

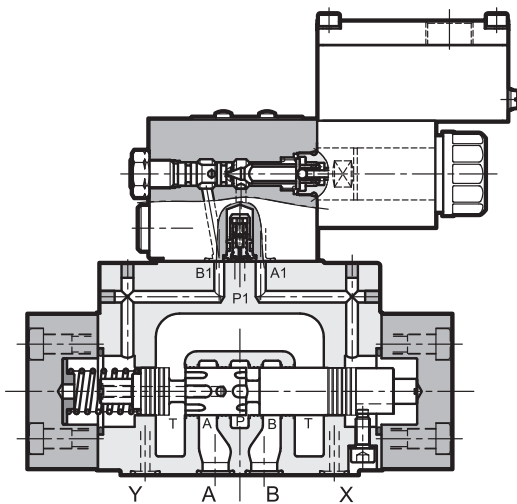
# DZCE\*K\*

## EXPLOSION-PROOF PRESSURE REDUCING VALVE WITH PROPORTIONAL CONTROL in compliance with ATEX 94/9/EC

### SERIES 11

**DZCE5K\***      **CETOP P05**  
**DZCE5RK\***    **ISO 4401-05 (CETOP R05)**  
**DZCE7K\***      **ISO 4401-07 (CETOP 07)**  
**DZCE8K\***      **ISO 4401-08 (CETOP 08)**

### OPERATING PRINCIPLE

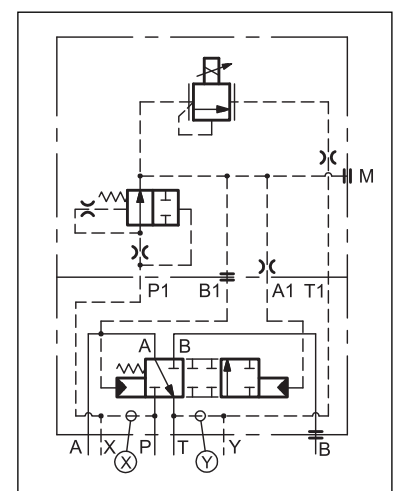


Type examination certificate No: CEC 13 ATEX 030-REV.2

- The DZCE\*K\* are explosion-proof pressure reducing valves, pilot operated, with proportional control, available with CETOP P05, ISO 4401-05 (CETOP R05), ISO 4401-07 (CETOP 07) and ISO 4401-08 (CETOP 08) mounting surfaces.
- They are compliant with ATEX 94/9/EC standards and are suitable for the use in potentially explosive atmospheres, that fall within the ATEX II 2GD (temperature class T4 or T5) or I M2, for mines. See par. 7 for ATEX classification, operating temperatures and electrical characteristics.
- The statement of conformity to the up-mentioned standards is always supplied with the valves .
- A low temperature version ( up to -40 °C) is also available.
- The pressure can be modulated continuously in proportion to the current supplied to the solenoid.
- They can be controlled directly by a current control supply unit or by means of an electronic card to exploit valve performance to the full (see par. 15).
- Upon request, DZCE\*K\* valves can be supplied with a finishing surface treatment (zinc-nickel) suitable to ensure a salt spray resistance up to 600 hours.

<b>PERFORMANCES</b> (obtained with mineral oil with viscosity of 36 cSt at 50°C and electronic control cards)		<b>DZCE5K*</b> <b>DZCE5RK*</b>	<b>DZCE7K*</b>	<b>DZCE8K*</b>
Maximum operating pressure	bar	350		
Maximum flow	l/min	150	300	500
Step response		see paragraph 4		
Hysteresis (with PWM 200 Hz)	% of p max	< 4%		
Repeatability	% of p max	< ±2%		
Electrical characteristic		see paragraph 7.6		
Temperature ranges (ambient and fluid)		see paragraph 7.5		
Fluid viscosity range	cSt	10 ÷ 400		
Fluid contamination degree		According to ISO 4406:1999 class 18/16/13		
Recommended viscosity	cSt	25		
Mass	kg	7,3	9,5	15,6

### HYDRAULIC SYMBOL



## 1 - IDENTIFICATION CODE

<b>D</b>	<b>Z</b>	<b>C</b>	<b>E</b>		-	/ 10		-		/	<b>K9</b>			
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Pressure reducing valve

Electric proportional control

Nominal size:  
**5** = CETOP P05  
**5R** = ISO 4401-05 (CETOP R05)  
**7** = ISO 4401-07 (CETOP 07)  
**8** = ISO 4401-08 (CETOP 08)

Explosion-proof version: Protection type of the coil: "d"  
**KD2** = classified as ATEX II 2GD for gas or for dust  
**KDM2** = classified as ATEX I M2, for mines

Pressure control range  
**070** = 1 ÷ 70 bar  
**140** = 1 ÷ 140 bar  
**210** = 1 ÷ 210 bar  
**300** = 1 ÷ 300 bar

Series N. (the overall and mounting dimensions remain unchanged from 10 to 19)

Seals:  
For temperature range -20 / +80 °C  
**N** = NBR seals for mineral oil (**standard**)  
**V** = FPM seals for special fluids  
For temperature range -40 / +80 °C  
**NL** = seal for low temperatures (for mineral oil)

**NOTE:** the valves are supplied with standard surface treatment of phosphating black. Upon request we can supply these valves with full zinc-nickel surface treatment, suitable to ensure a salt spray resistance up to 600 h (test operated according to UNI EN ISO 9227 standards and test evaluation operated according to UNI EN ISO 10289 standards).  
For zinc-nickel surface treatment add **/W7** at the end of the identification code.

Option: surface treatment not standard. Omit if not required (see **NOTE**)

Option: **/T5** version in T5 temperature class. See at par. 7.5. Omit if not required.

Connection type for cable gland upper connection:  
**T01** = M20x1.5 - ISO 261  
**T02** = Gk 1/2 - UNI EN 10226-2 (ex ANSI B2.1)  
**T03** = 1/2" NPT - ANSI B1.20.1 (ex ANSI B2.1)  
side connection:  
**S01** = M20x1.5 - ISO 261  
**S02** = Gk 1/2 - UNI EN 10226-2 (ex ANSI B2.1)  
**S03** = 1/2" NPT - ANSI B1.20.1 (ex ANSI B2.1)  
**S04** = M16x1.5 - ISO 261

Coil electrical connection: by terminal block

Nominal solenoid voltage:  
**D12** = 12V DC    **D24** = 24V DC

Drainage: **I** = internal  
**E** = external

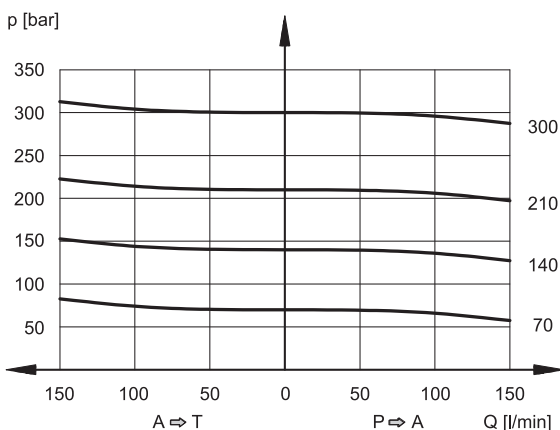
Piloting: **I** = internal  
**E** = external

