HYDAC INTERNATIONAL

Valves in sandwich plate design Nominal size 6

DESCRIPTION

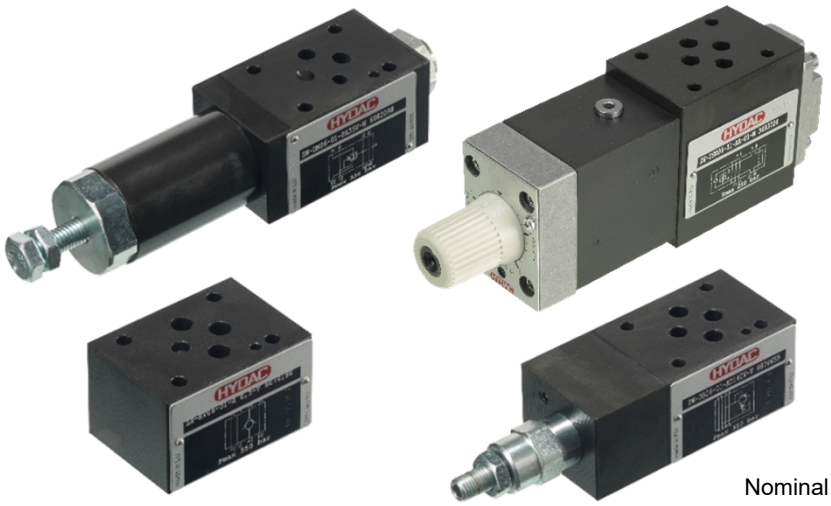
HYDAC valves in sandwich plate design in nominal size 6 enable modular design of the hydraulic control via stacked valve assembly. We offer them as pressure reducing and pressure relief valves for pressure control and as needle or flow valves with bypass check valve for flow control.

Furthermore, the sandwich plates are available as check valve for direction control, pilot-to-open and non-pilot-to-open, and as pressure compensator to realise the flow control function.

Mounting elements are dependent on the modular design of your hydraulic control and are thus not included in delivery.

FEATURES

- Available with pressure, flow, check and pressure compensator function
- Modular design of the hydraulic control
- Interface to ISO 4401-03-02-0-05 (Cetop 4.2-4-03-350)



Nominal size 6
up to 75 l/min
up to 350 bar

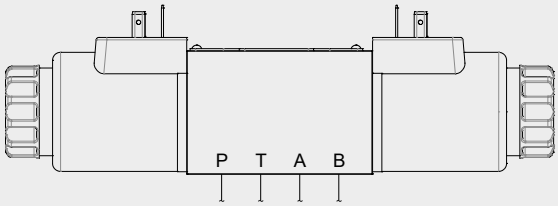
TECHNICAL DATA [1]

General specifications		
$MTTF_d$		150 - 1200 years, according to DIN EN ISO 13849-1:2016; Table C.1, confirmation of ISO 13849-2:2013; Tables C.1 and C.2
Ambient temperature	[°C]	-20 to +60
Installation		no orientation restrictions
		Casing: steel (ZW-RV10 only)
		Name plate: aluminium
Surface coating		Valve housing: phosphate-plated
Hydraulic specifications		
Operating pressure	[bar]	350
Operating fluid		Hydraulic oil to DIN 51524 part 1, 2 and 3
Temp. range of operating fluid	[°C]	-20 to +80
Viscosity	[mm²/s]	10 to 400
Permitted contamination level of operating fluid		class 20/18/15 to ISO 4406
Sealing material		NBR, FKM (standard)

[1] see “Conditions and Instructions for Valves” in brochure 53.000

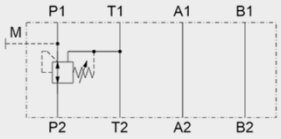
CONTENTS

Directional valve



Pressure reducing valves **page 4**

ZW-DM06…PT



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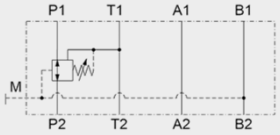

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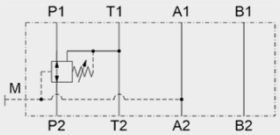
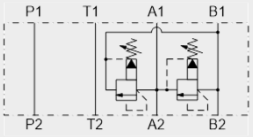


Pressure relief valves **page 7**

ZW-DM06…AB



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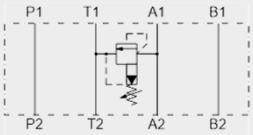

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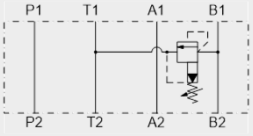

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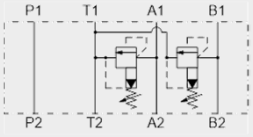

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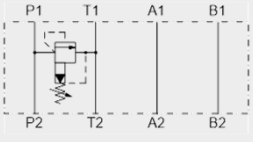
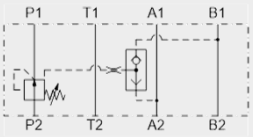


Pressure compensators **page 10**

ZW-DW06…PAB…V



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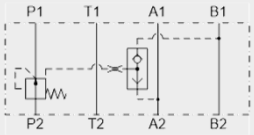

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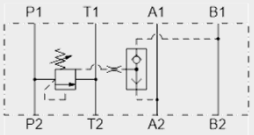

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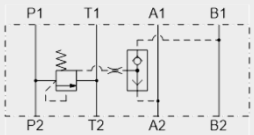
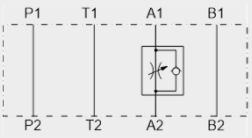


Needle valves **page 13**

ZW-SDR06…AA



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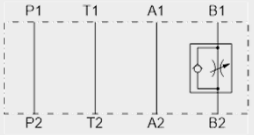

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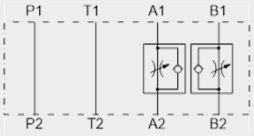

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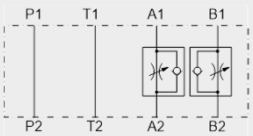
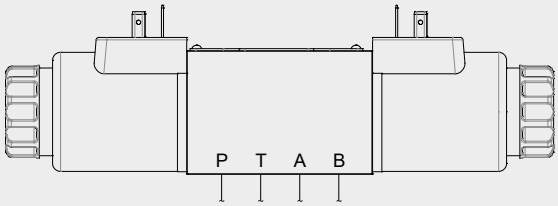


CONTENTS

Directional valve



Flow control valves **page 16**

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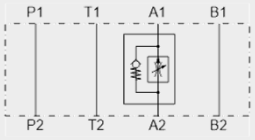

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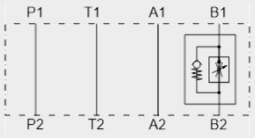

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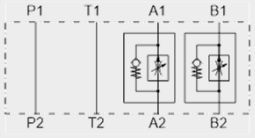
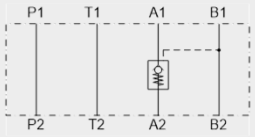


Check valves pilot-to-open **page 19**

ZW-RP06…AA



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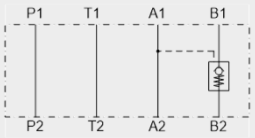

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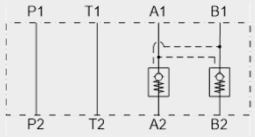
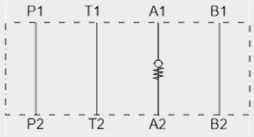


Check valves **page 22**

ZW-RV06…A



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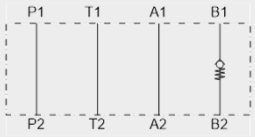

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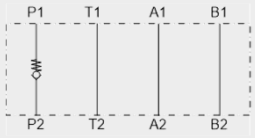

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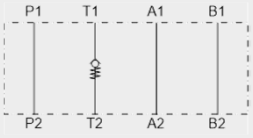

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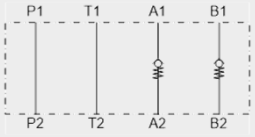

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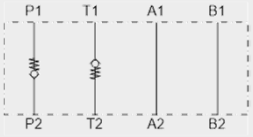


Accessories **page 24**

PRESSURE REDUCING VALVE IN SANDWICH PLATE DESIGN
ZW – DM06

SUPPLEMENTARY TECHNICAL DATA

General specifications		
Weight	[kg]	1.4
Hydraulic specifications		
Tank pressure	[bar]	Port T: p_{max} = 10
Flow rate max.	[l/min]	50 in controlled port 75 in free port
Leakage	[l/min]	≤ 0.08

