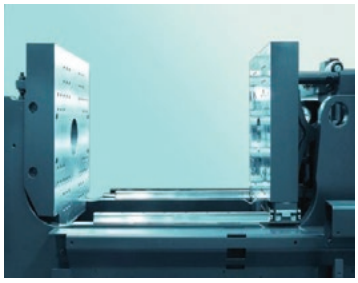

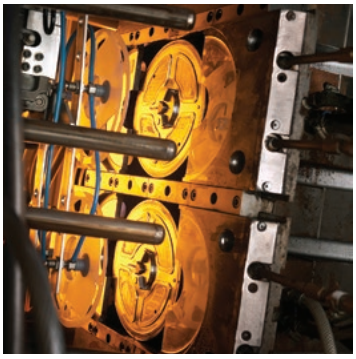

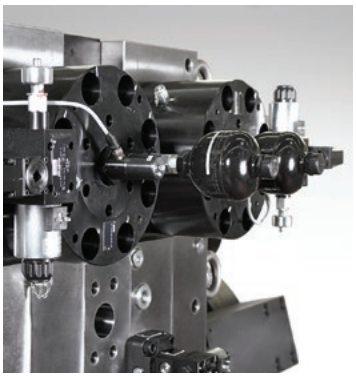

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Slip-in Cartridge Valves

Pressure Control, Throttle, Check

Catalog MSG14-3200/US

April 2019

Parker

ENGINEERING YOUR SUCCESS.

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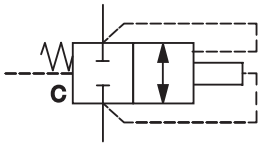
Cat3200_01w OFC-IFC.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

(Continued)

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

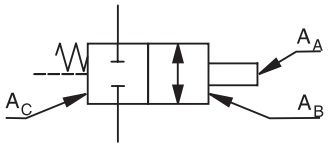
X control oil connection, inlet

Y control oil connection, outlet

Z_1 control oil connection, preferred inlet

Z_2 control oil connection, preferred outlet

Control Surfaces - Graphics



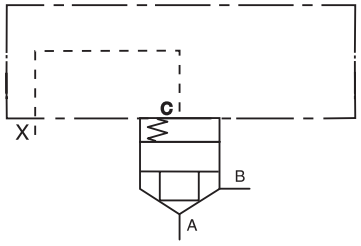
Description

A_A Area, which is subjected to the pressure at port A

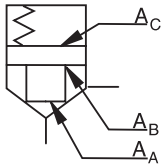
A_B Area, which is subjected to the pressure at port B

A_C Area, which is subjected to the pressure at port C

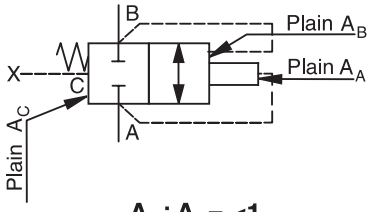
Port Identifications - Schematics



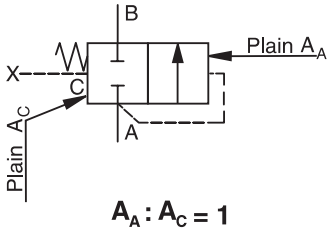
Control Surfaces - Schematics



Area Representation

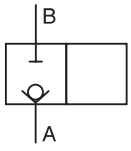


$A_A : A_C = <1$

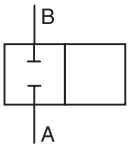


$A_A : A_C = 1$

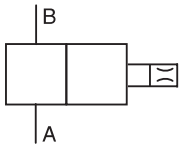
Design Representation



Seat design

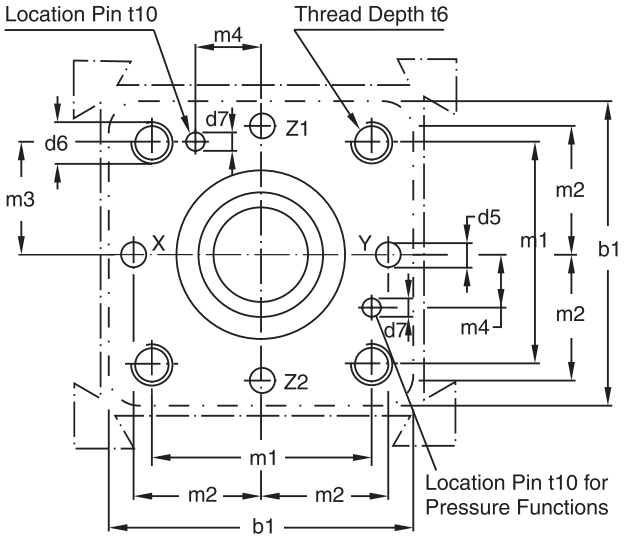


Spool design

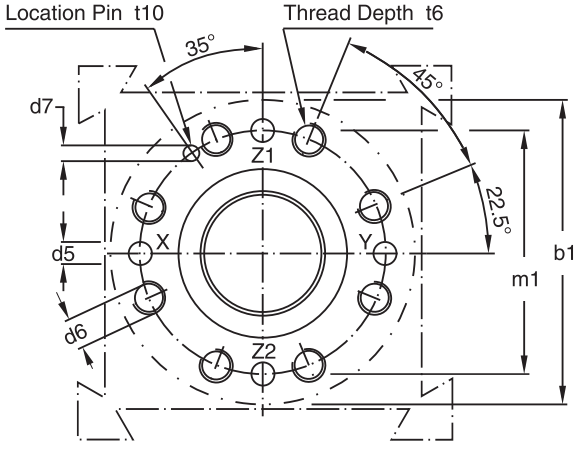


Dampening poppet

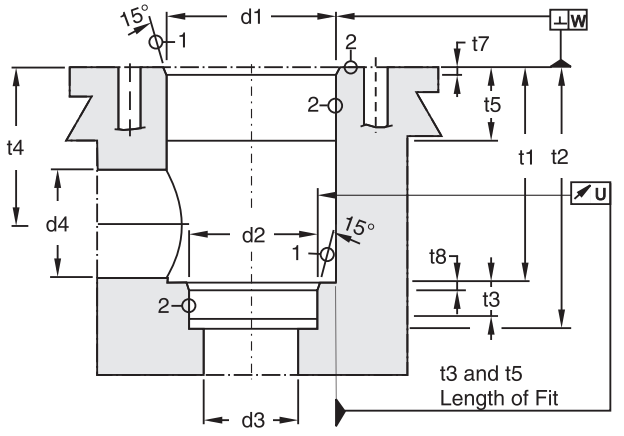
Code: ISO 7368-B*-*-2-A/B
NG16 to NG63



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



Hole and Mounting Pattern according to ISO7368



Required surface finish:

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

Cartridge Manifold Block Series CB, see Pages 40 and 41.

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.

CE

C*B

C*A

C*C

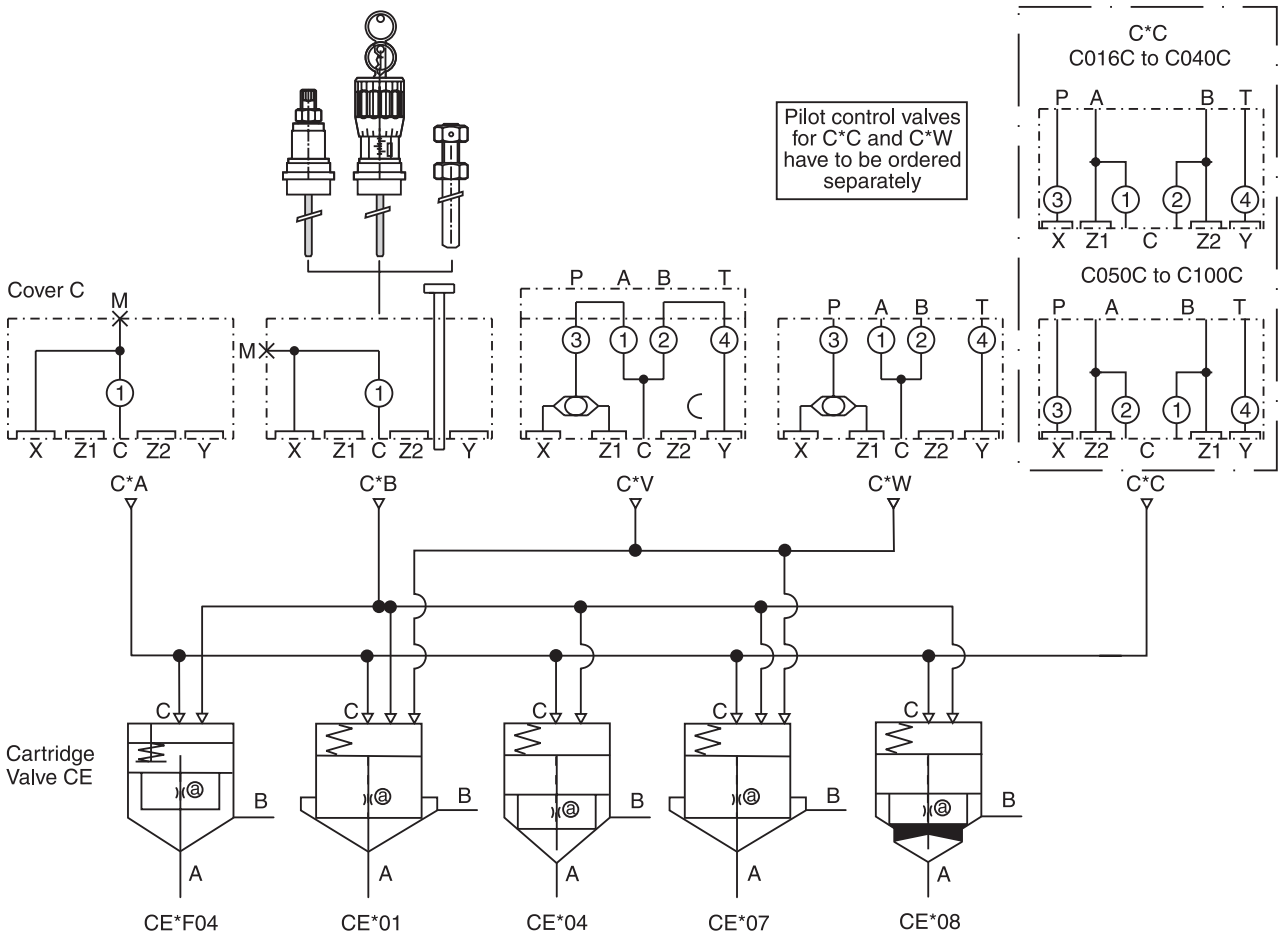
Features

- 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).

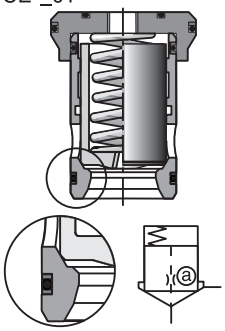
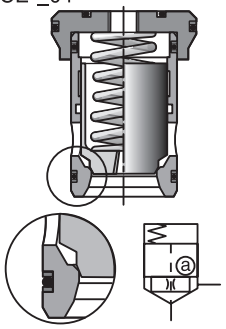
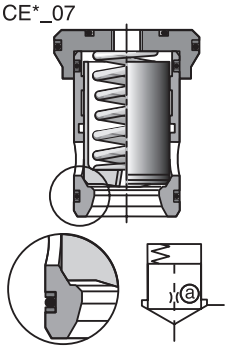
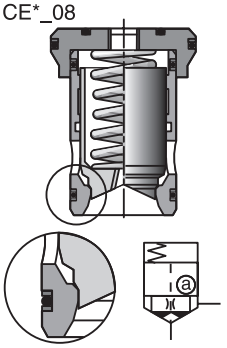
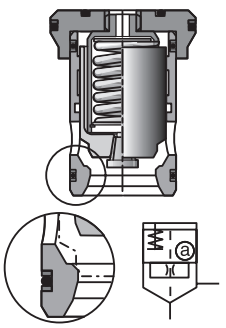
Cat3200_02.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

Pilot Control for Directional Functions

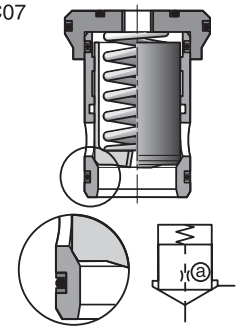


Cartridge Valve for Directional Function

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

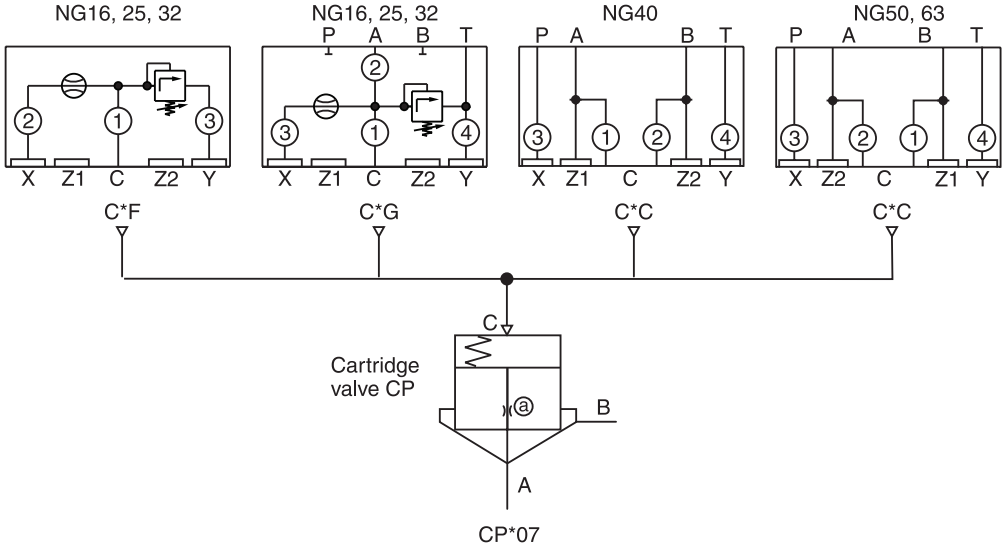
CP*_C07



1 : 1.04
$A_A = 0.96\ A_C$

Pilot Control for Pressure Function

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



CE — Cartridge | Nominal Size | Design | Poppet Area Ratio | Spring | 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	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

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, T and U. Not for poppet code 01 (NG16 to NG63).

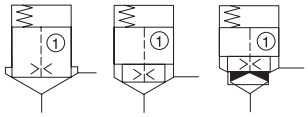
[2] Only with spring code L, only with closed bottom.

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)

Code	Description
N	Nitrile
V	Fluorocarbon

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.



Orifice position

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 | Design | **07** Poppet Area Ratio $A_A = 0.96A_C$ | Spring | Orifice [1] | Seals | Design Series (not required for ordering)

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

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

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)

Code	Description
N	Nitrile
V	Fluorocarbon

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

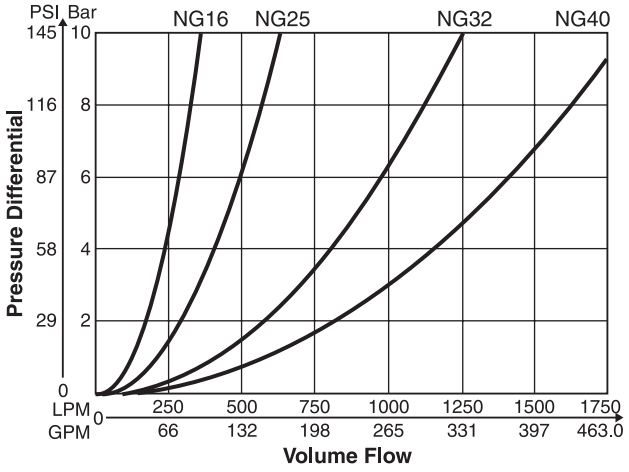
[1] Recommended diameter

Weight:

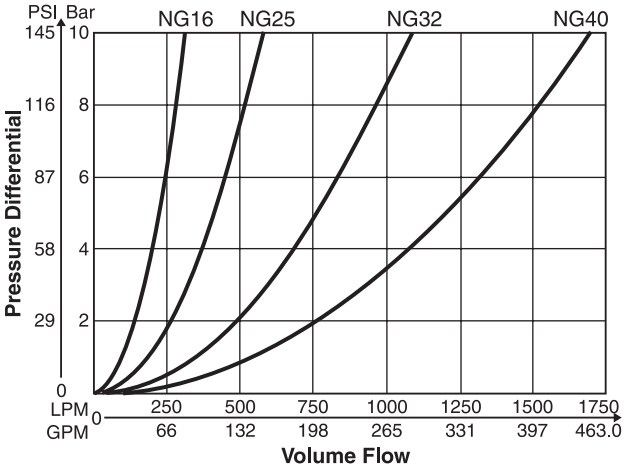
CP016	0.3 kg (0.7 lbs.)
CP025	0.6 kg (1.3 lbs.)
CP032	1.1 kg (2.4 lbs.)
CP040	1.7 kg (3.7 lbs.)
CP050	3.7 kg (8.2 lbs.)
CP063	7.1 kg (15.7 lbs.)

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 Recomended	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 flow direction A → B	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					
flow direction B → A	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)

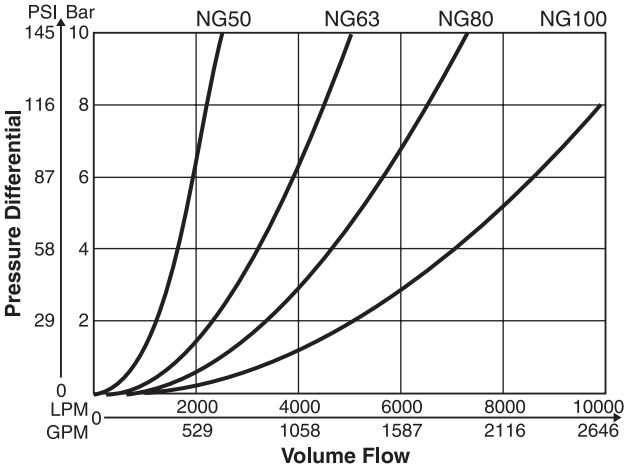
Poppet 01, 04, 07*



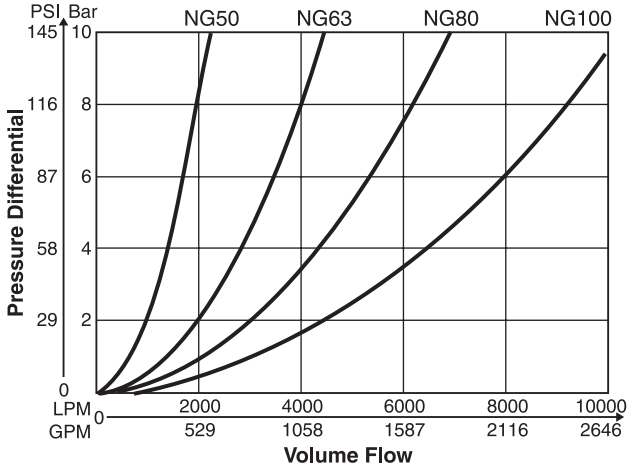
Poppet 08*



Poppet 01, 04, 07*



Poppet 08*



* without spring and poppet seal, C-chamber unloaded

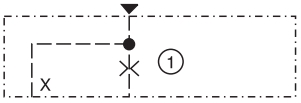
Ordering Information

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



Orifice position

Weight:

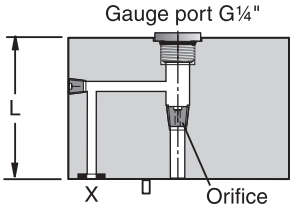
C016A	0.9 kg (2.0 lbs.)
C025A	1.9 kg (4.2 lbs.)
C032A	2.9 kg (6.4 lbs.)
C040A	5.3 kg (11.7 lbs.)
C050A	8.5 kg (18.7 lbs.)
C063A	15.5 kg (34.2 lbs.)
C080A	34.0 kg (75.0 lbs.)
C100A	58.0 kg (127.9 lbs.)

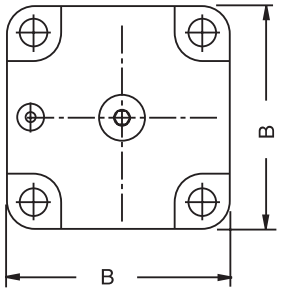
For orifice recommendations, bolt and seal kits, see Accessories.

Dimensions

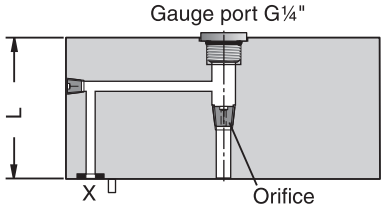
Inch equivalents for millimeter dimensions are shown in (**)

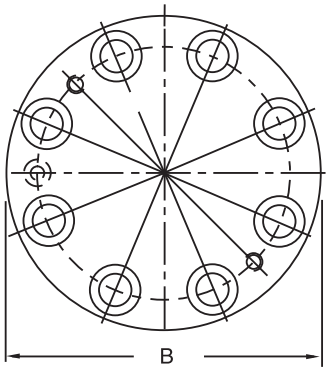
NG16 to NG63





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

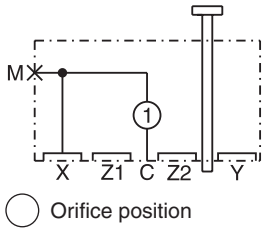
C		B				
Cover	Nominal Size	Cover with X-Connection and Stroke Limiter	Adjustment	Orifice	Seals	Design Series not required for ordering

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

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

Code	Description
N	Nitrile
V	Fluorocarbon

Code	Description
99	Without Orifice, Open Orifice Options



◯ Orifice position

Weight:

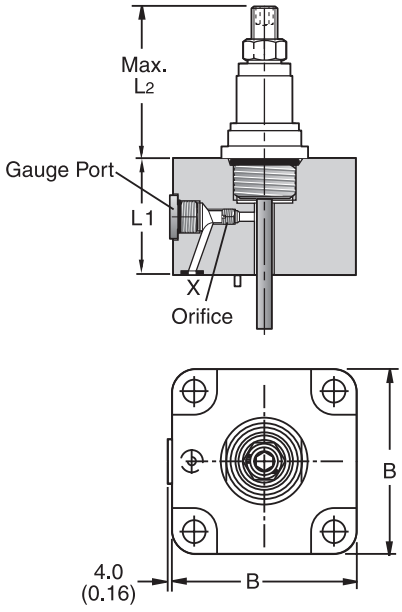
C016B	0.9 kg (2.0 lbs.)
C025B	1.9 kg (4.2 lbs.)
C032B	2.9 kg (6.4 lbs.)
C040B	5.4 kg (11.9 lbs.)
C050B	8.4 kg (18.5 lbs.)
C063B	15.1 kg (33.3 lbs.)
C080B	34.0 kg (75.0 lbs.)
C100B	60.0 kg (132.3 lbs.)

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

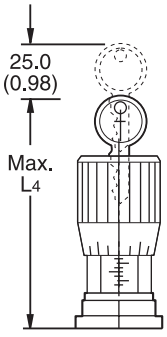
Dimensions

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

NG16 to NG25 - Adjustment N



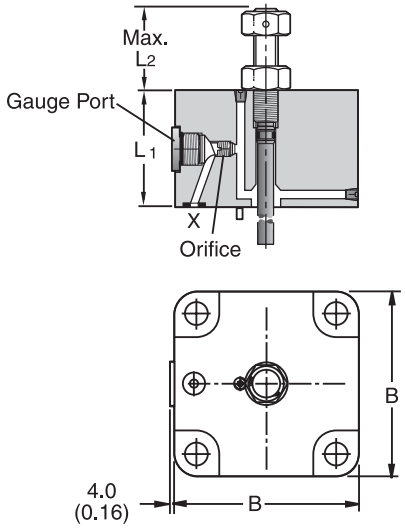
Adjustment Y



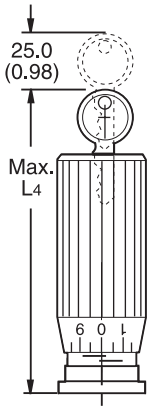
Size	B	L1	L2 max.	L4 max.	Gauge Port	Orifice Thread
NG16	65.0 (2.56)	36.0 (1.42)	72.0 (2.83)	100.0 (3.94)	G 1/4"	M6
NG25	85.0 (3.35)	45.0 (1.77)	72.0 (2.83)	100.0 (3.94)		

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

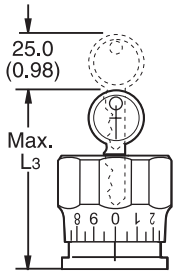
NG32 to NG50
Adjustment N



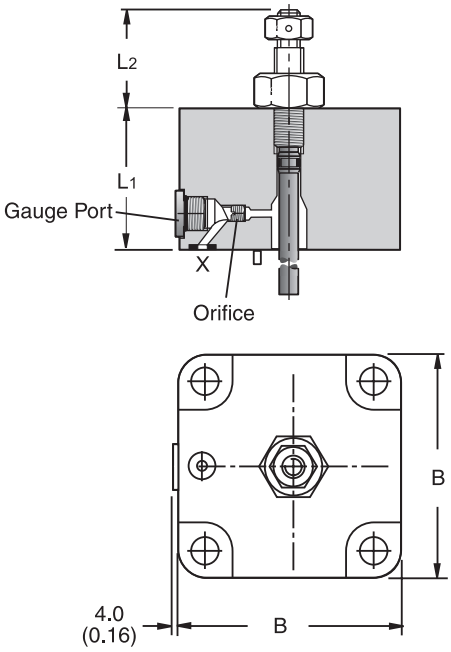
Adjustment Y (NG32)



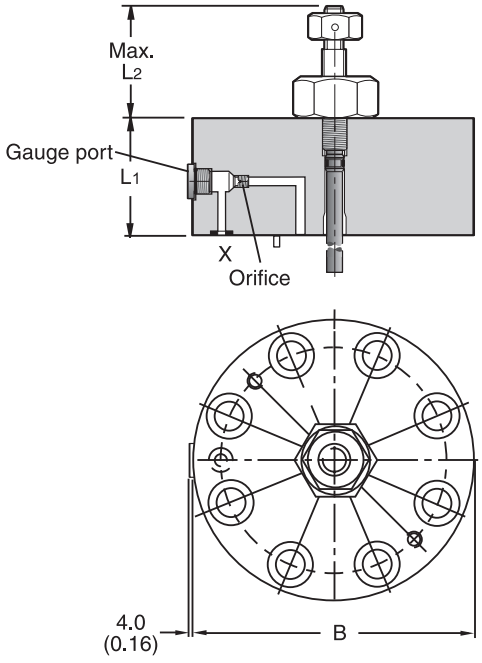
Adjustment Y (NG40/50)



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

Ordering Information

C		C	A						
Cover	Nominal Size	Cover for Pilot System Mounting	Without Auxiliary Function	1	2	3	4	Seals	Design Series not required for ordering
				Orifice / Choke					

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

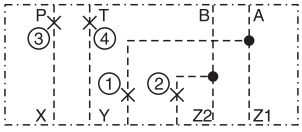
Code	Description
N	Nitrile
V	Fluorocarbon

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

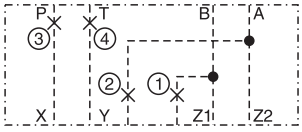
Attention:
For NG50 and larger:
If pilot system NG6 is used, mount adapter plate PADA1007/A-B/B-A or PADA1007/A-A/B-B (NG6 to NG10) on cover.

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

NG16 to NG40



NG50 to NG100



◯ Orifice position

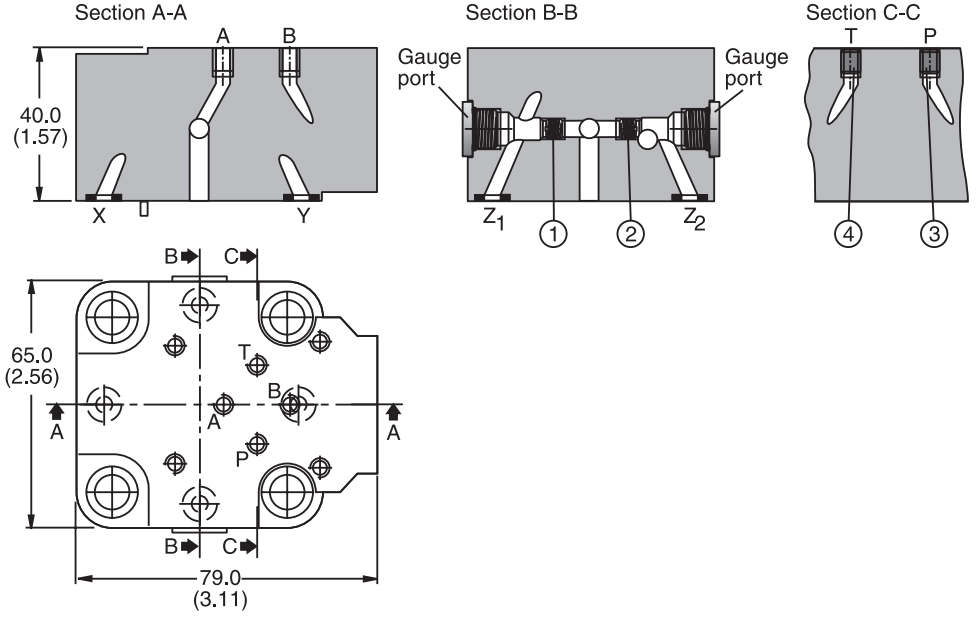
Weight:

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.)

Dimensions

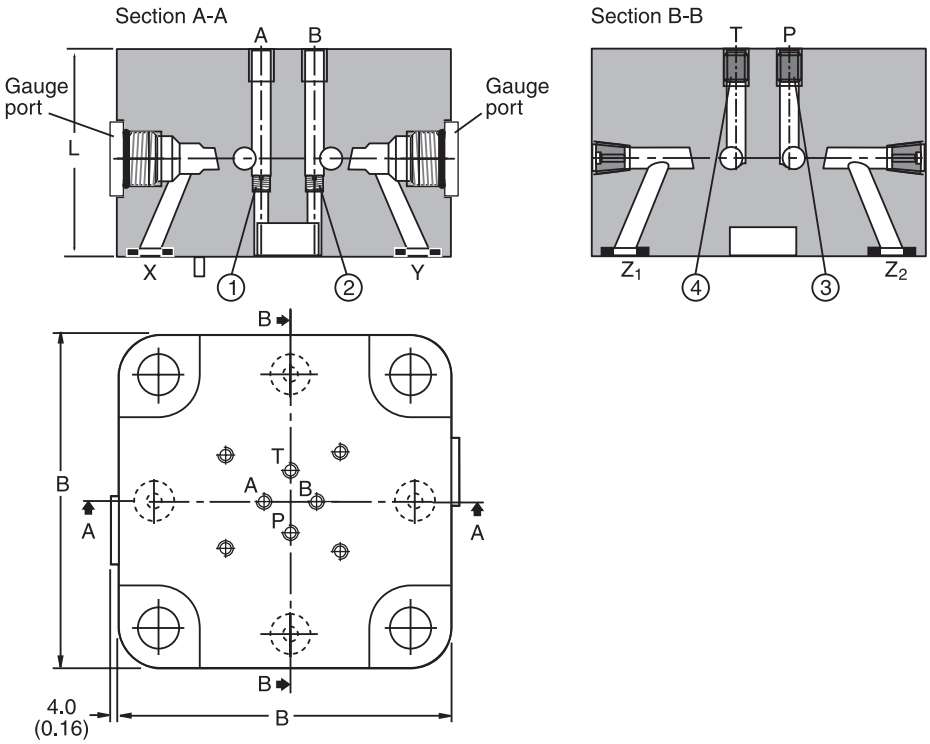
Inch equivalents for millimeter dimensions are shown in (**)

NG16

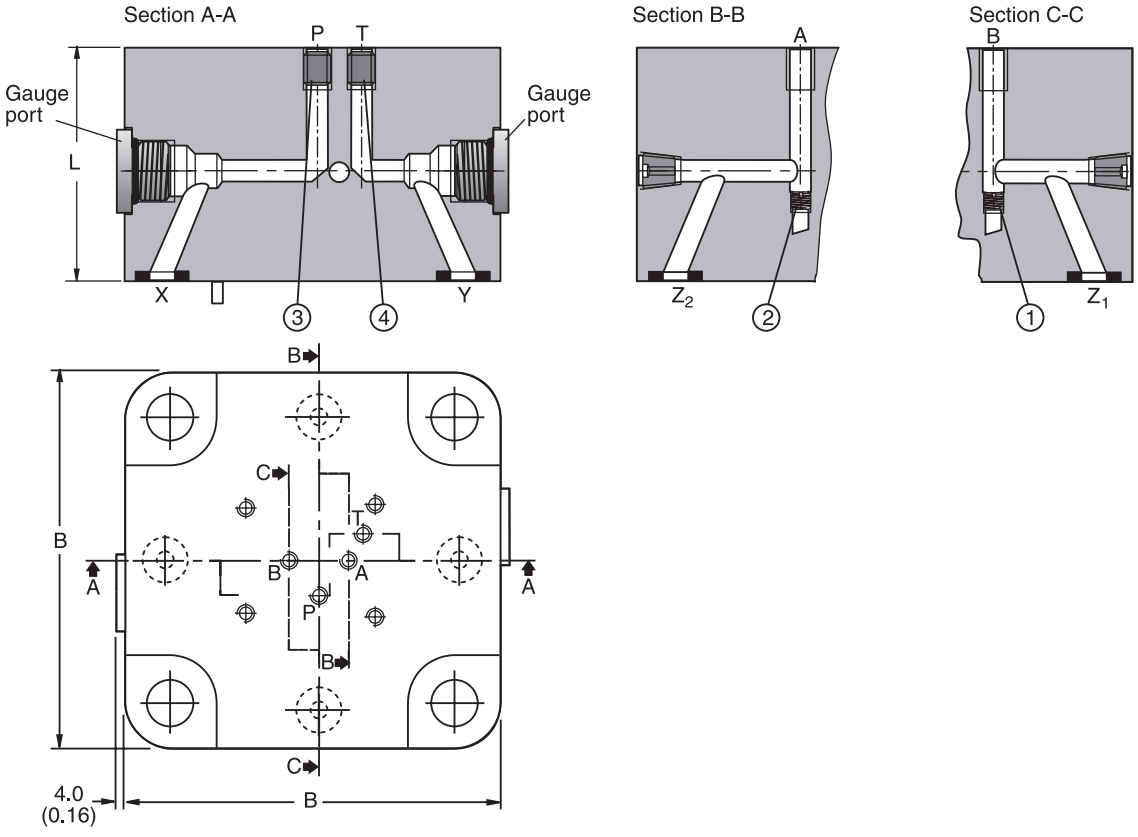


Inch equivalents for millimeter dimensions are shown in (**)

NG25 to NG40

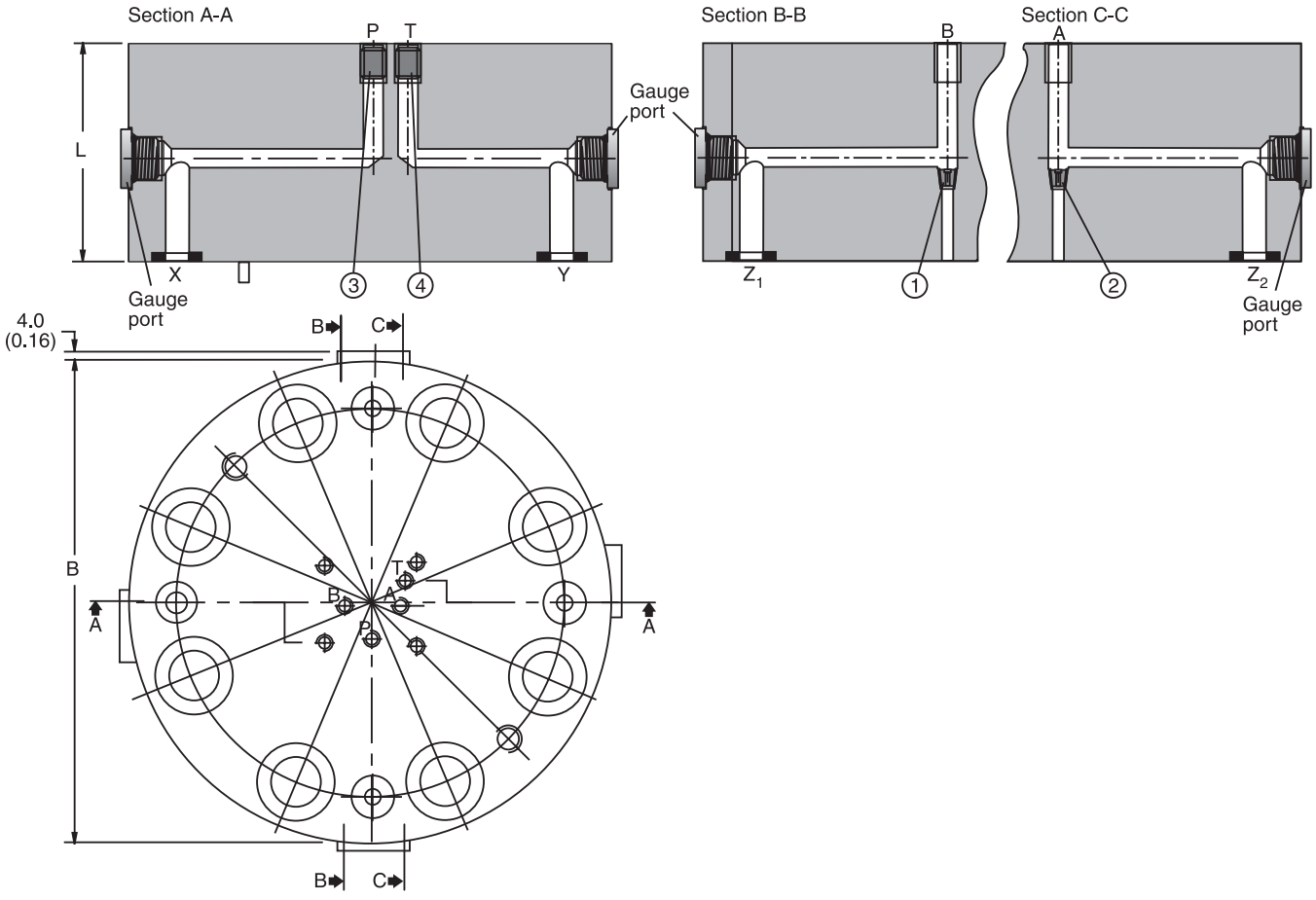


NG50 to NG63



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)	G¼"	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

C — Cover

□ — Nominal Size

Code	Description
016	NG16
025	NG25
032	NG32

F — Cover with Pressure Relief Valve

□ — Pressure Range

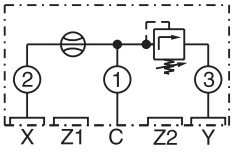
Code	Description
07	75 Bar (1088 PSI)
10	105 Bar (1522 PSI)
17	175 Bar (2538 PSI)
21	210 Bar (3000 PSI)
25	250 Bar (3625 PSI)
35	350 Bar (5075 PSI)

□ — Pressure Adjustment

Code	Description
S	Screw with Lock Nut
L	Knob E10 Lock

□ □ □ — ① ② ③ Orifice / Choke

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



Orifice position

□ — Seals

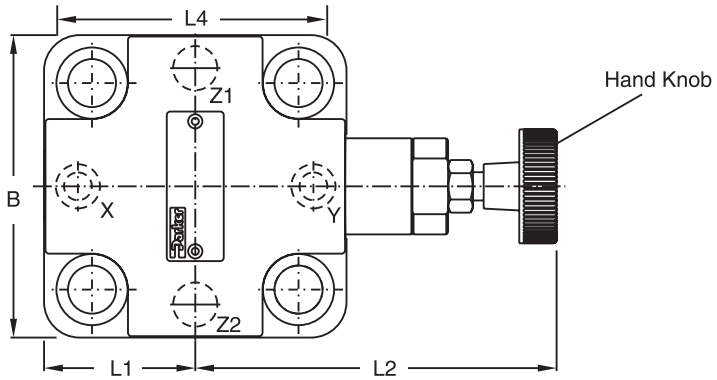
Code	Description
N	Nitrile
V	Fluorocarbon

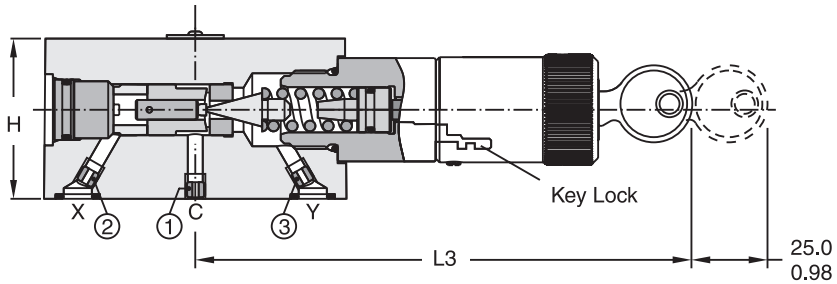
□ — Design Series
not required for ordering

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	Orifice Thread ②	Orifice Thread 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

Code	Description
016	NG16
025	NG25
032	NG32

G — Cover with Pressure Relief and Pilot System Mounting

□ — Pressure Range

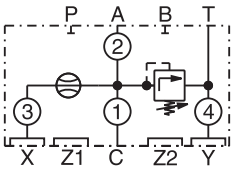
Code	Description
07	75 Bar (1088 PSI)
10	105 Bar (1522 PSI)
17	175 Bar (2538 PSI)
21	210 Bar (3000 PSI)
25	250 Bar (3625 PSI)
35	350 Bar (5075 PSI)

□ — Pressure Adjustment

Code	Description
S	Screw with Lock Nut
L	Knob E10 Lock

□ ① □ ② □ ③ □ ④ — Orifice / Choke

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



◯ Orifice position

□ — Seals

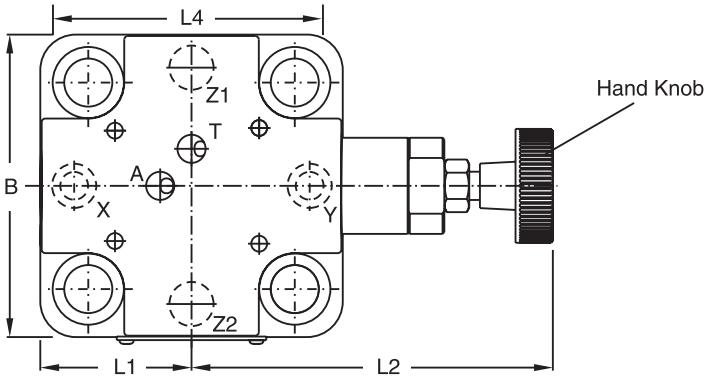
Code	Description
N	Nitrile
V	Fluorocarbon

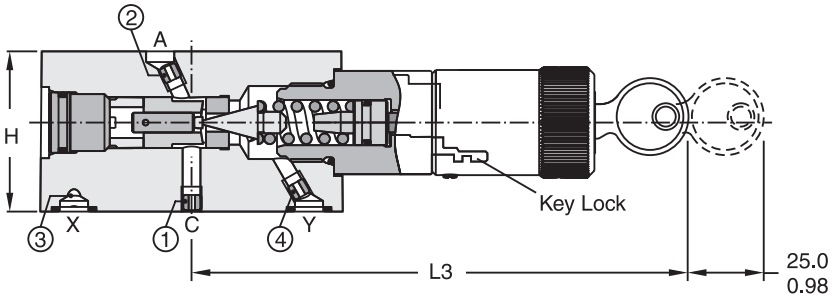
Design Series
not required for ordering

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

Dimensions

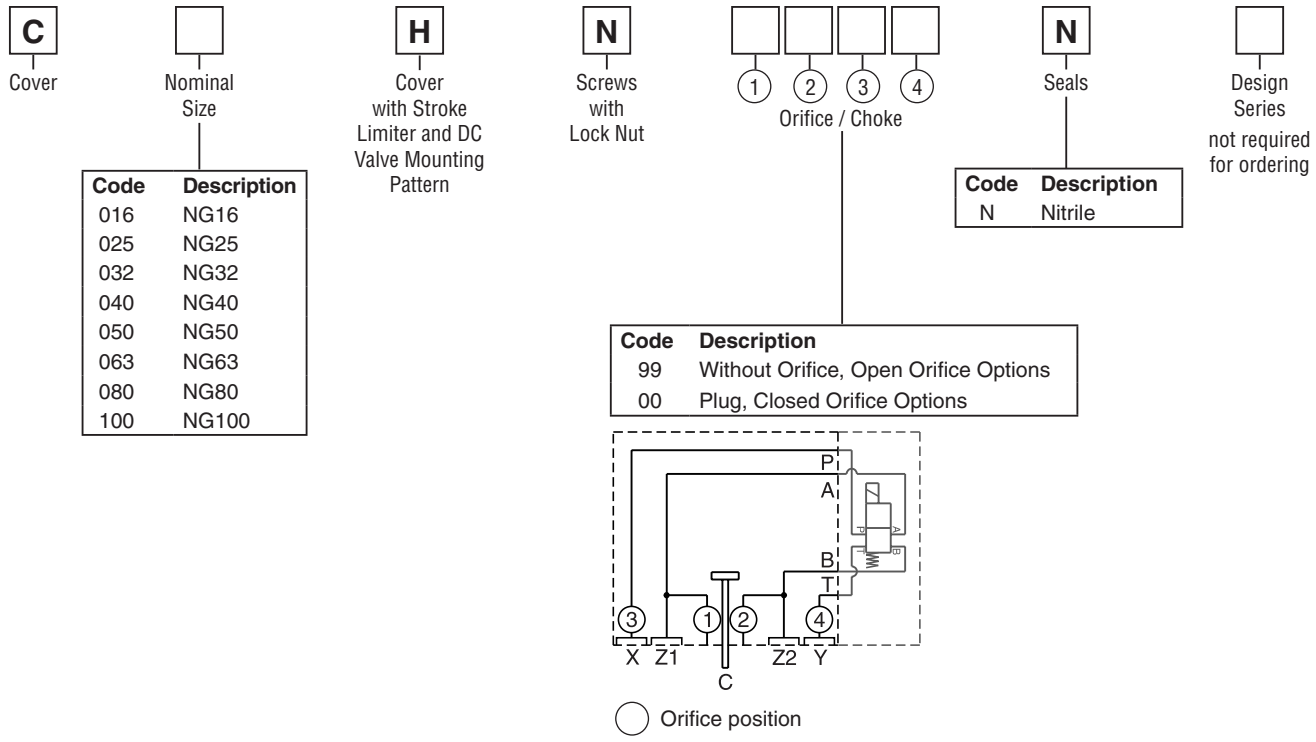
Inch equivalents for millimeter dimensions are shown in (**)





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



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

Code	Description
N	Nitrile

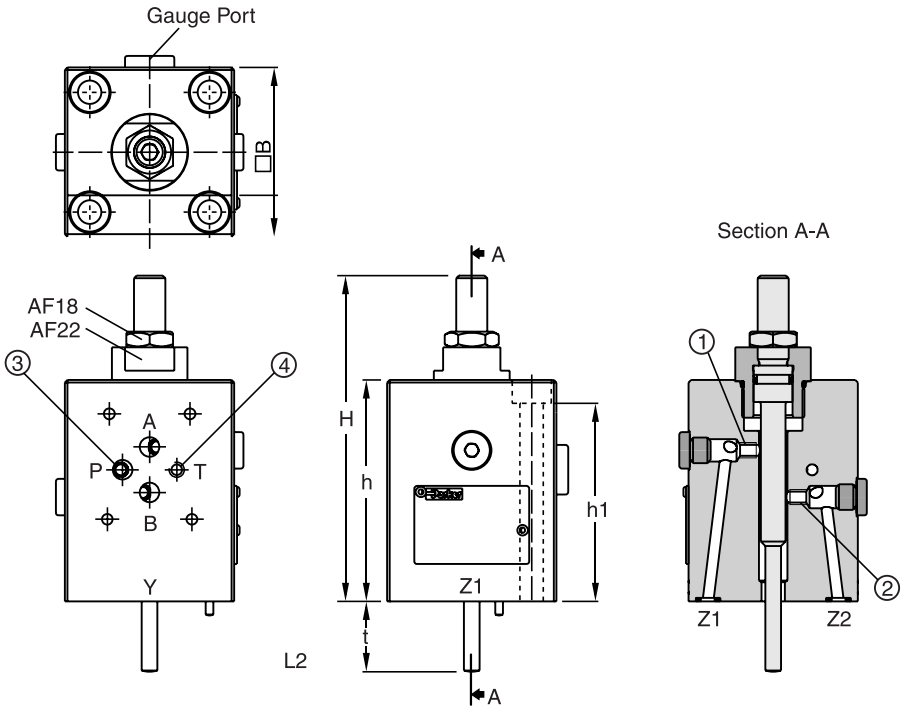
Code	Description
99	Without Orifice, Open Orifice Options
00	Plug, Closed Orifice Options

For NG63, 80 and 100: If pilot system NG06 should be used, mount adapter plate PADA 1007/A-B/B-A or PADA 1007 A-A/B-B (NG10 to NG06), see Accessories in this chapter.

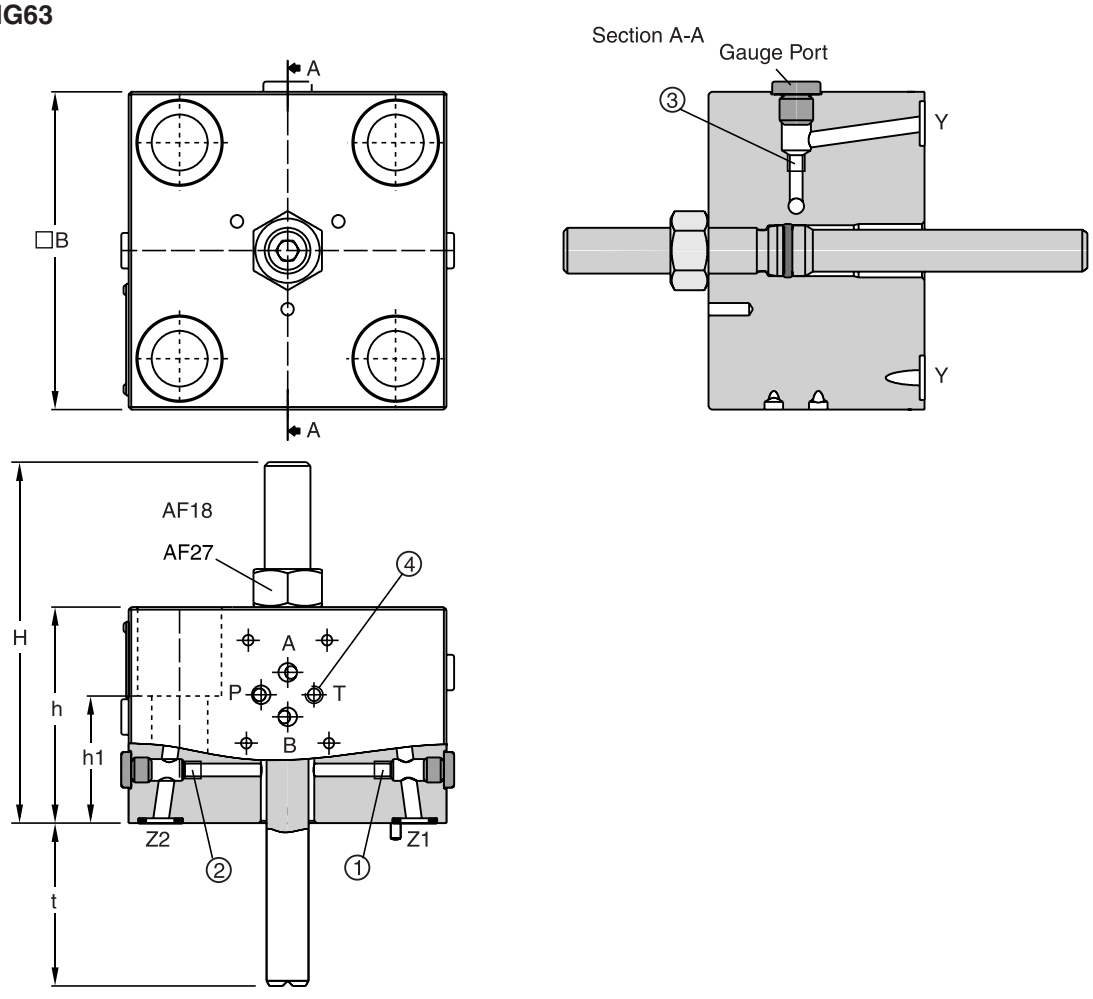
For orifice recommendations, bolt and seal kits, see Accessories in this chapter.

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

NG16



NG25 to NG63

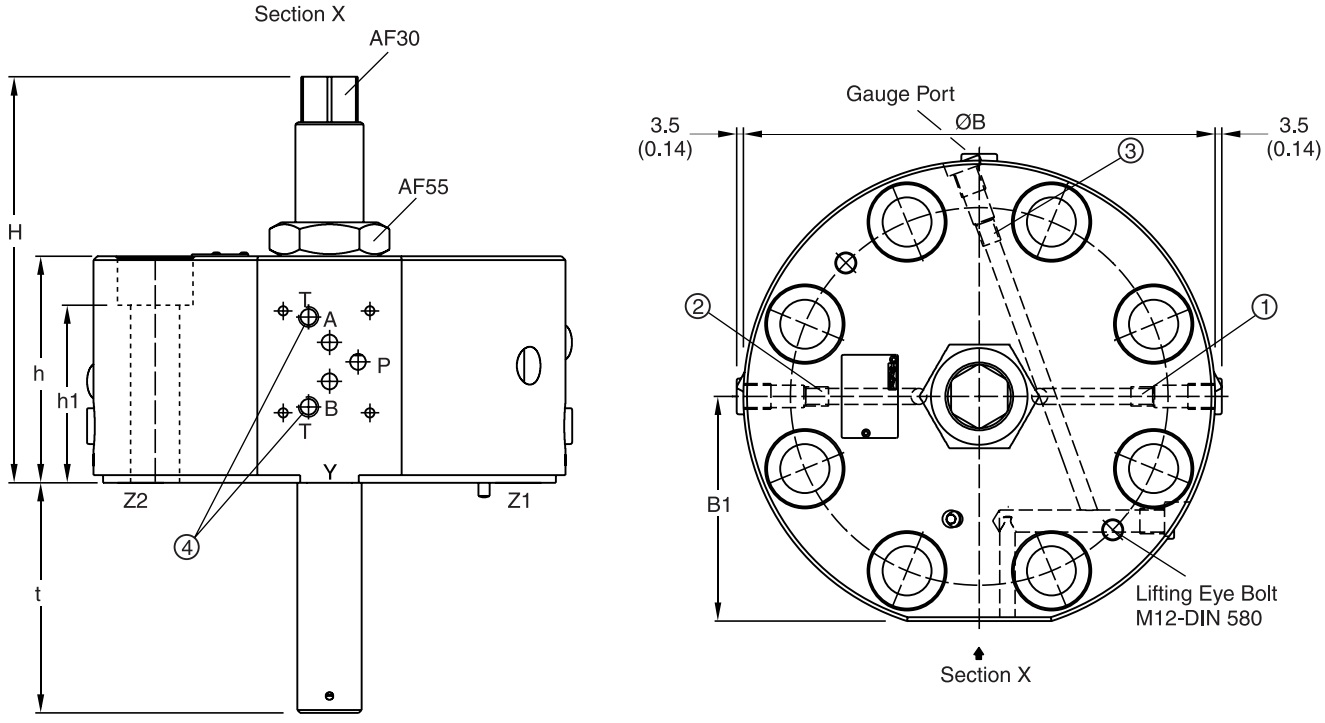


Cat3200_02.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

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

NG80 to NG100



Size	B	B1	H	h	h1	t	Gauge Port	Orifice Thread ①	②	③	④
NG16	65.0 (2.56)	—	125.0 (4.92)	85.0 (3.35)	76.0 (2.99)	27.0 (1.06)	G1/4	M5	M5	M5	M5
NG25	85.0 (33.5)	—	114.0 (4.49)	85.0 (3.35)	70.0 (2.76)	36.5 (1.44)	G1/4	M6	M6	M6	M6
NG32	102.0 (4.02)	—	132.5 (5.22)	85.0 (3.35)	56.0 (2.20)	47.5 (1.87)	G1/4	M6	M6	M6	M6
NG40	125.0 (4.92)	—	142.0 (5.59)	85.0 (3.35)	50.0 (1.97)	64.0 (2.52)	G1/4	M6	M6	M6	M6
NG50	140.0 (5.51)	—	147.5 (5.81)	85.0 (3.35)	60.0 (2.36)	72.5 (2.85)	G1/4	M8	M8	M8	M8
NG63	180.0 (7.09)	—	161.0 (6.34)	110.0 (4.33)	75.0 (2.95)	90.0 (3.54)	G1/4	M8	M8	M8	M8
NG80	Ø250.0 (9.84)	119.0 (4.69)	215.0 (8.46)	120.0 (4.72)	94.0 (3.70)	122.0 (4.80)	G1/4	1/8 NPT	1/8 NPT	1/8 NPT	1/8 NPT
NG100	Ø300.0 (11.81)	144.0 (5.67)	240.0 (9.45)	120.0 (4.72)	85.0 (3.35)	145.0 (5.71)	G1/4	1/8 NPT	1/8 NPT	1/8 NPT	1/8 NPT

Ordering Information

C		V	A
Cover	Nominal Size	Cover with Shuttle Valve	Without Additional Option

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

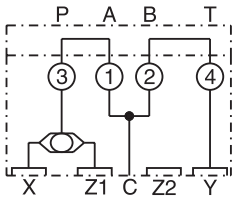
① ② ③ ④ Orifice / Choke

Seals

Code	Description
N	Nitrile
V	Fluorocarbon

Design Series
not required for ordering

Code	Description
99	Without Orifice, Open Orifice Options

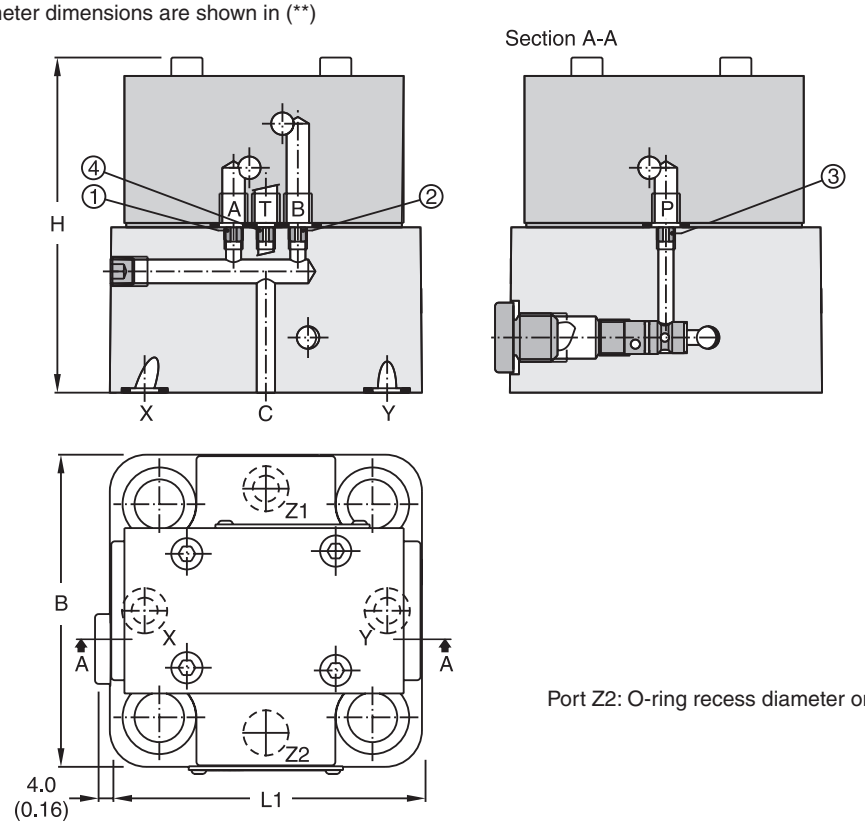


◯ Orifice position

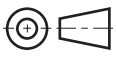
For orifice recommendations, bolt and seal kits, see Accessories.

Dimensions

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

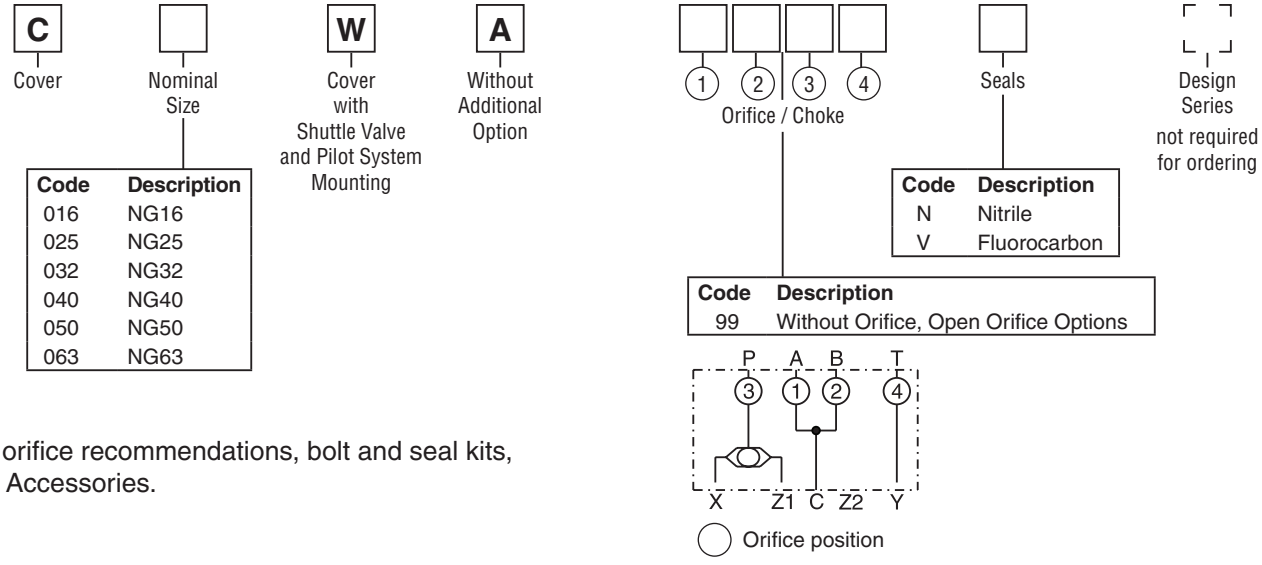


Port Z2: O-ring recess diameter on valve body



Size	B	H	L1	Orifice Thread ①	②	③	④
NG16	65.0 (2.56)	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



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

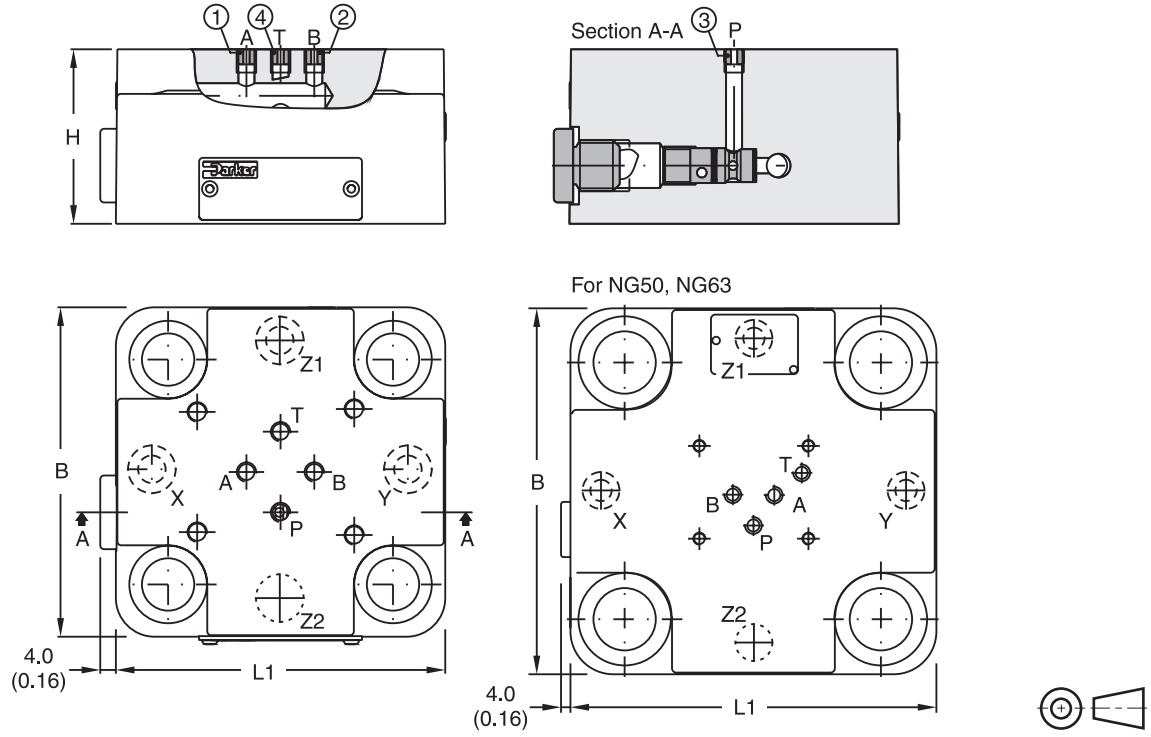
Code	Description
N	Nitrile
V	Fluorocarbon

Code	Description
99	Without Orifice, Open Orifice Options

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

Dimensions

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

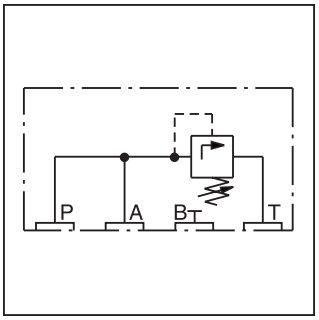


Port Z2: O-ring recess diameter on valve body

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 [ ] [ ] **4** [ ] [ ]

Pressure Range

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 Adjustment

Code	Description
S	Hand knob (standard)
L	Key lock

Pilot Oil

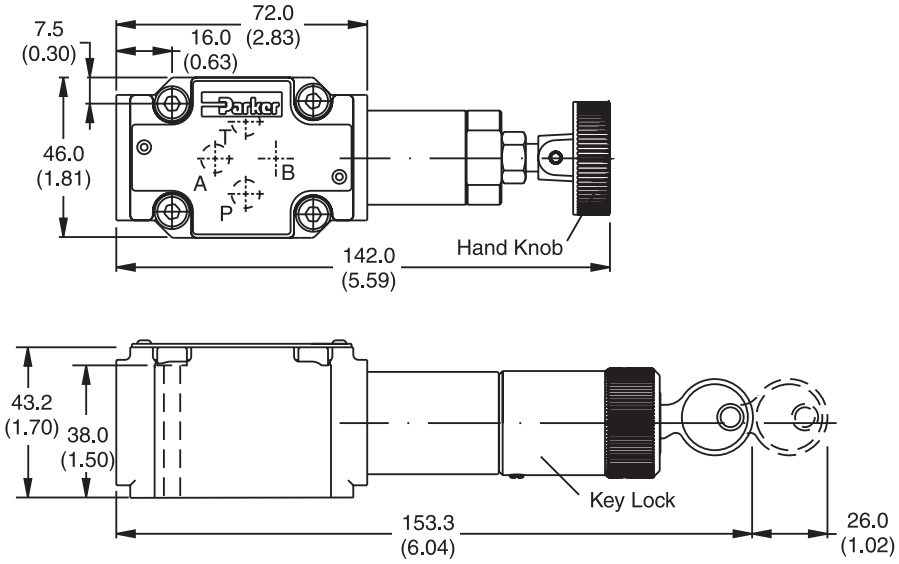
Seal

Code	Description
N	Nitrile
V	Fluorocarbon

Design Series

NOTE:
Not required when ordering.

