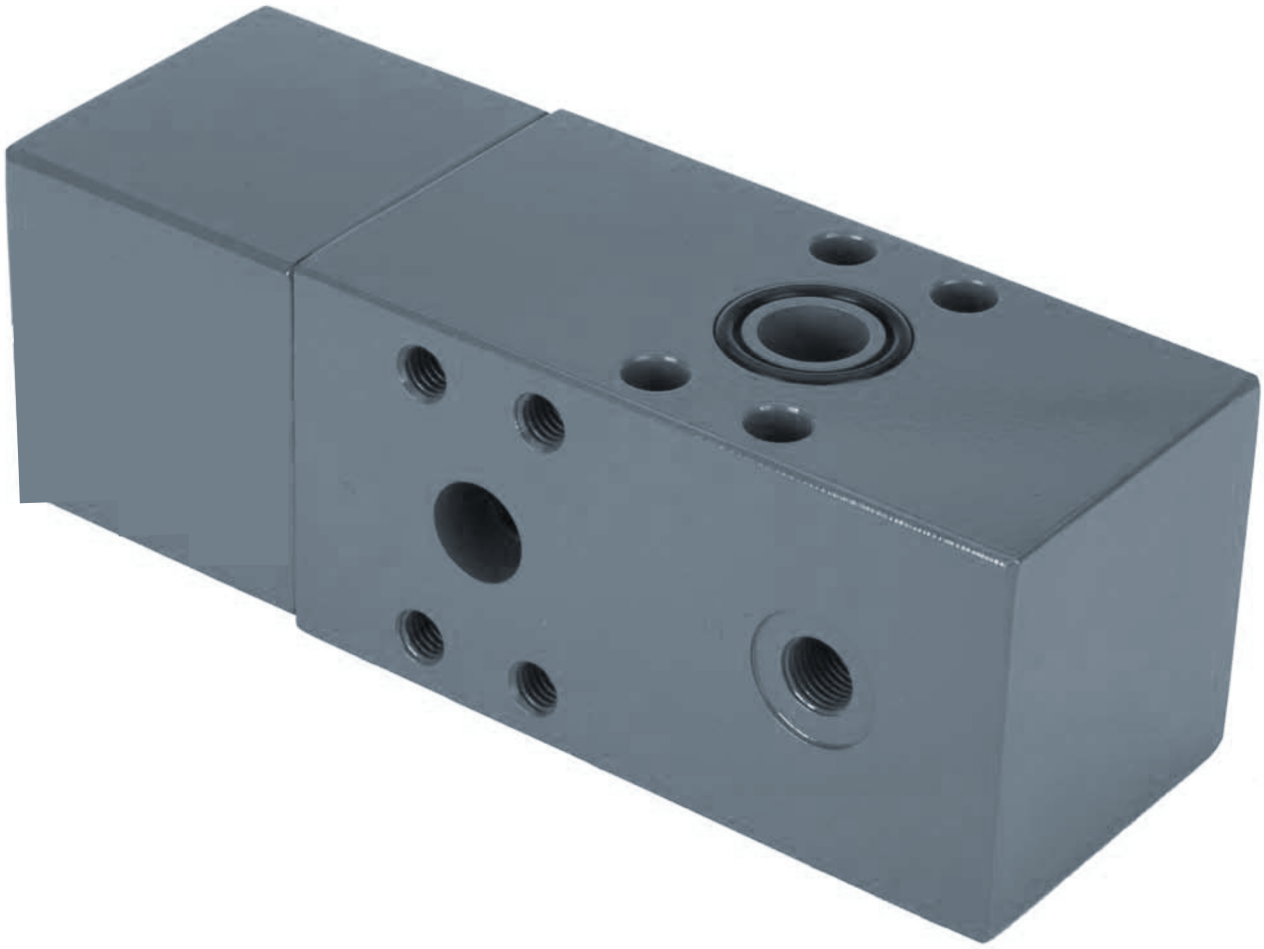
Vickers by Danfoss
Counterbalance Valve

CB Series
315 Bar
80-560 L/min

Mainfold Mounting
SAE Flange Mounting
Subplate Mounting



ENGINEERING
TOMORROW

BC454266946595en-000101

Table of Contents

Counterbalance Valve

General Description 2

Functional Symbols 2

Model Code 3

Technical Data 3

Flow Curves 3

Circuit Examples 4

Mainfold Mounting Dimensions 4

Subplate Mounting Dimensions 5

SAE Flange Mounting Dimensions 6,7

Released Part Numbers 8

General Description

General:

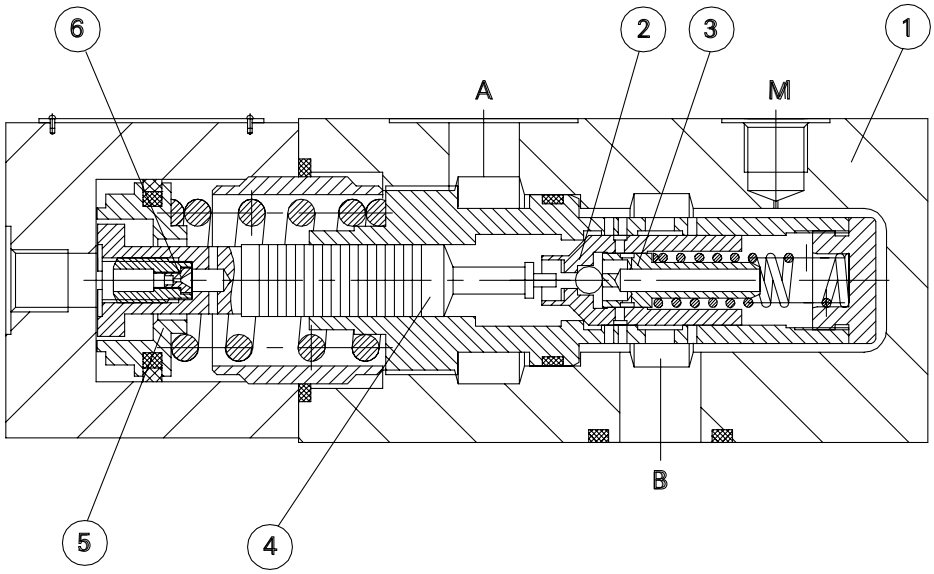
Counterbalance valve are used in hydraulic systems to control the speed of hydraulic motors and cylinders independent of the load (prevents running away). In addition there is a isolater function for pipe burst safety. Counterbalance valve comprises basically of the housing (1), main poppet (2), pilot part (3), pilot spool (4), damping spool (5) and pilot damping (6).

Specs:

Pressure rating 315 bar
Flow up to 560 LPM

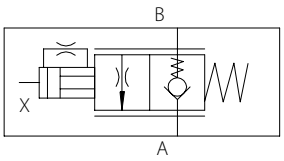
Features:

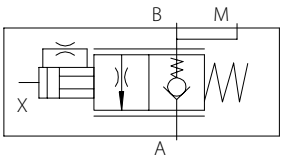
- Pilot operated check valve, leak-free function
- The counterbalance valve controls the returning flow q v2 in relation to the flow being directed into the other side of the actuator q v1. With cylinders the area ratio (q v2=q v1) hasto be taken into account
- By-pass valve, free flow in opposite direction
- Optional built-on secondary pressure relief valve (only for flange mounted valve)



Functional Symbols

Without secondary pressure relief valve





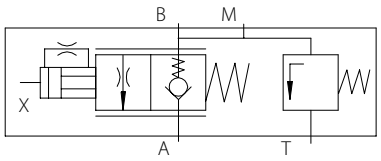
Valve Type:

CB 12 KA 10/B30
CB 16 KA 10/B30
CB 25 KA 10/B40
CB 32 KA 10/B60

Valve Type:

CB 12 GA 10/B30
CB 16 GA 10/B30
CB 25 GA 10/B40
CB 32 GA 10/B60

With secondary pressure relief valve



CB 12 FA 10/B30
CB 16 FA 10/B30
CB 25 FA 10/B40
CB 32 FA 10/B60

Valve Type:

CB 12 F** 1 0 / B 3 0
CB 16 F** 1 0 / B 3 0
CB 25 F** 1 0 / B 4 0
CB 32 F** 10/B60

Model Code

F3 CB 12 G A 10 B00

1 2 3 4 5 6 7

1 **Seal Options**

F3 – Fluorocarbin seals, for Phosephate Ester (class L-HFD)

Blank – Nitrile, for Mineral oil Anti-wear hydraulic oil (class L-HM) Invert emulsion (class L-HFB)

2 **Counterbalance Valve**

3 **Size**

12 - Size 12
16 - Size 16
25 - Size 25 32 - Size 32

4 **Mounting Style**

F - SAE flange mounting (CD 62)
G - Subplate mounting
K - Cartridge only (for manifold)

5 Secondary Relief Valve

A - No
200 - 200 bar (only on F style)
300 - 300 bar (only on F style)
350 - 350 bar (only on F style)

