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We reserve the right to change or modify our product specifications, configurations, or dimensions at any time without notice.
Each product configuration listed below is subject to availability: please contact Sales Dpt. for more commercial detailed info.

## INTRODUCTION

Read this instructions carefully before installation. All operations must be carried out by qualified personnel following the instructions.

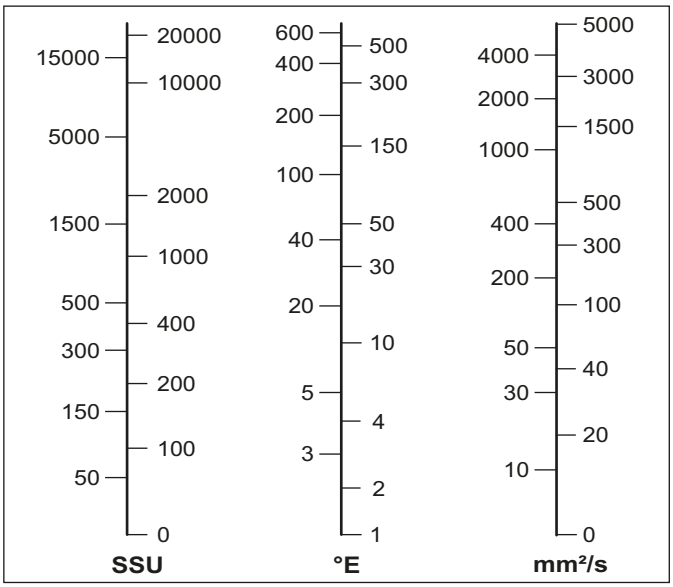
The user must periodically inspect, based on the conditions of use and the substances used, the presence of corrosion, dirt, the state of wear and correct function of the valves.

Always observe first the operating conditions given in datasheet of the valve.

## HYDRAULIC FLUID

Observe the recommendations given in the data sheet of the valve. Use only mineral oil (HL, HLP) according to DIN 51524. Use of other different fluids may damage the good operation of the valve.

## CONVERSION TABLE SSU / °E / mm²/s




## VISCOSITY

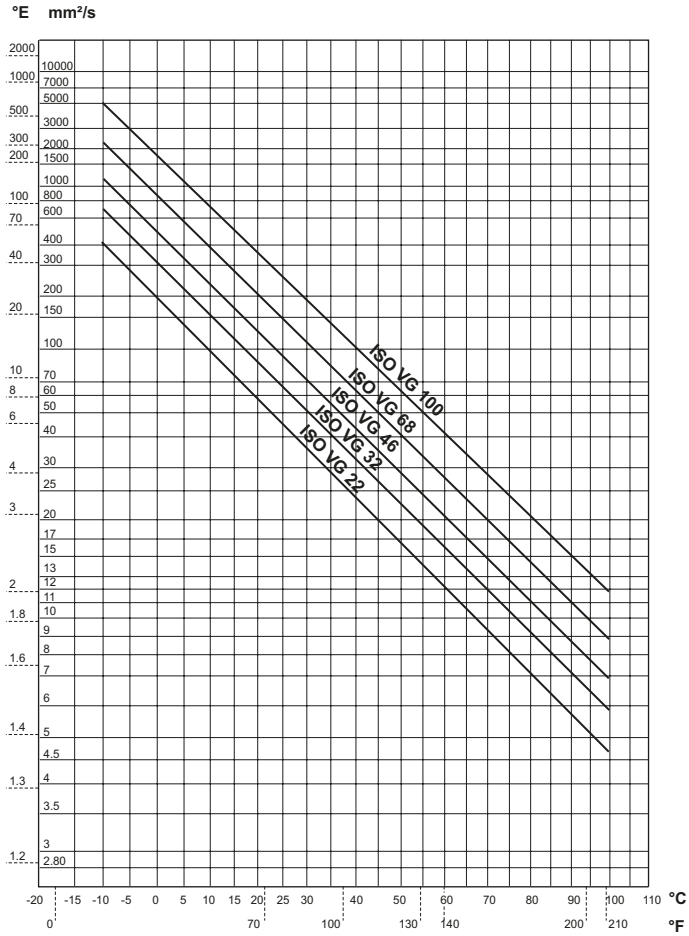
Observe the recommendations given in the data sheet of the valve.The oil viscosity must be in the range of 10 mm²/s to 500 mm²/s.
Recommended oil viscosity 46 mm²/s (32 mm²/s for Cartridge valves)

Table 1: ISO viscosity grades

| Average kinematic viscosity mm²/s @ 40°C | Viscosity grade | Kinematic-viscosity limits mm²/s @ 40°C | |
|---|---|---|---|
| | | min. | max. |
| ISO VG 10 | 10 | 9.00 | 11.0 |
| ISO VG 15 | 15 | 13.5 | 16.5 |
| ISO VG 22 | 22 | 19.8 | 24.2 |
| ISO VG 32 | 32 | 28.8 | 35.2 |
| ISO VG 46 | 46 | 41.4 | 50.6 |
| ISO VG 68 | 68 | 61.2 | 74.8 |
| ISO VG 100 | 100 | 90.0 | 110 |

= Values used in the chart "Oil viscosity according to temperature"

## OIL VISCOSITY ACCORDING TO TEMPERATURE



## CONTAMINATION

Oil contamination is the main cause of faults and malfunction in hydraulic systems. Abrasive particles in the fluid erode or block moving parts, leading to system malfunction.
The valves we are offering do not require filtering characteristics any higher than those needed for usual hydraulic components such as pumps, motors, etc.

However, accurate filtering does guarantee reliability and a long life to all the system's hydraulic parts. Reliable performance and long working life for all oil-pressure parts is assured by maintaining the level of fluid contamination within the limits specified in the data sheet of the valve.
Hydraulic fluid must also be cleaned properly before filling the hydraulic circuit, especially when commissioning a new system, as this is when the oil contamination generally peaks due to its flushing effect on the components, and the running-in of the pump.
Maximum contamination level is required on datasheet of the valve according to ISO 4406:1999.

In the following table there is the correspondence between ISO 4406:1999 and old standard NAS 1638 for information purpose:
The standard ISO 4406:1999 defines the contamination level with three numbers that relate with the number of particles of average dimension equal or greater than 4 µm, 6 µm e 14 µm, in 1 ml of fliuid.

In following table there is a reference to reccomended contamination level and correspondence with old NAS 1638 standard.

Table 2: Reccomanded contamination level.

| Type of system<br>Type of valve | Oil filtration recommendations | | |
|---|---|---|---|
| | Cleanliness class recommended | | Absolute filtration micron rating ( ** ) |
| | ISO 4406 : 1999 | NAS 1638 ( * ) | |
| Systems or components operating at HIGH PRESSURE > 250 bar (3600 psi)<br>HIGH DUTY CYCLE APPLICATIONS<br>Systems or components with LOW dirt tolerance | 18 / 16 / 13 | 7 - 8 | 5 |
| Systems or components operating at MEDIUM / HIGH PRESSURE<br>Systems and components with moderate dirt tolerance | 19 / 17 / 14 | 9 | 10 |
| Systems or components operating at LOW PRESSURE < 100 bar (1500 psi)<br>LOW DUTY CYCLE APPLICATIONS<br>Systems and components with GOOD dirt tolerance | 20 / 18 / 15 | 10 - 11 | 20 |

* Contamination class NAS 1638: it is determined by counting the total particles of different size ranges contained in 100 ml of fluid.

** Absolute filtration: it is a characteristic of each filter, it refers the size (in micron) of the largest sperical particle wich may pass through the filter.

## WORKING TEMPERATURES

Ambient temperature range: -25°C to +60°C
Fluid temperature range (NBR seals): -25°C to +75°C
Thermal shocks can affect the performance and the expected life of the product, hence it is necessary to protect the product from these conditions.

