DENISON HYDRAULICS

Seat Valve Cartridges CVD, Control Covers CVC

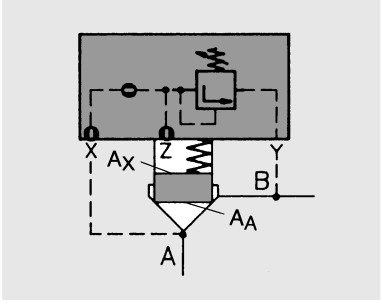
Pressure Relief Function / Cavity conform to DIN 24342

Publ. 3–EN 2450–A, replaces 3–EN 245–B

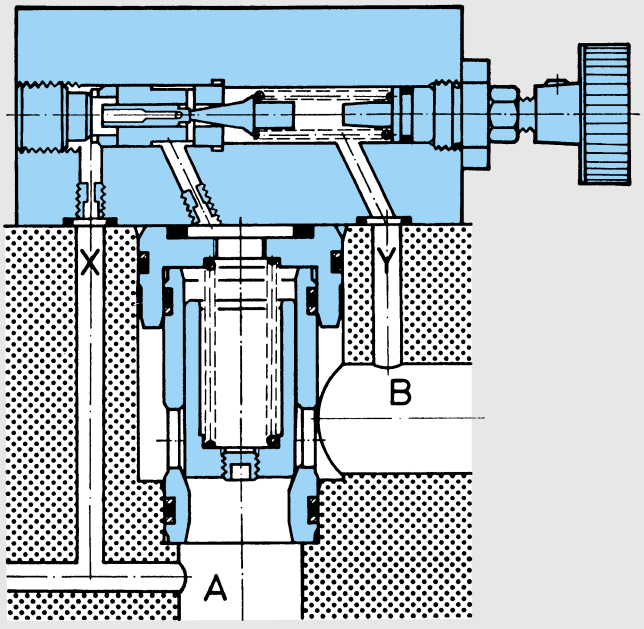
DENISON Hydraulics

FEATURES

- Pilot operated relief valve function with excellent balanced pressure characteristics.
- Low pressure drop in vented condition (see curves).
- All functions designed for an operating pressure of 350 bar or more.
- Low pressure overshoot owing to fast response.
- **DIN Cartridge Kit**
  – standardized installation dimensions according to DIN 24342
  – comprises poppet, sleeve, spring, ring and seals
  – O-ring and backup ring combination provide for a trouble free seal.
- **DIN Control Cover Versions**
  – with integrated pilot valve
  – for mounting of 4/2-directional valve CETOP 03 (4D01 or A4D01) for control of vent function
  – for mounting of proportional pressure valve CETOP 03 with position feedback (R1EP01)
  – for mounting of proportional pressure valve CETOP 03 without position feedback (4VP01).



A = Working port (pressure)
B = Working port (tank)
X = Pilot port
Y = Drain port



Example: Control Cover CVC 08–61
Cartridge CVD 08–31

DESCRIPTION

Relief valves of the CV* design are also based on the pilot operated 2/2 seat valves. Their applications are in manifold block systems. Cavity and installation dimensions are according to DIN 24342 standard.
The area ratio of the cartridge assembly $A_A : A_X = 1 : 1$.
The control cover with the standard pilot option contains the complete pressure control assembly with adjustment options of control knob, acorn nut with locking wire or key lock device. Five cover options with various pilot connections are available.
By use of the suitable pilot valves R1EP01 or 4VP01 the DENISON CV* valves can be operated electro-proportionally (see also page 9).

OPERATION

Pressure relief valves limit the hydraulic pressure in a system. Depending on system pressure they open or close effectively preventing excessive pressure build up.
The system pressure in port A acts on the bottom surface A_A of the main poppet. The orifice plug in connection X allows an equal pressure to be applied to the top surface Z of the main poppet. At operating pressure lower than setting the main poppet is, therefore, hydraulically balanced. A relative light spring holds the main poppet against the seat.
Simultaneously the pressure in Z also acts on the cone of the pilot head which in turn is held against the seat by a preloaded spring.
The setting of the adjustable preloaded spring plus the spring which holds the main poppet closed determines the pressure setting of the valve. If the system pressure exceeds this set value the pilot cone is pushed off its seat and pilot oil flows via the Y port to the tank. The flow through the control orifice in X creates a pressure drop which results in the pressure at the top of the main poppet being reduced.
The higher system pressure in A now lifts the main poppet of its seat. In the resulting float position only enough flow is passed from A to B to maintain the inlet pressure in A, as determined by the pilot head setting. If the pressure falls below its setting the main poppet is pushed against back the seat. The valve is once again closed.

By means of a 4/2 directional valve the top side of the main poppet Z can be vented to tank allowing virtually free flow from A to B, at a low Δp.

