

Throttle valve

Screw-in cartridge						
•	Q _{N max}	=	25 l/min			
•	Q _{max}	=	25 l/min			

= 350 bar • **p**_{max}

DESCRIPTION

Manually adjustable, M18x1,5 screw-in cartridge throttle valve in accordance with cavity ISO 7789. The valve can be adjusted and locked in two ways, either with a spanner («S» type), a knob («D» type). Three volume flow stages are available as standard: $Q_N = 0.32 / 3.2$ and 25 l/min with a $\Delta p = 10$ bar. The cartridge body made of steel is galvanized and therefore rust-protected.

FUNCTION

A fine tread on the adjustable throttle reveals an annular gap or triangular notch. The adjusted throttle cross-section produces a pressure drop which determines the volume flow. The volume flow is zero when the throttle is screwed in (the metal sealing edge seals completely). The valve flow is bidirectional.

M18x1,5 ISO 7789



APPLICATION

Throttle valves can be used anywhere where volume flows can be infinitely controlled in both directions without taking pressure fluctuations into account. The screwed cartridge design is ideal for installing in control blocks and is used as a functional part in sandwich plates (vertical linkage) of the Wandfluh NG3-Mini hydraulics (please refer to the separate data sheets in register 2.4). Stepped tools are available for making the receptacle bores in steel and aluminium (hire or purchase). Please refer to the data sheets in register 2.13.

TYPE CODE

			[DN		PM18	-		#	
Throttle valve										
Setting versions:	Key Control knob	S D								
Screw-in cartridge	e M18x1,5									
Standard nomina (at 10 bar valve pressu	l volume flow rates: re loss)	$Q_{N} = 0$ $Q_{N} = 3$ $Q_{N} = 2$,32 l/min ,2 l/min 5 l/min		0,32 3,2 25					

Design-Index (Subject to change)

GE Des

Description	Throttle valve
Construction	Screw-in cartridge for cavity
	acc. to ISO 7789
Mounting	Screw-in thread M18x1,5
Ambient temperature	-20+50 °C
Mounting position	any
Fastening torque	$M_{p} = 30 \text{ Nm}$
Weight	m = 0,12 kg (Screw)

m = 0,13 kg (Knob)

 $1 \leftrightarrow 2$

HYDRAULIC SPECIFICATIONS

Fluid	Mineral oil, other fluid on request
Contamination efficiency	ISO 4406:1999,
	class 20/18/1421/19/15
	Required filtration grade ($\[mathbb{B}\]$ 1025 \ge 75)
	(refer to data sheet 1.0-50/2)
Viscosity range	12mm ² /s320mm ² /s
Fluid temperature	-20+70 °C
Peak pressure	p _{max} = 350 bar
Nominal volume flow rates	$Q_{N} = 0.32 \text{ l/min}, Q_{N} = 3.2 \text{ l/min}$
	$Q_N = 25 $ l/min
	Q _N at 10 bar valve pressure loss
Max. volume flow	Q _{max} = 25 l/min
Leakage volume flow	Almost leak free with closed restrictor

SYMBOL

Volume flow direction

MECHANICAL ACTUATION

Control angle α_h

Mechanical types of operation	ation	in 2 different versions:
S	=	Screw adjustment
		with fork wrench and Allen key
D	=	Control knob adjustment, fixed
Control storke S	=	4,5 mm
D		

= 1620° / 4,5 turns

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Technical explanation see data sheet 1.0-100

Wandfluh AG Postfach CH-3714 Frutigen

60

049.3156

Back-up ring RD 12,1x15x1,4



Throttle valve

S	crew-	in	cartr	idge
•	Q _{N max}	=	30	l/min

- $\mathbf{Q}_{\max}^{\text{N max}} = 40 \text{ l/min}$
- p_{max}^{max} = 350 bar

DESCRIPTION

Manually adjustable, M18x1,5 screw-in cartridge throttle valve in accordance with cavity ISO 7789. The cartridge body made of steel is galvanized and therefore rust-protected. FUNCTION

A fine tread on the adjustable throttle reveals an annular gap. The adjusted throttle crosssection produces a pressure drop which determines the volume flow. The volume flow is zero when the throttle is screwed in (the metal sealing edge seals completely). The valve flow is bidirectional.

M18x1,5 ISO 7789



APPLICATION

Throttle valves can be used anywhere where volume flows can be infinitely controlled in both directions without taking pressure fluctuations into account. Stepped tools are available for making the receptacle bores in steel and aluminium (hire or purchase). Please refer to the data sheets in register 2.13.

TYPE CODE



GENERAL SPECIFICATIONS

Description	Throttle valve
Construction	Screw-in cartridge for cavity
	acc. to ISO 7789
Mounting	Screw-in thread M18x1,5
Ambient temperature	-20+50 °C
Mounting position	any
Fastening torque	M _D = 30 Nm
Weight	m = 0,11 kg
Volume flow direction	$1 \leftrightarrow 2$

HYDRAULIC SPECIFICATIONS

Fluid	Mineral oil, other fluid on request
Contamination efficiency	ISO 4406:1999,
	class 20/18/1421/19/15
	Required filtration grade ($\[mathbb{B}\]$ 1025 \ge 75)
	(refer to data sheet 1.0-50/2)
Viscosity range	12mm ² /s320mm ² /s
Fluid temperature	-20+70 °C
Peak pressure	p _{may} = 350 bar
Nominal volume flow rates	$Q_{\rm N} = 30 \text{l/min}$
	Q _N at 10 bar valve pressure loss
Max. volume flow	$Q_{max} = 40 \text{ l/min}$
Leakage volume flow	Almost leak free with closed restrictor
-	

SYMBOL

1 2

MECHANICAL ACTUATION

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CHARACTERISTICS Oil viscosity u = 30 mm²/s





Cavity drawing according to ISO 7789–18–01–0–98



For detailed cavity drawing and cavity tools see data sheet 2.13-1002.

ACCESSORIES

Line mount body

Data sheet 2.9-205

Technical explanation see data sheet 1.0-100



Throttle valves

Throttle valve

S	cre	w-ir	l Ca	artr	idge
•	Q _N		-	60	l/min

- Q_{max} = 80 l/min
- = 350 bar **p**_{max}

DESCRIPTION

Manually adjustable, M22x1,5 screw-in cartridge throttle valve in accordance with cavity ISO 7789. The cartridge body made of steel is galvanized and therefore rust-protected.

FUNCTION

A fine tread on the adjustable throttle reveals an annular gap. The adjusted throttle crosssection produces a pressure drop which determines the volume flow. The volume flow is zero when the throttle is screwed in (the metal sealing edge seals completely). The valve flow is bidirectional.

M22x1,5 ISO 7789



APPLICATION

Throttle valves can be used anywhere where volume flows can be infinitely controlled in both directions without taking pressure fluctuations into account. Stepped tools are available for making the receptacle bores in steel and aluminium (hire or purchase). Please refer to the data sheets in register 2.13.

TYPE CODE

		DN	Ι	PM22 -	60	#
Throttle valve						
Setting version						
Screw-in cartridge M22x1,5						
Standard nominal volume flow rates: (at 10 bar valve pressure loss)	Q _N = 60 l/min					
Design-Index (Subject to change)						

GENERAL SPECIFICATIONS

Construction	
Mounting Ambient temperature Mounting position Fastening torque Weight	
Volume flow direction	

Throttle valve Screw-in cartridge for cavity acc. to ISO 7789 Screw-in thread M22x1,5 -20...+50°C any $M_{D} = 50 \text{ Nm}$ m = 0,16 kg $1 \leftrightarrow 2$

HYDRAULIC SPECIFICATIONS

Fluid	Mineral oil, other fluid on request
Contamination efficiency	ISO 4406:1999,
	class 20/18/1421/19/15
	Required filtration grade ($\[mathbb{B}\]$ 1025 \ge 75)
	(refer to data sheet 1.0-50/2)
Viscosity range	12mm ² /s320mm ² /s
Fluid temperature	-20+70 °C
Peak pressure	p _{may} = 350 bar
Nominal volume flow rates	$Q_{\rm N} = 60 \text{l/min}$
	Q _N at 10 bar valve pressure loss
Max. volume flow	Q _{max} = 80 l/min
Leakage volume flow	Almost leak free with closed restrictor

SYMBOL

Description

1 2

MECHANICAL ACTUATION

Screw adjustment with t	ork wrench and Allen key
Control storke S _b	= 4,5 mm
Control angle α _b	= 1620° / 4,5 turns

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Illustrations not obligatory Data subject to change

Data sheet no. 2.4-532E 1/2 Edition 11 26



CHARACTERISTICS Oil viscosity u = 30 mm²/s







ACCESSORIES

Data sheet 2.9-205

Technical explanation see data sheet 1.0-100



Throttle valves

Throttle valve . . .

5	cre	w-in	cartr	lage
	$\mathbf{\Omega}$	_	4 4 0	1/main

- **Q**_{N max} = 140 l/min • $Q_{max}^{(max)} = 140 \text{ l/min}$
- = 350 bar
- p_{max}

DESCRIPTION

Manually adjustable, M33x2 screw-in cartridge throttle valve in accordance with cavity ISO 7789. The cartridge body made of steel is galvanized and therefore rust-protected.

FUNCTION

A fine tread on the adjustable throttle reveals an annular gap. The adjusted throttle crosssection produces a pressure drop which determines the volume flow. The volume flow is zero when the throttle is screwed in (the metal sealing edge seals completely). The valve flow is bidirectional.

M33x2

ISO 7789



APPLICATION

Throttle valves can be used anywhere where volume flows can be infinitely controlled in both directions without taking pressure fluctuations into account. Stepped tools are available for making the receptacle bores in steel and aluminium (hire or purchase). Please refer to the data sheets in register 2.13.

TYPEN CODE

		DN	I	PM33 -	140	#
Throttle valve						
Setting version						
Screw-in cartridge M33x2						
Standard nominal volume flow rates (at 10 bar valve pressure loss)	Q _N = 140 l/min					
Design-Index (Subject to change)						

GENERAL SPECIFICATIONS Description

Construction	Sc
	ac
Mounting	Sc
Ambient temperature	-2
Mounting position	ar
Fastening torque	M
Weight	m
Volume flow direction	1

Throttle valve crew-in cartridge for cavity c. to ISO 7789 crew-in thread M33x2 20...+50°C ۱y ^o = 80 Nm = 0,37 kg ↔ 2

HYDRAULIC SPECIFICATIONS

Fluid	Mineral oil, other fluid on request
Contamination efficiency	ISO 4406:1999,
	class 20/18/1421/19/15
	Required filtration grade ($\[mathbb{B}\]$ 1025 \ge 75)
	(refer to data sheet 1.0-50/2)
Viscosity range	12mm ² /s320mm ² /s
Fluid temperature	-20+70 °C
Peak pressure	p _{may} = 350 bar
Nominal volume flow rates	$Q_{\rm N} = 140 \text{l/min}$
	Q _N at 10 bar valve pressure loss
Max. volume flow	Q _{max} = 140 l/min
Leakage volume flow	Almost leak free with closed restrictor

SYMBOL

1 2

MECHANICAL ACTUATION

Screw adjustment with	fork wrench and Allen key
Control storke S	= 4,5 mm
Control angle α_{b}	= 1620° / 4,5 turns

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Illustrations not obligatory Data subject to change

Data sheet no. 2.4-552E 1/2 Edition 11 26



CHARACTERISTICS Oil viscosity u = 30 mm²/s





Cavity drawing according to ISO 7789–33–01–0–98



For detailed cavity drawing and cavity tools see data sheet 2.13-1005.

ACCESSORIES

Line mount body

Data sheet 2.9-205

Technical explanation see data sheet 1.0-100



Restrictor valve with reverse free flow check Screw-in cartridge

• Q_{max} = 25 l/min

• Q_N = 25 l/min

= 350 bar

• p_{max}

DESCRIPTION

Manually adjustable restrictor valve in cartridge format with an M18x1,5 thread, in accordance with ISO 7789. Standard adjustment types: «S» = Screw adjustment «D» = Knob adjustment. The cartridge body made of steel is galvanized and therefore rust-protected.

FUNCTION

The one part throttle / check piston gives unrestricted flow from port 2 to 1 (see hydraulic symbol). The pressure required to open the check valve = 1 bar. The throttled flow is from port 1 to 2 (see hydraulic symbol). The oil flow closes the check valve and is then controlled via a notched cone, to give good liniar control. When the throttle is closed the valve is leak free

M18x1,5

ISO 7789



APPLICATION

Restrictor valves with reverse free flow check are used wherever non pressure compen-sated flow is required in one direction and unrestricted in the other direction.

Installation of the screw-in cartridge in control blocks as well as in the Wandfluh sandwich plates (vertical stacked systems) of the NG3-Mini types. (Please note the separate data sheets in register 2.4). Cavity tools are avail-able for machining the cavities in steel and aluminium (hire or purchase). Please refer to the data sheets in register 2.13.

TYPE CODE

			DR 🗌 PM	118 -	#	
Restrictor valve w	vith reverse free flow	check				
Setting versions:	Key Control knob	S D				
Screw-in cartridge	e M18x1,5					
Standard nominal (at 10 bar valve pressu	l volume flow rates: re loss)	$Q_N = 3,2 \text{ l/min}$ $Q_N = 25 \text{ l/min}$	3,2 25			
Design-Index (Su	bject to change)					

GENERAL SPECIFICATIONS

Restrictor valve with reverse free flow check Denomination Construction Screw-in cartridge for cavity acc. to ISO 7789 Screw-in thread M18x1,5 Mounting -20...+50 °C Ambient temperature Mounting position any M_D = 30 Nm Fastening torque Weight: m = 0,1 kg (screw)m = 0,11 kg (knob)

Volume flow direction: $1 \rightarrow 2$ adustable flow

 $2 \rightarrow 1$ free flow

HYDRAULIC SPECIFICATIONS

Fluid	Mineral oil, other fluid on request
Contamination efficiency	ISO 4406:1999,
	class 20/18/1421/19/15
	(Required filtration grad $\&1025 \ge 75$)
	srefer to data sheet 1.0-50/2
Viscosity range	12 mm ² /s320 mm ² /s
Temperature of fluid	-20+70°C
Peak pressure	p _{max} = 315 bar
Opening pressure	$p_{o} = 1 \text{ bar}$
Nominal volume flow rates	$Q_{N} = 25 \text{ l/min}, Q_{N} = 3,2 \text{ l/min}$
	Q _N at 10 bar valve pressure loss
Max. volume flow	Q _{max} = 25 l/min
Leakage volume flow	almost leak free with closed restrictor

SYMBOL



ACTUATION MECHANICAL

Mechanical types of operation	in	2 different versions:
S	=	Screw adjustment
		with fork wrench and Allen key
D	=	Control knob adjustment, fixed
Control stroke S	=	5 mm
Control angle α_{b}	=	1800° / 5 turns

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Illustrations not obligatory Data subject to change

Data sheet no. 2.4-610E 1/2 Edition 11 02





DIMENSIONS / SECTIONAL DRAWING







PARTS LIST

Position	Article	Description
10	114.2299	Knob
15	234.1060	Disc
20	193.1040	Safety plate RD4 DIN 6799
30	153.1302	Hexagonal nut 0,5D M6x3,2
40	160.2156	O-ring ID 15,60x1,78
50	160.2111	O-ring ID 11,11x1,78
60	049.3156	Back-up ring RD 12,1x15x1,4

ACCESSORIES

Flange-/sandwich plate NG3-Mini Line mount body

Data sheet 2.4-800 Data sheet 2.9-205

Technical explanation see data sheet 1.0-100

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Throttle valve

- Sandwich construction
- Q_{max} = 15 l/min
- $Q_{N \max}^{IIIAA} = 8 I/min$
- p_{max} = 315 bar

DESCRIPTION

Sandwich type throttle valves based on an M18x1,5 screw type throttle cartridge in accord-ance with ISO 7789 (see data sheet no. 2.4-510). The sandwich plate is in clear anodised aluminium, for weight saving and corrosion protection.

