonctionnement de ce dernier.
- Le fabricant n'est pas responsable des dysfonctionnements dus à des manipulations non autorisées ou à l'utilisation de pièces de rechange non originales.



1.5 - UTILISATION NON APPROPRIÉE

- Le produit doit être utilisé uniquement pour le but pour lequel il a été construit.
- Il est interdit de l'utiliser avec des fluides autres que ceux indiqués.
- Les données techniques indiquées sur la plaque ne doivent en aucun cas être dépassées. Il appartient à l'utilisateur final ou à l'installateur d'adopter des systèmes adéquats de protection de l'appareil qui empêchent de dépasser la pression maximale indiquée sur la plaque.
- Le Fabricant n'est pas responsable des dommages causés par un usage impropre de l'appareil.

2.0 - DONNÉES TECHNIQUES

• Emploi	: gaz non agressifs des trois familles (gaz secs)
• Température ambiante (TS)	: -20 ÷ +60 °C
• Tensions d'alimentation (DN 15 - DN 20 - DN 25)	: 12 Vcc, 12 V/50 Hz, 24 Vcc, 24 V/50 Hz, 110 V/50-60 Hz, 230 V/50-60 Hz*
• Tensions d'alimentation (DN 32 - DN 40 - DN 50)	: 24 Vcc - 24 V/50 Hz - 110 V/50-60 Hz - 230 V/50-60 Hz*
• Tolérance de la tension d'alimentation	: -15 % ... +10 %
• Câblage électrique	: serre-câble M20x1,5
• Puissance absorbée	: voir tableaux 2a - 2b - 2c
• Pression maximum de fonctionnement	: 0,36 - 1 - 3 - 6 bar (voir l'étiquette du produit)
• Indice de protection	: IP65
• Résistance mécanique	: Groupe 2
• Raccords filetés Rp	: (DN 15 - DN 20 - DN 25 - DN 32 - DN 40) selon la norme EN 10226
• Raccords à brides à coupler avec des brides PN 16:	(DN 25** - DN 32 - DN 40 - DN 50) selon la norme ISO 7005
• Raccords filetés NPT ou à brides ANSI 150	: demander la faisabilité
• Conformément à la	: Directive PED 2014/68/UE (versions ayant P.max 1 - 3 - 6 bar) Directive EMC 2014/30/UE - Directive LVD 2014/35/UE Directive RoHS II 2011/65/UE

* Seulement monophasée, l'appareil ne fonctionne pas s'il est alimenté avec une tension triphasée.

** DN 25 avec brides tournantes.

2.1 - IDENTIFICATION DES MODÈLES

EVAP/NA : DN 15 - 20 - 25 P. max 360 mbar

EVAP-1/NA : DN 15 - 20 - 25 P. max 1 bar

EVAP-3/NA : DN 15 - 20 - 25 P. max 1 bar

EVAP-6/NA : DN 15 - 20 - 25 P. max 6 bar

EVA-1/NA : DN 32 - 40 - 50 P. max 1 bar

EVA-3/NA : DN 32 - 40 - 50 P. max 3 bar

EVA-6/NA : DN 32 - 40 - 50 P. max 6 bar

3.0 - MISE EN MARCHÉ DU DISPOSITIF



3.1 - OPÉRATIONS PRÉALABLES À L'INSTALLATION

- Il est nécessaire de fermer le gaz en amont de la vanne avant l'installation ;
- Vérifier que la pression de ligne **NE DÉPASSE PAS** la pression maximum déclarée sur l'étiquette du produit ;
- Tout bouchon de protection (le cas échéant) doit être ôté avant l'installation ;
- Les conduites et les intérieurs de la vanne doivent être débarrassés des corps étrangers ;

Si l'appareil est fileté :

- vérifier que la longueur du filet du tuyau ne soit pas excessive pour ne pas endommager le corps de l'appareil en phase de vissage ;

Si l'appareil est bridé :

- vérifier que les contre-brides d'entrée et de sortie soient parfaitement coaxiales et parallèles pour éviter de soumettre le corps à des efforts mécaniques inutiles, calculer également l'espace pour introduire le joint d'étanchéité ;
- Pour les phases de serrage, il faut se munir d'une ou de plusieurs clés dynamométriques calibrées ou d'autres outils de verrouillage contrôlés ;

Procédures en commun (appareils filetés et bridés) :

- En cas d'installation à l'extérieur, il est conseillé de prévoir un auvent de protection pour éviter que l'eau de pluie ne puisse endommager les pièces électriques de l'appareil.
- Avant d'effectuer les branchements électriques, vérifier que la tension du réseau corresponde à la tension d'alimentation indiquée sur l'étiquette du produit ;



- Couper l'alimentation avant de procéder au câblage ;
- Évaluer le risque de formation de mélange explosif dans les tuyaux, en fonction de la géométrie de l'installation ;
- Si l'électrovanne est installée à proximité d'autres appareils ou en tant que partie d'un ensemble, il est nécessaire d'évaluer au préalable la compatibilité entre l'électrovanne et ces appareils.
- Éviter d'installer l'électrovanne à proximité des surfaces susceptibles d'être endommagées par la température de la bobine ;
- Si l'électrovanne est accessible au personnel non qualifié, il faut prévoir une protection contre les collisions ou les contacts accidentels.



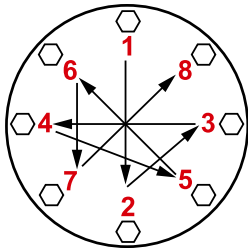
3.2 - INSTALLATION (voir l'exemple au 3.4)

Appareils filetés :

- Assembler le dispositif en le vissant, avec ses joints opportuns, sur l'installation avec les tuyaux et/ou raccords dont les filetages doivent être cohérents avec la connexion à assembler.
- Ne pas se servir de la bobine (2) comme levier pour le vissage mais utiliser l'outil spécifique ;
- La flèche indiquée sur le corps (8) de l'appareil doit être tournée vers l'application ;

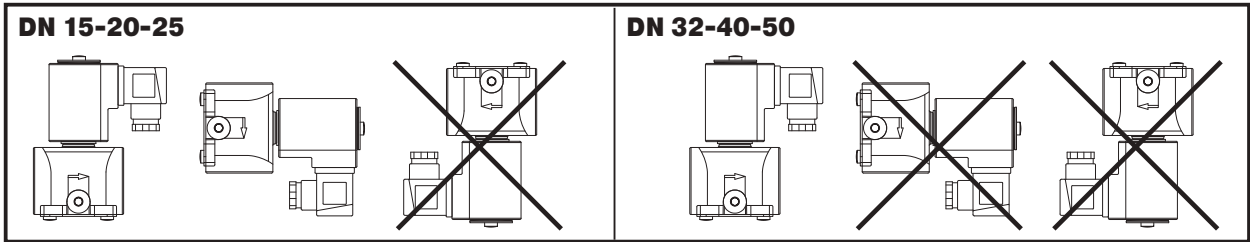
Appareils bridés :

- Assembler l'appareil en le bridant, en même temps que les joints appropriés, à l'équipement avec des tuyaux dont les brides sont compatibles avec la connexion à assembler. Les joints doivent être exempts de défauts et doivent être centrés entre les brides ;
- Lorsque les joints sont introduits, si l'espace qui reste est excessif, il ne faut pas essayer de le combler en serrant trop les boulons de l'appareil ;
- La flèche indiquée sur le corps (8) de l'appareil doit être tournée vers l'application ;
- Insérer les rondelles appropriées à l'intérieur des boulons pour éviter d'endommager les brides pendant le serrage ;
- Pendant la phase de serrage, veiller à ne pas « pincer » ni endommager le joint ;
- Serrer les écrous ou les boulons progressivement, selon un schéma en croix (voir l'exemple ci-dessous) ;
- Serrez-les d'abord à 30 %, puis 60 %, jusqu'à 100 % du couple maximum (voir le tableau ci-dessous selon EN 13611) ;



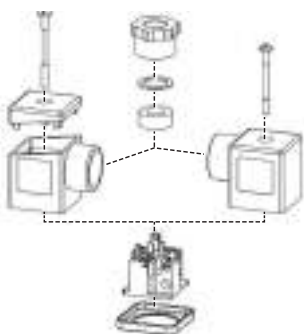
Diamètre	DN 25	DN 32	DN 40	DN 50
Couple max. (N.m)	30	50	50	50

- Serrer chaque écrou ou boulon dans le sens des aiguilles d'une montre au moins une fois jusqu'à ce que l'uniformité du couple maximal soit atteinte ;
- Procédures en commun (appareils filetés et bridés) :
- Pour les positions d'installation, voir le schéma ci-dessous ;



- Pendant l'installation, éviter que des déchets ou des résidus métalliques ne pénètrent à l'intérieur de l'appareil ;
- Garantir un montage dépourvu de tensions mécaniques, il est conseillé d'utiliser aussi des joints compensateurs pour remédier aux dilatations thermiques du tuyau ;

- Si l'installation de l'appareil est prévue dans une rampe, c'est à l'installateur de prévoir des supports adéquats ou des appuis correctement dimensionnés, pour soutenir et fixer l'ensemble. Ne jamais laisser, sous aucun prétexte, reposer le poids de la rampe uniquement sur les connexions (filetées ou à brides) des dispositifs ;
- Dans tous les cas, après la mise en place, vérifier l'étanchéité de l'installation ;
- Il est interdit de câbler avec des câbles directement raccordés à la bobine. Utiliser **TOUJOURS et SEULEMENT** le connecteur indiqué par le Fabricant ;
- Avant de câbler le connecteur (**11**), dévisser à fond et ôter la vis centrale (**12**). Utiliser les bornes spécifiques pour les câbles (voir les figures ci-dessous). **REMARQUE :** Les opérations de câblage du connecteur (**1**) doivent être exécutées en veillant à garantir l'indice IP65 du produit ;
- Câbler le connecteur (**1**) avec un câble 3 x 0,75 mm² Ø externe de 6,2 à 8,1 mm. Le câble à utiliser doit être en double gaine, adapté à une utilisation en extérieur, avec une tension minimale de 500 V et une température d'au moins 120 C ;
- Raccorder les bornes 1 et 2 à l'alimentation, et le câble de terre à la borne $\perp$. **IMPORTANT :** avec les alimentations 12 et 24 Vcc il faut respecter la polarité : (connecteurs normaux : broche 1 connecteur = $\oplus$ / broche 2 connecteur = $\ominus$) ; (connecteurs avec économie d'énergie : broche 1 connecteur = $\ominus$ / broche 2 connecteur = $\oplus$) ;
- Fixer le connecteur (**11**) à la bobine (**2**) en serrant (couple conseillé 0,4 N.m $\pm$ 10 %) la vis centrale (**12**) ;
- La vanne doit être raccordée à la terre ou au tuyau par d'autres moyens (ex. ponts à câbles).