MODEL CODE

ZW-DM 06 - 01 - PA 035 V - N

Type
Pressure reducing valve in sandwich plate design, direct-acting

Nominal size
6

Series
01 = specified by manufacturer

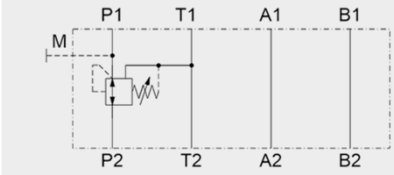
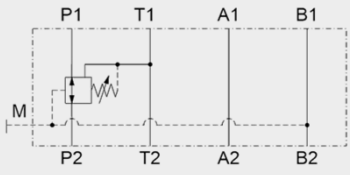
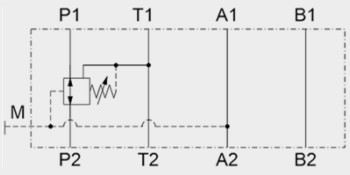
Spool symbol
PA = pressure control in port A
PB = pressure control in port B
PT = pressure control in port T

Pressure ranges
035 = 3 to 35 bar
070 = 10 to 70 bar
140 = 30 to 140 bar
280 = 60 to 280 bar

Adjustment types
V = adjustable using tool
K = adjustment knob (optional)

Sealing material
N = NBR
V = FKM (standard)

SPOOL TYPES / SYMBOLS

PT	PB	PA
		

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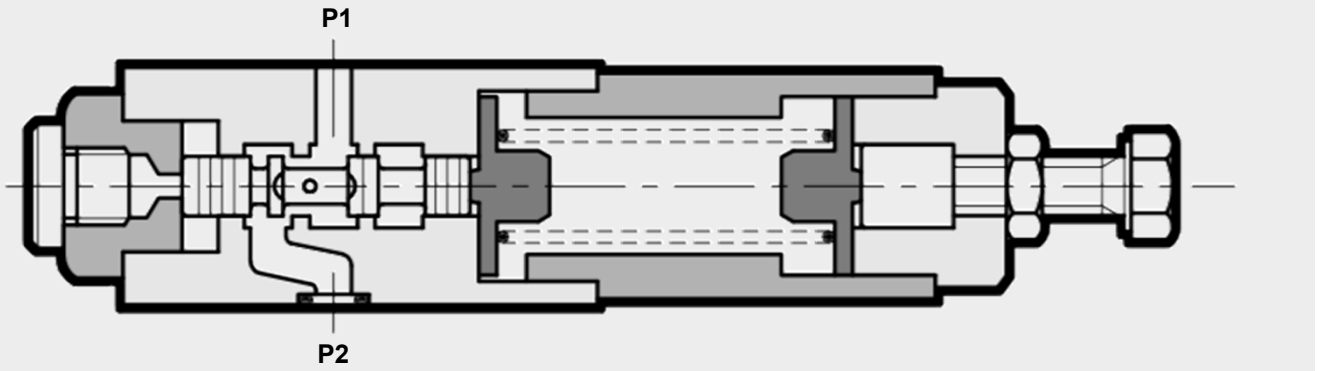


FUNCTION

The direct-acting pressure reducing valve in sandwich plate design in nominal size 6 is used to reduce the inlet pressure at P2 to a smaller outlet pressure P1. The pressure tapping for the reduced pressure is designed differently depending on the symbol:

- reduced pressure in line A → PA
- reduced pressure in line B → PB
- reduced pressure in line P → PT

The outlet pressure P1 can be tapped at measuring port (M).

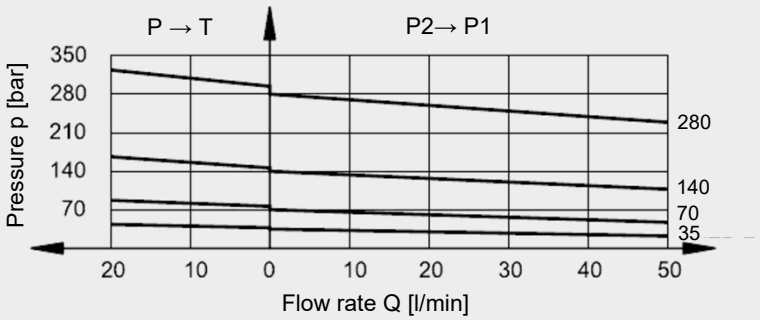
Hint

In designs PA and PB, the pressure losses of the subsequent components must be considered when selecting the inlet pressure.

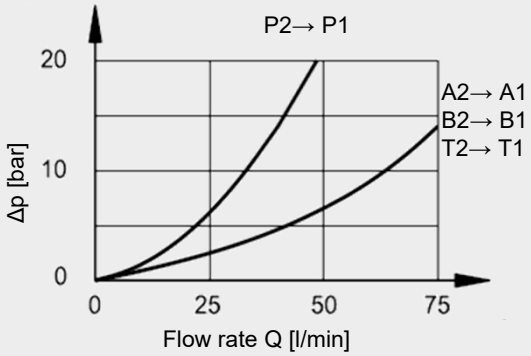
PERFORMANCE

measured at v = 36 mm²/s and T_{oil} = 50°C

Control



Pressure drop



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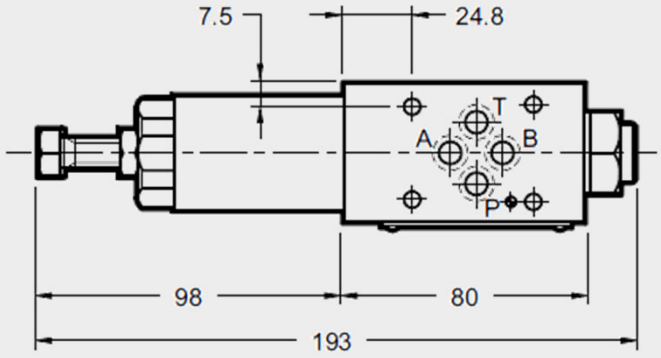
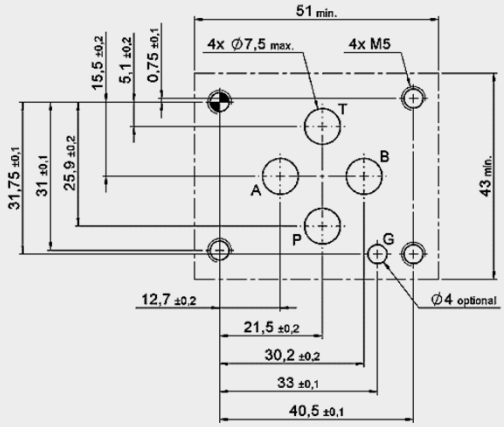
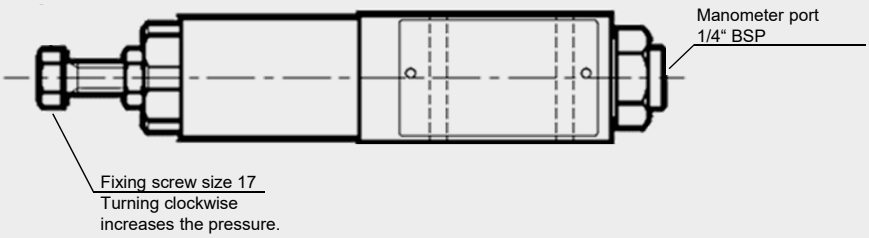
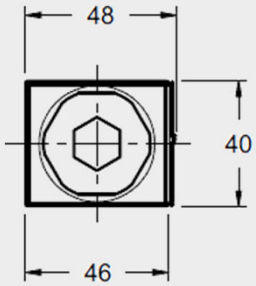


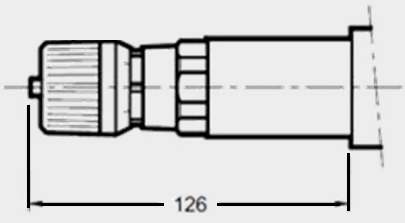
Interface to ISO 4401-03-02-0-05
(Cetop 4.2-4-03-350)



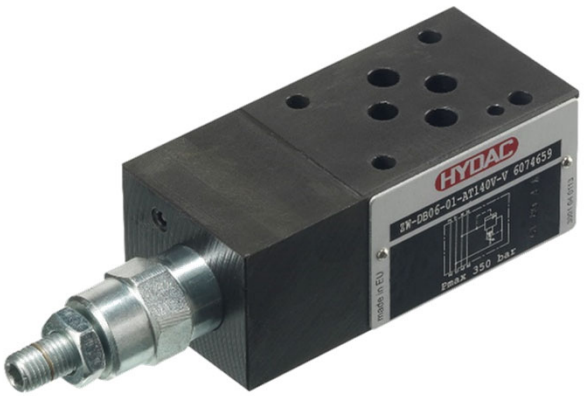




Optional with adjustment type K (adjustment knob)
(Press and turn simultaneously during actuation)



