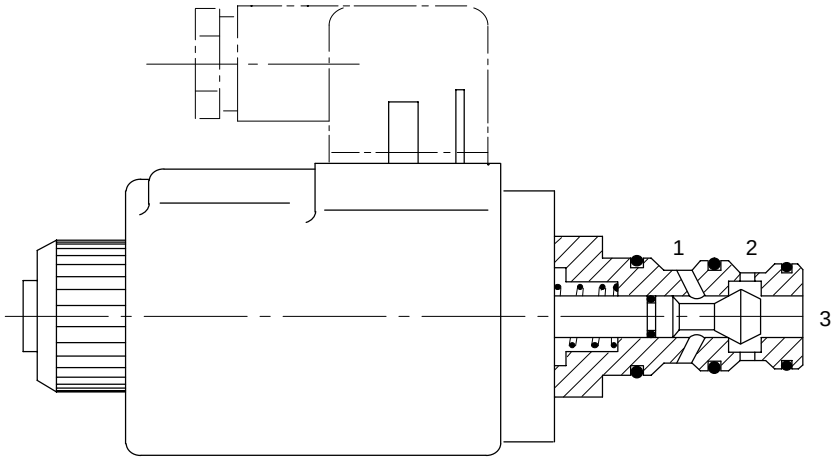
Solenoid Operated Poppet-Type Directional Control Valves

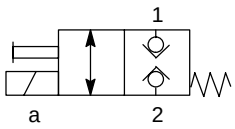
Cartridge Models CVUA-6-PD
Gasket Mounted Models DG3/4VP-3

**Construction of a Typical
3 Way/2 Position Cartridge Type
Valve, Model CVUA-6-PDN-3-M-U**

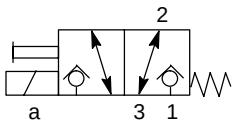


Functional Symbols

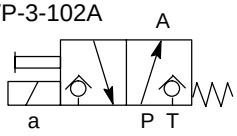
CVUA-6-PD*-2



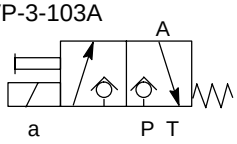
CVUA-6-PD*-3



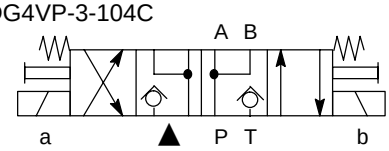
DG3VP-3-102A



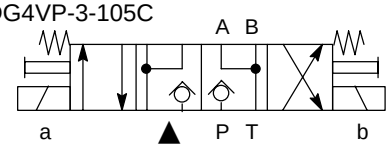
DG3VP-3-103A



DG4VP-3-104C



DG4VP-3-105C



▲ *This spool position is achieved only when both solenoids are energized simultaneously and remain so.*

Note: ◇ No leakage in either direction

↕ Through flow in both directions

Basic Characteristics

Max. pressure . . . . . 315 bar (4500 psi)
Max. flow rates . . . . . Up to 20 L/min (32 USgpm)
Mounting surface for DG*VP models . . . . . ISO 4401 size 03 NFPA D01 DIN 24340 (NG6)

General Description

These new solenoid operated poppet valves are used mainly for starting, stopping and controlling the direction of linear and rotary actuators or for use as a pilot valve. The gasket mounted types can also be used for controlling the pilot functions of cartridge valves to ISO 7368 (DIN 24342) (see catalog 2378).

All valves are of a “zero leakage design” which is the major design feature of poppet-type valves. The valves are available as either gasket mounted or cartridge insert type. The latter requires a housing having a purpose-formed recess (see recess hole drawing and special tool note).

