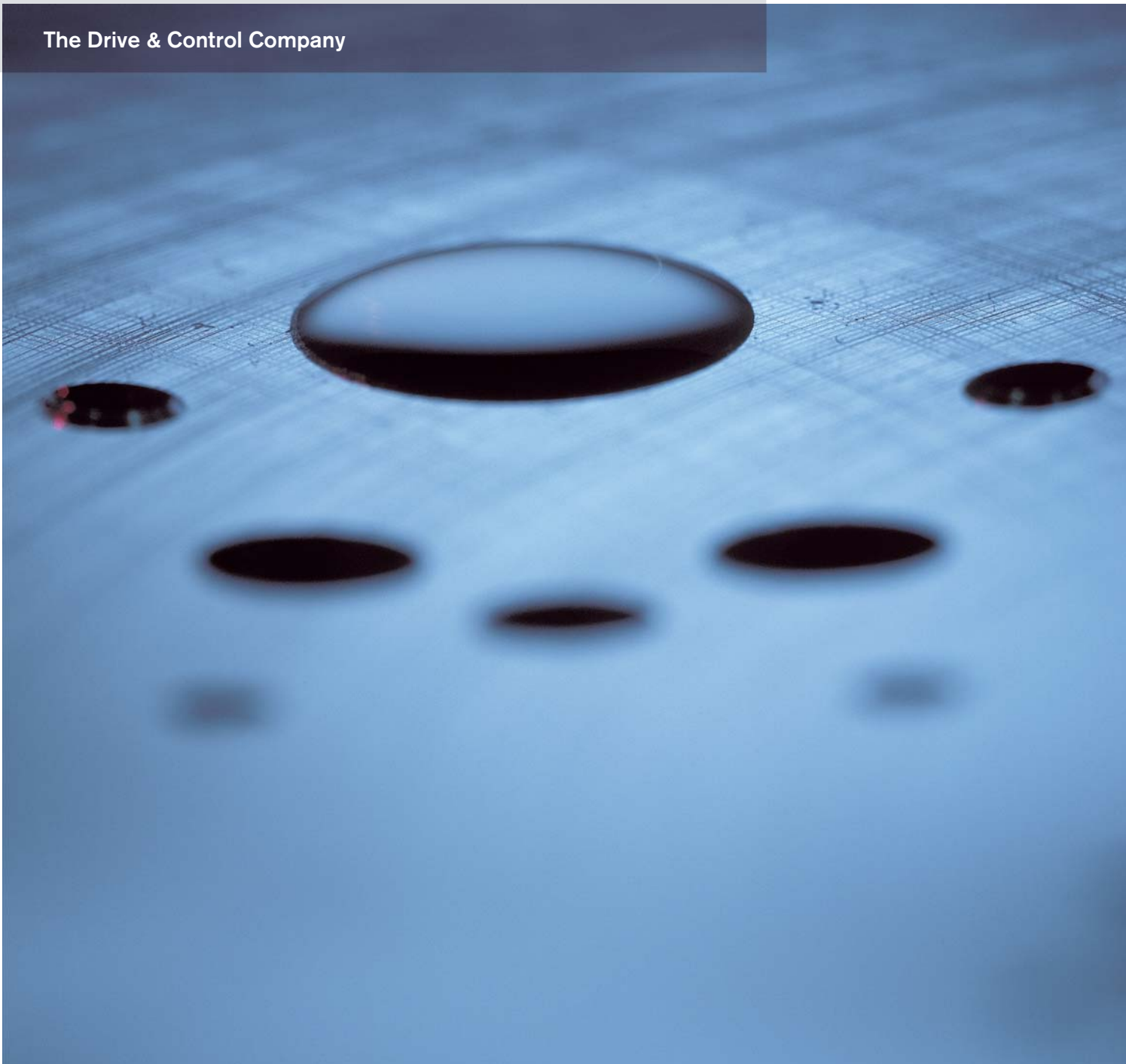
Rexroth
Bosch Group

Industrial Hydraulics

Hydraulic and Electronic Components

Product Range Information

The Drive & Control Company



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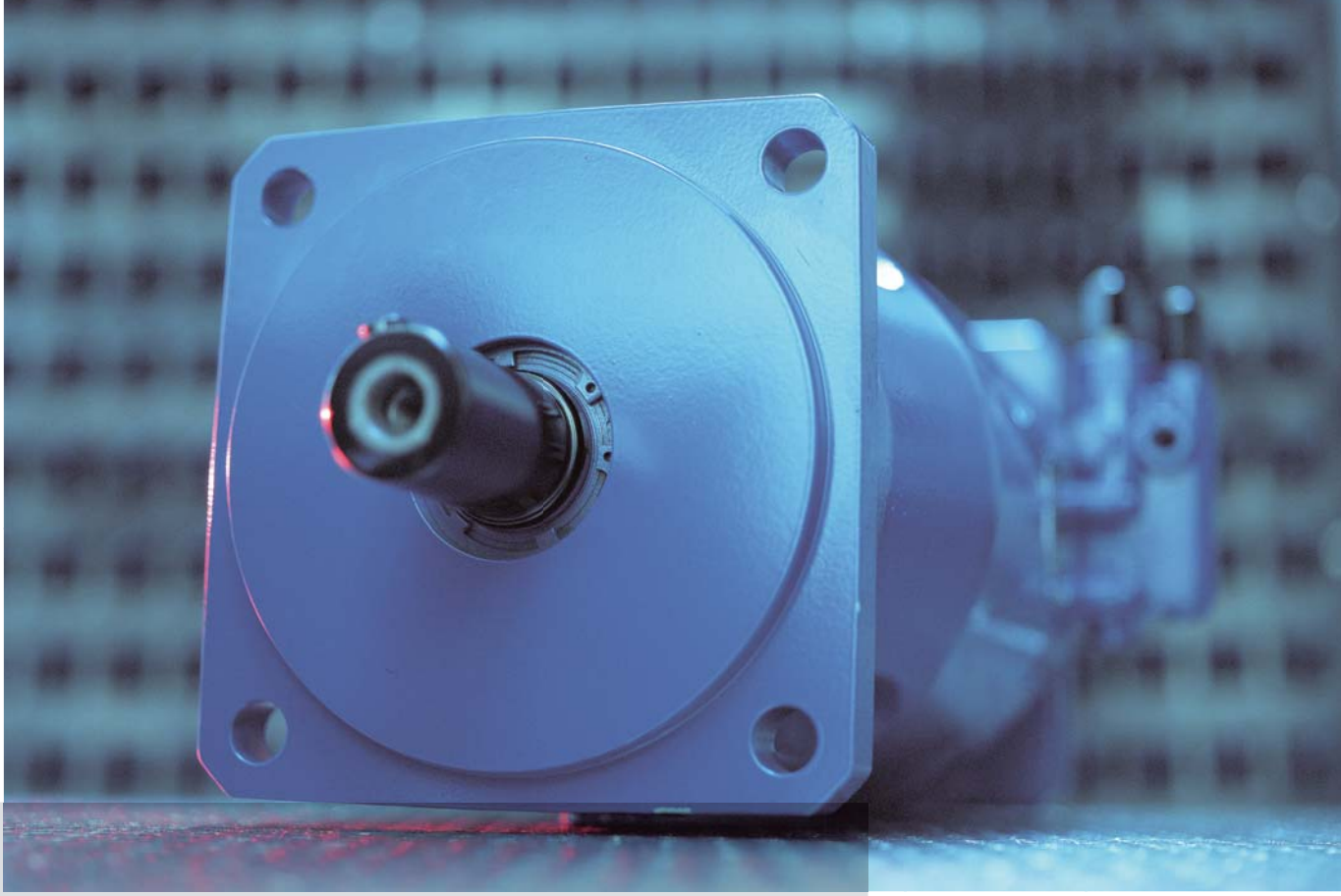


Pumps

Axial piston pumps

Axial piston pumps are available in swashplate and bent-axis design for the medium and high-pressure range. Variations in the design, in the output range and in the open and closed-loop control options guarantee 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 five series offer a multitude of application possibilities.

Performance profile

- Displacement 1 to 56 cm^3
- 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

Pumps

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 gap

Vane pumps

Our vane pump series are mainly used in the low and medium pressure range.

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, 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
- Series 6
- Standard fixed displacement pump for any application
- Robust and short taper roller bearing
- Service ports SAE or thraded
- Good suction characteristics
- Long-life bearing possible (sizes 250 to 1000)

Type A2FO

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 (ca.)		m	kg	2,5	6	6	6	9,5	9,5	9,5	13,5

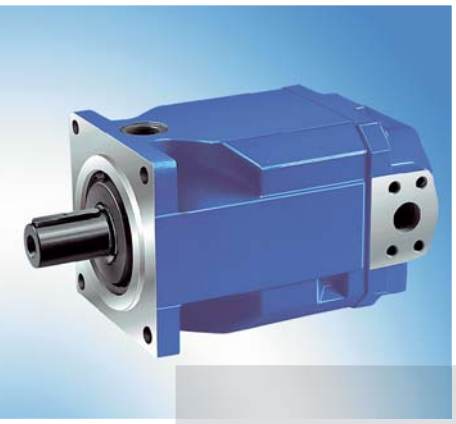
Size				**56**	**63**	**80**	**90**	**107**	**125**	**160**	**180**
Nominal pressure			bar	400	400	400	400	400	400	400	400
Peak pressure			bar	450	450	450	450	450	450	450	450
Displacement		V_g	cm^3	56.1	63	80.4	90	106.7	125	160.4	180
Speed [1]		n_{max}	min^{-1}	2000	2000	1800	1800	1600	1600	1450	1450
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 (ca.)		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 (ca.)		m	kg	66	73	110	155	322	336

Detailed information:
RE 91401

[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
- Series 1 and 3
- Long bearing life
- Good suction characteristics
- Pump combinations possible
- Optional through-drive for mounting further pumps
- Operation with HF fluids possible with reduced technical data (sizes 71 to 500)

Type A4FO

Detailed information:
RE 91455

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 (ca.)		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 (ca.)		m	kg	34	61	120	220

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
- Closed circuit
- Series 1 and 3
- Mainly for industrial applications
- Valve block for safeguarding the closed circuit
- Auxiliary pumps for the boost and pliot oil circuit or a further axial piston pump of up to the same size can be connected to the through-drive

Type A4VSG

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 (ca.)	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 (ca.)	EO+valve block	m	kg	237	350	500	630

Detailed information:
RE 92100

– Pump for semi-closed circuit:
RE 92110

MA
Manual control

EM
Electromotive control

HW
Hydraulic displacement control, position-related

EO1/EO2
Hydraulic displacement control (proportional valve)

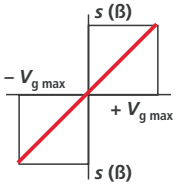
HS/HS3
Hydraulic displacement control (servo-/proportional valve)

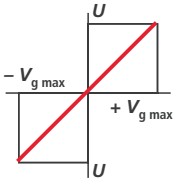
HM1/2
Hydraulic displacement control, flow-related

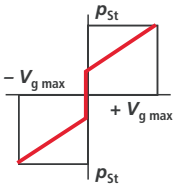
HD
Hydraulic control, pilot pressure-related

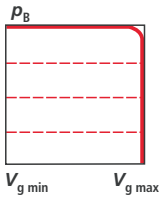
DR
Pressure controller

DP
Pressure controller for parallel operation









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

Variable displacement pumps (compact units)

- Sizes 250 to 750
- Axial piston swashplate design
- Closed circuit
- Series 3
- Integrated boost pump and valve technology
- Compact build
- Through-drive and pump combination possible in spite of integrated auxiliary pump

Type A4CSG

Detailed information:
RE 92105

Size				250	355	500	750
Nominal pressure			bar	350	350	350	350
Peak pressure			bar	400	400	400	400
Displacement	Variable displ. pump	$V_{g\,max}$	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 (ca.) [3]		m	kg	214	237	350	500

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

HM1/2/3
Hydraulic displacement control, flow-related

MA
Manual control

EM
Electromotive control

HW
Hydraulic displacement control, position-related

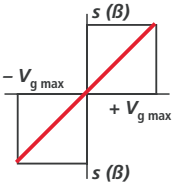
EO1/2
Hydraulic displacement control (proportional valve)

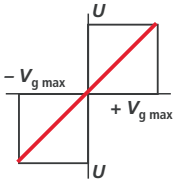
HS/HS3
Hydraulic displacement control (servo-/proportional valve)

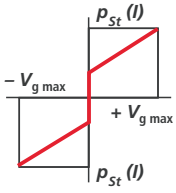
HD
Hydraulic control, pilot pressure-related

EP
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

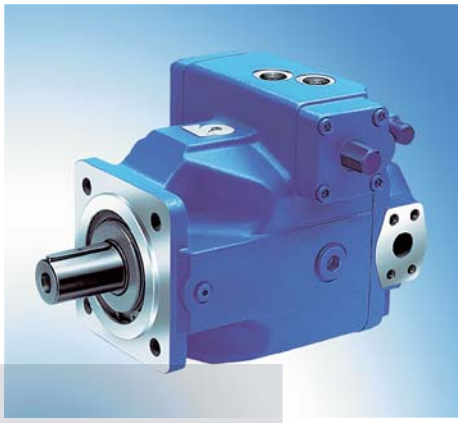






Variable displacement pumps

- Sizes 40 to 1000
- Axial piston swashplate design
- Open circuit
- Series 1 and 3
- Mainly for industrial applications
- Long service life
- Comprehensive controller and actuator product range
- Through-drive option



Type A4VSO

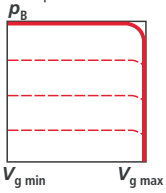
Size				**40**	**71**	**125**	**180**	**250**
Nominal pressure			bar	350	350	350	350	350
Peak pressure			bar	400	400	400	400	400
Displacement		$V_{g\,max}$	cm^3	40	71	125	180	250
Speed [1]		n_{max}	min^{-1}	2600	2200	1800	1800	1500 [2]
Flow	at n_{max}	$q_{V\,max}$	L/min	104	156	225	324	375
Power	$\Delta p = 350$ bar	P_{max}	kW	61	91	131	189	219
Torque	$\Delta p = 350$ bar	T_{max}	Nm	223	395	696	1002	1391
Weight (ca.)	Press. 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 (ca.)	Press. controller	m	kg	207	320	460	605

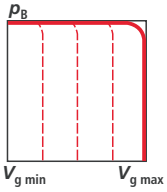
Detailed information:
RE 92050

[1] values valid at an absolute pressure of 1 bar in suction port S
[2] higher speeds permitted with high-speed version

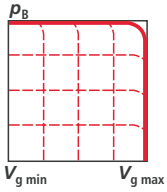
DR Pressure controller
DP
Pressure controller for parallel operation



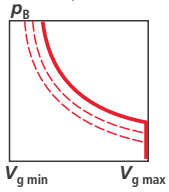
FR
Flow controller



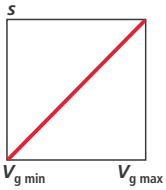
DFR
Pressure and flow controller



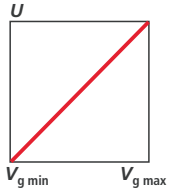
LR2 Power controller
LR3
Remote-controlled power controller,



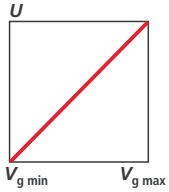
MA
Manual control
EM
Electromotive control



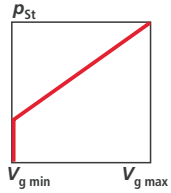
HS/HS3
Hydraulic displacement control (servo-/proportional valve)



