

SLAM-SHUT VALVE

ICN



TECHNICAL MANUAL MT065

INSTALLATION, COMMISSIONING AND MAINTENANCE INSTRUCTIONS

PRECAUTIONS

GENERAL PRECAUTIONS

- The apparatus described in this manual is a device subject to pressure installed in systems under pressure;
- the apparatus in question is normally installed in systems for transporting flammable gases (natural gas, for example).

PRECAUTIONS FOR THE OPERATORS

Before proceeding with installation, commissioning or maintenance, operators must:

- examine the **safety provisions** applicable to the installation in which they must work;
- obtain the **authorisations** necessary for working when so required;
- use the necessary means of **individual protection** (helmet, goggles, etc.);
- ensure that the area in which they operate is fitted with the means of **collective protection** envisaged and with the necessary **safety indications**.

HANDLING

The handling of the apparatus and of its components must only be carried out after ensuring that the lifting gear is adequate for the **loads to lift** (lifting capacity and functionality). The apparatus must be handled using the **lifting points** provided on the apparatus itself.

Motorised means must only be used by the persons in charge of them.

INSTALLATION

If the installation of the apparatus requires the application of **compression fittings** in the field, these must be installed following the **instructions of the manufacturer** of the fittings themselves. The choice of the fitting must be compatible with the use specified for the apparatus and with the specifications of the system when envisaged.

COMMISSIONING

Commissioning must be carried out by adequately trained personnel.

During the commissioning activities, the personnel not strictly necessary must be ordered away and the no-go area must be properly signalled (signs, barriers, etc.). Check that the settings of the apparatus are those requested; if necessary, reset them to the required values in accordance with the procedures indicated in the manual.

When commissioning, the risks associated with any discharges into the atmosphere of flammable or noxious gases must be assessed.

In installations in natural gas distribution networks, the risk of the formation of explosive mixtures (gas/air) inside the piping must be considered.

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1.0 INTRODUCTION

The scope of this manual is to provide the essential information for the installation, commissioning and maintenance of ICN slam-shut valves. It is also appropriate to provide a brief illustration of the main features of the valves and of its accessories.

1.1 MAIN FEATURES

This is a device which immediately blocks the gas flow if, following some kind of failure, the downstream pressure reaches the set-point for its intervention or if it is operated manually.

The main characteristics of the slam-shut device are:

- design pressure: 18.9 bar for all the components;
- intervention with pressure increase and/or decrease;
- precision (AG): $\pm 1\%$ of the pressure set-point for pressure increases, $\pm 5\%$ for pressure decreases;
- incorporated by-pass for balancing the pressures and facilitating the resetting of the device;
- push-button manual control.

1.2 OPERATION

The slam-shut mechanism (Fig. 1) consists of:

- a mobile obturator A with sealing gaskets subject to the load of the closing spring G;
- a lever assembly L whose rotation causes the movement of the obturator A;
- a pressure switch device I-N whose internal motion determines the open or closed position of the obturator A.

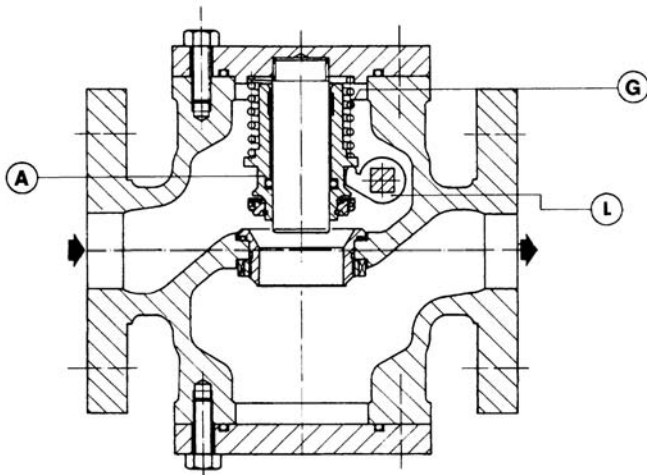


Fig. 1

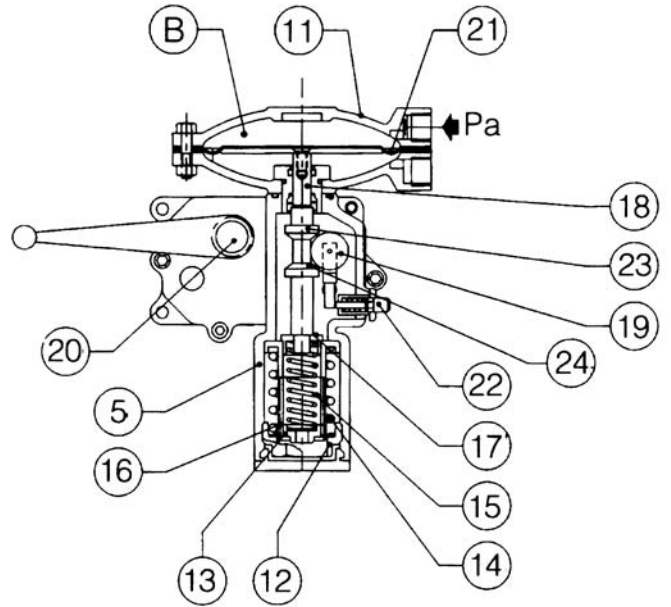


Fig. 2

The pressure switch device (Fig. 2) comprises a control head 11 in which the pressure to control Pa acts on the diaphragm 21 which is integral with the shaft with cams 18.

The load of the pressure Pa on the diaphragm is contrasted by the springs 14 and 15, which respectively determine intervention for a pressure increase or decrease. The slam-shut device is set by adjusting the rings 12 and 13.

The intervention value is increased by turning the rings clockwise and vice versa when turned anticlockwise. In the case of intervention for pressure increase, when the Pa exceeds the setpoint, the load on the diaphragm 21 of the control head B increases until it overcomes the resistance of the spring 14.

This provokes the downward displacement of the shaft 18 which shifts the feeler 19 and releases the lever mechanism 20 by means of the cam 23.

Intervention for a pressure decrease takes place as follows.

As long as the value of Pa stays above the set load of the spring 15, the spring support 17 rests on support 16.

If the pressure Pa drops below the setpoint, the support of spring 16 stops its stroke on the beat of the body 5 and the spring 15 displaces the support 17 upwards and the shaft 18 as a result. The cam 24 then shifts the feeler 19 and causes the release of the lever mechanism 20.

Intervention of the slam-shut device can also be provoked manually by means of the release button 22. The connection between the control head 11 and the Pa control point can be made with the intrposition of a device "Push" Fig. 8 which makes it easy to control the operation of the pressure control device.

1.3 TAB. 1 SETTING SPRINGS

Spring characteristics								SETTING RANGE mbar						
								I - N (Fig. 3)		I - N (Fig. 4)		I - N / TR (Fig. 3 e 4)		
Code	Colour	De	Lo	d	i	it	max	min	max	min	max	min		
1	2700565	WHITE	35	50	2.0	5.25	7.25	13 ÷ 33		17 ÷ 35				
2	2700675	YELLOW			2.3	5.25	7.25	25 ÷ 50		30 ÷ 55				
3	2700820	ORANGE			2.5	5.00	7.00	40 ÷ 85		45 ÷ 85				
4	2700910	RED			2.7	6.00	8.00	65 ÷ 145		65 ÷ 145				
5	2701035	GREEN			3.0	5.25	7.25	100 ÷ 180		100 ÷ 180				
6	2701140	BLACK			3.2	4.50	6.50	150 ÷ 270		150 ÷ 270				
7	2701255	BLUE			3.5	4.50	6.50	200 ÷ 350		200 ÷ 350				
8	2701380	GREY			3.7	4.25	6.25					700 ÷ 1500		
9	2701525	BROWN			4.0	4.50	6.50	300 ÷ 550		300 ÷ 550		900 ÷ 2000		
10	2701645	VIOLET			4.2	4.00	6.00	500 ÷ 900		500 ÷ 900		1300 ÷ 2800		
11	2702065	AZURE			5.0	4.50	6.00	850 ÷ 1200		850 ÷ 1200		2500 ÷ 5000		

