

Directional high-response cartridge valve, pilot-operated, with integrated electronics (OBE)

Type WRCE



- ▶ Size 32 ... 50
- ▶ Component series 2X
- ▶ Maximum operating pressure 420 bar
- ▶ Maximum flow 4500 l/min

Features

- ▶ 2 or 3-way directional cartridge valve
- ▶ Pilot control valve: 2-stage directional servo valve
- ▶ Main stage: position-controlled
- ▶ Normalized:
 - Installation dimensions according to ISO 7368 ("2WRCE")
- ▶ Flexible:
 - Suitable for position, pressure, force and velocity control
- ▶ Typical applications:
 - Presses
 - Die casting machines
 - Punching axes

Contents

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Ordering code: "2WRCE"

01	02	03	04	05	06	07	08	09	10	11	12	13	14
2	WRCE		S			-	2X	/	S		K31	/	*

01	2 main ports	2
02	Directional high-response cartridge valve, pilot-operated, with integrated electronics (OBE)	WRCE
03	Size 32	32
	Size 40	40
	Size 50	50
04	Control spool in seat design	S

Rated flow at 5 bar pressure differential

05	- Size 32	
	480 l/min (only version "R")	480
	650 l/min (only version "L")	650
	- Size 40	
	700 l/min (only version "R")	700
	1000 l/min (only version "L")	1000
	- Size 50	
	1100 l/min (only version "R")	1100
	1600 l/min (only version "L")	1600

Flow characteristic

06	Linear	L
	Linear with progressive fine control range	R
07	Component series 20 ... 29 (20 ... 29: Unchanged installation and connection dimensions)	2X

Pilot control valve

08	Directional servo valve	S
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Supply voltage

09	Direct voltage 24 V	G24
	DC voltage ± 15 V	G15

Electrical connection

10	Without mating connector; connector according to DIN EN 175201-804	K31 ¹⁾
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Electrical interface

11	Command value 0 ... 10 V, actual value 0.5 ... 10 V	A1
	Command value 0 ... 10 mA, actual value 0.5 ... 10 mA	C1

Sandwich plate shut-off valve

12	Without shut-off valve	no code
	With shut-off valve ¹⁾	
	Shut-off valve switched to de-energized actively closes "2WRCE" with applied pilot pressure	WK15
	Shut-off valve switched to de-energized actively opens "2WRCE" with applied pilot pressure	WL15

Seal material (observe compatibility of seals with hydraulic fluid used, see page 10)

13	NBR seals	M
	FKM seals	V
14	Further details in the plain text	

¹⁾ Mating connectors, separate order, see page 28 and data sheet 08006.

Ordering code: "3WRCE"

01	02	03	04	05	06	07	08	09	10	11	12	13	14
3	WRCE					-	2X	/	S		K31	/	*

01	3 main ports	3
02	Directional high-response cartridge valve, pilot-operated, with integrated electronics (OBE)	WRCE
03	Size 32	32
	Size 40	40
	Size 50	50
04	Control spool in spool design – zero overlap (+0.5 ... +1.5 %)	V
	Control spool in spool design – positive overlap 10 ... 13 %	E

Rated flow at 5 bar pressure differential

05	– Size 32	
	250 l/min (only versions "E" and "P")	250
	290 l/min (only versions "V" and "L")	290
	– Size 40	
	410 l/min (only versions "E" and "P")	410
	460 l/min (only versions "V" and "L")	460
	– Size 50	
	620 l/min (only versions "E" and "P")	620
	720 l/min (only versions "V" and "L")	720

Flow characteristic

06	Linear	L
	Linear with progressive fine control range	P
07	Component series 20 ... 29 (20 ... 29: Unchanged installation and connection dimensions)	2X

Pilot control valve

08	Directional servo valve	S
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Supply voltage

09	Direct voltage 24 V	G24
	DC voltage ± 15 V	G15

Electrical connection

10	Without mating connector; connector according to DIN EN 175201-804	K31 ¹⁾
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Electrical interface

11	Command value ± 10 V, actual value ± 10 V	A1
	Command value ± 10 mA, actual value ± 10 mA	C1

Sandwich plate shut-off valve

12	Without shut-off valve	no code
	With shut-off valve ¹⁾	
	Shut-off valve switched to de-energized actively closes "2WRCE" with applied pilot pressure	WK15
	Shut-off valve switched to de-energized actively opens "2WRCE" with applied pilot pressure	WL15

Seal material (observe compatibility of seals with hydraulic fluid used, see page 10)

13	NBR seals	M
	FKM seals	V

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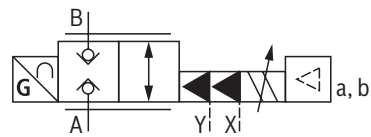
¹⁾ Mating connectors, separate order, see page 28 and data sheet 08006.

 **Notice:** Version "3WRCE" is not recommended for new applications, see page 7.

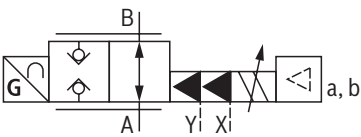
Symbols: "2WRCE"

Simplified

"No code" and "WK15" version

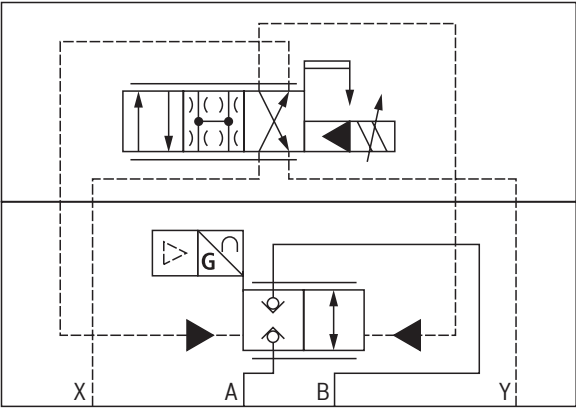


Version "WL15"

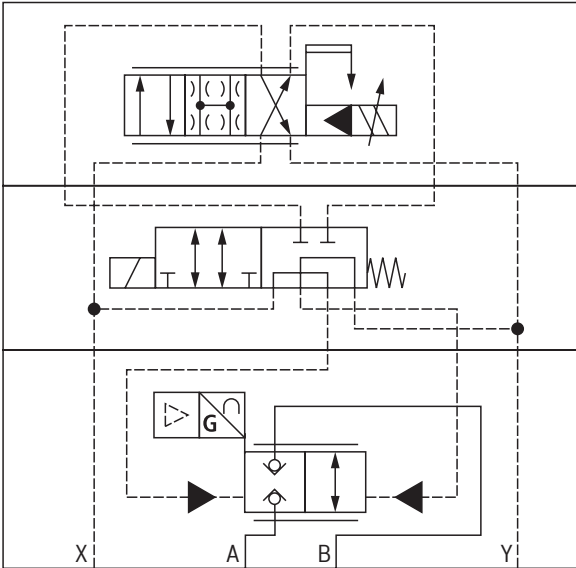


Detailed

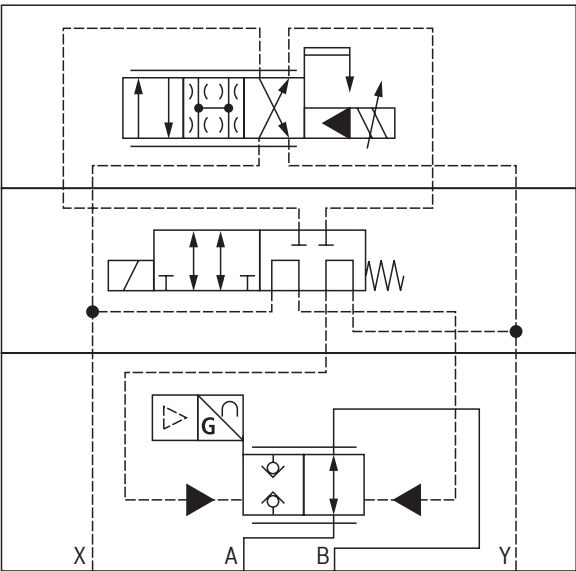
"No code" version



Version "WK15"

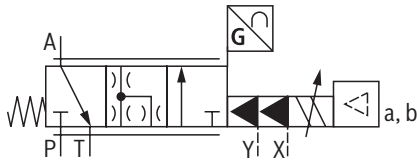
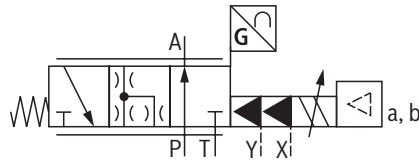
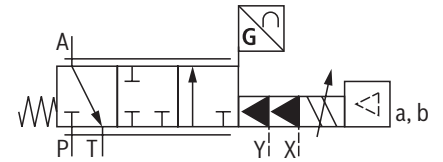


Version "WL15"

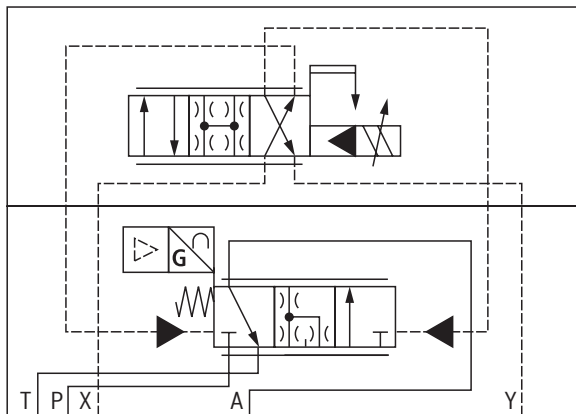
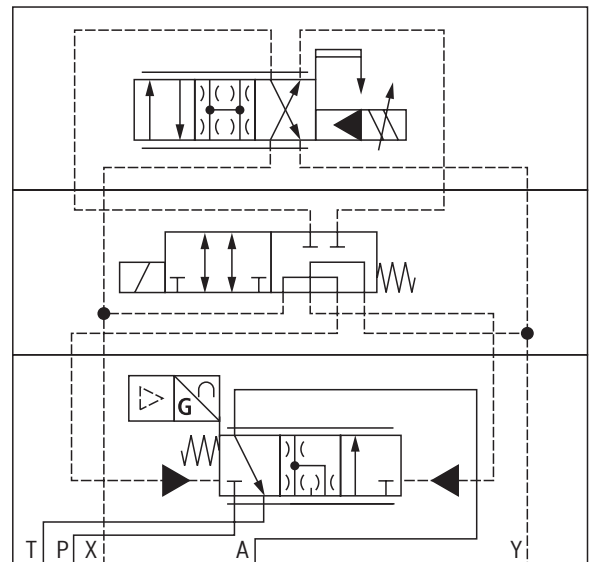
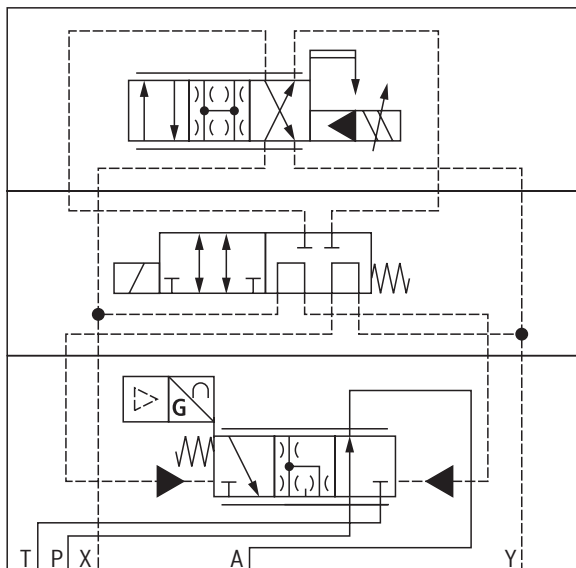
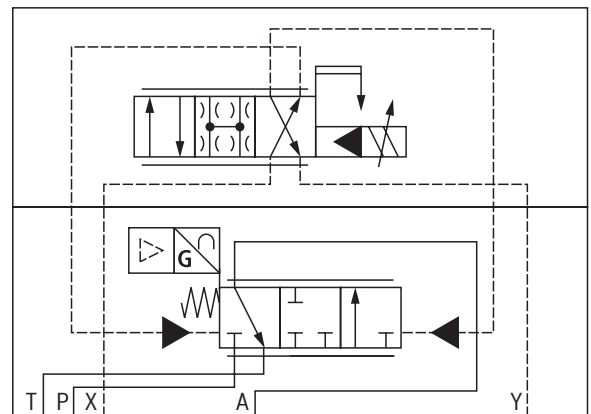


Symbols: "3WRCE"

Simplified

Version "V...no code" and "V...WK15"

Version "V...WL15"

Version "E...no code"


Detailed

Version "V...no code"

Version "V...WK15"

Version "V...WL15"

Version "E...no code"


Function, section: "2WRCE"

Valves of type 2WRCE are pilot-operated, 3-stage directional high-response cartridge valves. They control the quantity and direction of a flow and are mainly used in control loops.

