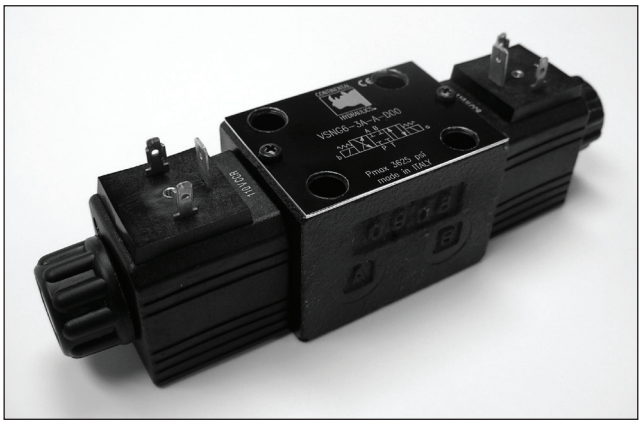
CONTINENTAL HYDRAULICS



# VSNG6

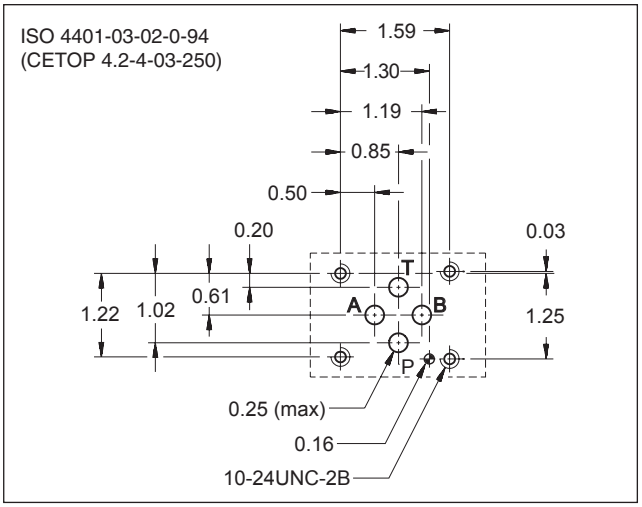
## SOLENOID OPERATED DIRECTIONAL CONTROL VALVE COMPACT SIZE

**NFPA D03**

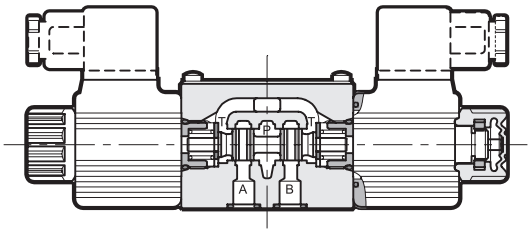
**SUBPLATE MOUNTING** NFPA D03
**ISO 4401-03** (CETOP 03) NG6

Pressure max **4060 PSI** (280 bar)
Flow max **13.2 GPM** (50 l/min)

### MOUNTING INTERFACE




### OPERATING PRINCIPLE




— Direct acting, subplate mounted directional control valve, with mounting surface according to NFPA D03 ISO 4401-03 (CETOP RP 121H) standards.

— Compact design with reduced solenoid dimensions, suitable for mini-power packs and mobile and agricultural applications.

— The valve body is made with high strength iron castings provided with wide internal passages in order to minimize the flow pressure drop. Wet armature solenoids with interchangeable coils are used (for further information on solenoids see paragraph 6).

— The valve is supplied with 3 or 4 way designs and with several spools with different porting arrangements.

