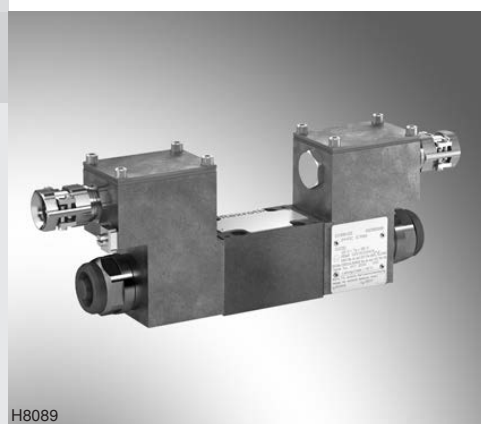


Proportional pressure reducing valve, direct operated

RE 29184-XE/04.16
Replaces: 09.13

Type 3DREP ...XE

Size 6
Component series 2X
Maximum operating pressure 100 bar
Maximum flow 15 l/min



H8089

ATEX units – For potentially explosive atmosphere



Information on the explosion protection:

- ▶ Area of application in accordance with the Explosion Protection Directive 2014/34/EU: **II 2G**
- ▶ Type of protection of the valve solenoids:
Ex eb mb IIC T4 Gb according to EN 60079-7 / EN 60079-16

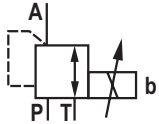
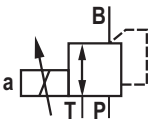
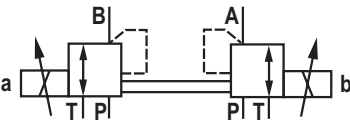
Table of contents

Contents	Page
Features	2
Ordering code	3
Symbols	3
Function, section	4
Technical data	5, 6
Control electronics	6
Electrical connection	7
Characteristic curves	8
Dimensions	9
Installation conditions	10
Further information	10

Features

- 3-way version
- For intended use in potentially explosive atmosphere
- For subplate mounting
- Porting pattern according to ISO 4401-03-02-0-05 (but without locating hole)
- Wet-pin DC solenoids
- Solenoid coil rotatable by 90°
- Electrical connection as individual connection with cable gland

Ordering code

3DREP 6 -2X/ E G24 XE J /	
Size	= 6
Symbols (simplified)	
	= A
	= B
	= C
Component series 20 to 29 (20 to 29: unchanged installation and mounting dimensions)	= 2X
Pressure rating 16 bar	= 16
Pressure rating 25 bar	= 25
Pressure rating 45 bar	= 45

M = NBR seals
V = FKM seals
Notice: Observe compatibility of seals with hydraulic fluid used!

J = Surface protection
 Seawater-resistant, galvanized

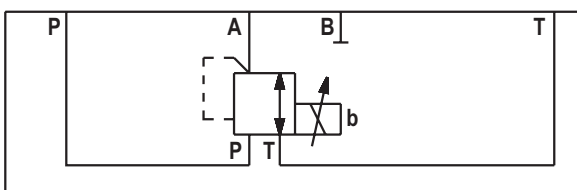
XE = Explosion protection "Increased safety",
 for details, see information on explosion protection on page 6

G24 = Supply voltage of the control electronics
 24 V direct voltage

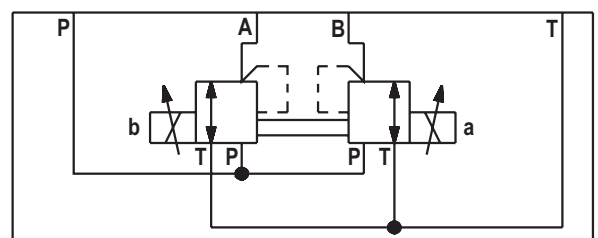
E = Proportional solenoid

Symbols

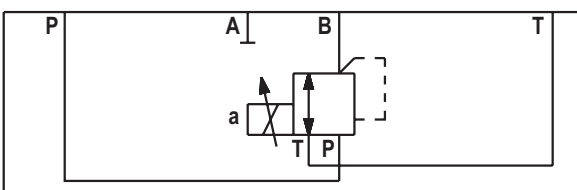
Type 3DREP.. 6 A 2X/... (detailed)



Type 3DREP.. 6 C 2X/... (detailed)



Type 3DREP.. 6 B 2X/... (detailed)



Function, section

The 3-way pressure reducing valve type 3DREP 6.. is direct operated by proportional solenoids. It converts an electrical input signal into a proportional pressure output signal.