Advantages

- Zero internal leakage in closed position
- Fast consistent response times
- Cost-efficient high pressure capability
- Simple assembly and installation
- Fast and easy servicing

GB-642A

Model Codes

For CVUA Cartridge Valves

(F3-)CVUA-6-PD * - * -M-U-* -1*

1 4 5 6 7

For DG*VP Valves

(F3-)DG* VP-3-10 -VM-U-* -1***

1 2 3 6 7

1 Prefix, fluid compatibility

Blank = For petroleum oils, water glycols and invert emulsions
F3 = For phosphate esters, petroleum oils, water glycols and invert emulsions

2 Function

3 = Three-way
4 = Four-way

3 Spool and spring arrangement

102A = Normally open, spring offset; option for DG3VP models
103A = Normally closed, spring offset; option for DG3VP models
104C = Normally open, spring centered; option for DG4VP models
105C = Normally closed, spring centered; option for DG4VP models

4 Mounting flange type

N = Narrow thickness flange
W = Wide thickness flange

5 Function

2 = Two-way
3 = Three-way

6 Coil rating

B = 110 V AC 50/115 V AC 60
D = 220 V AC 50/230 V AC 60
G = 12 V DC
H = 24 V DC

7 Design number, 10 series

Subject to change. Installation dimensions unaltered for design numbers 10 to 19 inclusive.

For Electrical Plugs
See “Installation Dimensions” section.

For Tool Kits for CVUA Valves
See “Installation Dimensions” section.

For Mounting Subplates and Bolt Kits for DG*VP Models
See catalogs 2425 and 2314.
Note: CVUA valves are supplied complete with mounting flanges and metric fixing bolts.

Operating Data

Pressure and Flow Limits

Max. Pressure
Non-F3-Prefix Models:
For <10 switching cycles/min . . . . . 315 bar (4500 psi)
For 10 to 180 switching cycles/min . . . . . 210 bar (3000 psi)

F3-Prefix Models:
Up to 180 switching cycles/min . . . . . 210 bar (3000 psi)
Note: For all valves lower limits may apply if high-water-based fluids (e.g. 5%/95% oil-in-water emulsions) are to be used; contact your Vickers representative.

Max. Flow Rate . . . . . Up to 20 L/min (5.3 USgpm)

Control Data

Rated Power Supply
See “Model Codes” section.

Power Consumption, AC Solenoids
Inrush, max.▲ VA 396
Steady-state ▼ VA 198
Holding VA 57
All above values are RMS

▲ *Armature fully retracted, 1st half-cycle.*
▼ *At start of normal working stroke of valve spool. Previously called “Inrush”.*

Power Consumption, DC Solenoids
At rated voltage and wire temperature of 20°C (68°F) 38W

Relative Duty Factor
100% continuous rating

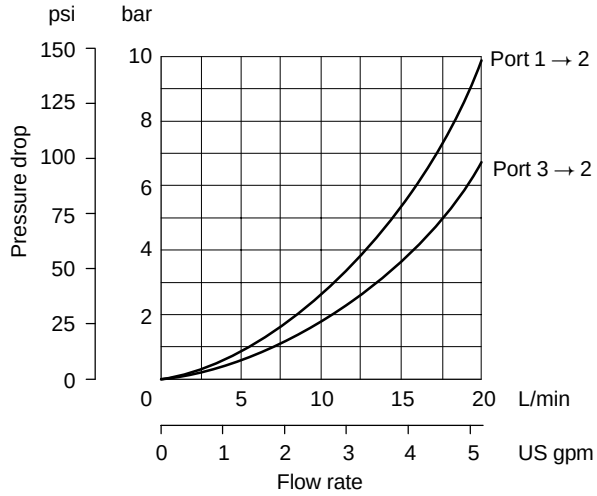
Type of Protection
Weatherproof to IEC 144 Class IP65
Winding insulation to Class H
Epoxy resin to Class F

