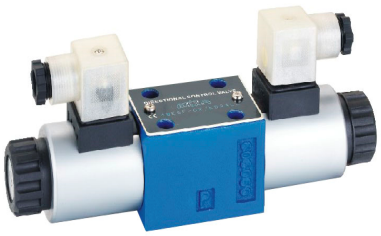
Automation Specialists

Ningbo Best Industrial Co.,Ltd.

4/3, 4/2 and 3/2 directional valve with wet-pin DC or AC voltage solenoids

RE 23178/04.09
Replaces: 08.08

Type WE



Size 6
Component series 6X
Maximum operating pressure 350 bar *[5076 psi]*
Maximum flow: 80 l/min *[21 US gpm]* – DC
60 l/min *[15.8 US gpm]* – AC

Features

- Direct operated directional spool valve with solenoid actuation in high-performance design
- Porting pattern according to DIN 24340 form A
- Porting pattern according to ISO 4401-03-02-05 and NFPA T3.5.1 R2-2002 D03
- Subplates see data sheet RE 45052
- Wet-pin DC or AC voltage solenoids with detachable coil
- Solenoid coil can be rotated by 90°
- The coil can be changed without having to open the pressure-tight chamber
- Electrical connection as individual or central connection (for more electrical connections see RE 08010)
- Manual override, optional
- For smoothly switching variant, see RE 23183
- Inductive position switch and proximity sensor (contactless), see RE 24830
- Supplementary documentation:
  - "General product information on hydraulic products" RE 07008
  - "Installation, commissioning and maintenance of industrial valves" RE 07300

Ordering code

	WE	6		6X/		E				

3 main ports = **3**
4 main ports = **4**

Size 6 = **6**

Spool symbols e.g. C, E, EA, EB, etc; possible variants see page 4

Component series 60 to 69 = **6X**
(60 to 69: unchanged installation and connection dimensions)

With spring return = **No code**
Without spring return = **O**
Without spring return with detent = **OF**

High-performance wet-pin solenoid with detachable coil = **E**

DC voltage 24 V = **G24**
AC voltage 230 V 50/60 Hz = **W230**
AC voltage 120 V or 110 V 50/60 Hz = **W110**
= **W + voltage**
DC voltage 205 V = **G205** [1]
DC voltage solenoid with rectifier for AC voltage = **W110R**
(not frequency-related; only available with plug-in connection with D cover, page 14)
For further ordering codes for other voltages and frequencies, see page 7

With concealed manual override (standard) = **N9**
With manual override = **N**
Without manual override = **No code**

Electrical connection

Individual connection

Without mating connector with connector DIN EN 175301-803 = **K4** [3]
Without mating connector with connector AMP Junior Timer = **C4** [3]
Without mating connector with connector DT 04-2PA (Deutsch plug) = **K40** [3]
Without mating connector with M12x1 plug-in connection with operating display LED = **K72L** [4]
Without mating connector with M12x1 plug-in connection with operating display LED
(no connection pin 1 to pin 2) = **K73L** [4]

Central connection

Cable entry at the cover, with indicator light = **DL**
Central plug-in connection at the cover, with indicator light (without mating connector) = **DKL** [5]
For further electrical connections, see RE 08010

[1] For the connection to AC voltage mains, a DC voltage solenoid **must** be used, which is controlled via a rectifier (see table below).

In the case of individual connection, a large mating connector with integrated rectifier can be used (separate order).

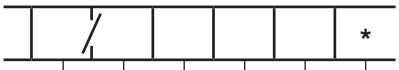
[2] Locating pin ISO 8752-3x8-St, material no. **R900005694** (separate order)

[3] Mating connectors, separate order, RE 08006.

[4] Only version "G24", see RE 08010

[5] Mating connectors, separate order, material no. **R900005538**

AC voltage mains (permissible voltage tolerance ± 10%)	**Nominal voltage of the DC solenoid when operated with AC voltage**	**Ordering code**
110 V - 50/60 Hz	96 V	**G96**
230 V - 50/60 Hz	205 V	**G205**



Further details in the plain text

No code = **Without** locating hole
/60 [2] **=** **With** locating hole
/62 = **With** locating hole and locating pin ISO 8752-3x8-St

Seal material

No code = NBR seals
V = FKM seals
(other seals upon request)
Attention!
Observe compatibility of seals with the hydraulic fluids used!

