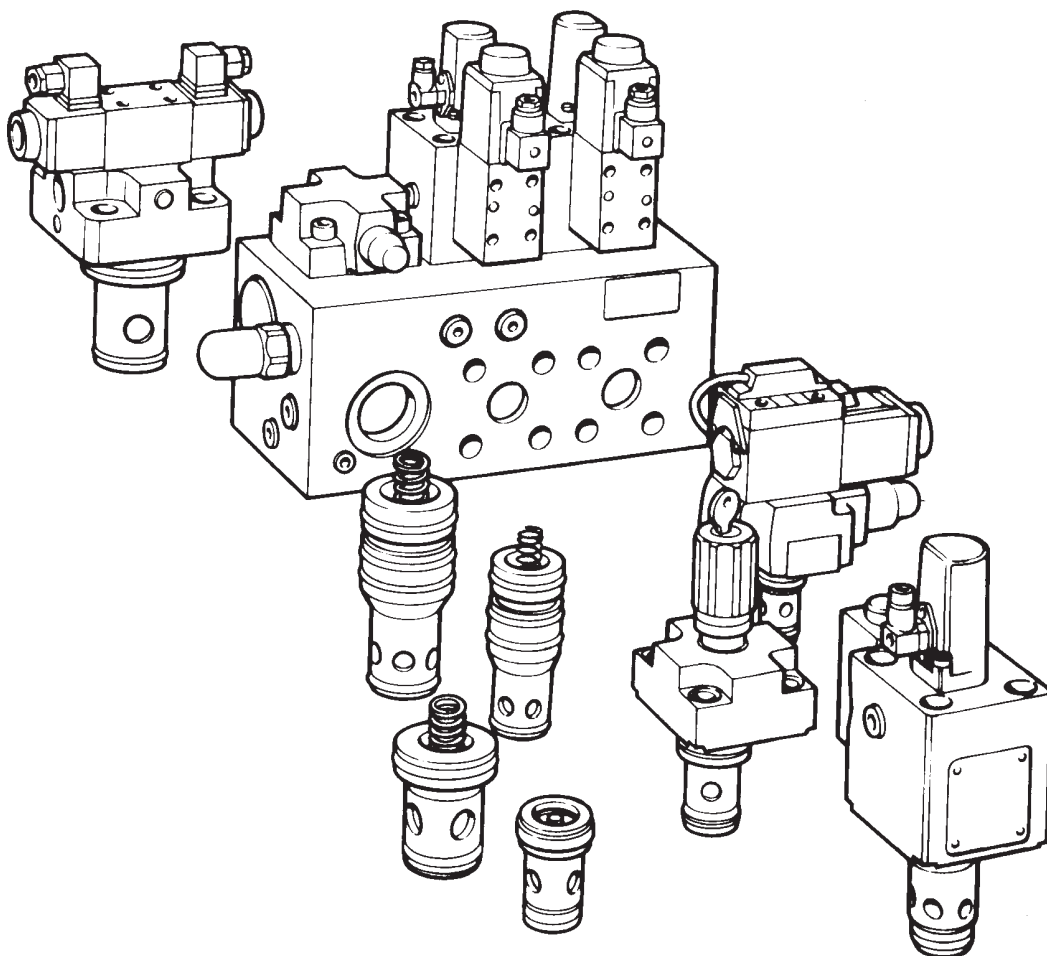


Vickers®

Cartridge Valves



Slip-in Cartridge Valves to ISO 7368 (DIN 24342)



Pilot Operated Directional Valves

Sizes 16 to 40

Covers are available with mounting interfaces for pilot valves. These pilots are typically the DG4V-3(S) solenoid operated directional valve that mounts to the ISO 4401, size 03 (ANSI/B93.7M-D03) interface. Manually operated DG17V-3, pilot operated DG3V-3, or air operated DG18V-3 pilots are also applicable. The Vickers soft shift pilot valves DG4V-3S-****2** (catalog 614 can also be used to achieve smooth opening and closing.

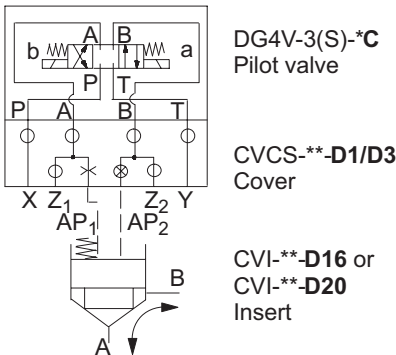
The model identification for size 03 pilot valve interface options is:
 D1 for North American formats, i.e. UNC/UNF threads
 D3 for European formats, i.e. metric threads

Single or dual solenoid pilots are applicable (Figure 15), depending on circuit requirements. The spool center condition of the solenoid pilots also depends on the circuit function desired.

Ports Z_1 and Z_2 are for remote control of additional cartridges. That is, for D1/D3 covers, Z_1 is connected to pilot port A. The X port is the pilot pressure port. The Y port should always go directly to the reservoir.

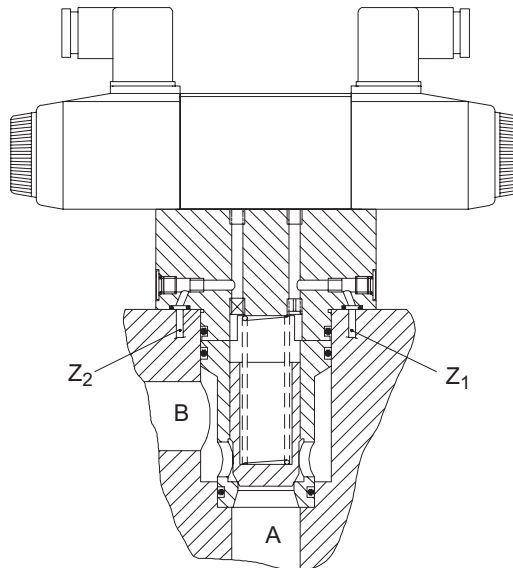
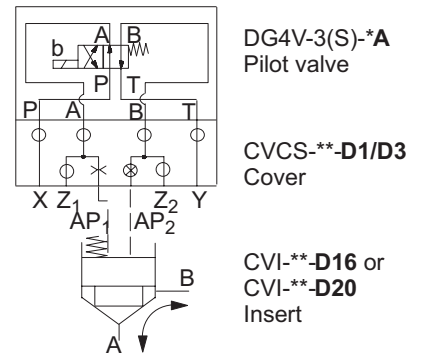
The insert used can be either the model D16 (1:1.6 area ratio poppet), or model D20 (1:2 area ratio poppet).