## 2 - CHARACTERISTIC CURVES

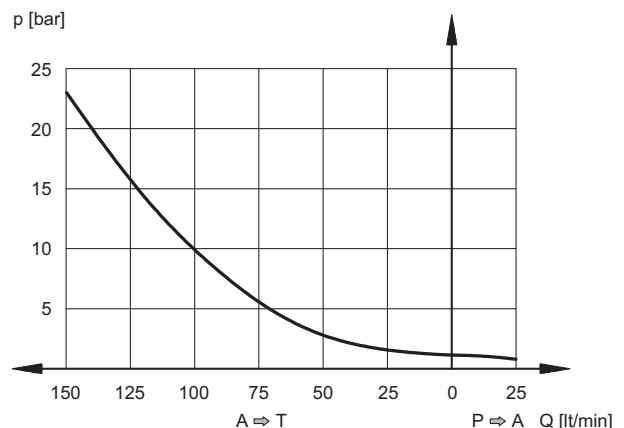
(obtained with mineral oil with viscosity of 36 cSt at 50°C and electronic control cards)

### 2.1 - Characteristic curves DZCE5K\* and DZCE5RK\*

**ADJUSTMENT**

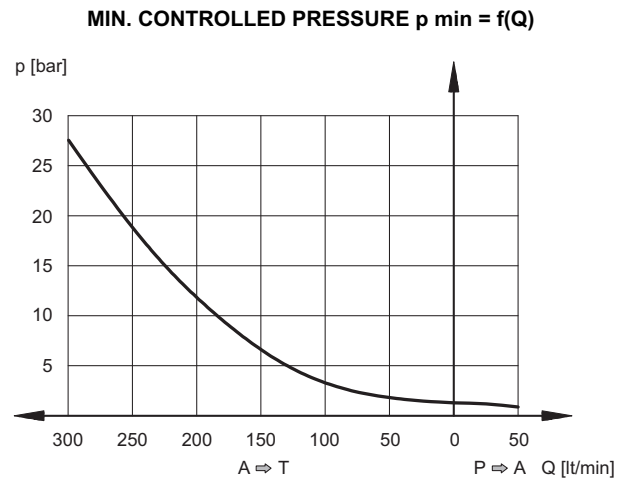
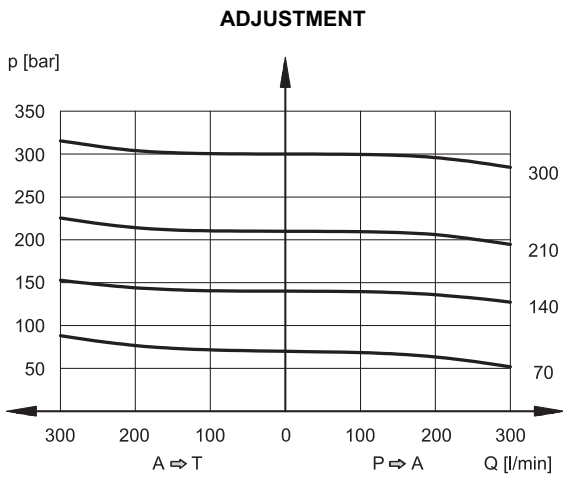


**MIN. CONTROLLED PRESSURE  $p_{min} = f(Q)$**

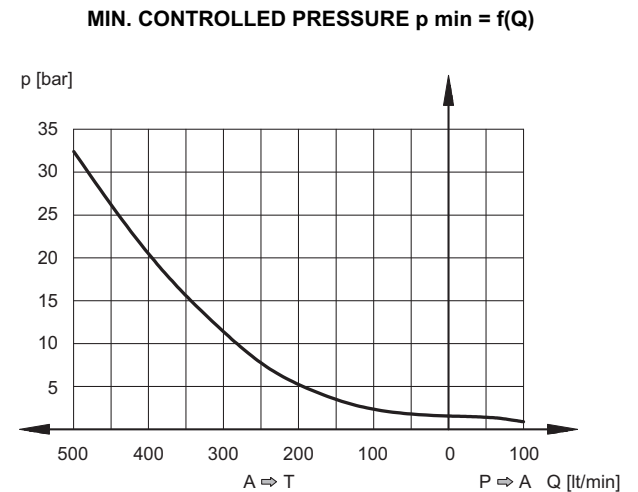
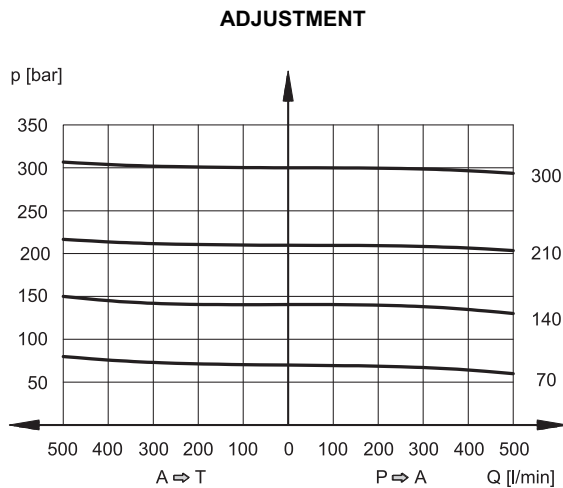




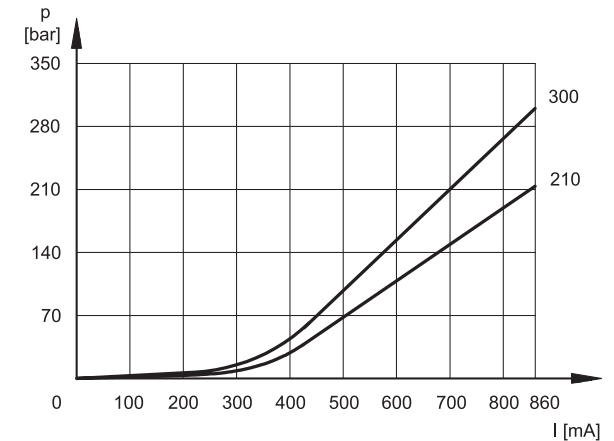
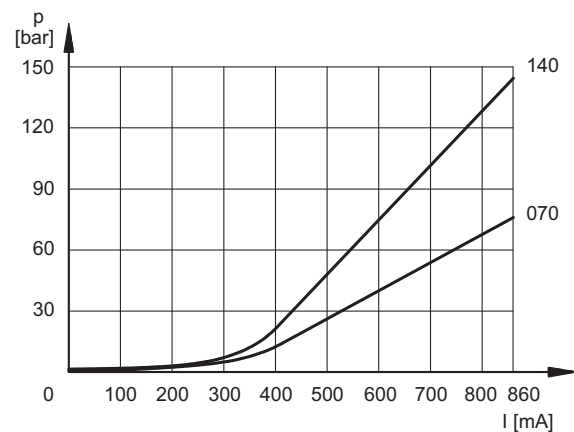
## 2.2 - Characteristic curves DZCE7K\*



## 2.3 - Characteristic curves DZCE8K\*



## 2.4 - Pressure control $p = f(I)$ DZCE5K\*, DZCE5RK\*, DZCE7K\* and DZCE8K\*



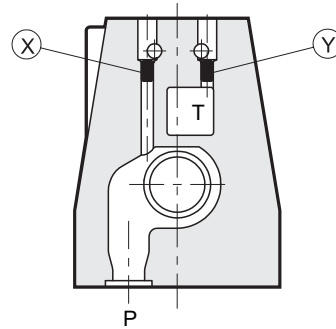
### 3 - PILOTING AND DRAINAGE

The DZCE\*K\* valves are available with piloting and drainage, both internal and external. We suggest to use the version with external drainage that allows a higher backpressure on the unloading.

