



6.11

2-way high-response proportional servo cartridge valve, pilot operated

Type 2WRCHE...H1

NG 80, 100
Max. pressure 420 bar
Nominal flow 12500 L/min



Contents

Function and configuration	02
Symbols	03
Ordering code	04
Technical data	05
Electrical connections	06
Characteristic curves	07
Unit dimensions	08-11
Installation dimensions	12

Features

- Three-stage cartridge valve: Pilot-operated high-frequency valve with spool and sleeve structure servo valve with voice coil
- Extremely fast step response
- Flow direction B to A and A to B
- Features an integrated controller, standard shock-absorbing pads, and high vibration resistance, complies with standard EN60068-2
- Cavity and mounting pattern according to ISO7368
- High control accuracy: high response sensitivity, low hysteresis
- Excellent flexibility: suitable for position, pressure, force and velocity control
- Typical applications:
 - Die-casting machines
 - General presses

Function and configuration

Valves of type 2WRCH...H1 is a pilot proportional servo cartridge valve with valve core position feedback and integrated amplifier

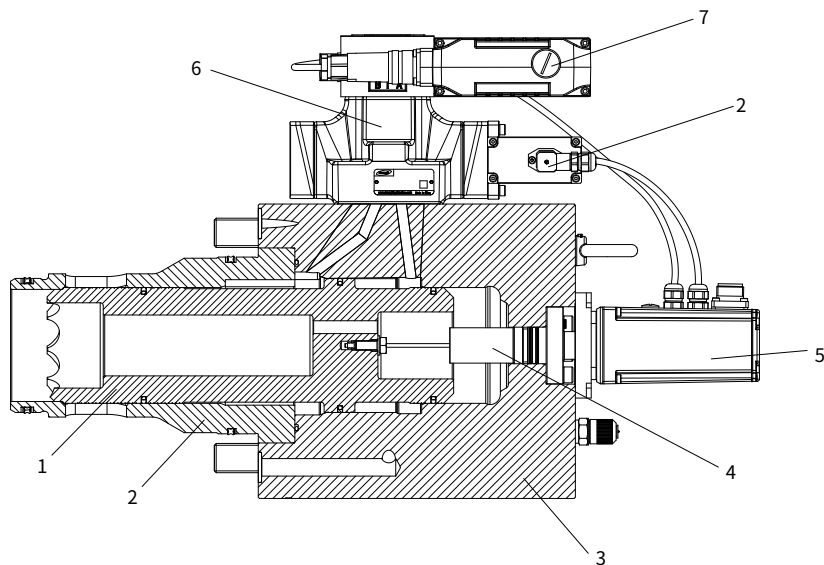
Function:

This valve employs a three-stage control design comprising two-stage pilot servo valves and a spool-type main stage equipped with an LVDT spool position sensor.

Employing a moving-coil motor as the pilot valve actuator, this valve achieves exceptionally rapid response times: 22ms (NG80) to 28ms (NG100), with control accuracy <0.1% of rated flow.

The main spool stroke is actively controlled by the two-stage pilot servo valves, independent of the pressure conditions at the main circuit ports. As a fundamental operating condition, the pilot pressure should be equivalent to the system pressure. In low-system-pressure applications where high dynamic response is required, the pilot pressure must not fall below 140 bar.

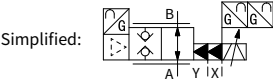
Both the two-stage pilot servo valves and the main valve incorporate integrated amplifiers with closed-loop control circuits to regulate the positions of their respective main spools and pilot valve spools.