Using a proportional pilot valve on top of the cover, the operating pressure is electro-proportional adjustable. The hydraulic-mechanical pilot valve within the control cover should be set 10 % higher as the max. operating pressure.

GENERAL

• Type of unit	Pressure Relief Valve
• Design	Poppet type
• Type of mounting	Manifold cavity conform to DIN 24342
• Sizes	NG 16, NG 25, NG 32
• Mounting position	Optional
• Direction of flow	A→B
• Ambient temperature range	– 20 . . . + 80 °C
• Suitablitity for special working conditions	Consult DENISON

HYDRAULIC CHARACTERISTICS

• Operating pressure range	
– Inlet (Port A)	. . . 350 bar
– Outlet (Port B)	. . . 30 bar
– Port X	. . . 350 bar
– Port Y	. . . 30 bar
• Pressure setting range	7 . . . 105 bar 7 . . . 210 bar 7 . . . 350 bar

	NG 16	NG 25	NG 32
• Nominal flow	150 l/min	200 l/min	450 l/min
• Max. flow	200 l/min	300 l/min	600 l/min

• Max. pilot flow	at 50 bar	at 350 bar
– NG 16	0.5 l/min	0.6 l/min (A→B = 50 l/min)
	0.8 l/min	1.1 l/min (A→B = 200 l/min)
– NG 25	0.6 l/min	0.7 l/min (A→B = 50 l/min)
	1.1 l/min	1.6 l/min (A→B = 300 l/min)
– NG 32	0.7 l/min	0.8 l/min (A→B = 50 l/min)
	1.5 l/min	2.7 l/min (A→B = 600 l/min)

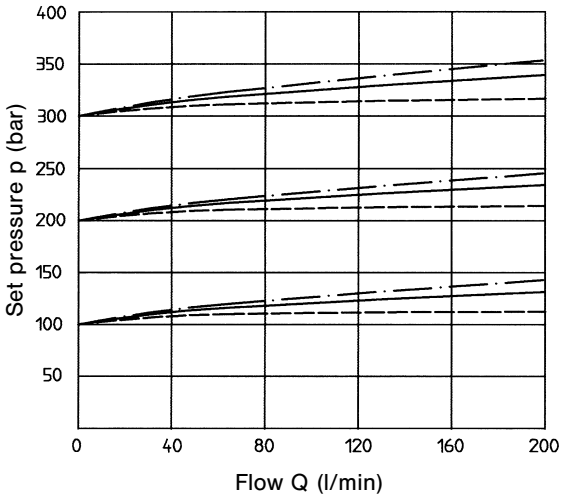
• Fluid	Petroleum base anti-wear fluids (covered by DENISON HF-0 and HF-2 specification). Such as mineral oil according to DIN 51524/25. Maximum catalogue ratings and performance data are based on operation with these fluids.
• Fluid temperature range	– 18 . . . + 80 °C
• Viscosity range	10 . . . 650 cSt; optimal 30 cSt
• Contamination level	Max. permissible contamination level according to NAS 1638 Class 8 (Class 9 for 15 micron and smaller) or ISO 17/14

TYPE OF ACTUATOR

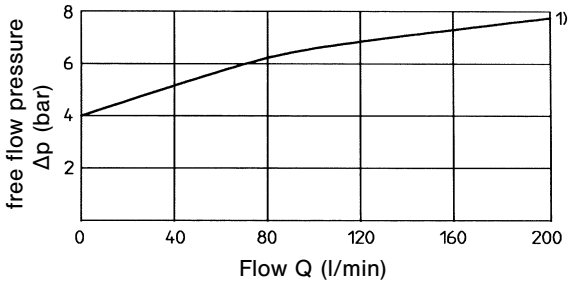
• **Mechanical** (within cover) (Max. pressure adjustment)	By hand
• Rotation	3.75 rev
• Operating torque	72 Ncm
• **Electric** (Proportional solenoid)	see bulletins 3–EN 220 (4VP01) 3–EN 225 (R1EP01)

