

RE 23 327/02.03

Replaces: 07.02

**4/3-, 4/2- and 3/2- way directional valves
with wet pin DC or AC solenoids,
Type .WE 10 ../C**

Nominal size 10

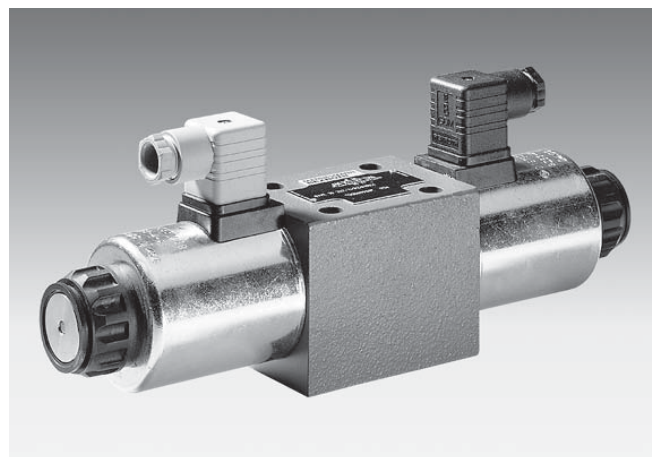
Series 3X (individual connections)

Series 4X (central connections)

Maximum operating pressure 315 bar

Maximum flow 120 L/min

HAD5958/98



Type 4WE 10 E3X/CG24N9K4 with plug-in connector

Overview of contents**Contents**

Features
Ordering details
symbols,
plug-in connectors
Function, section
Technical data
Characteristic curves
Performance limits
Unit dimensions
Preferred types

Page

1
2, 3
3
3
4
5
6
6, 7
8, 9
10

Features

- Direct solenoid operated directional spool valve, standard version
- Porting pattern to DIN 24 340 form A, ISO 4401 and CETOP–RP 121 H, subplates to catalogue sheet RE 45 054 (separate order)
- Wet pin AC or DC solenoids with removable coil
- Solenoid coil can be rotated through 90°
- Coils may be replaced without opening the pressure tight chamber
- Electrical connections available as either individual connections or as a central connection
- Hand override, optional
- For soft switching version, see RE 23 183
- For inductive limit switch (contact and proximity), see RE 24 830



© 2003
by Bosch Rexroth AG, Industrial Hydraulics, D-97813 Lohr am Main

All rights reserved. No part of this document may be reproduced or stored, processed, duplicated or circulated using electronic systems, in any form or by any means, without the prior written authorisation of Bosch Rexroth AG. In the event of contravention of the above provisions, the contravening party is obliged to pay compensation.

Ordering details

	WE	10		/	C				/		*
3 actuator ports	= 3										
4 actuator ports	= 4										
Nominal size 10		= 10									
Symbol e.g. C, E, EA, EB etc. – for possible versions see page 3											
Series 30 to 39 – individual connection (30 to 39: unchanged installation and connection dimensions)			= 3X								
Series 40 to 49 – central connection (40 to 49: unchanged installation and connection dimensions)			= 4X								
With spring return			= No code								
Without spring return, with detent			= OF								
Without spring return			= 0								
Wet pin solenoid (oil immersed) with removable coil			= C								
24 V DC			= G24								
230 V AC 50/60 Hz			= W230								
205 V DC			= G205 ¹⁾								
Ordering details for other voltages and frequencies see page 5.											
With protected hand override (standard)			= N9								
Without hand override			= No code								
Hand override with protective cap			= N								
Types of electrical connections											
Individual connection; with component plug			= K4 ²⁾								
DIN EN 175 301-803, without plug-in connector											
Central connection; cable entry in cover with indicator lamp			= DL								
Central connection; central connection in cover with indicator light (without angled plug-in connector)			= DKL ³⁾								
Accessories											
With inductive limit switch (for ordering details see catalogue sheet RE 24 830)											
Without limit switch			= No code								
Without cartridge throttle			= No code								
Throttle Ø 0.8 mm			= B08								
Throttle Ø 1.0 mm			= B10								
Throttle Ø 1.2 mm			= B12								
NBR seals			= No code								
FKM seals			= V								
(other seals on request) ⚠ Attention! The compatibility of the seals and pressure fluid has to be taken into account!											
Further details in clear text											

¹⁾ When connecting to an AC supply a DC solenoid **must** be used which is controlled via a rectifier (see table below).
With an individual connection a large plug-in connector with built-in rectifier can be used
(separate order, see page 3).

²⁾ Plug-in connectors must be ordered separately (see page 3).

³⁾ Plug-in connector (Material No. **R900005538**) must be ordered separately.

