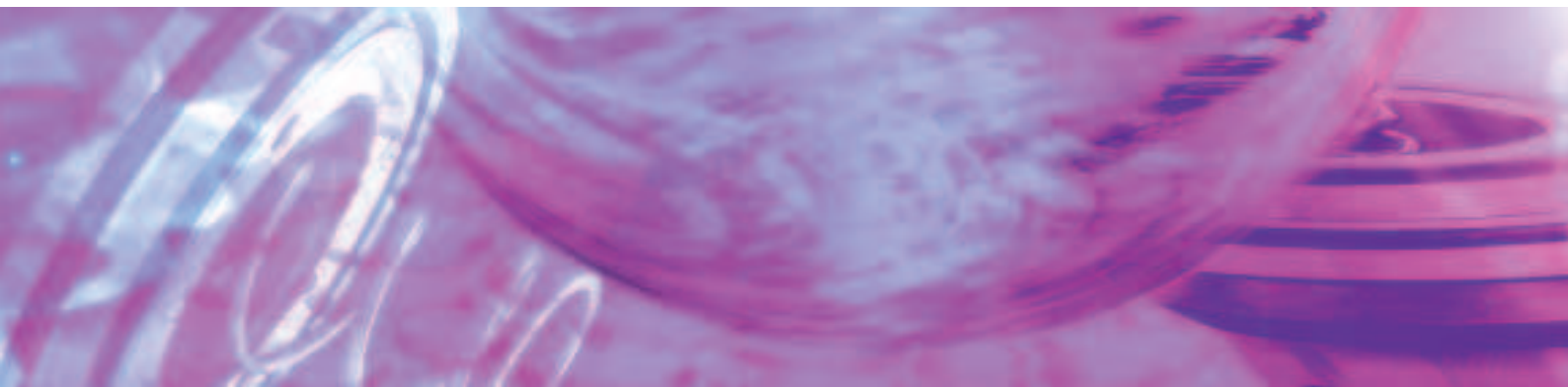
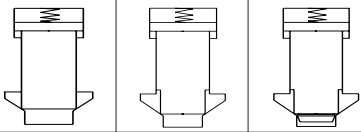
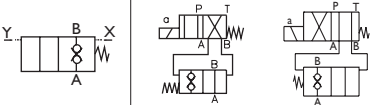


Active Cartridge Valves – 2/2 Way
Series NGI6–NGI00



Designation	Symbol	Page
General Description		4
Features and Types of Cones and Sleeves		5
Specifications and Characteristic Parameters		6
Performance Data		7-9
Standard Models X-Cone, S-Cone, T-Cone		10-12
Standard Models Covers		13
Typical Orifice Characteristics		14
Dimensions Hydraulically Operated, Solenoid Operated		15-16
Dimensions Cavity and Porting Pattern as per DIN 24342		17
Ordering Information		18-20
Configuration		21
Spare Parts		22

This catalogue is for users with technical knowledge. To ensure that all necessary characteristics for function and safety of the system are given, the user has to check the suitability of the products described herein. In case of doubt please contact Moog Hydrolux.

General Description

Moog Hydrolux's Active Cartridge valve was designed to eliminate many of the limitations of Standard Cartridge Valves. The Active Cartridge contains an additional control area that provides more robust control of switching pressure for high speed and response machines where low system pressure can delay closing times. In essence, Active Cartridges have a double acting pilot piston for 4-way directional control of the cone or poppet, whereas a Standard Cartridge uses a single acting piston for 3-way control.

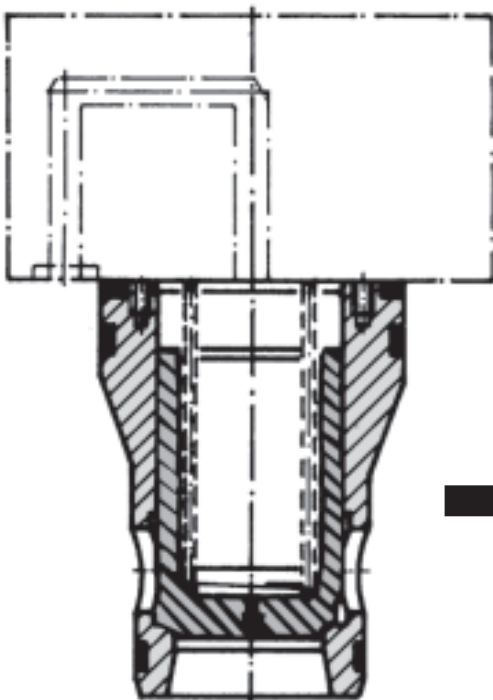
As a result, the Active Cartridge can offer improvements in:

- Closing time
- Opening time
- Closing under load

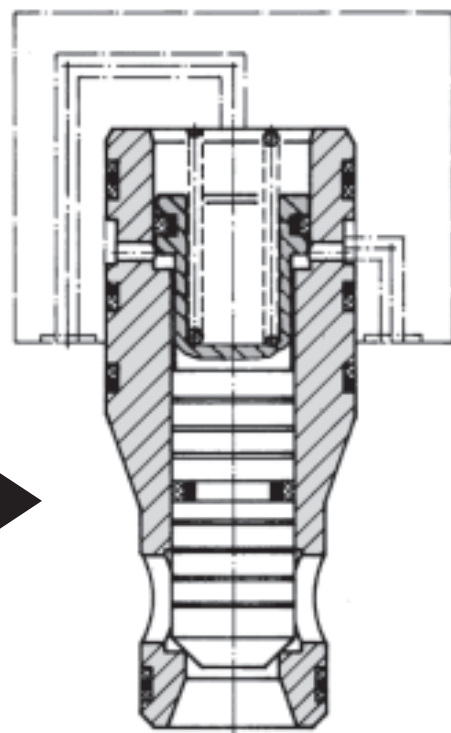
An Active Cartridge may be used for the following functions:

- Hydraulically pilot operated check or direction control
- Solenoid pilot operated check or direction control

Standard Cartridge



Active Cartridge



- All pilot and poppet seals create tight fit at all ports to prevent leakage in either direction
- Can operate without a spring when a defined spool position is not required and hydraulic system pressure is lost
- Cartridge can be closed by a considerably lower control pressure at X due to the larger control surface area A_X (compared to the surface area A_A)
- Opening function and velocity of the cartridge are independent of the pressure in the working ports A and B
- Ability to be equipped with X-, S-, T-, and special cones
- Sizes NG16 to NG100 per DIN 24342

Types of Cones and Sleeves

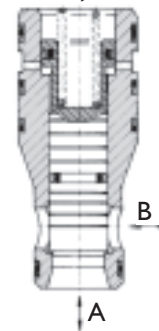
Sleeve A, Cone X:

An active-cartridge with sleeve-A and cone-X (differential area $A_B = 0$) can be used for all directional and check functions where a larger flow area and lower pressure losses are desired.

Due to the lower throttle function ($A_B = 0$) the switching operations are not as soft as when using cones with a differential area $A_B > 0$ (Cones S and T).

With non-active control, the flow of this cartridge can only be from A to B.

Sleeve A, Cone X

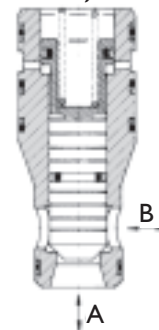


Sleeve B, Cone S:

Used in all directional, check, and flow control functions.

Due to the cone differential area $A_B > 0$, the flow direction can be chosen also with non-active control.

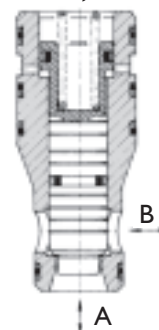
Sleeve B, Cone S



Sleeve B, Cone T:

Cone T, with a dampening nose, can be used to avoid additional pressure peaks in tank circuits or to obtain a better adjustment of flow control valves.

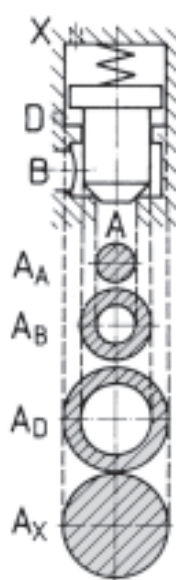
Sleeve B, Cone T



Specifications

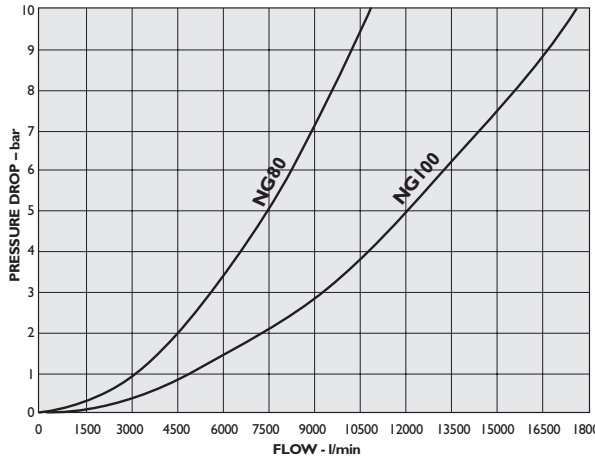
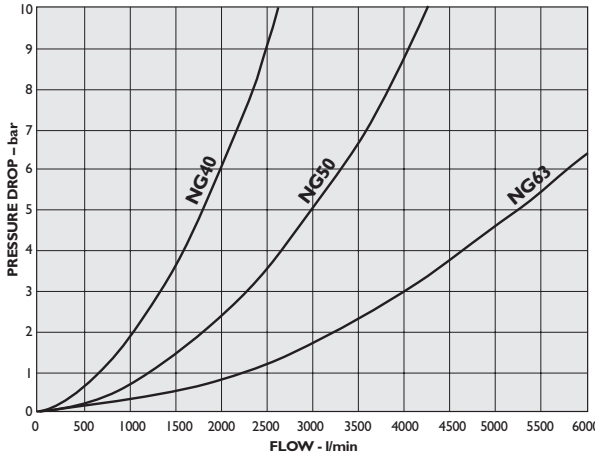
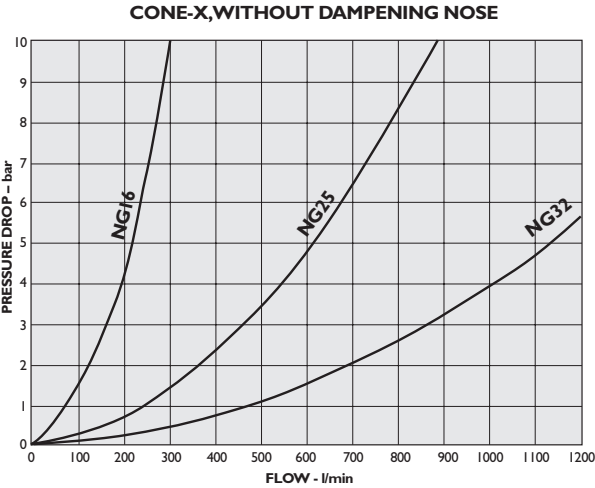
General Data	Value	Unit	Specifications
Designation and Symbol	—	—	2-way Seat Valve (Cartridge)
Mode of Construction	—	—	Pilot Operated Seat Valve
Manner of Mounting	—	—	Manifold Cartridge Mounting
Branch Circuit Connection	—	—	Drilling in the Manifold
Mounting Dimensions	—	—	See Mounting Dimensions Page 17
Mounting Position	—	—	Any
Flow Direction	—	—	See Cone Types Page 5
Ambient Temperature Range	min.	°C	-25°
	max.	°C	+60°
Working Pressure			
Inlet	min.	bar	0
	max.	bar	350
Outlet	min.	bar	0
	max.	bar	350
Temperature Range	min.	°C	-25°
	max.	°C	+80°
Viscosity Range	min.	mm ² ·s ⁻¹ [cSt]	2,8
	max.	mm ² ·s ⁻¹ [cSt]	380
Operational Viscosity	Vn	mm ² ·s ⁻¹ [cSt]	35
Nominal Bore Size	—	mm	NG16 NG25 NG32 NG40 NG50 NG63 NG80 NG100
Weight	m	kg	0,4 0,8 1,5 3,2 5,5 11,2 24,1 39,2
Pilot Volume (S & T Cones)	V _x	cm ³	2,00 8,00 17,00 29,00 77,00 191,00 285,00 494,00
Pilot Volume (X Cone)	V _x	cm ³	2,03 7,70 17,10 32,60 77,00 190,50 285,00 492,50

Characteristic Parameters

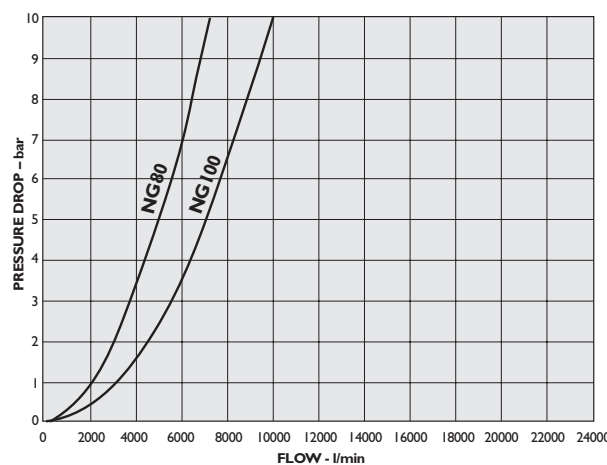
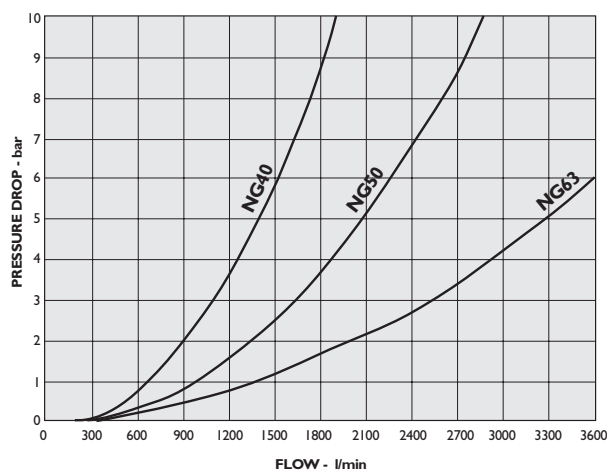
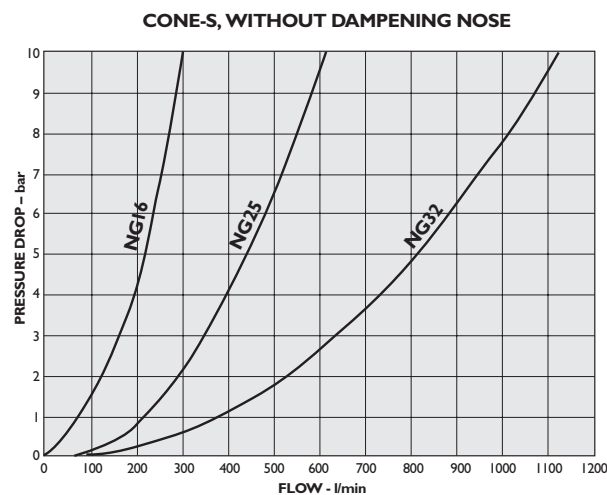


Reference Surface A_A								
	NG16	NG25	NG32	NG40	NG50	NG63	NG80	NG100
Cones S and T								
Stroke mm	6,5	12,5	15,0	15,0	20	30,0	30,0	35,5
A _A mm ²	123	227	452	804	1590	2642	3848	5675
A _A (Ref)	1	1	1	1	1	1	1	1
A _B	0,64	0,67	0,56	0,41	0,49	0,46	0,47	0,68
A _D	0,92	1,04	0,95	1,03	0,93	0,95	1,00	0,77
A _X	2,56	2,71	2,51	2,44	2,42	2,41	2,47	2,45
Cone X								
Stroke mm	6,5	12,5	15,0	15,0	20,0	30,0	30,0	35,5
A _A mm ²	201	380	707	1257	2376	3848	5674	9503
A _A (Ref)	1	1	1	1	1	1	1	1
A _B	—	—	—	—	—	—	—	—
A _D	,56	0,62	0,61	0,73	0,62	0,65	0,68	0,46
A _X	1,56	1,62	1,61	1,73	1,62	1,65	1,68	1,46

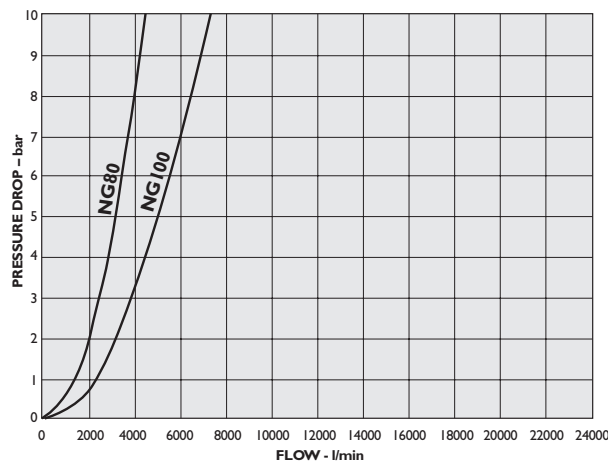
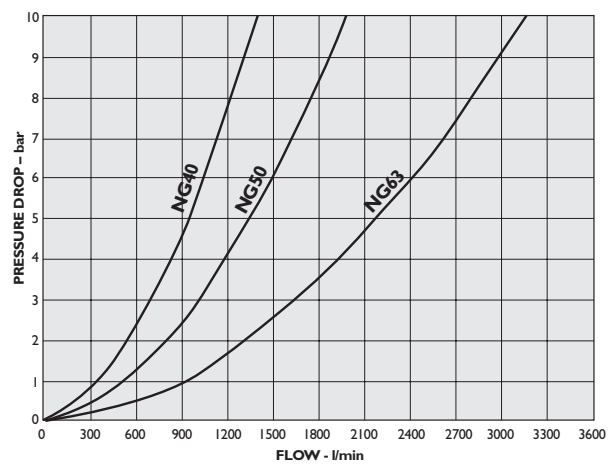
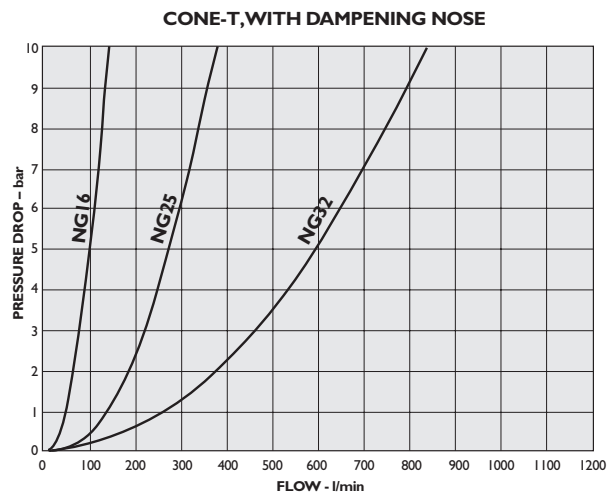
Direction and Check Functions



Direction; Check and Flow Control Functions

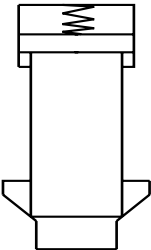
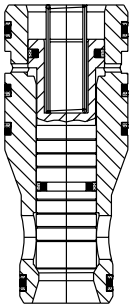


Direction; Check and Flow Control Functions

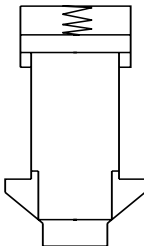
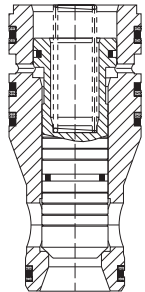


Standard Models

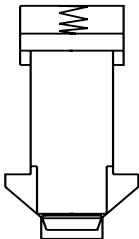
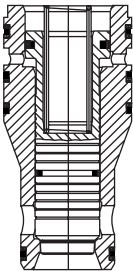
X-Cone for Direction Control and Check Functions (without dampening nose)

Symbol	Function	Size NG [mm]	Weight kg	Spring Rating bar	Part Designation	Part Number
		16	0,4	1,0	CHE16A6XS	XCBI0866-000-00
				2,0	CHE16A6XT	XCBI0867-000-00
				4,0	CHE16A6XU	XCBI0868-000-00
				6,0	CHE16A6XV	XCBI0869-000-00
		25	0,8	1,0	CHE25A6XS	XCBI0878-000-00
				2,0	CHE25A6XT	XCBI0879-000-00
				4,0	CHE25A6XU	XCBI0880-000-00
				6,0	CHE25A6XV	XCBI0881-000-00
		32	1,5	1,0	CHE32A6XS	XCBI0886-000-00
				2,0	CHE32A6XT	XCBI0887-000-00
				4,0	CHE32A6XU	XCBI0888-000-00
		40	3,2	1,0	CHE40A6XS	XCBI1104-000-00
				2,0	CHE40A6XT	XCBI1105-000-00
				4,0	CHE40A6XU	XCBI1106-000-00
		50	5,5	1,0	CHE50A6XS	XCBI0901-000-00
				2,0	CHE50A6XT	XCBI0902-000-00
				4,0	CHE50A6XU	XCBI0903-000-00
		63	11,2	1,0	CHE63A6XS	XCBI0910-000-00
				2,0	CHE63A6XT	XCBI0911-000-00
				4,0	CHE63A6XU	XCBI0912-000-00
		80	24,1	1,0	CHE80A6XS	XCBI1160-000-00
				2,0	CHE80A6XT	XCBI1161-000-00
				4,0	CHE80A6XU	XCBI1162-000-00
		100	39,2	1,0	CHE100A6XS	XCBI0923-000-00
				2,0	CHE100A6XT	XCBI0924-000-00
				4,0	CHE100A6XU	XCBI1026-000-00

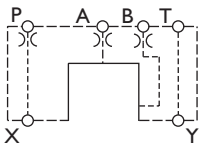
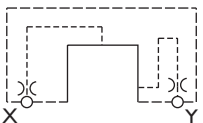
S-Cone for Direction; Check and Flow Control Functions (without dampening nose)

Symbol	Function	Size NG [mm]	Weight kg	Spring Rating bar	Part Designation	Part Number
		16	0,4	1,0	CHE16A6SS	XEB10870-000-00
				2,0	CHE16A6ST	XEB10871-000-00
				4,0	CHE16A6SU	XEB10872-000-00
				6,0	CHE16A6SV	XEB10873-000-00
		25	0,8	1,0	CHE25A6SS	XCB10001-000-00
				2,0	CHE25A6ST	XCB10002-000-00
				4,0	CHE25A6SU	XCB10003-000-00
				6,0	CHE25A6SV	XCB10004-000-00
		32	1,5	1,0	CHE32A6SS	XCB10889-000-00
				2,0	CHE32A6ST	XCB10890-000-00
				4,0	CHE32A6SU	XCB10891-000-00
		40	3,2	1,0	CHE40A6SS	XCB10895-000-00
				2,0	CHE40A6ST	XCB10896-000-00
				4,0	CHE40A6SU	XCB10897-000-00
		50	5,5	1,0	CHE50A6SS	XCB10904-000-00
				2,0	CHE50A6ST	XCB10905-000-00
				4,0	CHE50A6SU	XCB10906-000-00
		63	11,2	1,0	CHE63A6SS	XCB10913-000-00
				2,0	CHE63A6ST	XCB10914-000-00
				4,0	CHE63A6SU	XCB10915-000-00
		80	24,1	1,0	CHE80A6SS	XCB10919-000-00
				2,0	CHE80A6ST	XCB10920-000-00
				4,0	CHE80A6SU	XCB11078-000-00
		100	39,2	1,0	CHE100A6SS	XCB10925-000-00
				2,0	CHE100A6ST	XCB10926-000-00
				4,0	CHE100A6SU	XCB11027-000-00

T-Cone for Direction; Check and Flow Control Functions (with dampening nose)

Symbol	Function	Size NG [mm]	Weight kg	Spring Rating bar	Part Designation	Part Number
		16	0,4	1,0	CHE16A6TS	XCB10874-000-00
				2,0	CHE16A6TT	XCB10875-000-00
				4,0	CHE16A6TU	XCB10876-000-00
				6,0	CHE16A6TV	XCB10877-000-00
		25	0,8	1,0	CHE25A6TS	XCB10882-000-00
				2,0	CHE25A6TT	XCB10883-000-00
				4,0	CHE25A6TU	XCB10884-000-00
				6,0	CHE25A6TV	XCB10885-000-00
		32	1,5	1,0	CHE32A6TS	XCB10892-000-00
				2,0	CHE32A6TT	XCB10893-000-00
				4,0	CHE32A6TU	XCB10894-000-00
		40	3,2	1,0	CHE40A6TS	XCB10898-000-00
				2,0	CHE40A6TT	XCB10899-000-00
				4,0	CHE40A6TU	XCB10900-000-00
		50	5,5	1,0	CHE50A6TS	XCB10907-000-00
				2,0	CHE50A6TT	XCB10908-000-00
				4,0	CHE50A6TU	XCB10909-000-00
		63	11,2	1,0	CHE63A6TS	XCB10916-000-00
				2,0	CHE63A6TT	XCB10917-000-00
				4,0	CHE63A6TU	XCB10918-000-00
		80	24,1	1,0	CHE80A6TS	XCB10921-000-00
				2,0	CHE80A6TT	XCB10922-000-00
				4,0	CHE80A6TU	XCB11079-000-00
		100	39,2	1,0	CHE100A6TS	XCB11404-000-00
				2,0	CHE100A6TT	XCB11405-000-00
				4,0	CHE100A6TU	XCB11406-000-00

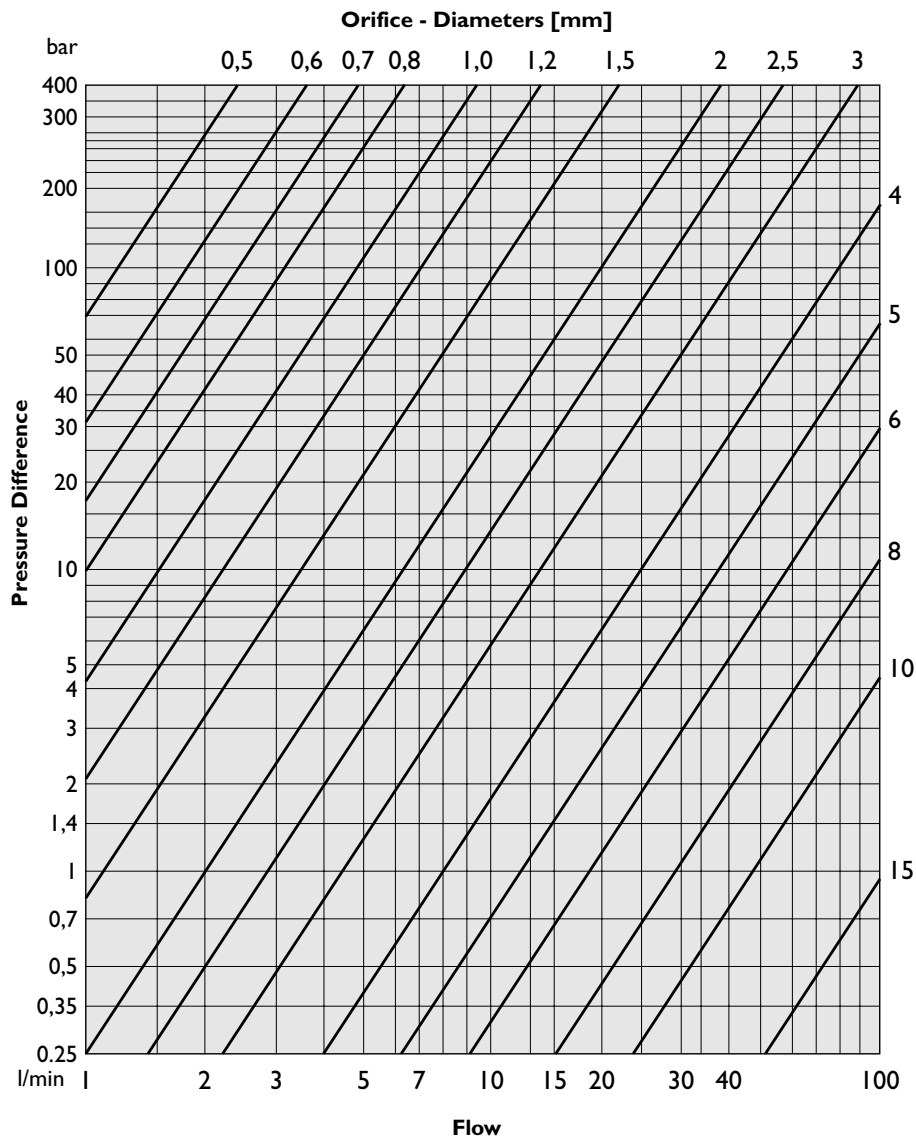
DIN Covers

Symbol	Function	Size NG [mm]	Weight lb (kg)	Part Designation	Part Number
	Normally Open or Normally Closed	16	4,0	CCE16A6RH1X06	XEB14151-000-01
		25	6,0	CCE25A6RH1X06	XEB13343-000-01
		32	8,0	CCE32A6RH1X06	XEB12705-000-01
		40	13,0	CCE40A6RH1X06	XEB13558-000-01
		50	21,0	CCE50A6RH1X10	XEB12603-000-01
		63	39,0	CCE63A6RH1X10	XEB13861-000-01
		80	57,0	CCE80A6RH1X10	XEB13959-000-01
		100	86,0	CCE100A6RH1X10	XEB14346-000-01
	Externally Piloted	16	2,0	CCE16A6RH3X	XEB14065-000-01
		25	4,0	CCE25A6RH3X	XEB14150-000-01
		32	6,0	CCE32A6RH3X	XEB13410-000-01
		40	10,0	CCE40A6RH3X	XEB13287-000-01
		50	18,0	CCE50A6RH3X	XEB12923-000-01
		63	36,0	CCE63A6RH3X	XEB14463-000-01
		80	57,0	CCE80A6RH3X	XEB13462-000-01
		100	60,0	CCE100A6RH3X	XEB14040-000-01

Typical Orifice Characteristics

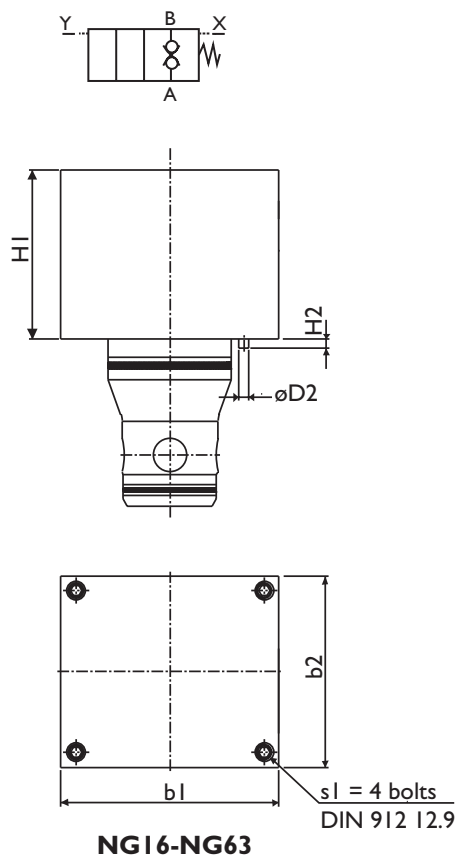
The function and switching velocity of a cartridge-valve can be influenced by changes in the metering-in and metering-out flow through the pilot lines. This is achieved by changing mounting orifices as required.

The following diagram should be used for selecting the correct orifice diameter.

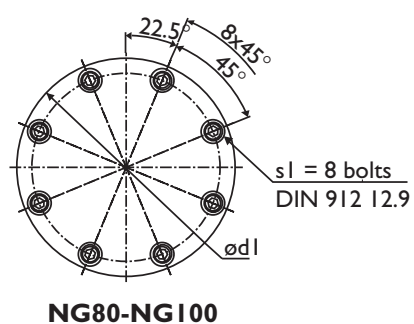


Viscosity : 35 mm² · s⁻¹ [cSt]
Oil temperature : 50°C

Hydraulically Operated Valves



Dimensions mm	NG16	NG25	NG32	NG40	NG50	NG63
H1	65	65	80	80	4.72 (120)	140
H2	5	5	5	5	6	6
D2	5	5	5	5)	6	6
b1	65	85	102	125	140	180
b2	65	85	102	125	140	180
s1	UNC	$\frac{5}{16}'' \times 2\frac{3}{4}''$	$\frac{1}{2}'' \times 2\frac{3}{4}''$	$\frac{5}{8}'' \times 3\frac{1}{4}''$	$\frac{3}{4}'' \times 3\frac{1}{2}''$	$\frac{3}{4}'' \times 5.0''$
	Metric	M8X70	M12X65	M16X80	M20X90	M20X120
Tightening Torque	ft-lb	23	75	225	413	1350
	N-m	30	100	300	550	1800

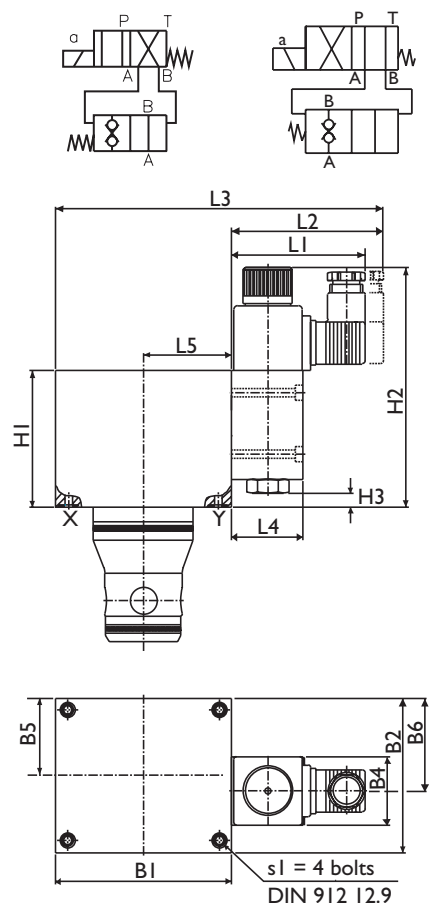


Dimensions mm	NG80	NG100
d1	250	300
H1	150	160
H2	6	6
D2	8	8
s1	UNC	$1'' \times 6\frac{1}{2}''$
	Metric	M24X150
Tightening Torque	ft-lb	675
	N-m	900

Note: Fastening screws are not part of the delivery.

Dimensions

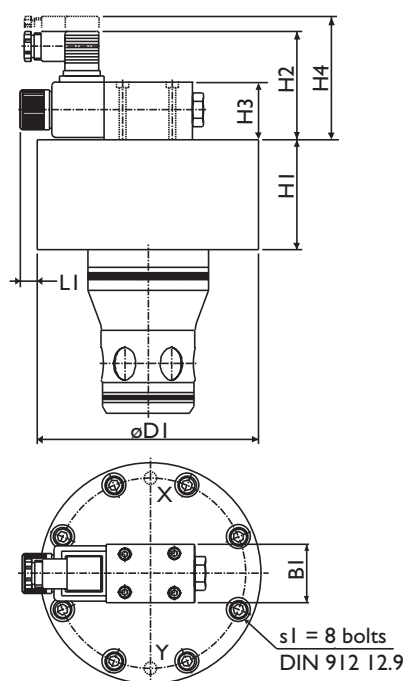
Solenoid Operated Valves



NG16-NG63

Dimensions mm		NG16	NG25	NG32	NG40	NG50	NG63
H1		90	90	90	90	120	40
H2		166	166	166	166	228	228
H3		8	8	8	8	5	5
L1		93	93	93	93	120	120
L2		105	105	105	105	132	132
L3		190	205	221	251	292	336
L4		6	46	46	46	96	96
L5		42,5	50	58	73	80	100
la*		Y	Y	Y	Y	Y	Y
B1		85	100	116	146	160	200
B2		65	85	100	125	140	180
B4		46	46	46	46	70	70
B5		32,5	42,5	50	62,5	70	90
B6		32,5	42,5	60,4	62,5	71,6	90
sI	UNC	$\frac{5}{16}'' \times 3\frac{1}{2}''$	$\frac{1}{2}'' \times 3\frac{3}{4}''$	$\frac{5}{8}'' \times 3\frac{3}{4}''$	$\frac{3}{4}'' \times 4''$	$\frac{3}{4}'' \times 4\frac{3}{4}''$	$1\frac{1}{4}'' \times 6,0''$
	Metric	M8X90	M12X100	M16X90	M20X100	M20X120	M30X150
Tightening Torque	ft-lb	23	75	225	413	413	1350
	N-m	30	100	300	550	550	1800

*la = Mounted side of pilot valve

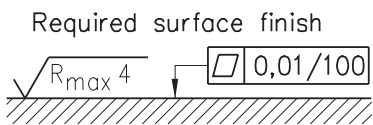
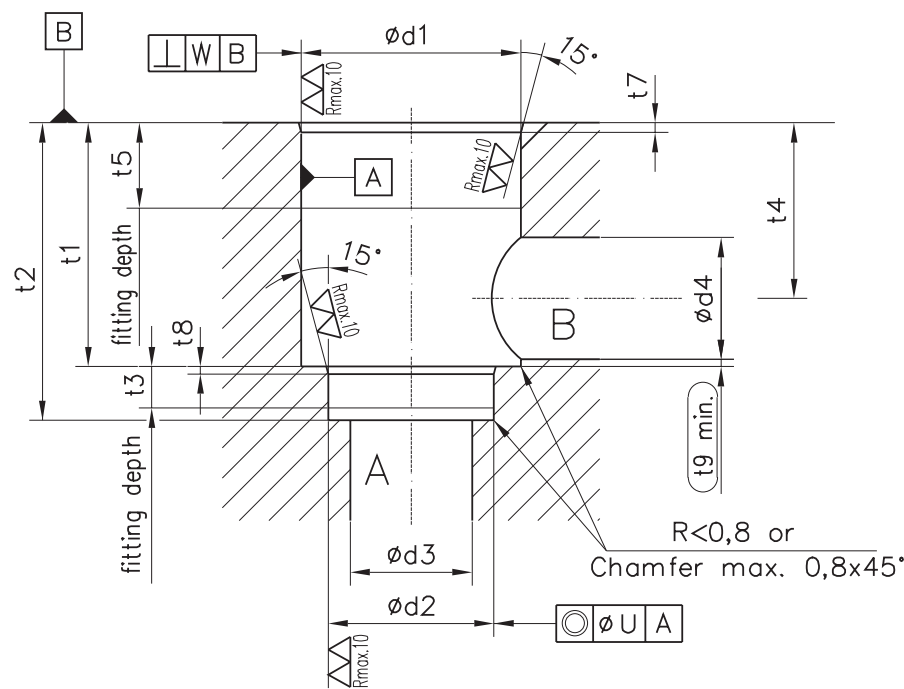


NG80-NG100

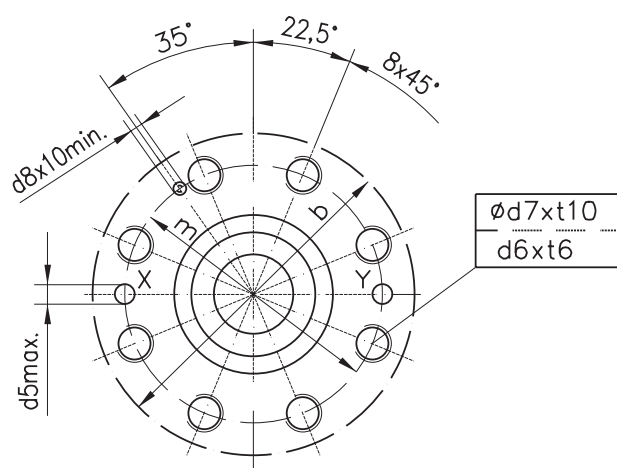
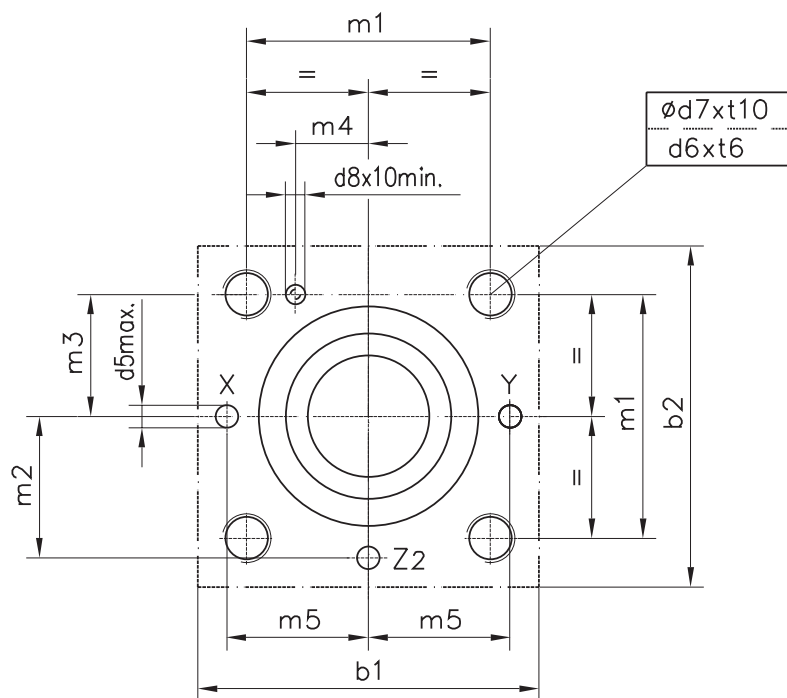
Dimensions in (mm)		NG80	NG100
D1		250	300
H1		150	160
H2		111	111
H3		70	70
H4		123	123
L1		44	19
B1		70	70
sI	UNC	$1'' \times 6\frac{1}{2}''$	$1\frac{1}{4}'' \times 6\frac{1}{2}''$
	Metric	M24X150	M30X160
Tightening Torque	ft-lb	675	1350
	N-m	900	1800

Note: Fastening screws are not part of the delivery.

CAVITY AS PER ISO 7368



Dimension	NG16	NG25	NG32	NG40	NG50	NG63
b1	65	85	102	125	140	200
b2	65	85	102	125	140	180
d1 H7	32	45	60	75	90	120
d2 H7	25	34	45	55	68	90
d3	16	25	32	40	50	63
d4	16	25	32	40	50	63
d4 max.	25	32	40	50	63	80
d5 max.	4	6	8	10	10	12
d6	M8	M12	M16	M20	M20	M30
d7	6,8	10,2	14	17,5	17,5	26,5
d8 H13	4	6	6	6	8	8
m1 $\pm 0,2$	46	58	70	85	100	125
m2 $\pm 0,2$	25	33	41	50	58	75
m3 $\pm 0,2$	23	29	35	42,5	50	62,5
m4 $\pm 0,2$	10,5	16	17	23	30	38
m5 $\pm 0,2$	25	33	41	50	58	75
t1 $+0,1$	43	58	70	87	100	130
t2 $+0,1$	56	72	85	105	122	155
t3	11	12	13	15	17	20
t4	34	44	52	64	72	95
t4 at d4 max.	29,5	40,5	48	59	65,5	86,5
t5	20	30	30	30	35	40
t6	14	20	26	33	33	50
t7	2	2,5	2,5	3	4	4
t8	2	2,5	2,5	3	3	4
t9	0,5	1,0	1,5	2,5	2,5	3
t10	17	24	31	38	38	56
U	0,03	0,03	0,03	0,05	0,05	0,05
W	0,05	0,05	0,1	0,1	0,1	0,2



Dimension	NG80	NG100
b max.	250	300
d1 H7	145	180
d2 H7	110	135
d3	80	100
d4	80	100
d4 max.	100	125
d5 max.	16	20
d6	M24	M30
d7	21	26,5
d8 H13	10	10
t1	175	210
t2 $+0,2$	205	245
t3	25	29
t4	130	155
t4 at d4 max.	120	142,5
t5	40	50
t6	39	50
t7	5	5
t8	5	5
t9	3	5
t10	45	56
m $\pm 0,3$	200	245
U	0,05	0,05
W	0,2	0,2

Ordering Information

Active Cartridge Only

-

C

Type of Seals

-

STD - Viton Seals

N

Buna N Seals

Valve Type

C

Cartridge without cover

Valve Function

H

Active Cartridge

Mounting

E

Manifold Mounting

Nominal Bore Size (mm)

16

NG16

25

NG25

32

NG32

40

NG40

50

NG50

63

NG63

80

NG80

100

NG100

A

Serial Number

H

E

A

6

Type of Poppet/Cone

X

Step Poppet

S

Step Poppet with Small Seat

T

Step Poppet with Small Seat and Dampening Nose

Opening Pressure

S

1,0 bar

T

2,0 bar

U

4,0 bar

V

6,0 bar (not available for all sizes)

Series

6

Cartridge Dimensions per DIN 24342

Active Cartridge Covers Only

-

C

C

E

A

6

/

Type of Seals

-

STD - Viton Seals

M

Mixed Viton and PU Seals

N

Buna N Seals

Valve Type

C

Cartridge

Valve Function

C

Cartridge Cover

Mounting

E

Manifold Mounting

Nominal Bore Size (mm)

16

NG16

25

NG25

32

NG32

40

NG40

50

NG50

63

NG63

80

NG80

100

NG100

A

Serial Number

Series

6

Cartridge Dimensions per DIN 24342

Type of Cover Function

RH1

Cover with normally open/closed configuration

RH3

Cover with external hydraulic pilot (no pilot pattern)

Pilot Valve Pattern

X06

Cover with P06/D03 pattern up to NG40

X10

Cover with P10/D05 pattern from NG50 and above

Orifices

Indication in 10 th of a mm of the diameter and in the same order as given in the function symbol (P, A, B, T, X, Y)
..00 = Plug
..08 = Orifice 0,8 mm
..15 = Orifice 1,5 mm
i.e.: X08 = Orifice 0,8 mm in X
i.e.: P10 = Orifice 1,0 mm in P

Ordering Information

Aktiv Cartridge complete

	-	R	H	E		A		6				W	X				/	
--	---	---	---	---	--	---	--	---	--	--	--	---	---	--	--	--	---	--

Type of Seals

without Des.	FPM/FKM (Standard)
M	FPM/FKM + PUR
N	NBR

Valve Type

R	Activ Cartridge with Cover
---	----------------------------

Valve function

H	Activ Cartridge
---	-----------------

Mounting

E	Manifold mounting
---	-------------------

Nominal Bore Size (nn)

16	NG 16
25	NG 25
32	NG 32
40	NG 40
50	NG 50
63	NG 63
80	NG 80
100	NG 100

A

Serial Number

Spring

S	1,0 bar
T	2,0 bar
U	4,0 bar
V	6,0 bar (not available for all sizes)

Series

6	mounting dimensions as per DIN 24342 / ISO 7368
---	---

Type of Poppet / Cone

X	Step Poppet
S	Step Poppet with small Seat
T	Step Poppet with small Seat and dampening nose
-	special poppet on request

Modifications

OP	without pilot valve
W106	Cover with mounting face dimension P06 for solenoid pilot control.
W110	Cover with mounting face dimension P10 for solenoid pilot control.

Indication in 10 th of a mm of the diameter and in the same order as given in the function symbol (P,A,B,T,X,Y)
..00 = Plug
..08 = Orifice 0,8 mm
..15 = Orifice 1,5 mm
i.e.: X08 = Orifice 0,8 mm in X
i.e.: P10 = Orifice 1,0 mm in P

Electrical connection (optional)

without Des.	connection as per DIN 43650 without plug
1	Cube plug recommended by DIN 43650

Solenoid supply (only for valves with pilot operated solenoid)

A	12 VDC
B	24 VDC
M	110 VAC 50/60 Hz
N	220 VAC 50/60 Hz

Function

1	Active opening with energised solenoid.
2	Active closing with energised solenoid.
3	Externally pilot operated.

Pilot connection

X	x trough mounting surface / y through mounting surface
---	--

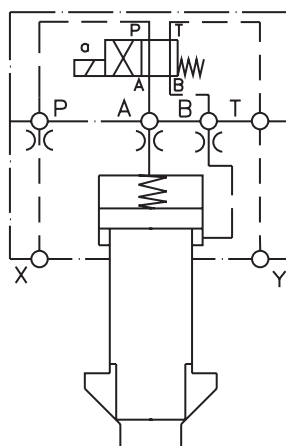
Opening

W	activ
---	-------

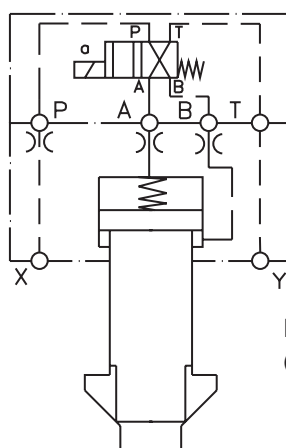
Ratio see page 6

1	NG 16	Factory determined!
2	NG 25	
3	NG 32	
4	NG 40	
5	NG 50	
6	NG 63	
7	NG 80	
8	NG 100	

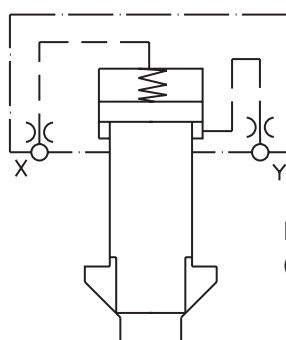
Subject to technical changes



RHE...WX1..
(Normally Closed - Energize solenoid to open)

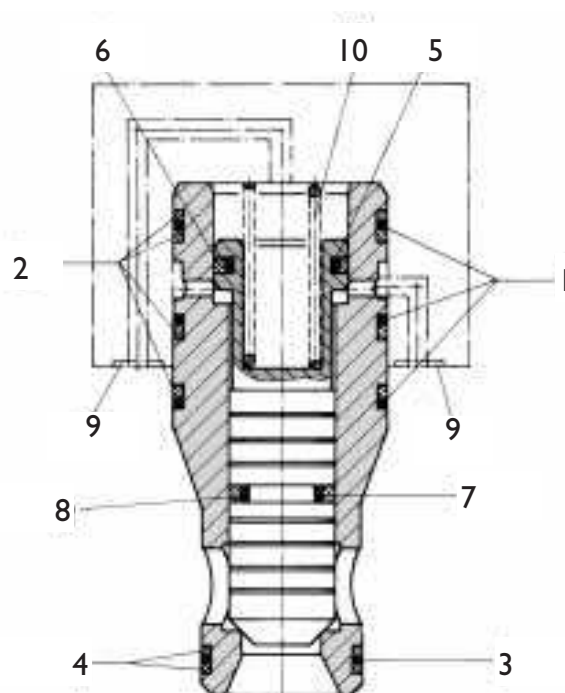


RHE...WX2..
(Normally Open - Energize solenoid to close)



RHE...WX3..
(externally hydraulically operated)

Spare Parts



Pos.	Designation	Order Number								
			NG16	NG25	NG32	NG40	NG50	NG63	NG80	NG100
	Seal Kit	XEB	12240	12241	12242	12243	12244	12245	12246	12247
1	O-Ring 80 Shore	X980-	02024	02129	02227	02231	02338	02347	02430	02439
2	Back-Up Ring	X780-	18024	18129	08227	18231	18338	08348	08431	18439
3	O-Ring 80 Shore	X980-	02020	02122	02222	02225	02229	02338	02344	02427
4	Back-Up Ring	X780-	08020	18122	18222	18225	18229	18338	18344	18427
5	O-Ring 70 Shore	X980-	02112	02116	02123	02222	02228	02336	02343	02425
6	Turcon Glyd Ring	X780-	40200	40280	40380	40500	40700	40900	41100	41330
7	O-Ring 70 Shore	X980-	02109	02113	02118	02123	02224	02228	02335	02343
8	Turcon Glyd Ring	X780-	40160	40220	40300	40380	40550	40700	40850	41100
9	O-Ring 80 Shore	X980-	02010	02012	02013	02112	02112	02116	02215	02220
	Springs									
10	Spring S - 1,0 bar	XEF	10006	10013	10138	10106	10037	10044	10051	10058
10	Spring T - 2,0 bar	XEF	10007	10014	10140	10105	10038	10045	10052	10059
10	Spring U - 4,0 bar	XEF	10008	10015	10191	10104	10173	10046	10052 10250	10059 10253
10	Spring V - 6,0 bar	XEF	10009	10015 10016	—	—	—	—	—	—

Order examples:

O-Ring Item 5 for NG25
Order number: X980-02116

Spring 2,0 bar Item 10 for NG25
Order number: XEF10014



Australia

Brazil

China

Denmark

England

Finland



France

Germany

India

Ireland

Italy

Japan

Korea

Luxembourg

Philippines

Singapore

Spain

Sweden

USA

MOOG
HYDROLUX

MOOG HYDROLUX S.à.r.l.

1, rue de l'Acierie

L-1112 LUXEMBOURG

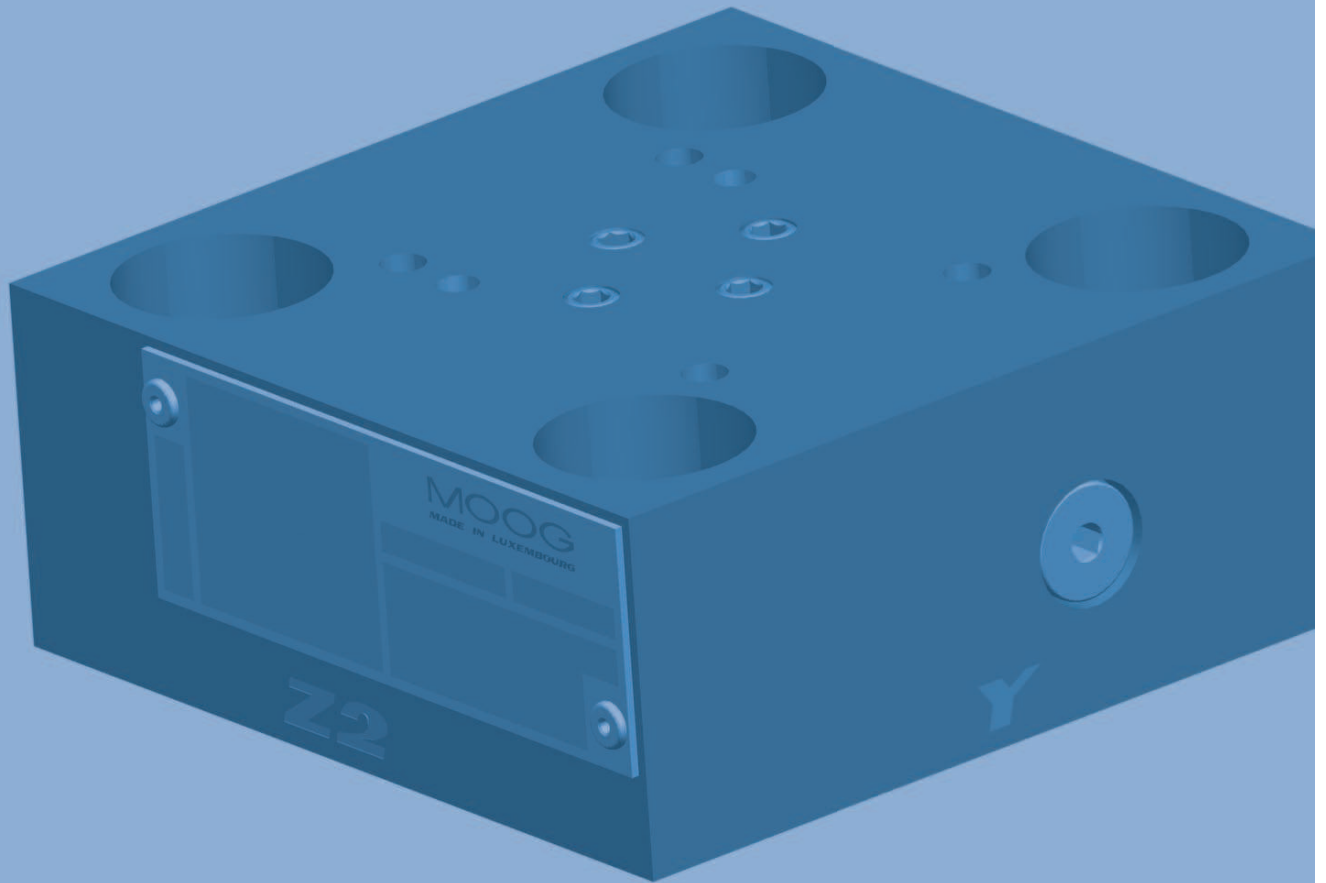
Tel: (+352) 40 46 40-1

Fax: (+352) 40 46 40-909

E-mail: administration@moog.lu

CARTRIDGE COVERS

D SERIES



D SERIES COVERS FOR CARTRIDGES
TO ISO 7368
NG16 TO NG100



CHAPTER	PAGE
Introduction	3
Symbols	4
General description	5
Selection of orifice size	6
Description Check, directional control and throttle functions	7
Dimensions Check, directional control and throttle functions	12
Ordering information Check, directional control and throttle functions	30
Order numbers and seal kits Check, directional control and throttle functions	31
Conversation table	33

Our Quality Management System conforms to DIN EN ISO9001.

NOTICE

This catalogue is for users with some technical knowledge. To ensure that all the necessary characteristics for function and safety of the system are given, the user must check the suitability of the products described herein. In case of doubt, please contact Moog.

Moog is a registered trademark of Moog Inc. and its subsidiaries. Unless stated otherwise, all trademarks mentioned herein are the property of Moog Inc. and its subsidiaries. For the full disclaimer refer to www.moog.com/literature/disclaimers.

©Moog Inc. 2008. All rights reserved. The right to make changes is reserved
For the most current information, visit www.moog.com/industrial

Cover	Symbol	Cover type code
Cartridge cover with remote control port size 16 - 100		_CCE_D61DX
Cartridge cover with integrated shuttle valve size 16 - 100		_CCE_D62DX
Cartridge cover with remote control port valve port and stroke limiter size 16 - 100		_CCE_D61H_X
Cartridge cover with mounting pattern for a directional control valve or a seat valve size 16-100		_CCE_D6RMX_
Cartridge cover with mounting pattern for a directional control valve or a seat valve with an additional port for a 2nd valve size 16-100		_CCE_D61WX_
Cartridge cover with integrated shuttle valve as check valve circuit and mounting pattern for a directional control valve or a seat valve size 16-100		_CCE_D62WX
Cartridge cover with integrated shuttle valve and mounting pattern for a direc- tional control valve or a seat valve size 16-100		_CCE_D62WRX_
Cartridge cover with mounting pattern for a directional control valve or a seat valve with built in check valves size 16-100		_CCE_D64WX_
Cartridge cover for pilot operated check valve function, with remote control port size 16 - 100		_CCE_D6RVX
Cartridge cover for pressure relief function with remote control port size 16 - 100	UNDER PREPARATION!	UNDER PREPARATION!
Cartridge cover for pressure relief function with mounting pattern for a directional control valve or a seat valve size 16-100	UNDER PREPARATION!	UNDER PREPARATION!

1. ORIFICE INSTALLATION OPTIONS IN THE COVER

Type	Orifices in ports										Orifices can be changed from the outside
	P	A	B	T	X	Y	C	Z1	Z2	AP	
1D					X						All nominal sizes
2D					X	X	X				From NG63 to NG100 → X, Y
2WR	X	X	X	X	X		X				From NG63 to NG100 → X
1H					X						All nominal sizes
RM	X	X	X	X							-
1W	X	X	X	X			X		X		From NG63 to NG100 → Z2
2W	X	X	X	X			X	X	X		From NG63 to NG100 → Z1, Z2
4W	X	X	X	X			X		X		From NG63 to NG100 → Z2
RV					X	X	X		X		From NG63 to NG100 → X, Y, Z2
DBA	X	X	X	X	X		X		X	X	From NG63 to NG100 → X, Z2
DBC					X	X	X				From NG63 to NG100 → X, Y

Orifice installation options in the cover are identified on the cover, e.g., ' DX, DY, DZ1, DZ2 '.

DX means that an orifice can be installed in port X.

Identifiers starting with "M..." mark the test port for the port concerned.

2. ORIFICE THREAD SIZES

Port	NG16	NG25	NG32	NG40	NG50	NG63	NG80	NG100
P, A, B, T	M6	M6	M6	M6	M6	M10	M10	M10
X, C, Z1, Z2, Y	M5	M6	M6	M8	M8	M10	M14	M16
AP	M5	M6	M6	M8	M8	M10	M14	M16

3. TECHNICAL DATA

Maximum operating pressure [MPa]	35
Seals* for hydraulic fluids	FKM + PU → M-CCE, M-CCE, hydraulic fluids on mineral oil basis FKM → V-CCE, hydraulic fluids on mineral oil basis, HFD type fluids NBR → N-CCE, N-CCE, hydraulic fluids on mineral oil basis, HFA, HFB, HFC type fluids Other hydraulic fluids on request
Hydraulic fluid temperature range [°C]	-30 to +80 for NBR seals -10 to +80 for FKM seals/PU seals
Viscosity range [mm²/s]	2,8 to 380
Cleanliness class to ISO-Code	Max. ISO 4406 (C) class 20/18/15

*PU : Polyurethane rubber
 FKM : Fluorosilicone rubber (Viton®)
 NBR : Nitrile rubber (Buna N)

This calculation is used to select the orifice size which influences the opening and closing times. It may be necessary to optimize the settings on the machine. Using the diagram below, the cartridge opening and closing times may be calculated for various orifice sizes.

Equation:

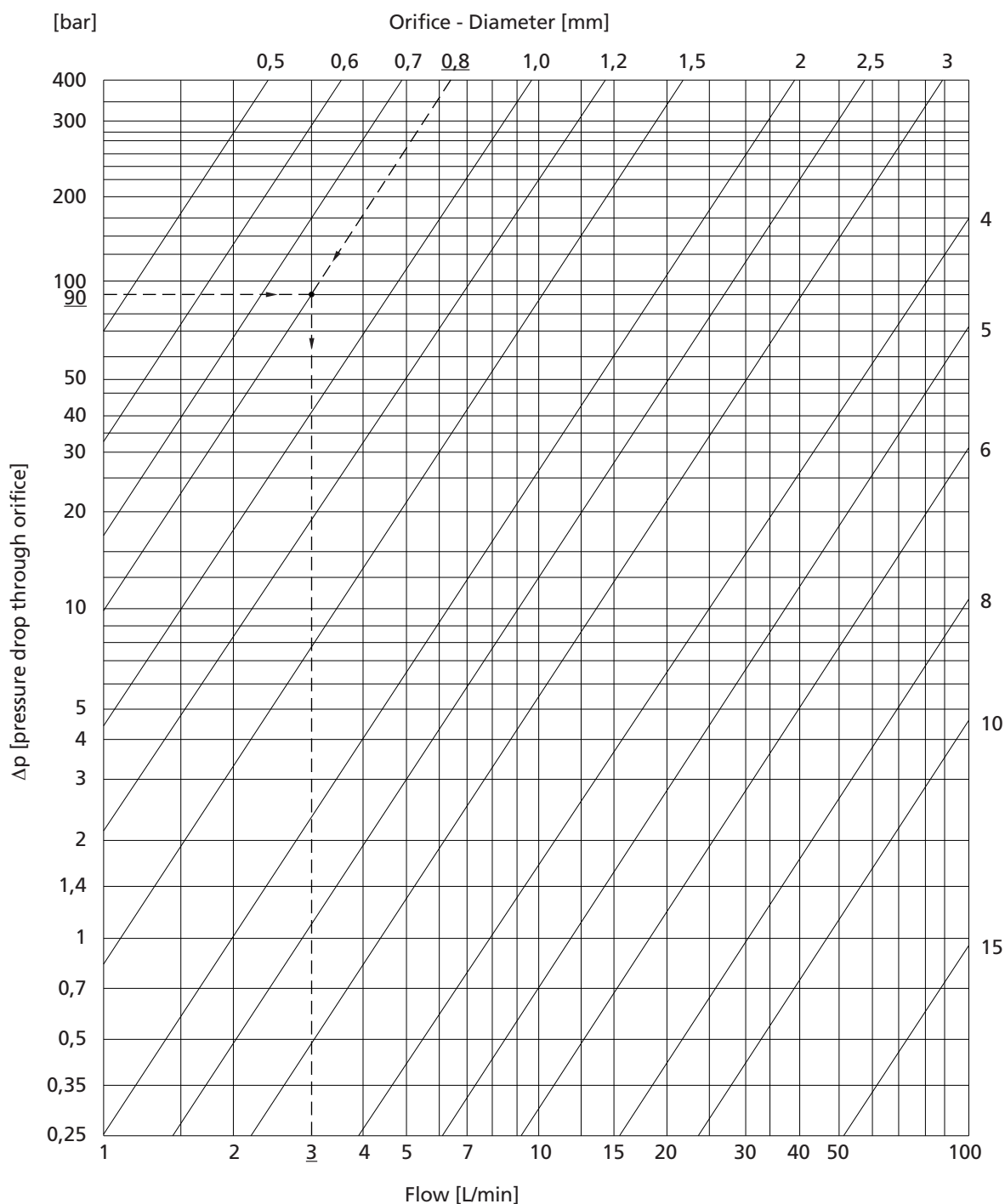
$$\text{Opening and closing time [ms]} = \frac{\text{Pilot oil volume cartridge [cm}^3\text{]} \times 60}{\text{Orifice flow (diagram) [l/min]}}$$

The pilot oil volume can be read from the applicable cartridge catalogue.

Example:

For Δp of 90 bar through a 0,8 mm nozzle in an NG25 cartridge with B cone, the cone takes approx. 88 ms for the complete stroke.

$$\text{Opening and closing time [ms]} = \frac{4,4 \text{ [cm}^3\text{]} \times 60}{3 \text{ [l/min]}} = 88 \text{ ms}$$



DESCRIPTION OF CHECK, DIRECTIONAL CONTROL AND THROTTLE FUNCTIONS

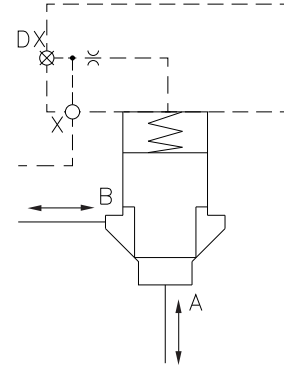
NG16-100

1. DIRECTIONAL CONTROL FUNCTIONS

Cover 1D: NG16 to NG100 (pages 12-13)

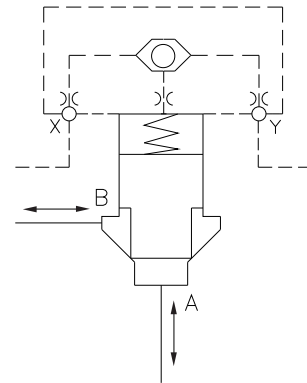
When using a 1D cover in combination with a cartridge*, the pressure relief of cover port X towards the tank triggers a 2 directional control function where the flow direction is $A \rightarrow B$ or $B \rightarrow A$.

If control port X of the cover is subjected to the maximum system pressure or the highest pressure of A or B, the flow from A to B and vice versa is blocked.



Cover 2D: NG16 to NG100 (pages 14-15)

For the 2D cover, the 2 directional control function is achieved using an integrated shuttle valve. To activate the function, cover ports X and Y are relieved towards the tank. In this case, the flow direction is $A \rightarrow B$ or $B \rightarrow A$. If control valve port X or Y of the cover is subjected to the maximum system pressure or the highest pressure of A or B, the flow from A to B and vice versa is blocked.



* Cartridge: B, C cone for standard cartridge or S, T cone for high flow cartridge

DESCRIPTION OF CHECK, DIRECTIONAL CONTROL AND THROTTLE FUNCTIONS

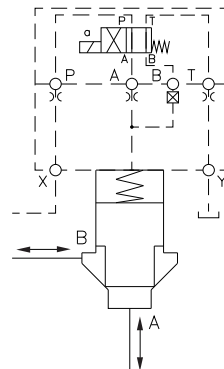
NG16-100

2. PILOT-OPERATED DIRECTIONAL CONTROL FUNCTION

Cover RM: NG16 to NG100 (pages 18-19)

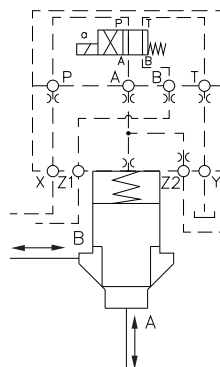
When using an RM cover in combination with a cartridge* and a control valve**, a 2 directional control function is achieved when the solenoid is energized and there is a plug in port B of the cover where the flow direction is $A \rightarrow B$ or $B \rightarrow A$. This effect is achieved by pressure relief of the cartridge* spring chamber.

If control port X of the cover is subjected to the maximum system pressure or the highest pressure of A or B, the flow from A to B and vice versa is blocked when the solenoid is de-energized and there is a plug in port B of the cover. If the plug is installed in port A of the cover, the function with respect to an energized and a de-energized solenoid is exactly the opposite.



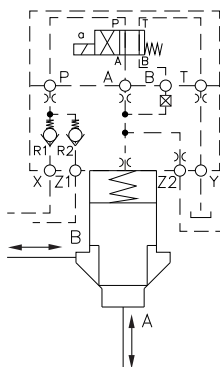
Cover 1W: NG16 to NG100 (pages 20-21)

When using a 1W cover in combination with a cartridge* and a control valve**, the function of the RM cover is copied. The Z1 or Z2 port can be used in order to activate another cartridge*.



Cover 4W: NG16 to NG100 (pages 26-27)

When using a 4W cover in combination with a cartridge* and a control valve**, the function is the same as for the RM cover. It offers parallel check functions on ports X and Z1. The higher pressure is applied to port P. This feature is helpful in applications where the risk of a short-term opening of the cartridge* during pilot pressure switching must be positively prevented. In addition, the Z2 port may be used to activate another cartridge*.



* Cartridge: B, C cone for standard cartridge or S, T cone for high flow cartridge

** Control valve: 4/2 NG06 directional control valve up to NG50 or 4/2 NG10 directional control valve from NG63 to NG100.

DESCRIPTION OF CHECK, DIRECTIONAL CONTROL AND THROTTLE FUNCTIONS

NG16-100

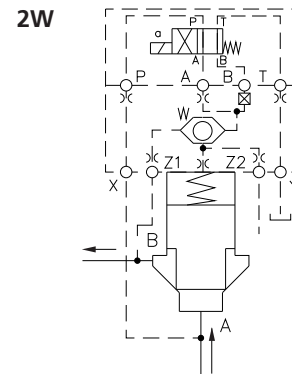
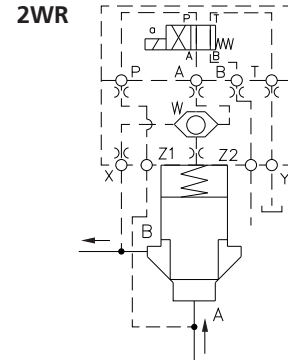
3. PILOT-OPERATED DIRECTIONAL CONTROL VALVE WITH INTEGRATED SHUTTLE FUNCTION

Cover 2WR + 2W: NG16 to NG100 (pages 22-25)

Using a 2WR or 2W cover in combination with a cartridge* or a control valve**, a check function is achieved when the solenoid is energized where the flow direction is $A \rightarrow B$. The flow direction $B \rightarrow A$ is always blocked. When the solenoid is de-energized, the flow direction $A \rightarrow B$ is blocked. For 2WR covers, control port Z1 is subjected to the maximum system pressure; for 2W covers, it is control port X. If the plug is installed in port A of the 2W cover, the function is exactly the opposite with regard to an energized and a de-energized solenoid. For 2WR covers, control port Z2 may be used to activate another cartridge*. For 2W covers, control port Z2 may be used in combination with a control valve** to unlock the check function from $B \rightarrow A$.

* Cartridge: B, C cone for standard cartridge or S, T cone for high flow cartridge

** Control valve: 4/2 NG06 directional control valve up to NG50 or 4/2 NG10 directional control valve from NG63 to NG100.



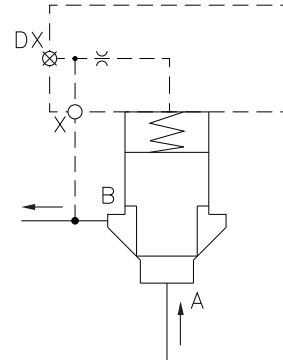
DESCRIPTION OF CHECK, DIRECTIONAL CONTROL AND THROTTLE FUNCTIONS

NG16-100

4. CHECK FUNCTION

Cover 1D: NG16 to NG100 (pages 12-13)

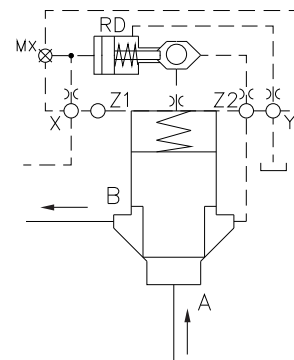
When using a 1D cover in combination with a cartridge*, a check function may be achieved by connecting control port X with port B. The flow direction is $A \rightarrow B$ ($B \rightarrow A$ blocked).



Cover RV: NG16 to NG100 (pages 28-29)

When using an RV cover in combination with a cartridge*, an unlockable check function is achieved by connecting control port Z2 with port B. The flow direction is $A \rightarrow B$ ($B \rightarrow A$ blocked).

If control port X is subjected to pressure, the check function is cancelled and the spring chamber of the cartridge is relieved towards control port Y. To cancel the check function, the pilot pressure at port X must be at least 20% (1:5) of the load pressure in port B.



- * Cartridge: B, C cone for standard cartridge or
S, T cone for high flow cartridge

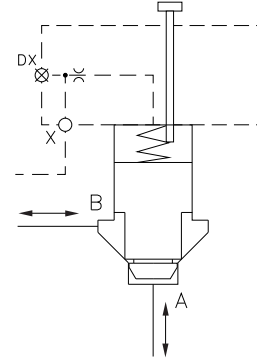
5. THROTTLE FUNCTION

Cover 1H: NG16 to NG100 (pages 16-17)

When using a 1H cover in combination with a cartridge*, a 2 directional control function is achieved when the cover port X is relieved towards the tank. The flow direction is A → B or B → A.

If control port X of the cover is subjected to the maximum system pressure or the highest pressure of A or B, the flow from A to B or vice versa is blocked. Due to the adjustable stroke limiter, the flow is throttled in both directions. The stroke limiter can only be adjusted to a limited extent while under pressure. The stroke limiter also allows the cartridge* to be closed.

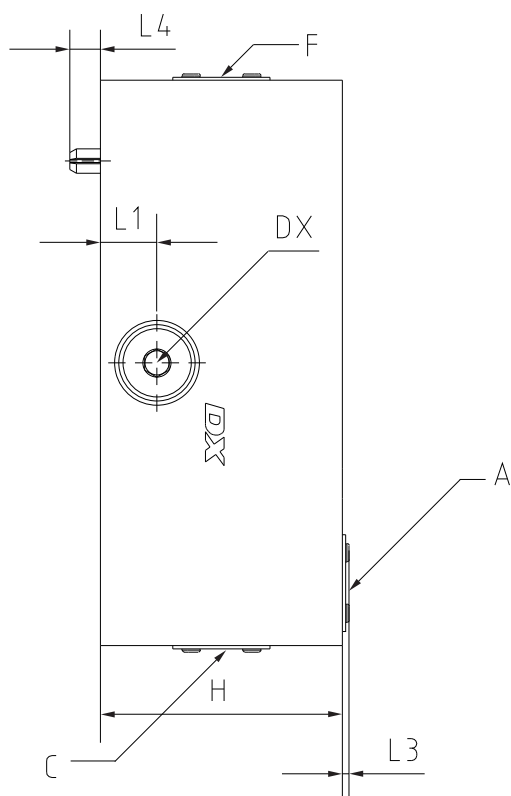
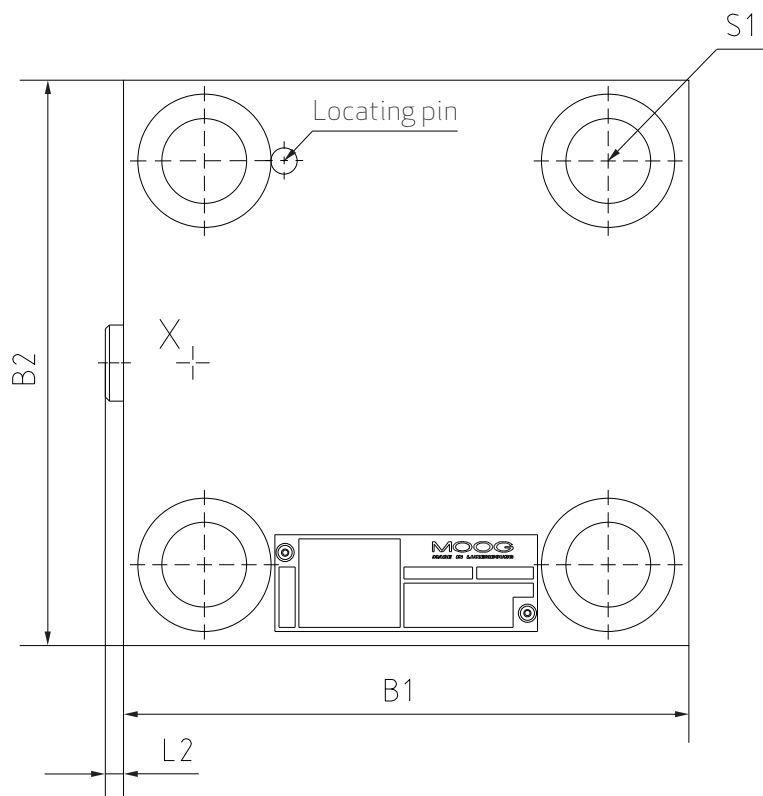
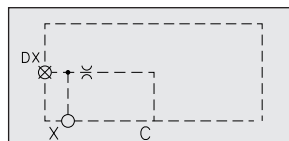
- * Cartridge: C cone for standard cartridge. High flow cartridge only on request.
Not in combination with internal cartridge spring and shaft seal cone.



DIMENSIONS OF CHECK, DIRECTIONAL CONTROL AND THROTTLE FUNCTIONS

NG16-100

COVER 1D NG16 TO NG63



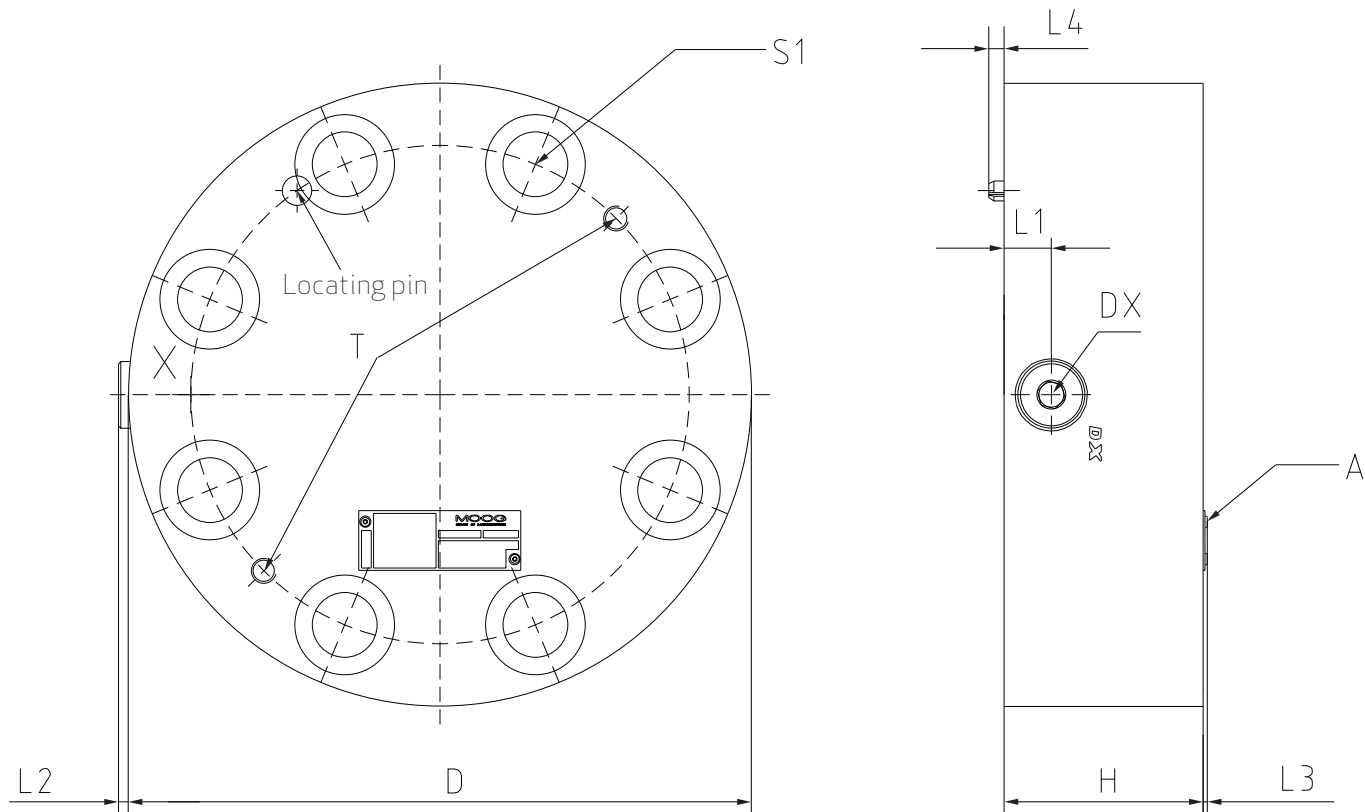
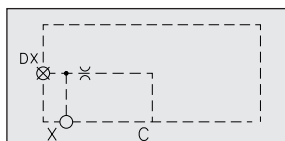
Size	16	25	32	40	50	63
B1 [mm]	65	85	102	125	140	180
B2 [mm]	65	85	102	125	140	180
H [mm]	35	35	45	60	60	80
L1 [mm]	17	12	21	20	14	27
L2 [mm]	3,5	3,5	4,5	4,5	4,5	4,5
L3 [mm]	1,6	1,6	1,6	1,6	1,6	1,6
L4 [mm]	5	5,5	6	6	7,5	8
Nameplate on the side	A	C	F	C	A	A
Plug DX **	G 1/8"	G 1/8"	G 1/4"	G 1/4"	G 1/4"	G3/8"
Tightening torque [Nm]	12	12	27	27	27	56
Socket width across flats	5	5	6	6	6	8
S1* DIN EN ISO 4762 - 12.9	M8x35	M12x40	M16x50	M20x70	M20x70	M30x90
Tightening torque [Nm]	30	100	300	550	550	1800
Weight [kg]	1,1	1,7	3,1	6,3	8,2	17

*not part of the delivery, **may also be used as test port

DIMENSIONS OF CHECK, DIRECTIONAL CONTROL AND THROTTLE FUNCTIONS

NG16-100

COVER 1D NG80 AND NG100



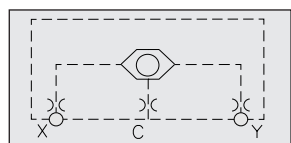
Size	80	100
D [mm]	250	300
H [mm]	80	90
L1 [mm]	19	18
L2 [mm]	4	4
L3 [mm]	1,6	1,6
L4 [mm]	6	6
Nameplate on the side	A	A
Plug DX **	G1/2"	G1/2"
Tightening torque [Nm]	72	72
Socket width across flats	10	10
S1* DIN EN ISO 4762 - 12.9	M24x90	M30x100
Tightening torque [Nm]	900	1800
Thread for eye locating pin T	M10	M10
Weight [kg]	27	43

*not part of the delivery, **may also be used as test port

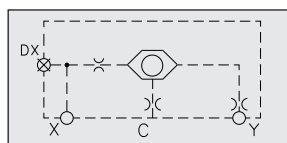
DIMENSIONS OF CHECK, DIRECTIONAL CONTROL AND THROTTLE FUNCTIONS

NG16-100

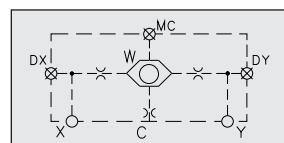
COVER 2D NG16 TO NG63



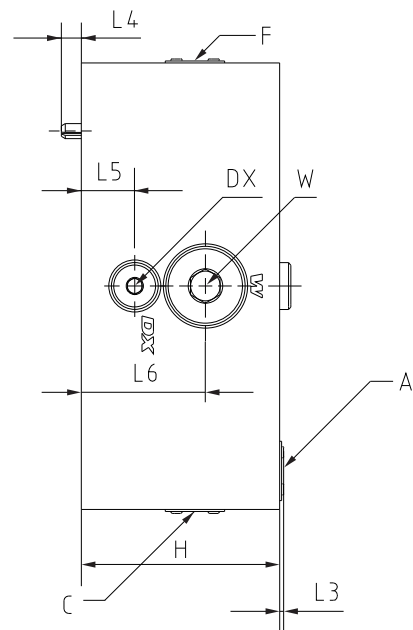
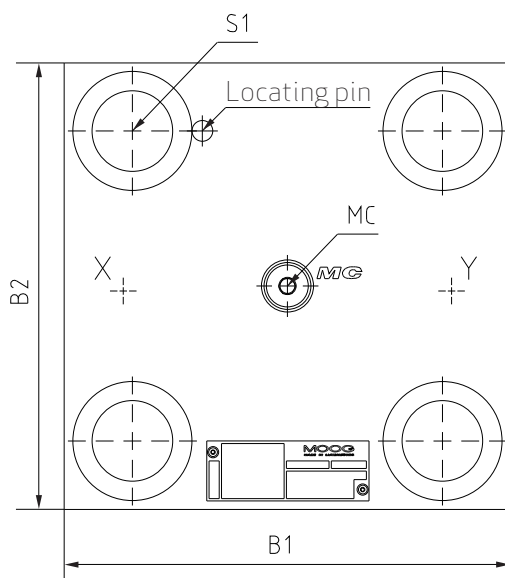
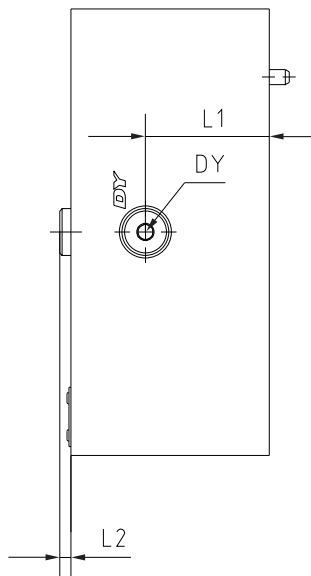
NG16, 25, 32, 50



NG40



NG63



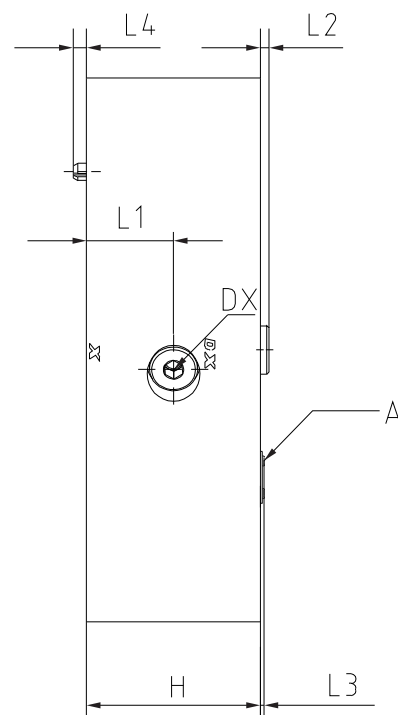
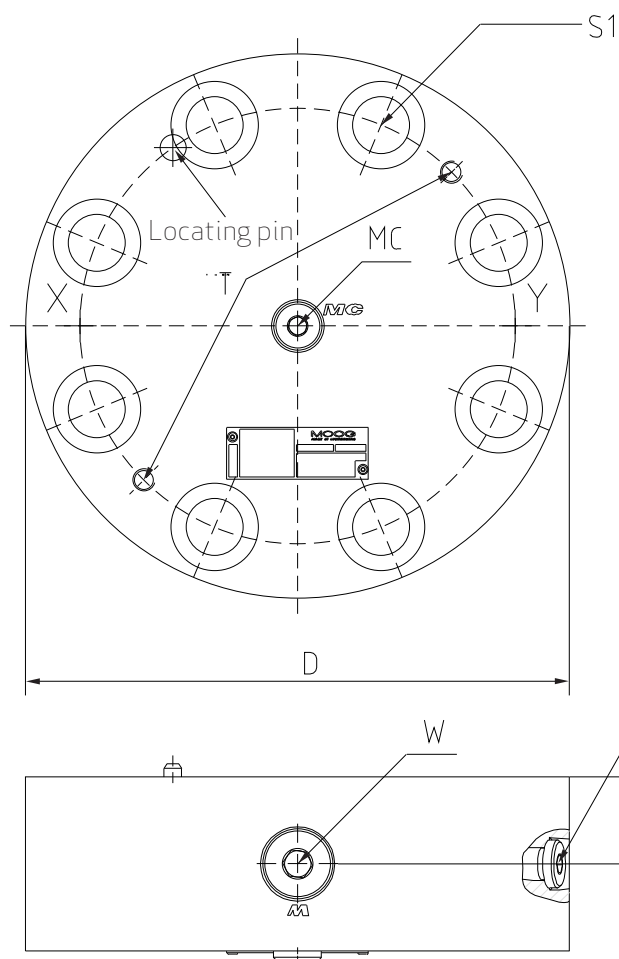
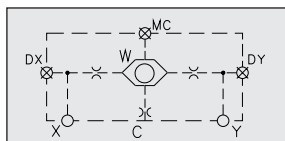
Size	16	25	32	40	50	63
B1 [mm]	65	85	102	125	140	180
B2 [mm]	65	85	102	125	140	180
H [mm]	35	35	45	60	60	80
L1 [mm]	-	-	-	-	-	50
L2 [mm]	4	0	0	0	0	4,5
L3 [mm]	1,6	1,6	1,6	1,6	1,6	1,6
L4 [mm]	5	5,5	6	6	7,5	8
L5 [mm]	-	-	-	12,5	-	21,5
L6 [mm]	21,5	21,5	30	33,5	45	50
Nameplate on the side	A	C	F	C	A	A
Plug DX, DY + MC	-	-	-	G 1/8"	-	G1/4"
Tightening torque [Nm]	-	-	-	12	-	27
Socket width across flats	-	-	-	5	-	6
Plug W	G 3/8"	G 3/8"	G 3/8"	G 3/8"	G 3/8"	G 3/4"
Tightening torque [Nm]	56	56	56	56	56	120
Socket width across flats	8	8	8	8	8	12
Shuttle valve under plug W	-	-	-	-	-	G 1/2"
Tightening torque [Nm]	-	-	-	-	-	40
Socket width across flats	-	-	-	-	-	10
S1* DIN EN ISO 4762 - 12.9	M8x35	M12x40	M16x50	M20x70	M20x70	M30x90
Tightening torque [Nm]	30	100	300	550	550	1800
Weight [kg]	1,1	1,7	3,1	6,3	8,2	17

*not part of the delivery

DIMENSIONS OF CHECK, DIRECTIONAL CONTROL AND THROTTLE FUNCTIONS

NG16-100

COVER 2D NG80 AND NG100



Size	80	100
D [mm]	250	300
H [mm]	80	90
L1 [mm]	40	45
L2 [mm]	4	4
L3 [mm]	1,6	1,6
L4 [mm]	6	6
L5 [mm]	40	45
Nameplate on the side	A	A
Plug DX, DY + MC	G 3/8"	G 1/2"
Tightening torque [Nm]	56	72
Socket width across flats	8	10

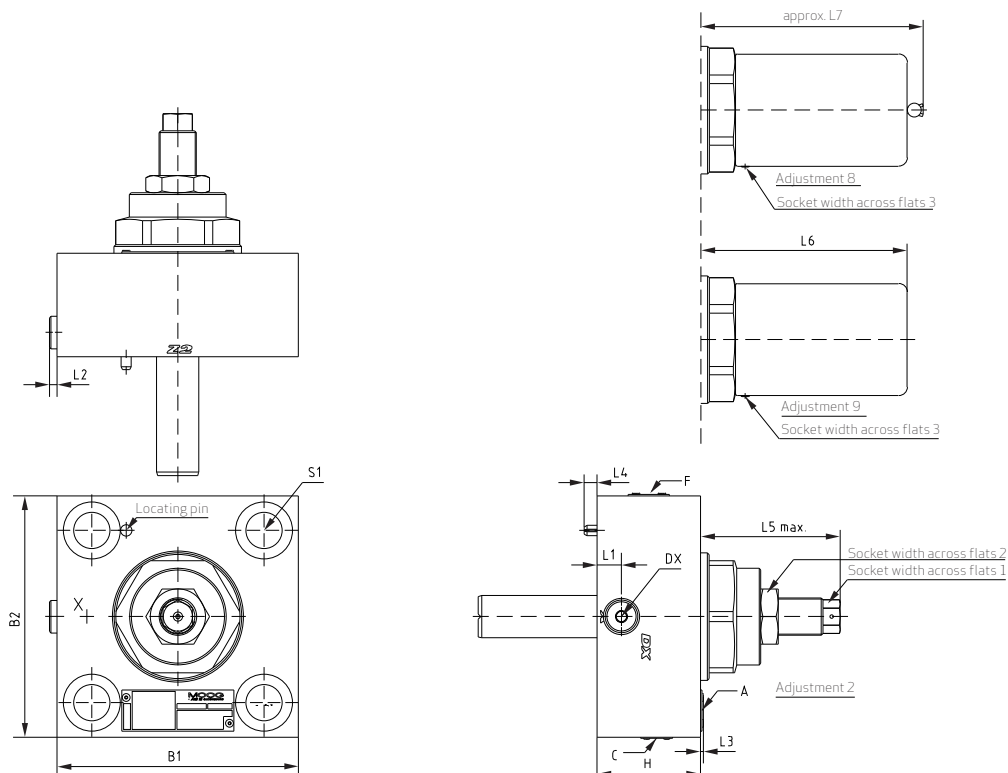
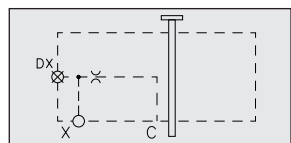
Size	80	100
Plug W	G 3/4"	G 3/4"
Tightening torque [Nm]	120	120
Socket width across flats	12	12
Shuttle valve under plug W	G 1/2"	G 1/2"
Tightening torque [Nm]	40	40
Socket width across flats	10	10
S1* DIN EN ISO 4762 - 12.9	M24x90	M30x100
Tightening torque [Nm]	900	1800
Thread for eye locating pin T	M10	M10
Weight [kg]	26	42

*not part of the delivery

DIMENSIONS OF CHECK, DIRECTIONAL CONTROL AND THROTTLE FUNCTIONS

NG16-100

COVER 1H NG16 TO NG63



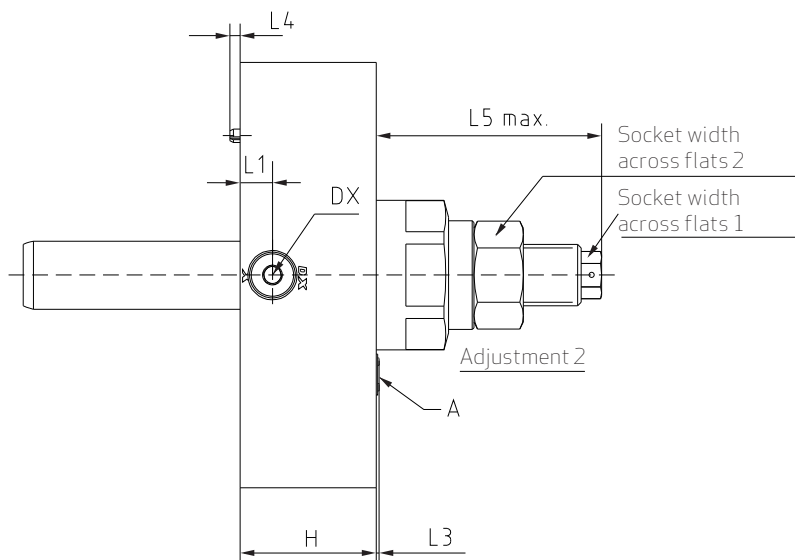
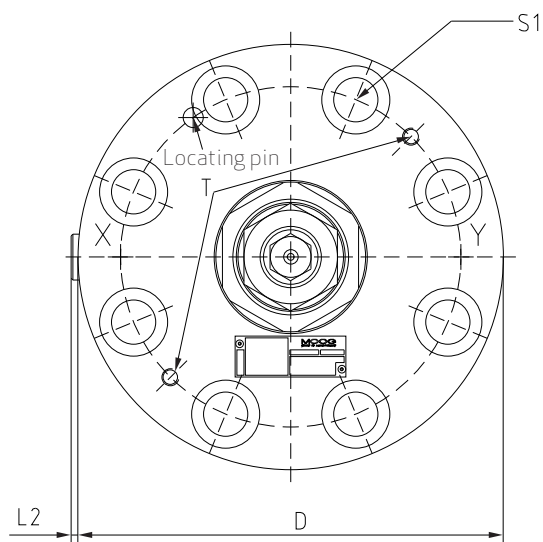
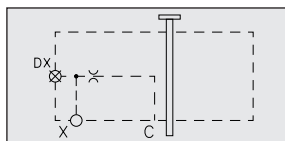
Size	16	25	32	40	50	63
B1 [mm]	65	85	102	125	140	180
B2 [mm]	65	85	102	125	140	180
H [mm]	35	35	45	60	60	80
L1 [mm]	17	12	21	20	14	27
L2 [mm]	3,5	3,5	4,5	4,5	4,5	4,5
L3 [mm]	1,6	1,6	1,6	1,6	1,6	1,6
L4 [mm]	5	5,5	6	6	7,5	8
L5 max [mm]	50,5	50,5	62	62	81	117
L6 [mm]	83,5	83,5	80	80	120	131
approx. L7 [mm]	94	94	90,5	90,5	129	140
Nameplate on the side	C	C	F	C	A	A
Plug DX**	G 1/8"	G 1/8"	G 1/4"	G 1/4"	G 1/4"	G 3/8"
Tightening torque [mm]	12	12	27	27	27	56
Socket width across flats	5	5	6	6	6	8
Socket width across flats 1	8	8	10	10	17	19
Socket width across flats 2	19	19	24	24	32	46
Tightening torque Socket width across flats 2 [Nm]	65	65	85	85	110	150
Socket width across flats 3 (Allen screw)	2	2	2	2	2	2
Tightening torque Socket width across flats 3 [Nm]	5	5	5	5	5	5
S1* DIN EN ISO 4762 - 12.9	M8x35	M12x40	M16x50	M20x70	M20x70	M30x90
Tightening torque [Nm]	30	100	300	550	550	1800
Weight [kg]	1,4	2,7	4	7,3	10,3	19,2

*not part of the delivery, **may also be used as test port

DIMENSIONS OF CHECK, DIRECTIONAL CONTROL AND THROTTLE FUNCTIONS

NG16-100

COVER 1H NG80 AND NG100



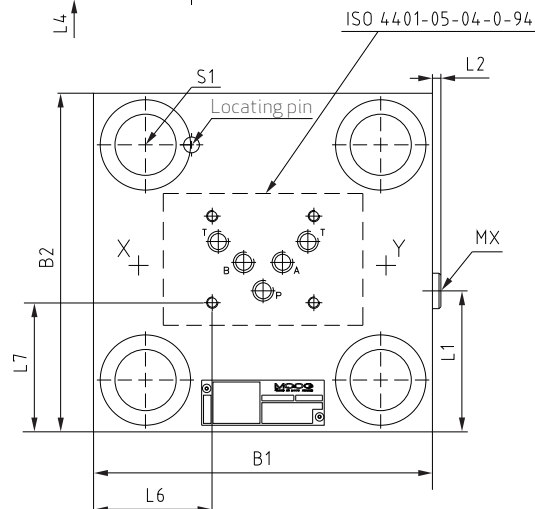
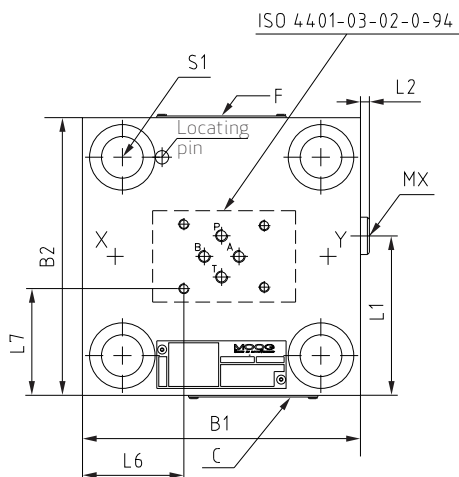
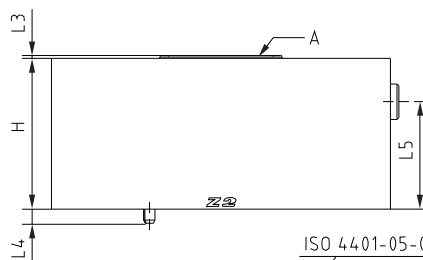
Size	80	100
D [mm]	250	300
H [mm]	80	90
L1 [mm]	19	18
L2 [mm]	4	4
L3 [mm]	1,6	1,6
L4 [mm]	6	6
L5 max [mm]	132,5	166
Nameplate on the side	A	A
Plug DX **	G 1/2 "	G 1/2 "
Tightening torque [Nm]	72	72
Socket width across flats	10	10
Socket width across flats 1	24	30
Socket width across flats 2	55	65
Tightening torque Socket width across flats 2 [Nm]	175	240
S1* DIN EN ISO 4762 - 12.9	M24x90	M30x100
Tightening torque [Nm]	900	1800
Thread for eye locating pin T	M10	M10
Weight [kg]	31	40

*not part of the delivery, **may also be used as test port

NG16-100

A rectangular circuit diagram. On the left vertical wire is a battery symbol with two cells, labeled 'P' at the top and 'X' at the bottom. On the right vertical wire is a light bulb symbol, labeled 'Y' at the bottom. The top horizontal wire contains two points, 'A' and 'B', with a light bulb symbol between them. The bottom horizontal wire contains a point 'C'. A dashed line connects point 'C' to the bottom of the light bulb on the right wire. A solid line connects point 'B' to a junction point, from which a solid line goes down to point 'C' and another solid line goes left to point 'A'.