PRESSURE RELIEF VALVE IN SANDWICH PLATE DESIGN
ZW – DB06



SUPPLEMENTARY TECHNICAL DATA

General specifications		
Weight	[kg]	1.4 2.1 (symbol ABT only)
Hydraulic specifications		
Flow rate max.	[l/min]	75

MODEL CODE

ZW-DB 06 - 01 - AB 70 V - N

Type
Pressure relief valve in sandwich plate design, pilot-operated

Nominal size
6

Series
01 = specified by manufacturer

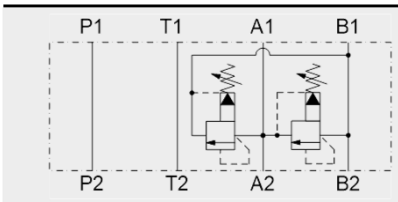
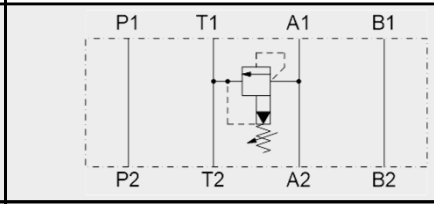
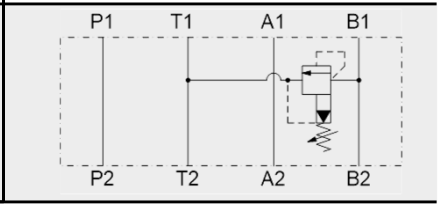
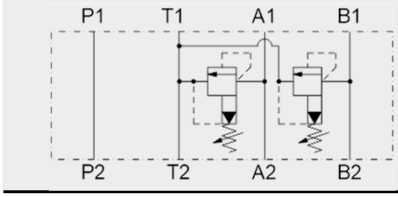
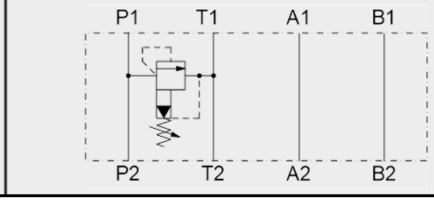
Spool symbol
AB = pressure relief in port B, meter-out in port A
AT = pressure relief in port A, meter-out in port T
BT = pressure relief in port B, meter-out in port T
PT = pressure relief in port P, meter-out in port T
ABT = pressure relief in port A and B, meter-out in port T

Pressure ranges
070 = up to 70 bar
140 = up to 140 bar
210 = up to 210 bar
350 = up to 350 bar

Adjustment types
V = adjustable using tool

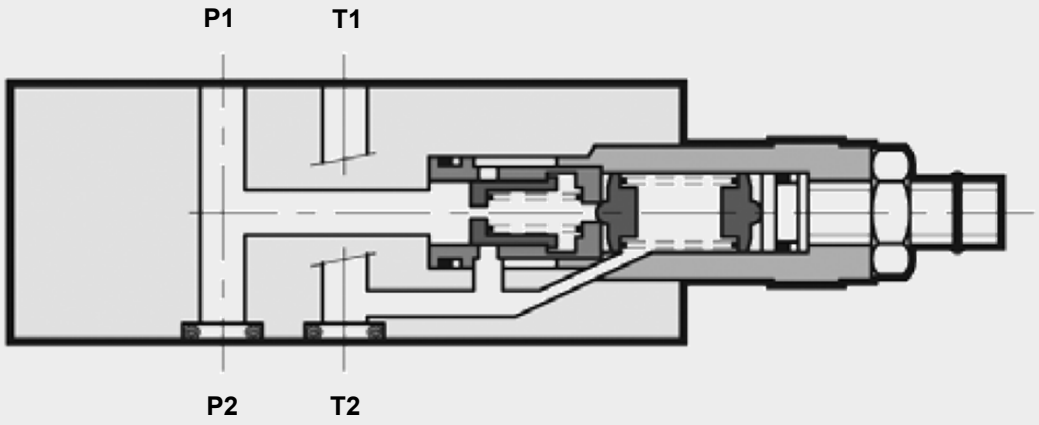
Sealing material
N = NBR
V = FKM (standard)

SPOOL TYPES / SYMBOLS

AB	AT	BT
		
ABT	**PT**	
		

SECTION VIEW

Example PT



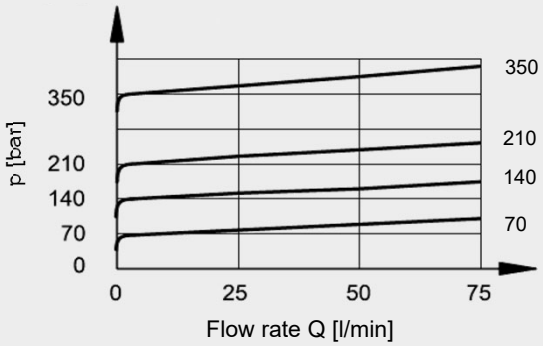
FUNCTION

The pressure relief valve is a pilot-operated spool valve in sandwich plate design in nominal size 6, which limits the pressure in the system.
If the pressure at port P exceeds the pressure setting, the pilot stage opens, so a small flow flows to the tank via pilot stage. Because of the resulting pressure difference, the main piston moves towards the return spring and allows flow from port P to T.

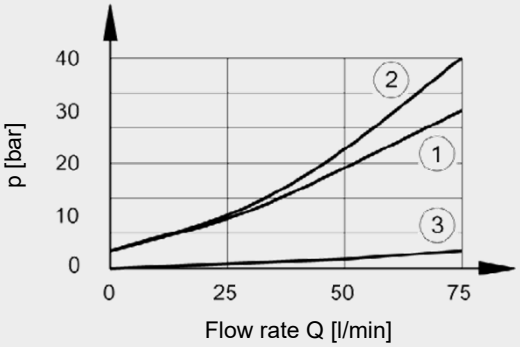
PERFORMANCE

measured at v = 36 mm²/s and T_{oil} = 50°C

Control



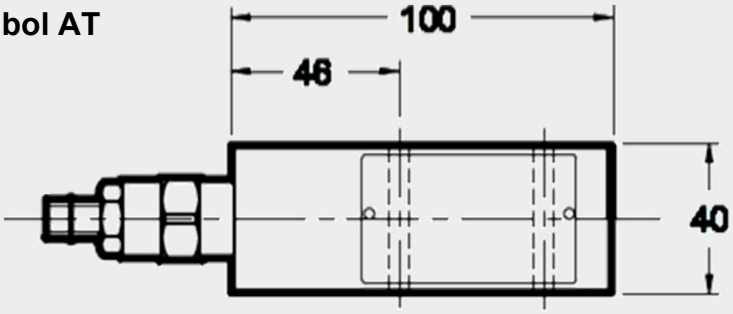
Pressure drop



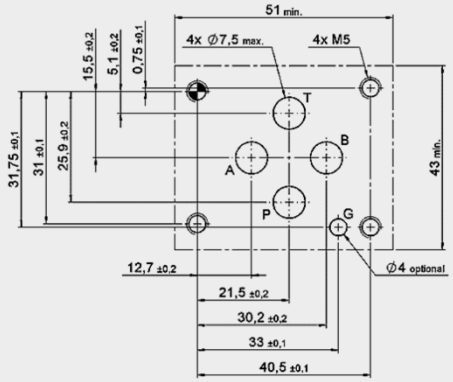
1) Controlled port, symbol PT, AT, BT
2) Controlled port, symbol AB, ABT
3) Free port

