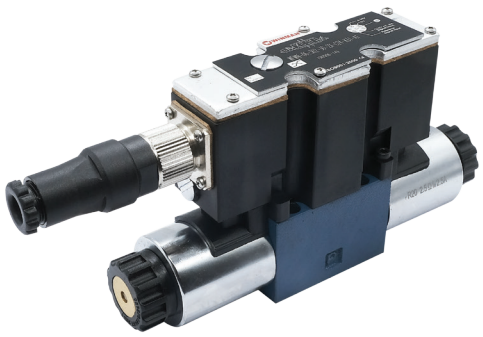
WINMAN®

Proportional directional valve (WFW-WFWN)



Specification

The built-in 4/2-and 4/3-way directly operated	
Proportional solenoid valves	
Direct operated spool without electrical position feedback	
Type	WFW and WFWN
Nominal sizes	6 and 10
Series	2X
Maximum Operating pressure	315 bar
Maximum Flow	42L/min (DN 6)
Maximum Flow	75L/min (DN 10)

Technical data

Model		WFW	WFWN
Installation position		optional,preferably horizontal	
Storage Temperature Range	℃	-20~80	
Ambient Temperature Range	℃	-20~70	-20~50

Note :Please consult with us when the application needs higher requirement than the parameter shown below.

Hydraulic

Operating Pressure	(Bar)	PortsA,B,P	315
		Port T	210
Nominal Flow When q_{vnom} at △p=10 bar	(L/min)	DN6	7,15 and 26
		DN10	30,60
Flow (Max. Permissible)	(L/min)	DN6	42 (with double flow 40) 80
		DN10	75 (with double flow 75) 140
Pressure fluid			Mineral oil (HL,HLP) to DIN 51524; 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)
Hysteresis	(%)		⩽ 5
Reversal span	(%)		⩽ 1
Response sensitivity	(%)		⩽ 0.5
Cleanliness	Maximum premissible degree of pressure fluid contamination to NAS 1638 to class 9 Recommended filter $\beta_{10} \geqslant 75$。		

Electrical

Model			WFW[1)]	WFWN
Voltage Type			Direct Voltage	
WFWN 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	(Ω)	cold value at 20°C	6DN2	10DN2
		cold value at 20°C	6DN3	10DN3
Duty cycle		(%)	100	
Max.Coil temperature[2)]		(℃)	up to150	
Electrical connection			socket as per DIN EN 175 301-803 and ISO 4400 with component plug to DIN EN 175301-803 and ISO 4400	socket as per DIN EN 43 563-AM6-3 with component plug to DIN 43 563-BF6-3/Pg11
Insulation of valve to DIN 40 050			IP 65	

Proportional directional valve (WFW-WFWN)

Control electronics

WFW (type)	Analogue amplifier in Eurocard format 3)		Details refer to proportional amplifier	
	Digital amplifier in Eurocard format 3)		Details refer to proportional amplifier	
WFWN (type)	Analogue command value module		Integrated into the valves	
Supply Voltage	Nominal voltage	VDC	24	
	WFWN Lower limiting value	V	21/22	19
	WFW 1) Upper limiting value	V	35	
Amplifier current consumption	I_{max}	A	1.8	1.8
	Max. impulse current	A	3	3

1) With WINMAN control amplifier. 2)Due to the occurring surface temperature of the solenoid coils, the European Standards DIN EN 563 and DIN EN 982. 3)separate order.

Model description

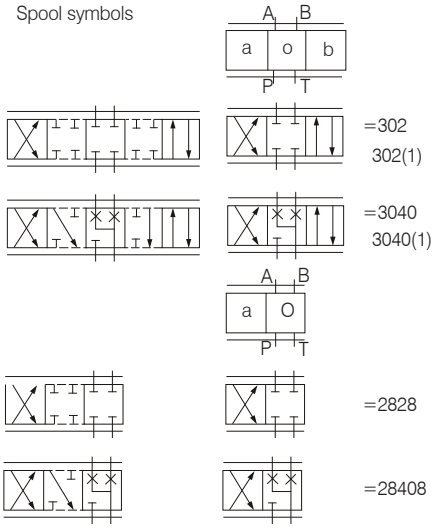
WFW — ✱ — ✱ — ✱ — ✱ — 2X — G24 — ✱ — ✱ — ✱ — ✱ — ✱