Clamping length

No code = 42 mm *[1.65 inch]* (Standard)
Z = 22 mm *[0.87 inch]*

No code = Without throttle insert
With throttle insert see table:

Connection	Throttle Ø in mm *[inch]*		
	0.8 *[0.031]*	1.0 *[0.039]*	1.2 *[0.047]*
P	**= B08**	**= B10**	**= B12**
A	**= H08**	**= H10**	**= H12**
B	**= R08**	**= R10**	**= R12**
A and B	**= N08**	**= N10**	**= N12**
T	**= X08**	**= X10**	**= X12**

Use at flows which exceed the performance limit of the valve (see page 5).

Spool position monitoring

No code = Without position switch

– Inductive position switch type QM

QMAG24 = Monitored spool position "a"
QMBG24 = Monitored spool position "b"
QM0G24 = Monitored rest position

– Inductive position switch type QR

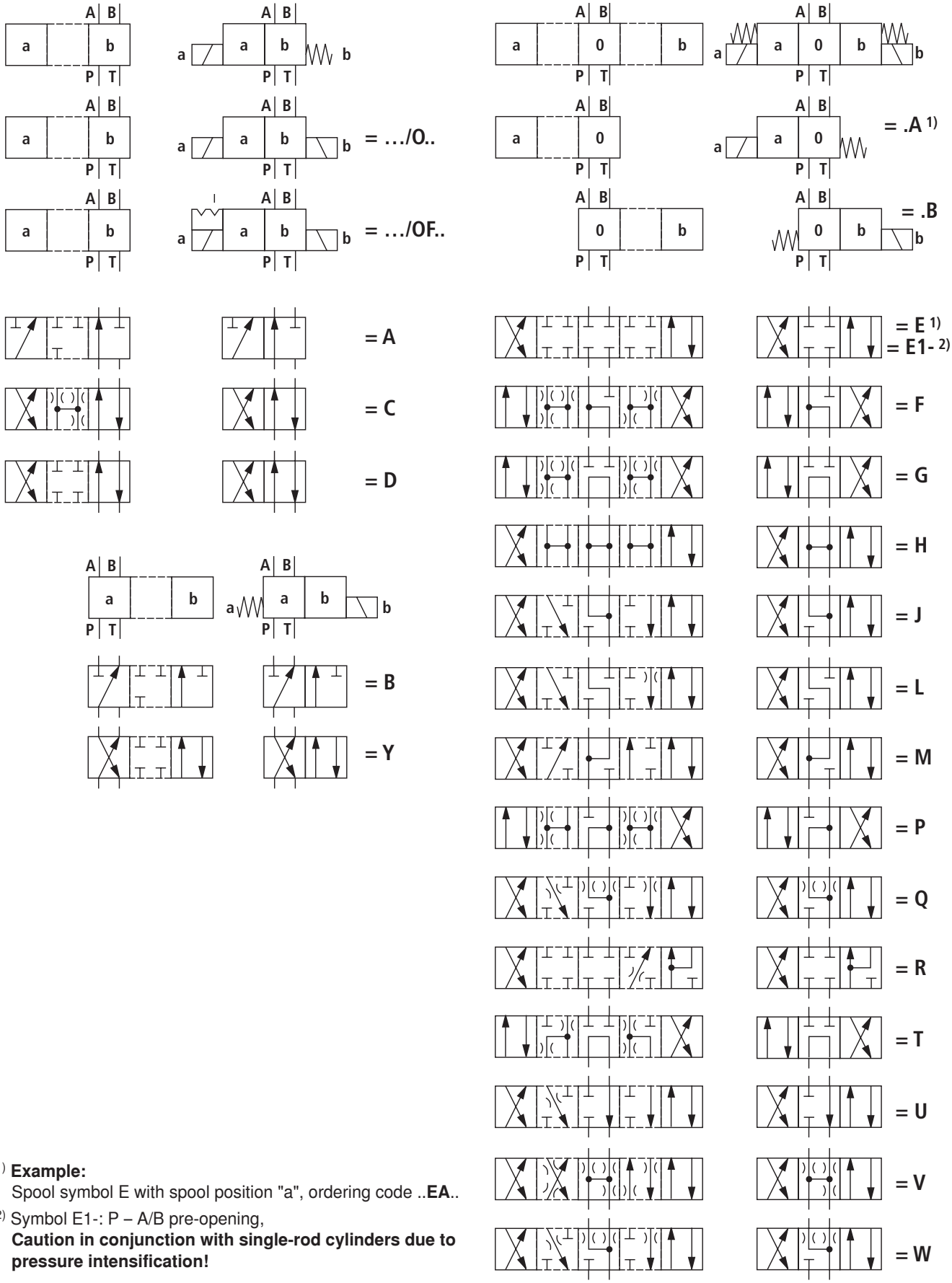
QR0G24S = Monitored rest position
QRABG24E = Monitored spool position "a" and "b"

