Electric Drives and Controls | Hydraulics | Linear Motion and Assembly Technologies | Pneumatics | Service

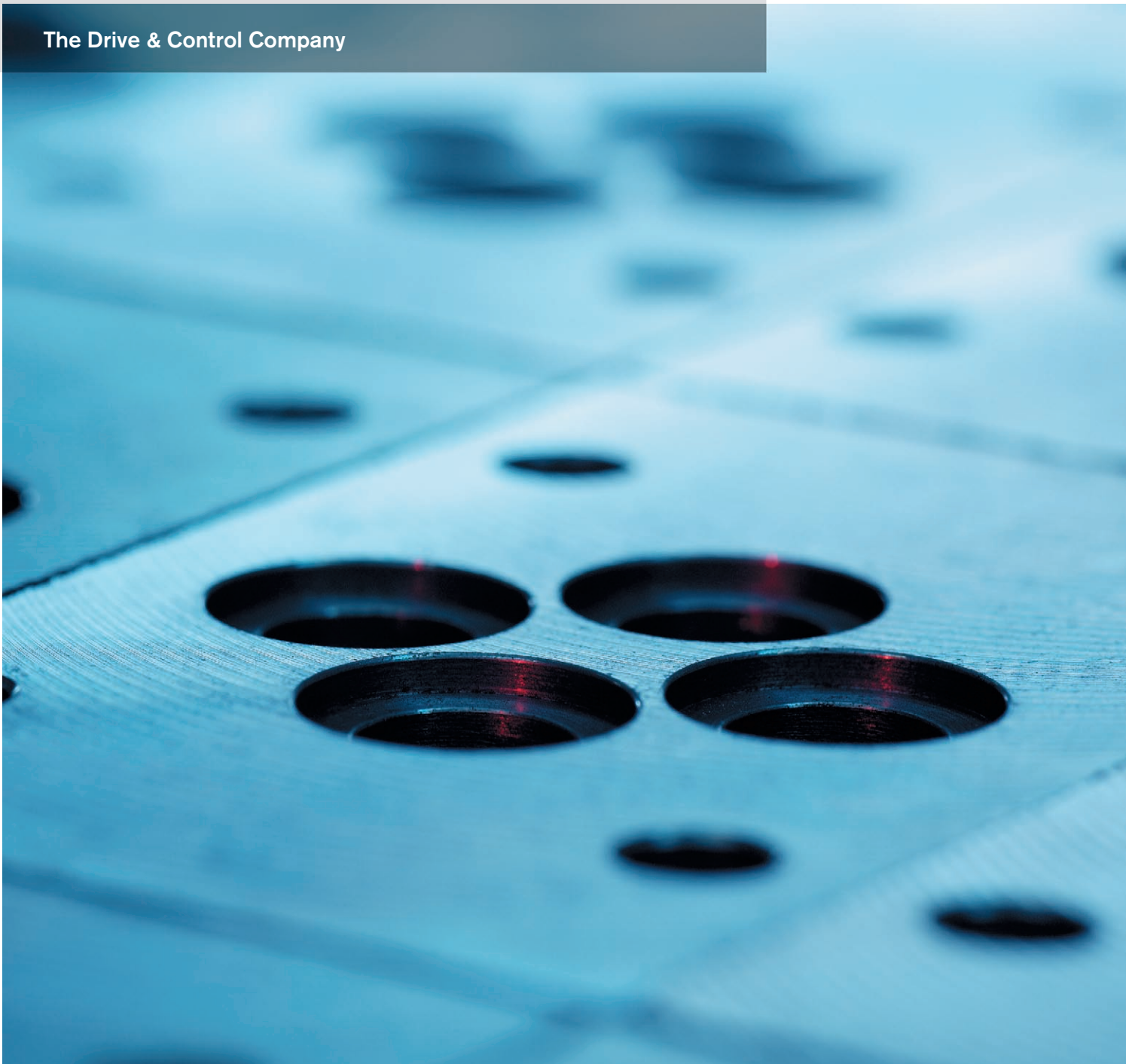
Rexroth
Bosch Group

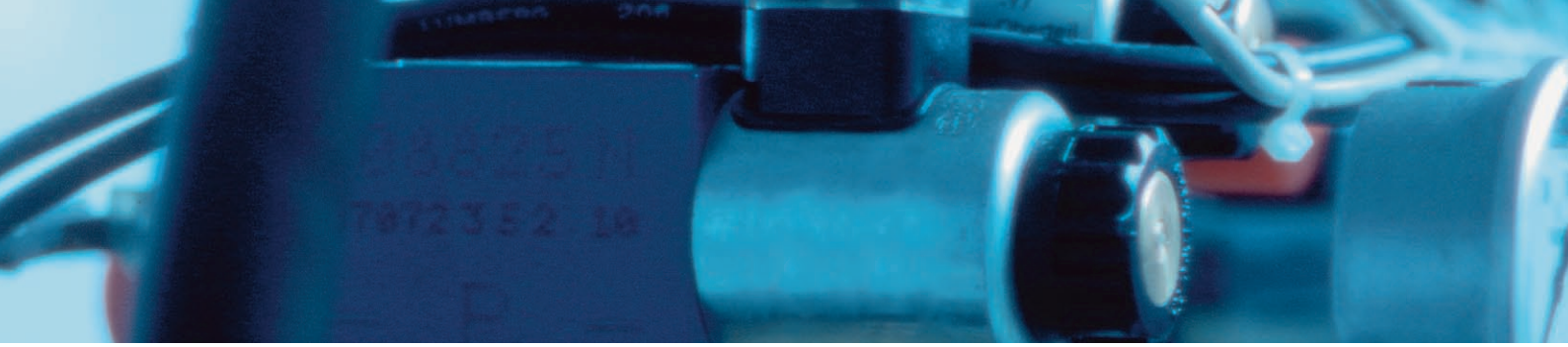
Industrial Hydraulics

Hydraulic and Electronic Components

Product Range Information

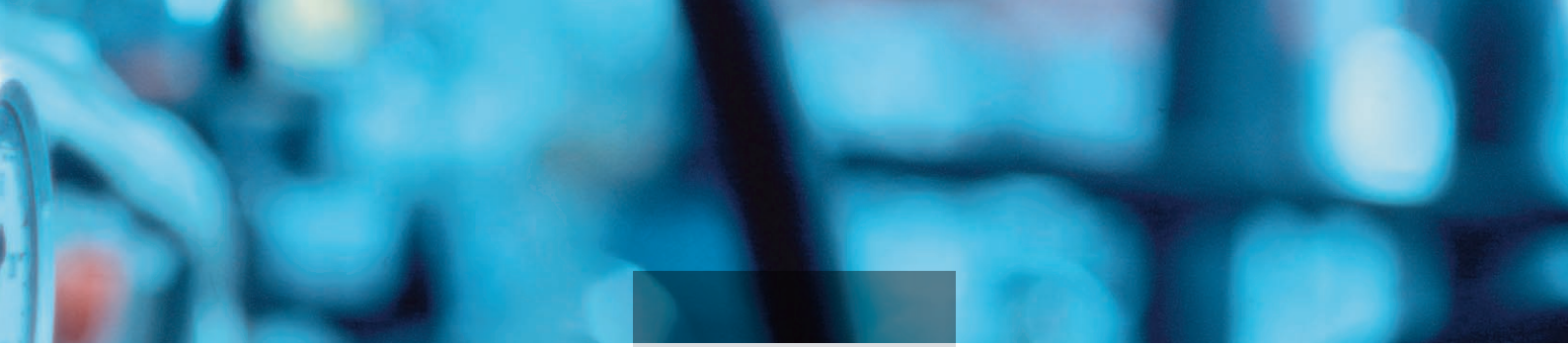
The Drive & Control Company



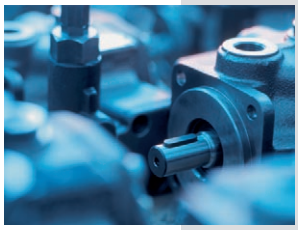


You are looking for quality? Rely on Rexroth products!

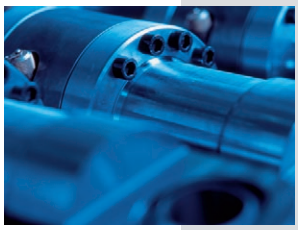
As a leading provider of industrial hydraulics, Rexroth takes a top position with its parts, systems and specially customized electronic components.
When choosing Rexroth products, you will benefit from the competence and experience of this international market leader who succeeded in increasing the capacity of its hydraulic drive components significantly by integrating microelectronics in all drive and control solutions. You, as a manufacturer of machines, systems and plants, will be provided with products which are setting high efficiency standards. Our comprehensive quality management systems ensure maximum safety and reliability worldwide, even under hard conditions in practice. Our products comply with applicable national and international standards and can be incorporated in machine concepts without any difficulties.
In addition, certificates have been issued by international automotive manufacturers and numerous classification societies for a multitude of products. This high product standard is ensured by the most modern test procedures as well as current calculation and simulation methods for the analysis of vibrations and component deformations and the testing and optimization of prototypes. Products complying with the ultrahigh directive 94/9/EC - explosive atmosphere, are available for special hazard situations.



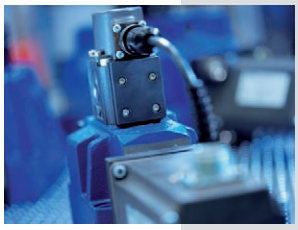
Pumps



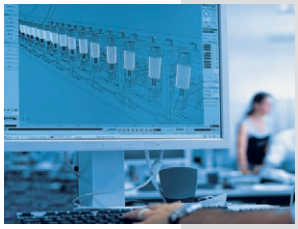
Cylinders



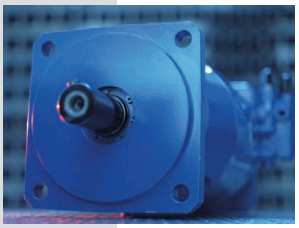
Proportional, high-response and servo-valves



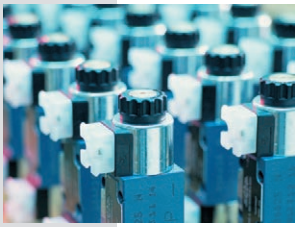
Simulation technology



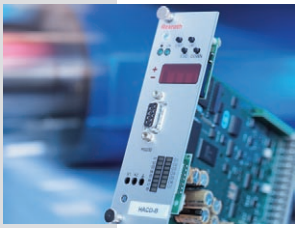
Accumulators and accessories



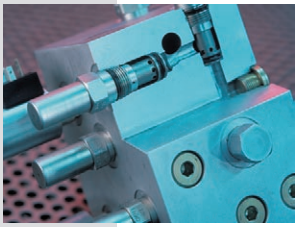
Motors



On/off valves



Electronics



Control blocks / plates

Power units and accessories

Pumps

Axial piston pumps

Axial piston pumps are available in swashplate and bent-axis design for the medium and high-pressure range. Variations in design, output range and control options ensure optimum solutions for stationary applications.

Performance profile

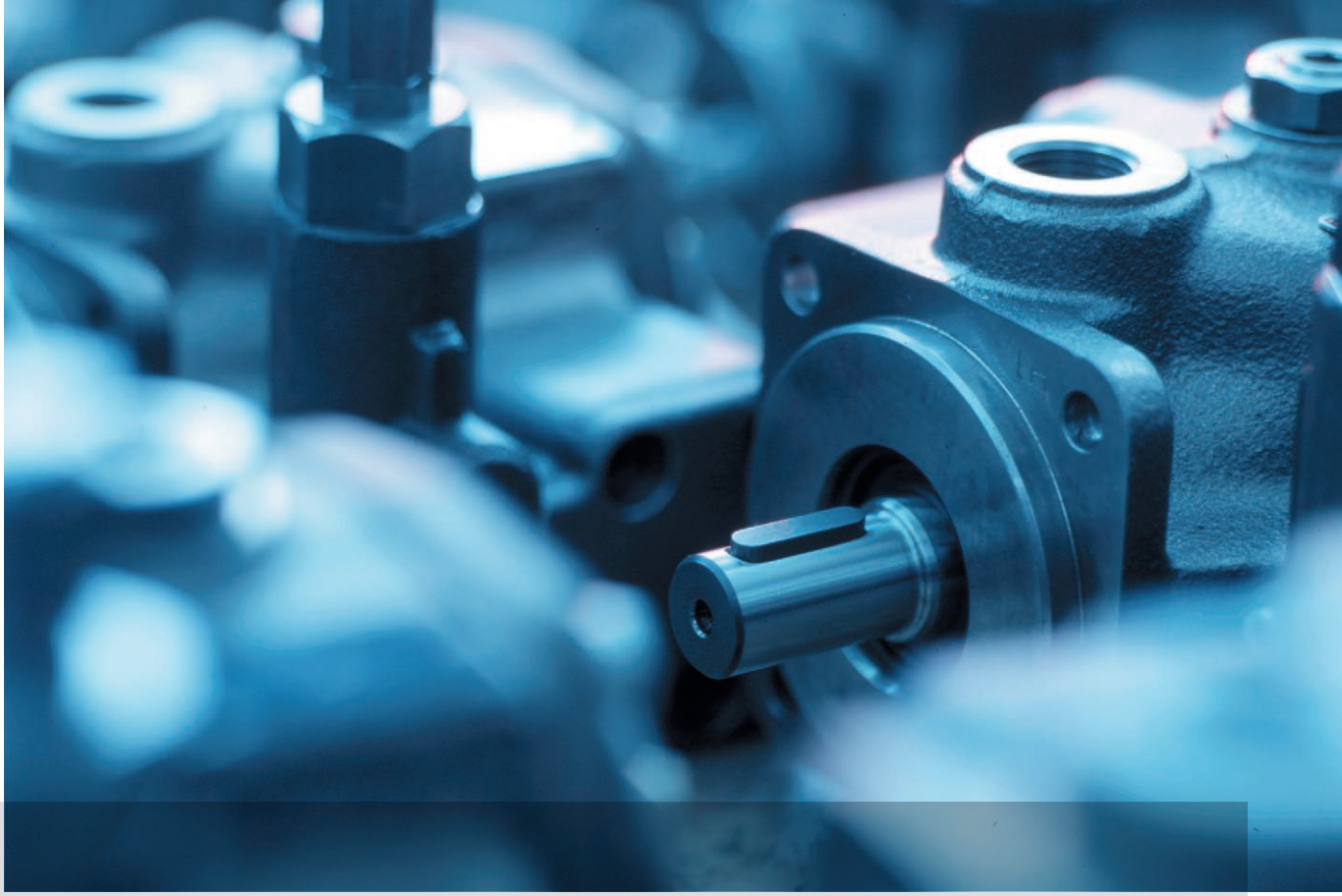
- Displacement 5 to 1000 cm^3
- Nominal pressure up to 420 bar
- Maximum speed up to 5600 min^{-1}
- Maximum power 933 kW
- Modular controllers: hydromechanical and electrohydraulic controllers

External gear pumps

Gear pumps are classic in the field of hydraulics.
Solo-pumps, multiple pumps and low-noise "silence" pumps in seven frame sizes offer a multitude of application possibilities.

Performance profile

- Displacement 1 to 63 cm^3 (up to 100 cm^3 on request)
- Nominal pressure up to 280 bar
- Pressure-related gap sealing and high manufacturing precision ensure optimum efficiency
- Design variants with different flanges, shafts, built-on valves and multiple-pump combinations



Internal gear pumps

Internal gear pumps are suitable for operation at a continuous pressure of up to 315 bar (depending on frame size). Their compact build results in a particularly high power density and minimum space requirement.

Performance profile

- Displacement 1.7 to 250 cm^3
- Continuous pressure up to 315 bar
- Pumps can be combined with each other
- Low flow pulsation and low-noise operation due to internal toothing
- Excellent volumetric efficiency due to hydraulic compensation of axial and radial sealing gaps

Vane pumps

Our vane pump frame sizes are mainly used in the low and medium pressure ranges.

Performance profile

Fixed displacement pumps:

- Displacement 18 to 193 cm^3
- Continuous pressure up to 210 bar
- Dual-flow pumps
- Low operating noise
- Maintenance-friendly

Variable displacement pumps:

- Displacement 10 to 150 cm^3
- Continuous pressure up to 160 bar
- Multiple pump combinations
- Pressure controllers, direct or pilot operated
- Pressure and flow controllers

Radial piston pumps

Radial piston pumps are used for the high pressure range (operating pressures up to 700 bar). They are valve-controlled, self-priming pumps with a fixed displacement.

Performance profile

- Displacement 0.40 to 20 cm^3
- Operating pressure up to 700 bar
- Hydrostatic bearing relief for a long service life
- Multiple pump combinations

Fixed displacement pumps

- Sizes 5 to 1000
- Axial tapered piston bent-axis design
- Open circuit
- Frame size 6
- Standard fixed displacement pump for any application
- Service ports SAE or threaded
- Long-life bearing possible (sizes 250 to 1000)

Type A2FO

Detailed information:
RE 91401

Size				5	10	12	16	23	28	32	45
Nominal pressure			bar	315	400	400	400	400	400	400	400
Peak pressure			bar	350	450	450	450	450	450	450	450
Displacement		V_g	cm^3	4.93	10.3	12	16	22.9	28.1	32	45.6
Speed [1]		n_{max}	min^{-1}	5600	3150	3150	3150	2500	2500	2500	2240
Flow	at n_{max}	$q_{V\,max}$	l/min	27.6	32.4	37.8	50	57	70	80	102
Power [2]		P_{max}	kW	14.5 [3]	21.6	25	34	38	47	53	68
Torque [2]		T_{max}	Nm	24.7 [3]	65	76	101	145	178	203	290
Weight (approx.)		m	kg	2.5	6	6	6	9.5	9.5	9.5	13.5

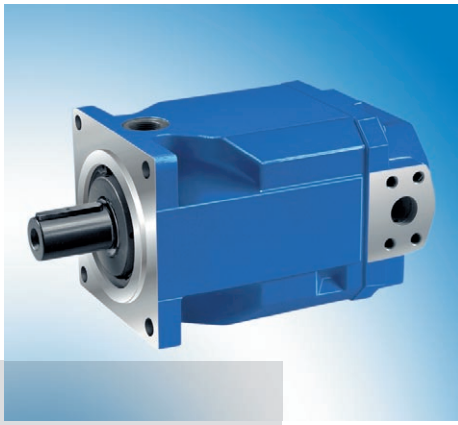
Size				56	63	80	90	107	125	160	180
Nominal pressure			bar	400	400	400	400	400	400	400	400
Peak pressure			bar	450	450	450	450	450	450	450	450
Displacement		V_g	cm^3	56.1	63	80.4	90	106.7	125	160.4	180
Speed [1]		n_{max}	min^{-1}	2000	2000	1800	1800	1600	1600	1450	1450
Flow	at n_{max}	$q_{V\,max}$	l/min	112	126	144	162	170	200	232	261
Power [2]		P_{max}	kW	75	84	96	108	114	133	155	174
Torque [2]		T_{max}	Nm	356	400	511	572	678	795	1020	1145
Weight (approx.)		m	kg	18	18	23	23	32	32	45	45

Size				200	250	355	500	710	1000
Nominal pressure			bar	400	350	350	350	350	350
Peak pressure			bar	450	400	400	400	400	400
Displacement		V_g	cm^3	200	250	355	500	710	1000
Speed [1]		n_{max}	min^{-1}	1550	1500	1320	1200	1200	950
Flow	at n_{max}	$q_{V\,max}$	l/min	310	375	469	600	826	950
Power [4]		P_{max}	kW	207 [2]	219	273	350	497	554
Torque [4]		T_{max}	Nm	1272 [2]	1393	1978	2785	3955	5570
Weight (approx.)		m	kg	66	73	110	155	322	336

[1] values valid at an absolute pressure of 1 bar in suction port S
[2] $\Delta p = 400$ bar
[3] $\Delta p = 315$ bar
[4] $\Delta p = 350$ bar

Fixed displacement pumps

- Sizes 16 to 500
- Axial piston swashplate design
- Open circuit
- Frame size 1 (size 71)
- Frame size 3 (sizes 16 to 40 and 125 to 500)
- Mounting of further pumps up to the same size possible to through-drive
- Operation with HF fluids possible with reduced technical data (sizes 71 to 500)



Type A4FO

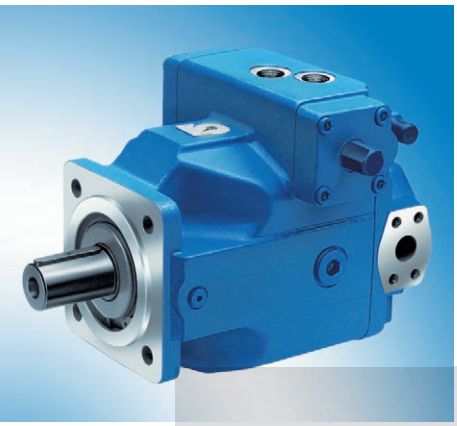
Size				**16**	**22**	**28**	**40**
Nominal pressure			bar	400	400	400	400
Peak pressure			bar	450	450	450	450
Displacement		V_g	cm^3	16	22	28	40
Speed [1]		n_{max}	min^{-1}	4000	3600	3000	2750
Flow	at n_{max}	$q_{V\,max}$	l/min	64	79	84	110
Power	$\Delta p = 400$ bar	P_{max}	kW	43	53	56	73
Torque	$\Delta p = 400$ bar	T_{max}	Nm	102	140	178	254
Weight (approx.)		m	kg	13.5	13.5	13.5	16.5

Size				**71**	**125**	**250**	**500**
Nominal pressure			bar	350	350	350	350
Peak pressure			bar	400	400	400	400
Displacement		V_g	cm^3	71	125	250	500
Speed [1]		n_{max}	min^{-1}	2200	1800	1500 [2]	1320 [2]
Flow	at n_{max}	$q_{V\,max}$	l/min	152	225	375	660
Power	$\Delta p = 350$ bar	P_{max}	kW	91	131	219	385
Torque	$\Delta p = 350$ bar	T_{max}	Nm	395	696	1391	2783
Weight (approx.)		m	kg	34	61	120	220

Detailed information:
RE 91455

[1] values valid at an absolute pressure of 1 bar in suction port S

[2] higher speeds permitted with high-speed version



Variable displacement pumps

- Sizes 40 to 1000
- Axial piston swashplate design
- Open circuit
- Frame size 1 and 3
- Long bearing life
- Comprehensive controller and actuator product range (see below)
- Mounting of further pumps up to the same size possible to through-drive
- Operation with HFC fluids optionally possible if performance data identical to those in mineral oil mode (sizes 180 to 355)

Type A4VSO

Detailed information:
– RE 92050

– Pump for HFC fluid: RE 92053

Size				40	71	125	180	250
Nominal pressure			bar	350	350	350	350	350
Peak pressure			bar	400	400	400	400	400
Displacement		$V_{g\,max}$	cm^3	40	71	125	180	250
Speed [1]		n_{max}	min^{-1}	2600	2200	1800	1800	1500 [2]
Flow	at n_{max}	$q_{V\,max}$	l/min	104	156	225	324	375
Power	$\Delta p = 350$ bar	P_{max}	kW	61	91	131	189	219
Torque	$\Delta p = 350$ bar	T_{max}	Nm	223	395	696	1002	1391
Weight (approx.)	Pressure controller	m	kg	39	53	88	102	184

Size				355	500	750	1000
Nominal pressure			bar	350	350	350	350
Peak pressure			bar	400	400	400	400
Displacement		$V_{g\,max}$	cm^3	355	500	750	1000
Speed [1]		n_{max}	min^{-1}	1500 [2]	1320 [2]	1200	1000
Flow	at n_{max}	$q_{V\,max}$	l/min	533	660	900	1000
Power	$\Delta p = 350$ bar	P_{max}	kW	311	385	525	583
Torque	$\Delta p = 350$ bar	T_{max}	Nm	1976	2783	4174	5565
Weight (approx.)	Pressure controller	m	kg	207	320	460	605

[1] values valid at an absolute pressure of 1 bar in suction port S

[2] higher speeds permitted with high-speed version

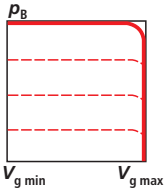
Further controllers and actuators:

LR2N (RE 92064)
Power controllers, pilot pressure-related

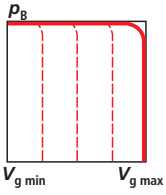
HM (RE 92076)
Hydraulic control, flow-related

DFE1 (RE 92088)
Electrohydraulic control system

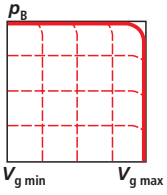
DR (RE 92060)
Pressure controller
DP (RE 92060)
Pressure controller for parallel operation



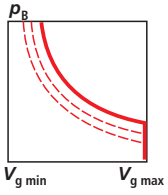
FR (RE 92060)
Flow controller



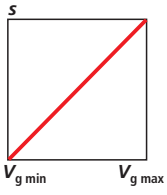
DFR (RE 92060)
Pressure and flow controller



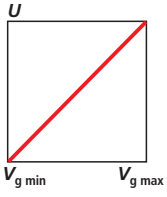
LR2 (RE 92064)
Power controller
LR3 (RE 92064)
Remote-controlled power controller



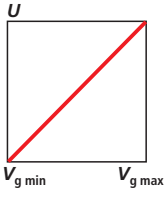
MA (RE 92072)
Manual control
EM (RE 92072)
Electromotive control



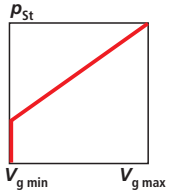
HS/HS4 (RE 92076)
Hydraulic displacement control (servo-/proportional valve)



EO1/EO2 (RE 92076)
Hydraulic displacement control (proportional valve)



HD (RE 92080)
Hydraulic control, pilot pressure-related



V_g = displacement
p_B = operating pressure
p_{St} = pilot pressure
s = actuator travel
$ß$ = swivel angle
U = control voltage

Variable displacement pumps

- Sizes 10 to 140
- Axial piston swashplate design
- Open circuit
- Frame size 31 (sizes 18 to 140)
- Frame size 52 (size 10)
- Comprehensive controller and actuator product range (see below)
- Through-drive option for mounting further pumps up to the same size (not with size 10)

Type A10VSO (frame size 31 and 52)

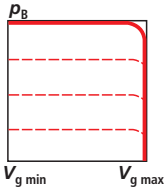
Size				**10**	**18**	**28**	**45**
Nominal pressure			bar	250	280	280	280
Peak pressure			bar	315	350	350	350
Displacement		$V_{g\,max}$	cm^3	10.5	18	28	45
Speed [1]		n_{max}	min^{-1}	3600	3300	3000	2600
Flow	at n_{max}	$q_{V\,max}$	l/min	38	59	84	117
Power	$\Delta p = 280$ bar	P_{max}	kW	16 [2]	28	39	55
Torque	$\Delta p = 280$ bar	T_{max}	Nm	42 [2]	80	125	200
Weight (approx.)	Pressure controller	m	kg	8	12	15	21

Size				**71**	**100**	**140**
Nominal pressure			bar	280	280	280
Peak pressure			bar	350	350	350
Displacement		$V_{g\,max}$	cm^3	71	100	140
Speed [1]		n_{max}	min^{-1}	2200	2000	1800
Flow	at n_{max}	$q_{V\,max}$	l/min	156	200	252
Power	$\Delta p = 280$ bar	P_{max}	kW	73	93	118
Torque	$\Delta p = 280$ bar	T_{max}	Nm	316	445	623
Weight (approx.)	Pressure controller	m	kg	33	45	60

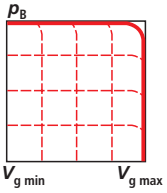
Detailed information:
– Size 10: RE 92703
– Size 18: RE 92712
– Sizes 28 to 140: RE 92711

[1] values valid at an absolute pressure of 1 bar in suction port S
[2] $\Delta p = 250$ bar

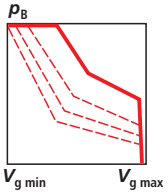
DR
Pressure controller



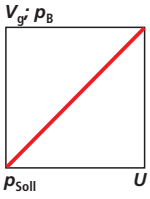
DFR
Pressure and flow controller



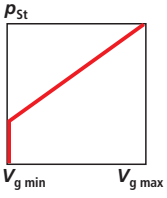
DFLR
Pressure, flow and power controller



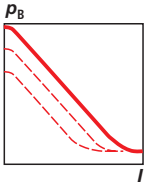
DFE
Pressure and flow controller, electronic



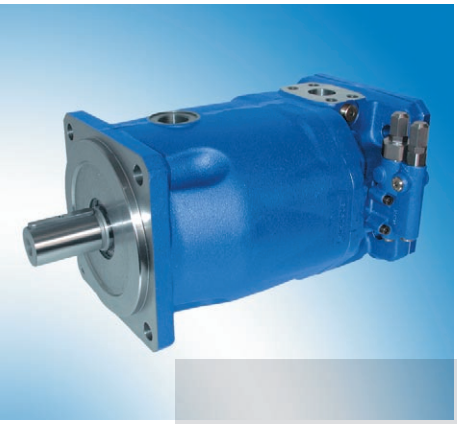
FHD
Displacement controller, pilot pressure-related, with pressure control



ED (RE 92707)
Electrohydraulic closed-loop pressure control



V_g = displacement
p_{St} = pilot pressure
p_B = operating pressure
I = current intensity
U = control voltage



Variable displacement pumps

- Sizes 71 to 140
- Axial piston swashplate design
- Open circuit
- Frame size 32
- Low noise development
- High efficiency
- High reliability
- Universal through-drive

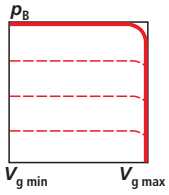
Type A10VSO (frame size 32)

Detailed information:
RE 92714

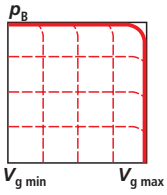
Size				71	100	140
Nominal pressure			bar	280	280	280
Peak pressure			bar	350	350	350
Displacement		$V_{g\,max}$	cm^3	71.1	100	140
Speed [1]		n_{max}	min^{-1}	2600	2400	2100
Flow	at n_{max}	$q_{V\,max}$	l/min	156.4	200	252
Power	$\Delta p = 280$ bar at n_{max}	P_{max}	kW	73	93	118
Torque	$\Delta p = 280$ bar at $V_{g\,max}$	T_{max}	Nm	317	446	624
Weight (without priming volume)		m	kg	47	69	73

[1] values valid at an absolute pressure of 1 bar in suction port S

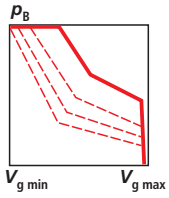
DR
Pressure controller



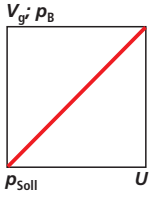
DRF/DRS
Pressure and flow controller



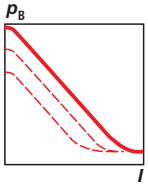
LA
Pressure, flow and power controller



DFE
Pressure and flow controller, electronic



ED (RE 92707)
Electrohydraulic closed-loop pressure control



V_g = displacement
p_{St} = pilot pressure
p_B = operating pressure
I = current intensity
U = control voltage

Variable displacement pumps

- Sizes 28 to 1000
- Axial tapered piston bent-axis design
- Open circuit
- Frame size 6
- Robust, for versatile use in open-circuit applications
- Long-life bearings possible for prolonged service life (sizes 250 to 1000)
- Visual or electrical swivel angle indicator on request (sizes 250 to 1000)

Type A7VO

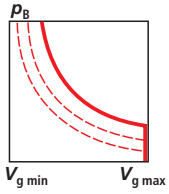
Size				**28**	**55**	**80**	**107**	**160**
Nominal pressure			bar	350	350	350	350	350
Peak pressure			bar	400	400	400	400	400
Displacement		$V_{g\,max}$	cm^3	28.1	54.8	80	107	160
Speed [1]		n_{max}	min^{-1}	3150	2500	2240	2150	1900
Flow	at n_{max}	$q_{V\,max}$	l/min	89	137	179	230	304
Power	$\Delta p = 350$ bar	P_{max}	kW	52	80	105	134	177
Torque	$\Delta p = 350$ bar	T_{max}	Nm	156	305	446	596	891
Weight (approx.)		m	kg	17	25	40	49	71

Size				**250**	**355**	**500**	**1000**
Nominal pressure			bar	350	350	350	350
Peak pressure			bar	400	400	400	400
Displacement		$V_{g\,max}$	cm^3	250	355	500	1000
Speed [1]		n_{max}	min^{-1}	1500	1320	1200	950
Flow	at n_{max}	$q_{V\,max}$	l/min	375	469	600	950
Power	$\Delta p = 350$ bar	P_{max}	kW	212	265	340	538
Torque	$\Delta p = 350$ bar	T_{max}	Nm	1391	1976	2783	5565
Weight (approx.)		m	kg	102	173	234	450

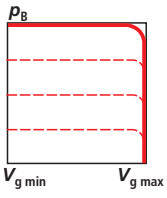
Detailed information
- Sizes 28 to 160: RE 92202
- Sizes 250 to 1000: RE 92203

[1] values valid at an absolute pressure of 1 bar in suction port S

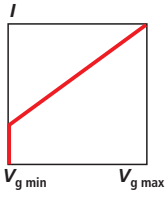
LR
Power controller



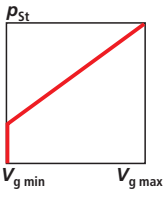
DR
Pressure controller



EP
Electrical control with proportional solenoid



HD
Hydraulic control, pilot pressure-related



V_g = displacement
p_B = operating pressure
p_{St} = pilot pressure
I = current intensity

Variable displacement pumps

- Sizes 40 to 1000
- Axial piston swashplate design
- Closed circuit
- Frame size 1 and 3
- Valve block for safeguarding the closed circuit
- Auxiliary pumps for the boost and pilot oil circuit or a further axial piston pump of up to the same size can be mounted to the through-drive

Type A4VSG

Detailed information:
RE 92100

Size				**40**	**71**	**125**	**180**	**250**
Nominal pressure			bar	350	350	350	350	350
Peak pressure			bar	400	400	400	400	400
Displacement		$V_{g\,max}$	cm^3	40	71	125	180	250
Speed		n_{max}	min^{-1}	3700	3200	2600	2400	2200
Flow	at n_{max}	$q_{V\,max}$	l/min	148	227	325	432	550
Power	$\Delta p = 350$ bar	P_{max}	kW	86	132	190	252	321
Torque	$\Delta p = 350$ bar	T_{max}	Nm	223	395	696	1002	1391
Weight (approx.)	EO+valve block	m	kg	47	60	100	114	214

Size				**355**	**500**	**750**	**1000**
Nominal pressure			bar	350	350	350	350
Peak pressure			bar	400	400	400	400
Displacement		$V_{g\,max}$	cm^3	355	500	750	1000
Speed		n_{max}	min^{-1}	2000	1800	1600	1600
Flow	at n_{max}	$q_{V\,max}$	l/min	710	900	1200	1600
Power	$\Delta p = 350$ bar	P_{max}	kW	414	525	700	933
Torque	$\Delta p = 350$ bar	T_{max}	Nm	1976	2783	4174	5565
Weight (approx.)	EO+valve block	m	kg	237	350	500	630

Further controllers:

FR (RE 92060)
Flow controller

DFR (RE 92060)
Pressure and flow controller

MA (RE 92072)
Manual control

EM (RE 92072)
Electromotive control

EO1/EO2 (RE 92076)
Hydraulic displacement control (proportional valve)

HS/HS4 (RE 92076)
Hydraulic displacement control (servo-/proportional valve)

HM1/2 (RE 92076)
Hydraulic displacement control, flow-related

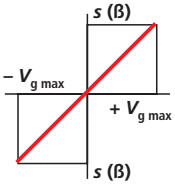
HD (RE 92080)
Hydraulic control, pilot pressure-related

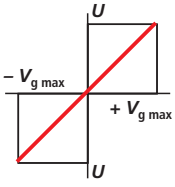
EP (RE 92084)
Electrohydraulic displacement control with proportional solenoid

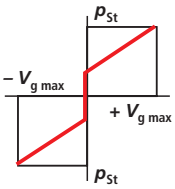
DR (RE 92060)
Pressure controller

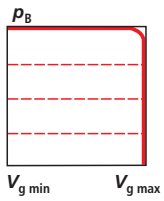
DP (RE 92060)
Pressure controller for parallel operation

V_g = displacement
p_{St} = pilot pressure
p_B = operating pressure
s = actuator travel
U = control voltage
I = current intensity









Variable displacement pumps (compact units)

- Sizes 250 to 750
- Axial piston swashplate design
- Closed circuit
- Frame size 3
- Integrated boost pump and valve technology
- Compact build
- Through-drive and pump combination possible even with integrated auxiliary pump

Type A4CSG

Size				**250**	**355**	**500**	**750**
Nominal pressure			bar	350	350	350	350
Peak pressure			bar	400	400	400	400
Displacement	Variable displ.	$V_{g\,max}$	cm^3	250	355	500	750
	integr. auxiliary pump	$V_{g\,H}$	cm^3	63	80	98	143
Speed	Max. speed	n_{max}	min^{-1}	2200	2000	1800	1600
	Min. speed	n_{min}	min^{-1}	800	800	800	800
Flow [1]	at n_{max}	$q_{V\,max}$	l/min	550	710	900	1200
Power	$\Delta p = 350$ bar at $n_{0\,max}$	$P_{0\,max}$	kW	321	414	525	700
Torque [2]	$\Delta p = 350$ bar at $V_{g\,max}$	T_{max}	Nm	1391	1976	2783	4174
Weight (approx.) [3]		m	kg	214	237	350	500

Detailed information:
RE 92105

1) Variable displacement pump
2) Variable displacement pump without auxiliary pump
3) Pump with EP control and integrated auxiliary pump

HM1/2/3 (RE 92076)
Hydraulic displacement control, flow-related

MA (RE 92072)
Manual control

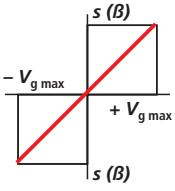
EM (RE 92072)
Electromotive control

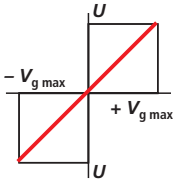
EO1/2 (RE 92076)
Hydraulic displacement control (proportional valve)