The proportional solenoids are controllable wet-pin DC solenoids. The solenoids are actuated by external control electronics.

Set-up:

The valve basically consists of:

- Housing (1) with connection surface
- Control spool (2) with pressure measuring pins (3 and 4)
- Solenoids (5 and 6) with central thread

Functional description:

The pressure in A or B is set by means of the proportional solenoids. The amount of the pressure depends on the current.

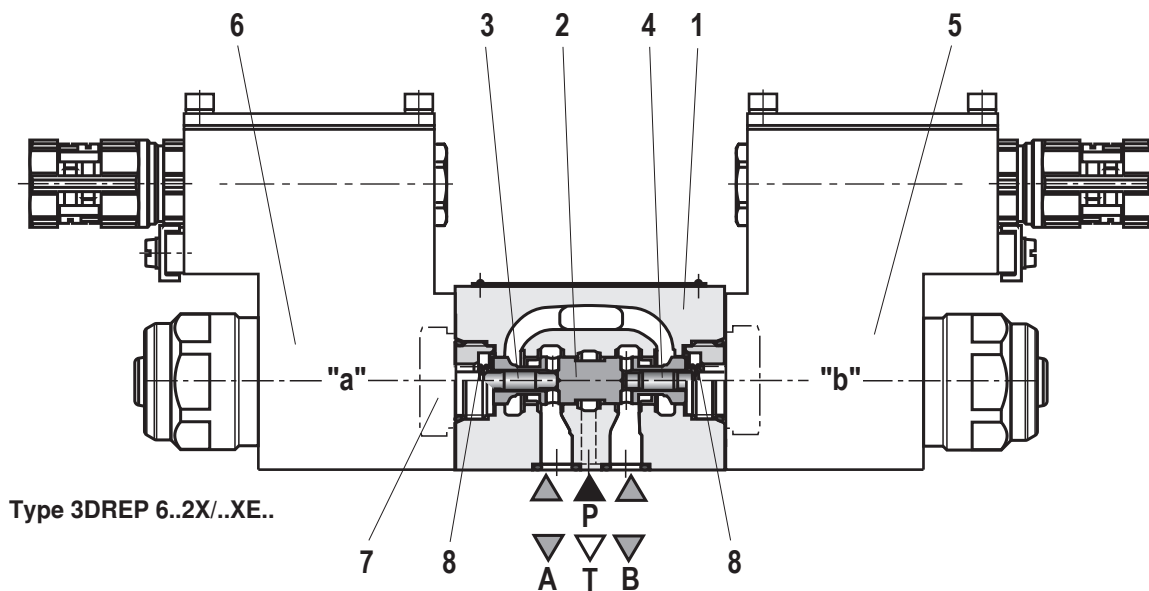
With de-energized solenoids (5, 6), the control spool (2) is held in the central position by means of the compression springs (8). Ports A and B are connected with T so that the hydraulic fluid can flow off to the tank without obstructions.

When one proportional solenoid is actuated, e.g. solenoid "b" (5), the pressure measuring pin and the control spool (2) are moved to the left. This opens the connection from P to A and B to T via orifice-type cross-sections with progressive flow characteristics. With the surface of the pressure measuring pin (3) the pressure that builds up in channel A acts on the control spool and against the solenoid force. The pressure measuring pin (3) is supported by the solenoid "a". If the pressure exceeds the value set at solenoid "b", the control spool (2) is pushed back against the solenoid force and connects A to T until the set pressure is achieved again. The pressure is proportional to the solenoid current.

When the solenoid is switched off, the control spool (2) is returned into the central position by the compression springs (8).

Notice:

Regarding valves of the version 3DREP 6 C, only one solenoid may be actuated at a time.



Valve with two spool positions

(Type 3DREP 6...A...)

The function of this valve version basically corresponds to the valve with three spool positions. This 2 spool position valve is, however, only equipped with solenoid "b" (5). Instead of the 2nd proportional solenoid, there is a plug screw (7).

Notice:

The tank line must not be allowed to run empty. With corresponding installation conditions, a preload valve (preload pressure approx. 2 bar) must be installed.