12	2700338	WHITE	35	50	1.3	8.75	10.75		5 ÷ 19		8 ÷ 23			
13	2700377	YELLOW			1.5	8.50	10.50		15 ÷ 50		20 ÷ 50			
14	2700464	ORANGE			1.7	8.50	10.50		45 ÷ 100		45 ÷ 100			
15	2700513	RED			2.0	8.50	10.50		70 ÷ 140		70 ÷ 140			
16	2700713	GREEN			2.3	8.50	10.50		120 ÷ 270		120 ÷ 270			
17	2700750	BLACK			2.5	6.00	8.25		250 ÷ 600		250 ÷ 600		150 ÷ 1500	
18	2700980	BLUE			3.0	6.00	8.00		500 ÷ 900		500 ÷ 900		1000 ÷ 2100	
19	2701180	BROWN			3.5	6.25	8.25						1800 ÷ 2700	

De = Ø external diameter

d = Ø wire diameter

i = active coils

Lo = spring length

it = total coils

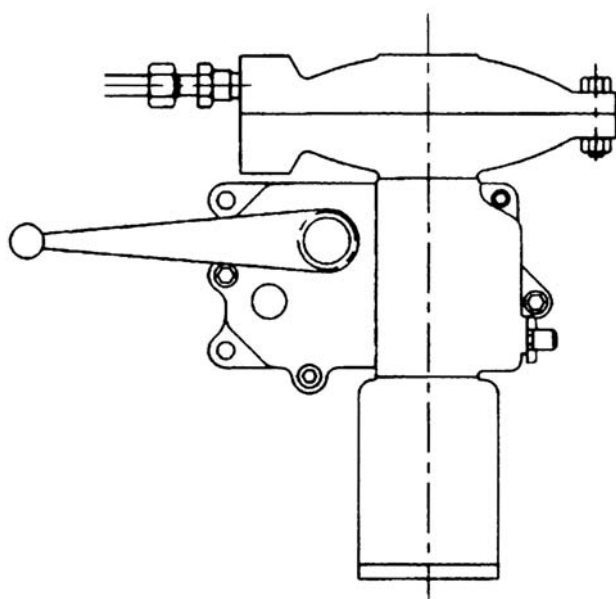


Fig. 3

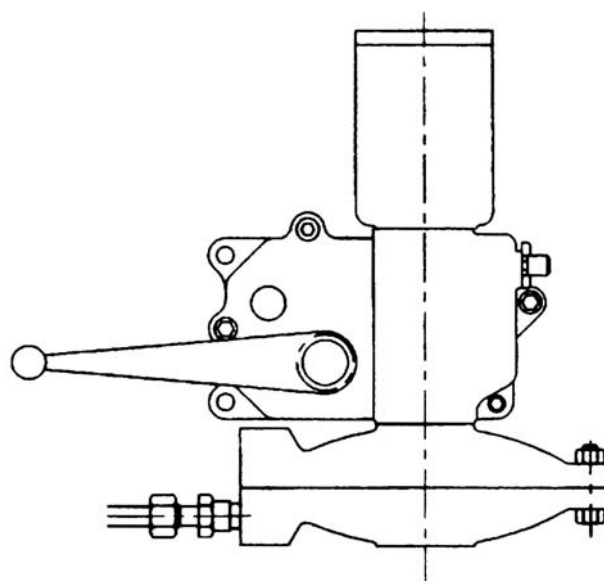


Fig. 4

2.0 INSTALLATION

2.1 GENERAL

Before installing the valve, you must ensure that:

- the valve can be inserted into the space provided and that it is sufficiently accessible for subsequent maintenance operations;
- the piping upstream and downstream are at the same level and able to support the weight of the valve;

- the inlet/outlet flanges of the piping are parallel;
- the inlet/outlet flanges of the valve are clean and the valve itself has not been damaged during transport;
- the piping upstream has been cleaned with the removal of residual impurities such as welding slag, sand, paint residues, water; etc.

The normally recommended set-ups are:

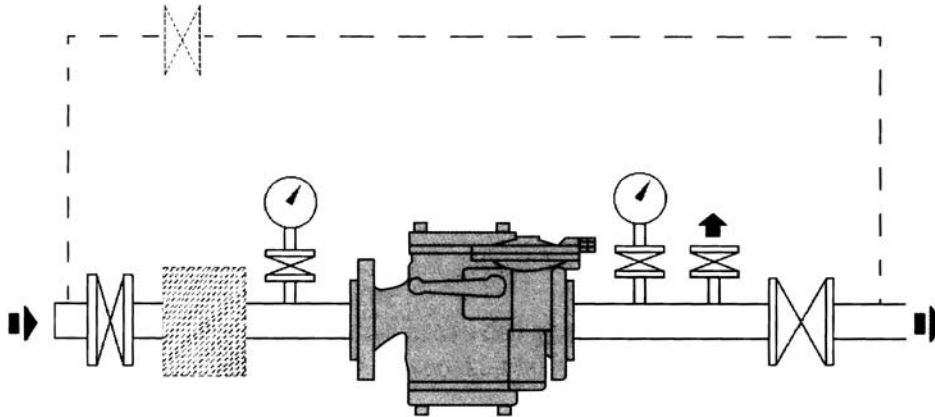
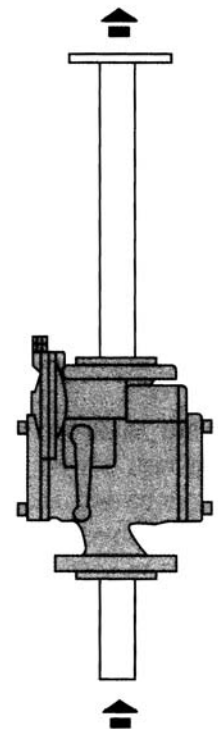


Fig. 5



When the above controls have been carried out, the valve can be fitted in line, making sure that the body is oriented so that the flow is in the direction shown by the arrow impressed on the body itself.

For proper regulation, it is indispensable for the downstream sensing line to be connected to a rectilinear stretch of the downstream piping itself with a length in accordance with the Fig. 6 and 7 and with a maximum gas speed at the take-off point not exceeding 30 m/sec.

The following is recommended so as to prevent the accumulation of impurities and condensate in the lines of the pressure take-offs:

- the piping itself must slope down towards the downstream connectors with a slope of about 5 - 10%;
- the connectors on the piping must always be welded on the top of the piping itself and there must be no burr or inward protrusion in the hole in the piping.

N.B. DO NOT PTU ON/OFF VALVES ON THE IMPULSE TAKE-OFFS

The most common types of installation for the ICN cut-off device are shown in figures 6 and 7.

Figure 6 shows installation in a pressure regulation line, figure 7 shows installation on a generic trunk.