## SEALS

O-rings made in Acrylonitrile Butadiene (NBR) are normally fitted on the valves. The backup rings that protect the O-rings are also made in NBR, or sometimes PTFE. Both the O-rings and the backup rings are suitable for the working temperatures mentioned above.
In the case of fluid temperatures > 75°C, FKM seals must be used (identified with "V1" variant).

## ELECTRICAL POWER SUPPLY

Solenoid valves coils are designed to operate safely in the voltage range of ±10% of nominal voltage at max. 60°C ambient temperature. The combination of permanent overvoltage and very hot temperatures can stress the solenoid. Therefore always a good heat dissipation and voltage level has to be assured.
Faulty coils may only be replaced by new, interchangeable, tested components in original-equipment quality.
Before removing a coil, voltage must be disconnected.
When replacing the coil, be aware to insert O-Rings in order to avoid the entrance of water.

## INSTALLATION

The mounting surface must feature surface quality specified in data sheet of the valve: for example for Cetop valves generally is required Ra ≤ 1.6µm and flatness ≤ 0.03 mm over 100 mm length. Normally in cartridge valve for sealing diameters of the cavities, is required roughness Ra ≤ 1.6µm. The surfaces and openings in the assembly plate must be free from impurity or dirt.
Make sure the O-Rings fit correctly in their seats.
Fixing screws must comply with the dimensions and the strength class specified in the data sheet and must be tightened at the specified tightening torque.
Complete the electrical wiring. For circuit examples and pin assignments, see the relevant datasheet.

## USE AND MAINTENANCE

Observe the functional limits indicated in the technical catalogue
On a periodic basis and based on the conditions of use, check for cleanliness, state of wear or fractures and correct performance of the valve.
If the O-rings are damaged, replace them with those supplied by the manufacturer.
To assure the best working conditions at all time, check the oil and replace it periodically (after the first 100 working hours and then after every 2000 working hours or at least once every year).
Attention: all installation and maintenance intervention must be performed by qualified staff.

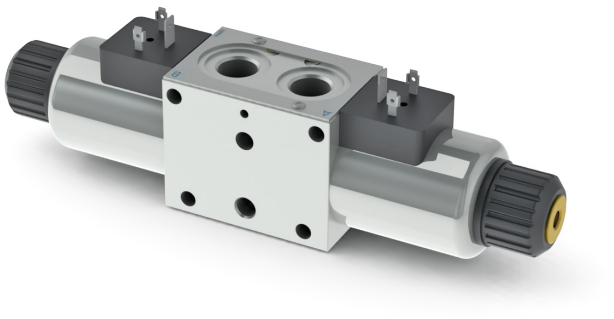
## TRANSPORT AND STORAGE

The valve must be handled with care to avoid damage caused by impact, which could compromise its efficiency.
In the case of storage, keep the valves in a dry place and protect against dust and corrosive substances.
When storing for periods of more than 6 months, fill the valve with preserving oils and seal it.

## CONVERSION CHART

| Type | SI units | | Alternative units | | Conversion factor |
|---|---|---|---|---|---|
| Force | Newton | (N) [kgm/s$^2$] | Kilogram force | (kgf) | 1 kgf = 9.807 N |
| | | | pound force | (lbf) [lbf/s$^2$] | 1 lgf = 4.448 N |
| Length | millimeter | (mm) [10 m] | inch | (in) | 1 in = 25.4 mm |
| | meter | (km) [1000 m] | yard | (yd) [3ft] | 1 m = 1.0936 yd |
| | kilometer | (km) [1000 m] | mile | (mile) [1760 yd] | 1 mile = 1.609 km |
| Torque | Newton meter | (Nm) | pound force.feet | (lbf.ft) | 1 lbf.ft = 1.356 Nm |
| Power | kiloWatt (kW) | [1000 Nm/s] | horsepower | (hp) | 1 kW = 1.341 hp |
| | | | metric horsepower | (CV) | 1 kW = 1.36 CV |
| Pressure | MegaPascal | (MPa) [ N/mm$^2$] | bar | | 1 MPa = 10 bar |
| | | | psi (lbf/ln$^2$) | | 1 MPa = 145 psi |
| | | | ton/f/ln$^2$ | | 1 ton/f/ln$^2$ = 15.45 MPa |
| Flow rate | liter/min | (l/min) | UK gal/min | | 1 UK gal/min = 4.546 l/min |
| | | | US gal/min | | 1 US gal/min = 3.785 l/min |
| Temperature | Degrees Celsius | (°C) | Farenheit | (°F) | 1°F = 1.8 °C+32 |

## DIRECTIONAL CONTROL BANKABLE VALVE WITH D15 COILS



Directional control bankable valve CD3 with single or double solenoid.

- Centring achieved by means of calibrated length springs which immediately reposition the spool in the neutral position when the electrical signal is shut off.
- Different springs used for each spool to improve the valve performance.
- Emergency control.
- Body for parallel or series connections
- Threaded ports sizes G3/8" or 9/16"-18UNF (SAE 6), with or without LS line.
- Coils protection IP66
- Power supply DC or AC (with rectifier).
- Standard connectors DIN 43650 ISO 4400, AMP Junior, flying leads and Deutsch
- Maximum flow until 40 l/min.
- Cast iron zinc plated body.



Connector to be ordered separately, see page 105.

### ORDERING CODE

| | |
|---|---|
| CD | Directional control bankable valve (with D15 coil) |
| 3 | Size |
| * | Body type (tab. 1) |
| E | Electrical operator |
| ** | Spool (tab.2) |
| * | Mounting (tab.3) |
| * | Voltage (tab.4) |
| ** | Variants (tab.5) |
| 2 | Serial No. |

Calibrated diaphragms on P line, see page 104.

### FEATURES

| | |
|---|---|
| Max. pressure ports P/A/B/T | 310 bar |
| Max. pressure port T | 250 bar |
| Max. Flow | 40 l/min |
| Max excitation frequency | 3 Hz |
| Duty cycle | 100% ED |
| Hydraulic fluid | DIN 51524 Mineral oils |
| Fluid viscosity | 10 ÷ 500 $mm^2/s$ |
| Fluid temperature | -25°C ÷ 75°C |
| Ambient temperature | -25°C ÷ 60°C |
| Max. contamination level (filter $ß_{25} \geq 75$) | ISO4406:1999: class 21/19/16 NAS 1638: class 10 |
| Weight with one DC solenoid<br>Weight with two DC solenoids | 1.389 kg<br>1.778 kg |

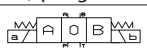
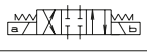
## ORDERING CODE

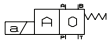
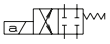
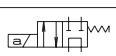
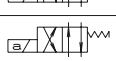
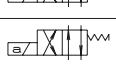


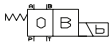
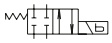
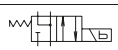
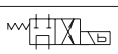
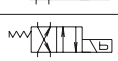
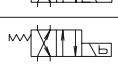
Tab.1 - Body type

| Code | Body |
|---|---|
| A | Ports G3/8" parallel |
| B | Ports 9/16" - 18UNF parallel |
| D (1) | Ports G3/8" series |
| E (1) | Ports 9/16" - 18UNF series |
| G | Attachment style<br>Parallel presetting for modular valves |
| H (1) | Attachment style<br>Series presetting for modular valves |
| I | Ports 9/16" - 18UNF parallel - LS vers. |
| L | Ports G3/8" parallel - LS vers. |
| M | Attachment style, parallel-LS vers.<br>Presetting for modular valves |
| S | Special connection B-P-A<br>(see outlet module unit FUS3 pag .55) |
| U | Ports G3/8" parallel - P-T closed<br>(not require the outlet module units) |