3.3 - INSTALLATION DANS DES ENDROITS À RISQUE D'EXPLOSION (DIRECTIVE 2014/34/UE)

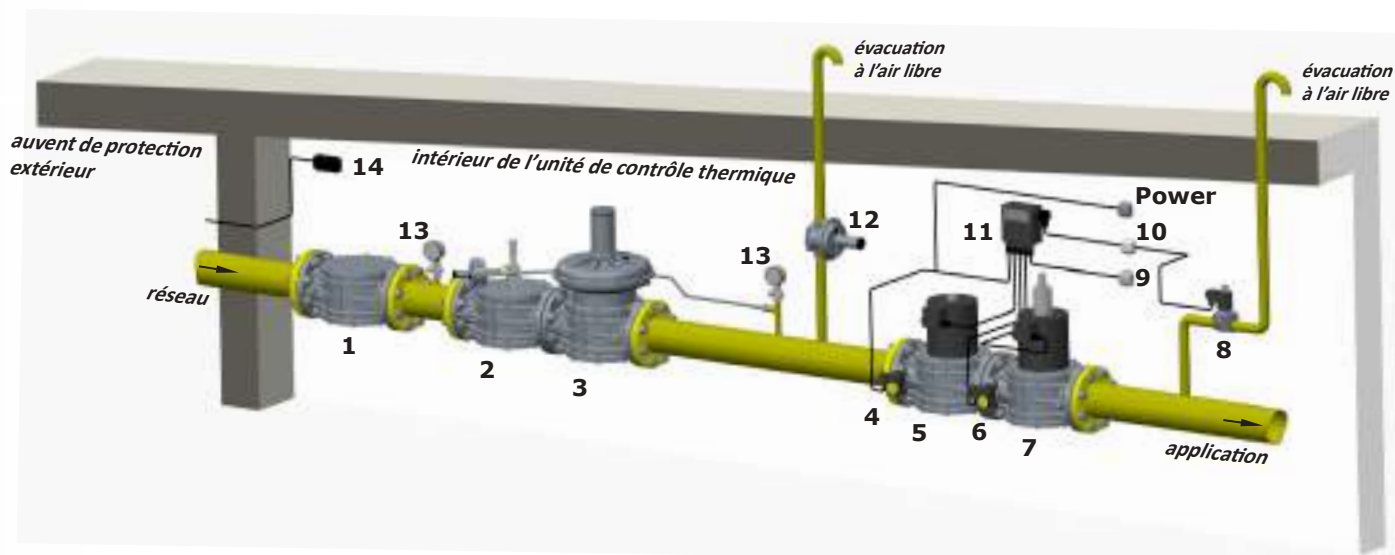
L'électrovanne ne convient pas pour être utilisée dans des endroits exposés au risque d'explosion.

3.4 - EXEMPLE GÉNÉRAL D'INSTALLATION (Rampe de brûleur)

1. Filtre à gaz FM
2. Vanne de fermeture OPSO série MVB/1 MAX
3. Régulateur de pression RG/2MC
4. Pressostat de pression minimum
5. Électrovanne automatique EVP/NF à ouverture rapide
6. Pressostat de pression maximum
7. Électrovanne automatique EVPS/NF à ouverture lente

8. Électrovanne automatique de purge EVA...NA

9. Reset externe
10. Burner control
11. Dispositif de contrôle de l'étanchéité MTC10
12. Vanne d'évacuation MVS/1
13. Manomètre et son bouton
14. Détecteur de gaz





4.0 - PREMIÈRE MISE EN SERVICE



- Avant la mise en service, veiller à ce que toutes les indications présentes sur la plaque, y compris le sens du flux, soient respectées ;
- Après avoir pressurisé progressivement l'installation, vérifier l'étanchéité et le fonctionnement de l'électrovanne, en mettant sous tension / hors tension le connecteur **UNIQUEMENT S'IL EST** connecté à la bobine.

REMARQUE IMPORTANTE : Ne pas utiliser le connecteur comme si c'était un interrupteur pour ouvrir/fermer l'électrovanne.



4.1 - VÉRIFICATIONS PÉRIODIQUES CONSEILLÉES

- vérifier, avec un instrument calibré approprié, que le serrage des boulons soit conforme aux indications fournies à l'alinéa 3.2 ;
 - vérifier l'étanchéité des connexions à brides/filetées sur l'installation ;
 - vérifier l'étanchéité et le fonctionnement de l'électrovanne ;
- Il incombe à l'utilisateur final ou à l'installateur de définir la fréquence des vérifications susmentionnées selon la lourdeur des conditions de fonctionnement.



5.0 - ENTRETIEN

Aucune opération d'entretien n'est prévue à l'intérieur de l'appareil.

S'il faut remplacer la bobine et / ou la carte électronique / le connecteur :



- Avant d'effectuer toute opération, veiller à ce que l'appareil ne soit pas sous tension ;
- Vu que la bobine est également adaptée à une alimentation permanente, le réchauffement de la bobine en cas de service continu est un phénomène tout à fait normal. Il est conseillé d'éviter tout contact à mains nues avec la bobine après une alimentation électrique continue supérieure à 20 minutes. En cas d'entretien, attendre le refroidissement de la bobine ou utiliser éventuellement des protections adéquates ;

REMARQUE : s'il faut remplacer la bobine (2) suite à une panne électrique, il est conseillé de remplacer aussi le connecteur (11). Les opérations de remplacement de la bobine et/ou du connecteur doivent être exécutées en veillant à garantir l'indice IP65 du produit.



5.1 - REMPLACEMENT DU CONNECTEUR

- Dévisser à fond et ôter la vis centrale (12) puis décrocher le connecteur (11) de la bobine (2) ;
- Après avoir ôté le câblage électrique interne existant, câbler le nouveau connecteur et le fixer à la bobine comme indiqué au paragraphe 3.2 ;



5.2 - REMPLACEMENT DE LA BOBINE

- Dévisser à fond et ôter la vis centrale (12) puis décrocher le connecteur (11) de la bobine (2) ;
- Dévisser la vis (ou l'écrou) ou enlever l'anneau seeger (1) de blocage de la bobine (2) et l'ôter du manchon en même temps que les joints/disques spécifiques ;
- Introduire la nouvelle bobine + les joints + les disques dans le manchon et fixer le tout à l'aide de la vis appropriée (ou écrou ou anneau seeger) ;

6.0 - INTERRUPTEURS CPI SWITCH/INTERRUPTEURS OPI

Le micro interrupteur de signalisation de position de fermeture (CPI SWITCH) est un capteur de proximité magnétique à contact normalement ouvert. Il fournit une signalisation lors de la fermeture de l'obturateur de la vanne.

Si l'électrovanne est fournie avec le CPI, la position du capteur est déjà calibrée et fixée, il suffit donc de le connecter électriquement pour le faire fonctionner.

S'il est fourni à part et installé par la suite sur une électrovanne avec un agencement, suivre les indications reportées au paragraphe 6.2 dans le mode d'emploi relatif au CPI.

L'interrupteur OPI fournit en revanche une signalisation lorsque la vanne est ouverte.

Le tableau à la page suivante indique la faisabilité des interrupteurs CPI/OPI en fonction des diamètres.

Pour les caractéristiques techniques des interrupteurs CPI ou OPI, veuillez consulter les modes d'emploi correspondants.

Faisabilité des dispositifs CPI/OPI

DN	P.max (bar)	Agencement CPI	CPI	OPI	CPI + OPI
15-20-25	0,36	✗	✗	✗	✗
15-20-25	1-3-6	✓	✓	✓	✗
32-40-50	1-3-6	✓	✓	✗	✓
Les versions OPI et CPI + OPI ne peuvent être fournies que par le site de production. Pour ces 2 versions, la version avec agencement n'est pas prévue.					

7.0 - TRANSPORT, STOCKAGE ET ÉLIMINATION

- Pendant le transport, le matériel doit être traité avec soin, en évitant que le dispositif ne puisse subir des chocs, des coups ou des vibrations ;
- Si le produit présente des traitements de surface (ex. peinture, cataphorèse, etc.), ils ne doivent pas être endommagés pendant le transport ;
- La température de transport et de stockage coïncide avec celle indiquée sur les données nominales ;
- Si le dispositif n'est pas installé tout de suite après la livraison, il doit être correctement stocké dans un endroit sec et propre ;
- Dans les locaux humides, il est nécessaire d'utiliser des siccatis ou bien il faut les chauffer pour éviter la condensation.
- Le produit, en fin de vie, doit être éliminé conformément à la législation en vigueur dans le pays de réalisation de cette opération.

8.0 - GARANTIE

Les conditions de garantie qui s'appliquent sont définies avec le Fabricant lors de la livraison.

Pour les dommages causés par :

- Un usage impropre du dispositif ;
- Le non-respect des prescriptions indiquées dans le présent document ;
- le non-respect des règles concernant l'installation ;

aucun droit de garantie ou de dédommagement ne peut être revendiqué.

Sont également exclus de la garantie les travaux d'entretien, le montage de pièces de rechange ou les pièces non originales, la modification du dispositif et l'usure naturelle.