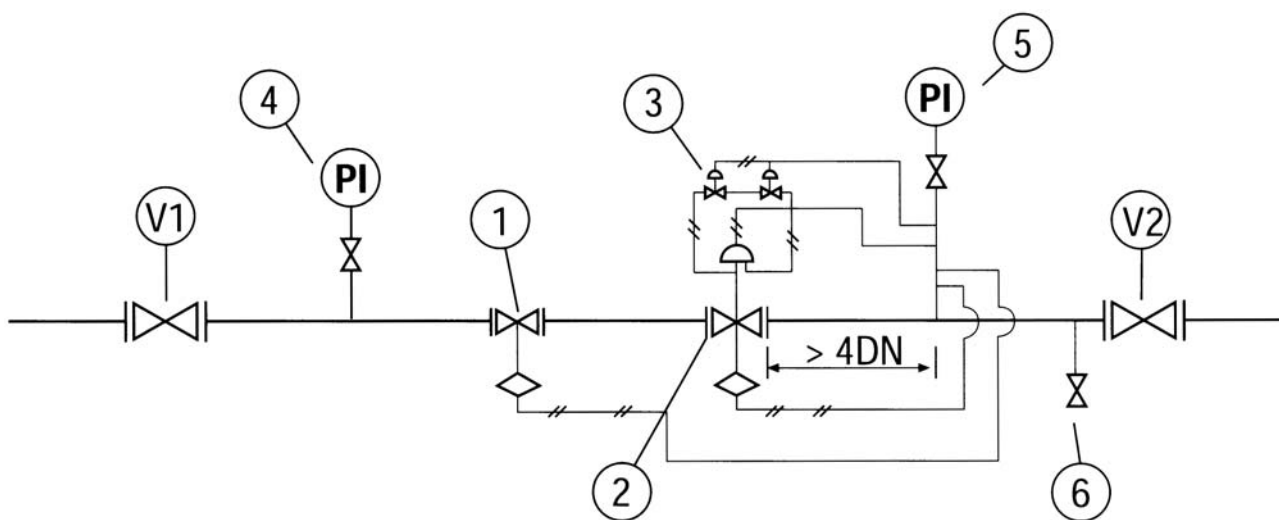


Fig. 6

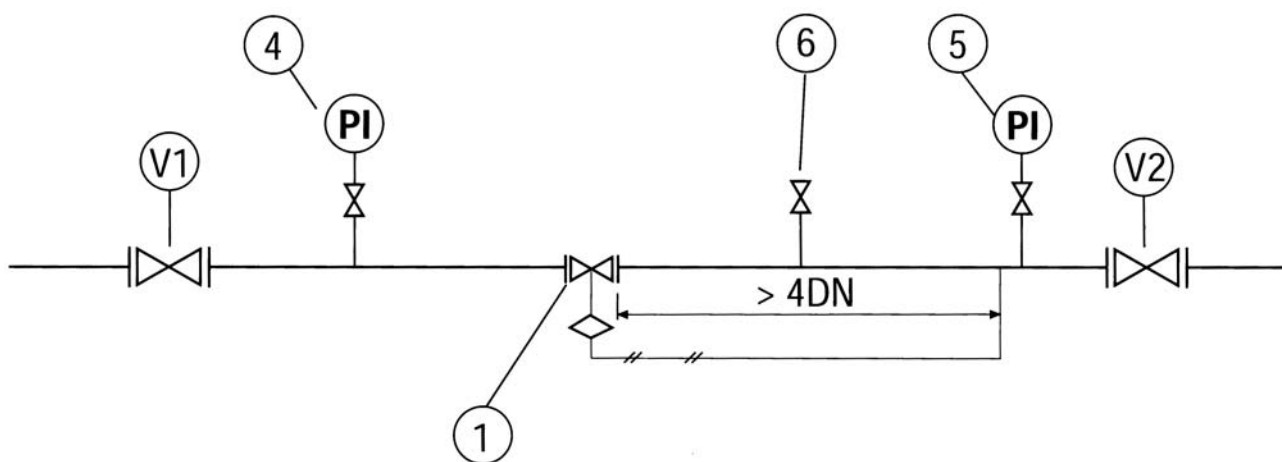


Fig. 7

- V1** Upstream on-off valve
- 1** Gas safety cut-off device Fig. 7
- 2** Pressure regulator with built-in cut-off device Fig. 6
- 3** Pilot
- 4** Upstream pressure gauge
- 5** Downstream pressure gauge
- 6** Downstream bleed valve
- V2** Downstream on-off valve

3.0 ACCESSORIES

3.1 "PUSH" THREE-WAYS SWITCH VALVE (FIG. 8)

The "Push" is a special spring three-ways switch valve. When the knob is in the "rest" position, the angular A and B ways are in communication while the C way is excluded. With the knob pressed down in the "check" position, the A and C way are connected and the B way excluded. When thrust is taken off the knob, the connection between A and C is AUTOMATICALLY REESTABLISHED by means of the spring pos. 11.

With the steam in the middle "open" position, the three ways are all in communication with each other. This cock is normally installed in the impulse lines of safety devices for protection against pressure increases and/or decreases (SAV and SBV) in order to allow very rapid verification of the settings without disconnecting the impulse pipes themselves during periodical checking operations. Its particular feature lies in the fact that, during normal running, the head (or the pilot of safety valve) receives the signal of the pressure to be kept under control through the A and B ways; when testing, the head receives the signal of a CONTROLLED PRESSURE from the A and C ways; once the check has been carried out, when the knob returns to the "rest" position, the connection is automatically re-established between the safety device head and the environment with the pressure to be controlled, thus avoiding the risk to shut off the safety device itself as it would in the case of a normal, manually-operated threeway cock, due to a trivial oversight. In other words, the "Push" is a SECOND SAFETY DEVICE which ensures the NON EXCLUSION of the main safety device and allows for its "Fool-proof" PERIODICAL CHECKING.

The stem is fitted with a stroke limit pin which makes it possible to:

- connect A and C ways only when the pin enters the "check" slot;
- connect the three ways, a, B and C, when the pin is on "open".

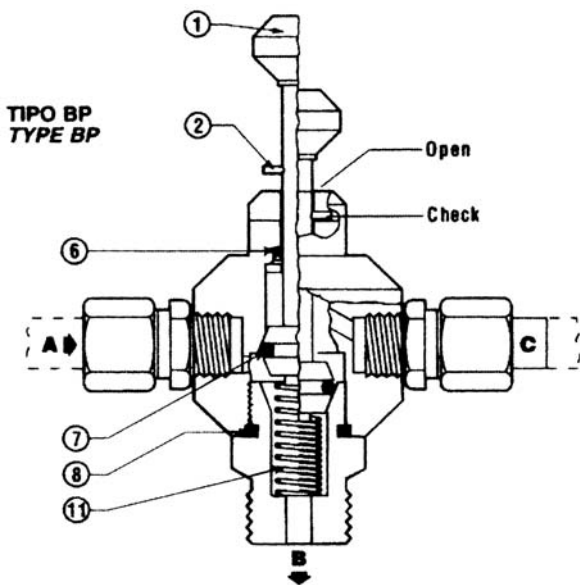


Fig. 8

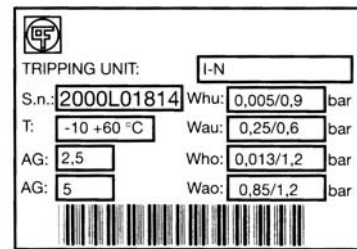
4.0 START UP

4.1 GENERAL

After installation, check that the inlet/outlet on/off valves, any by-pass and the bleed cock are closed. Before commissioning, you must ensure that the conditions of use comply with the characteristics of the apparatuses.

These characteristics are recalled by the symbols on the specification plates applied to each apparatus. We recommend actuating the opening and closing valves very slowly. The valve could be damaged by operations which are too fast.

APPARATUS SPECIFICATION PLATES



The list of symbols used and their meanings are listed below:

Pemax = maximum operating pressure at the inlet of the apparatus

Pzul = maximum pressure which can be supported by the structure of the body of the apparatus in safety conditions

AG = intervention accuracy

Wao = range of intervention for the over pressure of slam-shut, relief and safety valves and accelerators which can be obtained using the setting spring fitted at the moment of testing. In piloted safety valves, the pilot is considered as a separate apparatus with its own setting range Wao

Who = range of intervention for the over pressure of slam-shut, relief and safety valves and accelerators which can be obtained using the setting springs indicated in the tables. In piloted safety valves, the pilot is considered as a separate apparatus with its own setting range Who

Wau = range of intervention for pressure decrease of sla-shut which can be obtained using the setting springs indicated in the tables.

4.2 GAS INPUT, CONTROL OF EXTERNAL TIGHTNESS AND SETTING

External tightness is guaranteed if no bubbles form when a foam medium is applied on the element under pressure.

The slam-shut valves are normally supplied already set for the desired setpoint. It is possible for various reasons (e.g., vibration during transport) for the settings to be changed while remaining within the values permitted by the springs used.

We therefore recommend checking the settings using the procedures illustrated below.

Before commissioning the valves you must check that all the on-off valves (inlet, outlet, any by-pass) are closed and that the gas is a temperature which will not lead to malfunction.

4.3 CHECKING THE SETTING

Check and adjust the intervention of the slam-shut 1 as follows:

A) For slam-shuts connected to the downstream piping by a three-way deviator “push” valve proceed as follows (Fig. 9):

- connect a controlled auxiliary pressure to C;
- stabilise this pressure at the notch, pressing the knob 1 completely;
- reset the slam-shut device by means of the provided lever;
- keep the knob 1 pressed:

a) safety devices which intervene for maximum pressure: slowly increase the auxiliary pressure and check the intervention value. If necessary, increase the intervention value by turning the adjustment ring 12 clockwise, or anticlockwise to reduce the intervention value.

b) safety devices which intervene for pressure increase and reduction: slowly increase the auxiliary pressure and record the intervention value. restore the pressure to the setpoint established for the regulator, and carry out the slam-shut reset operation.