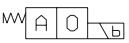
Tab.2 - Standard spools

| Two solenoids,spring centred "C" Mounting | | | |
|---|---|---|---|
| Code |  | Covering | Transient position |
| 01 |  | + |  |
| 02 |  | - |  |
| 03 |  | + |  |
| 04 (2) |  | - |  |

| One solenoid, side A "E" Mounting | | | |
|---|---|---|---|
| Code |  | Covering | Transient position |
| 01 |  | + |  |
| 02 |  | - |  |
| 03 |  | + |  |
| 04 (2) |  | - |  |
| 15 |  | - |  |
| 16 |  | + |  |

| One solenoid, side B "F" Mounting | | | |
|---|---|---|---|
| Code |  | Covering | Transient position |
| 01 |  | + |  |
| 02 |  | - |  |
| 03 |  | + |  |
| 04 (2) |  | - |  |
| 15 |  | - |  |
| 16 |  | + |  |

Tab.3 - Mounting

| Code | Symbol |
|---|---|
| C |  |
| E |  |
| F |  |
| G (2) |  |
| H (2) |  |

Tab.4 - Coils D15 voltage (7)

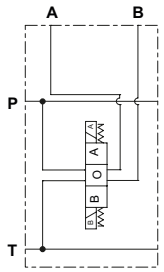
| Code | Voltage | Max. winding temperature (Ambienttemperature25°C) | Ratedpower W | Resistance @ 20°C (Ohm) ±10% |
|---|---|---|---|---|
| L | 12 Vdc | 110 °C | 30 | 4.8 |
| M | 24 Vdc | 110 °C | 30 | 18.8 |
| V (3) | 28 Vdc | 110 °C | 30 | 25.6 |
| N (3) | 48 Vdc | 110 °C | 30 | 75.2 |
| Z (4) | 102 Vdc | 110 °C | 30 | 340 |
| P (3) | 110 Vdc | 110 °C | 30 | 387 |
| X (5) | 205 Vdc | 110 °C | 30 | 1375 |
| W (6) | Without coils | | | |

Tab.5 - Variants (7-8)

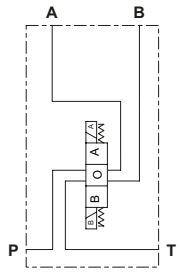
| Code | Variant |
|---|---|
| S1 | No variant |
| SV | Viton |
| LF (12) | Emergency control lever (see page 40) |
| LR | Emergency control lever180° rotated (see page 40) |
| ES | Emergency button (see page 40) |
| P2 (9) | Rotary emergency button (see page 40) |
| R5 (9) | Rotary emergency b. 180° (see page 40) |
| 3T | First elem. for series connec. |
| AJ (10) | AMP Junior connection (see page 108) |
| AD (10) | AMP Junior and integr diode (see page 108) |
| SL (10) | Coil with flying leads 175 mm (see page 108) |
| CZ (10) | Deutsch DT04-2P connection (see page 109) |
| CX (10) | Deutsch DT04-2P connection and integr diode (see page 109) |
| R6 (10) | Deutsch DT04-2P connection eCoat surface treatment (see page 109) |
| RS (11) | Hirschmann coil eCoat surface treatment (see page 109) |

(1) For series connection configuration, a special individual bankable valve CD3*E04**3T2 (A B or G parallel body type only, with spool 04 type, 3T variant) must always be used as first element. For other individual bankable valve must use body D E or H connector series type with spool 04 only
(2) Specials with price increasing
(3) Special voltage
(4) Require connector with rectifier: 115 VAC/50Hz - 120 VAC/60Hz
(5) Require connector with rectifier: 230 VAC/50Hz - 240 VAC/60Hz
(6) Performance are guaranteed only using valves completed with coil
(7) Connector to be ordered separately, see page 105;
Coils technical data, see page 108 - 109;
Voltage codes are not stamped on the plate, their are readable on the coils
(8) Other variants available on request
(9) Tightening torque max. 6÷9 Nm (CH n. 22)
(10) Available in 12V or 24V DC voltage only.
(11) Available in 12V, 24V, 28V or 110V DC voltage only
(12) For the body type G - H - M order LR variant (Emergency control lever180° rotated)

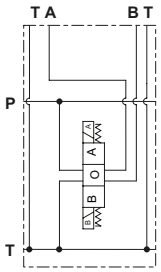
## HYDRAULIC SYMBOLS



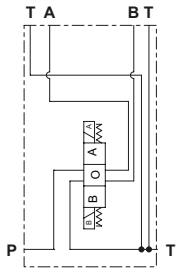

CD3 A ... CD3 B ...



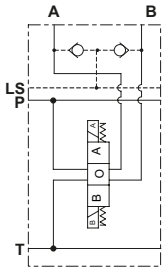

CD3 D ... CDC3 E ...



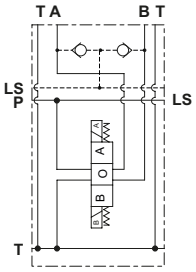

CD3 G ...



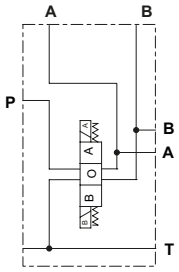

CD3 H ...



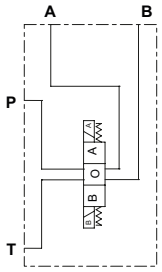

CD3 I ...
CD3 L ...




CD3 M ...



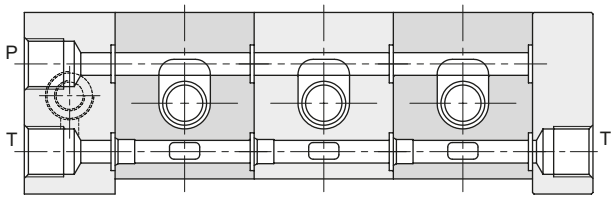

CDC3 S ...

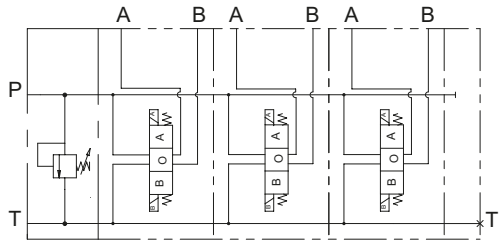



CDC3 U ...

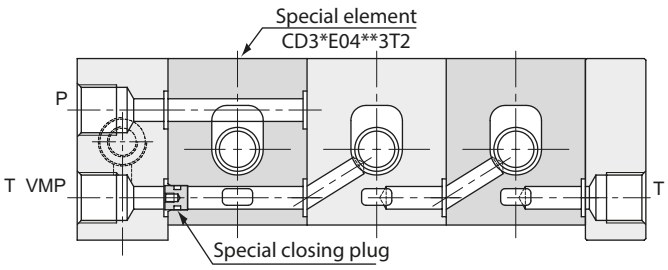
## HYDRAULIC SYMBOLS AND INSTRUCTION OF CONNECTION

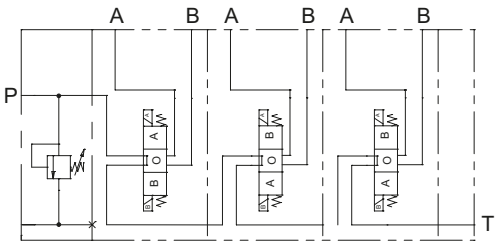
### PARALLEL CONNECTION



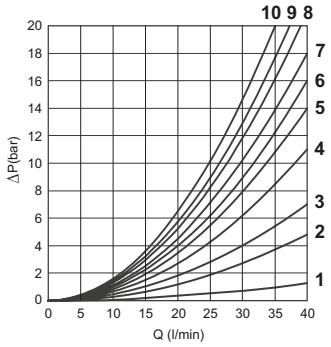

### SERIES CONNECTION




For series connection configuration, a special individual valve bank section (CD3*E04**3T2) must always be used as first element (see ordering code page 35).

