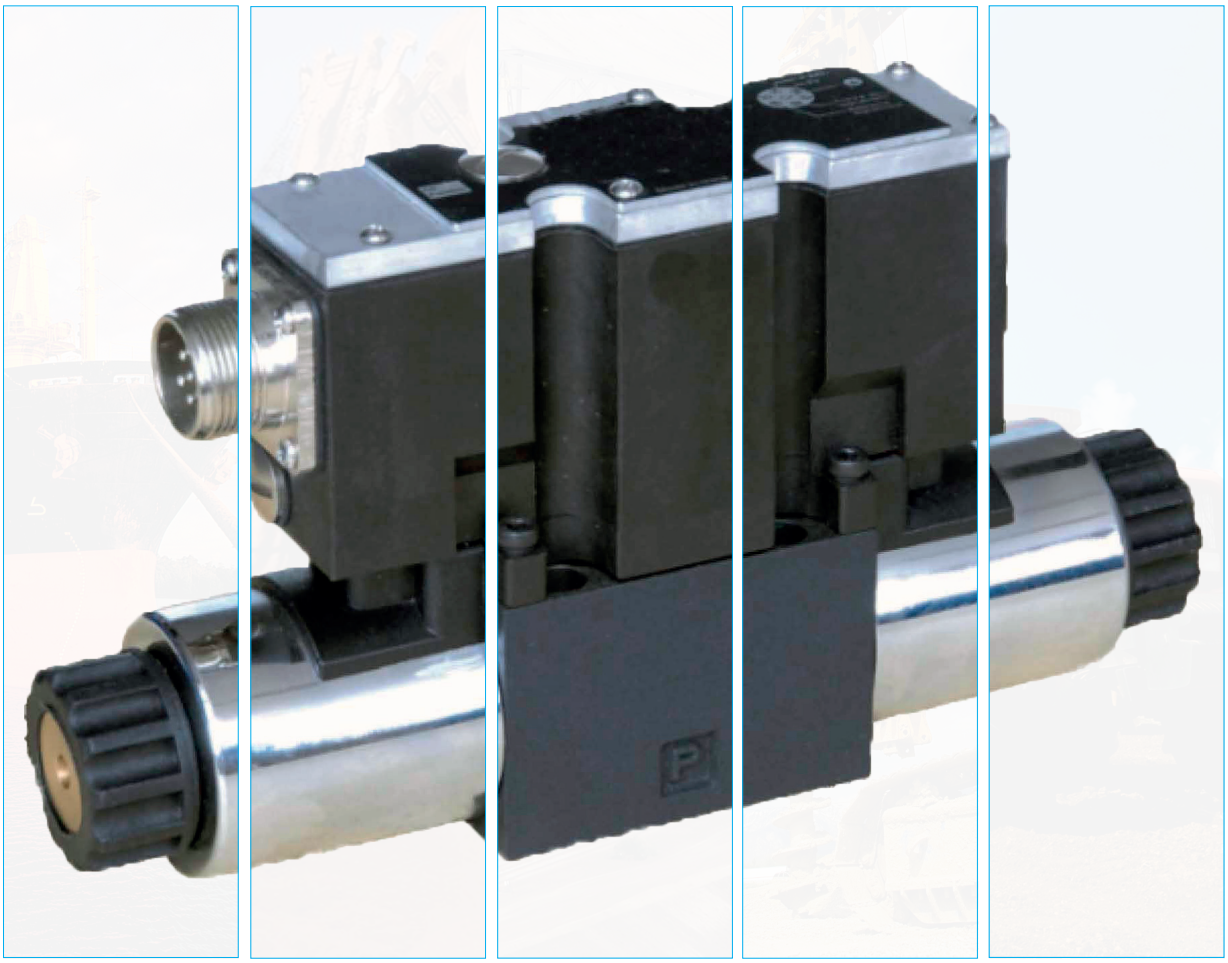
CERTYFIKACJA SYSTEMU JAKOŚCI
DNV·GL
ISO 9001