Permissible Voltage Fluctuation
±5% of rated voltage

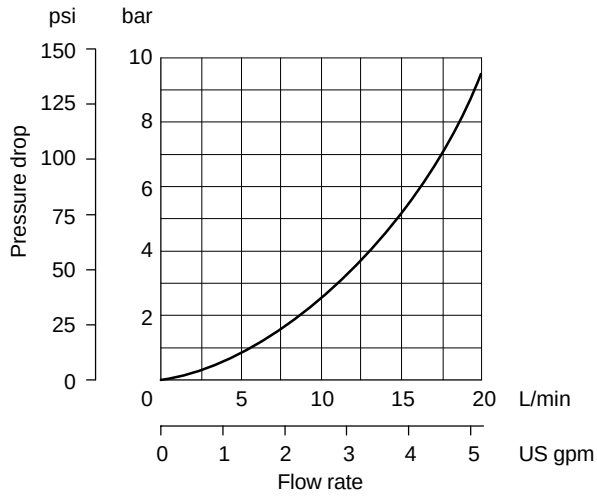
Performance Data

Pressure Drop Data
Typical with hydraulic petroleum oil at 36 cSt (170 SUS) and at 50°C (122°F)

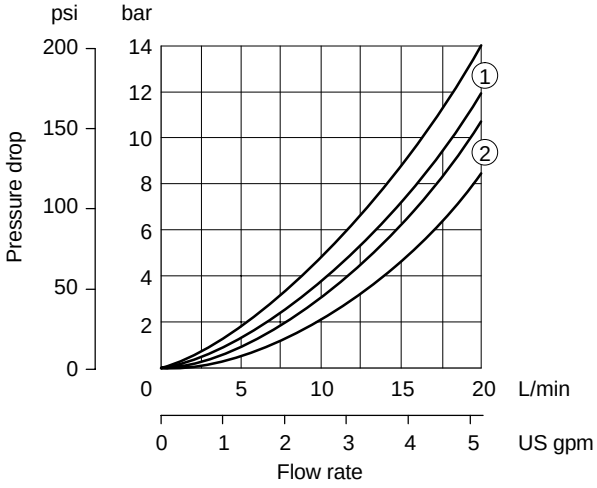
CVUA-6-PD*-3 Models



CVUA-6-PD*-2 Models



DG3VP-3 and DG4VP-3 Models



Model	Curve for flow: P to A	P to B	A to T	B to T
DG3VP-3-102A	②	–	①	–
DG3VP-3-103A	①	–	②	–
DG4VP-3-104C	②	②	①	①
DG4VP-3-105C	①	①	②	②

Response Times
Time taken from when signal is first applied at solenoid until armature completes its travel. Based on average conditions with warm solenoids at 95% rated voltage:
AC and DC energizing . . . . . 150 ms
AC and DC* de-energizing . . . . . 85 ms

* *In pure switched circuit conditions devoid of the effects of any suppression diodes and full-wave rectifiers.*

Hydraulic Fluids
All valves can be used with anti-wear hydraulic oils, water-in-oil emulsions and water glycols. Add prefix “F3” to model designation when phosphate ester (not alkyl-based) or chlorinated hydrocarbons are to be used.

The valves are also suitable for use with high water-based fluids (95% water, 5% oil) up to 200 bar.

The extreme operating viscosity range is from 300 to 13 cSt (1460 to 70 SUS) but the recommended running range is 54 to 13 cSt (250 to 70 SUS).

For further information about fluids see catalog 920.

Temperature Limits
Ambient min. . . . . –20°C (–4°F)
Ambient max. . . . . +70°C (158°F)

Fluid temperature

	Petroleum oil	**Water-containing**
Min.	–20°C (–4°F)	+10°C (+50°F)
Max.*	+70°C (+158°F)	+54°C (+130°F)

* *To obtain optimum service life from both fluid and hydraulic system, 65°C (150°F) normally is the maximum temperature except for water-containing fluids.*

For synthetic fluids consult manufacturer and your Vickers representative where limits are outside those for petroleum oil.

Whatever the actual temperature range, ensure that viscosities stay within the limits specified in the “Hydraulic Fluids” section.