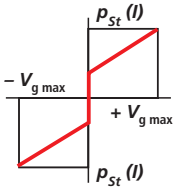
HS/HS4 (RE 92076)
Hydraulic displacement control (servo-/ proportional valve)

HD (RE 92080)
Hydraulic control, pilot pressure-related

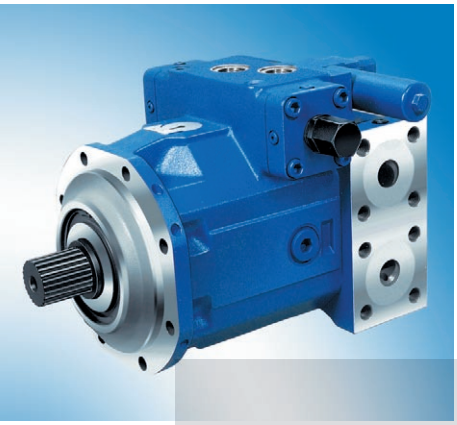
EP (RE 92084)
Electrohydraulic displacement control with proportional solenoid







V_g = displacement
p_{St} = pilot pressure
s = actuator travel
$ß$ = angular position of the rotary pin
U = control voltage
I = current intensity



Variable displacement pumps

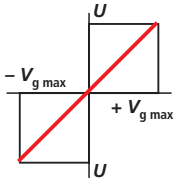
- Size 450
- Axial piston swashplate design
- Variable displacement pump for the closed circuit and preload operation
- Frame size 3

Type A4VB

Detailed information:
RE 92120

Size				**450**
Nominal pressure			bar	420
Peak pressure			bar	450
Displacement		V_g	cm^3	456
Speed		n_{max}	min^{-1}	1800
Flow	at n_{max}	$q_{V\,max}$	l/min	821
Power	$\Delta p = 420$ bar	P_{max}	kW	574
Torque	$\Delta p = 420$ bar	T_{max}	Nm	3044
Weight (approx.)		m	kg	420

HS/HS4 (RE 92076)
Hydraulic displacement control (servo-/ proportional valve)



V_g = displacement
U = control voltage

Variable displacement pumps

- Sizes 12 to 107, frame size 1 and 4 (type A2VK)
- Size 28, frame size 6 (type A7VK)
- Axial piston bent-axis design
- Open or closed circuit
- Material-modified high-pressure pump for delivering polyurethane components
- High dosing accuracy and reproducibility of the adjustable delivery volumes
- Increased corrosion protection through special surface treatment
- Manual control with precision indicator and clamping device
- Dual shaft seal made of special material and flushing chamber for damage detection and environmental protection
- Good volumetric efficiency

Detailed information:
– Type A2VK: RE 94001
– Type A7VK: RE 94010

Type A2VK

Size				**12**	**28**	**55**	**107**
Nominal pressure			bar	250	250	250	250
Peak pressure			bar	315	315	315	315
Displacement		$V_{g\,max}$	cm^3	11.6	28.1	54.8	107
Flow	$n = 1450\ min^{-1}$	$q_{V\,max}$	l/min	16.8	40.7	79.5	155.1
	$n = 1800\ min^{-1}$	$q_{V\,max}$	l/min	20.9	50.6	98.6	192.6
Power $\Delta p = 250$ bar	$n = 1450\ min^{-1}$	P_{max}	kW	7	17	33.1	64.6
	$n = 1800\ min^{-1}$	P_{max}	kW	8.7	21.1	41.1	80.3
Weight (approx.)		m	kg	19	36	64	117

Type A7VK

Size				**28**
Nominal pressure			bar	250
Peak pressure			bar	315
Displacement		$V_{g\,max}$	cm^3	28.1
Flow	$n = 1450\ min^{-1}$	$q_{V\,max}$	l/min	40.7
	$n = 1800\ min^{-1}$	$q_{V\,max}$	l/min	50.6
Power $\Delta p = 250$ bar	$n = 1450\ min^{-1}$	P_{max}	kW	17
	$n = 1800\ min^{-1}$	P_{max}	kW	21.1
Weight (approx.)		m	kg	26

Electronics for axial piston units

Overview of electronic components and systems suitable for axial piston units in stationary applications

Detailed information:	Type of component		For controlling	
	Open-loop control electronics, analogue			
RE 29904	**VT 2000**	Amplifier for proportional valves	A10VS / A4VS	DRG
RE 30111	**VT-VSPA1(K)-1**	Amplifier for proportional valves	A10VS / A4VS	DRG
RE 29935	**VT 3000**	Amplifier for proportional valves	A10VS / A4VS	DRG
	Closed-loop control electronics, analogue			
RE 29955	**VT 5035**	Amplifier for flow control	A4VS	EO
RE 29763	**VT 11019**	Amplifier for flow control	A10VS	FE
RE 29993	**VT-SR7**	Amplifier for flow control	A4VS	HS
RE 30024	**SYDFE1-2X**	Closed-loop control systems for A10VSO…		DFE
RE 30027	**SYDFEC-2X**	Closed-loop control systems for A10VSO…		DFE
RE 30030	**SYDFEE-2X**	Closed-loop control systems for A10VSO…		DFE
RE 30624	**SYDFE1-3X**	Closed-loop control systems for A10VSO…		DFE
RE 30627	**SYDFEC-3X**	Closed-loop control systems for A10VSO…		DFE
RE 30630	**SYDFEE-3X**	Closed-loop control systems for A10VSO…		DFE
RE 30241	**VT 5041**	External A10VSO control electronics…		DFE1
	Closed-loop control electronics, digital			
RE 30028	**VT-VPCD**	Closed-loop control system for A4VS…HS4		
	Accessories			
RE 29928	**VT 3002**	Card holder		
RE 30103	**VT 12302**	Enclosed card holder		
RE 29768	**VT 19101 to 19110**	19" racks		
RE 29929	**VT-NE30 to VT-NE32**	Compact power supply units		
on request	**BODAC**	PC program for digital amplifier cards		

External gear pumps

- Sizes 1 to 63 (size 100 on request)
- Plain bearings for high loads
- Drive shafts in various designs
- Combination of several pumps possible
- Line connections: connecting flanges or pipe threads
- Many design variants available

Type AZP

Frame size B; component series 1X	**Size**		**1**	**2**	**3**	**4**	**5**
Displacement	$V_{g\,max}$	cm^3	1	2	3	3.8	4.6
Max. continuous pressure	p_1	bar	210	210	210	190	140
Intermittent pressure	p_2	bar	230	230	230	210	160
Pressure in suction port		bar	min. 0.7; max. 3 absolute				
Max. speed – at p_2	n	min^{-1}	6000	6000	5000	4000	4000
Min. speed – at p_2	n	min^{-1}	1000	1000	850	750	750

Frame size B; component series 2X	**Size**		**1**	**2**	**2.5**	**3**	**4**	**4.5**	**5**	**6**	**7**
Displacement	$V_{g\,max}$	cm^3	1	2	2.5	3.15	4	4.5	5	6.3	7.1
Max. continuous pressure	p_1	bar	250	250	250	250	250	250	250	225	200
Intermittent pressure	p_2	bar	280	280	280	280	280	280	280	255	230
Pressure in suction port		bar	min. 0.7; max. 3 absolute								
Max. speed – at p_2	n	min^{-1}	6000	5000	5000	4000	4000	4000	4000	3500	3500
Min. speed – at p_2	n	min^{-1}	750	750	750	750	750	750	750	750	750

Frame size F; component series 1X	**Size**		**4**	**5**	**8**	**11**	**14**	**16**	**19**	**22**	**22** [1]
Displacement	$V_{g\,max}$	cm^3	4	5.5	8	11	14	16	19	22.5	22.5
Max. continuous pressure	p_1	bar	250	250	250	250	250	250	210	180	210
Intermittent pressure	p_2	bar	280	280	280	280	280	280	230	210	230
Pressure in suction port		bar	min. 0.7; max. 3 absolute								
Max. speed – at p_2	n	min^{-1}	4000	4000	4000	3500	3000	3000	3000	2500	3000
Min. speed – at p_2	n	min^{-1}	600	500	400	350	300	300	300	300	300

Frame size F; component series 2X	**Size**		**4**	**5**	**8**	**11**	**14**	**16**	**19**	**22**	**25**	**28**
Displacement	$V_{g\,max}$	cm^3	4	5.5	8	11	14	16	19	22.5	25	28
Max. continuous pressure	p_1	bar	250	250	250	250	250	250	250	220	195	170
Intermittent pressure	p_2	bar	280	280	280	280	280	280	280	250	225	200
Pressure in suction port		bar	min. 0.7; max. 3 absolute									
Max. speed – at p_2	n	min^{-1}	4000	4000	4000	3500	3000	3000	3500	3500	3000	3000
Min. speed – at p_2	n	min^{-1}	600	500	400	350	300	300	300	300	300	300

Detailed information:
– 1987760100
– RE 10089
– RE 98240

Note:
– The maximum pressures of versions with claw are sometimes reduced!
– Pumps with threaded connections have reduced admissible pressures or a reduced service life.
– Applicable to an oil viscosity of 25 mm^2/s and an oil temperature of 55 °C with HLP 46

[1] with extended bearings

External gear pumps

- Sizes 1 to 63 (size 100 on request)
- Plain bearings for high loads
- Drive shafts in various designs
- Combination of several pumps possible
- Line connections: connecting flanges or pipe threads
- Many design variants available

Type AZP

Detailed information:
– 1987760100
– RE 10089
– RE 98240

Frame size N; component series 1X		Size		20	22	25	28	32	36
Displacement		$V_{g\,max}$	cm^3	20	22.5	25	28	32	36
Max. continuous pressure		p_1	bar	230	230	230	210	180	160
Intermittent pressure		p_2	bar	250	250	250	230	200	180
Pressure in suction port			bar	min. 0.7; max. 3 absolute					
Max. speed	– at p_2	n	min^{-1}	3000	3000	3000	2800	2800	2600
Min. speed	– at p_2	n	min^{-1}	800	800	800	800	800	800

Frame size N; component series 2X		Size		20	22	25	28	32	36
Displacement		$V_{g\,max}$	cm^3	20	22.5	25	28	32	36
Max. continuous pressure		p_1	bar	250	250	250	230	210	180
Intermittent pressure		p_2	bar	280	280	280	260	240	210
Pressure in suction port			bar	min. 0.7; max. 3 absolute					
Max. speed	– at p_2	n	min^{-1}	3000	3000	3000	3000	2800	2600
	– at 10 bar	n	min^{-1}	3500	3500	3500	3500	3200	3000
Min. speed	– at p_2	n	min^{-1}	400	400	400	400	400	400

Frame size G; component series 1X		Size		22	28	32	38	45	56
Displacement		$V_{g\,max}$	cm^3	22.5	28	32	38	45	56
Max. continuous pressure		p_1	bar	210	210	210	200	180	160
Intermittent pressure		p_2	bar	250	250	250	250	230	200
Pressure in suction port			bar	min. 0.7; max. 3 absolute					
Max. speed	– at p_2	n	min^{-1}	3000	3000	3000	2800	2600	2300
Min. speed	– at p_2	n	min^{-1}	800	800	800	800	800	800

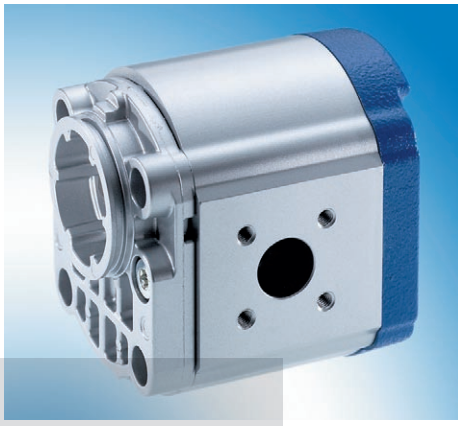
Frame size G; component series 2X		Size		22	25	28	32	36	40
Displacement		$V_{g\,max}$	cm^3	22.5	25	28	32	36	40
Max. continuous pressure		p_1	bar	250	250	250	250	250	250
Intermittent pressure		p_2	bar	280	280	280	280	280	280
Pressure in suction port			bar	min. 0.7; max. 3 absolute					
Max. speed	– at p_2	n	min^{-1}	3000	3000	3000	2800	2800	2800
	– at 10 bar	n	min^{-1}	3500	3500	3500	3200	3200	3200
Min. speed	– at p_2	n	min^{-1}	400	400	400	400	400	400

Frame size G; component series 2X		Size		45	50	56	63	70	80	100
Displacement		$V_{g\,max}$	cm^3	45	50	56	63	70	80	100
Max. continuous pressure		p_1	bar	250	220	195	170	120	90	70
Intermittent pressure		p_2	bar	280	250	225	200	150	120	100
Pressure in suction port			bar	min. 0.7; max. 3 absolute						
Max. speed	– at p_2	n	min^{-1}	2600	2600	2300	2300	2200	2000	1700
	– at 10 bar	n	min^{-1}	3000	3000	2600	2600	2500	2300	1900
Min. speed	– at p_2	n	min^{-1}	400	400	400	400	400	400	400

Note:
– The maximum pressures of versions with claw are sometimes reduced!
– Pumps with threaded connections have reduced admissible pressures or a reduced service life.
– Applicable to an oil viscosity of 25 mm^2/s and an oil temperature of 55 °C with HLP 46

External gear pumps (silence version)

- Sizes 4 to 63
- Plain bearings for high loads
- Drive shafts in various designs
- Combination of several pumps possible
- Line connections: connecting flanges or pipe threads
- Many design variants available
- Optimized pressure pulsation reduces noise emission and excitation of vibration in the system
- Significantly longer service life due to reinforced shaft and housing



Detailed information:
– RE 10095
– RE 98240

Type AZP

Frame size S		**Size**		**4**	**5**	**8**	**11**	**14**	**16**	**19**	**22**	**25**	**28**
Displacement		$V_{g\,max}$	cm^3	4	5.5	8	11	14	16	19	22.5	25	28
Max. continuous pressure		p_1	bar	250	250	250	250	250	250	250	220	195	170
Intermittent pressure		p_2	bar	280	280	280	280	280	280	280	250	225	200
Pressure in suction port			bar	min. 0.7; max. 3 absolute									
Max. speed	– at p_2	n	min^{-1}	4000	4000	4000	3500	3000	3000	3500	3500	3000	3000
Min. speed	– at p_2	n	min^{-1}	600	500	400	350	300	300	300	300	300	300

Frame size T; component series 2X		**Size**		**20**	**22**	**25**	**28**	**32**	**36**
Displacement		$V_{g\,max}$	cm^3	20	22.5	25	28	32	36
Max. continuous pressure		p_1	bar	250	250	250	230	210	180
Intermittent pressure		p_2	bar	280	280	280	260	240	210
Pressure in suction port			bar	min. 0.7; max. 3 absolute					
Max. speed	– at p_2	n	min^{-1}	3000	3000	3000	3000	2800	2600
	– at 10 bar	n	min^{-1}	3500	3500	3500	3500	3200	3000
Min. speed	– at p_2	n	min^{-1}	400	400	400	400	400	400

Frame size U; component series 2X		**Size**		**22**	**25**	**28**	**32**	**36**	**40**	**45**	**50**	**56**	**63**
Displacement		$V_{g\,max}$	cm^3	22.5	25	28	32	36	40	45	50	56	63
Max. continuous pressure		p_1	bar	250	250	250	250	250	250	250	220	195	170
Intermittent pressure		p_2	bar	280	280	280	280	280	280	280	250	225	200
Pressure in suction port			bar	min. 0.7; max. 3 absolute									
Max. speed	– at p_2	n	min^{-1}	3000	3000	3000	2800	2800	2800	2600	2600	2300	2300
	– at 10 bar	n	min^{-1}	3500	3500	3500	3200	3200	3200	3000	3000	2600	2600
Min. speed	– at p_2	n	min^{-1}	400	400	400	400	400	400	400	400	400	400

Internal gear pumps

- Sizes 1.7 to 40
- Low operating noise
- Low flow pulsation
- High efficiency even at low viscosity due to sealing gap compensation
- Suitable for wide speed and viscosity ranges
- Combination of several pumps possible
- Can be combined with axial piston pumps and vane pumps

Detailed information:
RE 10213

Type PGF

Frame size 1		**Size**		**1.7**	**2.2**	**2.8**	**3.2**	**4.1**	**5.0**
Nominal pressure			bar	180	210	210	210	210	180
Displacement		$V_{g\,max}$	cm^3	1.7	2.2	2.8	3.2	4.1	5.0
Operating pressure [1]		p_{max}	bar	210	250	250	250	250	210
Power [2]	at 1450 min^{-1}	P	kW	1.2	1.8	2	2.2	2.6	3.1
Speed range [3]		n_{max}	min^{-1}	600 to 4500					
Weight		m	kg	0.8	0.9	1.0	1.0	1.1	1.3

Frame size 2		**Size**		**6**	**8**	**11**	**13**	**16**	**19**	**22**
Nominal pressure			bar	210	210	210	210	210	210	180
Displacement		$V_{g\,max}$	cm^3	6.5	8.2	11	13.3	16	18.9	22
Operating pressure [1]		p_{max}	bar	250	250	250	250	250	250	210
Power [2]	at 1450 min^{-1}	P	kW	4	5.1	6.6	8	9.3	10.9	12.4
Speed range [3]		n_{max}	min^{-1}	600 to 3600						
Weight		m	kg	2.1	2.2	2.4	2.6	2.7	2.9	3.1

Frame size 3		**Size**		**20**	**22**	**25**	**32**	**40**
Nominal pressure			bar	210	210	210	210	180
Displacement		$V_{g\,max}$	cm^3	20.6	22.2	25.4	32.5	40.5
Operating pressure [1]		p_{max}	bar	250	250	250	250	210
Power [2]	at 1450 min^{-1}	P	kW	11.7	12.5	14.1	18.1	20.0
Speed range [3]		n_{max}	min^{-1}	500 to 3600				
Weight		m	kg	3.3	3.7	4.1	4.5	4.9

[1] intermittent
[2] at max., continuous operating pressure
[3] Depending on size

Internal gear pumps

- Very low operating noise
- Low flow pulsation
- High efficiency even at low speed and viscosity due to sealing gap compensation
- Suitable for wide speed and viscosity ranges
- All frame sizes and nominal sizes can be combined with each other
- Can be combined with vane pumps and axial piston pumps

Detailed information:
RE 10223

Type PGH

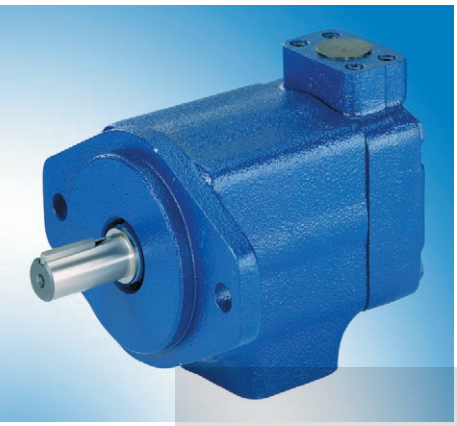
Frame size 2	**Size**								
Nominal pressure		bar					315	315	315
Displacement	$V_{g\,max}$	cm^3					5.2	6.5	8.2
Operating pressure [1]	p_{max}	bar					350	350	350
Power [2]	P	kW					4.6	5.6	7.2
Speed	n_{min}	min^{-1}					600	600	600
	n_{max}	min^{-1}					3000	3000	3000
Weight (approx.)	m	kg					4.3	4.4	4.6

Frame size 3	**Size**								
Nominal pressure		bar					315	315	315
Displacement	$V_{g\,max}$	cm^3					11	13	16
Operating pressure [1]	p_{max}	bar					350	350	350
Power [2]	P	kW					9.1	11.2	13.5
Speed	n_{min}	min^{-1}					600	600	600
	n_{max}	min^{-1}					3000	3000	3000
Weight (approx.)	m	kg					4.8	5.0	5.3

Frame size 4	**Size**			**20**	**25**	**32**	**40**	**50**	**63**
Nominal pressure		bar		250	250	250	250	250	210
Displacement	$V_{g\,max}$	cm^3		20.1	25.3	32.7	40.1	50.7	65.5
Operating pressure [1]	p_{max}	bar		315	315	315	315	315	250
Power [2]	P	kW		13.0	16.5	21.0	25.0	33.0	38.0
Speed	n_{min}	min^{-1}		500	500	500	500	500	400
	n_{max}	min^{-1}		3000	3000	3000	2600	2600	2600
Weight (approx.)	m	kg		13.5	14	14.5	15	16	17

Frame size 5	**Size**		**63**	**80**	**100**	**125**	**160**	**200**	**250**
Nominal pressure		bar	250	250	250	250	210	160	125
Displacement	$V_{g\,max}$	cm^3	64.7	81.4	100.2	125.3	162.8	200.4	250.5
Operating pressure [1]	p_{max}	bar	315	315	315	315	250	210	160
Power [2]	P	kW	43.0	54.0	67.0	84.0	82.0	96.0	84.0
Speed	n_{min}	min^{-1}	400	400	400	400	300	300	300
	n_{max}	min^{-1}	2600	2200	2200	2200	1800	1800	1800
Weight (approx.)	m	kg	39	40.5	42.5	45	49	52.5	57.5

[1] intermittent
[2] at maximum continuous operating pressure and $n = 1450\ min^{-1}$



Vane pumps, fixed displacement

- Sizes 18 to 193
- Low operating noise
- Low flow pulsation
- Suitable for wide speed and viscosity ranges
- Combination of several pumps possible
- Can be combined with axial piston pumps and internal gear pumps

Detailed information:
RE 10335

Types PVV, PVQ

Frame size 1		**Size**		**18**	**27**	**36**	**40**	**46**
Nominal pressure [1]		p_{max}	bar	210	210	210	160	140
Displacement		$V_{g\,max}$	cm^3	18	27	36	40	46
Power [2]		P_{hyd}	kW	11	16	21	18	18
Speed range [3]		n	min^{-1}			on inquiry		
Weight		m	kg	12	12	12	12	12

Frame size 2		**Size**		**40**	**45**	**55**	**60**	**68**
Nominal pressure [1]	Type PVV	p_{max}	bar	175	175	175	175	175
	Type PVQ	p_{max}	bar	210	210	210	210	210
Displacement		$V_{g\,max}$	cm^3	40	45	55	60	68
Power [2]	Type PVV	P_{hyd}	kW	19	22	26	28	31
	Type PVQ	P_{hyd}	kW	22	26	32	34	37
Speed range [3]		n	min^{-1}			on inquiry		
Weight		m	kg	14.8	14.8	14.8	14.8	14.8

Frame size 4		**Size**		**69**	**82**	**98**	**113**	**122**
Nominal pressure [1]	Type PVV	p_{max}	bar	175	175	175	175	175
	Type PVQ	p_{max}	bar	210	210	210	210	210
Displacement		$V_{g\,max}$	cm^3	69	82	98	113	122
Power [2]	Type PVV	P_{hyd}	kW	31	33	45	50	55
	Type PVQ	P_{hyd}	kW	38	45	55	60	65
Speed range [3]		n	min^{-1}			on inquiry		
Weight		m	kg	23	23	23	23	23

Frame size 5		**Size**		**139**	**154**	**162**	**183**	**193**
Nominal pressure [1]		p_{max}	bar	175	175	175	175	175
Displacement		$V_{g\,max}$	cm^3	139	154	162	183	193
Power [2]		P_{hyd}	kW	69	75	80	90	95
Speed range [3]		n	min^{-1}			on inquiry		
Weight		m	kg	34	34	34	34	34

[1] continuous
[2] at maximum continuous operating pressure and $n = 1450\ min^{-1}$ hydraulic fluid temperature $\vartheta = 50\ °C$
[3] Depending on size

Vane pumps, direct operated

- Sizes 10 to 25
- Very short control times
- Low operating noise
- Lower zero stroke power
- Mounting and connection dimensions according to VDMA 24 560/1 and ISO 3019/2
- Good efficiency
- Pump combination possible

Detailed information:
RE 10522

Type PV7...A

Frame size		**FS**		**06**	**06**	**20**	**20**
Nominal pressure			bar	100	70	100	100
Displacement (size)		$V_{g\,max}$	cm^3	10	14	20	25
Power	at 1450 min^{-1}	*P*	kW	2.5	2.7	5	6
Speed range		*n*	min^{-1}		900 to 1800		
Weight		*m*	kg	6.3	6.3	11.4	11.4

Vane pumps, pilot operated

- Sizes 14 to 150
- Variable displacement
- Low operating noise
- Pressure and flow can be controlled
- Controller actuator can optionally be locked
- Low hysteresis
- Very short control times
- Pump combination possible with standard pumps
- Mounting and connection dimensions according to VDMA 24 560/1 and ISO 3019/2

Detailed information:
RE 10515

Type PV7

Frame size		**FS**		**10**	**10**	**16**	**16**	**25**	**25**
Nominal pressure			bar	160	100	160	80	160	80
Displacement (size)		$V_{g\,max}$	cm^3	14	20	20	30	30	45
Power	at 1450 min^{-1}	*P*	kW	6.3	5.8	10	7.1	13.7	10.5
Speed range		*n*	min^{-1}			900 to 1800			
Weight		*m*	kg	12.5	12.5	17	17	21	21

Frame size		**FS**		**40**	**40**	**63**	**63**	**100**	**100**
Nominal pressure			bar	160	80	160	80	160	80
Displacement (size)		$V_{g\,max}$	cm^3	45	71	71	94	118	150
Power	at 1450 min^{-1}	*P*	kW	20.5	17	34	22	54	35
Speed range		*n*	min^{-1}			900 to 1800			
Weight		*m*	kg	30	30	37	37	56	56

Radial piston pumps, fixed displacement

- Sizes 0.4 to 2.0
- Radial piston pump with 3 pistons
- Very compact build, hence installation-friendly dimensions
- 5 sizes

Type PR4-Mini

Detailed information:
RE 11260

Size		Size		0.4	0.63	1.0	1.6	2.0
Displacement		$V_{g\,max}$	cm^3	0.4	0.63	1.0	1.6	2.0
Operating pressure		p_{max}	bar	700	700	450	250	175
Power	at 1450 min^{-1}	P	kW	0.66	1.15	1.14	1.06	0.86
Speed range [1]		n	min^{-1}	1000 to 3400				
Weight		m	kg	2.6	2.6	2.6	2.6	2.6

[1] Depending on size

Radial piston pumps, fixed displacement

- Sizes 1.6 to 20.0
- Radial piston pump with 3, 5 or 10 pistons
- Self-aspirating, valve-controlled
- Long bearing life due to hydro-dynamically lubricated plain bearings
- Several pressure ports with various cylinder combinations possible
- Optional combination with fixed and variable displacement vane and axial piston pumps
- 14 sizes, favourable gradation for optimum matching to the application at hand

Type PR4

Detailed information:
RE 11263

Size		Size		1.6	2.0	2.5	3.15	4.0	6.3	8.0
Displacement		$V_{g\,max}$	cm^3	1.51	2.14	2.59	3.57	4.32	7.14	8.63
Operating pressure		p_{max}	bar	700	700	700	700	700	700	700
Power	at 1450 min^{-1}	P	kW	2.9	4.1	4.9	6.8	8.1	13.6	16.1
Speed range		n	min^{-1}			1000 to 2000				
Weight		m	kg	9.2	9.2	9.2	12.4	12.4	16.4	16.4

Size		Size		3.15	5.0	6.3	8.0	10.0	16.0	20.0
Displacement		$V_{g\,max}$	cm^3	3.39	4.82	5.83	8.03	9.71	16.07	19.43
Operating pressure		p_{max}	bar	500	500	500	500	500	500	500
Power	at 1450 min^{-1}	P	kW	4.7	6.7	7.9	10.9	12.9	21.2	25.3
Speed range		n	min^{-1}			1000 to 2000				
Weight		m	kg	9.2	9.2	9.2	12.4	12.4	16.4	16.4

Combination pumps

- Fixed displacement pump + fixed displacement pump
- Variable displacement pump + fixed displacement pump
- Variable displacement pump + variable displacement pump

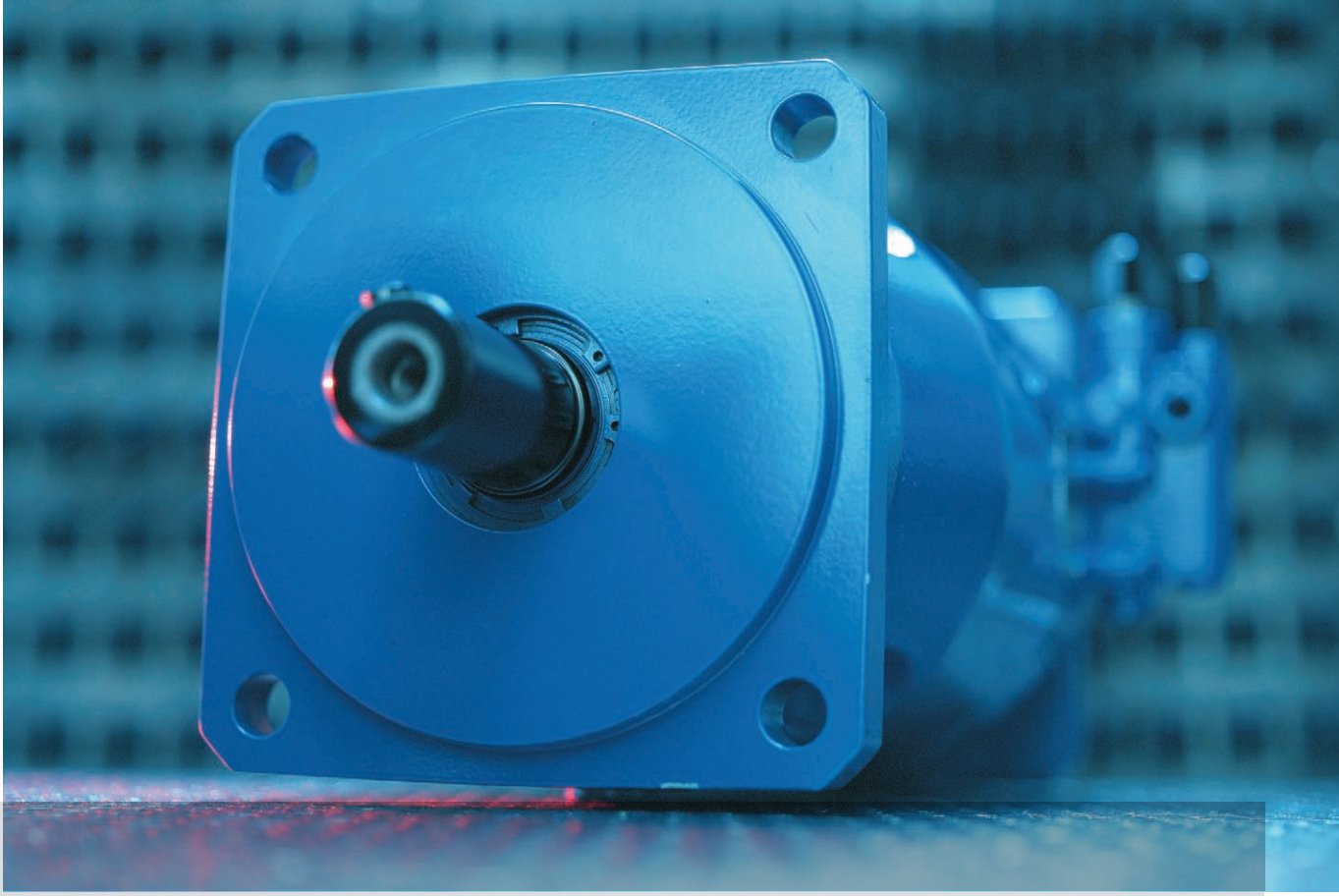
Numerous optional combinations

Front pump \ Rear pump	PV7	PGH/PGF	PR4	PR4-Mini	AZP	A10	PVV/PVQ
PV7	•	•	•	•	•	•	•
PGH/PGF	–	•	–	•	•	•	•
PR4	–	–	–	–	•	–	–
AZP	–	–	–	–	•	–	–
A10	–	•	–	–	•	•	•

Detailed information:
See data sheet of front pump

• = in program
– = not available

Multiple combinations on inquiry



Motors

Axial piston units

Axial piston units are available in bent-axis and swashplate design for medium and high pressure applications.
Our hydrostatic drives for stationary applications are characterized by their ruggedness, reliability, long service life, low noise emission, high efficiency and economic operation.

Performance profile

- Swept volume 5 to 1000 cm^3
- Nominal pressure up to 400 bar
- Max. speed up to 10000 min^{-1}
- Torque up to 5570 Nm

External gear motors

External gear motors are available in 4 frame sizes (B, F, N, G). Their swept volumes are classified by various gear widths. Motors are also available in various design variants, owing to different flanges, shafts and built-on valves.

Performance profile

- Swept volume 2.5 to 45 cm^3
- Nominal pressure up to 280 bar
- Max. speed up to 5000 min^{-1}
- Reversible motors for operation with 2 and 4 quadrants

Radial piston motors

Radial piston motors of types MR.. are externally pressurized hydraulic motors with fixed swept volume. The direction of rotation can be clockwise, anti-clockwise or reversible.

Performance profile

- Swept volume up to 8525 cm^3
- Max. speed up to 800 min^{-1}
- Continuous power up to 260 kW
- Torque up to 32500 Nm

Fixed displacement motors

- Sizes 5 to 1000
- Axial tapered piston bent-axis design
- Open and closed circuits
- Frame size 6
- Break valve attachment possible
- Optional: integrated flushing and boost pressure valve
- Suitable for pump operation in the closed circuit
- Long-life bearing possible (sizes 250 to 1000)

Type A2FM

Detailed information:
RE 91001

Size				**5**	**10**	**12**	**16**	**23**	**28**
Nominal pressure			bar	315	400	400	400	400	400
Peak pressure			bar	350	450	450	450	450	450
Swept volume		V_g	cm^3	4.93	10.3	12.0	16.0	22.9	28.1
Speed		n_{max}	min^{-1}	10000	8000	8000	8000	6300	6300
Inlet flow		$q_{V\,max}$	l/min	49	82	96	128	144	176
Power	$\Delta p = 400$ bar	P_{max}	kW	26 [1]	55	64	85	96	118
Torque	$\Delta p = 400$ bar	T	Nm	24.7 [1]	65	76	100	144	178
Weight (approx.)		m	kg	2.5	5.4	5.4	5.4	9.5	9.5

Size				**32**	**45**	**56**	**63**	**80**	**90**
Nominal pressure			bar	400	400	400	400	400	400
Peak pressure			bar	450	450	450	450	450	450
Swept volume		V_g	cm^3	32	45.6	56.1	63	80.4	90
Speed		n_{max}	min^{-1}	6300	5600	5000	5000	4500	4500
Inlet flow		$q_{V\,max}$	l/min	201	255	280	315	360	405
Power	$\Delta p = 400$ bar	P_{max}	kW	134	170	187	210	241	270
Torque	$\Delta p = 400$ bar	T	Nm	204	290	356	400	508	572
Weight (approx.)		m	kg	9.5	13.5	18	18	23	23

Size				**107**	**125**	**160**	**180**	**200**	**250**
Nominal pressure			bar	400	400	400	400	400	350
Peak pressure			bar	450	450	450	450	450	400
Swept volume		V_g	cm^3	106.7	125	160.4	180	200	250
Speed		n_{max}	min^{-1}	4000	4000	3600	3600	2750	2700
Inlet flow		$q_{V\,max}$	l/min	427	500	577	648	550	625
Power	$\Delta p = 400$ bar	P_{max}	kW	285	333	385	432	367	365 [2]
Torque	$\Delta p = 400$ bar	T	Nm	680	796	1016	1144	1272	1393 [2]
Weight (approx.)		m	kg	32	32	45	45	66	73

Size						**355**	**500**	**710**	**1000**
Nominal pressure			bar			350	350	350	350
Peak pressure			bar			400	400	400	400
Swept volume		V_g	cm^3			355	500	710	1000
Speed		n_{max}	min^{-1}			2240	2000	1600	1600
Inlet flow		$q_{V\,max}$	l/min			795	1000	1136	1600
Power	$\Delta p = 350$ bar	P_{max}	kW			464	583	663	933
Torque	$\Delta p = 350$ bar	T	Nm			1978	2785	3955	5570
Weight (approx.)		m	kg			110	155	322	336

[1] $\Delta p = 315$ bar
[2] $\Delta p = 350$ bar

Fixed displacement motors

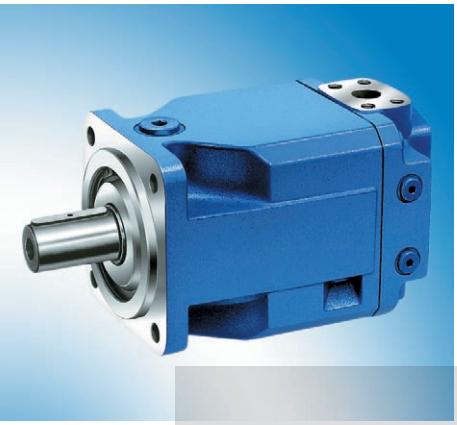
- Sizes 18 to 63
- Axial piston swashplate design
- Open and closed circuits
- Frame size 5
- SAE version
- Optional:
  – integrated flush and boost pressure valve
  – integrated coasting valve, e.g. for fan drives

Type A10FM

Size				18	23	28	37	45	58	63
Nominal pressure			bar	280	280	280	280	280	280	280
Peak pressure			bar	350	350	350	350	350	350	350
Swept volume		V_g	cm^3	18	23.5	28.5	36.7	44.5	58	63.1
Speed [1]		n_{max}	min^{-1}	4200	4900	4700	4200	4000	3600	3400
Inlet flow	at n_{max}	$q_{V\,max}$	l/min	76	115	134	154	178	209	215
Power	$\Delta p = 280$ bar	P_{max}	kW	35.3	53.6	62.5	71.8	83.1	97.4	100.1
Torque	$\Delta p = 280$ bar	T	Nm	80	105	127	163	198	258	281
Weight (approx.)		m	kg	6.5	12	12	17	17	22	22

Detailed information:
RE 91172

[1] at speed n_{max}, a pressure of 18 bar is required on the low pressure side bar.