9.0 - DONNÉES NOMINALES

Les données nominales (voir l'exemple ci-contre)

fournissent les informations suivantes :

- Nom/logo et adresse du Fabricant (éventuellement nom/logo du revendeur)
- Mod. : = nom/modèle de l'appareil suivi du diamètre de connexion
- P.max = Pression maximum à laquelle le fonctionnement du produit est garanti
- PS = Pression maximale admissible
- IP... = Indice de protection
- 230V... = Tension d'alimentation, fréquence (si Vca), suivies de l'absorption électrique

Exemple d'une indication de l'absorption électrique 55/16 VA indique 55 VA au démarrage, 16 VA à plein régime

- TS = Plage de température à laquelle le fonctionnement du produit est garanti
-  0497 = Conformité à la Directive PED suivie du n° de l'Organisme Notifié
- year = Année de fabrication

- Lot = Numéro de série du produit (voir l'explication ci-dessous)
 - U1804 = Lot produit au cours de l'année 2018 semaine n° 4
 - 2185 = numéro progressif de commande se référant à l'année indiquée
 - 00001 = numéro progressif se référant à la quantité du lot

MADAS®

Via Moratello, 5/7 - 37045
Legnago (VR) - Italy
www.madas.it

Mod.: EVA-1/NA DN 50

P.max=PS= 1 bar

IP65 - 230 V/50-60 Hz 55/16 VA TS: -20+60 °C

 0497

year: 2018 Lot:U1804 2185/00001

1.0 - INFORMACIÓN GENERAL

Este manual ilustra cómo instalar, hacer funcionar y utilizar el dispositivo de forma segura.
Las instrucciones de uso deben estar **SIEMPRE** disponibles en la instalación donde se encuentra el dispositivo.

ATENCIÓN: las operaciones de instalación/cableado/mantenimiento las debe realizar personal cualificado (como se indica en 1.3), utilizando equipos de protección individual (EPI) adecuados.

Para obtener más información respecto a las operaciones de instalación/cableado/mantenimiento o en caso de problemas que no se puedan solucionar usando las instrucciones, es posible ponerse en contacto con el fabricante a través de la dirección y los números de teléfono que aparecen en la última página.

1.1 - DESCRIPCIÓN

Electroválvulas automáticas de purga para quemadores y aparatos de gas. Se abren cuando no hay tensión, se cierran si están alimentadas eléctricamente.
Pueden suministrarse (según el modelo) con CPI SWITCH (Closed Position Indicator) o con OPI SWITCH (Open Position Indicator).
Puede encontrar más información relacionada con la factibilidad de CPI/OPI SWITCH en 6.0.
Normas de referencia: EN 16304 - EN 13611.

1.2 - LEYENDA DE SÍMBOLOS

	PRECAUCIÓN: En caso de incumplimiento, se pueden acarrear daños en bienes materiales.		PELIGRO: En caso de incumplimiento, además de daños en bienes materiales, también pueden provocarse daños a las personas y/o animales domésticos.		ATENCIÓN: Se ponen de relieve los detalles técnicos dirigidos al personal cualificado.
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1.3 - PERSONAL CUALIFICADO

Se trata de personas que:

- Están familiarizadas con la instalación, el montaje, la puesta en servicio y el mantenimiento del producto;
- Conocen las normativas vigentes en la región o país en materia de instalación y seguridad;
- Ha recibido formación acerca de primeros auxilios.

1.4 - USO DE RECAMBIOS NO ORIGINALES

- En caso de mantenimiento o sustitución de recambios (p. ej. bobina, conector, etc.), se deben usar **SOLO** los indicados por el fabricante. El uso de componentes diferentes, además de invalidar la garantía del producto, podría perjudicar su funcionamiento correcto.
- El fabricante se exime de toda responsabilidad por problemas de funcionamiento que deriven de alteraciones no autorizadas o del uso de recambios no originales.

1.5 - USO NO APROPIADO

- El producto debe utilizarse solamente para el fin para el que ha sido fabricado.
- No se permite el uso con fluidos que no sean los indicados.
- No se deben superar en ningún caso, los datos técnicos indicados en la placa. El usuario final o el instalador tienen que adoptar los sistemas correctos de protección del aparato que impidan que se supere la presión máxima indicada en la placa.
- El fabricante no es responsable por los daños causados por un uso impropio del aparato.

2.0 - DATOS TÉCNICOS

- Uso : gases no agresivos de las tres familias (gases secos)
- Temperatura ambiente (TS) : $-20 \div +60$ °C
- Tensiones de alimentación (DN 15 - DN 20 - DN 25) : 12 V cc, 12 V/50 Hz, 24 V cc, 24 V/50 Hz, 110 V/50-60 Hz, 230 V/50-60 Hz*
- Tensiones de alimentación (DN 32 - DN 40 - DN 50) : 24 V cc - 24 V/50 Hz - 110 V/50-60 Hz - 230 V/50-60 Hz*
- Tolerancia de tensión de alimentación : -15 % ... +10 %
- Cableado eléctrico : prensaestopas M20x1,5
- Potencia absorbida : véanse las tablas 2a - 2b - 2c
- Presión máxima de funcionamiento : 0,36 - 1 - 3 - 6 bares (véase la etiqueta del producto)
- Grado de protección : IP65
- Resistencia mecánica : Grupo 2
- Conexiones roscadas Rp : (DN 15- DN 20 - DN 25 - DN 32 - DN 40) según la norma EN 10226
- Conexiones embridadas acoplables con bridas PN 16: (DN 25** - DN 32 - DN 40 - DN 50) según la norma ISO 7005
- Conexiones roscadas NPT o embridadas ANSI 150 : consulte la disponibilidad
- De conformidad con : Directiva PED 2014/68/UE (versiones con P. máx 1 - 3 - 6 bares)
Directiva EMC 2014/30/UE - Directiva LVD 2014/35/UE
Directiva RoHS II 2011/65/UE

* Únicamente monofásica, el aparato no funciona si se alimenta con tensión trifásica.

** DN 25 con bridas giratorias.

2.1 - IDENTIFICACIÓN DE MODELOS

EVAP/NA : DN 15 - 20 - 25 P. máx 360 mbares

EVAP-1/NA : DN 15 - 20 - 25 P. máx 1 bar

EVAP-3/NA : DN 15 - 20 - 25 P. máx 1 bar

EVAP-6/NA : DN 15 - 20 - 25 P. máx 6 bar

EVA-1/NA : DN 32 - 40 - 50 P. máx 1 bar

EVA-3/NA : DN 32 - 40 - 50 P. máx 3 bar

EVA-6/NA : DN 32 - 40 - 50 P. máx 6 bares

3.0 - PUESTA EN FUNCIONAMIENTO DEL DISPOSITIVO



3.1 - OPERACIONES ANTES DE LA INSTALACIÓN

- Se debe cerrar el gas en la entrada de la válvula, antes de la instalación;
- Compruebe que la presión de línea **NO SEA SUPERIOR** a la presión máxima declarada en la etiqueta del producto;
- Los posibles tapones de protección (de estar presentes) se deben quitar antes de la instalación;
- Las tuberías y las partes internas de la válvula no deben tener cuerpos extraños;

Si el aparato está roscado:

- Compruebe que la longitud de la rosca de la tubería no sea excesiva, para no dañar el cuerpo del aparato en fase de atornillado;

Si el aparato está embridado:

- Compruebe que las contrabridas de entrada y salida sean perfectamente coaxiales y paralelas, para evitar someter el cuerpo a esfuerzos mecánicos inútiles; además, calcule el espacio para introducir la junta de estanquidad;
- Para las fases de apriete, es necesario procurarse una o varias llaves dinamométricas calibradas u otras herramientas de bloqueo controladas;

Procedimientos en común (aparatos roscados y embridados):

- En caso de instalación en el exterior, se recomienda colocar un techo de protección para evitar que el agua de lluvia pueda dañar las partes eléctricas del aparato.
- Antes de realizar las conexiones eléctricas, hay que comprobar que la tensión de red se ajuste a la tensión de alimentación indicada en la etiqueta del producto;
- Antes de realizar el cableado, hay que desconectar la alimentación;
- En función de la geometría de la instalación, evalúe el riesgo de formación de mezcla explosiva en el interior del conducto;
- Si la electroválvula se instala en proximidad de otros equipos o como parte de un conjunto, hay que evaluar previamente la compatibilidad entre la electroválvula y estos equipos.
- Evite instalar la electroválvula cerca de superficies que podrían sufrir daños debido a la temperatura de la bobina;
- Coloque una protección contra golpes o contactos accidentales en caso de que la electroválvula sea accesible para el personal no cualificado.



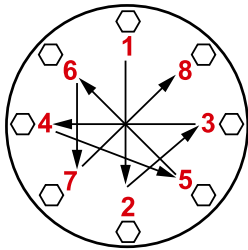
3.2 - INSTALACIÓN (véase el ejemplo en el punto 3.4)

Aparatos roscados:

- Montar el dispositivo enroscándolo, junto con las juntas correspondientes, en la instalación con tuberías y/o racores cuyas roscas encajen con la conexión que hay que acoplar.
- No use la bobina (2) como palanca para enroscar; use la herramienta adecuada;
- La flecha, indicada en el cuerpo (8) del aparato, debe estar dirigida hacia el punto de consumo;

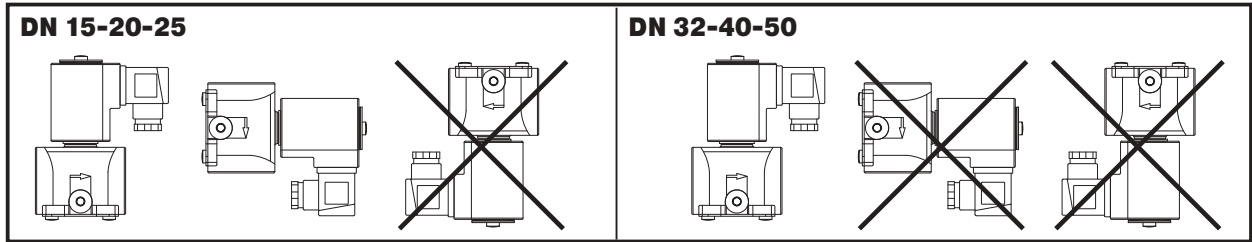
Aparatos embridados:

- Monte el dispositivo con bridas, insertando las juntas correspondientes en la instalación con tuberías y/o racores cuyas bridas encajen con la conexión que hay que acoplar. Las juntas no deben tener defectos y deben estar centradas entre las bridas;
- Si con las juntas puestas, el espacio que queda fuese excesivo no trate de rellenarlo apretando excesivamente los pernos del aparato;
- La flecha, indicada en el cuerpo (8) del aparato, debe estar dirigida hacia el punto de consumo;
- Introduzca dentro de los pernos las arandelas correspondientes para evitar que las bridas se dañen en la fase de apriete;
- Durante la fase de apriete, asegúrese de no “pellizcar” ni dañar la junta;
- Apriete las tuercas o pernos gradualmente, según un esquema “de cruz” (véase el ejemplo indicado abajo);
- Apriételos, primero al 30 %, después al 60 %, hasta el 100 % del par máximo (consulte la tabla de abajo según EN 13611);



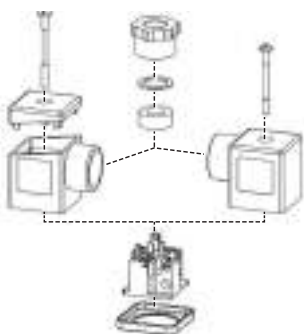
Diámetro	DN 25	DN 32	DN 40	DN 50
Par máximo (N.m)	30	50	50	50

- Apriete de nuevo las tuercas o pernos a derechas al menos una vez, hasta alcanzar la uniformidad del par máximo;
- Procedimientos comunes (aparatos roscados y embridados):
- Para posiciones de instalación, consulte el siguiente esquema;



- Durante la instalación, evite que la suciedad o los residuos metálicos penetren en el aparato;
- Garantice un montaje sin tensiones mecánicas; se recomienda el uso de juntas de compensación para absorber también las dilataciones térmicas de la tubería;

- Si se ha previsto la instalación del aparato en una rampa, es deber del instalador preparar soportes o apoyos adecuados, correctamente dimensionados, para sostener y fijar el conjunto. Nunca deje, por ningún motivo, que el peso de la rampa recaiga solamente sobre las conexiones (roscadas o embridadas) de cada uno de los dispositivos;
- En cualquier caso, después del montaje compruebe la estanquidad de la instalación;
- No se permite el cableado con cables conectados directamente a la bobina. Use **SIEMPRE y SOLAMENTE** el conector indicado por el fabricante;
- Antes de cablear el conector (**11**), destornille completamente y quite el tornillo central (**12**). Utilice los terminales oportunos para cables (consulte las siguientes figuras). **NOTA:** Las operaciones de cableado del conector (**1**) se deben realizar asegurándose de garantizar el grado IP65 del producto;
- Cablee el conector (**1**) con cable de $3 \times 0,75 \text{ mm}^2$, $\varnothing$ externo de 6,2 a 8,1 mm. El cable debe contar con doble funda, debe ser idóneo para usos exteriores, con una tensión mínima de 500 V y temperatura mínima de 120 °C;
- Conecte a la alimentación los bornes 1 y 2 y el cable de tierra al borne $\perp$. **IMPORTANTE:** con alimentaciones de 12 y 24 V cc, es necesario respetar la polaridad: (conectores normales: pin1 conector = $\oplus$ / pin2 conector = $\ominus$); (conectores con energy saving (ahorro de energía): pin1 conector = $\ominus$ / pin2 conector = $\oplus$);
- Fije el conector (**11**) en la bobina (**2**) apretando (par aconsejado 0,4 N.m $\pm$ 10 %) el tornillo central (**12**);
- La válvula se debe conectar a tierra o con la tubería o con otros medios (ej. puentes de cables).



3.3 - INSTALACIÓN EN LUGARES CON RIESGO DE EXPLOSIÓN (DIRECTIVA 2014/34/UE)

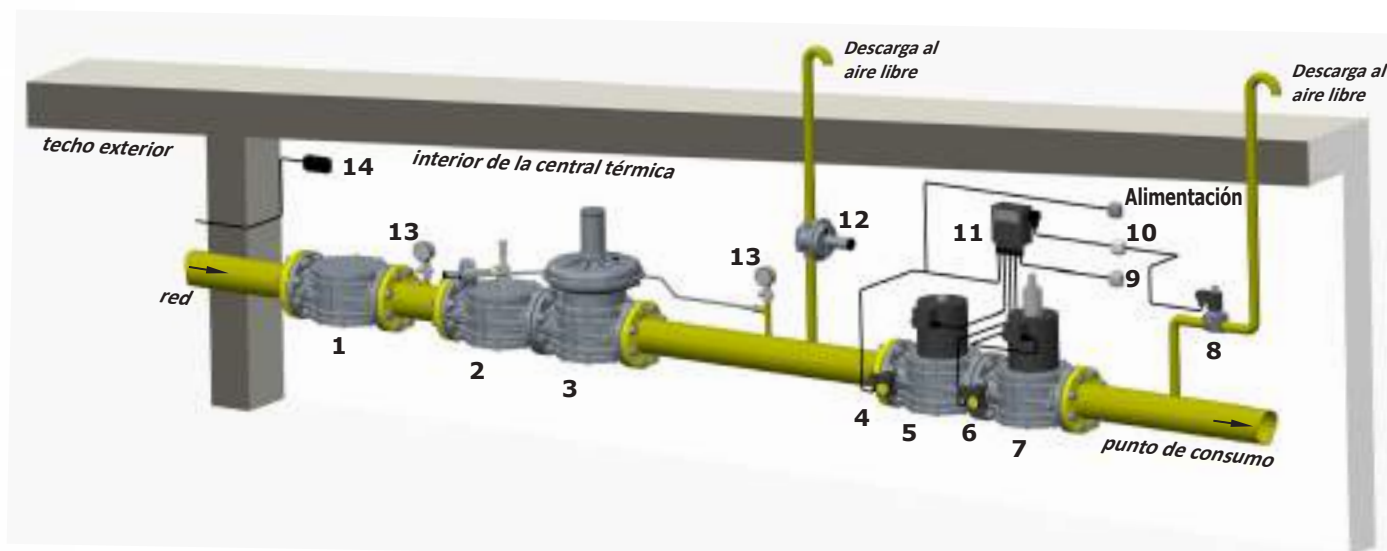
La electroválvula no es idónea para el uso en lugares con riesgo de explosión.

3.4 - EJEMPLO GENÉRICO DE INSTALACIÓN (Rampa de quemador)

1. Filtro de gas FM
2. Válvula de seguridad por máxima OPSO serie MVB/1 MAX
3. Regulador de presión RG/2MC
4. Presostato de mínima presión
5. Electroválvula automática tipo EVP/NC de apertura rápida
6. Presostato de máxima presión
7. Electroválvula automática EVPS/NC de apertura lenta

8. Electroválvula automática de purga EVA...NA

9. Reset externo
10. Control del quemador
11. Dispositivo de control de estanquidad MTC10
12. Válvula de alivio MVS/1
13. Manómetro y botón correspondiente
14. Detección de gas





4.0 - PRIMERA PUESTA EN SERVICIO



- Antes de la puesta en servicio, compruebe que se respetan todas las indicaciones presentes en la placa, incluida la dirección del flujo;
- Tras haber presurizado de forma gradual la instalación, compruebe la estanquidad y el funcionamiento de la electroválvula, alimentando/desalimentando eléctricamente el conector **SOLO SI** está conectado a la bobina.

NOTA IMPORTANTE: No utilice el conector como interruptor para abrir/cerrar la electroválvula.



4.1 - COMPROBACIONES PERIÓDICAS RECOMENDADAS

- compruebe con el instrumento específico calibrado, que el apriete de los pernos sea conforme con lo indicado en 3.2;
- compruebe la estanquidad de las conexiones embridadas/roscadas en la instalación;
- compruebe la estanquidad y el funcionamiento de la electroválvula;

Es deber del usuario final o del instalador determinar la frecuencia de dichas comprobaciones en función de la relevancia de las condiciones de servicio.



5.0 - MANTENIMIENTO

No se prevén operaciones de mantenimiento a efectuar dentro del aparato.

Si es necesario sustituir la bobina y/o la tarjeta electrónica/conector:



- Antes de realizar cualquier operación, asegúrese de que el aparato no reciba alimentación eléctrica;
- Como la bobina es idónea también para alimentación permanente, el calentamiento de la bobina en caso de funcionamiento continuo es un fenómeno normal. Se aconseja evitar el contacto de las manos desnudas con la bobina tras una alimentación eléctrica continua superior a 20 minutos. En caso de mantenimiento, hay que esperar a que se enfríe la bobina o, si esto no es posible, utilizar protecciones adecuadas;

NOTA: si es necesario sustituir la bobina (**2**) después de una avería eléctrica, es recomendable sustituir también el conector (**11**). Las operaciones de sustitución de la bobina y/o el conector se deben realizar asegurándose de garantizar el grado IP65 del producto.



5.1 - SUSTITUCIÓN DEL CONECTOR

- Desenrosque completamente y quite el tornillo central (**12**); a continuación, desenganche el conector (**11**) de la bobina (**2**);
- Después de haber quitado el cableado eléctrico interior existente, cablee el nuevo conector y fíjelo a la bobina, tal como se indica en el punto 3.2;



5.2 - SUSTITUCIÓN DE LA BOBINA

- Desenrosque completamente y quite el tornillo central (**12**); a continuación, desenganche el conector (**11**) de la bobina (**2**);
- Desenrosque el tornillo (o la tuerca) o quite el anillo seeger (**1**) de bloqueo de la bobina (**2**) y quítelo del manguito junto con las juntas/discos;
- Coloque en el manguito la nueva bobina + juntas + discos y fije todo con el tornillo (o tuerca o anillo seeger) correspondiente;

6.0 - CPI SWITCH / OPI SWITCH

El microinterruptor de indicación de la posición de cierre (MICROINTERRUPTOR CPI) es un sensor de proximidad magnético con contacto normalmente abierto. Proporciona una señal cuando se cierra el obturador de la válvula.