Technical data

general

Installation position	Any; preferably horizontal		
Storage temperature range	°C	+5 ... +40	
Maximum storage time	Years	1 (see operating instructions 29184-XE)	
Ambient temperature range	°C	-20 ... +60	
Weight	3DREP6 A/B	kg	2.7
	3DREP6 C	kg	4.4
Surface protection	Galvanized		

hydraulic

Operating pressure range	Port P	bar	20 ... 100 for pressure rating 16
		bar	30 ... 100 for pressure rating 25
		bar	50 ... 100 for pressure rating 45
	Port T	bar	0 ... 30
Maximum flow P → A or P → B		l/min	15 ($\Delta p = 50$ bar) see characteristic curves page 7
Hydraulic fluid	See table below		
Hydraulic fluid temperature range		°C	-20 ... +80 (NBR seals)
			-15 ... +80 (FKM seals)
Viscosity range		mm ² /s	20 ... 380 (preferably 30 ... 46)
Maximum admissible degree of contamination of the hydraulic fluid Cleanliness class according to ISO 4406 (c)	Class 17/15/12 ¹⁾		
Hysteresis		%	≤ 6
Repetition accuracy		%	≤ 2
Response sensitivity		%	≤ 1
Range of inversion		%	≤ 2
Maximum surface temperature		°C	120

Hydraulic fluid	Classification	Suitable sealing materials	Standards	Data sheet
Mineral oils	HL, HLP, HLPD, HVLP, HVLPD	NBR, FKM	DIN 51524	90220
Bio-degradable ²⁾	▶ Insoluble in water	HETG	ISO 15380	90221
		HEES		
	▶ Soluble in water	HEPG	ISO 15380	
Flame-resistant ²⁾	▶ Water-free	HFDD, HFDR	ISO 12922	90222
	▶ Containing water	HFC (Fuchs Hydrotherm 46M, Petrofer Ultra Safe 620)	ISO 12922	90223



Important information on hydraulic fluids:

- ▶ For further information and data on the use of other hydraulic fluids, please refer to the data sheets above or contact us.
- ▶ There may be limitations regarding the technical valve data (temperature, pressure range, life cycle, maintenance intervals, etc.).
- ▶ The ignition temperature of the hydraulic fluid used must be 50 K higher than the maximum solenoid surface temperature.

▶ Flame-resistant – containing water:

- Maximum operating pressure 210 bar
- Maximum pressure differential per control edge 175 bar
- Pressure pre-loading at the tank port >20% of the pressure differential, otherwise increased cavitation erosion
- Life cycle as compared to operation with mineral oil HL, HLP 50 ... 100%
- Maximum hydraulic fluid temperature 50 °C

- ▶ **Bio-degradable and flame-resistant:** If these hydraulic fluids are used which are also zinc-solvent, an accumulation of zinc may occur.

¹⁾ The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and at the same time increases the life cycle of the components. For the selection of the filters, see www.boschrexroth.com/filter.

²⁾ Not recommended for version "J" with corrosion protection

Technical data

electric

Voltage type		Direct current or pulse-width modulated signal with a pulse voltage ≤ 28 V and a frequency ≥ 160 Hz up to max. 500 Hz
Type of signal		Analog
Maximum current per solenoid	A	1.03
Duty cycle	%	100
Maximum coil temperature	$^{\circ}\text{C}$	120

Information on the explosion protection

Area of application according to directive 2014/34/EU		II 2G
Type of protection of valve according to EN 13463-1 / EN 13463-5		c T4 X
Type of protection valve solenoid according to EN 60079-7 / EN 60079-18		Ex eb mb IIC T4 Gb ¹⁾
Type examination certificate solenoid		KEMA 02ATEX2240 X
"IECEX Certificate of Conformity" solenoid		IECEX DEK 12.0068X
Special application conditions for safe application		<ul style="list-style-type: none"> - In case of bank assembly, only one solenoid of all valves may be energized at a time. - In case of valves with two solenoids, maximally one of the solenoids may be energized at a time. - Only direct current or a pulse-width modulated signal with a pulse voltage ≤ 28 V and a frequency ≥ 160 Hz up to max. 500 Hz may be used for operation.

Control electronics ²⁾

Amplifier module for the control of explosion-proof proportional directional valves 4WRA...XE, 3DREP 6...XE and 4WRZ...XE	VT-MSPA2-200-1X/V0/0 according to data sheet 30228-200
Module for monitoring and limiting the solenoid currents with proportional valves	VT-MUXA2-2-1X/V0/1A according to data sheet 30290

¹⁾ Surface temperature > 50 $^{\circ}\text{C}$, provide contact protection.