– Inductive proximity sensor type QS

QSAG24W = Monitored spool position "a"
QSBG24W = Monitored spool position "b"
QS0G24W = Monitored spool position "0"
QS0AG24W = Monitored spool position "0" and "a"
QS0BG24W = Monitored spool position "0" and "b"
QSABG24W = Monitored spool position "a" and "b"

For further details, see RE 24830

Spool symbols



1) **Example:**
Spool symbol E with spool position "a", ordering code ..**EA**..

2) Symbol E1-: P – A/B pre-opening,
Caution in conjunction with single-rod cylinders due to pressure intensification!

Technical data (For applications outside these parameters, please consult us!)

general

Weight	– Valve with one solenoid	kg *[lbs]*	1.45 *[3.2]*
	– Valve with two solenoids	kg *[lbs]*	1.95 *[4.3]*
Installation position			any
Ambient temperature range		°C *[°F]*	–30 to +50 *[–22 to +122]* (NBR seals) –20 to +50 *[–4 to +122]* (FKM seals)

hydraulic

Maximum operating pressure	– Port A, B, P	bar *[psi]*	350 *[5076]*
	– Port T	bar *[psi]*	210 *[3050]* (DC); 160 *[2320]* (AC) With symbols A and B, port T must be used as leakage port.
Maximum flow		l/min *[US gpm]*	80 *[21]* (DC); 60 *[15.8]* (AC)
Flow cross-section (Spool position 0)	– Spool symbol Q	mm^2	ca. 6 % of nominal cross-section
	– Spool symbol W	mm^2	ca. 3 % of nominal cross-section
Hydraulic fluid [1]			Mineral oil (HL, HLP) according to DIN 51524[2]; quickly bio-degradable hydraulic fluids according to VDMA 24568 (see also RE 90221); HETG (rape seed oil) [2]; HEPG (polyglycols) [3]; HEES (synthetic esters) [3]; other hydraulic fluids upon request
Hydraulic fluid temperature range		°C *[°F]*	–30 to +80 *[–22 to +176]* (NBR seals) –15 to +80 *[–4 to +176]* (FKM seals)
Viscosity range		mm^2/s *[SUS]*	2.8 to 500 *[35 to 2320]*
Maximum permitted degree of contamination of the hydraulic fluid - cleanliness class according to ISO 4406 (c)			Class 20/18/15 [4]

[1] The flashpoint of the process and operating medium used must be 15 K higher than the maximum solenoid surface temperature.

[2] Suitable for NBR and FKM seals

[3] Only suitable for FKM seals

[4] The cleanliness classes specified for the components must be adhered to in hydraulic systems. Efficient filtration prevents malfunctions and at the same time prolongs the service life of components.

For maintenance requirements of the hydraulic fluid and contamination limit values, see data sheet RE 07300.

For the selection of the filters, see data sheets RE 50070, RE 50076, RE 50081, RE 50086, RE 50087 and RE 50088.