Dimensions R06M



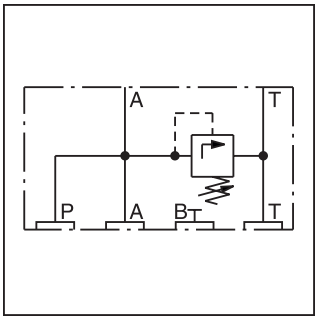
Replaces DSDA (P07)

⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

Cat3200_02.indd, ddp, 04/19

Pilot Valve with Pressure Relief Function RS06M Sandwich Plate Mounting NG6

(see Combination Examples)
$MTTF_D$ value 150 years



Ordering Information

RS06M | ☐ | ☐ | **4** | ☐ | ⌐ ¬

- ☐ Pressure Range
- ☐ Pressure Adjustment
- **4** Pilot Oil
- ☐ Seal
- ⌐ ¬ Design Series

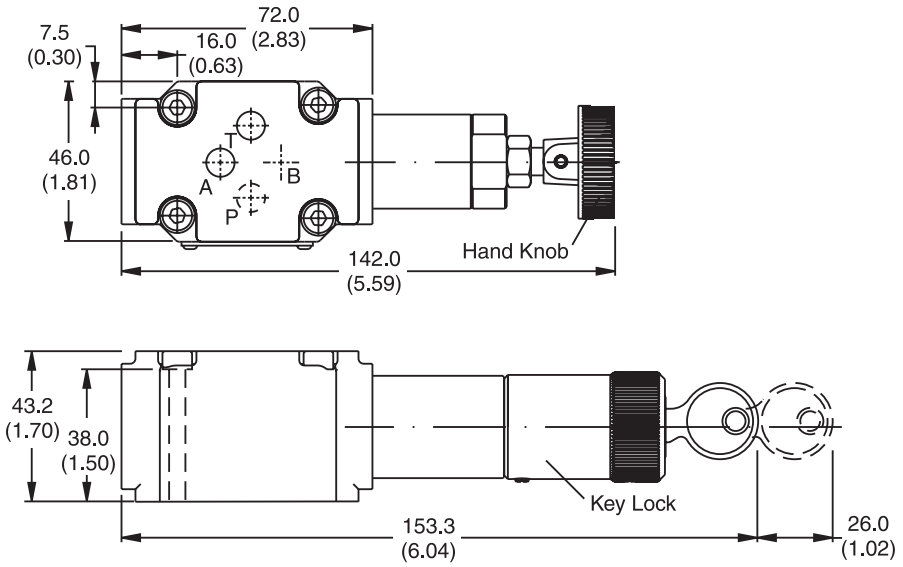
NOTE: Not required when ordering.

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 RS06M



Replaces DSDA (Z07)

⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

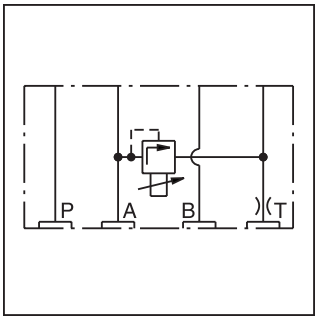
Cat3200_02.indd, ddp, 04/19

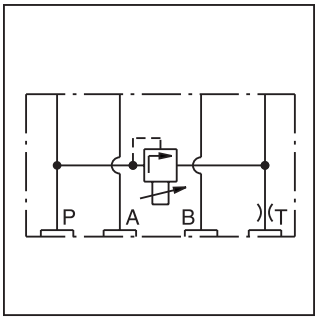
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

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** | ☐

- **2** — Pressure Adjustment
- ☐ — Pressure Relief

Code	Description
AT	A to T
PT	P to T

- ☐ — Pressure Range

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

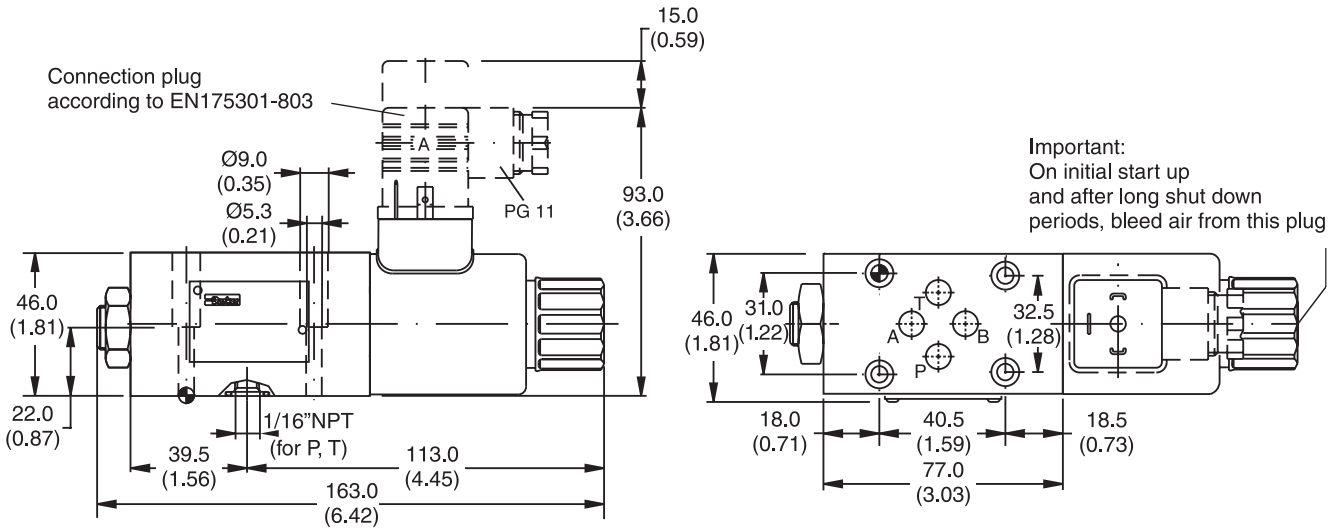
- ☐ — Solenoid Voltage

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

- **V** — Seal Fluorocarbon
- ☐ — Design Series

NOTE: Not required when ordering.

Dimensions RPDM2



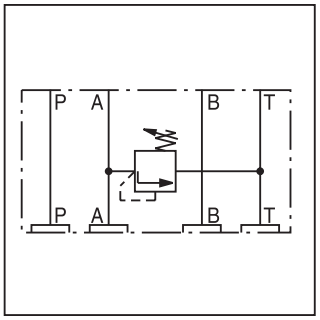
⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

Cat3200_02.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

Sandwich Valve with Pressure Relief Function ZUD*AT*Z*
Sandwich Plate Mounting NG6

(see Combination Examples)
$MTTF_D$ value 150 years



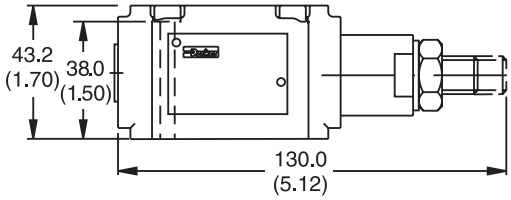
□ — **ZUDB1AT** □ **Z07** □

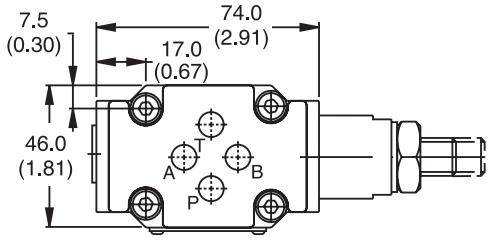
Seal — Pressure Adjustment — Pressure Range

Code	Description
Omit	Nitrile
V	Fluorocarbon

Code	Description
2	Hexagon Screw with Locknut
61	Knob E10 Lock

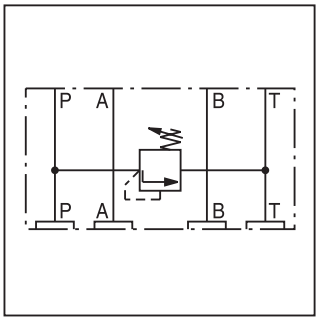
Code	Description
B	70 Bar (1015 PSI)
E	175 Bar (2538 PSI)
G	250 Bar (3625 PSI)
K	350 Bar (5075 PSI)





Sandwich Valve with Pressure Relief Function ZUD*PT*Z*
Sandwich Plate Mounting NG6

(see Combination Examples)
$MTTF_D$ value 150 years



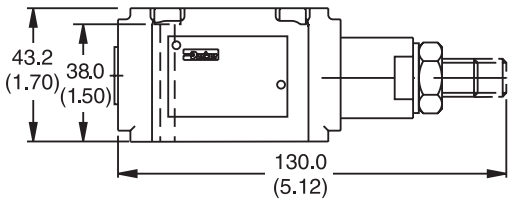
□ — **ZUDB1PT** □ **Z07** □

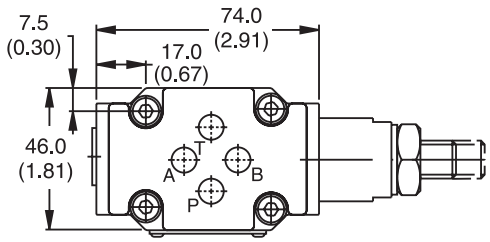
Seal — Pressure Adjustment — Pressure Range

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)





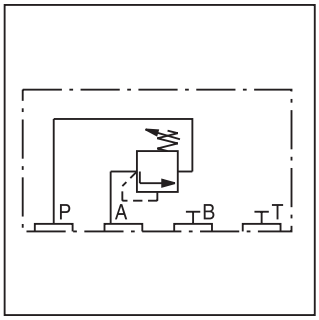
⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

Cat3200_02.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

Pilot Valve with Preload Function DSB*P*
Subplate Mounting NG6

(see Combination Examples)
$MTTF_D$ value 150 years



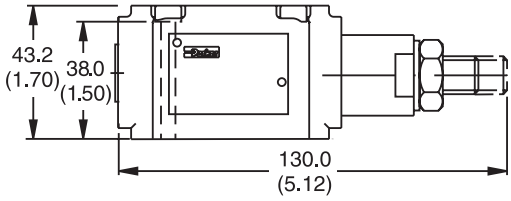
□ — **DSBA100** □ **P07** □

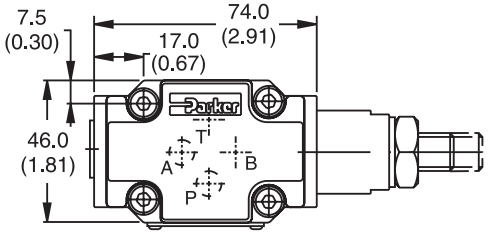
Seal | Pressure Adjustment | Pressure Range

Code	Description
Omit	Nitrile
V	Fluorocarbon

Code	Description
2	Hexagon Screw with Locknut
61	Knob E10 Lock

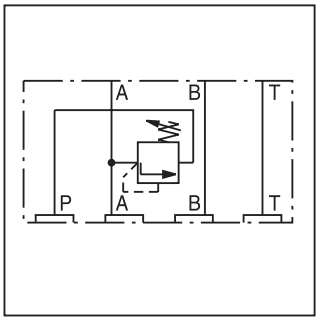
Code	Description
B	70 Bar (1015 PSI)
E	175 Bar (2538 PSI)
G	250 Bar (3625 PSI)
K	350 Bar (5075 PSI)





Pilot Valve with Preload Function DSB*Z*
Sandwich Plate Mounting NG6

(see Combination Examples)
$MTTF_D$ value 150 years



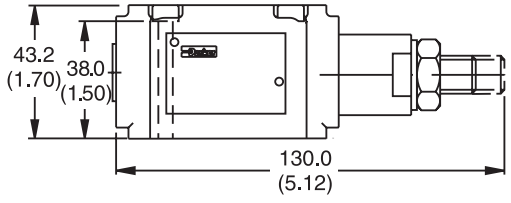
□ — **DSBA100** □ **Z07** □

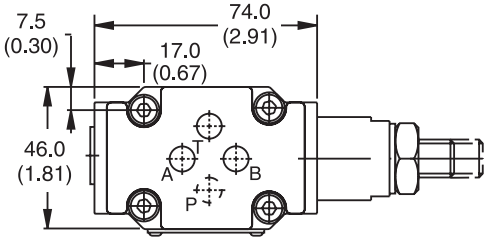
Seal | Pressure Adjustment | Pressure Range

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)



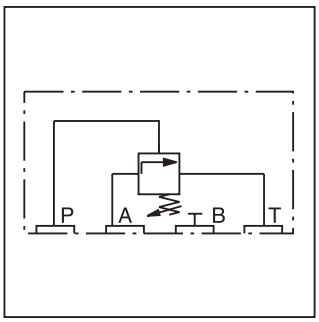


⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

Cat3200_02.indd, ddp, 04/19

Pilot Valve with Unloading Function UR06M
Subplate Mounting NG6

(see Combination Examples)
$MTTF_D$ value 150 years

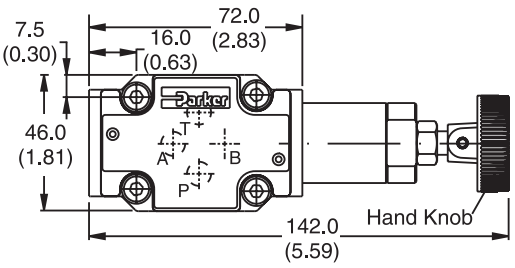


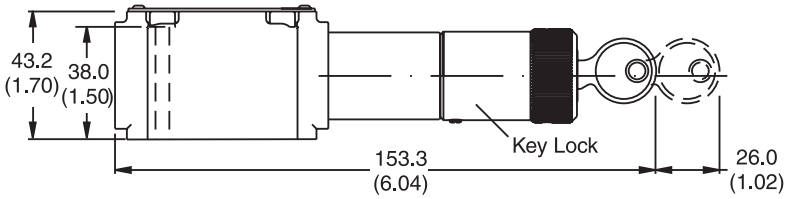
UR	06	M	☐	☐	4	☐
			Pressure Range	Pressure Adjustment	Pilot Oil Drain Internal	Seal

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

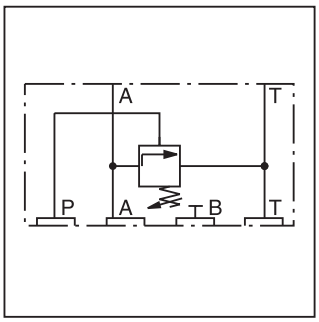




Replaces DAFA (P07)

Pilot Valve with Unloading Function US06M
Subplate Mounting NG6

(see Combination Examples)
$MTTF_D$ value 150 years

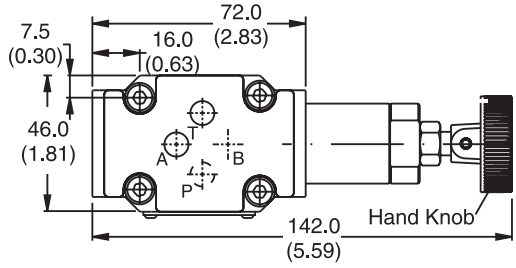


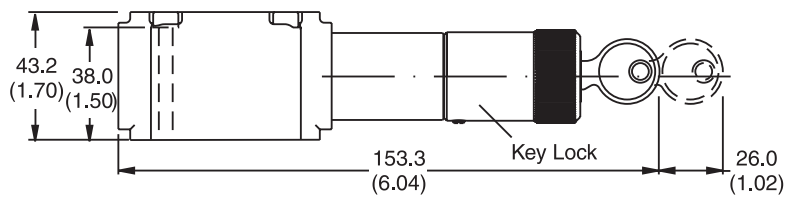
US	06	M	☐	☐	4	☐
			Pressure Range	Pressure Adjustment	Pilot Oil Drain Internal	Seal

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)

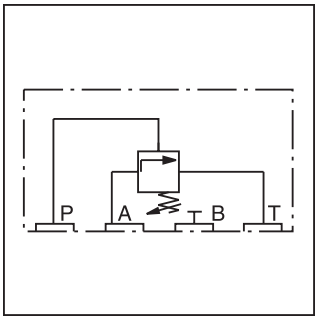
⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

Cat3200_02.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

Pilot Valve with Pressure Sequence Function S06M Subplate Mounting NG6

(see Combination Examples)
$MTTF_D$ value 150 years



Ordering Information

S06M □ □ **4** □ □

Pressure Range

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 Adjustment

Code	Description
S	Hand knob (standard)
L	Key lock

Pilot Oil Inlet Internal/ Outlet Internal

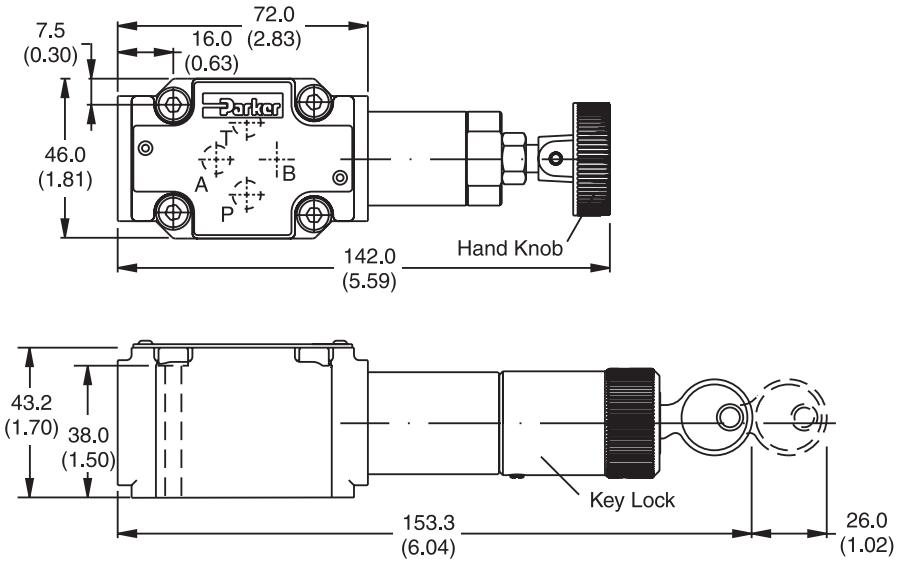
Seal

Code	Description
N	Nitrile
V	Fluorocarbon

Design Series

NOTE: Not required when ordering.

Dimensions S06M



Replaces DNLA

⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

Cat3200_02.indd, ddp, 04/19

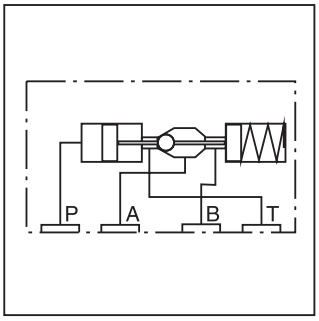
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

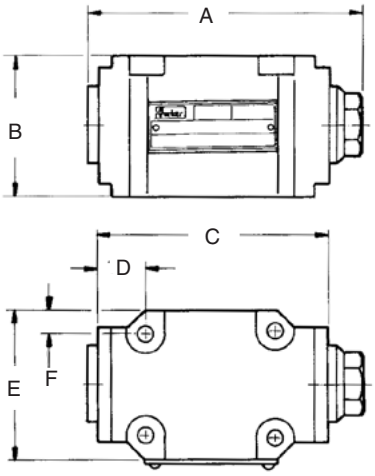
Check Valve
Hydraulically Pilot Operated NG6

Size NG6 with pilot control for subplate assembly

Ordering Information

SVLA1006P07





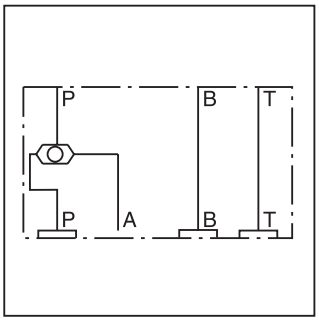
Dimension	A	B	C	D	E	F
mm (in.)	92.0 (3.62)	43.2 (1.70)	74.0 (2.91)	17.0 (0.67)	46.0 (1.81)	7.5 (0.30)

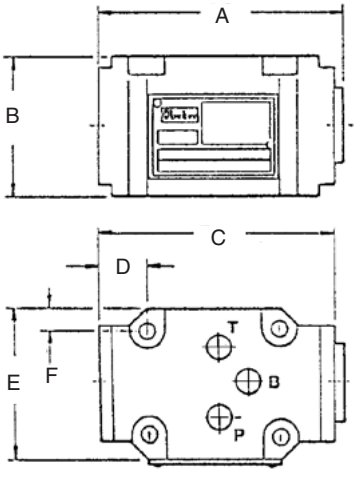
Shuttle Valve
Sandwich Plate NG6

Size NG6 with pilot control for subplate assembly

Ordering Information

ZSRA1PP0Z07





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

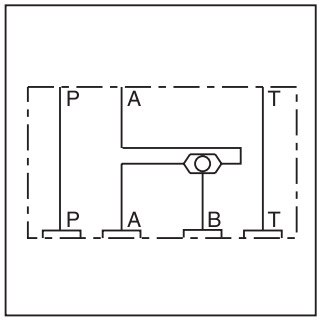
Cat3200_02.indd, ddp, 04/19

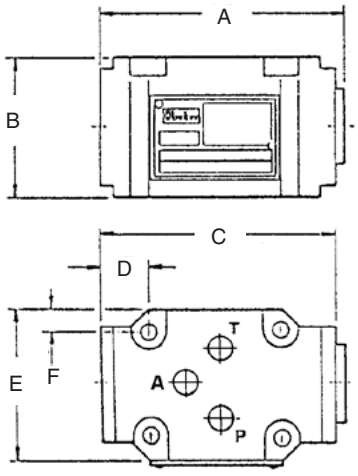
Shuttle Valve
Sandwich Plate NG6

Size NG6 with pilot control for subplate assembly

Ordering Information

ZSRB1AA0Z07





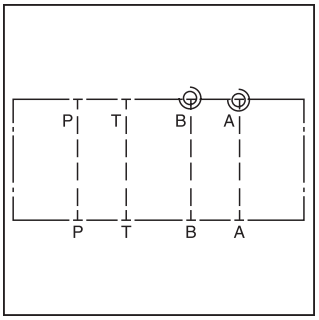
Dimension	A	B	C	D	E	F
mm (in.)	80.0 (3.15)	43.2 (1.70)	74.0 (2.91)	17.0 (0.67)	46.0 (1.81)	7.5 (0.30)

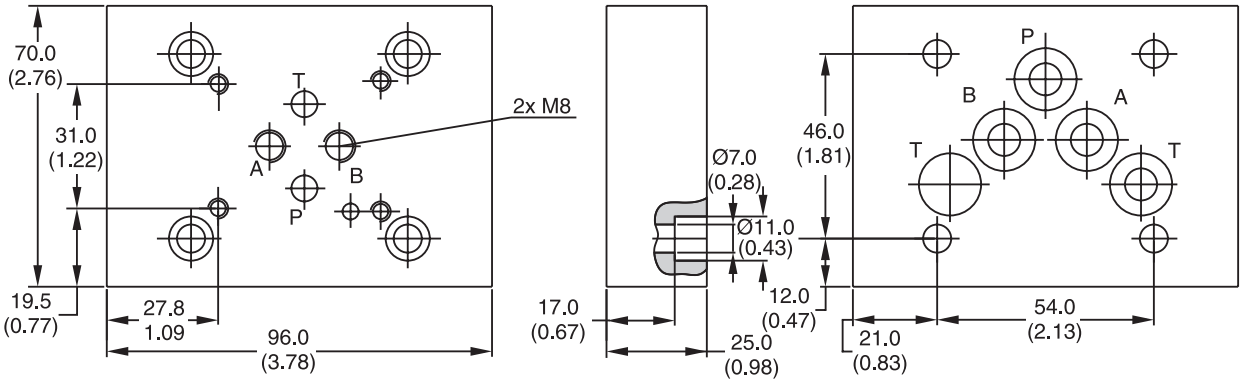
Adapter Plate

Size NG6 to NG10

Ordering Information

PADA1007/A-A/B-B





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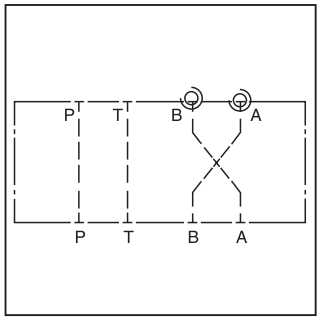
Cat3200_02.indd, ddp, 04/19

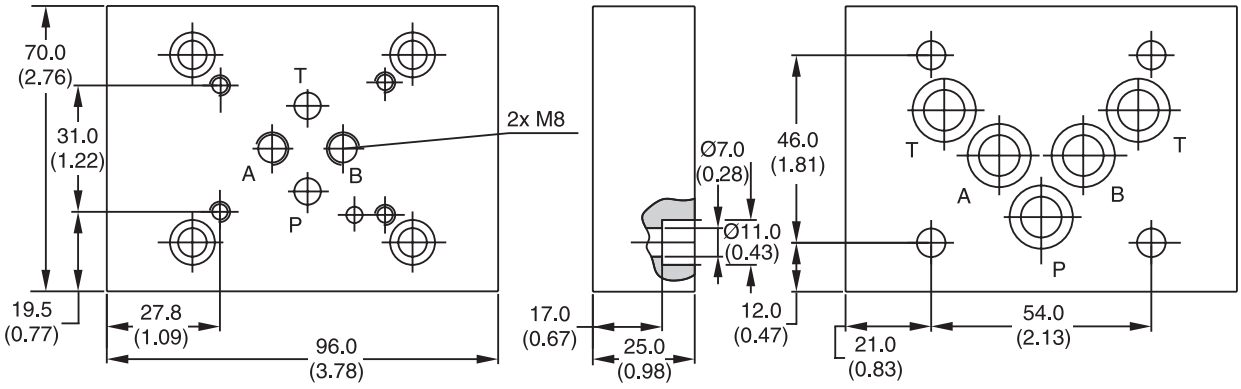
Adapter Plate

Size NG6 to NG10



Ordering Information

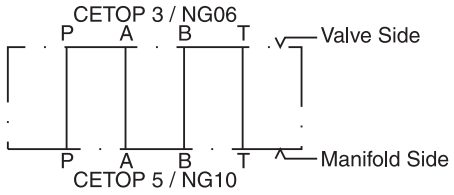
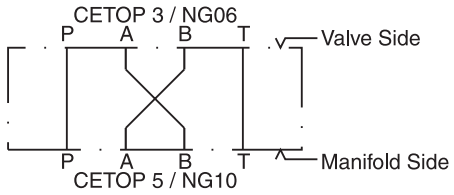
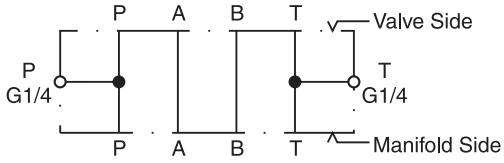
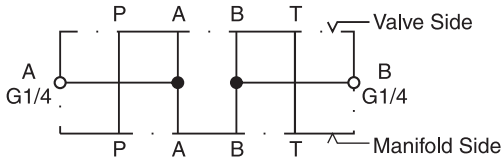
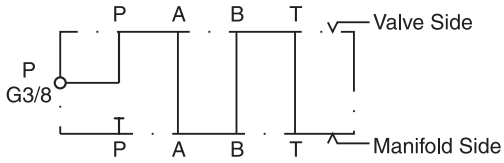
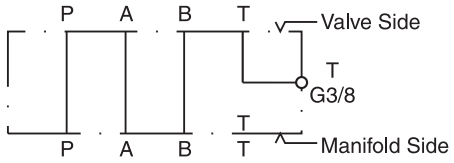
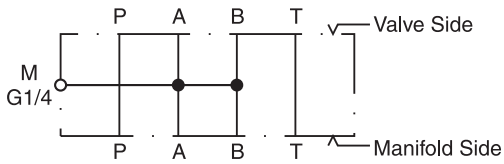
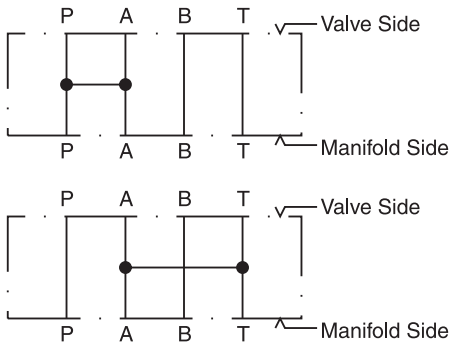
PADA1007/A-B/B-A

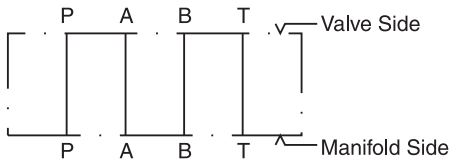
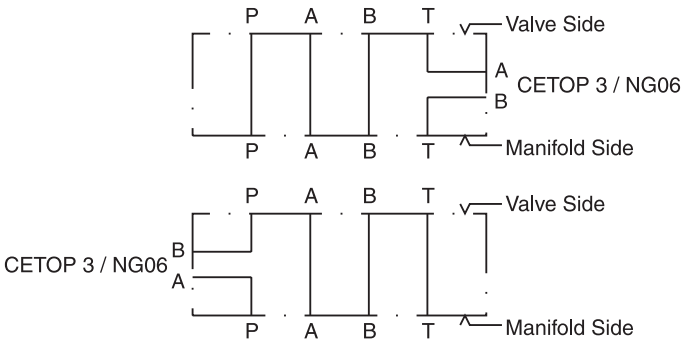
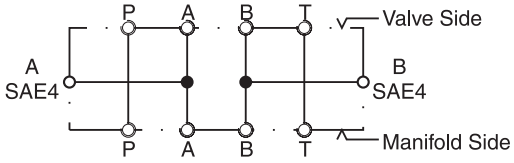
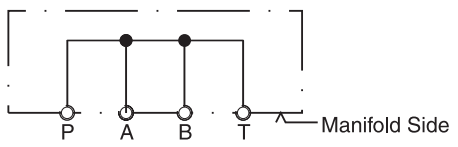
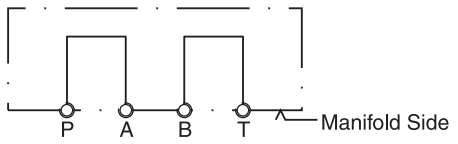
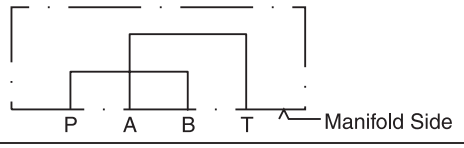
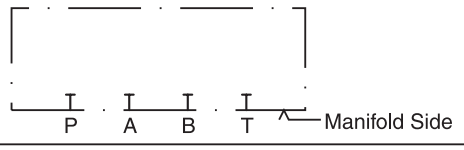


Attention:
For NG50 and larger: If pilot system NG6 is used, mount adapter plate PADA1007/A-B/B-A or PADA1007/A-A/B-B (NG6 to NG10) on cover.

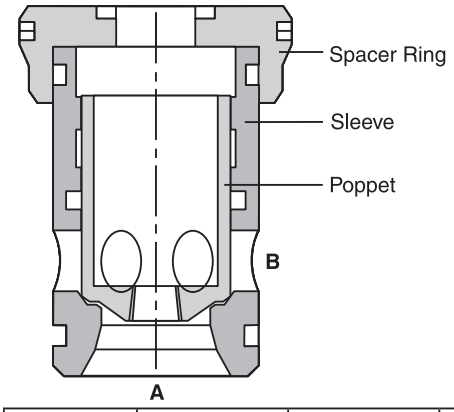
Adapter Plate: PADA1007/A-B/B-A or PADA1007/A-A/B-B
Sealing Kit: SK-PADA 1007
Bolt Kit: BK136

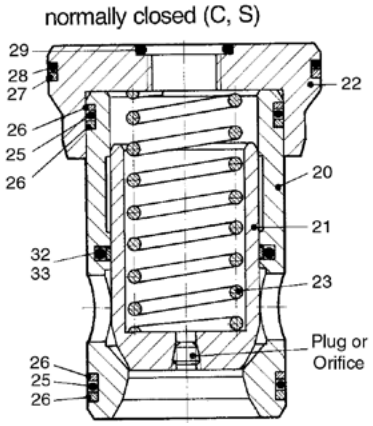
Cat3200_02.indd, ddp, 04/19

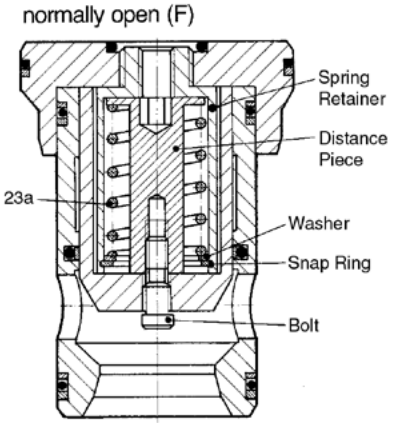
Symbol	Type	Size	Height
	PADA1007/A-A/B-B	NG6-NG10	25.0mm (0.98 in.)
	PADA1007/A-B/B-A	NG6-NG10	25.0mm (0.98 in.)
	H06-1044	NG6	30.0mm (1.18 in.)
	H06-1039	NG6	30.0mm (1.18 in.)
	H06-504	NG6	30.0mm (1.18 in.)
	H06-711	NG6	30.0mm (1.18 in.)
	H06-1274	NG6	30.0mm (1.18 in.)
	H06-1040	NG6	30.0mm (1.18 in.)

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

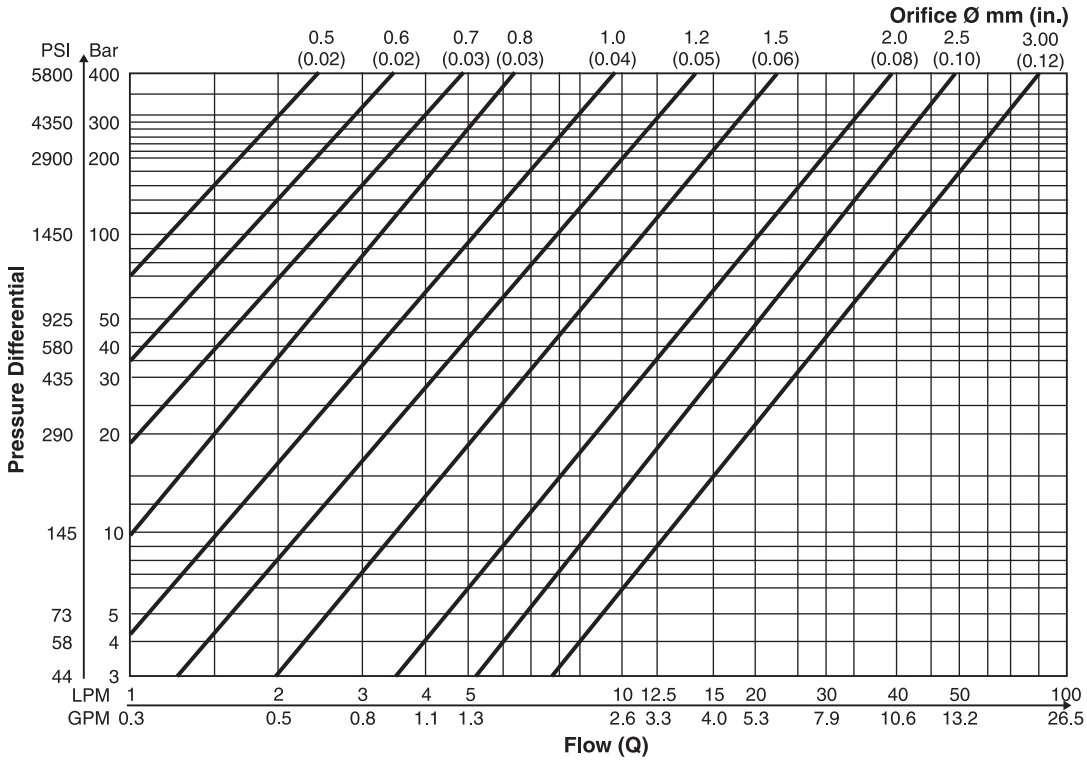
Spare Parts

No.	Description	Part Number							
		CE016	CE025	CE032	CE040	CE050	CE063	CE080	CE100
20	Cage	35036363	35036377	35036389	35036403	35036417	25036432	25036452	25036470
21	Poppet 01	45036369	45036379	45036392	45036409	45036421	45036437	35036449	35036467
	Poppet 04	45036370	45036380	45036395	45036406	45036422	45036436	35036460	35036468
	Poppet 07	–	45036964	45036965	45036966	45036967	45036968	—	—
	Poppet 08	45036368	45036381	45036391	45036408	45036424	45036438	35036459	35036469
23	Spring L 0.1 Bar (1 PSI)	45051368	45051375	45051376	45051382	45051384	45051388	45051395	45051400
	Spring N 0.5 Bar (7 PSI)	45051369	45051374	45051377	45051381	45051385	45051389	45051396	45051401
	Spring S 1.6 Bar (23 PSI)	45051370	45051372	45051378	45051380	45051386	45051390	45051397	45051402
	Spring U 4.0 Bar (58 PSI)	45051371	45051373	45051379	45051383	45051387	45051391	45051398	45051403
23a	Spring L 0.1 Bar (1 PSI)	45051435	45051436	45051429	45051433	45051432	45051430	45051431	45051428
22	Retainer	35036364	45036375	45036393	35036402	35036416	35036435	25036453	25036471
29	O-Ring Nitrile N 552-90	5000934	5000971	5000976	5000980	5000984	5000988	5002481	5001004
	Fluorocarbon V 747-90	5001038 2-155	5001066 2-213	5001070 2-218	5001074 2-222	5001078 2-226	5001082 2-231	5002485 2-339	5002526 2-345
27	O-Ring Nitrile N 552-90	5000916	5000948	5000957	5000988	5000992	5000966	5002481	5001008
	Fluorocarbon V 747-90	5001026 2-2024	5001090 2-129	5001059 2-139	5001082 2-231	5001085 2-236	5001093 2-246	5002485 2-355	5001094 2-439
28	Backup Ring N 300-90	–	–	5001147 8-139	5002576 8-231	5001157 8-236	5001161 8-246	5002483 8-355	5002478 8-439
25	O-Ring Nitrile N 552-90	5000912	5000941	5000948	5000983	5000965	5000992	5002480	5002476
	Fluorocarbon V 747-90	5001022 2-020	5001045 2-122	5001090 2-129	5001077 2-225	5001091 2-229	2001085 2-236	5002484 2-344	5002479 2-352
26	Backup Ring N 300-90	–	–	5001143 8-129	5001163 8-225	5001162 8-229	5001157 8-236	5002482 8-344	5002477 8-352
32 33	Poppet Seal Kit Nitrile only	–	46212761	46212762	46212763	46212764	46212765	46212766	46212767

Seal Kits

No.	Variation	Material	Part Number							
			CE016	CE025	CE032	CE040	CE050	CE063	CE080	CE100
25 to 29	C and F	Nitrile	SK-CBE 160	SK-CBE 250	SK-CBE 320	SK-CBE 400	SK-CBE 500	SK-CBE 630	SK-CBE 800	SK-CBE 1000
	C and F	Fluorocarbon	SK-CBE 160V	SK-CBE 250V	SK-CBE 320V	SK-CBE 400V	SK-CBE 500V	SK-CBE 630V	SK-CBE 800V	SK-CBE 1000V

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.

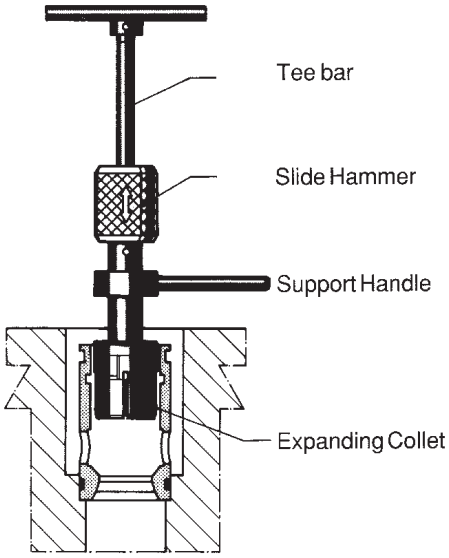


Figure 1

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

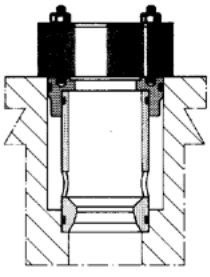


Figure 2

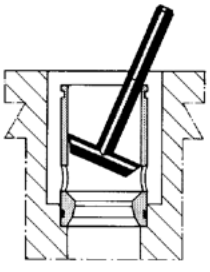


Figure 3

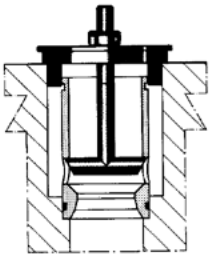


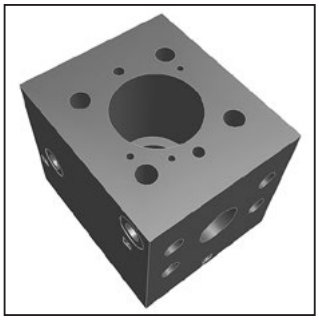
Figure 4

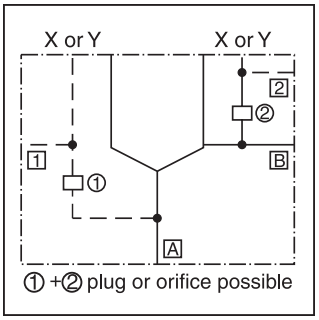
General Description

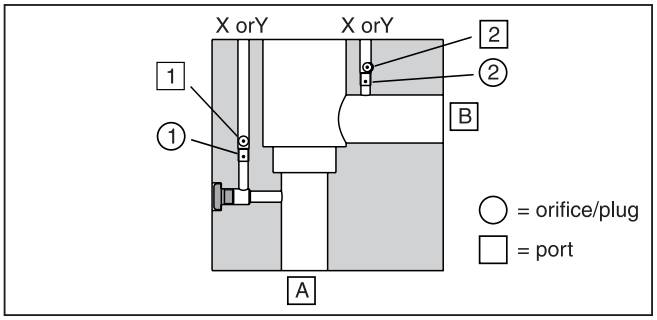
Cartridge Manifold Blocks are bodies for 2/2-way slip-in cartridge valves. They are used in systems with only one cartridge valve without the need to design a specific manifold block.

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

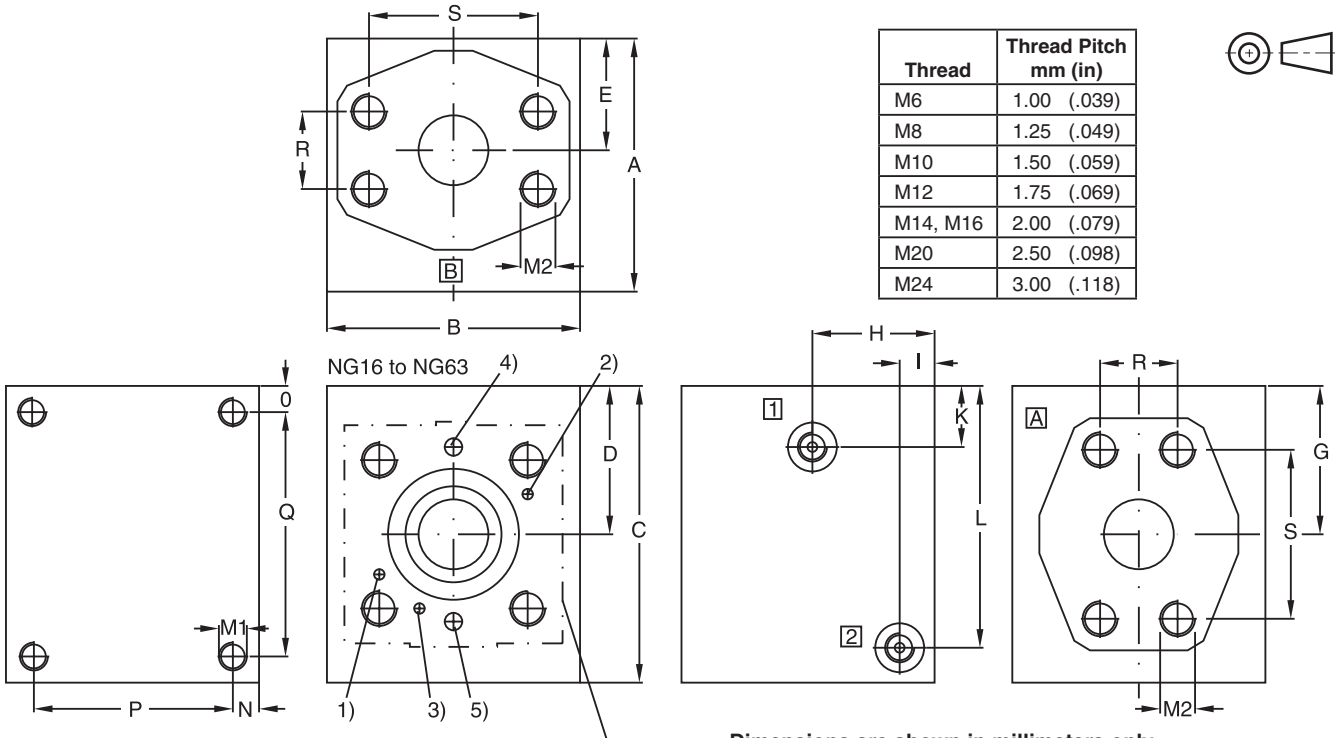
CB	☐	A	1	☐	10	W
Cartridge Manifold Block	Nominal Size	Function In – Out	Manifold for 1 Cartridge	Flange Size	Design Series	Without Assembly

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

Cat3200_02.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA



Thread	Thread Pitch mm (in)
M6	1.00 (.039)
M8	1.25 (.049)
M10	1.50 (.059)
M12	1.75 (.069)
M14, M16	2.00 (.079)
M20	2.50 (.098)
M24	3.00 (.118)

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

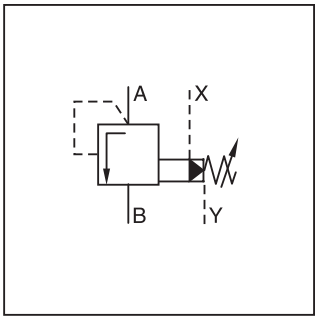
General Description

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

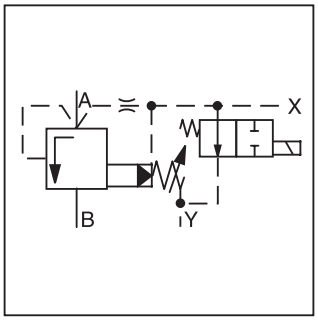
Series RS*E consists of a manual adjusted pilot stage with a directional valve for an electrically controlled vent function and a cartridge main part.

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

RS*E



R*E



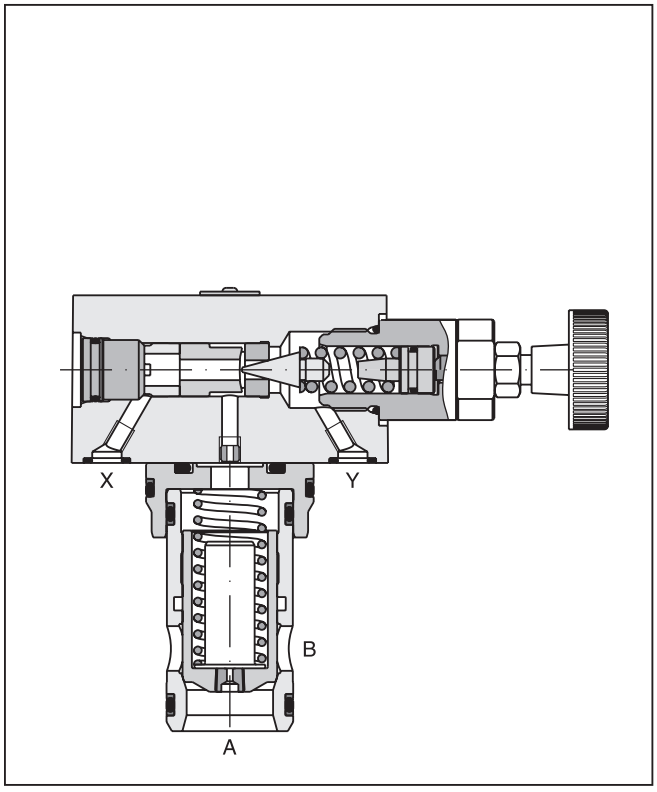
RS*E (simplified symbol)

Features

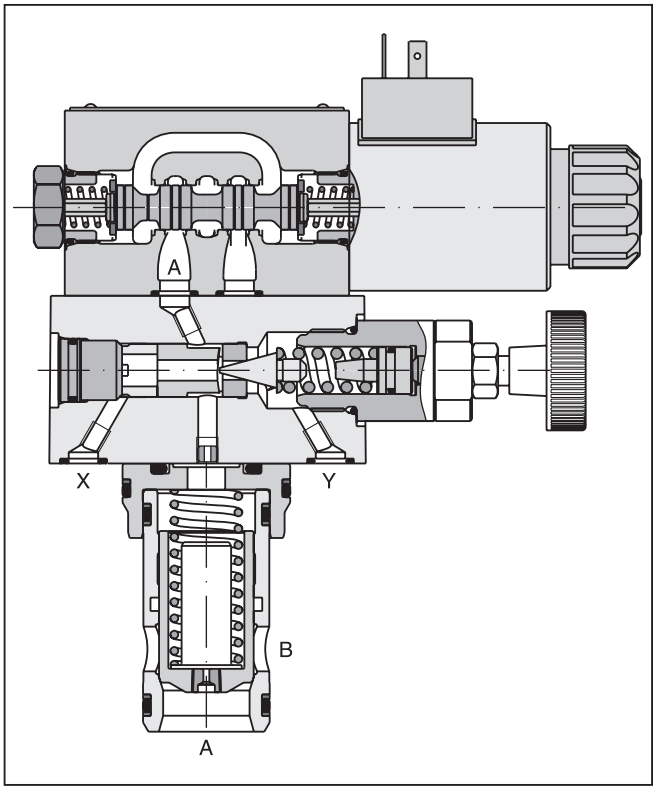
- Pilot operated with manual adjustment.
- Cavity and mounting pattern according to ISO 7368.
- 4 pressure ranges.
- 2 switching types (series RS*E).
- 2 adjustment modes:
  - Hand knob
  - Key lock
- Remote control via port X.
- 6 sizes, NG16 to NG63.

Note: Port X only usable for remote vent function

R*E



RS*E



⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

Cat3200_02.indd, ddp, 04/19

R Pressure Relief Valve | ☐ Nominal Size | **E** Slip-in Mounting ISO 7368 | ☐ Pressure Range | ☐ Adjustment | **1** Pilot Oil Pilot Internal Drain External | **S** Poppet Spring | ☐ Seals | ☐ Design Series | ☐ Spool Type

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

Code	Description
07	up to 70 Bar (1015 PSI)
10	up to 105 Bar (1522 PSI)
17	up to 175 Bar (2538 PSI)
21	up to 210 Bar (3000 PSI)
25	up to 250 Bar (3625 PSI)
35	up to 350 Bar (5075 PSI)

Code	Description
S	Hexagon Screw with Lock Nut
L	Key Lock

Code	Description
N	Nitrile
V	Fluorocarbon

Design Series
NOTE:
Not required when ordering.

Code	Description
Omit	Standard
S07	With Poppet Seals

Weight:

R16E	2.2 kg (4.9 lbs.)
R25E	3.5 kg (7.7 (lbs.)
R32E	4.9 kg (10.8 lbs.)
R40E	8.0 kg (17.6 lbs.)
R50E	13.7 kg (30.2 lbs.)
R63E	22.8 kg (50.3 lbs.)

RS Pressure Relief Valve with Electric Unloading | ☐ Nominal Size | **E** Slip-in Mounting ISO 7368 | ☐ Pressure Range | ☐ Adjustment | **1** Pilot Oil Pilot Internal Drain External | **S** Poppet Spring | ☐ Seals | ☐ Switching Type | ☐ Solenoid | **W** Without Plug | ☐ Options | ☐ Design Series | ☐ Spool Type

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

Code	Description
S	Hexagon Screw with Lock Nut
L	Key Lock

Code	Description
07	up to 70 Bar (1015 PSI)
10	up to 105 Bar (1522 PSI)
17	up to 175 Bar (2538 PSI)
21	up to 210 Bar (3000 PSI)
25	up to 250 Bar (3625 PSI)
35	up to 350 Bar (5075 PSI)

Code	Description
N	Nitrile
V	Fluorocarbon

Code	Description
1	Solenoid not activated, unpressurized circulation
9	Solenoid activated, unpressurized circulation

Code	Description
K	12V
J	24V
U	98V [1]
G	205V [1]

[1] Use plug with rectifier at AC

Options

Code	Description
Omit	Standard
S	With Slow Unloading

Design Series
NOTE:
Not required when ordering.

Code	Description
Omit	Standard
S07	With Poppet Seals

Weight:

RS16E	2.7 kg (6.0 lbs.)
RS25E	5.2 kg (11.5 (lbs.)
RS32E	6.4 kg (14.1 lbs.)
RS40E	9.5 kg (20.9 lbs.)
RS50E	15.2 kg (33.5 lbs.)
RS63E	24.3 kg (53.6 lbs.)

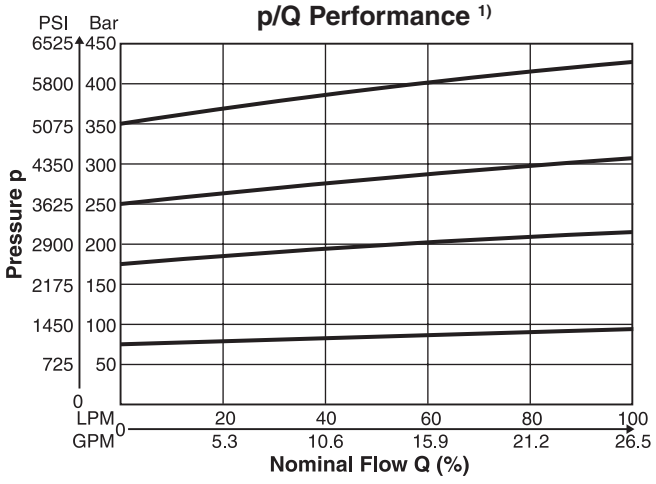
Specifications — R*E, RS*E

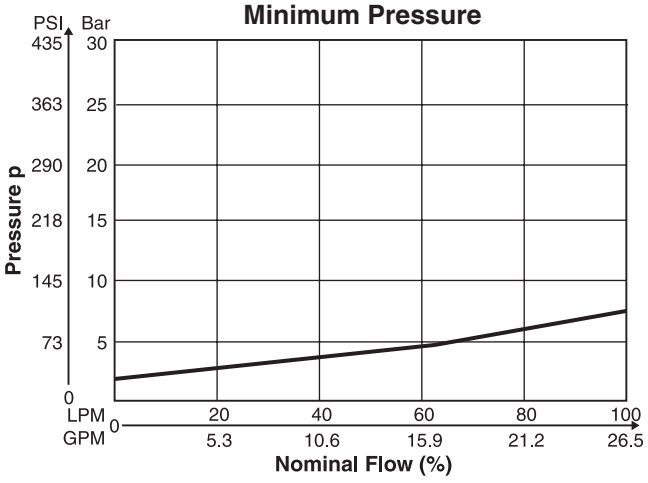
General						
Size	**NG16**	**NG25**	**NG32**	**NG40**	**NG50**	**NG63**
Interface	Slip-in mounting according to ISO 7368					
Mounting Position	As desired, horizontal mounting preferred					
Ambient Temperature	-20°C to +80°C (-4°F to +176°F)					
Hydraulic						
Maximum Operating Pressure	Ports A and 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^2s)					
Viscosity Permitted	20 to 380 cSt (mm^2s)					
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 **Power** **Current**	12 VDC 31 W 2.5 amps	24 VDC 31 W 1.25 amps	98 VDC 31 W 0.31 amps	205 VDC 31 W 0.15 amps	
Solenoid Connection	Connector as per EN 175301-803				
Wiring Minimum	3 x 1.5 mm² recommended				
Wiring Length Maximum	50m (164 ft.) recommended				

Performance Curves

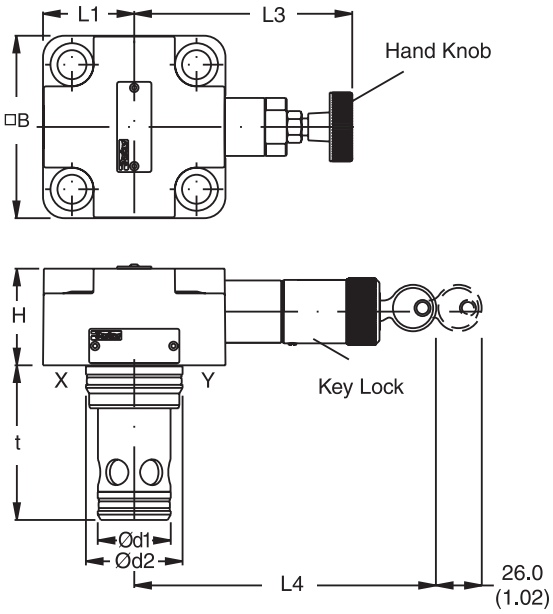




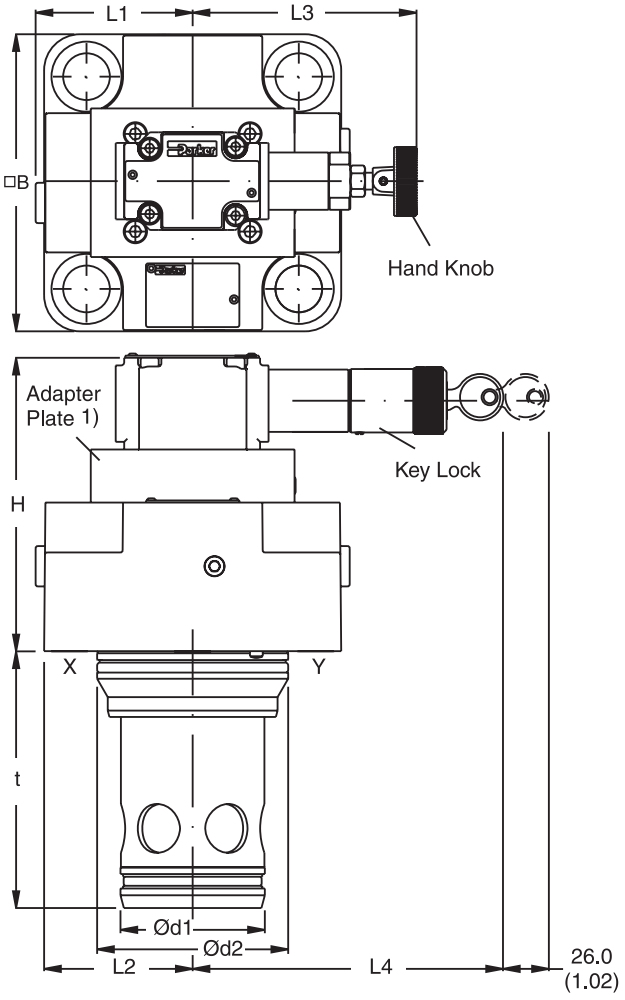
1) The performance curves are measured with external drain.
For internal drain the tank pressure has to be added to curve.

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

NG16 - NG32



NG40 - NG63 [1]



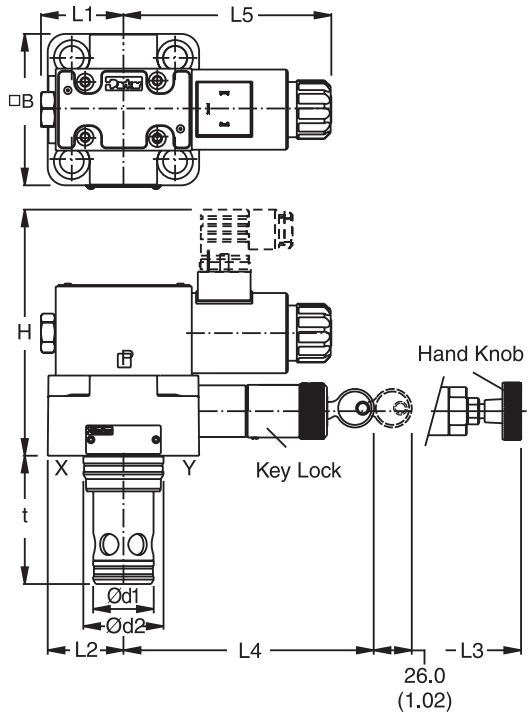
Size	H	B	L1	L2	L3	L4	d1	d2	t
NG16	40.0 (1.57)	65.0 [2] (2.56)	32.5 (1.28)	–	114.0 (4.49)	125.5 (4.94)	32.0 (1.26)	25.0 (0.98)	56.0 (2.20)
NG25	47.0 (1.85)	85.0 (3.35)	42.5 (1.67)	–	102.0 (4.02)	114.0 (4.49)	45.0 (1.77)	34.0 (1.34)	71.0 (2.80)
NG32	50.0 (1.97)	102.0 (4.02)	51.0 (2.01)	–	95.0 (3.74)	106.0 (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.)

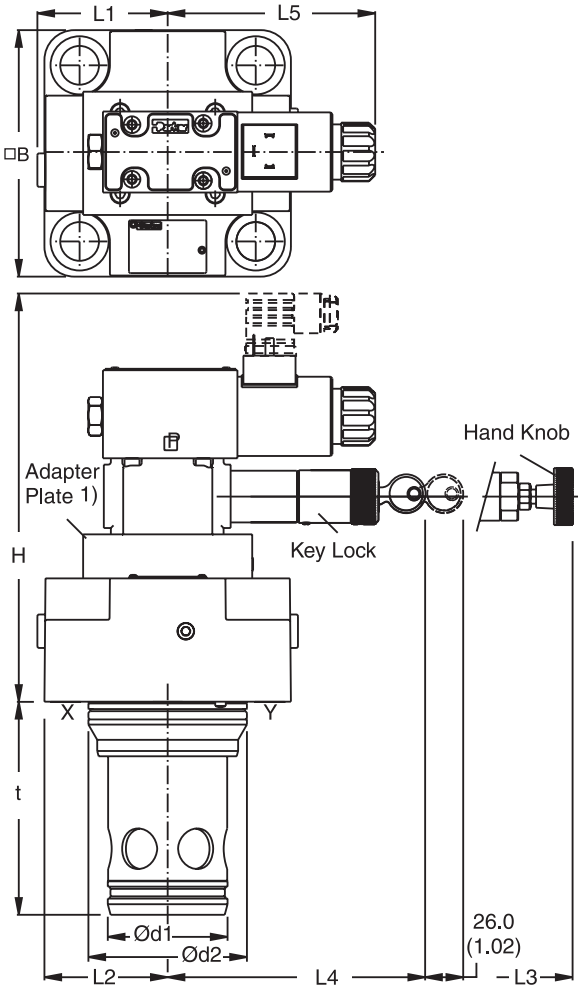
NG	Bolt Kit	DIN912 12.9		Kit	
				Nitrile	Fluorocarbon
16	BK414 (BK84)	4 x M8x40	33 Nm (24.3 lb.-ft.)	SK-R16E25	SK-R16EV25
25	BK391 (BK77)	4 x M12x50	115 Nm (84.8 lb.-ft.)	SK-R25E25	SK-R25EV25
32	BK415 (BK85)	4 x M16x55	281 Nm (207.2 lb.-ft.)	SK-R32E25	SK-R32EV25
40	BK416 (BK86)	4 x M20x70	553 Nm (407.8 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.)

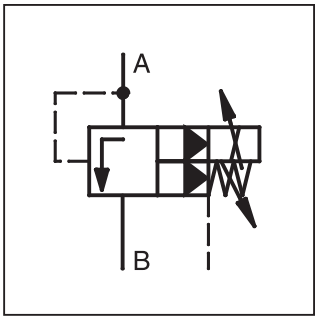
NG	Bolt Kit	DIN912 12.9		Kit	
				Nitrile	Fluorocarbon
16	BK414 (BK84)	4 x M8x40	33 Nm (24.3 lb.-ft.)	SK-RS16E25	SK-RS16EV25
25	BK391 (BK77)	4 x M12x50	115 Nm (84.8 lb.-ft.)	SK-RS25E25	SK-RS25EV25
32	BK415 (BK85)	4 x M16x55	281 Nm (207.2 lb.-ft.)	SK-RS32E25	SK-RS32EV25
40	BK416 (BK86)	4 x M20x70	553 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.

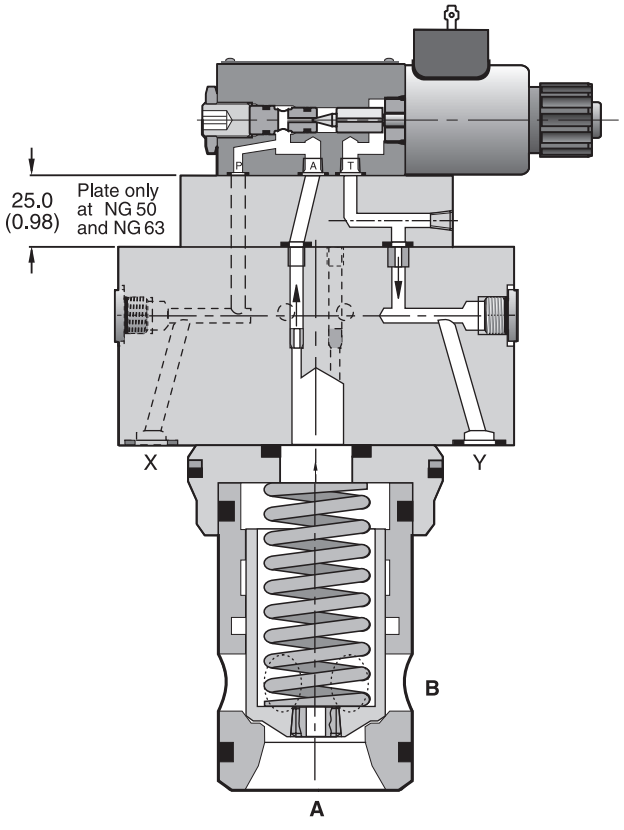
The RE*W model code embraces the pilot valves, covers and cartridges that are also offered as separate items. See combination examples for details.

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.



⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

Cat3200_02.indd, ddp, 04/19

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

RE		E		W	1	S		1		W				
Proportional Pressure Relief Valve	Nominal Size	Slip-in Mounting ISO 7368	Pressure Range	Offboard Electronics	Pilot Oil Pilot Internal Drain External	Poppet Spring	Seals	Normally Open	Solenoid	Without Plug	Options	Design Series	Spool Type

NOTE: Not required when ordering.

