



Slip-in Cartridge Valves

Pressure Control, Throttle, Check

Catalog HY14-3200/US

aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding



ENGINEERING YOUR SUCCESS.

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SAFETY GUIDE

For safety information, see Safety Guide SG HY14-1000 at www.parker.com/safety or call 1-800-CParker.

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Cat HY14-3200-frtcvr.indd, dd

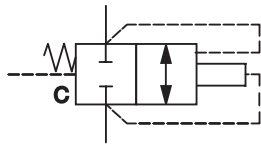


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Port Identifications - Graphics



Description

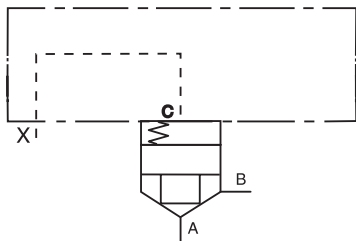
Depending on valve function and design, power ports A and B can be used for inlet or outlet.

The control port C is the connection between cover and cartridge unit.

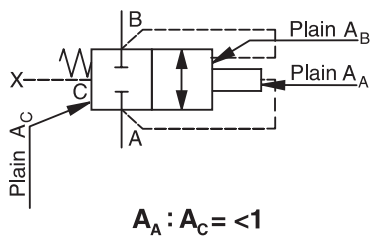
Further Control Ports

- X control oil connection, inlet
- Y control oil connection, outlet
- Z₁ control oil connection, preferred inlet
- Z₂ control oil connection, preferred outlet

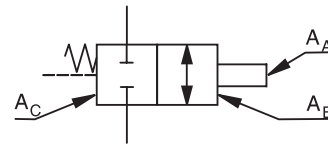
Port Identifications - Schematics



Area Representation



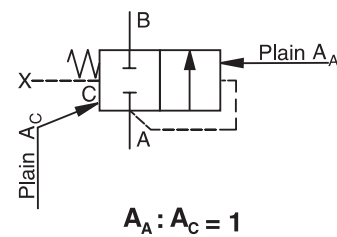
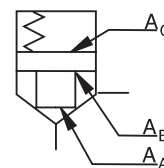
Control Surfaces - Graphics



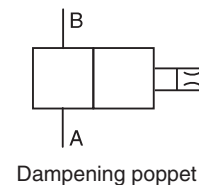
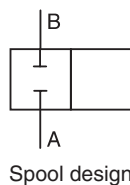
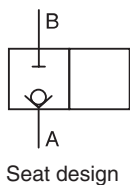
Description

- A_A Area, which is subjected to the pressure at port A
- A_B Area, which is subjected to the pressure at port B
- A_C Area, which is subjected to the pressure at port C

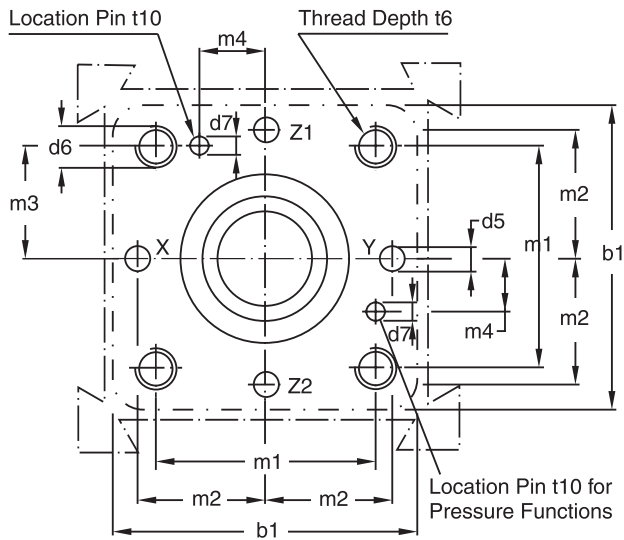
Control Surfaces - Schematics



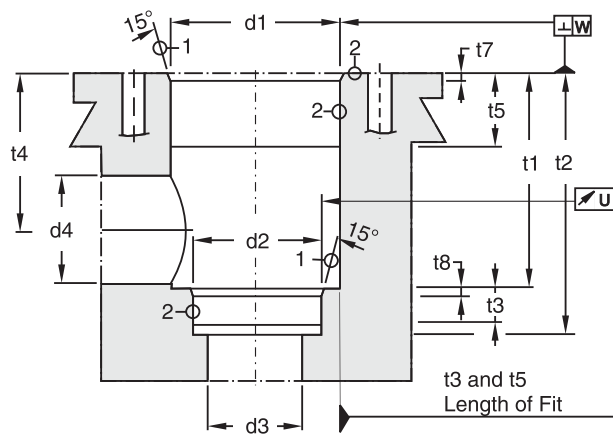
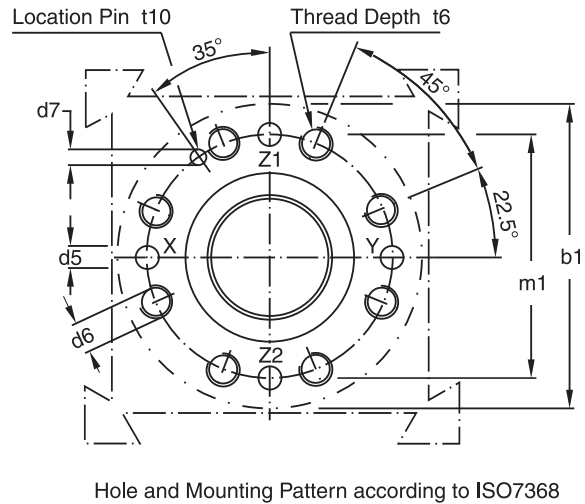
Design Representation



Code: ISO 7368-B*-*-2-A/B
NG16 to NG63



Code: ISO 7368-B*-*-2-A
NG80 to NG100



Required surface finish:

① = $\sqrt{R_{\max} 16}$, ② = $\sqrt{R_{\max} 8}$

Cartridge Manifold Block Series CB, see Pages 35 and 36

Dimensions

Inch equivalents for millimeter dimensions are shown in (**)

Size	b1	d1 H7	d2 H7	d3	d3 max	d4	d4 max*	d5 max	d6	d7 H13	m1±0.2	m2±0.2	m3±0.2
NG16	65.0 (2.56)	32.0 (1.26)	25.0 (0.98)	16.0 (0.63)	18.0 (0.71)	16.0 (0.63)	25.0 (0.98)	4.0 (0.16)	M 8	4.0 (0.16)	46.0 (1.81)	25.0 (0.98)	23.0 (0.91)
NG25	85.0 (3.35)	45.0 (1.77)	34.0 (1.34)	25.0 (0.98)	25.5 (1.00)	25.0 (0.98)	32.0 (1.26)	6.0 (0.24)	M 12	6.0 (0.24)	58.0 (2.20)	33.0 (1.30)	29.0 (1.14)
NG32	102.0 (4.02)	60.0 (2.36)	45.0 (1.77)	32.0 (1.26)	36.0 (1.42)	32.0 (1.26)	40.0 (1.57)	8.0 (0.31)	M 16	6.0 (0.24)	70.0 (2.76)	41.0 (1.61)	35.0 (1.38)
NG40	125.0 (4.92)	75.0 (2.95)	55.0 (2.17)	40.0 (1.57)	43.0 (1.69)	40.0 (1.57)	50.0 (1.97)	10.0 (0.39)	M 20	6.0 (0.24)	85.0 (3.35)	50.0 (1.97)	42.5 (1.67)
NG50	140.0 (5.51)	90.0 (3.54)	68.0 (2.68)	50.0 (1.97)	56.0 (2.20)	50.0 (1.97)	63.0 (2.48)	10.0 (0.39)	M 20	8.0 (0.31)	100.0 (3.94)	58.0 (2.28)	50.0 (1.97)
NG63	180.0 (7.09)	120.0 (4.72)	90.0 (3.54)	63.0 (2.48)	74.0 (2.91)	63.0 (2.48)	80.0 (3.15)	12.0 (0.47)	M 30	8.0 (0.31)	125.0 (4.92)	75.0 (2.95)	62.5 (2.46)
NG80	250.0 (9.84)	145.0 (5.71)	110.0 (4.33)	80.0 (3.15)	93.0 (3.66)	80.0 (3.15)	100.0 (3.94)	16.0 (0.63)	M 24	10.0 (0.39)	200.0 (7.87)	—	—
NG100	300.0 (11.81)	180.0 (7.09)	135.0 (5.31)	100.0 (3.94)	115.0 (4.53)	100.0 (3.94)	125.0 (4.92)	20.0 (0.79)	M 30	10.0 (0.39)	245.0 (9.65)	—	—

Size	m4±0.2	t1+0.1	t2+0.1	t3	t4	t4 max*	t5	t6	t7	t8	t10	U	W
NG16	10.5 (0.41)	43.0 (1.69)	56.0 (2.20)	11.0 (0.43)	34.0 (1.34)	29.5 (1.16)	20.0 (0.79)	20.0 (0.79)	2.0 (0.08)	2.0 (0.08)	10.0 (0.39)	0.03 (0.001)	0.05 (0.002)
NG25	16.0 (0.63)	58.0 (2.28)	72.0 (2.83)	12.0 (0.47)	44.0 (1.73)	40.5 (1.59)	30.0 (1.18)	25.0 (0.98)	2.5 (0.10)	2.5 (0.10)	10.0 (0.39)	0.03 (0.001)	0.05 (0.002)
NG32	17.0 (0.67)	70.0 (2.76)	85.0 (3.35)	13.0 (0.51)	52.0 (2.05)	48.0 (1.89)	30.0 (1.18)	35.0 (1.38)	2.5 (0.10)	2.5 (0.10)	10.0 (0.39)	0.03 (0.001)	0.1 (0.004)
NG40	23.0 (0.91)	87.0 (3.43)	105.0 (4.13)	15.0 (0.59)	64.0 (2.52)	59.0 (2.32)	30.0 (1.18)	45.0 (1.77)	3.0 (0.12)	3.0 (0.12)	10.0 (0.39)	0.05 (0.002)	0.1 (0.004)
NG50	30.0 (1.18)	100.0 (3.94)	122.0 (4.80)	17.0 (0.67)	72.0 (2.83)	65.5 (2.58)	35.0 (1.38)	45.0 (1.77)	4.0 (0.16)	3.0 (0.12)	10.0 (0.39)	0.05 (0.002)	0.1 (0.004)
NG63	38.0 (1.50)	130.0 (5.12)	155.0 (6.10)	20.0 (0.79)	95.0 (3.74)	86.5 (3.41)	40.0 (1.57)	65.0 (2.56)	4.0 (0.16)	4.0 (0.16)	10.0 (0.39)	0.05 (0.002)	0.2 (0.008)
NG80	—	175.0 (6.89)	205.0 (8.07)	25.0 (0.98)	130.0 (5.12)	120.0 (4.72)	40.0 (1.57)	50.0 (1.97)	5.0 (0.20)	5.0 (0.20)	10.0 (0.39)	0.05 (0.002)	0.2 (0.008)
NG100	—	210.0 (8.27)	245.0 (9.65)	29.0 (1.14)	155.0 (6.10)	142.0 (5.59)	50.0 (1.97)	53.0 (2.09)	5.0 (0.20)	5.0 (0.20)	10.0 (0.39)	0.05 (0.002)	0.2 (0.008)

* Only together with d4_{max} and t4_{max}

General Description

Series CE, CP and C 2-way slip-in cartridge valves are hydraulically controlled seat valves that are designed for compact block installation. Slip-in cartridge, cover, and pilot system are valve elements that permit single and combined functions.

Series CE offers poppet and sleeve combinations for directional functions. Series CP offers a cartridge for pressure functions and has to be combined with corresponding covers.

Features

- Installation cavity and mounting pattern according to ISO 7368.
- One sleeve only for all poppets.
- 5 poppet shapes.
- 5 poppet springs.
- Optional seal between ports B and C.
- Cover with adjustable stroke limitation.
- Cover with mounting pattern for pilot valve assembly.
- Combinations for complex functions.
- Normally open cartridge (CE*F04).



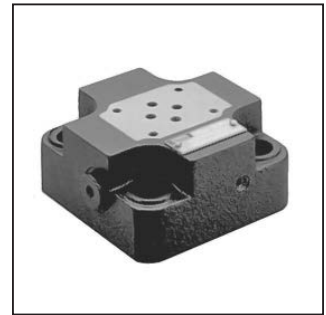
CE



C*B

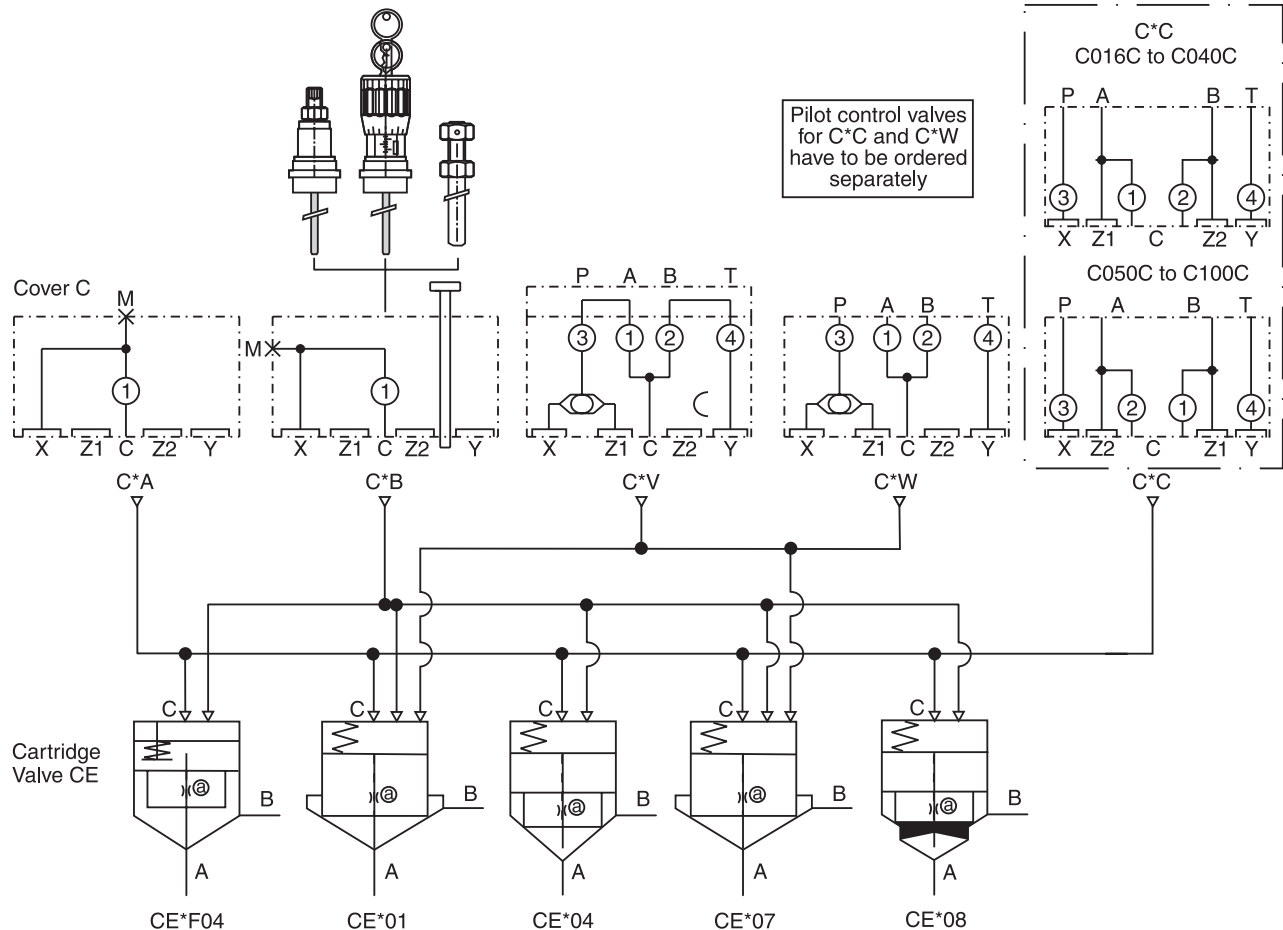


C*A

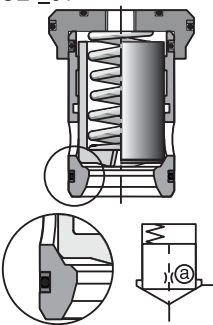
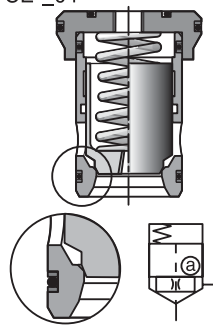
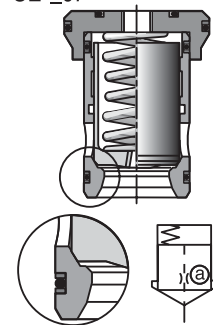
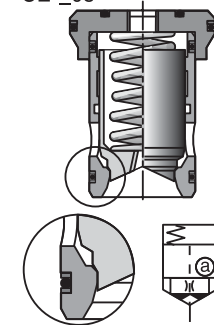
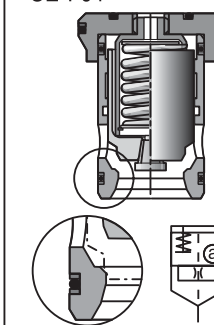


C*C

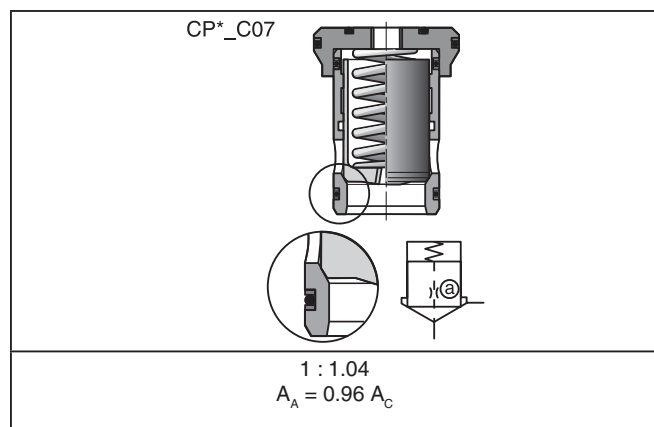
Pilot Control for Directional Functions



Cartridge Valve for Directional Function

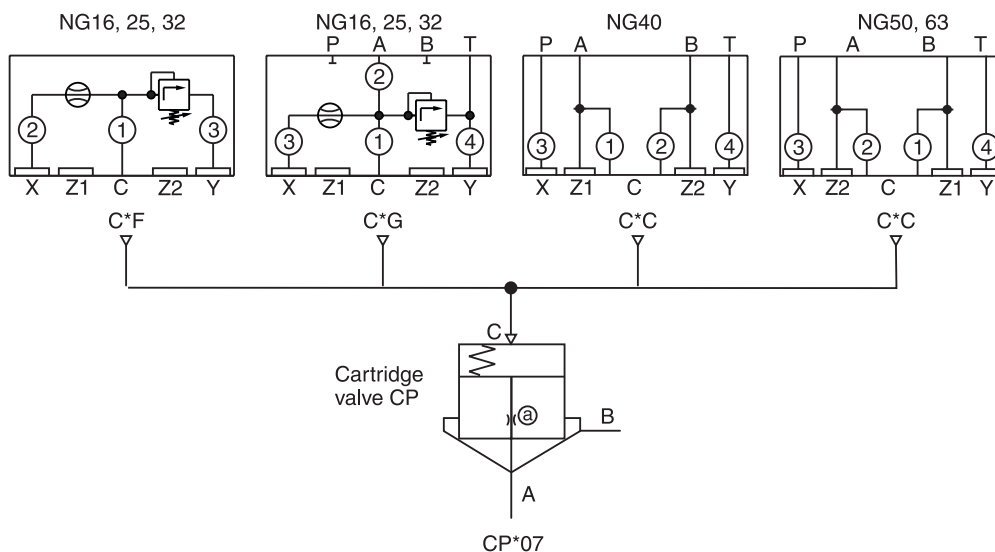
CE*_01 	CE*_04 	CE*_07 	CE*_08 	CE*F04 
1 : 1 $A_A = A_C$	1 : 1.67 $A_A = 0.6 A_C$ $A_B = 0.4 A_C$	1 : 1.04 $A_A = 0.96 A_C$	1 : 1.67 $A_A = 0.6 A_C$ $A_B = 0.4 A_C$ dampening poppet	1 : 1.67 $A_A = 0.6 A_C$ $A_B = 0.4 A_C$ normally open

Cartridge Valve for Pressure Function



Pilot Control for Pressure Function

Pilot control valves
 for C*C and C*G
 have to be ordered
 separately



CE
 Cartridge

Nominal Size

Code	Description
016	NG16
025	NG25
032	NG32
040	NG40
050	NG50
063	NG63
080	NG80
100	NG100

Design

Code	Normal Position	Description
C	Closed	No Poppet Sealing
S ¹⁾	Closed	With Poppet Sealing
F ²⁾	Open	No Poppet Sealing

¹⁾ Only for spring S and U.
²⁾ Only with spring code L

Poppet Area Ratio

Code	Poppet Area Ratio
01	$A_A = A_C$
04	$A_A = 0.6A_C, A_B = 0.4A_C$
07 ³⁾	$A_A = 0.96A_C$
08	$A_A = 0.6A_C, A_B = 0.4A_C$ with dampening

³⁾ Not for NG80 and NG100

Spring

Code	Description
L	Opening Pressure 0.1 Bar (1.45 PSI)
N	Opening Pressure 0.5 Bar (7.25 PSI)
S	Opening Pressure 1.6 Bar (23.2 PSI)
T	Opening Pressure 2.5 Bar (36.3 PSI)
U	Opening Pressure 4.0 Bar (58.0 PSI)

Orifice

Code	Size	Poppet	Description
99	All	All	Without Orifice, Open
00	All	01	Orifice Optional ⁴⁾
00	All	04, 07, 08	Plugged, Closed

⁴⁾ Orifice size in 1/10 mm, eg. 1.2 mm orifice - code 12
 Thread size 1/16 NPTF

Seals

Code	Description
N	Nitrile
V	Fluorocarbon

Design Series not required for ordering

Weight:

CE016	0.3 kg (0.7 lbs.)
CE025	0.6 kg (1.3 lbs.)
CE032	1.1 kg (2.4 lbs.)
CE040	1.7 kg (3.7 lbs.)
CE050	3.7 kg (8.2 lbs.)
CE063	7.1 kg (15.7 lbs.)
CE080	12.8 kg (28.2 lbs.)
CE100	27.0 kg (59.5 lbs.)

CP
 Cartridge

Nominal Size

Code	Description
016	NG16
025	NG25
032	NG32
040	NG40
050	NG50
063	NG63

Design

Code	Normal Position	Description
C	Closed	No Poppet Sealing
S	Closed	With Poppet Sealing

Poppet Area Ratio

07
 $A_A = 0.96A_C$

Spring

Code	Description
S	Opening Pressure 1.6 Bar (23.2 PSI)
T	Opening Pressure 2.5 Bar (36.3 PSI)
U	Opening Pressure 4.0 Bar (58.0 PSI)

Orifice¹⁾

Code	Description
00	Plug
09	0.9mm for NG16
11	1.1mm for NG25
12	1.2mm for NG32
13	1.3mm for NG40
14	1.4mm for NG50
15	1.5mm for NG63

¹⁾ Recommended diameter

Seals

Code	Description
N	Nitrile
V	Fluorocarbon

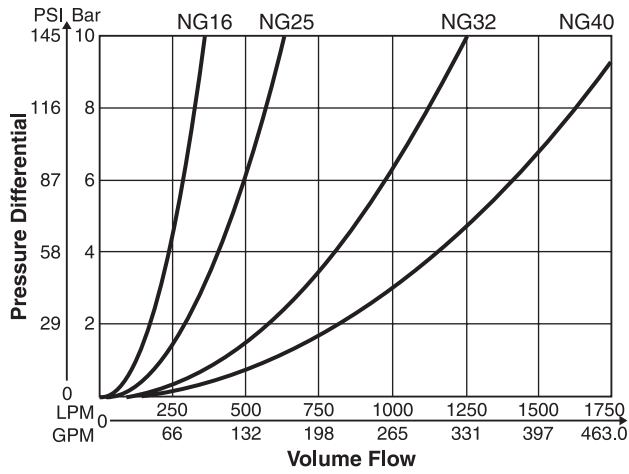
Design Series not required for ordering

Weight:

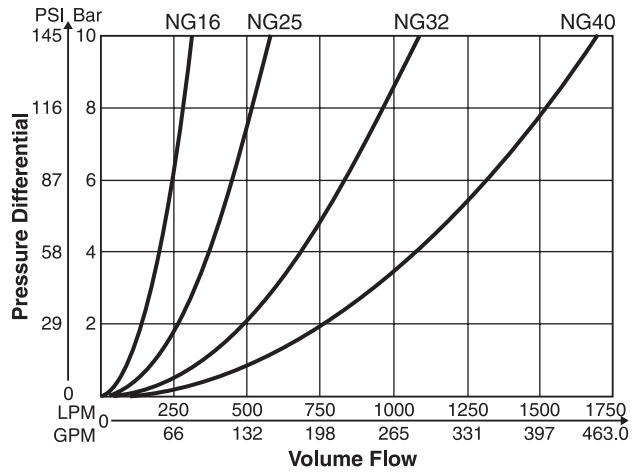
CP016	0.3 kg (0.7 lbs.)
CP025	0.6 kg (1.3 lbs.)
CP032	1.1 kg (2.4 lbs.)
CP040	1.7 kg (3.7 lbs.)
CP050	3.7 kg (8.2 lbs.)
CP063	7.1 kg (15.7 lbs.)

General									
Interface	2-way slip-in cartridge valves according to ISO 7368								
Operation	Hydraulic								
Mounting Position	Unrestricted								
Ambient Temperature	-40°C to +60°C (-40°F to +140°F)								
Hydraulic									
Fluid	Hydraulic fluid according to DIN 51 524...525								
Viscosity Recommended	30 to 80 cSt (mm ² /s)								
Viscosity Permitted	20 to 380 cSt (mm ² /s)								
Fluid Temperature	-20°C to +60°C (-4°F to +140°F)								
Max. Contamination	ISO 4406 (1999); 18/16/13 (meet NAS 1638:7)								
Operating Pressure	420 Bar (6090 PSI) without pilot valve								
	Ports A, B, X, Z1, Z2: 350 Bar (5075 PSI), 420 Bar (6090 PSI) (depending on p _{max} of pilot valves)								
	Port Y: 350 Bar (5075 PSI), according to pilot system, maximum (depending on p _{max} of pilot valves)								
Nominal Size	NG16	NG25	NG32	NG40	NG50	NG63	NG80	NG100	
Nominal Flow at Δp 5 Bar (73 PSI)	LPM (GPM)	LPM (GPM)	LPM (GPM)	LPM (GPM)	LPM (GPM)	LPM (GPM)	LPM (GPM)	LPM (GPM)	
	poppet 01, 04, 07	250 (66)	450 (119)	900 (238)	1350 (357)	1800 (476)	3600 (952)	5250 (1576)	8000 (2116)
	poppet 08	230 (61)	400 (106)	800 (212)	1250 (331)	1625 (430)	3400 (900)	5000 (1323)	7500 (1984)
Pilot Volume Requirement	cm ³	cm ³	cm ³	cm ³	cm ³	cm ³	cm ³	cm ³	
	at poppet 01	2.0	6.5	10.2	17.4	34.5	77.4	190.1	342.6
	at poppet 04	2.0	6.5	12.2	20.3	39.4	94.6	190.1	363.4
	at poppet 07	2.0	6.5	10.2	17.4	34.5	77.4	—	—
	at poppet 08	2.0	7.4	15.3	23.2	49.2	111.8	217.3	415.3
Opening Pressure	Poppet 01 / 07		spring:	L = 0.1 Bar (1.5 PSI)	N = 0.5 Bar (7.3 PSI)	S = 1.6 Bar (23.2 PSI)	T = 2.5 Bar (36.3 PSI)	U = 4.0 Bar (58.0 PSI)	
	Poppet 04 / 08		spring:	L = 0.2 Bar (2.9 PSI)	N = 0.9 Bar (13.1 PSI)	S = 2.7 Bar (39.2 PSI)	T = 4.0 Bar (58.0 PSI)	U = 6.6 Bar (95.7 PSI)	
Opening Pressure	Poppet 01 / 07		not possible						
	Poppet 04 / 08		spring:	L = 0.3 Bar (4.4 PSI)	N = 1.3 Bar (18.9 PSI)	S = 4.0 Bar (58.0 PSI)	T = 6.3 Bar (91.4 PSI)	U = 10.0 Bar (145.0 PSI)	

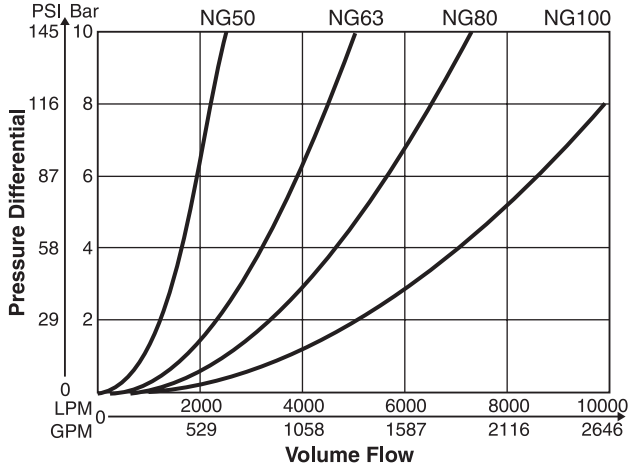
Poppet 01, 04, 07*



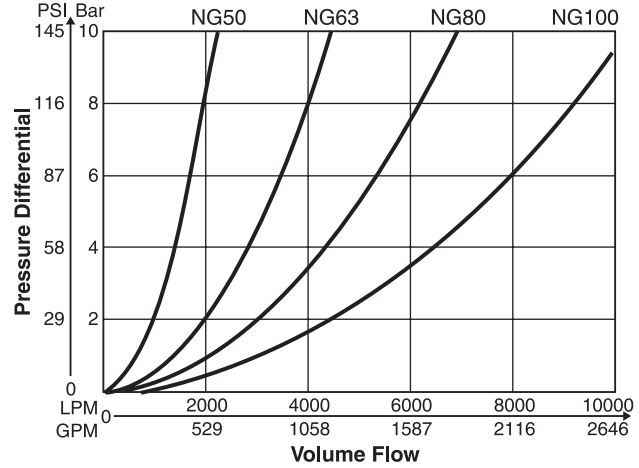
Poppet 08*



Poppet 01, 04, 07*



Poppet 08*



* without spring and poppet seal, C-chamber unloaded

Ordering Information

C
 Cover

Nominal
 Size

A
 Cover with
 X-Connection
 and
 Gauge Port
 G1/4"

A
 Without
 Auxiliary
 Function

Orifice

Seals

Design
 Series
 not required
 for ordering

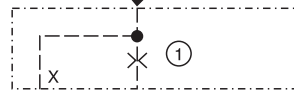
Code	Description
016	NG16
025	NG25
032	NG32
040	NG40
050	NG50
063	NG63
080	NG80
100	NG100

Code	Description
N	Nitrile
V	Fluorocarbon

Code	Description
99	Without Orifice, Open Orifice Options

Weight:

C016A	0.9 kg (2.0 lbs.)
C025A	1.9 kg (4.2 lbs.)
C032A	2.9 kg (6.4 lbs.)
C040A	5.3 kg (11.7 lbs.)
C050A	8.5 kg (18.7 lbs.)
C063A	15.5 kg (34.2 lbs.)
C080A	34.0 kg (75.0 lbs.)
C100A	58.0 kg (127.9 lbs.)



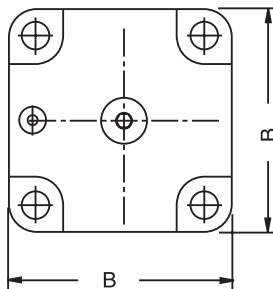
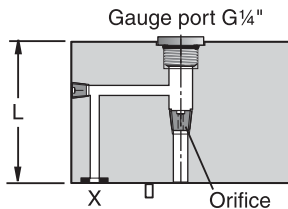
○ Orifice position

For orifice recommendations, bolt and seal kits, see Accessories.

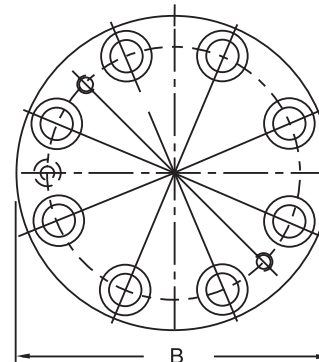
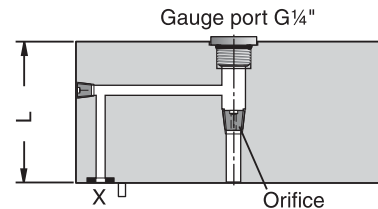
Dimensions

Inch equivalents for millimeter dimensions are shown in (**)

NG16 to NG63



NG80 to NG100



Size	B	L	Orifice Thread
NG16	65.0 (2.56)	36.0 (1.42)	1/16 NPT
NG25	85.0 (3.35)	45.0 (1.77)	1/16 NPT
NG32	102.0 (4.02)	50.0 (1.97)	1/16 NPT
NG40	125.0 (4.92)	60.0 (2.36)	1/8 NPT
NG50	140.0 (5.51)	70.0 (2.76)	1/8 NPT
NG63	180.0 (7.09)	85.0 (3.35)	1/8 NPT
NG80	Ø250.0 (9.84)	105.0 (4.13)	1/8 NPT
NG100	Ø300.0 (11.81)	120.0 (4.72)	1/8 NPT

Ordering Information

<div style="border: 1px solid black; width: 20px; height: 20px; margin: 0 auto; display: flex; align-items: center; justify-content: center;"> C </div> <p>Cover</p>	<div style="border: 1px solid black; width: 20px; height: 20px; margin: 0 auto;"></div> <p>Nominal Size</p>	<div style="border: 1px solid black; width: 20px; height: 20px; margin: 0 auto; display: flex; align-items: center; justify-content: center;"> B </div> <p>Cover with X-Connection and Stroke Limiter</p>	<div style="border: 1px solid black; width: 20px; height: 20px; margin: 0 auto;"></div> <p>Adjustment</p>	<div style="border: 1px solid black; width: 20px; height: 20px; margin: 0 auto;"></div> <p>Orifice</p>	<div style="border: 1px solid black; width: 20px; height: 20px; margin: 0 auto;"></div> <p>Seals</p>	<div style="border: 1px dashed black; width: 20px; height: 20px; margin: 0 auto; display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; width: 10px; height: 10px; margin: 2px;"></div> </div> <p>Design Series not required for ordering</p>
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Code	Description
016	NG16
025	NG25
032	NG32
040	NG40
050	NG50
063	NG63
080	NG80
100	NG100

Code	Description
N	Screw / Spindle
Y	Knob E10 lock, only NG16-NG50

Code	Description
N	Nitrile
V	Fluorocarbon

Code	Description
99	Without Orifice, Open Orifice Options

Weight:

C016B	0.9 kg (2.0 lbs.)
C025B	1.9 kg (4.2 lbs.)
C032B	2.9 kg (6.4 lbs.)
C040B	5.4 kg (11.9 lbs.)
C050B	8.4 kg (18.5 lbs.)
C063B	15.1 kg (33.3 lbs.)
C080B	34.0 kg (75.0 lbs.)
C100B	60.0 kg (132.3 lbs.)

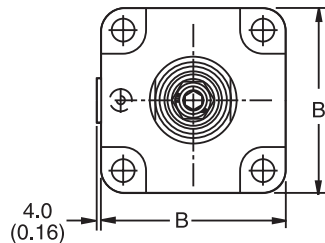
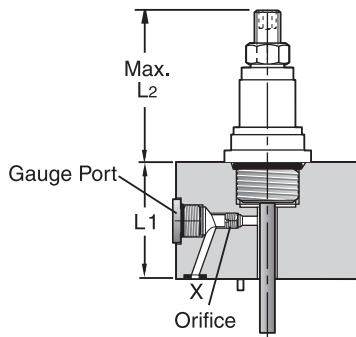
For orifice recommendations, bolt and seal kits, see Accessories.

○ Orifice position

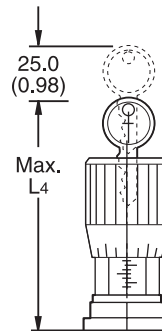
Dimensions

Inch equivalents for millimeter dimensions are shown in (**)

NG16 to NG25 - Adjustment N



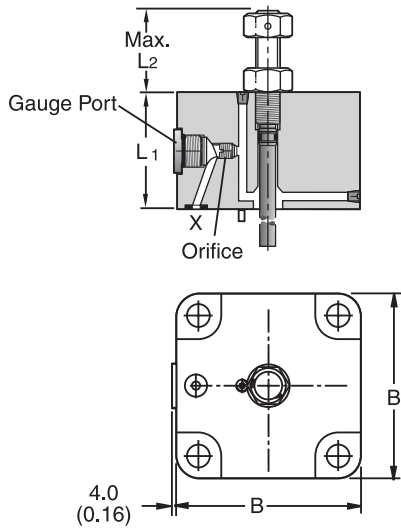
Adjustment Y



Size	B	L1	L2 max.	L4 max.	Gauge Port	Orifice Thread
NG16	65.0 (2.56)	36.0 (1.42)	72.0 (2.83)	100.0 (3.94)	G 1/4"	M6
NG25	85.0 (3.35)	45.0 (1.77)	72.0 (2.83)	100.0 (3.94)		

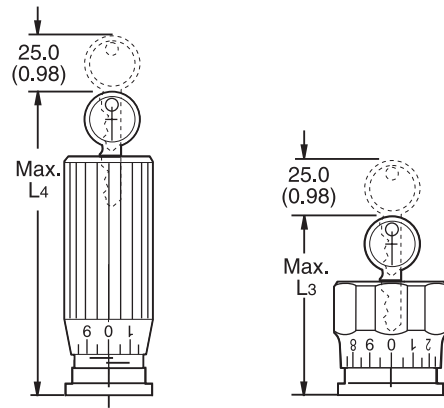
Inch equivalents for millimeter dimensions are shown in (**)

**NG32 to NG50
Adjustment N**

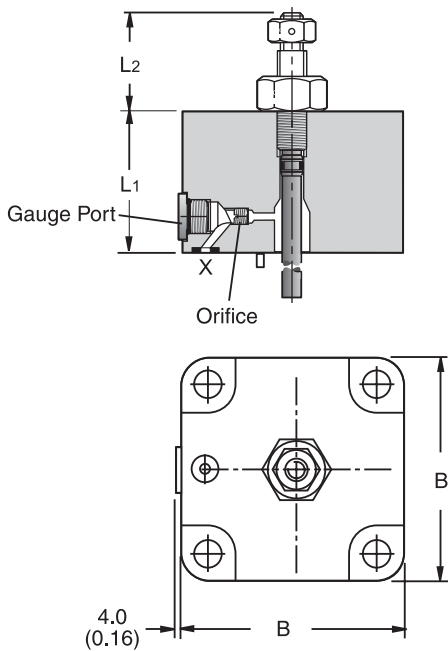


Adjustment Y (NG32)

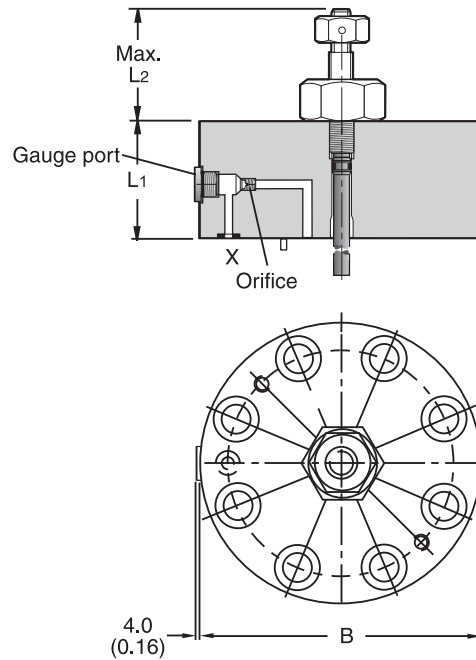
Adjustment Y (NG40/50)



**NG63
Adjustment N**



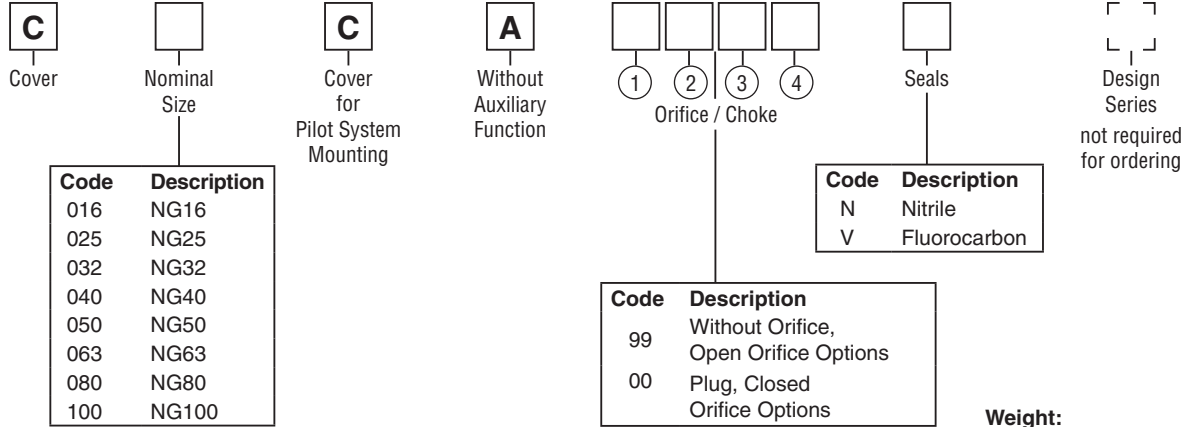
**NG80 to 100
Adjustment N**



Size	B	L1	L2 max.	L3	L4 max.	Gauge Port	Orifice Thread
NG32	102.0 (4.02)	50.0 (1.97)	48.0 (1.89)	—	141.0 (5.50)	G¼"	1/16 NPT
NG40	125.0 (4.92)	60.0 (2.36)	50.0 (1.97)	123.0 (4.84)	—		1/16 NPT
NG50	140.0 (5.51)	70.0 (2.76)	50.0 (1.97)	127.0 (5.00)	—		1/16 NPT
NG63	180.0 (7.09)	85.0 (3.35)	65.0 (2.56)	—	—		1/8 NPT
NG80	Ø250.0 (9.84)	105.0 (4.13)	95.0 (3.74)	—	—		1/8 NPT
NG100	Ø300.0 (11.81)	120.0 (4.72)	120.0 (4.72)	—	—		1/8 NPT

CE-CP.indd, ddp

Ordering Information



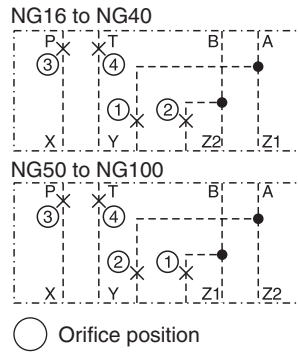
Weight:

C016C	1.0 kg (2.12 lbs.)
C025C	1.9 kg (4.20 lbs.)
C032C	2.9 kg (6.40 lbs.)
C040C	5.3 kg (11.70 lbs.)
C050C	8.5 kg (18.70 lbs.)
C063C	15.3 kg (33.70 lbs.)
C080C	34.0 kg (75.0 lbs.)
C100C	60.0 kg (132.30 lbs.)

Attention:

For NG50 and larger:
 If pilot system NG6 is used, mount adapter plate PADA1007/A-B/B-A or PADA1007/A-A/B-B (NG6 to NG10) on cover.

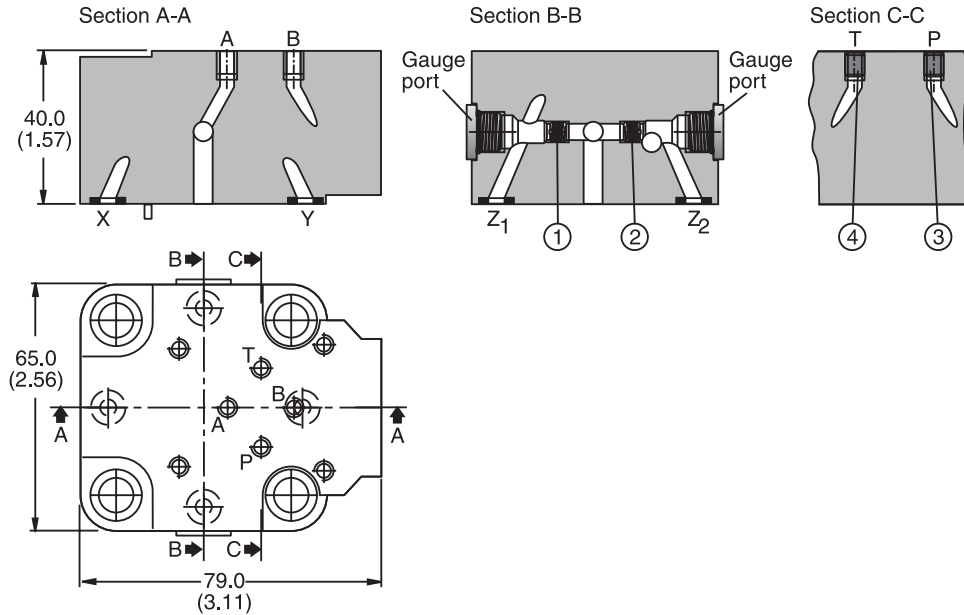
For orifice recommendations, bolt and seal kits, see Accessories.



Dimensions

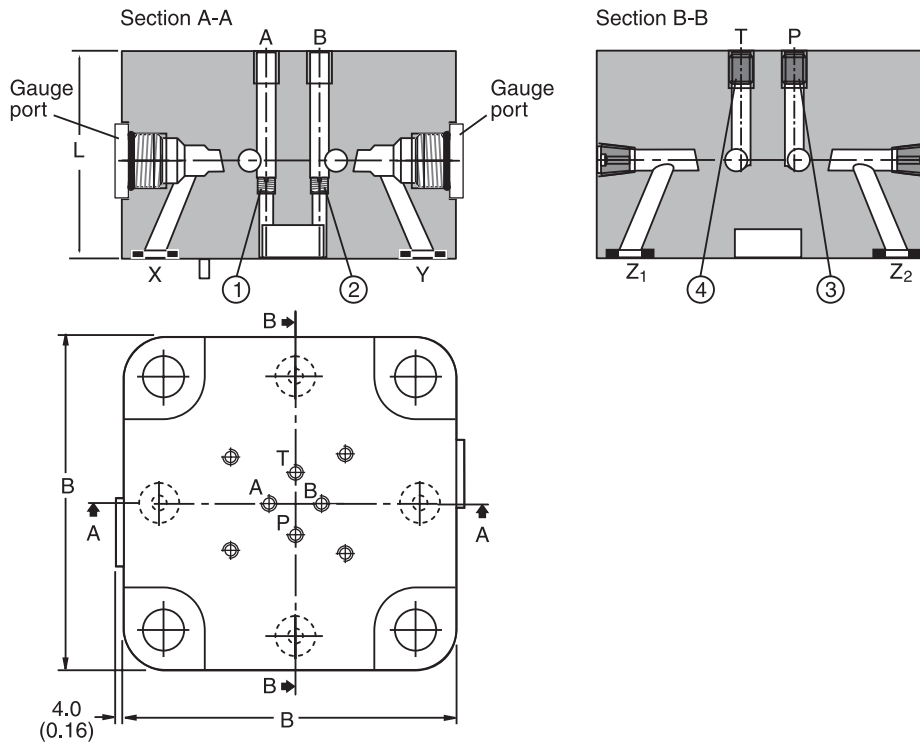
Inch equivalents for millimeter dimensions are shown in (**)

NG16

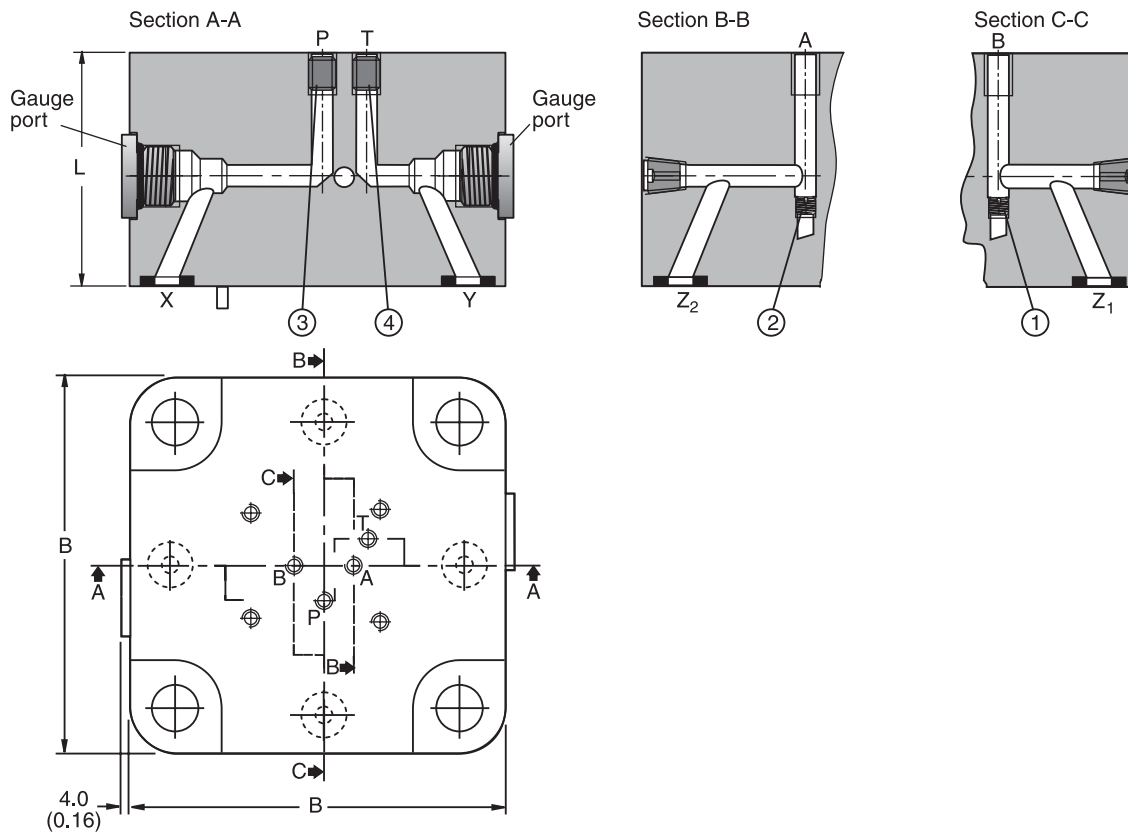


Inch equivalents for millimeter dimensions are shown in (**)

NG25 to NG40

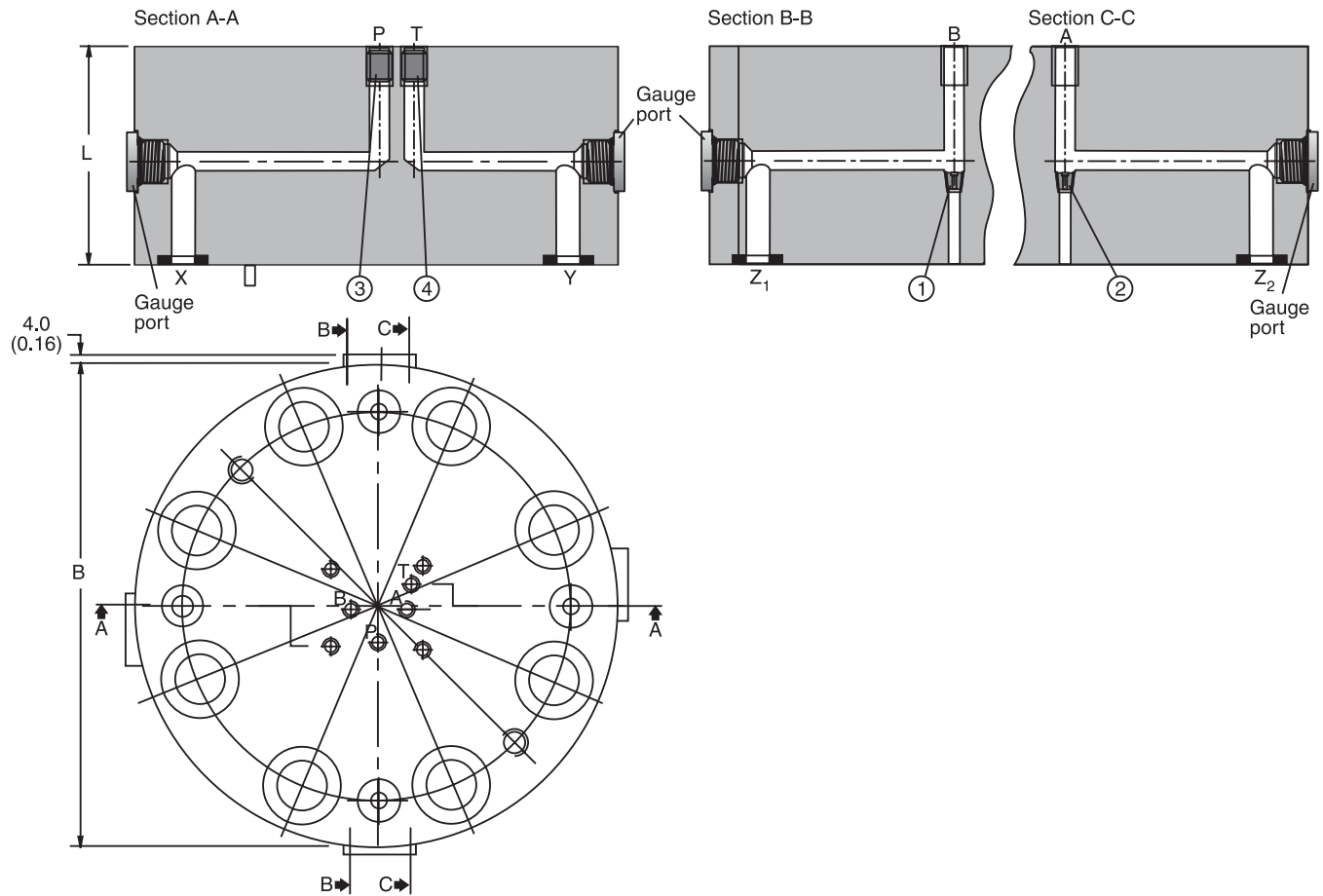


NG50 to NG63



Inch equivalents for millimeter dimensions are shown in (**)

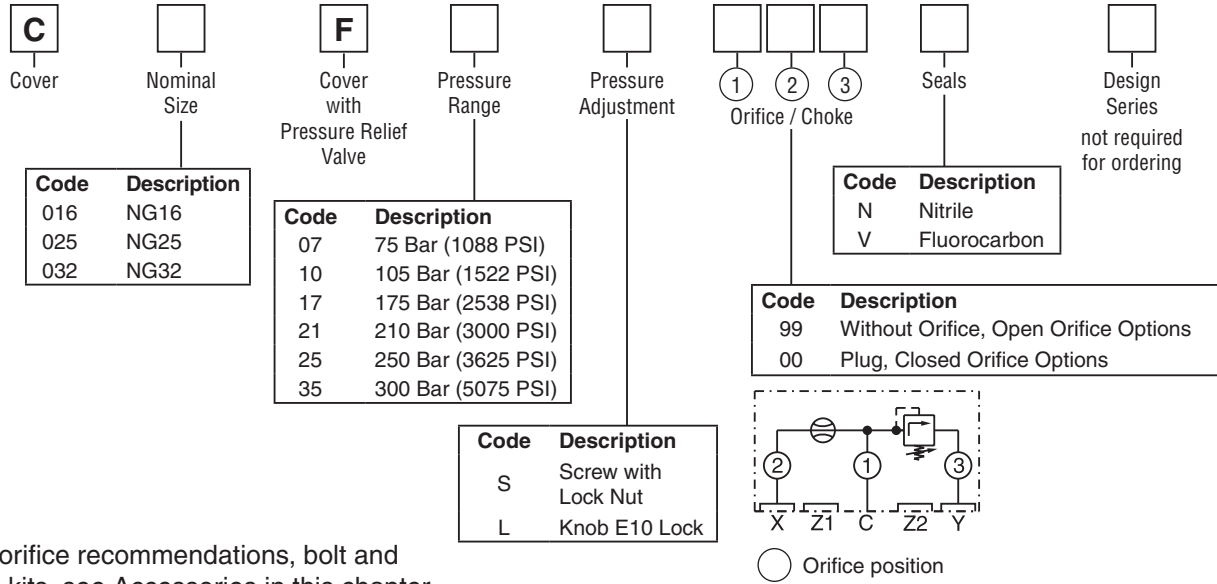
NG80 to NG100



Size	B	L	Gauge Port	Orifice Thread			
				①	②	③	④
NG16	79.0 ¹⁾ (3.11)	40.0 (1.57)	G 1/4"	M5	M5	M5	M5
NG25	85.0 (3.35)	45.0 (1.77)		M5	M5	M6	M6
NG32	102.0 (4.02)	50.0 (1.97)		M5	M5	M6	M6
NG40	125.0 (4.92)	60.0 (2.36)		M5	M5	M6	M6
NG50	140.0 (5.51)	70.0 (2.76)		M6	M6	M8	M8
NG63	180.0 (7.09)	85.0 (3.35)		M6	M6	M8	M8
NG80	Ø250.0 (9.81)	105.0 (4.13)		1/16 NPT	1/16 NPT	M10x1	M10x1
NG100	Ø300.0 (11.81)	120.0 (4.72)		1/16 NPT	1/16 NPT	M10x1	M10x1

¹⁾ Width 65m (2.56 in.)

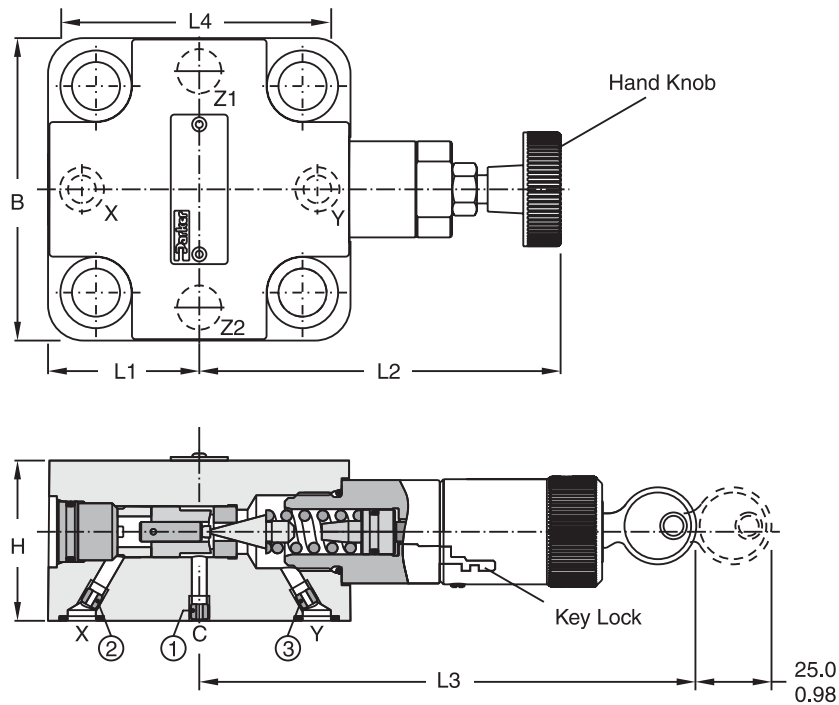
Ordering Information



For orifice recommendations, bolt and seal kits, see Accessories in this chapter.

Dimensions

Inch equivalents for millimeter dimensions are shown in (**)



Ports Z1 and Z2: O-ring recess diameter on valve body

Size	B	H	L1	L2 max.	L3 max.	L4	Orifice Thread		
							①	②	③
NG16	65.0 (2.56)	40.0 (1.57)	32.5 (1.28)	114.0 (4.49)	125.5 (4.94)	79.0 (3.11)	M5	M4	M5
NG25	85.0 (3.35)	45.0 (1.77)	42.5 (1.68)	102.0 (4.02)	114.0 (4.49)	85.0 (3.35)	M5	M5	M5
NG32	102.0 (4.02)	50.0 (1.97)	51.0 (2.01)	95.0 (3.74)	106.0 (4.17)	102.0 (4.02)	M5	M6	M6

Ordering Information

C Cover	Nominal Size	G Cover with Pressure Relief and Pilot System Mounting	Pressure Range	Pressure Adjustment	Orifice / Choke (1, 2, 3, 4)	Seals	Design Series (not required for ordering)
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Code	Description
016	NG16
025	NG25
032	NG32

Code	Description
07	75 Bar (1088 PSI)
10	105 Bar (1522 PSI)
17	175 Bar (2538 PSI)
21	210 Bar (3000 PSI)
25	250 Bar (3625 PSI)
35	300 Bar (5075 PSI)

Code	Description
S	Screw with Lock Nut
L	Knob E10 Lock

Code	Description
N	Nitrile
V	Fluorocarbon

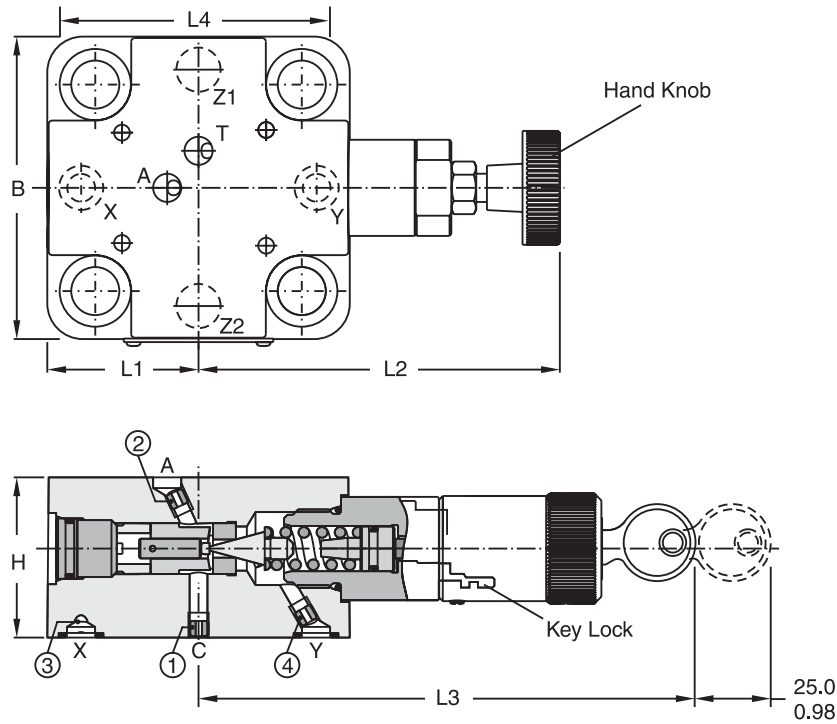
Code	Description
99	Without Orifice, Open Orifice Options
00	Plug, Closed Orifice Options

○ Orifice position

For orifice recommendations, bolt and seal kits, see Accessories.

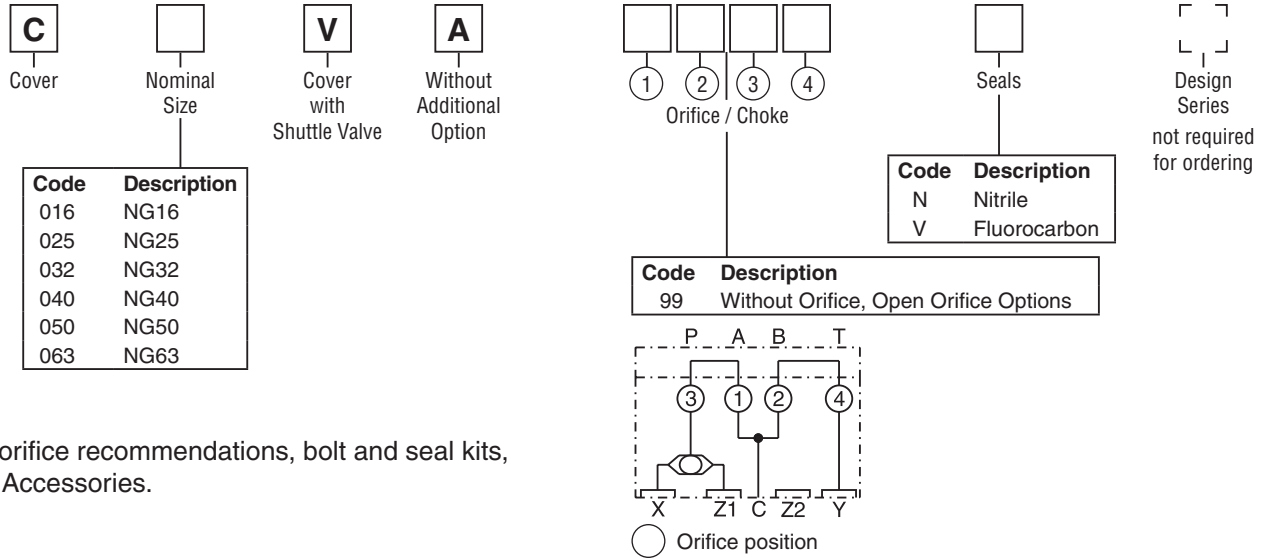
Dimensions

Inch equivalents for millimeter dimensions are shown in (**)



Size	B	H	L1	L2 max.	L3 max.	L4	Orifice Thread			
							①	②	③	④
NG16	65.0 (2.56)	40.0 (1.57)	32.5 (1.28)	114.0 (4.49)	125.5 (4.94)	79.0 (3.11)	M5	M5	M4	M5
NG25	85.0 (3.35)	45.0 (1.77)	42.5 (1.68)	102.0 (4.02)	114.0 (4.49)	85.0 (3.35)	M5	M5	M5	M5
NG32	102.0 (4.02)	50.0 (1.97)	51.0 (2.01)	95.0 (3.74)	106.0 (4.17)	102.0 (4.02)	M6	M6	M6	M6

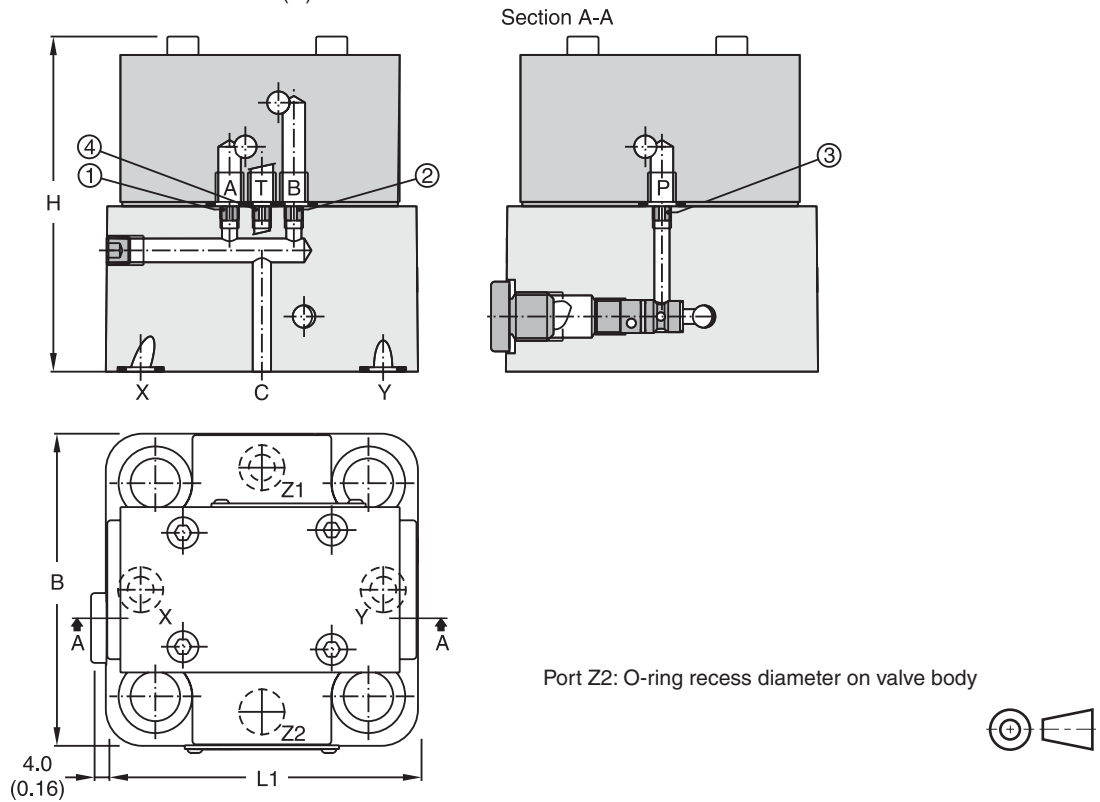
Ordering Information



For orifice recommendations, bolt and seal kits, see Accessories.

Dimensions

Inch equivalents for millimeter dimensions are shown in (**)



Size	B	H	L1	Orifice Thread			
				①	②	③	④
NG16	65.0 (2.56)	86.5 (3.41)	85.0 (3.35)	M5	M5	M5	M5
NG25	85.0 (3.35)	91.5 (3.60)	85.0 (3.35)	M5	M5	M5	M5
NG32	102.0 (4.02)	96.5 (3.80)	102.0 (4.02)	M5	M5	M5	M5
NG40	125.0 (4.92)	106.5 (4.19)	125.0 (4.92)	M6	M6	M6	M6
NG50	140.0 (5.51)	126.5 (4.98)	140.0 (5.51)	M8	M8	M8	M8
NG63	180.0 (7.09)	141.0 (5.55)	180.0 (7.09)	M8	M8	M8	M8

Ordering Information

C
 Cover

Nominal
 Size

W
 Cover with
 Shuttle Valve
 and Pilot System
 Mounting

A
 Without
 Additional
 Option

Code	Description
016	NG16
025	NG25
032	NG32
040	NG40
050	NG50
063	NG63

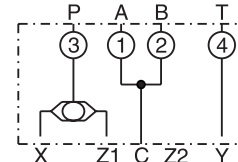
① ② ③ ④
 Orifice / Choke

Seals

Design
 Series
 not required
 for ordering

Code	Description
N	Nitrile
V	Fluorocarbon

Code	Description
99	Without Orifice, Open Orifice Options

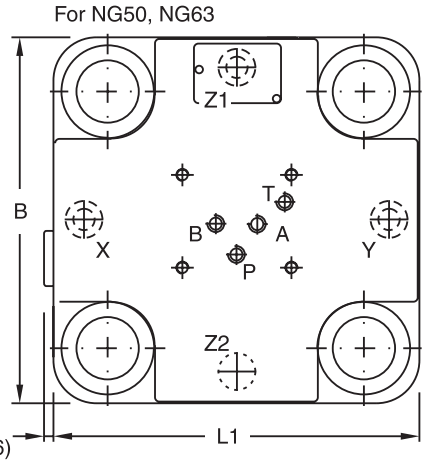
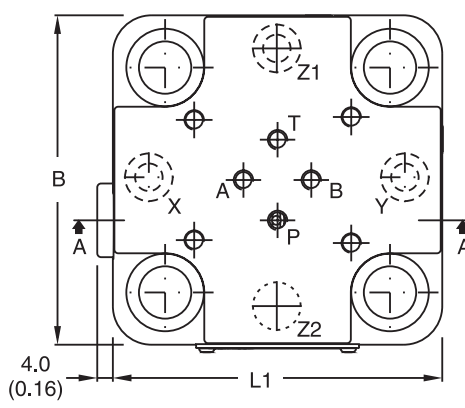
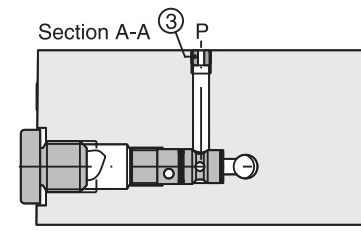
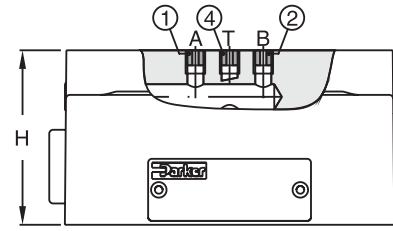


○ Orifice position

For orifice recommendations, bolt and seal kits, see Accessories.

Dimensions

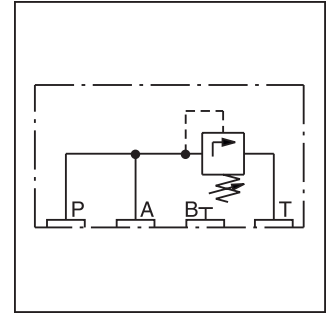
Inch equivalents for millimeter dimensions are shown in (**)



Port Z2: O-ring recess diameter on valve body

Size	B	H	L1	Orifice Thread			
				①	②	③	④
NG16	65.0 (2.56)	40.0 (1.57)	79.0 (3.11)	M5	M5	M5	M5
NG25	85.0 (3.35)	45.0 (1.77)	85.0 (3.35)	M5	M5	M5	M5
NG32	102.0 (4.02)	50.0 (1.97)	102.0 (4.02)	M5	M5	M5	M5
NG40	125.0 (4.92)	60.0 (2.36)	125.0 (4.92)	M6	M6	M6	M6
NG50	140.0 (5.51)	70.0 (2.76)	140.0 (5.51)	M8	M8	M8	M8
NG63	180.0 (7.09)	85.0 (3.35)	180.0 (7.09)	M8	M8	M8	M8

**Pilot Valve with Pressure Relief
 Function R06M
 Subplate Mounting NG6
 (see Combination Examples)
 MTTF_D value 150 years**



Ordering Information

R06M

Code	Description
10	105 Bar (1523 PSI)
17	175 Bar (2538 PSI)
21	210 Bar (3045 PSI)
25	250 Bar (3625 PSI)
35	350 Bar (5075 PSI)

Pressure Range

Code	Description
S	Hand knob (standard)
L	Key lock

Pressure Adjustment

4

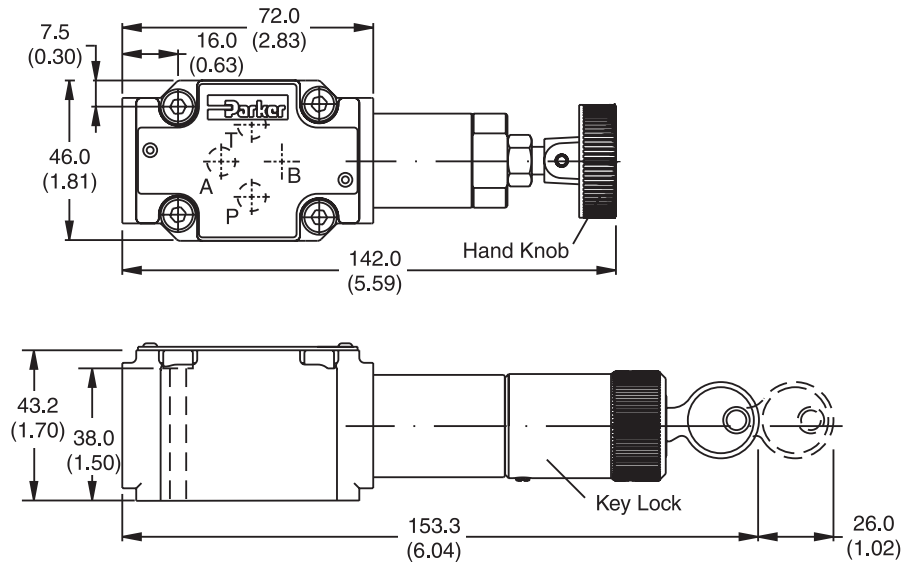
Pilot Oil

Code	Description
N	Nitrile
V	Fluorocarbon

Seal

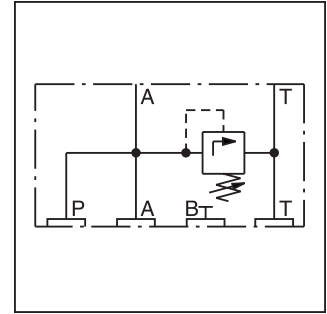
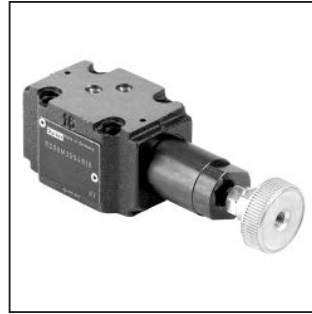
Design Series
 NOTE:
 Not required when ordering.