A rectangular circuit diagram. On the left vertical wire, there is a battery labeled 'MX' with a '+' sign at the top and a '-' sign at the bottom. The top horizontal wire contains two resistors labeled 'P' and 'A' in series. The bottom horizontal wire contains two resistors labeled 'C' and 'Y' in series. The right vertical wire contains two resistors labeled 'B' and 'T' in series. The circuit is completed by connecting the top and bottom wires on the right side.

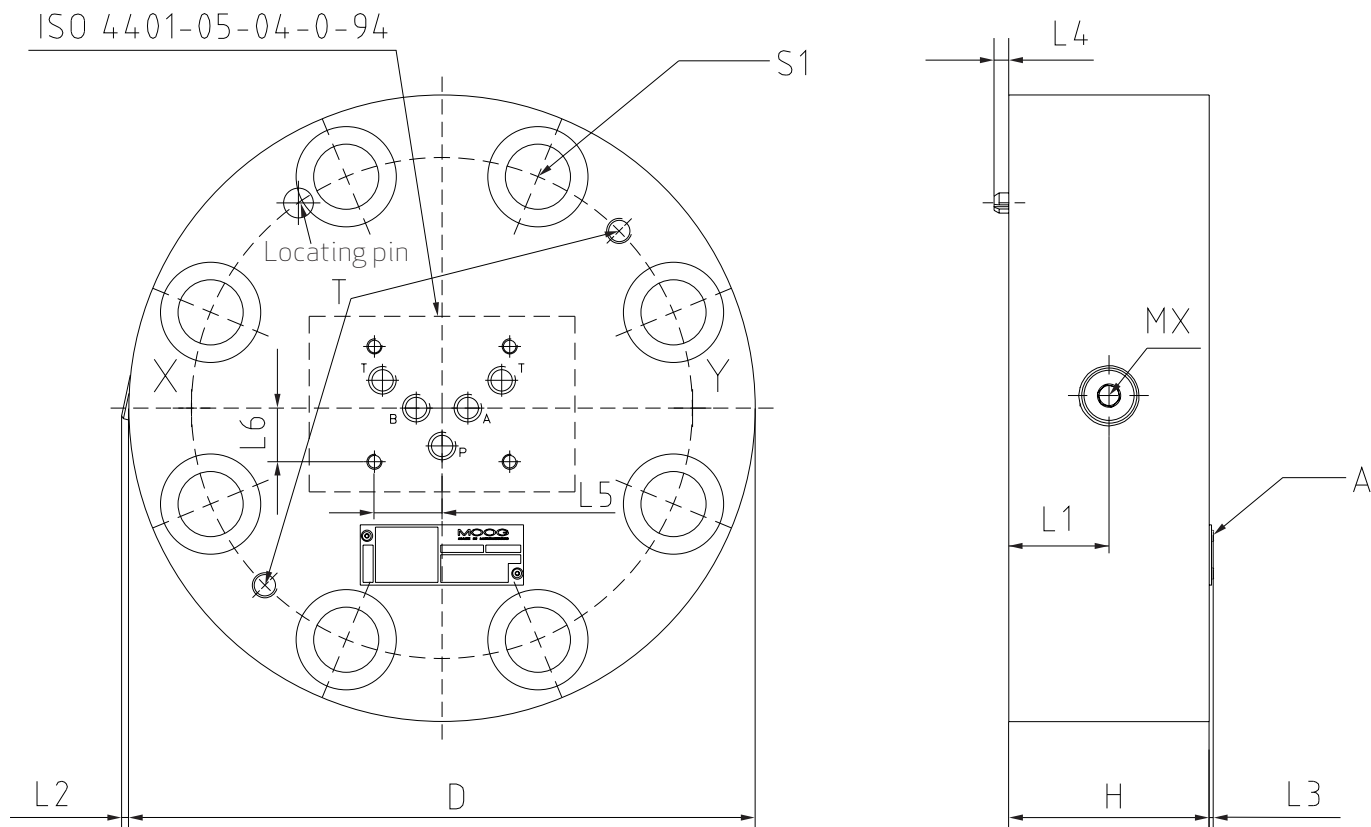
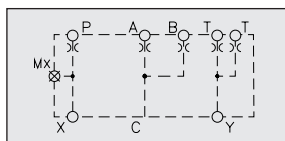


*not part of the delivery

DIMENSIONS OF CHECK, DIRECTIONAL CONTROL AND THROTTLE FUNCTIONS

NG16-100

COVER RM NG80 AND NG100

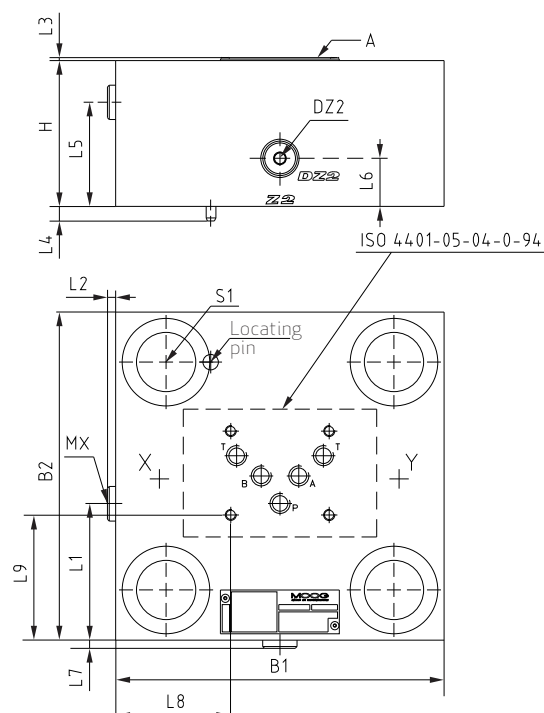


Size	80	100
D [mm]	250	300
H [mm]	80	90
L1 [mm]	40	43
L2 [mm]	2,5	2,5
L3 [mm]	1,6	1,6
L4 [mm]	6	6
L5 [mm]	27	27
L6 [mm]	23	23
Nameplate on the side	A	A
Plug MX	G 3/8"	G 1/2"
Tightening torque [Nm]	56	72
Socket width across flats	8	10
S1* DIN EN ISO 4762 - 12.9	M24x90	M30x100
Tightening torque [Nm]	900	1800
Thread for eye locating pin T	M10	M10
Weight [kg]	26	42

*not part of the delivery

NG16-100

Technical drawing of a rectangular plate with dimensions and features. The drawing includes a top view and a side view. The top view shows a rectangular plate with dimensions L1 (width) and L2 (height). It features four circular holes with diameters of 10 mm, 12 mm, and 14 mm. A central rectangular area is defined by dimensions B1 and B2. A dashed line indicates a locating pin. The side view shows the plate's thickness L3 and the position of the holes relative to the edges, with dimensions L4, L5, and L6. The drawing is labeled with ISO 4401-03-02-0-94.

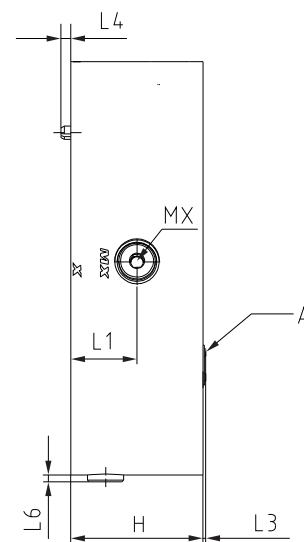
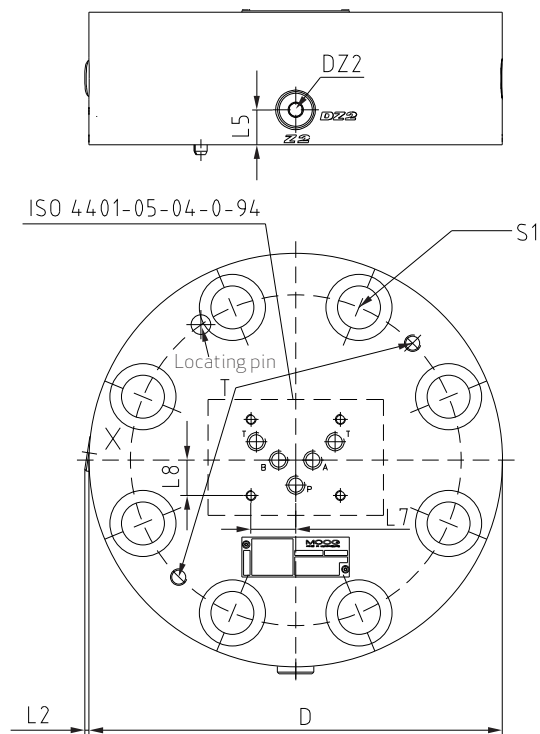
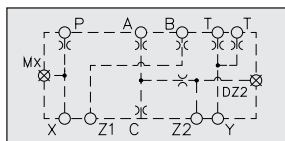


*not part of the delivery, **may also be used as test port

DIMENSIONS OF CHECK, DIRECTIONAL CONTROL AND THROTTLE FUNCTIONS

NG16-100

COVER 1W NG80 AND NG100



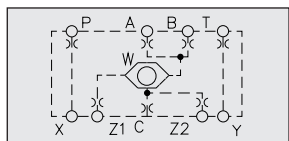
Size	80	100
D [mm]	250	300
H [mm]	80	90
L1 [mm]	40	43
L2 [mm]	2,5	2,5
L3 [mm]	1,6	1,6
L4 [mm]	6	6
L5 [mm]	21	25
L6 [mm]	4	4
L7 [mm]	27	27
L8 [mm]	23	23
Nameplate on the side	A	A
Plug MX + DZ2 **	G 3/8 "	G 1/2 "
Tightening torque [Nm]	56	72
Socket width across flats	8	10
S1* DIN EN ISO 4762 - 12.9	M24x90	M30x100
Tightening torque [Nm]	900	1800
Thread for eye locating pin T	M10	M10
Weight [kg]	26	42

*not part of the delivery, **may also be used as test port

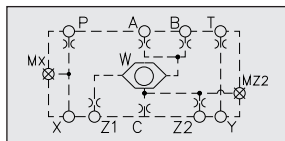
DIMENSIONS OF CHECK, DIRECTIONAL CONTROL AND THROTTLE FUNCTIONS

NG16-100

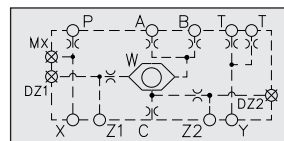
COVER 2W NG16 TO NG63



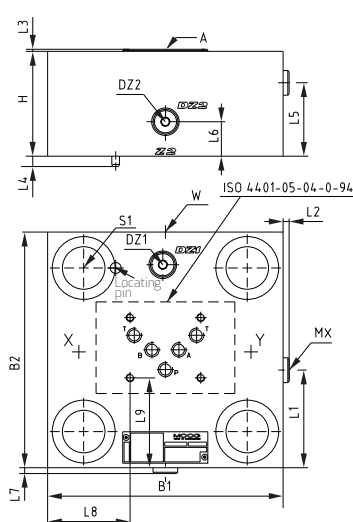
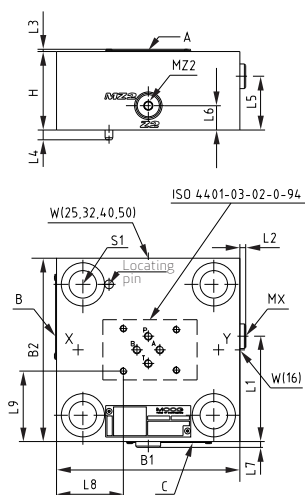
NG16, 25



NG32, 40, 50



NG63



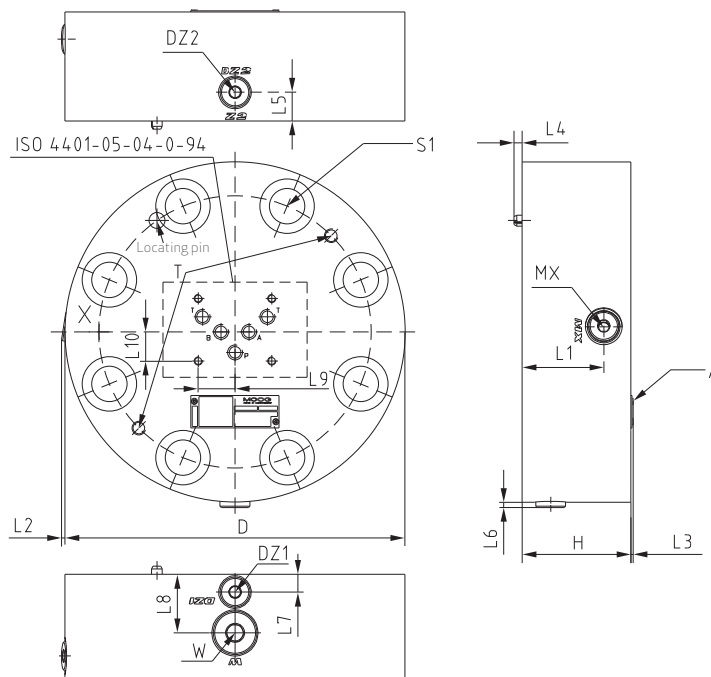
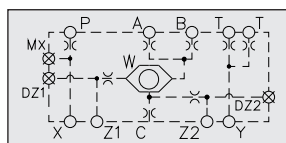
Size	16	25	32	40	50	63
B1 [mm]	80	85	102	125	140	180
B2 [mm]	65	85	102	125	140	180
H [mm]	35	40	45	60	60	80
L1 [mm]	-	-	58,9	73	80,4	74,5
L2 [mm]	-	-	3,5	4,5	4,5	4,5
L3 [mm]	1,6	1,6	1,6	1,6	1,6	1,6
L4 [mm]	5	5,5	6	6	7,5	8
L5 [mm]	-	-	34	40,5	41	56
L6 [mm]	-	-	21	17	18,5	26,25
L7 [mm]	-	-	3,5	4,5	4,5	4,5
L8 [mm]	7	23,5	32	43,5	51	63
L9 [mm]	16,25	26,25	34,65	46,25	53,75	68,6
Nameplate on the side	C	C	B	C	A	A
Plug MX, MZ2, DZ1 + DZ2**	-	-	G 1/8"	G 1/4"	G 1/4"	G 1/4"
Tightening torque [Nm]	-	-	12	27	27	27
Socket width across flats	-	-	5	6	6	6
Plug W	G 3/8"	G 3/8"	G 3/8"	G 3/8"	G 3/8"	G 1/2"
Tightening torque [Nm]	56	56	56	56	56	72
Socket width across flats	8	8	8	8	8	10
Shuttle valve under plug W	-	-	-	-	-	G 1/2"
Tightening torque [Nm]	-	-	-	-	-	40
Socket width across flats	-	-	-	-	-	10
S1* DIN EN ISO 4762 - 12.9	M8x35	M12x40	M16x50	M20x70	M20x70	M30x90
Tightening torque [Nm]	30	100	300	550	550	1800
Weight [kg]	1,3	2	3	6,2	8	16,5

*not part of the delivery, **may also be used as test port

DIMENSIONS OF CHECK, DIRECTIONAL CONTROL AND THROTTLE FUNCTIONS

NG16-100

COVER 2W NG80 AND NG100



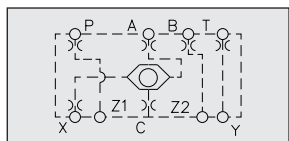
Size	80	100
D [mm]	250	300
H [mm]	80	90
L1 [mm]	60	43
L2 [mm]	2,5	2,5
L3 [mm]	1,6	1,6
L4 [mm]	6	6
L5 [mm]	21	23,9
L6 [mm]	4	4
L7 [mm]	13	24
L8 [mm]	43	56,9
L9 [mm]	27	27
L10 [mm]	23	23
Nameplate on the side	A	A
Plug MX, DZ1 + DZ2**	G 3/8 "	G 1/2 "
Tightening torque [Nm]	56	72
Socket width across flats	8	10
Plug W	G 3/4 "	G 3/4 "
Tightening torque [Nm]	120	120
Socket width across flats	12	12
Shuttle valve under plug W	G 1/2 "	G 1/2 "
Tightening torque [Nm]	40	40
Socket width across flats	10	10
S1* DIN EN ISO 4762 - 12.9	M24x90	M30x100
Tightening torque [Nm]	900	1800
Thread for eye locating pin T	M10	M10
Weight [kg]	26	44

*not part of the delivery, **may also be used as test port

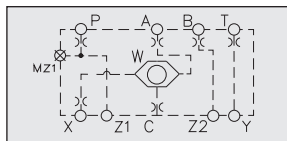
DIMENSIONS OF CHECK, DIRECTIONAL CONTROL AND THROTTLE FUNCTIONS

NG16-100

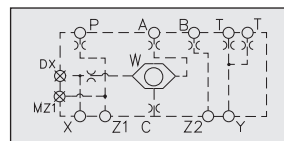
COVER 2WR NG16 TO NG63



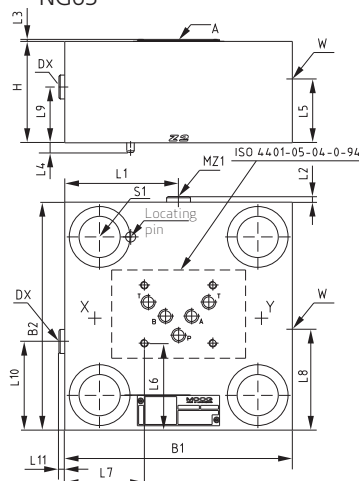
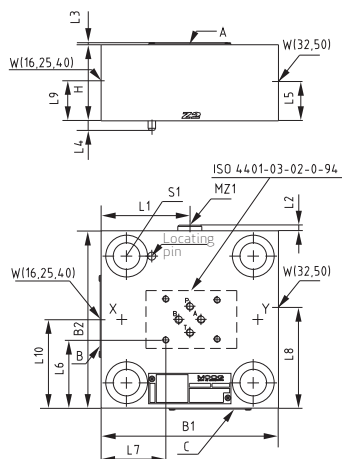
NG16, 25



NG32, 40, 50



NG63



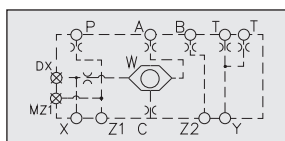
Size	16	25	32	40	50	63
B1 [mm]	80	85	102	125	140	180
B2 [mm]	65	85	102	125	140	180
H [mm]	40	40	45	60	60	80
L1 [mm]	-	-	51	62,5	70	90
L2 [mm]	-	-	3,5	4,5	4,5	4,5
L3 [mm]	1,6	1,6	1,6	1,6	1,6	1,6
L4 [mm]	5	5,5	6	6	7,5	8
L5 [mm]	-	-	17,5	-	31	44
L6 [mm]	16,25	26,25	34,65	46,25	73	68,6
L7 [mm]	7	23,5	32	43,5	53,75	63
L8 [mm]	-	-	63	-	51	70
L9 [mm]	16,5	21	-	34,5	-	44
L10 [mm]	31,5	43,5	-	64	-	70
L11 [mm]	-	-	-	-	-	4,5
Nameplate on the side	C	C	B	C	A	A
Plug DX** + MZ1	-	-	G 1/8"	G 1/4"	G 1/4"	G 1/4"
Tightening torque [Nm]	-	-	12	27	27	27
Socket width across flats	-	-	5	6	6	6
Plug W	G 3/8"	G 3/8"	G 3/8"	G 3/8"	G 3/8"	G 3/4"
Tightening torque [Nm]	56	56	56	56	56	120
Socket width across flats	8	8	8	8	8	12
Shuttle valve under plug W	-	-	-	-	-	G 1/2"
Tightening torque [Nm]	-	-	-	-	-	40
Socket width across flats	-	-	-	-	-	10
S1* DIN EN ISO 4762 - 12.9	M8x35	M12x40	M16x50	M20x70	M20x70	M30x90
Tightening torque [Nm]	30	100	300	550	550	1800
Weight [kg]	1,5	2	3	6,2	8	16,5

*not part of the delivery, **may also be used as test port

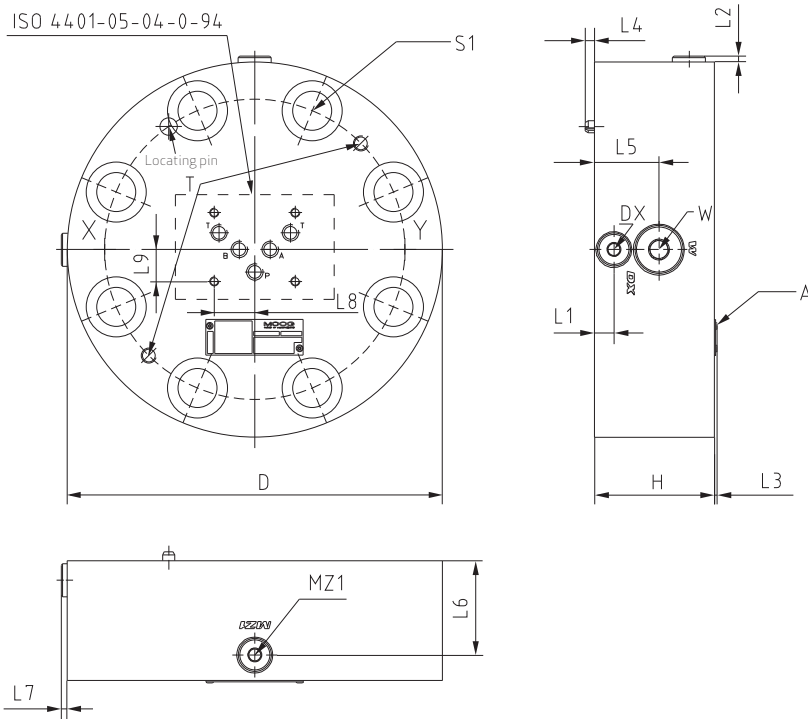
DIMENSIONS OF CHECK, DIRECTIONAL CONTROL AND THROTTLE FUNCTIONS

NG16-100

COVER 2WR NG80 AND NG100



ISO 4401-05-04-0-94



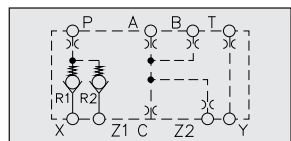
Size	80	100
D [mm]	250	300
H [mm]	80	90
L1 [mm]	13	15,5
L2 [mm]	4	4
L3 [mm]	1,6	1,6
L4 [mm]	6	6
L5 [mm]	43	48
L6 [mm]	63	72
L7 [mm]	4	4
L8 [mm]	27	27
L9 [mm]	23	23
Nameplate on the side	A	A
Plug DX** + MZ1	G 3/8 "	G 1/2 "
Tightening torque [Nm]	56	72
Socket width across flats	8	10
Plug W	G 3/4 "	G 3/4 "
Tightening torque [Nm]	120	120
Socket width across flats	12	12
Shuttle valve under plug W	G 1/2 "	G 1/2 "
Tightening torque [Nm]	40	40
Socket width across flats	10	10
S1* DIN EN ISO 4762 - 12.9	M24x90	M30x100
Tightening torque [Nm]	900	1800
Thread for eye locating pin T	M10	M10
Weight [kg]	26	42

*not part of the delivery, **may also be used as test port

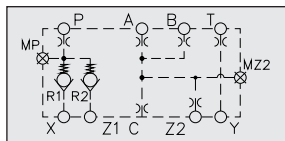
DIMENSIONS OF CHECK, DIRECTIONAL CONTROL AND THROTTLE FUNCTIONS

NG16-100

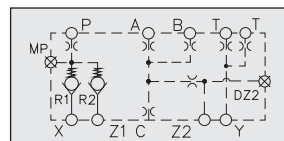
COVER 4W NG16 TO NG63



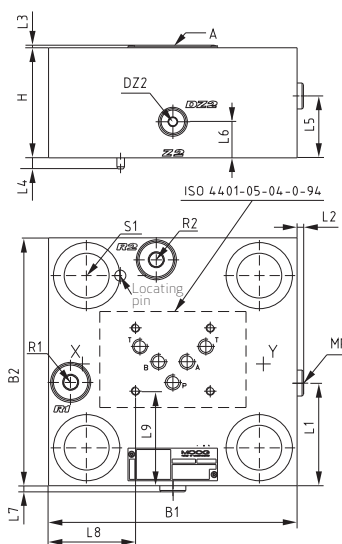
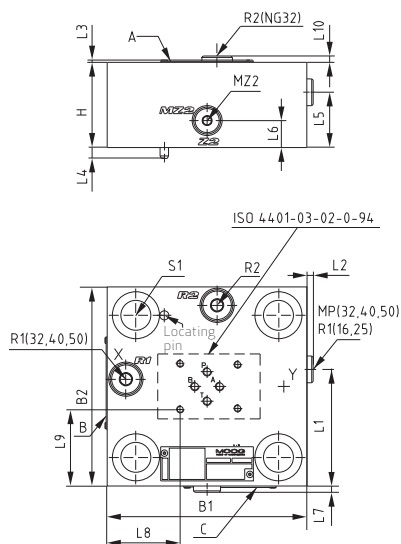
NG16, 25



NG32, 40, 50



NG63



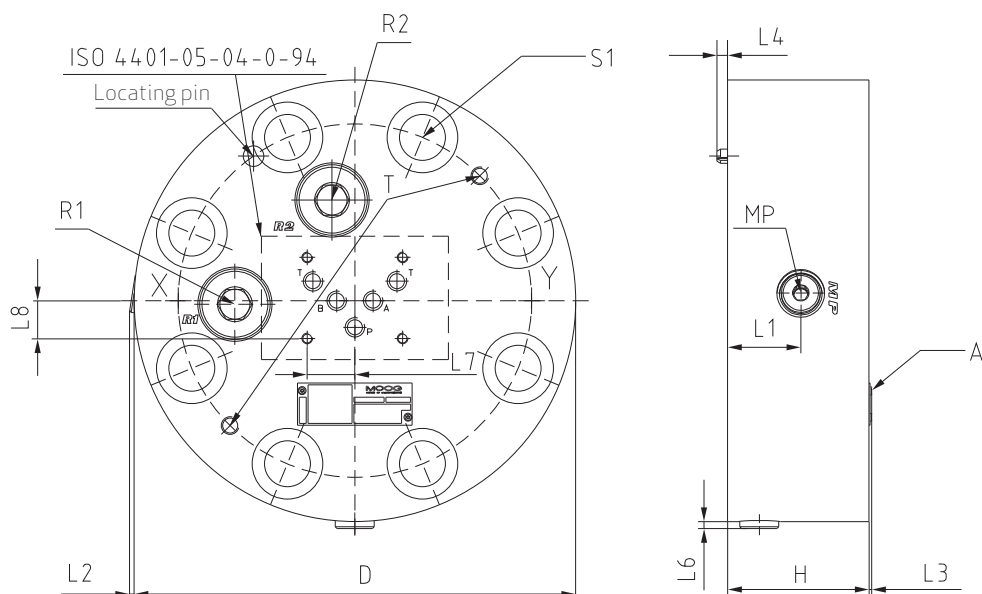
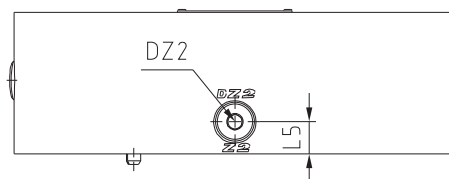
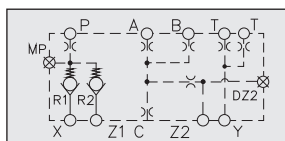
Size	16	25	32	40	50	63
B1 [mm]	80	85	102	125	140	180
B2 [mm]	65	85	102	125	140	180
H [mm]	40	40	45	60	60	80
L1 [mm]	43	53	59,5	73	82	74,5
L2 [mm]	0	0	3,5	4,5	4,5	4,5
L3 [mm]	1,6	1,6	1,6	1,6	1,6	1,6
L4 [mm]	5	5,5	6	6	7,5	8
L5 [mm]	17	20	25	38,5	39	45
L6 [mm]	-	-	18	19	19	26,25
L7 [mm]	-	-	3,5	4,5	4,5	4,5
L8 [mm]	7	23,5	32	43,5	51	63
L9 [mm]	16,25	26,25	34,65	46,25	53,75	68,6
Nameplate on the side	C	C	B	C	A	A
Plug MP, MZ2 + DZ2***	-	-	G 1/8"	G 1/4"	G 1/4"	G 1/4"
Tightening torque [Nm]	-	-	12	27	27	27
Socket width across flats	-	-	5	6	6	6
Plug R1 + R2	G 1/8"	G 1/8"	G 1/4"	G 3/8"	G 3/8"	G 1/2"
Tightening torque [Nm]	12	12	27	56	56	72
Socket width across flats	5	5	6	8	8	10
RKVE valve under plug R	G 1/8"	G 1/8"	G 1/4"	G 3/8"	G 3/8"	-
Tightening torque [Nm]	3	3	7	15	15	-
Socket width across flats**	M-04	M-04	M-06	M-08	M-08	-
S1* DIN EN ISO 4762 - 12.9	M8x35	M12x40	M16x50	M20x70	M20x70	M30x90
Tightening torque [Nm]	30	100	300	550	550	1800
Weight [kg]	1,5	2	3	6,2	8	16,5

*not part of the delivery, **special tool, please contact Moog, ***may also be used as test port

DIMENSIONS OF CHECK, DIRECTIONAL CONTROL AND THROTTLE FUNCTIONS

NG16-100

COVER 4W NG80 AND NG100



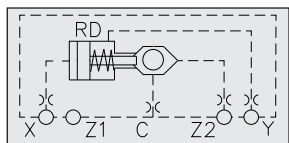
Size	80	100
D [mm]	250	300
H [mm]	80	90
L1 [mm]	41,5	50
L2 [mm]	2,5	2,8
L3 [mm]	1,6	1,6
L4 [mm]	6	6
L5 [mm]	18	25
L6 [mm]	4	4
L7 [mm]	27	27
L8 [mm]	23	23
Nameplate on the side	A	A
Plug MP + DZ2**	G 3/8"	G 1/2"
Tightening torque [Nm]	56	72
Socket width across flats	8	10
Plug R1 + R2	G 1"	G 1"
Tightening torque [Nm]	170	170
Socket width across flats	17	17
S1* DIN EN ISO 4762 - 12.9	M24x90	M30x100
Tightening torque [Nm]	900	1800
Thread for eye locating pin T	M10	M10
Weight [kg]	26	44

*not part of the delivery, **may also be used as test port

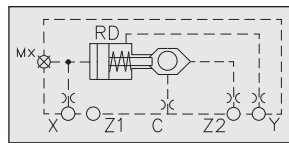
DIMENSIONS OF CHECK, DIRECTIONAL CONTROL AND THROTTLE FUNCTIONS

NG16-100

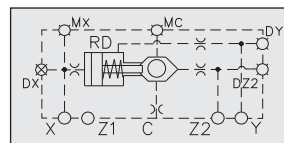
COVER RV NG16 TO NG63



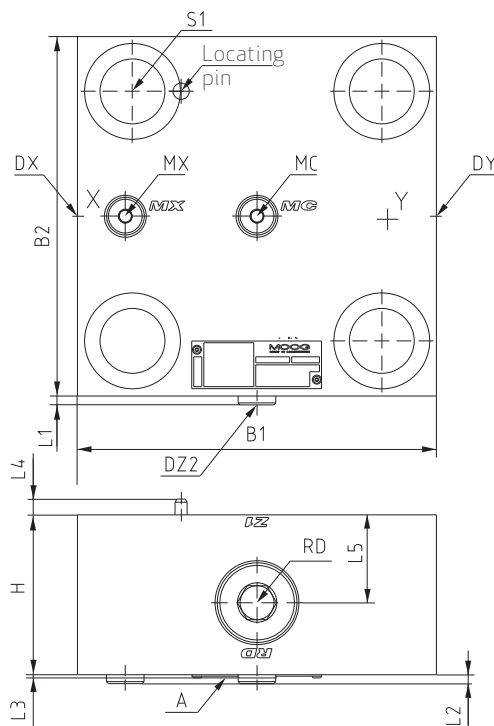
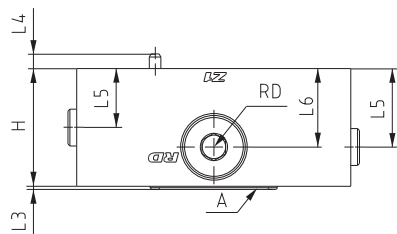
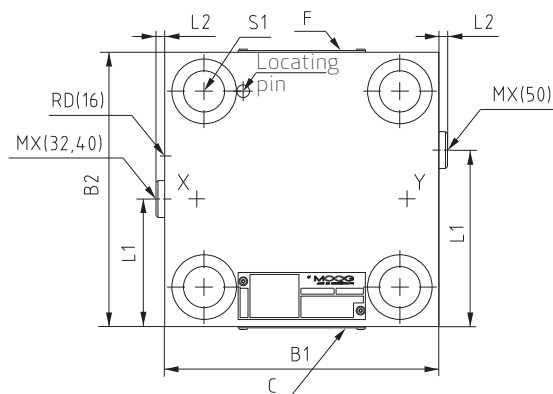
NG16, 25



NG32, 40, 50



NG63



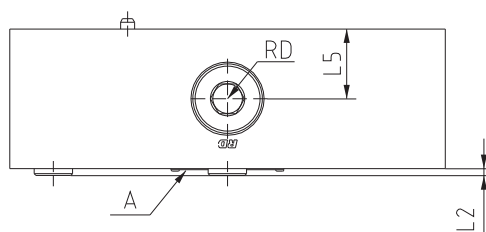
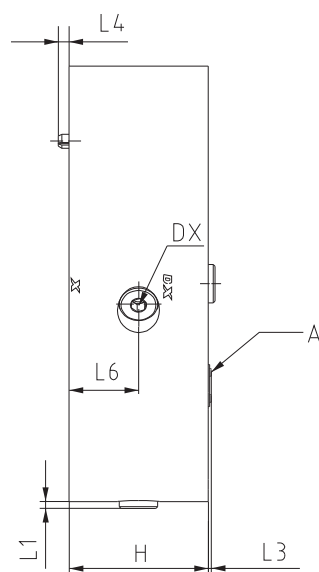
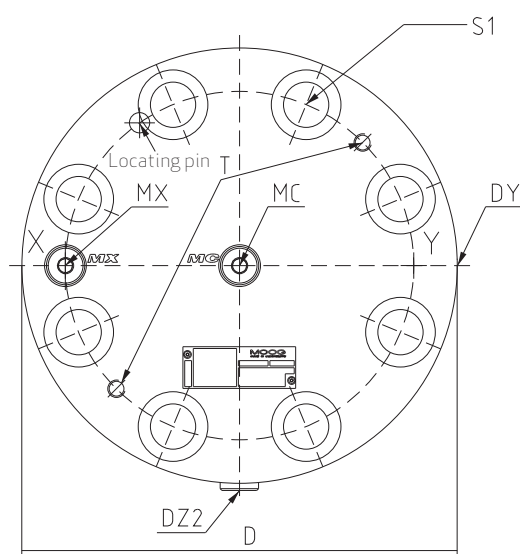
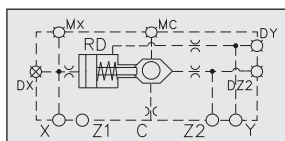
Size	16	25	32	40	50	63
B1 [mm]	80	85	102	125	140	180
B2 [mm]	65	85	102	125	140	180
H [mm]	65	60	45	60	60	80
L1 [mm]	-	-	48	59	90	4,5
L2 [mm]	4,5	-	3,5	4,5	4,5	4,5
L3 [mm]	1,6	1,6	1,6	1,6	1,6	1,6
L4 [mm]	5	5,5	6	6	7,5	8
L5 [mm]	-	-	19	40	40	44
L6 [mm]	45	42	27	40	40	-
Nameplate on the side	C	C	C	C	A	A
Plug MX, MC, DX, DY + DZ2**	-	-	G 1/8"	G 1/4"	G 1/4"	G 1/4"
Tightening torque [Nm]	-	-	12	27	27	27
Socket width across flats	-	-	5	6	6	6
Plug RD	G 3/4"	G 3/4"	G 3/4"	G 3/4"	G 3/4"	G 1"
Tightening torque [Nm]	120	120	120	120	120	170
Socket width across flats	12	12	12	12	12	17
S1* DIN EN ISO 4762 - 12.9	M8x35	M12x40	M16x50	M20x70	M20x70	M30x90
Tightening torque [Nm]	30	100	300	550	550	1800
Area ratio RD	1:5,4					
Weight [kg]	2,1	2,6	3	6	8	16,5

*not part of the delivery, **may also be used as test port

DIMENSIONS OF CHECK, DIRECTIONAL CONTROL AND THROTTLE FUNCTIONS

NG16-100

COVER RV NG80 AND NG100

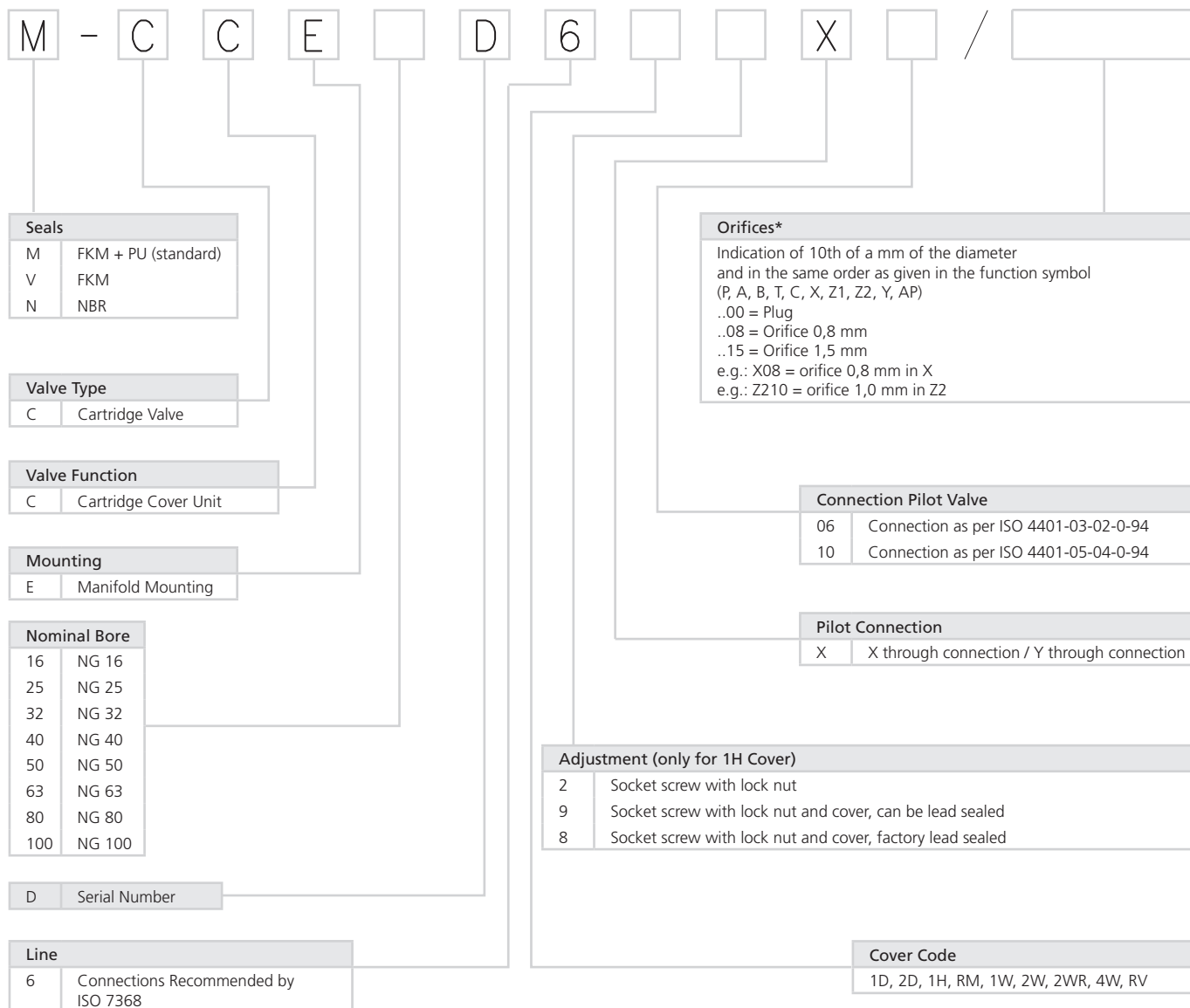


Size	80	100
D [mm]	250	300
H [mm]	80	90
L1 [mm]	4	4
L2 [mm]	4	4
L3 [mm]	1,6	1,6
L4 [mm]	6	6
L5 [mm]	40	45
L6 [mm]	40	45
Nameplate on the side	A	A
Plug MX, MC, DX, DY + DZ2**	G 3/8"	G 1/2"
Tightening torque [Nm]	56	72
Socket width across flats	8	10
Plug RD	G 1"	G 1"
Tightening torque [Nm]	170	170
Socket width across flats	17	17
S1* DIN EN ISO 4762 - 12.9	M24x90	M30x100
Tightening torque [Nm]	900	1800
Area ratio RD	1:5,4	
Thread for eye locating pin T	M10	M10
Weight [kg]	26	41

*not part of the delivery, **may also be used as test port

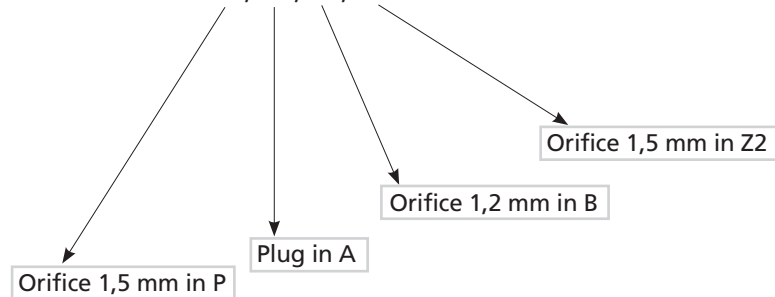
ORDERING INFORMATION CHECK, DIRECTIONAL CONTROL AND THROTTLE FUNCTIONS

NG16-100



*Order Example:

M-CCE32D64WX06 / P15;A00;B12;Z215



ORDER NUMBERS AND SEAL KITS CHECK, DIRECTIONAL CONTROL AND THROTTLE FUNCTIONS

NG16-100

ORDER NUMBERS OF COMPLETE CARTRIDGE COVERS* PLEASE NOTE: WITHOUT ORIFICES!

Cover type	NG16	NG25	NG32	NG40
1D	XEB18534-000M01	XEB18516-000M01	XEB18498-000M01	XEB18440-000M01
2D	XEB18535-000M01	XEB18517-000M01	XEB18499-000M01	XEB18441-000M01
1H2	XEB18537-000M01	XEB18519-000M01	XEB18503-000M01	XEB18444-000M01
RM	XEB18540-000M01	XEB18527-000M01	XEB18504-000M01	XEB18445-000M01
1W	XEB18542-000M01	XEB18521-000M01	XEB18506-000M01	XEB18447-000M01
2W	XEB18549-000M01	XEB18528-000M01	XEB18507-000M01	XEB18448-000M01
2WR	XEB18548-000M01	XEB18525-000M01	XEB18501-000M01	XEB18442-000M01
4W	XEB18550-000M01	XEB18529-000M01	XEB18508-000M01	XEB18449-000M01
RV	XEB18919-000M01	XEB18918-000M01	XEB18510-000M01	XEB18451-000M01

Cover type	NG50	NG63	NG80	NG100
1D	XEB18422-000M01	XEB18330-000M01	XEB18307-000M01	XEB18292-000M01
2D	XEB18423-000M01	XEB18331-000M01	XEB18308-000M01	XEB18293-000M01
1H2	XEB18426-000M01	XEB18334-000M01	XEB18311-000M01	XEB18296-000M01
RM	XEB18427-000M01	XEB18335-000M01	XEB18312-000M01	XEB18297-000M01
1W	XEB18429-000M01	XEB18337-000M01	XEB18314-000M01	XEB18299-000M01
2W	XEB18430-000M01	XEB18338-000M01	XEB18315-000M01	XEB18300-000M01
2WR	XEB18424-000M01	XEB18332-000M01	XEB18309-000M01	XEB18294-000M01
4W	XEB18431-000M01	XEB18339-000M01	XEB18316-000M01	XEB18301-000M01
RV	XEB18433-000M01	XEB18341-000M01	XEB18318-000M01	XEB18303-000M01

* For covers with other seals, the order number remains the same, however "M" identifying the seal is replaced by the identifier for the required seal, i.e., **V(FKM)** or **N(NBR)**.

Example:

XEB18534-000M01 becomes XEB18534-000V01 or XEB18534-000N01.

ORDER NUMBERS AND SEAL KITS CHECK, DIRECTIONAL CONTROL AND THROTTLE FUNCTIONS

NG16-100

ORDER NUMBERS OF COMPLETE SEAL KITS* (EXAMPLE 1D COVER)

Cover type	NG16	NG25	NG32	NG40
M-1D	XEB18534D000M00	XEB18516D000M00	XEB18498D000M00	XEB18440D000M00
V-1D	XEB18534D000V00	XEB18516D000V00	XEB18498D000V00	XEB18440D000V00
N-1D	XEB18534D000N00	XEB18516D000N00	XEB18498D000N00	XEB18440D000N00

Cover type	NG50	NG63	NG80	NG100
M-1D	XEB18422D000M00	XEB18330D000M00	XEB18307D000M00	XEB18292D000M00
V-1D	XEB18422D000V00	XEB18330D000V00	XEB18307D000V00	XEB18292D000V00
N-1D	XEB18422D000N00	XEB18330D000N00	XEB18307D000N00	XEB18292D000N00

* For seal kits, the basic number remains the same as the order number for the complete cartridge cover, but it is followed by the letter 'D', see example of 1D cover.

ORDER NUMBERS OF SEALS FOR PORTS X, Y, Z1, Z2

NG	PU	FKM	NBR
16	CA52618-001	X980-02010	X783-00206
25	CA23742-001	X980-02012	X783-00288
32	C97155-001	X980-02013	X783-00292
40, 50	C97076-001	X980-02112	X783-00207
63	C97939-001	X980-02116	X783-00293
80	C97918-001	X980-02215	X783-00281
100	C97058-001	X980-02220	X783-00296

GENERAL CONVERSION TABLE

1 bar	=	14,5038 lb/in ² (PSI)
1 PSI	=	0,0689 bars
1 mm	=	0,0394 in
1 in	=	25,4 mm
1 cm ³	=	0,0610 in ³ = 0,000264 gal (US)
1 in ³	=	16,3871 cm ³ = 0,004329 gal (US)
1 Liter	=	0,26417 gal (US) = 61,024 in ³
1 gal (US)	=	3,7854 Liter [l] = 231 in ³
1 kg	=	2,2046 lb
1 lb	=	0,4536 kg
1 Nm	=	8,8507 lbf.in
1 lbf.in	=	0,1130 Nm
1 kW	=	1,3596 PS = 1,3410 hp (UK)
1 hp (UK)	=	1,0139 PS = 0,7457 kW
1 °F	=	0,5556 °C
1 °C	=	1,8 °F
		(°F-32) x 0,5556 = °C
		(°C/0,5556) + 32 = °F
0 °F	=	-17,778 °C
0 °C	=	32 °F
100 °F	=	37,778 °C
100 °C	=	212 °F

MASS MOMENT OF INERTIA

1 kg.cm ²	=	0,3417 lb.in ²
1 lb.in ²	=	2,9264 kg.cm ²

KINEMATIC VISCOSITY

1 mm ² /s	=	1 cSt = 0,00155 in ² /s
1 in ² /s	=	645,16 cSt = 645,16 mm ² /s

All dimensions in the catalog are in mm unless otherwise specified.

GLOBAL SUPPORT

As a recognized leader in motion control technologies, Moog offers a full range of services to support our products and ensure that they meet the expectations of customers. Moog experts are the best at helping customers select the right products and ensuring that they run reliably for a long time.

When it is time for new machine commissioning, refurbishment or routine maintenance, our engineers can help to optimize machine performance, minimize downtime and ensure the smooth application of our products.

Known for the ability to customize products for the unique needs of our customers, we are uniquely able to handle customer needs and supply services throughout the life cycle of the product. **Moog Authentic Repair®** is designed to provide the highest quality repair services using original equipment parts, the latest design specifications, and highly trained technicians. This ensures that our repaired products will run as well as when they were new.

With facilities in over 25 countries, Moog is committed to offering convenient local service to our customers.

Visit www.moog.com/industrial/globallocator to find the location nearest you for application engineering, repair, or field services.

FOR MORE INFORMATION VISIT
<http://www.moog.com/industrial>

MOOG.COM/INDUSTRIAL

For the office nearest you, contact us online at moog.com/industrial/globallocator.

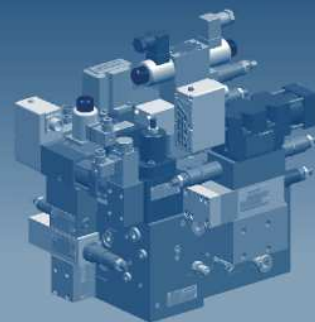
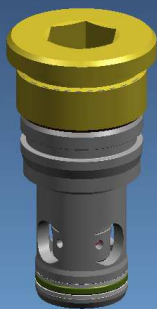
Argentina	+54	(0) 11 4326 5916	info.argentina@moog.com
Australia	+61	(0) 3 9561 6044	info.australia@moog.com
Austria	+43	(0) 664 144 6580	info.austria@moog.com
Brazil	+55	(0) 11 3572 0400	info.brazil@moog.com
China	+86	(0) 21 2893 1600	info.china@moog.com
Finland	+358	(0) 9 2517 2730	info.finland@moog.com
France	+33	(0) 1 4560 7000	info.france@moog.com
Germany	+49	(0) 7031 622 0	info.germany@moog.com
Hong Kong	+852	2 635 3200	info.hongkong@moog.com
India	+91	(0) 80 4120 8799	info.india@moog.com
Ireland	+353	(0) 21 451 9000	info.ireland@moog.com
Italy	+39	0 332 42111	info.italy@moog.com
Japan	+81	(0) 46 355 3615	info.japan@moog.com
Korea	+82	(0) 31 764 6711	info.korea@moog.com
Luxembourg	+352	40 46 401	info.luxembourg@moog.com
Netherlands	+31	(0) 252 462 000	info.netherlands@moog.com
Norway	+47	224 32927	info.norway@moog.com
Russia	+7	(8) 31 713 1811	info.russia@moog.com
Singapore	+65	677 36238	info.singapore@moog.com
South Africa	+27	(0) 12 653 6763	info.southafrica@moog.com
Spain	+34	902 133 240	info.spain@moog.com
Sweden	+46	(0) 31 680 060	info.sweden@moog.com
Switzerland	+41	(0) 71 394 5010	info.switzerland@moog.com
United Kingdom	+44	(0) 168 429 6600	info.unitedkingdom@moog.com
USA	+1	(1) 716 652 2000	info.usa@moog.com

©2008 Moog, Inc.

Moog is a registered trademark of Moog, Inc. and its subsidiaries. All trademarks as indicated herein are the property of Moog, Inc. and its subsidiaries.

All rights reserved.

Cartridge
Cover_en_03/2008



Check valves REE

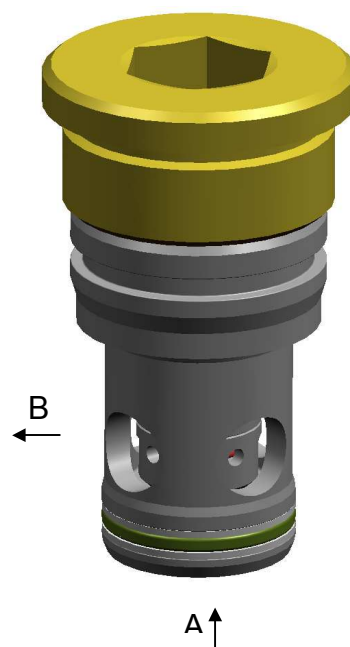
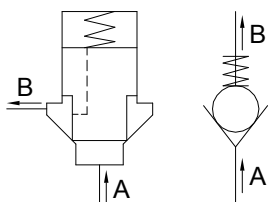
2-Way Cartridge Type REE (Check valves) with deepened plug mounting cavity. NB10 – NB25

General Description

2-Way Cartridge Type REE have two operational ports A and B. The flow direction is A to B, B to A is blocked (leak-free). A wide selection of cracking pressure is available from 0,3 to 6 bar.

The preferred mode of mounting is the installation in manifold blocks, which can be equipped with several valves depending on the hydraulic circuit for the specific application. Each valve can be connected to each other in the manifold block.

These valves are available in various sizes: 10, 16 and 25.



Benifits

- Space-saving for the installation in manifold blocks. No cartridge cover are required.
- Any deep positioning (deepened plug mounting cavity) in manifold blocks, without additional components.

Sizes

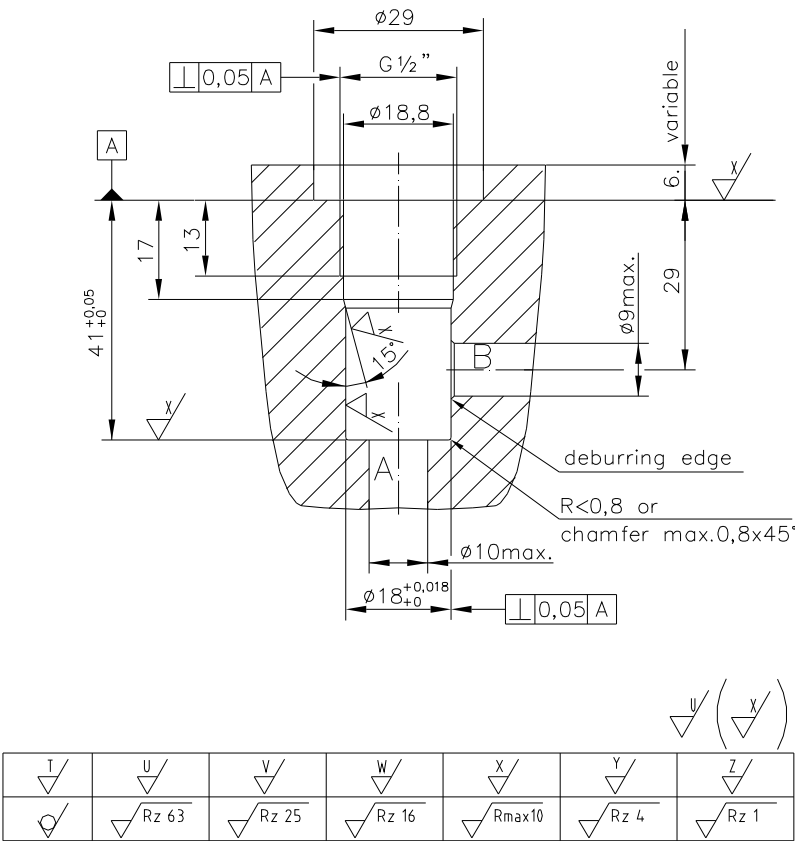
- Maximum operating pressure: 350 bar
- Nominal flow at $\Delta p = 5$ bar (Cartridge completely opened without spring):

- NB10:	60	L/min
- NB16:	210	L/min
- NB25:	430	L/min

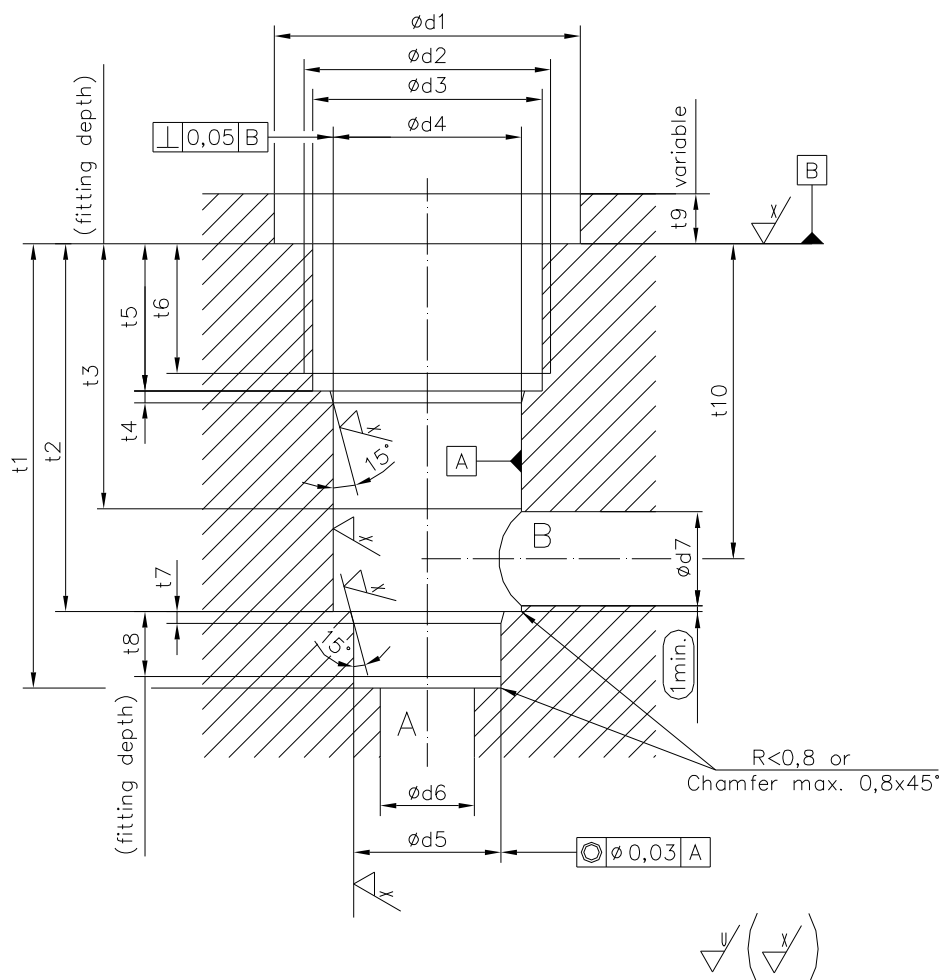
General Data	Value	Unit	Specification
Mode of construction	-	-	2-Way-Cartridge with deepened plug mounting cavity
Type	-	-	REE
Design	-	-	Cartridge valve
Mounting style	-	-	Manifold cartridge mounting
Sizes	NB	-	10 16 25
Tightening torque Closing plug	-	Nm	72 (G1/2") 400 (G1 1/4") 550 (G1 1/2")
Mounting cavity	-	-	see mounting cavity on page 3+4
Mounting position	-	-	any
Flow direction	-	-	A → B ; B → A blocked
Operating pressure	max.	MPa	35
Ambient temperature range	min.	°C	-20
	max.	°C	+80
Seals* for hydraulic fluids	-	-	FKM, hydraulic fluids on mineral oil basis, HFD type fluids
	-	-	NBR, hydraulic fluids on mineral oil basis, HFA, HFB, HFC type fluids
	-	-	other hydraulic fluids on request
Hydraulic fluid temperature range	-	°C	-10 to +80 for FKM seals
			-30 to +80 for NBR seals
Viscosity range	min.	mm²/s	2,8
	max.	mm²/s	380
Operating viscosity	-	mm²/s	35
Cleanliness class to ISO-Code	max.		ISO 4406 (C) class 20/18/15

* FKM: Fluorosilicone rubber (Viton®), NBR: Nitril rubber (Buna N)

REE NB10



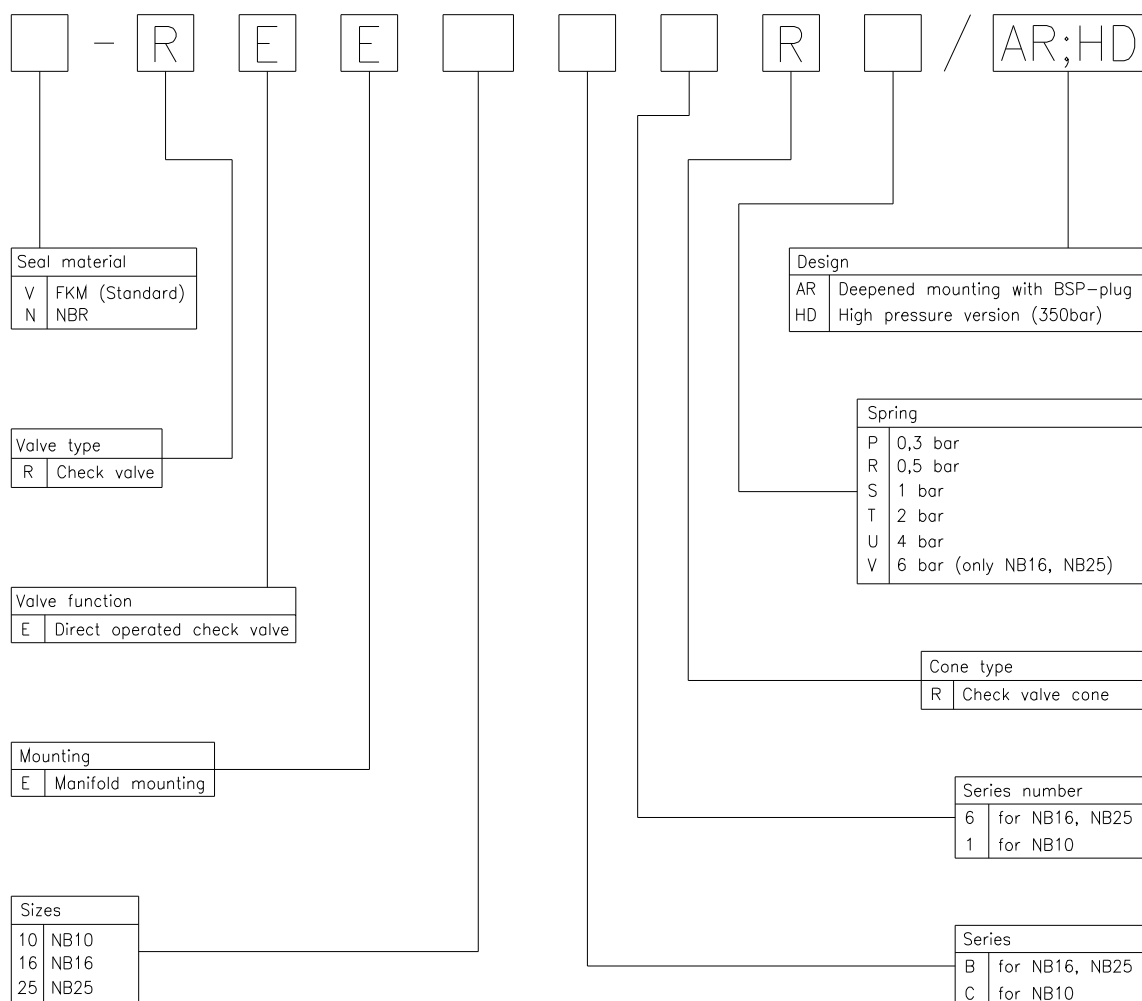
REE NB16 + NB25



Ma8	NB16	NB25
d1	52	57
d2	G11/4"	G11/2"
d3	39	—
d4 ^{H7}	32	45
d5 ^{H7}	25	34
d6	16	25
d7	16	25
d7 _{max.}	25	32
t1 ^{+0,050 +0,005}	75,5	93,5
t2 ^{+0,1}	62,5	79,5
t3	45	50
t4	2	—
t5	25	—
t6	22	24
t7	2	2,5
t8	11	12
t9	8,5	8,5
t10	53,5	65,5
t10 at d4 _{max.}	49	62

$\sqrt{\text{I}}$	$\sqrt{\text{U}}$	$\sqrt{\text{V}}$	$\sqrt{\text{W}}$	$\sqrt{\text{X}}$	$\sqrt{\text{Y}}$	$\sqrt{\text{Z}}$
$\sqrt{\text{Rz 63}}$	$\sqrt{\text{Rz 25}}$	$\sqrt{\text{Rz 16}}$	$\sqrt{\text{Rmax10}}$	$\sqrt{\text{Rz 4}}$	$\sqrt{\text{Rz 1}}$	

Ordering code



Order examples

NB10:

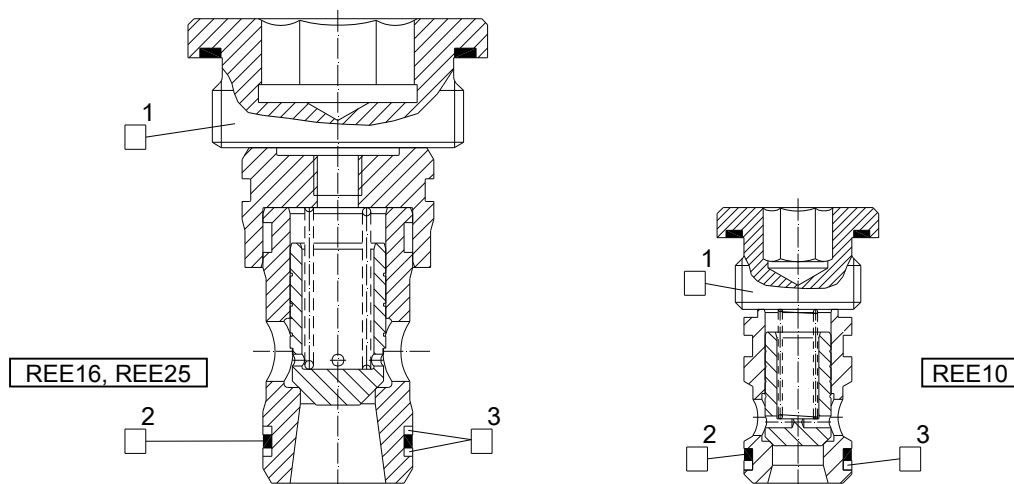
V-REE10C1RS/AR;HD

NB16:

V-REE16B6RT/AR;HD

NB25:

V-REE25B6RU/AR;HD



Order numbers REE valves (V-version) *			
		Description	Order number
NB10	V-REE10C1RP/AR;HD		XSB10009-000V00
	V-REE10C1RR/AR;HD		XSB10010-000V00
	V-REE10C1RS/AR;HD		XSB10011-000V00
	V-REE10C1RT/AR;HD		XSB10012-000V00
	V-REE10C1RU/AR;HD		XSB10013-000V00
NB16	V-REE16B6RP/AR;HD		XSB10276-000V00
	V-REE16B6RR/AR;HD		XSB10277-000V00
	V-REE16B6RS/AR;HD		XSB10278-000V00
	V-REE16B6RT/AR;HD		XSB10279-000V00
	V-REE16B6RU/AR;HD		XSB10280-000V00
	V-REE16B6RV/AR;HD		XSB10281-000V00
NB25	V-REE25B6RP/AR;HD		XSB10283-000V00
	V-REE25B6RR/AR;HD		XSB10284-000V00
	V-REE25B6RS/AR;HD		XSB10285-000V00
	V-REE25B6RT/AR;HD		XSB10286-000V00
	V-REE25B6RU/AR;HD		XSB10287-000V00
	V-REE25B6RV/AR;HD		XSB10288-000V00
Seal kits (V-version) *			
Pos.	Qty.	Description	Order number
-	-	V-REE10 (complete seal kit)	XEB13971-000V00
1	1	Closing plug G1/2“ (FKM)	C97891-001
2	1	O-Ring Viton (FKM) 14,00x1,78	X980-02015
3	1	Back-up ring 15,2x18x0,7	X780-18015
-	-	V-REE16 (complete seal kit)	XEB16265-000V00
1	1	Closing plug G1 1/4“ (FKM)	CA60695-001
2	1	O-Ring Viton (FKM) 21,95x1,78	X980-02020
3	2	Back-up ring 22,1x25x0,7	X780-08020
-	-	V-REE25 (complete seal kit)	XEB18682-000V00
1	1	Closing plug G1 1/2“ (FKM)	CA28531-001
2	1	O-Ring Viton (FKM) 28,24x2,62	X980-02122
3	2	Back-up ring 29,5x34x0,7	X780-18122

* For valves with others seals, the order number remains the same, however 'V' identifying the seal is replaced by the identifier for the required seal, i.e., **N (NBR)**.
Example : XSB10013-000V00 becomes XSB10013-000N00.

As a recognized leader in motion control technologies, Moog offers a full range of services to support our products and ensure that they meet the expectations of customers. Moog experts are the best at helping customers select the right products and ensuring that they run reliably for a long time.

When it is time for new machine commissioning, refurbishment or routine maintenance, our engineers can help to optimize machine performance, minimize downtime and ensure the smooth application of our products.

Moog Authentic Repair™ is designed to provide the highest quality repair services using original equipment parts, the latest design specifications, and highly trained technicians. This ensures that our repaired products will run as well as when they were new.

With facilities in over 25 countries, Moog is committed to offering convenient local service to our customers.

Visit www.moog.com/industrial/worldwide to find the location nearest you for application engineering, repair, or field services.

FOR MORE INFORMATION VISIT
<http://www.moog.com/industrial>

MOOG.COM/INDUSTRIAL

For the office nearest you, contact us online at moog.com/industrial/globallocator.

Argentina	+54	(0) 11 4326 5916	info.argentina@moog.com
Australia	+61	(0) 3 9561 6044	info.australia@moog.com
Austria	+43	(0) 664 144 6580	info.austria@moog.com
Brazil	+55	(0) 11 5523 8011	info.brazil@moog.com
China	+86	(0) 21 2893 1600	info.china@moog.com
Finland	+358	(0) 9 2517 2730	info.finland@moog.com
France	+33	(0) 1 4560 7000	info.france@moog.com
Germany	+49	(0) 7031 622 0	info.germany@moog.com
Hong Kong	+852	2 635 3200	info.hongkong@moog.com
India	+91	(0) 80 4120 8799	info.india@moog.com
Ireland	+353	(0)21 451 9000	info.ireland@moog.com
Italy	+39	0 332 42111	info.italy@moog.com
Japan	+81	(0) 46 355 3615	info.japan@moog.com
Korea	+82	(0) 31 764 6711	info.korea@moog.com
Luxembourg	+352	40 46 401	info.luxembourg@moog.com
Netherlands	+31	(0) 252 462 000	info.netherlands@moog.com
Norway	+47	224 32927	info.norway@moog.com
Russia	+7	(8) 31 713 1811	info.russia@moog.com
Singapore	+65	677 36238	info.singapore@moog.com
South Africa	+27	(0) 12 653 6763	info.southafrica@moog.com
Spain	+34	902 133 240	info.spain@moog.com
Sweden	+46	(0) 31 680 060	info.sweden@moog.com
Switzerland	+41	(0) 71 394 5010	info.switzerland@moog.com
United Kingdom	+44	(0) 168 429 6600	info.unitedkingdom@moog.com
USA	+1	(1) 716 652 2000	info.usa@moog.com

©2008 Moog Inc.

Moog is a registered trademark of Moog, Inc. and its subsidiaries. All trademarks as indicated herein are property of Moog, Inc. and its subsidiaries.

All rights reserved.

REE_AR_HD-1-EN-Rueckschlagventile / 04_2008

2-WAY SLIP-IN CARTRIDGE VALVES DIRECTIONAL AND PRESSURE FUNCTION ISO 7368 SIZES 16 TO 100



Rev. A, June 2013

FLOW-OPTIMIZED DESIGN FOR 420 BAR
(6,000 PSI) OPERATING PRESSURE AND
MAXIMUM ENERGY EFFICIENCY

Whenever the highest levels of motion control performance and design flexibility are required, you'll find Moog expertise at work. Through collaboration, creativity and world-class technological solutions, we help you overcome your toughest engineering obstacles. Enhance your machine's performance. And help take your thinking further than you ever thought possible.

INTRODUCTION.....2

 Product Overview3

 Description of Operation4

 Flow Calculation.....9

 Installation Instructions.....10

TECHNICAL DATA11

 General Technical Data.....11

 Size 1612

 Size 2516

 Size 3220

 Size 4024

 Size 5028

 Size 6332

 Size 8036

 Size 100.....40

 Installation Dimensions.....44

ORDERING INFORMATION.....46

 Accessories and Spare Parts.....46

 Removal Tools52

 About Moog.....53

 Ordering Code55



This catalog is for users with technical knowledge. To ensure all necessary characteristics for function and safety of the system, the user has to check the suitability of the products described herein. The products described herein are subject to change without notice. In case of doubt, please contact Moog.

Moog is a registered trademark of Moog Inc. and its subsidiaries. All trademarks as indicated herein are the property of Moog Inc. and its subsidiaries. For the full disclaimer refer to www.moog.com/literature/disclaimers.

For the most current information, visit www.moog.com/industrial or contact your local Moog office.

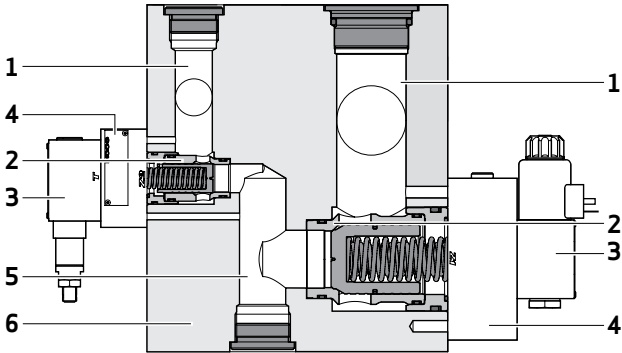
PRODUCT OVERVIEW

2-way Slip-in Cartridge Valves are logic elements designed for use in hydraulic manifolds. With a compact design, this product series offers a high power density for high performance hydraulic systems. In addition to the slip-in cartridge valve, a cover and in most cases, a pilot valve are required for the valve to be fully functional.

The 2-way Slip-in Cartridge Valves featured in this catalog are designed for 420 bar (6,000 psi) operation and offer the highest nominal flows and lowest pressure drops available on the market. State-of-the-art development techniques were used to optimize the design, and increase the energy efficiency of the systems in which they are installed.

This series offers a variety of directional and pressure control functions. Versions are available for the nominal diameters (Sizes) 16, 25, 32, 40, 50, 63, 80 and 100 mm and each can be used with all the standard CCE covers (see cover catalog for more details). Designed in accordance with ISO 7368, these cartridge valves can be exchanged with other cartridge valves with the same functions.

Cartridge valves in the manifold



- 1 B port
- 2 Cartridge valve
- 3 Pilot valve
- 4 Cover
- 5 A port
- 6 Manifold

Features and Benefits

Feature	Advantage
Flow-optimized design with highest nominal flows and lowest pressure drops	Compact manifold design and minimal energy consumption, reduces operating costs
Robust design for a nominal pressure of 420 bar (6,000 psi)	Highest load capability, even in extreme environments applications
Directional and pressure control functions for all sizes with numerous options are available (e.g., damping noses, spring strengths, shaft seals)	Wide selection of functions for maximum flexibility in manifold design
Extremely reliable and durable design and construction	High degree of system availability
Optimized design of valve seat and shaft seal	Leakage free valve seat and stable behavior of pressure controls

DESCRIPTION OF OPERATION

Operating Principle for Directional Function

Whether an application requires a simple check (non-return) function or something much more complex, it is important to understand the basic operating principles of a directional cartridge valve in order to get the most performance out of the application.

A directional control function requires, first of all, a B, C, E or F poppet. These poppets, with a stepped shape, have 3 different control surfaces which is the key to their operation.

When used with a cartridge cover and corresponding pilot valve, the sum of the pressures applied to each of these control surfaces either opens or closes the cartridge valve. Surfaces A_A and A_B work to open the valve, while surface A_X together with the spring force work to close the valve.

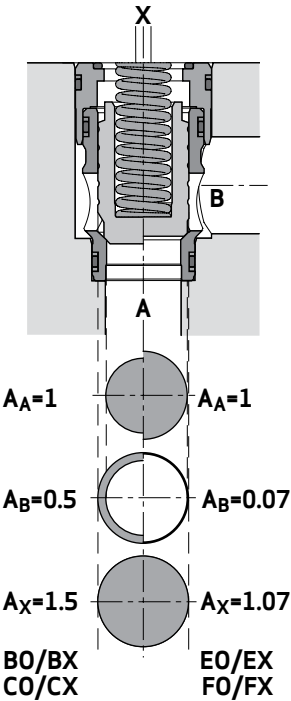
When in the open position, the poppet enables fluid flow in both directions, from A to B or B to A depending on the needs of the application.

When the poppet is in the closed position, the valve seat design ensures a leak free separation of ports A and B.

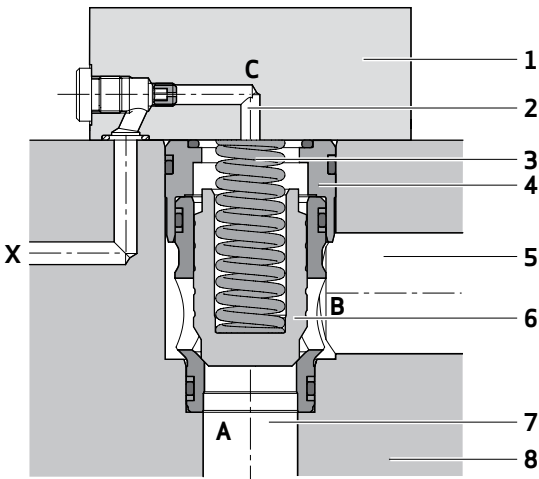
Should a leak free separation of ports B and X also be desired, an optional shaft seal is available to seal the gap between poppet and sleeve.

The size of the valve, the strength of the spring, and the poppet type can be selected from the product code. There is also the option of using sandwich plate valves to enhance the functionality (for example slow opening, rapid closing) of the valve. Please refer to the relevant catalog for more information.

Control area ratios



2-way Slip-in Cartridge Valve - Directional Function



- | | | | |
|---|----------------|---|----------|
| 1 | Cover | 5 | B port |
| 2 | Control port C | 6 | Poppet |
| 3 | Spring | 7 | A port |
| 4 | Sleeve and cap | 8 | Manifold |

DESCRIPTION OF OPERATION

Operating Principle for Pressure Function

Pressure relief valves are a vital component of any hydraulic system. These valves are used to limit the maximum permissible hydraulic pressure at the relevant port. Typical applications include limiting pump and cylinder pressures. The limiting of cylinder pressures not only protects the cylinder from damage, but also enables the reliable control of the force applied by the cylinder.

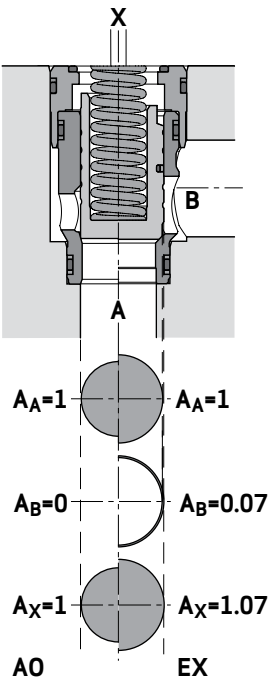
Unlike directional valves, the A0 and EX poppets used in pressure valves have no or only a small control surface at port B. Leaving only 2 primary control surfaces, surface A working to open the valve, and surface X together with the spring force working to close the valve. In combination with a cover and a pilot valve, both manual and electrical proportional pressure settings can be realized with or without relief functionality. In order to get the most out of these functions, it is important to understand the basic operating principles of a pressure cartridge.

The pressure to be limited is applied to port A (9) and is also routed simultaneously to port C (4) of the cover (3) and the pilot valve (1) via a pilot line (11) equipped with a suitable metering orifice. If the pressure in port A acting on surface A_A exceeds the preset pressure setting of the pilot valve, the pilot valve opens venting the pressure at port C and therefore the pressure on A_X . The pressure compensated poppet (8) then opens against the spring force (5) and set pressure, limiting the pressure at port A. Please refer to the "Pressure Valves" catalog for detailed information regarding the pressure and flow characteristics of these valves.

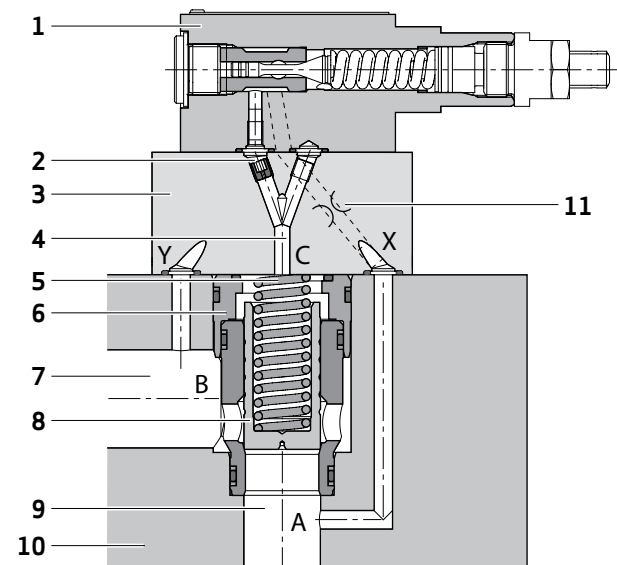
When ordering a pressure cartridge, the valve size, spring strength and poppet design can be selected from the product code. It is also possible to enhance the functionality (for example a depressurizing function or additional pressure stages) by using additional sandwich plate valves.

For pressure reducing and compensating functions Moog offers the CKE range of 2-way Slip-in Cartridge Valves with a spool design. Please refer to the catalog for more information.

Control area ratios



2-way Slip-in Cartridge Valve - Pressure Control



- | | |
|--------------------------------|---------------------------------|
| 1 Pilot valve, pressure relief | 7 B port |
| 2 Damping orifice | 8 Poppet |
| 3 Cover | 9 A port |
| 4 C port | 10 Manifold |
| 5 Spring | 11 X port with metering orifice |
| 6 Sleeve and cap | |

DESCRIPTION OF OPERATION

Directional Poppet Types - B and C Poppets (Control Area Ratio $A_A:A_X$ of 1:1.5)

4 poppet types (B, C, E and F) are available for directional control functions. This section will focus on 2 of these poppet types: The B and C poppets.

BO Poppet

The B poppet is the standard stepped poppet for directional control functions. The poppet has a control area ratio $A_A:A_X$ of 1:1.5 and the flow area is approximately proportional to the poppet stroke.

CO Poppet

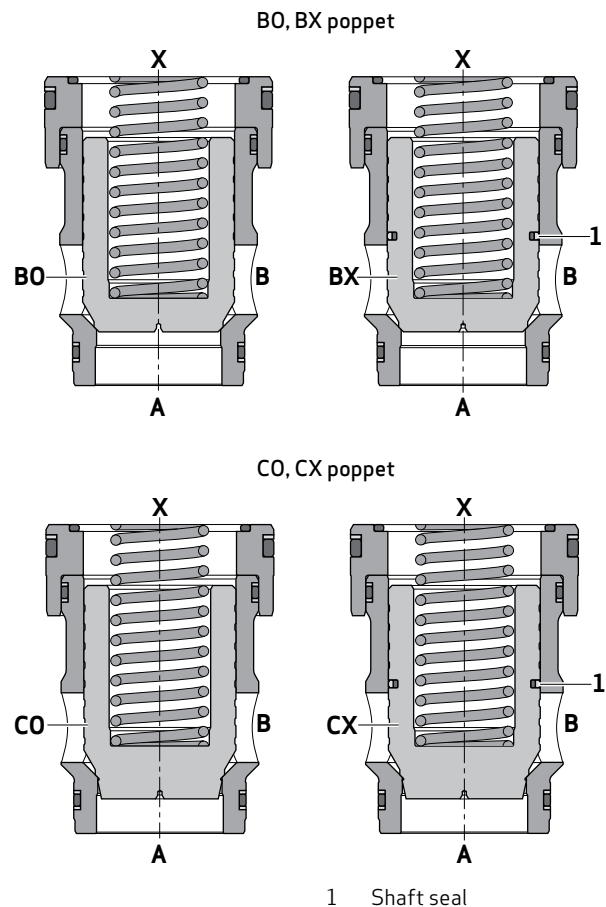
The C poppet is based upon the B poppet and has the same control surface ratio. The only difference is that the C poppet is equipped with a damping nose. This damping nose enables a more gradual increase/decrease in flow during the lower part of the poppet stroke. This is useful in applications that require a damped switching function to prevent pressure spikes in the hydraulic system.