Code	Description
16	NG10
25	NG25
32	NG32
40*	NG40
50*	NG50
63*	NG63

* with poppet seal.

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

Code	Description
Omit	Standard
M	Mechanical Maximum Adjustment

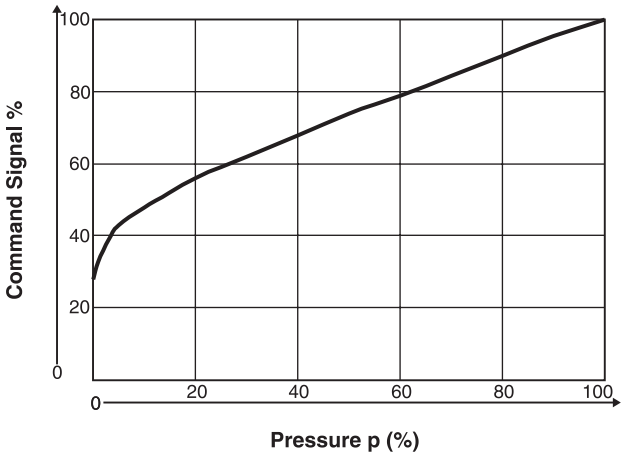
Code	Description
Omit	Standard
S07	With Poppet Seals

Weight:

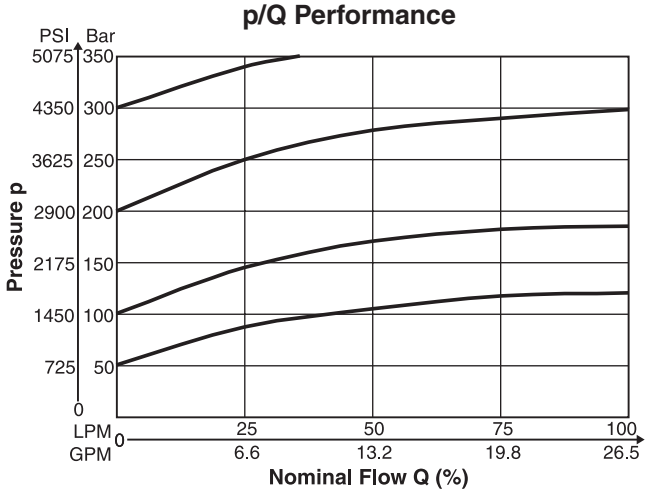
RE16E*W	2.7 kg (6.0 lbs.)
RE25E*W	5.2 kg (11.5 (lbs.)
RE32E*W	6.4 kg (14.1 lbs.)
RE40E*W	9.5 kg (20.9 lbs.)
RE50E*W	15.2 kg (33.5 lbs.)
RE63E*W	24.3 kg (53.6 lbs.)

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

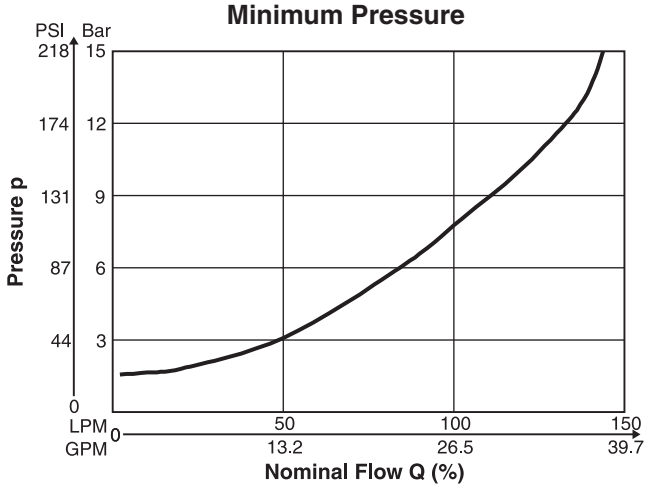
Signal / Pressure



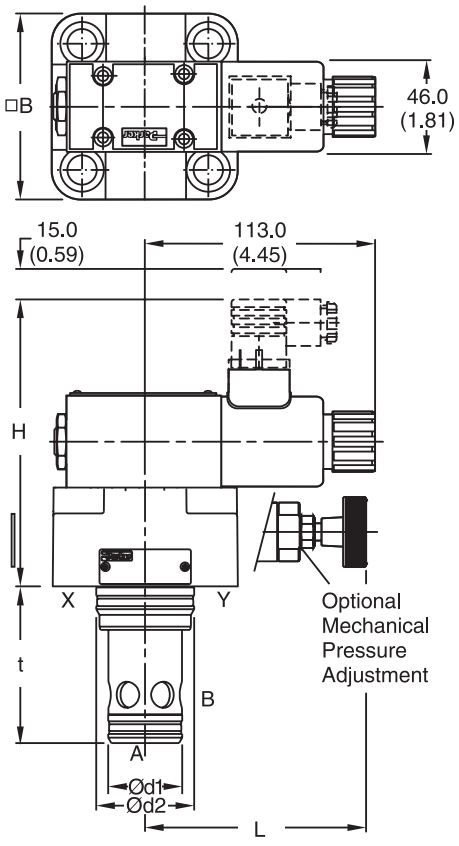
p/Q Performance



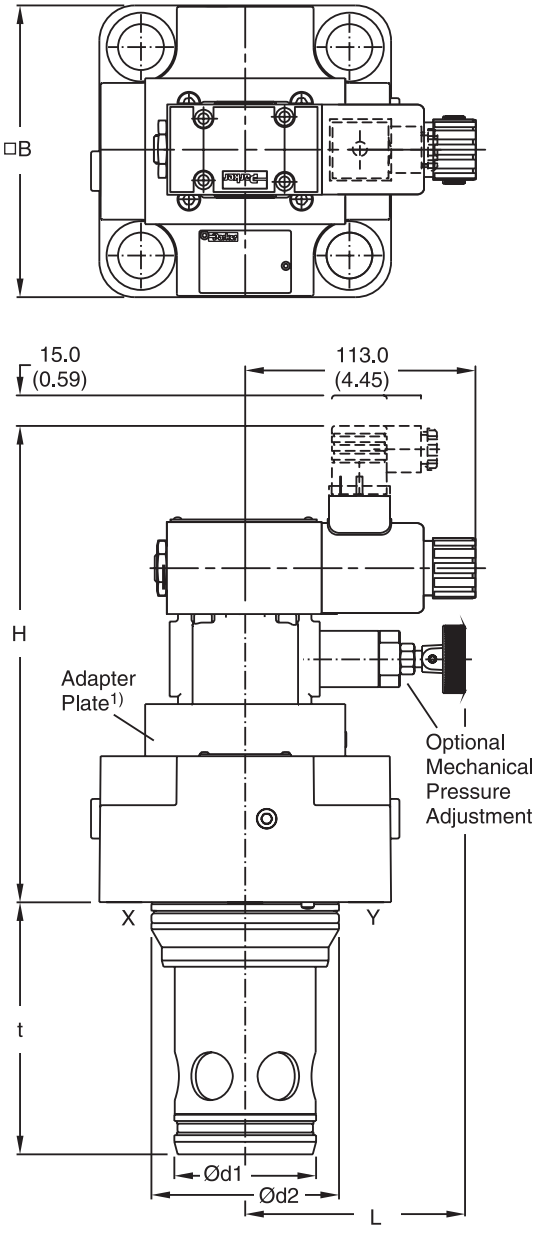
Minimum Pressure



NG16 - NG32



NG40 - NG63



1) NG40 without Adapter Plate

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

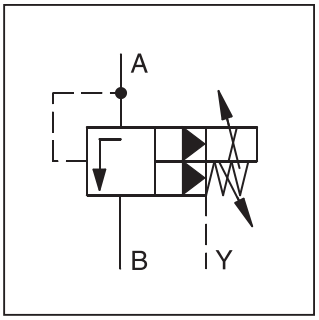
NG	Bolt Kit - 		Kit	
			Nitrile	Fluorcarbon
16	BK414 (BK84)	33 Nm (24.3 lb.-ft.)	SK-RE16E	SK-RE16EV
25	BK391 (BK77)	115 Nm (84.8 lb.-ft.)	SK-RE25E	SK-RE25EV
32	BK415 (BK85)	281 Nm (207.2 lb.-ft.)	SK-RE32E	SK-RE32EV
40	BK416 (BK86)	553 Nm (407.8 lb.-ft.)	SK-RE40E	SK-RE40EV
50	BK417 (BK87)	553 Nm (407.8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

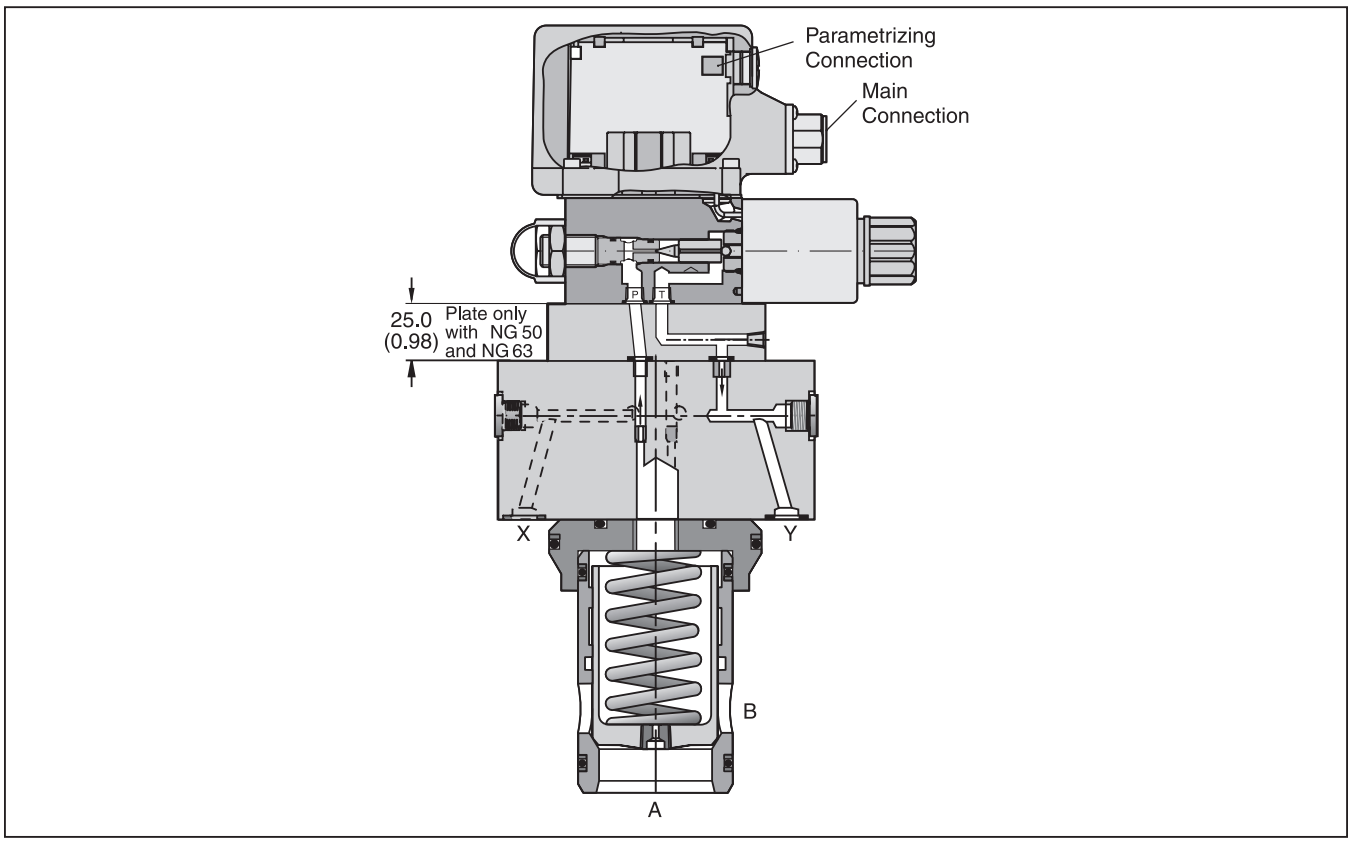
The valve comes factory set with linearized characteristics.

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.



⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

Cat3200_02.indd, ddp, 04/19

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** **Current Input**	0 to +10V maximum / 10k Ohm 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	Spool Type

NOTE: Not required when ordering.

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

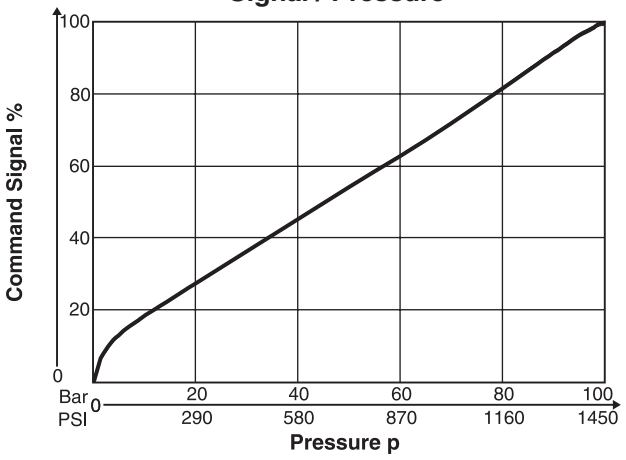
[1] Not for NG16

Weight:

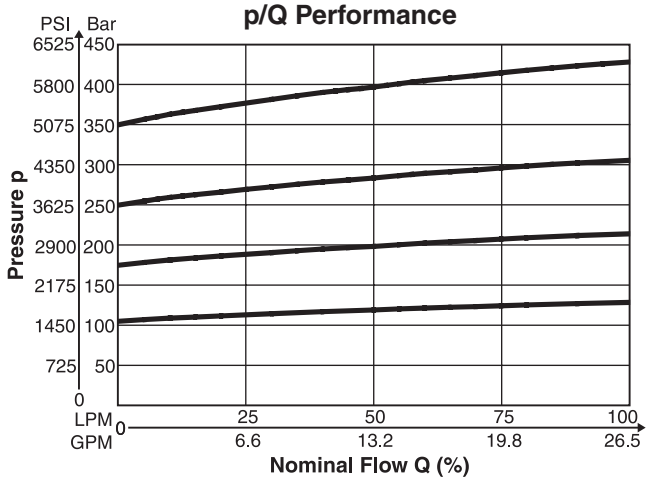
RE16E*T	2.7 kg (6.0 lbs.)	RE40E*T	9.5 kg (20.9 lbs.)
RE25E*T	5.2 kg (11.5 (lbs.)	RE50E*T	15.2 kg (33.5 lbs.)
RE32E*T	6.4 kg (14.1 lbs.)	RE63E*T	24.3 kg (53.6 lbs.)

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

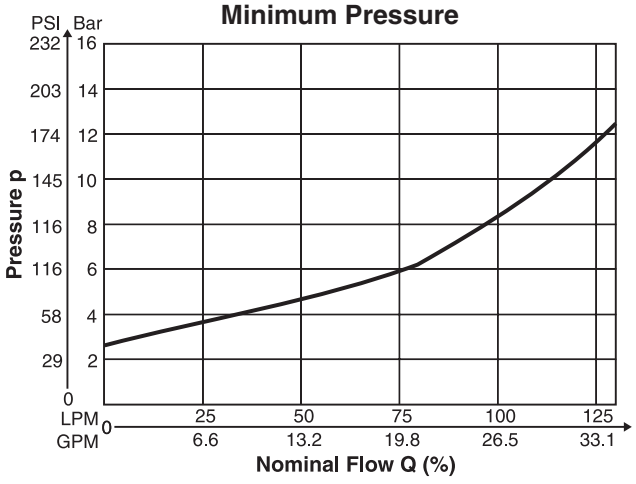
Signal / Pressure



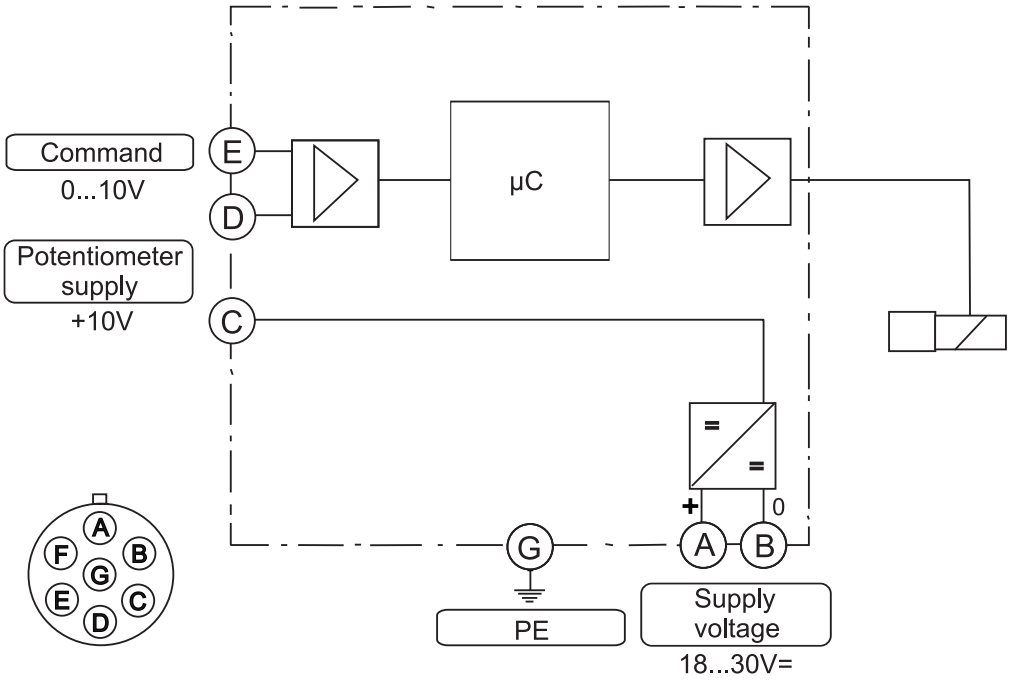
p/Q Performance



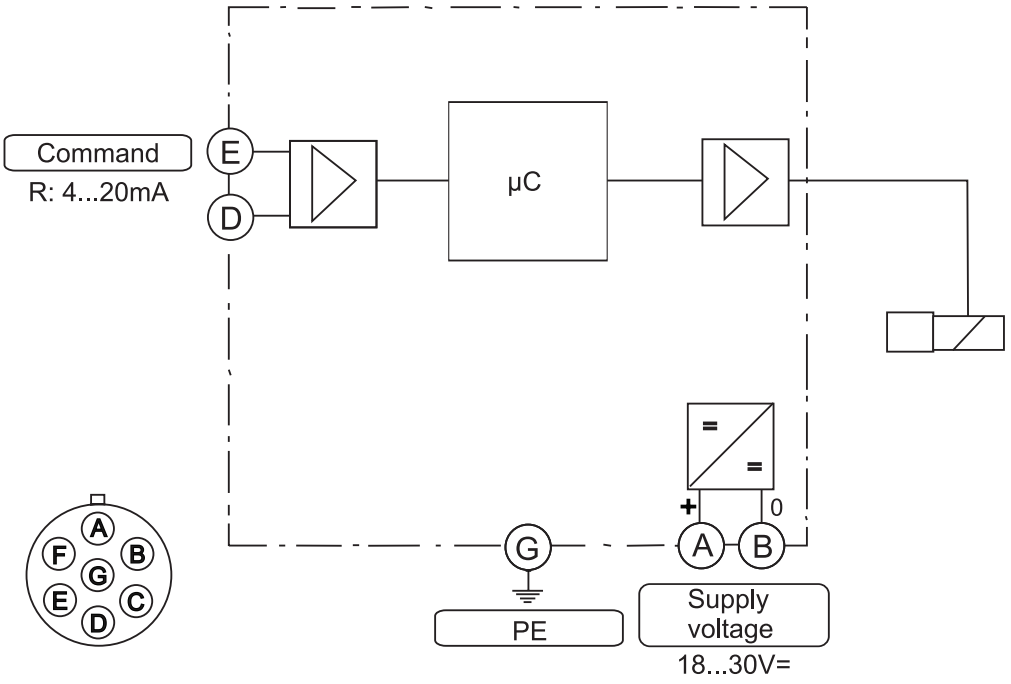
Minimum Pressure



Code F
6 + PE acc. EN 175201-804



Code R
6 + PE acc. EN 175201-804



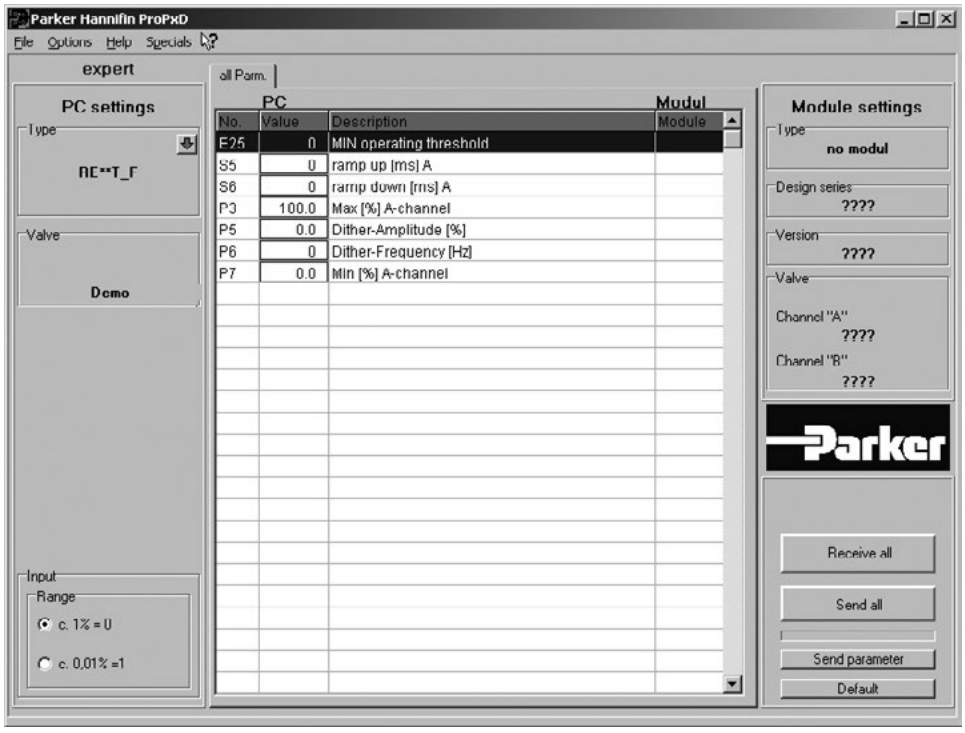
ProPxD Interface Program

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.

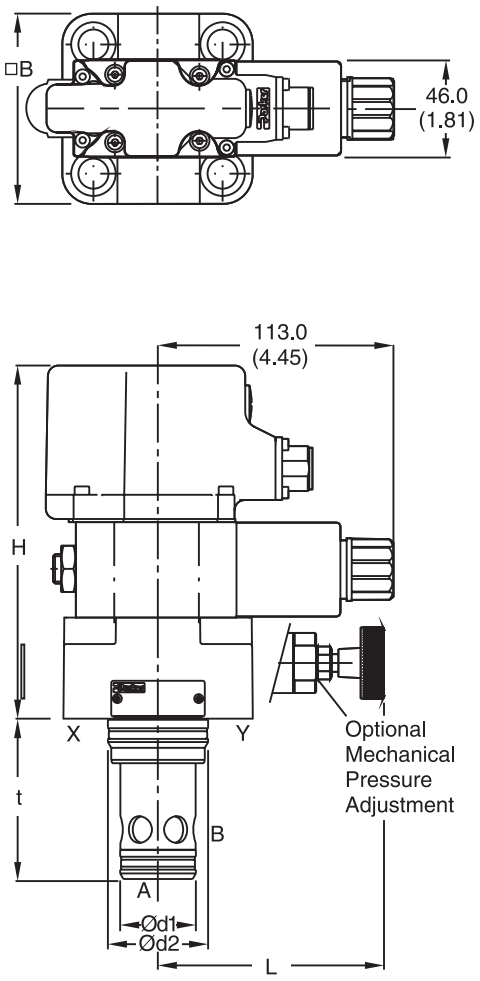
Features

- 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”

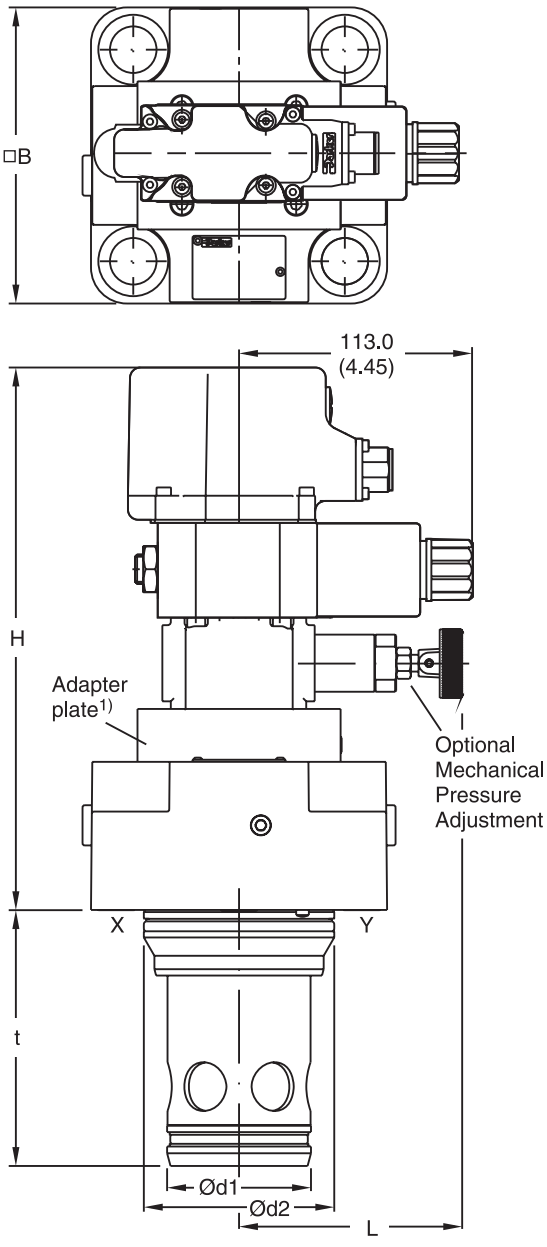


The parametrizing cable may be ordered under item no. 40982923.

NG16 - NG32



NG40 - NG63

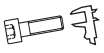


1) NG40 without Adapter Plate

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

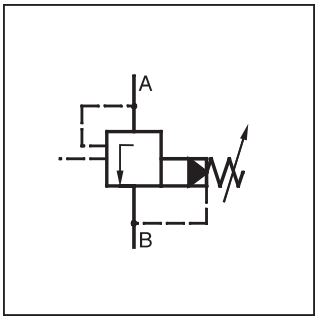
NG	Bolt Kit - 		Kit	
			Nitrile	Fluorocarbon
16	BK414 (BK84)	33 Nm (24.3 lb.-ft.)	SK-RE16E	SK-RE16EV
25	BK391 (BK77)	115 Nm (84.8 lb.-ft.)	SK-RE25E	SK-RE25EV
32	BK415 (B K85)	281 Nm (207.2 lb.-ft.)	SK-RE32E	SK-RE32EV
40	BK416 (BK86)	553 Nm (407.8 lb.-ft.)	SK-RE40E	SK-RE40EV
50	BK417 (BK87)	553 Nm (407.8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

General Description

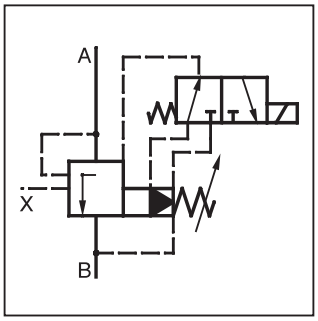
Series UR*E unloading valves consist of a mechanical pilot stage and a slip-in cartridge main stage. These valves are used to unload a circuit at low pressure. The mechanically adjustable pressure signal to unload the main stage has to be applied to port X. The pressure differential between opening and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

US25E



UR*E



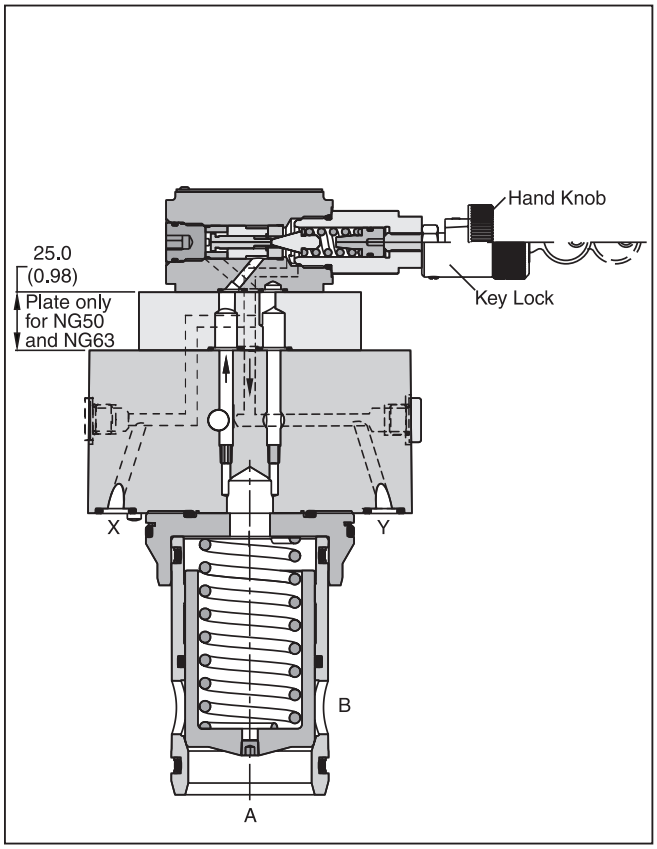
US*E

Features

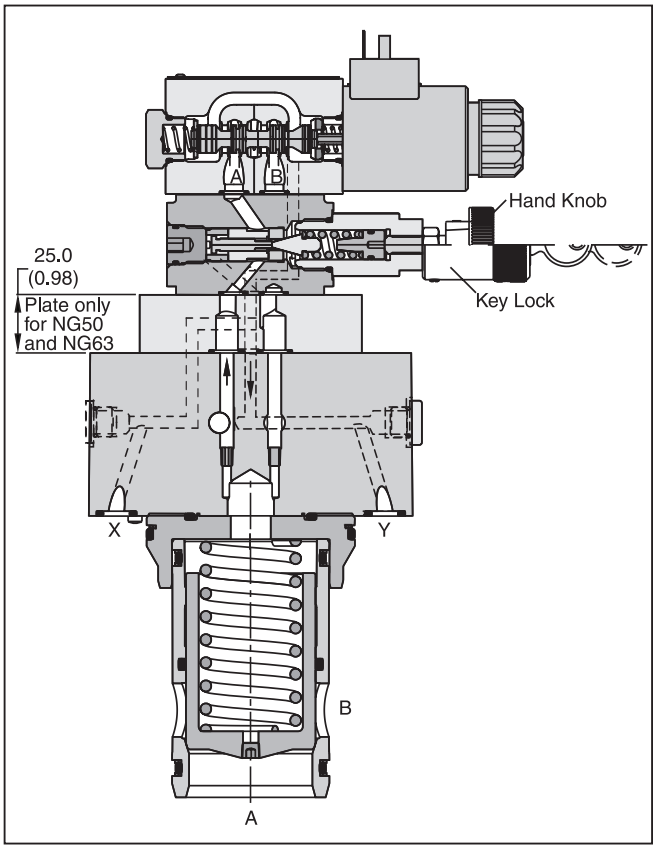
- Pilot operated unloading valve.
- Cavity and mounting pattern according to ISO 7368.
- 4 pressure ranges.
- 2 adjustment modes:
  - – Hand knob
  - – Key lock
- 6 sizes, NG16 to NG63.

Note: Port X only usable for remote vent function.

UR*E



US*E



Cat3200_02.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

UR*E

UR	□	E	□	□	1	S	□	□
Unloading Valve	Nominal Size	Slip-in Mounting ISO 7368	Pressure Range	Adjustment	Pilot Oil Pilot Internal Drain External	Poppet Spring	Seals	Design Series

NOTE: Not required when ordering.

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

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

Code	Description
L	Key Lock
S	Hand Knob (Standard)

Code	Description
N	Nitrile
V	Fluorocarbon

Weight:

UR16E	2.2 kg (4.9 lbs.)
UR25E	3.5 kg (7.7 (lbs.)
UR32E	4.9 kg (10.8 lbs.)
UR40E	8.0 kg (17.6 lbs.)
UR50E	13.7 kg (30.2 lbs.)
UR63E	22.8 kg (50.3 lbs.)

US*E

US	□	E	□	□	1	S	□	□	□	□	W	□	□
Unloading Valve with Electric Unloading	Nominal Size	Slip-in Mounting ISO 7368	Pressure Range	Adjustment	Pilot Oil Pilot Internal Drain External	Poppet Spring	Seals	Switching Type	Solenoid	Without Plug	Options	Design Series

NOTE: Not required when ordering.

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

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

Code	Description
L	Key Lock
S	Hand Knob (Standard)

Code	Description
Omit	Standard
S	With Slow Unloading

Code	Description
K	12V
J	24V
U	98V [1]
G	205V [1]

[1] To be used in combination with rectifier plugs at 120VAC / 230VAC power supply.

Code	Description
1	Solenoid not activated, unpressurized circulation
9	Solenoid activated, unpressurized circulation

Code	Description
N	Nitrile
V	Fluorocarbon

Weight:

US16E	2.7 kg (6.0 lbs.)
US25E	5.2 kg (11.5 (lbs.)
US32E	6.4 kg (14.1 lbs.)
US40E	9.5 kg (20.9 lbs.)
US50E	15.2 kg (33.5 lbs.)
US63E	24.3 kg (53.6 lbs.)

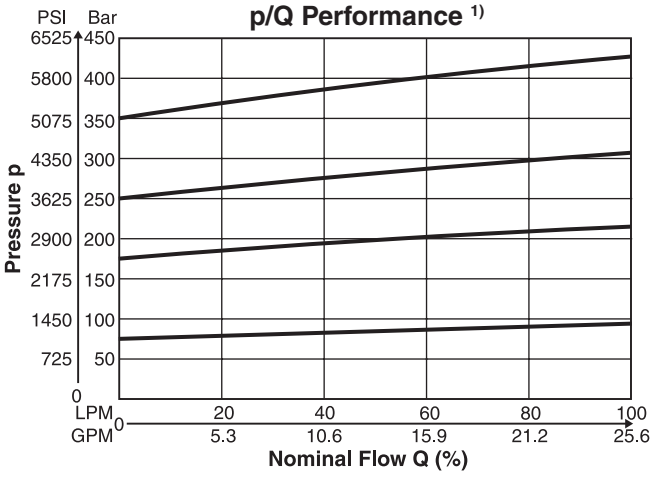
Specifications — UR*E / US*E

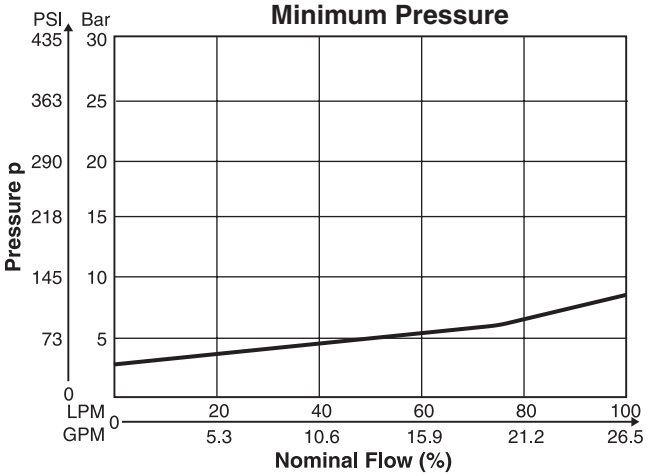
General						
Size	**NG16**	**NG25**	**NG32**	**NG40**	**NG50**	**NG63**
Interface	Slip-in mounting according to ISO 7368					
Mounting Position	As desired, horizontal mounting preferred					
Ambient Temperature	-20°C to +80°C (-4°F to +176°F)					
Hydraulic						
Maximum Operating Pressure	Ports A and 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 **Power** **Current**	12V 31W 2.5A	24V 31W 1.25A	98V 31W 0.31A	205V 31W 0.15A	
Solenoid Connection	Connector as per EN 175301-803				
Wiring	3 x 1.5 mm² minimum, recommended				
Wiring Length	50m (164 ft.) maximum, recommended				

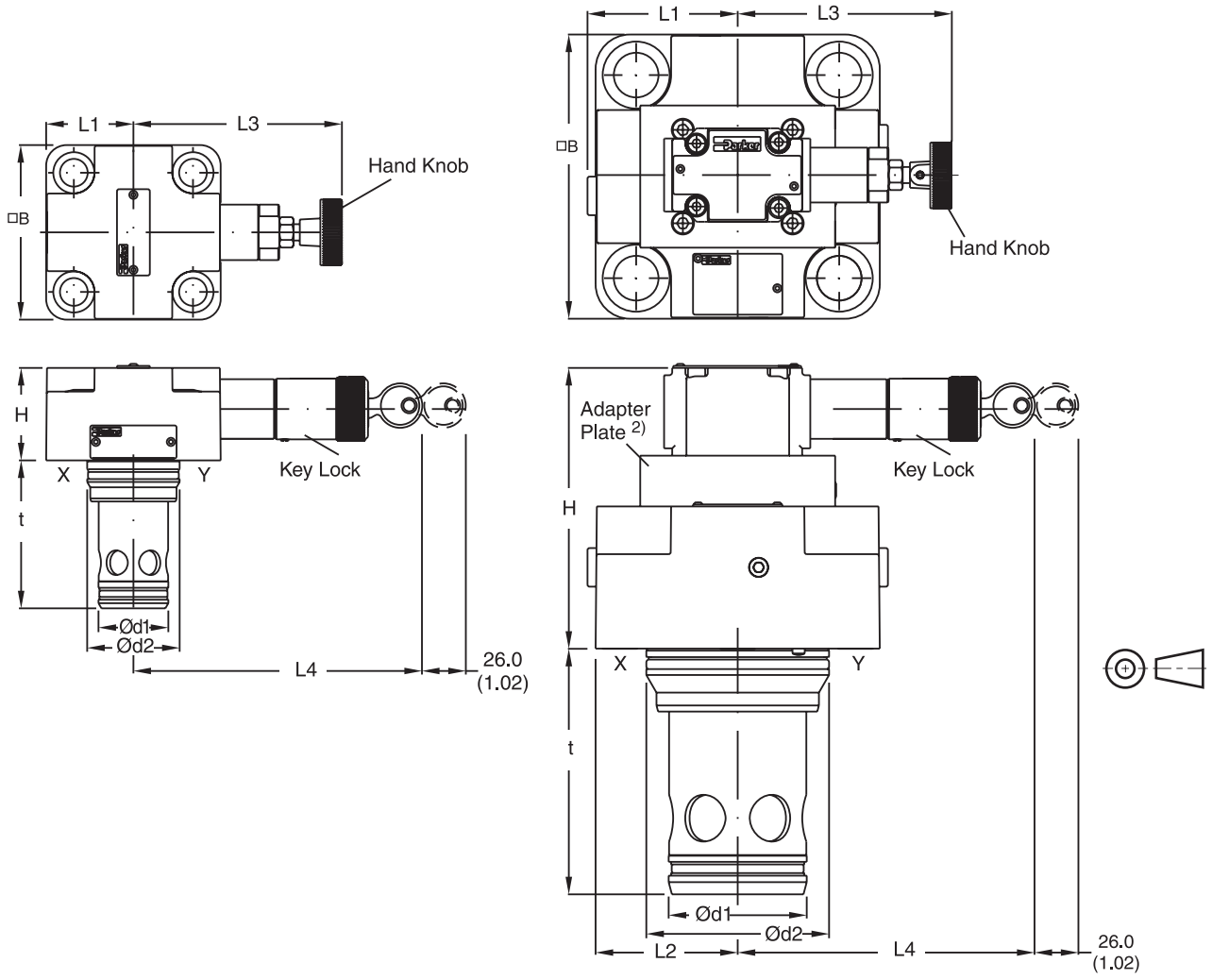
Performance Curves





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 (**)

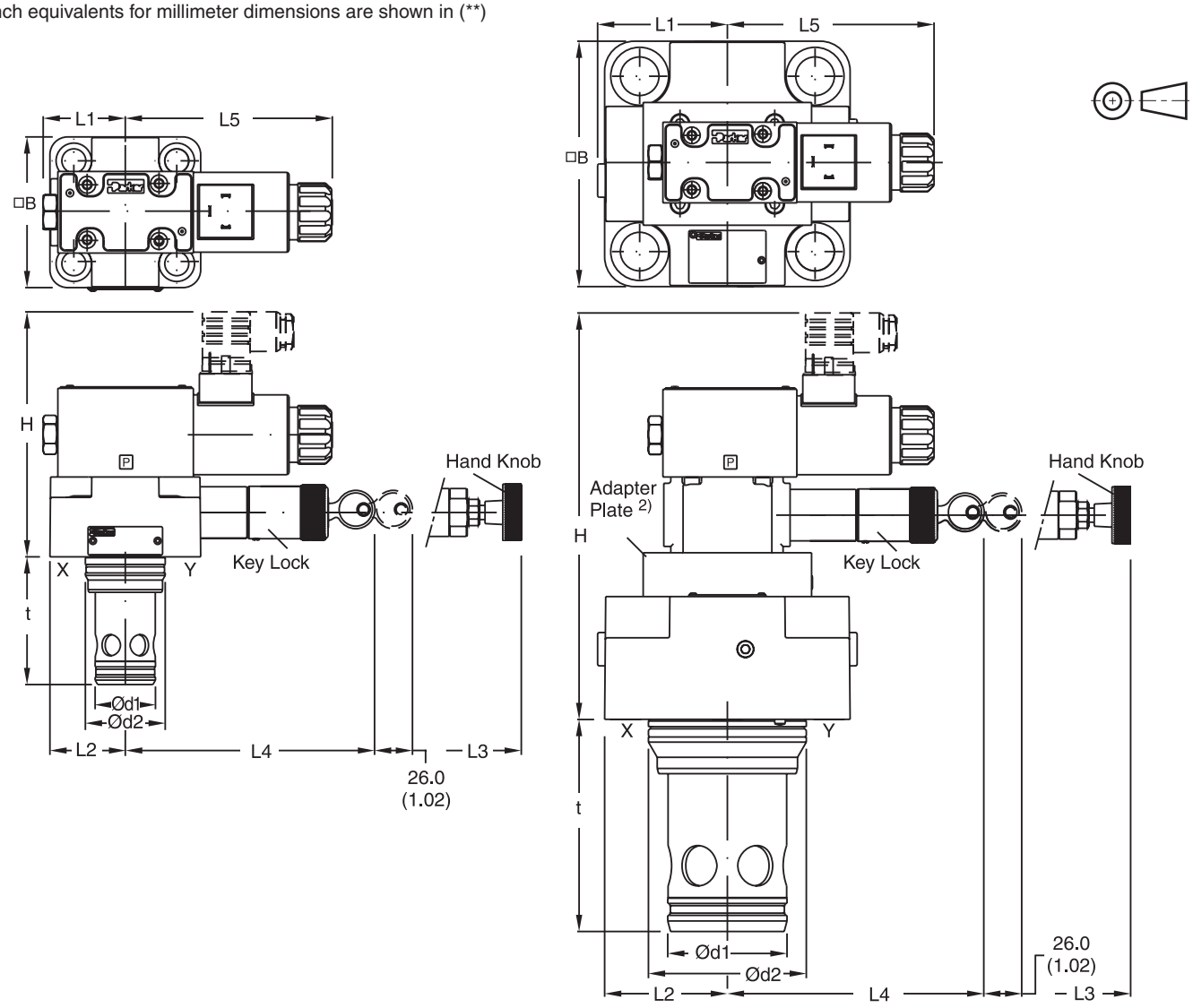


Size	H	B	L1	L2	L3	L4	d1	d2	t
NG16	40.0 (1.57)	65.0 1) (2.56)	36.5 (1.44)	32.5 (1.28)	114.0 (4.49)	125.5 (4.94)	32.0 (1.26)	25.0 (0.98)	56.0 (2.20)
NG25	47.0 (1.85)	85.0 (33.5)	46.5 (1.83)	42.5 (1.67)	102.0 (4.02)	114.0 (4.49)	45.0 (1.77)	34.0 (1.34)	71.0 (2.80)
NG32	50.0 (1.97)	102.0 (4.02)	55.0 (2.17)	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 (**)

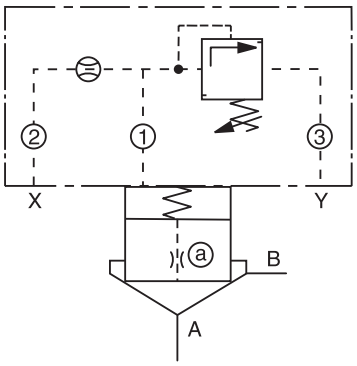


Size	H	B	L1	L2	L3	L4	d1	d2	t
NG16	40.0 (1.57)	65.0 1) (2.56)	36.5 (1.44)	32.5 (1.28)	114.0 (4.49)	125.5 (4.94)	32.0 (1.26)	25.0 (0.98)	56.0 (2.20)
NG25	47.0 (1.85)	85.0 (33.5)	46.5 (1.83)	42.5 (1.67)	102.0 (4.02)	114.0 (4.49)	45.0 (1.77)	34.0 (1.34)	71.0 (2.80)
NG32	50.0 (1.97)	102.0 (4.02)	55.0 (2.17)	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)

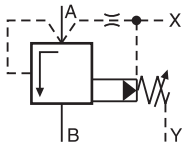
1) Width 79mm (3.11 in.) 2) NG40 without adapter plate

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



NG16 - NG32

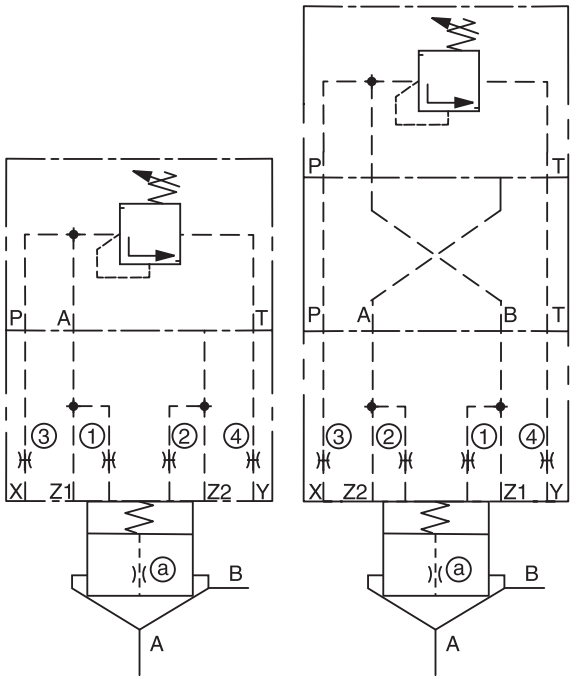


	Type		
Description	**NG16**	**NG25**	**NG32**
Cover incl. Pressure Valve [1]	C016Fxxxxxxxxxx	C025Fxxxxxxxxxx	C032Fxxxxxxxxxx
Cover Orifice ①	M5xØ1.0	M5xØ1.1	M6xØ1.2
Cover Orifice ②	M4xØ0.8	M5xØ0.9	M6xØ1.0
Cover Orifice ③	M5xØ99		M6xØ99
Cartridge [2]	CP016C07S00X	CP025C07S00X	CP032C07S00X
Poppet Orifice ⓐ	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

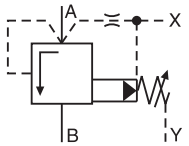
[1] Complete type see Ordering Information C*F
[2] Complete type see Ordering Information CP*

Pressure Relief Valve with Separate Pilot



NG16 - NG40 NG50 - NG63

Flow A → B

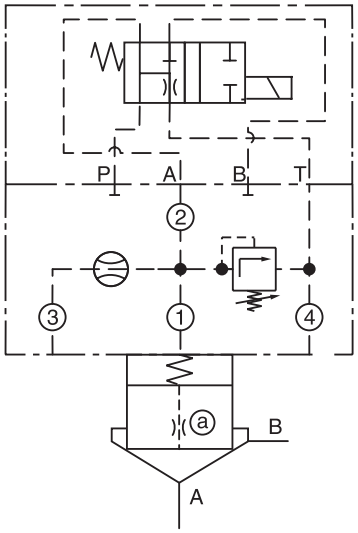


	Type					
Description	**NG16**	**NG25**	**NG32**	**NG40**	**NG50**	**NG63**
Pressure Valve [1]	R06Mxxx4x					
Adapter Plate [2]	without				PADA1007/A-B/B-A	
Cover [3]	C016CA*	C025CA*	C032CA*	C040CA*	C050CA*	C063CA*
Cover Orifice ①	M5xØ1.1	M5xØ1.3	M5xØ1.4	M5xØ1.5	M6xØ1.6	M6xØ1.7
Cover Orifice ②	M5xØ00				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 ⓐ	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

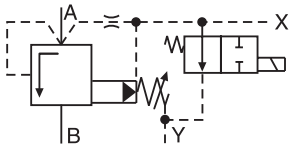
[1] Complete type see Pilot Valves
[2] Includes O-rings and mounting bolts
[3] Complete type see Ordering Information C*C
[4] Complete type see Ordering Information CP*

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



NG16 - NG32

Flow A → B

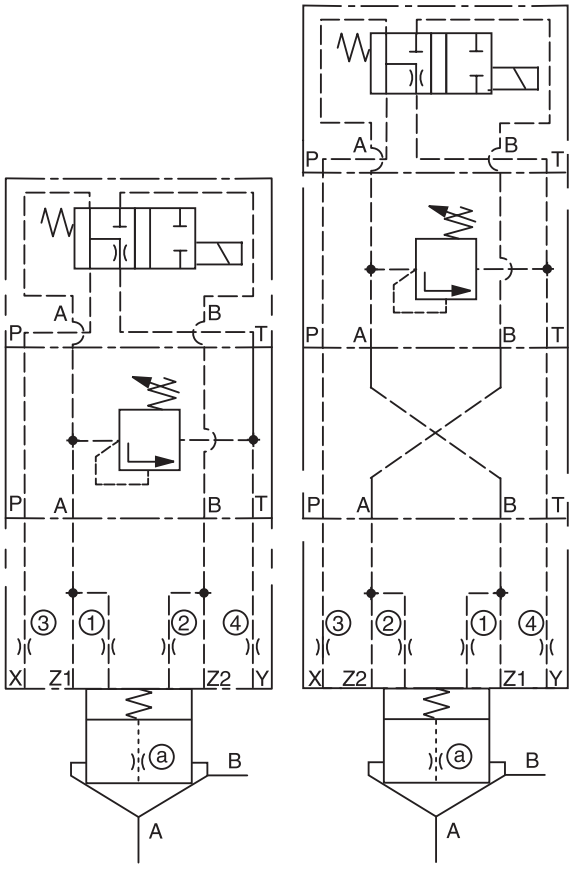


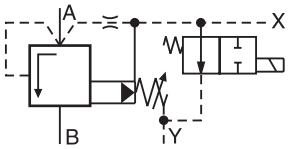
	Type		
Description	**NG16**	**NG25**	**NG32**
4/2 DC Valve [1]	D1VW104K*		
Cover incl. Pressure Valve [2]	C016Gxxxxxxxxxx	C025Gxxxxxxxxxx	C032Gxxxxxxxxxx
Cover Orifice ①	M5xØ1.0	M5xØ1.1	M5xØ1.2
Cover Orifice ②	M5xØ99		M6xØ99
Cover Orifice ③	M4xØ00	M5xØ00	M6xØ00
Cover Orifice ④	M5xØ1.2	M5xØ1.3	M6xØ1.4
Cartridge [3]	CP016C07*	CP025C07*	CP032C07*
Poppet Orifice ⓐ	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



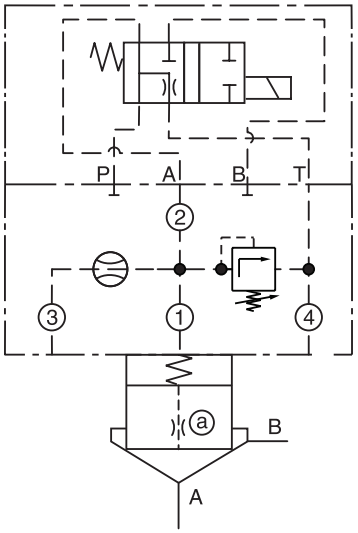


	Type					
Description	**NG16**	**NG25**	**NG32**	**NG40**	**NG50**	**NG63**
4/2 DC Valve [1]	D1VW104K*					
Pressure Valve [2]	V-ZUDB1ATxZ07x					
Adapter Plate [3] NG6 – NG10	without				PADA1007/A-B/B-A	
Cover [4]	C016CA*	C025CA*	C032CA*	C040CA*	C050CA*	C063CA*
Cover Orifice ①	M5xØ1.1	M5xØ1.3	M5xØ1.4	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 ⓐ	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

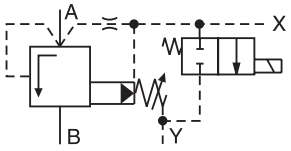
[1] Complete type see Catalog HY14-2500/US, Series D1VW.
[2] Complete types see Pilot Valves
[3] Includes O-rings and mounting bolts
[4] Complete type see Ordering Information C*C
[5] Complete type see Ordering Information CP*

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



Ng16 - NG32

Flow A → B

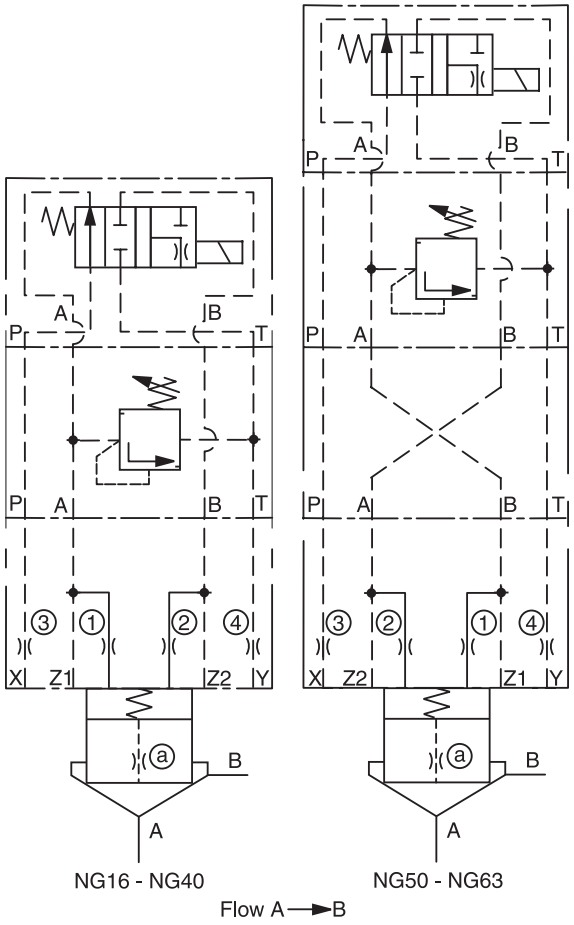


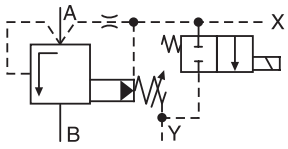
	Type		
Description	**NG16**	**NG25**	**NG32**
4/2 DC Valve [1]	D1VW105K*		
Cover incl. Pressure Valve [2]	C016Gxxxxxxxxxxx	C025Gxxxxxxxxxxx	C032Gxxxxxxxxxxx
Cover Orifice ①	M5xØ1.0	M5xØ1.1	M6xØ1.4
Cover Orifice ②	M5xØ99		M6xØ99
Cover Orifice ③	M4xØ00	M5xØ00	M6xØ00
Cover Orifice ④	M5xØ1.2	M5xØ1.3	M6xØ1.4
Cartridge [3]	CP016C07*	CP025C07*	CP032C07*
Poppet Orifice ⓐ	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



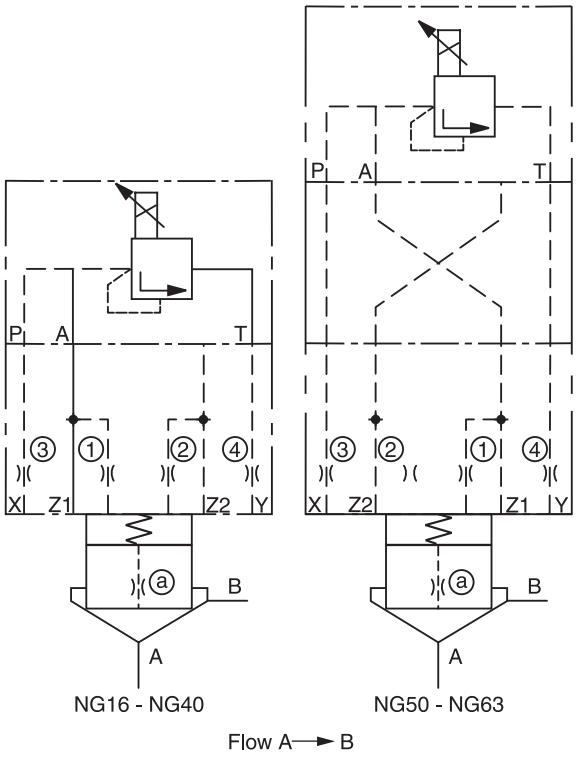


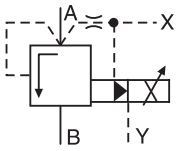
	Type					
Description	**NG16**	**NG25**	**NG32**	**NG40**	**NG50**	**NG63**
4/2 DC Valve [1]	D1VW105K*					
Pressure Valve [2]	V-ZUDB1ATxZ07x					
Adapter Plate [3]	without				PADA1007/A-B/B-A	
Cover [4]	C016CA*	C025CA*	C032CA*	C040CA*	C050CA*	C063CA*
Cover Orifice ①	M5xØ1.1	M5xØ1.3	M5xØ1.4	M5xØ1.5	M6xØ1.6	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 ⓐ	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



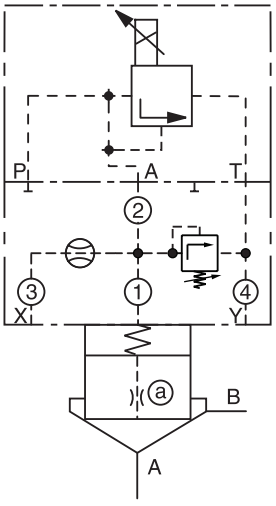


	Type					
Description	**NG16**	**NG25**	**NG32**	**NG40**	**NG50**	**NG63**
Pressure Valve [1]	RE06MxW2V1KW					
Adapter Plate [2]	without				PADA1007/A-B/B-A	
Cover [3]	C016CA*	C025CA*	C032CA*	C040CA*	C050CA*	C063CA*
Cover Orifice ①	M5xØ1.1	M5xØ1.3	M5xØ1.4		M6xØ1.5	
Cover Orifice ②	M5xØ00				M6xØ00	
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 ⓐ	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					

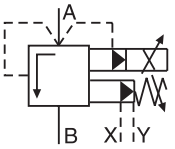
Shown orifice Ø and springs are recommendations.
xxØ00 = plug
xxØ99 = open

[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

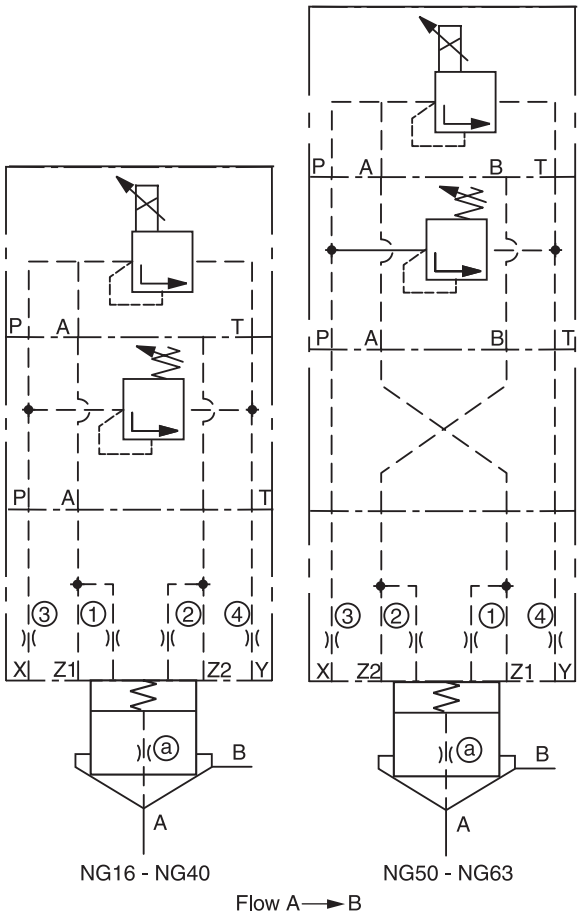


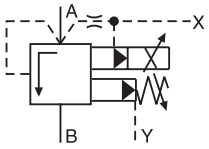
	Type		
Description	**NG16**	**NG25**	**NG32**
Prop. DC Valve [1]	RE06MxW2V1xW		
Cover incl. Pressure Valve [2]	C016Gxxxxxxxxxxx	C025Gxxxxxxxxxxx	C032Gxxxxxxxxxxx
Cover Orifice ①	M5xØ1.0	M5xØ1.1	M6xØ1.4
Cover Orifice ②	M5xØ99		M6xØ99
Cover Orifice ③	M4xØ00	M5xØ00	M6xØ00
Cover Orifice ④	M5xØ1.2	M5xØ1.3	M6xØ1.7
Cartridge [3]	CP016C07*	CP025C07*	CP032C07*
Poppet Orifice ⓐ	1/16NPT 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



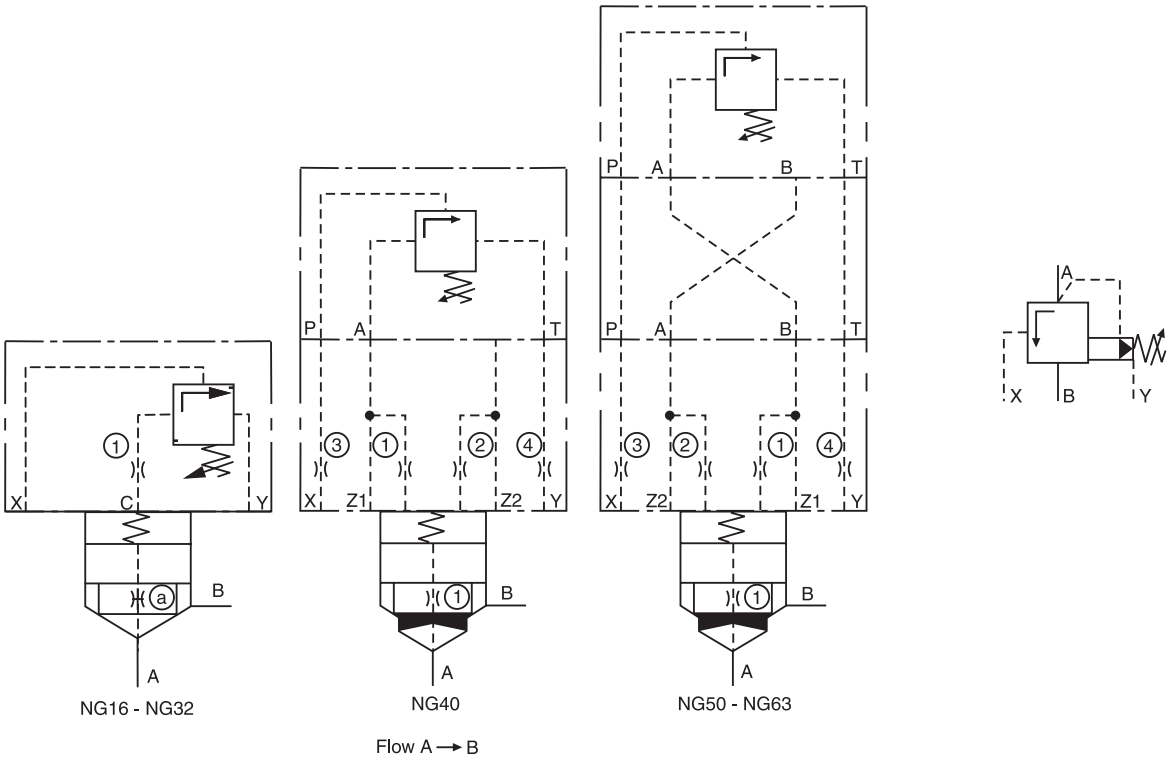


	Type					
Description	**NG16**	**NG25**	**NG32**	**NG40**	**NG50**	**NG63**
Pressure Valve [1]	RE06MxW2V1KW					
Max. Pressure Valve [2]	V-ZUDB1PTxZ07x					
Adapter Plate [3] NG6 – NG10	without				PADA1007/A-B/B-A	
Cover [4]	C016CA*	C025CA*	C032CA*	C040CA*	C050CA*	C063CA*
Cover Orifice ①	M5xØ1.1	M5xØ1.3		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 ⓐ	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*C
[5] Complete type see Ordering Information CP*