## PRESSURE DROPS - DIRECTIONAL CONTROL BANKABLE VALVE

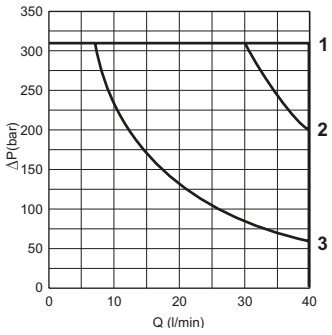



| Spool type | Connections | | | | | |
|---|---|---|---|---|---|---|
| | P → A | P → B | A → T | B → T | P → T | P/T passing |
| 01 | 6 | 6 | 6 | 6 | — | 1 |
| 02 (p) | 5 | 5 | 4 | 4 | 2 | 1 |
| 02 (s) | 5 | 5 | 5 | 5 | 3 | — |
| 03 | 6 | 6 | 5 | 5 | — | 1 |
| 04 (p) | 9 | 10 | 8 | 8 | 4 | 1 |
| 04 (s) | 9 | 9 | 8 | 8 | 5 | — |
| 15-16 (E) | 5 | 7 | 5 | 9 | — | 1 |
| 15-16 (F) | 7 | 5 | 9 | 5 | — | 1 |
| | Curve No. | | | | | |

The diagram at the side shows the pressure drop curves for spools during normal usage.
The fluid used is a mineral oil with a viscosity of 46 mm²/s at 40 C°; the tests have been carried out at a fluid temperature of 40 C°.

(p) Parallel connections
(s) Series connections
(E) Mounting E
(F) Mounting F

## LIMITS OF USE (MOUNTING C-E-F)




| Spool type | Curve No. |
|---|---|
| 01 | 1 |
| 02 | 1 |
| 03 | 1 |
| 04 | 2 |
| 15 | 3 |
| 16 | 1 |

(3) = 16 spools used as 2 or 3 way, follow the curve No. 3

The tests have been carried out with solenoids at operating temperature and a voltage 10% less than rated voltage with a fluid temperature of 50 C°. The fluid used was a mineral oil with a viscosity of 46 mm²/s at 40 degrees C. The values in the diagram refer to tests carried out with the oil flow in two directions simultaneously (e.g. from P to A and at the same time B to T).

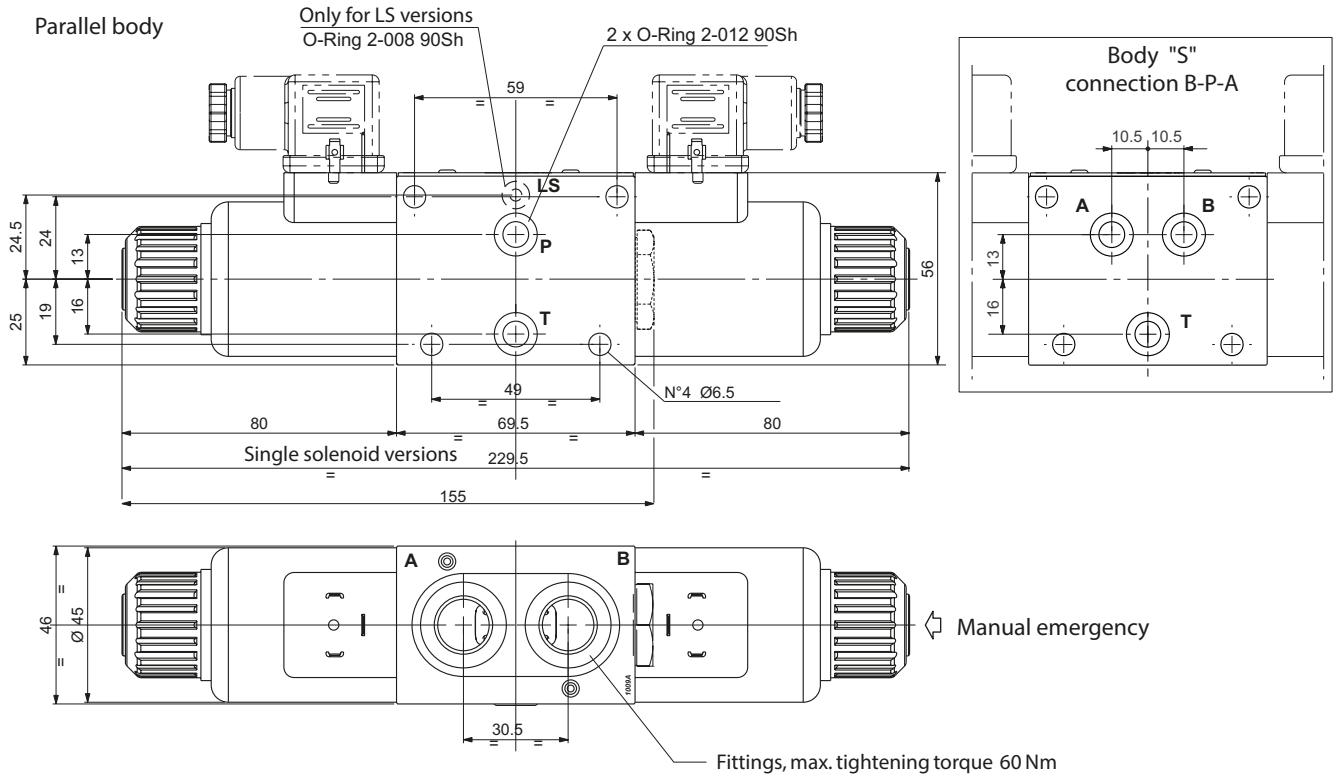
In the cases where valves 4/2 and 4/3 are used with the flow in one direction only, the limits of use could have variations which may even be negative (See curve No 3 and Spool No 16 used as 2 or 3 ways). The tests were carried out with a counter-pressure of 2 bar at T port.

NOTE: The limits of use are valid for the C, E, F mounting.