Fixed displacement motors

- Sizes 22 to 500
- Axial piston swashplate design
- Open and closed circuits
- Frame size 1 (size 71)
- Frame size 3 (sizes 22 to 56 and 125 to 500)
- The small A4FM motor is the ideal supplement to the A2FM bent-axis motor
- Operation with HF fluids possible with reduced technical data (sizes 71 to 500)

Type A4FM

Detailed information:
RE 91120

Size				**22**	**28**	**40**	**56**
Nominal pressure			bar	400	400	400	400
Peak pressure			bar	450	450	450	450
Swept volume		V_g	cm^3	22	28	40	56
Speed		n_{max}	min^{-1}	4250	4250	4000	3600
Inlet flow		$q_{V\,max}$	l/min	93	119	160	202
Power	$\Delta p = 400$ bar	P_{max}	kW	62	79	106	134
Torque	$\Delta p = 400$ bar	T	Nm	140	178	255	356
Weight (approx.)		m	kg	11	11	15	21

Size				**71**	**125**	**250**	**500**
Nominal pressure			bar	350	350	350	350
Peak pressure			bar	400	400	400	400
Swept volume		V_g	cm^3	71	125	250	500
Speed		n_{max}	min^{-1}	3200	2600	2200	1800
Inlet flow		$q_{V\,max}$	l/min	227	325	550	900
Power	$\Delta p = 350$ bar	P_{max}	kW	132	190	321	525
Torque	$\Delta p = 350$ bar	T	Nm	395	696	1391	2783
Weight (approx.)		m	kg	34	61	120	260

Variable displacement motors

- Sizes 28 to 1000
- Axial piston bent-axis design
- Open and closed circuits
- Frame size 6
- Motor available as standard version (A6VM) or plug-in version (A6VE)
- Wide control range (can be swivelled over zero)
- High speeds and high torque
- Optional: brake valve, flushing and boost pressure valve
- Hydrostatic A6VE plug-in motors are intended for the space-saving installation in mechanical gearboxes

Types A6VM and A6VE

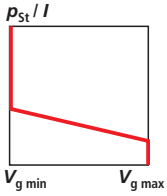
Size		A6VM/A6VE		28	55	80	107	140 [2]	160	200 [2]
Nominal pressure			bar	400	400	400	400	400	400	400
Peak pressure			bar	450	450	450	450	450	450	450
Swept volume (size)		$V_{g\,max}$	cm^3	28.1	54.8	80	107	140	160	200
Speed [1]	at $V_{g\,max}$	n_{max}	min^{-1}	5550	4450	3900	3550	3250	3100	2900
	at $V_g < V_{g\,max}$	n_{max}	min^{-1}	8750	7000	6150	5600	5150	4900	4600
Inlet flow	at n_{max}	$q_{V\,max}$	l/min	156	244	312	380	455	496	580
Power [3]		P_{max}	kW	104	163	208	253	303	331	387
Torque [3]		T	Nm	179	349	509	681	891	1019	1273
Weight (approx.)		m	kg	16	26	34	47	60	64	80

Size		A6VM		250 [5]	355	500	1000
Nominal pressure			bar	350	350	350	350
Peak pressure			bar	400	400	400	400
Swept volume (size)		$V_{g\,max}$	cm^3	250	355	500	1000
Speed [1]	at $V_{g\,max}$	n_{max}	min^{-1}	2700	2240	2000	1600
	at $V_g < V_{g\,max}$	n_{max}	min^{-1}	3600	2950	2650	2100
Inlet flow	at n_{max}	$q_{V\,max}$	l/min	675	795	1000	1600
Power [4]		P_{max}	kW	394	464	583	933
Torque [4]		T	Nm	1391	1978	2785	5571
Weight (approx.)		m	kg	90	170	210	430

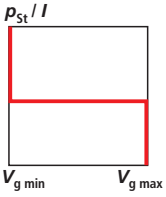
Detailed information:
– A6VM: RE 91604
– A6VE: RE 91606

[1] while adhering to $q_{V\,max}$
[2] available only as A6VM
[3] $\Delta p = 400$ bar at $V_{g\,max}$
[4] $\Delta p = 350$ bar at $V_{g\,max}$
[5] also available as A6VE

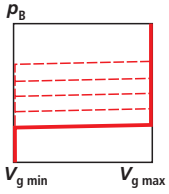
HD / EP
Hydr. control, pilot pressure-related / el. control with proportional solenoid



HZ / EZ
Hydraulic / electrical two-point control



HA
Automatic control, high pressure-related



DA
Hydraulic control, speed-related

p_B = operating pressure
p_{St} = pilot pressure
I = current intensity
V_g = swept volume

Two-speed motors

- Sizes 28 to 63
- Axial piston swashplate design
- Open and closed circuits
- Frame size 5
- Hydraulic or electrical two-point control

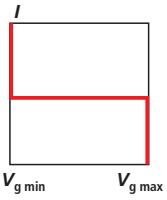
Type A10VM

Detailed information:
RE 91703

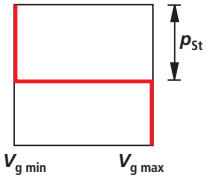
Size		Size		28	45	63
Nominal pressure			bar	280	280	280
Peak pressure			bar	350	350	350
Swept volume		$V_{g\,max}$	cm^3	28	45	62
Speed [1]	at $V_{g\,max}$	n_{max}	min^{-1}	4700	4000	3300
	at $V_{g\,min}$	n_{max}	min^{-1}	5300	4600	3800
Inlet flow	at n_{max}	$q_{V\,max}$	l/min	131.6	180	205
Power	$\Delta p = 280$ bar	P_{max}	kW	61	84	95
Torque	$\Delta p = 280$ bar	T_{max}	Nm	125	200	276
Weight (approx.)		m	kg	14	18	26

[1] at speed n_{max}, a pressure of at least 18 bar is required on the low pressure side

EZ1/EZ2/EZ6/EZ7
Electrical two-point control



HZ/HZ6
Hydraulic two-point control



DG
Direct operated two-point control

V_g = swept volume
p_{St} = pilot pressure
I = current intensity

External gear motors

- Sizes 2.5 to 45
- High pressures with small installation space and low weight
- Wide speed ranges
- Wide viscosity and temperature ranges
- Reversible motors for operation with 2 and 4 quadrants
- Plain bearings for high loads
- Consistently high quality owing to large-scale production
- Many design variants available

Type AZM

Frame size B; component series 2X	Size		2.5	3	4	4.5	5	6	7
Swept volume	V_g	cm^3	2.5	3.15	4	4.5	5	6.3	7.1
Max. continuous pressure	p_1	bar	250	250	250	250	250	225	200
Max. starting pressure	p_2	bar	280	280	280	280	280	255	230
Max. speed – at p_1	n	min^{-1}	5000	4000	4000	4000	4000	3500	3500
Min. speed	n	min^{-1}	750	750	750	750	750	750	750

Frame size F; component series 1X	Size		5 [1]	8	11	14	16	19	22
Swept volume	V_g	cm^3	5.5	8	11	14	16	19	22.5
Max. continuous pressure	p_1	bar	250	250	250	250	250	180	180
Max. starting pressure	p_2	bar	280	280	280	280	280	210	210
Max. speed – at p_1	n	min^{-1}	4000	4000	3500	3000	3000	3000	3000
Min. speed	n	min^{-1}	500	500	500	500	500	500	500

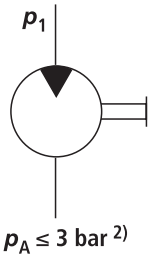
Frame size N; component seriess 1X, 2X	Size			20	22	25	28	32	36
Swept volume	V_g	cm^3		20	22.5	25	28	32	36
Max. continuous pressure	p_1	bar		250	210	210	210	180	160
Max. starting pressure	p_2	bar		280	240	240	240	210	190
Max. speed – at p_1	n	min^{-1}		3000	3000	3000	3000	3000	3000
Min. speed	n	min^{-1}		500	500	500	500	500	500

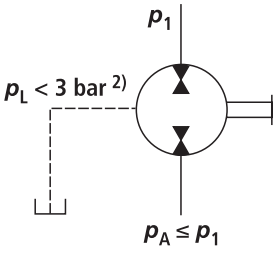
Frame size G; component series 1X	Size				22	28	32	38	45
Swept volume	V_g	cm^3			22.5	28	32	38	45
Max. continuous pressure	p_1	bar			180	180	180	180	180
Max. starting pressure	p_2	bar			210	210	210	210	210
Max. speed – at p_1	n	min^{-1}			3000	3000	2800	2600	2600
Min. speed	n	min^{-1}			500	500	500	500	500

Detailed information
– RE 14026
– RE 98240

[1] only on inquiry
[2] briefly 10 bar on starting

Motor outgoing pressure p_A, pressure in overflow oil line p_L





Radial piston motors

- Sizes 160 to 8500
- Closely graduated swept volumes
- Very high start-up torque
- Smooth running even at very low speeds (n_{min} = 0.5 to 1 min^{-1})
- High resistance to thermal shock
- Reversible
- Suitable for closed-loop controlled applications
- Suitable for hardly inflammable fluids
- Roller bearings for extremely long service life
- Very low operating noise
- Version with measurement shaft, hollow shaft, brake

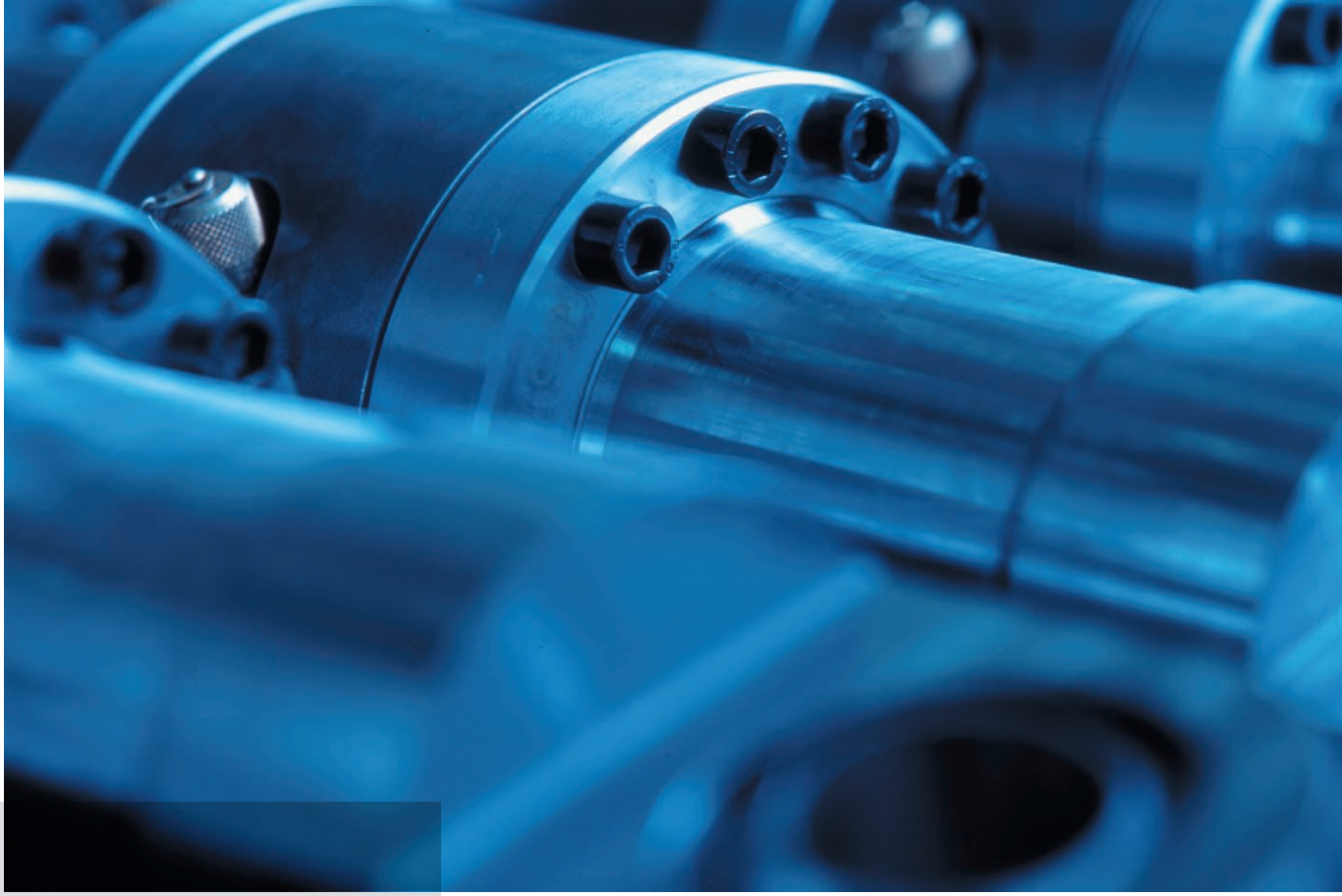
Detailed information
– Types MR, MRE: RE 15228

Types MR, MRE

Size	**MR**		**160**	**190**	**250**	**300**	**350**	**450**	**600**	**700**
Swept volume	V_g	cm^3	160	192	251	304	349	452	608	707
Continuous pressure	$p_{const.}$	bar	250	250	250	250	250	250	250	250
Power	P_{max}	kW	30	36	48	53	54	75	84	97
Speed	n_{max}	min^{-1}	800	800	750	750	600	600	500	500
Torque	T_{max}	Nm	720	870	1120	1380	1560	2030	2720	3170
Weight (approx.)	m	kg	46	46	50	50	77	77	97	97

Size	**MR**		**1100**	**1800**	**2400**	**2800**	**3600**	**4500**	**6500**	**7000**
Swept volume	V_g	cm^3	1126	1810	2393	2792	3637	4503	6504	6995
Continuous pressure	$p_{const.}$	bar	250	250	250	250	250	250	250	250
Power	P_{max}	kW	119	157	183	194	198	210	250	260
Speed	n_{max}	min^{-1}	330	250	220	200	180	170	130	130
Torque	T_{max}	Nm	5100	8240	10650	12650	16350	20250	29450	32000
Weight (approx.)	m	kg	140	209	325	325	508	508	750	750

Size	**MRE**		**500**	**800**	**1400**	**2100**	**3100**	**5400**	**8500**
Swept volume	V_g	cm^3	498	804	1369	2091	3104	5401	8525
Continuous pressure	$p_{const.}$	bar	210	210	210	210	210	210	210
Power	P_{max}	kW	70	93	102	148	190	210	260
Speed	n_{max}	min^{-1}	600	450	280	250	200	160	120
Torque	T_{max}	Nm	1880	3020	5160	7850	11700	20600	32500
Weight (approx.)	m	kg	77	97	140	209	320	508	750



Cylinders

Rexroth cylinders are characterized by high quality and innovative concepts such as precisely guided piston rods in conjunction with advanced sealing technology, self-adjusting or variable end position cushioning and safety bleeding. Proximity switches and integrated position measuring systems in conjunction with built-on control blocks and high-response valves allow the realization of complete hydraulic axes.

Performance profile

- Standard, industry-specific and project-related cylinders
- Operating pressure up to 4000 bar
- Installation dimensions to ISO, DIN, NFPA, etc.
- Piston Ø 25 up to 1500 mm
- Stroke length up to 44000 mm
- Highly advanced seal systems
- Integrated position measuring systems
- Integrated proximity switches

Tie rod cylinders

- Mounting of head and cap according to the tie rod principle
- Service-friendly modular system
- Small installation dimensions
- Various mounting types
- Interchangeability thanks to standardization
- Industry-specific and project-related cylinders on inquiry

Detailed information:
– CDT3…F: RE 17039
– CST3…F: RE 17039
– CDT1: RA 17038
– CDT4: RA 17041
– CD70: RE 17016
– CD210: RE 17017
– VBH: RE 17047

Frame size		**CDT3…F** [1]	**CST3…F**
Nominal pressure	bar	160	160
Piston Ø	mm	25 to 200	40 to 200
Piston rod Ø	mm	12 to 140	28 to 140
Mounting types		13	5
Max. stroke length	mm	2700	1400
Max. stroke speed	m/s	0.5	0.5

Frame size		**CDT1** [2]	**CDT4** [2]
Nominal pressure	psi	1500	3000
Piston Ø	inch	1.00 to 8.00	1.50 to 8.00
Piston rod Ø	inch	0.50 to 5.50	0.63 to 5.50
Mounting types		18	19
Max. stroke length	inch	120	120
Max. stroke speed	in/sec	20	20

Frame size		**CD70** [2]	**CD210** [2]
Nominal pressure	bar	70	210
Piston Ø	mm	25 to 200	40 to 200
Piston rod Ø	mm	12 to 140	16 to 140
Mounting types		16	16
Max. stroke length	mm	3000	3000
Max. stroke speed	m/s	0.5	0.5

Frame size		**VBH** [3]
Nominal pressure	bar	200
Piston Ø	mm	25 to 125
Piston rod Ø	mm	16 to 70
Mounting types		4
Max. stroke length	mm	160
Max. stroke speed	m/s	0.5

[1] inst. dimensions according to ISO 6020/2, DIN 24554, and NF/ISO 6020/2
[2] inst. dimensions to NFPA
[3] to CNOMO E05.22.815.N

Mill type cylinders

- Mill type design for applications even under extreme conditions
- Service-friendly modular system
- Various mounting types
- Interchangeability thanks to standardization
- Industry-specific and project-related cylinders on inquiry

Frame size		**CDL1** [1]	**CDM1** [2]	**CDH1** [1]
Nominal pressure	bar	160	160	250
Piston Ø	mm	25 to 200	25 to 200	40 to 320
Piston rod Ø	mm	14 to 110	14 to 140	22 to 220
Mounting types		5	9	6
Max. stroke length	mm	3000	3000	6000
Max. stroke speed	m/s	0.5	0.5	0.5

Frame size		**CDH2** [3]	**CDH3** [1]
Nominal pressure	bar	250	350
Piston Ø	mm	40 to 320	40 to 320
Piston rod Ø	mm	25 to 220	28 to 220
Mounting types		6	6
Max. stroke length	mm	6000	6000
Max. stroke speed	m/s	0.5	0.5

Detailed information
– CDL1: RE 17325
– CDM1: RE 17328
– CDH1: RE 17331
– CDH2: RE 17334
– CDH3: RE 17337

[1] inst. dimensions to Rexroth standard
[2] inst. dimensions to ISO 6020/1
[3] inst. dimensions to DIN 24333 and ISO 6022

Mill type cylinders

- Mill type design for applications even under extreme conditions
- inst. dimensions to DIN 24333, ISO 6022 and VW39D921
- Service-friendly modular system
- Various mounting types
- Interchangeability thanks to standardization
- Industry-specific and project-related cylinders on inquiry
- Application according to Explosion Protection Directive 94/9/EG

Detailed information:
RE 17334-X

Types CDH2…X and CGH2…X

Frame size		CDH2…X	CGH2…X
Nominal pressure	bar	250	250
Piston Ø	mm	40 to 320	40 to 320
Piston rod Ø	mm	25 to 220	25 to 220
Mounting types		6	6
Max. stroke length	mm	6000	6000
Max. stroke speed	m/s	0.5	0.5

Without position measuring system

Applications according to Directive 94/9/EC			Type of protection	
Component group	Category to ATEX	Fields of application		
II	2G	Gases, mist, vapors	EEx C T4X	Structural safety
II	2D	Dusts	EEx C T135°CX	Structural safety

With position measuring system

Applications according to Directive 94/9/EC			Type of protection	
Component group	Category to ATEX	Fields of application		
II	3D	Dusts	EEx IP67 T135°CX	Increased safety

On/off valves

Directional valves

For applications in hydraulic systems we offer direct and pilot operated directional valves with pressure-tight solenoids and hydraulic, pneumatic or mechanical actuation.

Performance profile

- Sizes 6 and 10, direct-operated:
  Maximum operating pressure 350 bar
  Maximum flow 120 l/min
- Sizes 10 to 32, pilot-operated:
  Maximum operating pressure 350 bar
  Maximum flow 1100 l/min
- Porting patterns internationally standardized
- Numerous spool symbols and types of operation

Pressure, flow and isolator valves

Apart from pressure, flow control and isolator valves, this product segment also includes accessories such as subplates.

Performance profile

- Sizes 6 to 32 and valves for in-line mounting:
  Max. operating pressure 630 bar
- Pressure valves:
  Pressure relief valves
  Pressure reducing valves
  Pressure sequencing and
  Pressure cut-off valves
- Flow valves:
  Throttle valves
  Flow control valves
- Isolator valves:
  Check valves
  Pilot operated check valves

2-way cartridge valves

2-way cartridge valves are elements designed for compact modular structures. The power part is mounted in the control block in a cavity standardized in accordance with DIN ISO 7368 and closed with a cover.

Performance profile

- Sizes 16 to 160
- Maximum operating pressure 420 bar
- Directional function
- Pressure function

Check valves of sandwich plate design

- Sizes 6 and 10
- Porting pattern to DIN 24340 form A and ISO 4401
- Various isolating functions
- Various opening pressures
- Size 6 (component series 4X):
  - Check valve made of carbon fiber reinforced plastic
  - Tightness improved as compared with previous version with metal seal
  - Excellent compatibility with various hydraulic fluids
- Size 10 (component series 3X): optionally with
  - Metal seal ("–")
  - Soft seal ("W4") (please note restrictions with regard to flow volume!)

Type Z1S

Detailed information:
– Size 6: RE 21534
– Size 10: RE 21536

Size			6	10
Operating pressure	p_{max}	bar	350	315
Opening pressure		bar	0.5; 1.5; 3; 5	0.5; 3; 5
Flow	$q_{V\,max}$	l/min	40	100

Check valves

- Sizes 6 to 30
- Leak-free isolation in one direction
- For threaded connection
- Various opening pressures
- Optional surface coating
- Special media (e.g. emulsion, water) on inquiry

Type S

Detailed information:
RE 20375

Size			6	8	10	20	25	30
Operating pressure	p_{max}	bar	315	315	315	315	315	315
Opening pressure		bar	without spring; 0.5; 1.5; 3; 5					
Flow	$q_{V\,max}$	l/min	18	36	60	250	350	450

Plug-in check valve

- Sizes 6 to 30
- Leak-free isolation in one direction
- Plug screw with pipe thread or metric ISO thread
- For block installation:
  – Plug-in right-angled valve ("KE")
  – Plug-in straight valve ("KD")
- Various opening pressures
- Special media (e.g. emulsion, water) on inquiry

Type M-SR

Size				**6**	**8**	**10**	**15**	**20**	**25**	**30**
Operating pressure		p_{max}	bar	315	315	315	315	315	315	315
Opening pressure			bar	without spring; 0.2; 0.5; 1.5; 3; 5						
Flow	"KE"	$q_{V\,max}$	l/min	–	35	50	120	200	300	400
	"KD"	$q_{V\,max}$	l/min	15	30	50	100	200	300	400

Detailed information:
RE 20380

Pilot operated check valves in sandwich plate design

- Sizes 6 to 22
- Porting pattern to DIN 24340 form A and ISO 4401
- For the leak-free isolation of one or two actuator ports
- Various opening pressures

Type Z2S

Detailed information:
– Size 6: RE 21548
– Size 10: RE 21553
– Size 16: RE 21558
– Size 22: RE 21564

Size			6	10	16	22
Component series			6X	3X	5X	5X
Operating pressure	p_{max}	bar	315	315	315	315
Opening pressure		bar	1.5; 3; 7	1.5: 3; 6; 10	3; 5; 7.5; 10	3; 5; 7.5; 10
Flow	$q_{V\,max}$	l/min	60	120	300	450

Pilot operated check valves in sandwich plate design (210 bar version)

- Sizes 6 and 10
- Porting pattern to DIN 24340 form A and ISO 4401
- For the leak-free isolation of two actuator ports

Type Z2SRK

Detailed information:
– Size 6: RE 21543
– Size 10: RE 21549

Size			6	10
Operating pressure	p_{max}	bar	210	210
Opening pressure		bar	1.5	1.5
Flow	$q_{V\,max}$	l/min	40	80

Hydraulically pilot operated check valves

- Sizes 6 to 150
- With optional leak connection (sizes 6 to 10 only)
- With optional pre-decompression (sizes 10 to 32 only)
- For subplate mounting ("P"):
  - Size 6: Porting pattern to DIN 24340 form A and ISO 4401, Subplates to RE 45052
  - Sizes 10 to 32: Porting pattern to DIN 24340 form D and ISO 5781, Subplates to RE 45062
- For threaded connection ("G") (sizes 10 to 32 only)
- For flanged connection ("G") (sizes 52 to 150 only)
  - Connection flange to RE 45501
- Various opening pressures

Types SV and SL

Size				**6**	**10**	**16**
Component series				6X	4X	4X
Operating pressure		p_{max}	bar	315	315	315
Pilot pressure		p_{St}	bar	5 to 315	5 to 315	5 to 315
Opening pressure			bar	1.5; 3; 7; 10	1.5; 3; 6; 10	2.5; 5; 7.5; 10
Flow	"G"	$q_{V\,max}$	l/min	–	150	350
	"P"	$q_{V\,max}$	l/min	60	150	–

Size				**20**	**25**	**32**
Component series				4X	4X	4X
Operating pressure		p_{max}	bar	315	315	315
Pilot pressure		p_{St}	bar	5 to 315	5 to 315	5 to 315
Opening pressure			bar	2.5; 5; 7.5; 10	2.5; 5; 8; 10	2.5; 5; 8; 10
Flow	"G"	$q_{V\,max}$	l/min	350	150	350
	"P"	$q_{V\,max}$	l/min	350	150	–

Type S

Size			**52 to 150**
Component series			1X
Operating pressure	p_{max}	bar	315
Pilot pressure	p_{St}	bar	0.6 to 315
Opening pressure		bar	1.3; 3 [1]; 4.5 [1]
Flow	$q_{V\,max}$	l/min	700 to 6400

Detailed information:
- Size 6: RE 21460
- Sizes 10 to 32:RE 21468
- Sizes 52 to 150: RE 20392

[1] not for sizes 125 and 150

Shut-off valves in sandwich plate design

- Sizes 6 and 10
- Directional spool valve, pilot operated
- Porting pattern to DIN 24340 form A and ISO 4401
- Functioning as straight shut-off valve or straight shut-off short-circuit valve
- Electrohydraulic operation
- Wet-pin DC solenoid

Detailed information:
– Type Z4WEH: RE 24755
– Type Z4WE: RE 23193
– Further types on inquiry

Types Z4WEH and Z4WE

Size			6	10
Operating pressure	p_{max}	bar	315	250
Flow	$q_{V\,max}$	l/min	60	100

Pre-fill valves

- Hydraulically pilot operated pre-fill valve (check valve) in sandwich plate design
  - For flanged connection
  - For in-line installation
- Optional: Unloading via built-on directional valve (type ZSFW)
  - Some versions with HD port and decompression

Types ZSF and ZSFW

Size			32 to 160
Operating pressure	p_{max}	bar	350

Detailed information:
RE 20478

Pre-fill valves

- Hydraulically pilot operated pre-fill valve (check valve)
  - For block installation ("P")
  - For integration into cylinder ("Z")
- Matching cover type LFF

Type SFE

Size			25 to 100
Operating pressure	p_{max}	bar	350

Detailed information:
on inquiry

Pre-fill valves, active switching

- Hydraulically active-switching pre-fill valve (check valve)
  - For flanged connection
- Reduced switching noise due to integrated end position cushioning

Type SFS

Size			200 to 300
Operating pressure	p_{max}	bar	350

Detailed information:
RE 20473

Pre-fill valves

- Hydraulically pilot operated pre-fill valve (check valve)
  - For threaded connection (sizes 25 and 32)
  - For flanged connection (size 40 and greater)
- For mounting directly onto the working cylinder
- With or without decompression
- Integrated high pressure port

Type SFA

Detailed information:
RE 20485

Size			25 to 80
Operating pressure	p_{max}	bar	350

Pre-fill valves

- Hydraulically pilot operated pre-fill valve (check valve)
  - For flanged connection ("A")
  - For tank installation ("B")
  - As cartridge valve ("K")
- Some versions with decompression

Type SF

Detailed information:
– Sizes 125 to 400: RE 20482
– Size 500: on inquiry

Size			125 to 500
Operating pressure	p_{max}	bar	350

Directional poppet valves, direct operated

- Sizes 6 and 10
- Porting pattern to DIN 24340 form A and ISO 4401
- Leak-free isolation of closed port
- Solenoids with detachable coil
- Pressure-tight chamber needs not to be opened for changing the coil (type SED)
- Reliable switching when under pressure over longer periods of standstill

Type SED

Size			6	10
Operating pressure	p_{max}	bar	350	350
Flow	$q_{V\ max}$	l/min	25	40

Type SEW

Size			6	10
Operating pressure	p_{max}	bar	420/630	420/630
Flow	$q_{V\ max}$	l/min	25	40

Detailed information:
Size 6
– Type SED: RE 22049
– Type SEW: RE 22058
Size 10
– Type SED: RE 22045
– Type SEW: RE 22075

Directional poppet valves, direct operated with mechanical or fluidic actuation

- Sizes 6 and 10
- Lever operation (type SMM)
- Roller tappet operation (type SMR)
- Hydraulic operation (type SH)
- Pneumatic operation (type SP)

Types SMM, SMR, SH and SP

Size			6	10
Operating pressure	p_{max}	bar	420/630	420/630
Flow	$q_{V\ max}$	l/min	25	40

Detailed information:
on inquiry

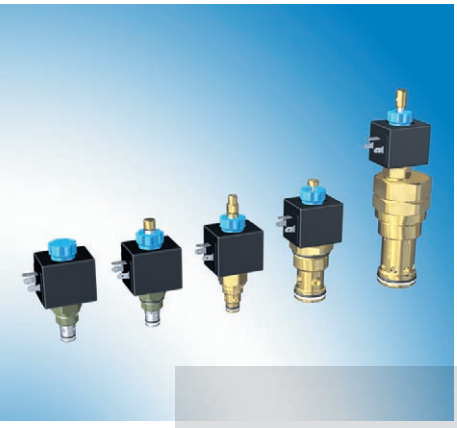
Directional poppet valves, direct operated, with solenoid actuation (high performance)

- Size 1
- Leak-free isolation of closed port
- Reliable switching even after longer periods of time at rest
- Wet-pin DC solenoids
- Solenoid coil can be rotated
- With concealed auxiliary operating device, optional
- Leak-free on both sides (version 2/2)

Types KSDER and KSDEU

Detailed information:
Type KSDER
– 2/2: RE 18136-02
– 3/2: RE 18136-03
Type KSDEU
– 2/2: RE 18136-10
– 3/2: RE 18136-11

Version			2/2	3/2	2/2	3/2
Type			KSDER	KSDER	KSDEU	KSDEU
Operating pressure	p_{max}	bar	350	350	500	500
Flow	$q_{V\,max}$	l/min	20	12	20	12



Directional poppet valves, pilot operated, with solenoid actuation

- Frame sizes 06, 10A, 12A, 16A and 16
- Leak-free isolation of closed port
- Isolating on one or on either side
- UNF installation space

Type VEI

Detailed information:
RE 00162-02

Frame size			06	10A	12A	16A	16
Operating pressure	p_{max}	bar	350	350	350	350	350
Flow	$q_{V\,max}$	l/min	40	70	150	200	260

Directional spool valves, direct operated, with solenoid actuation

- Sizes 6 to 10
- Wet-pin AC or DC solenoids
- Solenoids with detachable coil
- For subplate mounting ("P"): Porting pattern to DIN 24340 form A and ISO 4401
- Electrical connection as individual connection or central connection
- Optional inductive position monitoring (RE 24830)
- Smooth switching characteristics [3]

Type WE

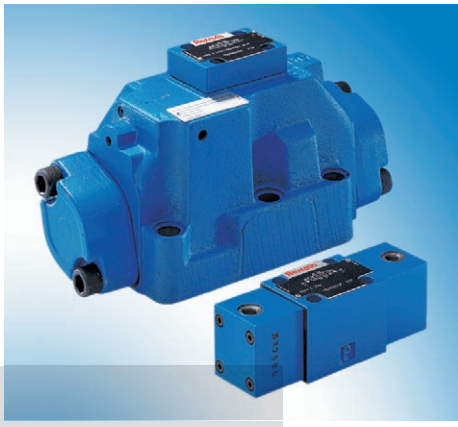
Size				**6**		
Version			[1]	[2]	[3]	[4]
Operating pressure	p_{max}	bar	315	350	350	315
Flow	$q_{V\,max}$	l/min	60	80	60	60
Size					**10**	
Version				[3]	[5]	[6]
Operating pressure	p_{max}	bar		315	315	315
Flow	$q_{V\,max}$	l/min		100	120	120

Detailed information:
- Size 6:
  RE 23164 [1]
  RE 23178 [2]
  RE 23183 [3]
  RE 23178-00 [4]
- Size 10:
  RE 23183 [3]
  RE 23327 [5]
  RE 23351 [6]

[1] standard valve, size 6 (DC solenoid only)
[2] heavy duty valve
[3] smoothly switching valve
[4] reduced electrical power consumption
[5] standard valve, size 10
[6] 5-chamber version (DC solenoid only)

Directional spool valves, direct operated, with fluidic actuation

- Sizes 6 to 32
- Porting pattern to DIN 24340 form A and ISO 4401
- Optional stroke adjustment (types H-WH, WH; size 10)
- Position monitoring by means of inductive position switch, optional (RE 24830)
- Hydraulic operation (types WH, WHZ and WHD)
- Pneumatic operation (types WN, WP and WPZ)



Types WH, WHZ, WHD, WN, WP and WPZ

Size			**6**	**6**	**10**	**10**
Type			WH, WP	WHZ, WPZ	WHD, WP, WN	H-WH, WH
Operating pressure	p_{max}	bar	315	315	315	350/280
Flow	$q_{V\,max}$	l/min	60	60	120	160
Size				**16**	**25**	**32**
Type				H-WH	H-WH	H-WH
Operating pressure	p_{max}	bar		350	350	350
Flow	$q_{V\,max}$	l/min		300	650	1100

Detailed information:
- Size 6
  Types WH, WP: RE 22282
- Size 10
  Types WHD, WP, WN:
  RE 22331
- Sizes 10 to 32
  Types H-WH, WH:
  RE 24751

Directional spool valves, direct operated, with mechanical or manual actuation

- Sizes 4 to 32
- Porting pattern to DIN 24340 form A and ISO 4401
- As cartridge valve (version "K")
- Position monitoring by
  - inductive position switch or
  - mechanical position switch, optional (RE 24830)
- Operation by means of
  - lever (type WMM)
  - roller (type WMR, WMU)
  - axial roller (type WMRA)
  - rotary knob (type WMD)

Detailed information:
– Size 6: RE 22280
– Size 10: RE 22331
– Sizes 16 and 22: RE 22371
– Size 32: on inquiry

Types WMM, WMR, WMRA, WMU and WMD

Size				**6**	**10**
Type				WMM, WMR, WMRA, WMU, WMD	
Operating pressure	p_{max}	bar		315	315
Flow	$q_{V\,max}$	l/min		60	120

Size			**16**	**22**	**32**
Type			H-WMM	H-WMM	H-WMM
Operating pressure	p_{max}	bar	350	350	350
Flow	$q_{V\,max}$	l/min	300	450	1100

Directional spool valves, direct operated, with solenoid actuation (high performance)

- Frame sizes 1 and 8
- Fluid can flow through the valves in both directions
- Positive overlap prevents switching shocks
- Wet-pin DC solenoids
- Solenoid coil can be rotated
- With concealed auxiliary operating device, optional

Type KKDER

Frame size			**1**	**1**	**1**	**8**	**8**
Version			2/2	3/2	4/2	2/2	3/2
Operating pressure	p_{max}	bar	350	350	350	350	350
Flow	$q_{V\ max}$	l/min	55	60	40	45	30

Detailed information:
Frame size 1:
– 2/2: RE 18136-06
– 3/2: RE 18136-04
– 4/2: RE 18136-05
Frame size 8:
– 2/2: RE 18136-08
– 3/2: RE 18136-09

Directional spool valves, direct operated, with solenoid actuation (standard performance)

- Frame sizes 1 and 8
- Fluid can flow through the valves in both directions
- Positive overlap prevents switching shocks
- Wet-pin DC solenoids
- Solenoid coil can be rotated
- With concealed auxiliary operating device, optional

Type KKDEN

Frame size			**1**	**1**	**1**	**8**	**8**
Version			2/2	3/2	4/2	2/2	3/2
Operating pressure	p_{max}	bar	250	250	250	250	250
Flow	$q_{V\,max}$	l/min	30	35	30	25	20

Detailed information:
Frame size 1:
– 2/2: RE 18136-13
– 3/2: RE 18136-14
– 4/2: RE 18136-15
Frame size 8:
– 2/2: RE 18136-16
– 3/2: RE 18136-17

Directional spool valves, pilot operated, with electrohydraulic actuation

- Sizes 10 to 102
- Wet-pin AC or DC solenoids
- Spring and/or pressure return of the main spool to the initial position
- Spring centering (size 10)
- Spring or pressure centering (sizes 16, 25 and 32)
- Optional auxiliary operating device
- Porting pattern to DIN 24340 form A and ISO 4401
- Electrical connection as individual connection or central connection
- Optional switching time adjustment
- Stroke limitation of the main spool, optional (RE 24830)
- Stroke limitation and/or end position (sizes 16, 25 and 32), optional (RE 24830)
- Position monitoring by means of inductive position switch, optional (RE 24830)
- Preload valve in the P-channel of the main valve for sizes 16, 25 and 32

Type H-4WEH

Size			**10**	**16**	**25**	**32**
Type			H-4WEH	H-4WEH	H-4WEH	H-4WEH
Operating pressure	p_{max}	bar	350	350	350	350
Flow	$q_{V\ max}$	l/min	160	300	650	1100

Size			**52**	**62**	**82**	**102**
Type			H-4WEH	H-4WEH	H-4WEH	H-4WEH
Operating pressure	p_{max}	bar	350	350	350	350
Flow	$q_{V\ max}$	l/min	2000	3000	4500	7000