Si la electroválvula se suministra con el CPI de serie, la posición del sensor ya está calibrada y es fija; por tanto, para hacerlo funcionar es suficiente conectarlo eléctricamente.

Si se suministra por separado y se instala posteriormente en una electroválvula preparada para esto, siga las indicaciones que figuran en el apartado 6.2 del manual de instrucciones del CPI.

En cambio, el OPI SWITCH proporciona una señalización cuando la válvula está abierta.

En la tabla de la siguiente tabla se indica la factibilidad de CPI/OPI en relación con los diámetros.

Para conocer las características técnicas de CPI y OPI, consulte los manuales de instrucciones correspondientes.

Factibilidad CPI/OPI					
DN	P. máx. (bar)	Predisposición CPI	CPI	OPI	CPI + OPI
15-20-25	0,36	✗	✗	✗	✗
15-20-25	1-3-6	✓	✓	✓	✗
32-40-50	1-3-6	✓	✓	✗	✓
Las versiones OPI y CPI+OPI las puede suministrar solamente la fábrica. Para estas 2 versiones no se ha previsto la versión con predisposición.					

7.0 - TRANSPORTE, ALMACENAMIENTO Y ELIMINACIÓN

- Durante el transporte, el material debe tratarse con cuidado, evitando que el dispositivo se someta a choques, golpes o vibraciones;
- Si el producto tiene tratamientos superficiales (p. ej. pintura, cataforesis, etc.), los mismos no deben dañarse durante el transporte;
- La temperatura de transporte y almacenamiento debe coincidir con la indicada en los datos de la placa;
- Si el dispositivo no se instala inmediatamente tras la entrega, se debe almacenar correctamente en un lugar seco y limpio;
- En lugares húmedos es necesario usar secadores o bien calefacción para evitar la formación de condensación.
- El producto, al final de su vida útil, deberá eliminarse en conformidad con la legislación vigente en el país en el que se realiza esta operación.

8.0 - GARANTÍA

Son válidas las condiciones de garantía establecidas con el fabricante en el momento del suministro.

Para daños causados por:

- El uso inadecuado del dispositivo;
- El incumplimiento de las disposiciones indicadas en este documento;
- incumplimiento de las normas relacionadas con la instalación;

no se pueden reclamar derechos de garantía ni resarcimiento de daños.

Además, se excluyen de la garantía los trabajos de mantenimiento, el montaje de recambios o de piezas no originales, la modificación del dispositivo y el desgaste natural.

9.0 - DATOS DE LA PLACA

En la información de la placa (véase el ejemplo de al lado) aparecen los siguientes datos:

- Nombre/logotipo y dirección del fabricante (eventual nombre/logotipo del distribuidor)
- Mod.: = nombre/modelo del aparato seguido del diámetro de conexión
- P. max. = Presión máxima en la que se garantiza el funcionamiento del producto
- PS = Presión máxima admisible
- IP... = Grado de protección
- 230 V... = Tensión de alimentación, frecuencia (si es V ca), seguidas por el consumo eléctrico

Ejemplo de indicación de la absorción eléctrica: 55/16 VA indica 55 VA en el arranque, 16 VA a régimen

- TS = Intervalo de temperatura en el que se garantiza el funcionamiento del producto
-  0497 = Conformidad Dir. PED seguida del n.º del Organismo Notificado
- year = Año de fabricación
- Lot = Número de matrícula del producto (véase la explicación a continuación)
 - U1804 = Lote en salida año 2018 semana n.º 4
 - 2185 = número progresivo de pedido referido al año indicado
 - 00001 = número progresivo referido a la cantidad del lote

		Via Moratello, 5/7 - 37045 Legnago (VR) - Italy www.madas.it
Mod.: EVA-1/NA DN 50		P.max=PS= 1 bar
IP65 - 230 V/50-60 Hz 55/16 VA		TS: -20+60 °C
year: 2018 Lot:U1804 2185/00001		 0497