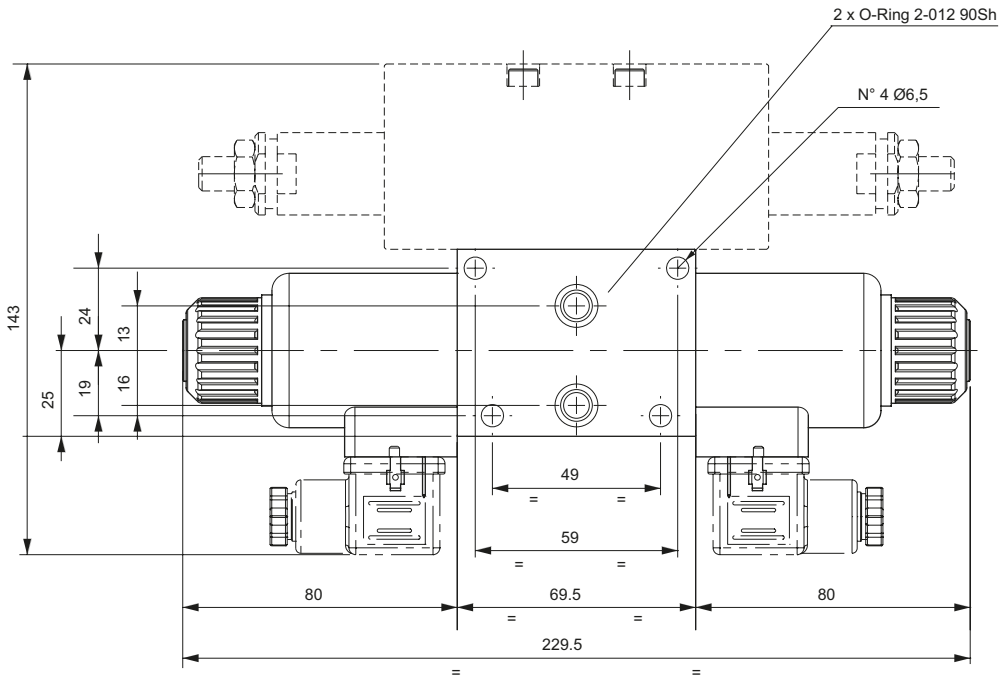
## OVERALL DIMENSIONS



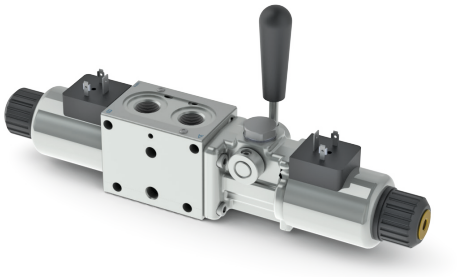
Parallel body



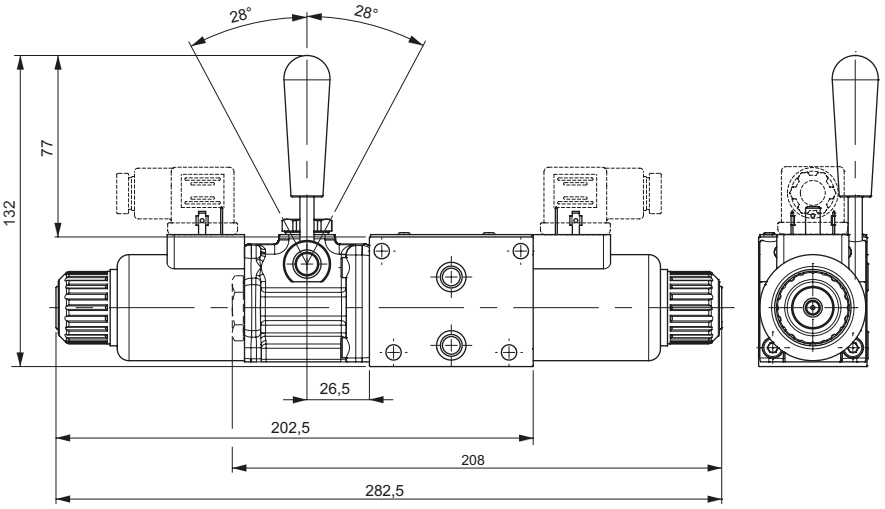

Parallel body
Presetting for modular valves



## "LF" AND "LR" VARIANTS - EMERGENCY CONTROL LEVER



Thanks to his flexibility, the component is designed to be inserted between the valve body and the spool, providing total interchangeability between the different types of solenoid body valves manufactured by Dana.
The control can be used as an emergency device in the event of power cuts.

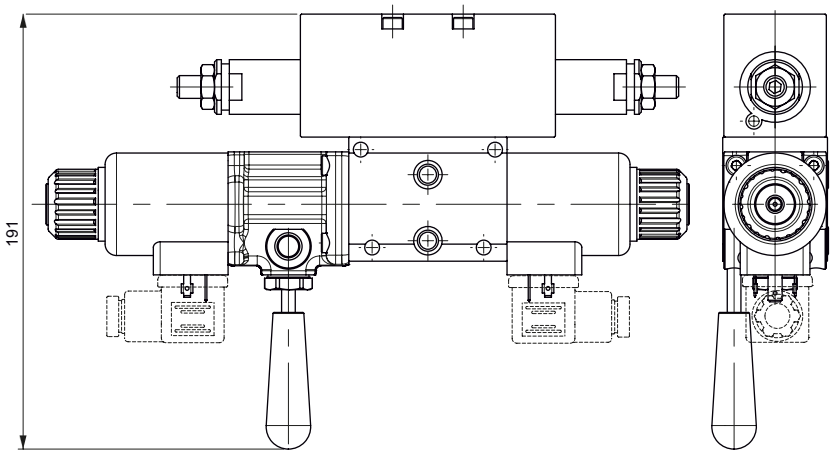



LF variant

## HYDRAULIC SYMBOL



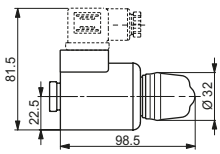

| | | |
|---|---|---|
| Max operating pressure port T | dynamic | 160 bar |
| | static | 210 bar |
| Max operating pressure port P for series connection configuration | | 160 bar |
| Mounting type | | C - F - H |
| Spools type | | 01 - 02 - 03<br>04 - 16 |
| Weight with single solenoid<br>Weight with double solenoid | | 2.35 kg<br>2.74 kg |



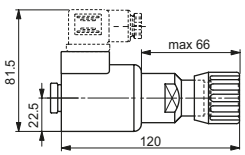

LR variant

## OTHER VARIANTS

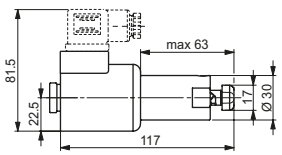
"ES"
Manual emergency



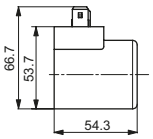

"P2"
Rotary emergency



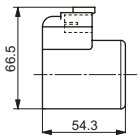

"R5"
Rotaryemergency180°



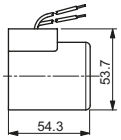

"AJ" AMP Junior
"AD" AMP Junior + Diode



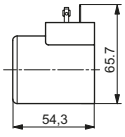

"CZ" Deutsch DT04-2P
"R6" Deutsch DT04-2P eCoat treatment




"SL"
Flying leads




"RS"
eCoat treatment



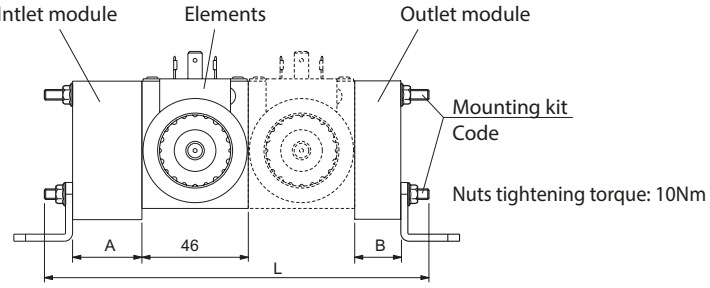

Emergency P2 and P5, tightening torque max. 6÷9 Nm (CH n. 22)

# Mounting kit

SIZE 6
ON/OFF and proportional valves

Kit composed by No. 4 rods and No. 8 stud nuts

For more combinations or with intermediate element, contact our customer service.



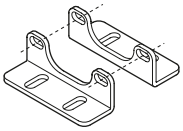
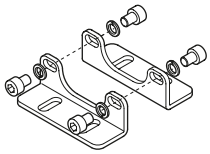
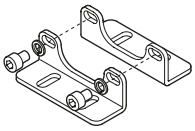

| Intlet module | | FE3 / FE02 (A=30 mm) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Outlet module | | FU3 (B=15 mm) | | FU3* (B=20 mm) | | FUT3 (B=25 mm) | | FUS3 (B=35 mm) | |
| | | Code | L (mm) | Code | L (mm) | Code | L (mm) | Code | L (mm) |
| Elements | 1 | V89B50042 | 121 | V89B50043 | 125 | V89B50043 | 125 | V89B50044 | 140 |
| | 2 | V89B50047 | 160 | V89B50012 | 170 | V89B50012 | 170 | V89B50022 | 180 |
| | 3 | V89B50013 | 210 | V89B50013 | 210 | V89B50023 | 220 | V89B50049 | 230 |
| | 4 | V89B50014 | 260 | V89B50014 | 260 | V89B50024 | 270 | V89B50024 | 270 |
| | 5 | V89B50052 | 300 | V89B50015 | 310 | V89B50015 | 310 | V89B50053 | 320 |
| | 6 | V89B50016 | 350 | V89B50016 | 350 | V89B50026 | 361 | V89B50036 | 380 |
| | 7 | V89B50055 | 390 | V89B50017 | 400 | V89B50017 | 400 | V89B50027 | 410 |
| | 8 | V89B50018 | 440 | V89B50028 | 450 | V89B50028 | 450 | V89B50056 | 460 |