FUNCTION

A fine thread on the adjustable throttle reveals an annular gap or triangular notch. The volume flow is zero when the throttle is screwed in (the metal sealing edge seals completely). The valve flow is bidirectional.

NG3-Mini



APPLICATION

Sandwich type throttle valves can be used anywhere where volume flows have to be infinitely controlled in both directions without taking pressure fluctuations into account. These sandwich valves are ideal for machine tools and also all types of handling operation. Mini-3 throttle valves are used wherever light, extremely compact hydraulic control units are needed.

TYPE CODE



GENERAL SPECIFICATIONS

Denomination	Throttle valve
Nominal size	NG3-Mini according to Wandfluh standard
Construction	Sandwich construction
Mounting	3 holes for socket head cap screw M4
	or studs M4
Connections	Threaded connection plates, Multi-flange
	plates, Longitudinal stacking system
Ambient temperature	-20+50 °C
Mounting position	any
Fastening torque	M_{D} = 2,8 Nm (Qual. 8.8) for fastening screws
	$M_{D} = 30$ Nm for screw-in cartridge
Weight	Depending on the type 0,220,40 kg

HYDRAULIC SPECIFICATIONS

Fluid	Mineral oil, other fluid on request
Contamination efficiency	ISO 4406:1999,
	class 20/18/1421/19/15
	(Required filtration grade ß $1025 \ge 75$)
	refer to data sheet 1.0-50/2
Viscosity range	12 mm²/s…320 mm²/s
Fluid temperature	-20+70 °C
Peak pressure	p _{may} = 315 bar
Nominal volume flow rates	$Q_{N} = 0.32 \text{ l/min}, Q_{N} = 3.2 \text{ l/min}$
	$Q_{\rm N} = 8 \text{l/min}$
	Q _N at 10 bar valve pressure loss
Max. volume flow	Q _{max} = 15 l/min
Leakage volume flow	Almost leak free with closed restrictor
For additional informations	refer to data sheet no 2.4-510.
(For Q _N = 8 l/min please tal	ke the screw-in cartridge DN.PM18-25)

TYPE LIST / FUNCTION



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E-mail: sales@wandfluh.com Internet: www.wandfluh.com Illustrations not obligatory Data subject to change Data sheet no. 2.4-700E 1/2 Edition 03 40



CHARACTERISTICS oil viscosity v = 30 mm²/s



* The exterior dimensions of the screw-in cartridge can be obtained from the corresponding data sheet no. 2.4-510

Technical explanation see data sheet 1.0-100

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Position

10

20

30

Article

623.1 ..

160.2045

238.4401

Description

O-ring ID 4,5x1,5

Screw-in cartridge M18x1,5

Plug VSTI M18X1,5-OR



Throttle valve

- Sandwich construction
- Q_{max} = 20 l/min
- $Q_{N \max}^{\text{max}} = 15 \text{ l/min}$
- p_{max} = 315 bar

DESCRIPTION

Throttle valve sandwich design NG4-Mini with mounting interface acc. to Wandfluh standard. The throttle valve is available in two different variants, namely the standard and the precision throttle (FD). The rotary control is made from aluminium, all other parts, have been phosphated.

NG4-Mini

FUNCTION

TYPE CODE

Using the precision thread adjusting spindle, the restriction of the volume flow can be continuously adjusted. With the spindle fully screwed home, the volume flow is zero, and a metallic edge makes a leak-tight closure. The throttle effect is produced by an annular gap which can be varied in size, or by means of a triangular edge. Because of the nature of the design, there is only a small amount of leakage.



APPLICATION

Sandwich type throttle valves can be used anywhere where volume flows have to be infinitely controlled in both directions without taking pressure fluctuations into account. These sandwich valves are ideal for machine tools and also all types of handling operation. Mini-4 throttle valves are used wherever light, extremely compact hydraulic control units are needed.

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.....1 A

Mounting inte	erface				B DR [4	-	#	
Throttle valve	•								
Restriction in: A A and B P P and T	A AB P PT	B T	B						
Nominal size	4-Mini								
Additional ma	arking for p	recision thr	ottle	FD					
Design-Index	(Subject	to change)							

GENERAL SPECIFICATIONS

Description	Throttle valve
Nominal size	NG4-Mini acc. to Wandfluh standard
Construction	Sandwich
Mounting	3 mounting holes for socket head cap
screws	
	M5 or studs M5
Connections	Threaded connection plates, Multi-flange subplates, Longitudinal stacking system
Ambient temperature	-20+50 °C
Mounting position	any
Fastening torque	M _p = 5,5 Nm (Quality. 8.8)
Weight	Depending on the type 0,80,9 kg

HYDRAULIC SPECIFICATIONS

Fluid Contamination efficiency

Viscosity range Fluid temperature Peak pressure Nominal volume flow rate

Max. Volume flow Leakage volume flow Mineral oil, other fluid on request ISO 4406:1999, class 20/18/14...21/19/15 (Required filtration grade ß 10...25 \geq 75) refer to data sheet 1.0-50/2 12 mm²/s...320 mm²/s -20...+70 °C p_{max} = 315 bar Q_N = 15 l/min Q_N at 10 bar valve pressure loss Q_{max} = 20 l/min Almost leak free with closed restrictor

TYPE LIST / FUNCTION



BDRB4







BDRPT4



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CHARACTERISTICS Oil viscosity v = 30 mm²/s





DIMENSIONS

BDRA4, BDRB4 et BDRAB4

20



30







Technical explanation see data sheet 1.0-100

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PARTS LIST

Position

10

20

Article

114.1204

160.2052

Description

Turning knob O-ring ID 5,28x1,78

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Throttle valve

- Sandwich construction
- Q_{max} = 80 l/min
- Q_N^{max} = 50 l/min p_{max} = 350 bar

DESCRIPTION

Throttle valve sandwich type NG6 with interface acc. to ISO 4401-03. The throttle valve is available in two different variants, namely the standard and the precision throttle (FD). Version FD only avaiable for sandwiches with restriction in A, B, or AB. The turning knob is made from aluminium, all other parts made of steel, have been phosphated.

GENERAL SPECIFICATIONS......1 HYDRAULIC SPECIFICATION1 TYPE LIST / FUNCTION1 CHARACTERISTICS......2 DIMENSIONS......2 PARTS LIST2

FUNCTION

Using the precision thread adjusting spindle, the restriction of the volume flow can be continuously adjusted. With the spindle fully screwed home, the volume flow is zero, and a metallic edge makes a leak-tight closure. The throttle effect is produced by an annular gap which can be varied in size, or by means of a triangular edge. Because of the nature of the design, there is only a small amount of leakage.

NG6

ISO 4401-03



APPLICATION

Sandwich type throttle valves can be used anywhere where volume flows have to be infinitely controlled in both directions without taking pressure fluctuations into account. These sandwich valves are ideal for machine tools and also all types of handling operation.

Attention:

The throttle spindle in case of ADRP, ADRT and ADRPT is not secured against being unscrewed.

6

4

CONTENTS

TYPE CODE

					J #
Internationa	al mounting in	nterface IS	0		
Throttle val	ve				
Restriction	in:				
A	A	В	В		
A and B	AB				
Р	Ρ	Т	Т		
P and T	PT				
Nominal siz	ze 6				
Additional r	marking for p	recision th	ottle (in A, B or Al	only) FD	
Design-Inde	ex (Subject to	change)			

GENERAL SPECIFICATIONS

Description	Throttle valve
Nominal size	NG6 acc. to ISO 4401-03
Construction	Sandwich construction
Mounting	4 mounting holes for socket cap screws
	M5 or studs screws M5
Connections	Threaded connection plates, Multi-flange
	subplates, Longitudinal stacking system
Ambient temperature	-20+50 °C
Mounting position	any
Fastening torque	M _p = 5,5 Nm (Quality. 8.8)
Weight	m = 1.9 kg

HYDRAULIC SPECIFICATIONS

Mineral oil, other fluid on request
ISO 4406:1999,
class 20/18/1421/19/15
(Required filtration grade ß 1025 ≥75)
refer to data sheet 1.0-50/2
12 mm ² /s320 mm ² /s
-20+70 °C
p _{max} = 350 bar
$Q_{N} = 50$ l/min (throttle at A or B)
Q _N at 10 bar valve pressure loss
$Q_{max} = 80 \text{ l/min}$
Almost leak free with closed restrictor

TYPE LIST / FUNCTION



PT А В





ADRPT6



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Illustrations not obligatory Data subject to change

Data sheet no. 2.4-750E 1/2 Edition 03 40



∆p = 10 bar

∆p = 5 bar

3 n[-]

CHARACTERISTICS Oil viscosity v = 30 mm²/s Q = f(n)Volume flow adjustment characteristics $\Delta p = f(Q)$ Pressure loss/flow characteristics (Standard ADRA, B, AB6) p [bar] Q [l/min] 80 ∆p = 20 bar 60 ∆p = 10 bar 40 ∆p = 5 bar 2 20 0 0 10 20 30 40 50 60 70 80 Q [l/min] 1 2 3 4,5 n[-] 0 4 1. Restriction in A or B Q = f(n)Volume flow adjustment characteristics 2. Restriction in P or T (Precision throttle) Q [l/min] 80 Δp = 20 bar 60 $\Delta p = 10 \text{ bar}$ 40 ∆p = 5 bar 20 0 1 2 3 0 4 5 6 n[-] Q = f(n)Volume flow adjustment characteristics (Precision throttle) Q [l/min] 3 ∆p = 20 bar 2.5

2 1,5

1 0.5 0 Ó0

0.5

DIMENSIONS

30

25

20

15

10

5 0



1

1,5

2

2.5

ADRP, T, PT6:

The throttle spindle is not secured against being unscrewed.



Technical explanation see data sheet 1.0-100

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PARTS LIST

Position

10

20

30

Article

114.1201

153.1602

160.2093

Description

Turning knob

Hexagon nut 0,8D M12

O-ring ID 9,25x1,78

Ø 5,5

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Throttle valve

- Sandwich construction
- Q_{max} = 100 l/min
- $Q_N^{max} = 60 \text{ l/min}$ $p_{max} = 350 \text{ bar}$

DESCRIPTION

Throttle valve sandwich type NG10 with interface acc. to ISO 4401-05. The throttle valve is available in two different variants, namely the standard and the precision throttle (FD). Version FD only avaiable for sandwiches with restriction in A, B, T, or AB. The turning knob is made from aluminium, all other parts made of steel, have been phosphated.

GENERAL SPECIFICATIONS.....1 HYDRAULIC SPECIFICATION1 TYPE LIST / FUNCTION1 CHARACTERISTICS......2 DIMENSIONS......2 PARTS LIST2

FUNCTION

Using the precision thread adjusting spindle, the restriction of the volume flow can be continuously adjusted. With the spindle fully screwed home, the volume flow is zero, and a metallic edge makes a leak-tight closure. The throttle effect is produced by an annular gap which can be varied in size, or by means of a triangular edge. Because of the nature of the design, there is only a small amount of leakage.

NG10

ISO 4401-05



APPLICATION

Sandwich type throttle valves can be used anywhere where volume flows have to be infinitely controlled in both directions without taking pressure fluctuations into account. These sandwich valves are ideal for machine tools and also all types of handling operation. Attention: The throttle spindle in case of ADRP is not secured against being unscrewed.

CONTENTS

TYPE CODE

Internationa	Il mounting ii	nterface IS	0		A DR	10 - [#
Trottle valve	9						
Restriction i A A and B P P and T	in: AB P PT	B T	B				
Nominal siz	e 10						
Additional m	narking for p	recision thr	ottle (in A, B, T or	AB only) FD			
Design-Inde	ex (Subject to	change)					

GENERAL SPECIFICATIONS

Description	Throttle valve
Nominal size	NG10 acc. to ISO 4401-05
Construction	Sandwich construction
Mounting	4 mounting holes for socket head cap screws
-	M6 or studs screws M6
Connections	Threaded connection plates, Multi-flange
	subplates, Longitudinal stacking system
Ambient temperature	-20+50 °C
Mounting position	any
Fastening torque	$M_{p} = 9,5 \text{ Nm}$ (Quality. 8.8)
Weight	m = 2,1 kg

HYDRAULIC SPECIFICATIONS

Fluid	Mineral oil, other fluid on request
Contamination efficiency	ISO 4406:1999,
	class 20/18/1421/19/15
	(Required filtration grade ß 1025 ≥75)
	refer to data sheet 1.0-50/2
Viscosity range	12 mm²/s…320 mm²/s
Fluid temperature	-20+70°C
Peak pressure	p _{max} = 350 bar
Nominal volume flow rate	$Q_{N} = 60 \text{ l/min}$
	Q _N at 10 bar valve pressure loss
Max. Volume flow	$Q_{max} = 100 \text{ l/min}$
Leakage volume flow	Almost leak free with closed restrictor

TYPE LIST / FUNCTION







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10







PARTS LIST

Position	Article	Description
10	114.1201	Turning knob
20	153.1702	Hexagon nut 0,5D M16
30	160.2140	O-ring ID 14,00x1,78

Technical explanation see data sheet 1.0-100

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Ø 6,5

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ADRP10

screwed.

The throttle spindle

is not secured against being un-

> Illustrations not obligatory Data subject to change

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ο To

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P=106

18

в

Data sheet no. 2.4-770E 2/2 Edition 03 40



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Restrictor valve with reverse free flow check Sandwich construction

- Q_{max} = 10 l/min
- Q_{N max} = 8 l/min
- p_{max} = 315 bar

DESCRIPTION

Sandwich type one-way restrictor. Fitted with one way restrictor cartridge with incorporated free flow check. Screw-in cartridge M18x1,5 in accordance with ISO 7789 (see data sheet no. 2.4-610). The sandwich plate is in clear anodised aluminium, for weight saving and corrosion protection.

FUNCTION

Free flow in one direction via the spring-loaded check valve integrated in the screw-in cartridge. The opening pressure of the check valve $p_{a} = 1$ bar. In the other direction, with the check valve shut, the volume flow can be infinitely adjusted via the restrictor section as a function of the pressure.

NG3-Mini



APPLICATION

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Sandwich type, one-way restrictors are used where volume flows have to be controlled in one flow direction according to the load. Depending on the application, a distinction is made between restricting the forward flow or the return flow. These sandwich valves are particularly suitable for machine tools and also all kinds of handling operations. Mini-3 oneway restrictors are used where hydraulic systems have to be both light and compact.

TYPE CODE

					DR	5	A03	-	[#
Restrictor valve with reverse free flow check										
Setting versions:	Screw Knob	S D								
Sandwich construction										
Interface NG3-Mini										
Meter-out::	A and B A	AB A B	В							
Meter-in:	A and B A	ABV AV B	BV							
Standard nominal volume to (at 10 bar valve pressure le	flow rates: Q _N oss) Q _N	= 3,2 l/min = 8 l/min	3,2							
Design-Index (Subject to c	hange)									

GENERAL SPECIFICATIONS

TYPE LIST / FUNCTION

Denomination	Restrictor valve with reverse free flow check
Nominal size	NG3-Mini acc. to Wandfluh standard
Construction	Sandwich
Mounting	3 mounting holes for socket head cap screws
	M4 or stud screws M4
Connections	Threaded connection plates, Multi-flange
	subplates, Longitudinal stacking system
Ambient temperature	-20+50 °C
Mounting position	any
Fastening torque	M_{p} = 2,8 Nm (Qual. 8.8) for fastening screws
	$M_{D} = 30$ Nm for screw-in cartridge
Weight	Depending on the type 0,320,42 kg

HYDRALILIC SPECIFICATIONS

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Fluid	Mineraoil, other fluid on request
Contamination efficiency	ISO 4406:1999, class 20/18/1421/19/15
	(Required filtration grade ß $1025 \ge 75$)
	refer to data sheet 1.0-50/2
Viscosity range	12 mm²/s320 mm²/s
Fluid temperature	-20+70 °C
Peak pressure	p _{may} = 315 bar
Pressure required to open	- 1144
the check valve	p _e = 1 bar
Nominal volume flow rates	$Q_{N} = 8 \text{ l/min}, Q_{N} = 3,2 \text{ l/min}$
	Q _N at 10 bar valve pressure loss
Max. volume flow	$Q_{max} = 10 $ l/min
Leakage volume flow	Almost leak free with closed restrictor
For further hydraulic specif	fications refer to data sheet 2.4-610.