EO1/EO2
Hydraulic displacement control (proportional valve)



HD
Hydraulic control, pilot pressure-related



HM1/2
Hydraulic displacement control, flow-related

DFE1
Pressure, flow controller, electronic

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 dsign
- Open circuit
- Series 3 (sizes 18 to 140)
- Series 5 (size 10)
- Long bearing life
- Comprehensive controller and actuator product range
- Through-drive option for mounting further pumps up to the same size (not with size 10)

Type A10VSO

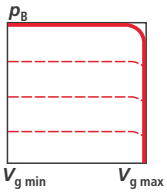
Detailed information:
– Size 10: RE 92713
– Size 18: RE 92712
– Sizes 28 to 140: RE 92711

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	37.8	59.4	84	117
Power	$\Delta p = 280$ bar	P_{max}	kW	15.7 [2]	27.7	39	55
Torque	$\Delta p = 280$ bar	T_{max}	Nm	41.7 [2]	80	125	200
Weight (ca.)	Press. controller	m	kg	8	12	15	21

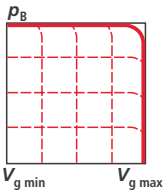
Size				71	100	140
Nominal pressure			bar	280	280	280
Peak pressure			bar	350	350	350
Displacement		$V_{g\,max}$	cm^3	71	100	140
Speed [1]		n_{max}	min^{-1}	2200	2000	1800
Flow	at n_{max}	$q_{V\,max}$	L/min	156	200	252
Power	$\Delta p = 280$ bar	P_{max}	kW	73	93	118
Torque	$\Delta p = 280$ bar	T_{max}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

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

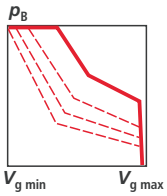
DR
Pressure controller



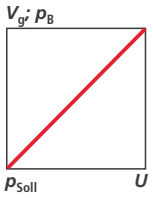
DFR
Pressure and flow controller



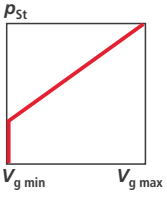
DFLR
Pressure, flow and power controller



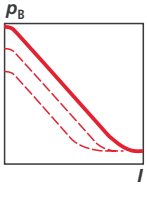
DFE
Pressure, flow controller, electronic



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



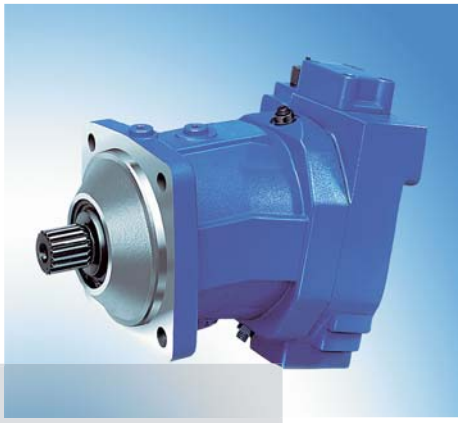
ED
Electrohydraulic closed-loop pressure control



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

Variable displacement pumps

- Sizes 55 to 1000
- Axial tapered piston bent-axis design
- Open circuit
- Series 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 (size 250 to 1000)
- Comprehensive controller and actuator product range



Type A7VO

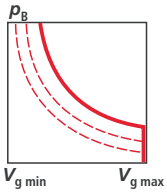
Size				**55**	**80**	**107**	**160**
Nominal pressure			bar	350	350	350	350
Peak pressure			bar	400	400	400	400
Displacement		$V_{g\,max}$	cm^3	54.8	80	107	160
Speed [1]		n_{max}	min^{-1}	2500	2240	2150	1900
Flow	at n_{max}	$q_{V\,max}$	L/min	137	179	230	304
Power	$\Delta p = 350$ bar	P_{max}	kW	80	105	134	177
Torque	$\Delta p = 350$ bar	T_{max}	Nm	305	446	596	891
Weight (ca.)		m	kg	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 (ca.)		m	kg	102	173	234	450

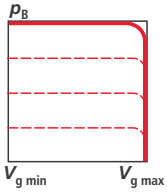
Detailed information
– Sizes 55 to 160: RE 92202
– Sizes 250 to 1000: RE 92203

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

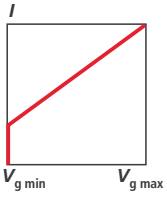
LR
Power controller



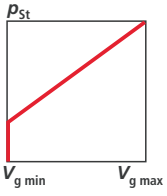
DR
Pressure controller



EP
Electrical control with proportional solenid



HD
Hydraulic control, pilot pressure-related



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

Variable displacement pumps

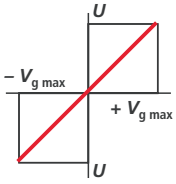
- Size 450
- Axial piston swashplate design
- Variable displacement pump for the closed circuit and preload operation
- Series 3

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 (ca.)		m	kg	420

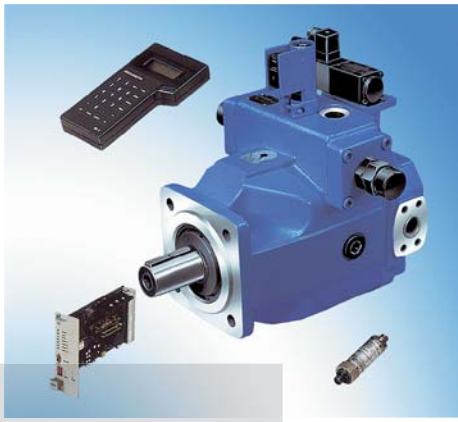
HS/HS3
Hydraulic displacement control (servo-/proportional valve)



V_g = displacement
U = control voltage

Electronics for axial piston units

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



Type of component		For controlling		Detailed information:
Sensors				
HM 16	Pressure transducer	A10VS	DFEE	RE 30266
Open-loop control electronics, **analogue**				
VT 2000	Amplifier for proportional valves	A10VS / A4VS	DRG	RE 29904
VT-VSPA1(K)-1	Amplifier for proportional valves	A10VS / A4VS	DRG	RE 30111
VT 3000	Amplifier for proportional valves	A10VS / A4VS	DRG	RE 29935
VT 5003	Amplifier for proportional valves	A10VS / A4VS	DRG	RE 29945
Closed-loop control electronics, **analogue**				
VT 5035	Amplifier for flow control	A4VS	EO	RE 29955
VT 11019	Amplifier for flow control	A10VS	FE	RE 29763
VT-SR7	Amplifier for flow control	A4VS	HS	RE 29993
SYDFE1, SYDFEE, SYDFEC	Closed-loop control systems for A10VSO…		DFE	RE 30024, RE 30030, RE 30027
VT 5041	Closed-loop control system for A4VS		DFE	RE 30240
Closed-loop control electronics, **digital**				
VT 12350	Closed-loop control system for A4VS…HS3			RE 30021
Accessories				
VT 3002	Card holder			RE 29928
VT 12302	Enclosed card holder			RE 30103
VT 12304	Interface converter			RE 30104
VT 19101 to 19110	19" racks			RE 29768
VT-NE30 to VT-NE32	Compact power supply units			RE 29929
VTS 0102	FUW1 frequency/voltage converter			RE 29761
VT 12321	BB-3 hand-held control box			RE 29798
BODIV	PC program for digital amplifier cards			RE 29899

External gear pumps

- Sizes 1 to 56
- Plain bearings for high loads
- Drive shafts according to ISO or SAE
- Combination of several pumps possible
- Line connections: Connecting flanges or pipe thread
- Silence version:
  - Optimized pressure pulsation reduces noise emission and excitation of vibration in the system
  - Significantly longer service life due to reinforced shaft and housing

Type AZP

Detailed information:
– 1987760100
– RE 98240
– RE 10095
(Silence version)

Frame size B	**Size**		**1**	**2**	**3**	**4**	**5**
Displacement	$V_{g\,max}$	cm^3	1	2	3	3.8	4.6
Operating pressure [1]	p	bar	230	230	230	210	160
Power at 1450 min^{-1}	P_{Antr}	kW	0.62	1.24	1.85	2.14	1.98
Speed range [2]	n	min^{-1}	750 to 6000				
Weight (ca.)	m	kg	0.8	0.86	0.9	0.9	0.9

Frame size F	**Size**		**4**	**5**	**8**	**11**	**14**	**16**	**19**	**22**
Displacement	$V_{g\,max}$	cm^3	4	5.5	8	11	14	16	19	22.5
Operating pressure [1]	p	bar	280	280	280	280	280	280	230	210
Power at 1450 min^{-1}	P_{Antr}	kW	3.01	4.14	6.01	8.27	10.5	12	11.7	12.7
Speed range [2]	n	min^{-1}	500 to 4000							
Weight (ca.)	m	kg	2.8	2.85	2.9	3	3.2	3.4	3.6	3.8

Silence version	**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
Operating pressure [1]	p	bar	280	280	280	280	280	280	280	250	225	200
Power at 1450 min^{-1}	P_{Antr}	kW	3.01	4.14	6.01	8.27	10.5	12	14.3	15.1	15.1	15
Speed range [2]	n	min^{-1}	500 to 4000									
Weight (ca.)	m	kg	2.8	2.85	2.9	3	3.2	3.4	3.6	3.8	–	–

Frame size N	**Size**		**20**	**22**	**25**	**28**	**32**	**36**
Displacement	$V_{g\,max}$	cm^3	20	22.5	25	28	32	36
Operating pressure [1]	p	bar	250	250	250	230	200	180
Power at 1450 min^{-1}	P_{Antr}	kW	13.4	15.1	16.8	17.3	17.2	17.4
Speed range [2]	n	min^{-1}	500 to 3000					
Weight (ca.)	m	kg	5.4	5.5	5.6	5.7	5.9	6

Frame size G	**Size**		**22**	**28**	**32**	**38**	**45**	**56**
Displacement	$V_{g\,max}$	cm^3	22.5	28	32	38	45	56
Operating pressure [1]	p	bar	250	250	250	250	230	200
Power at 1450 min^{-1}	P_{Antr}	kW	15.1	18.8	21.5	25.5	27.8	30.1
Speed range [2]	n	min^{-1}	500 to 3000					
Weight (ca.)	m	kg	9	9.2	9.4	9.7	9.9	10.4

[1] intermittent
[2] depending on size

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

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	3.1
Speed range		n_{max}	min^{-1}	600 to 4500 [3]					
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		n_{max}	min^{-1}	600 to 3600 [3]						
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		n_{max}	min^{-1}	500 to 3600 [3]				
Weight		m	kg	3.3	3.7	4.1	4.5	4.9

Detailed information:
RE 10213

[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 sizes can be combined with each other
- Can be combined with vane pumps and axial piston pumps

Type PGH

Detailed information:
RE 10223

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
Speed	n_{min}	min^{-1}						600	600	600
	n_{max}	min^{-1}						3000	3000	3000
Weight (ca.)	m	kg						4.3	4.8	5

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
Speed	n_{min}	min^{-1}						600	600	600
	n_{max}	min^{-1}						3000	3000	3000
Weight (ca.)	m	kg						5.9	6.2	6.4

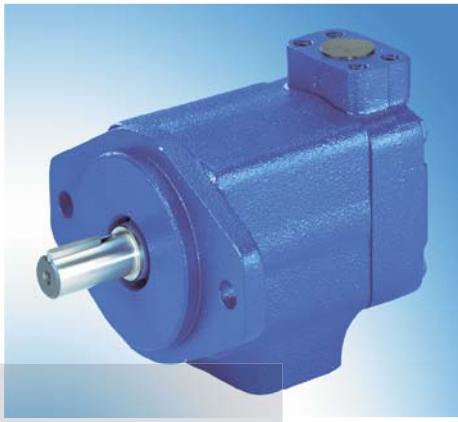
Frame size 4	**Size**		**20**	**25**	**32**	**40**	**50**	**63**	**80**	**100**
Nominal pressure		bar	250	250	250	250	250	210	210	160
Displacement	$V_{g\,max}$	cm^3	20.1	25.3	32.7	40.1	50.7	65.5	80.3	101.4
Operating pressure [1]	p_{max}	bar	315	315	315	315	315	250	250	210
Speed	n_{min}	min^{-1}	500	500	500	500	500	400	400	400
	n_{max}	min^{-1}	3000	3000	3000	2600	2600	2600	2200	2200
Weight (ca.)	m	kg	13.5	14	14.5	15	16	17	18.5	20

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
Speed	n_{min}	min^{-1}	400	400	400	400	300	300	300
	n_{max}	min^{-1}	2600	2200	2200	2200	1800	1800	1800
Weight (ca.)	m	kg	39	40.5	42.5	45	49	52.5	57.5

[1] intermittent

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



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]	at 1450 min^{-1}	P_{hyd}	kW	11	16	21	18	18
Speed range		n	min^{-1}			on inquiry [3]		
Weight		m	kg	12	12	12	12	12
Frame size 2		**Size**		**40**	**45**	**55**	**60**	**68**
Nominal pressure [1]		p_{max}	bar	210	210	210	210	210
Displacement		$V_{g\,max}$	cm^3	40	45	55	60	68
Power [2]	at 1450 min^{-1}	P_{hyd}	kW	22	26	32	34	37
Speed range		n	min^{-1}			on inquiry [3]		
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]		p_{max}	bar	210	210	210	210	210
Displacement		$V_{g\,max}$	cm^3	69	82	98	113	122
Power [2]	at 1450 min^{-1}	P_{hyd}	kW	38	45	55	60	65
Speed range		n	min^{-1}			on inquiry [3]		
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]	at 1450 min^{-1}	P_{hyd}	kW	69	75	80	90	95
Speed range		n	min^{-1}			on inquiry [3]		
Weight		m	kg	34	34	34	34	34

Detailed information:
RE 10335

[1] intermittent
[2] at max., continuous operating pressure; hydraulic fluid temperature $\vartheta = 50$ °C
[3] depending on size

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
- Available as completely assembled, compact "MPU" drive unit (pump and electric motor)
- Low hysteresis
- Very short control times
- Pump combination possible with standard pumps
- Mounting and connection dimensions to VDMA 24 560/1 and ISO 3019/2

Type PV7

Detailed information:
RE 10515

Frame size				**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	at1450 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

Vane pumps, direct operated

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

Type PV7...A

Detailed information:
RE 10522

Frame size				**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}		1000 to 1800		
Weight		*m*	kg	6.3	6.3	11.4	11.4

Radial piston pumps, fixed displacement

- Sizes 1.6 to 20.0
- Radial piston pump with 3, 5 or 10 pistons
- Self-aspirating, valve-controlled
- Very low noise
- 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, gear and axial piston pumps
- 14 sizes, favourable gradation for optimum matching to the application at hand

Type R4

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	6.8	6.8	6.8	8.6	8.6	12.7	12.7

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	6.8	6.8	6.8	8.6	8.6	12.7	12.7