Directional proportional valve

No code without integrated electronics
N With integrated electronics

02 DN 6
03 DN 10

Spool symbols



With spool symbols : 302(1)and 3040(1)
P → A: q_{vmax} B →T:$q_{vmax}/2$
P → B: $q_{vmax}/2$ A →T:q_{vmax}

Note:
With spools 3040 and 28408, in the neutral position , there is a connection from A to T and B to T with approx. 3 % of the relevant nominal cross section.

Further details in clear text

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

No code WFW(type) WFWN(type)
A1 Command valueinput ±10V
F1 Command value input 4~20mA

Electrical connection For
WFW(type)
2)K4 with plug component DIN EN 175301-803
See page 3
WFWN(type)
2)K31 with plug component DIN 43 650-AM2
See page :4

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

24V 24 VDC

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

Nominal flow at valve pressure differential Äp = 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

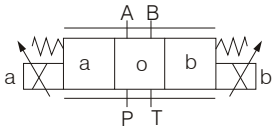
1.Other types of electrical protection on request

2.Only for Dn6 for versian “3040” sea water resistant only state “K31” !

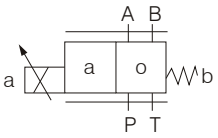
Proportional directional valve (WFW-WFWN)

Model description

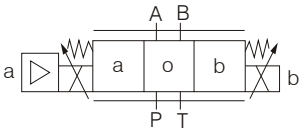
Model WFW···



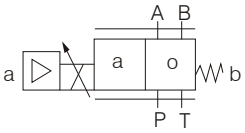
Model WFW···2828 (28408)



Model WFWN···



Model WFWN··· 2828 (28408)



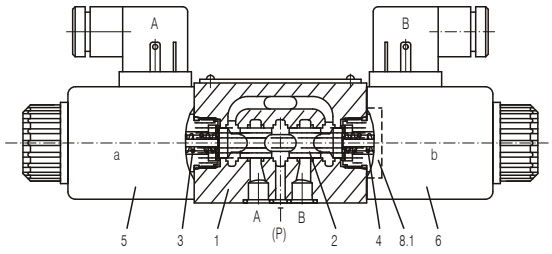
Structure and function description, section

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 WFW) or integrated control electronics (type WFWN).

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)

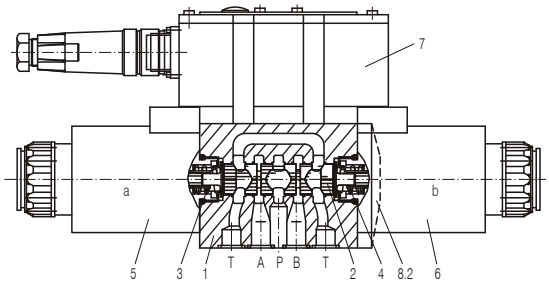
Function:
-When solenoids (5 and 6) do not work, the control spool (2) is held in the central position by compression springs (3 and 4)
-Direct actuation of the control spool (2) by energising a proportional solenoid E.g. When the solenoid "b" power is on (6)
→ The control spool (2) is moved to the left in proportion to the electrical input signal
→ connection from P to A and B to T via orifice-like crosssections with progressive flow characteristics
-When the solenoid power is off (6)
→ The control spool (2) is returned to the central position by compression spring (3)

Model WFW-02···2x/···



In theory, the function of this valve is the same to the valve with 3 positions. However, the valves with 2 positions are only fitted with solenoid " ".
For DN6 valve, there is a plug (8.1) fixed in the second solenoid,but for DN10, it is a cover (8.2) instead.