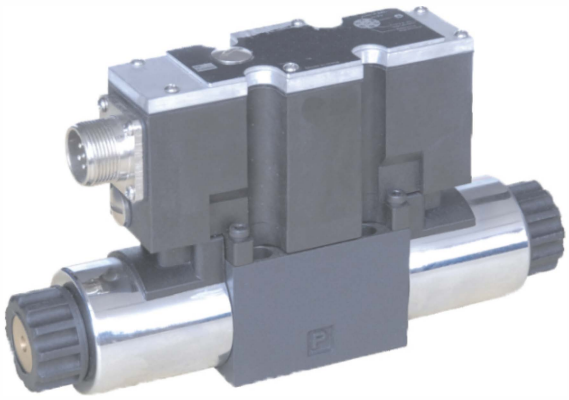
ZAWORY DO ZABUDOWY PŁYTOWEJ CETOP

PROPORCJONALNE PŁYTOWE

HYDROPRESS®
hydraulika siłowa

HPBWE, HPBWEN

Directional Proportional Valve



The built-in 4/2 and 4/3-way directly operated proportional solenoid

Direct operated spool without electrical position feedback

Type HPBWE and HPBWEN:

- Nominal sizes 6 and 10
- Component series 2X
- Maximum operating pressure 315 bar
- Maximum flow 42L/min 6 (DN6)
- Maximum flow 75L/min 10 (DN10)

Technical data (For application outside these parameters please consult with us)

General			HPBWE	HPBWEN
Installation position			optional, prefer. horizontal	
Storage temperature range	℃		-20~80	
Ambient temperature range	℃		-20~70	-20~50
Weight	DN6	kg	2.0	2.2
	DN10	kg	6.6	6.8

Hydraulic

Operating pressure	Ports A B P	bar	(to)315
	Port T	bar	(to)210
Nominal flow q_{vnom} p=10 bar	DN6	L/min	7, 15 (and)26
	DN10	L/min	30, 60
Flow (Max. Permissible)	DN6	L/min	42, 80 with double flow
	DN10	L/min	75, 140 with double flow
Pressure fluid			DIN 51 524 (HL HLP) Mineral oil (HL, HLP) to DIN 51 524; For other fluid please consult with us.
Fluid temp. Range	℃		-20~80(+40~+50 is preference)
Viscosity range	mm^2/s		20~380(30~46 is preference)
Fluid contamination cleanliness			NAS 1638 9 β x ≥75 X=10 Maximum permissible degree of pressure fluid contamination to NAS 1638 to class 9 Recommended filter β x ≥75 X=10
Hysteresis	%		≤5
Reversal span	%		≤ 1
Response sensitivity	%		≤0.5

Electrical

Type			HPBWE[1]	HPBWEN
Voltage type			Direct Voltage	
(Type)BWEN Command signal	Voltage input „A1"	V	±10	±10
	Current input „F1"	mA	4~20	4~20
Max. current per solenoid		A	2.5	2.5
Solenoid coil Resistance	Cold value at 20℃	Ω	2	2
	Max. warm value	Ω	3	3
Duty cycle	%		100	
Coil temperature (max)			up to 150	
Electrical connection	HPBWE		Plug-in connector to DIN EN 175301-803 and ISO 4400	
	HPBWEN		Plug-in connector to DIN EN 175301-803 and ISO 4400 Plug-in connector to DIN 43563-AM-3	
Type of insulation to DIN 40 050			IP 65	

Control electronics

BWE	Analogue amplifier in Eurocard format		Details refer to proportional amplifier	
	Digital amplifier in Eurocard format		Details refer to proportional amplifier	
BWEN	Analogue command value module		Integrated into the valves	
Supply voltage	Nominal voltage	VDC	24	
BWEN	Lower limiting value	V	21/22	19
BWE	Upper limiting value	V	35	
Amplifier current consumption	I_{max}	A	1.8	1.8
	Max. impulse current	A	3	3

Due to the occurring surface temperature of the solenoid coils, the European Standards DIN EN 563 and DIN EN 982 must be taken into account!

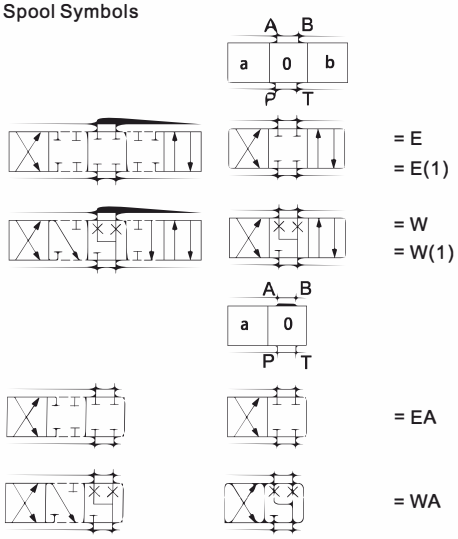
Model code

HPBWE * * * * 2X G24 * * * * * *

Without integrated electronics — No code
With integrated electronics — =N

(DN)6 =0.6
(DN)10 =0.10

Spool Symbols



With spool symbols: E(1) and W(1)