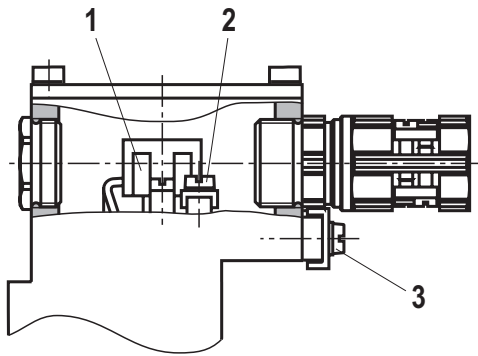
²⁾ **Notice:**

A monitoring circuit is to be provided for the monitoring of the solenoid current. We recommend operating the valves with the assemblies described herein.

Electrical connection

The type-examination tested valve solenoid is equipped with a terminal box and a type-tested cable gland.

The connection is polarity-independent.



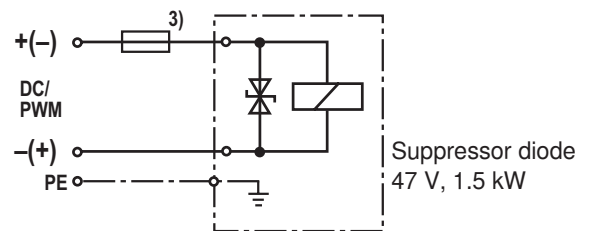
Notice:

A fuse which corresponds to the rated current according to DIN 41571 and EN / IEC 60127 has to be connected upstream of every valve solenoid (max. $3 \times I_{rated}$).

The shut-off threshold of the fuse has to match the prospective short-circuit current of the supply source.

The prospective short-circuit current of the supply source may amount to a maximum of 1500 A.

This fuse may only be installed outside the potentially explosive atmosphere or must be of an explosion-proof design.



³⁾ Recommended pre-fuse characteristics: medium time-lag according to DIN 41571, 1.25 A

Properties of the connection terminals

Position	Function	Connectable line cross-section
1	Operating voltage connection	Single-wire 0.75 ... 2.5 mm ² Finely stranded 0.75 ... 1.5 mm ²
2	Connection for protective earthing conductor	Single-wire max. 2.5 mm ² Finely stranded max. 1.5 mm ²
3	Connection for potential equalization conductor	Single-wire 4 ... 6 mm ² Finely stranded 4 mm ²

Cable gland

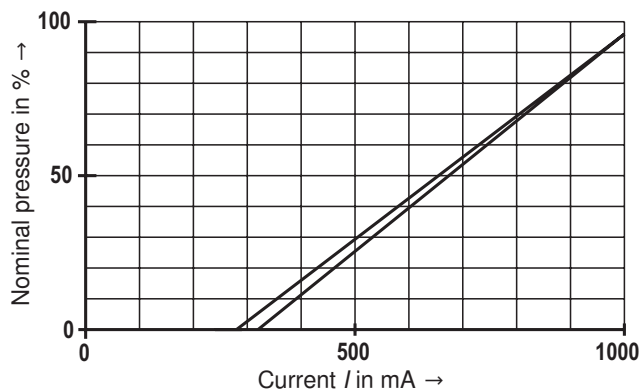
Type approval	II 2G Ex e IIC Gb
Threaded connection	M20 x 1.5
Protection class according to EN 60529	IP66 (With correctly installed electrical connection)
Line diameter	mm 7 ... 10.5
Sealing	Outer sheath sealing

Connection line

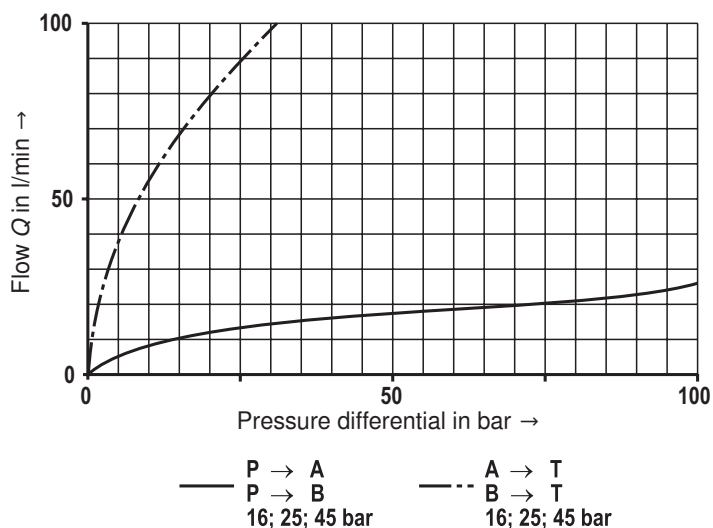
Line type	Non-armored cables and lines (outer sheath sealing)
Temperature range	°C -30 ... > +110