Meter-out: Meter-in: Valves for restricting the meter-in flow are DR.SA03-A DR.SA03-AV achieved by turning the one-way restrictors (horizontal axis): B get ΒV A get В AV DR.SA03-B DR.SA03-BV ABV AB get Valves for restricting the meter-in flow are P Р٦ supplied with a sealing plate and an intermediate plate. DR.SA03-AB DR.SA03-ABV ΡT R A ΡT В sales@wandfluh.com Wandfluh AG Tel. +41 33 672 72 72 F-mail[.] Illustrations not obligatory Data sheet no.

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Data subject to change





PARTS LISTS

Position	Article	Description
10	627.1	Restrictor valve cartridge M18x1,5 according to data sheet 2.4-610
20	160.2045	O-ring ID 4,5x1,5
30	238.4401	Plug VSTI M18x1,5-OR
40	173.0650	Sealing plate PDSA03
50	173.0700	Intermediate plate PZSA03

* The total lenghts depends on the cartridge type, see data sheet no. 2.4-610.

Technical explanation see data sheet 1.0-100

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Restrictor valve with reverse free flow check Sandwich construction

- Q_{max} = 20 l/min
- Q_N^{max} = 12 l/min p_{max} = 315 bar

DESCRIPTION

Restrictor valve sandwich design NG4-Mini with connecting diagram pursuant acc. to Wandfluh standard. The non-return throttle valve is available in two different variants, namely the standard and the precision throttle (FD). The rotary control is made from aluminium, all other parts, have been phosphated.

FUNCTION

Using the precision thread adjusting spindle, the restriction of the volume flow can be continuously adjusted. With the spindle fully screwed home, the volume flow is zero, and a metallic edge makes a leak-tight closure. In the opposite direction, the spring-loaded tapered piston opens and volume flow with a load pressure drop is enabled. The throttle effect is produced ba an annular gap which can be varied in size, or by means of a triangular edge. Because of the nature of the design, there is only a small amount of leakage.

NG4-Mini



APPLICATION

Sandwich type, one-way restrictors are used where volume flows have to be controlled in one flow direction according to the load. Depending on the application, a distinction is made between restricting the forward flow or the return flow. These sandwich valves are particularly suitable for machine tools and also all kinds of handling operations. Mini-4 one-way restrictors are used where hydraulic systems have to be both light and compact.

CONTENTS

GENERAL SPECIFICATIONS	1
HYDRAULIC SPECIFICATIONS	1
TYPE LIST / FUNCTION	1
CHARACTERISTICS	2
DIMENSIONS	2
PARTS LIST	2

TYPE CODE

				В	URD	4	-	#	
Mounting interface									
Description for restrictor valve									
Meter out in: A A A and B no remark	В	В							
Meter-in in: A VA A and B V	В	VB							
Nominal size 4-Mini									
Additional marking for precisio	n throttle	e F	D						
Design-Index (Subject to char	nge)								

GENERAL SPECIFICATIONS

Denomination	Restrictor valve with reverse free flow check
Nominal size	NG4-Mini acc. to Wandfluh standard
Construction	Sandwich
Mounting	3 mounting holes for socket head cap screws
	M5 or stud screws M5
Connections	Threaded connection plates, Multi-flange subplates, Longitudinal stacking system
Ambient temperature	-20+50 °C
Mounting position	any
Fastening torque Weight	M_{D} = 5,5 Nm (Qual. 8.8) for fastening screws Depending on the type 0,80,9 kg

HYDRALILIC SPECIFICATIONS

Fluid	Mineraoil, other fluid on request
Contamination efficiency	ISO 4406:1999, class 20/18/1421/19/15
	(Required filtration grade ß $1025 \ge 75$)
	reler to data sheet 1.0-50/2
Viscosity range	12 mm²/s320 mm²/s
Fluid temperature	-20+70°C
Peak pressure	p _{may} = 315 bar
Pressure required to open	- 1164
the check valve	p _o = 2,2 bar
Nominal volume flow rates	$\tilde{Q_N} = 12 \text{ l/min}$
	Q at 10 bar valve pressure loss
Max. volume flow	$Q_{max} = 20 $ l/min
Leakage volume flow	Almost leak free with closed restrictor

TYPE LIST / FUNCTION



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Data subject to change

2.4-835E 1/2 Edition 03 40





PARTS LISTS

Position	Article	Description
10	114.1204	Turning knob
20	160.2052	O-ring ID 5,28x1,78
30	160.2067	O-ring ID 6,75x1,78
		in line with check valve
40	173.1650	Sealing plate BDB4
50	173.1700	Intermediate plate BZB4

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Technical explanation see data sheet 1.0-100

V=88



Restrictor valve with reverse free flow check Sandwich construction

- Q_{max} = 70 l/min
- Q_N = 40 l/min p_{max} = 350 bar

DESCRIPTION

Restrictor valve sandwich type NG6 with interface to ISO 4401-03. The non-return throttle valve is available in two different variants, namely the standard and the precision throttle (FD). The turning knob is made from aluminium, all other parts made of steel, have been phosphated.

FUNCTION

Using the precision thread adjusting spindle, the restriction of the volume flow can be continuously adjusted. With the spindle fully screwed home, the volume flow is zero, and a metallic edge makes a leak-tight closure. In the opposite direction, the spring-loaded tapered piston opens and volume flow with a load pressure drop is enabled. The throttle effect is produced ba an annular gap which can be varied in size, or by means of a triangular edge. Because of the nature of the design, there is only a small amount of leakage.

NG6

ISO 4401-03



APPLICATION

Sandwich type, one-way restrictors are used where volume flows have to be controlled in one flow direction according to the load. Depending on the application, a distinction is made between restricting the forward flow or the return flow. These sandwich valves are particularly suitable for machine tools and also all kinds of handling operations.

GENERAL SPECIFICATIONS......1 H

CONTENTS

HYDRAULIC SPECIFICATIONS	1
TYPE LIST / FUNCTION	1
CHARACTERISTICS	2
DIMENSIONS	2
PARTS LIST	2

TYPE CODE

			А	URD	6	-	#	
International mounting interface	ISO							
Description for restrictor valve								
Meter out in: A A A and B no remark	В	В						
Meter-in in: A VA A and B V	В	VB						
Nominal size 6								
Additional marking for precision	throttle	FD						
Design-Index (Subject to change	ge)							

GENERAL SPECIFICATIONS

Denomination	Restrictor valve with reverse free flow check
Nominal size	NG6 acc. to ISO 4401-03
Construction	Sandwich
Mounting	4 mounting holes for socket head cap screws
	M5 or stud screws M5
Connections	Threaded connection plates, Multi-flange subplates, Longitudinal stacking system
Ambient temperature	-20+50 °C
Mounting position	any
Fastening torque Weight	$M_D = 5,5$ Nm (Qual. 8.8) for fastening screws Depending on the type 1.81.9 kg

HYDRALILIC SPECIFICATIONS

Fluid	Mineraoil, other fluid on request
Contamination efficiency	ISO 4406:1999, class 20/18/1421/19/15
	(Required filtration grade $\& 1025 \ge 75$)
	refer to data sheet 1.0-50/2
Viscosity range	12 mm²/s…320 mm²/s
Fluid temperature	-20+70°C
Peak pressure	p _{max} = 350 bar
Pressure required to open	
the check valve	p _a = 2 bar
Nominal volume flow rates	$\tilde{Q_N} = 40 \text{ l/min}$
	Q _N at 10 bar valve pressure loss
Max. volume flow	$Q_{max} = 70 $ l/min
Leakage volume flow	Almost leak free with closed restrictor

TYPE LIST / FUNCTION



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Data subject to change

2.4-850E 1/2 Edition 03 40











PARTS LISTS

Position	Article	Description
10	114.1201	Turning knob
20	160.2076	O-ring ID 7,65x1,78
30	160.2120	O-ring ID 12,42x1,78
		in line with check valve
40	173.3650	Sealing plate ADB6
50	173.3700	Intermediate plate AZB6



Technical explanation see data sheet 1.0-100

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Restrictor valve with reverse free flow check Sandwich construction

- Q_{max} = 100 l/min
- \mathbf{Q}_{N}^{\max} = 60 l/min
- $p_{max} = 350 \text{ bar}$

DESCRIPTION

CONTENTS

Restrictor valve sandwich type NG10 with interface to ISO 4401-05. The non-return throttle valve is available in two different variants, namely the standard and the precision throttle (FD). The turning knob is made from aluminium, all other parts made of steel, have been phosphated.

FUNCTION

Using the precision thread adjusting spindle, the restriction of the volume flow can be continuously adjusted. With the spindle fully screwed home, the volume flow is zero, and a metallic edge makes a leak-tight closure. In the opposite direction, the spring-loaded tapered piston opens and volume flow with a load pressure drop is enabled. The throttle effect is produced ba an annular gap which can be varied in size, or by means of a triangular edge. Because of the nature of the design, there is only a small amount of leakage.

NG10

ISO 4401-05



APPLICATION

A URD [

Sandwich type, one-way restrictors are used where volume flows have to be controlled in one flow direction according to the load. Depending on the application, a distinction is made between restricting the forward flow or the return flow. These sandwich valves are particularly suitable for machine tools and also all kinds of handling operations.

10 -

#

TYPE CODE

GENERAL SPECIFICATIONS1	
HYDRAULIC SPECIFICATIONS1	
TYPE LIST / FUNCTION1	
CHARACTERISTICS2	
DIMENSIONS2	
PARTS LIST2	

International mounting interface ISO Description for restrictor valve Meter out in: А B B A A and B no remark Meter-in in: VA B VB Α A and B V Nominal size 10 Additional marking for precision throttle FD Design-Index (Subject to change)

GENERAL SPECIFICATIONS

Denomination	Restrictor valve with reverse free flow check
Nominal size	NG10 acc. to ISO 4401-05
Construction	Sandwich
Mounting	4 mounting holes for socket head cap screws
	M6 or stud screws M6
Connections	Threaded connection plates, Multi-flange
	subplates, Longitudinal stacking system
Ambient temperature	-20+50° C
Mounting position	any
Fastening torque	M_{p} = 9,5 Nm (Qual. 8.8) for fastening screws
Weight	Depending on the type 1,82,3 kg

HYDRAULIC SPECIFICATIONS Fluid Mineraoil, other fluid on request

Fluid Contamination efficiency

Viscosity range Fluid temperature Peak pressure Pressure required to open the check valve Nominal volume flow rates

Leakage volume flow

the check valve $p_o = 0.8$ bar Nominal volume flow rates $Q_N = 60$ l/min Q_N at 10 bar valve pressure loss Max. volume flow $Q_{max} = 100$ l/min

Q_{max} = 100 l/min Almost leak free with closed restrictor

ISO 4406:1999, class 20/18/14...21/19/15(Required filtration grade ß $10...25 \ge 75$)

refer to data sheet 1.0-50/2

12 mm²/s...320 mm²/s

-20...+70°C

 $p_{max} = 350 \text{ bar}$

TYPE LIST / FUNCTION



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Meter-out





20

30







PARTS LISTS

Position	Article	Description
10	114.1201	Turning knob
20	160.2120	O-ring ID 12,42x1,78
30	160.2132	O-ring ID 13,10x2,62
		in line with check valve
40	173.4650	Sealing plate ADB10
50	173.4700	Intermediate plate AZB10

Technical explanation see data sheet 1.0-100E

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Illustrations not obligatory Data subject to change

VA=106

VB=106

V=132



2-way flow control valve Screw-in cartridge Fixed orifice, adjustable pressure compensator

• Q_{max} = 17 l/min

• Q_{N max} = 12,5 l/min

• p_{max}^{N} = 315 bar

DESCRIPTION

2-way screw-in cartridge-type flow control valve with M18x1,5 thread, for pressure cavity acc. to ISO 7789. The valve is available in two different setting versions: Spanner setting "S" and turning knob "D". In its standard form, this control valve can be supplied with five nominal volume flow ranges. The two part cartridge body is made of steel. The surface of the valve is zinc-coated plated for rust protection.

FUNCTION

The 2-way flow control valve is designed to keep the speed of a consumer constant irrespective of the load. The fixed measuring orifice which is integrated into the pressure compensating piston determines the volume flow. If there is a pressure change, the pressure compensating spool is displaced and changes the outlet diameter in order to keep the pressure difference on the measuring orifice constant. By varying the spring bias acting on the compensator spool the flow rate can be changed. Minimum adjustable flow within 40...70% of $Q_{nominal}$. Flow regulation is effective above Δp 10 bar approx. Backward flow depends on load.

M18x1,5

ISO 7789



APPLICATION

For use in all hydraulic systems where the supply volume flow needs to be kept constant even when the load fluctuates. Installation of the screw-in cartridge in control blocks as well as in the Wandfluh sandwich plates (vertical stacked systems) and flange valves of the NG3-Mini size. (Please note the separate data sheets in register 2.5). Cavity tools are available for machining the cavities in steel and aluminium (hire or purchase). Please refer to the data sheets in register 2.13.

TYPE CODE

		QA	4 [PM18	-	#	
Flow control valve	e 2-way							
Setting versions:	Screw Turning knob Cover	S D A (see data sheet 2.0-50)						
Screw-in cartridge	e M18x1,5							
Standard nomina	pressure range:	$\begin{array}{l} Q_{_{N}}=0,4\ldots0,6 \ \text{l/min} \\ Q_{_{N}}=0,8\ldots1,25 \ \text{l/min} \\ Q_{_{N}}=1,3\ldots2,1 \ \text{l/min} \\ Q_{_{N}}=2,5\ldots5,0 \ \text{l/min} \\ Q_{_{N}}=5,0\ldots12,5 \ \text{l/min} \end{array}$	0 1 2 5 1	,63 ,25 2,5]]]]			

Design-Index (Subject to change)

GENERAL SPECIFICATIONS

Denomination	Flow control valve 2-way
Construction	Screw-in cartridge for cav
Mounting	Screw-in thread M18x1,5
Ambient temperature	-2050 °C
Mounting position	any
Fastening torque	$M_{p} = 30 \text{ Nm}$
Weight:	m = 0,09 kg (screw)
-	m = 0,1 kg (knob)
Volume flow direction:	$1 \rightarrow 2$ adjustable flow

Screw-in cartridge for cavity acc. to ISO 7789 Screw-in thread M18x1,5 -20...50 °C any $M_D = 30 \text{ Nm}$ m = 0,09 kg (screw)m = 0,1 kg (knob) $1 \rightarrow 2 \text{ adjustable flow}$ $2 \rightarrow 1 \text{ free flow}$

HYDRAULIC SPECIFICATIONS

Fluid	Mineral oil, other fluid on request
	ISO 4406:1999, class 18/16/13
Contamination efficiency	(Required filtration grade $\& 610 \ge 75$)
	refer to data sheet 1.0-50/2
Viscosity range	12 mm ² /s320 mm ² /s
Fluid temperature	-20+70 °C
Peak pressure	p _{max} = 315 bar
Minimum pressure for	- IIGA
controlled flow	$\Delta p_{min} = 10 \text{ bar}$
Nominal volume flow rates:	$Q_{N} = 0.63 \text{ l/min}, Q_{N} = 1.25 \text{ l/min},$
	$Q_{N} = 2$ l/min, $Q_{N} = 5$ l/min, $Q_{N} = 12,5$ l/min
Min. volume flow	$Q_{min} = 0.4 $ l/min
Max. volume flow	$Q_{max} = 17 \text{ l/min}$
Hysteresis	depending on nom. volume flow 38%

SYMBOLS

simplified





MECHANICAL ACTUATION

Mechanical types of operation	in	2 different versions:
S	=	Screw adjustment
		with fork wrench and Allen key
D	=	Control knob adjustment, fixed
Control stroke S _b	=	5 mm
Control angle α_{b}	=	1800° / 5 turns

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CHARACTERISTICS Oil viscosity υ = 30 mm²/s



 $\Delta p = f(Q)$ Pressure drop characteristics for return flow (from $2 \rightarrow 1$) Q [l/min]_{QN = 12,5} Q_N= 5 25 20 15 Q_N= 2 10 Q_N= 1,25 5 Q_N=0,63 0 0 50 100 150 200 250 300 350 p [bar]

DIMENSIONS / SECTIONAL DRAWING



Cavity drawing according to ISO 7789–18–01–0–98



For detailed cavity drawing and cavity tools see data sheet 2.13-1002.