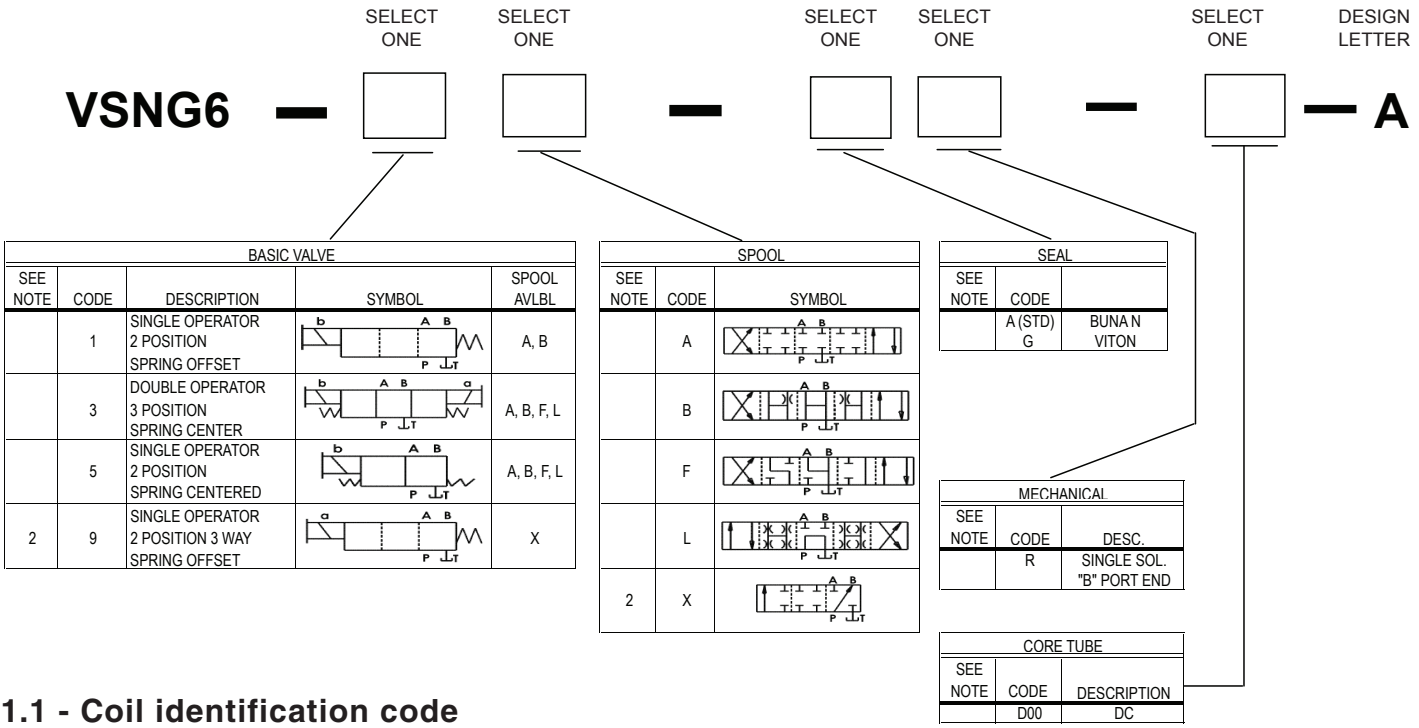
— The valve is available with DC or rectified AC current solenoids and with five different types of electrical connections in order to cover many installation requirements (see paragraph 9).

— It is normally supplied with boot protected manual override which ensures IP65 protection degree.

### PERFORMANCES (with mineral oil of viscosity of 36 cSt at 50°C)

| | | |
|---|---|---|
| Maximum operating pressure Ports P - A - B | PSI (bar) | 4060 (280) |
| T Port | PSI (bar) | 3625 (250) |
| Maximum flow rate | GPM (l/min) | 13.2 (50) |
| Pressure drop Δp-Q | see paragraph 4 | |
| Operating limits | see paragraph 5 | |
| Electrical features | see paragraph 6 | |
| Electrical connections | see paragraph 9 | |
| Ambient temperature range | °F (°C) | -4 / +125 (-20 / +50) |
| Fluid temperature range | °F (°C) | -4 / +175 (-20 / +80) |
| Fluid viscosity range | cSt | 10 - 400 |
| Fluid contamination degree | according to ISO 4406:1999 class 20/18/15 | |
| Recommended viscosity | cSt | 25 |
| Weight: single solenoid valve<br>double solenoid valve | LBS (kg) | 2.54 (1,15)<br>3.13 (1,42) |