TYPE OF VALVE	Plug assembly	
	X	Y
<b>IE</b> INTERNAL PILOT AND EXTERNAL DRAIN	NO	YES
<b>II</b> INTERNAL PILOT AND INTERNAL DRAIN	NO	NO
<b>EE</b> EXTERNAL PILOT AND EXTERNAL DRAIN	YES	YES
<b>EI</b> EXTERNAL PILOT AND INTERNAL DRAIN	YES	NO

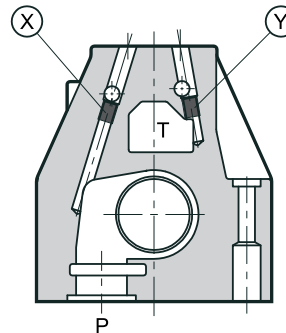
PRESSURES [bar]	MIN	MAX
Piloting pressure on X port	30	350
Pressure in T port with internal drain	-	2
Pressure in T port with external drain	-	250

**DZCE5K\* and DZCE5RK\***



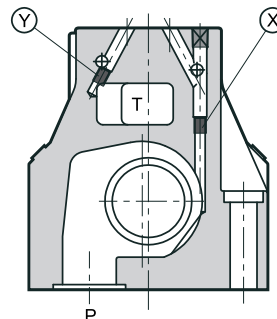
**X:** M5x6 plug for external pilot  
**Y:** M5x6 plug for external drain

**DZCE7K\***



**X:** M6x8 plug for external pilot  
**Y:** M6x8 plug for external drain

**DZCE8K\***



**X:** M6x8 plug for external pilot  
**Y:** M6x8 plug for external drain

## 4 - STEP RESPONSE

(measured with mineral oil with viscosity of 36 cSt at 50°C with the relative electronic control units)

Step response is the time taken for the valve to reach 90% of the set pressure value following a step change of reference signal.

REFERENCE SIGNAL STEP	0 →100%	100→0%
Response times [ms]		
DZCE5K* and DZCE5RK*	100	70
DZCE7K*	100	50
DZCE8K*	100	50

## 5 - INSTALLATION



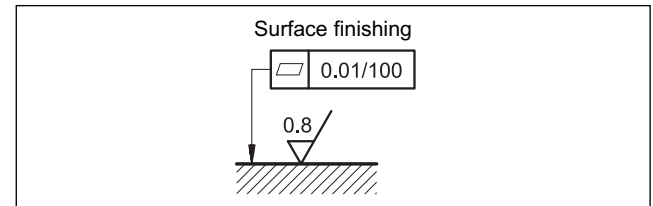
**Installation must adhere to instructions reported in the Use and Maintenance manual, always attached to the valve. Unauthorized interventions can be harmful to people and goods because of the explosion hazards present in ATEX classified areas .**

We recommend to install the DZCE\*K\* valve either in horizontal position, or vertical position with the solenoid downward. If the valve is installed in vertical position and with the solenoid upward, you must consider possible variations of the minimum controlled pressure, if compared to what is indicated in paragraph 2.

Ensure that there is no air in the hydraulic circuit. In particular applications, it can be necessary to vent the air entrapped in the solenoid tube, using the special drain screw and then ensure to screw it correctly.

Connect the valve T port directly to the tank. Add any backpressure value detected in the T line to the controlled pressure value. Maximum admissible backpressure in the T line, under operational conditions, is 2 bar.

Valves are fixed by means of screws or tie rods on a flat surface with planarity and roughness equal to or better than those indicated in the relative symbols. If minimum values are not observed, fluid can easily leak between the valve and support surface.



## 6 - HYDRAULIC FLUIDS

Use mineral oil-based hydraulic fluids HL or HM type, according to ISO 6743-4. For these fluids, use NBR seals (code N). For fluids HFDR type (phosphate esters) use FPM seals (code V). For the use of other kinds of fluid such as HFA, HFB, HFC, please consult our technical department. Using fluids at temperatures higher than 80 °C causes a faster degradation of the fluid and of the seals characteristics.

The fluid must be preserved in its physical and chemical characteristics.

## 7 - ATEX CLASSIFICATION, OPERATING TEMPERATURES AND ELECTRICAL CHARACTERISTICS

Diplomatic certificates the combination valve-coil for the valves suitable for application and installation in potentially explosive atmospheres, according to ATEX directive prescriptions; **the supply always includes the declaration of conformity to the directive and the operating and maintenance manual, that contains all the information needed for a correct use of the valve in potentially explosive environments.**

Coils assembled on these valves have been separately certified according to ATEX directive and so they are suitable for use in potentially explosive atmospheres.

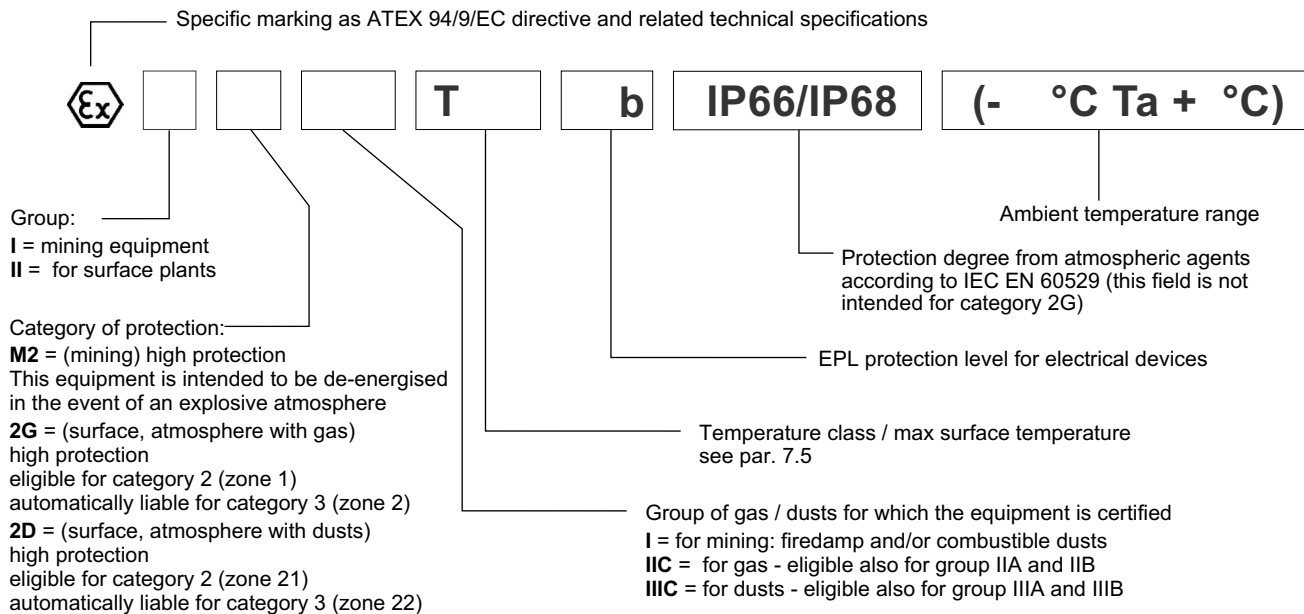
### 7.1 - ATEX classification for valves

The valves are suitable for applications and installations in potentially explosive atmospheres that fall within:

ATEX II 2G ATEX II 2D	<b>*KD2</b>	intended for use in areas in which explosive atmospheres caused by gases, vapours, mists or air/dust mixtures are likely to occur occasionally.
ATEX I M2	<b>*KDM2</b>	intended for use in underground parts of mines as well as those parts of surface installations of such mines likely to be endangered by firedamp and/or combustible dust. This equipment is intended to be de-energised in the event of an explosive atmosphere.