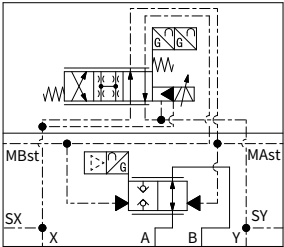
- | | |
|--------------------|--|
| 1、 Main spool | 5、 Amplifier assembly |
| 2、 Valve sleeve | 6、 Pilot-operated proportional servo pilot valve |
| 3、 Main valve | 7、 Direct-acting moving-coil valve |
| 4、 Sensor assembly | |

Symbols

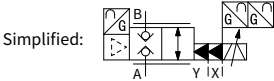
2WRCHE...H1/VL



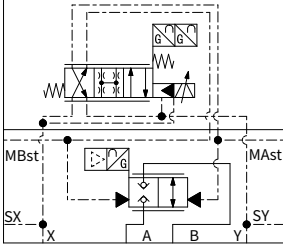
Detailed:



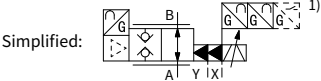
2WRCHE...H1/VK



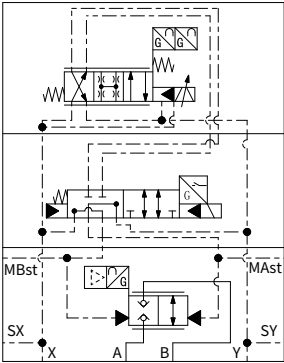
Detailed:



2WRCHE...H1/VWL...

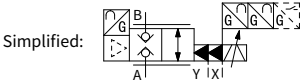


Detailed:

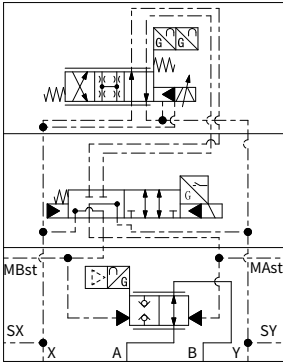


1) With safety valve and position switch

2WRCHE...H1/VWK...



Detailed:



1) With safety valve and position switch

Ordering code

2	WRCH			S		-	H1	/	V		/		/		*
---	------	--	--	---	--	---	----	---	---	--	---	--	---	--	---

Two-way directional valve = 2

High-response proportional servo cartridge valve = WRCH

With integrated electronics (OBE) = E

Size 80 = 80 Size 100 = 100

Seat piston = S

Rated flow in L/min at 5 bar valve pressure drop			
Size	Type ...S...L (linear)	Type ...S...R (linear with progressive fine control range)	
80	7200 =7K2	6700 =6K7	
100	12500 =12K5	12000 =12K0	

Characteristic curve form

Linear = L

Linear with progressive fine control range = R

Other versions available upon request (customised design, code blank) = No code

Series =H1

The pilot valve is a voice coil motor (VCD) driven pilot-operated electro-hydraulic proportional servo valve =V

Sandwich plate shut-off valve:

Without shut-off valve, de-energized pilot control valve actively "closes" WRCH with applied pilot pressure =K

Without shut-off valve, de-energized pilot control valve actively "opens" WRCH with applied pilot pressure =L

With shut-off valve, de-energized shut-off valve actively "closes" WRCH with applied pilot pressure =WK

With shut-off valve, de-energized shut-off valve actively "opens" WRCH with applied pilot pressure =WL

Spool position monitoring:

Safety valve without position switch = No code

With safety valve and position switch = E

Electrical interface:

Command value 0~10V (only with integrated electronics (OBE) "E") = A1

Command value 4~20mA (only with integrated electronics (OBE) "E") = F1

Seal material:

FKM seals = V

NBR seals = No code

Enable signal control:

Without band enable =No code

Band enable =Q

Further details in the plain text

0710

Technical data

General				
Size NG			80	100
Weight	Without shut-off valve .../...K or .../...L	kg	104	153
	With shut-off valve .../...WK or .../...WL		118	167
Installation position			Any, preferably horizontal	
Storage temperature range		°C	-20 to +80	
Ambient temperature range		°C	-20 to +60	
Sine test according to EN 60068-2-6			10 to 2000Hz/ max. of 10g/ 10 cycles/ 3 axes	
Noise test according to EN 60068-2-64			20 to 2000Hz/ 10gRMS /30 g peak /24h /3 axes	
Transport shock according to EN 60068-2-27			15g/ 11ms/ 3 axes	