Optional Shaft Seal: BX and CX Poppet

Both, the B and the C poppets can be equipped with an optional shaft seal (denoted as a BX or CX poppet in the product code).

The shaft seal is important for applications where it is necessary to seal off port X from port B. To accomplish this, a shaft seal (1) is installed on the outer diameter of the poppet creating a leak free seal between the poppet and the cartridge sleeve.

When using a cartridge valve with a shaft seal, Moog recommends using the strongest spring available to ensure a secure closing of the valve against the friction force of the shaft seal.



DESCRIPTION OF OPERATION

Directional Poppet Types - E and F Poppets (Control Area Ratio $A_A:A_X$ of 1:1.07)

4 poppet types (B, C, E and F) are available for directional control functions. This section will focus on 2 of these poppet types: The E and F poppets.

EO Poppet

The E poppet is available for directional control applications where a smaller control surface in port B and a larger control surface in port A is desired. The poppet has a control area ratio $A_A:A_X$ of 1:1.07 and the flow area is approximately proportional to the poppet stroke.

FO Poppet

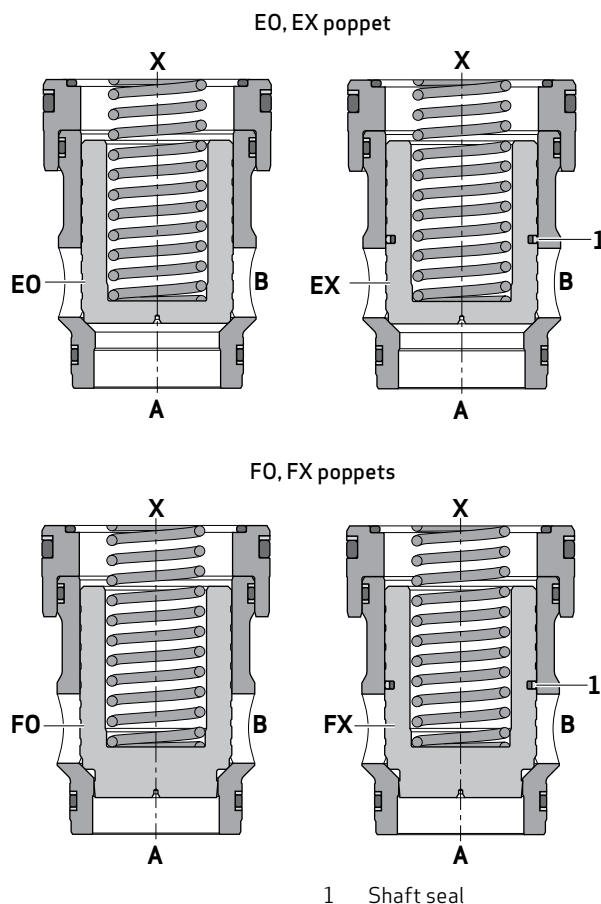
The F poppet is based upon the E poppet and has the same control surface ratio. The only difference is that the F poppet is equipped with a damping nose. This damping nose enables a more gradual increase/decrease in flow during the lower part of the poppet stroke. This is useful in applications that require a damped switching function to prevent pressure spikes in the hydraulic system.

Optional Shaft Seal: EX and FX Poppet

Both the E and the F poppets can be equipped with an optional shaft seal (denoted as an EX or FX poppet in the product code).

The shaft seal is important for applications where it is necessary to seal off port X from port B. To accomplish this, a shaft seal (1) is installed on the outer diameter of the poppet creating a leak free seal between the poppet and the cartridge sleeve.

When using a cartridge valve with a shaft seal, Moog recommends also using the strongest spring available to ensure a secure closing of the valve against the friction force of the shaft seal.



DESCRIPTION OF OPERATION

Pressure Poppet Types - AO and EX Poppets

AO and EX Poppets

2 poppets are available for pressure relief function: The AO and EX poppets.

AO Poppet (without shaft seal)

The AO poppet is designed for conventional pressure relief functions. Due to the fact that the poppet has no control surface in port B, the control area ratio is $A_A:A_X = 1:1$. Please note, for a pressure relief function it is important that the pressure in port X not greatly exceeds the pressure in port A, otherwise damage to the valve seat may occur.

EX Poppet (with shaft seal)

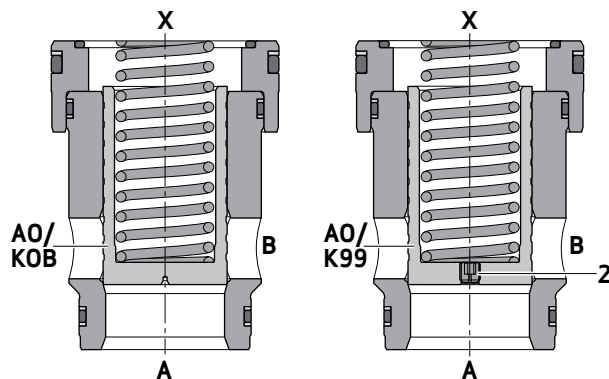
The EX poppet, with its shaft seal and a control area ratio of $A_A:A_X = 1:1.07$, is ideal for pressure relief applications where it is necessary to seal off port X from port B. The shaft seal (1) installed on the outer diameter of the poppet, creates a leak-free seal between the poppet and the cartridge sleeve.

When using a cartridge valve with a shaft seal, Moog recommends using the strongest spring available to ensure a secure closing of the valve against the friction force of the shaft seal.

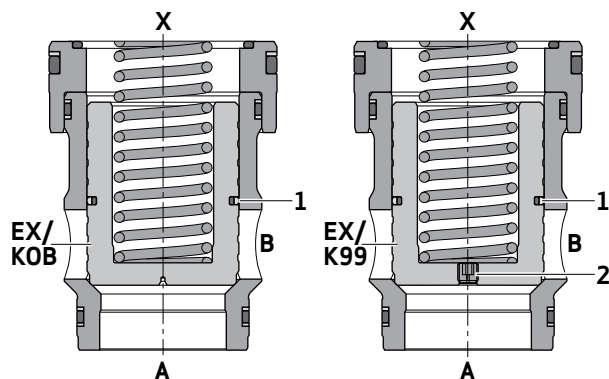
Optional Internal Pilot Oil Supply

Both the A and E poppets can be ordered with a metric thread in the bottom of the poppet to accommodate an orifice (2). This orifice enables an internal pilot oil supply from port A to port X. Please see the „Ordering Information“ for the full range of orifice options.

AO/KOB and AO/K99 poppet



EX/KOB, EX/K99 poppet



- 1 Shaft seal
- 2 Threaded bore in poppet

FLOW CALCULATION

Performance curves similar to those below showing the pressure loss in relation to the flow rate can be found for each of the cartridge sizes and poppet types in the corresponding sections of this catalog.

Should your application require a flow rate beyond the range of these curves, it is possible to use the following equation to approximate that flow (Q, Δp) by using a known reference point (Q_N, Δp_N) on the curve.

In order to prevent cavitation damage from occurring, the flow should not exceed a mean velocity of 30 m/s (approximately 100 ft/s) in the valve manifold ports. The flow rate that corresponds to this maximum recommended flow velocity can be found in the individual flow curves for the different valve sizes.

$$Q = Q_N \cdot \sqrt{\frac{\Delta p}{\Delta p_N}}$$

Q [l/min (gpm)]	flow to be calculated
Q _N [l/min (gpm)]	known nominal flow from curve
Δp [bar (psi)]	pressure loss at the flow rate to be calculated
Δp _N [bar (psi)]	known pressure loss at nominal flow curve

Use Recommendations

The following recommendations can help further reduce the pressure loss and maximize the performance of your Moog Slip-in Cartridge Valve:

Flow direction

A flow from A to B is preferable when trying to reduce pressure losses. Detailed flow curves for both flow directions can be found in the flow diagrams for each valve size and poppet type.

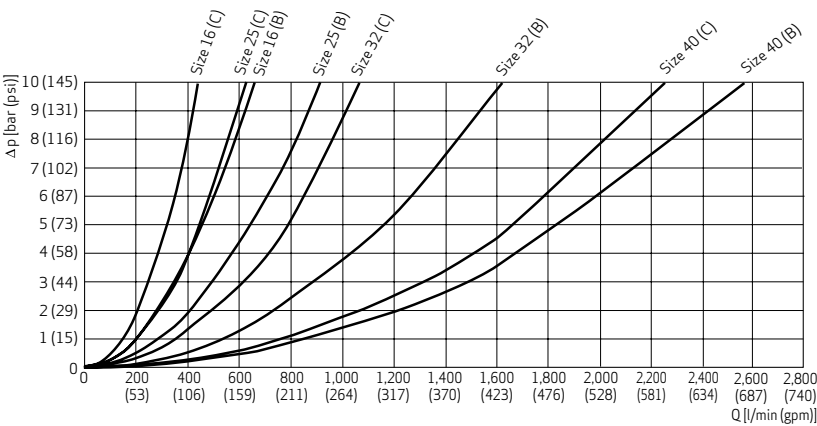
B Port diameter

Drilling the downstream B port larger than the ISO 7368 recommended diameter will help reduce pressure losses. For maximum permissible B port diameters, please refer to the "Installation Dimensions" section in this catalog.

Cartridge orientation

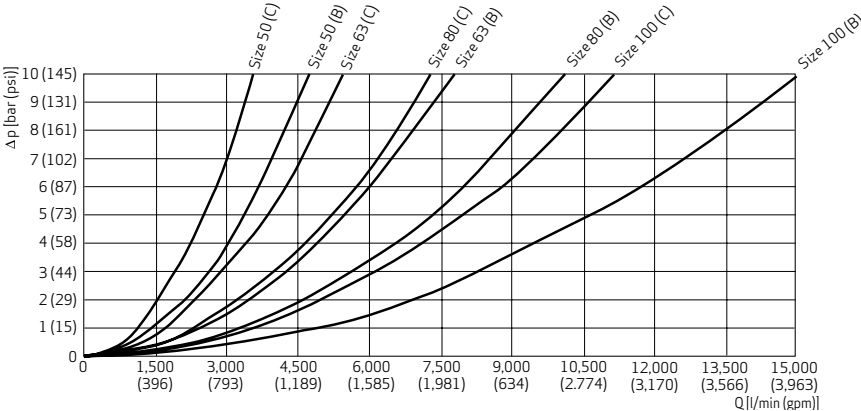
When installing the cartridge valve in the manifold, proper alignment of the cartridge valve will further reduce the pressure losses of the valve. Please see the "Installation Instructions" for further information.

Sizes 16 to 40



- (B) B0/BX poppet
- (C) C0/CX poppet

Sizes 50 to 100



- (B) B0/BX poppet
- (C) C0/CX poppet

INSTALLATION INSTRUCTIONS

The following instructions will ensure the correct installation and maximum performance of the 2-way Slip-in Cartridge Valve.

Seals

Check that all seals and back-up rings are mounted correctly. The back-up rings must not protrude beyond the outer diameter of the o-ring groove. If necessary, remove the back-up ring and "tighten" to a smaller diameter, then install the back-up ring again. Grease all outer seals slightly prior to installing the cartridge in the manifold cavity.

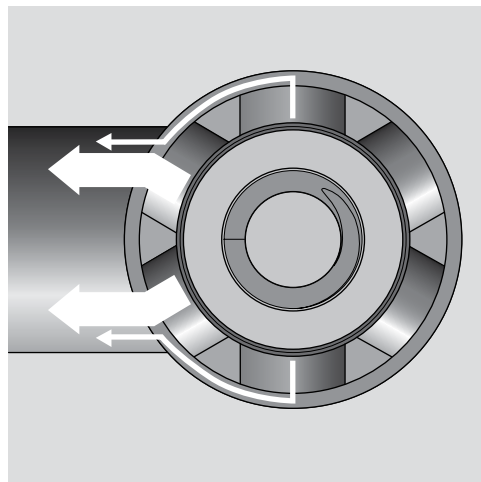
Cartridge Orientation

In order to fully utilize the flow-optimized design of the 2-way Slip-in Cartridge Valves, the valve must be properly aligned within the manifold cavity as follows:

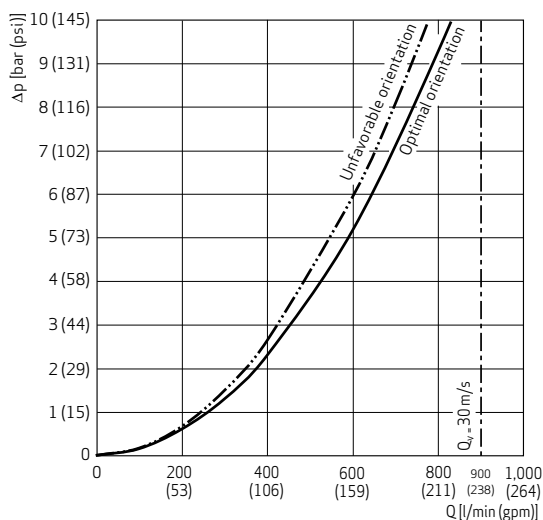
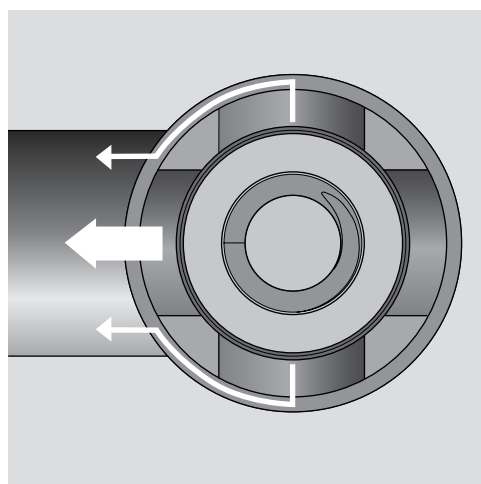
- For valve sleeves with 6 lateral holes, the cartridge valve must be installed such that the "bridge" between two of the lateral holes is facing towards the B port of the manifold. In other words, the two lateral holes should align symmetrically, and not parallel, with the B port.
- For valve sleeves with 4 lateral holes (size 16 AO poppet only), the cartridge valve must be installed with one hole facing towards (parallel to) the B port of the manifold.

The diagram shows, as an example, the effect that proper cartridge orientation can have on the pressure loss of a valve with size 25.

Ideal cartridge orientation for sleeves with 6 holes



Ideal cartridge orientation for sleeves with 4 holes



GENERAL TECHNICAL DATA

General Technical Data

Valve type	2-way Slip-in Cartridge Valve
Valve design	Seated valve
Mounting type	Manifold mounting
Flow direction	A ↔ B (A → B)
Installation position	Any
Mounting pattern	ISO 7368:1989-08
Storage temperature range	
Valve with FKM seals	-20 to +80 °C (-4 to 176 °F)
Valve with NBR seals	-30 to +80 °C (-22 to 176 °F)
Ambient temperature range	
Valve with FKM seals	-20 to +80 °C (-4 to 176 °F)
Valve with NBR seals	-30 to +80 °C (-22 to 176 °F)
MTTFd value according to EN ISO 13849-1	150 years

Hydraulic Data

Maximum operating pressure port A, B, X ¹⁾	420 bar (6,000 psi)
Seal material/hydraulic fluid combination	
FKM	- Mineral oil based hydraulic fluids - HFD hydraulic fluids
NBR	- Mineral oil based hydraulic fluids - HFB, HFC hydraulic fluids
Temperature range of hydraulic fluid	
Valve with FKM seals	-20 to +80 °C (-4 to 176 °F)
Valve with NBR seals	-30 to +80 °C (-22 to 176 °F)
Recommended viscosity range	15 to 46 mm ² /s (cSt)
Recommended viscosity range	15 to 46 mm ² /s (cSt)
Maximum permissible viscosity range	2.8 to 380 mm ² /s (cSt)
Recommended cleanliness class as per ISO 4406	
For functional safety	20/18/15
For longer service life	17/14/11

1) Please regard the maximum operating pressure of control cover and pilot valve.

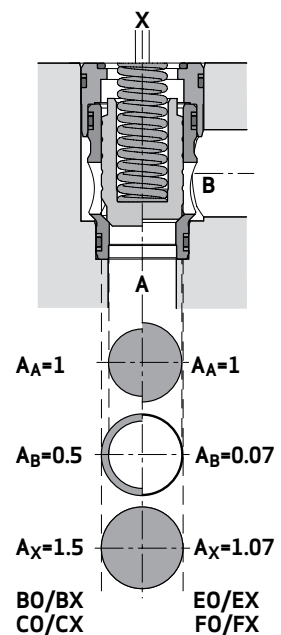
SIZE 16 - DIRECTIONAL CONTROL

General Technical Data

Flow direction	A ↔ B
Mounting pattern	ISO 7368-BA-06-2-A
Weight	0.17 kg (0.4 lb)

Specific Hydraulic Data

With poppet type	BO/BX	CO/CX	EO/EX	FO/FX
Maximum operating pressure port A, B, X ¹⁾	420 bar (6,000 psi)			
Pilot volume (area A _x)	2.83 cm ³ (0.17 in ³)			
Control panel				
Poppet stroke	9 mm (0.35 in)			
Surface A _A	209 mm ² (0.32 in ²)		290 mm ² (0.45 in ²)	
Factor A _A	1			
Factor A _B	0.5		0.07	
Factor A _x	1.5		1.07	
Seal material/hydraulic fluid combination				
FKM	- Mineral oil based hydraulic fluids - HFD hydraulic fluids			
NBR	- Mineral oil based hydraulic fluids - HFB, HFC hydraulic fluids			
Temperature range of hydraulic fluids				
Valve with FKM seals	-20 to +80 °C (-4 to 176 °F)			
Valve with NBR seals	-30 to +80 °C (-22 to 176 °F)			



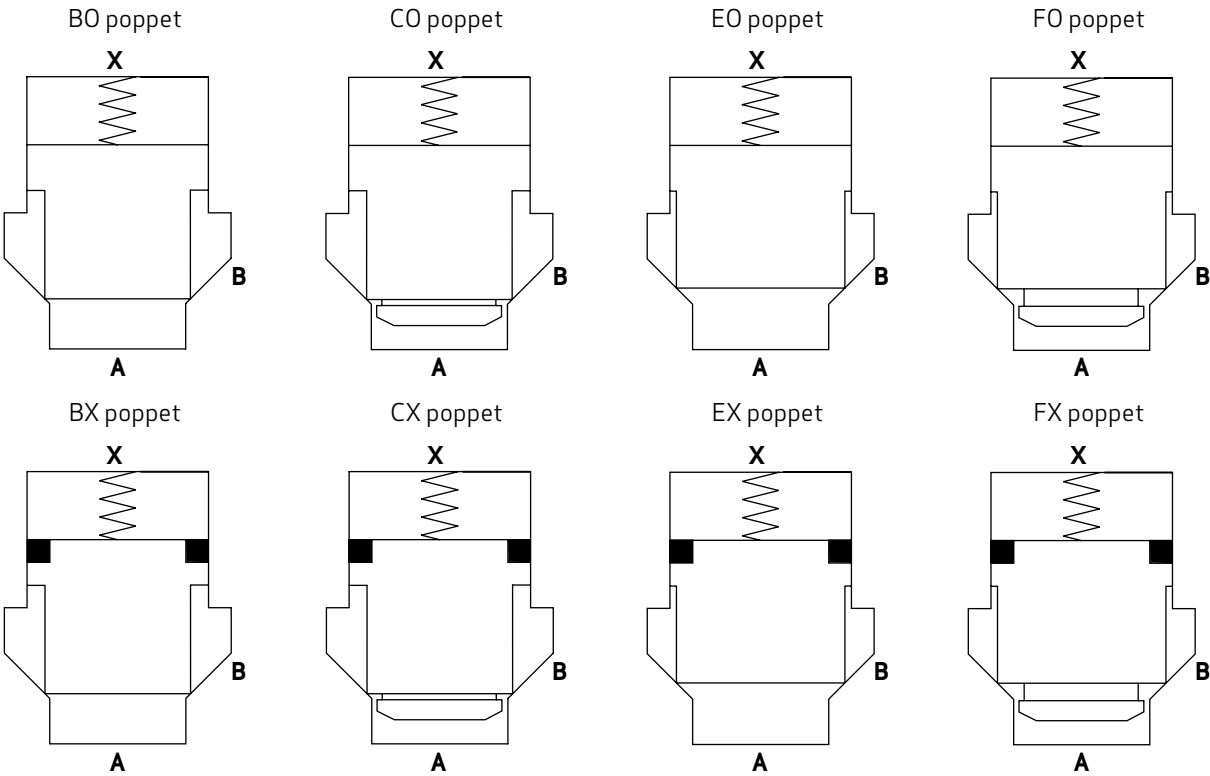
1) Please regard the maximum operating pressure of control cover and pilot valve.

Preferred Slip-in Cartridge Valve Types

With poppet type	Spring strength	Product code	Part number
BO	Spring S - 1.0 bar (15 psi)	N-CEE16K6BOS/KOB	X731-016BOS-000N00
BO	Spring T - 1.9 bar (28 psi)	N-CEE16K6BOT/KOB	X731-016BOT-000N00
BO	Spring U - 3.8 bar (55 psi)	N-CEE16K6BOU/KOB	X731-016BOU-000N00
BX	Spring U - 3.8 bar (55 psi)	N-CEE16K6BXU/KOB	X731-016BXU-000N00
CO	Spring S - 1.0 bar (15 psi)	N-CEE16K6COS/KOB	X731-016COS-000N00
CO	Spring T - 1.9 bar (28 psi)	N-CEE16K6COT/KOB	X731-016COT-000N00
CO	Spring U - 3.8 bar (55 psi)	N-CEE16K6COU/KOB	X731-016COU-000N00
CX	Spring U - 3.8 bar (55 psi)	N-CEE16K6CXU/KOB	X731-016CXU-000N00
EO	Spring S - 0.7 bar (10 psi)	N-CEE16K6EOS/KOB	X731-016EOS-000N00
EO	Spring T - 1.4 bar (20 psi)	N-CEE16K6EOT/KOB	X731-016EOT-000N00
EO	Spring U - 2.7 bar (39 psi)	N-CEE16K6EOU/KOB	X731-016EOU-000N00
EX	Spring U - 2.7 bar (39 psi)	N-CEE16K6EXU/KOB	X731-016EXU-000N00
FO	Spring S - 0.7 bar (10 psi)	N-CEE16K6FOS/KOB	X731-016FOS-000N00
FO	Spring T - 1.4 bar (20 psi)	N-CEE16K6FOT/KOB	X731-016FOT-000N00
FO	Spring U - 2.7 bar (39 psi)	N-CEE16K6FOU/KOB	X731-016FOU-000N00
FX	Spring U - 2.7 bar (39 psi)	N-CEE16K6FXU/KOB	X731-016FXU-000N00

SIZE 16 - DIRECTIONAL CONTROL

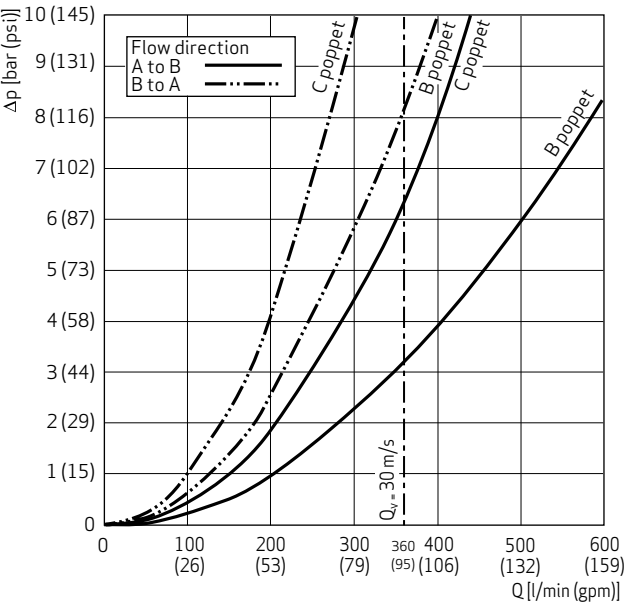
Hydraulic Symbol



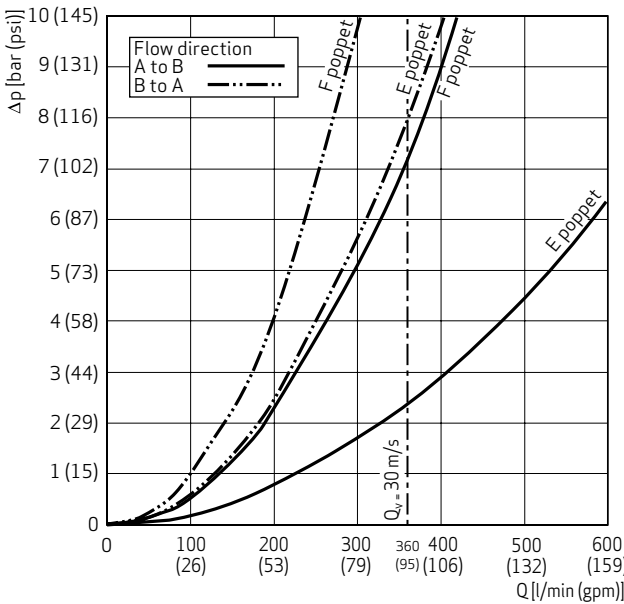
Valve Flow Diagram

Measuring conditions: Oil viscosity 32 mm²/s (cSt), oil temperature 40 °C (104 °F), port B drilled with d_{max} as per ISO 7368, valve fully opened

BO/BX, CO/CX poppet



EO/EX, FO/FX poppet



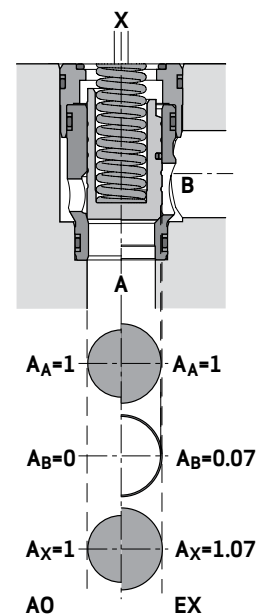
SIZE 16 - PRESSURE CONTROL

General Technical Data

Flow direction	A → B
Mounting pattern	ISO 7368-BA-06-2-A
Weight	0.17 kg (0.4 lb)
Orifice thread size (K99 poppet only)	M6

Specific Hydraulic Data

With poppet type	AO	EX
Maximum operating pressure port A, B, X ¹⁾	420 bar (6,000 psi)	
Pilot volume (area A _x)	1.81 cm ³ (0.11 in ³)	2.83 cm ³ (0.17 in ³)
Control panel		
Poppet stroke	9 mm (0.35 in)	
Surface A _A	201 mm ² (0.31 in ²)	290 mm ² (0.45 in ²)
Factor A _A	1	
Factor A _B	0	0.07
Factor A _x	1	1.07
Seal material/hydraulic fluid combination		
FKM	- Mineral oil based hydraulic fluids - HFD hydraulic fluids	
NBR	- Mineral oil based hydraulic fluids - HFB, HFC hydraulic fluids	
Temperature range of hydraulic fluids		
Valve with FKM seals	-20 to +80 °C (-4 to 176 °F)	
Valve with NBR seals	-30 to +80 °C (-22 to 176 °F)	



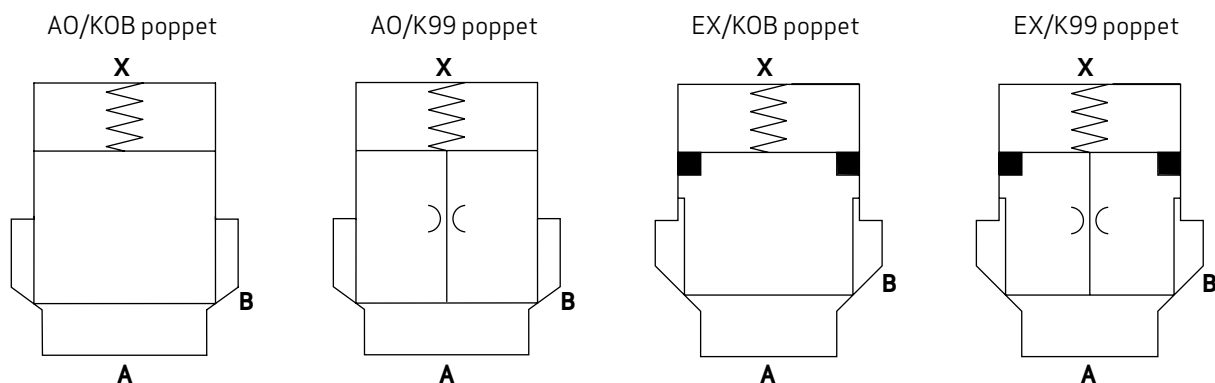
1) Please regard the maximum operating pressure of control cover and pilot valve.

Preferred Slip-in Cartridge Valve Types

With poppet type	Spring strength	Product code	Part number
AO/KOB	Spring S - 1 bar (15 psi)	N-CEE16K6AOS/KOB	X731-016AOS-000N00
AO/KOB	Spring T - 2 bar (29 psi)	N-CEE16K6AOT/KOB	X731-016AOT-000N00
AO/KOB	Spring U - 4 bar (58 psi)	N-CEE16K6AOU/KOB	X731-016AOU-000N00
AO/K99	Spring S - 1 bar (15 psi)	N-CEE16K6AOS/K99	X731-016AOS-001N00
AO/K99	Spring T - 2 bar (29 psi)	N-CEE16K6AOT/K99	X731-016AOT-001N00
AO/K99	Spring U - 4 bar (58 psi)	N-CEE16K6AOU/K99	X731-016AOU-001N00
EX/KOB	Spring U - 2.7 bar (39 psi)	N-CEE16K6EXU/KOB	X731-016EXU-000N00
EX/K99	Spring U - 2.7 bar (39 psi)	N-CEE16K6EXU/K99	X731-016EXU-001N00

SIZE 16 - PRESSURE CONTROL

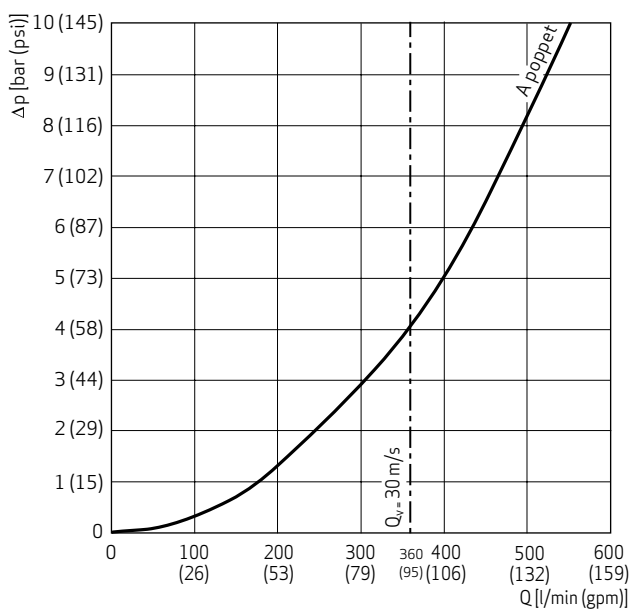
Hydraulic Symbol



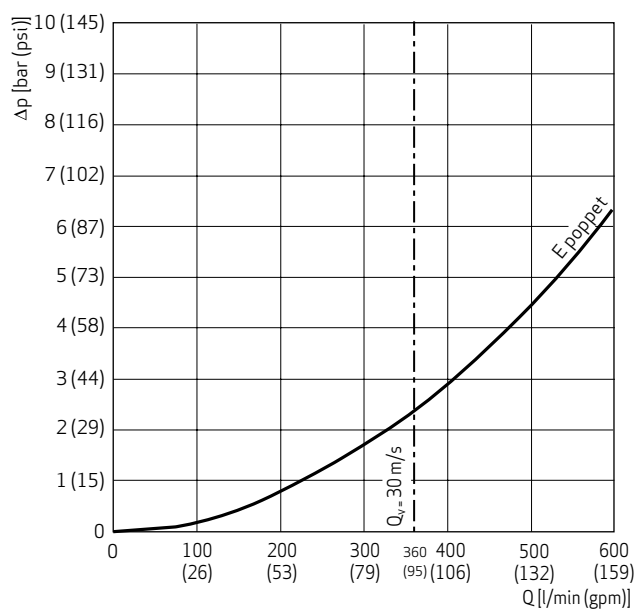
Valve Flow Diagram

Measuring conditions: Oil viscosity 32 mm²/s (cSt), oil temperature 40 °C (104 °F), flow A→B, port B drilled with d4_{max} as per ISO 7368, valve fully opened

AO poppets



EX poppet



Notes

- Characteristic curves for pressure relief functions are included in the relevant catalog.
- Cartridges with AO poppets should only be used for pressure control. For a pressure relief function it is important that the pressure in port X not greatly exceeds the pressure in port A, otherwise damage to the valve seat may occur.

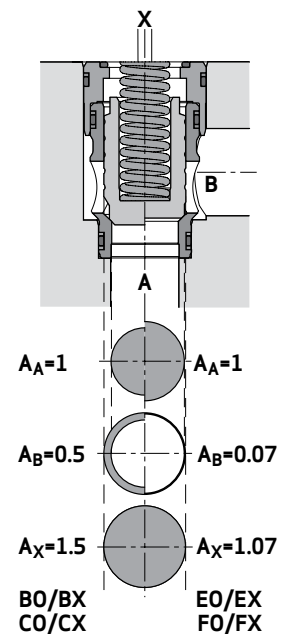
SIZE 25 - DIRECTIONAL CONTROL

General Technical Data

Flow direction	A ↔ B
Mounting pattern	ISO 7368-BB-08-2-A
Weight	0.4 kg (0.9 lb)

Specific Hydraulic Data

With poppet type	BO/BX	CO/CX	EO/EX	FO/FX
Maximum operating pressure port A, B, X ¹⁾	420 bar (6,000 psi)			
Pilot volume (area A _x)	9.19 cm ³ (0.56 in ³)			
Control panel				
Poppet stroke	13 mm (0.51 in)			
Surface A _A	471 mm ² (0.73 in ²)		661 mm ² (1.02 in ²)	
Factor A _A	1			
Factor A _B	0.5		0.07	
Factor A _x	1.5		1.07	
Seal material/hydraulic fluid combination				
FKM	- Mineral oil based hydraulic fluids - HFD hydraulic fluids			
NBR	- Mineral oil based hydraulic fluids - HFB, HFC hydraulic fluids			
Temperature range of hydraulic fluids				
Valve with FKM seals	-20 to +80 °C (-4 to 176 °F)			
Valve with NBR seals	-30 to +80 °C (-22 to 176 °F)			



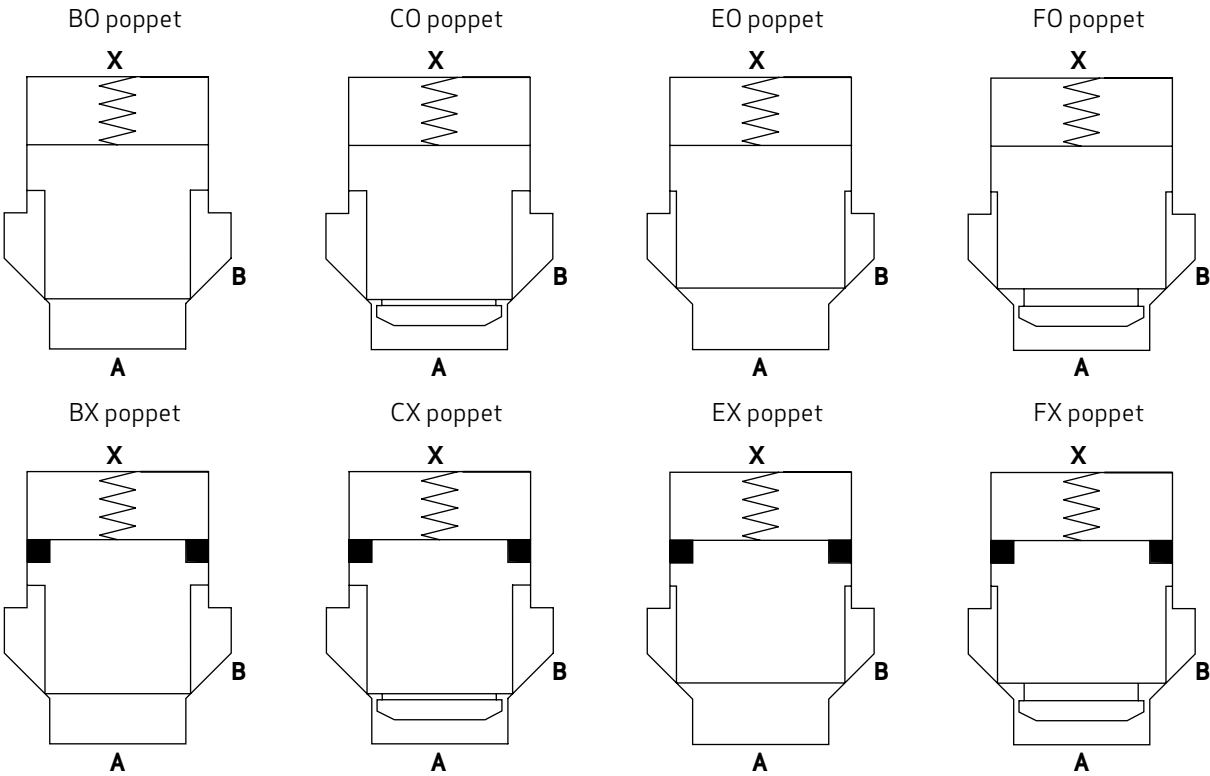
1) Please regard the maximum operating pressure of control cover and pilot valve.

Preferred Slip-in Cartridge Valve Types

With poppet type	Spring strength	Product code	Part number
B0	Spring S - 1 bar (15 psi)	N-CEE25K6BOS/KOB	X731-025BOS-000N00
B0	Spring T - 2.1 bar (30 psi)	N-CEE25K6BOT/KOB	X731-025BOT-000N00
B0	Spring U - 4.2 bar (61 psi)	N-CEE25K6BOU/KOB	X731-025BOU-000N00
BX	Spring U - 4.2 bar (61 psi)	N-CEE25K6BXU/KOB	X731-025BXU-000N00
C0	Spring S - 1 bar (15 psi)	N-CEE25K6COS/KOB	X731-025COS-000N00
C0	Spring T - 2.1 bar (30 psi)	N-CEE25K6COT/KOB	X731-025COT-000N00
C0	Spring U - 4.2 bar (61 psi)	N-CEE25K6COU/KOB	X731-025COU-000N00
CX	Spring U - 4.2 bar (61 psi)	N-CEE25K6CXU/KOB	X731-025CXU-000N00
E0	Spring S - 0.7 bar (10 psi)	N-CEE25K6EOS/KOB	X731-025EOS-000N00
E0	Spring T - 1.5 bar (22 psi)	N-CEE25K6EOT/KOB	X731-025EOT-000N00
E0	Spring U - 3.0 bar (44 psi)	N-CEE25K6EOU/KOB	X731-025EOU-000N00
EX	Spring U - 3.0 bar (44 psi)	N-CEE25K6EXU/KOB	X731-025EXU-000N00
F0	Spring S - 0.7 bar (10 psi)	N-CEE25K6FOS/KOB	X731-025FOS-000N00
F0	Spring T - 1.5 bar (22 psi)	N-CEE25K6FOT/KOB	X731-025FOT-000N00
F0	Spring U - 3.0 bar (44 psi)	N-CEE25K6FOU/KOB	X731-025FOU-000N00
FX	Spring U - 3.0 bar (44 psi)	N-CEE25K6FXU/KOB	X731-025FXU-000N00

SIZE 25 - DIRECTIONAL CONTROL

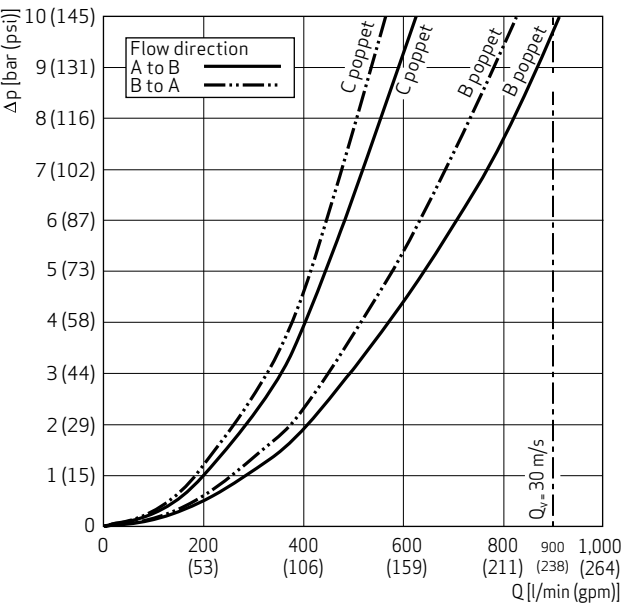
Hydraulic Symbol



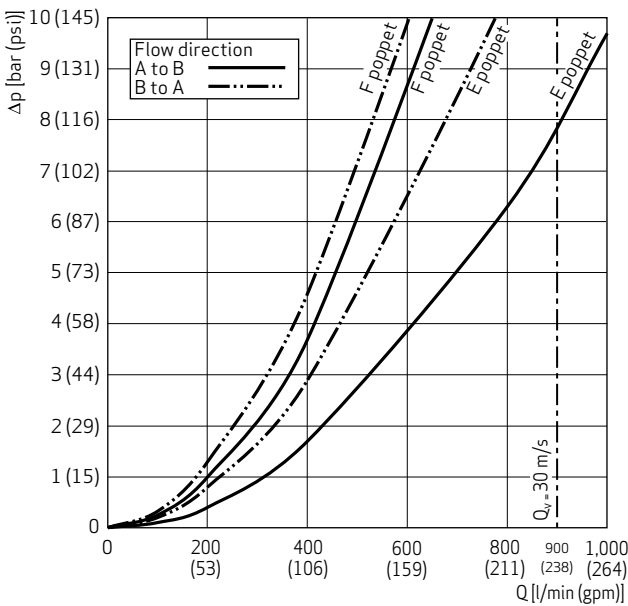
Valve Flow Diagram

Measuring conditions: Oil viscosity 32 mm²/s (cSt), oil temperature 40 °C (104 °F), port B drilled with d_{max} as per ISO 7368, valve fully opened

BO/BX, CO/CX poppet



EO/EX, FO/FX poppet



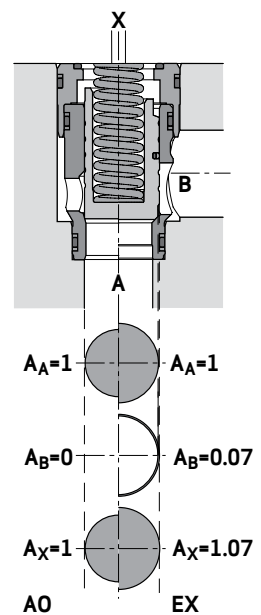
SIZE 25 - PRESSURE CONTROL

General Technical Data

Flow direction	A → B
Mounting pattern	ISO 7368-BB-08-2-A
Weight	0.4 kg (0.9 lb)
Orifice thread size (K99 poppet only)	M6

Specific Hydraulic Data

With poppet type	AO	EX
Maximum operating pressure port A, B, X ¹⁾	420 bar (6,000 psi)	
Pilot volume (area A _x)	4.42 cm ³ (0.26 in ³)	9.19 cm ³ (0.56 in ³)
Control panel		
Poppet stroke	9 mm (0.35 in)	13 mm (0.51 in)
Surface A _A	491 mm ² (0.76 in ²)	661 mm ² (1.02 in ²)
Factor A _A	1	
Factor A _B	0	0.07
Factor A _x	1	1.07
Seal material/hydraulic fluid combination		
FKM	- Mineral oil based hydraulic fluids - HFD hydraulic fluids	
NBR	- Mineral oil based hydraulic fluids - HFB, HFC hydraulic fluids	
Temperature range of hydraulic fluids		
Valve with FKM seals	-20 to +80 °C (-4 to 176 °F)	
Valve with NBR seals	-30 to +80 °C (-22 to 176 °F)	



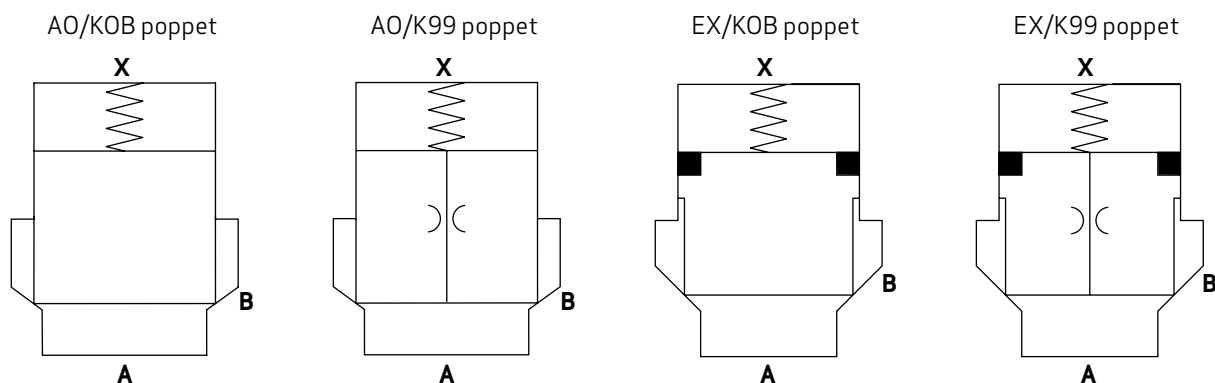
1) Please regard the maximum operating pressure of control cover and pilot valve.

Preferred Slip-in Cartridge Valve Types

With poppet type	Spring strength	Product code	Part number
AO/KOB	Spring S - 1.0 bar (15 psi)	N-CEE25K6AOS/KOB	X731-025AOS-000N00
AO/KOB	Spring T - 2.0 bar (29 psi)	N-CEE25K6AOT/KOB	X731-025AOT-000N00
AO/KOB	Spring U - 4.0 bar (58 psi)	N-CEE25K6AOU/KOB	X731-025AOU-000N00
AO/K99	Spring S - 1.0 bar (15 psi)	N-CEE25K6AOS/K99	X731-025AOS-001N00
AO/K99	Spring T - 2.0 bar (29 psi)	N-CEE25K6AOT/K99	X731-025AOT-001N00
AO/K99	Spring U - 4.0 bar (58 psi)	N-CEE25K6AOU/K99	X731-025AOU-001N00
EX/KOB	Spring U - 3.0 bar (44 psi)	N-CEE25K6EXU/KOB	X731-025EXU-000N00
EX/K99	Spring U - 3.0 bar (44 psi)	N-CEE25K6EXU/K99	X731-025EXU-001N00

SIZE 25 - PRESSURE CONTROL

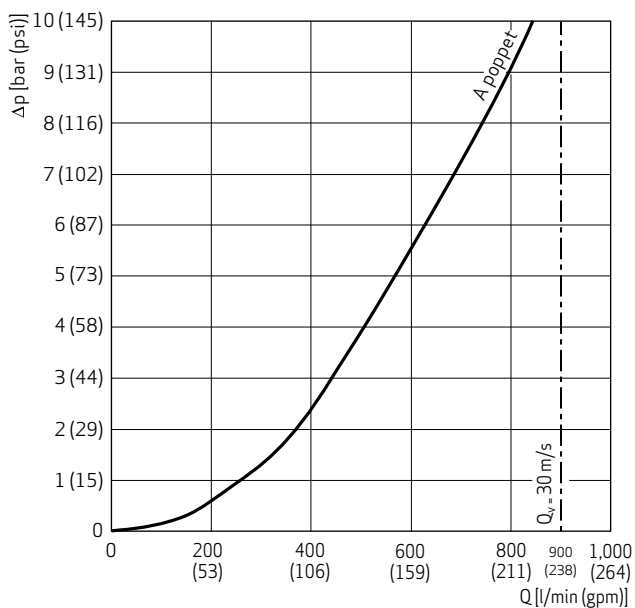
Hydraulic Symbol



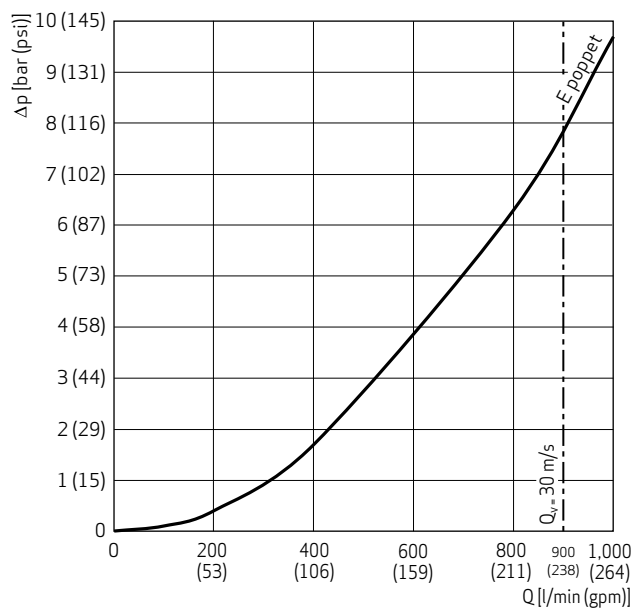
Valve Flow Diagram

Measuring conditions: Oil viscosity 32 mm²/s (cSt), oil temperature 40 °C (104 °F), flow A→B, port B drilled with d4_{max} as per ISO 7368, valve fully opened

AO poppets



EX poppet



Notes

- Characteristic curves for pressure relief functions are included in the relevant catalog.
- Cartridges with AO poppets should only be used for pressure control. For a pressure relief function it is important that the pressure in port X not greatly exceeds the pressure in port A, otherwise damage to the valve seat may occur.

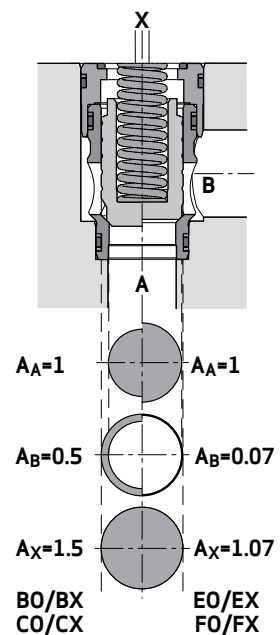
SIZE 32 - DIRECTIONAL CONTROL

General Technical Data

Flow direction	A ↔ B
Mounting pattern	ISO 7368-BC-09-2-A
Weight	0.9 kg (2 lb)

Specific hydraulic data

With poppet type	BO/BX	CO/CX	EO/EX	FO/FX
Maximum operating pressure port A, B, X ¹⁾	420 bar (6,000 psi)			
Pilot volume (area A _x)	17.92 cm ³ (1.09 in ³)			
Control panel				
Poppet stroke	15 mm (0.59 in)			
Surface A _A	794 mm ² (1.23 in ²)		1,116 mm ² (1.73 in ²)	
Factor A _A	1			
Factor A _B	0.5		0.07	
Factor A _x	1.5		1.07	
Seal material/hydraulic fluid combination				
FKM	- Mineral oil based hydraulic fluids - HFD hydraulic fluids			
NBR	- Mineral oil based hydraulic fluids - HFB, HFC hydraulic fluids			
Temperature range of hydraulic fluids				
Valve with FKM seals	-20 to +80 °C (-4 to 176 °F)			
Valve with NBR seals	-30 to +80 °C (-22 to 176 °F)			



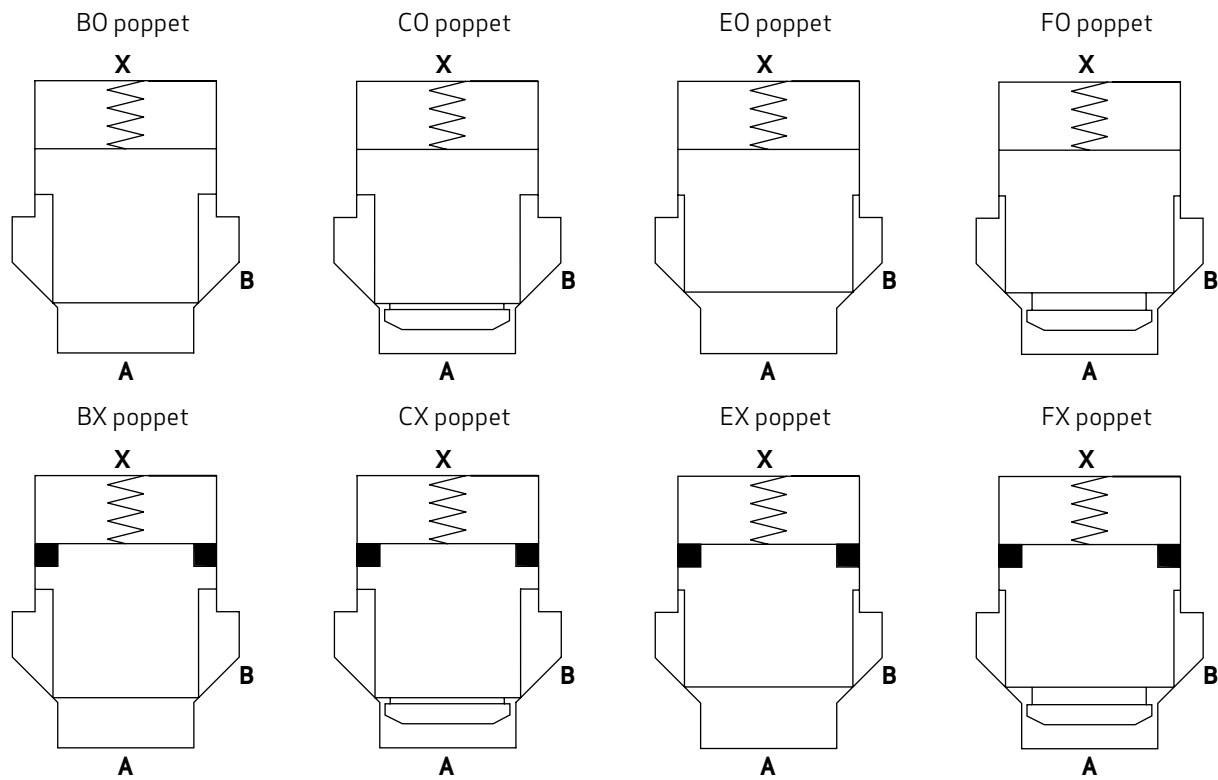
1) Please regard the maximum operating pressure of control cover and pilot valve.

Preferred Slip-in Cartridge Valve Types

With poppet type	Spring strength	Product code	Part number
BO	Spring S - 1.0 bar (15 psi)	N-CEE32K6BOS/KOB	X731-032BOS-000N00
BO	Spring T - 2.0 bar (29 psi)	N-CEE32K6BOT/KOB	X731-032BOT-000N00
BO	Spring U - 4.0 bar (58 psi)	N-CEE32K6BOU/KOB	X731-032BOU-000N00
BX	Spring U - 4.0 bar (58 psi)	N-CEE32K6BXU/KOB	X731-032BXU-000N00
CO	Spring S - 1.0 bar (15 psi)	N-CEE32K6COS/KOB	X731-032COS-000N00
CO	Spring T - 2.0 bar (29 psi)	N-CEE32K6COT/KOB	X731-032COT-000N00
CO	Spring U - 4.0 bar (58 psi)	N-CEE32K6COU/KOB	X731-032COU-000N00
CX	Spring U - 4.0 bar (58 psi)	N-CEE32K6CXU/KOB	X731-032CXU-000N00
EO	Spring S - 0.7 bar (10 psi)	N-CEE32K6EOS/KOB	X731-032EOS-000N00
EO	Spring T - 1.4 bar (20 psi)	N-CEE32K6EOT/KOB	X731-032EOT-000N00
EO	Spring U - 2.8 bar (41 psi)	N-CEE32K6EOU/KOB	X731-032EOU-000N00
EX	Spring U - 2.8 bar (41 psi)	N-CEE32K6EXU/KOB	X731-032EXU-000N00
FO	Spring S - 0.7 bar (10 psi)	N-CEE32K6FOS/KOB	X731-032FOS-000N00
FO	Spring T - 1.4 bar (20 psi)	N-CEE32K6FOT/KOB	X731-032EOT-000N00
FO	Spring U - 2.8 bar (41 psi)	N-CEE32K6FOU/KOB	X731-032FOU-000N00
FX	Spring U - 2.8 bar (41 psi)	N-CEE32K6FXU/KOB	X731-032FXU-000N00

SIZE 32 - DIRECTIONAL CONTROL

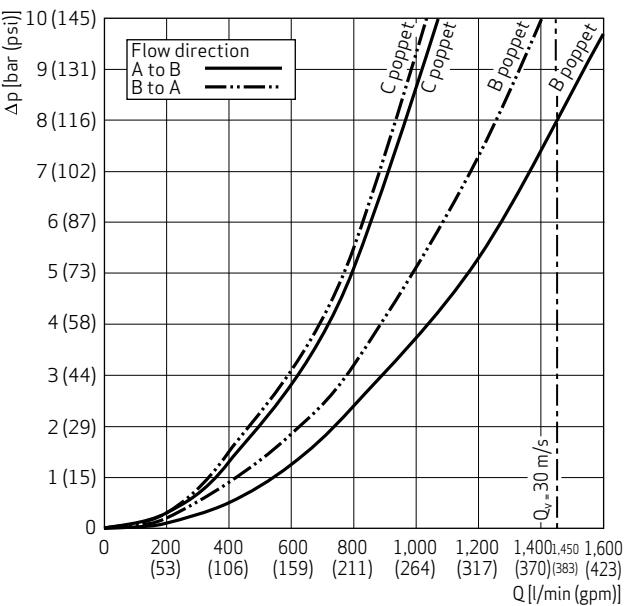
Hydraulic Symbol



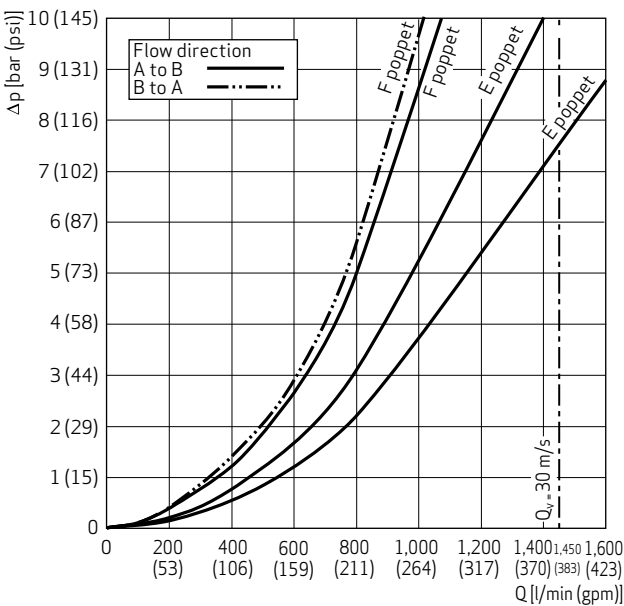
Valve Flow Diagram

Measuring conditions: Oil viscosity 32 mm²/s (cSt), oil temperature 40 °C (104 °F), port B drilled with d_{4max} as per ISO 7368, valve fully opened

BO/BX, CO/CX poppet



EO/EX, FO/FX poppet



SIZE 32 - PRESSURE CONTROL

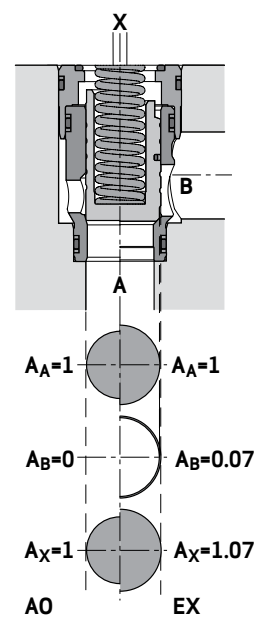
General Technical Data

Flow direction	A → B
Mounting pattern	ISO 7368-BC-09-2-A
Weight	0.9 kg (2 lb)
Orifice thread size (K99 poppet only)	M6

Specific hydraulic data

With poppet type	AO	EX
Maximum operating pressure port A, B, X ¹⁾	420 bar (6,000 psi)	
Pilot volume (area A _x)	12.06 cm ³ (0.73 in ³)	17.92 cm ³ (1.09 in ³)
Control panel		
Poppet stroke	15 mm (0.59 in)	
Surface A _A	804 mm ² (1.25 in ²)	1,116 mm ² (1.73 in ²)
Factor A _A	1	
Factor A _B	0	0.07
Factor A _x	1	1.07
Seal material/hydraulic fluid combination		
FKM	- Mineral oil based hydraulic fluids - HFD hydraulic fluids	
NBR	- Mineral oil based hydraulic fluids - HFB, HFC hydraulic fluids	
Temperature range of hydraulic fluids		
Valve with FKM seals	-20 to +80 °C (-4 to 176 °F)	
Valve with NBR seals	-30 to +80 °C (-22 to 176 °F)	

1) Please regard the maximum operating pressure of control cover and pilot valve.

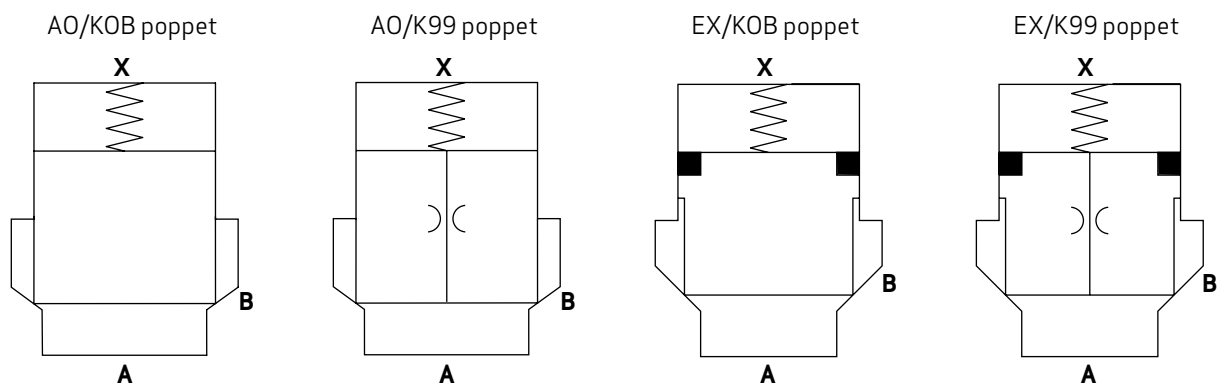


Preferred Slip-in Cartridge Valve Types

With poppet type	Spring strength	Product code	Part number
AO/KOB	Spring S - 1.0 bar (15 psi)	N-CEE32K6AOS/KOB	X731-032AOS-000N00
AO/KOB	Spring T - 2.0 bar (29 psi)	N-CEE32K6AOT/KOB	X731-032AOT-000N00
AO/KOB	Spring U - 4.0 bar (58 psi)	N-CEE32K6AOU/KOB	X731-032AOU-000N00
AO/K99	Spring S - 1.0 bar (15 psi)	N-CEE32K6AOS/K99	X731-032AOS-001N00
AO/K99	Spring T - 2.0 bar (29 psi)	N-CEE32K6AOT/K99	X731-032AOT-001N00
AO/K99	Spring U - 4.0 bar (58 psi)	N-CEE32K6AOU/K99	X731-032AOU-001N00
EX/KOB	Spring U - 2.8 bar (41 psi)	N-CEE32K6EXU/KOB	X731-032EXU-000N00
EX/K99	Spring U - 2.8 bar (41 psi)	N-CEE32K6EXU/K99	X731-032EXU-001N00

SIZE 32 - PRESSURE CONTROL

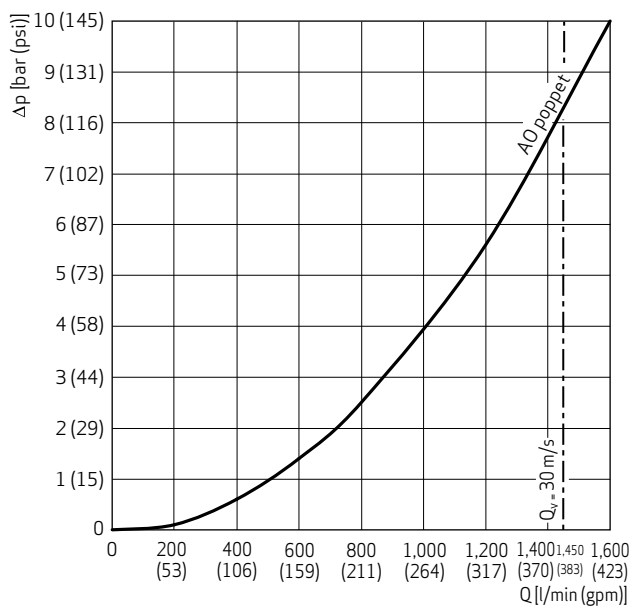
Hydraulic Symbol



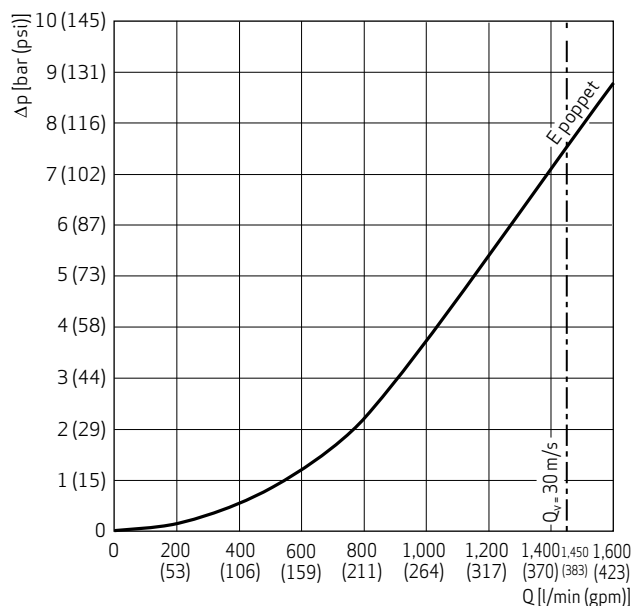
Valve Flow Diagram

Measuring conditions: Oil viscosity 32 mm²/s (cSt), oil temperature 40 °C (104 °F), flow A→B, port B drilled with d4_{max} as per ISO 7368, valve fully opened

AO poppets



EX poppet



Notes

- Characteristic curves for pressure relief functions are included in the relevant catalog.
- Cartridges with AO poppets should only be used for pressure control. For a pressure relief function it is important that the pressure in port X not greatly exceeds the pressure in port A, otherwise damage to the valve seat may occur.

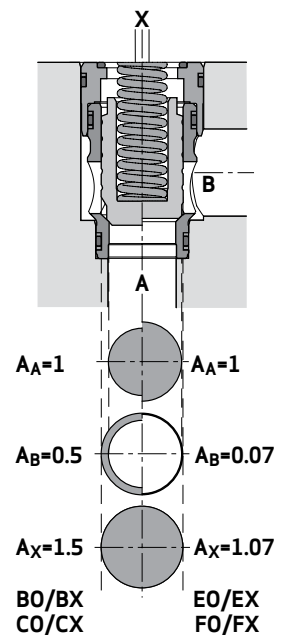
SIZE 40 - DIRECTIONAL CONTROL

General Technical Data

Flow direction	A ↔ B
Mounting pattern	ISO 7368-BD-10-2-A
Weight	1.8 kg (4 lb)

Specific Hydraulic Data

With poppet type	BO/BX	CO/CX	EO/EX	FO/FX
Maximum operating pressure port A, B, X ¹⁾	420 bar (6,000 psi)			
Pilot volume (area A _X)	33.24 cm ³ (2.02 in ³)			
Control panel				
Poppet stroke	20 mm (0.79 in)			
Surface A _A	1,110 mm ² (1.72 in ²)	1,555 mm ² (2.41 in ²)		
Factor A _A	1			
Factor A _B	0.5	0.07		
Factor A _X	1.5	1.07		
Seal material/hydraulic fluid combination				
FKM	- Mineral oil based hydraulic fluids - HFD hydraulic fluids			
NBR	- Mineral oil based hydraulic fluids - HFB, HFC hydraulic fluids			
Temperature range of hydraulic fluids				
Valve with FKM seals	-20 to +80 °C (-4 to 176 °F)			
Valve with NBR seals	-30 to +80 °C (-22 to 176 °F)			



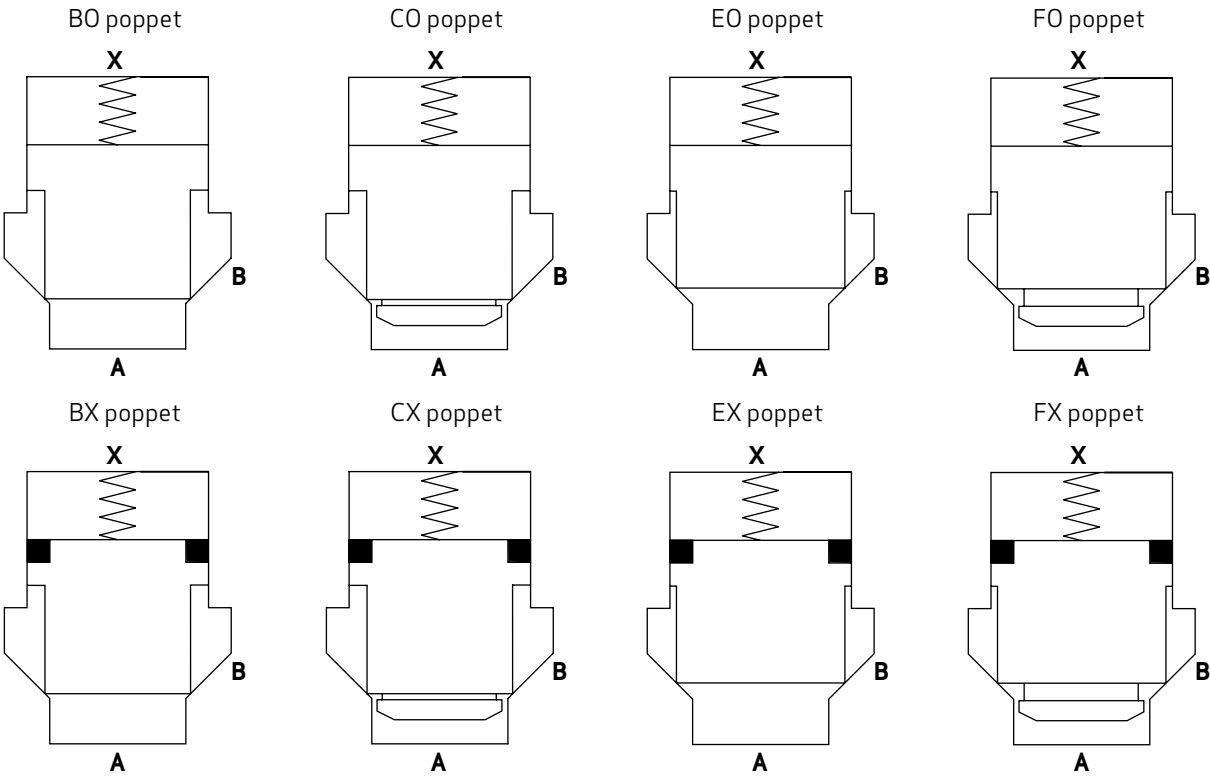
1) Please regard the maximum operating pressure of control cover and pilot valve.

Preferred Slip-in Cartridge Valve Types

With poppet type	Spring strength	Product code	Part number
BO	Spring S - 1.0 bar (15 psi)	N-CEE40K6BOS/KOB	X731-040BOS-000N00
BO	Spring T - 2.0 bar (29 psi)	N-CEE40K6BOT/KOB	X731-040BOT-000N00
BO	Spring U - 4.0 bar (58 psi)	N-CEE40K6BOU/KOB	X731-040BOU-000N00
BX	Spring U - 4.0 bar (58 psi)	N-CEE40K6BXU/KOB	X731-040BXU-000N00
CO	Spring S - 1.0 bar (15 psi)	N-CEE40K6COS/KOB	X731-040COS-000N00
CO	Spring T - 2.0 bar (29 psi)	N-CEE40K6COT/KOB	X731-040COT-000N00
CO	Spring U - 4.0 bar (58 psi)	N-CEE40K6COU/KOB	X731-040COU-000N00
CX	Spring U - 4.0 bar (58 psi)	N-CEE40K6CXU/KOB	X731-040CXU-000N00
EO	Spring S - 0.7 bar (10 psi)	N-CEE40K6EOS/KOB	X731-040EOS-000N00
EO	Spring T - 1.4 bar (20 psi)	N-CEE40K6EOT/KOB	X731-040EOT-000N00
EO	Spring U - 2.9 bar (42 psi)	N-CEE40K6EOU/KOB	X731-040EOU-000N00
EX	Spring U - 2.9 bar (42 psi)	N-CEE40K6EXU/KOB	X731-040EXU-000N00
FO	Spring S - 0.7 bar (10 psi)	N-CEE40K6FOS/KOB	X731-040FOS-000N00
FO	Spring T - 1.4 bar (20 psi)	N-CEE40K6FOT/KOB	X731-040EOT-000N00
FO	Spring U - 2.9 bar (42 psi)	N-CEE40K6FOU/KOB	X731-040FOU-000N00
FX	Spring U - 2.9 bar (42 psi)	N-CEE40K6FXU/KOB	X731-040FXU-000N00

SIZE 40 - DIRECTIONAL CONTROL

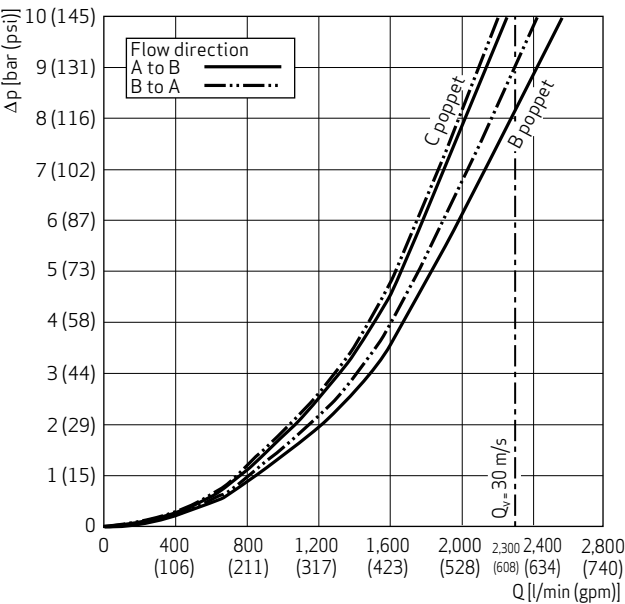
Hydraulic Symbol



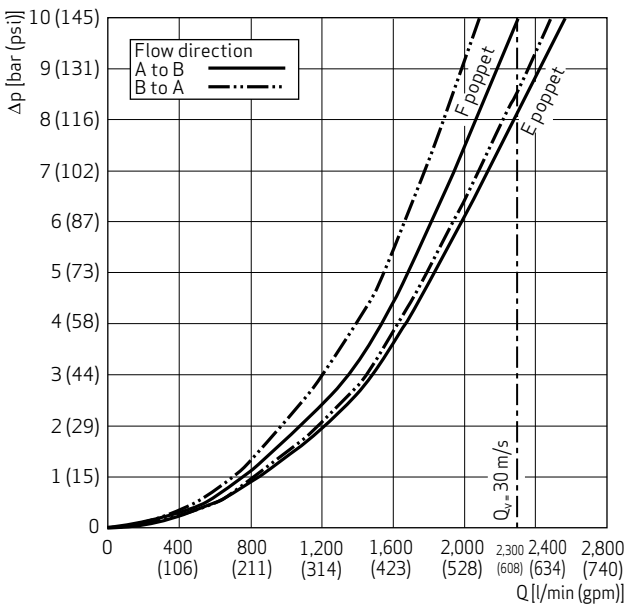
Valve Flow Diagram

Measuring conditions: Oil viscosity 32 mm²/s (cSt), oil temperature 40 °C (104 °F), port B drilled with d_{4max} as per ISO 7368, valve fully opened

BO/BX, CO/CX poppet



EO/EX, FO/FX poppet



SIZE 40 - PRESSURE CONTROL

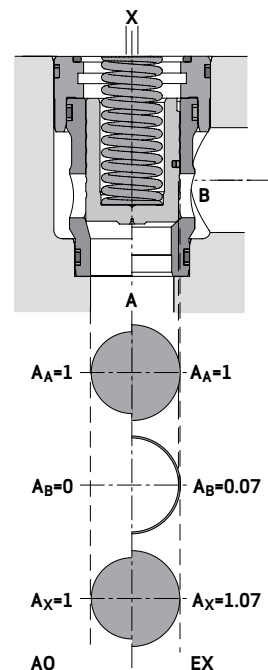
General Technical Data

Flow direction	A → B
Mounting pattern	ISO 7368-BD-10-2-A
Weight	1.8 kg (4 lb)
Orifice thread size (K99 poppet only)	M6

Specific Hydraulic Data

With poppet type	AO	EX
Maximum operating pressure port A, B, X ¹⁾	420 bar (6,000 psi)	
Pilot volume (area A _x)	31.11 cm ³ (1.89 in ³)	33.24 cm ³ (2.02 in ³)
Control panel		
Poppet stroke	20 mm (0.79 in)	
Surface A _A	1,555 mm ² (2.41 in ²)	
Factor A _A	1	
Factor A _B	0	0.07
Factor A _x	1	1.07
Seal material/hydraulic fluid combination		
FKM	- Mineral oil based hydraulic fluids - HFD hydraulic fluids	
NBR	- Mineral oil based hydraulic fluids - HFB, HFC hydraulic fluids	
Temperature range of hydraulic fluids		
Valve with FKM seals	-20 to +80 °C (-4 to 176 °F)	
Valve with NBR seals	-30 to +80 °C (-22 to 176 °F)	

1) Please regard the maximum operating pressure of control cover and pilot valve.

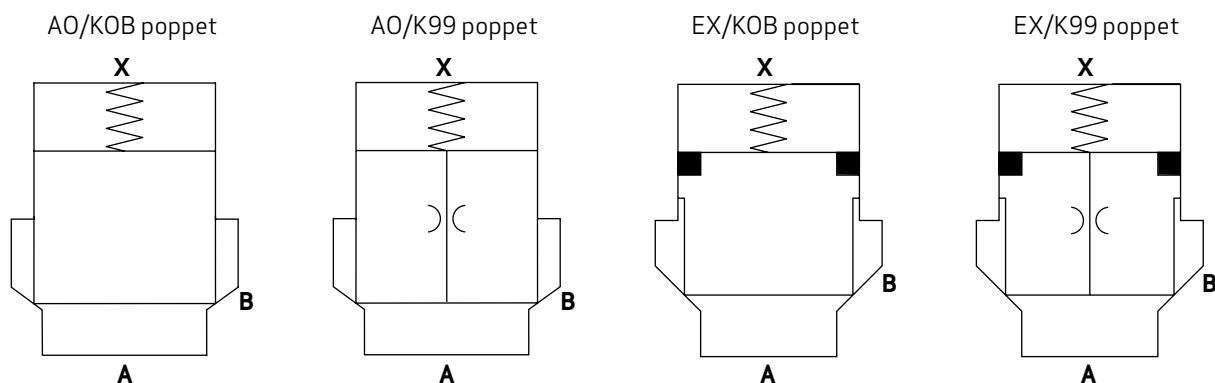


Preferred Slip-in Cartridge Valve Types

With poppet type	Spring strength	Product code	Part number
A0/KOB	Spring S - 0.7 bar (10 psi)	N-CEE40K6AOS/KOB	X731-040AOS-000N00
A0/KOB	Spring T - 1.4 bar (20 psi)	N-CEE40K6AOT/KOB	X731-040AOT-000N00
A0/KOB	Spring U - 2.9 bar (42 psi)	N-CEE40K6AOU/KOB	X731-040AOU-000N00
A0/K99	Spring S - 0.7 bar (10 psi)	N-CEE40K6AOS/K99	X731-040AOS-001N00
A0/K99	Spring T - 1.4 bar (20 psi)	N-CEE40K6AOT/K99	X731-040AOT-001N00
A0/K99	Spring U - 2.9 bar (42 psi)	N-CEE40K6AOU/K99	X731-040AOU-001N00
EX/KOB	Spring U - 2.9 bar (42 psi)	N-CEE40K6EXU/KOB	X731-040EXU-000N00
EX/K99	Spring U - 2.9 bar (42 psi)	N-CEE40K6EXU/K99	X731-040EXU-001N00

SIZE 40 - PRESSURE CONTROL

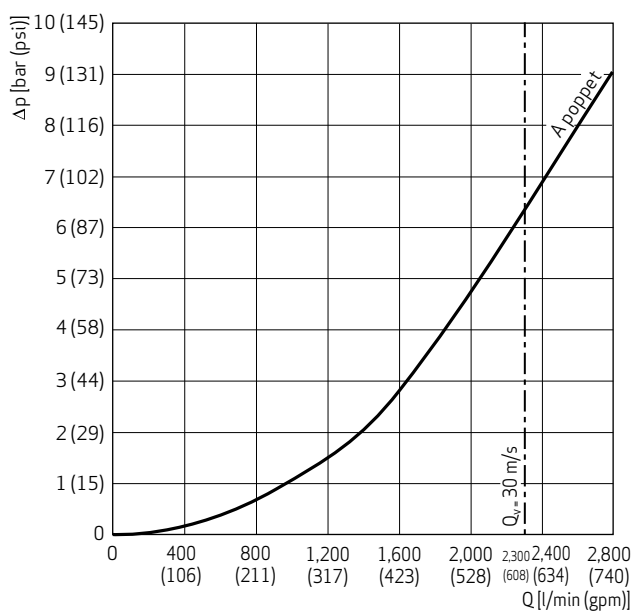
Hydraulic Symbol



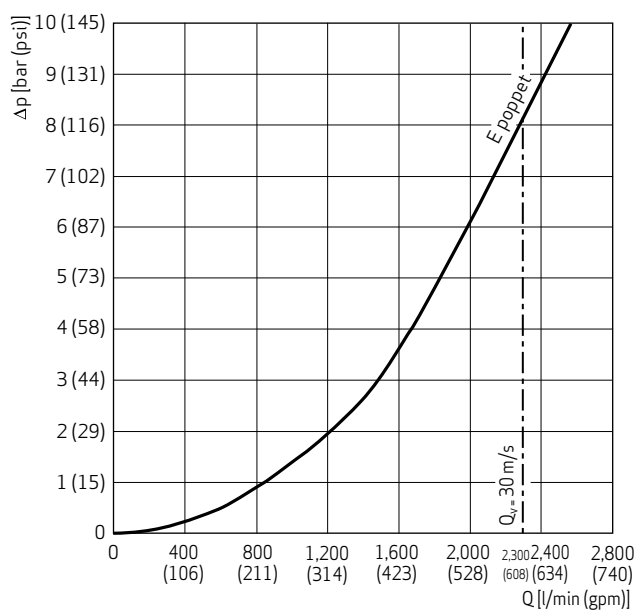
Valve Flow Diagram

Measuring conditions: Oil viscosity 32 mm²/s (cSt), oil temperature 40 °C (104 °F), flow A→B, port B drilled with d4_{max} as per ISO 7368, valve fully opened

AO poppets



EX poppet



Notes

- Characteristic curves for pressure relief functions are included in the relevant catalog.
- Cartridges with AO poppets should only be used for pressure control. For a pressure relief function it is important that the pressure in port X not greatly exceeds the pressure in port A, otherwise damage to the valve seat may occur.

SIZE 50 - DIRECTIONAL CONTROL

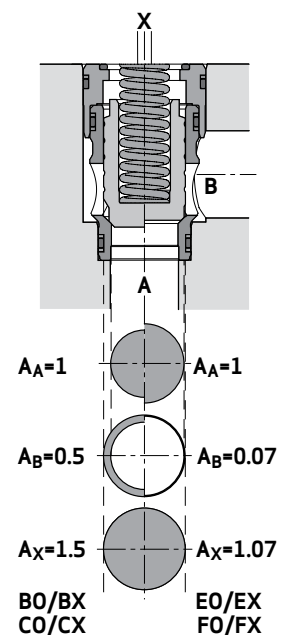
General Technical Data

Flow direction	A ↔ B
Mounting pattern	ISO 7368-BE-11-2-A
Weight	3.2 kg (7.1 lb)

Specific Hydraulic Data

With poppet type	BO/BX	CO/CX	EO/EX	FO/FX
Maximum operating pressure port A, B, X ¹⁾	420 bar (6,000 psi)			
Pilot volume (area A _x)	67.86 cm ³ (4.14 in ³)			
Control panel				
Poppet stroke	24 mm (0.95 in)			
Surface A _A	1,886 mm ² (2.92 in ²)	2,642 mm ² (4.1 in ²)		
Factor A _A	1			
Factor A _B	0.5	0.07		
Factor A _x	1.5	1.07		
Seal material/hydraulic fluid combination				
FKM	- Mineral oil based hydraulic fluids - HFD hydraulic fluids			
NBR	- Mineral oil based hydraulic fluids - HFB, HFC hydraulic fluids			
Temperature range of hydraulic fluids				
Valve with FKM seals	-20 to +80 °C (-4 to 176 °F)			
Valve with NBR seals	-30 to +80 °C (-22 to 176 °F)			

1) Please regard the maximum operating pressure of control cover and pilot valve.

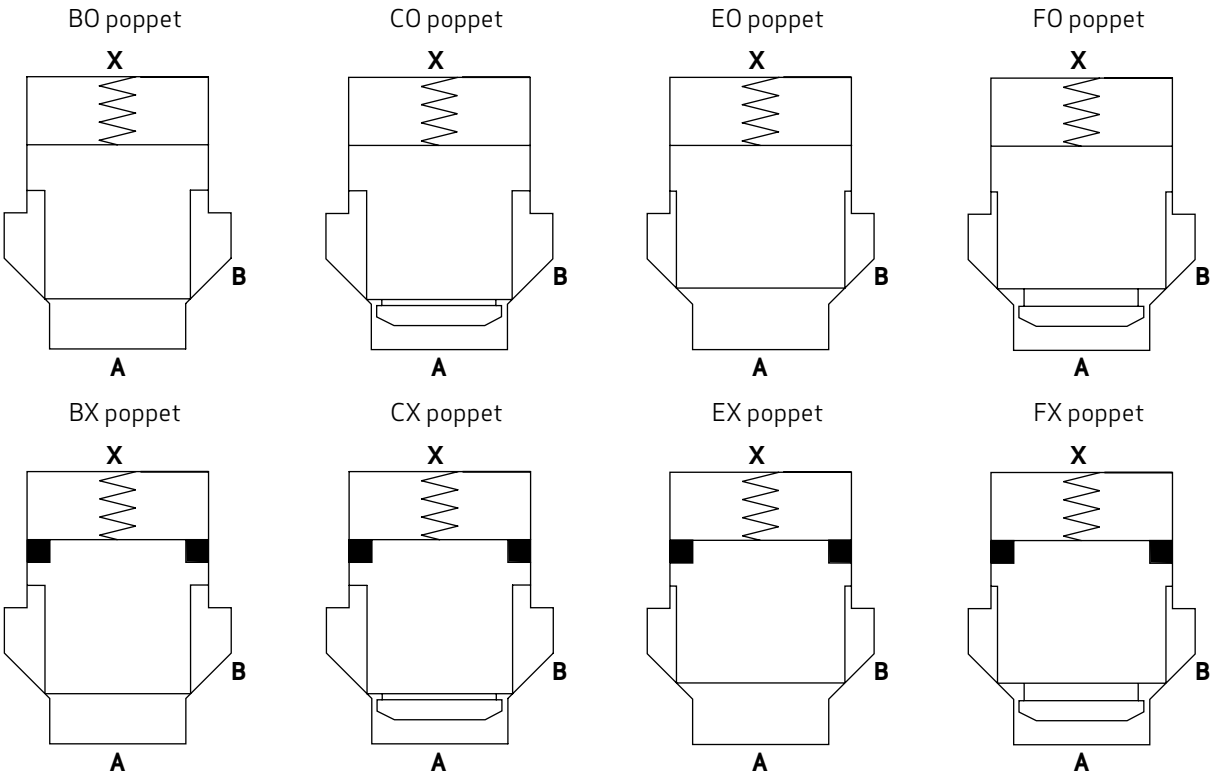


Preferred Slip-in Cartridge Valve Types

With poppet type	Spring strength	Product code	Part number
BO	Spring S - 1.0 bar (15 psi)	N-CEE50K6BOS/KOB	X731-050BOS-000N00
BO	Spring T - 2.0 bar (29 psi)	N-CEE50K6BOT/KOB	X731-050BOT-000N00
BO	Spring U - 4.0 bar (58 psi)	N-CEE50K6BOU/KOB	X731-050BOU-000N00
BX	Spring U - 4.0 bar (58 psi)	N-CEE50K6BXU/KOB	X731-050BXU-000N00
CO	Spring S - 1.0 bar (15 psi)	N-CEE50K6COS/KOB	X731-050COS-000N00
CO	Spring T - 2.0 bar (29 psi)	N-CEE50K6COT/KOB	X731-050COT-000N00
CO	Spring U - 4.0 bar (58 psi)	N-CEE50K6COU/KOB	X731-050COU-000N00
CX	Spring U - 4.0 bar (58 psi)	N-CEE50K6CXU/KOB	X731-050CXU-000N00
EO	Spring S - 0.7 bar (10 psi)	N-CEE50K6EOS/KOB	X731-050EOS-000N00
EO	Spring T - 1.4 bar (20 psi)	N-CEE50K6EOT/KOB	X731-050EOT-000N00
EO	Spring U - 2.9 bar (42 psi)	N-CEE50K6EOU/KOB	X731-050EOU-000N00
EX	Spring U - 2.9 bar (42 psi)	N-CEE50K6EXU/KOB	X731-050EXU-000N00
FO	Spring S - 0.7 bar (10 psi)	N-CEE50K6FOS/KOB	X731-050FOS-000N00
FO	Spring T - 1.4 bar (20 psi)	N-CEE50K6FOT/KOB	X731-050EOT-000N00
FO	Spring U - 2.9 bar (42 psi)	N-CEE50K6FOU/KOB	X731-050FOU-000N00
FX	Spring U - 2.9 bar (42 psi)	N-CEE50K6FXU/KOB	X731-050FXU-000N00

SIZE 50 - DIRECTIONAL CONTROL

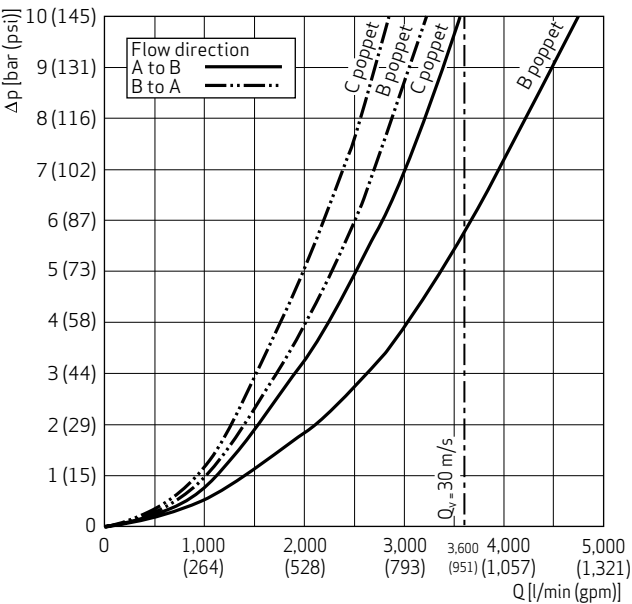
Hydraulic Symbol



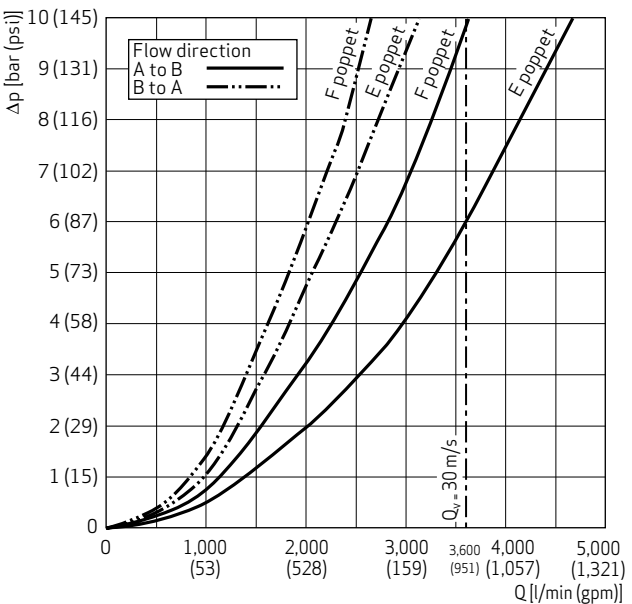
Valve Flow Diagram

Simulation conditions: Oil viscosity 32 mm²/s (cSt), oil temperature 40 °C (104 °F), port B drilled with d4_{max} as per ISO 7368, valve fully opened

BO/BX, CO/CX poppet



EO/EX, FO/FX poppet



SIZE 50 - PRESSURE CONTROL

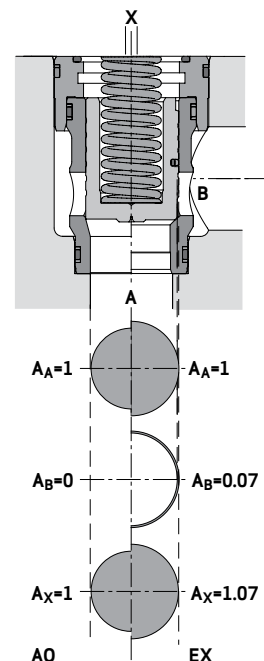
General Technical Data

Flow direction	A → B
Mounting pattern	ISO 7368-BE-11-2-A
Weight	3.2 kg (7.1 lb)
Orifice thread size (K99 poppet only)	M8

Specific Hydraulic Data

With poppet type	AO	EX
Maximum operating pressure port A, B, X ¹⁾	420 bar (6,000 psi)	
Pilot volume (area A _x)	63.41 cm ³ (3.86 in ³)	67.86 cm ³ (4.14 in ³)
Control panel		
Poppet stroke	24 mm (0.95 in)	
Surface A _A	2,642 mm ² (4.1 in ²)	
Factor A _A	1	
Factor A _B	0	0.07
Factor A _x	1	1.07
Seal material/hydraulic fluid combination		
FKM	- Mineral oil based hydraulic fluids - HFD hydraulic fluids	
NBR	- Mineral oil based hydraulic fluids - HFB, HFC hydraulic fluids	
Temperature range of hydraulic fluids		
Valve with FKM seals	-20 to +80 °C (-4 to 176 °F)	
Valve with NBR seals	-30 to +80 °C (-22 to 176 °F)	

1) Please regard the maximum operating pressure of control cover and pilot valve.