Technical data (For applications outside these parameters, please consult us!)

electrical

Type of voltage			Direct voltage	Alternating voltage 50/60 Hz
Available voltages [5] (For ordering code for AC voltage solenoids, see below)		V	12, 24, 96, 205	110, 230
Voltage tolerance (nominal voltage)		%	±10	
Power consumption		W	30	–
Holding power		VA	–	50
Switch-on power		VA	–	220
Duty cycle (ED)		%	100	
Switching time according to ISO 6403 [6]	– ON	ms	25 to 45	10 to 20
	– OFF	ms	10 to 25	15 to 40
Maximum switching frequency		1/h	15000	7200
Maximum surface temperature of the coil [7]		°C *[°F]*	120 *[248]*	180 *[356]*
Type of protection according to DIN EN 60529	– with connector "K4", "K72L", "K73L"		IP 65 (with mating connector mounted and locked)	
	– with connector "C4"		IP 66A (with mating connector mounted and locked)	
	– with connector "K40"		IP 69K (with mating connector mounted and locked)	

[5] Special voltages upon request

[6] The switching times were established at a hydraulic fluid temperature of 40 °C *[104 °F]* and a viscosity of 46 cSt. Deviating hydraulic fluid temperatures can result in different switching times! Switching times change in dependence on the operating time and operating conditions.

[7] Due to the temperatures occurring on the surfaces of the solenoid coils, the standards ISO 13732-1 and EN 982 need to be adhered to!
The specified surface temperature in AC voltage solenoids is valid for the faultless operation. In case of faults (e.g. blocking of the control spool), the surface temperature may rise to above 180 °C *[356 °F]*. Thus, the system must be checked for possible hazards considering the flashpoint (see footnote [1])
As fuse protection, circuit breakers (see table page 16) must be used unless the creation of an ignitable atmosphere can be excluded in a different way. Thus, the surface temperature can - in case of fault - be limited to maximally 220 °C *[428 °F]*.
The tripping current must be 8 to 10 times higher than the nominal power consumption over a time span of 0.6 s. (tripping characteristics "K").
The necessary non-tripping current of the fuse must not fall below the value I_1 - ping current of the fuse must not exceed the value I_2

The temperature dependence of the tripping behavior of the circuit breakers has to be considered according to the manufacturer's specifications.

☞ **Notes!**

– Operation of the manual override is only possible up to a tank pressure of ca. 50 bar *[725 psi]*. Avoid damage to the bore for the manual override! (Special tool for actuation, separate order, material no. **R900024943**). When the manual override is blocked, the operation of the solenoid must be ruled out!

– The simultaneous operation of the solenoids must be ruled out!

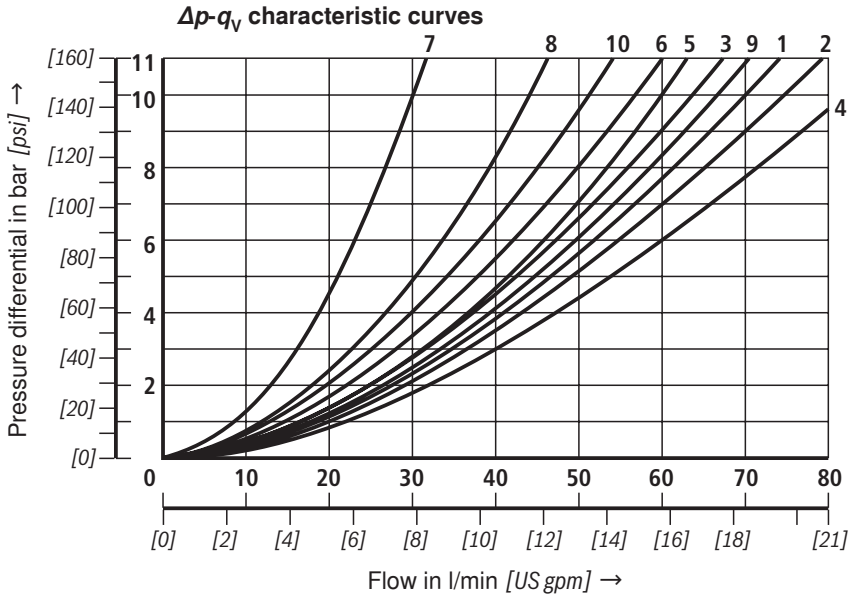
When establishing the electrical connection, properly connect the protective earth conductor (PE ⏚).