Model WFWN-03···2x/···

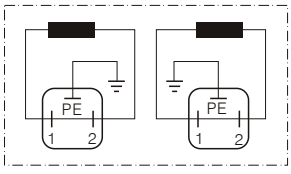


Note for type WFW-02 2X/ :
Draining of tank line is to be avoided. With the appropriate installation conditions, a back pressure valve is to be installed (back pressure approx. 2 bar).

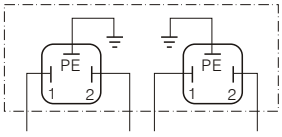
Electrical connectio, plug-in connectors

WFW type (Without integrated electronics not for version "J"= sea w ater-r esistant)

Connection on component plug

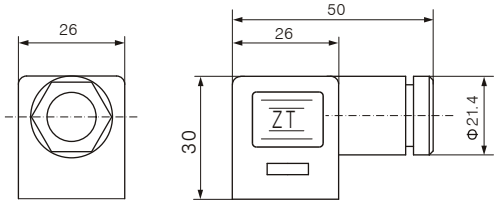


Connection on plug-in connector



To amplifier To amplifier

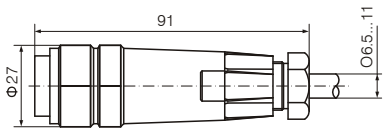
Plug-in connector: CECC 75 301-803-A002FA-H3D08-G/DIN EN 175 301-803 and ISO 4400

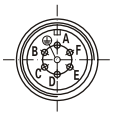


Proportional directional valve (WFW-WFWN)

Electrical connection, plug-in connectors

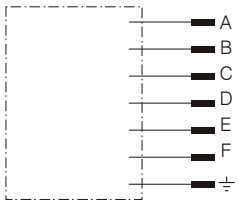
For type WFWN (with integrated electronics (OBE) and for version "J" = sea water-resistant) Plug-in connector see the block circuit diagram below





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

Integrated electronics for type WFWN
Pin allocation of the component plug

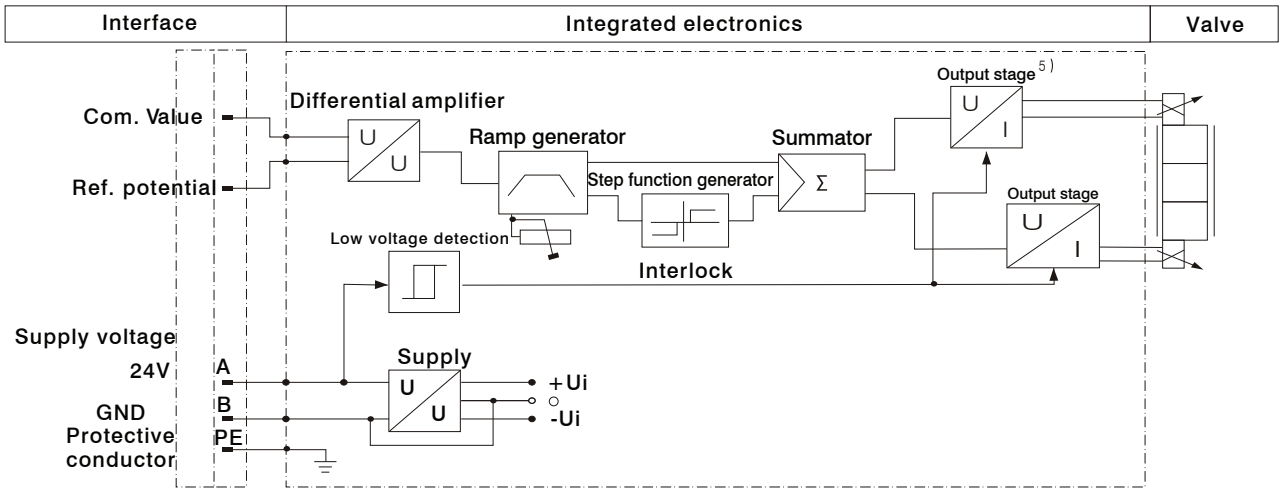


WFW (type)	Contact	Signal
Supply voltage	A B	24VDC(19~35VDC) GND
	C	n.c.(1)
Differential amplifier input	D E	Com. value (±10V/4-20mA) reference potential
	F	n.c.(1)