DIMENSIONS

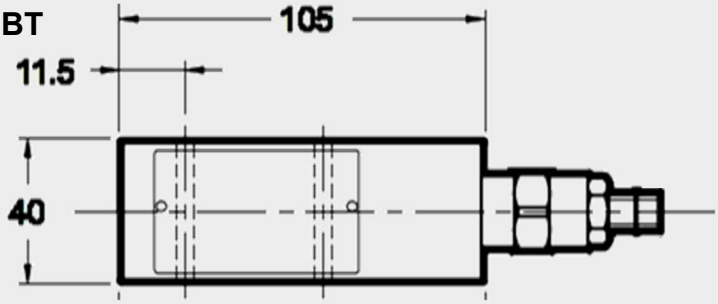
Symbol AT



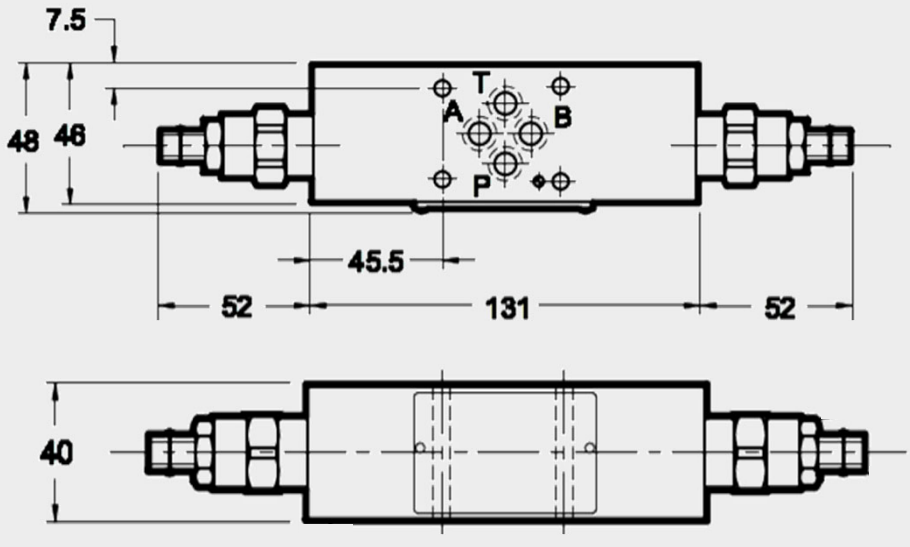
Interface to ISO 4401-03-02-0-05



Symbol PT, BT



Symbol AB, ABT



PRESSURE COMPENSATOR IN SANDWICH PLATE DESIGN
ZW – DW06

SUPPLEMENTARY TECHNICAL DATA

General specifications		
Weight	[kg]	1.5
Hydraulic specifications		
Flow rate max.	[l/min]	40

MODEL CODE

ZW-DW 06 - 01 - PAB 33 V - N

Type
Pressure compensator in sandwich plate design

Nominal size
6

Series
01 = specified by manufacturer

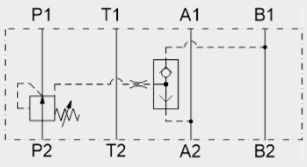
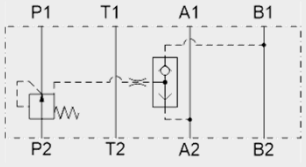
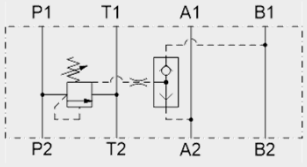
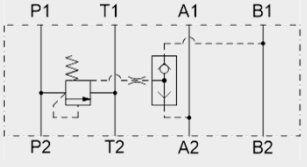
Spool symbol
PAB = 2-way pressure compensator
PTAB = 3-way pressure compensator

Setting ranges
4 = 4 bar
8 = 8 bar
33 = 7 to 33 bar

Adjustment types
Not specified = non-adjustable
V = adjustable using tool (only with setting range 33 bar)

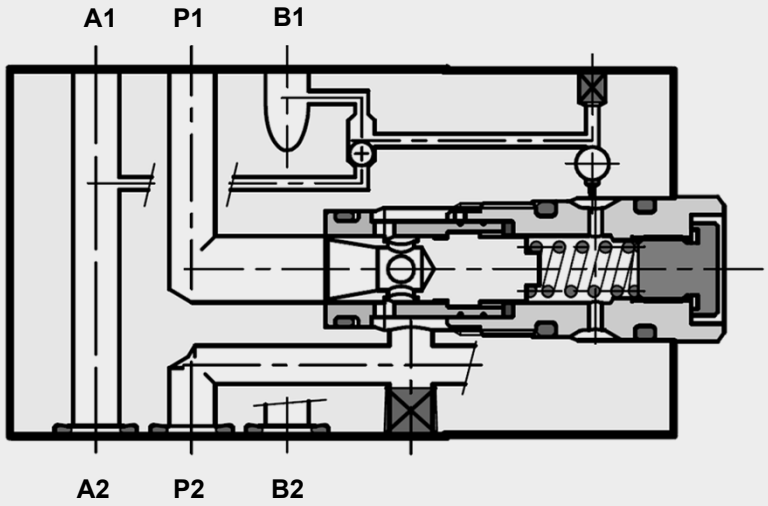
Sealing material
N = NBR
V = FKM (standard)

SPOOL TYPES / SYMBOLS

PAB…V (adjustable)	PAB	PTAB…V (adjustable)	PTAB
			

SECTION VIEW

Example PAB

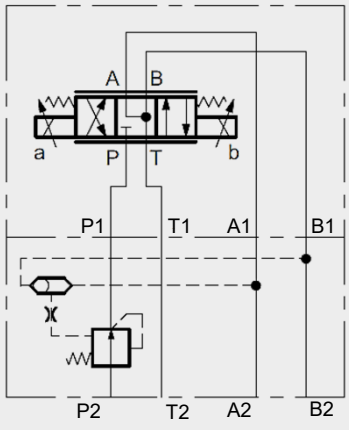


FUNCTION

The pressure compensator in sandwich plate design in nominal size 6 keeps the pressure loss constant between inlet port P and – depending on the remote control of the integrated shuttle valve – the inlet to either consumer port A or B. In combination with a needle valve or proportional directional valve results in a constant flow to the consumer at port A or B. The control pressure of the pressure compensator can be specified between 7 and 33 bar via an internal hexagon adjustment screw. Non-adjustable pressure compensators are available with a control pressure of 4 or 8 bar.

The valve is available as a 2- or 3-way pressure compensator.
For the 3-way pressure compensator, an excess flow flows to tank port T.

Application example for a meter-in flow control at cylinder port A or B with a proportional directional valve:

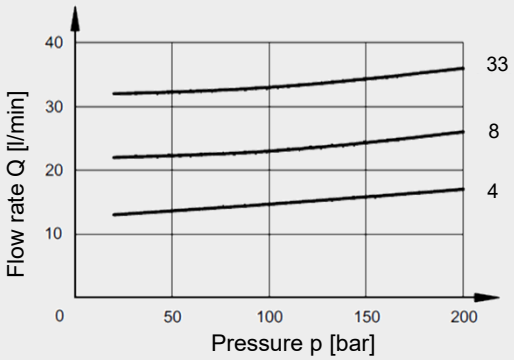


PERFORMANCE

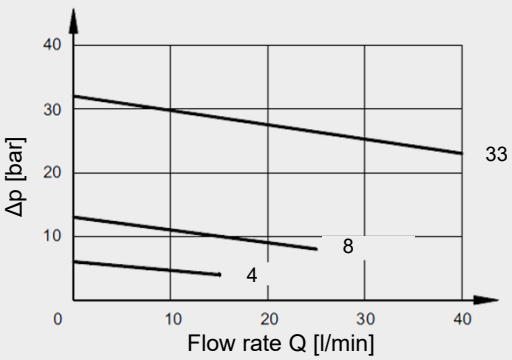
measured at v = 36 mm²/s and T_{oil} = 50°C

2-way pressure compensator

Flow pressure Q = f(p)

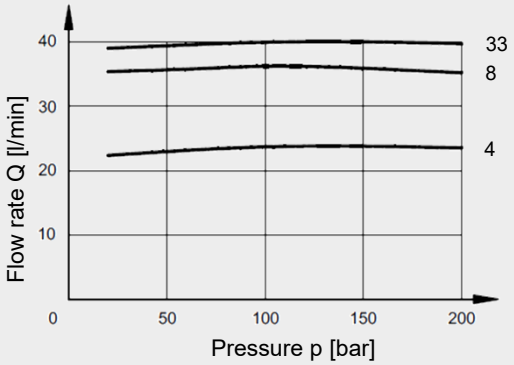


Pressure drop Δp = f(Q)

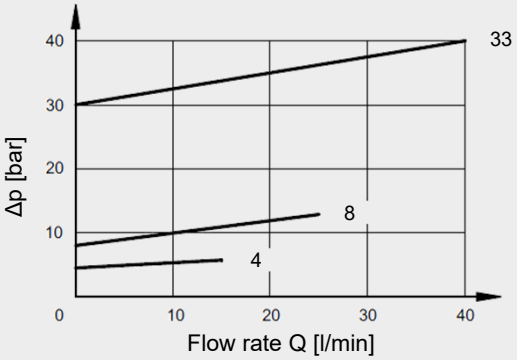


3-way pressure compensator

Flow pressure Q = f(p)

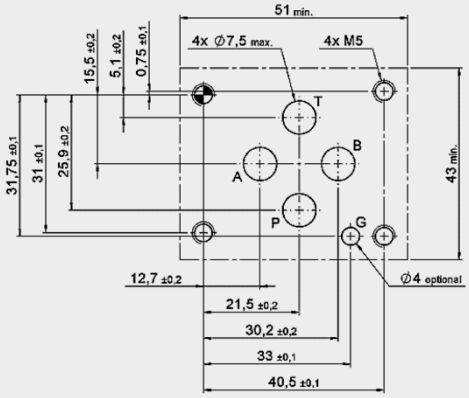


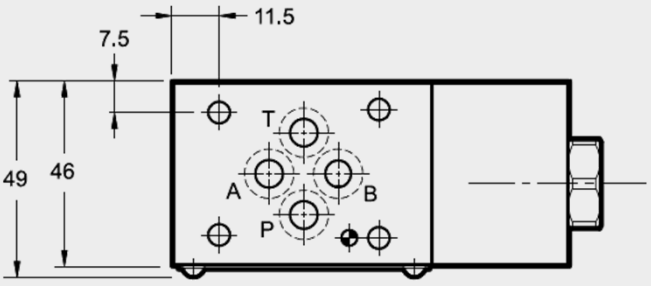
Pressure drop Δp = f(Q)