☞ **Note!**

AC voltage solenoids can be used for 2 or 3 mains;
e. g. solenoid type **W110** for:
110 V, 50 Hz; 110 V, 60 Hz; 120 V, 60 Hz

Ordering code	Mains
W110	110 V, 50 Hz 110 V, 60 Hz 120 V, 60 Hz
W230	230 V, 50 Hz 230 V, 60 Hz

Characteristic curves (measured with HLP46, ϑ_{Oil} = 40 °C ±5 °C *[104 °F ±9 °F]*)



7 Spool symbol "R" in spool position B – A

8 Spool symbol "G" and "T" in central position P – T

9 Spool symbol "H" in central position P – T

Spool symbol	Flow direction			
	P – A	P – B	A – T	B – T
A; B	3	3	–	–
C	1	1	3	1
D; Y	5	5	3	3
E	3	3	1	1
F	1	3	1	1
T	10	10	9	9
H	2	4	2	2
J; Q	1	1	2	1
L	3	3	4	9
M	2	4	3	3
P	3	1	1	1
R	5	5	4	–
V	1	2	1	1
W	1	1	2	2
U	3	3	9	4
G	6	6	9	9

Performance limits (measured with HLP46, ϑ_{Oil} = 40 °C ±5 °C *[104 °F ±9 °F]*)

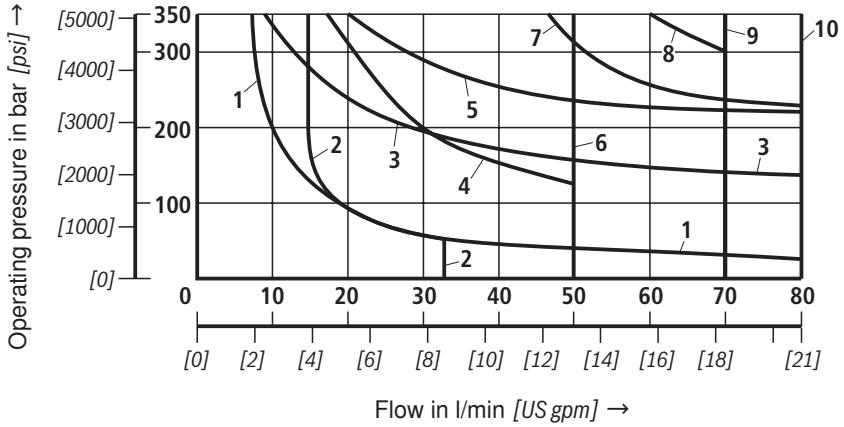
Attention!

The specified switching performance limits are valid for operation with two directions of flow (e.g. from P to A and simultaneous return flow from B to T).

Due to the flow forces acting within the valves, the permissible switching performance limits may be considerably lower with only one direction of flow (e.g. from P to A while port B is blocked)!

In such cases, please consult us!

The switching performance limit was established while the solenoids were at operating temperature, at 10% undervoltage and without tank pre-loading.



DC solenoid Solenoid voltage
12; 24; 48; 96; 125; 205 V

DC solenoid	
Characteristic curve	Spool symbol
1	A; B[1)]
2	V
3	A; B
4	F; P
5	J
6	G; H; T
7	A/O; A/OF; L; U
8	C; D; Y
9	M
10	E; E1–[2)]; R[3)]; C/O; C/OF D/O; D/OF; Q; W