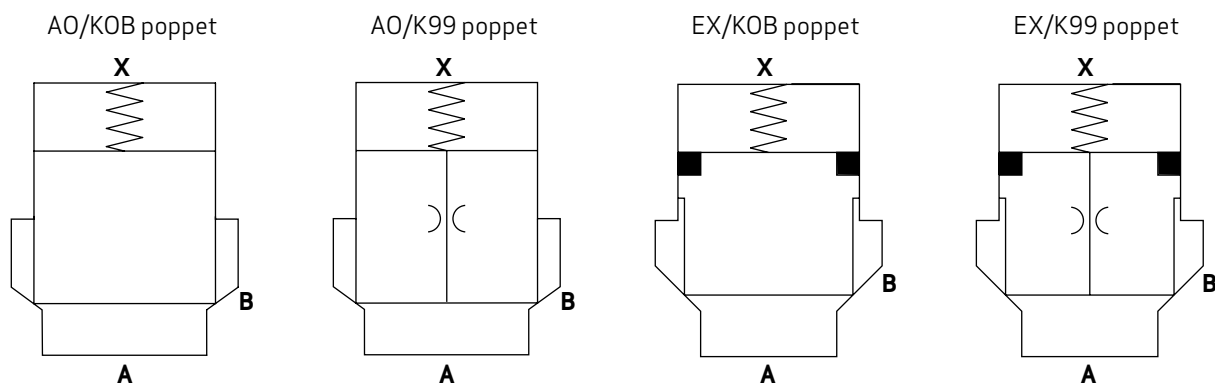


Preferred Slip-in Cartridge Valve Types

With poppet type	Spring strength	Product code	Part number
A0/KOB	Spring S - 0.7 bar (10 psi)	N-CEE50K6AOS/KOB	X731-050AOS-000N00
A0/KOB	Spring T - 1.4 bar (20 psi)	N-CEE50K6AOT/KOB	X731-050AOT-000N00
A0/KOB	Spring U - 2.9 bar (42 psi)	N-CEE50K6AOU/KOB	X731-050AOU-000N00
A0/K99	Spring S - 0.7 bar (10 psi)	N-CEE50K6AOS/K99	X731-050AOS-001N00
A0/K99	Spring T - 1.4 bar (20 psi)	N-CEE50K6AOT/K99	X731-050AOT-001N00
A0/K99	Spring U - 2.9 bar (42 psi)	N-CEE50K6AOU/K99	X731-050AOU-001N00
EX/KOB	Spring U - 2.9 bar (42 psi)	N-CEE50K6EXU/KOB	X731-050EXU-000N00
EX/K99	Spring U - 2.9 bar (42 psi)	N-CEE50K6EXU/K99	X731-050EXU-001N00

SIZE 50 - PRESSURE CONTROL

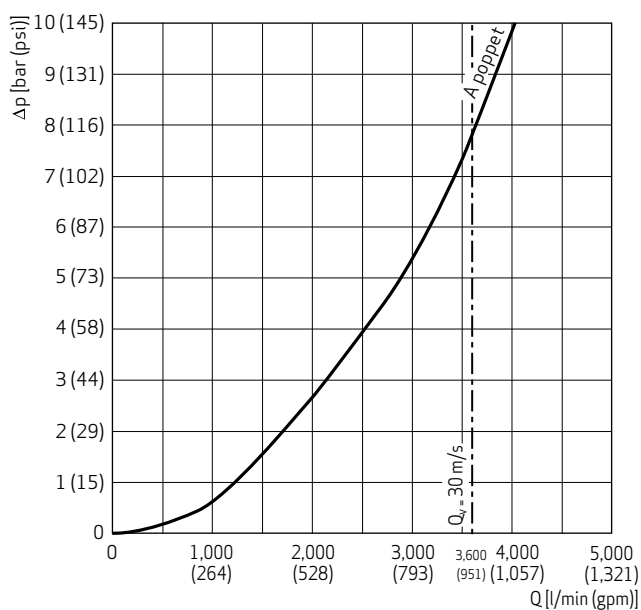
Hydraulic Symbol



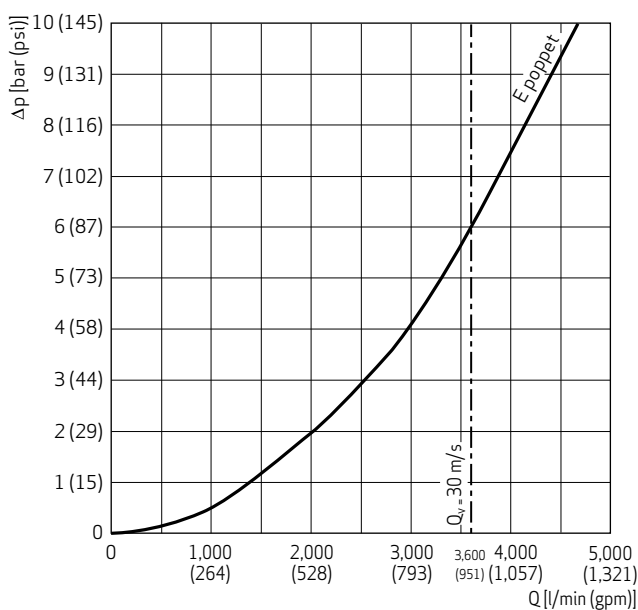
Valve Flow Diagram

Simulation conditions: Oil viscosity 32 mm²/s (cSt), oil temperature 40 °C (104 °F), flow A→B, port B drilled with d4_{max} as per ISO 7368, valve fully opened

AO poppets



EX poppet



Notes

- Characteristic curves for pressure relief functions are included in the relevant catalog.
- Cartridges with AO poppets should only be used for pressure control. For a pressure relief function it is important that the pressure in port X not greatly exceeds the pressure in port A, otherwise damage to the valve seat may occur.

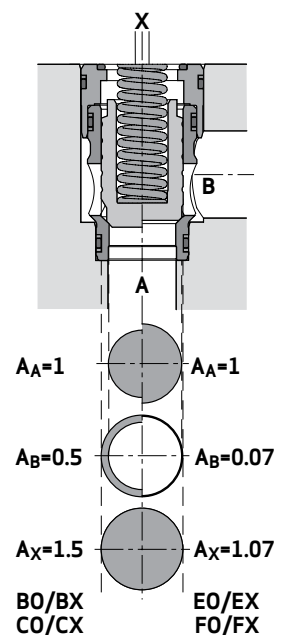
SIZE 63 - DIRECTIONAL CONTROL

General Technical Data

Flow direction	A ↔ B
Mounting pattern	ISO 7368-BF-12-2-A
Weight	6.9 kg (15.2 lb)

Specific Hydraulic Data

With poppet type	BO/BX	CO/CX	EO/EX	FO/FX
Maximum operating pressure port A, B, X ¹⁾	420 bar (6,000 psi)			
Pilot volume (area A _x)	133.79 cm ³ (8.1644 in ³)			
Control panel				
Poppet stroke	28 mm (1.1 in)			
Surface A _A	3,187 mm ² (4.94 in ²)		4,465 mm ² (6.92 in ²)	
Factor A _A	1			
Factor A _B	0.5		0.07	
Factor A _x	1.5		1.07	
Seal material/hydraulic fluid combination				
FKM	- Mineral oil based hydraulic fluids - HFD hydraulic fluids			
NBR	- Mineral oil based hydraulic fluids - HFB, HFC hydraulic fluids			
Temperature range of hydraulic fluids				
Valve with FKM seals	-20 to +80 °C (-4 to 176 °F)			
Valve with NBR seals	-30 to +80 °C (-22 to 176 °F)			



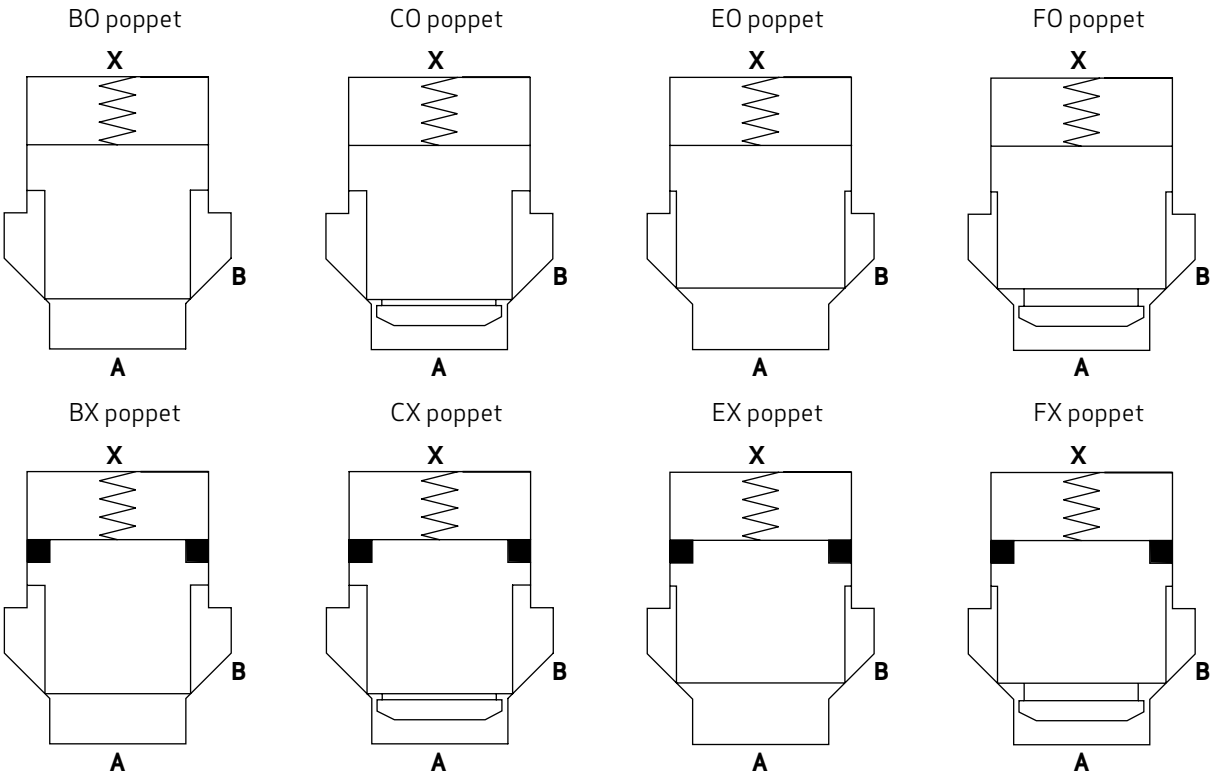
1) Please regard the maximum operating pressure of control cover and pilot valve.

Preferred Slip-in Cartridge Valve Types

With poppet type	Spring strength	Product code	Part number
BO	Spring S - 1.0 bar (15 psi)	N-CEE63K6BOS/KOB	X731-063BOS-000N00
BO	Spring T - 2.0 bar (29 psi)	N-CEE63K6BOT/KOB	X731-063BOT-000N00
BO	Spring U - 4.0 bar (58 psi)	N-CEE63K6BOU/KOB	X731-063BOU-000N00
BX	Spring U - 4.0 bar (58 psi)	N-CEE63K6BXU/KOB	X731-063BXU-000N00
CO	Spring S - 1.0 bar (10 psi)	N-CEE63K6COS/KOB	X731-063COS-000N00
CO	Spring T - 2.0 bar (29 psi)	N-CEE63K6COT/KOB	X731-063COT-000N00
CO	Spring U - 4.0 bar (58 psi)	N-CEE63K6COU/KOB	X731-063COU-000N00
CX	Spring U - 4.0 bar (58 psi)	N-CEE63K6CXU/KOB	X731-063CXU-000N00
EO	Spring S - 0.7 bar (10 psi)	N-CEE63K6EOS/KOB	X731-063EOS-000N00
EO	Spring T - 1.4 bar (20 psi)	N-CEE63K6EOT/KOB	X731-063EOT-000N00
EO	Spring U - 2.9 bar (42 psi)	N-CEE63K6EOU/KOB	X731-063EOU-000N00
EX	Spring U - 2.9 bar (42 psi)	N-CEE63K6EXU/KOB	X731-063EXU-000N00
FO	Spring S - 0.7 bar (10 psi)	N-CEE63K6FOS/KOB	X731-063FOS-000N00
FO	Spring T - 1.4 bar (20 psi)	N-CEE63K6FOT/KOB	X731-063FOT-000N00
FO	Spring U - 2.9 bar (42 psi)	N-CEE63K6FOU/KOB	X731-063FOU-000N00
FX	Spring U - 2.9 bar (42 psi)	N-CEE63K6FXU/KOB	X731-063FXU-000N00

SIZE 63 - DIRECTIONAL CONTROL

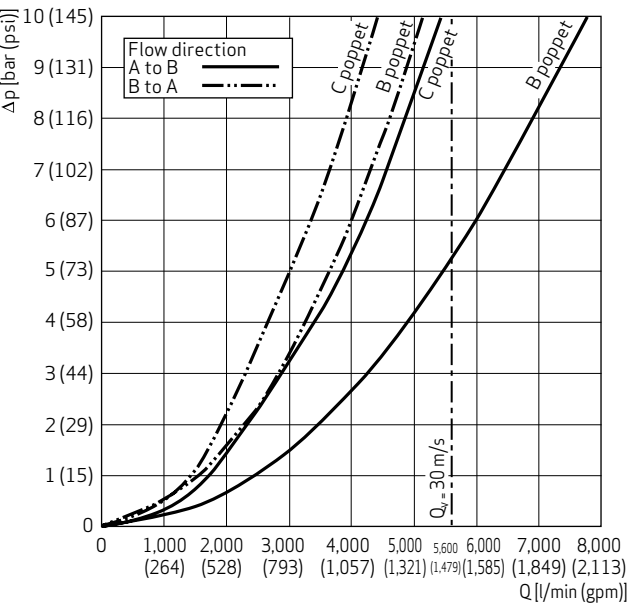
Hydraulic Symbol



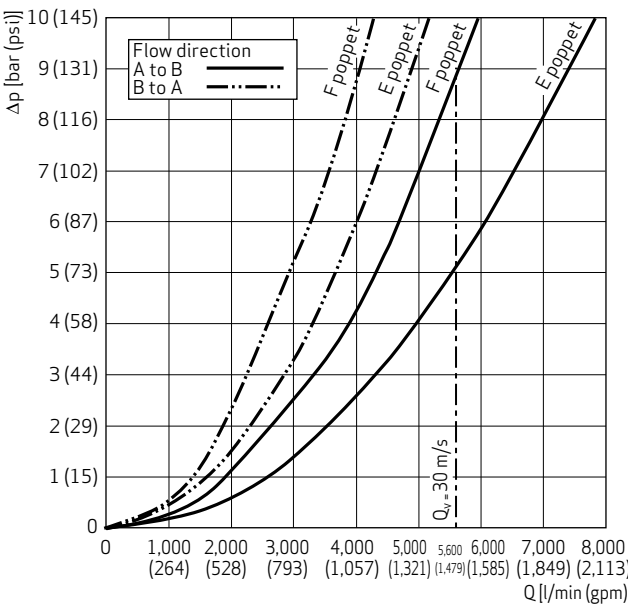
Valve Flow Diagram

Simulation conditions: Oil viscosity 32 mm²/s (cSt), oil temperature 40 °C (104 °F), port B drilled with d_{max} as per ISO 7368, valve fully opened

BO/BX, CO/CX poppet



EO/EX, FO/FX poppet



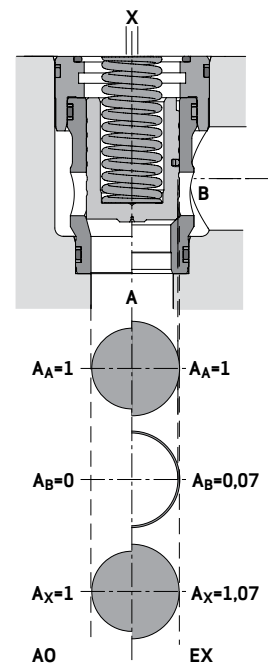
SIZE 63 - PRESSURE CONTROL

General Technical Data

Flow direction	A → B
Mounting pattern	ISO 7368-BF-12-2-A
Weight	6.9 kg (15.2 lb)
Orifice thread size (K99 poppet only)	M8

Specific Hydraulic Data

With poppet type	AO	EX
Maximum operating pressure port A, B, X ¹⁾	420 bar (6,000 psi)	
Pilot volume (area A _x)	123.7 cm ³ (7.54 in ³)	133.79 cm ³ (8.16 in ³)
Control panel		
Poppet stroke	28 mm (1.1 in)	
Surface A _A	4,418 mm ² (6.85 in ²)	4,465 mm ² (6.92 in ²)
Factor A _A	1	
Factor A _B	0	0.07
Factor A _x	1	1.07
Seal material/hydraulic fluid combination		
FKM	- Mineral oil based hydraulic fluids - HFD hydraulic fluids	
NBR	- Mineral oil based hydraulic fluids - HFB, HFC hydraulic fluids	
Temperature range of hydraulic fluids		
Valve with FKM seals	-20 to +80 °C (-4 to 176 °F)	
Valve with NBR seals	-30 to +80 °C (-22 to 176 °F)	



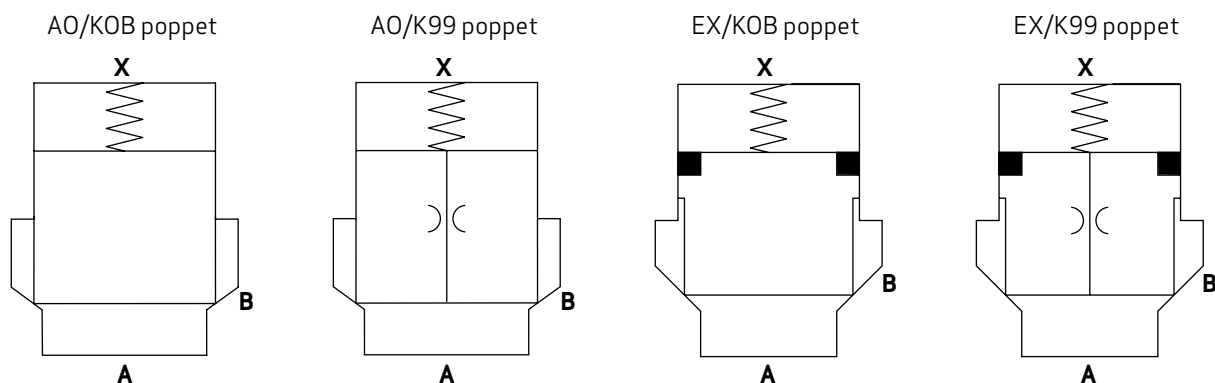
1) Please regard the maximum operating pressure of control cover and pilot valve.

Preferred Slip-in Cartridge Valve Types

With poppet type	Spring strength	Product code	Part number
A0/KOB	Spring S - 0.7 bar (10 psi)	N-CEE63K6AOS/KOB	X731-063AOS-000N00
A0/KOB	Spring T - 1.5 bar (22 psi)	N-CEE63K6AOT/KOB	X731-063AOT-000N00
A0/KOB	Spring U - 2.9 bar (42 psi)	N-CEE63K6AOU/KOB	X731-063AOU-000N00
A0/K99	Spring S - 0.7 bar (10 psi)	N-CEE63K6AOS/K99	X731-063AOS-001N00
A0/K99	Spring T - 1.5 bar (22 psi)	N-CEE63K6AOT/K99	X731-063AOT-001N00
A0/K99	Spring U - 2.9 bar (42 psi)	N-CEE63K6AOU/K99	X731-063AOU-001N00
EX/KOB	Spring U - 2.9 bar (42 psi)	N-CEE63K6EXU/KOB	X731-063EXU-000N00
EX/K99	Spring U - 2.9 bar (42 psi)	N-CEE63K6EXU/K99	X731-063EXU-001N00

SIZE 63 - PRESSURE CONTROL

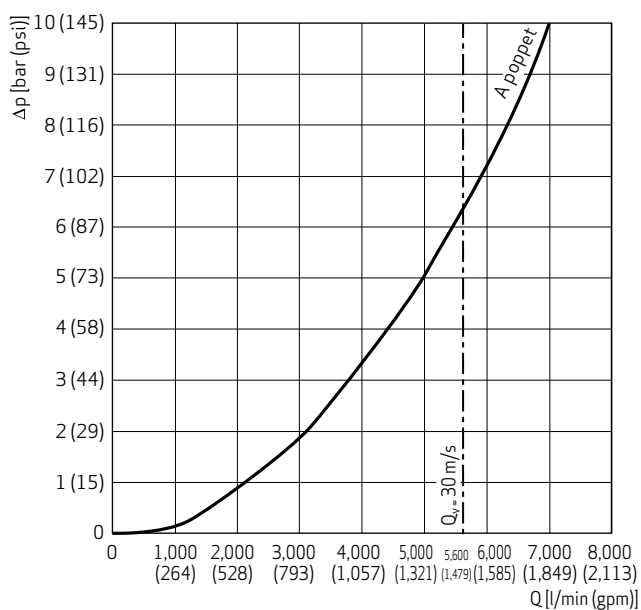
Hydraulic Symbol



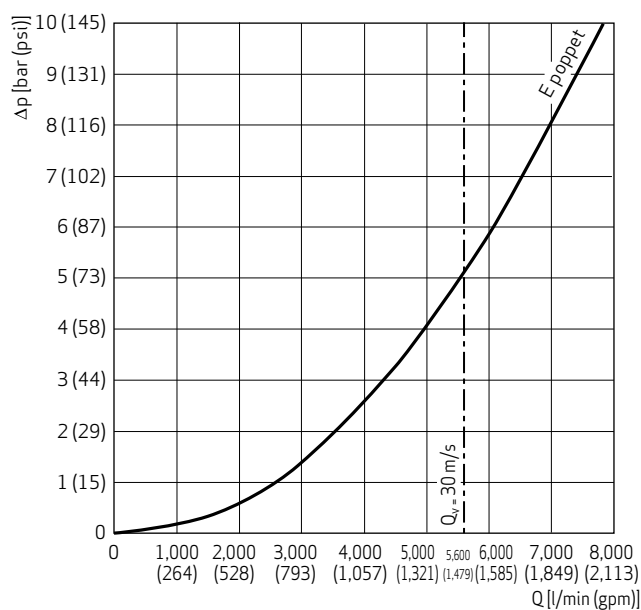
Valve Flow Diagram

Simulation conditions: Oil viscosity 32 mm²/s (cSt), oil temperature 40 °C (104°F), flow A→B, port B drilled with d_{4_max} as per ISO 7368, valve fully opened

AO poppets



EX poppet



Notes

- Characteristic curves for pressure relief functions are included in the relevant catalog.
- Cartridges with AO poppets should only be used for pressure control. For a pressure relief function it is important that the pressure in port X not greatly exceeds the pressure in port A, otherwise damage to the valve seat may occur.

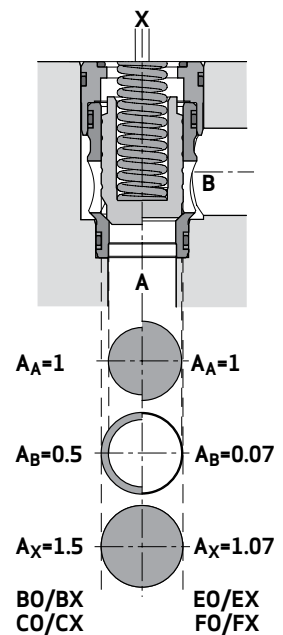
SIZE 80 - DIRECTIONAL CONTROL

General Technical Data

Flow direction	A ↔ B
Mounting pattern	ISO 7368-BG-13-2-A
Weight	12 kg (26.5 lb)

Specific Hydraulic Data

With poppet type	BO/BX	CO/CX	EO/EX	FO/FX
Maximum operating pressure port A, B, X ¹⁾	420 bar (6,000 psi)			
Pilot volume (area A _x)	203.58 cm ³ (12.42 in ³)			
Control panel				
Poppet stroke	32 mm (1.26 in)			
Surface A _A	4,243 mm ² (6.58 in ²)		5,945 mm ² (9.21 in ²)	
Factor A _A	1			
Factor A _B	0.5		0.07	
Factor A _x	1.5		1.07	
Seal material/hydraulic fluid combination				
FKM	- Mineral oil based hydraulic fluids - HFD hydraulic fluids			
NBR	- Mineral oil based hydraulic fluids - HFB, HFC hydraulic fluids			
Temperature range of hydraulic fluids				
Valve with FKM seals	-20 to +80 °C (-4 to 176 °F)			
Valve with NBR seals	-30 to +80 °C (-22 to 176 °F)			



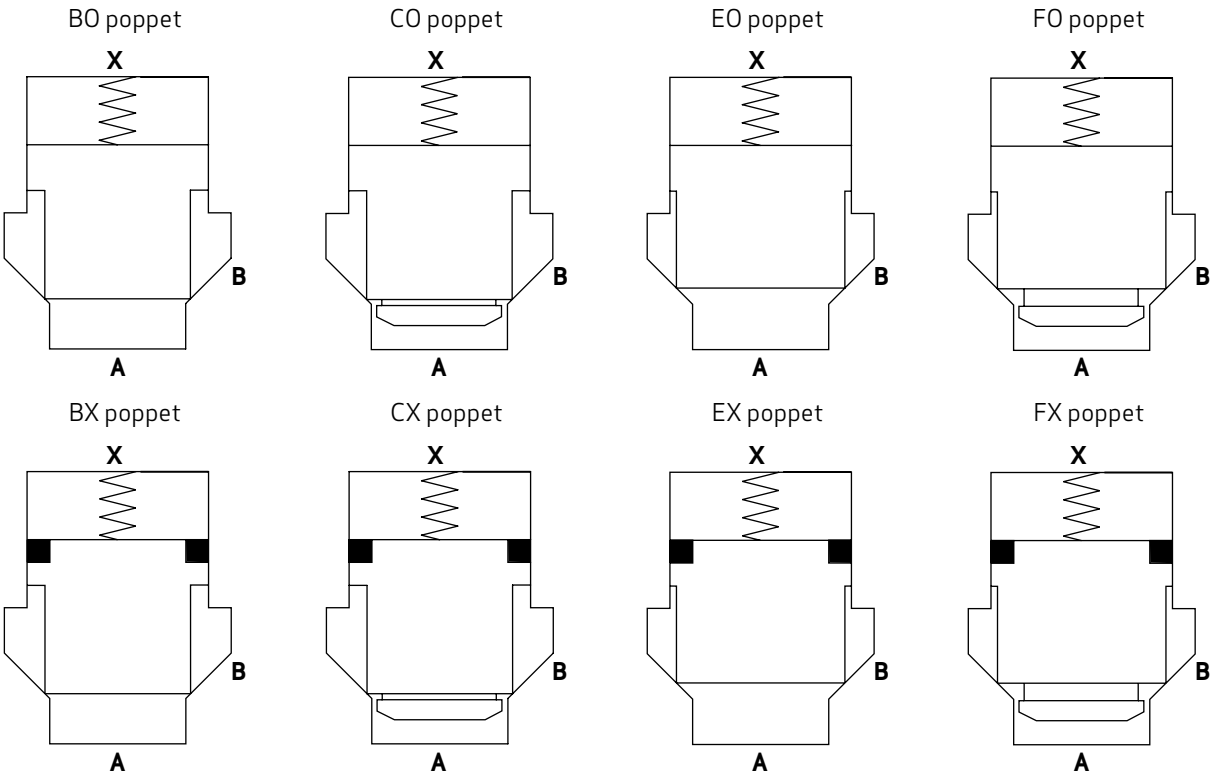
1) Please regard the maximum operating pressure of control cover and pilot valve.

Preferred Slip-in Cartridge Valve Types

With poppet type	Spring strength	Product code	Part number
BO	Spring S - 1.0 bar (15 psi)	N-CEE80K6BOS/KOB	X731-080BOS-000N00
BO	Spring T - 2.0 bar (29 psi)	N-CEE80K6BOT/KOB	X731-080BOT-000N00
BO	Spring U - 4.0 bar (58 psi)	N-CEE80K6BOU/KOB	X731-080BOU-000N00
BX	Spring U - 4.0 bar (58 psi)	N-CEE80K6BXU/KOB	X731-080BXU-000N00
CO	Spring S - 1.0 bar (15 psi)	N-CEE80K6COS/KOB	X731-080COS-000N00
CO	Spring T - 2.0 bar (29 psi)	N-CEE80K6COT/KOB	X731-080COT-000N00
CO	Spring U - 4.0 bar (58 psi)	N-CEE80K6COU/KOB	X731-080COU-000N00
CX	Spring U - 4.0 bar (58 psi)	N-CEE80K6CXU/KOB	X731-080CXU-000N00
EO	Spring S - 0.7 bar (10 psi)	N-CEE80K6EOS/KOB	X731-080EOS-000N00
EO	Spring T - 1.4 bar (20 psi)	N-CEE80K6EOT/KOB	X731-080EOT-000N00
EO	Spring U - 2.8 bar (41 psi)	N-CEE80K6EOU/KOB	X731-080EOU-000N00
EX	Spring U - 2.8 bar (41 psi)	N-CEE80K6EXU/KOB	X731-080EXU-000N00
FO	Spring S - 0.7 bar (10 psi)	N-CEE80K6FOS/KOB	X731-080FOS-000N00
FO	Spring T - 1.4 bar (20 psi)	N-CEE80K6FOT/KOB	X731-080FOT-000N00
FO	Spring U - 2.8 bar (41 psi)	N-CEE80K6FOU/KOB	X731-080FOU-000N00
FX	Spring U - 2.8 bar (41 psi)	N-CEE80K6FXU/KOB	X731-080FXU-000N00

SIZE 80 - DIRECTIONAL CONTROL

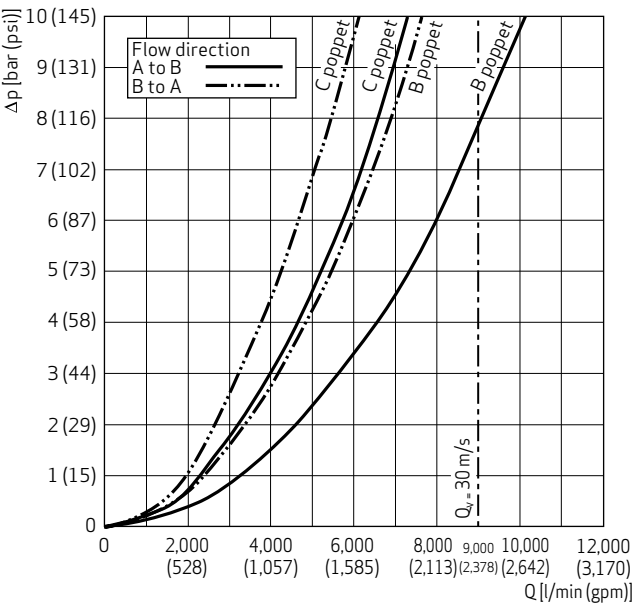
Hydraulic Symbol



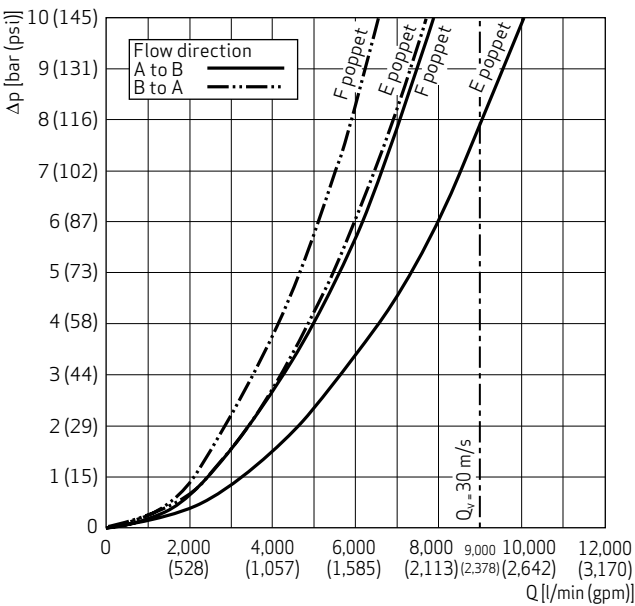
Valve Flow Diagram

Simulation conditions: Oil viscosity 32 mm²/s (cSt), oil temperature 40 °C (104 °F), port B drilled with d_{max} as per ISO 7368, valve fully opened

BO/BX, CO/CX poppet



EO/EX, FO/FX poppet



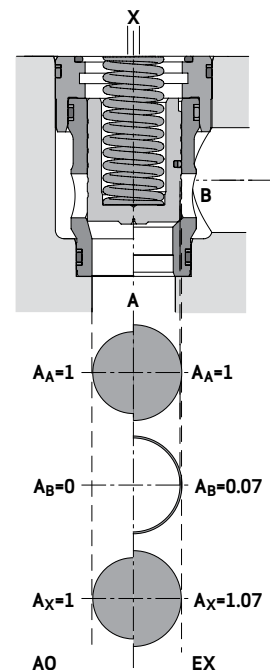
SIZE 80 - PRESSURE CONTROL

General Technical Data

Flow direction	A → B
Mounting pattern	ISO 7368-BG-13-2-A
Weight	12 kg
Orifice thread size (K99 poppet only)	M8

Specific Hydraulic Data

With poppet type	AO	EX
Maximum operating pressure port A, B, X ¹⁾	420 bar (6,000 psi)	
Pilot volume (area A _x)	190.23 cm ³ (11.60 in ³)	203.58 cm ³ (12.42 in ³)
Control panel		
Poppet stroke	32 mm (1.26 in)	
Surface A _A	5,945 mm ² (9.21 in ²)	
Factor A _A	1	
Factor A _B	0	0.07
Factor A _X	1	1.07
Seal material/hydraulic fluid combination		
FKM	- Mineral oil based hydraulic fluids - HFD hydraulic fluids	
NBR	- Mineral oil based hydraulic fluids - HFB, HFC hydraulic fluids	
Temperature range of hydraulic fluids		
Valve with FKM seals	-20 to +80 °C (-4 to 176 °F)	
Valve with NBR seals	-30 to +80 °C (-22 to 176 °F)	



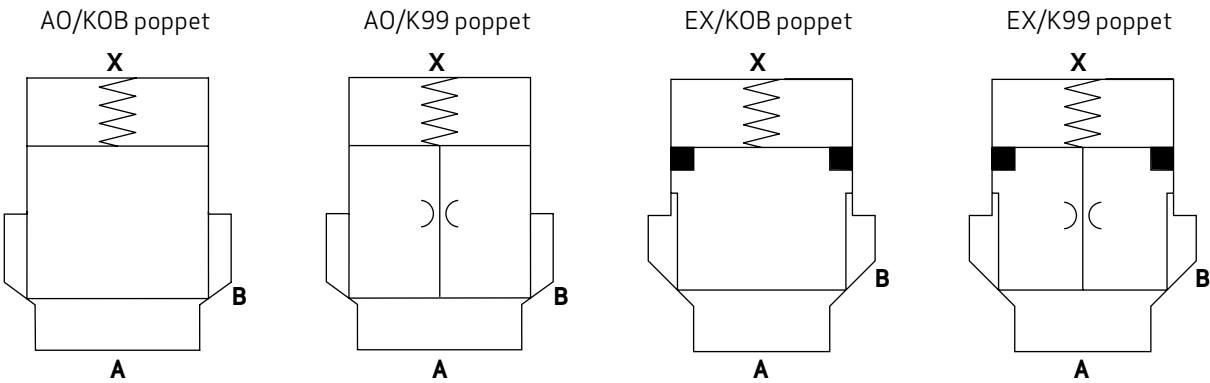
1) Please regard the maximum operating pressure of control cover and pilot valve.

Preferred Slip-in Cartridge Valve Types

With poppet type	Spring strength	Product code	Part number
AO/KOB	Spring S - 0.7 bar (10 psi)	N-CEE80K6AOS/KOB	X731-080AOS-000N00
AO/KOB	Spring T - 1.4 bar (20 psi)	N-CEE80K6AOT/KOB	X731-080AOT-000N00
AO/KOB	Spring U - 2.8 bar (41 psi)	N-CEE80K6AOU/KOB	X731-080AOU-000N00
AO/K99	Spring S - 0.7 bar (10 psi)	N-CEE80K6AOS/K99	X731-080AOS-001N00
AO/K99	Spring T - 1.4 bar (20 psi)	N-CEE80K6AOT/K99	X731-080AOT-001N00
AO/K99	Spring U - 2.8 bar (41 psi)	N-CEE80K6AOU/K99	X731-080AOU-001N00
EX/KOB	Spring U - 2.8 bar (41 psi)	N-CEE80K6EXU/KOB	X731-080EXU-000N00
EX/K99	Spring U - 2.8 bar (41 psi)	N-CEE80K6EXU/K99	X731-080EXU-001N00

SIZE 80 - PRESSURE CONTROL

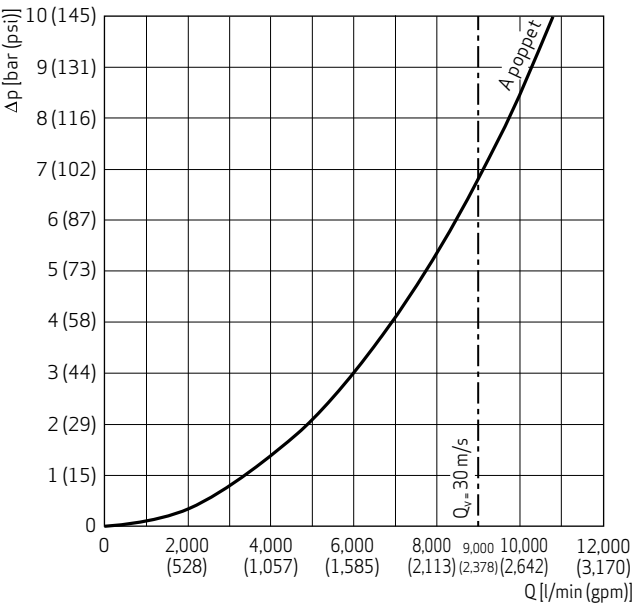
Hydraulic Symbol



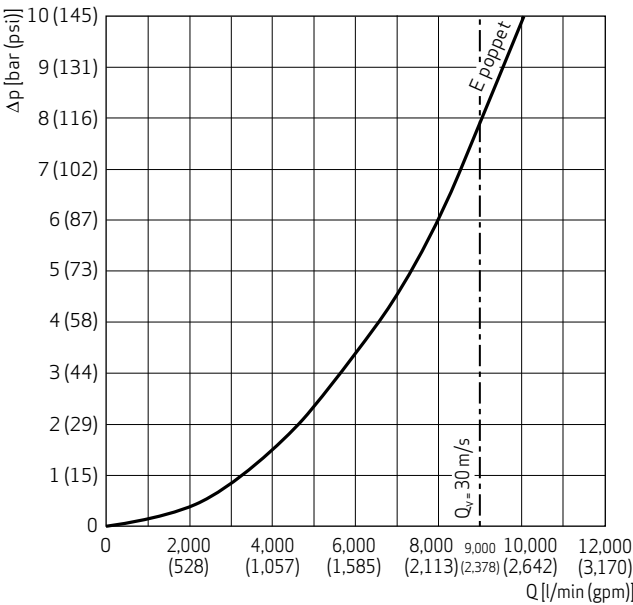
Valve Flow Diagram

Simulation conditions: Oil viscosity 32 mm²/s (cSt), oil temperature 40 °C (104 °F), flow A→B, port B drilled with d4_{max} as per ISO 7368, valve fully opened

AO poppets



EX poppet



Notes

- Characteristic curves for pressure relief functions are included in the relevant catalog.
- Cartridges with AO poppets should only be used for pressure control. For a pressure relief function it is important that the pressure in port X not greatly exceeds the pressure in port A, otherwise damage to the valve seat may occur.

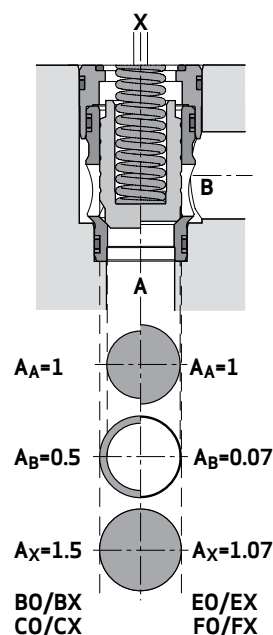
SIZE 100 - DIRECTIONAL CONTROL

General Technical Data

Flow direction	A ↔ B
Mounting pattern	ISO 7368-BH-14-2-A
Weight	24 kg (52.9 lb)

Specific Hydraulic Data

With poppet type	BO/BX	CO/CX	EO/EX	FO/FX
Maximum operating pressure port A, B, X ¹⁾	420 bar (6,000 psi)			
Pilot volume (area A _x)	444.21 cm ³ (27.10 in ³)			
Control panel				
Poppet stroke	38 mm (1.5 in)			
Surface A _A	7,791 mm ² (12.08 in ²)		10,936 mm ² (16.95 in ²)	
Factor A _A	1			
Factor A _B	0.5		0.07	
Factor A _x	1.5		1.07	
Seal material/hydraulic fluid combination				
FKM	- Mineral oil based hydraulic fluids - HFD hydraulic fluids			
NBR	- Mineral oil based hydraulic fluids - HFB, HFC hydraulic fluids			
Temperature range of hydraulic fluids				
Valve with FKM seals	-20 to +80 °C (-4 to 176 °F)			
Valve with NBR seals	-30 to +80 °C (-22 to 176 °F)			



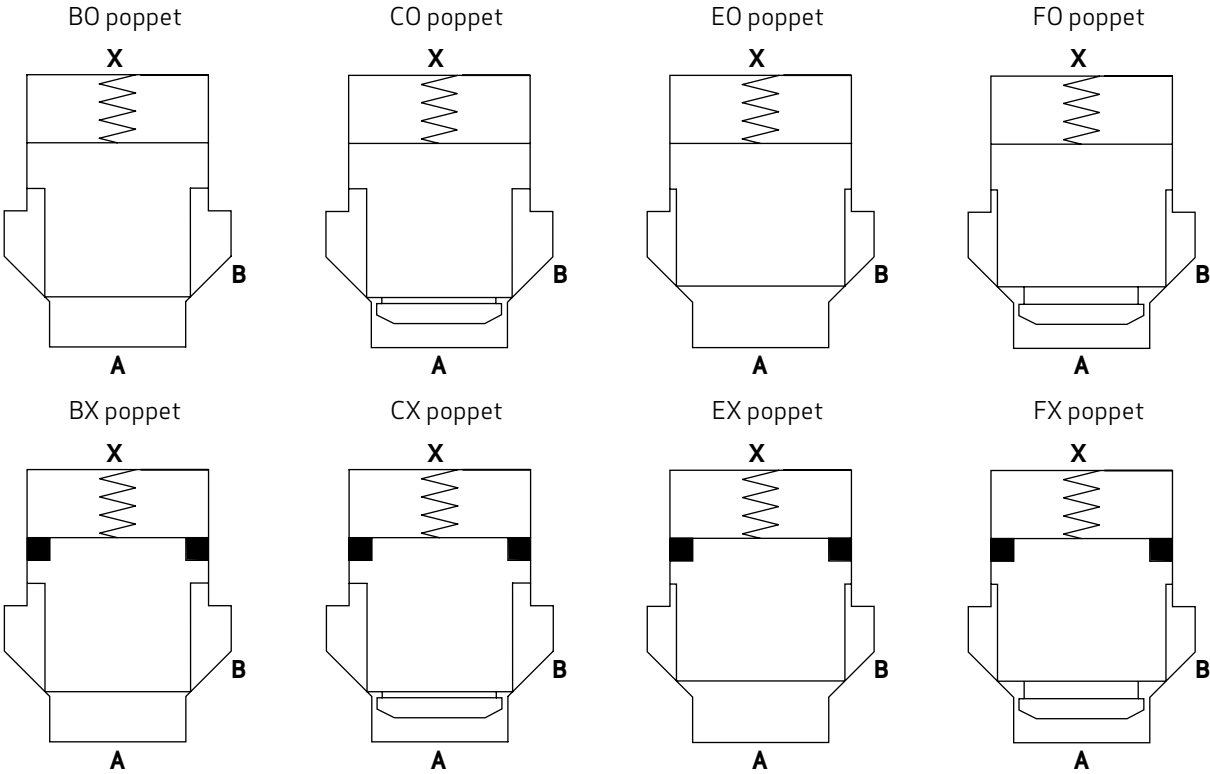
1) Please regard the maximum operating pressure of control cover and pilot valve.

Preferred Slip-in Cartridge Valve Types

With poppet type	Spring strength	Product code	Part number
B0	Spring S - 1.0 bar (15 psi)	N-CEE100K6BOS/KOB	X731-100BOS-000N00
B0	Spring T - 2.0 bar (29 psi)	N-CEE100K6BOT/KOB	X731-100BOT-000N00
B0	Spring U - 4.0 bar (58 psi)	N-CEE100K6BOU/KOB	X731-100BOU-000N00
BX	Spring U - 4.0 bar (58 psi)	N-CEE100K6BXU/KOB	X731-100BXU-000N00
C0	Spring S - 1.0 bar (15 psi)	N-CEE100K6COS/KOB	X731-100COS-000N00
C0	Spring T - 2.0 bar (29 psi)	N-CEE100K6COT/KOB	X731-100COT-000N00
C0	Spring U - 4.0 bar (58 psi)	N-CEE100K6COU/KOB	X731-100COU-000N00
CX	Spring U - 4.0 bar (58 psi)	N-CEE100K6CXU/KOB	X731-100CXU-000N00
E0	Spring S - 0.7 bar (10 psi)	N-CEE100K6EOS/KOB	X731-100EOS-000N00
E0	Spring T - 1.4 bar (20 psi)	N-CEE100K6EOT/KOB	X731-100EOT-000N00
E0	Spring U - 2.8 bar (41 psi)	N-CEE100K6EOU/KOB	X731-100EOU-000N00
EX	Spring U - 2.8 bar (41 psi)	N-CEE100K6EXU/KOB	X731-100EXU-000N00
F0	Spring S - 0.7 bar (10 psi)	N-CEE100K6FOS/KOB	X731-100FOS-000N00
F0	Spring T - 1.4 bar (20 psi)	N-CEE100K6FOT/KOB	X731-100FOT-000N00
F0	Spring U - 2.8 bar (41 psi)	N-CEE100K6FOU/KOB	X731-100FOU-000N00
FX	Spring U - 2.8 bar (41 psi)	N-CEE100K6FXU/KOB	X731-100FXU-000N00

SIZE 100 - DIRECTIONAL CONTROL

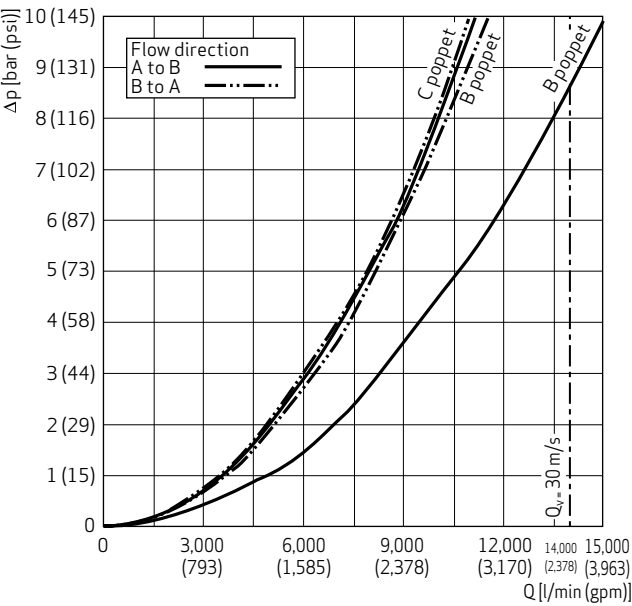
Hydraulic Symbol



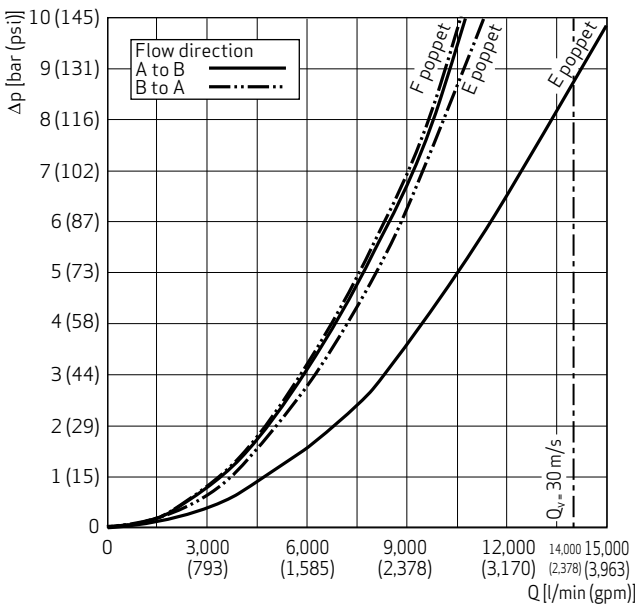
Valve Flow Diagram

Simulation conditions: Oil viscosity 32 mm²/s (cSt), oil temperature 40 °C (104 °F), port B drilled with d_{4 max} as per ISO 7368, valve fully opened

BO/BX, CO/CX poppet



EO/EX, FO/FX poppet



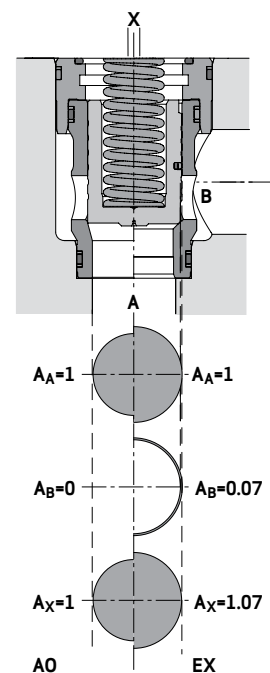
SIZE 100 - PRESSURE CONTROL

General Technical Data

Flow direction	A → B
Mounting pattern	ISO 7368-BH-14-2-A
Weight	24 kg (52.9 lb)
Orifice thread size (K99 poppet only)	M8

Specific Hydraulic Data

With poppet type	AO	EX
Maximum operating pressure port A, B, X ¹⁾	420 bar (6,000 psi)	
Pilot volume (area A _x)	393.69 cm ³ (24.02 in ³)	444.21 cm ³ (27.10 in ³)
Control panel		
Poppet stroke	36 mm (1.42 in)	38 mm (1.5 in)
Surface A _A	10,936 mm ² (16.95 in ²)	
Factor A _A	1	
Factor A _B	0	0.07
Factor A _x	1	1.07
Seal material/hydraulic fluid combination		
FKM	- Mineral oil based hydraulic fluids - HFD hydraulic fluids	
NBR	- Mineral oil based hydraulic fluids - HFB, HFC hydraulic fluids	
Temperature range of hydraulic fluids		
Valve with FKM seals	-20 to +80 °C (-4 to 176 °F)	
Valve with NBR seals	-30 to +80 °C (-22 to 176 °F)	



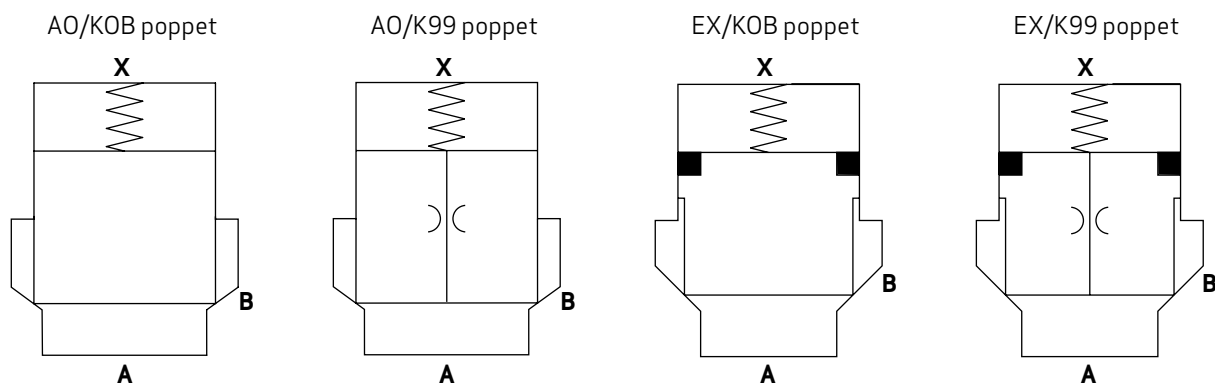
1) Please regard the maximum operating pressure of control cover and pilot valve.

Preferred Slip-in Cartridge Valve Types

With poppet type	Spring strength	Product code	Part number
AO/KOB	Spring S - 0.7 bar (10 psi)	N-CEE100K6AOS/KOB	X731-100AOS-000N00
AO/KOB	Spring T - 1.4 bar (20 psi)	N-CEE100K6AOT/KOB	X731-100AOT-000N00
AO/KOB	Spring U - 2.8 bar (41 psi)	N-CEE100K6AOU/KOB	X731-100AOU-000N00
AO/K99	Spring S - 0.7 bar (10 psi)	N-CEE100K6AOS/K99	X731-100AOS-001N00
AO/K99	Spring T - 1.4 bar (20 psi)	N-CEE100K6AOT/K99	X731-100AOT-001N00
AO/K99	Spring U - 2.8 bar (41 psi)	N-CEE100K6AOU/K99	X731-100AOU-001N00
EX/KOB	Spring U - 2.8 bar (41 psi)	N-CEE100K6EXU/KOB	X731-100EXU-000N00
EX/K99	Spring U - 2.8 bar (41 psi)	N-CEE100K6EXU/K99	X731-100EXU-001N00

SIZE 100 - PRESSURE CONTROL

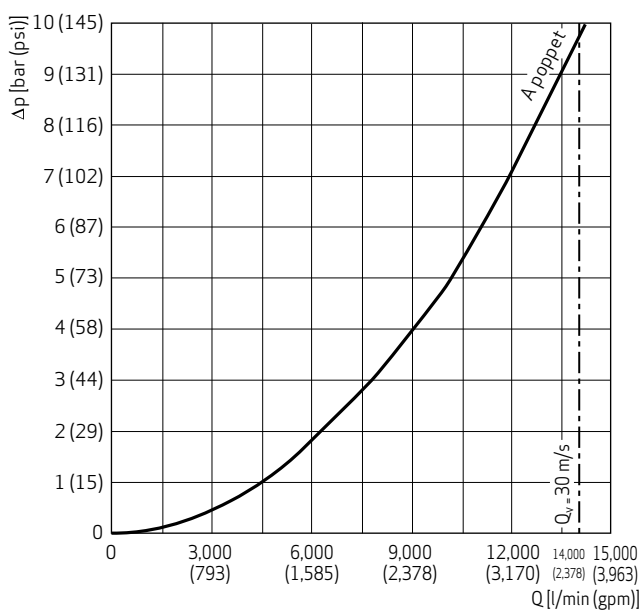
Hydraulic Symbol



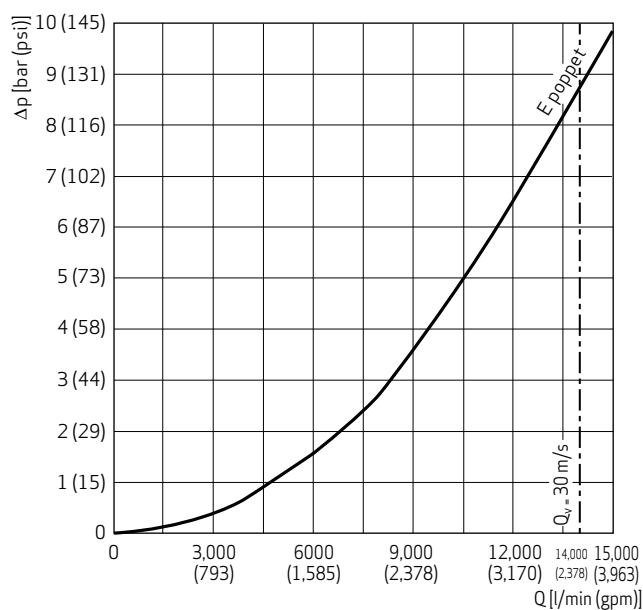
Valve Flow Diagram

Simulation conditions: Oil viscosity 32 mm²/s (cSt), oil temperature 40 °C (104 °F), flow A→B, port B drilled with d4_{max} as per ISO 7368, valve fully opened

AO poppets



EX poppet



Notes

- Characteristic curves for pressure relief functions are included in the relevant catalog.
- Cartridges with AO poppets should only be used for pressure control. For a pressure relief function it is important that the pressure in port X not greatly exceeds the pressure in port A, otherwise damage to the valve seat may occur.

In Accordance with ISO 7386:1989-08

The drawing shows a shaft-hub assembly with the following details:

- Shaft:**
 - Keyway: $\square$ W B
 - Key: $\square$ A
 - Surface finish: $R_{max} 10^{(1)}$
 - Dimensions: $\varnothing d1$, $\varnothing d2$, $\varnothing d3$, $\varnothing d4$
 - Distances: $t1$, $t2$, $t3$, $t4$, $t5$, $t6$, $t7$, $t8$, $t9$
 - Angles: 15°
 - Surface finish: $R_{max} 10^{(1)}$
- Hub:**
 - Surface finish: $R_{max} 10^{(1)}$
 - Dimensions: $\varnothing d1$, $\varnothing d2$, $\varnothing d3$, $\varnothing d4$
 - Distances: $t1$, $t2$, $t3$, $t4$, $t5$, $t6$, $t7$, $t8$, $t9$
 - Angles: 15°
 - Surface finish: $R_{max} 10^{(1)}$
- Surface Finish Requirements:**
 - Required surface finish of the mating surface: $R_{max} 4$
 - Surface finish: $\square$ 0,01/100

- ### Bolt and Port Pattern

Technical drawing of a square flange with dimensions and labels:

- Overall Dimensions:**
 - $m1$: Distance from center to hole center (horizontal).
 - $m2$: Distance from center to hole center (vertical).
 - $m3$: Distance from center to hole center (vertical, offset).
 - $m4$: Distance from center to hole center (horizontal, offset).
 - $m5$: Distance from center to hole center (horizontal, offset).
 - $b1$: Total width of the flange.
 - $b2$: Total height of the flange.
- Labels and Features:**
 - $\emptyset d7 \times t10$: Hole diameter and thickness.
 - $d6 \times t6$: Hole diameter and thickness.
 - $d8 \times 10 \text{ min.}$: Hole diameter and thickness.
 - $d5 \text{ max.}$: Hole diameter and thickness.
 - $Z1$, $Z2$: Hole locations.
 - X , Y : Hole locations.

INSTALLATION DIMENSIONS

In Accordance with ISO 7386:1989-08

ND	16 mm	25 mm	32 mm	40 mm	50 mm	63 mm
b1	65 (2.56)	85 (3.35)	102 (4.02)	125 (4.92)	140 (5.51)	200 (7.87)
b2	65 (2.56)	85 (3.35)	102 (4.02)	125 (4.92)	140 (5.51)	180 (7.09)
d1^{H7 1)}	32 (1.26)	45 (1.77)	60 (2.36)	75 (2.95)	90 (3.54)	120 (4.72)
d2^{H7 1)}	35 (1.38)	34 (1.34)	45 (1.77)	55 (2.17)	68 (2.68)	90 (3.54)
d3	16 (0.63)	25 (0.98)	32 (1.26)	40 (1.57)	50 (1.97)	63 (2.48)
d4	16 (0.63)	25 (0.98)	32 (1.26)	40 (1.57)	50 (1.97)	63 (2.48)
d4_{max.}¹⁾	25 (0.98)	32 (1.26)	40 (1.57)	50 (1.97)	63 (2.48)	80 (3.15)
d5_{max.}	4 (0.16)	6 (0.24)	8 (0.31)	10 (0.39)	10 (0.39)	12 (0.47)
d6	M8	M12	M16	M20	M20	M30
d7	6.8 (0.27)	10.2 (0.4)	14 (0.55)	17.5 (0.69)	17.5 (0.69)	26.5 (1.04)
d8^{H13}	4 (0.16)	6 (0.24)	6 (0.24)	6 (0.24)	8 (0.31)	8 (0.31)
m1^{±0.2}	46 (1.81)	58 (2.28)	70 (2.76)	85 (3.35)	100 (3.94)	125 (4.92)
m2^{±0.2}	25 (0.98)	33 (1.3)	41 (1.61)	50 (1.97)	58 (2.28)	75 (2.95)
m3^{±0.2}	23 (0.91)	29 (1.14)	35 (1.38)	42.5 (1.67)	50 (1.97)	62.5 (2.46)
m4^{±0.2}	10.5 (0.41)	16 (0.63)	17 (0.67)	23 (0.91)	30 (1.18)	38 (1.5)
m5^{±0.2}	25 (0.98)	33 (1.3)	41 (1.61)	50 (1.97)	58 (2.28)	75 (2.95)
t1^{±0.1}	43 (1.69)	58 (2.28)	70 (2.76)	87 (3.43)	100 (3.94)	130 (5.12)
t2^{±0.1}	56 (2.2)	72 (2.83)	85 (3.35)	105 (4.13)	122 (4.8)	155 (6.1)
t3	11 (0.43)	12 (0.47)	13 (0.51)	15 (0.59)	17 (0.67)	20 (0.79)
t4	34 (1.34)	44 (1.73)	52 (2.05)	64 (2.52)	72 (2.83)	95 (3.74)
t4 bei d4_{max.}¹⁾	29.5 (1.16)	40.5 (1.59)	48 (1.89)	59 (2.32)	65.5 (2.58)	86.5 (3.41)
t5	20 (0.79)	30 (1.18)	30 (1.18)	30 (1.18)	35 (1.38)	40 (1.57)
t6	14 (0.55)	20 (0.79)	26 (1.02)	33 (1.3)	33 (1.3)	50 (1.97)
t7	2 (0.08)	2.5 (0.1)	2.5 (0.1)	3 (0.12)	4 (0.16)	4 (0.16)
t8	2 (0.08)	2.5 (0.1)	2.5 (0.1)	3 (0.12)	3 (0.12)	4 (0.16)
t9	0.5 (0.02)	1.0 (0.04)	1.5 (0.06)	2.5 (0.1)	2.5 (0.1)	3 (0.12)
t10	17 (0.67)	24 (0.94)	31 (1.22)	38 (1.5)	38 (1.5)	56 (2.2)
U	0.03 (0)	0.03 (0)	0.03 (0)	0.05 (0)	0.05 (0)	0.05 (0)
W	0.05 (0)	0.05 (0)	0.1 (0)	0.1 (0)	0.1 (0)	0.2 (0.01)

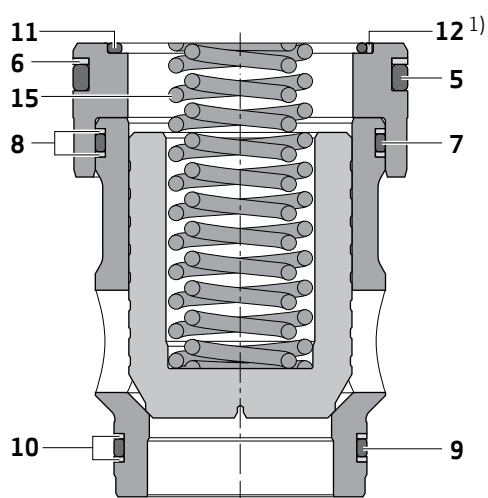
ND	80 mm	100 mm
b_{max.}	250 (9.84)	300 (11.81)
d1^{H7 1)}	145 (5.71)	180 (7.09)
d2^{H7 1)}	110 (4.33)	135 (5.31)
d3	80 (3.15)	100 (3.94)
d4	80 (3.15)	100 (3.94)
d4_{max.}¹⁾	100 (3.94)	125 (4.92)
d5_{max.}	16 (0.63)	20 (0.79)
d6	M24	M30
d7	21 (0.83)	26.5 (1.04)
d8^{H13}	10 (0.39)	10 (0.39)
m^{±0.3}	200 (7.87)	245 (9.65)
t1	175 (6.89)	210 (8.27)
t2^{±0.2}	205 (8.07)	245 (9.65)
t3	25 (0.98)	29 (1.14)
t4	130 (5.12)	155 (6.1)
t4 bei d4_{max.}¹⁾	120 (4.72)	142.5 (5.61)
t5	40 (1.57)	50 (1.97)
t6	39 (1.54)	50 (1.97)
t7	5 (0.2)	5 (0.2)
t8	5 (0.2)	5 (0.2)
t9	3 (0.12)	5 (0.2)
t10	45 (1.77)	56 (2.2)
U	0.05 (0)	0.05 (0)
W	0.2 (0.01)	0.2 (0.01)

1) Recommendation deviates from the standard

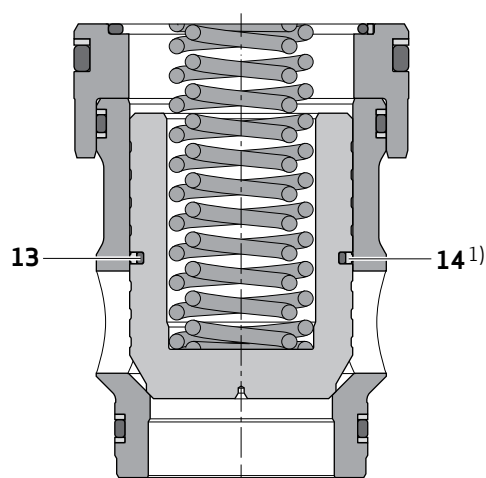
Note: Dimensions in mm (in)

ACCESSORIES AND SPARE PARTS

Size Specific Accessories and Spare Parts



1) Valid for sizes 50 to 100



1) Appropriate assembly tools must be used to fit the shaft seal.

Size 16

Position	Part designation	Description	Part number
	Disassembly tool	X731-016	XEB19149-016-00
5	O-ring - 70 Shore	Ø 28.3x1.78 mm	
7	O-ring - 70 Shore	Ø 23.52x1.78 mm	
9	O-ring - 70 Shore	Ø 21.95x1.78 mm	
11	O-ring - 90 Shore	Ø 18.72x2.62 mm	
5, 6, 7, 8, 9, 10, 11	Seal kit NBR	N-CEE16K6_O_	X731-016_O_D000N00
5, 6, 7, 8, 9, 10, 11	Seal kit FKM	V-CEE16K6_O_	X731-016_O_D000V00
5, 6, 7, 8, 9, 10, 11, 13, 14	Seal kit NBR	N-CEE16K6_X_	X731-016_X_D000N00
5, 6, 7, 8, 9, 10, 11, 13, 14	Seal kit FKM	V-CEE16K6_X_	X731-016_X_D000V00
15	Spring R	CEE16K6	XEF10513
15	Spring S	CEE16K6	XEF10514
15	Spring T	CEE16K6	XEF10515
15	Spring U	CEE16K6	XEF10516

ACCESSORIES AND SPARE PARTS

Size 25

Position	Part designation	Description	Part number
	Disassembly tool	X731-025	XEB19149-025-00
5	O-ring - 70 Shore	Ø 39.34x2.62 mm	
7	O-ring - 70 Shore	Ø 34.59x2.62 mm	
9	O-ring - 70 Shore	Ø 28.24x2.62 mm	
11	O-ring - 90 Shore	Ø 28.24x2.62 mm	
5, 6, 7, 8, 9, 10, 11	Seal kit NBR	N-CEE25K6_O_	X731-025_O_D000N00
5, 6, 7, 8, 9, 10, 11	Seal kit FKM	V-CEE25K6_O_	X731-025_O_D000V00
5, 6, 7, 8, 9, 10, 11, 13, 14	Seal kit NBR	N-CEE25K6_X_	X731-025_X_D000N00
5, 6, 7, 8, 9, 10, 11, 13, 14	Seal kit FKM	V-CEE25K6_X_	X731-025_X_D000V00
15	Spring R	CEE25K6	XE10502
15	Spring S	CEE25K6	XE10503
15	Spring T	CEE25K6	XE10504
15	Spring U	CEE25K6	XE10505

Size 32

Position	Part designation	Description	Part number
	Disassembly tool	X731-032	XEB19149-032-00
5	O-ring - 70 Shore	Ø 53.57x3.53 mm	
7	O-ring - 70 Shore	Ø 44.04x3.53 mm	
9	O-ring - 70 Shore	Ø 39.34x2.62 mm	
11	O-ring - 90 Shore	Ø 40.87x3.53 mm	
5, 6, 7, 8, 9, 10, 11	Seal kit NBR	N-CEE32K6_O_	X731-032_O_D000N00
5, 6, 7, 8, 9, 10, 11	Seal kit FKM	V-CEE32K6_O_	X731-032_O_D000V00
5, 6, 7, 8, 9, 10, 11, 13, 14	Seal kit NBR	N-CEE32K6_X_	X731-032_X_D000N00
5, 6, 7, 8, 9, 10, 11, 13, 14	Seal kit FKM	V-CEE32K6_X_	X731-032_X_D000V00
15	Spring R	CEE32K6	XE10527
15	Spring S	CEE32K6	XE10528
15	Spring T	CEE32K6	XE10530
15	Spring U	CEE32K6	XE10531

ACCESSORIES AND SPARE PARTS

Size 40

Position	Part designation	Description	Part number
	Disassembly tool	X731-040	XEB19149-040-00
5	O-ring - 70 Shore	Ø 66.27x3.53 mm	
7	O-ring - 70 Shore	Ø 56.74x3.53 mm	
9	O-ring - 70 Shore	Ø 47.22x3.53 mm	
11	O-ring - 90 Shore	Ø 50.39x3.53 mm	
5, 6, 7, 8, 9, 10, 11	Seal kit NBR	N-CEE40K6_O_	X731-040_O_D000N00
5, 6, 7, 8, 9, 10, 11	Seal kit FKM	V-CEE40K6_O_	X731-040_O_D000V00
5, 6, 7, 8, 9, 10, 11, 13, 14	Seal kit NBR	N-CEE40K6_X_	X731-040_X_D000N00
5, 6, 7, 8, 9, 10, 11, 13, 14	Seal kit FKM	V-CEE40K6_X_	X731-040_X_D000V00
15	Spring R	CEE40K6	XE10536
15	Spring S	CEE40K6	XE10537
15	Spring package T	CEE40K6	XE10537 + XE10538
15	Spring package U	CEE40K6	XE10539 + XE10538

Size 50

Position	Part designation	Description	Part number
	Disassembly tool	X731-050	XEB19149-050-00
5	O-ring - 70 Shore	Ø 78.74x5.33 mm	
7	O-ring - 70 Shore	Ø 69.44x3.53 mm	
9	O-ring - 70 Shore	Ø 59.92x3.53 mm	
11	O-ring - 90 Shore	Ø 64.00x3.00 mm	
5, 6, 7, 8, 9, 10, 11, 12	Seal kit NBR	N-CEE50K6_O_	X731-050_O_D000N00
5, 6, 7, 8, 9, 10, 11, 12	Seal kit FKM	V-CEE50K6_O_	X731-050_O_D000V00
5, 6, 7, 8, 9, 10, 11, 12, 13, 14	Seal kit NBR	N-CEE50K6_X_	X731-050_X_D000N00
5, 6, 7, 8, 9, 10, 11, 12, 13, 14	Seal kit FKM	V-CEE50K6_X_	X731-050_X_D000V00
15	Spring R	CEE50K6	XE10508
15	Spring S	CEE50K6	XE10509
15	Spring T	CEE50K6	XE10510
15	Spring package U	CEE50K6	XE10510 + XE10511

ACCESSORIES AND SPARE PARTS

Size 63

Position	Part designation	Description	Part number
	Disassembly tool	X731-063	XEB19149-063-00
5	O-ring - 70 Shore	Ø 107.32x5.33 mm	
7	O-ring - 70 Shore	Ø 91.44x5.33 mm	
9	O-ring - 70 Shore	Ø 78.74x5.33 mm	
11	O-ring - 90 Shore	Ø 85.32x3.53 mm	
5, 6, 7, 8, 9, 10, 11, 12	Seal kit NBR	N-CEE63K6_O_	X731-063_O_D000N00
5, 6, 7, 8, 9, 10, 11, 12	Seal kit FKM	V-CEE63K6_O_	X731-063_O_D000V00
5, 6, 7, 8, 9, 10, 11, 12, 13, 14	Seal kit NBR	N-CEE63K6_X_	X731-063_X_D000N00
5, 6, 7, 8, 9, 10, 11, 12, 13, 14	Seal kit FKM	V-CEE63K6_X_	X731-063_X_D000V00
15	Spring R	CEE63K6	XE10519
15	Spring S	CEE63K6	XE10520
15	Spring T	CEE63K6	XE10521
15	Spring package U	CEE63K6	XE10521 + XE10522

Size 80

Position	Part designation	Description	Part number
	Disassembly tool	X731-080	XEB19149-080-00
5	O-ring - 70 Shore	Ø 129.54x7.00 mm	
7	O-ring - 70 Shore	Ø 107.32x5.33 mm	
9	O-ring - 70 Shore	Ø 97.79x5.33 mm	
11	O-ring - 90 Shore	Ø 97.79x5.33 mm	
5, 6, 7, 8, 9, 10, 11, 12	Seal kit NBR	N-CEE80K6_O_	X731-080_O_D000N00
5, 6, 7, 8, 9, 10, 11, 12	Seal kit FKM	V-CEE80K6_O_	X731-080_O_D000V00
5, 6, 7, 8, 9, 10, 11, 12, 13, 14	Seal kit NBR	N-CEE80K6_X_	X731-080_X_D000N00
5, 6, 7, 8, 9, 10, 11, 12, 13, 14	Seal kit FKM	V-CEE80K6_X_	X731-080_X_D000V00
15	Spring R	CEE80K6	XE10532
15	Spring S	CEE80K6	XE10533
15	Spring T	CEE80K6	XE10534
15	Spring package U	CEE80K6	XE10534 + XE10535

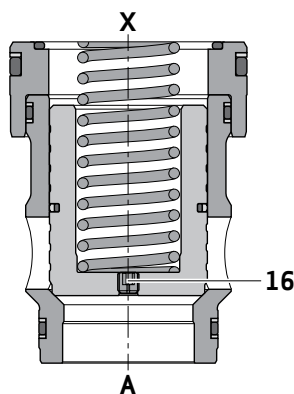
ACCESSORIES AND SPARE PARTS

Size 100

Position	Part designation	Description	Part number
	Disassembly tool	X731-100	XEB19149-100-00
5	O-ring - 70 Shore	Ø 164.47x7.00 mm	
7	O-ring - 70 Shore	Ø 145.42x7.00 mm	
9	O-ring - 70 Shore	Ø 120.02x7.00 mm	
11	O-ring - 90 Shore	Ø 129.54x7.00 mm	
5, 6, 7, 8, 9, 10, 11, 12	Seal kit NBR	N-CEE100K6_O_	X731-100_O_D000N00
5, 6, 7, 8, 9, 10, 11, 12	Seal kit FKM	V-CEE100K6_O_	X731-100_O_D000V00
5, 6, 7, 8, 9, 10, 11, 12, 13, 14	Seal kit NBR	N-CEE100K6_X_	X731-100_X_D000N00
5, 6, 7, 8, 9, 10, 11, 12, 13, 14	Seal kit FKM	V-CEE100K6_X_	X731-100_X_D000V00
15	Spring R	CEE100K6	XEF10523
15	Spring S	CEE100K6	XEF10524
15	Spring T	CEE100K6	XEF10525
15	Spring package U	CEE100K6	XEF10525 + XEF10526

ACCESSORIES AND SPARE PARTS

Plugs and Orifices for Poppet Installation



Notes:

- Tightening torques: M6 = 3.5 + 0.5 Nm (31 lbf in + 4 lbf in),
M8 = 10 + 0.8 Nm (89 lbf in + 7 lbf in)
- Secure orifices sufficiently (e.g. by using adhesive)

Size 16 to 40

Position	Part designation	Part number
16	Plug M6x6	CA37690-000
16	Orifice M6x6x0.6 mm	CA37690-060
16	Orifice M6x6x0.8 mm	CA37690-080
16	Orifice M6x6x1.0 mm	CA37690-100
16	Orifice M6x6x1.2 mm	CA37690-120
16	Orifice M6x6x1.5 mm	CA37690-150
16	Orifice M6x6x1.8 mm	CA37690-180

Size 50 to 100

Position	Part designation	Part number
16	Plug M8x8	X784-90800
16	Orifice M8x8x0.6 mm	X784-90806
16	Orifice M8x8x0.8 mm	X784-90808
16	Orifice M8x8x0.9 mm	X784-90809
16	Orifice M8x8x1.0 mm	X784-90810
16	Orifice M8x8x1.1 mm	X784-90811
16	Orifice M8x8x1.2 mm	X784-90812
16	Orifice M8x8x1.5 mm	X784-90815
16	Orifice M8x8x1.8 mm	X784-90818
16	Orifice M8x8x2.0 mm	X784-90820
16	Orifice M8x8x2.5 mm	X784-90825
16	Orifice M8x8x2.6 mm	X784-90826
16	Orifice M8x8x3.0 mm	X784-90830
16	Orifice M8x8x3.5 mm	X784-90835

REMOVAL TOOLS

Cartridge Sizes 16 to 50

The removal tools for the smaller valves consist of an expander and a striking weight.

Step A)

Remove the spring and poppet by hand.

Step B)

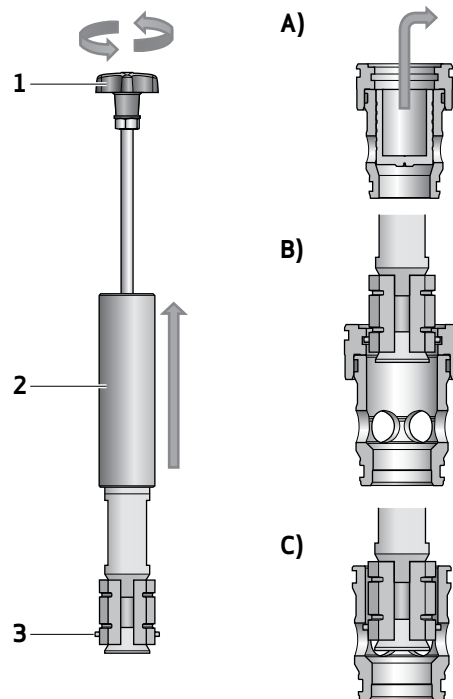
Insert the removal tool into the valve.

Use the grip (1) to expand the tool making sure that the pins (3) on the expander engage with the groove on the inside of the sleeve cap.

Use the striking weight (2) to remove the sleeve cap from the manifold.

Step C)

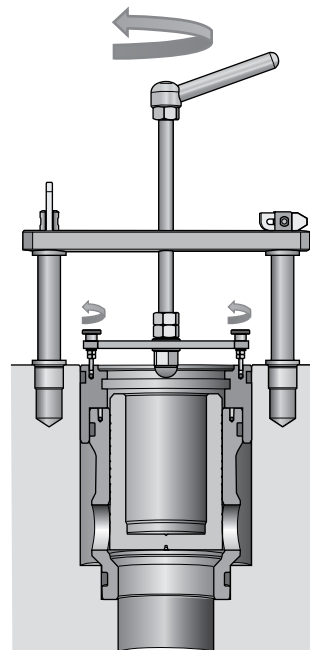
Using the same procedure, remove the valve sleeve from the manifold. Here it is important that the pins of the expander engage below the guide surface of the sleeve in the lateral holes. Otherwise damage may occur to the guide surface of the sleeve.



Cartridge Sizes 63 to 100

The removal tool for the larger valves consists of a bridge and a spindle.

Insert both threaded bolts of the bridge into the threaded holes of the manifold. Attach the bridge to the threaded bolts and lock into place. Screw the spindle into the sleeve cap then gently remove the sleeve cap by withdrawing the spindle. Repeat the same procedure to remove the valve sleeve from the manifold.



ABOUT MOOG

Moog Inc. is a worldwide designer, manufacturer and integrator of precision control components and systems. Moog's Industrial Group designs and manufactures high performance motion control solutions combining electric, hydraulic, and hybrid technologies with expert consultative support in a range of applications including energy production and generation machinery, industrial production machinery and simulation and test equipment. We help performance-driven companies design and develop their next-generation machines. Moog Industrial Group, with fiscal year 2012 sales of USD 634 million and locations in 26 countries, is part of Moog Inc. (NYSE:MOG.A and MOG.B) which has sales of USD 2.47 billion.

This vast scope ensures that our engineers remain close to the needs of machine builders and provide flexible design solutions and technical expertise tailored to our customers' toughest challenges.

Moog experts work in close collaboration with machine builders and application engineers to design motion control systems for greater productivity, higher reliability, superior connectivity, less costly maintenance and more effective operations. Our regional presence, industry knowledge and design flexibility ensures Moog motion control solutions are tailored to their environment — from meeting operating regulations and performance standards, to taking machine performance to a higher level.

Products

At the heart of every Moog solution is an array of products engineered for precision, high performance and reliability. For more than six decades, Moog products have been specified for critical machine applications.

Some are developed specifically for unique operating environments. Others are standard equipment on machines across many industries. All are continuously improved to take advantage of the latest technology breakthroughs and advancements.

Moog products include:

- Servo Valves and Proportional Valves
- Servo Motors and Servo Drives
- Servo Controllers and Software
- Radial Piston Pumps
- Actuators
- Integrated Hydraulic Manifold Systems and Cartridge Valves
- Slip Rings
- Motion Bases



Servo Valves



Servo Cartridge Valves



Radial Piston Pumps



Servo Drives

ABOUT MOOG

Solutions

Hydraulic solutions

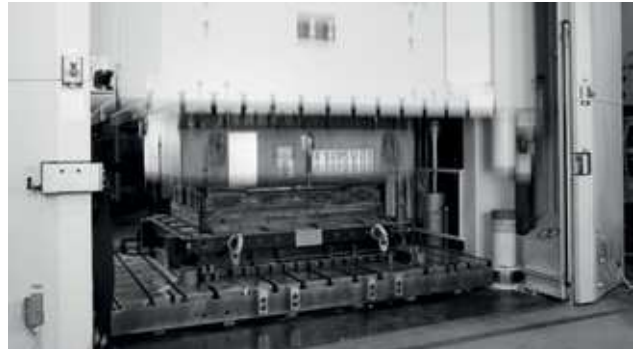
Since Bill Moog invented the first commercially viable servo valve in 1951, Moog has set the standard for world-class hydraulic technology. Today, Moog products are used in a variety of applications - providing high power, enhanced productivity and ever better performance for some of the worlds most demanding applications.

Electric solutions

Clean operation, low noise generation, less maintenance and reduced power consumption make Moog electric solutions ideal for applications worldwide. Moog is the ideal partner for applications where transitioning technologies requires special expertise.

Hybrid solutions

By incorporating the advantages of existing hydraulic and electric technologies - including modular flexibility, increased efficiency and cleanliness - into innovative hybrid solutions, Moog offers new performance potential in specialized applications.



Press



Injection Molding Machine

Moog Global Support

Moog Global Support is our promise to offer world-class Repair and Maintenance Services delivered expertly by our trained technicians. With the reliability only available from a leading manufacturer with facilities around the world, Moog offers you service and expertise you can count on to keep your equipment operating as it should.

This promise offers many benefits to our customers including:

- Reduce your downtime by keeping critical machines running in peak performance
- Protect your investment by ensuring reliability, versatility and long-life of products
- Better plan your maintenance activities and make systematic upgrades
- Leverage our flexible programs to meet the unique service requirements of your facility

Look to Moog for global support including:

- Repair services using OEM parts are performed by trained technicians to the latest specifications
- Stock management of spare parts and products to prevent unplanned downtime

- Flexible programs, tailored to your needs such as upgrades, preventative maintenance and annual/multi-year contracts
- On-site services bring the expertise to you, providing quicker commissioning, set-up and diagnostics
- Access to reliable services that are guaranteed to offer consistent quality anywhere in the world

For more information on Moog Global Support visit www.moog.com/industrial/service.



ORDERING CODE

Type designation											
	1	2	3	4	5	6	7	8	9	10	
N	-	C	E	E		K	6			/	
Seal materials N NBR (standard) V FKM						Orifice configuration KOB Poppet without orifice bore K99 Poppet with orifice bore, without nozzle ¹⁾ K09 Poppet with nozzle Ø 0.9 mm ¹⁾ ¹⁾ Poppet B, C and F only available as KOB					
Valve type C Directional or pressure valve R Non-return valve						Spring²⁾ Z without spring R Spring R S Spring S T Spring T U Spring U Q Special spring ²⁾ Opening pressure, see table					
Valve function E Slip-in cartridge valve without cover						Shaft seal O Poppet without shaft seal X Poppet with shaft seal					
Cover unit connection type E Manifold installation						Poppet type A Pressure function area ratio 1:1 B Directional function area ratio 1:1.5 C Directional function 1:1.5 with damping E Pressure, directional function area ratio 1:1.07 F Directional function 1:1.07 with damping					
Nominal diameter [mm] 16 ISO 7368-BA-06-2-A 25 ISO 7368-BB-08-2-A 32 ISO 7368-BC-09-2-A 40 ISO 7368-BD-10-2-A 50 ISO 7368-BE-11-2-A 63 ISO 7368-BF-12-2-A 80 ISO 7368-BG-13-2-A 100 ISO 7368-BH-14-2-A											
Series K Model range X731											
Series 6 Connecting dimensions according to ISO 7368											

Spring opening pressures [bar]

A poppet, flow direction A → B

Spring	16	25	32	40	50	63	80	100
R	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4
S	1.0	1.0	1.0	0.7	0.7	0.7	0.7	0.7
T	2.0	2.0	2.0	1.4	1.4	1.5	1.4	1.4
U	4.0	4.0	4.0	2.9	2.9	2.9	2.8	2.8

B and C poppet, flow direction A → B

Spring	16	25	32	40	50	63	80	100
R	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
S	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
T	1.9	2.1	2.0	2.0	2.0	2.0	2.0	2.0
U	3.8	4.2	4.0	4.0	4.0	4.0	4.0	4.0

E and F poppet, flow direction A → B

Spring	16	25	32	40	50	63	80	100
R	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4
S	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
T	1.4	1.5	1.4	1.4	1.4	1.5	1.4	1.4
U	2.7	3.0	2.8	2.9	2.9	2.9	2.8	2.8

B and C poppet, flow direction B → A

Spring	16	25	32	40	50	63	80	100
R	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0
S	1.9	2.1	2.0	2.0	2.0	2.0	2.0	2.0
T	3.8	4.2	4.0	4.0	4.0	4.0	4.0	4.0
U	7.6	8.3	7.9	8.1	8.0	8.1	8.0	8.0

E and F poppet, flow direction B → A

Spring	16	25	32	40	50	63	80	100
R	5.4	5.3	5.1	5.2	5.1	5.1	5.1	5.2
S	10.8	10.6	10.2	10.4	10.2	10.2	10.2	10.3
T	21.5	21.1	20.3	20.8	20.3	20.5	20.2	20.6
U	43.1	42.3	40.6	41.6	40.7	41.1	40.5	41.3

TAKE A CLOSER LOOK.

Moog designs a range of motion control products that complement the performance of those featured in this catalog. Visit our website for more information and contact the Moog facility nearest you.

Argentina
+54 11 4326 5916
info.argentina@moog.com

India
+91 80 4057 6666
info.india@moog.com

Singapore
+65 677 36238
info.singapore@moog.com

Australia
+61 3 9561 6044
info.australia@moog.com

Ireland
+353 21 451 9000
info.ireland@moog.com

South Africa
+27 12 653 6768
info.southafrica@moog.com

Brazil
+55 11 3572 0400
info.brazil@moog.com

Italy
+39 0332 421 111
info.italy@moog.com

Spain
+34 902 133 240
info.spain@moog.com

Canada
+1 716 652 2000
info.canada@moog.com

Japan
+81 46 355 3767
info.japan@moog.com

Sweden
+46 31 680 060
info.sweden@moog.com

China
+86 21 2893 1600
info.china@moog.com

Korea
+82 31 764 6711
info.korea@moog.com

Switzerland
+41 71 394 5010
info.switzerland@moog.com

Finland
+358 10 422 1840
info.finland@moog.com

Luxembourg
+352 40 46 401
info.luxembourg@moog.com

Turkey
+90 216 663 6020
info.turkey@moog.com

France
+33 1 4560 7000
info.france@moog.com

The Netherlands
+31 252 462 000
info.thenetherlands@moog.com

United Kingdom
+44 168 429 6600
info.uk@moog.com

Germany
+49 7031 622 0
info.germany@moog.com

Norway
+47 6494 1948
info.norway@moog.com

USA
+1 716 652 2000
info.usa@moog.com

Hong Kong
+852 2 635 3200
info.hongkong@moog.com

Russia
+7 831 713 1811
info.russia@moog.com

www.moog.com/industrial

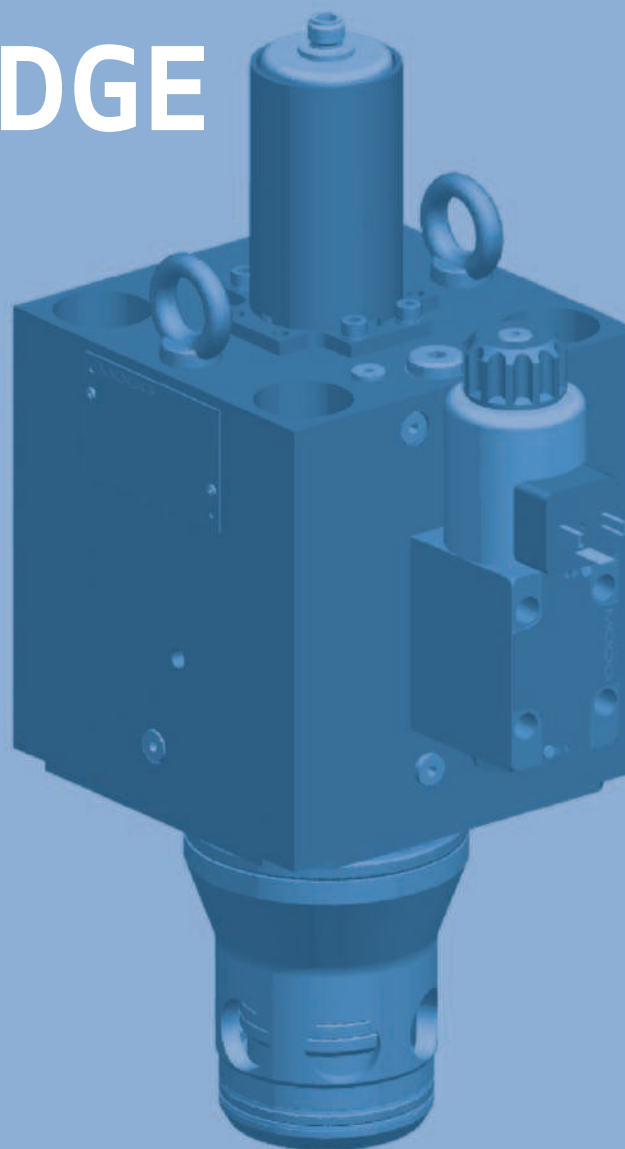
Moog is a registered trademark of Moog Inc. and its subsidiaries. All trademarks as indicated herein are the property of Moog Inc. and its subsidiaries.