Hydraulic (measured with HLP32, $\vartheta_{oil}=40^{\circ}\text{C} \pm 5^{\circ}\text{C}$)					
Max. operating pressures	Ports A, B,		bar	420	
	Pilot control valve port X			350	
	Port Y			35	
Rated flow at $\Delta p = 5\text{bar}$	Design ...S...L (linear)		L/min	7200	12500
	Design ...S...R (linear with progressive fine control range)			6700	12000
Pilot valve pressure			bar	> 140	
Max. pilot flow at 140bar pilot pressure			L/min	200	280
Leakage of pilot valve at P = 100bar			mL/min	≤ 200	
Hydraulic fluid			Mineral oil (HL, HLP) to DIN 51524; HFC (Water glycol)		
Hydraulic fluid temperature range			$^{\circ}\text{C}$	-20 to +80; preferably +40 to +50	
Viscosity range			mm ² /s	20 to 380; preferably 30 to 45	
Max. permissible degree of contamination of the pressure fluid is to ISO 4006 (c).		Pilot control valve		Class 18/16/13	
		Main valve		Class 20/18/15	
Hysteresis			%	≤ 0.1	
Temperature drift			%/K	Zero drift < 0.028	
Response sensitivity			%	≤ 0.1	
Response time	10~100% step signal		ms	22	28
	0%~100% step signal			27	35
Frequency response ($\Delta p > 140\text{bar}$; $\pm 5\%$ signal)		Amplitude -3dB		53	33
		Phase -90°		55	35

Electric				
Duty ratio		%	100	
Supply voltage / ripple		VDC	Direct voltage 22 to 30, electric shut-off at <19, ripple <5% effective, surge free	
Current consumption max.		A	3.5	
Pre-fusing		A	4.0, medium lag	
Input signal: A1	Voltage	V	0 to +10, ripple < 0.01%, effective, surge free	
	Impedance	kΩ	100	
Input signal: F1	Current	mA	+4 to 20, ripple < 0.01% effective, surge free, < 3.6mA=disable, >3.8mA=enable	
	Impedance	Ω	< 250	
Diagnostic signal		V	0 to +10, rated max. 5mA	
Enable signal		V	5 to 30, Ri = > 8kΩhm	
Control mode			Voltage control, current control	
Electrical connection			6+PE, plug-in connector in accordance with DIN EN 175201-804 standard	
Protection class of the valve according to EN60529			Ip65	

Electrical connections, plug-in connectors

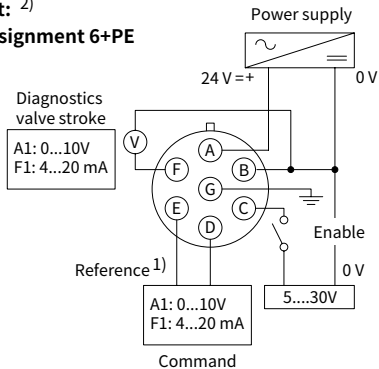
Installation recommendations

An insufficient pilot oil supply (e.g. due to long distances and/or small diameters) can negatively influence the dynamics of the valve.

To avoid this, an accumulator can be connected to port SX at the valve body. A short-term undersupply with pilot oil can be compensated via this accumulator.

Sizing data: see operation manual.

Pinout: 2)
Pin assignment 6+PE

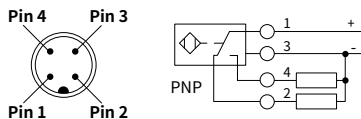


- Notes:
- 1) Cannot be connected to 0V of the power supply voltage.
 - 2) This model of product can provide dedicated debugging cables, and can be ordered separately if needed.