Dimensions R06M



Replaces DSDA (P07)

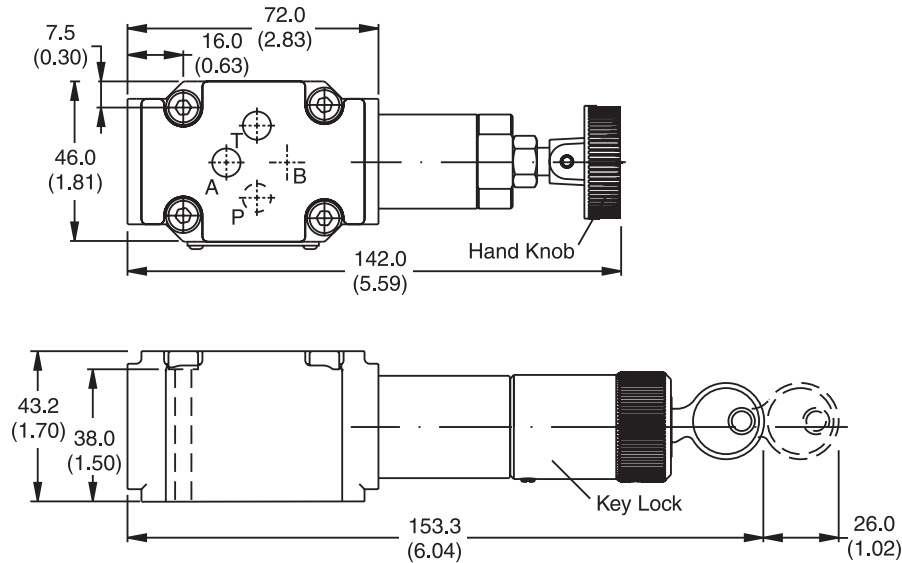
**Pilot Valve with Pressure Relief
 Function RS06M**
Sandwich Plate Mounting NG6
 (see Combination Examples)
 MTTF_D value 150 years



Ordering Information

RS06M	□ Pressure Range	□ Pressure Adjustment	4 Pilot Oil	□ Seal	□ Design Series NOTE: Not required when ordering.																								
	<table border="1"> <thead> <tr> <th>Code</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>10</td> <td>105 Bar (1523 PSI)</td> </tr> <tr> <td>17</td> <td>175 Bar (2538 PSI)</td> </tr> <tr> <td>21</td> <td>210 Bar (3045 PSI)</td> </tr> <tr> <td>25</td> <td>250 Bar (3625 PSI)</td> </tr> <tr> <td>35</td> <td>350 Bar (5075 PSI)</td> </tr> </tbody> </table>	Code	Description	10	105 Bar (1523 PSI)	17	175 Bar (2538 PSI)	21	210 Bar (3045 PSI)	25	250 Bar (3625 PSI)	35	350 Bar (5075 PSI)	<table border="1"> <thead> <tr> <th>Code</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>S</td> <td>Hand knob (standard)</td> </tr> <tr> <td>L</td> <td>Key lock</td> </tr> </tbody> </table>	Code	Description	S	Hand knob (standard)	L	Key lock		<table border="1"> <thead> <tr> <th>Code</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>N</td> <td>Nitrile</td> </tr> <tr> <td>V</td> <td>Fluorocarbon</td> </tr> </tbody> </table>	Code	Description	N	Nitrile	V	Fluorocarbon	
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17	175 Bar (2538 PSI)																												
21	210 Bar (3045 PSI)																												
25	250 Bar (3625 PSI)																												
35	350 Bar (5075 PSI)																												
Code	Description																												
S	Hand knob (standard)																												
L	Key lock																												
Code	Description																												
N	Nitrile																												
V	Fluorocarbon																												

Dimensions RS06M

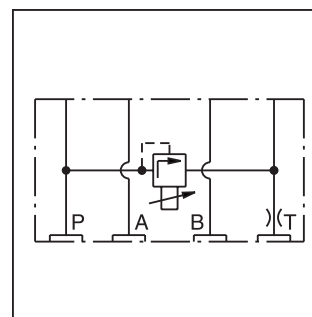
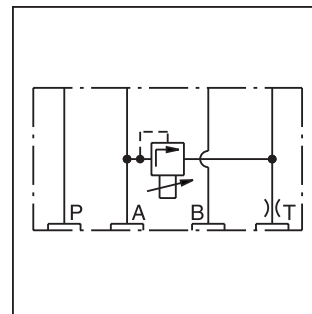


Replaces DSDA (Z07)

**Pilot Valve with Proportional Relief
 Function RPDM2***

Sandwich Mounting NG6
 (see Combination Examples)
 MTTF_D value 150 years

* For technical details see Series RE06M*W.



Ordering Information

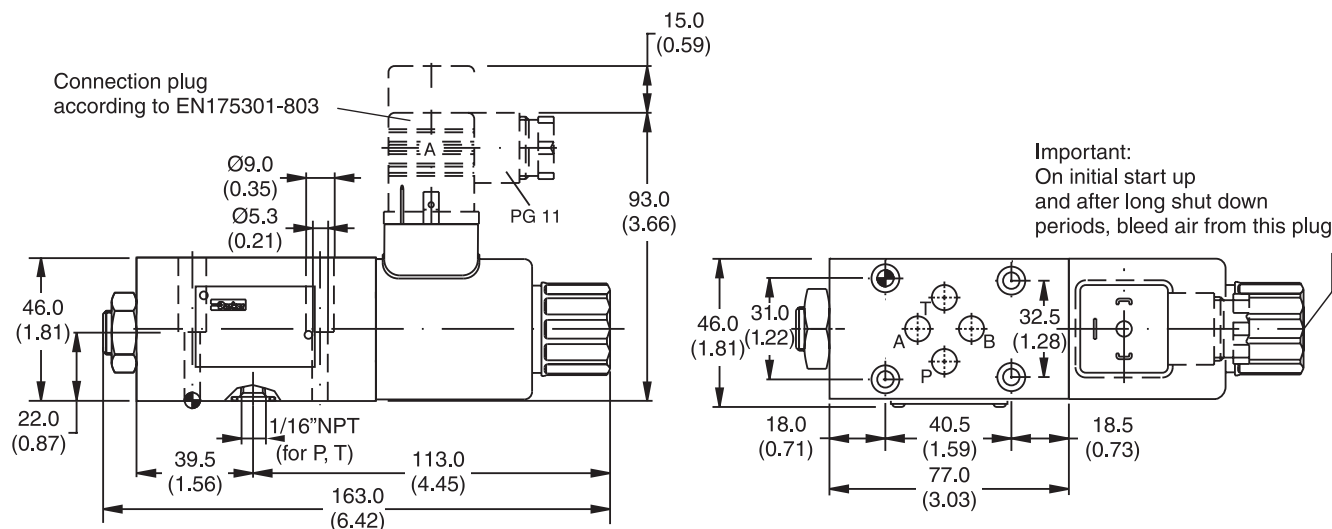
RPDM	2	□	□	□	V	□
	Pressure Adjustment	Pressure Relief	Pressure Range	Solenoid Voltage	Seal Fluorocarbon	Design Series
						NOTE: Not required when ordering.

Code	Description
AT	A to T
PT	P to T

Code	Description
10	105 Bar (1523 PSI)
17	175 Bar (2538 PSI)
25	250 Bar (3625 PSI)
35	350 Bar (5075 PSI)

Code	Description
K	12V, 2.3A
X	16V, 1.3A

Dimensions RPDM2

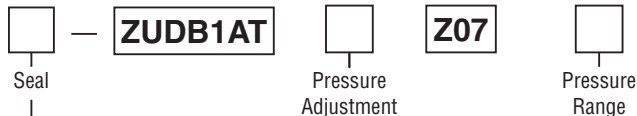


**Sandwich Valve with Pressure Relief
 Function ZUD*AT*Z***

Sandwich Plate Mounting NG6

(see Combination Examples)

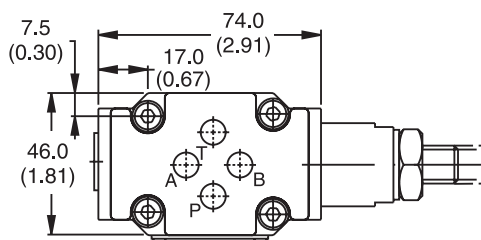
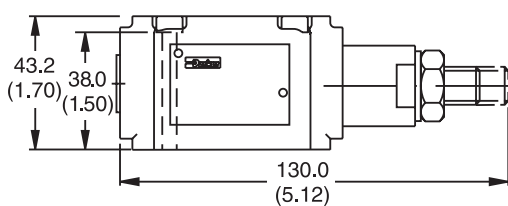
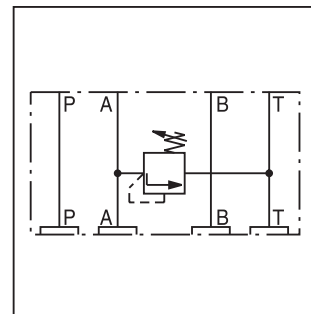
MTTF_D value 150 years



Code	Description
Omit	Nitrile
V	Fluorocarbon

Code	Description
2	Hexagon Screw with Locknut
61	Knob E10 Lock

Code	Description
B	70 Bar (1015 PSI)
E	175 Bar (2538 PSI)
G	250 Bar (3625 PSI)
K	350 Bar (5075 PSI)

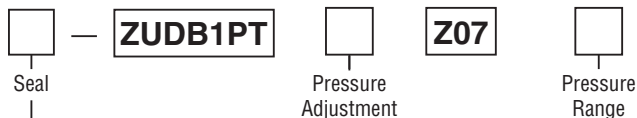


**Sandwich Valve with Pressure Relief
 Function ZUD*PT*Z***

Sandwich Plate Mounting NG6

(see Combination Examples)

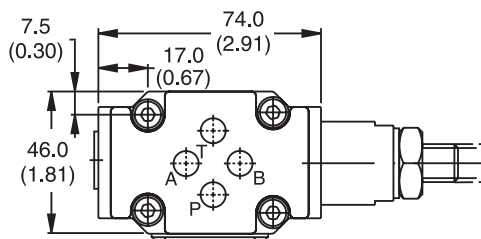
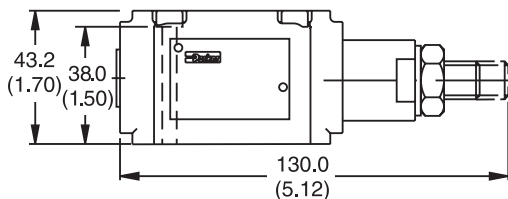
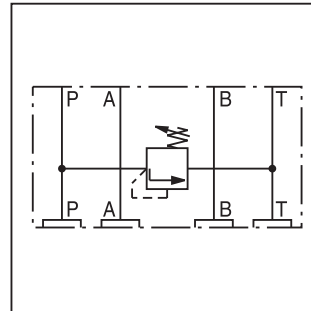
MTTF_D value 150 years



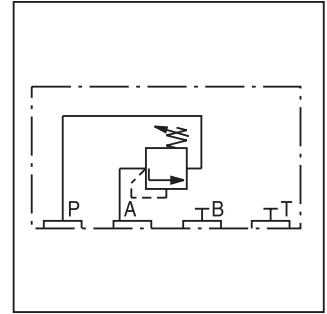
Code	Description
Omit	Nitrile
V	Fluorocarbon

Code	Description
2	Hexagon Screw with Locknut
61	Knob E10 Lock

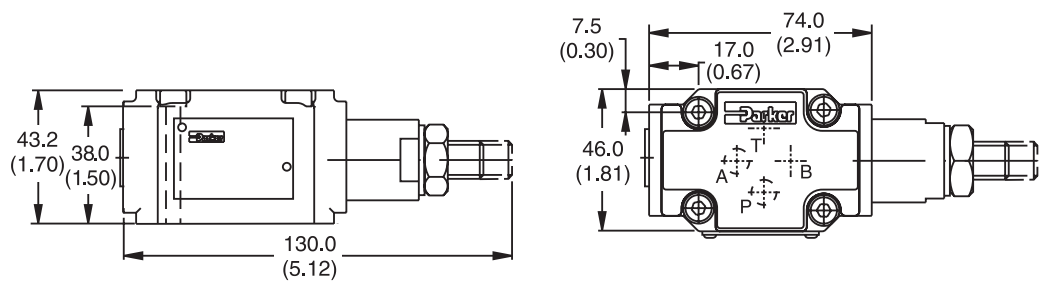
Code	Description
B	70 Bar (1015 PSI)
E	175 Bar (2538 PSI)
G	250 Bar (3625 PSI)
K	350 Bar (5075 PSI)



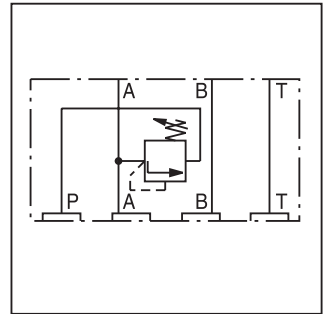
Pilot Valve with Preload Function DSB*P*
Subplate Mounting NG6
(see Combination Examples)
MTTF_D value 150 years



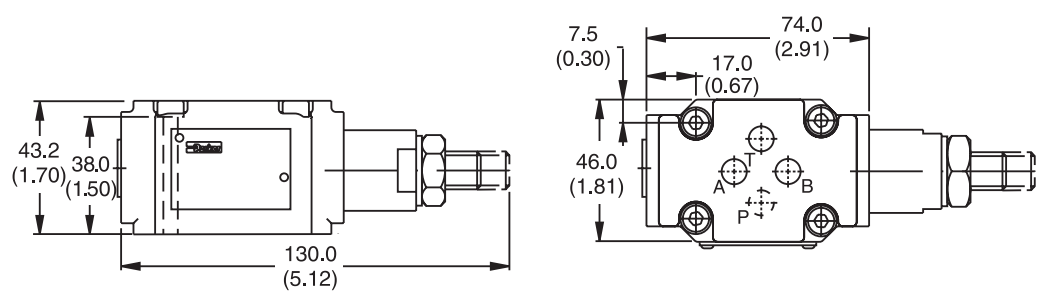
Seal	DSBA100	Pressure Adjustment	P07	Pressure Range	
Code	Description	Code	Description	Code	Description
Omit	Nitrile	2	Hexagon Screw with Locknut	B	70 Bar (1015 PSI)
V	Fluorocarbon	61	Knob E10 Lock	E	175 Bar (2538 PSI)
				G	250 Bar (3625 PSI)
				K	350 Bar (5075 PSI)



Pilot Valve with Preload Function DSB*Z*
Sandwich Plate Mounting NG6
(see Combination Examples)
MTTF_D value 150 years



Seal	DSBA100	Pressure Adjustment	Z07	Pressure Range	
Code	Description	Code	Description	Code	Description
Omit	Nitrile	2	Hexagon Screw with Locknut	B	70 Bar (1015 PSI)
V	Fluorocarbon	61	Knob E10 Lock	E	175 Bar (2538 PSI)
				G	250 Bar (3625 PSI)
				K	350 Bar (5075 PSI)



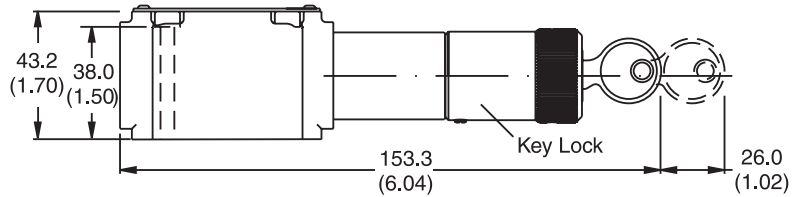
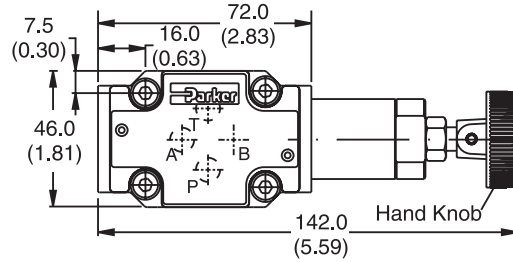
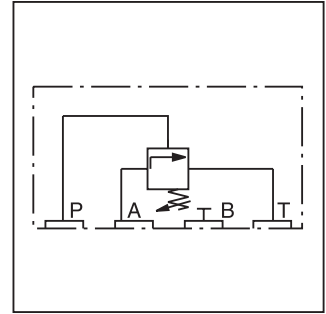
Pilot Valve with Unloading Function UR06M
Subplate Mounting NG6
 (see Combination Examples)
 MTTF_D value 150 years

UR	06	M	<input type="checkbox"/>	<input type="checkbox"/>	4	<input type="checkbox"/>
	Pressure Range	Pressure Adjustment	Pilot Oil Drain Internal	Seal		

Code	Description
07	70 Bar (1015 PSI)
17	175 Bar (2538 PSI)
25	250 Bar (3625 PSI)
35	350 Bar (5075 PSI)

Code	Description
S	Hand knob
L	Key lock

Code	Description
N	Nitrile
V	Fluorocarbon



Replaces DAFA (P07)

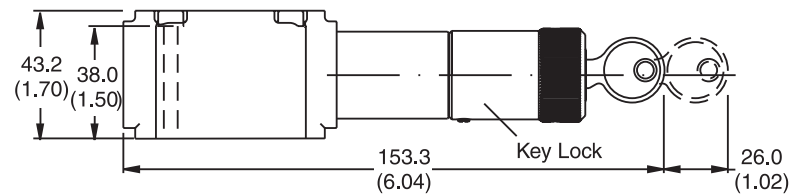
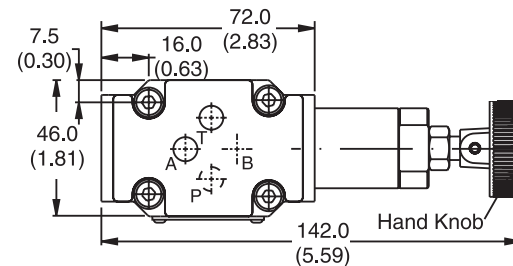
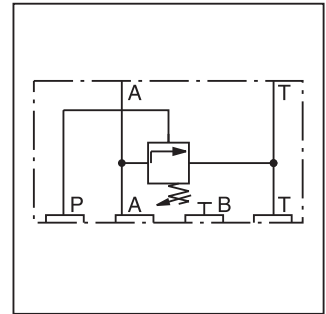
Pilot Valve with Unloading Function US06M
Subplate Mounting NG6
 (see Combination Examples)
 MTTF_D value 150 years

US	06	M	<input type="checkbox"/>	<input type="checkbox"/>	4	<input type="checkbox"/>
	Pressure Range	Pressure Adjustment	Pilot Oil Drain Internal	Seal		

Code	Description
07	70 Bar (1015 PSI)
17	175 Bar (2538 PSI)
25	250 Bar (3625 PSI)
35	350 Bar (5075 PSI)

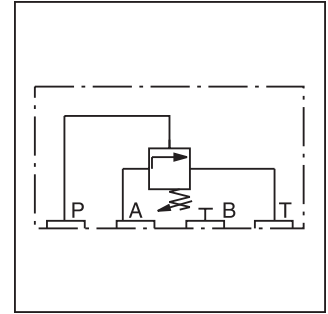
Code	Description
S	Hand knob
L	Key lock

Code	Description
N	Nitrile
V	Fluorocarbon



Replaces DAFA (Z07)

**Pilot Valve with Pressure Sequence
 Function S06M
 Subplate Mounting NG6
 (see Combination Examples)
 MTTF_D value 150 years**



Ordering Information

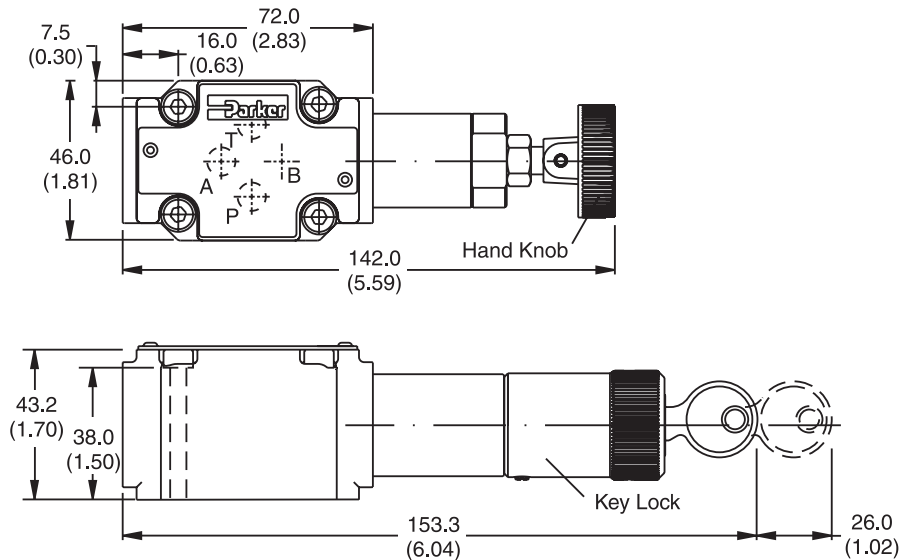
S06M	□ Pressure Range	□ Pressure Adjustment	4 Pilot Oil Inlet Internal/Outlet Internal	□ Seal	□ Design Series NOTE: Not required when ordering.
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Code	Description
10	105 Bar (1523 PSI)
17	175 Bar (2538 PSI)
21	210 Bar (3045 PSI)
25	250 Bar (3625 PSI)
35	350 Bar (5075 PSI)

Code	Description
S	Hand knob (standard)
L	Key lock

Code	Description
N	Nitrile
V	Fluorocarbon

Dimensions S06M



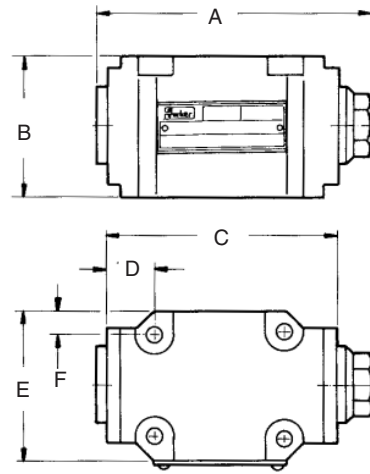
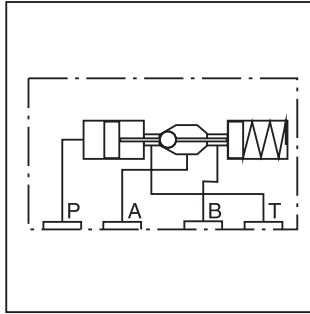
Replaces DNLA

**Check Valve
 Hydraulically Pilot Operated NG6**

Size NG6 with pilot control for subplate assembly

Ordering Information

SVLA1006P07



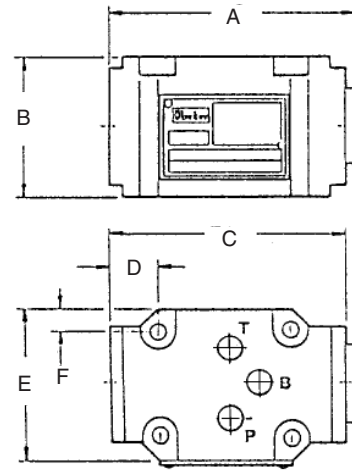
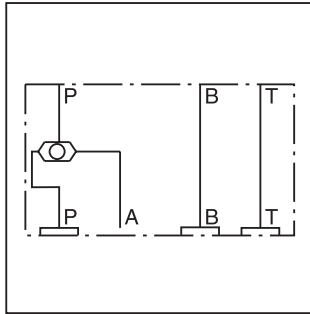
Dimension	A	B	C	D	E	F
mm	92.0	43.2	74.0	17.0	46.0	7.5
(in.)	(3.62)	(1.70)	(2.91)	(0.67)	(1.81)	(0.30)

**Shuttle Valve
 Sandwich Plate NG6**

Size NG6 with pilot control for subplate assembly

Ordering Information

ZSRA1PP0Z07



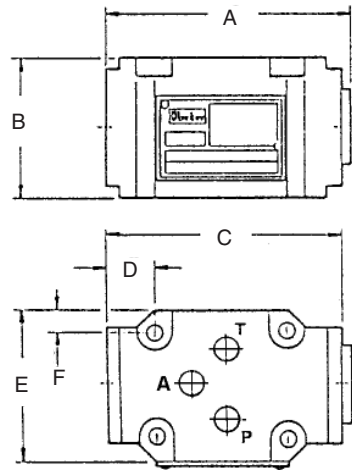
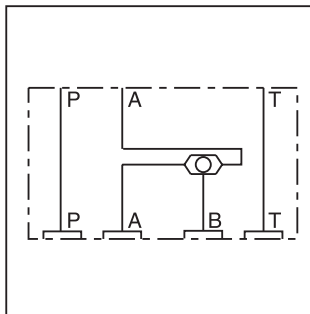
Dimension	A	B	C	D	E	F
mm	80.0	43.2	74.0	17.0	46.0	7.5
(in.)	(3.15)	(1.70)	(2.91)	(0.67)	(1.81)	(0.30)

**Shuttle Valve
 Sandwich Plate NG6**

Size NG6 with pilot control for subplate assembly

Ordering Information

ZSRB1AA0Z07



Dimension	A	B	C	D	E	F
mm	80.0	43.2	74.0	17.0	46.0	7.5
(in.)	(3.15)	(1.70)	(2.91)	(0.67)	(1.81)	(0.30)

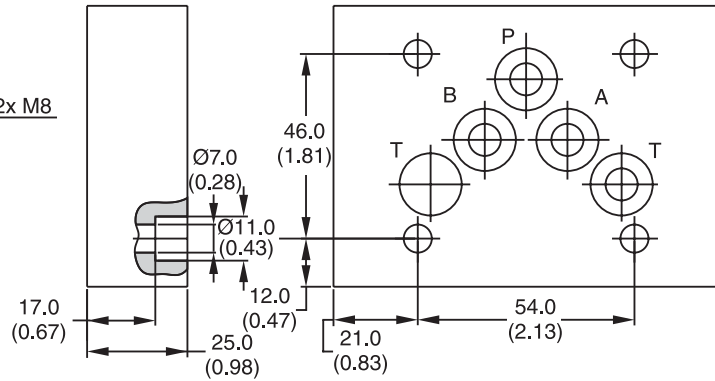
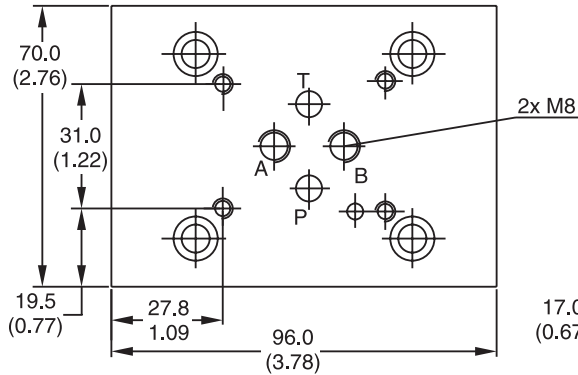
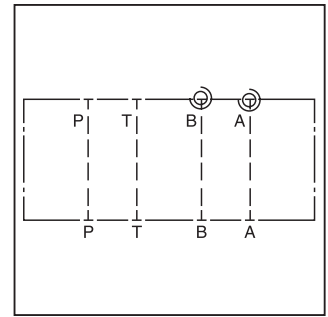
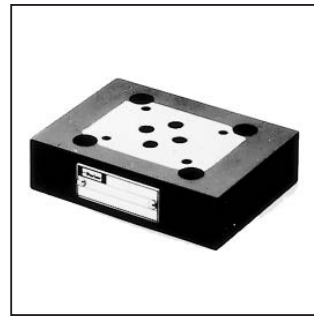
Accessories.indd, ddp

Adapter Plate

Size NG6 to NG10

Ordering Information

PADA1007/A-A/B-B

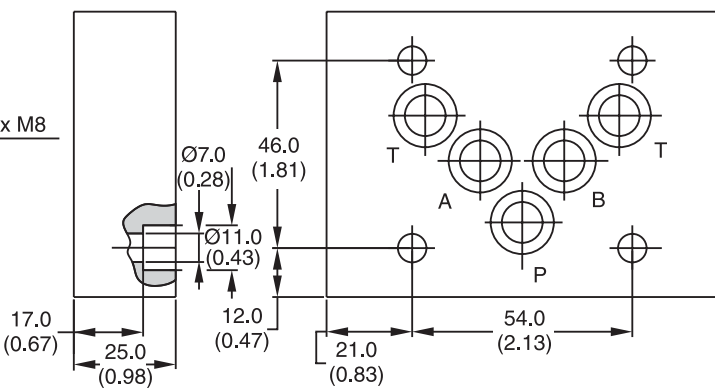
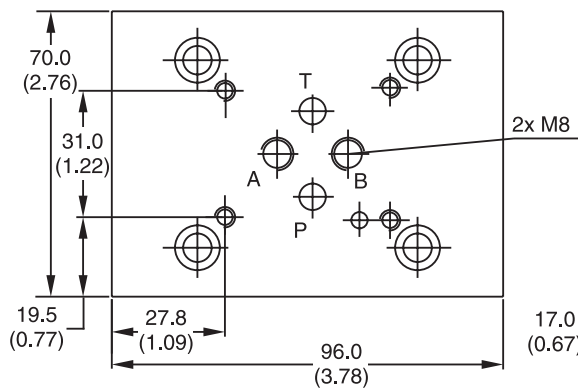
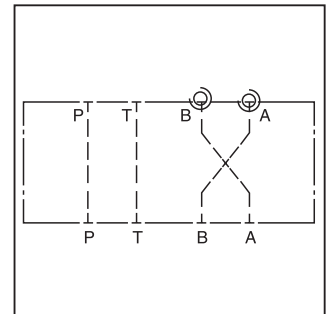


Adapter Plate

Size NG6 to NG10

Ordering Information

PADA1007/A-B/B-A



Attention:

For NG50 and larger: If pilot system NG6 is used, mount adapter plate PADA1007/A-B/B-A or PADA1007/A-A/B-B (NG6 to NG10) on cover.

Adapter Plate: PADA1007/A-B/B-A or PADA1007/A-A/B-B

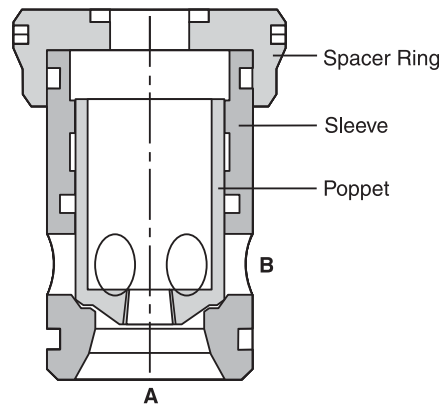
Sealing Kit: SK-PADA 1007

Bolt Kit: BK136

Symbol	Type	Size	Height
	PADA1007/A-A/B-B	NG6-NG10	25.0mm (0.98 in.)
	PADA1007/A-B/B-A	NG6-NG10	25.0mm (0.98 in.)
	H06-1044	NG6	30.0mm (1.18 in.)
	H06-1039	NG6	30.0mm (1.18 in.)
	H06-504	NG6	30.0mm (1.18 in.)
	H06-711	NG6	30.0mm (1.18 in.)
	H06-1274	NG6	30.0mm (1.18 in.)
	H06-1040	NG6	30.0mm (1.18 in.)

Symbol	Type	Size	Height
	H06DO-1291	NG6	10.0mm (0.39 in.)
	H06DU-814	NG6	71.3mm (2.81 in.)
	SPD2T2SWS35	NG6	25.4mm (1.00 in.)
	CS06082N	NG6	40.3mm (1.59 in.)
	SPD2A1*NS35	NG6	19.1mm (0.75 in.)
	D51VP071D	NG6	26.3mm (1.04 in.)
	SPD2C1*NS35 SPD3C1*NS35	NG6 NG10	19.1mm (0.75 in.) 19.1mm (0.75 in.)

Poppets, Cages, Spacer Rings



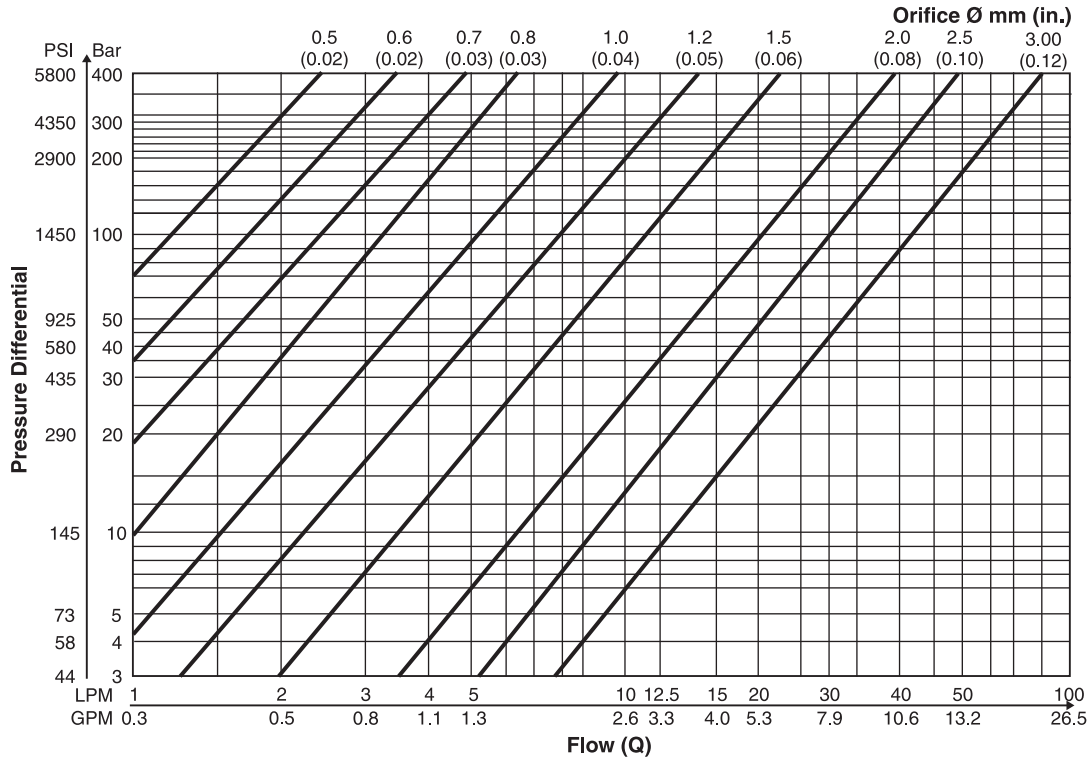
Size	NG16	NG25	NG32	NG40	NG50	NG63	NG80	NG100
Poppet 01	RK-45036369	RK-45036379	RK-45036392	RK-45036409	RK-45036421	RK-45036437	RK-35036449	RK-35036467
Poppet 04	RK-45036370	RK-45036380	RK-45036395	RK-45036406	RK-45036422	RK-45036436	RK-35036460	RK-35036468
Poppet 07	RK-35037531	RK-45036964	RK-45036965	RK-45036966	RK-45036967	RK-45036968	—	—
Poppet 08	RK-45036368	RK-45036381	RK-45036391	RK-45036408	RK-45036424	RK-45036438	RK-35036459	RK-35036469
CE-Sleeve	RK-35038871	RK-35038872	RK-35038873	RK-35036403	RK-35036417	RK-35036432	RK-25036452	RK-25036470
CP-Sleeve	RK-35039384	RK-35039385	RK-35039386	RK-35039387	RK-35039388	RK-35039389	—	—
Spacer Ring	RK-35036364	RK-35036375	RK-35036393	RK-35036402	RK-35036416	RK-35036435	RK-25036453	RK-25036471

Springs, Seals, Fitting Bolts

Size	NG16	NG25	NG32	NG40	NG50	NG63	NG80	NG100
Spring *								
Type L 0.1 Bar (1.5 PSI)	FK-CE016-L	FK-CE025-L	FK-CE032-L	FK-CE040-L	FK-CE050-L	FK-CE063-L	FK-CE080-L	FK-CE100-L
Type N 0.5 Bar (7.3 PSI)	FK-CE016-N	FK-CE025-N	FK-CE032-N	FK-CE040-N	FK-CE050-N	FK-CE063-N	FK-CE080-N	FK-CE100-N
Type S 1.6 Bar (23.2 PSI)	FK-CE016-S	FK-CE025-S	FK-CE032-S	FK-CE040-S	FK-CE050-S	FK-CE063-S	FK-CE080-S	FK-CE100-S
Type T 2.5 Bar (36.3 PSI)	FK-CE016-T	FK-CE025-T	FK-CE032-T	FK-CE040-T	FK-CE050-T	FK-CE063-T	FK-CE080-T	FK-CE100-T
Type U 4.0 Bar (58.0 PSI)	FK-CE016-U	FK-CE025-U	FK-CE032-U	FK-CE040-U	FK-CE050-U	FK-CE063-U	FK-CE080-U	FK-CE100-U
Seal Kits								
Fluorcarbon	SK-CBE160V	SK-CBE250V	SK-CBE320V	SK-CBE400V	SK-CBE500V	SK-CBE630V	SK-CBE800V	SK-CBE1000V
Nitrile	SK-CBE160	SK-CBE250	SK-CBE320	SK-CBE400V	SK-CBE500	SK-CBE630	SK-CBE800	SK-CBE1000
Bolt Kits (DIN 912 12.9)	BK414 4x M8x40	BK391 4x M12x50	BK415 4x M16x55	BK416 4x M20x70	BK417 4x M2x75	BK418 4x M30x100	BK419 4x M24x120	BK420 4x M30x130
Bolt Kits (US)	BK84 5/16-18x1.5	BK77 1/2-13x2	BK85 5/8-11x2.25	BK86 3/4-10x2.75	BK87 3/4-10x3.0	BK88 1 1/4-7x4.00	BK135 1-8x5.00	BK90 1 1/4-7x5.5
Recommended Torque Nm (lb.-ft.)	27 (19.9)	94 (69.3)	234 (172.6)	460 (339.3)	460 (339.3)	1570 (1157.9)	790 (582.6)	1570 (1157.9)

* 1 spring kit contains 10 springs
 Ordering Example: FK-CE016 ⇒ 10 pcs., type U

Diagram to Choose the Orifice Ø



Values measured at a viscosity of 40 cSt (187 SSU) and a temperature of 50°C (122°F).

Orifices

There are different orifices available to realize different opening / closing velocities.
 The control volume of each nominal valve size can be found at the CE series.

Orifice Kits, Sorted by Thread with Different Diameters

Orifice Kit	Orifice Kit, sorted by thread with different diameters, consisting of 2 pieces of each marked diameter													
Ø mm (in.)	0.0 (0.0)	0.8 (0.03)	0.9 (0.04)	1.0 (0.04)	1.1 (0.04)	1.2 (0.05)	1.3 (0.05)	1.5 (0.06)	1.8 (0.07)	2.0 (0.08)	2.2 (0.09)	2.5 (0.10)	3.0 (0.12)	
DK-M4	x	x	x	x	x	x	x	x	-	x	-	-	-	
DK-M5	x	x	x	x	x	x	x	x	-	x	-	-	-	
DK-M6	x	x	x	x	x	x	x	x	-	x	-	-	-	
DK-M8	x	-	-	x	-	x	-	x	x	x	x	x	-	
DK-M10x1	x	-	-	x	-	x	-	x	x	x	-	x	x	
DK-1/16NPT	x	x	x	x	x	x	x	x	-	x	-	-	-	
DK-1/8NPT	x	-	-	x	-	x	-	x	x	x	-	x	x	

Orifice Kits, Thread with One Defined Diameter, 20 pieces per Box

Orifice kits of one size:

Ordering Examples:

DK-M4-06 ⇒ 20 pcs., orifice size 0.8mm (0.03 in.)

DK-M5-10 ⇒ 20 pcs., orifice size 1.0mm (0.04 in.)

DK-M8-12 ⇒ 20 pcs., orifice size 1.2mm (0.05 in.)

Orifice gauge: Order no. DK-05-30

Removal CE016 to CE063

The extracting tools consist of tee bar, slide hammer, support handle, and expanding collet (Figure 1).

At first the spacer ring is removed. Next, spring and poppet are withdrawn. Finally, the expanding collet is inserted into the sleeve and braced by means of the tee bar. Using the slide hammer, collet and sleeve are extracted from the cavity.

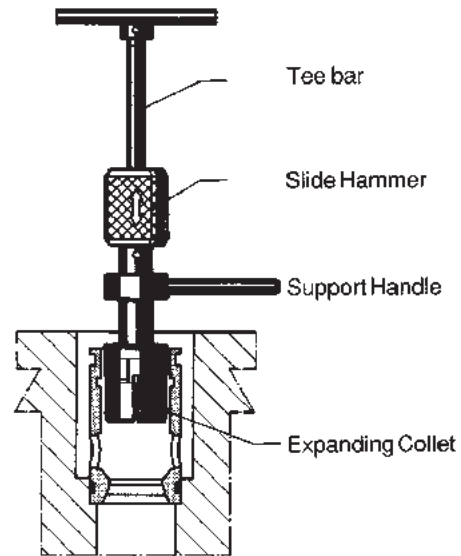


Figure 1

Ordering Information

Valve Size	Order No.
CE016	090460009779
CE025	090460009780
CE032	090460009781
CE040	090460009782
CE050	090460009783
CE063	090460009784
CE016 to CE063	090460009785

Removal CE080 to CE100

The extracting tools consist of spacer ring puller (Figure 4), puller (Figure 3), and puller thrust plate. At first the spacer ring is removed. Next the puller is inserted into the sleeve and aligned by the puller thrust plate. Tightening the nut then extracts the sleeve from the cavity.

Ordering Information

Valve Size	Order No.
CE080	090460010628
CE100	090460010629

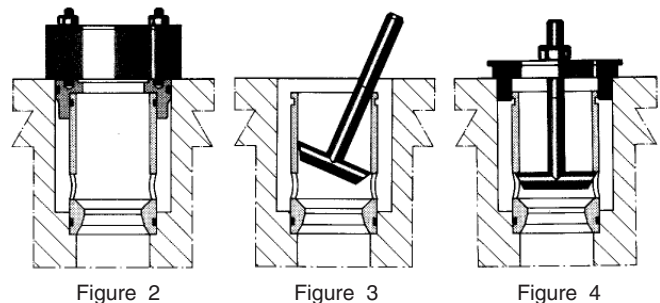


Figure 2

Figure 3

Figure 4

General Description

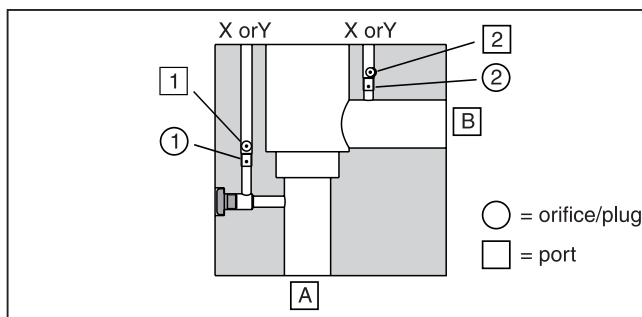
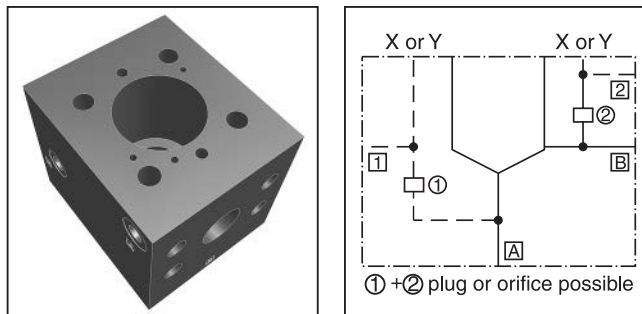
Cartridge Manifold Blocks are bodies for 2/2-way slip-in cartridge valves. They are used in systems with only one cartridge valve without the need to design a specific manifold block.

The pilot ports X and Y can either be connected to A and B or vice versa by changing the mounting position of the cartridge cover.

The wide range of Parker slip-in cartridge valves allows to design solutions for all hydraulic requirements.

Features

- Flanges SAE 61 or SAE 62 respectively CETOP square flange.
- 2 options for pilot oil supply and drain.
- 7 sizes.



Specifications

General	
Interface	ISO 7368-B*-2-A/B
Mounting Position	Unrestricted
Maximum Operating Pressure	138 Bar (2000 PSI) to 420 Bar (6090 PSI) depending on p _{max} of flanges
Flanges	SAE 61 (3000 PSI Series), SAE 62 (6000 PSI Series) ISO 6162, CETOP Square Flange (400 Bar series)

Ordering Information

CB
 Cartridge
 Manifold
 Block

□
 Nominal
 Size

A
 Function
 In – Out

1
 Manifold
 for
 1 Cartridge

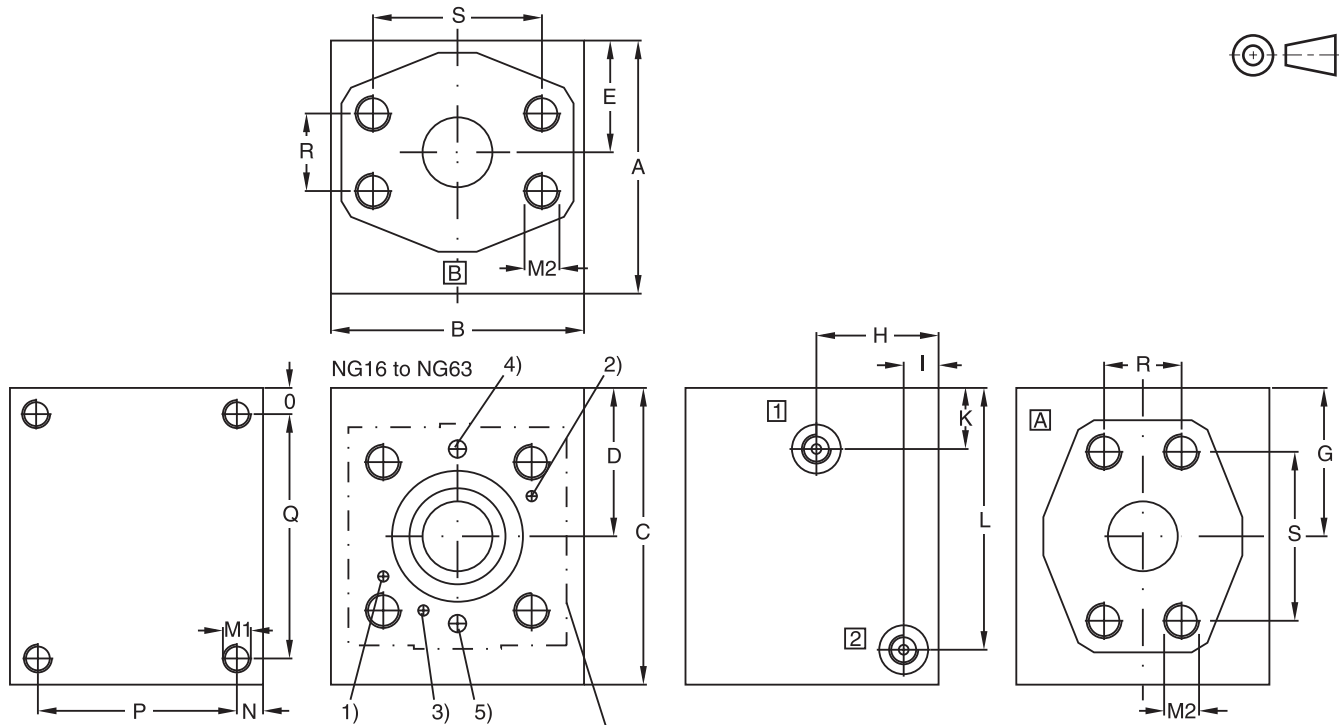
□
 Flange
 Size

10
 Design
 Series

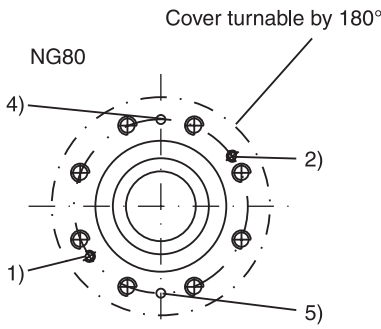
W
 Without
 Assembly

Code	Description
016	NG16
025	NG25
032	NG32
040	NG40
050	NG50
063	NG63
080	NG80

Code	Size	Flange
34	016	1" SAE 61
35	025	1 1/4" SAE 61
36	032	1 1/2" SAE 61
38	040	2" SAE 61
310	050	2 1/2" SAE 61
312	063	3" SAE 61
64	016	1" SAE 62
65	025	1 1/4" SAE 62
66	032	1 1/2" SAE 62
68	040/050	2" SAE 62
70	063	3 1/2" PN400
80	080	4" PN400



- 1) Location pin for X connected to **B** and **2**, Y connected to **A** and **1**
- 2) Location pin for X connected to **A** and **1**, Y connected to **B** and **2**
- 3) Location pin for pressure functions
- 4) X or Y, orifice/plug **1** (connected to **A** and **1**)
- 5) X or Y, orifice/plug **2** (connected to **B** and **2**)



Dimensions are shown in millimeters only.

Ordering Code	M1	M2	R	S
CB016A13410W	M8 x 16	M10x20	26.2	52.4
CB016A16410W	M8 x 16	M12x19	27.8	57.2
CB025A13510W	M10 x 18	M10x20	30.2	58.7
CB025A16510W	M10 x 18	M14x22	31.8	66.6
CB032A13610W	M16 x 30	M12x24	35.7	69.9
CB032A16610W	M16 x 30	M16x32	36.5	79.3
CB040A13810W	M16 x 30	M12x24	42.9	77.8
CB040A16810W	M16 x 30	M20x40	44.5	96.8
CB050A131010W	M16 x 30	M12x24	50.8	88.9
CB050A16810W	M16 x 30	M20x40	44.5	96.8
CB063A131210W	M16 x 30	M16x30	61.9	106.4
CB063A17010W	M16 x 30	M20x33	102.5	102.5
CB080A18010W	M16 x 30	M24x50	113.2	113.2

Dimensions are shown in millimeters only.

Ordering Code	Max. Operating Pressure (Bar)	A	B	C	D	E	G	H	I	K	L	N	O	P	Q	Port A and B	Port 1 and 2	Orifice thread 1 and 2	Weight (kg)
CB016A13410W	350	105.0	80.0	105.0	38.5	34.0	38.5	45.0	13.0	13.5	75.5	10.0	10.0	85.0	85.0	1" SAE 61	G1/4	M5	6.0
CB016A16410W	420	105.0	80.0	105.0	38.5	34.0	38.5	45.0	13.0	13.5	75.5	10.0	10.0	85.0	85.0	1" SAE 62	G1/4	M5	6.0
CB025A13510W	280	125.0	100.0	125.0	50.0	43.0	50.0	55.0	15.0	17.0	94.5	10.0	10.0	105.0	105.0	1-1/4" SAE 61	G1/4	M6	11.0
CB025A16510W	420	125.0	100.0	125.0	50.0	43.0	50.0	55.0	15.0	17.0	94.5	10.0	10.0	105.0	105.0	1-1/4" SAE 62	G1/4	M6	11.0
CB032A13610W	210	125.0	125.0	145.0	72.5	51.0	72.5	55.0	15.0	31.5	125.0	15.0	15.0	95.0	115.0	1-1/2" SAE 61	G1/4	M6	16.0
CB032A16610W	420	125.0	125.0	145.0	72.5	51.0	72.5	55.0	15.0	31.5	125.0	15.0	15.0	95.0	115.0	1-1/2" SAE 62	G1/4	M6	16.0
CB040A13810W	210	145.0	145.0	170.0	85.0	65.0	85.0	70.0	20.0	35.0	150.0	15.0	15.0	115.0	140.0	2" SAE 61	G3/8	M8	25.0
CB040A16810W	420	145.0	145.0	170.0	85.0	65.0	85.0	70.0	20.0	35.0	150.0	15.0	15.0	115.0	140.0	2" SAE 62	G3/8	M8	25.0
CB050A131010W	172	155.0	155.0	190.0	95.0	70.0	95.0	70.0	20.0	37.0	170.0	15.0	15.0	125.0	160.0	2-1/2" SAE 61	G3/8	M8	32.0
CB050A16810W	420	155.0	155.0	190.0	95.0	70.0	95.0	70.0	20.0	37.0	170.0	15.0	15.0	125.0	160.0	2" SAE 62	G3/8	M8	32.0
CB063A131210W	138	192.0	192.0	240.0	120.0	86.5	120.0	86.5	20.0	45.0	220.0	15.0	15.0	165.0	210.0	3" SAE 61	G3/8	M8	63.0
CB063A17010W	400	192.0	192.0	240.0	120.0	86.5	120.0	86.5	20.0	45.0	220.0	15.0	15.0	162.0	210.0	3-1/2" PN 400	G3/8	M8	63.0
CB080A18010W	400	270.0	270.0	270.0	135.0	120.0	135.0	120.0	20.0	35.0	250.0	15.0	15.0	240.0	240.0	4" PN 400	G3/8	M8	139.0

Cartridge Manifold Blocks are supplied with a set of plugs and orifices

Accessories.indd, ddp

General Description

Series R pressure relief valves consist of a manual adjusted pilot stage and a cartridge main stage.

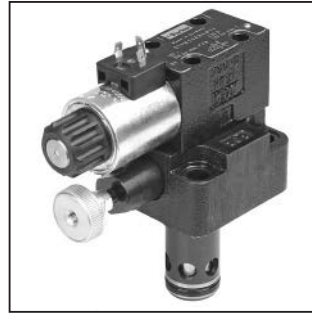
Series RS*E consists of a manual adjusted pilot stage with a directional valve for an electrically controlled vent function and a cartridge main part.

The R/RS*E model codes embrace the pilot valves, covers and cartridges that are also offered as separate items. See combination examples for details.

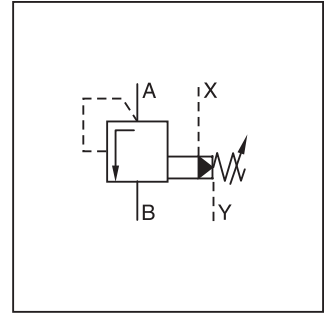
Features

- Pilot operated with manual adjustment.
- Cavity and mounting pattern according to ISO 7368.
- 4 pressure ranges.
- 2 switching types (series RS*E).
- 2 adjustment modes:
 - Hand knob
 - Key lock
- Remote control via port X.
- 6 sizes, NG16 to NG63.

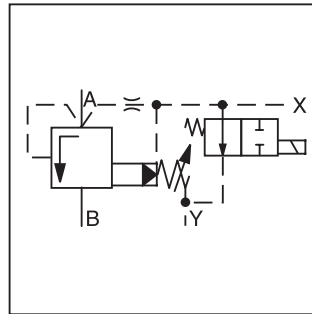
Note: Port X only usable for remote vent function



RS*E

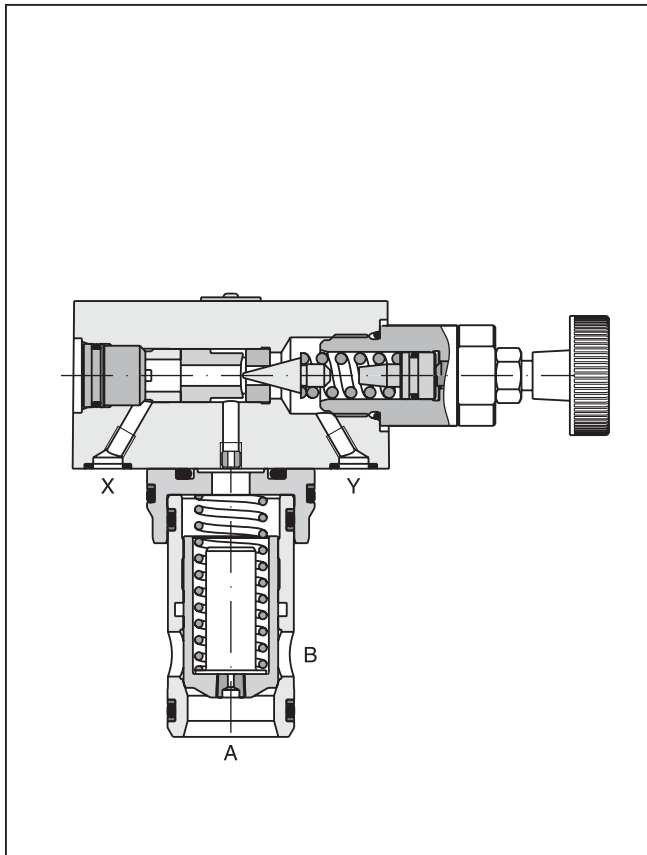


R*E

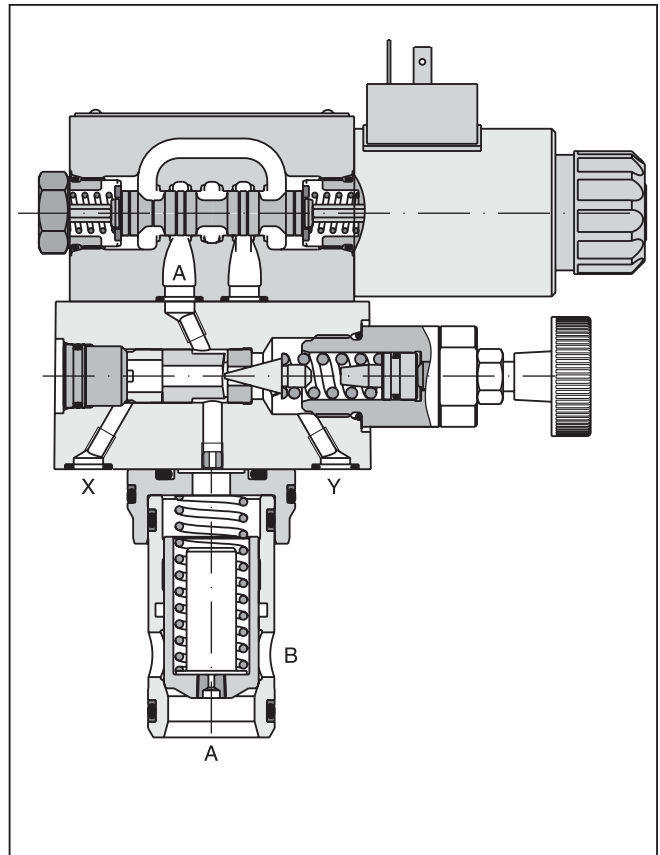


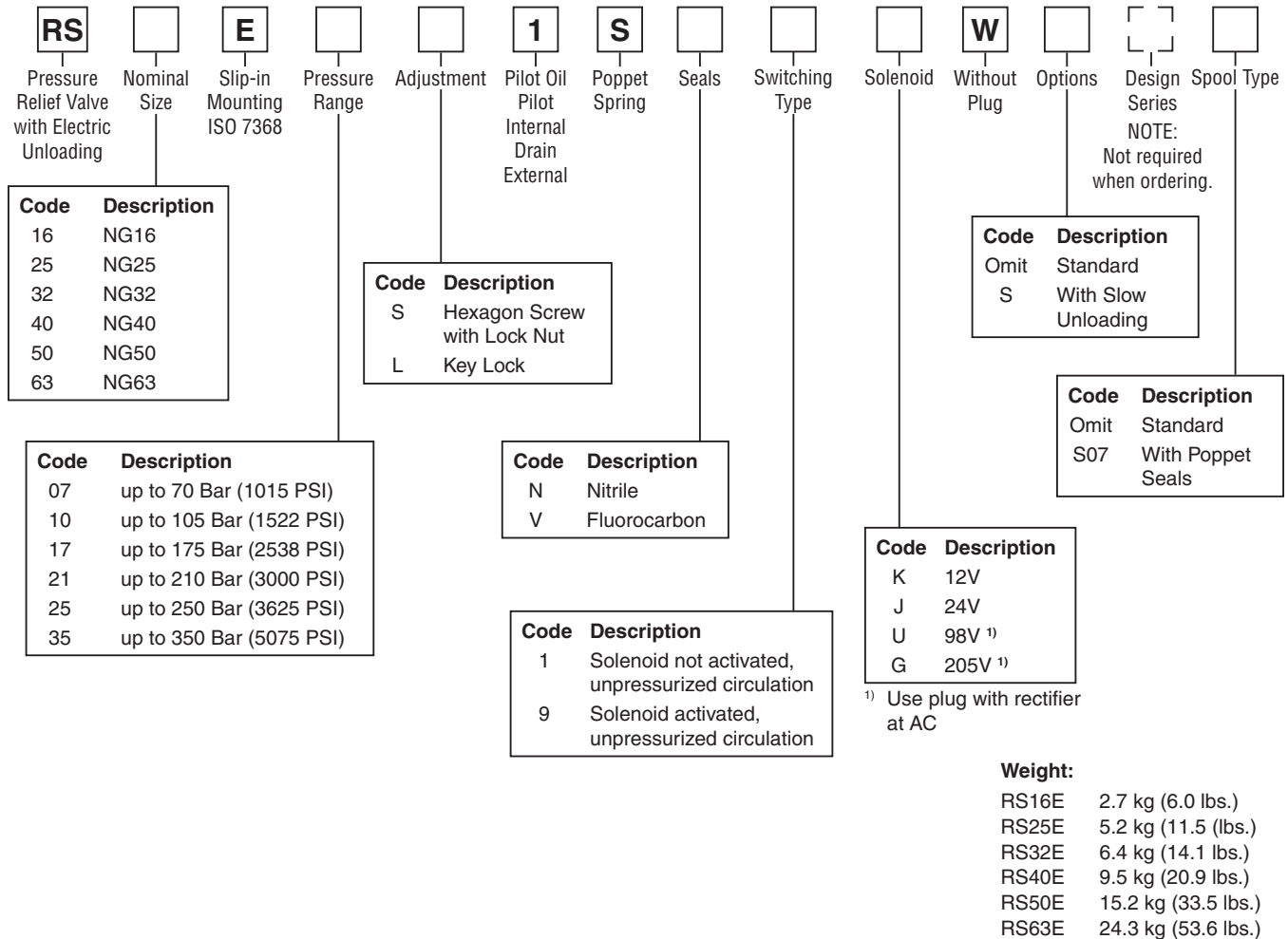
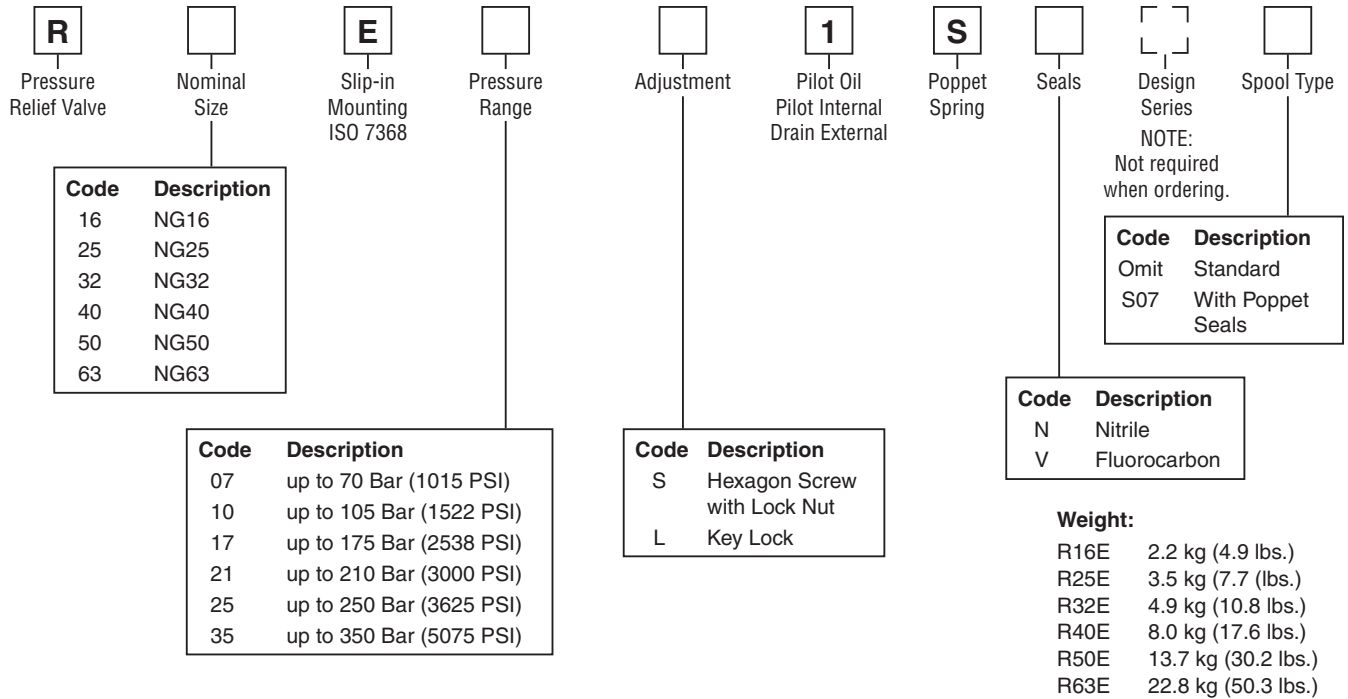
RS*E (simplified symbol)

R*E



RS*E





¹⁾ Use plug with rectifier at AC

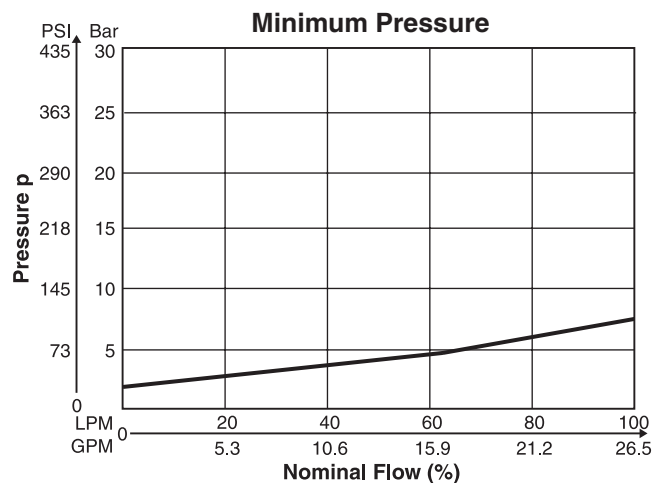
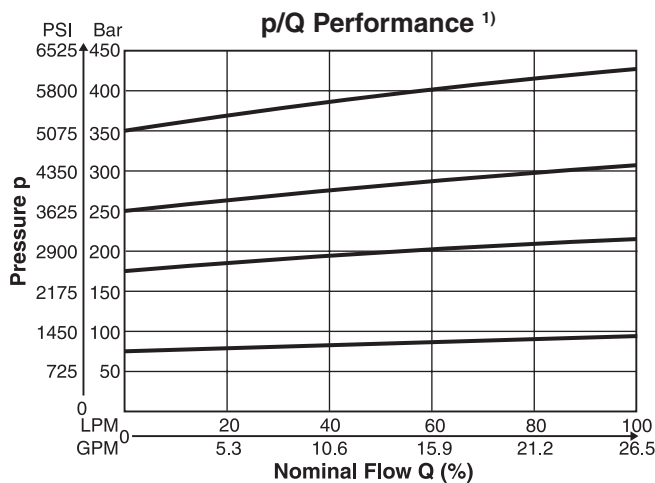
Specifications — R*E, RS*E

General						
Size	NG16	NG25	NG32	NG40	NG50	NG63
Interface	Slip-in mounting according to ISO 7368					
Mounting Position	As desired, horizontal mounting preferred					
Ambient Temperature	-20°C to +80°C (-4°F to +176°F)					
Hydraulic						
Maximum Operating Pressure	Ports A and X up to 350 Bar (5075 PSI), Ports B and Y depressurized					
Pressure Range	70, 175, 250, 350 Bar (1015, 2538, 3625, 5075 PSI)					
Nominal Flow	220 LPM (58 GPM)	500 LPM (132 GPM)	950 LPM (251 GPM)	1400 LPM (370 GPM)	2300 LPM (609 GPM)	4000 LPM (1058 GPM)
Fluid	Hydraulic oil according to DIN 51524 ... 525					
Viscosity Recommended	30 to 50 cSt (mm ² s)					
Viscosity Permitted	20 to 380 cSt (mm ² s)					
Fluid Temperature	-20°C to +70°C (-4°F to +158°F)					
Filtration	ISO 4406 (1999); 18/16/13 (meet NAS 1638:7)					

Specifications — RS*E

Electrical (Solenoid)					
Duty Ratio	100% ED; CAUTION: coil temperature up to 180°C (356°F) possible				
Maximum Switching Frequency	16000 switchings per hour				
Protection Class	IP65 in accordance with EN 60529 (plugged and mounted)				
Direct Current	Code	K	J	U	G
Supply Voltage		12 VDC	24 VDC	98 VDC	205 VDC
Power		31 W	31 W	31 W	31 W
Current		2.5 amps	1.25 amps	0.31 amps	0.15 amps
Solenoid Connection	Connector as per EN 175301-803				
Wiring Minimum	3 x 1.5 mm ² recommended				
Wiring Length Maximum	50m (164 ft.) recommended				

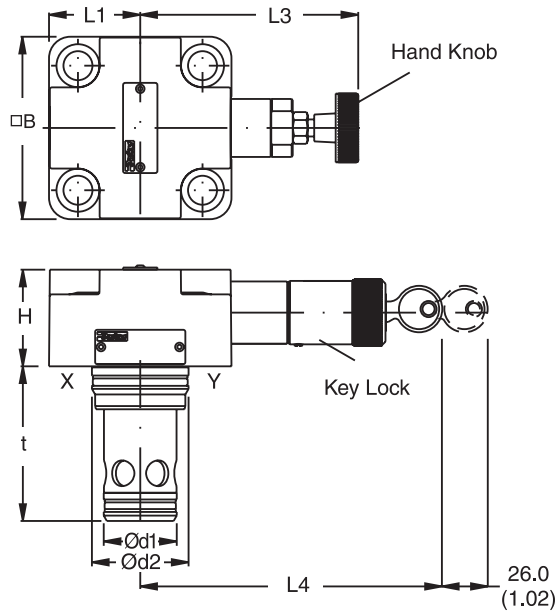
Performance Curves



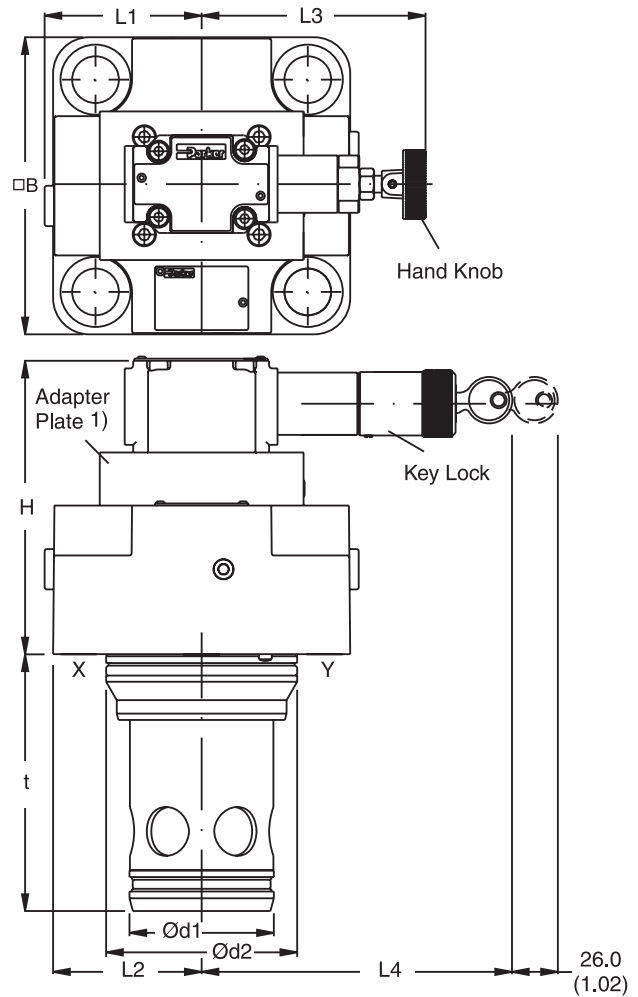
¹⁾ The performance curves are measured with external drain.
 For internal drain the tank pressure has to be added to curve.

Inch equivalents for millimeter dimensions are shown in (**)

NG16 - NG32



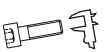


NG40 - NG63 ¹⁾



Size	H	B	L1	L2	L3	L4	d1	d2	t
NG16	40.0 (1.57)	65.0 ²⁾ (2.56)	32.5 (1.28)	—	114.0 (4.49)	125.5 (4.94)	32.0 (1.26)	25.0 (0.98)	56.0 (2.20)
NG25	47.0 (1.85)	85.0 (3.35)	42.5 (1.67)	—	102.0 (4.02)	114.0 (4.49)	45.0 (1.77)	34.0 (1.34)	71.0 (2.80)
NG32	50.0 (1.97)	102.0 (4.02)	51.0 (2.01)	—	95.0 (3.74)	106.0 (4.17)	60.0 (2.36)	45.0 (1.77)	85.0 (3.35)
NG40 ¹⁾	106.0 (4.17)	125.0 (4.92)	62.5 (2.46)	66.5 (2.62)	106.0 (4.17)	144.0 (5.67)	75.0 (2.95)	55.0 (2.17)	105.0 (4.13)
NG50	141.0 (5.55)	140.0 (5.51)	70.0 (2.76)	74.0 (2.91)	106.0 (4.17)	144.0 (5.67)	90.0 (3.54)	68.0 (2.68)	121.0 (4.76)
NG63	155.0 (6.10)	180.0 (7.09)	90.0 (3.54)	94.0 (3.70)	106.0 (4.17)	144.0 (5.67)	120.0 (4.72)	90.0 (3.54)	155.0 (6.10)

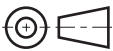
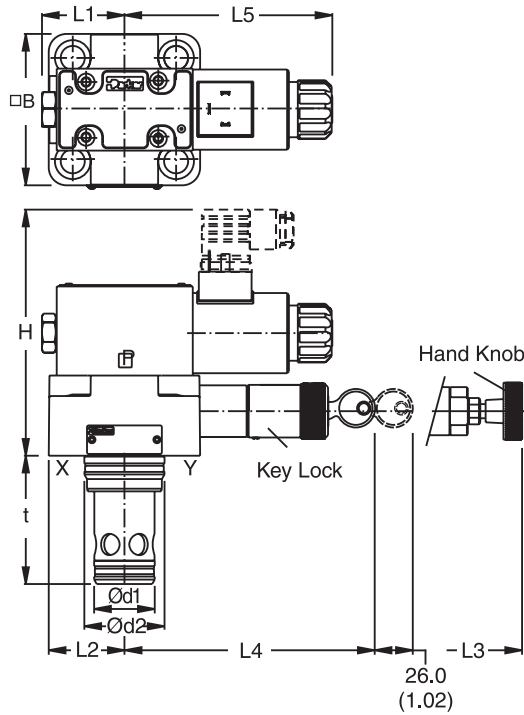
¹⁾ NG40 without adapter plate

²⁾ Width 79mm (3.11 in.)

