

Relief Valves

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INTRODUCTION

Scope of Manual

This manual provides instructions for installation, startup, maintenance and spare parts ordering for the V Series spring-loaded relief valves.

This product has been designed to be used with fuel gases of 1st and 2nd family according to EN 437, and with other non aggressive and non fuel gases. For any other gases, other than natural gas, please contact your local sales agent.



Figure 1. Relief Valves V/50, V/60 Series and Type V/20-2

SEP STATEMENT

Emerson Process Management declares this product (V/50 and V/20-2) conforms to Pressure Equipment Directive (PED) 97/23/EC Article 3 section 3 and was designed and manufactured in accordance with sound engineering practice (SEP).

Per Article 3 section 3, this “SEP” product must not bear the CE marking.

Product Description

The V Series are spring-loaded automatic type relief valves.

They are used in reduction, distribution and conveying stations using suitably filtered natural gas.

They can also be used for air, propane, butane, LPG, city gas, nitrogen, carbon dioxide.

The following versions are available:

V/50 and V/60 : for very low pressure applications

V/51 and V/61 : for low pressure applications

V/52 and V/62 : for middle pressure applications

V/20-2 : for high pressure applications

All standard gas pressure devices (relief valves) used in assemblies will comply to EN 12186 and EN 12279 standards.

V Series

P.E.D. CATEGORIES AND FLUID GROUP

The V Series relief valves are designed as functional equipments and they are typically used in gas pressure reducing stations for overpressure protection by releasing small amounts of gas in the event of not perfect pressure relief valve closing.

Table 1. P.E.D. Category for V Series Relief Valves

TYPE	CATEGORY	FLUID GROUP
V/50 - V/51 - V/52	SEP	1
V/60 - V/61 - V/62	I	
V/20-2	SEP	

If V series relief valve is used as full-capacity relief device (according clause 8.3.2 EN 12186) , downstream equipments protected by this products shall have technical features such as not to be category higher than following category (according Directive 97/23/EC “PED”).

CHARACTERISTICS

End Connection Styles

V/50 Series

1" x 1 1/2" GAS

V/60 Series

1 1/2" x 2" GAS

Type V/20-2

1" x 1" NPT



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

Maximum Allowable Pressure

V/50 Series: 4 bar

V/60 Series: 2.5 bar

Type V/20-2: 100 bar

Outlet Set Pressure Ranges

V/50 Series: 0.025 ÷ 2 bar

V/60 Series: 0.025 ÷ 2 bar

Type V/20-2: 1.5 ÷ 40 bar

Minimum/Maximum Allowable Temperature (TS)

See label

Temperature

Standard Version : Working -10° to 60°C

Low Temperature Version : Working -20° to 60°C

Materials

V/50 and V/60 Series

Body / cover : Aluminium

Seat : Brass

Diaphragms : Fabric Nitrile (NBR) + PVC

Pads : Nitrile (NBR) rubber

Type V/20-2

Body : Brass

Pad retainer : Brass

Pad holder : Brass

Adjusting nut : Brass

Pad : Nitrile (NBR) rubber

LABELLING

TARTARINI SOLOGNA ITALY **CE** Notified body XXXX

APPARECCHIO TIPO / DEVICE TYPE
Note 1

MATRICOLA SERIAL N°: [] DN1 []
ANNO YEAR: Note 2 DN2 []

NORME ARMONIZ. HARMONIZED STD. EN [] Wa [] bar
CLASSE DI PERDITA LEAKAGE CLASS [] Wao [] bar
CLASSE FUNZIONALE FUNCTIONAL CLASS [] Cg [] Wau [] bar
FLUIDO GRUPPO FLUID GROUP: 1 pmax [] bar pao [] bar
TS Note 3 °C PS body Note 4 bar PS covers - bar PT= 1.5 x PS bar

Figure 2. Label for V Series Relief Valves

Note 1: See “Characteristics”

Note 2: Year of manufacture

Note 3: Class 1: -10°/60°C
Class 2: -20°/60°C

Note 4: V/50 Series : 4 bar
V/60 Series : 2.5 bar
Type V/20-2 : 100 bar

OVERPRESSURE PROTECTION

The recommended safety pressure limitations are stamped on the valve label.