### 7.2 - ATEX marking for valves

valve code		N and V seals	NL seals
<b>*KD2</b>	for gas	II 2G IIC T4 Gb (-20°C Ta +80°C)	II 2G IIC T4 Gb (-40°C Ta +80°C)
	for dusts	II 2D IIIC T154°C Db IP66/IP68 (-20°C Ta +80°C)	II 2D IIIC T154°C Db IP66/IP68 (-40°C Ta +80°C)
<b>*KD2 /T5</b>	for gas	II 2G IIC T5 Gb (-20°C Ta +55°C)	II 2G IIC T5 Gb (-40°C Ta +55°C)
	for dusts	II 2D IIIC T129°C Db IP66/IP68 (-20°C Ta +55°C)	II 2D IIIC T129°C Db IP66/IP68 (-40°C Ta +55°C)
<b>*KDM2</b>	mining	I M2 I T150°C Mb IP66/68 (-20°C Ta +75°C)	I M2 I T150°C Mb IP66/68 (-40°C Ta +75°C)



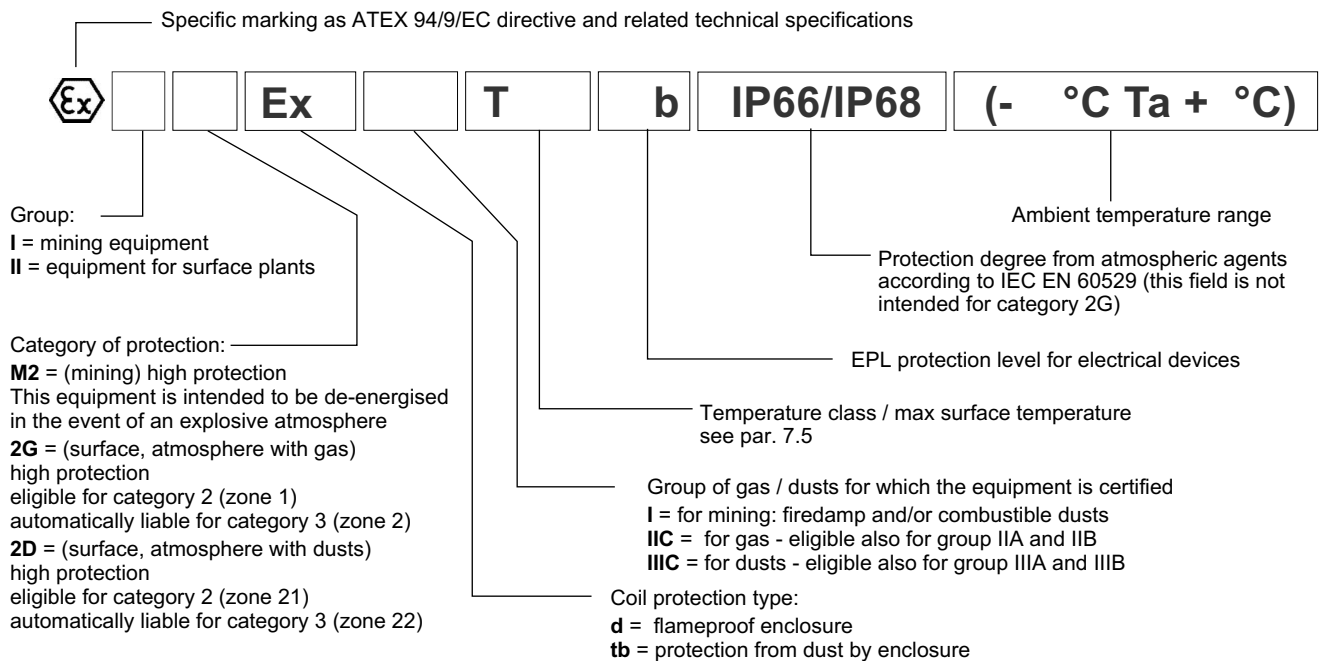
### 7.3 - ATEX classification of the coils

The coil of the explosion-proof valves is identified with its own tag, which carries the relative ATEX marking. **The mechanical construction of the coil housing is made in order to ensure its resistance to possible internal explosion and to avoid any explosion propagation to the outside environment, matching an "Ex d" type protection (explosion-proof coil).**

Moreover, the solenoid is designed to maintain its surface temperature below the limits specified to the relevant class.

### 7.4 - ATEX marking on coils

for valve type <b>*KD2</b>	for gas <b>Ex</b> II 2G Ex d IIC T4 Gb (-40°C Ta +80°C)
	for dusts <b>Ex</b> II 2D Ex tb IIIC T154°C Db IP66/IP68 (-40°C Ta +80°C)
for valve type <b>*KD2 /T5</b>	for gas <b>Ex</b> II 2G Ex d IIC T5 Gb (-40°C Ta +55°C)
	for dusts <b>Ex</b> II 2D Ex tb IIIC T129°C Db IP66/IP68 (-40°C Ta +55°C)
for valve type <b>*KDM2</b>	mining <b>Ex</b> I M2 Ex d I T150°C Mb IP66/IP68 (-40°C Ta +75°C)



### 7.5 - Operating temperatures

These valves are classified according to their maximum surface temperature (EN 13463-1), which must be lower than the ignition temperature of the gases, vapors and dusts for which the area in which they will be used is classified.

The valves in group II can also be used for less limiting temperature classes (surface temperature allowed higher).

		temperature range	N and V seals	NL seals	Temperature class	eligible also for
ATEX II 2G ATEX II 2D	<b>*KD2</b>	of ambient	-20 / +80 °C	-40 / +80 °C	T4 (gas) T154°C (dusts)	T3, T2, T1 T200°C and higher
		of fluid				
	<b>*KD2 /T5</b>	of ambient	-20 / +55 °C	-40 / +55 °C	T5 (gas) T129°C (dusts)	T4, T3, T2, T1 T135°C and higher
		of fluid	-20 / +60 °C	-40 / +60 °C		
ATEX I M2	<b>*KDM2</b>	of ambient	-20 / +75 °C	-40 / +75 °C	T150°C	-
		of fluid				

### 7.6 - Electrical characteristics (values ± 5%)

NOMINAL VOLTAGE	V DC	12	24
RESISTANCE (AT 20°C)	Ω	3,4	15,6
NOMINAL CURRENT	A	1,88	0,86

DUTY CYCLE	100%
EXPLOSION-PROOF VERSION	According to ATEX 94/9/CE
ELECTROMAGNETIC COMPATIBILITY (EMC)	According to 2004/108/CE
CLASS OF PROTECTION: Atmospheric agents Coil insulation (VDE 0580)	IP66 / IP68 class H

## 8 - ELECTRICAL CONNECTION

### 8.1 - Wiring

In order to realise the electrical connection of the coil, it is necessary to access the terminal block (1) unscrewing the 4 screws (2) that fasten the cover (3) with the box (4) that contains the terminal block.