Check intervention for pressure reduction by slowly reducing the auxiliary pressure.

If necessary, increase the intervention values for pressure increase or decrease by respectively turning the rings 12 and 13 clockwise and vice versa to reduce the intervention values.

- check proper operation by repeating the operations at least 2-3 times.

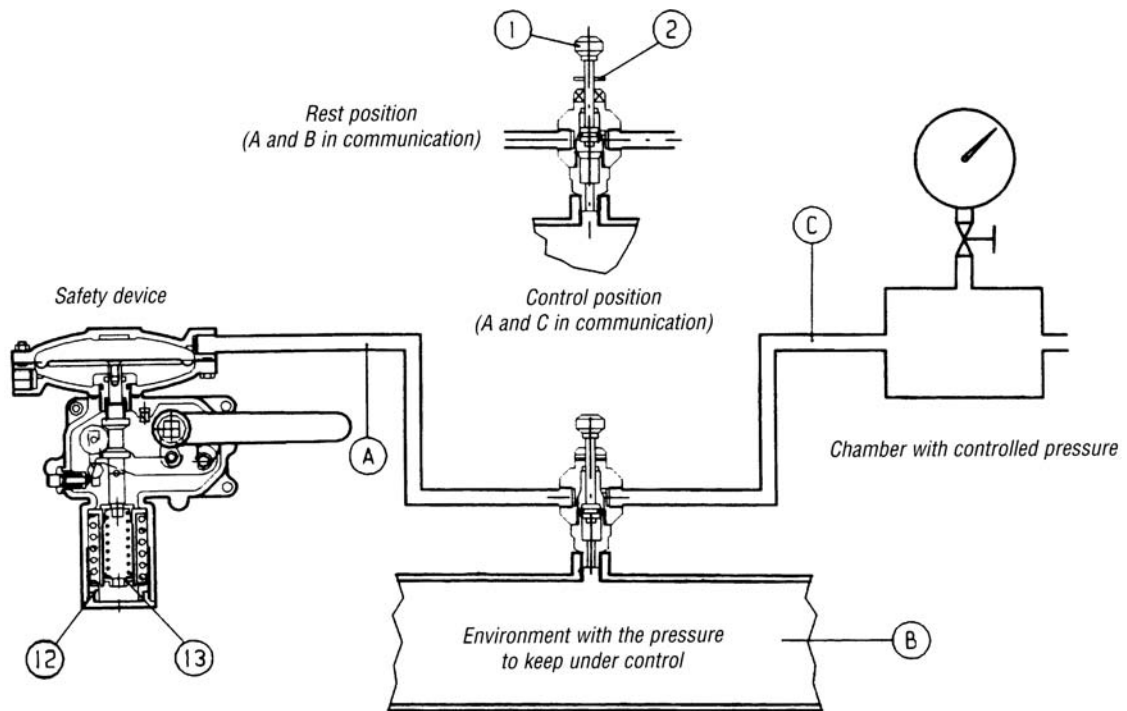


Fig. 9

B) On devices without the “push” valve (Fig. 10) we recommend connecting the control head separately to a controlled auxiliary pressure and repeating the operations described above.

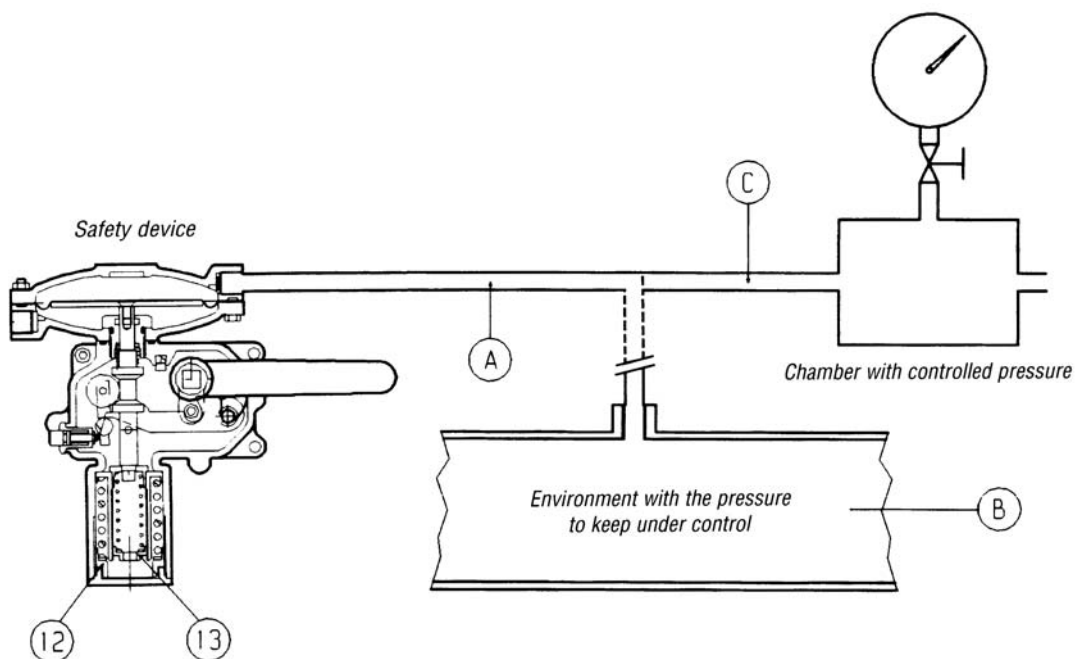


Fig. 10

ATTENTION

**At the end of the operation,
reconnect the control head
to the downstream pressure take-off.**

**N.B.: The intervention tests should be repeated at
least every 6 months.**

**At the end of the slam-shut check, proceed as
follows:**

- 1) check that the slam-shuts is in the closed position;
- 2) open the inlet on/off valve V1;
- 3) very slowly open the slam-shut by turning the provided lever.

5.0 TROUBLE-SHOOTING

The problems of various kinds which could arise over time are highlighted below.

They derive from phenomena associated with the conditions of the gas as well, of course, as the natural ageing and wear of the materials.

It must be remembered that all operations on the apparatuses must be carried out by highly qualified personnel with appropriate knowledge of the subject. Tampering with the apparatuses by unsuitable personnel relieves us from all responsibility of any kind.

You must therefore train your maintenance personnel or avail of the service centres officially authorised by us.

5.1 TAB. 2 ICN SLAM-SHUT (Fig. 11-12)

PROBLEM	POSSIBLE CAUSES	REMEDY
Slam - shut obturator does not close	Control diaphragm (16) ruptured	Change the diaphragm
Leakage from slam-shut obturator	Obturator gasket (10) deteriorated	Change the gasket
	O-ring (66) worn	Change
	Obturator seat (7) eroded or chipped	Change the seat
Wrong release pressure	Wrong setting of maximum and/or minimum spring	Make the setting again using the rings (12) and/or (13)
	Friction in the lever system	Change the box containing the whole assembly
Resetting not possible	Persistence of the cause which led to downstream pressure increase or decrease	Decrease or increase the downstream pressure
	Lever system broken or chipped	Change the standard box containing the assembly outside the regulator

N.B. If the slam-shut has intervened, close the inlet and outlet valve (**V1** and **V2**) on the line and discharge the pressure before carrying out any operation.

Eliminate the causes which gave rise to intervention before reactivating it.

In the event of operating problems when personnel qualified for a specific operation are not available, call the nearest service centre.

6.0 MAINTENANCE

6.1 GENERAL


Before carrying out any operation it is important to ascertain that the valve has been cut off both upstream and downstream and that the pressure has been discharged in the sections of piping between the valve and the on/off valves.

The maintenance operations are closely associated with the quality of the gas transported (impurities, humidity, gasoline, corrosive substances) and with the efficiency of the filtering.

Preventive maintenance should be carried out at intervals which, if not established by regulations, depend on:

- the quality of the gas transported;
- The cleanliness and conservation of the piping upstream from the valve: in general, for example, when starting the equipment for the first time, more frequent maintenance is required because of the precarious state of cleanliness inside the piping;
- the level of reliability required from the regulation system.