fig. 1
 EVAP/NA DN 15 - DN 20 - DN 25
 P.max 360 mbar

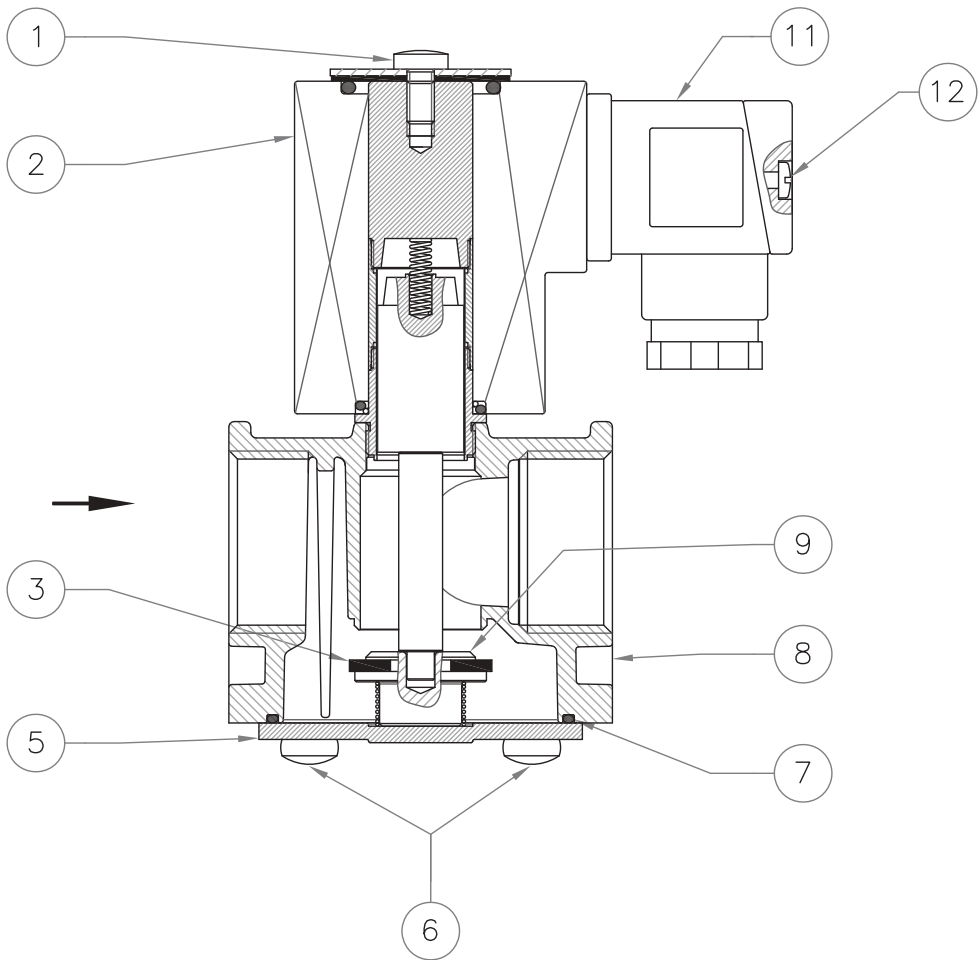


fig. 2
 EVAP-1 - 3 - 6/NA
 DN 15 - DN 20 - DN 25
 P. max 1 - 3 - 6 bar

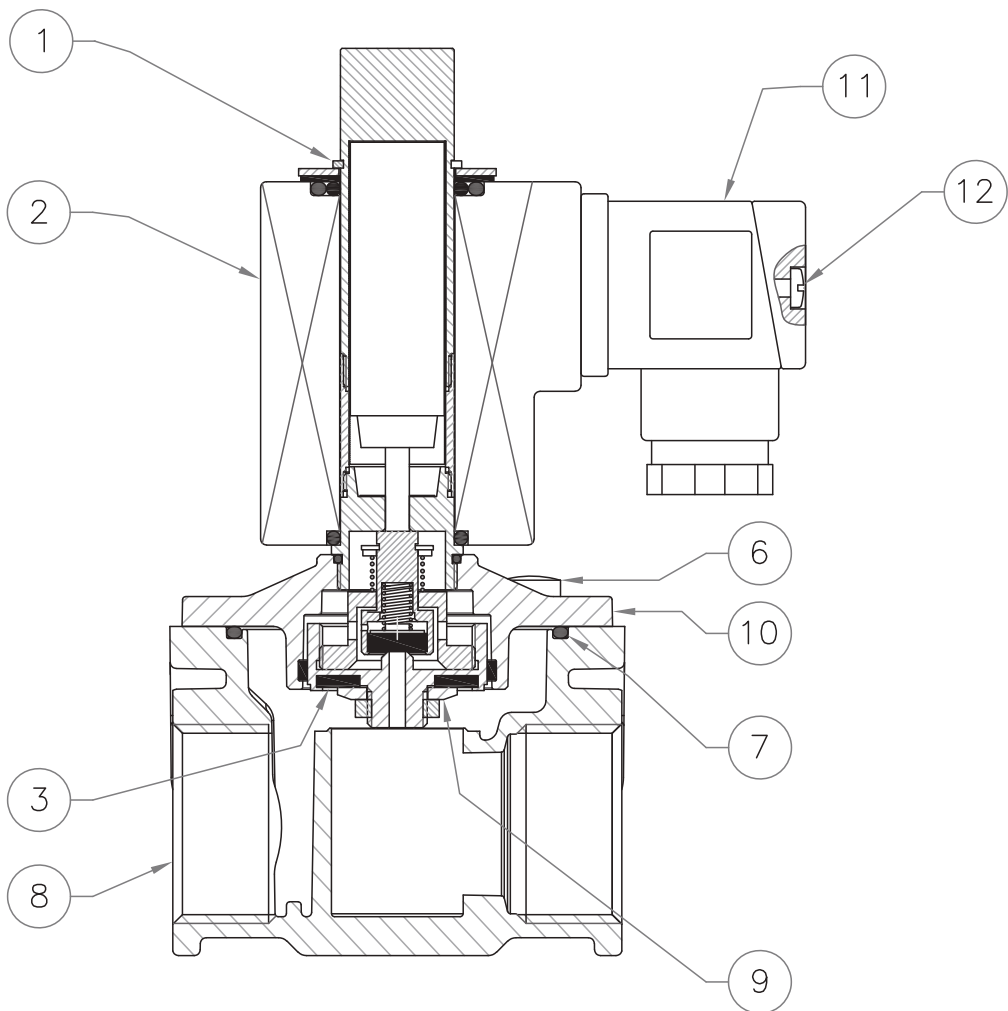
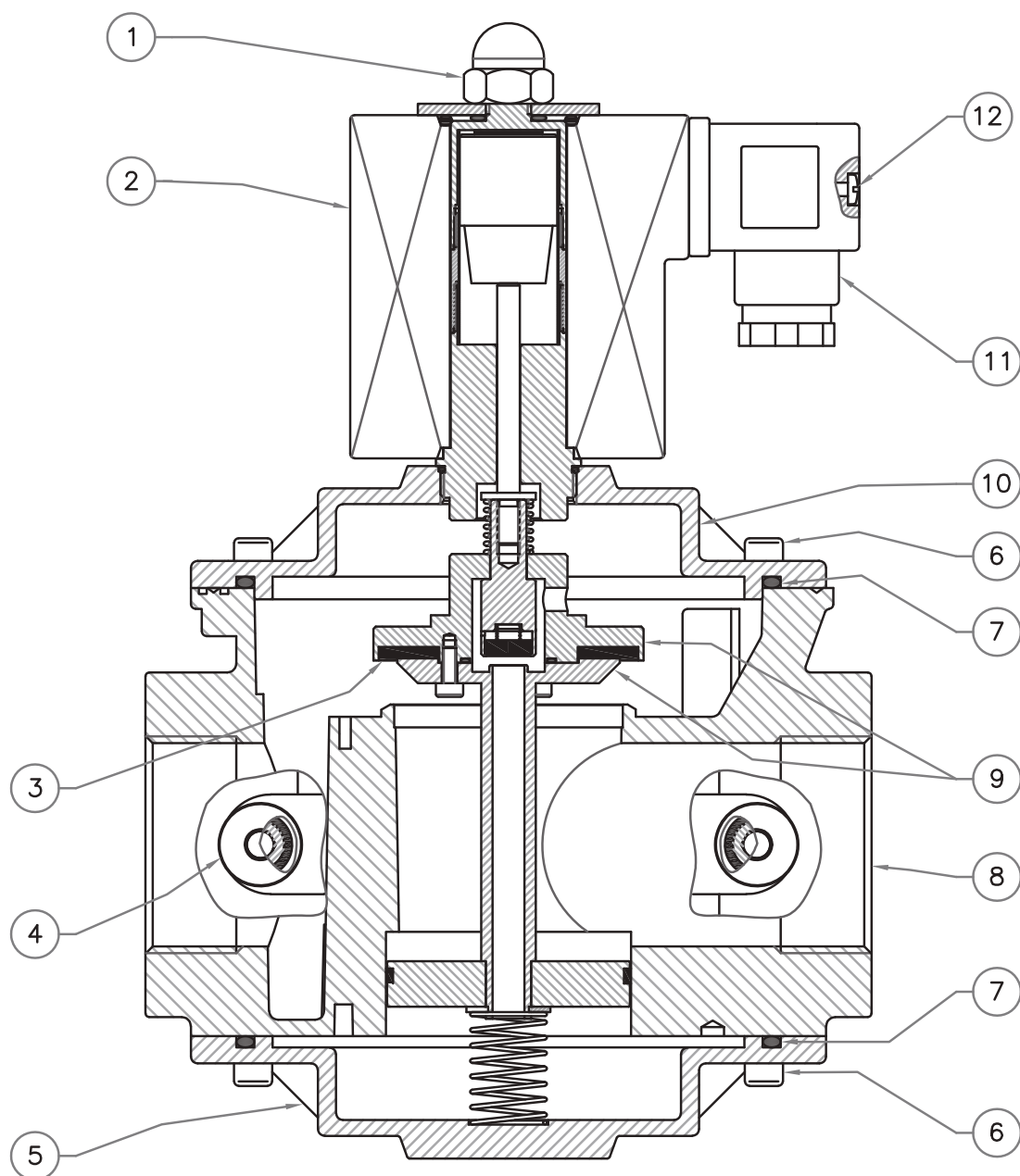


fig. 3

EVA-1 - 3 - 6/NA

DN 32 - DN 40 - DN 50

P. max 1 - 3 - 6 bar



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fig. 1, 2 e 3

1. Vite/dado/seeger fissaggio bobina
2. Bobina elettrica
3. Rondella di tenuta
4. Attacco G 1/4
5. Fondello
6. Viti di fissaggio
7. O-Ring di tenuta
8. Corpo valvola
9. Otturatore
10. Coperchio
11. Connettore elettrico
12. Vite fissaggio connettore

GB

fig. 1, 2 and 3

1. Coil fixing screw/nut/seeger
2. Electrical coil
3. Seal washer
4. G 1/4 connection
5. Bottom
6. Fixing screws
7. Seal O-Ring
8. Body valve
9. Obturator
10. Cover
11. Electrical connector
12. Connector fixing screw

F

fig. 1, 2 et 3

1. Vis/écrou/seeger de fixation bobine
2. Bobine électrique
3. Rondelle de tenue
4. Fixation G 1/4
5. Fond
6. Vis de fixation
7. O-Ring de tenue
8. Corps soupape
9. Obturateur
10. Couvercle
11. Connecteur électrique
12. Vis de fixation du connecteur

E

fig. 1, 2 y 3

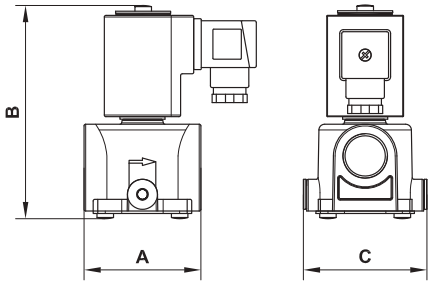
1. Tornillos/tuerca/seeger fijación bobina
2. Bobina eléctrica
3. Rondana de estanquidad
4. Conexiones G 1/4
5. Fondillos
6. Tornillos de fijación
7. O-Ring de estanquidad
8. Cuerpo válvula
9. Obturador
10. Tapa
11. Conector eléctrico
12. Tornillo de fijación del conector

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Tabella 1 - Table 1 - Tableau 1 - Tabla 1

Dimensioni di ingombro in mm - Overall dimensions in mm - Mesures d'encombrement en mm - Dimensiones en mm

Attacchi filettati Threaded connections Fixations filetees Conexiones roscadas	Attacchi flangiati Flanged connections Fixations bridees Conexiones de brida	P. max (bar)	A	B	C	
DN 15 - DN 20 - DN 25	-	0,36	75	130	74	
DN 15 - DN 20 - DN 25	-	1 - 3 - 6	75	152	74	
DN 32- DN 40 - DN 50	-	1 - 3 - 6	160	250	140	
	DN 25	0,36	142	147	115	
	DN 25	1 - 3 - 6	142	187	115	
	DN 32- DN 40 - DN 50	1 - 3 - 6	230	260	140	

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Tabella 2a - Table 2a - Tableau 2a - Tabla 2a

Bobine e connettori - Coils and connectors - Bobines et connecteurs - Bobinas y conectores

Modello/Ø Model/Ø Modèle/Ø Modelo/Ø	Tensione Tension Tension Tensión	Codice bobina Coil code Code bobine Código bobina	Timbratura bobina Coil stamping Timbrage bobine Timbre bobina	Codice connettore Connector code Code connecteur Código conector	Potenza assorbita Power absorption Puissance absorbée Potencia absorbida
DN 15 ÷ DN 25 EVAP/NA (P.max 360 mbar) EVAP-1/NA (P.max 1 bar)	12 Vdc	BO-0400	BO-0400 12 VDC 17W	CN-0010	16 VA
	12 V/50 Hz			CN-0050	12 VA
	24 Vdc	BO-0410	BO-0410 24 VDC 17W	CN-0010	17 VA
	24 V/50 Hz			CN-0050	14 VA
	110 V/50-60 Hz	BO-0420	BO-0420 110 V RAC 17W	CN-0045	17 VA
	230 V/50-60 Hz	BO-0430	BO-0430 230 V RAC 17W	CN-0045	18 VA

Tipo connettore / Connector type / Type connecteur / Tipo conector**CN-0010** = Normale / Normal / Normal / Normal**CN-0045** = (230 Vac, 110 Vac) = Raddrizzatore / Rectifier / Redresseur / Retificador**CN-0050** = (24 Vac, 12 Vac) = Raddrizzatore / Rectifier / Redresseur / Retificador

Tabella 2b - Table 2b - Tableau 2b - Tabla 2b

Bobine e connettori - Coils and connectors - Bobines et connecteurs - Bobinas y conectores

Modello/Ø Model/Ø Modèle/Ø Modelo/Ø	Tensione Tension Tension Tensión	Codice bobina Coil code Code bobine Código bobina	Timbratura bobina Coil stamping Timbrage bobine Timbre bobina	Codice connettore Connector code Code connecteur Código conector	Potenza assorbita Power absorption Puissance absorbée Potencia absorbida
DN 15 ÷ DN 25 EVAP-3-6/NA (P.max 3 - 6 bar)	12 Vdc	BO-0510	BO-0510 12 VDC 28W	CN-2100	23 VA Energy saving 6 VA
	12 V/50 Hz			CN-2110	20 VA Energy saving 6 VA
	24 Vdc	BO-0520	BO-0520 24 VDC 28W	CN-2100	27 VA Energy saving 7 VA
	24 V/50 Hz			CN-2110	24 VA Energy saving 7 VA
	110 V/50-60 Hz	BO-0530	BO-0530 110 V RAC 28W	CN-2120	29 VA Energy saving 9 VA
	230 V/50-60 Hz	BO-0540	BO-0540 230 V RAC 28W	CN-2130	30 VA Energy saving 9 VA

Tipo connettore / Connector type / Type connecteur / Tipo conector
CN-2100 = Energy Saving 12 Vdc - 24 Vdc