Dual Solenoid Control: Sizes 16 to 40 3-position, spring centered pilot valve



Note that the circuitry (i.e. flow path and orifice locations) of these 16 to 40 sizes is different from that of sizes 50 and 63 shown on the next page.

Single Solenoid Control: Sizes 16 to 40 2-position, spring offset pilot valve



Area ratio
 $A_A:A_{AP} = 1:1.6$ or
 $A_A:A_{AP} = 1:2$

Figure 15

Pilot Operated Directional Valves with Shuttle Function

General Information

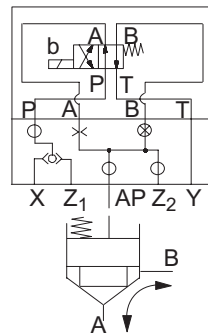
The shuttle function in combination with a solenoid operated pilot valve is available in cartridge sizes 16 through 40. In each cartridge size, the pilot valve is the DG4V-3(S) that mounts to the ISO

4401, size 03 (ANSI/B93.7M-D03) interface. There are two functional cover types, W11/W13 and W31/W33, that are applied with a model DG4V-3(S) pilot valve.

The insert used can be either the model D16 (1:1.6 area ratio poppet), or model D20 (1:2 area ratio poppet).

Shuttle Type 1 (W11/W13 Cover): Sizes 16 to 40

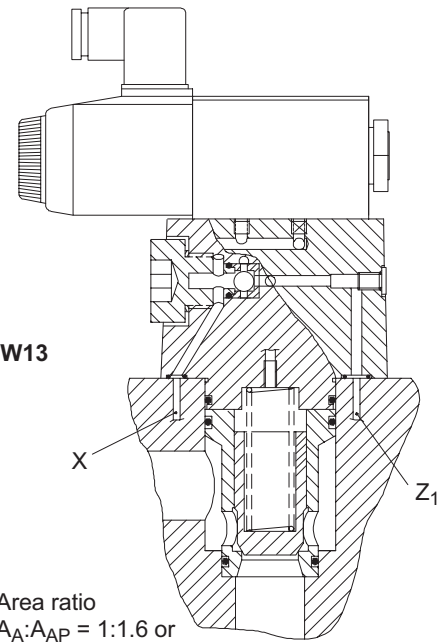
With the solenoid de-energized, Figure 17, the cartridge is shut by the higher of the pressures at X or Z₁. Pilot port Z₂ can be used to pilot a second cartridge simultaneously.



DG4V-3(S)-*A
Pilot valve

CVCS-**-W11/W13
Cover

CVI-**-D16 or
CVI-**-D20
Insert

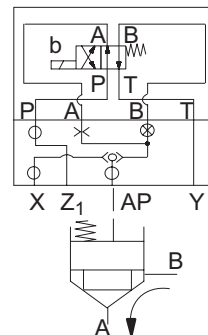


Area ratio
 $A_A:A_{AP} = 1:1.6$ or
 $A_A:A_{AP} = 1:2$

Figure 17

Shuttle Type 3 (W31/W33 Cover): Sizes 16 to 40

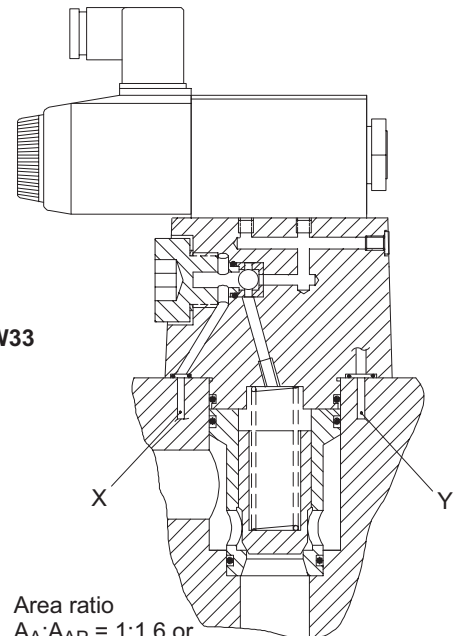
The function of the W31/W33 cover, Figure 18, is to provide a non-reverse-flow check, thereby eliminating the need for a separate back flow check. Flow is either blocked or allowed from port B to port A. Flow from port A to port B is always blocked. The application would have pump flow going into port B, port A connected to the actuator and control port X connected to port A.



DG4V-3(S)-*A
Pilot valve

CVCS-**-W31/W33
Cover

CVI-**-D16 or
CVI-**-D20
Insert



Area ratio
 $A_A:A_{AP} = 1:1.6$ or
 $A_A:A_{AP} = 1:2$

Figure 18

**Dual Check (DC1/DC3 Cover):
Sizes 16 to 40**

The DC1/DC3 cover, Figure 19, provides parallel check functions in pilot control ports X and Z₁. The higher of these two pressures is then available at pilot port P to close the insert via the size 03 solenoid operated valve. A second cartridge can be operated simultaneously from pilot port Z₂.

The DC1/DC3 cover is similar to the type W11/W13 cover but, whereas there is an open transient condition in the shuttle function (type W11/W13), the DC1/DC3 design uses two check valves to ensure that no transient loss of pressure in port P can occur during pilot pressure change-over between ports X and Z₁. This feature is of benefit in any application where there must be absolutely no risk of the cartridge even momentarily opening during pilot pressure changeover.