**Preferred types, see page 10,
are readily available**

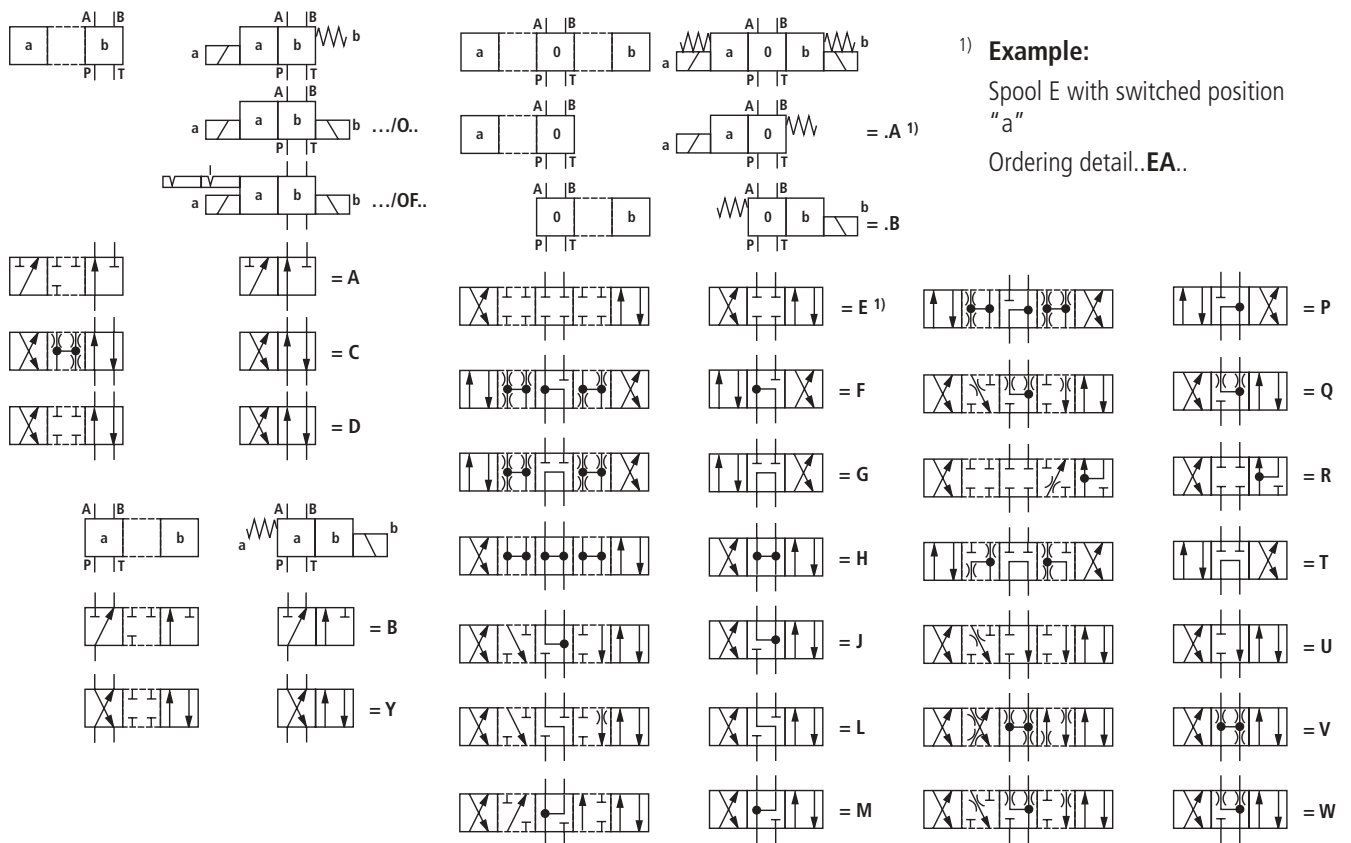
DC solenoids used with an AC supply

AC supply (permissible voltage tolerance ± 10%)	Nominal voltage of the DC solenoid when used with an AC supply via rectifier	Order detail
110 V - 50/60 Hz	96 V	G96
120 V - 60 Hz	110 V	G110
230 V - 50/60 Hz	205 V	G205

AC solenoids may be used for
several types of supplies:

Supply	Ordering details
42 V, 50 Hz 42 V, 60 Hz	W42
110 V, 50 Hz 110 V, 60 Hz 120 V, 60 Hz	W110
230 V, 50 Hz 230 V, 60 Hz	W230

Symbols



Ordering details: plug-in connectors to DIN EN 175 301-803 and ISO 4400 for component plug "K4"

Further plug-in connectors see RE 08 006		Material No.			
Valve side	Colour	Without circuitry	With indicator lamp 12 ... 240 V	With rectifier 12 ... 240 V	With indicator lamp and Z-diode protective circuit 24 V
a	grey	R900074683	—	—	—
b	black	R900074684	—	—	—
a/b	black	—	R900057292	R900313933	R900310995

Function, section

Directional valves type WE are solenoid operated directional spool valves. They are used to control the start, stop and direction of a flow.

The directional valves basically comprise of the housing (1), one or two solenoids (2), a control spool (3), and one or two return springs (4).