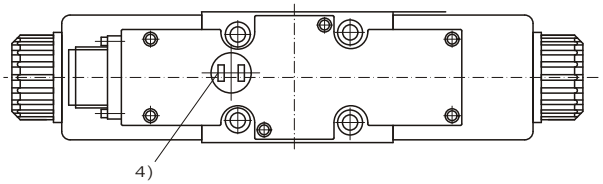
Com. value: Positive command value (0 to 10 V or 12 to 20 mA) at D and reference potential to E causes flow from P to A and B to T.
Negative command value (0 to 10 V or 12 to 4 mA) at D and reference potential to E causes flow from P to B and A to T.
For valves with a solenoid on side “a” (spool variants 2B2B and 2B40B) 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.

Recommendation:
-up to 25 m cable length type LiYCY 5 x 0.75 mm²
-up to 50 m cable length type LiYCY 5 x 1.0 mm²
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!
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 Tup and Tdown
5) Output stages current regulated
6) Low voltage detection is not carried out for component type WFWN-03-2X

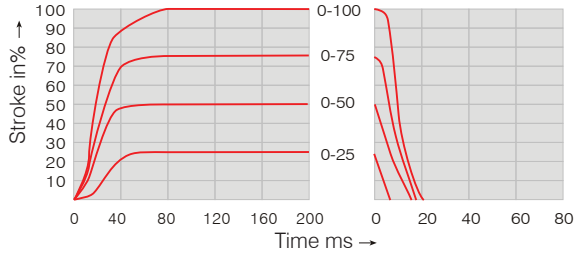


Proportional directional valve (WFW-WFWN)

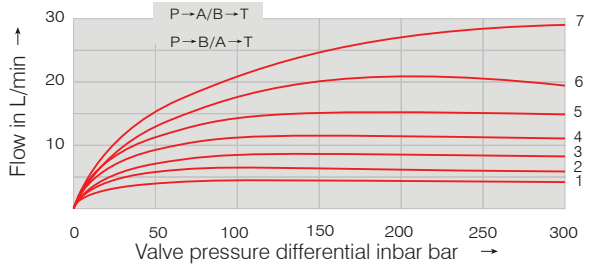
Characteristic curves

6DN

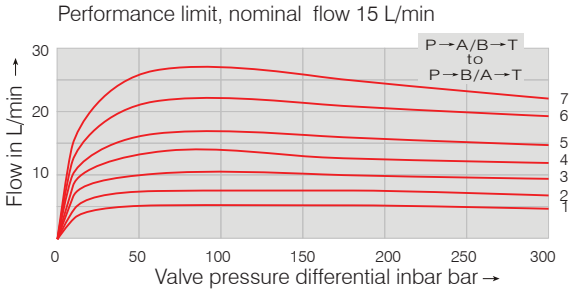
Transient functions with stepped form of electrical input signa