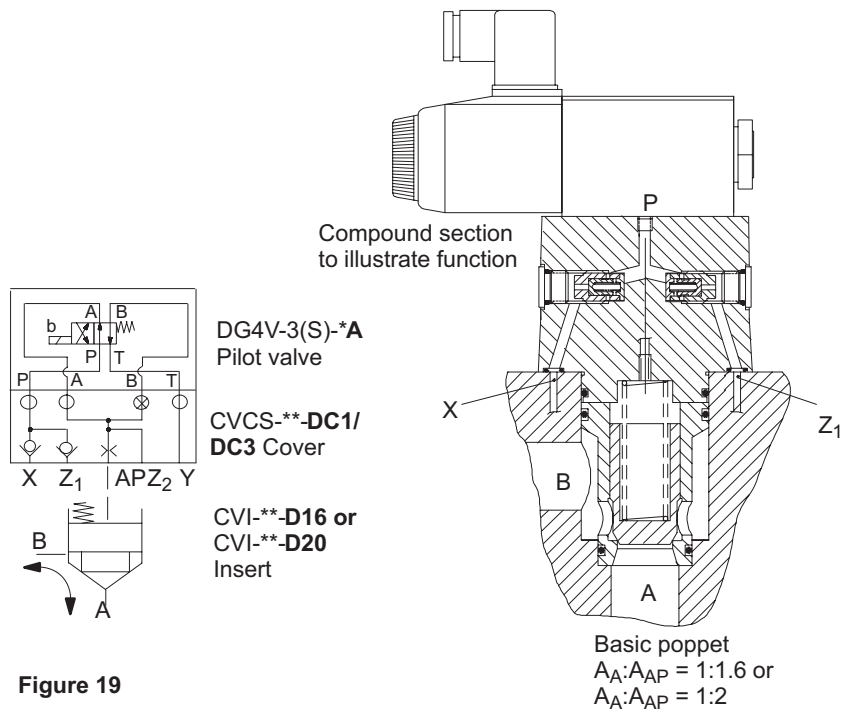


Figure 19

Stroke Limiter Control Functions

General Information

Flow control is by means of a standard cover with a stroke adjuster which limits the stroke of any of the inserts and thereby limits the flow.

Size 16 to 40

The R16 insert (1:1.6 area ratio) has a notch for a fine metering (reduced gain) flow control function.

Sizes 50 and 63

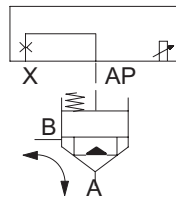
The R insert (1:2 area ratio) has a notch for a fine metering (reduced gain) flow control function. The F insert (area ratio 1:2) has a larger notch for more coarse metering (high gain) flow control function.

The A insert stroke adjuster cover is available with three types of adjusters, micrometer (M), micrometer with keylock (K) or standard square end screw with hex. locknut (W).

Adjustable Stroke Limiter and Directional Functions: Sizes 16 to 63

The adjustable limiting of the insert poppet opening restricts flow in both directions (A to B and B to A). Control is from pilot port X. See Figure 20.

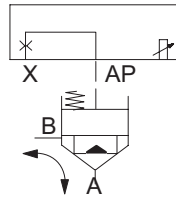
Sizes 16 to 40



CVCS-**-A
Cover

CVI-**-R16
Insert

Sizes 50 and 63



CVC(S)-**-A
Cover

CVI-**-F or
CVI-**-R
Insert

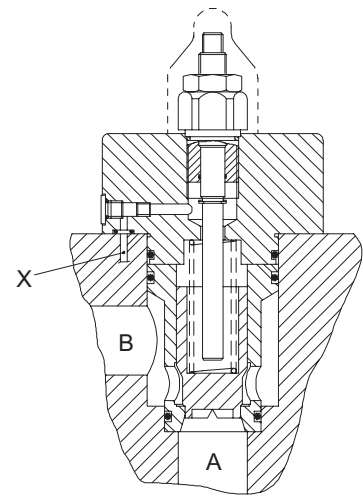
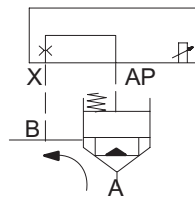


Figure 20

Adjustable Stroke Limiter and Check Functions: Sizes 16 to 63

The adjustable poppet lift limiter restricts flow from A to B. The check function prevents flow from B to A. The X pilot port of the cover is connected to the B port of the insert. See Figure 21.

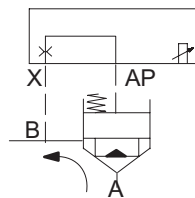
Sizes 16 to 40



CVCS-**-A
Cover

CVI-**-R16
Insert

Sizes 50 and 63



CVC(S)-**-A
Cover

CVI-**-F or
CVI-**-R
Insert

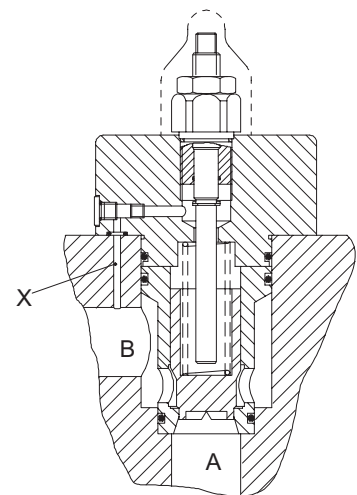


Figure 21

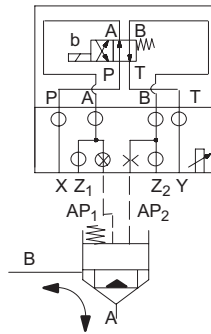
Adjustable Stroke Limiter and Pilot (Directional) Function: Sizes 16 to 40

Stroke limiters are available with an ISO 4401, size 03 (ANSI/B93.7M-D03) interface for mounting a single-solenoid controlled DG4V-3(S)-*A pilot valve.

These type A1/A3 covers are supplied configured for a “normally open” function, i.e. the insert poppet is vented when the solenoid of the pilot valve is de-energized (with pilot pressure applied to port X).