Detailed information:
– Sizes 10 to 32:
RE 24751
– Sizes 52 to 102:
on inquiry
– Accessories:
RE 24830

Accessories for 4/3, 4/2 and 3/2 directional valves Types WE, WEH and WH

- Sizes 6 to 32
- Inductive position switch
- Stroke adjustment elements (valve types WEH and WH **only**)
- Direct monitoring of the spool position
- High reliability
- Long service life

Size			**6**	**10**	**16**	**25**	**32**
Operating pressure	p_{max}	bar	350	350	350	350	350
Flow	$q_{V\ max}$	l/min	80	160	300	350	1100

Detailed information:
RE 24830
(Sizes 52 to 102 on inquiry)

Pressure relief valves, direct operated

- Sizes 4 to 30
- For subplate mounting ("P")
- For threaded connection ("G")
- As cartridge valve ("K")
- Type-tested safety valves in accordance with Pressure Equipment Directive 97/23/EC
- 3 optional adjustment types:
  – Threaded pin with hexagon socket and protective cap
  – Rotary knob / hand wheel
  – Lockable rotary knob

Type DBD

Detailed information:
– Size 4: RE 25710
– Sizes 6 to 30: RE 25402

Size			**4**	**6**	**8**	**10**
Version			"K"	"P, G, K"	"G"	"P, G, K"
Operating pressure	p_{max}	bar	500	400	400	630
Flow	$q_{V\,max}$	l/min	20	50	120	120

Size			**15**	**20**	**25**	**30**
Version			"G"	"P, G, K"	"G"	"P, G, K"
Operating pressure	p_{max}	bar	400	400	315	315
Flow	$q_{V\,max}$	l/min	250	250	330	330

Pressure relief valves, direct operated, with mechanical actuation (standard performance)

- Size 0
- High power density
- Various pressure stages
- Versatile use for simple pressure limitation function

Type KBD

Detailed information:
RE 18105-01

Frame size			**0**
Operating pressure	p_{max}	bar	350
Flow	$q_{V\,max}$	l/min	40

Pressure relief valves in sandwich plate design, pilot operated

- Sizes 6 and 10
- Porting pattern to DIN 24340 form A and ISO 4401
- 4 pressure stages: 50, 100, 200, 315 bar
- 5 pressure relief functions:
  A – T, P – T, B – T, A – T and B – T, A – B and B – A
- 4 optional adjustment types:
  – Rotary knob
  – Sleeve with hexagon and protective cap
  – Lockable rotary knob with scale
  – Rotary knob with scale

Types ZDB and Z2DB

Size			6	10
Operating pressure	p_{max}	bar	315	315
Flow	$q_{V\ max}$	l/min	60	100

Detailed information:
– Size 6: RE 25751
– Size 10: RE 25761

Pressure relief valves in sandwich plate design, pilot operated (210 bar frame size)

- Sizes 6 and 10
- Porting pattern to DIN 24340 form A and ISO 4401
- 5 pressure relief functions:
  A – T, P – T, B – T, A – T and B – T, A – B and B – A
- 3 pressure stages: 50, 100, 210 bar

Types ZDBK and Z2DBK

Size			6	10
Operating pressure	p_{max}	bar	210	210
Flow	$q_{V\ max}$	l/min	40	80

Detailed information:
– Size 6: RE 25754
– Size 10: RE 25764

Pump safety block, pilot operated

- Sizes 16 to 32
- For direct mounting to the SAE pressure port of the pump
- Zero-pressure start-up and circulation of the pump
- Solenoid operated unloading via built-on directional spool valve or directional poppet valve
- Electrical monitoring of the set pressure
- Proportional pressure limitation and unloading using external or integral control electronics
- Type-tested safety valves in accordance with Pressure Equipment Directive 97/23/EC

Types DBA, DBAW and DBAE

Detailed information:
RE 25890

Size			16	25	32
Operating pressure	p_{max}	bar	350	350	350
Flow	$q_{V\,max}$	l/min	300	400	400

Pump safety block, pilot operated

- Sizes 32 and 40
- For direct mounting to the SAE pressure port of the pump
- Zero-pressure start-up and circulation of the pump
- With integrated check valve
- Solenoid operated unloading via built-on directional spool valve or directional poppet valve
- Switching shock damping, optional (type DBAW only)
- Type-tested safety valves in accordance with Pressure Equipment Directive 97/23/EC
- 4 optional adjustment types:
  - Rotary knob
  - Sleeve with hexagon and protective cap
  - Lockable rotary knob with scale
  - Rotary knob with scale

Types DBA, DBAW

Detailed information:
RE 25880

Size					32	40
Operating pressure			p_{max}	bar	350	350
Flow	– without check valve		$q_{V\,max}$	l/min	600	650
	– with check valve		$q_{V\,max}$	l/min	350	450

Pressure relief valves, pilot operated

- Sizes 6 to 30
- For subplate mounting ("P"): Porting pattern to DIN 24340 form E and ISO 6264
- For block installation ("C")
- For threaded connection ("G")
- For flanged connection ("F")
- As cartridge valve ("K")
- Solenoid operated unloading via built-on directional spool valve or directional poppet valve
- Switching shock damping, optional (type DBW. only)
- Type-tested safety valves in accordance with Pressure Equipment Directive 97/23/EC
- 4 optional adjustment types:
  - Rotary knob
  - Sleeve with hexagon and protective cap
  - Lockable rotary knob with scale
  - Rotary knob with scale

Types DB, DBW

Size						**6** [3]	**10** [3]	**20** [4]
Operating pressure		p_{max}	bar			315	315	350
Flow	"K"	$q_{V\,max}$	l/min			60	100	300

Size						**10** [2]	**15** [2]	**20** [2]
Operating pressure		p_{max}	bar			350	350	350
Flow	"P"	$q_{V\,max}$	l/min			200	–	400
	"G"	$q_{V\,max}$	l/min			150	300	300

Size				**10** [1]	**15** [1]	**20** [1]	**25** [1]	**30** [1]
Operating pressure		p_{max}	bar	350	350	350	350	350
Flow	"P"	$q_{V\,max}$	l/min	250	–	500	–	650
	"G"	$q_{V\,max}$	l/min	250	500	500	500	650
	"C"	$q_{V\,max}$	l/min	215	–	–	–	650

Size				**52** [5]
Operating pressure		p_{max}	bar	315
Flow	"P"	$q_{V\,max}$	l/min	2000
	"F"	$q_{V\,max}$	l/min	2000

Detailed information:
- Sizes 6 and 10: Component series 4X ("K" only) RE 25731 [3]
- Sizes 10 to 30: Component series 5X: RE 25802 [1]
- Sizes 10, 15, 20: Component series 4X: RE 25818 [2]
- Size 20 Component series 1X ("K" only): RE 25818 [4]
- Size 52 Component series 3X ("P" and "F" only): RE 25850 [5]

Pressure reducing valves in sandwich plate design, direct operated

- Sizes 6 and 10
- Porting pattern to DIN 24340 form A and ISO 4401
- Pressure reduction in channel A, B or P
- 4 pressure stages: 25, 75, 150, 210 bar
- 4 optional adjustment types:
  - Rotary knob
  - Sleeve with hexagon and protective cap
  - Lockable rotary knob with scale
  - Rotary knob with scale
- Check valve, optional

Type ZDR.D

Detailed information:
– Size 6: RE 26570
– Size 10: RE 26585

Size			6	10
Component series			4X	5X
Operating pressure	p_{max}	bar	210	210
Flow	$q_{V\ max}$	l/min	50	80

Pressure reducing valves, direct operated

- Sizes 6 and 10
- Porting pattern
  - Size 6 to DIN 24340 form A and ISO 4401
  - Size 10 to DIN 24340 form D and ISO 5781
- 5 pressure stages
- 4 optional adjustment types:
  - Rotary knob
  - Sleeve with hexagon and protective cap
  - Lockable rotary knob with scale
  - Rotary knob with scale
- Check valve, optional

Type DR.DP

Detailed information:
– Size 6: RE 26564
– Size 10: RE 26580

Size			6	10
Component series			5X	4X
Secondary pressure, adjustable	p_{max}	bar	315	210
Flow	$q_{V\ max}$	l/min	60	80

Pressure reducing valves, direct operated, with pressure monitoring

- Size 6
- Porting pattern to DIN 24340 form A and ISO 4401
- Clamping pressure adjustment and monitoring in a single unit
- Joint adjustment for clamping and monitoring pressure
- Pressure monitoring, internal or optionally external on consumer
- Adjustable switching distance between reduced pressure and monitoring pressure
- Limitation of the minimum adjustable monitoring and/or secondary pressure

Types DRHD and ZDRHD

Size			**6**
Operating pressure	p_{max}	bar	200
Secondary pressure, adjustable	p_{max}	bar	100
Flow	$q_{V\ max}$	l/min	40

Detailed information:
RE 26576

2-way pressure reducing valves, direct operated (high performance)

- Size 2
- Screw hole to R/ISO 7789-27-01-1-98
- 3 pressure stages: 100, 210, 315 bar
- Versatile use for simple pressure reducing functions without leakage oil feedback

Type KRD

Size			**2**
Component series			B
Operating pressure	p_{max}	bar	400
Secondary pressure, adjustable	p_{max}	bar	315
Flow	$q_{V\ max}$	l/min	25

Detailed information:
RE 18111-03

Pressure reducing valves in sandwich plate design, pilot operated

- Size 10
- Porting pattern to DIN 24340 form A and ISO 4401
- Pressure reduction in channel A, B or P
- 4 pressure stages: 50, 100, 200, 315 bar
- 4 optional adjustment types:
  - Rotary knob
  - Sleeve with hexagon and protective cap
  - Lockable rotary knob with scale
  - Rotary knob with scale
- Check valve, optional

Type ZDR10V

Detailed information:
RE 26861

Size			10
Operating pressure	p_{max}	bar	315
Flow	$q_{V\ max}$	l/min	100

Pressure reducing valves in sandwich plate design, pilot operated (210 bar frame size)

- Sizes 6 and 10
- Porting pattern to DIN 24340 form A and ISO 4401
- Pressure reduction in channel A, B or P (with size 6, P channel only)
- 3 pressure stages: 50, 100, 210 bar
- Pressure gauge connection

Type ZDRK.V

Detailed information:
– Size 6: RE 26572
– Size 10: RE 26864

Size			6	10
Operating pressure	p_{max}	bar	210	210
Flow	$q_{V\ max}$	l/min	40	80

3-way pressure reducing valves, direct operated (high performance)

- Size 1
- Screw hole R/KTV.1
- 4 pressure stages: 50, 100, 210, 315 bar
- Versatile use for pressure reducing functions
- Low standard deviations in the p-q_V charakteristics

Type KTV

Size			**1**
Component series			A
Operating pressure	p_{max}	bar	350
Secondary pressure, adjustable	p_{max}	bar	315
Flow	$q_{V\,max}$	l/min	100

Detailed information:
RE 18111-02

Pressure reducing valves, pilot operated

- Sizes 10 to 30
- For subplate mounting ("P"): Porting pattern to DIN 24340 form D and ISO 5781
- For block installation ("C")
- For threaded connection ("G")
- As cartridge valve ("K")
- 4 pressure stages
- 4 optional adjustment types:
  - Rotary knob
  - Sleeve with hexagon and protective cap
  - Lockable rotary knob with scale
  - Rotary knob with scale
- Check valve, optional (with version "P" only)

Type DR

Size				**10** [1]	**10** [2]	**25** [2]
Secondary pressure, adjustable		p_{max}	bar	315	315	315
Flow	"P"	$q_{V\,max}$	l/min	–	80	160
	"G"	$q_{V\,max}$	l/min	–	80	160
	"K"	$q_{V\,max}$	l/min	100	100	160

Size				**10** [3]	**15** [3]	**20** [3]	**25** [3]	**30** [3]
Secondary pressure, adjustable		p_{max}	bar	350	350	350	350	350
Flow	"P"	$q_{V\,max}$	l/min	150	–	300	–	400
	"G"	$q_{V\,max}$	l/min	150	300	300	400	400
	"C"	$q_{V\,max}$	l/min	–	–	–	–	400

Detailed information:
– Size 10, Component series 3X ("K" only): RE 26850 [1]

– Sizes 10; 25,Component series 4X: RE 26893 [2]

– Sizes 10 to 30,Component series 5X: RE 26892 [3]

Pressure sequencing valves, direct operated

- Sizes 6 and 10
- Porting pattern
  - Size 6 to DIN 24340 form A and ISO 4401
  - Size 10 to DIN 24340 form D and ISO 5781
- 4 optional adjustment types:
  - Rotary knob
  - Sleeve with hexagon and protective cap
  - Lockable rotary knob with scale
  - Rotary knob with scale
- Check valve, optional

Type DZ.D

Detailed information
– Size 6, component series 5X: RE 26076 (load-dependent counterbalance valve)
– Size 10, component series 4X: RE 26099

Size			6	10
Sequencing pressure	p_{max}	bar	315	210
Flow	$q_{V\,max}$	l/min	60	80

Pressure sequencing valves, pilot operated

- Sizes 10, 25, 32
- For subplate mounting ("P"): Porting pattern to DIN 24340 form D and ISO 5781
- For block installation ("C")
- Suitable for use as preload, sequencing and switchover valve
- 4 optional adjustment types:
  - Rotary knob
  - Sleeve with hexagon and protective cap
  - Lockable rotary knob with scale
  - Rotary knob with scale
- Check valve, optional

Type DZ

Detailed information:
RE 26391

Size			10	25	32
Version			"P"	"P"	"P, C"
Sequencing pressure	p_{max}	bar	315	315	315
Flow	$q_{V\,max}$	l/min	200	400	600

Pressure cut-off valves, pilot operated

- Sizes 6 to 30
- For subplate mounting ("P"):
  Porting pattern to DIN 24340 form A and ISO 4401
- For block installation ("C")
- As cartridge valve ("K")
- Solenoid operated unloading via built-on directional valve (sizes 10, 20, 30)
- 4 optional adjustment types:
  – Rotary knob
  – Sleeve with hexagon and protective cap
  – Lockable rotary knob with scale
  – Rotary knob with scale

Type DA

Size				6	10	25	32
Version				"P, K"	"P"	"P"	"P, C"
Cut-off pressure		p_{max}	bar	315	315	315	315
Flow	Switching pressure diff. 10 %	$q_{V\,max}$	l/min	30 [1]	40	80	120
	Switching pressure diff. 17 %	$q_{V\,max}$	l/min	–	60	120	240

Detailed information:
– Size 6, component series 4X: RE 26404
– Sizes 10; 25; 32, component series 5X: RE 26411

[1] at $q_{V\,max}$ = 100 %

Pressure cut-off valves, pilot operated (high performance)

- Size 2
- Screw hole R/KAV.2
- 4 pressure stages: 50, 100, 210, 315 bar
- High switching capacity
- Infinitely variable switching pressure difference
- Pilot unit with main spool
- Hexagon with protective cap

Type KAV

Size			2
Component series			A
Operating pressure	p_{max}	bar	350
Flow	$q_{V\,max}$	l/min	140

Detailed information:
RE 18107-01

Double throttle check valves in sandwich plate design

- Sizes 6 to 22
- Porting pattern to DIN 24340 form A and ISO 4401
- For limiting the main or pilot flow of one or two actuators
- Meter-in or meter-out throttling
- 4 optional adjustment types:
  - Rotary knob
  - Sleeve with hexagon and protective cap
  - Lockable rotary knob with scale
  - Rotary knob with scale
  - Spindle with hexagon socket and scale

Type Z2FS

Detailed information:
- Size 6: RE 27506
- Size 10: RE 27518
- Size 16: RE 27526
- Size 22: RE 27536

Size			6	10	16	22
Operating pressure	p_{max}	bar	315	315	350	350
Flow	$q_{V\ max}$	l/min	80	160	250	360

Double throttle check valves in sandwich plate design (210 bar frame size)

- Sizes 6 and 10
- Porting pattern to DIN 24340 form A and ISO 4401
- For limiting the main or pilot flow of two actuator ports
- Meter-in or meter-out throttling

Type Z2FSK

Detailed information:
- Size 6: RE 27510
- Size 10: RE 27524

Size			6	10
Operating pressure	p_{max}	bar	210	210
Flow	$q_{V\ max}$	l/min	40	80

Throttle valves and throttle check valves

- Sizes 6 to 102
- For in-line installation
- Pressure and viscosity-dependent
- Type MG: Throttling in both directions of flow
- Type MK: Throttling in only one direction of flow, free flow in the opposite direction (opening pressure 0.5 bar)
- Type F (needle type throttle valve): Throttling in both directions of flow
- With optional surface coating
- Special media (e.g. emulsion, water) on inquiry

Types MG and MK

Size			**6**	**8**	**10**	**15**	**20**	**25**
Operating pressure	p_{max}	bar	315	315	315	315	315	315
Flow	$q_{V\ max}$	l/min	15	30	50	120	200	300

Size			**30**	**52**	**62**	**82**	**102**
Operating pressure	p_{max}	bar	315	315	315	315	315
Flow	$q_{V\ max}$	l/min	400	700	1100	1800	3000

Detailed information:
– Sizes 6 to 30: RE 27219
– Sizes 52 to 102: on inquiry

Type F

Size			**5**	**10**
Operating pressure	p_{max}	bar	210	210
Flow	$q_{V\ max}$	l/min	20	50

Detailed information:
RE 27761

2-way flow control valves in sandwich plate design

- Size 6
- Porting pattern to DIN 24340 form A and ISO 4401
- With flow control in channel A, B, A and B or T (P)

Type Z2FRM

Detailed information:
RE 28164

Size			6
Operating pressure	p_{max}	bar	315
Flow	$q_{V\,max}$	l/min	32

2-way flow control valves

- Sizes 6 to 16
- For subplate mounting:
  – Size 6: Porting pattern to DIN 24340 form A and ISO 4401
  – Sizes 10 and 16: Porting pattern to DIN 24340 form G and ISO 6263
- Manual actuation (type 2FRM)
- Hydraulic actuation (type 2FRH)
- Electrohydraulic actuation (type 2FRW)
- Flow control in both directions through rectifier sandwich plate, optional (see below, type Z4S)
- Stroke limiter of the rack-and-pinion drive that can be adjusted on both ends (types 2FRH and 2FRW)
- With actual value potentiometer for continuous monitoring of the throttle orifice position, optional (types 2FRH and 2FRW)
- With external closure of the pressure compensator, optional (size 6)
- Check valve, optional (size 6)
- Pressure compensator stroke limiter for reducing start-up jumps, optional (sizes 10 and 16)

Types 2FRM, 2FRH and 2FRW

Detailed information:
– Size 6: RE 28163
– Sizes 10 and 16: RE 28389

[1] with rectifier sandwich plate up to 210 bar

Size			6	10	16
Type			2FRM	2FRM, 2FRH, 2FRW	2FRM, 2FRH, 2FRW
Operating pressure	p_{max}	bar	315 [1]	315	315
Pilot pressure	p_{St}	bar	–	315	315
Flow	$q_{V\,max}$	l/min	32	50	160

2-way flow control valves

- Sizes 6 and 10
- As cartridge valve ("K")
- With integrated check valve
- Low startup jump

Type 2FRM.K

Size			6	10
Operating pressure	p_{max}	bar	315	315
Flow	$q_{V\ max}$	l/min	32	60

Detailed information:
RE 28155

Rectifier sandwich plates (Graetz circuit) for combination with flow control valves

- Sizes 6 to 16
- For ensuring a rectified flow through a built-on flow control valve
- Can be used for supply and return flow

Type Z4S

Size			6	10	16
Component series			1X	3X	2X
Operating pressure	p_{max}	bar	210	315	315
Flow	$q_{V\ max}$	l/min	32	50	160

Detailed information:
– Size 6: RE 28163
– Sizes 10 and 16: RE 28389

2-way cartridge valves with directional function

- Sizes 16 to 160
- Standardized installation to DIN ISO 7368 (up to size 100)
- Standard area ratios 2:1 and 14.3:1
- "High flow" by default
- Valve poppet with and without damping nose
- Various opening pressures
- Various stroke limitation adjustment types
- Control cover, optionally with
  - – integrated poppet/shuttle valve
  - – built-on possibility for directional poppet/spool valve or combination
  - – end switch monitoring
- Variable nozzle fittings
- Optional shaft sealing
- Mounting screws included in the scope of delivery of the cover
- High pressure versions on inquiry
- Special media (e.g. emulsion, water) on inquiry

Detailed information:
RE 21010

Types LC..A, LC..B (cartridge) and LFA (control cover)

Size			16	25	32	40	50
Operating pressure	p_{max}	bar	420 [3]	420 [3]	420 [3]	420 [3]	420 [3]
Flow [1]	$q_{V\,max}$	l/min	290	600	750	1270	1950
Flow [2]	$q_{V\,max}$	l/min	320	800	900	1500	2750

Size			63	80	100	125	160
Operating pressure	p_{max}	bar	420 [3]	420 [3]	420 [3]	420 [3]	420 [3]
Flow [1]	$q_{V\,max}$	l/min	2750	4500	7500	11500	18000
Flow [2]	$q_{V\,max}$	l/min	3750	6200	10600	16000	25000

[1] $\Delta p \approx 10$ bar, with damping nose
[2] $\Delta p \approx 10$ bar, without damping nose
[3] depending on pilot control valve

2-way cartridge valves with pressure relief function

- Sizes 16 to 100
- Standardized installation to DIN ISO 7368
- Implementation of unloading, isolating and pressure stage circuits possible
- Cartridge kit optionally with
  - poppet plunger
  - poppet-spool plunger
- Various control valves for manual and/or electrical-proportional pressure adjustment
  - Integrated in the control cover
  - Additionally built-on as pilot control valve
  - Various combination options
- Various opening pressures
- Pressure stages ranging from 25 to 420 bar
- Various adjustment types with manual pressure adjustment
- Variable nozzle fittings
- Optional shaft sealing
- Mounting screws included in the scope of delivery of the cover
- High pressure versions on inquiry
- Special media (e.g. emulsion, water) on inquiry

Type LC..DB (cartridge) and type LFA..DB (control cover)

Size			**16**	**25**	**32**	**40**
Operating pressure	p_{max}	bar	420	420	420	400
Flow ("E")	$q_{V\ max}$	l/min	250	400	600	1000
Flow ("D")	$q_{V\ max}$	l/min	175	300	450	700

Size			**50**	**63**	**80**	**100**
Operating pressure	p_{max}	bar	400	400	400	400
Flow ("E")	$q_{V\ max}$	l/min	1600	2500	4500	7000
Flow ("D")	$q_{V\ max}$	l/min	1400	1750	3200	4900

Detailed information:
RE 21050

2-way cartridge valves with pressure reducing function

- Sizes 16 to 100 (size 125 on inquiry)
- Standardized installation to DIN ISO 7368
- Implementation of isolating and pressure stage circuits possible
- Open rest position (cartridge with directional spool valve)
- When the set pressure is reached, port A is limited according to the pressure/flow characteristics
- Various control valves for manual and/or electrical-proportional pressure adjustment
  – Integrated in the control cover
  – Additionally built-on as pilot control valve
  – Various combination options
- Various closing pressures
- Various adjustment types with manual pressure adjustment
- Variable nozzle fittings
- Mounting screws included in the scope of delivery of the cover
- Special media (e.g. emulsion, water) on inquiry

Detailed information:
RE 21050

Type LC..DR (cartridge) and type LFA..DB (control cover)

Size			**16**	**25**	**32**	**40**
Operating pressure	p_{max}	bar	315	315	315	315
Flow	$q_{V\,max}$	l/min	150	270	450	900

Size			**50**	**63**	**80**	**100**
Operating pressure	p_{max}	bar	315	315	315	315
Flow	$q_{V\,max}$	l/min	1100	1700	2800	4400

2-way cartridge valves with pressure reducing function

- Sizes 16 to 100 (size 125 on inquiry)
- Standardized installation to DIN ISO 7368 (up to size 100)
- Implementation of isolating and pressure stage circuits possible
- Closed rest position
- When the set pressure is reached, port B is limited according to the pressure/flow characteristics
- Various control valves for manual and/or electrical-proportional pressure adjustment
  – Integrated in the control cover
  – Additionally built-on as pilot control valve
  – Various combination options
- Various closing pressures
- Various adjustment types with manual pressure adjustment
- Variable nozzle fittings
- Mounting screws included in the scope of delivery of the cover
- Special media (e.g. emulsion, water) on inquiry

Detailed information:
RE 21050

Type LC..DB (cartridge) and type LFA..DR (control cover)

Size			**16**	**25**	**32**	**40**
Operating pressure	p_{max}	bar	315/350	315/350	315/350	315/350
Flow	$q_{V\ max}$	l/min	175	300	450	700
Size			**50**	**63**	**80**	**100**
Operating pressure	p_{max}	bar	315/350	315/350	315/350	315/350
Flow	$q_{V\ max}$	l/min	1400	1750	3200	4900

2-way cartridge valves with pressure sequencing function

- Sizes 16 to 50
- Standardized installation to DIN ISO 7368
- Cartridge kit optionally with
  - poppet plunger
  - poppet-spool plunger
- Switching examples
  - Pressure-independent PS function
  - Pressure-dependent sequencing of a second pressure system
- Unloading, isolating and pressure stage circuits
- Various control valves for manual and/or electrical-proportional pressure adjustment
  - Integrated in the control cover
  - Additionally built-on as pilot control valve
  - Various combination options
- Various closing pressures
- Various adjustment types with manual pressure adjustment
- Variable nozzle fittings
- Mounting screws included in the scope of delivery of the cover
- Special media (e.g. emulsion, water) on inquiry

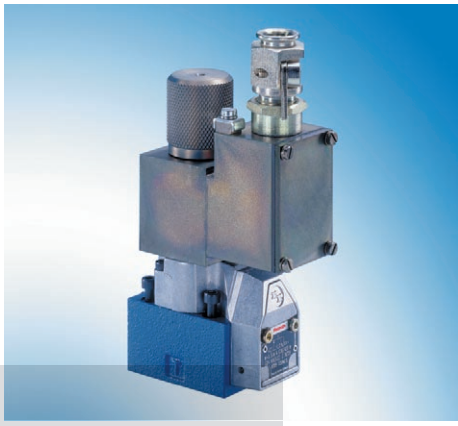
Detailed information:
RE 21050

Type LC..DB (cartridge) and type LFA..DZ(W) (control cover)

Size			16	25	32	40	50
Operating pressure	p_{max}	bar	350	350	350	350	350
Flow ("E")	$q_{V\,max}$	l/min	250	400	600	1000	1600
Flow ("D")	$q_{V\,max}$	l/min	175	300	450	700	1400

Directional poppet valves, direct operated, with solenoid actuation

- Size 6
- Component series 3X
- Maximum operating pressure 420 bar
- Maximum flow 25 l/min
- Application according to Explosion Protection Directive 94/9/EC



Type M-.SEW…XE

Applications according to Directive 94/9/EC			Solenoid type of protection to EN 50019/50028	
Component group	Category to ATEX	Fields of application		
II	2G	Gases, mist, vapors	EEx em IIT4	Increased safety

Detailed information:
RE 22058-Z-XE-B2

Directional poppet valves, direct operated, with solenoid actuation

- Size 10
- Component series 1X
- Maximum operating pressure 420 bar
- Maximum flow 40 l/min
- Application according to Explosion Protection Directive 94/9/EC

Type M-.SEW…XE

Applications according to Directive 94/9/EC			Solenoid type of protection to EN 50019/50028	
Component group	Category to ATEX	Fields of application		
II	2G	Gases, mist, vapors	EEx em IIT4	Increased safety

Detailed information:
RE 22075-Z-XE-B2

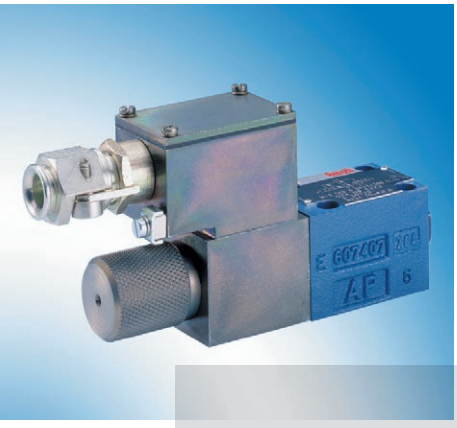
Directional poppet valves, direct operated, with solenoid actuation

- Size 6
- Component series 1X
- Maximum operating pressure 350 bar
- Maximum flow 25 l/min
- Application according to Explosion Protection Directive 94/9/EC

Type M-.SED…XN

Detailed information:
RE 22049-XN-B2

Applications according to Directive 94/9/EC			Solenoid type of protection to EN 50021/50281	
Component group	Category to ATEX	Fields of application		
II	3G	Gases, mist, vapors	EEx nA II T140 °C; IP 65 T140 °C	Non-igniting
II	3D	Dusts		



Directional poppet valves, direct operated, with solenoid actuation

- Size 6
- Component series 1X
- Maximum operating pressure 350 bar
- Maximum flow 25 l/min
- Application according to Explosion Protection Directive 94/9/EC

Special features with seawater-proof valves:

- External metal parts are galvanized or treated with corrosion protection.
- The conditional seawater resistance is defined by specifying "SO321" in the order.

Type M-.SED…XE

Detailed information:
RE 22049-XE-B2

Applications according to Directive 94/9/EC			Solenoid type of protection to EN 50019/50028	
Component group	Category to ATEX	Fields of application		
II	2G	Gases, mist, vapors	EEx em IIT4	Increased safety

Directional poppet valves, direct operated, with solenoid actuation

- Size 10
- Component series 1X
- Maximum operating pressure 350 bar
- Maximum flow 40 l/min
- Application according to Explosion Protection Directive 94/9/EC

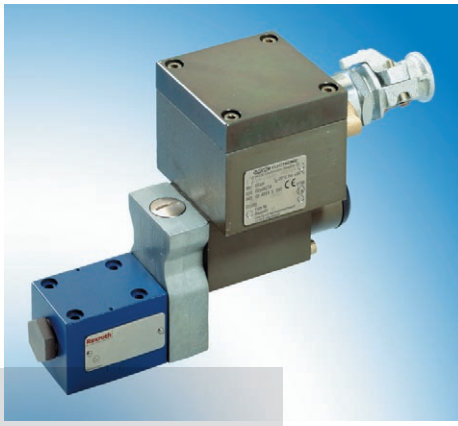
Type M-.SED…XN

Applications according to Directive 94/9/EC			Solenoid type of protection to EN 50021/50281	
Component group	Category to ATEX	Fields of application		
II	3G	Gases, mist, vapors	EEx nA II T140 °C; IP 65 T140 °C	Non-igniting
II	3D	Dusts		

Detailed information:
RE 22045-XN-B2

Directional poppet valves, direct operated, with solenoid actuation

- Size 6
- Component series 6X
- Maximum operating pressure 420 bar
- Maximum flow 12 l/min
- Application according to Explosion Protection Directive 94/9/EC



Type M-.SE…XD

Applications according to Directive 94/9/EC			Solenoid type of protection to EN 50014/50018	
Component group	Category to ATEX	Fields of application		
I	M2	Mining	EEx dII; EEx dII CT4	Pressure-tight encapsulation
II	2G	Gases, mist, vapors		

Detailed information:
RE 22047-XD-B2

Directional poppet valves, direct operated, with solenoid actuation

- Size 6
- Component series 6X
- Maximum operating pressure 420 bar
- Maximum flow 4 l/min
- Application according to Explosion Protection Directive 94/9/EC

Types E-.SE…XH and W-.SE…XH

Detailed information:
RE 22047-XH-B2

Applications according to Directive 94/9/EC			Solenoid type of protection to EN 50014/50020	
Component group	Category to ATEX	Fields of application		
I	M2	Mining	EEx ib II CT6 / EEx ib I	Intrinsically safe
II	2G	Gases, mist, vapors		

Directional spool valves, direct operated, with solenoid actuation

- Size 6
- Component series 6X
- Maximum operating pressure 350 bar
- Maximum flow 70 l/min
- Application according to Explosion Protection Directive 94/9/EC

Special features with seawater-proof valves:

- External metal parts are galvanized or treated with corrosion protection.
- The conditional seawater resistance is defined by specifying "SO329" in the order.

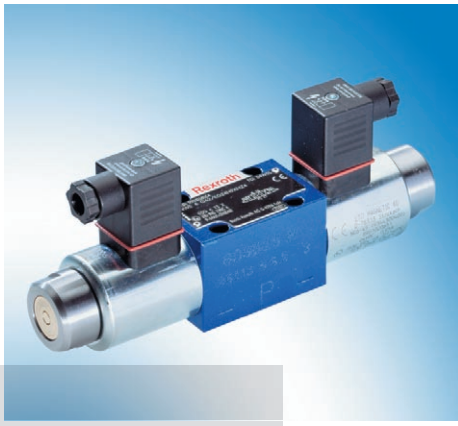
Type .WE…E..XE

Detailed information:
RE 23178-Z-XE-B2

Applications according to Directive 94/9/EC			Solenoid type of protection to EN 50019/50028	
Component group	Category to ATEX	Fields of application		
II	2G	Gases, mist, vapors	EEx em IIT4	Increased safety

Directional spool valves, direct operated, with solenoid actuation

- Size 6
- Component series 6X
- Maximum operating pressure 350 bar
- Maximum flow 80 l/min
- Application according to Explosion Protection Directive 94/9/EC



Type .WE…E..XN

Applications according to Directive 94/9/EC			Solenoid type of protection to EN 50021/50281	
Component group	Category to ATEX	Fields of application		
II	3G	Gases, mist, vapors	EEx nA II T140 °C; IP 65 T140 °C	Non-igniting
II	3D	Dusts		

Detailed information:
RE 23178-XN-B2

Directional spool valves, direct operated, with solenoid actuation

- Size 6
- Component series 6X
- Maximum operating pressure 315 bar
- Maximum flow 60 l/min
- Application according to Explosion Protection Directive 94/9/EC

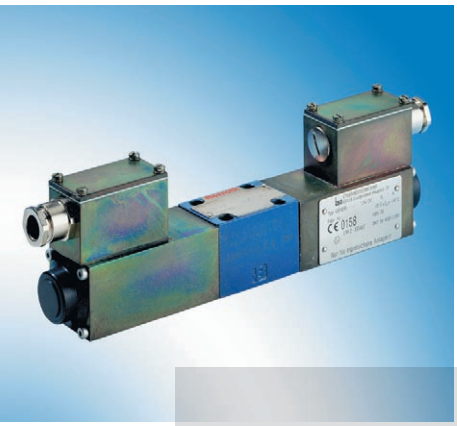
Special features with seawater-proof valves:

- External metal parts are galvanized or treated with corrosion protection.
- The conditional seawater resistance is defined by specifying "SO329" in the order.