Seven-pin plug

Pin	Interface type (voltage type)	Interface type (current type)	Remarks
A	24VDC	24VDC	Power supply
B	0V	0V	
C	0V (without enable)/ 24VDC (with enable)	0V (without enable)/ 24VDC (with enable)	Enable signal specification: 5-30V to activate, approximately 0V to deactivate, with reference potential at pin B
D	0-10V	4-20mA	Command input
E	Command voltage reference potential	Command voltage reference potential	
F	0.2-+10V	4.3-20mA	Main valve spool feedback output, reference potential at pin B
PE	Chassis ground	Chassis ground	

Safety valve wiring diagram 3)

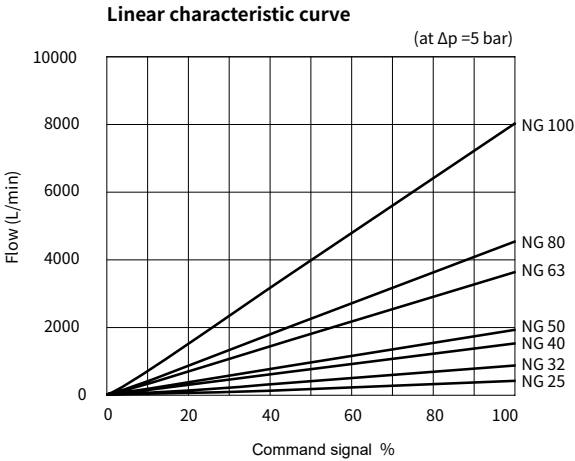
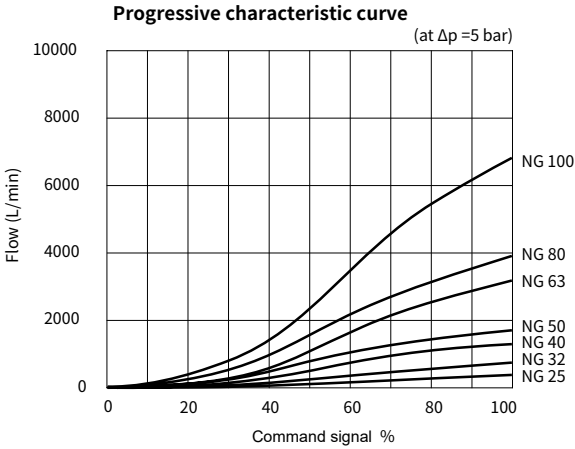


Note:

3) Refer to this wiring for safety valves with position detection.

Pin	Function
Pin1	+24V
Pin2	Normal close (low impedance - high impedance)
Pin3	0V
Pin4	Normal open (high impedance - low impedance)

Characteristic curves (measured with HLP46, $\vartheta_{oil}=50^{\circ}\text{C}$, $\Delta P=5\text{bar}$)

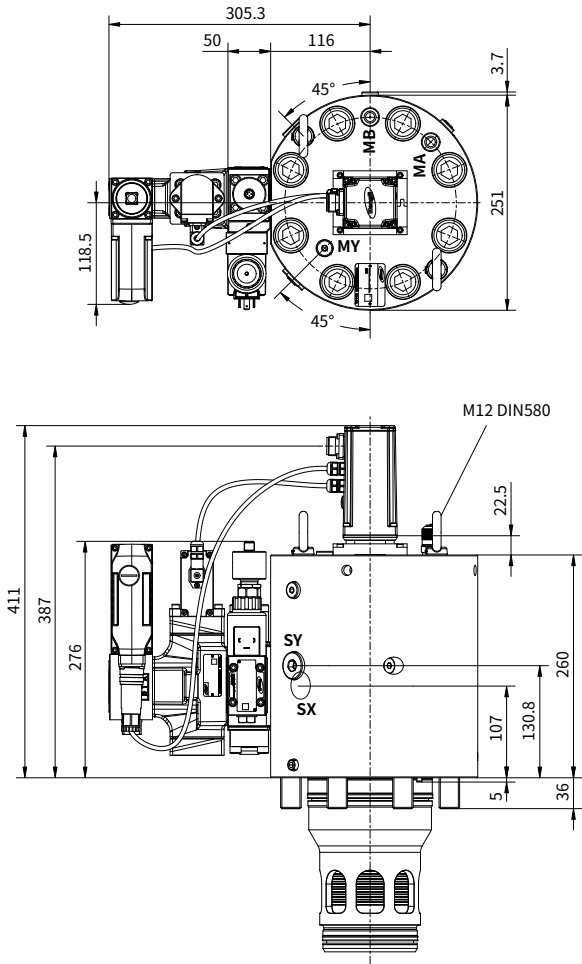


Unit dimensions

(nominal dimensions in mm)