Unloading Valve

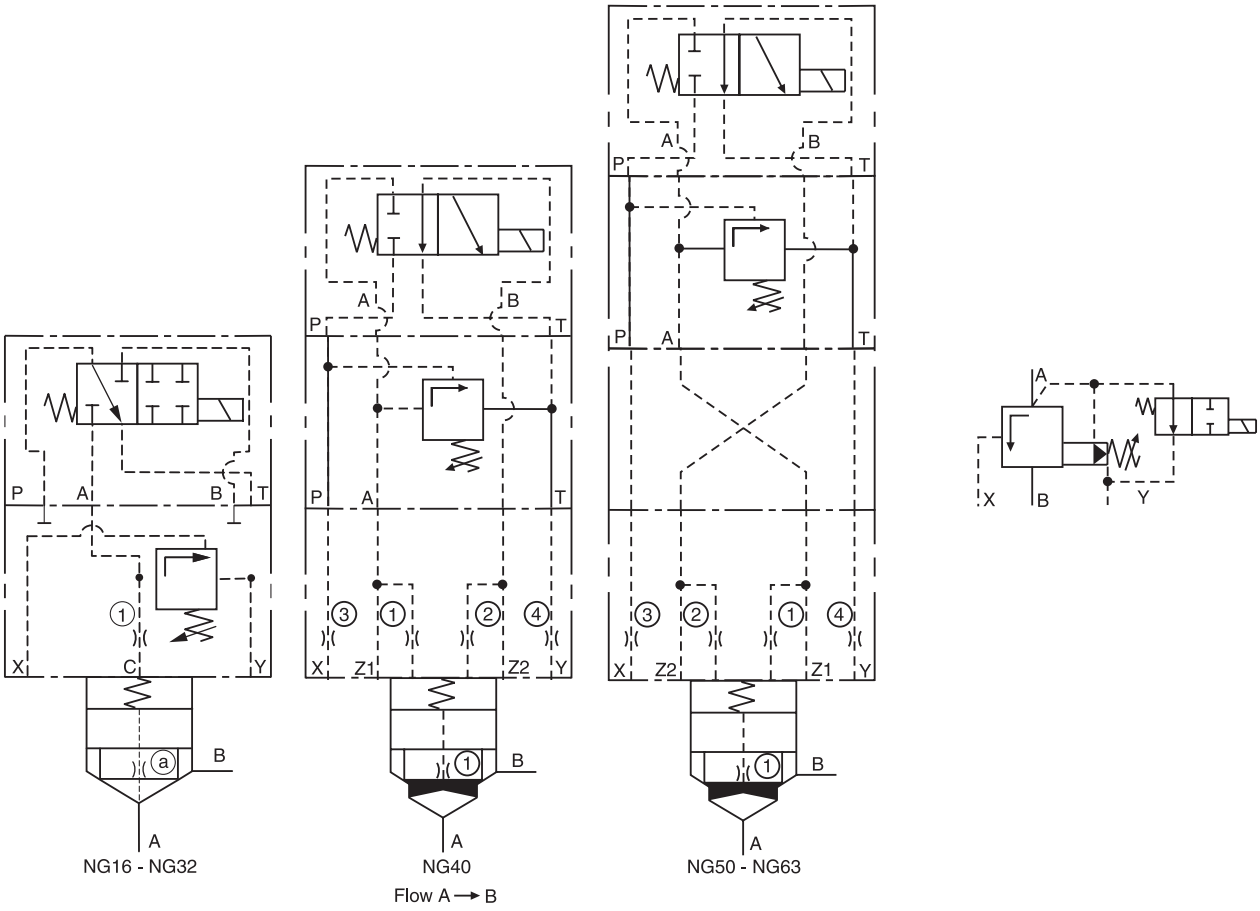


	Type					
Description	**NG16**	**NG25**	**NG32**	**NG40**	**NG50**	**NG63**
Unloading Valve [1]	–	–	–	UR06Mxxx4x		
Adapter Plate [2]	without				PADA1007/A-B/B-A	
Cover [3]	On Request	On Request	On Request	C040CA*	C050CA*	C063CA*
Cover Orifice ①	M5xØ1.4	M5xØ1.5	M5xØ1.6	M5xØ1.7	M6xØ1.8	M6xØ1.9
Cover Orifice 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

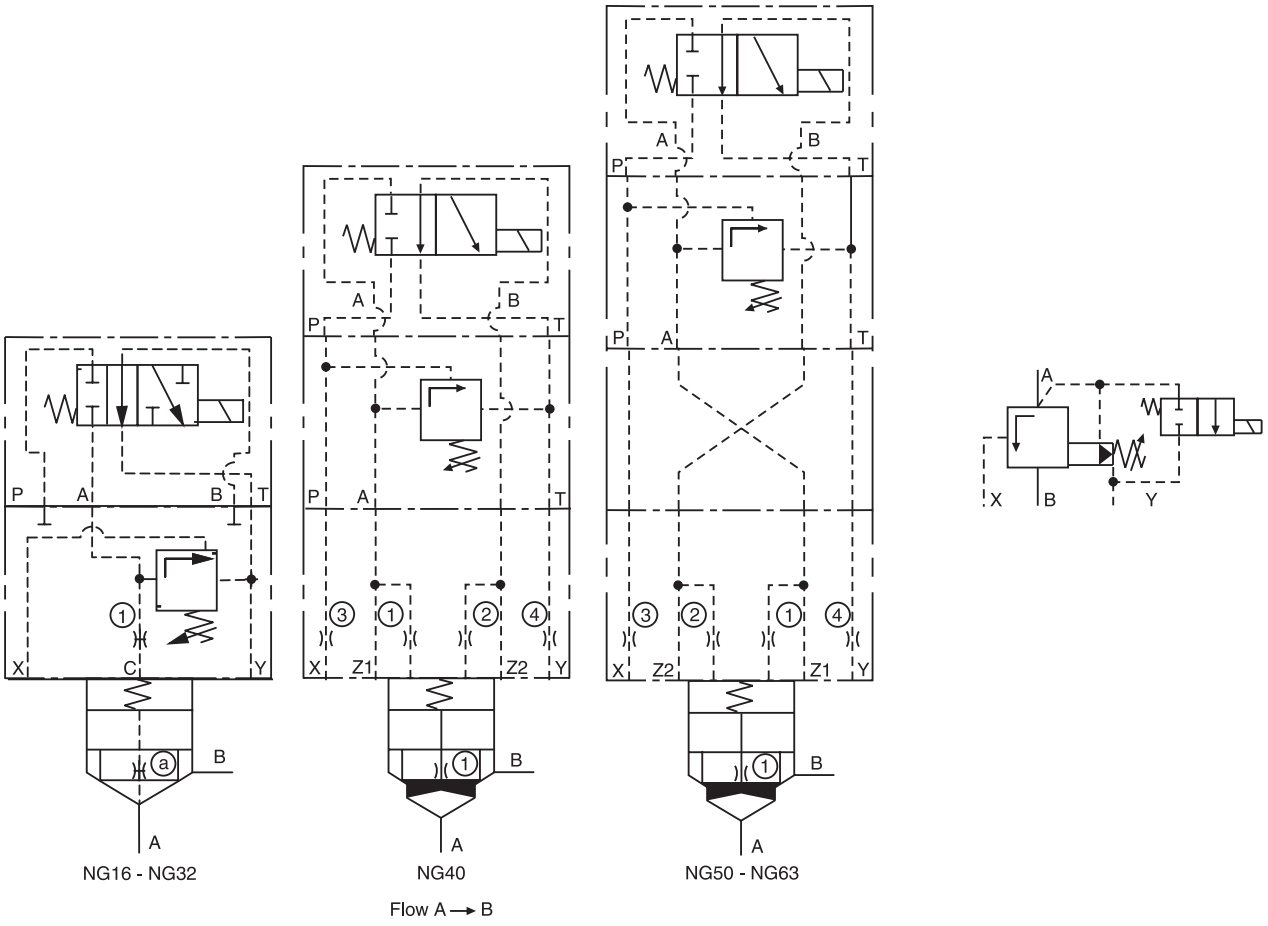


	Type					
Description	**NG16**	**NG25**	**NG32**	**NG40**	**NG50**	**NG63**
4/2 DC Valve [1]	D1VW076K*					
Pressure Valve [2]	US06Mxxx4x					
Adapter Plate [3]	without				PADA1007/A-B/B-A	
Cover [4]	On Request	On Request	On Request	C040CA*	C050CA*	C063CA*
Cover Orifice ①	M5xØ1.4	M5xØ1.5	M5xØ1.6	M5xØ1.7	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

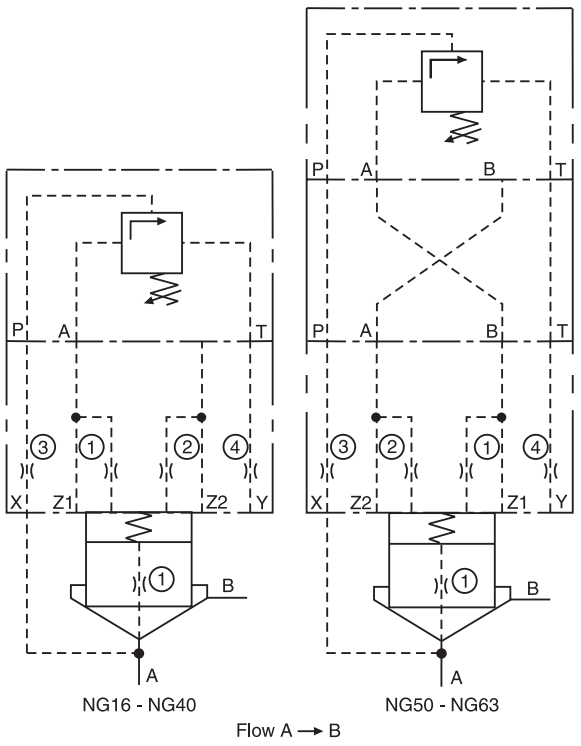


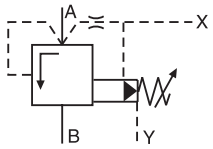
	Type					
Description	**NG16**	**NG25**	**NG32**	**NG40**	**NG50**	**NG63**
4/2 DC Valve [1]	D1VW078K*					
Pressure Valve [2]	US06Mxxx4x					
Adapter Plate [3]	without				PADA1007/A-B/B-A	
Cover [4]	On Request	On Request*	On Request*	C040CA*	C050CA*	C063CA*
Cover Orifice ①	M5xØ1.4	M5xØ1.5	M5xØ1.6	M5xØ1.7	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



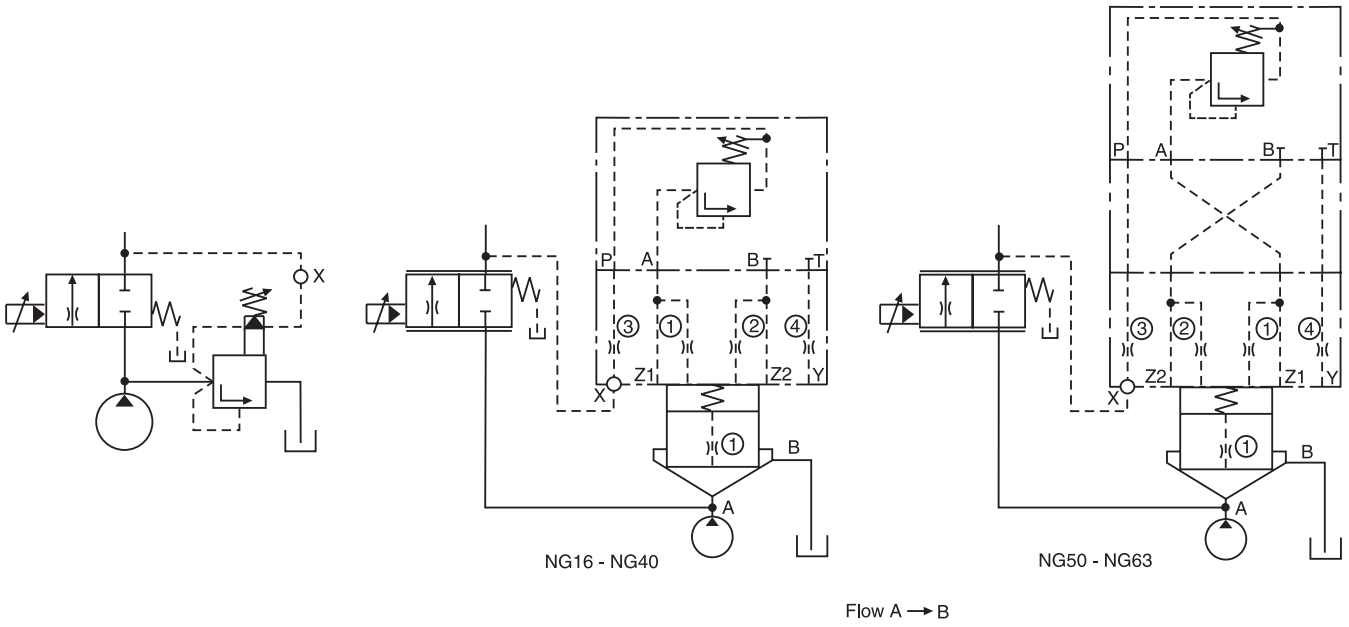


	Type					
Description	**NG16**	**NG25**	**NG32**	**NG40**	**NG50**	**NG63**
Press. Sequence Valve [1]	S06Mxxx4x					
Adapter Plate [2]	without				PADA1007/A-B/B-A	
Cover [3]	C016CA*	C025CA*	C032CA*	C040CA*	C050CA*	C063CA*
Cover Orifice ①	M5xØ1.1	M5xØ1.3	M5xØ1.4	M5xØ1.5	M6xØ1.6	M6xØ1.7
Cover Orifice ②	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)

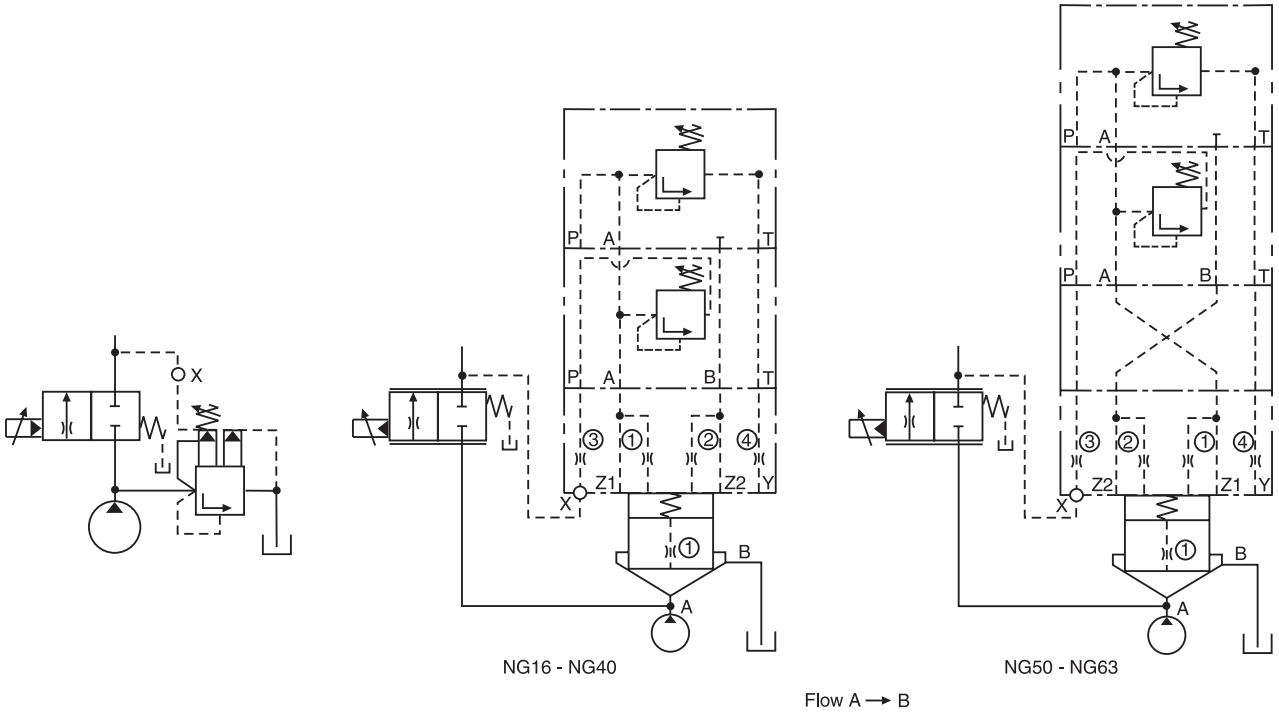


	Type					
Description	**NG16**	**NG25**	**NG32**	**NG40**	**NG50**	**NG63**
Preload Valve [1]	DSBA100xP07x					
Adapter Plate [2]	without				PADA1007/A-B/B-A	
Cover [3]	C016CA*	C025CA*	C032CA*	C040CA*	C050CA*	C063CA*
Cover Orifice ①	M5xØ1.1	M5xØ1.3	M5xØ1.4	M5xØ1.5	M6xØ1.6	M6xØ1.7
Cover Orifice ②	M5xØ00				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)

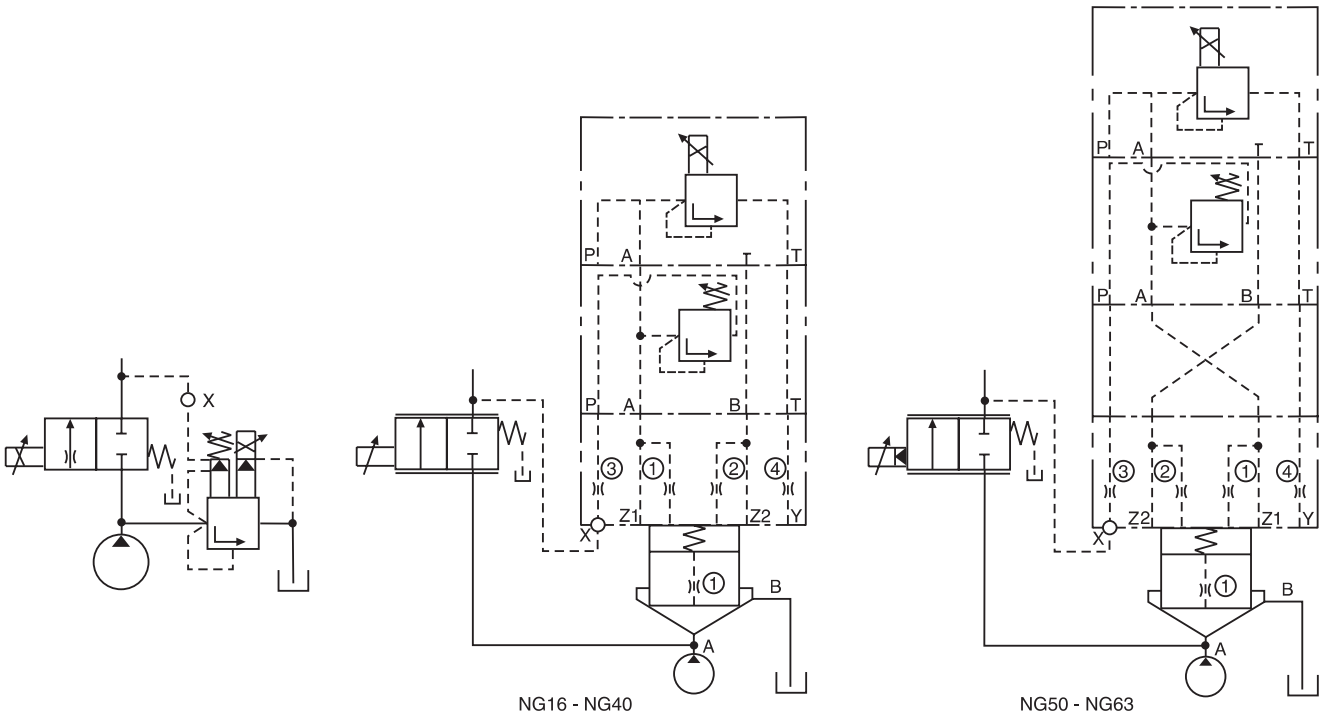


	Type					
Description	**NG16**	**NG25**	**NG32**	**NG40**	**NG50**	**NG63**
Pressure Valve [1]	R06Mxxx4x					
Preload Valve [1]	DSBA100xZ07x					
Adapter Plate [2]	without				PADA1007/A-B/B-A	
Cover [3]	C016CA*	C025CA*	C032CA*	C040CA*	C050CA*	C063CA*
Cover Orifice ①	M5xØ1.1	M5xØ1.3	M5xØ1.4	M5xØ1.5	M6xØ1.6	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 Pessure Relief Valve for Pressure Control

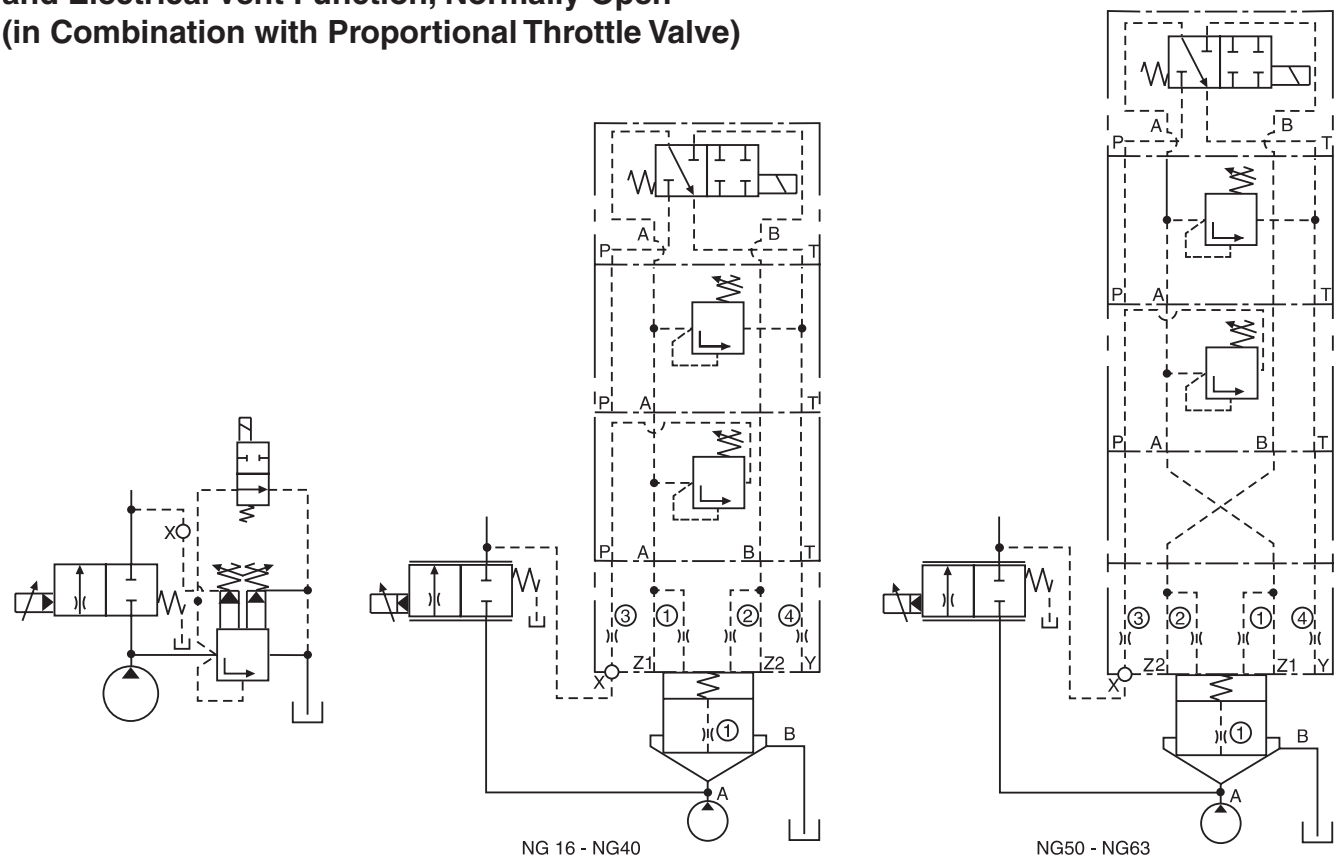


	Type					
Description	**NG16**	**NG25**	**NG32**	**NG40**	**NG50**	**NG63**
Prop. Pressure Valve [1]	RE06MxW2V1KW*					
Preload Valve [2]	DSBA100xZ07x					
Adapter Plate [3]	without				PADA1007/A-B/B-A	
Cover [4]	C016CA*	C025CA*	C032CA*	C040CA*	C050CA*	C063CA*
Cover Orifice ①	M5xØ1.1	M5xØ1.3	M5xØ1.4	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)

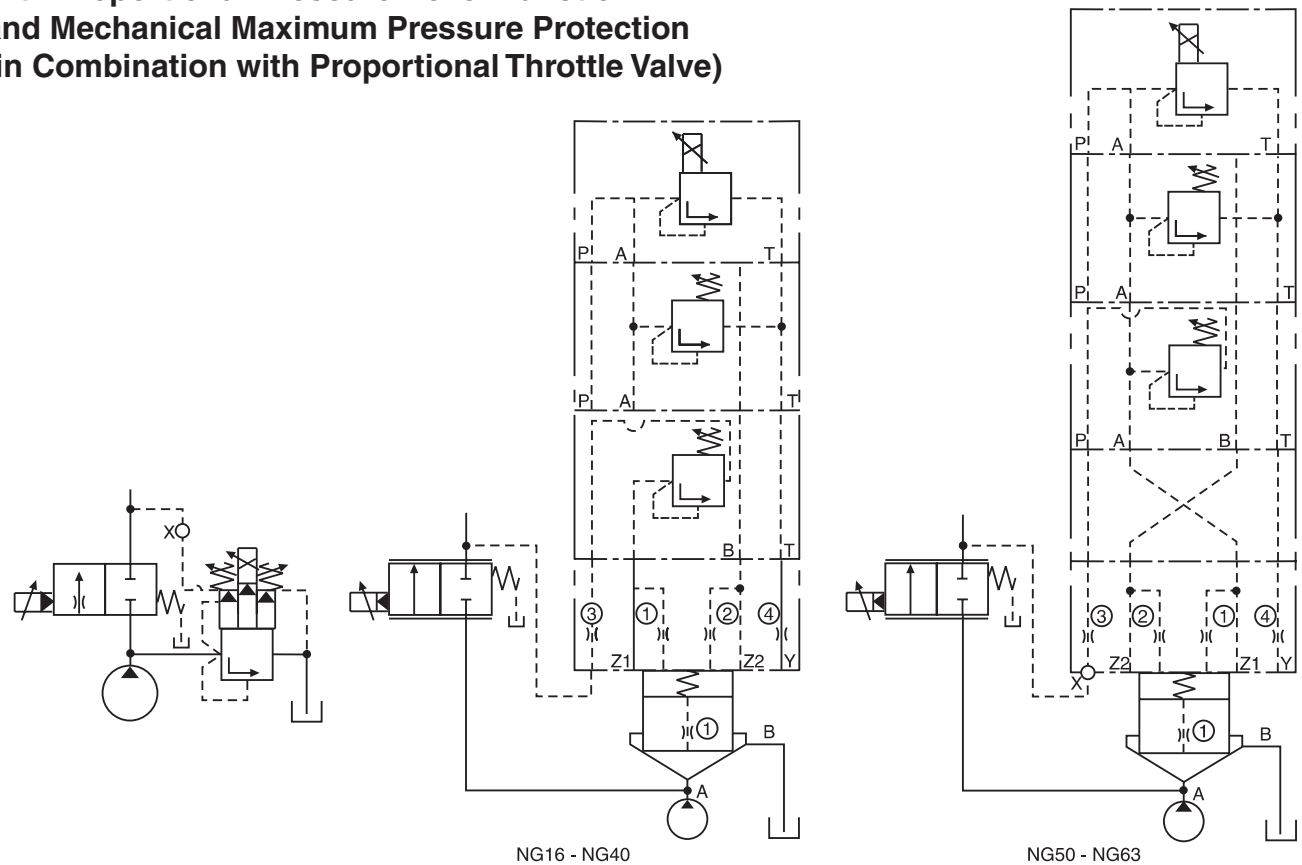


	Type					
Description	**NG16**	**NG25**	**NG32**	**NG40**	**NG50**	**NG63**
4/2 DC Valve [1]	D1VW076K*					
Press. Valve [2]	ZUDB1ATxZ07x					
Preload Valve [2]	DSBA100xZ07x					
Adapter Plate [3]	without				PADA1007/A-B/B-A	
Cover [4]	C016CA*	C025CA*	C032CA*	C040CA*	C050CA*	C063CA*
Cover Orifice ①	M5xØ1.1	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)



	Type					
Description	**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*

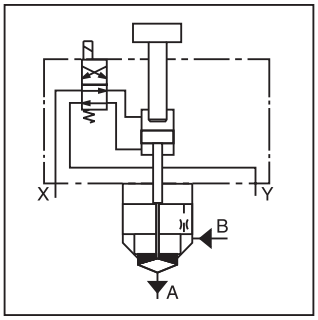
General Description

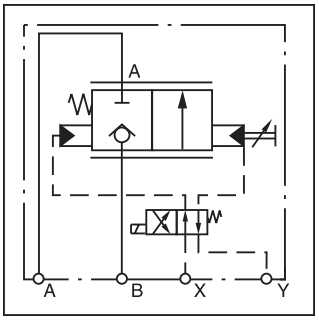
Series TEH accumulator discharge valves are preferably used in hydraulic systems where high volume flow rates are discharged from accumulators over a short operating period (in the range of milliseconds).

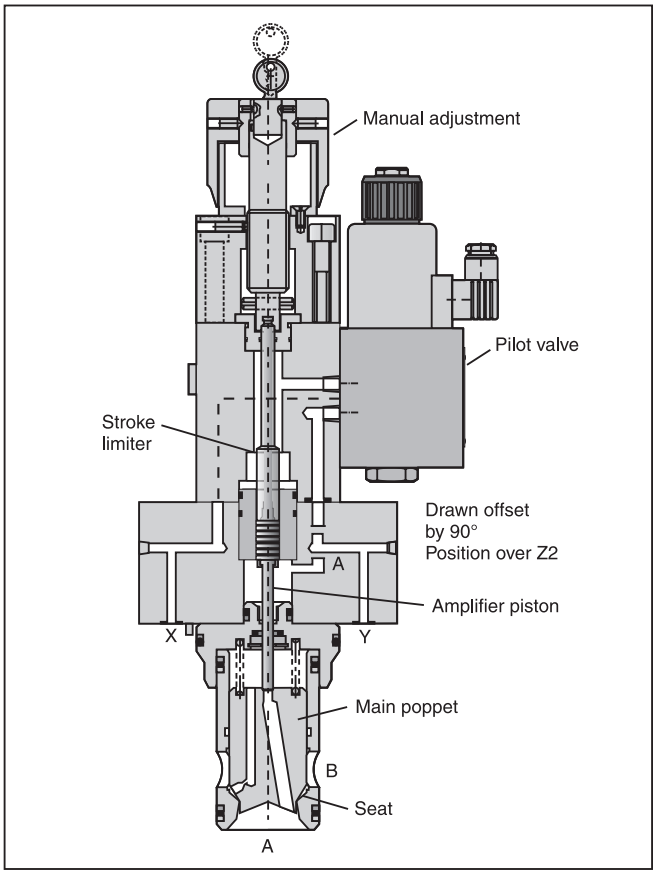
Typical applications are injection molding and die casting machines as well as hydraulic presses.

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.







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

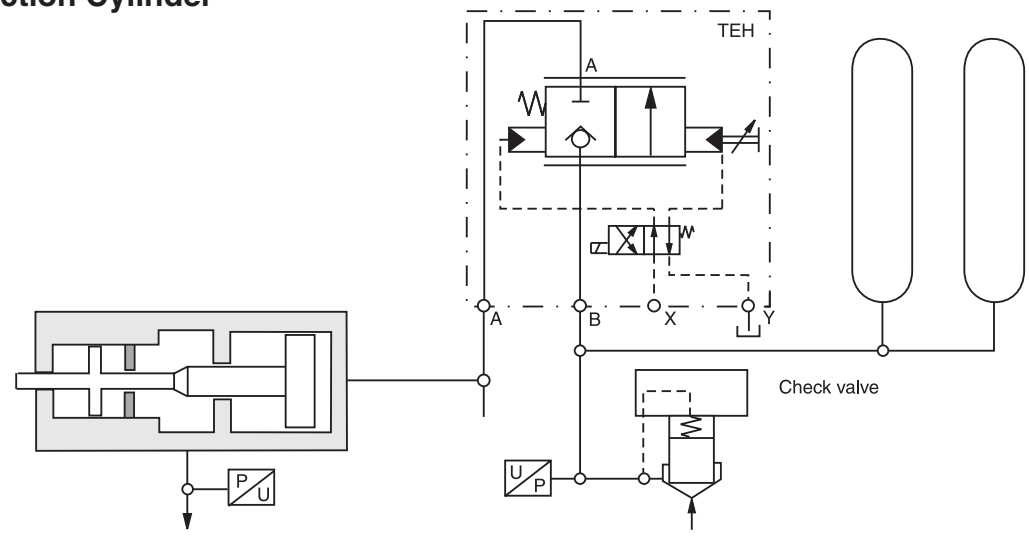
TEH032	9.0 kg (19.8 lbs.)	TEH063	38.0 kg (83.8 lbs.)
TEH040	13.0 kg (28.7 (lbs.)	TEH080	62.0 kg (136.7 lbs.)
TEH050	22.0 kg (48.5 lbs.)	TEH100	85.0 kg (187.4 lbs.)

⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

Cat3200_02.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

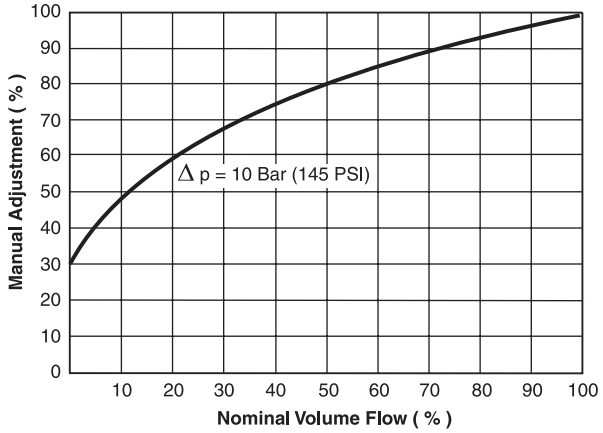
Example Accumulator System for an Injection Cylinder



Specifications

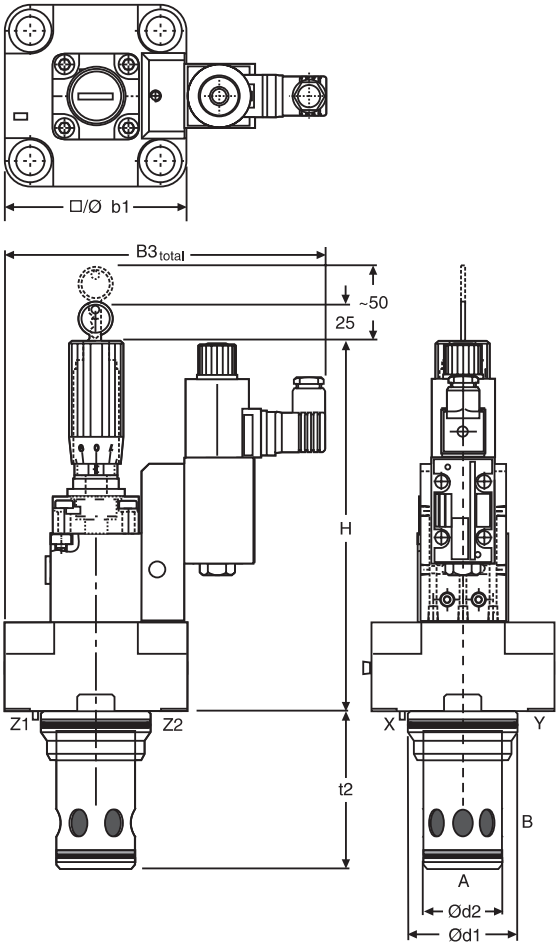
General						
Size	**NG32**	**NG40**	**NG50**	**NG63**	**NG80**	**NG100**
Interface	Slip-in cartridge according to ISO 7368					
Mounting Position	Unrestricted					
Ambient Temperature	-20°C to +80°C (-4°F to +176°F)					
Extracting Tools	See Accessories					
Hydraulic						
Maximum Operating Pressure	Ports A, B and X: up to 350 Bar (5075 PSI), Port Y: 10 Bar (145 PSI) maximum					
Nominal Flow Δ **p= 10 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		

Performance Curve

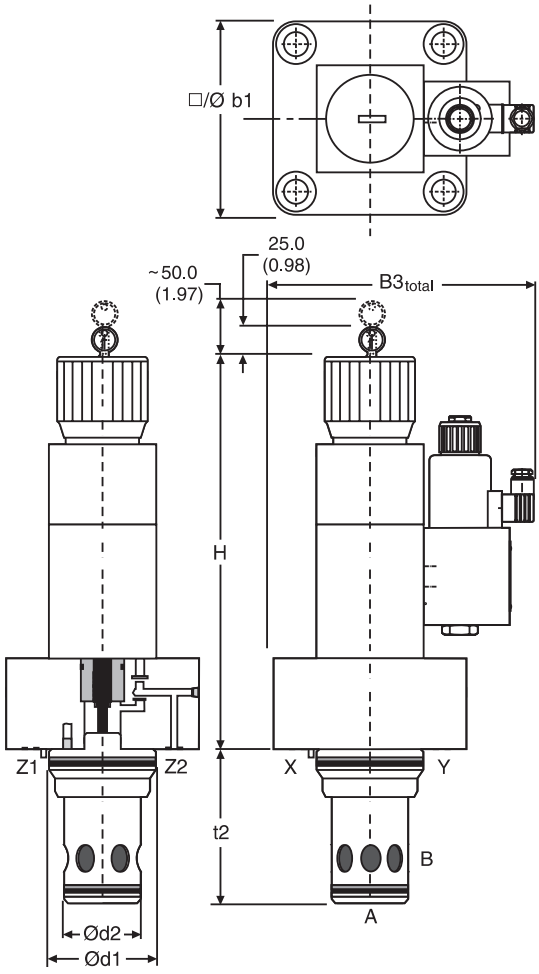


Inch equivalents for millimeter dimensions are shown in (**)

NG32 to NG50

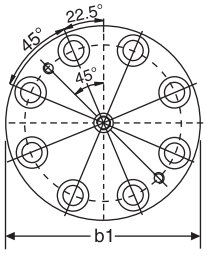


NG63



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)	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)
$B3_{total}$	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-TEHE10-E32	SK-TEHE10-E32V
40	BK416 (BK86)	553 Nm (407.8 lb.-ft.)	SK-TEHE10-E40	SK-TEHE10-E40V
50	BK417 (BK87)	553 Nm (407.8 lb.-ft.)	SK-TEHE10-E50	SK-TEHE10-E50V
63	BK418 (BK88)	1910 Nm (1408.6 lb.-ft.)	SK-TEHE10-E63	SK-TEHE10-E63V
80	BK419 (BK135)	935 Nm (689.6 lb.-ft.)	SK-TEHE10-E80	SK-TEHE10-E80V
100	BK420 (BK90)	1910 Nm (1408.6 lb.-ft.)	SK-TEHE10-E100	SK-TEHE10-E100V

General Description

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

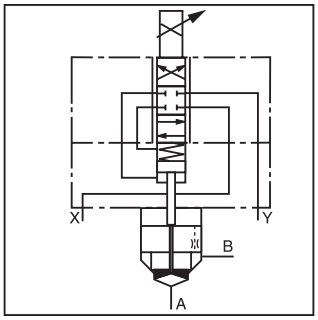
Features

- 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.

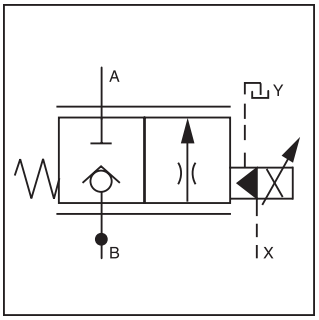
Function

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.

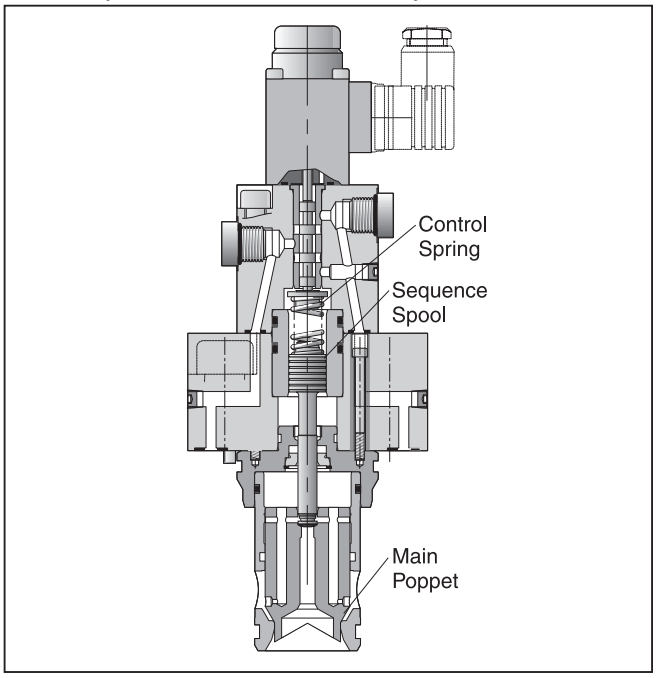
In combination with the digital power amplifier PCD00A-400 the valve parameters can be saved, changed and duplicated.



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	Piloting	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.)

⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

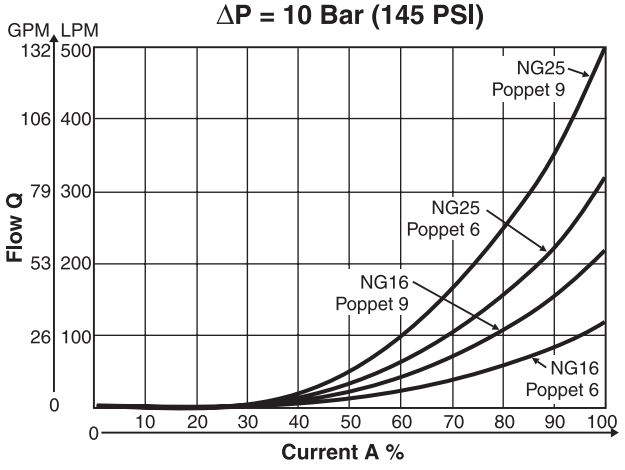
Cat3200_02.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

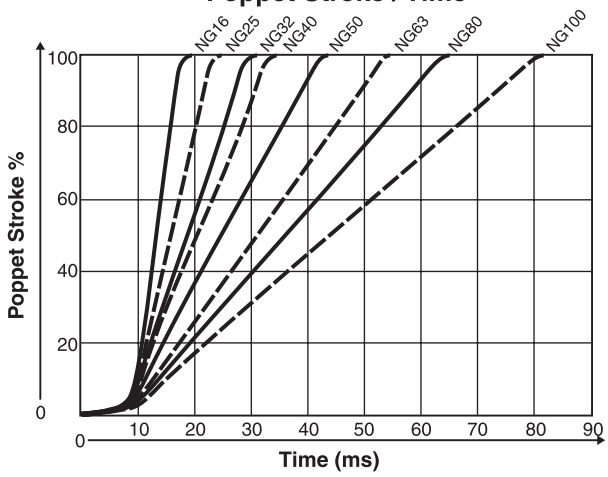
General								
Size	**NG16**	**NG25**	**NG32**	**NG40**	**NG50**	**NG63**	**NG80**	**NG100**
Interface	Slip-in cartridge according to ISO 7368							
Mounting Position	Unrestricted							
Ambient Temperature	-20°C to +80°C (-4°F to +176°F)							
Hydraulic								
Maximum Operating Pressure	Ports A, B and X: 350 Bar (5075 PSI), Port Y 10: Bar (145 PSI) maximum							
Nominal Flow LPM **Δp = 10 Bar (145 PSI) 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 Qnom							
Static / Dynamic								
Hysteresis	< 3%							
Repeatability	< 1%							
Response Time **px = 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**		**NG63-100**		**NG16-50**		**NG63-100**	
Solenoid Voltage **Nominal Current (100% ED)**	6 VDC 2.6 amps				16 VDC 1.05 amps			
Nominal Resistance	2.2 Ohm		2.5 Ohm		11.3 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.

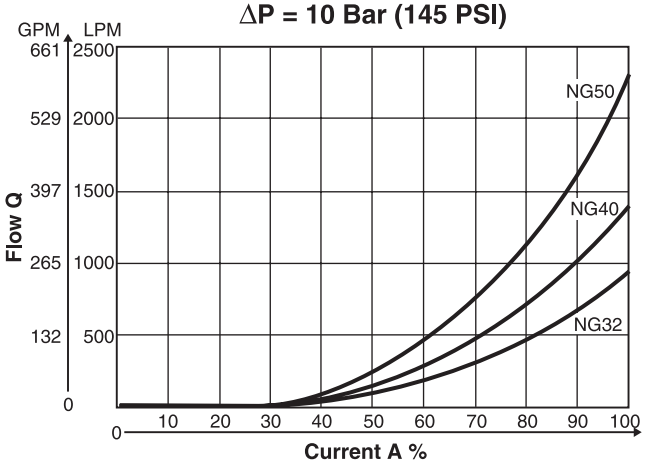
NG16 and NG25 Solenoid Current
ΔP = 10 Bar (145 PSI)



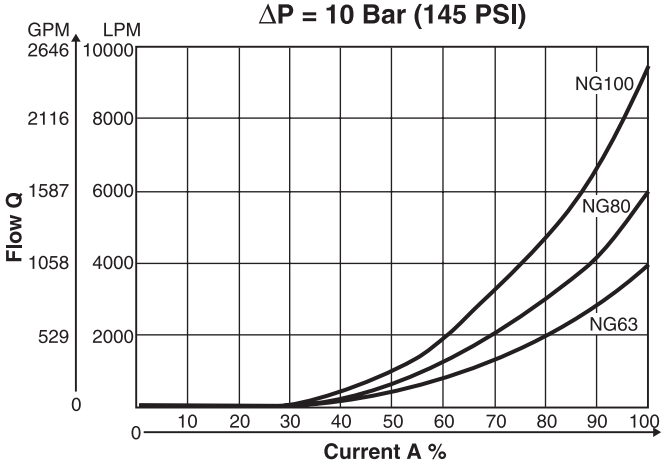
Poppet Stroke / Time



NG32, NG40 and NG50 Solenoid Current
ΔP = 10 Bar (145 PSI)



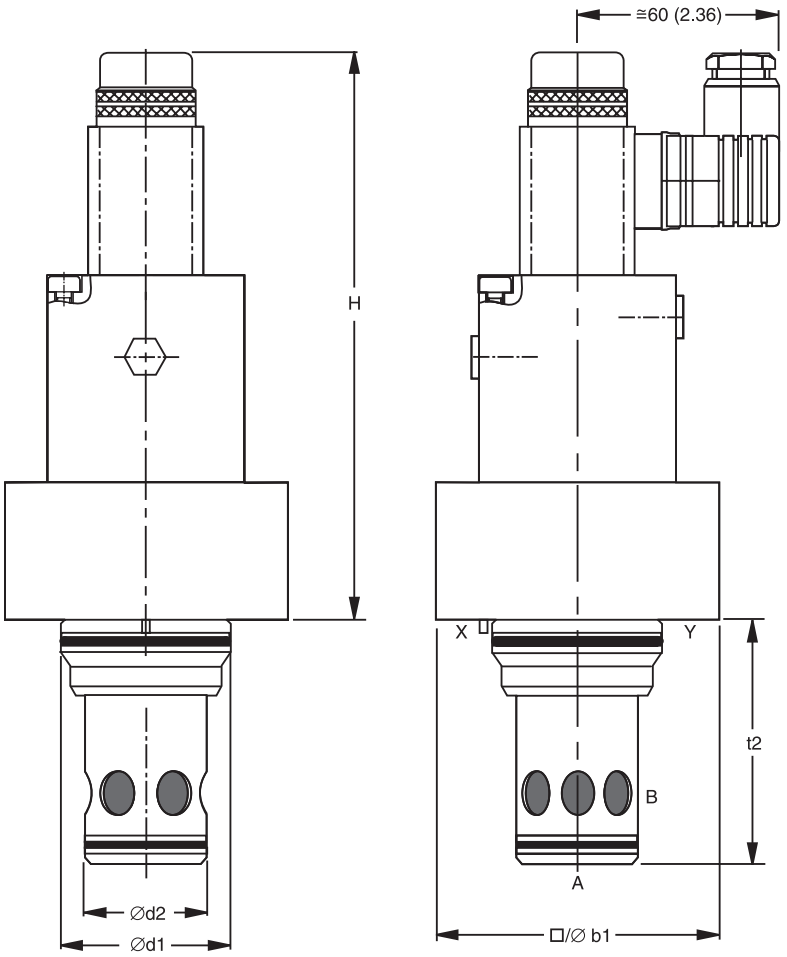
NG63, NG80 and NG100 Solenoid Current
ΔP = 10 Bar (145 PSI)



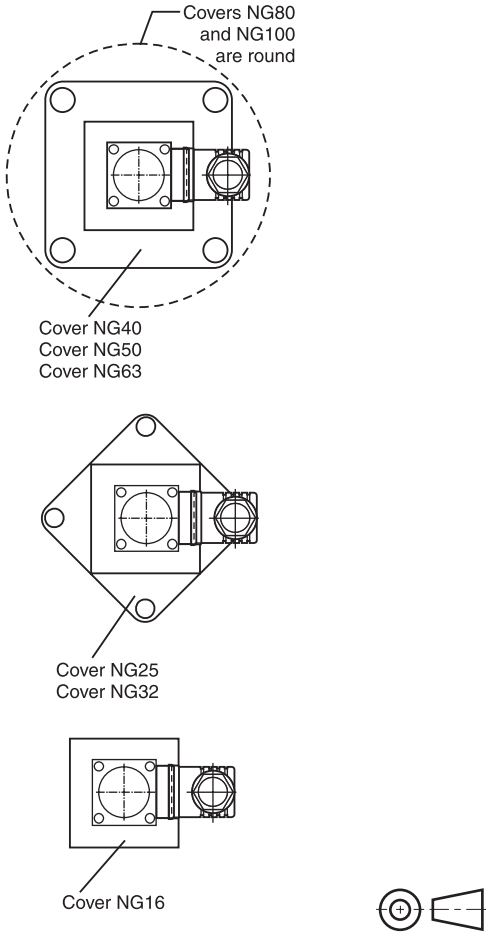
$$\Delta p_{actual} = \left(\frac{Q_{actual}}{Q_{nominal}}\right)^2 \bullet \Delta p_{nominal}$$

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

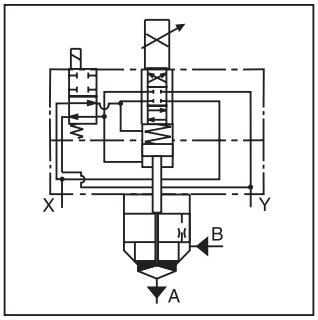
General Description

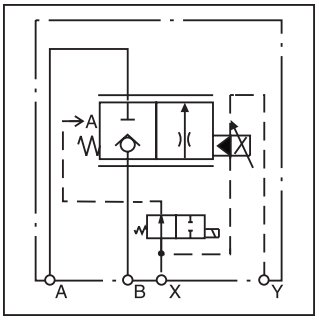
Series TEA accumulator discharge valves are preferably used in hydraulic systems where high flow rates are discharged from hydraulic accumulators over a short operating period (in the range of milliseconds).

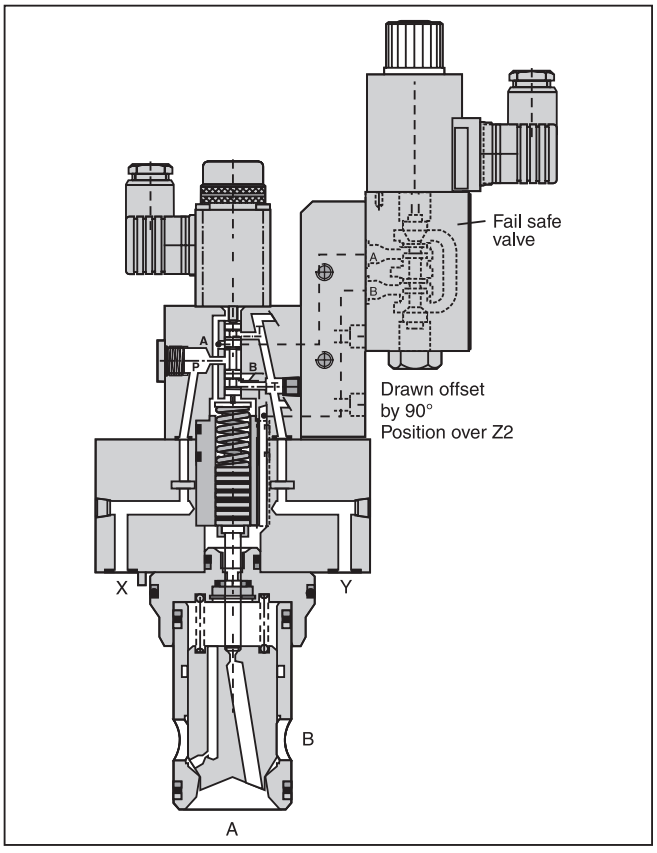
Typical applications are injection molding and die casting machines as well as hydraulic presses.

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.

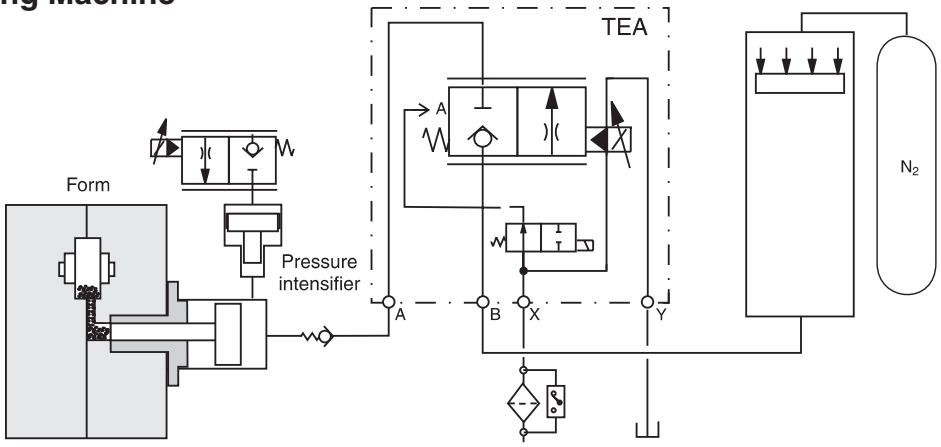
The directional valve provides the safety function. When the solenoid is deenergized and the spring is in the end position, pilot pressure from X presses the control piston into lower end position and, the main poppet is closed. As a result the flow from B to A or from the reservoir system to the machine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







Example: Accumulator System in a Die Casting Machine



⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

Cat3200_02.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

Ordering Information

TEA	[ ]	E	W	0	9	[ ]	2	[ ]	[ ]	W	[ ]	[ ]
Proportional Throttle Valve with Shut-off Function	Nominal Size	Cartridge Valve ISO 7368	Design	Spool Form	Flow Code	Flow Direction	Pilot Oil Guide	Seals	Proportional Solenoid Voltage	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
L	6 VDC
X	16 VDC

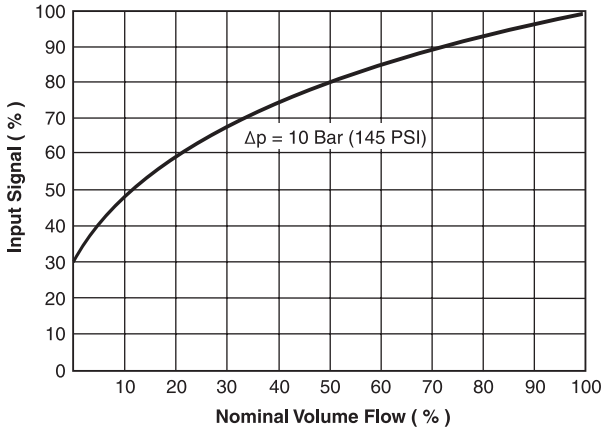
Code	Description
J	24V= / 1.25A
U	98V= / 0.31A *
G	205V= / 0.15A *

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

Weight:

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.)

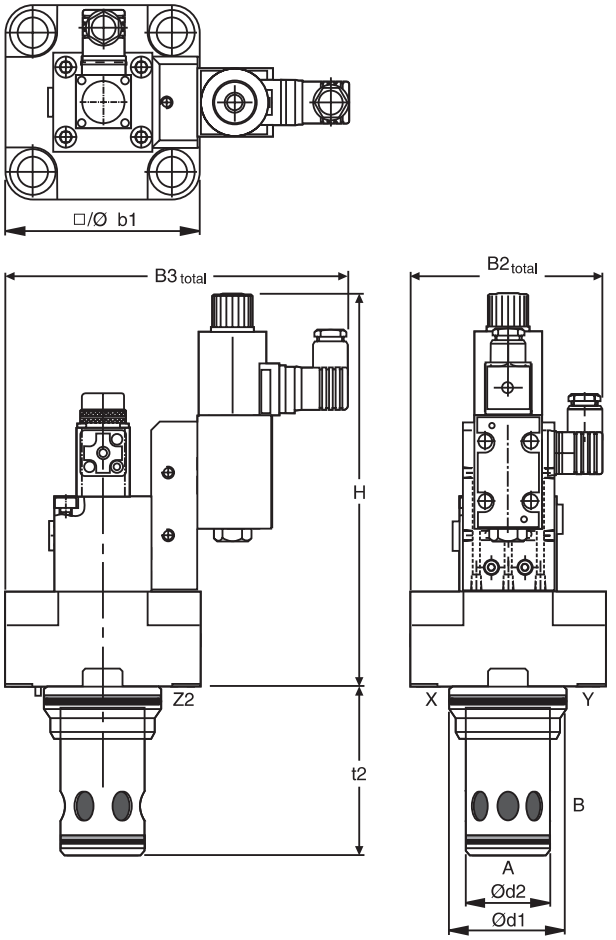
Performance Curve



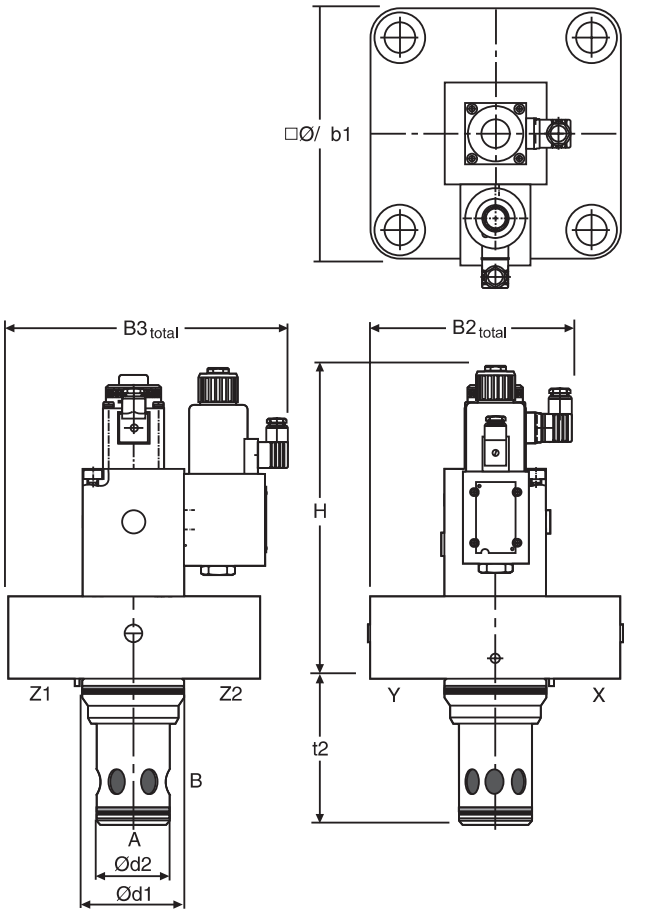
General						
Size	**NG32**	**NG40**	**NG50**	**NG63**	**NG80**	**NG100**
Interface	Slip-in cartridge according to ISO 7368					
Mounting Position	Unrestricted					
Ambient Temperature	-20 to +80°C (-4 to +176°F)					
Hydraulic						
Maximum Operating Pressure	Ports A, B and X: 350 Bar (5075 PSI), Port Y: 10 Bar (145 PSI) maximum					
Nominal Flow **Δp = 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 Qnom					
Static / Dynamic						
Hysteresis	< 3%					
Repeatability	< 1%					
Response Time **px = 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	**L**			**X**		
Size	**NG16-50**	**NG63-100**		**NG16-50**	**NG63-100**	
Solenoid Voltage **Nominal Current (100% ED)**	6 VDC 2.6 amps			16 VDC 1.05 amps		
Nominal Resistance	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		

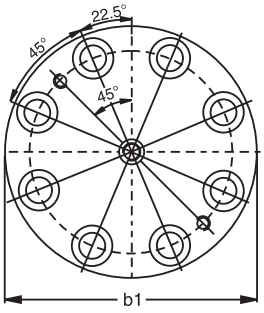
Inch equivalents for millimeter dimensions are shown in (**)

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 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.

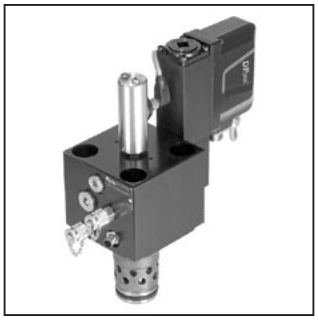
Function

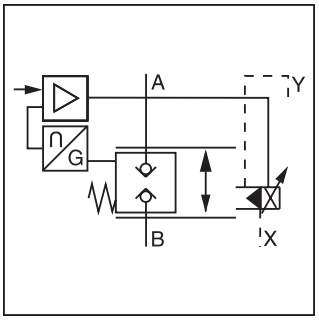
The TDP valve has a 2-stage design consisting of a DFplus pilot valve and a main stage with poppet and LVDT.

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.

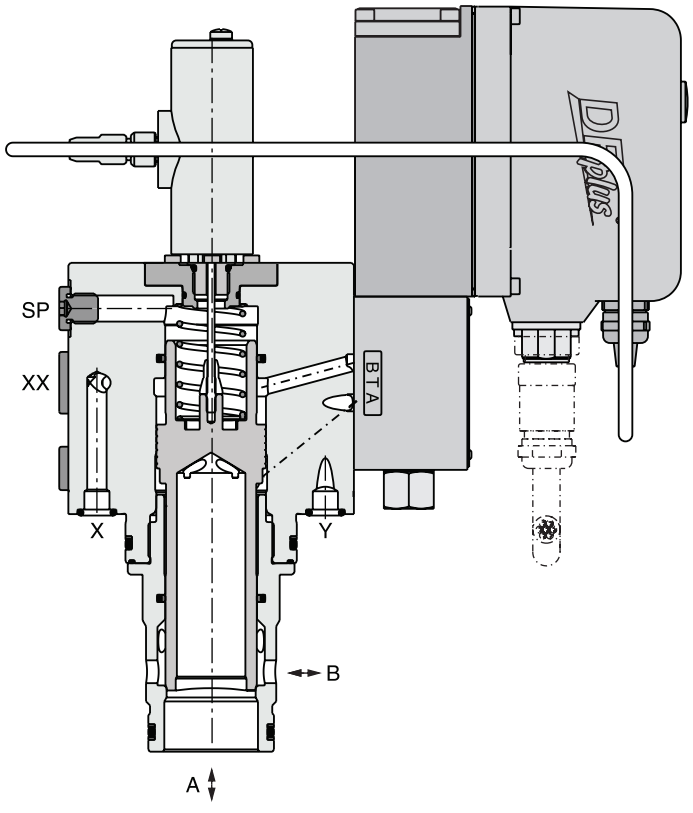




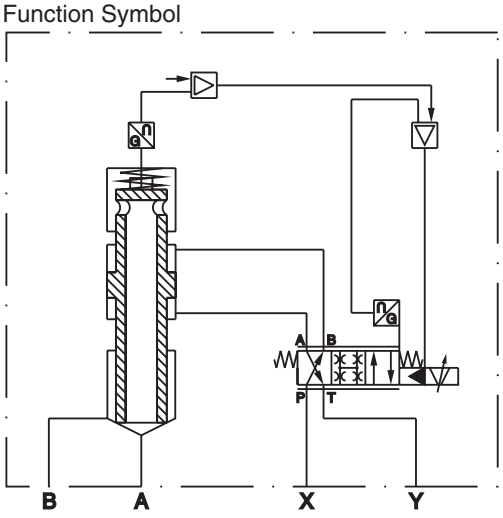
Features

- 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. No pressure spikes on A port.
- 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



Function Symbol



⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

Cat3200_02.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

Ordering Information

TDP		E	H	9	9	C	2		B	0	
Proportional Throttle Valve with LVDT	Nominal Size	Slip-in Cartridge	Closed Pilot Loop, Fast Valve Type, Intgegrated Electroniccs	Sinus Poppet	Nominal Flow	Flow Direction A to B B to A	Pilot Oil Supply External Drain External	Seal	Command Signal 0...+10V	Standard Electronics	Design Series NOTE: Not required when ordering.

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

Code	Description
N*	Nitrile
V	Fluorocarbon

* HFC fluids suitable.

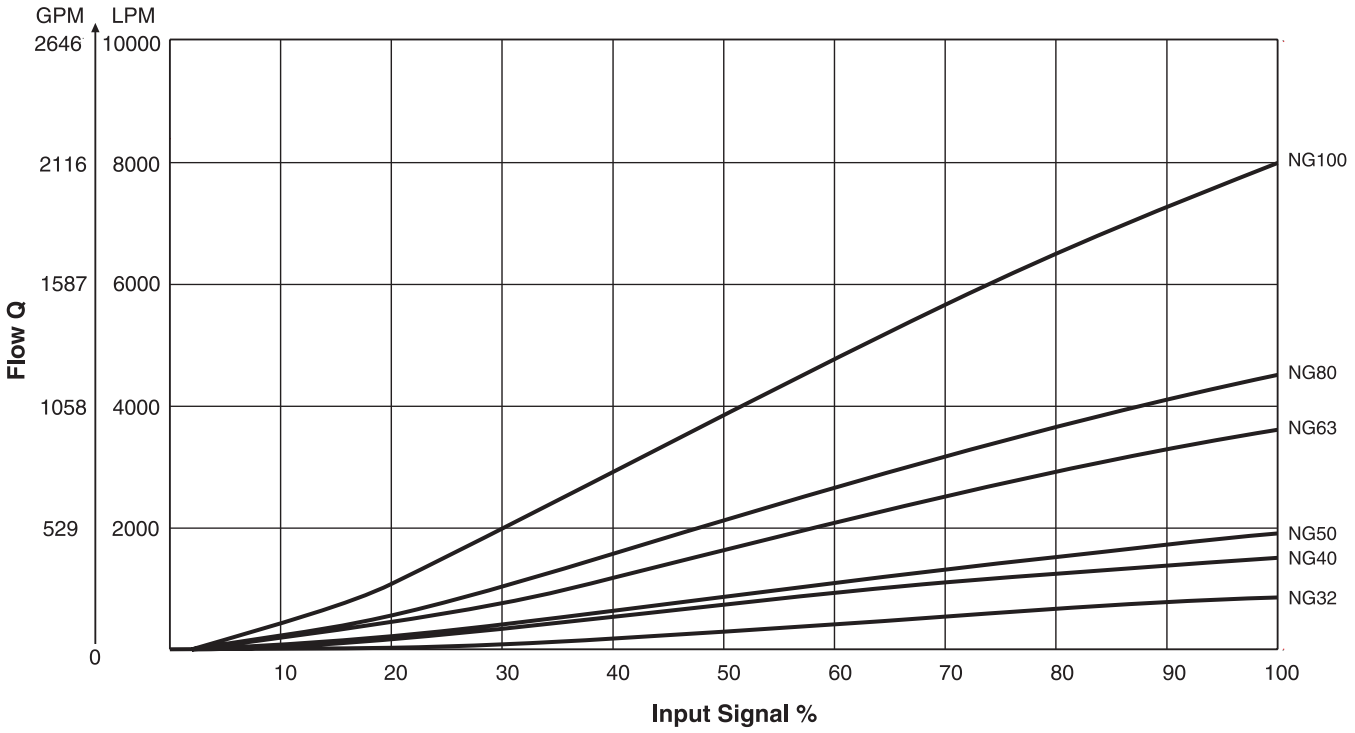
Please order connector separately.

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.)