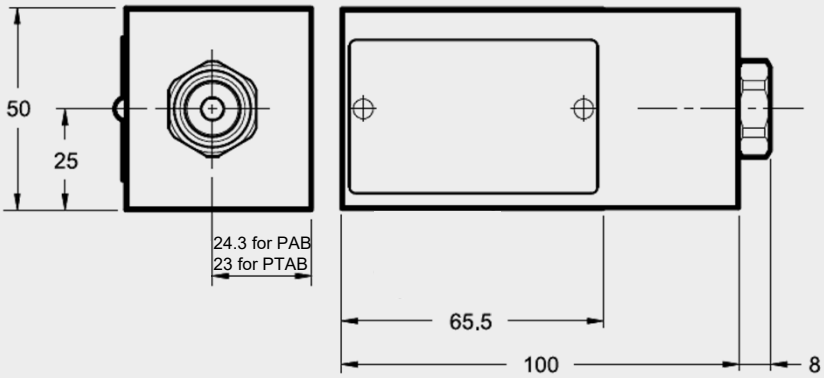


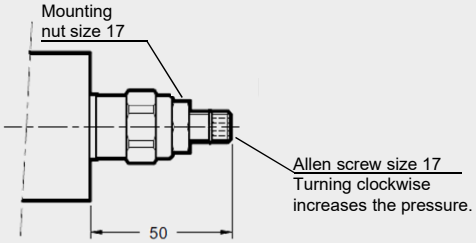
DIMENSIONS

Interface to ISO 4401-03-02-0-05
(Cetop 4.2-4-03-350)









NEEDLE VALVE
IN SANDWICH PLATE DESIGN
ZW – SDR06

SUPPLEMENTARY TECHNICAL DATA

General specifications		
Weight	[kg]	1.3
Hydraulic specifications		
Cracking pressure check valve	[bar]	0.5
Flow rate max.	[l/min]	50 in controlled port 75 in free port

MODEL CODE

ZW-SDR 06 - 01 - AAB – N

Type
Needle valve in sandwich plate design

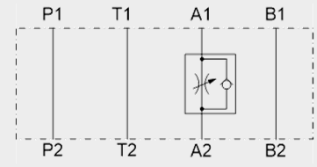
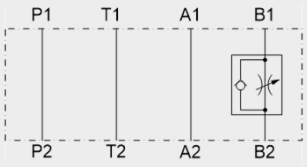
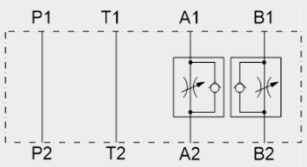
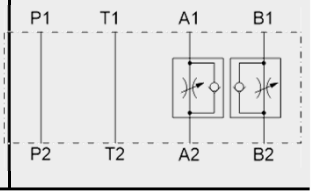
Nominal size
6

Series
01 = specified by manufacturer

Spool symbol
AA = meter-out in port A
AB = meter-out in port B
AAB = meter-out in port A and B
ZAB = meter-in in port A and B

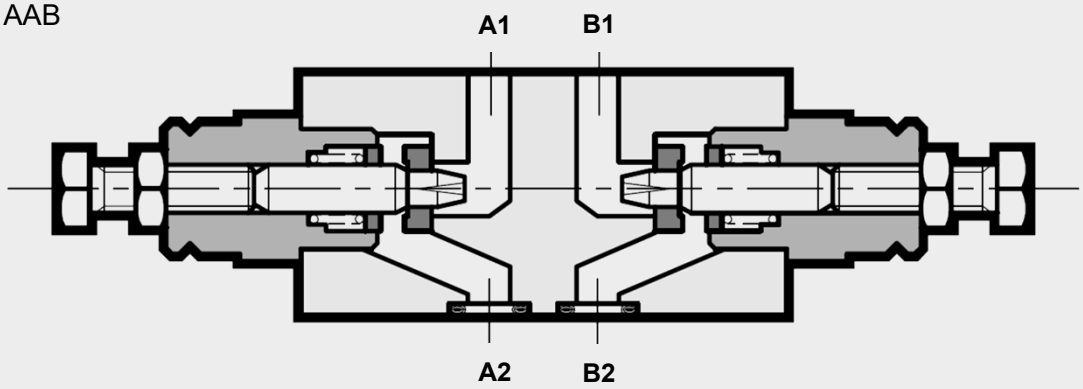
Sealing material
N = NBR
V = FKM (standard)

SPOOL TYPES / SYMBOLS

AA	AB	AAB	ZAB
			

SECTION VIEW

Example AAB



FUNCTION

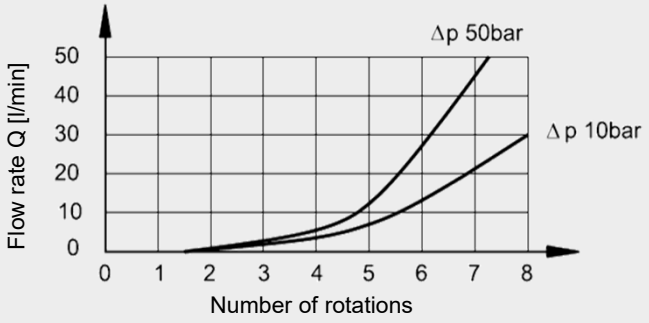
The needle valve in sandwich plate design in nominal size 6 is used to control a flow in flow direction.
In the reverse direction there is free flow through the valve if the cracking pressure is exceeded. The valve opens when the inlet pressure at the check valve is higher than the outlet pressure including the pressure spring force.
The throttling of the flow rate depends on the version:

- flow from consumer to directional valve in port A → AA
- flow from consumer to directional valve in port B → AB
- flow from consumer to directional valve in port A and B → AAB
- flow from directional valve to consumer in port A and B → ZAB