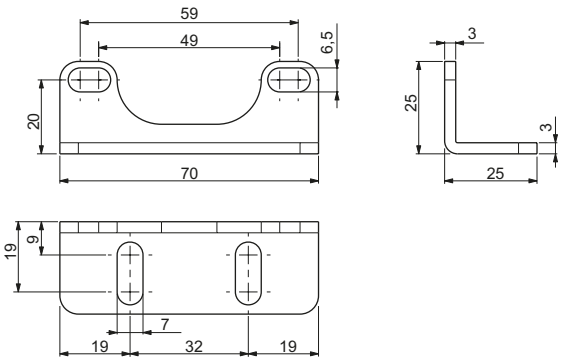
| Intlet module | | FE10S (A=35 mm) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Outlet module | | FU3 (B=15 mm) | | FU3* (B=20 mm) | | FUT3 (B=25 mm) | | FUS3 (B=35 mm) | |
| | | Code | L (mm) | Code | L (mm) | Code | L (mm) | Code | L (mm) |
| Elements | 1 | V89B50042 | 121 | V89B50043 | 125 | V89B50043 | 125 | V89B50045 | 145 |
| | 2 | V89B50012 | 170 | V89B50012 | 170 | V89B50022 | 180 | V89B50032 | 190 |
| | 3 | V89B50013 | 210 | V89B50023 | 220 | V89B50023 | 220 | V89B50049 | 230 |
| | 4 | V89B50014 | 260 | V89B50024 | 270 | V89B50024 | 270 | V89B50034 | 285 |
| | 5 | V89B50015 | 310 | V89B50015 | 310 | V89B50015 | 310 | V89B50035 | 330 |
| | 6 | V89B50016 | 350 | V89B50026 | 361 | V89B50026 | 361 | V89B50036 | 380 |
| | 7 | V89B50017 | 400 | V89B50017 | 400 | V89B50027 | 410 | V89B50037 | 430 |
| | 8 | V89B50028 | 450 | V89B50028 | 450 | V89B50028 | 450 | V89B50038 | 470 |

| Intlet module | | FELS / FE10 / FE10LS (A=40 mm) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Outlet module | | FU3 (B=15 mm) | | FU3* (B=20 mm) | | FUT3 (B=25 mm) | | FUS3 (B=35 mm) | |
| | | Code | L (mm) | Code | L (mm) | Code | L (mm) | Code | L (mm) |
| Elements | 1 | V89B50043 | 125 | V89B50021 | 130 | V89B50044 | 140 | V89B50046 | 150 |
| | 2 | V89B50012 | 170 | V89B50022 | 180 | V89B50022 | 180 | V89B50032 | 190 |
| | 3 | V89B50023 | 220 | V89B50023 | 220 | V89B50049 | 230 | V89B50033 | 240 |
| | 4 | V89B50024 | 270 | V89B50024 | 270 | V89B50024 | 270 | V89B50034 | 285 |
| | 5 | V89B50015 | 310 | V89B50015 | 310 | V89B50053 | 320 | V89B50035 | 330 |
| | 6 | V89B50026 | 361 | V89B50026 | 361 | V89B50036 | 380 | V89B50036 | 380 |
| | 7 | V89B50017 | 400 | V89B50027 | 410 | V89B50027 | 410 | V89B50037 | 430 |
| | 8 | V89B50028 | 450 | V89B50028 | 450 | V89B50056 | 460 | V89B50038 | 470 |

| Intlet module | | FE02Q / FE10P / FE10PS (A=57 mm) - FE10X (A=59 mm) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Outlet module | | FU3 (B=15 mm) | | FU3* (B=20 mm) | | FUT3 (B=25 mm) | | FUS3 (B=35 mm) | |
| | | Code | L (mm) | Code | L (mm) | Code | L (mm) | Code | L (mm) |
| Elements | 1 | V89B50044 | 140 | V89B50045 | 145 | V89B50046 | 150 | V89B50047 | 160 |
| | 2 | V89B50032 | 190 | V89B50048 | 199 | V89B50048 | 199 | V89B50013 | 210 |
| | 3 | V89B50033 | 240 | V89B50033 | 240 | V89B50050 | 250 | V89B50014 | 260 |
| | 4 | V89B50034 | 285 | V89B50034 | 285 | V89B50051 | 296 | V89B50052 | 300 |
| | 5 | V89B50035 | 330 | V89B50035 | 330 | V89B50054 | 340 | V89B50016 | 350 |
| | 6 | V89B50036 | 380 | V89B50036 | 380 | V89B50055 | 390 | V89B50017 | 400 |
| | 7 | V89B50037 | 430 | V89B50037 | 430 | V89B50037 | 430 | V89B50018 | 440 |
| | 8 | V89B50038 | 470 | V89B50038 | 470 | V89B50057 | 480 | V89B50058 | 490 |

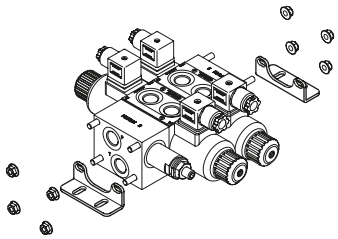
# Fixing feet

| Code | Type | |
|---|---|---|
| V89980000 |  | SIZE 6 - ON/OFF and proportional valves<br>Kit supplied with the valves, composed by:<br>- No. 2 feet |
| V89B60000<br>(*) | <br>Screw tightening torque: 10Nm | SIZE 6 - Pre and post compensated valves<br>Kit supplied on request (**) composed by:<br>- No. 2 feet<br>- No. 4 screws<br>- No. 4 washers |
| V89B60001<br>(*) | <br>Screw tightening torque: 10Nm | SIZE 10 - ON/OFF valves<br>Kit supplied on request (**) composed by:<br>- No. 2 feet<br>- No. 2 screws<br>- No. 2 washers |

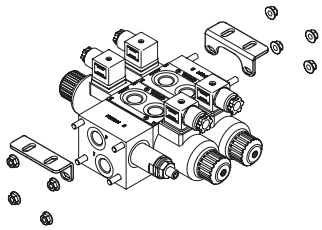



* Fixing feet can not be used with HSIF interface module unit.
** If the kit is not required, the valve can be fixed by the fixing holes on the bottom faces of the inlet and outlet modules (see drawing on page 57 and 82).

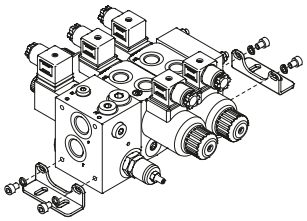
## Feet mounting example



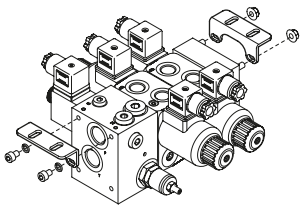
Intel module FE10, outlet module FU, mounting on BOTTOM position (standard mounting)



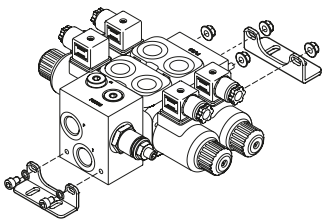
Intel module FE10, outlet module FU, mounting on TOP position (to be specify)



Intel module FEH30PQ, outlet module FUH, mounting on BOTTOM position (standard mounting)



Intel module FEH30PQ, outlet module FUH, mounting on TOP position (to be specify)

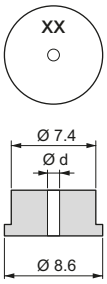


Intel module FE305, outlet module FU5, mounting on BOTTOM position (standard mounting)