P → A: q_{vmax} B → T:qv/2
P → B: q_{vmax} A → T:qv/2

Note:
With spools W and WA, in the neutral position there is a connection from A to T and B to T with approx. 3 % of the relevant nominal crosssection

Further details in clear text

V= Nitrile rubber sealing
NBR seals suitable for mineral oil (HL, HLP) to DIN 51 524

No code= For BWE and BWEN
A1= Command value input V
F1= Command value input 4~20mA

K4= Electrical connection For BWE with plug component DIN EN 175301-803 See page 3

K31= Electrical connection For BWEN with plug component DIN 43 650-AM2 See page 4

Special protection
No code= Without special protection
J= Seawater-resistant(only for DN6)

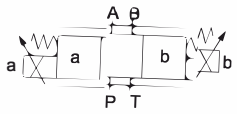
G24= 24 VDC

2X= Component series 20 to 29 (20 to 29 unchanged installation and connection dimensions)

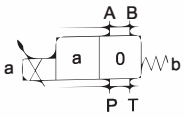
Nominal flow at valve pressure differential Δp = 10 bar.
(DN)6
07= 7 L/min
15= 15 L/min
30= 26 L/min
(DN)10
30= 30 L/min
60= 60 L/min

Directional Proportional valve without integrated electronics

HPBWE

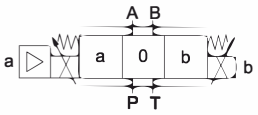


HPBWE...EA(WA)

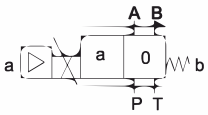


Directional Proportional valve with integrated electronics

HPBWEN



HPBWEN...EA{WA)



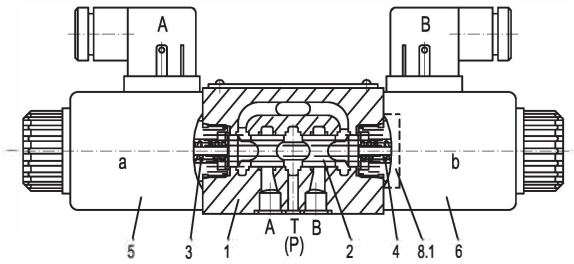
Structure and function description, section

The 4/2-way and 4/3-way proportional directional valves are designed as direct operated components for subplate mounting. They are actuated by means of proportional solenoid with central removable coil. The solenoid are controlled either by external control electronics (type BWE) or integrated control electronics (type HPBWEN).

Design: The valves basically consist of:
- Body (1) with mounting surface
- Control spool (2) with compression springs (3 and 4)
- Solenoids (5 and 6) with central coil
- Optional integrated electronics (7)

Function:
- With solenoids (5 and 6) release, the control spool (2) is held in the central position by compression springs (3 and 4)
- Direct actuation of the control spool (2) by energising a proportional solenoid E.g. energisation of solenoid "b" (6)
  ~The control spool (2) is moved to the left in proportion to the electrical input signal
  ~connection from P to A and B to T via orifice-like crosssections with progressive flow characteristics
- releasing -de-energisation of the solenoid (6)
  ~The control spool (2) is returned to the central position by compression spring (3)

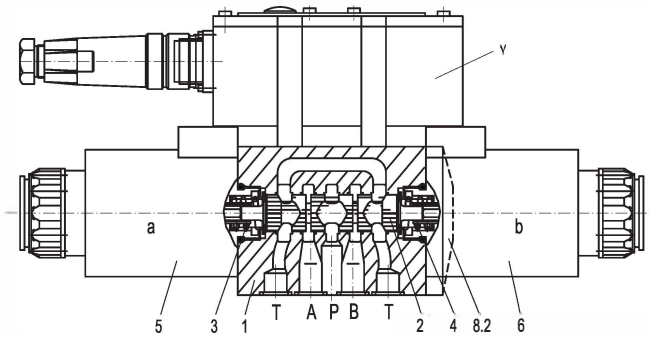
HPBWE-6 ...2x/...