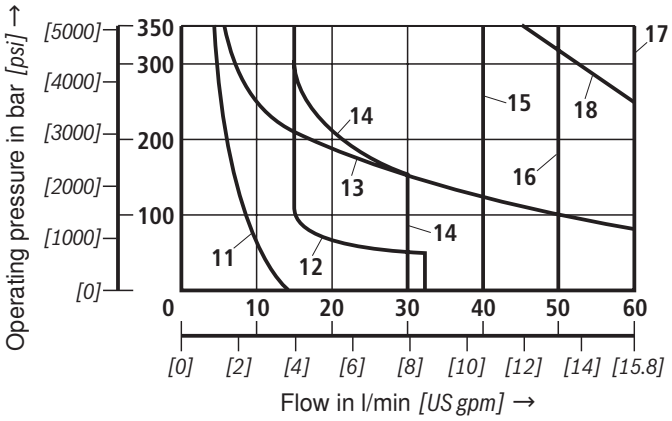
[1)] With manual override

[2)] P – A/B pre-opening

[3)] Return flow from actuator to tank

Performance limits (measured with HLP46, ϑ_{Oil} = 40 °C ±5 °C *[104 °F ±9 °F]*)

see note on page 8.



AC solenoid Solenoid voltage	
W110	110 V; 50 Hz 120 V; 60 Hz
W230	230 V; 50 Hz

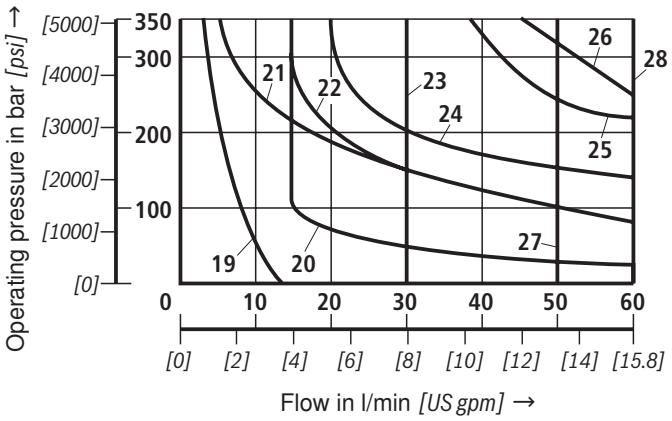
(other voltages upon request)

AC solenoid – 50 Hz	
Character-istic curve	**Spool symbol**
11	A; B[1)]
12	V
13	A; B
14	F; P
15	G; T
16	H
17	A/O; A/OF; C/O; C/OF; D/O; D/OF; E; E1–[2)]; J; L; M; Q; R[3)]; U; W
18	C; D; Y

[1)] With manual override

[2)] P – A/B pre-opening

[3)] Return flow from actuator to tank



AC solenoid Solenoid voltage	
W110	110 V; 60 Hz
W230	230 V; 60 Hz

(other voltages upon request)

AC solenoid – 60 Hz	
Character-istic curve	**Spool symbol**
19	A; B[1)]
20	V
21	A; B
22	F; P
23	G; T
24	J; L; U
25	A/O; A/OF; Q; W
26	C; D; Y
27	H
28	C/O; C/OF; D/O; D/OF; E E1–[2)]; M; R[3)]