## 1 - IDENTIFICATION CODE




| BASIC VALVE | | | | |
|---|---|---|---|---|
| SEE NOTE | CODE | DESCRIPTION | SYMBOL | SPOOL AVLBL |
| | 1 | SINGLE OPERATOR<br>2 POSITION<br>SPRING OFFSET | | A, B |
| | 3 | DOUBLE OPERATOR<br>3 POSITION<br>SPRING CENTER | | A, B, F, L |
| | 5 | SINGLE OPERATOR<br>2 POSITION<br>SPRING CENTERED | | A, B, F, L |
| 2 | 9 | SINGLE OPERATOR<br>2 POSITION 3 WAY<br>SPRING OFFSET | | X |

| SPOOL | | |
|---|---|---|
| SEE NOTE | CODE | SYMBOL |
| | A | |
| | B | |
| | F | |
| | L | |
| 2 | X | |

| SEAL | | |
|---|---|---|
| SEE NOTE | CODE | |
| | A (STD) | BUNA N |
| | G | VITON |

| MECHANICAL | | |
|---|---|---|
| SEE NOTE | CODE | DESC. |
| | R | SINGLE SOL. "B" PORT END |

| CORE TUBE | | |
|---|---|---|
| SEE NOTE | CODE | DESCRIPTION |
| | D00 | DC |

### 1.1 - Coil identification code

| COILS SUPPLIED SEPARATELY | | |
|---|---|---|
| COIL VOLTAGE / TERMINATION | | |
| SEE NOTE | CODE | DESCRIPTION |
| | D12K1 | 12 VDC DIN 43650 |
| | D24K1 | 24 VDC DIN 43650 |
| 1 | R110K1 | 110 VAC DIN 43650 (Rectified) |
| 1 | R230K1 | 230 VAC DIN 43650 (Rectified) |
| | D12K2 | 12 VDC AMP JUNIOR |
| | D24K2 | 24 VDC AMP JUNIOR |
| | D12K4 | 12 VDC LEAD WIRES (1 Meter lg.) |
| | D24K4 | 24 VDC LEAD WIRES (1 Meter lg.) |
| | D12K7 | 12 VDC DEUTSCH DT04 male |
| | D24K7 | 24 VDC DEUTSCH DT04 male |
| | D12K8 | 12 VDC AMP SUPER SEAL |
| | D24K8 | 24 VDC AMP SUPER SEAL |

**NOTES**:

1 - "R" COIL MUST BE USED WHEN AC POWER, SUBSEQUENTLY RECTIFIED BY MEANS OF RECTIFIER BRIDGE EXTERNALLY OR INCORPORATED IN THE DIN CONNECTOR, IS SUPPLIED.

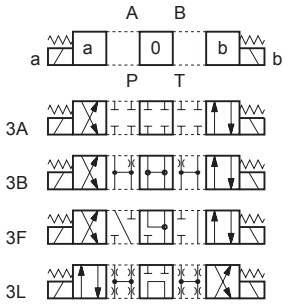
2 - TWO POSITION, 3 WAY CODE 9 AND X VALVES ONLY (VSNG6-9X-****)

## 2 - HYDRAULIC FLUIDS

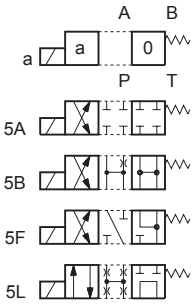
Use mineral oil-based hydraulic fluids HL or HM type, according to ISO 6743-4. For these fluids, use NBR seals (code N). For fluids HFDR type (phosphate esters) use FPM seals (code V). For the use of other kinds of fluid such as HFA, HFB, HFC, please consult our technical department. Using fluids at temperatures higher than 176 °F causes a faster degradation of the fluid and of the seals characteristics. The fluid must be preserved in its physical and chemical characteristics.