Set-up

The valves consist of the following assemblies:

- ▶ 2-stage pilot control valve (1)
 - with dry torque motor
 - low-friction nozzle flapper plate amplifier
 - mechanical feedback of the control spool position
- ▶ Main stage (2) for flow control
- ▶ Inductive position transducer (3) the core (4) of which is attached to the main control spool (5) of the second stage
- ▶ Integrated electronics (6).

Function

The integrated electronics compares command and actual values, and the torque motor of the pilot control valve is actuated with a proportional current according to the control deviation.

The pilot control valve (1) takes a proportionally controlled position and controls the flow in and out of the control chambers A (7) and B (8) that actuate the main control spool (5) through the closed valve control loop up to 0 control deviation.

This means that the stroke of the main control spool (5) is regulated proportionally to the command value. It must be noted that the flow also depends on the valve pressure drop.

Valve features

The flow can pass through the valve from A to B or from B to A.

The control spool (seat design) closes or opens at 5 % of the command value. At lower command values, the valve control loop attempts to guide the control spool, thus presses it onto the seat at full pilot pressure and blocks the connection in a leakage-free way.

The specified valve dynamics only apply to the control area of the valve. At command value steps from the seat to lower opening values, additional delay times occur.

The opening point of 5 % ($= 0.5 \text{ V}$ or 0.5 mA) is set at the factory. Upon replacement of the pilot control valve (1) or the integrated electronics (6), the opening point can be readjusted using the zero adjustment potentiometer R316 (accessible via a plug screw).

During the exchange, no settings must be made at the control electronics (= controller or control electronics) and the pilot control valve (1), except for the zero adjustment at the controller.

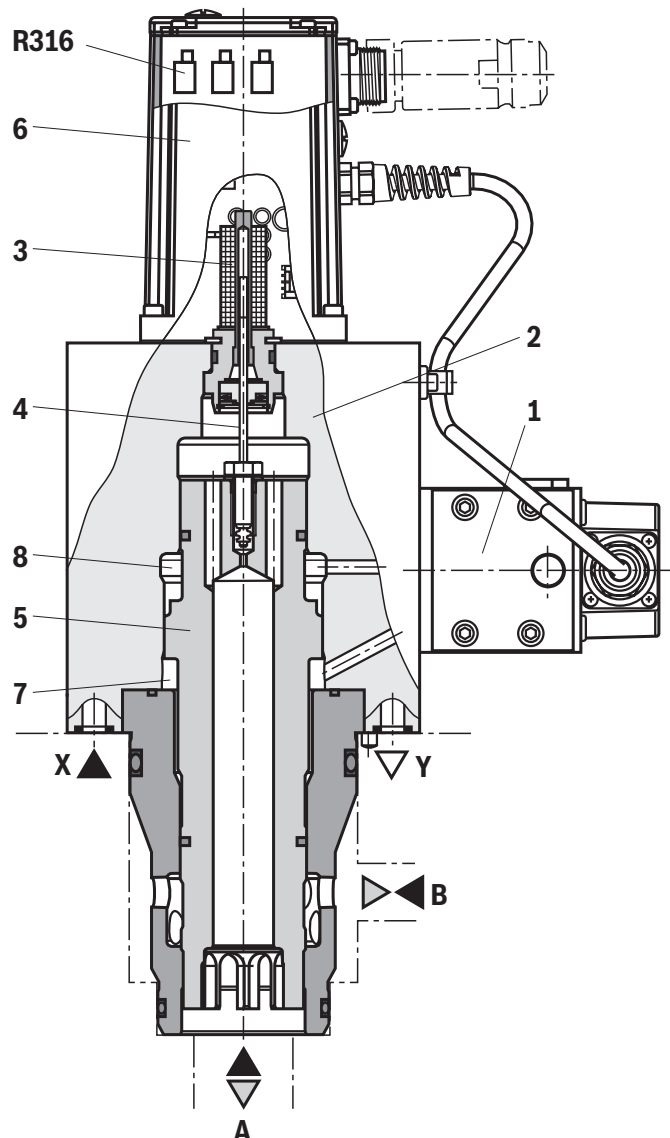
At the pilot control valve (1), only the filter element may be exchanged. The pilot control valve (1) is trimmed so that the pilot pressure is connected to control chamber B (8) in case of a power failure, i.e. the main stage is closed.

The integrated electronics (6) features an offset to compensate the trimming (pilot trimming) of the pilot control valve (1).

Due to differences in diameter in the seat range, the control spools are statically not pressure-compensated.

To compensate the force differential, 6 % of the system pressure is required for version "L" and 22 % of the system pressure is required for version "R" as pilot pressure.

With reserves for flow force and dynamics, this defines the recommended minimum pilot pressure.



Function, section: "3WRCE"

Valves of type 3WRCE are pilot-operated, 3-stage directional high-response cartridge valves. They control the quantity and direction of a flow and are mainly used in control loops.

Set-up

The valves consist of the following assemblies:

- ▶ 2-stage pilot control valve (1)
 - with dry torque motor
 - low-friction nozzle flapper plate amplifier
 - mechanical feedback of the control spool position
- ▶ Main stage (2) for flow control
- ▶ Inductive position transducer (3) the core (4) of which is attached to the main control spool (5) of the second stage
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Function

The integrated electronics compares command and actual values, and the torque motor of the pilot control valve is actuated with a proportional current according to the control deviation.

The pilot control valve (1) takes a proportionally controlled position and controls the flow in and out of the control chambers A (7) and B (8) that actuate the main control spool (5) through the closed valve control loop up to 0 control deviation.

This means that the stroke of the main control spool (5) is regulated proportionally to the command value. It must be noted that the flow also depends on the valve pressure drop.

Valve features

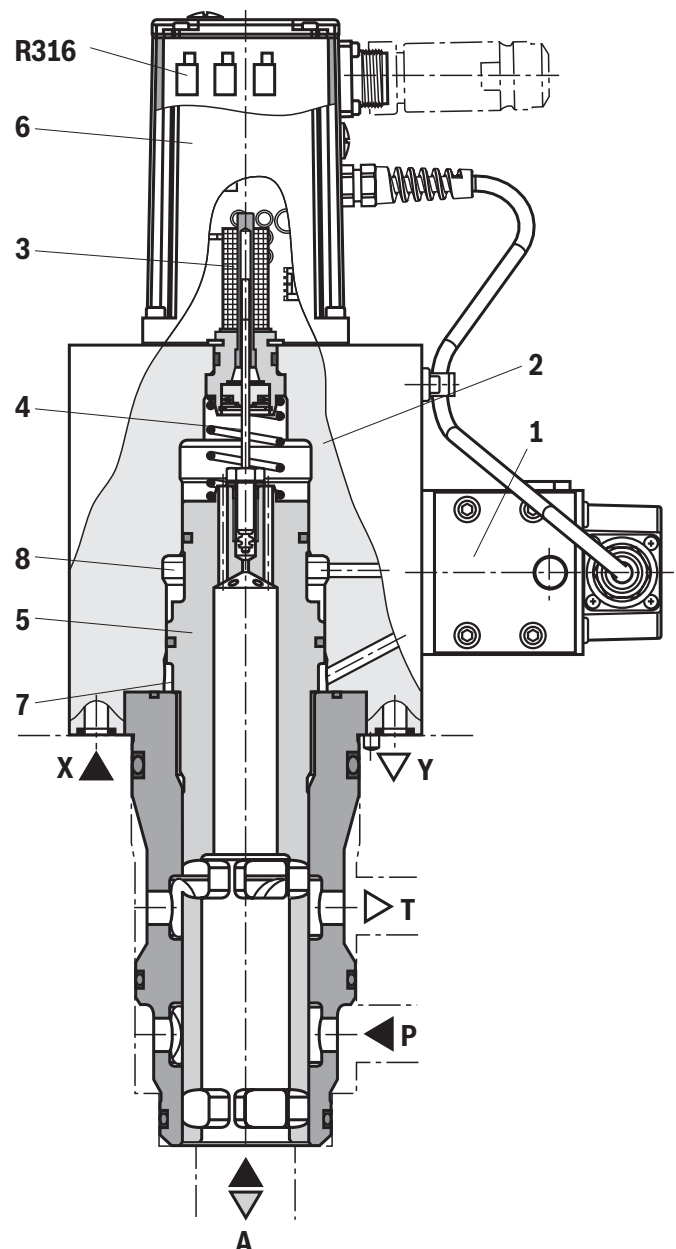
The opening point of 0 % (symbol V) is set at the factory. Upon replacement of the pilot control valve (1) or the integrated electronics (6), the opening point can be readjusted using the zero adjustment potentiometer R316 (accessible via a plug screw).

During the exchange, no settings must be made at the control electronics (= controller or control electronics) and the pilot control valve (1), except for the zero adjustment.

At the pilot control valve (1), only the filter element may be exchanged. The pilot control valve (1) is trimmed so that the pilot pressure is connected to control chamber B (8) in case of a power failure, i.e. the main stage opens from A to T and/or closes the connection from P to A.

The spring behind the main control spool (5) moves it into position so that P to A is closed if no pressure is applied (e.g. prior to installation, before the pressures are reapplied after tool change).

The integrated electronics (6) features an offset to compensate the trimming (pilot trimming) of the pilot control valve (1).



Notice:

Version "3WRCE" is not recommended for new applications.

If version "3WRCE" is used, ports A and P have to be exchanged. Upon request.

Technical data: "2WRCE"

(For applications outside these values, please consult us!)

General					
Sizes	NG	32	40	50	
Installation position; commissioning		Any, preferably horizontal			
Storage temperature range		°C	−20 ... +80		
Ambient temperature range		°C	−20 ... +60		
Weight	► Without shut-off valve ("no code")	kg	11.2	21.1	28
	► With shut-off valve ("WK15", "WL15")	kg	12.4	24.8	31.7
Size of the pilot control valve		NG	6	10	10

Hydraulic					
Maximum operating pressure	▶ Main stage				
	– Ports A, B	bar	420		
	▶ Pilot control valve				
	– Port X	bar	315		
	– Port Y	bar	Pressure peaks < 100, static < 10		
Minimum pilot pressure (in % of the system pressure)	▶ Version "L"	%	15		
	▶ Version "R"	%	45		
Rated flow ($q_{Vnom} + 10\%$; $\Delta p = 5$ bar)	▶ Version "L"	l/min	650	1000	1600
	▶ Version "R"	l/min	480	700	1100
Maximum flow	▶ Version "L"	l/min	1500	2200	3500
	▶ Version "R"	l/min	2000	3000	4500
Pilot flow ¹⁾		l/min	38	56	80
Zero flow (pre-stage)	See characteristic curves page 13				
Pilot oil volume		cm ³	4.52	8.48	17.3
Nominal stroke		mm	10	12	15
Hydraulic fluid	See table page 10				
Hydraulic fluid temperature range	▶ Recommended	°C	+40 ... +50		
	▶ Maximum admissible		–20 ... +80		
Viscosity range	▶ Recommended	mm ² /s	30 ... 45		
	▶ Maximum admissible		20 ... 380		
Maximum admissible degree of contamination of the hydraulic fluid, cleanliness class according to ISO 4406 (c)	▶ Pilot control valve		Class 18/16/13 ²⁾		
	▶ Main stage		Class 20/18/15 ²⁾		
Hysteresis		%	≤ 0.2		
Range of inversion		%	≤ 0.1		
Response sensitivity		%	≤ 0.1		
Closing time ³⁾	▶ With pilot trimming	ms	≤ 550		
	▶ With shut-off valve	ms	≤ 200		

¹⁾ Stepped input signal (from 0 to 100 %, pilot pressure 315 bar)²⁾ The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and simultaneously increases the life cycle of the components. Available filters can be found at www.boschrexroth.com/filter.³⁾ Pilot pressure 40 ... 315 bar

Technical data: "3WRCE"

(For applications outside these values, please consult us!)