p-Q-Characteristics NG 16

—·— CVC05–67
——— CVC05–64
– – – CVC05–61/62/63

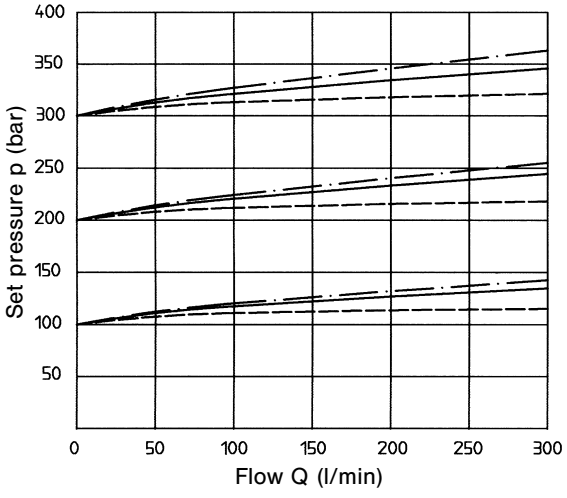


Δp-Q-Characteristics NG 16 (at 350 bar)
CVC05 / NG 16

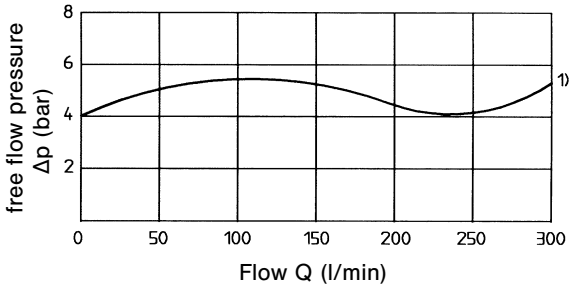


p-Q-Characteristics NG 25

—·— CVC08–67
——— CVC08–64
– – – CVC08–61/62/63

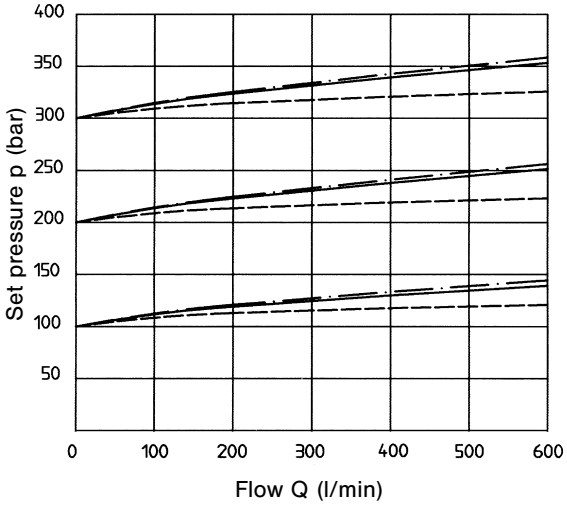


Δp-Q-Characteristics NG 25 (at 350 bar)
CVC08 / NG 25

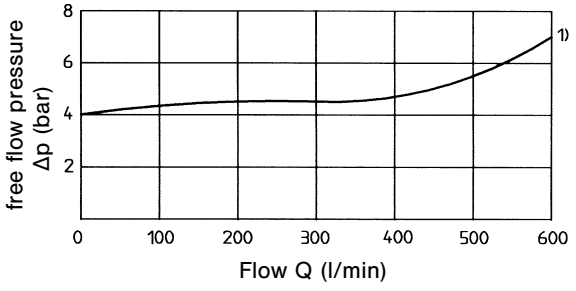


p-Q-Characteristics NG 32

—·— CVC10–67
——— CVC10–64
– – – CVC10–61/62/63

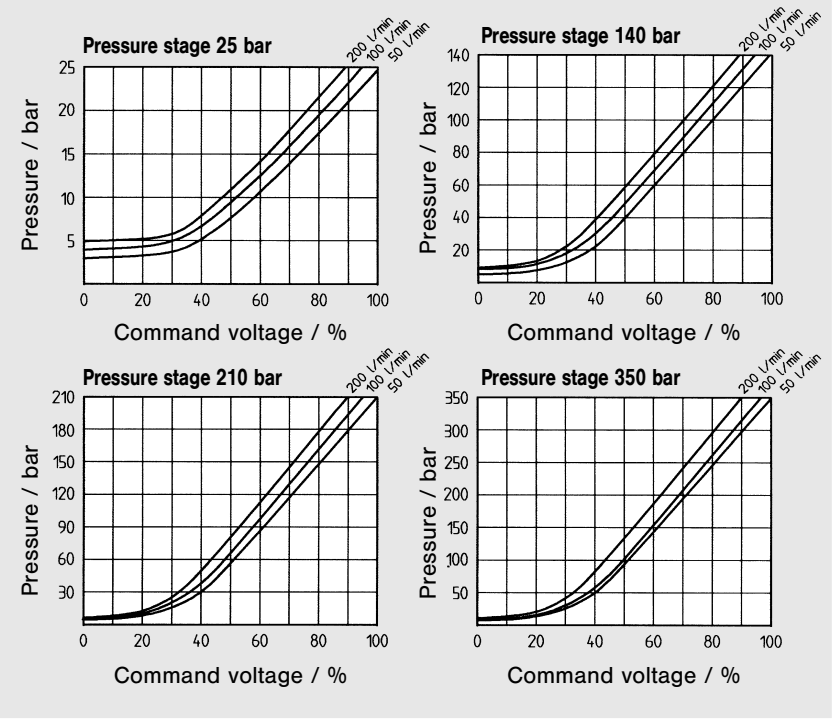


Δp-Q-Characteristics NG 32 (at 350 bar)
CVC10 / NG 32



[1]) main spool spring force included

COVER CVC05/08/10–64
WITH PROPORTIONAL VALVE
R1EP01



ORDERING CODE – CARTRIDGE

Model Number: **CVD .. – 31 – 6 – A .**

1 **Series**
CVD = Pressure relief function

2 **Seat Valve Size**
05 = NG 16
08 = NG 25
10 = NG 32

3 **Area Ratio A_A : A_X**
31 = 1 : 1
spool with closed bottom

4 **Spring**
6 = cracking pressure 4 bar

5 **Design Letter**

6 **Seal Class**
1 = N.B.R. (Buna N) Standard
4 = E.P.R. (not with R1EP01)
5 = VITON ®