Valve with 2 spool positions

In principle, the function of this valve version corresponds to that of the valve with 3 spool positions. However, the valves with 2 spool positions are only fitted with solenoid "a". Instead of the 2nd proportional solenoid a plug (8.1) is fitted with a cover for DN 6 or for DN 10 (8.2).

HPBWEN-10...2x/...

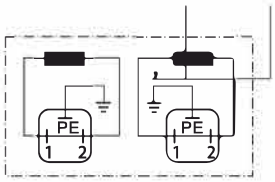


Note for type HPBWE-06...2X/...:
Draining of tank line is to be avoided. With the appropriate installation conditions, a back pressure valve is to be installed (back pressure approx. 2 bar).

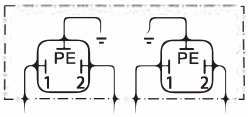
Electrical connection, plug-in connectors

BWE (Without integrated electronics not for version "J"= sea water resistant)

Connection on component plug

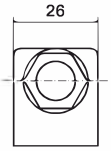


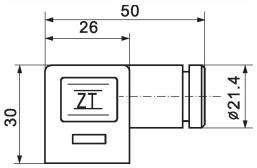
Connection on plug-in connector



To amplifier To amplifier

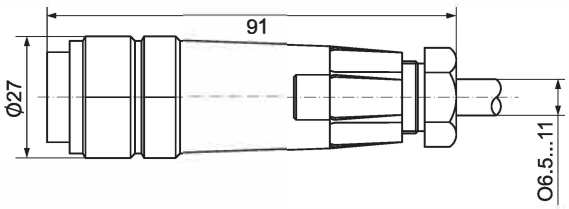
Plug-in connector: CECC 75 301-803-A002FA-H3D08-
G/DIN EN 175 301-803 (and) ISO 4400



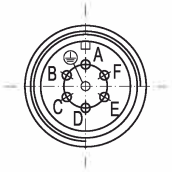


HPBWEN

For type BWEN (with integrated electronics (OBE) and for version "J" = sea water resistant) Plug-in connector see the block circuit diagram below

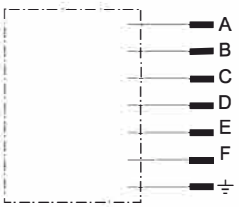


Plug-in connector:
DIN 43 563-BF6-3/Pg11



Integrated electronics for type BWEN

Pin allocation of the component plug

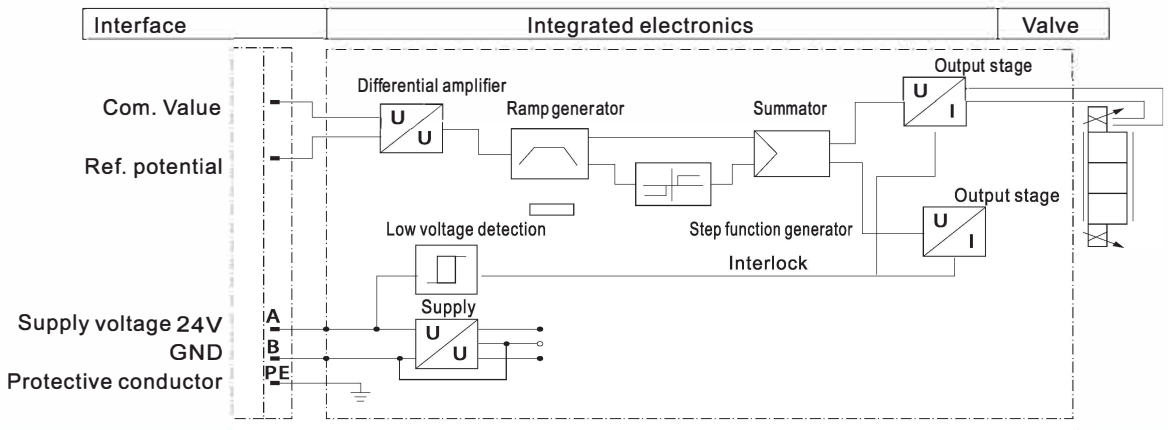


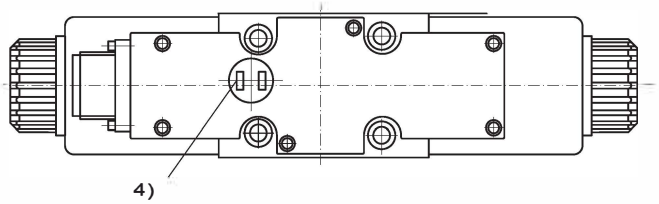
	Contact	Signal
Supply voltage	A	24VDC(19~35VDC)
	B	GND
	C	n.c.
Differential amplifier input	D	Com. Value (V/4-20mA)
	E	reference potential
	F	n.c.