General				
Sizes	NG	32	40	50
Installation position; commissioning	Any, preferably horizontal			
Storage temperature range	°C	-20 ... +80		
Ambient temperature range	°C	-20 ... +60		
Weight	► Without shut-off valve ("no code")	kg	11.5	18.9
	► With shut-off valve ("WK15", "WL15")	kg	12.7	20.1
Size of the pilot control valve	NG	6	6	10
Hydraulic				
Maximum operating pressure	► Main stage			
	– Ports A, B, T	bar	315	
	► Pilot control valve			
	– Port X	bar	315	
Rated flow ($q_{Vnom} + 10\%$; $\Delta p = 5\text{ bar}$)	► Version "L"	l/min	290	460
	► Version "P"	l/min	250	410
Maximum flow	► Version "L"	l/min	900	1400
	► Version "P"	l/min	900	1400
Pilot flow ¹⁾		l/min	27	42
Zero flow	► Pilot control valve		See characteristic curves page 13	
	► Main stage ($p_p = 300\text{ bar}$)		4	6
Pilot oil volume		cm ³	±2.26	±4.24
Nominal stroke		mm	±5	±6
Hydraulic fluid			see table 10	
Hydraulic fluid temperature range	► Recommended	°C	+40 ... +50	
	► Maximum admissible		-20 ... +80	
Viscosity range	► Recommended	mm ² /s	30 ... 45	
	► Maximum admissible		20 ... 380	
Maximum admissible degree of contamination of the hydraulic fluid, cleanliness class according to ISO 4406 (c)	► Pilot control valve		Class 18/16/13 ²⁾	
	► Main stage		Class 20/18/15 ²⁾	
Hysteresis		%	≤ 0.2	
Range of inversion		%	≤ 0.1	
Response sensitivity		%	≤ 0.1	
Closing time ³⁾	► With pilot trimming	ms	≤ 550	
	► With shut-off valve	ms	≤ 200	

¹⁾ Stepped input signal (from 0 to 100 %, pilot pressure 315 bar)²⁾ The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and simultaneously increases the life cycle of the components.
Available filters can be found at www.boschrexroth.com/filter.³⁾ Pilot pressure 40 ... 315 bar

Technical data

(For applications outside these values, please consult us!)

Hydraulic fluid		Classification	Suitable sealing materials	Standards	Data sheet
Mineral oils		HL, HLP, HLPD, HVLP, HVLPD	NBR, FKM	DIN 51524	90220
Bio-degradable	► Insoluble in water	HETG	FKM	ISO 15380	90221
		HEES	FKM		
	► Soluble in water	HEPG	FKM	ISO 15380	
Flame-resistant	► Water-free	HFDU (glycol base)	FKM	ISO 12922	90222
		HFDU (ester base)	FKM		
		HFDR	FKM		
	► Containing water	HFC (Fuchs: Hydrotherm 46M, Renosafe 500; Petrofer: Ultra Safe 620; Houghton: Safe 620; Union: Carbide HP5046)	NBR	ISO 12922	90223

**Important information on hydraulic fluids:**

- For further information and data on the use of other hydraulic fluids, please refer to the data sheets above or contact us.
- There may be limitations regarding the technical valve data (temperature, pressure range, life cycle, maintenance intervals, etc.).
- The ignition temperature of the hydraulic fluid used must be 50 K higher than the maximum surface temperature.
- **Bio-degradable and flame-resistant – containing water:**
If components with galvanic zinc coating (e.g. version "J3" or "J5") or parts containing zinc are used, small amounts of dissolved zinc may get into the hydraulic system and cause accelerated aging of the hydraulic fluid. Zinc soap may form as a chemical reaction product, which may clog filters, nozzles and solenoid valves – particularly in connection with local heat input.

► Flame-resistant – containing water:

- Due to increased cavitation tendency with HFC hydraulic fluids, the life cycle of the component may be reduced by up to 30 % as compared to the use with mineral oil HLP. In order to reduce the cavitation effect, it is recommended – if possible specific to the installation – to back up the return flow pressure in ports T to approx. 20 % of the pressure differential at the component.
- Dependent on the hydraulic fluid used, the maximum environment and hydraulic fluid temperature must not exceed 50 °C. In order to reduce the heat input into the component, the command value profile is to be adjusted for proportional and high-response valves.

Electric

Protection class of the valve according to EN 60529		IP65 with mating connector mounted and locked	
Voltage type		Direct voltage	
Type of signal		Analog	
Zero compensation		%	≤ 1
Zero shift upon change of:	► Hydraulic fluid temperature	%/10 K	≤ 0.3
	► Pilot pressure in X	%/100 bar	≤ 0.7
	► Return flow pressure in Y (0 ... 10 % of the pilot pressure)	%/bar	≤ 0.3

**Notice:**

For information on the environment simulation testing for the areas EMC (electromagnetic compatibility), climate and mechanical load, see data sheet 29136-U (declarations on environmental compatibility).

Electrical connections and assignment

Connector pin assignment

Pin	Signal	Interface assignment			
		"A1"		"C1"	
		"2WRCE"	"3WRCE"	"2WRCE"	"3WRCE"
A	Supply voltage	+24 VDC (+15 VDC)		+24 VDC (+15 VDC)	
B		0 VDC (–15 VDC)		0 VDC (–15 VDC)	
C	M0 at ±15 V "G15"	n.c. (reference to pins A, B)		n.c. (reference to pins A, B)	
D	Differential command value input	0 to +10 V	0 to ±10 V	0 to +10 mA	0 to ±10 mA
E					
F	Actual value Reference with "G24" is pin B Reference with "G15" is pin C	+0.5 to +10 V	0 to ±10 V	+0.5 to +10 mA	0 to ±10 mA
PE	Protective ground	Functional ground (directly connected to the valve housing)			

Supply voltage:	▶ +24 VDC ±6 V; full bridge rectification with smoothing capacitor 2200 µF = $I_{\max} = 230$ mA ▶ ±15 VDC ±0.45 V; stabilized and smoothened; $I_{\max} = 180$ mA
Command value:	▶ 0 ... +10 mA / ±10 mA → input resistance 100 Ω
Actual value:	▶ 0.5 mA ... +10 mA / ±10 mA → maximum load resistance 1 kΩ



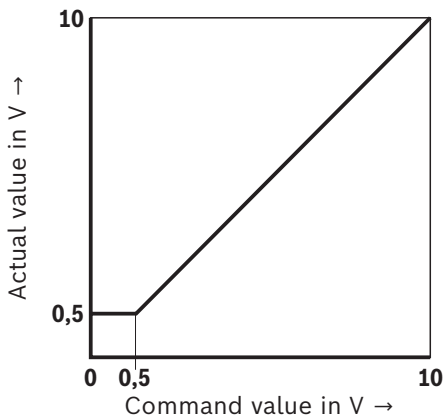
Notice:

- ▶ Do not connect PE if the valve has already been grounded via the system.
- ▶ Command value and actual value have the same polarity
- ▶ Electrical signals provided via control electronics (e.g. actual value) must not be used to switch off safety-relevant machine functions.
- ▶ Mating connectors, separate order, see page 28 and data sheet 08006.

Nominal command value range

Version "2WRCE"

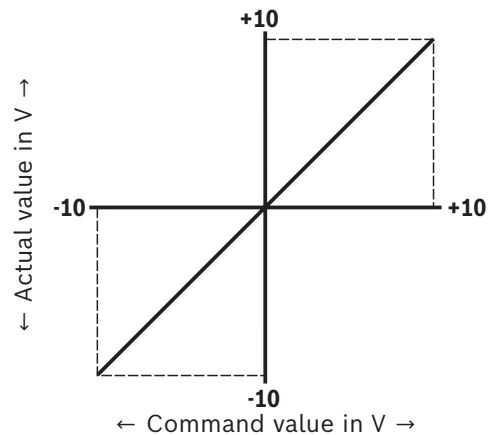
- ▶ 0 ... +10 V; 0 ... +10 mA (0 ... 100 %)



- ▶ In case of a slow command value modification from +0.5 V to +10 V, the actual value follows the command value within ±0.1 V.
- ▶ For command values over +10 V, the actual value follows up to approx. +12 V.
- ▶ In the command value range of 0 ... +0.5 V, the actual value remains constant at 0.5 V.
- ▶ At a command value step to +10 V, the actual value can temporarily reach values of up to approx. +10.5 V.

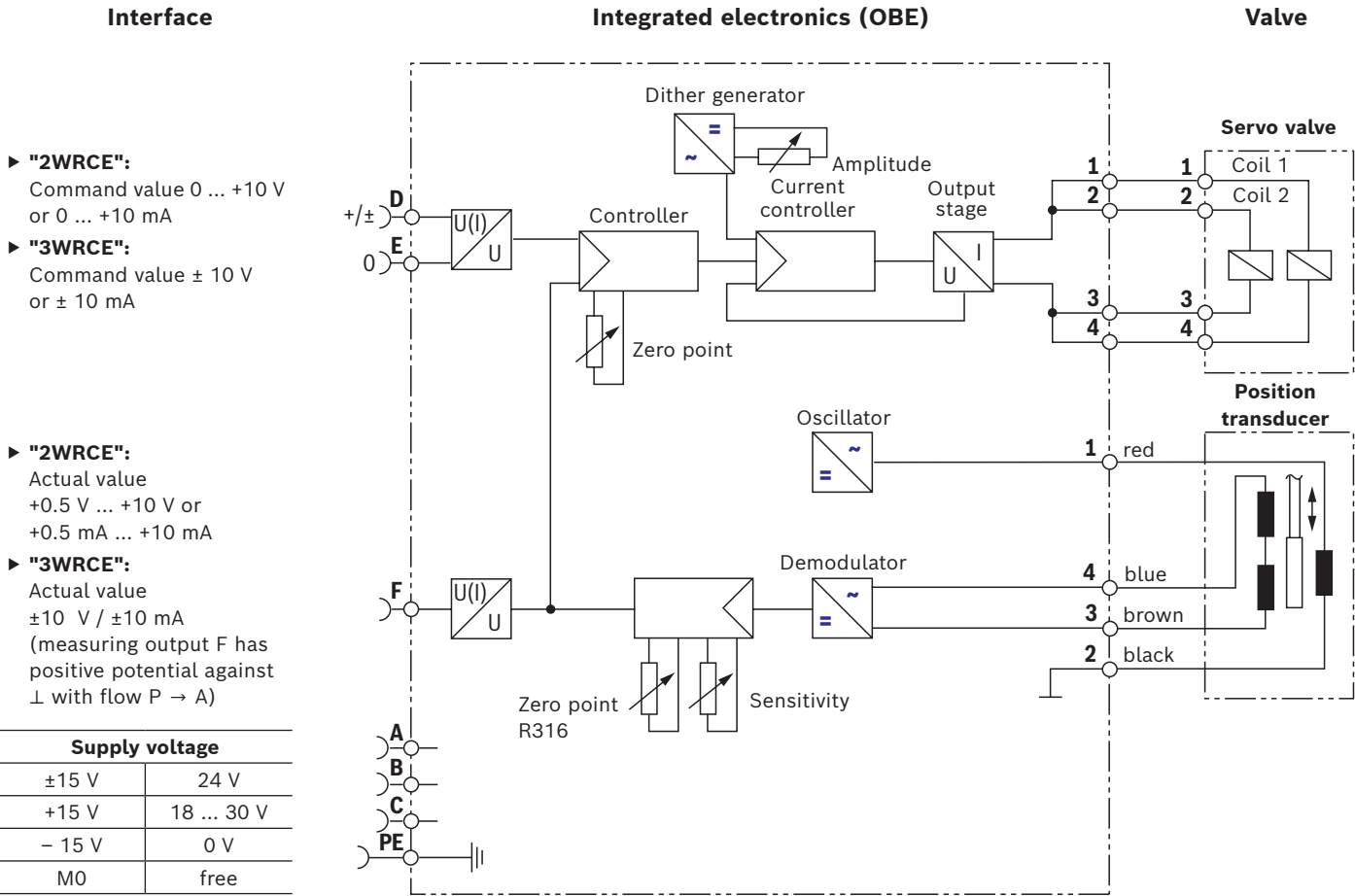
Version "3WRCE"

- ▶ 0 ... ±10 V; 0 ... ±10 mA (0 ... ±100 %)



- ▶ In case of a slow command value modification from +0 V ... ±10 V, the actual value follows the command value within ±0.1 V.
- ▶ For command values over 10 V, the actual value follows up to approx. ±13 V.
- ▶ At a command value step to +10 V, the actual value can temporarily reach values of up to approx. +10.5 V.