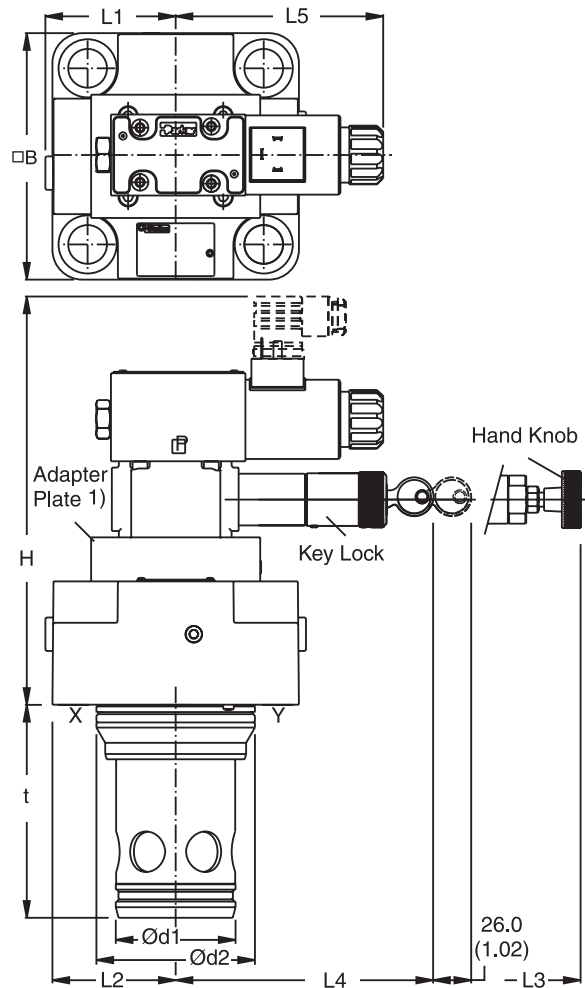
NG	Bolt Kit	 DIN912 12.9		 Kit	
				Nitrile	Fluorocarbon
16	BK414 (BK84)	4 x M8x40	33 Nm (24.3 lb.-ft.)	SK-R16E25	SK-R16EV25
25	BK391 (BK77)	4 x M12x50	115 Nm (84.8 lb.-ft.)	SK-R25E25	SK-R25EV25
32	BK415 (BK85)	4 x M16x55	281 Nm (207.2 lb.-ft.)	SK-R32E25	SK-R32EV25
40	BK416 (BK86)	4 x M20x70	553 Nm (407.8 lb.-ft.)	SK-R40E25	SK-R40EV25
50	BK417 (BK87)	4 x M20x75	553 Nm (407.8 lb.-ft.)	SK-R50E25	SK-R50EV25
63	BK418 (BK88)	4 x M30x100	1910 Nm (1408.6 lb.-ft.)	SK-R63E25	SK-R63EV25

Inch equivalents for millimeter dimensions are shown in (**)

NG16 - NG32






NG40 - NG63 ¹⁾



Size	H	B	L1	L2	L3	L4	L5	d1	d2	t
NG16	133.0 (5.24)	65.0 ²⁾ (2.56)	32.5 (1.28)	-	114.0 (4.49)	125.5 (4.94)	117.0 (4.61)	32.0 (1.26)	25.0 (0.98)	56.0 (2.20)
NG25	137.0 (5.39)	85.0 (3.35)	42.5 (1.67)	-	102.0 (4.02)	114.0 (4.49)	117.0 (4.61)	45.0 (1.77)	34.0 (1.34)	71.0 (2.80)
NG32	143.0 (5.63)	102.0 (4.02)	51.0 (2.01)	-	95.0 (3.74)	106.0 (4.17)	117.0 (4.61)	60.0 (2.36)	45.0 (1.77)	85.0 (3.35)
NG40 ¹⁾	196.0 (7.72)	125.0 (4.92)	62.5 (2.46)	66.5 (2.62)	106.0 (4.17)	144.0 (5.67)	117.0 (4.61)	75.0 (2.95)	55.0 (2.17)	105.0 (4.13)
NG50	231.0 (9.09)	140.0 (5.51)	70.0 (2.76)	74.0 (2.91)	106.0 (4.17)	144.0 (5.67)	117.0 (4.61)	90.0 (3.54)	68.0 (2.68)	121.0 (4.76)
NG63	246.0 (9.69)	180.0 (7.09)	90.0 (3.54)	94.0 (3.70)	106.0 (4.17)	144.0 (5.67)	117.0 (4.61)	120.0 (4.72)	90.0 (3.54)	155.0 (6.10)

¹⁾ NG40 without adapter plate

²⁾ Width 79mm (3.11 in.)

NG	Bolt Kit	 DIN912 12.9		 Kit	
				Nitrile	Fluorocarbon
16	BK414 (BK84)	4 x M8x40	33 Nm (24.3 lb.-ft.)	SK-RS16E25	SK-RS16EV25
25	BK391 (BK77)	4 x M12x50	115 Nm (84.8 lb.-ft.)	SK-RS25E25	SK-RS25EV25
32	BK415 (BK85)	4 x M16x55	281 Nm (207.2 lb.-ft.)	SK-RS32E25	SK-RS32EV25
40	BK416 (BK86)	4 x M20x70	553 Nm (407.8 lb.-ft.)	SK-RS40E25	SK-Rs40EV25
50	BK417 (BK87)	4 x M20x75	553 Nm (407.8 lb.-ft.)	SK-RS50E25	SK-RS50EV25
63	BK418 (BK88)	4 x M30x100	1910 Nm (1408.6 lb.-ft.)	SK-RS63E25	SK-RS63EV25

General Description

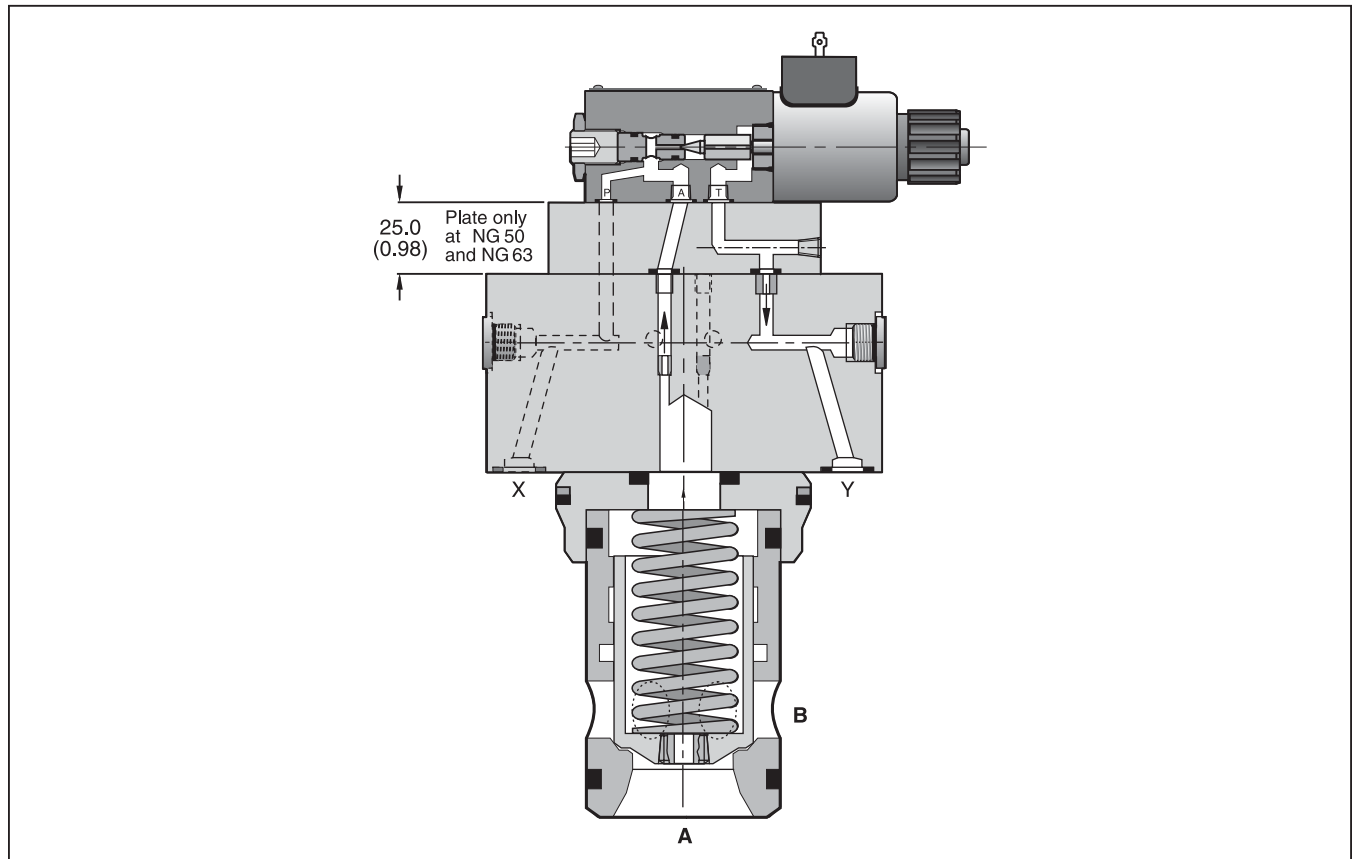
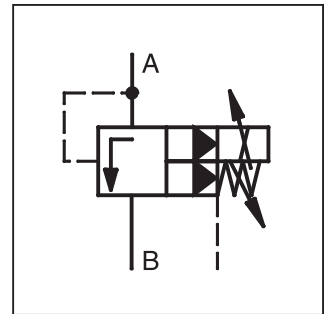
Series RE*E*W proportional pressure relief valves consist of a proportional pilot stage and a slip-in cartridge main stage. A mechanical maximum pressure stage is optionally available. For sizes NG25 and NG32 a screw-in cartridge is used; for sizes NG40, NG50 and NG63 an additional sandwich unit is used.

The RE*W model code embraces the pilot valves, covers and cartridges that are also offered as separate items. See combination examples for details.

In combination with the digital power amplifier PCD00A-400 the valve parameters can be saved, changed and duplicated.

Features

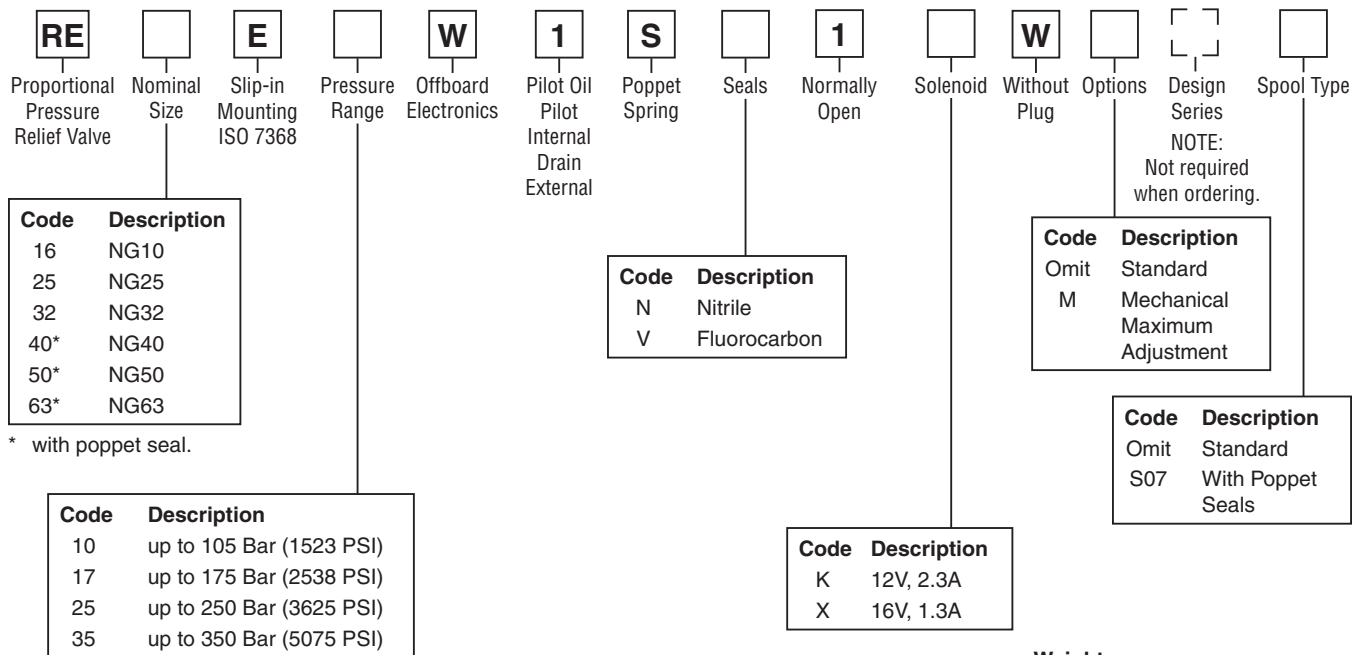
- Pilot operated with proportional solenoid.
- Continuous adjustment by proportional solenoid.
- Optional mechanical maximum pressure stage.
- Cavity and mounting pattern according to ISO 7368.
- 4 pressure ranges.
- 6 sizes, NG16 to NG63.



Specifications

General						
Size	NG16	NG25	NG32	NG40	NG50	NG63
Interface	Slip-in mounting according to ISO 7368					
Mounting Position	As desired, horizontal mounting preferred					
Ambient Temperature	-20 to +80°C (-4 to +176°F)					
Hydraulic						
Maximum Operating Pressure	Ports A and X: 350 Bar (5075 PSI), Ports B and Y: depressurized					
Pressure Range	105, 175, 250, 350 Bar (1523, 2538, 3625, 5075 PSI)					
Nominal Flow	220 LPM (58 GPM)	500 LPM (132 GPM)	950 LPM (251 GPM)	1400 LPM (370 GPM)	2300 LPM (609 GPM)	4000 LPM (1058 GPM)
Fluid	Hydraulic oil according to DIN 51524 ... 525					
Viscosity Recommended	30 to 50 cSt (mm ² /s)					
Viscosity Permitted	20 to 380 cSt (mm ² /s)					
Fluid Temperature	-20 to +70°C (-4 to +158°F)					
Filtration	ISO 4406 (1999); 18/16/13 (meet NAS 1638:7)					
Electrical (Proportional Solenoid)						
Duty Ratio	100% ED					
Protection Class	IP65 in accordance with EN 60529 (plugged and mounted)					
Nominal Voltage	12 VDC (maximum current 2.3 amps), 16 VDC (maximum current 1.3 amps)					
Coil Resistance	4 Ohm at 20°C (68°F)					
Solenoid Connection	Connector as per EN 175301-803					
Power Amplifier Recommended	PCD00A-400					

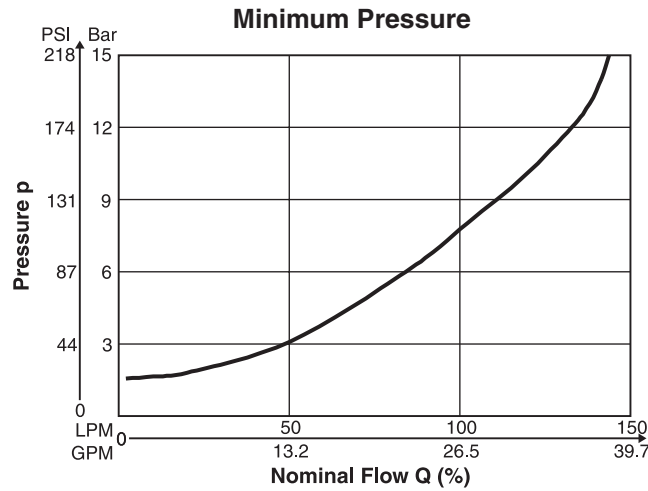
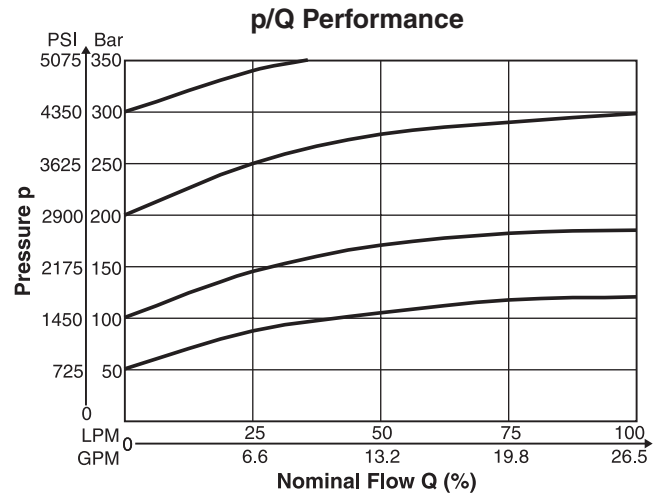
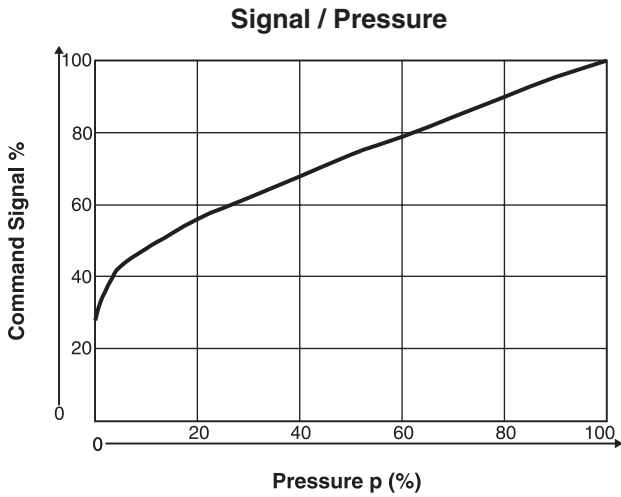
Ordering Information



Weight:

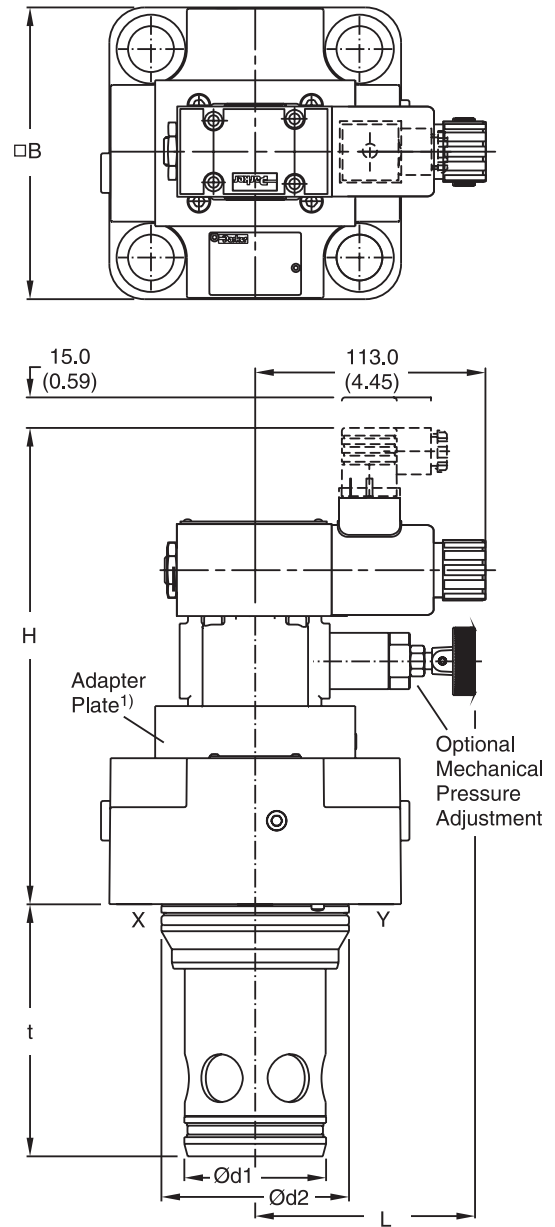
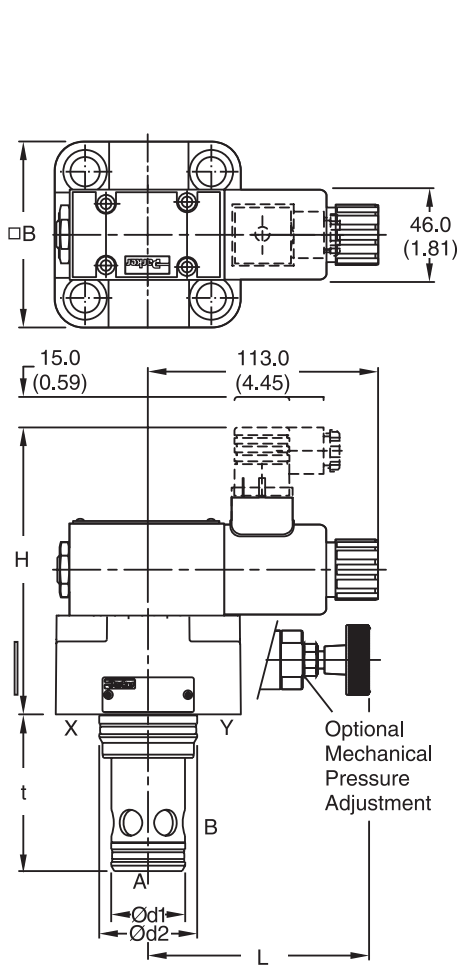
- RE16E*W 2.7 kg (6.0 lbs.)
- RE25E*W 5.2 kg (11.5 lbs.)
- RE32E*W 6.4 kg (14.1 lbs.)
- RE40E*W 9.5 kg (20.9 lbs.)
- RE50E*W 15.2 kg (33.5 lbs.)
- RE63E*W 24.3 kg (53.6 lbs.)

The performance curves are measured with external drain. For internal drain the tank pressure has to be added to curve.



NG16 - NG32

NG40 - NG63



¹⁾ NG40 without Adapter Plate






Dimensions

Inch equivalents for millimeter dimensions are shown in (**)

Size	H	B	d1	d2	t
NG16	135.0 (5.31)	79.0 ¹⁾ (3.11)	32.0 (1.26)	25.0 (0.98)	56.0 (2.20)
NG25	140.0 (5.51)	85.0 (33.5)	45.0 (1.77)	34.0 (1.34)	72.0 (2.83)
NG32	145.0 (5.71)	102.0 (4.02)	60.0 (2.36)	45.0 (1.77)	85.0 (3.35)
NG40	137.0 (5.39) ²⁾ 179.0 (7.05) ²⁾	125.0 (4.92)	75.0 (2.95)	55.0 (2.17)	105.0 (4.13)
NG50	172.0 (6.77) ²⁾ 214.0 (8.43) ²⁾	140.0 (5.51)	90.0 (3.54)	68.0 (2.68)	122.0 (4.80)
NG63	187.0 (7.36) ²⁾ 229.0 (9.02) ²⁾	180.0 (7.09)	120.0 (4.72)	90.0 (3.54)	155.0 (6.10)

¹⁾ Width 65mm (2.56 in.)

²⁾ With mechanical maximum adjustment

NG	Bolt Kit - 		Kit 	
			Nitrile	Fluorcarbon
16	BK414 (BK84)	33 Nm (24.3 lb.-ft.)	SK-RE16E	SK-RE16EV
25	BK391 (BK77)	115 Nm (84.8 lb.-ft.)	SK-RE25E	SK-RE25EV
32	BK415 (BK85)	281 Nm (207.2 lb.-ft.)	SK-RE32E	SK-RE32EV
40	BK416 (BK86)	553 Nm (407.8 lb.-ft.)	SK-RE40E	SK-RE40EV
50	BK417 (BK87)	553 Nm (407.8 lb.-ft.)	SK-RE50E	SK-RE50EV
63	BK418 (BK88)	1910 Nm (1408.6 lb.-ft.)	SK-RE63E	SK-RE63EV

General Description

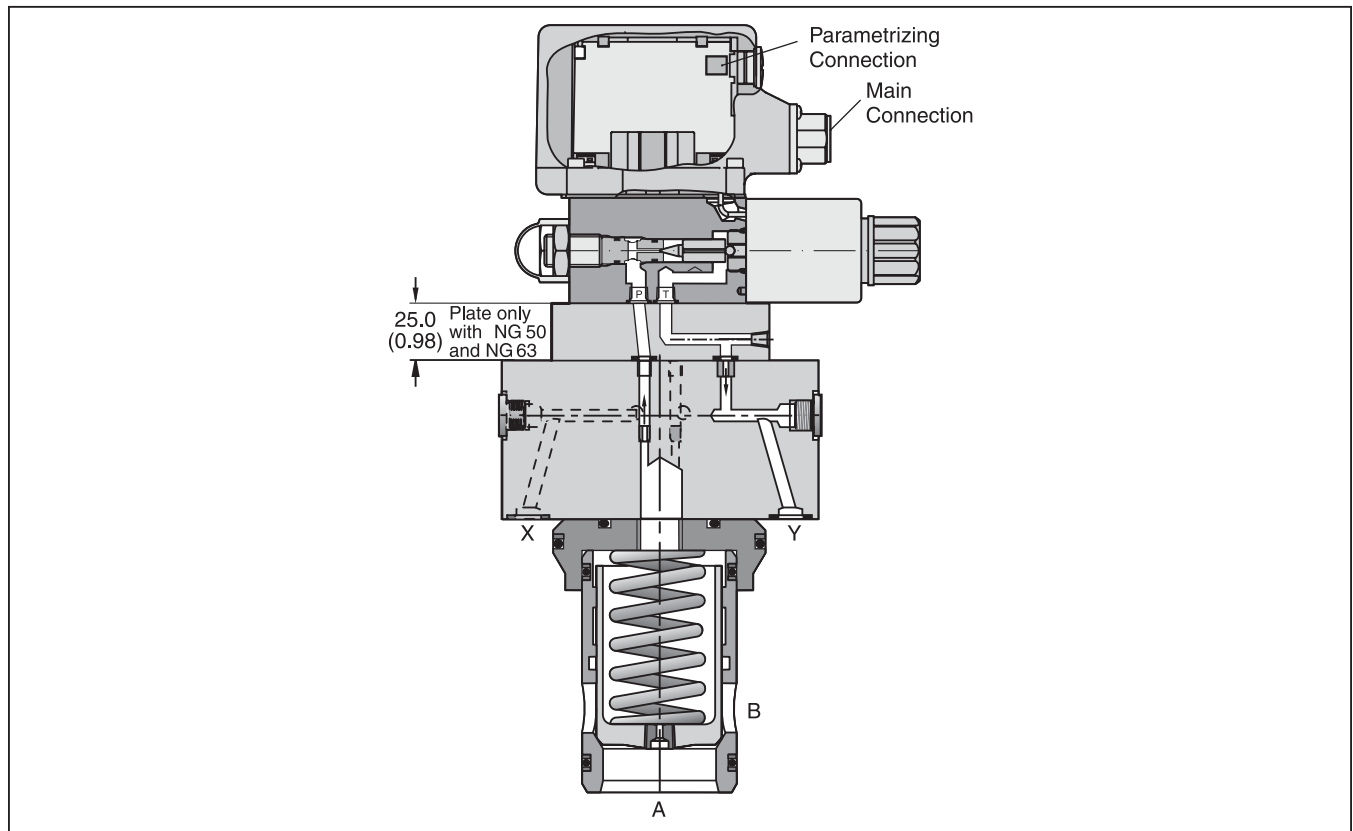
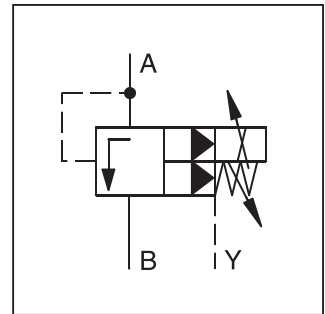
Series RE*E*T proportional pressure relief valves consist of a proportional pilot stage with onboard electronics and a slip-in cartridge main stage. A mechanical maximum pressure stage is optionally available. For sizes NG25 and NG32 a screw-in cartridge is used; for sizes NG40, NG50 and NG63 an additional sandwich unit is used.

The valve comes factory set with linearized characteristics.

The RE*T model code embraces the pilot valves, covers and cartridges that are also offered as separate items. The pilot valve with onboard electronics (RE06M*T) is not shown in the combination examples

Features

- Pilot operated with proportional solenoid.
- Onboard electronics.
- Optional mechanical maximum pressure stage.
- Factory setting.
- Ramp time adjustment.
- Linearized characteristics.
- 4 pressure ranges.
- Cavity and mounting pattern according to ISO 7368.
- 6 sizes, NG16 to NG63.



Specifications

General						
Size	NG16	NG25	NG32	NG40	NG50	NG63
Interface	Slip-in mounting according to ISO 7368					
Mounting Position	As desired, horizontal mounting preferred					
Ambient Temperature	-20 to +80°C (-4 to +176°F)					
Hydraulic						
Maximum Operating Pressure	Ports A and X: 350 Bar (5075 PSI), ports B and Y: depressurized					
Pressure Range	105, 175, 250, 350 Bar (1523, 2538, 3625, 5075 PSI)					
Nominal Flow	220 LPM (58 GPM)	500 LPM (132 GPM)	950 LPM (251 GPM)	1400 LPM (370 GPM)	2300 LPM (609 GPM)	4000 LPM (1058 GPM)
Fluid	Hydraulic oil according to DIN 51524 ... 525					
Viscosity Recommended	30 to 50 cSt (mm ² /s)					
Viscosity Permitted	20 to 380 cSt (mm ² /s)					
Fluid Temperature	-20 to +70°C (-4 to +158°F)					
Filtration	ISO 4406 (1999); 18/16/13 (meet NAS 1638:7)					
Electrical (Proportional Solenoid)						
Duty Ratio	100% ED					
Protection Class	IP65 in accordance with EN 60529 (plugged and mounted)					
Supply Voltage	14.5 VDC to 30 VDC					
Ripple in Supply Voltage	5% maximum					
Current Consumption	2.8 amps maximum					
Input Range	Voltage Input	0 to +10V maximum / 10k Ohm				
	Current Input	4 to +20mA / 500 Ohm				
Adjustment Range of Ramp Time	0 to 5s					
Installation Cross-section	1 mm ² minimum, shielded					
Cable Length	50 m (164 ft.) maximum					
Electrical Connection	No. 5004072; 6 pole + PE / Connector as per EN 175201-804 / cable - 8 to 10 mm					

Ordering Information

RE		E		T	1	S		1		0			
Proportional Pressure Relief Valve w/Electric Unloading	Nominal Size	Slip-in Mounting ISO 7368	Pressure Range	Offboard Electronics	Pilot Oil Pilot Internal Drain External	Poppet Spring	Seals	Normally Open	Command Signal	Electrical Attachments	Options	Design Series NOTE: Not required when ordering.	Spool Type

Code	Description
16	NG16
25	NG25
32	NG32
40	NG40
50	NG50
63	NG63

Code	Description
10	up to 105 Bar (1523 PSI)
17	up to 175 Bar (2538 PSI)
25	up to 250 Bar (3625 PSI)
35	up to 350 Bar (5075 PSI)

Code	Description
N	Nitrile
V	Fluorocarbon

Code	Description
F	Voltage input 0 to +10V with ref. output +10V
R	Current input 4 to 20mA

Code	Description
Omit	Standard
M	Mechanical Maximum Adjustment

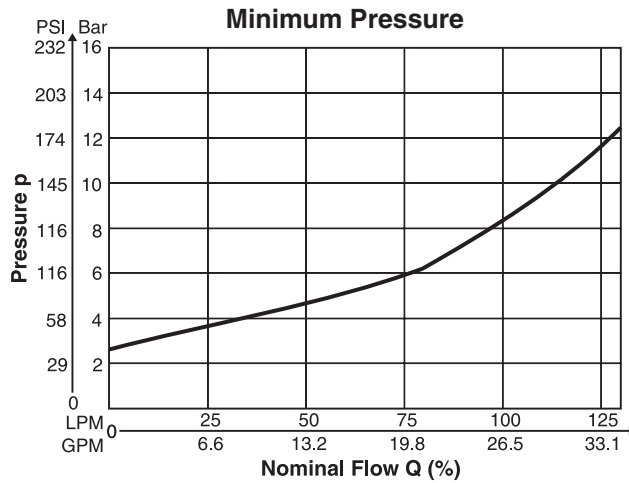
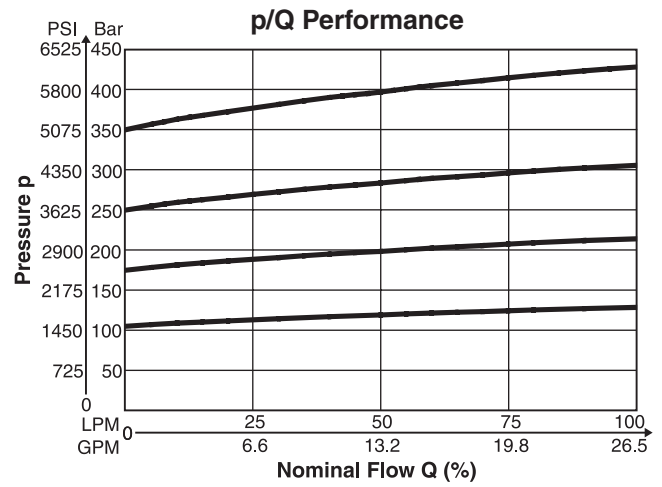
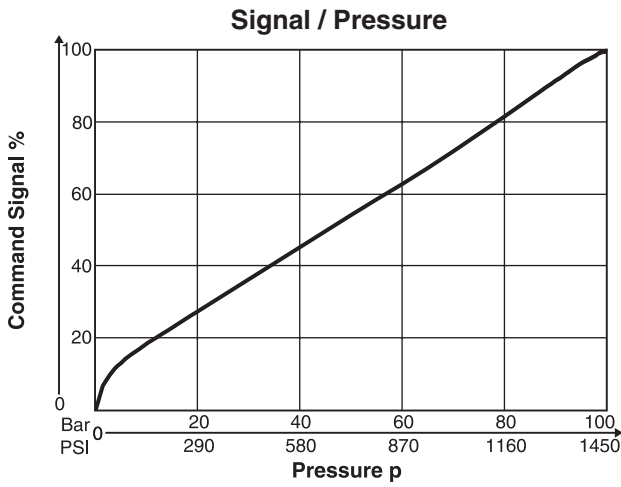
Code	Description
Omit	Standard
S07 ¹⁾	With Poppet Seals

¹⁾ Not for NG16

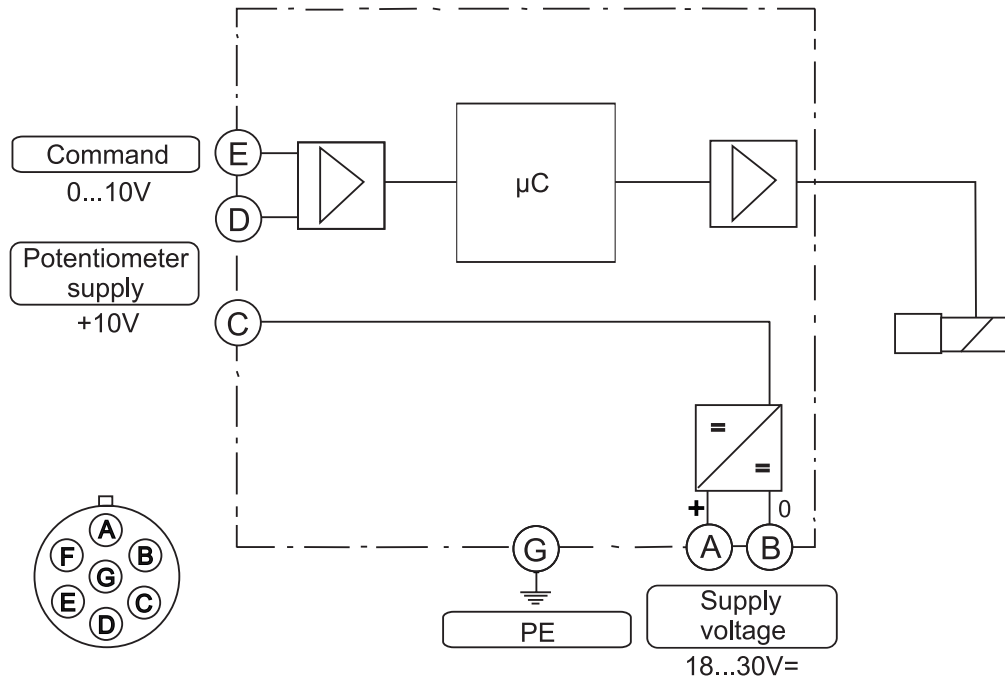
Weight:

RE16E*T	2.7 kg (6.0 lbs.)	RE40E*T	9.5 kg (20.9 lbs.)
RE25E*T	5.2 kg (11.5 lbs.)	RE50E*T	15.2 kg (33.5 lbs.)
RE32E*T	6.4 kg (14.1 lbs.)	RE63E*T	24.3 kg (53.6 lbs.)

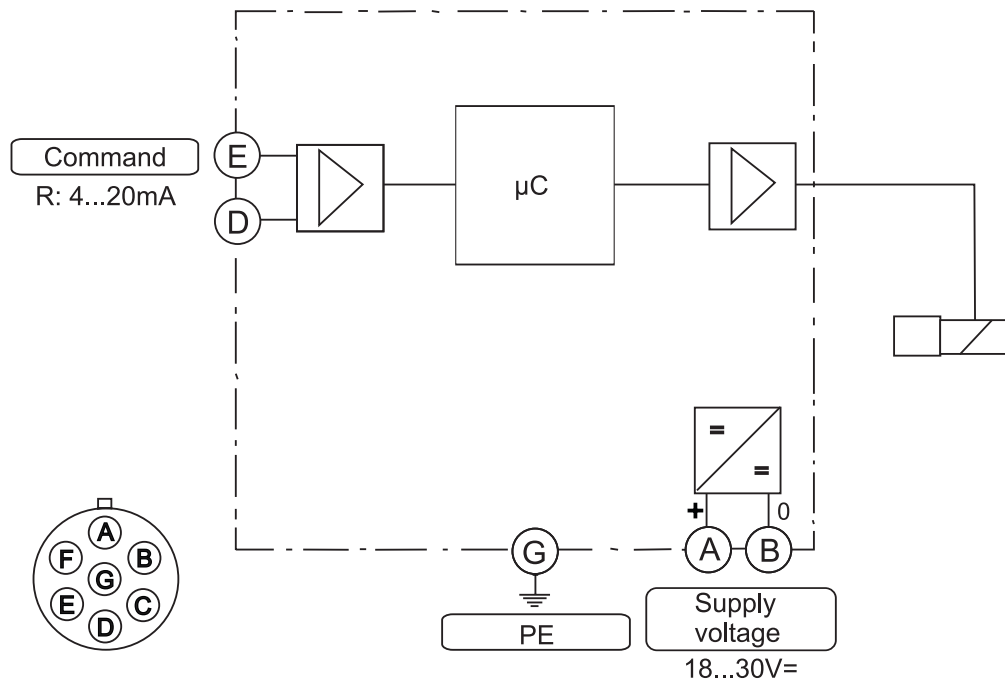
The performance curves are measured with external drain. For internal drain the tank pressure has to be added to curve.



Code F
6 + PE acc. EN 175201-804



Code R
6 + PE acc. EN 175201-804



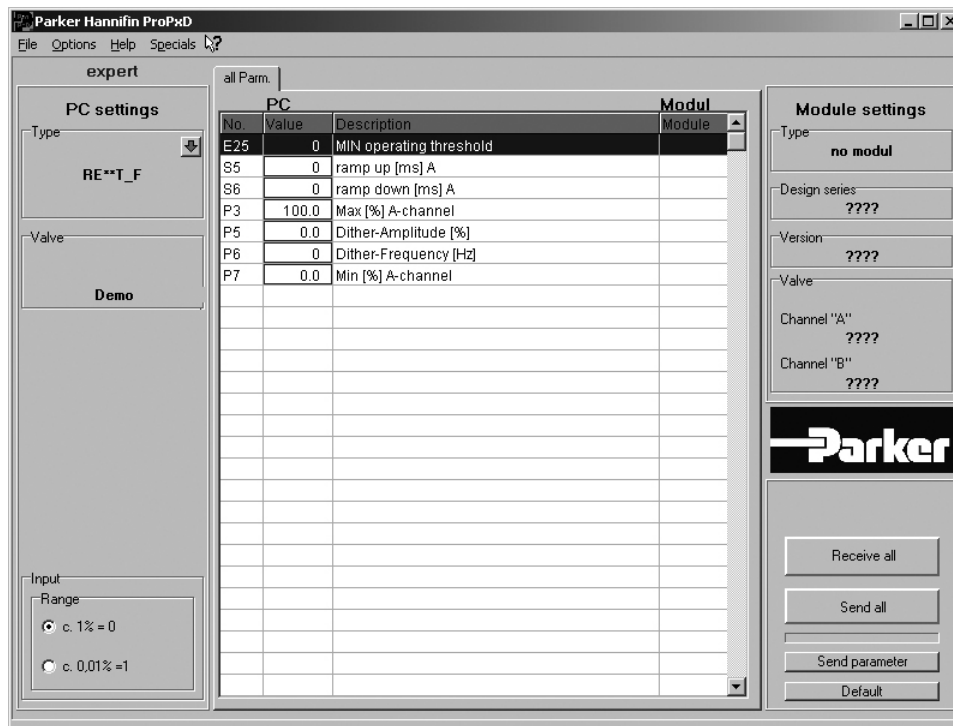
ProPxD Interface Program

The ProPxD software permits comfortable parameter setting for the electronic modules Series PCD, PWD, PZD, PID and PWDXX.

Via the clearly arranged entry mask the parameters can be displayed and modified. Storage of complete parameter sets is possible as well as printout or record as a text file for further documentation. Stored parameter sets may be loaded anytime and transmitted to the electronic module in the same manner as the basic parameters which are available for all usable valve series. Inside the electronics a nonvolatile memory stores the data with the option for recalling or modification.

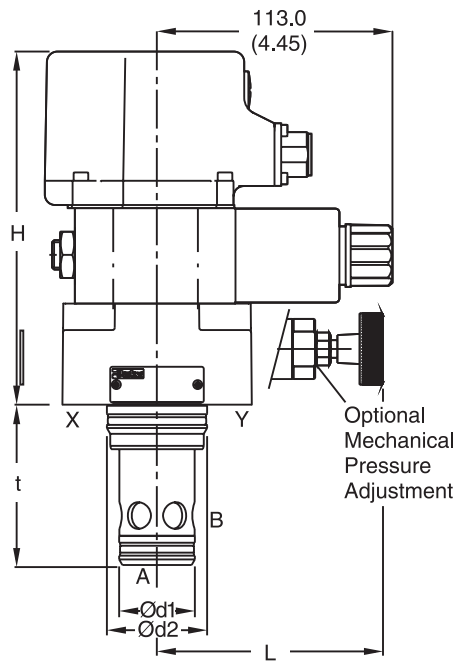
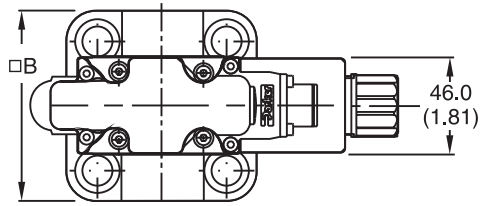
Features

- Simple editing of all parameters.
- Depiction and documentation of parameter sets.
- Storage and loading of optimized parameter adjustments.
- Executable with all Windows® operating systems from Windows® 95 upwards.
- Communication between PC and electronic via serial interface RS-232C and null modem cable.
- Simple to use PC user software, free of charge: www.parker.com/euro_hcd
 – see “Software Downloads”

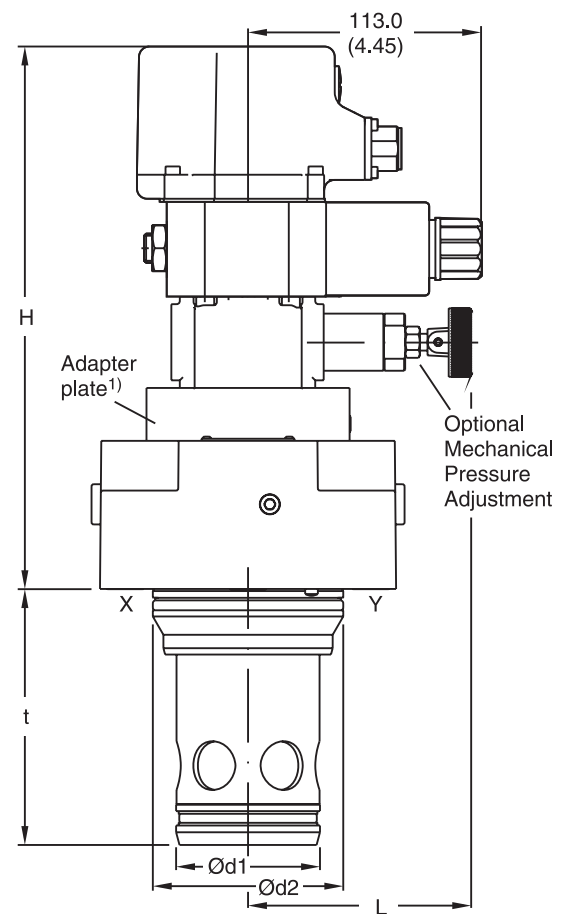
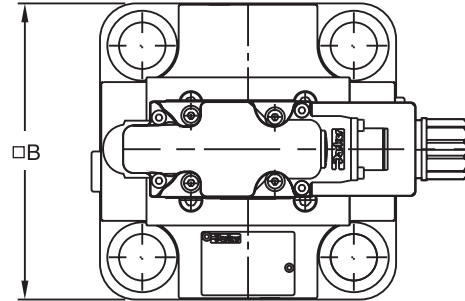


The parametrizing cable may be ordered under item no. 40982923.

NG16 - NG32



NG40 - NG63



1) NG40 without Adapter Plate



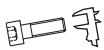


Dimensions

Inch equivalents for millimeter dimensions are shown in (**)

Size	H	B	d1	d2	t
NG16	177.0 (6.97)	79.0 ¹⁾ (3.11)	32.0 (1.26)	25.0 (0.98)	56.0 (2.20)
NG25	122.0 (4.80)	85.0 (33.5)	45.0 (1.77)	34.0 (1.34)	72.0 (2.83)
NG32	127.0 (5.00)	102.0 (4.02)	60.0 (2.36)	45.0 (1.77)	85.0 (3.35)
NG40	137.0 (5.39) ²⁾ 179.0 (7.05) ²⁾	125.0 (4.92)	75.0 (2.95)	55.0 (2.17)	105.0 (4.13)
NG50	172.0 (6.77) ²⁾ 214.0 (8.43) ²⁾	140.0 (5.51)	90.0 (3.54)	68.0 (2.68)	122.0 (4.80)
NG63	187.0 (7.36) ²⁾ 229.0 (9.02) ²⁾	180.0 (7.09)	120.0 (4.72)	90.0 (3.54)	155.0 (6.10)

¹⁾ Width 65mm (2.56 in.)

²⁾ With mechanical maximum adjustment

NG	Bolt Kit - 		Kit 	
			Nitrile	Fluorocarbon
16	BK414 (BK84)	33 Nm (24.3 lb.-ft.)	SK-RE16E	SK-RE16EV
25	BK391 (BK77)	115 Nm (84.8 lb.-ft.)	SK-RE25E	SK-RE25EV
32	BK415 (B K85)	281 Nm (207.2 lb.-ft.)	SK-RE32E	SK-RE32EV
40	BK416 (BK86)	553 Nm (407.8 lb.-ft.)	SK-RE40E	SK-RE40EV
50	BK417 (BK87)	553 Nm (407.8 lb.-ft.)	SK-RE50E	SK-RE50EV
63	BK418 (BK88)	1910 Nm (1408.6 lb.-ft.)	SK-RE63E	SK-RE63EV

General Description

Series UR*E unloading valves consist of a mechanical pilot stage and a slip-in cartridge main stage. These valves are used to unload a circuit at low pressure. The mechanically adjustable pressure signal to unload the main stage has to be applied to port X. The pressure differential between opening and closing is 15%.

In addition, Series US*E is vented by electrical operation. The UR*E/US*E model codes embrace the pilot valves, covers and cartridges that are also offered as separate items. See combination examples for details.

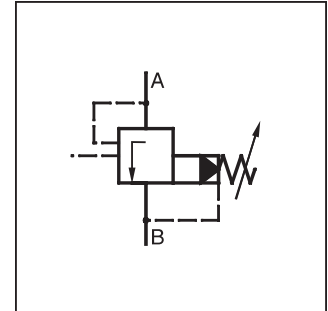
Features

- Pilot operated unloading valve.
- Cavity and mounting pattern according to ISO 7368.
- 4 pressure ranges.
- 2 adjustment modes:
 - Hand knob
 - Key lock
- 6 sizes, NG16 to NG63.

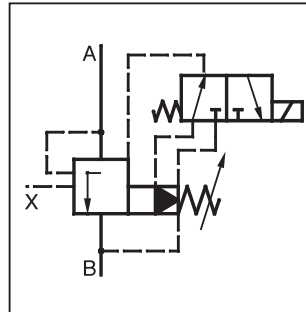
Note: Port X only usable for remote vent function.



US25E

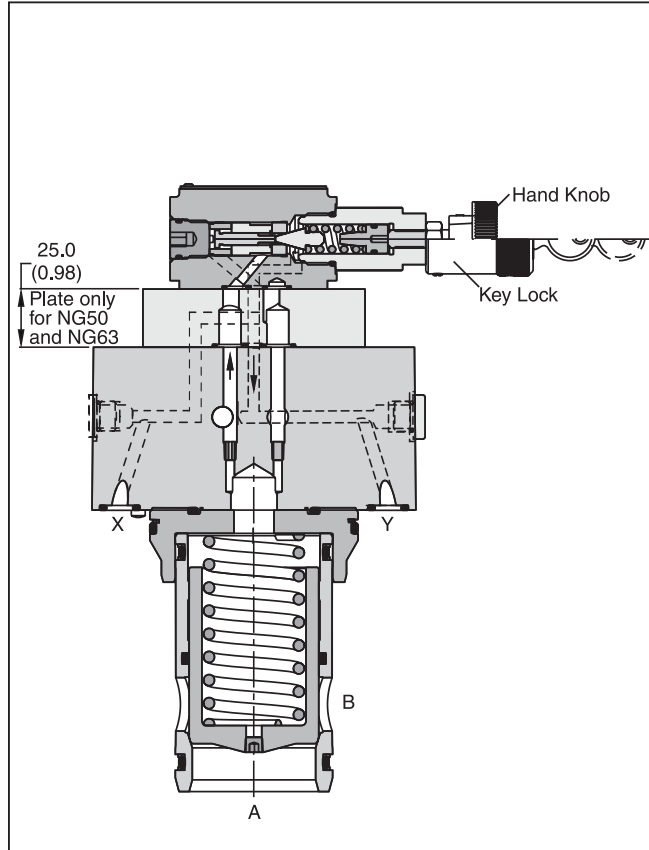


UR*E

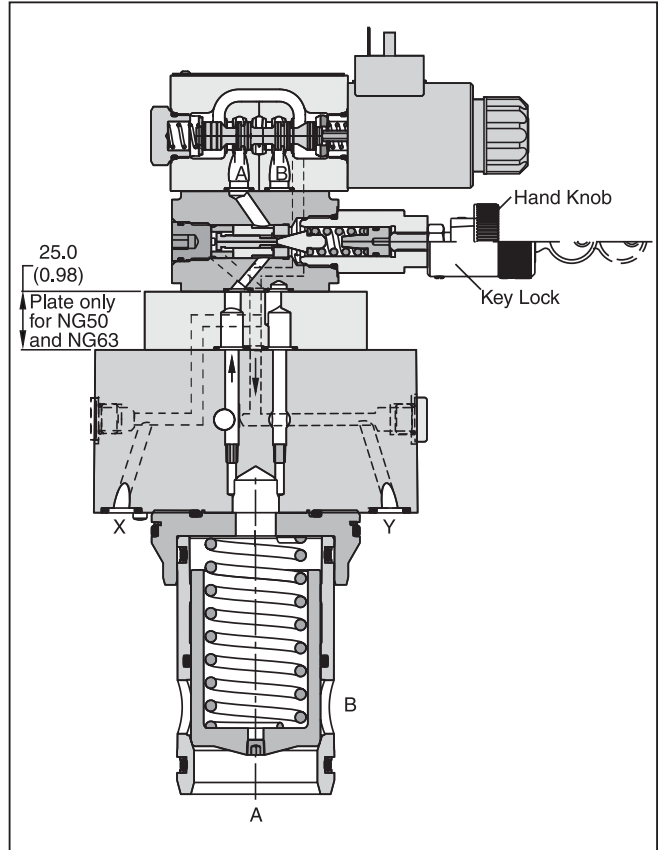


US*E

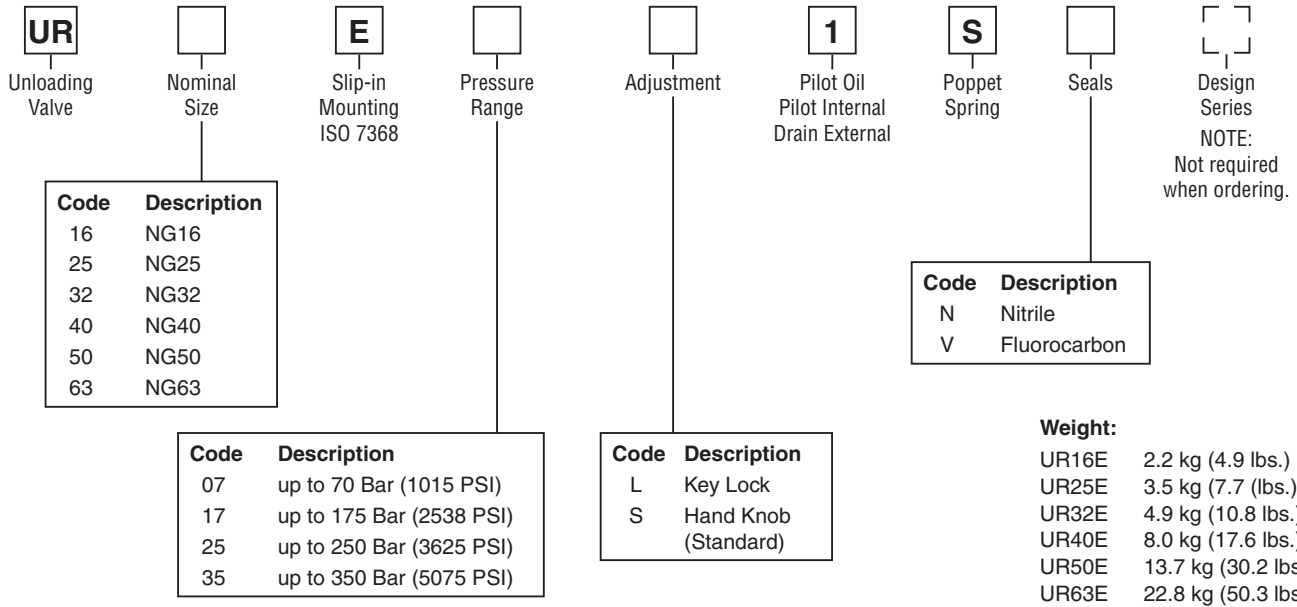
UR*E



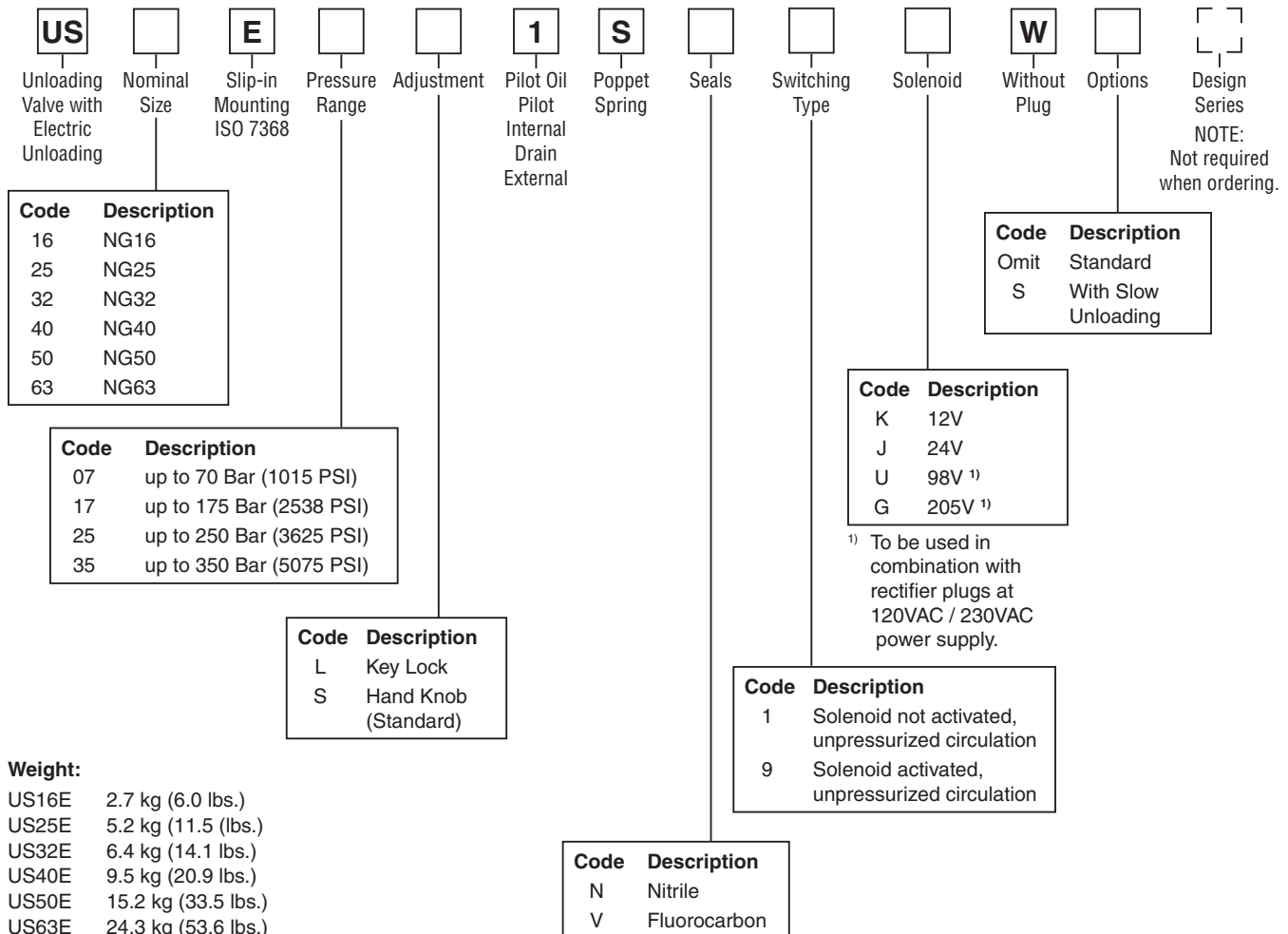
US*E



UR*E



US*E



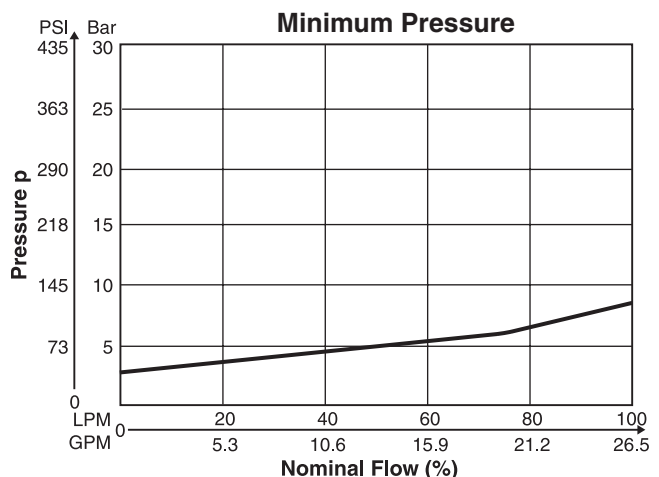
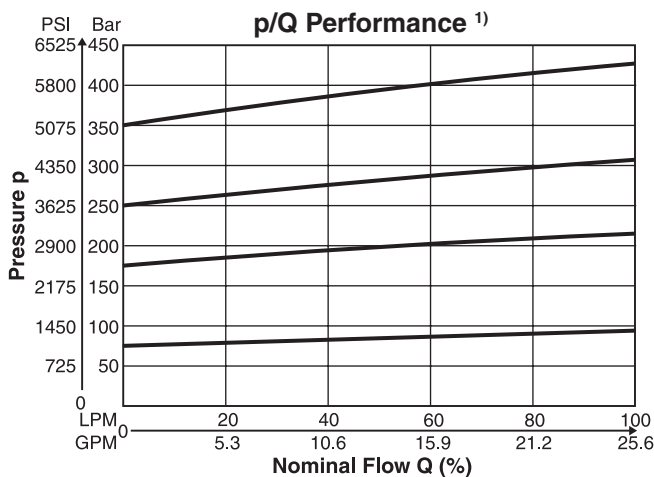
Specifications — UR*E / US*E

General						
Size	NG16	NG25	NG32	NG40	NG50	NG63
Interface	Slip-in mounting according to ISO 7368					
Mounting Position	As desired, horizontal mounting preferred					
Ambient Temperature	-20°C to +80°C (-4°F to +176°F)					
Hydraulic						
Maximum Operating Pressure	Ports A and X: up to 350 Bar (5075 PSI), Ports B and Y: depressurized					
Pressure Range	70, 175, 250, 350 Bar (1015, 2538, 3625, 5075 PSI)					
Pressure Differential	15%					
Nominal Flow	220 LPM (58 GPM)	500 LPM (132 GPM)	950 LPM (251 GPM)	1400 LPM (370 GPM)	2300 LPM (609 GPM)	4000 LPM (1058 GPM)
Fluid	Hydraulic oil according to DIN 51524 ... 525					
Viscosity Recommended	30 to 50 cSt (mm ² /s)					
Viscosity Permitted	20 to 380 cSt (mm ² /s)					
Fluid Temperature	-20°C to +70°C (-4°F to +158°F)					
Filtration	ISO 4406 (1999); 18/16/13 (meet NAS 1638:7)					

Specifications — US*E

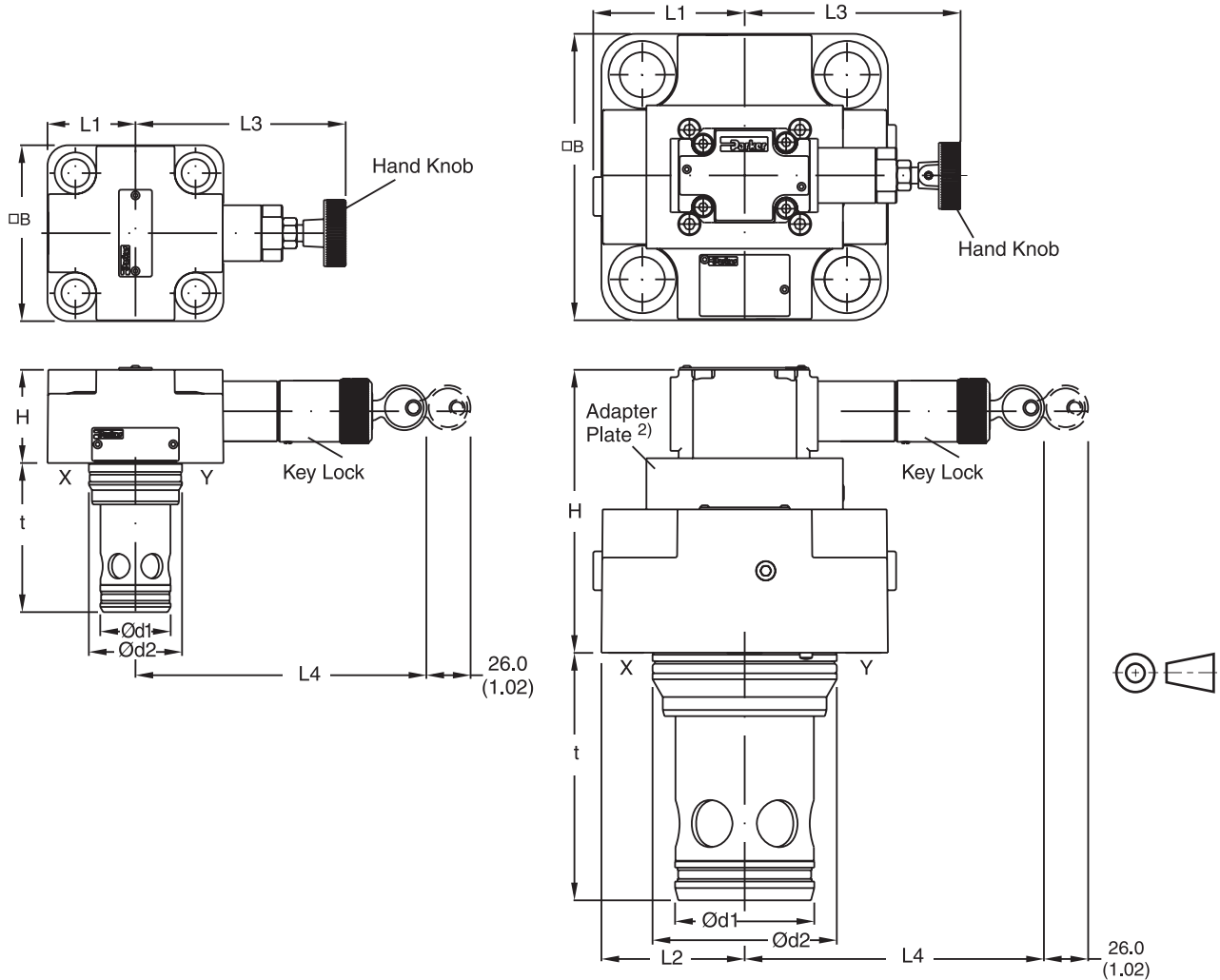
Electrical (Solenoid)					
Duty Ratio	100% ED; CAUTION: coil temperature up to 180°C (356°F) possible				
Maximum Switching Frequency	16000 switchings per hour				
Protection Class	IP65 in accordance with EN 60529 (plugged and mounted)				
Direct Current	Code	K	J	U	G
Supply Voltage		12V	24V	98V	205V
Power		31W	31W	31W	31W
Current		2.5A	1.25A	0.31A	0.15A
Solenoid Connection	Connector as per EN 175301-803				
Wiring	3 x 1.5 mm ² minimum, recommended				
Wiring Length	50m (164 ft.) maximum, recommended				

Performance Curves



¹⁾ The performance curves are measured with external drain.
 For internal drain, the tank pressure has to be added to curve.

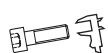


Inch equivalents for millimeter dimensions are shown in (**)



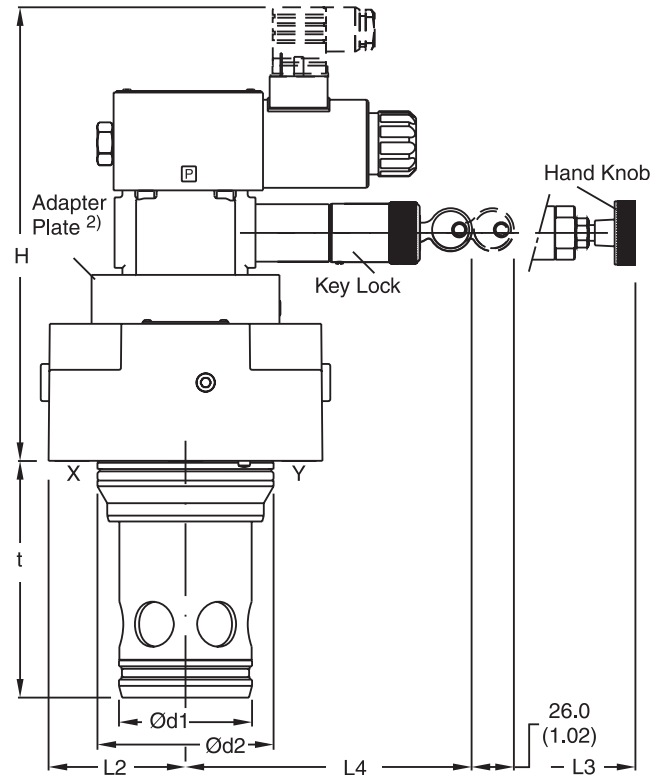
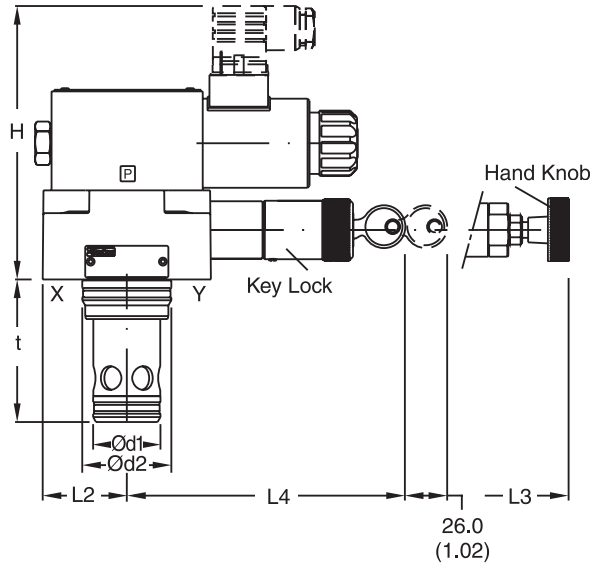
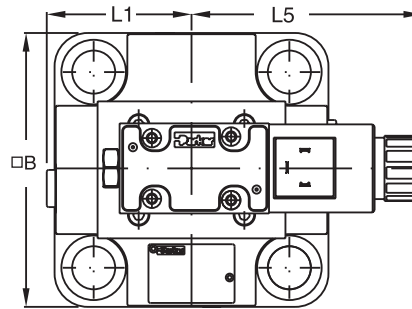
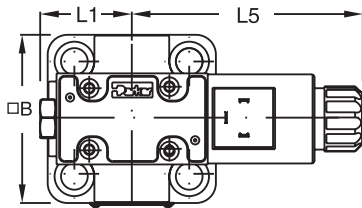
Size	H	B	L1	L2	L3	L4	d1	d2	t
NG16	40.0 (1.57)	65.0 ¹⁾ (2.56)	36.5 (1.44)	32.5 (1.28)	114.0 (4.49)	125.5 (4.94)	32.0 (1.26)	25.0 (0.98)	56.0 (2.20)
NG25	47.0 (1.85)	85.0 (33.5)	46.5 (1.83)	42.5 (1.67)	102.0 (4.02)	114.0 (4.49)	45.0 (1.77)	34.0 (1.34)	71.0 (2.80)
NG32	50.0 (1.97)	102.0 (4.02)	55.0 (2.17)	51.0 (2.01)	95.0 (3.74)	106.0 (4.17)	60.0 (2.36)	45.0 (1.77)	85.0 (3.35)
NG40 ²⁾	106.0 (4.17)	125.0 (4.92)	66.5 (2.62)	62.5 (2.46)	106.0 (4.17)	144.0 (5.67)	75.0 (2.95)	55.0 (2.17)	105.0 (4.13)
NG50	141.0 (5.55)	140.0 (5.51)	74.0 (2.91)	70.0 (2.76)	106.0 (4.17)	144.0 (5.67)	90.0 (3.54)	68.0 (2.68)	121.0 (4.76)
NG63	155.0 (6.10)	180.0 (7.09)	94.0 (3.70)	90.0 (3.54)	106.0 (4.17)	144.0 (5.67)	120.0 (4.72)	90.0 (3.54)	155.0 (6.10)

¹⁾ Width 79mm (3.11 in.)

²⁾ NG40 without adapter plate

NG	Bolt Kit - 		Kit 	
			Nitrile	Fluorocarbon
16	BK414 (BK84)	33 Nm (24.3 lb.-ft.)	SK-R16E25	SK-R16EV25
25	BK391 (BK77)	115 Nm (84.8 lb.-ft.)	SK-R25E25	SK-R25EV25
32	BK415 (BK85)	281 Nm (207.2 lb.-ft.)	SK-R32E25	SK-R32EV25
40	BK416 (BK86)	553 Nm (407.8 lb.-ft.)	SK-R40E25	SK-R40EV25
50	BK417 (BK87)	553 Nm (407.8 lb.-ft.)	SK-R50E25	SK-R50EV25
63	BK418 (BK88)	1910 Nm (1408.6 lb.-ft.)	SK-R63E25	SK-R63EV25




Inch equivalents for millimeter dimensions are shown in (**)



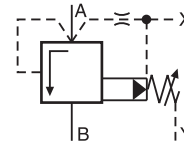
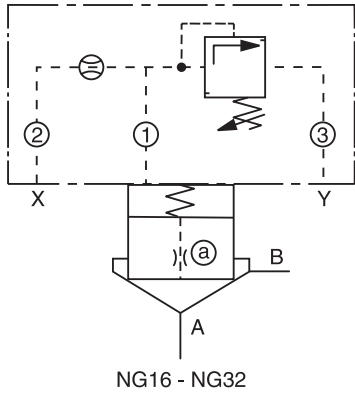
Size	H	B	L1	L2	L3	L4	d1	d2	t
NG16	40.0 (1.57)	65.0 ¹⁾ (2.56)	36.5 (1.44)	32.5 (1.28)	114.0 (4.49)	125.5 (4.94)	32.0 (1.26)	25.0 (0.98)	56.0 (2.20)
NG25	47.0 (1.85)	85.0 (33.5)	46.5 (1.83)	42.5 (1.67)	102.0 (4.02)	114.0 (4.49)	45.0 (1.77)	34.0 (1.34)	71.0 (2.80)
NG32	50.0 (1.97)	102.0 (4.02)	55.0 (2.17)	51.0 (2.01)	95.0 (3.74)	106.0 (4.17)	60.0 (2.36)	45.0 (1.77)	85.0 (3.35)
NG40 ²⁾	106.0 (4.17)	125.0 (4.92)	66.5 (2.62)	62.5 (2.46)	106.0 (4.17)	144.0 (5.67)	75.0 (2.95)	55.0 (2.17)	105.0 (4.13)
NG50	141.0 (5.55)	140.0 (5.51)	74.0 (2.91)	70.0 (2.76)	106.0 (4.17)	144.0 (5.67)	90.0 (3.54)	68.0 (2.68)	121.0 (4.76)
NG63	155.0 (6.10)	180.0 (7.09)	94.0 (3.70)	90.0 (3.54)	106.0 (4.17)	144.0 (5.67)	120.0 (4.72)	90.0 (3.54)	155.0 (6.10)

¹⁾ Width 79mm (3.11 in.)