6 **Design Number**

7 **Orifice**

B00 - No orifice
B30 - ϕ 0.3mm orifice (size 12 & 16)
B40 - ϕ 0.4mm orifice (size 25)
B60 - ϕ 0.6mm orifice (size 32)

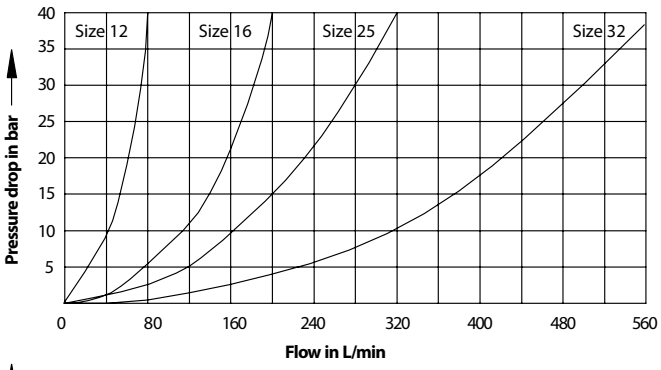
Technical Data

(for applications outside these parameters, please consult us!)

Operating pressure ports A, X	315 bar max.
Operating pressure port B	350 bar max.
Pilot pressure port X	20-35 bar min; 315 bar max.
Cracking pressure A to B	2 bar
Max pressure setting for secondary relief valve	to 350 bar
Flow	80 (size 12), 200 (size 16) L/min.
	320 (size 25), 560 (size 32) L/min.
Area ratio	$\frac{\text{Poppet seat area}}{\text{Pilot spool area}} = \frac{1}{20}$
Fluid temperature range	-20 to +80° C
Fluid viscosity range	10-800 mm²/s
Fluid cleanliness	20/18/15

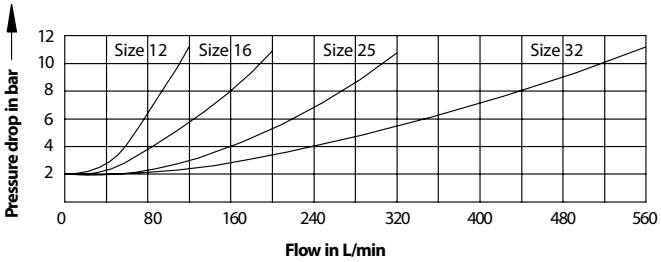
Flow Curves

(measured at v = 41 mm²/s and t = 50°C)



Pressure differential in relation to flow, measured at throttle position:

Throttle fully open (Px=65 bar) B to A



Flow in L/min.
Pressure differential in relation to flow, measured over the check valve A to B

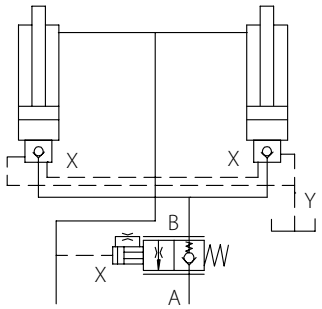
Circuit Examples

Note:

Two counterbalance cannot be used to control two cylinders which are forced mechanically to move together, as synchronization and the same pressure cannot be guaranteed in each cylinder.