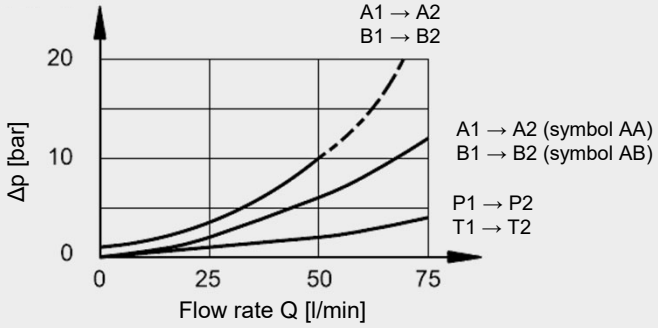
PERFORMANCE

measured at v = 36 mm²/s and T_{oil} = 50°C

Control

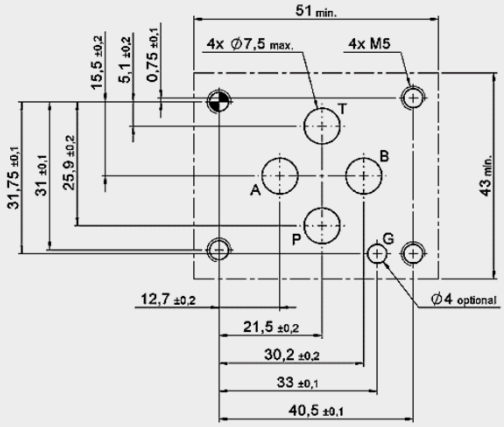


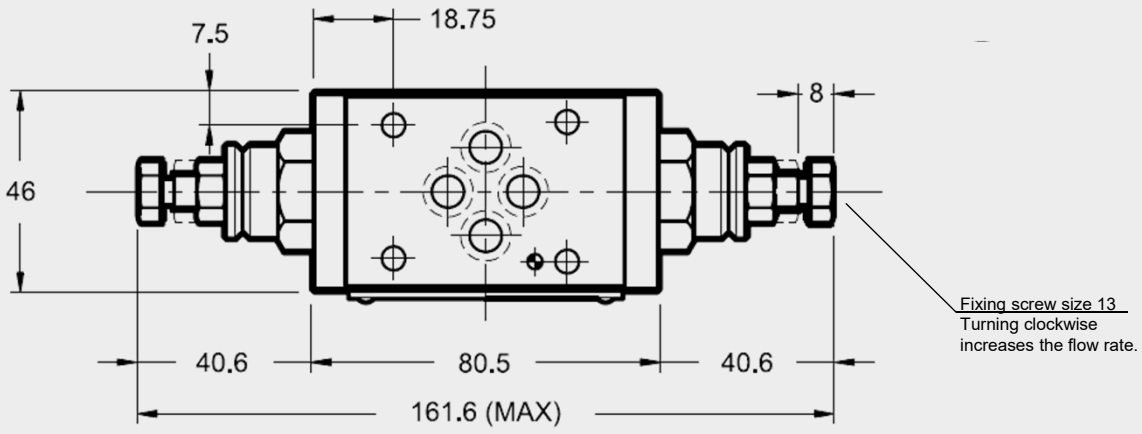
Pressure drop

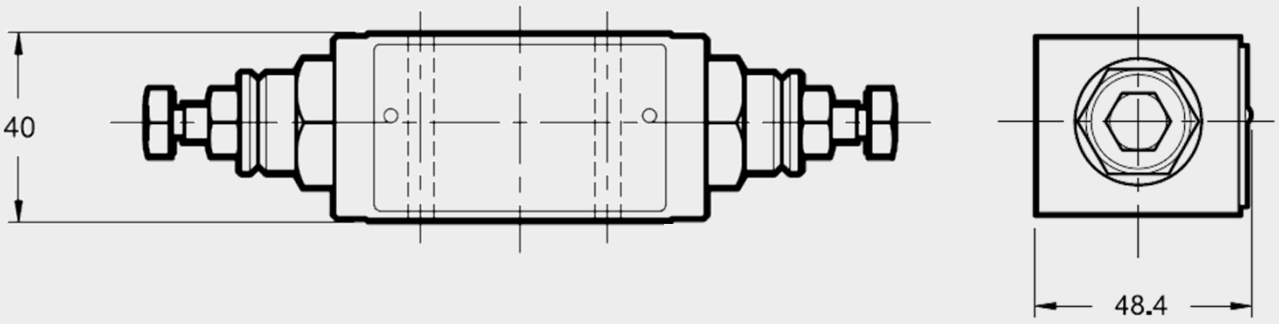


DIMENSIONS

Interface to ISO 4401-03-02-0-05
(Cetop 4.2-4-03-350)







FLOW CONTROL VALVE
IN SANDWICH PLATE DESIGN
ZW – 2SR06

SUPPLEMENTARY TECHNICAL DATA

General specifications		
Weight	[kg]	3 4.1 (symbol AAB only)
Hydraulic specifications		
Operating pressure	[bar]	250
Cracking pressure check valve	[bar]	0.5
Flow rate max.	[l/min]	Controlled port: 1; 4; 10; 16; 22; 30 Free port: 65 (40 free flow in opposite direction)

MODEL CODE

ZW-2SR 06 - 01 - AA - 01 - N

Type
Flow control valve in sandwich plate design

Nominal size
6

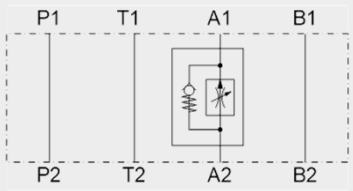
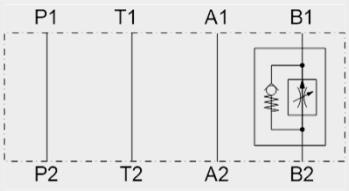
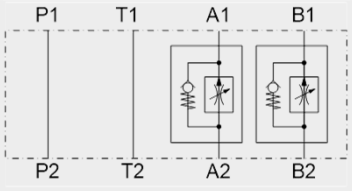
Series
01 = specified by manufacturer

Spool symbol
AA = meter-out in port A
AB = meter-out in port B
AAB = meter-out in port A and B

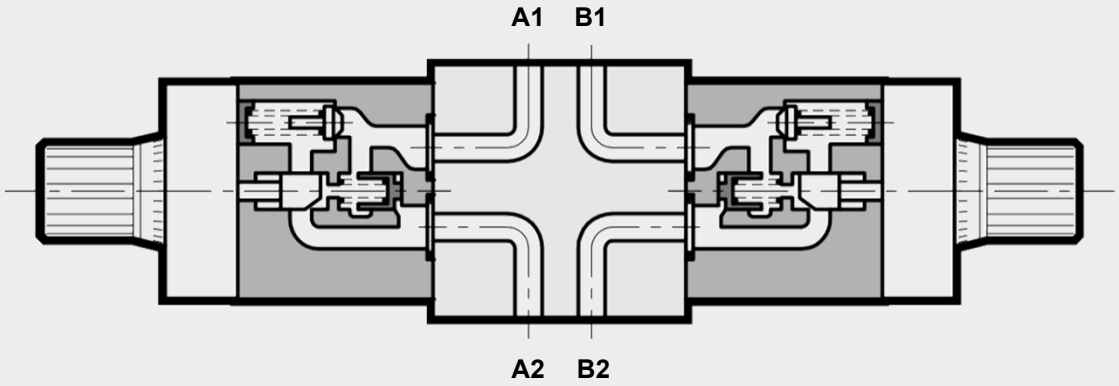
Adjustment ranges, flow rate
01 = 1 l/min
04 = 4 l/min
10 = 10 l/min
16 = 16 l/min
22 = 22 l/min
30 = 30 l/min

Sealing material
N = NBR
V = FKM (standard)

SPOOL TYPES / SYMBOLS

AA	AB	AAB
		

SECTION VIEW



FUNCTION

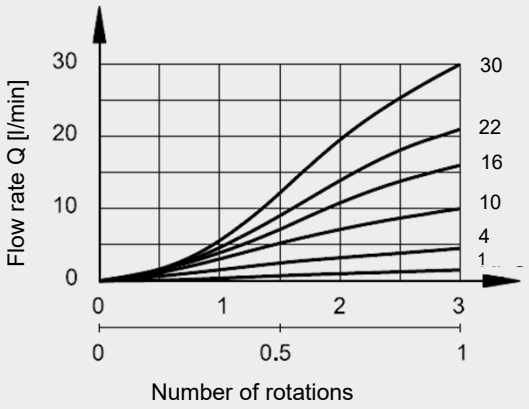
The flow control valve in sandwich plate design in nominal size 6 is used to control a flow in flow direction.
The flow rate is kept constant independent of the pressure loss at the consumer. In the reverse direction there is free flow through the valve if the cracking pressure is exceeded. The valve opens when the inlet pressure at the check valve is higher than the outlet pressure including the pressure spring force.
The control of the flow rate depends on the version:

- flow from consumer to directional valve in port A → AA
- flow from consumer to directional valve in port B → AB
- flow from consumer to directional valve in port A and B → AAB