## 3 - CONFIGURATIONS

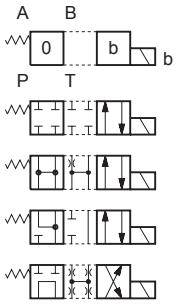
Code 3:
2 solenoids - 3 positions
spring centering



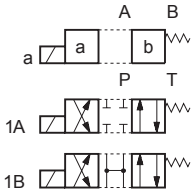

Code 5:
1 solenoid side A
2 positions (central + external)
spring centering



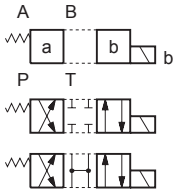

Code 5 Reverse Operator:
1 solenoid side B
2 positions (central + external)
spring centering



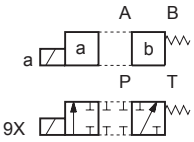

Code 1:
1 solenoid side A - 2 external positions
with return spring

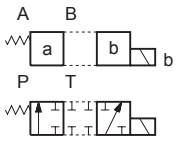



Code 1 Reverse Operator:
1 solenoid side B - 2 external positions
with return spring



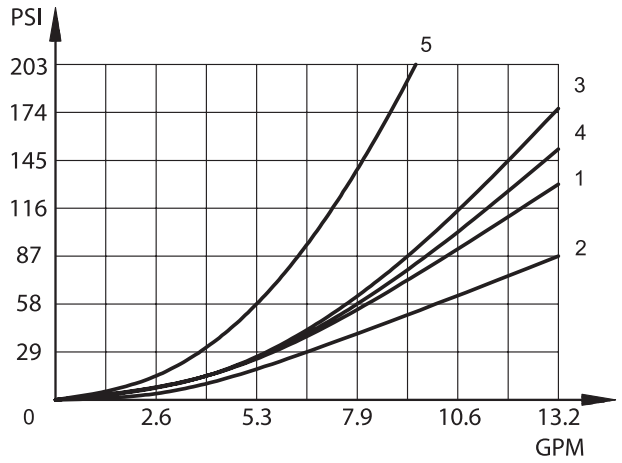

Code 9:
3 way valve - 1 solenoid - 2 external positions, return spring




Other spool type available upon request only.

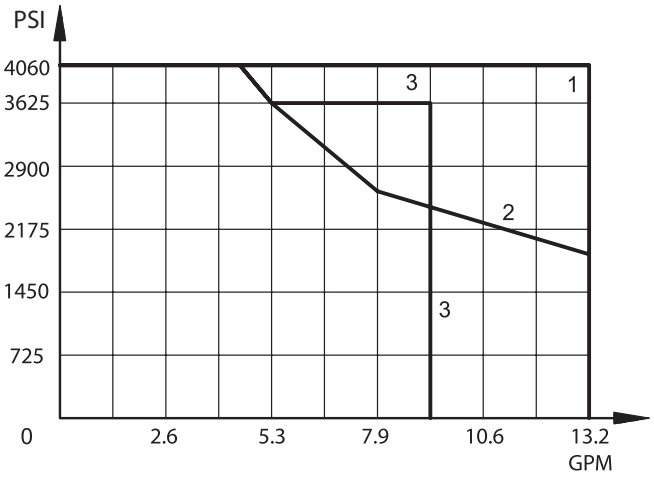
## 4 - PRESSURE DROPS Δp-Q (obtained with viscosity of 36 cSt at 122 °F)




| SPOOL | CONNECTIONS | | | | |
|---|---|---|---|---|---|
| | P→A | P→B | A→T | B→T | P→T |
| | CURVES ON GRAPH | | | | |
| 3A, 5A | 1 | 1 | 1 | 1 | |
| 3B, 5B | 1 | 1 | 2 | 2 | 3 |
| 3F, 5F | 3 | 3 | 2 | 2 | |
| 3L, 5L | 5 | 5 | 5 | 5 | 5 |
| 1A | 4 | 4 | 4 | 4 | |
| 9A | 4 | 4 | 4 | 4 | |