©2013 Moog Inc. All rights reserved. All changes are reserved.

2-way Slip-in Cartridge Valves - Directional and Pressure Function
PIM, Rev. A, June 2013, CDL34559-en

POSITION-MONITORED ACTIVE CARTRIDGE

MODEL RSE - SERIES H



DIMENSIONS ACCORDING TO ISO 7368
NOMINAL SIZE NB16 TO NB100

Whenever the highest levels of motion control performance and design flexibility are required, you'll find Moog expertise at work. Through collaboration, creativity and world-class technological solutions, we help you overcome your toughest engineering obstacles. Enhance your machine performance. And help take your thinking further than you ever thought possible.

General Descriptions	2	Sandwich Valves	
Configurations	3	NB06 / NB10 (CETOP 3/5)	23
Technical Data		Ordering Instructions	24
General Information	4	Technical Data	25
Area Ratios	5	Typical Curves	26
Position Switch	6	Dimensions	27
Typical Curves	7	BG Approval Certificate	28
Standard Models	8	Worldwide Support	29
Orifice Selection			
Suggested Orifices	10		
Leakage at Switching Point	11		
Dimensions	12		
Connection and Mounting	18		
Ordering Instructions	21		
Accessories	22		



Our Quality Standard conforms to DIN EN ISO 9001.

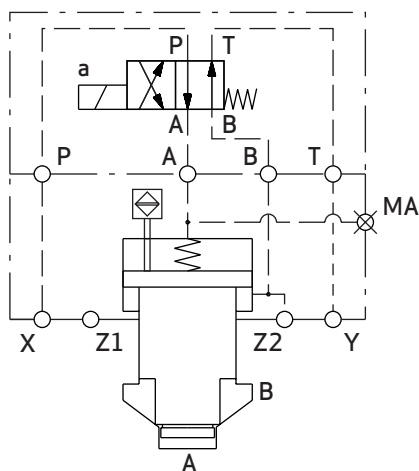
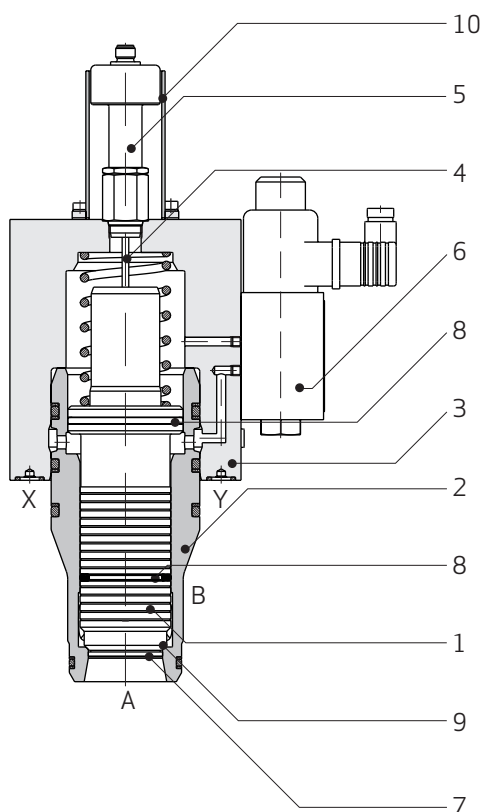
This catalog is for users with technical knowledge. To ensure that all necessary characteristics for function and safety of the system are given, the user has to check the suitability of the products described herein. The products described herein are subject to change without notice. In case of doubt, please contact Moog.

For the most current information, visit www.moog.com/industrial. Moog is a registered trademark of Moog Inc. and its subsidiaries. All trademarks as indicated herein are the property of Moog Inc. and its subsidiaries.

©Moog Inc. 2008. All rights reserved. All changes are reserved.
Dimensions in mm

Position-monitored active cartridge for manifold mounting

Switching on and off of flow from ports A to B or B to A through monitoring the closed position of the main stage of the valve.



Warning

The valves are set, tested and sealed by Moog. If these settings are tampered with, the certificate issued by the German Accident Prevention and Insurance Association (BG) is voided.

Valve design and function

The main valve comprises a sleeve (2) and seated cone (1) with integrated pushing rod (4) and contactless position switch (5), enclosed in a valve body (3). The seated cone (1) can be controlled by an integrated pilot valve (6) mounted on the cover (3) or externally controlled via ports X and Y. This active control reduces opening and closing times significantly. The contactless position switch (5) gives the open signal when the seated cone (1) is raised from the seat (9) but the cylindrical overlap (7) of the cone is yet to open ports A and B. The position switch (5) is mechanically shielded by a protective sleeve (10).

Advantages

- No seals required for moving parts of position switch as it is contactless
- Direct monitoring of closed valve position
- Reliable, active closing behaviour due to excess surface area
- Long lifecycle
- Controlled opening behaviour with optional sandwich valve
- Zero leakage at working ports due to metal seat (9)
- Zero leakage at control ports due to seals (8) (disregarding leakage from pilot valve)

Applications

Protection from adverse movements caused by systems containing hydraulically operated cylinders and motors and by pressure build-up in the system.

Application examples

Presses, injection moulding machines, lifting equipment and accumulator systems.

Note

Certificate of approval from the German Accident Prevention and Insurance Association (BG) for all sizes (see page 28):

Approval includes the interconnecting plate for the WX6 version.

For the WX1 and WX2 versions, approval applies to the main valve only.

Configurations

	Normally closed (WX1 - version)	Normally open (WX2 version)	Externally pilot operated via X and Y (WX6 version)
NB16, NB25, NB32, NB40, NB50			
NB63			

- ONH: Without manual override

			Externally pilot operated via X and Y (WX3 version)
NB80, NB100			

- Orifices for adjusting switching times must be provided on the manifold
- X and Y diameter are 2 mm larger than specified in ISO 7368

General information

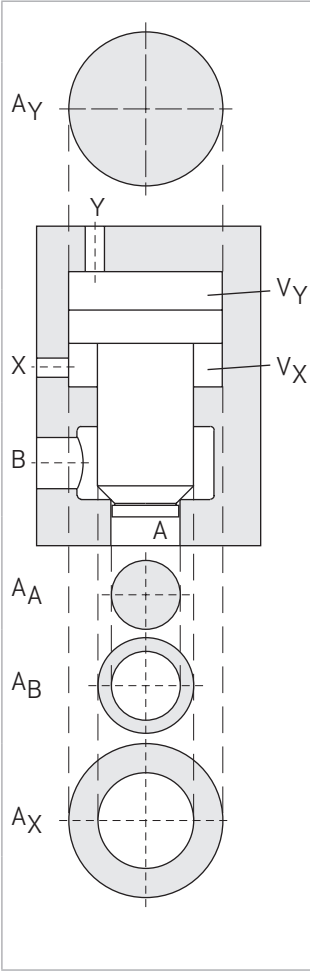
Designation	Position-monitored active cartridge
Type designation	See order information (page 21)
Mode of construction	Pilot operated 2/2 way seat valve
Mounting style	Manifold mounting according to ISO 7368
Mounting dimensions	See page 12
Mounting position	Any
Flow direction	A to B or B to A (preferably A to B)
Seals for hydraulic fluids*	FKM + PU → M-RSE, mineral oil-based hydraulic fluids FKM → V-RSE, mineral oil-based hydraulic fluids, HFD hydraulic fluids NBR → N-RSE, mineral oil-based hydraulic fluids, HFA-, HFB-, HFC-based hydraulic fluids Others on request

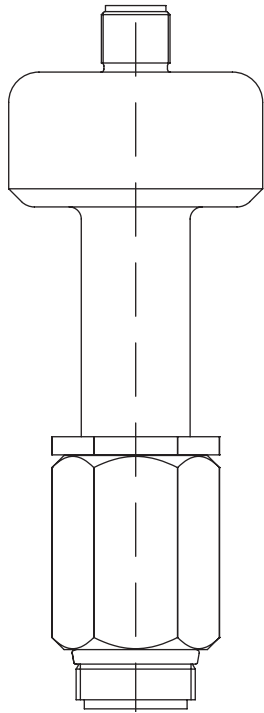
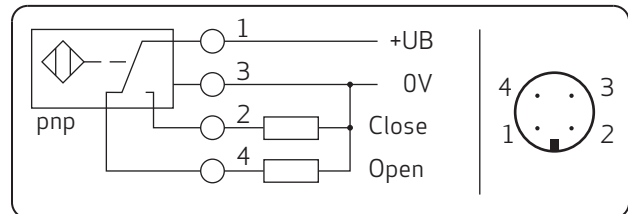
Operating parameters

Port A	$p_{\max.}$	35 MPa
Port B	$p_{\max.}$	35 MPa
Port X	$p_{\max.}$	35 MPa
Port Y	$p_{\max.}$	21 MPa with pilot valve (WX1, WX2)
	$p_{\max.}$	35 MPa without pilot valve (WX3, WX6)
Port Z2	$p_{\max.}$	35 MPa
Fluid temperature range	$T_{\min.}$	-20 °C (NBR) -10 °C (FKM/PU)
	$T_{\max.}$	80 °C
Ambient temperature range	$T_{\min.}$	-20 °C (NBR) -10 °C (FKM/PU)
	$T_{\max.}$	80 °C
Viscosity range	$\nu_{\min.}$	2.8 mm ² /s [cSt]
	$\nu_{\max.}$	380 mm ² /s [cSt]
Operational viscosity	ν	15 to 46 mm ² /s [cSt]
ISO cleanliness code		Max. ISO 4406 (C) class 20/18/15

* FKM: Fluoroelastomer (Viton®); NBR: Nitrile Rubber (Buna N); PU: Polyurethane Elastomer

Area ratios

	NB	16	25	32	40	50	63	80	100
	Stroke [mm]	9.5	11	17.5	17	22.5	28	30	36.5
	V _Y [cm ³]	3.6	10	20.4	33.4	86.6	178.1	285.1	507.1
	V _X [cm ³]	1.7	5.8	7.7	14.1	33.1	70.4	114.9	160.2
	A _A [mm ²]	122.7	227	452.4	804.2	1590.4	2642.1	3848.4	5674.5
	A _A /A _A	1	1	1	1	1	1	1	1
	A _B /A _A	0.64	0.67	0.56	0.41	0.49	0.46	0.47	0.67
	A _Y /A _A	3.1	4	2.51	2.44	2.42	2.41	2.47	2.45
	A _X /A _A	1.46	2.33	0.94	1.03	0.93	0.95	0.99	0.77

Technical data of the inductive position switch**Contact assignment of connector on limit switch**

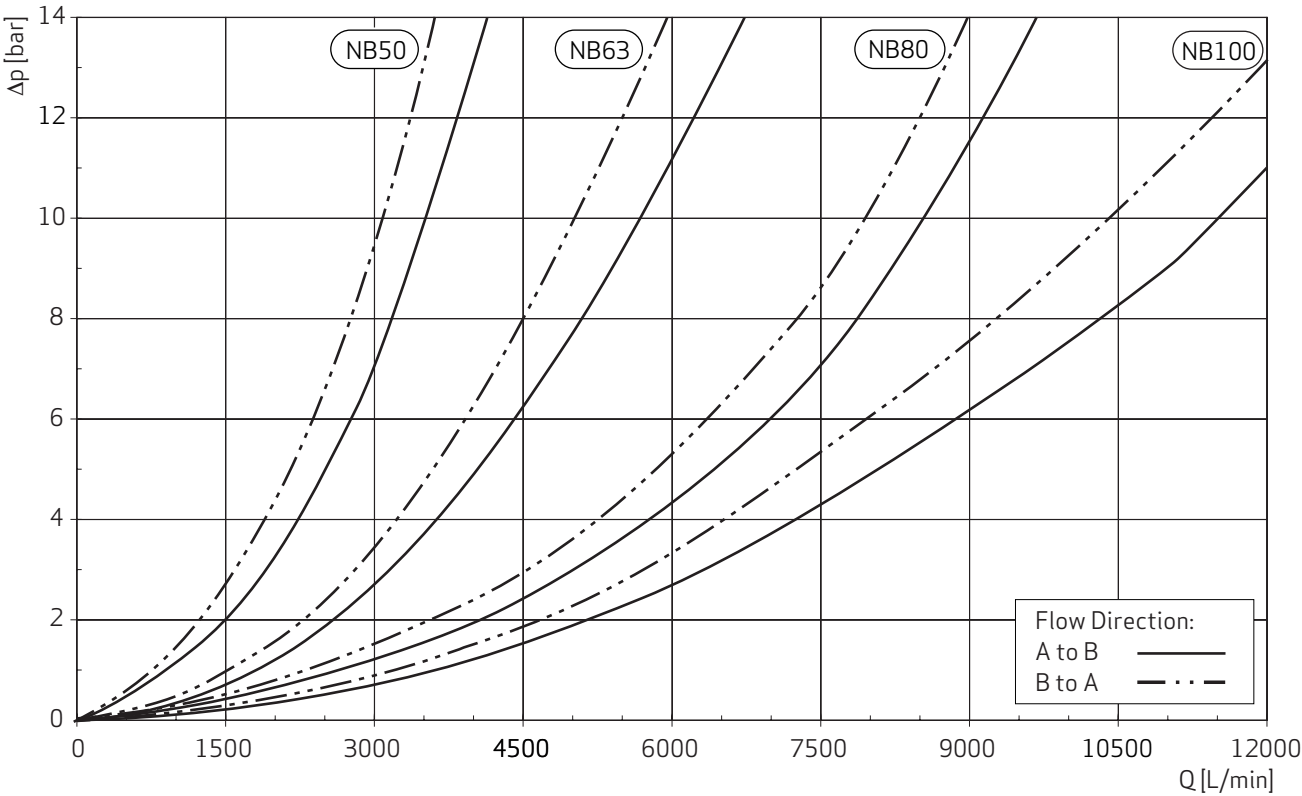
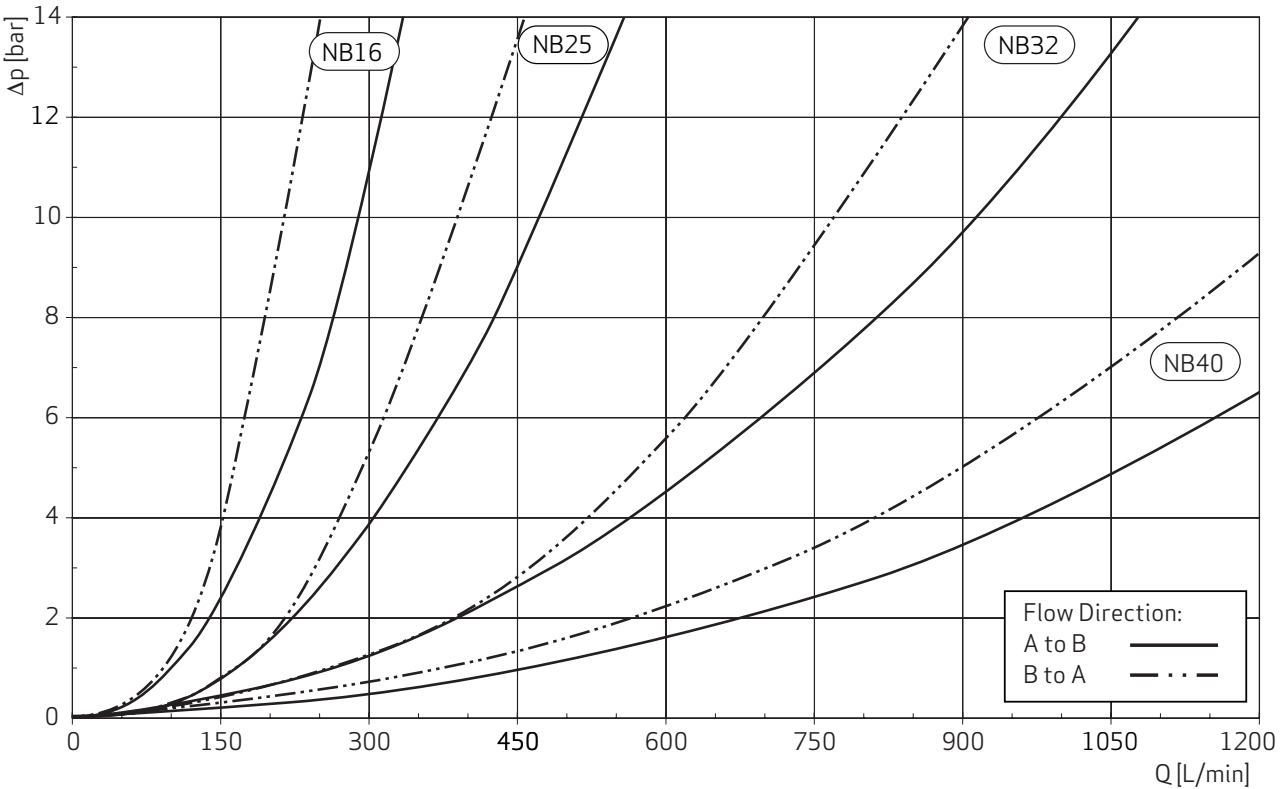
- 1: + 24 V DC
 2: Low signal when the valve is in the closed position.
 3: 0 V
 4: High signal when the valve is in the closed position.

- The limit switch has no PE connection.
- The connector is not included in delivery but can be ordered separately .
 (see page 22 – Accessories)

Supply voltage	$U_B = 24 \text{ V} \pm 20 \%$
Residual ripple	$\leq 10 \%$
Maximum output voltage	$U_B - 2.5 \text{ V}$
Reverse polarity protection	$\leq 300 \text{ V}$
Maximum consumption (without load current)	20 mA
Switching point hysteresis	$\leq 0.06 \text{ mm}$
Repetitive accuracy (at $T_U = 25 \text{ }^\circ\text{C}$)	$\pm 0.02 \text{ mm}$
Temperature drift	0.002 mm/ $^\circ\text{C}$ (static)
Maximum output current	250 mA
Leak current at blocked output	$< 10 \text{ } \mu\text{A}$
Outputs	High side, overload protected
Operating temperature	-20 to +85 $^\circ\text{C}$
Vibration tolerance	Sinus, 20 g (5 min), 40 to 250 Hz (12 h)
Protection according to DIN 40050	IP 65 (with mounted plug)
Pressure resistance	35 MPa, 5 Hz / swelling
EMV (Electromagnetic Vulnerability)*	according to 89/336/EWG

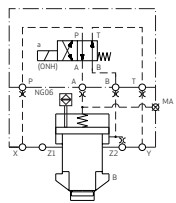
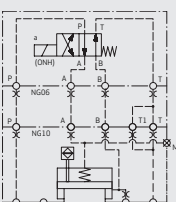
* EMV only ensured through use of insulated cables and plug shielding.

Δp -Q curves

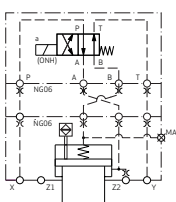
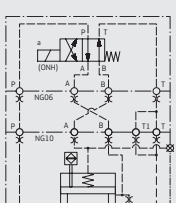


Test conditions: actively opened, oil viscosity 32 mm²/s, oil temperature: 40 °C

Normally closed

Symbol	Function	NB	Mass [kg]	Article	Order number
 NB16 - NB50	WX1	16	6.6	M-RSE16HV6T0WX1B00/Z2	XSB10360-106M01
		25	8.7	M-RSE25HV6T0WX1B00/Z2	XSB10361-106M01
		32	12.5	M-RSE32HV6T0WX1B00/Z2	XSB10362-106M01
		40	18.6	M-RSE40HV6T0WX1B00/Z2	XSB10363-106M01
		50	26.0	M-RSE50HV6T0WX1B00/Z2	XSB10364-106M01
		63	47.2	M-RSE63HL6T0WX1B00/Z2	XSB10365-103M01
 NB63					

Normally open

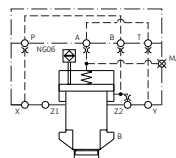
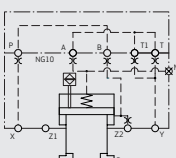
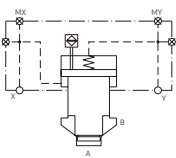
Symbol	Function	NB	Mass [kg]	Article	Order number
 NB16 - NB50	WX2	16	7.3	M-RSE16HV6T0WX2B00/Z2	XSB10360-206M01
		25	9.4	M-RSE25HV6T0WX2B00/Z2	XSB10361-206M01
		32	13.1	M-RSE32HV6T0WX2B00/Z2	XSB10362-206M01
 NB63		40	19.2	M-RSE40HV6T0WX2B00/Z2	XSB10363-206M01
		50	26.6	M-RSE50HV6T0WX2B00/Z2	XSB10364-206M01
		63	47.2	M-RSE63HL6T0WX2B00/Z2	XSB10365-203M01

Warning

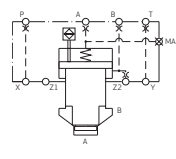
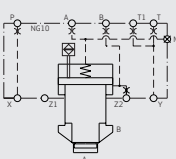
The listed valves of the WX1 and WX2 versions includes solenoid pilot valves without manual override is standard in Moog models. Safety requirements of the German version of EN 201 and EN 698 for injection moulding machines and presses require solenoid valves without manual override.

For further details, see order information on page 23.

Externally pilot operated via X and Y port

Symbol	Function	NB	Mass [kg]	Article	Order number
 NB16 - NG50	WX6	16	4.8	M-RSE16HV6T0WX6/Z2	XSB10360-606M01
		25	6.8	M-RSE25HV6T0WX6/Z2	XSB10361-606M01
		32	10.6	M-RSE32HV6T0WX6/Z2	XSB10362-606M01
 NB63		40	16.7	M-RSE40HV6T0WX6/Z2	XSB10363-606M01
		50	24.1	M-RSE50HV6T0WX6/Z2	XSB10364-606M01
		63	44.6	M-RSE63HL6T0WX6/Z2	XSB10365-603M01
 NB80 - NG100	WX3	80	79.2	M-RSE80HT6T0WX3	XSB10366-302M01
		100	127.1	M-RSE100HT6T0WX3	XSB10367-302M01

Standard models without pilot valve

Symbol	Function	NB	Mass [kg]	Article	Order number
 NB16 - NB50	without pilot valve	16	4.3	M-RSE16HV6T0WX_/OP;Z2	XSB10360-006M01
		25	6.4	M-RSE25HV6T0WX_/OP;Z2	XSB10361-006M01
		32	10.1	M-RSE32HV6T0WX_/OP;Z2	XSB10362-006M01
 NB63		40	16.3	M-RSE40HV6T0WX_/OP;Z2	XSB10363-006M01
		50	23.7	M-RSE50HV6T0WX_/OP;Z2	XSB10364-006M01
		63	43.3	M-RSE63HL6T0WX_/OP;Z2	XSB10365-003M01

All configuration listed are not provided with orifices. The standard seal configuration is a mix of Fluoroelastomer (Viton®) and (axial) Polyurethane Elastomer seals. Other options are available on request.

Suggested orifices for standard applications

Pilot area	NB	Orifice diameter as per DIN 913*
	16	1.0 mm
	25	1.5 mm
	32	2.0 mm
	40	2.5 mm
	50	2.5 mm
	63	2.5 mm (for NB06 pilot valve) 3.0 mm (for NB10 pilot valve)

*for orifice locations and orifice diameters, see dimensions from page 12.

Orifice selection

For precise orifice dimensions, use the following formula.

A sandwich plate is available for regulating opening times (see pages 23 to 27).

The following formula is used to calculate the maximum permitted average closing time of the valve poppet from v = 0.3 m/s:

$$d \text{ [mm]} \leq \sqrt{\frac{K}{\sqrt{\Delta p \text{ [bar]}}}}$$

$$\Delta p = |p1 - p2| \quad (\text{see above})$$

NB	16	25	32	40	50	63	80	100
K [-]	11.4	27.4	34.1	58.2	116.1	192	290.1	417.4
Q [L/min]	7	17	21	36	70	115	171	250

Note:

In determining orifice dimensions, the switching capacity of the chosen pilot valve must be taken into account. The required flowrate should be extracted from the table.

Sample orifice dimension calculations for opening main valve

An active cartridge of size NB 50 with pressure in A of 140 bar, in B of 5 bar and in X of 100 bar, and with a 6 bar spring produces the following:

$$p_1 = \frac{(p_A \cdot A_A + p_B \cdot A_B + p_X \cdot A_X - p_F \cdot A_A)}{A_T} = 95 \text{ bar}$$

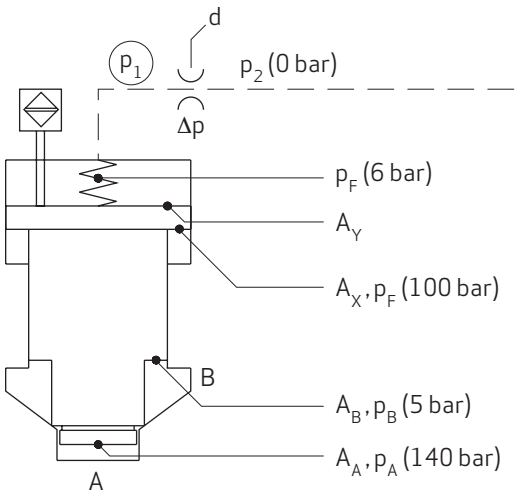
and with p_2 of 0 bar and Δp of 95 bar

$$d \text{ [mm]} \leq \sqrt{\frac{K}{\sqrt{\Delta p \text{ [bar]}}}}$$

$$d \text{ [mm]} \leq \sqrt{\frac{116,1}{\sqrt{95 \text{ bar}}}}$$

$$d \text{ [mm]} \leq 3,5$$

requires an orifice of diameter $\leq 3.5\text{mm}$.



(Area ratios: see page 5)

Leakage at switching point

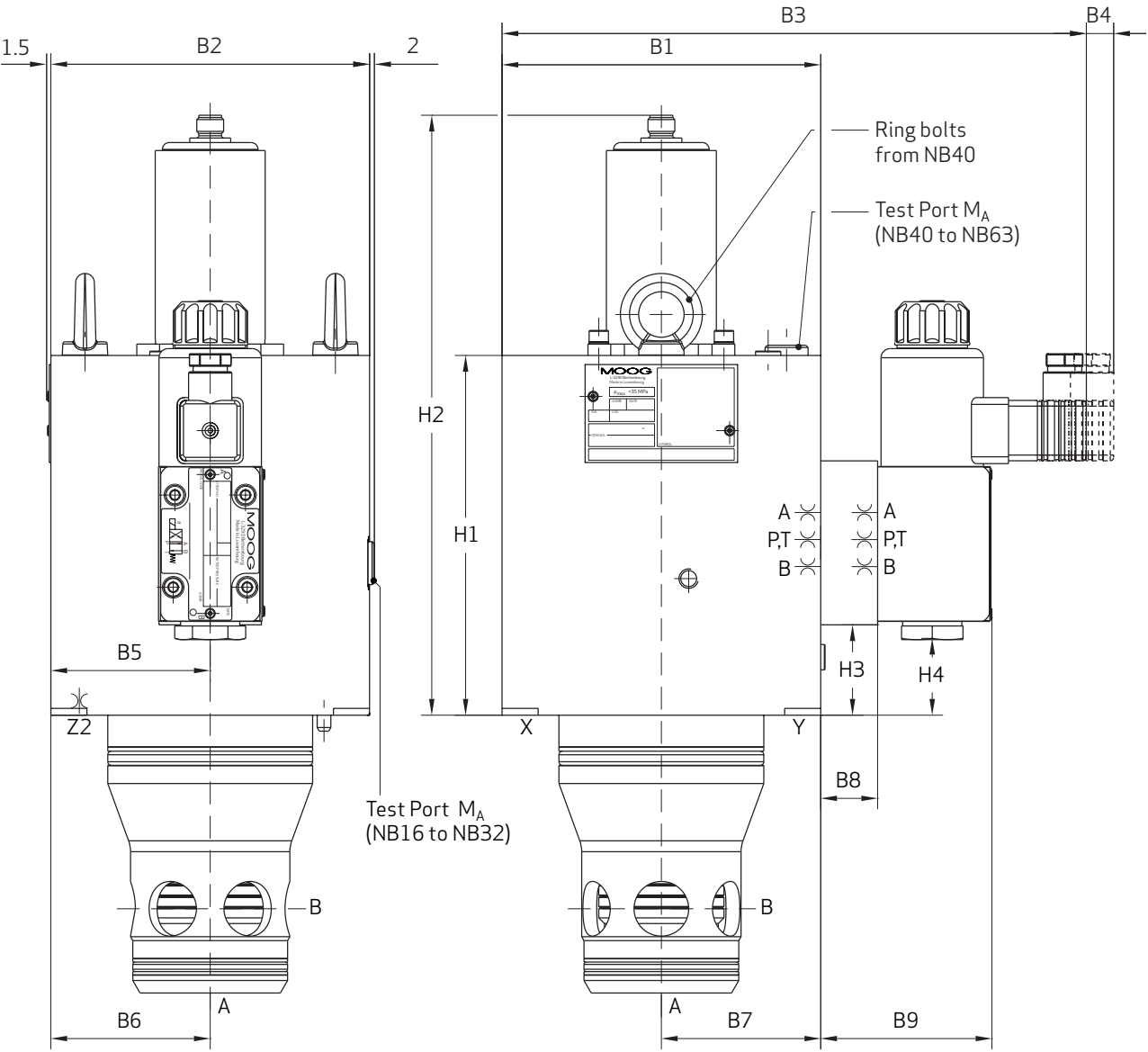
Maximum leakage at the switching point when $\Delta p = 100 \text{ bar}$ ($\Delta p = |p_A - p_B|$) and with kinematic oil viscosity of $46 \text{ mm}^2/\text{s}$ can be found in the following table:

NB	16	25	32	40	50	63	80	100
Maximum leakage [L/min]	0.23	0.7	1.25	1.72	2.6	4.4	9.3	21

Note:

Maximal admissible leakage is established on the basis of the admissible movement of hydraulically driven components (e.g. cylinders) according to the specific machine guidelines or relevant regulations.

Dimensions for WX1 + WX2 – NB16 to NB63



Dimensions for WX1 + WX2 – NB16 to NB63

Size	NB16	NB25	NB32	NB40	NB50	NB63
B1 [mm]	75	90	102	125	140	200**
B2 [mm]	65	85	102	125	140	180
B3 [mm]	170 (WX1) 195 (WX2)	185 (WX1) 210 (WX2)	195 (WX1) 220 (WX2)	217 (WX1) 242 (WX2)	232 (WX1) 257 (WX2)	320 (WX1) 325 (WX2)
B4 [mm]	12	12	12	12	12	12
B5 [mm]	32.5	39.15	47	54.5	70	100
B6 [mm]	32.5	42.5	51	62.5	70	90
B7 [mm]	42.5	47.5	51	62.5	70	100
B8 [mm]	- (WX1) 25 (WX2)	- (WX1) 25 (WX2)	- (WX1) 25 (WX2)	- (WX1) 25 (WX2)	- (WX1) 25 (WX2)	27 (WX1) 32 (WX2)
B9 [mm]	50 (WX1) 75 (WX2)	50 (WX1) 75 (WX2)	50 (WX1) 75 (WX2)	50 (WX1) 75 (WX2)	50 (WX1) 75 (WX2)	77 (WX1) 82 (WX2)
H1 [mm]	100	100	109	131	158	151
H2 [mm]	210	200	215	237	265	250
H3 [mm]	- (WX1) 22 (WX2)	- (WX1) 28 (WX2)	- (WX1) 34 (WX2)	- (WX1) 40 (WX2)	- (WX1) 39 (WX2)	29 (WX1) 29 (WX2)
H4 [mm]	16	22	28	34	33	40 (WX1) 23 (WX2)
Test port M_A	G 1/4"	G 1/4"	G 1/4"	G 1/4"	G 1/4"	G 1/4"
Tightening torque [Nm]	27 ± 1.3	27 ± 1.3	27 ± 1.3	27 ± 1.3	27 ± 1.3	27 ± 1.3
Allen key [mm]	6	6	6	6	6	6
Orifice thread in P, A, B, T (in cover)	M6	M6	M6	M6	M6	M10
Orifice thread in Z2 (see drawing)	M5	M6	M6	M8	M8	M10
Mass [kg]	6.6 (WX1) 7.3 (WX2)	8.7 (WX1) 9.4 (WX2)	12.5 (WX1) 13.1 (WX2)	18.6 (WX1) 19.2 (WX2)	26.0 (WX1) 26.6 (WX2)	47.2 (WX1) 47.5 (WX2)
Mounting bolts * DIN EN ISO 4762-12.9	M8 x 95	M12 x 100	M16 x 100	M20 x 140	M20 x 120	M30 x 150
Tightening torque [Nm]	30 ± 1.5	100 ± 5	300 ± 15	550 ± 27	550 ± 27	1800 ± 90
Allen key [mm]	6	10	14	17	17	22

* not part of delivery

** deviates from DIN ISO 7368

Technical drawings of the NB40 to NB63 pressure vessel, showing front and side views with dimensions and labels.

Front View (Left):

- Overall width: 1.5
- Top flange width: B2
- Top flange thickness: 2
- MOOG pressure transmitter mounted on the front face.
- Bottom flange width: B5
- Bottom flange thickness: Z2
- Bottom flange diameter: B6
- Bottom flange port: A
- Bottom flange port: B

Side View (Right):

- Overall height: B3
- Top flange height: B1
- Ring bolts from NB40
- Test port M_A (NB40 to NB63)
- MOOG pressure transmitter mounted on the side face.
- Height from base to transmitter: H2
- Height from base to top flange: H1
- Port A
- Port P,T
- Port B
- Bottom flange thickness: H3
- Bottom flange port: X
- Bottom flange port: Y
- Bottom flange diameter: B7
- Bottom flange port: A
- Bottom flange port: B

Test port M_A (NB16 to NB32):

Test port M_A (NB16 to NB32)

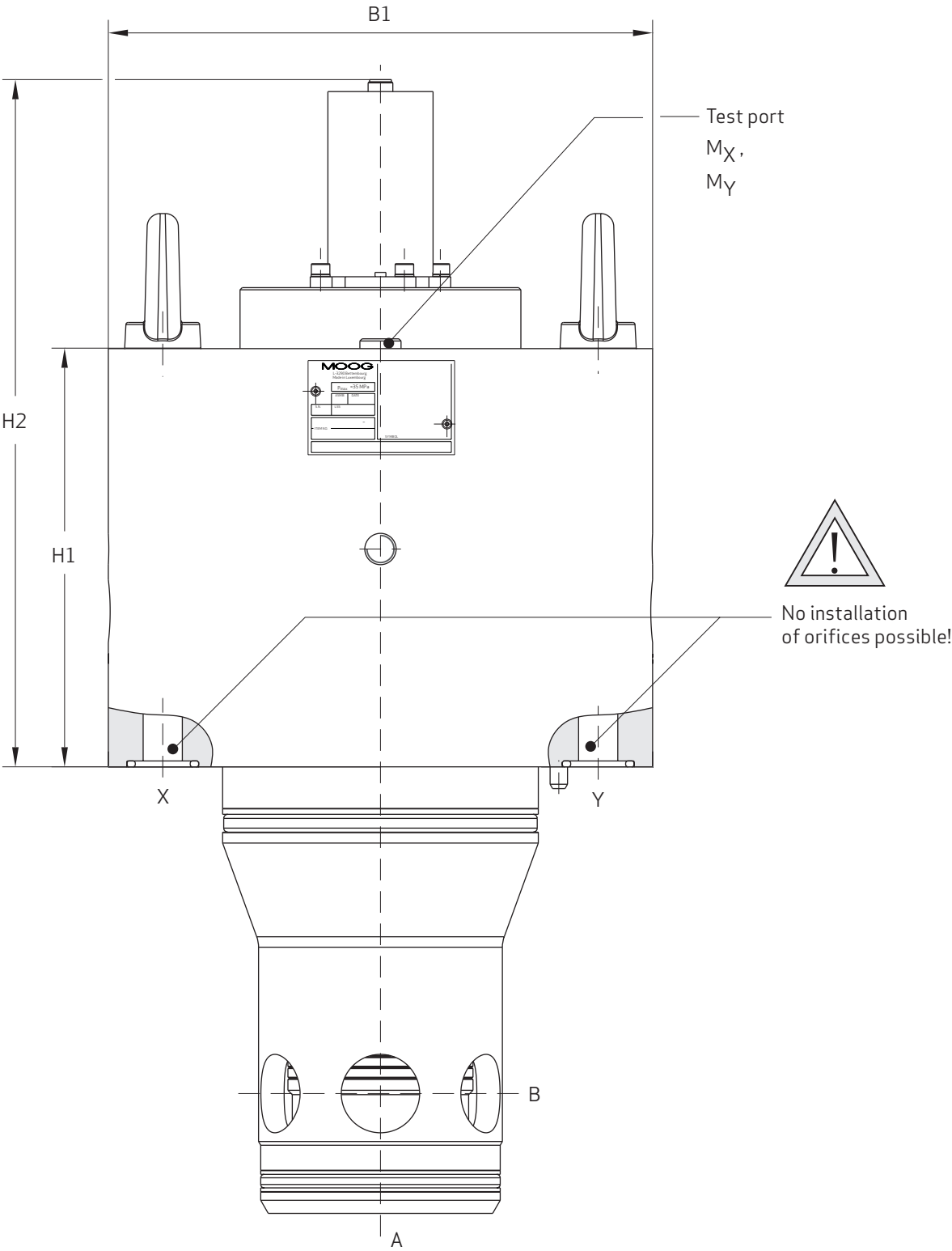
Dimensions for WX6 – NB16 to NB63

Size	NB16	NB25	NB32	NB40	NB50	NB63
B1 [mm]	75	90	102	125	140	200**
B2 [mm]	65	85	102	125	140	180
B3 [mm]	95	108	119	144	160	225
B5 [mm]	32.5	39.15	47	54.5	70	100
B6 [mm]	32.5	42.5	51	62.5	70	90
B7 [mm]	42.5	47.5	51	62.5	70	100
H1 [mm]	100	100	109	131	158	151
H2 [mm]	210	200	215	237	265	250
H3 [mm]	22	29	34	42	40	29
Test port M_A	G 1/4"	G 1/4"	G 1/4"	G 1/4"	G 1/4"	G 1/4"
Tightening torque [Nm]	27 ± 1.3	27 ± 1.3	27 ± 1.3	27 ± 1.3	27 ± 1.3	27 ± 1.3
Allen key [mm]	6	6	6	6	6	6
Orifice thread in P, A, B, T (in cover)	M6	M6	M6	M6	M6	M10
Orifice thread in Z2 (see drawing)	M5	M6	M6	M8	M8	M10
Mass [kg]	6.6	8.7	12.5	18.6	26.0	47.2
Mounting bolts * DIN EN ISO 4762-12.9	M8 x 95	M12 x 100	M16 x 100	M20 x 140	M20 x 120	M30 x 150
Tightening torque [Nm]	30 ± 1.5	100 ± 5	300 ± 15	550 ± 27	550 ± 27	1800 ± 90
Allen key [mm]	6	10	14	17	17	22

* not part of delivery

** deviates from DIN ISO 7368

Dimensions for WX3 – NB80 to NB100

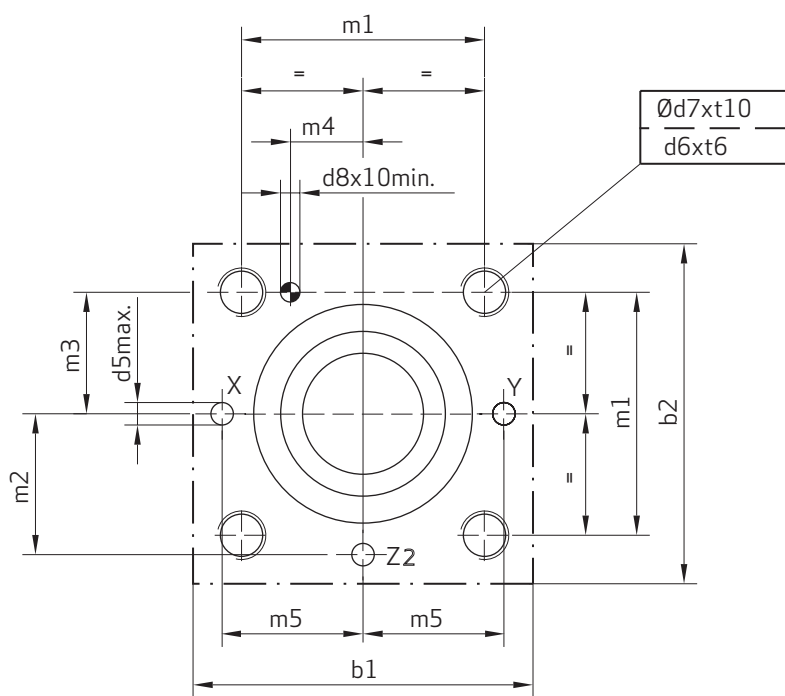
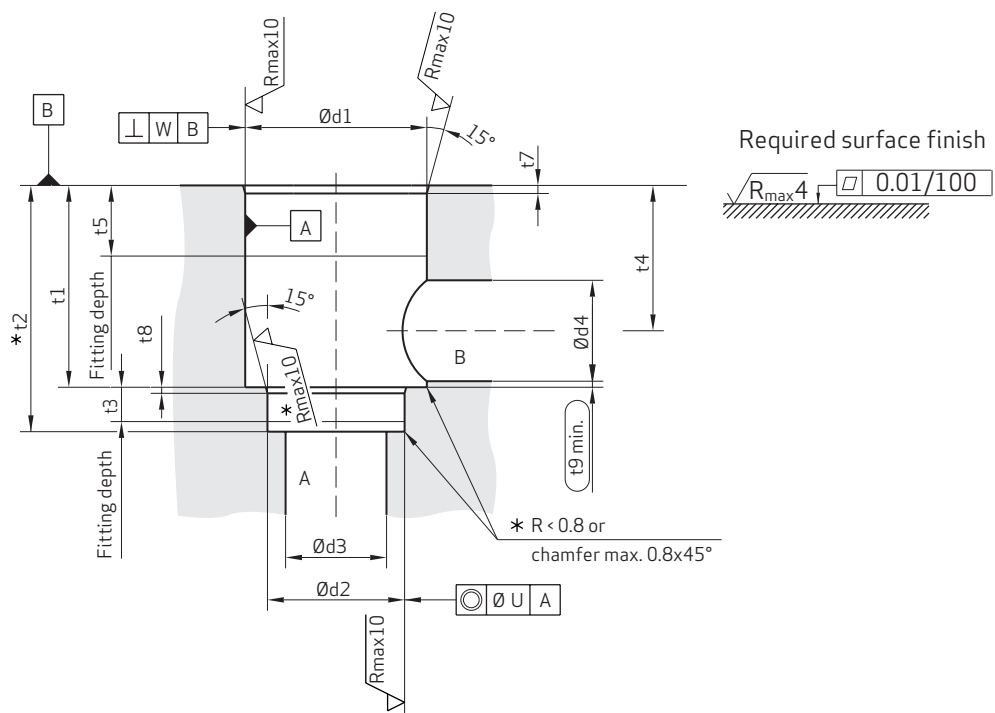


Dimensions for WX3 – NB80 to NB100

Size	NB80	NB100
B1 [mm]	Ø 250	Ø 300
H1 [mm]	192	218
H2 [mm]	317	358
Test port M_x, M_y	G 1/4"	G 1/4"
Tightening torque [Nm]	27 ± 1.3	27 ± 1.3
Allen key [mm]	6	6
Orifice thread in X, Y (see drawing)	-	-
Mass [kg]	79.2	127.1
Mounting bolts * DIN EN ISO 4762-12.9	M24 x 200	M30 x 170
Tightening torque [Nm]	900 ± 45	1800 ± 90
Allen key [mm]	19	22

* not part of delivery

Connection and mounting dimensions for NB16 to NB63

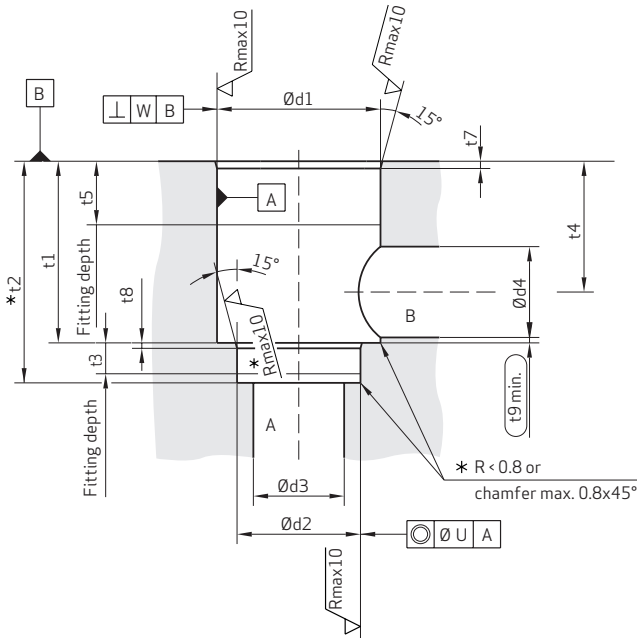


Connection and mounting dimensions for NB16 to NB63

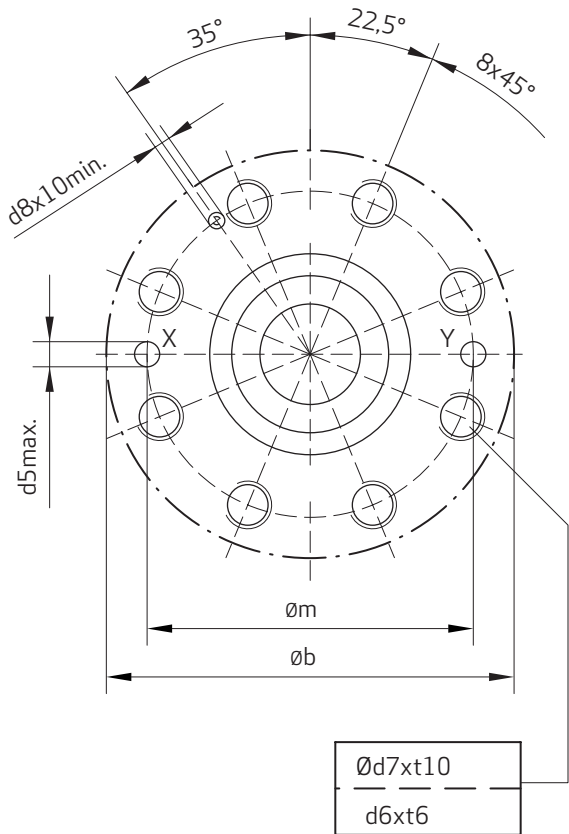
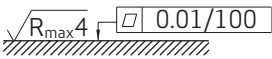
Size		NB16	NB25	NB32	NB40	NB50	NB63
b1	[mm]	75	90	102	125	140	200
b2	[mm]	65	85	102	125	140	180
d1 ^{H7}	[mm]	32	45	60	75	90	120
d2 ^{H7}	[mm]	25	34	45	55	68	90
d3	[mm]	16	25	32	40	50	63
d4	[mm]	16	25	32	40	50	63
d4 _{max.} *	[mm]	25	32	40	50	63	80
d5 _{max.}	[mm]	4	6	8	10	10	12
d6	[mm]	M8	M12	M16	M20	M20	M30
d7	[mm]	6.3	10.2	14	17.5	17.5	26.5
d8 ^{H13}	[mm]	4	6	6	6	8	8
m1 ^{±0.2}	[mm]	46	58	70	85	100	125
m2 ^{±0.2}	[mm]	25	33	41	50	58	75
m3 ^{±0.2}	[mm]	23	29	35	42.5	50	62.5
m4 ^{±0.2}	[mm]	10.5	16	17	23	30	38
m5 ^{±0.2}	[mm]	25	33	41	50	58	75
t1 ^{+0.1}	[mm]	43	58	70	87	100	130
t2 ^{+0.1}	[mm]	56	72	85	105	122	155
t3	[mm]	11	12	13	15	17	20
t4	[mm]	34	44	52	64	72	95
t4 at d4 _{max.} *	[mm]	29.5	40.5	48	59	65.5	86.5
t5	[mm]	20	30	30	30	35	40
t6	[mm]	14	20	26	33	33	50
t7	[mm]	2	2.5	2.5	3	4	4
t8	[mm]	2	2.5	2.5	3	3	4
t9	[mm]	0.5	1.0	1.5	2.5	2.5	3
t10	[mm]	17	24	31	38	38	56
U	[mm]	0.03	0.03	0.03	0.05	0.05	0.05
W	[mm]	0.03	0.05	0.1	0.1	0.1	0.2

* Recommendation, deviates from ISO 7368

Connection and mounting dimensions for NB80 to NB100



Required surface finish



Size		NB80	NB100
b _{max.}	[mm]	250	300
d1 ^{H7}	[mm]	145	180
d2 ^{H7}	[mm]	110	135
d3	[mm]	80	100
d4	[mm]	80	100
d4 [*] _{max.}	[mm]	100	125
d5 _{max.}	[mm]	16	20
d6	[mm]	M24	M30
d7	[mm]	21	26.5
d8 ^{H13}	[mm]	10	10
t1 ^{+0.1}	[mm]	175	210
t2 ^{+0.1}	[mm]	205	245
t3	[mm]	25	29
t4	[mm]	130	155
t4 at d4 [*] _{max.}	[mm]	120	142.5
t5	[mm]	40	50
t6	[mm]	39	50
t7	[mm]	5	5
t8	[mm]	5	5
t9	[mm]	3	5
t10	[mm]	45	56
m ^{±0.3}	[mm]	200	245
U	[mm]	0.05	0.05
W	[mm]	0.2	0.2

* Recommendation, deviates from ISO 7368

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
[]	-	R	S	E	[]	H	[]	6	T	O	W	X	[]	[]	[]	[]	/ []

1) Seals material

V	FPM/FKM
M	FPM/FKM + PUR (Standard)
N	NBR

2) Valve type

R	Check valve
---	-------------

3) Valve function

S	Safety valve
---	--------------

4) Mounting style

E	Manifold
---	----------

5) Nominal size (ISO 7368)

16	NB16
25	NB25
32	NB32
40	NB40
50	NB50
63	NB63
80	NB80
100	NB100

6) Series

7) Spring

T	2.0 bar (Standard for NB80 and NB100)
L	3.0 bar (Standard for NB63)
V	6.0 bar (Standard)

8) Dimensions

6	ISO 7368
---	----------

9) Cone type

T	Step cone with small seat and damping nose
---	--

17) Modification

OP	Without pilot valve
ZZ	additional Z2 port (standard for NB16 to NB63)

Orifices: Indication in tenths of mm of the diameter and in same order as given in function diagram.
 ..00 = Plug
 ..08 = 0.8 mm Ø orifice
 ..15 = 1.5 mm Ø orifice
 e.g.: X08 = 0.8 mm orifice in x
 e.g.: Z210 = 1.0 mm orifice in Z2

16) Electrical connection (only for valves with pilot valve)

0	Connection as per DIN 43650 without plug
---	--

15) Solenoid type (only for valves with pilot valve)

N	Wet solenoid, oil-immersed with manual override
O	Wet solenoid, oil-immersed without manual override (standard)

14) Solenoid supply (only for valves with pilot valve)

B	24 V DC
---	---------

13) Function

1	Normally closed (active opening with energised solenoid)
2	Normally open (active closing with energised solenoid)
3	Externally pilot operated (only NB80 + NB100)
6	Externally pilot operated via interconnecting plate
-	Without pilot valve

12) Pilot oil connection

X	x through mounting surface / y through mounting surface
---	---

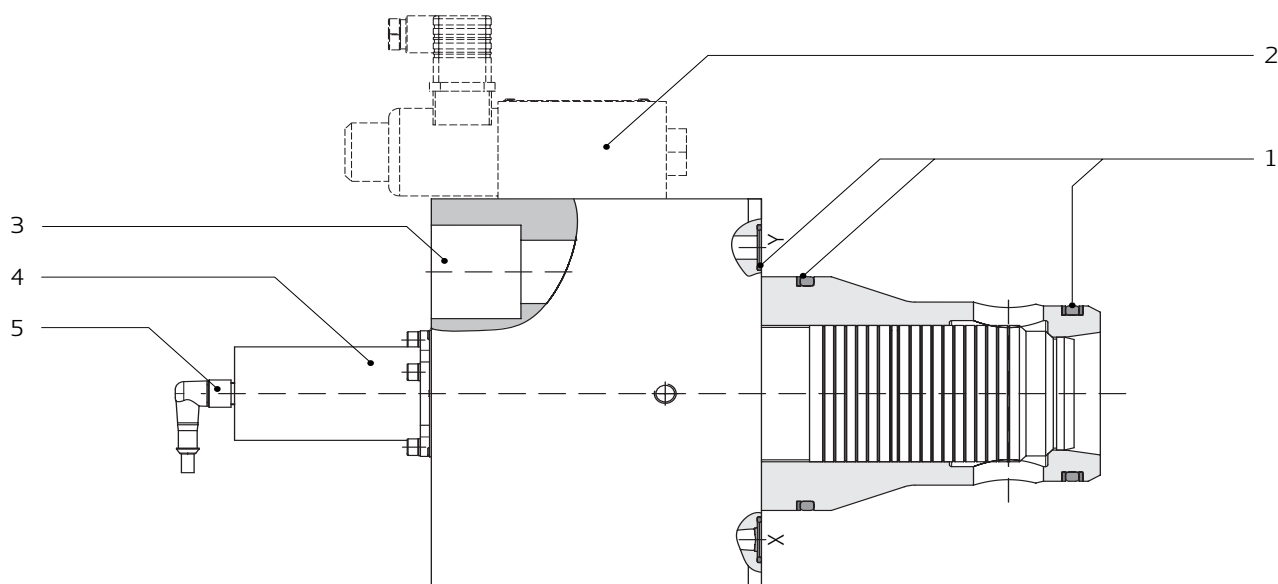
11) Opening

W	Active
---	--------

10) Area ratios

0	Standard
---	----------

Spare parts and accessories



	Position 1			Position 2			Position 3
	Seal kit for main stage			Seal kit for pilot valve NB06			Mounting bolts
	(FKM+PU)	(FKM)	(NBR)	(FKM+PU)	(FKM)	(NBR)	ISO 4762-12.9*
NB16	XSB10360 D000M00	XSB10360 D000V00	XSB10360 D000N00	XEB16512 -000M00	XEB16512 -000-00	XEB16512 -000N00	X784-10819
NB25	XSB10361 D000M00	XSB10361 D000V00	XSB10361 D000N00	XEB16512 -000M00	XEB16512 -000-00	XEB16512 -000N00	X784-11209
NB32	XSB10362 D000M00	XSB10362 D000V00	XSB10362 D000N00	XEB16512 -000M00	XEB16512 -000-00	XEB16512 -000N00	X784-11607
NB40	XSB10363 D000M00	XSB10363 D000V00	XSB10363 D000N00	XEB16512 -000M00	XEB16512 -000-00	XEB16512 -000N00	X784-12016
NB50	XSB10364 D000M00	XSB10364 D000V00	XSB10364 D000N00	XEB16512 -000M00	XEB16512 -000-00	XEB16512 -000N00	X784-12008
NB16 to NB50	Sandwich plate seal kit for WX2			XEB14500 D000M00	XEB14500 D000-00	XEB14500 D000N00	
	Interconnecting plate seal kit for WX6			XEB13051 D000M00	XEB13051 D000-00	XEB13051 D000N00	
NB63	XSB10365 D000M00	XSB10365 D000V00	XSB10365 D000N00	XEB16512 -000M00	XEB16512 -000-00	XEB16512 -000N00	X784-13006
	Seal kit for adapter plate P10-P06			XEB16360 D000M00	XEB16360 D000M00	XEB16360 D000M00	
	Interconnecting plate seal kit for WX6			XEB16116 D000M00	XEB16116 D000M00	XEB16116 D000M00	
NB80	XSB10366 D000M00	XSB10366 D000V00	XSB10366 D000N00	-	-	-	X784-12409
NB100	XSB10367 D000M00	XSB10367 D000V00	XSB10367 D000N00	-	-	-	X784-13004
all	Protective sleeve including mounting screws (Position 4)						XEB18975-000-00
	Pin connector with 10m cable** (Position 5)						X798-00127

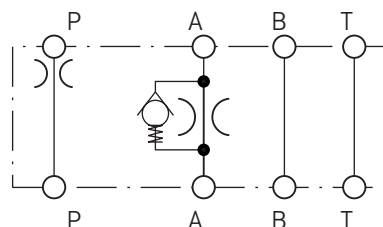
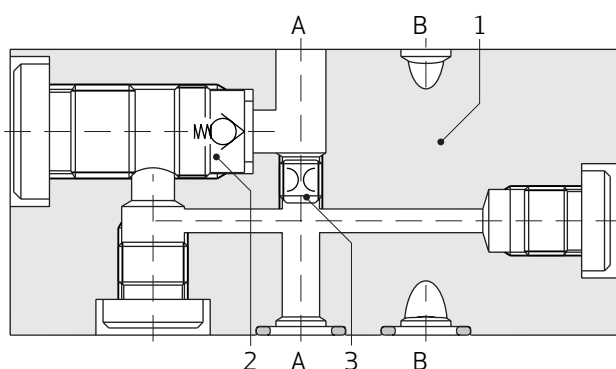
*not part of delivery

**4-pin and uninsulated with function and supply voltage displayed

Sandwich-throttle check valve

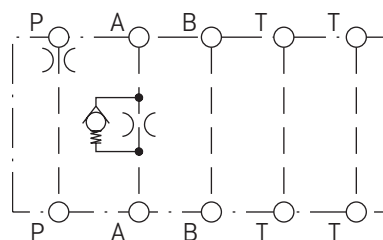
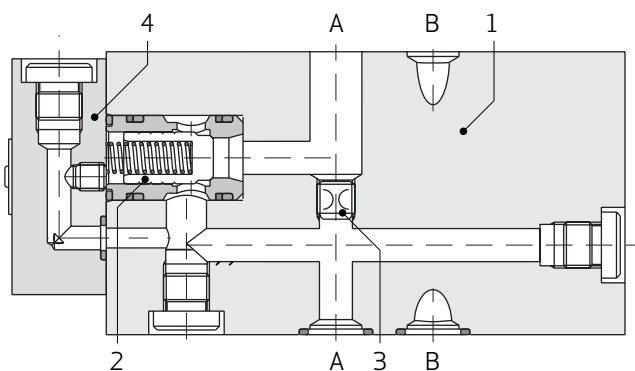
ZFDR sandwich plates are used to control opening times, allowing free flow through the check valve in the closed direction of the cartridge main stage (opening pressure approx. 0.3 bar) and limiting flow in the open direction dependent on orifice size.

NB06 (CETOP 3)



- Body (1)
- Check valve (2)
- Orifice M6 (3) for flow control

NB10 (CETOP 5)



- Body (1)
- Check valve (2)
- Orifice M8 (3) for flow control
- Check valve body (4)

Order information for sandwich-throttle check valve

NB06 (CETOP 3)

	Article	Order number
	M-ZFDRP06A4K0AS/A06	XEB15159-006M01
	M-ZFDRP06A4K0AS/A12	XEB15159-002M01
	M-ZFDRP06A4K0AS/A15	XEB15159-001M01
	M-ZFDRP06A4K0AS/A20	XEB15159-007M01
	M-ZFDRP06A4K0AS/A25	XEB15159-008M01

The opening pressure is 0.3 bar, Axx represents the orifice diameter (xx) in tenths of mm in the A port.
(Example: ZFDRP06A4K0AS/A25 → 2.5 mm orifice in A)

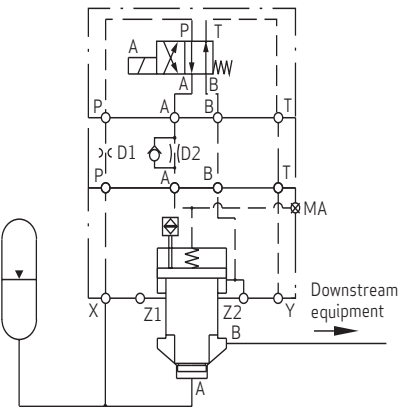
NB10 (CETOP 5)

	Article	Order number
	M-ZFDRP10A4K0AS / CEE10;A20	XEB17522-004M01
	M-ZFDRP10A4K0AS / CEE10;A25	XEB17522-005M01
	M-ZFDRP10A4K0AS / CEE10;A30	XEB17522-006M01
	M-ZFDRP10A4K0AS / CEE10;A35	XEB17522-003M01
	M-ZFDRP10A4K0AS / CEE10;A40	XEB17522-002M01

The opening pressure is 0.3 bar, Axx represents the orifice diameter (xx) in tenths of mm in the A port.
(Example: ZFDRP06A4K0AS/A25 → 3.0 mm orifice in A)

Both sandwich plates can be shipped with FKM (V-ZFDRP) or NBR (N-ZFDRP) seals, as well as a combination of FKM and (axial) PU seals (M-ZFDRP). Please specify when ordering.

Example application



In the example shown, a accumulator is controlled by a position-monitored active cartridge. A sandwich-throttle check valve is used to limit the opening speed, with orifice D2 regulating the opening time. The target value for the opening times is > 250 ms. The closing speed can be limited by the metering nozzle D1. The pressure balance in the cartridge cone must be monitored.

Technical data for the sandwich valve

Interface	NB06 (CETOP 3) NB10 (CETOP 5)		
ISO 4401-03-02-0-94	X		
ISO 4401-05-04-0-94		X	
Mounting dimensions [mm]			See Dimensions
Mounting position			Any
Seals for hydraulic fluids*	FKM + PU →	M-ZFDRP	Mineral oil-based hydraulic fluids
	FKM →	V-ZFDRP	Mineral oil-based hydraulic fluids, HFD hydraulic fluids
	NBR →	N-ZFDRP	Mineral oil-based hydraulic fluids, HFA-, HFB-, HFC-based hydraulic fluids
			Others on request

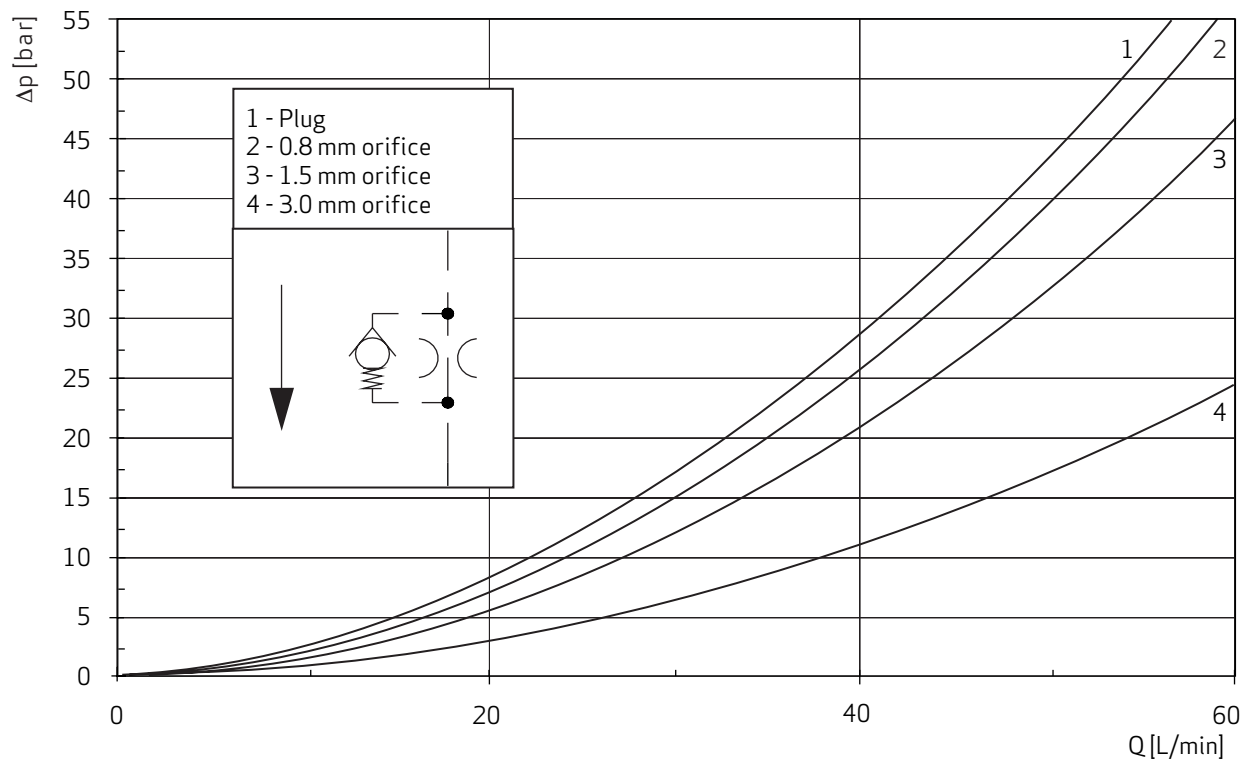
Operating parameters

Maximum operating pressure at input	$p_{max.}$	35 MPa		
Maximum operating pressure at output	$p_{max.}$	35 MPa		
Fluid temperature range	$T_{min.}$	-20 °C (NBR) -10 °C (FKM/PU)		
	$T_{max.}$	80 °C		
Viscosity range	$v_{min.}$	2.8 mm ² /s		
	$v_{max.}$	380 mm ² /s		
Operational viscosity	v	35 mm ² /s		
Mass	m	1.2 kg	3.7 kg	
Opening pressure	p_o	0.03 MPa		Other opening pressures on request
ISO cleanliness code				Max. ISO 4406 (C) class 20/18/15

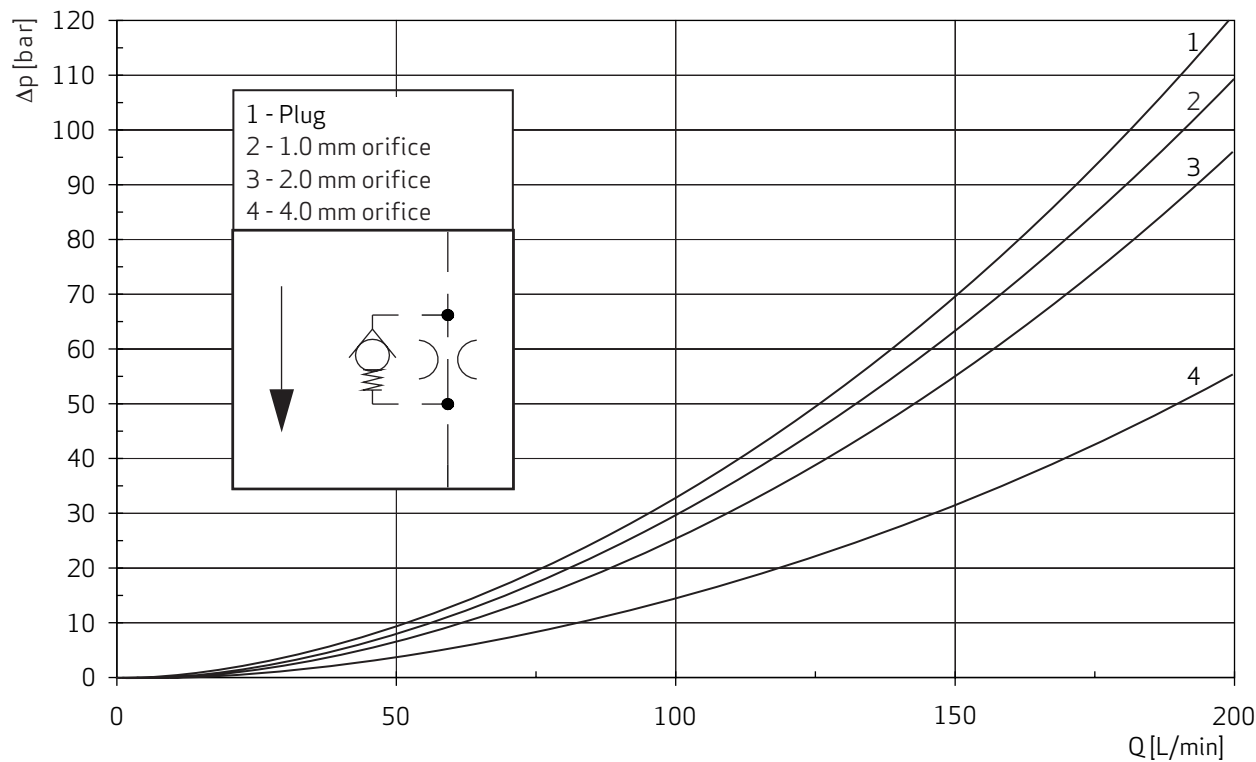
* FKM: Fluoroelastomer (Viton®); NBR: Nitrile rubber (Buna N); PU: Polyurethane Elastomer

Δp -Q curves

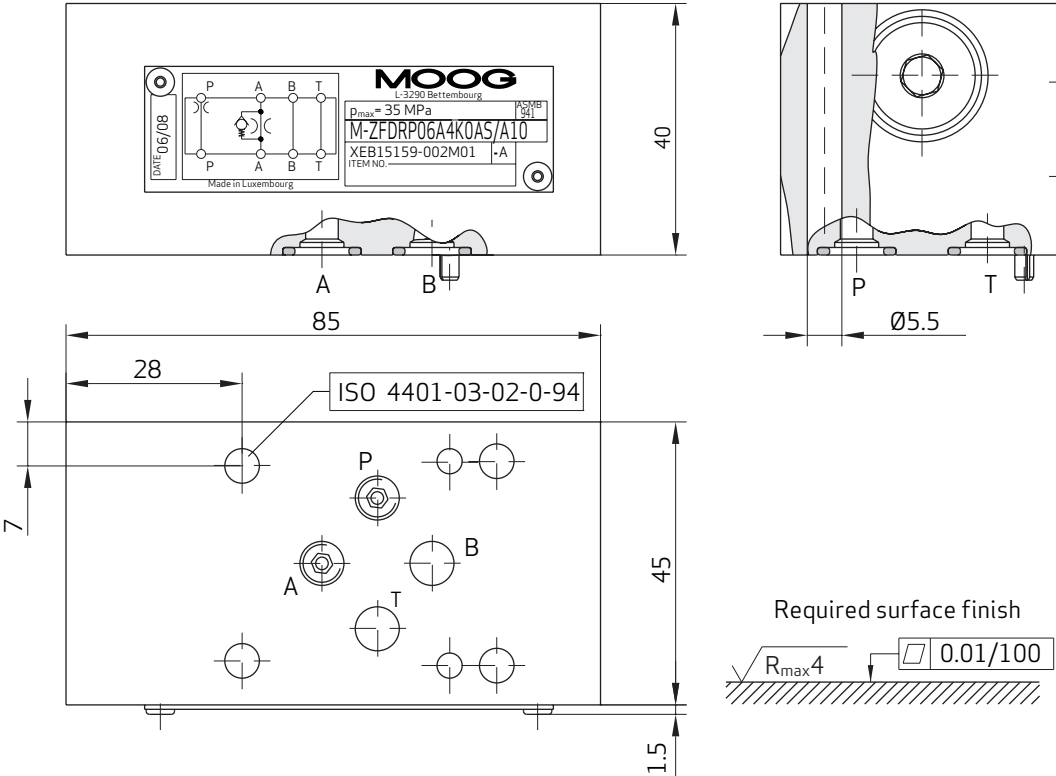
NB06 (CETOP 3)



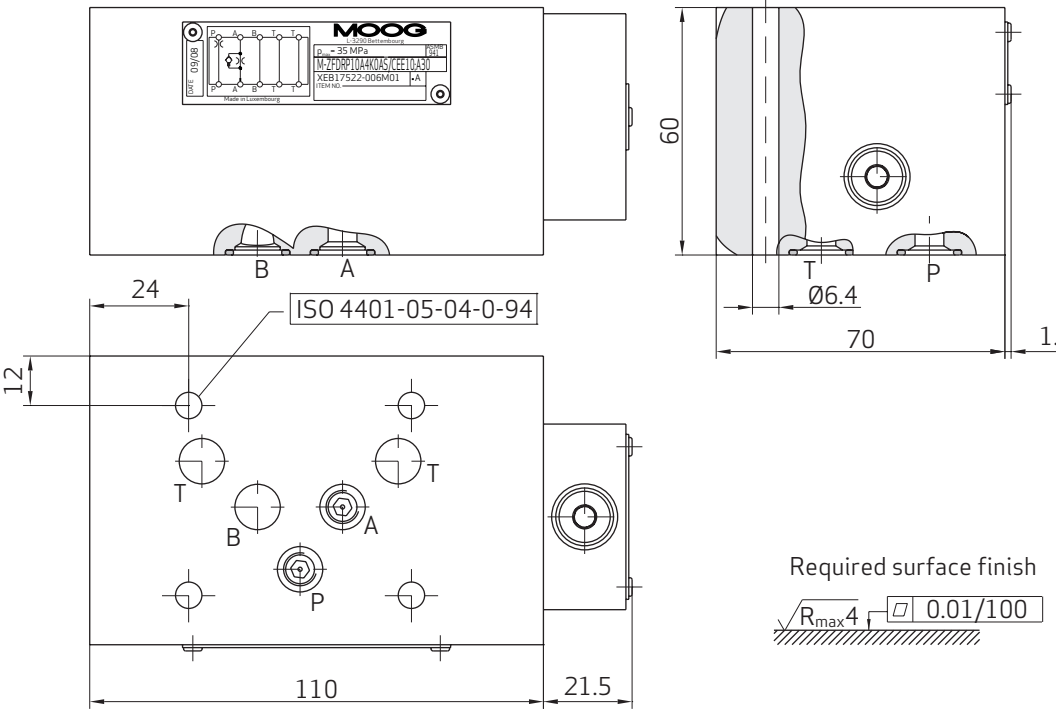
NB10 (CETOP 5)



Dimensions of the NB06 (CETOP 3) sandwich valve



Dimensions of the NB10 (CETOP 5) sandwich valve



For both sizes, the orifice is accessible through the A port from the side where the pilot valve should be mounted.

Deutsche Gesetzliche
Unfallversicherung



Bescheinigung
Nr. **MHHW 99 087**
vom **14.04.2008**

Fachausschuss Maschinenbau, Hebezeuge,
Hütten- und Walzwerksanlagen
Prüf- und Zertifizierungsstelle im BG-PRÜFZERT

Baumusterprüfbescheinigung

Name und Anschrift des
Bescheinigungsinhabers:
(Auftraggeber)

Moog Luxembourg S.à.r.l.
1, Zone d'activités économiques Krakelshaff
3290 BETTEMBOURG / LUXEMBOURG

Name und Anschrift des
Herstellers:

- siehe oben -

Produktbezeichnung:

**2/2 Wegesitzventil mit induktivem Überwachungsschalter
(Standardausführung)**

Typ:

**RSE 16•RSE 25•RSE 32•RSE 40•RSE 50•RSE 63•RSE 80•RSE 100
B(H)_6_ _WX_/(SI1)**

Bestimmungsgemäße
Verwendung:

Zur Verwendung für hydraulische Schließicherungen in Spritzgießmaschinen gemäß
Herstellereinbauanleitung

Prüfgrundlage:

- Prüfgrundsätze für die Prüfung der Arbeitssicherheit und des Gesundheitsschutzes von Spritzgießmaschinen (GS-MHHW-20), Ausgabe 07/2002
- EN 201:1997 „Gummi- und Kunststoffmaschinen SPRITZGIEßMASCHINEN – Sicherheitsanforderungen“

Zugehöriger Prüfbericht:

Bemerkungen:

- ° Das jeweilige Ventil ist gemäß § 1 Abs. 2b der Unfallverhütungsvorschrift „Spritzgießmaschinen“ (VBG 7 ac) bzw. Kapitel 5 der EN 201:1997 „Spritzgießmaschinen – Sicherheitsanforderungen“ von der Steuerung der Spritzgießmaschine selbsttätig zu überwachen, so dass auch bei Versagen des Positionsschalters ein erneuter Maschinenzyklus nicht mehr eingeleitet werden kann.
- ° Die Prüfbescheinigung schließt die Umlenkplatte für WX 6-Ausführung mit ein.
- ° Die Prüfbescheinigung bezieht sich auf die Hauptstufe. Bei Ausführung des Ventils mit 4/2-Wegevorsteuerventil (WX 1-Ausführung) ist im Rahmen einer Fehlersimulation an der ausgeführten Steuerung nachzuweisen, dass eine ausreichende Überwachung des Vorsteuerventils durch die Überwachung der Hauptstufe gewährleistet ist.

■ Folgebescheinigung zu der Prüfnummer 99 087 vom 01. September 2007 ■

Das geprüfte Baumuster entspricht den einschlägigen Bestimmungen der Richtlinie 98/37/EG (**Maschinen**).

Diese Bescheinigung wird spätestens ungültig am: **01.09.2010**

Weiteres über die Gültigkeit, eine Gültigkeitsverlängerung und andere Bedingungen regelt die Prüf- und Zertifizierungsordnung vom April 2004.



Unterschrift (Dipl.-Ing. HEINKE)

Postadresse: Postfach 10 10 15 • 40001 Düsseldorf • Hausadresse: Graf-Recke-Str. 69 • 40239 Düsseldorf
Telefon 0211 8224 - 0 • Telefax 0211 8224 - 866 • E-Mail fpuz@mmbg.de • www.mmbg.de
Zeichen der Prüf- und Zertifizierungsstelle: MHHW 612.1:612.28-UB Gb/bt



As a recognized leader in motion drive technology, Moog offers a full range of services to support our products and ensure that they meet the expectations of customers. Moog experts are the best at helping customers select the right products and ensuring that they run reliably for a long time.

When it is time for new machine commissioning, refurbishment or routine maintenance, our engineers can help to optimize machine performance, minimize downtime and ensure the smooth application of our products.

Moog Authentic Repair™ is designed to provide the highest quality repair services using original equipment parts, the latest design specifications, and highly trained technicians. This ensures that our repaired products will run as well as when they were new.

With facilities in over 25 countries, Moog is committed to offering convenient local service to our customers.

Visit www.moog.com/industrial/worldwide to find the location nearest you for application engineering, repair, or field services.

MOOG.COM/INDUSTRIAL

Moog solutions are only a click away. Visit our Web site for more information and the Moog facility nearest you.

Argentina
+54 (0) 11 4326 5916
info.argentina@moog.com

Italy
+39 0 332 421 111
info.italy@moog.com

Singapore
+65 677 36238
info.singapore@moog.com

Australia
+61 (0) 3 9561 6044
info.australia@moog.com

Japan
+81 (0) 46 355 3767
info.japan@moog.com

South Africa
+27 (0) 12 653 6768
info.southafrica@moog.com

Brazil
+55 (0) 11 3572 0400
info.brazil@moog.com

Korea
+82 (0) 31 764 6711
info.korea@moog.com

Spain
+34 902 133 240
info.spain@moog.com

China
+86 (0) 21 2893 1600
info.china@moog.com

Luxembourg
+352 40 46 401
info.luxembourg@moog.com

United States of America
+1 (1) 716 652 2000
info.usa@moog.com

Germany
+49 (0) 7031 622 0
info.germany@moog.com

Netherlands
+31 (0) 252 462 000
info.netherlands@moog.com

United Kingdom
+44 (0) 168 429 6600
info.unitedkingdom@moog.com

Finland
+358 (0) 9 2517 2730
info.finland@moog.com

Norway
+47 6494 1948
info.norway@moog.com

France
+33 (0) 1 4560 7000
info.france@moog.com

Austria
+43 (0) 664 144 6580
info.austria@moog.com

Hong Kong
+852 2 635 3200
info.hongkong@moog.com

Russia
+7 (8) 31 713 1811
info.russia@moog.com

India
+91 (0) 80 4120 8785
info.india@moog.com

Sweden
+46 (0) 31 680 060
info.sweden@moog.com

Ireland
+353 (0) 21 451 9000
info.ireland@moog.com

Switzerland
+41 (0) 71 394 5010
info.switzerland@moog.com

www.moog.com/industrial

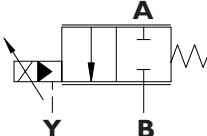
©2008 Moog, Inc.

Moog is a registered trademark of Moog Inc. All trademarks as indicated herein are the property of Moog Inc. and its subsidiaries. All rights reserved.

RSE_H-1-EN-Position-Monitored Active Cartridge

Differential Proportional Flow Control Valve DPCMEE 16 & 20



Designation	Symbol	Page
General Description and Operating Principle		4
Specifications		5
Performance Data DPCMEE16 - CK; EK and DK Cones		6
Response Characteristics Frequency & Step Response- DPCMEE16		7
Performance Data DPCMEE20 - CK; EK and DK Cones		8
Response Characteristics Frequency & Step Response- DPCMEE20		9
Standard Models		10
Dimensions Valve & Cavity Dimensions - DPCMEE16		11
Dimensions Valve & Cavity Dimensions - DPCMEE20		12
Ordering Information		13
Spare Parts		14

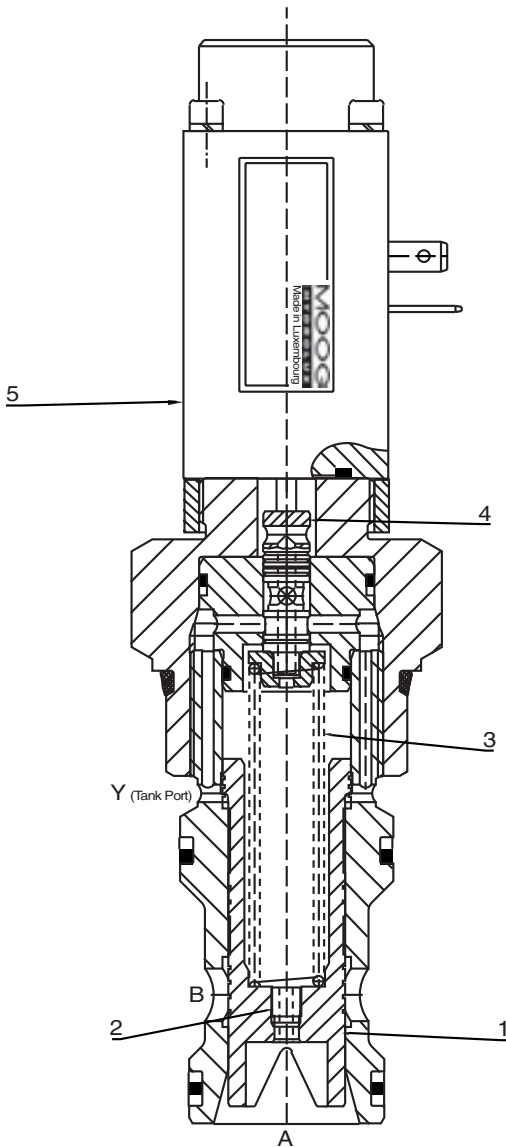
General Description and Operating Principle

DESCRIPTION:

Moog Luxembourg's DPCMEE series differential proportional flow control valves are used to regulate flow from 'A' port to 'B' port. This valve uses a self-regulating hydraulic design for control of flow rate by a current-controlled PWM signal. This screw-in cartridge type valve is designed to fit in SAE style cavity with UNF thread for use in manifolds. It can also be used in conjunction with 2- or 3-way pressure compensators as a 2- or 3- way pressure compensated flow control valve.

OPERATING PRINCIPLE:

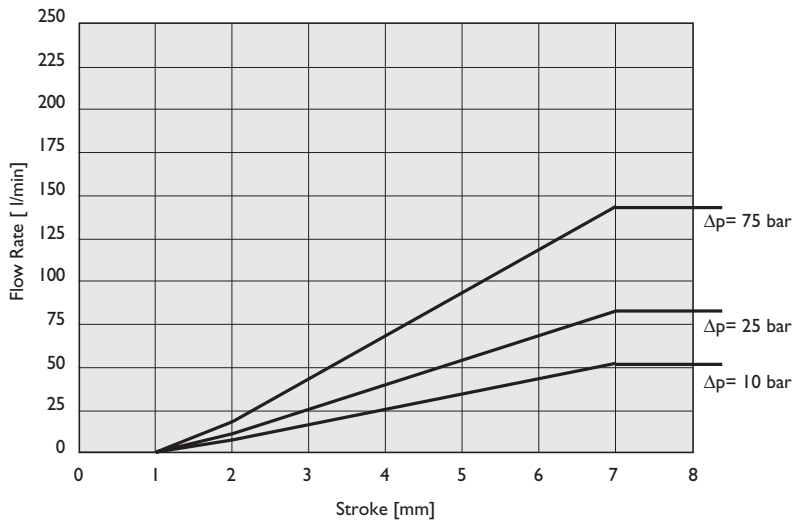
This valve is in a normally closed condition. In the closed condition the pressure of the fluid at the 'A' port is sensed through the orifice (2) and acts on the main spool (1). Since the pilot spool (4) is a pressure balanced design, the main spool is held closed due to the hydraulic pressure and the spring (3) force. When a current signal is applied to the valve, the proportional solenoid (5) extends. The force of the solenoid (5), which is directly proportional to the applied signal, pushes the pilot spool (4) downwards. At this time the pilot spool (4) connects the pilot side flow to the tank port internally, thus creating a pressure drop across the orifice (2). This will allow the main spool to move upwards, allowing flow from 'A' port to 'B' port. As the main spool (1) opens, the forces become unbalanced between the spring (3) and solenoid (5) acting on the pilot spool (4). At which time this force balance is reestablished, the main spool (1) stops moving. This allows the valve to be used for proportionally controlling the flow by steplessly varying the input current signal.



General Data	Value	Unit	Specifications
Designation			Differential-proportional flow control valve
Type Designation			Refer to Ordering Information page 13
Mode of Construction			Cartridge-Screw-in-Valve
Mounting Style			Manifold Mounting
Branch Circuit Connection			Drillings in the Manifold
Mounting Dimensions		mm	See page 11 and 12
Mounting Position			Any
Flow Direction			A → B
Ambient Temperature Range	min.	°C	-25
	max.	°C	+60
Working Pressure			
Input	min.	bar	5
	max.	bar	350
Outlet	min.	bar	0
	max.	bar	350
Fluid Temperature Range	min.	°C	-20
	max.	°C	+80
Viscosity Range	min.	cSt	2,8
	max.	cSt	380
Operational Viscosity	Vn	cSt	35
Connection Bore = Size (mm)			See page 11 and 12
Weight of Typical Assembly		kg	See page 10
Nominal Flow	Qn	l/min	See Page 6 and 8
Filtration	Maximum permissible degree of contamination of fluid to NAS 1638 Class 9. We there fore recommend a filter with a minimum retention rate of $\beta_{10} \geq 75$.		