Block diagram/controller function block: Integrated electronics (OBE)



Effect of the control:
A positive signal at pin D and a reference potential at pin E results in

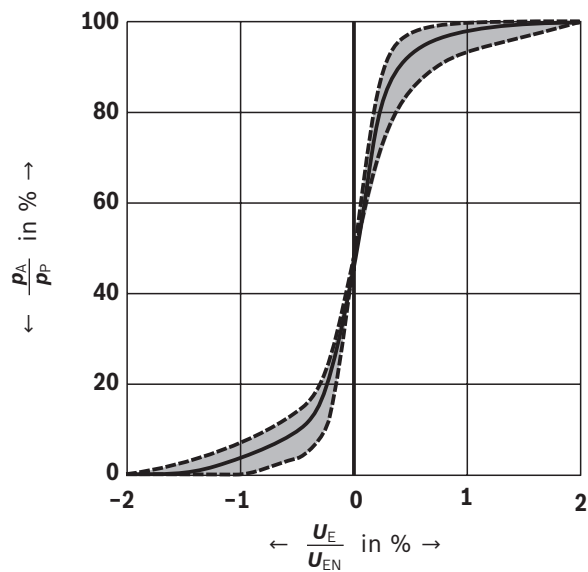
- "2WRCE": Flow A → B or B → A
- "3WRCE": Flow P → A

Characteristic curves

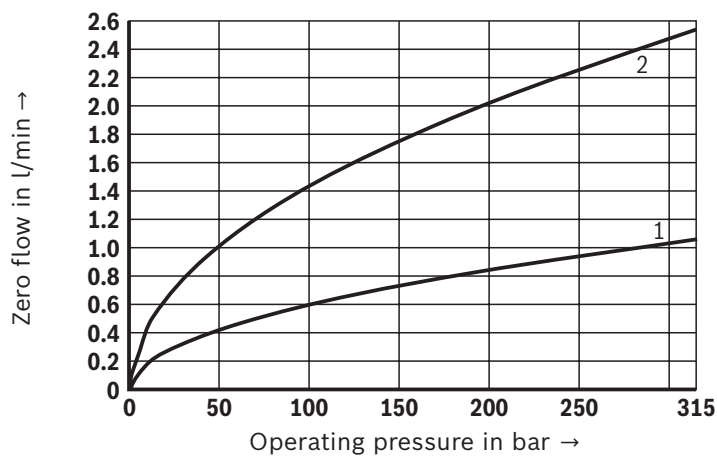
(measured with HLP32, $\vartheta_{oil} = 40 \pm 5 \text{ }^{\circ}\text{C}$)

Pressure-signal function

("3WRCE...V"; limit and average characteristic curves)



Zero flow at the pilot control valve

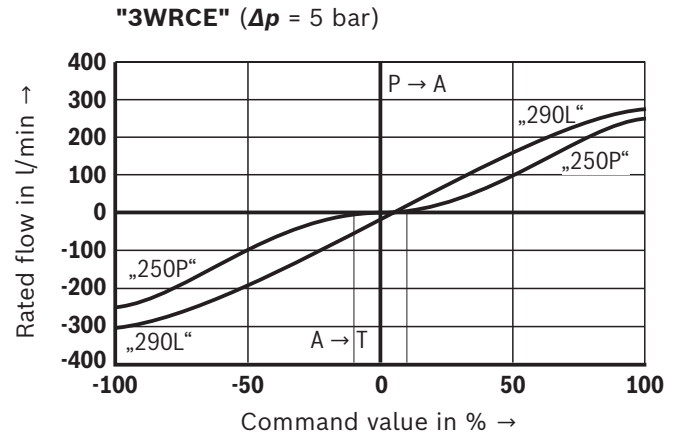
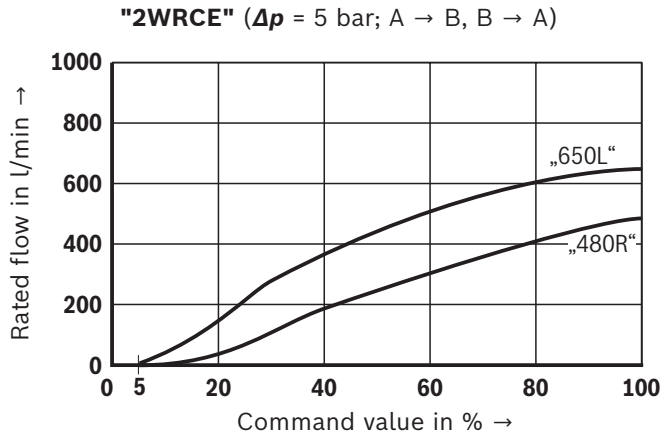


- 1 Sizes 32 and 40 ("3WRCE")
- 2 Sizes 40 ("2WRCE") and 50

Characteristic curves: Size 32

(measured with HLP32, $\vartheta_{oil} = 40 \pm 5 \text{ }^{\circ}\text{C}$)

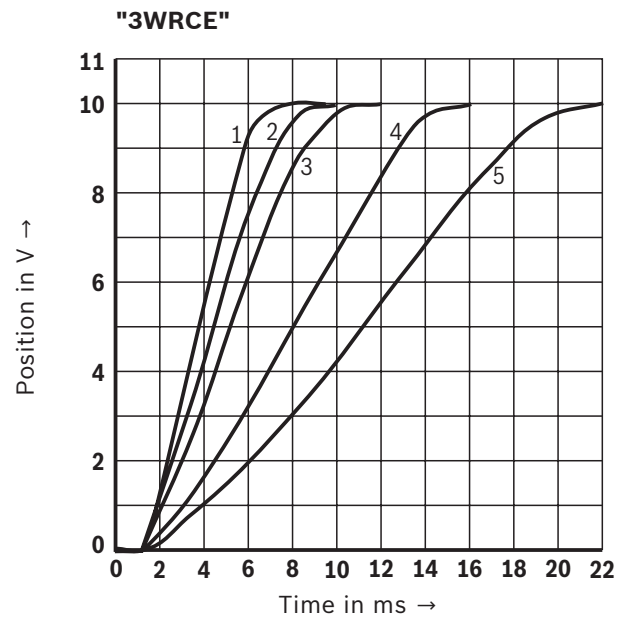
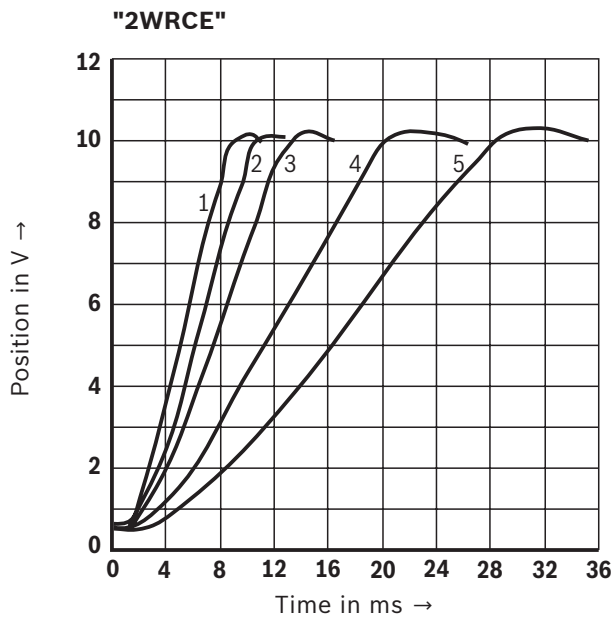
Rated flow



"E250P" 10 % overlap

"V290L" 0.5 ... 1.5 % overlap

Transition function



1 315 bar

2 210 bar

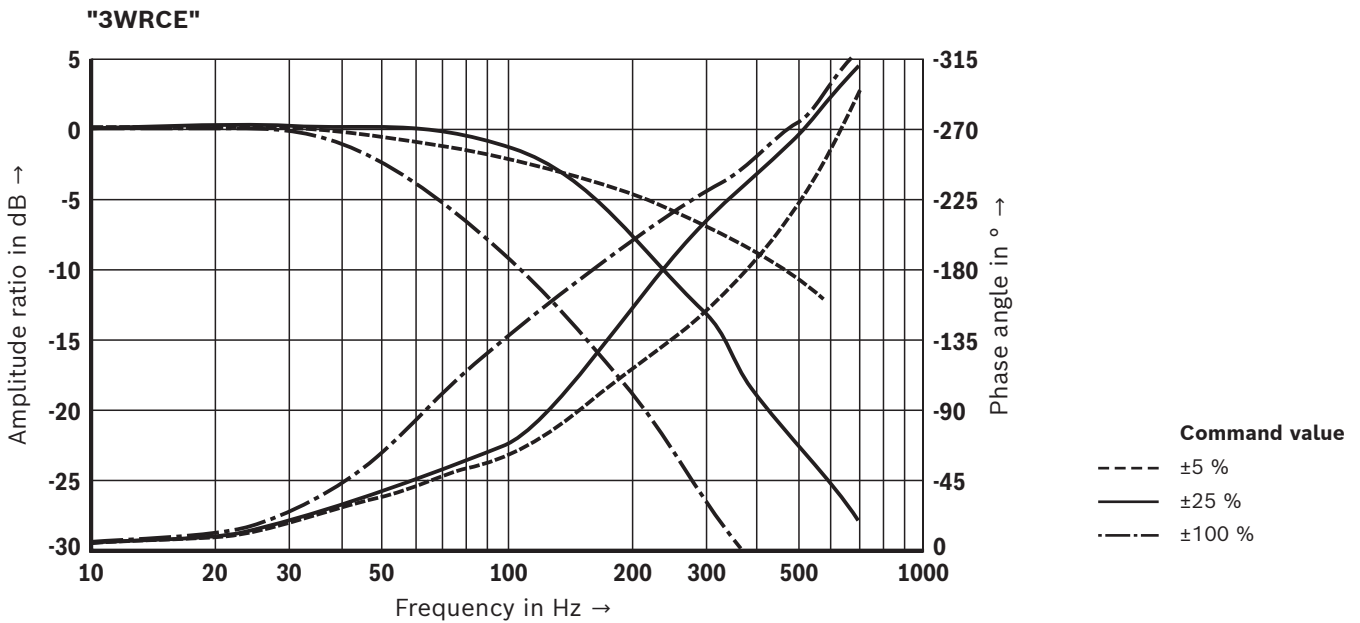
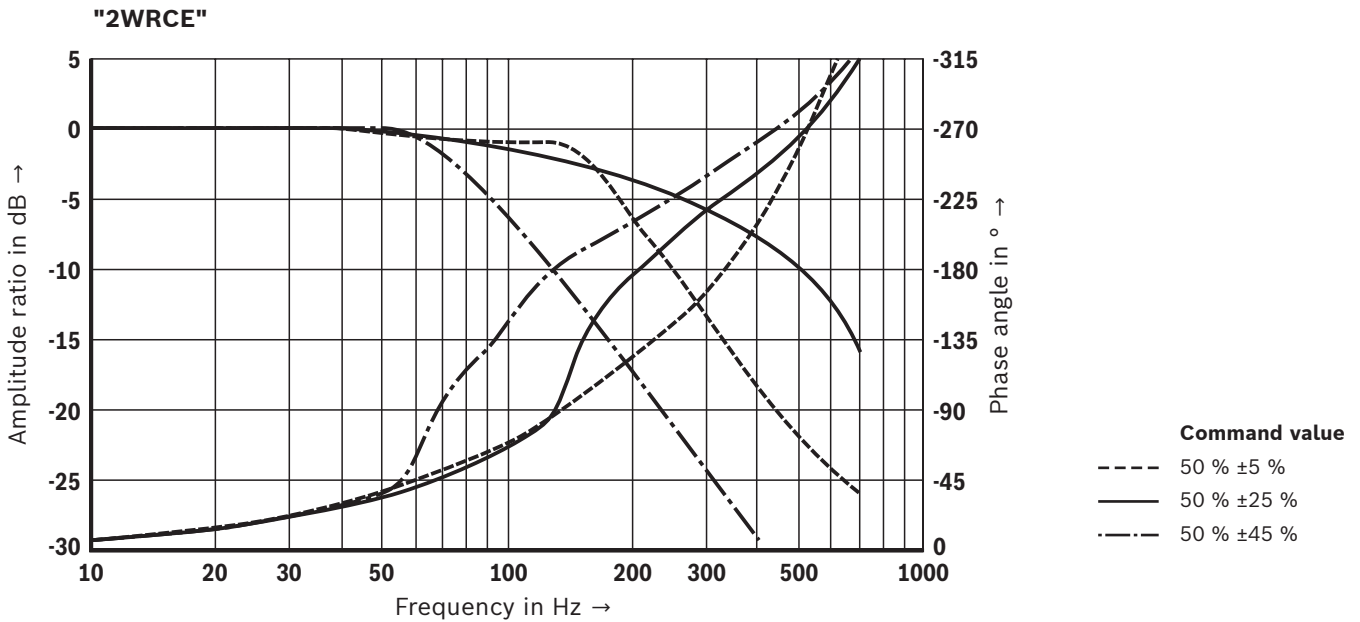
3 140 bar