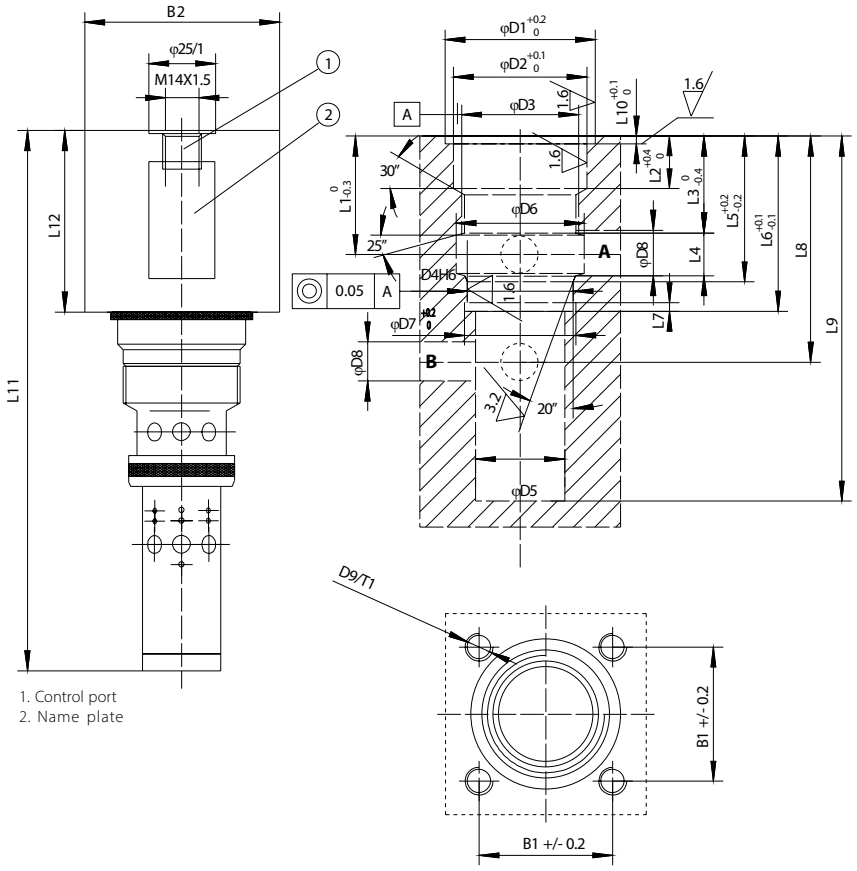
Therefore, the cylinders have to be equipped with two pilot operated check valves. The counterbalance valve is fitted in a common line.

In this case, the load pressure must not exceed 200 bar!



Manifold Mounting

(Dimensions in mm)