Weight-Cartridge

CVD05	0.2 kg
CVD08	0.4 kg
CVD10	1.0 kg

ORDERING CODE – CONTROL COVER

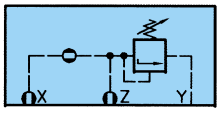
Model Number: CVC .. – .. – . – . – A .

1 **Series**
CVC = Pressure relief function

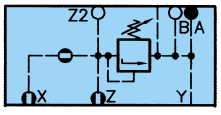
2 **Cover Size**
05 = NG 16
08 = NG 25
10 = NG 32

3 **Control Cover**

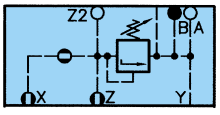
61 = with internal pilot valve



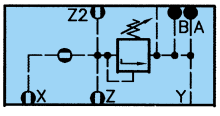
62 = with internal pilot valve,
to mount a 4/2-directional valve
CETOP 03 (4D01),
sol. de-energized:
main valve closed



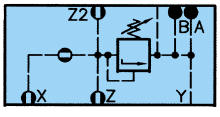
63 = with internal pilot valve,
to mount a 4/2-directional valve
CETOP 03 (4D01),
sol. de-energized:
main valve open (vented)



64 = to mount proportional pressure
valve with position feedback
CETOP 03 (R1EP01);
with internal maximum pressure
adjustment



67 = to mount proportional pressure
valve without position feedback
CETOP 03 (4VP01)
with internal maximum pressure
adjustment

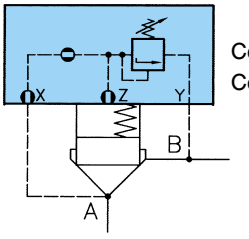


7 **Seal Class**
1 = N.B.R. (Buna N) Standard
4 = E.P.R. (not with R1EP01)
5 = VITON ®

6 **Design Letter**

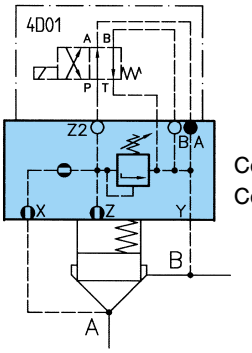
5 **Type of Control**
1 = Hand knob 32 mm dia.
2 = Hand knob 50 mm dia.
3 = Acorn nut with lead seal
4 = Adjusting device [1]
with key lock
(key order no.
700–70619)
[1] not for CVC05

4 **Pressure Setting R nge**
1 = 7...105 bar
3 = 7...210 bar
5 = 7...350 bar
(higher pressure on request)