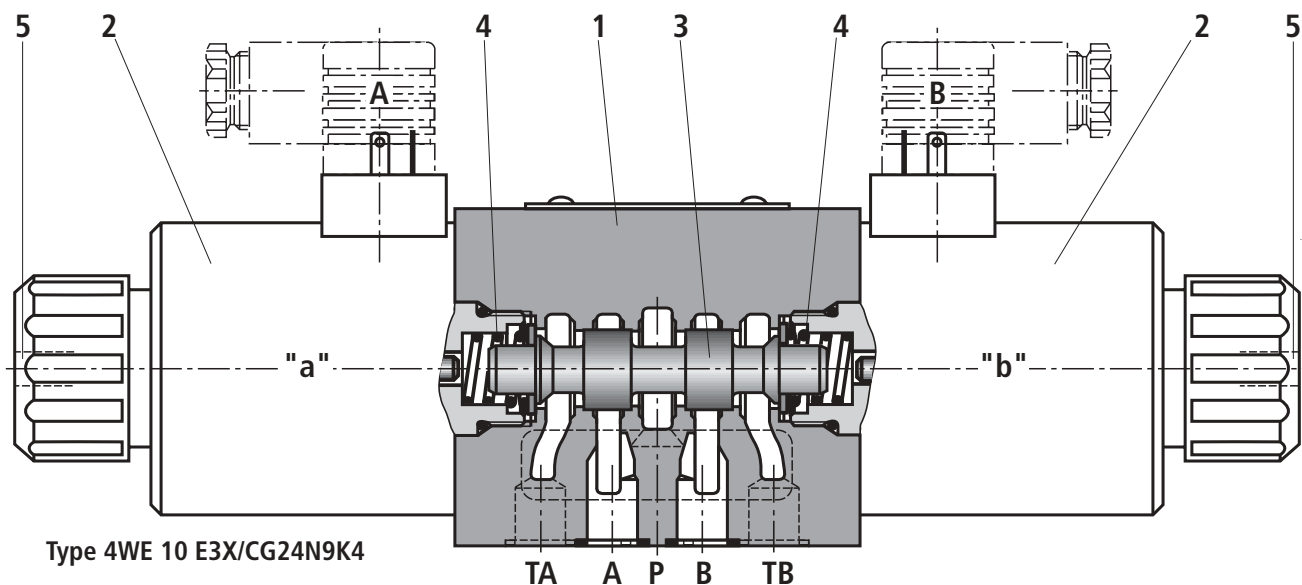
In the de-energised condition the control spool (3) is held in its central or initial position by means of the return springs (4) (with the exception of impulse spools). The control spool (3) is operated by the wet pin solenoids (2).

In order to ensure correct function care must be taken that the solenoid pressure chamber is filled with oil.

The force of solenoid (2) acts on the control spool (3) and moves it from its initial position to the desired end position. This permits free flow from P to A and B to T or P to B and A to T.

On de-energising the solenoid (2) the control spool (3) is returned to its initial position by the return spring (4).

The optional hand override (5) permits the control spool (3) to be moved without the solenoids being energised.



Type .WE 10.3X/OC....

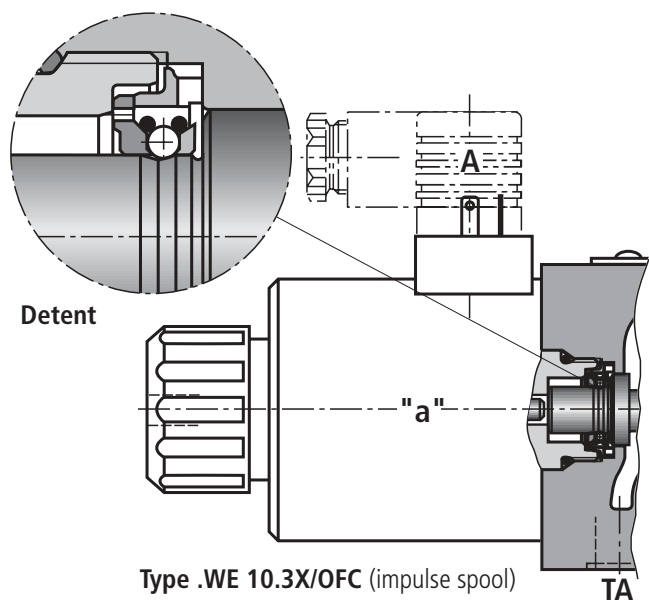
(only possible with symbols A, C and D)

This model is a 2-position directional valve with 2 solenoids without detents. The spool position, when the solenoids are de-energised, is **not** defined.

Type .WE 10.3X/OFC... (impulse spool), with detent

(only possible with symbols A, C and D)

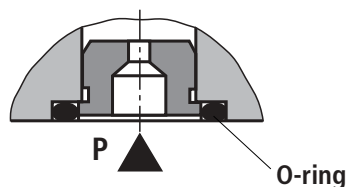
This model is a 2-position directional valve with 2 solenoids and detents. Hence, when the solenoids are de-energised, the spool is held in the detented position and thus the solenoids do not need to be continuously energised.



Cartridge throttle (type 4WE 10.../.../B..)

A cartridge throttle is required when, if due to the operating conditions, flows can occur during the switching procedure which are higher than the permitted performance limits of the valve.