Characteristic curves (measured with HLP46, $\vartheta_{oil} = 40 \text{ }^\circ\text{C} \pm 5 \text{ }^\circ\text{C}$ and $p = 100 \text{ bar}$)

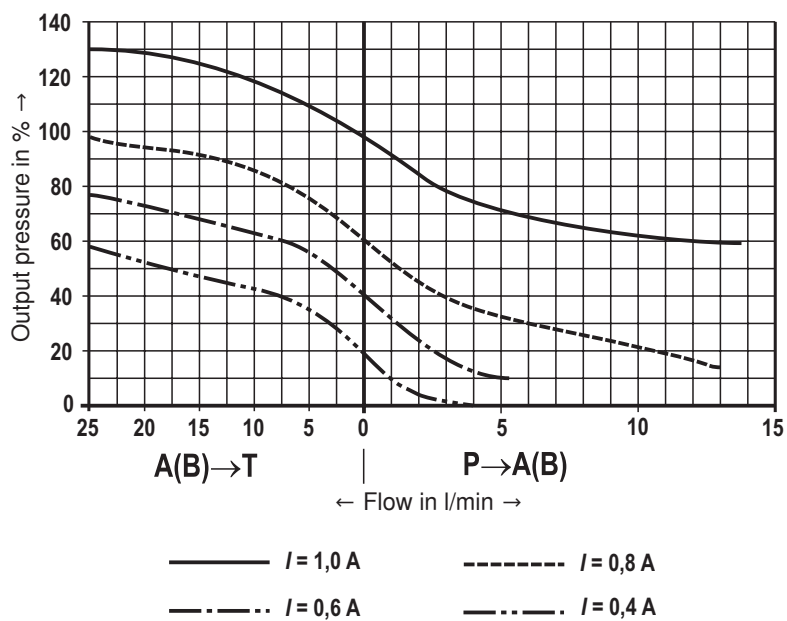
Pressure ratings 16, 25, and 45 bar



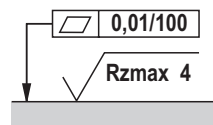
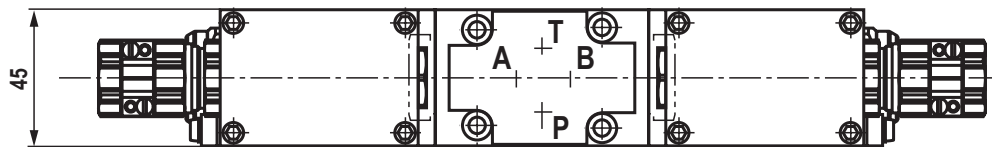
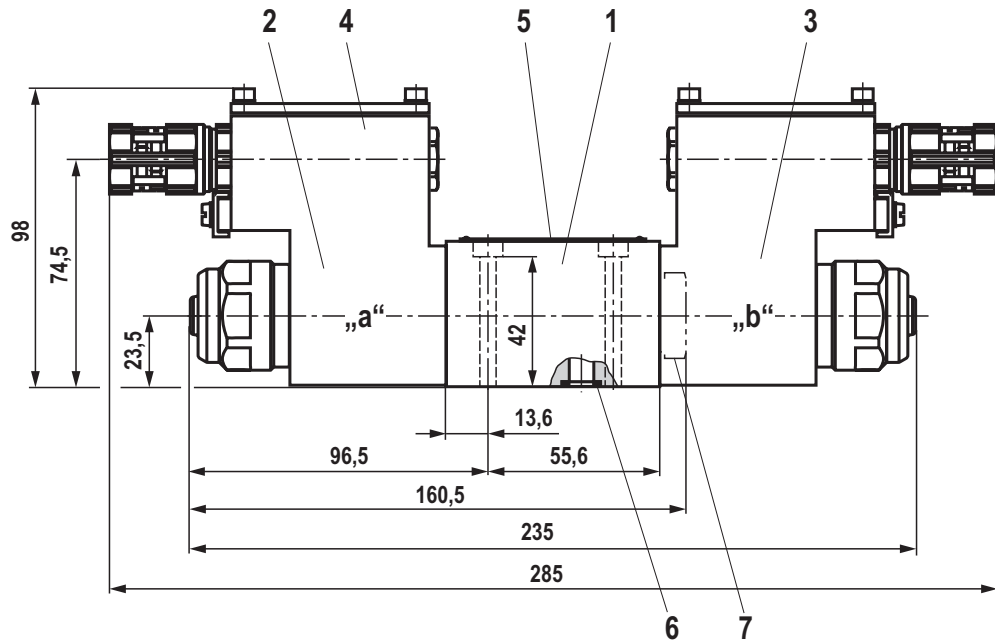
Pressure ratings 16, 25, and 45 bar