Type .WE…B..XD

Applications according to Directive 94/9/EC			Solenoid type of protection to EN 50014/50018	
Component group	Category to ATEX	Fields of application		
I	M2	Mining	EEx dI; EEx dII CT4	Pressure-tight encapsulation
II	2G	Gases, mist, vapors		

Detailed information:
RE 23178-XD-B2



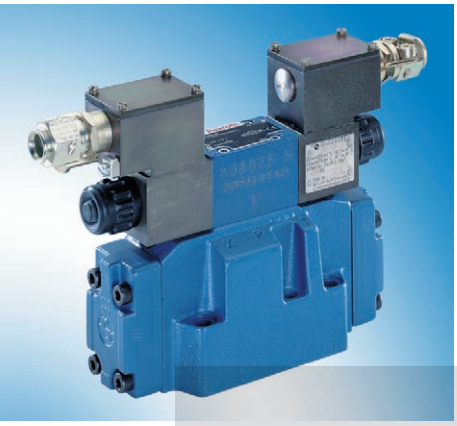
Directional spool valves, direct operated, with solenoid actuation

- Size 6
- Component series 5X
- Maximum operating pressure 210 bar
- Maximum flow 20 l/min
- Application according to Explosion Protection Directive 94/9/EC

Type .WE 6 ../.B..XH

Detailed information:
RE 23177-XH-B2

Applications according to Directive 94/9/EC			Solenoid type of protection to EN 50014/50020	
Component group	Category to ATEX	Fields of application		
I	M2	Mining	EEx ib II CT6 / EEx ib I	Intrinsically safe
II	2G	Gases, mist, vapors		



Directional spool valves, pilot operated, with electrohydraulic actuation

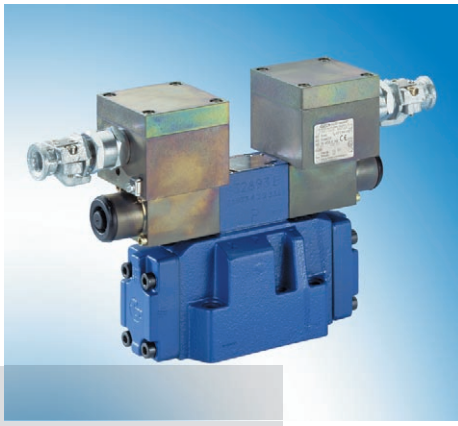
- Sizes 10, 16, 25 and 32
- Component series 4X; 6X; 7X
- Maximum operating pressure 350 bar
- Maximum flow 1100 l/min
- Application according to Explosion Protection Directive 94/9/EC

Type H-4WEH …XE

Detailed information:
RE 24751-Z-XE-B2

Applications according to Directive 94/9/EC			Solenoid type of protection to EN 50019/50028	
Component group	Category to ATEX	Fields of application		
II	2G	Gases, mist, vapors	EEx em IIT4	Increased safety

Directional spool valves, pilot operated, with electrohydraulic actuation



- Sizes 10, 16, 25 and 32
- Component series 4X, 6X, 7X
- Maximum operating pressure 350 bar
- Maximum flow 1100 l/min
- Application according to Explosion Protection Directive 94/9/EC

Type H-4WEH…XD

Applications according to Directive 94/9/EC			Solenoid type of protection to EN 50014/50018	
Component group	Category to ATEX	Fields of application		
I	M2	Mining	EEx dI; EEx dII CT4	Pressure-tight encapsulation
II	2G	Gases, mist, vapors		

Detailed information:
RE 24751-XD-B2

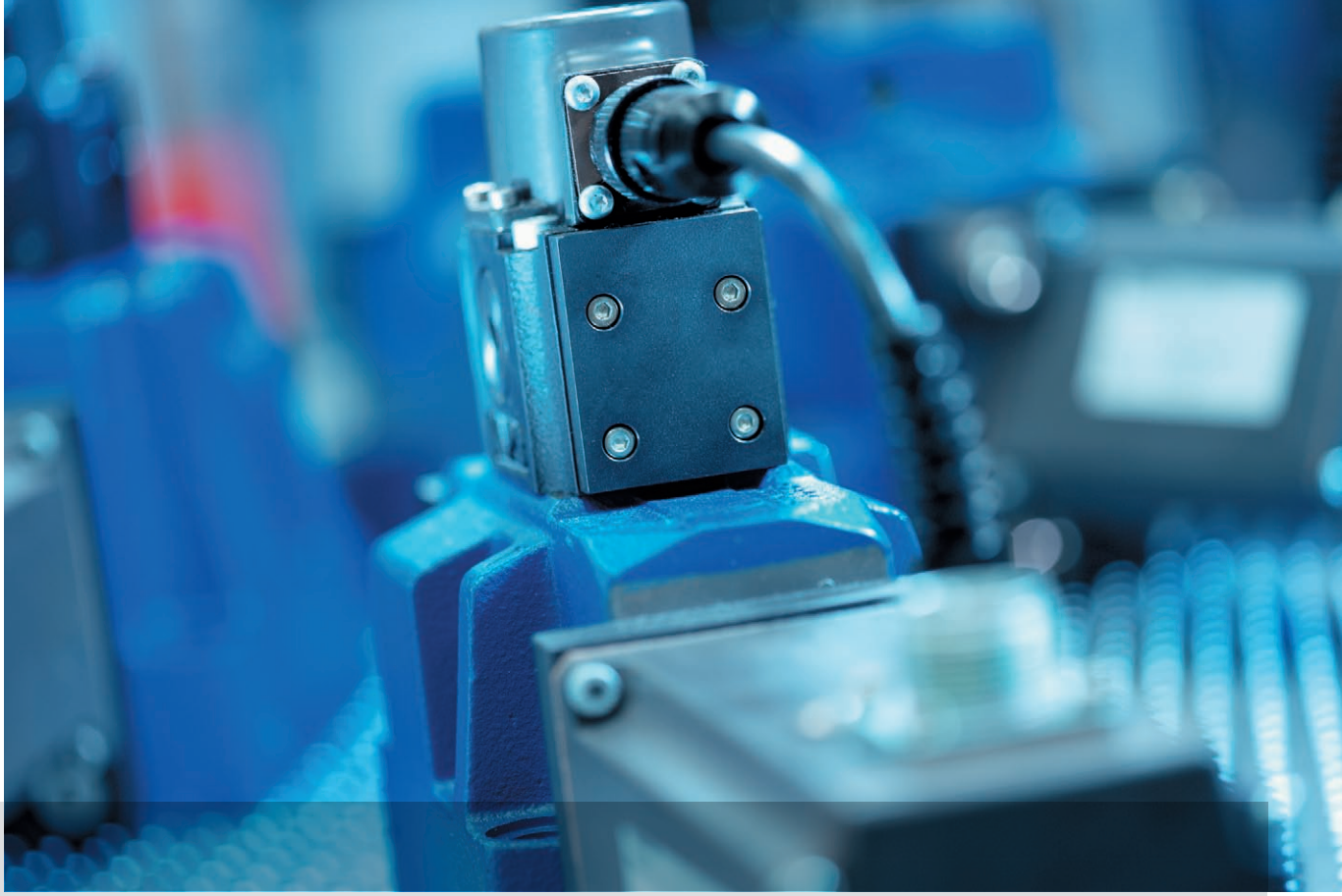
Pressure reducing valves, direct operated

- Size 6
- Component series 5X
- Maximum operating pressure 315 bar
- Maximum flow 60 l/min
- 5 pressure stages
- Application according to Explosion Protection Directive 94/9/EC

Type DR 6 DP…XC

Applications according to Directive 94/9/EC			Type of valve protection to EN 13463-5	
Component group	Category to ATEX	Fields of application		
II	2G	Gases, mist, vapors	c	Structural safety
I	2M	Mining		

Detailed information:
RE 26564-XC-B2



Proportional, high-response and servo-valves

Proportional valves

Many controls would hardly be conceivable without proportional valves with integrated control electronics (OBE). They reduce the cabling effort and simplify handling while offering exact reproducibility and low manufacturing tolerances.

Performance profile

- Pressure and flow control and directional valve variants in sizes 6 to 52
- Maximum flow 2800 l/min
- Maximum operating pressure 350 bar
- Proportional solenoid with electrical closed-loop position control for high accuracies (> 1 %)
- Rugged electronics for stationary and mobile applications

High-response valves

High-response valves are compact and robust. They are convincing in their high dynamics and control accuracy. The size 6 and size 10 core product can be combined with main stages of up to size 160 with a nominal flow of up to 18000 liters.

Performance profile

- Maximum flow 50000 l/min
- Maximum operating pressure 420 bar
- Sizes 6 to 160
- Highly dynamic valves with zero overlap for use in closed control loops
- Direct and pilot operated
- For subplate mounting and block installation

Servo-valves

Servo-valves are hydraulically pilot operated 2- or 3-stage directional valves with porting pattern to DIN 24340 form A. They are mainly used for closed loop-controls of position, force or pressure and velocity.

They are characterized by:

- Compact build
- Low electrical power consumption
- High dynamics and
- Excellent quasi-steady-state values

Performance profile

- Maximum flow 1600 l/min
- Maximum operating pressure 315 bar
- Sizes 6 to 32

Proportional directional valves, direct operated, without electrical position feedback

- Sizes 6 and 10
- Porting pattern to ISO 4401
- Control of the direction and magnitude of a flow
- Proportional solenoid operation
- Spring-centered control spool
- Different spool overlaps possible
- Integrated control electronics (OBE) for type 4WRAE

Types 4WRA and 4WRAE

Detailed information:
RE 29055

Size				6	10
Operating pressure	– Ports A, B, P	p_{max}	bar	315	315
Nominal flow	(= 10 bar)	$q_{V\ nom}$	l/min	7, 15, 30	30, 60
Maximum hysteresis			%	5	5
Step response	0 to 90 %	T_u+T_g	ms	< 40	< 140
Operating voltage		U	V	24	24
Comm. value signal (alternative)	Type 4WRAE	U	V	±10	±10
		I	mA	4 to 20	4 to 20
Control electronics	Type 4WRA		analog.	VT-VSPA2-1 / VT-MSPA2-1	
			digital	VT-VSPD-1	VT-VSPD1

Proportional directional valves, direct operated, with integrated control electronics (OBE), without electrical position feedback

- Sizes 6 and 10
- For subplate mounting
- Porting pattern to ISO 4401
- Positive overlap and integrated control electronics
- Operated on either end, standard symbols E and W
- Adjustable through the command value of the integrated control electronics

Types 4WRBA and 4WRBAE

Detailed information:
– Type 4WRBAE: RE 29051
– Type 4WRBA: RE 29049
– Types 4WRBA…EA:
RE 29047

Size				6	10
Operating pressure	– Ports P, A, B	p_{max}	bar	315	315
Flow		$q_{V\ max}$	l/min	32	65
Maximum hysteresis	Type 4 WRBA(E)		%	≤ 4 (6)	≤ 6 (8)
Step response	0 to 100 %		ms	70 (50)	100 (90)
Operating voltage		U	V	24	24
Control electronics	Type 4WRBA		analog.	VT-VSPA2-525 / VT-MSPA2-525	

Proportional directional valves, direct operated, with electrical position feedback

- Sizes 6 and 10
- Porting pattern to ISO 4401
- Control of the direction and magnitude of a flow
- Proportional solenoid operation
- Spring-centered control spool
- Different spool overlaps possible
- Integrated control electronics (OBE) for type 4WREE

Types 4WRE and 4WREE

Size				6	10
Operating pressure	– Ports A, B, P	p_{max}	bar	315	315
Nominal flow	(Δp = 10 bar)	$q_{V\,nom}$	l/min	8, 16, 32	25; 50; 75
Maximum hysteresis			%	0.1	0.1
Step response	0 to 90 %	T_u+T_g	ms	20	40
Operating voltage		U	V	24	24
Comm. value signal (alternative)	Type 4WREE	U	V	±10	±10
		I	mA	4 to 20	4 to 20
Control electronics	Type 4WRE		analog.	VT-RPA2-1 VT-MRPA2-1	VT-RPA2-2 VT-MRPA2-2
	4/3-way version		digital	VT-VRPD2-2	VT-VRPD2
	4/2-way version		analog.	VT-MRPA2-1	VT-MRPA2-2

Detailed information:
RE 29061

Proportional directional valves, direct operated, with integrated control electronics (OBE), electrical position feedback and spool position monitoring

- Sizes 6 and 10
- Porting pattern to ISO 4401
- Control of the direction and magnitude of a flow
- Proportional solenoid operation
- Spring-centered control spool
- Optional deadband compensation

Type 4WREEM

Size				6	10
Operating pressure	– Ports A, B, P	p_{max}	bar	315	315
Nominal flow	(Δp = 10 bar)	$q_{V\,nom}$	l/min	4, 8, 16, 32	25, 50, 75
Maximum hysteresis			%	≤ 0.1	≤ 0.1
Step response	0 to 90 %	T_u+T_g	ms	20	40
Operating voltage		U	V	24	24
Comm. value signal		U	V	±10	±10

Detailed information:
RE 29064

2/2 proportional directional valves, direct operated (high performance)

- Size 1
- Direct operated proportional valve for controlling the magnitude of a flow
- Operation through proportional solenoid with central thread and detachable coil
- Solenoid coil can be rotated
- Flow in both directions
- With concealed auxiliary operating device, optional

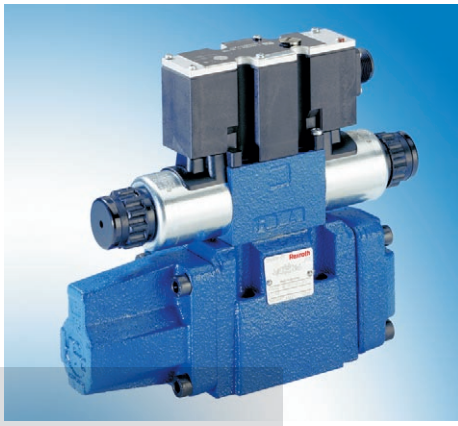
Detailed information:
RE 18139-06

Type KKDS

Frame size				1	1
Component series				B	B
Version				N	P
Operating pressure		p_{max}	bar	350	350
Nominal flow	1 → 2	$q_{V\,nom}$	l/min	38	32
	2 → 1	$q_{V\,nom}$	l/min	34	45
Maximum hysteresis			%	5	5
Step response	0 to 100 %	T_u+T_g	ms	< 65	< 65
	100 to 0 %	T_u+T_g	ms	< 65	< 65
Operating voltage		U	V	24	24
Comm. value signal		U	V	0 to +10	0 to +10
Control electronics		Modular amp.		VT-MSPA1	VT-MSPA1
		Plug-in amplifier		VT-SSPA1	VT-SSPA1

Proportional directional valves, pilot operated, without electrical position feedback

- Sizes 10 to 52
- Porting pattern to ISO 4401
- Control of the direction and magnitude of a flow
- Pilot control via 3-way pressure reducing valve
- Spring centering and anti-rotation feature of the main spool
- Different spool overlaps possible
- Integrated control electronics (OBE) for type 4WRZE



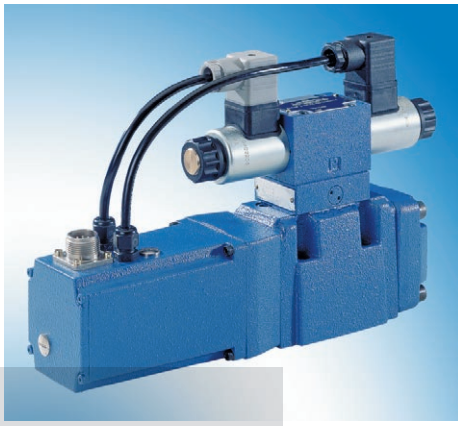
Types 4WRH, 4WRZ, 4WRZE

Size				10	16	25	32	52
Operating pressure	– Port P	p_{max}	bar	315	350	350	350	350
Nominal flow	(Δp = 10 bar)	$q_{V\,nom}$	l/min	25, 50, 85	100, 150	220, 325	360, 520	1000
Maximum hysteresis			%	6	6	6	6	6
Step response	0 to 90 %	T_u+T_g	ms	40	70	90	170	450
Operating voltage		U	V	24	24	24	24	24
Control electronics	Type 4WRZ		analogue	VT-VSPA2-1				
			digital	VT-VSPD-1				
			modular design	VT 11118				

Detailed information:
RE 29115

Proportional directional valves, pilot operated, with integrated control electronics (OBE) and electrical position feedback

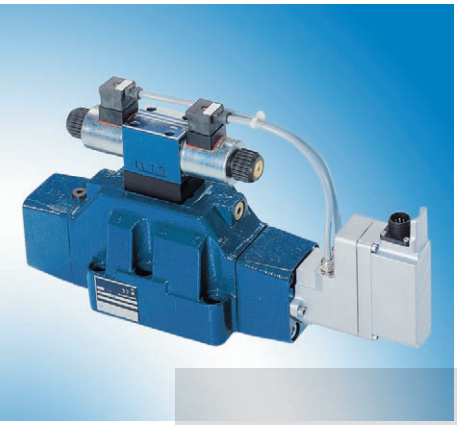
- Sizes 10 to 35
- Porting pattern to ISO 4401
- Control of the direction and magnitude of a flow
- Pilot control via 3-way proportional directional valve without position feedback
- Spring-centering of the main spool



Type 4WRKE

Size				10	16	25	27	32	35
Operating pressure		p_{max}	bar	315	350	350	210	350	350
Nominal flow	(Δp = 10 bar)	$q_{V\,nom}$	l/min	25, 50, 100	125, 200	220, 350	500	400, 600	1000
Maximum hysteresis			%	1	1	1	1	1	1
Step response	0 to 90 %	T_u+T_g	ms	20	30	50	50	80	120
Operating voltage		U	V	24	24	24	24	24	24
Comm. value signal (alternative)		U	V	±10	±10	±10	±10	±10	±10
		I	mA	4 to 20					

Detailed information:
RE 29075



Proportional directional valve, pilot operated, with integrated control electronics (OBE) and electrical position feedback

- Sizes 10 to 35
- Porting pattern to ISO 4401
- Overlap compensated and calibrated electronically
- Pilot control via 3-way proportional directional valve without position feedback
- Spring-centering of the main spool

Detailed information:
RE 29076

Type 4WRBKE

Size				**10**	**16**	**27**	**35**
Operating pressure	– Ports P, A, B	p_{max}	bar	350	350	280	350
Flow		$q_{V\,max}$	l/min	85	180	250, 430	1100
Maximum hysteresis			%	≤ 0.3	≤ 0.3	≤ 0.3	≤ 0.3
Actuating time	0 to 100 %		ms	35	55	60	140
Operating voltage		***U***	V	24	24	24	24
Comm. value signal		***U***	V	±10	±10	±10	±10

Proportional pressure relief valves, direct operated

- Size 6
- Porting pattern to DIN 24340 form A and ISO 4401
- Valve for limiting a system pressure
- Proportional solenoid operation
- For subplate mounting

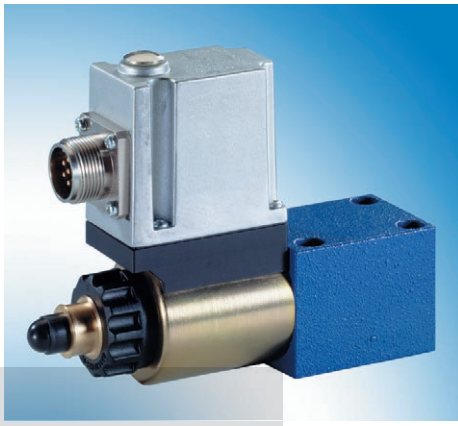
Type DBEP

Size			**6**
Operating pressure	p_{max}	bar	100
Flow	$q_{V\,max}$	l/min	8
Maximum hysteresis		%	≤ 3
Operating voltage	U	V	24
Comm. value signal	U	V	0 to +10
Control electronics	analog.		VT-VSPA1-1 and VT 3000
	digital		VT-VSPD-1

Detailed information:
RE 29164

Proportional pressure relief valves, direct operated

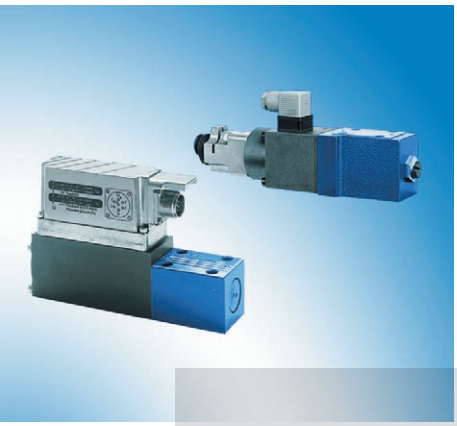
- Size 6
- Porting pattern to DIN 24340 form A and ISO 4401
- Valve for limiting a system pressure
- Proportional solenoid operation
- For subplate mounting
- Integrated control electronics (OBE) for type DBETE
- Linearized pressure/command value characteristic curve
- Also available as screw-in cartridge valve



Types DBET and DBETE

Size				**6**
Operating pressure		p_{max}	bar	420
Flow		$q_{V\,max}$	l/min	2
Maximum hysteresis			%	< 4 of maximum set pressure
Step response	0 to 100 % 100 to 0 %	T_u+T_g	ms	70 (depending on system)
Operating voltage		U	V	24
Comm. value signal		U	V	0 to 10
		I	mA	4 to 20
Control electronics	Type DBET	analog.		VT-VSPA1-2-1X
		modular design		VT-MSPA1-1-1X

Detailed information:
RE 29162



Proportional pressure relief valves, direct operated, with position feedback

- Size 6
- Porting pattern to ISO 4401
- Integrated control electronics (OBE) for type DBETBEX
- Proportional solenoid operation
- Adjustable through position specification of the solenoid armature

Type DBET

Detailed information:
– Type DBETBX: RE 29150
– Type DBETBEX: RE 29151
– Type DBETFX: RE 29152

Size				**6**	**6**	**6**
Type				DBETBX	DBETBEX	DBETFX
Operating pressure	– Port P	p_{max}	bar	315	315	315
	– Port T			2	250	200
Flow		$q_{V\,max}$	l/min	2	2	2
Maximum hysteresis			%	≤ 0.3	≤ 0.2	≤ 1

Proportional pressure relief valves, direct operated (high performance)

- Size 8
- Pilot valve
- Direct operated valves for limiting a system pressure
- Proportional solenoid operation
- Proportional solenoid with central thread and detachable coil
- Screw-in cartridge valve
- Fine-balancing of command value/pressure characteristic curve externally on the control electronics
- In the event of a power failure, the minimum set ("A") or maximum ("B") pressure is obtained.

Type KBPS

Detailed information:
– Version "A":
RE 18139-04
– Version "B":
RE 18139-05

Frame size				**8**
Component series				A
Operating pressure		p_{max}	bar	420
Flow		$q_{V\,max}$	l/min	2
Maximum hysteresis			%	4
Step response	0 to 100 %	T_u+T_g	ms	< 70
	100 to 0 %	T_u+T_g	ms	< 70
Operating voltage		U	V	24
Comm. value signal		U	V	0 to +10
Control electronics		Plug-in amplifier		VT-SSPA1

Proportional pressure relief valves, pilot operated

- Size 6
- Porting pattern to DIN 24340 form A and ISO 4401
- Valve for limiting a system pressure
- Proportional solenoid operation
- For subplate mounting, types DBE and DBEE
- Sandwich plate version, types ZDBE and ZDBEE
- Integrated control electronics (OBE) for types DBEE and ZDBEE
- Linearized pressure/command value characteristic curve

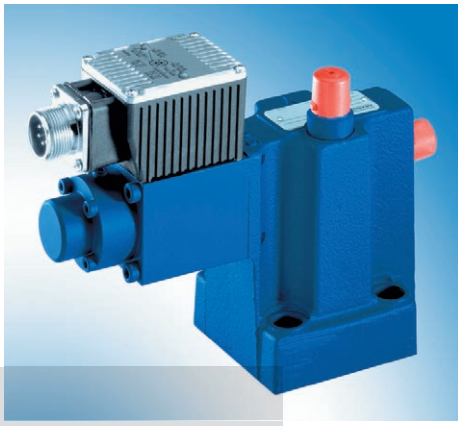
Types (Z)DBE and (Z)DBEE

Size				**6**
Operating pressure		p_{max}	bar	315
Flow		$q_{V\,max}$	l/min	30
Maximum hysteresis			%	±1.5
Step response	10 to 90 %	T_u+T_g	ms	80 (depending on system)
	90 to 10 %	T_u+T_g	ms	50 (depending on system)
Operating voltage		U	V	24
Comm. value signal		U	V	0 to 10
Control electronics	Type (Z)DBE	analogue		VT-VSPA
		digital		VT-VSPD-1
		modular design		VT 11131

Detailed information:
RE 29158

Proportional pressure relief valves, pilot operated

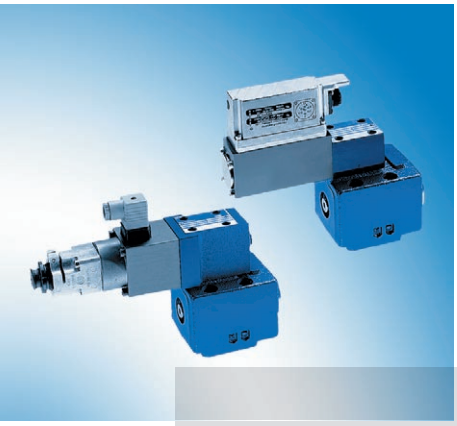
- Sizes 10 to 32
- Porting pattern to DIN 24340 form E
- Valve for limiting a system pressure
- Proportional solenoid operation
- For subplate mounting
- Maximum pressure relief function with types DBEM and DBEME
- Integrated control electronics (OBE) for types DBEE and DBEME
- Linearized pressure/command value characteristic curve (sizes 10 and 25)



Types DBE(M) and DBE(M)E

Size				**10**	**25**	**32**
Operating pressure		p_{max}	bar	350	350	350
Flow		$q_{V\,max}$	l/min	200	400	600
Maximum hysteresis			%	±1.5	±1.5	±1.5
Step response	0 to 100 % 100 to 0 %	T_u+T_g	ms	150 (depending on system)		
Operating voltage		U	V	24	24	24
Comm. value signal		U	V	0 to 10	0 to 10	0 to 10
Control electronics	Type DBE	analog.		VT-VSPA1-1	VT-VSPA1-1	VT-VSPA1-1
		digital		VT-VSPD-1	VT-VSPD-1	VT-VSPD-1
		modular design		VT 11131	VT 11131	VT 11030

Detailed information:
– Sizes 10 and 25:
RE 29160
– Size 32: RE 29142



Proportional pressure relief valves, pilot operated

- Sizes 6 and 10
- – Size 6: Porting pattern to ISO 4401
  – Size 10: Porting pattern to ISO 5781-AG-06-2-A
- Vavle for limiting a system pressure
- Integrated control electronics (OBE) for type DBEBE
- Proportional solenoid operation
- Adjustable through position specification of the solenoid armature

Detailed information:
Size 6
– Type DBE6X: RE 29156
– Type DBEBE6X: RE 29159

Size 10
– Type DBE10Z: RE 29140
– Type DBEB10Z: RE 29141
– Type DBEBE10Z: RE 29163

Type DBE

Size					**6**	**6**
Type					DBE6X	DBEBE6X
Operating pressure	– Port P	p_{max}	bar		315	315
	– Port T	p_{max}	bar		250	250
Flow		$q_{V\,max}$	l/min		40	40
Maximum hysteresis			%		≤ 4	≤ 1

Size				**10**	**10**	**10**
Type				DBE10Z	DBEB10Z	DBEBE10Z
Operating pressure	– Port P	p_{max}	bar	315	315	315
	– Port T	p_{max}	bar	2	2	2
Flow		$q_{V\,max}$	l/min	120	120	120
Maximum hysteresis			%	≤ 5	≤ 1	≤ 1

Proportional pressure relief valves, pilot operated (high performance)

- Size 3
- Pilot operated valves for limiting a system pressure
- Proportional solenoid operation
- Proportional solenoid with central thread and detachable coil
- Screw-in cartridge valve
- Fine-balancing of command value/pressure characteristic curve externally on the control electronics
- In the event of a power failure, the minimum set ("A") or maximum ("B") pressure is obtained.

Detailed information:
– Version "A":
RE 18139-08
– Version "B":
RE 18139-07

Type KBVS

Frame size				**3**
Component series				A
Operating pressure		p_{max}	bar	350
Flow		$q_{V\,max}$	l/min	200
Maximum hysteresis			%	< 6
Step response	0 to 100 %	T_u+T_g	ms	100
	100 to 0 %	T_u+T_g	ms	100
Operating voltage		U	V	24
Comm. value signal		U	V	0 to + 10
Control electronics		Plug-in amplifier		VT-SSPA1

Proportional pressure reducing valves, direct operated

- Size 6
- Porting pattern to DIN 24340 form A and ISO 4401
- Valve for reducing a system pressure
- Proportional solenoid operation
- For subplate mounting
- Integrated control electronics (OBE) for type 3DREPE

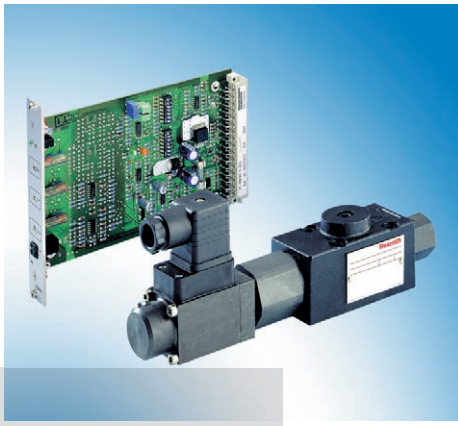
Types 3DREP and 3DREPE

Size				**6**
Operating pressure		p_{max}	bar	100
Flow		$q_{V\,max}$	l/min	15
Maximum hysteresis			%	5
Operating voltage		U	V	24
Comm. value signals		U	V	±10
		I	mA	4 to 20
Control electronics	Type 3DREP	analog.		VT-VSPA2-5.
		digital		VT-VSPD1
		modular design		VT 11118

Detailed information:
RE 29184

Proportional pressure reducing valves, pilot operated

- Sizes 6 and 10
- Porting pattern to DIN 24340 form A and ISO 4401
- Valve for reducing a system pressure
- Proportional solenoid operation
- For subplate mounting, type DRE 6
- Sandwich plate version, types ZDRE 6 and 10
- Linearized pressure/command value characteristic curve
- Integrated control electronics (OBE) for type ZDREE 10



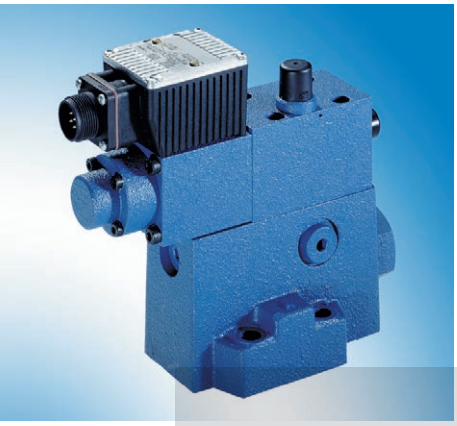
Types (Z)DRE and ZDREE 10

Size			**6**	**10** [1]
Operating pressure	p_{max}	bar	210	315
Flow	$q_{V\,max}$	l/min	30	80
Maximum hysteresis		%	±2	±1.5
Operating voltage	U	V	24	22 to 33
Comm. value signal	U	V	–	0 to 10
Control electronics	analog.		VT-VSPA1(K)-1	VT-VSPA1(K)-1
	digital		VT-VSPD-1	VT-VSPD-1
	modular design		VT 11132	VT 11131

Detailed information:
– Size 6: RE 29175
– Size 10: RE 29179

[1] available only in sandwich plate design

Proportional pressure reducing valves, pilot operated



- Sizes 10 to 32
- Porting pattern to DIN 24340 form D
- Valve for reducing a system pressure
- Proportional solenoid operation
- For subplate mounting
- Linearized pressure/command value characteristic curve
- Maximum pressure relief function with types DREM and DREME
- Optional check valve between ports A and B
- Integrated control electronics (OBE) for types DREE and DREME

Detailed information:
– Sizes 10 and 25: RE 29176
– Size 32: RE 29178

Types DRE(M) and DRE(M)E

Size				**10**	**25**	**32**
Operating pressure		p_{max}	bar	315	315	315
Flow		$q_{V\,max}$	l/min	200	300	300
Maximum hysteresis			%	±2.5	±2.5	±2.5
Operating voltage		U	V	24	24	24
Comm. value signal	Type DRE(M)E	U	V	0 to 10	0 to 10	0 to 10
Control electronics	Type DRE(M)	analog.		VT-VSPA1(K)	VT-VSPA1(K)	VT-VSPA1(K)
		digital		VT-VSPD-1	VT-VSPD-1	VT-VSPD-1
		modular design		VT 11724	VT 11724	VT 11030

Proportional pressure reducing valves, pilot operated

- Sizes 6 and 10
- – Size 6: Porting pattern to ISO 4401
  – Size 10: Porting pattern to ISO 5781-AG-06-2-A
- Vavle for reducing a system pressure
- Proportional solenoid operation
- Adjustable through position specification of the solenoid armature
- Integrated control electronics (OBE) for type DREBE

Detailed information:
Size 6
– Type DRE6X: RE 29177
– Type DREB6X: RE 29182
– Type DREBE6X: RE 29195

Size 10
– Type DRE10Z: RE 29197
– Type DREB10Z: RE 29198
– Type DREBE10Z: RE 29199

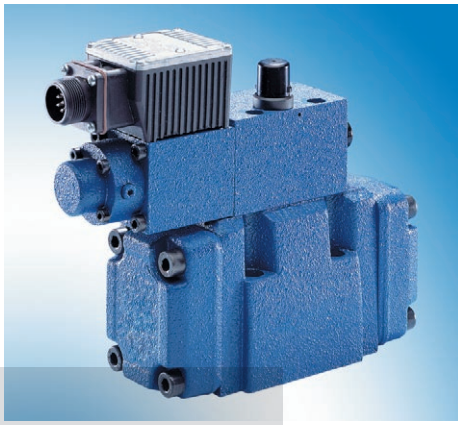
Type DRE

Size				**6**	**6**	**6**
Type				DRE6X	DREB6X	DREBE6X
Operating pressure	– Port P	p_{max}	bar	315	315	315
	– Port T	p_{max}	bar	250	250	250
Flow		$q_{V\,max}$	l/min	40	40	40
Maximum hysteresis			%	≤ 4	≤ 1	≤ 1

Size				**10**	**10**	**10**
Type				DRE10Z	DREB10Z	DREBE10Z
Operating pressure	– Port P	p_{max}	bar	315	315	315
	– Port T	p_{max}	bar	2	2	2
Flow		$q_{V\,max}$	l/min	120	120	120
Maximum hysteresis			%	≤ 5	≤ 1	≤ 1

Proportional pressure reducing valves, pilot operated

- Sizes 10 and 16
- Porting pattern to DIN 24340 form A and ISO 4401
- Valve for reducing a system pressure
- Proportional solenoid operation
- For subplate mounting
- Integrated control electronics (OBE) for type 3DREE and 3DREME



Types 3DRE(M) and 3DRE(M)E

Size				10	16
Operating pressure		p_{max}	bar	315	315
Flow	$\Delta p = 10$ bar	$q_{V\ nom}$	l/min	125	300
Maximum hysteresis			%	±2	±2
Operating voltage		U	V	24	24
Comm. value signal	Type 3DRE(M)E	U	V	0 to 10	0 to 10
Control electronics	Type 3DRE(M)	analog.		VT-VSPA1(K) and VT 11131	
		digital		VT-VSPD-1	VT-VSPD-1

Detailed information:
RE 29186

Proportional pressure reducing valves, pilot controlled, with direct current motor operation

- Size 6
- Porting pattern to ISO 4401
- Valve for reducing a system pressure with pressure relief function
- Direct current motor operation
- For subplate mounting
- As sandwich plate valve
- Integrated pressure monitoring, optional

Types DRS and ZDRS

Size				6
Operating pressure	– Port P	p_{max}	bar	210
Flow		$q_{V\ nom}$	l/min	30
Maximum hysteresis			%	≤ 2
Actuating time	0 to 100 %		ms	500

Detailed information:
RE 29173

Proportional throttle valves, pilot operated

- Size 16
- Inst. dimensions to DIN ISO 7368-BA-06-2-A
- 2-way version as cartridge valve
- Orifice spool position is electrically position controlled
- Integrated control electronics (OBE) for type FEE
- Flow direction from A to B

Types FE and FEE

Detailed information:
RE 29202

Size				**16**
Operating pressure	– Port P	p_{max}	bar	315
Flow		$q_{V\,max}$	l/min	190
Maximum hysteresis			%	≤ 0.2
Operating voltage		U	V	24
Comm. value signal	With OBE	U	V	0 to 10
		I	mA	4 to 20

Proportional throttle valves, pilot operated

- Sizes 25 to 63
- Installation dimensions to DIN ISO 7365
- 2-way version as cartridge valve
- Proportional solenoid operation
- Can be used for pressure-compensated closed-loop flow control in conjunction with a pressure compensator
- Excellent dynamics and hysteresis, leak-free isolation
- Orifice spool position is electrically position controlled
- Integrated control electronics (OBE) for type FESE
- Flow characteristics optionally linear or progressive
- Flow in both directions possible

Types FES and FESE

Detailed information:
RE 29209

Size				**25**	**32**	**40**	**50**	**63**
Operating pressure		p_{max}	bar	315	315	315	315	315
Flow	$\Delta p = 10$ bar	$q_{V\,max}$	l/min	360	480	680	1400	1800
Maximum response sensitivity			%	0.10	0.10	0.10	0.10	0.10
Maximum range of inversion			%	0.15	0.15	0.15	0.15	0.15
Step response	0 to 100 %	T_u+T_g	ms	50	80	100	200	400
	100 to 0 %	T_u+T_g	ms	70	120	160	250	500
Operating voltage		U	V	24	24	24	24	24
Comm. value signal	With OBE	U	V	0 to 10	0 to 10	0 to 10	0 to 10	0 to 10
		I	mA	4 to 20	4 to 20	4 to 20	4 to 20	4 to 20
Control electronics	Type FES	analog.		VT-VRPA1-50, VT-VRPA1-51, VT-VRPA1-52				
		modular design		VT 11037				

Proportional flow control valves, direct operated, 2-way version

- Sizes 6 to 16
- Porting pattern:
  – Size 6: to DIN 24340 form A and ISO 4401
  – Sizes 10 and 16: to DIN 24340 form G
- Proportional solenoid operation
- Valve with pressure compensator for pressure-compensated controlling of a flow
- Metering orifice closed-loop position controlled using an inductive position transducer
- Flow control in both directions through rectifier sandwich plate
- Operating voltage of proportional solenoids 24 V

Type 2FRE

Size				6	10	16
Operating pressure		p_{max}	bar	210	315	315
Flow	$\Delta p = 8$ bar	$q_{V\,max}$	l/min	60	100	160
Maximum hysteresis			%	±1	±1	±1
Step response	0 to 100 %	T_u+T_g	ms	60	90	130
	100 to 0 %	T_u+T_g	ms	70	100	90
Control electronics		analog.		VT 5010	VT5004	VT5004
		modular design		VT 11033	VT 11034	VT 11034

Detailed information:
– Size 6: RE 29188
– Sizes 10 and 16: RE 29190

Proportional flow control valves, direct operated

- Sizes 6 and 10
- Porting pattern to ISO 4401
- With or without position transducer
- Integrated control electronics (OBE) for type 3FREEZ

Types 3(2)FRE. and 3FREEZ

Size				6	10
Operating pressure	– Port P	p_{max}	bar	250	250
Flow		$q_{V\,max}$	l/min	35	80
Maximum hysteresis			%	≤ 1	≤ 1
Actuating time	0 to 100 %		ms	25	35

Detailed information:
– Type FREX: RE 29219
– Type FREZ: RE 29220
Type FREEZ: RE 29221

High-response directional valves, direct operated, with electrical position feedback

- Sizes 6 and 10
- Porting pattern to DIN 24340 form A and ISO 4401
- Control of the direction and magnitude of a flow
- Use for closed-loop control of position, velocity and pressure
- Actuation through control solenoid
- Position sensing of the control spool via an inductive position transducer
- Integrated control electronics (OBE) for type 4WRPEH
- Characteristic curves with and without inflection

Types 4WRPH and 4WRPEH

Detailed information:
Size 6
– Type 4WRPH: RE 29028
– Type 4WRPEH: RE 29035

Size 10
– Type 4WRPH: RE 29032
– Type 4WRPEH: RE 29037

Variant with OBE-D2
on inquiry

Size				**6**	**10**
Operating pressure		p_{max}	bar	315	315
Nominal flow	(Δp = 70 bar)	$q_{V\,nom}$	l/min	2 to 40	50 to 100
Maximum hysteresis			%	< 0.2	< 0.2
Frequency	at -90 ° phase response	f	Hz	120	60
Operating voltage		U_{nom}	V	24	24
Comm. value signal		U	V	±10	±10
		I	mA	4 … 12 … 20	4 to 20
Control electronics		Circuit board		RE 30040 and 30041	RE 30040 and 30041

High-response directional valves, direct operated, with electrical position feedback