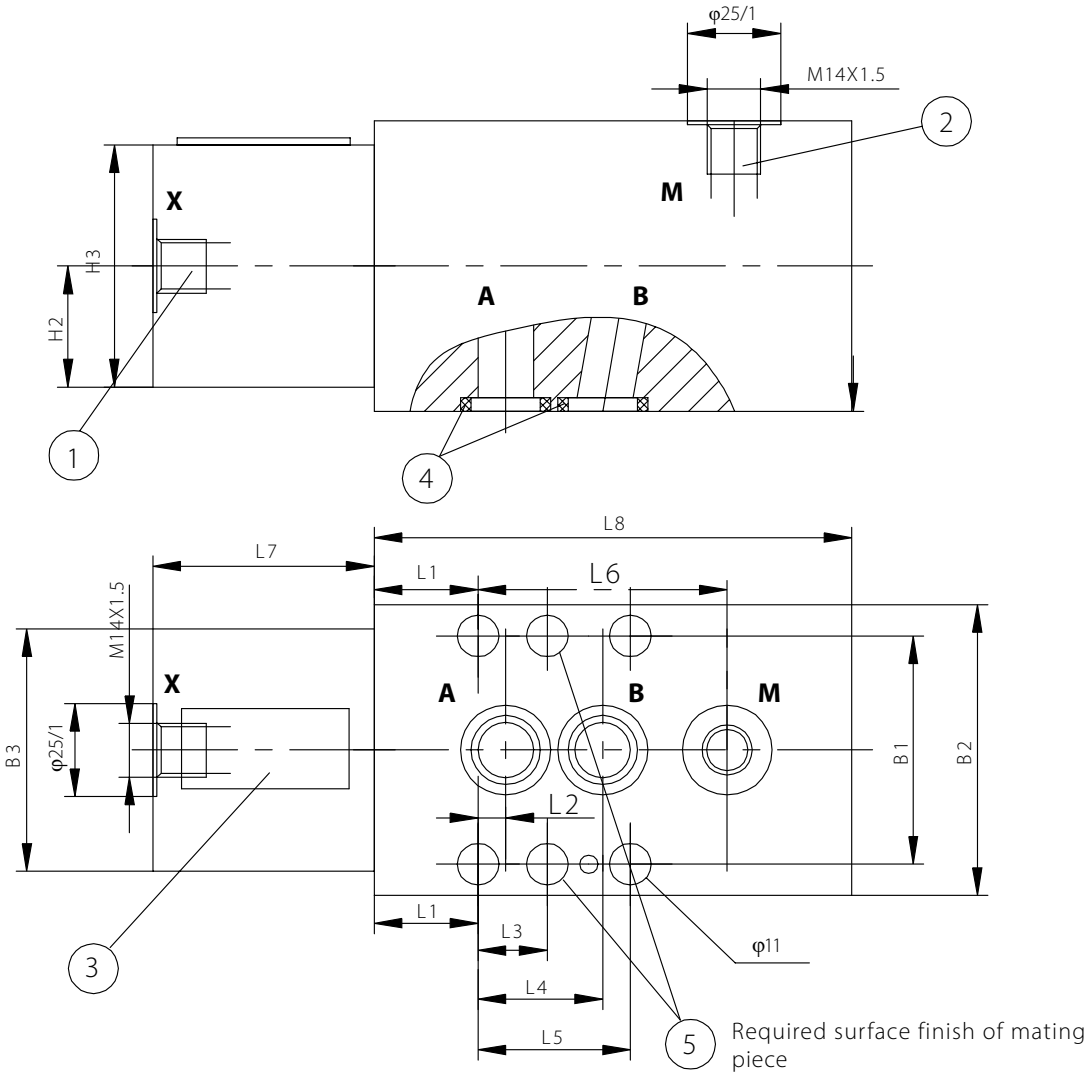
1. Control port
2. Name plate

Type	B1	B2			D1	D4	D5	D6	D7	D8	D9	T1	L1	L2	L3	L4	L5	L6
CB12KA10	48	70	54	46	M42×2	38	34	46	38.6	16	M10	16	39	16	32	15.5	50.6	60
CB16KA10	48	70	54	46	M42×2	38	34	46	38.6	16	M10	16	39	16	32	15.5	50.6	60
CB25KA10	56	80	60	54	M52×2	48	40	60	48.6	25	M12	19	50	19	39	22.0	65.0	80
CB32KA10	66	95	72	65	M64×2	58	52	74	58.6	30	M16	23	52	19	40	25.0	71.0	85

Type	L7	L8	L9	L10	L11	L12	Size	Bolts	Torque(Nm)	Weight
CB12KA10	3	78	128	2.3	191	65	12	4-M10×70-10.9	69	2.8 kg
CB16KA10	3	78	128	2.3	191	65	16	4-M10×70-10.9	69	2.8 kg
CB25KA10	4	105	182	2.3	253	75	25	4-M12×80-10.9	120	2.8 kg
CB32KA10	4	115	198	2.3	289	94	32	4-M16×100-10.9	295	7.5 kg

Sub-plate Mounting

(Dimensions in mm)