Detailed information:
RE 11263

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 R4-Mini

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

Detailed information:
RE 11260

[1] Depending on size

Combination pumps

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

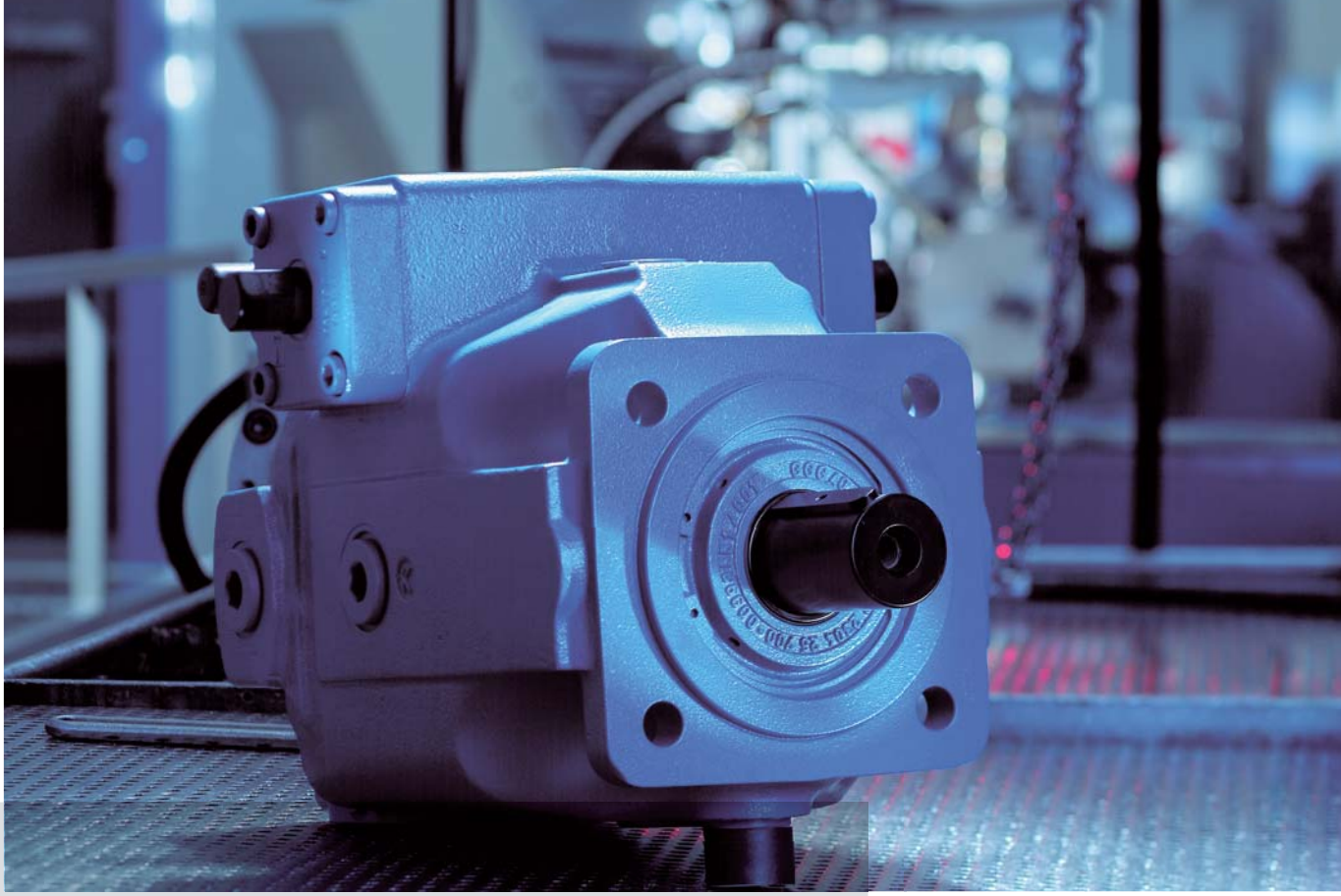
Numerous optional combinations

Detailed information:
See data sheet of front pump

• = included in product range
– = not avaialble

Multiple combinations on inquiry

Front pump	Rear pump: PV7	PGH/PGF	R4	R4-Mini	AZP	A10	PVV/PVQ
PV7	•	•	•	•	•	•	•
PGH/PGF	–	•	•	•	•	•	•
R4	–	–	–	–	•	–	–
AZP	–	–	–	–	•	–	–
A10	–	•	–	–	•	•	•



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

Radial piston eccentric units

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

Performance profile

- Swept volume up to 10802 cm^3
- Max. speed up to 800 min^{-1}
- Continuous power up to 370 kW
- Torque up to 40000 Nm

Fixed displacement motors

- Sizes 5 to 1000
- Axial tapered piston bent-axis design
- Open and closed circuit
- Series 6
- The standard motor is suitable for all fields of application
- Brake valves can be fitted directly
- Integrated or built-on flushing valves
- 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 (ca.)		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 (ca.)		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	2500
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 (ca.)		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 (ca.)		m	kg			110	155	322	336

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

Fixed displacement motors

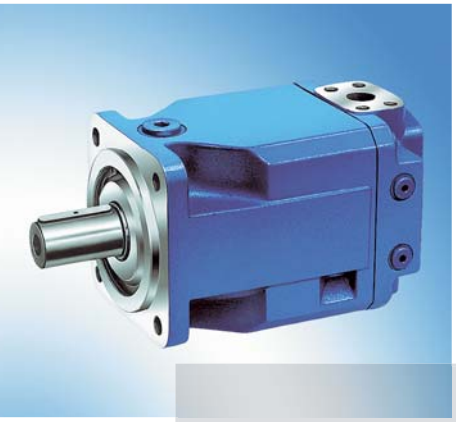
- Sizes 18 to 63
- Axial piston swashplate design
- Open and closed circuit
- Series 5
- High permissible output speeds
- SAE version
- Option: integrated flushing and boost pressure valve

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	75.6	115	134	154	178	209	215
Power	$\Delta p = 280$ bar	P_{max}	kW	35.3	43.6	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 (ca.)		m	kg	6	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 circuit
- Series 1 and 3
- The small A4FM motor is the ideal supplement to the A2FM bent-axis motor
- Long service life
- Operation with HF hydraulic 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 (ca.)		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 (ca.)		m	kg	34	61	120	

Variable displacement motors

- Sizes 28 to 1000
- Axial piston bent-axis design
- Open and closed circuit
- Series 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
- Compact build
- Good efficiency
- Option: 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

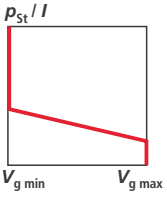
Size		**A6VM/A6VE**		**28**	**55**	**80**	**107**	**140** [2]	**160**	**200** [2]
Nom. pressure			bar	400	400	400	400	400	400	400
Peak pressure			bar	450	450	450	450	450	450	450
Swept volume (size)		$V_{g\,max}$	cm^3	28.1	54.8	80	107	140	160	200
Speed [1]	at $V_{g\,max}$	n_{max}	min^{-1}	5550	4450	3900	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	178	348	510	679	891	1016	1273
Weight (ca.)		m	kg	16	26	34	47	60	64	80

Size		**A6VM**		**250** [5]	**355**	**500**	**1000**
Nom. 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	365	464	583	933
Torque [4]		T	Nm	1391	1978	2785	5571
Weight (ca.)		m	kg	90	170	210	430

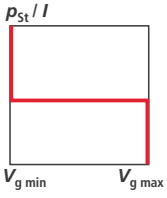
Detailed information:
– A6VM: RE 91604
– A6VE: RE 91606

[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

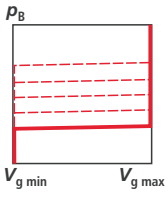
HD / EP
Hydr. control, pilot pressure-related / el. control with proportional solenoid



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, 45 and 63
- Axial piston swashplate design
- Open and closed circuit
- Series 5
- Hydraulic or electrical two-point control
- High permissible output speeds
- SAE version

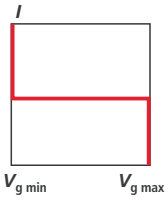
Type A10VM

Detailed information:
RE 91703

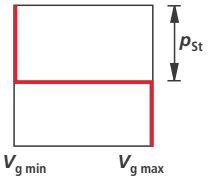
Size				28	45	63
Nominal pressure			bar	280	280	280
Peak pressure			bar	350	350	350
Swept volume		$V_{g\,max}$	cm^3	28	45	62
Speed [1]	at $V_{g\,max}$	n_{max}	min^{-1}	4700	4000	3300
	at $V_{g\,min}$	n_{max}	min^{-1}	5300	4600	3800
Inlet flow	at n_{max}	$q_{V\,max}$	L/min	131,6	180	205
Power	$\Delta p = 280$ bar	P_{max}	kW	61	84	95
Torque	$\Delta p = 280$ bar	T_{max}	Nm	125	200	276
Weight (ca.)		m	kg	14	18	26

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

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



HZ/HZ6
Hydraulic two-point control

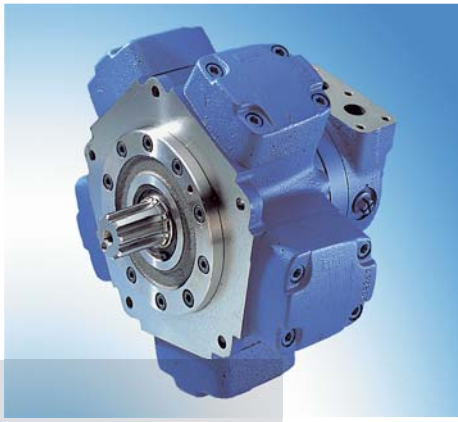


DG
Direct operated
two-point control

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

Radial piston eccentric units

- 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 (ca.)	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 (ca.)	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 (ca.)	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 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, CETOP, etc.
- Piston Ø 25 up to 1500 mm
- Stroke length up to 44000 mm
- Seal systems
- Integrated position measuring systems
- Integrated proximity switches

Tie rod design

- 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
– H160CA:	1987761512
– CD70:	RE 17016
– C80H:	1987761514
– CDW160:	RE 17014
– VBH:	RE 17047
– CD210:	RE 17017

Series		**CDT3…F** [1]	**CD70** [1]
Nominal pressure	bar	160 [2]	70
Piston Ø	mm	25 to 200	25 to 200
Piston rod Ø	mm	12 to 140	12 to 140
Mounting types		14	16
Max. stroke length	mm	3000	3000
Max. stroke speed	m/s	0,5	0,5

Series		**C80H**	**CDW160** [3]
Nominal pressure	bar	80	160
Piston Ø	mm	32 to 160	40 to 200
Piston rod Ø	mm	18 to 110	28 to 140
Mounting types		6	5
Max. stroke length	mm	1500	1700
Max. stroke speed	m/s	1	1

Series		**VBH** [4]	**CD210** [5]
Nominal pressure	bar	200	210
Piston Ø	mm	25 to 125	14 to 200
Piston rod Ø	mm	16 to 70	16 to 140
Mounting types		4	16
Max. stroke length	mm	160	3000
Max. stroke speed	m/s	0,5	0,5

[1] installation dimensions to DIN 24 554 and ISO 6020/2
[2] operating pressures up to 210 bar possible
[3] with integrated position transducer
[4] according to CNOMO 05.07.65 to 05.07.71
[5] installation dimensions to N.F.P.A and JIC

Mill type design

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

Series		**CDL1** [1]	**CDM1** [2]	**CDH1** [1]	**CDH2** [3]	**CDH3** [1]
Nominal pressure	bar	160	160	250	250	350
Piston Ø	mm	25 to 200	25 to 200	40 to 320	40 to 320	40 to 320
Piston rod Ø	mm	14 to 110	14 to 140	22 to 220	22 to 220	28 to 220
Mounting types		7	9	6	6	6
Max. stroke length	mm	3000	3000	6000	6000	6000
Max. stroke speed	m/s	0.5	0.5	0.5	0.5	0.5

Series		**C160TH/BH** [4]	**A60/A120H**	**C160SV/SVP/SVU** [5]
Nominal pressure	bar	160	80/130	160
Piston Ø	mm	32 to 160	40 to 80	40 to 80
Piston rod Ø	mm	16 to 110	22 to 56	22 to 45
Mounting types		7	12	4
Max. stroke length	mm	4500	3000	1500
Max. stroke speed	m/s	1	1	1

Detailed information:
– CDL1: RE 17325
– CDM1: RE 17328
– H160M: 1987761513
– CDH1: RE 17331
– CDH2: RE 17334
– CDH3: RE 17337
– H250E: 1987761515

– C160TH/BH: 1987761503
– A60/A120H: 7472999315
– C160SV/SVP/SVU: BEY 015/2

[1] inst. dimensions to Rexroth
[2] installation dimensions to ISO 6020/1 and CETOP RP 58 H
[3] installation dimensions to DIN 24 333, ISO 6022 and CETOP RP 73 H
[4] installation dimensions to ISO 6020/1
[5] with integrated position transducer

On/off valves

Directional valves

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

Performance profile

- Size 6 and size 10 direct operated:
  Max. operating pressure 350 bar
  Max. flow 120 L/min
- Sizes 10 to 32 pilot operated:
  Max. operating pressure 350 bar
  Max. flow 1100 L/min
- Porting patterns internationally standardized
- Numerous spool symbols and types of operation

Pressure, flow control 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 control valves:
  Pressure relief valves
  Pressure reducing valves
  Pressure sequencing and
  Pressure cut-off valves
- Flow control valves:
  Throttle valves
  Flow control valves
- Isolator valves:
  Check valves
  Pilot operated check valves

2-way cartridge valves (logic elements)

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
- Max. operating pressure 420 bar
- Directional function
- Pressure function

Check valves

- Sizes 6 to 30
- Leak-free isolation in one direction
- For threaded connection
- 4 different opening pressures

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

Check valve cartridge units

- Sizes 6 to 30
- Leak-free isolation in one direction
- Plug screw with pipe thread or metric ISO thread
- Installation in manifolds:
  – As right-angled cartridge valve (version "KE")
  – As straight cartridge valve (version "KD")
- 5 different opening pressures

Type M-SR

Detailed information:
RE 20380

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

Check valves of sandwich pate design

- Sizes 6 and 10
- Porting pattern to DIN 24 340 form A, ISO 4401 and CETOP–RP 121 H
- 8 check functions
- 3 different opening pressures
- Optionally with
  – Metal seal: Type Z1S…-3X/V ($v_{hydraulic\ fluid} > 4$ m/s)
  – Soft seal: Type Z1S…1-2X/VW4 ($v_{hydraulic\ fluid} < 4$ m/s)

Type Z1S

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

Detailed information:
– Size 6: RE 21533
– Size 10: RE 21536

Pilot operated check valves of sandwich plate design

- Sizes 6 to 22
- Porting pattern to DIN 24 340 form A, ISO 4401 and CETOP–RP 121 H
- For the leak-free isolation of one or two actuator ports, even over longer times at rest
- At least 3 different opening pressures

Type Z2S

Size			**6**	**10**	**16**	**22**
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

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

Pilot operated check valves of sandwich plate desgn (210 bar version)

- Sizes 6 and 10
- Porting pattern to DIN 24 340 form A, ISO 4401 and CETOP–RP 121 H
- For the leak-free isolation of two actuator ports

Type Z2SRK

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

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

Pilot operated check valves

- Sizes 6 to 32
- With optional leak-oil port
- With optional pre-decompression (sizes 10 to 32 only)
- For subplate mounting ("P"):
  - Size 6: Porting pattern DIN 24 340 form A, ISO 4401 and CETOP–RP 121 H, subplates to RE 45052
  - Sizes 10 to 32: Porting pattern DIN 24 340 form D, ISO 5781 and CETOP–RP 121 H, subplates to RE 45062
- For threaded connection ("G") (sizes 10 to 32 only)
- 4 different opening pressures

Types SV and SL

Detailed information:
– Size 6: RE 21460
– Sizes 10 to 32: RE 21468
– Sizes 52 to 150: on inquiry

Size				**6**	**10**	**16**
Series				6X	4X	4X
Operating pressure		p_{max}	bar	315	315	315
Pilot control		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**
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	–