## 5 - OPERATING LIMITS

The curves define the flow rate operating fields according to the solenoid valve pressure with DC and AC rectified solenoids. The values have been obtained with viscosity 36 cSt, temperature 122°F, filtration 25 µm and with solenoids at 285°F coil temperature and supplied with voltage equal to 90% of the nominal voltage.




| SPOOL | CURVE |
|---|---|
| 3A, 5A | 1 |
| 3B, 5B | 1 |
| 9A | 2 |
| 3F, 5F | 2 |
| 3L, 5L | 3 |
| 1A | 2 |

The values indicated in the graph can be considerably reduced if a 4-way valve is used with port A or B plugged.

### 5.1 Switching times

The values indicated refer to a 3A solenoid valve for 6.6 GPM, 2175 PSI working with mineral oil at a temperature of 122°F, a viscosity of 36 cSt and with PA and BT connections. The energizing times are obtained at the time the spool switches over. The de-energizing times are measured at the time pressure variation occurs on the line.

| **TIMES (±10%)** [ms] | |
|---|---|
| **ENERGIZING** | **DE-ENERGIZING** |
| 25 - 75 | 15 - 25 |

# 6 - ELECTRICAL FEATURES

## 6.1 Solenoids

These are essentially made up of two parts: tube and coil. The tube is threaded onto the valve body and includes the armature that moves immersed in oil, without wear. The inner part, in contact with the oil in the return line, ensures heat dissipation. The coil is fastened to the tube by a threaded nut, and can be rotated 360°, compatible with the available space. The interchangeability of coils of different voltages is allowed within the same type of supply current, alternating or direct.

**Protection according CEI EN 60529 - atmpspheric agents**

| Connector | IP 65 | IP 67 | IP 69 K |
|---|---|---|---|
| K1 DIN 43650 | x | | |
| K2 AMP JUNIOR | x | x | |
| K4 outgoing cables | x | x | |
| K7 DEUTSCH DT04 male | x | x | x |
| K8 AMP SUPER SEAL | x | x | x |

NOTE: The protection degree is guaranteed only with the connector correctly connected and installed.

| | |
|---|---|
| **SUPPLY VOLTAGE FLUCTUATION** | ± 10% Vnom |
| **MAX SWITCH ON FREQUENCY** | 10.000 ins/hr |
| **DUTY CYCLE** | 100% |
| **ELECTROMAGNETIC COMPATIBILITY (EMC)**<br>emissions (see **NOTE**) EN 50081-1<br>immunity EN 50082-2 | In compliance with 89/336 CEE |
| **LOW VOLTAGE** | In compliance with 73/23/CEE 96/68/CEE |
| **CLASS OF PROTECTION :**<br>Coil insulation (VDE 0580)<br>Impregnation | <br>class H<br>class H |