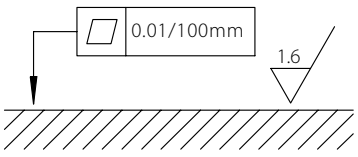
1. Control Port

2. Pressure Gauge Port

3. Name Plate

4. O-ring

5. 6 Valve fixing holes for size 32

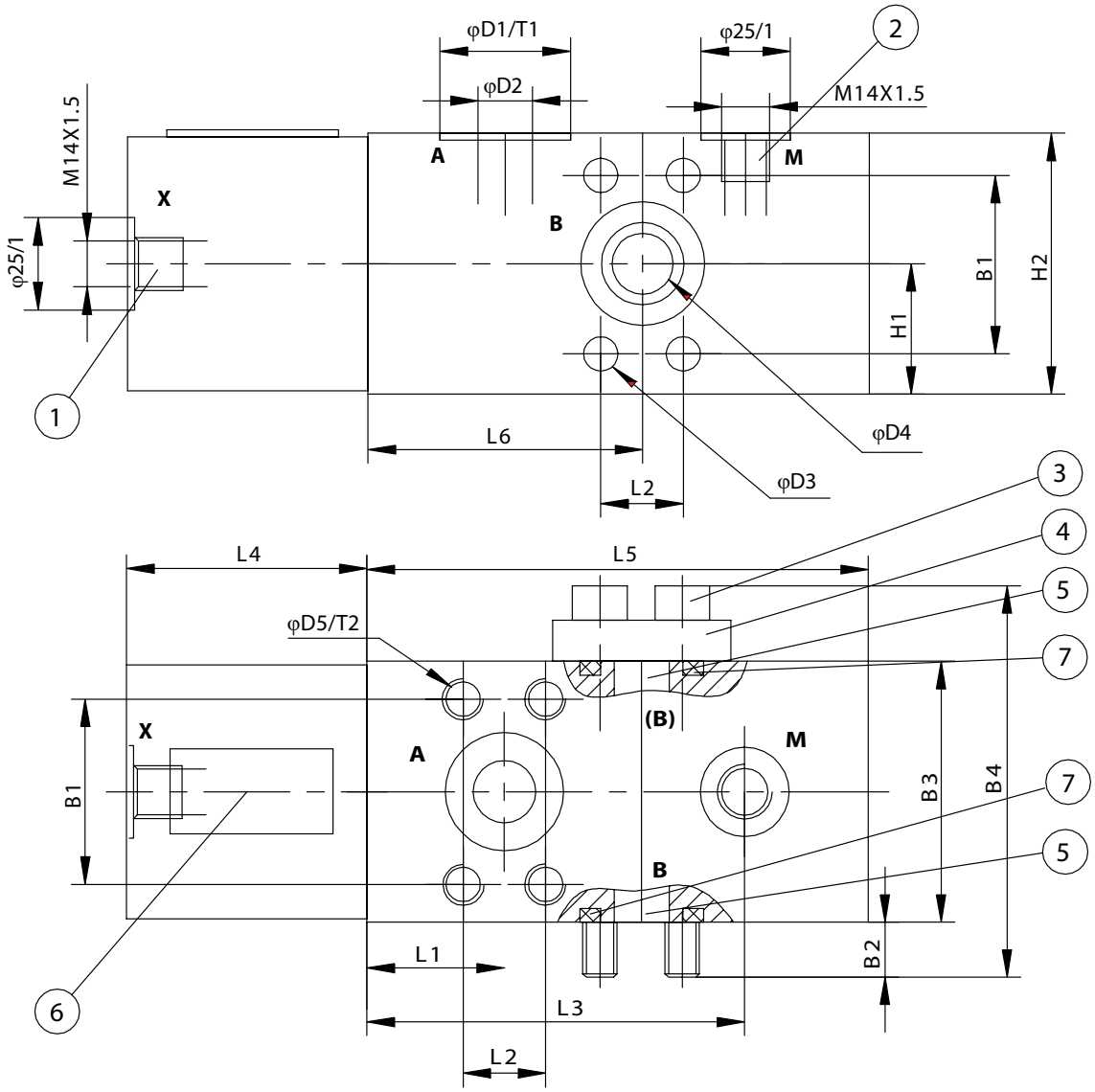


Type	*B1*	*B2*	*B3*	*H1*	*H2*	*H3*	*L1*	*L2*
CB 12 GA 10	66.5	85	70	85	42.5	70	32.0	7.0
CB 16 GA 10	66.5	85	70	85	42.5	70	32.0	7.0
CB 25 GA 10	79.5	100	80	100	50.0	80	39.0	11.0
CB 32 GA 10	97.0	120	95	120	60.0	95	35.5	16.5

Type	*L3*	*L4*	*L5*	*L6*	*L7*	*L8*	*Weight*	*O-Ring*
CB 12 GA 10	-	35.5	43.0	73.0	65	140	65 kg	21.3x2.4
CB 16 GA 10	-	35.5	43.0	73.0	65	140	65 kg	21.3x2.4
CB 25 GA 10	-	49.0	60.5	109.0	75	200	18 kg	29.82x2.62
CB 32 GA 10	42	67.5	84.0	119.5	94	215	24 kg	38x3

SAE Flange Mounting, Without Secondary Pressure Relief Valve

(Dimensions in mm)



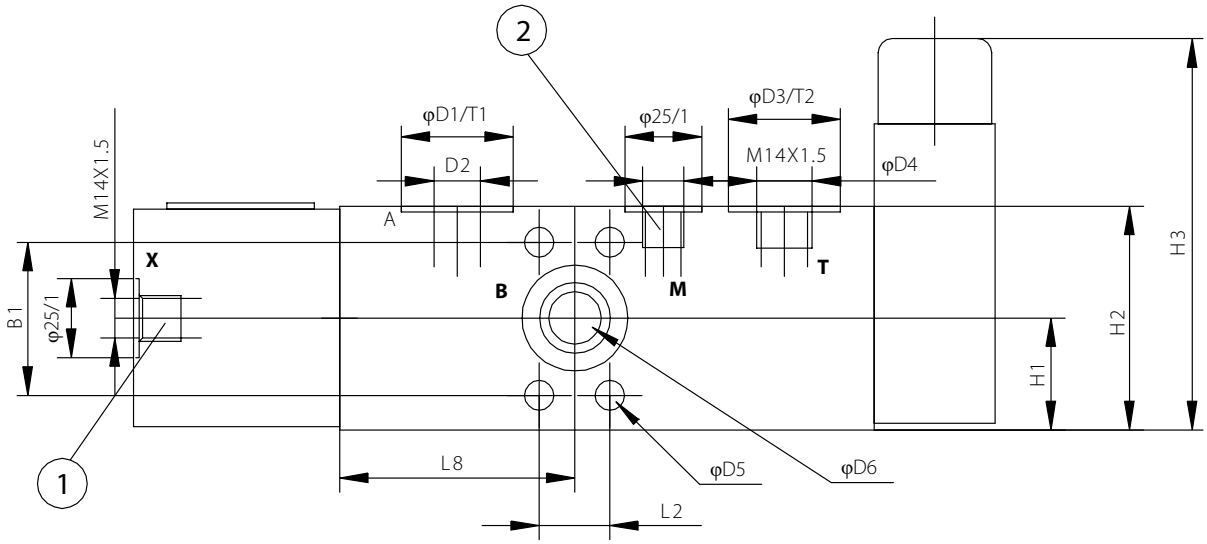
1. Control Port
2. Measuring Port
3. Flange fixing screws
4. Blanking flange
5. Optional port B
6. Name plate
7. O-ring