Performance Curves

Flow / Signal Line



Opening point factory set to 3%

Characteristic curve measured with HLP46 at 50°C (122°F).

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

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 LPM **Δp = 10 Bar (145 PSI) GPM**	850 (224.5)	1500 (396.3)	1900 (501.9)	3600 (951.0)	4500 (1188.8)	8000 (2113.4)
Maximum Flow LPM **Recommended 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 (mm²/s)					
Viscosity Permitted	20 to 380 cSt (mm²/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% ±5%** **Phase -90°; 10% +5%**	 80 Hz 63 Hz	 74 Hz 59 Hz	 66 Hz 52 Hz	 52 Hz 56 Hz	 46 Hz 51 Hz	 41 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 mm^2	7 x 1.0 (AWG16) overall braid shield
Wiring Length Maximum	50 m (164 ft.)

Installation Recommendations

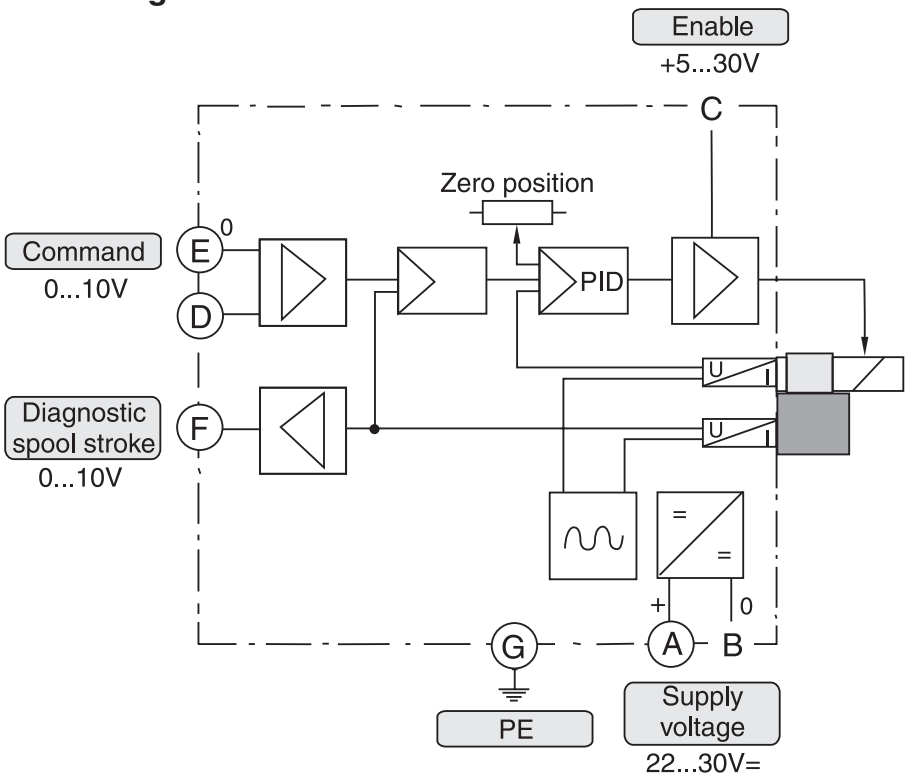
The maximum pilot flow is given in the technical data. At insufficient pilot oil supply – e.g. because of long distances and/or small diameters – an accumulator can be connected to port XX. See selection guide for correct dimensions.

Selection Guide

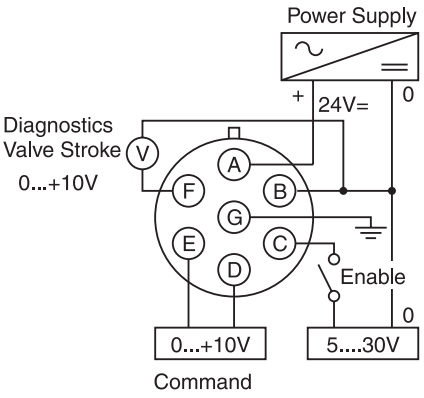
Size	Capacity	Product Type	Pressure Rating	Accu port XX
NG40	0.162 Liters (0.0428 Gallons)	ADE016-25R	126 Bar (1827.5 PSI)	G 1/2
NG50	0.243 Liters (0.0642 Gallons)	ADE032-21R	126 Bar (1827.5 PSI)	G 1/2
NG63	0.405 Liters (0.1070 Gallons	ADE050-21R	126 Bar (1827.5 PSI)	G 1
NG80	0.647 Liters (0.1709 Gallons)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

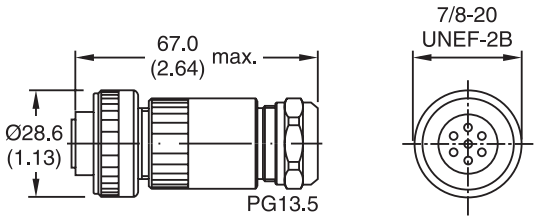


Electronics Connection Code B



Female Connector

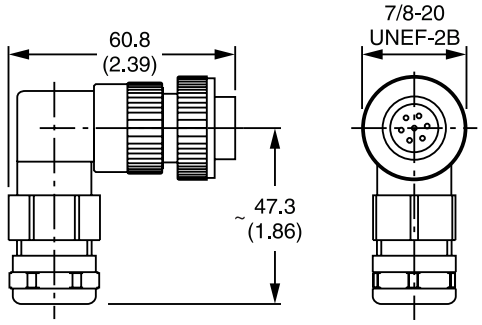
(EMC conform)



Part No. 5004072

Angle Female Connector

(EMC conform)

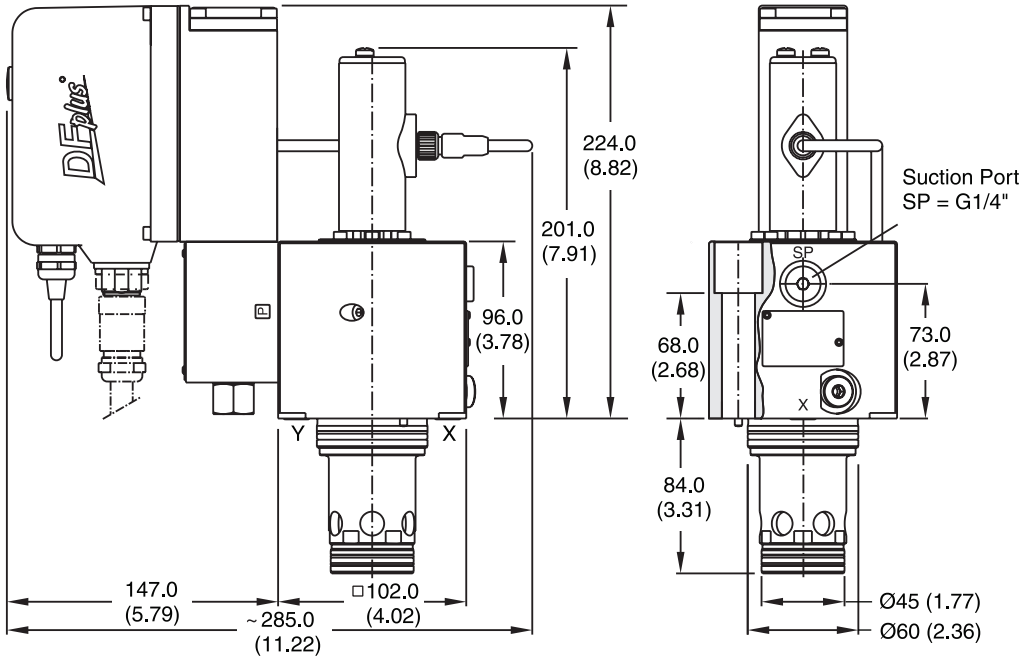


Part No. 5005160

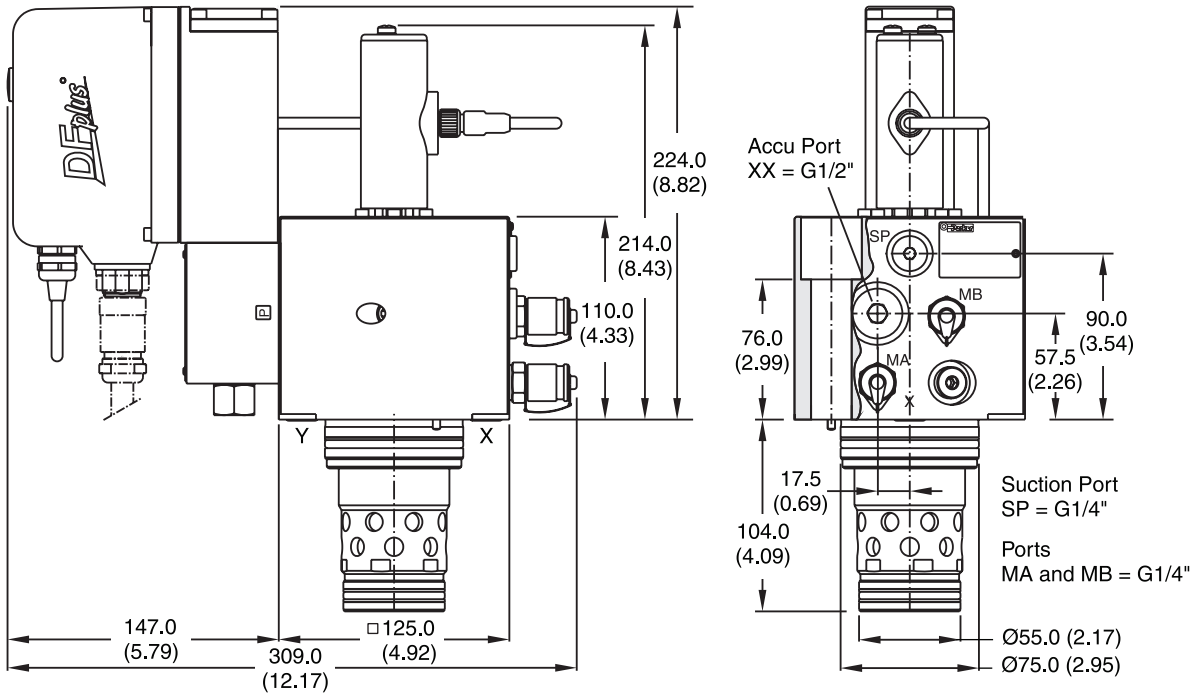
Please order plugs separately.

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

NG32



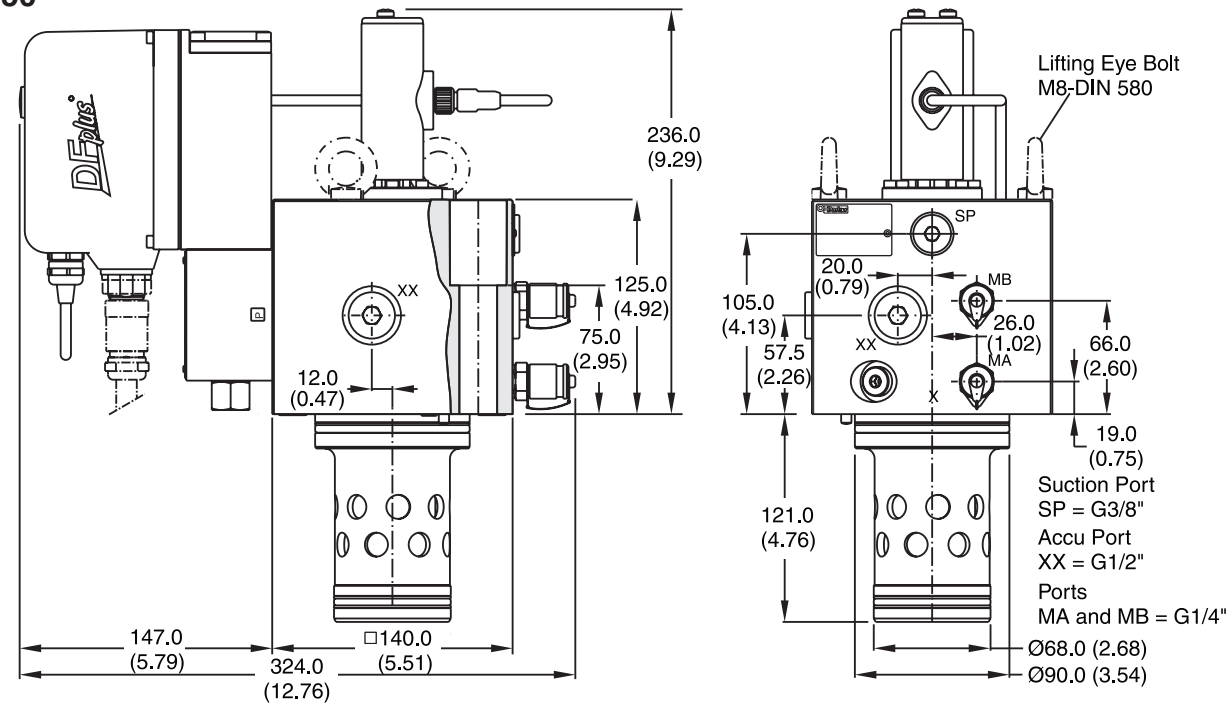
NG40



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

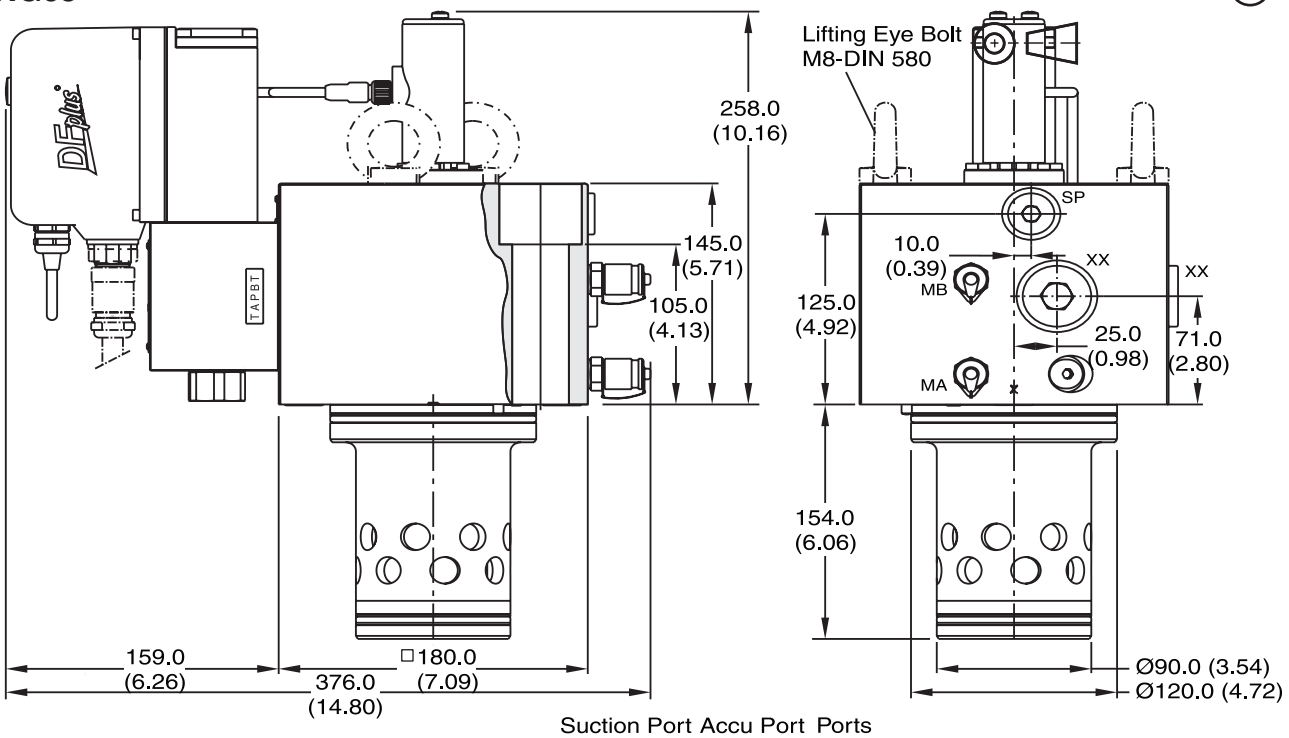
Inch equivalents for millimeter dimensions are shown in (**)

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"

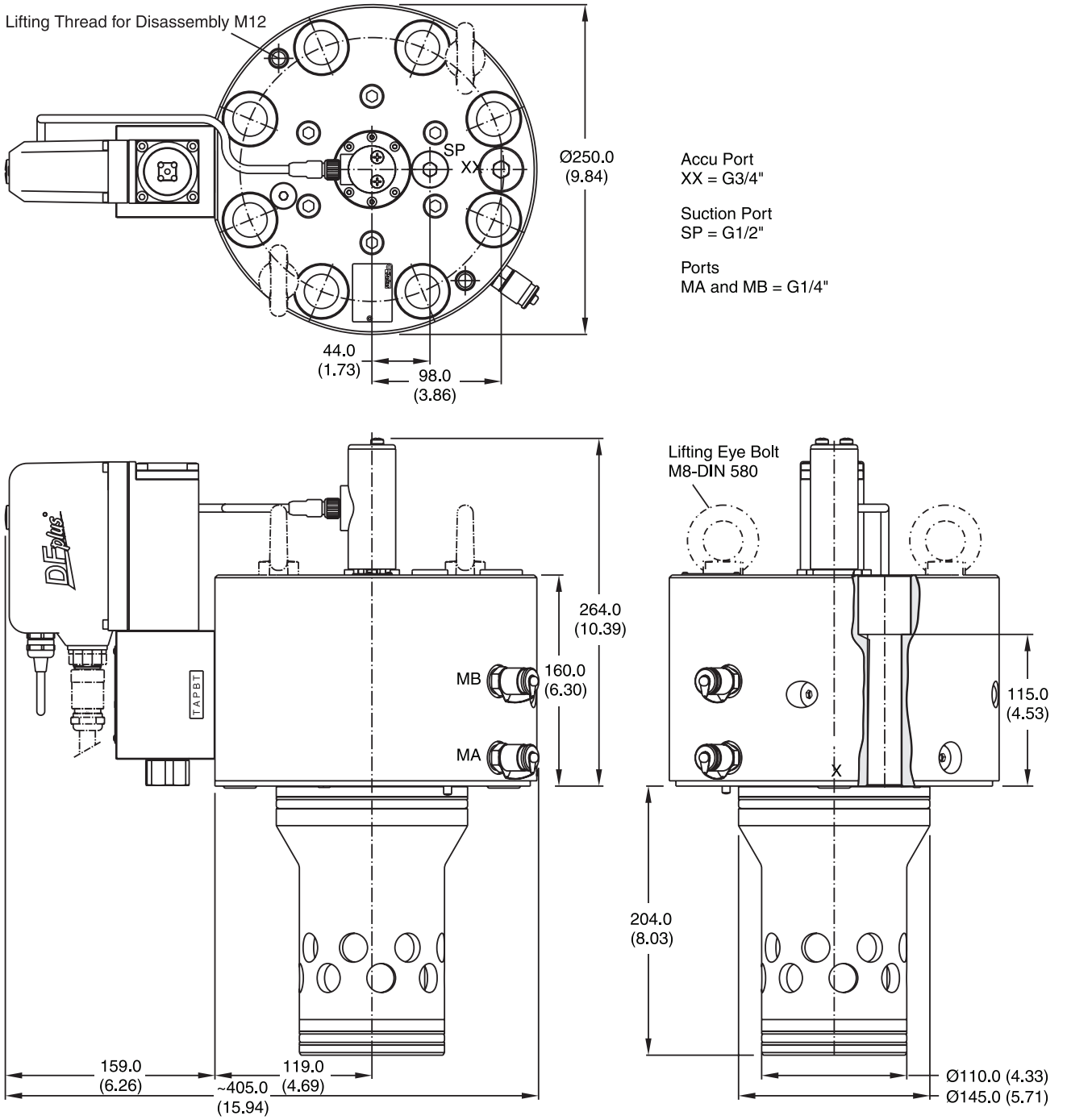
NG	Bolt Kit - DIN912 12.9		Kit Nitrile	Kit Fluorocarbon
50	BK513 4 x M20x120 DIN 912 12.8	553 Nm (407.8 lb-ft.)	SK-TDP050EN	SK-TDP050EV
63	BK420 4 x M30x140 DIN 912 12.9	1910 Nm (1408.6 lb.-ft.)	SK-TDP063EN	SK-TDP063EV

Cat3200_02.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

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

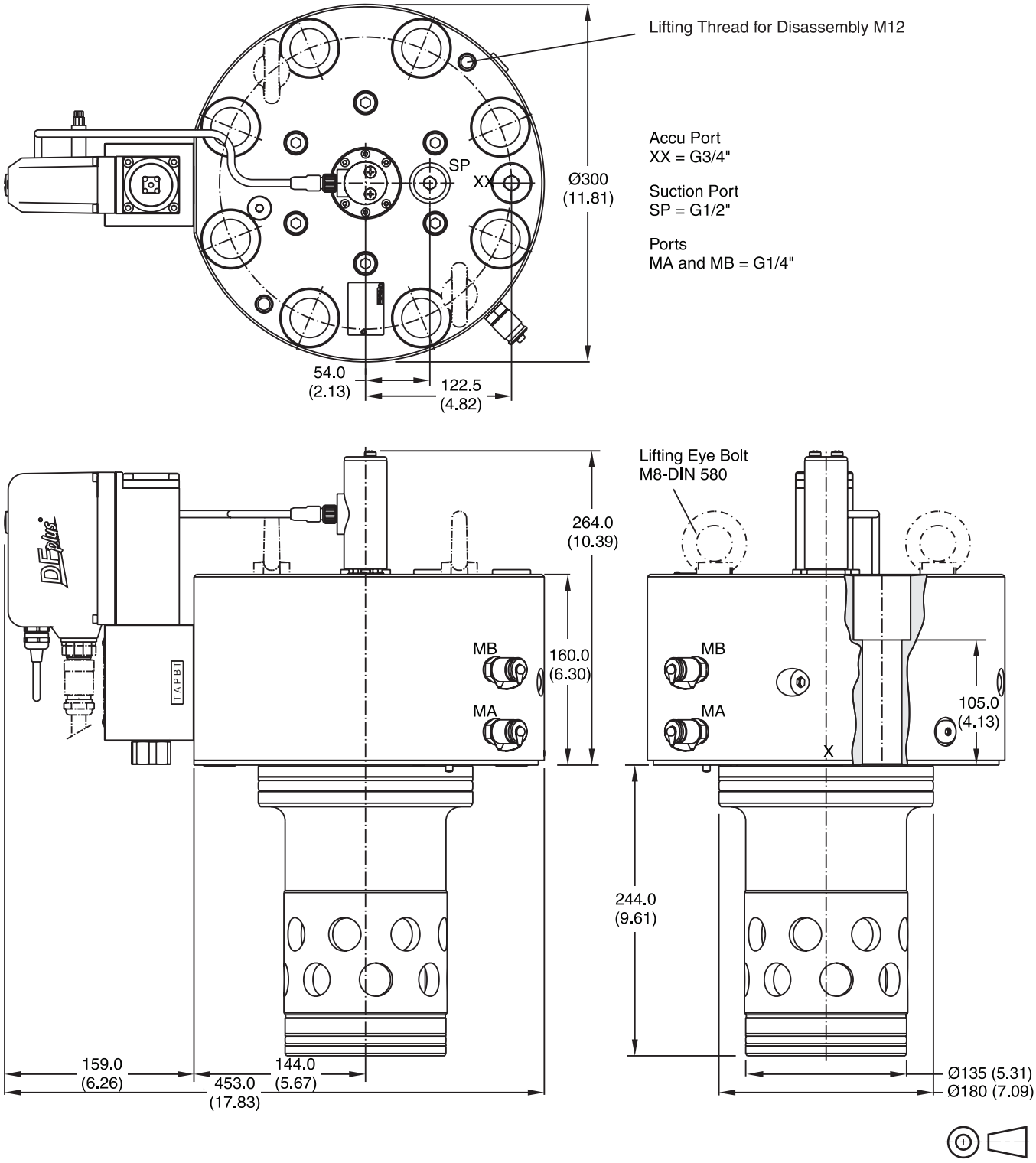
NG80



NG	Bolt Kit - DIN912 12.9		Kit	
			Nitrile	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 (**)

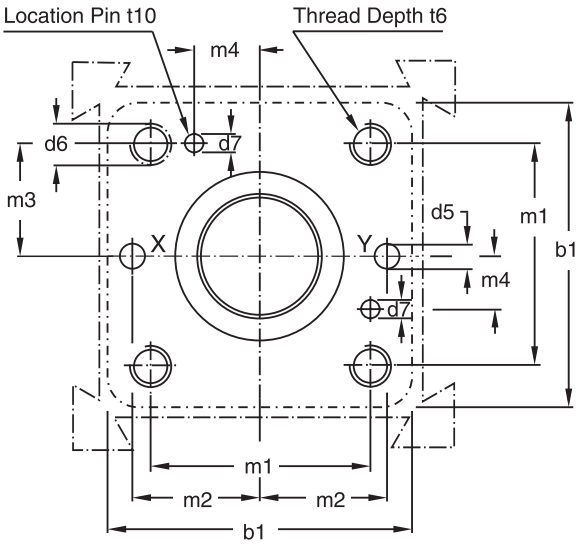
NG100



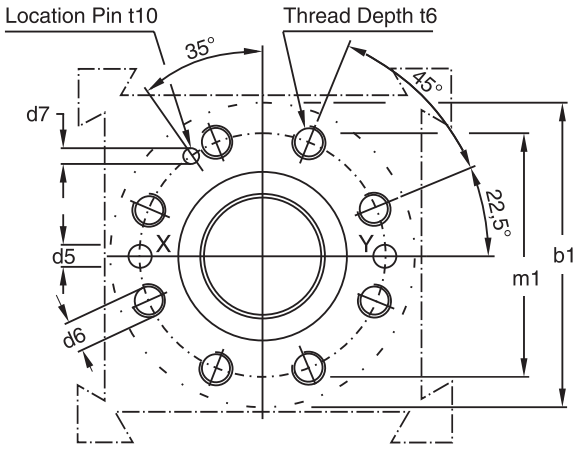
NG	Bolt Kit - DIN912 12.9		Kit	
			Nitrile	Fluorocarbon
100	BK517 8x M30x150 DIN 912 12.9	1910 Nm (1408.6 lb.-ft.)	SK-TDP100EN	SK-TDP100EV

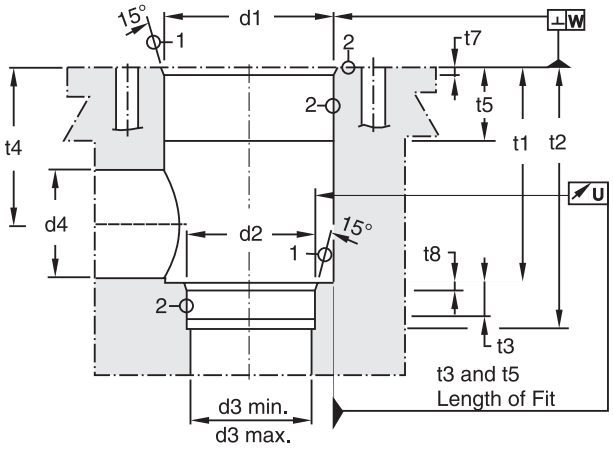
Mounting Patterns

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.

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.

Thread	Thread Pitch mm (in)
M6	1.00 (.039)
M8	1.25 (.049)
M10	1.50 (.059)
M12	1.75 (.069)
M14, M16	2.00 (.079)
M20	2.50 (.098)
M24	3.00 (.118)

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.

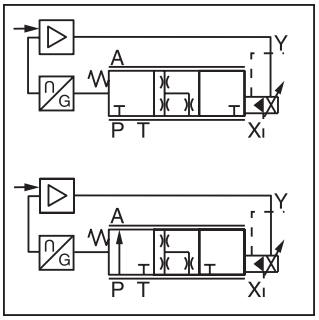
Function

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.

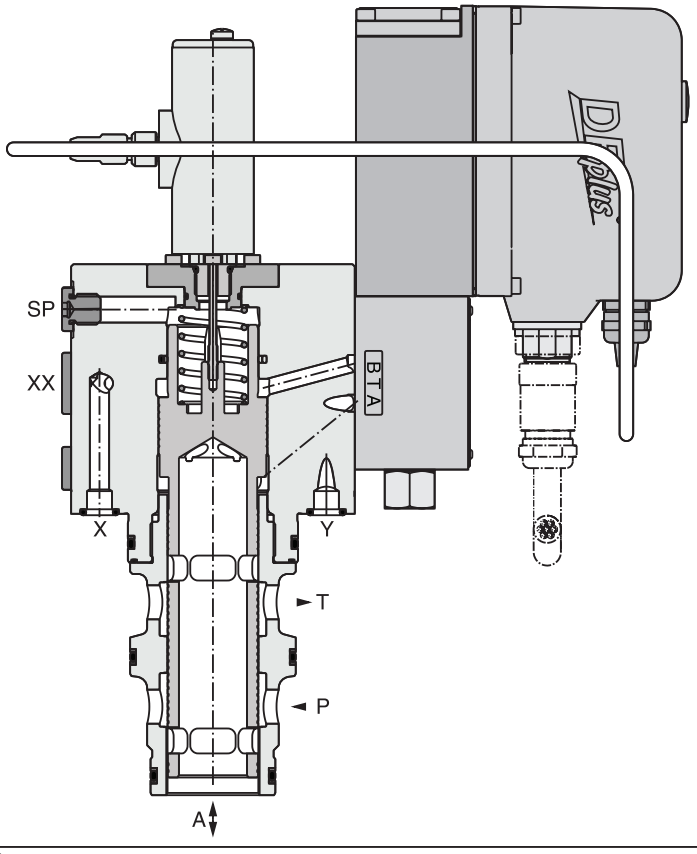
The TPQ has integrated electronics controlling both the position of the main poppet and the spool position of the DFplus pilot valve.



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.

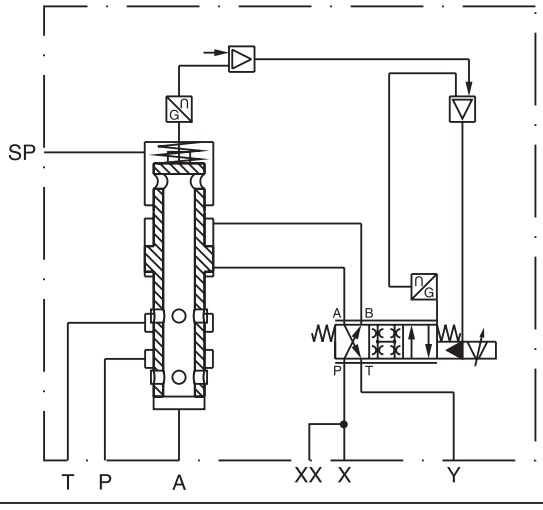
TPQ040



Failsafe Position:

Zero Position:

Function Symbol
Failsafe Position Spool Type U



⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

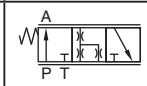
Cat3200_02.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

Ordering Information

TPQ		W	H	2	5		2				0	
Proportional Throttle Valve with LVDT	Nominal Size	Parker Slip-in Cartridge	Closed Pilot Loop, Fast Valve Type, Intgegrated Electroniccs	Linear Spool	Nominal Flow	Spool Type	Pilot Oil Supply External Drain External	Seal	Input Signal	Standard Electronics		Design Series NOTE: Not required when ordering.

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

Zerolap		
Code	Spool Type Input signal - 0 +	Fail save
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.

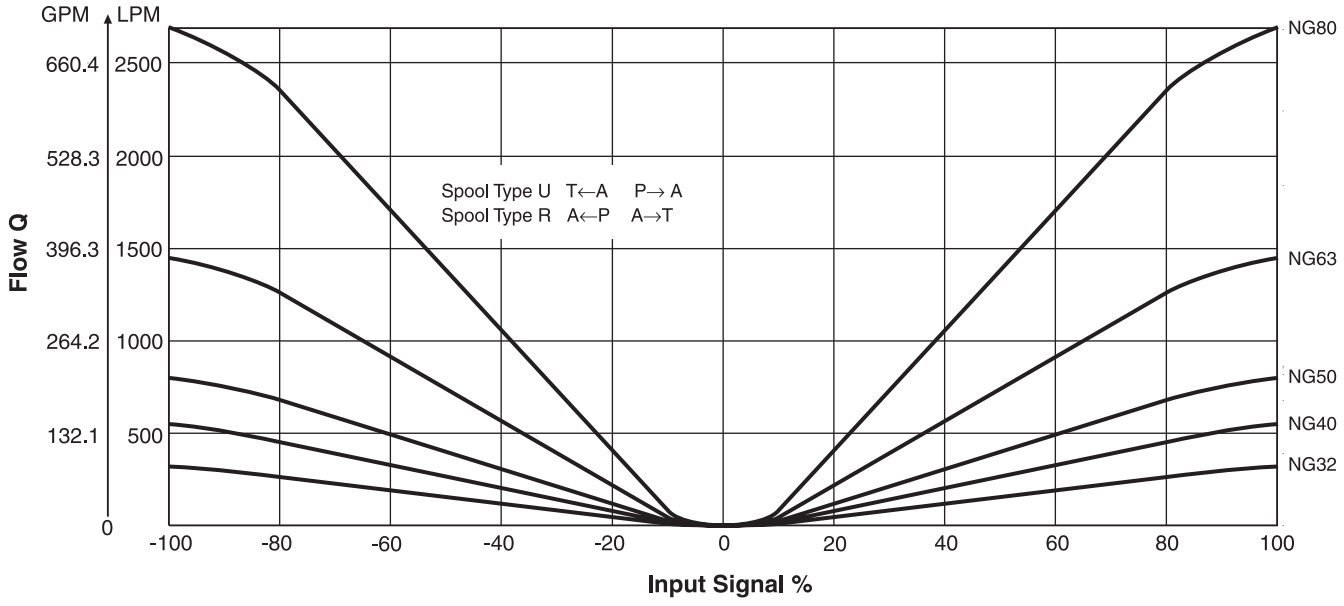
Weight:

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

Δp = 5 Bar (73 PSI)



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 (122°F).

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	**LPM**	320	550	800	1450	2700
Δp = 5 Bar (72.5 PSI)	**GPM**	(84.5)	(145.3)	(211.3)	(383.0)	(713.3)
Maximum Flow	**LPM**	1000	1600	2250	3500	6500
Recommended	**GPM**	(264.2)	(422.7)	(594.4)	(924.6)	(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%		105 Hz	95 Hz	54 Hz	30 Hz	34 Hz
Phase -90°; ±5%		90 Hz	82 Hz	72 Hz	62 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.

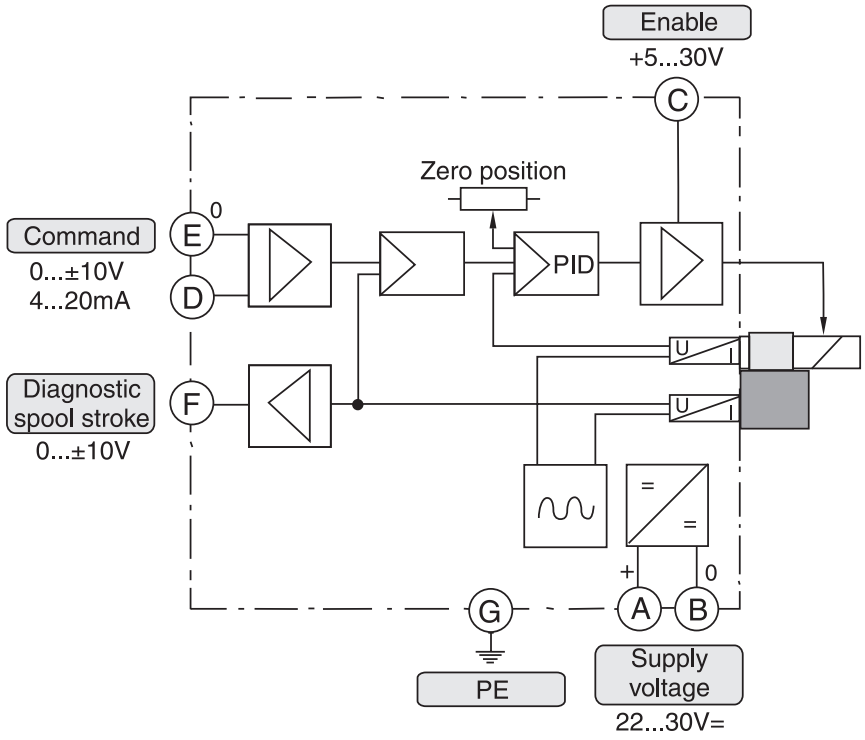
2) For optimal dynamics see installation recommendation.

(Continued on next page)

Specifications (Continued from previous page)

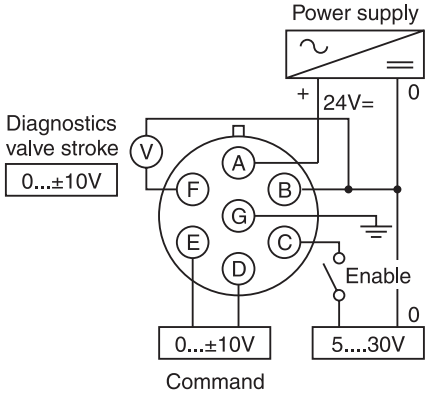
Electrical	
Duty Ratio	100% ED
Protection Class	IP65 in accordance with EN 60529 (with correctly mounted plug-in connector)
Supply Voltage / Ripple	22...30V, ripple < 5% eff., surge free
Current Consumption Max.	3.5 A
Pre-fusing	4.0 A medium lag
Input Signal **Voltage** **Impedance** **Input Capacitance 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 mm^2	7 x 1.0 (AWG16) overall braid shield
Wiring Length Maximum	50 m (164 ft.)

Block Diagram

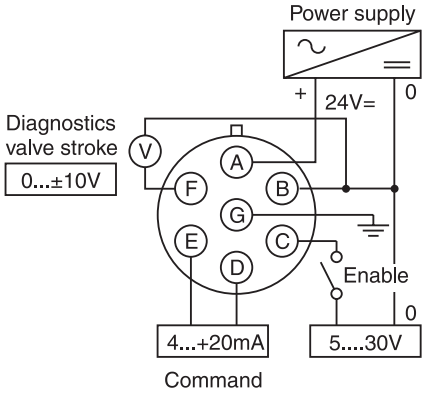


Wiring Connections

Electronics Code B

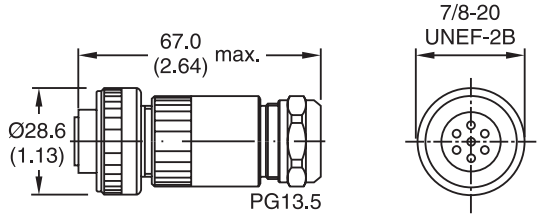


Electronics Code S



Female Connector

(EMC conforming)

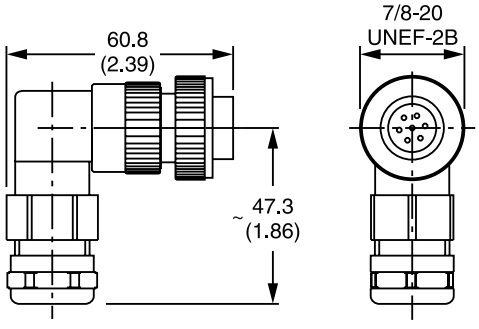


Part No. 5004072

Please order plugs separately.

Angle Female Connector

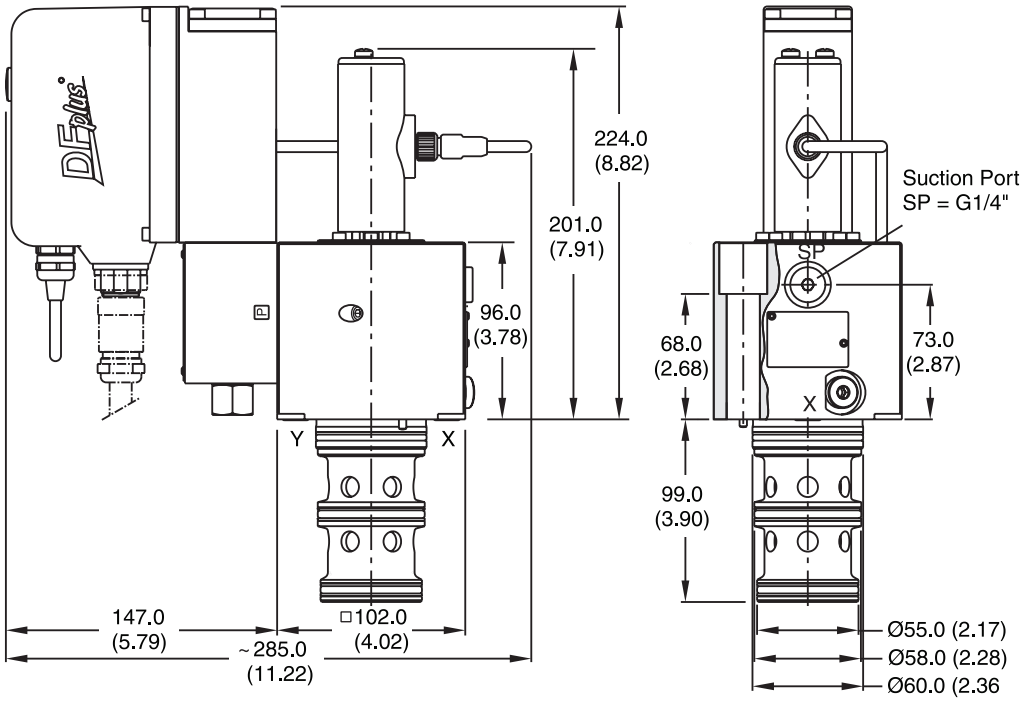
(EMC conforming)



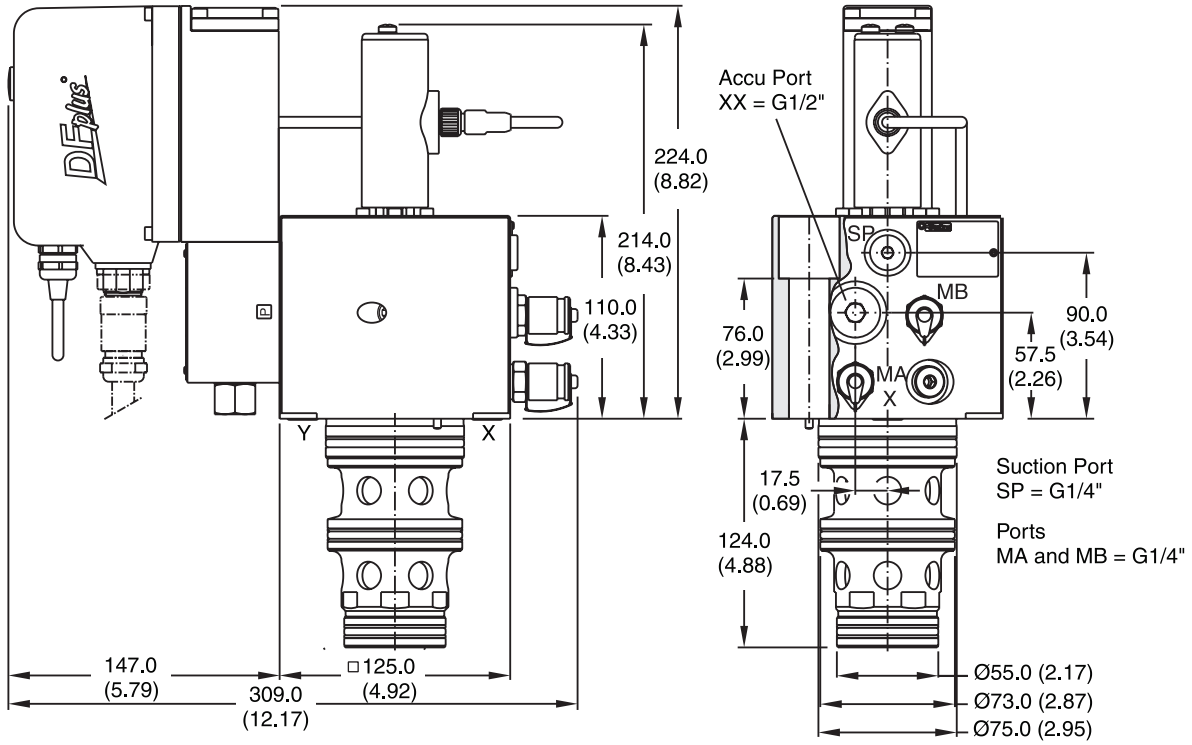
Part No. 5005160

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

NG32



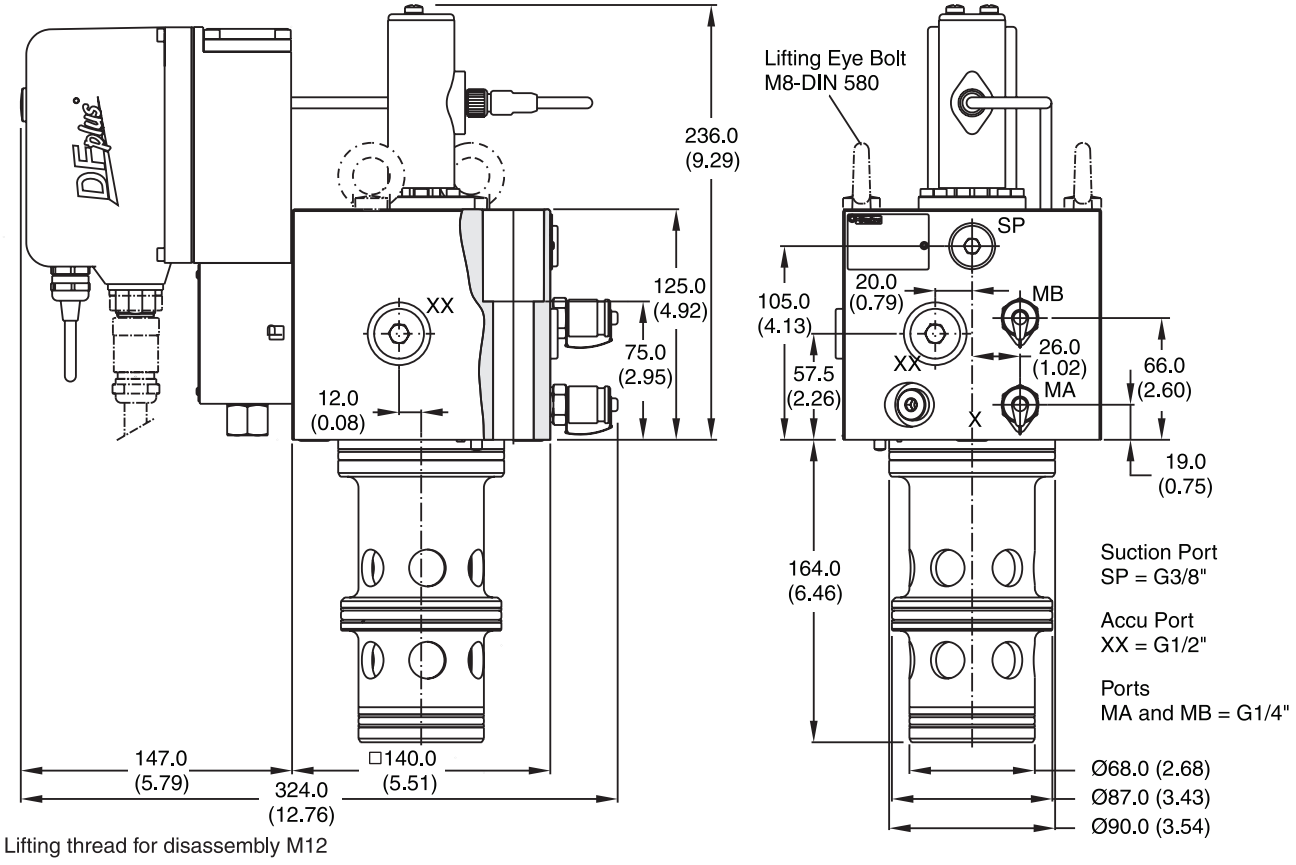
NG40



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 (**)

NG50

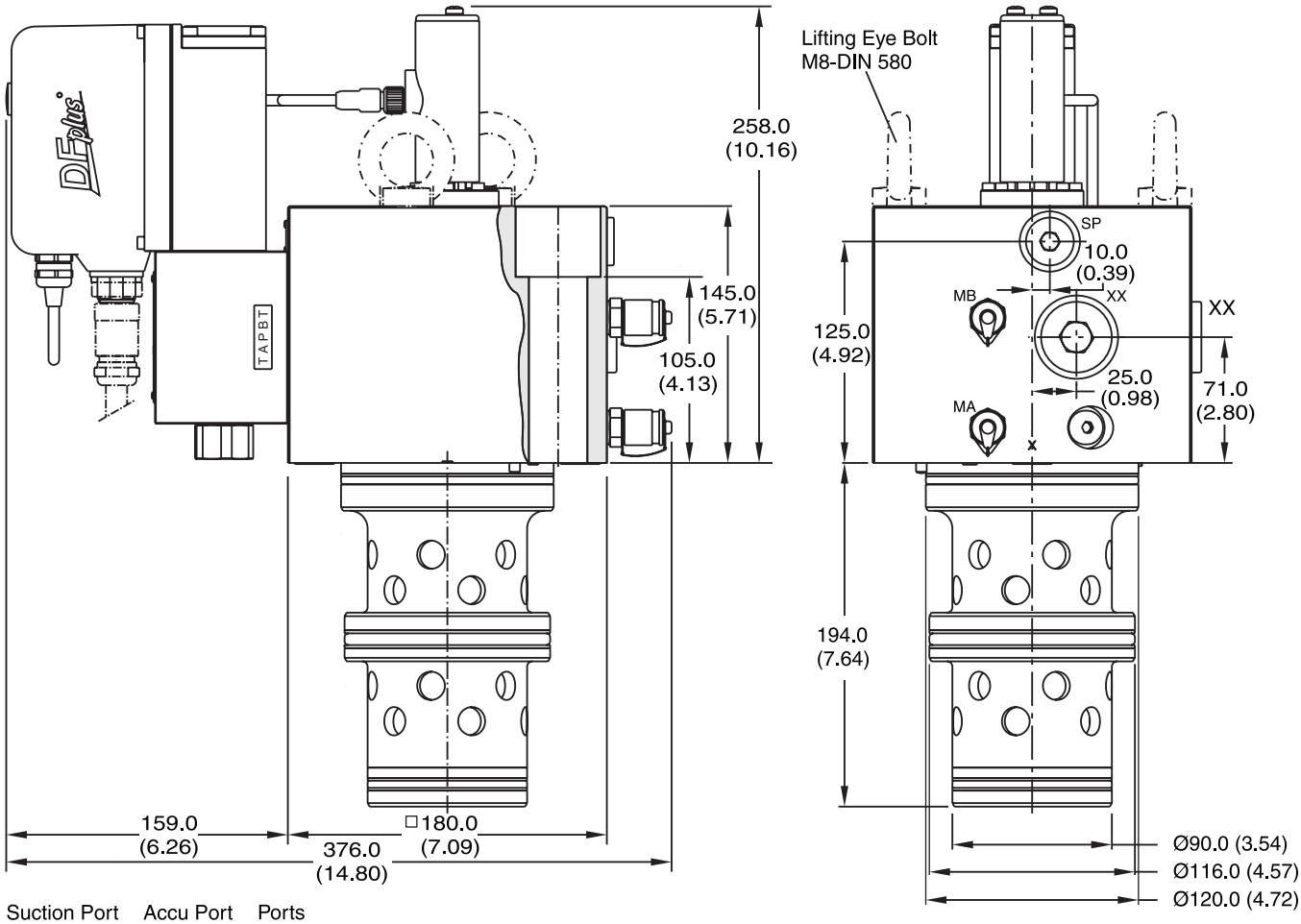


Lifting thread for disassembly M12

NG	Bolt Kit -		Kit	
			Nitrile	Fluorocarbon
50	BK513 4 x M20x120 DIN 912 12.8	553 Nm (407.8 lb.-ft.)	SK-TPQ050EN	SK-TPQ050EV

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

NG63



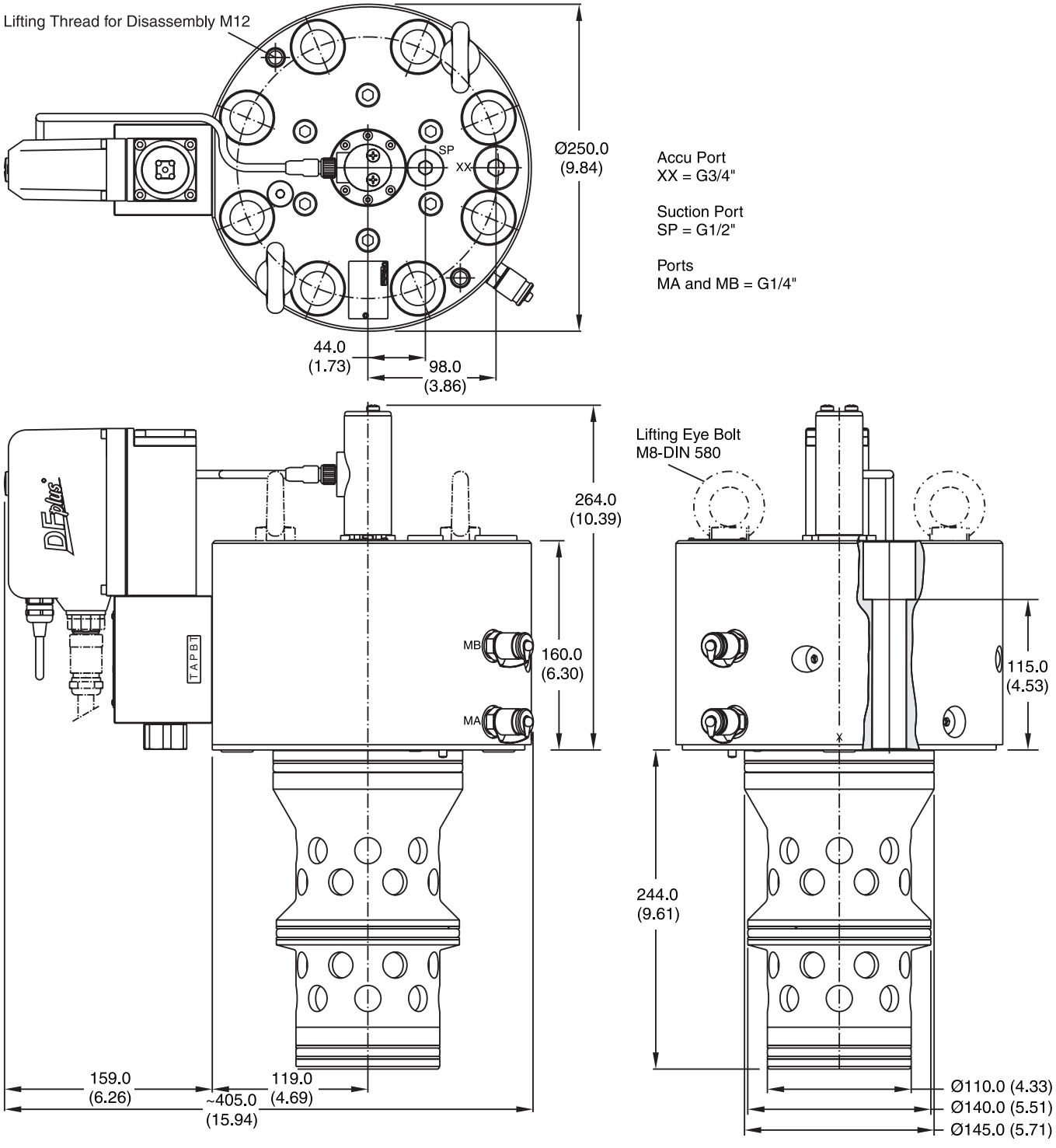
Suction Port	Accu Port	Ports
SP = G1/2"	XX = G1"	MA and MB = G1/4"

Lifting Thread for Disassembly M12

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

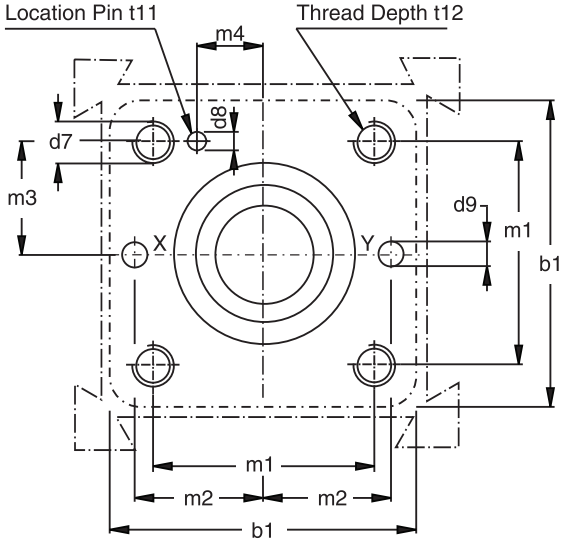
Inch equivalents for millimeter dimensions are shown in (**)

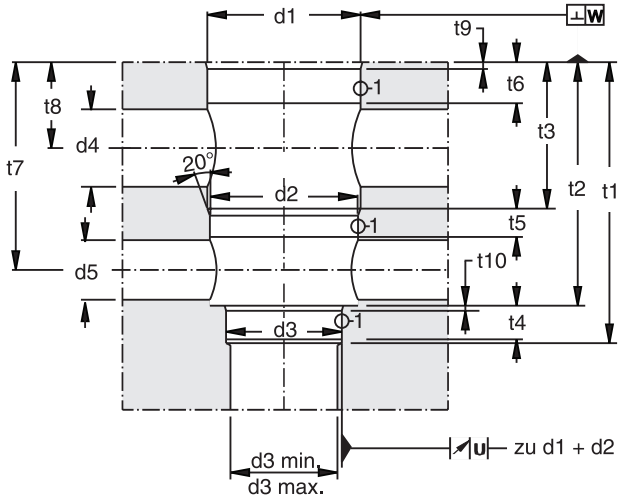
NG80



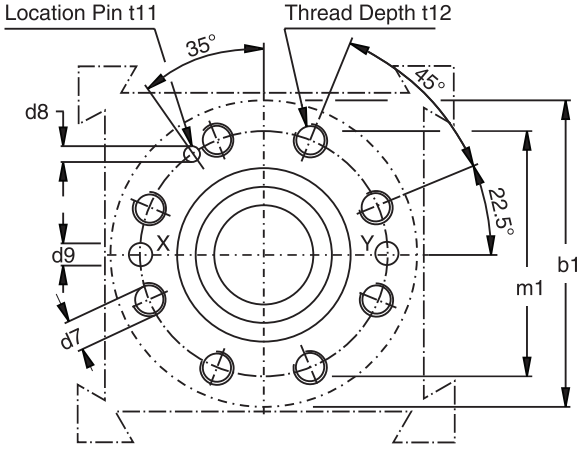
NG	Bolt Kit - DIN912 12.9		Kit	
			Nitrile	Fluorocarbon
80	BK530 8x M24x160 DIN 912 12.9	955 Nm (704.3 lb.-ft.)	SK-TPQ080EN	SK-TPQ080EV

NG32 to NG63





NG80



Required surface finish:

$\sqrt{R_{max}25}$, (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

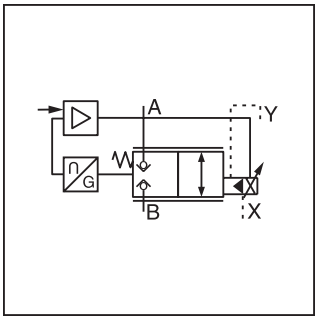
The 2-way high performance proportional throttle valves series TDC are used in applications where high flow has to be precisely controlled at high dynamics. Typical applications are die casting, injection moulding and hydraulic presses.

Function

The 2-way high performance proportional throttle valves TDC have a 2-stage design consisting of a proportional pilot valve and a main stage with poppet and LVDT.

With the pilot valve the TDC achieves fast response times: from 20 ms (NG25) up to 31 ms (NG50) with an accuracy of <0.7 % of the nominal flow. The pilot valve actively controls the poppet – independent of the pressure conditions in the main ports.

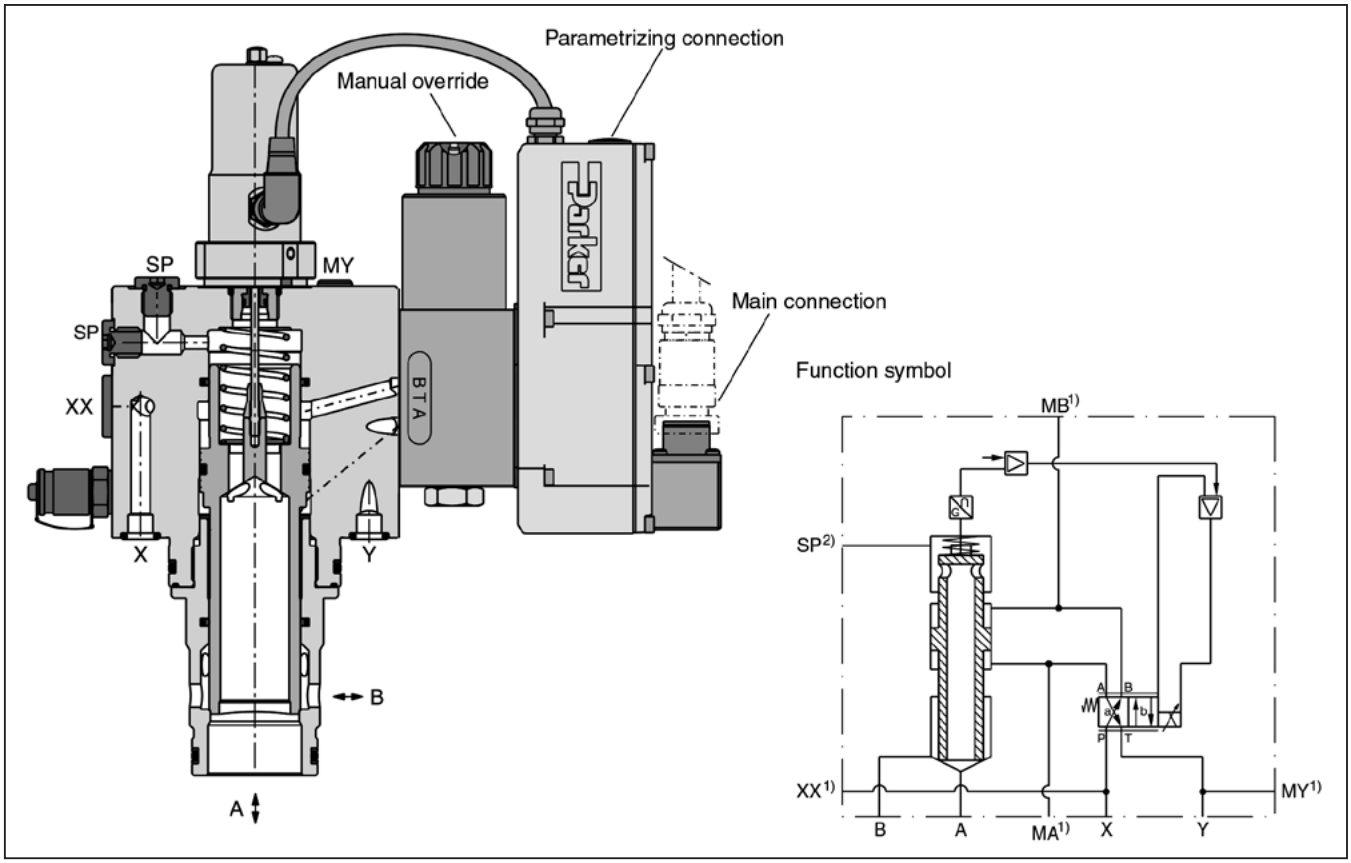
It is basically required that the pilot pressure is at the level of the system pressure. At low system pressure the pilot pressure should be min. 140 Bar (2031 PSI), when high valve dynamics are desired.



Features

- Active pilot operated 2-way high performance 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.
- In order to ensure the closed position, plot pressure is required.
- 4 sizes NG25 up to NG50.

TDC040



⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

Ordering Information

TDC		E	S		9		2				0	
2-Way High Performance Proportional Throttle Valve	Nominal Size	Parker Slip-in Cartridge	Performance Standard Response for Controlled Applications	Flow Characteristics	Nominal Flow	Flow Direction B to A A to B	Pilot Oil Supply External Drain External	Seal	Input Signal	Standard Electronics	Design Series NOTE: Not required when ordering.

Code	Description
025	NG25
032	NG32
040	NG40
050	NG50

Code	Description
7	Progressive
9	Linear

Code	Description
B	0...±10V
E	0...+20mA

Code	Description
N	Nitrile
V*	Fluorocarbon

* HFC fluids suitable.

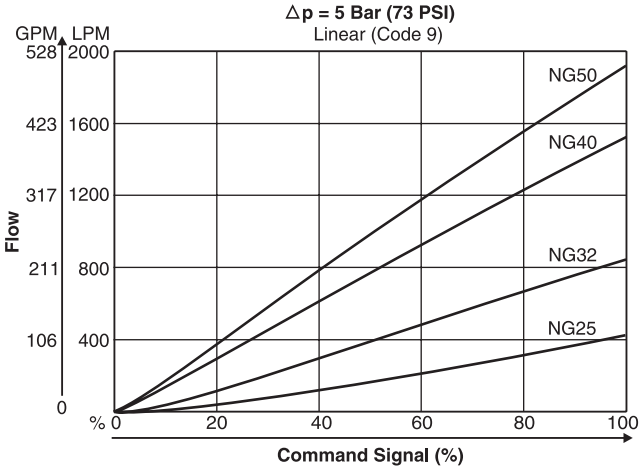
Please order connector separately.

Weight:

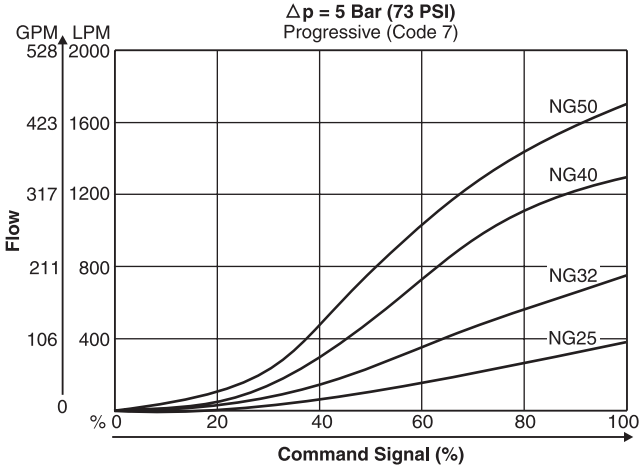
TDC025 11.0 kg (24.3 lbs.)
TDC032 13.0 kg (28.7 lbs.)
TDC040 15.0 kg (33.1 lbs.)
TDC050 26.0 kg (57.3 lbs.)

Performance Curves

Flow/Signal Curve
Δp = 5 Bar (73 PSI)
Linear (Code 9)



Flow/Signal Curve
Δp = 5 Bar (73 PSI)
Progressive (Code 7)



Open point factory set to 3%.
Characteristic curve measured with HLP46 at 50°C (122°F).