The opposite, “normally closed” (NC) function, can be obtained by interchanging the orifice and plug in ports AP₁/AP₂. With this arrangement, the insert poppet is “normally closed” (NC) and is open when the solenoid of the pilot valve is energized (with pilot pressure applied to port X).

Normally Open Function

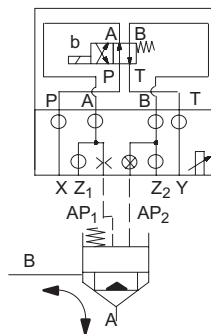


DG4V-3(S)-*A
Pilot valve

CVCS-**-A1/A3
Cover as supplied

CVI-**-R16
Insert

Normally Closed Function



DG4V-3(S)-*A
Pilot valve

CVCS-**-A1/A3
Cover

CVI-**-R16
Insert

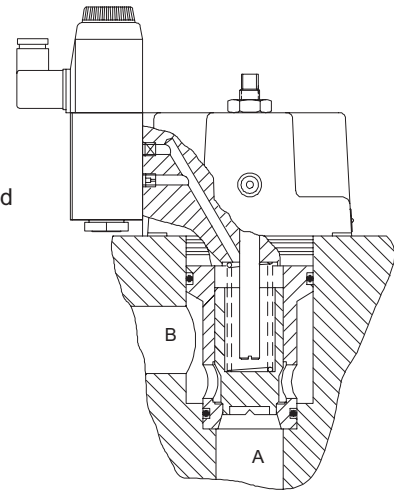


Figure 22

Model Codes - Check, Directional and Flow Restrictor Functions - Sizes 16 to 40

CVCS Covers

Vickers type "CVCS" cartridge covers featured in this catalog conform to installation requirements of ISO 7368 and

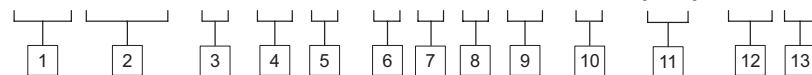
DIN 24342. This includes *port usage changes to the D*, PC, W and W1* functions from prior published information for cover types "CVC."*

For availability of covers by size and function see page 4. All features must be specified when ordering; those in brackets () are optional or apply only to specific models.

Metric Models

Metric bolt tappings and orifice threads; BSPF plugs. Mounting bolts supplied.

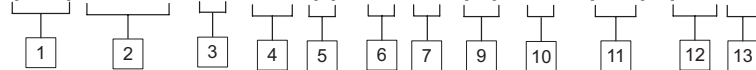
(F3-) CVCS - ** - * (*) - B 2 9 (-*) - 1* - (NC) (-*** **)**



Non-Metric Models

UNC bolt tappings; UNF orifice threads; SAE plugs; mounting bolts not supplied.

(F3-) CVCS - ** - * (*) - S 2 (-*) - 1* - (NC) (-*** **)**



1 Seal Material

F3 - Special seals. See "Fluids and Seals" on page 16.
Omit for standard seals.

2 Model

CVCS - Cartridge valve cover to ISO 7368

3 Nominal size to ISO 7368 (DIN 24342)

16 - 06 (NG16)
25 - 08 (NG25)
32 - 09 (NG32)
40 - 10 (NG40)

4 Function

A - Stroke adjuster (flow restrictor)
A* - Stroke adjuster with mounting face for size 03 pilot valve
B - Blanking cover
D* - Standard directional with mounting face for size 03 pilot valve
DC* - Two check valves with mounting face for size 03 pilot valve
N - Basic
PC - Pilot operated check
W - Pilot shuttle (ports X and Z₁)
W1* - As type W with mounting face for size 03 pilot valve
W3* - Pilot shuttle (ports X and B) with mounting face for size 03 pilot valve

* Code for optional threads, see 5.

5 Mounting bolt tappings for pilot valve

For size 03 pilot valve, applicable to types A*, D*, DC*, W1*, W3*:

1 - Inch threads
3 - Metric threads

6 Plugs and orifice threads

B - G (BSPF) threads for closure plugs; metric plugs for orifices
S - SAE threads for closure plugs; UNF threads for orifices

7 Seals

2 - Inch O-ring seals to ISO 3601

8 Mounting bolts

9 - Metric mounting bolts supplied

9 Adjuster mechanism

For all model types A, A* only
For all sizes

W - Wrench adjustment with hex locknut

For sizes 16, 25, 32 only

K - Micrometer adjuster with keylock

M - Micrometer adjuster without lock

10 Design number, 1* series

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

11 Normal function

NC = Normally closed
Blank = Normally open

See page 124 for sizes of factory-fitted standard orifices. Other orifice sizes and locations can be fitted by special arrangement with your Vickers representative. Non-standard orifice requirements should be defined as follows:

12 Pilot control orifice location

Specify port location for non-standard orifice, e.g. "AP", followed by orifice size code, see 13. Repeat as necessary for further non-standard requirements.

13 Orifice size

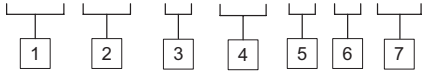
Specify non-standard orifice size code, see tables on page 125.

Model Codes - Check, Directional and Flow Restrictor Functions - Sizes 16 to 63

CVI Inserts

For availability of inserts by size and function see page 5. All features must be specified when ordering; those in brackets () are optional.

(F3-) CVI - ** - **** - * - ** (-**)



1 Seal Material

F3 - Special seals. See “Fluids and Seals” on page 16.
Omit for standard seals.