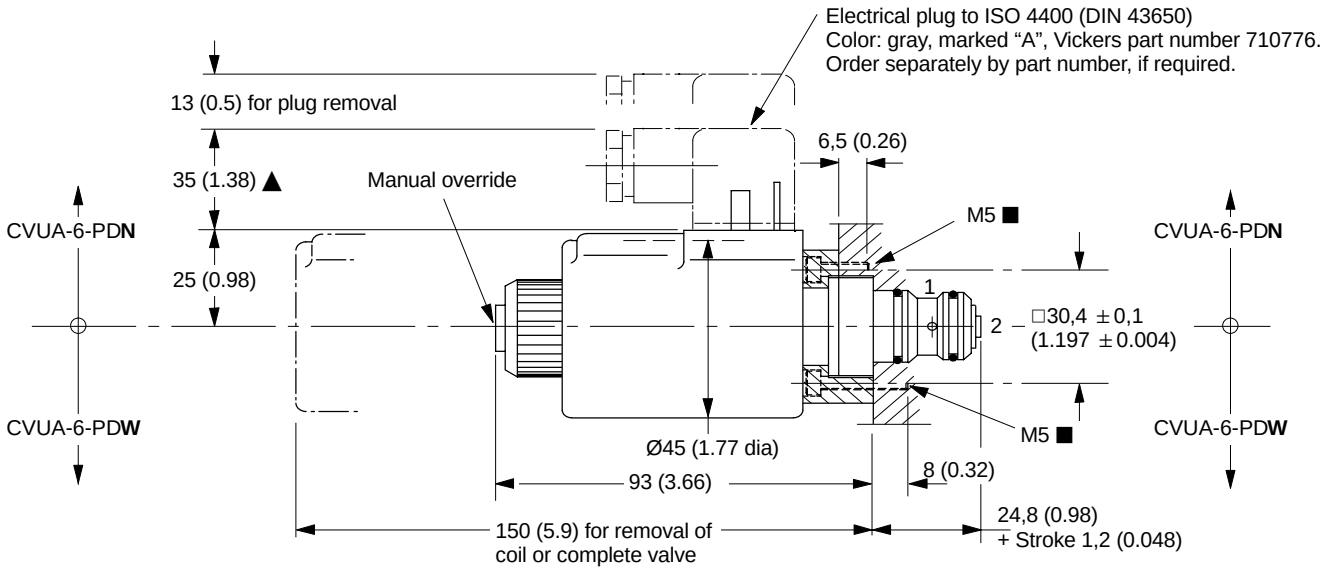
Contamination Control Requirements
Recommendations on contamination control methods and the selection of products to control fluid condition are included in Vickers publication 9132 or 561, “Vickers Guide to Systemic Contamination Control”. The book also includes information on the Vickers concept of “ProActive Maintenance”. The following recommendations are based on ISO cleanliness levels at 2 μm, 5 μm and 15 μm. For products in this catalog the recommended levels are:

Up to 210 bar (3050 psi) 20/**18**/**15**
Above 210 bar (3050 psi) 19/**17**/**14**

Installation Dimensions in mm (inches)

Model Types:
CVUA-6-PDN-2 and CVUA-6-PDW-2

3rd angle projection



▲ *May vary depending on plug source.* ■ *Torque to 4-6 Nm (35-53 lbf.in)*

Recess Dimensions

Notes (metric dimensions)