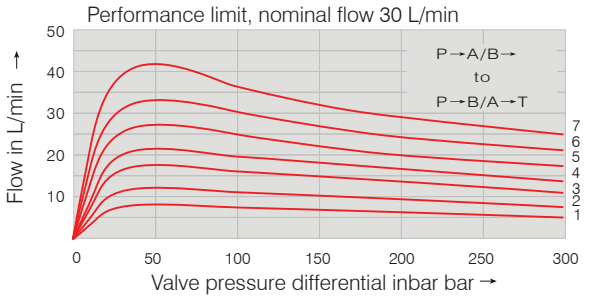
Performance limit, nominal flow 7 L/min



Performance limit, nominal flow 15 L/min



Performance limit, nominal flow 30 L/min

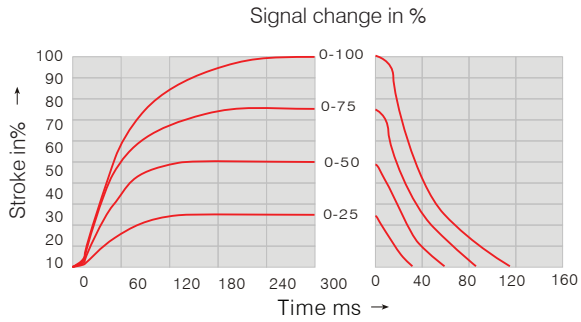


1 Com. Value=40%
2 Com. Value=50%
3 Com. Value=60%
4 Com. Value=70%
5 Com. Value=80%
6 Com. Value=90%
7 Com. Value=100%

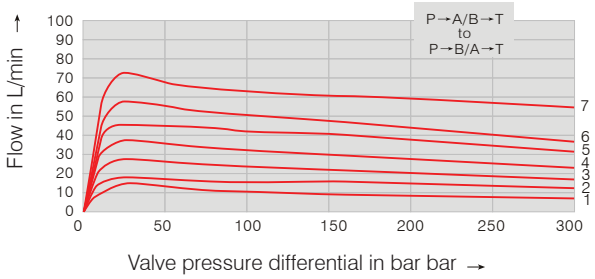
If the performance limits are exceeded, then the movement of spool will be unstable.

10DN

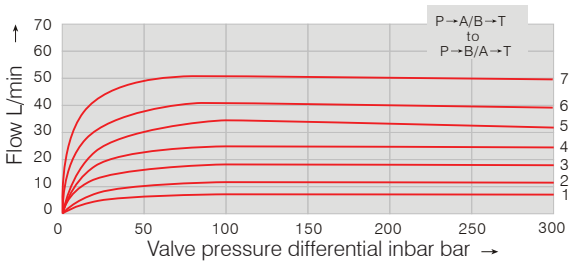
Transient functions with stepped form of electrical input signa



Performance limit, nominal flow 60 L/min



Performance limit, nominal flow 30 L/min



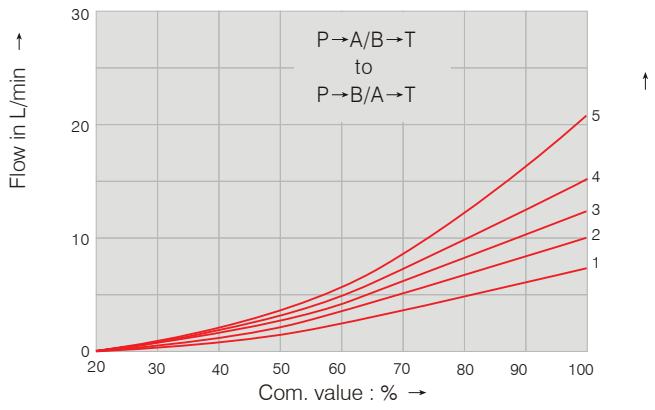
1 Com. Value=40%
2 Com. Value=50%
3 Com. Value=60%
4 Com. Value=70%
5 Com. Value=80%
6 Com. Value=90%
7 Com. Value=100%

If the performance limits are exceeded, then the movement of spool will be unstable.

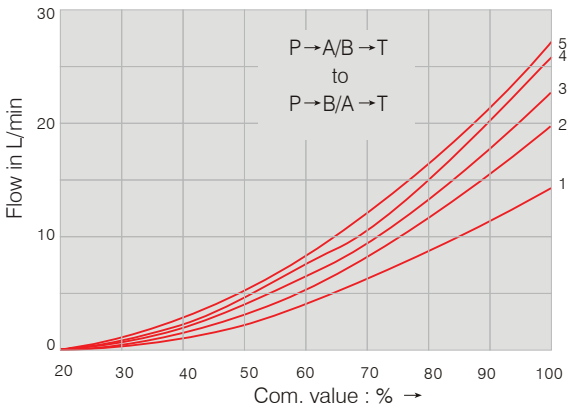
Proportional directional valve (WFW-WFWN)