2 Model

CVI - Cartridge valve insert

3 Nominal size to ISO 7368 (DIN 24342)

16 - 06 (NG16)
25 - 08 (NG25)
32 - 09 (NG32)
40 - 10 (NG40)
50 - 11 (NG50)
63 - 12 (NG63)

4 Function

Sizes 16 to 40

D10 - 1:1 ratio
D105 - 1:1.05 ratio
D105V - 1:1.05 ratio with variable orifice plug
D16 - 1:1.6 ratio
D20 - 1:2 ratio
DC16 - 1:1.6 ratio direct check
R16 - 1:1.6 ratio with damping

Sizes 50 and 63

D11 - 1:1.1 ratio
D20 - 1:2 ratio
F - 1:2 ratio, flow restrictor
R - 1:2 ratio with damping

5 Cracking pressure, bar (psi)

For flow direction A to B
Sizes 16 to 40

Spring code	Insert code	
	D10	D105(V)
L	0,31 (4.5)	0,33 (4.8)
M	1,55 (22.5)	1,65 (24)
H	3,1 (45)	3,3 (48)

Spring code	Insert code	
	D16, D20 DC16	R16
L	0,5 (7.3)	0,6 (8.7)
M	2,5 (36.3)	3,0 (43.5)
H	5,0 (73)	6,0 (87)

Sizes 50 and 63

Spring code	Insert code	
	D11	D20, F, R
L	0,31 (4)	0,5 (7.3)
M	1,4 (20)	2,5 (36.3)
H	2,7 (39)	5,0 (73)

6 Design number, 1* & 4* series

Subject to change. Installation dimensions unchanged for design numbers 10 to 19 and 40 to 49 inclusive. Tables show availability by current design number according to function and size.

Sizes 16 to 40

D10	40 design
D105	40 design
D105V	40 design
D16	40 design
D20	10 design
DC16	40 design
R16	40 design

Sizes 50 and 63

D11	10 design
D20	10 design
F	10 design
R	10 design

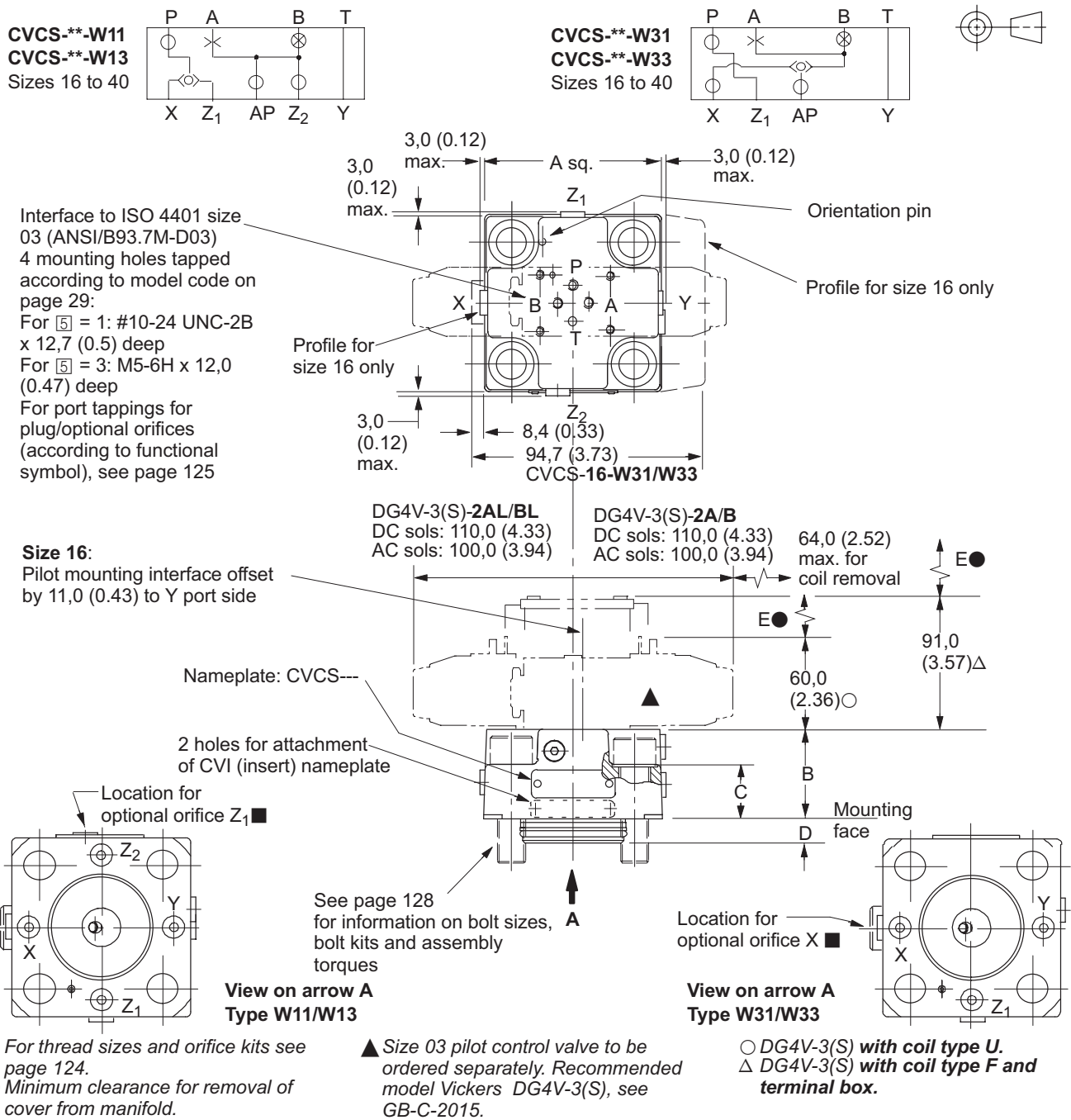
7 Orifice size

Specify non-standard orifice size code, see tables on page 125.

See page 124 for sizes of standard orifices factory-fitted to function type D105V. Other orifice sizes can be fitted by special arrangement with your Vickers representative.

Note: A nameplate is supplied with each insert for fixing to the cover to identify the insert in use.