Com. Value : Positive command value (0 to 10 V or 12 to 20 mA) at D and reference potential to E causes flow from P to A and B to T. Negative command value (0 to 10 V or 12 to 4 mA) at D and reference potential to E causes flow from P to B and A to T. For valves with a solenoid on side „a" (spool variants EA and WA) a positive command value at D and reference potential to E (NS 6: 4 to 20 mA and NS 10: 12 to 20 mA) causes flow from P to B and A to T.

Connection cable : Recommendation:
-up to 25 m cable length type LiYCY 5 x 0.75 mm^2
-up to 50 m cable length type LiYCY 5 x 1.0 mm^2
External diameter 6.5 to 11 mm
Connect screen to PE only on the supply side

Block circuit diagram / connection allocation



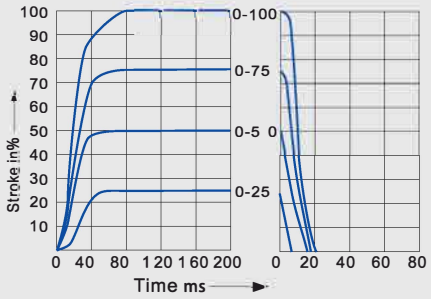


1) Contacts C and F must not be connected! Block circuit diagram / connection allocation
2) PE is connected to the cooling body and the valve housing
3) Protective conductor screwed to the valve housing and cover
4) Ramp can be externally adjusted from 0 to 2.5 s; the same applies for *T* up and *T* down
5) Output stages current regulated
6) Low voltage detection is not carried out for component type HPBWEN-10 -2X

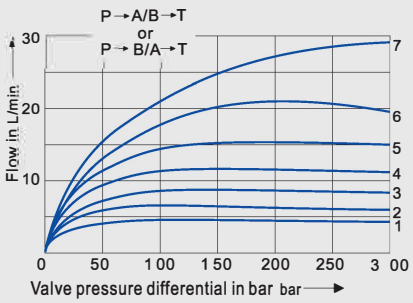
Transient function with stepped form of electrical input signal HPBWE and HPBWEN

6DN

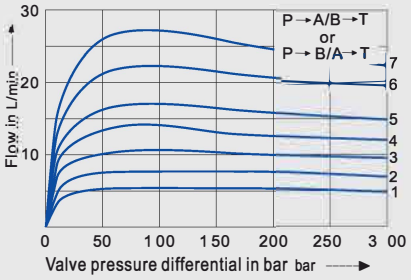
Signal change in %



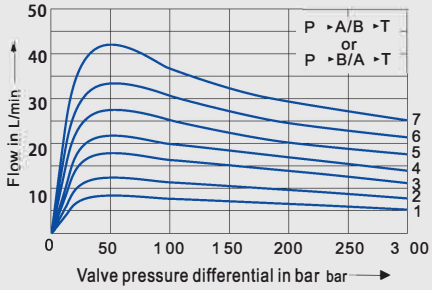
Performance limit, nominal flow 7 L/min



Performance limit, nominal flow 15 L/min



Performance limit, nominal flow 30 L/min

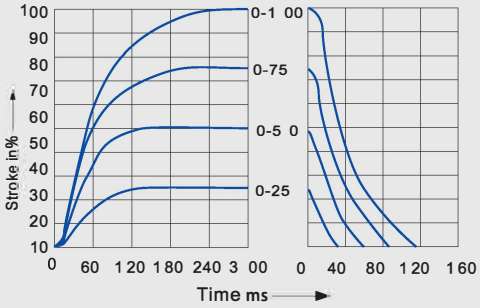


1 Com. Value=40%
2 Com. Value=50%
3 Com. Value=60%
4 Com. Value=70%
5 Com. Value=80%
6 Com. Value=90%
7 Com. Value=100%

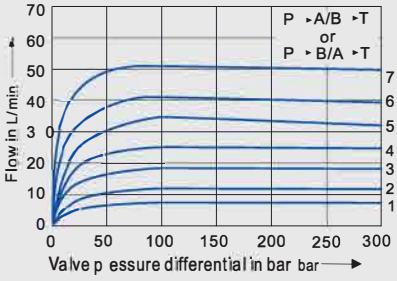
If the performance limits are exceeded then flow force occurs which lead the spool movement uncontrolled.