Downstream overpressure protection shall be also provided if the inlet pressure can be greater than the PS (see label).

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

The relief valve should be inspected for damage after any overpressure condition.

TRANSPORT AND HANDLING

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

Ringbolts are designed just for handling of equipment weight.

Built-up sensing lines and pressure accessories (e.g. pilots) shall be protected by shocks or anomalous stresses.

ATEX REQUIREMENTS

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

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

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

In any case,

- provisions of Directive 1999/92/EC and 89/655/EC shall be enforced by gas pressure regulating/measuring station/ installation's end user
- with a view to preventing and providing protection against explosions, technical and/or organizational measures appropriate to the nature of the operation shall be taken (e.g. : filling/exhausting of fuel gas of internal volume of the isolated part/entire installation with vent lines to safe area - 7.5.2 of EN 12186 & 7.4 of EN 12279 ; monitoring of settings with further exhaust of fuel gas to safe area ; connection of isolated part/entire installation to downstream pipeline;)

- provision in 9.3 of EN 12186 & 12279 shall be enforced by pressure regulating/measuring station/installation's end user
- external tightness test shall be carried out after each reassembly at installation site using testing pressure in accordance with national rules
- periodical check/maintenance for surveillance shall be carried out complying with national regulations, if any, and specific manufacturer recommendations.

OPERATION

V/50 and V/60 Series

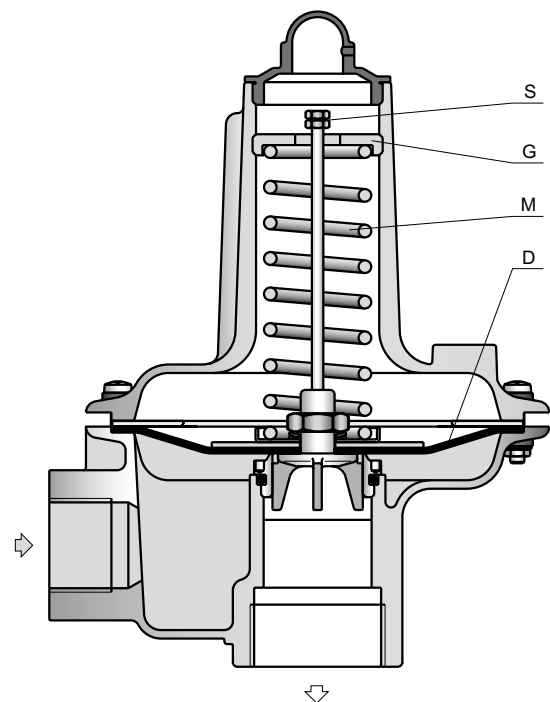


Figure 3. Closed V/50 Relief Valve

Whenever gas pressure under diaphragm (D) is higher than the force exerted by spring (M), diaphragm is raised causing sleeve (O), which is integral with the diaphragm itself, to move and thereby open the release orifice.

In order to check the efficiency of the relief valve, pull up valve opening stem (S).

Valve setting is carried out by adjusting the compression of spring (M) through the appropriate ring (G).

Valve set point should generally be at an intermediate value between active regulator or monitor and slam-shut valve (if fitted) set points.

In all other cases, it is recommended that relief valve be set at a value at least 15% higher than the working pressure of the equipment.