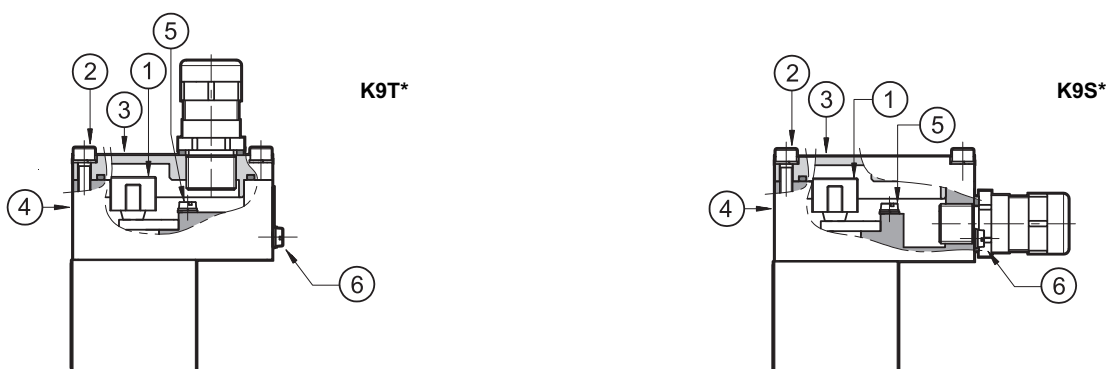
**The electrical connection is polarity-independent.**

By doing electrical connection it is important to connect also the grounding point (5) in the terminal block box (M4 screws), through suitable conductors with the general grounding line of the system.

On the external body of the coil there is a grounding point (6) (M4 screw) that allow to ensure equipotentiality between the valve and the general grounding line of the system; connecting this point the regulation of the EN 13463-1 standard, that impose to verify the equipotentiality of the elements included in a potentially explosive environment (the maximum resistance between the elements must be 100 Ω), is guaranteed.

At the end of the electrical wiring, it is necessary to reassemble the cover (3) on the box (4), checking the correct positioning of the seal located in the cover seat and fastening the 4 M5 screws with a torque of 4.9+6 Nm.

Electrical wiring must be done following the instructions of the rules in compliance with ATEX standards.



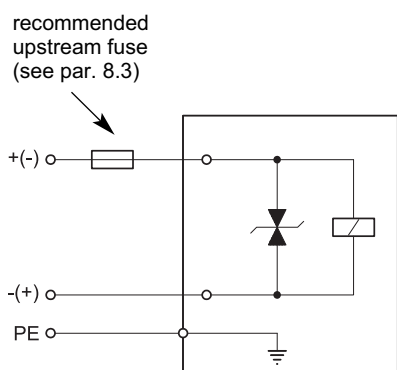
Characteristics of the cables connectable for wiring are indicated in the table below:

Function	Cable section
Operating voltage cables connection	max 2.5 mm <sup>2</sup>
Connection for internal grounding point	max 2.5 mm <sup>2</sup>
Connection for external equipotential grounding point	max 6 mm <sup>2</sup>

Cables for wiring must be non-armoured cables, with external covering sheath and must be suitable for use in environments with temperatures from - 20 °C to +110 °C (for valves either with N or V seals) or from - 40 °C to +110 °C (for valves with NL seals).

Cable glands (which must be ordered separately, see paragraph 14) allow to use cables with external diameter between 8 and 10 mm.

### 8.2 - Electrical diagram



### 8.3 - Overcurrent fuse and switch-off voltage peak

Upstream of each valve, an appropriate fuse (max 3 x I<sub>n</sub> according to IEC 60127) or a protective motor switch with short-circuit and thermal instantaneous tripping, as short-circuit protection, must be connected. The cut-off power of the fuse must correspond or exceed the short circuit current of the supply source. The fuse or the protective motor must be placed outside the dangerous area or they must be protected with an explosion-proof covering.

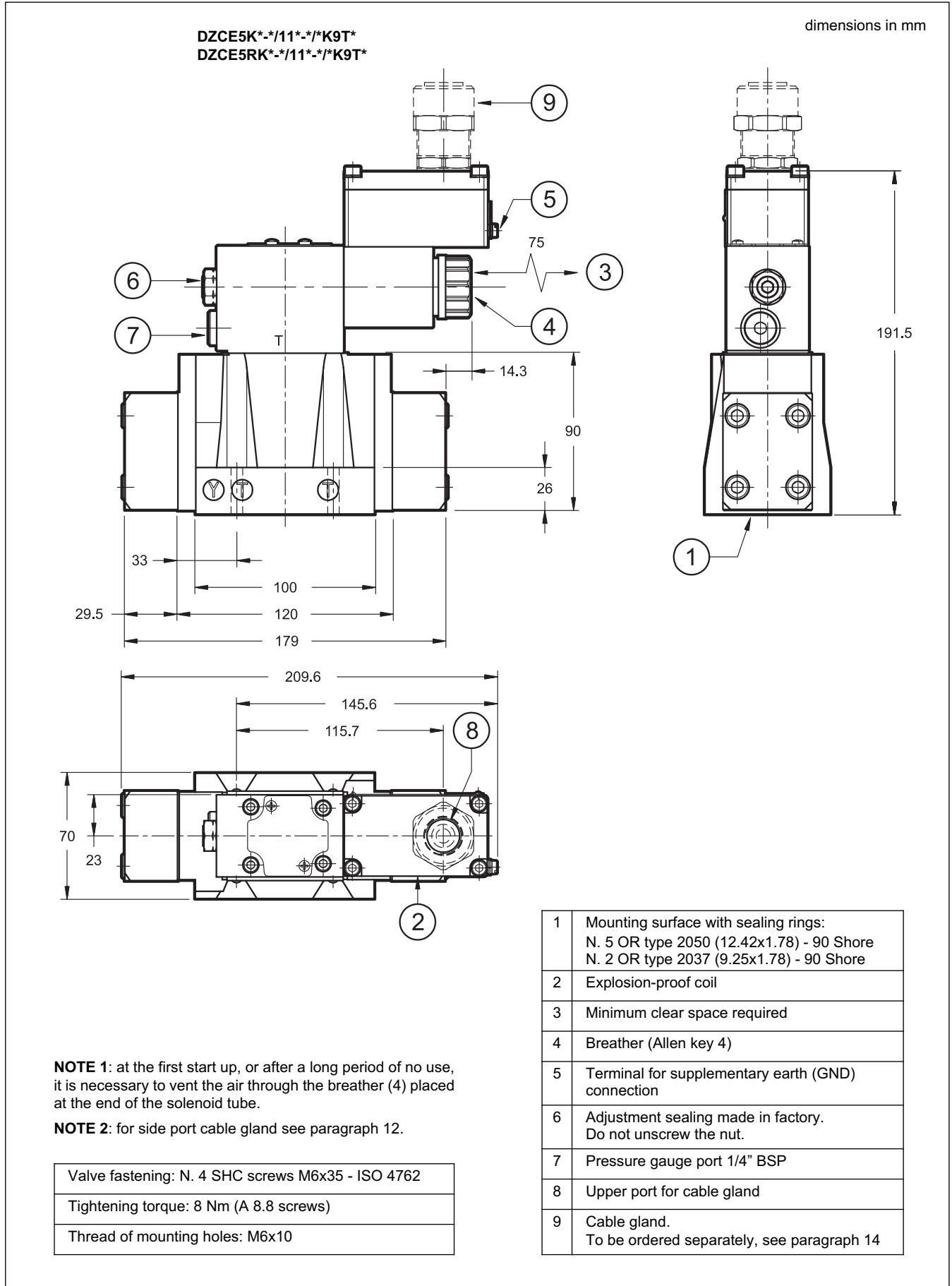
In order to safeguard the electronic device to which the valve is connected, there is a protection circuit in the coil, that reduces voltage peaks, which can occur when inductances are switched off.