CN-2110 = Energy Saving 12 Vac - 24 Vac

CN-2120 = Energy Saving 110 Vac

CN-2130 = Energy Saving 230 Vac

Tabella 2c - Table 2c - Tableau 2c - Tabla 2c

Bobine e connettori - Coils and connectors - Bobines et connecteurs - Bobinas y conectores

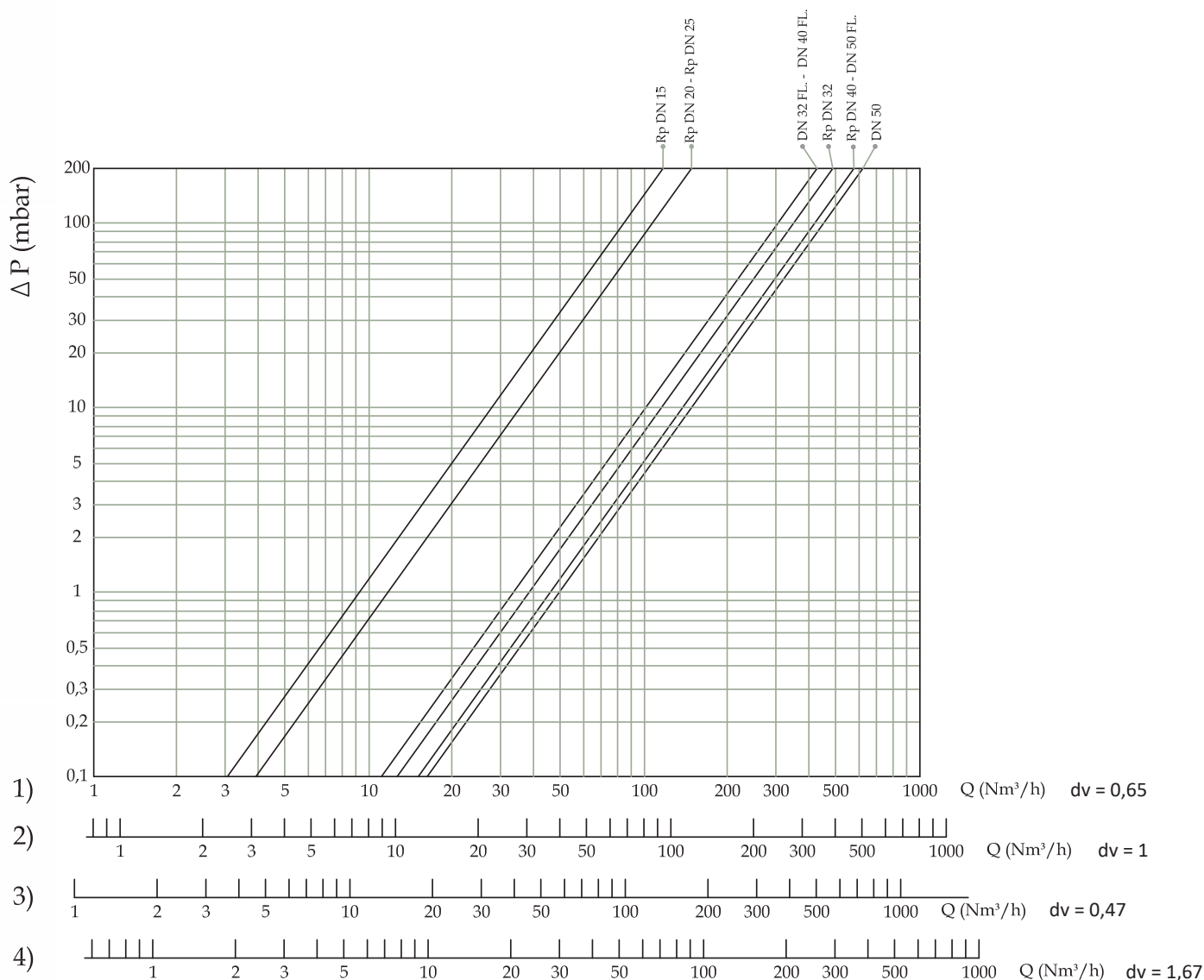
Modello/Ø Model/Ø Modèle/Ø Modelo/Ø	Tensione Tension Tension Tensión	Codice bobina Coil code Code bobine Código bobina	Timbratura bobina Coil stamping Timbrage bobine Timbre bobina	Codice connettore Connector code Code connecteur Código conector	Potenza assorbita Power absorption Puissance absorbée Potencia absorbida
DN 32 ÷ DN 50 EVA-1-3/NA (P.max 1 - 3 bar)	24 Vdc	BO-0300	BO-0300 24 VDC W45	CN-2100	45 VA
	24 V/50 Hz			CN-2110	Energy saving 11 VA
	110 V/50-60 Hz	BO-0310	BO-0310 V 98 DC W45	CN-2120	53 VA Energy saving 15 VA
	230 V/50-60 Hz	BO-0320	BO-0320 V 196 DC W45	CN-2130	55 VA Energy saving 16 VA
DN 32 ÷ DN 50 EVA-6/NA (P.max 6 bar)	24 Vdc	BO-0355	BO-0355 24 V RAC ES	CN-2100	68 VA
	24 V/50 Hz			CN-2110	Energy saving 18 VA
	110 V/50-60 Hz	BO-0365	BO-0365 110 V RAC ES	CN-2120	77 VA Energy saving 23 VA
	230 V/50-60 Hz	BO-0375	BO-0375 230 V RAC ES	CN-2130	89 VA Energy saving 25 VA

Tipo connettore / Connector type / Type connecteur / Tipo conector
CN-2100 = Energy Saving 12 Vdc - 24 Vdc

CN-2110 = Energy Saving 12 Vac - 24 Vac

CN-2120 = Energy Saving 110 Vac

CN-2130 = Energy Saving 230 Vac



- 1) metano - methane - méthane - metano
- 2) aria - air - air - aire
- 3) gas di città - town gas - gaz de ville - gas de ciudad
- 4) gpl - lpg - gaz liquide - gas líquido

dv = densità relativa all'aria
 dv = density relative to the air
 dv = densité relative à l'air
 dv = densidad relativa del aire

P. max 0,36 bar					
Attacchi Connections Raccords Conexiones	Voltaggio Voltage Voltage Voltaje	Attacchi filettati Threaded connections Fixations filetees Conexiones roscadas		Attacchi flangiati Flanged connections Fixations bridees Conexiones de brida	
		Codice / Code / Code / Código		Codice / Code / Code / Código	
EVAP/NA DN 15	12 Vdc	EVAP02	001	-	
	12 V/50 Hz	EVAP02	004	-	
	24 Vdc	EVAP02	005	-	
	24 V/50 Hz	EVAP02	003	-	
	110 V/50-60 Hz	EVAP02	002	-	
	230 V/50-60 Hz	EVAP02	008	-	
EVAP/NA DN 20	12 Vdc	EVAP03	001	-	
	12 V/50 Hz	EVAP03	004	-	
	24 Vdc	EVAP03	005	-	
	24 V/50 Hz	EVAP03	003	-	
	110 V/50-60 Hz	EVAP03	002	-	
	230 V/50-60 Hz	EVAP03	008	-	
EVAP/NA DN 25	12 Vdc	EVAP04	001	EVAP25	001
	12 V/50 Hz	EVAP04	004	EVAP25	004
	24 Vdc	EVAP04	005	EVAP25	005
	24 V/50 Hz	EVAP04	003	EVAP25	003
	110 V/50-60 Hz	EVAP04	002	EVAP25	002
	230 V/50-60 Hz	EVAP04	008	EVAP25	008

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Attacchi filettati / Threaded connections / Fixations filetees / Conexiones roscadas

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Attacchi Connections Raccords Conexiones	Voltaggio Voltage Voltage Voltaje	P. max 1 bar		P. max 3 bar		P. max 6 bar	
		Codice/Code/Code/Código		Codice/Code/Code/Código		Codice/Code/Code/Código	
EVAP.../NA DN 15	12 Vdc	EVAP020000	101	EVAP020000	301	EVAP020000	601
	12 V/50 Hz	EVAP020000	104	EVAP020000	304	EVAP020000	604
	24 Vdc	EVAP020000	105	EVAP020000	305	EVAP020000	605
	24 V/50 Hz	EVAP020000	103	EVAP020000	303	EVAP020000	603
	110 V/50-60 Hz	EVAP020000	102	EVAP020000	302	EVAP020000	602
	230 V/50-60 Hz	EVAP020000	108	EVAP020000	308	EVAP020000	608

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EVAP.../NA DN 20	12 Vdc	EVAP030000	101	EVAP030000	301	EVAP030000	601
	12 V/50 Hz	EVAP030000	104	EVAP030000	304	EVAP030000	604
	24 Vdc	EVAP030000	105	EVAP030000	305	EVAP030000	605
	24 V/50 Hz	EVAP030000	103	EVAP030000	303	EVAP030000	603
	110 V/50-60 Hz	EVAP030000	102	EVAP030000	302	EVAP030000	602
	230 V/50-60 Hz	EVAP030000	108	EVAP030000	308	EVAP030000	608

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EVAP.../NA DN 25	12 Vdc	EVAP040000	101	EVAP040000	301	EVAP040000	601
	12 V/50 Hz	EVAP040000	104	EVAP040000	304	EVAP040000	604
	24 Vdc	EVAP040000	105	EVAP040000	305	EVAP040000	605
	24 V/50 Hz	EVAP040000	103	EVAP040000	303	EVAP040000	603
	110 V/50-60 Hz	EVAP040000	102	EVAP040000	302	EVAP040000	602
	230 V/50-60 Hz	EVAP040000	108	EVAP040000	308	EVAP040000	608
EVA.../NA DN 32	24 Vdc	EVA050000	105	EVA050000	305	EVA050000	605
	24 V/50 Hz	EVA050000	103	EVA050000	303	EVA050000	603
	110 V/50-60 Hz	EVA050000	102	EVA050000	302	EVA050000	602
	230 V/50-60 Hz	EVA050000	108	EVA050000	308	EVA050000	608