“W1*” and “W3*” Covers with Size 03 Pilot Valve Interface



Size	A	B	C	D max. Tolerance -0,1 (0.004)	E	Location of nameplates	
						Type W1*	Type W3*
16	65,0 (2.56)	48,0 (1.89)	36,0 (1.42)	8,0 (0.315)	12,0 (0.47)	Side Z ₂	Side Z ₂
25	85,5 (3.37)	57,0 (2.24)	25,0 (0.98)	10,5 (0.413)	22,0 (0.90)	Side X	Side Z ₂
32	102,5 (4.04)	60,0 (2.36)	30,0 (1.18)	13,0 (0.512)	31,0 (1.22)	Side X	Side Z ₂
40	124,5 (4.90)	58,0 (2.28)	35,0 (1.38)	15,0 (0.591)	33,0 (1.30)	Side X	Side Z ₂

Covers with Stroke Limiters “A” for Flow Control Functions

CVCS-**-A

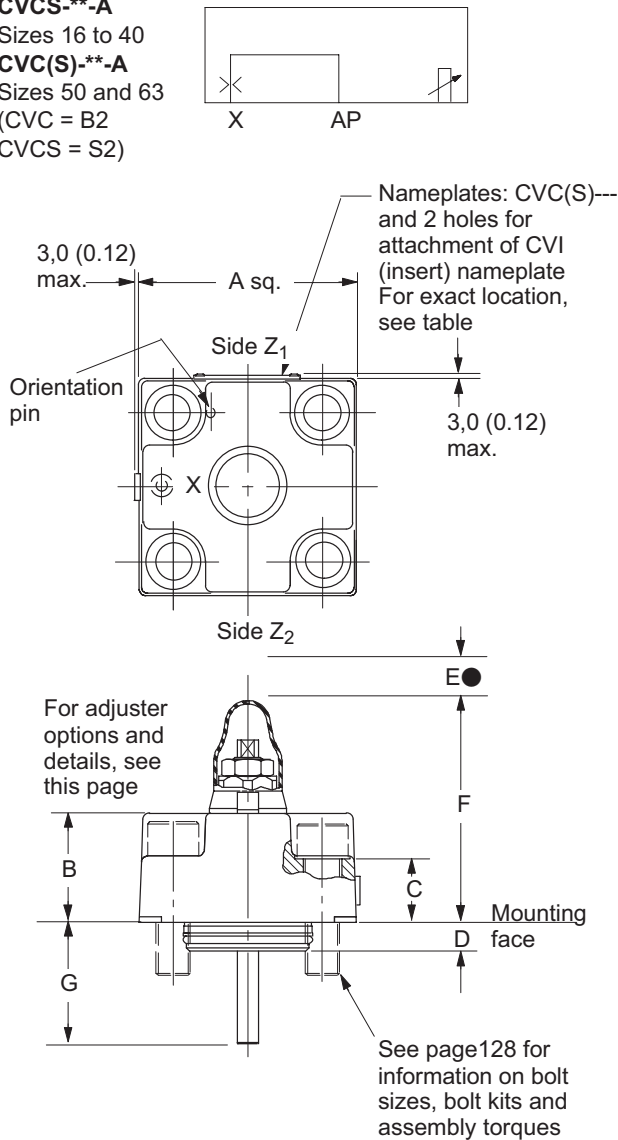
Sizes 16 to 40

CVC(S)-**-A

Sizes 50 and 63

(CVC = B2

CVCS = S2)



● Minimum clearance for removal of cover from manifold. For adjuster type K allow 43,0 (1.69) for key removal, see this page.

Details of Stroke Adjusters

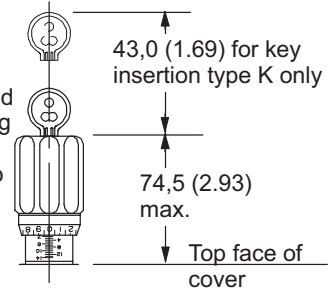
For cover types CVC(S)-**-A, A1, A3

Types K and M

Sizes 16, 25 and 32 only

Type K:

Adjustment of valve setting is only possible while key is inserted and turned to engage driving pin. When key is removed, adjuster knob can be freely spun and does not engage with mechanism.



Type W

Sizes 16 and 25

Size 32 (CVCS-**-A only)

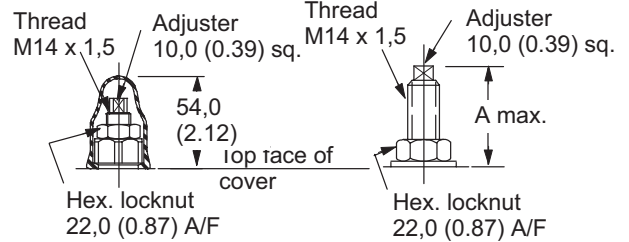
Type W

Size 32 (CVCS-**-A1/A3 only)

Size 40

Size 32: A = 36,0 (1.42)

Size 40: A = 43,0 (1.7)



Type W

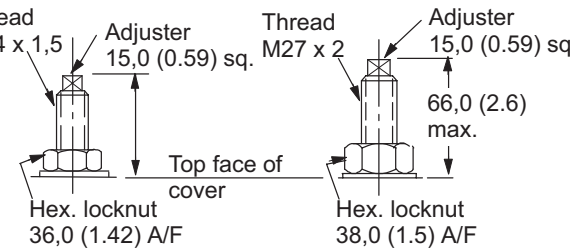
Size 50

Thread M24 x 1,5, Adjuster 15,0 (0.59) sq.

Type W

Size 63

Thread M27 x 2, Adjuster 15,0 (0.59) sq.