V Series

Type V/20-2

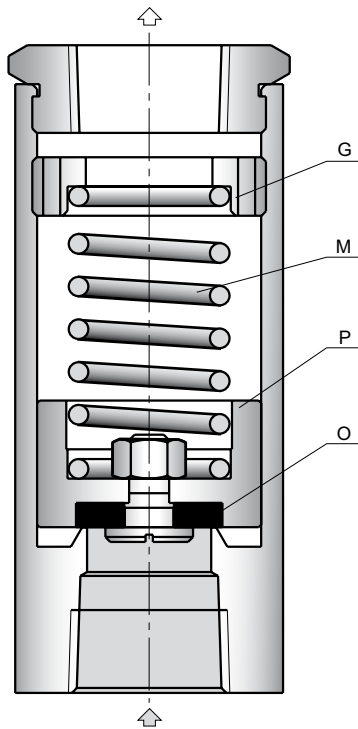


Figure 4. Closed V/20-2 Relief Valve

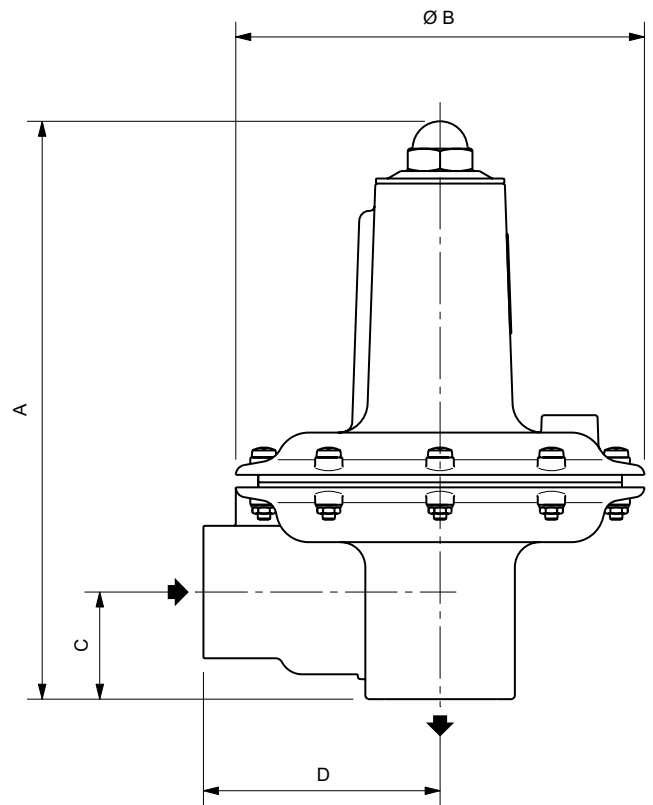


Figure 5. V/50 and V/60 Series Dimensions

Whenever gas pressure under pad (O) is higher than the force exerted by spring (M) in the opposite direction, pad older device (P) is raised, thereby causing the release orifice to open.

Setting is carried out by adjusting the compression of spring (M) through the appropriate ring (G).

It is recommended that relief valve be set at a value at least 15% higher than the operating pressure of the station.

DIMENSIONS AND WEIGHTS

V/50 and V/60 Series

Table 2. V Series Dimensions (mm)

TYPE	V/50 SERIES	V/60 SERIES
A	236	258
B	164	198
C	43	70
D	95	110
Weight (Kg)	1,3	1,9

Type V/20-2

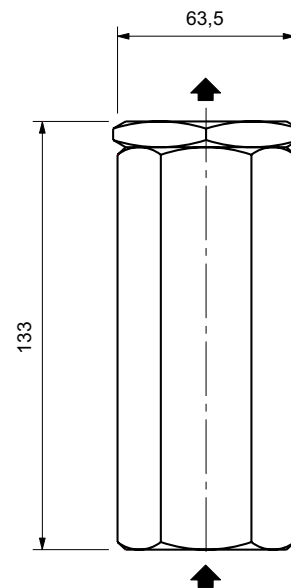


Figure 6. Type V/20-2 Dimensions (mm)

Valve Weight 1.6 Kg

INSTALLATION

- Ensure that the data found on the valve label are compatible with usage requirements.
- Ensure that the valve is mounted in accordance with the direction of flow indicated by the arrow.



WARNING

Only qualified personnel should install or service a relief valve.

Relief valves should be installed, operated, and maintained in accordance with international and applicable codes and regulations.

Failure to take the relief valve out of service immediately may create a hazardous condition.

Personal injury, equipment damage, or leakage due to escaping fluid or bursting of pressure-containing parts may result if this relief valve is over-pressured or is installed where service conditions could exceed the limits given in the Specifications section, or where conditions exceed any ratings of the adjacent piping or piping connections.