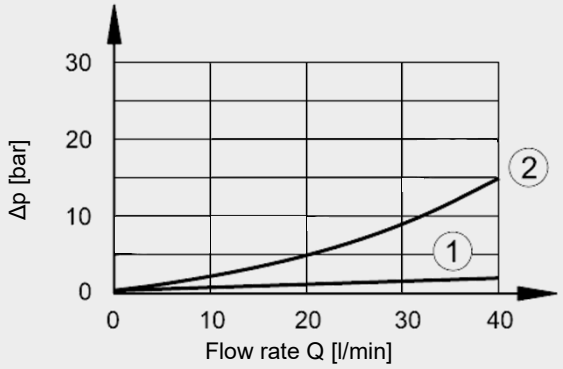
PERFORMANCE

measured at v = 36 mm²/s and T_{oil} = 50°C

Control



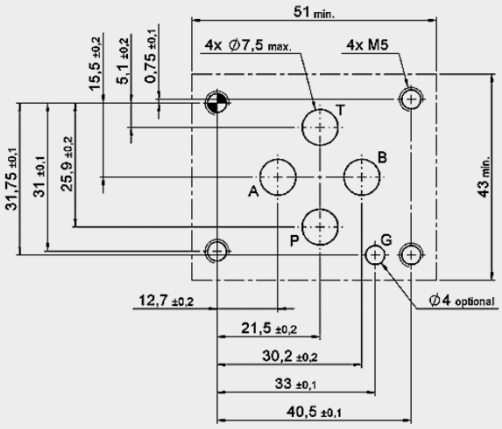
Pressure drop



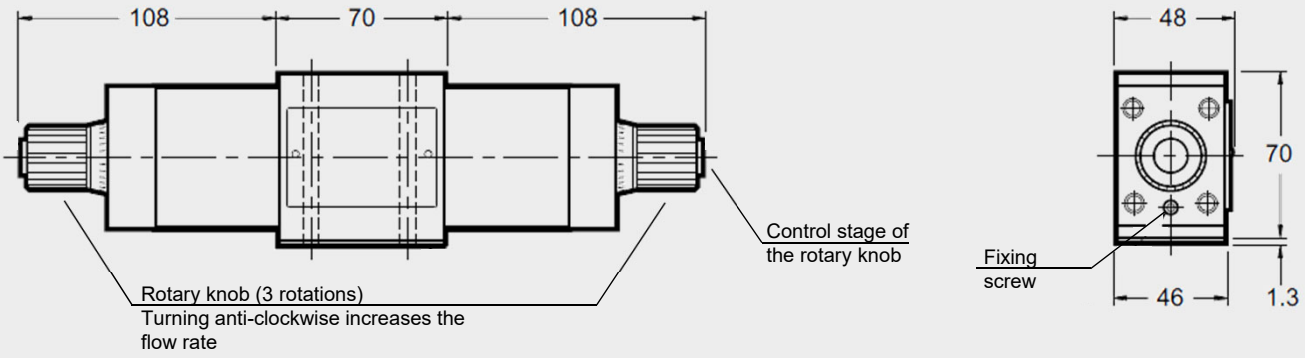
1) Free port
2) Check valve

DIMENSIONS

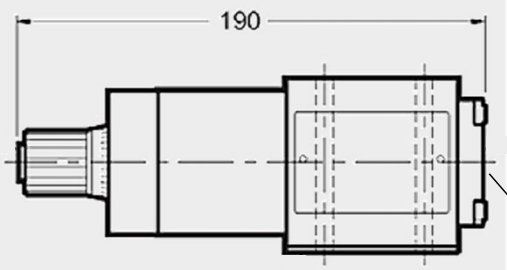
Interface to ISO 4401-03-02-0-05
(Cetop 4.2-4-03-350)



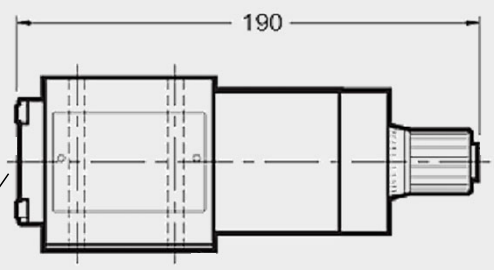
AAB



AA



AB



CHECK VALVE, PILOT-TO-OPEN IN SANDWICH PLATE DESIGN
ZW – RP06

SUPPLEMENTARY TECHNICAL DATA

General specifications		
Weight	[kg]	1.3
Hydraulic specifications		
Cracking pressure check valve	[bar]	3
Flow rate max.	[l/min]	50 in controlled port 75 in free port
Pilot ratio		3.4 : 1

MODEL CODE

ZW-RP 06 - 01 - AA - N

Type
Check valve, pilot-to-open in sandwich plate design

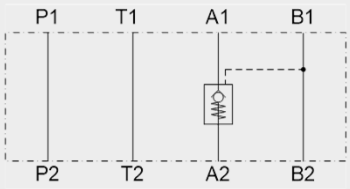
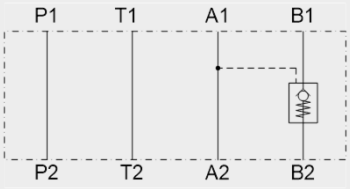
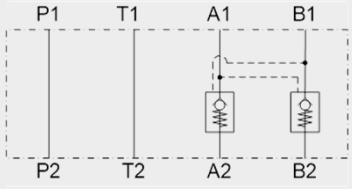
Nominal size
6

Series
01 = specified by manufacturer

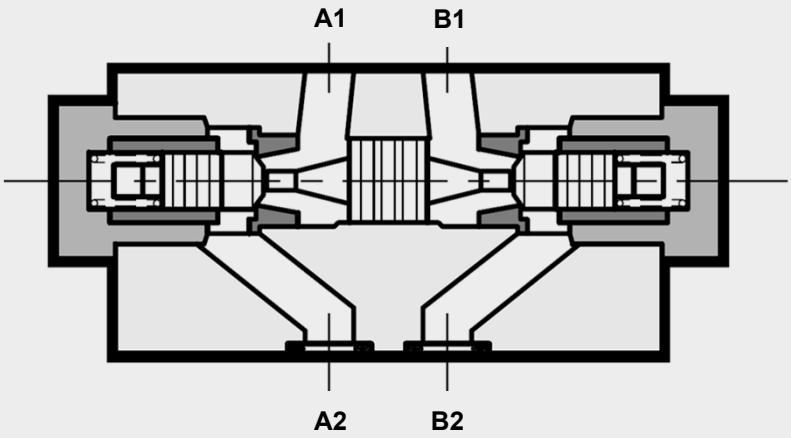
Spool symbol
AA = meter-out in port A
AB = meter-out in port B
AAB = meter-out in port A and B

Sealing material
N = NBR
V = FKM (standard)

SPOOL TYPES / SYMBOLS

AA	AB	AAB
		

SECTION VIEW



FUNCTION

The check valve, pilot-to-open in sandwich plate design in sandwich plate design in nominal size 6 is a direct-acting, spring-loaded poppet valve. It releases flow from the directional valve to the consumer and blocks flow from the consumer to the directional valve.Thereby the valve poppet is pressed into the seat and blocks the flow. If sufficiently high control pressure is built up in the relevant control port, the valve is unlocked and flow flows from the consumer to the directional valve. The required control pressure is based on the pressure difference between the ports to be unblocked.

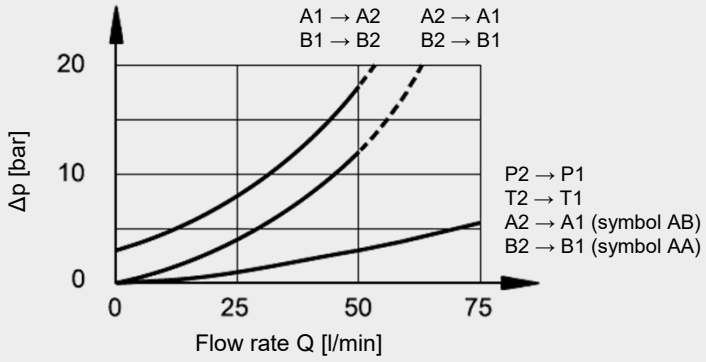
Hint

A pressure in the port of the directional valve influences the required control pressure.

PERFORMANCE

measured at v = 36 mm²/s and T_{oil} = 50°C

Pressure drop



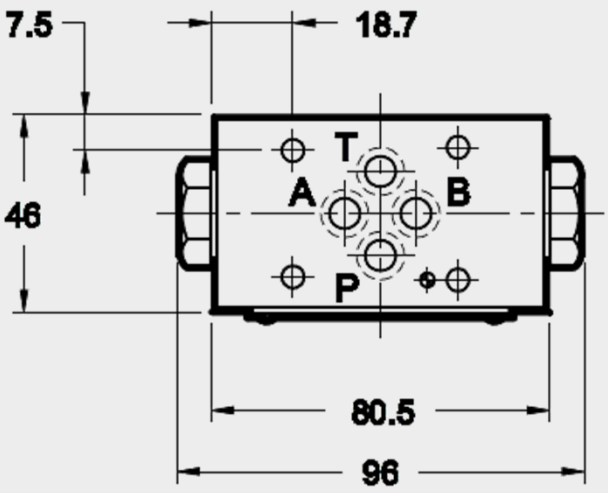
Use the following formula to calculate the min. required pilot pressure in port B:

$$p_{control} = \frac{p_{A2} - p_{A1}}{\varphi} + p_{A1}$$

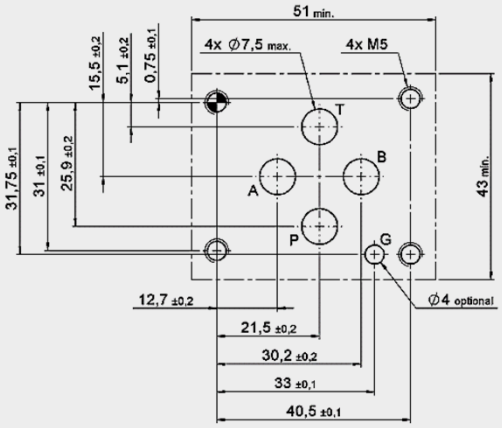
Use the following formula to calculate the min. required pilot pressure in port A:

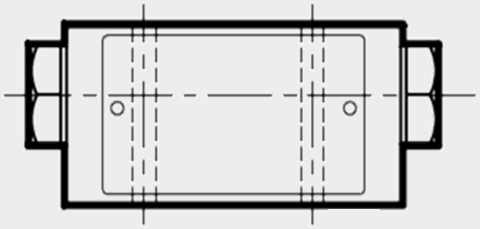
$$p_{control} = \frac{p_{B2} - p_{B1}}{\varphi} + p_{B1}$$