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

General				
Size	**NG25**	**NG32**	**NG40**	**NG50**
Interface	Proportional throttle valve with LVDT and integrated electronics, slip-in cartridge according to ISO 7368			
Mounting Position	Unrestricted			
Ambient Temperature	-20°C to +60°C (-4°F to +140°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, and SP, up to 350 Bar (5075 PSI), XX observe accumulator pressure rating; Port Y, maximum 210 Bar (3046 PSI)			
Nom. Flow (linear) LPM **Δp = 5 Bar (72.5 PSI) GPM**	420 (111.0)	850 (224.6)	1500 (396.3)	1900 (501.9)
Max. Flow (linear) LPM **Recommended GPM**	800 (211.3)	2000 (528.3)	3000 (792.5)	4500 (1188.8)
Nom. Flow (progressive) LPM **Δp = 5 Bar (72.5 PSI) GPM**	380 (100.4)	750 (198.1)	1300 (343.4)	1700 (449.1)
Max. Flow (progressive) LPM **Recommended GPM**	700 (184.9)	1750 (462.3)	2600 (686.9)	4000 (1056.7)
Fluid	Hydraulic oil according to DIN 51524			
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 400 cSt (mm^2/s)			
Filtration	ISO 4406 (1999); 18/16/13			
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	NG06			
Maximum Pilot Flow at 140 Bar (2030 PSI) Pilot Press.	23 LPM (6.1 GPM)	30 LPM (7.9 GPM)	40 LPM (10.6 GPM)	40 LPM (10.6 GPM)
Static / Dynamic [1)]				
Step Response at Pilot Pressure >140 Bar (2030 PSI)	20 ms	22 ms	27 ms	31 ms
Hysteresis	< 0.1%			
Sensitivity	< 0.05%			

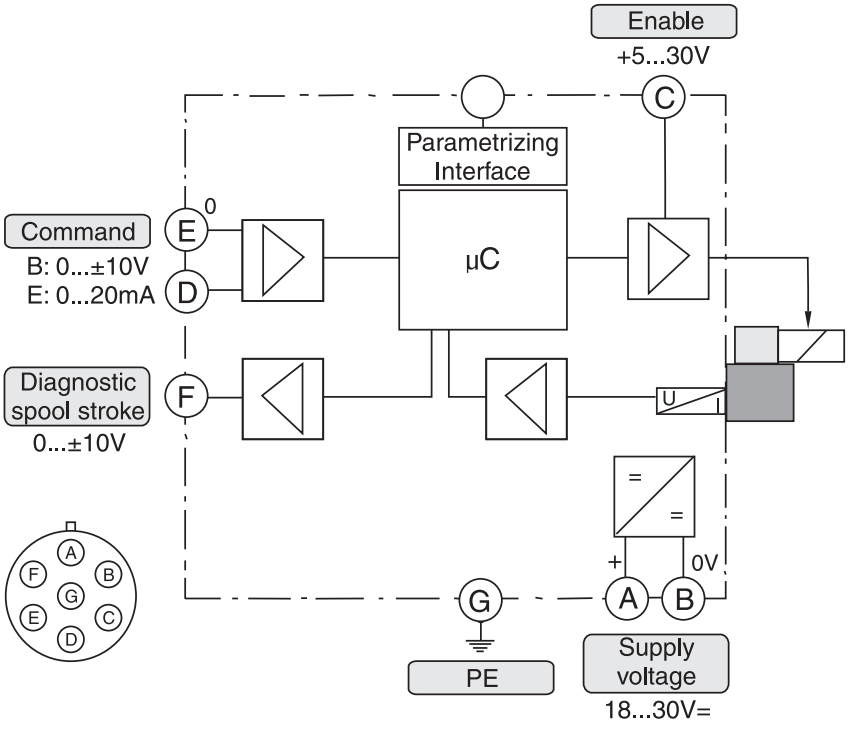
1) For optimal dynamics see installation recommendation.

(Continued on next page)

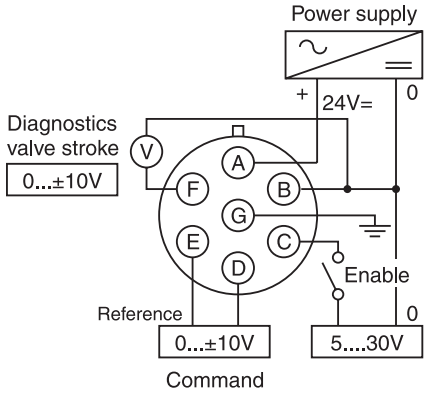
(Continued from previous page)

Electrical	
Duty Ratio	100%
Protection Class	IP65 in accordance with EN 60529 (with correctly mounted plug-in connector)
Supply Voltage / Ripple	DC 18...30V, electric shut-off at < 17, ripple < 5% eff., surge free
Current Consumption Max.	2.0 A
Pre-fusing	2.5 A medium lag
Input Signal **Code B Voltage** **Impedance** **Code E Current** **Impedance**	 0...+10, ripple < 0.01% eff., surge free 100 kOhm 0...+20, ripple < 0.01% eff., surge free < 250 kOhm
Differential Input Maximum	30V for terminal D and E against PE (terminal G), 11V for terminal D and E against 0V (terminal B)
Adjustment Ranges Min. **Max.** **Ramp**	0...50% 50...100% 0...32.5s
Enable Signal	5...30V
Diagnostic Signal	0...+10V / +12.5 error detection, rated max. 5mA
EMC	EN 61000-6-2, EN 61000-6-4
Electrical Connection	6 + PE as per EN 175201-804
Wiring Minimum mm^2	7 x 1.0 (AWG16) overall braid shield
Wiring Length Maximum	50 m (164 ft.)

Block Circuit Diagram Electronics

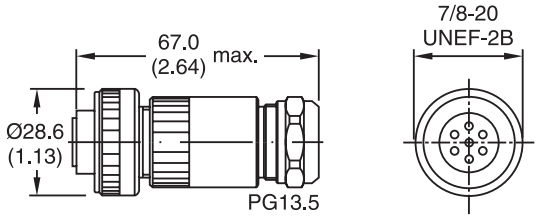


Connections Diagrams Electronics



Female Connector

(EMC conforming)

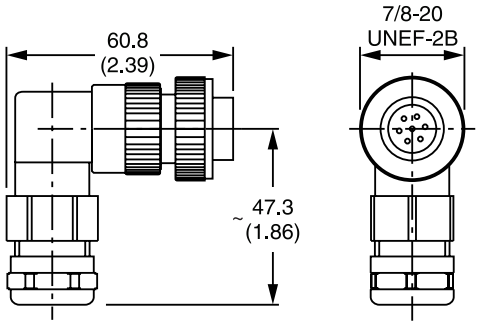


Part No. 5004072

Please order plugs separately.

Angle Female Connector

(EMC conforming)



Part No. 5005160

ProPxD Interface Program

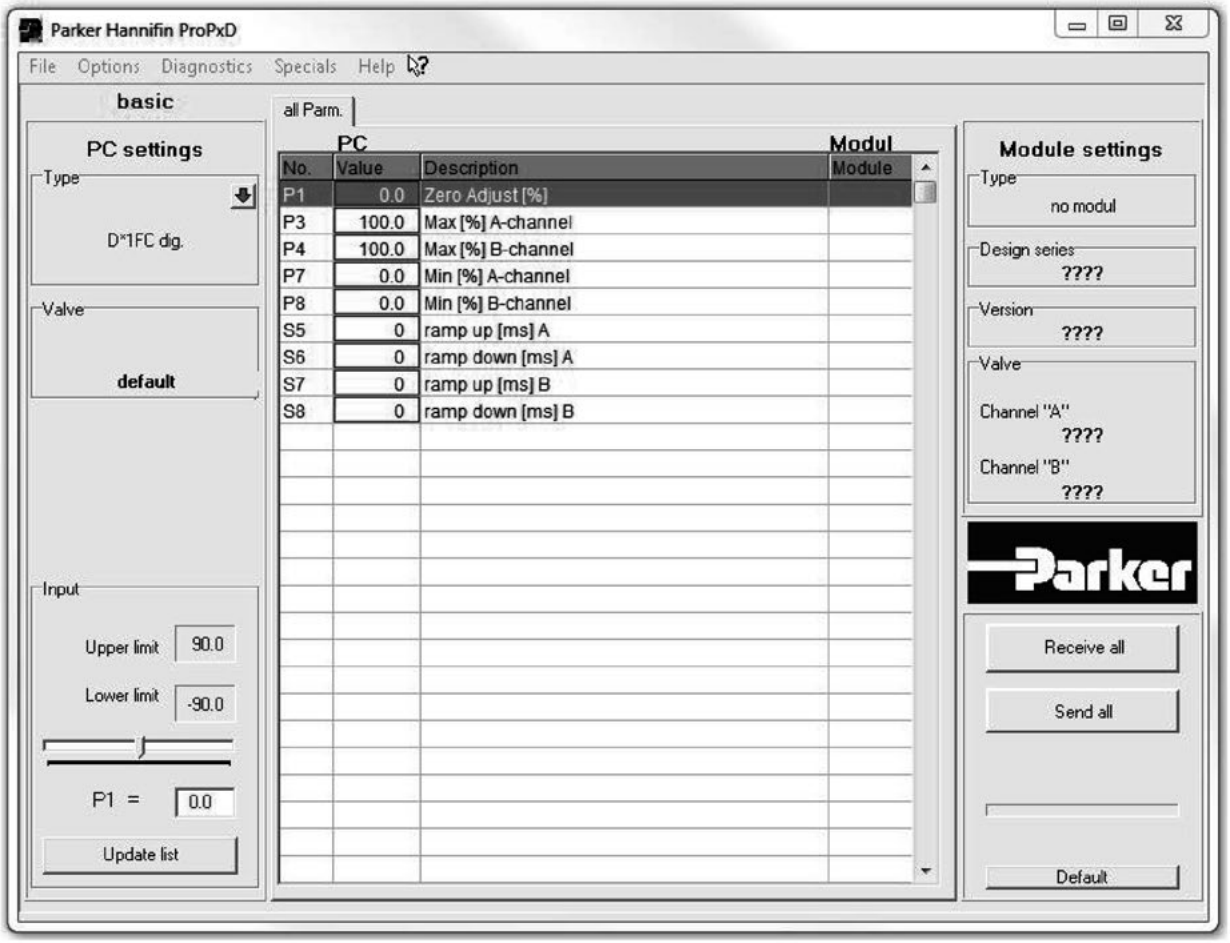
The ProPxD software allows quick and easy setting of the digital valve electronics. Individual parameters as well as complete settings can be viewed, changed and saved via the comfortable user interface. Parameter sets saved in the non-volatile memory can be loaded to other valves of the same type or printed out for documentation pur-poses.

The PC software can be downloaded free of charge at www.parker.com/euro_hcd – see page “Support” or directly at www.parker.com/propxd.

Features

- Simple editing of valve parameters.
- Saving and loading of customized parameter sets.
- Executable with all Windows® operating systems from Windows® XP upwards.
- Communication between PC and valve electronics via serial interface RS-232C.

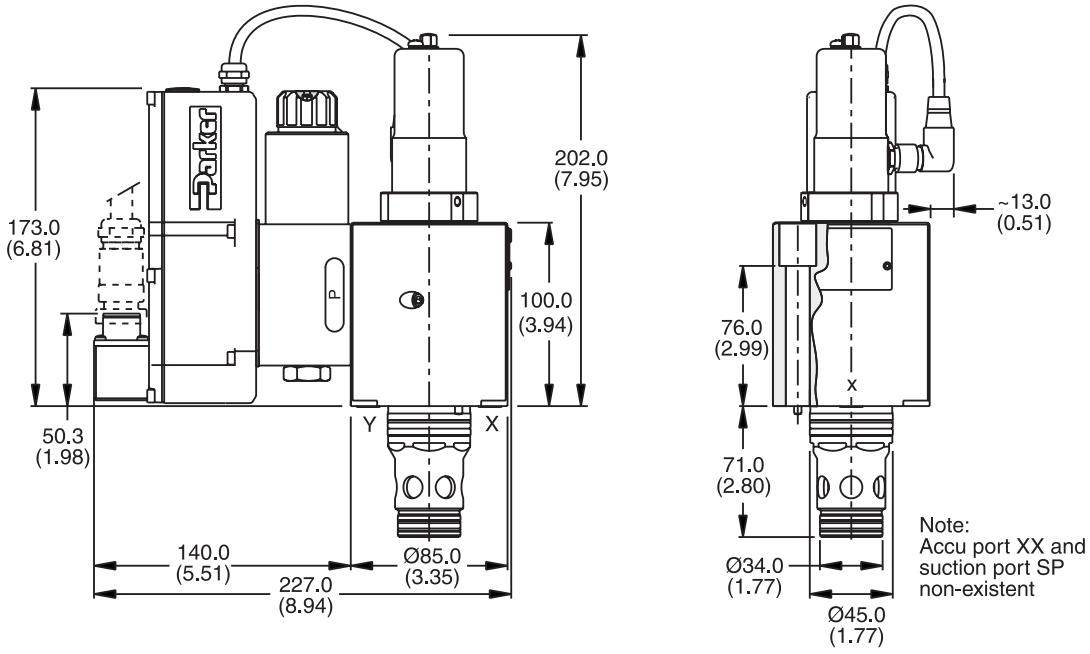
The valve electronics cannot be connected to a PC with a standard USB cable – this can result in damages of PC and/or valve electronics.



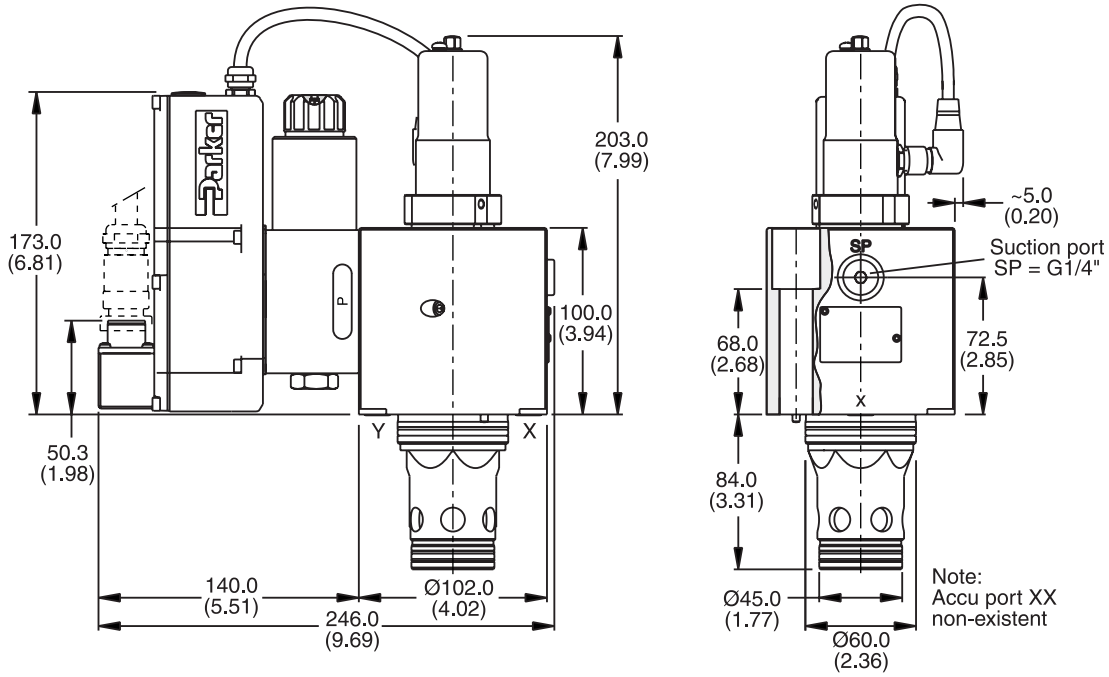
The parametrizing cable may be ordered under item no. 40982923.

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

NG25



NG32

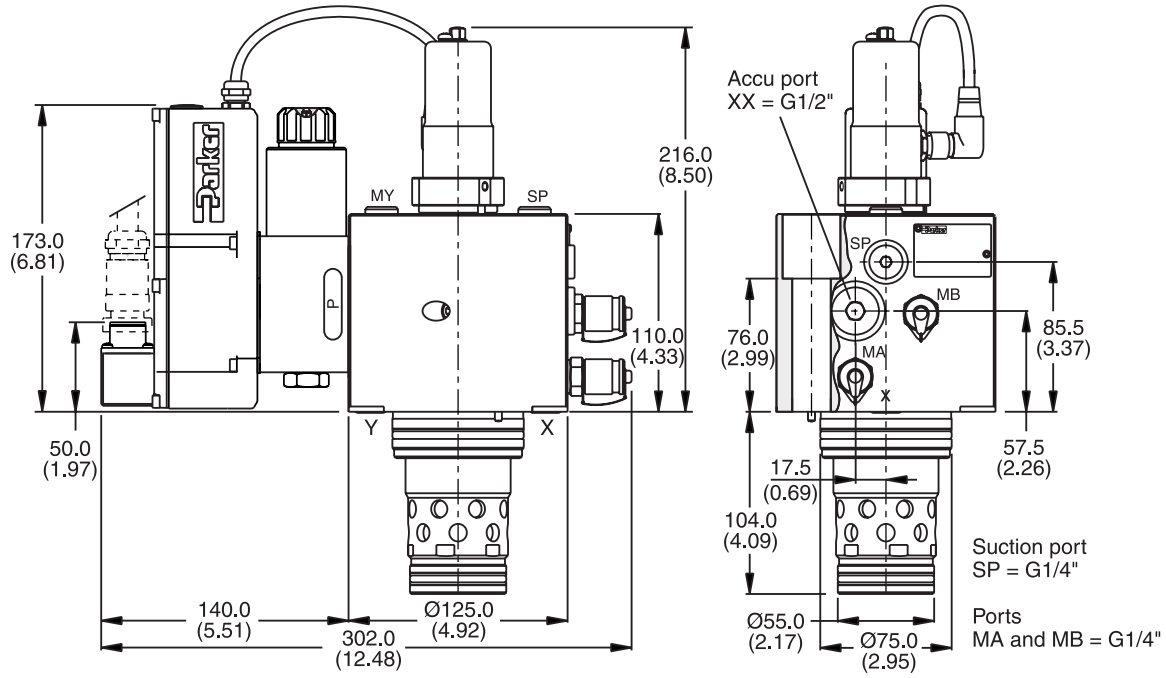


Suction port SP: Contact Parker for installation recommendation.

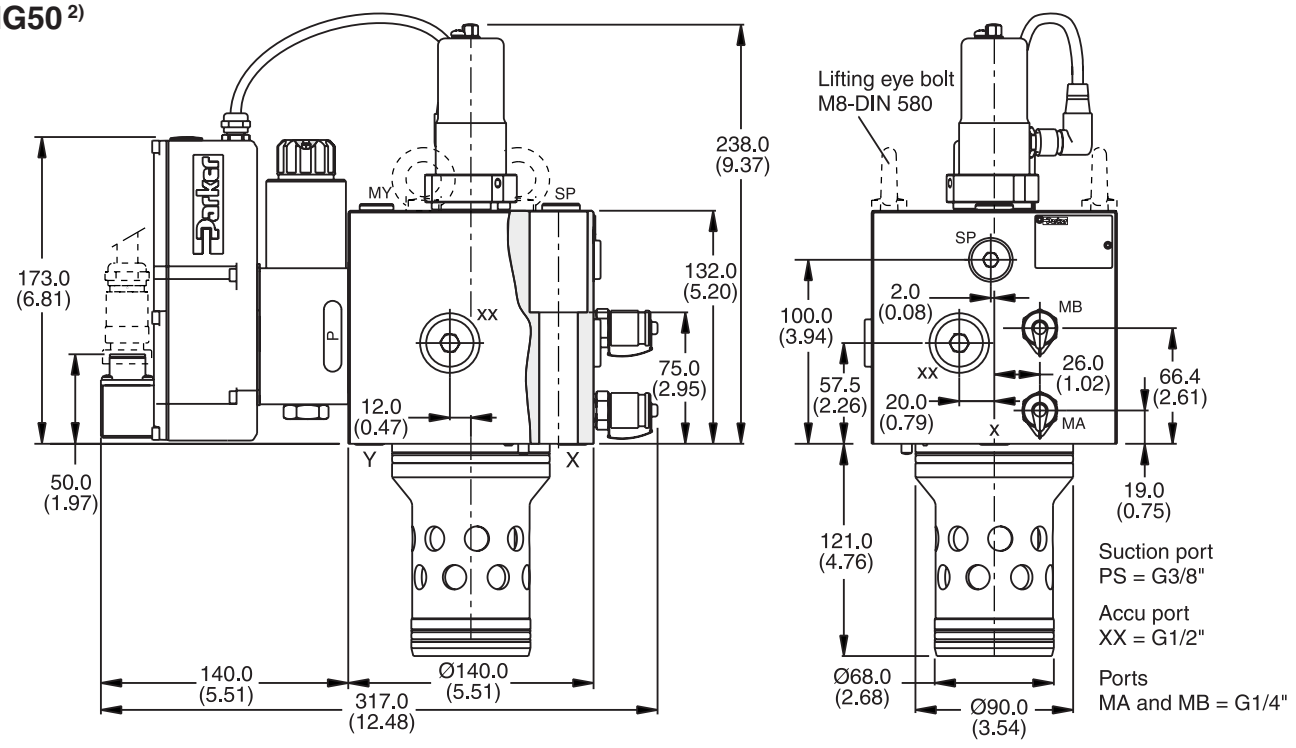
NG	Bolt Kit -				Kit	
					Nitrile	Fluorocarbon
25	BK504	4 x M12x100	ISO 4762-12.9	108 Nm (79.7 lb.-ft.)	SK-TDP025EN30	SK-TDP025EV30
32	BK529	4 x M16x100	ISO 4762-12.9	264 Nm (194.7 lb.-ft.)	SK-TDP032EN30	SK-TDP032EV30

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

NG40 [1)]



NG50 [2)]



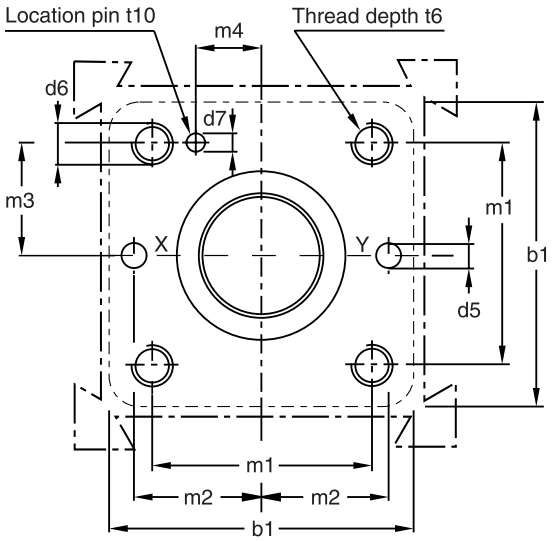
1) Recommended accumulator ELM 0.16-250/00/AF, please see catalog HY10-4004/UK for details.
2) Recommended accumulator ELM 0.32-210/00/AF, please see catalog HY10-4004/UK for details.

NG	Bolt Kit -				Kit	
					Nitrile	Fluorocarbon
40	BK481	4 x M12x100	ISO 4762-12.9	517 Nm (381.3 lb.-ft.)	SK-TDP040EN30	SK-TDP040EV30
50	BK481	4 x M16x100	ISO 4762-12.9	517 Nm (381.3 lb.-ft.)	SK-TDP050EN30	SK-TDP050EV30

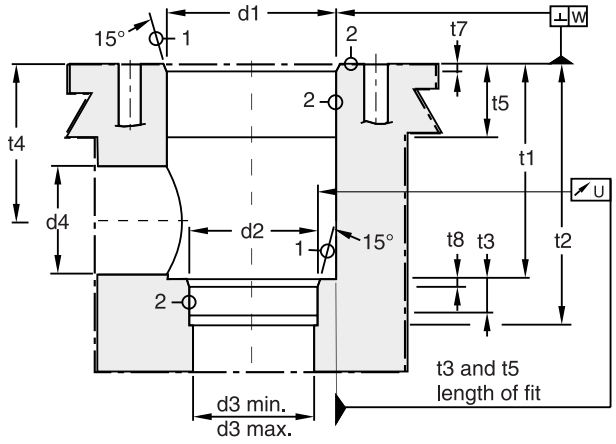
Inch equivalents for millimeter dimensions are shown in (**)

Code: ISO 7368-B*-*-2-A/B

NG25 to NG50



Thread	Thread Pitch mm (in)
M6	1.00 (.039)
M8	1.25 (.049)
M10	1.50 (.059)
M12	1.75 (.069)
M14, M16	2.00 (.079)
M20	2.50 (.098)
M24	3.00 (.118)



Required surface finish:

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

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

Size	b1	d1 H7	d2 H7	d3 / d4	d3 max.	d4 max.*	d5	d6	d7 H13	m1±0.2	m2±0.2	m3±0.2
25	85.0 (33.5)	45.0 (1.77)	34.0 (1.34)	25.0 (0.98)	27.0 (1.06)	32.0 (1.26)	6.0 (0.24)	M 12	4.0 (0.16)	58.0 (2.28)	33.0 (1.30)	29.0 (1.14)
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)

Size	m4±0.2	t1+0.5	t2+1	t3	t4	t4 max.*	t5	t6	t7	t8	t10	U	W
25	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)	35.0 (1.38)	25.0 (0.98)	25.0 (0.98)	10.0 (0.39)	0.03 (0.001)	0.05 (0.002)
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)

* d4 max. only in combination with t4 max.

General Description

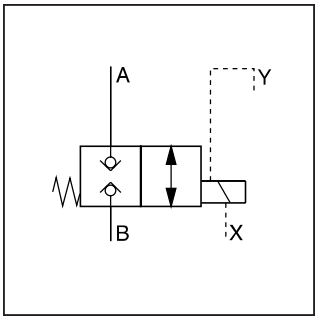
Series TDW active pilot operated 2/2-way cartridge valves open and close the main poppet solely by pilot pressure, independent of pressure build-pu in the main ports A and B.

The main poppet is designed hollow and mostly pressure balanced. The operation is accomplished via minimal control surfaces resulting in low pilot oil demand and fast switching operations.

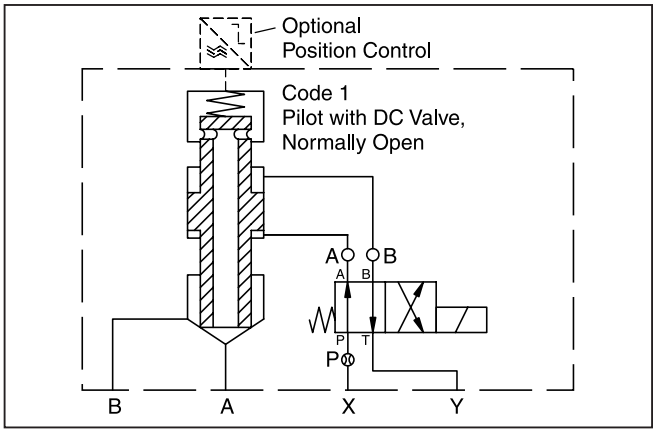
TDW is supplied as one unit to ensure easy installation – sleeve and body are screwed together. Additionally, the lower recess in the standardized mounting cavity is no longer required, providing the possibility to minimize pressure losses in the manifold block.

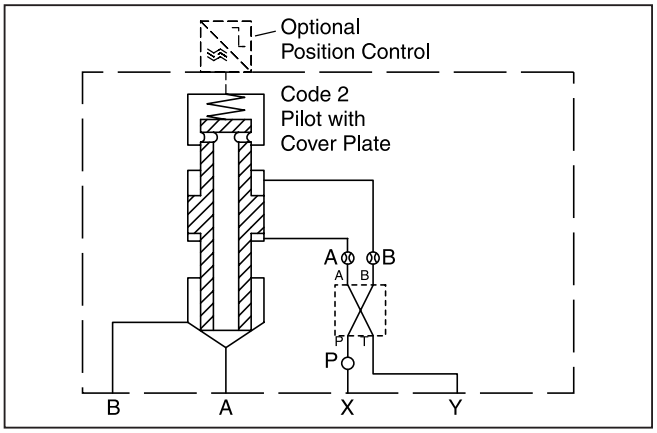
Features

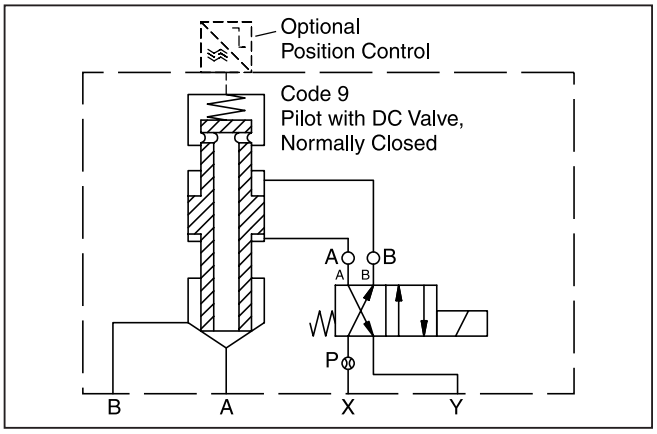
- Active pilot operated 2/2-way cartridge valve.
- Cavity and mounting pattern according to ISO 7368 (except size NG125).
- Flow direction B to A and A to B.
- 8 sizes NG25 up to NG126.
- Position monitoring optional.
- Stroke limiter optional.



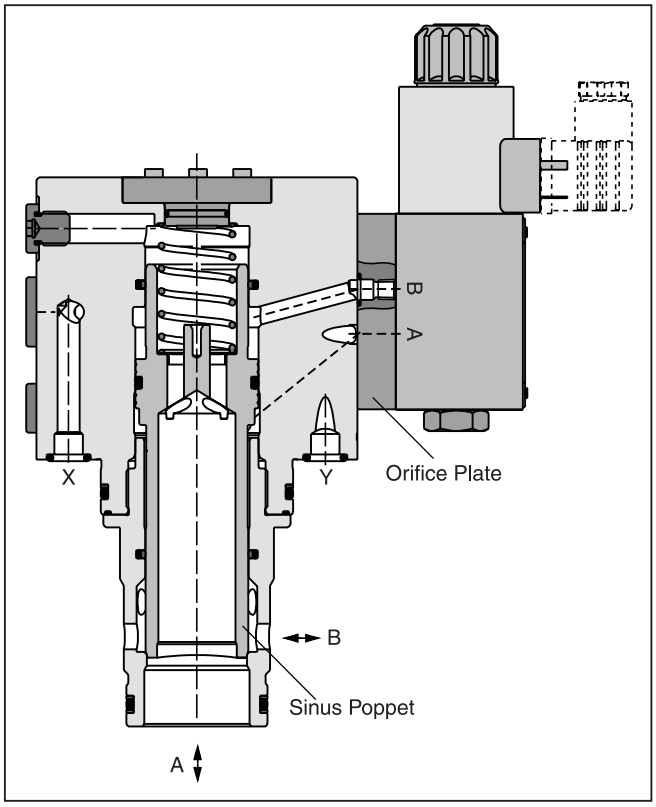
Function Symbols







TDW040



Cat3200_02.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

Ordering Information

TDW		E	W		9	C	2	N			J	W				
2/2-Way Cartridge Valve DC Pilot	Nominal Size	Parker Slip-in Cartridge	Design	Sinus Poppet	Nominal Flow 100%	Flow Direction B to A A to B	Pilot Oil Supply External Drain External	Seal	Position Control	Pilot Direct Operated	Omit for Valves Without DC Valve			P	A	B
											Solenoid Voltage DC Valve 24V =	Connector as per EN175301-803	Options DC Valve		Orifice	

Code	Description
025	NG25
032	NG32
040	NG40
050	NG50
063	NG63
080	NG80
100	NG100
125	NG125

Code	Poppet Shape
1*	1:1 Standard
8**	With Overlap

* Not for start position monitored, Code 8.

** Only in combination with start position monitored, Code 8.

Code	Description
N	Nitrile

Code	Description
0	w/o Position Control
2*	Stroke Limiter
8**	Start Position Monitored

* Only for NG25 to NG63.

** Please order female connector M12x1 separately (see accessories directional control valves, female connector M12x1 (order no. 5004109).

Code	Description
1	With DC Valve, Normally Open
2	With Cover Plate X = Closing Y = Opening
9	With DC Valve, Normally Closed

Code	Description
0	Standard
T	Without Manual Override

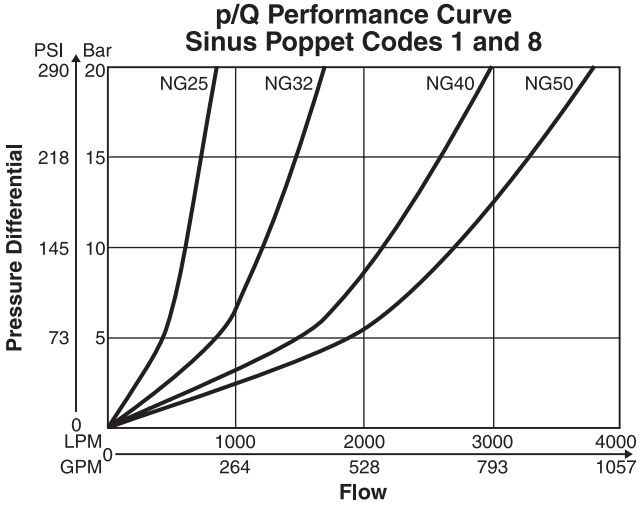
Code*	Nominal Size
Pilot with DC Valve	
129999	NG25, NG32
159999	NG40
189999	NG50
209999	NG63
259999	NG80
309999	NG100
359999	NG125
Pilot with Cover Plate	
991212	NG25, NG32
991515	NG40
991818	NG50
992020	NG63
992525	NG80
993030	NG100
993535	NG125

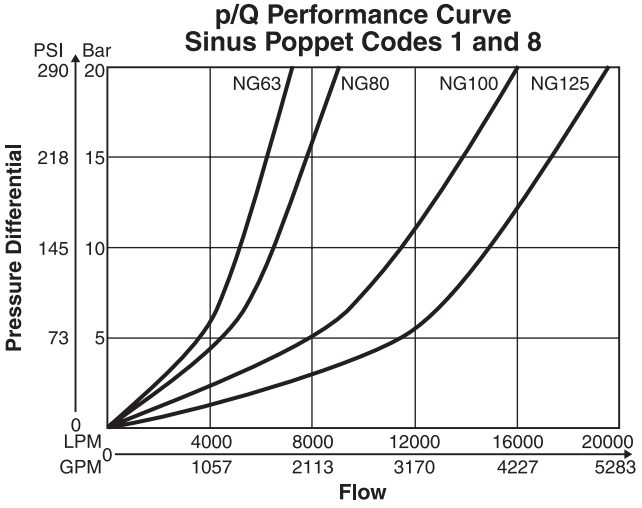
* Example Code 129999: 12 = dia. 1.2 mm, 99 = without orifice.

Weight:

TDW025	8 kg (17.6 lbs.)
TDW032	10 kg (22.0 lbs.)
TDW040	12 kg (26.5 lbs.)
TDW050	23 kg (50.7 lbs.)
TDW063	49 kg (108.7 lbs.)
TDW080	102 kg (224.9 lbs.)
TDW100	154 kg (339.5 lbs.)
TDW125	193 kg (425.5 lbs.)

Performance Curves





Characteristic curve measured with HLP46 at 50°C (122°F).

Cat3200_02.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

General								
Design	2-way slip-in cartridge valve according to ISO 7368 (except for size NG125)							
Size **DIN**	**NG25**	**NG32**	**NG40**	**NG50**	**NG63**	**NG80**	**NG100**	**NG125**
Mounting Position	Unrestricted							
Ambient Temperature	-20°C to +60°C (-4°F to +140°F)							
$MTTF_D$	75 Years							
Hydraulic								
Maximum Operating Pressure	Ports A, B, X, up to 350 Bar (5075 PSI); Port Y, maximum 210 Bar (3046 PSI) (350 bar (5075 PSI) with cover plate)							
Nominal Flow **LPM** **Δp = 5 Bar (72.5 PSI)** **GPM**	420 (111.0)	850 (224.6)	1500 (396.3)	1900 (501.9)	3600 (951.0)	4500 (1188.8)	8000 (2113.4)	11,500 (3038.0)
Maximum Flow **LPM** **Recommended** **GPM**	800 (211.3)	2000 (528.3)	3000 (792.5)	4500 (1188.8)	8000 (2113.4)	13,000 (3434.2)	20,000 (5283.5)	29,000 (7661.0)
Fluid	Hydraulic oil according to DIN 51524							
Fluid Temperature	-25°C to +70°C (-13°F to +158°F)							
Viscosity Recommended	30 to 80 cSt (mm^2/s)							
Viscosity Permitted	20 to 400 cSt (mm^2/s)							
Filtration	ISO 4406 (1999); 18/16/13							
Flow Direction	B to A and A to B							
Pilot Pressure	Must be as high as system pressure							
Overlap (for poppet code 8) **mm** **inches**	3.7 (0.15)	3.7 (0.15)	3.7 (0.15)	3.7 (0.15)	3.7 (0.15)	3.7 (0.15)	3.7 (0.15)	3.7 (0.15)
Electrical								
Duty Ratio	100% ED; CAUTION: Coil temperature up to 150°C (302°F) possible							
Protection Class	IP65 in accordance with EN 60529 (with correctly mounted plug-in connector)							
Code	J							
Supply Voltage	24 V =							
Tolerance Supply Voltage	±10%							
Current Consumption – Hold	1.29 A							
Current Consumption – In Rush	1.29 A							
Power Consumption – Hold	31 W							
Power Consumption – In Rush	31 W							
Solenoid Connection	Connector as per EN175301-803, solenoid identification as per ISO 9461 (code W).							
Wiring Minimum **[mm^2]**	3 x 1.5 recommended							
Wiring Length Maximum	50m recommended (164 ft)							

With electrical connections the protective conductor (PE ⏚) must be connected according to the relevant regulations.

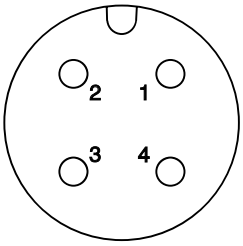
Electrical Characteristics of Position Control M12x1

As per IEC 61076-2-101, NG25 to NG125

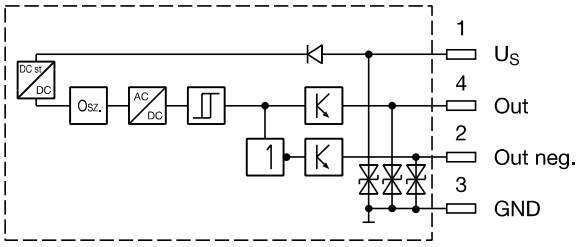
Supply Voltage	24 VDC
Tolerance Supply Voltage	±20%
Ripple Supply Voltage	≤10%
Polarity Protection	300V
Current Consumption without Load	≤20mA
Switching Hysteresis	<0.06mm
Max. Output Current Per Channel, ohmic	250 mA
Ambient Temperature	-20°C to +60°C (-4°F to +140°F)
Protection Class	IP65 in accordance with EN 60529 (with correctly mounted plug-in connector)
Min. Distance to Next AC Solenoid	0.1m
Interface	M12x1 to IEC 61076-2-101
CE Conform	EN61000-4-2 / EN61000-4-4 / EN61000-4-6* / ENV 50140 / ENV50204

*Only guaranteed with screened cable and female connector.

M12 Pin Assignment



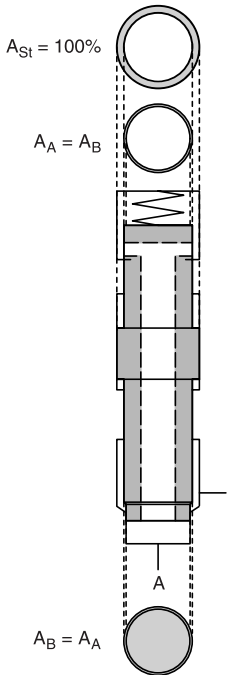
1 + U_S 19.2...28.8 V
2 Out B: normally open
3 0V
4 Out A: normally closed



Outputs: Open collector

Please order female connector M12x1 separately, part number 5004109.

Control Surfaces



NG	Pilot Oil Volume for Full Stroke (cm^3)	A_{ST} (%)	Standard Poppet 1 A_B/A_{ST} (%)	Overlapped Poppet 8 A_B/A_{ST} (%)
25	4.7	100	0	10.6
32	5.3	100	0	10.9
40	8.3	100	0	11.2
50	12.9	100	0	11.5
63	18.9	100	0	11.7
80	28.5	100	0	11.8
100	35.3	100	0	12.0
125*	–	–	–	–

* On Request

The 1:1 standard poppet (Code 1) is pressure balanced. The overlapped poppet (Code 8) shows smaller areas A_A respectively A_B.

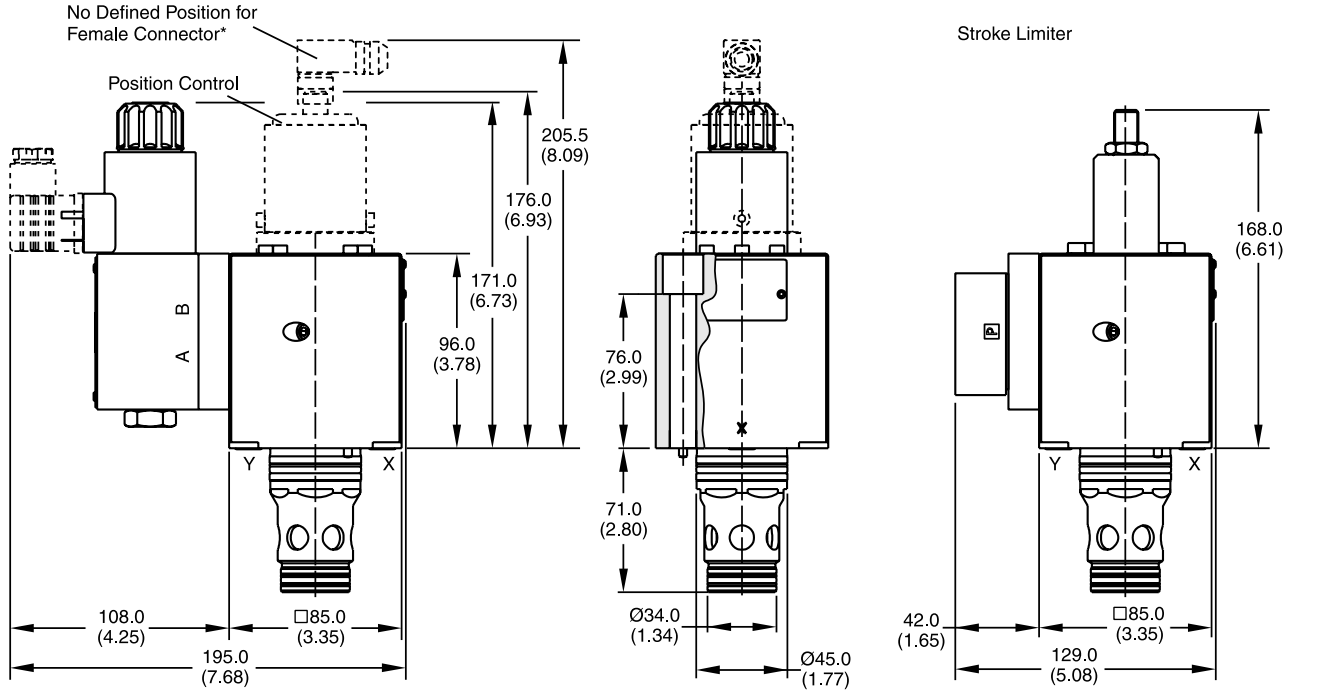
Example for NG100:

A_{NOM} = 7854 mm^2 = 600%
A_{St} = 1307 mm^2 = 100%
A_A=A_B = 157 mm^2 = 12%

Dimensions

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

NG25

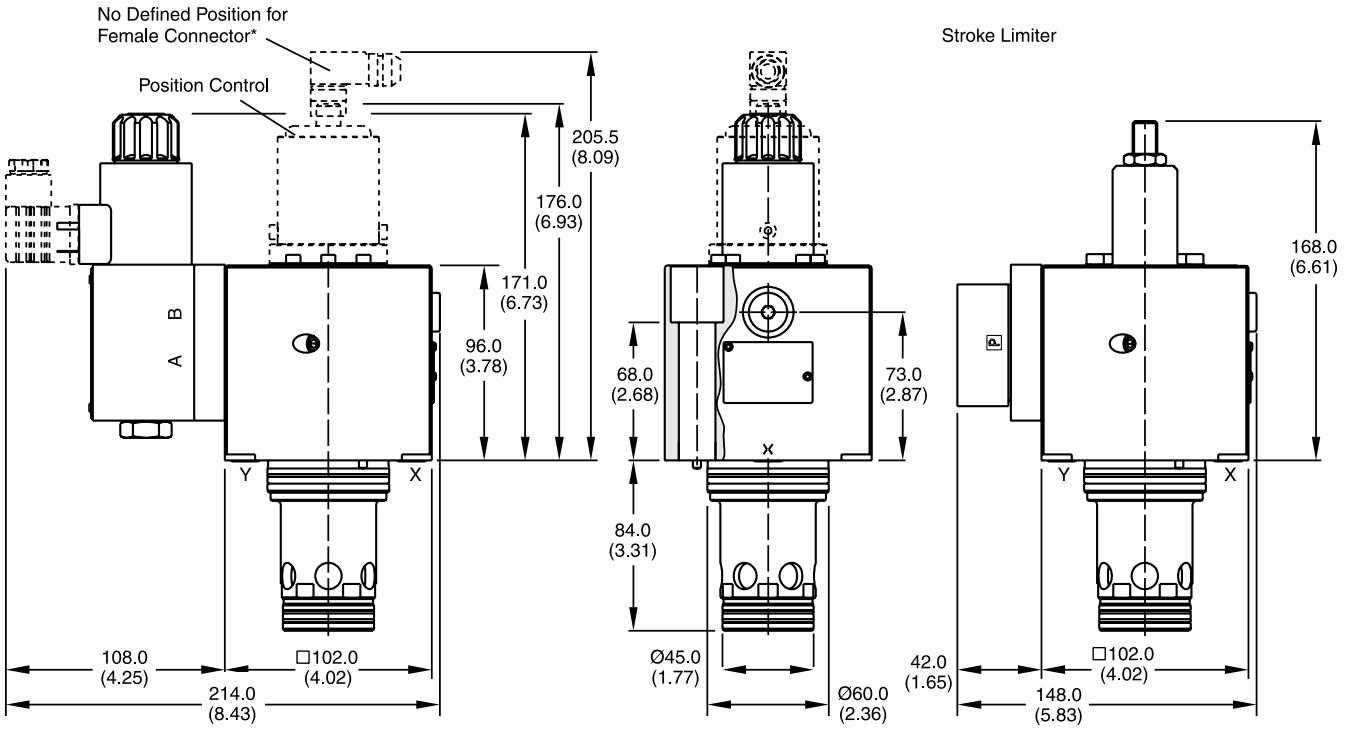


*Please order female connector M12x1 separately, part number 5004109.

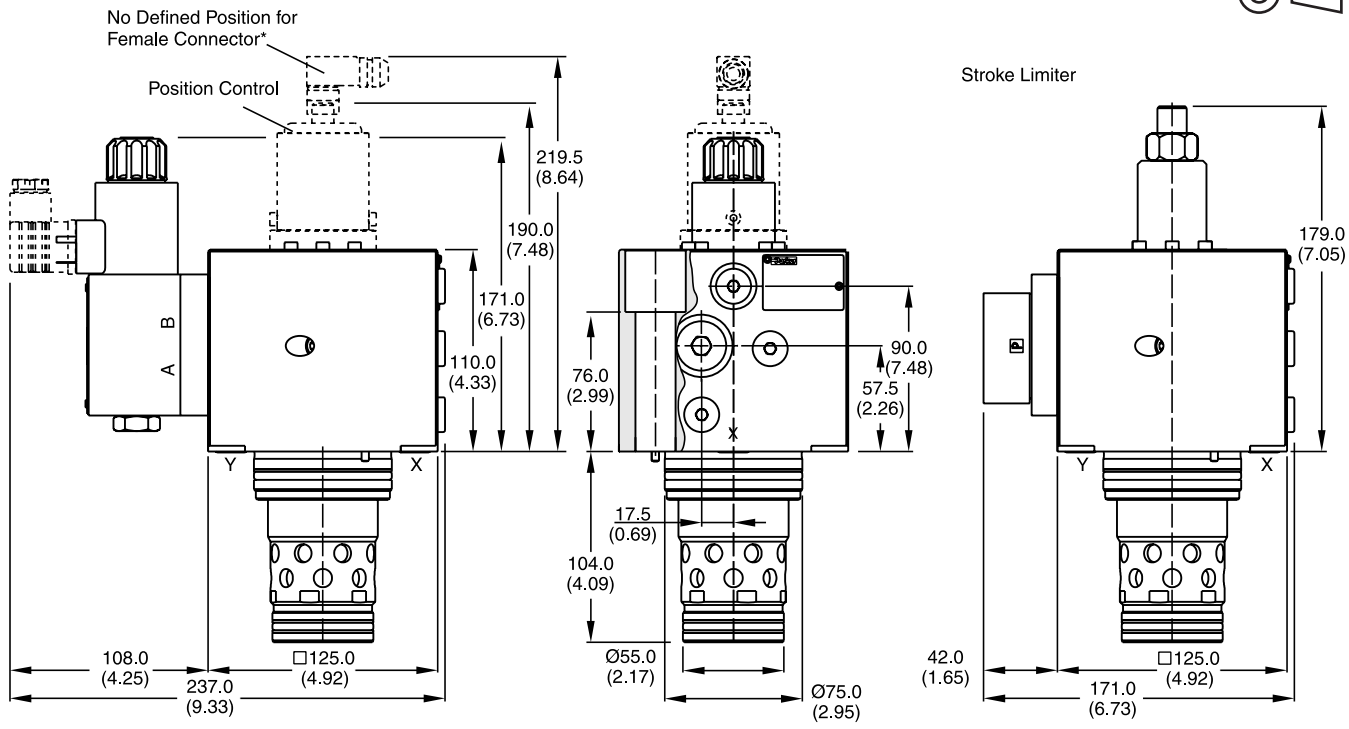
NG	Bolt Kit -		Kit Nitrile	Kit Fluorocarbon
25	BK504 4 x M12x100 ISO 4762-12.9	108 Nm (79.7 lb.-ft.)	SK-TDW025EN	SK-TDW025EV

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

NG32



NG40

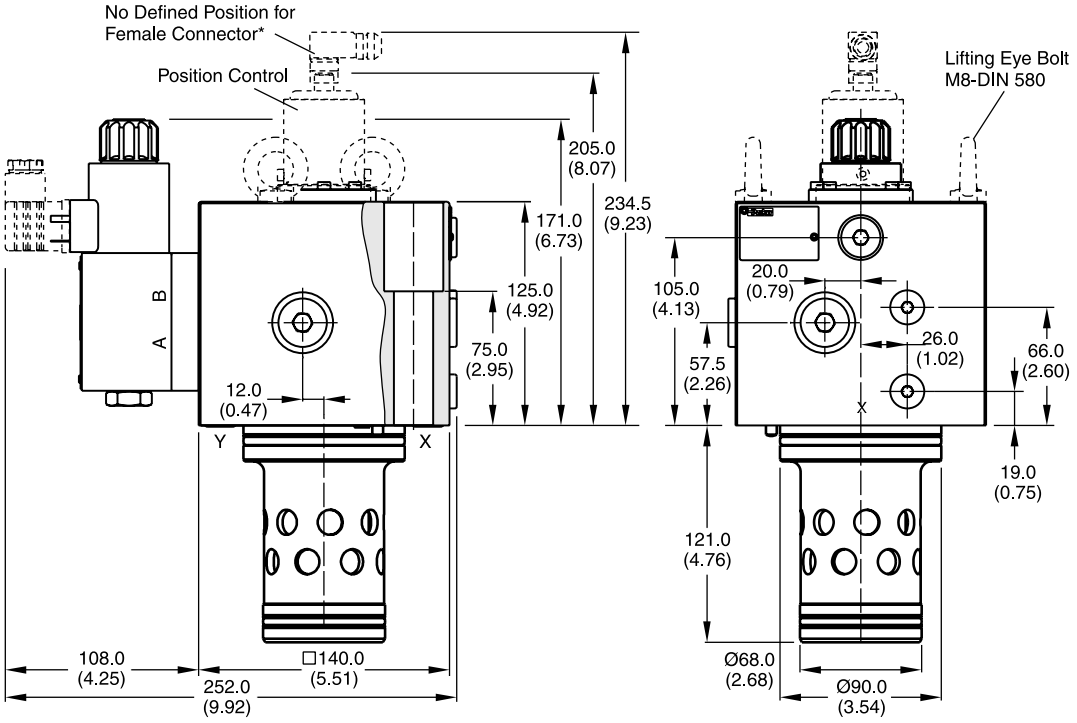


*Please order female connector M12x1 separately, part number 5004109.

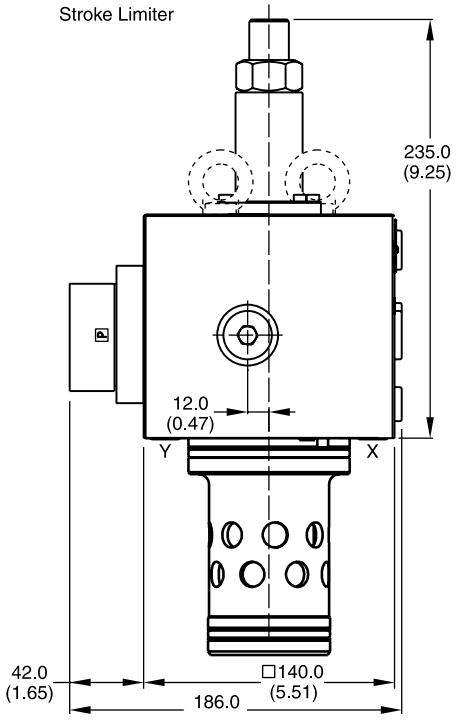
NG	Bolt Kit -		Kit	
			Nitrile	Fluorocarbon
32	BK529 4 x M16x100 ISO 4762-12.9	264 Nm (194.7 lb.-ft.)	SK-TDW032EN	SK-TDW032EV
40	BK481 4 x M20x100 ISO 4762-12.9	517 Nm (381.3 lb.-ft.)	SK-TDW040EN	SK-TDW040EV

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

NG50



Lifting Thread for Disassembly M12

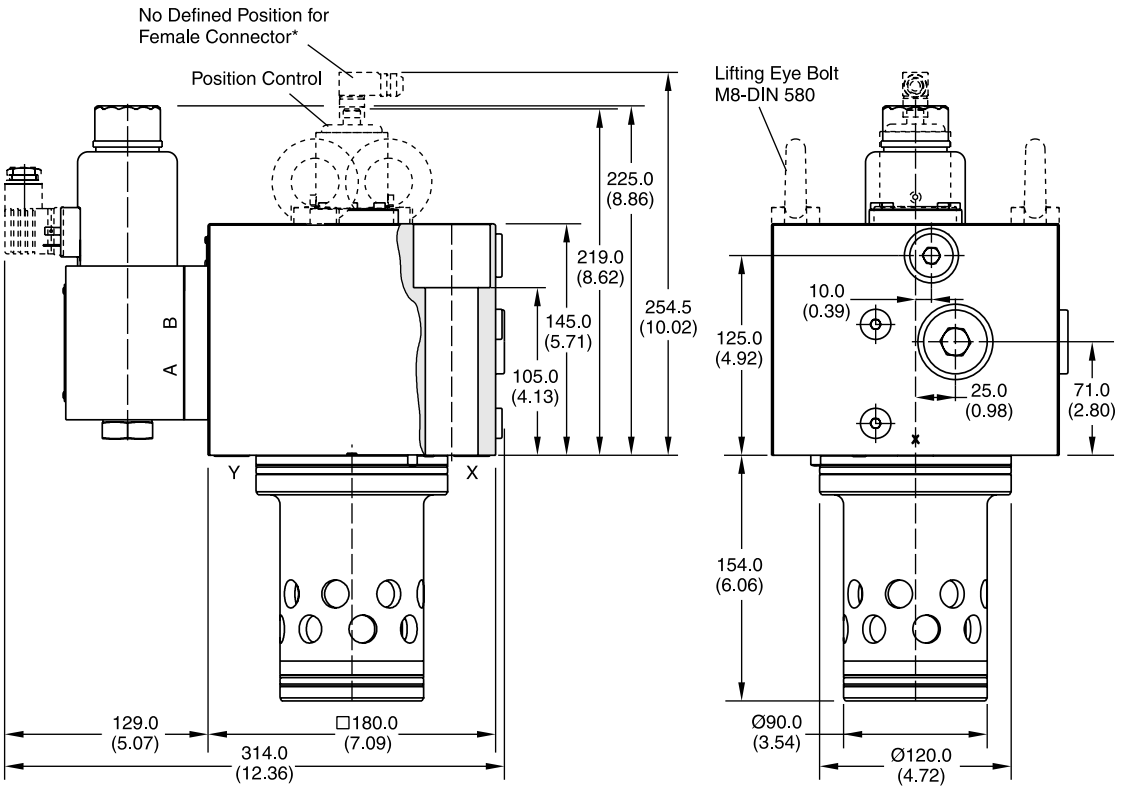


*Please order female connector M12x1 separately, part number 5004109.

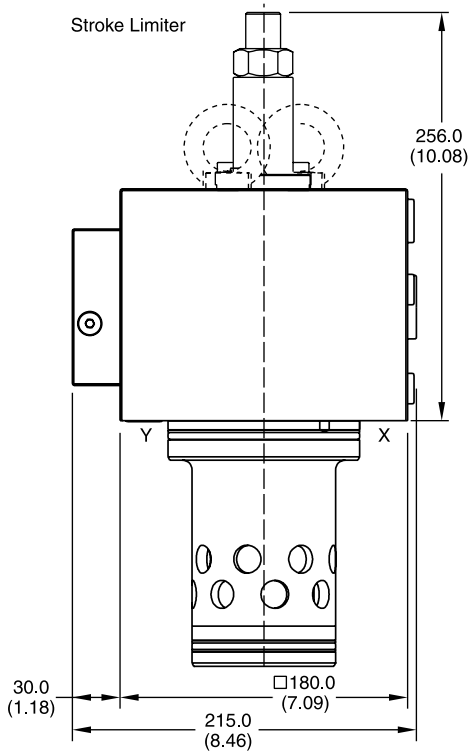
NG	Bolt Kit -		Kit	
			Nitrile	Fluorocarbon
50	BK481 4 x M20x110 ISO 4762-12.9	517 Nm (381.3 lb.-ft.)	SK-TDW050EN	SK-TDW050EV

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

NG63



Lifting Thread for Disassembly M12

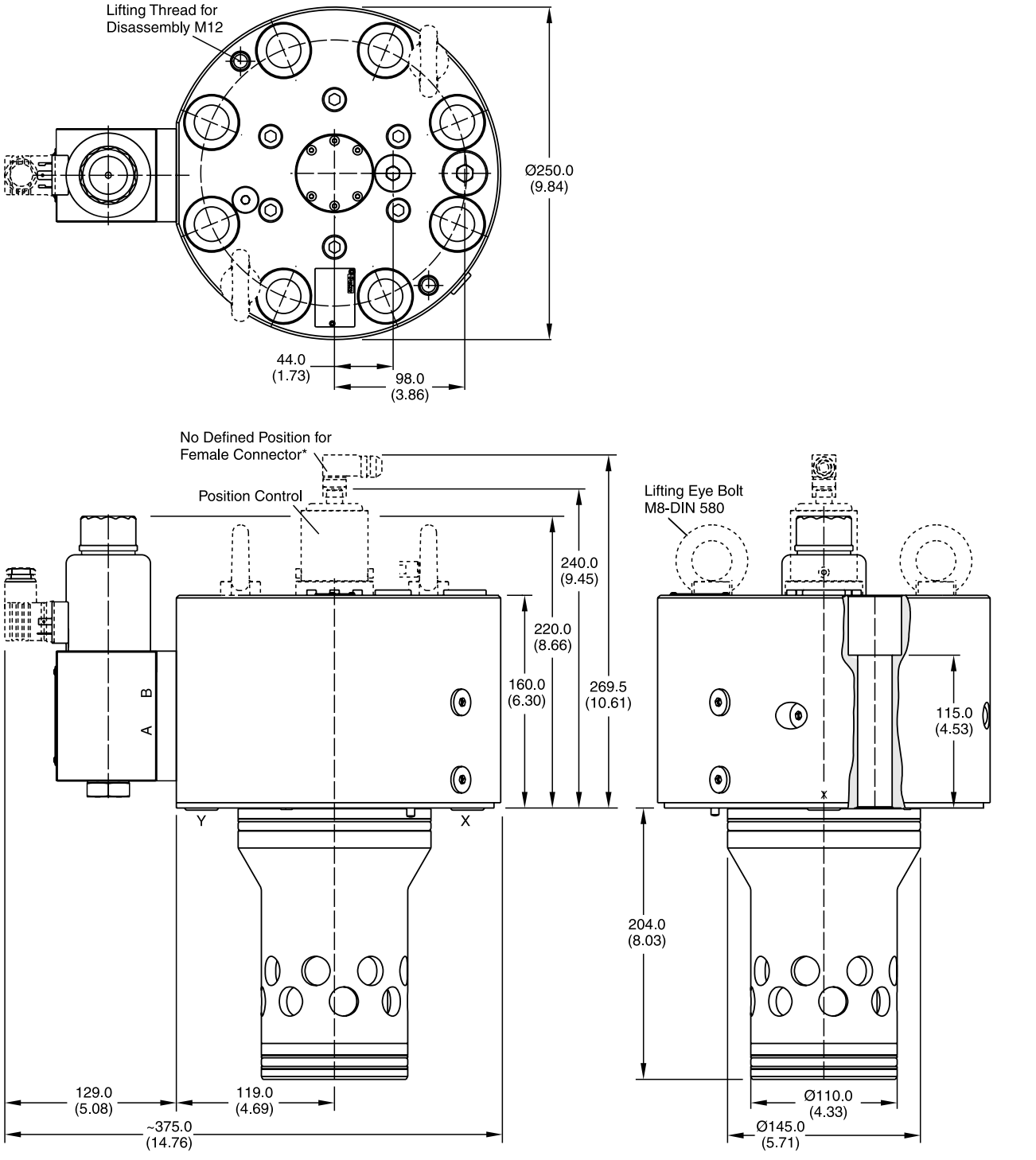


*Please order female connector M12x1 separately, part number 5004109.

NG	Bolt Kit		Kit Nitrile	Kit Fluorocarbon
63	BK518 4 x M30x160 ISO 4762-12.9	1775 Nm (1309.2 lb.-ft.)	SK-TDW063EN	SK-TDW063EV

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

NG80



*Please order female connector M12x1 separately, part number 5004109.

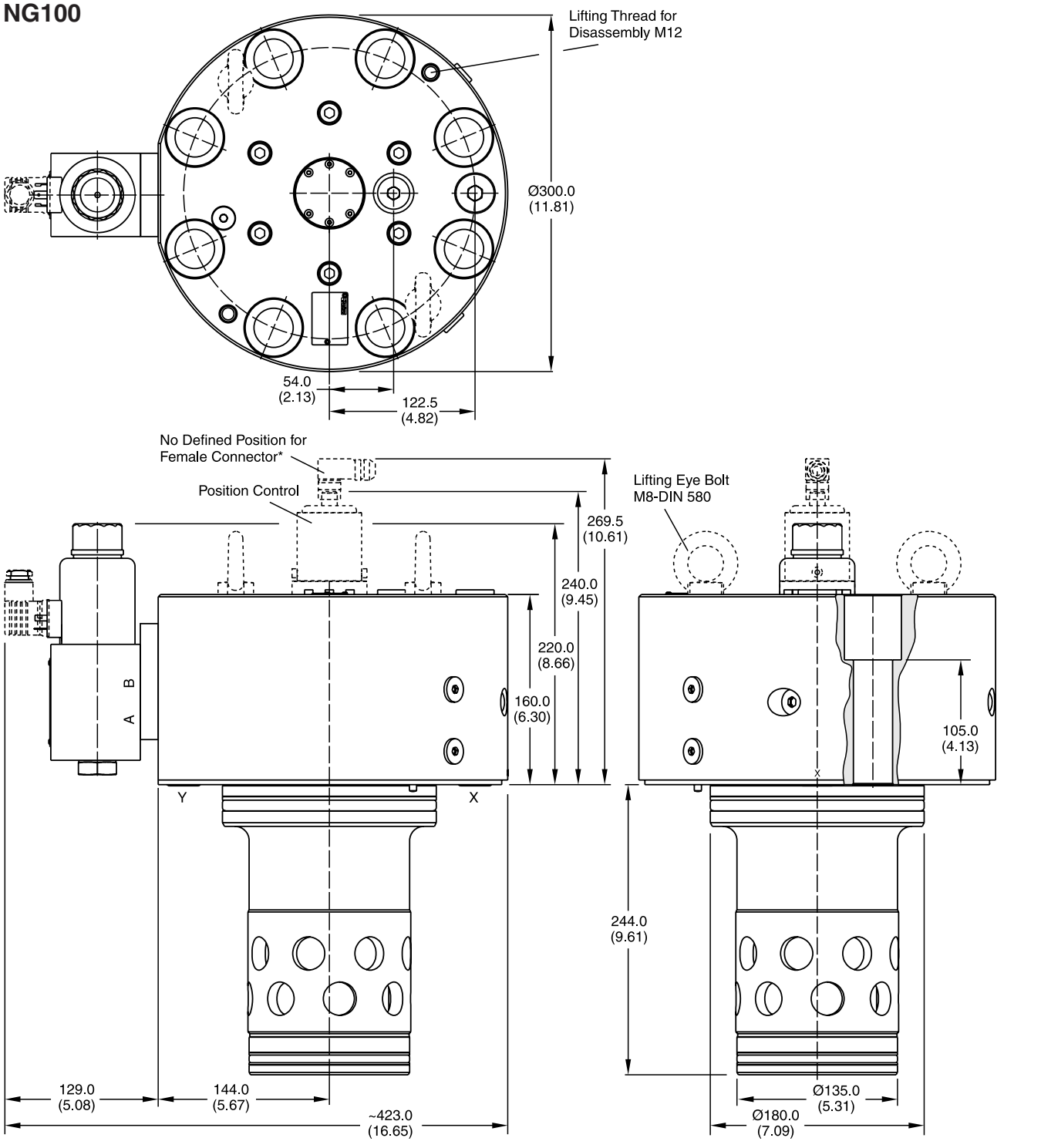
NG	Bolt Kit		Kit	
			Nitrile	Fluorocarbon
80	BK530 8x M24x160 ISO4762-12.9	890 Nm (656.4 lb.-ft.)	SK-TDW080EN	SK-TDW080EV

Cat3200_02.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

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

NG100



*Please order female connector M12x1 separately, part number 5004109.