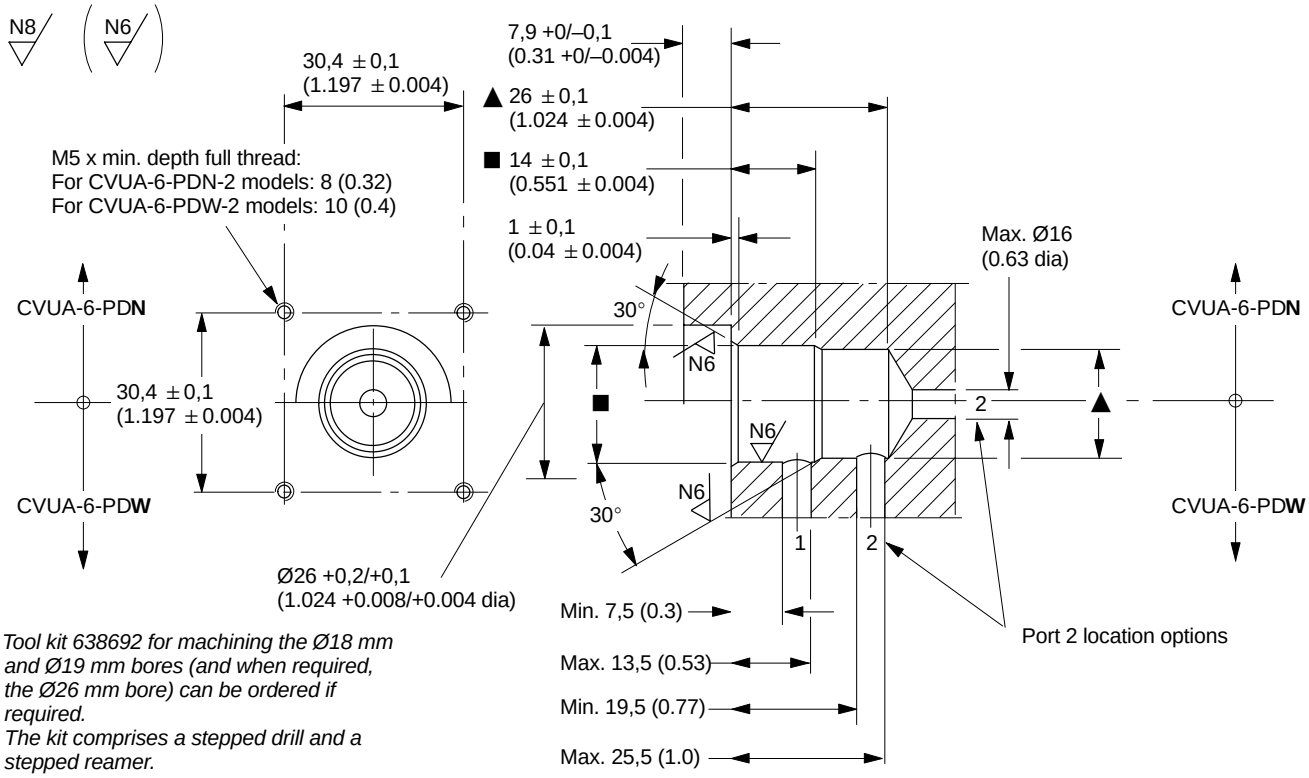
▲ Ø18 +0/–0,2 x 26 ±0,1 deep: Ream Ø18 H7 x 20 deep min. ◆

■ Ø19 +0/–0,2 x 14 ±0,1 deep: Ream Ø19 H7 x 8 deep min. ◆

Notes (inch dimensions)

▲ Diameter 0.709 +0/–0.008 x 1.024 ±0.004 deep: Ream Ø18 mm H7 x 0.79 deep min. ◆