PARTS LIST

Position	Article	Description
10	114.2299	Knob
15	234.1060	Disc
20	193.1040	Safety plate RD4 DIN 6799
30	153.1302	Hexagonal nut 0,5D M6x3,2
40	160.2156	O-ring ID 15,60x1,78
50	160.2111	O-ring ID 11,11x1,78
60	049.3156	Back-up ring RD 12,1x15x1,4

ACCESSORIES

Sandwich plate NG3-Mini

Line mount body

Data sheet 2.5-700

Data sheet 2.9-205

Technical explanation see data sheet 1.0-100



2-way flow control valve Screw-in cartridge

- Integrated non-return valve function
- · Fixed orifice, adjustable pressure compensator
- Q_{max} = 50 l/min
- Q_{N max} = 40 l/min
- p_{max} = 350 bar

DESCRIPTION

2-way flow control valve with non-return function as a screw-in cartridge with a thread M22x1,5 for cavity according to ISO 7789. In its standard form, this flow control valve can be supplied with nine nominal volume flow ranges. For a flow at low pressure drop in the oposite direction, a check function has been integrated. The two part cartridge body is made of steel. The surface of the valve is zinc-coated for rust protection.

FUNCTION

The 2-way flow control valve is designed to keep the speed of a consumer constant, irrespective of the load. The fixed measuring orifice which is integrated into the pressure compensating spool, determines the volume flow. If there is a pressure change, the compensating spool is displaced and changes the outlet diameter in order to keep the pressure difference over the mesuring orifice constant. The volume flow is adjustable with the adjustment spindle within a range of 60...100% of $Q_{_{N}}$ by changing the spring force acting on the compensating spool.

M22x1,5

ISO 7789



APPLICATION

For use in all hydraulic systems where the supply volume flow has to be kept constant even when the load fluctuates. Installation of the screw-in cartridge in control blocks as well as in the Wandfluh sandwich plates (vertical stacked systems) and flange valves of the NG4-Mini and NG6 size. (Please note the separate data sheets in register 2.5). Cavity tools are available for machining the cavities in steel and aluminium (hire or purchase). Please refer to the data sheets in register 2.13.

QR S PM22 - [

TYPE CODE

2-way flow control valve with non-return function			
Screw setting versions			
Screw-in cartridge M22x1,5			
Standard nominal volume flow ranges ${\rm Q}_{\rm N}\!\!:$	0,61,0 l/min 1,01,6 l/min 1,62,5 l/min 2,54,0 l/min 4,06,3 l/min 6,310 l/min 1016 l/min 1625 l/min 2540 l/min	1 1,6 2,5 4 6,3 10 16 25 40	

Design-Index (Subject to change)

GENERAL SPECIFICATIONS

Description Construction Mounting Ambient temperature Mounting position Fastening torque Weight Volume flow direction:

2-way flow control valve Screw-in cartridge for cavity acc. to ISO 7789 Screw-in thread M22x1,5 -20...50°C any M_D = 50 Nm m = 0,1 kg $1 \rightarrow 2$ adjusted volume flow $2 \rightarrow 1$ free flow through by-pass check

HYDRAULIC SPECIFICATIONS

Fluid	Mineral oil, other fluid on request
Contamination efficiency	ISO 4406:1999, class 18/16/13
	(Required filtration grade ß $610 \ge 75$)
	refer to data sheet 1.0-50/2
Viscosity range	12 mm²/s…320 mm²/s
Fluid temperature	-20+70 °C
Peak pressure	p = 350 bar
Beginning of regulation	approx. 9 bar for 60 % of Q
	approx. 25 bar for 100 % Q
Influence of load pressure	< 10 % of adjusted volume flow
Nominal volume flow rates	see type code
Max. volume flow	$Q_{max} = 50 $ l/min
Hysteresis	$< 5\%$ of $Q_{\rm M}$, minimum 0,2 l/min
	14

1440°(4 turns)

Hexagonal socket wrench s4

SYMBOLS

simplified



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CONTROL Screw setting

Control angle α_{h}

Illustrations not obligatory Data subject to change

Data sheet no. 2.5-530E 1/2 Edition 05 06



CHARACTERISTICS Oil viscosity v = 30 mm²/s





DIMENSIONS / SECTIONAL DRAWINGS

Screw setting versions "S"



Cavity drawing according to ISO 7789–22–01–0–98



For detailed cavity drawing and cavity tools see data sheet 2.13-1008.

PARTS LIST

Position	Article	Description
20	193.1050	Retainer for shaft RD5 DIN 6799
30	153.1403	Hexagonal nut 0,5D M8
40	160.2188	O-ring ID 18,77x1,78
50	160.2156	O-ring ID 15,60x1,78
60	049.3196	Back-up ring RD 16,1x19x1,4

ACCESSORIES

Line mount body

Data sheet 2.9-205

Technical explanation see data sheet 1.0-100



2-way flow control valve Adjustable orifice, fixed pressure compensator Screw-in cartridge

• $Q_{max} = 48 \text{ l/min}$

- Q_{N max} = 40 l/min
- p_{max} = 350 bar

DESCRIPTION

2-way screw-in cartridge-type flow control valve with M22x1,5 thread, for pressure cavity acc. to ISO 7789. The valve is available in 2 different setting versions: Spanner setting "S" and turning knob "D". In its standard form, this control valve can be supplied with five nominal volume flow ranges. The two part cartridge body is made of steel. The surface of the valve is zinc-plated for rust protection.



The 2-way flow control valve is designed to keep the speed of a consumer constant irrespective of the load. The adjustable measuring orifice determines the volume flow. If there is a pressure change, the pressure compensating spool is displaced and changes the outlet diameter in order to keep the pressure difference on the measuring orifice constant.

M22x1,5

ISO 7789



APPLICATION

For use in all hydraulic systems where the supply volume flow needs to be kept constant even when the load fluctuates. Installation of the screw-in cartridge in control blocks as well as in the Wandfluh sandwich plates (vertical stakked systems) and flange valves of the NG3-Mini size. (Please note the separate data sheets in register 2.5). Cavity tools are available for machining cavities (hire or purchase). Please refer to the data sheets in register 2.13.

TYPE CODE



Design-Index (Subject to change)

GENERAL SPECIFICATIONS

Denomination	Flow control valve 2-way	Fluid
Construction	Screw-in cartridge for cavity acc. to ISO 7789	
Mounting	Screw-in thread M22x1,5	Contamination effi
Ambient temperature	-2050° C	
Mounting position	any	Viscosity range
Fastening torque	$M_D = 50 \text{ Nm}$	Fluid temperature
Weight:	m = 0,18 kg (screw)	Peak pressure
-	m = 0,19 kg (knob)	Nominal volume flo
Volume flow direction:	$1 \rightarrow 2$ adjustable flow	
	-	Min. volume flow

HYDRAULIC SPECIFICATIONS

Fluid	Mineral oil, other fluid on request
	ISO 4406:1999, class 18/16/13
Contamination efficiency	(Required filtration grade $\& 610 \ge 75$)
	refer to data sheet 1.0-50/2
Viscosity range	12 mm ² /s320 mm ² /s
Fluid temperature	-20+70° C
Peak pressure	p _{max} = 350 bar
Nominal volume flow rates:	Q _N = 2,5 l/min, 6,3 l/min, 16 l/min,
	Q _N = 25 I/min, 40 I/min
Min. volume flow	$Q_{min} = 0,1 \text{ l/min} (v = 30 \text{ mm}^2/\text{s})$
Max. volume flow	Q _{max} = 48 l/min
Control accuracy	≤ 1 %

SYMBOLS

simplified







MECHANICAL ACTUATION

Mechanical types of op	eration in 2 different versions:
S	= Screw adjustment
	with fork wrench and Allen key
D	= Control knob adjustment, fixed
Control stroke Sb	= 2,5 mm
Control angle α_b	= 900° / 2,5 turns

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Illustrations not obligatory Data subject to change

Data sheet no. 2.5-535E 1/2 Edition 11 20



CHARACTERISTICS Oil viscosity v = 30 mm²/s







DIMENSIONS







Q = f (n) Volume flow adjustment characteristic (p = 350 bar)







For cavity details and cavity tools, see data sheet 2.13-1008.

PARTS LIST

Position	Article	Description
10	114.2299	Knob
15	234.1060	Plate
20	193.1040	Safety plate RD4 DIN 6799
30	153.1302	Hexagonal nut 0,5D M6x3,2
40	160.2188	O-ring ID 18,77x1,78
50	160.2156	O-ring ID 15,60x1,78
60	049.3196	Back-up ring RD 16,1x19x1,4

ACCESSORIES

ACCECCONIEC	
Flange-/sandwich plate NG4-Mini	Data sheet 2.5-720
Flange-/sandwich plate NG6	Data sheet 2.5-740
Line mount body	Data sheet 2.9-205

Technical explanation see data sheet 1.0-100



3-way flow control valve With a fixed pressure compensator and adjustable orifice Screw-in cartridge construction

• Q_{max} = 42 l/min

- Q_{N max} = 40 l/min
- p_{max} = 350 bar

DESCRIPTION

3-way flow control valve as screw-in cartridge with thread M22x1.5 for cavity in accordance with ISO 7789. The valve can be supplied in 2 different setting versions: Spanner setting «S» and rotary knob setting «D». Available as standard are 3 nominal flow steps. The two-part cartridge body is made of steel. External parts are zinc coated and as a result rust protected.



The 3-way flow control valve is designed to

keep the oil flow to any actuator constant irre-

spective of the load. Surplus volume flow will

be diverted to the tank line thus saving energy

and preventing an overheating of the hydrau-

lic system. By turning the knob of the variable

restrictor, the volume flow can be adjusted. In

case of pressure fluctuations, the through flow

cross-section in the pressure balance spool

changes in such a manner, that the pressure

difference in the measuring orifice is kept con-



APPLICATION

For use in all hydraulic systems where the supply volume flow needs to be kept constant even when the load fluctuates. Installation of the screw-in cartridge in control blocks as well as in the Wandfluh sandwich plates (vertical stakked systems) and flange valves. (Please note the separate data sheets in register 2.5) Cavity tools are available for machining cavities (hire or purchase). Please refer to the data sheets in register 2.13.

TYPE CODE

stant

FUNCTION



UVDDALLI IC SDECIEICATIONS

GENERAL SPECIFICATIONS

GENERAL SPECIFICA		HIDRAULIC SPECIFICAT	IONS
Denomination	3-way flow control valve	Fluid	Mineral oil, other fluid on request
Construction	Screw-in cartridge for cavity acc. to ISO 7789	Contamination efficiency	ISO 4406:1999, class 18/16/13
Type of fastening	Screw-in thread M22x1,5	-	Required filtration grade (ß 610 ≥ 75)
Ambient temperature	-2050 °C		(refer to data sheet 1.0-50/2)
Installation position	any	Viscosity range	12 mm ² /s320 mm ² /s
Tightening torque	$M_{\rm p} = 50 \text{ Nm}$	Fluid temperature	-20+70°C
Weight	m = 0,22 kg (screw)	Peak pressure	p _{max} = 350 bar
	m = 0,23 kg (knob)	Nominal volume flow rates	Q _N = 12 I/min, 25 I/min, 40 I/min
Volume flow direction	$1 \rightarrow 3$ adjustable flow	Min. volume flow	$Q_{min} = 0,1 \text{ l/min} (at v = 30 \text{ mm}^2/\text{s})$
		Max. volume flow	Q _{max} = 42 l/min
		Max. feed flow	50 l/min
		Control accuracy	< 1%

SYMBOLS

simplified





MECHANICAL ACTUATION

Mechanical types of operat	ion in 2 different versions:
S	= Screw adjustment
	with fork wrench and Allen key
D	= Control knob adjustment, fixed
Control stroke S _b	= 2,5 mm
Control angle α_b	= 900°(2,5 turns)

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CHARACTERISTICS Oil viscosity v = 30 mm²/s





DIMENSIONS/SECTIONAL DRAWINGS





Q = f (p) Volume flow pressure characteristic Q [l/min] K0943_21 50 40 $Q_N = 40 \text{ l/min}$ 30 Q_N = 25 l/min 20 $Q_N = 12 \text{ l/min}$ 10 0 0 50 100 150 200 250 300 350 p [bar] $\Delta p = f(Q)$ Pressure drop-volume flow characteristic $1 \rightarrow 3$ p [bar] $Q_N = 12 \text{ l/min}$ Q_N = 25 l/min $Q_N = 40 \text{ l/min}$ 25 20 15 10 5 0 0 10 20 30 40 50 Q [l/min]

Cavity drawing ISO 7789–22–04–0–98



For cavity details and cavity tools, see data sheet 2.13-1004

PARTS LIST

Position	Article	Description
10	114.2299	Knob
15	234.1060	Plate
20	193.1040	Safety plate RD4 DIN 6799
30	153.1302	Hexagonal nut 0,5D M6x3,2
40	160.2140	O-ring ID 14,00x1,78
50	160.2156	O-ring ID 15,60x1,78
60	160.2188	O-ring ID 18,77x1,78
70	049.3176	Back-up RD 14,1x17x1,4
80	049.3196	Back-up RD 16,1x19x1,4

ACCESSORIES

Line mount body

Flange-/sandwich plate NG6

Data sheet 2.5-742

Data sheet 2.9-210

Technical explanation see data sheet 1.0-100

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2-way flow control valve Adjustable orifice, fixed pressure compensator Screw-in cartridge

• Q_{max} = 80 l/min

- $\mathbf{Q}_{N \max} = 70 \text{ l/min}$
- $p_{max} = 350 \text{ bar}$

DESCRIPTION

2-way screw-in cartridge-type flow control valve with M33x2 thread, for pressure cavity acc. to ISO 7789. The valve is available in 2 different setting versions: Spanner setting "S" and turning knob "D". In its standard form, this control valve can be supplied with two nominal volume flow ranges. The two part cartridge body is made of steel. The surface of the valve is zinc-coated or rust protection.



The 2-way flow control valve is designed to keep the speed of a consumer constant irrespective of the load. The adjustable measuring orifice determines the volume flow. If there is a pressure change, the pressure compensating spool is displaced and changes the outlet diameter in order to keep the pressure difference on the measuring orifice constant.

M33x2

ISO 7789



APPLICATION

For use in all hydraulic systems where the supply volume flow needs to be kept constant even when the load fluctuates. Installation of the screw-in cartridge in control blocks as well as in the Wandfluh sandwich plates (vertical stakked systems) and flange valves. (Please note the separate data sheets in register 2.5). Cavity tools are available for machining cavities (hire or purchase). Please refer to the data sheets in register 2.13.