The table shows the type of fuse recommended according to the nominal voltage of the valve and to the value of the voltage peaks reduction.

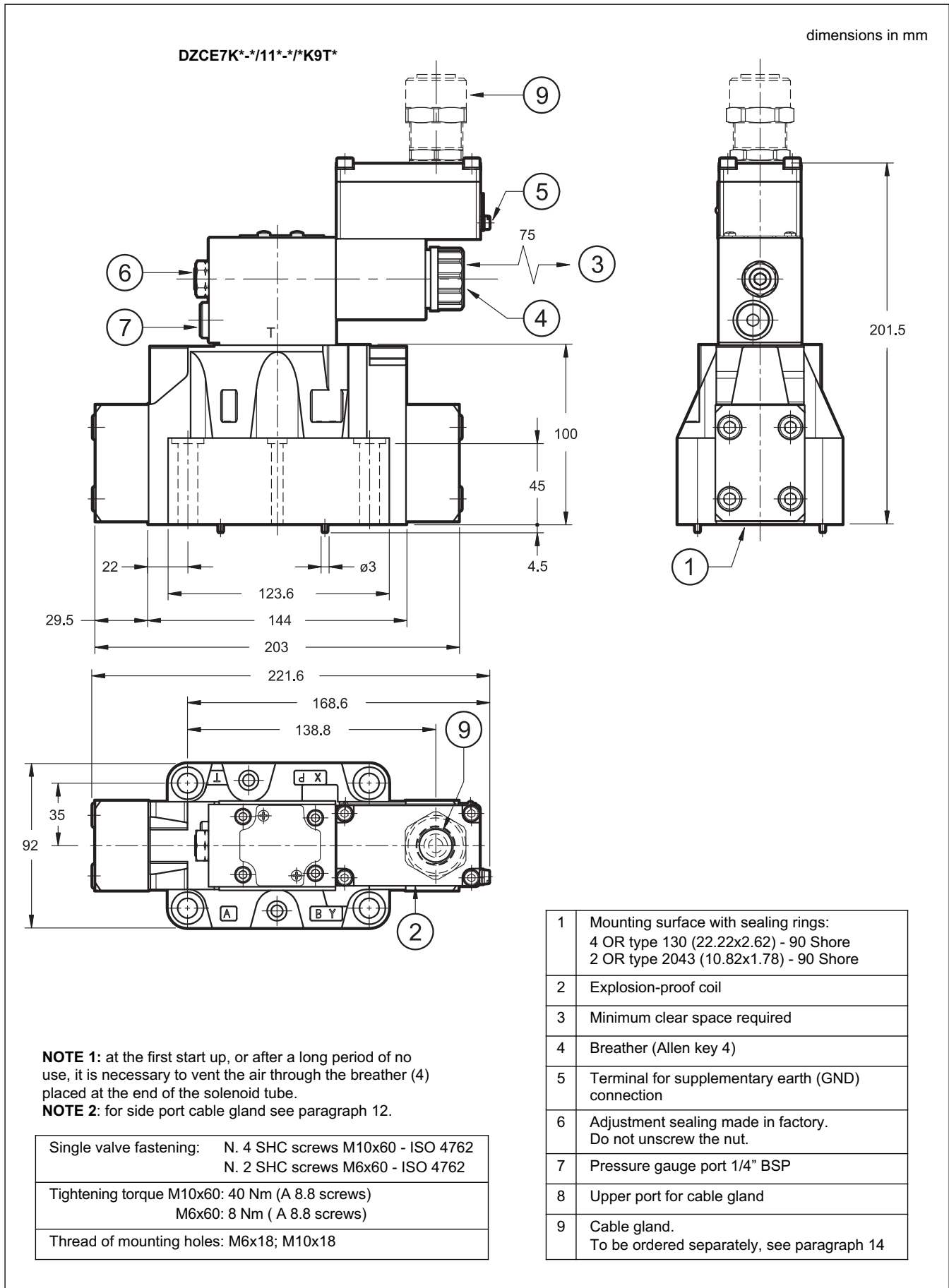
Coil type	Nominal voltage [V]	Rated current [A]	Recommended pre-fuse characteristics medium time-lag according to DIN 41571 [A]	Maximum voltage value upon switch off [V]	Suppressor circuit
D12	12	1,88	2,5	- 49	Transient voltage suppressor bidirectional
D24	24	0,86	1,25	- 49	