To avoid such injury or damage, provide pressure-limiting devices (as required by the appropriate code, regulation, or standard) to prevent service conditions from exceeding limits.

Additionally, physical damage to the relief valve could result in personal injury and property damage due to escaping fluid.

To avoid such injury and damage, install the relief valve in a safe location.

Before installation, check shall be done if service conditions are consistent with use limitations.

All means for draining must be provided in the equipment installed before relief valves (ENs 12186 & 12279).

If using a V series relief valve on hazardous or flammable gas service, personal injury and property damage could occur due to fire or explosion of vented gas that may have accumulated.

To prevent such injury or damage, provide piping or tubing to vent the gas to a safe, well-ventilated area in accordance also with international and applicable codes and regulations.

In particular, when venting a hazardous gas, the piping or tubing should be located far enough away from any buildings or windows so to not create a further hazard, and the vent opening should be protected against anything that could clog it.

If installing the relief valve at an outside location, adequate protection, such as rain caps or elbow piping, must be attached to the outlet to keep the relief valve from getting plugged or from collecting moisture, corrosive chemicals, or other foreign materials.

For outdoor installations, the relief valve should be located away from vehicular traffic.

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

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

START-UP

The relief valve's spring is factory set at approximately the midpoint of the spring range or the pressure requested, so an initial adjustment may be required to give the desired results.

With proper installation completed and system equipment properly adjusted, slowly open the upstream shut-off device while using pressure gauges to monitor pressure.

SETTING

To change the set-points, remove the vent line (type V/20-2) or spring closing cap (V/50 and V/60 series) and turn the adjusting screws clockwise to increase outlet pressure or counter-clockwise to decrease pressures.

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

Replace the vent line and closing cap to maintain the desired setting.

V Series

SHUTDOWN



WARNING

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

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

PERIODICAL CHECKS



CAUTION

It is recommended to check periodically the relief valve.

Proper operation can be tested by letting gas in at a pressure higher than the valve setting, the valve should release gas.

Once the check is completed, and the valve is reset for normal operation, make sure valve seal is in proper working order.

MAINTENANCE



WARNING

All maintenance procedures must be carried out only by qualified personnel.

If necessary, contact our technical support representatives or our authorized dealers.

V Series Relief valve and its pressure accessories are subject to normal wear and must be inspected periodically and replaced as necessary.

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

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

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

V/50 Series (See Figure 7)

- a. Remove the cap (key 1), the adjusting nut (key 4) and the spring (key 5).
- b. Remove the screws (key 10), the cover (key 6).
Only for V/52 version remove the reduction ring (key 22).
- c. Remove the diaphragm assembly and check proper operation of the diaphragm (key 9), the pad (key 14) and the pad retainer (key 20). Replace any worn part.
- d. Remove the seat (key 15) using the appropriate wrench. Remove the O-ring (key 16) and replace it if necessary.
- e. Re-assemble in reverse order, be very careful in positioning the diaphragm and in tightening the screws (key 10). Uneven tightening can cause seal and valve malfunctioning.

V/60 Series (See Figure 8)

- a. Remove the cap (key 1), the adjusting nut (key 20) and the spring (key 3).
- b. Remove the screws (key 10), the cover (key 19).
Only for V/62 version remove the reduction ring (key 22).
- c. Remove the diaphragm assembly and check proper operation of the diaphragm (key 9), the pad unit (key 11) and the pad retainer (key 14). Replace any worn part.
- d. Remove the seat (key 12) using the appropriate wrench. Remove the O-ring (key 13) and replace it if necessary.
- e. Re-assemble in reverse order, be very careful in positioning the diaphragm and in tightening the screws (key 10). Uneven tightening can cause seal and valve malfunctioning.

Type V/20-2 (See Figure 9)

- a. Unscrew the outlet connection (key 9).
- b. Unscrew the adjusting nut (key 2), remove the spring (key 8) and the pad unit (key 4-5-6-7).
- c. Disassemble the pad unit parts and replace the pad (key 6).
- d. Check the seat on the valve body.
- e. Re-assemble in reverse order.