TYPE CODE

		QZ 🗌 PM33 - 🥅 # 🗌
Flow control valve 2-way		
Setting versions: Screw Turning knob Cover	S D A (see data sheet 2.0-50)	
Screw-in cartridge M33x2		
Standard nominal flow rates:	$Q_{N} = 32 $ l/min 32 $Q_{N} = 70 $ l/min 70	
Design-Index (Subject to change)		

GENERAL SPECIFICATIONS

Denomination	Flow control valve 2-way
Construction	Screw-in cartridge for cavity acc. to ISO 7789
Mounting	Screw-in thread M33x2
Ambient temperature	-2050° C
Mounting position	any
Fastening torque	$M_D = 80 \text{ Nm}$
Weight:	m = 0,39 kg (screw)
-	m = 0.40 kg (knob)
Volume flow direction:	$1 \rightarrow 2$ adjustable flow

HYDRAULIC SPECIFICATIONS

Fluid	Mineral oil, other fluid on request
	ISO 4406:1999, class 18/16/13
Contamination efficiency	(Required filtration grade $\& 610 \ge 75$)
	refer to data sheet 1.0-50/2
Viscosity range	12 mm ² /s320 mm ² /s
Fluid temperature	-20+70° C
Peak pressure	p _{max} = 350 bar
Nominal volume flow rates:	Q _N = 32 l/min, 70 l/min,
Min. volume flow	$Q_{min} = 0.2 \text{ l/min} (v = 30 \text{ mm}^2/\text{s})$
Max. volume flow	Q _{max} = 85 l/min
Control accuracy	≤ 1%



simplified





MECHANICAL ACTUATION

Mechanical types of operat	tion in 3 different versions:
S	= Screw adjustment
	with fork wrench and Allen key
D	 Control knob adjustment, fixed
Control stroke S _b	=4 mm
Control angle α_b	= 1440° (4 turns)

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CHARACTERISTICS Oil viscosity v = 30 mm²/s



Q = f (p) Volume flow pressure characteristic



DIMENSIONS

Screw adjustment "S"



Knob adjustment "D"





 $Q_{I} = f(p)$ Leakage volume flow characteristic



Cavity drawing acc. to ISO 7789–33–01–0–98



For cavity details and cavity tools, see data sheet 2.13-1005.

PARTS LIST

Position	Article	Description
10	114.2299	Knob
15	234.1060	Plate
20	193.1040	Safety plate RD4 DIN 6799
30	153.1302	Hexagonal nut 0,5D M6x3,2
40	160.2298	O-ring ID 29,82x2,62
50	160.2238	O-ring ID 23,81x2,62
60	049.3297	Back-up ring RD 24,5x29x1,4

ACCESSORIES

Flange-/sandwich plate NG10

Data sheet 2.5-760

Line mount body

Data sheet 2.9-205

Technical explanation see data sheet 1.0-100

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3-way flow control valve With fixed pressure compensator and adjustable orifice,

Screw-in cartridge construction

- Q_{max} = 120 l/min
- Q_{N max} = 100 l/min
- p_{max} = 350 bar

DESCRIPTION

3-way flow control valve as screw-in cartridge with thread M33x2 for cavity in accordance with ISO 7789. The valve can be supplied in 2 different setting versions: Key setting «S» and turning knob setting «D». Key adjustment «S» is also available with cover, see data sheet 2.0.50. Available as standard are 2 nominal flow steps.

The two-part cartridge body is made of steel. External parts are zinc coated and as a result rust protected. The colourlessly anodised aluminium rotary knob gives this quality product a clean design.



The 3-way flow control valve is designed to keep the oil flow to any actuator constant irrespective of the load. Surplus volume flow will be diverted to the tank line thus saving energy and preventing an overheating of the hydraulic system. By turning the knob of the variable restrictor the volume flow can be adjusted. In case of pressure fluctuations, the through flow cross-section in the pressure balance spool changes in such a manner, that the pressure difference in the measuring orifice is kept constant.

M33x2

ISO 7789



APPLICATION

For use in all hydraulic systems where the supply volume flow needs to be kept constant even when the load fluctuates. Installation of the screw-in cartridge in control blocks as well as in the Wandfluh sandwich plates (vertical stakked systems) and flange valves. (Please note the separate data sheets in register 2.5). Cavity tools are available for machining cavities (hire or purchase). Please refer to the data sheets in register 2.13.

TYPE CODE



GENERAL SPECIFICATIONS

Denomination	3-way flow control valve
Construction	Screw-in cartridge for cavity acc. to ISO 7789
Mounting	Screw-in thread M33x2
Ambient temperature	-2050 °C
Mounting position	any
Fastening torque	M _D = 80 Nm
Weight	m = 0,48 kg (screw)
	m = 0,49 kg (knob)
Volume flow direction	$1 \rightarrow 3$ adjustable flow

HYDRAULIC SPECIFICATIONS

Fluid	Mineral oil, other fluid on request
	ISO 4406:1999, class 18/16/13
Contamination efficiency	Required filtration grade ($\beta 610 \ge 75$)
	refer to data sheet 1.0-50/2
Viscosity range	12 mm ² /s320 mm ² /s
Fluid temperature	-20+70°C
Peak pressure	p _{max} = 350 bar
Nominal volume flow rates:	Q _N = 50 l/min, 100 l/min
Min. volume flow	$Q_{min} = 0.2 \text{ l/min} (at v = 30 \text{ mm}^2/\text{s})$
Max. volume flow	Q _{max} = 120 l/min
Max. feed flow	140 l/min
Control accuracy	≤1%
•	



MECHANICAL ACTUATION

Mechanical types of operat	ion in 2 different versions:
S	= Screw adjustment
	with fork wrench and Allen key
D	= Control knob adjustment, fixed
Control stroke S _b	= 4 mm
Control angle ab	= 1440° (4 turns)

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CHARACTERISTICS Oil viscosity v = 30 mm²/s



$\Delta p = f(Q)$ Pressure drop volume flow characteristic $1 \rightarrow 2$



DIMENSIONS / SECTIONAL DRAWING

Screw adjustment «S»

Knob adjustment «D»

10

Ø26

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59,8

55

40.



PARTS LIST

Position	Artikcle	Description
10	114.2299	Knob
15	234.1060	Plate
20	193.1040	Safety plate RD4 DIN 6799
30	153.1302	Hexagonal nut 0,5D M6x3,2
40	160.2236	O-ring ID 23,52x1,78
50	160.2238	O-ring ID 23,81x2,62
60	160.2298	O-ring ID 29,82x2,62
70	049.3276	Back-up ring RD 24,1x27x1,4
80	049.3297	Back-up ring RD 24,5x29x1,4



 $\Delta p = f(Q)$ Pressure drop volume flow characteristic $1 \rightarrow 3$







For cavity details and cavity tools, see data sheet 2.13-1040

ACCESSORIES

Flange-/sandwich plate NG10

Line mount body

Data sheet 2.5-762

Data sheet 2.9-210

Technical	ovalanation	ana data	abaat	1 0 100
recrimcar	explanation	see uala	Sheet	1.0-100

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Pressure compensating valve Screw-in cartridge

- · 2- and 3-way operation
- Q_{max} = 25 l/min
- p_{max} = 350 bar

DESCRIPTION Pressure compensator valve with fixed settings, in screw cartridge construction with M22x1,5 thread for cavity acc. to ISO 7789. The valve is available in a 2 or 3 way design. The one-piece cartridge is made of steel. The external parts are zinc coated and therefore protected against rust.

FUNCTION

The pressure compensator valve keeps the pressure difference between inlet pressure at port P and the pressure in output port A or B on the directional valve nearly constant. It ensures that, for a given actuating spool position, a precise amount of oil, which is not dependent on load pressure, flows through the directional valve. Pressure compensating valves are mostly used in conjunction with proportional valves.

M22x1,5

ISO 7789



APPLICATION

2-way pressure compensating valve: Volume flow changes resulting from pressure or load changes in the consumer are corrected. Cylinder or motor speeds remain constant. If several consumers are operating in parallel, the full system pressure is available to each one.

3-way pressure compensating valve: Surplus output flow is cost-effectively led to the return system. This prevents the hydraulic system from overheating, especially in mobile systems which lack the necessary cooling surfaces. Parallel operation is not possible. If there are several consumers the pump pressure is set at the maximum working pressure. Important: Pressure compensators are only suitable for open loop control.

U F PM22 #

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DIMENSIONS/ SECTIONAL DRAWINGS	2
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ACCESSORIES	2

TYPE CODE

Pressure compensator, 2-way operation Pressure compensator, 3-way operation	Z D	
Types of adjustment: fixed setting		
M22x1,5 screw cartridge		
Design-Index (Subject to change)		

GENERAL CHARACTERISTICS

Designation	2- and 3-way pressure compensating valve
Construction	Screw cartridge for cavity acc. to ISO 7789
Type of fastening	M22x1,5 screw thread
Ambient temperature	-20+50 °C
Installation position	any
Tightening torque	$M_{p} = 50 \text{ Nm}$
Weight:	m = 0,4 kg (2-way operation)
	m = 0,4 kg (3-way operation)

HYDRAULIC CHARACTERISTICS

TIDRAULIC CHARACTE	RISTICS
Hydraulic fluid	mineral oils, other media on request
Max. permissible	ISO 4406:1999, class 18/16/13
contamination level	(Recommended filter gauge $\& 610 \ge 75$)
	see also data sheet 1.0-50/2
Viscosity range	12 mm ² /s320 mm ² /s
Hydraulic fluid temp.	-20+70°C
Peak pressure	p _{max} = 350 bar
Differential pressure	p _{Diff} = 10 bar
	other differential pressures on request
max. volume flow	Q _{max} = 25 l/min
Leackage volume flow	see curve
-	

SYMBOLS





MECHANICAL ACTUATION

Fixed setting design. Other differential pressure available on request.

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Data sheet no. 2.5-630E 1/2 Edition 03 43



PERFORMANCE CHARACTERISTICS Oil viscosity υ = 30 mm²/s





DIMENSIONS / SECTIONAL DRAWINGS





0

50

100

150

200

250

Cavity drawing acc. to ISO 7789–22–06–0–98

300

350 p [bar]



For detailed cavity drawings and cavity tools see data sheet 2.13-1006.

PARTS LIST

Position	Article	Description
10	160.2188	O-ring ID 18,77x1,78
20	160.2156	O-ring ID 15,60x1,78
30	160.2120	O-ring ID 12,42x1,78
40	049.3196	Back-up ring RD 16,1x19x1,4
50	049.3176	Back-up ring RD 14,1x17x1,4

ACCESSORIES

Cartridge installed in sandwich plates: Sandwich valve

register 2.5

Technical explanation see data sheet 1.0-100

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Pressure compensating valve Screw-in cartridge

- 2- and 3-way operation
- Q_{max} = 100 l/min
- p_{max} = 350 bar

DESCRIPTION

Pressure compensator valve with fixed settings, in screw cartridge construction with M33x2 thread for cavity acc. to ISO 7789. The valve is available in a 2 or 3 way design. The onepiece cartridge is made of steel. The external parts are zinc coated and therefore protected against rust.

FUNCTION

The pressure compensator valve keeps the pressure difference between inlet pressure at port P and the pressure in output port A or B on the directional valve nearly constant. It ensures that, for a given actuating spool position, a precise amount of oil, which is not dependent on load pressure, flows through the directional valve. Pressure compensating valves are mostly used in conjunction with proportional valves.

M33x2

ISO 7789



APPLICATION

2-way pressure compensating valve: Volume flow changes resulting from pressure or load changes in the consumer are corrected. Cylinder or motor speeds remain constant. If several consumers are operating in parallel, the full system pressure is available to each one.

3-way pressure compensating valve: Surplus output flow is cost-effectively led to the return system. This prevents the hydraulic system from overheating, especially in mobile systems which lack the necessary cooling surfaces. Parallel operation is not possible. If there are several consumers the pump pressure is set at the maximum working pressure.

Important: Pressure compensators are only suitable for open loop control.

U F PM33 #

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CONTENTS

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1
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2
2

TYPE CODE

Pressure compensator, 2-way operation Pressure compensator, 3-way operation	Z	
Types of adjustment: fixed setting		
M33x2 screw cartridge		
Design-Index (Subject to change)		

GENERAL CHARACTERISTICS

Designation	2- and 3-way pressure compensating valve
Construction	Screw cartridge for cavity acc. to ISO 7789
Type of fastening	M33x2 screw thread
Ambient temperature	-20+50 °C
Installation position	any
Tightening torque	$M_{\rm D} = 80 \ {\rm Nm}$
Weight:	m = 0,52 kg (2-way operation)
	m = 0,42 kg (3-way operation)

HYDRAULIC CHARACTERISTICS

HIDRAULIC CHARACI	ERIGTICS
Hydraulic fluid	mineral oils, other media on request
Max. permissible	ISO 4406:1999, class 18/16/13
contamination level	(Recommended filter gauge ß 610≥75)
	see also data sheet 1.0-50/2
Viscosity range	12 mm ² /s320 mm ² /s
Hydraulic fluid temp.	-20+70 °C
Peak pressure	p _{max} = 350 bar
Differential pressure	p _{Diff} = 10 bar
	other differential pressures on request
Max. volume flow	Q _{max} = 100 l/min
Leackage volume flow	see curve

SYMBOLS

2-way operation A (1)

P (2



MECHANICAL ACTUATION

Fixed setting design. Other differential pressure available on request.

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PERFORMANCE CHARACTERISTICS Oil viscosity υ = 30 mm²/s





DIMENSIONS





3-way operation





For detailed cavity drawings and cavity tools see data sheet 2.13-1011.

PARTS LIST

Position	Article	Description
10	160 2208	O ring ID 20 82v2 62
10	160.2298	0-ring ID 29,82x2,62
20	160.2252	O-ring ID 25.12x1.78
20	100,0000	
30	160.2236	0-nng iD 23,52x1,78
40	49.3296	Back-up ring RD 26,1x29x1,4
FO	40.2276	Book up ring DD 24 1v27v1 4
(50	49.3276	Back-up ring RD 24,1x27x1,4

ACCESSORIES

Cartridge installed in sandwich plates: Sandwich valve

register 2.5

Technical explanation see data sheet 1.0-100

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2-way flow control valve Fixed orifice, adjustable pressure compensator Sandwich construction NG3-Mini

• Q_{max} = 10 l/min

• Q_{N max} = 8 l/min

• p_{max} = 315 bar

DESCRIPTION

Sandwich type 2-way flow control valve. Fitted with 2-way flow control cartridge M18x1,5 in accordance with ISO 7789. Type of adjustment available: "S" = screw adjustment, "D" = knob adjustment, (see data sheet no. 2.5-510). In order to save weight and to protect against corrosion, both sandwich body and knob of cartridge are in anodized aluminium.

FUNCTION

The 2-way flow control valve is designed to keep the speed of a consumer constant irrespective of the load. The fixed measuring orifice which is integrated into the pressure compensating piston determines the volume flow. If there is a pressure change, the pressure compensating spool is displaced and changes the outlet diameter in order to keep the pressure difference across the measuring orifice constant. By varying the spring bias acting on the compensator spool, the flow rate can be changed. Minimum adjustable flow within 40...70% of Q_N . Flow regulation is effective above Δp 10 bar approx.



APPLICATION

Sandwich type flow control valves are used where the supply volume flow has to be kept constant even when the load fluctuates. Depending on the application, a distinction is made between restricting the forward flow or the return flow. These sandwich valves are particularly suitable for machine tools and also all types of handling operations. The Mini-3 flow control valves are used where hydraulic systems have to be both light and compact.