- Size 10
- Porting pattern to DIN 24340 form A and ISO 4401
- Control of flow P – A / A – T
- Application for closed-loop velocity and pressure controls
- Actuation through control solenoid
- Position sensing of the control spool via an inductive position transducer
- Integrated control electronics (OBE) for type 5WRPE
- Linear characteristic curve

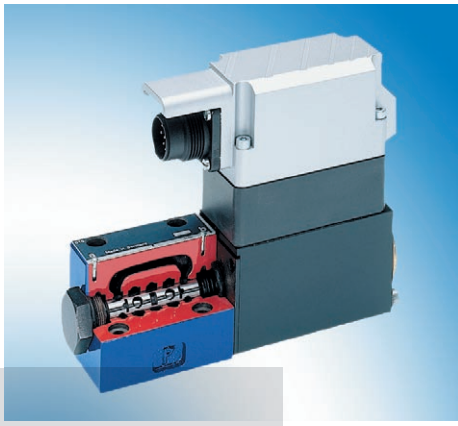
Types 5WRP and 5WRPE

Detailed information:
– Type 5WRP: RE 29043
– Type 5WRPE: RE 29045

Size				**10**
Operating pressure		p_{max}	bar	210
Nominal flow	(Δp = 11 bar)	$q_{V\,nom}$	l/min	70/70
Maximum hysteresis			%	< 0.3
Frequency	at -90 ° phase response	f	Hz	70
Operating voltage		U_{nom}	V	24
Comm. value signal		U	V	±10
Control electronics		Circuit board		RE 30041

High-response directional valves, direct operated, with electrical position feedback

- Size 6
- Porting pattern to DIN 24340 form A and ISO 4401
- Control of the direction and magnitude of a flow
- Use for closed-loop controls with high dynamics
- Actuation through double-stroke control solenoid
- Position sensing of the control spool via an inductive position transducer
- Integrated control electronics (OBE)
- Characteristic curves with and without inflection



Type 4WRREH

Size				**6**
Operating pressure		p_{max}	bar	315
Nominal flow	($\Delta p = 70$ bar)	$q_{V\ nom}$	l/min	8 to 40
Maximum hysteresis			%	< 0.2
Frequency	at -90 ° phase response	f	Hz	250
Operating voltage		U_{nom}	V	24
Comm. value signal		U	V	±10

Detailed information:
RE 29041

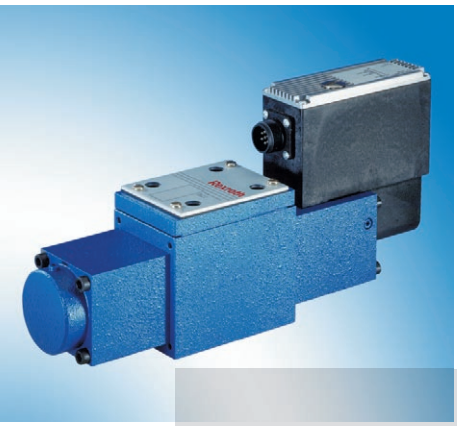
High-response directional valves, direct operated, with electrical position feedback

- Sizes 6 and 10
- Porting pattern to DIN ISO 4401 (type 4WRP, size 10 with additional port L)
- Positive overlap
- Integrated control electronics (OBE) for type 4WRPE
- Spool and sleeve in servo quality with type 4WRPH
- Use for electrohydraulic controls

Types 4WRP, 4WRPE and 4WRP(E)H

Size				**6**	**10**
Operating pressure	– Ports P, A, B	p_{max}	bar	315	315
Flow		$q_{V\ max}$	l/min	40	100
Maximum hysteresis			%	≤ 0.2	≤ 0.2
Actuating time	0 to 100 %		ms	12	25

Detailed information:
- Type 4WRP:
  RE 29020 and RE 29022
- Type 4WRPE:
  RE 29024 and RE 29025
- Type 4WRPH:
  RE 29026, RE 29030 and RE 29032
- Type 4WRPEH10:
  RE 29037



High-response directional valves, direct operated, with integrated control electronics (OBE)

- Sizes 6 and 10
- Porting pattern to DIN 24340 form A and ISO 4401
- Suitable for position and velocity control
- Integrated control electronics (OBE) with interfaces of ±10 V and 4 to 20 mA
- Spool and sleeve in servo quality with type 4WRSEH

Types 4WRSE and 4WRSEH

Detailed information:
– Type 4WRSE: RE 29067
– Type 4WRSEH: RE 29069

Size				6	10
Operating pressure	– Ports P, A, B	p_{max}	bar	315	315
Flow		$q_{V\,max}$	l/min	80	180
Maximum hysteresis			%	≤ 0.05	≤ 0.05

High-response directional valve with integrated axis controller and field bus interface

- Sizes 6 and 10
- Integrate digital axis control functionality (IAC-R) for:
  - Volume flow control
  - Position control
  - Pressure control
  - p/Q function
  - Alternating position/pressure and position/force controls
  - NC functionality
- Analog and digital interfaces for command and actual values
  - 4 x analog sensors (±10 V or 4 to 20 mA) or
  - 1 x length measuring system (1Vss or SSI) and 2 analog sensors
- Field bus connection
  - CAN bus with CANopen protocol DS408
  - Profibus-DP V0/V1
- Quick start-up via PC and start-up software

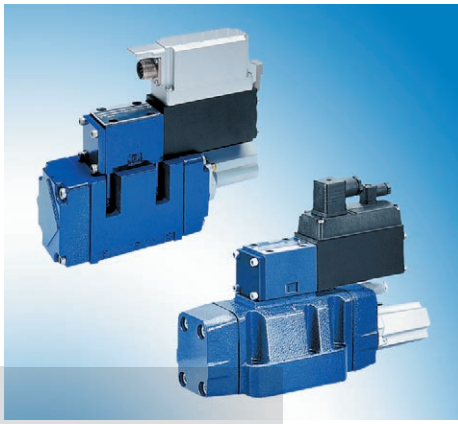
Type 4WRPNH

Detailed information:
RE 29191

Size				6	10
Operating pressure	– Ports P, A, B	p_{max}	bar	315	315
Flow		$q_{V\,max}$	l/min	40	100
Maximum hysteresis			%	≤ 0.2	≤ 0.2
Actuating time	0 to 100 %		ms	10	25

High-response directional valves, pilot operated, with electrical position feedback

- Sizes 10 to 35
- Porting pattern to DIN 24340 form A and ISO 4401
- Control of the direction and magnitude of a flow
- Use for closed-loop control of force, position, velocity and pressure
- RV-PL pilot control valve
- Pilot control valve and main stage are closed-loop position-controlled
- Modular system with different valve symbols
- Integrated control electronics (OBE) for type 4WRLE
- Characteristic curves with and without inflection



Types 4WRL and 4WRLE

Size				10	16	25	35 [2]
Operating pressure		p_{max}	bar	350	350	350	350
Nominal flow	(Δp = 10 bar)	$q_{V\,nom}$	l/min	55, 80	120, 200	370	1000
Maximum hysteresis [1]			%	0.1	0.1	0.1	0.1
Frequency	at -90 ° phase response	f	Hz	45	45	50	20
Operating voltage		U_{nom}	V	24	24	24	24
Comm. value signal	standard with OBE	U	V	±10	±10	±10	±10
		I	mA	4 to 20	4 to 20	4 to 20	4 to 20
Control electronics		Circuit board		RE 30043, RE 30044, RE 30045			

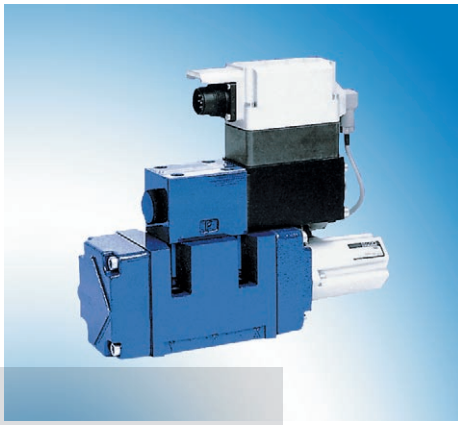
Detailed information:
– Type 4WRL:
RE 29086 and RE 29087
– Type 4WRLE:
RE 29088 and RE 29089

Variant with OBE-D2 on inquiry

[1] at 100 bar
[2] mounting cavity Ø50

High-response directional valves, pilot operated, with electrical position feedback

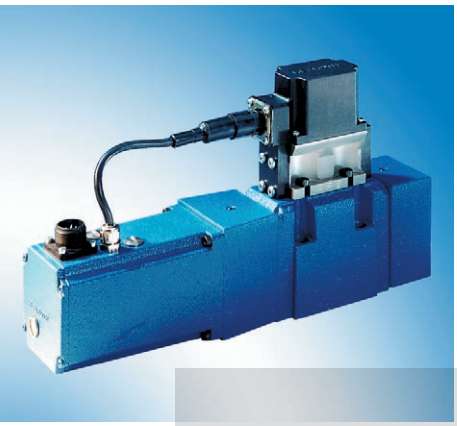
- Sizes 10 to 25
- Porting pattern to DIN 24340 form A and ISO 4401
- Control of the direction and magnitude of a flow
- Use for closed-loop controls with high dynamics
- RV-HRV pilot control valve
- Modular system with different valve symbols
- Integrated control electronics (OBE)
- Characteristic curves with and without inflection



Type 4WRVE

Size				10	16	25
Operating pressure		p_{max}	bar	350	350	350
Nominal flow	(Δp = 10 bar)	$q_{V\,nom}$	l/min	55, 80	120, 200	370
Maximum hysteresis			%	0.1	0.1	0.1
Frequency	at -90 ° phase response	f	Hz	100	100	55
Operating voltage		U_{nom}	V	24	24	24
Comm. value signal		U	V	±10	±10	±10

Detailed information:
RE 29077



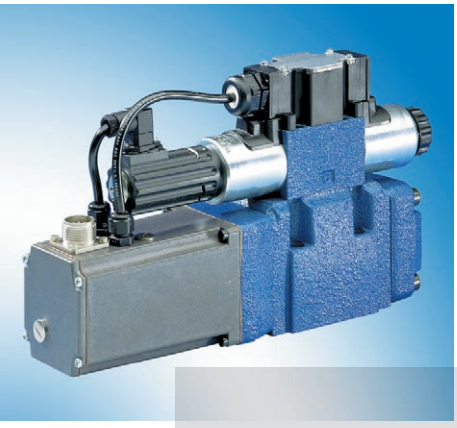
High-response directional valves, pilot operated, with electrical position feedback

- Sizes 10 to 25
- Porting pattern to DIN 24340 form A
- Control of the direction and magnitude of a flow
- Suitable for closed-loop controlling of force, position, velocity and pressure
- Pilot control via a 3-way high-response valve with position feedback
- Self-centering of the main stage
- Position sensing of the main spool via an inductive position transducer
- Integrated control electronics (OBE)

Type 4WRGE

Detailed information:
RE 29070

Size				10	16	25
Operating pressure		p_{max}	bar	315	350	350
Nominal flow	(Δp = 10 bar)	$q_{V\ nom}$	l/min	50, 100	125, 200	250, 350
Maximum hysteresis			%	0.1	0.1	0.1
Frequency	at -90 ° phase response		Hz	100	65	60
Operating voltage		U	V	24	24	24
		I	mA	3	3	3
Comm. value signal		U	V	±10	±10	±10
		I	mA	±10	±10	±10



High-response directional valves, pilot operated, with electrical position feedback

- Sizes 10 to 35
- Porting pattern to ISO 4401
- Suitable for closed-loop control of position, velocity, pressure and force
- Integrated control electronics (OBE)

Type 4WRTE

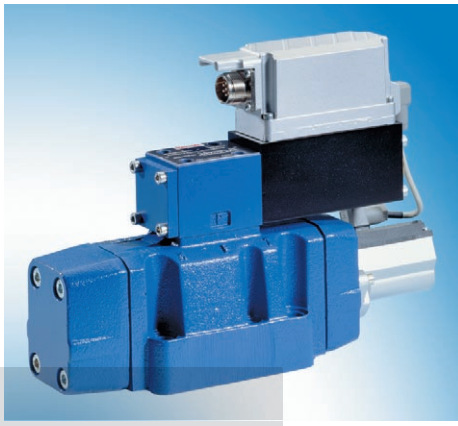
Detailed information:
RE 29083

Size				10	16	25
Operating pressure	– Ports P, A, B	p_{max}	bar	315	350	350
Flow		$q_{V\ max}$	l/min	170	460	870
Maximum hysteresis			%	≤ 0.1	≤ 0.1	≤ 0.1

Size				27	32	35
Operating pressure	– Ports P, A, B	p_{max}	bar	210	350	350
Flow		$q_{V\ max}$	l/min	1000	1600	3000
Maximum hysteresis			%	≤ 0.1	≤ 0.1	≤ 0.1

High-response directional valves, pilot operated, with electrical position feedback

- Sizes 10 to 25
- Porting pattern to ISO 4401
- Main stage in servo quality
- Flow characteristics
  – Progressive and fine-control edge ("M")
  – Inflected characteristic curve ("P")
- Integrated control electronics (OBE) with type 4WRLE



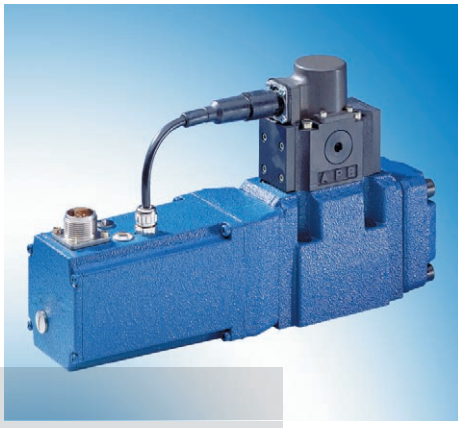
Types 4WRL and 4WRLE

Size				10	16	25
Operating pressure	– Ports P, A, B	p_{max}	bar	350	350	350
Flow		$q_{V\,max}$	l/min	170	450	900
Maximum hysteresis			%	≤ 0.1	≤ 0.1	≤ 0.1
Actuating time	0 to 100 %		ms	25	40	45

Detailed information:
– Type 4WRL: RE 29084
– Type 4WRLE: RE 29088 and RE 29089

High-response directional valves, pilot operated, with electrical position feedback

- Sizes 10 to 32
- Porting pattern to ISO 4401
- Control of the direction and magnitude of a flow
- Suitable for closed-loop controlling of force, position, velocity and pressure
- Pilot control via a 2-stage servo-valve (size 6)
- Position sensing of the main spool via an inductive position transducer
- Integrated control electronics (OBE)



Type 4WRDE

Size				10	16	25	27	32
Operating pressure	– Port P [1]	p_{max}	bar	250	250	250	250	250
	– Port P [2]	p_{max}	bar	315	350	350	350	350
	– Port X [2]	p_{max}	bar	250	250	250	250	250
Nominal flow	(Δp = 10 bar)	$q_{V\,nom}$	l/min	50, 100	125, 200	220, 350, 500	500	600
Maximum hysteresis			%	0.2	0.2	0.2	0.2	0.2
Frequency	at -90 ° phase response		Hz	150	140	130	130	90
Operating voltage		U	V	24	24	24	24	24
Comm. value signal		U	V	±10	±10	±10	±10	±10

Detailed information:
RE 29093

[1] internal control oil
[2] external control oil

High-response directional valves (block installation), pilot operated, with integrated control electronics (OBE) and electrical position feedback

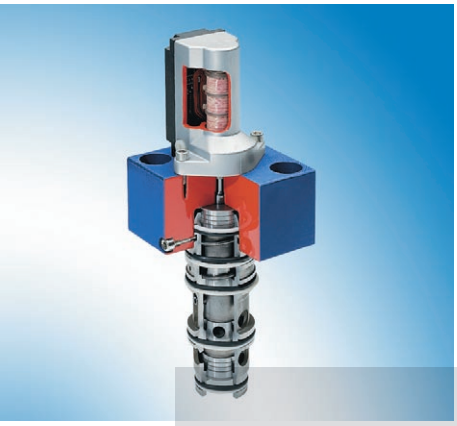
- Sizes 32 to 50
- Component series 2X
- Installation dimensions to DIN ISO 7368 (type 2WRCE)
- Suitable for closed-loop controlling of position, velocity and pressure
- Controlling via proportional valve
- Robust build
- Position sensing of the control spool via an inductive position transducer
- Sizes 63 and 80 on inquiry

Types 2WRCE…/P and 3WRCE…/P

Detailed information: RE 29137

Component series 3X in preparation (ports A / P exchanged)

Size				32	40	50
Operating pressure	2-way	p_{max}	bar	420	420	420
	3-way	p_{max}	bar	315	315	315
Nominal flow ($\Delta p = 5$ bar)	2-way	$q_{V\,nom}$	l/min	650	1000	1600
	3-way	$q_{V\,nom}$	l/min	290	460	720
Maximum hysteresis			%	< 0.2	< 0.2	< 0.2
Repeatability			%	0.2	0.2	0.2
Comm. value signal	Type 2WRCE	U	V	0 to 10	0 to 10	0 to 10
	Type 3WRCE	U	V	±10	±10	±10
Control electronics	Type .WRC			VT-SR31	VT-SR32	VT-SR33



High-response directional valves (block installation), pilot operated, with electrical position feedback

- Sizes 25 to 50
- Component series 1X
- For block installation, 3/2-way symbol, control edges P–A / A–T
- Control slide with anti-rotation feature and control edges in servo quality
- Pressure-proof up to 315 bar
- Control line A–X required in general
- Dynamic return (B–Z) is possible with size 25 and size 50
- With inductive position transducer, position-controlled through the external pilot control valve and the valve electronics
- Pilot control valve on control bock allocated externally
- Hysteresis < 0.1 %
- Flow characteristics progressive with fine control edge

Type 3WRCBH

Detailed information: RE 29217

Type 3WRCBEE, component series 1X in preparation (pilot control valve mounted to lid)

Size				25	32	50
Operating pressure	– Ports P, A, T, X, Z	p_{max}	bar	315	315	315
Flow		$q_{V\,max}$	l/min	190	380	750
Maximum hysteresis			%	≤ 0.1	≤ 0.1	≤ 0.1
Actuating time	0 to 100 %		ms	33	28	60

High-response directional valves (block installation), pilot operated, with electrical position feedback

- Sizes 32 to 160
- Installation dimensions to DIN ISO 7368 (type 2WRC)
- Suitable for closed-loop controlling of position, velocity and pressure
- Controlling via servo-valve
- Very short switching times, low hysteresis
- Position sensing of the control spool via an inductive position transducer
- With or without integrated control electronics (OBE)

Types 2WRC(E)…/S and 3WRC(E)…/S

Size				**32**	**40**	**50**	**63**
Operating pressure	2-way	p_{max}	bar	420	420	420	420
	3-way	p_{max}	bar	315	315	315	315
Nominal flow ($\Delta p = 5$ bar)	2-way	$q_{V\ nom}$	l/min	650	1000	1600	2800
	3-way	$q_{V\ nom}$	l/min	290	460	720	1250
Maximum hysteresis			%	< 0.2	< 0.2	< 0.2	< 0.2
Repeatability			%	0.2	0.2	0.2	0.2
Control electronics	Type .WRC			VT-SR31	VT-SR32	VT-SR33	VT-SR34

Size				**80**	**100**	**125**	**160**
Operating pressure	2-way	p_{max}	bar	420	420	420	420
	3-way	p_{max}	bar	315	315	315	315
Nominal flow ($\Delta p = 5$ bar)	2-way	$q_{V\ nom}$	l/min	4350	7200	11500	18000
	3-way	$q_{V\ nom}$	l/min	2000	3000	4500	7500
Maximum hysteresis			%	< 0.2	< 0.2	< 0.2	< 0.2
Repeatability			%	0.2	0.2	0.2	0.2
Control electronics	Type .WRC			VT-SR35	VT-SR36	VT-SR37	VT-SR38

Detailed information:
– Sizes 32 to 50, component series 2X: RE 29136
– Sizes 63 to 160, component series1X: RE 29135

2-stage directional servo-valves, mechanical and electrical feedback

- Sizes 6, 10 and 16
- Porting pattern to DIN 24340 form A
- Control of the direction and magnitude of a flow
- Suitable for closed-loop controlling of force, position, velocity and pressure
- 1st stage nozzle/flapper plate amplifier
- Dry torque motor
- Wear-free connection of the spool to feedback element
- Position sensing of the main spool via an inductive position transducer for valves with electrical feedback (size 10)
- Integrated control electronics (OBE) for type 4WSE2E.

Type 4WS.2E.

Detailed information:
– Size 6: RE 29564
– Size 10: RE 29583
– Size 16: RE 29591

Size				6	10	16
Operating pressure		p_{max}	bar	315	315	315
Nominal flow	(Δp = 70 bar)	$q_{V\ nom}$	l/min	2, 5, 10, 15, 20, 25	20, 30, 45, 60, 75, 90	100, 150, 200
Maximum hysteresis			%	1.5 [1]	1.5	1.5
Corner frequency	-90 ° (±25 %; 315 bar)		Hz	250	180	95
Operating voltage	Type 4WS2E.	*U*	V	±15	±15	±15
Comm. value signal	Type 4WSE2E.	*U*	V	±10	±10	±10
		I	mA	±10	±10	±10
Control electronics [2]	Type 4WS2E.	analog.		VT-SR2	VT-SR2	VT-SR2
		modular design		VT 11021	VT 11021	

[1] 210 bar
[2] depending on coil or feedback

3-stage directional servo-valves, electrical feedback

- Sizes 16 to 32
- Porting pattern to DIN 24340 form A
- Control of the direction and magnitude of a flow
- Suitable for closed-loop controlling of force, position, velocity and pressure
- High response sensitivity, very low hysteresis and zero point drift
- Position sensing of the main spool via an inductive position transducer
- Integrated control electronics (OBE)

Type 4WSE3EE

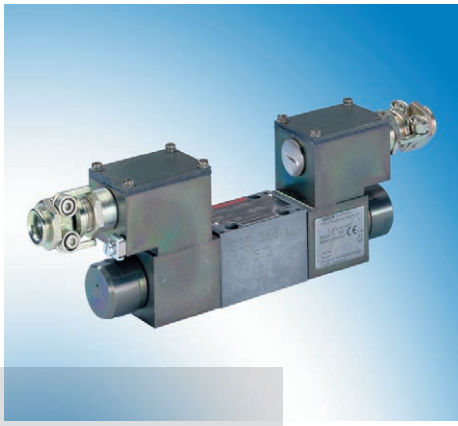
Detailed information:
RE 29595

Size				16	25	32
Operating pressure		p_{max}	bar	315	315	315
Nominal flow	(Δp = 70 bar)	$q_{V\ nom}$	l/min	100, 150, 200, 300	300, 400, 500	500, 700, 1000
Maximum hysteresis			%	0.2	0.2	0.2
Corner frequency	-90 ° (±25 %; 315 bar)		Hz	250	180	75
Operating voltage		*U*	V	±15	±15	±15
Comm. value signal		*U*	V	±10	±10	±10
		I	mA	±10	±10	±10

4/2- and 4/3-proportional directional valve, direct controlled, without electrical position feedback

- Size 6
- Component series 2X
- Maximum operating pressure 315 bar
- Maximum flow 22 l/min
- Application according to Explosion Protection Directive 94/9/EC

Special features with seawater-proof valves:
- External metal parts are galvanized and chromated in olive-green.



Type 4WRA…XEJ

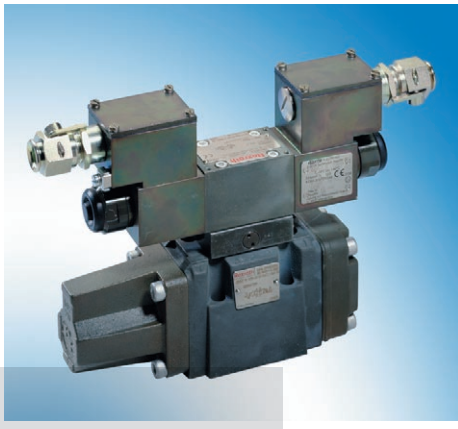
Applications according to Directive 94/9/EC			Solenoid type of protection to EN 50019/50028	
Component group	Category to ATEX	Fields of application		
II	2G	Gases, mist, vapors	EEx em IIT4	Increased safety

Detailed information:
RE 29055-Z-XE-B2

4/2- and 4/3-proportional directional valve, pilot controlled, without electrical position feedback

- Sizes 10, 16, 25 and 32
- Component series 7X
- Maximum operating pressure 350 bar
- Maximum flow 1600 l/min
- Application according to Explosion Protection Directive 94/9/EC

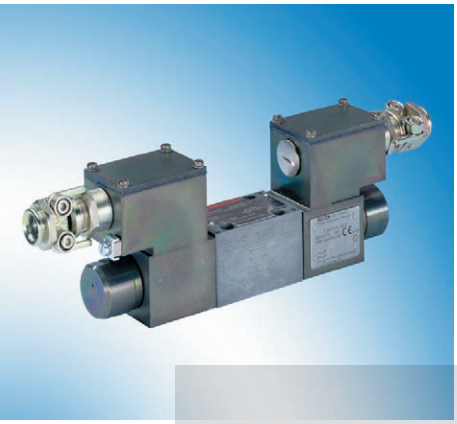
Special features with seawater-proof valves:
- External metal parts are galvanized and chromated in olive-green.



Type 4WRZ…XE

Applications according to Directive 94/9/EC			Solenoid type of protection to EN 50019/50028	
Component group	Category to ATEX	Fields of application		
II	2G	Gases, mist, vapors	EEx em IIT4	Increased safety

Detailed information:
RE 29115-Z-XE-B2



Proportional pressure reducing valve, 3-way version

- Size 6
- Component series 2X
- Maximum operating pressure 100 bar
- Maximum flow 15 l/min
- Application according to Explosion Protection Directive 94/9/EC

Special features with seawater-proof valves:

- External metal parts are galvanized or treated with corrosion protection.

Type 3DREP…XE

Detailed information:
RE 29184-Z-XE-B2

Applications according to Directive 94/9/EC			Solenoid type of protection to EN 50019/50028	
Component group	Category to ATEX	Fields of application		
II	2G	Gases, mist, vapors	EEx em IIT4	Increased safety

Servo-valve in 4-way design

- Size 6
- Component series 2X
- Maximum operating pressure 210/315 bar
- Maximum flow 48 l/min
- Application according to Explosion Protection Directive 94/9/EC

Type 4WS2EM…XN

Detailed information:
RE 29564-XN-B2

Applications according to Directive 94/9/EC			Type of protection non-igniting acc. to	
Component group	Category to ATEX	Fields of application	EN 50014/50021	EN 50281-1-1
II	3G	Gases, mist, vapors	EEx nA II T4	–
II	3D	Dusts	–	IP 65 T100 °C

Servo-valve in 4-way design

- Size 10
- Component series 5X
- Maximum operating pressure 315 bar
- Maximum flow 180 l/min
- Application according to Explosion Protection Directive 94/9/EC
- Ambient temperature range –30 °C to +70 °C

Type 4WS2EM…XN

Applications according to Directive 94/9/EC			Type of protection non-igniting acc. to	
Component group	Category to ATEX	Fields of application	EN 50014/50021	EN 50281-1-1
II	3G	Gases, mist, vapors	EEx nA II T4	–
II	3D	Dusts	–	IP 65 T100 °C

Detailed information:
RE 29583-XN-B2

Servo-valve in 4-way design

- Size 10
- Component series 5X
- Maximum operating pressure 315 bar
- Maximum flow 180 l/min
- Application according to Explosion Protection Directive 94/9/EC
- Use on FM approval in the U.S. "VH1"
- Ambient temperature range –20 °C to 60 °C

Type 4WS2EM…XH

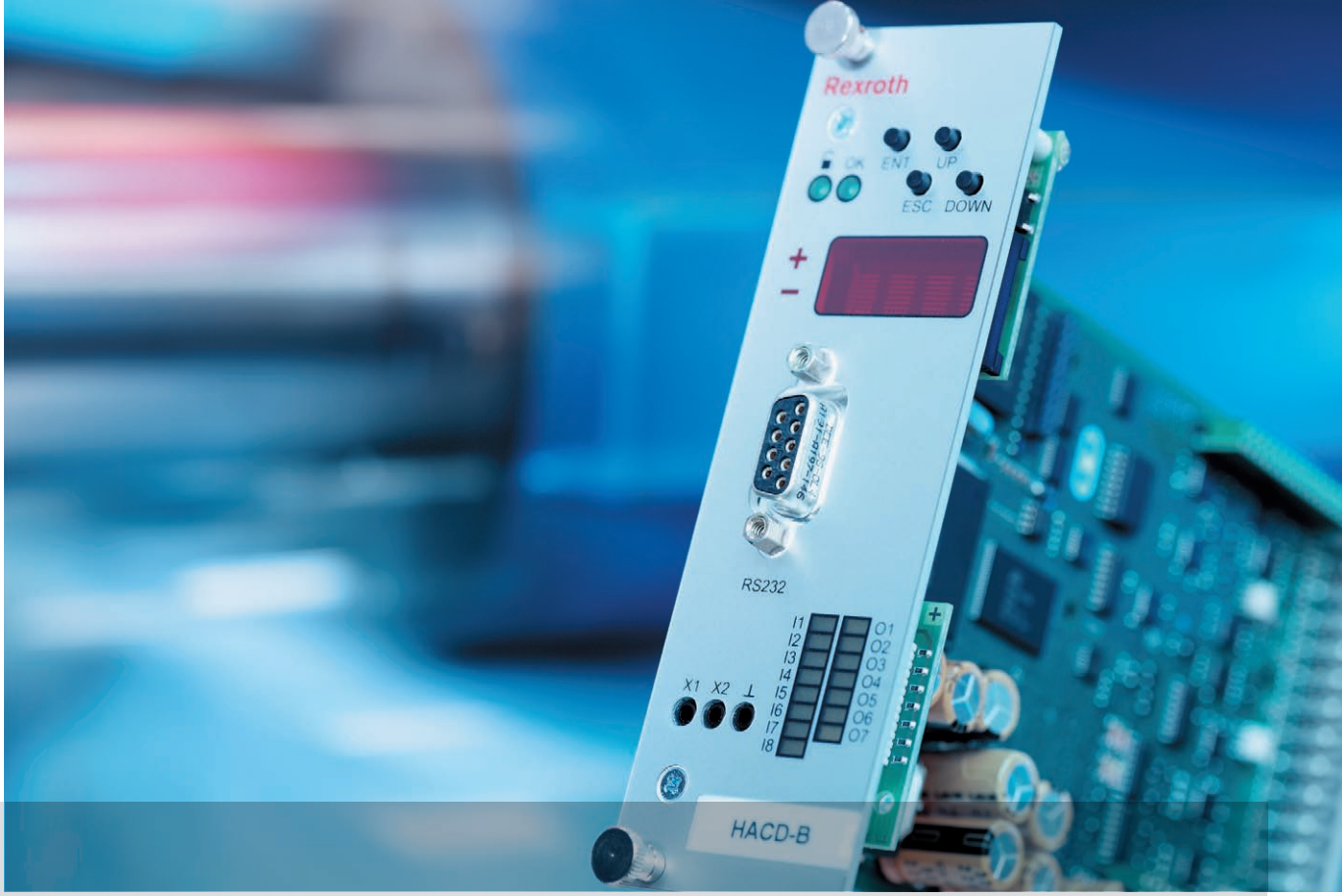
Applications according to Directive 94/9/EC			Type of protection to EN 50014/50020	
Component group	Category to ATEX	Fields of application		
II	1G	Gases, mist, vapors	EEx ia IICT4	Intrinsically safe

Detailed information:
RE 29583-XH-B2

Type 4WS2EM…VH1

Fields of application acc. to NEC			Type of protection acc. to NEC 505	
Component group	Zone	Fields of application		
IS Class 1	0	Gases, mist, vapors	FM 3610	AEx ia IIC T4
NI Class 1	2		FM 3611	

Detailed information:
RA 29583-VH1-B1



Electronics

Adjusted to the particular valve system, the appropriate amplifier cards in Eurocard format or modular design are available for implementing controlled or closed-loop controlled drives.

Rexroth provides a unique, complete and scalable portfolio of digital control electronics and motion controllers ranging from 1-axis controllers to high-performance multi-axis controls. The latter can be used to combine almost any number of axes with each other through cross-communication.

The integrated software covers the physical special features of the hydraulic system and allows startup, parameterization and diagnostics without requiring profound knowledge on hydraulics. Depending on the particular case, the electronics used may external or integrated.

Performance profile

- Analog and digital valve amplifiers for proportional, high-response and servo-valves
- Command value conditioning for generating, linking and normalizing signals
- Closed-loop controlling and controlling electronics for machine axes to be controlled in a closed loop
- Sensors and signal encoders

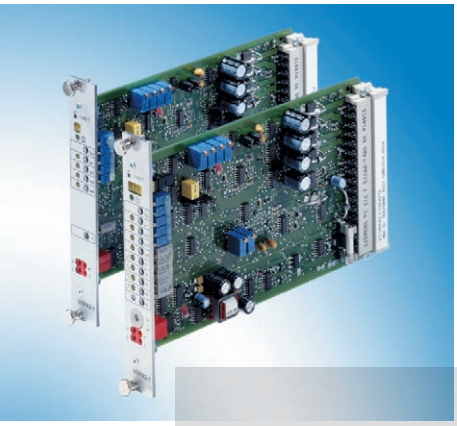
Performance profile

- Electronic accessories
  - Card holders and racks
  - Power supply technology
  - Test and servicing devices
- Electrohydraulic systems
  - Closed-loop control systems with axial piston pumps as complete units comprising pump and electronics
  - Customer-specific solutions in control and automation technology

Accessories product range

- Card holders and racks
- Power supply technology
- Command value cards and modules
- Test and servicing devices
- Signal encoders

Amplifiers for proportional valves without electrical position feedback



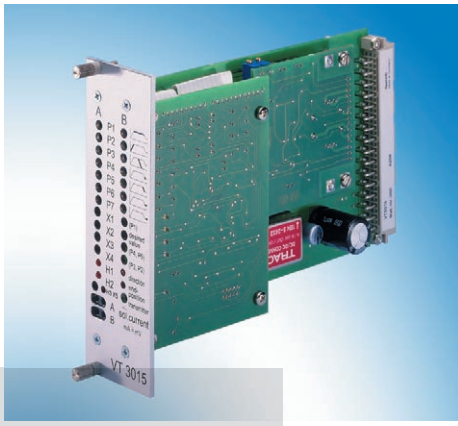
- Analog amplifiers in Eurocard format
- Voltage stabilization, partially with raised measuring zero point, filter capacitor on the amplifier card
- Differential input, can be changed over to current input (on some versions)
- Internal command value adjustment by means of 4 trimming potentiometers, call-up via relays, with LED indicator lamp (on some versions)
- Ramp generator that can be switched off
- 5 ramp times, adjustable by means of trimming potentiometers (on some versions)
- Step function for quickly passing through overlaps of directional valves
- Clocked output amplifier with current regulation
- Enable input (on some versions)
- Message "ready for operation" (on some versions)

Technical data			
Operating voltage	U_B	VDC	24
– Upper limit value	$U_B(t)^{max}$	V	35
– Lower limit value	$U_B(t)_{min}$	V	22
Output amplifier			Current-regulated, clocked
Type of connection			32- or 48-pin male connector, DIN 41612, form D
Card dimensions		mm	Eurocard 100 x 160, DIN 41494
Ambient temperature range	ϑ	°C	0 to +50
Storage temperature range	ϑ	°C	–25 to +85

Detailed information:	**Amplifier type**	**Suitable for valve type**
RE 29904	VT-2000-5X	For proportional pressure control valves
RE 30110	VT-VSPA2-1-2X	4WRA, sizes 6 and 10 (component series 2X); WRZ (component series 7X)
RE 30111	VT-VSPA1-1-1X	For proportional pressure control valves
RE 30115	VT-VSPA1-2-1X	DBET (component series 6X)

Analog amplifier

- Position-dependent braking with proportional directional valves
- Only analog position signals can be processed
- Controlled output stages
- Voltage stabilization
- Potentiometer for command value specification
- Relay for calling up command values
- Ramp generator
- Maximum value weighting unit, summing unit
- LED lamps indicating changes in direction and end position

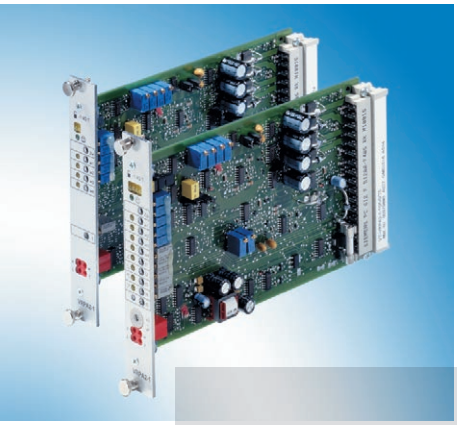


VT 3015

Technical data			
Operating voltage	U_B	VDC	24
– Upper limit value	$U_B(t)_{max}$	V	39
– Lower limit value	$U_B(t)_{min}$	V	22
Command value	U	V	0 to 15
Position signal	U	V	0 to −10
Output amplifier			Current-regulated, clocked
Type of connection			32-pin male connector, DIN 41612, form D
Ambient temperature range	ϑ	°C	0 to +50
Storage temperature range	ϑ	°C	−25 to +85

Amplifier type	**Suitable for valve type**	Detailed information:
VT 3015	WRZ, WRA	RE 29892

Amplifiers for proportional valves with electrical position feedback



- Analog amplifiers in Eurocard format
- Voltage stabilization, partially with raised measuring zero point, filter capacitor on the amplifier card
- Differential input
- Internal command value adjustment by means of 4 trimming potentiometers, call-up via relays, with LED indicator lamp (on some versions)
- Ramp generator that can be switched off
- 5 ramp times, adjustable by means of trimming potentiometers (on some versions)
- Step function for quickly passing through overlaps of directional valves
- Oscillator/demodulator for inductive position feedback
- PID-controller for controlling the control spool position
- Cable break detection with LED indicator lamp for position transducer; in the event of a cable break, the output amplifier is de-energized
- Clocked output amplifier with current regulation