Size				**52 to 150**
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

[1] not for sizes 125 and 150

Shut-off valves of sandwich plate design

- Sizes 6 and 10
- Spool and seat valve version
- Porting pattern to ISO 4401

Detailed information:
1987761012

Size			**6**	**10**
Operating pressure	p_{max}	bar	250	250
Flow	$q_{V\,max}$	L/min	50	100

Pre-fill valves

- Pilot operated check valve
  - For flanged connection
  - For tank installation

Type SF

Size			**125 to 400**
Operating pressure	p_{max}	bar	350

Detailed information:
RE 20482

Pre-fill valves

- Pilot operated check valve
  - For threaded connection (size 32)
  - For flanged connection (from size 40 on)
- For mounting directly onto the working cylinder
- With or without decompression
- Integrated high pressure port

Type SFA

Size			**32 to 80**
Operating pressure	p_{max}	bar	350

Detailed information:
RE 20485

Pre-fill valves

- Pilot operated check valve of sandwich plate design
  - For flanged connection
  - For in-line installation
- Solenoid operated unloading through built-on directional valve

Types ZSF and ZSFW

Detailed information:
RE 20478

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

Pre-fill valves

- Pilot operated check valve
  - For block installation
  - For integration into cylinder

Type SFE

Detailed information:
RE 20745

[1] sizes 63 and 80 on inquiry

Size			25 to 80 [1]
Operating pressure	p_{max}	bar	350

Directional poppet valve, direct operated

- Sizes 6 and 10
- Porting pattern to DIN 24 340 form A, ISO 4401 and CETOP–RP 121 H
- 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 22 049
– Type SEW: RE 22 058

Size 10
– Type SED: RE 22 045
– Type SEW: RE 22 075

Directional poppet valves, direct operated with mechanical or fluidic actuation

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

Types SMM; 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 spool valves, direct operated, with fluidic actuation

- Sizes 6 to 32
- Porting pattern to DIN 24 340 form A, ISO 4401 and CETOP–RP 121 H
- Optional stroke adjustment (types H-WH, WH; size 10)
- Position monitoring by inductive position switch
- Hydraulic operation (types WH and WHD)
- Pneumatic operation (types WN and WP)

Detailed information:
– Size 6
Types WH, WP: RE 22 282

– Size 10
Types WHD, WP, WN:
RE 22 331

– Sizes 10 to 32
Types H-WH, WH: RE 24 751

Types WH, WHD, WN and WP

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

Size			**22**	**25**	**32**
Type			H-WH, WH	H-WH, WH	H-WH, WH
Operating pressure	p_{max}	bar	350/280	350/280	350/280
Flow	$q_{V\,max}$	L/min	450	650	1100

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

- Sizes 4 to 22
- Porting pattern to DIN 24 340 form A, ISO 4401 and CETOP–RP 121 H
- As cartridge valve (RE 23 140, version "K")
- Position monitoring by
  – inductive position switch or
  – mechanical position switch
- Operation by means of
  – lever (type WMM)
  – roller (type WMR, WMU)
  – rotary knob (type WMD)

Detailed information:
– Size 6: RE 22280
RE 22284
– Size 10: RE 22312
RE 22331
– Sizes 16 and 22:
RE 22371
– Size 32: RE 23778

Types WMM, WMR, WMU and WMD

Size			**6**	**10**
Type			WMM, WMR, 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

- Sizes 4 to 10
- Wet-pin AC or DC solenoids
- Solenoids with detachable coil
- For subplate mounting ("P"): Porting pattern to DIN 24 340 form A, ISO 4401 and CETOP–RP 121 H
- Electrical connection as individual connection or central connection
- Optional inductive position monitoring (RE 24830)
- Smooth switching characteristics [3]

Type WE

Size						**4**
Version						"P"
Operating pressure	p_{max}	bar				210
Flow	$q_{V\,max}$	L/min				30
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 4:
RE 23161 ("P")
– Size 6:
RE 23163 [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, 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 (sizes 10 and 22)
- Spring or pressure centering (sizes 16, 25 and 32)
- Optional manual override
- Porting pattern to DIN 24 340 form A, ISO 4401 and CETOP–RP 121 H
- 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, 22, 25 and 32), optional (RE 24830)
- Position monitoring by means of inductive position switch (RE 24830)
- Preload valve in the P-channel of the main valve for sizes 16, 22, 25 and 32

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

Type WEH

Size					**10**	**10**
Type					4WEH	H-4WEH
Operating pressure	p_{max}	bar			280	350
Flow	$q_{V\,max}$	L/min			160	160

Size					**16**	**16**
Type					4WEH	H-4WEH
Operating pressure	p_{max}	bar			280	350
Flow	$q_{V\,max}$	L/min			300	300

Size					**22**	**22**
Type					4WEH	H-4WEH
Operating pressure	p_{max}	bar			280	350
Flow	$q_{V\,max}$	L/min			450	450

Size				**25**	**32**	**32**
Type				H-4WEH	4WEH	H-4WEH
Operating pressure	p_{max}	bar		350	280	350
Flow	$q_{V\,max}$	L/min		650	1100	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

Directional poppet valves, direct operated (high performance)

- Size 1
- Direct operated directional seat valve with solenoid actuation
- 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 manual override (optional)
- Leak-free on both sides (version 2/2)

Types KSDER and KSDEU

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	12	6

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

Directional poppet valves, direct operated

- Size M20 x 1.5
- Direct operated directional poppet valve with solenoid actuation
- 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 manual override
- Leak-free on both sides

Type M20 x 1.5

Version			**2/2**
Operating pressure	p_{max}	bar	160/270
Flow	$q_{V\ max}$	L/min	30

Detailed information:
RE 18136-18

Directional spool valves, direct operated (high performance)

- Size 1
- Direct operated directional spool valve with solenoid actuation
- Fluid can flow through the valve in both directions
- Positive overlap prevents switching shocks
- Wet-pin DC solenids
- Solenoid coil can be rotated
- With concealed manual override (optional)

Type KKDER

Detailed information:
– 2/2: RE 18136-06
– 3/2: RE 18136-04
– 4/2: RE 18136-05

Version			**2/2**	**3/2**	**4/2**
Operating pressure	p_{max}	bar	350	350	350
Flow	$q_{V\ max}$	L/min	40	60	50

Pressure relief valves, direct operated

- Sizes 6 to 30
- For subplate mounting ("P")
- For threaded connection ("G")
- As cartridge valve ("K")
- Valves in accordance with Pressure Equipment Directive 97/23/EC
- 3 optional pressure adjustment elements:
  - Threaded pin with hexagon socket and protective cap
  - Rotary knob / hand wheel
  - Lockable rotary knob

Type DBD

Size			**6**	**8**	**10**	**15**
Version			"P, G, K"	"G"	"P, G, K"	"G"
Operating pressure	p_{max}	bar	400	400	630	400
Flow	$q_{V\ max}$	L/min	50	120	120	250

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

Detailed information:
RE 25402

Pressure relief valves, direct operated, (standard performance)

- Size 0
- Direct operated pressure relief valve with mechanical actuation
- High power density
- 4 different pressure stages
- Versatile use for simple pressure limitation function

Type KBD

Size			**0**
Operating pressure	p_{max}	bar	350
Flow	$q_{V\ max}$	L/min	40

Detailed information:
RE 18105-01

Pilot pressure control valves

- Size 6
- For mounting onto valve cover
- Pressure relief function with up to 2 pressure stages and various directional valve controls
- Pilot control also via proportional valves
- Realization of cuttin-in and cutting-off functions

Detailed information:
1987761105

Size				6
Operating pressure		p_{max}	bar	315

Pressure relief valves, pilot operated

- Sizes 6 to 30
- For subplate mounting ("P"): Porting pattern to DIN 24 340 form E, ISO 6264 and CETOP–RP 121 H
- For block installation ("C")
- For threaded connection ("G")
- As cartridge valve ("K")
- Solenoid operated unloading via built-on directional spool valve or directional poppet valve
- Switching shock damping, optional (type DBW. only)
- Valves in accordance with Pressure Equipment Directive 97/23/EC
- 4 pressure adjustment elements, optional:
  – Rotary knob
  – Sleeve with hexagon and protective cap
  – Lockable rotary knob with scale
  – Rotary knob with scale

Types DB, DBW

Detailed information:
– Sizes 6 and 10:
Series 4X ("K" only) RE 25731 [3]

– Sizes 10 to 30:
Series 5X: RE 25802 [1]

– Sizes 10, 15, 20:
Series 4X: RE 25818 [2]

– Size 20
Series 1X ("K" only):RE 25818 [4]

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

Pressure relief valves of sandwich plate design, pilot operated

- Sizes 6 and 10
- Porting pattern to DIN 24 340 form A, ISO 4401 and CETOP–RP 121 H
- 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 adjustment elements:
  – 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 of sandwich plate design, pilot operated (210 bar series)

- Sizes 6 and 10
- Porting pattern to DIN 24 340 form A, ISO 4401 and CETOP–RP 121 H
- 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

Pressure relief valves, direct operated

- Sizes 6 and 10
- For subplate mounting ("P")
- For threaded connection ("G")
- As cartridge valve ("K")
- Valves in accordance with Pressure Equipment Directive 97/23/EG
- Adjustment elements, optional:
  - Grub screw with slot and protective cap
  - Grub screw with hexagon socket
  - Rotary knob / hand wheel
  - Lockable rotary knob

Detailed information:
1987760711

[1] horizontal and vertical versions

Size			6	6	10	10
Version			"K, G"	"P" [1]	"K, G"	"P"
Operating pressure	p_{max}	bar	350	315	350	300
Flow	$q_{V\,max}$	L/min	60	60	120	120

Pressure relief valves of sandwich plate design, direct operated

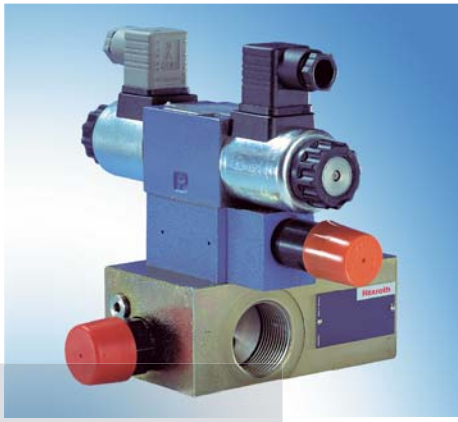
- Sizes 6 and 10
- Porting pattern to ISO 4401
- 3 pressure stages: 80, 160, 315 bar
- 5 pressure relief functions:
  A – T, P – T, B – T, A – T and B – T, A – B and B – A
- Adjustment elements:
  - Grub screw with hexagon socket
  - Rotary knob with scale
  - Lockable rotary knob with scale

Detailed information:
1987761012

Size			6	10
Operating pressure	p_{max}	bar	315	315
Flow	$q_{V\,max}$	L/min	60	90/120

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
- Valves in accordance with Pressure Equipment Directive 97/23/EC



Types DBA, DBAW and DBAE

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

Detailed information:
RE 25890

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)
- Valves in accordance with Pressure Equipment Directive 97/23/EC
- 4 pressure adjustment elements, optional:
  – Rotary knob
  – Sleeve with hexagon and protective cap
  – Lockable rotary knob with scale
  – Rotary knob with scale

Types DBA, DBAW

Size				32	40
Operating pressure		p_{max}	bar	420	420
Flow	– without check valve	$q_{V\ max}$	L/min	600	650
	– with check valve	$q_{V\ max}$	L/min	350	450

Detailed information:
RE 25880

Pressure reducing valves, pilot operated

- Sizes 10 to 30
- For subplate mounting ("P"): Porting pattern to DIN 24 340 form D, ISO 5781 and CETOP–RP 121 H
- For block installation ("C")
- For threaded connection ("G")
- As cartridge valve ("K")
- 4 pressure stages
- 4 pressure adjustment elements, optional:
  – 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

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

– Size 10; 15; 20, series 4X: RE 26893 [2]

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

Size				**10** [1]	**10** [2]	**15** [2]	**20** [2]
Secondary pressure, adjustable		p_{max}	bar	350	315	350	315
Flow	"P"	$q_{V\,max}$	L/min	150	80	–	160
	"G"	$q_{V\,max}$	L/min	150	80	160	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

Pressure reducing valves, direct operated

- Sizes 6 and 10
- Porting pattern
  – Size 6 to DIN 24 340 form A, ISO 4401 and CETOP–RP 121 H
  – Size 10 to DIN 24 340 form D, ISO 5781 and CETOP–RP 121 H
- 5 pressure stages
- 4 pressure adjustment elements, optional:
  – 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**
Series			5X	4X
Secondary pressure, adjustable	p_{max}	bar	315	210
Flow	$q_{V\,max}$	L/min	60	80

Pressure reducing valves of sandwich plate design, direct operated

- Sizes 6 and 10
- Porting pattern to DIN 24 340 form A, ISO 4401 and CETOP–RP 121 H
- Pressure reduction in channel A, B or P
- 4 pressure stages: 25, 75, 150, 210 bar
- 4 adjustment elements:
  – Rotary knob
  – Sleeve with hexagon and protective cap
  – Lockable rotary knob with scale
  – Rotary knob with scale
- Check valve, optional

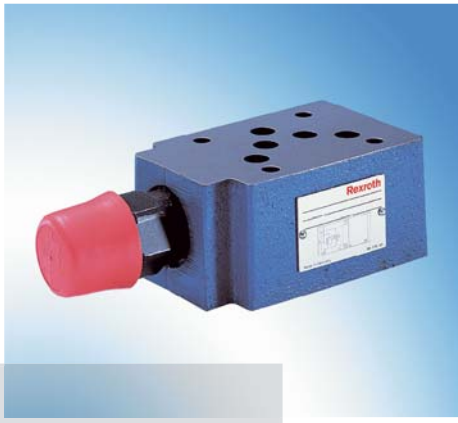
Type ZDR.D

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

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

Pressure reducing valves of sandwich plate design, pilot operated

- Size 10
- Porting pattern to DIN 24 340 form A, ISO 4401 and CETOP–RP 121 H
- Pressure reduction in channel A, B or P
- 4 pressure stages: 50, 100, 200, 315 bar
- 4 adjustment elements:
  – Rotary knob
  – Sleeve with hexagon and protective cap
  – Lockable rotary knob with scale
  – Rotary knob with scale
- Check valve, optional



Type ZDR10V

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

Detailed information:
RE 26861

Pressure reducing valves of sandwich plate design, pilot operated (210 bar series)

- Sizes 6 and 10
- Porting pattern to DIN 24 340 form A, ISO 4401 and CETOP–RP 121 H
- 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

Pressure sequencing valves, direct operated

- Sizes 6 and 10
- Porting pattern
  - Size 6 to DIN 24 340 form A, ISO 4401 and CETOP–RP 121 H
  - Size 10 to DIN 24 340 form D, ISO 5781 and CETOP–RP 121 H
- 4 pressure adjustment elements, optional:
  - Rotary knob
  - Sleeve with hexagon and protective cap
  - Lockable rotary knob with scale
  - Rotary knob with scale
- Check valve, optional