NG 80

- 2WRCHE...SVWKE..., with safety valve and position switch



Accumulator port:
XY=G3/4"; XX=G3/4"

Pressure measurement ports:
MA and MB = G1/4"; MY = G1/4"

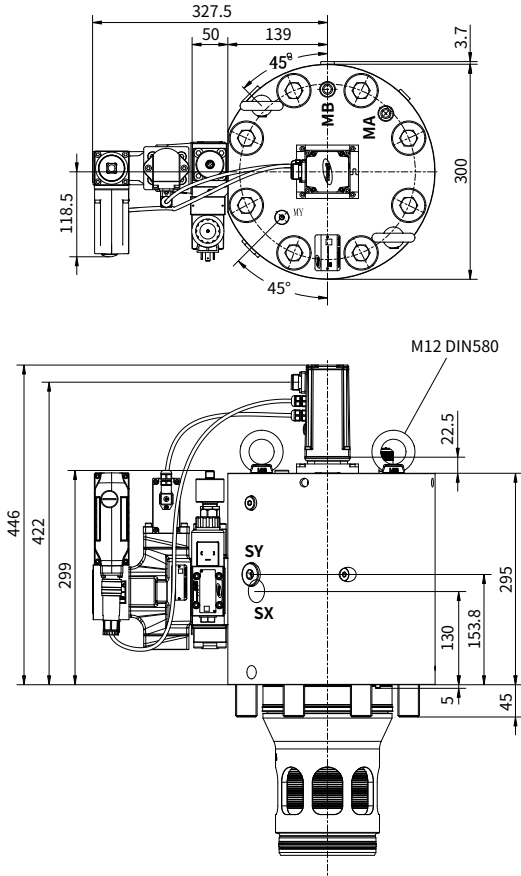
Size	Fastening bolts DIN912 12.9	Tightening torque
80	8 - M24×160	890 Nm

Unit dimensions

(nominal dimensions in mm)

NG 100

- 2WRCH...SVWKE..., with safety valve and position switch



Accumulator port:
XY=G3/4"; XX=G3/4"

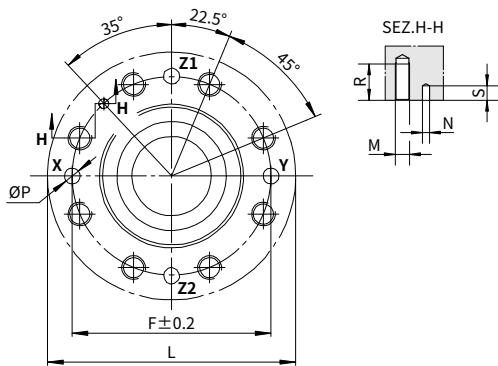
Pressure measurement ports:
MA and MB = G1/4"; MY = G1/4"

Size	Fastening bolts DIN912 12.9	Tightening torque
100	8 - M30×150	1775 Nm

Unit dimensions

(nominal dimensions in mm)

Size 80, 100:



Size	80	100
A	-	-
B	-	-
C	-	-
D	-	-
E	-	-
F	200	245
G	-	-
L _{min}	250	300
M	M24	M30
$\varnothing N$	10	10
$\varnothing P_{max}$	16	20
R	50	66
S _{max}	8	10
T	-	-
V	-	-
$\varnothing d1$	145	180
$\varnothing d2$	110	135
$\varnothing d3_{max}$	110	135
$\varnothing d4_{max}$	110	125
L1	175 ^{+0.2} ₀	210 ^{+0.2} ₀
L2	205 ^{+0.2} ₀	245 ^{+0.2} ₀
L3	200	239
L4	170.5	205.5
L5	40	50
L6	5	5
L7	5	5
U	0.05	0.05
W	0.2	0.2