Technical data			
Operating voltage	U_B	VDC	24
– Upper limit value	$U_B(t)_{max}$	V	35
– Lower limit value	$U_B(t)_{min}$	V	22
Oscillator frequency	f	kHz	approx. 2.5
Output amplifier			Current-regulated, clocked
Type of connection			32- or 48-pin male connector, DIN 41612, form D
Card dimensions		mm	Eurocard 100 x 160, DIN 41494
Ambient temperature range	ϑ	°C	0 to +50
Storage temperature range	ϑ	°C	–20 to +70

Detailed information:	**Amplifier type**	**Suitable for valve type**
RE 30117	VT-VRPA1-50 to 52	FE, sizes 16 and 25; FES, sizes 25 to 63
RE 30118	VT-VRPA1-100	DBETR; 2FRE
RE 30119	VT-VRPA2-1	4WRE 6 (component series 2X)
RE 30119	VT-VRPA2-2	4WRE 10 (component series 2X)

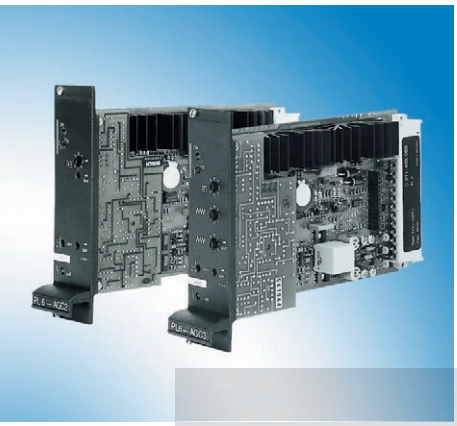
Amplifiers for proportional valves for adjusting the flow of axial piston pumps

- Analog amplifiers in Eurocard format
- Voltage stabilization with raised measuring zero point, filter capacitor on the amplifier card
- Differential input
- Internal command value adjustment by means of 4 trimming potentiometers, call-up via relays, on some versions LED indicator lamp
- Ramp generator
- Ramp times can be adjusted by means of trimming potentiometers (on some versions separately for up/down)
- Oscillator/demodulator for inductive transducer (on some versions)
- PID-controller for controlling the swivel angle (on some versions)
- Cable break detection with LED indicator lamp for swivel angle transducer; in the event of a cable break, the output amplifier is de-energized (on some versions)
- Clocked output amplifier with current regulation

Technical data			
Operating voltage	U_B	VDC	24; +40 %; –5 %
– Upper limit value	$U_B(t)_{max}$	V	35
– Lower limit value	$U_B(t)_{min}$	V	22
Oscillator frequency	f	kHz	approx. 2.5
Output amplifier			Current-regulated, short-circuit-proof
Type of connection			32-pin male connector, DIN 41612, form D
Card dimensions		mm	Eurocard 100 x 160, DIN 41494
Ambient temperature range	ϑ	°C	0 to +50
Storage temperature range	ϑ	°C	–20 to +70

Amplifier type	Suitable for pump type	Detailed information:
VT 5035	A4VSO	RE 29955
VT 5041	A10VSO…DFE1	RE 30241

Amplifiers for high-response valves



- Analog amplifiers in Eurocard format
- Controlled output stage
- Enable input
- Short-circuit-proof outputs
- Adjustment options: Valve zero point
- Cable break detection for actual value cable
- Area adjustment of single-rod cylinders (on some versions) [1)]
- Gain in the small signal range (on some versions) [1)]
- Closed-loop position control with PID-characteristics

Technical data			
Operating voltage	U_B	VDC	Nominal 24 (21 to 40)
Type of connection			Plug to DIN 41612-F32
Card dimensions		mm	Eurocard 100 x 160 with front panel 7TE
Ambient temperature range	ϑ	°C	0 to +70
Storage temperature range	ϑ	°C	–20 to +70

Detailed information:	**Amplifier type**	**Suitable for valve type**
RE 30041	VT-VRRA1-527-2X/V0	4WRPH 6 … L-2X
RE 30041	VT-VRRA1-537-2X/V0	4WRPH 10 … L-2X
RE 30041	VT-VRPA1-537-1X/V0	5WRP 10 … L-2X
RE 30040	VT-VRRA1-527-2X/V0/K40-AGC [1)]	4WRPH 6 … P-2X
RE 30040	VT-VRRA1-527-2X/V0/K60-AGC [1)]	4WRPH 6 … P-2X
RE 30040	VT-VRRA1-537-2X/V0/K40-AGC [1)]	4WRPH 10 … P-2X
RE 30043	VT-VRRA1-527-2X/V0/K40-AGC-2STV [1)]	4WRL … P-3X
RE 30044	VT-VRPA1-527-2X/V0/RTS-2TV	4WRL … M-3X
RE 30045	VT-VRRA1-527-2X/V0/2STV	4WRL … M-3X; 3WRCB, sizes 25 to 50
RE 30046	VT-VRRA1-527-2X/V0/KV-AGC [1)]	4WRPH 6 … P-2X
RE 30046	VT-VRRA1-537-2X/V0/KV-AGC [1)]	4WRPH 10 … P-2X
RE 30052	VT-VRPA1-5	DBETFX; DBEB…; DREB6X; 4WRP; 3FREZ
RE 30054	VT-VRPA1-5…RTP	
RE 30056	VT-VRPA1-5…RTS	

Amplifiers for servo-valves

- Analog amplifiers in Eurocard format
- Symmetric voltage regulator (optional)
- PD-controller for controlling the valve spool position (on some versions)
- PID-controller for free component placement (optional)
- PID-controller for controlling the swivel angle, always provided for pump controls
- Oscillator/demodulator for inductive feedback (on some versions)
- Output amplifier with current regulation and dither generator

Technical data			
Operating voltage	U_B	V	±22 to ±28, smoothed
Oscillator frequency	*f*	kHz	approx. 2.5 / 5
Output amplifier			Current-regulated
Type of connection			32-pin male connector, DIN 41612, form D
Output current	*I*	mA	±60 / ±100
Jitter signal	*f*	Hz	340 (ISS = 3 mA)
Card dimensions		mm	Eurocard 100 x 160, DIN 41494
Ambient temperature range	ϑ	°C	0 to +50
Storage temperature range	ϑ	°C	–20 to +70

Amplifier type	**Suitable for valve type/pump type**	Detailed information:
VT-SR1	4WS2EE 10	RE 29979
VT-SR2	4WS2EM, sizes 6 to 16	RE 29980
	4WS2EB 10	
	4DS1EO 2	
	3DS2EH 10	
VT-SR7	A4VS..HS	RE 29993

Digital amplifiers for proportional valves with electrical position feedback

- Digital amplifiers in Eurocard format
- Presetting of all parameters for the following valves: 4WRE, sizes 6 and 10 (component series 2X)
- Use of a high-capacity microcontroller
- Analog command value input as voltage or current input
- Variable amplification and offset correction for command value input
- Ramp generator
- Optional sequence control and overlap compensation
- Digital inputs for calling up preset command value parameters
- Enable input and disturbance output
- Switching power supply unit for internal supply voltages
- Function indicators by means of LEDs; test sockets for command and actual values
- Standardized pin connector assignment
- Configuration, parameterization and diagnostics via serial interface

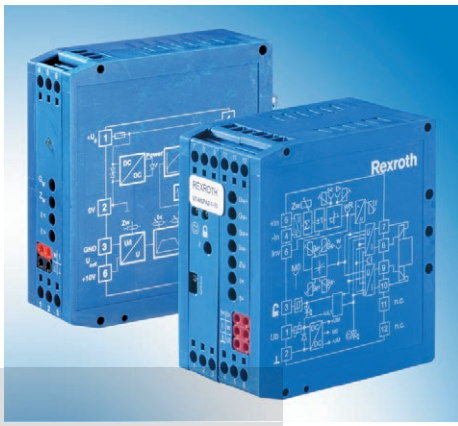
Type VT-VRPD-2

Technical data			
Operating voltage	U_B	VDC	24
– Upper limit value	$U_B(t)_{max}$	V	35
– Lower limit value	$U_B(t)_{min}$	V	21
Current consumption	I_{max}	A	1.5
Digital inputs	U	V	log 0 = 0 to 5; log 1 = 15 to U_B –3 V
Analog inputs (R_e = 100 Ω)	U	V	±10
	I	mA	4 to 20
Oscillator frequency	f	kHz	5.7
Scanning time	T	ms	2
Type of connection			64-pin male connector, DIN 41612, form G
Serial interface			RS 232
Card dimensions		mm	Eurocard 100 x 160, DIN 41494
Operating temperature range	ϑ	°C	0 to +50
Storage temperature range	ϑ	°C	–20 to +70

Detailed information:	**Type of electronics**	**Suitable for valve type**
RE 30126	VT-VRPD-2	4WRE

Analog amplifiers in modular design

- Compact amplifiers in plastic housing for snapping onto top-hat rails to EN 60715
- DC-DC converters for internal voltage supply; a filter capacitor must be externally connected in the supply cable (on some versions)
- Differential input
- Ramp generator (on some versions)
- Step function for quickly passing through overlaps of directional valves
- Oscillator/demodulator for inductive position feedback (on some versions)
- PI-controller for controlling the control spool position (on some versions)
- Clocked output amplifier with current regulation



Technical data				
Operating voltage	U_B	V	12	24
– Upper limit value	$U_B(t)_{max}$	V	16	35
– Lower limit value	$U_B(t)_{min}$	V	10.5	21 .5
Command value	U	V	±10	
Output amplifier			Current-regulated, clocked	
Type of connection			Screw terminals	
Module dimensions		mm	79 x 85.5 (height x depth)	
Ambient temperature range	ϑ	°C	0 to +50	
Storage temperature range	ϑ	°C	–20 to +70	

Amplifier type	**Suitable for valve type**	Detailed information:
VT 11011 and VT 11012	For proportional directional and pressure valves without electrical position feedback	RE 29737
VT 11131 and VT 11132	For proportional pressure valves without electrical position feedback	RE 29865
VT 11550 to VT 11554	DRE 4 K (+3WE 4)	RE 29870
VT 11724	For proportional pressure reducing valves without electrical position feedback	RE 29866
VT-MRPA2-1	4WRE 6 (component series 2X)	RE 30219
VT-MRPA2-2	4WRE 10 (component series 2X)	RE 30219
VT-MSPA1-1	DBET; KBPS	RE 30223
VT-MSPA2	4WRA (component series 2X)	RE 30228
VT 11004; VT 11015; VT 11026	DRE 4 K	RE 30226
VT 11019	For pumps A10VSO...FE	RE 29763

Plug-in proportional amplifier

- Analog amplifier in plug-in design for controlling of proportional valves
- Differential input with optional current input
- Integrated ramp generator
- Proportional command value / current characteristic curve

VT-SSPA1

Technical data					
Type			VT-SSPA1-525 / VT-SSPA1-508	VT-SSPA1-5 / VT-SSPA1-100	VT-SSPA1-1 / VT-SSPA1-50
Operating voltage	U_B	VDC	10.2 to 31	24 (12)	24
Command value	U	V	0 to 10	0 to 10 (0 to 5)	0 to 10
	I	mA	4 to 20	4 to 20	4 to 20
Output amplifier			Current-regulated, clocked		
Type of connection			Screw terminals		
Ambient temperature range	ϑ	°C	–20 to +70	–25 to +85	–25 to +85
Storage temperature range	ϑ	°C	–20 to +70	–25 to +85	–25 to +85

Detailed information:	Amplifier type	Suitable for valve type
RE 30264	VT-SSPA1-525…	DBETX–…–25; DBE6X–…–25; DRE6X–…–25; DBE10Z–…–25; DRE10Z–…–25; 2FREX6; 2FREX10; 3FREX6; 3FREX10; 4WRBA..EA
RE 30264	VT-SSPA1-508…	DBETX–…–8; DBE6X–…–8; DRE6X–…–8; DBE10Z–…–8; DRE10Z–…–8
RE 30116	VT-SSPA1-5	KBPS…8
RE 30116	VT-SSPA1-100	KKDSR
RE 30265	VT-SSPA1-1	DBET-6X
RE 30265	VT-SSPA1-50	Universal

Analog command value conditioning

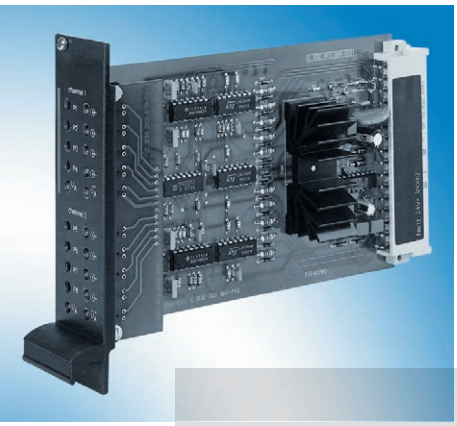
- Analog command value card for controlling amplifiers or valves with integrated electronics
- Generating, linking and normalizing command value signals
- Configuration and parameterization of the command value card using potentiometers
- Inversion of the internal command value signal via 24V input or by means of jumpers
- Ramp functions (on some versions)
- Characteristic curve correction through separately adjustable step-change heights and maximum values
- Special features: inversion, ramp time selection through calls or quadrant detection, characteristic curve correction

Type VT-SWKA-1

Technical data				
Operating voltage		U_B	VDC	24
– Upper limit value		$U_B(t)_{max}$	V	35
– Lower limit value		$U_B(t)_{min}$	V	18
4 retrievable command value inputs		U_e	V	0 to ± 10
2 command value inputs	– Differential input	U_e	V	0 to ± 10
	– Current input	I_e	mA	4 to 20
2 outputs	– Voltage output	U	V	0 to ± 10
	– Current output	I	mA	4 to 20
Type of connection				64-pin male connector, DIN 41612, form G
Ambient temperature range		ϑ	°C	0 to +50
Storage temperature range		ϑ	°C	–25 to +80

Amplifier type	Detailed information:
VT-SWKA-1	RE 30255

Analog command value conditioning



- Analog command value cards for controlling proportional amplifiers
- Generating, linking and normalizing command value signals
- Configuration and parameterization of the command value card using potentiometers
- Inversion of the internal command value signal via 24V input (on some versions)
- Ramp functions (on some versions)
- Special features:
  – Type VT-SWKA-1-5: Interconnection for 1 x 8 internal command values, inversion
  – Type VT-SWKA-3-5: Selection of internal or external ramp control, quadrant detection

Type VT-SWKA-1-5

Technical data			
Operating voltage	U_B	VDC	24 (21 to 40)
2 x 4 internal retrievable com. values	U	V	0 to ±10
2 x 1 command value input	U	V	0 to ±10
2 x 1 voltage output	U	V	0 to ±10
Type of connection			32-pin male connector, DIN 41612, form F
Ambient temperature range	ϑ	°C	0 to +70
Storage temperature range	ϑ	°C	–20 to +70

Type VT-SWKA-3-5

Technical data			
Operating voltage	U_B	VDC	24 (21 to 40)
4 internal retrievable com. values	U	V	0 to ±10
1 command value input	U	V	0 to ±10 (of which 1 is a differential input)
1 voltage output	U	V	0 to ±10
Type of connection			32-pin male connector, DIN 41612, form F
Ambient temperature range	ϑ	°C	0 to +70
Storage temperature range	ϑ	°C	–20 to +70

Detailed information:	**Amplifier type**
RE 30282	VT-SWKA-1-5
RE 30281	VT-SWKA-3-5

Analog command value conditioning

- For controlling valves with integrated electronics
- Possibility of digital controls for the implementation of simple hydraulic functions
- Differential input
- Actuating signal output
- Power supply unit without raised zero point
- Without power part

Types VT-SWMA-1 and VT-SWMAK-1

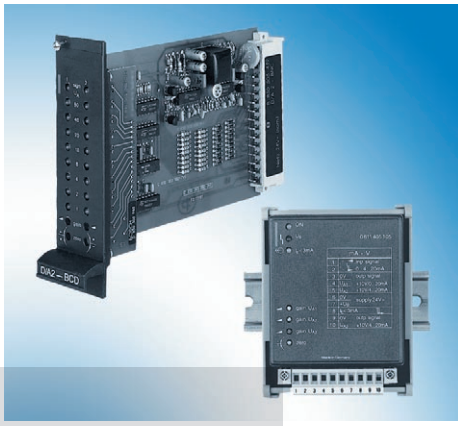
Technical data			
Operating voltage	U_B	VDC	±24
Command value	U	V	±10
Output signal (control variable)	U	V	0 to ±10
Type of connection			Screw terminals
Module dimensions		mm	79 x 85.5 (height x depth)
Ambient temperature range	ϑ	°C	0 to +50
Storage temperature range	ϑ	°C	–20 to +70

Detailed information:
– Command value module VT-SWMA-1: RE 29902

– Command value module VT-SWMAK-1: RE 29903

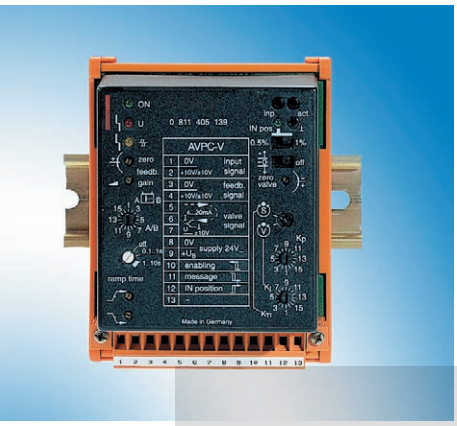
Signal converters

- Modules and electronic printed circuit boards for converting current into voltage signals or digital into analog signals



Technical data		Detailed information:
I/U2-U/I1	Input signal 0 to 20 mA or 4 to 20 mA; output signal 0 to 10 V or 0 to ±10 V or vice versa	1987761327 Chapter 4
VT-SWMA1-5	Module, input signal 0 to 20 mA or 4 to 20 mA; output signal 0 to 10 V or 0 to ±10 V	RE 30284
D/A2-BCD	Input signal BCD (2 digits); output signal 0 to ± 10 V (2 channels)	1987761327 Chapter 4
VT-SWMA2-5	Command value signal adjustment for valves with integrated electronics. Inflection adjustment; adjustment for single-rod cylinders. Input signal 0 to 20 mA; 4 to 20 mA; 0 to ±10 V	RE 30283

Analog position and velocity controllers – modular design



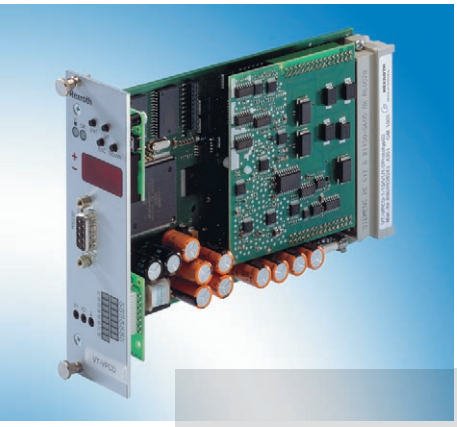
- Controlling of 0 to 10/±10 V and 4 to 20 mA valves
- Enable input
- Cable break detection for actual value cable
- Short-circuit-proof interfaces
- Test points on front panel
- Compensation jump can be switched off
- Position: PT1-control
- Velocity: PI-control
- Area matching of cylinders
- Controlling in V or I version

VT-MACAS

Technical data			
Operating voltage	U_B	VDC	24 (21 to 40 V smoothed)
Type of connection			13-pin screw terminals
Card dimensions		mm	86 x 110 x 95
Ambient temperature range	ϑ	°C	0 to +70
Storage temperature range	ϑ	°C	–20 to +70

Detailed information:	Amplifier type	Suitable for valve type
RE 30050	VT-MACAS-500-1X/V0/	Without valve amplifier, 0 to 10 V/±10 V controlling
	VT-MACAS-500-1X/V0/I	Without valve amplifier, 4 to 20 mA controlling

Freely configurable command value and controller cards



- Digital assemblies in Eurocard format
- Use as command value card for generating, linking and normalizing signals
- Use as controller card for 2 closed control loops (VT-HACD-1) with PIDT1 controller and state feedback
- Alternating control possible (e.g. position control with superimposed pressure control)
- Special control algorithms for hydraulic drives
- Digital SSI position measuring system or incremental
- 6 analog inputs, voltage (±10 V, 0 to 10 V) and current (0 to 20 mA; 4 to 20 mA) can be changed over via software
- Versatile options of logic signal operations and changeover
- Possibility of sequence control through block call-ups with command values, ramp times and controller parameters
- Front display with keys for displaying and changing parameters as well as for diagnostic purposes
- PC software BODAC for configuration, parameterization and diagnostics
- Online diagnostic function
- Integrated "online manual"
- Field bus systems: Profibus

Type VT-HACD

Detailed information:	Type of electronics	
RE 30143	VT-HACD1	Command value and controller card for one closed control loop

Digital positioning card for position-dependent braking

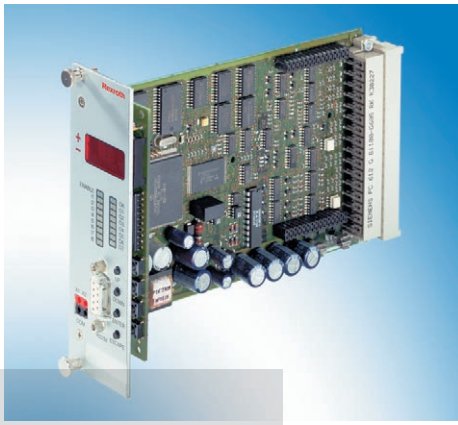
- Digital assemblies in Eurocard format
- Position-dependent braking of a hydraulic axis
- Braking characteristics linear or root-shaped, adjustable
- Traversing profile separately adjustable for A to B and B to A
- Adjustable start-up ramp with rounding option (S-components)
- Setup mode
- Digital SSI position measuring system
- Analog inputs, voltage (±10 V, 0 to 10 V) and current (0 to 20 mA; 4 to 20 mA) can be changed over via software
- Special control algorithms for hydraulic drives
- Front display with keys for displaying and changing parameters as well as for diagnostic purposes
- PC software BODAC for configuration, parameterization and diagnostics SYS-HACD-BODAC-01
- Online diagnostic function
- Integrated "online manual"

Type VT-HACD-B

Type of electronics		Detailed information:
VT-HACD-B	Digital positioning card for position-dependent braking	RE 30144

Digital injection control electronics

- Digital closed-loop control electronics in Eurocard format
- Open or closed-loop controlling of the injection process / closing axis
  - Injection control with superimposed pressure control / locking the form
  - Pack-and-hold pressure / building up the locking force
  - Backpressure / holding the locking force
  - Worm withdrawal / opening the form
- Command value specification
  - Analog
  - Command value profile
- Sensor interfaces
  - Analog
  - Absolute position measuring system SSI
  - PC software BODAC for configuration, parameterization and diagnostics
- Online diagnostic function
- Integrated "online manual"



Types VT-HACD-DPQ and VT-HACD-DPC

Type of electronics	Suitable for	Detailed information:
VT-HACD-DPQ	Injection process	RE 30146
VT-HACD-DPC	Closing axis	RE 30147

Digital multi-axis NC control

- Control of 2 to 32 electrohydraulic or electromechanical axes, programmable as desired
- Interconnectable to further MAC8 units via local Ethernet
- Communication with the higher-order control via Profibus-DP®, CAN or Ethernet
- Special hydraulic control characteristics and PLC functionality for independent control of machines or machine parts
- Various process connection options
- User programming with PC
- Fields of application:
  - Presses
  - Materials handling
  - Steelwork and rolling mill technology
  - Testing technology
  - Special machines

Detailed information:
RE 30156

Type VT-MAC8

Technical data			
Operating voltage	U_B	VDC	24 (18 to 36)
Position measuring system	Incremental or absolute (SSI)		
	U	V	±10
	I	mA	4 to 20; ±10; ±20
Control variable	*U*	V	±10
	I	mA	4 to 20; ±10; ±20
Ambient temperature range	ϑ	°C	0 to +50
Storage temperature range	ϑ	°C	–20 to +70

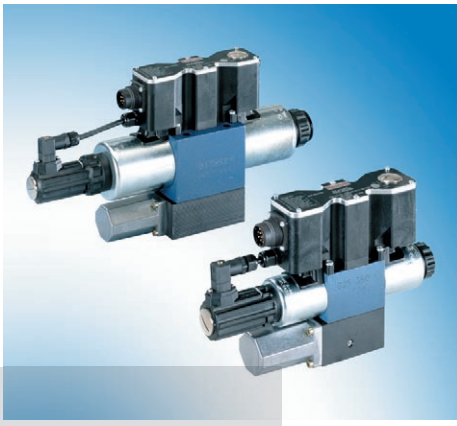
Programming and system integration as programmable NC control	
Programming:	– User programming with PC
	– Comprehensive diagnostic and debugging tools
	– Comfortable data management on a PC
	– High-level-language-oriented
	– 32 NC programs can be executed at the same time
	– High execution speed owing to compiled programs
	– Quick integer and real arithmetics
	– Exponential and angle functions
Process connection	32 digital inputs, 24 digital outputs, Profibus-DP®, CANopen, TCP-IP
Connection / visualization	– by means of "OPC server"
	– by means of "Active X" elements
	– Interfaces: RS 485 or Ethernet
Control	– Following controller
	– State controller
	– Position-related braking
	– Synchronization controller for up to 32 axes (various versions)
	– Pressure / force controller

IAC integrated axis controllers - decentralized intelligence in hydraulic valves

- Integrated axis controller functionality such as pressure, volume, force, position and alternating control
- Complete product series on the basis of proportional and high-response valves
- Special open and closed-loop control algorithms for hydraulic drives
- Parameterization/configuration of IAC from a PC (PC commissioning tool) or from a higher-level control
- Controller adjustment possible during operation
- Compact, pre-tested assemblies on the basis of proportional and high-response valves
- Reduced assembly and commissioning effort
- Standardized connection technology
- Interfacing with higher-level control via standard field bus systems
- Command value specirfication optionally analog or via field bus
- Comprehensive diagnostic functions

Integrated axis controllers IAC-P on the basis of proportional valves

- Based on the 4WRE... proportional valves (sizes 6 and 10)
- pQ function, closed-loop force and flow control (electronic pressure compensator)
- Connection of external analog sensors
- Optional: 1 to 4 miniature pressure sensors integrated in special sandwich plate
- Command value specirfication optionally analog or via field bus
- For CANopen and Profibus-DP



Type 4WREQ

Detailed information:
RE 29050

Integrated axis controllers IAC-R on the basis of high-response valves

- Based on 4WRPEH high-response valves (sizes 6 and 10)
- pQ function, closed-loop control of force, position and alternating position/pressure and position/force control
- NC functionality
- Connection of up to 4 analog sensors
- Connection of an incremental (1Vss) or absolute (SSI) position measuring system
- Command value specirfication optionally analog or via field bus
- For CANopen and Profibus-DP

Type 4WRPNH

Detailed information:
– Type 4WRPNH: RE 29191

Pressure transducers

- For measuring steady-state or dynamic pressures and for converting the measured signals into electrical signals
- Sensor in thin-film technology
- Integrated voltage regulator with reverse polarity and overvoltage protection
- Measuring amplifier with voltage or current output
- Various plug-in variants

Types HM 17 and HM 18

Detailed information:
– Type HM 17: RE 30269
– Type HM 18: RE 30271

Technical data			HM 17	HM 18
Operating voltage	U_B	V	19 to 36	14 to 28
Accuracy class			0.5	0.5
Output signal (alternative)	*U*	V	0 to 5; 0.1 to 10	0 to 5; 0 to 10; 1 to 6
	I	mA	4 to 20	4 to 20
Pressure range	*p*	bar	50 to 600	60 to 350
Operating temperature range	ϑ	°C	–10 to +80	–10 to +80

Programmable electronic pressure switches

- Suitable for measuring pressures and converting the measured values into electrical signal variables and displaying them
- Programming options (hysteresis/window; make-contact/break-contact; pick-up, drop-out delay; display unit; two switching outputs or one analog and one switching output
- 4-digit alphanumerical display
- Due to EMC also suitable for critical applications
- Sensor ceramic/capacitive
- 4-pin M12 plug-in connector on housing
- G 1/4 connection thread

Type HEDE 10

Detailed information:
– Type HEDE10/1/: RE 30276
– Type HEDE10/2/: RE 30278

Technical data			
Operating voltage	U_B	V	18 to 36
Accuracy class			1.0
Switching output	*I*	mA	250 (current carrying capacity)
Output signal	*U*	VDC	0 to 10
	I	mA	4 to 20
Pressure range	*p*	bar	100 to 600
Medium temperature range	ϑ	°C	–20 to +80

Electronic signal encoders

- Manually operated command value encoders for controlling valves and pumps via valve amplifier modules or cards
- Sensitive controls due to low operating forces
- Integrated impedance converters for load-independent linearization of characteristic curves
- Reverse polarity protection
- Replaceable bellows
- Options:
  - Deadman contact
  - Direction and zeroing contacts
  - Spring centering or locking in any position by means of friction brake

Types VT 10468, VT 10406 and VT 10399

Technical data – pressure transducer				
Operating voltage		U_B	VDC	±15
Output signal		*U*	V	±10
		I	mA	5
Switching contacts		*U*	VDC	30
		I	A	max. 2
Operating force	– VT 10468	*F*	N	approx. 6 to 10
	– VT 10406	*F*	N	approx. 7 to 16
	– VT 10399	*F*	N	approx. 7 to 16
Ambient temperature range		ϑ	°C	–25 to +70

Type of electronics		Detailed information:
VT 10468	1 control axis	RE 29753
VT 10406	2 control axes	RE 29754
VT 10399	3 control axes	RE 29755

Command value encoders

- Modules and potentiometers

Detailed information:
- Type VT-SWMA4-5: RE 30285
- Type VT-SWMA5-5: RE 30287

Racks and card holders

- 19" racks for accommodating electronic assemblies in Eurocard format
- Universal housing for 2 or 4 printed circuit boards in Eurocard format DIN 41612
  - External connection using screw assemblies
  - Contact load of connections up to 4 A
  - Slots that are not required can be covered by dummy plates
- Card holders for the installation of electronic assemblies in Eurocard format (single and double)
- Separate power supply

Detailed information:	**Technical data**	
1987761327 Chapter 2	Universal housing	DIN 41612
	Type of electronics	
RE 29768	VT 19101	Rack 1 x 3HE for 100 x 160 mm cards, with or without connector backpanel
RE 29768	VT 19102	Rack 2 x 3HE for 100 x 160 mm cards, with or without connector backpanel
RE 29768	VT 19103	Rack 3 x 3HE for 100 x 160 mm cards, with or without connector backpanel
RE 29768	VT 19110	Bus rack 3HE for 100 x 160 mm or 100 x 220 mm cards
RE 30105	VT 10812	Connection adapter with 32-, 48- or 64-pin socket connector for VT 19101 to VT 19103 without connector backpanel
RE 29928	VT 3002	Open card holder with 32-, 48- or 64-pin socket connector
RE 30103	VT 12302	Enclosed card holder with 64-pin socket connector

Power supply and stabilizing units

- Smoothed or regulated output voltages
- Stabilization of smoothed voltages

Detailed information:	**Type of electronics**		
RE 29929	VT-NE30	Input voltage: Output voltage:	115/230 VAC +26 VDC/4.0 A
RE 29929	VT-NE31	Input voltage: Output voltage:	115/230 VAC ±24 VDC/2 x 0.25 A
RE 29929	VT-NE 32	Input voltage: Output voltage:	115/230 VAC +25 VDC/2.5 A and +24 VDC/1 A (regulated)
RE 29732	VT 11006	Input voltage: Output voltage:	21.5 to 35 VAC ±15 V
RE 29729	VT 11005	Input voltage: Output voltage:	10.5 to 16 VAC ±15 V

General accessories

Assemblies in plastic housing for switching and filtering supply voltages

Type of electronics		Detailed information:
VT 11027 and VT 11028	Relay module with one operate contact, smoothing capacitor and overvoltage protection	RE 29742
VT 11073	Capacitor module with smoothing capacitor, reverse polarity protection and overvoltage protection	RE 29750

Service cases with test unit for proportional, high-response and servo-valves

- VT-VETSY-1 integrated electronics
- VT-PPV external electronics

Types VT-VETSY-1, VT-PPV

Detailed information:
– VT-VETSY-1: RE 29685
– VT-PPV: RE 29687

Test boxes for proportional and high-response valves

- For functional testing and commissioning of proportional and high-response valves and related electronics
- Command values can be specified internally/externally
- Measuring points for inputs and outputs
- 115/230 V AC supply
- Connecting cable included in the scope of supply

Type VT-PE-TB

Detailed information:	Type	
RE 30063	Test box I VT-PE-TB1	For direct operated proportional valves without integrated electronics
RE 30064	Test box II VT-PE-TB2	For pilot operated proportional and high-response valves with external amplifier
RE 30065	Test box III VT-PE-TB3	For valves with integrated electronics and voltage interface

Service cases with test unit for servo-valves without integrated electronics

Type VT-SVTSY-1

Detailed information:
RE 29681

Closed-loop control systems with A4VSO variable displacement axial piston unit

- Pump sizes 125 to 355
- Infinitely variable control of flow and pressure
- Additional power limitation possible
- High reproducibility of flow and pressure due to closed control loop
- Dynamics of flow control corresponds to dynamics of control with proportional valves due to short adjustment times of the pump
- Prevention of throttling losses due to central flow and pressure control (energy savings)
- Matching of the pressure controller to the consumer possible through parameter settings
- Integrated analog control electronics with type SYHDFEE
- Integrated digital control electronics with CAN with type SYHDFEC

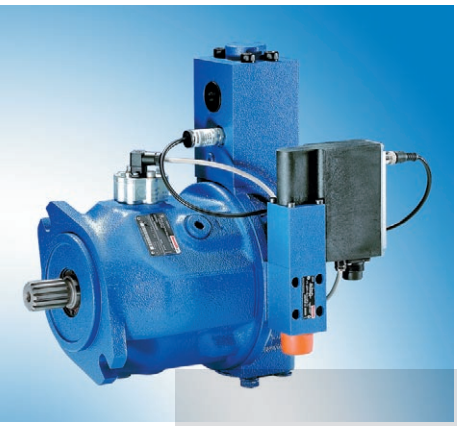
Types SYHDFE1, SYHDFEE and SYHDFEC

Pump size				**125**	**180**	**250**	**355**
Operating pressure		p_{max}	bar	350	350	350	350
Nominal flow	$n = 1500\ min^{-1}$	$q_{V\ nom}$	l/min	187	270	375	532
Step response (swivel angle control 100 bar)	0 to 100 %	T_u+T_g	ms	80	110	130	170
	100 to 0 %	T_u+T_g	ms	70	80	130	180

SYHDFE1, SYHDFEE and SYHDFEC closed-loop control systems	
System structure:	– A4VSO variable displacement axial piston pump with proportional valve and swivel angle transducer
	– Integrated HM 16 pressure transducer or external
	– Integrated electronics
Fields of application:	– Presses
	– Plastics processing machines
	– Test benches

Detailed information:
– Type SYHDFE1: on inquiry
– Type SYHDFEC: on inquiry
– Type SYHDFEE: RE 30035

Closed-loop control systems with A10VSO variable displacement axial piston pump



- Pump sizes 18 to 140
- Infinitely variable control of flow and pressure
- Additional power limitation possible
- High reproducibility of flow and pressure due to closed control loops
- Dynamics of flow control corresponds to dynamics of control with proportional valves due to short adjustment times of the pump
- Prevention of throttling losses due to central flow and pressure control (energy savings)
- Matching of the pressure controller to the consumer possible through parameter settings
- External analog control electronics with type DFE1
- Integrated analog control electronics with type DFEE
- Integrated digital control electronics with CAN with type DFEC

Detailed information:
– Type SYDFE1: RE 30024
– Type SYDFEC: RE 30027
– Type SYDFEE: RE 30030

Types SYDFE1, SYDFEE and SYDFEC

Pump size				**18**	**28**	**45**
Operating pressure		p_{max}	bar	250	250	250
Nominal flow	$n = 1500\ min^{-1}$	$q_{V\ nom}$	l/min	27	42	68
Step response (swivel angle control 50 bar)	0 to 100 %	T_u+T_g	ms	60	65	65
	100 to 0 %	T_u+T_g	ms	35	35	35

Pump size				**71**	**100**	**140**
Operating pressure		p_{max}	bar	250	250	250
Nominal flow	$n = 1500\ min^{-1}$	$q_{V\ nom}$	l/min	107	150	210
Step response (swivel angle control 50 bar)	0 to 100 %	T_u+T_g	ms	70	80	100
	100 to 0 %	T_u+T_g	ms	40	45	60

SYDFE1, SYDFEE and SYDFEC closed-loop control systems	
System structure:	– A10VSO variable displacement axial piston pump with proportional valve and swivel angle transducer
	– Integrated HM 16 pressure transducer or external
	– SYDZ 0001 pre-load valve
	– VT 5041 controller card (for SYDFE1 only) with power limitation and swivel angle indication
Fields of application:	– Plastics processing machines
	– Presses
	– Crane systems
	– Broaching machines
	– Shipbuilding
	– Construction machinery

Pump pre-load valve for SYDFE control system

- Integrated pre-load and maximum pressure relief function
- Use fo flow control at operating pressures of less than 12 bar and interal control oil supply

Type SYDZ 0001

Technical data			
Operating pressure	p_{max}	bar	350

Suitable for pump type	Detailed information:
A10VSO sizes 18/28	RE 29255
A10VSO size 45	
A10VSO size 71	
A10VSO sizes 100/140	

3/3 proportional directional valve for SYDFE control system

- Pilot for the pressure and delivery flow control system SYDFE
- For controlling the swivel angle of a variable displacement pump of type A10VSO…DFE
- Operation through a proportional solenoid with electrical feedback

Type VT-DFP

Technical data			
Operating pressure	p_{max}	bar	350
Ambient temperature range	ϑ	°C	–20 to +60
Storage temperature range	ϑ	°C	–20 to +70
Solenoid activation	through external activation electronics VT 5014 (for SYDFE1 control system)		
	through integrated analog activation electronics (for SYDFEE control system)		
	through integrated digital activation electronics (for SYDFEC control system)		

Valve type	Suitable for control system	Detailed information:
VT-DFP	SYDFE1 (RE 30024)	RE 29016
VT-DFPE	SYDFEE (RE 30030)	
VT-DFPC	SYDFEC (RE 30027)	

Digital closed-loop control amplifier for activating A4VS... axial piston pumps with HS4 variable displacement and A2V... axial piston pumps with EO4 variable displacement

- Electrohydraulic control of swivel angle and pressure as well as limitation of the capacity of variable displacement axial piston pumps
- Pressure controller with secondary swivel angle controller
- Analog inputs for command and actual values
- Adjustable limitation of capacity
- Various diagnostic functions
- Parameterization possible with PC and BODAC software

Type VT-VPCD

Detailed information:
RE 30028

Technical data				
Operating voltage		U_B	VDC	24
– Upper limit value		$U_B(t)_{max}$	V	35
– Lower limit value		$U_B(t)_{min}$	V	21
Command value	– Swivel angle	U	V	0 to 10, ±10
		I	mA	4 to 20
	– Pressure	U	V	0 to 10
		I	mA	4 to 20
	– Power	U	V	0 to 10
Type of connection				64-pin male connector
Ambient temperature range		ϑ	°C	0 to +50
Storage temp. range		ϑ	°C	–20 to +70
Interface to PC				RS 232

External activation electronics for DFE1 variable displacement of the A10VSO axial piston pump

- Integral part of the pressure and flow control system SYDFE1 (component series 1X and 2X) for activation of the A10VSO... axial piston unit with DFE1 variable displacement
- Pressure and swivel angle control, with optional capacity limitation
- Configuration of pressure controller adjustable to existing pressure fluid volume
- Controller for valve plunger position
- Pressure-related leakage compensation (can be switched off)
- Reversible pressure-actual value input (current, voltage, range)

Type VT 5041

Technical data				
Operating voltage		U_B	VDC	24
– Upper limit value		$U_B(t)_{max}$	V	35
– Lower limit value		$U_B(t)_{min}$	V	21
Command value	– Swivel angle	U	V	±10
	– Pressure, capacity	U	V	0 to 10
Type of connection				32-pin male connector, DIN 41612, form D
Ambient temperature range		ϑ	°C	0 to +50
Storage temperature range		ϑ	°C	–20 to +70

Detailed information:
RE 30241

Control and instrumentation technology for stage technology applications

- Flexible, digital control and instrumentation system with optimum operator comfort
- Control and instrumentation technology tailored specifically to the requirements of stages and studios; complies with SIL3 according to IEC 61508
- Thanks to modular design, adaptable to the requirements of small and large systems
- High availability
- Real-time protocol via patented MR-10 bus

SYB2000

Detailed information:
RE 30885

Control and automation technology for hydraulic systems

- Electrohydraulic systems from a single source
- From the specification through to the finished system
- Complete package, including:
  - Design, installation and commissioning
  - Software
  - Maintenance / service
- Complete design:
  - Power electrics
  - Programmable logic controls
  - Visualization systems
- Minimization of number of interfaces, site coordination
- Comprehensive documentation on CAD and programming systems

Detailed information:
on inquiry

Fields of application
– Steelworks and rolling mill technology
– Press construction and general mechanical engineering
– Test rig technology
– Shipbuilding and offshore applications
– Materials handling
– Stage technology
– Energy and environmental technology
– Water engineering
– Special technology

Safety module for monitoring and limiting the solenoid current of proportional valves

- Safe shut-off of solenoid currents if the permissible solenoid current is exceeded
- Additional command value correction (not relevant to safety) prevents premature shutoff
- Reverse polarity protection
- Amplifier connectable in series: VT-MSPA2-200
- Application according to Explosion Protection Directive 94/9/EC II2G

Type VT-MUXA2-1

Technical data			
Operating voltage	U_B	VDC	24
– Upper limit value	$U_B(t)_{max}$	V	30
– Lower limit value	$U_B(t)_{min}$	V	18
Command value input [1]	U	V	0 to ±10
2 solenoid current inputs			With reverse polarity prot., clock pulse freq. 0 to 500 Hz
Command value output [2]	U	V	0 to ±10.2 mA
2 solenoid current outputs	I_{max}	A	1.0 monitored
Type of connection			16-pin terminal casing
Ambient temperature range	ϑ	°C	0 to +50
Storage temperature range	ϑ	°C	–25 to +85

Detailed information:
RE 30290-B2

[1] for command value correction
[2] for command value specification to amplifier

Amplifier module for activating explosion-protected proportional valves 4WRA...XE, 3DREP 6...XE and 4WRZ...XE

- Compact amplifiers in plastic housing for snapping onto top-hat rails to EN 60715
- Amplifier not subject to Guideline 94/9/EC (ATEX guideline)!
- Activation of explosion-protected valves permitted only in conjunction with the Rexroth safety module VT-MUXA2!