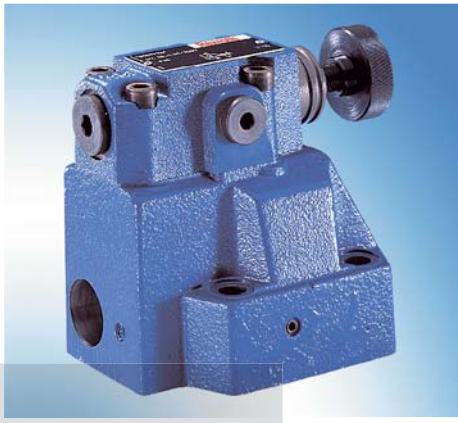
Type DZ.D

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

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

Pressure sequencing valves, pilot operated

- Sizes 10, 20, 30
- For subplate mounting ("P"): Porting pattern to DIN 24 340 Form D, ISO 5781 and CETOP–RP 121 H
- For block installation ("C")
- Suitable for use as preload, sequencing and by-pass valve
- 4 pressure adjustment elements, optional:
  - Rotary knob
  - Sleeve with hexagon and protective cap
  - Lockable rotary knob with scale
  - Rotary knob with scale
- Check valve, optional



Type DZ

Size			**10**	**20**	**30**
Version			"P"	"P"	"P, C"
Sequencing pressure	p_{max}	bar	315	315	315
Flow	$q_{V\ max}$	L/min	200	400	600

Detailed information:
RE 26391

Pressure cut-off valves, pilot operated

- Sizes 6 to 30
- For subplate mounting ("P"):
  Porting pattern to DIN 24 340 form A, ISO 4401 and CETOP–RP 121 H
- For block installation ("C")
- As cartridge valve ("K")
- Solenoid operated unloading via built-on directional valve (sizes 10, 20, 30)
- 4 pressure adjustment elements, optional:
  – Rotary knob
  – Sleeve with hexagon and protective cap
  – Lockable rotary knob with scale
  – Rotary knob with scale

Type DA

Detailed information:
– Size 6, series 4X: RE 26404
– Sizes 10; 20; 30, series 5X: RE 26411

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

Size				6	10	25	30
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

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

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

Double throttle check valves of sandwich plate design

- Sizes 6 to 22
- Porting pattern to DIN 24 340 form A, ISO 4401 and CETOP–RP 121 H
- For limiting the main or pilot flow of one or two actuators
- Meter-in or meter-out throttling
- 4 adjustment elements:
  - Rotary knob
  - Sleeve with hexagon and protective cap
  - Lockable rotary knob with scale
  - Rotary knob with 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 of sandwich plate design

(210 bar series)

- Sizes 6 and 10
- Porting pattern to DIN 24 340 form A, ISO 4401 and CETOP–RP 121 H
- 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

2-way flow control valves

- Sizes 6 to 16
- For subplate mounting:
  – Size 6: Porting pattern to DIN 24 340 form A, ISO 4401 and CETOP–RP 121 H
  – Sizes 10 and 16: Porting pattern to DIN 24 340 form G, ISO 6263 and CETOP–RP 121 H
- 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

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

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

[1] with rectifier sandwich plate up to 210 bar

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
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 flow control valves

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

Type 2FRM.K

Detailed information:
RE 28155

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

2-way flow control valves of sandwich plate design

- Size 6
- Porting pattern to DIN 24 340 form A, ISO 4401 and CETOP–RP 121 H
- 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 cartridge valves with directional function

- Sizes 16 to 160
- Valve poppet with or without damping nose
- 4 different springs/opening pressures
- 4 stroke limiters
- Control cover with integrated poppet or shuttle valve
- Control cover for mounting directional poppet valves and integrated shuttle valve, optional
- Control cover for mounting directional spool valves and integrated shuttle valve, optional
- Power part as cartridge valve in standardized mounting cavity (DIN ISO 7368, however, only up to size 100), closed by control cover
- Area ratio:
  – Type LC..A: 2:1
  – Type LC..B: 14.3:1
- With electrical control of the closed position

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

Detailed information:
RE 21010

[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
- Cartridge:
  – with directional poppet valve (version "E")
  – with directional spool valve (version "D")
- Power part as cartridge valve in standardized mounting cavity (DIN ISO 7368), closed by control cover
- Various control valves for manual or electrical-proportional pressure adjustment, optional
  – Integrated in the control cover
  – Mounted onto the control cover as pilot valve (connection dimensions to DIN 24 340)
- 7 pressure stages, optional: 25, 50, 100, 200, 315, 400 or 420 bar

Detailed information:
RE 21050

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

2-way cartridge valves with pressure sequencing function

- Sizes 16 to 50
- Cartridge with directional poppet valve ("E") or directional spool valve ("D") (type LC..DB)
- Control cover (type LFA..DZ)
- Control cover for PS function with pressure-independent sequencing (type LFA..DZW)
- Pressure-independent sequencing of a second system (e.g. high-pressure/low-pressure coupling of two pumps), optional
- Pressure-independent selection of the required spool position by means of electrically operated pilot control valve, optional (not included in the scope of supply)
- Power part as cartridge valve in standardized mounting cavity (DIN 24 342), closed by control cover
- Pilot control valves for manual pressure adjustment, optional
  – Integrated in the control cover
  – Mounted onto the control cover as pilot valve (connection dimensions to DIN 24 340)
- Various settable max. sequencing pressures (up to 315 bar), optional

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

2-way cartridge valves with pressure reducing function

- Sizes 16 to 100
- Cartridge – rest position open (type LC..DR)
- When the set pressure is reached, the pressure in port A is limited according to the pressure/flow characteristics
- With fine control lands, optional
- Power part as cartridge valve in standardized mounting cavity (DIN ISO 7368), closed by control cover
- Various pilot control valves for manual and electrical-proportional pressure adjustment, optional:
  – Integrated in the control cover
  – Mounted onto the control cover as pilot valve (connection dimensions to DIN 24 340)
- Closing pressures, optional: 2, (3), 4, 5 and 8 bar

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

Detailed information:
RE 21050

2-way cartridge valves with pressure reducing function

- Sizes 16 to 100
- Cartridge – rest position closed (type LC..DB)
- When the set pressure is reached, the pressure in port B is limited according to the pressure/flow characteristics
- Cartridge only in with directional spool valve
- Power part as cartridge valve in standardized mounting cavity (DIN ISO 7368), closed by control cover
- Various pilot control valves for manual and electrical-proportional pressure adjustment, optional
- Pilot valve mounted onto the control cover (connection dimensions to DIN 24 340)

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

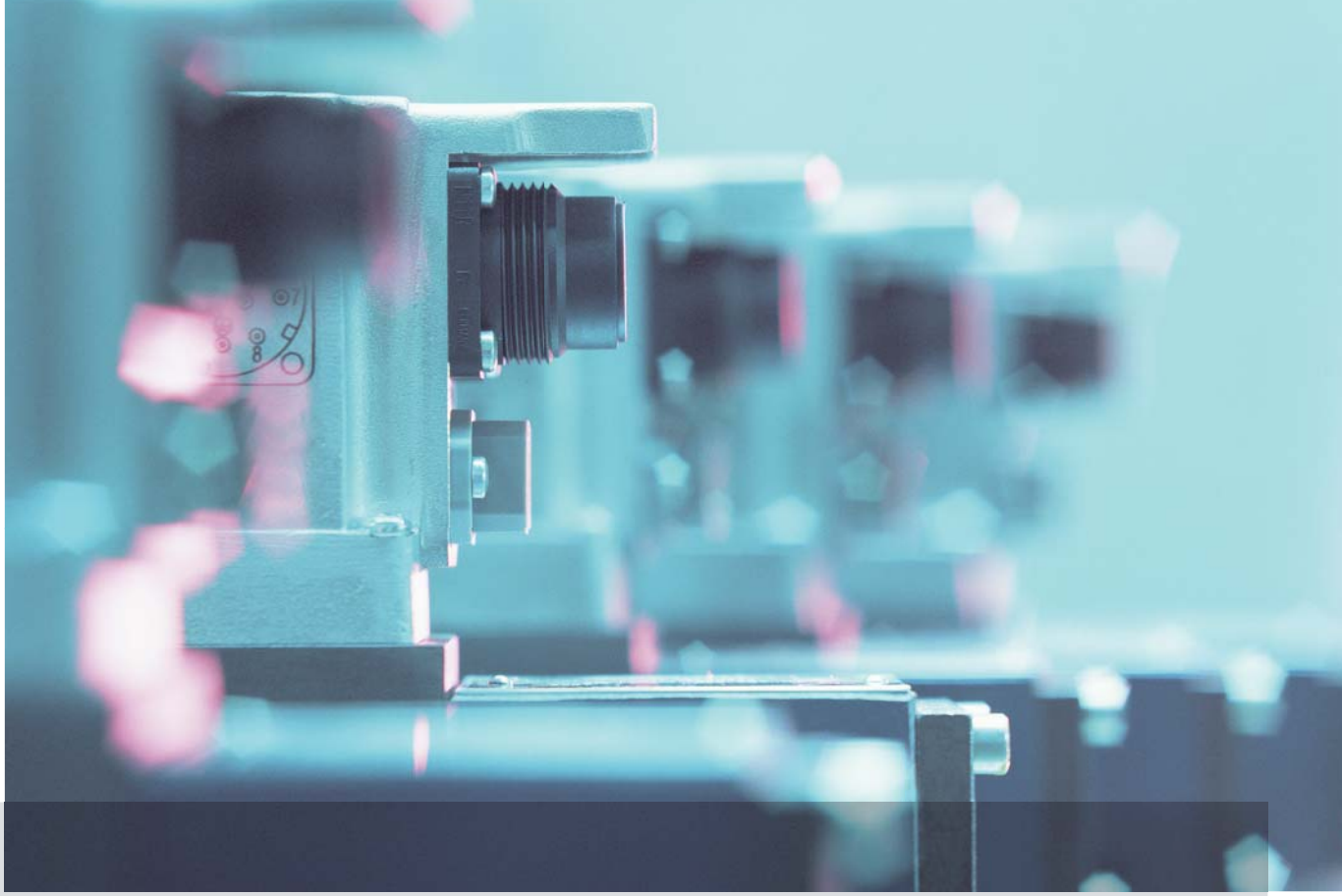
Detailed information:
RE 21050

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

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

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



Proportional, high-response and servo-valves

Proportional valves

Many controls would hardly be conceivable without proportional valves with integral 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 core product of size 6 and size 10 can be combined with main stages of up to size 160 with a nominal flow of up to 18000 litres.

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 DIN 24 340, form A
- Control of the direction and magnitude of a flow
- Proportional solenoid operation
- Spring-centered control spool
- Different spool overlaps possible
- Integral control electronics for type 4WRAE

Types 4WRAE, 4WRA

Detailed information: RE 29055

Size				6	10
Operating pressure		p_{max}	bar	315	315
Nominal flow	(Δp = 10 bar)	$q_{V\ nom}$	L/min	7, 15, 26	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	Type 4WRAE	U	V	± 10	± 10
		I	mA	4 to 20	4 to 20
Control electronics	Type 4WRA		analogue	VT-VSPA / VT-MSPA-2	VT-VSPA
			digital	VT-VSPD-1	VT-VRPD2-1

Proportional directional valves, direct operated, without electrical position feedback, with bus interface

- Sizes 6 and 10
- Porting pattern to DIN 24 340, form A
- Version for CAN bus with CANopen protocol (DS 408)
- Separate plugs for power supply and bus connection
- Command value feedforward analogue or via bus
- Zero point correction and overlap compensation can be parameterized via bus

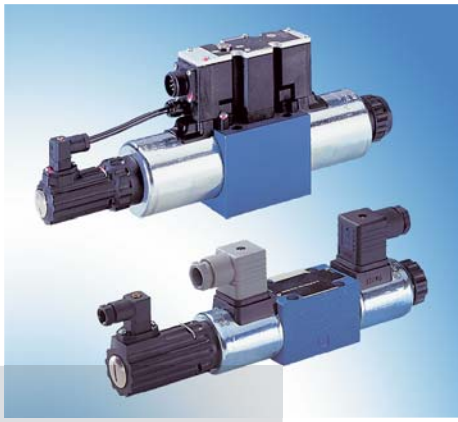
Type 4WRAF

Detailed information: RE 29055-02-M

Size				6	10
Operating pressure		p_{max}	bar	315	315
Nominal flow	(Δp = 10 bar)	$q_{V\ nom}$	L/min	7, 15, 26	30, 60
Maximum hysteresis			%	5	5
Step response	0 to 90 %	T_u+T_g	ms	< 40	< 140
Operating voltage		U	V	24	24

Proportional directional valves, direct operated, with electrical position feedback

- Sizes 6 and 10
- Porting pattern to DIN 24 340, form A
- Control of the direction and magnitude of a flow
- Proportional solenoid operation
- Spring-centered control spool
- Different spool overlaps possible
- Position sensing of the control spool via inductive position transducer
- Integral control electronics for type 4WREE



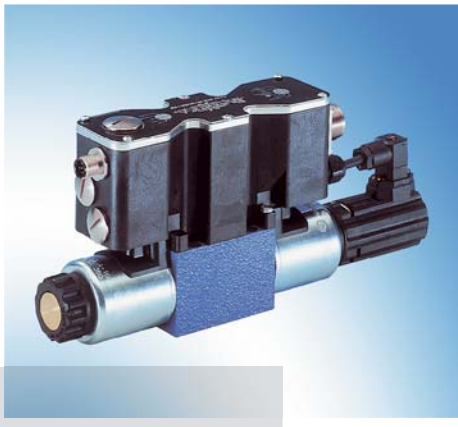
Types 4WRE, 4WREE

Size				6	10
Operating pressure		p_{max}	bar	315	315
Nominal flow	($\Delta p = 10$ 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
		I	mA	< 2	< 2
Comm. value signal		U	V	± 10	± 10
		I	mA	4 to 20	4 to 20
Control electronics	Type 4WRE		analogue	VT-RPA2 / VT-MRAP2	VT-VSPA
			digital	VT-VRPD2	VT-VRPD2

Detailed information:
RE 29061

Proportional directional valves, direct operated, with electrical position feedback and bus interface

- Sizes 6 and 10
- Porting pattern to DIN 24 340, form A
- Version for CAN bus with CANopen protocol (DS 408)
- Separate plugs for power supply and bus connection
- Command value feedforward analogue or via bus
- Zero point correction and overlap compensation can be parameterized via bus



Type 4WREF

Size				6	10
Operating pressure		p_{max}	bar	315	315
Nominal flow	($\Delta p = 10$ 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
		I	mA	< 2	< 2
Comm. value signal		U	V	± 10	± 10
		I	mA	4 to 20	4 to 20

Detailed information:
RE 29015-Z
CANopen protocol

Proportional directional valves, direct operated, with integral control electronics, electrical position feedback and spool position monitoring

- Sizes 6 and 10
- Porting pattern to DIN 24 340, form A, ISO 4401 and CETOP–RP 121 H
- Control of the direction and magnitude of a flow
- Proportional solenoid operation
- Spring-centered control spool
- Different spool overlaps possible
- Deadband compensation firmly set in the factory

Type 4WREEM

Detailed information: RE 29064

Size				6	10
Operating pressure		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		U	V	± 10	± 10

Proportional directional valves, direct operated with integral control electronics, el. position feedback and closed-loop control of pressures

- Sizes 6 and 10
- Porting pattern to DIN 24 340, form A, ISO 4401 and CETOP–RP 121 H
- Closed loop control in A and B, and, if applicable, area-related differential pressure
- Integral digital control electronics
- 1 to 4 integrated pressure sensors or one external pressure sensor
- Version for CAN bus with protocol CANopen (DS-408) or Profibus DP (on inquiry)
- All parameters (ramps, controllers,...) can be adjusted via the field bus interface
- Extended diagnosis functions via field bus