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

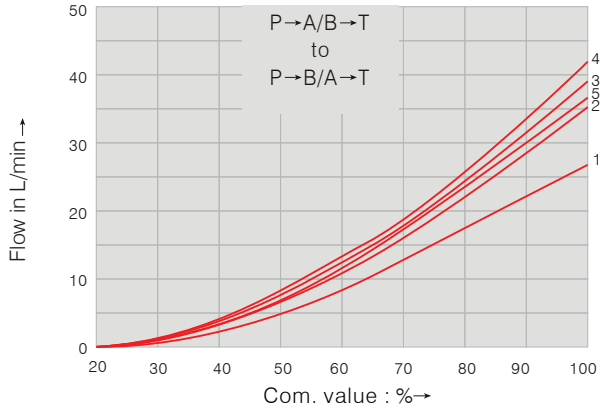
7 l/min nominal flow at differential pressure 10 bar



15 l/min nominal flow at differential pressure 10 bar



30 l/min nominal flow at differential pressure 10 bar

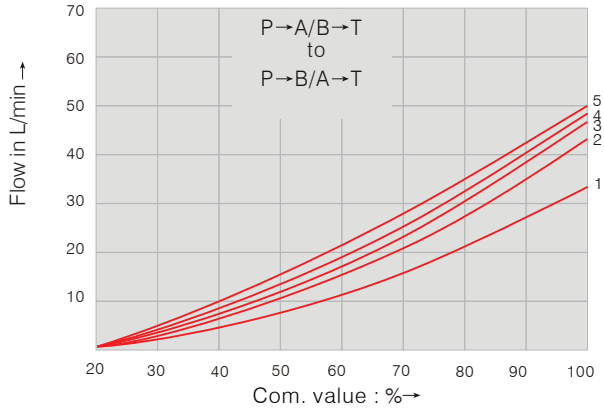


1 △p=10 bar Constant
2 △p=20 bar Constant
3 △p=30 bar Constant
4 △p=50 bar Constant
5 △p=100 bar Constant

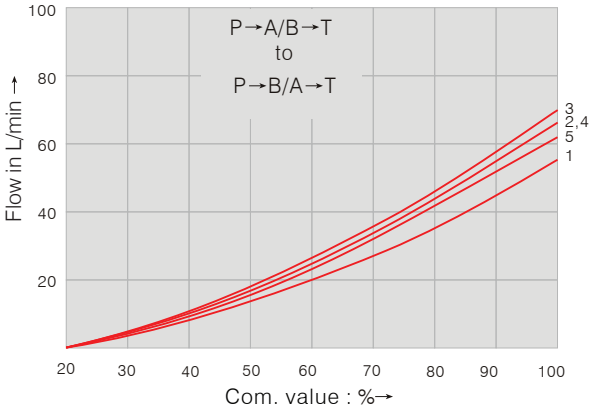
△p=Valve pressure differential
(inlet pressure P_P minus load
pressure P_L and minus return pressure P_T)

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

30 l/min nominal flow at differential pressure 10 bar



60 l/min nominal flow at differential pressure 10 bar



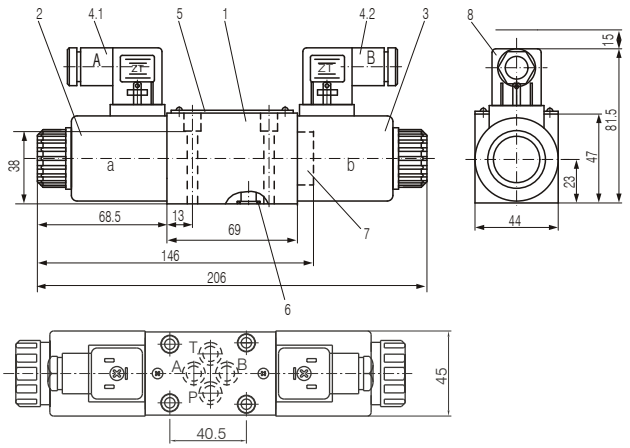
1 △p=10 bar Constant
2 △p=20 bar Constant
3 △p=30 bar Constant
4 △p=50 bar Constant
5 △p=100 bar Constant

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

Proportional directional valve (WFW-WFWN)