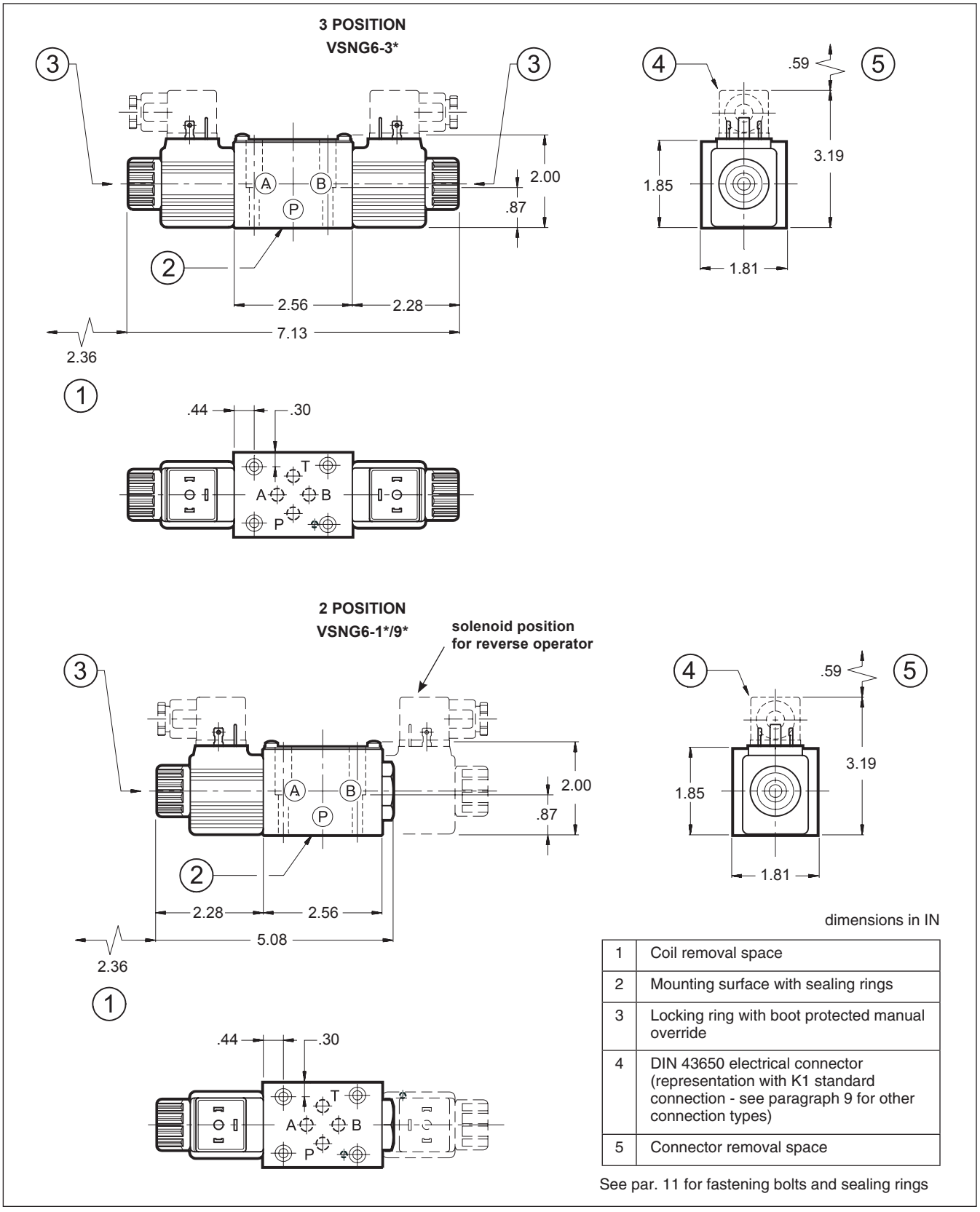
NOTE: In order to further reduce the emissions, use of type H connectors is recommended. These prevent voltage peaks on opening of the coil supply electrical circuit.

## 6.2 Current and absorbed power

In the table are shown current and power consumption values relevant to the different coil types. “R” coil must be used when the valve is fed with AC power supply subsequently rectified by means of rectifier bridge, externally or incorporated in the “D” type connector.

| | Resistance at 68°F [Ω] (±1%) | Absorbed current [A] (±5%) | Absorbed power (±5%) [W] | [VA] | Coil code K1 | K2 | K4 | K7 | K8 |
|---|---|---|---|---|---|---|---|---|---|
| **D12*** | 5,4 | 2,2 | 26,5 | | 1008390AB | 1008392AB | 1008393AB | 1008394AB | 1008395AB |
| **D24*** | 20,7 | 1,16 | 27,8 | | 1008390AC | 1008392AC | 1008393AC | 1008394AC | 1008395AC |
| **R110*** | 363 | 0,25 | | 27,2 | 1008390AD | | | | |
| **R230*** | 1640 | 0,11 | | 26,4 | 1008390AE | | | | |