# Calibrated diaphragms

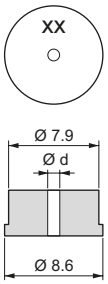
## FOR VALVES CD3 / CDC3 / CDCM3

| Ø d (mm) | Code | Stamping xx |
|---|---|---|
| CLOSED | M52050043/3 | / |
| 0.5 | M52050043/2 | 05 |
| 1.0 | M52050043 | 10 |
| 2.0 | M52050043/10 | 20 |
| 2.2 | M52050043/1 | 22 |
| 3.0 | M52050043/30 | 30 |

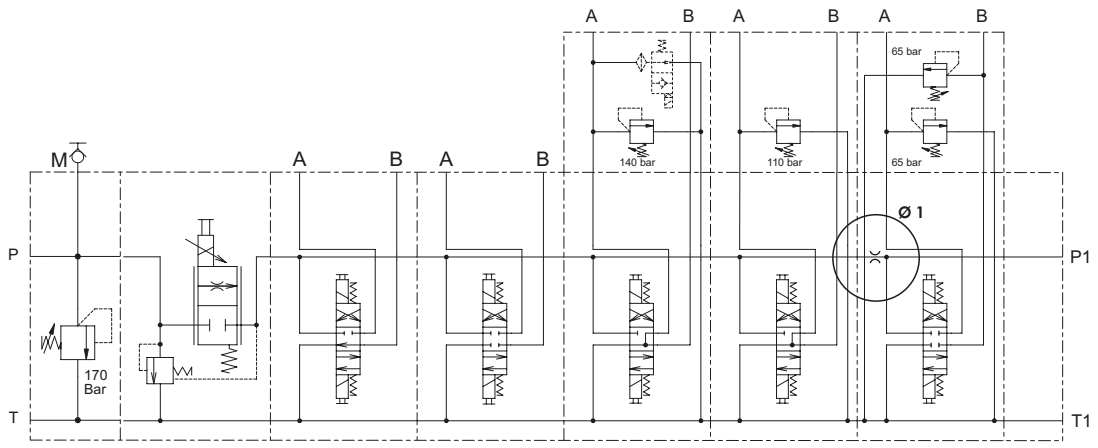



## FOR VALVES CDH3 / CXDH3 / CFS3

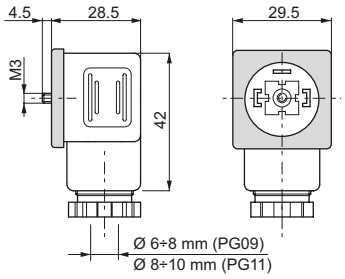
| Ø d (mm) | Code | Stamping xx |
|---|---|---|
| CLOSED | M52050023/4 | / |
| 0.3 | M52050023/21 | 03 |
| 0.4 | M52050023/22 | 04 |
| 0.5 | M52050023/1 | 05 |
| 0.6 | M52050023/6 | 06 |
| 0.7 | M52050023/8 | 07 |
| 0.8 | M52050023 | 08 |
| 0.9 | M52050023/17 | 09 |
| 1.0 | M52050023/2 | 10 |
| 1.1 | M52050023/20 | 11 |
| 1.2 | M52050023/3 | 12 |
| 1.3 | M52050023/19 | 13 |
| 1.4 | M52050023/16 | 14 |
| 1.5 | M52050023/7 | 15 |
| 1.6 | M52050023/15 | 16 |
| 1.8 | M52050023/11 | 18 |
| 1.9 | M52050023/14 | 19 |
| 2.0 | M52050023/10 | 20 |
| 2.2 | M52050023/9 | 22 |
| 2.5 | M52050023/5 | 25 |
| 2.7 | M52050023/13 | 27 |
| 3.0 | M52050023/18 | 30 |
| 3.5 | M52050023/12 | 35 |




## HYDRAULIC CIRCUIT EXAMPLE WITH CALIBRATED DIAPHRAGM ON "P" LINE

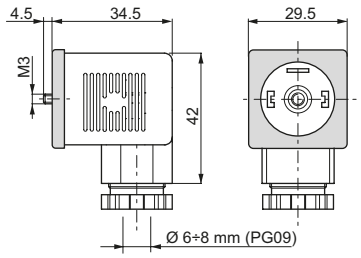


## CONNECTORS FOR CONTROL VALVES IN ACCORDANCE WITH DIN 43650 / ISO 4400



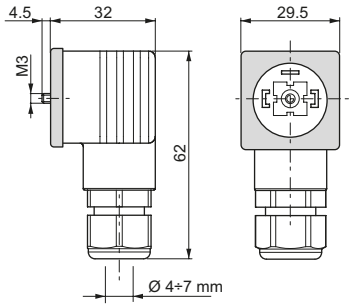

| Connector | Protection level | Type | Cable gland | Code |
|---|---|---|---|---|
| Standard | IP65 | Black color | PG09 | V86 05 0002 |
| | | Grey color | PG09 | V86 05 0004 |
| | | Black color | PG11 | V86 05 0006 |
| | | Grey color | PG11 | V86 05 0008 |
| Lens cover with pilot light (1) | IP65 | 12 VAC/VDC | PG09 | V86 10 0018 |
| | | 24 VAC/VDC | PG09 | V86 10 0012 |
| | | 115 VAC/VDC | PG09 | V86 10 0020 |
| | | 230 VAC/VDC | PG09 | V86 10 0022 |

(1) do not use for proportional versions

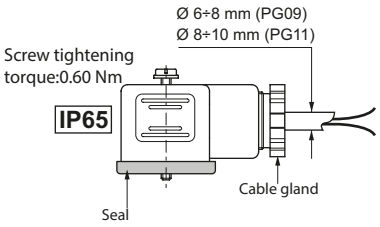


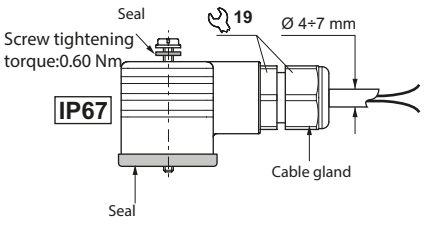

| Connector | Protection level | Type | Cable gland | Code |
|---|---|---|---|---|
| With rectifier (1)<br>Inlet voltage 12÷230 VAC<br>Outlet voltage 9÷205 VDC | IP65 | Black color | PG09 | V86 20 0002 |
| | | Grey color | PG09 | V86 20 0004 |
| Lens cover with pilot light<br>and rectifier (1)<br>Inlet voltage 12÷230 VAC<br>Outlet voltage 9÷205 VDC | IP65 | 12 VAC | PG09 | V86 25 0018 |
| | | 24 VAC | PG09 | V86 25 0019 |
| | | 48 VAC | PG09 | V86 25 0020 |
| | | 115 VAC | PG09 | V86 25 0021 |
| | | 230 VAC | PG09 | V86 25 0022 |

(1) do not use for proportional versions




| Connector | Protection level | Type | Cable gland | Code |
|---|---|---|---|---|
| With protection level IP67 | IP67 | Black color | — | V86 28 0001 |
| | | Grey color | — | V86 28 0002 |



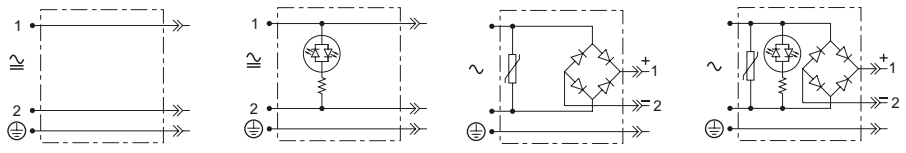




### Electrical features of connectors

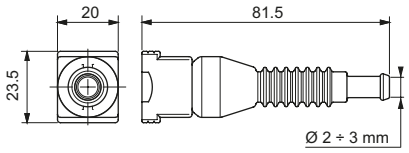
| Description | IP65 | IP67 |
|---|---|---|
| AC rated voltage<br>DC rated voltage | Max. 250 V<br>Max. 300 V | Max. 250 V<br>Max. 300 V |
| Pin conctat nominal current<br>Pin conctat max. current | 10A<br>16A | 10A<br>16A |
| Max. section cable | 1.5 mm² | 1.5 mm² |
| Cable gland PG09 - M16x1,5<br>Cable gland PG11 - G 1/2" - M20x1,5 | Ø cable 6 ÷ 8 mm<br>Ø cable 8 ÷ 10 mm | Ø cable 4 ÷ 7 mm<br>— |
| Protection level<br>Insulation class<br>Operating temperature | IP65 EN60529<br>VDE 0110-1/89<br>-40°C ÷ 90 C° | IP67 EN60529<br>VDE 0110-1/89<br>-20°C ÷ 80 C° |

The degrees of protection indicate is guaranteed only if the connectors were properly mounted with his original seals.