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EVA.../NA DN 40	24 Vdc	EVA060000	105	EVA060000	305	EVA060000	605
	24 V/50 Hz	EVA060000	103	EVA060000	303	EVA060000	603
	110 V/50-60 Hz	EVA060000	102	EVA060000	302	EVA060000	602
	230 V/50-60 Hz	EVA060000	108	EVA060000	308	EVA060000	608
EVA.../NA DN 50	24 Vdc	EVA070000	105	EVA070000	305	EVA070000	605
	24 V/50 Hz	EVA070000	103	EVA070000	303	EVA070000	603
	110 V/50-60 Hz	EVA070000	102	EVA070000	302	EVA070000	602
	230 V/50-60 Hz	EVA070000	108	EVA070000	308	EVA070000	608

Attacchi flangiati / Flanged connections / Fixations bridees / Conexiones de brida							
Attacchi Connections Raccords Conexiones	Voltage Voltage Voltage Voltaje	P. max 1 bar		P. max 3 bar		P. max 6 bar	
		Codice / Code / Code / Código		Codice / Code / Code / Código		Codice / Code / Code / Código	
EVAP.../NA DN 25	12 Vdc	EVAP250000	101	EVAP250000	301	EVAP250000	601
	12 V/50 Hz	EVAP250000	104	EVAP250000	304	EVAP250000	604
	24 Vdc	EVAP250000	105	EVAP250000	305	EVAP250000	605
	24 V/50 Hz	EVAP250000	103	EVAP250000	303	EVAP250000	603
	110 V/50-60 Hz	EVAP250000	102	EVAP250000	302	EVAP250000	602
	230 V/50-60 Hz	EVAP250000	108	EVAP250000	308	EVAP250000	608
EVA.../NA DN 32	24 Vdc	EVA320000	105	EVA320000	305	EVA320000	605
	24 V/50 Hz	EVA320000	103	EVA320000	303	EVA320000	603
	110 V/50-60 Hz	EVA320000	102	EVA320000	302	EVA320000	602
	230 V/50-60 Hz	EVA320000	108	EVA320000	308	EVA320000	608
EVA.../NA DN 40	24 Vdc	EVA400000	105	EVA400000	305	EVA400000	605
	24 V/50 Hz	EVA400000	103	EVA400000	303	EVA400000	603
	110 V/50-60 Hz	EVA400000	102	EVA400000	302	EVA400000	602
	230 V/50-60 Hz	EVA400000	108	EVA400000	308	EVA400000	608
EVA.../NA DN 50	24 Vdc	EVA500000	105	EVA500000	305	EVA500000	605
	24 V/50 Hz	EVA500000	103	EVA500000	303	EVA500000	603
	110 V/50-60 Hz	EVA500000	102	EVA500000	302	EVA500000	602
	230 V/50-60 Hz	EVA500000	108	EVA500000	308	EVA500000	608

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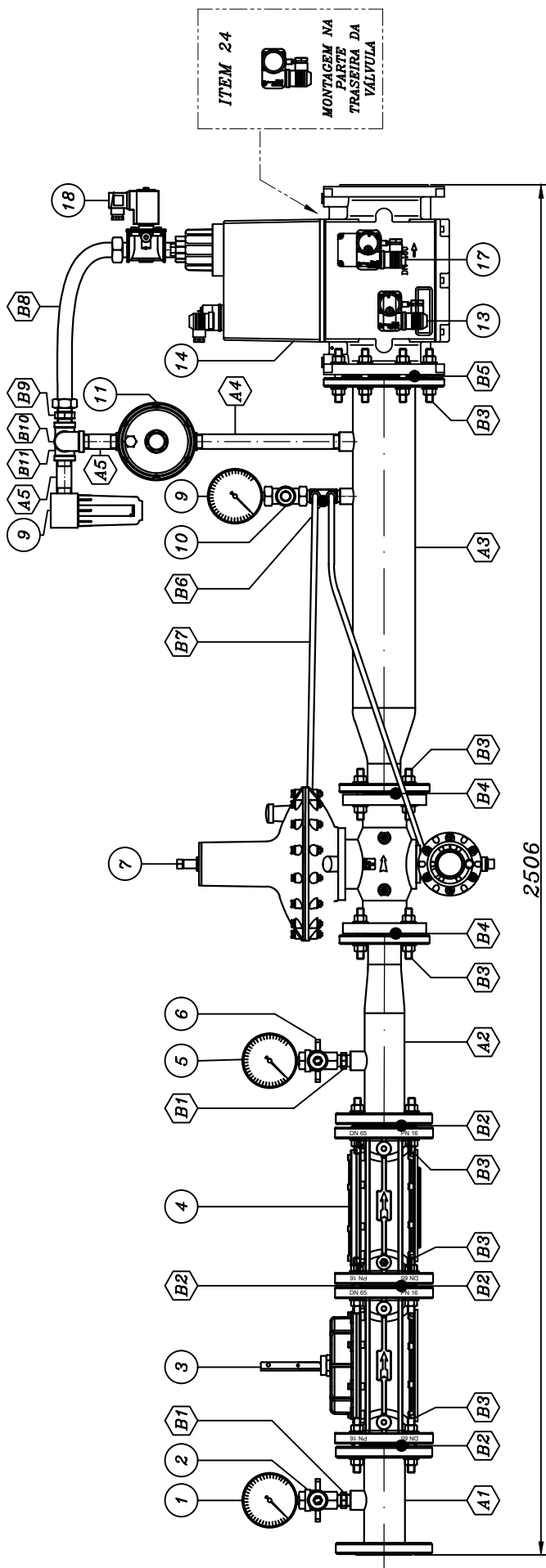
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Ci riserviamo qualsiasi modifica tecnica e costruttiva.
We reserve the right to any technical and construction changes.
Nous nous réservons le droit de toute modification technique et constructive.
Nos reservamos el derecho de realizar cualquier cambio técnico y estructural.



Desenho geral do cavalete





POS.	QUANT.	DESCRIÇÃO	DIMENSÕES	MATERIAL	TAG	PESO	POS.	QUANT.	DESCRIÇÃO	DIMENSÕES	MATERIAL	TAG	PESO
B11	1	TEE GALVANIZADO Ø3/4"	Rp 3/4"	-	W00054	-	24	1	PRESSOSTATO ØW50AS 5-15MBAR IP-54	-	-	-	404
B10	1	COTOVELO GALVANIZADO Ø3/4"	Rp 3/4"	-	W00032	-	18	1	VALVULA SOLENÓIDE NA- 360MBAR EVAP 20R-230V	Rp 3/4"	-	-	1182
B9	1	NIPLE DUPLO GALVANIZADO Ø3/4"	R 3/4"	-	W00101	-	17	1	PRESSOSTATO ØW60AS 100-500 MBAR IP-54	-	-	-	405
B8	1	TUBO PEX M-F Ø3/4"	R 3/4" x Rp 3/4"	-	W00224	-	14	1	VALVULA SOLENÓIDE DUPLA DMV-DLE 5100/11 - 230V	DN 100 PN 16	-	-	228
B7	1	TUBING PARA PILOTAGEM	-	-	-	-	13	1	PRESSOSTATO ØW50AS 5-15MBAR IP-54	-	-	-	404
B6	1	MANIFOLD PARA MANÔMETRO 4 ENTRADAS Ø1/2" M-M	R 1/2"	-	W00217	-	12	1	DETECTOR VISUAL DE VAZAMENTO DN 20	Rp 3/4"	-	-	3242
B5	1	JUNTA DE PAPELAO HIDRÁULICO Ø4"	Ø4"	-	W00077	-	11	1	VALVULA ALVIMO MVS 1 20R 140-215 MBAR	Rp 3/4"	-	-	120750
B4	2	JUNTA DE PAPELAO HIDRÁULICO Ø2"	Ø2"	-	W00075	-	10	1	VALVULA DE BLOQUEIO PUSH-BUTTON Ø1/2"	G 1/2"	-	-	5371
B3	28	ESTUPO COMPLETO Ø5/8" X 100 MM	-	-	W00135	-	9	1	MANÔMETRO Ø1/2" DN 100 RETO - ESC 0-250 MBAR	G 1/2"	-	-	5318S
B2	1	JUNTA DE PAPELAO HIDRÁULICO Ø2.1/2"	Ø2.1/2"	-	W00074	-	7	1	REGULADORA DIVAL-600 DN 50-50F - 116-165 MBAR	DN 50 PN 16	-	-	70448
B1	1	NIPLE DUPLO GALVANIZADO Ø1/2"	R 1/2"	-	W00121	-	6	1	VALVULA ESFERA Ø1/2" - ALAVANCA BORBOLETA F-F	G 1/2"	-	-	9603
A5	2	NIPLE USINADO Ø3/4" X 60 MM	R 3/4"	-	W00001	-	5	1	MANÔMETRO Ø1/2" DN 100 RETO - ESC 0-4 BAR	G 1/2"	-	-	5313
A4	2	TUBO PARA VALVULA DE ALIVIO Ø3/4" X 260 MM	R 3/4"	-	W00014	-	4	1	FILTRO PARA GAS 6 BAR FM DN65F-AP 20 um	DN 65 PN 16	-	-	1057
A3	1	CARRETEL 50 (5) X 100 (7) - (2)	DN 50 PN 16 X DN 100 PN 16	-	W00247	-	3	1	VALVULA DE BLOQUEIO - 6 BAR SX 65F - AP	DN 65 PN 16	-	-	1556
A2	1	CARRETEL DE REDUÇÃO P/ MANÔMETRO Ø2.1/2" X Ø2"	DN 65 PN 16 X DN 50 PN 16	-	W00278	-	2	1	VALVULA ESFERA Ø1/2" - ALAVANCA BORBOLETA F-F	G 1/2"	-	-	9603
A1	1	TEE PARA MANÔMETRO FLANGEADO Ø2.1/2"	DN 65 PN 16	-	W00178	-	1	1	MANÔMETRO Ø1/2" DN 100 RETO - ESC 0-4 BAR	G 1/2"	-	-	5313

[illegible]