TYPE CODE

						QA	S	A03	-	- [] #
Flow control valve 2-wa	ау					I		1			 -
Setting versions: Screw	N	S									
Knob)	D									
Sandwich							_				
Interface NG3-Mini											
Flow control:	Р	Ρ	Т		Т						
Meter-out flow control:	A and B	AB									
	А	A	В		В						
Meter-in flow control:	A and B	ABV									
	А	AV	В		BV						
Nominal volume	$Q_{N} = 0.4.$	0,6 l/r	min	0,63							
	$Q_{N} = 0,8$.1,25 l/r	min	1,25							
	$Q_{N} = 1,3.$	2,1 l/r	min	2							
	$Q_{N} = 2,5.$	5 l/r	min	5							
	$Q_{N}^{''} = 5 \dots$	8 l/r	min	8							
	Q _N = 5	8 l/r	min	8							

Design-Index (Subject to change)

GENERAL SPECIFICATIONS

Description	2-way flow control valve
Nominal size	NG3-Mini acc. to Wandfluh standard
Construction	Sandwich
Mounting	3 mounting holes for socket head screws
	M4 or double ended screws M4
Connections	Threaded connection plates, Multi-flange
	subplates, Longitudinal stacking system
Ambient temperature	-20+50 °C
Mounting position	any
Fastening torque	$M_{D} = 2,8$ Nm (quality 8.8) for fastening screws
	$M_{D} = 30$ Nm for screw-in cartridge
Weight	depending on the type 0,320,42 kg

HYDRAULIC SPECIFICATIONS

Fluid	Mineral oil, other fluid on request
Contamination efficiency	ISO 4406:1999, class 18/16/13
	(Required filtration grade $\&610 \ge 75)$
	refer to data sheet 1.0-50/2
Viscosity range	12 mm²/s320 mm²/s
Fluid temperature	-20+70 °C
Peak pressure	p _{max} = 315 bar
Opening pressure	- IIIdA
to non-return valve	p _o = 0,2 bar
Minimum pressure for	
controlled flow	∆p = 10 bar
Nominal volume flow	$Q_{\rm N} = 0.63$ l/min, $Q_{\rm N} = 1.25$ l/min,
	$Q_{N}^{"} = 2 \text{ I/min}, Q_{N} = 5 \text{ I/min}, Q_{N} = 8 \text{ I/min}$
Min. volume flow	$Q_{min} = 0.4 $ l/min
Max. volume flow	$Q_{max} = 10 $ l/min
Hysteresis	depending on nominal volumeflow 38%

For further hydraulic specifications refer to data sheet 2.5-510.



$\frac{\text{CHARACTERISTICS Oil viscosity } \upsilon = 30 \text{ mm}^2/\text{s}}{\text{Q} = f(p) \text{ Pressure drop/flow characteristics}}$



SYMBOLS / DIMENSIONS



15

30

Sandwich types QA . SA03-P, T



Sandwich types QA . SA03-A, AV, B, BV AB, ABV



* The total lenghts depends on the cartridge type, see data sheet 2.5-510

70

Technical explanation see data sheet 1.0-100

QA.SA03-P

QA.SA03-T

PARTS LIST

PT

X

B

_ <u>| _</u> B

Position	Article	Description
10	128.5601 128.5603 128.6601 128.6602 128.6600	Sandwich plate P Sandwich plate T Sandwich plate A, BV Sandwich plate B, AV Sandwich plate AB, ABV

Position	Article	Description
20	633.1	Flow control cartridge M18x1,5 Data sheet 2.5-510
30	160.2045	O-ring ID 4,5x1,5
50	173.0700	Intermediate plate PZSA03
60	173.0650	Sealing plate PDSA03

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2-way flow control valve Flange- and sandwich construction

- Q_{max} = 48 l/min, p_{max} = 350 bar
- Q_{N max} = 40 l/min

DESCRIPTION

Direct operated, pressure compensated flow control valve in flange- and sandwich construction. Flow control screw-in cartridges M22x21,5 acc. to ISO 7789 are installed. In the sandwich plates for A, B and AB line, a bypass check valve for reversed free flow is installed. A bypass non-return valve plate for the flange valve, for free flow from B to A, can be ordered separately. Two flow ranges are available. The flange body is painted and the sandwich plates are phosphatised.

TYPE CODE

FUNCTION

The 2-way flow control valve is designed to keep the oil flow to any actuator constant irrespectiv of the load.

NG4-Mini[®]

	0000

APPLICATION

2-way flow control valves are used where the supply volume flow has to be kept constant even when the load fluctuates. De-pending on the application, a distinction is made between restricting the forward flow or the return flow. Mini-4 flow control valves are used where hydraulic systems have to be both light and compact.

							Q	Z		04	 #
Flow control valve											
2-way-construction											
Setting versions:	Key Control knob Cover	S D A									
Flange construction Sandwich construction		F									
Mounting interface acc.	. to Wandfluh s	tandard	NG4-Mi	ni							
Type list / Function:	Flange constr flow control fr	uction om	Sandwi flow co	ich construction ntrol in	Sandwich o meter-out fl	construction low control in	Sai me	ndwich ter-in fi	i construc low contr	tion ol in	
	A to B	¥В	P T	P T	A B A and B	A B AB	A B A a	ind B	AV BV ABV		
Nominal volume flow ra	ates Q _N :	2,5 6,3 16 25 40	5 I/min 8 I/min I/min I/min I/min	2,5 6,3 16 25 40							
Design-Index (Subject	to change)										

GENERAL SPECIFICATIONS

GENERAL SPECIFIC	ATIONS	HYDRAULIC SPECIFIC	HYDRAULIC SPECIFICATIONS					
Description	2-way flow control valve	Fluid	Mineral oil, other fluid on request					
Nominal size	NG4-Mini acc. to Wandfluh standard	Contamination	ISO 4406:1999, class 18/16/13					
Construction	Flange- and sandwich construction	efficiency	(Required filtration grade ß 610≥75)					
Mounting	3 holes for socket cap screws M5		see data sheet 1.0-50/2					
-	or studs screws M5	Viscosity range	12 mm ² /s320 mm ² /s					
Connection	Threaded connection plates	Fluid temperature	-20+70 °C					
Multi-flange subplate		Peak pressure	p _{max} = 350 bar					
	Longitudinal stacking system	Min. volume flow	$Q_{\text{min}} = 0.1 \text{ l/min}$					
Ambient temperature	-2050 °C	Max. volume flow	Q = 48 l/min					
Mounting position	any		max					
Fastening torque	$M_{\rm p} = 5,5$ Nm (Qual. 8.8), for fastening	screws						
0	$M_{\rm p} = 50$ Nm for screw-in cartridge							
Weight	• Flange type m = 0,46 kg	9						
(without screw-in cartridge)	• Sandwich type P,T,A,B m = 0,95 kg	g						
	• Sandwich type AB m = 1,22 kg	- 9						
		-						

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SCREW-IN CARTRIDGES INSTALLED

The following screw-in cartridges are used in either the flange body or the sandwich body:

Туре	Designation	Data sheet no.
QZ.PM22	flow control valve	
	•2-way	2.5-535

TYPE CHARTS



By turning around valves with meter-out function, meter-in function can be adchieved:

- A turns into BV
- B turns into AV
- AB turns into ABV

Valves for flow control are supplied respectively with a sealing plate and an intermediate plate.



REMARK!

Detailed performance data and additional hydraulic specifications may by drawn from the data sheets of the corresponding installed pressure relief cartridge.



CAUTION!

The performace data especially the **"pressure-flow-characteristic**, on the data sheets of the screw-in catridges refere to the screw-in cartridges only. The additional pressure drop of the flange body respectively sandwich body must be taken into consideration.



DIMENSIONS

Flange construction QZ.FA04 - A/B





Sandwich construction QZ.SA04 - P, T





Sandwich construction QZ.SA04 - A, B, AB, AV, BV, ABV





PARTS LIST

Position	Article	Description
10	130.5200 130.5617 130.5624 130.6617 130.6618 130.6614	Flange body Sandwich plate P Sandwich plate T Sandwich plate A Sandwich plate B Sandwich plate AB
20	633.3	Flow control cartridge M22x1,5 see data sheet 2.5-535
30	160.2052	O-ring ID 5,28x1,78
40	173.1700	Intermediate plate BZB4
50	173.1650	Sealing plate BDB4

Technical explanation see data sheet 1.0-100



2-way flow control valve Flange- and sandwich construction

- Q_{max} = 48 l/min, p_{max} = 350 bar
- $Q_{N \max} = 40 \text{ l/min}$

DESCRIPTION

Direct operated, pressure compensated flow control valve in flange- and sand-wich construction. Flow control screw-in cartridges M22x1,5 acc. to ISO 7789 are installed. In the sandwich plates for A, B and AB line, a bypass check valve for reversed free flow is installed. A bypass non-return valve plate for the flange valve, for free flow from B to A, can be ordered separately. Two flow ranges are available. The flange body is painted and the sandwich plates are phosphatised.

TYPE CODE

FUNCTION

The 2-way flow control valve is designed to keep the oil flow to any actuator constant irrespectiv of the load.

NG6

ISO 4401-03

000

APPLICATION

2-way flow control valves are used where the supply volume flow has to be kept constant even when the load fluctuates. De-pending on the application, a distinction is made between restricting the forward flow or the return flow.

							Q	Ζ		A06	6 - 🗌	-	#
Flow control valve													
2-way-construction													
Setting versions:	Key Control kn Cover	ob D A]]										
Flange construction Sandwich construction		F]										
International standard i	nterface IS	O, NG6											
Type list / Function:	Flange co flow contro	nstruction ol from	Sandv flow c	vich construction ontrol in	Sandwich meter-out	construction flow control in	Sa me	ndwic eter-in	h con flow c	structi control	ion I in		
	A to B	A/B	P T	P T	A B A and B	A B AB	A B A a	and B	Ē	AV BV \BV			
Nominal volume flow ra	ates Q _N :	2, 6, 10 25 40	5 l/min 3 l/min 3 l/min 5 l/min 0 l/min	2.5 6.3 16 25 40								1	
Design-Index (Subject	to change)												

GENERAL SPECIFICATIONS

GENERAL SPECIFICATIONS			HYDRAULIC SPE	HYDRAULIC SPECIFICATIONS						
Description Nominal size Construction Mounting	2-way flow control valve NG6 acc. to ISO 4401-03 Flange- and sandwich con 4 holes for socket cap scree M5 or studs screws M5	struction ws	Fluid Contamination efficiency Viscosity range	Mineral oil, other flui ISO 4406:1999, clas (Required filtration g see data sheet 1.0-5 12 mm²/s320 mm²	d on request s 18/16/13 rade ß 610≥75) 50/2 ²/s					
Connection	Threaded connection plate Multi-flange subplate Longitudinal stacking syste	en	Fluid temperature Peak pressure Min. volume flow	-20+70 °C p _{max} = 350 bar Q _{min} = 0,1 l/min						
Ambient temperature Mounting position Fastening torque	-2050 °C any M _p = 5,5 Nm (Qual. 8.8), fr M _a = 50 Nm for screw-in ci	or fastening scre	Max. volume flow	Q _{max} = 48 l/min						
Weight (without screw-in cartridge)	 Flange type Sandwich type A,B Sandwich type P,T, AB 	m = 0,81 kg m = 1,15 kg m = 1,45 kg								
Wandfluh AG	Tel. +41 33 672 72 72	E-mail: sa	ales@wandfluh.com	Illustrations not obligatory	Data sheet no.					

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Data subject to change



SCREW-IN CARTRIDGES INSTALLED

The following screw-in cartridges are used in either the flange body or the sandwich body:

Туре	Designation	Data sheet no.
QZ.PM22	flow control valve	
	•2-way	2.5-535

TYPE CHARTS



By turning around (longitudinal axis) valves with meter-out function, meter-in function can be adchieved:

- A turns into AV
- B turns into BV
- AB turns into ABV



REMARK!

Detailed performance data and additional hydraulic specifications may by drawn from the data sheets of the corresponding installed pressure relief cartridge.



CAUTION!

The performace data especially the **"pressure-flow-characteristic**, on the data sheets of the screw-in catridges refere to the screw-in cartridges only. The additional pressure drop of the flange body respectivly sandwich body must be taken into consideration.



DIMENSIONS

Flange construction QZ.FA06-A/B





Sandwich construction QZ.SA06-P, T





Sandwich construction QZ.SA06 - A, B, AB, AV, BV, ABV





PARTS LIST

Position	Article	Description
10	134.5202 134.5630 134.6634 134.6635 134.6633	Flange body Sandwich plate P, T Sandwich plate A Sandwich plate B Sandwich plate AB
20	633.3	Flow control cartridge M22x1,5 see data sheet 2.5-535
30	160.2093	O-ring ID 9,25x1,78
40	173.3650	Sealing plate ADB6

Technical explanation see data sheet 1.0-100E

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Illustrations not obligatory Data subject to change

Data sheet no. 2.5-740E 3/3 Edition 11 50



3-way flow control valve

Flange- and sandwich construction = 42 l/min

• Q_{max} = 40 l/min

- Q_{N max} = 350 bar
- p_{max}

DESCRIPTION

Direct operated, pressure compensated flow control valve in flange- and sandwich construction. Flow control screw-in cartridges M22x1,5 acc. to ISO 7789 are installed. The flange body is painted, the sandwich plates and the outside parts are phosphatised. The solenoid is zinc coated.

FUNCTION

The 3-way flow control valve is designed to keep the oil flow to any actuator constant irrespectiv of the load.

NG6

ISO 4401-03

<i>_</i>	0000	0
0		

APPLICATION

3-way flow control valves are used where the supply volume flow has to be kept constant even when the load fluctuates. Depending on the application, a distinction is made between restricting the forward flow or the return flow.

TYPE CODE

		Q	D		A	06	-		- [#
Flow control valve											
3-way-construction											
Setting versions: Screw S Turning knob D Cover A			_								
Flange construction F Sandwich construction S											
International mounting interface ISO, NG6											
Type list/Function: Flange, flow control from A to B A/B Sandwich, meter-in flow control in P P						-					
Nominal volume flow rates Q _N : 12 l/min 12 25 l/min 25 40 l/min 40								_			
Design-Index (Subject to change)										_	

GENERAL SPECIFICATIONS

Description	3-way flow control valve
Nominal size	NG6 acc. to ISO 4401-03
Construction	Flange- and sandwich construction
Mounting	4 holes for socket cap screws M5
	or studs screws M5
Connection	Threaded connection plates
	Multi-flange subplate
	Longitudinal stacking system
Ambient temperature	-2050 °C
Mounting position	any
Fastening torque	$M_D = 5,5 \text{ Nm}$ (Qual. 8.8) for fastening screws
	$M_D = 50$ Nm for screw-in cartridge
Weight:	• Flange type m = 1,10 kg
(without screw-in cartridge)	Sandwich type m = 1,30 kg

HYDRAULIC SPECIFICATIONS

Contamination efficiency Viscosity range Fluid temperature Peak pressure Min. volume flow Max. volume flow Control accurancy

Fluid

Mineral oil, other fluid on request ISO 4406:1999, class 18/16/13 (Required filtration grade ß 6...10≥75) see data sheet 1.0-50/2 12 mm²/s...320 mm²/s -20...+70°C $p_{max} = 350 \text{ bar}$ $Q_{min} = 0,1 \text{ l/min} (at v = 30 \text{ mm}^2/\text{s})$ Q_{max} = 42 l/min ≤1%

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Designation

•3-way

flow control valve

SCREW-IN CARTRIDGES INSTALLED

The following screw-in cartridges are used in either the flange body or the sandwich body.

TYPE CHARTS

QD.FA06-A/B

QD.SA06-P







Туре

QD.PM22

REMARK!

Detailed performance data and additional hydraulic specifications may by drawn from the data sheets of the corresponding installed pressure relief cartridge.



CAUTION!

The performace data especially the «pressure-flow-characteristic» on the data sheets of the screw-in catridges refere to the screw-in cartridges only. The additional pressure drop of the flange body respectivly sandwich body must be taken into consideration.

DIMENSIONS

Flange construction QD.FA06-A/B

30





Data sheet no.

2.5-540







* The total lenghts depends on the cartridge type, see data sheet 2.5-540

PARTS LIST

Position	Article	Description
10	134.6208	Flange body
	134.6645	Sandwich plate P
20	633.3	Flow control cartridge M22x1,5 see data sheet 2.5-540
30	160.2093	O-ring ID 9,25x1,78

Technical explanation see data sheet 1.0-100E

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2-way flow control valve Flange- and sandwich construction

- Q_{max} = 85 l/min, p_{max} = 350 bar
- Q_{N max} = 70 l/min

DESCRIPTION

Direct operated, pressure compensated flow control valve in flange- and sand-wich construction. Flow control screw-in cartridges M33x2 acc. to ISO 7789 are installed. In the sandwich plates for A, B and AB line, a bypass check valve for reversed free flow is installed. A bypass non-return valve plate for the flange valve, for free flow from B to A, can be ordered separately. Two flow ranges are available. The flange body is painted and the sandwich plates are phosphatised.