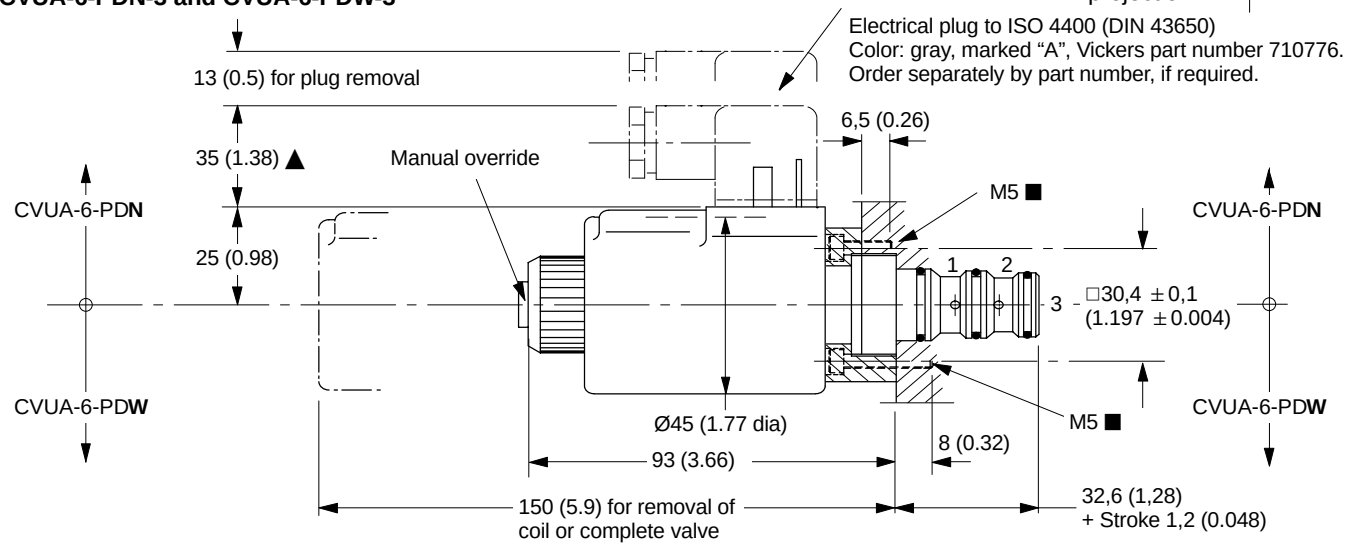
■ Diameter 0.748 +0/–0.008 x 0.551 ±0.004 deep: Ream Ø19 mm H7 x 0.32 deep min. ◆



◆ *Tool kit 638692 for machining the Ø18 mm and Ø19 mm bores (and when required, the Ø26 mm bore) can be ordered if required.*
The kit comprises a stepped drill and a stepped reamer.