Performance Data

Performance Curve DPCMEE16S8 – Cone CK



Formula:

To calculate flow at different pressure drops, use the following formula:

$$Q_x = Q_{\Delta p 10} \sqrt{\frac{\Delta p_x}{10}}$$

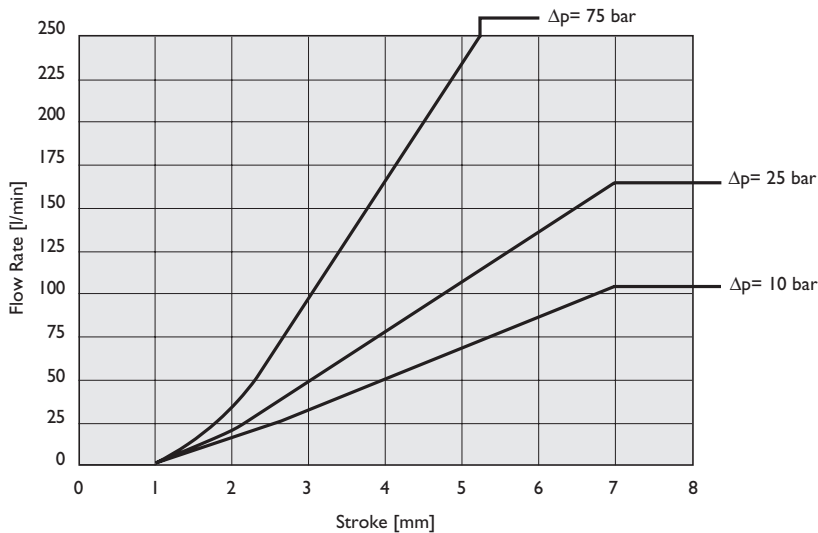
Where:

Q_x = Flow at pressure drop Δp_x -lpm

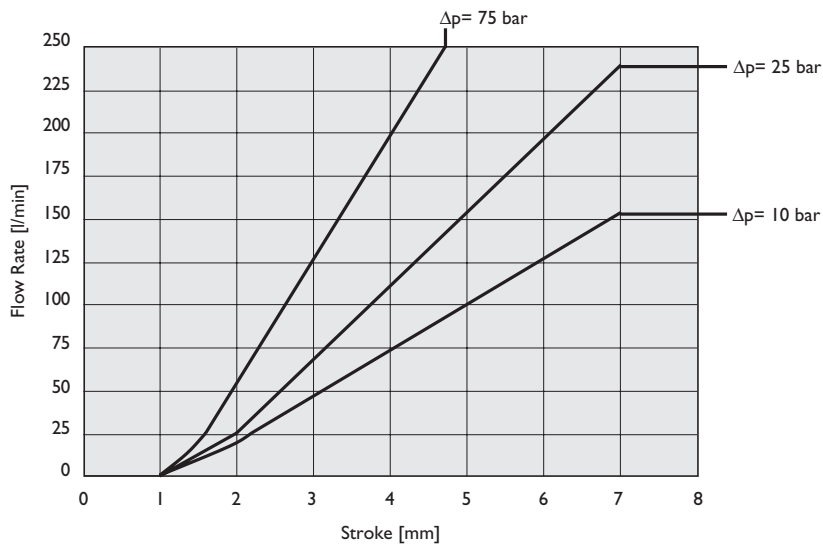
$Q_{\Delta p 10}$ = Flow at 10 bar pressure drop (from the curves)

Δp_x = Pressure drop in bar at which flow is calculated

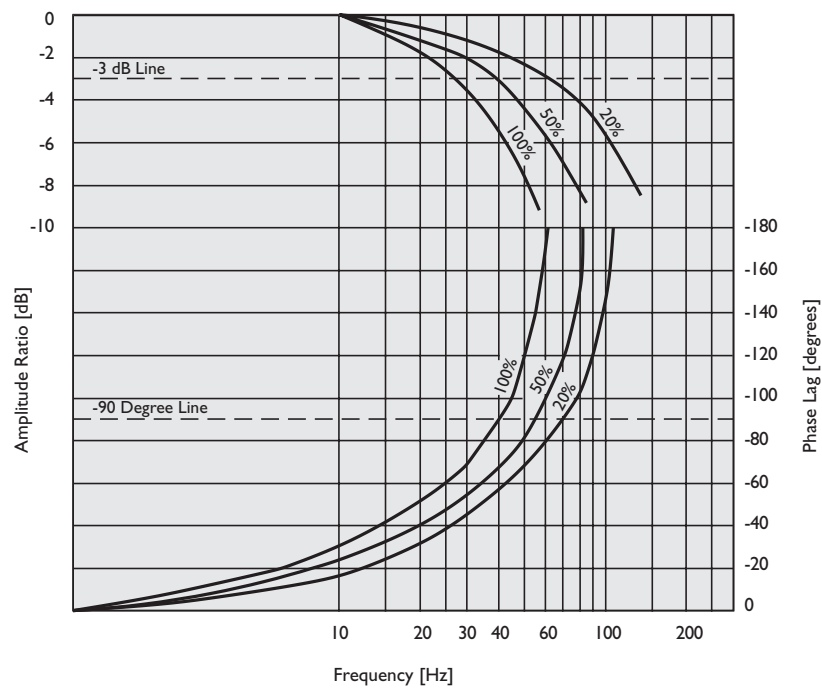
Performance Curves DPCMEE16S8 – Cone EK



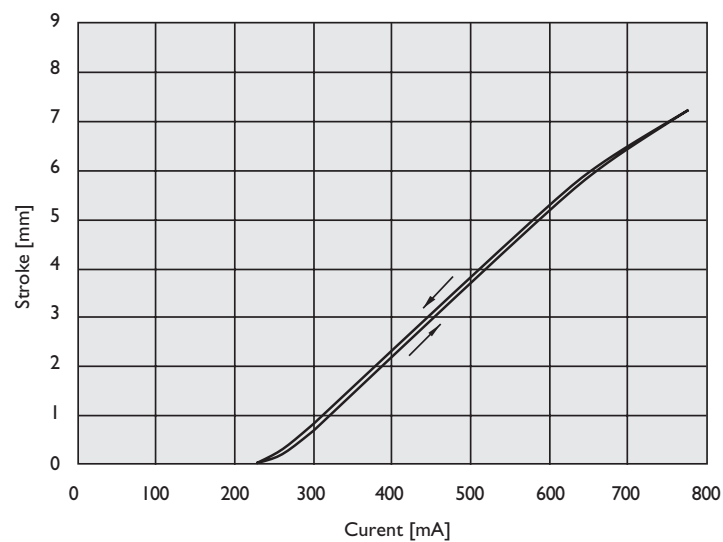
Performance Curves DPCMEE16S8 – Cone DK



Frequency Response – DPCMEE16S8

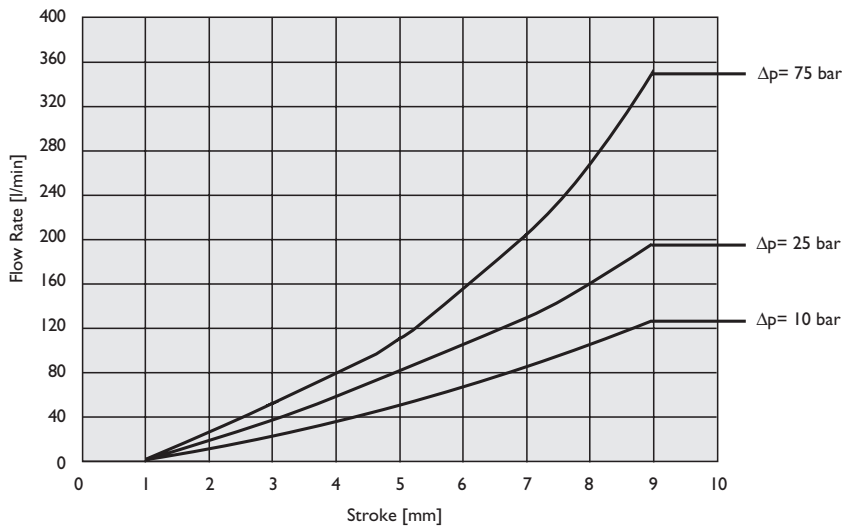


Current vs Stroke Characteristic Curve DPCMEE16S8



Performance Data

Performance Curves – DPCMEE20S8 – Cone CK



Formula:

To calculate flow at different pressure drops, use the following formula:

$$Q_x = Q_{\Delta p 10} \sqrt{\frac{\Delta p_x}{10}}$$

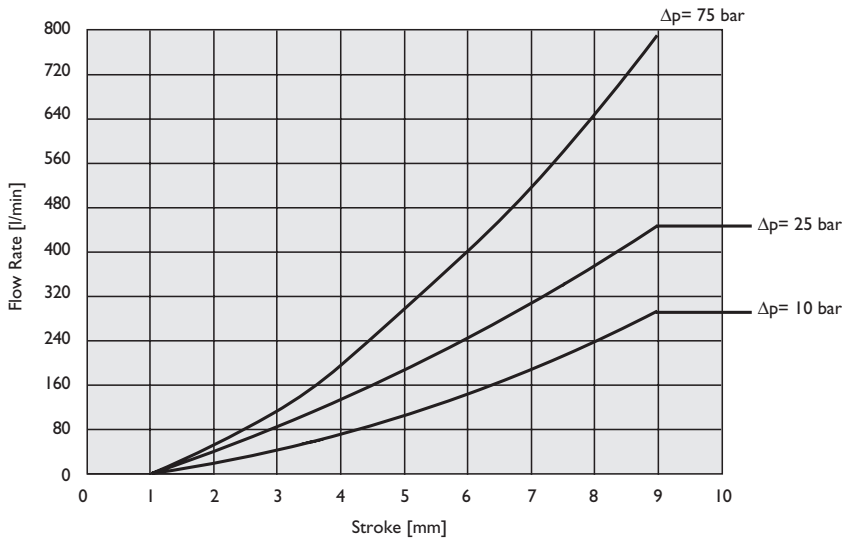
Where:

Q_x = Flow at pressure drop Δp_x -lpm

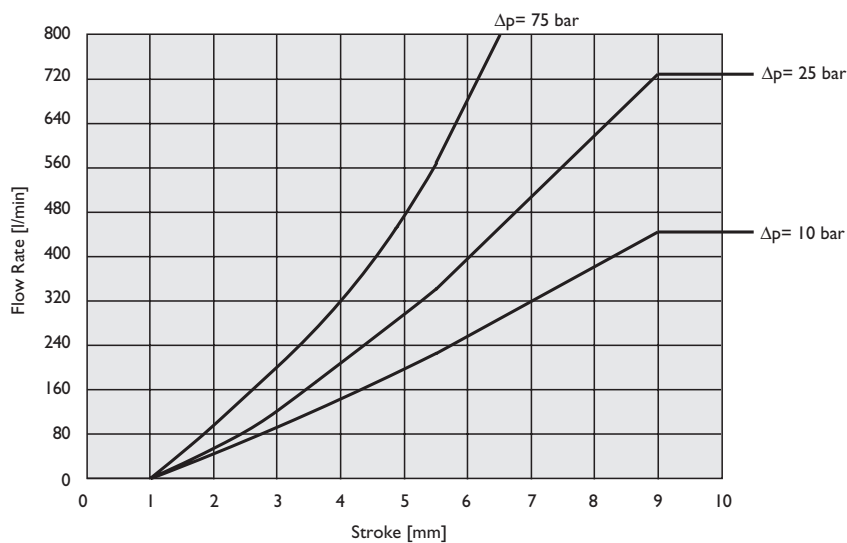
$Q_{\Delta p 10}$ = Flow at 10 bar pressure drop (from the curves)

Δp_x = Pressure drop in bar at which flow is calculated

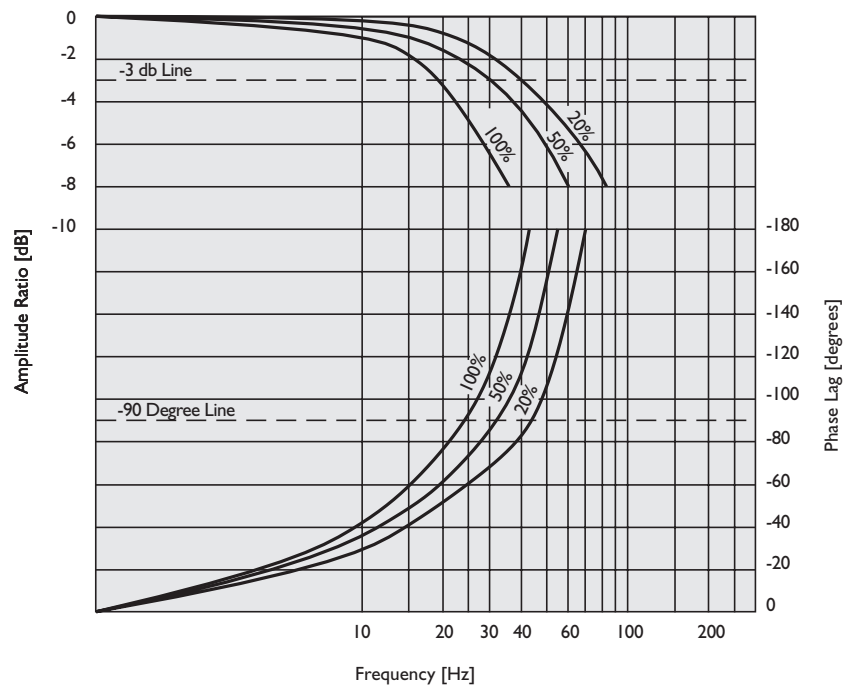
Performance Curves – DPCMEE20S8 – Cone EK



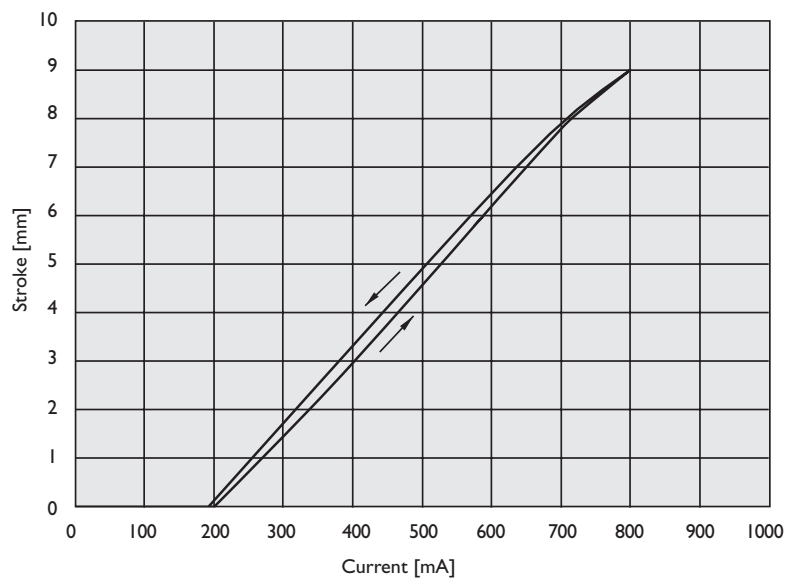
Performance Curves – DPCMEE20S8 – Cone DK



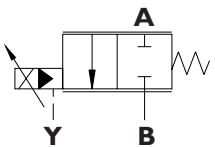
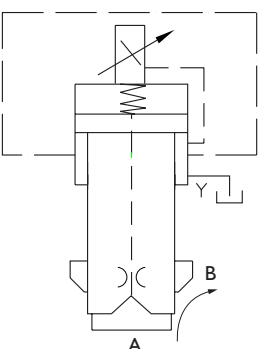
Frequency Response – DPCMEE20S8



Current vs Stroke Characteristic Curve DPCMEE20S8

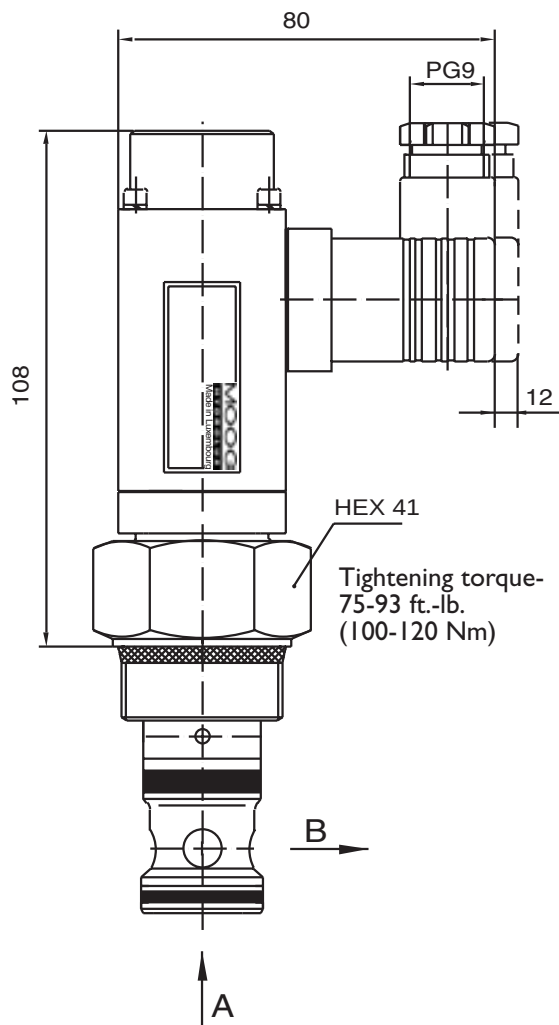


Standard Models

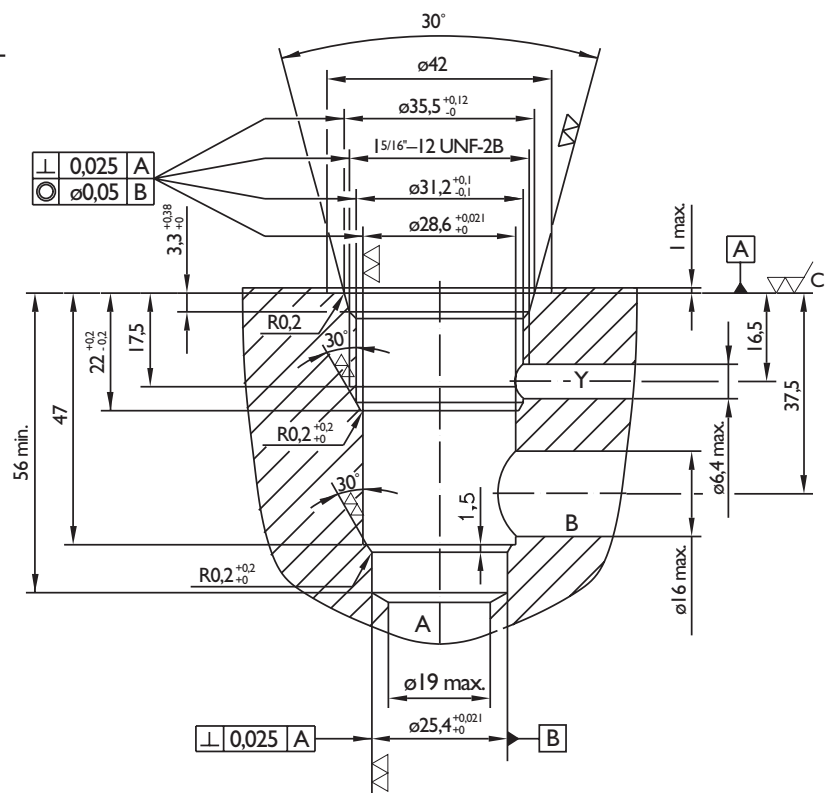
Symbol	Function	Nominal Size*	Weight [kg]	Part Designation	Part Number
 	Proportional Throttle	16	1.2	DPCMEE16S8CK0ZS3A	XDB10424-000-01
				DPCMEE16S8CK0ZS3B	XDB10108-000-01
				DPCMEE16S8EK0ZS3A	XDB10423-000-01
				DPCMEE16S8EK0ZS3B	XDB10107-000-01
				DPCMEE16S8DK0ZS3A	XDB10425-000-01
				DPCMEE16S8DK0ZS3B	XDB10109-000-01
		20	1.5	DPCMEE20S8CK0ZS3A	XDB10462-000-01
				DPCMEE20S8CK0ZS3B	XDB10110-000-01
				DPCMEE20S8EK0ZS3A	XDB10461-000-01
				DPCMEE20S8EK0ZS3B	XDB10111-000-01
				DPCMEE20S8DK0ZS3A	XDB10463-000-01
				DPCMEE20S8DK0ZS3B	XDB10112-000-01

*Nominal size refers to the Standard Industrial "Short Series" screw-in cavities. Refer to pages 11 & 12 for cavity details.

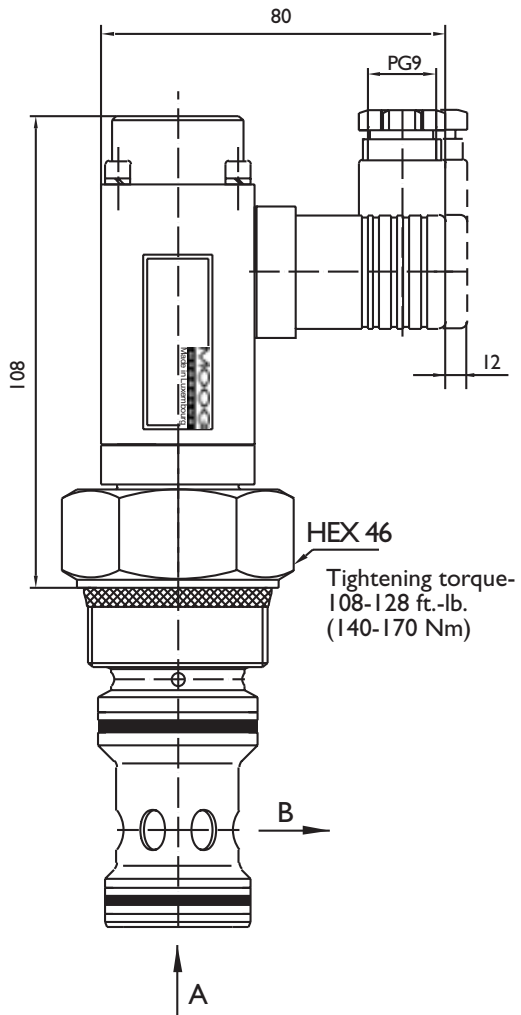
Valve Dimensions - DPCMEE16S8



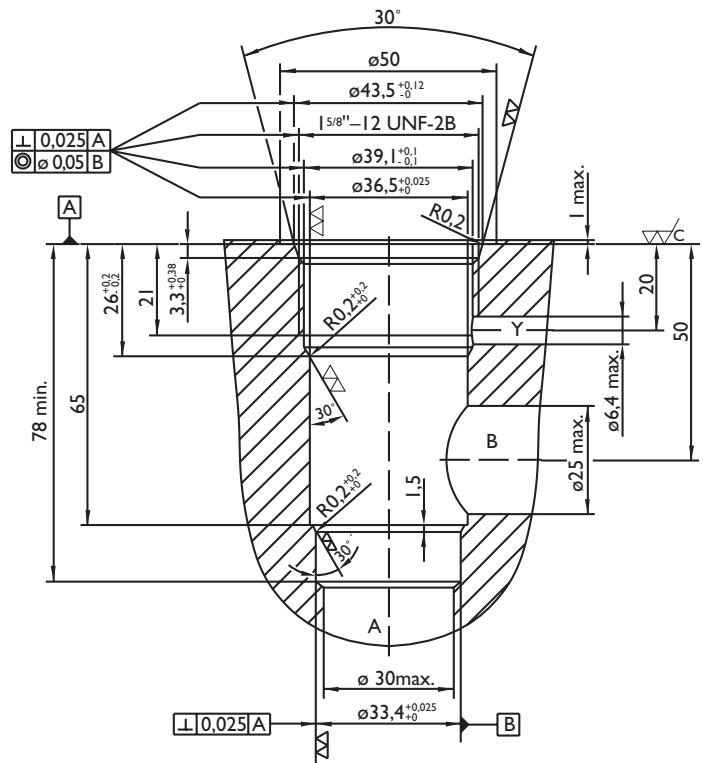
Cavity Dimensions - DPCMEE16S8



Valve Dimensions - DPCMEE20S8



Cavity Dimensions - DPCMEE20S8



	DP	CME	E		S	8			Z	S	3			/	
--	----	-----	---	--	---	---	--	--	---	---	---	--	--	---	--

Type of Seals

–	Viton seals std.
M	MIXED VITON and PU seal
N	BUNA – N SEALS
S	Special seals on request

Valve Type

DP	Differential Proportional Flow control
----	--

Function

CME	Electrical infinite Remote control
-----	------------------------------------

Mounting

E	Manifold mounting
---	-------------------

Size

Nominal size	16
	20

Connection

S	SAE thread
---	------------

Series

8	Screw-in valve
---	----------------

Opening pressure

Z	Not applicable
---	----------------

Flow Rate of the Cone – l/min

0	Standard flow
xxx	Max flow for the cone in l/min ex: 170 = Max flow, 170 l/min

Type of Cones & Nominal Flow @ 6 bar pressure drop – l/min

Nominal Size – 16		Nominal Size – 20	
CK	40	CK	100
EK	80	EK	200
DK	120	DK	300
GK	Special form (consult factory)	GK	Special form (consult factory)

Electrical connection (Optional)

1	Cube plug recommended by DIN 43650
2	Large cube plug with cable strain relief

Solenoid supply voltage

A	12VDC
B	24VDC

Operation

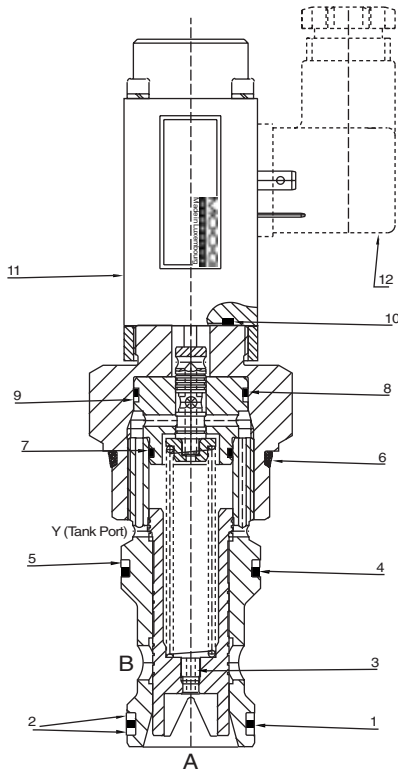
3	Stepless stroke with proportional control
---	---

Pilot connection

S	'X' through cone 'Y' through mounting surface
---	--

Special modification

Spare Parts



PARTS LIST				
Position #	Quantity	Designation	Part Number	
			DPCMEE16S8	DPCMEE20S8
—	1	Seal Kit	XEB12544-000-00	XEB13696-000-00
1	1	O-ring, Viton 21.95 x 1.78	X980-02020	
	1	O-ring, Viton 28.24 x 2.62		X980-02122
2	2	Back-up Ring	X783-00062	
	2	Back-up Ring		X783-00077
3	1	Orifice M5 x 5 x 1.0	X784-90510	
4	1	O-ring, Viton 23.47 x 2.62	X980-02119	
	1	O-ring, Viton 31.42 x 2.62		X980-02124
5	1	Back-up Ring	X783-00030	
	1	Back-up Ring		X783-00078
6	1	O-ring, Viton 29.82 x 2.62	X980-02123	
	1	O-ring, Viton 37.77 x 2.62		X980-02128
7	1	O-ring, Viton 12.42 x 1.78	X980-02014	
	1	O-ring, Viton 18.77 x 1.78		X980-02018
8	1	O-ring, Viton 20.35 x 1.78	X980-02019	
	1	O-ring, Viton 26.70 x 1.78		X980-02023
9	1	Back-up Ring	X783-00043	
	1	Back-up Ring		X783-00079
10	1	O-ring, Viton 18.77 x 1.78	X980-02018	
	1	O-ring, Viton 18.77 x 1.78		X980-02018
11	1	Prop. Solenoid - 12V DC	X788-10126	
	1	Prop. Solenoid - 24V DC	X788-32202	
12*	1	Plug-in Connector w/o LED, DIN 43650 / ISO 4400 (PG9)-Black	X798-00004	
	1	Plug-in Connector w/o LED, DIN 43650 / ISO 4400 (PG9)-Grey	X798-00005	
	1	Big Plug-in Connector w/o LED, DIN 43650 / ISO 4400 (PG11)-Black	XEB16580-000-00	
	1	Big Plug-in Connector w/o LED, DIN 43650 / ISO 4400 (PG11)-Grey	XEB16577-000-00	
	1	Big Plug-in Connector with LED 24VDC and free wheeling, DIN 43650 / ISO 4400 (PG11)-Black	XEB16581-000-00	
	1	Big Plug-in Connector with LED 24VDC and free wheeling, DIN 43650 / ISO 4400 (PG11)-Grey	XEB16578-000-00	

Recommended Amplifiers*

—	1	HAN 209 - 10 - 08 (for use with 24VDC supply voltage coils only) - Eurocard style 100 x 160 mm	X798-02005
		HAN 209 - 10 - 16 (for use with 12VDC supply voltage coils only) - Eurocard style 100 x 160 mm	X798-02006
		SKDHD32S - Card Holder for above.	X798-02013
		STV1010 - Plug-in box IP65 rated (for use with 24VDC supply voltage coils only) 104 x 45 x 51 mm	X798-02060
		STV1010 - Plug-in box IP65 rated (for use with 12VDC supply voltage coils only) 104 x 45 x 51 mm	X798-02061
		Snap-on module EM1020 (only for use with 24VDC supply voltage coil models) 79 x 74 x 22.5	X798-02031

*OPTIONAL – Not part of delivery.



Australia
Brazil
China

Denmark
England
Finland
France



Germany
India
Ireland
Italy

Japan
Korea
Luxembourg
Philippines
Singapore
Spain
Sweden
USA

MOOG

MOOG Luxembourg S.à r.l.
1, ZAE Krakelshaff
L-3290 Bettembourg
Tel: (+352) 40 46 40-1
Fax: (+352) 40 46 40-909
E-mail: info.luxembourg@moog.lu

Proportional throttle cartridge valve
PCME/PCLME NG16-NG50

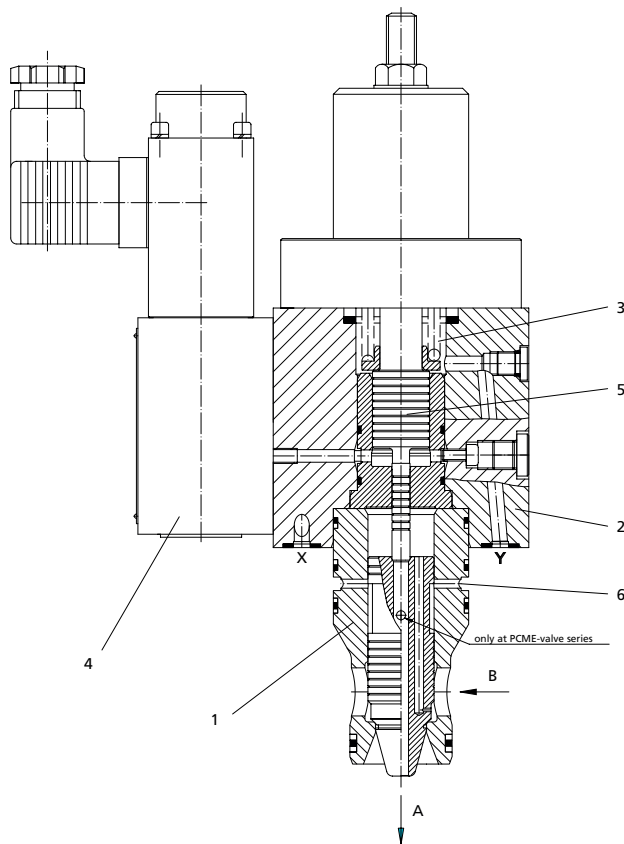


CONTENTS

PCME/PCLME

Description	Page
General description	4
Specifications	5
Characteristic curves	6
Mounting dimensions	9
Dimensions	11
Standard models	13
Ordering information	14
Spare parts	15
Electronics	16

This catalogue is for users with technical knowledge. To ensure that all necessary characteristics for function and safety of the system are given, the user has to check the suitability of the products described here in. In case of doubt please contact Moog Hydrolux.



Technical design

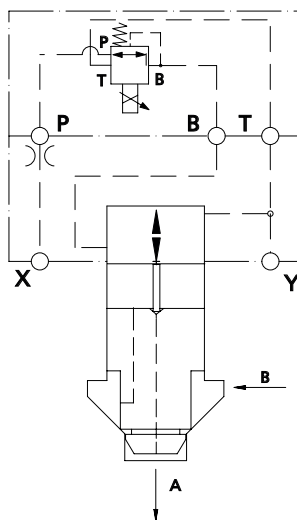
- ❶ Main stage cartridge
- ❷ Cover
- ❸ Pressure spring
- ❹ Proportional pressure reducing valve
- ❺ Pilot piston
- ❻ Load sensing

Proportional throttle cartridge valve solenoid pilot operated (PCME-Valve)

The proportional throttle valve of the PCME-series is a low pressure controlled, piloted throttle valve in cartridge version.

An integrated proportional pressure reducing valve ❹, electronically controlled by 200-800mA positions the pressure compensated pilot piston ❺ against a strong spring ❸. This pilot piston ❶ is followed by the main stage cone.

The PCME valve offers additionally the possibility of load sensing ❻ (PCLME-valve series, picture on right side) for example on applications as electro-hydraulic operated flow control valve.



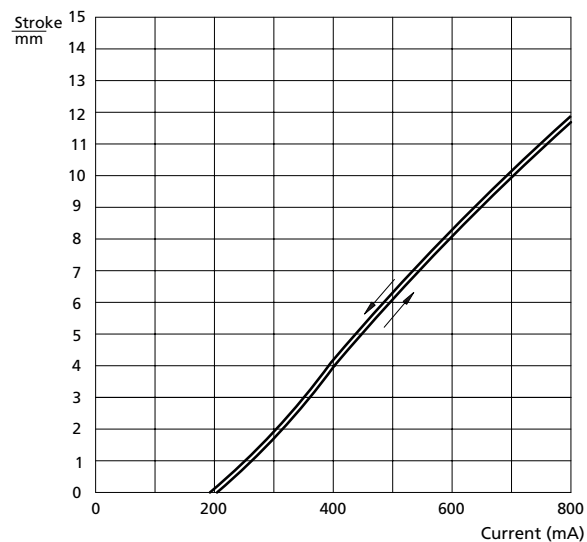
SPECIFICATIONS

PCME/PCLME

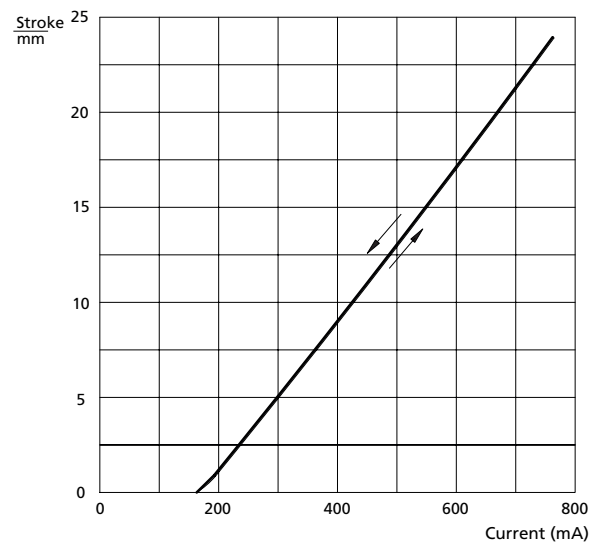
General Data	Value	Unit	Specifications				
Designation and symbol	-	-	Proportional throttle cartridge valve				
Type designation	-	-	see How to order page 14				
Mode of construction	-	-	pilot operated seat valve				
Manner of mounting	-	-	manifold cartridge mounting				
Mounting dimensions	-	mm	see mounting dimensions page 9 + 10				
Mounting position	-	-	any				
Flow direction	-	-	B -> A				
Ambient temperature range	min.	°C	-25				
	max.	°C	+60				
Working pressure							
Input	min.	bar	0				
	max.	bar	350				
Output	min.	bar	0				
	max.	bar	350				
Temperature	min.	°C	-25				
	max.	°C	+80				
Viscosity range	min.	mm ² • s ⁻¹ [cSt]	2,8				
	max.	mm ² • s ⁻¹ [cSt]	380				
Operational viscosity	v	mm ² • s ⁻¹ [cSt]	35				
Size	-	-	NG16	NG25	NG32	NG40	NG50
Weight	m	kg	3,3	5,7	9,7	11,7	23,6
Nominal flow at Δp = 10bar	Qn	l/min	see characteristic curves 7				

Solenoid current - Stroke curves

NG16-40

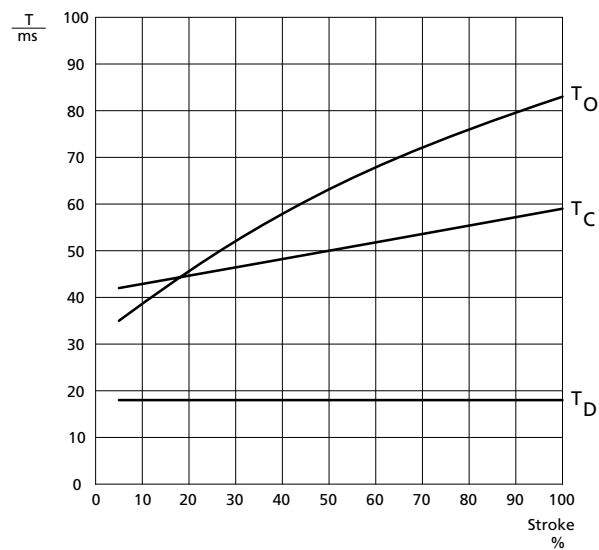


NG50



Closing time

Closing time NG16-40

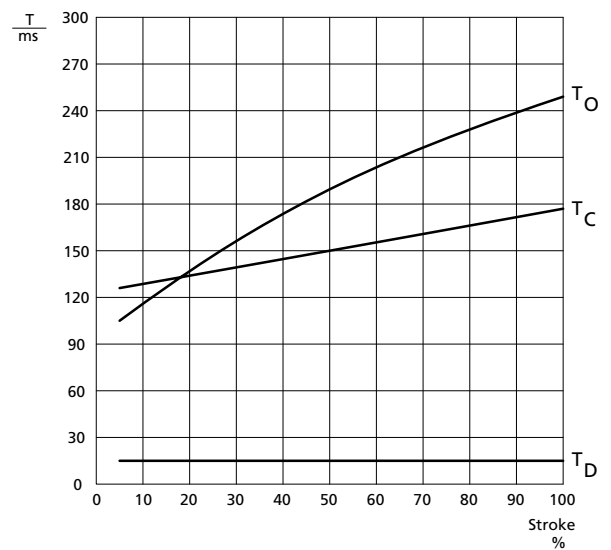


T_O = Opening time

T_C = Closing time

T_D = Dead band

Closing time NG50

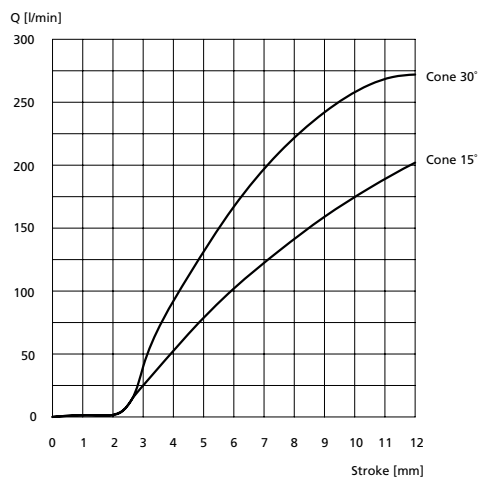


CHARACTERISTIC CURVES

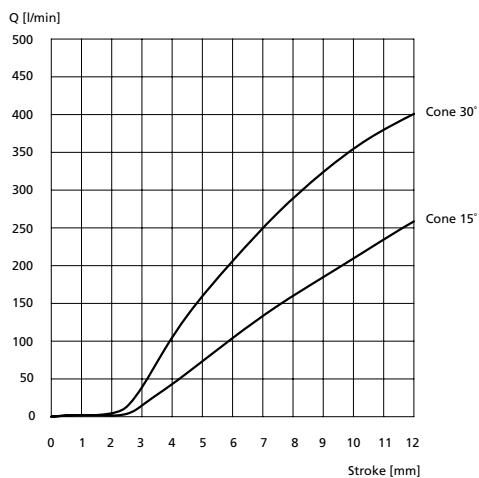
PCME/PCLME

Δp - Q Characteristic curves at $\Delta p = 10$ bar

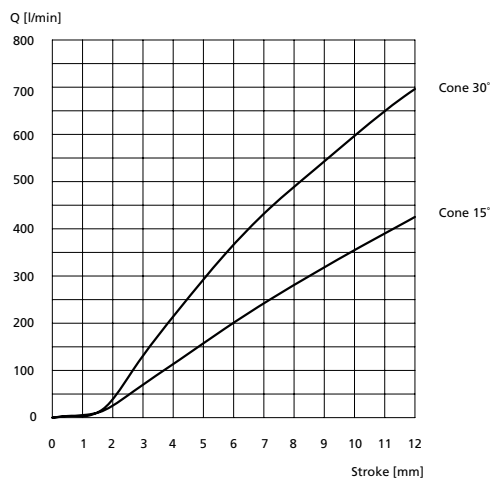
NG16



NG25



NG32



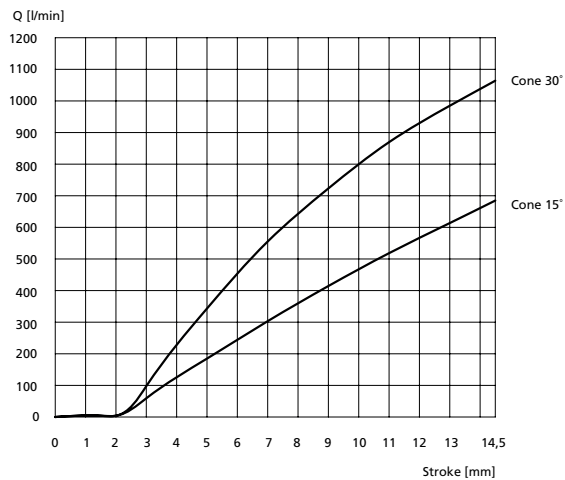
Oil temperature 45°C

Calculation of the flow Q_x
for other pressure differences Δp_x :

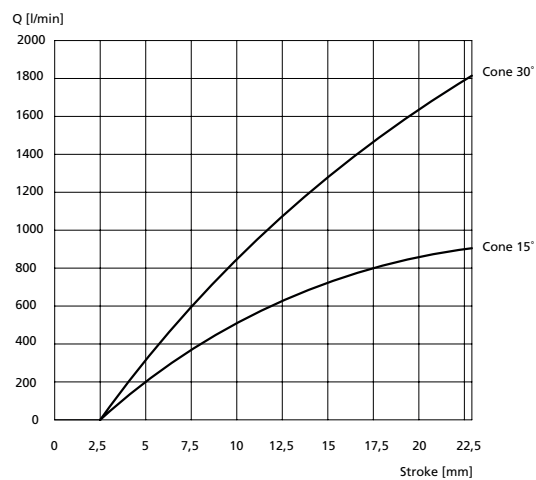
$$Q_x = Q \cdot \sqrt{\frac{\Delta p_x}{10}}$$

Δp - Q Characteristic curves at $\Delta p = 10$ bar

NG40



NG50



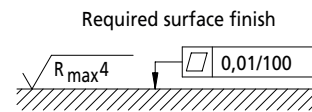
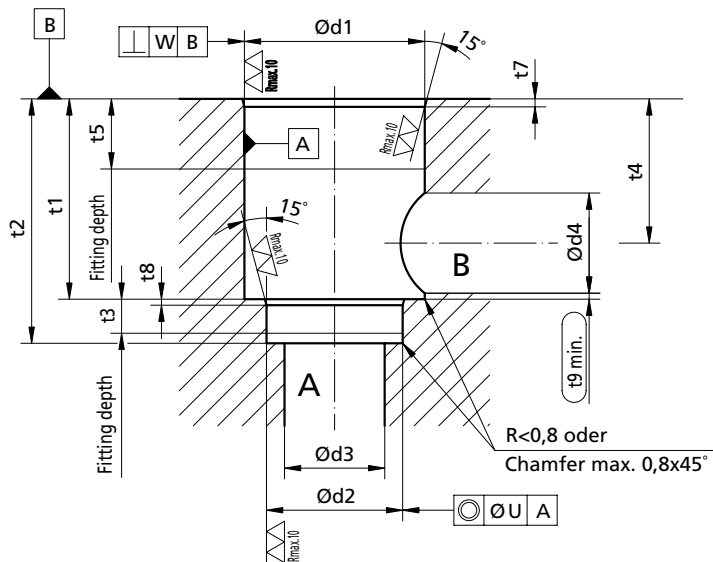
Oil temperature 45°C

Calculation of the flow Q_x
for other pressure differences Δp_x :

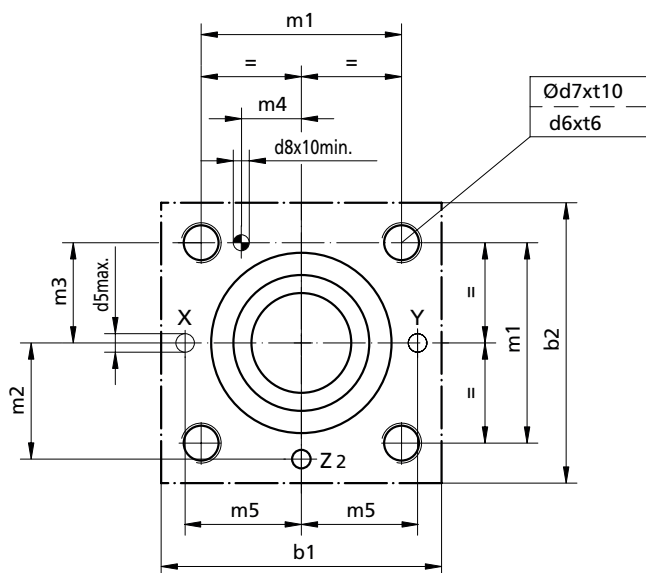
$$Q_x = Q \cdot \sqrt{\frac{\Delta p_x}{10}}$$

Mounting dimensions NG16-NG50 (without load sensing)

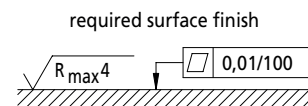
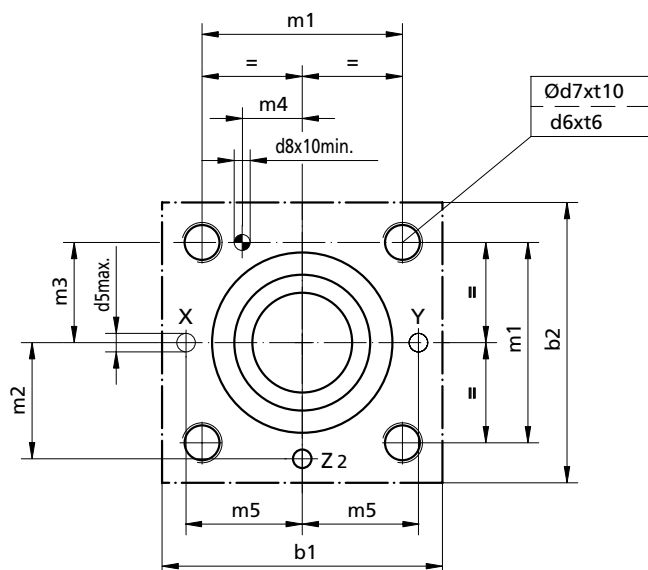
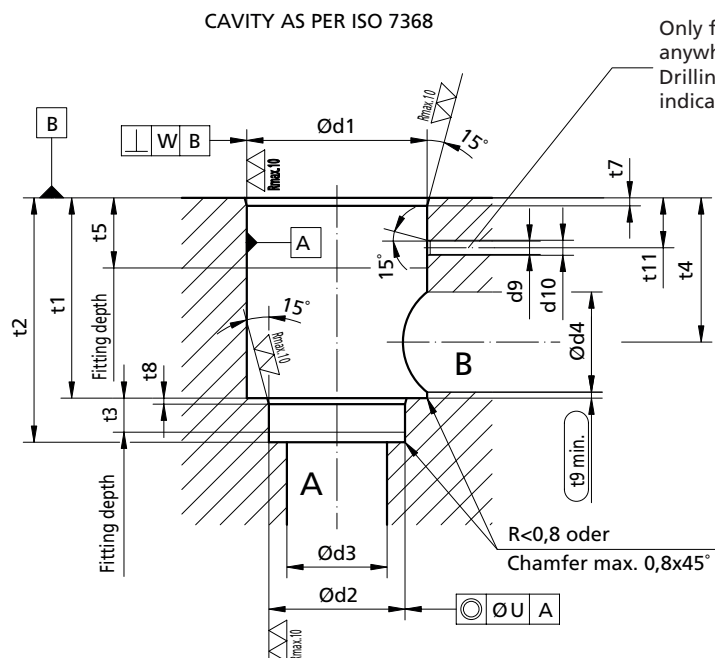
CAVITY AS PER ISO 7368



Dimensions	NG16	NG25	NG32	NG40	NG50
b1	65	85	102	125	140
b2	65	85	102	125	140
d1 ^{H7}	32	45	60	75	90
d2 ^{H7}	25	34	45	55	68
d3	16	25	32	40	50
d4	16	25	32	40	50
d4 max.	25	32	40	50	63
d5 max.	4	6	8	10	10
d6	M8	M12	M16	M20	M20
d7	6,8	10,2	14	17,5	17,5
d8 ^{H13}	4	6	6	6	8
m1 ± 0,2	46	58	70	85	100
m2 ± 0,2	25	33	41	50	58
m3 ± 0,2	23	29	35	42,5	50
m4 ± 0,2	10,5	16	17	23	30
m5 ± 0,2	25	33	41	50	58
t1 ± 0,1	43	58	70	87	100
t2 ± 0,1	56	72	85	105	122
t3	11	12	13	15	17
t4	34	44	52	64	72
t4 at d4 max.	29,5	40,5	48	59	65,5
t5	20	30	30	30	35
t6	14	20	26	33	33
t7	2	2,5	2,5	3	4
t8	2	2,5	2,5	3	3
t9	0,5	1,0	1,5	2,5	2,5
t10	17	24	31	38	38
U	0,03	0,03	0,03	0,05	0,05
W	0,05	0,05	0,1	0,1	0,1



Mounting dimensions NG25-NG50 (with load sensing)

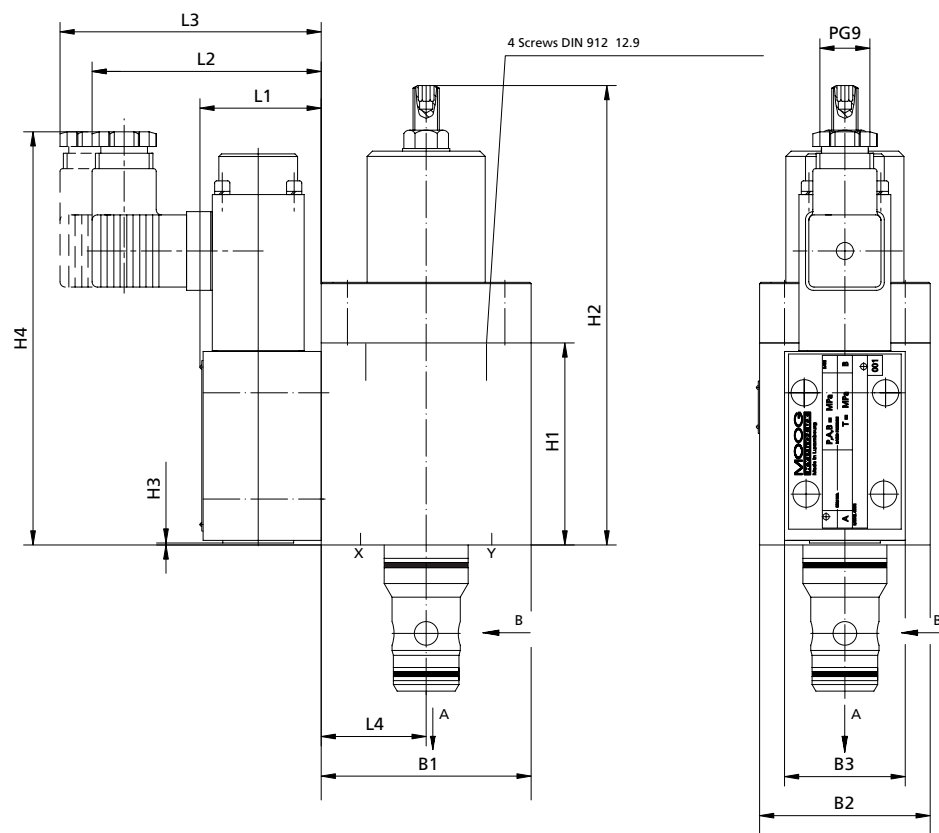


Dimensions	NG25	NG32	NG40	NG50
b1	85	102	125	140
b2	85	102	125	140
d1 ^{H7}	45	60	75	90
d2 ^{H7}	34	45	55	68
d3	25	32	40	50
d4	25	32	40	50
d4 max.	32	40	50	63
d5 max.	6	8	10	10
d6	M12	M16	M20	M20
d7	10,2	14	17,5	17,5
d8 ^{H13}	6	6	6	8
d9 max.	3	4	6	6
d10 max.	4	6	9	9
m1 ± 0,2	58	70	85	100
m2 ± 0,2	33	41	50	58
m3 ± 0,2	29	35	42,5	50
m4 ± 0,2	16	17	23	30
m5 ± 0,2	33	41	50	58
t1 + 0,1	58	70	87	100
t2 + 0,1	72	85	105	122
t3	12	13	15	17
t4	44	52	64	72
t4 at d4 max.	40,5	48	59	65,5
t5	30	30	35	35
t6	20	26	33	33
t7	2,5	2,5	3	4
t8	2,5	2,5	3	3
t9	1,0	1,5	2,5	2,5
t10	24	31	38	38
t11	12	13,4	16,7	17
U	0,03	0,03	0,05	0,05
W	0,05	0,1	0,1	0,1

DIMENSIONS

PCME/PCLME

Dimensions PC(L)ME valves NG16-NG40



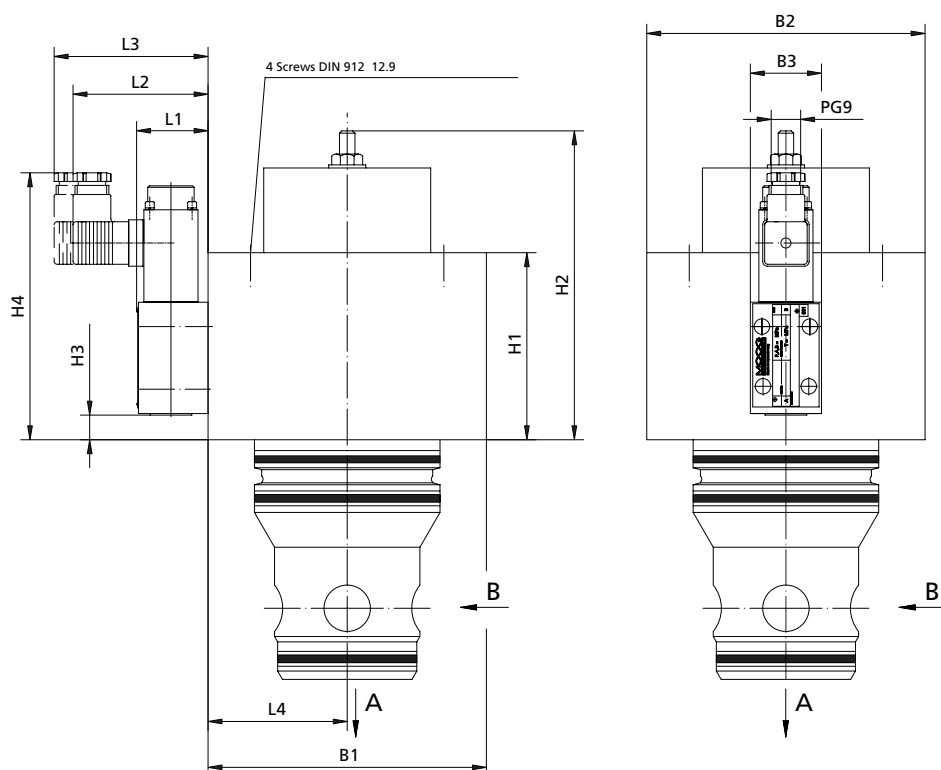
Dimensions	NG16	NG25	NG32	NG40
H1 [mm]	77	80	84	84
H2 [mm]	177	180	184	184
H3 [mm]	1	3	5	5
H4 [mm]	158	160	159	159
L1 [mm]	45	45	45	45
L2 [mm]	88	88	88	88
L3 [mm]	100	100	100	100
L4 [mm]	40	42,5	58	58
B1 [mm]	80	85	116	125
B2 [mm]	65	85	100	125
B3 [mm]	45	45	45	45
*S = Screws DIN EN ISO 4762-12.9	4x M8 x 100	4x M12 x 100	4x M16 x 90	4x M20 x 90
Tightening torque M _A [Nm]	30	100	300	550

* not part of the delivery

DIMENSIONS

PCME/PCLME

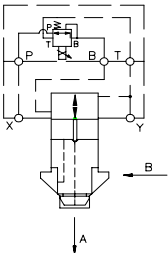
Dimensions PC(L)ME valves NG50



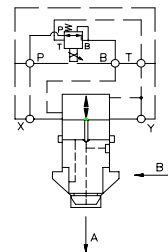
Dimensions	NG50
H1 [mm]	123
H2 [mm]	208
H3 [mm]	18
H4 [mm]	172
L1 [mm]	45
L2 [mm]	88
L3 [mm]	100
L4 [mm]	70
B1 [mm]	140
B2 [mm]	140
B3 [mm]	45
*S = Screws DIN EN ISO 4762-12.9	4x M20 x 120
Tightening torque MA [Nm]	550

* not part of the delivery

PCME Standard valves

Symbol	Cone	NG	Weight [kg]	Description	Part number
	15° Cone	16	3,3	PCMEE16A6C0ZX3B	XPB10048-000-01
		25	5,7	PCMEE25A6C0ZX3B	XPB10077-000-01
		32	9,7	PCMEE32A6C0ZX3B	XPB10078-000-01
		40	11,7	PCMEE40A6C0ZX3B	XPB10025-000-01
		50	23,6	PCMEE50A6C0ZX3B	XPB10028-000-01
	30° Cone	16	3,3	PCMEE16A6E0ZX3B	XPB10049-000-01
		25	5,7	PCMEE25A6E0ZX3B	XPB10066-000-01
		32	9,7	PCMEE32A6E0ZX3B	XPB10046-000-01
		40	11,7	PCMEE40A6E0ZX3B	XPB10004-000-01
		50	23,6	PCMEE50A6E0ZX3B	XPB10059-000-01

PCLME Standard valves

Symbol	Cone	NG	Weight [kg]	Description	Part number
	15° Cone	25	5,7	PCLMEE25A6C0ZX3B/LP	XPB10030-000-01
		32	9,7	PCLMEE32A6C0ZX3B/LP	XPB10034-000-01
		40	11,7	PCLMEE40A6C0ZX3B/LP	XPB10035-000-01
		50	23,6	PCLMEE50A6C0ZX3B/LP	XPB10073-000-01
	30° Cone	25	5,7	PCLMEE25A6E0ZX3B/LP	XPB10076-000-01
		32	9,7	PCLMEE32A6E0ZX3B/LP	XPB10024-000-01
		40	11,7	PCLMEE40A6E0ZX3B/LP	XPB10088-000-01
		50	23,6	PCLMEE50A6E0ZX3B/LP	XPB10089-000-01

ORDERING INFORMATION

PCME/PCLME

	-	P		E		A	6		0	Z	X	3	B		/	
--	---	---	--	---	--	---	---	--	---	---	---	---	---	--	---	--

Seals	
without ind.	FPM/FKM (Standard)
M	FPM/FKM + PUR
N	NBR

Valve type	
P	Proportional-throttle cartridge valve

Valve function	
CME	solenoid pilot operated
CLME	solenoid pilot operated with load sensing (only for NG25-50)

Mounting	
E	Manifold mounting

Size	
16	NG16
25	NG25
32	NG32
40	NG40
50	NG50

Serial number	
---------------	--

Series	
6	Mounting dimensions per DIN 24342

Modification => only PCLME valves	
LP	Load-sensing positive (Standard)
LN	Load-sensing negative

Electrical connection	
0	Connection per DIN 43650 without plug
1	Cube plug per DIN 43650

Solenoid supply	
B	24 VDC

Function	
3	steppless stroke by proportional control

Pilot port	
X	x through mounting surface / y through mounting surface

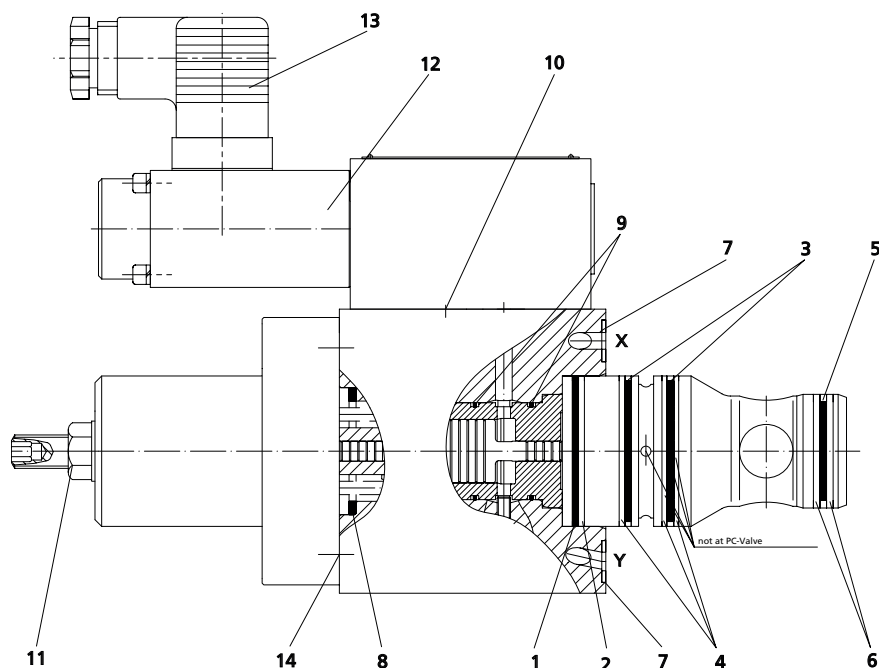
Spring	
Z	Standard

max. Flow at $\Delta p = 15\text{bar}$	
0	Standard Flow

Cone type	
C	PC-Cone, small seat with dampening nose 15°
E	PC-Cone, small seat with dampening nose 30°

SPARE PARTS

PCME/PCLME



Pos.	Designation		Part number				
			NG16	NG25	NG32	NG40	NG50
	Seal kit	XEB	12273	12273	12274	12275	12276
1	O-Ring	X980-	02122	02030	02139	02148	02152
2	Back-Up Ring	X780-	08122	18030	08139	18148	18152
3	O-Ring	X980-	02024	02030	02139	02148	02152
4	Back-Up Ring	X780-	18024	18030	08139	18148	18152
5	O-Ring	X980-	02020	02122	02222	02225	02229
6	Back-Up Ring	X780-	08020	18122	18222	18225	18229
7	O-Ring	X980-	02010	02012	02013	02112	02112
8	O-Ring	X980-	02120	02125	02125	02125	02125
9	O-Ring	X980-	02022	02022	02022	02022	02022
10	O-Ring	X980-	02112	02112	02112	02112	02112
11	Seal-Lock Collar Nut	X786-	11108	11108	11108	11108	11108
12	Solenoid valve	X788-	10243	10243	10243	10243	10243
13	Cube plug gray	X798-	00005	00005	00005	00005	00005
	Cube plug black	X798-	00004	00004	00004	00004	00004
14	Screws	X784-	10811	11209	11605	12015	12008

Order example: O-Ring Pos.3 NG40 => Part number: X980-02148

Plug amplifier STV1010

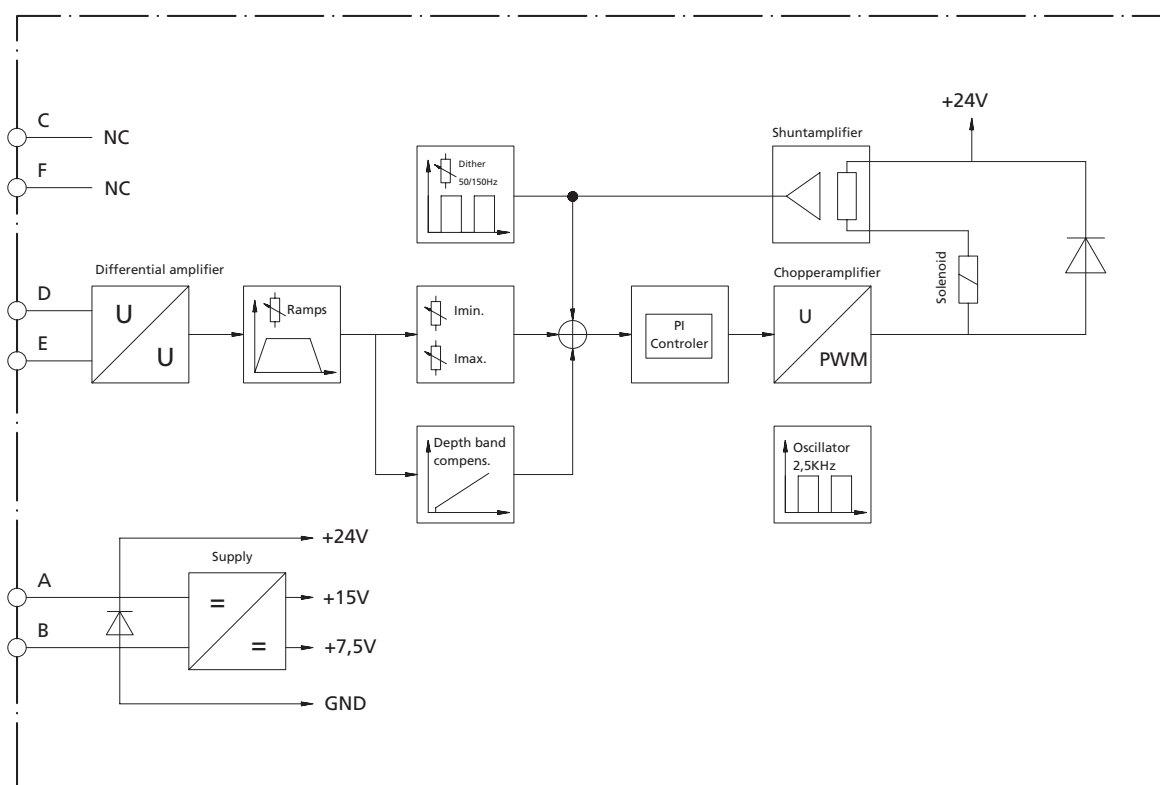
The plug amplifier has the function of actuating proportional valves without position control. It is plugged directly into the valve solenoid plug.

Part number

Part number	Description
XEB15753-001-01	STV1010AC15AF50R0T0A1



Diagram



Specification STV1010

Supply Voltage	19...30V DC
max. Output current	1.5A
Input voltage	-0,4V bis 15V (gegen GND)
Signal Output	0...10V
Connection	Connection an solenoid: DIN 43650 Connection on plug amplifier: 6pin+PE DIN 43563
Dither frequency	50Hz with Jumper
Dimensions (LxBxH)	104x45x51
Weight	ca. 200g

For further technical data please take our electronics catalogue

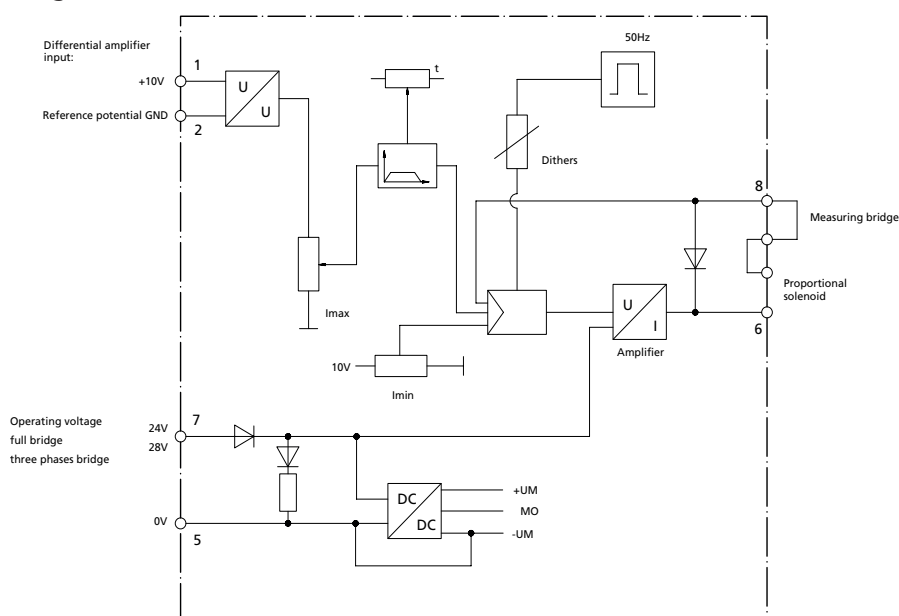
Amplifier module EM1020

These amplifier modules are suitable for controlling a proportional solenoid. They are to be snapped onto carrier rails according to DIN 50 022. The electrical connection is made by means of screw terminals. The modules are powered by 24 V DC. The solenoid current (actual value) is measured and compared with the externally provided command value. Any occurring difference between the actual and command value, caused, e.g., by changes in the solenoid temperature or the operating voltage, are balanced.

Part number

Part number	Description
X798-02031	EM1020 (50Hz)

Diagram



Specification EM1020

Supply Voltage	24...28V DC
max. Output current	0...1,2A (1,3A max. Power)
min. Output current	0...800mA
Signal output	0...10V
Ramp time	0,1...7s
Dither frequency	50Hz with Jumper
Mounting style	Mounting rail NS 35/7,5 to DIN 50022
Connection	Screw terminals
Dimensions (LxBxH)	74x79x22,5
Weight	ca. 130g

For further technical data please take our electronics catalogue

Amplifier card HAN209 for proportional valves with one solenoid

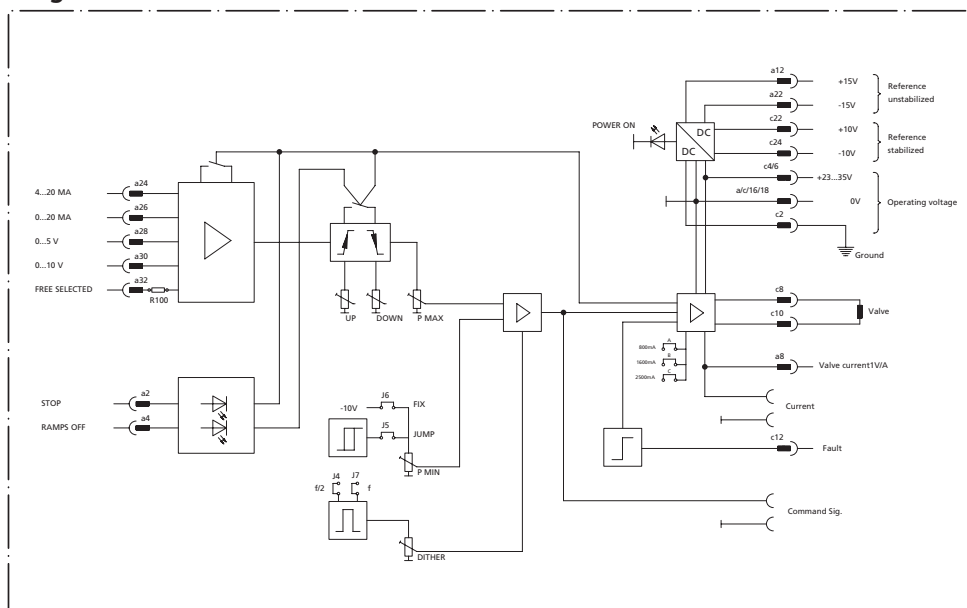
The amplifier card HAN209 is for proportional valves with one solenoid. They are used to control the input for proportional pressure adjustment valve and throttles. The module is with 5 inputs equipped. (1x 4...20mA, 1x 0...20mA, 1x 0...5V, 1x 0...10V, 1x free selected 10kV/V). The card can be closed external over the approved input. The ramp time can be leave separate for the pressure climp and for the pressure drop.

Part number

Part number	Description
X798-02005	Amplifier card HAN209



Diagram



Specification HAN209

Supply Voltage	24V DC nominal 20...35V DC smooth battery-tension ca. 16...24V DC rectified change voltage
Output current	$I_{\max} = 0...800\text{mA}$
Command value input	1x 4...20mA 100Ω 1x 0...20mA 100Ω 1x 0...5V 50kΩ 1x 0...10V 100kΩ 1x free selected 10kΩ/V
Connection	32-pin blade connector DIN 41612 D32
Dimensions (LxBxH)	186,5mm x 128,4mm X 40mm, Front panel: 3HE x 8TE
Weight	ca. 210g

For further technical data please take our electronics catalogue



Australia
Brazil
China

Denmark
England
Finland
France



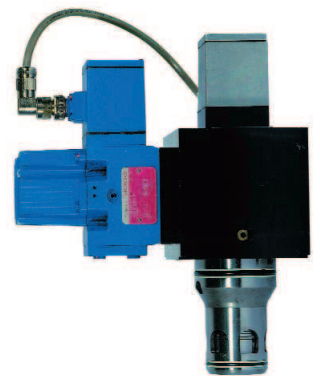
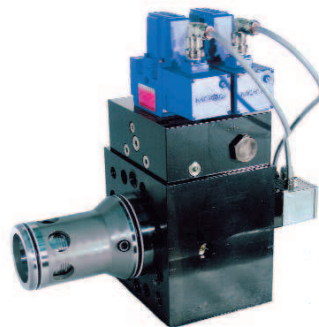
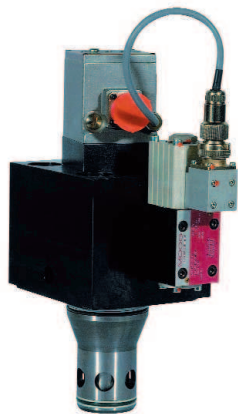
Germany
India
Ireland
Italy

Japan
Korea
Luxembourg
Philippines
Singapore
Spain
Sweden
USA

MOOG
HYDROLUX

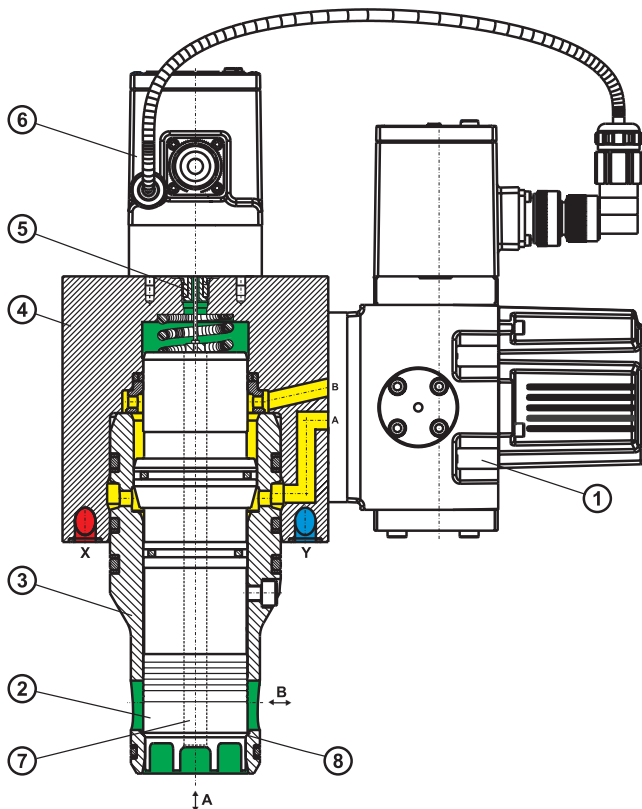
MOOG HYDROLUX S.à.r.l.
1, rue de l'Acierie
L-1112 LUXEMBOURG
Tel: (+352) 40 46 40-1
Fax: (+352) 40 46 40-909
E-mail: administration@moog.lu

DSHR 2/2-Way Servo cartridge valve
NB40, 50, 63, 80, 100, 125, 160



Description	Page
General description	3
Symbols	4
Specifications	5
Block circuit diagram of the integrated electronics	6
Characteristic curves + Cone types	7
Models	8
Dimensions	11
Ordering Information	24
Fail-safe functions	25
Spare parts	26
Specifications accumulator for sizes NB80.....NB160	27

This catalogue is for users with technical knowledge. To ensure that all necessary characteristics for function and safety of the system are given, the user has to check the suitability of the products described herein. In case of doubt please contact Moog Hydrolux.



Servo valve for manifold mounting

Continuously adjustable from A to B or B to A.
Pilot valve (1) located directly on the cover.

Technical design

The valve comprises of 6 main groups.:

- Pilot valve (1)
- Main stage cone (2)
- Sleeve (3)
- Cover (4)
- Position transducer (5)
- Integrated control electronics (6)

Function description

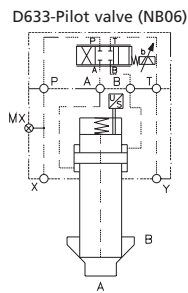
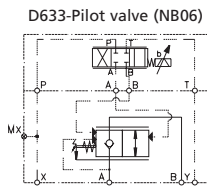
- Main stage cone (2) with equal pilot-surfaces and metallic seat.
- Controlled by a high-dynamic servo-pilot valve (D661) or a high-dynamic proportional-pilot valve (D633).
- Shut off of the connections A and B by cone-seat (8) of the main stage cone (2).
- => **LEAKAGE FREE**
- Pressure balance through the drilling (7) in the main stage cone (2), resulting in a very low displacement force.
- Control of the main stage cone by a position transducer (5).
- Closed loop by integrated electronics (6).
- Failsafe features: Main stage cone always closed, when pilot pressure available,
=> biased pilot valve and also with a fail-safe sandwich plate on request.

Recommendation: Valves with NB10 - pilot valve (High response-valve),

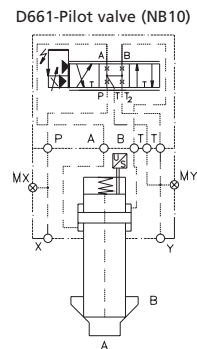
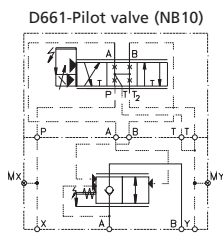
- ⇒ Accu in the X - and Y - port of the cover (4), depending on the nominal size.
- ⇒ At low pressure in the Y - port (< 2 bar), it's recommended to use a check valve in the Y- line to ensure a minimal backpressure to protect the diaphragm of the accumulator !

For application where vibrations higher than 30g are expected (i.e Diecasting), the electronics with additional dampening elements are required. (see " ES " in the Ordering Information)

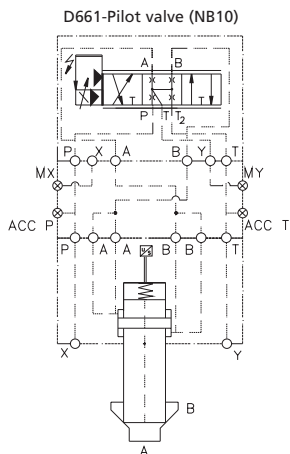
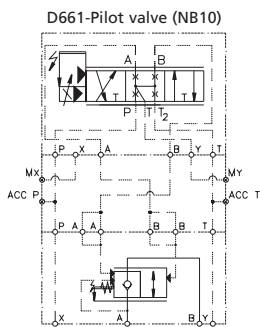
Attention: Wrong connecting leads to uncontrolled movements of the main stage cone and may cause damage to person and machine !



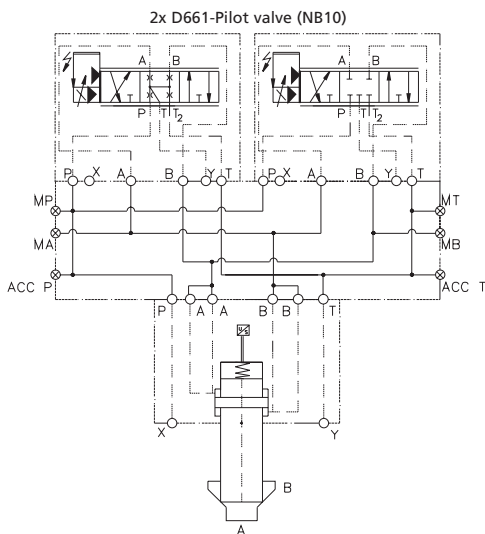
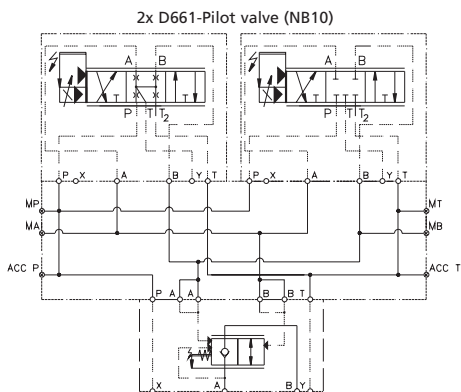
NB40 + NB50 (D633)



NB40....NB63 (D661)



NB80 + NB100 (1xD661)



NB80...NB160 (2xD661)

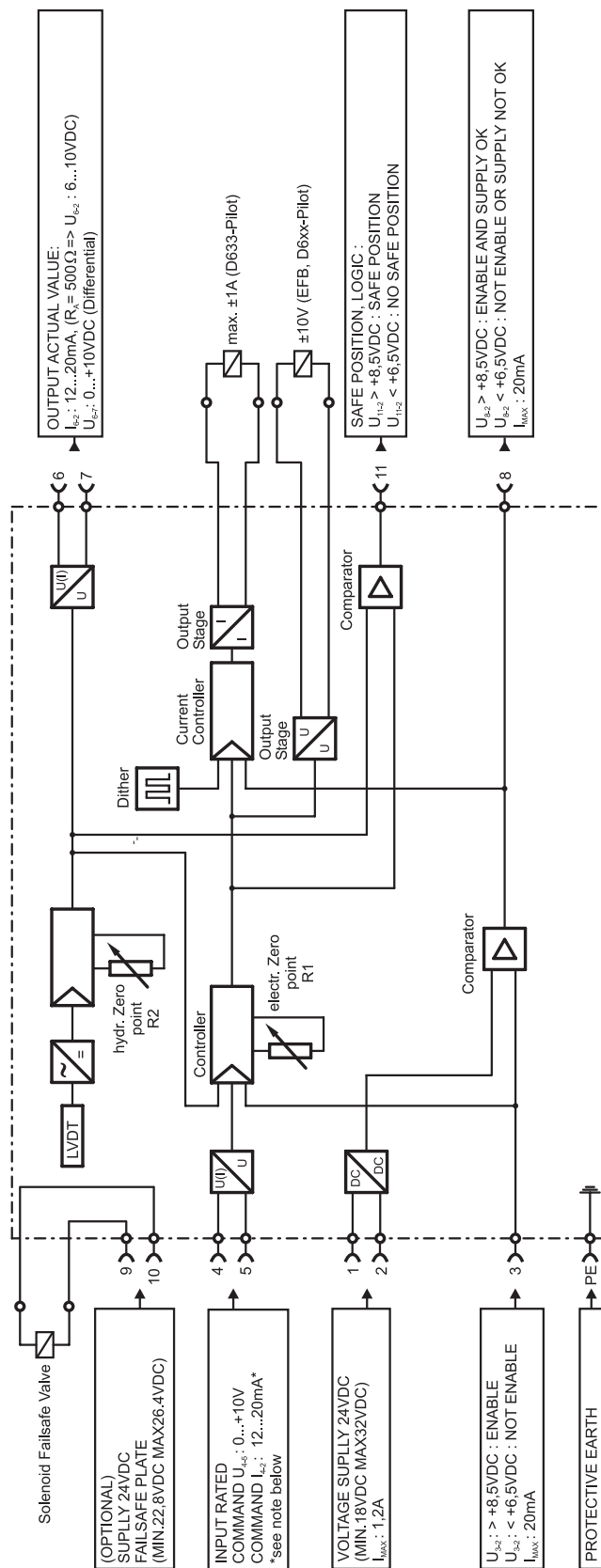
General data	Value	Unit	Specifications
Mode of construction	-	-	2/2-way-cartridge valve, seat valve with positioning control. Proportional-hydraulically operated with servo pilot valve
Mounting position	-	-	any
Vibration	-	-	30 g, 3 axes
Ambient temperature range	min. max.	°C °C	- 20 + 60
Hydraulic			
Operating pressure ports A, B A-port B-port	max. max.	bar bar	dynamic 350 for all sizes dynamic 420 for all sizes
Pilot pressure for	max.	bar	280 => D661-Pilotvalve 350 => D633-Pilotvalve
Pressure fluid temperature range	min. max.	°C °C	-20 +80
Flow direction	-	-	A → B B → A (recommended in case of pressure peaks > 350 bar)
Viscosity → recommended → max admissible		mm²/s mm²/s	15.....45 5.....400
Filtration of the pressure fluid for the pilot circuit			D661-Pilot D633-Pilot
Recommended cleanliness class for normal operation			ISO 4406 < 19 / 16 / 13 ISO 4406 < 18 / 15 / 12
Recommended cleanliness class for longer life			ISO 4406 < 17 / 14 / 11 ISO 4406 < 17 / 14 / 11
Filter rating recommended for normal operation			$\beta_{15} \geq 75$ (15 µm absolute) $\beta_{10} \geq 75$ (10 µm absolute)
Filter rating recommended for longer life			$\beta_{10} \geq 75$ (10 µm absolute) $\beta_6 \geq 75$ (6 µm absolute)
Nominal size	-	-	NB40 NB50 NB63 NB80 NB100 NB125 NB160
Nominal flow at $\Delta p = 5$ bar X-cone	Q_N	L/min	1450 2700 3900 6100 9600 12550 20550
Nominal flow at $\Delta p = 5$ bar U-cone	Q_N	L/min	1100 1500 3000 4100 6500 -
Nominal flow at $\Delta p = 5$ bar V-cone	Q_N	L/min	850 1100 2200 3000 4800 8450 13350
max. permissible flow ³⁾	$Q_{max.}$	L/min	2 x Q_N (X-cone), 3 x Q_N (V-cone + U-cone)
Control stroke of mainstage	-	mm	14 14 24 24 30 40 50
Control oil volume	$V_{st.}$	cm³	8,1 13,2 33,5 60,2 108,4 231,7 515,4
Pilot valve: (NB40-NB160) (High Response valve)			Series D661 => NB40 to NB160 (NB80 to NB160 => 2 x D661)
Pilot valve: (only NB40 + NB50)			Series D633 => NB40 + NB50
Nominal flow of the pilot valve	Q_N	L/min	10 / 20 (NB40 / NB50) => D633-Pilotvalve at $\Delta p = 35$ bar ¹⁾ 35 => 1x D661-Pilotvalve at $\Delta p = 5$ bar ¹⁾ 65 => 2x D661-Pilotvalve at $\Delta p = 5$ bar ¹⁾
max. null leakage flow at $p_x = 210$ bar of the pilot valve	Q_L	L/min	0,4 => D633-Pilotvalve 4,5 => D661-Pilotvalve ²⁾
Static / dynamic			
Hysteresis	-	%	< 0,3
Response time for signal change 0...100% at $p_x = 160$ bar with accu and D661-pilotvalve	-	ms	12 15 20 32 (1xD661) 18 (2xD661) 55 (1xD661) 32 (2xD661) 55 100
To achieve this response times, membrane accumulators in the P port of the covers are recommended. See on pages 12 until 15 the size of the accumulators. To avoid pressure peaks, for sizes NB63, NB80, NB100, NB125 and NB160 an additional accumulator in the T port is also recommended.			
Response time for signal change 0...100% at $p_x = 160$ bar without accu and D633-pilotvalve	-	ms	22 25 - - - -
Weight	-	kg	23 (D633) 26 (D661) 36 (D633) 39 (D661) 58 125 (1x D661) 135 (2x D661) 210 (1x D661) 220 (2x D661) 360 733

¹⁾ Nominal flow per land / Flow rate at a different Δp : $Q_x = Q_{nom.} \cdot \sqrt{\frac{\Delta p_x}{5}}$

²⁾ Leakage for one pilot valve - for two pilot valves the leakage is approximately twice as high.

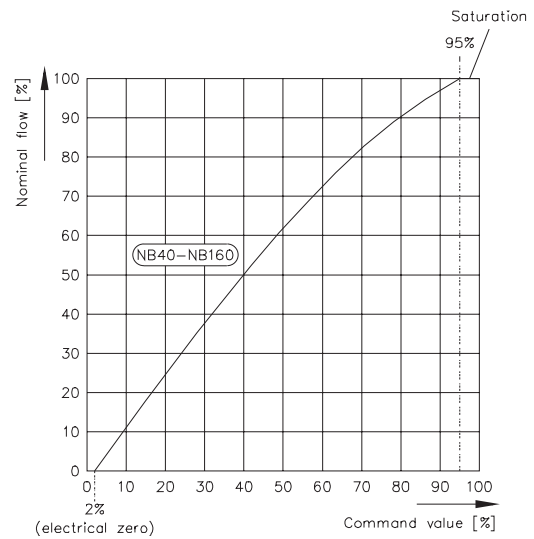
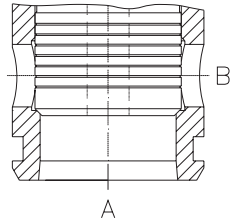
³⁾ For higher flow rates, please contact Moog Hydrolux.

Pole connector to EN 175201 Part 804 (DIN 43 651), and mating connector (type E, metal shell) with leading protective earth connection ($\perp$)

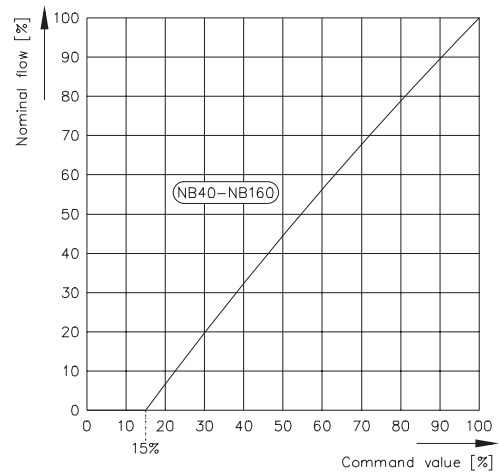
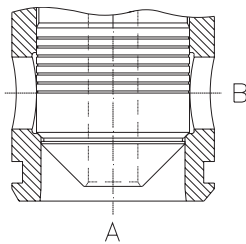


Flow characteristics (measured at $\nu = 32 \text{ mm}^2/\text{s}$ and $t = 40^\circ$)
Nominal flow at $\Delta p = 5 \text{ bar}$

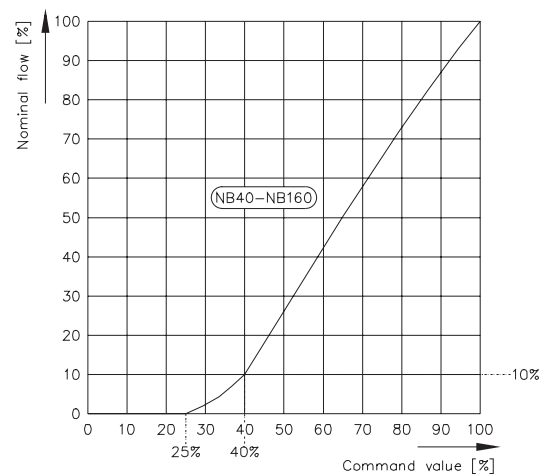
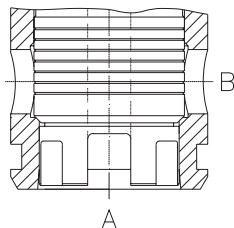
Cone " X "

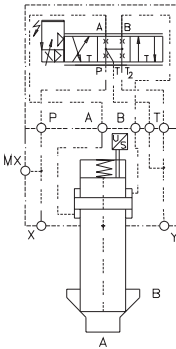
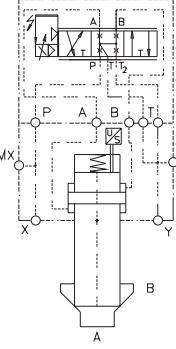
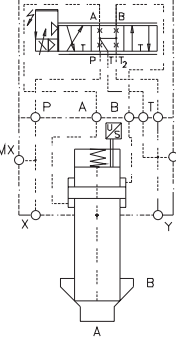
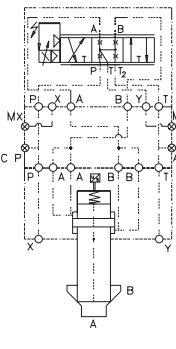


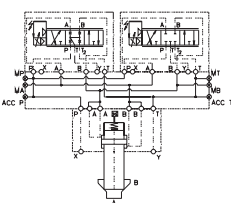
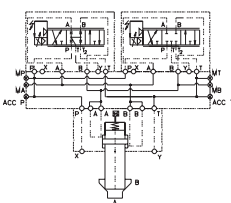
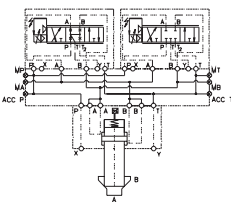
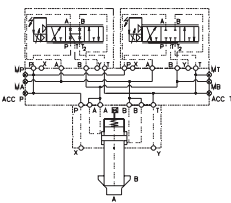
Cone " U "

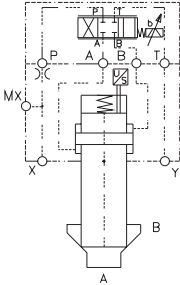
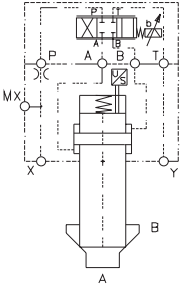


Cone " V "



Symbol	Cone	NB	Q_N (l/min) at $\Delta p = 5$ bar	Description	Weight (kg)
	X	40	1450	N-DSHRE40_6XB__1AA_X	26
	U		1100	N-DSHRE40_6UB__1AA_X	
	V		850	N-DSHRE40_6VB__1AA_X	
	X	50	2700	N-DSHRE50_6XB__1AB_X	39
	U		1500	N-DSHRE50_6UB__1AB_X	
	V		1100	N-DSHRE50_6VB__1AB_X	
	X	63	3900	N-DSHRE63_6XB__1AC_X	58
	U		3000	N-DSHRE63_6UB__1AC_X	
	V		2200	N-DSHRE63_6VB__1AC_X	
	X	80	6100	N-DSHRE80_6XB__1AD_X/AP05	125
		100	9600	N-DSHRE100_6XB__1AE_X/AP01	210
	U	80	4100	N-DSHRE80_6UB__1AD_X/AP05	125
		100	6500	N-DSHRE100_6UB__1AE_X/AP01	210
	V	80	3000	N-DSHRE80_6VB__1AD_X/AP05	125
		100	4800	N-DSHRE100_6VB__1AE_X/AP01	210

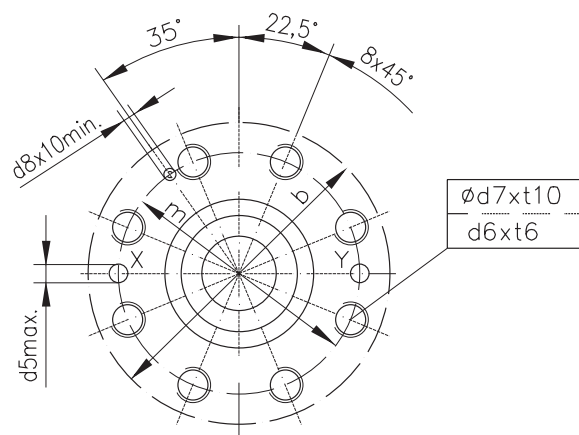
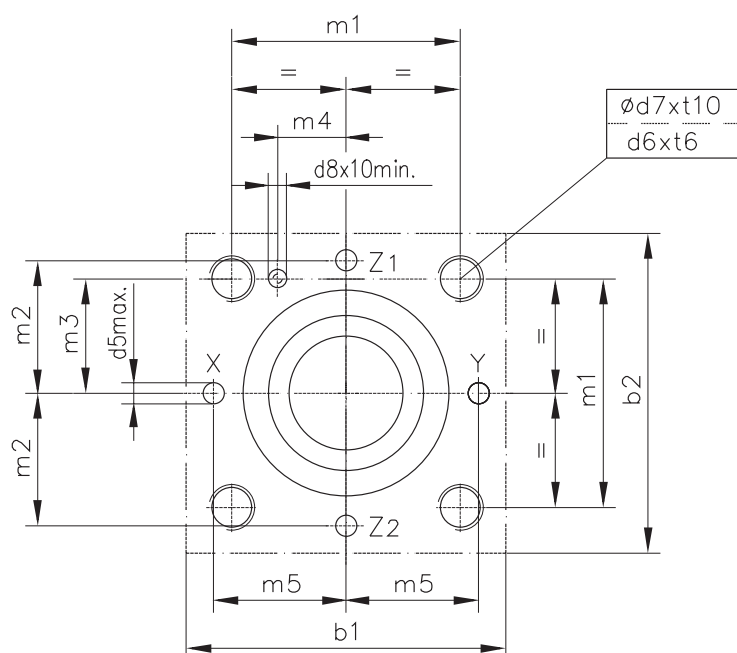
Symbol	Cone	NB	Q_N (l/min) at $\Delta p = 5$ bar	Description	Weight (kg)
	X	80	6100	N-DSHRE80_6XB__1AD_X/AP05	135
	U		4100	N-DSHRE80_6UB__1AD_X/AP05	
	V		3000	N-DSHRE80_6VB__1AD_X/AP05	
	X	100	9600	N-DSHRE100_6XB__1AE_X/AP01	220
	U		6500	N-DSHRE100_6UB__1AE_X/AP01	
	V		4800	N-DSHRE100_6VB__1AE_X/AP01	
	X	125	12550	N-DSHRE125_6XB__1AF_X/AP02	360
	U		—	—	
	V		8450	N-DSHRE125_6VB__1AF_X/AP02	
	X	160	20550	N-DSHRE160_6XB__1AG_X/AP01	733
	U		—	—	
	V		13350	N-DSHRE160_6VB__1AG_X/AP01	

Symbol	Cone	NB	Q_N (l/min) at $\Delta p=5\text{ bar}$	Description	Weight (kg)
	X	40	1450	N-DSHRE40_6XA__1AA_X	23
	U		1100	N-DSHRE40_6UA__1AA_X	
	V		850	N-DSHRE40_6VA__1AA_X	
	X	50	2700	N-DSHRE50_6XA__1AB_X	36
	U		1500	N-DSHRE50_6UA__1AB_X	
	V		1100	N-DSHRE50_6VA__1AB_X	

DSHR

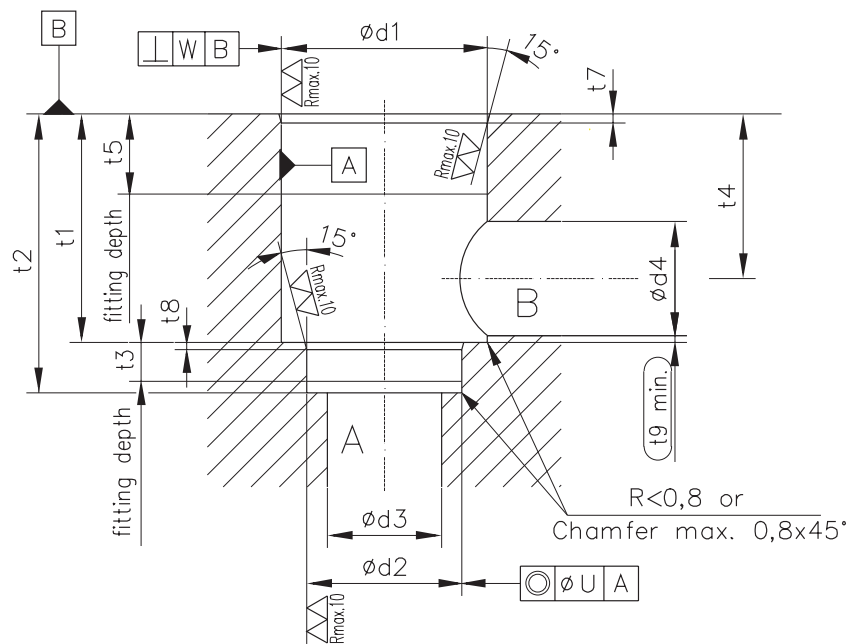
Technical drawing of a mechanical assembly showing a cross-section of a shaft with a keyway and a hole. The drawing includes dimensions for diameters ($\varnothing d1$, $\varnothing d2$, $\varnothing d3$, $\varnothing d4$), thicknesses ($t1$, $t2$, $t3$, $t4$, $t5$, $t7$, $t8$), and radii ($R_{max.10}$, $R_{max.10}$, $R_{max.10}$). It also shows a chamfer with a 45° angle and a minimum thickness of $t9 \text{ min.}$. The drawing is labeled with 'B' and 'A' for different parts.