TYPE CODE

NG10 ISO 4401-05



FUNCTION

The 2-way flow control valve is designed to keep the oil flow to any actuator constant irrespectiv of the load.

APPLICATION

2-way flow control valves are used where the supply volume flow has to be kept constant even when the load fluctuates. De-pending on the application, a distinction is made between restricting the forward flow or the return flow.

				Q Z	A10	# _
Flow control valve						
2-way-construction						
Setting versions:	Key Control knob Cover	S D A				
Flange construction Sandwich construction	I	FS				
International standard	interface ISO, NG1	0				
Type list / Function:	Flange constructi flow control from	on Sandwich construction flow control in	Sandwich construction meter-out flow control in	Sandwich meter-in flo	construction ow control in	
	A to B	P P T T	A A B B A and B AB	A B A and B	AV BV ABV	
Nominal volume flow r	ates Q _N :	32 l/min 32 70 l/min 70				-
Design-Index (Subject	to change)					

GENERAL SPECIFICA	TIONS				
Description	2-way flow control valve				
Nominal size	NG10 acc. to ISO 4401-05	5			
Construction	Flange- and sandwich con	struction			
Mounting	4 holes for socket cap screws M6				
-	or studs screws M6				
Connection	Threaded connection plate	es			
	Multi-flange subplate				
	Longitudinal stacking syste	em			
Ambient temperature	-2050 °C				
Mounting position	any				
Fastening torque	$M_{\rm D} = 9,5$ Nm (Qual. 8.8), fe	or fastening screws			
	M_{D} = 80 Nm for screw-in c	artridge			
Weight	 Flange type 	m = 2,20 kg			
(without screw-in cartridge)	 Sandwich type P,T,A,B 	m = 3,10 kg			
	 Sandwich type AB 	m = 3,75 kg			

HYDRAULIC SPECIFICATIONS

Fluid Contamination efficiency Viscosity range Fluid temperature Peak pressure Min. volume flow Max. volume flow

$\begin{array}{l} \mbox{Mineral oil, other fluid on request} \\ \mbox{ISO 4406:1999, class 18/16/13} \\ \mbox{(Required filtration grade ß 6...10<math>\geq$ 75)} \\ \mbox{see data sheet 1.0-50/2} \\ \mbox{12 mm}^2/s...320 mm^2/s \\ \mbox{-20...+70 °C} \\ \mbox{p}_{max} = 350 \mbox{ bar} \\ \mbox{Q}_{min} = 0,2 \mbox{l/min} \\ \mbox{Q}_{max} = 85 \mbox{l/min} \end{array}

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SCREW-IN CARTRIDGES INSTALLED

The following screw-in cartridges are used in either the flange body or the sandwich body:

Туре	Designation	Data sheet no.
QZ.PM33	flow control valve	
	•2-way	2.5-550

TYPE CHARTS



By turning around valves with meter-out function, meter-in function can be adchieved:

- A turns into BV
- B turns into AV
- AB turns into ABV

Valves for flow control are supplied respectively with a sealing plate and an intermediate plate.



REMARK!

Detailed performance data and additional hydraulic specifications may by drawn from the data sheets of the corresponding installed pressure relief cartridge.



CAUTION!

The performace data especially the **"pressure-flow-characteristic,** on the data sheets of the screw-in catridges refere to the screw-in cartridges only. The additional pressure drop of the flange body respectively sandwich body must be taken into consideration.



DIMENSIONS

Flange construction QZ.FA10-A/B





Sandwich construction QZ.SA10 - P, T





Sandwich construction QZ.SA10-A, B, AB, AV, BV, ABV



* The total lenghts depends on the cartridge type, see data sheet 2.5-550

PARTS LIST

Position	Article	Description
10	136.5201 136.5621 136.5624 136.6633 136.6634 136.6631	Flange body Sandwich plate P Sandwich plate T Sandwich plate A Sandwich plate B Sandwich plate AB
20	633.8	Flow control cartridge M33x2 see data sheet 2.5-550
30	160.2140 160.2120 160.2132	O-ring ID 14,00x1,78 for flange and sandwich construction O-Ring ID 12,42x1,78 for sandwich cons- truction A, B, AB, VA, VB, VAB O-Ring ID 13,10x2,62 in line with RV
40	173.4700	Intermediate plate AZB10
50	173.4650	Sealing plate ADB10

Technical explanation see data sheet 1.0-100



Flow control valves

3-way flow control valve

Flange- and sandwich construction

• Q_{max} = 120 l/min

- $Q_{N \max} = 100 \text{ l/min}$
- p_{max} = 350 bar

DESCRIPTION

Direct operated, pressure compensated flow control valve in flange- and sandwich construction. Flow control screw-in cartridges M33x2 acc. to ISO 7789 are installed. The flange body is painted, the sandwich plates and the outside parts are phosphatised. The solenoid is zinc coated.

FUNCTION

The 3-way flow control valve is designed to keep the oil flow to any actuator constant irrespectiv of the load.

NG10

ISO 4401-05

0	0000	00

APPLICATION

3-way flow control valves are used where the supply volume flow has to be kept constant even when the load fluctuates. De-pending on the application, a distinction is made between restricting the forward flow or the return flow.

TYPE CODE

					Q D	A1	0 - [] - [#
Flow control valve	9								
3-way-constructio	n								
Setting versions:	ScrewSTurning knobDCoverA								
Flange construction Sandwich constru	on Iction		F S						
International mou	nting interface ISO, N	IG10							
Type list/Function Flange, flow contr Sandwich, meter-	n: rol from A to B in flow control in P		A/B P						
Nominal volume fl	low rates Q_N :	50 l/min 100 l/min	50 100						
Design-Index (Sul	bject to change)								

GENERAL SPECIFICA	TIONS	HYD
Description	3-way flow control valve	Fluid
Nominal size	NG10 acc. to ISO 4401-05	Cont
Construction	Flange- and sandwich construction	effici
Mounting	4 holes for socket cap screws M6	
	or studs screws M6	Visco
Connection	Threaded connection plates	Fluid
	Multi-flange subplate	Peak
	Longitudinal stacking system	Min.
Ambient temperature	-2050°C	Max.
Mounting position	any	Cont
Fastening torque	M_{D} = 9,5 Nm (Qual. 8.8) for fastening screws	
	M_{D} = 80 Nm for screw-in cartridge	
Weight	• Flange type m = 2,40 kg	
(without screw-in cartridge)	Sandwich type m = 3,75 kg	

HYDRAULIC SPECIFICATIONS

Contamination efficiency Viscosity range Fluid temperature Peak pressure Min. volume flow Max. volume flow Control accurancy

$\begin{array}{l} \mbox{Mineral oil, other fluid on request} \\ \mbox{ISO 4406:1999, class 18/16/13} \\ \mbox{(Required filtration grade ß 6...10≥75)} \\ \mbox{see data sheet 1.0-50/2} \\ \mbox{12 mm}^2/s...320 mm^2/s} \\ \mbox{-20...+70 °C} \\ \mbox{p}_{max} = 350 \mbox{ bar} \\ \mbox{Q}_{min} = 0,2 \mbox{ l/min (at ν = 30 mm}^2/s)} \\ \mbox{Q}_{max} = 120 \mbox{ l/min} \\ \mbox{\leq 1\%} \end{array}$

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В

SCREW-IN CARTRIDGES INSTALLED

• 3-way

Designation

flow control valve

The following screw-in cartridges are used in either the flange body or the sandwich body:

TYPE CHARTS

×

B

¥

PT

QD.FA10-A/B

Α

Data sheet no.

2.5-555

QD.SA10-P





Туре

QD.PM33

REMARK!

Detailed performance data and additional hydraulic specifications may by drawn from the data sheets of the corresponding installed pressure relief cartridge.



CAUTION!

The performace data especially the «pressure-flow-characteristic» on the data sheets of the screw-in catridges refere to the screw-in cartridges only. The additional pressure drop of the flange body respectivly sandwich body must be taken into consideration.

DIMENSIONS

Flange construction QD.FA10-A/B



Sandwich construction QD.SA10-P









PARTS LIST

Position	Article	Description
10	136.6204	Flange body
	136.6639	Sandwich plate P
20	633.8	Flow control cartridge M33x2 see data sheet 2.5-555
30	160.2140	O-ring ID 14,00x1,78

Technical explanation see data sheet 1.0-100E

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Pressure compensating valves

Pressure compensating valve Sandwich construction

• 2- and 3-way operation

• Q_{max} = 10 l/min

• p_{max} = 315 bar

DESCRIPTION

Pressure compensator valve with fixed setting in sandwich design with interface NG4-Mini acc. to Wandfluh standard with 4 ports. Available with 2-way and 3-way operation. The steel body of the sandwich valve is phosphatized and the cartridge body is zinc coated for corrosion protection. The load is sensed in line A or B with an incorporated shuttle valve.

FUNCTION

The pressure compensator valve maintains a constant differential pressure through an orifice (e.g. metering edge of a directional valve). The 2-way pressure compensator restricts the volume flow in the meter-in mode. The 3-way pressure compensator diverts the surplus volume flow to the tank line. As a result, with both compensator types the amount of flow through an orifice (directional valve) remains constant even if the load pressure changes.

NG4-Mini



APPLICATION

Pressure compensator sandwich valves are usually stacked underneath proportional directional valves. They are used in open loop circuits. 2-way pressure compensators may be installed in parallel pressure lines with a common power source to operate actuators individually. For each actuator the full pump pressure is available. Only one 3-way pressure compensator can be installed in a system.

U F S A04 # 🗌

CONTENT GENERAL SPECIFICATIONS.....1 HYDRAULIC SPECIFICATION1 SWITCHING DIAGRAMS.....1 MECHANICAL ACTUATION.....1 CHARACTERISTICS......2 DIMENSIONS......2 PARTS LIST2 ACCESSORIES......2

TYPE CODE

	-	- L
Pressure compensator, 2-way operationZ Pressure compensator, 3-way operationD		
Types of adjustment: fixed setting		
Sandwich construction		
Mounting interface NG4-Mini		
Design-Index (Subject to change)		

GENERAL SPECIFICATIONS

2- and 3-way pressure compensating valve
NG4-Mini acc. to Wandfluh standard
Sandwich construction
3 mounting holes for M5 socket head screws
or M5 locking screws
Thread connection plates
Rows of flange plates and horizontal
stacking system
-20+50°C
any
$M_{D} = 5,5 \text{ Nm}$ (Qual. 8.8) for fixing screws
$M_{D} = 50$ Nm for screw cartridge
m ⁻ = 1,5 kg

SWITCHING DIAGRAMS

2-way operation





HYDRAULIC SPECIFICATIONS

Hydraulic fluid	Mineral oils, other media on request
Max. permissible	ISO 4406:1999, class 18/16/13
contamination level	(Recommended filter gauge ß6102
	see data sheet 1.0-50/2
Viscosity range	12 mm²/s 320 mm²/s
Hydraulic fluid temperature	-20+70 °C
Peak pressure	p _{max} = 315 bar
Differential pressure	$p_{\text{Diff}} = 10 \text{ bar}$

4406:1999, class 18/16/13 commended filter gauge ß6...10≥75) data sheet 1.0-50/2 nm²/s ... 320 mm²/s ...+70°C = 315 bar $p_{\text{Diff}} = 10 \text{ bar}$ other differential pressures on request Q_{max} = 10 l/min see characteritics

Maximum volume flow Leakage volume flow

MECHANICAL ACTUATION

Fixed setting design. Other differential pressures available on request.

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Data sheet no 2.5-820E 1/2 Edition 12 47



CHARACTERISTICS Oil viscosity υ = 30 mm²/s





DIMENSIONS



PARTS LIST

Position	Article	Description
10	130.4603	Sandwich plate for 2-way operation
	130.4612	Sandwich plate for 3-way operation
20	597.3000	Cartridge UZFPM22 (Data sheet 2.5-630)
	597.3001	Cartridge UDFPM22 (Data sheet 2.5-630)
30	160.2052	O-Ring ID 5,28x1,78
40	238.1405	Locking screw DIN 908 G1/8"

ACCESSORIES

Thread connection plates and rows of flange plates register 2.9

Technical explanation see data sheet 1.0-100

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Pressure compensating valve Sandwich construction

2- and 3-way operation

• Q_{max} = 25 l/min

• p_{max} = 350 bar

DESCRIPTION

Pressure compensator valve with fixed setting in sandwich design with interface NG6 acc. to ISO 4401-03 with 4 ports. Available with 2-way and 3-way operation. The steel body of the sandwich valve is phosphatized and the cartridge body is zinc coated for corrosion protection. The load is sensed in line A or B with an incorporated shuttle valve.

FUNCTION

The pressure compensator valve maintains a constant differential pressure across an orifice (e.g. metering edge of a directional valve). The 2-way pressure compensator restricts the volume flow in the meter-in mode. The 3-way pressure compensator diverts the surplus volume flow to the tank line. As a result, with both compensator types the amount of flow through an orifice (directional valve) remains constant even if the load pressure changes.

NG6

ISO 4401-03



APPLICATION

Pressure compensator sandwich valves are usually stacked underneath proportional directional valves. They are used in open loop circuits. 2-way pressure compensators may be installed in parallel pressure lines with a common power source to operate actuators individually. For each actuator the full pump pressure is available. Only one 3-way pressure compensator can be installed in a system.

CONTENT GENERAL SPECIFICATIONS HYDRAULIC SPECIFICATION SWITCHING DIAGRAMS MECHANICAL ACTUATION CHARACTERISTICS DIMENSIONS PARTS LIST ACCESSORIES

TYPE CODE

GENERAL SPECIFICATION

Designation	2- and 3-way pressure compensating valve
Size	NG6 acc. to ISO 4401-03
Construction	Sandwich construction
Mounting	3 mounting holes for M5 socket head screws
	or M5 locking screws
Type of connection	Thread connection plates
	Rows of flange plates and horizontal
	stacking system
Ambient temperature	-20 +50 °C
Installation position	any
Fastening torque	$M_{p} = 5,5 \text{ Nm}$ (Qual. 8.8) for fixing screws
	$M_{D} = 50$ Nm for screw cartridge
Weight	m = 1,8 kg

SWITCHING DIAGRAMS

2-way operation





HYDRAULIC SPECIFICATIONS

Hydraulic fluid	Mineral oils, other media on request
Max. permissible	ISO 4406:1999, class 18/16/13
contamination level	(Recommended filter gauge ß610≥75)
	see data sheet 1.0-50/2
Viscosity range	12 mm²/s 320 mm²/s
Hydraulic fluid temperature	-20+70 °C
Peak pressure	p _{may} = 350 bar
Differential pressure	p _{Diff} = 10 bar
	other differential pressures on request
Maximum volume flow	$Q_{max} = 25 $ l/min
Leaking volume flow	see characteristics

MECHANICAL ACTUATION

Fixed setting design. Other differential pressures available on request.

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CHARACTERISTICS Oil viscosity υ = 30 mm²/s





DIMENSIONS



PARTS LIST

Position	Article	Description
10	134.4603	Sandwich plate for 2-way operation
	134.4602	Sandwich plate for 3-way operation
20	597.3000	Cartridge UZFPM22 (data sheet 2.5-630)
	597.3001	Cartridge UDFPM22 (data sheet 2.5-630)
30	160.2093	O-ring ID 9,25x1,78
40	238.2204	Locking screw DIN 908 G1/4"
50	49.2132	Bonded seal ID 13,7x20x1,5

ACCESSORIES

0

50

100

150

200

250

300

Thread connection plates and rows of flange plates

register 2.9

Technical explanation see data sheet 1.0-100

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Data sheet no. 2.5-840E 2/2 Edition 03 43



Pressure compensating valve Sandwich construction

- · 2- and 3-way operating
- Q_{max} = 50 l/min
- p_{max} = 350 bar

DESCRIPTION

CONTENT

Pressure compensator valve with fixed setting in sandwich design with interface NG10 acc. to ISO 4401-05 with 4 ports. Available with 2-way and 3-way operation. The steel body of the sandwich valve is phosphatized and the cartridge body is zinc coated for corrosion protection. The load is sensed in line A or B with an incorporated shuttle valve.