²⁾ NG40 without adapter plate

NG	Bolt Kit - 		Kit 	
			Nitrile	Fluorocarbon
16	BK414 (BK84)	33 Nm (24.3 lb.-ft.)	SK-RS16E25	SK-RS16EV25
25	BK391 (BK77)	115 Nm (84.8 lb.-ft.)	SK-RS25E25	SK-RS25EV25
32	BK415 (BK85)	281 Nm (207.2 lb.-ft.)	SK-RS32E25	SK-RS32EV25
40	BK416 (BK86)	553 Nm (407.8 lb.-ft.)	SK-RS40E25	SK-RS40EV25
50	BK417 (BK87)	553 Nm (407.8 lb.-ft.)	SK-RS50E25	SK-RS50EV25
63	BK418 (BK88)	1910 Nm (1408.6 lb.-ft.)	SK-RS63E25	SK-RS63EV25

Pressure Relief Valve with Screw-in Cartridge within Control Cover



Description	Type		
	NG16	NG25	NG32
Cover incl. Pressure Valve ¹⁾	C016Fxxxxxxxxx	C025Fxxxxxxxxx	C032Fxxxxxxxxx
Cover Orifice ①	M5xØ1.0	M5xØ1.1	M6xØ1.2
Cover Orifice ②	M4xØ0.8	M5xØ0.9	M6xØ1.0
Cover Orifice ③	M5xØ99		M6xØ99
Cartridge ²⁾	CP016C07S00X	CP025C07S00X	CP032C07S00X
Poppet Orifice (a)	1/16NPT x 00 (plug)		
Spring	1.6 Bar (23.2 PSI), Type S (order no. see spare parts)		
Bolt Kit Cover	BK414, 4x M8x40	BK391, 4x M12x50	BK415, 4x M16x55

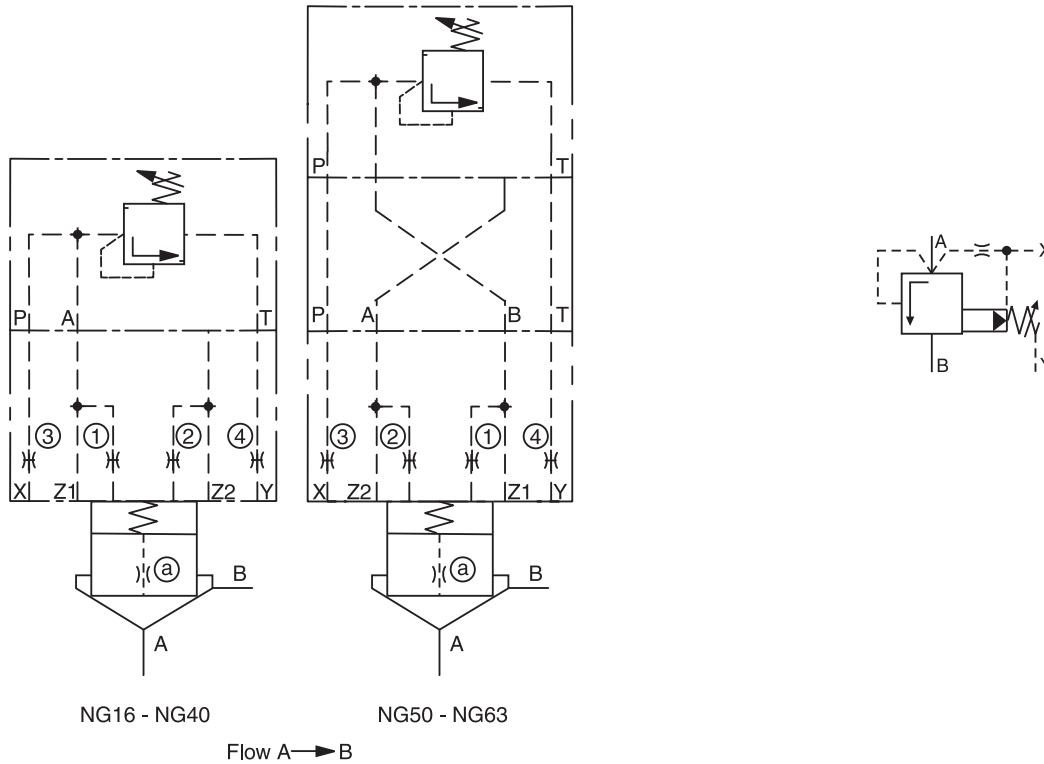
Shown orifice Ø and springs are recommendations.

xxØ00 = plug
 xxØ99 = open

¹⁾ Complete type see Ordering Information C*F

²⁾ Complete type see Ordering Information CP*

Pressure Relief Valve with Separate Pilot



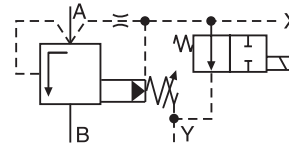
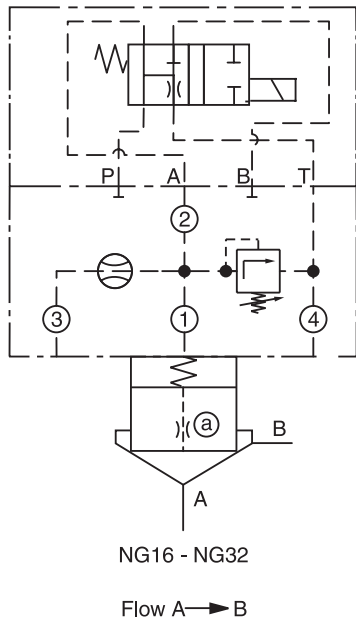
Description	Type					
	NG16	NG25	NG32	NG40	NG50	NG63
Pressure Valve ¹⁾	R06Mxxx4x					
Adapter Plate ²⁾	without				PADA1007/A-B/B-A	
Cover ³⁾	C016CA*	C025CA*	C032CA*	C040CA*	C050CA*	C063CA*
Cover Orifice ①	M5xØ1.1	M5xØ1.3	M5xØ1.4	M5xØ1.5	M6xØ1.6	M6xØ1.7
Cover Orifice ②	M5xØ00				M6xØ00	
Cover Orifice ③	M5xØ99	M6xØ99			M8xØ99	
Cover Orifice ④	M5xØ1.3	M6xØ1.5	M6xØ1.7	M6xØ1.8	M8xØ2.0	M8xØ2.2
Cartridge ⁴⁾	CP016C07*	CP025C07*	CP032C07*	CP040C07*	CP050C07*	CP063C07*
Poppet Orifice ③	1/16NPT x Ø0.9	1/16NPT x Ø1.1	1/16NPT x Ø1.2	1/16NPT x Ø1.3	1/16NPT x Ø1.4	1/16NPT x Ø1.5
Spring	1.6 Bar (23.2 PSI), Type S (order no. see spare parts)					
Bolt Kit Cover	BK414, 4x M8x40	BK391, 4x M12x50	BK415, 4x M16x55	BK416, 4x M20x70	BK417, 4x M20x75	BK418, 4x M30x100
Bolt Kit Pilot	BK443, 4x M5x45					

Shown orifice Ø and springs are recommendations.

xxØ00 = plug
 xxØ99 = open

- ¹⁾ Complete type see Pilot Valves
- ²⁾ Includes O-rings and mounting bolts
- ³⁾ Complete type see Ordering Information C*C
- ⁴⁾ Complete type see Ordering Information CP*

**Pressure Relief Valve with Electrical Vent Function, Normally Open
 and Screw-in Cartridge within Control Cover**

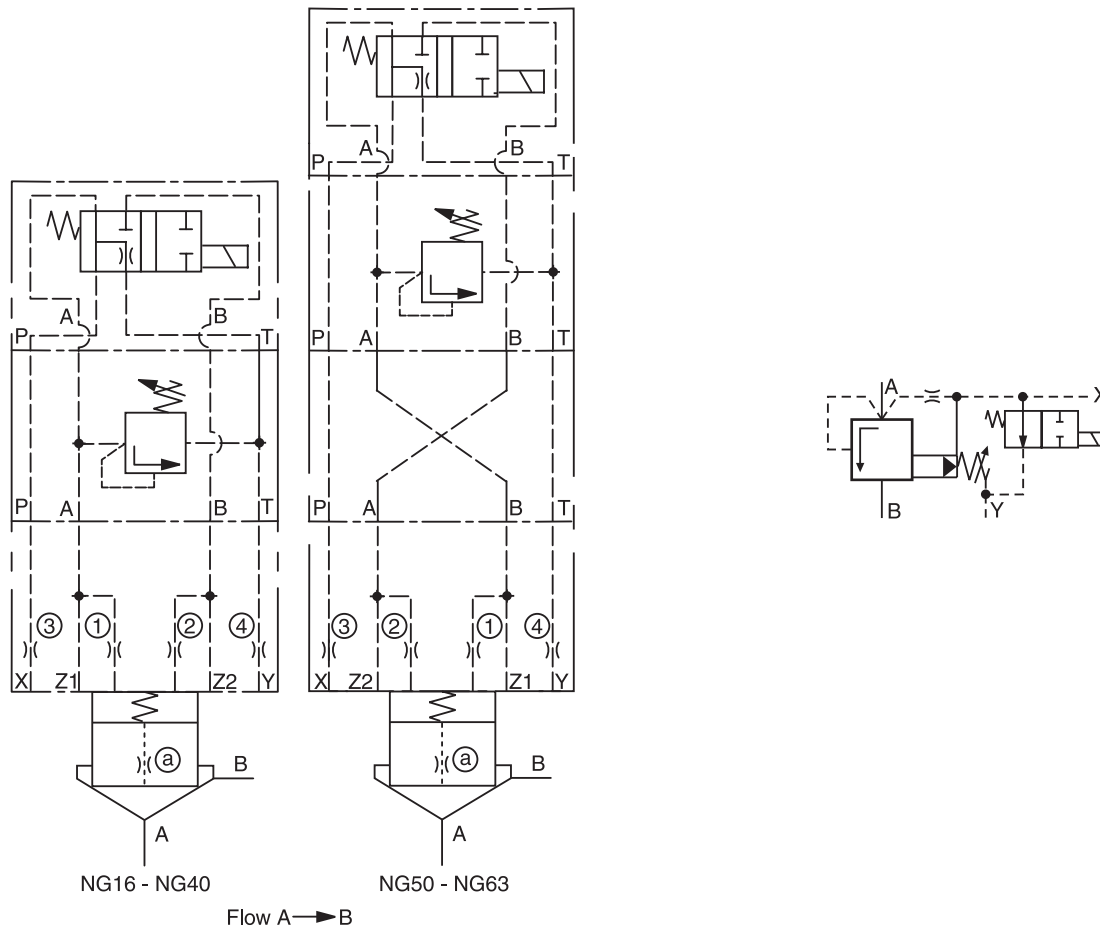


Description	Type		
	NG16	NG25	NG32
4/2 DC Valve ¹⁾	D1VW104K*		
Cover incl. Pressure Valve ²⁾	C016Gxxxxxxxxxx	C025Gxxxxxxxxxx	C032Gxxxxxxxxxx
Cover Orifice ①	M5xØ1.0	M5xØ1.1	M5xØ1.2
Cover Orifice ②	M5xØ99		M6xØ99
Cover Orifice ③	M4xØ00	M5xØ00	M6xØ00
Cover Orifice ④	M5xØ1.2	M5xØ1.3	M6xØ1.4
Cartridge ³⁾	CP016C07*	CP025C07*	CP032C07*
Poppet Orifice ①a	1/16NPT x Ø0.8		1/16NPT x Ø1.0
Spring	1.6 Bar (23.2 PSI), Type S (order no. see spare parts)		
Bolt Kit Cover	BK414, 4x M8x40	BK391, 4x M12x50	BK415, 4x M16x55
Bolt Kit 4/2 DC Valve	BK375, 4x M5x30		

Shown orifice Ø and springs are recommendations.
 xxØ00 = plug
 xxØ99 = open

¹⁾ Complete type see Catalog HY14-2500/US, Series D1VW.
²⁾ Complete type see Ordering Information C*G
³⁾ Complete type see Ordering Information CP*

Pressure Relief Valve with Electrical Vent Function, Normally Open and Pilot in Sandwich Design



Description	Type					
	NG16	NG25	NG32	NG40	NG50	NG63
4/2 DC Valve ¹⁾	D1VW104K*					
Pressure Valve ²⁾	V-ZUDB1ATxZ07x					
Adapter Plate ³⁾ NG6 – NG10	without			PADA1007/A-B/B-A		
Cover ⁴⁾	C016CA*	C025CA*	C032CA*	C040CA*	C050CA*	C063CA*
Cover Orifice ①	M5xØ1.1	M5xØ1.3	M5xØ1.4	M5xØ1.5	M6xØ1.6	M6xØ1.7
Cover Orifice ②	M5xØ00				M6xØ00	
Cover Orifice ③	M5xØ99	M6xØ99			M8xØ99	
Cover Orifice ④	M5xØ1.3	M6xØ1.5		M6xØ1.8	M8xØ2.0	M8xØ2.2
Cartridge ⁵⁾	CP016C07*	CP025C07*	CP032C07*	CP040C07*	CP050C07*	CP063C07*
Poppet Orifice ⑤	1/16NPT x Ø0.9	1/16NPT x Ø1.1	1/16NPT x Ø1.2	1/16NPT x Ø1.3	1/16NPT x Ø1.4	1/16NPT x Ø1.5
Spring	1.6 Bar (23.2 PSI), Type S (order no. see spare parts)					
Bolt Kit Cover	BK414, 4x M8x40	BK391, 4x M12x50	BK415, 4x M16x55	BK416, 4x M20x70	BK417, 4x M20x75	BK418, 4x M30x100
Bolt Kit Pilot	TK1482					

Shown orifice Ø and springs are recommendations.

xxØ00 = plug
 xxØ99 = open

¹⁾ Complete type see Catalog HY14-2500/US, Series D1VW.

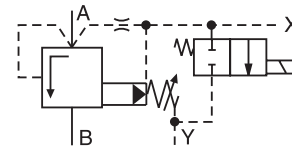
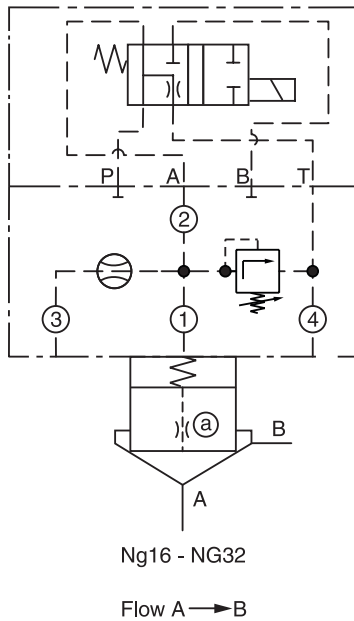
²⁾ Complete types see Pilot Valves

³⁾ Includes O-rings and mounting bolts

⁴⁾ Complete type see Ordering Information C*C

⁵⁾ Complete type see Ordering Information CP*

**Pressure Relief Valve with Electrical Vent Function, Normally Closed
 and Screw-in Cartridge within Control Cover**

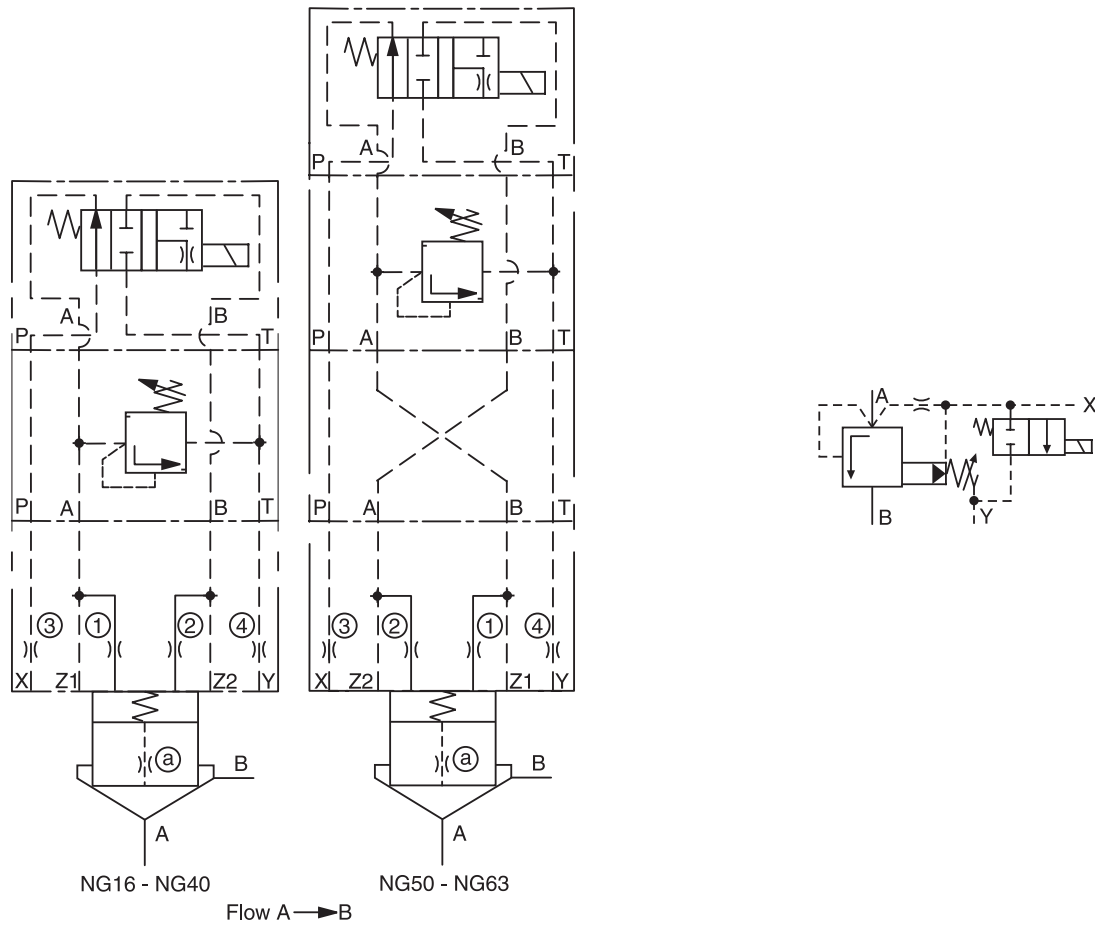


Description	Type		
	NG16	NG25	NG32
4/2 DC Valve ¹⁾	D1VW105K*		
Cover incl. Pressure Valve ²⁾	C016Gxxxxxxxxxxxx	C025Gxxxxxxxxxxxx	C032Gxxxxxxxxxxxx
Cover Orifice ①	M5xØ1.0	M5xØ1.1	M6xØ1.4
Cover Orifice ②	M5xØ99		M6xØ99
Cover Orifice ③	M4xØ00	M5xØ00	M6xØ00
Cover Orifice ④	M5xØ1.2	M5xØ1.3	M6xØ1.4
Cartridge ³⁾	CP016C07*	CP025C07*	CP032C07*
Poppet Orifice (a)	1/16NPT x Ø0.8		1/16NPT x Ø1.0
Spring	1.6 Bar (23.2 PSI), Type S (order no. see spare parts)		
Bolt Kit Cover	BK414, 4x M8x40	BK391, 4x M12x50	BK415, 4x M16x55
Bolt Kit 4/2 DC Valve	BK375, 4x M5x30		

Shown orifice Ø and springs are recommendations.
 xxØ00 = plug
 xxØ99 = open

¹⁾ Complete type see Catalog HY14-2500/US, Series D1VW.
²⁾ Complete type see Ordering Information C*G
³⁾ Complete type see Ordering Information CP*

Pressure Relief Valve with Electrical Vent Function, Normally Closed and Pilot in Sandwich Design



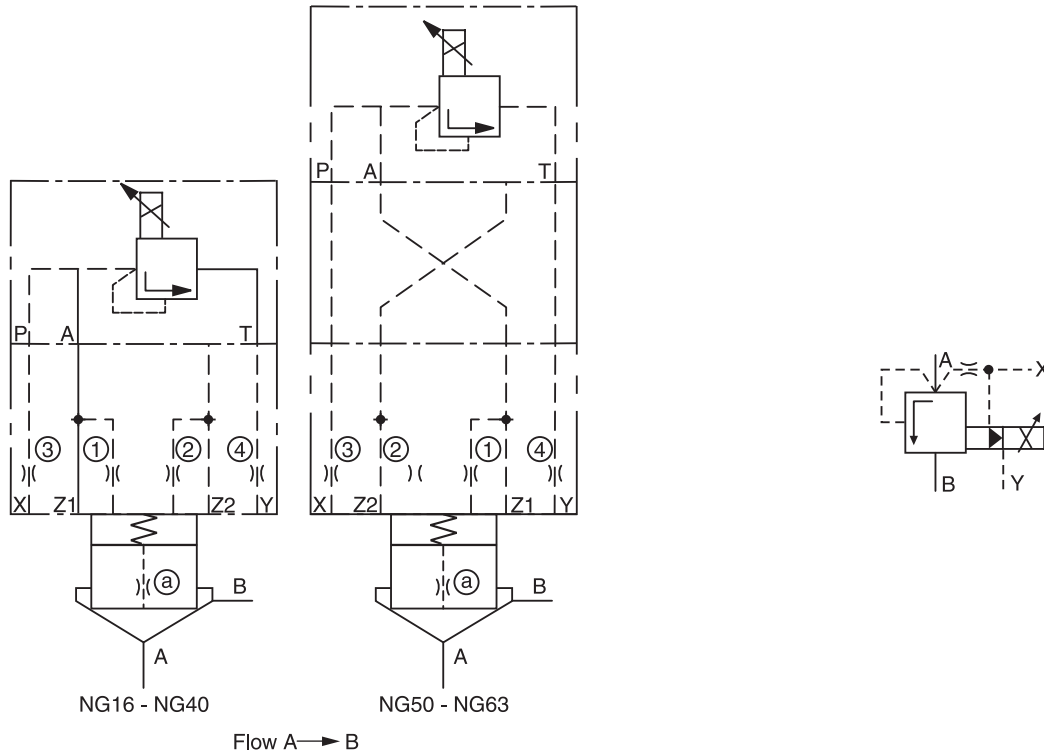
Description	Type					
	NG16	NG25	NG32	NG40	NG50	NG63
4/2 DC Valve ¹⁾	D1VW105K*					
Pressure Valve ²⁾	V-ZUDB1ATxZ07x					
Adapter Plate ³⁾	without				PADA1007/A-B/B-A	
Cover ⁴⁾	C016CA*	C025CA*	C032CA*	C040CA*	C050CA*	C063CA*
Cover Orifice ①	M5xØ1.1	M5xØ1.3	M5xØ1.4	M5xØ1.5	M6xØ1.6	M6xØ1.7
Cover Orifice ②	M5xØ00				M6xØ00	
Cover Orifice ③	M5xØ99	M6xØ99			M8xØ99	
Cover Orifice ④	M5xØ1.3	M6xØ1.5	M6xØ1.7	M6xØ1.8	M8xØ2.0	M8xØ2.2
Cartridge ⁵⁾	CP016C07*	CP025C07*	CP032C07*	CP040C07*	CP050C07*	CP063C07*
Poppet Orifice ⑤	1/16NPT x Ø0.9	1/16NPT x Ø1.1	1/16NPT x Ø1.2	1/16NPT x Ø1.3	1/16NPT x Ø1.4	1/16NPT x Ø1.5
Spring	1.6 Bar (23.2 PSI), Type S (order no. see spare parts)					
Bolt Kit Cover	BK414, 4x M8x40	BK391, 4x M12x50	BK415, 4x M16x55	BK416, 4x M20x70	BK417, 4x M20x75	BK418, 4x M30x100
Bolt Kit Pilot	TK1482					

Shown orifice Ø and springs are recommendations.

xxØ00 = plug
 xxØ99 = open

- ¹⁾ Complete type see Catalog HY14-2500/US, Series D1VW.
- ²⁾ Complete types see Pilot Valves
- ³⁾ Includes O-rings and mounting bolts
- ⁴⁾ Complete type see Ordering Information C*C
- ⁵⁾ Complete type see Ordering Information CP*

Proportional Pressure Relief Valve



Description	Type					
	NG16	NG25	NG32	NG40	NG50	NG63
Pressure Valve ¹⁾	RE06MxW2V1KW					
Adapter Plate ²⁾	without				PADA1007/A-B/B-A	
Cover ³⁾	C016CA*	C025CA*	C032CA*	C040CA*	C050CA*	C063CA*
Cover Orifice ①	M5xØ1.1	M5xØ1.3	M5xØ1.4		M6xØ1.5	
Cover Orifice ②	M5xØ00				M6xØ00	
Cover Orifice ③	M5xØ99	M6xØ99			M8xØ99	
Cover Orifice ④	M5xØ1.2	M6xØ1.4	M6xØ1.5		M8xØ1.6	
Cartridge ⁴⁾	CP016C07*	CP025C07*	CP032C07*	CP040S07*	CP050S07*	CP063S07*
Poppet Orifice ⑤	1/16NPT x Ø0.9	1/16NPT x Ø1.1	1/16NPT x Ø1.2	1/16NPT x Ø1.3	1/16NPT x Ø1.4	
Spring	0.5 Bar (7.3 PSI), Type S (order no. see spare parts)					
Bolt Kit Cover	BK414, 4x M8x40	BK391, 4x M12x50	BK415, 4x M16x55	BK416, 4x M20x70	BK417, 4x M20x75	BK418, 4x M30x100
Bolt Kit Pilot	BK375, 4x M5x30					

Shown orifice Ø and springs are recommendations.

xxØ00 = plug
 xxØ99 = open

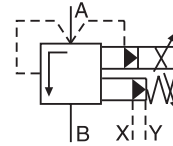
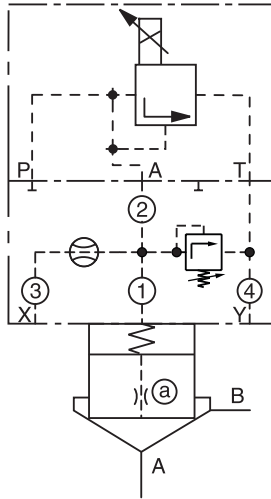
¹⁾ Complete type see Catalog HY14-2550/US, Series RE06M*W.

²⁾ Includes O-rings and mounting bolts

³⁾ Complete type see Ordering Information C*C

⁴⁾ Complete type see Ordering Information CP*

**Proportional Pressure Relief Valve
 with Mechanical Maximum Pressure Protection
 (Screw-in Cartridge within Control Cover)**



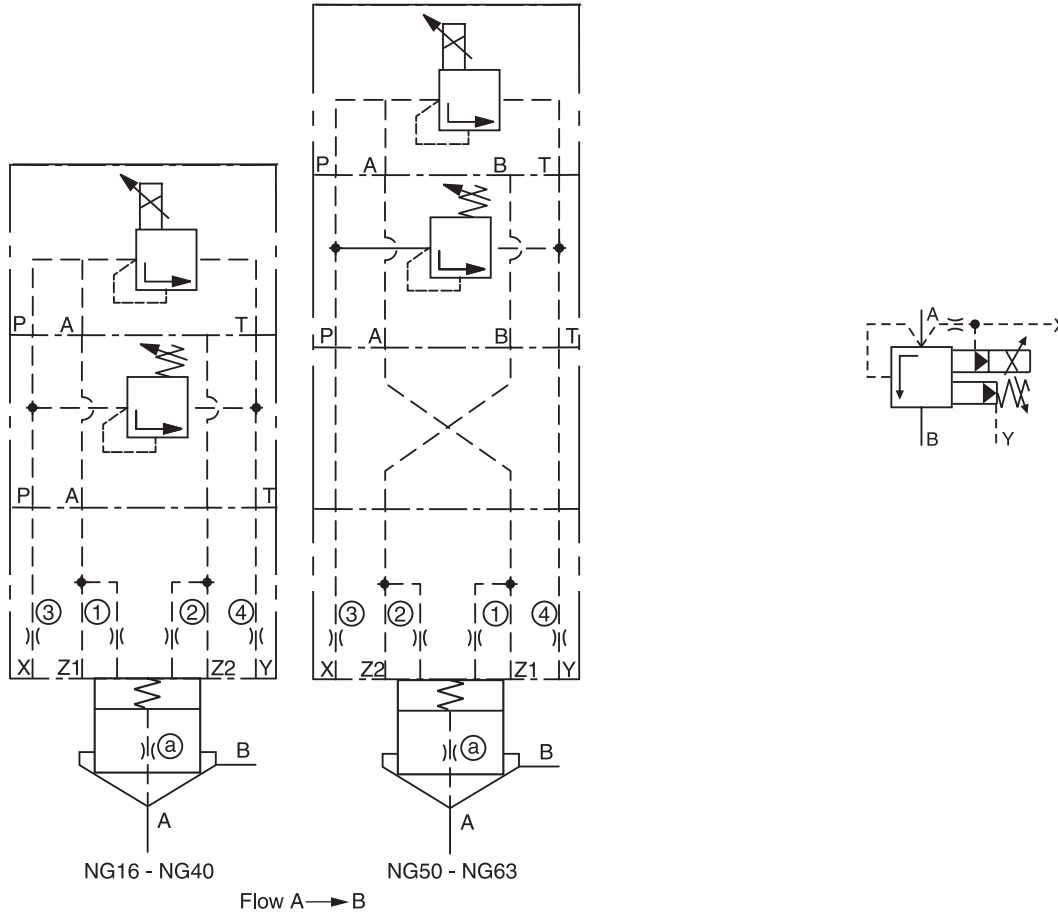
Flow A → B

Description	Type		
	NG16	NG25	NG32
Prop. DC Valve ¹⁾	RE06MxW2V1xW		
Cover incl. Pressure Valve ²⁾	C016Gxxxxxxxxxxxx	C025Gxxxxxxxxxxxx	C032Gxxxxxxxxxxxx
Cover Orifice ①	M5xØ1.0	M5xØ1.1	M6xØ1.4
Cover Orifice ②	M5xØ99		M6xØ99
Cover Orifice ③	M4xØ00	M5xØ00	M6xØ00
Cover Orifice ④	M5xØ1.2	M5xØ1.3	M6xØ1.7
Cartridge ³⁾	CP016C07*	CP025C07*	CP032C07*
Poppet Orifice ①	1/16NPT x Ø0.8	1/16NPT x Ø0.9	1/16NPT x Ø1.2
Spring	1.6 Bar (23.2), Type S (order no. see spare parts)		
Bolt Kit Cover	BK414, 4x M8x40	BK391, 4x M12x50	BK415, 4x M16x55
Bolt Kit 4/2 DC Valve	BK375, 4x M5x30		

Shown orifice Ø and springs are recommendations.
 xxØ00 = plug
 xxØ99 = open

¹⁾ Complete type see Catalog HY14-2550/US, Series RE06M*W.
²⁾ Complete type see Ordering Information C*G
³⁾ Complete type see Ordering Information CP*

**Proportional Pressure Relief Valve
 with Mechanical Maximum Pressure Protection in Sandwich Design**

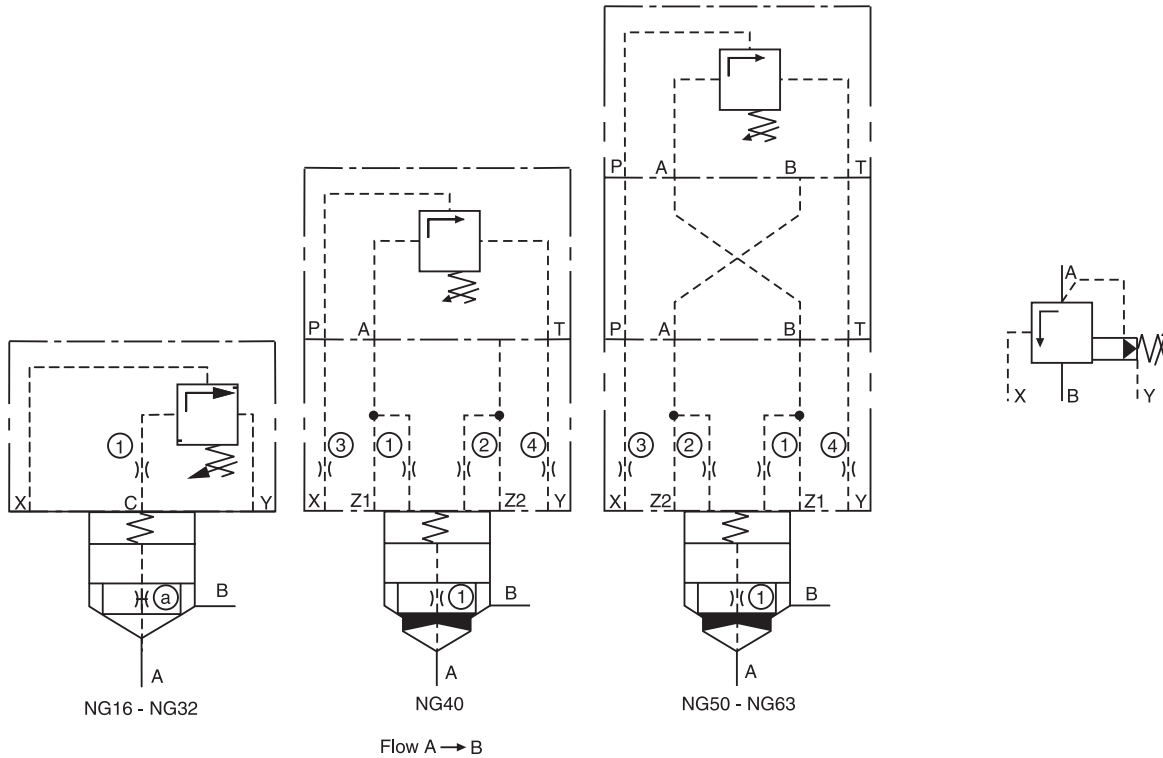


Description	Type					
	NG16	NG25	NG32	NG40	NG50	NG63
Pressure Valve ¹⁾	RE06MxW2V1KW					
Max. Pressure Valve ²⁾	V-ZUDB1PTxZ07x					
Adapter Plate ³⁾ NG6 – NG10	without				PADA1007/A-B/B-A	
Cover ⁴⁾	C016CA*	C025CA*	C032CA*	C040CA*	C050CA*	C063CA*
Cover Orifice ①	M5xØ1.1	M5xØ1.3		M5xØ1.4	M6xØ1.6	
Cover Orifice ②	M5xØ00				M6xØ00	
Cover Orifice ③	M5xØ99	M6xØ99			M8xØ99	
Cover Orifice ④	M5xØ1.2	M6xØ1.4		M6xØ1.5	M8xØ1.6	
Cartridge ⁵⁾	CP016C07*	CP025C07*	CP032C07*	CP040S07*	CP050S07*	CP063S07*
Poppet Orifice ③	1/16NPT x Ø0.9	1/16NPT x Ø1.1	1/16NPT x Ø1.2	1/16NPT x Ø1.3	1/16NPT x Ø1.4	
Spring	0.5 Bar (7.3 PSI), Type N (order no. see spare parts)					
Bolt Kit Cover	BK414, 4x M8x40	BK391, 4x M12x50	BK415, 4x M16x55	BK416, 4x M20x70	BK417, 4x M20x75	BK418, 4x M30x100
Bolt Kit Pilot	TK1482					

Shown orifice Ø and springs are recommendations.
 xxØ00 = plug
 xxØ99 = open

- ¹⁾ Complete type see Catalog HY14-2550/US, Series RE06M*W.
- ²⁾ Complete types see Pilot Valves
- ³⁾ Includes O-rings and mounting bolts
- ⁴⁾ Complete type see Ordering Information C*W
- ⁵⁾ Complete type see Ordering Information CP*

Unloading Valve



Description	Type					
	NG16	NG25	NG32	NG40	NG50	NG63
Unloading Valve ¹⁾	-	-	-	UR06Mxxx4x		
Adapter Plate ²⁾	without			PADA1007/A-B/B-A		
Cover ³⁾	On Request	On Request	On Request	C040CA*	C050CA*	C063CA*
Cover Orifice ①	M5xØ1.4	M5xØ1.5	M5xØ1.6	M5xØ1.7	M6xØ1.8	M6xØ1.9
Cover Orifice ②	M5xØ00			M6xØ00		
Cover Orifice ③	M5xØ99	M6xØ99		M8xØ99		
Cover Orifice ④	M5xØ1.5	M6xØ1.6	M6xØ1.7	M6xØ1.8	M8xØ1.9	M8xØ2.0
Cartridge ⁴⁾	CP016C07*	CP025C07*	CP032C07*	CP040S07*	CP050C07*	CP063S07*
Poppet Orifice ①	1/16NPT x Ø0.9	1/16NPT x Ø1.0	1/16NPT x Ø1.1	1/16NPT x Ø1.2	1/16NPT x Ø1.3	1/16NPT x Ø1.4
Spring	1.6 Bar (23.2 PSI), Type S (order no. see spare parts)					
Bolt Kit Cover	BK414 (BK84)	BK391 (BK77)	BK415 (BK85)	BK416 (BK86)	BK417 (BK87)	BK418 (BK88)
Bolt Kit Pilot	BK387					

Shown orifice Ø and springs are recommendations.

xxØ00 = plug

xxØ99 = open

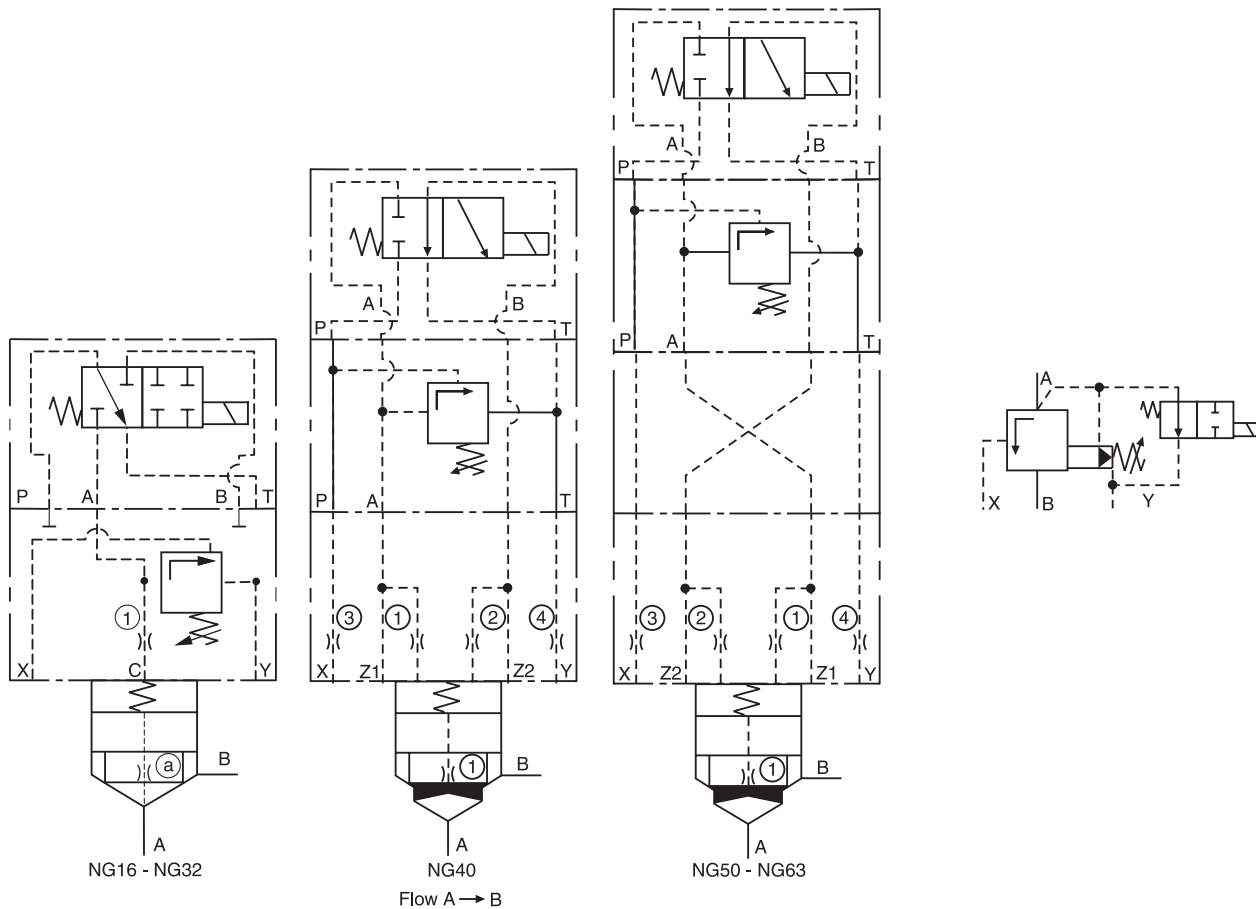
¹⁾ Complete types see Pilot Valves

²⁾ Includes O-rings and mounting bolts

³⁾ Complete type see Ordering Information C*C

⁴⁾ Complete type see Ordering Information CP*

Unloading Valve with Electrical Vent Function, Normally Open



Description	Type					
	NG16	NG25	NG32	NG40	NG50	NG63
4/2 DC Valve ¹⁾	D1VW076K*					
Pressure Valve ²⁾	US06Mxxx4x					
Adapter Plate ³⁾	without				PADA1007/A-B/B-A	
Cover ⁴⁾	On Request	On Request	On Request	C040CA*	C050CA*	C063CA*
Cover Orifice ①	M5xØ1.4	M5xØ1.5	M5xØ1.6	M5xØ1.7	M6xØ1.8	M6xØ1.9
Cover Orifice ②	M5xØ00				M6xØ00	
Cover Orifice ③	M5xØ99	M6xØ99			M8xØ99	
Cover Orifice ④	M5xØ1.5	M6xØ1.6	M6xØ1.7	M6xØ1.8	M8xØ1.9	M8xØ2.2
Cartridge ⁵⁾	CP016C07*	CP025C07*	CP032C07*	CP040S07*	CP050S07*	CP063S07*
Poppet Orifice ①	1/16NPT x Ø0.9	1/16NPT x Ø1.0	1/16NPT x Ø1.1	1/16NPT x Ø1.2	1/16NPT x Ø1.3	1/16NPT x Ø1.4
Spring	1.6 Bar (23.2 PSI), Type S (order no. see spare parts)					
Bolt Kit Cover	BK414 (BK84)	BK391 (BK77)	BK415 (BK85)	BK416 (BK86)	BK417 (BK87)	BK418 (BK88)
Bolt Kit Pilot	BK401					

Shown orifice Ø and springs are recommendations.

xxØ00 = plug

xxØ99 = open

¹⁾ Complete type see Catalog HY14-2500/US, Series D1VW.

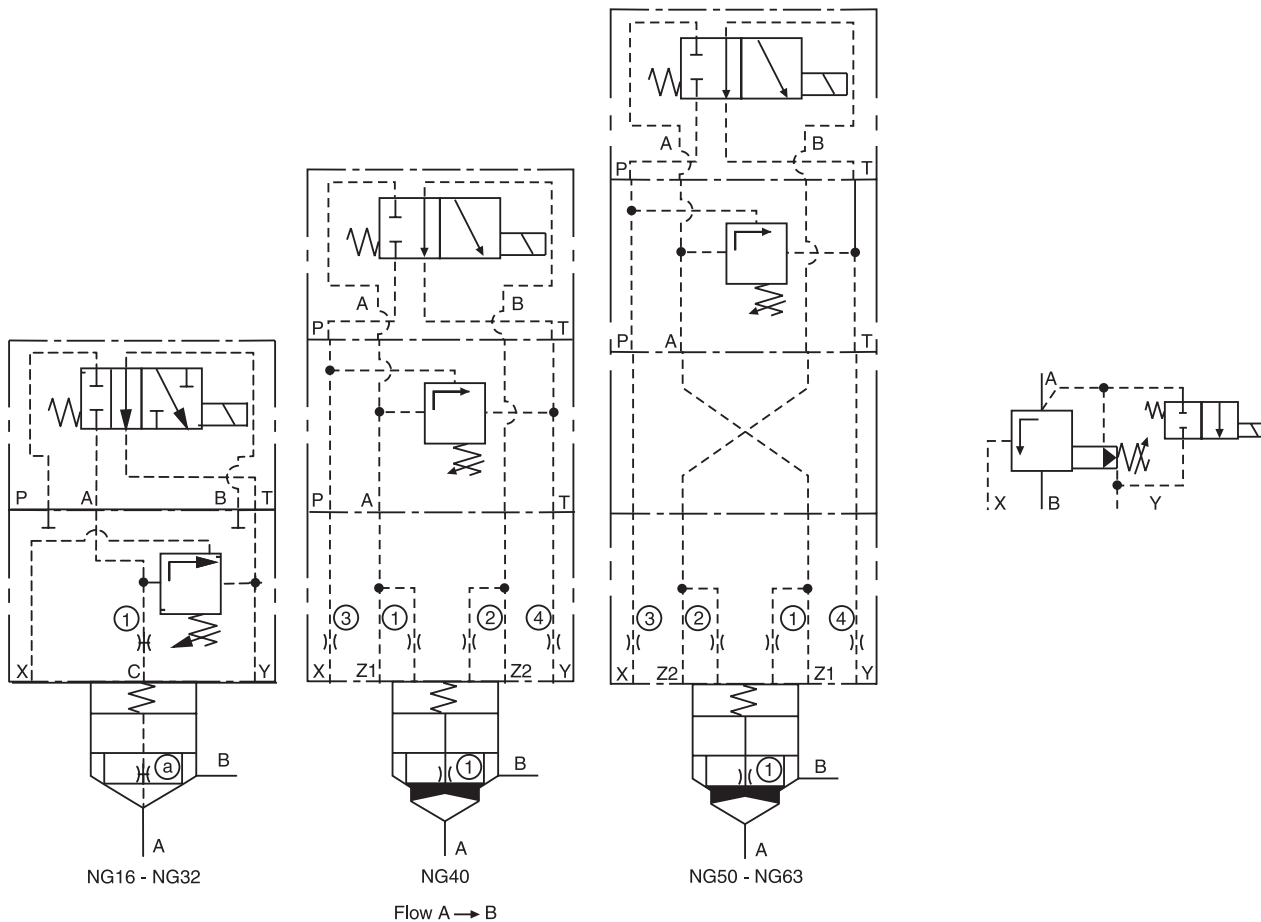
²⁾ Complete types see Pilot Valves

³⁾ Includes O-rings and mounting bolts

⁴⁾ Complete type see Ordering Information C*C

⁵⁾ Complete type see Ordering Information CP*

Unloading Valve with Electrical Vent Function, Normally Closed



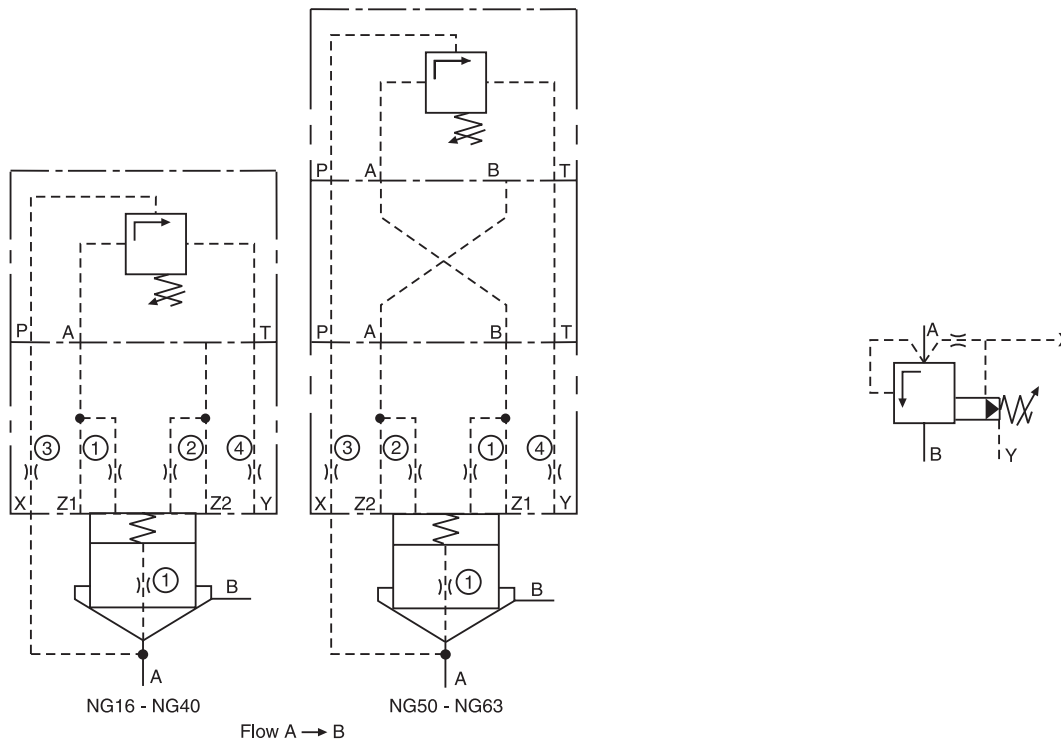
Description	Type					
	NG16	NG25	NG32	NG40	NG50	NG63
4/2 DC Valve ¹⁾	D1VW078K*					
Pressure Valve ²⁾	US06Mxxx4x					
Adapter Plate ³⁾	without				PADA1007/A-B/B-A	
Cover ⁴⁾	On Request	On Request*	On Request*	C040CA*	C050CA*	C063CA*
Cover Orifice ①	M5xØ1.4	M5xØ1.5	M5xØ1.6	M5xØ1.7	M6xØ1.8	M6xØ1.9
Cover Orifice ②	M5xØ00				M6xØ00	
Cover Orifice ③	M5xØ99	M6xØ99			M8xØ99	
Cover Orifice ④	M5xØ1.5	M6xØ1.6	M6xØ1.7	M6xØ1.8	M8xØ1.9	M8xØ2.2
Cartridge ⁵⁾	CP016C07*	CP025C07*	CP032C07*	CP040S07*	CP050S08*	CP063S07*
Poppet Orifice ①	1/16NPT x Ø0.9	1/16NPT x Ø1.0	1/16NPT x Ø1.1	1/16NPT x Ø1.2	1/16NPT x Ø1.3	1/16NPT x Ø1.4
Spring	1.6 Bar (23.2 PSI), Type S (order no. see spare parts)					
Bolt Kit Cover	BK414 (BK84)	BK391 (BK77)	BK415 (BK85)	BK416 (BK86)	BK417 (BK87)	BK418 (BK88)
Bolt Kit Pilot	BK401					

Shown orifice Ø and springs are recommendations.

xxØ00 = plug
 xxØ99 = open

- 1) Complete type see Catalog HY14-2500/US, Series D1VW.
- 2) Complete types see Pilot Valves
- 3) Includes O-rings and mounting bolts
- 4) Complete type see Ordering Information C*C
- 5) Complete type see Ordering Information CP*

Pressure Sequence Valve



Description	Type					
	NG16	NG25	NG32	NG40	NG50	NG63
Press. Sequence Valve ¹⁾	S06Mxxx4x					
Adapter Plate ²⁾	without				PADA1007/A-B/B-A	
Cover ³⁾	C016CA*	C025CA*	C032CA*	C040CA*	C050CA*	C063CA*
Cover Orifice ①	M5xØ1.1	M5xØ1.3	M5xØ1.4	M5xØ1.5	M6xØ1.6	M6xØ1.7
Cover Orifice ②	M5xØ00				M6xØ00	
Cover Orifice ③	M5xØ0.9	M6xØ1.1	M6xØ1.2	M6xØ1.3	M8xØ1.4	M8xØ1.5
Cover Orifice ④	M5xØ1.3	M6xØ1.5	M6xØ1.7	M6xØ1.8	M8xØ2.0	M8xØ2.2
Cartridge ⁴⁾	CE016C01*	CE025C01*	CE032C01*	CE040C01*	CE050C01*	CE063C01*
Poppet Orifice ①	1/16NPT x Ø00					
Spring	1.6 Bar (23.2 PSI), Type S (order no. see spare parts)					
Bolt Kit Cover	BK414 (BK84)	BK391 (BK77)	BK415 (BK85)	BK416 (BK86)	BK417 (BK87)	BK418 (BK88)
Bolt Kit Pilot	BK401					

Shown orifice Ø and springs are recommendations.

xxØ00 = plug

xxØ99 = open

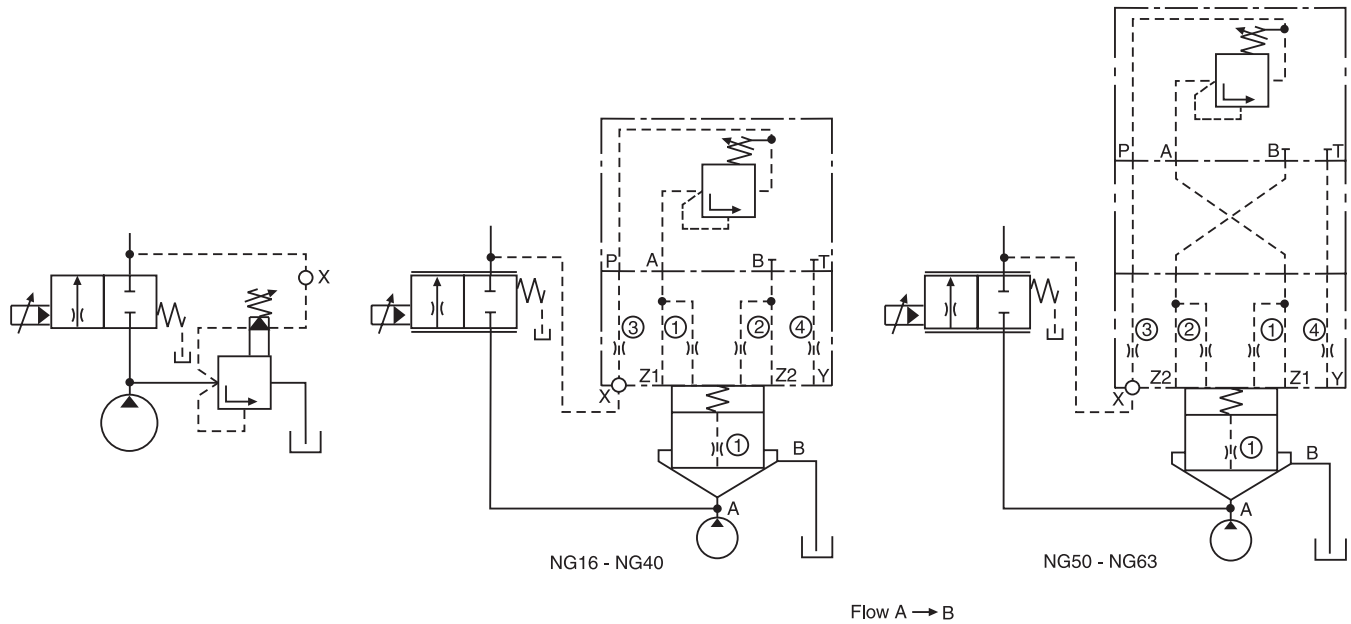
¹⁾ Complete types see Pilot Valves

²⁾ Includes O-rings and mounting bolts

³⁾ Complete type see Ordering Information C*C

⁴⁾ Complete type see Ordering Information CE*

**3-Way Compensator
 (in Combination with Proportional Throttle Valve)**



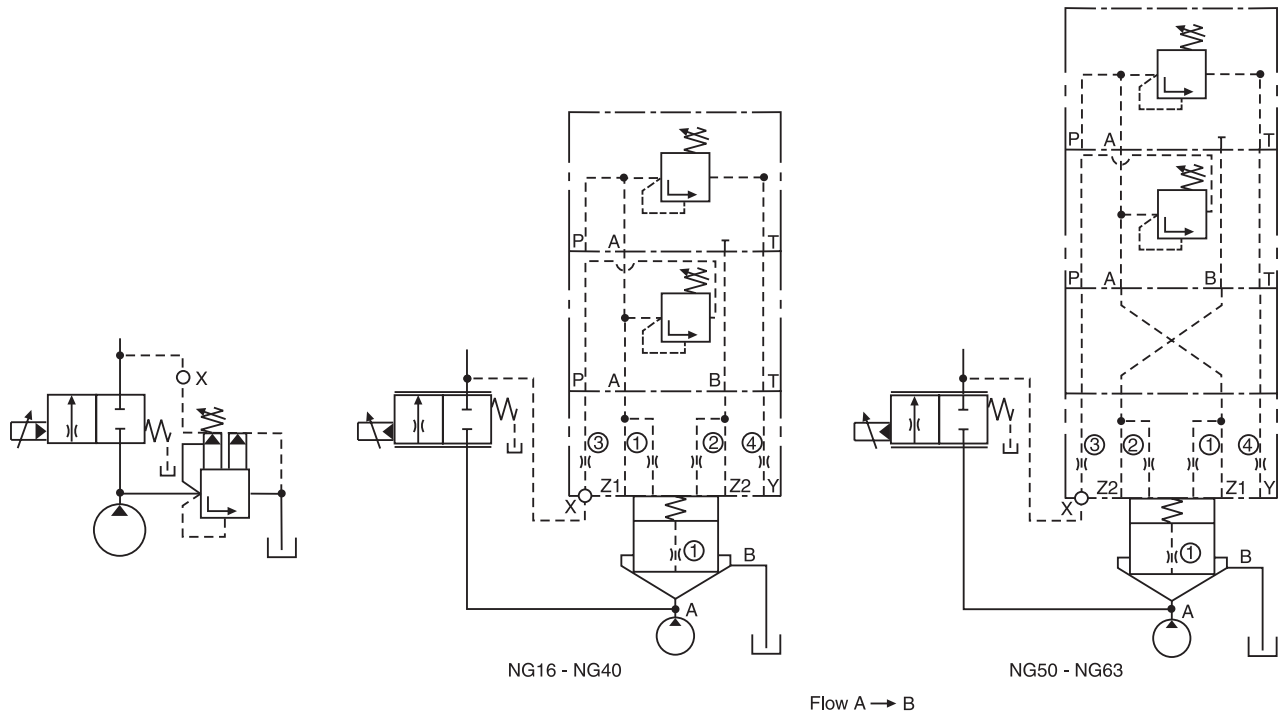
Description	Type					
	NG16	NG25	NG32	NG40	NG50	NG63
Preload Valve ¹⁾	DSBA100xP07x					
Adapter Plate ²⁾	without				PADA1007/A-B/B-A	
Cover ³⁾	C016CA*	C025CA*	C032CA*	C040CA*	C050CA*	C063CA*
Cover Orifice ①	M5xØ1.1	M5xØ1.3	M5xØ1.4	M5xØ1.5	M6xØ1.6	M6xØ1.7
Cover Orifice ②	M5xØ00				M6xØ00	
Cover Orifice ③	M5xØ99	M6xØ99			M8xØ99	
Cover Orifice ④	M5xØ1.3	M6xØ1.5	M6xØ1.7	M6xØ1.8	M8xØ2.0	M8xØ2.2
Cartridge ⁴⁾	CE016C01*	CE025C01*	CE032C01*	CE040C01*	CE050C01*	CE063C01*
Poppet Orifice ①	1/16NPT x Ø0.9	1/16NPT x Ø1.1	1/16NPT x Ø1.2	1/16NPT x Ø1.3	1/16NPT x Ø1.4	1/16NPT x Ø1.5
Spring	1.6 Bar (3.2 PSI), Type S (order no. see spare parts)					
Bolt Kit Cover	BK414 (BK84)	BK391 (BK77)	BK415 (BK85)	BK416 (BK86)	BK417 (BK87)	BK418 (BK88)
Bolt Kit Pilot	BK401					

Shown orifice Ø and springs are recommendations.

xxØ00 = plug
 xxØ99 = open

- ¹⁾ Complete type see Pilot Valves
- ²⁾ Includes O-rings and mounting bolts
- ³⁾ Complete type see Ordering Information C*C
- ⁴⁾ Complete type see Ordering Information CE*

**3-Way Compensator
 with Mechanical Maximum Pressure Protection
 (in Combination with Proportion Throttle Valve)**



Description	Type					
	NG16	NG25	NG32	NG40	NG50	NG63
Pressure Valve ¹⁾	R06Mxxx4x					
Preload Valve ¹⁾	DSBA100xZ07x					
Adapter Plate ²⁾	without			PADA1007/A-B/B-A		
Cover ³⁾	C016CA*	C025CA*	C032CA*	C040CA*	C050CA*	C063CA*
Cover Orifice ①	M5xØ1.1	M5xØ1.3	M5xØ1.4	M5xØ1.5	M6xØ1.6	M6xØ1.7
Cover Orifice ②	M5xØ00				M6xØ00	
Cover Orifice ③	M5xØ99	M6xØ99			M8xØ99	
Cover Orifice ④	M5xØ1.3	M6xØ1.5	M6xØ1.7	M6xØ1.8	M8xØ2.0	M8xØ2.2
Cartridge ⁴⁾	CE016C01*	CE025C01*	CE032C01*	CE040C01*	CE050C01*	CE063C01*
Poppet Orifice ①	1/16NPT x Ø0.9	1/16NPT x Ø1.1	1/16NPT x Ø1.2	1/16NPT x Ø1.3	1/16NPT x Ø1.4	1/16NPT x Ø1.5
Spring	1.6 Bar (23.2 PSI), Type S (order no. see spare parts)					
Bolt Kit Cover	BK414 (BK84)	BK391 (BK77)	BK415 (BK85)	BK416 (BK86)	BK417 (BK87)	BK418 (BK88)
Bolt Kit Pilot	BK401					

Shown orifice Ø and springs are recommendations.

xxØ00 = plug
 xxØ99 = open

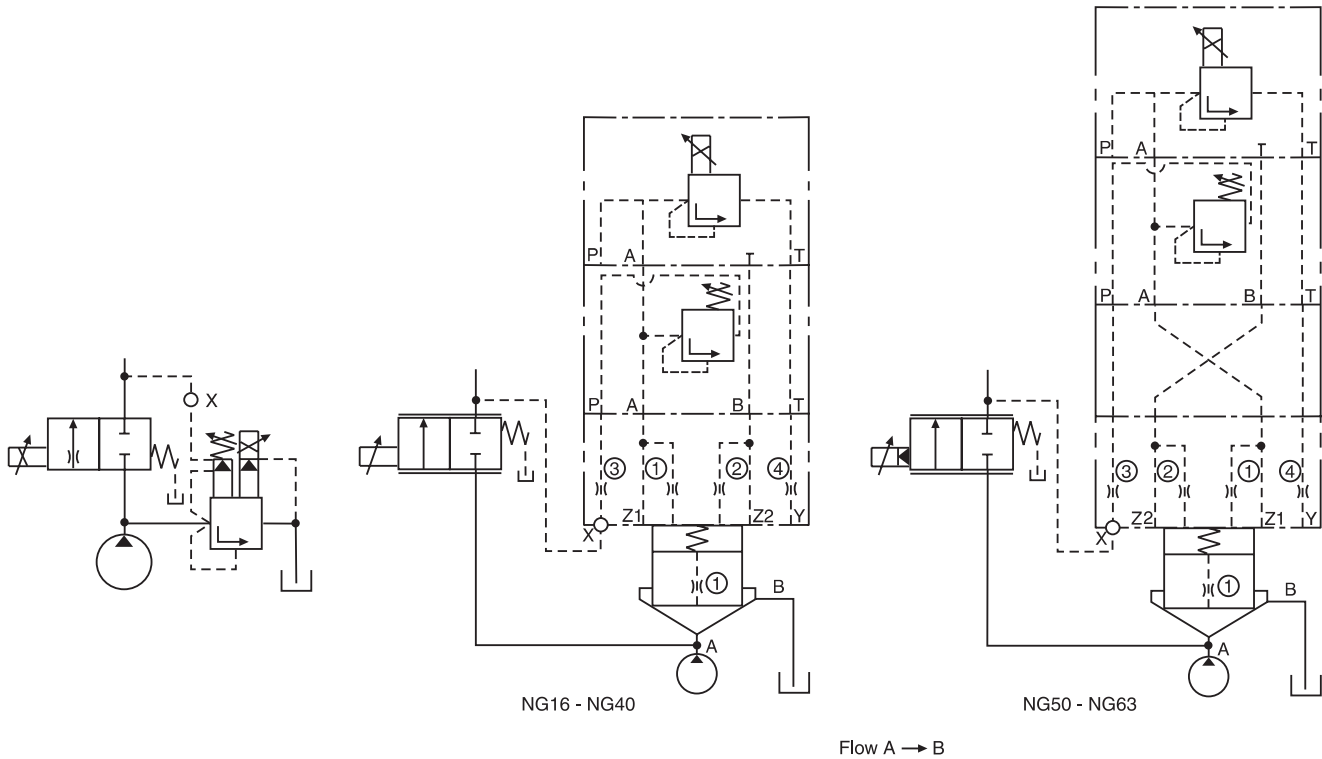
¹⁾ Complete type see Pilot Valve Examples

²⁾ Includes O-rings and mounting bolts

³⁾ Complete type see Ordering Information C*C

⁴⁾ Complete type see Ordering Information CE*

**3-Way Compensator
 with Proportional Pressure Relief Valve for Pressure Control**

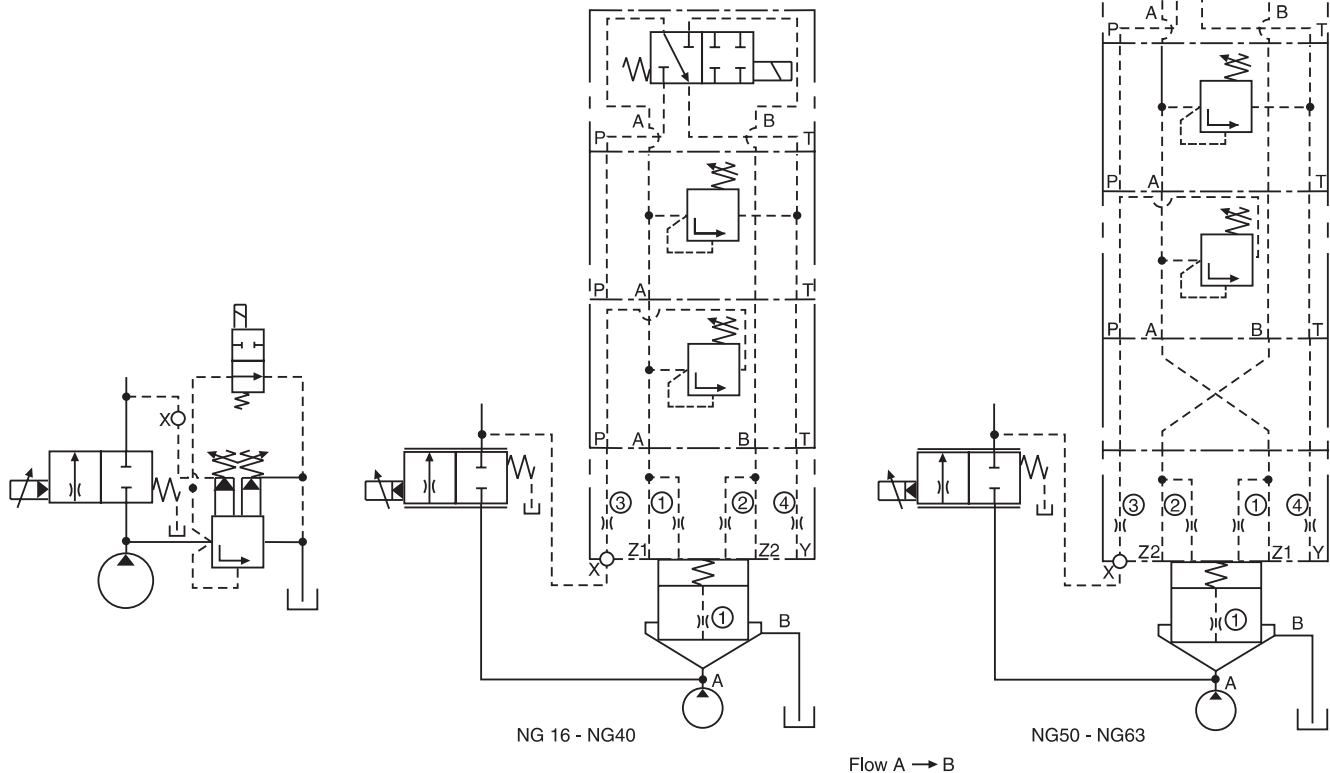


Description	Type					
	NG16	NG25	NG32	NG40	NG50	NG63
Prop. Pressure Valve ¹⁾	RE06MxW2V1KW*					
Preload Valve ²⁾	DSBA100xZ07x					
Adapter Plate ³⁾	without			PADA1007/A-B/B-A		
Cover ⁴⁾	C016CA*	C025CA*	C032CA*	C040CA*	C050CA*	C063CA*
Cover Orifice ①	M5xØ1.1	M5xØ1.3	M5xØ1.4	M5xØ1.5	M6xØ1.6	M6xØ1.7
Cover Orifice ②	M5xØ00				M6xØ00	
Cover Orifice ③	M5xØ99	M6xØ99			M8xØ99	
Cover Orifice ④	M5xØ1.3	M6xØ1.5	M6xØ1.7	M6xØ1.8	M8xØ2.0	M8xØ2.2
Cartridge ⁵⁾	CE016C01*	CE025C01*	CE032C01*	CE040C01*	CE050C01*	CE063C01*
Poppet Orifice ①	1/16NPT x Ø0.9	1/16NPT x Ø1.1	1/16NPT x Ø1.2	1/16NPT x Ø1.3	1/16NPT x Ø1.4	1/16NPT x Ø1.5
Spring	1.6 Bar (23.2 PSI), Type S (order no. see spare parts)					
Bolt Kit Cover	BK414 (BK84)	BK391 (BK77)	BK415 (BK85)	BK416 (BK86)	BK417 (BK87)	BK418 BK88)
Bolt Kit Pilot	BK401					

Shown orifice Ø and springs are recommendations.
 xxØ00 = plug
 xxØ99 = open

- ¹⁾ Complete type see Catalog HY14-2550/US, Series RE06M*W.
- ²⁾ Complete type see Pilot Valves
- ³⁾ Includes O-rings and mounting bolts
- ⁴⁾ Complete type see Ordering Information C*C
- ⁵⁾ Complete type see Ordering Information CE*

**3-Way Compensator with Mechanical Maximum Pressure Protection
 and Electrical Vent Function, Normally Open
 (in Combination with Proportional Throttle Valve)**

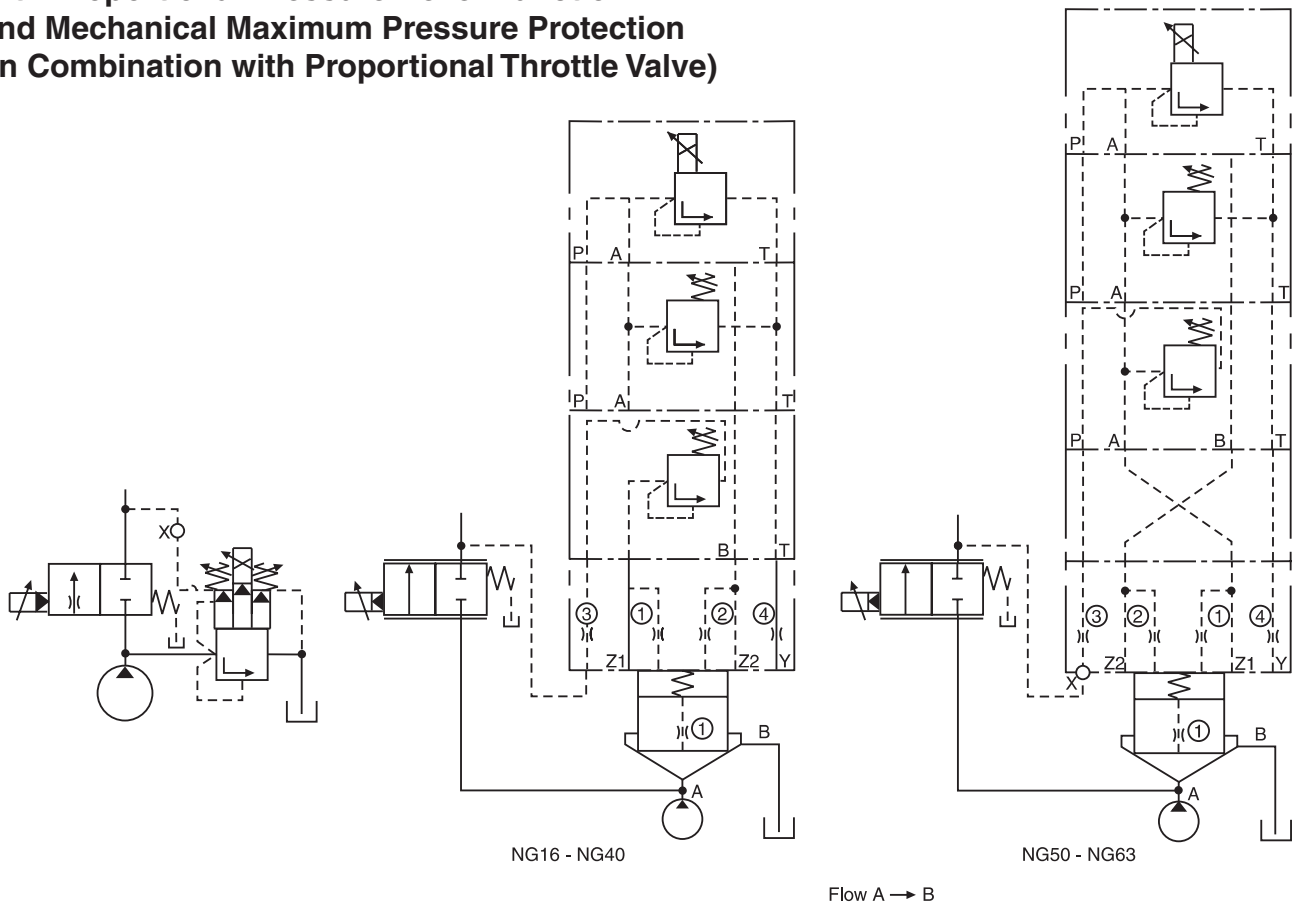


Description	Type					
	NG16	NG25	NG32	NG40	NG50	NG63
4/2 DC Valve ¹⁾	D1VW076K*					
Press. Valve ²⁾	ZUDB1ATxZ07x					
Preload Valve ²⁾	DSBA100xZ07x					
Adapter Plate ³⁾	without			PADA1007/A-B/B-A		
Cover ⁴⁾	C016CA*	C025CA*	C032CA*	C040CA*	C050CA*	C063CA*
Cover Orifice ①	M5xØ1.1	M5xØ1.3	M5xØ1.4	M5xØ1.5	M6xØ1.6	M6xØ1.7
Cover Orifice ②	M5xØ00				M6xØ00	
Cover Orifice ③	M5xØ99	M6xØ99			M8xØ99	
Cover Orifice ④	M5xØ1.3	M6xØ1.5	M6xØ1.7	M6xØ1.8	M8xØ2.0	M8xØ2.2
Cartridge ⁵⁾	CE016C01*	CE025C01*	CE032C01*	CE040C01*	CE050C01*	CE063C01*
Poppet Orifice ①	1/16NPT x Ø0.9	1/16NPT x Ø1.1	1/16NPT x Ø1.2	1/16NPT x Ø1.3	1/16NPT x Ø1.4	1/16NPT x Ø1.5
Spring	1.6 Bar (23.2 PSI), Type S (order no. see spare parts)					
Bolt Kit Cover	BK414 (BK84)	BK391 (BK77)	BK415 (BK85)	BK416 (BK86)	BK417 (BK87)	BK418 (BK88)
Bolt Kit Pilot	BK424					

Shown orifice Ø and springs are recommendations.
 xxØ00 = plug
 xxØ99 = open

- 1) Complete type see Catalog HY14-2500/US, Series D1VW.
- 2) Complete type see Pilot Valves
- 3) Includes O-rings and mounting bolt
- 4) Complete type see Ordering Information C*C
- 5) Complete type see Ordering Information CE*

**3-Way Compensator
 with Proportional Pressure Relief Function
 and Mechanical Maximum Pressure Protection
 (in Combination with Proportional Throttle Valve)**



Description	Type					
	NG16	NG25	NG32	NG40	NG50	NG63
Prop. Pressure Valve ¹⁾	RE06MxW2V1KW*					
Press. Valve ²⁾	ZUDB1ATxZ07x					
Preload Valve ²⁾	DSBA100xZ07x					
Adapter Plate ³⁾	without				PADA1007/A-B/B-A	
Cover ⁴⁾	C016CA*	C025CA*	C032CA*	C040CA*	C050CA*	C063CA*
Cover Orifice ①	M5xØ1.1	M5xØ1.3	M5xØ1.4	M5xØ1.5	M6xØ1.6	M6xØ1.7
Cover Orifice ②	M5xØ00				M6xØ00	
Cover Orifice ③	M5xØ99	M6xØ99			M8xØ99	
Cover Orifice ④	M5xØ1.3	M6xØ1.5	M6xØ1.7	M6xØ1.8	M8xØ2.0	M8xØ2.2
Cartridge ⁵⁾	CE016C01*	CE025C01*	CE032C01*	CE040C01*	CE050C01*	CE063C01*
Poppet Orifice ①	1/16NPT x Ø0.9	1/16NPT x Ø1.1	1/16NPT x Ø1.2	1/16NPT x Ø1.3	1/16NPT x Ø1.4	1/16NPT x Ø1.5
Spring	1.6 Bar (23.2 PSI), Type S (order no. see spare parts)					
Bolt Kit Cover	BK414 (BK84)	BK391 (BK77)	BK415 (BK85)	BK416 (BK86)	BK417 (BK87)	BK418 (BK88)
Bolt Kit Pilot	BK424					

Shown orifice Ø and springs are recommendations.
 xxØ00 = plug
 xxØ99 = open

- 1) Complete type see Catalog HY14-2550/US, Series RE06M*W
- 2) Complete type see Pilot Valves
- 3) Includes O-rings and mounting bolts
- 4) Complete type see Ordering Information C*C
- 5) Complete type see Ordering Information CE*

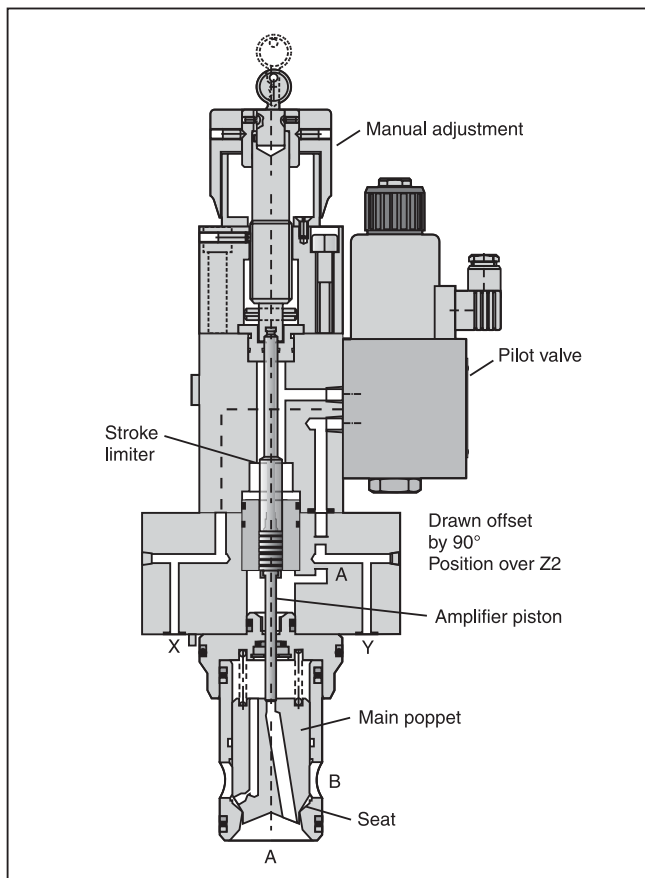
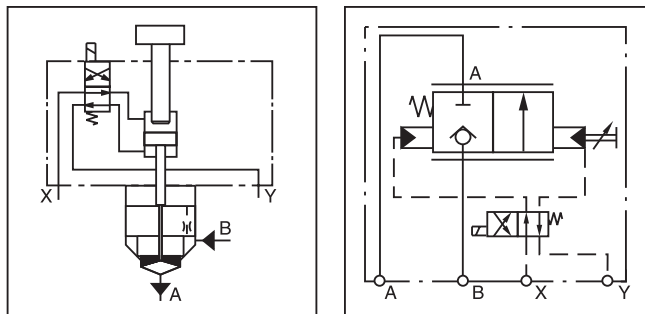
General Description

Series TEH accumulator discharge valves are preferably used in hydraulic systems where high volume flow rates are discharged from accumulators over a short operating period (in the range of milliseconds).