Dimension	NB40	NB50	NB63
b1	160	140	200
b2	125	140	180
d1 ^{H7}	75	90	120
d2 ^{H7}	55	68	90
d3	40	50	63
d4	40	50	63
d4 _{max.}	50	63	80
d5 _{max.}	10	10	12
d6	M20	M20	M30
d7	17,5	17,5	26,5
d8 ^{H13}	6	8	8
m1 ±0,2	85	100	125
m2 ±0,2	50	58	75
m3 ±0,2	42,5	50	62,5
m4 ±0,2	23	30	38
m5 ±0,2	50	58	75
t1 +0,1	87	100	130
t2 +0,1	105	122	155
t3	15	17	20
t4	64	72	95
t4 at d4 _{max.}	59	65,5	86,5
t5	30	35	40
t6	33	33	50
t7	3	4	4
t8	3	3	4
t9	2,5	2,5	3
t10	38	38	56
U	0,05	0,05	0,05
W	0,1	0,1	0,2

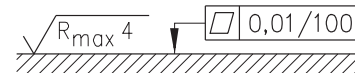


Dimension	NB80	NB100
b max.	250	300
d1 ^{H7}	145	180
d2 ^{H7}	110	135
d3	80	100
d4	80	100
d4 _{max.}	100	125
d5 _{max.}	16	20
d6	M24	M30
d7	21	26,5
d8 ^{H13}	10	10
t1	175	210
t2 ^{+0,2}	205	245
t3	25	29
t4	130	155
t4 _{at d4max.}	120	142,5
t5	40	50
t6	39	50
t7	5	5
t8	5	5
t9	3	5
t10	45	56
m ^{±0,3}	200	245
U	0,05	0,05
W	0,2	0,2

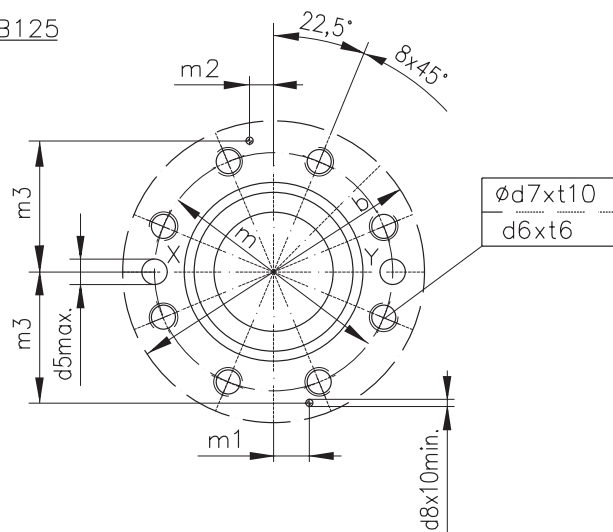
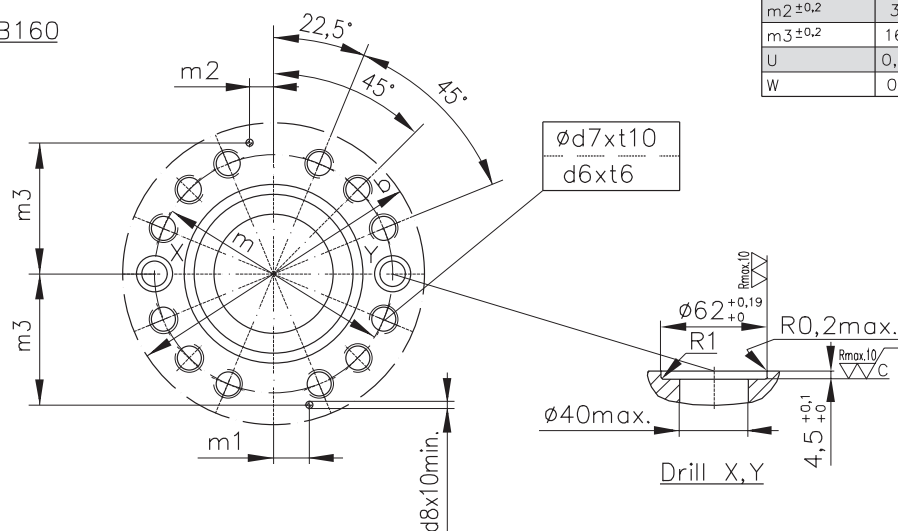
CAVITY AS PER MOOG HYDROLUX



Required surface finish



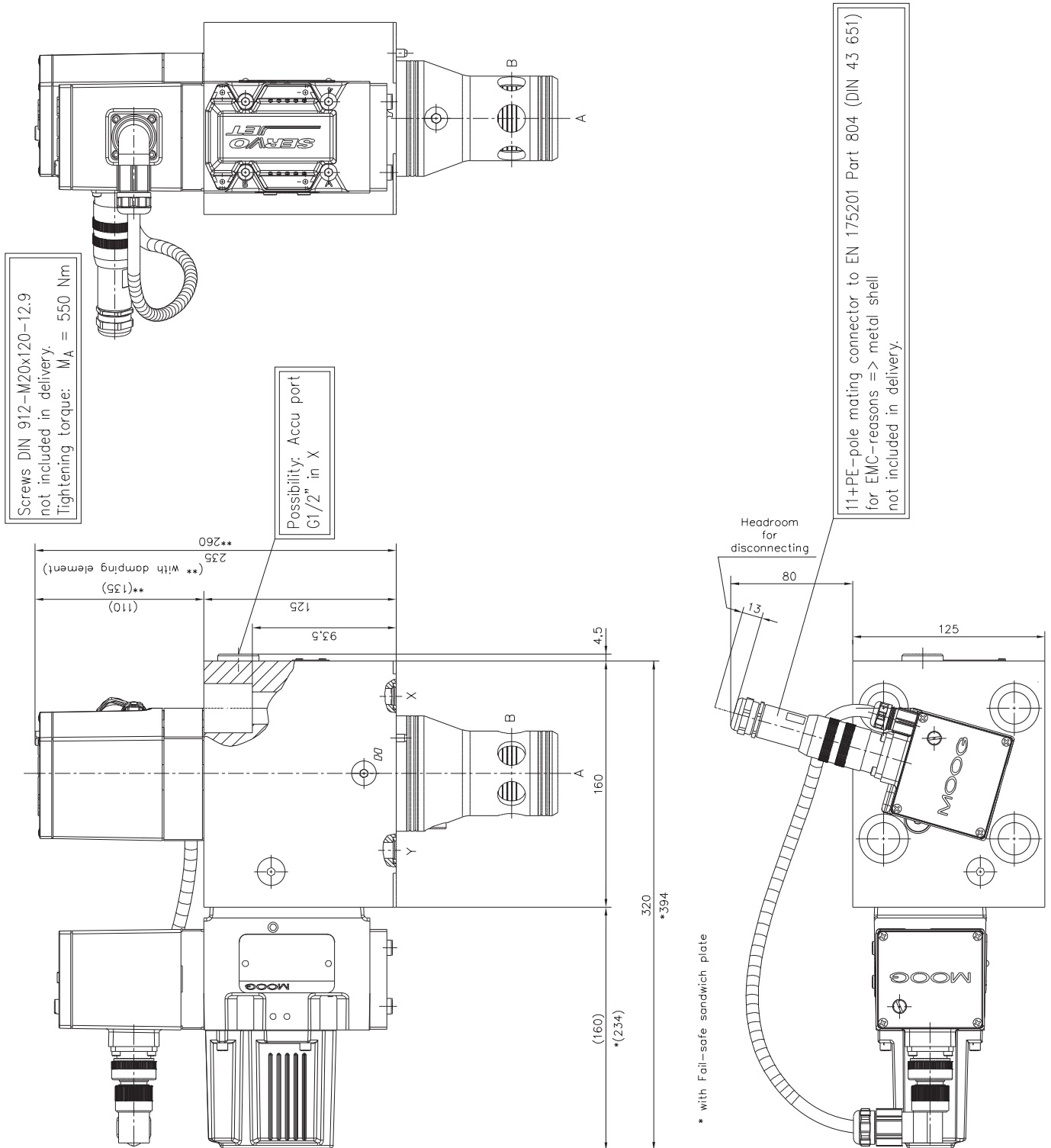
$R < 0,8$ or
Chamfer max. $0,8 \times 45^\circ$

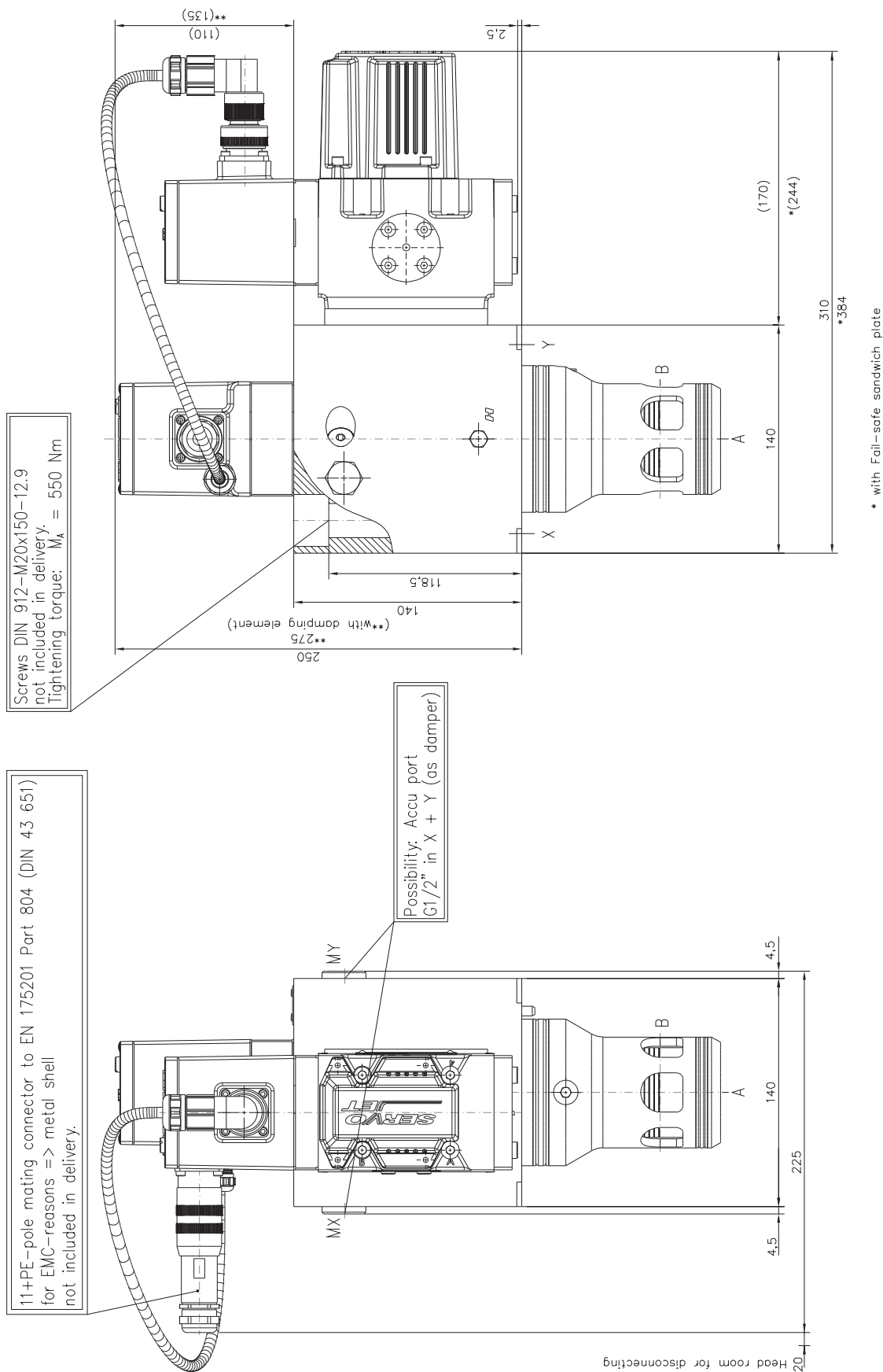
NB125NB160

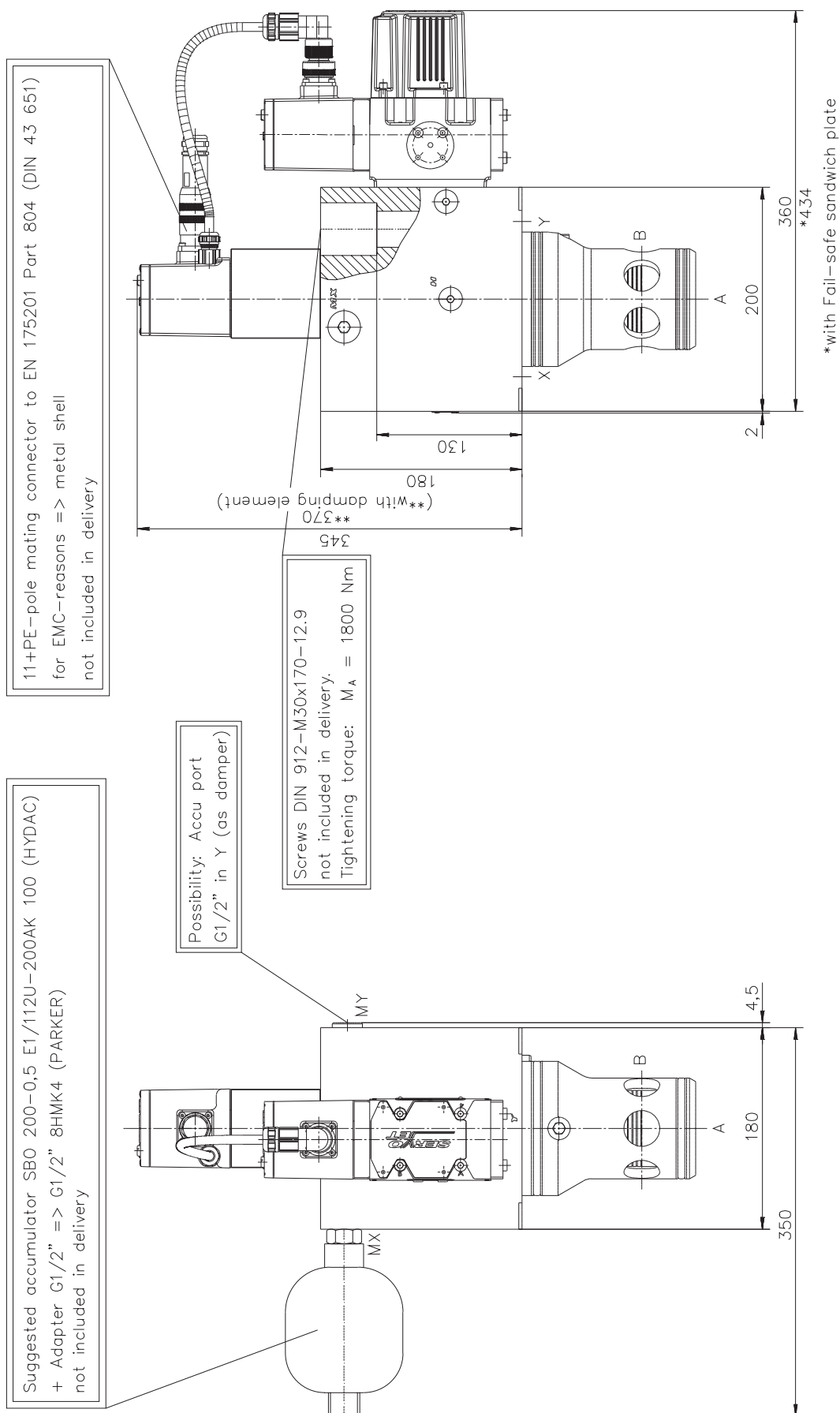
Dimension	NB125	NB160
b $\pm 0,3$	380	480
d1 ^{H7}	225	300
d2 ^{H7}	200	270
d3	150	200
d4	125	200
d4 _{max.}	150	250
d5 _{max.}	32	40
d6	M36	M42
d7	32	37,5
d8 ^{H13}	9.	9.
t1 $\pm 0,5$	257	370
t2 $\pm 0,15$	300	—
t2 $\pm 0,5$	—	425
t3	31	45
t4	192	268
t4 at d4 _{max.}	180	243
t5	40	50
t6	58	70
t7 $\pm 0,2$	5,5	5,5
t8 $\pm 0,2$	7	8
t9 _{min.}	2	2
t10	66	79
m $\pm 0,3$	300	400
m1 $\pm 0,2$	45	60
m2 $\pm 0,2$	30	45
m3 $\pm 0,2$	165	215
U	0,05	0,05
W	0,2	0,2

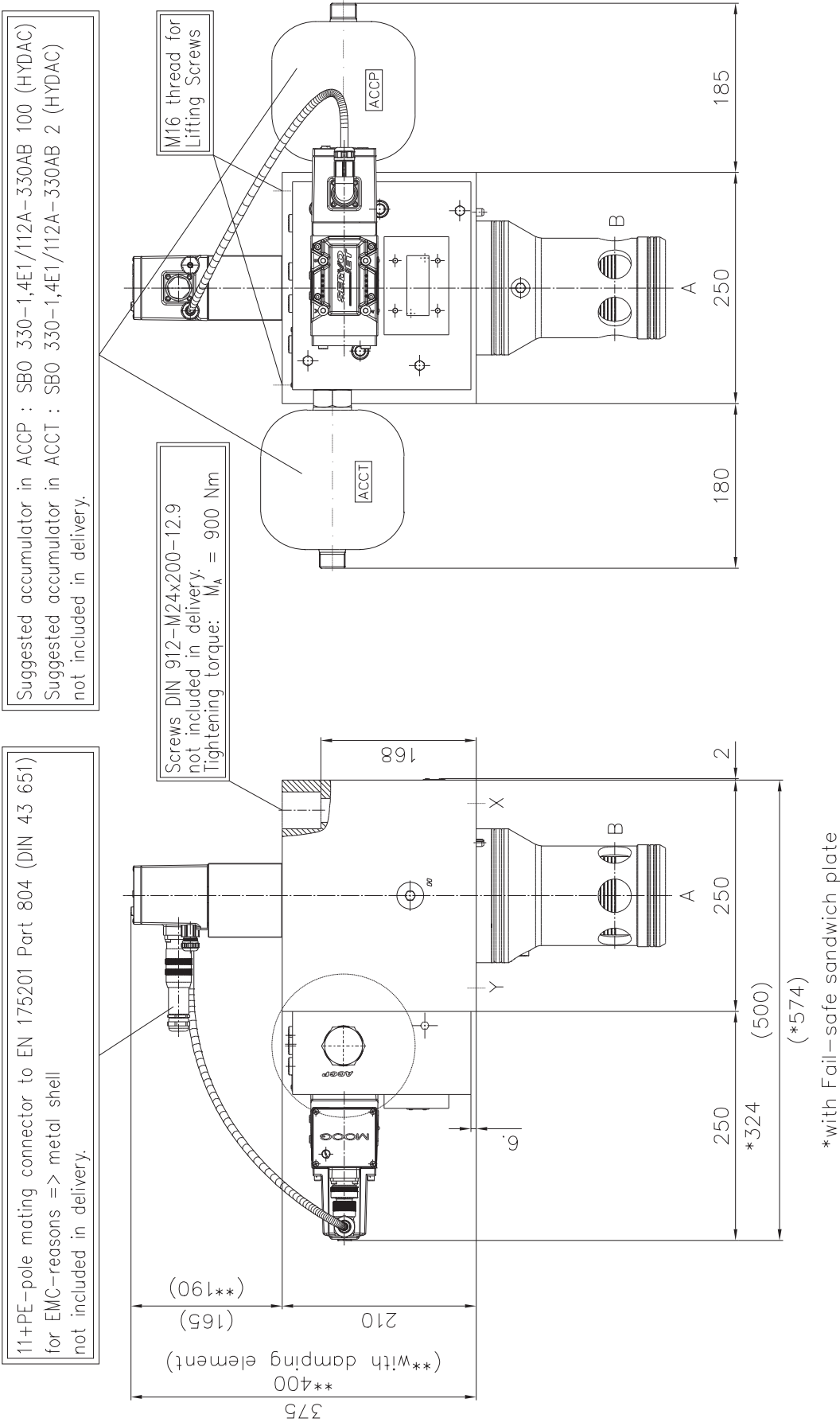
DIMENSIONS NB40 WITH D661-PILOT VALVE

DSHR



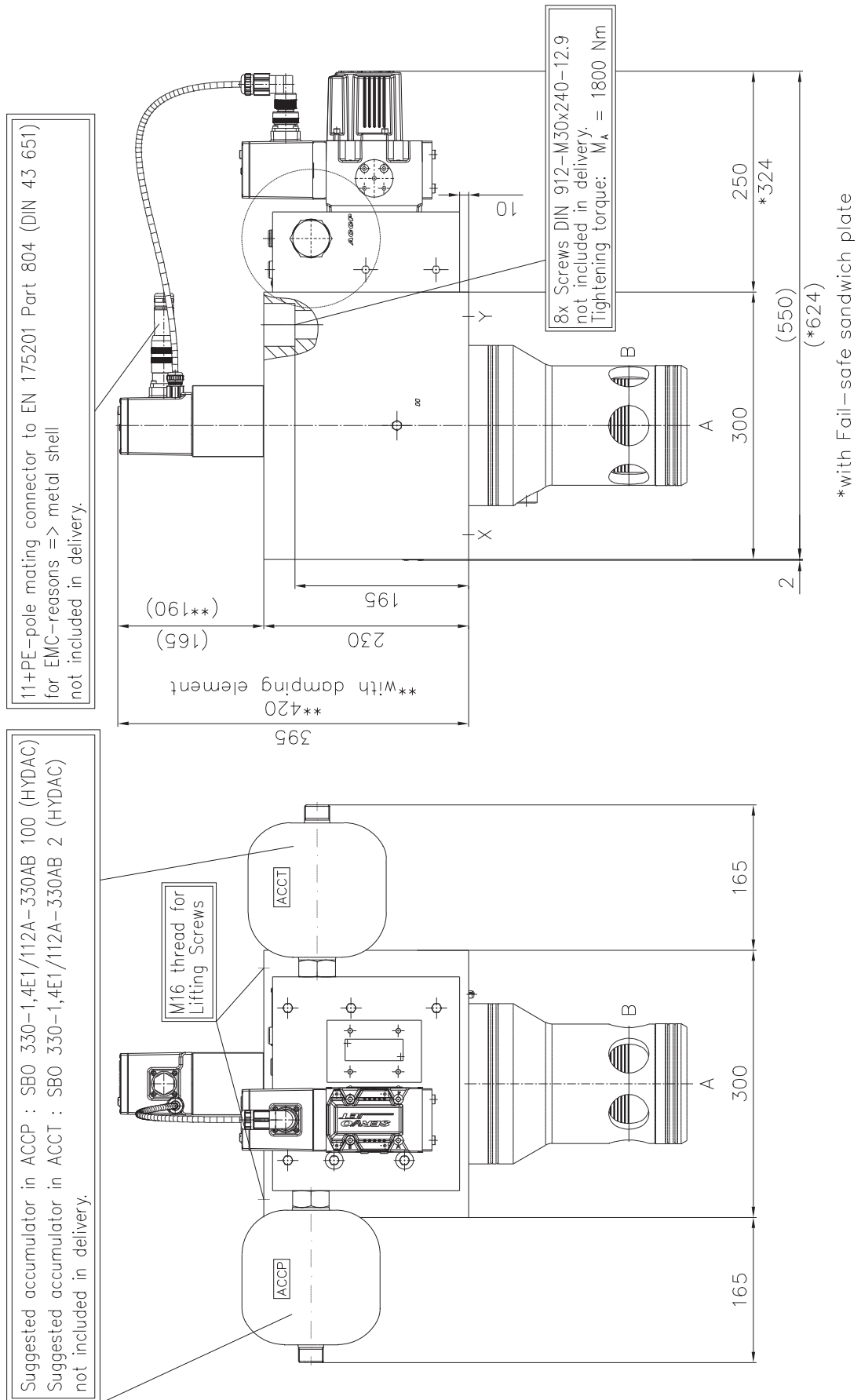


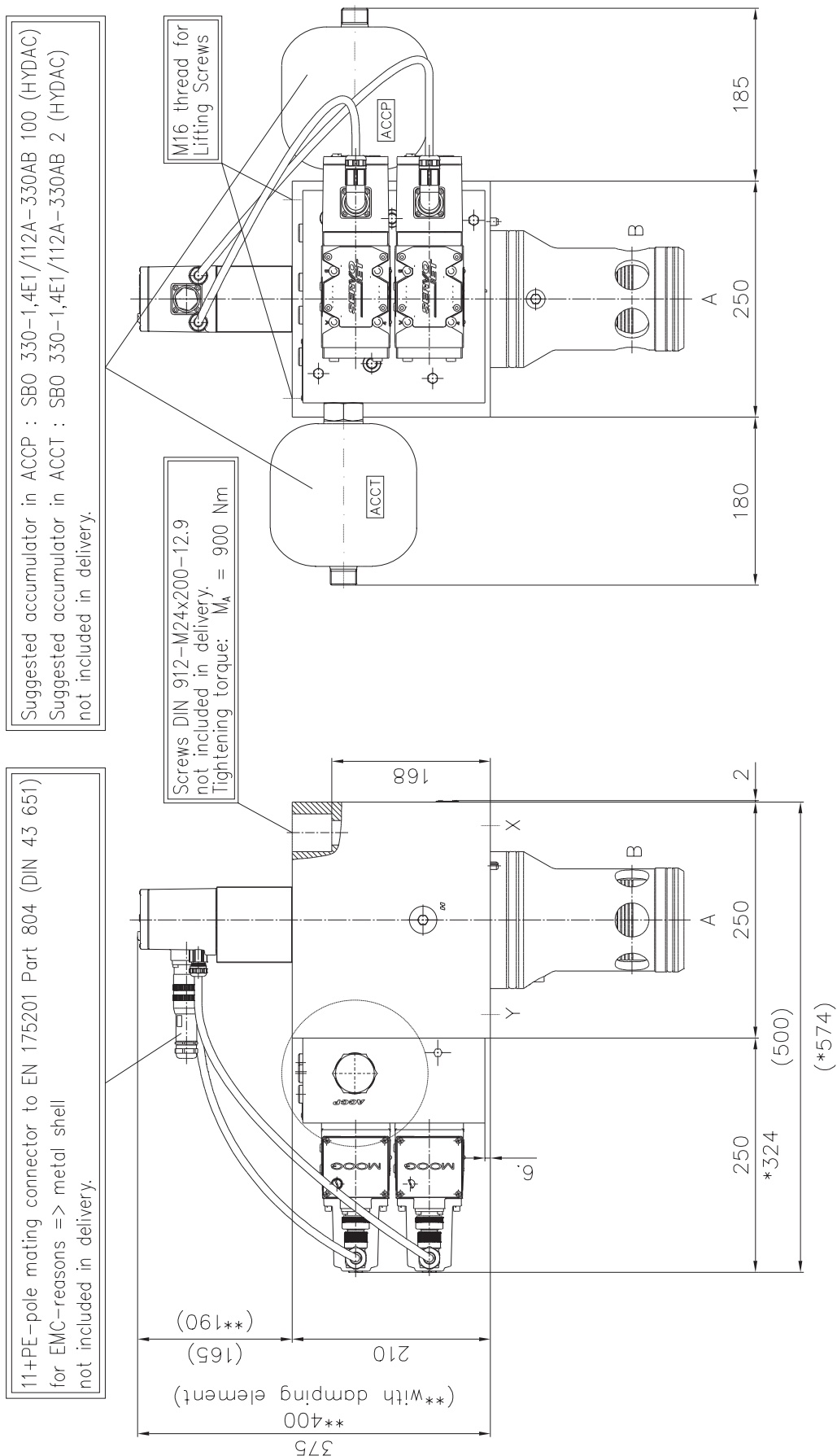




DIMENSIONS NB100 WITH 1 D661-PILOT VALVE

DSHR

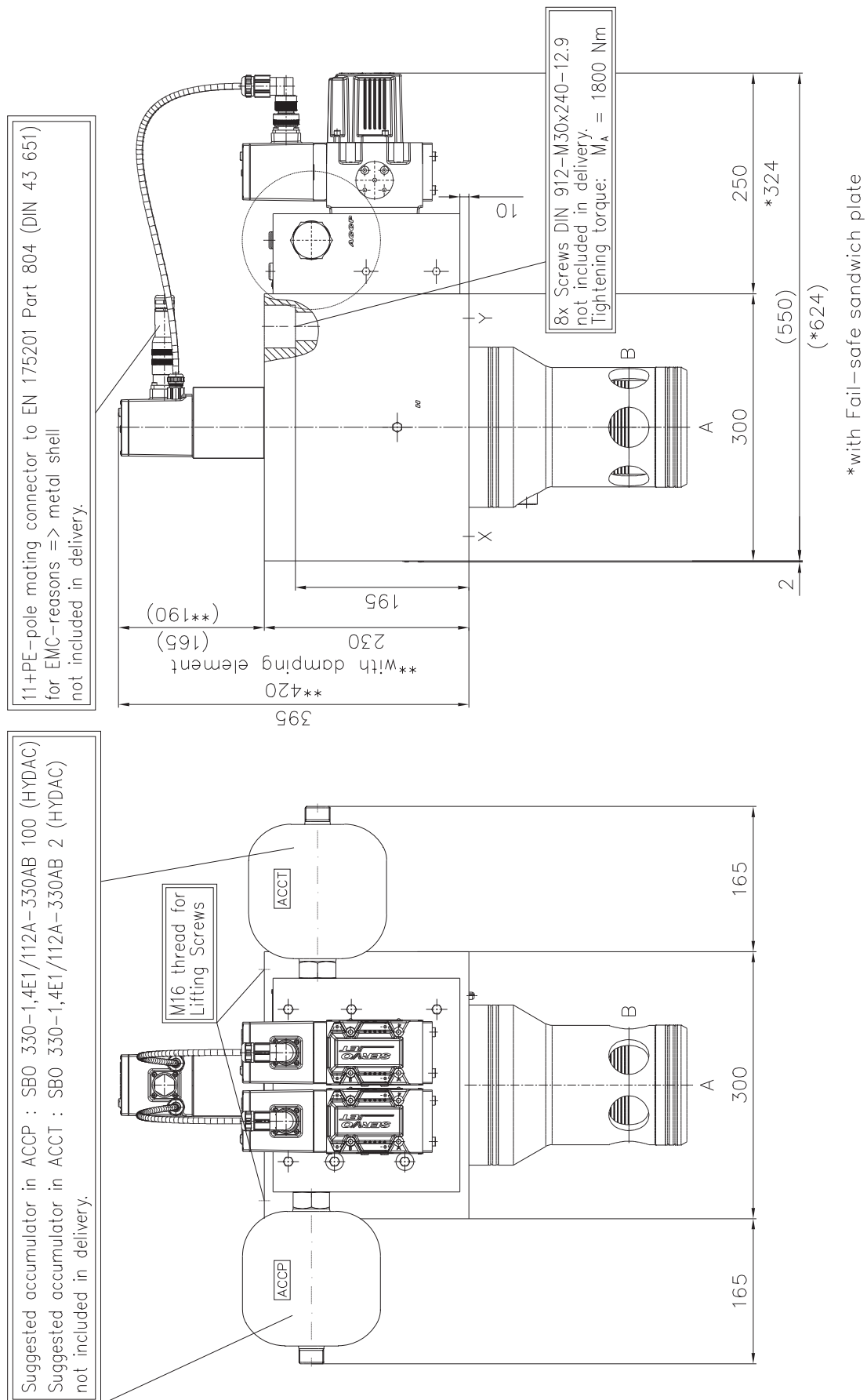


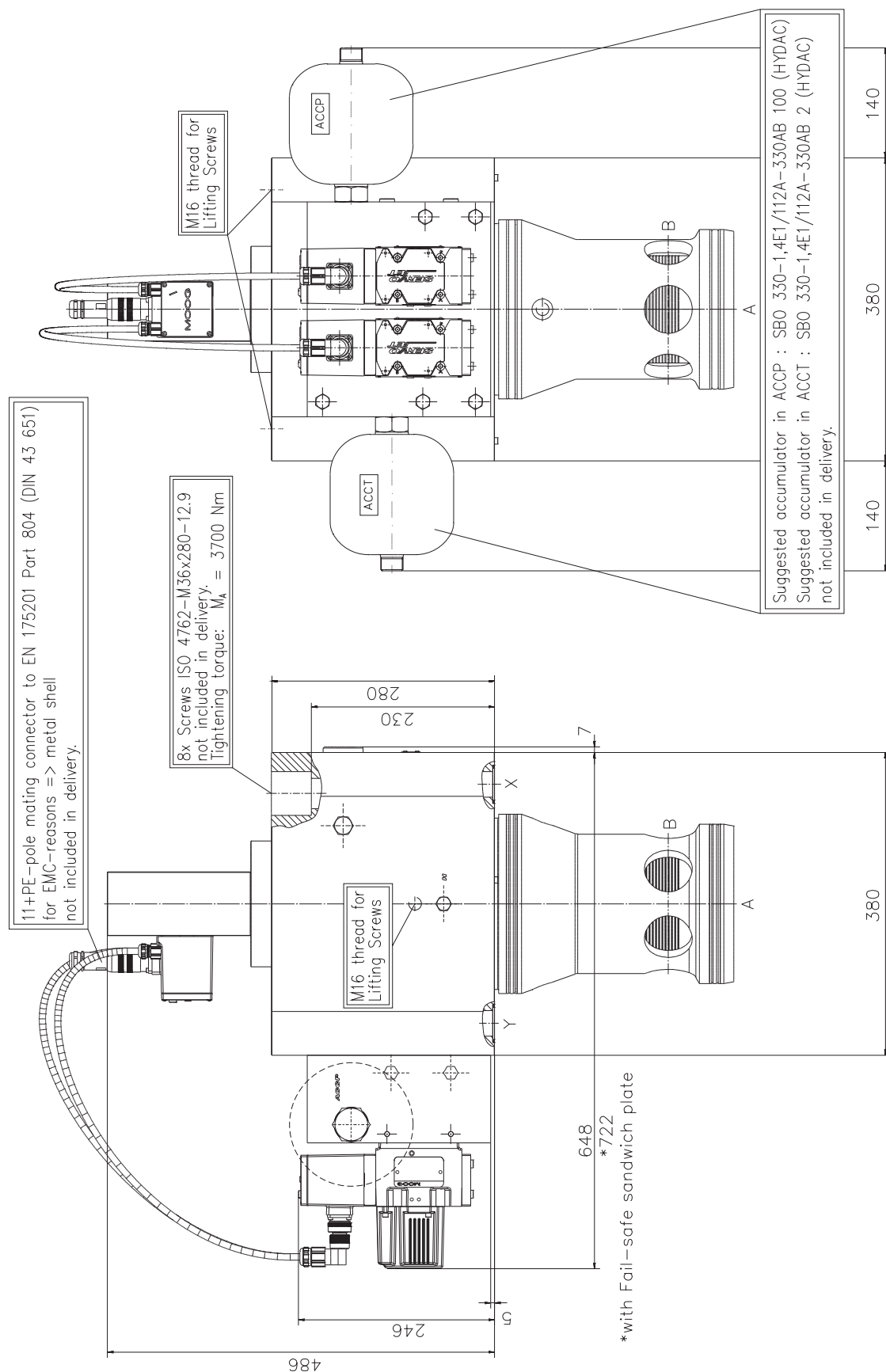


*with Fail-safe sandwich plate

DIMENSIONS NB100 WITH 2 D661-PILOT VALVE

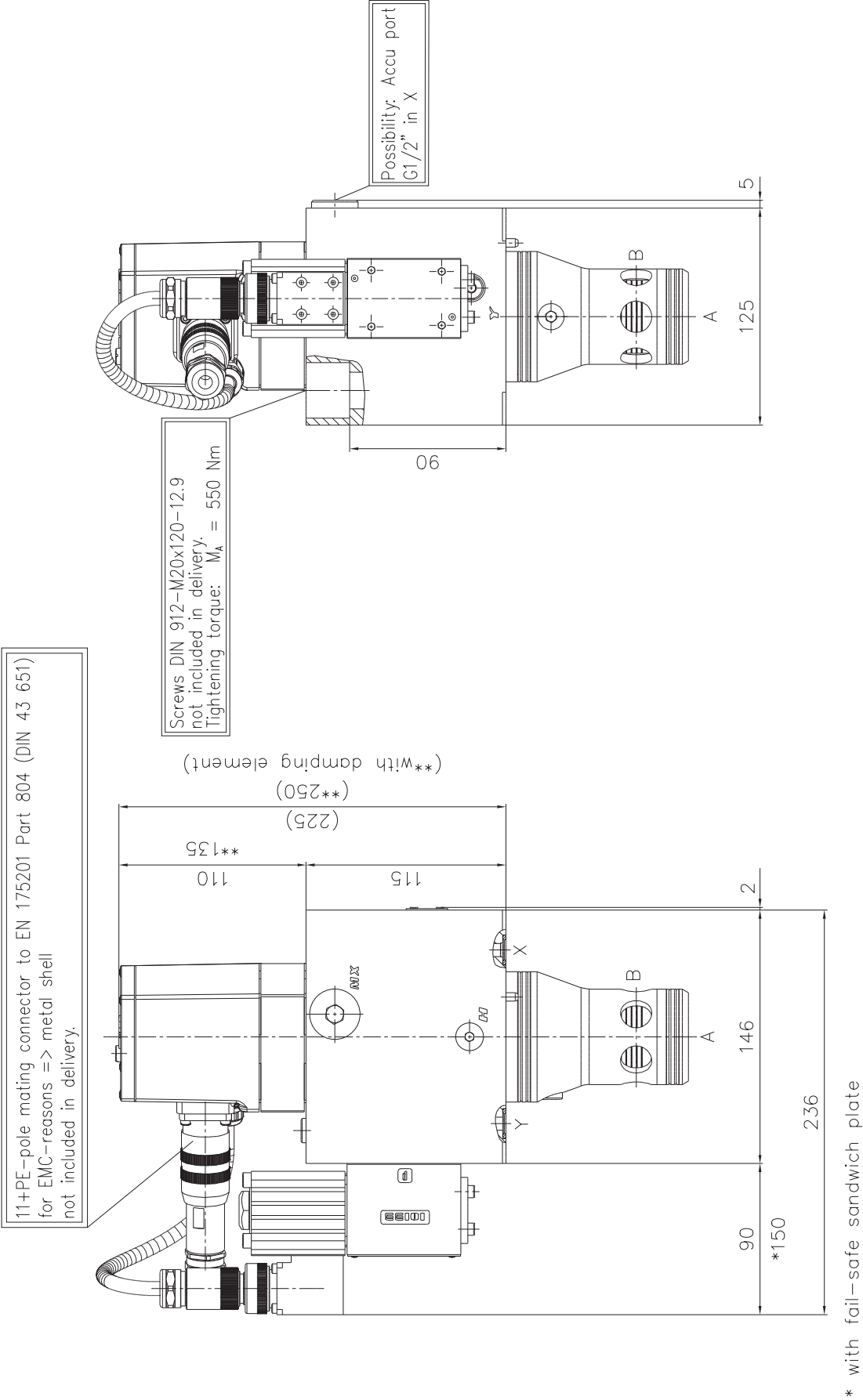
DSHR



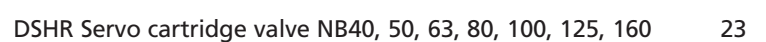


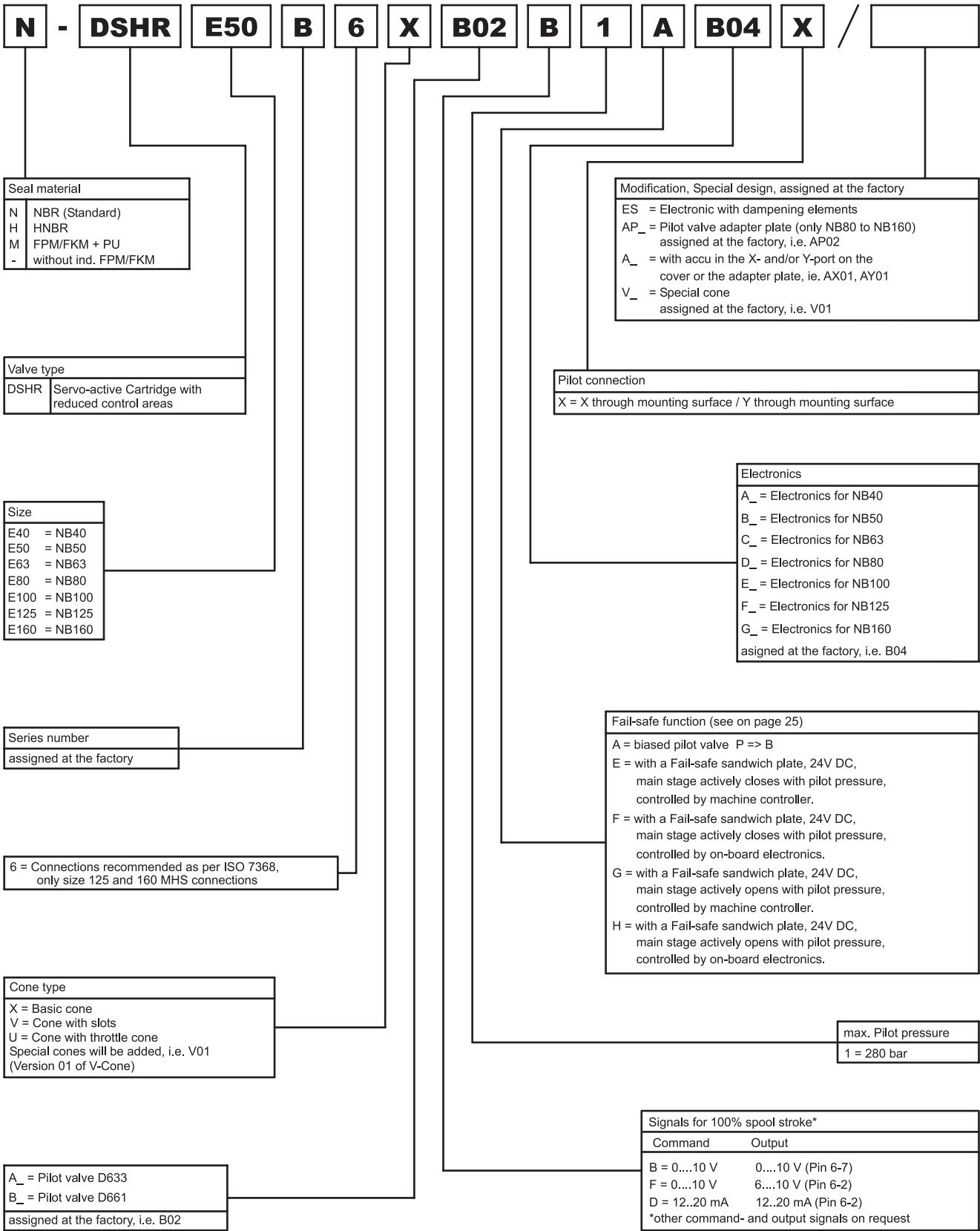
DSHR



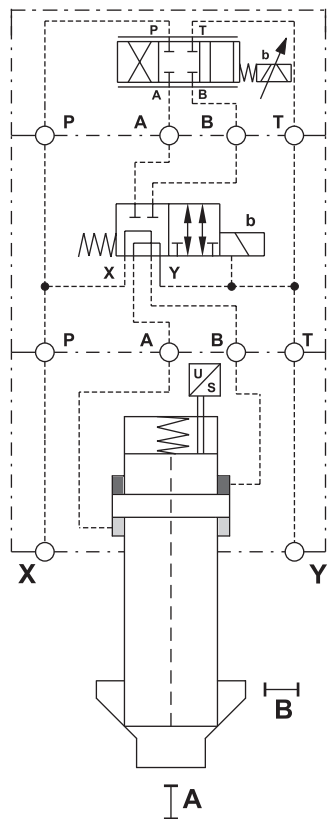


DSHR

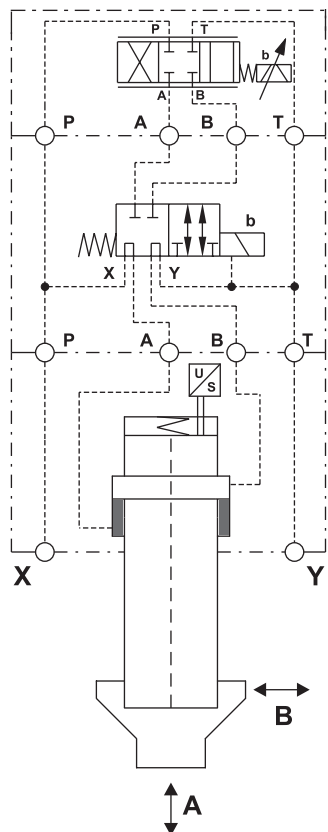




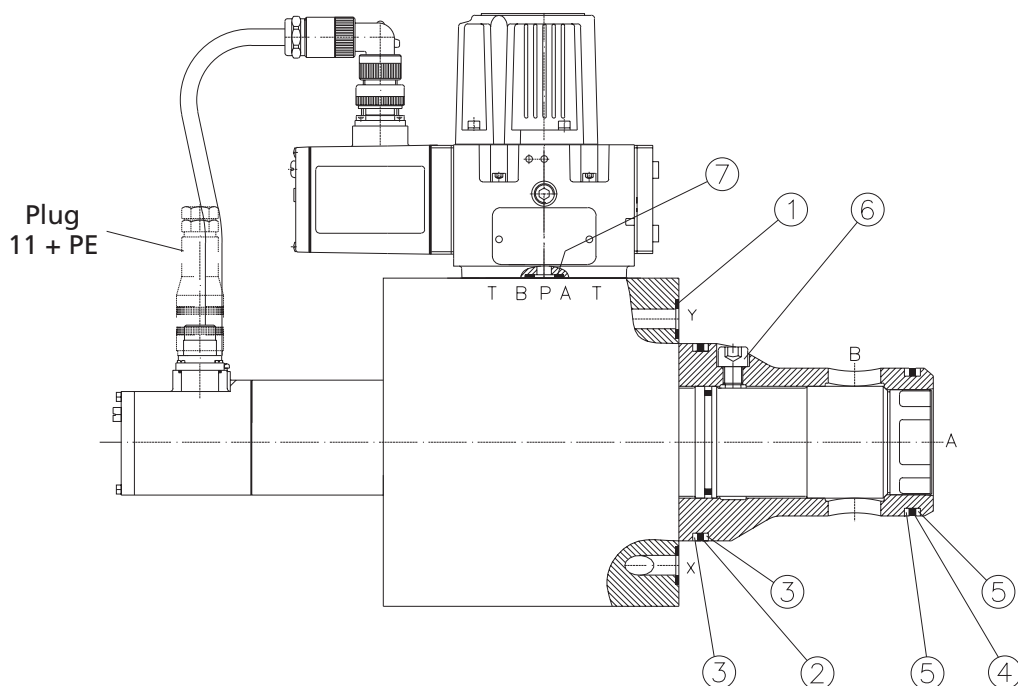
Subject to technical changes



Main stage actively closes :
" E " + " F "



Main stage actively opens :
" G " + " H "



Seal-Kits & Accessories for Sleeve and Cover									
Pos.	Description	Ordering number							
			NB40	NB50	NB63	NB80	NB100	NB125	NB160
	Seal - Kit	XEB	17680-000N00	17681-000N00	17682-000N00	17683-000N00	17924-000N00	18045-000N00	18147-000N00
1	O-Ring	X783-	00207	00207	00293	00281	01296	01304	-
2	O-Ring	X783-	00204	00270	00297	00283	01298	01301	01303
3	Backup-Ring	X780-	18231	18338	08348	08431	18439	18445	18452
4	O-Ring	X783-	00205	00268	00270	00282	01297	01300	01302
5	Backup-Ring	X780-	18225	18229	18338	18344	18427	18442	18450
6	Locking Screws, not for X-cone	C97	247-001	247-001	122-001	122-001	005-001	005-001	151-001
Description		Accessories (not in valve delivery included !)							
	Socket screws DIN EN ISO 4762-12.9	X784-	12008 (4x)	12010 (4x)	13004 (4x)	12409 (4x)	13014 (8x)	13602 (8x)	14202 (12x)
	Torques	(Nm)	550	550	1800	900	1800	3700	5900
	Plug 11+PE-pole (Metal)	XEB	17725						
	* Cable 12 x 1 mm ² for plug 11+PE-pole	X798-	00117						

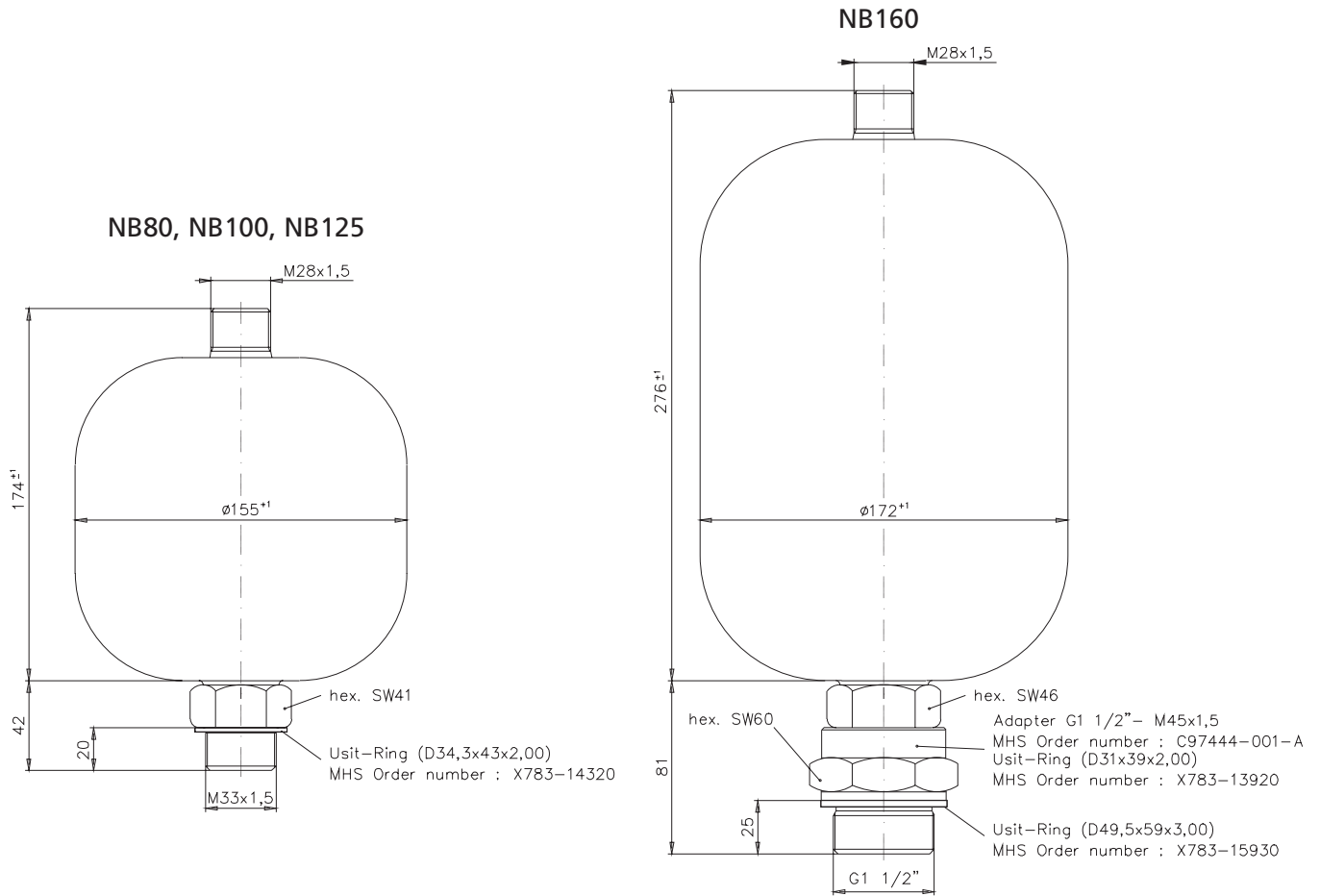
*This part number have a unit of measure (length), for example : 1 x X789-00117 => 1 metre / 10 x X798-00117 => 10 metre

Order example : O-Ring NBR Pos.4 NB50 => Part number : X783-00268

Seal-Kits & Accessories for Pilot valves					
Pos.	Description	Ordering number			
			NBR 85 Shore	HNBR 85 Shore	FPM (Viton) 85 Shore
7	Seal - Kit D663	XEB-	17866	17867	17868
7	Seal - Kit D661	XEB-	17869	17870	17871
Seal - Kits only available completely					
Description		Accessories			
			D633	D661	-
	Socket screws DIN EN ISO 4762-12.9	X784-	10522 (4x)	10631 (4x)	-
	Torques	(Nm)	8	13	-

SPECIFICATIONS ACCUMULATOR FOR SIZES NB80....NB160

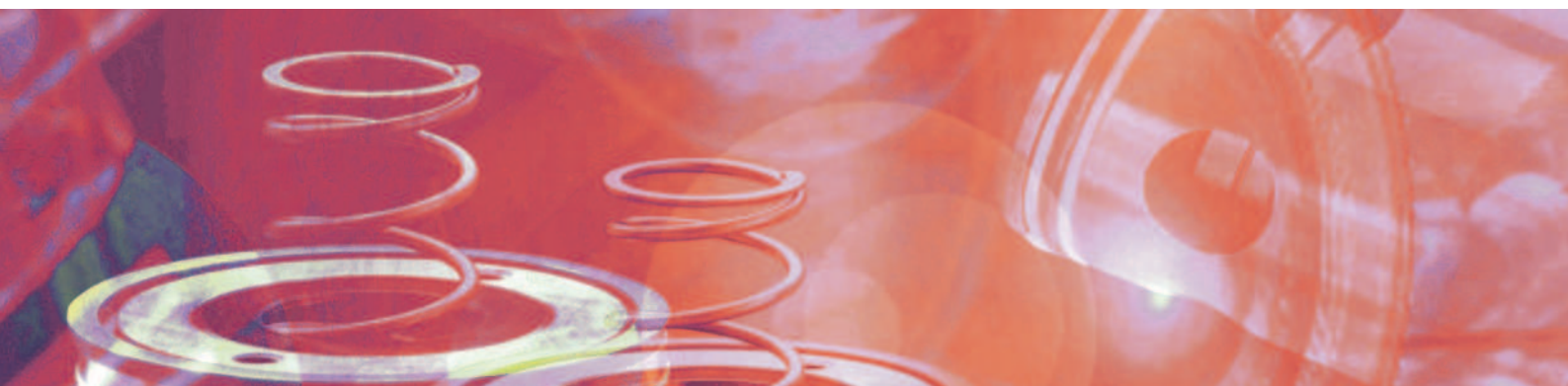
DSHR



Accumulator SBO 300-1,4E1/112A-330AB (HYDAC) for NB80,NB100,NB125,not included in delivery				
Nominal volume (l)	Permissible pressure ratio ($p_2 : p_0$)	Perm. working pressure (bar)	$Q_{max.}$ (l/min)	Weight (kg)
1,4	8 : 1	330	95	7,6
Accumulator SBO 300-3,5E1/112A-330AB (HYDAC) for NB160, not included in delivery				
Nominal volume (l)	Permissible pressure ratio ($p_2 : p_0$)	Perm. working pressure (bar)	$Q_{max.}$ (l/min)	Weight (kg)
3,5	4 : 1	330	150	13,8



Argentina
Australia
Austria
Brazil
China
Finland
France
Germany
India
Ireland

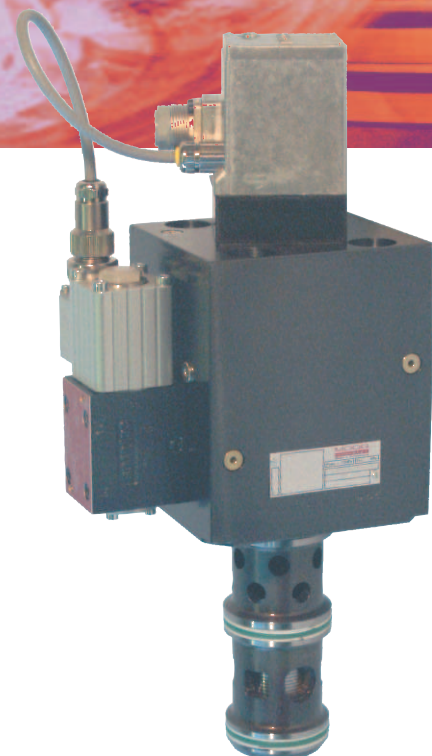
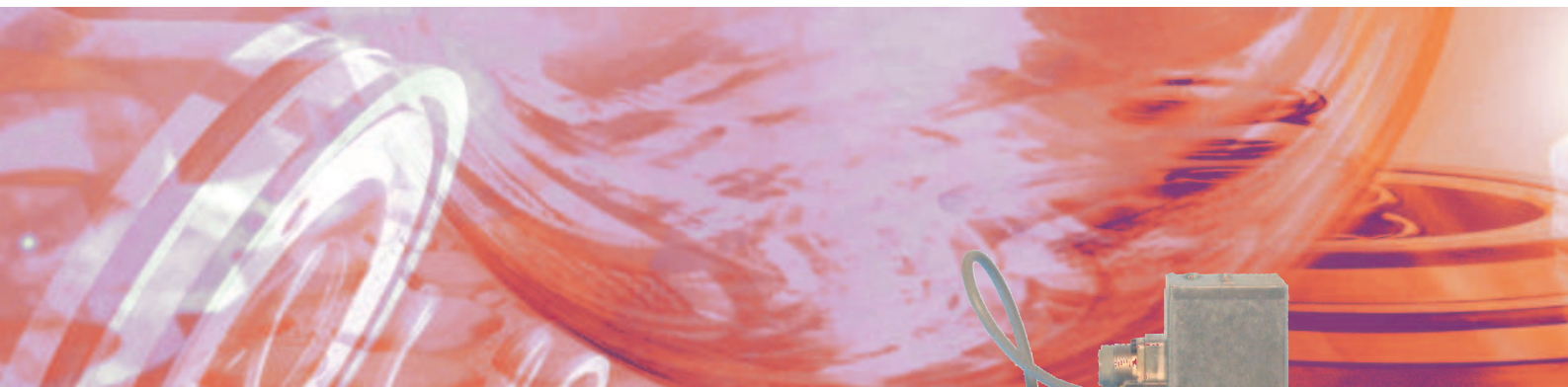


Italy
Japan
Korea
Luxembourg
Norway
Russia
Singapore
South Africa
Spain
Sweden
United Kingdom
USA

MOOG
HYDROLUX

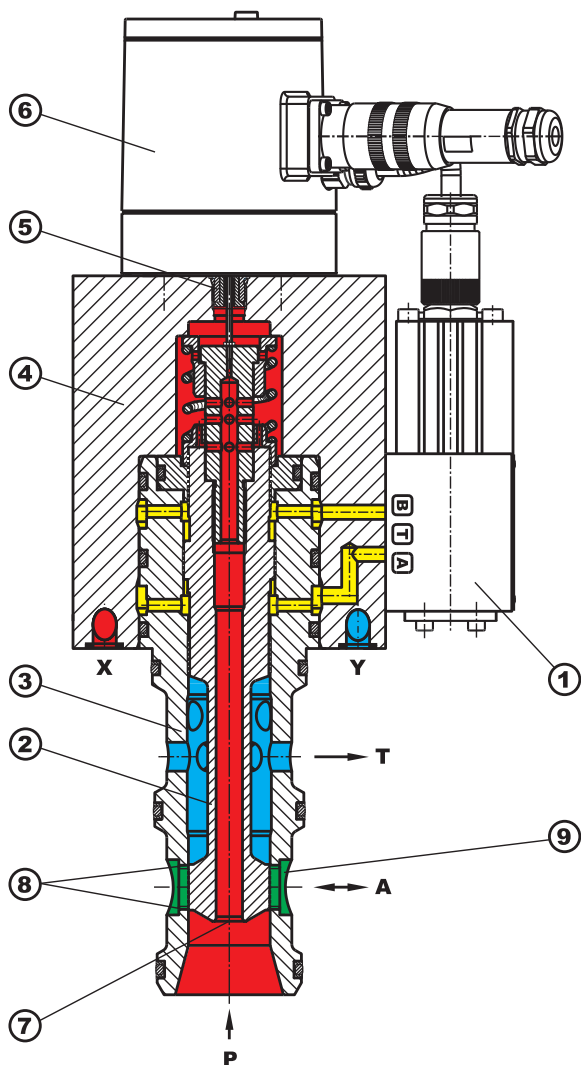
MOOG HYDROLUX S.à r.l.
1, rue de l'Acierie
L-1112 LUXEMBOURG
Tel: (+352) 40 46 40-900
Fax: (+352) 40 46 40-909
E-mail: administration@moog.lu

SE3 3/3-Way Servo cartridge valve
NB30, 50, 63



Description	Page
General description	3
Specifications	4
Block circuit diagram of the integrated electronics	5
Characteristic curves + Spool types	6
Models	7
Dimensions	8
Ordering Information	12
Fail-safe functions	13
Spare parts + Accessoires	14

This catalogue is for users with technical knowledge. To ensure that all necessary characteristics for function and safety of the system are given, the user has to check the suitability of the products described herein. In case of doubt please contact Moog Hydrolux.



Servo valve for manifold mounting

Continuously adjustable from P to A or A to T.
Pilot valve (1) located directly on the cover (4).

Technical design

The valve comprises of 6 main groups.:

- Pilot valve (1)
- Main stage spool (2)
- Sleeve (3)
- Cover (4)
- Position transducer (5)
- Integrated control electronics (6)

Function description

- Main stage spool (2) with equal pilot-surfaces.
- Controlled by a high-dynamic proportional-pilot valve (D633).
- Pressure balance through the drilling (7) in the main stage spool (2), resulting in a very low displacement force.
- Control of the main flow from P to A or A to T by the spool lands (8).
- Control of the main stage spool by a position transducer (5).
- Closed loop by integrated electronics (6).
- Failsafe features: => Fail-safe sandwich plate or biased pilot valve, see on page 13.

Recommendation: For application where vibrations shocks higher than 30g are expected, the electronics with additional dampening elements are required. (see " ES " in the Ordering Information)

Attention: Wrong connecting leads to uncontrolled movements of the main stage spool and may cause damage to person and machine !

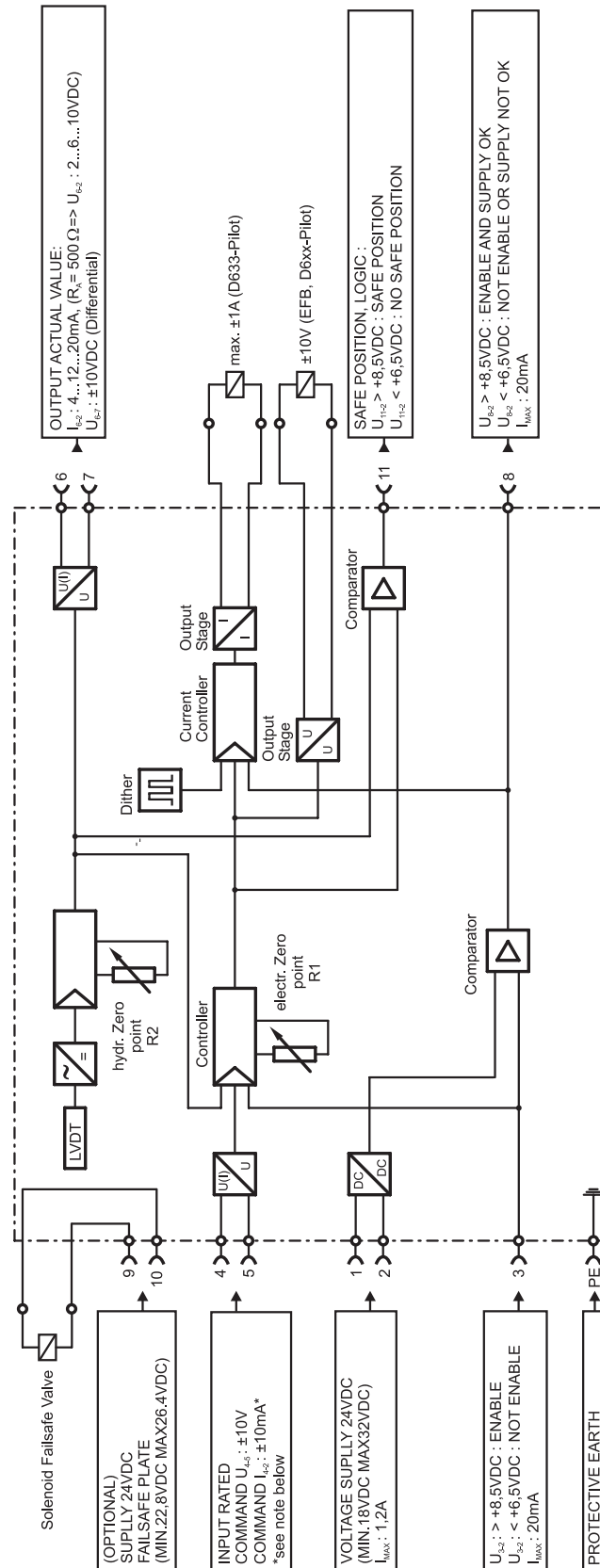
General data	Value	Unit	Specifications		
Mode of construction	-	-	3/3-way-cartridge valve, sliding spool valve with positioning control and integrated electronics, proportional-hydraulically operated.		
Mounting position	-	-	any		
Vibration	-	-	30 g, 3 axes		
Ambient temperature range	min. max.	°C °C	- 20 + 60		
Weight without fail-safe sandwich plate	-	kg	18	28	44
Weight with fail-safe sandwich plate	-	kg	21	31	47
Weight with fail-safe sandwich plate and filter sandwich plate	-	kg	24	34	50
Hydraulic					
Operating pressure ports P, A, T	max.	bar	dynamic 350		
Pilot pressure	max.	bar	350		
Pressure fluid temperature range	min. max.	°C °C	-20 +80		
Viscosity → recommended → max admissible		mm²/S mm²/S	15.....45 5.....400		
Filtration of the pressure fluid for the pilot circuit					
Recommended cleanliness class for normal operation		ISO 4406 < 18 / 15 / 12			
Recommended cleanliness class for longer life		ISO 4406 < 17 / 14 / 11			
Filter rating recommended for normal operation		β ₁₀ ≥75 (10 μm absolute)			
Filter rating recommended for longer life		β ₆ ≥75 (6 μm absolute)			
Nominal size	-	-	NB30	NB50	NB63
Nominal flow at Δp = 5 bar ¹⁾	Q _N	l/min	425	850	1185
max. permissible flow	Q _{max.}	l/min	900	1800	2500
Control stroke of mainstage	-	mm	±8	±8	±10
Control oil volume	V _{st.}	cm³	±1,2	±3,3	±4,8
Pilot valve		Series D633			
Nominal flow of the pilot valve at Δp = 35 bar ¹⁾	Q _N	l/min	7,5	7,5	20
max. null leakage flow at p _x = 210 bar for the pilot valve	Q _L	l/min	0,4		
Static / dynamic					
Hysteresis	-	%	< 0,2		
Response time for signal change 0...100% at p _x = 180 bar	-	ms	13	18	25

¹⁾ Nominal flow per land / Flow rate at a different Δp : $Q_x = Q_{nom} \cdot \sqrt{\frac{\Delta p_x}{5}}$

BLOCK CIRCUIT DIAGRAM OF THE INTEGRATED CONTROL ELECTRONICS

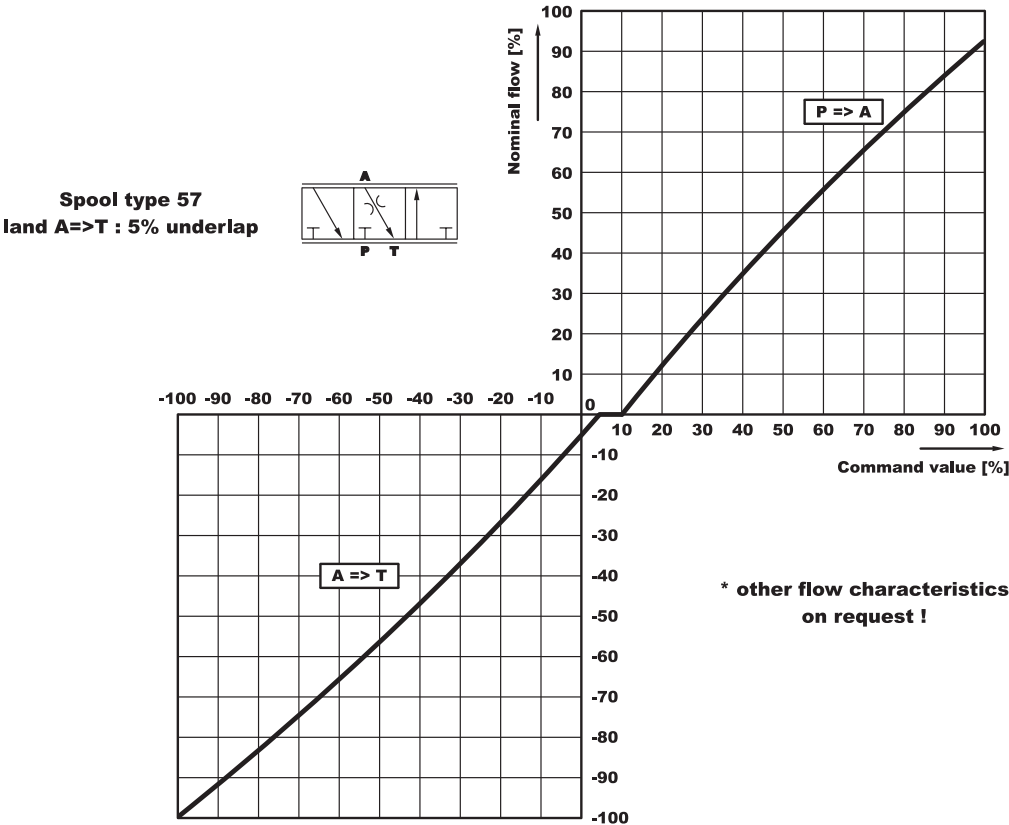
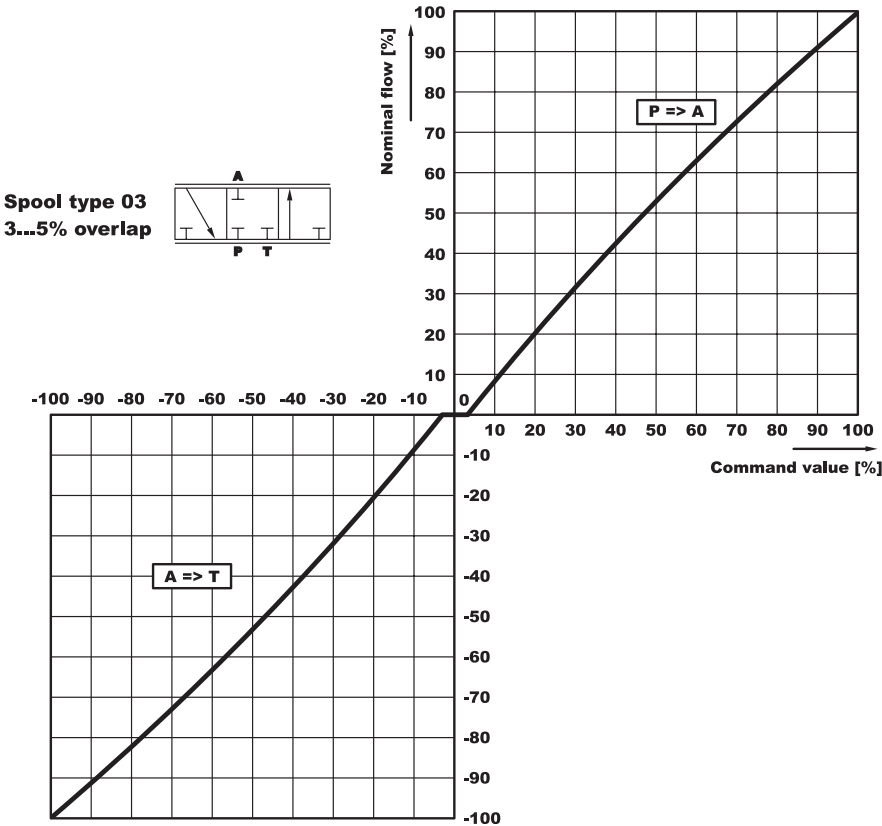
SE3

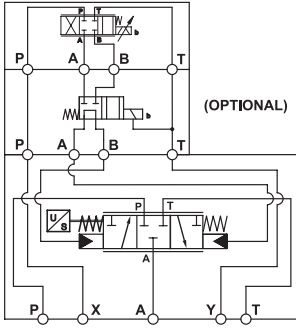
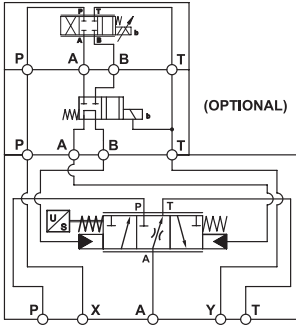
Pole connector to EN 175201 Part 804 (DIN 43 651), and mating connector (type E, metal shell) with leading protective earth connection (⏏)



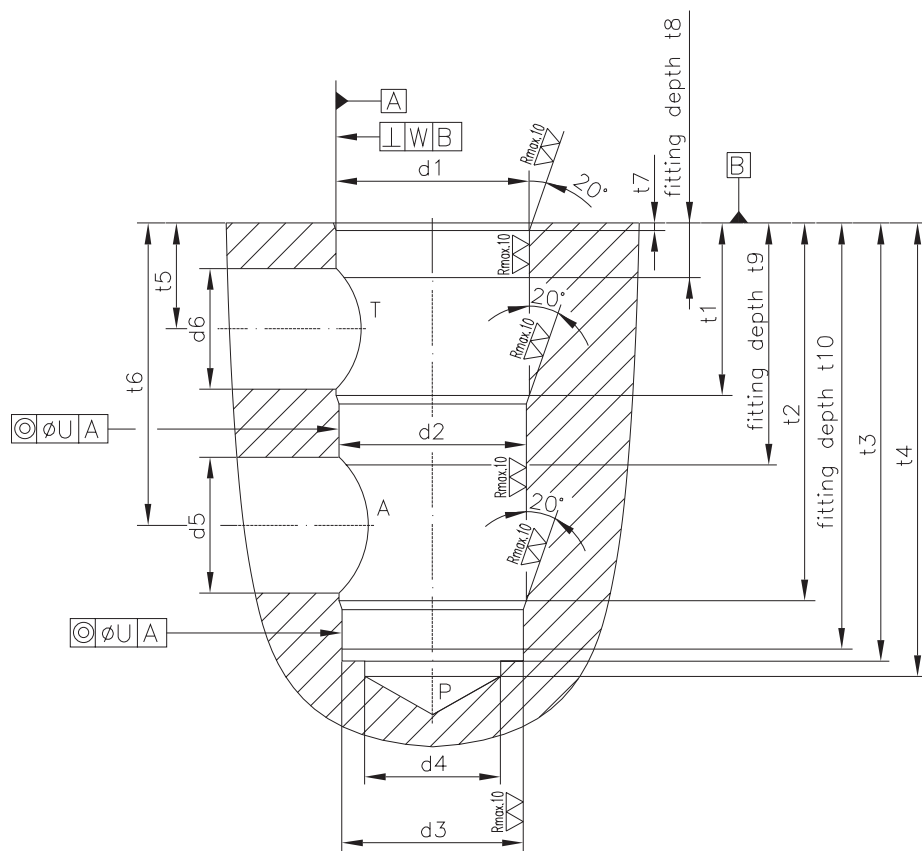
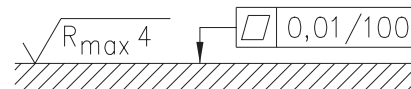
*INPUT RATED COMMAND $\pm 10\text{ mA}$.
 The stroke of the spool is proportional to $I_i = -I_o$.
 100% spool opening $P \Rightarrow A$ or $A \Rightarrow T$ is achieved at $I_i = \pm 10\text{mA}$.
 If pin 4 is used, pin 5 must be connected to pin 2 at cabinet side.
 At 0 mA command signal the spool is in center position.

Flow characteristics + Spool types *

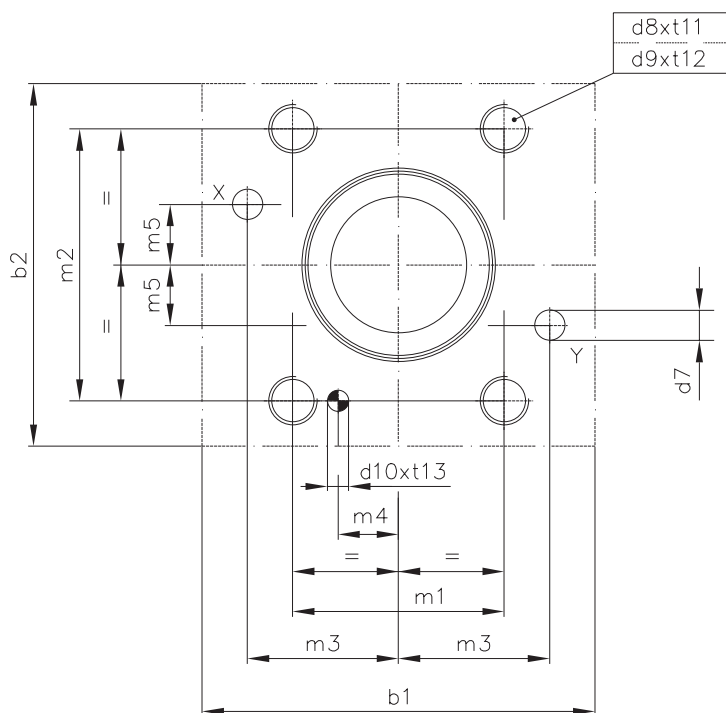


Symbol	NB	Q_N (l/min) at $\Delta p = 5$ bar	Description (see Ordering Information page 13)	Weight (kg)
 Spool 03	30	425	SE3E30D1A03A_2_A_X0A	18 21=> Fail-safe 24=> Filter
	50	850	SE3E50D1A03A_2_B_X0A	28 31=> Fail-safe 34=> Filter
	63	1185	SE3E63F1A03A_2_C_X0A	44 47=> Fail-safe 50=> Filter
 Spool 57	30	425	SE3E30D1A57A_2_A_X0A	18 21=> Fail-safe 24=> Filter
	50	850	SE3E50D1A57A_2_B_X0A	28 31=> Fail-safe 34=> Filter
	63	1185	SE3E63F1A57A_2_C_X0A	44 47=> Fail-safe 50=> Filter

Required surface finish

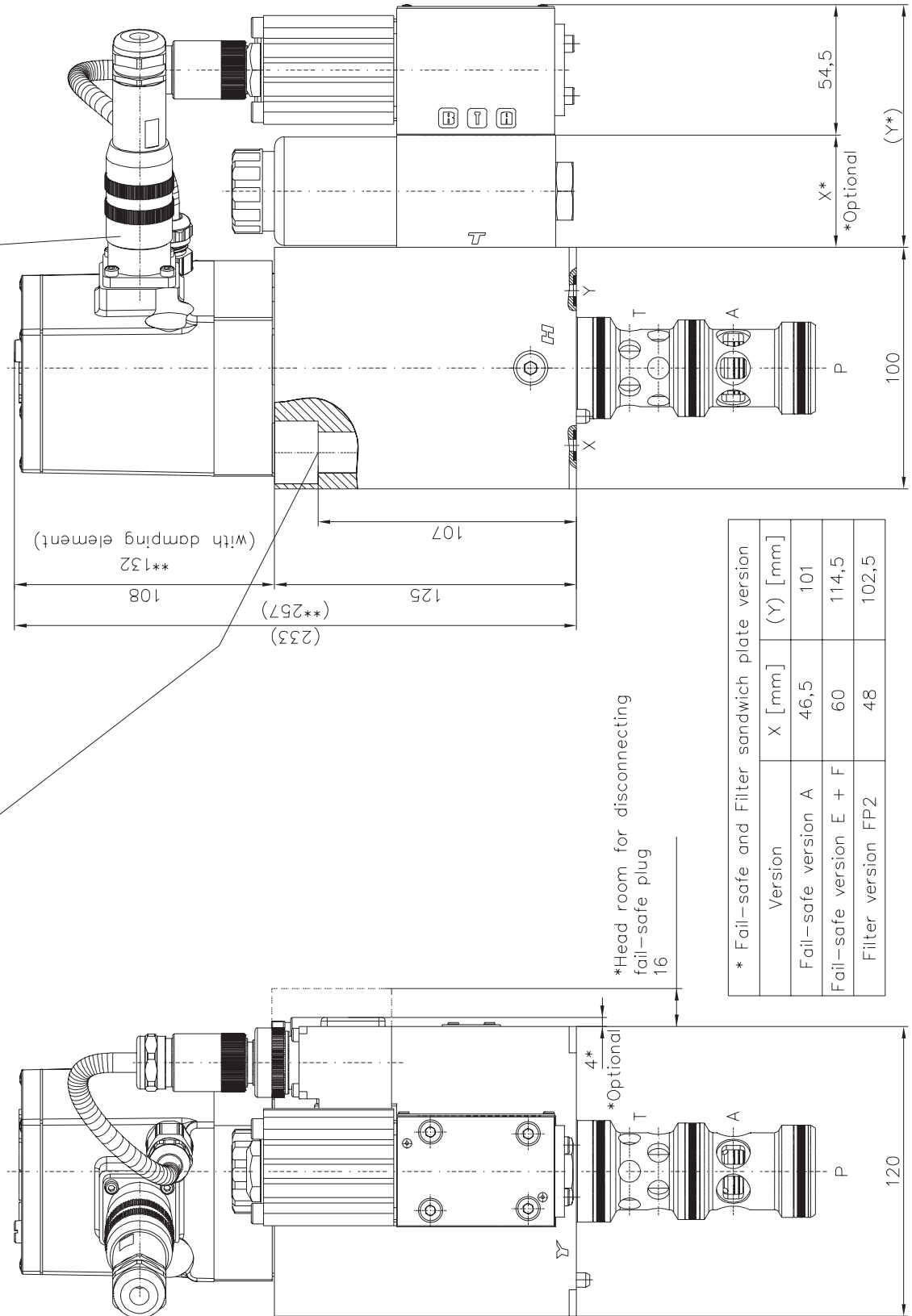


Dimension	NB30	NB50	NB63
b1	100	130	160
b2	120	120	140
d1 ^{H7}	42	64	92
d2 ^{H7}	40	62	90
d3 ^{H7}	38,1	60	88
d4max.	30	45	63
d5max.	30	45	63
d6max.	25	40	55
d7max	6.	10	10
d8	14	14	17,5
d9	M16	M16	M20
d10 ^{H13}	7	7	8
m1 ±0,2	70	70	100
m2 ±0,2	90	90	100
m3 ±0,2	32	50	65
m4 ±0,2	20	20	70
m5 ±0,2	11	20	15
t1 +0,1	40	57	77,5
t2 +0,1	85	125	158,5
t3 +0,5	100	145	178
t4min.	105	150	183
t5	26	35	48
t6	68	100	126
t7	2,5	2,5	2,5
t8	18	18	20
t9	58	80	96
t10	98	141	175
t11	31	31	38
t12	26	26	33
t13	8	8	10
U	0,05	0,05	0,05
W	0,05	0,05	0,05



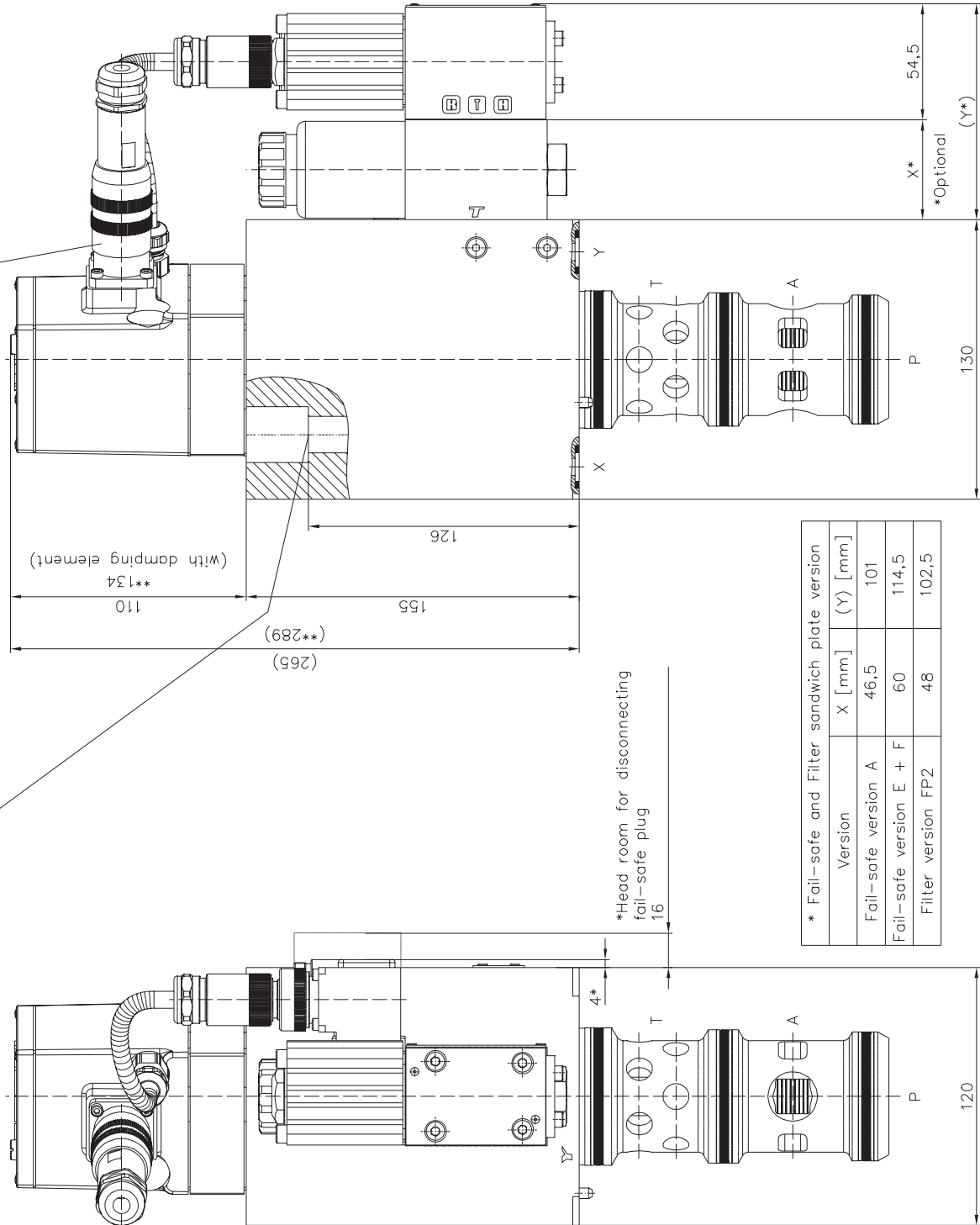
Screws ISO 4762-M16x130-12.9
not included in delivery.
Tightening torque: $M_A = 300 \text{ Nm}$

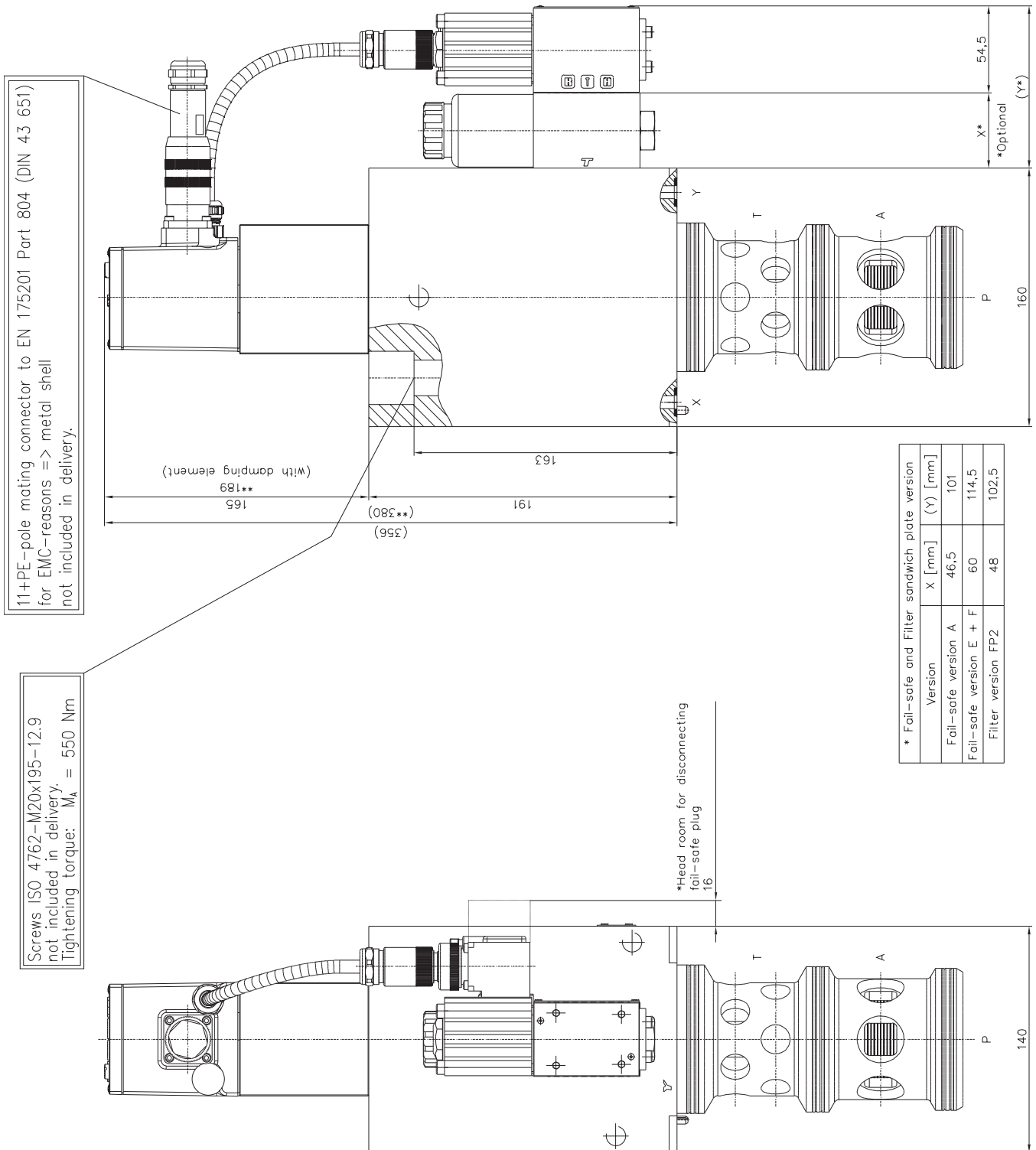
11+PE-pole mating connector to EN 175201 Part 804 (DIN 43 651)
for EMC-reasons => metal shell
not included in delivery.