### Electrical circuits




## AMP JUNIOR CONNECTORS

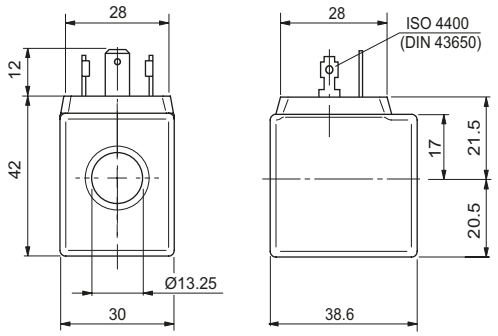



| Connector | Type | Cable section | Pin conctat max current | Code |
|---|---|---|---|---|
| AMP Junior connector Timer 2 conctat | Black color | 0.5 ÷ 1.5 mm² | 10A | RKRC0808000 |

## 18W COILS

| | |
|---|---|
| Type of protection | IP 65 |
| Number of cycle | 18000/h |
| Supply tolerance | ±10% |
| Ambient | -30°C ÷ 60°C |

| | |
|---|---|
| Duty cycle | 100% ED |
| Insulation class wire | F |
| Weight | 0.141 kg |
| | |

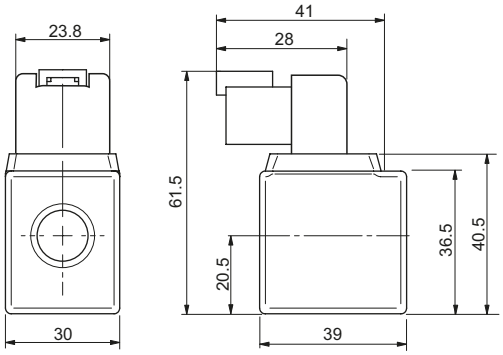



STANDARD Hirschmann ISO 4400 DIN43650

| Coil | | Max winding temperature (1) | Rated power | Resistance ±7% (2) | Spare code |
|---|---|---|---|---|---|
| Code | Voltage | | | | |
| L | 12 VDC | 135 °C | 18 W | 7.7 Ω | M14000001 |
| M | 24 VDC | 135 °C | 18 W | 31 Ω | M14000002 |
| N | 48 VDC | 135 °C | 18 W | 116 Ω | M14000003 |
| 2 | 21.6 VDC | 135 °C | 18 W | 27 Ω | M14000009 |
| Z | 102 VDC (3) | 120 °C | 18 W | 578 Ω | M14000006 |
| X | 205 VDC (3) | 120 °C | 18 W | 2627 Ω | M14000007 |

(1) Ambient temperature 25 °C - (2) Ambient temperature 20 °C

(3) The european low voltage directive is applied to electronical equipments used at a nominal voltages between 50 and 1000 VAC or 75 and 1500 VDC. In conformity with the low directive each part of the manifold or the subplate on which the valve is mounted should be connected to a protective earth with a resistence less than 0.1 ohms.




DEUTSCH and bidirectional integrated diode (CX variant)

| Coil | | Max winding temperature (1) | Rated power | Resistance ±7% (2) | Spare code |
|---|---|---|---|---|---|
| Code | Voltage | | | | |
| L | 12 VDC | 135 °C | 18 W | 7.7 Ω | M14760001 |
| M | 24 VDC | 135 °C | 18 W | 31 Ω | M14760002 |

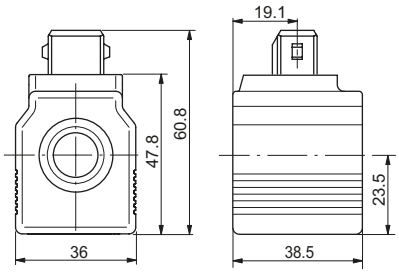
(1) Ambient temperature 25 °C - (2) Ambient temperature 20 °C

4

## 22W COILS

| | |
|---|---|
| Type of protection | IP 65 |
| Number of cycle | 18000/h |
| Supply tolerance | ±10% |
| Ambient temperature | -30°C ÷ 60°C |

| | |
|---|---|
| Duty cycle | 100% ED |
| Insulation class wire | H |
| Weight | 0.2 kg |
| | |




AMP Junior (AJ variant)

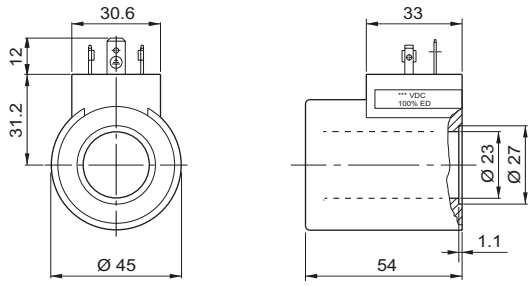
| Coil | | Max winding temperature (1) | Rated power | Resistance ±7% (2) | Spare code |
|---|---|---|---|---|---|
| Code | Voltage | | | | |
| L | 12 VDC | 135 °C | 22 W | 6.3 Ω | M14730001 |
| M | 24 VDC | 135 °C | 22 W | 25.6 Ω | M14730002 |

(1) Ambient temperature 25 °C - (2) Ambient temperature 20 °C

## 40 W COILS - D15

| | |
|---|---|
| Type of protection | IP 66 |
| Number of cycle | 18000/h |
| Supply tolerance | ±10% |
| Ambient temperature | -54°C ÷ 60°C |

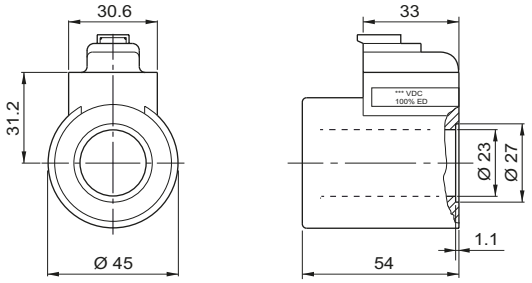
| | |
|---|---|
| Duty cycle | 100% ED |
| Insulation class wire | H |
| Weight | 0.354 kg |
| | |




STANDARD Hirschmann ISO 4400 DIN43650

| Coil | | Max winding temperature (1) | Rated power | Resistance ±7% (2) | Spare code |
|---|---|---|---|---|---|
| Code | Voltage | | | | |
| L | 12 VDC | 135 °C | 40 W | 3.6 Ω | M14600001 |
| M | 24 VDC | 135 °C | 40 W | 14.4 Ω | M14600002 |

(1) Ambient temperature 25 °C




DEUTSCH DT04-2P (CZ variant)

| Coil | | Max winding temperature (1) | Rated power | Resistance ±7% (2) | Spare code |
|---|---|---|---|---|---|
| Code | Voltage | | | | |
| L | 12 VDC | 135 °C | 40 W | 3.6 Ω | M14610001 |
| M | 24 VDC | 135 °C | 40 W | 14.4 Ω | M14610002 |

(1) Ambient temperature 25 °C