## 7 - OVERALL AND MOUNTING DIMENSIONS



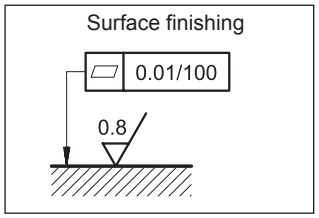

dimensions in IN

| | |
|---|---|
| 1 | Coil removal space |
| 2 | Mounting surface with sealing rings |
| 3 | Locking ring with boot protected manual override |
| 4 | DIN 43650 electrical connector (representation with K1 standard connection - see paragraph 9 for other connection types) |
| 5 | Connector removal space |

See par. 11 for fastening bolts and sealing rings

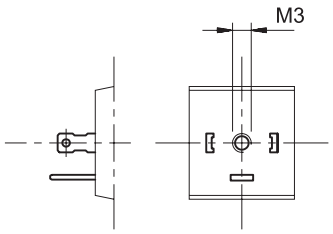
## 8 - INSTALLATION

The configuration with centering and return springs can be mounted in any position. Valve fitting takes place by means of bolts or stud kits, fixing the valve on a lapped surface, with values of planarity and smoothness that are equal to or better than those indicated in the drawing. If the minimum values of planarity or smoothness are not met, fluid leakages between valve and mounting surface can easily occur.

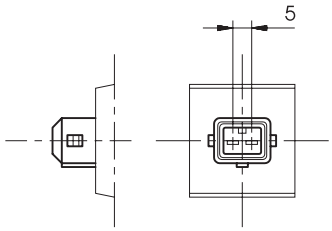



## 9 - ELECTRIC CONNECTIONS

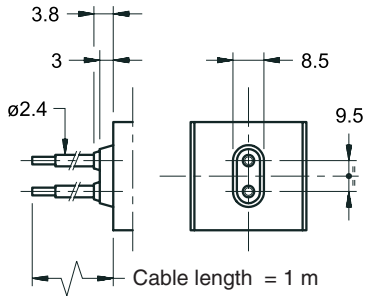
connection for DIN 43650
connector type
code **K1** (**standard**)



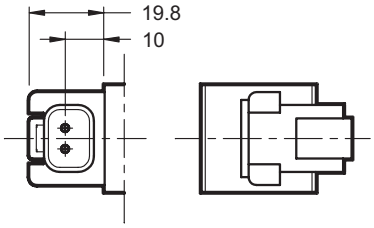

connection for AMP JUNIOR
connector type
code **K2**



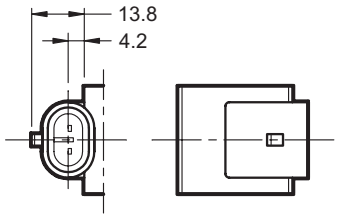

outgoing cable connections
code **K4**




connection for DEUTSCH DT04-2P male
connector type
code **K7**




connection for AMP SUPER SEAL (two contacts)
connector type
code **K8**



## 10 - ELECTRIC CONNECTORS

The solenoid valves are supplied without connectors.
For coils with standard electrical connections K1 type (DIN 43650) the connectors can be ordered separately.
AC Voltages will require a connector with rectifier.
For K2, K7 and K8 connection type the relative connectors are not available.

## 11 - BOLT KITS

| | |
|---|---|
| BD03-125 Valve only | 1008406 |
| BD03-317 Valve + (1) 40mm stack | 1008408 |
| BD03-474 Valve + (2) 40mm stack | 1008409 |
| BD03-631 Valve + (3) 40mm stack | 1008410 |
| | |
| Bolt kits consist of: | |
| (4) 10-24NC Fasteners | |
| (4) #10 Lock washers | |
| | |

## 12 - DIN CONNECTORS 43650/ISO 4400 (Form A) 90°

| | |
|---|---|
| VEA-3E (Gray) | 165639 |
| VEA-3F (Black) | 165638 |
| VEA-6ER (Gray) Connector with built in Graetz bridge rectifier | 1008399 |
| VEA-6FR (Black) Connector with built in Graetz bridge rectifier | 1008400 |

## 13 - SEAL KIT

| | |
|---|---|
| Kit Seal VSNG6 Buna | 1008577 |

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