SPARE PARTS

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

TROUBLESHOOTING

Table 3. General Troubleshooting for V Series Relief Valves

SYMPTOMS	CAUSE	ACTIONS
The valve does not open	Lack of incoming gas	Check the station feeding
	Valve diaphragm is broken (V/50 and V/60 Series only)	To be replaced
	Valve setting is higher than required	Check valve setting
	Pad is stuck to seat	Perform complete valve maintenance
The valve is not sealed properly	Tight shutoff gaskets are worn	To be replaced
	Deposit of grime on the valve seat. It can prevent proper closing	Perform complete valve maintenance
	Valve setting is lower than required	Check valve setting

V Series

PARTS LISTS

V/50 Series Relief Valve (See Figure 7)

Key	Description
1	Cap
2	Nut
3	Threaded stem
4	Adjusting nut
5	Spring
6	Cover
7	Washer
8	Plate
9*	Diaphragm
10	Screw
11	Washer
12	Nut
13	Body
14*	Pad
15	Seat
16*	O-ring
17*	Gasket
18	Plate
19	Dado
20	Pad retainer
21	Label
22	Reduction ring

Type V/20-2 Relief Valve (See Figure 9)

Key	Description
1	Body
2	Adjusting nut
4	Pad holder
5	Nut
6*	Pad
7	Pad retainer
8	Spring
9	Outlet connection

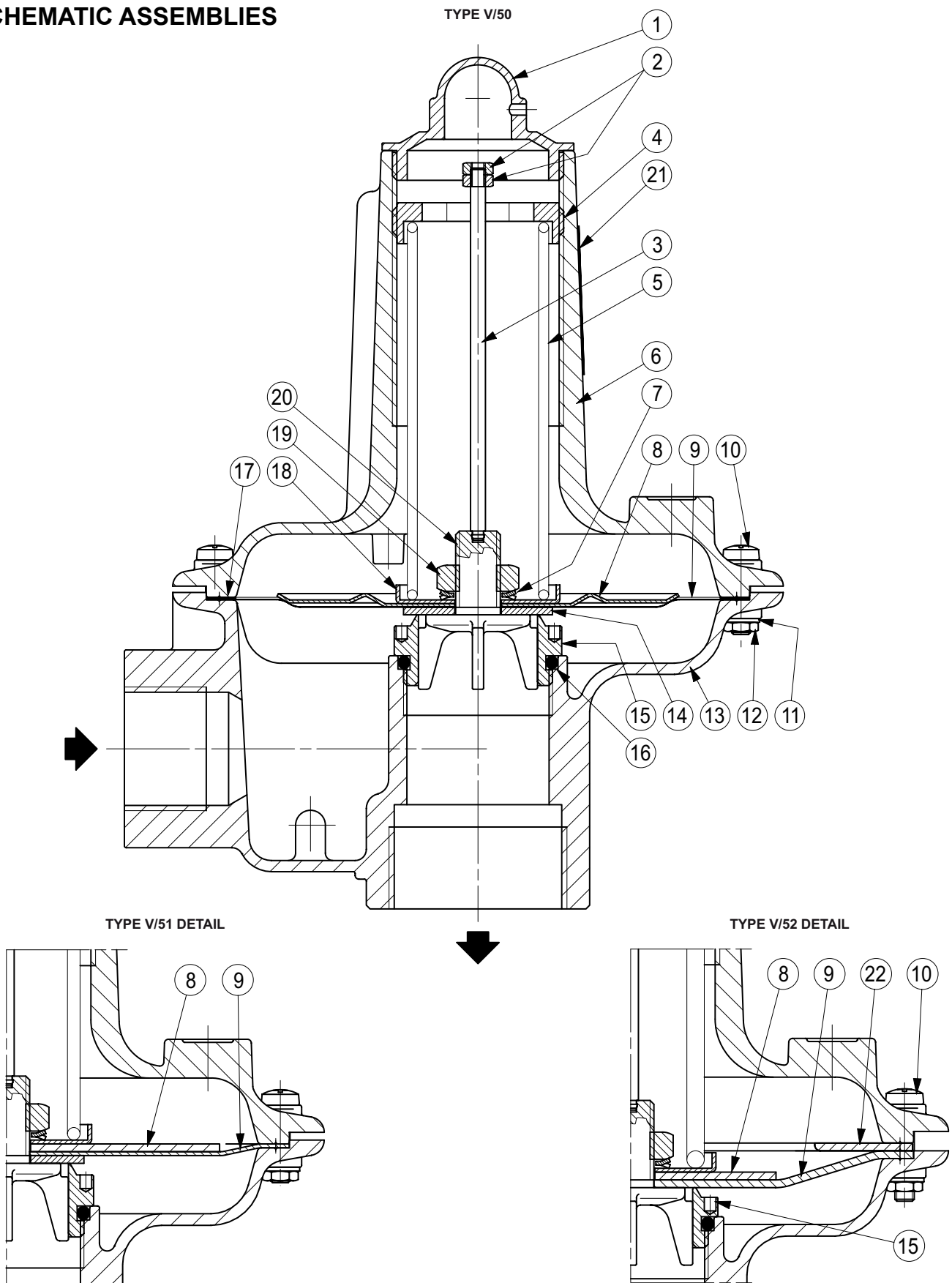
Rubber parts marked with (*) are supplied in the “spare parts kit”, recommended as stock.