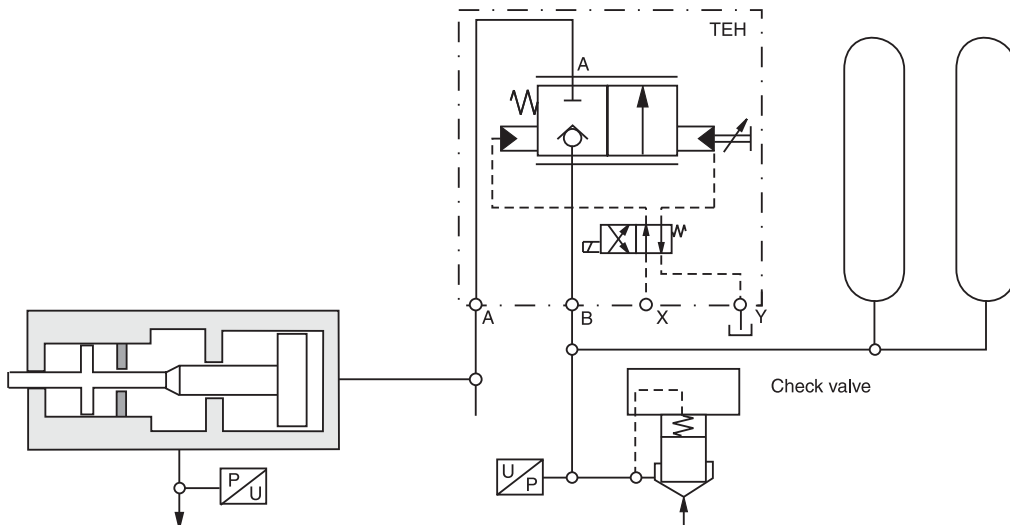
Typical applications are injection molding and die casting machines as well as hydraulic presses.

The amplifier piston is pressed down onto the main poppet by pilot pressure in the X-line and pushes the main poppet into the seat. By switching the pilot valve the pilot pressure pushes the amplifier piston against the manual adjusted stroke limiter. The main poppet is forced by pressure in the B-line to follow the amplifier piston immediately and opens the adjusted area for flow from B to A. In the neutral position, the flow from B to A is blocked. With pilot pressure in X flow from A to B is blocked as well. Without pilot pressure oil can pass from A to B through the orifice in the poppet.

Note: This is not a complete shut off valve.



Example Accumulator System for an Injection Cylinder



Specifications

General						
Size	NG32	NG40	NG50	NG63	NG80	NG100
Interface	Slip-in cartridge according to ISO 7368					
Mounting Position	Unrestricted					
Ambient Temperature	-20°C to +80°C (-4°F to +176°F)					
Extracting Tools	See Accessories					
Hydraulic						
Maximum Operating Pressure	Ports A, B and X: up to 350 Bar (5075 PSI), Port Y: 10 Bar (145 PSI) maximum					
Nominal Flow $\Delta p = 10 \text{ Bar (145 PSI)}$	950 LPM (251 GPM)	1400 LPM (370 GPM)	2300 LPM (609 GPM)	4000 LPM (1058 GPM)	6000 LPM (1577 GPM)	9500 LPM (2513 GPM)
Fluid	Hydraulic oil according to DIN 51524 ... 525					
Viscosity Recommended	30 to 80 cSt (mm ² /s)					
Viscosity Permitted	20 to 380 cSt (mm ² /s)					
Fluid Temperature	0°C to +60°C (+32°F to +140°F)					
Filtration	ISO 4406 (1999); 18/16/13					
Pilot Valve	4/2 flow control valve, See Catalog HY14-2500/US Type D1VW			4/2 flow control valve, See Catalog HY14-2500/US Type D3W		

Ordering Information

TEH	□	E	L	0	9	□	□	W	□	□
Throttle Valve with Shut-off Function	Nominal Size	Cartridge Valve ISO 7368	Manual Adjustment with DIN-Lock	Spool Form	Flow Code	Flow Direction	Seals	Plug Socket without Plug	Solenoid Voltage	Design Series NOTE: Not required when ordering.

Code	Description
032	NG32
040	NG40
050	NG50
063	NG63
080	NG80
100	NG100

Code	Description
A	A to B
B	B to A

Code	Description
N	Nitrile
V	Fluorocarbon

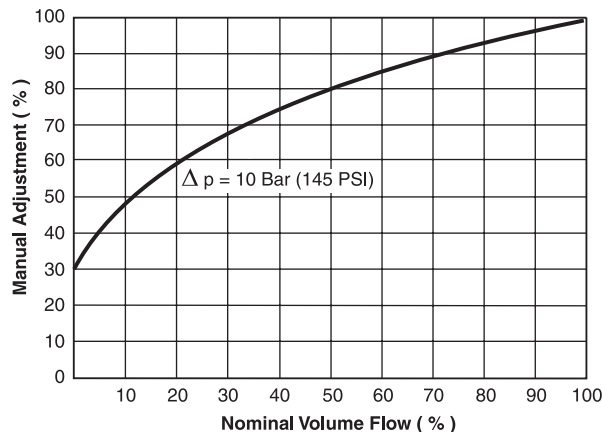
Code	Description
J	24V= / 1.25A
U	98V= / 0.31A *
G	205V= / 0.15A *

* For 110V / 50 Hz or 220V / 50 Hz use plug with rectifier

Weight:

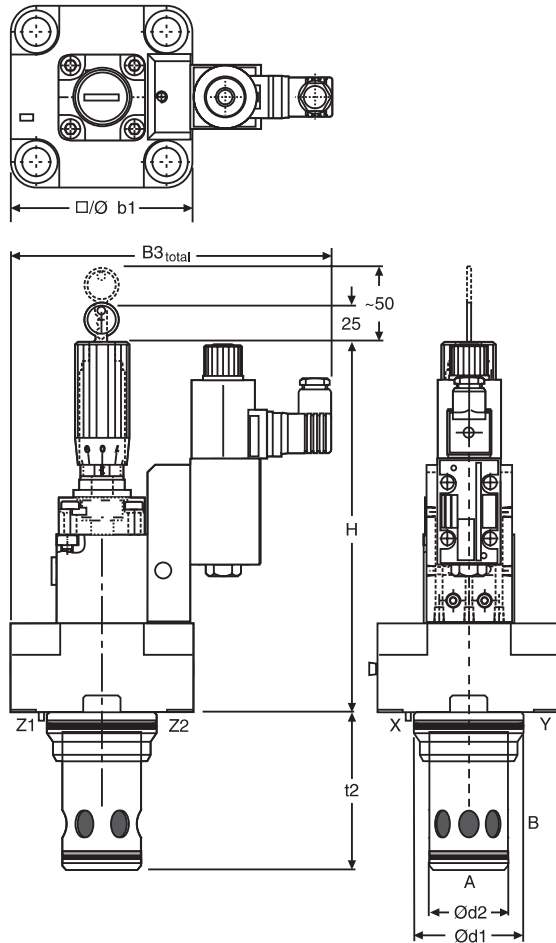
TEH032	9.0 kg (19.8 lbs.)	TEH063	38.0 kg (83.8 lbs.)
TEH040	13.0 kg (28.7 lbs.)	TEH080	62.0 kg (136.7 lbs.)
TEH050	22.0 kg (48.5 lbs.)	TEH100	85.0 kg (187.4 lbs.)

Performance Curve

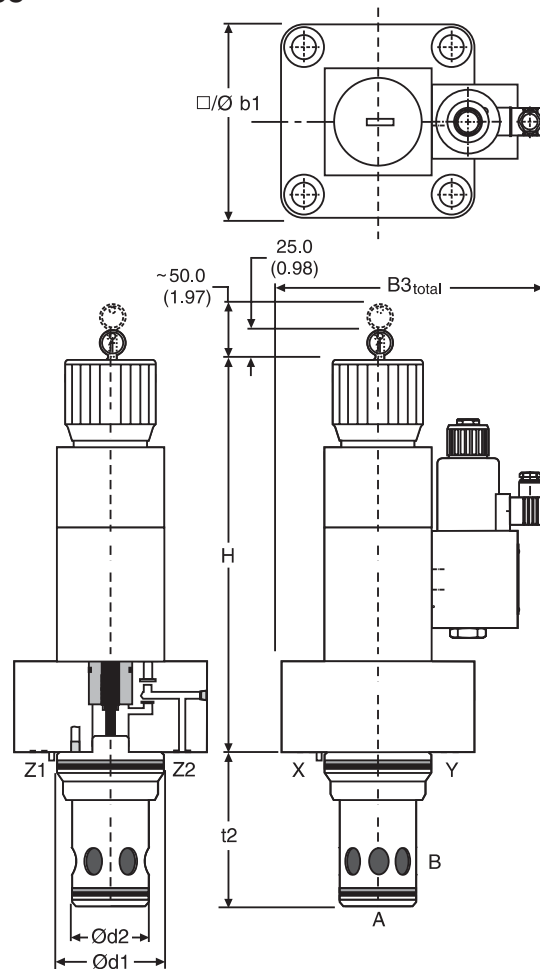


Inch equivalents for millimeter dimensions are shown in (**)

NG32 to NG50

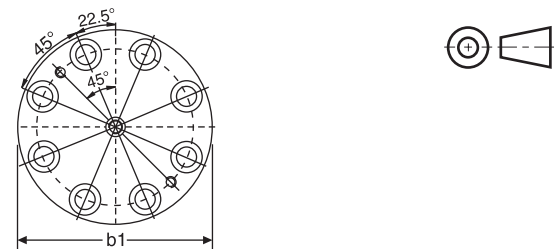





NG63



Size	32	40	50	63	80	100
H	255.0 (10.04)	265.0 (10.43)	275.0 (10.83)	407.0 (16.02)	427.0 (16.81)	442.0 (17.04)
b1	102.0 (4.02)	125.0 (4.92)	140.0 (5.51)	180.0 (7.09)	∅250.0 (9.84)	∅300.0 (11.81)
d1 ^{H7}	60.0 (2.36)	75.0 (2.95)	90.0 (3.54)	120.0 (4.72)	145.0 (5.71)	180.0 (7.09)
d2 ^{H7}	45.0 (1.77)	55.0 (2.17)	68.0 (2.68)	90.0 (3.54)	110.0 (4.33)	135.0 (5.31)
t2 ^{+0.1}	85.0 (3.35)	105.0 (4.13)	122.0 (4.80)	155.0 (6.10)	205.0 (8.07)	245.0 (9.65)
B3 _{total}	205.0 (8.07)	216.0 (8.50)	224.0 (8.82)	255.0 (10.04)	290.0 (11.42)	315.0 (12.40)

NG80 to NG100



NG	Bolt Kit - 		Kit 	
			Nitrile	Fluorocarbon
32	BK415 (BK85)	281 Nm (207.2 lb.-ft.)	SK-TEH032EN20	SK-TEH032EV20
40	BK416 (BK86)	553 Nm (407.8 lb.-ft.)	SK-TEH040EN20	SK-TEH040EV20
50	BK417 (BK87)	553 Nm (407.8 lb.-ft.)	SK-TEH050EN20	SK-TEH050EV20
63	BK418 (BK88)	1910 Nm (1408.6 lb.-ft.)	SK-TEH063EN20	SK-TEH063EV20
80	BK419 (BK135)	935 Nm (689.6 lb.-ft.)	SK-TEH080EN20	SK-TEH080EV20
100	BK420 (BK90)	1910 Nm (1408.6 lb.-ft.)	SK-TEH100EN20	SK-TEH100EV20

TEH.indd, ddp

General Description

Series TDA 2/2 way proportional throttle valves are used to control large oil flows.

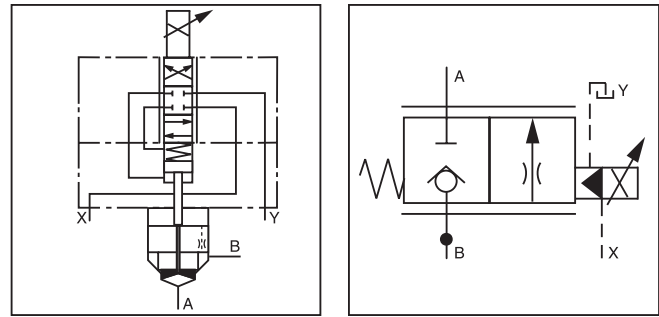
Features

- Cavity and mounting pattern according to ISO 7368.
- Fail-safe function at power failure.
- Leak-free from port B to A.
- Pressure differential up to 350 Bar (5075 PSI) possible.
- 8 sizes NG16 up to NG100.

Function

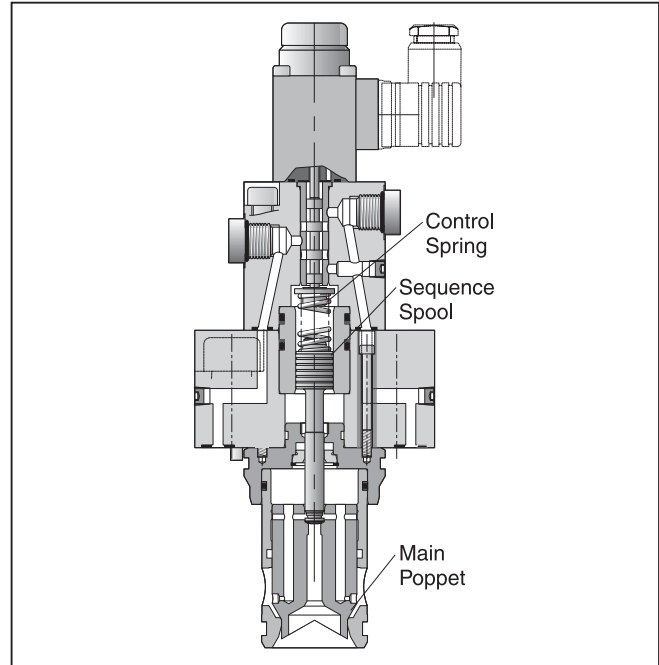
The TDA valve has a 3-stage design consisting of the first solenoid operated pilot stage with a spool in sleeve design, the second pilot stage with the control spring and the sequence spool and as main stage the poppet in the sleeve. The proportional solenoid operates the pilot spool against the feedback of the control spring and controls the position of the sequence spool. The main poppet follows the position of the sequence spool and provides an open area for flow from B to A (optional A to B) in proportion to the solenoid current. The poppet is positioned independent of the differential pressure, which can become as high as the maximum working pressure.

In combination with the digital power amplifier PCD00A-400 the valve parameters can be saved, changed and duplicated.



Function Symbol

Short Symbol



Ordering Information

TDA	□	E	W	0	9	□	2	□	□	□	W	□
Proportional Throttle Valve	Nominal Size	Slip-in Valve ISO 7368	Design	Poppet Shape	Nominal Flow	Flow Direction	Pilot	Seals	Solenoid Voltage	Plug Socket without Plug	Design Series	NOTE: Not required when ordering.

Code	Description
016	NG16
025	NG25
032	NG32
040	NG40
050	NG50
063	NG63
080	NG80
100	NG100

Code	Description
A	A to B
B	B to A

Code	Description
N	Nitrile
V	Fluorocarbon

Code	Description
L	6 VDC
X	16 VDC

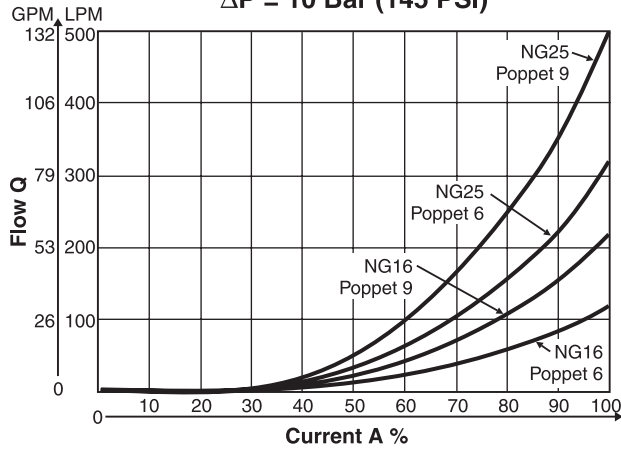
Weight:

TDA016	3.1 kg (6.8 lbs.)	TDA050	15.0 kg (33.1 lbs.)
TDA025	4.3 kg (9.5 lbs.)	TDA063	33.0 kg (72.8 lbs.)
TDA032	5.8 kg (12.8 lbs.)	TDA080	63.0 kg (138.9 lbs.)
TDA040	9.2 kg (20.3 lbs.)	TDA100	87.0 kg (191.8 lbs.)

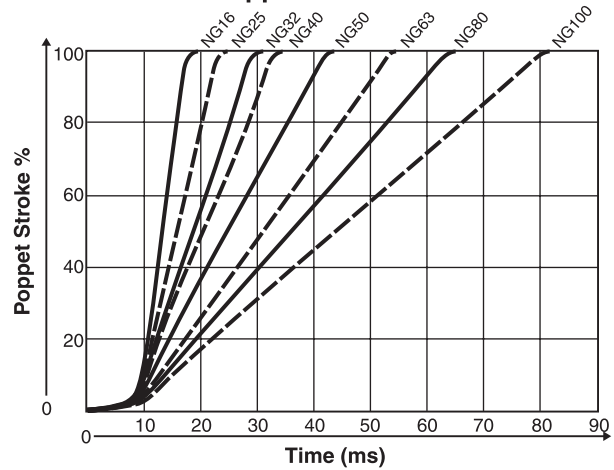
General									
Size	NG16	NG25	NG32	NG40	NG50	NG63	NG80	NG100	
Interface	Slip-in cartridge according to ISO 7368								
Mounting Position	Unrestricted								
Ambient Temperature	-20°C to +80°C (-4°F to +176°F)								
Hydraulic									
Maximum Operating Pressure	Ports A, B and X: 350 Bar (5075 PSI), Port Y 10: Bar (145 PSI) maximum								
Nominal Flow $\Delta p = 10$ Bar (145 PSI)	LPM GPM	220 (58)	500 (132)	950 (251)	1400 (370)	2300 (609)	4000 (1058)	6000 (1587)	9500 (2513)
Flow Direction	See Ordering Information								
Fluid	Hydraulic oil according to DIN 51524 ... 525								
Viscosity Recommended	30 to 80 cSt (mm ² /s)								
Viscosity Permitted	20 to 380 cSt (mm ² /s)								
Fluid Temperature	0°C to +60°C (+32°F to +140°F)								
Filtration	ISO 4406 (1999); 18/16/13 (meet NAS 1638:7)								
Minimum Pilot Pressure	> 25% of system pressure								
Minimum Operating Pressure	Port A to B at 10 Bar (145 PSI), B to A at 15 Bar (208 PSI)								
Pilot Oil Supply	Depending on flow direction A or B using X or external X								
Pilot Oil Drain	External using Y, 10 Bar (145 PSI) maximum								
Pilot Oil at p = 100 Bar (1450 PSI)	Port X to Y < 1.5 LPM (0.4 GPM)								
Opening Point	At 30% of nominal current								
Manufacturing Tolerance	±5% of Q _{nom}								
Static / Dynamic									
Hysteresis	< 3%								
Repeatability	< 1%								
Response Time p _x = 50 Bar (725 PSI)	20 ms	25 ms	30 ms	35 ms	45 ms	55 ms	65 ms	80 ms	
Electrical (Proportional Solenoid)									
Duty Ratio	100% ED								
Protection Class	IP65 in accordance with EN 60529 (plugged and mounted)								
Solenoid	Code	L				X			
	Size	NG16-50	NG25-50	NG32-50	NG40-50	NG63-100	NG80-100	NG100-100	
Solenoid Voltage	6 VDC				16 VDC				
Nominal Current (100% ED)	2.6 amps				1.05 amps				
Nominal Resistance	2.2 Ohm	2.5 Ohm	2.5 Ohm	2.5 Ohm	11.3 Ohm	11.3 Ohm	14 Ohm	14 Ohm	
Power Amplifier Recommended	PCD00A-400								
Solenoid Connection	Connector as per EN 175301-803								

The pilot pressure in X-line must be at least 25% (NG16-40) or 45% (NG50-100) of the pressure in the draining-off line of the cartridge to make sure that the main poppet closes safely without malfunction.

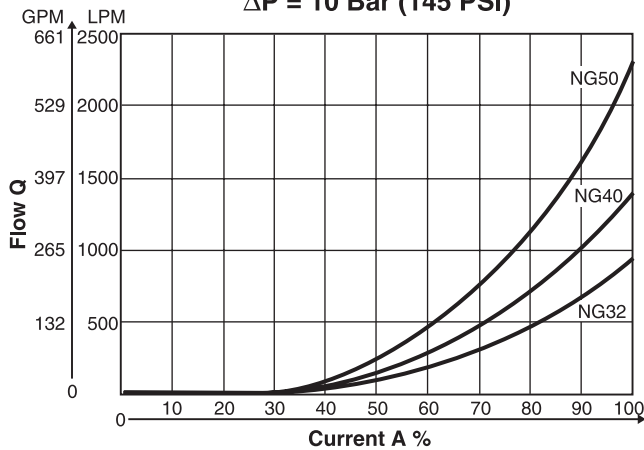
NG16 and NG25 Solenoid Current
 $\Delta P = 10 \text{ Bar (145 PSI)}$



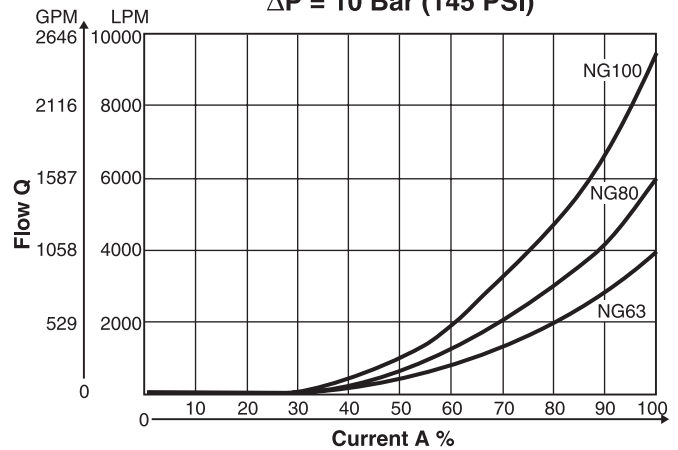
Poppet Stroke / Time



NG32, NG40 and NG50 Solenoid Current
 $\Delta P = 10 \text{ Bar (145 PSI)}$



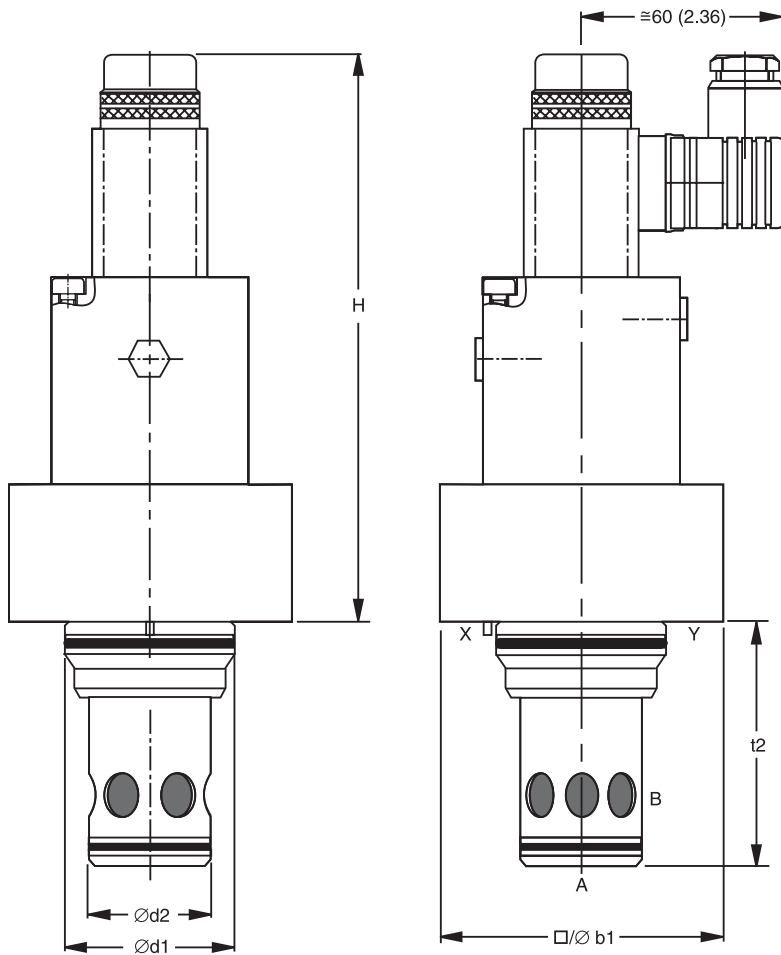
NG63, NG80 and NG100 Solenoid Current
 $\Delta P = 10 \text{ Bar (145 PSI)}$



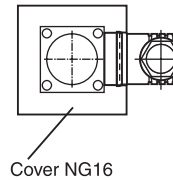
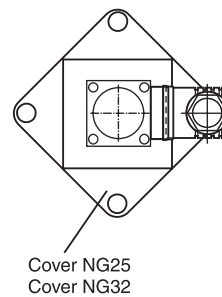
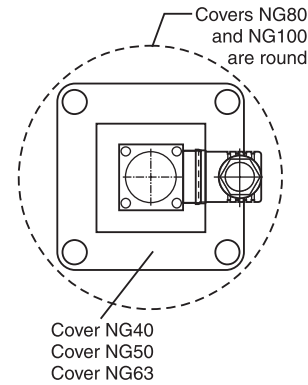
$$\Delta p_{\text{actual}} = \left(\frac{Q_{\text{actual}}}{Q_{\text{nominal}}} \right)^2 \cdot \Delta p_{\text{nominal}}$$

Inch equivalents for millimeter dimensions are shown in (**)




Valves



Valve Covers



Size	NG16	NG25	NG32	NG40	NG50	NG63	NG80	NG100
H	168.0 (6.61)	173.0 (6.81)	178.0 (7.01)	262.0 (10.31)	198.0 (7.80)	287.0 (11.30)	327.0 (12.87)	342.0 (13.46)
b1	65.0 (2.56)	85.0 (3.35)	102.0 (4.02)	125.0 (4.92)	140.0 (5.51)	180.0 (7.09)	Ø250.0 (9.84)	Ø300.0 (11.81)
d1 ^{H7}	32.0 (1.26)	45.0 (1.77)	60.0 (2.36)	75.0 (2.95)	90.0 (3.54)	120.0 (4.72)	145.0 (5.71)	180.0 (7.09)
d2 ^{H7}	25.0 (0.98)	34.0 (1.34)	45.0 (1.77)	55.0 (2.17)	68.0 (2.68)	90.0 (3.54)	110.0 (4.33)	135.0 (5.31)
t2 ^{+0.1}	56.0 (2.20)	72.0 (2.83)	85.0 (3.35)	105.0 (4.13)	122.0 (4.80)	155.0 (6.10)	205.0 (8.07)	245.0 (9.65)

NG	Bolt Kit - 		Kit 	
			Nitrile	Fluorocarbon
16	BK-M8x100-4pcs	33 Nm (24.3 lb.-ft.)	SK-TDA016EN20	SK-TDA016EV20
25	BK391 (BK77)	115 Nm (54.8 lb.-ft.)	SK-TDA025EN20	SK-TDA025EV20
32	BK415 (BK85)	281 Nm (207.2 lb.-ft.)	SK-TDA032EN20	SK-TDA032EV20
40	BK416 (BK86)	553 Nm (407.8 lb.-ft.)	SK-TDA040EN20	SK-TDA040EV20
50	BK417 (BK87)	553 Nm (407.8 lb.-ft.)	SK-TDA050EN20	SK-TDA050EV20
63	BK418 (BK88)	1910 Nm (1408.6 lb.-ft.)	SK-TDA063EN20	SK-TDA063EV20
80	BK419 (BK135)	935 Nm (689.6 lb.-ft.)	SK-TDA080EN20	SK-TDA080EV20
100	BK420 (BK90)	1910 Nm (1408.6 lb.-ft.)	SK-TDA100EN20	SK-TDA100EV20

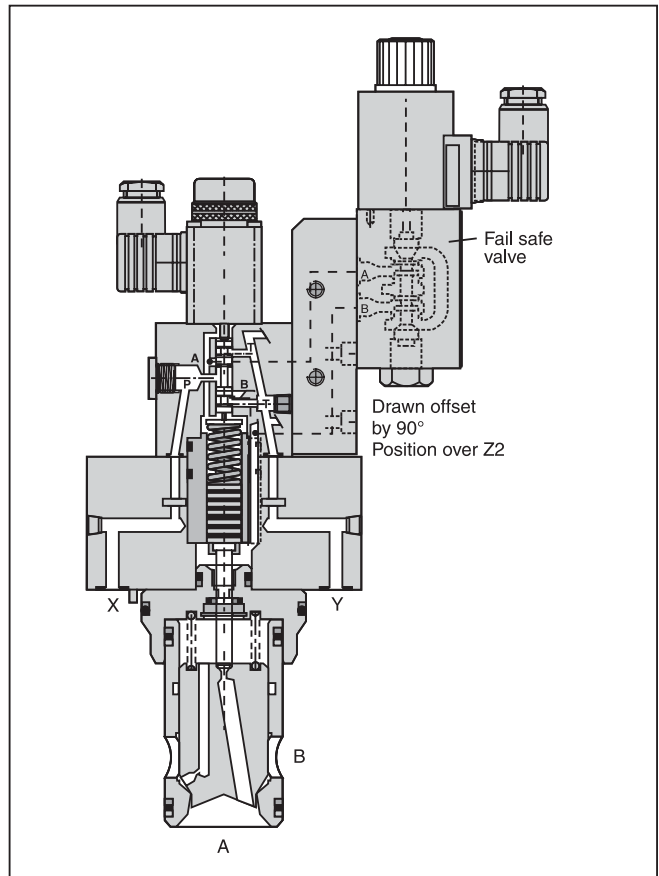
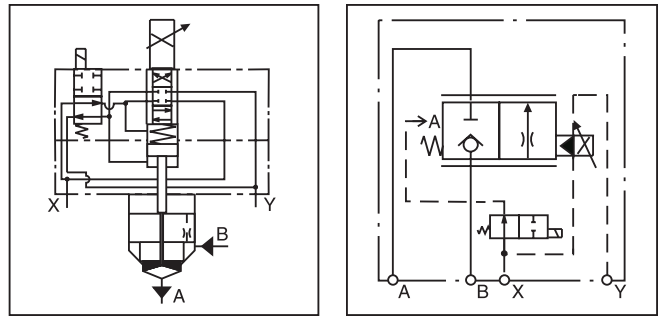
General Description

Series TEA accumulator discharge valves are preferably used in hydraulic systems where high flow rates are discharged from hydraulic accumulators over a short operating period (in the range of milliseconds).

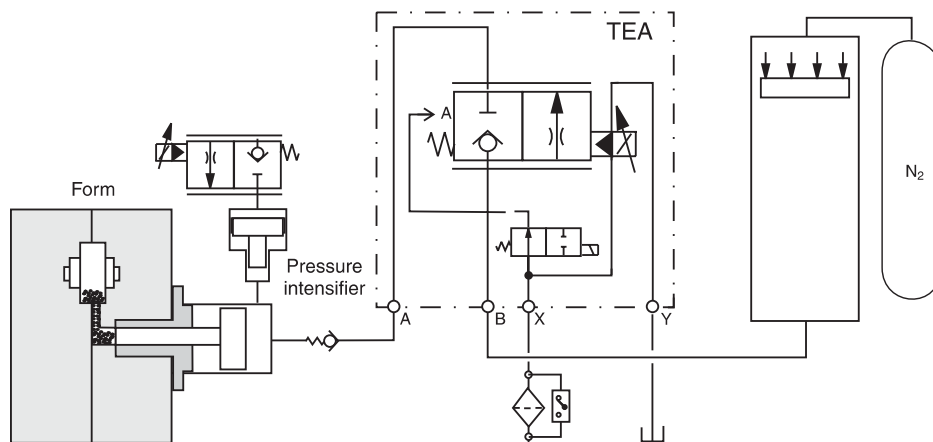
Typical applications are injection molding and die casting machines as well as hydraulic presses.

Basically the function of an accumulator discharge valve corresponds to the function of a TDA throttle valve. In addition a directional valve is integrated in the pilot circuit to meet the relevant safety regulations.

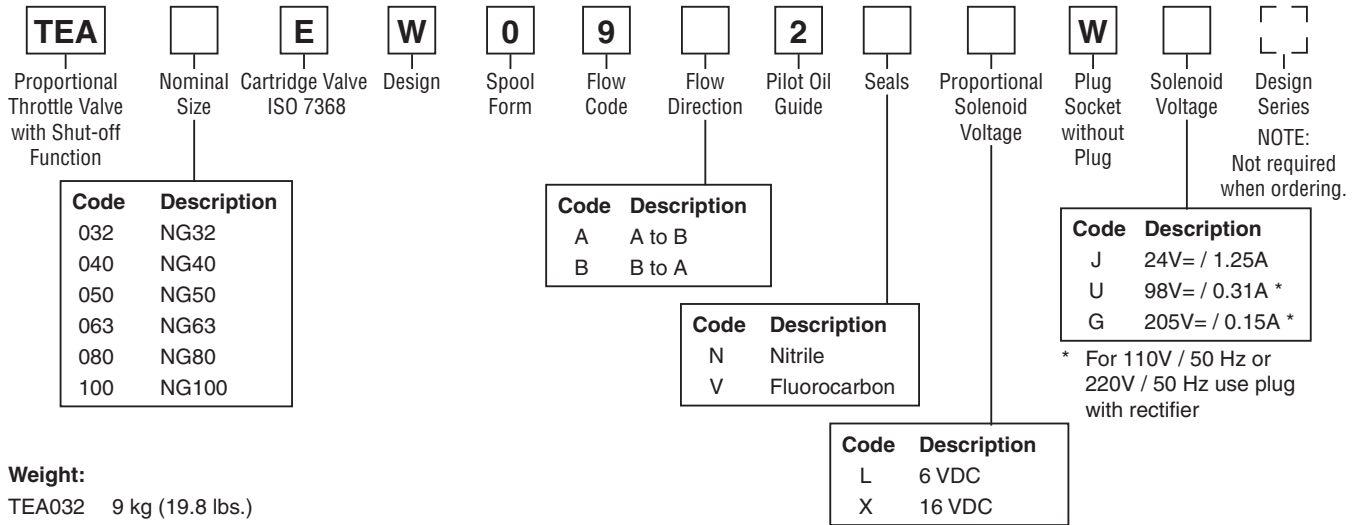
The directional valve provides the safety function. When the solenoid is deenergized and the spring is in the end position, pilot pressure from X presses the control piston into lower end position and, the main poppet is closed. As a result the flow from B to A or from the reservoir system to the machine is blocked.



Example: Accumulator System in a Die Casting Machine



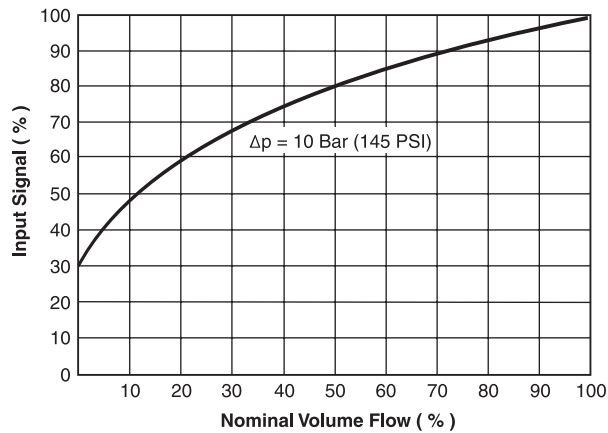
Ordering Information



Weight:

TEA032	9 kg (19.8 lbs.)
TEA040	13 kg (28.7 lbs.)
TEA050	22 kg (48.5 lbs.)
TEA063	38 kg (83.8 lbs.)
TEA080	62 kg (136.7 lbs.)
TEA100	85 kg (187.4 lbs.)

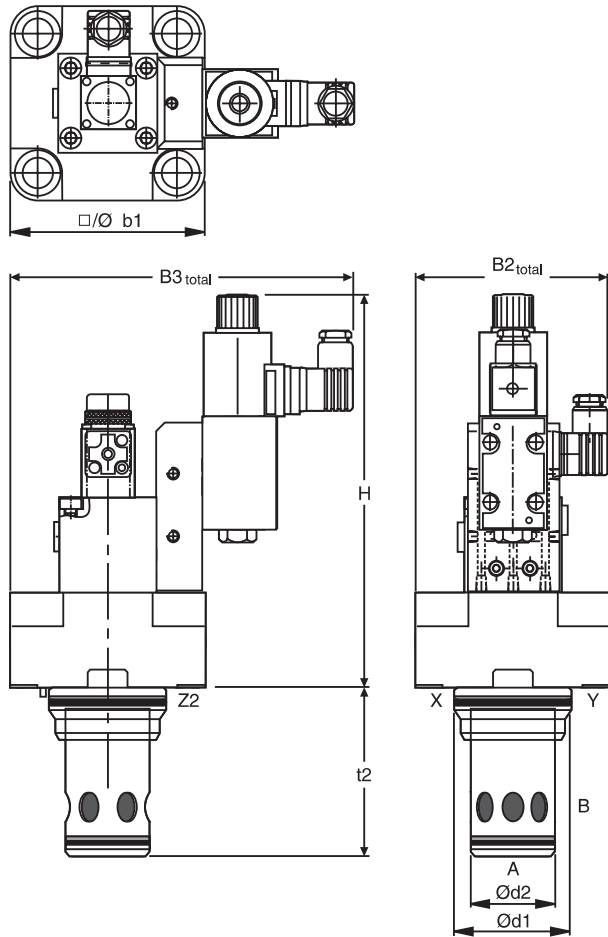
Performance Curve



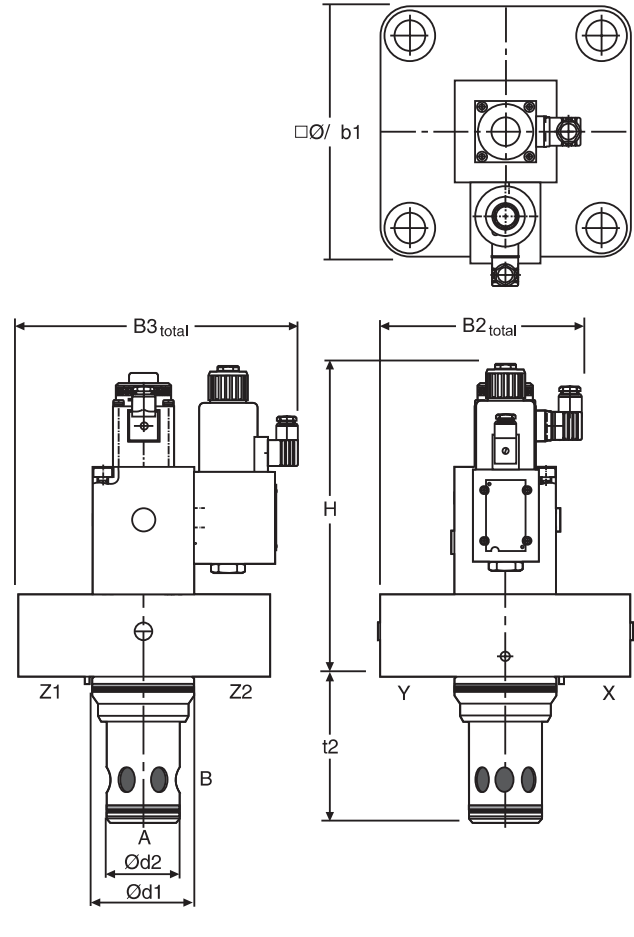
General						
Size	NG32	NG40	NG50	NG63	NG80	NG100
Interface	Slip-in cartridge according to ISO 7368					
Mounting Position	Unrestricted					
Ambient Temperature	-20 to +80°C (-4 to +176°F)					
Hydraulic						
Maximum Operating Pressure	Ports A, B and X: 350 Bar (5075 PSI), Port Y: 10 Bar (145 PSI) maximum					
Nominal Flow $\Delta p = 10$ Bar (145 PSI)	950 LPM (251) GPM	1400 LPM (370) GPM	2300 LPM (609) GPM	4000 LPM (1058) GPM	6000 LPM (1587) GPM	9500 LPM (2513) GPM
Fluid	Hydraulic oil according to DIN 51524 ... 525					
Viscosity Recommended	30 to 80 cSt (mm ² /s)					
Viscosity Permitted	20 to 380 cSt (mm ² /s)					
Fluid Temperature	0 to +60°C (+32°F to +140°F)					
Filtration	ISO 4406 (1999); 18/16/13 (meet NAS 1638:7)					
Minimum Pilot Pressure	> 25% of system pressure					
Minimum Operating Pressure	Port A to B at 10 Bar (145 PSI), B to A at 15 Bar (208 PSI)					
Pilot Oil Supply	Depending on flow direction A or B using X or external X					
Pilot Oil at $p = 100$ Bar (1450 PSI)	Port X to Y < 1.5 LPM (0.4 GPM)					
Opening Point	At 30% of nominal current					
Manufacturing Tolerance	±5% of Q _{nom}					
Static / Dynamic						
Hysteresis	< 3%					
Repeatability	< 1%					
Response Time $p_x = 50$ Bar (725 PSI)	30 ms	35 ms	45 ms	55 ms	65 ms	80 ms
Electrical (Proportional Solenoid)						
Duty Ratio	100% ED					
Protection Class	IP65 in accordance with EN 60529 (plugged and mounted)					
Solenoid Code Size	L			X		
	NG16-50	NG63-100		NG16-50	NG63-100	
Solenoid Voltage Nominal Current (100% ED)	6 VDC 2.6 amps			16 VDC 1.05 amps		
	2.2 Ohm	2.5 Ohm		11.3 Ohm	14 Ohm	
Power Amplifier Recommended	PCD00A-400					
Solenoid Connection	Connector as per EN 175301-803					
Pilot Valve	4/2 flow control valve, See Catalog HY14-2500/US Type D1VW			4/2 flow control valve, See Catalog HY14-2500/US Type D3W		

Inch equivalents for millimeter dimensions are shown in (**)

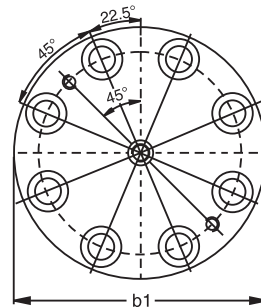
NG32 to NG50



NG63 to NG100



Size	32	40	50	63	80	100
H	250.0 (98.4)	260.0 (10.24)	270.0 (10.63)	312.0 (12.28)	337.0 (13.27)	352.0 (13.86)
b1	102.0 (4.02)	125.0 (4.92)	140.0 (5.51)	180.0 (7.09)	Ø250.0 (9.84)	Ø300.0 (11.81)
d1 ^{H7}	60.0 (2.36)	75.0 (2.95)	90.0 (3.54)	120.0 (4.72)	145.0 (5.71)	180.0 (7.09)
d2 ^{H7}	45.0 (1.77)	55.0 (2.17)	68.0 (2.68)	90.0 (3.54)	110.0 (4.33)	135.0 (5.31)
t2 ^{+0.1}	85.0 (3.35)	105.0 (4.13)	122.0 (4.80)	155.0 (6.10)	205.0 (8.07)	245.0 (9.65)
B2 _{total}	106.0 (4.17)	118.0 (4.65)	125.0 (4.92)	158.0 (6.22)	193.0 (7.60)	218.0 (8.58)
B3 _{total}	205.0 (8.07)	216.0 (8.50)	224.0 (8.82)	255.0 (10.04)	290.0 (11.42)	315.0 (12.40)



NG	Bolt Kit -		Kit	
			Nitrile	Fluorocarbon
32	BK415 (BK85)	281 Nm (207.2 lb.-ft.)	SK-TEAN10E32	SK-TEAN10E32V
40	BK416 (BK86)	553 Nm (407.8 lb.-ft.)	SK-TEAN10E40	SK-TEAN10E40V
50	BK417 (BK87)	553 Nm (407.8 lb.-ft.)	SK-TEAN10E50	SK-TEAN10E50V
63	BK418 (BK88)	1910 Nm (1408.6 lb.-ft.)	SK-TEAN10E63	SK-TEAN10E63V
80	BK419 (BK135)	935 Nm (689.6 lb.-ft.)	SK-TEAN10E80	SK-TEAN10E80V
100	BK420 (BK90)	1910 Nm (1408.6 lb.-ft.)	SK-TEAN10E100	SK-TEAN10E100V

General Description

Series TDL 2/2 way, proportional throttle valves are used in applications where high flow has to be precisely controlled with a very fast response time. Typical applications are die casting, injection molding and hydraulic presses.

Function

The TDL valve has a 3-stage design consisting of the DFplus pilot valve, the hydraulic follow-up system with LVDT and the main stage with poppet and sleeve.

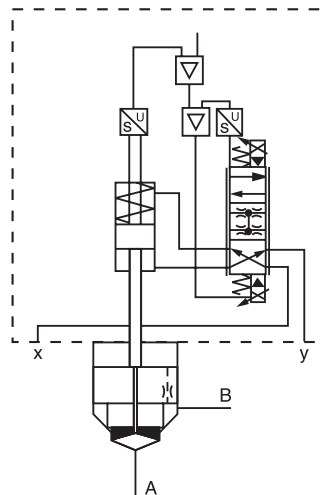
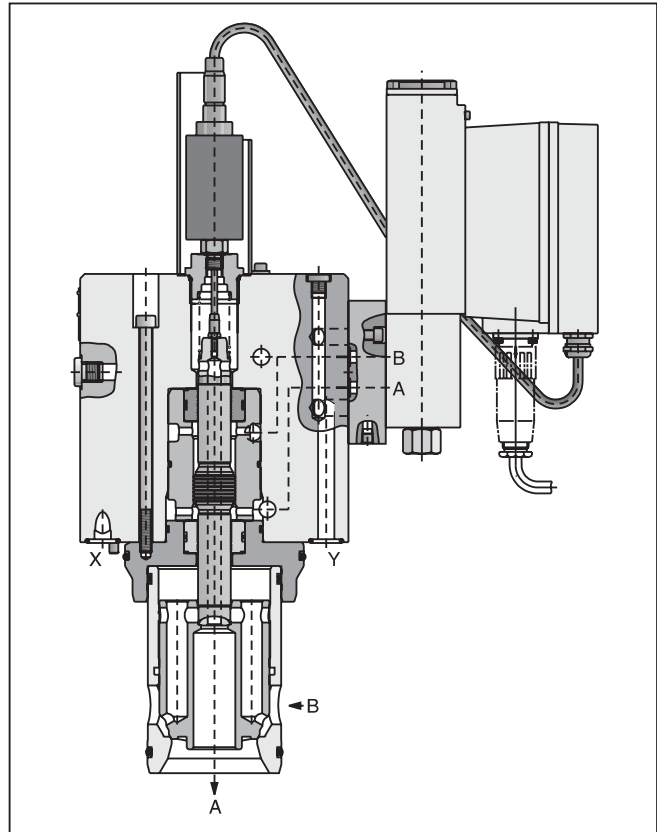
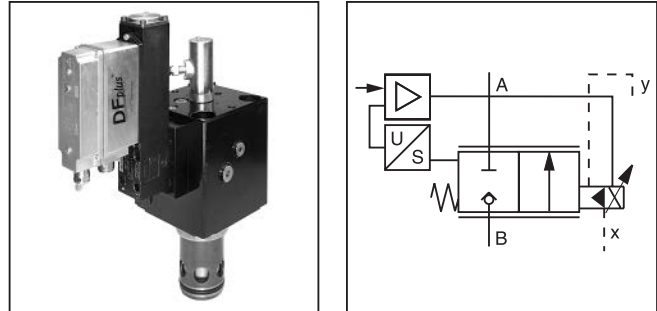
With the DFplus pilot valve the TDL achieves extremely fast response times: from 14ms (NG40) up to 22ms (NG100) with an adjustment precision of 0.5% of the nominal adjusted flow. The follow-up spool enables the poppet to be positioned independent of the differential pressure, which can become as high as the maximum working pressure.

The optimum dynamics are achieved at a control pressure >50 bar. The TDL has integrated electronics controlling both the position of the follow-up piston and the spool position of the DFplus pilot valve. All this makes the TDL a completely factory set unit with minimum or no need for on-site setting.

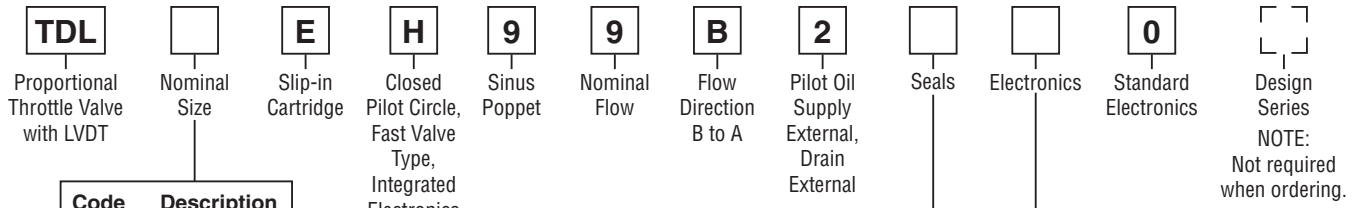
Features

- Pilot operated 2/2 way proportional throttle valve.
- Cavity and mounting pattern according to ISO 7368.
- For speed and position control.
- Fast step response.
- Flow direction B to A.
- Completely calibrated unit with integrated electronics.
- Fail safe position.
- 5 sizes NG40 up to NG100.

Function Symbol



Ordering Information



Code	Description
040	NG40
050	NG50
063	NG63
080	NG80
100	NG100

Code	Description
N	Nitrile
V	Fluorocarbon

Code	Description
B	Supply Voltage 0...+10 VDC
E	Supply 0...+20 mA

Weight:

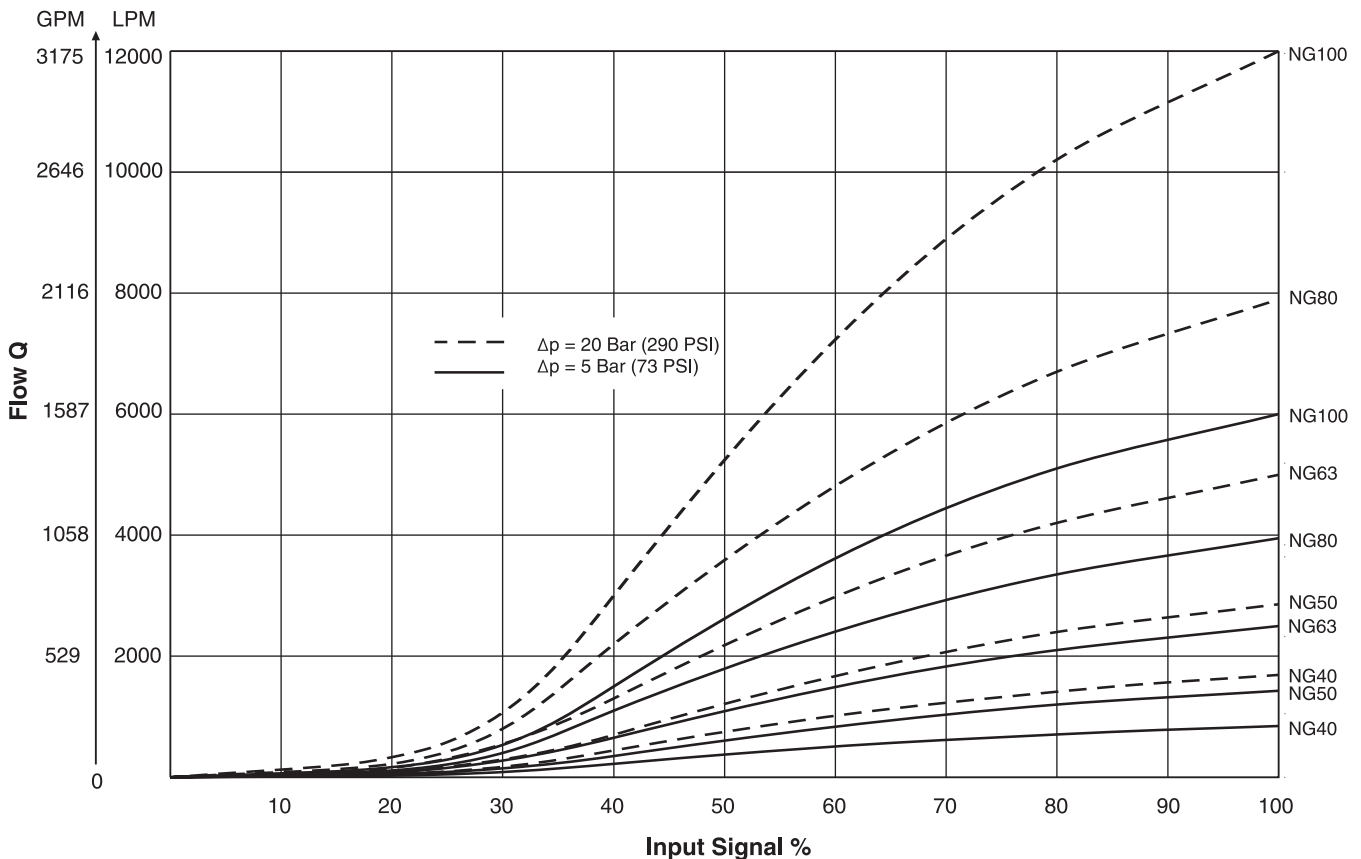
TDL040	15.0 kg (33.1 lbs.)
TDL050	26.0 kg (57.3 lbs.)
TDL063	52.0 kg (114.7 lbs.)
TDL080	105.0 kg (231.5 lbs.)
TDL100	157.0 kg (346.2 lbs.)

Please order plugs separately

Performance Curves

Flow / Signal Line

$\Delta p = 5$ to 20 Bar (73 to 290 PSI) Constant, Viscosity 25mm²/s

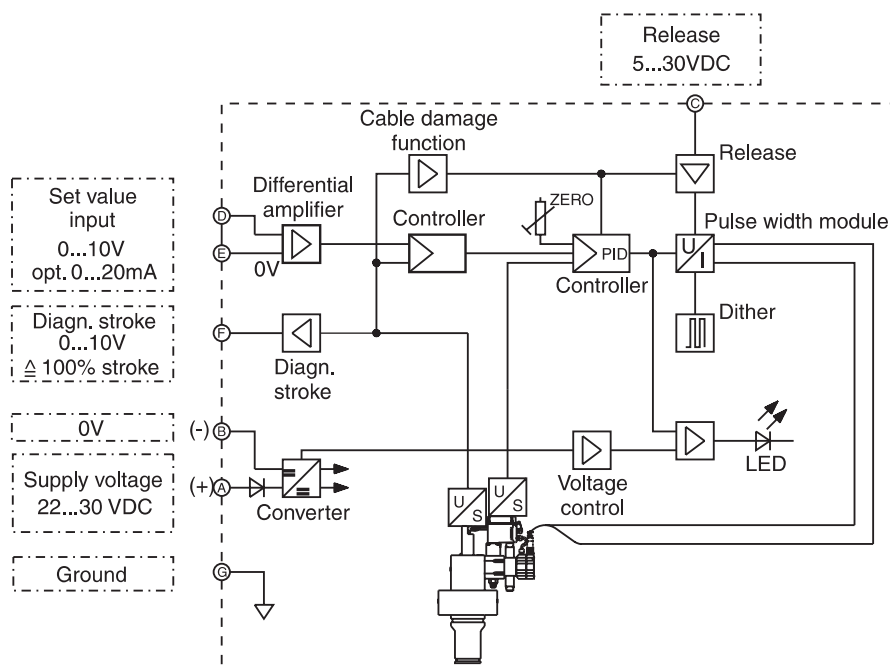


TDL.indd, ddp

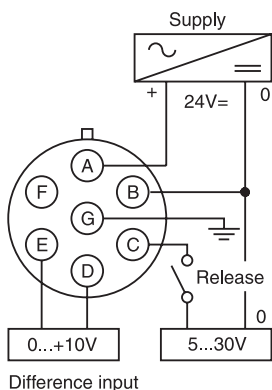
General					
Size	NG40	NG50	NG63	NG80	NG100
Interface	Slip-in cartridge according to ISO 7368				
Mounting Position	Unrestricted				
Ambient Temperature	-20 to +80°C (-4 to +176°F)				
Extracting Tool	See Accessories				
Hydraulic					
Maximum Operating Pressure	Ports A, B and X: 350 Bar (5075 PSI), Port Y: 10 Bar (145 PSI) maximum				
Nominal Flow $\Delta p = 20$ Bar (290 PSI)	2500 LPM (661 GPM)	4100 LPM (1085 GPM)	6800 LPM (1799 GPM)	9500 LPM (2153 GPM)	13500 LPM (3571 GPM)
Flow Direction	B to A				
Fluid	Hydraulic oil according to DIN 51524 ... 525				
Viscosity Recommended	30 to 80 cSt (mm ² /s)				
Viscosity Permitted	20 to 380 cSt (mm ² /s)				
Fluid Temperature	0 to +60°C (+32°F to +140°F)				
Filtration	ISO 4406 (1999); 18/16/13 (meet NAS 1638:7)				
Minimum Pilot Pressure	50% of system pressure				
Pilot Oil Supply	Depending on flow direction B using X or external X				
Pilot Oil Drain	External using Y, 10 Bar (145 PSI) maximum				
Leakage at $p = 175$ Bar (2538 PSI)	Port X to Y				
Release Off	NG40 to NG63 <1.2 LPM (0.3 GPM), NG80 to NG100 <2.0 LPM (0.5 GPM)				
Enable On	NG40 to NG63 <2.5 LPM (0.7 GPM), NG80 to NG100 <4.0 LPM (1.1 GPM)				
Supply Pressure at Port B	Approximately 5 Bar (73 PSI), minimum				
Pilot Fluid Flow	13 LPM (3.4 GPM)	24 LPM (6.3 GPM)	42 LPM (11.1 GPM)	54 LPM (14.3 GPM)	65 LPM (17.2 GPM)
Static / Dynamic					
Hysteresis	< 1%				
Repeatability	< 0.5%				
Response Time t at $p_x = 50$ Bar (725 PSI)	12 ms	16 ms	20 ms	17.5 ms	22 ms
Electrical					
Protection Class	IP65				
Supply Voltage	22 to 30V, ripple < 5% eff., surge free				
Waviness Permitted	5%, maximum				
Power Consumption	2.8 amps, maximum				
Input Signal Range: Voltage Input Current Input Release Input	0 to +10 VDC / 100k Ohm 0 to +20 mA / 250 Ohm 5 to 30 VDC				
Wiring	1.0 mm ² , minimum, shielded				
Wiring Length	50m (164 ft.), maximum				

¹⁾ Flow at different Δp $Q_{\text{actual}} = Q_{\text{nominal}} \cdot \sqrt{\frac{\Delta p_{\text{actual}}}{20}}$

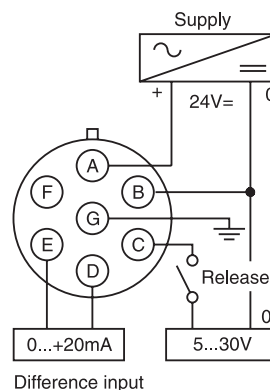
Block Circuit Diagram Electronics



**Connection Diagrams
 Electronics Code B**



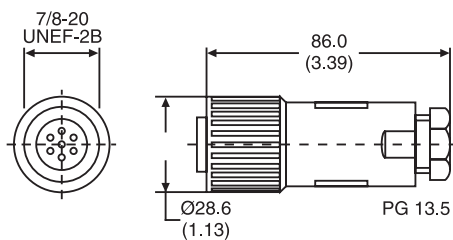
Electronics Code E



Connector

Inch equivalents for millimeter dimensions are shown in (**)

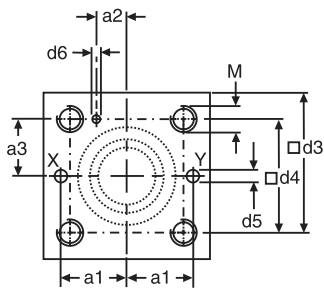
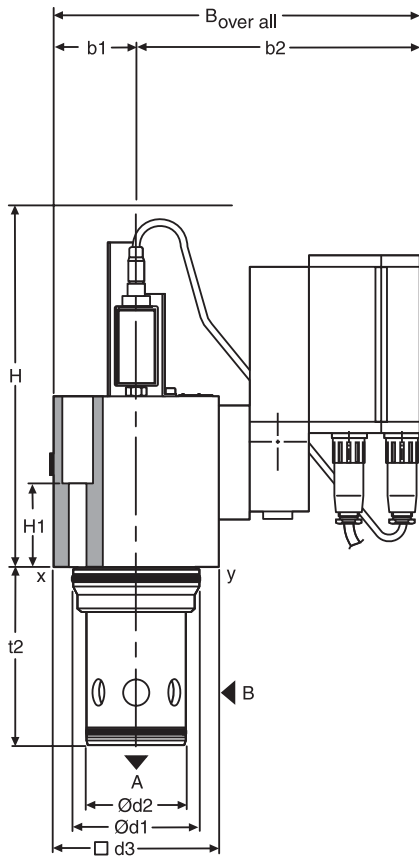
EMV Conforming



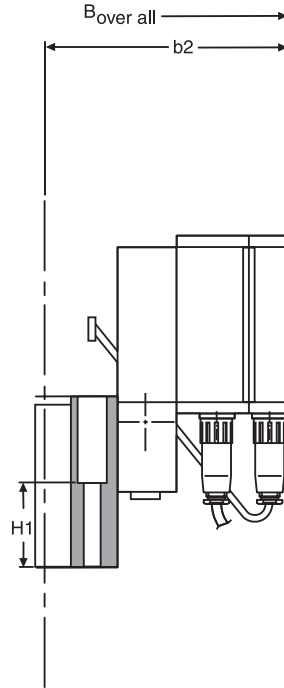
ID no. 5004072
 Please order plugs separately

Complete Cable:
 EHC158GE is 4.57m (15 ft.)

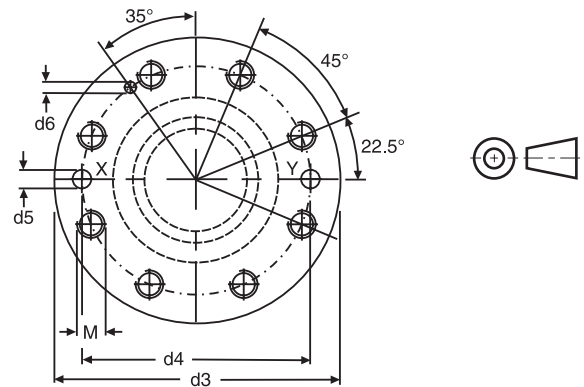
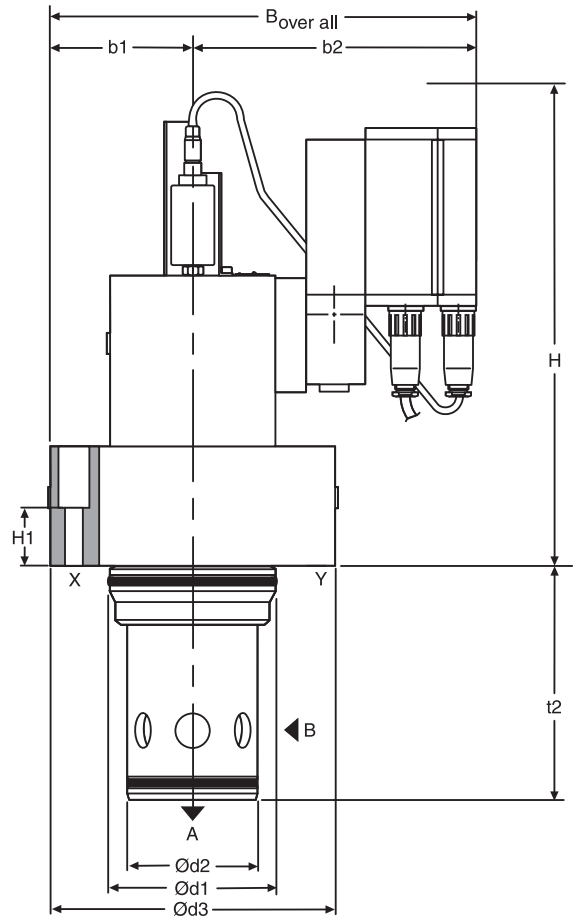
NG50 to NG63



Pilot Valve NG40





Pilot Valve NG80 to NG100



Inch equivalents for millimeter dimensions are shown in (**)

NG	B _{o.a.}	H	H1	t _{2+0.1}	a1	a2	a3	b1
40	275.0 (10.83)	280.0 (11.02)	90.0 (3.54)	105.0 (4.13)	50.0 ±0.2 (1.97 ±.01)	23.0 ±0.2 (0.91 ±.01)	42.0 ±0.2 (1.65 ±.01)	62.5 (2.46)
50	355.0 (13.98)	330.0 (12.99)	130.0 (5.12)	122.0 (4.80)	58.0 ±0.2 (2.28 ±.01)	30.0 ±0.2 (1.18 ±.01)	50.0 ±0.2 (1.97 ±.01)	70.0 (2.76)
63	395.0 (15.55)	325.0 (12.80)	115.0 (4.53)	155.0 (6.10)	75.0 ±0.2 (2.95 ±.01)	38.0 ±0.2 (1.50 ±.01)	62.5 ±0.2 (2.46 ±.01)	90.0 (3.54)
80	385.0 (15.16)	425.0 (16.73)	80.0 (3.15)	205.0 (8.07)	—	—	—	125.0 (4.92)
100	425.0 (16.73)	440.0 (17.32)	89.0 (3.50)	245.0 (9.65)	—	—	—	150.0 (5.91)

NG	b2	Ød1 _{H7}	Ød1 _{H7}	d3	d4	Ød5 max.	Ød6	M
40	210.0 (8.27)	75.0 (2.95)	55.0 (2.17)	125.0 (4.92)	85.0 ±0.2 (3.35 ±.01)	10.0 (0.39)	6+0.22x10	M20x45
50	285.0 (11.22)	90.0 (3.54)	68.0 (2.68)	140.0 (5.51)	100 ±0.2 (3.94 ±.01)	10.0 (0.39)	8+0.22x10	M20x45
63	305.0 (12.01)	120.0 (4.72)	90.0 (3.54)	180.0 (7.09)	125 ±0.2 (4.92 ±.01)	12.0 (0.47)	8+0.22x10	M30x65
80	260.0 (10.24)	145.0 (5.71)	110.0 (4.33)	250.0 (9.84)	200 ±0.2 (7.87 ±.01)	16.0 (0.63)	10+0.22x10	M24x55
100	275.0 (10.83)	180.0 (7.09)	135.0 (5.31)	300.0 (11.81)	245 ±0.2 (9.65 ±.01)	20.0 (0.79)	10+0.22x10	M30x65

NG	Bolt kit - 	
40	BK-M20x120-4pcs	553 Nm (407.8 lb.-ft.)
50	BK-M20x160-4pcs	553 Nm (407.8 lb.-ft.)
63	BK-M30x180-4pcs	1910 Nm (1408.6 lb.-ft.)
80	BK-M24x120-8pcs	935 Nm (689.6 lb.-ft.)
100	BK-M30x140-8pcs	1910 Nm (1408.6 lb.-ft.)

General Description

Series TDP 2/2 way, proportional throttle valves are used in applications where high flow has to be precisely controlled at maximum dynamics. Typical applications are die casting, injection molding and hydraulic presses.

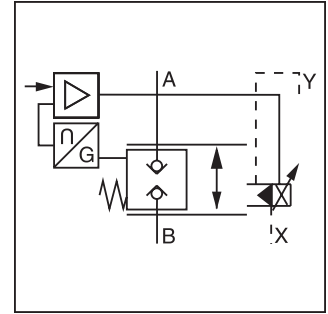
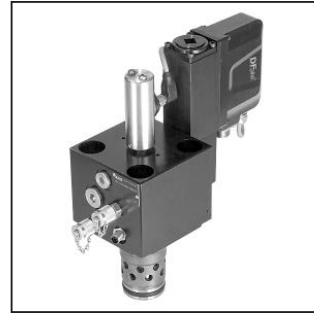
Function

The TDP valve has a 2-stage design consisting of a DFplus pilot valve and a main stage with poppet and LVDT.

With the DFplus pilot valve the TDP achieves extremely fast response times: from 12ms (NG32) up to 28ms (NG100) with an accuracy of <0.1% of the nominal flow. The pilot valve actively controls the poppet independent of the pressure conditions in the main ports.

It is basically required that the pilot pressure is at the level of the system pressure. At low system pressure the pilot pressure should be min. 140 Bar (2030 PSI), when high valve dynamics are desired.

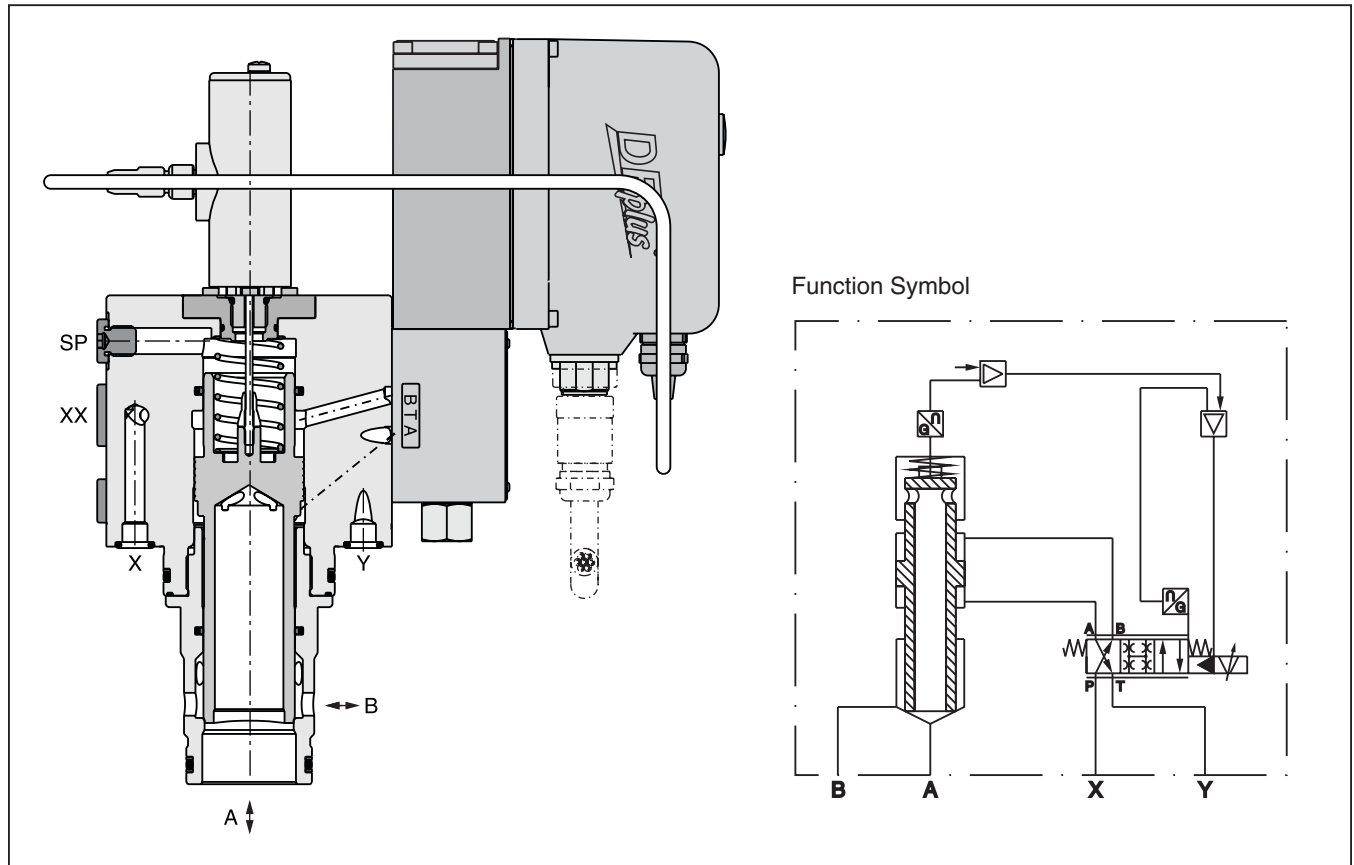
The TDP has integrated electronics controlling both the position of the main poppet and the spool position of the DFplus pilot valve.



Features

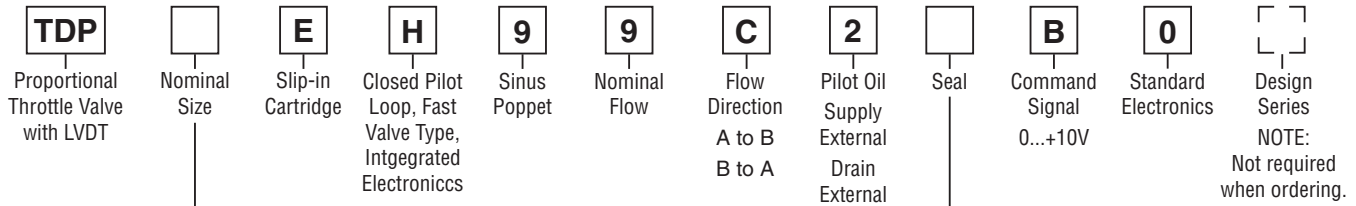
- Active pilot operated 2/2 way proportional throttle valve.
- Cavity and mounting pattern according to ISO 7368.
- Fast step response.
- Flow direction B to A and A to B.
- Completely mounted and adapted unit with integrated electronics.
- Fail save position in case of electrical and/or hydraulic power down.
- 6 sizes NG32 up to NG100.

TDP040



TDP.indd, ddp

Ordering Information



Code	Description
032	NG32
040	NG40
050	NG50
063	NG63
080	NG80
100	NG100

Code	Description
N*	Nitrile
V	Fluorocarbon

* HFC fluids suitable.