10 DN

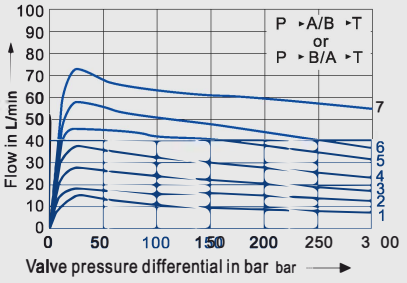
Signal change in %



Performance limit, nominal flow 30 L/min



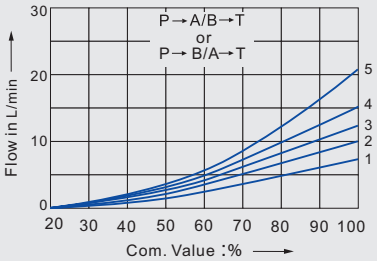
Performance limit, nominal flow 60 L/min



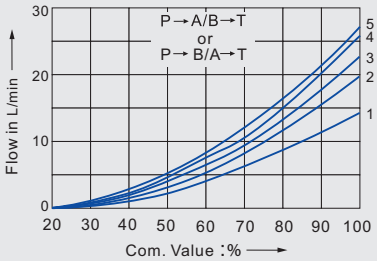
100

Characteristic curves (measured with HLP46, Qoil = 40± 5℃) DN6

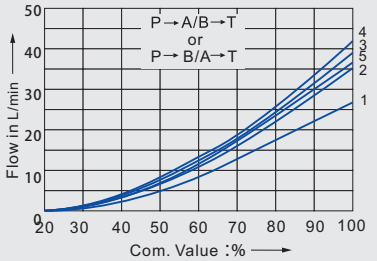
7 l/min nominal flow at pressure differential 10 bar



15 l/min nominal flow at pressure differential 10 bar

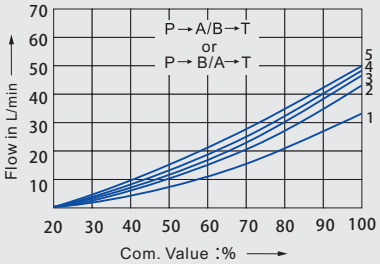


30 l/min nominal flow at pressure differential10 bar

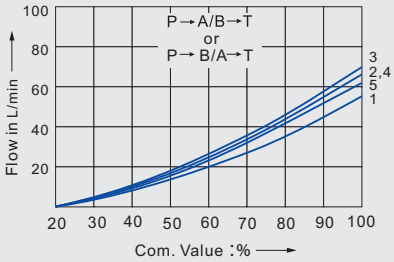


Characteristic curves (measured with HLP46, Qoil = 40±5℃)DN10

30 l/min nominal flow at pressure differential 10 bar



60 l/min nominal flow at pressure differential 10 bar

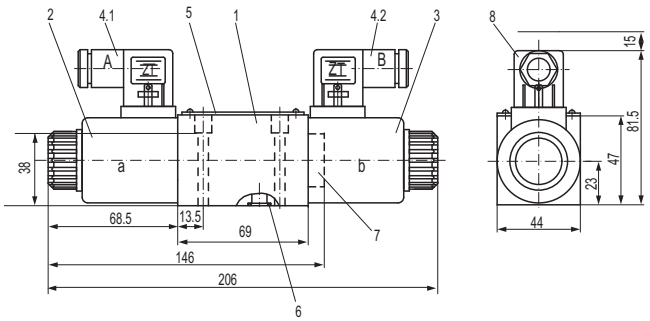


1	△p=10 bar	Constant
2	△p=20 bar	Constant
3	△p=30 bar	Constant
4	△p=50 bar	Constant
5	△p=100 bar	Constant

△p= Valve pressure differential (inlet pressure P_p minus load pressure P_L and minus return pressure P_T)