To order the kit it is necessary to communicate to us the type of the relief and its serial number.

V/60 Series Relief Valve (See Figure 8)

Key	Description
1	Cap
2	Nut
3	Spring
4	Nut
5	Nut
6	Washer
7	Disk
8	Plate
9*	Diaphragm
10	Screw
11*	Pad unit
12	Seat
13*	O-ring
14	Pad retainer
15	Body
16	Seeger
17	Net
18	Label
19	Cover
20	Adjusting nut
21	Threaded stem
22	Reduction ring

SCHEMATIC ASSEMBLIES



LM/518/1

Figure 7. V/50 Series Relief Valve

V Series

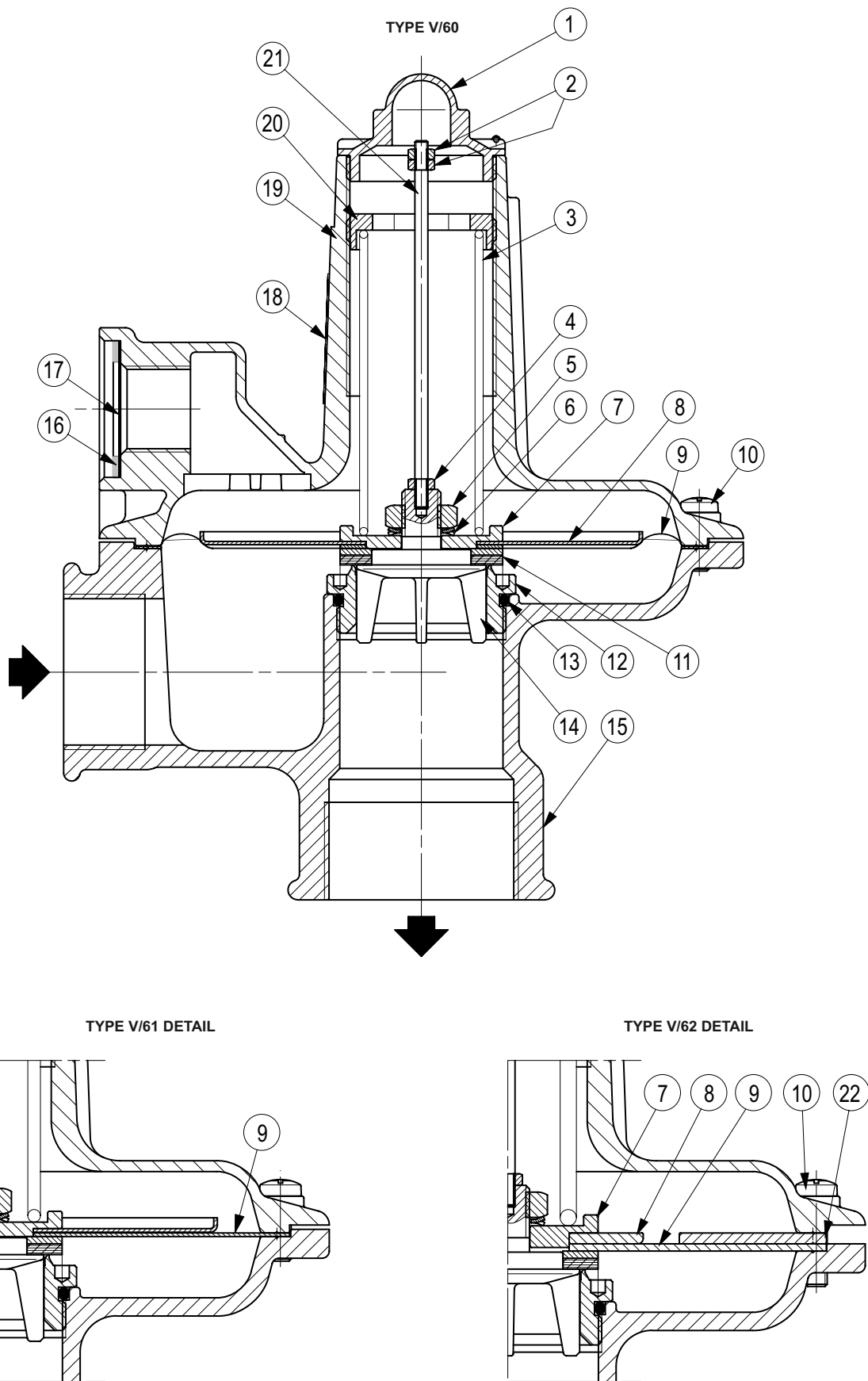
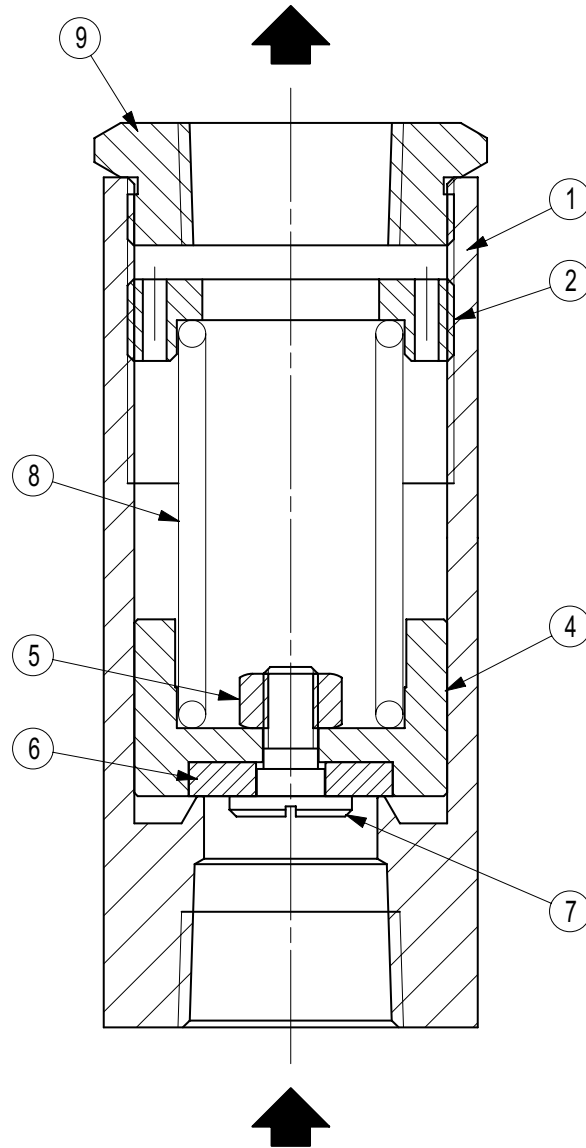


Figure 8. V/60 Series Relief Valve



LM/643

Figure 9. Type V/20-2 Relief Valve

V Series

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