4 70 bar

5 40 bar

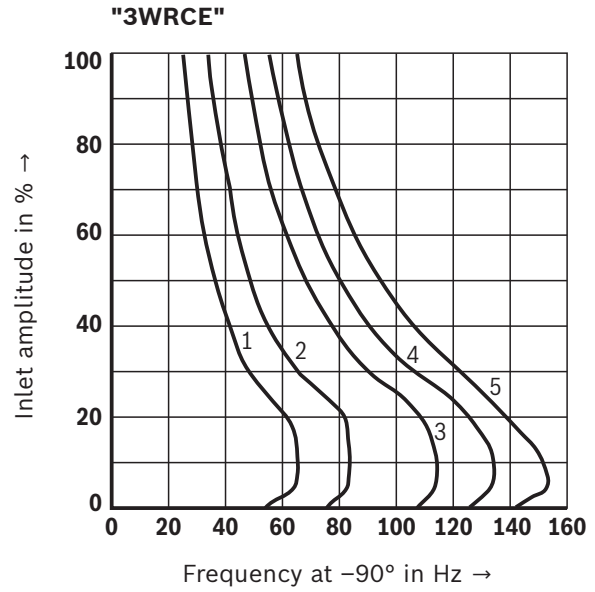
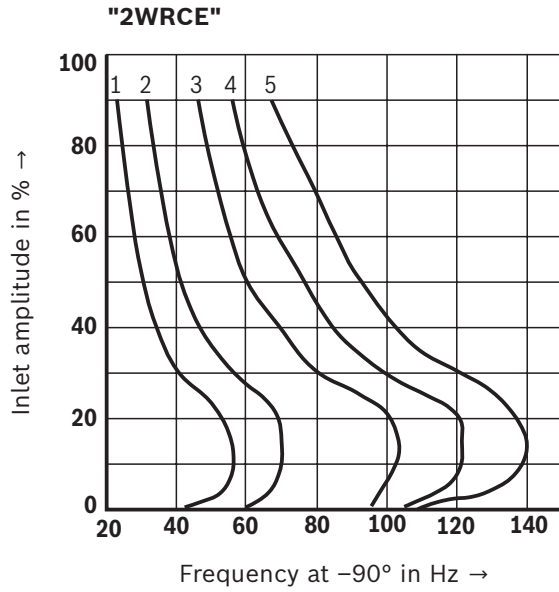
Characteristic curves: Size 32
(measured with HLP32, $\vartheta_{oil} = 40 \pm 5 \text{ }^{\circ}\text{C}$)

Frequency response ($p_p = 315 \text{ bar}$)



Characteristic curves: Size 32
(measured with HLP32, $\vartheta_{oil} = 40 \pm 5 \text{ }^{\circ}\text{C}$)

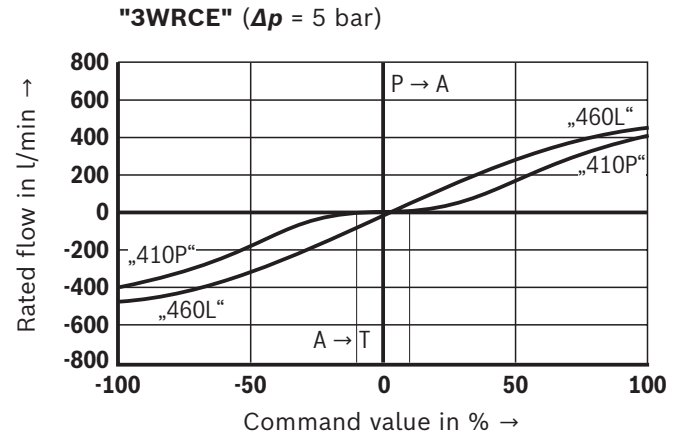
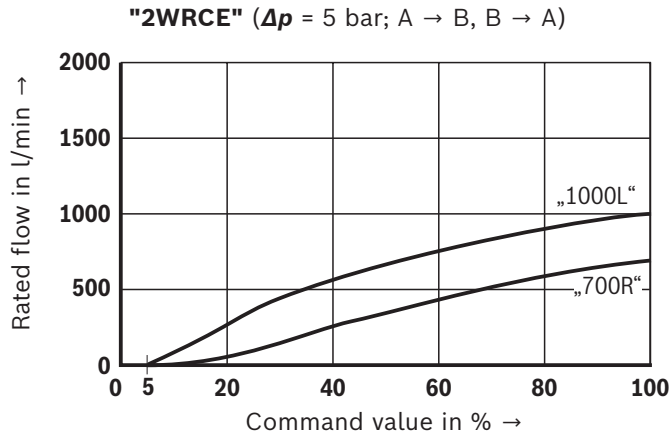
Frequency f dependent on operating pressure and inlet amplitude



- 1 40 bar
- 2 70 bar
- 3 140 bar
- 4 210 bar
- 5 315 bar

Characteristic curves: Size 40
(measured with HLP32, $\vartheta_{oil} = 40 \pm 5 \text{ }^{\circ}\text{C}$)

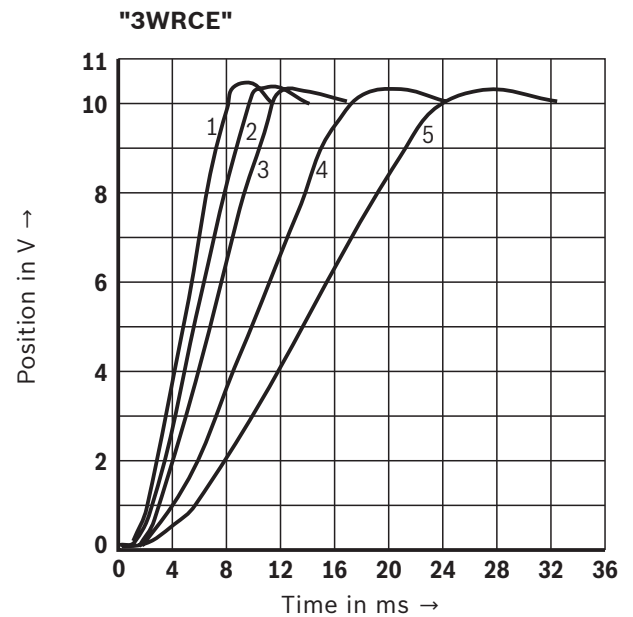
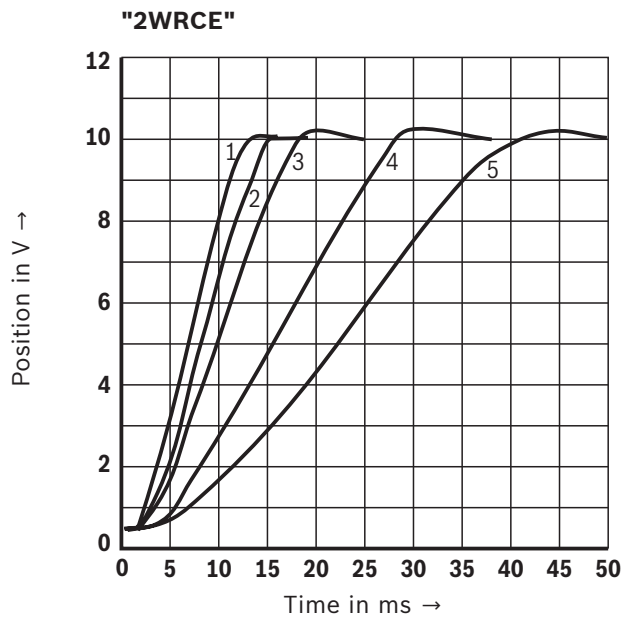
Rated flow



"E410P" 10 % overlap

"V460L" 0.5 ... 1.5 % overlap

Transition function



1 315 bar

2 210 bar

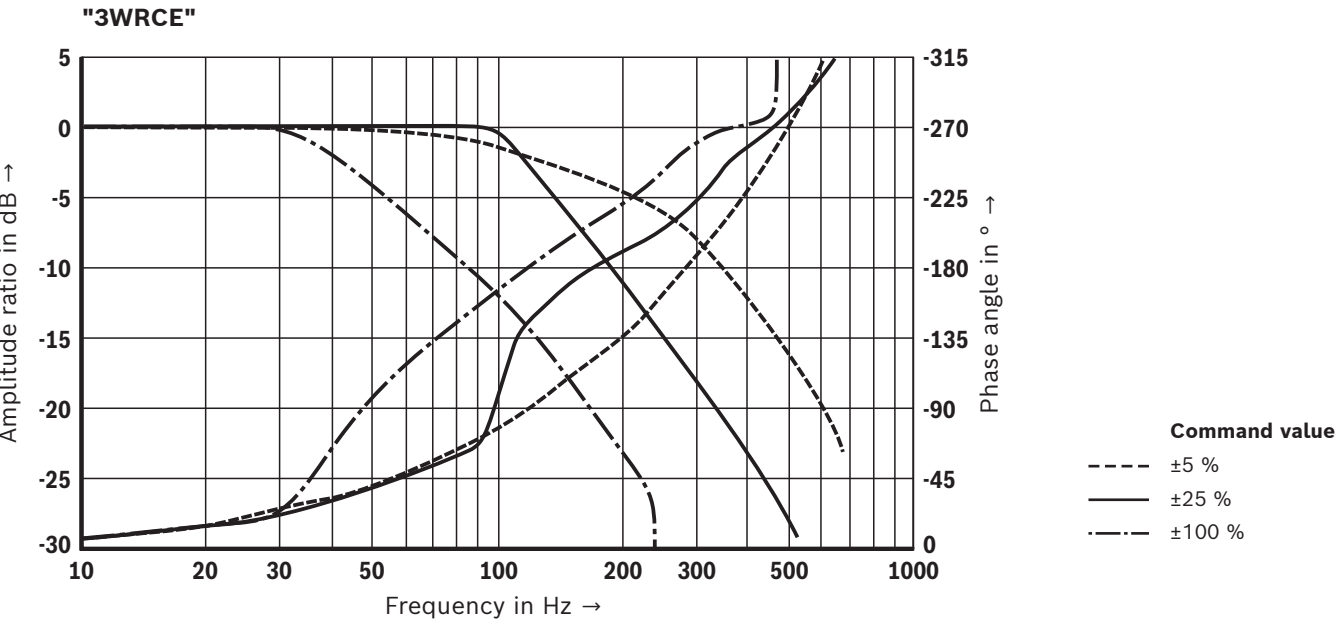
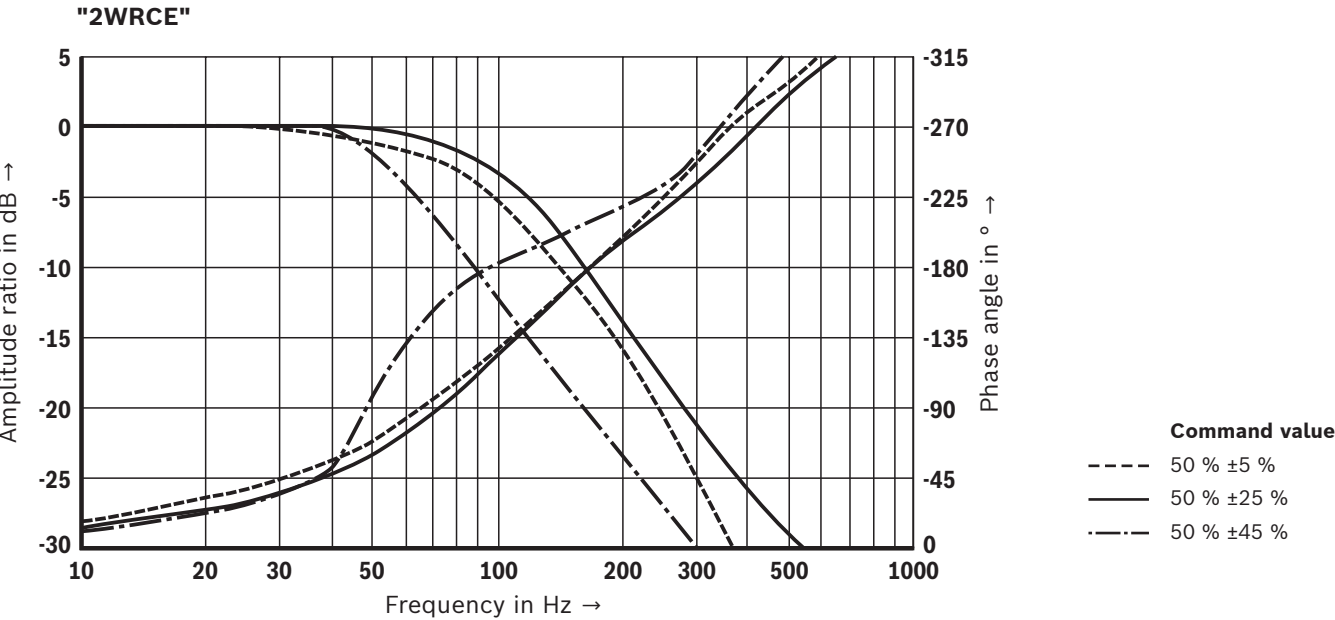
3 140 bar