Model Types:
CVUA-6-PDN-3 and CVUA-6-PDW-3

3rd angle projection



▲ *May vary depending on plug source.* ■ *Torque to 4-6 Nm (35-53 lbf.in)*

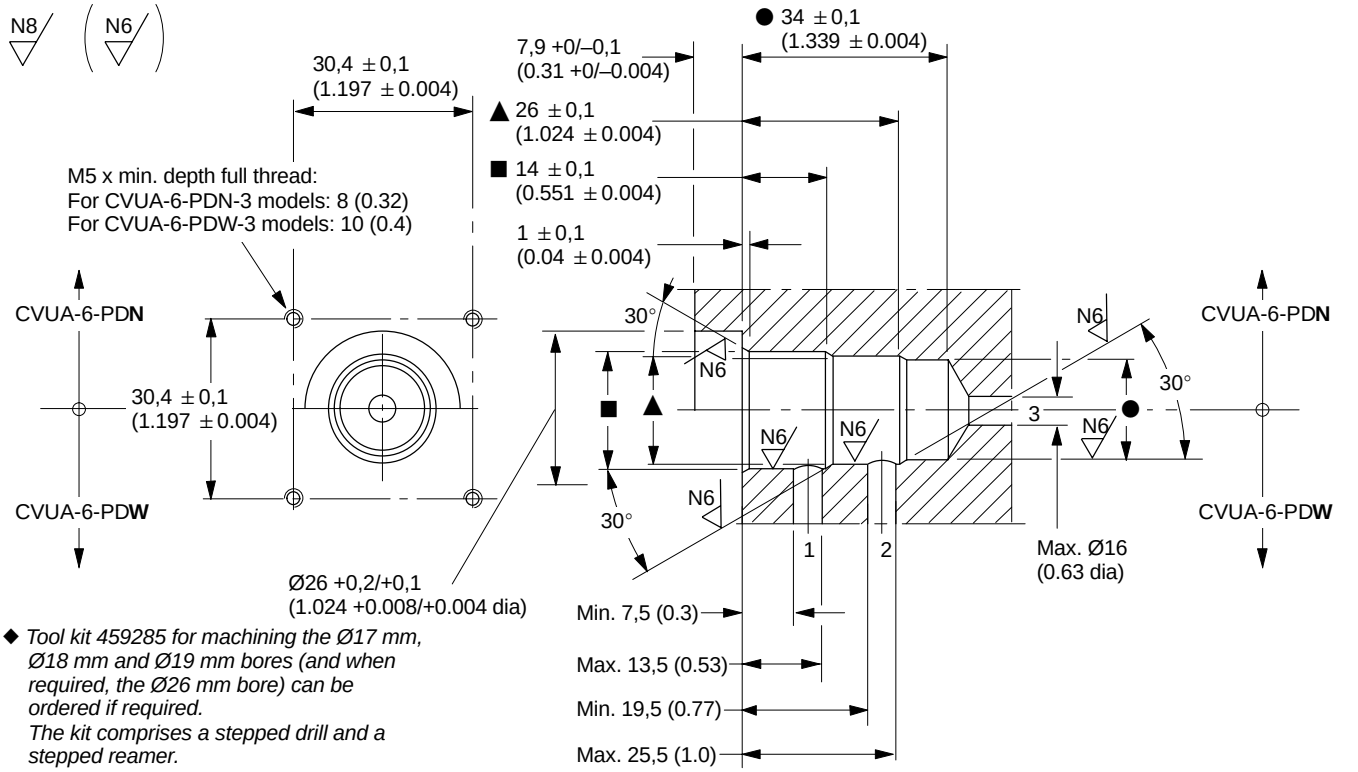
Recess Dimensions

Notes (metric dimensions)

- ● Ø17 +0/–0,2 x 34 ±0,1 deep: Ream Ø17 H7 x 32,5 deep min. ◆
- ▲ Ø18 +0/–0,2 x 26 ±0,1 deep: Ream Ø18 H7 x 20 deep min. ◆
- ■ Ø19 +0/–0,2 x 14 ±0,1 deep: Ream Ø19 H7 x 8 deep min. ◆

Notes (inch dimensions)