Unit dimensions

HPBWE-6



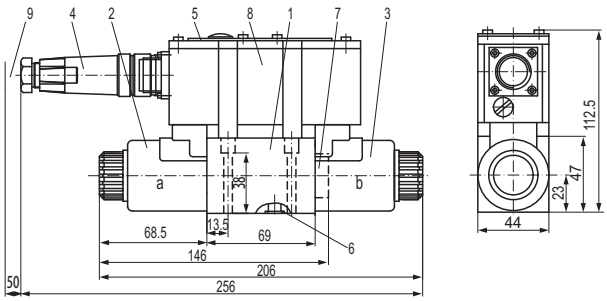
1 Valve body
2 Proportional solenoid a
3 Proportional solenoid b
4.1 4.2 Plug-in connector , colour black, separate order
5 Name plate
6 8.73x 1.78 Identical seal rings for ports A, B, P and T

7 Plug for valves with one solenoid (2 switched positions, versions 2B2B or 2B40B)
8 Space required to remove the plug in connector
9 Machined valve mounting surface, connection location to DIN 24 340A, IS04401 and CETOP-RP 121 H

Subplates: See page 7 "size of subplate"

Valve fixing screws: 4-M5x 45 DIN 912-12.9; M_A=8.9 Nm

HPBWEN-6.../...K31...V



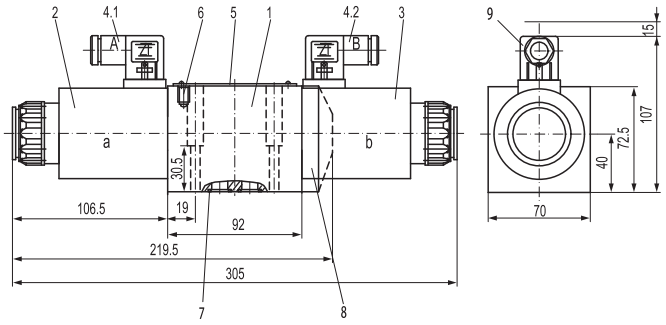
1 Valve body
2 Proportional solenoid „a”
3 Proportional solenoid „b”
4 Plug-in connector to E DIN 43 563-BF6-3/Pg11
5 Name plate
6 8.73 x 1.78 Identical seal rings for ports A, B, P and T
7 Plug for valves with one solenoid 2 switched positions, versions 2B2B or 2B40B)
8 Integrated electronics
9 Space required for the connection cable and to remove the plug-in connector
10 Machined valve mounting surface, connection location DIN 24 340A, ISO 4401 and CETOP-RP 121 H

Subplates: See page 7 "size of subplate"

Valve fixing screws: 4-M5x 45 DIN 912-12.9; M_A=8.9 Nm

Unit dimensions

BWE-10

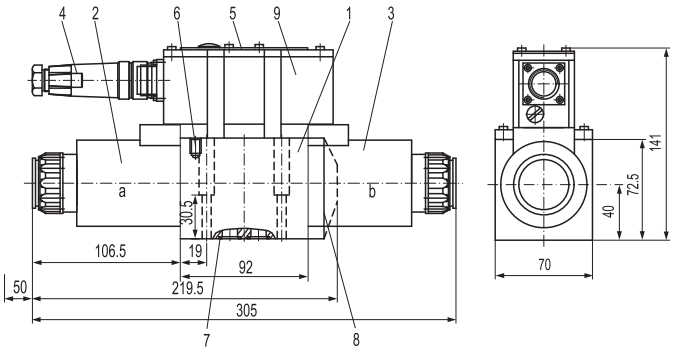


1 Valve body
2 Proportional solenoid „a”
3 Proportional solenoid „b”
4.1, 4.2 Plug-in connector, colour black, separate order
5 Name plate
6 Valve deflation screw
7 12 x 2 Identical seal rings for ports A, B, P and T
8 Plug for valves with one solenoid 2 switched positions, versions 2B2B or 2B40B)
9 Space required to remove the plug-in connector
10 Machined valve mounting surface, connection location to DIN 24 340A IS04401 (and) CETOP-RP 121H

Subplates: See page 7 "size of subplate"