4 70 bar

5 40 bar

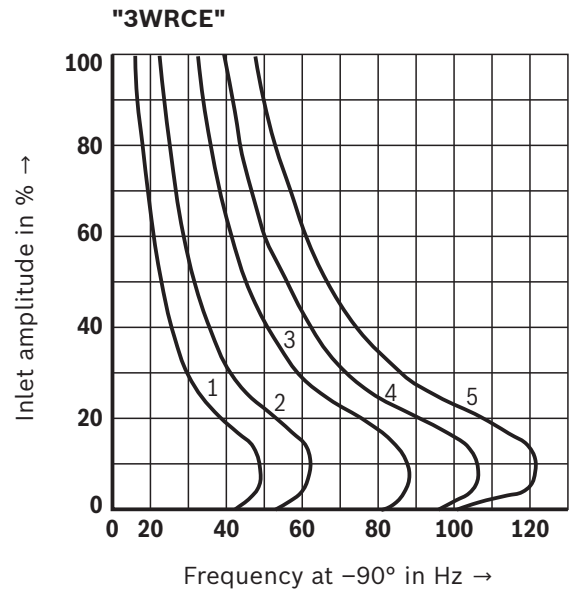
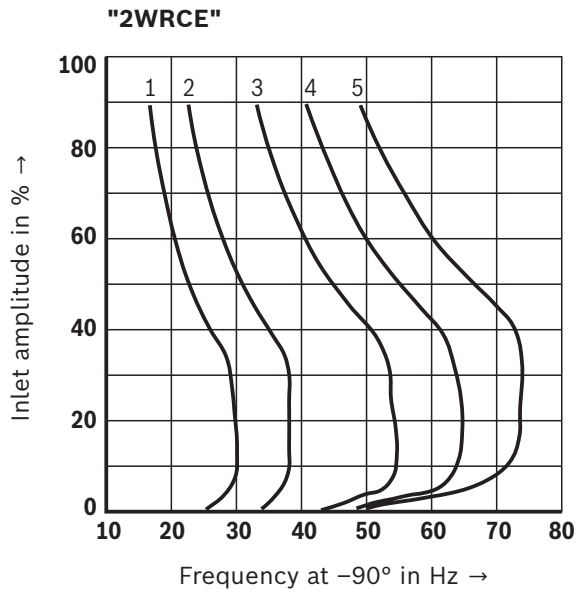
Characteristic curves: Size 40
(measured with HLP32, $\vartheta_{oil} = 40 \pm 5 \text{ }^{\circ}\text{C}$)

Frequency response ($p_p = 315 \text{ bar}$)



Characteristic curves: Size 40
(measured with HLP32, $\vartheta_{oil} = 40 \pm 5 \text{ }^{\circ}\text{C}$)

Frequency f dependent on operating pressure and inlet amplitude

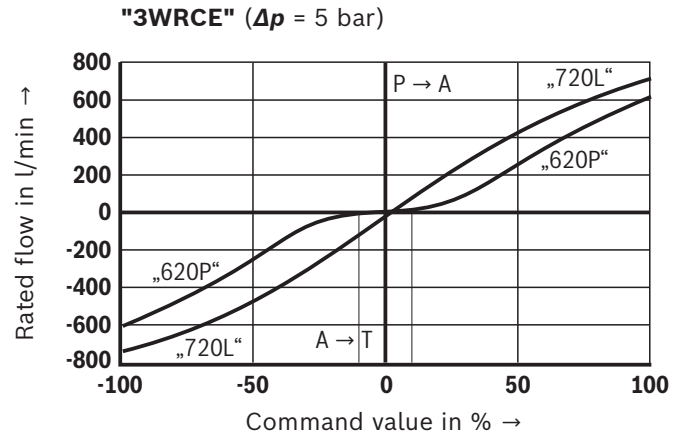
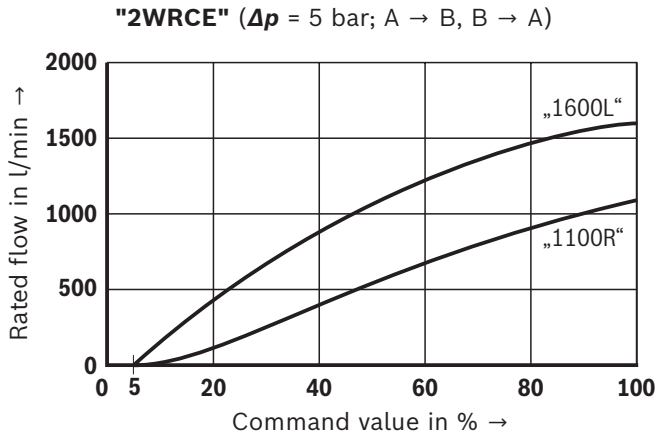


- 1 40 bar
- 2 70 bar
- 3 140 bar
- 4 210 bar
- 5 315 bar

Characteristic curves: Size 50

(measured with HLP32, $\vartheta_{oil} = 40 \pm 5 \text{ }^{\circ}\text{C}$)

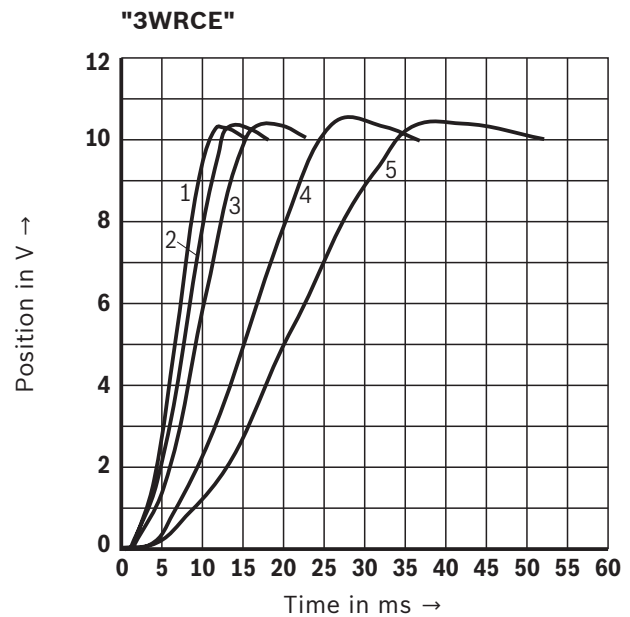
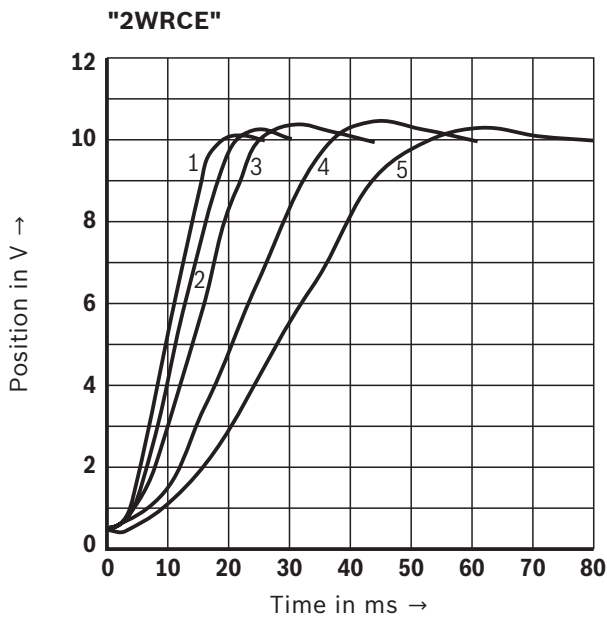
Rated flow



"E620P" 10 % overlap

"V720L" 0.5 ... 1.5 % overlap

Transition function



1 315 bar

2 210 bar

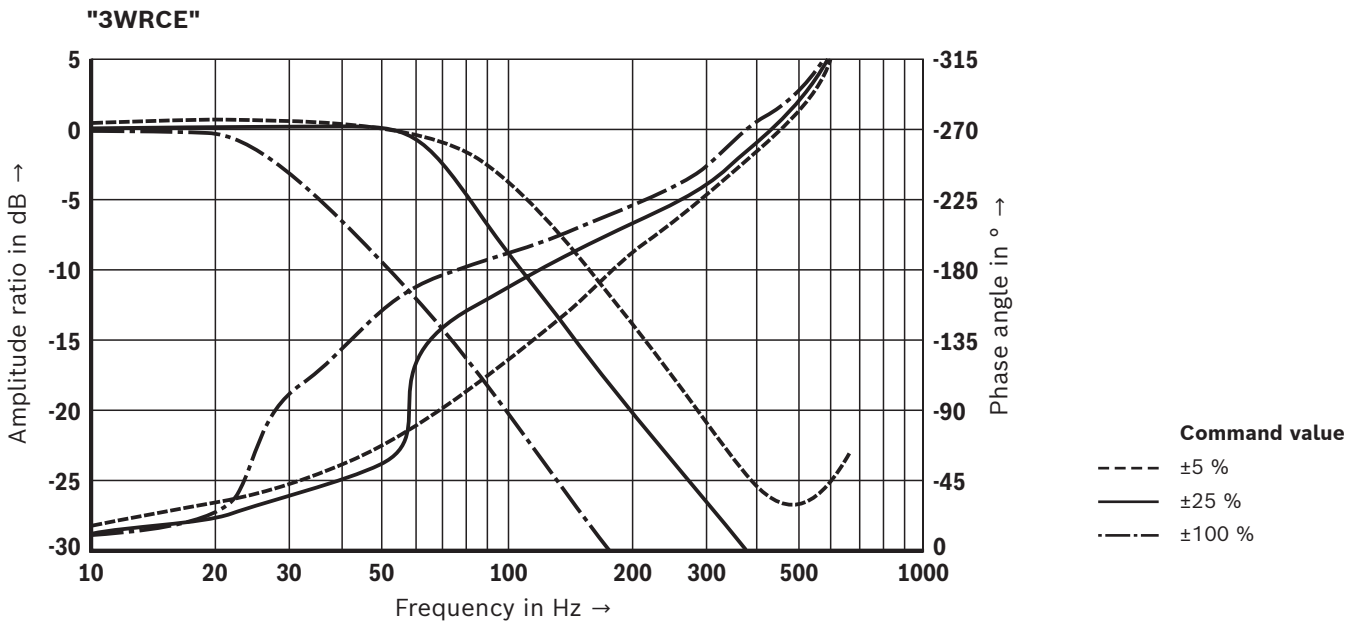
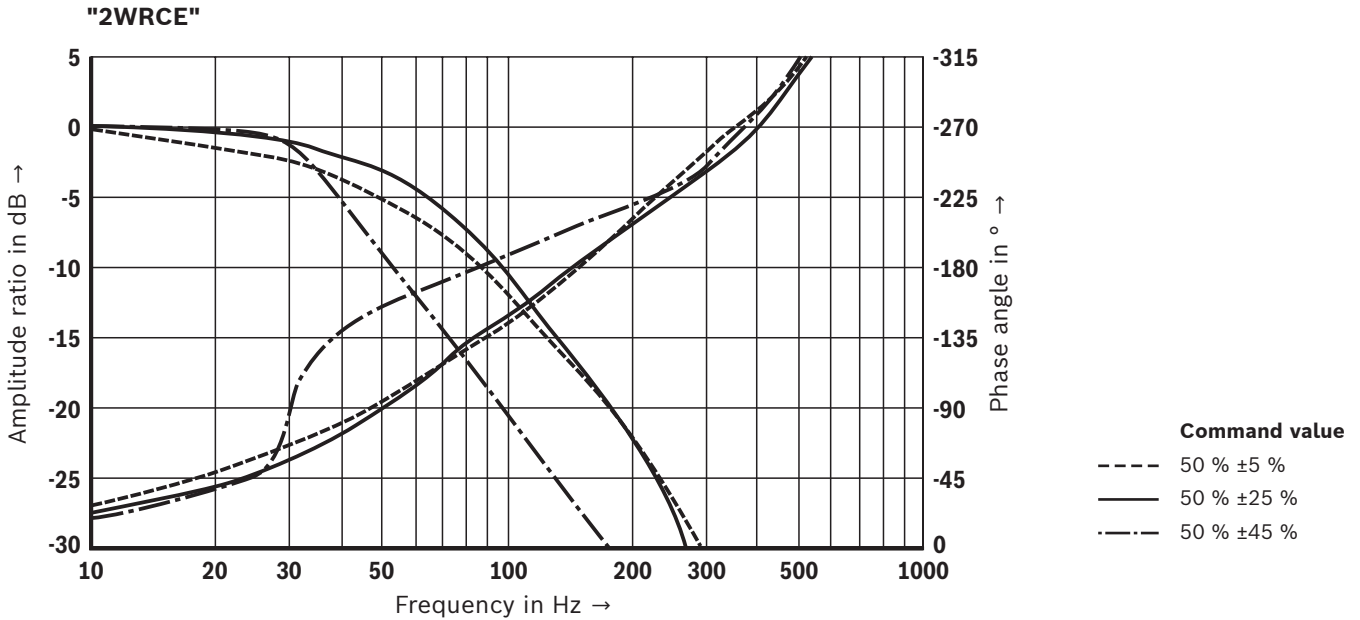
3 140 bar