Before starting the disassembly operations on the apparatus you should check that:

- a set of recommended spares is available. The spares must be original **3L.P.GAS** ones, bearing in mind that the more important ones such as diaphragms are marked 

The use of non-original components relieves us of all responsibility.

- A set of wrenches is available as specified in table 3.

If the maintenance is carried out by your own authorized personnel, we recommend putting reference markings before the disassembly on those parts which could have directional or reciprocal positioning problems when reassembling.

Finally, we would remind you that O-rings and sliding mechanical components (rods, etc. ...) must be lubricated, before the reassembly, with a layer of silicone grease.

6.2 ICN SLAM-SHUT VALVE MAINTENANCE PROCEDURE

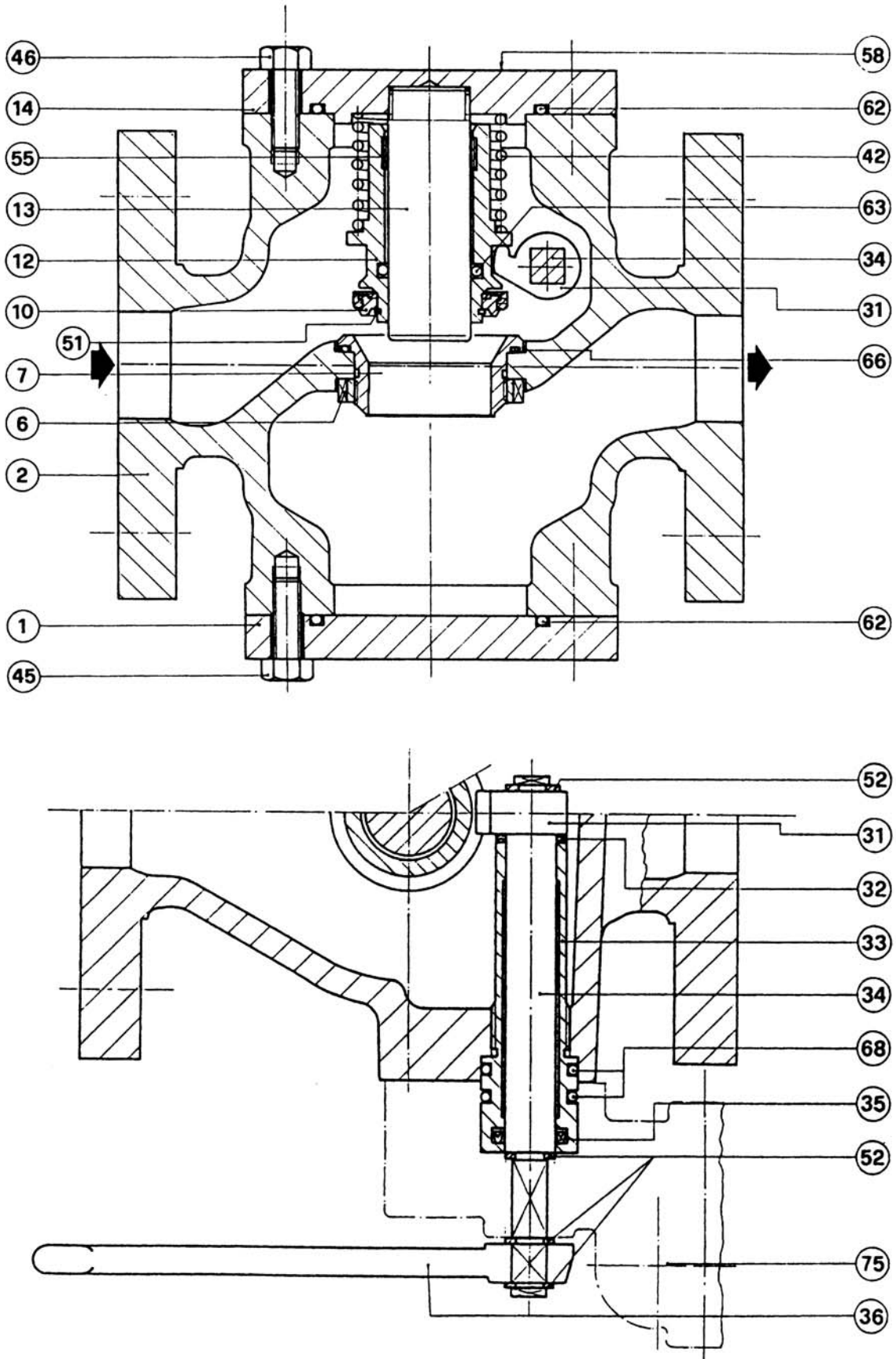


Fig. 11

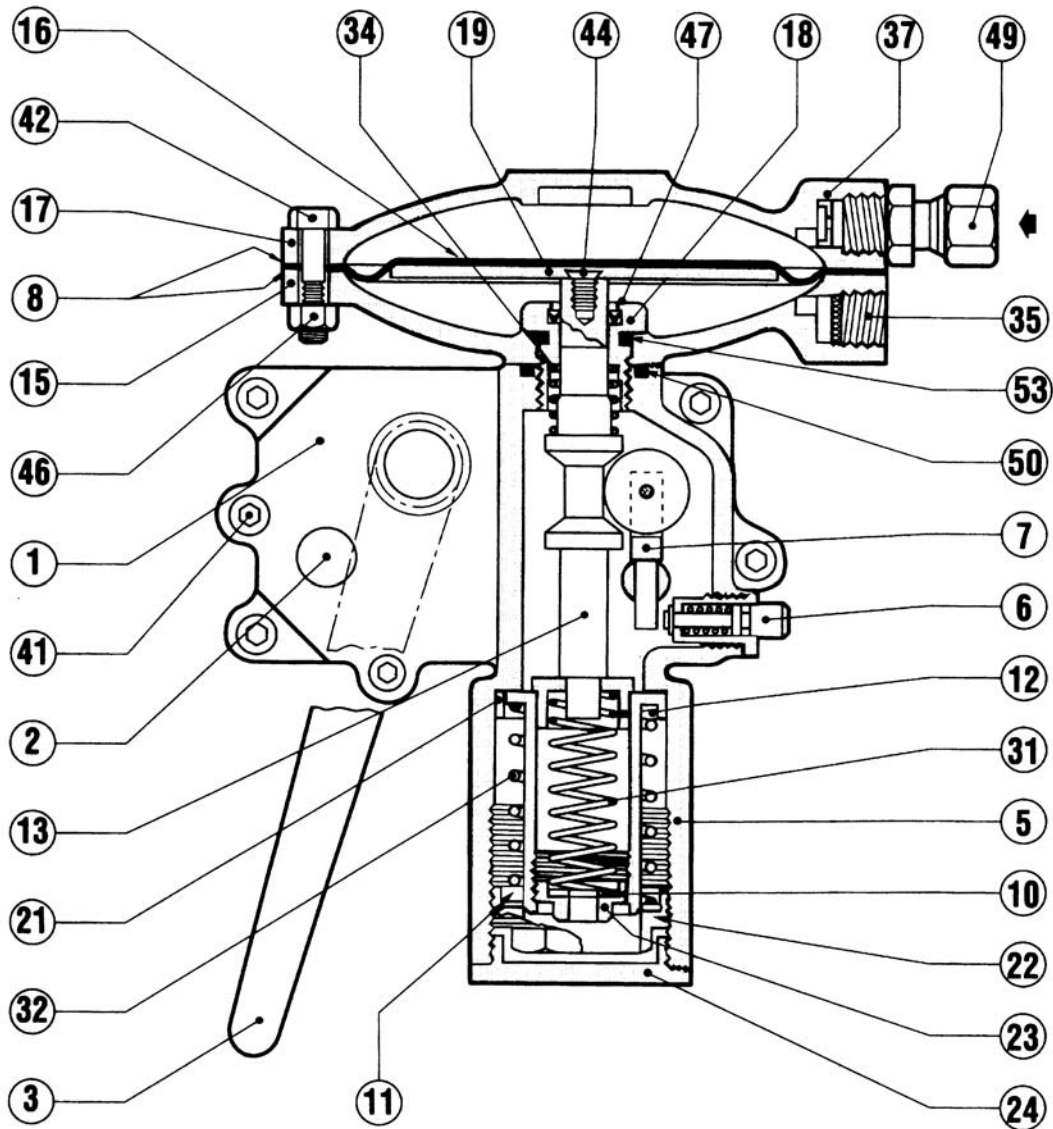


Fig. 12

Procedure for disassembly, complete replacement of the spare parts and reassembly of the ICN slam-shut valve (PROGRAMMED PREVENTIVE MAINTENANCE)

PRELIMINARY OPERATIONS

- A. Render the valve safe;
- B. Ensure that the pressure upstream and downstream from it is 0.