Valve fixing screws: 4-M6x 40 DIN 912-12.9; M_A=15.5 Nm

BWEN-10



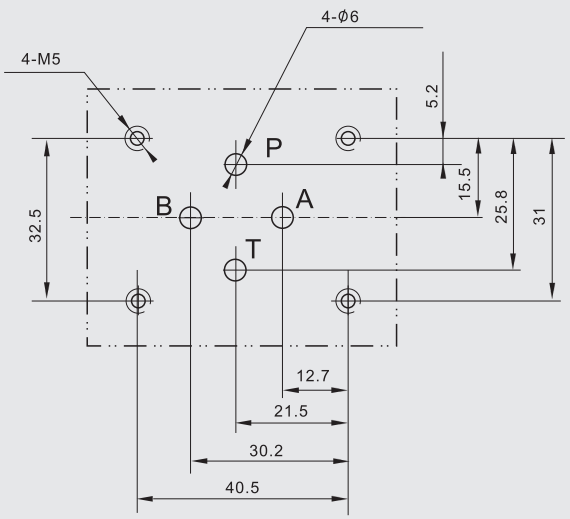
1 Valve body
2 Proportional solenoid „a”
3 Proportional solenoid „b”
4 Plug-in connector, to E DIN43563-BF6-3/Pg11
5 Name plate
6 Valve deflation screw
7 12 x 2 Identical seal rings for ports A, B, P and T
8 Plug for valves with one solenoid 2 switched positions, versions 2B2B or 2B40B)
9 Integrated electronics
10 Space required for the connection cable and to remove the plug-in connector
11 Machined valve mounting surface, connection location to DIN 24 340A, ISO 4401 (and) CETOP - RP 121H

Subplates: See page 7 "size of subplate"

Valve fixing screws: 4-M6x 40 DIN 912-12.9; M_A=15.5 Nm

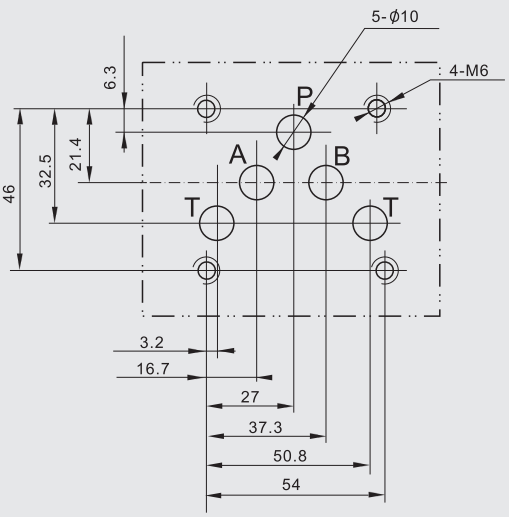
Subplate Size

BWE-6



Identical seal ring 8.73 x 1.78
Valve fixing screw: 4-M5 x 45-12.9 (GB70-85)

BWEN-10



Identical seal ring: 12 x 2
Valve fixing screw: 4-M6 x 35 -12.9 (GB70-85)

HYDROPRESS®
hydraulika siłowa

CENTRALA ELBLĄG

Ul. Rawska 19B
82-300 Elbląg

tel. /+48/ 55 625 51 00

fax /+48/ 55 625 51 01

Dział Handlowy

tel. /+48/ 55 625 51 51

elblag@hydropress.pl

www.hydropress.pl

ODDZIAŁ GDAŃSK
tel. /+48/ 55 625 51 21
fax /+48/ 55 625 51 22

ODDZIAŁ RUMIA
tel. /+48/ 58 679 34 15
fax /+48/ 55 625 51 25

ODDZIAŁ TYCHY
tel. /+48/ 32 787 52 88
fax /+48/ 55 625 51 38

ODDZIAŁ OLSZTYN
tel. /+48/ 89 532 01 05
fax /+48/ 89 715 21 42

ODDZIAŁ WARSZAWA
tel. /+48/ 22 468 86 97
fax /+48/ 55 625 51 32

BIURO WE WROCŁAWIU
tel. /+48/ 782 838 000
fax /+48/ 55 625 51 35

BIURO W KIELCACH
tel. /+48/ 885 995 501
fax /+48/ 55 625 51 01

BIURO W KRAKOWIE
tel. /+48/ 885 995 019
fax /+48/ 55 625 51 01

BIURO W OPOLU
tel. /+48/ 885 995 011
fax /+48/ 55 625 51 01

BIURO W BYDGOSZCZY
tel. /+48/ 790 222 771
fax /+48/ 55 625 51 01

BIURO W BIAŁYMSTOKU
tel. /+48/ 89 532 01 05
fax /+48/ 89 715 21 42

BIURO W ŁODZI
tel. /+48/ 609 221 421
fax /+48/ 89 715 21 42