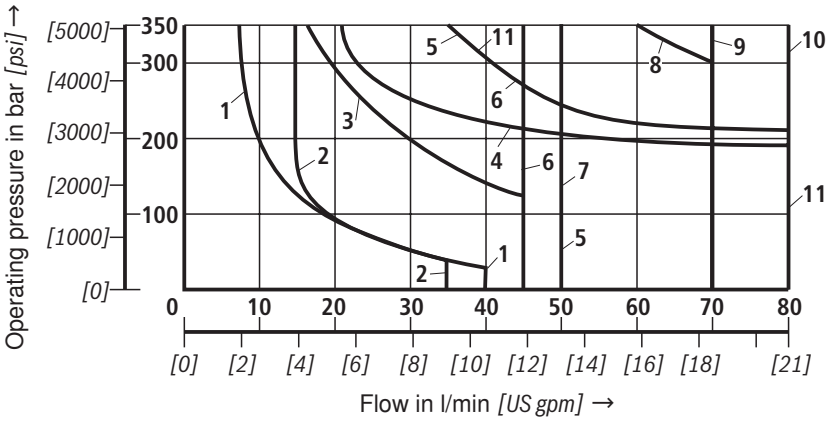
[1)] With manual override

[2)] P – A/B pre-opening

[3)] Return flow from actuator to tank

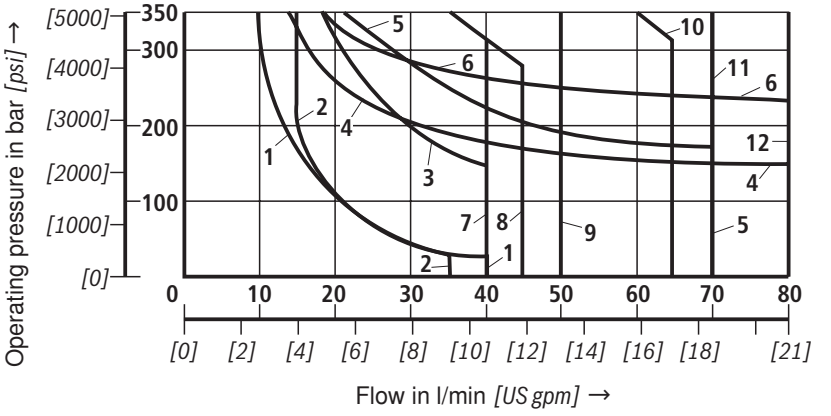
Performance limits (measured with HLP46, ϑ_{Oil} = 40 °C ±5 °C *[104 °F ±9 °F]*)

see note on page 8.



DC solenoid Solenoid voltage
110; 180 V

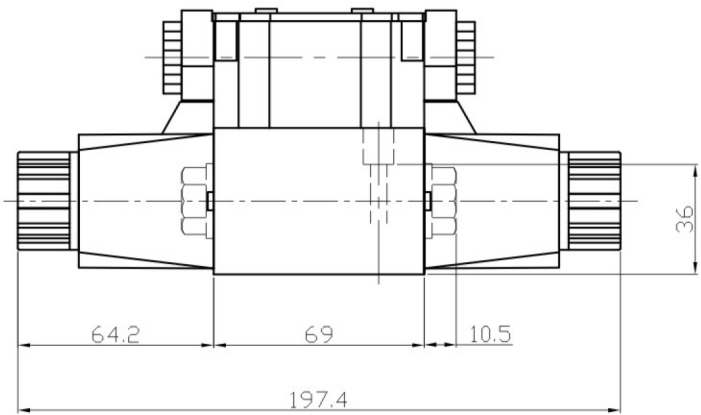
DC solenoid	
Character-istic curve	Spool symbol
1	A; B
2	V
3	F; P
4	J; L; U
5	G
6	T
7	H
8	D; C
9	M
10	C/O; C/OF; D/O; D/OF; E; E1–; R, Q; W
11	A/O; A/OF

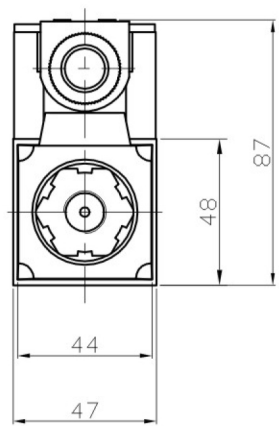


DC solenoid Solenoid voltage
42; 80; 220 V

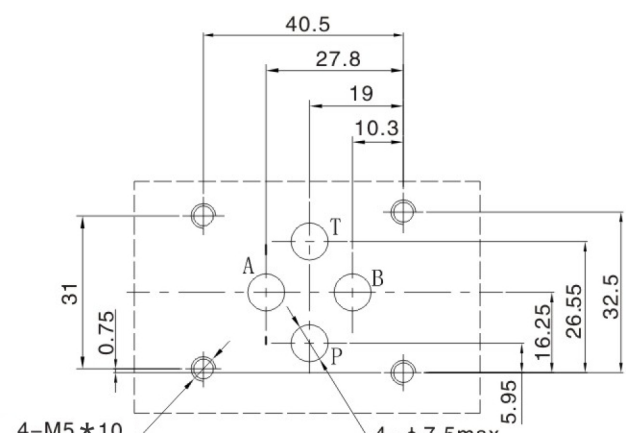
DC solenoid	
Character-istic curve	Spool symbol
1	A; B
2	V
3	F; P
4	J; L; U
5	A/O; A/OF
6	E
7	T
8	G
9	H
10	D; C
11	M
12	C/O; C/OF; D/O; D/OF; E1–; R, Q; W