DISASSEMBLY

(The position refer to Fig. 11-12)

- 1) Slacken and remove the fixing screws, pos. 46, in the flange slam-shut valve, pos. 14.
- 2) Remove the flange slam-shut valve pos. 14.
- 3) Remove the obturator support of the slam-shut valve, pos. 12, along with the spring, pos. 42, and the obturator, pos. 10.

- 4) Check and clean the inside of the valve body.
- 5) Carefully check that the valve seat, pos. 7, is in a good state.
- 6) Disconnect the sensing line which connects the pressure control of the slam-shut to the downstream piping, unscrewing the taper seal connections.
- 7) Slacken the fixing screws, pos. 42, of the slam-shut cover, pos. 17.
- 8) Remove the slam-shut cover, pos. 36.
- 9) Remove the retaining ring, pos. 52, which fixes the reset lever, pos. 36.
- 10) Remove the reset lever, pos. 36.
- 11) Remove the retaining ring, pos. 42.
- 12) Slacken and unscrew the screws, pos. 40.
- 13) Remove the pressure control from the value body.
- 14) Unscrew and remove the shaft guide, pos. 33.
- 15) **Replace all the components included in the spare parts list.**

RE-ASSEMBLY

Remembering that the O-rings and the sliding parts (rods, etc.) must be lightly lubricated with a fine layer of silicone grease before reassembly, while static parts require grease to render them softer but, especially, to hold them in their slots:

- 16) Fix the shaft guide, pos. 33, to the valve body.
- 17) Fit the pressure control back on the valve body.
- 18) Secure this by screwing in the screws, pos. 40.
- 19) Put back the retaining ring, pos. 52.
- 20) Position the reset lever, pos. 36.
- 21) Put back the retaining ring, pos. 52.
- 22) Put back the slam-shut cover, pos. 17.
- 23) Fix the screws, pos. 42, of the slam-shut cover, pos.17.
- 24) Reconnect the sensing line which connects the pressure control of the slam-shut to the downstream piping, and fix the taper seal connections.
- 25) Put back the slam-shut obturator support, pos. 12, along with the spring, pos. 42, and the obturator pos. 10.
- 26) Fit back the slam-shut flange, pos. 14 and fix the screws pos. 46.

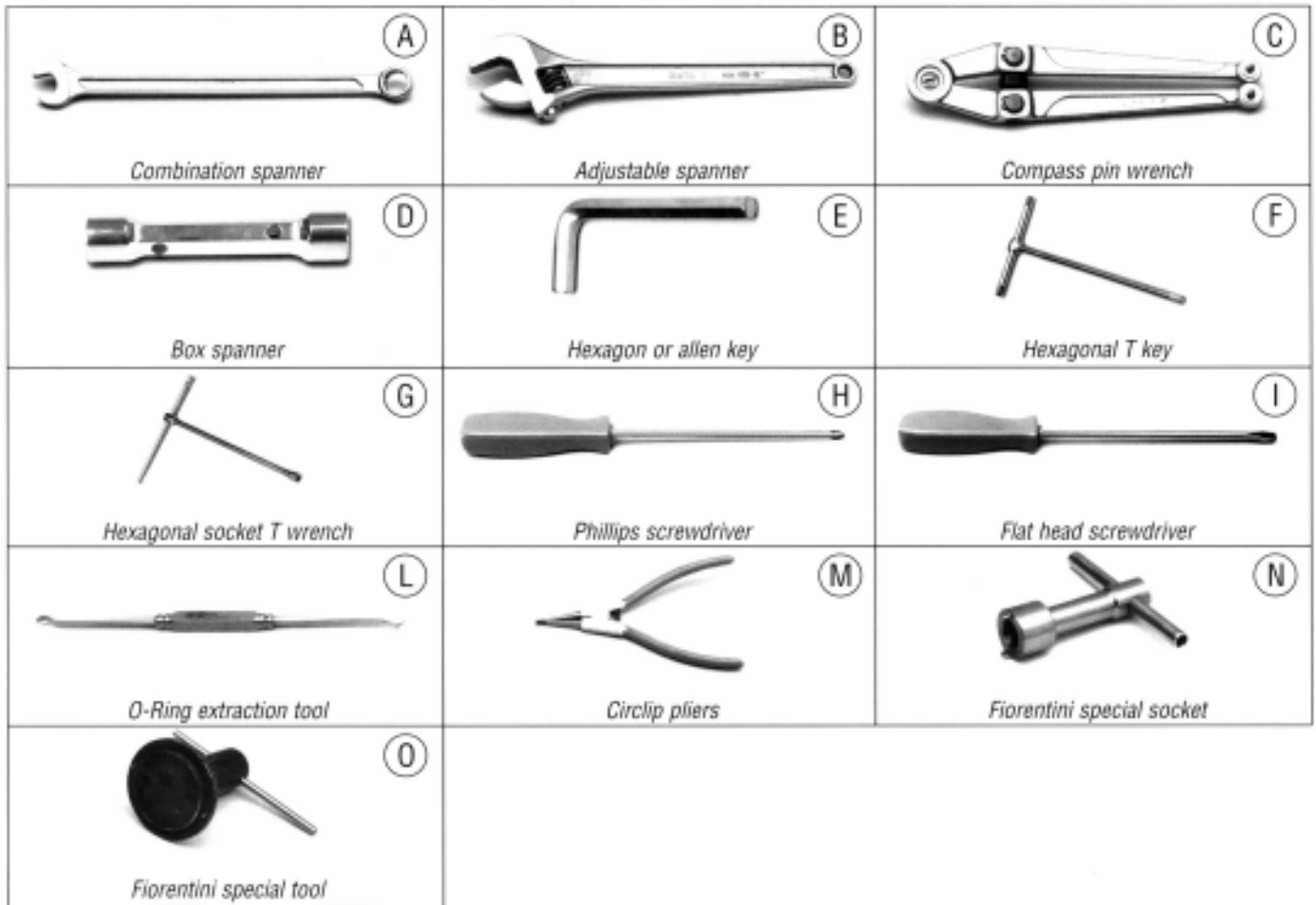
CHECKING THE TIGHTNESS AND SETTING

- 27) Very slowly open the on/off valve upstream from the slam-shut and using a foam solution or the like check:
 - the tightness of the external surfaces of the slam-shut;
 - the tightness of the slam-shut;
 - the tightness of the internal surfaces of the slam-shut;
 - the tightness of the fittings.
- 28) Operating very slowly, turn the reset lever, pos. 36, of the slam-shut from the vertical position towards the horizontal position until only the internal by-pass is opened. Then raise the lever completely to the re-engage position.

START UP

- 29) Very slowly open the downstream on/off valve.