The throttle is inserted into the P port of the directional valve.



Technical data (for applications outside these parameters, please consult us!)**General**

Installation			Optional	
ambient temperature range		°C	–30 to +50 (NBR seals)	
			–20 to +50 (FKM seals)	
Weight			Central connection	Individual connection
			Valve with 1 solenoid	kg
Valve with 2 solenoids		kg	6.0 (=); 4.4 (~)	5.9 (=); 4.3 (~)

Hydraulic

Max. operating pressure	Ports A, B, P	bar	315	For symbols A and B port T must be used as a drain line, if the operating pressure is higher than the permissible tank pressure.
	Port T	bar	210 (=) ; 160 (~)	
Max. flow		L/min	120	
Flow cross-section (switched position 0)	For symbol V	mm ²	11 (A/B → T); 10.3 (P → A/B)	
	For symbol W	mm ²	2.5 (A/B → T)	
	For symbol Q	mm ²	5.5 (A/B → T)	
Pressure fluid			Mineral oil (HL, HLP) to DIN 51 524 ¹⁾ ; Fast bio-degradable pressure fluids to VDMA 24 568 (also see RE 90 221); HETG (rape seed oil) ¹⁾ ; HEPG (polyglycols) ²⁾ ; HEES (synthetic ester) ²⁾ ; other pressure fluids on request	
Pressure fluid temperature range		°C	– 30 to + 80 (with NBR seals)	
			– 20 to + 80 (with FKM seals)	
Viscosity range		mm ² /s	2.8 to 500	
Cleanliness class to ISO code			Maximum permissible degree of contamination of the pressure fluid is to ISO 4406 (C) class 20/18/15 ³⁾	

Electrical

Voltage type		DC	AC	
Available voltages ⁴⁾ (ordering details for AC solenoids see below)	V	12, 24, 42, 60, 96, 110, 180, 205, 220	42, 110, 230 50/60 Hz	
Voltage tolerance (nominal voltage)		%	± 10	
Power consumption	W	35	–	
Holding power	VA	–	90	
Switching power	VA	–	550	
Duty		Continuous		
Switching time to ISO 6403	ON	ms	45 to 60	15 to 25
	OFF	ms	20 to 30	20 to 30
Switching frequency	cycles/h	Up to 15000	Up to 7200	
Protection to DIN 40 050 ⁵⁾		IP 65		
Insulation class VDE 0580		F	H	
Max. coil temperature ⁶⁾	°C	150	180	

With electrical connections the protective conductor (PE ≡) must be connected according to the relevant regulations.

¹⁾ Suitable for NBR **and** FKM seals

²⁾ **Only** suitable for FKM seals

³⁾ The cleanliness class stated for the components must be adhered too in hydraulic systems. Effective filtration prevents faults from occurring and at the same time increases the component service life.

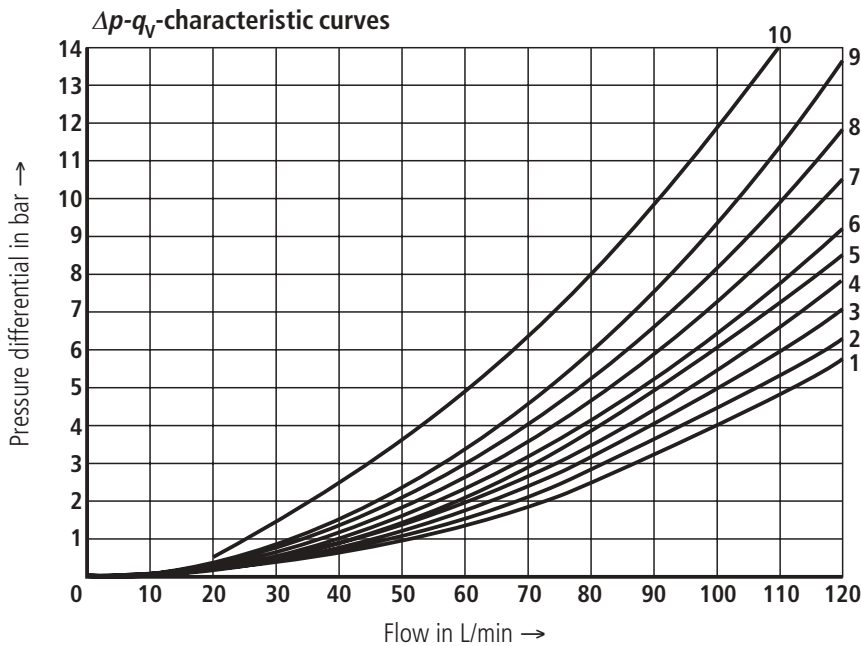
For the selection of filters see catalogue sheets RE 50 070, RE 50 076 and RE 50 081.

⁴⁾ Special voltages on request

⁵⁾ With assembled and locked plug-in connector

⁶⁾ Due to the surface temperatures which occur on the solenoid coil, the European standards EN563 and EN982 have to be taken into account!