4WE6 E-A220-B

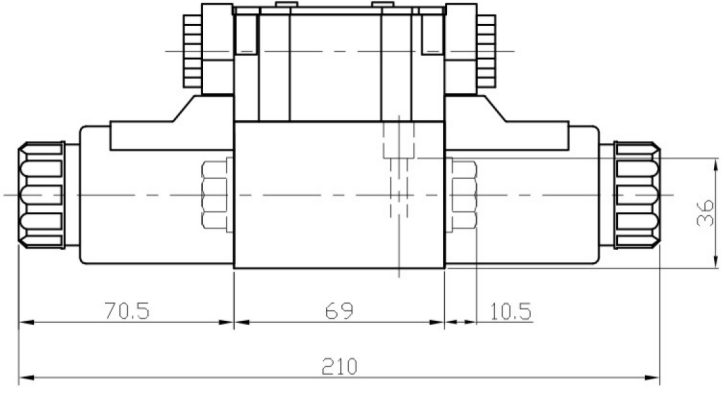

36
64.2
69
10.5
197.4

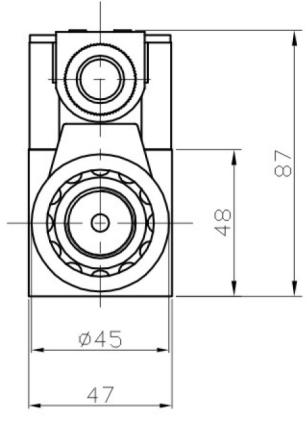

87
48
44
47


0.01/100mm
0.8


40.5
27.8
19
10.3
T
A
B
P
31
0.75
16.25
26.55
32.5
5.95
4-M5*10
4-φ7.5max

4WE6 E-D24-B





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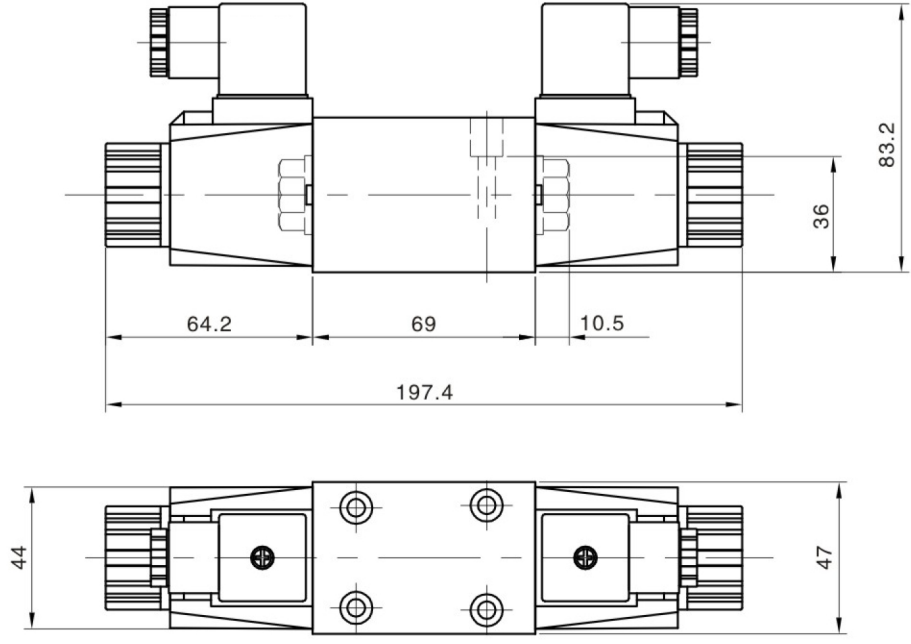

4WE6-DC-H