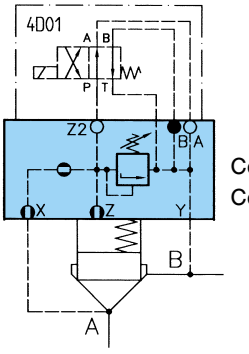
Cover
Code 61

see page 11



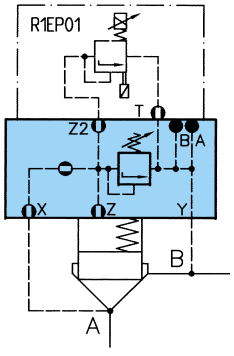
Cover
Code 62

integral pressure
relief function
see page 12



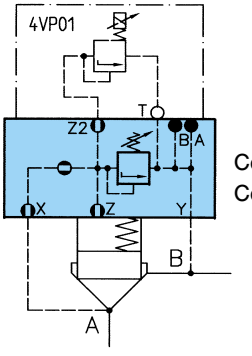
Cover
Code 63

free flow from
A→B to tank
see page 12



Cover
Code 64

see page 13

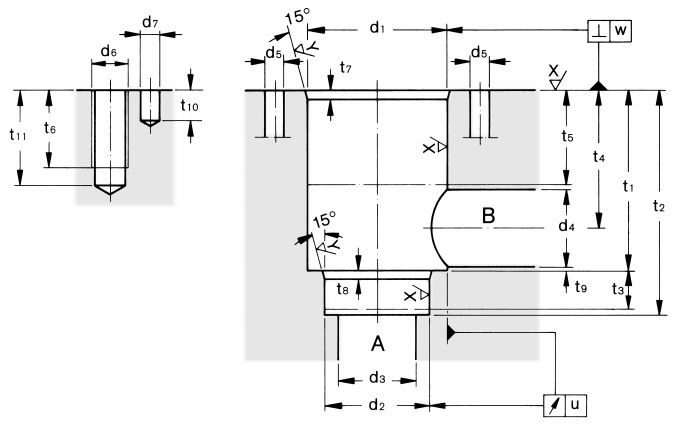


Cover
Code 67

see page 14

Section A–B

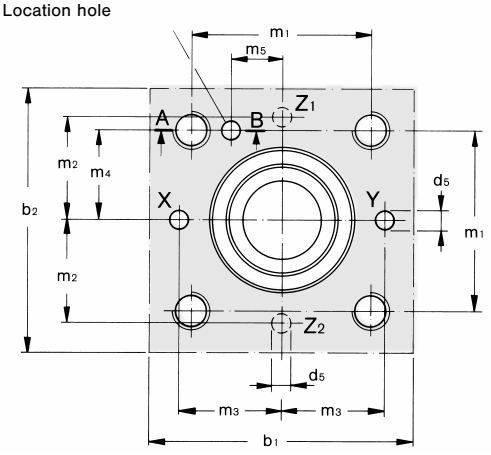
Cavity



Ra max (µm) X = 1.6 Y = 2.5

Configuration for the control cover

Location hole



A = Working port
B = Working port
X = Pilot port
Y = Drain port
Z1, Z2 = additional pilot ports
Z1 = preferred inlet
Z2 = preferred outlet

Dimension	Tolerance	NG 16	NG 25	NG 32
b_1 [1]		65	85	102
b_2 [1]		65	85	102
d_1	H7	32	45	60
d_2	H7	25	34	45
d_3		16	25	32
d_4 [2]	min.	16	25	32
	max.	25	32	40
d_5 [3]	max.	4	6	8
d_6		M8	M12	M16
d_7	H13	4	6	6
m_1	± 0.2	46	58	70
m_2	± 0.2	25	33	41
m_3	± 0.2	25	33	41
m_4	± 0.2	23	29	35
m_5	± 0.2	10.5	16	17
t_1	$^{0}_{+0.1}$	43	58	70
t_2	$^{0}_{+0.1}$	56	72	85
t_3 [5]		11	12	13
t_4 [2]	d_4 min.	34	44	52
	d_4 max.	29.5	40.5	48
t_5 [5]		20	30	30
t_6 [4]		20	25	35
t_7		2	2.5	2.5
t_8		2	2.5	2.5
t_9	min.	0.5	1.0	1.5
t_{10}	min.	10	10	10
t_{11} [4]	max.	25	31	42
u		0.03	0.03	0.03
w		0.05	0.05	0.1

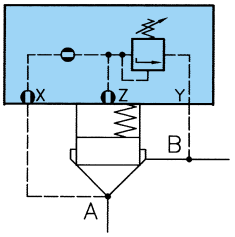
[1]) Cover parts (adjusting devices, pilot heads) can exceed dimension b_1 and b_2.

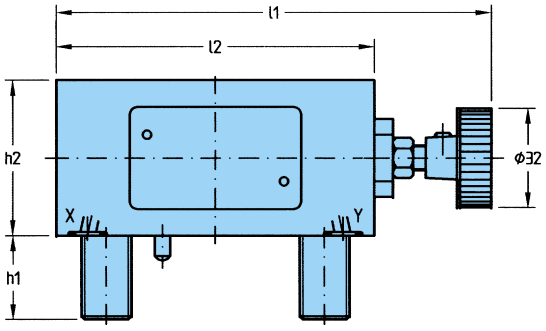
[2]) Port B can vary around the centre line of port A.
Note:
Holes for mounting screws and pilot oil must not be damaged.

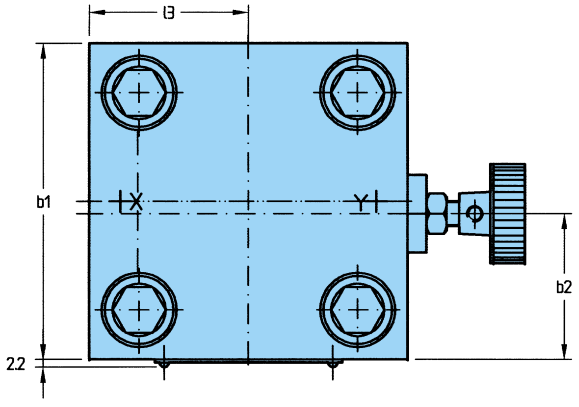
[3]) Drilling depth and drilling angle of pilot ports are related to circuitry and arrangement of valves within the manifold.