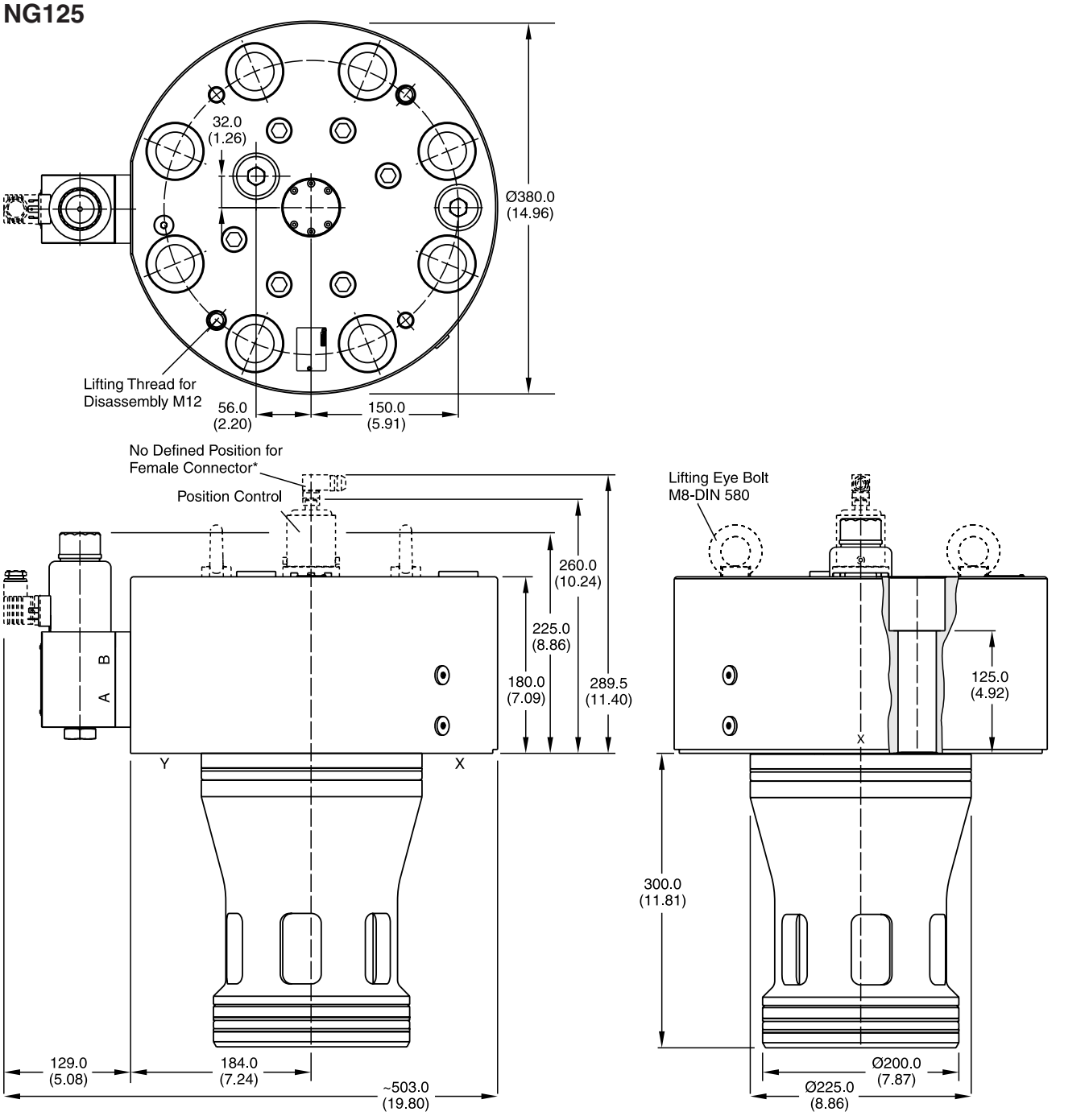
NG	Bolt Kit		Kit	
			Nitrile	Fluorocarbon
100	BK531 8 x M30x150 ISO 4762-12.9	1775 Nm (1309.2 lb.-ft.)	SK-TDW100EN	SK-TDW100EV

Cat3200_02.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

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

NG125



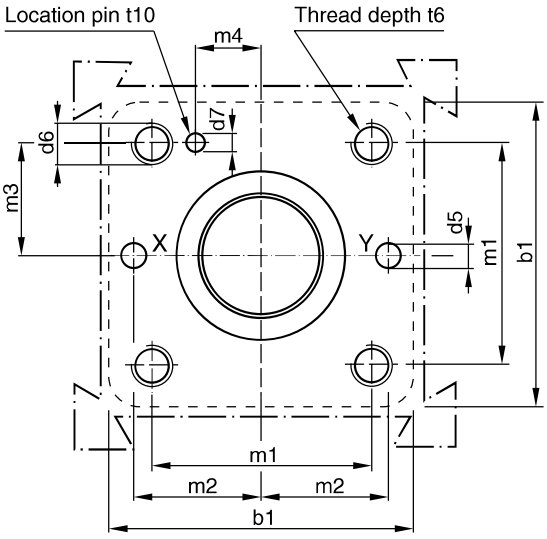
*Please order female connector M12x1 separately, part number 5004109.

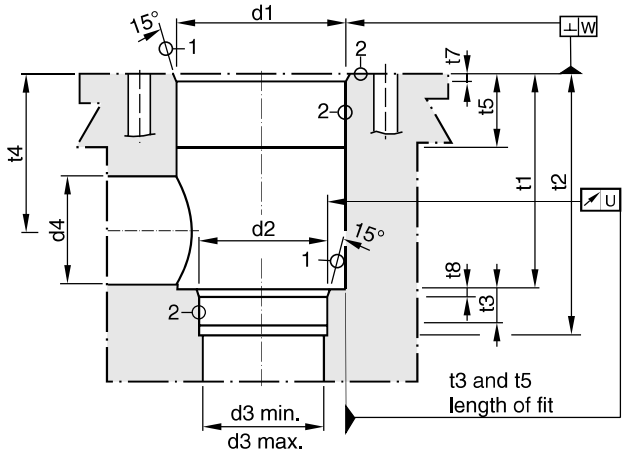
NG	Bolt Kit		Kit	
			Nitrile	Fluorocarbon
125	BK537 8 x M36x180 ISO 4762-12.9	3100 Nm (2286.4 lb.-ft.)	SK-TDW125EN	SK-TDW125EV

Cat3200_02.indd, ddp, 04/19

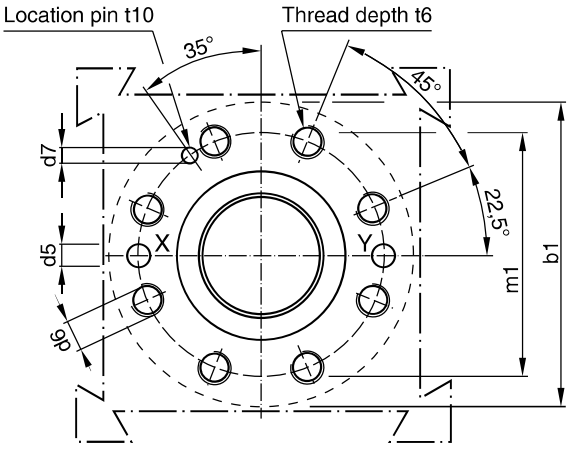
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

Code: ISO 7368-B*-*-2-A/B
NG25 to NG63





Code: ISO 7368-B*-*-2-A (except for size NG125)
NG80 to NG125



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.

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
25	85.0 (33.5)	45.0 (1.77)	34.0 (1.34)	25.0 (0.98)	27.0 (1.06)	32.0 (1.26)	6.0 (0.24)	M 12	4.0 (0.16)	58.0 (2.28)	33.0 (1.30)	29.0 (1.14)
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)	90.0 (3.54)	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)	110.0 (4.33)	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)	—	—
125	380.0 (14.96)	225.0 (8.86)	200.0 (7.87)	125.0 (4.92)	150.0 (5.91)	150.0 (5.91)	32.0 (1.26)	M 36	9.0 (0.35)	300.0 (11.81)	—	—

Size	m4±0.2	t1+0.5	t2+1	t3	t4	t4 max.*	t5	t6	t7	t8	t10	U	W
25	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)	35.0 (1.38)	2.5 (0.10)	2.5 (0.10)	10.0 (0.39)	0.03 (0.001)	0.05 (0.002)
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)
125	—	257.0 (10.12)	$300.0^{+0.15}$ (11.81)	31.0 (1.22)	192.0 (7.56)	180.0 (7.09)	40.0 (1.57)	62.0 (2.44)	5.5 (0.22)	7.0 (0.28)	10.0 (0.39)	0.05 (0.002)	0.2 (0.008)

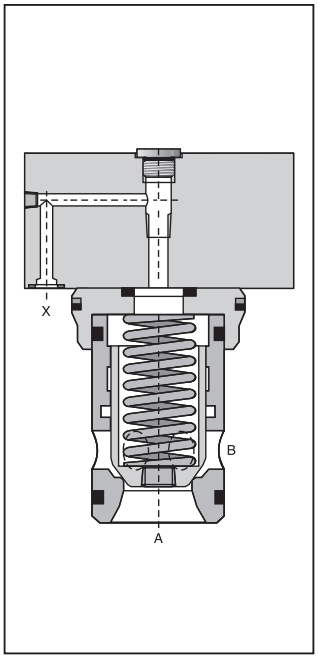
* Only in combination with d4 max and t4 max.

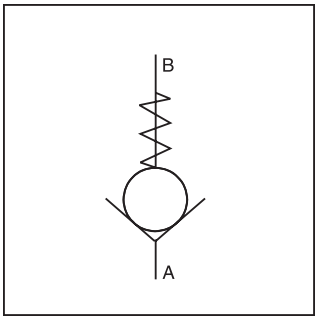
Cat3200_02.indd, ddp, 04/19

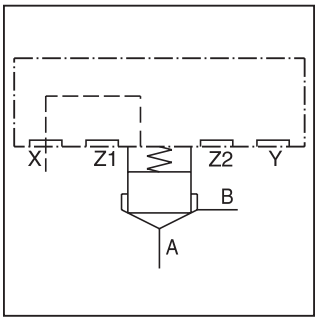
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

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)							

Cat3200_02.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

Ordering Information

	C1DB	101	E	0	/	0		99	00
Seals	Check Valve	Cover	Slip-in Valve	Valve Size		Design Series	Closing Spring		

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)

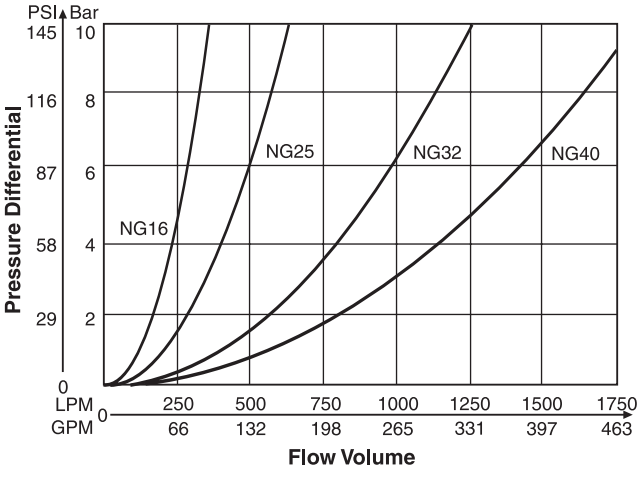
Weight:

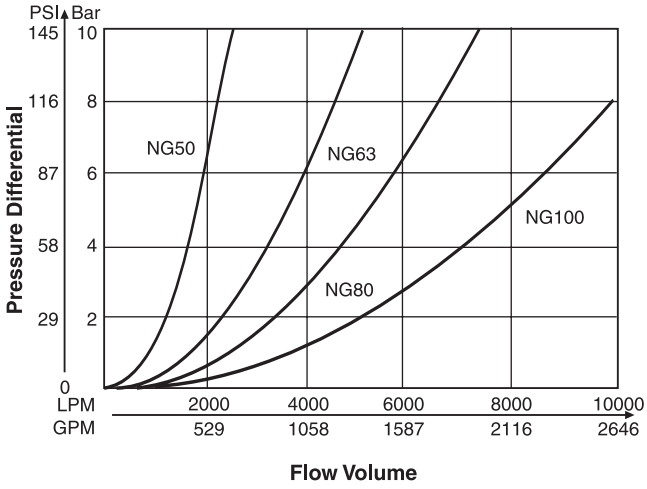
C1DB16	1.2 kg (2.6 lbs.)
C1DB25	2.5 kg (5.5 (lbs.)
C1DB32	3.9 kg (8.6 lbs.)
C1DB40	7.0 kg (15.4 lbs.)
C1DB50	11.4 kg (25.1 lbs.)
C1DB63	21.8 kg (48.1 lbs.)
C1DB80	45.0 kg (99.2 lbs.)
C1DB100	74.0 kg (163.2 lbs.)

Springs

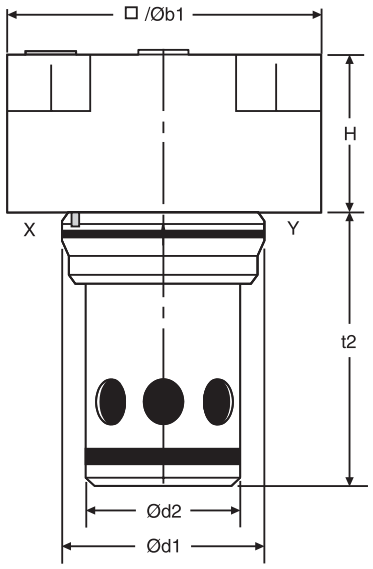
	Ordering Number							
Spring Type	**NG16**	**NG25**	**NG32**	**NG40**	**NG50**	**NG63**	**NG80**	**NG100**
L (0.1 Bar) (1.5 PSI)	45051368	45051375	45051376	45051382	45051384	45051388	45051395	45051400
N (0.5 Bar) (7.3 PSI)	45051369	45051374	45051377	45051381	45051385	45051389	45051396	45051401
S (1.6 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

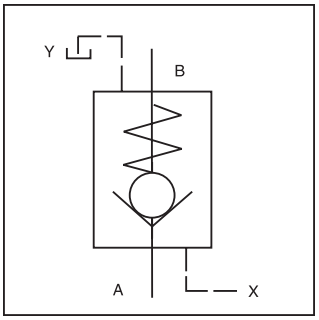
When no pressure is applied to the X-port, the flow from B to A is blocked, because the pressure in B is also effective on top of the poppet.

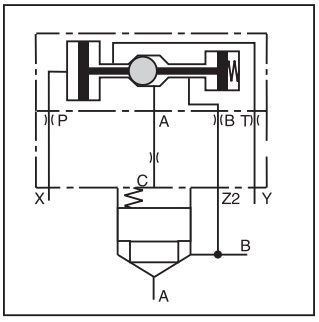
Pressurizing the X-port relieves the area on top of the poppet to the drain port and allows flow from B to A.

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

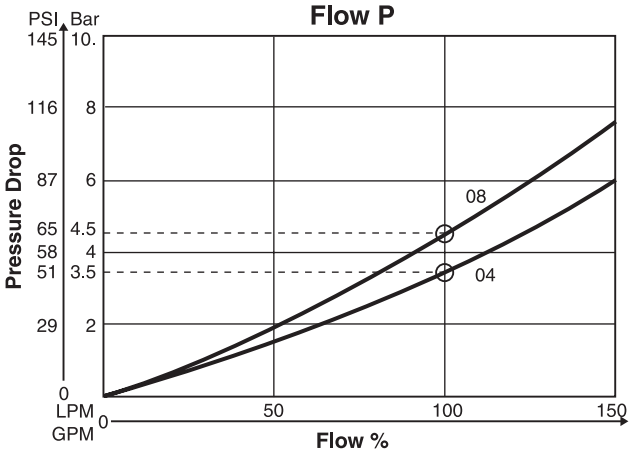
Features

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

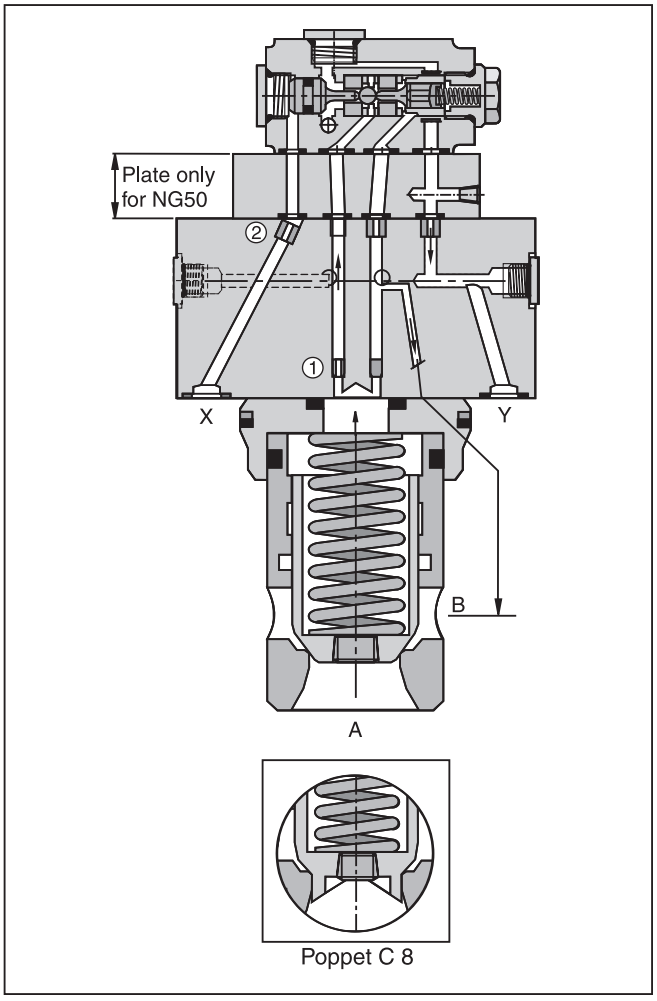




Performance Curves



Poppet Type 04, 08, without spring



Poppet C 8

⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

Ordering Information

Seals	Hydraulically Operated Check Valve	Slip-in Mounting	Design Style according to ISO 7368	Poppet Type	Pilot Control Ratio 6:1	Slip-in Cartridge Valve	Valve Size	Closing Spring	Design Series
☐	SVL	B	10	☐	6	E	☐	☐	⌜⌝

NOTE: Not required when ordering.

Code	Description
Omit	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)

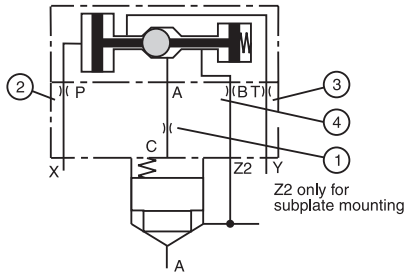
Weight:

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

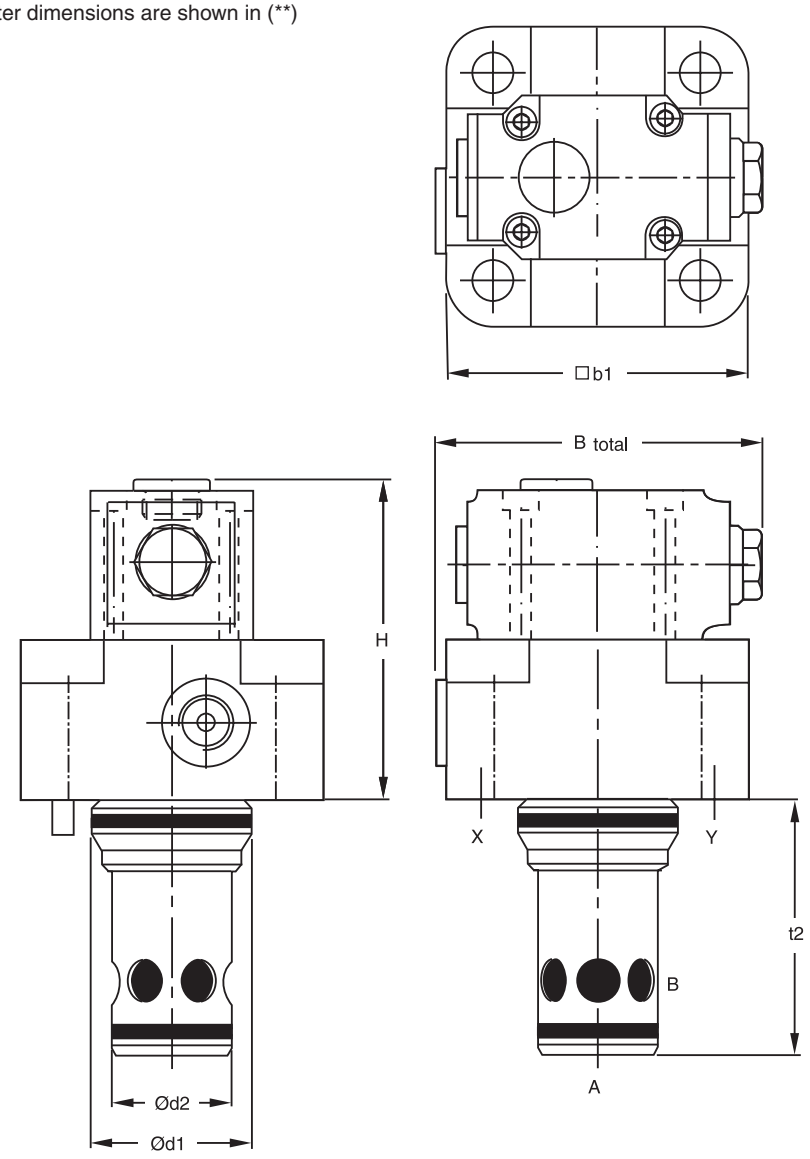
General					
Size	**NG16**	**NG25**	**NG32**	**NG40**	**NG50**
Interface	Slip-in mounting, according to ISO 7368				
Mounting Position	Unrestricted				
Ambient Temperature	-20°C to +80°C (-4°F to +176°F)				
Hydraulic					
Maximum Operating Pressure	350 Bar (5075 PSI)				
Nominal Flow **LPM** / **GPM**	250 (66)	450 (119)	900 (238)	1300 (344)	1800 (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 (**)

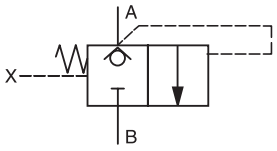


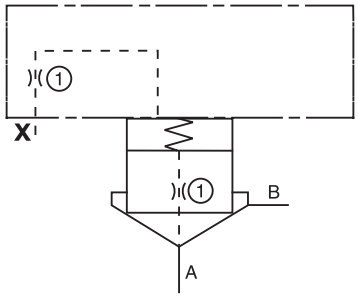
Size	NG16	NG25	NG32	NG40	NG50
H	84.0 (3.31)	88.0 (3.46)	93.0 (3.66)	103.0 (4.06)	138.0 (5.43)
b1	79.0* (3.11)	85.0 (3.35)	102.0 (4.02)	125.0 (4.92)	140.0 (5.51)
$d1^{H7}$	32.0 (1.26)	45.0 (1.77)	60.0 (2.36)	75.0 (2.95)	90.0 (3.54)
$d2^{H7}$	25.0 (0.98)	34.0 (1.34)	45.0 (1.77)	55.0 (2.17)	68.0 (2.68)
$t2^{+0.1}$	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



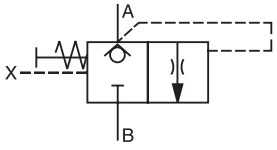


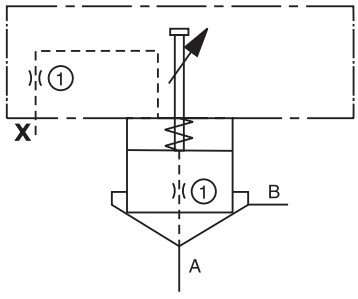
Description	Type							
	NG16	NG25	NG32	NG40	NG50	NG63	NG80	NG100
Cover [1]	C016AA*	C025AA*	C032AA*	C040AA*	C050AA*	C063AA*	C080AA*	C100AA*
Cover Orifice ①	1/16xØ0.8	1/16xØ1.0	1/16xØ1.2	1/8xØ1.5	1/8xØ1.8	1/8xØ2.0	1/8xØ2.2	1/8xØ2.5
Cartridge [2]	CE016C01*	CE025C01*	CE032C01*	CE040C01*	CE050C01*	CE063C01*	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*

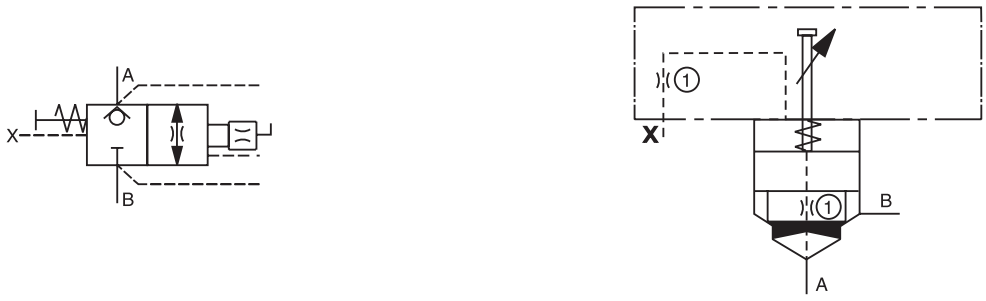
2-Way Functions with Dampening Poppet, Flow A ⇔ B

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 rdering Information CE*

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

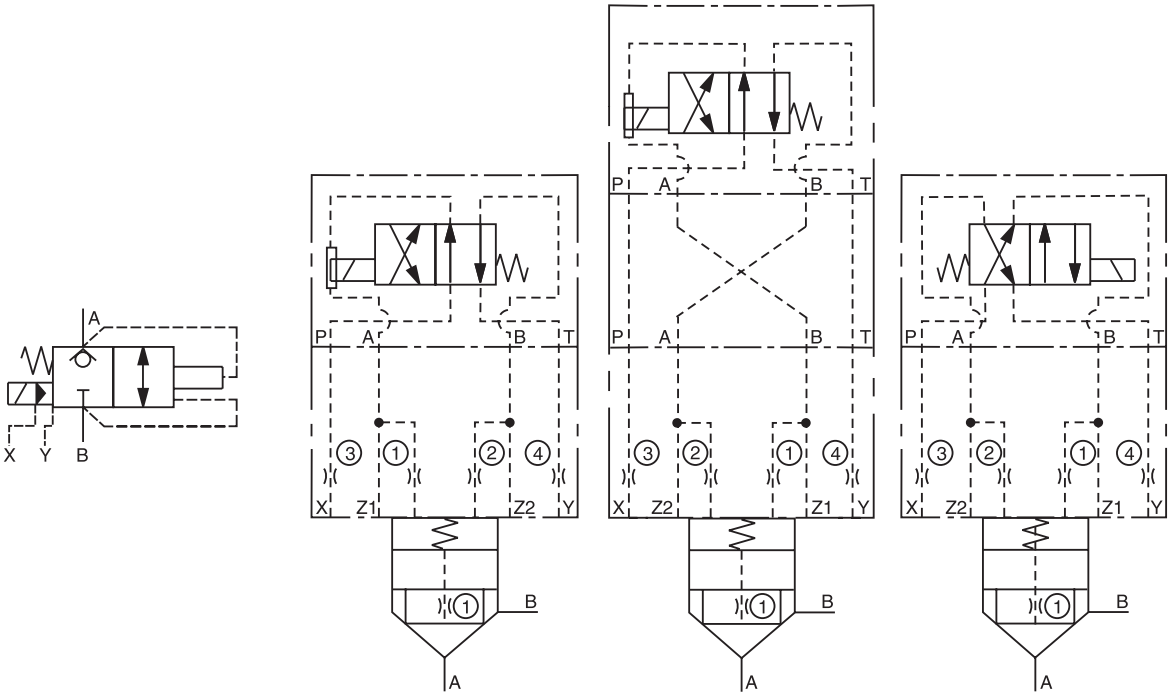


Description	Type							
	NG16	NG25	NG32	NG40	NG50	NG63	NG80	NG100
Cover [1]	C016B*	C025B*	C032B*	C040B*	C050B*	C063B*	C080B*	C100B*
Cover Orifice ①	M6xØ0.8	M6xØ1.0	1/16xØ1.2	1/16xØ1.5	1/16xØ1.8	1/8xØ2.0	1/8xØ2.2	1/8xØ2.5
Cartridge [2]	CE016C08*	CE025C08*	CE032C08*	CE040C08*	CE050C08*	CE063C08*	CE080C08*	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



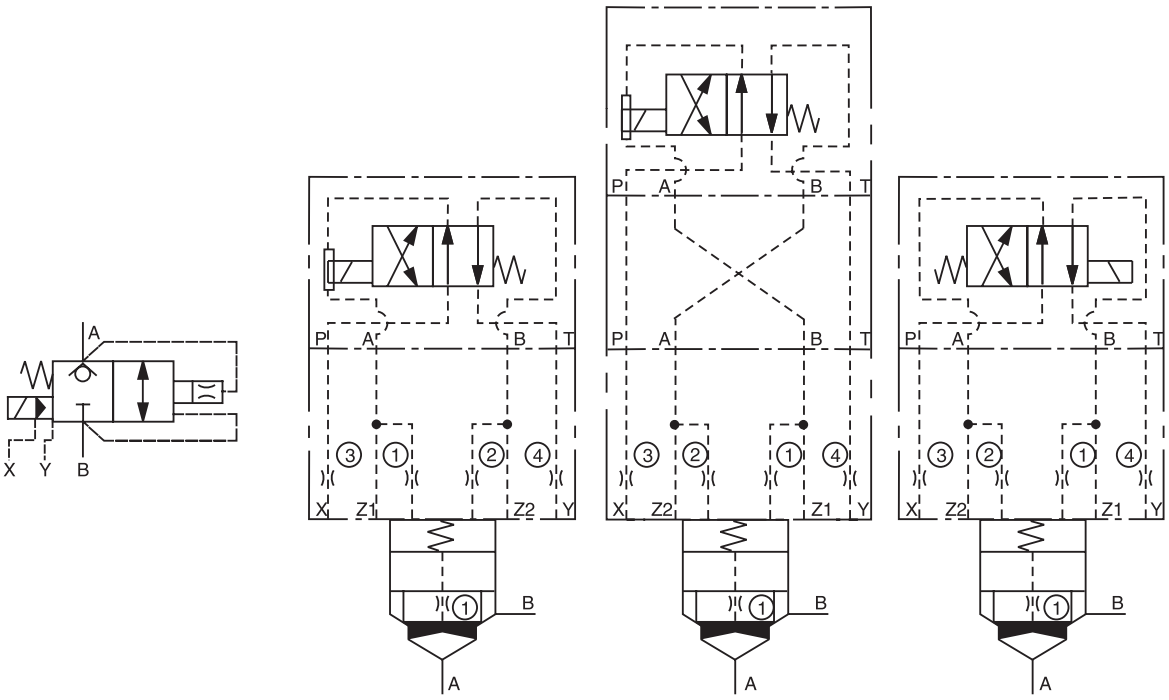
NG16 - 40 with Pilot NG06 | NG50 - 63 with Pilot NG06 | NG50 - 100 with Pilot NG10

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



NG16 - 40 with Pilot NG06

NG50 - 63 with Pilot NG06

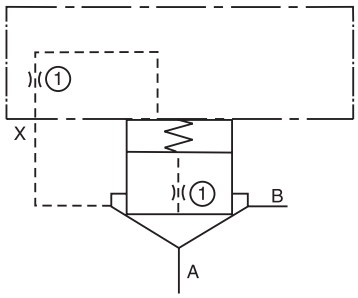
NG50 - 100 with Pilot NG10

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*

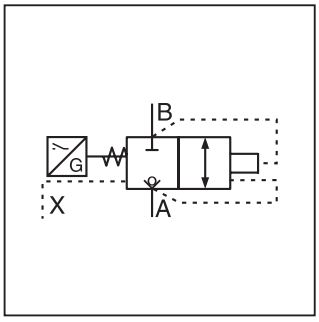
General Description

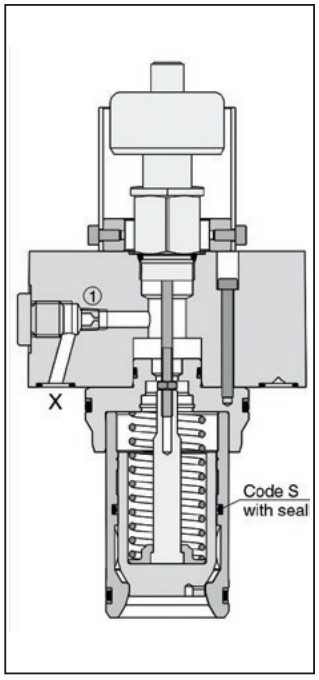
Series C10C*E*** 2/2-way seat valves are equipped with an inductive switch to monitor the closed position. The poppet has a 60/40 area ratio (AA = 0.6 AC, AB = 0.4 AC) and is capable for flow in both directions.

The safety overlap of the poppet avoids opening of the valve before the signal of the inductive switch has changed.

For sizes NG80 and NG100 a proximity switch is used.

C10C3E





C10C1E

Features

- Cover to mount a directional control valve (on the side) for cover 3.
- Cavity and mounting pattern according to ISO 7368.
- Monitored closed position.
- Inductive switch CE conform.
- Optional with poppet sealing between pilot flow C and port B.
- 8 sizes, NG16 to NG100.

Ordering Information

C	10	C		E										
2/2-way Valves	Poppet Shape 60/40	Ind. Monitoring Hydraulic Operation	Cover	Slip-in Cartridge ISO 7368	Nominal Size	Poppet Seal	Nominal Opening Pressure Spring	1	2	3	4 Orifice	Seal	Design Series

NOTE: Not required when ordering.

Code	Description
1	Without pilot valve interface
3*	With pilot valve interface

* The DC valve is not included in the delivery. We recommend the following pilot valves: D1VW020BN*W or D1VW020HN*W, depending on the required functionality and plug location.

Code	Description
C	Without
S*	With

* Only with springs S, T and U.

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

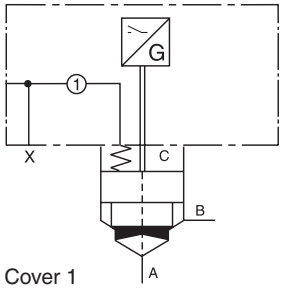
Code	Description
Ohne	No Orifice (2-4 cover 1)
00	Plug
99	Open, Without Orifice

Code	Description
N	Nitrile
V	Fluorocarbon

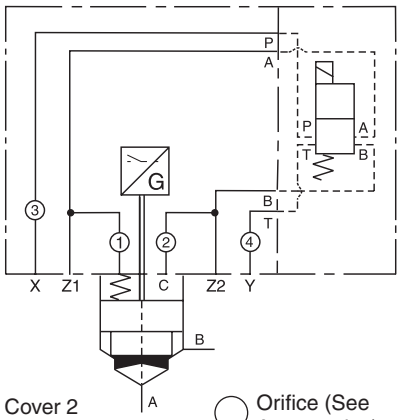
Weight:

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.)

Please order female connector M12x1 separately (order no. 5004109).



Cover 1



Cover 2

Orifice (See Accessories)

⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

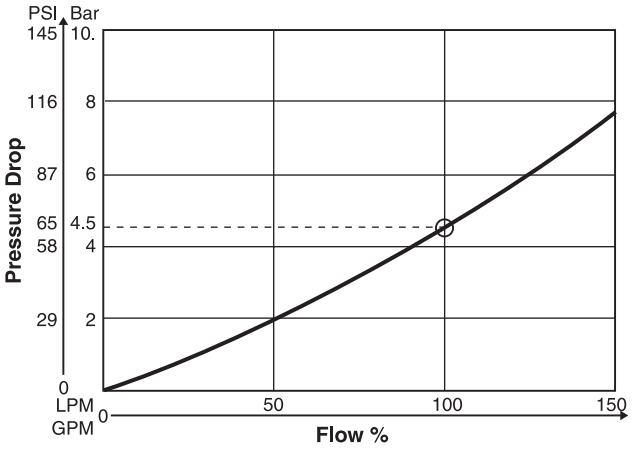
Specifications

General								
Size	**NG16**	**NG25**	**NG32**	**NG40**	**NG50**	**NG63**	**NG80**	**NG100**
Interface	S-way slip-in cartridge valves, according to ISO 7368							
Mounting Position	Unrestricted							
Ambient Temperature	-20°C to +60°C (-4°F to +140°F)							
$MTTF_D$	150 years							
Hydraulic								
Maximum Operating Pressure	350 Bar (5075 PSI)							
Nominal Flow LPM	230	400	800	1250	1625	3400	5000	7500
@ ∆p 5 Bar (72.5 PSI) GPM	(60.8)	(105.7)	(211.3)	(330.2)	(429.3)	(898.2)	(1320.9)	(1981.3)
Fluid	Hydraulic oil according to DIN 51524							
Viscosity Recommended	30 to 80 cSt (mm^2/s)							
Viscosity Permitted	20 to 400 cSt (mm^2/s)							
Fluid Temperature	-20°C to +70°C (-4°F to +158°F)							
Filtration	ISO 4406 (1999); 18/16/13							
Control Volume cm^3	2.03	6.45	12.21	20.32	39.40	94.56	950.0	1300.0
at Max. Stroke in^3	(0.12)	(0.39)	(0.75)	(1.24)	(2.40)	(5.77)	(57.97)	(79.33)
Control Surface (Surface C = 100%) A/B	Approx. 60 / 40 related on surface C							
Opening Pressure								
Flow Direction A to B Bar	Spring: L = 0.2;	N = 0.9;	S = 2.7;	T = 4.0;	U = 8.6			
PSI	(2.9)	(13.1)	(39.2)	(58.0)	(95.7)			
Flow Direction B to A Bar	Spring: L = 0.3;	N = 1.3;	S = 4.0;	T = 6.3;	U = 10.0			
PSI	(4.4)	(18.9)	(58.0)	(91.4)	(145.0)			
Electrical (Inductive Switch)	See Position Control							

Performance Curve

∆p/Q Performance Curve

Without spring and poppet seal, C-chamber unloaded



Characteristic curve measured with HLP46 at 50°C (122°F).

Recommended Orifice Diameter

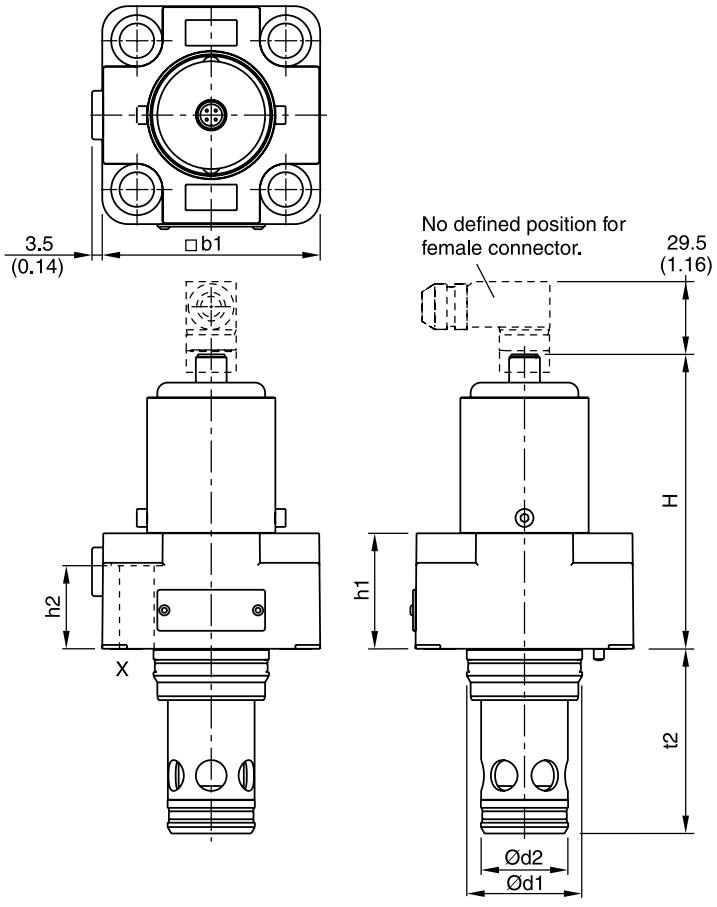
Cover	**Orifice**	**NG16**	**NG25**	**NG32**	**NG40**	**NG50**	**NG63**	**NG80**	**NG100**
C10C1E	No.: 1	1/16 NPT	1/16 NPT	1/16 NPT	1/8 NPT	1/8 NPT	1/8 NPT	1/8 NPT	1/8 NPT
C10C3E	No.: 1, 2, 3, 4	M5	M6	M6	M6	M8	M8	1/8 NPT	1/8 NPT
Inlet Orifice mm	Ø 0.8	Ø 1.2	Ø 1.5	Ø 2.0	Ø 2.5	Ø 3.0	Ø 3.0	Ø 3.0
(in)	(0.03)	(0.05)	(0.06)	(0.08)	(0.10)	(0.12)	(0.12)	(0.12)

Depending on function, plugs must be used (code 00).

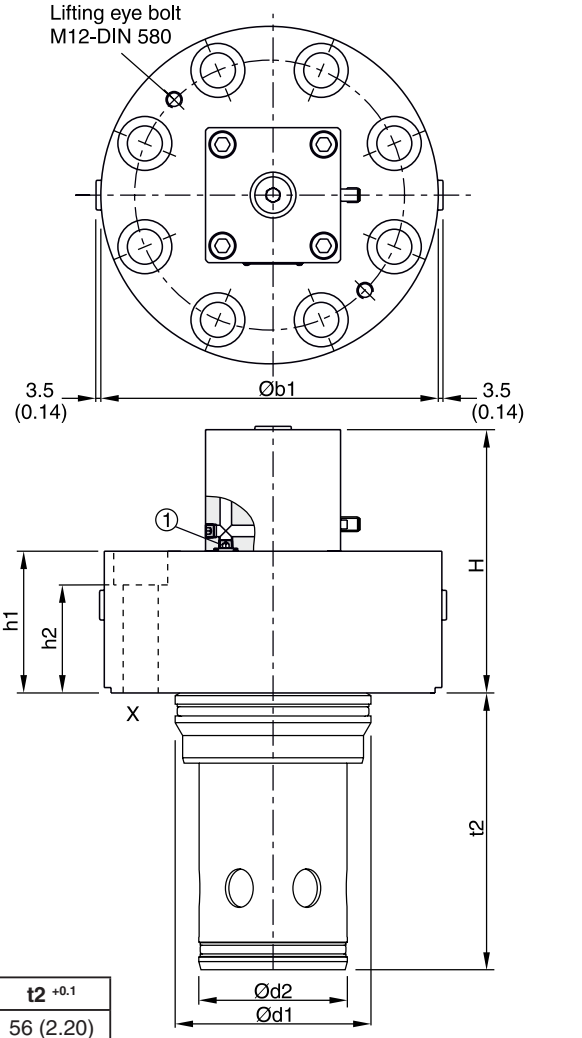
Inch equivalents for millimeter dimensions are shown in (**)

C10C1E

NG16 to NG63 [1)]



NG80 to NG100 [1)]



Cavity and mounting pattern according to ISO 7368.

NG	H	h	h2	b1	d1	d2	t2 +0.1
16	107 (4.21)	36 (1.42)	28 (1.10)	65 (2.56)	32 (1.26)	25 (0.98)	56 (2.20)
25	116 (4.57)	45 (1.77)	32.5 (1.28)	85 (3.35)	45 (1.77)	34 (1.34)	72 (2.83)
32	122 (4.80)	50 (1.97)	32 (1.26)	102 (4.02)	60 (2.36)	45 (1.77)	85 (3.35)
40	131 (5.16)	60 (2.36)	40 (1.57)	125 (4.92)	75 (2.95)	55 (2.17)	105 (4.13)
50	141 (5.55)	70 (2.76)	45 (1.77)	140 (5.51)	90 (3.54)	68 (2.68)	122 (4.80)
63	156 (6.14)	85 (3.35)	55 (2.17)	180 (7.09)	120 (4.72)	90 (3.54)	155 (6.10)
80	195 (7.68)	105 (4.13)	80 (3.15)	250 (9.84)	145 (5.71)	110 (4.33)	205 (8.07)
100	210 (8.27)	120 (4.72)	89 (3.50)	300 (11.81)	180 (7.09)	135 (5.31)	245 (9.65)

The space necessary to remove the M12x1 female connector is at least 22 mm (0.87 in.).

Seal and Bolt Kits

Nominal Size	16	25	32	40	50	63	80	100
Seal Kit	All Seal Kit part numbers begin with SK-C10C1 (example: NG16 Fluorocarbon Seal Kit = SK-C10C1E16V)							
Fluorocarbon	16V	25V	32V	40V	50V	63V	80V	100V
Nitrile	16N	25N	32N	40N	50N	63N	80N	100N
Bolt Kit (ISO 4762-12.9)	BK414 4x M8x40	BK391 4x M12x50	BK415 4x M16x55	BK416 4x M20x70	BK527 4x M20x80	BK418 4x M30x100	BK419 4x M24x120	BK420 4x M30x140
Rec. Torque Nm (lb.-ft.)	31.8 (23.45)	108 (79.66)	264 (194.72)	517 (381.3)	517 (381.3)	1775 (1309.2)	890 (656.4)	1775 (1309.2)

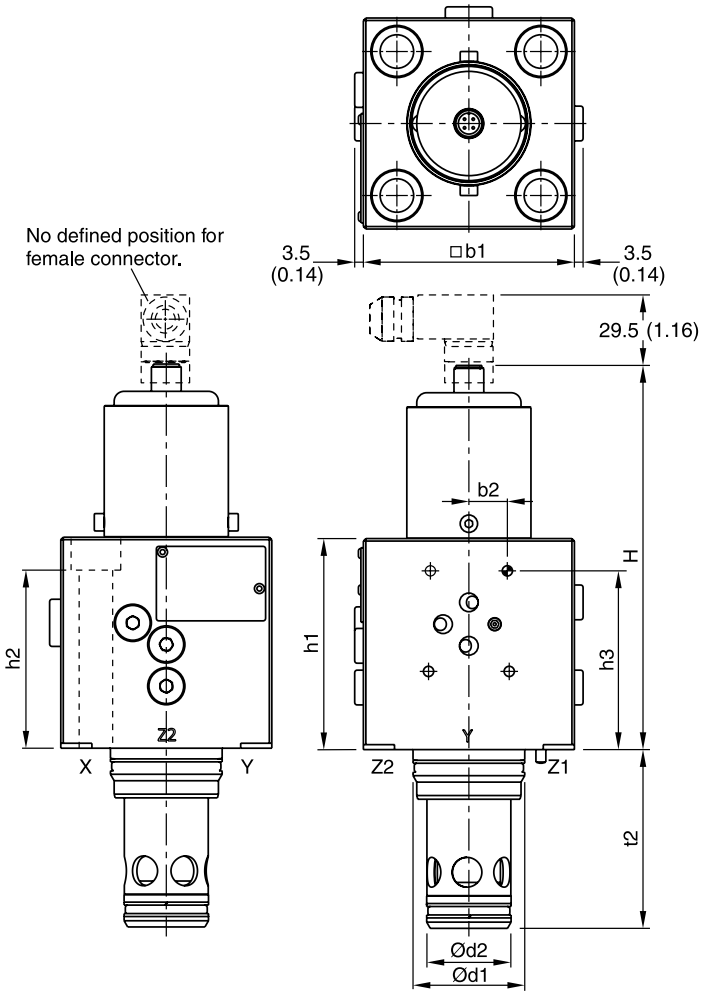
Note: The switch may only be adjusted by the valve manufacturer. The exchange of individual modules is not permitted.

[1)] Please order female connector M12x1 separately (see accessories directional control valves, female connector 12x1) (order no.: 5004109).

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

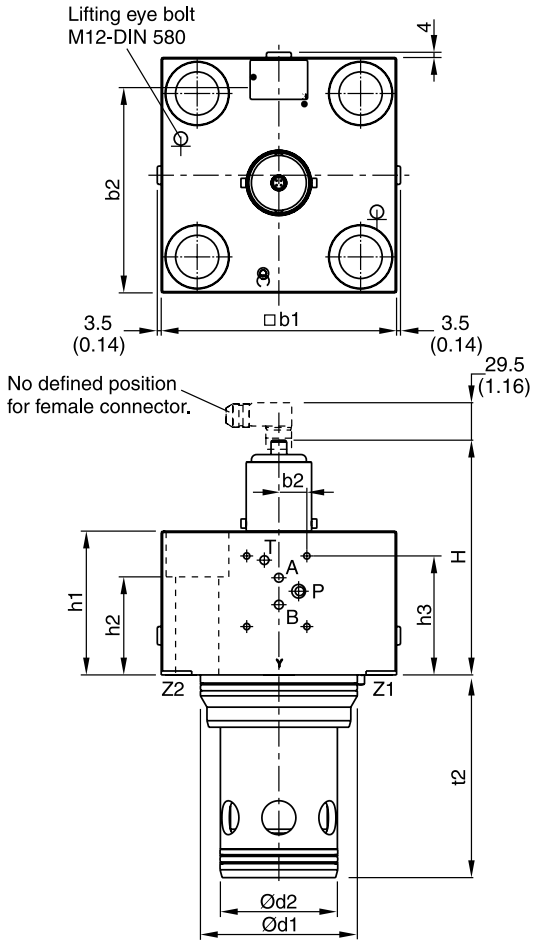
C10C3E

NG16 to NG50 [1)]
Pilot Valve Interface NG06



Cavity and mounting pattern according to ISO 7368.

NG63 [1)]
Pilot Valve Interface NG10



Cavity and mounting pattern according to ISO 7368.

NG	H	h1	h2	h3	b1	b2	d1	d2	t2
16	156 (6.14)	85 (3.35)	76 (2.99)	72 (2.83)	65 (2.56)	15.5 (0.61)	31 (1.22)	25 (0.98)	56 (2.20)
25	156 (6.14)	85 (3.35)	70 (2.76)	72 (2.83)	85 (3.35)	15.5 (0.61)	45 (1.77)	34 (1.34)	72 (2.83)
32	156 (6.14)	85 (3.35)	56 (2.20)	72 (2.83)	102 (4.02)	15.5 (0.61)	60 (2.36)	45 (1.77)	85 (3.35)
40	156 (6.14)	85 (3.35)	50 (1.97)	72 (2.83)	125 (4.92)	15.5 (0.61)	75 (2.95)	55 (2.16)	105 (4.13)
50	156 (6.14)	85 (3.35)	60 (2.36)	72 (2.83)	140 (5.51)	15.5 (0.61)	90 (3.54)	68 (2.68)	122 (4.80)
63	181 (7.13)	110 (4.33)	75 (2.95)	91 (3.58)	180 (7.09)	21.5 (0.85)	120 (4.72)	90 3.54)	155 (6.10)

The space necessary to remove the M12x1 female connector is at least 22 mm (0.87 in.).

Seal and Bolt Kits

Nominal Size		16	25	32	40	50	63
Seal Kit	Fluorocarbon	SK-C10C3E16V	SK-C10C3E25V	SK-C10C3E32V	SK-C10C3E40V	SK-C10C3E50V	SK-C10C3E63V
	Nitrile	SK-C10C3E16N	SK-C10C3E25N	SK-C10C3E32N	SK-C10C3E40N	SK-C10C3E50N	SK-C10C3E63N
Bolt Kit		BK533	BK532	BK526	BK527	BK534	BK536
(ISO 4762-12.9)		4x M8x90	4x M12x90	4x M16x80	4x M20x80	4x M20x90	4x M30x120
Rec. Torque	Nm (lb.-ft.)	31.8 (23.45)	108 (79.66)	264 (194.72)	517 (381.3)	517 (381.3)	1775 (1309.2)

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

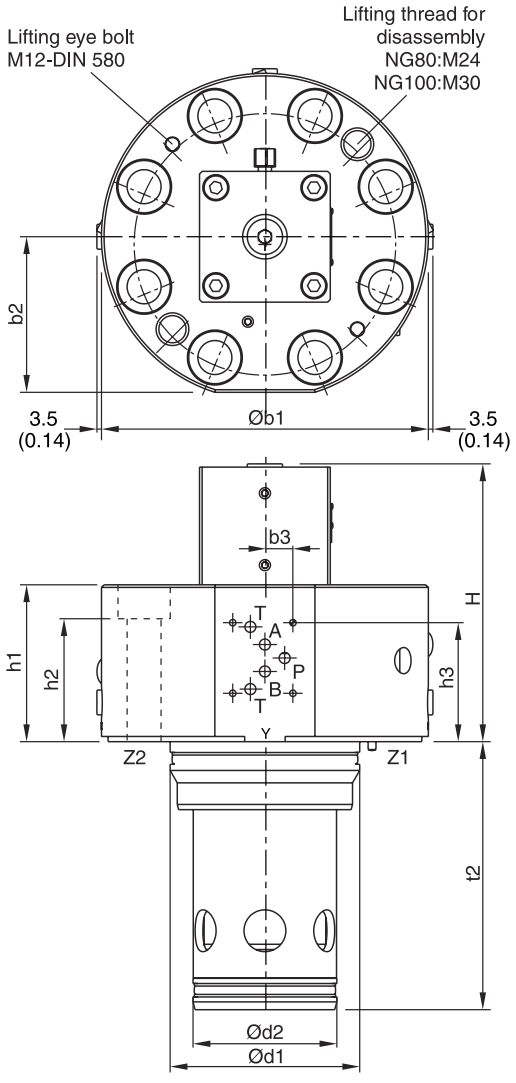
[1)] Please order female connector M12x1 separately (see accessories directional control valves, female connector 12x1) (order no.: 5004109).

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

C10C3E

NG100 [1)]

Pilot Valve Interface NG10



NG	H	h1	h2	h3	b1	b2	b3	d1	d2	t2
80	212.5 (8.37)	120 (4.72)	94 (3.70)	91 (3.58)	250 (9.84)	119 (4.69)	21.5 (0.85)	145 (5.71)	110 (4.33)	205 (8.07)
100	212.5 (8.37)	120 (4.72)	85 (3.35)	91 (3.58)	300 (11.81)	144 (5.67)	21.5 (0.85)	180 (7.09)	135 (5.31)	245 (9.65)

The space necessary to remove the M12x1 female connector is at least 22 mm (0.87 in.).

Seal and Bolt Kits

Nominal Size		80	100
Seal Kit	Fluorocarbon	SK-C10D-C12E16V	SK-C10D-C12E25V
	Nitrile	SK-C10D-C12E16N	SK-C10D-C12E25N
Bolt Kit		BK535	BK531
(ISO 4762-12.9)		4x M24x130	4x M30x150
Rec. Torque Nm (lb.-ft.)		890 (656.4)	1775 (1309.2)

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

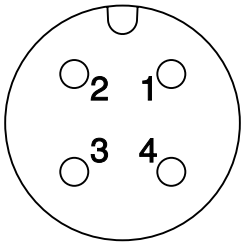
[1)] Please order female connector M12x1 separately (see accessories directional control valves, female connector 12x1) (order no.: 5004109).

Electrical Characteristics of Position Control M12x1 as per IEC 61076-2-101, NG16 to NG63

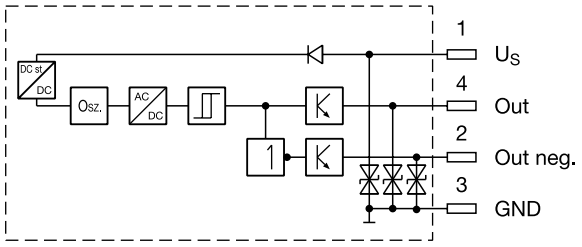
Supply Voltage	24 VDC
Tolerance Supply Voltage	±20%
Ripple Supply Voltage	<10%
Polarity Protection	300 V
Current Consumption without Load	< 20mA
Switching Hysteresis	< 0.06mm
Max. Output Current per Channel, Ohmic	250mA
Ambient Temperature	-20°C to +60°C (-4°F to +140°F)
Protection	IP65 acc. EN 60529
CE Conform [1)]	EN 61000-4-2, EN 61000-4-4, EN 61000-4-6 1) / ENV 50140 / ENV 50204
Electrical Connection	6 + PE as per EN 175201-804
Min Distance to Next AC Solenoid	0.1 m (0.33 ft.)
Interface	M12x1 to IEC 61076-2-101

1) Only guaranteed with screened cable and female connector.

M12 Pin Assignment



1 + U_S 19.2...28.8 V
2 Out B: normally open
3 0V
4 Out A: normally closed



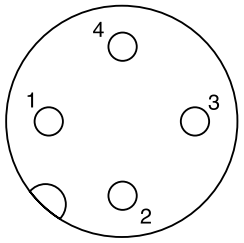
Outputs: Open collector

[1)] Please order female connector M12x1 separately (see accessories directional control valves, female connector 12x1) (order no.: 5004109).

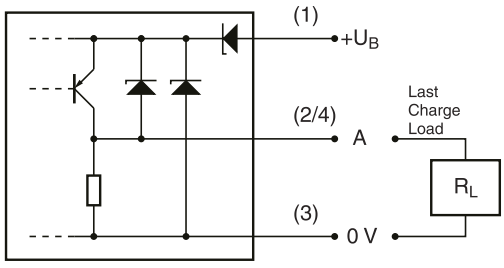
Electrical Characteristics of Position Control M12x1 as per IEC 61076-2-101, NG80 to NG100

Protection Class	IP65 in accordance with EN 60529 (with correctly mounted plug-in connector)
Ambient Temperature	0°C to +50°C (+32°F to +122°F)
Supply Voltage U_s / Ripple	10...30V / 10%
Current Consumption without Load	< 10mA
Max. Output Current per Channel, Ohmic	200mA
Max. Output Load per Channel, Ohmic	100 kOhm
Mac. Output Drop at 0.2A	< 2V
EMC	EN 61000-6-4, EN 61000-6-2
Min Distance to Next AC Solenoid	> 0.1 m (0.33 ft.)
Interface	M12x1
Wiring Minimum mm²	3 x 0.14 braid shield recommended
Wiring Length Maximum	50 m (164 ft.) recommended

M12 Pin Assignment



1 + U_S 10...30 V
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 overlap of the poppet.

After the signal of the inductive switch has changed, the poppet leaves the safety overlapping position.

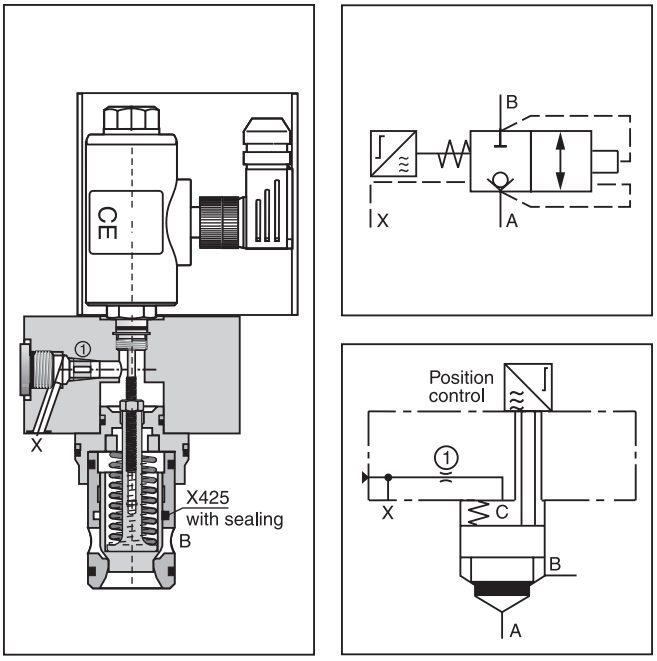
Please order plug M12x1 separately. Straight plug recommended – no defined position possible for angled plug.

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

	C	10	D		C	101	E		/ 0		99	00	
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	① 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)

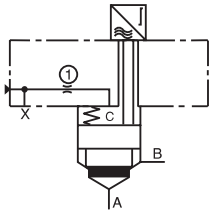
Code	Description
Omit	None
X425	Only with Spring Codes S and U

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.)

Orifice (See Accessories)



1) Certificate only for NG16-NG63

⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

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

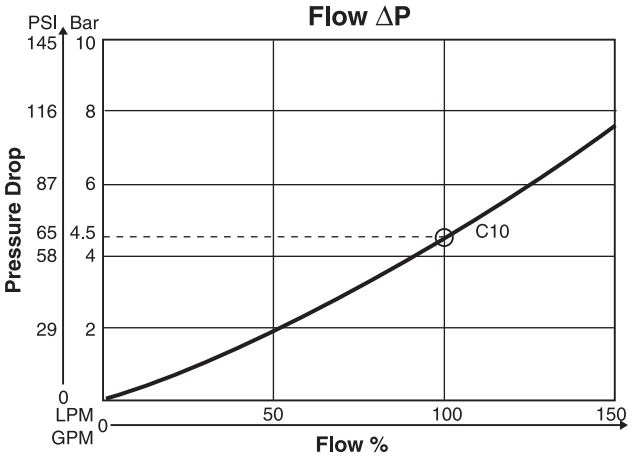
Orifices Ø in mm, thread in NPT

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.

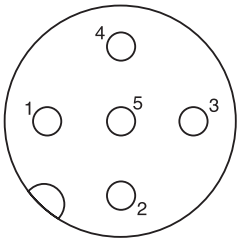
Performance Curve



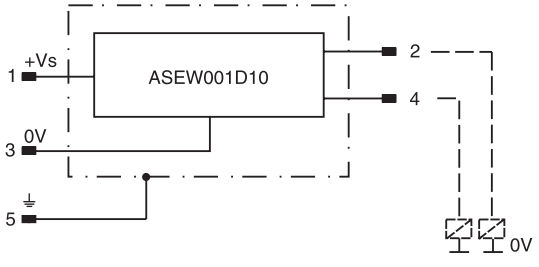
Specifications

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 LPM **Δp = 5 Bar (73 PSI) 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 ß10 > 75 ISO 18/16/13							
Control Volume at Maximum Stroke cm^3	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, brad 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

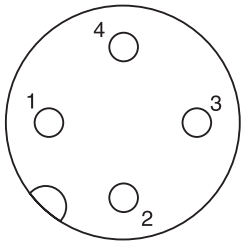
Name und Anschrift des Bescheinigungsinhabers: (Auftraggeber)	**Parker Hannifin GmbH** Hydraulic Controls Division Gutenbergstr. 38 - 40, D- 41564 Kaarst
Name und Anschrift des Herstellers:	**Parker Hannifin GmbH** Hydraulic Controls Division Gutenbergstr. 38 - 40, D- 41564 Kaarst
Zeichen des Auftraggebers:	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-Maschinenrichtline 2006/42/EG.

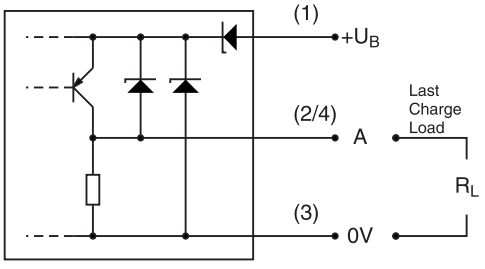
Electrical Specifications

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, brad 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

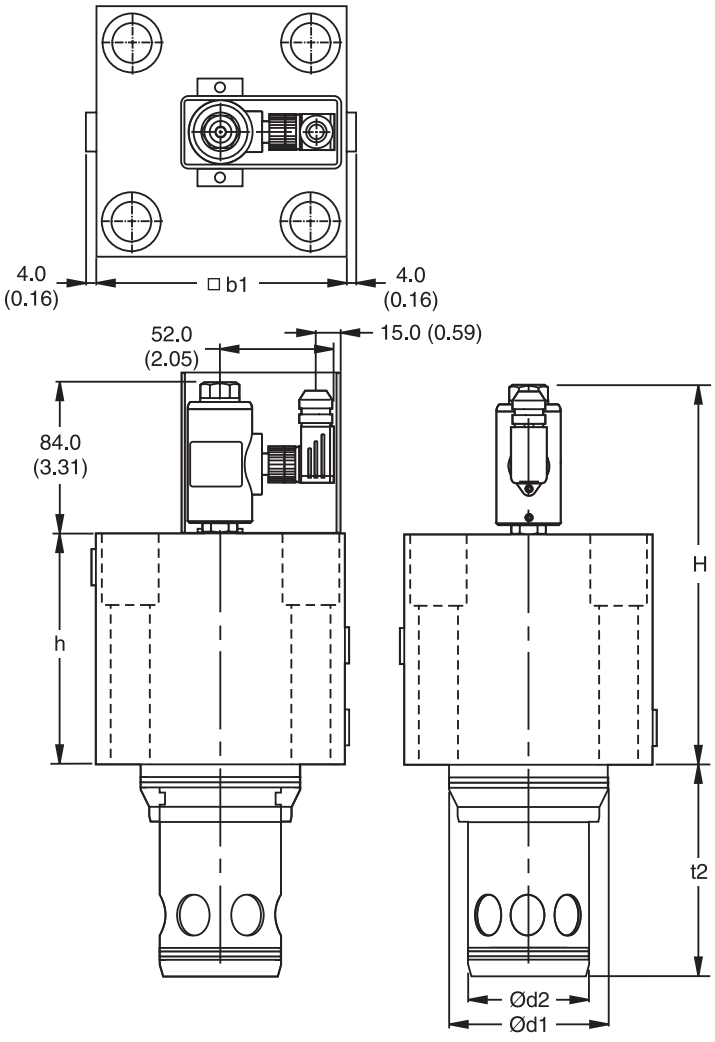
Start position monitored:

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

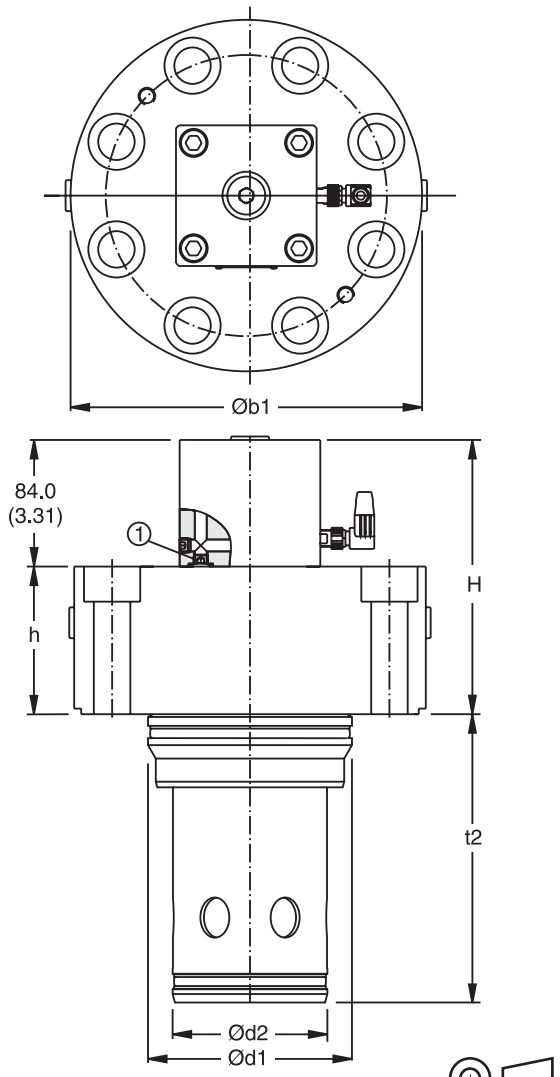
After the inductive switch changes the signal the valve opens.