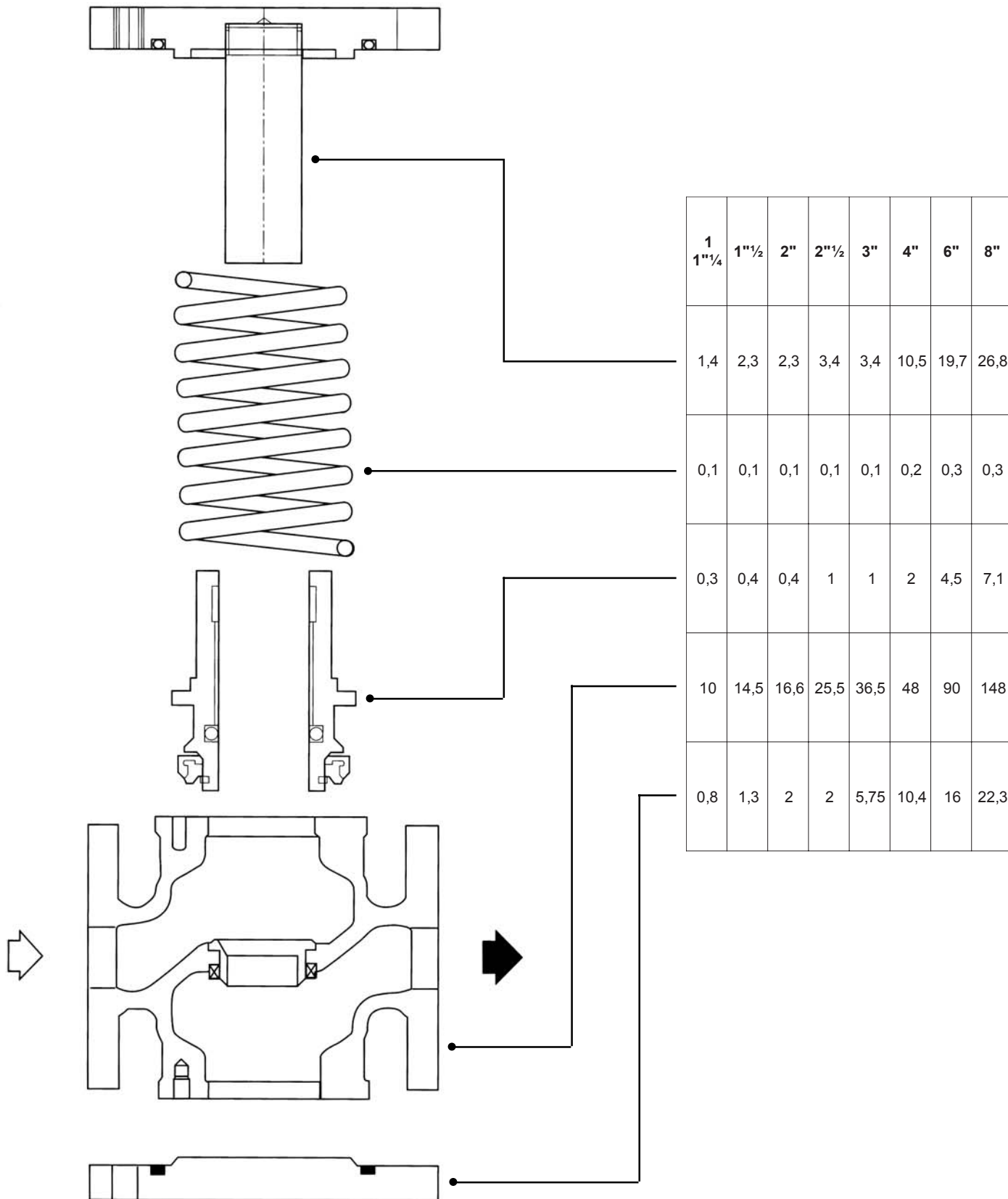
Tab. 3 MAINTENANCE WRENCHES FOR ICN SLAM SHUT VALVE



Type	ND	1" and 1¼"	1½" and 2"	2½" and 3"	4"	6"	8"
A	Ch.	8 - 13 - 19 - 23	8 - 17 - 19 - 23	8 - 17 - 19 - 23	8 - 19 - 24	8 - 19 - 22	8 - 19 - 22
B	L.	300					
D	Ch.	10 - 27					
E	Ch.	4 - 5					
L	Cod.	7999099					
M	∅	19 ÷ 60					
O	Cod.	7999045	7999047	7999049			