[4]) Recommended depth of screw (minimum) for cast iron is dia. of thread times 1.25.

[5]) Close-tolerance work depth.







Model Number:

CVC . . –61 – . – . – A .

(for details see page 8)

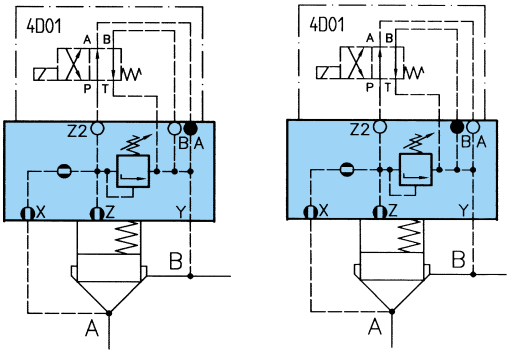
Dimensions

	CVC05 NG 16	CVC08 NG 25	CVC10 NG 32
l_1 max.	140	138	140
l_2	102	100	102
l_3	39	50	51
b_1	65	85	102
b_2	32.5	38.5	47
h_1	14	18	27
h_2	35	50	50
Weight	2.2 kg	3 kg	4 kg

4 Mounting Screws DIN 912–12.9
(supplied with cover)

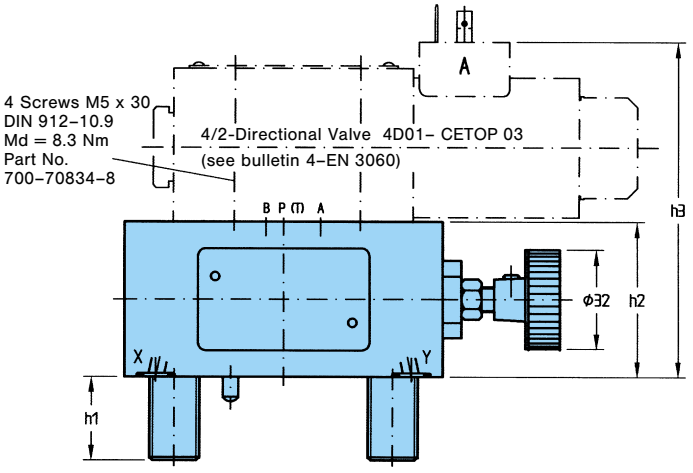
Series	Dimensions	Torque
CVC05	M 8 x 40	35 Nm
CVC08	M12 x 55	130 Nm
CVC10	M16 x 60	330 Nm

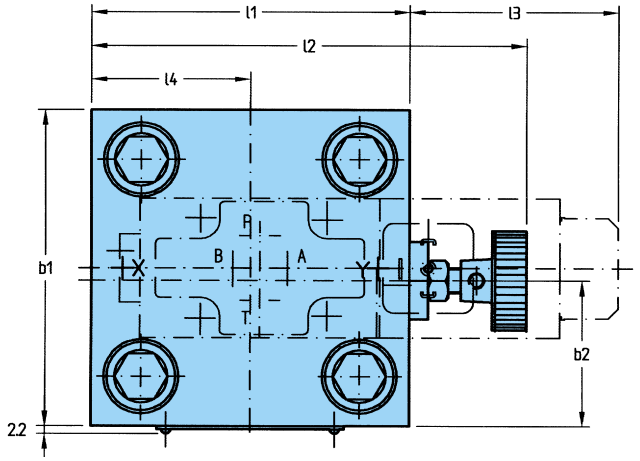
to mount 4/2-Directional Valve CETOP 03



Model Number: CVC.. | –62–.–.–A. | –63–.–.–A. |

(for detail see page 8)