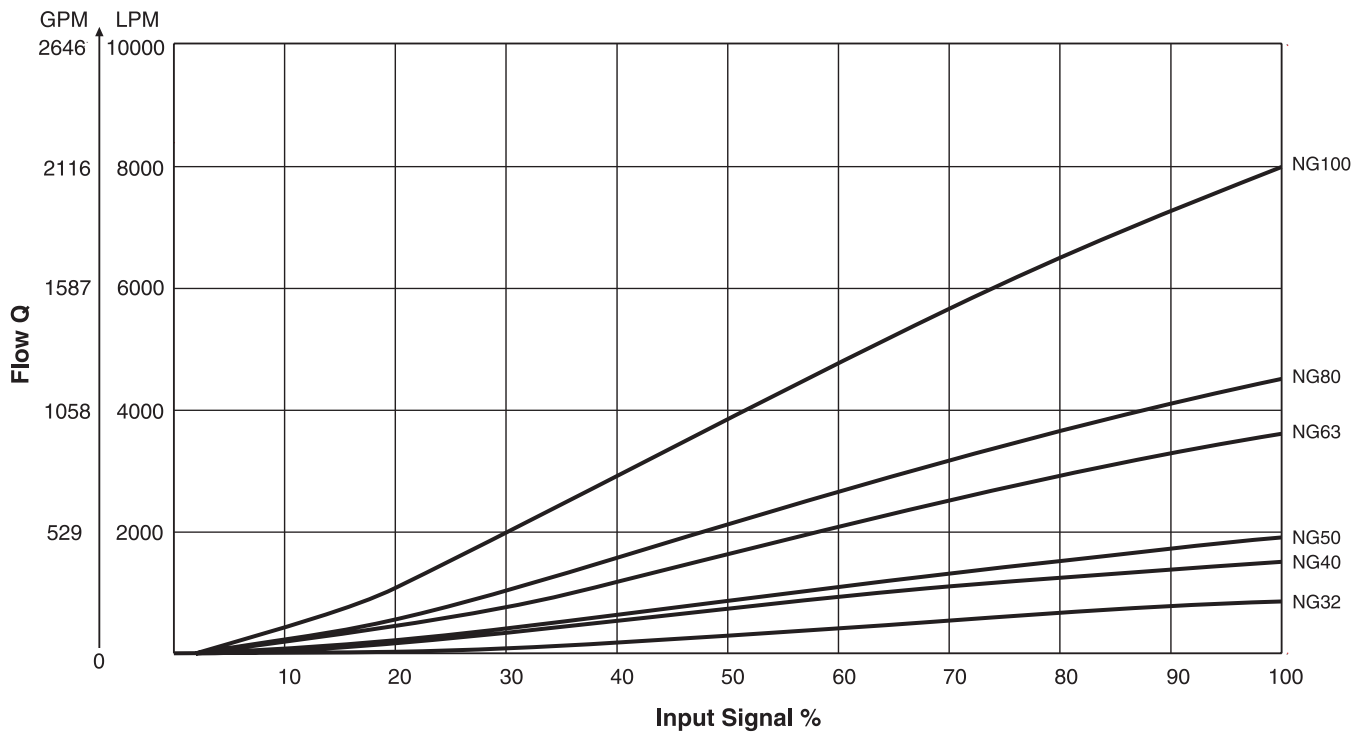
Weight:

TDA032	13.0 kg (28.7 lbs.)
TDA040	15.0 kg (33.1 lbs.)
TDA050	26.0 kg (57.3 lbs.)
TDA063	52.0 kg (114.6 lbs.)
TDA080	105.0 kg (231.5 lbs.)
TDA100	157.0 kg (346.1 lbs.)

Please order connector separately.

Performance Curves

Flow / Signal Line



Opening point factory set to 3%

Characteristic curve measured with HLP46 at 50°C.

Flow at different Δp

$$Q_{\text{actual}} = Q_{\text{nominal}} \cdot \sqrt{\frac{\Delta p_{\text{actual}}}{\Delta p_{\text{nominal}}}}$$

General														
Size	NG32		NG40		NG50		NG63		NG80		NG100			
Interface	Proportional Throttle Valve, Slip-in Cartridge according to ISO 7368													
Mounting Position	Unrestricted													
Ambient Temperature	-20°C to +50°C (-4°F to +122°F)													
MTTF _D	50 years													
Vibration Resistance	g		10 sinus 5...2000 Hz acc. IEC 68-2-6 30 random noise 20...2000 Hz acc. IEC 68-2-36 15 shock acc. IEC 68-2-27											
Hydraulic														
Maximum Operating Pressure	Ports A, B, X, XX and SP, up to 350 Bar (5075 PSI), Port Y, maximum 35 Bar (507.5 PSI)													
Nominal Flow $\Delta p = 10$ Bar (145 PSI)	LPM GPM		850 (224.5)		1500 (396.3)		1900 (501.9)		3600 (951.0)		4500 (1188.8)		8000 (2113.4)	
Maximum Flow Recommended	LPM GPM		2000 (528.3)		3000 (792.5)		4500 (1188.8)		8000 (2113.4)		13000 (3434.2)		20000 (5283.4)	
Fluid	Hydraulic oil according to DIN 51524 ... 51525													
Fluid Temperature	0°C to +60°C (+32°F to +140°F)													
Viscosity Recommended	30 to 80 cSt (mm ² /s)													
Viscosity Permitted	20 to 380 cSt (mm ² /s)													
Filtration	ISO 4406 (1999); 18/16/13 (meet NAS 1638:7)													
Flow Direction	B to A and A to B													
Pilot Pressure	Must be as high as system pressure													
Pilot Oil Supply	External via X													
Pilot Oil Drain	External via Y													
Leakage in Pilot Valve at 100 Bar (1450 PSI)	<400 LPM (105.7 GPM)													
Pilot Valve Size	NG6						NG10							
Maximum Pilot Flow at 140 Bar (2030 PSI) Pilot Press.	30 LPM (7.9 GPM)		40 LPM (10.6 GPM)		40 LPM (10.6 GPM)		70 LPM (18.5 GPM)		80 LPM (21.1 GPM)		100 LPM (26.4 GPM)			
Static / Dynamic ¹⁾														
Step Response at Pilot Pressure >140 Bar (2030 PSI)	12 ms		14 ms		20 ms		17 ms		23 ms		28 ms			
Frequency Resp. at Pilot Press. >140 Bar (2030 PSI)														
Amplitude -3dB; 10% \pm 5%	80 Hz		74 Hz		66 Hz		52 Hz		46 Hz		41 Hz			
Phase -90°; 10% \pm 5%	63 Hz		59 Hz		52 Hz		56 Hz		51 Hz		47 Hz			
Hysteresis	< 1%													
Sensitivity	< 0.05%													
Temperature Drift	< 0.025%K													

¹⁾ For optimal dynamics see installation recommendation.

(Continued on next page)

Specifications (Continued from previous page)

Electrical	
Duty Ratio	100% ED
Protection Class	IP65 in accordance with EN 60529 (with correctly mounted plug-in connector)
Supply Voltage / Ripple	22...30V, ripple < 5% eff., surge free
Current Consumption Max.	3.5 A
Pre-fusing	4.0 A medium lag
Input Signal Voltage Impedance Input Capacitance Typ.	0...+10V, ripple < 0.01 % eff., surge free 100 kOhm 1 nF
Differential Input Maximum	30V for terminal D and E against PE (terminal G), 11V for terminal D and E against 0V (terminal B)
Enable Signal	5...30V, Ri = 9 kOhm
Diagnostic Signal	0...+10V, rated max. 5mA
EMC	EN 61000-6-2, EN 61000-6-4
Electrical Connection	6 + PE as per EN 175201-804
Wiring Minimum	mm² 7 x 1.0 (AWG16) overall braid shield
Wiring Length Maximum	50 m (164 ft.)

Installation Recommendations

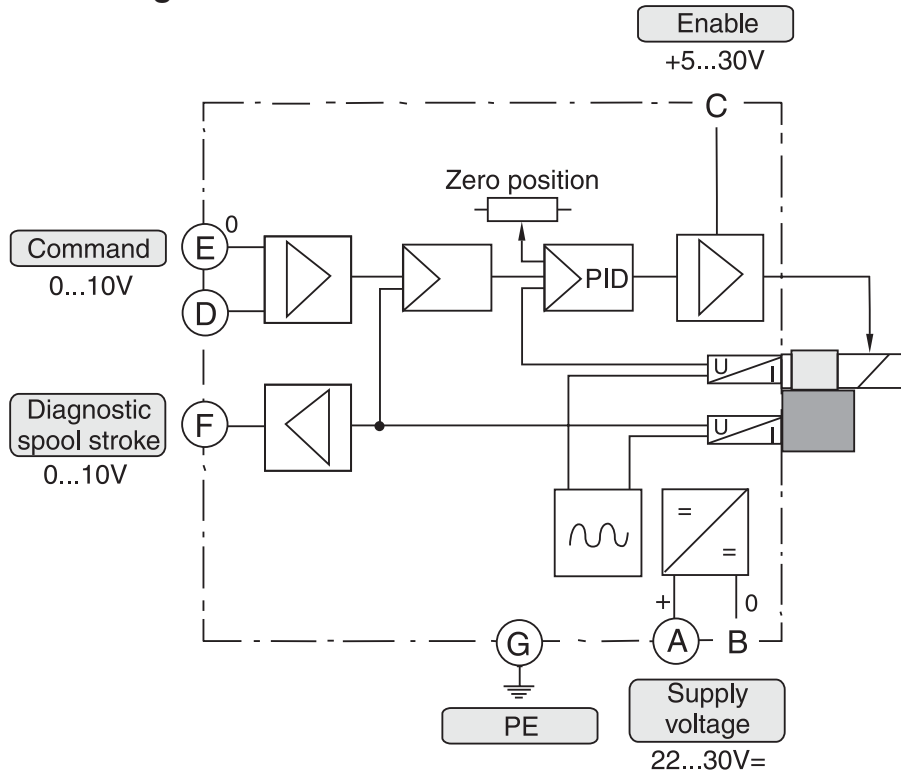
The maximum pilot flow is given in the technical data. At insufficient pilot oil supply – e.g. because of long distances and/or small diameters – an accumulator can be connected to port XX. See selection guide for correct dimensions.

Selection Guide

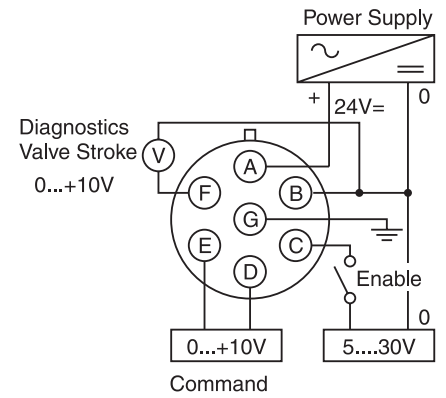
Size	Capacity	Product Type	Pressure Rating	Accu port XX
NG40	0.162 Liters (0.0428 Gallons)	ADE016-25R	126 Bar (1827.5 PSI)	G 1/2
NG50	0.243 Liters (0.0642 Gallons)	ADE032-21R	126 Bar (1827.5 PSI)	G 1/2
NG63	0.405 Liters (0.1070 Gallons)	ADE050-21R	126 Bar (1827.5 PSI)	G 1
NG80	0.647 Liters (0.1709 Gallons)	ADE075-21R	126 Bar (1827.5 PSI)	G 3/4
NG100	0.944 Liters (0.2494 Gallons)	ADE100-21R	126 Bar (1827.5 PSI)	G 3/4

Suction Port SP: Contact Parker for installation recommendation.

Block Diagram

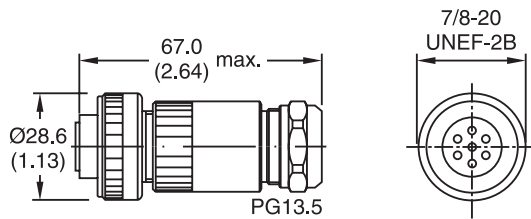


**Electronics Connection
 Code B**



Female Connector

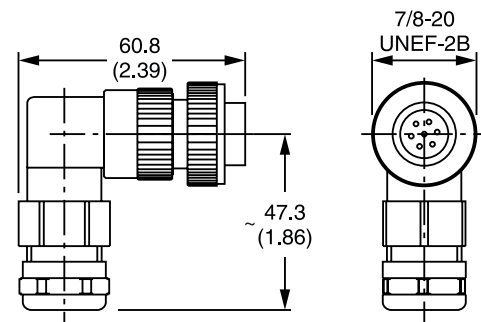
(EMC conform)



Part No. 5004072

Angle Female Connector

(EMC conform)

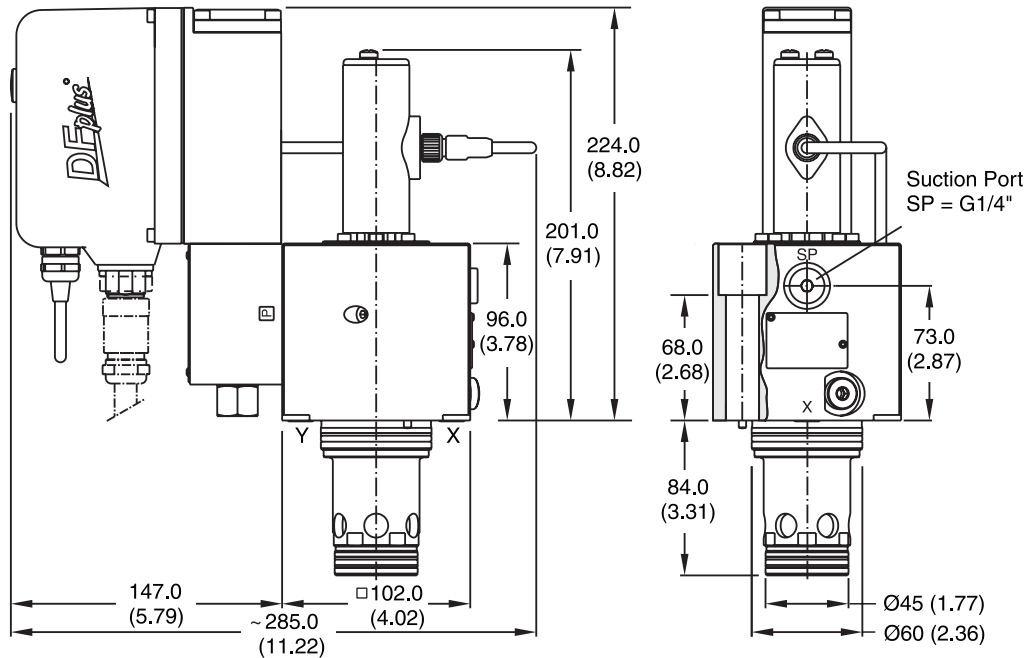


Part No. 5005160

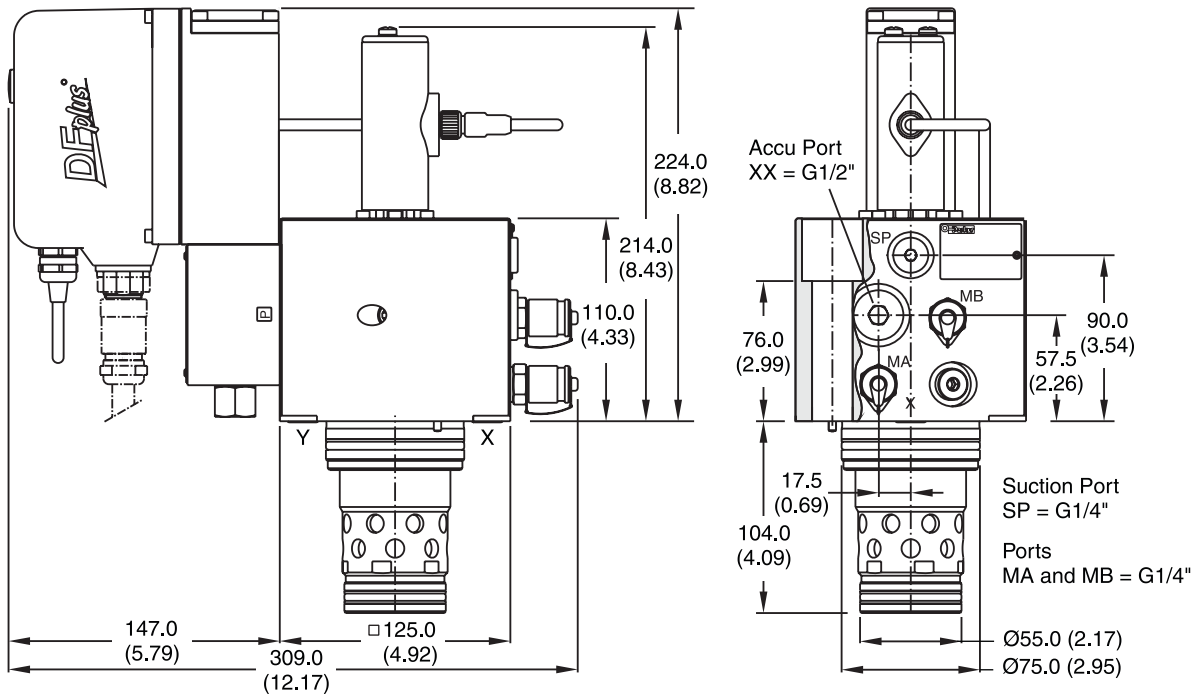
Please order plugs separately.

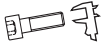

Inch equivalents for millimeter dimensions are shown in (**)

NG32



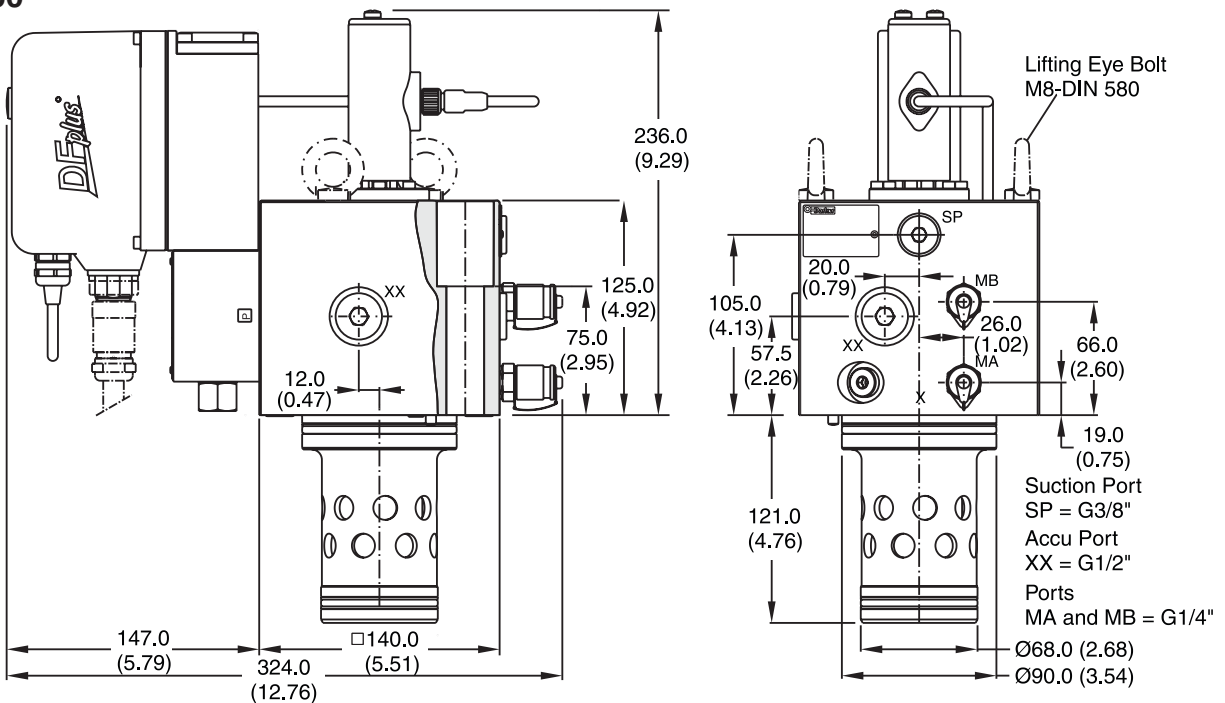
NG40



NG	Bolt Kit -  DIN912 12.9		Kit	
			Nitrile	Fluorocarbon
32	BK529 4 x M16x100 DIN 912 12.8	281 Nm (207.2 lb.-ft.)	SK-TDP032EN	SK-TDP032EV
40	BK513 4 x M20x120 DIN 912 12.8	553 Nm (407.8 lb.-ft.)	SK-TDP040EN	SK-TDP040EV

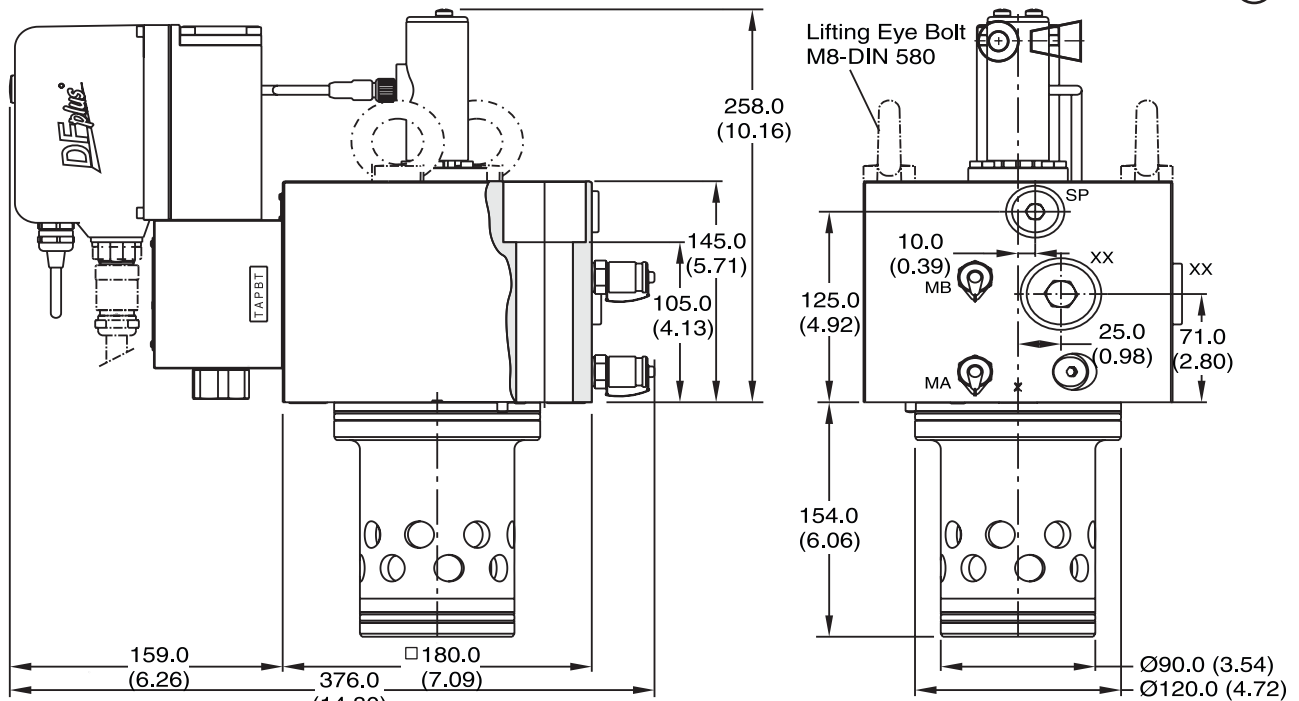
Inch equivalents for millimeter dimensions are shown in (**)

NG50



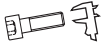

Lifting Thread for Disassembly M12

NG63



Lifting Thread for Disassembly M12

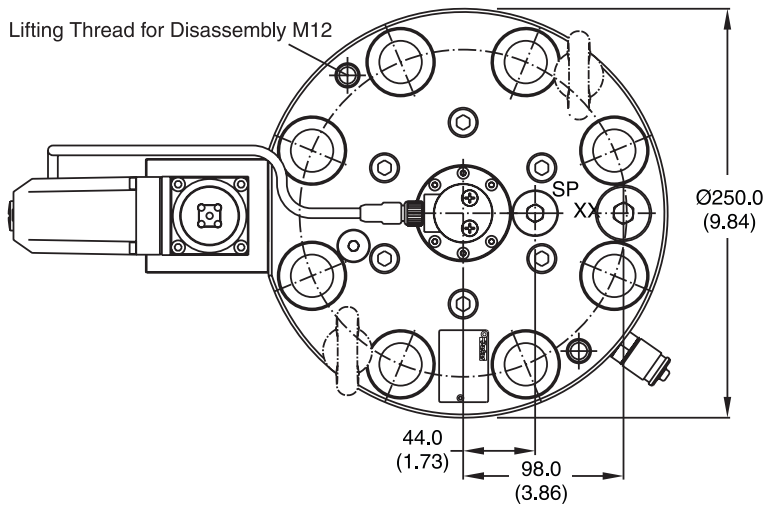
Suction Port Accu Port Ports
SP = G1/2" XX = G1" MA and MB = G1/4"

NG	Bolt Kit - 	DIN912 12.9		Kit	
				Nitrile	Fluorocarbon
50	BK513 4 x M20x120	DIN 912 12.8	553 Nm (407.8 lb.-ft.)	SK-TDP050EN	SK-TDP050EV
63	BK420 4 x M30x140	DIN 912 12.9	1910 Nm (1408.6 lb.-ft.)	SK-TDP063EN	SK-TDP063EV

Inch equivalents for millimeter dimensions are shown in (**)

NG80

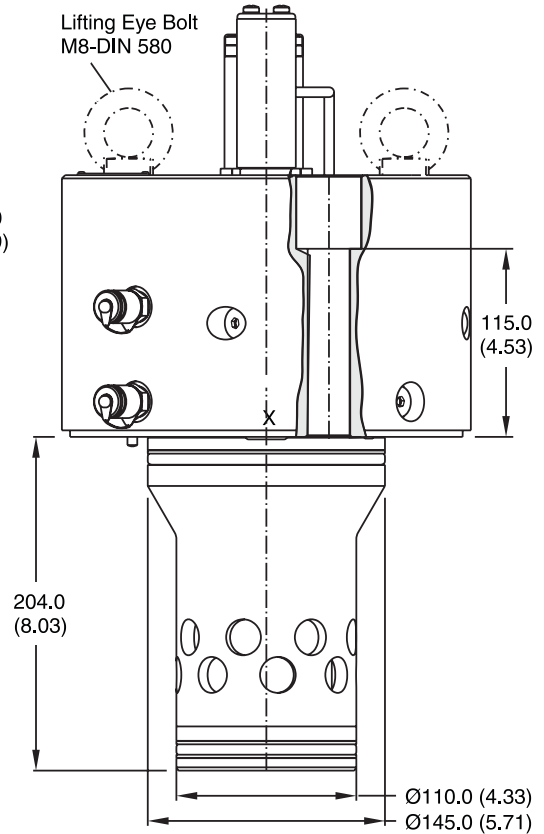
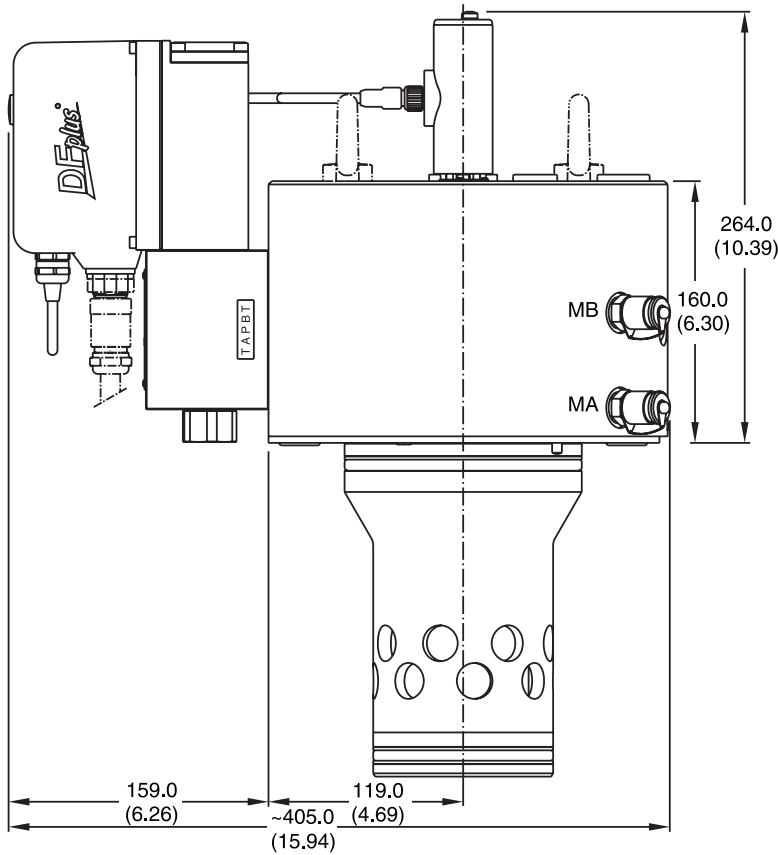
Lifting Thread for Disassembly M12

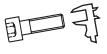



Accu Port
XX = G3/4"

Suction Port
SP = G1/2"

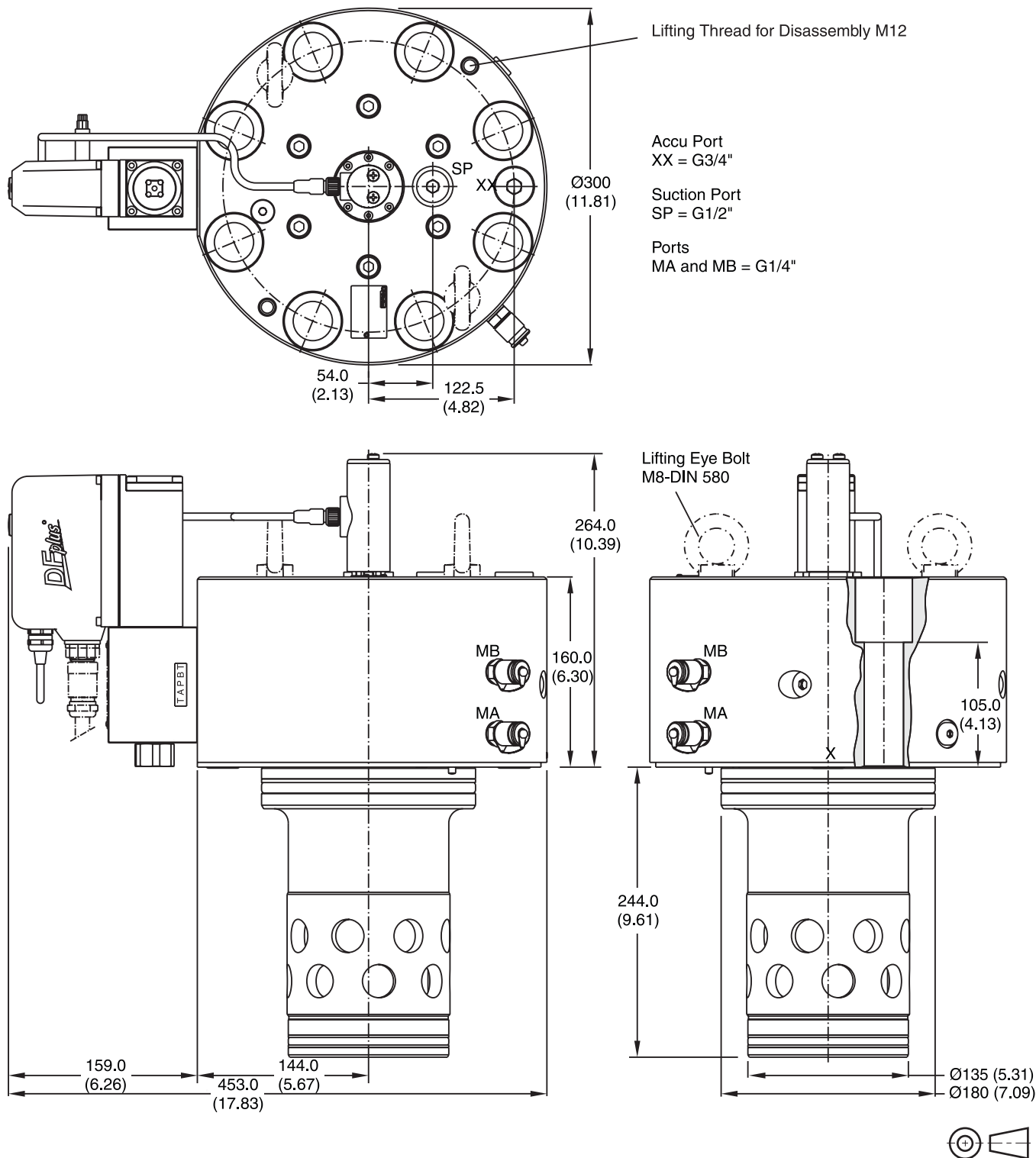
Ports
MA and MB = G1/4"





NG	Bolt Kit -  DIN912 12.9		Nitrile	Kit	Fluorocarbon
80	BK530 8x M24x160 DIN 912 12.9	955 Nm (704.3 lb.-ft.)	SK-TDP080EN		SK-TDP080EV

Inch equivalents for millimeter dimensions are shown in (**)

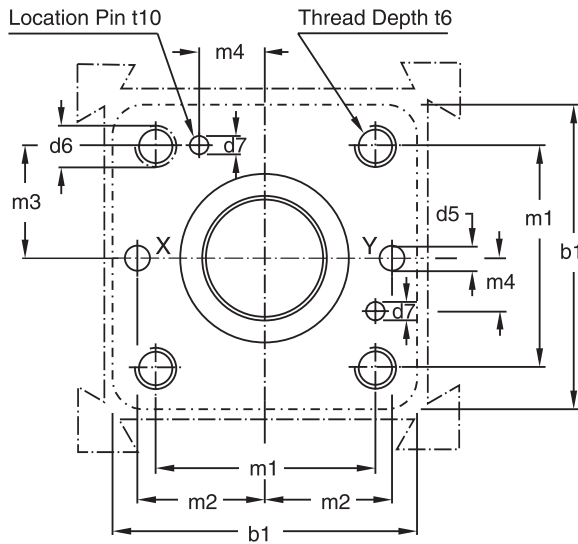
NG100



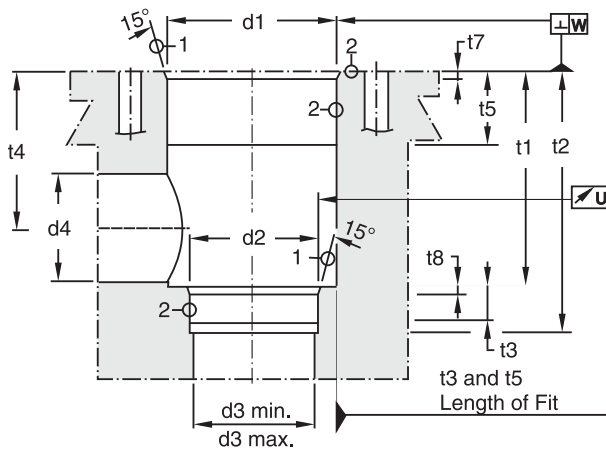
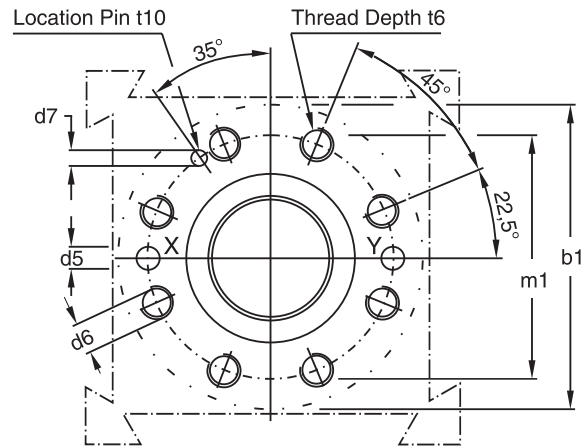
NG	Bolt Kit -  DIN912 12.9		Nitrile	Kit	Fluorocarbon
100	BK517 8x M30x150 DIN 912 12.9	1910 Nm (1408.6 lb.-ft.)	SK-TDP100EN		SK-TDP100EV

Mounting Patterns

Code: ISO 7368-B*-*-2-A/B
NG32 to NG63



Code: ISO 7368-B*-*-2-A
NG80 to NG100



Required Surface Finish:

① = $\sqrt{R_{\max} 16}$, ② = $\sqrt{R_{\max} 8}$

Deviating from ISO 7368 it is advisable to increase the diameters d3, d4 and d5.

Dimensions

Inch equivalents for millimeter dimensions are shown in (**)

Size	b1	d1 H7	d2 H7	d3	d3 max.	d4 max.*	d5 max.	d6	d7 H13	m1±0.2	m2±0.2	m3±0.2
32	102.0 (4.02)	60.0 (2.36)	45.0 (1.77)	32.0 (1.26)	44.0 (1.73)	50.0 (1.97)	8.0 (0.31)	M 16	6.0 (0.24)	70.0 (2.76)	41.0 (1.61)	35.0 (1.38)
40	125.0 (4.92)	75.0 (2.95)	55.0 (2.17)	40.0 (1.57)	54.0 (2.13)	63.0 (2.48)	10.0 (0.39)	M 20	6.0 (0.24)	85.0 (3.35)	50.0 (1.97)	42.5 (1.67)
50	140.0 (5.51)	90.0 (3.54)	68.0 (2.68)	50.0 (1.97)	67.0 (2.64)	80.0 (3.15)	10.0 (0.39)	M 20	8.0 (0.31)	100.0 (3.94)	58.0 (2.28)	50.0 (1.97)
63	180.0 (7.09)	120.0 (4.72)	90.0 (3.54)	63.0 (2.48)	89.0 (3.50)	100.0 (3.94)	12.0 (0.47)	M 30	8.0 (0.31)	125.0 (4.92)	75.0 (2.95)	62.5 (2.46)
80	250.0 (9.84)	145.0 (5.71)	110.0 (4.33)	80.0 (3.15)	109.0 (4.29)	110.0 (4.33)	16.0 (0.63)	M 24	10.0 (0.39)	200.0 (7.87)	—	—
100	300.0 (11.81)	180.0 (7.09)	135.0 (5.31)	100.0 (3.94)	134.0 (5.28)	150.0 (5.91)	20.0 (0.79)	M 30	10.0 (0.39)	245.0 (9.65)	—	—

Size	m4±0.2	t1+0.5	t2+1	t3	t4	t4 max.*	t5	t6	t7	t8	t10	U	W
32	17.0 (0.67)	70.0 (2.76)	85.0 (3.35)	13.0 (0.47)	52.0 (2.05)	44.0 (1.73)	15.0 (0.59)	35.0 (1.38)	2.5 (0.10)	2.5 (0.10)	10.0 (0.39)	0.03 (0.001)	0.1 (0.004)
40	23.0 (0.91)	87.0 (3.43)	105.0 (4.13)	15.0 (0.59)	64.0 (2.52)	54.0 (2.13)	15.0 (0.59)	45.0 (1.77)	3.0 (0.12)	3.0 (0.12)	10.0 (0.39)	0.05 (0.002)	0.1 (0.004)
50	30.0 (1.18)	100.0 (3.94)	122.0 (4.80)	17.0 (0.67)	72.0 (2.83)	59.0 (2.32)	17.0 (0.67)	45.0 (1.77)	4.0 (0.16)	3.0 (0.12)	10.0 (0.39)	0.05 (0.002)	0.1 (0.004)
63	38.0 (1.50)	130.0 (5.12)	155.0 (6.10)	20.0 (0.79)	95.0 (3.74)	78.0 (3.07)	19.0 (0.75)	65.0 (2.56)	4.0 (0.16)	4.0 (0.16)	10.0 (0.39)	0.05 (0.002)	0.2 (0.008)
80	—	175.0 (6.89)	205.0 (8.07)	25.0 (0.98)	130.0 (5.12)	115.0 (4.53)	32.0 (1.26)	50.0 (1.97)	5.0 (0.20)	5.0 (0.20)	10.0 (0.39)	0.05 (0.002)	0.2 (0.008)
100	—	210.0 (8.27)	245.0 (9.65)	29.0 (1.14)	155.0 (6.10)	133.0 (5.24)	32.0 (1.26)	53.0 (2.09)	5.0 (0.20)	5.0 (0.20)	10.0 (0.39)	0.05 (0.002)	0.2 (0.008)

* Only in combination with d4max and t4max.

General Description

Series TPQ 3/2 way, proportional throttle valves are used in applications where high flow has to be precisely controlled at maximum dynamics. Typical applications are die casting, injection molding and hydraulic presses.

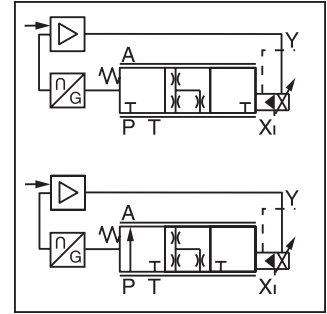
Function

The TPQ valve has a 2-stage design consisting of a DFplus pilot valve and a main stage with spool and LVDT.

With the DFplus pilot valve the TPQ achieves extremely fast response times: from 9ms (NG32) up to 23ms (NG80) with an accuracy of <0.1% of the nominal flow. The pilot valve actively controls the poppet independent of the pressure conditions in the main ports.

It is basically required that the pilot pressure is at the level of the system pressure. At low system pressure the pilot pressure should be min. 140 Bar (2030 PSI), when high valve dynamics are desired.

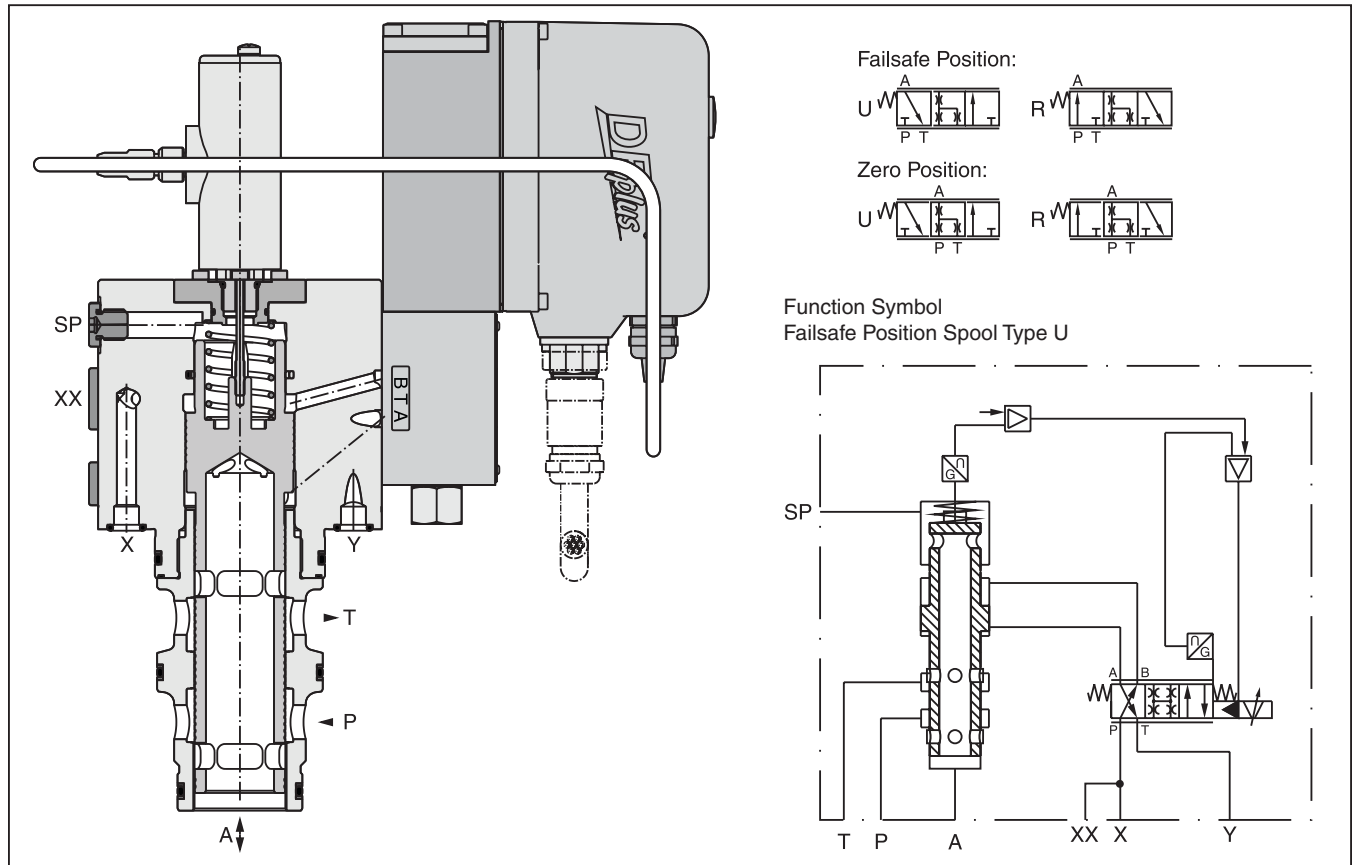
The TPQ has integrated electronics controlling both the position of the main poppet and the spool position of the DFplus pilot valve.



Features

- Active pilot operated 3/2 way proportional throttle valve.
- Cavity according to Parker house norm.
- Mounting pattern according to ISO 7368.
- Fast step response.
- Flow direction A to T and P to A.
- Completely mounted and adapted unit with integrated electronics.
- Fail save position in case of electrical and/or hydraulic power down.
- 5 sizes NG32 up to NG80.

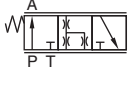

TPQ040



Ordering Information

<div style="border: 1px solid black; padding: 2px; width: 40px; margin: 0 auto;">TPQ</div> <p style="font-size: small;">Proportional Throttle Valve with LVDT</p>	<div style="border: 1px solid black; width: 40px; height: 40px; margin: 0 auto;"></div> <p style="font-size: small;">Nominal Size</p>	<div style="border: 1px solid black; padding: 2px; width: 40px; margin: 0 auto;">W</div> <p style="font-size: small;">Parker Slip-in Cartridge</p>	<div style="border: 1px solid black; padding: 2px; width: 40px; margin: 0 auto;">H</div> <p style="font-size: small;">Closed Pilot Loop, Fast Valve Type, Integrated Electronics</p>	<div style="border: 1px solid black; padding: 2px; width: 40px; margin: 0 auto;">2</div> <p style="font-size: small;">Linear Spool</p>	<div style="border: 1px solid black; padding: 2px; width: 40px; margin: 0 auto;">5</div> <p style="font-size: small;">Nominal Flow</p>	<div style="border: 1px solid black; width: 40px; height: 40px; margin: 0 auto;"></div> <p style="font-size: small;">Spool Type</p>	<div style="border: 1px solid black; padding: 2px; width: 40px; margin: 0 auto;">2</div> <p style="font-size: small;">Pilot Oil Supply External Drain External</p>	<div style="border: 1px solid black; width: 40px; height: 40px; margin: 0 auto;"></div> <p style="font-size: small;">Seal</p>	<div style="border: 1px solid black; width: 40px; height: 40px; margin: 0 auto;"></div> <p style="font-size: small;">Input Signal</p>	<div style="border: 1px solid black; padding: 2px; width: 40px; margin: 0 auto;">0</div> <p style="font-size: small;">Standard Electronics</p>	<div style="border: 1px dashed black; width: 40px; height: 40px; margin: 0 auto;"></div> <p style="font-size: small;">Design Series</p> <p style="font-size: x-small;">NOTE: Not required when ordering.</p>
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Code		Description
032	NG32	
040	NG40	
050	NG50	
063	NG63	
080	NG80	

Zerolap		
Code	Spool Type	Fail save
	Input signal	
	- 0 +	
R		P to A
U		A to T

Code		Description
B	0...±10V	
S	4...+20mA	

Code		Description
N	NBR	
V	FPM	
H	For HFC Fluid	

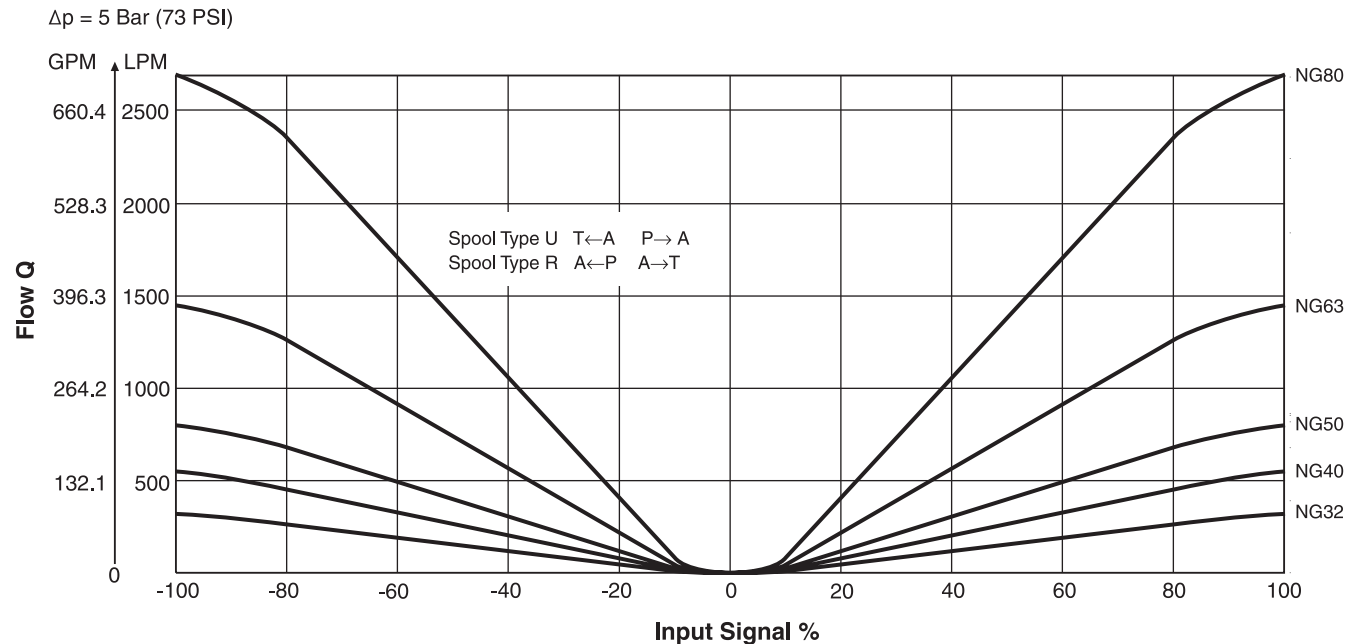
Please order connector separately.

Weight:

TPQ032	13.0 kg (28.7 lbs.)
TPQ040	15.0 kg (33.1 lbs.)
TPQ050	26.0 kg (57.3 lbs.)
TPQ063	52.0 kg (114.6 lbs.)
TPQ080	105.0 kg (231.5 lbs.)

Performance Curves

Flow / Signal Line



Flow at different Δp $Q_{actual} = Q_{nominal} \cdot \sqrt{\frac{\Delta p_{actual}}{\Delta p_{nominal}}}$

Characteristic curve measured with HLP46 at 50°C.

General						
Size		NG32	NG40	NG50	NG63	NG80
Interface	Proportional Throttle Valve, Slip-in Cartridge according to ISO 7368					
Mounting Position	Unrestricted					
Ambient Temperature	-20°C to +50°C (-4°F to +122°F)					
MTTF _D	50 years					
Vibration Resistance	g	10 sinus 5...2000 Hz acc. IEC 68-2-6 30 random noise 20...2000 Hz acc. IEC 68-2-36 15 shock acc. IEC 68-2-27				
Hydraulic						
Maximum Operating Pressure	Ports A, P, T, X, XX ¹⁾ and SP ¹⁾ , up to 350 Bar (5075 PSI), Port Y, maximum 35 Bar (507.5 PSI)					
Nominal Flow $\Delta p = 5 \text{ Bar (72.5 PSI)}$	LPM GPM	320 (84.5)	550 (145.3)	800 (211.3)	1450 (383.0)	2700 (713.3)
Maximum Flow Recommended	LPM GPM	1000 (264.2)	1600 (422.7)	2250 (594.4)	3500 (924.6)	6500 (1717.1)
Fluid	Hydraulic oil according to DIN 51524...51525					
Fluid Temperature	0°C to +60°C (+32°F to +140°F)					
Viscosity Recommended	30 to 80 cSt (mm ² /s)					
Viscosity Permitted	20 to 380 cSt (mm ² /s)					
Filtration	ISO 4406 (1999); 18/16/13 (meet NAS 1638:7)					
Nominal Overlap	< 1.5%					
Flow Direction	A to T and P to A					
Pilot Pressure	Must be as high as system pressure					
Pilot Oil Supply	External via X					
Pilot Oil Drain	External via Y					
Leakage in Pilot Valve at 100 Bar (1450 PSI)	<400 LPM (105.7 GPM)					
Leakage in Main Stage at 100 Bar (1450 PSI)	NG32 to 63 <2.5 LPM (0.7 GPM); NG80 <4.0 LPM (1.06 GPM)					
Pilot Valve Size	NG6			NG10		
Maximum Pilot Flow at 140 Bar (2030 PSI) Pilot Press.		25 LPM (6.6 GPM)	25 LPM (6.6 GPM)	25 LPM (6.6 GPM)	50 LPM (13.2 GPM)	60 LPM (15.9 GPM)
Static / Dynamic ²⁾						
Step Response at Pilot Pressure >140 Bar (2030 PSI)		9 ms	11 ms	18 ms	15 ms	23 ms
Frequency Resp. at Pilot Press. >140 Bar (2030 PSI) Amplitude -3dB; 10% ±5% Phase -90°; ±5%		105 Hz 90 Hz	95 Hz 82 Hz	54 Hz 72 Hz	30 Hz 62 Hz	34 Hz 56 Hz
Hysteresis	< 1%					
Sensitivity	< 0.05%					
Temperature Drift of Center Position	< 0.025%K					

1) Suction port SP and accu port XX: Please contact Parker for installation recommendation.

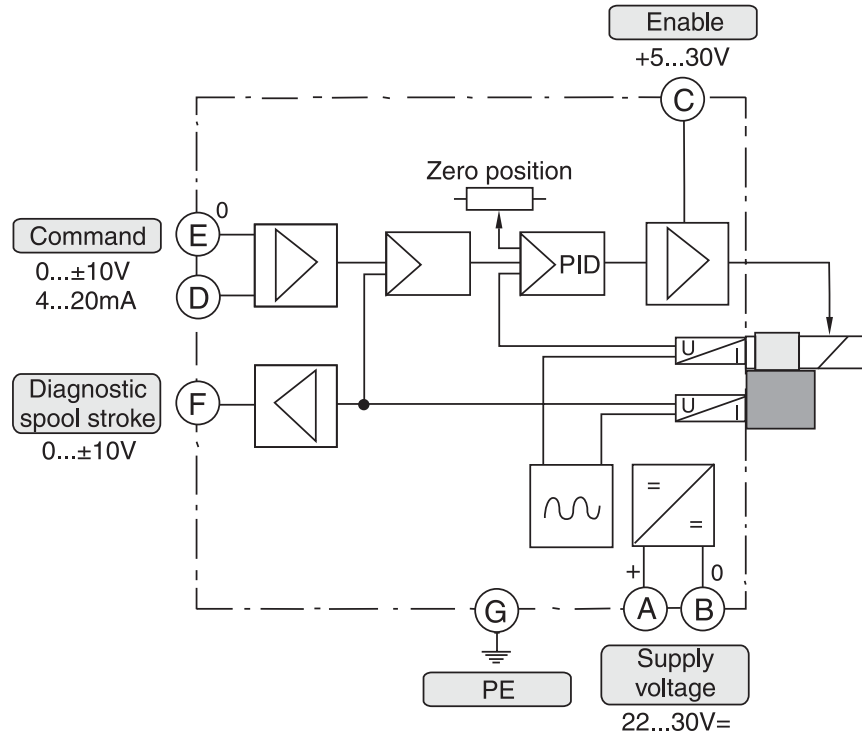
2) For optimal dynamics see installation recommendation.

(Continued on next page)

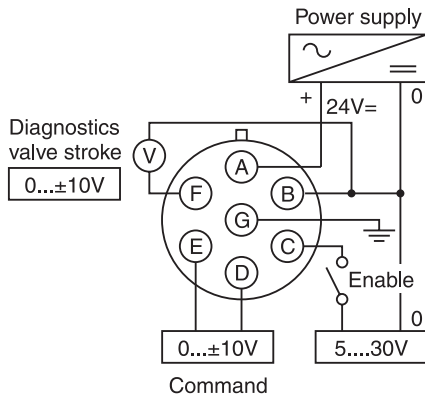
Specifications (Continued from previous page)

Electrical	
Duty Ratio	100% ED
Protection Class	IP65 in accordance with EN 60529 (with correctly mounted plug-in connector)
Supply Voltage / Ripple	22...30V, ripple < 5% eff., surge free
Current Consumption Max.	3.5 A
Pre-fusing	4.0 A medium lag
Input Signal Voltage Impedance Input Capacitance Typ.	+10...0...-10, ripple < 0.01% eff., surge free 100 kOhm 1 nF
Current	4...12...20 mA, ripple < 0.01% eff., surge free < 3.6 mA = enable off, > 3.8 mA = enable on acc. NAMUR NE43
Impedance	250 Ohm
Differential Input Maximum	30V for terminal D and E against PE (terminal G), 11V for terminal D and E against 0V (terminal B)
Enable Signal	5...30V, Ri = 9 kOhm
Diagnostic Signal	0...+10V, rated max. 5mA
EMC	EN 61000-6-2, EN 61000-6-4
Electrical Connection	6 + PE as per EN 175201-804
Wiring Minimum mm²	7 x 1.0 (AWG16) overall braid shield
Wiring Length Maximum	50 m (164 ft.)

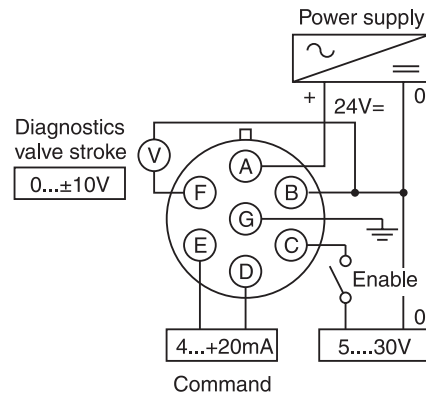
Block Diagram



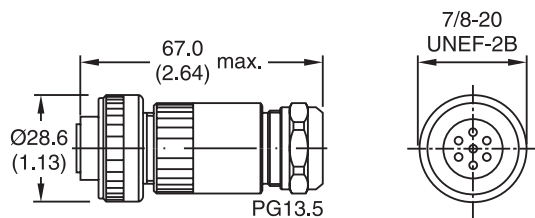
**Wiring Connections
 Electronics Code B**



Electronics Code S



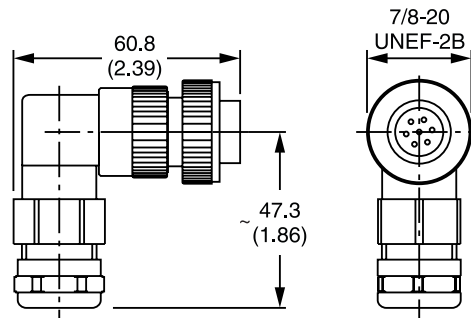
**Female Connector
 (EMC conforming)**



Part No. 5004072

Please order plugs separately.

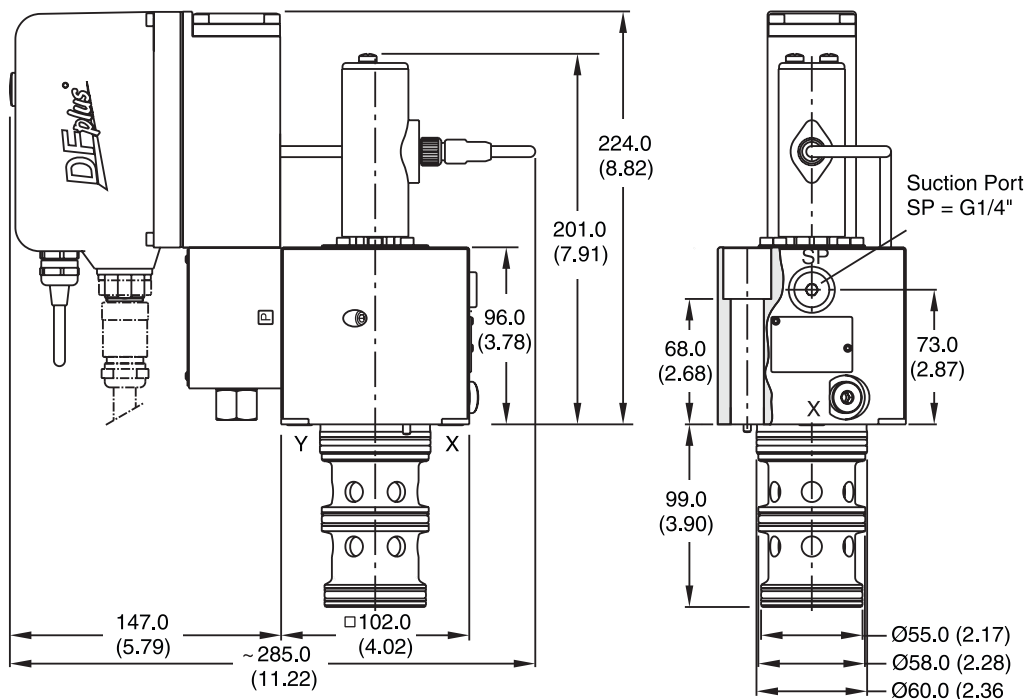
**Angle Female Connector
 (EMC conforming)**



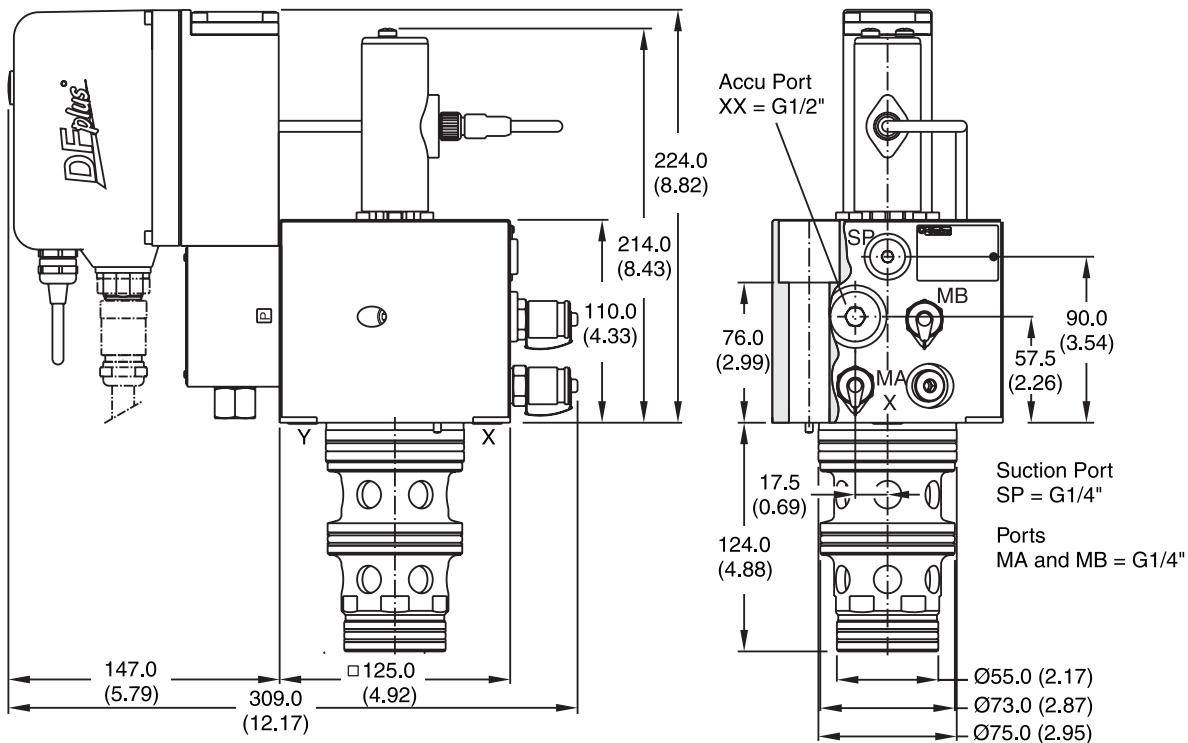
Part No. 5005160




Inch equivalents for millimeter dimensions are shown in (**)

NG32



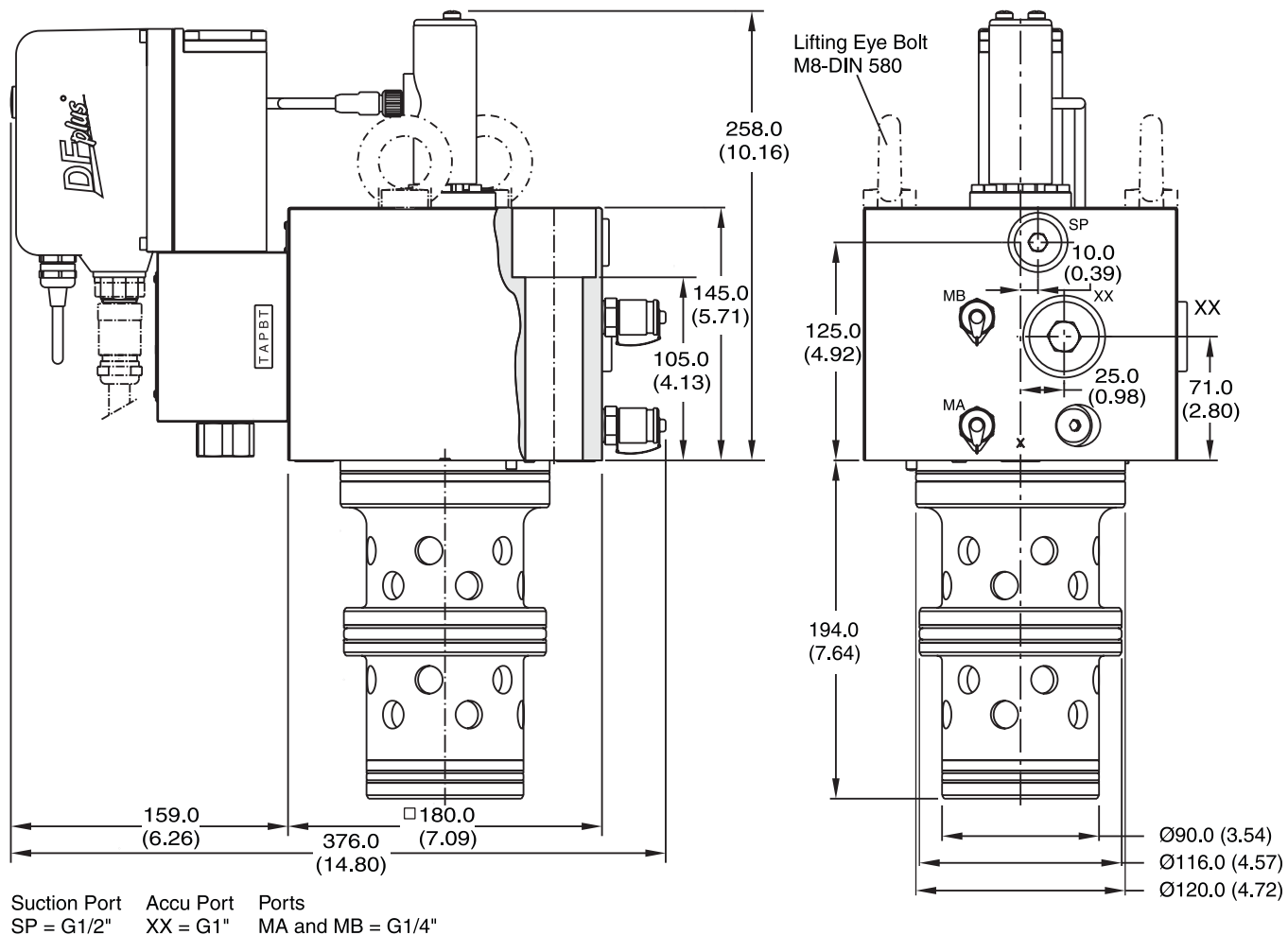
NG40



NG	Bolt Kit - 			Kit 	
				Nitrile	Fluorocarbon
32	BK529	4x M16x100 DIN 912 12.8	281 Nm (207.2 lb.-ft.)	SK-TPQ032EN	SK-TPQ032EV
40	BK513	4 x M20x120 DIN 912 12.8	553 Nm (407.8 lb.-ft.)	SK-TPQ040EN	SK-TPQ040EV



Inch equivalents for millimeter dimensions are shown in (**)

NG63



Lifting Thread for Disassembly M12

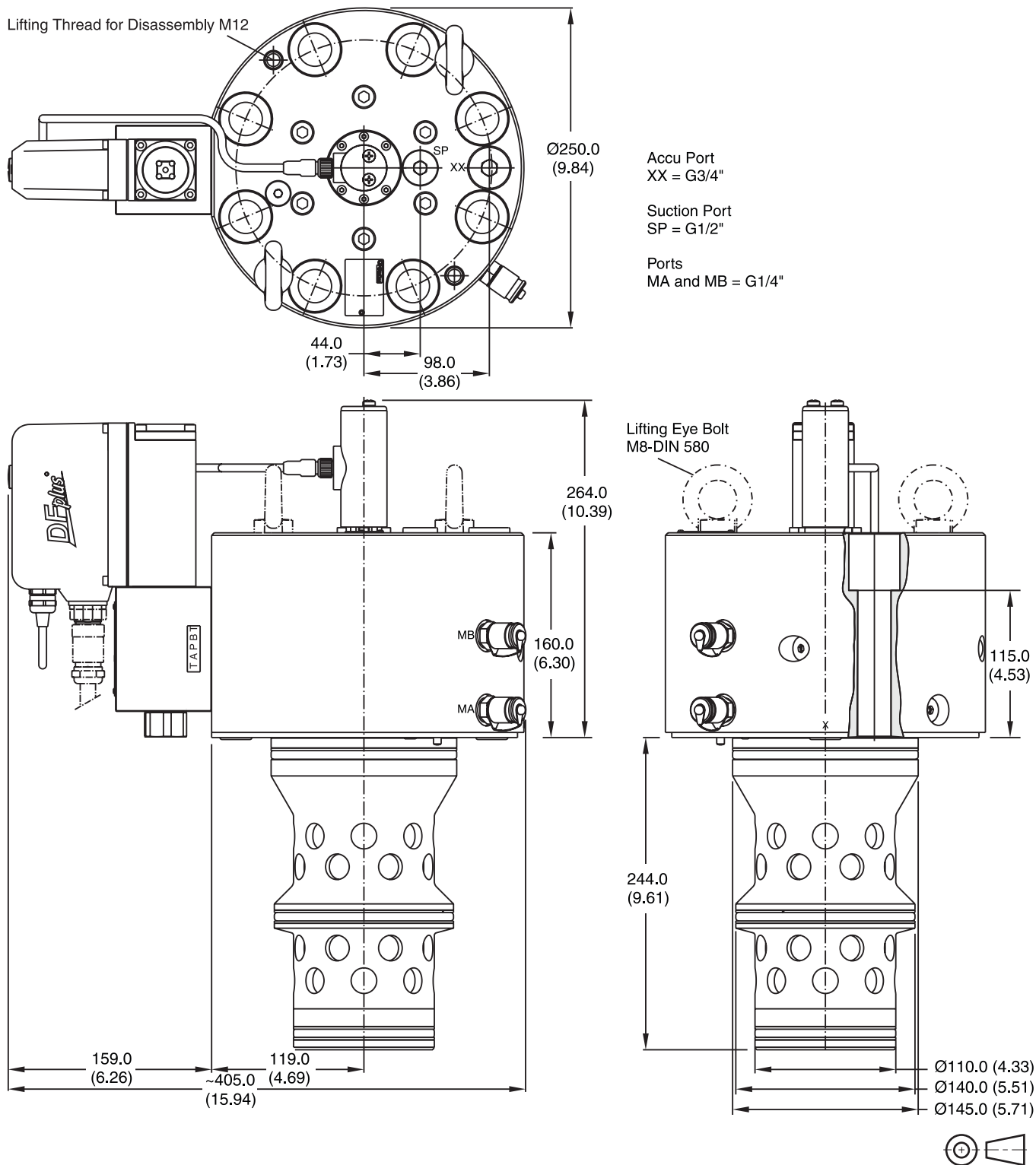




NG	Bolt Kit -  DIN912 12.9		Nitrile	Kit
63	BK420 4x M30x140 DIN 912 12.9	1910 Nm (1408.6 lb.-ft.)	SK-TPQ063EN	Fluorocarbon SK-TPQ063EV

Inch equivalents for millimeter dimensions are shown in (**)

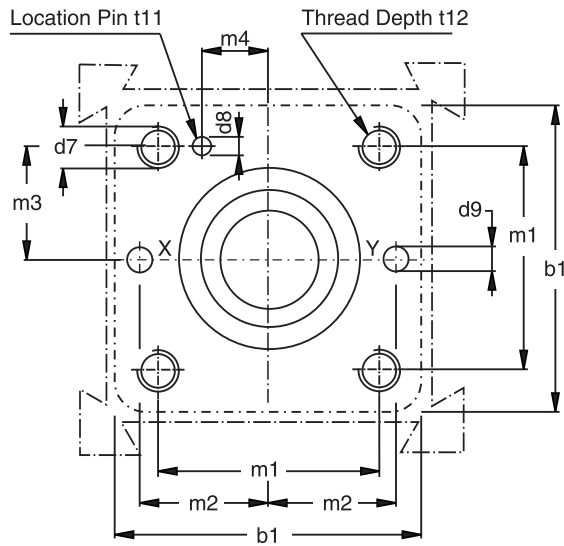
NG80

Lifting Thread for Disassembly M12

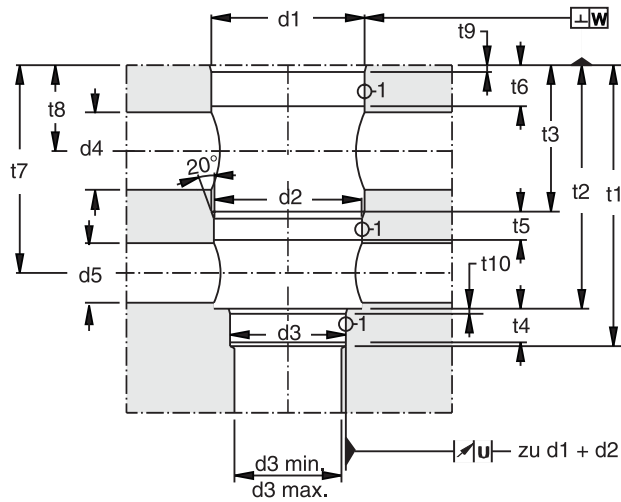
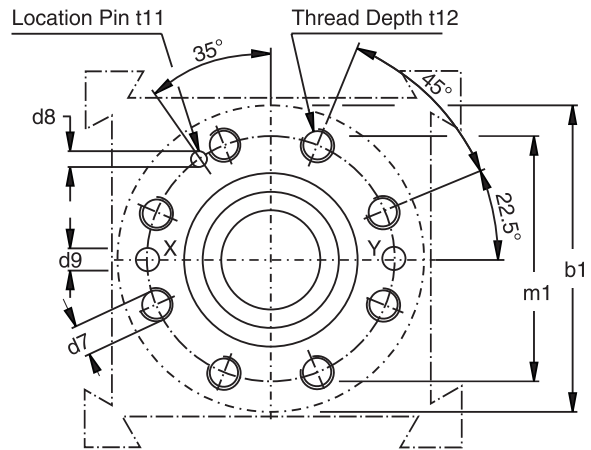


NG	Bolt Kit -  DIN912 12.9		Nitrile	Kit	Fluorocarbon
80	BK530 8x M24x160 DIN 912 12.9	955 Nm (704.3 lb.-ft.)	SK-TPQ080EN		SK-TPQ080EV

NG32 to NG63



NG80



Required surface finish:

$$\sqrt{R_{\max} 25}, \textcircled{1} = \sqrt{R_{\max} 8}$$

Inch equivalents for millimeter dimensions are shown in (**)

Size	b1	d1 H7	d2 H7	d3 H7	d3 min.	d3 max.	d4	d5	d7	d8 H13	d9
32	102.0 (4.02)	60.0 (2.36)	58.0 (2.28)	55.0 (2.17)	32.0 (1.26)	54.0 (2.13)	28.0 (1.10)	28.0 (1.10)	M 16	6.0 (0.24)	8.0 (0.31)
40	125.0 (4.92)	75.0 (2.95)	73.0 (2.87)	55.0 (2.17)	40.0 (1.57)	54.0 (2.13)	38.0 (1.50)	32.0 (1.26)	M 20	6.0 (0.24)	10.0 (0.39)
50	140.0 (5.51)	90.0 (3.54)	87.0 (3.43)	68.0 (2.68)	50.0 (1.97)	67.0 (2.64)	63.0 (2.48)	38.0 (1.50)	M 20	8.0 (0.31)	10.0 (0.39)
63	180.0 (7.09)	120.0 (4.72)	116.0 (4.57)	90.0 (3.54)	63.0 (2.48)	89.0 (3.50)	64.0 (2.52)	52.0 (2.05)	M 30	8.0 (0.31)	12.0 (0.47)
80	250.0 (9.84)	145.0 (5.71)	140.0 (5.51)	110.0 (4.33)	80.0 (3.15)	109.0 (4.29)	70.0 (2.76)	66.0 (2.60)	M 24	10.0 (0.39)	16.0 (0.63)

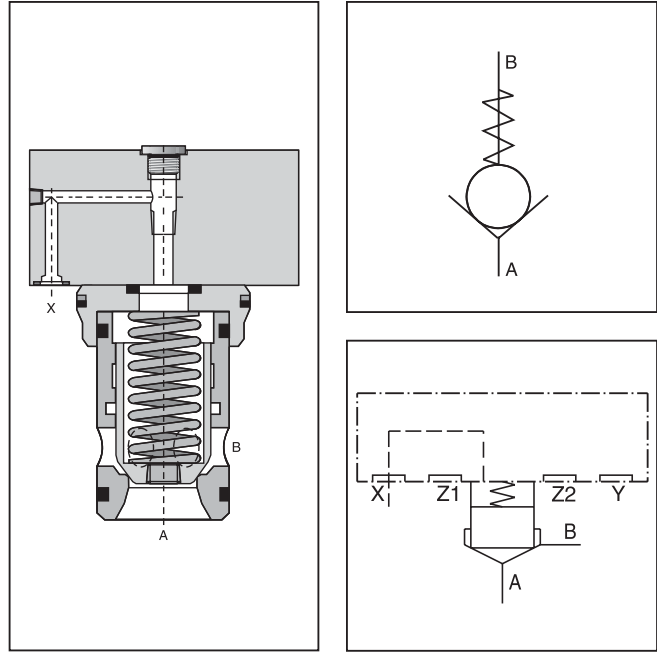
Size	m1 ±0.2	m2 ±0.2	m3 ±0.2	m4 ±0.2	t1 ⁺³ +1	t2 ±0.2	t3 ±0.2	t4	t5	t6	t7 ±0.2	t8 ±0.2	t9	t10	t11	t12
32	70.0 (2.76)	41.0 (1.61)	35.0 (1.38)	17.0 (0.67)	100.0 (3.94)	85.0 (3.35)	43.0 (1.69)	13.5 (0.53)	16.0 (0.63)	18.0 (0.71)	71.0 (2.80)	28.5 (1.12)	2.5 (0.10) x15°	2.5 (0.10) x15°	10.0 (0.39)	35.0 (1.38)
40	85.0 (3.35)	50.0 (1.97)	42.5 (1.67)	23.0 (0.91)	125.0 (4.92)	105.0 (4.13)	54.0 (2.13)	15.0 (0.59)	18.0 (0.71)	21.0 (0.83)	88.0 (3.46)	34.0 (1.34)	3.0 (0.12) x15°	3.0 (0.12) x15°	10.0 (0.39)	45.0 (1.77)
50	100.0 (3.94)	58.0 (2.28)	50.0 (1.97)	30.0 (1.18)	165.0 (6.50)	143.0 (5.63)	86.0 (3.39)	22.0 (0.87)	18.0 (0.71)	21.0 (0.83)	122.0 (4.80)	53.0 (2.09)	4.0 (0.16) x15°	3.0 (0.12) x15°	10.0 (0.39)	45.0 (1.77)
63	125.0 (4.92)	75.0 (2.95)	62.5 (2.46)	38.0 (1.50)	195.0 (7.68)	165.0 (6.50)	83.5 (3.29)	20.0 (0.79)	29.5 (1.16)	33.0 (1.30)	138.5 (5.45)	50.0 (1.97)	4.0 (0.16) x15°	4.0 (0.16) x15°	10.0 (0.39)	65.0 (2.56)
80	200.0 (7.87)	—	—	—	245.0 (9.65)	215.0 (8.46)	123.0 (4.84)	25.0 (0.98)	27.0 (1.06)	60.0 (2.36)	181.0 (7.13)	87.0 (3.43)	5.0 (0.20) x15°	5.0 (0.20) x15°	10.0 (0.39)	50.0 (1.97)

General Description

Series C1DB check valves consist of a slip-in valve, that is designed for a compact block installation.