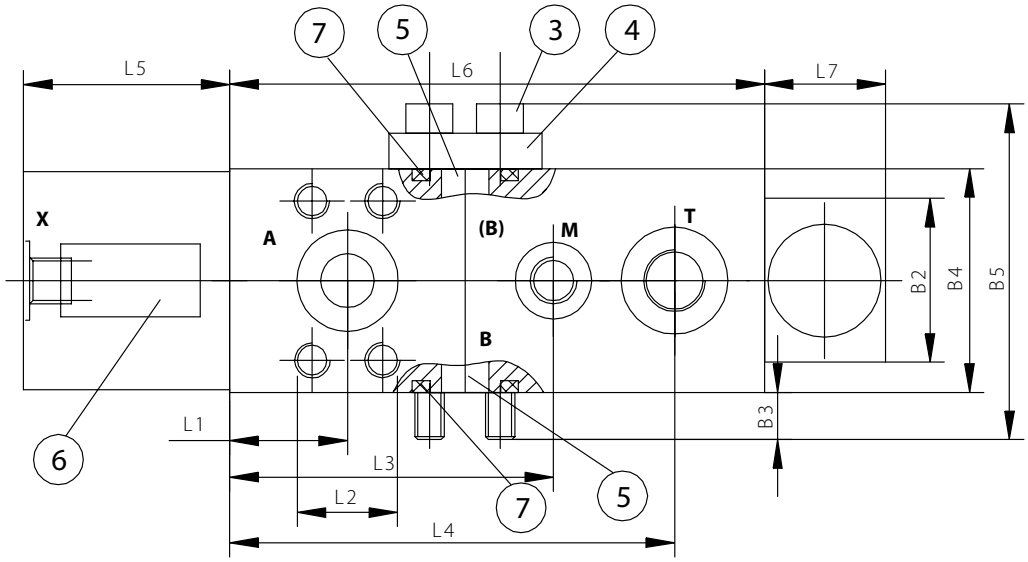
Type	B1	B2	B3	B4	D1	D2	D3	D4	D5	H1	H2
CB 12 FA 10	50.8	16.5	72	110	42	18	10.5	18	M10	36	72
CB 16 FA 10	50.8	16.5	72	110	42	18	10.5	18	M10	36	72
CB 25 FA 10	57.2	14.5	90	132	50	25	13.5	25	M12	45	90
CB 32 FA 10	66.7	20.0	105	154	56	30	15.0	30	M14	50	105

Type	L1	L2	L3	L4	L5	L6	T1	T2	Weight	O-Ring
CB 12 FA 10	39	23.8	105	65	140	78	0.2	15	7 kg	25x3.5
CB 16 FA 10	39	23.8	105	65	140	78	0.2	15	7 kg	25x3.5
CB 25 FA 10	50	27.8	148	75	200	105	0.2	18	16 kg	32.92x3.53
CB 32 FA 10	52	31.6	155	94	215	115	0.2	21	21 kg	37.7x3.53

For SAE Flange Mounting, With Secondary Pressure Relief Valve

(Dimensions in mm)





1. Control Port
2. Measuring Port
3. Flange fixing screws
4. Blanking flange
5. Optional port B
6. Name plate
7. O-ring

Type	B1	B2	B3	B4	B5	D1	D2	D3	D4	D5	D6	D7	H1	H2
CB 12 F** 10	50.8	49	16.5	72	110	42	18	34	M22x1.5	10.5	18	M10	36	72
CB 16 F** 10	50.8	49	16.5	72	110	42	18	34	M22x1.5	10.5	18	M10	36	72
CB 25 F** 10	57.2	78	14.5	90	132	50	25	42	M27x2	13.5	25	M12	45	90
CB 32 F** 10	66.7	78	20	105	154	56	30	42	M27x2	15.0	30	M14	50	105