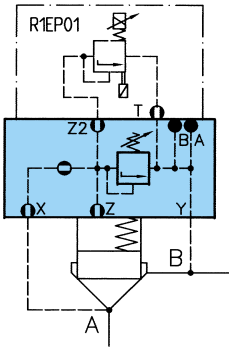
Dimensions

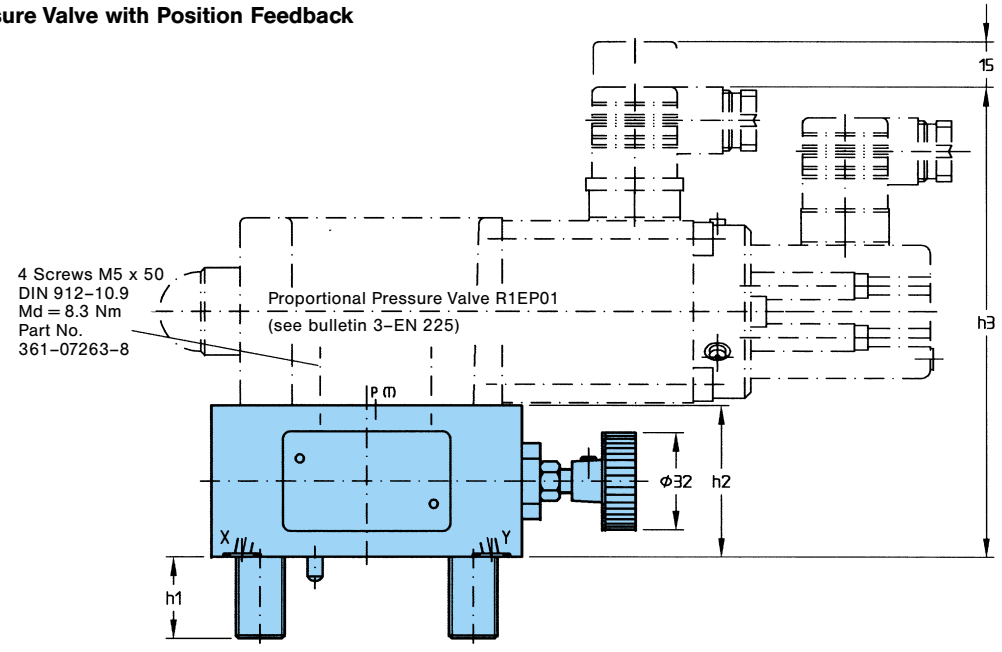
	CVC05 NG 16	CVC08 NG 25	CVC10 NG 32
l_1	102	100	102
l_2 max.	140	138	140
l_3	75	67	67
l_4	39	50	51
b_1	65	85	102
b_2	32.5	38.5	47
h_1	14	18	27
h_2	35	50	50
h_3	87	102	102
Weight	2.2 kg	3 kg	4 kg

4 Mounting Screws DIN 912–12.9
(supplied with cover)

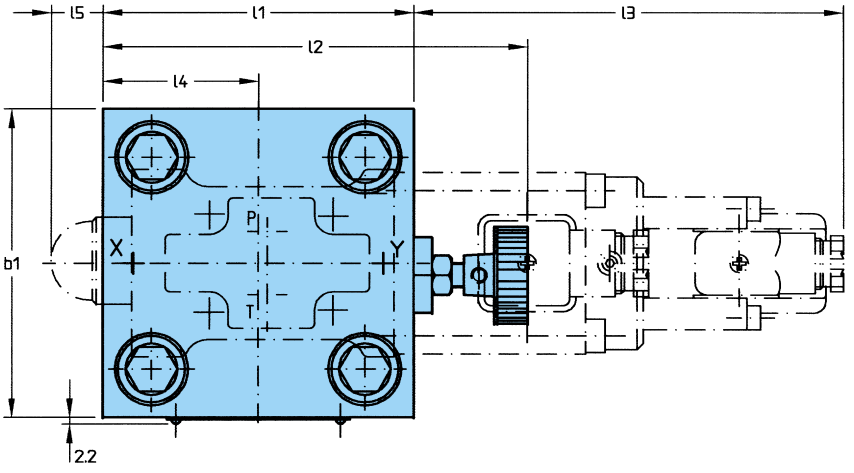
Series	Dimensions	Torque
CVC05	M 8 x 40	35 Nm
CVC08	M12 x 55	130 Nm
CVC10	M16 x 60	330 Nm

to mount Proportional Pressure Valve with Position Feedback





Model Number:
CVC . . – 64 – . – . – A .
(for details see page 8)