Features

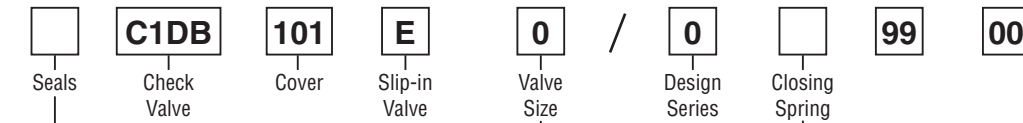
- Installation hole and mounting pattern according to ISO 7368.
- 5 different springs.
- 8 sizes NG16 to NG100.



Specifications

General								
Size	NG16	NG25	NG32	NG40	NG50	NG63	NG80	NG100
Interface	2-way cartridge valve according to ISO 7368							
Mounting Position	Unrestricted							
Ambient Temperature	-40°C to +60°C (-40°F to +140°F)							
Hydraulic								
Maximum Operating Pressure	Ports A, B and X 350 Bar (5075 PSI), port Y 10 Bar (145 PSI) maximum							
Nominal Flow	250 LPM (66 GPM)	450 LPM (119 GPM)	900 LPM (238 GPM)	1300 LPM (344 GPM)	1800 LPM (476 GPM)	3600 LPM (952 GPM)	5250 LPM (1389 GPM)	8000 LPM (2116 GPM)
Flow Direction	See Symbols							
Fluid	Hydraulic oil according to DIN 51524 ... 536							
Viscosity Recommended	30 to 80 cSt (mm ² /s)							
Viscosity Permitted	20 to 380 cSt (mm ² /s)							
Fluid Temperature	-20°C to +60°C (-4°F to +140°F)							
Filtration	ISO 4406 (1999); 18/16/13 (meet NAS 1638:7)							
Nominal Pressure	350 Bar (5075 PSI)							
Opening Spring Pressure	L = 0.1 Bar (1.5 PSI), N = 0.5 Bar (7.3 PSI), S = 1.6 Bar (23.2 PSI), U = 4.0 Bar (58.0 PSI)							

Ordering Information



Code	Description
Omit	Nitrile
V	Fluorocarbon

Code	Description
16	NG16
25	NG25
32	NG32
40	NG40
50	NG50
63	NG63
80	NG80
100	NG100

Code	Description
L	0.1 Bar (1.5 PSI)
N	0.5 Bar (7.3 PSI)
S	1.6 Bar (23.2 PSI)
T	2.5 Bar (36.3 PSI)
U	4.0 Bar (58.0 PSI)

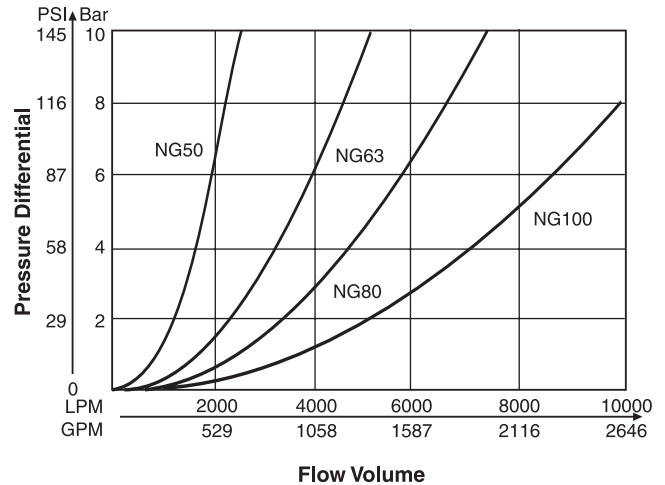
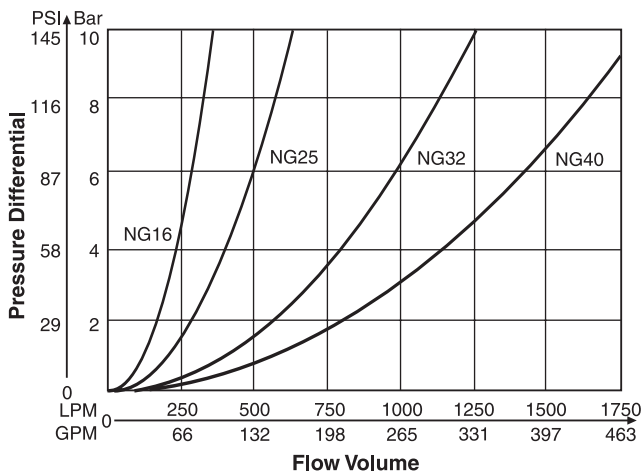
Weight:

C1DB16	1.2 kg (2.6 lbs.)
C1DB25	2.5 kg (5.5 lbs.)
C1DB32	3.9 kg (8.6 lbs.)
C1DB40	7.0 kg (15.4 lbs.)
C1DB50	11.4 kg (25.1 lbs.)
C1DB63	21.8 kg (48.1 lbs.)
C1DB80	45.0 kg (99.2 lbs.)
C1DB100	74.0 kg (163.2 lbs.)

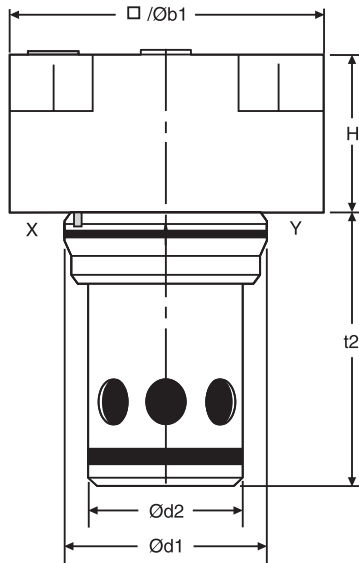
Springs

Spring Type	Ordering Number							
	NG16	NG25	NG32	NG40	NG50	NG63	NG80	NG100
L (0.1 Bar) (1.5 PSI)	45051368	45051375	45051376	45051382	45051384	45051388	45051395	45051400
N (0.5 Bar) (7.3 PSI)	45051369	45051374	45051377	45051381	45051385	45051389	45051396	45051401
S (1.6 Bar) (23.2 PSI)	45051370	45051372	45051378	45051380	45051386	45051390	45051397	45051402
T (2.5 Bar) (36.3 PSI)	45051670	45051671	45051672	45051673	45051674	—	—	—
U (4.0 Bar) (58.0 PSI)	45051371	45051373	45051379	45051383	45051387	45051391	45051398	45051403




Performance Curves



Inch equivalents for millimeter dimensions are shown in (**)



Size	NG16	NG25	NG32	NG40	NG50	NG63	NG80	NG100
H	40.0 (1.57)	45.0 (1.77)	50.0 (1.97)	60.0 (2.36)	70.0 (2.76)	85.0 (3.35)	105.0 (4.13)	120.0 (4.72)
b1	65.0 (2.56)	85.0 (3.35)	102.0 (4.02)	125.0 (4.92)	140.0 (5.51)	180.0 (7.09)	250.0 (9.84)	300.0 (11.81)
d1 ^{H7}	32.0 (1.26)	45.0 (1.77)	60.0 (2.36)	75.0 (2.95)	90.0 (3.54)	120.0 (4.72)	145.0 (5.71)	180.0 (7.09)
d2 ^{H7}	25.0 (0.98)	34.0 (1.34)	45.0 (1.77)	56.0 (2.20)	68.0 (2.68)	90.0 (3.54)	110.0 (4.33)	135.0 (5.31)
t2 ^{+0.1}	55.5 (2.19)	72.0 (2.83)	85.0 (3.35)	105.0 (4.13)	122.0 (4.80)	155.0 (6.10)	205.0 (8.07)	245.0 (9.65)

NG	Bolt Kit - 		Kit 	
			Nitrile	Fluorcarbon
16	BK414 (BK84)	33 Nm (24.3 lb.-ft.)	SK-CB-E160	SK-CB-E160V
25	BK391 (BK77)	115 Nm (54.8 lb.-ft.)	SK-CB-E250	SK-CB-E250V
32	BK415 (BK85)	281 Nm (207.2 lb.-ft.)	SK-CB-E320	SK-CB-E320V
40	BK416 (BK86)	553 Nm (407.8 lb.-ft.)	SK-CB-E400	SK-CB-E400V
50	BK417 (BK87)	553 Nm (407.8 lb.-ft.)	SK-CB-E500	SK-CB-E500V
63	BK418 (BK88)	1910 Nm (1408.6 lb.-ft.)	SK-CB-E630	SK-CB-E630V
80	BK419 (BK135)	935 Nm (689.6 lb.-ft.)	SK-CB-E630	SK-CB-E630V
100	BK420 (BK90)	1910 Nm (1408.6 lb.-ft.)	SK-CB-E630	SK-CB-E630V

General Description

Series SVLB hydraulically pilot operated check valves allow free flow from A to B. The counter-flow direction is blocked.

When pressure is applied to control port X, the ring chamber flow from B to A is released. The pilot control ratio is 6:1.

Function

When no pressure is applied to the X-port, the flow from B to A is blocked, because the pressure in B is also effective on top of the poppet.

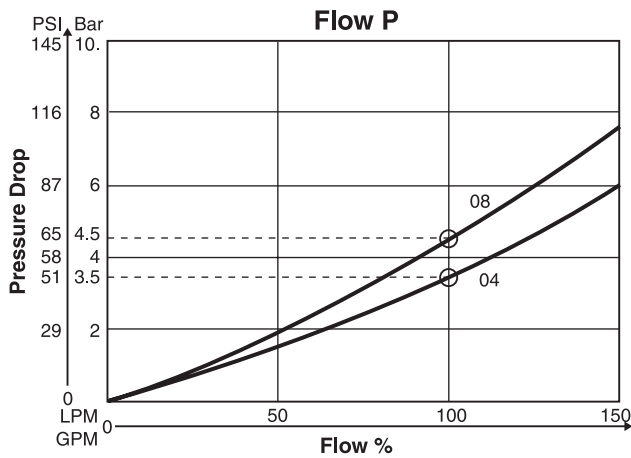
Pressurizing the X-port relieves the area on top of the poppet to the drain port and allows flow from B to A.

The seat design of the SVLB valve series provides leak-free separation of port A and B in the closed position.

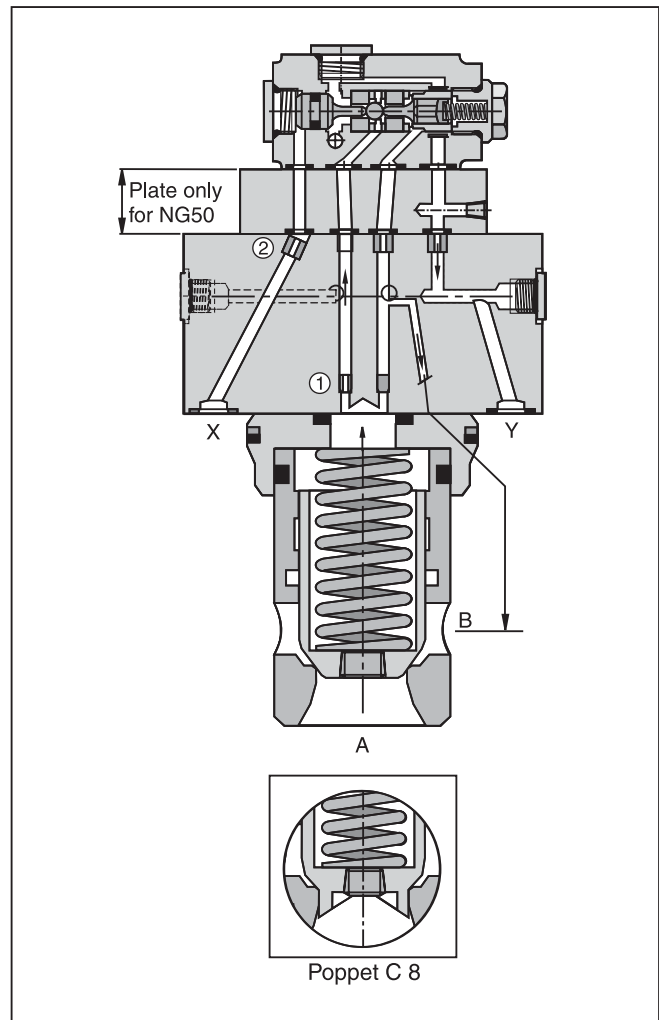
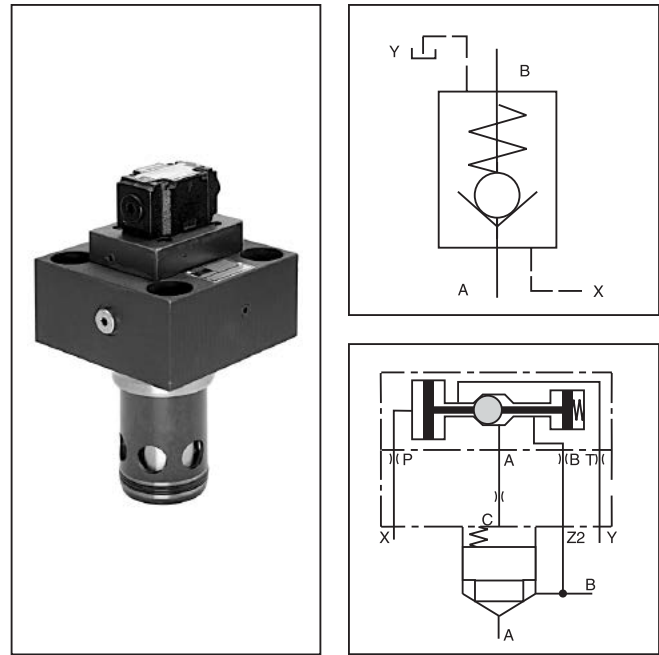
Features

- Pilot operated check valve.
- Cavity and mounting pattern according to ISO 7368.
- Dampening poppet optional.
- 5 sizes NG16 to NG50.

Performance Curves



Poppet Type 04, 08, without spring



Ordering Information

<div style="border: 1px solid black; width: 30px; height: 30px; margin: 0 auto;"></div> <p>Seals</p>	<div style="border: 1px solid black; padding: 2px; width: 40px; height: 30px; margin: 0 auto;">SVL</div> <p>Hydraulically Operated Check Valve</p>	<div style="border: 1px solid black; padding: 2px; width: 30px; height: 30px; margin: 0 auto;">B</div> <p>Slip-in Mounting</p>	<div style="border: 1px solid black; padding: 2px; width: 40px; height: 30px; margin: 0 auto;">10</div> <p>Design Style according to ISO 7368</p>	<div style="border: 1px solid black; width: 30px; height: 30px; margin: 0 auto;"></div> <p>Poppet Type</p>	<div style="border: 1px solid black; padding: 2px; width: 40px; height: 30px; margin: 0 auto;">6</div> <p>Pilot Control Ratio 6:1</p>	<div style="border: 1px solid black; padding: 2px; width: 40px; height: 30px; margin: 0 auto;">E</div> <p>Slip-in Cartridge Valve</p>	<div style="border: 1px solid black; width: 30px; height: 30px; margin: 0 auto;"></div> <p>Valve Size</p>	<div style="border: 1px solid black; width: 30px; height: 30px; margin: 0 auto;"></div> <p>Closing Spring</p>	<div style="border: 1px dashed black; width: 40px; height: 40px; margin: 0 auto; display: flex; align-items: center; justify-content: center;"> { } </div> <p>Design Series</p> <p>NOTE: Not required when ordering.</p>
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Code	Description
	Nitrile
V	Fluorocarbon

Code	Description
4	04
8 ¹⁾	08

¹⁾ with damping nose

Code	Description
16	NG16
25	NG25
32	NG32
40	NG40
50	NG50

Code	Description
N	0.5 Bar (7.3 PSI)
S	1.6 Bar (23.2 PSI)
T	2.5 Bar (36.3 PSI)
U	4.0 Bar (58.0 PSI)

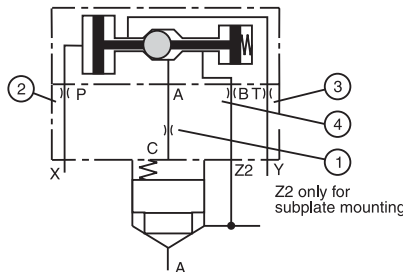
Weight:

SVLB16	2.3 kg (5.1 lbs.)
SVLB25	3.2 kg (7.1 lbs.)
SVLB32	4.6 kg (10.1 lbs.)
SVLB40	7.8 kg (17.2 lbs.)
SVLB50	12.0 kg (26.5 lbs.)

Specifications

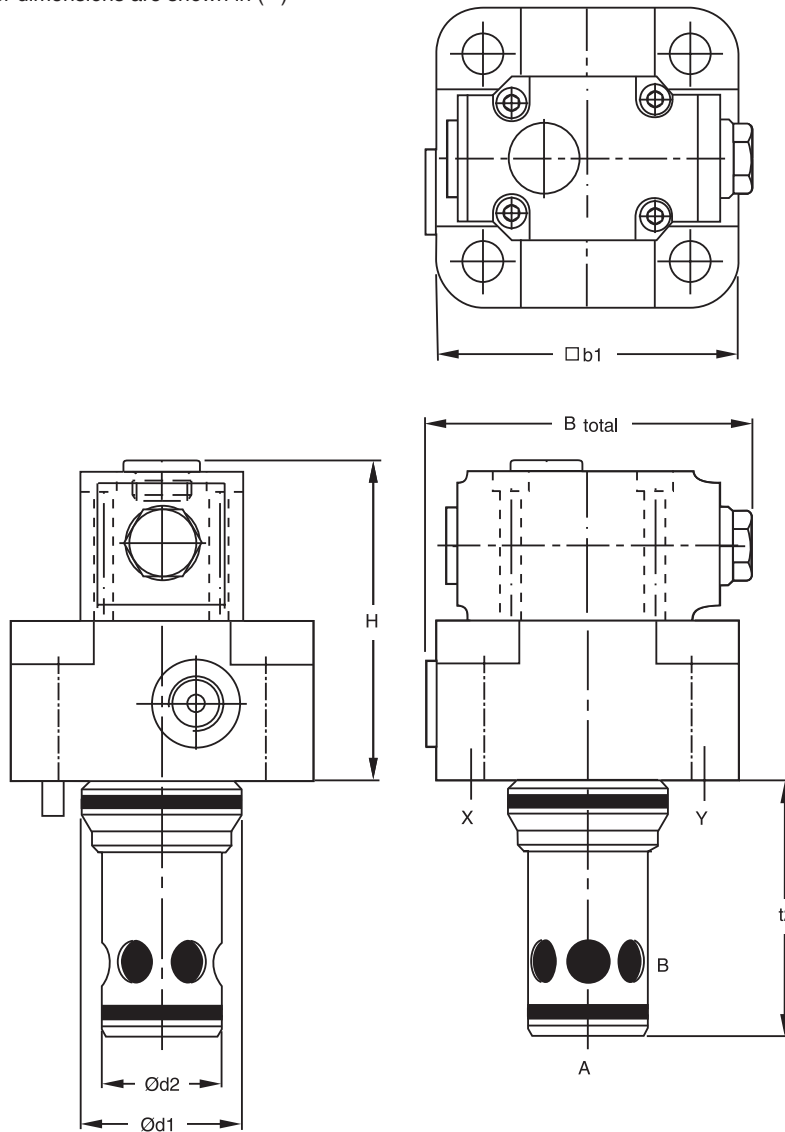
General						
Size		NG16	NG25	NG32	NG40	NG50
Interface	Slip-in mounting, according to ISO 7368					
Mounting Position	Unrestricted					
Ambient Temperature	-20°C to +80°C (-4°F to +176°F)					
Hydraulic						
Maximum Operating Pressure	350 Bar (5075 PSI)					
Nominal Flow	LPM	250	450	900	1300	1800
	GPM	(66)	(119)	(238)	(344)	(476)
Fluid	Hydraulic oil according to DIN 51524 ... 525					
Viscosity Recommended	30 to 50 cSt (mm ² /s)					
Viscosity Permitted	20 to 380 cSt (mm ² /s)					
Fluid Temperature	-20°C to +70°C (-4°F to +158°F)					
Filtration	ISO 4406 (1999); 18/16/13 (meet NAS 1638:7)					

Standard Orifices






Position	E16	E25	E32	E40	E50
1	open (M5)	open (M5)	open (M5)	open (M5)	open (M6)
2	Ø1.2 (M5)	Ø1.2 (M6)	Ø1.2 (M6)	Ø1.2 (M6)	Ø1.2 (M8)
3	open (M5)	open (M6)	open (M6)	open (M6)	open (M8)
4	Ø1.0 (M5)	Ø1.2 (M6)	Ø1.3 (M6)	Ø1.5 (M6)	Ø2.0 (M8)

Inch equivalents for millimeter dimensions are shown in (**)



Size	NG16	NG25	NG32	NG40	NG50
H	84.0 (3.31)	88.0 (3.46)	93.0 (3.66)	103.0 (4.06)	138.0 (5.43)
b1	79.0* (3.11)	85.0 (3.35)	102.0 (4.02)	125.0 (4.92)	140.0 (5.51)
d1 ^{H7}	32.0 (1.26)	45.0 (1.77)	60.0 (2.36)	75.0 (2.95)	90.0 (3.54)
d2 ^{H7}	25.0 (0.98)	34.0 (1.34)	45.0 (1.77)	55.0 (2.17)	68.0 (2.68)
t2 ^{+0.1}	56.0 (2.20)	72.0 (2.83)	85.0 (3.35)	105.0 (4.13)	122.0 (4.80)
Bges.	99.0 (3.90)	94.0 (3.70)	103.0 (4.06)	125.0 (4.92)	140.0 (5.51)

¹⁾ Width 65mm (2.56 in.)

NG	Bolt Kit - 		Kit 	
			Nitrile	Fluorcarbon
16	BK414 (BK84)	33 Nm (24.3 lb.-ft.)	SK-SVLB10-E16	SK-SVLB10-E16V
25	BK391 (BK77)	115 Nm (54.8 lb.-ft.)	SK-SVLB10-E25	SK-SVLB10-E25V
32	BK415 (BK85)	281 Nm (207.2 lb.-ft.)	SK-SVLB10-E32	SK-SVLB10-E32V
40	BK416 (BK86)	553 Nm (407.8 lb.-ft.)	SK-SVLB10-E40	SK-SVLB10-E40V
50	BK417 (BK87)	553 Nm (407.8 lb.-ft.)	SK-SVLB10-E50	SK-SVLB10-E50V

2-Way Seat Valve, Flow A ⇒ B



Description	Type							
	NG16	NG25	NG32	NG40	NG50	NG63	NG80	NG100
Cover ¹⁾	C016AA*	C025AA*	C032AA*	C040AA*	C050AA*	C063AA*	C080AA*	C100AA*
Cover Orifice (1)	1/16xØ0.8	1/16xØ1.0	1/16xØ1.2	1/8xØ1.5	1/8xØ1.8	1/8xØ2.0	1/8xØ2.2	1/8xØ2.5
Cartridge ²⁾	CE016C01*	CE025C01*	CE032C01*	CE040C01*	CE050C01*	CE063C01*	CE080C01*	CE100C01*
Poppet Orifice (1)	1/16xØ00							
Spring	1.6 Bar (23.2 PSI), Type S (Order no. see spare parts)							
Bolt Kit Cover	BK414 (BK84)	BK391 (BK77)	BK415 (BK85)	BK416 (BK86)	BK417 (BK87)	BK418 (BK88)	BK419 BK135)	BK420 (BK90)

Shown orifice Ø and springs are recommendations.
 xxØ00 = plug
 xxØ99 = open

¹⁾ Complete type see Ordering Information C*A
²⁾ Complete type see Ordering Information CE*

2-Way Seat Valve with Stroke Limiter, Flow A ⇒ B



Description	Type							
	NG16	NG25	NG32	NG40	NG50	NG63	NG80	NG100
Cover ¹⁾	C016B**	C025B**	C032B**	C040B**	C050B**	C063B**	C080B**	C100B**
Cover Orifice (1)	M6xØ0.8	M6xØ1.0	1/16xØ1.2	1/16xØ1.5	1/16xØ1.8	1/8xØ2.0	1/8xØ2.2	1/8xØ2.5
Cartridge ²⁾	CE016C01*	CE025C01*	CE032C01*	CE040C01*	CE050C01*	CE063C01*	CE080C01*	CE100C01*
Poppet Orifice (1)	1/16xØ00							
Spring	1.6 Bar (23.2 PSI), Type S (Order no. see spare parts)							
Bolt Kit Cover	BK414 (BK84)	BK391 (BK77)	BK415 (BK85)	BK416 (BK86)	BK417 (BK87)	BK418 (BK88)	BK419 BK135)	BK420 (BK90)

Shown orifice Ø and springs are recommendations.
 xxØ00 = plug
 xxØ99 = open

¹⁾ Complete type see Ordering Information C*B
²⁾ Complete type see Ordering Information CE*

2-Way Functions with Dampening Poppet, Flow A ⇌ B



Description	Type							
	NG16	NG25	NG32	NG40	NG50	NG63	NG80	NG100
Cover ¹⁾	C016AA*	C025B*	C032AA*	C040AA*	C050AA*	C063AA*	C080AA*	C100AA*
Cover Orifice ①	1/16xØ0.8	1/16xØ1.0	1/16xØ1.2	1/8xØ1.5	1/8xØ1.8	1/8xØ2.0	1/8xØ2.2	1/8xØ2.5
Cartridge ²⁾	CE016C08*	CE025C08*	CE032C08*	CE040C08*	CE050C08*	CE063C08*	CE080C08*	CE100C08*
Poppet Orifice ①	1/16xØ00							
Spring	1.6 Bar (23.2 PSI), Type S (Order no. see spare parts)							
Bolt Kit Cover	BK414 (BK84)	BK391 (BK77)	BK415 (BK85)	BK416 (BK86)	BK417 (BK87)	BK418 (BK88)	BK419 (BK135)	BK420 (BK90)

Shown orifice Ø and springs are recommendations.
 xxØ00 = plug
 xxØ99 = open

¹⁾ Complete type see Ordering Information C*A
²⁾ Complete type see Ordering Information CE*

2-Way Functions with Stroke Limiter and Dampening Poppet, Flow A ⇌ B

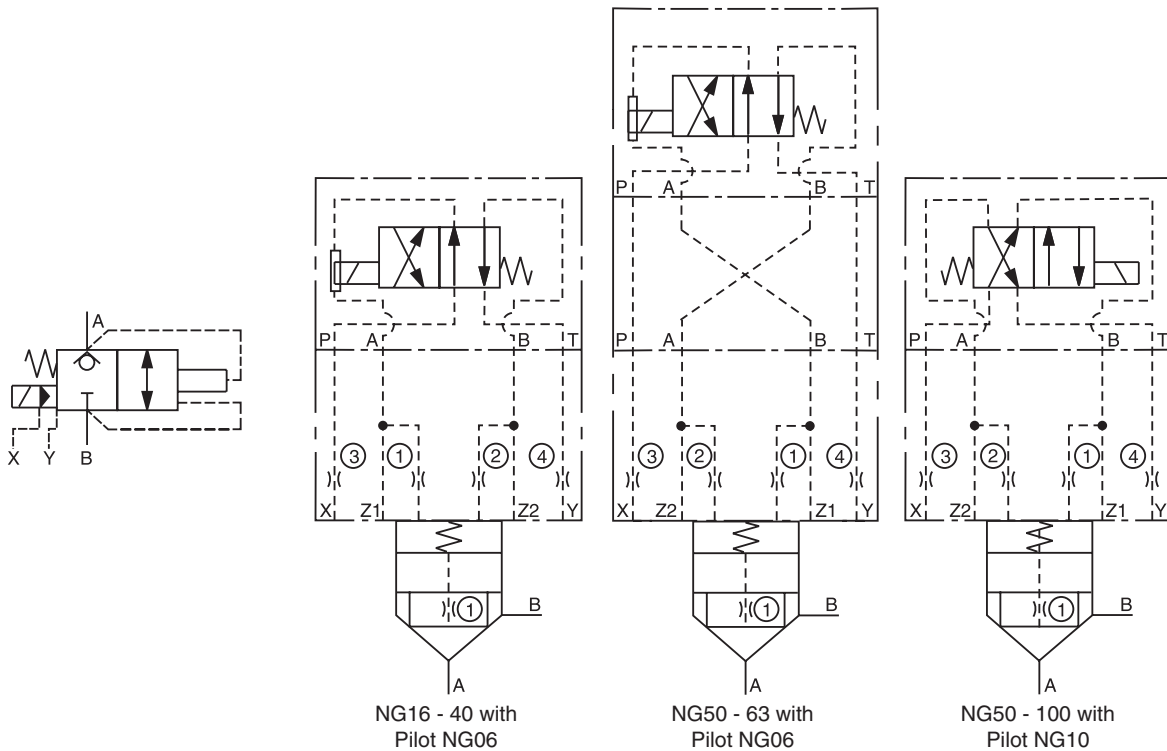


Description	Type							
	NG16	NG25	NG32	NG40	NG50	NG63	NG80	NG100
Cover ¹⁾	C016B*	C025B*	C032B*	C040B*	C050B*	C063B*	C080B*	C100B*
Cover Orifice ①	M6xØ0.8	M6xØ1.0	1/16xØ1.2	1/16xØ1.5	1/16xØ1.8	1/8xØ2.0	1/8xØ2.2	1/8xØ2.5
Cartridge ²⁾	CE016C08*	CE025C08*	CE032C08*	CE040C08*	CE050C08*	CE063C08*	CE080C08*	CE100C08*
Poppet Orifice ①	1/16xØ00							
Spring	1.6 Bar, (23.2 PSI) Type S (Order no. see spare parts)							
Bolt Kit Cover	BK414 (BK84)	BK391 (BK77)	BK415 (BK85)	BK416 (BK86)	BK417 (BK87)	BK418 (BK88)	BK419 (BK135)	BK420 (BK90)

Shown orifice Ø and springs are recommendations.
 xxØ00 = plug
 xxØ99 = open

¹⁾ Complete type see Ordering Information C*B
²⁾ Complete type see Ordering Information CE*

2-Way Seat Valve with Pilot, Normally Closed, Flow A ⇌ B

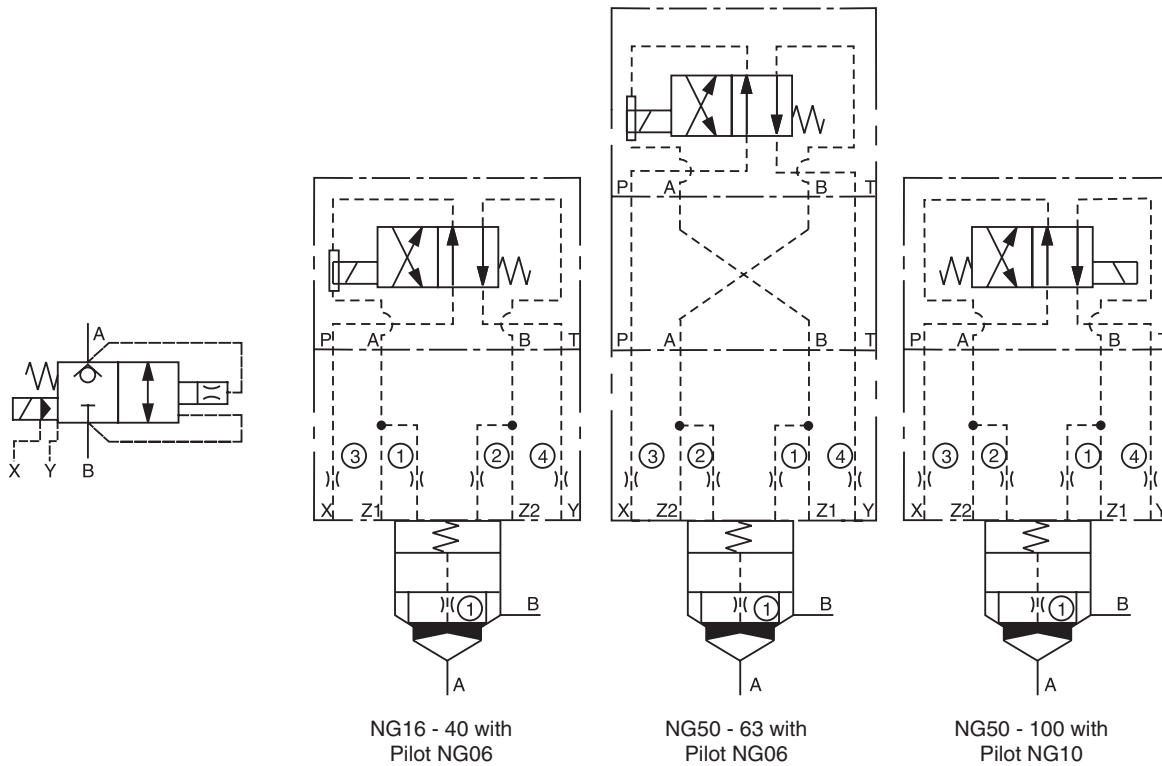


Description	Type									
	Pilot NG6						Pilot NG10			
	NG16	NG25	NG32	NG40	NG50	NG63	NG50	NG63	NG80	NG100
4/2-DC Valve ¹⁾	D1VW020B*						D3W20H*			
Adapter Plate ²⁾	without				PADA1007/A-B/B-A		without			
Cover ³⁾	C016CA*	C025CA*	C032CA*	C040CA*	C050CA*	C063CA*	C050CA*	C063CA*	C080CA*	C100CA*
Cover Orifice ①	M5xØ0.8	M5xØ1.0	M5xØ1.2	M5xØ1.5	M6xØ1.8	M6xØ2.0	M6xØ1.8	M6xØ2.0	1/16xØ2.2	1/16xØ2.5
Cover Orifice ②	M5xØ00				M6xØ00			1/16xØ00		
Cover Orifice ③	M5xØ1.0	M6xØ1.2	M6xØ1.5	M6xØ1.8	M8xØ2.0	M8xØ2.2	M8xØ2.0	M8xØ2.2	M10x1xØ2.5	M10x1xØ3.0
Cover Orifice ④	M5xØ99	M6xØ99			M8xØ99C				M10x1xØ99	
Cartridge ⁴⁾	CE016C04*	CE025C04*	CE032C04*	CE040C04*	CE050C04*	CE063C04*	CE050C04*	CE063C04*	CE080C04*	CE100C04*
Poppet Orifice ①	1/16NPTxØ00									
Spring	1.6 Bar (23.2 PSI), Type S (Order no. see spare parts)									
Bolt Kit Cover	BK414 (BK84)	BK391 (BK77)	BK415 (BK85)	BK416 (BK86)	BK417 (BK87)	BK418 (BK88)	BK417 (BK87)	BK418 (BK88)	BK419 (BK135)	BK420 (BK90)
Bolt Kit Pilot	BK375						BK385			

Shown orifice Ø and springs are recommendations.
 xxØ00 = plug
 xxØ99 = open

- 1) Complete type see Catalog HY14-2500/US, Series D1VW, D3W.
- 2) Includes O-rings and mounting bolts
- 3) Complete type see Ordering Information C*C
- 4) Complete type see Ordering Information CE*

2-Way Seat Valve with Pilot and Dampening Poppet, Normally Closed, Flow A ↔ B



Description	Type									
	Pilot NG06						Pilot NG10			
	NG16	NG25	NG32	NG40	NG50	NG63	NG50	NG63	NG80	NG100
4/2-DC Valve ¹⁾	D1VW020B*						D3W20H*			
Adapter Plate ²⁾	without				PADA1007/A-B/B-A		without			
Cover ³⁾	C016CA*	C025CA*	C032CA*	C040CA*	C050CA*	C063CA*	C050CA*	C063CA*	C080CA*	C100CA*
Cover Orifice ①	M5xØ0.8	M5xØ1.0	M5xØ1.2	M5xØ1.5	M6xØ1.8	M6xØ2.0	M6xØ1.8	M6xØ2.0	1/16xØ2.2	1/16xØ2.5
Cover Orifice ②	M5xØ00				M6xØ00				1/16xØ00	
Cover Orifice ③	M5xØ1.0	M6xØ1.2	M6xØ1.5	M6xØ1.8	M8xØ2.0	M8xØ2.2	M8xØ2.0	M8xØ2.2	M10x1xØ2.5	M10x1xØ3.0
Cover Orifice ④	M5xØ99	M6xØ99			M8xØ99C				M10x1xØ99	
Cartridge ⁴⁾	CE016C08*	CE025C08*	CE032C08*	CE040C08*	CE050C08*	CE063C08*	CE050C08*	CE063C08*	CE080C08*	CE100C08*
Poppet Orifice ①	1/16NPTxØ00									
Spring	1.6 Bar (23.2 PSI), Type S (Order no. see spare parts)									
Bolt Kit Cover	BK414 (BK84)	BK391 (BK77)	BK415 (BK85)	BK416 (BK86)	BK417 (BK87)	BK418 (BK88)	BK417 (BK87)	BK418 (BK88)	BK419 (BK135)	BK420 (BK90)
Bolt Kit Pilot	BK375						BK385			

Shown orifice Ø and springs are recommendations.

xxØ00 = plug

xxØ99 = open

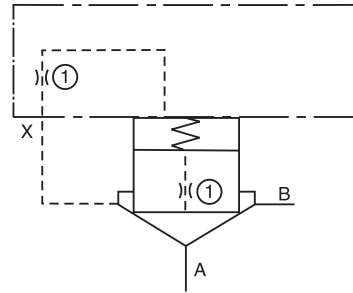
¹⁾ Complete type see Catalog HY14-2500/US, Series D1VW, D3W.

²⁾ Includes O-rings and mounting bolts

³⁾ Complete type see Ordering Information C*C

⁴⁾ Complete type see Ordering Information CE*

Check Valve, Flow A ⇒ B



Description	Type							
	NG16	NG25	NG32	NG40	NG50	NG63	NG80	NG100
Cover ¹⁾	C016AA*	C025AA*	C032AA*	C040AA*	C050AA*	C063AA*	C080AA*	C100AA*
Cover Orifice ①	M5xØ00				M6xØ99		1/16xØ99	
Cartridge ²⁾	CE016C01*	CE025C01*	CE032C01*	CE040C01*	CE050C01*	CE063C01*	CE080C01*	CE100C01*
Poppet Orifice ①	1/16NPTxØ00							
Spring	1.6 Bar (23.2 PSI), Type S (Order no. see spare parts)							
Bolt Kit Cover	BK414 (BK84)	BK391 (BK77)	BK415 (BK85)	BK416 (BK86)	BK417 (BK87)	BK418 (BK88)	BK419 (BK135)	BK420 (BK90)

Shown orifice Ø and springs are recommendations.
 xxØ00 = plug
 xxØ99 = open

¹⁾ Complete type see Ordering Information C*A

²⁾ Complete type see Ordering Information CE*

General Description

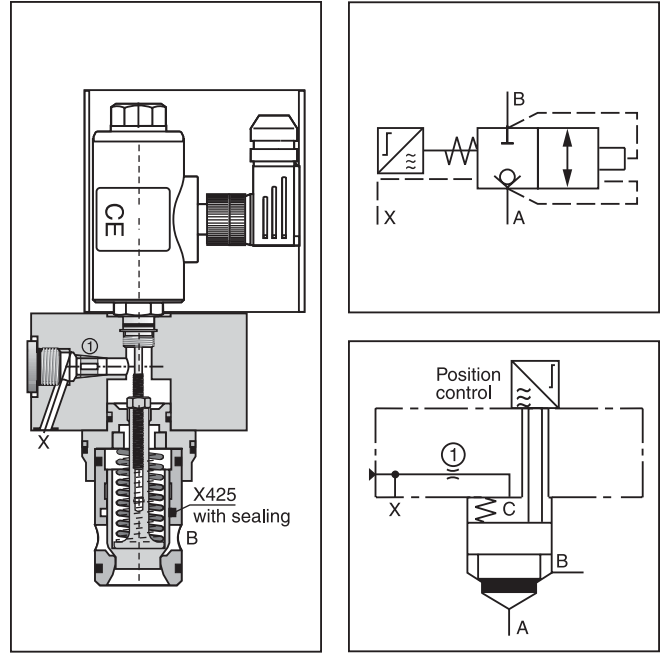
Series C10D*C 2/2 way seat valves are equipped with an inductive switch to monitor the closed position. After the poppet is lifted from the seat, the design of the poppet ensures that only a minimum amount of oil can pass the seat before the inductive switch changes the signal.

The poppet has a 60/40 area ratio (AA = 0.6 AC, AB = 0.4 Ac) and is capable for flow from A to B and B to A.

For sizes NG80 and NG100 a proximity switch 90° to the poppet is used.

Features

- German trade association certificate, No. 00 077.
- Cavity and mounting pattern according to ISO 7368.
- Monitored closed position.
- Inductive switch CE conform.
- Optional poppet sealing.
- 8 sizes NG16 up to NG100.



Ordering Information

<input type="checkbox"/>	C	10	D	<input type="checkbox"/>	C	101	E	<input type="checkbox"/>	0	<input type="checkbox"/>	99	00	<input type="checkbox"/>
Seals	2/2 Way Valve	Poppet Shape	Hydraulically Operated	Design Series	Inductive Monitoring German Trade Association Certificate 00 077 1)	Cover	Slip-in Cartridge	Valve Size	Cavity and Mounting Pattern ISO 7368	Spring	Orifice	Poppet Seal	

Code	Description
Omit	Nitrile
V	Fluorocarbon

Code	Description
E	NG16-NG63
F	NG80 - NG100

Code	Description
16	NG16
25	NG25
32	NG32
40	NG40
50	NG50
63	NG63
80	NG80
100	NG100

Code	Description
L	0.1 Bar (1.5 PSI)
N	0.5 Bar (7.3 PSI)
S	1.6 Bar (23.2 PSI)
U	4.0 Bar (58.0 PSI)

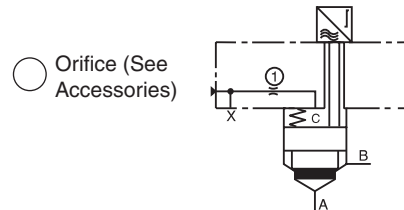
Code	Description
Omit	None
X425	Only with Spring Codes S and U

Code	Description
99	Without Orifice, Open Orifice Options

Weight:

C10DEC*16	1.5 kg (3.3 lbs.)
C10DEC*25	2.7 kg (6.0 lbs.)
C10DEC*32	4.3 kg (9.5 lbs.)
C10DEC*40	7.4 kg (16.3 lbs.)
C10DEC*50	12.0 kg (26.5 lbs.)
C10DEC*63	23.0 kg (50.7 lbs.)
C10DFC*80	53.0 kg (116.9 lbs.)
C10DFC*100	89.0 kg (196.2 lbs.)

1) Certificate only for NG16-NG63



Orifice Recommendation and Thread

Orifice	NG16	NG25	NG32	NG40	NG50	NG63	NG80	NG100
No.: 1	1/16 Ø0.8	1/16 Ø1.2	1/16 Ø1.5	1/8 Ø2.0	1/8 Ø2.5	1/8 Ø3.0	1/8 Ø3.0	1/8 Ø3.0

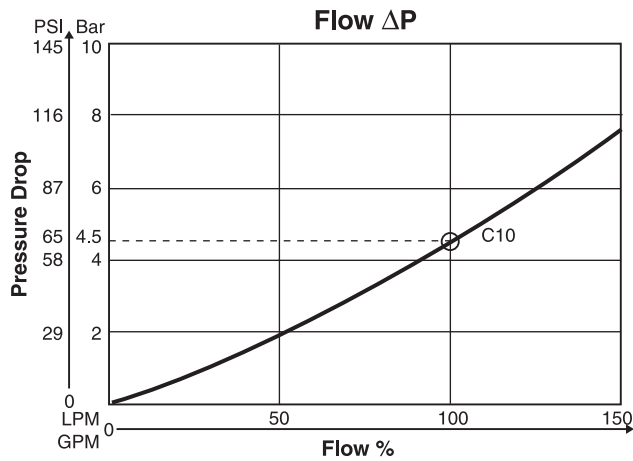
Orifices Ø in mm, thread in NPT

Seal and Bolt Kits

Nominal Size	16	25	32	40	50	63	80	100
Seal Kit								
Fluorocarbon	SK-CBE160V	SK-CBE250V	SK-CBE320V	SK-CBE400V	SK-CBE500V	SK-CBE630V	SK-CBE800V	SK-CBE100V
Nitrile	SK-CBE160	SK-CBE250	SK-CBE320	SK-CBE400	SK-CBE500	SK-CBE630	SK-CBE800	SK-CBE100
Bolt Kit	BK414 (BK84)	BK391 (BK77)	BK415 (BK85)	BK416 (BK86)	BK417 (BK87)	BK418 (BK88)	BK419	BK420
Recommended Torque	27 Nm (19.9 lb.ft.)	94 Nm (69.3 lb.ft.)	234 Nm (172.6 lb.ft.)	460 Nm (339.3 lb.ft.)	460 Nm (339.3 lb.ft.)	1570 Nm (1157.9 lb.ft.)	935 Nm (689.6 lb.-ft.)	1910 Nm (1408.6 lb.-ft.)

Attention! The switch may only be adjusted by the valve manufacturer. The exchange of individual modules is not permitted.

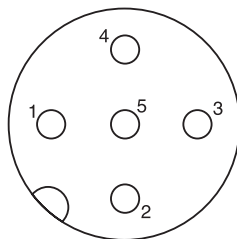
Performance Curve



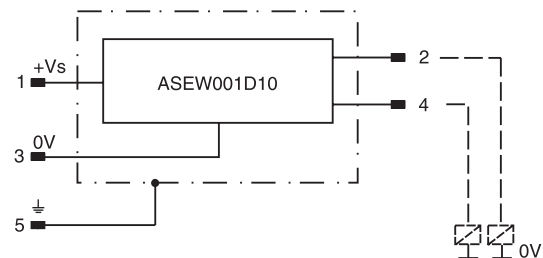
Specifications

General									
Size		NG16	NG25	NG32	NG40	NG50	NG63	NG80	NG100
Interface	2-way slip-in cartridge valve according to ISO 7368								
Mounting Position	Unrestricted								
Operation	Hydraulic								
Ambient Temperature	-40°C to +60°C (-40°F to +140°F)								
Hydraulic									
Maximum Operating Pressure	350 Bar (5075 PSI)								
Nominal Flow $\Delta p = 5 \text{ Bar (73 PSI)}$	LPM GPM	220 (58)	450 (119)	900 (238)	1300 (344)	1800 (476)	3600 (952)	5000 (1322)	7500 (1984)
Fluid	Hydraulic oil according to DIN 51524 ... 525								
Viscosity Recommended	30 to 80 cSt (mm ² /s)								
Viscosity Permitted	20 to 380 cSt (mm ² /s)								
Fluid Temperature Recommended	+30°C to +50°C (+86°F to +122°F)								
Fluid Temperature Permitted	-20°C to +60°C (-4°F to +140°F)								
Filtration	NAS 1638 class 9, to be achieved by $\beta_{10} > 75$ ISO 18/16/13								
Control Volume at Maximum Stroke	cm³	2.03	6.45	12.21	20.32	39.40	94.56	950	1300
Control Surface (Surface C = 100%) A/B	Approximately 60% / 40% related on surface C								
Opening Pressure Flow Direction B to A	L = 0.25 Bar (3.6 PSI), N 1.25 Bar (18.1 PSI), S = 4.0 Bar (58.0 PSI), U = 10.0 Bar (58.0 PSI)								
Opening Pressure Flow Direction A to B	L = 0.16 Bar (2.3 PSI), N 0.85 Bar (12.3 PSI), S = 2.7 Bar (39.2 PSI), U = 6.6 Bar (95.7 PSI)								
Electrical (Position Control per IEC 61076-2-101 (M12x1) NG16 to NG63)									
Protection Class	IP65 in accordance with EN60529 (plugged and mounted)								
Ambient Temperature	0°C to +50°C (+32°F to +122°F)								
Supply Voltage / Ripple	18V to 42V / 10%								
Current Consumption without Load	≤30mA								
Output Current per Channel, Ohmic	400mA, maximum								
Output Load per Channel, Ohmic	100k Ohm, minimum								
Output Drop at 0.2A	≤1.1 VDC, maximum								
Output Drop at 0.4A	≤1.6 VDC, maximum								
EMC	EN50081-1 / EN50082-2								
Ambient Field Strength	<1200A/m, maximum tolerance								
Distance to Next AC Solenoid	>0.1 m (3.9 in.), minimum								
Interface	Mx12x1								
Wiring	5 x 0.25 mm ² , minimum, braid shield recommended								
Wiring Length	50 m (164 ft.), maximum recommended								

M12 Pin Assignment



- 1 + Supply 18...42V
- 2 Normally open
- 3 0V
- 4 Normally closed
- 5 Earth ground



Extract from the German Trade Association Certificate (Applies to NG16 to NG63 only)



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

Hauptverband der gewerblichen
 Berufsgenossenschaften

00 077

Bescheinigungs-Nummer

Name und Anschrift
 des Bescheinigungsinhabers:
 (Auftraggeber) **Parker Hannifin GmbH**
 Hydraulic Controls Division
 Gutenbergstr. 38 - 40, D- 41564 Kaarst

Name und Anschrift
 des Herstellers: **Parker Hannifin GmbH**
 Hydraulic Controls Division
 Gutenbergstr. 38 - 40, D- 41564 Kaarst

Zeichen des Auftraggebers: Zeichen der Prüf- und Zertifizierungsstelle:
 MHHW 612.1:612.28-UB Gb/bt

Produktbezeichnung: **2/2- Wegesitzventil mit Überwachung**
Einbauventil nach DIN 24342 (entspricht DIN ISO 7368)

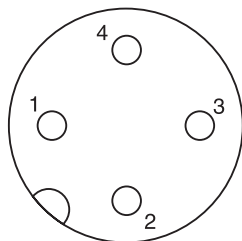
Typ: C10 DEC 101.....

Das geprüfte Baumuster entspricht den einschlägigen Bestimmungen der EG-Maschinenrichtlinie 2006/42/EG.

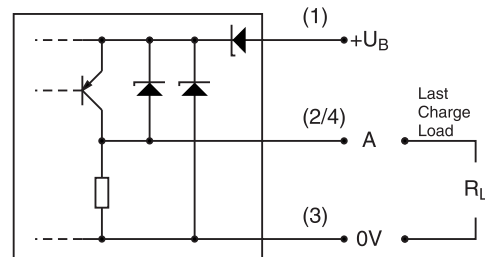
Electrical Specifications

Electrical (Position Control per IEC 61076-2-101 (M12x1) NG80 to NG100)	
Protection Class	IP65 in accordance with EN60529 (plugged and mounted)
Ambient Temperature	0°C to +50°C (+32°F to +122°F)
Supply Voltage U_S / Ripple	10V to 30V / 10%
Current Consumption without Load	≤10mA
Output Current per Channel, Ohmic	200mA, maximum
Output Load per Channel, Ohmic	100k Ohm, minimum
Output Drop at 0.2A	≤2 VDC, maximum
EMC	EN61000-6-4 / EN61000-6-2
Distance to Next AC Solenoid	>0.1 m (3.9 in.), minimum
Interface	Mx12x1
Wiring	3 x 0.14 mm ² minimum, braid shield recommended
Wiring Length	50 m (164 ft.), maximum recommended

M12 Pin Assignment



- 1 + U_S 10...30V
- 2 Out A: not connected
- 3 0V
- 4 Out A: normally closed



Definition

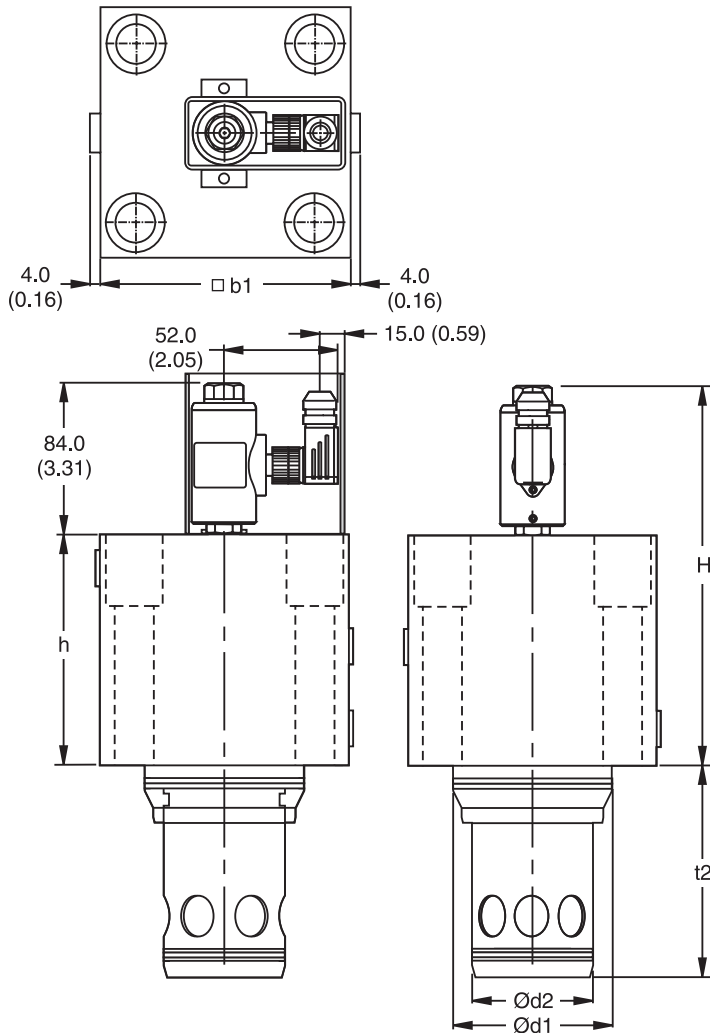
Start position monitored:

The switching point of the inductive switch is within the closed position of the poppet.

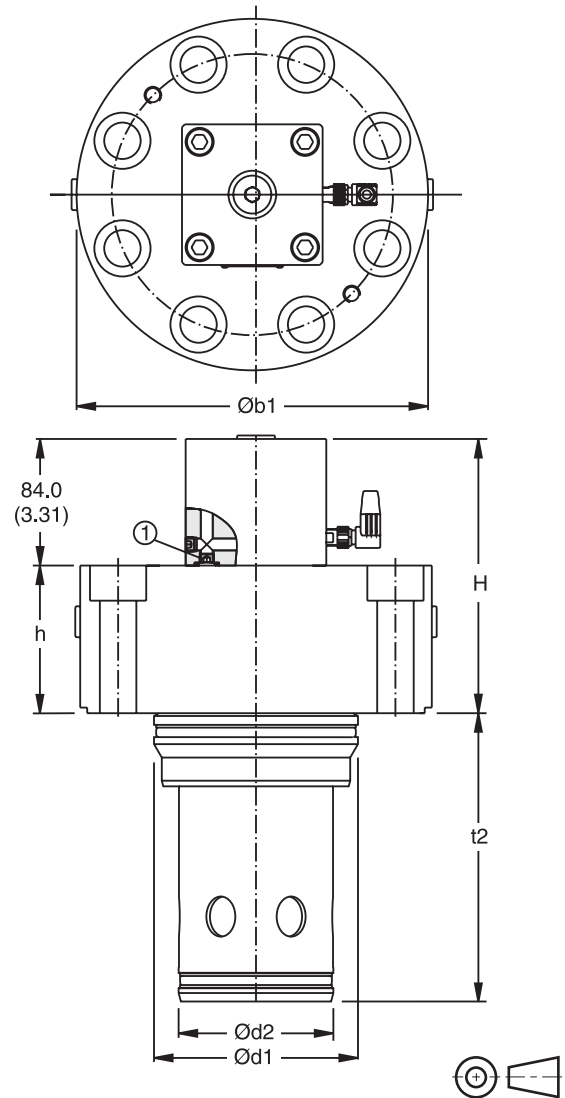
After the inductive switch changes the signal the valve opens.

Inch equivalents for millimeter dimensions are shown in (**)

NG16 to NG63



NG80 to NG100



Cavity and mounting pattern according to ISO7368

Nominal Size	H	h	b1	d1	d2	t2 ^{+0.1}
16	130.0 (5.12)	40.0 (1.57)	79.0 ¹⁾ (3.11)	32.0 (1.26)	25.0 (0.98)	56.0 (2.20)
25	135.0 (5.31)	45.0 (1.77)	85.0 (3.35)	45.0 (1.77)	34.0 (1.34)	72.0 (2.87)
32	140.0 (5.51)	50.0 (1.97)	102.0 (4.02)	60.0 (2.36)	45.0 (1.77)	85.0 (3.35)
40	150.0 (5.91)	60.0 (2.36)	125.0 (4.92)	75.0 (2.95)	55.0 (2.17)	105.0 (4.13)
50	160.0 (6.30)	70.0 (2.76)	140.0 (5.51)	90.0 (3.54)	68.0 (2.68)	122.0 (4.80)
63	175.0 (6.89)	85.0 (3.35)	180.0 (7.09)	120.0 (4.72)	90.0 (3.54)	155.0 (6.10)
80	195.0 (7.68)	105.0 (4.13)	250.0 (9.84)	145.0 (5.71)	110.0 (4.33)	205.0 (8.07)
100	210.0 (8.27)	120.0 (4.72)	300.0 (11.81)	180.0 (7.09)	135.0 (5.31)	245.0 (9.65)

¹⁾ Width 65mm (2.56 in.)

General Description

Series C18D*C 2/2 way, monitored seat valves with cartridge design according to ISO 7368 are preferably used for safety circuits: mainly for safety guards, mold form tools and locking mechanisms for presses and injection moulding machines. Pilot pressure actively opens and closes the main poppet independent of pressure in the main ports.

Features

- German trade association certificate, No. 00 078.
- Cavity and mounting pattern according to ISO 7368.
- Monitored closed position.
- Inductive switch CE conform.
- Active design with separate control surfaces.
- Sealing between control surfaces and connection B.
- 5 sizes NG25 up to NG63.

Ordering Information

<input type="checkbox"/>	C	18	D	E	C	107	E	<input type="checkbox"/>	0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Seals	2/2 Way Valve	Poppet Shape	Hydraulically Operated	Design Series	Inductive Monitoring German Trade Association Certificate 00 078	Cover	Slip-in Cartridge	Valve Size	Cavity and Mounting Pattern ISO 7368	Spring	1	2	3	4	Orifice				

Code	Description
Omit	Nitrile
V	Fluorocarbon

Code	Description
S	1.6 Bar (23.2 PSI)
U	4.0 Bar (58.0 PSI)

Code	Description
99	Without Orifice, Open

Code	Description
25	NG25
32	NG32
40	NG40
50	NG50
63	NG63

○ Orifice (See Accessories)

Weight:

C18DEC*25	3.2 kg (7.1 lbs.)
C18DEC*32	6.7 kg (14.8 lbs.)
C18DEC*40	8.7 kg (19.2 lbs.)
C18DEC*50	13.8 kg (30.4 lbs.)
C18DEC*63	26.3 kg (58.0 lbs.)

Orifice Thread

Orifice	NG25	NG32	NG40	NG50	NG63
1	M6	M6	M6	*1/16	*1/8
2	M6	M6	M6	*1/16	*1/16
3	M6	M6	M6	*1/16	*1/8
4	M6	M6	M6	*1/16	*1/16

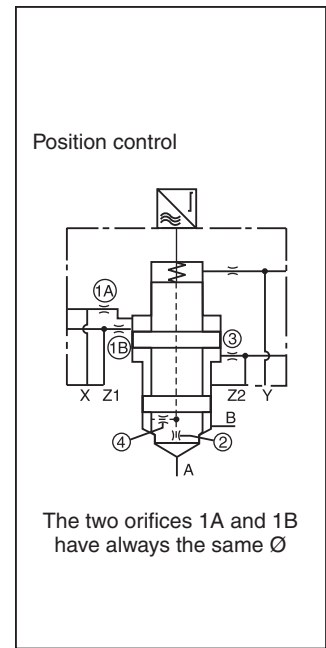
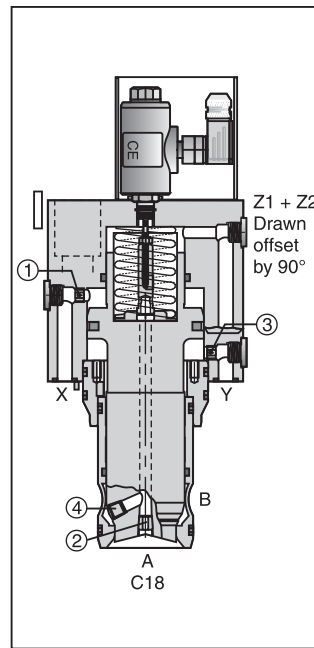
* Thread in NPT

Seal and Bolt Kits

Nominal Size		25	32	40	50	63
Seal Kit	Fluorocarbon	SK-C13DB10-E25V	SK-C13DB10-32V	SK-C13DB-E40V	SK-C13DB10-E50V	SK-C13DB10-E63V
	Nitrile	SK-C13DB10-E25	SK-C13DB10-32	SK-C13DB10-E40	SK-C13DB10-E50	SK-C13DB10-E63
Bolt Kit		BK-M12x90-4pcs	BK-M16x90-4pcs	BK-M20x110-4pcs	BK-M20x120-4pcs	BK-M30x160-4pcs
Recommended Torque	Nm (lb.-ft.)	94 (69.3)	234 (172.6)	460 (39.3)	460 (339.3)	1570 (1157.9)

Attention! The switch may only be adjusted by the valve manufacturer. The exchange of individual modules is not permitted.

C18D_C.indd, ddp



Orifice Recommendation

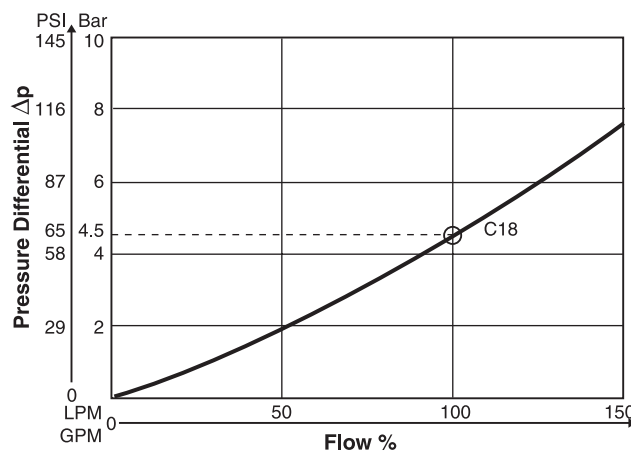
Orifice	NG25	NG32	NG40	NG50	NG63
① - ④	Ø 1.2	Ø 1.5	Ø 2.0	Ø 2.5	Ø 3.0

Depending on function, plugs must be used.

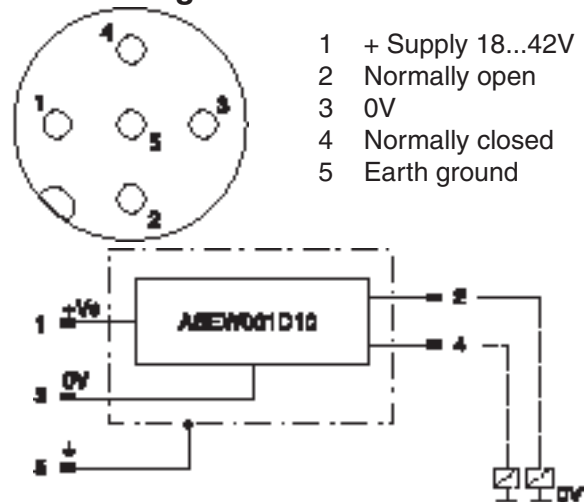
Specifications

General					
Size	NG25	NG32	NG40	NG50	NG63
Interface	2-way slip-in cartridge valve according to ISO 7368				
Mounting Position	Unrestricted				
Operation	Hydraulic				
Ambient Temperature	-40°C to +60°C (-40°F to +140°F)				
Hydraulic					
Maximum Operating Pressure	350 Bar (5075 PSI)				
Nominal Flow, $\Delta p = 5$ Bar (73 PSI)	400 LPM (105.7 GPM)	800 LPM (211.3 GPM)	1250 LPM (330.2 GPM)	1625 LPM (429.3 GPM)	3400 LPM (898.2 GPM)
Fluid	Hydraulic oil according to DIN 51524 ... 525				
Viscosity Recommended	30 to 80 cSt (mm ² /s)				
Viscosity Permitted	20 to 380 cSt (mm ² /s)				
Fluid Temperature Recommended	+30°C to +50°C (+86°F to +122°F)				
Fluid Temperature Permitted	-20°C to +60°C (-4°F to +140°F)				
Filtration	NAS 1638 class 9, to be achieved by $\beta_{10} > 75$ ISO 18/16/13				
Control Volume Spring Chamber Surface C	6.45 (cm ³)	12.21 (cm ³)	20.32 (cm ³)	39.40 (cm ³)	94.56 (cm ³)
Control Surface	F/C	100%			
	FSt	123.8%	108.6%	121.5%	117.0%
	FA/B	Approximately 60% / 40% related on surface C			
Opening Pressure Flow Direction B to A	L=0.25 Bar (3.6 PSI), N=1.25 Bar (18.1 PSI), S=4.0 Bar (58.0 PSI), U=10.0 Bar (145.0 PSI)				
Opening Pressure Flow Direction A to B	L=0.16 Bar (2.3 PSI), N=0.85 Bar (12.3 PSI), S=2.7 Bar (39.2 PSI), U=6.6 Bar (95.7 PSI)				
Electrical (Position Control per IEC 61076-2-101 (M12x1))					
Protection Class	IP65 in accordance with EN60529 (plugged and mounted)				
Ambient Temperature	0°C to +50°C (+32°F to +122°F)				
Supply Voltage / Ripple	18V to 42V / 10%				
Current Consumption without Load	≤ 30mA				
Output Current per Channel, Ohmic	400mA, maximum				
Output Load per Channel, Ohmic	100k Ohm, minimum				
Output Drop at 0.2A	≤1.1V, maximum				
Output Drop at 0.4A	≤1.6V, maximum				
EMC	EN50081-1 / EN50082-2				
Ambient Field Strength	<1200A/m, maximum tolerance				
Distance to Next AC Solenoid	>0.1 m (3.9 in.), minimum				
Interface	Mx12x1				
Wiring	5 x 0.25 mm ² minimum, braid shield recommended				
Wiring Length	50 m (164 ft.), maximum recommended				

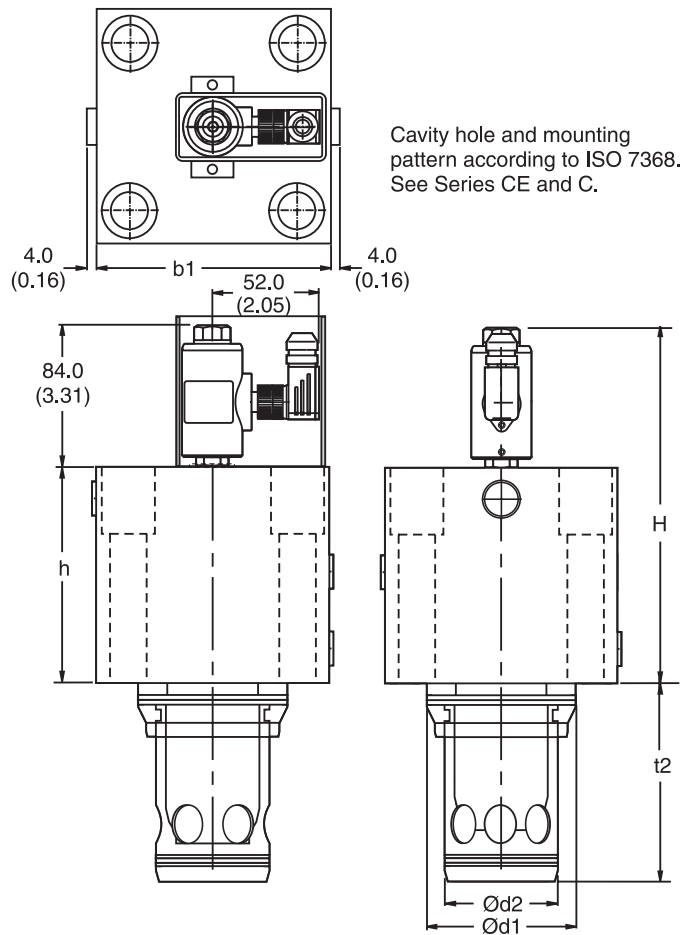
Performance Curve



M12 Pin Assignment

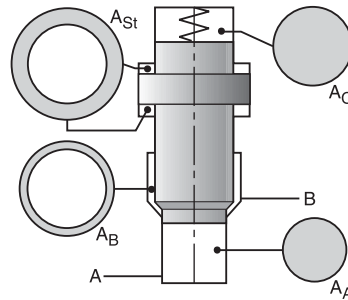


Inch equivalents for millimeter dimensions are shown in (**)



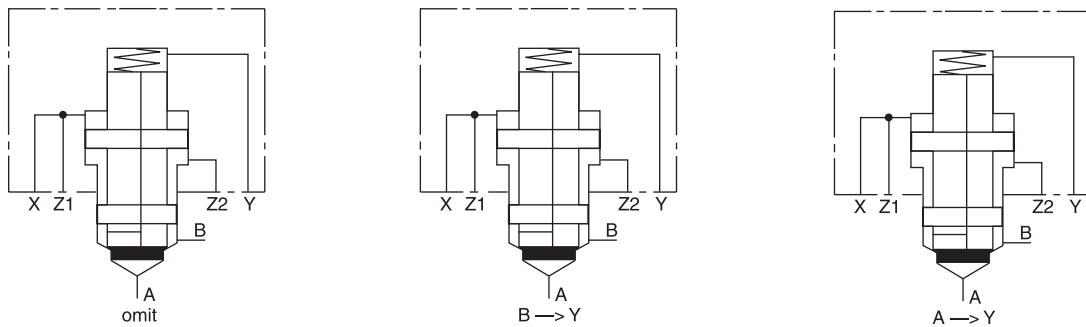
Nominal Size	25	32	40	50	63
H	174.0 (6.85)	174.0 (6.85)	194.0 (7.64)	214.0 (8.14)	234.0 (9.21)
h	90.0 (3.54)	90.0 (3.54)	110.0 (4.33)	130.0 (5.12)	150.0 (5.91)
b1	85.0 (3.35)	102.0 (4.02)	125.0 (4.92)	140.0 (5.51)	180.0 (7.09)
d1	45.0 (1.77)	60.0 (2.36)	75.0 (2.95)	90.0 (3.54)	120.0 (4.72)
d2	34.0 (1.34)	45.0 (1.77)	55.0 (2.17)	68.0 (2.68)	90.0 (3.54)
12 +0.1	72.0 (2.83)	85.0 (3.35)	105.0 (4.13)	122.0 (4.80)	155.0 (6.10)

Control Surfaces



NG	AA [%]	AB [%]	AC [%]	ASt [%]
25	60	40	100	124
32	60	40	100	109
40	60	40	100	121
50	60	40	100	117
63	60	40	100	121

Pilot Guide Inside the Poppet



Extract from the German Trade Association Certificate



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

Hauptverband der gewerblichen
Berufsgenossenschaften

00 078

Bescheinigungs-Nummer

Name und Anschrift
des Bescheinigungsinhabers:
(Auftraggeber) **Parker Hannifin GmbH**
Hydraulic Controls Division
Gutenbergstr. 38 - 40, D- 41564 Kaarst

Name und Anschrift
des Herstellers: **Parker Hannifin GmbH**
Hydraulic Controls Division
Gutenbergstr. 38 - 40, D- 41564 Kaarst

Zeichen des Auftraggebers: Zeichen der Prüf- und Zertifizierungsstelle:
MHHW 612.1:612.28-UB Gb/bt

Produktbezeichnung: **2/2- Wegesitzventil mit Überwachung**
aktiv gesteuerte Einbauventile nach DIN 24342 (entspricht DIN ISO 7368)

Typ: C18 DEC 107.....