Characteristic curves (measured with HLP46, $\vartheta_{oil} = 40\text{ °C} \pm 5\text{ °C}$)



Symbols	Direction of flow			
	P – A	P – B	A – T	B – T
A, B	3	3	–	–
C	3	3	4	5
D, Y	5	5	6	6
E	1	1	4	4
F	2	3	7	4
G	3	3	6	7
H	1	1	6	7
J	1	1	3	3
L	2	2	3	5
M	1	1	4	5
P	4	2	5	7
Q	1	2	1	3
R	3	6	4	–
T	3	3	6	7
U, V	2	2	3	3
W	2	2	4	5
Op. pos.	P – A	B – A	A – T	P – T
R	–	9	–	–

Centre pos.	P – A	P – B	B – T	A – T	P – T
F	4	–	–	9	9
P	–	5	8	–	10
G, T			–	–	9
H			–	–	3

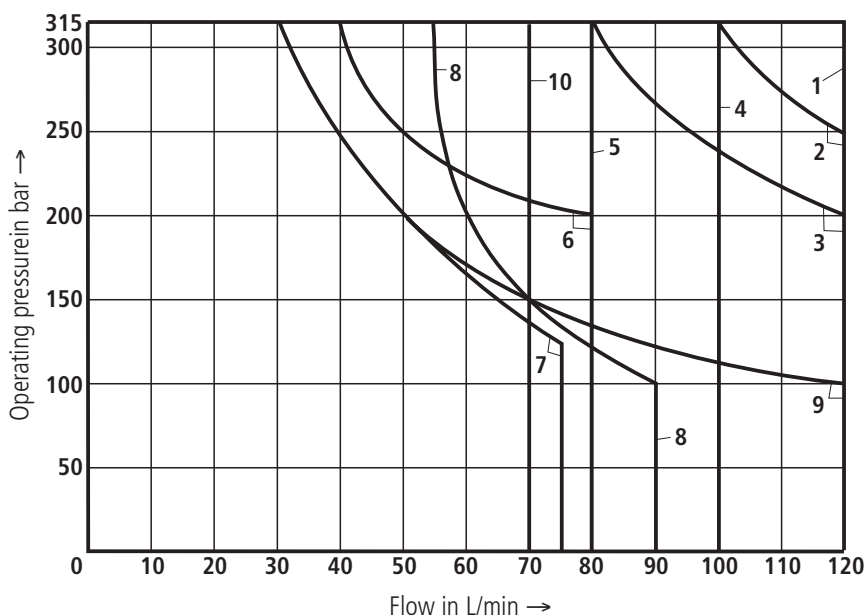
Performance limits: DC (measured with HLP46, $\vartheta_{oil} = 40\text{ °C} \pm 5\text{ °C}$)

The performance limits shown are valid when the valve is used with two directions of flow (e.g. from P to A with simultaneous return flow from B to T).

Due to the flow forces occurring within the valves, the permissible switching performance limits can be significantly lower with only one

direction of flow (e.g. from P to A and port B blocked)! (For these applications, please consult us.)

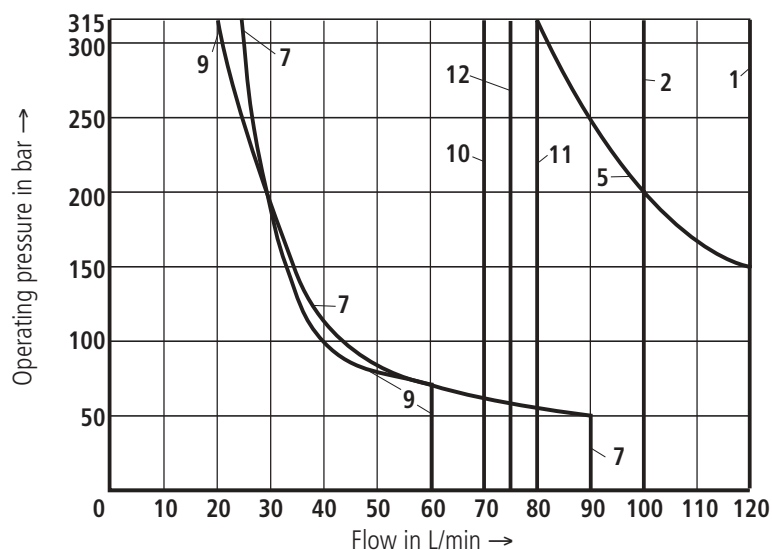
The performance limit was determined with the solenoids at their operating temperature, 10 % under voltage and with no pre-loading of the tank.