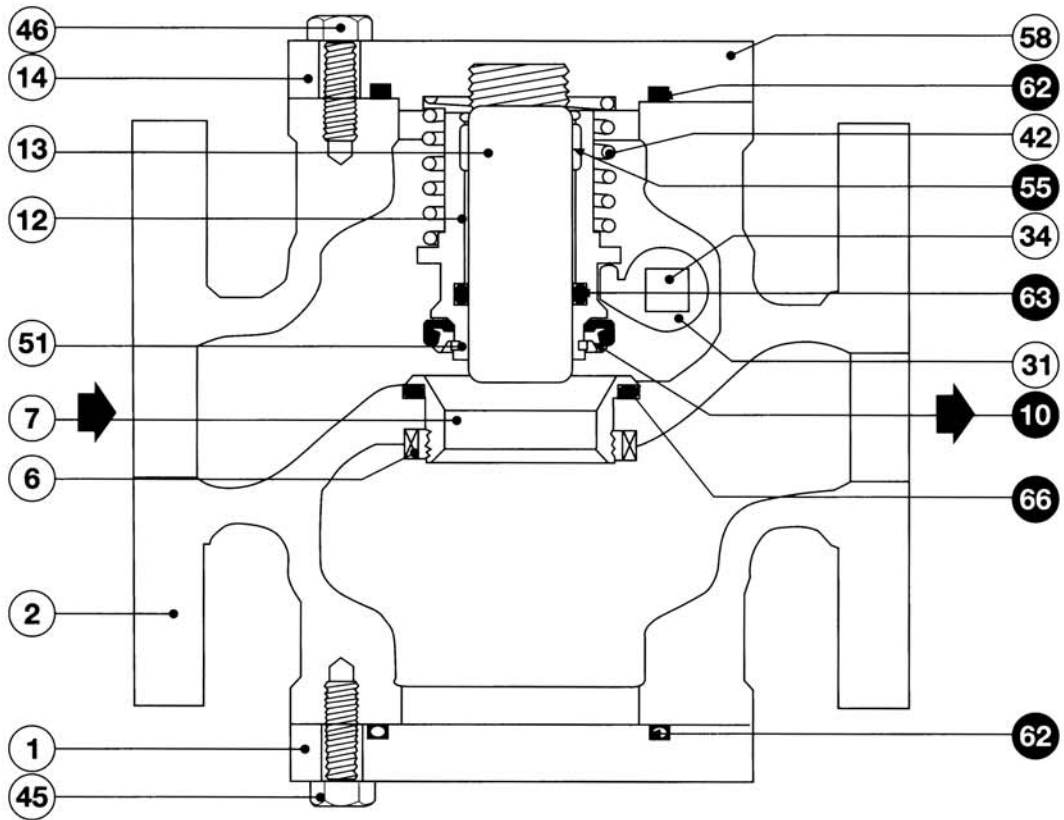
7.0 WEIGHT OF THE COMPONENTS

7.1 Tab. 4 WEIGHT OF THE COMPONENTS IN KG.

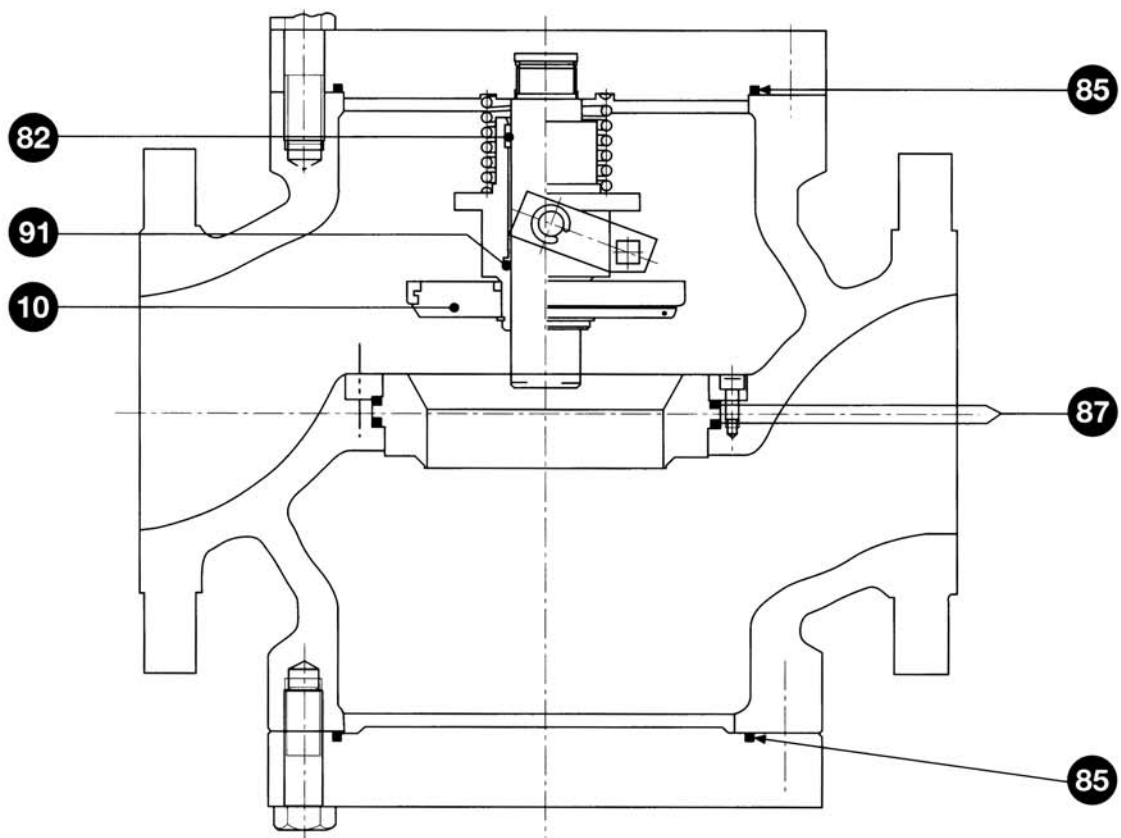


8.0 LIST OF RECOMMENDED SPARES

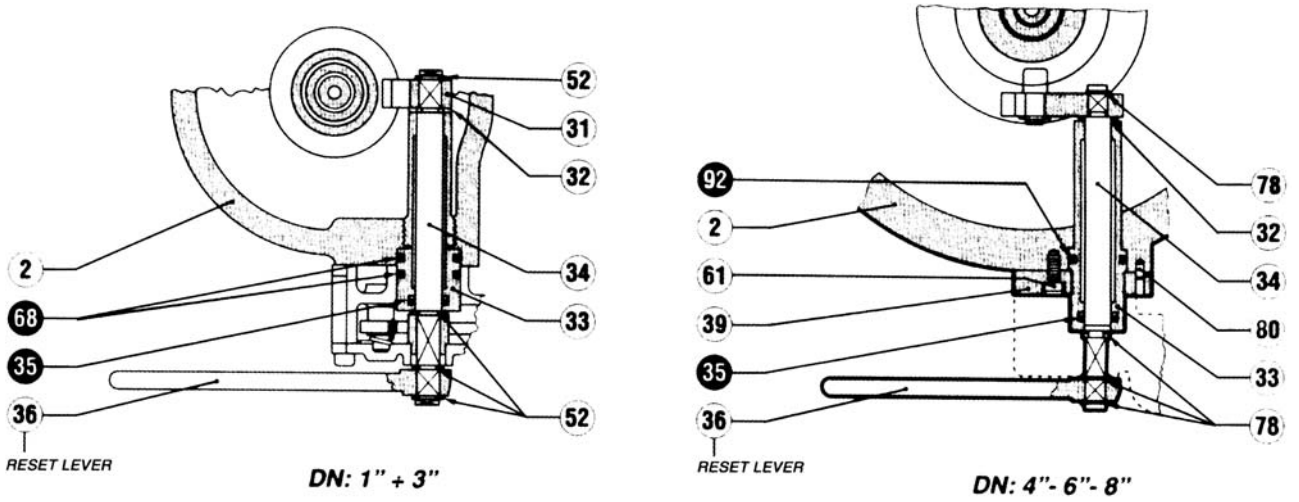
ICN/... SLAM-SHUT VALVE



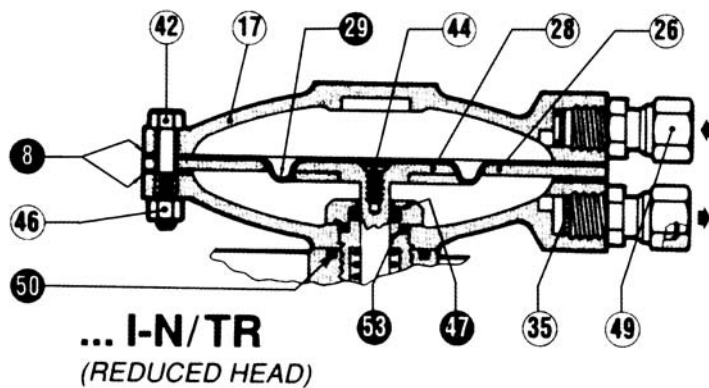
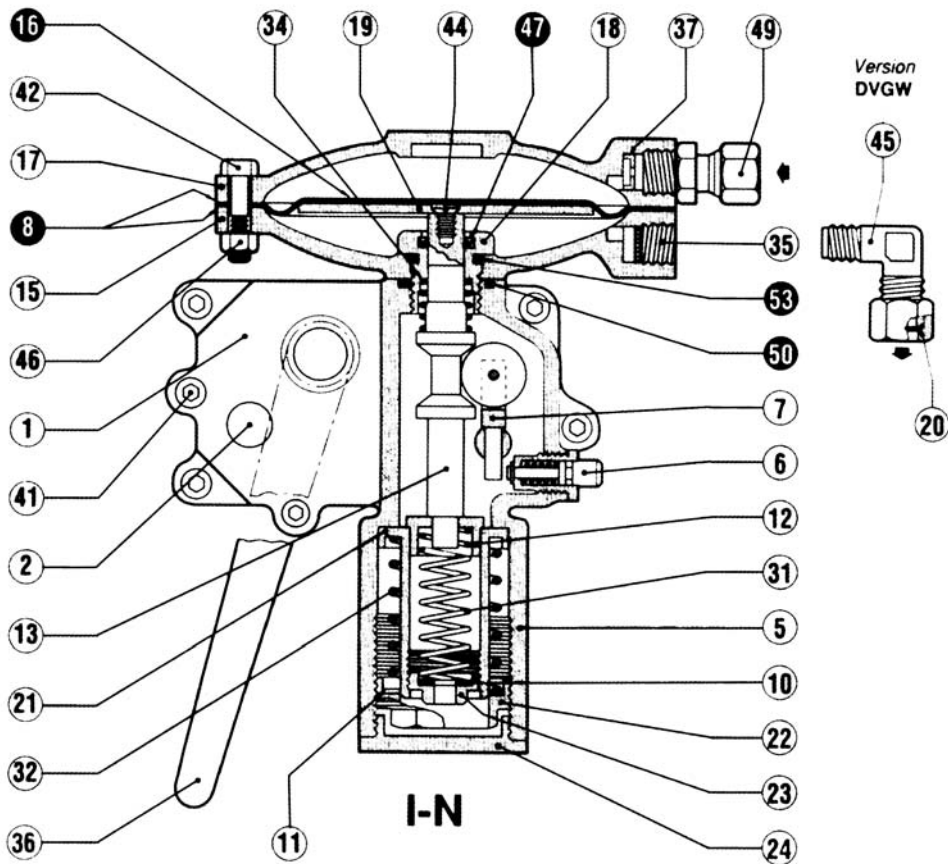
DN 1"-3"



DN 4"-8"



SLAM-SHUT CONTROL DEVICE



	POS.	DESCRIPTION	NUMBER OF PIECES	
			1" ÷ 3"	4" ÷ 8"
ICN	10	Obturator	1	1
	35	Sealing U	1	1
	55	Guide ring	1	-
	62	Sealing O-ring	2	-
	63	Sealing O-ring	1	-
	66	Sealing O-ring	1	-
	68	Sealing O-ring	2	-
	82	Guide ring	-	1
	85	Sealing O-ring	-	2
	87	Sealing O-ring	-	2
	91	Sealing O-ring	-	1
	92	Sealing O-ring	-	1

	POS.	DESCRIPTION	NUMBER OF PIECES
ICN I - N	8	Gasket	2
	16	Diaphragm	1
	*47	Sealing U	1
	50	O - Ring	1
	53	O - Ring	1
*Only for DVGW version			

	POS.	DESCRIPTION	NUMBER OF PIECES
ICN I-N/TR	*8	Gasket	2
	29	Diaphragm	1
	*47	Sealing U	1
	50	O - Ring	1
	53	O - Ring	1
*Only for DVGW version			

WHEN ORDERING SPARE PARTS, PLEASE SPECIFY:

Type of valve

Dne (nominal inlet diameter)

Type of head for slam-shut (I-N, I-N/TR)

Works no. (Serial no.)

Year of manufacture

Type of fluid used

The no. of the part (position no.)

Quantity desired



DESIGN, SALE & INSTALLATION OF L.P.G. - NATURAL GAS SYSTEMS

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