Type	H3	L1	L2	L3	L4	L5	L6	L7	L8	T1	T2	T3	Weight	O-Ring
CB 12 F** 10	118	39	23.8	105	141.5	65	162	38	78	0.2	1	15	9 kg	25x3.5
CB 16 F** 10	118	39	23.8	105	141.5	65	162	38	78	0.2	1	15	9 kg	25x3.5
CB 25 F** 10	145	50	27.8	148	198.0	75	225	50	105	0.2	1	18	18 kg	32.92x3.53
CB 32 F** 10	145	52	31.6	155	215.0	94	240	50	115	0.2	1	21	24 kg	37.7x3.53

Released Part Numbers

Part Number	*Model Code*
02-413594	CB-12-F-A-10-B30
02-413595	CB-16-F-A-10-B30
02-413596	CB-25-F-A-10-B40
02-413597	CB-32-F-A-10-B60
02-413598	**F3-CB-12-F-A-10-B30**
02-413599	F3-CB-12-F-200-10-B30
02-413600	F3-CB-12-K-A-10-B30
02-413601	F3-CB-12-G-A-10-B30
02-413602	**F3-CB-16-F-A-10-B30**
02-413603	F3-CB-16-F-200-10-B30
02-413604	F3-CB-16-K-A-10-B30
02-413605	F3-CB-16-G-A-10-B30
02-413606	**F3-CB-25-F-A-10-B40**
02-413607	F3-CB-25-F-200-10-B40
02-413608	F3-CB-25-F-300-10-B40
02-413609	F3-CB-25-K-A-10-B40
02-413610	F3-CB-25-G-A-10-B40
02-413611	**F3-CB-32-F-A-10-B60**
02-413612	F3-CB-32-F-200-10-B60
02-413613	F3-CB-32-F-300-10-B60
02-413614	F3-CB-32-K-A-10-B60
02-413615	F3-CB-32-G-A-10-B60

Items in bold are preferred product

ENGINEERING
TOMORROW

Products we offer:

- Cartridge valves
- DCV directional control valves
- Electric converters
- Electric machines
- Electric motors
- Gear motors
- Gear pumps
- Hydraulic integrated circuits (HICs)
- Hydrostatic motors
- Hydrostatic pumps
- Orbital motors
- PLUS+1® controllers
- PLUS+1® displays
- PLUS+1® joysticks and pedals
- PLUS+1® operator interfaces
- PLUS+1® sensors
- PLUS+1® software
- PLUS+1® software services, support and training
- Position controls and sensors
- PVG proportional valves
- Steering components and systems
- Telematics

Hydro-Gear
www.hydro-gear.com

Daikin-Sauer-Danfoss
www.daikin-sauer-danfoss.com

Danfoss Power Solutions is a global manufacturer and supplier of high-quality hydraulic and electric components. We specialize in providing state-of-the-art technology and solutions that excel in the harsh operating conditions of the mobile off-highway market as well as the marine sector. Building on our extensive applications expertise, we work closely with you to ensure exceptional performance for a broad range of applications. We help you and other customers around the world speed up system development, reduce costs and bring vehicles and vessels to market faster.

Danfoss Power Solutions – your strongest partner in mobile hydraulics and mobile electrification.

Go to www.danfoss.com for further product information.

We offer you expert worldwide support for ensuring the best possible solutions for outstanding performance. And with an extensive network of Global Service Partners, we also provide you with comprehensive global service for all of our components.

Local address:

Danfoss
Power Solutions (US) Company
2800 East 13th Street
Ames, IA 50010, USA
Phone: +1 515 239 6000

Danfoss
Power Solutions GmbH & Co. OHG
Krokamp 35
D-24539 Neumünster, Germany
Phone: +49 4321 871 0

Danfoss
Power Solutions ApS
Nordborgvej 81
DK-6430 Nordborg, Denmark
Phone: +45 7488 2222

Danfoss
Power Solutions Trading (Shanghai) Co., Ltd.
Building #22, No. 1000 Jin Hai Rd
Jin Qiao, Pudong New District
Shanghai, China 201206
Phone: +86 21 2080 6201

Danfoss can accept no responsibility for possible errors in catalogues, brochures and other printed material. Danfoss reserves the right to alter its products without notice. This also applies to products already on order provided that such alterations can be made without subsequent changes being necessary in specifications already agreed.
All trademarks in this material are property of the respective companies. Danfoss and the Danfoss logotype are trademarks of Danfoss A/S. All rights reserved.