4 70 bar

5 40 bar

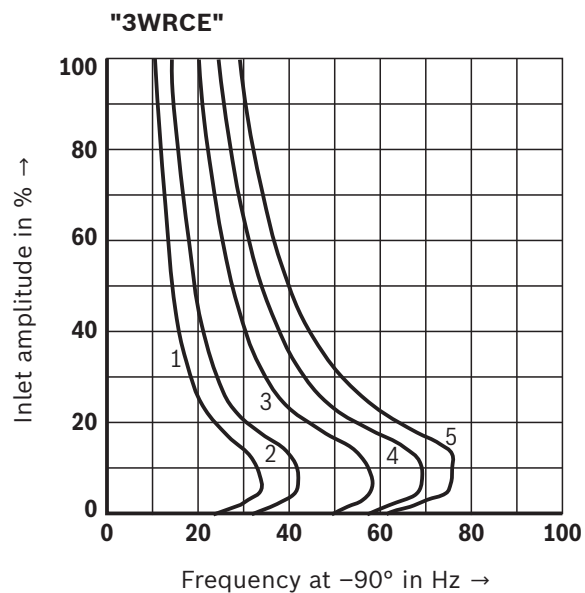
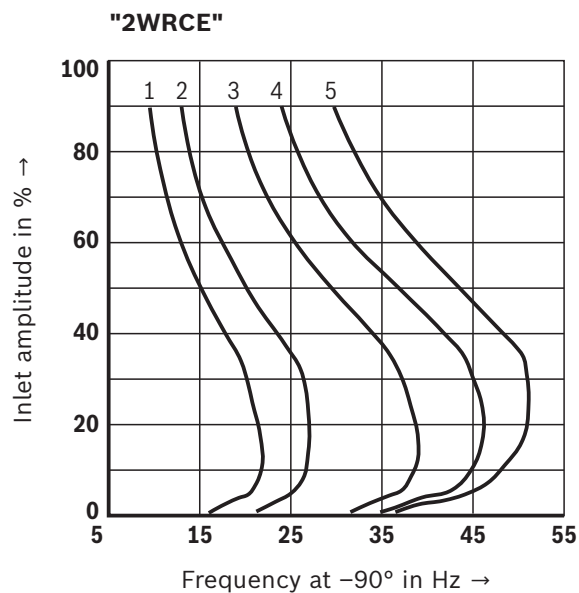
Characteristic curves: Size 50
(measured with HLP32, $\vartheta_{oil} = 40 \pm 5 \text{ }^{\circ}\text{C}$)

Frequency response ($p_p = 315 \text{ bar}$)



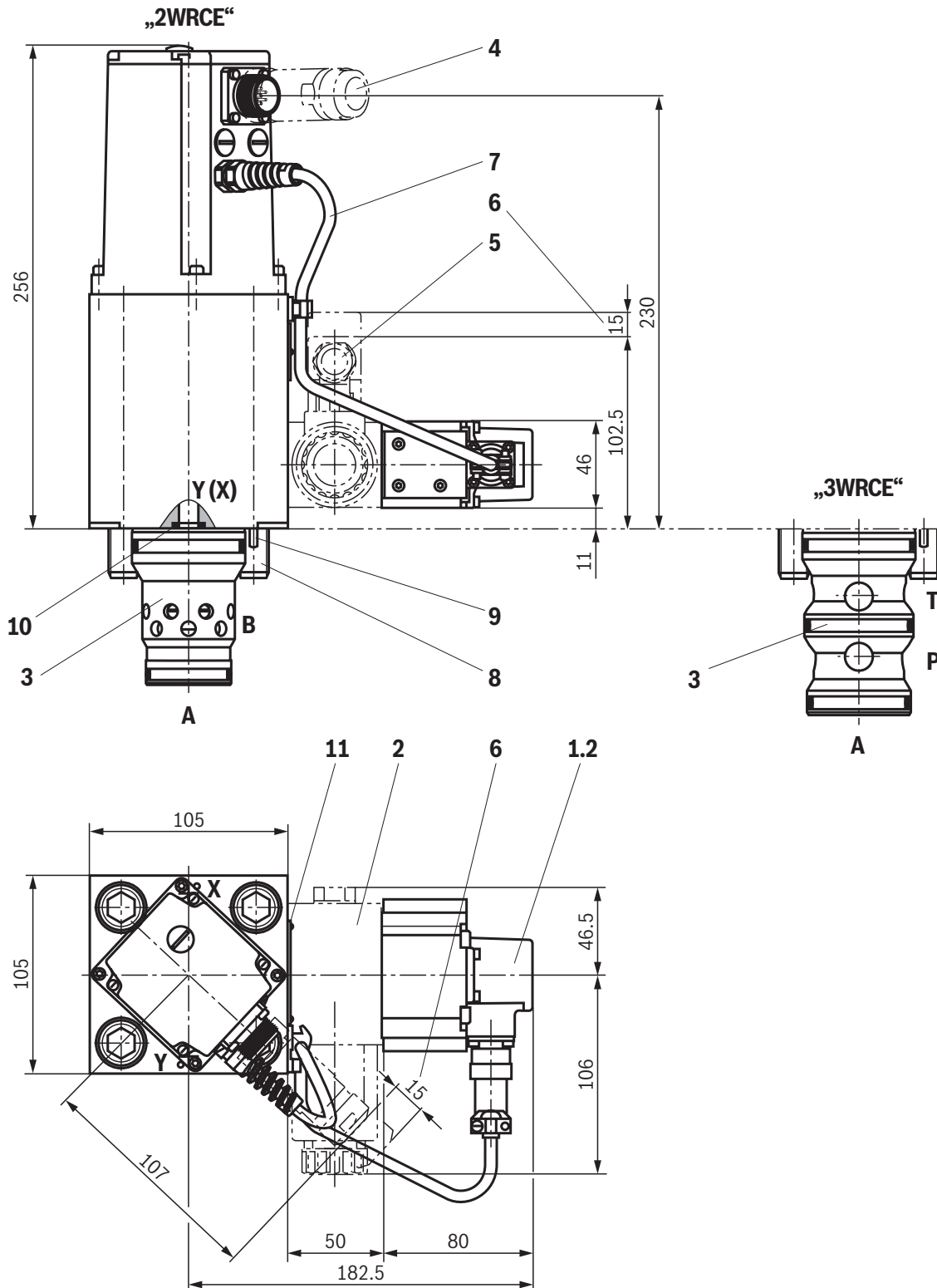
Characteristic curves: Size 50
(measured with HLP32, $\vartheta_{oil} = 40 \pm 5 \text{ }^{\circ}\text{C}$)

Frequency f dependent on operating pressure and inlet amplitude



- 1 40 bar
- 2 70 bar
- 3 140 bar
- 4 210 bar
- 5 315 bar

Dimensions: Size 32
(dimensions in mm)



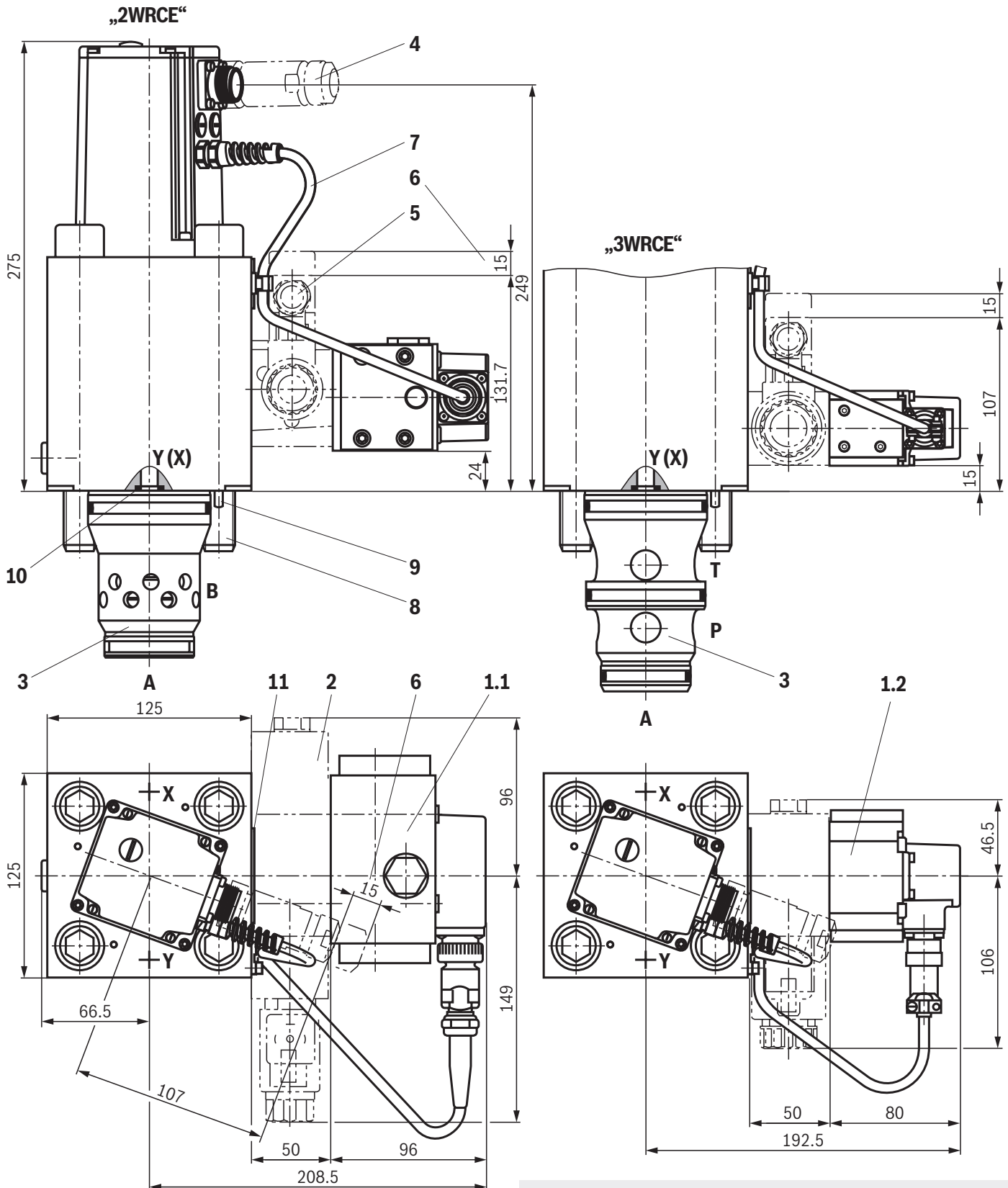
Item explanations and valve mounting screws
see page 26.