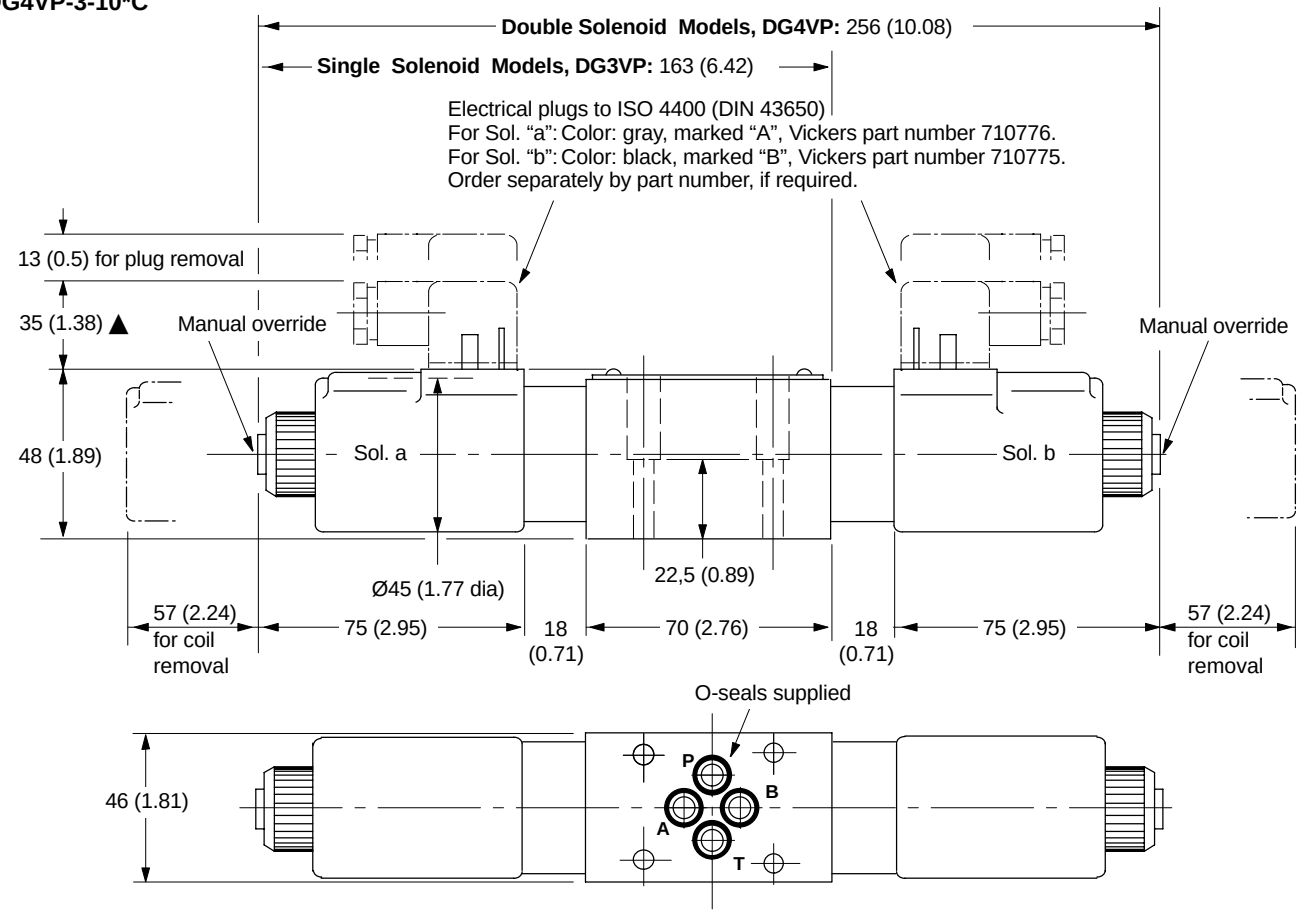
- ● Diameter 0.669 +0/–0.008 x 1.339 ±0.004 deep: Ream Ø17 mm H7 x 1.28 deep min. ◆
- ▲ Diameter 0.709 +0/–0.008 x 1.024 ±0.004 deep: Ream Ø18 mm H7 x 0.79 deep min. ◆
- ■ Diameter 0.748 +0/–0.008 x 0.551 ±0.004 deep: Ream Ø19 mm H7 x 0.32 deep min. ◆



◆ *Tool kit 459285 for machining the Ø17 mm, Ø18 mm and Ø19 mm bores (and when required, the Ø26 mm bore) can be ordered if required.*
The kit comprises a stepped drill and a stepped reamer.

Model Types:
DG3VP-3-10*A and
DG4VP-3-10*C

3rd angle projection



For details of mounting interface to ISO 4401, size 03, see catalog 2425.
For details of Vickers mounting bolt kits, see catalog 2314.

Mass, Approx. kg (lb)

CVUA-6-PD*-2-M-U-*-10 . . . . 0,85 (1.9)
CVUA-6-PD*-3-M-U-*-10 . . . . 0,86 (1.9)
DG3VP-3-10*A-VM-U-*-10 . . . 1,75 (3.8)
DG4VP-3-10*C-VM-U-*-10 . . . 2,50 (5.5)

Spare Parts Information

The only replacement parts available for these valves are as follows:

Seal kit	Part number
F3-prefix valves	638532
Non-F3 valves	992686

Solenoid Coils

Coil code	Coil rating	Part number
B	110V AC 50/115V AC 60	617947
D	220V AC 50/230V AC 60	617948
G	12V DC	617945
H	24V DC	617946

Electrical Plugs, ISO 4400 (DIN 43650)
Gray, marked "A" 710775
Black, marked "B" 710776

Tool Kits
For machining housing bores for:
CVUA-6-PD*-2 valves . . . . . Kit 638692
CVUA-6-PD*-3 valves . . . . . Kit 459285

Ordering Procedure

Order by full model designation or part number e.g.
CVUA-6-PDN-2-M-U-B-10 valve
710775 plug, gray marked "A"
638692 tool kit.