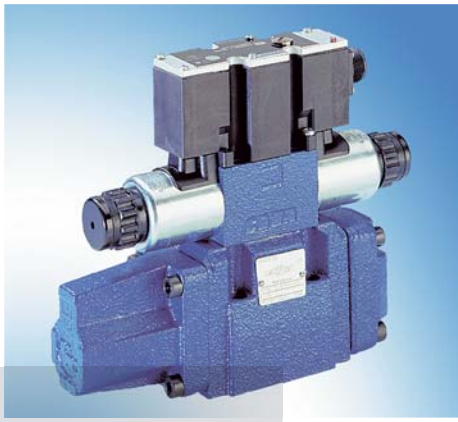
Type 4WREQ

Detailed information: RE 29050

Size				6	10
Operating pressure		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
		I	mA	< 2	< 2
Comm. value signal	Min. comm. value		V	± 10	± 10
	Flow comm. value		mA	4 to 20	4 to 20
	Press. comm. value		V	0 to 10	0 to 10

Proportional directional valves, pilot operated, without electrical position feedback

- Sizes 10 to 52
- Porting pattern to DIN 24 340, form A
- Control of the direction and magnitude of a flow
- Pilot control via a 3-way pressure reducing valve
- Spring-centering and anti-rotation protection of the main spool
- Different spool overlaps possible
- Optionally with integral electronics



Types 4WRH, 4WRZ, 4WRZE

Size				10	16	25	32	52
Operating pressure		p_{max}	bar	315	250	250	250	250
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		
			digital			VT-VSPD-1		
			modular design			VT 11118, VT 11011		

Detailed information:
RE 29115

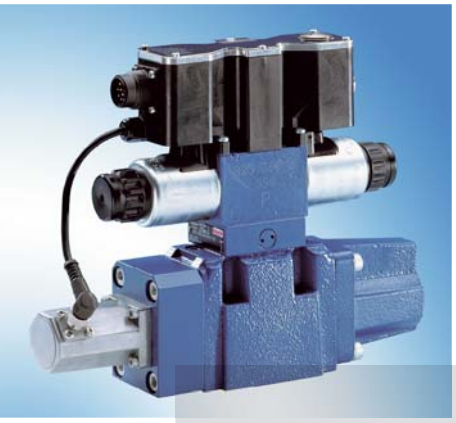
Proportional directional valves, pilot operated, without electrical position feedback and bus interface

- Sizes 10 to 52
- Porting pattern to DIN 24 340, form A
- Version for CAN bus with CANopen protocol (DS 408)
- Separate plugs for power supply and bus connection
- Command value feedforward analogue or via bus
- Zero point correction and overlap compensation can be parameterized via bus

Type 4WRZF

Size				10	16	25	32	52
Operating pressure		p_{max}	bar	315	250	250	250	250
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

Detailed information:
RE 29015-Z
CANopen protocol



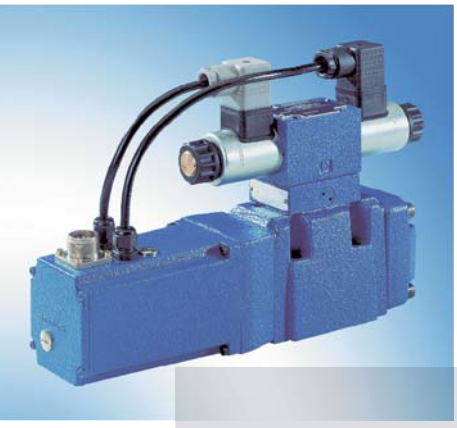
Proportional directional valves, pilot operated, with OBE and spool position monitoring

- Sizes 10 to 32
- Porting pattern to DIN 24 340, form A, ISO 4401 and CETOP–RP 121 H
- 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
- With test certificate issued by TÜV Nord
- Clear spool position monitoring
- Deadband compensation firmly set in the factory

Type 4WRZEM

Detailed information:
RE 29117

Size				10	16	25	32
Operating pressure		p_{max}	bar	315	350	350	350
Nominal flow	(Δp = 10 bar)	$q_{V\ nom}$	L/min	25, 50, 85	100, 150	220, 325	350, 520
Maximum hysteresis			%	6	6	6	6
Step response	0 to 90 %	T_u+T_g	ms	40	70	90	170
Operating voltage		U	V	24	24	24	24



Proportional directional valves, pilot operated, with electrical position feedback

- Sizes 10 to 35
- Porting pattern to DIN 24 340, form A
- 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
- Position sensing of the main spool via inductive position transducer
- Superimposed solenoid/direction cut-off using an ISA adapter for an independent shutdown function

Type 4WRKE

Detailed information:
RE 29075

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
Supply voltage		U	V	24	24	24	24	24	24
Comm. value signal		U	V	± 10	± 10	± 10	± 10	± 10	± 10
		I	mA	4 to 20					

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

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

Type KKDSR

Size				**1**	**1**
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

Detailed information:
RE 18139-06

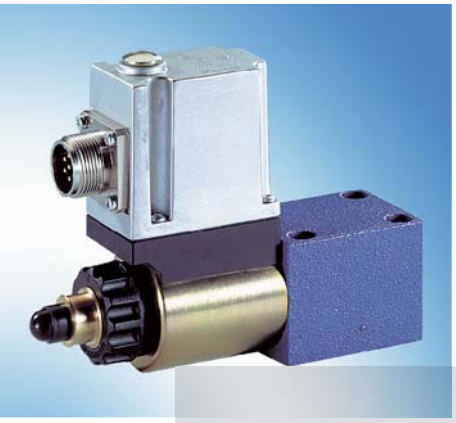
Proportional pressure relief valves, direct operated

- Size 6
- Porting pattern to DIN 24 340, form A and ISO 4401
- Valve for limiting a system pressure
- Proportional solenoid operation
- For subplate mounting

Type DBEP

Detailed information:
RE 29164

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		analogue		VT-VSPA1-1 and VT 3000
		digital		VT-VSPD-1



Proportional pressure relief valves, direct operated

- Size 6
- Porting pattern to DIN 24 340, form A, ISO 4401 and CETOP–RP 121 H
- Valve for limiting a system pressure
- Proportional solenoid operation
- For subplate mounting
- Integral control electronics for type DBETE
- Linearized pressure/command value characteristic curve
- Also available as screw-in cartridge valve

Types DBET and DBETE

Detailed information:
RE 29162

Size				**6**
Operating pressure		p_{max}	bar	350
Flow		$q_{V\,max}$	L/min	50/80
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	analogue		VT-VSPA1-2-1X
		modular design		VT-MSPA1-1-1X

Proportional pressure relief valves, pilot operated

- Size 6
- Porting pattern to DIN 24 340, form A
- Valve for limiting a system pressure
- Proportional solenoid operation
- For subplate mounting, types DBE and DBEE
- Sandwich plate version, types ZDBE and ZDBEE
- Integral control electronics for types DBEE and ZDBEE
- Linearized pressure/command value characteristic curve

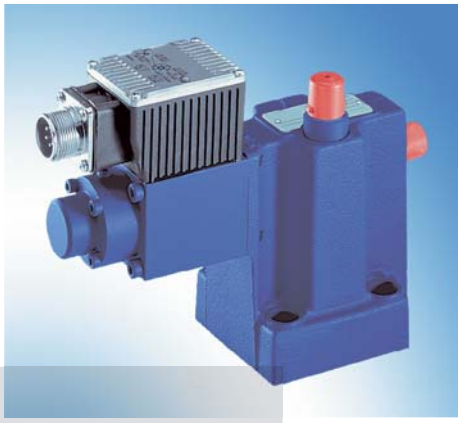
Types (Z)DBE and (Z)DBEE

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 24 340, form E
- Valve for limiting a system pressure
- Proportional solenoid operation
- For subplate mounting
- Maximum pressure relief function with types DBEM and DBEME
- Integral control electronics 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	analogue		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, direct operated, with closed-loop position control

- Size 6
- With or without OBE
- Proportional solenoid operation
- Series: Standard characteristic curve with OBE
- Electronics: Printed circuit board or integrated electronics
- Cone seat valve with compression spring

Type PV1-DBV

Detailed information:
1987761317 Chapter 1, pages 15 and 25

Size					**6**
Pressure stages				bar	50, 80, 180, 250, 315
Flow			$q_{V\,max}$	L/min	1
Maximum hysteresis				%	< 1 (with OBE < 0,2)
Actuating time	0 to 100 %	Standard char.		ms	45
		Linear char.		ms	45
		Char. curve with OBE		ms	35
Command value signal		standard	*U*	V	0 to 10
		with OBE	*I*	mA	4 to 20

Proportional pressure relief valves, direct operated, falling characteristic curve (standard performance)

- Direct operated vavles for limiting a system pressure
- Proportional solenoid operation
- Proportional solenoid with central thrad and detachable coil
- Screw-in cartridge valve
- Fine-balancing of commadn value/pressure characteristic curve externally on the control electronics
- Valves can be adjusted to maximum pressure by means of an adjustment spindle
- In the event of a power failure, the max. set pressure is obtained

Type KBPS.8

Detailed information:
RE 18139-05

Size				**Pilot valve**
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
- Proportional solenoid operation
- Series: With closed-loop position control and OBE
- Pilot control supplied internally from "P“
- Electronics for series with closed-loop position control electronics: Integral electronics

Type PV2-DBV

Size					**6**
Pressure stages				bar	80, 180, 315
Flow			$q_{V\,max}$	L/min	40
Maximum hysteresis				%	< 1
Actuating time	0 to 100 %	without position control		ms	70
Comm. value signal			*U*	V	0 to 10

Detailed information:
1987761317 Chapter 2

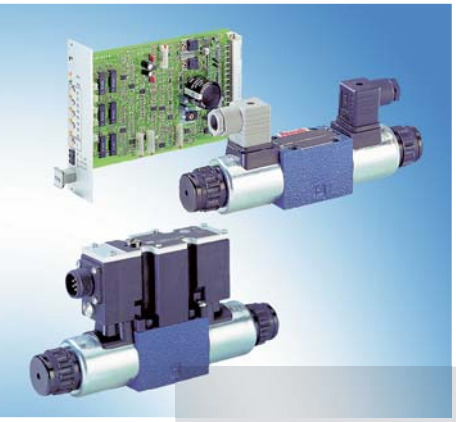
Proportional pressure relief valves, pilot operated

- Size 10
- Porting pattern to ISO 5781-AG-06-2-A
- Proportional solenoid operation
- Series: With closed-loop position control or with closed-loop position control and OBE

Type PV1-DBV

Size				**10**
Pressure stages			bar	180, 315
Flow		$q_{V\,max}$	L/min	120 to 300
Maximum hysteresis			%	1
Actuating time	0 to 100 %		ms	80
Comm. value signal	standard with OBE	*U*	V	0 to 10
		I	mA	4 to 20

Detailed information:
1987761317 Chapter 3



Proportional pressure reducing valves, direct operated

- Size 6
- Porting pattern to DIN 24 340, form A, ISO 4401 and CETOP–RP 121 H
- Valve for reducing a system pressure
- Proportional solenoid operation
- For subplate mounting
- With or without OBE

Types 3DREP, 3DREPE

Detailed information:
RE 29184

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 signal		U	V	±10
		I	mA	4 to 20
Control electronics	Type 3DREP	analogue		VT-VSPA2-5.
		digital		VT-VSPD1
		modular design		VT 11118

Proportional pressure reducing valves, direct operated

- Size 6
- Porting pattern to DIN 24 340, form A
- Version for CAN bus with CANopen protocol (DS 408)
- Separate plugs for power supply and bus connection
- Command value feedforward analogue or via bus
- Zero point correction and overlap compensation can be parameterized via bus

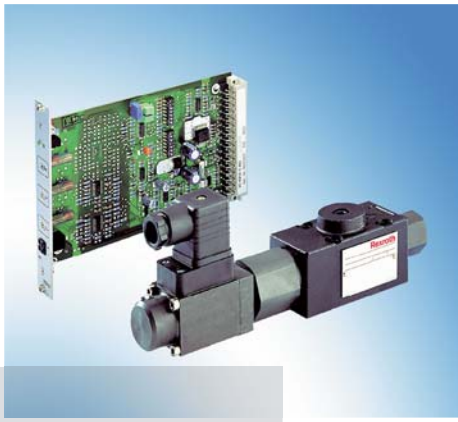
Type 3DREPF

Detailed information:
on inquiry

Size				**6**
Operating pressure		p_{max}	bar	315
Nominal flow	($\Delta p = 10$ bar)	$q_{V\,nom}$	L/min	7, 15, 26
Maximum hysteresis			%	5
Step response	0 to 90 %	T_u+T_g	ms	< 40
Operating voltage		U	V	24
Comm. value signal		U	V	±10
		I	mA	4 to 20

Proportional pressure reducing valves, pilot operated

- Sizes 6 and 10
- Porting pattern to DIN 24 340, form A
- 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
- Integral control electronics for type ZDREE 10



Type (Z)DRE (E)

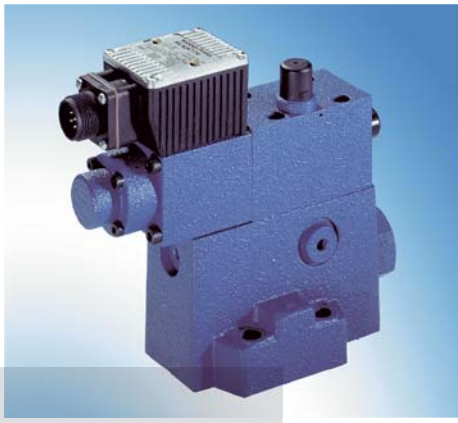
Size				6	10 [1]
Operating pressure		p_{max}	bar	210	315
Flow		$q_{V\,max}$	L/min	30	80
Maximum hysteresis			%	± 2	± 1,5
Operating voltage		U	V	24	22 to 33
Comm. value signal		U	V	–	0 to 10
Control electronics		analogue		VT-VSPA1(K)-1	VT-VSPA1(K)-1
		digital		VT-VSPD-1	VT-VSPD-1
		modular design		VT 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 24 340, 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 port A and B
- OBE for types DREE and DREME



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)	analogue		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

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

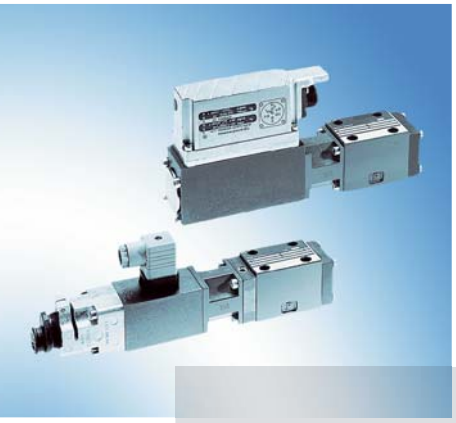
Proportional pressure reducing valves, pilot operated

- Sizes 10 and 16
- Porting pattern to DIN 24 340, form A, ISO 4401 and CETOP–RP 121 H
- Valve for reducing a system pressure
- Proportional solenoid operation
- For subplate mounting
- OBE for types 3DREE and 3DREME

Detailed information:
RE 29186

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)	analogue		VT-VSPA1(K) and VT 11131	
		digital		VT-VSPD-1	VT-VSPD-1



Proportional 3-way pressure reducing valves, pilot operated

- Size 6
- Proportional solenoid operation
- Series: With closed-loop position control or with closed-loop position control and OBE