Notice:

The dimensions are nominal dimensions which are subject to tolerances.

Dimensions: Size 40
(dimensions in mm)



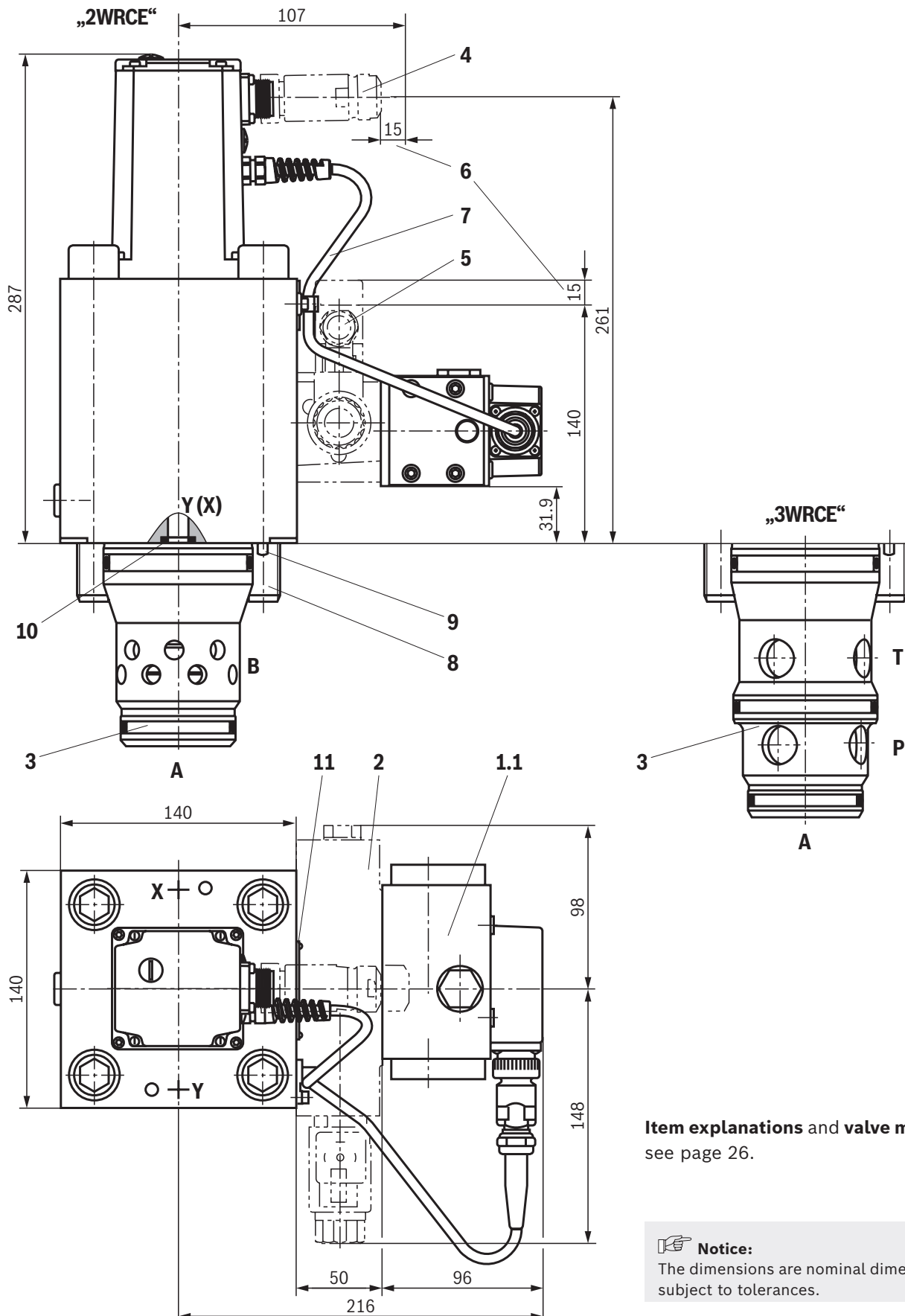
Item explanations and valve mounting screws
see page 26.



Notice:

The dimensions are nominal dimensions which are subject to tolerances.

Dimensions: Size 50
(dimensions in mm)



Item explanations and **valve mounting screws**
see page 26.



Notice:

The dimensions are nominal dimensions which are subject to tolerances.

Dimensions

- 1.1 Pilot control valve (servo valve NG10)
- 1.2 Pilot control valve (servo valve NG6)
- 2 Sandwich plate shut-off valve (version "WK15" and "WL15")
- 3 Bushing
- 4 Mating connectors for valves with round connector, 6-pole + PE (separate order, see page 28 and data sheet 08006)
- 5 Mating connectors for valves with connector "K4" (separate order, see page 28 and data sheet 08006)
- 6 Space required for removing the mating connector
- 7 Cabling
- 8 Valve mounting screws (included in the scope of delivery), see below
- 9 Locating pin
- 10 Identical seal rings for ports X and Y
- 11 Name plate

Valve mounting screws (included in the scope of delivery)

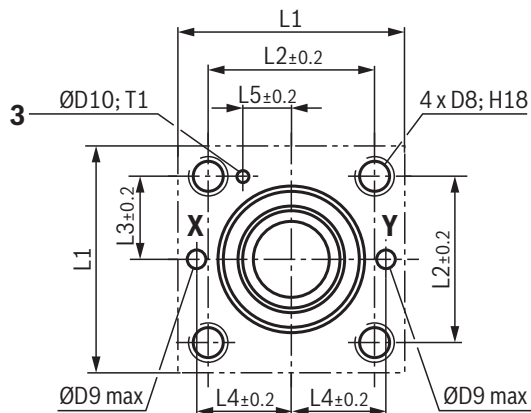
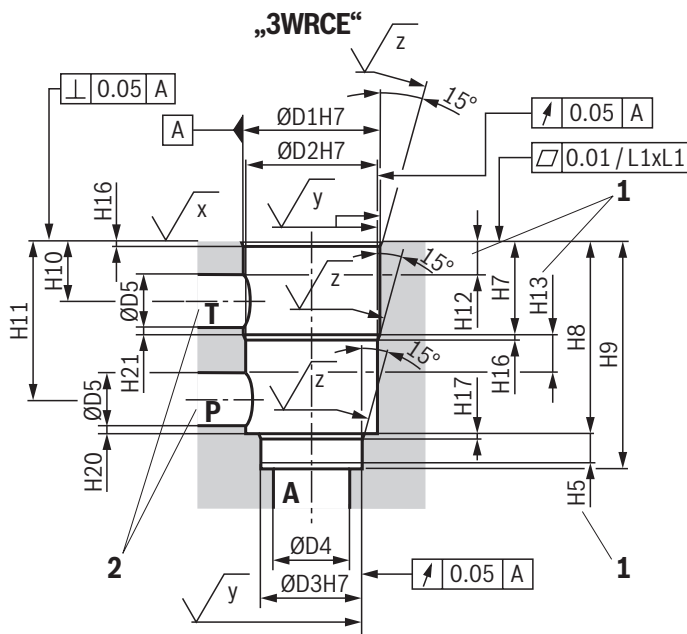
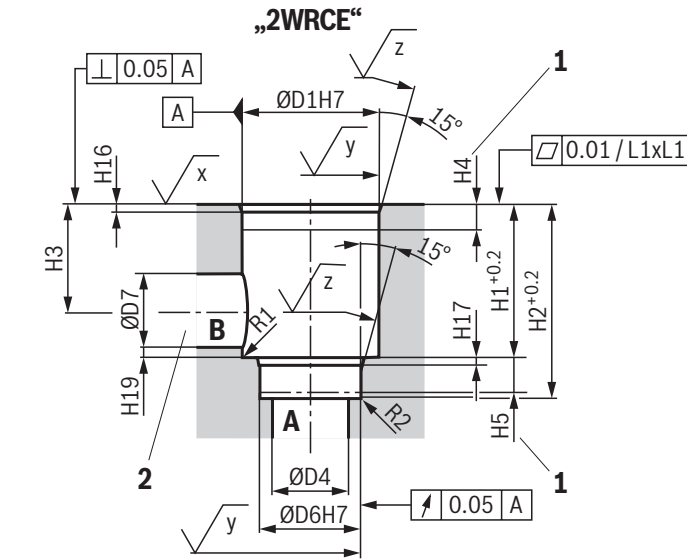
Size	Quantity	Hexagon socket head cap screws
32	4	ISO 4762 - M16 x 100 -10.9-fLZn/nc/480h/C Tightening torque $M_A = 250 \text{ Nm} \pm 10 \%$
40	4	ISO 4762 - M20 x 180 -10.9 Tightening torque $M_A = 590 \text{ Nm} \pm 10 \%$
50	4	ISO 4762 - M20 x 190 -10.9 Tightening torque $M_A = 590 \text{ Nm} \pm 10 \%$



Notice:

For tightening, a manual torque wrench with a tolerance of $\leq 10 \%$ is to be used.

Installation bore (dimensions in mm)



$$\sqrt{x} = \sqrt{R_{z\max} 4} \quad \sqrt{y} = \sqrt{R_{z\max} 8} \quad \sqrt{z} = \sqrt{R_z 10}$$

Installation dimensions according to DIN ISO 7368

NG	32	40	50
ØD1H7	60	75	90
ØD2H7	58	73	87
ØD3H7	55	55	68
ØD4	32	40	50
ØD5	24	30	35
ØD6H7	45	55	68
ØD7	32	40	50
D8	M16	M20	M20
ØD9 max	8	10	10
ØD10	6	6	8
H1	70	87	100
H2	85	105	122
H3	52	64	72
H4	30	30	35
H5	13	15	17
H7	43.5	54	87
H8	85	105	143
H9	100	125	165
H10	30	36	66
H11	70.5	87	122
H12	18	21	48
H13	15	18	18
H16	2.5	3	4
H17	2.5	3	3
H18	35	45	45
H19	2	3	3
H20	2.5	3	3.5
H21	1.5	3	3.5
L1	105	125	140
L2	70	85	100
L3	35	42.5	50
L4	41	50	58
L5	17	23	30
T1	10	10	10
R1 max	2	4	4
R2 max ¹⁾	1	1	1

1 Depth of fit, minimum dimension

2 The ports P, T and B can be positioned around the central axis of port A. However, it must be observed that the mounting bores and the control bores are not damaged.

3 Bore for locating pin

¹⁾ Deviating from ISO 7368

Tolerances according to: General tolerances ISO 2768-mK

Valve mounting screws see page 28.

Accessories (separate order)**Mating connectors and cable sets**

Item ¹⁾	Designation	Version	Short designation	Material number	Data sheet
4	Mating connector; for valves with round connector, 6-pole + PE	Straight, metal	7PZ31...M	R900223890	08006
		Straight, plastic	7PZ31...K	R900021267	
5	Mating connector; for valves with "K4" connector, 2-pole + PE, design A	Without circuitry, 12 ... 240 V	Z4	R901017010	08006
		With indicator light, 12 ... 240 V	Z5L	R901017022	
		With rectifier, 12 ... 240 V	RZ5	R901017025	
		Z-diode-suppressor 24 V	Z5L1	R901017026	

¹⁾ See dimensions on page 23 of 25.

Further information

- ▶ Hydraulic valves for industrial applications
- ▶ Hydraulic fluids on mineral oil basis
- ▶ Environmentally compatible hydraulic fluids
- ▶ Flame-resistant, water-free hydraulic fluids
- ▶ Flame-resistant hydraulic fluids - containing water (HFAE, HFAS, HFB, HFC)
- ▶ Selection of filters
- ▶ Information on available spare parts

Operating instructions 07600-B
 Data sheet 90220
 Data sheet 90221
 Data sheet 90222
 Data sheet 90223
www.boschrexroth.com/filter
www.boschrexroth.com/spc

Bosch Rexroth AG
 Industrial Hydraulics
 Zum Eisengießer 1
 97816 Lohr am Main, Germany
 Phone +49 (0) 93 52/40 30 20
my.support@boschrexroth.de
www.boschrexroth.de

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