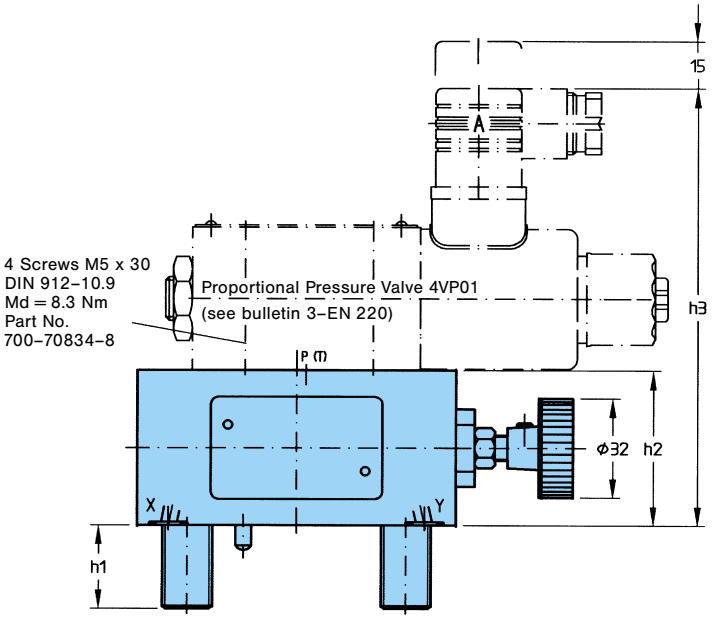
Dimensions

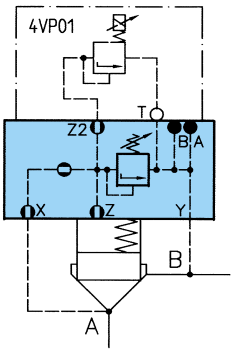
	CVC05 NG 16	CVC08 NG 25	CVC10 NG 32
l_1	102	100	102
l_2 max.	140	138	140
l_3	148	148	148
l_4	39	50	51
l_5	17	19	17
b_1	65	85	102
b_2	32.5	38.5	47
h_1	14	18	27
h_2	35	50	50
h_3	141	156	156
Weight	2.2 kg	3 kg	4 kg

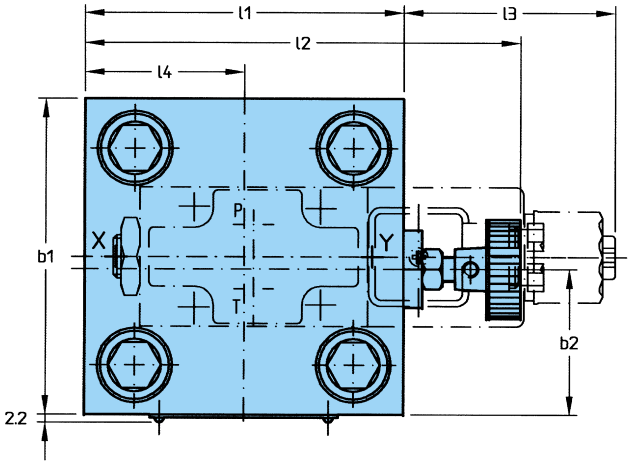
4 Mounting Screws DIN 912–12.9
(supplied with cover)

Series	Dimensions	Torque
CVC05	M 8 x 40	35 Nm
CVC08	M12 x 55	130 Nm
CVC10	M16 x 60	330 Nm

to mount Proportional Pressure Valve without Position Feedback







Model Number:
CVC . . – 67 – . – . – A .
(for details see page 8)

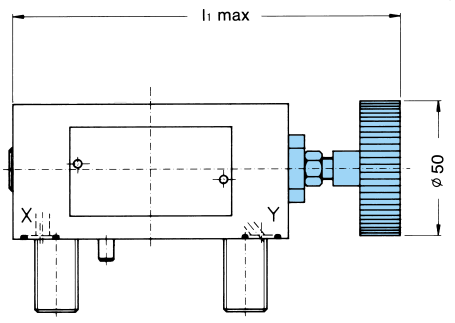
Dimensions

	CVC05 NG 16	CVC08 NG 25	CVC10 NG 32
l_1	102	100	102
l_2 max.	140	138	140
l_3	75	75	75
l_4	39	50	51
b_1	65	85	102
b_2	32.5	38.5	47
h_1	14	18	27
h_2	35	50	50
h_3	129	144	144
Weight	2.2 kg	3 kg	4 kg

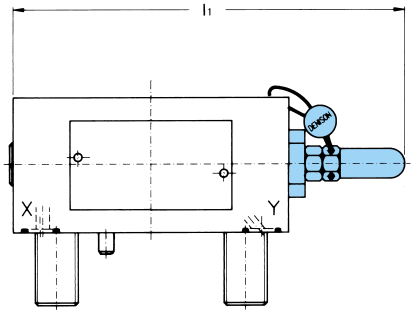
4 Mounting Screws DIN 912-12.9
(supplied with cover)

Series	Dimensions	Torque
CVC05	M 8 x 40	35 Nm
CVC08	M12 x 55	130 Nm
CVC10	M16 x 60	330 Nm

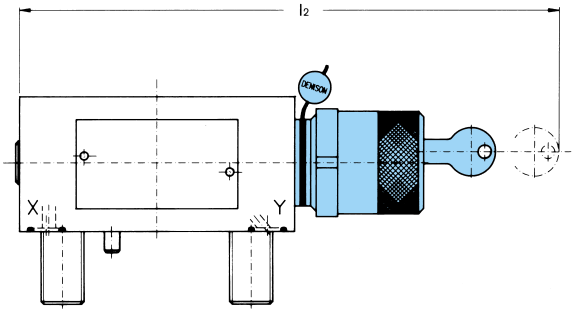
Type of Control-Code 2
Hand knob 50 mm dia.
(not for CVC05)



Type of Control-Code 3
Acorn nut with lead seal
(for all sizes)



Type of Control-Code Code 4
Adjusting device with key lock.
Key must be ordered separately,
order no. 700–70619
(not for CVC05)



Dimensions

	CVC05 NG 16	CVC08 NG 25	CVC10 NG 32
l_1	140	138	140
l_2	–	198	200