Detailed information:
1987761317 Chapter 2

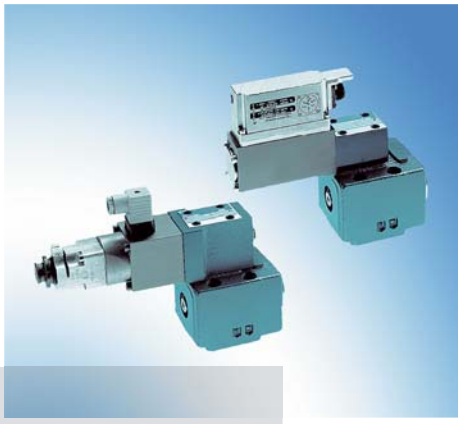
Control electronics analog
VT-VRPA1-527-10

Type PV2-DRV-3W

Size				6
Pressure stages			bar	75, 175, 310
Flow		$q_{V\,max}$	L/min	40
Maximum hysteresis			%	< 1
Actuating time	0 to 100 %		ms	50
Comm. value signal	Standard with OBE	U	V	0 to 10
		I	mA	4 to 20

Proportional pressure reducing valves, pilot operated

- Size 10
- Porting pattern to ISO 5781-AG-06-2-A
- Proportional solenoid operation
- Series: With closed-loop position control or with closed-loop position control and OBE
- Electronics for series with closed-loop position control: Printed circuit board or integrated electronics



Type PV2-DRV-2W

Size				**10**
Pressure stages			bar	180, 315
Flow		$q_{V\,max}$	L/min	120 to 300
Maximum hysteresis			%	1
Actuating time	0 to 100 %		ms	80
Comm. value signal	Standard with OBE	***U***	V	0 to 10
		I	mA	4 to 20

Detailed information:
1987761317 Chapter 3

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 closed-loop controlled
- Integral control electronics for type FESE (OBE)
- Flow characteristics optionally linear or progressive
- Flow in both directions possible

Type FES(E)

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		analogue		VT-VRPA1-50, VT-VRPA1-51, VT-VRPA1-52				
		digital		VT-VRPD-1				
		modular design		VT 11037				

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

- Sizes 6 to 16
- Porting pattern:
  – Size 6: to DIN 24 340, form A, ISO 4401 and CETOP–RP 121 H
  – Sizes 10 and 16: to DIN 24 340, 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		analogue		VT 5010	VT5004	VT5004
		digital		VT-VRPD-1	VT-VRPD-1	–
		modular design		VT 11033	VT 11034	VT 11034

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

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

- Sizes 6 and 10
- Porting pattern to DIN 24 340, form A, ISO 4401 and CETOP–RP 121 H
- 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
- Series with/without integrated electronics
- Characteristic curves with and without inflection

Types 4WRPH and 4WRPEH

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

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		PL6	PL10

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

- Size 10
- Porting pattern to DIN 24 340, form A, ISO 4401 and CETOP–RP 121 H
- Control of flow P – A / A – T
- Application for closed-loop velocity and pressure control
- Actuation through control solenoid
- Position sensing of the control spool via an inductive position transducer
- Series with/without integrated electronics
- Linear characteristic curve

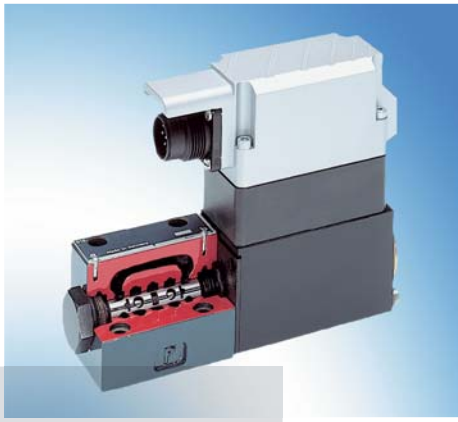
Types 5WRP and 5WRPE

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 valves, direct operated, with electrical position feedback

- Size 6
- Porting pattern to DIN 24 340, form A, ISO 4401 and CETOP–RP 121 H
- Control of the direction and magnitude of a flow
- Use for highly dynamic closed-loop controls
- Actuation through double-stroke control solenoid
- Position sensing of the control spool via an inductive position transducer
- Series with integrated electronics
- Characteristic curves with and without inflection



Type 4WRREH

Size				6
Operating pressure		p_{max}	bar	315
Nominal flow	(Δp = 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 valves for block installation, pilot operated, with electrical position feedback

- Sizes 25 to 50
- Main stage/oil flow P – A / A – T
- Application for closed-loop velocity and pressure controls
- Actuation through pilot control valve types 4WRP(E), 4WRR(E)
- Standard characteristic curve
- Pressure gain 1%

Type 3/2V

Size				25	32	50
Operating pressure		p_{max}	bar	315	315	315
Nominal flow	Δp = 5 bar	$q_{V\ nom}$	L/min	65 to 190	380	300 to 750
Maximum hysteresis			%	0.1	0.1	0.1
Frequency [1]	-90 ° phase response	f	Hz	50	45	35

Detailed information:
1987761323 Chapter 12

Control electronics VT-VRRA1

[1] at 100 bar

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

- Sizes 10 to 35
- Porting pattern to DIN 24 340, form A, ISO 4401 and CETOP–RP 121 H
- 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
- Series with/without integrated electronics
- Characteristic curves with and without inflection

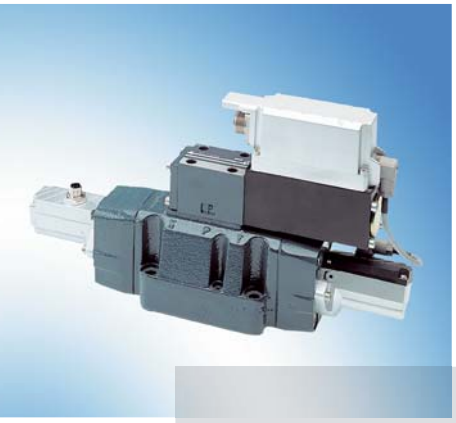
Types 4WRL and 4WRLE

Detailed information:
– Type 4WRL: RE 29086
– Type 4WRLE: RE 29088

Variant with OBE-D2 on inquiry

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		VT-VRRA1-527-2X			

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



Proportional high-response valve with spool position monitoring

- Sizes 10 to 25
- Concept and design in accordance with the Machinery Directive
- Clear monitoring of all spool positions

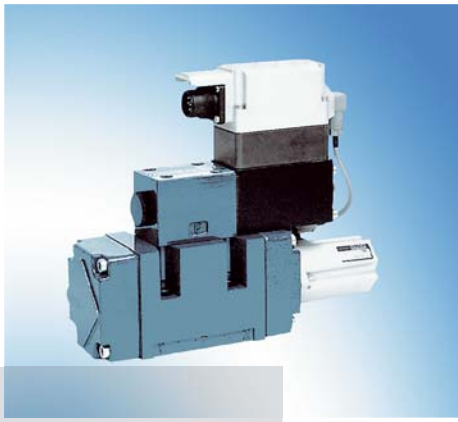
Type 4WRLEM

Detailed information:
1987761104

Size				10	16	25
Operating pressure	Port P, A, B	p_{max}	bar	315	350	350
	Port T	p_{max}	bar	250	250	250
Nominal flow	(Δp = 5 bar)	$q_{V\ nom}$	L/min	50, 80	180	350
Maximum hysteresis			%	< 0.3	< 0.3	< 0.3
Step response	0 to 100 %	T_u+T_g	ms	40	80	80
Operating voltage		U	V	24	24	24

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

- Sizes 10 to 25
- Porting pattern to DIN 24 340, form A, ISO 4401 and CETOP–RP 121 H
- 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
- Series with integrated electronics
- Characteristic curves with and without inflection



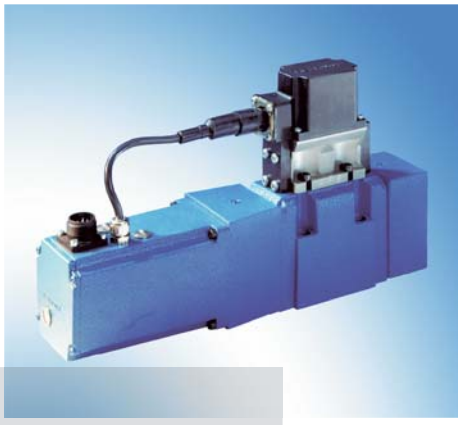
Type 4WRVE

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

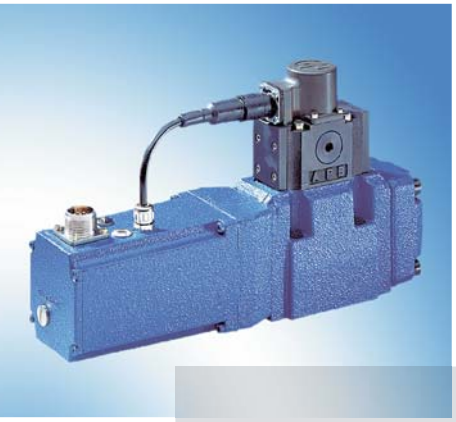
- Sizes 10 to 25
- Porting pattern to DIN 24 340, form A
- Control of the direction and magnitude of a flow
- Suitable for closed-loop controlling of force, position, velocity and pressure
- Pilot control via a 3-way high-response valve with position feedback
- Self-centering of the main stage
- Position sensing of the main spool via an inductive position transducer
- Integral control electronics



Type 4WRGE

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

Detailed information:
RE 29070



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

- Sizes 10 to 32
- Porting pattern to DIN 24 340, 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 2-stage servo-valve (size 6)
- Position sensing of the control spool via an inductive position transducer
- Integral control electronics

Type 4WRDE

Detailed information: RE 29093

Size				10	16	25	27	32
Operating pressure		p_{max}	bar	315	350	350	350	350
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

Proportional cartridge valves, pilot operated, with electrical position feedback

- Sizes 32 to 50
- Installation dimensions to DIN ISO 7368 (type 2WRCE)
- Suitable for closed-loop controlling of position, velocity and pressure
- Controlling via proportional valve
- Excellent switching times
- Robust build
- Position sensing of the control spool via an inductive position transducer
- Integral control electronics for type .WRCE (sizes 32 to 50)

Types 2WRC(E) and 3WRC(E)

Detailed information: RE 29137

Size					32	40	50
Operating pressure	2-way	p_{max}	bar		420	420	420
	3-way	p_{max}	bar		315	315	315
Nominal flow (Δp = 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 2WRC(E)	U	V		0 to 10	0 to 10	0 to 10
	Type 3WRC(E)	U	V		± 10	± 10	± 10
Control electronics	Type .WRC				VT-SR31	VT-SR32	VT-SR33

Proportional cartridge valves, pilot operated, with electrical position feedback

- Sizes 32 to 160
- Installation dimensions to DIN ISO 7368 (type 2WRCE)
- 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
- Integral control electronics for type .WRCE (sizes 32 to 100)

Types 2WRC(E) and 3WRC(E)

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, series 2X: RE 29136
– Sizes 63 to 160, series 1X: RE 29135

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

- Sizes 6; 10 and 16
- Porting pattern to DIN 24 340, 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 with feedback element
- Position sensing of the main spool via an inductive position transducer for valves with electrical feedback (size 10)
- Integral control electronics 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	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	75
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.	analogue		VT-SR2	VT-SR2	VT-SR2
		modular design		VT 11021	VT 11021	

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

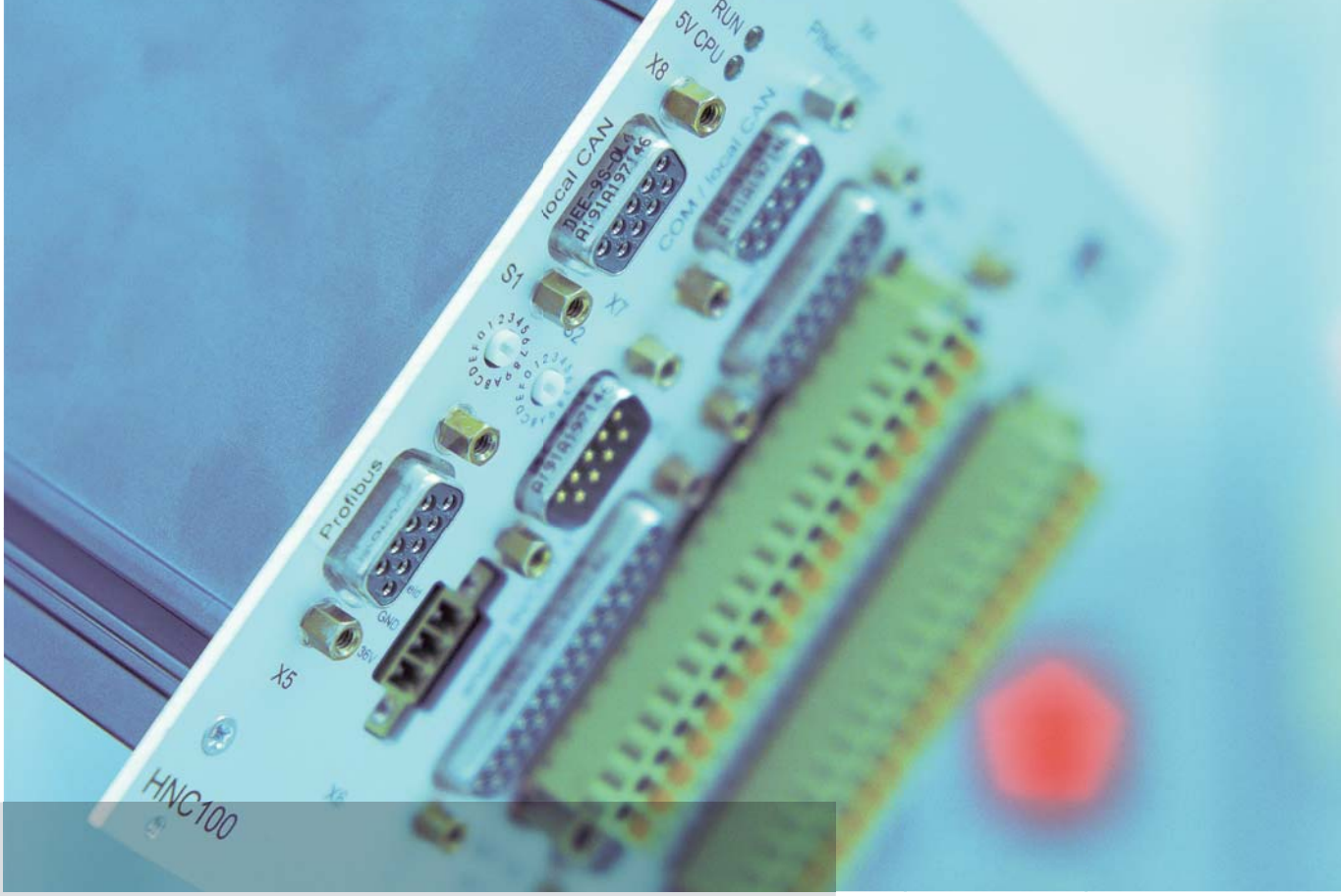
3-stage directional servo-valves, electrical feedback

- Sizes 16 to 32
- Porting pattern to DIN 24 340, 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
- Integral control electronics

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



Electronic components, systems and accessories

Electrohydraulic open and closed-loop control systems

Performance profile

- Analogue and digital valve amplifiers of Euro-card format and of modular design
- Controls for A4VS and A10VSO variable displacement axial piston pumps
- Digital closed-loop control electronics
- System technology
  - IAC integrated axis controllers
  - SYDFE closed-loop control systems
  - SYEHL electrohydraulic linear axes
  - Industry-specific electronics