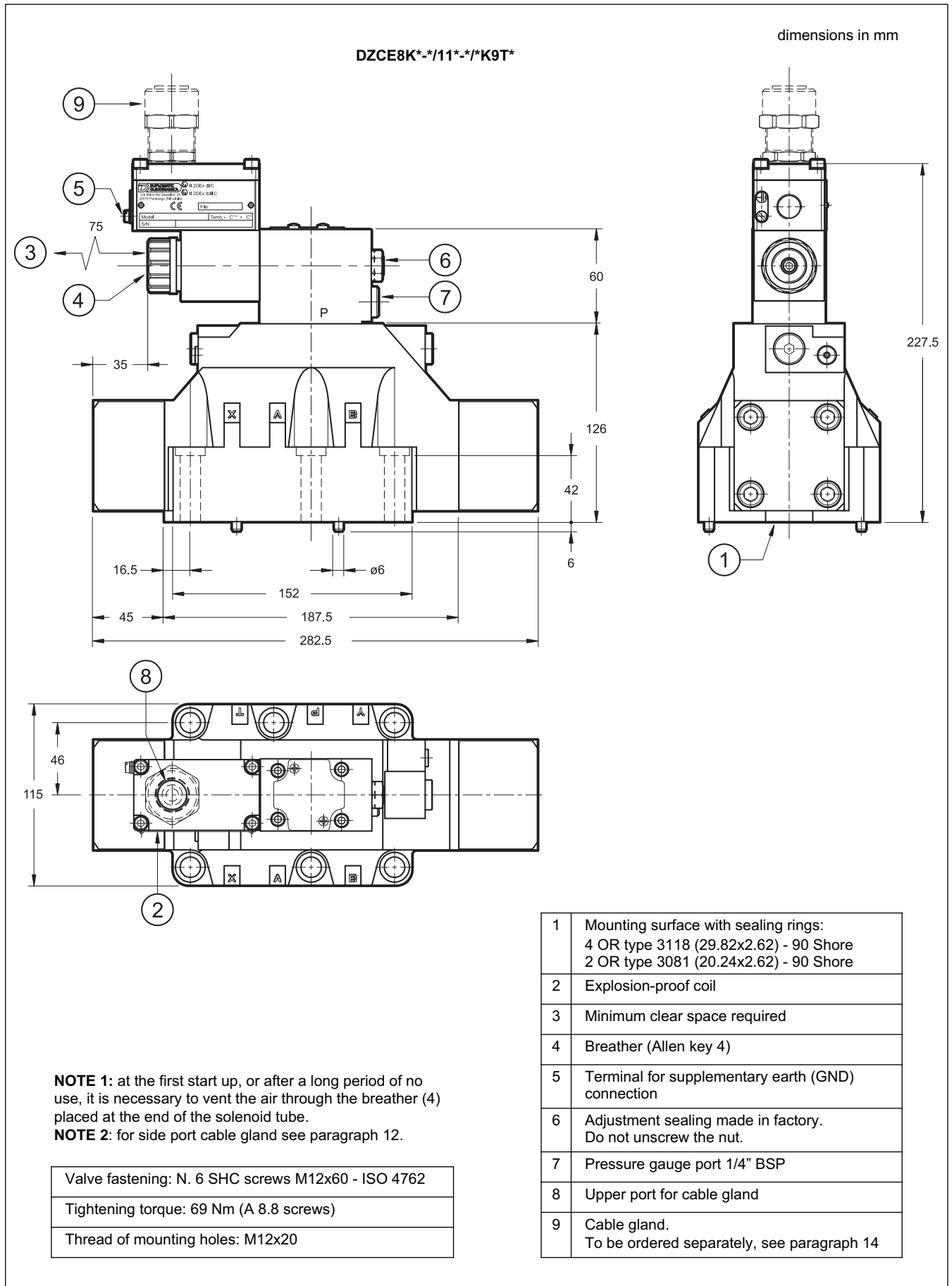
## 9 - DZCE5K\* AND DZCE5RK\* OVERALL AND MOUNTING DIMENSIONS



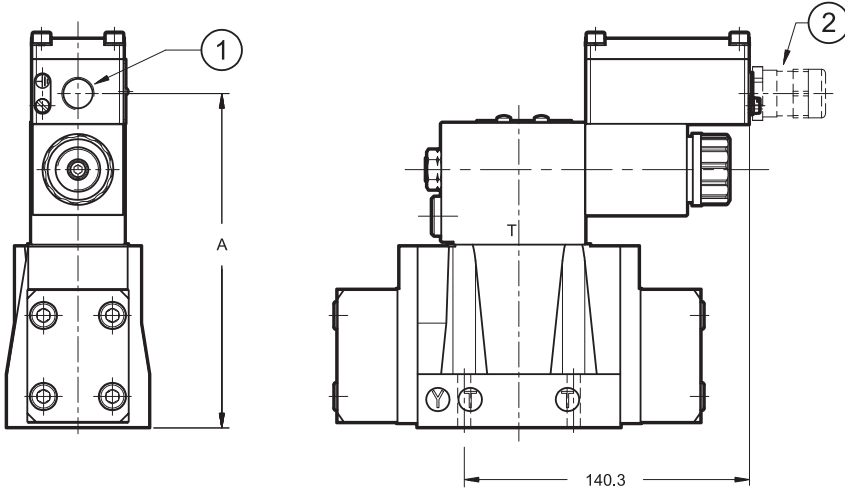
## 10 - DZCE7K\* OVERALL AND MOUNTING DIMENSIONS



## 11 - DZCE8K\* OVERALL AND MOUNTING DIMENSIONS

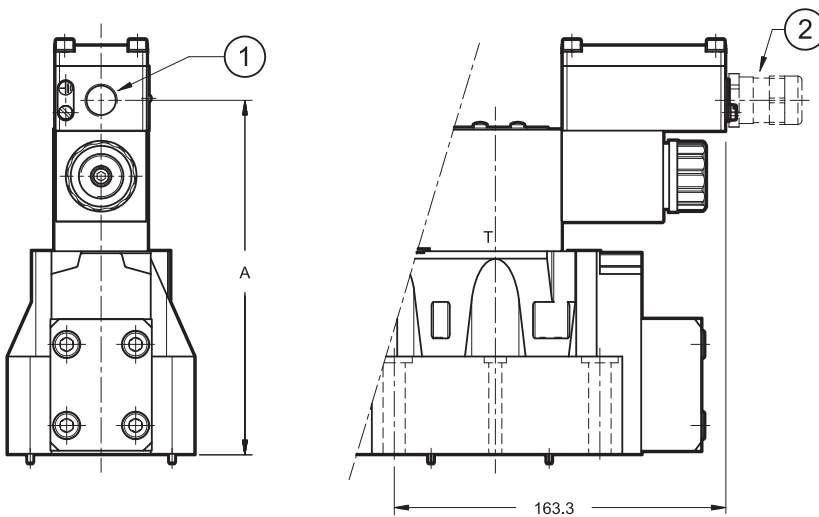


## 12 - DZCE\*K\*-/11\*-\*/\*K9S\* (SIDE CONNECTION) OVERALL AND MOUNTING DIMENSIONS



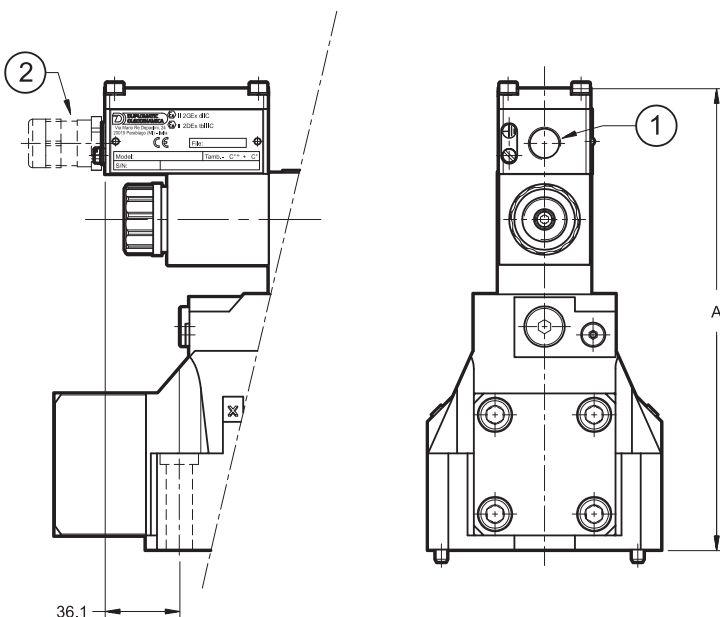
**DZCE5K\*-/11\*-\*/\*K9S\***  
**DZCE5RK\*-/11\*-\*/\*K9S\***