Type VT-MSPA2-200

Technical data			
Operating voltage	U_B	VDC	24
– Upper limit value	$U_B(t)_{max}$	V	30
– Lower limit value	$U_B(t)_{min}$	V	18
Command value	U	V	0 to ±10
Step-change height		%	0 to 50
Ramp times, up and down	t	ms	20 to 5000
Output amplifier			Current-regulated
Max. output current	I	A	1.0 (short-circuit-proof, clocked)
Type of connection			Screw terminals
Ambient temperature range	ϑ	°C	0 to +50
Storage temperature range	ϑ	°C	–25 to +85

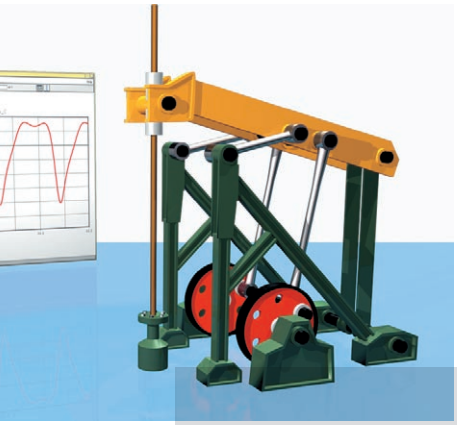
Detailed information:
RE 30228-200

Simulation technology

The design and optimization of closed-loop controlled hydraulic drives requires a high degree of experience and profound knowledge of manifold technologies.
The complex connection of hydraulics, electronics, control engineering and sensor technology results in highly sophisticated drives.

The simulation technology provides appropriate solutions for any application: We provide technical calculations to support you in the design of systems and provide simulation programs for optimizing electrohydraulic drives.

Using 3D visualizations and interactive presentations of components as well as complete systems, we enable you to simulate your machines and systems photorealistically and in operation.



Technical calculation

Technical calculations, simulations and system analyses to customer specifications

- Drive simulation
- Multi-body dynamics
- Simulation of complete systems
- Modal analyses
- Strength calculations
- 3D flow mechanics (CFD)

Detailed information:
on inquiry

Simulation software

Simulation software for valve-controlled cylinder drives

- Non-linear simulation of an electrohydraulic closed-loop controlled drive
- Library of Rexroth components
- Freely parameterizable components
- Comfortable user interface

HYVOS 6.0

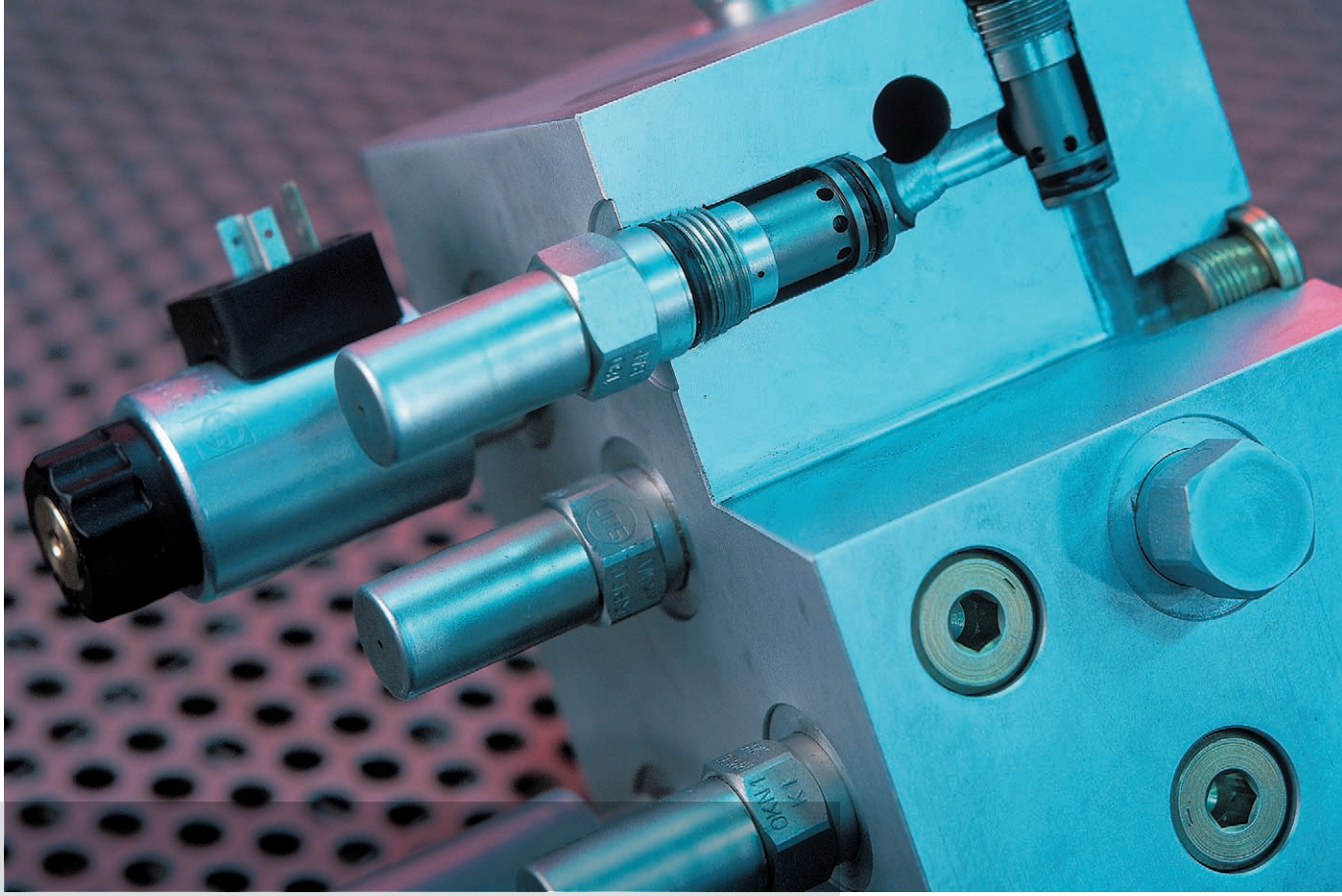
Detailed information:
on inquiry

Animation and presentation

Creation of 3D animations and presentations to customer specifications

- Virtual 3D animations
- Complete video productions
- Interactive multi-media presentations
- High-resolution, rendered pictures

Detailed information:
on inquiry



Control blocks / plates

Control blocks / plates are integrated hydraulic controls combined with built-in or flanged-on function elements.
They are based on circuit diagrams with specification of the position of ports and operating elements.

Advantages of the block design over individual piping:

- Low flow resistance / good efficiency
- Fewer sealing points
- Small sizes / high power density
- Industry-specific solutions
- Cost reduction

Multi-station manifold plates

- Sizes 6 to 16
- Compact hydraulic controls with common pressure and return flow port for all control circuits
- Separate actuator ports for each control circuit
- Implementation of various control circuits possible using vertical stacking elements of sandwich plate design

Detailed information:
– Size 6: RE 48107
– Size 10: RE 48110
– Size 16: on inquiry

Type HSR

Size			6	10	16
Operating pressure	p_{max}	bar	315	315	315
No. of ready-to-connect control circuits			10	8	6

The following sandwich plate valves included in this brochure are suitable for mounting onto the manifold blocks:

Component function	Page
Pressure relief valves	56
Pressure reducing valves	60
Check valves	42
Shut-off valves	46
Double throttle check valves	66
2-way flow control valves	68
Hydro-electric pressure switches for sandwich plate mounting	157

Control modules

- Individual control blocks thanks to free combination of individual segments
- High versatility owing to possible combination with size 6 valves and screw-in cartridge valve technology
- In conjunction with circuit-specific segments, complex hydraulic controls can be realized

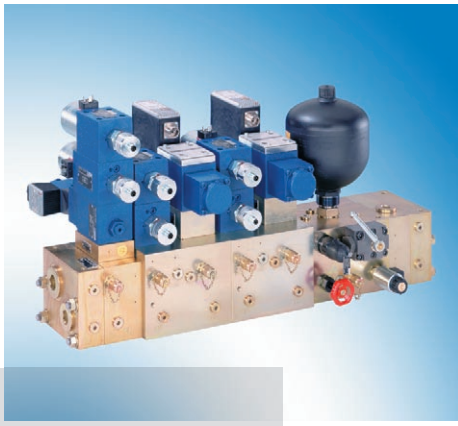
Types IH15A and IH15B

Technical data			IH15A	IH15B
Operating pressure	p_{max}	bar	500	350
Flow	$q_{V\ max}$	l/min	14	30

Detailed information:
– Type IH15A: RE 51144
– Type IH15B: RE 51156

Modular plate systems

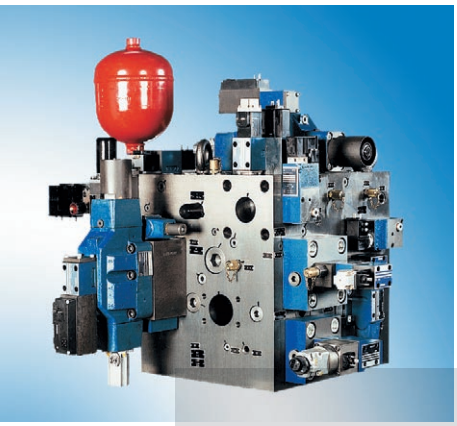
- Individual control blocks thanks to free combination of individual segments
- High versatility due to possible combination of valve sizes 6 to 25
- In conjunction with circuit-specific segments, complex hydraulic controls can be realized



Type IH20

Technical data			
Operating pressure	p_{max}	bar	320
Flow	$q_{V\ max}$	l/min	500

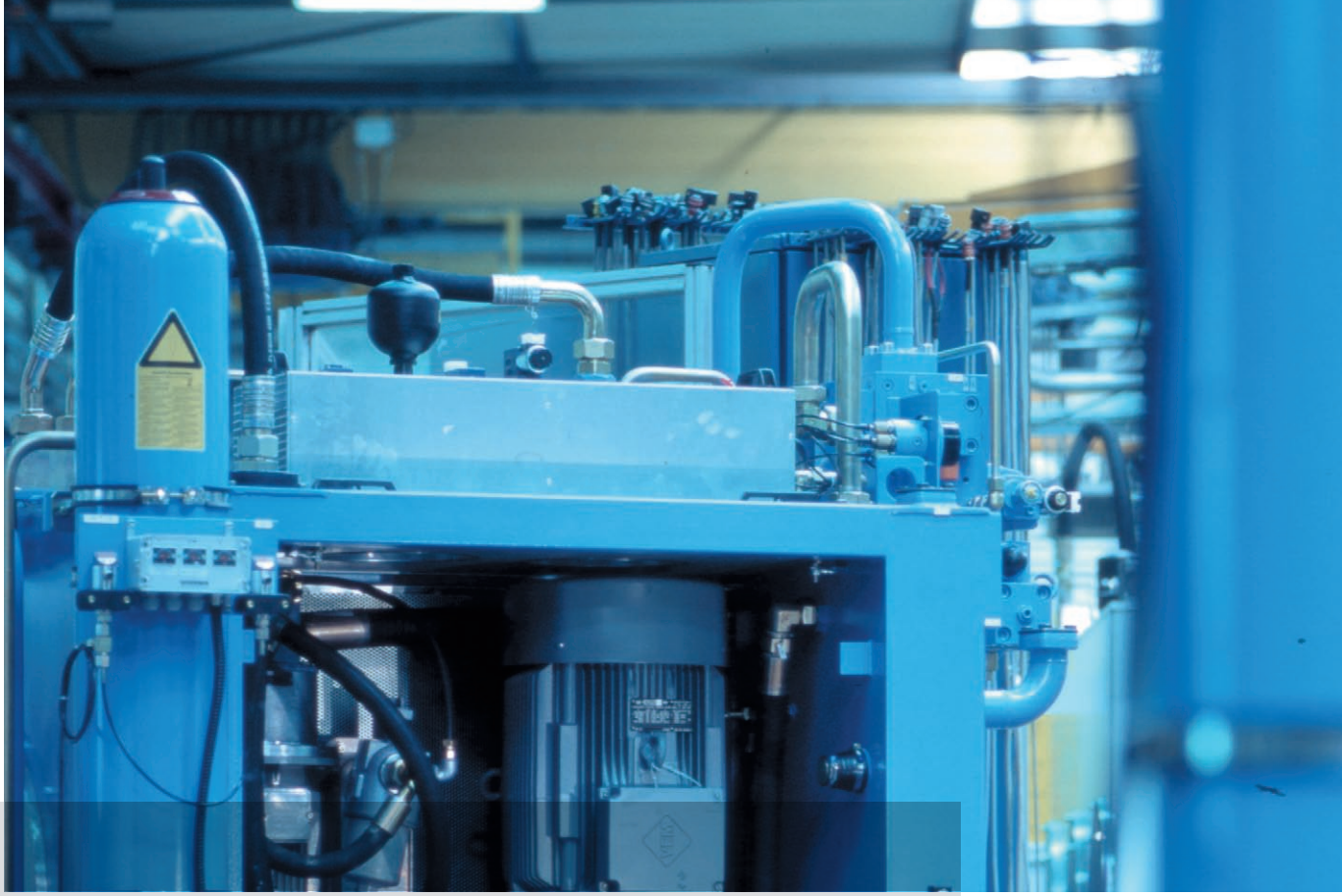
Detailed information:
on inquiry



Industry-specific and custom-specific control blocks (individually manufactured, small series)

- Press control blocks
- Modular control blocks for machine tools
- Control blocks for plastics processing machines, foundry machines, power plants, etc.

Detailed information:
on inquiry



Accumulators and accessories

Hydraulic accumulators are mainly used to minimize the pump drive power, compensate flows, smooth pressure peaks and as energy accumulators and pulsation dampers.

Performance profile

- Bladder type accumulators 1 to 50 liters
- Diaphragm type accumulators 0.075 to 2.80 litres
- Safety and shut-off blocks
- Charging and testing kits
- Mounting elements
- Safety elements
- Accumulator charging valves

Accumulator assemblies

- Accumulator assembly with safety block to DIN 24552
- Bladder or diaphragm type accumulators
- Safety block with integrated shut-off valve, safety valve (type tested) and unloading valve
- Unloading valve either manually or electrically operated
- Glycerine-filled pressure gauge with red marking of the pressure to be relieved
- Bracket for welding into place

Type ABSBG

Detailed information:
RE 50135

Technical data

Type of accumulator			Bladder accumulator	Diaphragm accumulator	Accumulator safety blocks
	DN	l	1 to 50	0.7 to 3.5	10 to 32
Operating pressure	p_{max}	bar	–	–	330

Hydro-pneumatic accumulators

- Bladder or diaphragm type accumulators
- Charging and testing kits
- Mounting elements
- Safety elements
- Certificates for type and pressure tests

Detailed information:
RE 50150
1987761403

Technical data

Type of accumulator			Bladder accumulator	Diaphragm accumulator
	DN	l	1 to 50	0.075 to 3.5

Accumulator safety blocks

- Protection, isolation and unloading of hydraulic accumulators
- Meet the requirements and safety regulations to DIN 24552 pressure vessel regulations and technical rules for pressure vessels (TRB 403 and TRB 404)
- Accumulator adapter available as optional extra for connecting accumulator safety blocks to the accumulators

Type ABZSS

Size			10	20	30
Operating pressure	p_{max}	bar	350	350	350
Weight	m	kg	5.2	8.5	20.5

Detailed information:
RE 50131

Power units and accessories

Power units

Power units form the basis of a hydraulic system.
Their dimensioning and concept are decisive for the environmental friendliness and efficiency of the entire system.

Accessories

- Pressure indicator units
- Pressure switches
- Filters
- Coolers

Performance profile

Small standard power units

- Oil tank with a capacity of 20, 40 or 60 litres
- Drive power 0.37 to 7.5 kW
- Can be extended by stacking systems

Standard power units

- Oil tank with a capacity of 100 to 800 liters
- Drive power 4 to 75 kW

Standard whispering power units

- Oil tank with a capacity of 100 to 1000 liters
- Drive power 7.5 to 90 kW

Individual power units

- are engineered and manufactured to customer requirements

With the combination of power unit and control block, Rexroth supplies the complete system from a single source!

Tanks

- Tank capacity 1000 to 20000 liters
- Steel tank with high static and dynamic stiffness
- Pipe joints through tank walls with welding fittings, SAE or DIN flanges
- Suction chamber separated from return flow chamber
- Tanks are available with dividing walls or baffles
- Lifting lugs for transport purposes
- Steps in tanks for tank sizes 5000 to 13000
- Ladders in tanks for tank sizes 16000 to 20000

Type ABTSR

Detailed information:
on inquiry

Modular standard power units

- Tank capacity 20; 40 and 60 liters
- Tank design: Aluminium tank
- Stable aluminium tank
- Modular design
- Compact power unit design
- Individual adaptation possible
- Versatile use
- Additional options possible
- Clear, maintenance-friendly arrangement

Type ABSKG

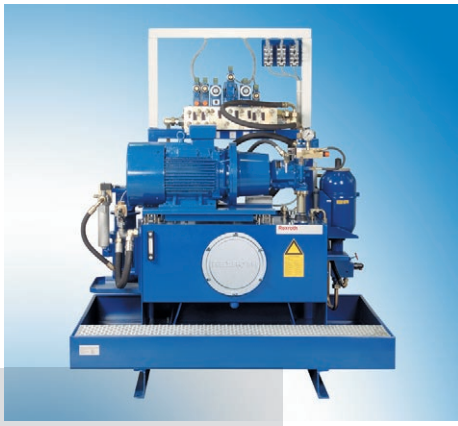
Detailed information:
RE 51013

Technical data (pump/motor)

Type of pump			Radial piston pump (fixed)	Gear pump (fixed)
Displacement	$V_{g\ max}$	cm^3	1.6 to 10	1.9 to 16
Operating pressure	p_{max}	bar	315	250
El. motor power	P	kW	0.37 to 7.5	0.37 to 7.5

Modular standard power units

- Tank capacity 100; 160; 250; 400 and 800 liters
- Tank design: Steel tank to DIN 24339, form AN, cover form C, standard sheet AB 40-40
- Stable steel tank
- Modular design of controls, accumulator kits, cooler kits
- Pump/motor group
- Filter/cooler circulation circuit
- Basic power units with pump power unit, tank accessories (filler and breather filter, oil level indicator, cleaning cover, drain), return line filter, float switch, thermostat



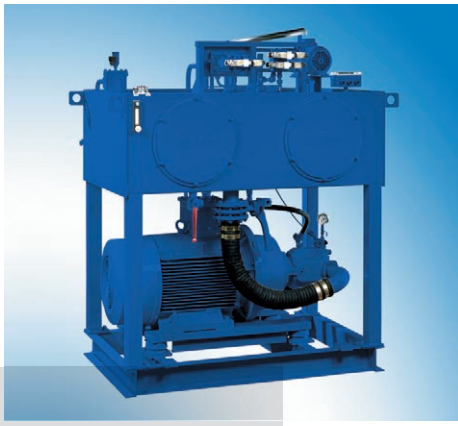
Type ABMAG

Technical data (pump/motor)			
Type of pump			Vane pump / axial piston pump (variable displacement)
Displacement	$V_{g\ max}$	cm^3	18 to 140
Operating pressure	p_{max}	bar	315
El. motor power	P	kW	4 to 75

Detailed information:
RE 51098

Power units with high-level tanks

- Tank capacity 400, 630, 800 and 1000 liters
- Tank design: Steel tank with supports
- Filter: Filter/cooler circulation circuit
- Stable steel tank
- Thanks to modular principle, unit can be easily extended
- Good accessibility of all components
- Suitable for a multitude of industrial applications
- Long service life
- Low noise emission
- Flow matched to the control and adjustment elements used



Type ABHSG

Technical data (pump/motor)			
Type of pump			Axial piston pump (variable)
Displacement	$V_{g\ max}$	cm^3	45 to 250
Operating pressure	p_{max}	bar	315
El. motor power	P	kW	7.5 to 160

Detailed information:
on inquiry

Hydraulic drive power units

- Tank capacity 100 to 1000 liters
- Very low operating noise
- Pump/motor group in **horizontal** arrangement
- Versatile application:
  - General mechanical engineering
  - Injection moulding machines
  - Lifting equipment
  - Presses
  - Laboratories, schools
- Flow matched to the control and adjustment elements used

Type ABFAG-V

Detailed information:
RE 51096

Technical data (pump/motor)			
Type of pump			Axial piston pump (variable)
Displacement	$V_{g\,max}$	cm^3	28 to 140
Operating pressure	p_{max}	bar	315
El. motor power	P	kW	7.5 to 90

Hydraulic drive power units

- Tank capacity 100 to 1000 liters
- Very low operating noise
- Pump/motor group in **vertical** arrangement
- Small erection space required
- Versatile application:
  - General mechanical engineering
  - Injection moulding machines
  - Lifting equipment
  - Presses
  - Laboratories, schools
- Flow matched to the control and adjustment elements used

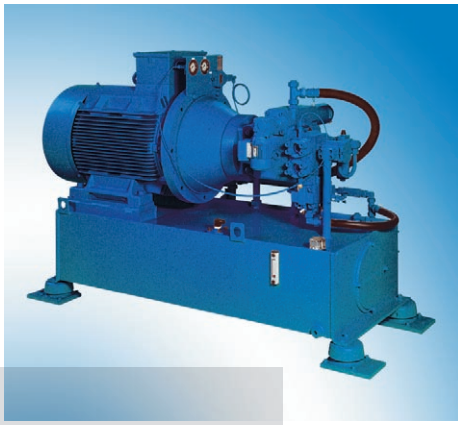
Type ABFAG-V

Detailed information:
RE 51094

Technical data (pump/motor)			
Type of pump			Axial piston pump (variable)
Displacement	$V_{g\,max}$	cm^3	28 to 140
Operating pressure	p_{max}	bar	315
El. motor power	P	kW	7.5 to 90

Hydraulic primary power units

- Tank capacity 63 to 400 liters
- For closed circuits
- Stable steel tank
- Good accessibility
- Versatile use in industrial applications:
  - Shredder systems
  - Stirring drives
  - Mixers
  - Centrifuges
  - Winders
- Flow matched to the control and adjustment elements used



Type ABPAG

Technical data (pump/motor)			
Type of pump			Axial piston pump (variable)
Displacement	$V_{g\ max}$	cm^3	28 to 250
Operating pressure	p_{max}	bar	360
El. motor power	P	kW	15 to 160

Detailed information:
on inquiry

Pump/motor groups

- With pump types A10VSO; PV7 and PGH
- El. motor frame sizes 132 to 280
- El. motor with support and flange, form B35
- Pump mounted to the motor with pump mounting bracket and coupling
- Provided for mounting onto tank, baseframe or separate installation
- Low operating noise
- Versatile use
- Clear and maintenance-friendly arrangement
- Optionally with fixed or variable displacement pumps
- Combination pumps possible for multi-circuit systems

Type ABAPG

Type of pump	Displacement $V_{g\ max}$ in cm^3	Max. operating pressure p_{max} in bar	El. motor power P in kW
Internal gear pump (fixed)	20 to 125	315	7.5 to 90
Vane pump (variable)	30 to 118	160	7.5 to 90
Axial piston pump (variable)	18 to 140	315	7.5 to 90

Detailed information:
RE 51062

Pump/motor groups

- El. motor with support and flange, form B35
- Pump mounted to the electric motor with pump mounting bracket and coupling
- Provided for mounting onto tank, baseframe or separate installation
- Low operating noise
- Version with fixed displacement pumps
- Specifically designed for the use in circulation circuits (filter/cooler)

Type ABUPG

Detailed information:
RE 51066

Technical data (pump/motor)			
Type of pump			Vane pump (fixed displacement)
Displacement	$V_{g\,max}$	cm^3	18 to 193
Operating pressure	p_{max}	bar	10
El. motor power	P	kW	0.75 to 7.5

Clamping and drive modules

- Tank capacity 2.9 liters
- Plastic tank with built-in motor
- Duty cycle, short-time operation S2 and intermittent operation S3
- Compact build
- Low noise
- Wide field of application
- Large number of variants
- Complete hydraulic control possible
- No piping of the control
- Ready for connection

Type UPE 1

Detailed information:
RE 51137
Control module:
RE 51144

Technical data (pump/motor)			
Type of pump			Radial piston pump (fixed)
Displacement	$V_{g\,max}$	cm^3	0.26 to 1.6
Operating pressure	p_{max}	bar	700
El. motor power	P	kW	0.37

Clamping and drive modules

- Tank capacity 2.4 to 7.2 liters
- Aluminium tank with built-in motor
- Duty cycle, short-time operation S2 and intermittent operation S3
- Compact build
- Low noise
- Wide field of application
- Large number of variants
- Complete hydraulic control possible
- No piping of the control
- External attachments possible
- Ready for connection

Type UPE 2

Technical data (pump/motor)				
Type of pump			Radial piston pump (fixed)	Gear pump (fixed)
Displacement	$V_{g\ max}$	cm^3	0.40 to 2.0	1.0 to 10.0
Operating pressure	p_{max}	bar	700	260
El. motor power	P	kW	1.1 to 2.2	1.1 to 2.2

Detailed information:
RE 51142
Control module: RE 51144

Clamping and drive modules

- Tank capacity 8.5 to 11 liters
- Tank design: Aluminium tank with built-in motor
- Duty cycle, continuous operation S1
- Compact build
- Low noise
- High cooling capacity
- Single and double pump
- Two separate hydraulic controls possible
- No piping of the control
- Ready for connection

Type UPE 3

Technical data (pump/motor)				
Type of pump			Radial piston pump (fixed)	Gear pump (fixed)
Displacement	$V_{g\ max}$	cm^3	0.67 to 1.67	1.0 to 10.0
Operating pressure	p_{max}	bar	700	260
El. motor power	P	kW	3.0 to 4.0	3.0 to 4.0

Detailed information:
RE 51147
Control module: RE 51144

Drive modules

- Tank capacity 26 liters
- Aluminium tank
- 100% duty cycle
- Compact build
- Low noise
- High cooling capacity
- Wide field of application
- Various mounting options
- Complete hydraulic control possible
- Ready for connection

Type UPE 5

Detailed information:
RE 51145
Control module: RE 51156

Technical data (pump/motor)					
Type of pump			External gear pump (fixed displacement)	Internal gear pump (fixed displacement)	Vane pump (variable displacem.)
Displacement	$V_{g\ max}$	cm^3	6.0 to 16.0	4.0 to 16.0	10 to 20
Operating pressure	p_{max}	bar	200	250	160
El. motor power	P	kW	1.5 to 40	1.5 to 40	1.5 to 40

Pressure gauge isolator valves

- Size 6
- 3-way straight valve
- For subplate mounting ("P")
- For threaded connection ("A")
- Push-button operation
- With or without accessories (connection piece, 2 seal rings, pressure gauge, anchor plate)
- Various indicator ranges, optional: up to 60, 100, 160, 250, 400 bar

Type AF

Detailed information:
RE 50031

Technical data			
Operating pressure	p_{max}	bar	300

Piston type pressure switches

- For threaded connection
- With leakage port, optional
- With check lamp, optional
- With explosion protection and intrinsically safe power circuit, optional
- Pressure stages:
  – Version "K": up to 50, 350, 500 bar
  – Version "O": up to 50, 100, 350 bar

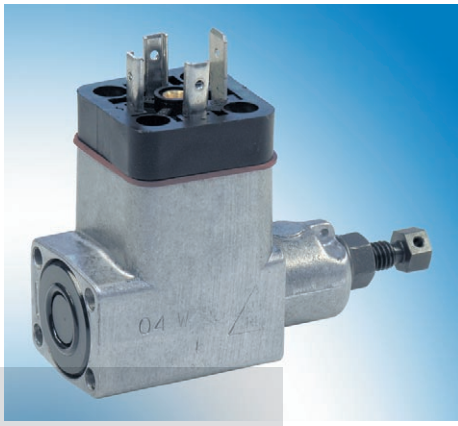
Type HED 1

Technical data				
Version			"K"	"O"
Operating pressure	p_{max}	bar	500	350
Switching frequency		1/h	18000	3000 (briefly 6000)

Detailed information:
RE 50040

Piston type pressure switches

- For subplate mounting ("OP")
- For in-line installation ("OA")
- For female thread ("OK")
- 4 pressure stages: 50, 210, 350, 630 bar



Type HED 5

Technical data			
Operating pressure	p_{max}	bar	630
Switching frequency		1/h	4800

Detailed information:
RE 50055

Piston type pressure switches

- For subplate mounting
- For in-line installation
- For sandwich plate connection
- Without leak connection
- Adjustment elements:
  - Grub screw with hexagon socket
  - Grub screw with hexagon socket and scale
  - Lockable rotary knob with scale
- Check lamp, optional (integrated in plug-in connector)
- 5 pressure stages: 55, 100, 150, 240, 350 bar

Type HED 7

Detailed information:
RE 50058

Size			**6**
Operating pressure	p_{max}	bar	315/400
Switching frequency		1/h	7200

Piston type pressure switches

- For subplate mounting ("OP")
- For in-line installation ("OA")
- As vertical stacking element in horizontal stacking systems ("OH")
- With check lamp, optional (only in conjunction with large plug-in connector)
- With lockable rotary knob, optional
- Pressure stages:
  - Versions "OP" and "OA": 50, 100, 200, 350, 630 bar
  - Version "OH": max. 50, 100, 200, 350 bar

Type HED 8

Detailed information:
RE 50061

Technical data			
Operating pressure	p_{max}	bar	630
Switching frequency		1/h	7200

Bourdon tube pressure switch with constant (HED 2) or with infinitely variable switching pressure differential (HED 3)

- For threaded connection
- With check lamp, optional
- Various electrical connections
- With lockable rotary knob (HED 2); with lockable cap, optional (HED 3)
- Switching pressure differential can be adjusted through separate, independent setting of switching pressures (HED 3)
- 5 pressure stages: 25, 63, 100, 200, 400 bar

Types HED 2 and HED 3

Version			
Operating pressure	p_{max}	bar	400
Switching frequency		1/h	1800

Detailed information:
– Type HED 2: RE 50045
– Type HED 3: RE 50050

Pressure filters acc. to DIN 24550 for installation in pressure lines

- Filter elements based on inorganic fiber
- Adsorption of finest particles over a wide pressure differential range
- High contamination retention capacity due to large specific adsorption surface
- High bursting strength of filter elements (e.g. in the case of cold starts)
- Filter ratings 10 µm and 3 µm absolute
- Mechanical visual and electrical clogging indicators

Type ABZFD…-DIN

Size			**63 to 400**
Nominal pressure	p_{max}	bar	400
Flow	$q_{V\ max}$	l/min	360

Detailed information:
RE 50086
(Filters can be flanged to control blocks laterally: RE 50087)

Return flow filter acc. to DIN 24550 for direct tank installation

- Filter elements based on inorganic fiber
- Excellent separation characteristics (β-values) over a wide pressure differential range
- High contamination retention capacity due to large specific adsorption surface
- High bursting strength of filter elements (e.g. in the case of cold starts)
- Filter ratings 10 µm and 3 µm absolute
- Mechanical visual and electrical clogging indicators

Type ABZFR…-DIN

Detailed information:
RE 50088

Size			**40 to 630**
Nominal pressure	p_{max}	bar	10
Flow	$q_{V\,max}$	l/min	460

Filter/cooler circulation circuits

- Compact circulation circuit with circulation pump, attached low pressure filter acc. to DIN 24550 and plate type heat exchanger
- El. motor frame sizes 80 to 112
- Tank attached or mounted according to modular principle

Type ABUKG

Detailed information:
RE 50126

Technical data (pump/motor)			
Heat dissipation capacity	*P*	kW	4 to 37

Piston type pressure switches

- Size 10
- Component series 2X
- Maximum operating pressure 630 bar
- Application according to Explosion Protection Directive 94/9/EC

Type HED 8 …XN

Applications according to Directive 94/9/EC			Solenoid type of protection to EN 50014/50281	
Component group	Category to ATEX	Fields of application		
II	3D	Dusts	II3D	Non-igniting

Detailed information:
RE 50061-XN-B2

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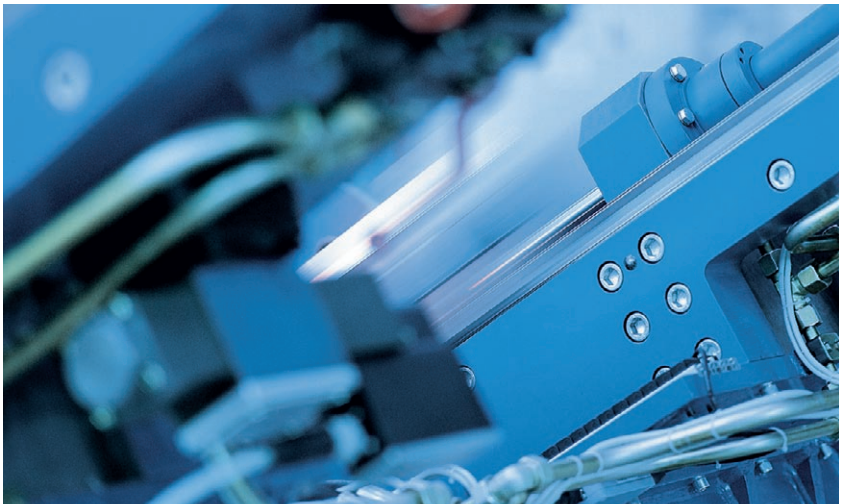

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