Das geprüfte Baumuster entspricht den einschlägigen Bestimmungen der EG-Maschinenrichtlinie 2006/42/EG.

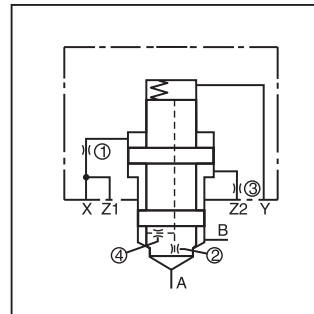
General Description

Series C18DB 2/2 way seat valves with cartridge design according to ISO 7368 are preferably used where opening and closing should be controlled by pilot pressure only, independent of the pressure in the main ports.

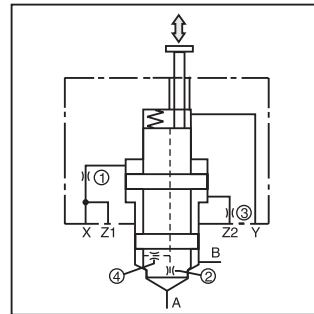
Series C18DB is offered as hydraulically controlled valve (C18DB107), with additional stroke limiter (C18DBN112) and with the mounting pattern for a pilot valve (C18DB121).

Features

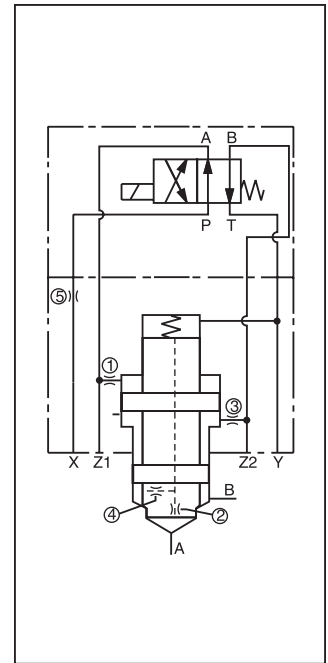
- Cavity and mounting pattern according to ISO 7368.
- Active design with separate control areas.
- Sealing between control surfaces and connection B.
- Up to 5 sizes:
 - C18DB107 5 sizes NG25 up to NG63
 - C18DBN112 3 sizes NG25 up to NG40
 - C18DB121 2 sizes NG32 up to NG40



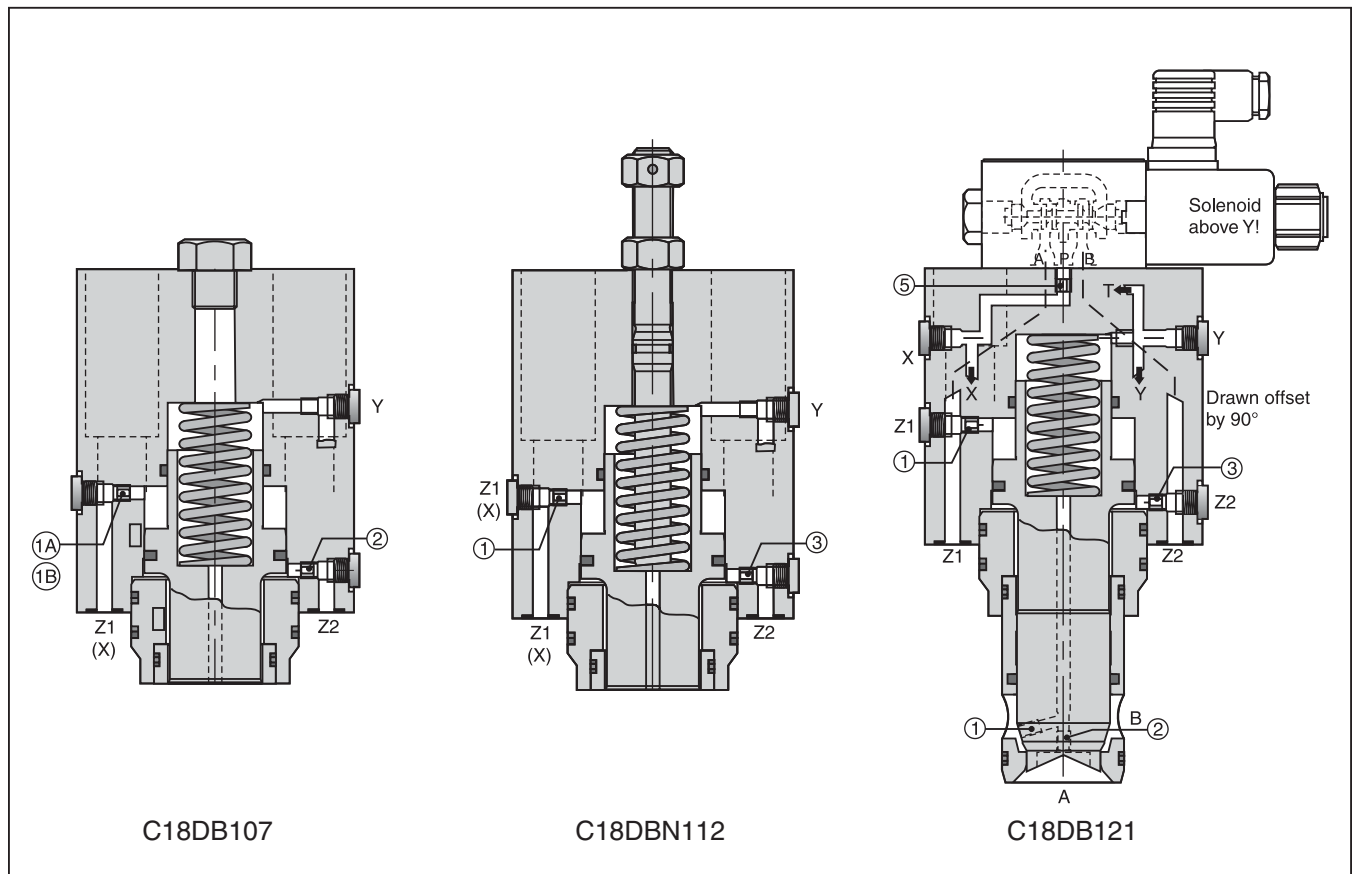
C18DB107



C18DBN112



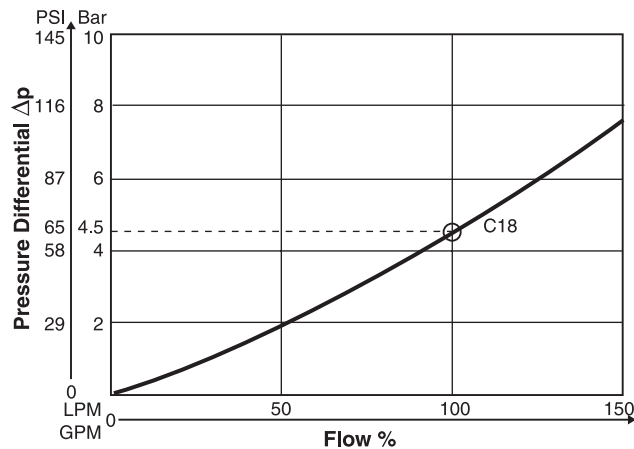
C18DB121



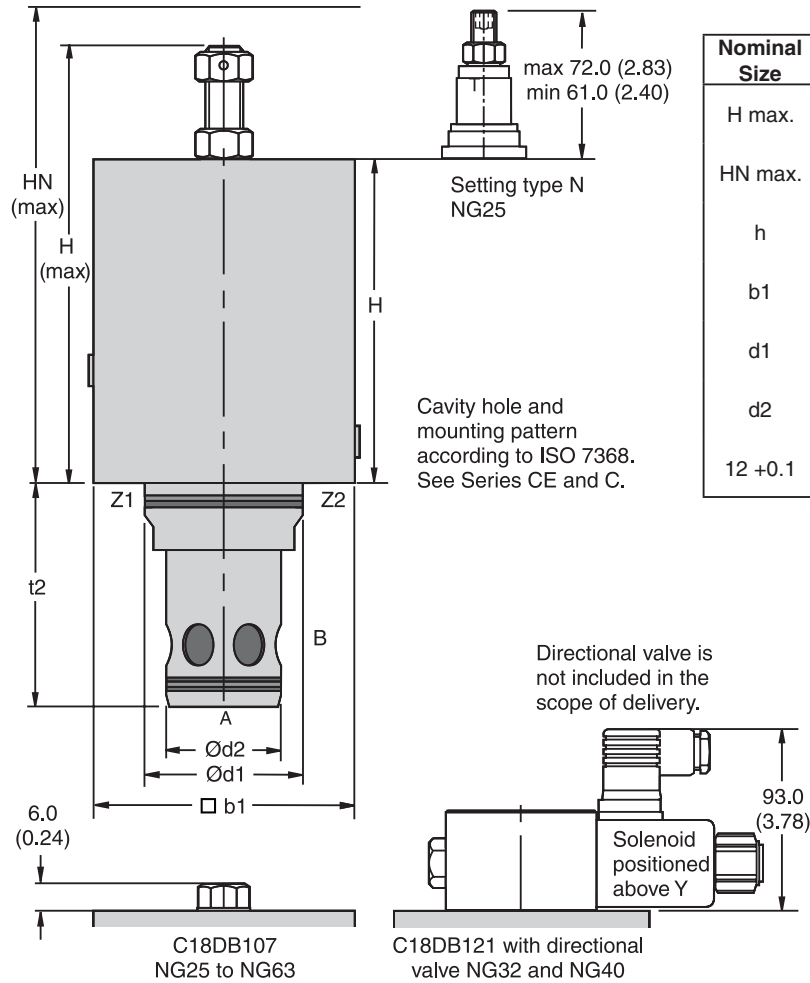
Specifications

General					
Size	NG25	NG32	NG40	NG50	NG63
Interface	2-way slip-in cartridge valve according to ISO 7368				
Mounting Position	Unrestricted				
Operation	Hydraulic				
Ambient Temperature	-40°C to +60°C (-40°F to +140°F)				
Hydraulic					
Maximum Operating Pressure	350 Bar (5075 PSI)				
Nominal Flow, $\Delta p = 5$ Bar (73 PSI)	450 LPM (119 GPM)	900 LPM (238 GPM)	1300 LPM (344 GPM)	1800 LPM (476 GPM)	3600 LPM (952 GPM)
Fluid	Hydraulic oil according to DIN 51524 ... 525				
Viscosity Recommended	30 to 80 cSt (mm ² /s)				
Viscosity Permitted	20 to 380 cSt (mm ² /s)				
Fluid Temperature Recommended	+30°C to +50°C (+86°F to +122°F)				
Fluid Temperature Permitted	-20°C to +60°C (-4°F to +140°F)				
Filtration	NAS 1638 class 9, to be achieved by $\beta_{10} > 75$ ISO 18/16/13				
Control Volume Spring Chamber Surface C	6.45 (cm ³)	12.21 (cm ³)	20.32 (cm ³)	39.40 (cm ³)	94.56 (cm ³)
Control Surface	FC	100%			
	FSt	123.8%	108.6%	121.5%	117.0%
	FA/B	Approximately 60% / 40% related on surface C			
Opening Pressure Flow Direction B to A	L=0.25 Bar (3.6 PSI), N=1.25 Bar (18.1 PSI), S=4.0 Bar (58.0 PSI), U=10.0 Bar (145.0 PSI)				
Opening Pressure Flow Direction A to B	L=0.16 Bar (2.3 PSI), N= 0.85 Bar (12.3 PSI), S=2.7 Bar (39.2 PSI), U=6.6 Bar (95.7 PSI)				

Performance Curve

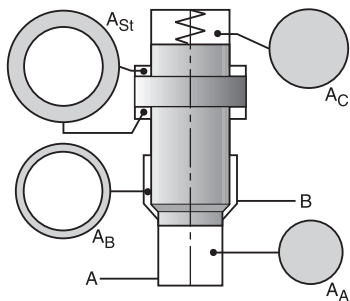


Inch equivalents for millimeter dimensions are shown in (**)



Nominal Size	25	32	40	50	63
H max.	234.0 (9.21)	142.0 (5.59)	208.0 (8.19)	189.0 (7.44)	241.0 (9.49)
HN max.	162.0 (6.38)	197.0 (7.76)	227.0 (8.94)	202.0 (7.95)	222.0 (8.74)
h	90.0 (3.54)	125.0 (4.92)	140.0 (5.51)	130.0 (5.12)	150.0 (5.91)
b1	85.0 (3.35)	102.0 (4.02)	125.0 (4.92)	140.0 (5.51)	180.0 (7.09)
d1	45.0 (1.77)	60.0 (2.36)	75.0 (2.95)	90.0 (3.54)	120.0 (4.72)
d2	34.0 (1.34)	45.0 (1.77)	55.0 (2.17)	68.0 (2.68)	90.0 (3.54)
12 +0.1	72.0 (2.83)	85.0 (3.35)	105.0 (4.13)	122.0 (4.80)	155.0 (6.10)

Control Surfaces



NG	AA [%]	AB [%]	AC [%]	Ast [%]
25	60	40	100	124
32	60	40	100	109
40	60	40	100	121
50	60	40	100	117
63	60	40	100	121

Installation Information

A hydraulic system that operates economically, safely, and trouble-free requires careful planning, as well as proper installation and start-up. Conscientious maintenance has a considerable effect on the service life of the hydraulic elements.

The following methods are to be observed when starting up and performing maintenance. There are helpful tips for fault correction in the troubleshooting section.

The information given in these instructions are of a general nature and require other professional procedures. The commissioning of the hydraulic equipment must be in accordance with the putting into operation of the entire machine or installation, and shall be done by experts who have the special hydraulic knowledge. For a safe and successful start-up, the information for installation and commissioning of each component particularly must be observed.

Technical Safety Instructions

The hydraulic system is to be planned and executed so that personnel cannot be endangered during possible malfunctions. This requires that the diverse pumps and devices are operated within their specified operating pressure ranges. Possible damage to the system and the electrical control system must be limited to a minimum.

Welding performed afterwards on oil reservoir may only be carried out by specialists at their own risk. Remaining oil and the cleaning cover must be removed.

Preventive steps must be introduced to avoid danger through the welding work.

Further measures must be arranged, depending on where the hydraulic system is set up, such as whether an oil receiver must be provided in water protection areas, etc., or whether hardly inflammable liquids must be used with an increased fire hazard.

Hydraulic Accumulator

For putting in operation and using accumulators the national rules, guidelines and regulations must be observed.



Hydraulic accumulators must be pre-charged only with nitrogen. Therefore, the filling up of the accumulator must be done according to the instructions of the producer by using only the special tools.

The testing documents of the hydraulic accumulators and safety valves must be stored separately. If necessary, they must be presented to the safety commissioner. It's not allowed to remove the lead seal of the safety valves. Observe information signs.

Transport

The power unit or the completely mounted manifold was properly packed and handed over to the transport company. If there are damages, please contact the manufacturer or your transport company.

For further transportation the hydraulic must be handled with care.

Storage

The power unit, manifolds and components must be protected from contamination, as well as from mechanical and weather damage.

Suitable measures must be taken to prevent corrosion if they are stored for longer periods of time without final painting.

Mounting

The pipe connection joints of the unit must be connected with the externally mounted devices and manifolds or the machine according to the positions shown in the hydraulic scheme.

Particularly the following points are to be observed:

- Use cold-drawn precision steel pipes, with the exception of nominal widths bigger than or equal NW50.
- Observe pipe cross-sections and permissible working pressure.
- Remove plastic plugs immediately before beginning pipeline work.
- Assemble pipe bends using bending devices.
- The pipe cross-section may not be pinched when bending.
- The pipes, after being cut to their exact lengths, are to be thoroughly debarred and cleaned.
- Fittings corresponding to pressure and environmental conditions are to be used on the system, and the manufacturer's assembly instructions followed.
- Pipelines are to be lain and tightened without stress.
- Heat-treated pipes must be mechanically cleaned and descaled.
- Drain lines are not to be crimped, and if possible, at a falling angle to the tank, above the oil level.
- If hose lines must be used, they must be selected according to the pressure and the environmental conditions of the system. Note their stability, working pressure, and nominal width.
- The pipes must be sufficiently mounted with pipe brackets to avoid vibrations.
- It is advisable to provide venting connections at the highest position in the pipeline network.
- The power units, the manifolds and the connected parts of the system must be installed and mounted safely for operation.

Installation Information

Fluids

In order to facilitate the selection of suitable fluids, we refer to the following chapter. This contains information about appropriate oil types. The fluids must meet the requirements of DIN 51524 sections 1 and 2.

Separate instructions must be observed for other fluids (e.g. compatibility with sealing materials).

Commissioning



Start-up may only be carried out by specialists. Particularly the special instructions of the manufacturer and the producer of the components must be observed.

The hydraulic scheme, the parts list, and the control system flow chart should be present. The planned pressure setting must be indicated for all pressure valves in the hydraulic scheme.

Starting-up Safety Instructions

Before start-up the assembly of the complete hydraulic equipment must be inspected by specialists. Particularly the following points are to be observed:

- Mounting of pipes including clamping.
- Accurate connection of pressure and return pipes.
- Accurate connection of the pilot pressure pipes.
- Accurate assembly of the hydraulic components.
- Accurate connection of the power unit.
- Accurate connection of the manifolds.
- Accurate connection of the cylinder and hydraulic motors.
- Accurate connection of the electrics.
- Hydraulic equipment must be mounted safely for the operation.
- Parts of the entire system where driven by the hydraulics must be mounted safely for the operation.

Before start-up of the hydraulic system the specialists must prepare all necessary requirements to protect individuals and parts of the system against damage.

The start-up must be done very carefully according to the safety regulation.

Filling

Before the hydraulic fluid is poured into the tank, its interior must be checked again for cleanliness, and be cleaned if necessary.

The tank is to be filled using a fine filter, so that the desired cleanliness class of the fluid is ensured when starting up. Special filling units or equipment provided with the system are especially suitable for this, e.g. the return line filter.

The oil type is indicated on a separate sign next to the filling opening.

Flushing

starting_up.indd, ddp

After filling the reservoir with fluid, we recommend the flushing of the fluid inside the hydraulic system where the fluid flushes around many times in the reservoir.

Before starting the flushing the servovalves and proportional valves must be removed and replaced by flushing plates to avoid damages of these valves according to contamination. Start-up of the components and the function of the entire system should only begin once the required minimum cleanliness and the operating temperature are reached.

It is recommended to flush the long pipelines by short circuiting the pressure and return lines, especially for large, central pressure oil stations. This prevents the installation dirt from entering the pilot valves (especially important for servo and proportional valves) or the drives (cylinder, hydro-motors, etc.). The diverse measures should be coordinated during design.

Electrical Connections

Are the correct current and voltage types available?

- **Motor**
Check available current with the E-motor type plate.
- **Solenoids**
Are the type of current (~ or =) and the voltage correct? Check the labels of these devices.
- **Plugs**
The electronic connections must be done according to the technical rules by using the appropriate plugs.
- **Grounding**
Power units, parts of the system and single mounted components must be grounded.

Pumps and Devices

The pump case must be filled with the clean operating hydraulic fluid before start-up to lubricate the bearing with oil.

Particularly the special start-up instructions for pumps and hydraulic and electric devices must be observed.

The following section contains only the most important aspects:

- **Pumps**
It is advantageous to keep the pressure setting low at first when starting the pump for the first time. The pressure compensator for variable displacement pumps and the pressure limiting valve for fixed displacement pumps are set to approx. 15 - 20 Bar (218 - 290 PSI).
- **Pressure Valves**
Depending on the machine function, first begin with a minimum pressure setting. Enter pressure onto the measuring location plate after the final pressure is established.

An exception are the design-tested and preset accumulator safety valves.

Pumps and Devices (continued)

- **Pressure Unloading Valves**

Installation Information


For setting the pressure unloading valves according the pressure information in hydraulic schematic particularly the start-up instructions for this valve must be observed.

- **Throttle Valves**

Set every drive (cylinder etc.) in steps via the throttle or flow control valves at the desired speed or stroke time.

- **Directional Valves**

Select the direction using the electric control system for electrically operated valves.


 **Manual override of the solenoid requires a suitable tool.**

- **Proportional Valves**

Proportional pressure flow and DC valves must be first started with a low electrical command signal.

- **Hydraulic Accumulators**

If hydraulic accumulators are assembled into the system, these must be verified at and/or filled up to the correct gas pre-load level. Suitable testing and filling equipment is necessary.

 **Hydraulic accumulators may only be filled with nitrogen for reasons of safety. The pre-loading coordinated with the working pressure is indicated in the hydraulic scheme.**

In general, the following applies:

Gas pre-loading = min. working pressure x 0.9

After testing or filling, the hydro-storage can be switched into the system via ball valve.

Switch On

First the motor is quickly switched on and directly switched off to determine the rotation direction. The correct rotation direction is indicated by an arrow on the pump housing. If the rotation direction is incorrect, reverse the polarity of the e-motor. The pump is started by multiple short start-ups (on-off operation). After approx. 1 min run time, the working pressure can be set to its nominal value (see also "**Troubleshooting**" 1.1 and 1.2).

Start-up information provided by the pump manufacturer has higher priority than these instructions.

Air Bleeding

Air in the hydraulic system is very disadvantageous and undesirable for the control system. The system must be carefully vented, especially for the first start-up, for oil changes, or when lines and valves were opened. All functions are run through, one after the other, in no-load operation with low pressure and with full cylinder stroke.

The pipeline network is vented at its highest point. The fitting can be loosened a little so that the air can escape with only a small amount of oil escaping. When the oil is no longer foaming, the fitting is retightened.

If the air bleeding cylinder is provided with venting screws, these should be used for venting. It must be

noted, however, that the full cylinder stroke must be travelled several times. These venting screws must be at the top for horizontally arranged cylinders.

After filling the cylinder, the oil level in the tank must be checked, and refilled as necessary.

Filter

The function and service life of pumps and hydro-devices are strongly affected by the cleanliness of the fluid. Dirt is the greatest enemy of hydraulic systems. There are three important sources of dirt to watch out for:


- Contamination arising during installation, installation dirt.
- Contamination arising during operation, operation dirt.
- Impurities from the environment.

The correct filtering method is specified during system planning or determined by the necessary cleanliness class. Depending on requirements, pressure or return line filtering as well as additional bypass flow filtration is used. Only a return line filter with $\beta_{25} \geq 75$ (25 μm filter) is used for noncritical systems. Thus contamination of the tank is prevented, and the pump only sucks in clean oil. Pressure filters are used for systems with higher demands, e.g. smallest oil flows ($Q > 200 \text{ cm}^3/\text{min}$) or high, constant pressure on pressure valves.

Pressure filters are to be installed whenever proportional valves are used. Typically, filters with fineness of $\beta_{10} \geq 75$ (10 μm) or $\beta_3 \geq 75$ (3 μm) are used. Filters can only fulfil their function when built-in filter cartridges are cleaned or replaced in time, especially in the initial operating period. During operation, the level of pollution is checked by mechanical or electrical level. For further information, see '**Oil Change**'.

Servicing and Maintenance

Service work may only be carried out by specialists. This requires knowledge of the machine's functions regarding switching on and off, as well as measures of safety engineering.

 **Work on systems that include accumulators may only be carried out after the fluid pressure is unloaded.**

Regular Inspection

The hydraulic system is subject to a simple inspection at short, regular intervals. An automatic monitoring system is already partly provided. Particularly the following is inspected:

- Oil level in the tank.
- Working temperature is not to exceed 60°C (140°).
- Condition of the fluid (visual inspection, color and smell of the hydraulic oil).

Regular Inspection (continued)

Installation Information

- Working pressures.
- Gas pre-load pressure on the accumulator.
- Leaks on the pump, valves, and pipelines.
- Filter elements, for cleanliness (see 'Filter').
- Hose must be checked according to conditions and age.
- All mechanical and electronic sensors must be checked on function.
- All parts of the entire system must be checked on damage.
- Cleanliness must be checked.
- All safety equipment and labelling must be checked.

Oil Change

The frequency of oil changes is dependent on:

- Kind of liquid (aging).
- Filtering.
- Operating and environmental conditions (operating temperature).

Prescribed change intervals

The required cleanliness class as per ISO 4406 or NAS 1638 is dependent on the use of hydraulic components. It requires conscientious planning for filtering and periodic fluid inspection in order to guarantee the desired service life of the pumps and devices. Under these conditions, an oil change can be considerably

delayed, or, depending on the evaluation of laboratory tests, completely omitted.

We refer to the service of well known oil or filter suppliers concerning fluid laboratory tests.

It is mandatory to inspect the breather filters regularly.

Spare Parts

Original spare parts are to be used for repairs. For questions about purchasing spare parts or for malfunctions, please contact our After Sales Service.

Warranty

Fault correction without charge is only possible within the framework of the arranged guarantee. The information given in these instructions are of a general nature and require other professional procedures. Assistance with installation, start-up, and maintenance by our personnel can be arranged according to our service conditions.

Additional regulations and guidelines

Particularly we recommend the following regulations and guidelines:

- International standard ISO 4413.
- German standard VDMA 24572.
Checklist for the inspection of hydraulic systems in industrial machines.

1. Excessive Noise in the System

Cause	Reason	Remedy
1.1 Cavitation in the system.	Suction filter is blocked.	Clean or recondition.
	Internal width of the suction line is too small. Or: Objects in the suction line.	Install pipes with larger internal width.
	Too many bends in the suction line.	Lay new pipes or use pipes with larger internal width.
	Local constrictions in the suction line, e.g. partially closed valve, spring is too strong in check valve, damaged pipe or kinked hose.	Make valves accessible or change pipes or hoses are to be repaired or replaced.
	Fluid is too cold.	Use electric heating to warm pressure fluid to the recommended temperature.
	Viscosity of fluid is too high.	Check fluid.
	Vapor forms.	Lower working temperature to the correct value: Refill fluid or replace with suitable fluid.
	Feed pump fails.	Repair feed pump or replace.
	Speed of pump is too high.	Check speed of the motor (see also specifications in the hydraulic plan).
1.2 Foam or air in the fluid.	Completely sealed tank.	Install breather.
	Suction line is too small or too long.	Increase diameter of the suction line.
	Fluid level in the tank is too low.	Refill oil. For systems with strongly changing oil level: Only fill between the minimum and maximum oil level.
	Incorrect tank design.	Improve design.
	Return line ends in tank above the fluid level.	Lay return flow line lower than the fluid level.
	Incorrect fluid.	Replace with the correct fluid, if necessary, contact the system supplier.
	Shaft seal on pump allows air to penetrate.	Replace seal.
	Fitting in the suction line allows air to invade.	Tighten fitting or replace.
	Porous suction hose.	Recondition hose.
Poor air bleeding.	Vent system.	

(continued on next page)

1. Excessive Noise in the System

Cause	Reason	Remedy
1.3 Mechanical vibrations.	Faulty alignment or loose coupling.	Aligning or tightening.
	Vibrations in the pipelines.	Tighten or improve mounting.
	Pump defective or damaged.	Repair or replace.
	Unsuitable pump type.	Replace with more suitable pump type.
	Drive defective or damaged.	Repair or replace.
	Unsuitable drive type.	Replace with more suitable drive type.
	Pressure valve is unstable (oscillates).	Set correctly or replace with more suitable valve.

2. No Pressure or Insufficient Pressure

Cause	Reason	Remedy
2.1 Pump does not deliver correctly.	Penetration of air into the suction lines.	See error 1.2 .
2.2 High pump temperature.	Worn out or damaged pump.	Repair or replace.
	Too little fluid viscosity.	See error 1.1 .
	Insufficient or incorrectly adjusted cooling.	Improve cooling line or adjust correctly. Ensure flow of cooling water.
2.3 Pump speed is too low or drive performance too small.	Coupling or belts slip or motor is faulty.	Remove defect parts.
	Motor is too small.	Use the correct driving motor.
2.4 Loss due to leakage from the pressure side in the return line.	Incorrect pressure setting.	Correct setting.
	Safety valve does not close because of dirt or there are defective parts.	Clean, repair or replace damaged parts.
	Directional valve or another valve is open because dirt or some other defective part is present, or due to electrical failure.	Damaged device is to be determined, adjusted, cleaned, repaired, or replaced.
	Damage to the cylinder hole, piston rod, or seal.	Damaged parts are to be repaired, replaced.
	Failure of piston seal, because the seal material is not suitable for the fluid used.	Use seals made of the correct material.
2.5 Feed pump fails (only for piston pump with feed pump).	Damaged pump, faulty drive, unsuitable fluid viscosity.	See error 1.3 .

3. Pressure Pulsations or Flow Fluctuations

Cause	Reason	Remedy
3.1 Cavitation in the pump.	See error 1.1 .	See error 1.1 .
3.2 Foam or air in the fluid.	See error 1.2 .	See error 1.2 .
3.3 Mechanical vibrations.	See error 1.3 .	See error 1.3 .
3.4 Unstable pressure relief or safety valves.	See error 1.3 .	See error 1.3 .
	Damaged valve seat.	Repair or replace.
	Valve has insufficient or no damping.	Install a more suitable device or damping equipment.
3.5 Valves stick.	Contamination.	Drain fluid, clean system and parts, fill with clean fluid.
	Defective or warped.	Replace device, remove warping.
3.6 Unsteady pump delivery.	Unsuitable pump type or pump design.	Replace with more suitable pump after contacting the pump system manufacturer.
3.7 Air in the system, which causes an irregular or yielding motion.	System is incompletely vented.	see error 1.2 .
	Electrical system is defective e.g. valves switch constantly.	Find and remove faults.

4. Too Little or No Pressure Flow

Cause	Reason	Remedy
4.1 Cavitation of the pump.	See error 1.1 .	See error 1.1 .
4.2 Foam formation or air in the fluid.	See error 1.2 .	See error 1.2 .
4.3 Defective pump.	See error 1.2 .	See error 1.2 .
4.4 Pump speed is too low or drive performance too small..	See error 2.3 .	See error 2.3 .
4.5 Loss due to leakage from the pressure side to the return line.	See error 2.4 .	See error 2.4 .
4.6 Pump runs in the wrong direction of rotation.	Motor rotation direction is incorrect.	Reverse the e-motor.

5. Liquid Temperature is Too High

Cause	Reason	Remedy
5.1 Overflow losses.	Pressure setting on pump is too high or safety valve is set too low.	Correct setting.
	Oil flows out at accumulator safety block.	Close accumulator drain valve on accumulator safety block.
5.2 Loss due to leakage from the pressure side in the return line.	Valves function poorly and seals are faulty.	See error 2.4 .
	Fluid has incorrect viscosity (viscosity is too low).	Remove fluid and fill up system with fluid that has viscosity recommended by the manufacturer.
5.3 Fluid is delivered under pressure via safety and pressure limiting circulation valve into the tank, although pressure fluid is not needed.	Design of switching for system is not correct.	Provide the correct control system, e.g. switching to depressurised.
	Faulty function of the air bleeding system as a result of dirt or faulty parts.	Clean, or if necessary, repair.
	Safety pressure is set too low.	Correct setting.
5.4 Insufficient cooling.	Failure of the cooling water supply.	Check cooling water supply, temperature and function of shut-off valve.
	Failure of the ventilating fan.	Check function of the oil-air-heat exchanger acc. to manufacturers instruction.
	Deposits in the cooling water line.	Clean.
5.5 Insufficient carrying away of heat.	System has insufficient cooling surface to carry off delivered heat.	Install cooling system and/or increase tank capacity and surface.
	An increase in machine performance without corresponding increase in the cooling capacity.	Improve cooling system and/or tank capacity and surface.
5.6 Overheated pump.	Wear in the pump.	Repair or replace.
	Working with fluid whose viscosity is too low.	See error 5.2 .
	Insufficient flushing of the pump.	Increase diameter of the drain line and provide a flushing of the pump housing.
5.7 Fluid circulates too quickly.	Fluid supply is insufficient.	Increase fluid capacity.
	Fluid level is too low in the system.	Fill up system to the recommended level.
5.8 Too much viscous friction.	Cross-section is too small in the pipelines and valves.	Install pipes and valves that have the correct size.

General Description

The hydraulic fluid is an important component of every operating hydraulic systems. The fluid covers several tasks:

- Power transmission
- Wear protection resp. wear reduction
- Heat transfer

The importance of the fluid may be seen in the following statement: "Statistical data indicate that more than 80% of all failures of hydraulic components are cause-related to an improper condition of the hydraulic fluid."

The selection and the maintenance and/or control of the fluid for a hydraulic system are of major importance. The main criteria for this selection are given in the following.

Power Transmission

An important index for the power transmission behaviour of a hydraulic fluid is the bulk module E_{oil} , measured in bar. It describes how much the volume of a fluid content is reduced under pressure.

A "hard" hydraulic fluid (high bulk module) transmits pressures very fast and leads to a stiff hydraulic system. This is appreciated in closed loop controlled systems. "Stiff" systems are achieved by small pressurized volumes, hard surrounding walls (pipes instead of flexible hoses) and high viscose fluids. Beside that pressure increases the bulk module of mineral oil.

A "soft" hydraulic system is more subject to instability, but it is in general quieter, because high frequent pressure ripple is damped better.

The air content of the fluid plays an important role. Mineral oil contains some 9% air in solution under atmospheric pressure. If caused by underpressure in a hydraulic circuit (pump inlet, high fluid velocity in orifices or by turbulences due to high return line speed into the reservoir), part of this air occurs as bubbles, the systems stiffness is drastically reduced, which can cause several problems.

The viscosity of the hydraulic fluid has a high influence on the **dynamic power transmission**. A high viscosity, that means a "thick" fluid, leads to a worse fluidity, which means:

- Pressure relief function (optionally proportional).
- With optional vent function.
- 3 sizes (SAE 3/4", 1", 1-1/4").
- Load compensated flow in combination with F5C.

- Higher pressure losses in pipes and components.
- Reduction of hydraulic-mechanical efficiency.
- More pressure drop in suction line, filling losses, cavitation.
- Sealing and lubrication gaps are not fully filled, loss of lubrication.

A too low viscosity leads to the following problems:

- Higher leakage across all sealing gaps in the pump and in valves.
- Thinner lubrication film causes more direct metal-to-metal contact and more wear in glide and roller bearings.

For these reasons the selection of the right viscosity and the best viscosity: temperature index need highest attention. Some of the selection criteria are:

- Function principle of hydraulic pumps and motors used in the system.
- Nominal pressure, nominal temperature (and range).
- Environmental temperature (and range).
- Length of piping.

The following limits are to be considered:

- Optimum working viscosity regarding efficiency, economy and safety.

$$v_{opt} = 20 - 40 \text{ mm}^2/\text{s}$$

- Working viscosity for full operability.

$$v_{operation} = 16 - 100 \text{ mm}^2/\text{s}$$

- Viscosity limits for reduced operating conditions (speed of rotation, pressure, load cycle).

$$v_{limit} = 12 - 300 \text{ mm}^2/\text{s}$$

- Lowest viscosity limit, start of the damaging metal-to-metal contact, only for short time and max. 50% nominal pressure.

$$v_{min} = 8 \text{ mm}^2/\text{s}$$

- Highest start up viscosity, suction limit of pumps, only for short time when suction line is short and straight.

$$v_{Start} = 800 \text{ mm}^2/\text{s}$$

- The recommended temperature range (fluid temperature) for the operation of a hydraulic system is between 30°C and 70°C, -30°C as the lowest and +90°C as the highest limit never should be exceeded depending on a fluid capable of these temperatures.

Power Transmission

Mineral oil is offered in different viscosity classes (VG, viscosity grade). The characteristic number describes the nominal viscosity in mm²/s at 40°C:

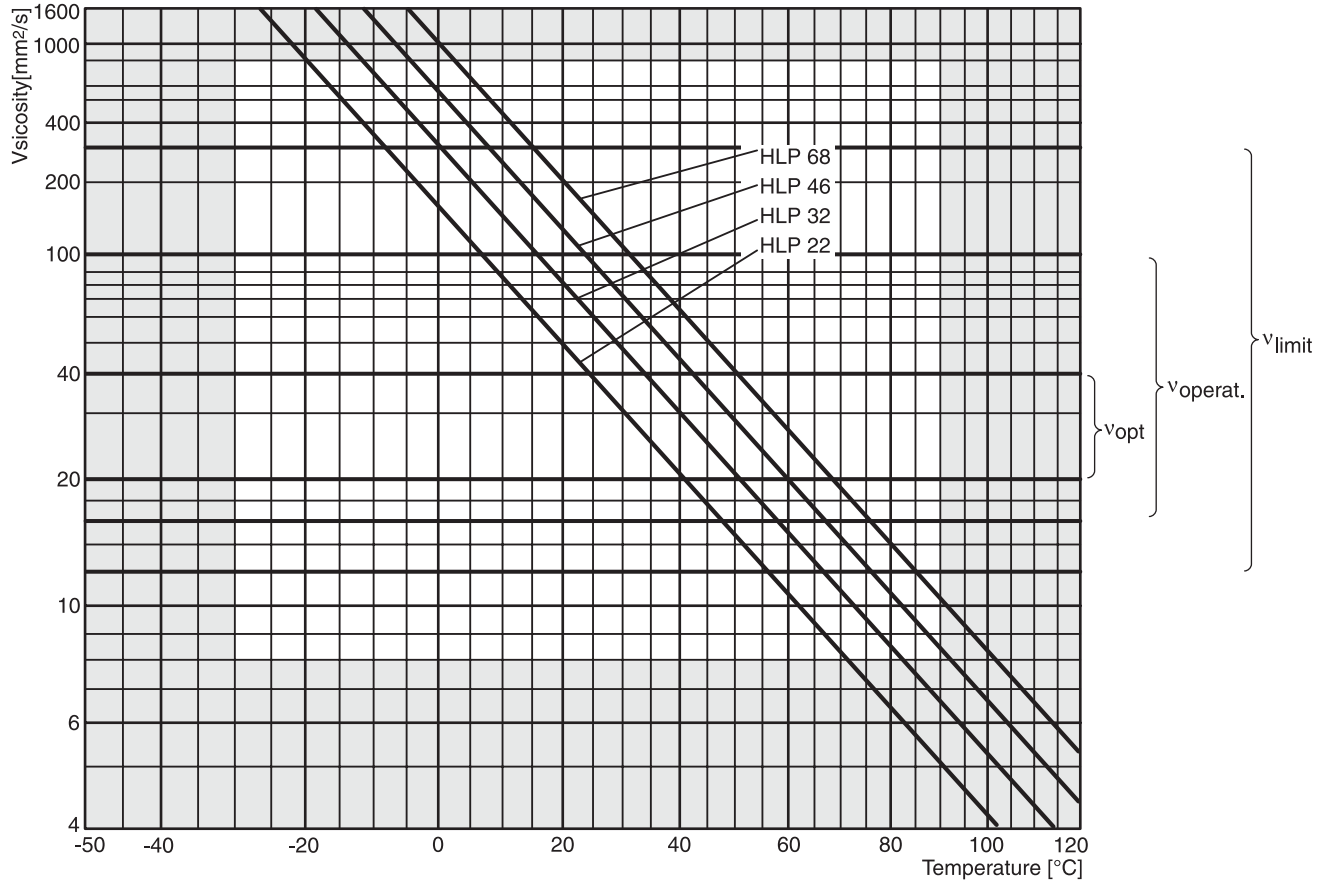
VG 22 arctic conditions, extremely long pipes

VG 46 normal conditions, closed buildings

VG 32 wintry conditions

VG 68 tropical conditions

Viscosity: Temperature Diagram for Mineral Oil



The correlation between viscosity and temperature usually is described in the double logarithmic diagram above.

Wear Protection / Wear Reduction

Wear Protection with Respect to Wear Reduction

In hydraulic components there are many gliding contacts partly under high (side) loads. Beside the correct viscosity, which on the one hand is responsible for the required supply of lubricating fluid to the gap, and on the other hand assures a stable lubricating film, the wear reduction capability of the hydraulic fluid is of major importance.

Load carrying capability is determined in the FZG normal test A/8.3/90 according to DIN 51 354 part 2 (gear transmission test rig, 12 defined load steps at 90°C start temperature and 8.3 m/s circumference speed).

Depending on the nominal working pressure the following load carrying capability is recommended:

Nominal Pressure	Load Carrying Capability
80 – 125 Bar (1160 – 1813 PSI)	≥ 5
125 – 200 Bar (1813 – 2900 PSI)	5 – 6
200 – 250 Bar (2900 – 3625 PSI)	7 – 9
250 – 320 Bar (3625 – 4640 PSI)	≥ 10
> 320 Bar (4640 PSI)	≥ 12

Max pressure limit: 1.25 x nominal pressure

Mineral oils are offered according to DIN 51 524 in different fluid types:

- HL-fluids according to DIN 51 524 part 2, normal working load conditions, load carrying capability 6 – 10.
- HLP-fluids according to DIN 51 524 part 3, higher working load conditions, load carrying capability > 10.

Modern HLP fluids today usually come with a load carrying capability >12. They are equipped with wear prohibiting additives, which ensure a high safety of operation even under severe working conditions.

Beside the wear reduction due to the elasto-hydrodynamic properties of the hydraulic fluid, which are expressed in the FZG value, the behavior of the fluid in a mixed friction situation is very important for the use of a fluid in heavy duty hydraulic applications. In hydraulic components mixed friction occurs permanently, because the velocity difference between two components in contact very often is below the minimum velocity for hydrodynamic lubrication.

During mixed friction, i. e.: at a direct metal-to-metal contact between two surfaces, the “lubricity” of a fluid is most important. The lubricity is measured according to DIN 51 347 and is expressed as a specific load in N/mm², at which wear does not yet occur. This value sometimes also is called the “Brugger Value”.

It is measured in a test device which moves two cylindrical test elements under a defined load. On one of the test elements a wear mark is created. This wear mark grows during the first seconds of the test, but then stays for several minutes at a constant size. The size of this wear mark gives a reading for the specific “wear free” load for this particular fluid in N/mm².

For general applications this value has to be at least:

30 N/mm², measured in accordance with DIN 51 347-2.

For heavily loaded hydraulic equipment and fast cycling machines and/or high dynamic loads, this value should not be below:

50 N/mm², measured in accordance with DIN 51 347-2.

But a fluid can maintain its wear prohibiting capabilities only, when it is not contaminated with hard and aggressive particles. Therefore in the interest of a long functional life of all components the **filtration of the hydraulic fluid** needs special attention.

The sealing and gliding gaps in hydraulic components typically are in the range of 3 – 10 µm. That means they are in the same size range as most of the particles found in a hydraulic fluid.

The smaller the number of particles in a hydraulic fluid, the lower the wear of the hydraulic components will be. And wear is by nearly 90% the root cause for failure of hydraulic pumps and motors.

To ensure a disruption-free operation of a general hydraulic system, at least a fluid quality (cleanliness level) of 20/18/15 according to ISO 4406 is required. The characteristic values indicate, how many particles in the size range >2 µm (value 1), >5µm (value 2) and >15 µm (value 3) are present in one ml of a fluid. The value 20 stands for 5.000 – 10.000 particles per ml, the 18 stands for 1.300 – 2.500 particles per ml, and the 15 for 160 – 320 particles per ml.

That illustrates that in a hydraulic fluid of the cleanliness level 20/18/15, a huge number of particles is distributed in the fluid content. That also indicates that this fluid quality is good enough only for general and low pressure applications.

When the requirements in functional safety and operational life are higher, or with high-pressure applications, Parker recommends a cleanliness level 18/16/13 according to ISO 4406. The fluid then is allowed to contain 320 – 640 particles $>5\mu\text{m}$ and 40 – 80 particles $>15\mu\text{m}$ per ml.

To achieve such a cleanliness level the hydraulic circuit must be equipped with a suitable filtration system. But it has to be considered that filters never perform an absolute cleaning of the fluid. A filter element with a β -value of e.g.: $\beta_{10} \geq 75$ does not retain all particles larger than $10\mu\text{m}$. Still 1/75 of all particles larger than $10\mu\text{m}$ will pass the element.

This review shows:

- A reservoir filling of 100 l contains billions of contamination particles.
- Even a “ 10μ filter“ will let pass millions of particles $> 10\mu\text{m}$.

On top of that, the following needs to be considered:

- Across a breather and through the piston rod seal and wiper of a hydraulic cylinder, particles can enter a hydraulic system.
- Wear on pumps, motors and valves adds more particles to the fluid.
- Mineral oil delivered in barrels typically has a cleanliness level of 21/19/16 according to ISO 4406 or worse.

Therefore, it is very important to pay highest attention also to the systems filtration in respect of its layout, its supervision and its maintenance.

The load to the fluid in hydraulic systems leads to its **aging**. Therefore, the fluid needs to be checked for its perfect condition. This check should be performed at least twice a year and include as a minimum requirement the determination of neutralization number, viscosity, colour index and cleanliness level.

The operational life of the fluid depends very much on the operating pressure, the operating temperature, the circulation number (delivery of all pumps divided by the reservoir content) and the type of the fluid. General statements to the average time of usage, therefore, are impossible.

Heat Dissipation

The temperature has an important influence on the properties of the hydraulic fluid. Viscosity, lubricity, aging and other significant features depend directly or indirectly on the temperature. That indicates that the thermal balance of a hydraulic system needs to be considered during the layout and design. On the one hand the fluid is stressed by a high temperature; on the other hand, the fluid is the medium to transport the heat away from resistors, orifices and other throttling devices and friction zones. Therefore, during layout it has to be made sure that nowhere in the system a local overheating by dissipated heat can occur. That could destroy seals, lead to a failure of components due to a lack of lubricity or finally lead to a destruction of the fluid itself.

A final comment on **seals**. A good hydraulic system should not show that it operates with a fluid. There should be no leakage at all. In general hydraulic components are leak-free. More than 90% of all problems occur at interfaces:

- Ports.
- Flange interfaces of valves.
- Connectors.

The assembly of the system is the main cause for problems in this area. Nevertheless, the system ‘hydraulic fluid & elastomeric seal’ is extremely sensitive. Temperature, chemical incompatibility and mechanical damages are the most frequent causes for a failure of this system. Please contact Parker if you have any question about this topic.

Parker does not give an explicit recommendation for a certain fluid product, fluid brand or fluid manufacturer. The permanent research and development in the field of hydraulic fluids and seal materials make it impossible to test all possible combinations for compatibility with our components. The recommendations made here and the discussion of possible restrictions, relevant standards and other useful literature should help to select the right fluid for a hydraulic system and to design the power unit in a way that it is able to fulfill all requirements.

Special Fluids

Special Fluids for Environment Protection

All statements made above are in principle also valid for these fluids. Regarding the selection/definition of the required viscosity level, the cleanliness level and the lubrication and wear protection behavior, all criteria discussed in the mineral oil section have to be applied accordingly.

The following special fluid features and conditions are to be considered:

Fluids Based on Natural Ingredients

- Good lubrication, viscosity-temperature characteristics better than standard mineral oil.
- Density slightly higher than mineral oil, therefore, check for good suction conditions!
- Pourpoint approx. -30° , therefore, not suitable for low temperature operation.
- Accelerated aging. First fluid change after 500 h, second change after another 1.000 h. Then all 2.000 h or annually, if less than 2.000 h annual operation.
- High affinity to water. The ingress of water has to be avoided under all conditions. At temperature above 50°C destroys the fluid if water is present.
- Can be mixed with mineral oil (under loss of biological degradability!).
- Internal coating of reservoirs etc. to be compatible with the fluid. Check with fluid supplier.

Fluids Based on Esters (Synthetical Esters)

- The same remarks as for fluids based on natural ingredients.

Fluids Based on Polyglycol (not HFC/Water Glycol)

- Good lubrication, viscosity-temperature characteristics better than standard mineral oil.
- Aging/durability according to actual knowledge similar to mineral oil.
- Pourpoint approx. -40°C , be careful at low temperatures!
- Density significantly higher than at mineral oil. Therefore, the max. input speeds for self priming pumps are to be reduced by 20%.
- Use fluorocarbon as seal material. Our hydraulic components are tested with mineral oil; they need to be emptied completely before installation!
- Normal paints and coatings are destroyed. Please contact fluid supplier!
- Never mix with mineral oil, solid sediments will develop and block filters, orifices, etc!



Note

Even bio-degradable fluids need to be disposed of according to special disposing rules (like mineral oil). Prior to the use of these fluids, we recommend to contact our specialists.

Fluids According to DIN 51 502 (HF Fluids)

These fluids are fire resistant. The following classes are used:

- | | |
|-----|---|
| HFA | oil in water emulsion: 95 – 98% water |
| HFB | water in oil emulsion: >40% water |
| HFC | water containing solutions: 35 – 55% water (polyglycol) |
| HFD | water-free fluids (mainly phosphoric acid ester) |

The operation of Parker hydraulic components with HFD fluids within the limits of the fluid suppliers specification (temperature range, filtration, seal material compatibility), and the viscosity limits of our components is possible without restrictions.

The operation with HFC involves certain restrictions regarding pressure limitation and bearing life reduction in rotating units. Please contact our specialists.

Parker does not give a general release for the operation with HFA and HFB fluids. In certain cases a special approval can be given upon request.

If you are not sure whether our products can be used with a special fluid or not, please contact us. Our specialists are glad to answer your questions and to give you any necessary support.

Terms of Sale with Warranty Limitations

Offer of Sale

The items described in this document and other documents and descriptions provided by Parker Hannifin Corporation, its subsidiaries and its authorized distributors ("Seller") are hereby offered for sale at prices to be established by Seller. This offer and its acceptance by any customer ("Buyer") shall be governed by all of the following Terms and Conditions. Buyer's order for any item described in its document, when communicated to Seller verbally, or in writing, shall constitute acceptance of this offer. All goods, services or work described will be referred to as "Products".

1. **Terms and Conditions.** Seller's willingness to offer Products, or accept an order for Products, to or from Buyer is subject to these Terms and Conditions or any newer version of the terms and conditions found on-line at www.parker.com/saleterms/. Seller objects to any contrary or additional terms or conditions of Buyer's order or any other document issued by Buyer.

2. **Price Adjustments; Payments.** Prices stated on Seller's quote or other documentation offered by Seller are valid for 30 days, and do not include any sales, use, or other taxes unless specifically stated. Unless otherwise specified by Seller, all prices are F.C.A. Seller's facility (INCOTERMS 2010). Payment is subject to credit approval and is due 30 days from the date of invoice or such other term as required by Seller's Credit Department, after which Buyer shall pay interest on any unpaid invoices at the rate of 1.5% per month or the maximum allowable rate under applicable law.

3. **Delivery Dates; Title and Risk; Shipment.** All delivery dates are approximate and Seller shall not be responsible for any damages resulting from any delay. Regardless of the manner of shipment, title to any products and risk of loss or damage shall pass to Buyer upon placement of the products with the shipment carrier at Seller's facility. Unless otherwise stated, Seller may exercise its judgment in choosing the carrier and means of delivery. No deferral of shipment at Buyers' request beyond the respective dates indicated will be made except on terms that will indemnify, defend and hold Seller harmless against all loss and additional expense. Buyer shall be responsible for any additional shipping charges incurred by Seller due to Buyer's acts or omissions.

4. **Warranty.** Seller warrants that the Products sold hereunder shall be free from defects in material or workmanship for a period of eighteen months from the date of delivery to Buyer. The prices charged for Seller's products are based upon the exclusive limited warranty stated above, and upon the following disclaimer: **DISCLAIMER OF WARRANTY: THIS WARRANTY COMPRISES THE SOLE AND ENTIRE WARRANTY PERTAINING TO PRODUCTS PROVIDED HEREUNDER. SELLER DISCLAIMS ALL OTHER WARRANTIES, EXPRESS AND IMPLIED, INCLUDING DESIGN, MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.**

5. **Claims; Commencement of Actions.** Buyer shall promptly inspect all Products upon delivery. No claims for shortages will be allowed unless reported to the Seller within 10 days of delivery. No other claims against Seller will be allowed unless asserted in writing within 30 days after delivery. Buyer shall notify Seller of any alleged breach of warranty within 30 days after the date the defect is or should have been discovered by Buyer. Any action based upon breach of this agreement or upon any other claim arising out of this sale (other than an action by Seller for an amount due on any invoice) must be commenced within 12 months from the date of the breach without regard to the date breach is discovered.

6. **LIMITATION OF LIABILITY.** UPON NOTIFICATION, SELLER WILL, AT ITS OPTION, REPAIR OR REPLACE A DEFECTIVE PRODUCT, OR REFUND THE PURCHASE PRICE. **IN NO EVENT SHALL SELLER BE LIABLE TO BUYER FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF, OR AS THE RESULT OF, THE SALE, DELIVERY, NON-DELIVERY, SERVICING, USE OR LOSS OF USE OF THE PRODUCTS OR ANY PART THEREOF, OR FOR ANY CHARGES OR EXPENSES OF ANY NATURE INCURRED WITHOUT SELLER'S WRITTEN CONSENT, EVEN IF SELLER HAS BEEN NEGLIGENT, WHETHER IN CONTRACT, TORT OR OTHER LEGAL THEORY. IN NO EVENT SHALL SELLER'S LIABILITY UNDER ANY CLAIM MADE BY BUYER EXCEED THE PURCHASE PRICE OF THE PRODUCTS.**

7. **User Responsibility.** The user, through its own analysis and testing, is solely responsible for making the final selection of the system and Product and assuring that all performance, endurance, maintenance, safety and warning requirements of the application are met. The user must analyze all aspects of the application and follow applicable industry standards and Product information. If Seller provides Product or system options, the user is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the Products or systems.

8. **Loss to Buyer's Property.** Any designs, tools, patterns, materials, drawings, confidential information or equipment furnished by Buyer or any other items which become Buyer's property, will be considered obsolete and may be destroyed by Seller after two consecutive years have elapsed without Buyer ordering the items manufactured using such property. Seller shall not be responsible for any loss or damage to such property while it is in Seller's possession or control.

9. **Special Tooling.** A tooling charge may be imposed for any special tooling, including without limitation, dies, fixtures, molds and patterns, acquired to manufacture Products. Such special tooling shall be and remain Seller's property notwithstanding payment of any charges by Buyer. In no event will Buyer acquire any interest in apparatus belonging to Seller which is utilized in the manufacture of the Products, even if such apparatus has been specially converted or adapted for such manufacture and notwithstanding any charges paid by Buyer. Unless otherwise agreed, Seller shall have the right to alter, discard or otherwise dispose of any special tooling or other property in its sole discretion at any time.

10. **Buyer's Obligation; Rights of Seller.** To secure payment of all sums due or otherwise, Seller shall retain a security interest in the goods delivered and this agreement shall be deemed a Security Agreement under the Uniform Commercial Code. Buyer authorizes Seller as its attorney to execute and file on Buyer's behalf all documents Seller deems necessary to perfect its security interest.

11. **Improper Use and Indemnity.** Buyer shall indemnify, defend, and hold Seller harmless from any claim, liability, damages, lawsuits, and costs (including attorney fees), whether for personal injury, property damage, patent, trademark or copyright

infringement or any other claim, brought by or incurred by Buyer, Buyer's employees, or any other person, arising out of: (a) improper selection, improper application or other misuse of Products purchased by Buyer from Seller; (b) any act or omission, negligent or otherwise, of Buyer; (c) Seller's use of patterns, plans, drawings, or specifications furnished by Buyer to manufacture Product; or (d) Buyer's failure to comply with these terms and conditions. Seller shall not indemnify Buyer under any circumstance except as otherwise provided.

12. **Cancellations and Changes.** Orders shall not be subject to cancellation or change by Buyer for any reason, except with Seller's written consent and upon terms that will indemnify, defend and hold Seller harmless against all direct, incidental and consequential loss or damage. Seller may change product features, specifications, designs and availability with notice to Buyer.

13. **Limitation on Assignment.** Buyer may not assign its rights or obligations under this agreement without the prior written consent of Seller.

14. **Force Majeure.** Seller does not assume the risk and shall not be liable for delay or failure to perform any of Seller's obligations by reason of circumstances beyond the reasonable control of Seller (hereinafter "Events of Force Majeure"). Events of Force Majeure shall include without limitation: accidents, strikes or labor disputes, acts of any government or government agency, acts of nature, delays or failures in delivery from carriers or suppliers, shortages of materials, or any other cause beyond Seller's reasonable control.

15. **Waiver and Severability.** Failure to enforce any provision of this agreement will not waive that provision nor will any such failure prejudice Seller's right to enforce that provision in the future. Invalidation of any provision of this agreement by legislation or other rule of law shall not invalidate any other provision herein. The remaining provisions of this agreement will remain in full force and effect.

16. **Termination.** Seller may terminate this agreement for any reason and at any time by giving Buyer thirty (30) days written notice of termination. Seller may immediately terminate this agreement, in writing, if Buyer: (a) commits a breach of any provision of this agreement (b) appointments a trustee, receiver or custodian for all or any part of Buyer's property (c) files a petition for relief in bankruptcy on its own behalf, or by a third party (d) makes an assignment for the benefit of creditors, or (e) dissolves or liquidates all or a majority of its assets.

17. **Governing Law.** This agreement and the sale and delivery of all Products hereunder shall be deemed to have taken place in and shall be governed and construed in accordance with the laws of the State of Ohio, as applicable to contracts executed and wholly performed therein and without regard to conflicts of laws principles. Buyer irrevocably agrees and consents to the exclusive jurisdiction and venue of the courts of Cuyahoga County, Ohio with respect to any dispute, controversy or claim arising out of or relating to this agreement.

18. **Indemnity for Infringement of Intellectual Property Rights.** Seller shall have no liability for infringement of any patents, trademarks, copyrights, trade dress, trade secrets or similar rights except as provided in this Section. Seller will defend and indemnify Buyer against allegations of infringement of U.S. patents, U.S. trademarks, copyrights, trade dress and trade secrets ("Intellectual Property Rights"). Seller will defend at its expense and will pay the cost of any settlement or damages awarded in an action brought against Buyer based on an allegation that a Product sold pursuant to this Agreement infringes the Intellectual Property Rights of a third party. Seller's obligation to defend and indemnify Buyer is contingent on Buyer notifying Seller within ten (10) days after Buyer becomes aware of such allegations of infringement, and Seller having sole control over the defense of any allegations or actions including all negotiations for settlement or compromise. If a Product is subject to a claim that it infringes the Intellectual Property Rights of a third party, Seller may, at its sole expense and option, procure for Buyer the right to continue using the Product, replace or modify the Product so as to make it noninfringing, or offer to accept return of the Product and return the purchase price less a reasonable allowance for depreciation. Notwithstanding the foregoing, Seller shall have no liability for claims of infringement based on information provided by Buyer, or directed to Products delivered hereunder for which the designs are specified in whole or part by Buyer, or infringements resulting from the modification, combination or use in a system of any Product sold hereunder. The foregoing provisions of this Section shall constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for infringement of Intellectual Property Rights.

19. **Entire Agreement.** This agreement contains the entire agreement between the Buyer and Seller and constitutes the final, complete and exclusive expression of the terms of sale. All prior or contemporaneous written or oral agreements or negotiations with respect to the subject matter are herein merged.

20. **Compliance with Law, U. K. Bribery Act and U.S. Foreign Corrupt Practices Act.** Buyer agrees to comply with all applicable laws and regulations, including both those of the United Kingdom and the United States of America, and of the country or countries of the Territory in which Buyer may operate, including without limitation the U. K. Bribery Act, the U.S. Foreign Corrupt Practices Act ("FCPA") and the U.S. Anti-Kickback Act (the "Anti-Kickback Act"), and agrees to indemnify and hold harmless Seller from the consequences of any violation of such provisions by Buyer, its employees or agents. Buyer acknowledges that they are familiar with the provisions of the U. K. Bribery Act, the FCPA and the Anti-Kickback Act, and certifies that Buyer will adhere to the requirements thereof. In particular, Buyer represents and agrees that Buyer shall not make any payment or give anything of value, directly or indirectly to any governmental official, any foreign political party or official thereof, any candidate for foreign political office, or any commercial entity or person, for the purpose of influencing such person to purchase products or otherwise benefit the business of Seller.

02/12



Parker Safety Guide for Selecting and Using Hydraulic Valves and Related Accessories

WARNING: Failure or improper selection or improper use of Parker Hydraulic Valve Division (HVD) Valves or related accessories (“Products”) can cause death, personal injury and property damage. Possible consequences of failure or improper use of these Products include but are not limited to:

- Valves or parts thereof thrown off at high speed
- High velocity fluid discharge
- Explosion or burning of the conveyed fluid
- Contact with suddenly moving or falling objects controlled by the Valve
- Injections by high-pressure fluid discharge
- Contact with fluid that may be hot, cold, toxic or otherwise injurious
- Injuries resulting from injection, inhalation or exposure to fluids
- Injury from handling a heavy item (dropped, awkward lift)
- Electric shock from improper handling of solenoid connections
- Injury from slip or fall on spilled or leaked fluid

Before selecting or using any of these Products, it is important that you read and follow the instructions below. In general, the Products are not approved for in-flight aerospace applications. Consult the factory for the few that are FAA approved.

1.0 GENERAL INSTRUCTIONS

- 1.1 **Scope:** This safety guide provides instructions for selecting and using (including assembling, installing and maintaining) these Products. For convenience all items in this guide are called “Valves”. This safety guide is a supplement to and is to be used in conjunction with the specific Parker catalogs for the specific Valves and/or accessories being considered for use. See item 1.6 below for obtaining those catalogs.
- 1.2 **Fail-Safe:** Valves can and do fail without warning for many reasons. Design all systems and equipment in a fail-safe mode, so that failure of the Valve or Valve Assembly will not endanger persons or property.
- 1.3 **Safety Devices:** Never disconnect, override, circumvent or otherwise disable any safety lockout on any system whether powered by HVD Valves or any motion control system of any manufacturer. (e.g. Automatic shut-off on a riding lawn mower should the operator get out of the seat).
- 1.4 **Distribution:** Provide a copy of this safety guide to each person that is responsible for selecting or using HVD Valve Products. Do not select HVD Valves without thoroughly reading and understanding this safety guide as well as the specific Parker catalogs for the Products considered or selected.
- 1.5 **User Responsibility:** Due the wide variety of operating conditions and applications for Valves, HVD and its distributors do not represent or warrant that any particular Valve is suitable for any specific system. This safety guide does not analyze all technical parameters that must be considered in selecting a product. The user, through its own analysis and testing is solely responsible for:
 - Making the final selection of the Valve
 - Assuring that the user’s requirements are met and that the application presents no health or safety hazards.
 - Providing all appropriate health and safety warnings on the equipment on which the Valves are used.
 - Assuring compliance with all applicable government and industry standards.
- 1.6 **Additional Questions:** Call the appropriate Parker technical service department if you have any questions or require any additional information. See the Parker publication for the product being considered or used, or call 1-800-CPARKER, or go to www.parker.com, for the telephone numbers of the appropriate technical service department. For additional copies of this or any other Parker Safety Guide go to www.parker.com and click on the safety button on the opening page. Catalogs and/or catalog numbers for the various HVD Valve Products can be obtained by calling HVD at 440-366-5100. Phone numbers and catalog information is also available on the Parker website, www.parker.com.

2.0 VALVE SELECTION INSTRUCTIONS

- 2.1 **Pressure:** Valve selection must be made so that the maximum working pressure of the Valve is equal to or greater than the maximum system pressure. Surge, impulse or peak transient pressures in the system must be below the maximum working pressure of the Valve. Surge, impulse and peak pressures can usually be determined by sensitive electrical instrumentation that measures and indicates pressures at millisecond intervals. Mechanical pressure gauges indicate only average pressure and cannot be used to determine surge, impulse or peak transient pressures. Burst pressure ratings if given or known are for manufacturing purposes only and are not an indication that the Product can be used in applications at the burst pressure or otherwise above the maximum working pressure.
- 2.2 **Temperature:** The fluid temperature must be regulated or controlled so that the operating viscosity of the fluid is maintained at a level specified for the particular Valve product. Such ranges are given in the product catalogs or can be obtained from the appropriate customer service department for the particular Valve product.
- 2.3 **Fluid Compatibility:** The fluid conveyed in Valves has direct implications on the Valve selection. The fluid must be chemically compatible with the Valve component materials. Elastomer seals, brass, cast iron, aluminum for example all are potentially affected by certain fluids. Additionally, fluid selection affects the performance of various Valves. Considerations relative to fluid selection are outlined in the specific HVD Valve product catalog. Of particular importance is that the fluid be for hydraulic use, contain the proper additives and wear inhibitors. See 1.6 “Additional Questions” above for information to obtain such HVD catalogs.
- 2.4 **Changing Fluids:** If a system requires a different fluid, it should be done with the guidance in number 2.3 above. Additionally, it may be necessary to flush the system (including the Valves) to remove any of the previous fluid. Consult the Parker Valve Division for guidance.
- 2.5 **Size:** Transmission of power by means of pressurized fluid varies with pressure and rate of flow. The size of the components must be adequate to keep pressure losses to a minimum and avoid damage due to heat generation or excessive fluid velocity.
- 2.6 **Placement:** Installation of Valves must take into account the orientation of the Valve and the proximity of the Valve to other parts of the system. This includes but is not limited to closeness to hot and cold areas, access for servicing and operation as well as orientation for proper connectors.
- 2.7 **Ports:** Connection of Valves in systems can be by threaded ports, sub-base surfaces, flanges and manifolds. In all cases, the proper fitting, surface or mounting hardware must be selected to properly seal and contain the system fluid so as to avoid the adverse conditions listed in the initial warning box above. Specifically, if using threaded ports, the designer must make sure that the mating fitting is of the compatible thread. Also, the instructions provided by the connector hardware supplier must be read and understood so as to properly assemble the connector. The Parker Safety Guide for using Hose, Tubing and Fittings and Related Accessories is but one reference to this end.
- 2.8 **Environment:** Care must be taken to insure that the Valve and Valve Assemblies are either compatible with or protected from the environment (that is, surrounding conditions) to which they are exposed. Environmental conditions including but not limited to ultraviolet radiation, sunlight, heat, ozone, moisture, water, salt water, chemicals and air pollutants can cause degradation and premature failure.
- 2.9 **Electric Power:** For Valves requiring electric power for control, it is imperative that the electricity be delivered at the proper voltage, current and wattage requirements. To obtain the proper control requirements please refer to the respective Parker product catalog for the specific Valve that is intended for use. If further guidance is required, call the appropriate technical service department identified in the respective Parker product catalog.
- 2.10 **Specifications and Standards:** When selecting Valves, government, industry and Parker specifications and recommendations must be reviewed and followed as applicable.
- 2.11 **Accessories:** All accessories used in conjunction with any Parker Valve product must be rated to the same requirements of the Valve including but not limited to pressure, flow, material compatibility, power requirements. All of these items must be examined as stated in the “VALVE INSTALLATION INSTRUCTIONS” paragraph 3.0.

3.0 VALVE INSTALLATION INSTRUCTIONS

- 3.1 **Component Inspection:** Prior to use, a careful examination of the Valve(s) must be performed. The Valve intended for use must be checked for correct style, size, catalog number and external condition. The Valve must be examined for cleanliness, absence of external defects or gouges, cracked or otherwise deformed parts or missing items. The mounting surface or port connections must be protected and free of burrs, scratches, corrosion or other imperfections. Do NOT use any item that displays any signs of nonconformance. In addition, any accessory including but not limited to fittings, bolt kits, hoses, sub bases, manifolds, and electrical connectors must be subjected to the same examination.
- 3.2 **Handling Valves:** Many Valves whether HVD Valves or of another manufacturer can be large, bulky or otherwise difficult to handle. Care must be taken to use proper lifting techniques, tools, braces, lifting belts or other aids so as not to cause injury to the user, any other person or to property.
- 3.3 **Filtration:** Fluid cleanliness is a necessity in any hydraulic system. Fluid filters must be installed and maintained in the system to provide the required level of fluid cleanliness. Filters can be placed in the inlets, pressure lines and return lines. The level of cleanliness required is specified in the HVD product catalog for the specific Valve(s) selected or intended for use. For additional information on Filter selection contact Parker Filter Division at 800-253-1258 or 419-644-4311.
- 3.4 **Servo Valves:** Application of Servo Valves in general requires knowledge and awareness of “closed loop control theory” and the use of electronic controls for successful and safe operation. Individuals who do not have such experience or knowledge must gain training before use of such Products. Parker offers both classroom training as well as manuals to assist in gaining this knowledge. These aids can be obtained by contacting Hydraulic Valve Division at 440-366-5100, calling the general Parker help line 800-CPARKER or going to the Parker web site at www.parker.com.
- 3.5 **Accessory Ratings:** All accessories used in combination with the selected or intended Valve product must be rated and compatible with the selected Valve. Specifically, the items must be of equal or greater rating including but not limited to pressure, flow, power, size, port style, thread connectors and material.
- 3.6 **Connection Styles:** It is the responsibility of the user of the Parker product to properly select connectors and accessories that match the connections on the sub plate, Valve, flange or threaded connection or manifold. It is also the responsibility of the installer to possess adequate skill and knowledge including but not limited to thread preparation, torque technique, hose assembly and inspection, tube preparation and assembly, and fitting installation. Parker Tube Fitting Division (www.parker.com/tfd) catalog 4300 and Parker Hose Products (www.parkerhose.com) catalog 4400 describe some basic technical information relative to proper fitting assembly.
- 3.7 **Electrical Connections:** All electrical connections must be made to the applicable codes and local safety requirements.
- 3.8 **Gauges and Sensors:** The user must install sufficient gauges and sensors in the system so as to be able to determine the condition of the system. This includes but is not limited to pressure gauges, flow meters, temperature sensors and site gauges. These are of utmost importance should removal or disassembly of a Valve, portion of a Valve or portion of the system become necessary. Refer to “VALVE MAINTENANCE AND REPLACEMENT INSTRUCTIONS” for details and especially item 4.8.
- 3.9 **System Checkout:** Once installed, the Valve installation must be tested to insure proper operation and that no external leakage exists. All safety equipment must be in place including but not limited to safety glasses, helmets, ear protection, splash guards, gloves, coveralls and any shields on the equipment. All air entrapment must be eliminated and the system pressurized to the maximum system pressure (at or below the Valve maximum working pressure) and checked for proper function and freedom from leaks. Personnel must stay out of potentially hazardous areas while testing and using.

4.0 VALVE MAINTENANCE AND REPLACEMENT INSTRUCTIONS

- 4.1 **Maintenance Program:** Even with proper installation, Valves and Valve System life may be significantly reduced without a continuing maintenance program. The severity of the application and risk potential must determine the frequency of the inspection and the replacement of the Products so that Products are replaced before any failure occurs. A maintenance program must be established and followed by the user and, at a minimum, must include instructions 4.2 through 4.10. An FMEA (Failure Mode and Effects Analysis) is recommended in determining maintenance requirements.
- 4.2 **Visual Inspection-Valves:** Any of the following conditions require immediate shut down and replacement of the Valve.
- Evidence that the Valve is in partial dis-assembly.
 - Visible crack or suspicion of a crack in the Valve housing or bent, cracked or otherwise damaged solenoid.
 - Missing or partially extending drive pin on a flow control knob.
 - Missing, loose components, obstructions or other condition impeding the motion or function of the manual knob, lever, foot pedal or other mechanical operator of a hydraulic Valve.
 - Any evidence of burning or heat induced discoloration.
 - Blistered, soft, degraded or loose cover of any kind.
 - Loose wire or electrical connector.
- 4.3 **Visual Inspection-Other:** The following conditions must be tightened, repaired, corrected or replaced as required.
1. Fluid on the ground must be cleaned immediately. Also, the source of the fluid must be determined prior to running the equipment again.
 2. Leaking port or excessive external dirt build-up.
 3. System fluid level is too low or air is entrapped or visible in the reservoir.
 4. Equipment controlled by the Valve or Valve assembly has been losing power, speed, efficiency
- 4.4 **Filter Maintenance:** System filters must be maintained and kept in proper working order. The main service requirement is periodic replacement of the filter element or screen. Contact Parker Filter Division at 800-253-1258 or 419-644-4311 for further filter maintenance details.
- 4.5 **Functional Test:** See “System Checkout” number 3.9 above in “VALVE INSTALLATION INSTRUCTIONS”.
- 4.6 **Replacement Intervals:** Valves and Valve Systems will eventually age and require replacement. Seals especially should be inspected and replaced at specific replacement intervals based on previous experience, government or industry recommendations, or when failures could result in unacceptable downtime, damage or injury risk. At a minimum seals must be replaced whenever service is rendered to a Valve product.
- 4.7 **Adjustments, Control Knobs, and Other Manual Controls:** System Pressure and Flow are typically adjusted by knobs and/or handles. A set-screw or lock-nut secures the adjustment device so as to maintain the desired setting. This set-screw or lock-nut must first be loosened prior to making any adjustments and re-tightened after adjustment on the HVD Valve. All adjustments must be made in conjunction with pressure gauges and/or flow meters (or by watching the speed of the actuator in the case of setting flow only). See paragraph “Gauges and Sensors” above in the section “VALVE INSTALLATION INSTRUCTIONS”. Under no circumstances should any control knob, adjustment stem, handle, foot pedal or other actuating device be forced beyond the mechanical stop(s) on the Valve. For example, the Parker Safety Notice Bulletin **HY14-3310-B1/US** for HVD Colorflow Valves specifically restricts the adjustment torque to “hand adjust” or “less than 10 ft/lbs” if it cannot be adjusted by hand. Failure to adhere to this may force the knob beyond the stop point allowing it to be ejected at high speed resulting in death, personal injury and property damage. For complete safety instructions on HVD Colorflow Valves, copies of Safety Notice **Bulletin HY14-3310-B1/US** can be obtained directly from the Hydraulic Valve Division at 440-366-5100 or from the Parker web site at www.parker.com by selecting the “Safety” button. Parker help line 800-CPARKER is on call 24/7 as well should there be any question about the use of a HVD Valve. Additionally, when making adjustments, always adjust the Valve with all parts of your body to the side of the Valve (that is, the knob is not pointing toward you or anyone else).
- 4.8 **High pressure Warning:** Hydraulic power is transmitted by high-pressure fluids through hoses, fittings and valves, pumps and actuators. This condition can be dangerous and potentially lethal and, therefore, extreme caution must be exercised when working with fluids under pressure. From time to time, hoses, Valves, tubes or fittings fail if they are not replaced at proper time intervals. Typically these failures are the result of some form of misapplication, abuse, wear, or failure to perform proper maintenance. When such failure occurs, generally the high pressure fluid inside escapes in a stream which may or may not be visible to the user. Under no circumstances should the user attempt to locate the leak by “feeling” with their hands or any other part of their body. High-pressure fluids can and will penetrate the skin and cause severe tissue damage and possible loss of limb or life. Even seemingly minor hydraulic fluid injection injuries must be treated immediately by a physician with knowledge of the tissue damaging properties of hydraulic fluid. If a hose, tube, fitting or Valve failure occurs, immediately shut down the equipment and leave the area until pressure has been completely released from the system. Simply shutting down the pump may or may not eliminate the pressure in the system. It may take several minutes or even hours for the pressure to be relieved so that the leak area can be examined safely. Once the pressure has been reduced to zero, the suspected leaking item can be taken off the equipment and examined. It must always be replaced if a failure has occurred. Never attempt to patch or repair a connector (especially a hose) or Valve that has failed. Consult the nearest Parker distributor or the appropriate Parker division for component replacement information. Never touch or examine a failed hydraulic component unless it is obvious that the item no longer contains fluid under pressure.

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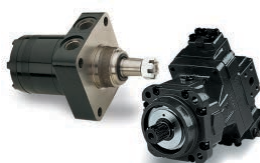
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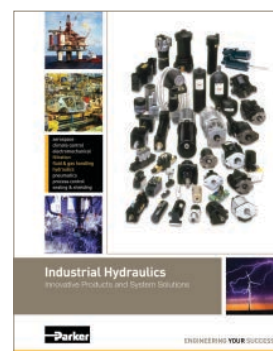
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Tel: 82 2 559 0408
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520 Ternes Avenue
Elyria, Ohio 44035 USA
Tel: 440-366-5100
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