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

NG16 to NG63



NG80 to NG100



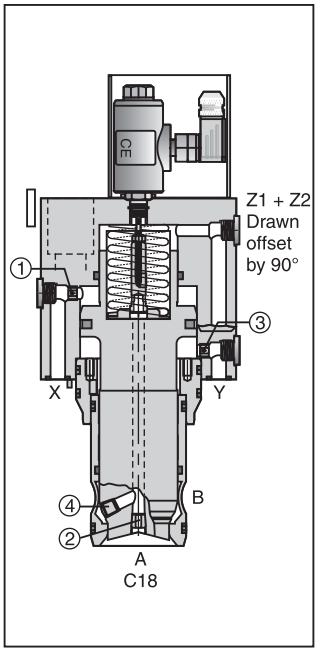
Cavity and mounting patterm according to ISO7368

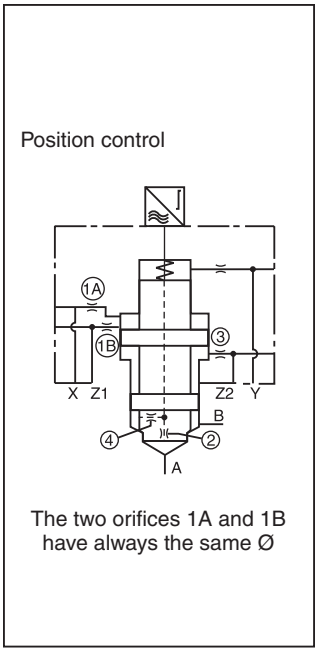
Nominal Size	H	h	b1	d1	d2	t2 +0.1
16	130.0 (5.12)	40.0 (1.57)	79.0 [1] (3.11)	32.0 (1.26)	25.0 (0.98)	56.0 (2.20)
25	135.0 (5.31)	45.0 (1.77)	85.0 (3.35)	45.0 (1.77)	34.0 (1.34)	72.0 (2.87)
32	140.0 (5.51)	50.0 (1.97)	102.0 (4.02)	60.0 (2.36)	45.0 (1.77)	85.0 (3.35)
40	150.0 (5.91)	60.0 (2.36)	125.0 (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.

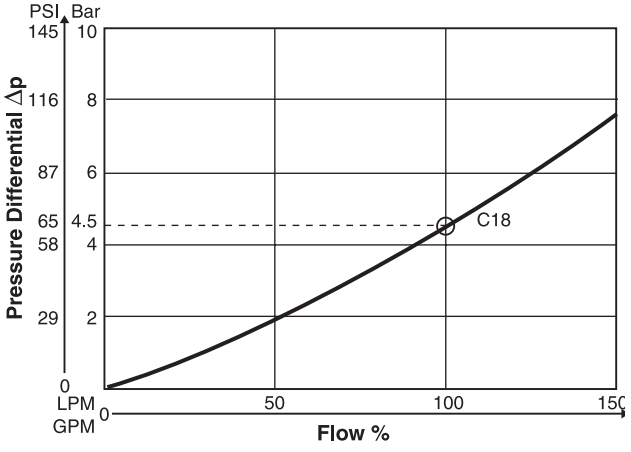




Features

- 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.

Performance Curve



Cat3200_02.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

	C	18	D	E	C	107	E		/	0					
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)

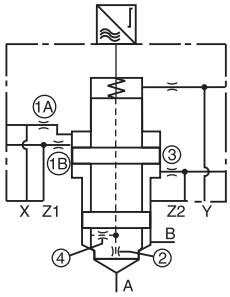
Code	Description
99	Without Orifice, Open

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

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 (See Accessories)



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

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.

Seal and Bolt Kits

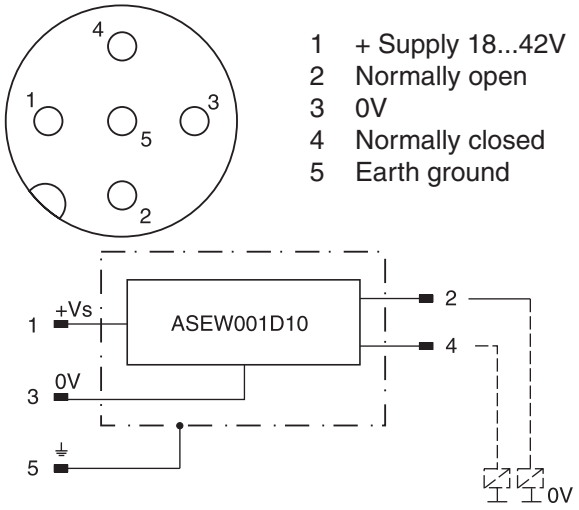
Nominal Size		25	32	40	50	63
Seal Kit	Fluorocarbon	SK-C13B10E250V	SK-C13DB10320V	SK-C13DBE400V	SK-C13B10E500V	SK-C13DB10E630V
	Nitrile	SK-C13DB10-E25	SK-C13DB10-32	SK-C13DB10-E40	SK-C13DB10-E50	SK-C13DB10-E63
Bolt Kit		BK-M12x90-4pcs	BK-M16x90-4pcs	BK-M20x110-4pcs	BK-M20x120-4pcs	BK-M30x160-4pcs
Recommemded 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.

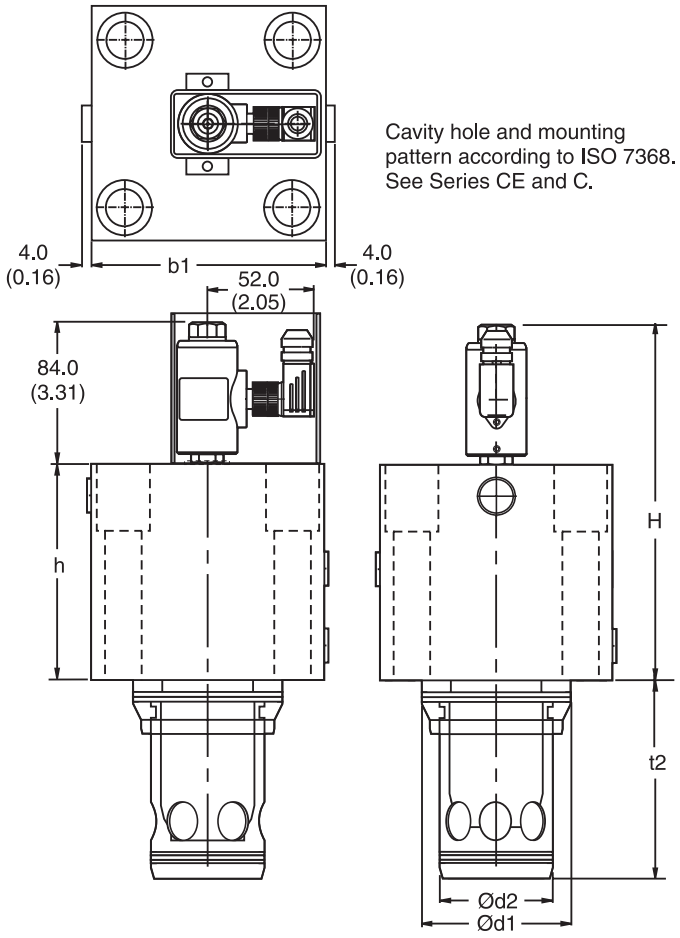
Specifications

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, Δp = 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 ß10 > 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%	121.0%
	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 (5=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, brad shield recommended				
Wiring Length		50 m (164 ft.), maximum recommended				

M12 Pin Assignment

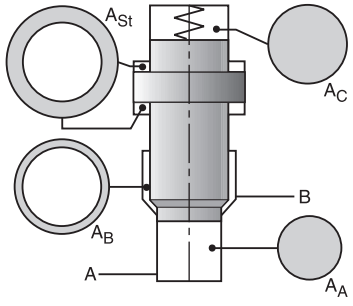


Inch equivalents for millimeter dimensions are shown in (**)



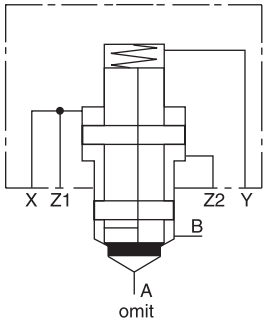
Nominal Size	25	32	40	50	63
H	174.0 (6.85)	174.0 (6.85)	194.0 (7.64)	214.0 (8.14)	234.0 (9.21)
h	90.0 (3.54)	90.0 (3.54)	110.0 (4.33)	130.0 (5.12)	150.0 (5.91)
b1	85.0 (3.35)	102.0 (4.02)	125.0 (4.92)	140.0 (5.51)	180.0 (7.09)
d1	45.0 (1.77)	60.0 (2.36)	75.0 (2.95)	90.0 (3.54)	120.0 (4.72)
d2	34.0 (1.34)	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)

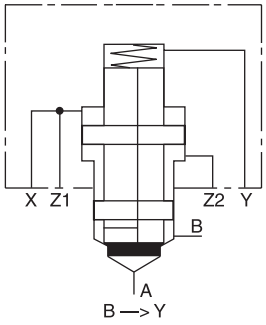
Control Surfaces

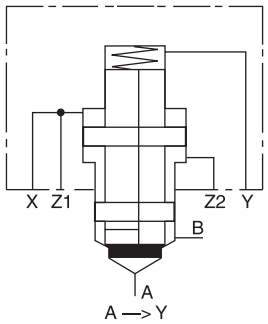


NG	A_A [%]	A_B [%]	A_C [%]	A_{St} [%]
25	60	40	100	124
32	60	40	100	109
40	60	40	100	121
50	60	40	100	117
63	60	40	100	121

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-Maschinenrichtline 2006/42/EG.

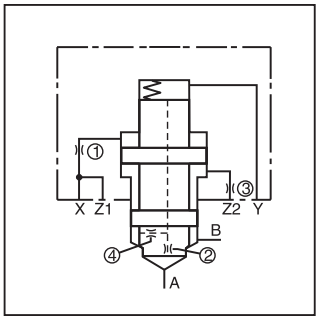
General Description

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.

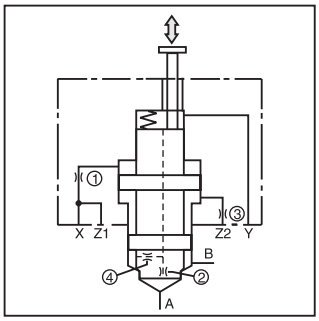
Series C18DB is offered as hydraulically controlled valve (C18DB107), with additional stroke limiter (C18DBN112) and with the mounting pattern for a pilot valve (C18DB121).

Features

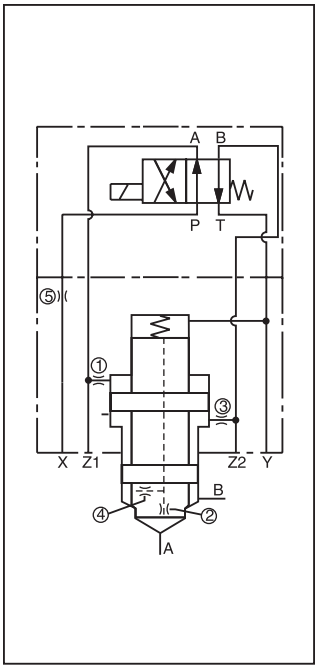
- Cavity and mounting pattern according to ISO 7368.
- Active design with separate control areas.
- Sealing between control surfaces and connection B.
- Up to 5 sizes:
  - – C18DB107 5 sizes NG25 up to NG63
  - – C18DBN112 3 sizes NG25 up to NG40
  - – C18DB121 2 sizes NG32 up to NG40



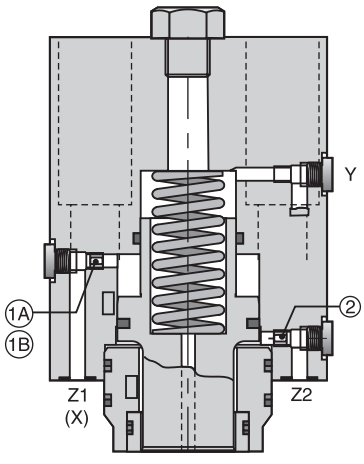
C18DB107



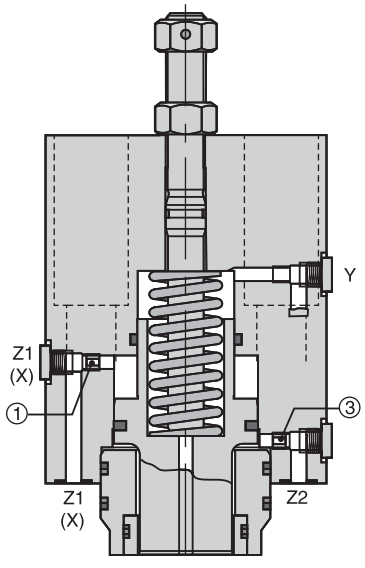
C18DBN112



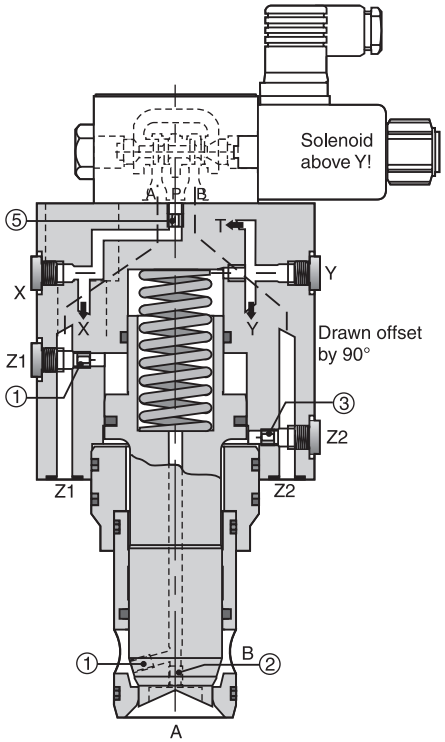
C18DB121



C18DB107



C18DBN112



C18DB121

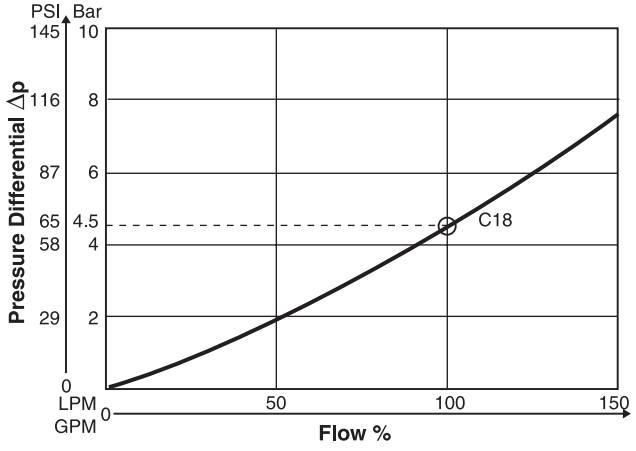
Cat3200_02.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

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, Δp = 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 ß10 > 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%	121.0%
	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



	C	18	D	B			E		/ 0	
Seals	2/2 Way Valve	Poppet with Damping	Hydraulically Operated	Design Series	Stroke Limiter	Cover	Slip-in Cartridge	Nominal Size	Cavity and Mounting Pattern ISO 7368	Spring

Code	Description
Omit	Nitrile
V	Fluorocarbon

Code	Description
Omit	Cover 107 and 121, No Stroke Limiter
N	Cover 112, with Stroke Limiter, Adjustment Spindle and Lock Nut

Code	Description
107	Standard, without Add. Function
112	With Stroke Limiter, only NG25, NG32 and NG40
121	Designed for DC Pilot Valves NG32 and NG40 only

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

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

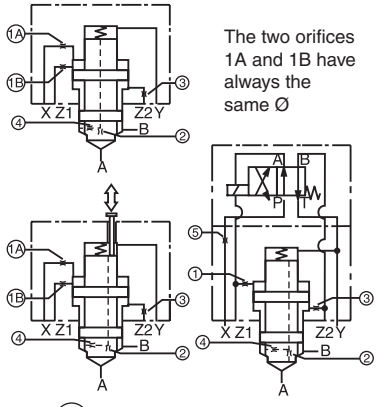
Weight:

C18DB*25 3.2 kg (7.1 (lbs.)
C18DB*32 6.7 kg (14.8 (lbs.)
C18DB*40 8.7 kg (19.2 lbs.)
C18DB*50 13.8 kg (30.4 lbs.)
C18DB*63 26.3 kg (58.0 lbs.)

①	②	③	④	⑤
Orifice				Only for '121' Cover Omit for '107' and '112'

Code	Description [1]
99	Without Orifice, Open Orifice Options
00	Plug, Closed Orifice Options

[1] only for code 121



The two orifices 1A and 1B have always the same Ø

◯ Orifices (See Accessories)

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
5	—	M6	M6	—	—

* Thread in NPT

Orifice Recommendation

Orifice	NG25	NG32	NG40	NG50	NG63
①-⑤	Ø 1.2	Ø 1.5	Ø 2.0	Ø 2.5	Ø 3.0

Depending on function, plugs and orifices must be used.

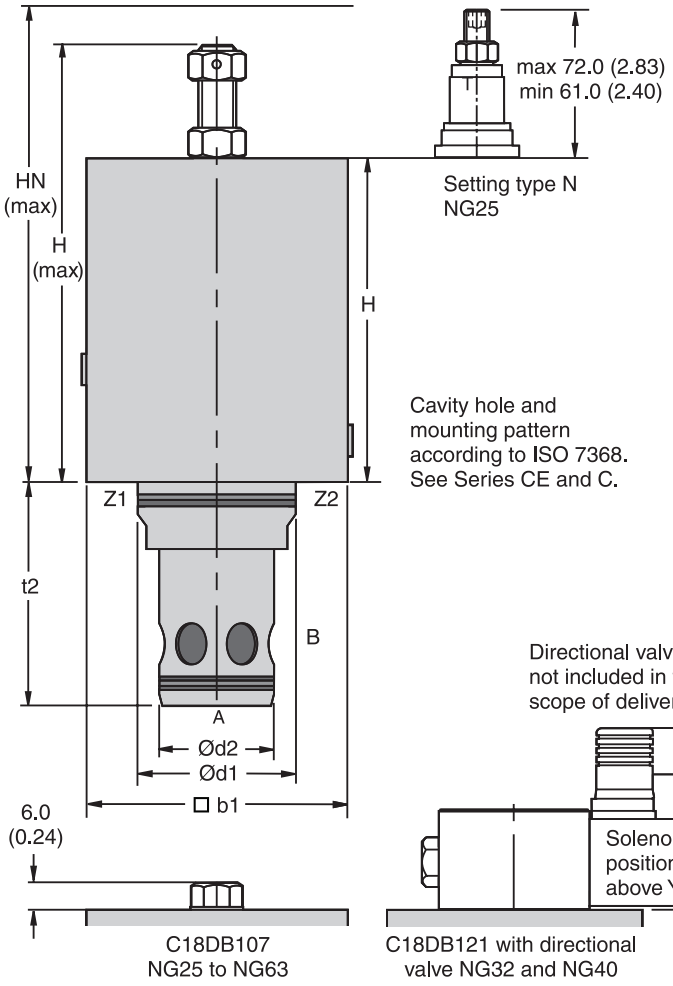
Seal Kits

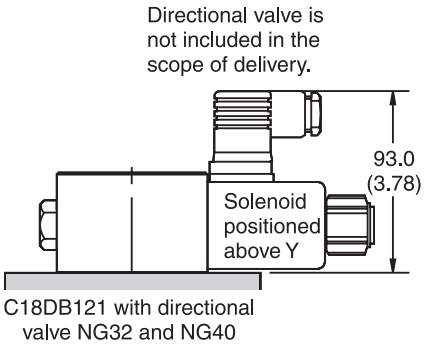
Nominal Size		25	32	40	50	63
Seal Kit	Fluorocarbon	SK-C13DB10-E25V	SK-C13DB10-32V	SK-C13DB-E40V	SK-C13DB10-E50V	SK-C13DB10-E63V
	Nitrile	SK-C13DB10-E25	SK-C13DB10-32	SK-C13DB10-E40	SK-C13DB10-E50	SK-C13DB10-E63

Mounting Kits

Nominal size		25	32	40	50	63
Cover code 107 Consisting of:		BK391 (BK77)	BK-M16x90-4pcs BK529	BK-M20x110-4pcs BK481	BK-M20x120-4pcs	BK-M30x160-4pcs
Cover code 112 Consisting of:		BK391 (BK77)	BK-M16x90-4pcs BK529	BK-M20x110-4pcs BK481	—	—
Cover code 121 Consisting of:		—	BK-M16x90-4pcs BK529	BK-M20x110-4pcs BK481	—	—
Recommended Torque	Nm (lb.-ft.)	94 (69.3)	234 (172.6)	460 (339.3)	460 (339.3)	1570.0 (1157.9)

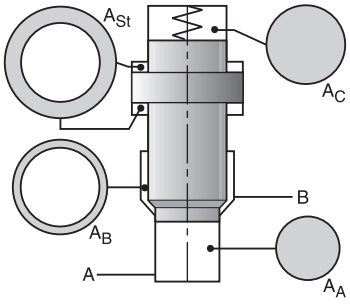
Inch equivalents for millimeter dimensions are shown in (**)





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	A_A [%]	A_B [%]	A_C [%]	A_{St} [%]
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

Notes

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.

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

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 contamination. Start-up 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

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 cm^3/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 60ºC (140º).
- Condition of the fluid (visual inspection, color and smell of the hydraulic oil).

Regular Inspection (continued)

- 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.

Warrantry

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).
	Completely sealed tank.	Install breather.
	Suction line is too small or too long.	Increase diameter of the suction line.
1.2 Foam or air in the fluid.	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.

  $\nu_{opt} = 20 – 40\ mm^2/s$
- Working viscosity for full operability.

  $\nu_{operation} = 16 – 100\ mm^2/s$
- Viscosity limits for reduced operating conditions (speed of rotation, pressure, load cycle).

  $\nu_{limit} = 12 – 300\ mm^2/s$
- Lowest viscosity limit, start of the damaging metal-to-metal contact, only for short time and max. 50% nominal pressure.

  $\nu_{min} = 8\ mm^2/s$
- Highest start up viscosity, suction limit of pumps, only for short time when suction line is short and straight.

  $\nu_{Start} = 800\ mm^2/s$
- 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.

Mineral oil is offered in different viscosity classes (VG, viscosity grade). The characteristic number describes the nominal viscosity in mm ²/s at 40°C:

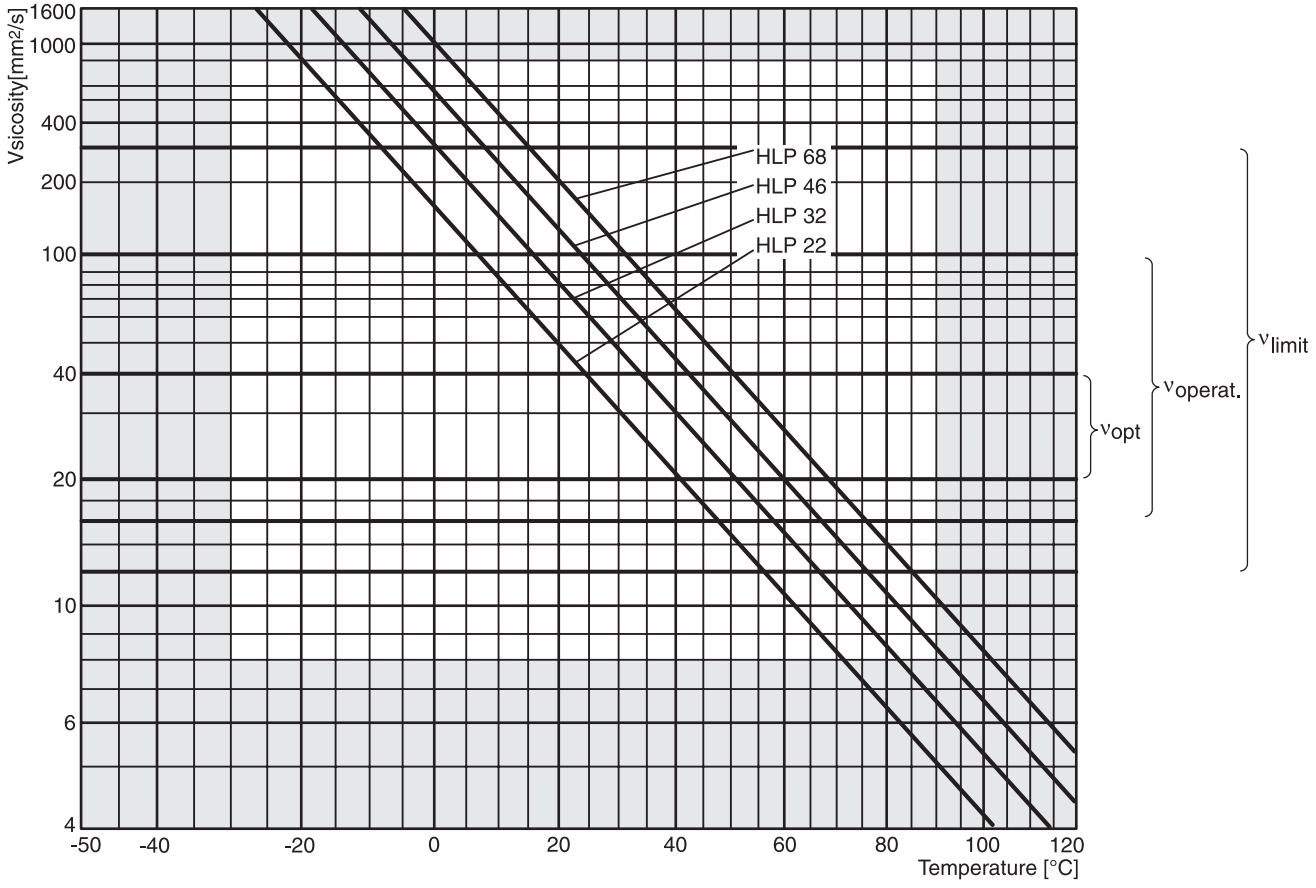
VG 22 arctic conditions, extremely long pipes

VG 32 wintery conditions

VG 46 normal conditions, closed buildings

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 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 circumferance 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 >5µm and 40 – 80 particles >15 µm 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 absolut cleaning of the fluid. A filter element with a ß-value of e.g.: $ß_{10} \geq 75$ does not retain all particles larger than 10µm. Still 1/75 of all particles larger than 10µm 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 µm.

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 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 ingression 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.

Notes

PARKER-HANNIFIN CORPORATION — HYDRAULIC VALVE DIVISION
OFFER OF SALE

1. Definitions. As used herein, the following terms have the meanings indicated.

Buyer: means any customer receiving a Quote for Products from Seller.
Goods: means any tangible part, system or component to be supplied by the Seller.
Products: means the Goods, Services and/or Software as described in a Quote provided by the Seller.
Quote: means the offer or proposal made by Seller to Buyer for the supply of Products.
Seller: means Parker-Hannifin Corporation, including all divisions and businesses thereof.
Services: means any services to be supplied by the Seller.
Software: means any software related to the Products, whether embedded or separately downloaded.
Terms: means the terms and conditions of this Offer of Sale or any newer version of the same as published by Seller electronically at www.parker.com/saleterms.

2. Terms. All sales of Products by Seller are contingent upon, and will be governed by, these Terms and, these Terms are incorporated into any Quote provided by Seller to any Buyer. Buyer's order for any Products whether communicated to Seller verbally, in writing, by electronic date interface or other electronic commerce, shall constitute acceptance of these Terms. Seller objects to any contrary or additional terms or conditions of Buyer. Reference in Seller's order acknowledgement to Buyer's purchase order or purchase order number shall in no way constitute an acceptance of any of Buyer's terms of purchase. No modification to these Terms will be binding on Seller unless agreed to in writing and signed by an authorized representative of Seller.

3. Price; Payment. The Products set forth in Seller's Quote are offered for sale at the prices indicated in Seller's Quote. Unless otherwise specifically stated in Seller's Quote, prices are valid for thirty (30) days and do not include any sales, use, or other taxes or duties. Seller reserves the right to modify prices at any time to adjust for any raw material price fluctuations. Unless otherwise specified by Seller, all prices are F.C.A. Seller's facility (INCOTERMS 2010). All sales are contingent upon credit approval and payment for all purchases is due thirty (30) days from the date of invoice (or such date as may be specified in the Quote). Unpaid invoices beyond the specified payment date incur interest at the rate of 1.5% per month or the maximum allowable rate under applicable law.

4. Shipment; Delivery; Title and Risk of Loss. All delivery dates are approximate. Seller is not responsible for damages resulting from any delay. Regardless of the manner of shipment, delivery occurs and title and risk of loss or damage pass to Buyer, upon placement of the Products with the shipment carrier at Seller's facility. Unless otherwise agreed, Seller may exercise its judgment in choosing the carrier and means of delivery. No deferment of shipment at Buyers' request beyond the respective indicated shipping date 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.

5. Warranty. The warranty related to the Products is as follows: (i) Goods are warranted against defects in material or workmanship for a period of eighteen (18) months from the date of delivery; (ii) Services shall be performed in accordance with generally accepted practices and using the degree of care and skill that is ordinarily exercised and customary in the field to which the Services pertain and are warranted for a period of six (6) months from the completion of the Services by Seller; and (iii) Software is only warranted to perform in accordance with applicable specifications provided by Seller to Buyer for ninety (90) days from the date of delivery or, when downloaded by a Buyer or end-user, from the date of the initial download. All prices are based upon the exclusive limited warranty stated above, and upon the following disclaimer:

DISCLAIMER OF WARRANTY: THIS WARRANTY IS THE SOLE AND ENTIRE WARRANTY PERTAINING TO PRODUCTS. SELLER DISCLAIMS ALL OTHER WARRANTIES, EXPRESS AND IMPLIED, INCLUDING DESIGN, NONINFRINGEMENT, MERCHANTABILITY, AND FITNESS FOR A PARTICULAR PURPOSE. SELLER DOES NOT WARRANT THAT THE SOFTWARE IS ERROR-FREE OR FAULT-TOLERANT, OR THAT BUYER'S USE THEREOF WILL BE SECURE OR UNINTERRUPTED. BUYER AGREES AND ACKNOWLEDGES THAT UNLESS OTHERWISE AUTHORIZED IN WRITING BY SELLER THE SOFTWARE SHALL NOT BE USED IN CONNECTION WITH HAZARDOUS OR HIGH RISK ACTIVITIES OR ENVIRONMENTS. EXCEPT AS EXPRESSLY STATED HEREIN, ALL PRODUCTS ARE PROVIDED "AS IS".

6. Claims; Commencement of Actions. Buyer shall promptly inspect all Products upon receipt. No claims for shortages will be allowed unless reported to the Seller within ten (10) days of delivery. Buyer shall notify Seller of any alleged breach of warranty within thirty (30) days after the date the non-conformance is or should have been discovered by Buyer. Any claim or action against Seller based upon breach of contract or any other theory, including tort, negligence, or otherwise must be commenced within twelve (12) months from the date of the alleged breach or other alleged event, without regard to the date of discovery.

7. LIMITATION OF LIABILITY. IN THE EVENT OF A BREACH OF WARRANTY, SELLER WILL, AT ITS OPTION, REPAIR OR REPLACE THE NON-CONFORMING PRODUCT, RE-PERFORM THE SERVICES, OR REFUND THE PURCHASE PRICE PAID WITHIN A REASONABLE PERIOD OF TIME. **IN NO EVENT IS SELLER LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF, OR AS THE RESULT OF, THE SALE, DELIVERY, NON-DELIVERY, SERVICING, NON-COMPLETION OF SERVICES, USE, LOSS OF USE OF, OR INABILITY TO USE THE PRODUCTS OR ANY PART THEREOF, LOSS OF DATA, IDENTITY, PRIVACY, OR CONFIDENTIALITY, OR FOR ANY CHARGES OR EXPENSES OF ANY NATURE INCURRED WITHOUT SELLER'S WRITTEN CONSENT, WHETHER BASED IN CONTRACT, TORT OR OTHER LEGAL THEORY. IN NO EVENT SHALL SELLER'S LIABILITY UNDER ANY CLAIM MADE BY BUYER EXCEED THE PURCHASE PRICE PAID FOR THE PRODUCTS.**

8. Loss to Buyer's Property. Any designs, tools, patterns, materials, drawings, confidential information or equipment furnished by Buyer or any other items which are or become Buyer's property, will be considered obsolete and may be destroyed by Seller after two (2) consecutive years have elapsed without Buyer ordering the Products 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. Special Tooling includes but is not limited to tooling, jigs, fixtures and associated manufacturing equipment acquired or necessary to manufacture Products. A tooling charge may be imposed for any Special Tooling. 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 Special Tooling belonging to Seller that is utilized in the manufacture of the Products, even if such Special Tooling has been specially converted or adapted for such manufacture and notwithstanding any charges paid by Buyer. Unless otherwise agreed, Seller has the right to alter, discard or otherwise dispose of any Special Tooling or other property in its sole discretion at any time.

10. Security Interest. To secure payment of all sums due, Seller retains a security interest in all Products delivered to Buyer and, Buyer's acceptance of these Terms is deemed to be 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. User Responsibility. The Buyer through its own analysis and testing, is solely responsible for making the final selection of the Products and assuring that all performance, endurance, maintenance, safety and warning requirements of the application of the Products are met. The Buyer must analyze all aspects of the application and follow applicable industry standards, specifications, and other technical information provided with the Product. If Seller provides Product options based upon data or specifications provided by the Buyer, the Buyer is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the Products. In the event the Buyer is not the end-user, Buyer will ensure such end-user complies with this paragraph.

12. Use of Products, Indemnity by Buyer. Buyer shall comply with all instructions, guides and specifications provided by Seller with the Products. Unauthorized Uses. If Buyer uses or resells the Products for any uses prohibited in Seller's instructions, guides or specifications, or Buyer otherwise fails to comply with Seller's instructions, guides and specifications, Buyer acknowledges that any such use, resale, or non-compliance is at Buyer's sole risk. Buyer shall indemnify, defend, and hold Seller harmless from any losses, claims, liabilities, damages, lawsuits, judgments and costs (including attorney fees and defense costs), whether for personal injury, property damage, intellectual property infringement or any other claim, brought by or incurred by Buyer, Buyer's employees, or any other person, arising out of: (a) improper selection, application, design, specification or other misuse of Products provided by Seller; (b) any act or omission, negligent or otherwise, of Buyer; (c) Seller's use of patterns, tooling, equipment, plans, drawings, designs or specifications or other information or things furnished by Buyer; (d) damage to the Products from an external cause, repair or attempted repair by anyone other than Seller, failure to follow instructions, guides and specifications provided by Seller, use with goods not provided by Seller, or opening, modifying, deconstructing or tampering with the Products for any reason; or (e) Buyer's failure to comply with these Terms. Seller shall not indemnify Buyer under any circumstance except as otherwise provided in these Terms.

13. Cancellations and Changes. Buyer may not cancel or modify any order 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, at any time, may change Product features, specifications, designs and availability.

14. Limitation on Assignment. Buyer may not assign its rights or obligations without the prior written consent of Seller.

15. Force Majeure. Seller does not assume the risk and is not liable for delay or failure to perform any of Seller's obligations by reason of events or circumstances beyond its reasonable control ("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.

16. Waiver and Severability. Failure to enforce any provision of these Terms will not invalidate that provision; nor will any such failure prejudice Seller's right to enforce that provision in the future. Invalidation of any provision of these Terms by legislation or other rule of law shall not invalidate any other provision herein and, the remaining provisions will remain in full force and effect.

17. Termination. Seller may terminate any agreement governed by or arising from these Terms for any reason and at any time by giving Buyer thirty (30) days prior written notice. Seller may immediately terminate, in writing, if Buyer: (a) breaches any provision of these Terms (b) appoints 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 one if filed by a third party (d) makes an assignment for the benefit of creditors; or (e) dissolves its business or liquidates all or a majority of its assets.

18. Ownership of Software. Seller retains ownership of all Software supplied to Buyer hereunder. In no event shall Buyer obtain any greater right in and to the Software than a right in the nature of a license limited to the use thereof and subject to compliance with any other terms provided with the Software.

19. Indemnity for Infringement of Intellectual Property Rights. Seller is not liable for infringement of any patents, trademarks, copyrights, trade dress, trade secrets or similar rights ("Intellectual Property Rights") except as provided in this Section. 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 a third party claim that one or more of the Products sold hereunder infringes the Intellectual Property Rights of a third party in the country of delivery of the Products by the Seller to the Buyer. Seller's obligation to defend and indemnify Buyer is contingent on Buyer notifying Seller within ten (10) days after Buyer becomes aware of any such claim, and Seller having sole control over the defense of the claim including all negotiations for settlement or compromise. If one or more Products sold hereunder is subject to such a claim, Seller may, at its sole expense and option, procure for Buyer the right to continue using the Products, replace or modify the Products so as to render them non-infringing, or offer to accept return of the Products and refund the purchase price less a reasonable allowance for depreciation. Seller has no obligation or liability for any claim of infringement: (i) arising from information provided by Buyer; or (ii) directed to any Products provided hereunder for which the designs are specified in whole or part by Buyer; or (iii) resulting from the modification, combination or use in a system of any Products provided hereunder. The foregoing provisions of this Section constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for such claims of infringement of Intellectual Property Rights.

20. Governing Law. These Terms and the sale and delivery of all Products are 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 the sale and delivery of the Products.

21. Entire Agreement. These Terms, along with the terms set forth in the main body of any Quote, forms the entire agreement between the Buyer and Seller and constitutes the final, complete and exclusive expression of the terms of sale. In the event of a conflict between any term set forth in the main body of a Quote and these Terms, the terms set forth in the main body of the Quote shall prevail. All prior or contemporaneous written or oral agreements or negotiations with respect to the subject matter shall have no effect. These Terms may not be modified unless in writing and signed by an authorized representative of Seller.

22. Compliance with Laws. Buyer agrees to comply with all applicable laws, regulations, and industry and professional standards, including those of the United States of America, and the country or countries in which Buyer may operate, including without limitation the U.S. Foreign Corrupt Practices Act ("FCPA"), the U.S. Anti-Kickback Act ("Anti-Kickback Act"), U.S. and E.U. export control and sanctions laws ("Export Laws"), the U.S. Food Drug and Cosmetic Act ("FDCA"), and the rules and regulations promulgated by the U.S. Food and Drug Administration ("FDA"), each as currently amended. Buyer agrees to indemnify, defend, and hold harmless Seller from the consequences of any violation of such laws, regulations and standards by Buyer, its employees or agents. Buyer acknowledges that it is familiar with all applicable provisions of the FCPA, the Anti-Kickback Act, Export Laws, the FDCA and the FDA and certifies that Buyer will adhere to the requirements thereof and not take any action that would make Seller violate such requirements. Buyer represents and agrees that Buyer will not make any payment or give anything of value, directly or indirectly, to any governmental official, foreign political party or official thereof, candidate for foreign political office, or commercial entity or person, for any improper purpose, including the purpose of influencing such person to purchase Products or otherwise benefit the business of Seller. Buyer further represents and agrees that it will not receive, use, service, transfer or ship any Product from Seller in a manner or for a purpose that violates Export Laws or would cause Seller to be in violation of Export Laws.

5/17

Parker Safety Guide for Selecting and Using Hose, Tubing, Fittings and Related Accessories
Publication No. 4400-B.1
Revised: October 2015, Rev A

WARNING: Failure or improper selection or improper use of hose, tubing, fittings, assemblies, valves, connectors, conductors or related accessories ("Products") can cause death, personal injury and property damage. Possible consequences of failure or improper selection or improper use of these Products include but are not limited to:

- Fittings thrown off at high speed.
- High velocity fluid discharge.
- Explosion or burning of the conveyed fluid.
- Electrocution from high voltage electric powerlines.
- Contact with suddenly moving or falling objects that
- are controlled by the conveyed fluid.
- Injections by high-pressure fluid discharge.
- Dangerously whipping Hose.
- Tube or pipe burst.
- Weld joint fracture.
- Contact with conveyed fluids that may be hot, cold, toxic or
- otherwise injurious.
- Sparking or explosion caused by static electricity buildup or other sources of electricity.
- Sparking or explosion while spraying paint or flammable liquids.
- Injuries resulting from inhalation, ingestion or exposure to fluids.

Before selecting or using any of these Products, it is important that you read and follow the instructions below. No product from any division in Parker Fluid Connectors Group is approved for in-flight aerospace applications. For hoses and fittings used in in-flight aerospace applications, please contact Parker Aerospace Group.

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 rubber and/or thermoplastic products commonly called "hose" or "tubing" are called "Hose" in this safety guide. Metallic tube or pipe are called "tube". All assemblies made with Hose are called "Hose Assemblies". All assemblies made with Tube are called "Tube Assemblies".

All products commonly called "fittings", "couplings" or "adapters" are called "Fittings". Valves are fluid system components that control the passage of luid. Related accessories are ancillary devices that enhance or monitor performance including crimping, flaring, flanging, presetting, bending, cutting, deburring, swaging machines, sensors, tags, lockout handles, spring guards and associated tooling. This safety guide is a supplement to and is to be used with the specific Parker publications for the specific Hose, Fittings and Related Accessories that are being considered for use. Parker publications are available at www.parker.com. SAE J1273 (www.sae.org) and ISO 17165-2 (www.ansi.org) also provide recommended practices for hydraulic Hose Assemblies, and should be followed.

1.2 Fail-Safe: Hose, Hose Assemblies, Tube, Tube Assemblies and Fittings can and do fail without warning for many reasons. Design all systems and equipment in a fail-safe mode, so that failure of the Hose, Hose Assembly, Tube, Tube Assembly or Fitting will not endanger persons or property.

1.3 Distribution: Provide a copy of this safety guide to each person responsible for selecting or using Hose, Tube and Fitting products. Do not select or use Parker Hose, Tube or Fittings without thoroughly reading and understanding this safety guide as well as the specific Parker publications for the Products.

1.4 User Responsibility: Due to the wide variety of operating conditions and applications for Hose, Tube and Fittings. Parker does not represent or warrant that any particular Hose, Tube or Fitting is suitable for any specific end use 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 Products.

• Assuring that the user's requirements are met and that the application presents no health or safety hazards.

• Following the safety guide for Related Accessories and being trained to operate Related Accessories.

• Providing all appropriate health and safety warnings on the equipment on which the Products are used.

• Assuring compliance with all applicable government and industry standards.

1.5 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 Products being considered or used, or call 1-800-CPARKER, or go to www.parker.com, for telephone numbers of the appropriate tec hnical service department.

2.0 HOSE, TUBE & FITTINGS SELECTION INSTRUCTIONS

2.1 Electrical Conductivity: Certain applications require that the Hose be nonconductive to prevent electrical current flow. Other applications require the Hose and the Fittings and the Hose/Fitting interface to be sufficiently conductive to drain off static electricity. Extreme care must be exercised when selecting Hose, Tube and Fittings for these or any other applications in which electrical conductivity or nonconductivity is a factor.

The electrical conductivity or nonconductivity of Hose, Tube and Fittings is dependent upon many factors and may be susceptible to change. These factors include but are not limited to the various materials used to make the Hose and the Fittings, Fitting finish (some Fitting finishes are electrically conductive while others are nonconductive), manufacturing methods (including moisture control), how the Fittings contact the Hose, age and amount of deterioration or damage or other changes, moisture content of the Hose at any particular time, and other factors.

The following are considerations for electrically nonconductive and conductive Hose. For other applications consult the individual catalog pages and the appropriate industry or regulatory standards for proper selection.

2.1.1 Electrically Nonconductive Hose: Certain applications require that the Hose be nonconductive to prevent electrical current flow or to maintain electrical isolation. For applications that require Hose to be electrically nonconductive, including but not limited to applications near high voltage electric lines, only special nonconductive Hose can be used. The manufacturer of the equipment in which the nonconductive Hose is to be used must be consulted to be certain that the Hose, Tube and Fittings that are selected are proper for the application. Do not use any Parker Hose or Fittings for any such application requiring nonconductive Hose, including but not limited to applications near high voltage electric lines or dense magnetic fields, unless (i) the application is expressly approved in the Parker technical publication for the product, (ii) the Hose is marked "nonconductive", and (iii) the manufacturer of the equipment on which the Hose is to be used specifically approves the particular Parker Hose, Tube and Fittings for such use.

2.1.2 Electrically Conductive Hose: Parker manufactures special Hose for certain applications that require electrically conductive Hose. Parker manufactures special Hose for conveying paint in airless paint spraying applications. This Hose is labeled "Electrically Conductive Airless Paint Spray Hose" on its layline and packaging. This Hose must be properly connected to the appropriate Parker Fittings and properly grounded in order to dissipate dangerous static charge buildup, which occurs in all airless paint spraying applications. Do not use any other Hose for airless paint spraying, even if electrically conductive. Use of any other Hose or failure to properly connect the Hose can cause a fire or an explosion resulting in death, personal injury, and property damage. All hoses that convey fuels must be grounded.

Parker manufactures a special Hose for certain compressed natural gas ("CNG") applications where static electricity buildup may occur. Parker CNG Hose assemblies comply with the requirements of ANSI/IAS NGV 4.2;CSA 12.52, "Hoses for Natural Gas Vehicles and Dispensing Systems"

(www.ansi.org). This Hose is labeled "Electrically Conductive for CNG Use" on its layline and packaging. This Hose must be properly connected to the appropriate Parker Fittings and properly grounded in order to dissipate dangerous static charge buildup, which occurs in, for example, high velocity CNG dispensing or transfer. Do not use any other Hose for CNG applications where static charge buildup may occur, even if electrically conductive. Use of other Hoses in CNG applications or failure to properly connect or ground this Hose can cause a fire or an explosion resulting in death, personal injury, and property damage. Care must also be taken to protect against CNG permeation through the Hose wall. See section 2.6, Permeation, for more information. Parker CNG Hose is intended for dispenser and vehicle use within the specified temperature range. Parker CNG Hose should not be used in confined spaces or unventilated areas or areas exceeding the specified temperature range.

Final assemblies must be tested for leaks. CNG Hose Assemblies should be tested on a monthly basis for conductivity per ANSI/IAS NGV 4.2; CSA 12.52.

Parker manufactures special Hose for aerospace in-flight applications. Aerospace in-flight applications employing Hose to transmit fuel, lubricating fluids and hydraulic fluids require a special Hose with a conductive inner tube. This Hose for in-flight applications is available only from Parker's Stratoflex Products Division. Do not use any other Parker Hose for in-flight applications, even if electrically conductive. Use of other Hoses for in-flight applications or failure to properly connect or ground this Hose can cause a fire or an explosion resulting in death, personal injury and property damage. These Hose assemblies for in-flight applications must meet all applicable aerospace industry, aircraft engine and aircraft requirements .

2.2 Pressure: Hose, Tube and Fitting selection must be made so that the published maximum working pressure of the Hose, Tube and Fittings are equal to or greater than the maximum system pressure. The maximum working pressure of a Hose, or Tube Assembly is the lower of the respective published maximum working pressures of the Hose, Tube and the Fittings used. Surge pressures or peak transient pressures in the system must be below the published maximum working pressure for the Hose, Tube and Fitting. Surge pressures and peak pressures can usually only be determined by sensitive electrical instrumentation that measures and indicates pressures at millisecond intervals. Mechanical pressure gauges indicate only average pressures and cannot be used to determine surge pressures or peak transient pressures. Published burst pressure ratings for Hose is for manufacturing test purposes only and is no indication that the Product can be used in applications at the burst pressure or otherwise above the published maximum recommended working pressure.

2.3 Suction: Hoses used for suction applications must be selected to insure that the Hose will withstand the vacuum and pressure of the system. Improperly selected Hose may collapse in suction application.

2.4 Temperature: Be certain that fluid and ambient temperatures, both steady and transient, do not exceed the limitations of the Hose, Tube, Fitting and Seals. Temperatures below and above the recommended limit can degrade Hose, Tube, Fittings and Seals to a point where a failure may occur and release fluid. Tube and Fittings performances are normally degraded at elevated temperature. Material compatibility can also change at temperatures outside of the rated range. Properly insulate and protect the Hose Assembly when routing near hot objects (e.g. manifolds). Do not use any Hose in any application where failure of the Hose could result in the conveyed fluids (or vapors or mist from the conveyed fluids) contacting any open flame, molten metal, or other potential fire ignition source that could cause burning or explosion of the conveyed fluids or vapors.

2.5 Fluid Compatibility: Hose, and Tube Assembly selection must assure compatibility of the Hose tube, cover, reinforcement, Tube, Plating and Seals with the fluid media used. See the fluid compatibility chart in the Parker publication for the product being considered or used. This information is offered only as a guide. Actual service life can only be determined by the end user by testing under all extreme conditions and other analysis.

Hose, and Tube that is chemically compatible with a particular fluid must be assembled using Fittings and adapters containing likewise compatible seals. Flange or flare processes can change Tube material properties that may not be compatible with certain requirements such as NACE

2.6 Permeation: Permeation (that is, seepage through the Hose or Seal) will occur from inside the Hose or Fitting to outside when Hose or Fitting is used with gases, liquid and gas fuels, and refrigerants (including but not limited to such materials as helium, diesel fuel, gasoline, natural gas, or LPG). This permeation may result in high concentrations of vapors which are potentially flammable, explosive, or toxic, and in loss of fluid. Dangerous explosions, fires, and other hazards can result when using the wrong Hose for such applications. The system designer must take into account the fact that this permeation will take place and must not use Hose or Fitting if this permeation could be hazardous. The system designer must take into account all legal, government, insurance, or any other special regulations which govern the use of fuels and refrigerants. Never use a Hose or Fitting even though the fluid compatibility is acceptable without considering the potential hazardous effects that can result from permeation through the Hose or Tube Assembly. Permeation of moisture from outside the Hose or Fitting to inside the Hose or Fitting will also occur in Hose or Tube assemblies, regardless of internal pressure. If this moisture permeation would have detrimental effects (particularly, but not limited to refrigeration and air conditioning systems), incorporation of sufficient drying capacity in the system or other appropriate system safeguards should be selected and used. The sudden pressure release of highly pressurized gas could also result in Explosive Decompression failure of permeated Seals and Hoses.

2.7 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.

2.8 Routing: Attention must be given to optimum routing to minimize inherent problems (kinking or flow restriction due to Hose collapse, twisting of the Hose, proximity to hot objects or heat sources). For additional routing recommendations see SAE J1273 and ISO 17165-2. Hose Assemblies have a finite life and should be installed in a manner that allows for ease of inspection and future replacement. Hose because of its relative short life, should not be used in residential and commercial buildings inside of inaccessible walls or floors, unless specifically allowed in the product literature. Always review all product literature for proper installation and routing instructions.

2.9 Environment: Care must be taken to insure that the Hose, Tube and Fittings 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.

2.10 Mechanical Loads: External forces can significantly reduce Hose, Tube and Fitting life or cause failure. Mechanical loads which must be considered include excessive flexing, twist, kinking, tensile or side loads, bend radius, and vibration. Use of swivel type Fittings or adapters may be required to insure no twist is put into the Hose. Use of proper Hose or Tube clamps may also be required to reduce external mechanical loads. Unusual applications may require special testing prior to Hose selection.

2.11 Physical Damage: Care must be taken to protect Hose from wear, snagging, kinking, bending smaller that minimum bend radius and cutting, any of which can cause premature Hose failure. Any Hose that has been kinked or bent to a radius smaller than the minimum bend radius, and any Hose that has been cut or is cracked or is otherwise damaged should be removed and discarded. Fittings with damages such as scratches on sealing surfaces and deformation should be replaced.

2.12 Proper End Fitting: See instructions 3.2 through 3.5. These recommendations may be substantiated by testing to industry standards such as SAE J517 for hydraulic applications, or MIL-A-5070, AS1339, or AS3517 for Hoses from Parker's Stratoflex Products Division for aerospace applications.

2.13 Length: When determining the proper Hose or Tube length of an assembly, be aware of Hose length change due to pressure, Tube length change due to thermal expansion or contraction, and Hose or Tube and machine tolerances and movement must be considered. When routing short hose assemblies, it is recommended that the minimum free hose length is always used. Consult the hose manufacturer for their minimum free hose length recommendations. Hose assemblies should be installed in such a way that any motion or flexing occurs within the same plane.

2.14 Specifications and Standards: When selecting Hose, Tube and Fittings, government, industry, and Parker specifications and recommendations must be reviewed and followed as applicable.

2.15 Hose Cleanliness: Hose and Tube components may vary in cleanliness levels. Care must be taken to insure that the Hose and Tube Assembly selected has an adequate level of cleanliness for the application.

2.16 Fire Resistant Fluids: Some fire resistant fluids that are to be conveyed by Hose or Tube require use of the same type of Hose or Tube as used with petroleum base fluids. Some such fluids require a special Hose, Tube, Fitting and Seal, while a few fluids will not work with any Hose at all. See instructions 2.5 and 1.5. The wrong Hose, Tube, Fitting or Seal may fail after a very short service. In addition, all liquids but pure water may burn fiercely under certain conditions, and even pure water leakage may be hazardous.

2.17 Radiant Heat: Hose and Seals can be heated to destruction without contact by such nearby items as hot manifolds or molten metal. The

same heat source may then initiate a fire. This can occur despite the presence of cool air around the Hose or Seal. Performance of Tube and Fitting subjected to the heat could be degraded.

2.18 Welding or Brazing: When using a torch or arc welder in close proximity to hydraulic lines, the hydraulic lines should be removed or shielded with appropriate fire resistant materials. Flame or weld spatter could burn through the Hose or Seal and possibly ignite escaping fluid resulting in a catastrophic failure. Heating of plated parts, including Hose Fittings and adapters, above 450°F (232°C) such as during welding, brazing or soldering may emit deadly gases. Any elastomer seal on fittings shall be removed prior to welding or brazing, any metallic surfaces shall be protected after brazing or welding when necessary. Welding and brazing filler material shall be compatible with the Tube and Fitting that are joined.

2.19 Atomic Radiation: Atomic radiation affects all materials used in Hose and Tube assemblies. Since the long-term effects may be unknown, do not expose Hose or Tube assemblies to atomic radiation. Nuclear applications may require special Tube and Fittings.

2.20 Aerospace Applications: The only Hose, Tube and Fittings that may be used for in-flight aerospace applications are those available from Parker's Stratoflex Products Division. Do not use any other Hose or Fittings for in-flight applications. Do not use any Hose or Fittings from Parker's Stratoflex Products Division with any other Hose or Fittings, unless expressly approved in writing by the engineering manager or chief engineer of Stratoflex Products Division and verified by the user's own testing and inspection to aerospace industry standards.

2.21 Unlocking Couplings: Ball locking couplings or other Fittings with quick disconnect ability can unintentionally disconnect if they are dragged over obstructions, or if the sleeve or other disconnect member, is bumped or moved enough to cause disconnect. Threaded Fittings should be considered where there is a potential for accidental uncoupling.

3.0 HOSE AND FITTINGS ASSEMBLY AND INSTALLATION INSTRUCTIONS

3.1 Component Inspection: Prior to assembly, a careful examination of the Hose and Fittings must be performed. All components must be checked for correct style, size, catalog number, and length. The Hose must be examined for cleanliness, obstructions, blisters, cover looseness, kinks, cracks,cuts or any other visible defects. Inspect the Fitting and sealing surfaces for burrs, nicks, corrosion or other imperfections. Do NOT use any component that displays any signs of nonconformance.

3.2 Hose and Fitting Assembly: Do not assemble a Parker Fitting on a Parker Hose that is not specifically listed by Parker for that Fitting, unless authorized in writing by the engineering manager or chief engineer of the appropriate Parker division. Do not assemble a Parker Fitting on another manufacturer's Hose or a Parker Hose on another manufacturer's Fitting unless (i) the engineering manager or chief engineer of the appropriate Parker division approves the Assembly in writing or that combination is expressly approved in the appropriate Parker literature for the specific Parker product, and (ii) the user verifies the Assembly and the application through analysis and testing. For Parker Hose that does not specify a Parker Fitting, the user is solely responsible for the selection of the proper Fitting and Hose Assembly procedures. See instruction 1.4.

To prevent the possibility of problems such as leakage at the Fitting or system contamination, it is important to completely remove all debris from the cutting operation before installation of the Fittings. The Parker published instructions must be followed for assembling the Fittings on the Hose. These instructions are provided in the Parker Fitting catalog for the specific Parker Fitting being used, or by calling 1-800-CPARKER, or at www.parker.com.

3.3 Related Accessories: Do not crimp or swage any Parker Hose or Fitting with anything but the listed swage or crimp machine and dies in accordance with Parker published instructions. Do not crimp or swage another manufacturer's Fitting with a Parker crimp or swage die unless authorized in writing by the engineering manager or chief engineer of the appropriate Parker division.

3.4 Parts: Do not use any Parker Fitting part (including but not limited to socket, shell, nipple, or insert) except with the correct Parker mating parts, in accordance with Parker published instructions, unless authorized in writing by the engineering manager or chief engineer of the appropriate Parker division.

3.5 Field Attachable/Permanent: Do not reuse any field attachable Hose Fitting that has blown or pulled off a Hose. Do not reuse a Parker permanent Hose Fitting (crimped or swaged) or any part thereof. Complete Hose Assemblies may only be reused after proper inspection under section 4.0. Do not assemble Fittings to any previously used hydraulic Hose that was in service, for use in a fluid power application.

3.6 Pre-Installation Inspection: Prior to installation, a careful examination of the Hose Assembly must be performed. Inspect the Hose Assembly for any damage or defects. DO NOT use any Hose Assembly that displays any signs of nonconformance.

3.7 Minimum Bend Radius: Installation of a Hose at less than the minimum listed bend radius may significantly reduce the Hose life. Particular attention must be given to preclude sharp bending at the Hose to Fitting juncture. Any bending during installation at less than the minimum bend radius must be avoided. If any Hose is kinked during installation, the Hose must be discarded.

3.8 Twist Angle and Orientation: Hose Assembly installation must be such that relative motion of machine components does not produce twisting.

3.9 Securement: In many applications, it may be necessary to restrain, protect, or guide the Hose to protect it from damage by unnecessary flexing, pressure surges, and contact with other mechanical components. Care must be taken to insure such restraints do not introduce additional stress or wear points.

3.10 Proper Connection of Ports: Proper physical installation of the Hose Assembly requires a correctly installed port connection insuring that no twist or torque is transferred to the Hose when the Fittings are being tightened or otherwise during use.

3.11 External Damage: Proper installation is not complete without insuring that tensile loads, side loads, kinking, flattening, potential abrasion,thread damage or damage to sealing surfaces are corrected or eliminated. See instruction 2.10.

3.12 System Checkout: All air entrapment must be eliminated and the system pressurized to the maximum system pressure (at or below the Hose maximum working pressure) and checked for proper function and freedom from leaks. Personnel must stay out of potential hazardous areas while testing and using.

3.13 Routing: The Hose Assembly should be routed in such a manner so if a failure does occur, the escaping media will not cause personal injury or property damage. In addition, if fluid media comes in contact with hot surfaces, open flame or sparks, a fire or explosion may occur. See section 2.4.

3.14 Ground Fault Equipment Protection Devices (GFEPDs): WARNING! Fire and Shock Hazard. To minimize the danger of fire if the heating cable of a Multitube bundle is damaged or improperly installed, use a Ground Fault Equipment Protection Device. Electrical fault currents may be insufficient to trip a conventional circuit breaker.

For ground fault protection, the IEEE 515: (www.ansi.org) standard for heating cables recommends the use of GFEPDs with a nominal 30 milliampere trip level for "piping systems in classified areas, those areas requiring a high degree of maintenance, or which may be exposed to physical abuse or corrosive atmospheres".

4.0 TUBE AND FITTINGS ASSEMBLY AND INSTALLATION INSTRUCTIONS

4.1 Component Inspection: Prior to assembly, a careful examination of the Tube and Fittings must be performed. All components must be checked for correct style, size, material, seal, and length. Inspect the Fitting and sealing surfaces for burrs, nicks, corrosion, missing seal or other imperfections. Do NOT use any component that displays any signs of nonconformance.

4.2 Tube and Fitting Assembly: Do not assemble a Parker Fitting with a Tube that is not specifically listed by Parker for that Fitting, unless authorized in writing by the engineering manager or chief engineer of the appropriate Parker division. The Tube must meet the requirements specified to the Fitting. The Parker published instructions must be followed for assembling the Fittings to a Tube. These instructions are provided in the Parker Fitting catalog for the specific Parker Fitting being used, or by calling 1-800-CPARKER, or at www.parker.com.

4.3 Related Accessories: Do not preset or flange Parker Fitting components using another manufacturer's equipment or procedures unless authorized in writing by the engineering manager or chief engineer of the appropriate Parker division. Tube, Fitting component and tool-

ing must be check for correct style, size and material. Operation and maintenance of Related Accessories must be in accordance with the operation manual for the designated Accessory.

4.4 Securement: In many applications, it may be necessary to restrain, protect, or guide the Tube to protect it from damage by unnecessary flexing, pressure surges, vibration, and contact with other mechanical components. Care must be taken to insure such restraints do not introduce additional stress or wear points.

4.5 Proper Connection of Ports: Proper physical installation of the Tube Assembly requires a correctly installed port connection insuring that no torque is transferred to the Tube when the Fittings are being tightened or otherwise during use.

4.6 External Damage: Proper installation is not complete without insuring that tensile loads, side loads, flattening, potential abrasion, thread damage or damage to sealing surfaces are corrected or eliminated. See instruction 2.10.

4.7 System Checkout: All air entrapment must be eliminated and the system pressurized to the maximum system pressure (at or below the Tube Assembly maximum working pressure) and checked for proper function and freedom from leaks. Personnel must stay out of potential hazardous areas while testing and using.

4.8 Routing: The Tube Assembly should be routed in such a manner so if a failure does occur, the escaping media will not cause personal injury or property damage. In addition, if fluid media comes in contact with hot surfaces, open flame or sparks, a fire or explosion may occur. See section 2.4.

5.0 HOSE AND FITTING MAINTENANCE AND REPLACEMENT INSRUCTIONS

5.1 Even with proper selection and installation, Hose life may be significantly reduced without a continuing maintenance program. The severity of the application, risk potential from a possible Hose failure, and experience with any Hose failures in the application or in similar applications should determine the frequency of the inspection and the replacement for the Products so that Products are replaced before any failure occurs. Certain products require maintenance and inspection per industry requirements. Failure to adhere to these requirements may lead to premature failure. A maintenance program must be established and followed by the user and, at minimum, must include instructions 5.2 through 5.7

5.2 Visual Inspection Hose/Fitting: Any of the following conditions require immediate shut down and replacement of the Hose Assembly:

- Fitting slippage on Hose;
- Damaged, cracked, cut or abraded cover (any reinforcement exposed);
- Hard, stiff, heat cracked, or charred Hose;
- Cracked, damaged, or badly corroded Fittings;
- Leaks at Fitting or in Hose;
- Kinked, crushed, flattened or twisted Hose; and
- Blistered, soft, degraded, or loose cover.

5.3 Visual Inspection All Other: The following items must be tightened, repaired, corrected or replaced as required:

- Leaking port conditions;
- Excess dirt buildup;/
- Worn clamps, guards or shields; and
- System fluid level, fluid type, and any air entrapment.

5.4 Functional Test: Operate the system at maximum operating pressure and check for possible malfunctions and leaks. Personnel must avoid potential hazardous areas while testing and using the system. See section 2.2.

5.5 Replacement Intervals: Hose assemblies and elastomeric seals used on Hose Fittings and adapters will eventually age, harden, wear and deteriorate under thermal cycling and compression set. Hose Assemblies and elastomeric seals should be inspected and replaced at specific replacement intervals, based on previous service life, government or industry recommendations, or when failures could result in unacceptable downtime, damage, or injury risk. See section 1.2. Hose and Fittings may be subjected to internal mechanical and/or chemical wear from the conveying fluid and may fail without warning. The user must determine the product life under such circumstances by testing. Also see section 2.5.

5.6 Hose Inspection and Failure: Hydraulic power is accomplished by utilizing high pressure fluids to transfer energy and do work. Hoses, Fittings and Hose Assemblies all contribute to this by transmitting fluids at high pressures. Fluids under pressure can be dangerous and potentially lethal and, therefore, extreme caution must be exercised when working with fluids under pressure and handling the Hoses transporting the fluids. From time to time, Hose Assemblies will fail if they are not replaced at proper time intervals. Usually these failures are the result of some form of misapplication, abuse, wear or failure to perform proper maintenance. When Hoses fail, generally the high pressure fluids inside escape 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 possibly loss of limb. 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 failure occurs, immediately shut down the equipment and leave the area until pressure has been completely released from the Hose Assembly. Simply shutting down the hydraulic pump may or may not eliminate the pressure in the Hose Assembly. Many times check valves, etc., are employed in a system and can cause pressure to remain in a Hose Assembly even when pumps or equipment are not operating. Tiny holes in the Hose, commonly known as pinholes, can eject small, dangerously powerful but hard to see streams of hydraulic fluid. It may take several minutes or even hours for the pressure to be relieved so that the Hose Assembly may be examined safely.

Once the pressure has been reduced to zero, the Hose Assembly may be taken off the equipment and examined. It must always be replaced if a failure has occurred. Never attempt to patch or repair a Hose Assembly that has failed. Consult the nearest Parker distributor or the appropriate Parker division for Hose Assembly replacement information. .

Never touch or examine a failed Hose Assembly unless it is obvious that the Hose no longer contains fluid under pressure. The high pressure fluid is extremely dangerous and can cause serious and potentially fatal injury.

5.7 Elastomeric seals: Elastomeric seals will eventually age, harden, wear and deteriorate under thermal cycling and compression set. Elastomeric seals should be inspected and replaced.

5.8 Refrigerant gases: Special care should be taken when working with refrigeration systems. Sudden escape of refrigerant gases can cause blindness if the escaping gases contact the eye and can cause freezing or other severe injuries if it contacts any other portion of the body.

5.9 Compressed natural gas (CNG): Parker CNG Hose Assemblies should be tested after installation and before use, and at least on a monthly basis per instructions provided on the Hose Assembly tag. The recommended procedure is to pressurize the Hose and check for leaks and to visually inspect the Hose for damage and to perform an electrical resistance test.

Caution: Matches, candles, open flame or other sources of ignition shall not be used for Hose inspection. Leak check solutions should be rinsed off after use.

6.0 HOSE STORAGE

6.1 Age Control: Hose and Hose Assemblies must be stored in a manner that facilitates age control and first-in and first-out usage based on manufacturing date of the Hose and Hose Assemblies. Unless otherwise specified by the manufacturer or defined by local laws and regulations:

6.1.1 The shelf life of rubber hose in bulk form or hose made from two or more materials is 28 quarters (7 years) from the date of manufacture, with an extension of 12 quarters (3 years), if stored in accordance with ISO 2230;

6.1.2 The shelf life of thermoplastic and polytetrafluoroethylene hose is considered to be unlimited;

6.1.3 Hose assemblies that pass visual inspection and proof test shall not be stored for longer than 2 years.

6.1.4 Storage: Stored Hose and Hose Assemblies must not be subjected to damage that could reduce their expected service life and must be placed in a cool, dark and dry area with the ends capped. Stored Hose and Hose Assemblies must not be exposed to temperature extremes, ozone, oils, corrosive liquids or fumes, solvents, high humidity, rodents, insects, ultraviolet light, electromagnetic fields or radioactive materials.

Notes

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