Char. curve	Symbols
1	C, C/O, C/OF D, D/O, D/OF Y, M
2	E
3	A/O, A/OF L, U, J, Q, W
4	H
5 ¹⁾	R, L ²⁾ , U ²⁾
6	G
7	T
8	F, P
9	A, B
10	V

¹⁾ Return flow
(independent of the area ratio)

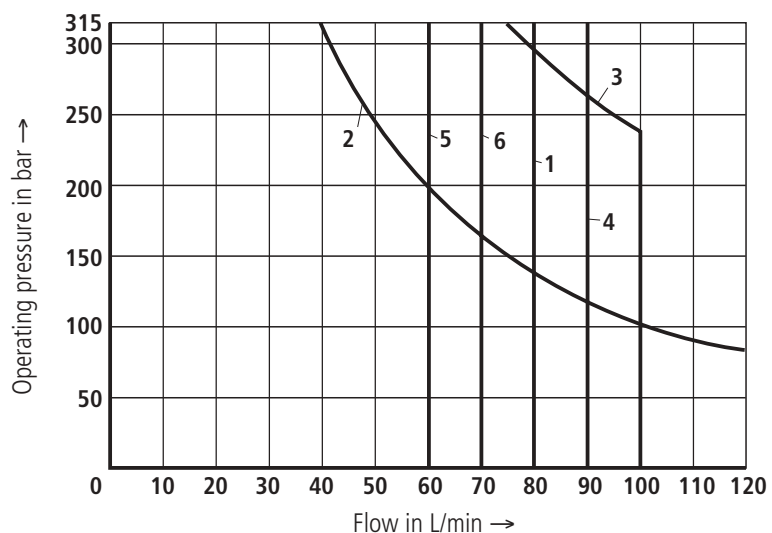
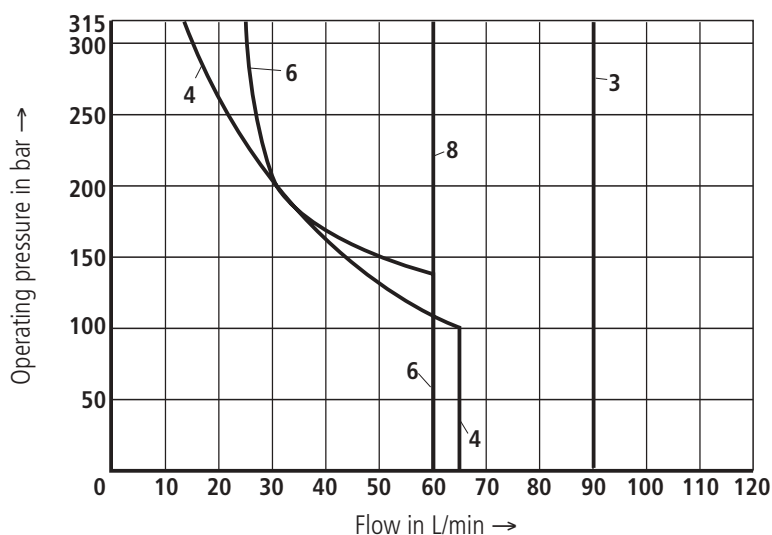
²⁾ Only the centre position



Char. curve	Symbols
1	C, C/O, C/OF D, D/O, D/OF Y
2	E, L, U, Q, W
3	M
4	A, B
5	A/O, A/OF, J
6	G
7	F, P
8	V
9	T
10	H
11	R
12 ¹⁾	L, U