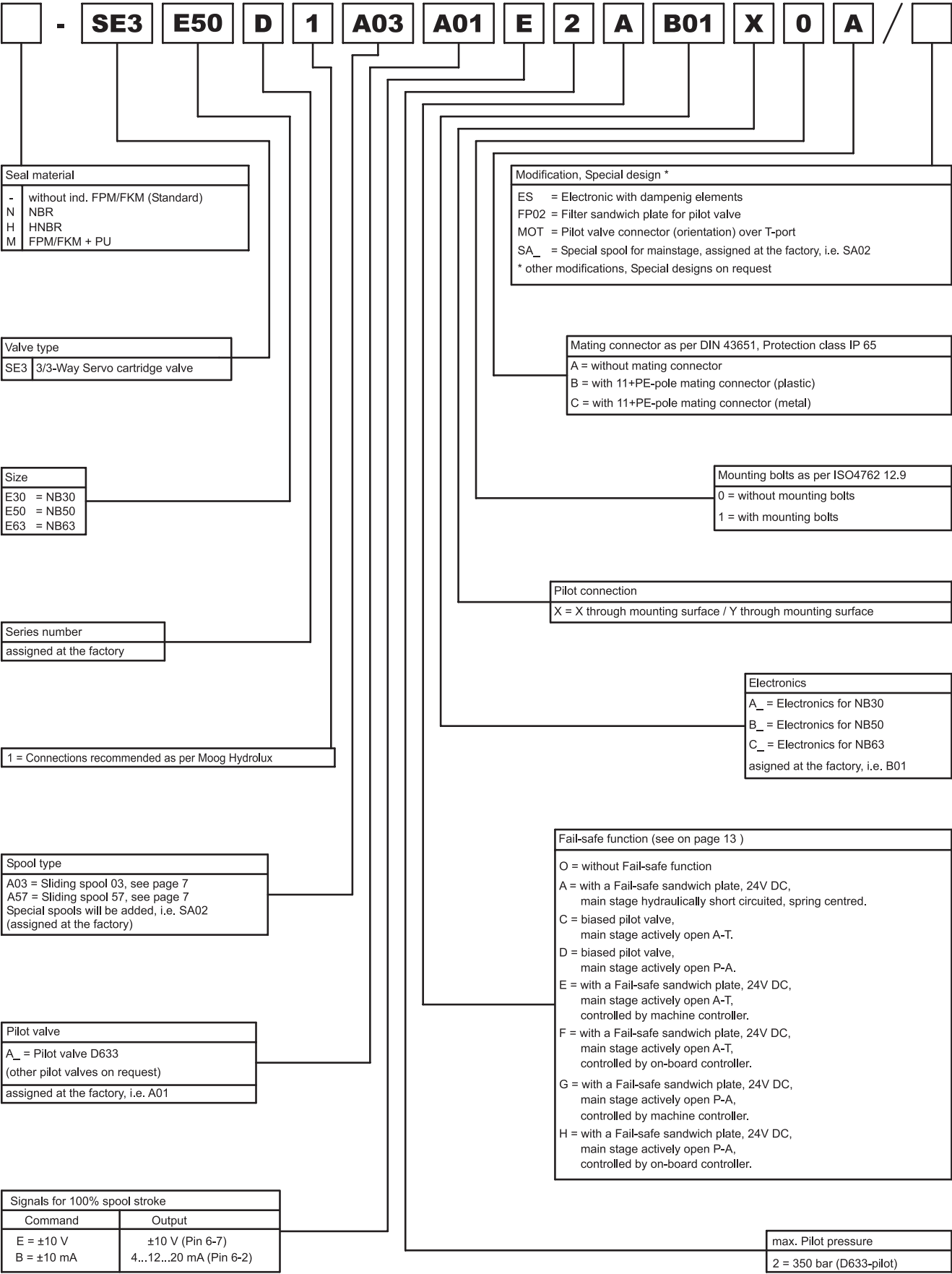


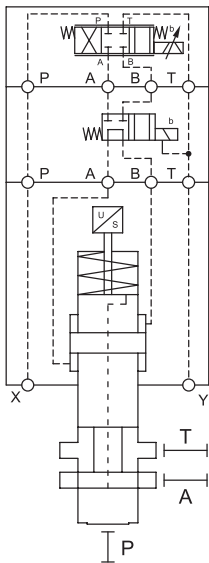
11+PE-pole mating connector to EN 175201 Part 804 (DIN 43 651)
for EMC-reasons => metal shell
not included in delivery.

Screws ISO 4762-M16x150-12.9
not included in delivery.
Tightening torque: $M_A = 300 \text{ Nm}$



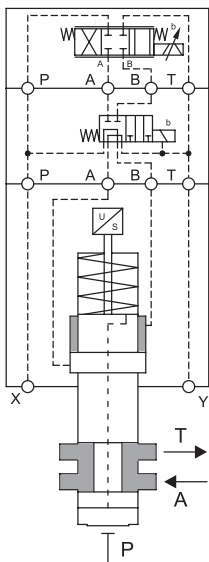






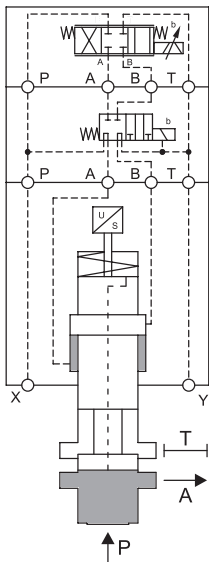
Fail-safe function

" A "



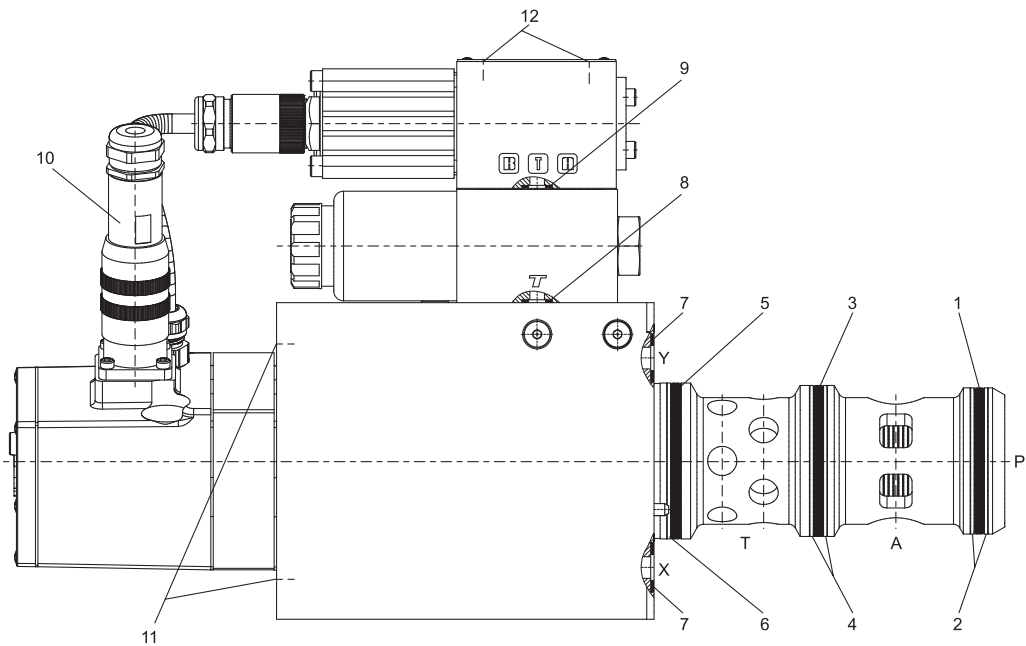
Fail-safe function

" E " + " F "



Fail-safe function

" G " + " E "

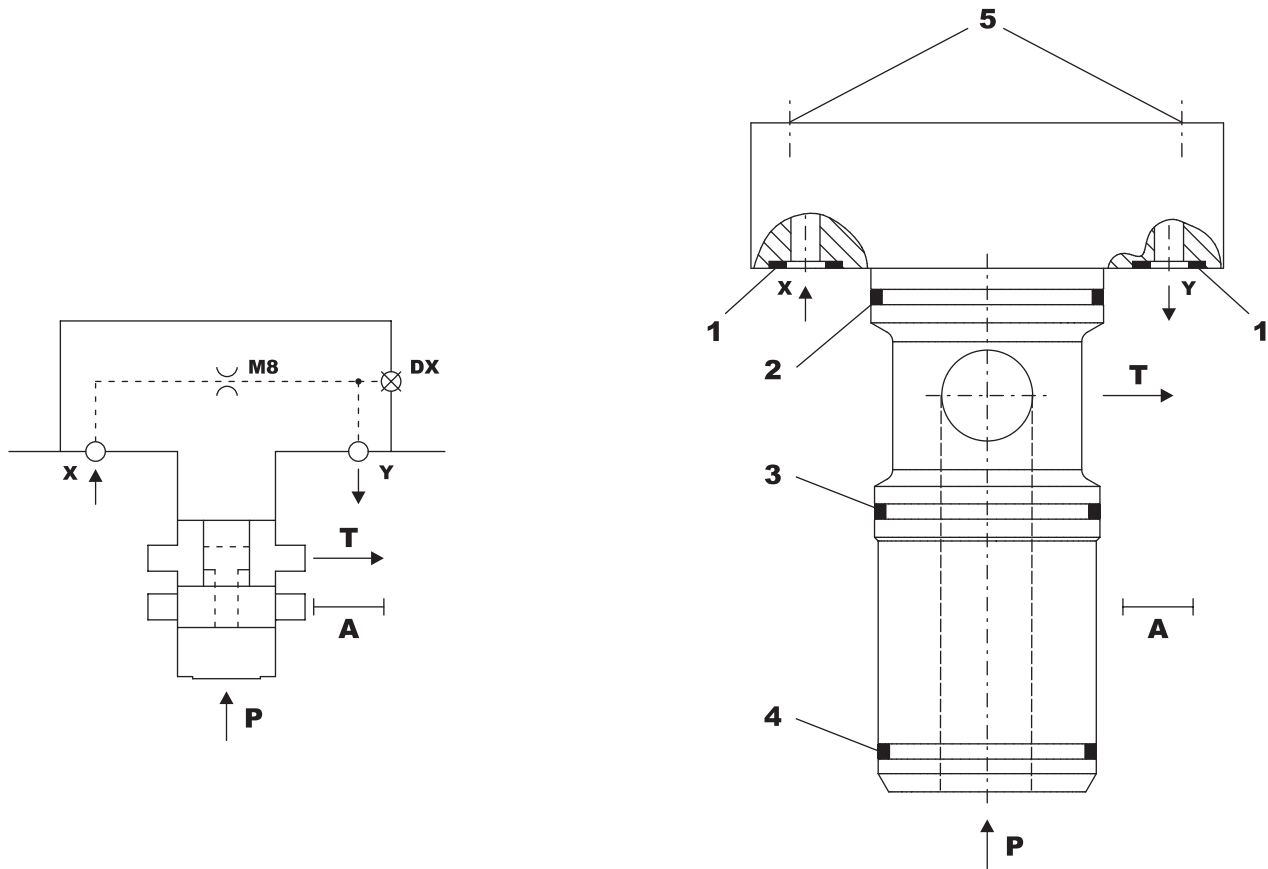


Seal-Kits & Accessories for Sleeve and Cover					
Pos.	Description	Ordering number			
			NB4	NB50	NB63
	Seal - Kit FPM/FKM*	XEB	17268-000-00	17267-000-00	16492-000-00
1	O-Ring FPM/FKM	X980-	02125	02227	02235
2	Backup-Ring	X780-	08125	08227	18235
3	O-Ring FPM/FKM	X980-	02126	02227	02236
4	Backup-Ring	X780-	08126	18227	18236
5	O-Ring FPM/FKM	X980-	02127	02228	02237
6	Backup-Ring	X780-	08127	18228	08237
7	O-Ring FPM/FKM	X980-	02012	02114	02112
Pos.	Description	Accessories (not in valve delivery included !)			
11	Mounting bolts DIN EN ISO 4762-12.9	X784-	11629 (4x)	11608 (4x)	12005 (4x)
11	Torques	[Nm]	300	300	550
10	Mating connector 11+PE-pole (Metal)	XEB	17725-000-00		
10	Mating connector 11+PE-pole (Metal)	XEB	18267-000-00		

*Attention !!! All seals are FPM/FKM-seals. Other seal material on request.

Order example : O-Ring Pos.3 NB50 => Part number : X980-02227

Seal-Kits & Accessories for Pilot valves					
Pos.	Description	Ordering number			
			FPM / FKM (Fluorocarbon) 85 Shore		
9	Seal - Kit D663	XEB-	17868		
8	Seal - Kit Fail-safe	XEB-	18268		
Seal - Kits only available completely					
Pos.	Description	Accessories			
			D633	D633 + Fail-safe function A	D633 + Fail-safe function F + E
12	Mounting bolts DIN EN ISO 4762-12.99	X784-	10522 (4x)	10537 (4x)	10515 (4x)
12	Torques	[Nm]	8	8	8



Seal-Kits & Accessories for Flushing sleeve					
Pos.	Description	Ordering number			
			NB30	NB50	NB63
	Flushing sleeve complete	XEB	18270-000-00	18271-000-00	18272-000-00
1	O-Ring FPM/FKM**	X980-	02012	02114	02112
2	O-Ring FPM/FKM**	X980-	02127	02228	02237
3	O-Ring FPM/FKM**	X980-	02126	02227	02236
4	O-Ring FPM/FKM**	X980-	02125	02227	02235
Pos.	Description	Accessories (not in valve delivery included !)			
11	Mounting bolts DIN EN ISO 4762-12.9	X784-	11615 (4x) (M16x40)	11612 (4x) (M16x45)	12001 (4x) (M20x60)
11	Torques	[Nm]	300	300	550

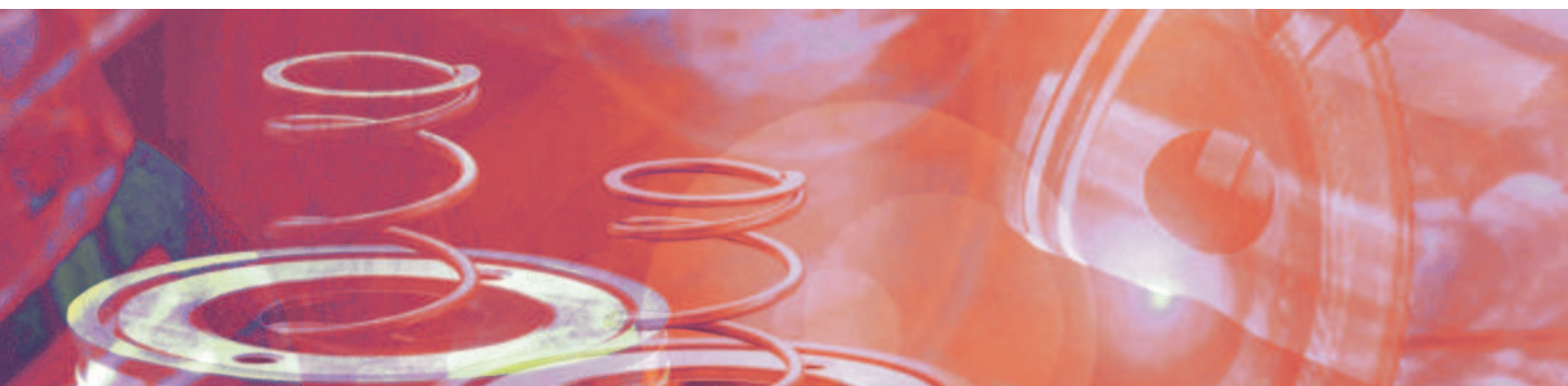
****Attention !!!** All seals are FPM/FKM-seals. Other seal material on request.

Order example : Flushing sleeve complete NB50 => Part number : XEB18271-000-00

*** IT'S RECOMMENDED TO USE THE FLUSHING SLEEVES BEFORE THE INSTALLATION OF THE SE3-CARTRIDGES IN THE MANIFOLD !!!**



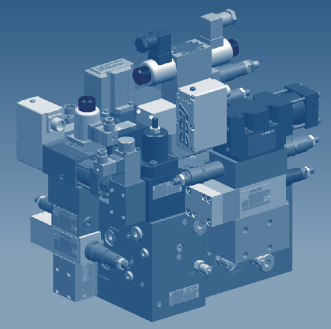
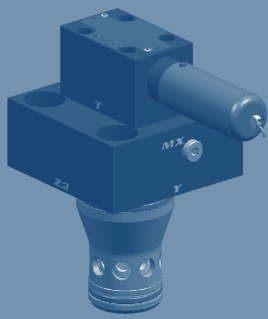
Australia
Brazil
China
Denmark
England
Finland
France



Germany
India
Ireland
Italy
Japan
Korea
Luxembourg
Philippines
Singapore
Spain
Sweden
USA

MOOG
HYDROLUX

MOOG HYDROLUX S.à r.l.
1, rue de l'Acérie
L-1112 LUXEMBOURG
Tel: (+352) 40 46 40-900
Fax: (+352) 40 46 40-909
E-mail: administration@moog.lu



2-Way Spool Type Pressure Reducing Valve Series D (01/2011)

2-Way Spool Type Pressure Reducing Valve (DMO) ISO 7368 NB 16 – NB 50

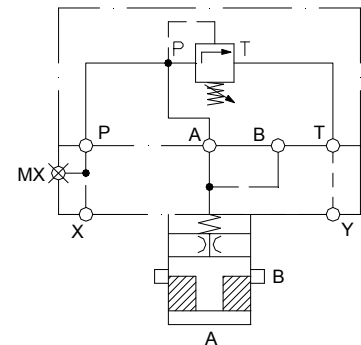
General Description

2-way pressure reducing valves are used to reduce a variable input pressure (primary pressure at B) to a lower, constant output pressure (secondary pressure at A).

The reduced pressure can be set using a pressure relief valve on the valve cover. Depending on configuration, this valve can also function as a pressure compensator.

The preferred mode of mounting is the manifold block which, depending on the hydraulic circuit for the specific application, can be equipped with several interconnected valves.

The valves are available as “normally open” or “normally closed” versions.



Benefits

- Maximum operating pressure: 350 bar
- Improved flow characteristics compared to series B
- Can be used with standard series D covers (RM or 1W)
- Available in multiple configurations

Sizes

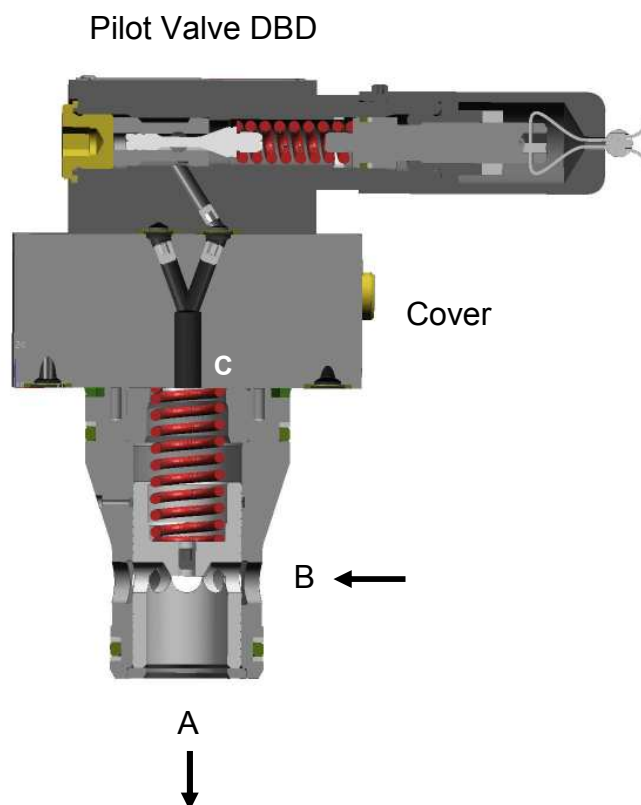
- NB 16
- NB 25
- NB 32
- NB 40
- NB 50

Operating Principle

A DMO type pressure reducing valve is a spool type valve without an effective surface in port B. The effective surfaces in port C and in operational port A are of equal size (surface ratio 1:1). The flow direction is from B to A.

As port B is pressurized, oil will flow from B to A. As the pressure in port A approaches the set pressure value of the limiting valve, the spool will move towards the closed position throttling the oil flow. As the pressure in port A exceeds the set pressure value, the spool will close port A and the oil flow will be interrupted.

Depending on the hydraulic circuit and the adaptation of suitable standard covers; a DMO type valve can also be used, for example, in flow-control functions as a pressure compensator.



Specification

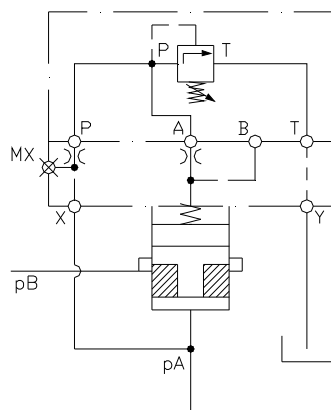
General data	Value	Unit	Specification				
Mode of Construction	-	-	2-Way Spool Type Pressure Reducing Valve				
Type	-	-	DMO (Manual Pressure Adjustment)				
Design	-	-	Cartridge Valve				
Mounting style	-	-	Manifold Cartridge Mounting				
Nominal size	NB	-	16	25	32	40	50
Mounting dimensions according ISO 7368-...	-	-	BA-06-2-A	BB-08-2-A	BC-09-2-A	BD-10-2-A	BE-11-2-A
Mounting position	-	-	Any				
Flow Direction	-	-	B → A				
Operating pressure	max.	MPa	35				
Ambient temperature range	min.	°C	-30				
	max.	°C	+80				
Seals* for hydraulic fluids	-	-	FKM+PU → M-DMO, hydraulic fluids on mineral oil basis				
			FKM → V-DMO, hydraulic fluids on mineral oil basis, HFD-hydraulic fluids				
			NBR → N-DMO, hydraulic fluids on mineral oil basis, HFC-hydraulic fluids				
Hydraulic fluid temperature range	-	°C	-30 to +80	NBR			
			-10 to +80	FKM + PU			
Viscosity range	min.	mm²/s	2,8				
	max.	mm²/s	380				
Operating viscosity	-	mm²/s	15 to 45				
Cleanliness to ISO-Code	max.		ISO 4406 (C) class 20/18/15				

* PU: Polyurethane; FKM: Fluorosilicone rubber (Viton®); NBR Nitrile rubber (Buna N); Other hydraulic fluids on request

Basic Configuration

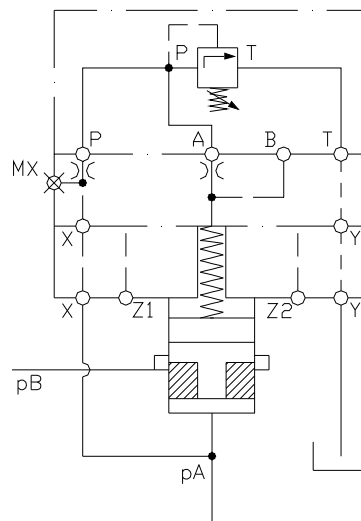
(1) Pressure reducing valve

- Standard RM cover
- Pilot oil supplied over port X
- Pilot oil tap on port A
- Without sandwich cover (max 3 bar spring)
- NB 16 to NB 40



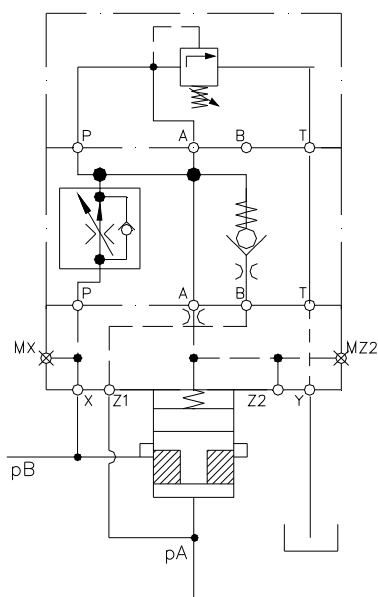
(2) Pressure reducing valve

- Standard RM cover
- Pilot oil supplied over port X
- Pilot oil tap on port A
- With sandwich cover for 8 bar spring
- NB 16 to NB 40 (NB 50 with 3 bar spring)



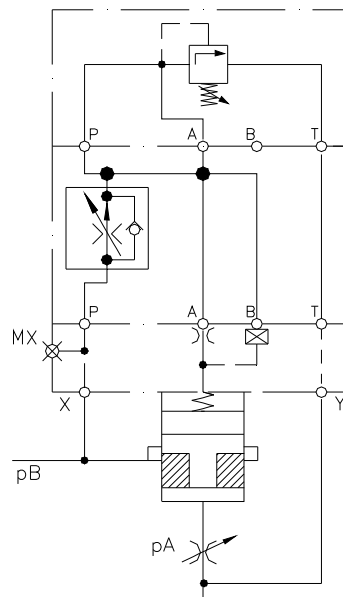
(3) Pressure reducing valve

- Standard 1W cover
- Pilot oil supplied over 2-way flow controller
- Pilot oil tap on port B
- Y port connected to tank
- NB 16 to NB 50
- Higher flow rates possible compared to configurations (1) and (2)



(4) Pressure compensator valve (upon request)

- Standard RM cover
- Pilot oil supplied over 2-way flow controller
- Pilot oil tap on port B
- Y port as pressure load tap downstream of the throttle valve
- NB 16 to NB 40 (NB 50 with sandwich cover)

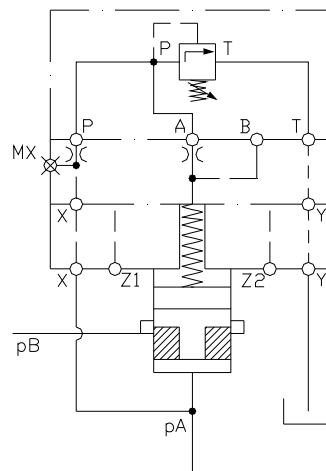
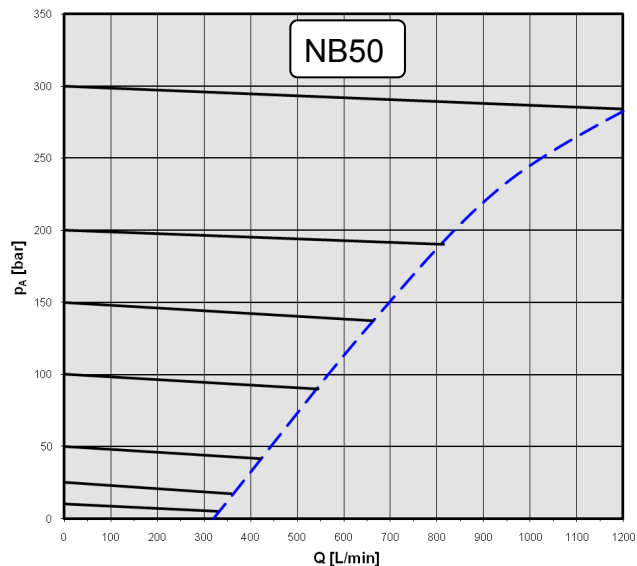
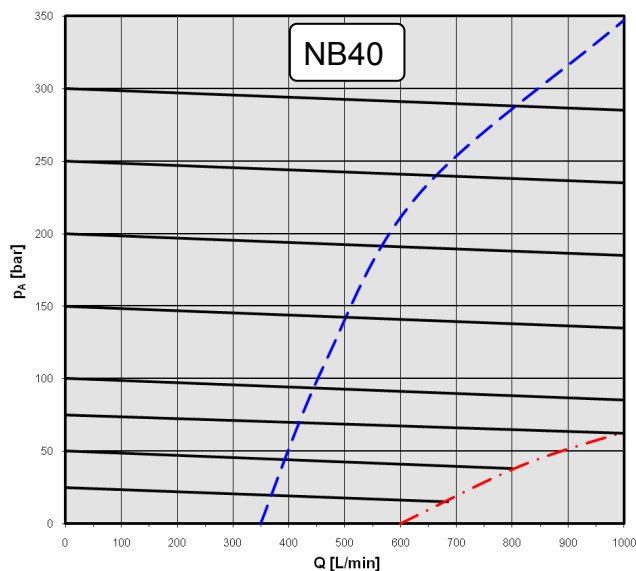
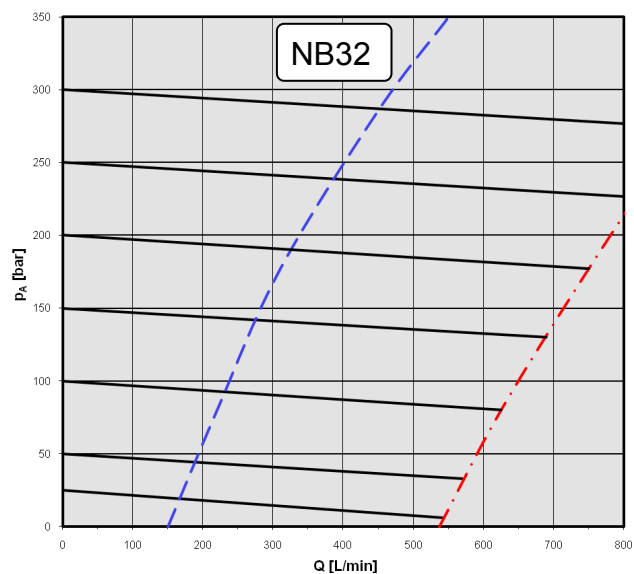
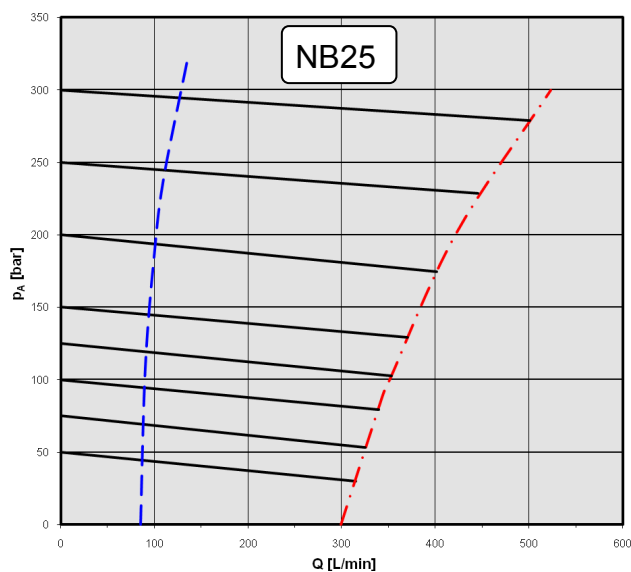
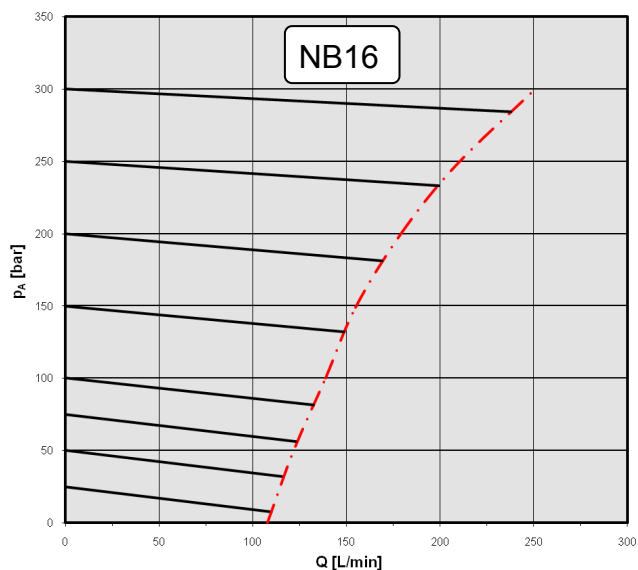


Characteristic Curves Using 3 Bar And/Or 8 Bar Springs

Characteristic Curves

Conditions: system pressure 350 bar, oil temperature 40 °C, oil viscosity 32 cSt

(Blue = performance limit with 3 bar spring, Red = performance limit with 8 bar spring)

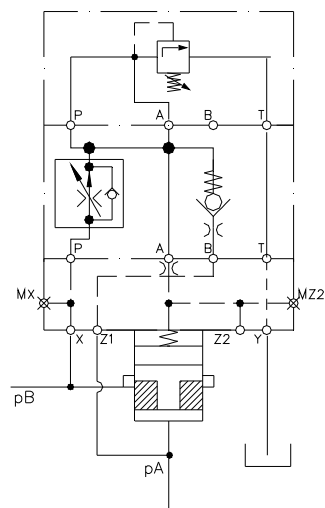
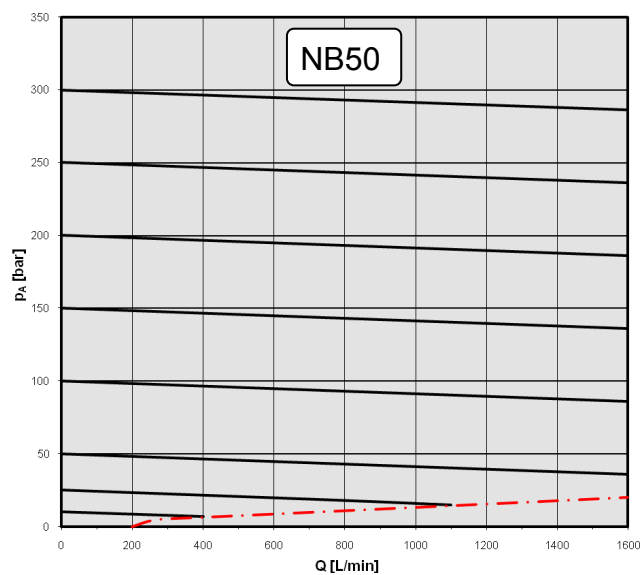
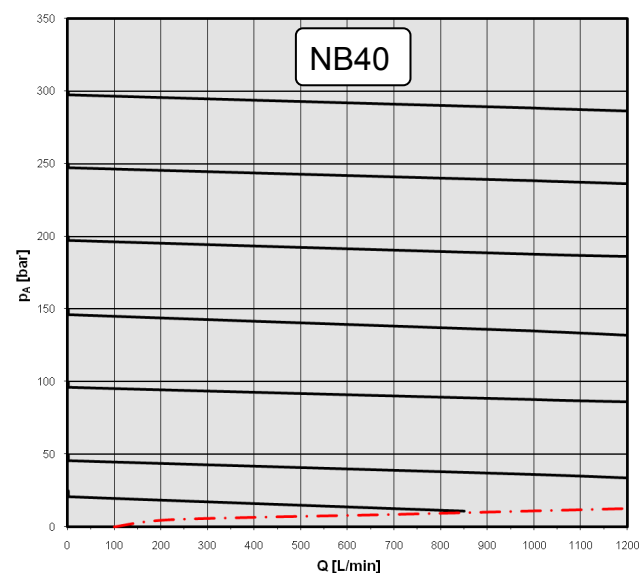
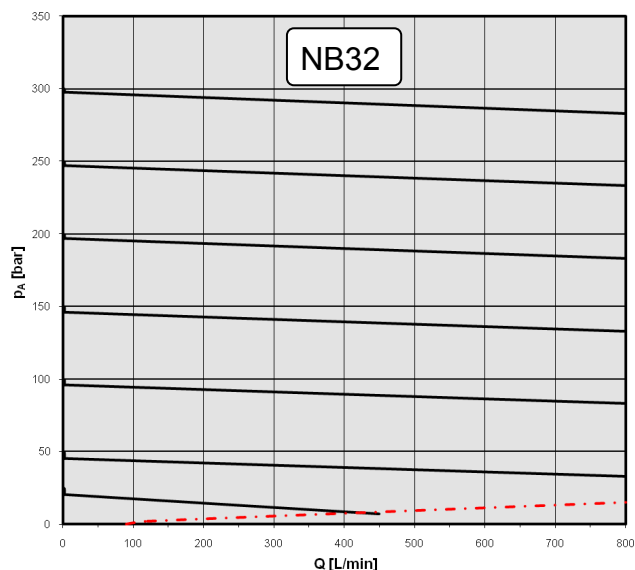
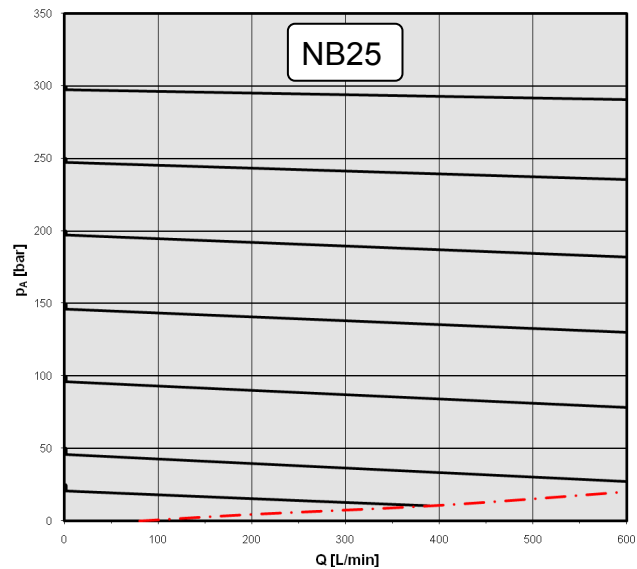
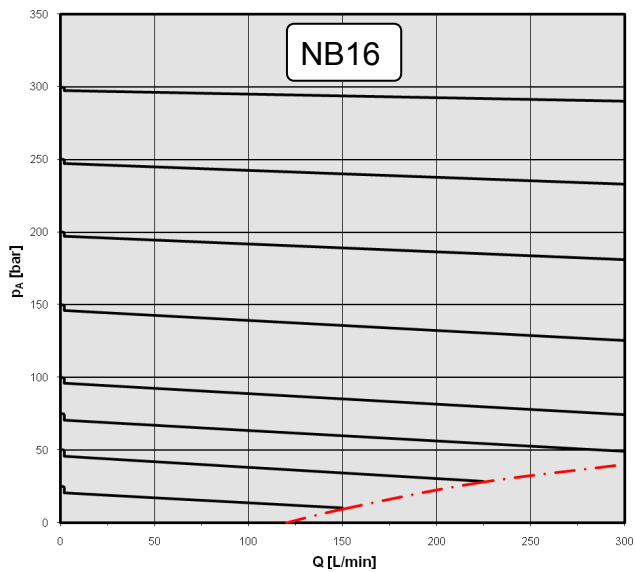


Characteristic Curves Using A Sandwich Plate Flow Control Valve

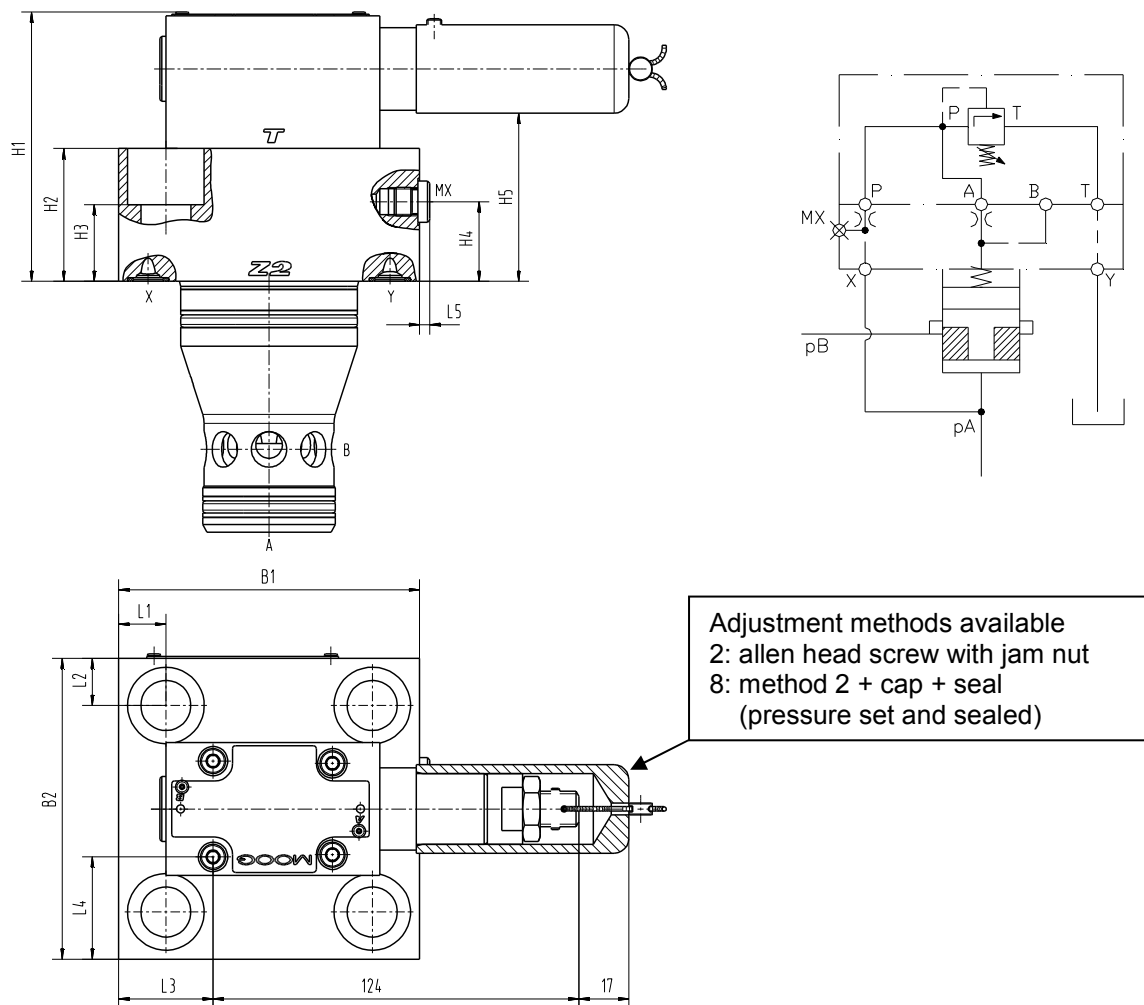
Characteristic Curves

Conditions: system pressure 350 bar, oil temperature 40 °C, oil viscosity 32 cSt

(Red = performance limit with 0,5 bar spring)



Dimensions



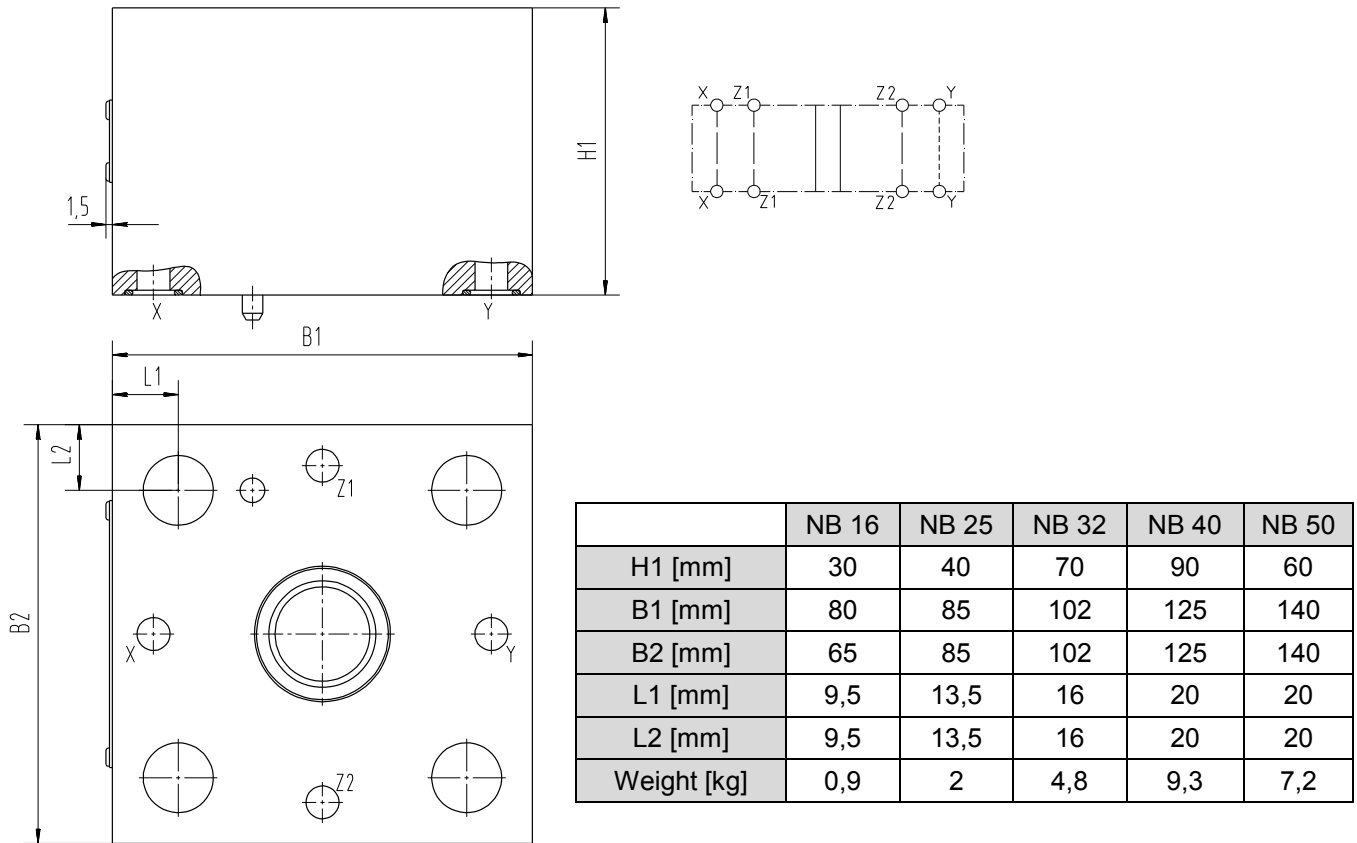
	NB 16	NB 25	NB 32	NB 40	NB 50 ²⁾
H1 [mm]	82	87	92	106	166 ³⁾
H2 [mm]	35	40	45	60	120 ³⁾
H3 [mm]	23	22	26	39	99 ³⁾
H4 [mm]	-	-	27	30	90 ³⁾
H5 [mm]	47	52	57	72	182 ³⁾
B1 [mm]	80 ¹⁾	85	102	125	140
B2 [mm]	65	85	102	125	140
L1 [mm]	9,5	13,5	16	20	20
L2 [mm]	9,5	13,5	16	20	20
L3 [mm]	7	23,5	32	43,5	51
L4 [mm]	16,25	26,25	34,65	46,25	53,75
L5 [mm]	-	-	3,5	4,5	4,5
Plugs MX	-	-	G 1/8"	G 1/4"	G 1/4"
Mounting Screws ISO 4762-12.9	M8x35	M12x40	M16x50	M20x70	M20x130
Tightening Torque [Nm]	30	100	300	550	550
Weight [kg]	2,9	3,9	5,5	9,6	20,7

¹⁾ Dimension B1 is larger than specified by ISO 7368

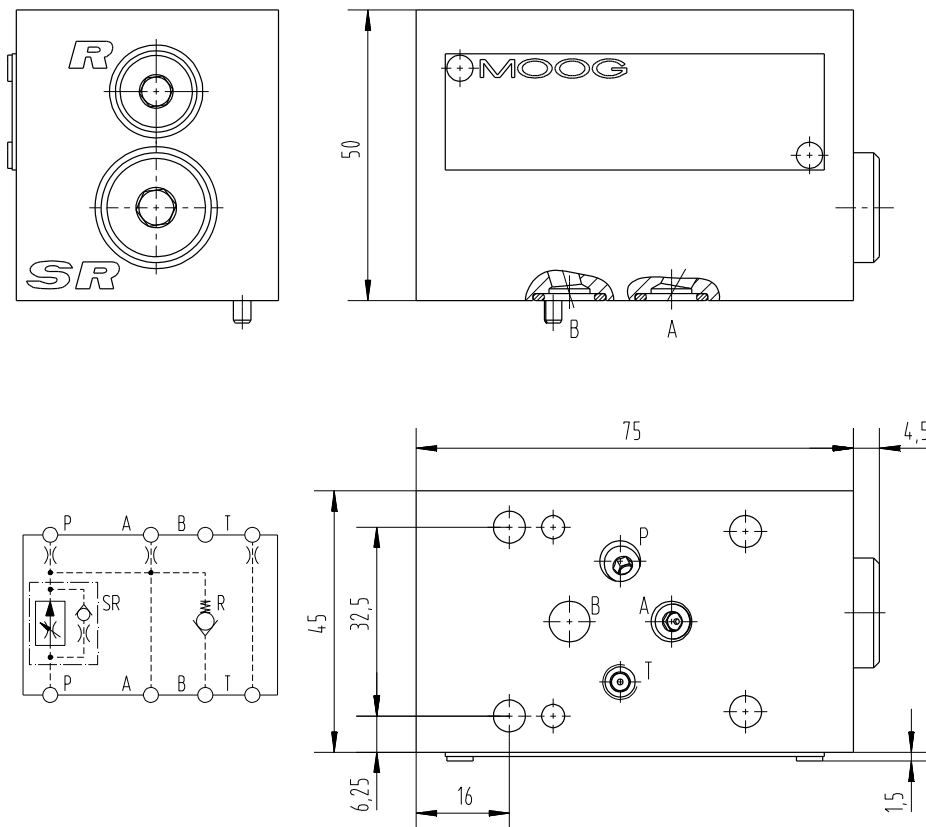
²⁾ NB50 delivered standard with sandwich cover (H1=166 mm)

³⁾ For NB50 with 0,5 bar spring subtract 60 mm from dimension given

Option: Sandwich cover for 8 bar spring NB16...NB40 (NB50 using max. 3 bar spring)



Option: 2-way flow control (NB06) using a sandwich plate (weight 1,25 kg)

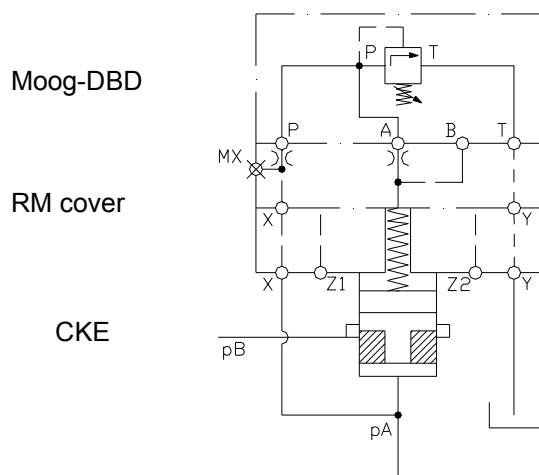


Alternative configurations for pilot valves that do not use port A.

It is recommended that pilot valves with no connection to port A be used in combination with a sandwich plate (P connected to A).

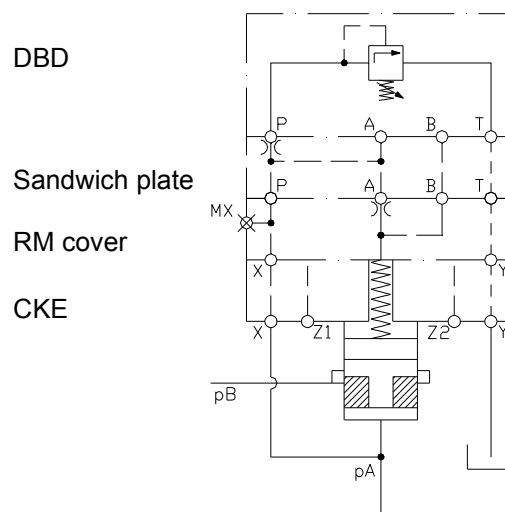
Standard:

Moog DB pilot valve + RM cover



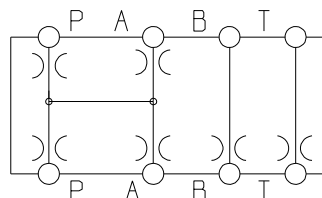
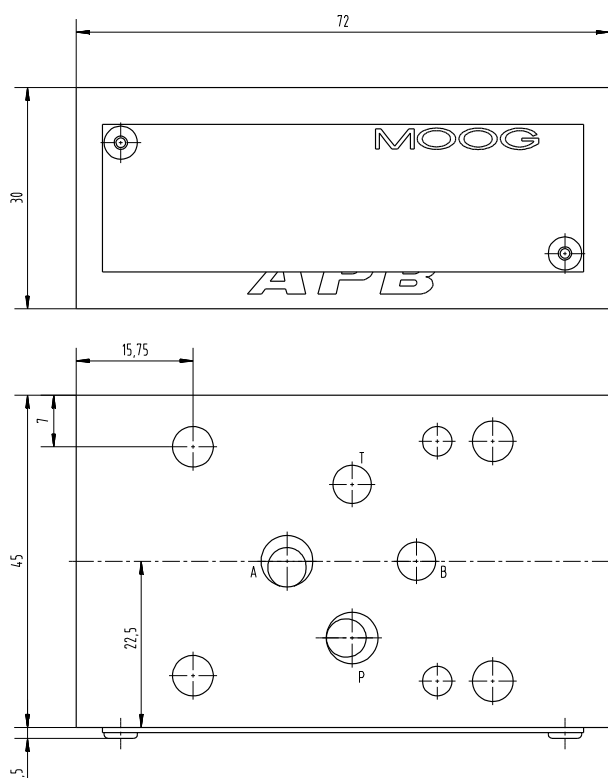
Alternative:

DB pilot valve + sandwich cover + RM cover

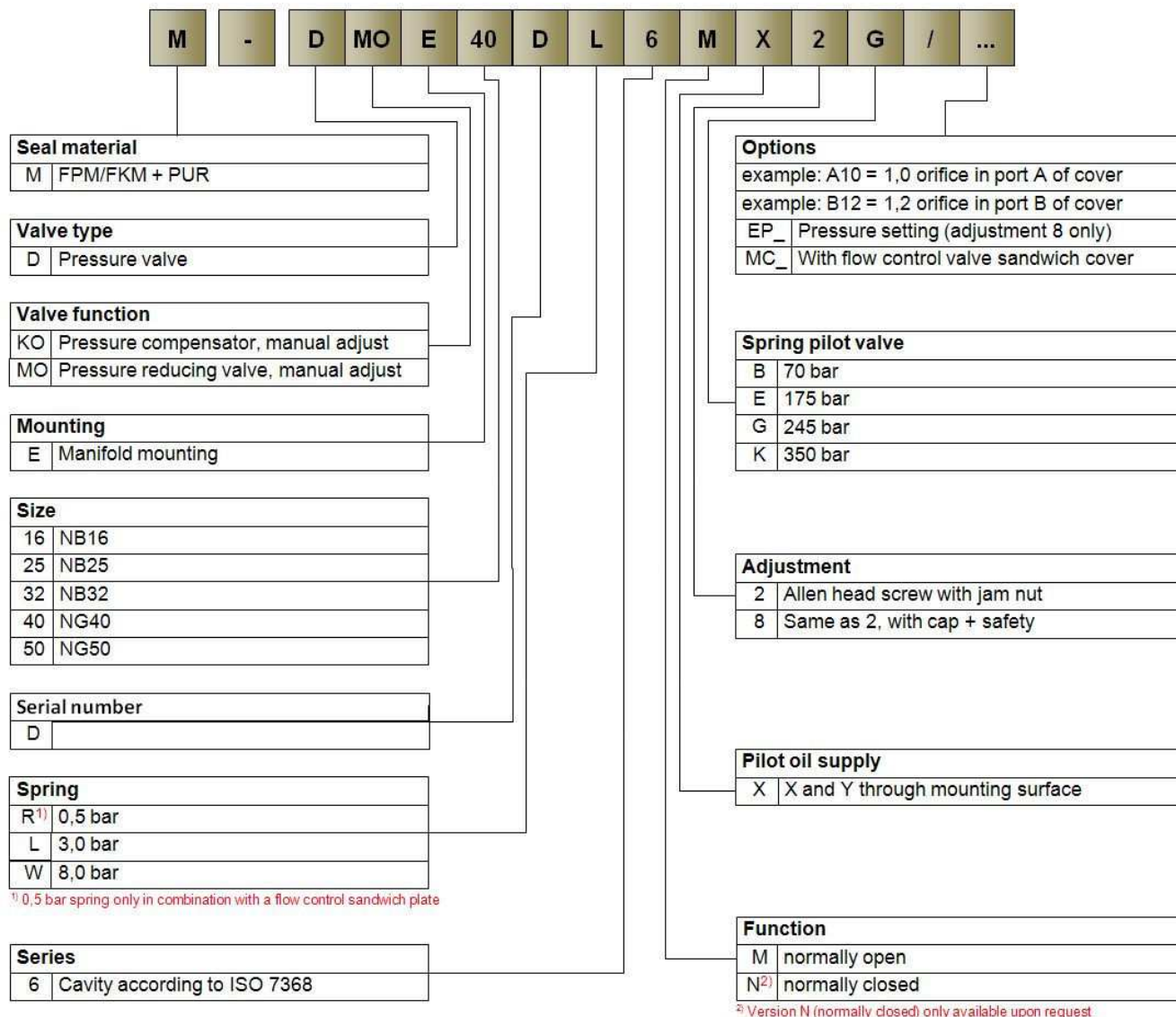


Valve configurations using a flow control sandwich plate, regardless of pilot valve; do not require any special sandwich plates.

Option: Sandwich cover (NB06) with connections from P and A (weight 0,7 kg)



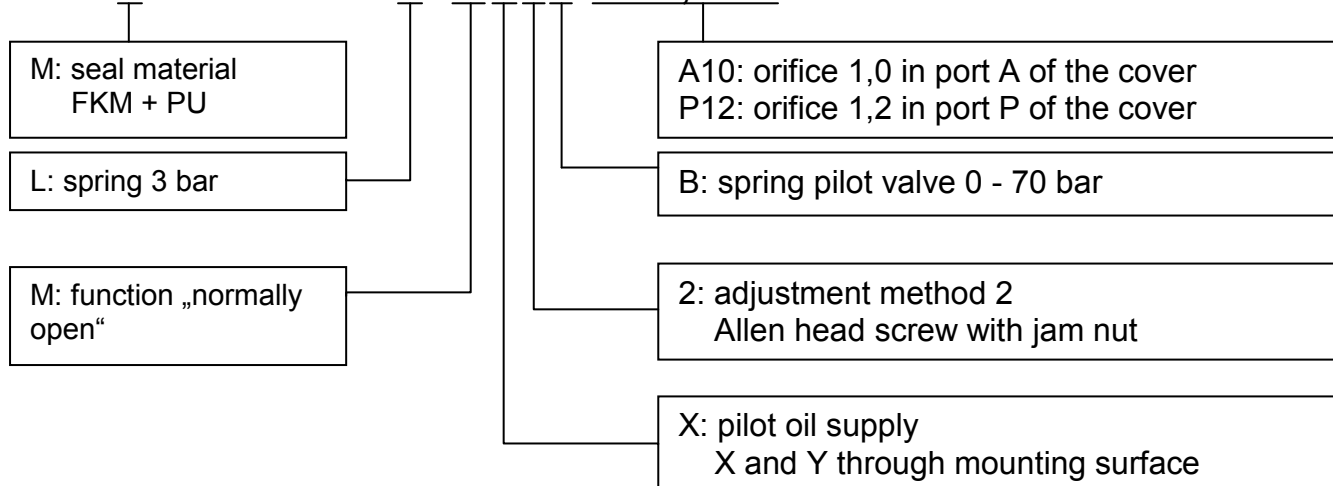
Ordering Information



Order Example

2/2-Way pressure reducing valve, NB 32, manual pressure adjustment, normally open

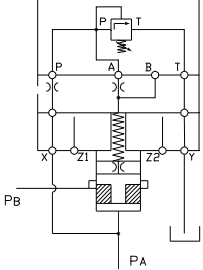
M-DMOE32DL6MX2B/A10;P12



Order Numbers

Pressure reducing valve with 3 or 8 bar spring (RM cover)

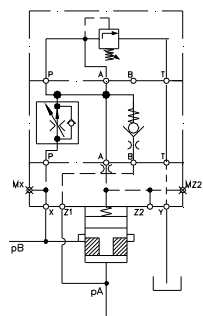
Function: normally open; Adjustment method 2, Spring pilot valve 350 bar, Seals PUR/FKM

Symbol	Size	Spring	ZWD*	Type code	
	16	3 bar	-	M-DMOE16DL6MX2K	
		8 bar	x	M-DMOE16DW6MX2K	
	25	3 bar	-	M-DMOE25DL6MX2K	
		8 bar	x	M-DMOE25DW6MX2K	
	32	3 bar	-	M-DMOE32DL6MX2K	
		8 bar	x	M-DMOE32DW6MX2K	
	40	3 bar	-	M-DMOE40DL6MX2K	
		8 bar	x	M-DMOE40DW6MX2K	
50	3 bar	x		M-DMOE50DL6MX2K	
	8 bar	-		not available	

*ZWD = sandwich cover required

Pressure reducing valve with sandwich cover flow control valve (1W cover)

Function: normally open; Adjustment method 2, Spring pilot valve 350 bar, Seals PUR/FKM

Symbol	Size	Spring	ZWD*	Type code	
	16	0,5 bar	-	M-DMOE16DR6MX2K/MC_	
	25	0,5 bar	-	M-DMOE25DR6MX2K/MC_	
	32	0,5 bar	-	M-DMOE32DR6MX2K/MC_	
	40	0,5 bar	-	M-DMOE40DR6MX2K/MC_	
	50	0,5 bar	-	M-DMOE50DR6MX2K/MC_	

* no sandwich cover required for these valve types

As a recognized leader in motion control technologies, Moog offers a full range of services to support our products and ensure that they meet the expectations of customers. Moog experts are the best at helping customers select the right products and ensuring that they run reliably for a long time.

When it is time for new machine commissioning, refurbishment or routine maintenance, our engineers can help to optimize machine performance, minimize downtime and ensure the smooth application of our products.

Moog Authentic Repair Service™ is designed to provide the highest quality repair services using original equipment parts, the latest design specifications, and highly trained technicians. This ensures that our repaired products will run as well as when they were new.

With facilities in over 25 countries, Moog is committed to offering convenient local service to our customers.

Visit www.moog.com/industrial/worldwide to find the location nearest you for application engineering, repair, or field services.

FOR MORE INFORMATION VISIT
<http://www.moog.com/industrial>

MOOG.COM/INDUSTRIAL

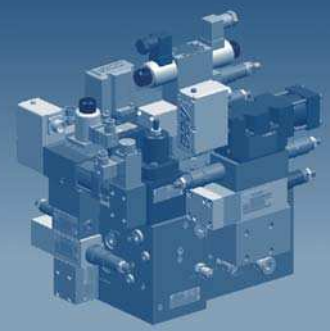
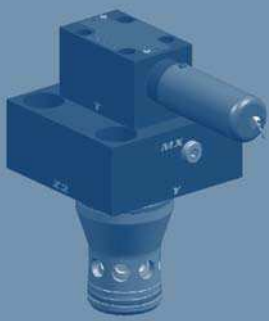
For the office nearest you, contact us online at moog.com/industrial/globallocator.

Argentina	+54	(0) 11 4326 5916	info.argentina@moog.com
Australia	+61	(0) 3 9561 6044	info.australia@moog.com
Austria	+43	(0) 664 144 6580	info.austria@moog.com
Brazil	+55	(0) 11 35720400	info.brazil@moog.com
Canada	+1	716 652 2000	info.canada@moog.com
China	+86	(0) 21 2893 1600	info.china@moog.com
Finland	+358	(0) 104221840	info.finland@moog.com
France	+33	(0) 1 4560 7000	info.france@moog.com
Germany	+49	(0) 7031 622 0	info.germany@moog.com
Hong Kong	+852	2 635 3200	info.hongkong@moog.com
India	+91	(0) 80 4057 6605	info.india@moog.com
Ireland	+353	(0)21 451 9000	info.ireland@moog.com
Italy	+39	0 332 421111	info.italy@moog.com
Japan	+81	(0) 46 355 3767	info.japan@moog.com
Korea	+82	(0) 31 764 6711	info.korea@moog.com
Luxembourg	+352	40 46 401	info.luxembourg@moog.com
Netherlands	+31	(0) 252 462 000	info.netherlands@moog.com
Norway	+47	6494 1948	info.norway@moog.com
Russia	+7	8 31 713 1811	info.russia@moog.com
Singapore	+65	677 36238	info.singapore@moog.com
South Africa	+27	(0) 12 653 6763	info.southafrica@moog.com
Spain	+34	902 133 240	info.spain@moog.com
Sweden	+46	(0) 31 680 060	info.sweden@moog.com
Switzerland	+41	(0) 71 394 5010	info.switzerland@moog.com
United Kingdom	+44	(0) 168 429 6600	info.unitedkingdom@moog.com
USA	+1	(1) 716 652 2000	info.usa@moog.com

©2010 Moog Inc.

Moog is a registered trademark of Moog, Inc. and its subsidiaries. All trademarks as indicated herein are property of Moog, Inc. and its subsidiaries. All rights reserved.

FLYER (E) DMO-D6_EN_01-2011.DOC



2-Way Spool Type Cartridge Valve Series D

2-Way Spool Type Cartridge Valve (CKE) ISO 7368 NB16 - NB50

General Description

Cartridge valves, also known as 2-way valves or logic valves, conform to ISO 7368 standards. They have two operational ports A and B. A pilot pressure controls the flow between these two connections hydraulically. The preferred mode of mounting is the manifold block, which can be equipped with several valves depending on the hydraulic circuit for the specific application. Each valve could be connected to each other in the manifold block. The product line contains valves of nominal bores 16, 25, 32, 40 und 50 as per ISO 7368.

The valve has opposed to other cartridge valves a spool instead of a cone. The area ratio is 1:1. The cartridge valve is available as „normally open“ or „normally closed“ version.



Benefits

- Improved flow characteristic compared to series B
- No special covers necessary

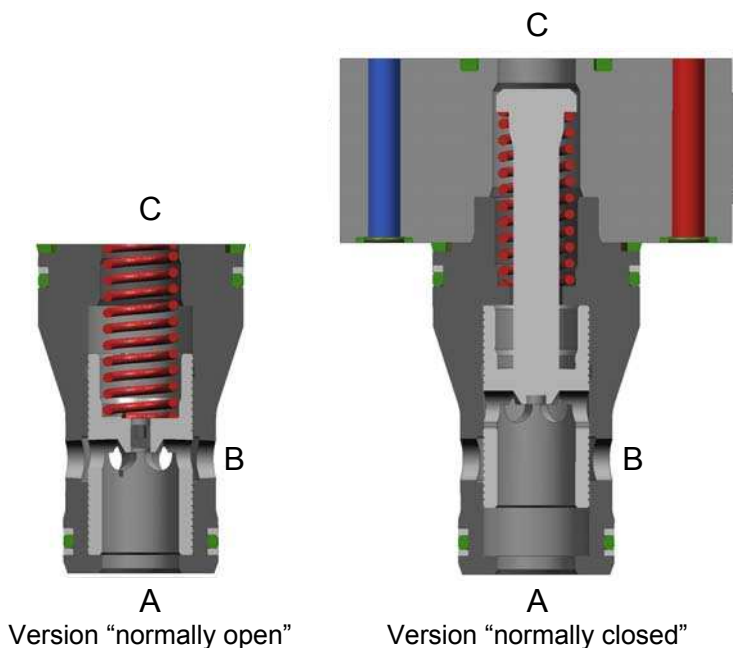
Sizes

- Maximum operating pressure: 350 bar
- Nominal flow at $\Delta p = 5$ bar (Cartridge completely opened):

- NB 16	130	L/min
- NB 25	270	L/min
- NB 32	480	L/min
- NB 40	770	L/min
- NB 50	1150	L/min

Operating Principle

The 2-way cartridge of CKE type is a spool type valve without an effective surface in the B-port. The surfaces of port C versus operational port A are equal (Ratio 1:1). The flow direction is B to A. Within the capacity of the valve, the spool position is determined by the effective pressures in ports A and C including the spring force. Depending on the valve configuration, the spring force works against the pilot pressure in direction of closing or in collaboration with the pilot pressure in direction of opening. According to the hydraulic circuit and adaption of suitable standard covers CKE valves can be used as pressure reducing valves in basic position open or closed. For flow-control functions, it can be used in combination with a throttle valve, as a pressure compensator.



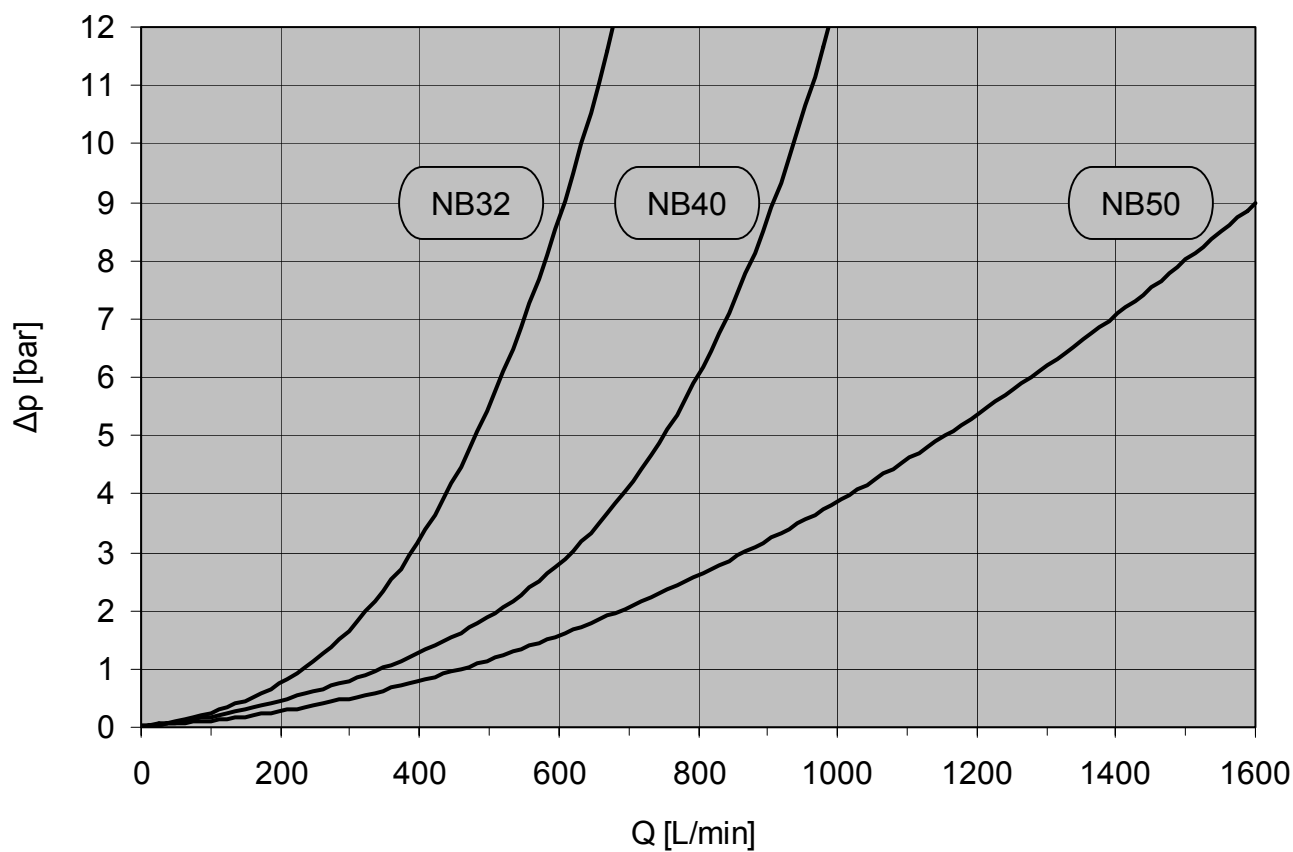
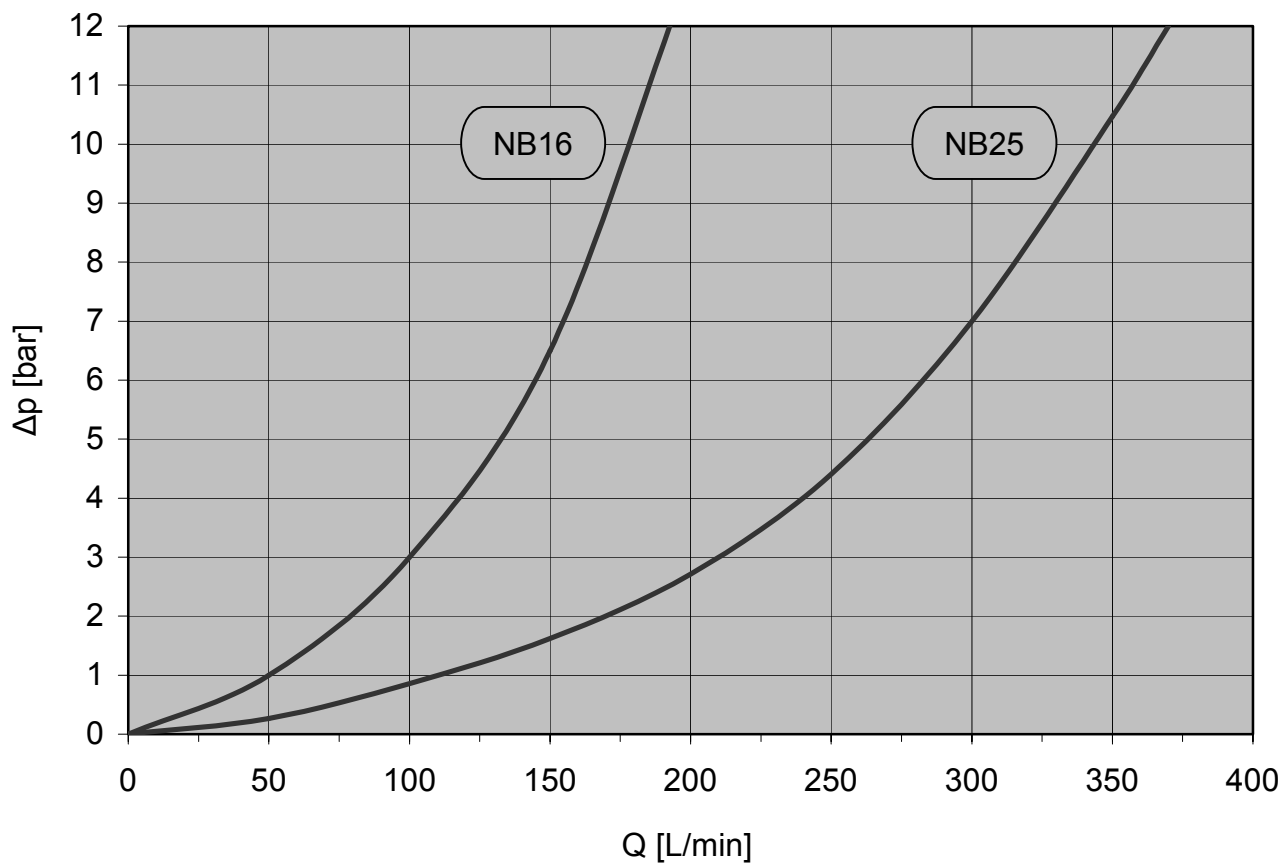
Specification

General data	Value	Unit	Specification				
Mode of construction	-	-	2-Way Spool Type Cartridge Valve				
Type	-	-	CKE				
Design	-	-	Cartridge Valve				
Mounting style	-	-	Manifold Cartridge Mounting				
Nominal size	NB	-	16	25	32	40	50
Mounting dimensions according ISO 7368-...	-	-	BA-06-2-A	BB-08-2-A	BC-09-2-A	BD-10-2-A	BE-11-2-A
Mounting position	-	-	Any				
Flow Direction	-	-	B ➔ A				
Operating pressure	max.	MPa	35				
Ambient temperature range	min.	°C	-20				
	max.	°C	+80				
Seals* for hydraulic fluids	-	-	FKM+PU: M-CKE, hydraulic fluids on mineral oil basis				
	-	-	Other hydraulic fluids on request				
Hydraulic fluid temperature range	min.	°C	-10	FKM + PU			
	max.	°C	+80				
Viscosity range	min.	mm²/s	2,8				
	max.	mm²/s	380				
Operating viscosity	-	mm²/s	35				
Cleanliness to ISO-Code	max.		ISO 4406 (C) class 20/18/15				

* PU: Polyurethane rubber; FKM: Fluorosilicone rubber (Viton®)

Characteristic Curves

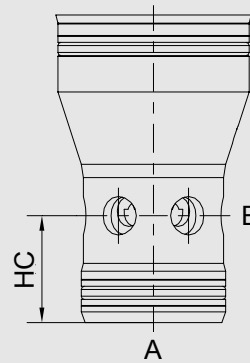
Direction of flow B→A; oil temperature: 40°C; Cartridge completely opened



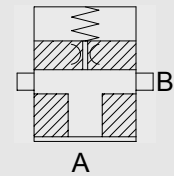
Dimensions

Spool Type Cartridge Valve
 CKE_D6M_/K_
 Function: Normally Open
 Spring: 0,5 bar/3,0 bar

NB	16	25	32	40	50
HC [mm]	18,5	25	28	32	Only with ZWD
Weight [kg]	0,2	0,5	1,0	1,9	

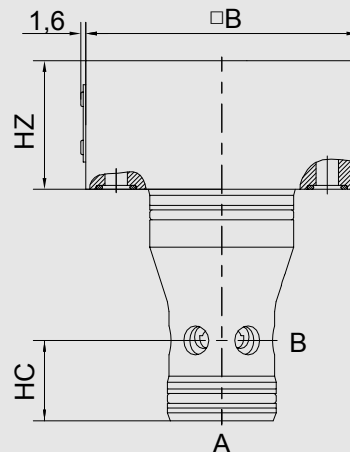


Symbol

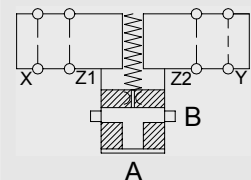


Spool Type Cartridge Valve
 including sandwich cover
 CKE_D6MQ/K_ ;Q8;ZWD
 Function: Normally Open
 Spring: 8,0 bar (NB 50: 0,5 bar/3,0 bar)

NB	16	25	32	40	50
HC [mm]	18,5	25	28	32	37
B [mm]	65	85	102	125	140
HZ [mm]	30	40	70	90	110
Weight [kg]	1,1	2,5	5,8	11,4	17,7

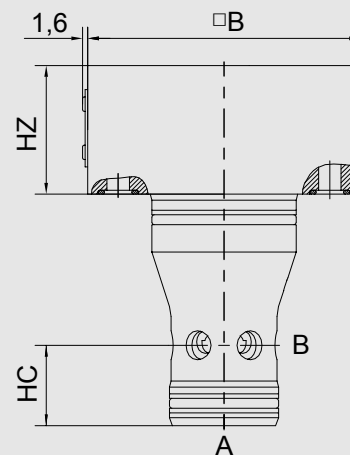


Symbol

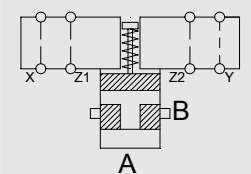


Spool Type Cartridge Valve
 including sandwich cover
 CKE_D6N_/ZWD
 Function: Normally Closed
 Spring: 0,5 bar/3,0 bar

NB	16	25	32	40	50
HC [mm]	18,5	25	28	32	37
B [mm]	65	85	102	125	140
HZ [mm]	30	40	70	90	110
Weight [kg]	1,1	2,5	5,8	11,4	18,1



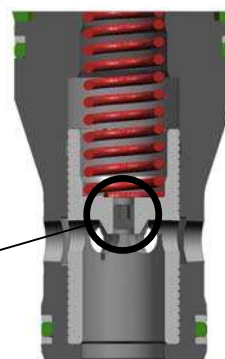
Symbol



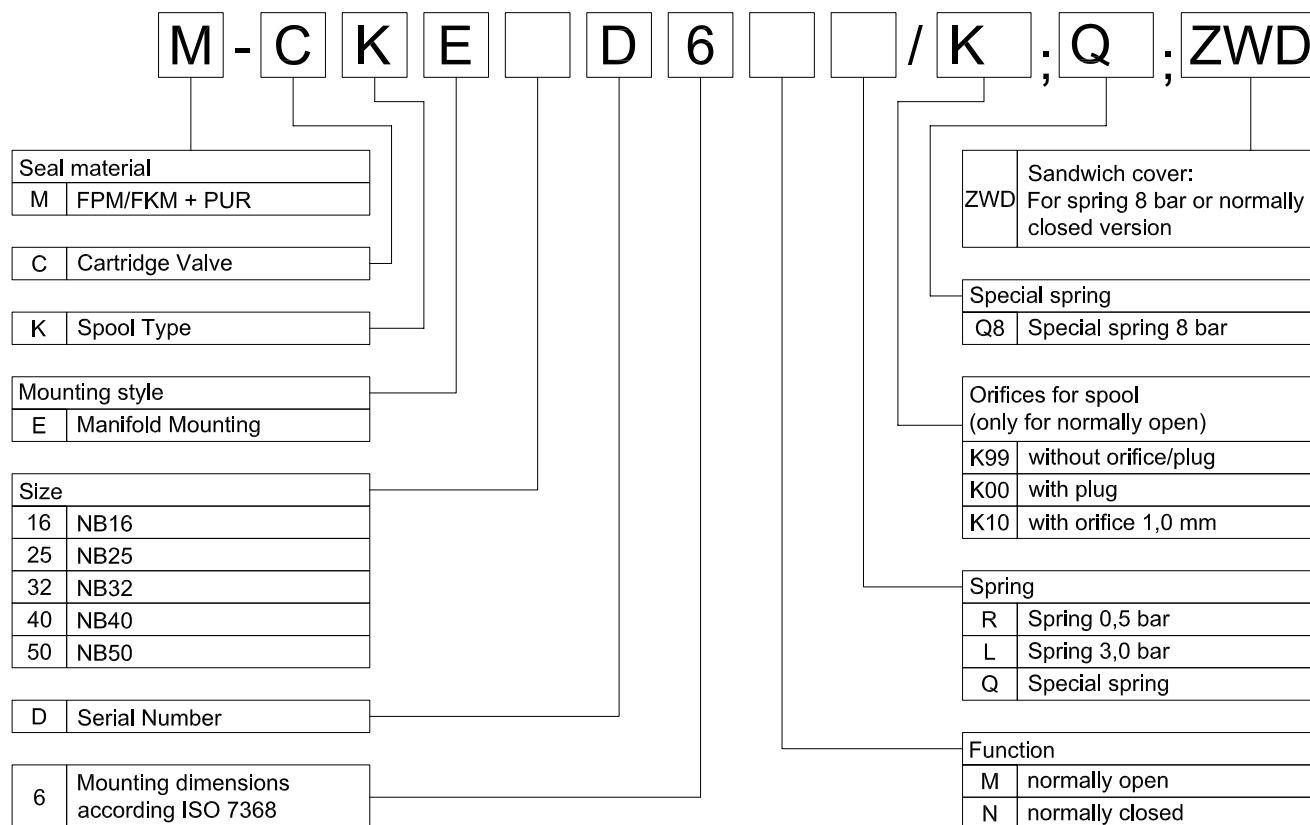
Orifice Installation Option in the cartridge spool

NB	16	25	32	40	50
Thread	M5	M5	M6	M6	M8

Installation option for orifice
 or plug in cartridge spool
 (Only for „Normally open“)



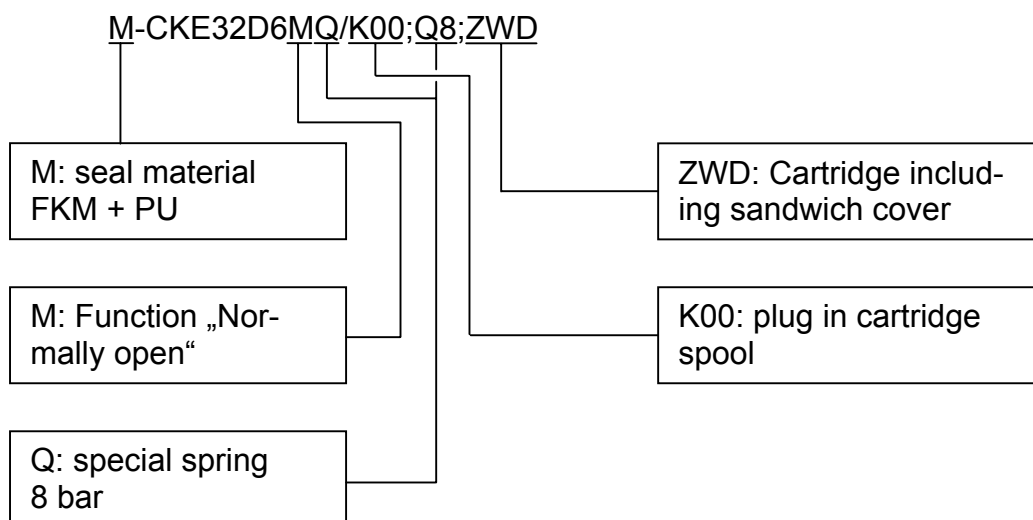
Ordering Information



Cartridge covers, sandwich plates and pilot valves have to be ordered separately.
For cartridges with sandwich covers please pay attention to longer fastening screws!

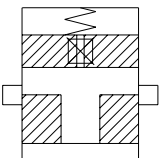
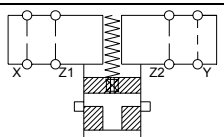
Order Example

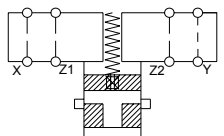
2-Way Spool Type Cartridge Valve „Normally open“ size NB32 with 8 bar spring.

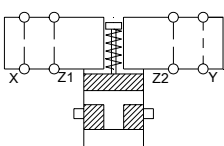


Order Numbers

Please note: Cartridges with plug in the spool

Function: Normally open; Spring: 0,5 bar/3,0 bar				
Symbol	Size	Spring	Type code	Order number
	16	0,5 bar	M-CKE16D6MR/K00	XCB11813-001M00
		3,0 bar	M-CKE16D6ML/K00	XCB11808-001M00
	25	0,5 bar	M-CKE25D6MR/K00	XCB11767-001M00
		3,0 bar	M-CKE25D6ML/K00	XCB11721-001M00
	32	0,5 bar	M-CKE32D6MR/K00	XCB11814-001M00
		3,0 bar	M-CKE32D6ML/K00	XCB11701-001M00
	40	0,5 bar	M-CKE40D6MR/K00	XCB11815-001M00
		3,0 bar	M-CKE40D6ML/K00	XCB11700-001M00
	50	0,5 bar	M-CKE50D6MR/K00;ZWD (Available only incl. sandwich cover!)	XCB11816-001M01
		3,0 bar	M-CKE50D6ML/K00;ZWD (Available only incl. sandwich cover!)	XCB11811-001M01

Function: Normally open; Spring: 8,0 bar				
Symbol	Size	Spring	Type code	Order number
	16	8,0 bar	M-CKE16D6MQ/K00;Q8;ZWD	XCB11809-001M01
	25	8,0 bar	M-CKE25D6MQ/K00;Q8;ZWD	XCB11751-001M01
	32	8,0 bar	M-CKE32D6MQ/K00;Q8;ZWD	XCB11749-001M01
	40	8,0 bar	M-CKE40D6MQ/K00;Q8;ZWD	XCB11750-001M01
	50	8,0 bar	Not available!	

Function: Normally closed; Spring: 0,5 bar/3,0 bar				
Symbol	Size	Spring	Type code	Order number
	16	0,5 bar	M-CKE16D6NR/ZWD	XCB11817-000M01
		3,0 bar	M-CKE16D6NL/ZWD	XCB11807-000M01
	25	0,5 bar	M-CKE25D6NR/ZWD	XCB11818-000M01
		3,0 bar	M-CKE25D6NL/ZWD	XCB11720-000M01
	32	0,5 bar	M-CKE32D6NR/ZWD	XCB11819-000M01
		3,0 bar	M-CKE32D6NL/ZWD	XCB11710-000M01
	40	0,5 bar	M-CKE40D6NR/ZWD	XCB11820-000M01
		3,0 bar	M-CKE40D6NL/ZWD	XCB11711-000M01
	50	0,5 bar	M-CKE50D6NR/ZWD	XCB11821-000M01
		3,0 bar	M-CKE50D6NL/ZWD	XCB11812-000M01

As a recognized leader in motion control technologies, Moog offers a full range of services to support our products and ensure that they meet the expectations of customers. Moog experts are the best at helping customers select the right products and ensuring that they run reliably for a long time.

When it is time for new machine commissioning, refurbishment or routine maintenance, our engineers can help to optimize machine performance, minimize downtime and ensure the smooth application of our products.

Moog Authentic Repair™ is designed to provide the highest quality repair services using original equipment parts, the latest design specifications, and highly trained technicians. This ensures that our repaired products will run as well as when they were new.

With facilities in over 25 countries, Moog is committed to offering convenient local service to our customers.

Visit www.moog.com/industrial/worldwide to find the location nearest you for application engineering, repair, or field services.

FOR MORE INFORMATION VISIT
<http://www.moog.com/industrial>

MOOG.COM/INDUSTRIAL

For the office nearest you, contact us online at moog.com/industrial/globallocator.

Argentina	+54	(0) 11 4326 5916	info.argentina@moog.com
Australia	+61	(0) 3 9561 6044	info.australia@moog.com
Austria	+43	(0) 664 144 6580	info.austria@moog.com
Brazil	+55	(0) 11 5523 8011	info.brazil@moog.com
China	+86	(0) 21 2893 1600	info.china@moog.com
Finland	+358	(0) 9 2517 2730	info.finland@moog.com
France	+33	(0) 1 4560 7000	info.france@moog.com
Germany	+49	(0) 7031 622 0	info.germany@moog.com
Hong Kong	+852	2 635 3200	info.hongkong@moog.com
India	+91	(0) 80 4120 8799	info.india@moog.com
Ireland	+353	(0)21 451 9000	info.ireland@moog.com
Italy	+39	0 332 42111	info.italy@moog.com
Japan	+81	(0) 46 355 3615	info.japan@moog.com
Korea	+82	(0) 31 764 6711	info.korea@moog.com
Luxembourg	+352	40 46 401	info.luxembourg@moog.com
Netherlands	+31	(0) 252 462 000	info.netherlands@moog.com
Norway	+47	224 32927	info.norway@moog.com
Russia	+7	(8) 31 713 1811	info.russia@moog.com
Singapore	+65	677 36238	info.singapore@moog.com
South Africa	+27	(0) 12 653 6763	info.southafrica@moog.com
Spain	+34	902 133 240	info.spain@moog.com
Sweden	+46	(0) 31 680 060	info.sweden@moog.com
Switzerland	+41	(0) 71 394 5010	info.switzerland@moog.com
United Kingdom	+44	(0) 168 429 6600	info.unitedkingdom@moog.com
USA	+1	(1) 716 652 2000	info.usa@moog.com

©2008 Moog Inc.

Moog is a registered trademark of Moog, Inc. and its subsidiaries. All trademarks as indicated herein are property of Moog, Inc. and its subsidiaries.

All rights reserved.

Cartridgevalve_CKE-D6_en_01-2008