Unit dimensions

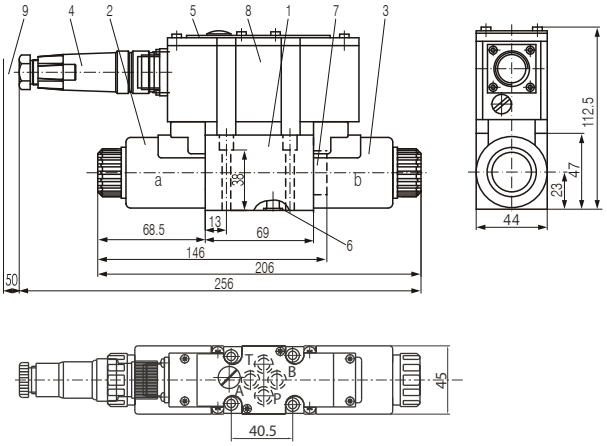
WFW-02 type



1 Valve body
2 Proportional solenoid “a”
3 Proportional solenoid “b”
4.1 4.2 Plug-in connector, colour black, seperate order
5 Nameplate
6 8.73 x 1.78 I seal rings for ports A, B, P and T
7 Plug for valves with one solenoid 2 positions spool type 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

Mounting plate: please refer to below drawing
Subplates: Valve fixing screws : 4-M5x 45 D IN 912-12.9; M_A =8.9 Nm

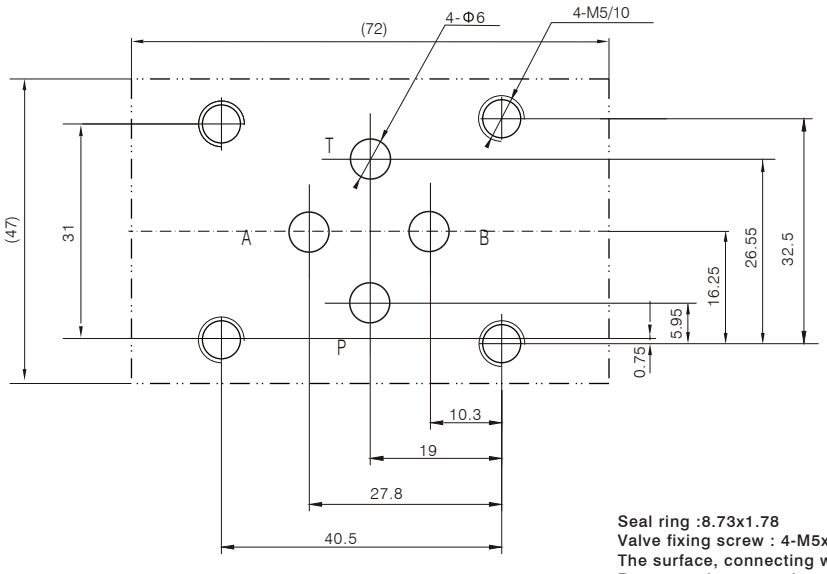
WFWN-02 ⋯/⋯K31⋯V type



1 Valve body
2 Proportional solenoid “a”
3 Proportional solenoid “b”
4 Plug-in connector to E DIN 43563-BF6-3/Pg11
5 Nameplate
6 8.73 x 1.78 O Identical seal rings for ports A, B, P and T
7 Plug for valves with one solenoid 2 switched positions, spool type 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 440 and CETOP-RP 121 H

Subplate Size

WFW-02
WFWN-02

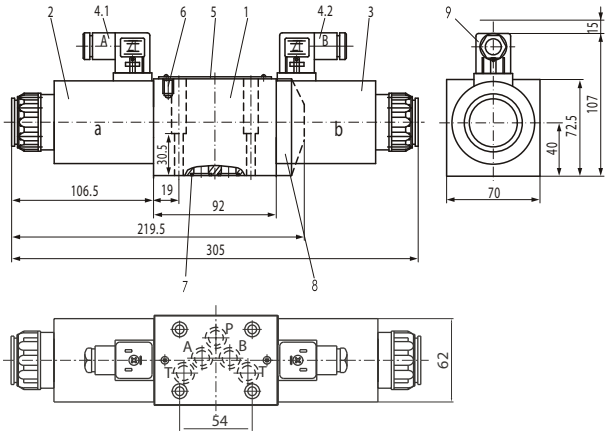


Seal ring :8.73x1.78
Valve fixing screw : 4-M5x45-12.9(GB70-85)
The surface, connecting with the valve, should be Ra0.8 roughness, and 0.01/100 mm flatness.