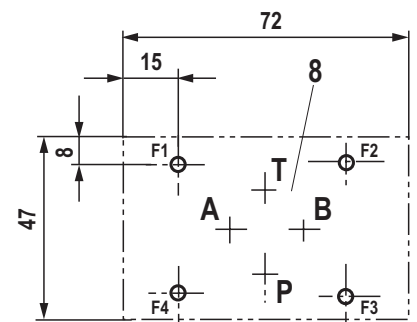
Pressure as a function of flow



Dimensions (dimensions in mm)



Required surface quality of the valve contact surface



- 1 Valve housing
- 2 Proportional solenoid "a"
- 3 Proportional solenoid "b"
- 4 Terminal box
- 5 Name plate
- 6 identical seal rings for A, B, P and T
- 7 Plug screw for valve with one solenoid (2 spool positions, version A or B)
- 8 Porting pattern according to ISO 4401-03-02-0-05 (but without locating hole)

Valve mounting screws (separate order)

For reasons of stability, exclusively use the following valve mounting screws:

4 hexagon socket head cap screws

ISO 4762-M5x50-10.9-fZn-240h-L

(friction coefficient 0.09 – 0.14 according to VDA 235-101)

Tightening torque $M_A = 7 \text{ Nm} \pm 10\%$,

Material no. **R913000064**

Subplates (separate order) with porting pattern according to ISO 4401-03-02-0-05, see data sheet 45100.

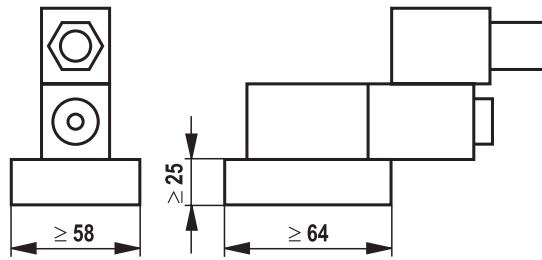
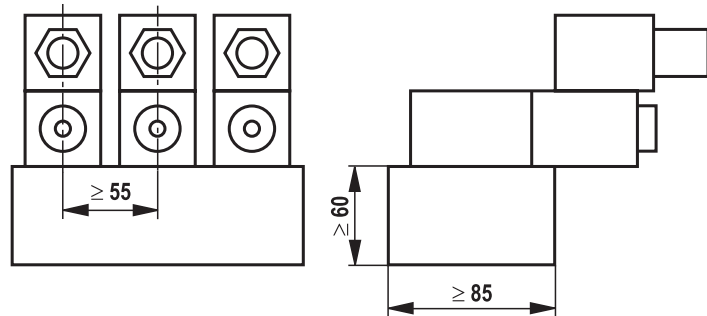
Notice:

Subplates are no components in the sense of directive 2014/34/EU and can be used after the manufacturer of the overall system has conducted an assessment of the risk of ignition.

The "G...J3" versions are free from aluminum and/or magnesium and galvanized.

Installation conditions (dimensions in mm)

	Individual assembly	Bank assembly
Subplate dimensions	Minimum dimensions Length ≥ 64 , width ≥ 58 , height ≥ 25	Minimum cross-section Height ≥ 60 , width ≥ 85
Thermal conductivity of the subplate	≥ 38 W/mK (EN-GJS-500-7)	
Minimum distance between the longitudinal valve axes	≥ 55 mm	

Individual assembly**Bank assembly****Notice:**

In case of bank assembly, only one solenoid of all valves may be energized at a time.