¹⁾ Only the centre position

42 V, 50 Hz; 110 V, 50 Hz; 120 V, 60 Hz;
127 V, 50 Hz; 220 V, 50 Hz; 240 V, 60 Hz

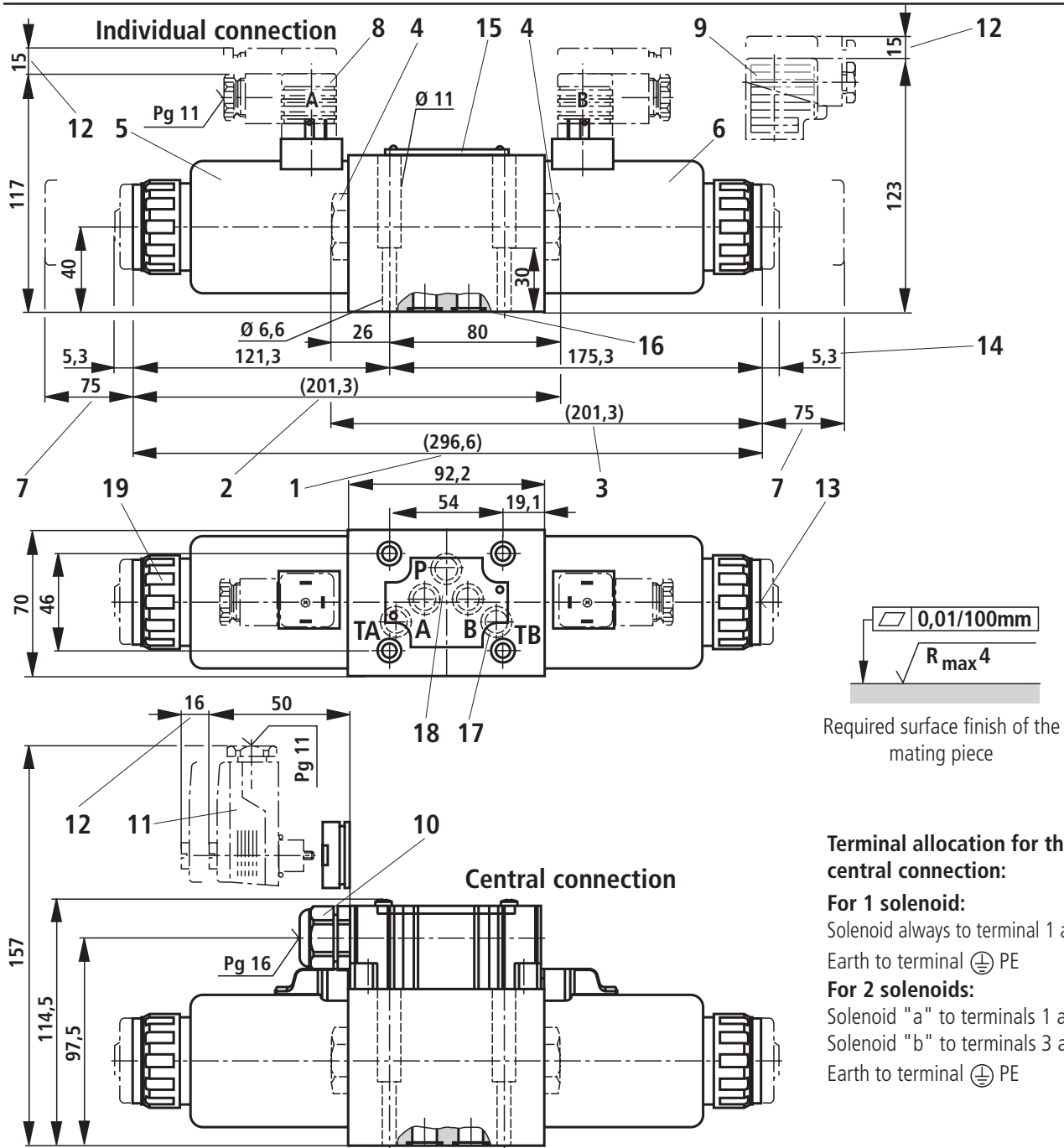


Char. curve	Symbols
1	C, C/O, C/OF D, D/O, D/OF Y
2	A/O, A/OF
3	E
4	M
5	V
6	H

42 V, 60 Hz; 110 V, 60 Hz;
127 V, 60 Hz; 220 V, 60 Hz

Performance limits for other spools on request!

Unit dimensions: DC (dimensions in mm)



Required surface finish of the mating piece

Terminal allocation for the central connection:

For 1 solenoid:

Solenoid always to terminal 1 and 2
Earth to terminal $\oplus$ PE

For 2 solenoids:

Solenoid "a" to terminals 1 and 2
Solenoid "b" to terminals 3 and 4
Earth to terminal $\oplus$ PE

- 1 3-position valve ¹⁾
- 2 2-position valve with 1 solenoid (A, C, D, EA...) ¹⁾
- 3 2-position valve with 1 solenoid (B, Y, EB...) ¹⁾
- 4 Cover for valve with 1 solenoid
- 5 Solenoid "a" (plug-in connector colour grey)
- 6 Solenoid "b" (plug-in connector colour black)
- 7 Space required to remove the coil
- 8 Plug-in connector **without** circuitry to DIN EN 175 301-803 ²⁾
- 9 Plug-in connector **with** circuitry to DIN EN 175 301-803 ²⁾

- 10 Cable gland Pg 16 "DL"
- 11 Plug-in connector (plug-in connector colour red, must be ordered separately, Material No. **R900005538**)
- 12 Space required to remove the plug-in connector
- 13 Hand override "N9" (standard) – the hand override can only be operated up to a max. tank pressure of 50 bar – avoid damage to the hand override pin bore!
- 14 Dimension for hand override "N"
- 15 Name plate
- 16 Identical seal rings for ports A, B, P, TA, TB (for valves with cartridge throttle: O-ring in the P port)

- 17 Additional T connection (TB) can be used with manifolds where this connection is required.
- 18 Porting pattern to DIN 24 340 form A, ISO 4401 and CETOP-RP 121 H.

Subplates G 66/01 (G 3/8),
G 67/01 (G 1/2),
G 534/01 (G 3/4)

to catalogue sheet RE 45 054 and

Valve fixing screws

M6 x 40 DIN 912-10.9, $M_A = 15.5$ Nm, must be ordered separately.

19 Tightening torque $M_A = 6 + 2$ Nm

¹⁾ Dim. without hand override and with protected hand override "N9"

²⁾ Must be ordered separately, see page 3.

Individual connection

Dimensions (mm): 15, 117, 40, 12, 5, 8, 4, 15, 4, 12, 123, 15, 16, 15, 46, 7, 19, 2, 1, 92,2, 54, 19,1, 3, 7, 13, 70, 46, 16, 50, 12, 11, 10, 157, 114,5, 97,5.

Labels: Pg 11, A, Ø 11, B, 9, 6, 14, 18, 17, Pg 16.

Central connection

Dimensions (mm): 15, 46, 95,8, 26, 80, 149,8, 15, 46, (175,8), (175,8), (245,6), 92,2, 54, 19,1.