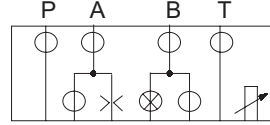


Size	A	B	C	D max. Tolerance -0,1 (0.004)	E	F max. for adjuster type K & M	W	G Max.	Min.	Location of nameplate
16	65,0 (2.56)	35,0 (1.38)	26,0 (1.02)	8,0 (0.315)	12,0(0.47)	109,5(4.31)	89,0(3.50)	31,0(1.22)	26,0(1.02)	Side Z ₁
25	85,5 (3.37)	42,0 (1.65)	25,0 (0.98)	10,5 (0.413)	22,0(0.90)	116,5(4.59)	96,0(3,78)	47,0(1.85)	32,0(1.26)	Side Z ₁
32	102,5 (4.04)	51,0 (2.01)	30,0 (1.18)	13,0 (0.512)	31,0(1.22)	125,5(4.94)	105,0(4.13)	57,0(2.24)	43,0(1.69)	Side Z ₁
40	124,5 (4.90)	61,0 (2.40)	35,0 (1.38)	15,0 (0.591)	33,0(1.30)	–	127,6(5.02)	76,0(2.99)	62,0(2.44)	Side Z ₁
50	141,0 (5.55)	70,0 (2.76)	44,0 (1.73)	18,0 (0.709)	34,0(1.34)	–	127,0(5.0)	81,0(3.19)	56,0(2.20)	Side Z ₂
63	181,0 (7.12)	86,0 (3.38)	48,0 (1.89)	20,0 (0.787)	43,0(1.70)	–	152,0(5.98)	108,5(4.27)	76,5(3.01)	Side Z ₂

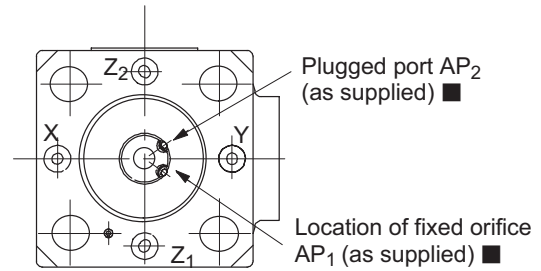
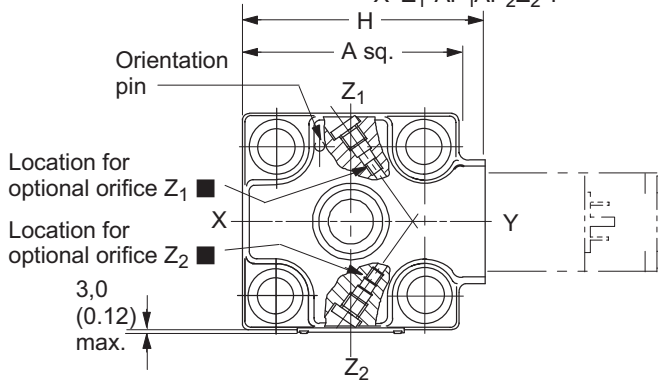
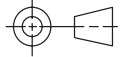
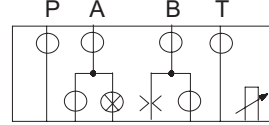
Covers for Directional and Flow Control Functions "A1/A3"

CVCS--A1**
CVCS--A3**
 Sizes 16 to 32
 For size 40 see next page

As supplied for
 Normally Closed function



As can be modified for Normally Open
 function: interchange plug/orifice in AP₁/AP₂

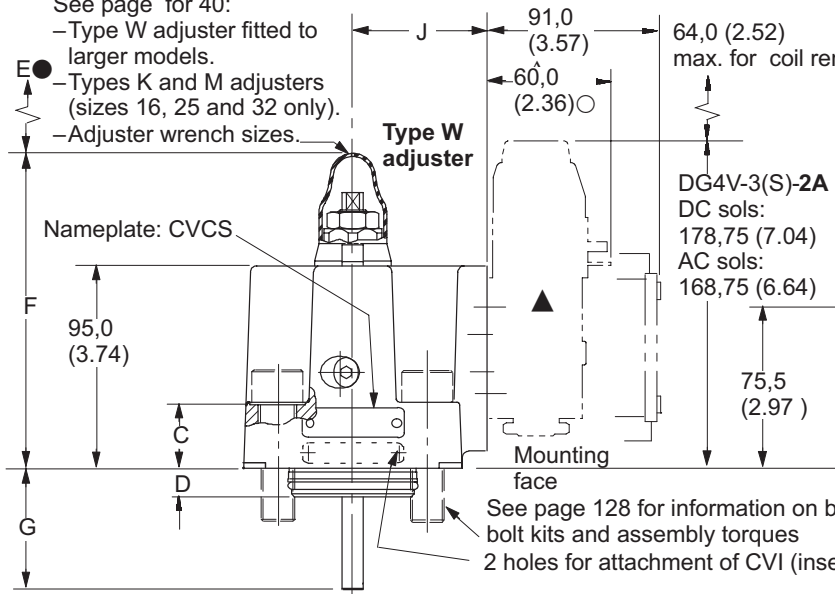


View on arrow A

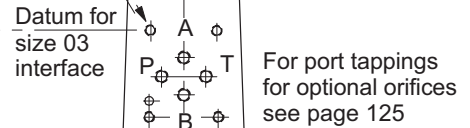
Type W adjuster as fitted to sizes 16, 25 and 32.

See page for 40:

- Type W adjuster fitted to larger models.
- Types K and M adjusters (sizes 16, 25 and 32 only).
- Adjuster wrench sizes.



4 mounting holes tapped according to model code on page 29:
 For □ = 1: #10-24 UNC-2B x 12,7 (0.5) deep
 For □ = 3: M5-6H x 12,0 (0.47) deep



Interface to ISO 4401 size 03 (ANSI/B93.7M-D03)

■ For thread sizes and orifice kits see page 124.

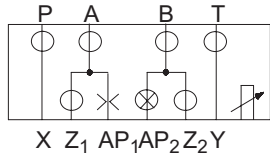
● Minimum clearance for removal of cover from manifold. For adjuster type K allow 43,0 (1.69) for key removal, see page 40.

- ▲ Size 03 pilot control valve to be ordered separately. Recommended model Vickers DG4V-3(S), see GB-C-2015.
- DG4V-3(S) with coil type U.
- △ DG4V-3(S) with coil type F and terminal box.