FUNCTION

The pressure compensator valve maintains a constant differential pressure across an orifice (e.g. metering edge of a directional valve). The 2-way pressure compensator restricts the volume flow in the meter-in mode. The 3-way pressure compensator diverts the surplus volume flow to the tank line. As a result, with both compensator types the amount of flow through an orifice (directional valve) remains constant even if the load pressure changes.

NG10

ISO 4401-05



APPLICATION

Pressure compensator sandwich valves are usually stacked underneath proportional directional valves. They are used in open loop circuits. 2-way pressure compensators may be installed in parallel pressure lines with a common power source to operate actuators individually. For each actuator the full pump pressure is available. Only one 3-way pressure compensator can be installed in a system.

GENERAL SPECIFICATIONS1
HYDRAULIC SPECIFICATION1
SWITCHING DIAGRAMS1
MECHANICAL ACTUATION1
CHARACTERISTICS2
DIMENSIONS2
PARTS LIST2
ACCESSORIES2

TYPE CODE

	U F	S A10 #
Pressure compensator, 2-way operationZ		
Types of adjustment: fixed setting		
Sandwich construction		
Mounting interface NG10		
Design-Index (Subject to change)		

GENERAL SPECIFICATIONS

Designation	2- and 3-way pressure compensating valve
Size	NG10 acc. to ISO 4401-05
Construction	Sandwich construction
Mounting	4 mounting holes for M6 socket head screws
	or M6 locking screws
Type of connection	Thread connection plates
	Rows of flange plates and horizontal
	stacking system
Ambient temperature	-20 +50 °C
Installation position	any
Fastening torques	$M_{D} = 9.5$ Nm (quality 8.8) for fixing screws
	$M_{D} = 80$ Nm for screw cartridge
Weight	m = 3,9 kg

SWITCHING DIAGRAMS

2-way operation





HYDRAULIC SPECIFICATIONS

Hydraulic fluid	Mineral oils, other media on request
Max. permissible	ISO 4406:1999, class 18/16/13
contamination level	(Recommended filter gauge ß610≥75)
	see data sheet 1.0-50/2
Viscosity range	12 mm²/s 320 mm²/s
Hydraulic fluid temperature	-20+70 °C
Peak pressure	p _{may} = 350 bar
Differential pressure	p _{Diff} = 10 bar
	other differential pressures on request
Maximum volume flow	$Q_{max} = 50 \text{ l/min}$
Leaking volume flow	see characteristics

MECHANICAL ACTUATION

Fixed setting design. Other differential pressures available on request.

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Data sheet no. 2.5-860E 1/2 Edition 03 43



CHARACTERISTICS Oil viscosity υ = 30 mm²/s





DIMENSIONS





PARTS LIST

Position	Article	Description
10	136.4603 136.4604	Sandwich plate for 2-way operation
20	597.4000 597.4001	Cartridge UZFPM33 (Data sheet 2.5-650) Cartridge UDFPM33 (Data sheet 2.5-650)
30	160.2140	O-Ring ID 14,00x1,78
40	238.2204	Locking screw DIN 908 G1/4"
50	49.2132	Bonded seal ID 13,7x20x1,5

ACCESSORIES

Thread connection plates and rows of flange plates register 2.9

Technical explanation see data sheet 1.0-100

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Data sheet no. 2.5-860E 2/2 Edition 03 43



Fine feed-/fast approach valve Sandwich construction

- Q_{max} = 20 I/min (Fine feed)
- Q_{max} = 30 l/min (Fast approach)
- $Q_{N max} = 20$ l/min
- $p_{max} = 350 \text{ bar}$

DESCRIPTION

TYPE CODE

Fine feed-/fast approach valve in sandwich construction. 2-way flow control cartridges (see data sheet 2.5-535) and 2/2-way solenoid poppet valve cartridges (1.11-2082) are installed. 4 standard nominal volume flow ranges are available. The sandwich body made of steel is phosphatized.

FUNCTION

The fine feed-/fast approach valve serves for the electrically controlled two-stage speed control. Fine feed and fast approach. In the fine feed, the volume flow is controlled by the flow control valve, to the manually adjusted value independent on the load. In doing so, the poppet valve is closed. In the fast approach, the volume flow, dependent of the load and of the system pressure, flows through the poppet valve.

NG4-Mini[®]



APPLICATION

The fine feed-/fast approach valves are utilised in hydraulic systems, which require an electrically controlled fine feed-/fast approach changeover, such as positioning controls on machine tools or elevation controls of elevating platforms, etc. Due to the sandwich construction, these fine feed-/fast approach valves can be integrated into stacked systems as an intermediate flange.

V QS A04 / W Fine feed-/fast approach value	#
Flow control function	
Setting versions Key S Control knob D	
Sandwich construction	
Mounting interface acc. to Wandfluh standard, NG4-Mini	
Function Flow control in: Meter-out flow control in: Meter-in flow control in: P P A A AV T T B B BV	
Poppet valve normally closed C normally open O	
Standard nominal volume flow rates Q _N 2,5 l/min 2.5 Fine feed 6,3 l/min 6.3 16 l/min 16 20 l/min 20	
Standard nominal voltage U _N 12VDC G12 115VAC R115 24VDC G24 230VAC R230	
Slip-on coil Metal housing round	
Connector socket EN175301-803/ISO 4400 \square AMP Junior-Timer \bigcirc (only for U _N \leq 75 VDC)	
Design-Index (Subject to change)	

GENERAL SPECIFICATIONS

GENERAL SPECIFICATIONS		HYDRAULIC SPECIFICATIONS	
Description	Fine feed-/fast approach valve	Fluid	Mineral oil, other fluid on request
Nominal size	NG4-Mini [®]	Contamination efficiency	ISO 4406:1999, class 18/16/13
Construction	Sandwich construction		(Recommended filtration grade
Mounting	3 holes for socket cap screws		ß 610≥75) refer to data sheet 1.0-50/2
-	M5 or studs M5	Viscosity range	12 mm²/s320 mm²/s
Connection	Threaded connection plates, multi-flange	Fluid temperature	-20+70 °C
	subplate, stacking system	Peak pressure	p = 350 bar
Ambient temperature	-20 +50 °C	Nominal volume flow rates	Q ₁ = 2,5 l/min, 6,3 l/min, 16 l/min, 20 l/min
Mounting	any	Min. volume flow	$Q_{min}^{N} = 0.1 $ l/min
Fastening torque	$M_{D} = 5,5$ Nm (Qual. 8.8) for fixing screws cartridges: see valve data sheets	Max. volume flow	$Q_{max} = 30 \text{ l/min}$
Weight	m = 1,65 kg	For further hydraulic specifications, refer to flow control valve data sheet 2.5-535.	

ELECTRICAL ACTUATION

Solenoid construction:

see data sheet poppet valve (1.11-2082)

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CHARACTERISTICS Oil viscosity v = 30 mm²/s





ACCESSORIES

Threaded connection plates and multi-flange subplates Register 2.9 Mating connector EN 175301-803 article no. 219.2002

Technical explanation see data sheet 1.0-100

TYPES/DIMENSIONS





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PARTS LIST

Position	Article	Description
10	130.6621	Sandwich plate P
	130.0022	Sandwich plate 1
	130.6623	Sandwich plate B, BV
20	633.3	Flow control valve QZ PM22
		acc. to data sheet 2.5-535
30	500.3	Solenoid poppet valve SVSPM22
		acc. to data sheet 1.11-2082
50	160.2060	O-ring ID 6,07 x 1,78



Control AV, B



Dimensions of the other setting versions see data sheet 2.5-535

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Fine feed-/fast approach valve Sandwich construction

- Q_{max} = 40 l/min (Fine feed)
- $Q_{max}^{\text{max}} = 80 \text{ l/min} (Fast approach)$
- $Q_{N \max}^{max} = 40 \text{ l/min}$
- p_{max} = 350 bar

DESCRIPTION

Fine feed-/fast approach valve in sandwich construction. 2-way flow control- and 2/2-way poppet valve cartridges are installed. 5 standard nominal volume flow ranges are available (see data sheet 2.5-535). The poppet valve cartridge is electrically actuated (see data sheet 1.11-2082). The sandwich body made of steel is phosphatized.

TYPE CODE

FUNCTION

The fine feed-/fast approach valve serves for the electrically controlled two-stage speed control. Fine feed and fast approach. In the first stage, the fine feed, the volume flow is controlled by the flow control valve, to the manually adjusted value independent on the load. In doing so, the poppet valve is closed. In the second stage, the fast approach, the volume flow, dependent of the load and of the system pressure, flows through the poppet valve.

NG6

ISO 4401-03



APPLICATION

The fine feed-/fast approach valves are utilised in hydraulic systems, which require an electrically controlled fine feed-/fast approach changeover, such as positioning controls on machine tools or elevation controls of elevating platforms, etc. Due to the sandwich construction, these fine feed-/fast approach valves can be integrated into stacked systems as an intermediate flange.

Fine food /fast approach valve	V Q S A06 / W #
Flow control function	
Setting versions Key S Control knob D	
Sandwich construction	
International standard connection ISO, NG6	
Function Flow control in: Meter-out flow control: Meter-in flow control in: P P A A AV T T B B BV	
Poppet valve normally closed C normally open O	
Standard nominal volume flow rates Q _N 2,5 l/min 2.5 6,3 l/min 6.3 16 l/min 16 25 l/min 25 40 l/min 40	
Standard nominal voltage U _N 12VDC G12 115VAC R115 24VDC G24 230VAC R230	
Slip-on coil Metal housing round	
Connector socket EN175301-803/ISO 4400 \square AMP Junior-Timer \boxed{J} (only for U _N ≤ 75 VDC)	
Design-Index (Subject to change)	

GENERAL SPECIFICATIONS

GENERAL SPECIFICATIONS		HYDRAULIC SPECIFICATIONS	
Description	Fine feed-/fast approach valve	Fluid	Mineral oil, other fluid on request
Nominal size	NG6 acc. to ISO 4401-03	Contamination efficiency	ISO 4406:1999, class 18/16/13
Construction	Sandwich construction		(Required filtration grade ß 610≥75)
Mounting	4 holes for socket cap screws		refer to data sheet 1.0-50/2
	M5 or studs screws M5	Viscosity range	12 mm²/s320 mm²/s
Connection	Threaded connection plates, multi-flange	Fluid temperature	-20+70 °C
	subplate, longitudial stacking system	Peak pressure	p = 350 bar
Ambient temperature	-20 +50 °C	Nominal volume flow rates	Q _N = 2,5 l/min, 6,3 l/min, 16 l/min,
Mounting	any		25 l/min, 40 l/min
Fastening torque	M _p = 5,5 Nm (Qual. 8.8)	Min. volume flow	$Q_{min} = 0,1 $ l/min
Weight	m = 1,9 kg	Max. volume flow	Q _{max} = 80 l/min

ELECTRICAL CONTROL

Solenoid construction: see data sheet poppet valve (1.11-2082) For further hydraulic specifications, refer to data sheet 2.5-535

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CHARACTERISTICS Oil viscosity v = 30 mm²/s



ACCECOIRES

Threaded connection plates and multi-flange subplatesRegister 2.9Mating connector EN 175301-803Article no. 219.2002

Technical explanation see data sheet 1.0-100

TYPES/DIMENSIONS



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PARTS LIST

Position	Article	Description
10	134.6650	Sandwich plate P
	134.6651	Sandwich plate T
	134.6652	Sandwich plate A, AV
	134.6649	Sandwich plate B, BV
20	633.3	Flow control valve QZ PM22
		acc. to data sheet 2.5-535
30	500.3	Solenoid poppet valve SVSPM22
		acc. to data sheet 1.11-2082
50	160.2093	O-ring ID 9,25x1,78



Fine feed-/fast approach valve Sandwich construction

- Q_{max} = 80 l/min (Fine feed)
- Q_{max}^{max} = 120 l/min (Fast approach)
- $Q_{N max}^{max} = 70$ l/min
- $p_{max} = 350 \text{ bar}$

DESCRIPTION

Fine feed-/fast approach valve in sandwich construction. 2-way flow control cartridges (see data sheet 2.5-550) and 2/2-way solenoid poppet valve cartridges 1.11-2076 are installed. 2 standard nominal volume flow ranges are available. The sandwich body made of steel is phosphatized.

TYPE CODE

FUNCTION

The fine feed-/fast approach valve serves for the electrically controlled two-stage speed control. Fine feed and fast approach. At the fine feed the volume flow is controlled by the flow control valve, to the manually adjusted value independent on the load. In doing so, the poppet valve is closed. At the fast approach the volume flow, dependent of the load and of the system pressure, flows through the poppet valve.

NG10

ISO 4401-05



APPLICATION

The fine feed-/fast approach valves are utilised in hydraulic systems, which require an electrically controlled fine feed-/fast approach changeover, such as positioning controls on machine tools or elevation controls of elevating platforms, etc. Due to the sandwich construction, these fine feed-/fast approach valves can be integrated into stacked systems as an intermediate flange.

	V Q _ S A10 / W _ # _
Fine feed-/fast approach valve	
Flow control function	
Setting versions Key S Control knob D	
Sandwich construction	
International standard connection ISO, NG10	
Function Flow control in: Meter-out flow control in: Meter-in flow control in: P P A A AV T T B B BV	
Poppet valve normally closed C normally open O	
Standard nominal volume flow rates Q32 l/min32Fine feed70 l/min70	
Standard nominal voltage U _N 12VDC G12 115VAC R115 24VDC G24 230VAC R230	
Slip-on coil Metal housing round	
Connector socket EN175301-803/ISO 4400 D AMP Junior-Timer J (only for U _N ≤ 75 VDC)	
Design-Index (Subject to change)	

GENERAL SPECIFICATIONS

Description	Fine feed-/fast approach valve
Nominal size	NG10 acc. to ISO 4401-05
Construction	Sandwich construction
Mounting	4 holes for socket cap screws
_	M6 or studs M6
Connection	Threaded connection plates, multi-flange
Ambient temperature	-20 +50 °C
Mounting	any
Fastening torque	M_{D} = 9,5 Nm (Qual. 8.8) for fixing screws cartridges: see valve data sheets
Weight	m = 4.5 kg

HYDRAULIC SPECIFICATIONS

Fluid	Mineral oil, other fluid on request
Contamination efficiency	ISO 4406:1999, class 18/16/13
	(Recommended filtration grade ß 610≥75)
	refer to data sheet 1.0-50/2
Viscosity range	12 mm ² /s320 mm ² /s
Fluid temperature	-20+70 °C
Peak pressure	p _{max} = 350 bar
Nominal volume flow rates	$Q_{N} = 32 \text{ l/min}, 70 \text{ l/min}$
Min. volume flow	$Q_{min} = 0,2 $ l/min
Max. volume flow	Q _{max} = 120 l/min

For further hydraulic specifications, refer to flow control valve data sheet 2.5-550.

ELECTRICAL ACTUATION

Solenoid construction:

see data sheet poppet valve (1.11-2076)



CHARACTERISTICS Oil viscosity v = 30 mm²/s







Threaded connection plates and multi-flange subplates Register 2.9 Mating connector EN 175301-803 Article no. 219.2002

Technical explanation see data sheet 1.0-100

TYPES/DIMENSIONS



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PARTS LIST

Position	Article	Description
10	136.6640	Sandwich plate P
	136.6643	Sandwich plate T
	136.6641	Sandwich plate A, AV
	136.6642	Sandwich plate B, BV
20	633.8	Flow control valve QZ.PM33
		acc. to data sheet 2.5-550
30	500.4	Solenoid poppet valve SVSPM33
		acc. to data sheet 1.11-2076
50	160.2140	O-ring ID 14,00 x 1,78