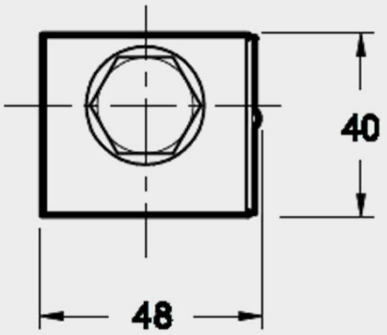
DIMENSIONS



Interface to ISO 4401-03-02-0-05 (Cetop 4.2-4-03-350)







CHECK VALVE
IN SANDWICH PLATE DESIGN
ZW – RV06

SUPPLEMENTARY TECHNICAL DATA

General specifications		
Weight	[kg]	1
Hydraulic specifications		
Cracking pressure check valve	[bar]	0.5 3 5
Flow rate max.	[l/min]	50 in controlled port 75 in free port

MODEL CODE

ZW-RV 06 - 01 - A 0,5 - N

Type
Check valve in sandwich plate design

Nominal size
6

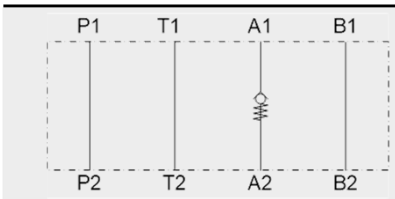
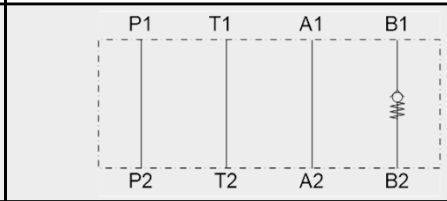
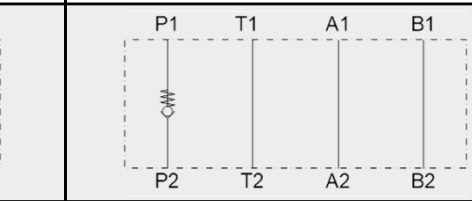
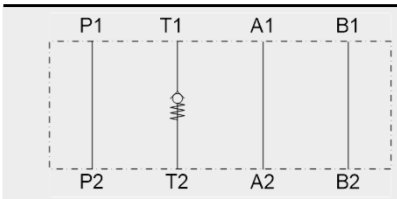
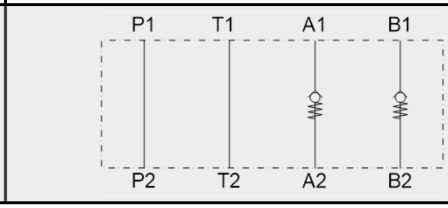
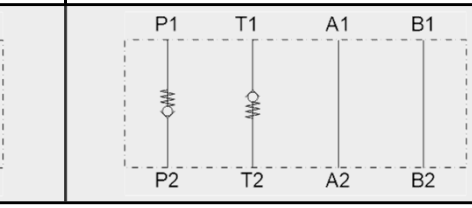
Series
01 = specified by manufacturer

Spool symbol
A = check valve in port A
B = check valve in port B
P = check valve in port P
T = check valve in port T
AB = check valve in port AB
PT = check valve in port PT

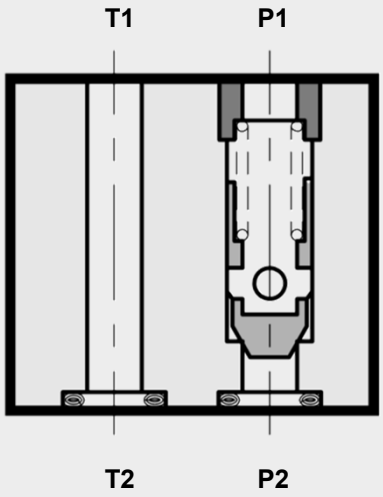
Cracking pressure
0.5 = 0.5 bar
Other cracking pressures on request

Sealing material
N = NBR
V = FKM (standard)

SPOOL TYPES / SYMBOLS

A	B	P
		
T	**AB**	**PT**
		

SECTION VIEW



FUNCTION

The check valve in sandwich plate design in nominal size 6 is a direct-acting, spring-loaded poppet valve.
The valve releases a flow in one direction after exceeding the spring force and blocks the flow in the opposite direction.
Thereby the valve poppet is pressed into the seat and blocks the flow.

- Flow blocked in port A from consumer to directional valve → A
- Flow blocked in port B from consumer to directional valve → B
- Meter-out blocked to pressure supply → P
- Preload of meter-out to tank → T
- Flow blocked in port A and B from consumer to directional valve → AB
- Meter-out blocked to pressure supply and preload of meter-out to tank → PT

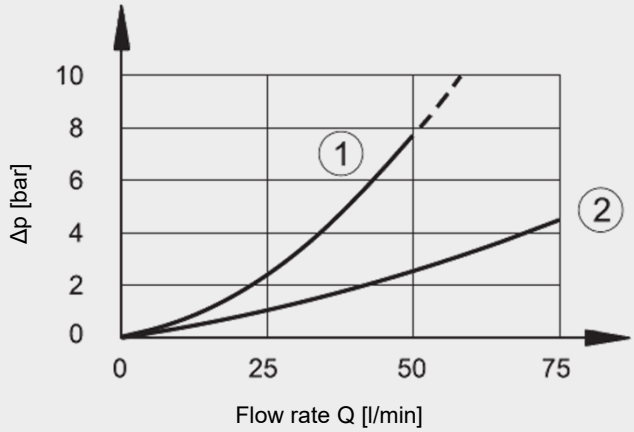
Hint

Spring-side pressures at the check element are added to its cracking pressure.

PERFORMANCE

measured at v = 36 mm²/s and T_{oil} = 50°C

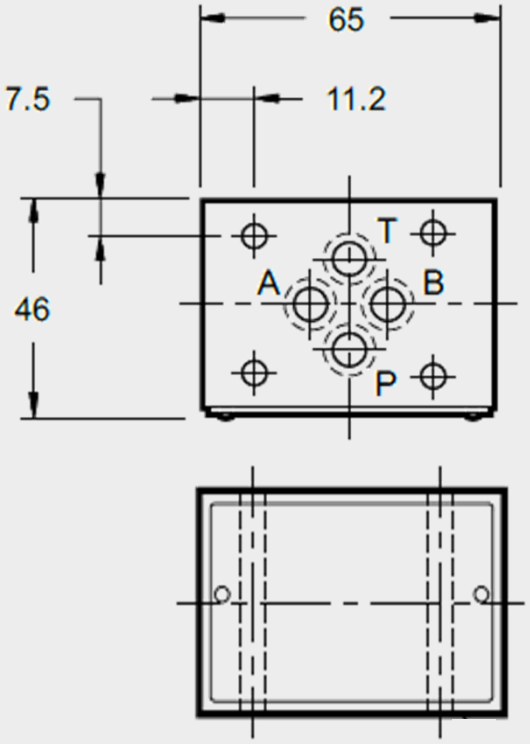
Pressure drop



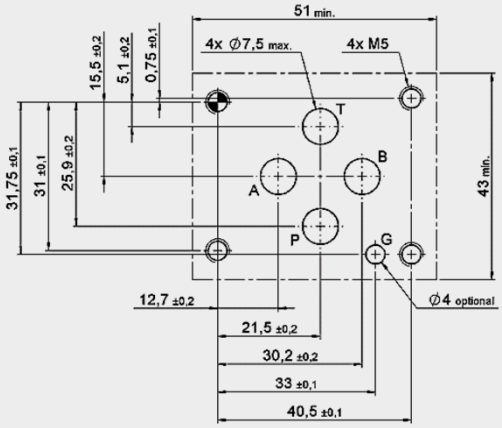
1) Controlled port (includes valve element)
2) Free port

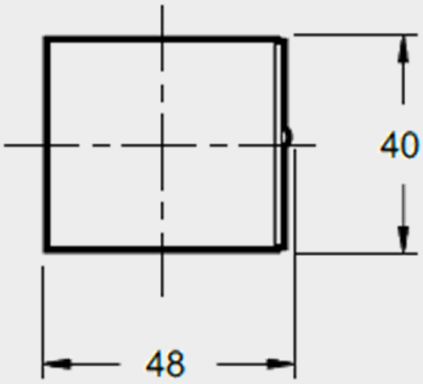
Hint
The cracking pressure of the valve is added to the values of the performance curve 1).

DIMENSIONS



Interface to ISO 4401-03-02-0-05 (Cetop 4.2-4-03-350)





ACCESSORIES

	Designation	Part no.
Seal kits (4-part set)	9.25 x 1.78 80 Sh NBR	3492432
	9.25 x 1.78 80 Sh FKM	3120269

Note
The information in this brochure relates to the operating conditions and applications described. For applications not described, please contact the relevant technical department.
Subject to technical modifications.

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