Proportional directional valve (WFW-WFWN)

Unit dimensions

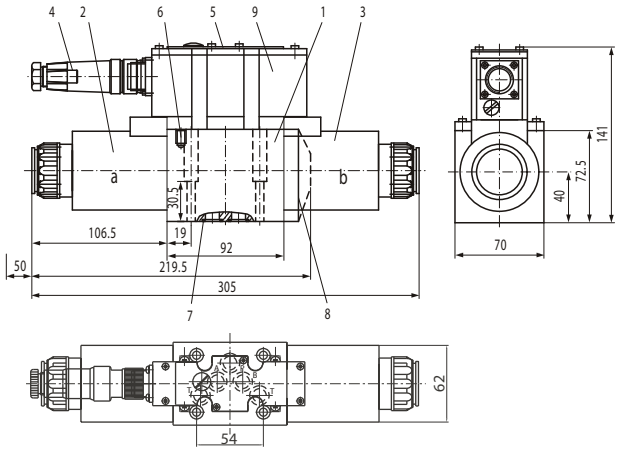
WFW-03 type



1 Valve body
2 Proportional solenoid “a”
3 Proportional solenoid “b”
4.1 4.2 Plug-in connector, colour black, seperate order
5 Nameplate
6 Valve deflation screw
7 12 x 2 seal rings for ports A, B, P and T
8 Plug for valves with one solenoid 2 positions,
spool type 2B2B or 2B40B)
9 Space required to remove the plug-in connector
10 Machined valve mounting surface, connection location
to DIN 24 340A, ISO4401 (and) CETOP-RP 121 H

Mounting plate: please refer to below drawing
Subplates: Valve fixing screws : 4个M6x 40 DIN 912-12.9; M_A =15.5 Nm

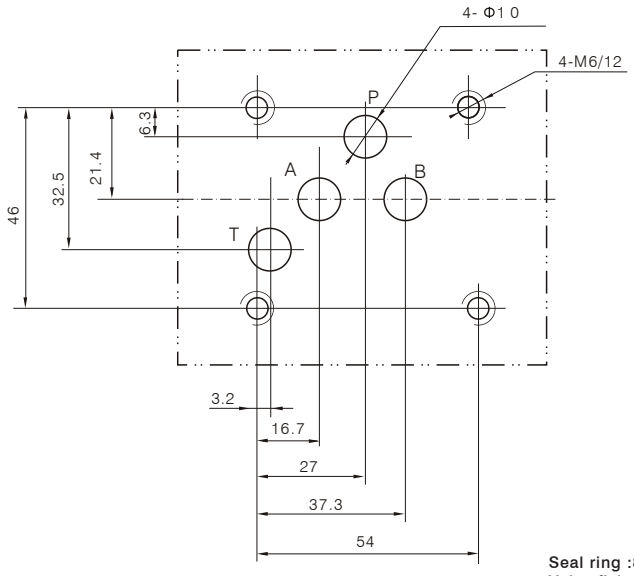
WFWN-03 type



1 Valve body
2 Proportional solenoid “a”
3 Proportional solenoid “b”
4 Plug-in connector to E DIN 43563-BF6-3/Pg11
5 Nameplate
6 Valve deflation screw
7 12 x 2 I O dentical seal rings for ports A, B, P and T
8 Plug for valves with one solenoid (2 positions,
spool type 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, ISO4401(and) CETOP-RP 121 H)

Subplate Size

WFW-03
WFWN-03



Seal ring :8.73x1.78
Valve fixing screw : 4-M5x45-12.9(GB70-85)
The surface, connecting with the valve, should be Ra0.8 roughness, and 0.01/100 mm flatness.