Side port type	Dimension A
<b>S01, S04</b>	180.5
<b>S02, S03</b>	180



**DZCE7K\*-/11\*-\*/\*K9S\***

Side port type	Dimension A
<b>S01, S04</b>	190.5
<b>S02, S03</b>	190



**DZCE8K\*-/11\*-\*/\*K9S\***

Side port type	Dimension A
<b>S01, S04</b>	226.5
<b>S02, S03</b>	226

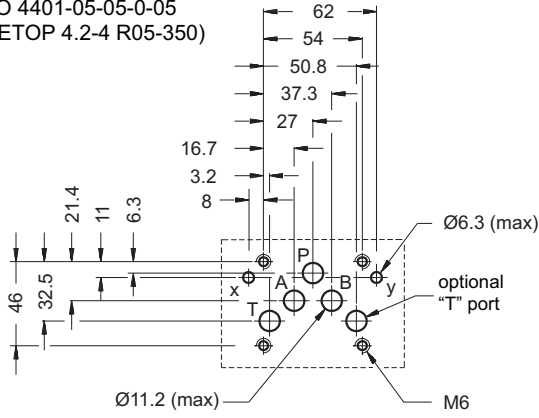
dimensions in mm

1	Side port for cable gland
2	Cable gland. To be ordered separately, see par. 14

## 13 - MOUNTING SURFACES

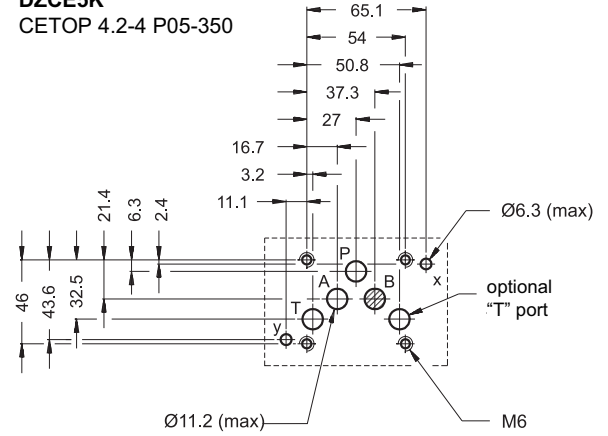
### DZCE5RK\*

ISO 4401-05-05-0-05  
(CETOP 4.2-4 R05-350)



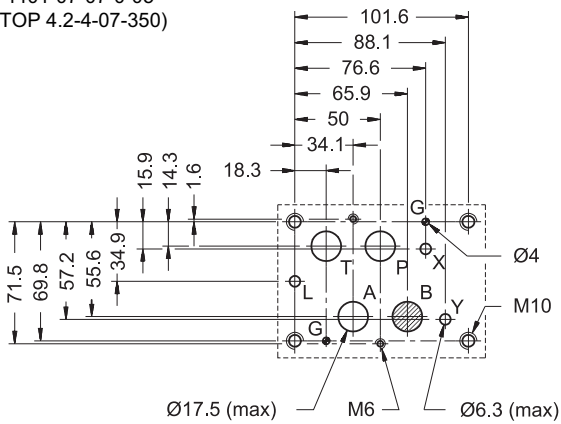
### DZCE5K\*

CETOP 4.2-4 P05-350



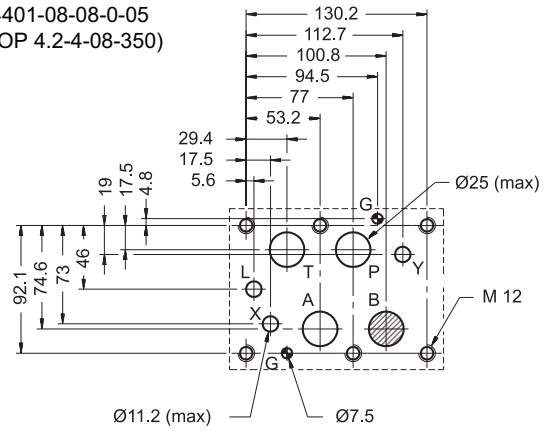
### DZCE7K\*

ISO 4401-07-07-0-05  
(CETOP 4.2-4-07-350)



### DZCE8K\*

ISO 4401-08-08-0-05  
(CETOP 4.2-4-08-350)

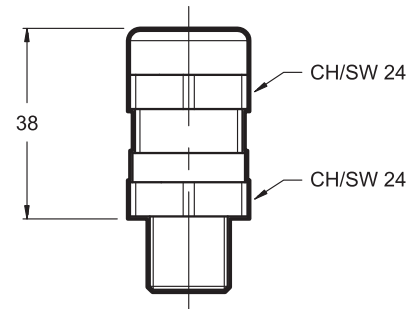




## 14 - CABLE GLANDS

Cable glands must be ordered separately; Diplomatic offers some types of cable glands with the following features:

- version for non-armoured cable, external seal on the cable (suitable for Ø8+10 mm cables);
- ATEX II 2GD and I M2 certified
- cable gland material: nickel brass
- rubber tip material: silicone
- ambient temperature range: -70°C + +220°C
- protection degree: IP66/IP68
- tightening torque : 15 Nm



To order, list the description and the code of the version chosen from among those listed below:

**Description: CGK2/NB-01/10**

**Code: 3908108001**

M20x1.5 - ISO 261 male thread, suitable for coils with T01 and S01 connections. It is supplied equipped with silicone seal, that must be assembled between the cable gland and the coil, so as to ensure IP66/IP68 protection degree.

**Description: CGK2/NB-03/10**

**Code: 3908108003**

1/2" NPT - ANSI B1.20.1 (ex ANSI B2.1), suitable for coils with T03 and S03 connections. The customer must apply LOCTITE® 243™ threadlocker or similar between the cable gland connection thread and the coil in order to ensure IP66/IP68 protection degree.

**Description: CGK2/NB-02/10**

**Code: 3908108002**

Gk 1/2 - UNI EN 10226-2 male thread, suitable for coils with T02 and S02 connections. The customer must apply LOCTITE® 243™ threadlocker or similar between the cable gland connection thread and the coil in order to ensure IP66/IP68 protection degree.

**Description: CGK2/NB-04/10**

**Code: 3908108004**

M16x1.5 - ISO 261 male thread, suitable for coils with S04 connection. It is supplied equipped with silicone seal, that must be assembled between the cable gland and the coil, so as to ensure IP66/IP68 protection degree.

## 15 - ELECTRONIC CONTROL UNITS

<b>EDM-M112</b>	for solenoid 24V DC	DIN EN 50022 rail mounting	see cat. 89 250
<b>EDM-M142</b>	for solenoid 12V DC		

**NOTE: electronic control units offered are not certified according to ATEX 94/9/EC Directive; therefore, they must be installed outside the classified area.**

## 16 - SUBPLATES

(see catalogue 51 000)

	<b>DZCE5K*</b>	<b>DZCE7K*</b>	<b>DZCE8K*</b>
Type with rear ports	PME4-AI5G	PME07-AI6G	-
Type with side ports	PME4-AL5G	PME07-AL6G	PME5-AL8G
Thread of ports:	P - T - A - B X - Y	3/4" BSP 1/4" BSP	1 1/2" BSP 1/4" BSP

**NOTE:** Subplates (to be ordered separately) do not contain neither aluminium nor magnesium at a higher rate than the value allowed by norms according to ATEX directive for categories II 2GD and I M2 .

The user must take care and make a complete assessment of the ignition risk, that can occur from the relative use in potentially explosive environments.



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