Labels: P, TA, A, B, TB.

Surface finish: 0,01/100mm, $R_{max} 4$

Terminal allocation for the central connection:

For 1 solenoid:
Solenoid always to terminals 1 and 2
Earth to terminal $\ominus$ PE

For 2 solenoids:
Solenoid "a" to terminals 1 and 2
Solenoid "b" to terminals 3 and 4
Earth to terminal $\ominus$ PE

Terminal allocation for the central connection:

Earth to terminal $\oplus$ PE

2) Must be ordered separately, see page 3.

- | | |
|---|--|
| <p>1 3-position valve ¹⁾</p> <p>2 2-position valve
with 1 solenoid (A, C, D, EA...) ¹⁾</p> <p>3 2-position valve
with 1 solenoid (B, Y, EB...) ¹⁾</p> <p>4 Cover for valve with 1 solenoid</p> <p>5 Solenoid "a" (plug-in connector
colour grey)</p> <p>6 Solenoid "b" (plug-in connector
colour black)</p> <p>7 Space required to remove the coil</p> <p>8 Plug-in connector without circuitry to
DIN EN 175 301-803 ²⁾</p> <p>9 Plug-in connector with circuitry to
DIN EN 175 301-803 ²⁾</p> | <p>10 Cable gland Pg 16 "DL"</p> <p>11 Plug-in connector (plug-in connector
colour red, must be ordered separately
Material No. R900005538)</p> <p>12 Space required to remove the plug-in
connector</p> <p>13 Hand override "N9" (standard)
– the hand override can only be
operated up to a max. tank pressure of
50 bar – avoid damage to the hand
override pin bore!</p> <p>14 Dimension for hand override "N"</p> <p>15 Name plate</p> <p>16 Identical seal rings for ports A, B, P, TA,
TB (for valves with cartridge throttle: O-
ring in P port)</p> |
|---|--|

Preferred types (readily available)

Type	Material number	Type	Material number
3WE 10 A3X/CG24N9K4	R900592014	4WE 10 M3X/CG24N9K4	R900500932
3WE 10 A3X/CW230N9K4	R900915675	4WE 10 M3X/CW230N9K4	R900916118
3WE 10 B3X/CG24N9K4	R900594429	4WE 10 P3X/CG24N9K4	R900500716
3WE 10 B3X/CW230N9K4	R900517341	4WE 10 Q3X/CG24N9K4	R900591325
4WE 10 C3X/CG24N9K4	R900593277	4WE 10 Q3X/CW230N9K4	R900921465
4WE 10 C3X/CW230N9K4	R900915651	4WE 10 R3X/CG24N9K4	R900598583
4WE 10 D3X/CG24N9K4	R900589933	4WE 10 R3X/CW230N9K4	R900593804
4WE 10 D3X/CW230N9K4	R900912496	4WE 10 T3X/CG24N9K4	R900503424
4WE 10 E3X/CG24N9K4	R900588201	4WE 10 T3X/CW230N9K4	R900931784
4WE 10 E3X/CW230N9K4	R900911869	4WE 10 U3X/CG24N9K4	R900592655
4WE 10 F3X/CG24N9K4	R900529749	4WE 10 U3X/CW230N9K4	R900909906
4WE 10 F3X/CW230N9K4	R900918361	4WE 10 V3X/CG24N9K4	R900921780
4WE 10 G3X/CG24N9K4	R900594277	4WE 10 V3X/CW230N9K4	R900919553
4WE 10 G3X/CW230N9K4	R900912497	4WE 10 W3X/CG24N9K4	R900588200
4WE 10 H3X/CG24N9K4	R900597986	4WE 10 W3X/CW230N9K4	R900521281
4WE 10 H3X/CW230N9K4	R900503425	4WE 10 Y3X/CG24N9K4	R900595531
4WE 10 J3X/CG24N9K4	R900589988	4WE 10 Y3X/CW230N9K4	R900915670
4WE 10 J3X/CW230N9K4	R900911868		
4WE 10 L3X/CG24N9K4	R900599646		
4WE 10 L3X/CW230N9K4	R900915669		

Further preferred types and standard units can be found in the EPS (Standard Price List).

**Bosch Rexroth AG
Industrial Hydraulics**

D-97813 Lohr am Main
Zum Eisengießer 1 • D-97816 Lohr am Main
Telefon 0 93 52 / 18-0
Telefax 0 93 52 / 18-23 58 • Telex 6 89 418-0
eMail documentation@boschrexroth.de
Internet www.boschrexroth.de

Bosch Rexroth Limited

Cromwell Road, St Neots,
Cambs, PE19 2ES
Tel: 0 14 80/22 32 56
Fax: 0 14 80/21 90 52
E-mail: info@boschrexroth.co.uk

The data specified above only serves to describe the product. No statements concerning a certain condition or suitability for a certain application can be derived from our information. The details stated do not release you from the responsibility for carrying out your own assessment and verification. It must be remembered that our products are subject to a natural process of wear and ageing.