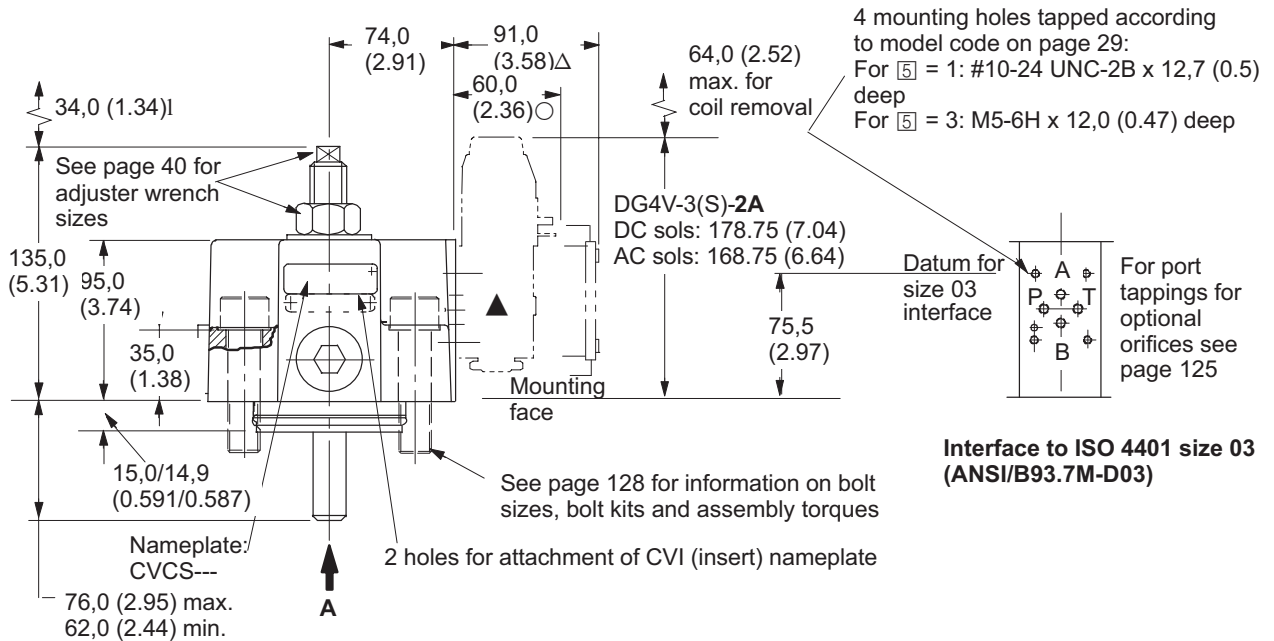
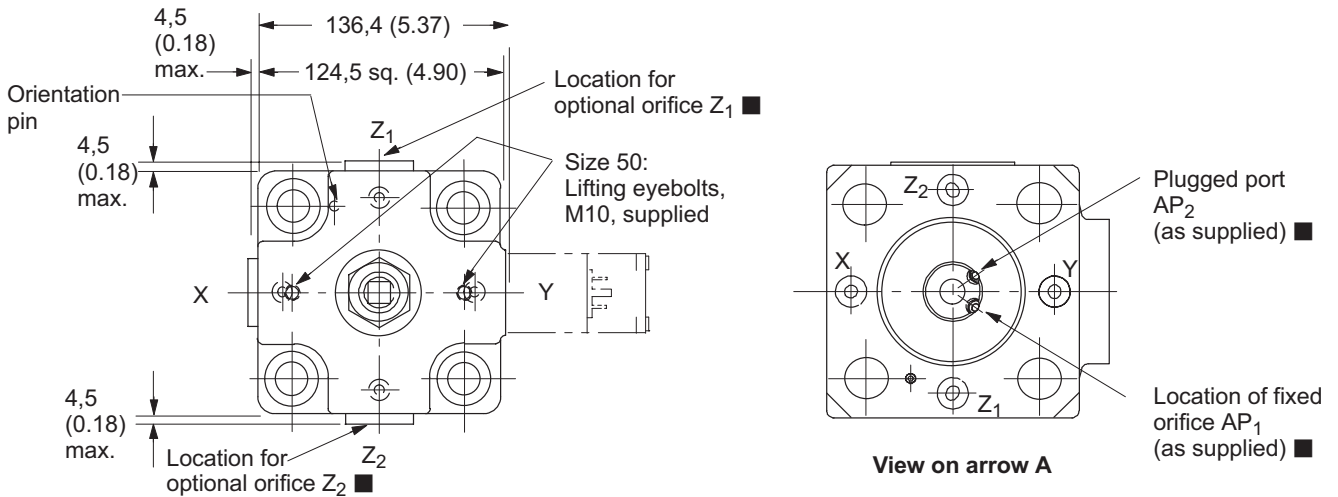
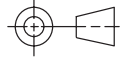
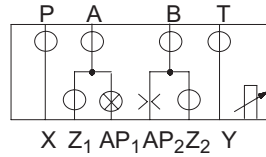
Size	A	C	D max. Tolerance -0,1 (0.004)	E	F for adjuster type:		G Max.	H		J
					K & M	W		Min.	(3.25)	
16	65,2 (2.57)	26,0 (1.02)	8,0 (0.315)	12,0 (0.47)	167,5 (6.59)	148,0 (5.83) max.	31,0 (1.22)	26,0 (1.02)	82,8 (3.25)	50,0 (1.97)
25	85,8 (3.38)	25,0 (0.98)	10,5 (0.413)	25,0 (0.98)	167,5 (6.59)	148,0 (5.83) max.	47,0 (1.85)	32,0 (1.26)	99,5 (3.92)	57,0 (2.24)
32	102,5 (4.04)	30,0 (1.18)	13,0 (0.512)	31,0 (1.22)	167,5 (6.59)	148,0 (5.83) max.	57,0 (2.24)	43,0 (1.69)	113,9 (4.48)	63,0 (2.48)

CVCS--A1**
CVCS--A3**
 Size 40

As supplied for
 Normally Closed function



As can be modified for Normally Open
 function: interchange plug/orifice in AP₁/AP₂



■ For thread sizes and orifice kits see page 124.

● Minimum clearance for removal of cover from manifold. For adjuster type K allow 43,0 (1.69) for key removal, see page 40.

▲ Size 03 pilot control valve to be ordered separately. Recommended model Vickers DG4V-3(S), see GB-C-2015.

○ DG4V-3(S) with coil type U.

△ DG4V-3(S) with coil type F and terminal box.