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

- Analogue amplifiers of Euro-card format for installation in 19" racks
- Voltage stabilization 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 can be switched off
- 5 ramp times, adjustable using trimming potentiometers (on some versions)
- Step function for quick passing of overlaps on directional valves
- Clocked output amplifier with current regulation
- Enable input (on some versions)
- Message "ready for operation" (on some versions)

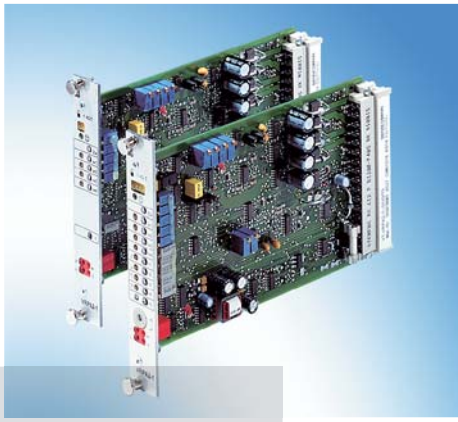
Technical data			
Operating voltage	U_B	VDC	24; + 40 %; – 5 %
– Upper limit value	$U_B(t)^{max}$	V	35
– Lower limit value	$U_B(t)_{min}$	V	22
Output amplifier			Current-regulated, clocked
Type of connection			32- or 48-pin male connector, DIN 41 612, form D
Card dimensions		mm	Euro-card 100 x 160, DIN 41 494
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 30111	VT-VSPA1-1-1X	For proportional pressure valves without electrical position feedback
RE 30112	VT-VSPA2-1-1X/T1 [1)]	4WRA, sizes 6 and 10 (series 2X)
RE 30112	VT-VSPA2-1-1X/T5 [2)]	4WRA, sizes 6 and 10 (series 2X)
RE 30113	VT-VSPA2-50-1X/T1 [1)]	4WRZ (series 7X); DREP 6 (series 2X)
RE 30113	VT-VSPA2-50-1X/T5 [2)]	4WRZ (series 7X); DREP 6 (series 2X)
RE 30115	VT-VSPA1-2-1X	DBET (series 6X)

[1)] 1 ramp time
[2)] 5 ramp times

Amplifiers for proportional valves with electrical position feedback

- Analogue amplifiers of Euro-card format for installation in 19" racks
- 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, 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 quick passing the overlap on 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; + 40 %; – 5 %
– Upper limit value	$U_B(t)^{max}$	V	35
– Lower limit value	$U_B(t)_{min}$	V	22
Regulated voltage	U	V	M0 ± 9 (with raised zero point)
Oscillator frequency	f	kHz	ca. 2.5
Output amplifier			Current-regulated, clocked
Type of connection			32- or 48-pin male connector, DIN 41 612
Card dimensions		mm	Euro-card 100 x 160, DIN 41 494
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 5004	2FRE, sizes 10 and 16	RE 29945
VT-VRPD-1	2FRE 6	RE 30125
VT-VRPA2-1	4WRE 6 (series 2X)	RE 30119
VT-VRPA2-2	4WRE 10 (series 2X)	RE 30119
VT-VRPD-2	4WRE (series 2X)	RE 30125

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

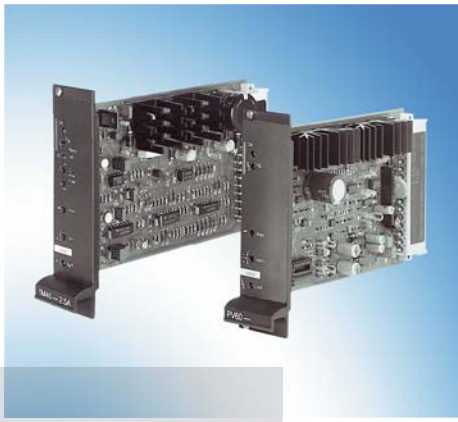
- Analogue amplifiers of Euro-card format for installation in 19" racks
- Voltage stabilization with raised measuring zero point, filter capacitor on the amplifier card
- Differential input
- Internal command value adjustment by means of 4 trimming potentiometers, call-up via relays, on some versions 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	ca. 2.5
Output amplifier			Current-regulated, short-circuit-proof
Type of connection			32-pin male connector, DIN 41 612, form D
Card dimensions		mm	Euro-card 100 x 160, DIN 41 494
Ambient temperature range	ϑ	°C	0 to + 50
Storage temperature range	ϑ	°C	– 20 to + 70

Detailed information:	**Amplifier type**	**Suitable for pump type**
RE 29955	VT 5035	A4VSO
RE 30240	VT 5041	A10VSO…DFE1

Amplifiers for proportional pressure relief valves of type PV1/2-DBV and proportional pressure control valves of type PV2-DRV – printed circuit board

- Analogue amplifiers of Euro-card format for installation in 19" racks
- Controlled output stage
- Enable input (on some versions)
- Compensation jump
- Inputs and short-circuit-proof outputs (on some versions)
- External ramp deactivation [1)]
- Adjustment options:
  – Valve zero point
  – Ramp times (if ramp function is provided)
- RGC3: External, voltage-controlled ramp adjustment via differential inputs



Technical data			
Operating voltage	U_B	VDC	Nominal 24 (21 to 40)
Type of connection			Plug to DIN 41 612-F32
Card dimensions		mm	Euro-card 100 x 160 with front panel 7TE
Ambient temperature range	ϑ	°C	0 to + 70
Storage temperature range	ϑ	°C	– 20 to + 70
Ramp times		s	0.05 to 5
	RGC3	s	0,1 to 10 adjustable

Amplifier type	**Suitable for valve type**
PV45	PV2-DRV-3W LVDT-AC
PV45-RGC1 [1)]	PV2-DRV-3W LVDT-AC
PV45-RGC3 [1)]	PV2-DRV-3W LVDT-AC
PV60	PV1-DBV LVDT-AC
	PV2-DBV LVDT-AC
	PV2-DRV-3W LVDT-AC
PV60-RGC1 [1)]	PV1-DBV LVDT-AC
	PV2-DBV LVDT-AC
	PV2-DRV-3W LVDT-AC
PV60-RGC3 [1)]	PV1-DBV LVDT-AC
	PV2-DBV LVDT-AC
	PV2-DRV-3W LVDT-AC
PDL1	PV1-DBV linear LVDT-AC
PDL1-RGC1 [1)]	PV1-DBV linear LVDT-AC
PDL1-RGC3 [1)]	PV1-DBV linear LVDT-AC

Detailed information:
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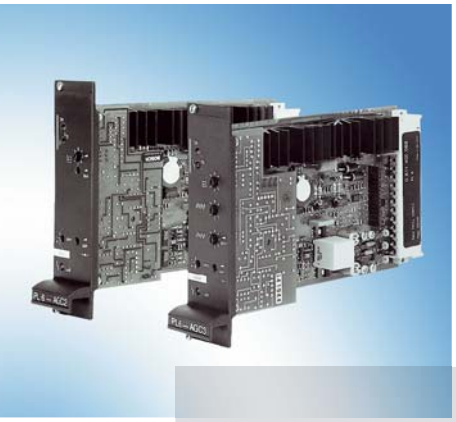
[1)] ramp

Amplifiers for high-response valve types 4WRPH, 4WRL and 5WRP – printed circuit board

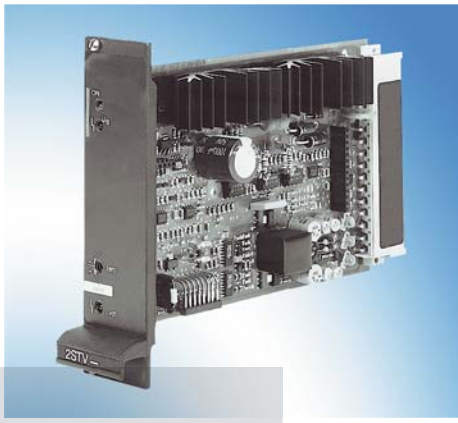


- Analogue amplifiers of Euro-card format for installation in 19" racks
- Controlled output stage
- Enable input
- Short-circuit-proof outputs
- Adjustment options: Valve zero point
- Cable break detection for actual value cable
- Area matching of single-rod cylinders (on some versions) [1)]
- Gain in 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 41 612-F32
Card dimensions		mm	Euro-card 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 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-VRRA1-527-2X/V0/RTS-2TV	4WRL … M-3X
RE 30045	VT-VRRA1-527-2X/V0/2STV	4WRL … M-3X
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

Amplifiers for high-response valves, block installation, type 3/2V
– printed circuit board for high-response valves, block installation



- Analogue amplifiers of Euro-card format for installation in 19" racks
- Controlled output stage
- Enable input
- Short-circuit-proof outputs
- Adjustment options: Valve zero point
- Cable break detection for actual value cable
- 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 41 612-F32
Card dimensions		mm	Euro-card 100 x 160 with front panel 7TE
Ambient temperature range	ϑ	°C	0 to + 70
Storage temperature range	ϑ	°C	– 20 to + 70

Amplifier type	**Suitable for valve type**
VT-VRRA1-527-2X/V0/2STV	3/2V block installation

Detailed information:
RE 30045

Amplifiers for servo-valves

- Analogue amplifiers of Euro-card format for installation in 19" racks
- Symmetric voltage regulator (option)
- PD-controller for controlling the valve spool position (on some versions)
- PID-controller for free component placement (option)
- For pump controls, generally PID-controller for controlling the swivel angle
- 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	ca. 2.5 / 5
Output amplifier			Current-regulated
Type of connection			32-pin male connector, DIN 41 612, form D
Output current	I	mA	± 60 / ± 100
Dither frequency	f	Hz	340 (ISS = 3 mA)
Card dimensions		mm	Euro-card 100 x 160, DIN 41 494
Ambient temperature range	ϑ	°C	0 to + 50
Storage temperature range	ϑ	°C	– 20 to + 70

Detailed information:	**Amplifier type**	**Suitable for valve type/pump type**
RE 29979	VT-SR1	4WS2EE 10
RE 29980	VT-SR2	4WS2EM, sizes 6 to 16
		4WS2EB 10
		4DS1EO 2
		3DS2EH 10
RE 29993	VT-SR7	A4VS..HS
RE 29931	VT-SR31 to VT-SR38	2WRC…/S and 3WRC…/S

Pressure and differential pressure controllers – printed circuit board

- Analogue amplifiers of Euro-card format for installation in 19" racks
- Cable break detection for actual value cable, position transducer/pressure sensor (except for Diff-p/Q)
- External controller deactivation
- Pressure sensor connection (1 to 6 V/0 to 10 V, 4 to 20 mA)
- Controller with valve amplifier:
  - Controlled output stage
  - Enable input
  - Short-circuit-proof outputs

Technical data			
Operating voltage	U_B	VDC	Nominal 24 (21 to 40)
Type of connection			Plug to DIN 41 612-F32
Card dimensions		mm	Euro-card 100 x 160 with front panel 7TE
Ambient temperature range	ϑ	°C	0 to + 70
Storage temperature range	ϑ	°C	– 20 to + 70

Amplifier type	**Suitable for valve type**
PL6-PQI	4WRPH 6
PL10-PQI	4WRPH 10
5/3V-PQI	5WRP 10
2STV-PQI	4WRL
PQI-1	Without valve amplifier
PQI-1/2	Without valve amplifier (2nd channel)
Diff-PQ [1)]	Without valve amplifier

Detailed information:
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[1)] No connection of 1 to 6 V pressure sensor

Analogue amplifiers of modular design

- Compact amplifiers in plastic housing for snapping onto carrier rails to DIN 50 022
- DC/DC converters for the 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; +30%; –10%	24; +40%; –10%
– 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	

Detailed information:	**Amplifier type**	**Suitable for valve type**
RE 30226	VT 11004, VT 11015 and VT 11026	DRE 4 K (24 V)
RE 29762	VT 11008 and VT 11017	FTDRE 2 K (24 V)
RE 29762	VT 11009 and VT 11018	FTDRE 2 K (12 V)
RE 29760	VT 11010 and VT 11031	DRE 4 K (12 V or 24 V)
RE 29737	VT 11011 and VT 11012	For proportional directional and pressure valves
RE 29743	VT 11021	4WS2E. 10
RE 29741	VT 11029	1 proportional solenoid - 100 Hz (pumps)
RE 29741	VT 11030	1 proportional solenoid - 200 Hz (e.g. DBE)
RE 29764	VT 11032 and VT 11165	DRE 4 K (24 V)
RE 29774	VT 11033 and VT 11034	2FRE, sizes 6 to 16
RE 30218	VT 11118	4WRZ (from series 5X on)
RE 29865	VT 11131 and VT 11132	For proportional pressure control valves
RE 29870	VT 11550 to VT 11554	DRE 4 K (+ 3WE 4)
RE 29866	VT 11724	For proportional pressure reducing valves
RE 30219	VT-MRPA2-1	4WRE 6 (series 2X)
RE 30219	VT-MRPA2-2	4WRE 10 (series 2X)

Digital amplifiers for proportional valves without electrical position feedback

- Digital amplifier of Euro-card format for installation in 19" racks
- Amplifier type for a multitude of valves (programmable)
- Use of a powerful microcontroller
- Analogue command value input as voltage or current input
- Ramp time with 2 rounding times at the beginning and at the end
- Free programmability of output stage frequency, biasing, step and final current or current characteristic curve with max. 8 interpolation points
- 16 command value call-ups with ramp times; call-up via digital inputs
- Possibility of sequence control
- Variable gain and offset correction for command value input
- Indication of functions by LEDs; measuring sockets for command and actual value
- Non-volatile saving of programmings in an EEPROM
- Clocked, current-regulated output stages
- Switched-mode power supply for internal supply voltages
- Configuration, parameterization and diagnosis via serial interface

Type VT-VSPD-1

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	21
Current consumption	I_{max}	A	2.3 (depending on selected valve)
Digital inputs	U	V	log 0 = 0 to 2; log 1 = 15 to U_B
Analogue inputs (R_e = 100 Ω)	U	V	± 10
	I	mA	± 20, 4 to 20 or 0 to 20
Nominal solenoid resistance (20 °C)	R	Ω	2 to 20
Output current	I	A	0 to 2.5 (clocked)
Output stage clock frequency	f	Hz	100 to 1000
Scanning rate	T	ms	0.3
Type of connection			48-pin male connector, DIN 41 612, form F
Serial interface			RS 485 (front panel and plug-in connector)
Card dimensions		mm	Euro-card 100 x 160, DIN 41 494
Ambient temperature range	ϑ	°C	0 to + 50
Storage temperature range	ϑ	°C	– 20 to + 70
Ramp time	t_{max}	s	100

Type of electronics		Detailed information:
VT-VSPD-1	For controlling proportional valves without electrical position feedback	RE 30123
For parameterization:		
VT 12321	BB-3 hand-held control box	RE 29798
VT 12323	BF-1 control panel	RE 29794
SYS-DigVen-BODIV-02	BODIV PC program	RE 29899

Digital amplifiers for proportional valves with electrical position feedback

- Digital amplifiers of Euro-card format for installation in 19" racks
- Presetting of all parameters
  - with VT-VRPD-1 for the following valves: 2FRE 6 (series 2X); 2FRE, sizes 10 and 16 (series 4X)
  - with VT-VRPD-2 for the following valves: 4WRE, sizes 6 and 10 (series 2X)
- Use of a powerful microcontroller
- Analogue command value input as voltage or current input
- Voltage input as differential input
- Variable gain and offset correction for command value input
- Ramp generator
- Possibility of sequence control and overlap compensation
- Digital inputs for calling up pre-set command value parameters
- Enable input and fault output
- Switched-mode power supply for internal supply voltages
- Indication of functions by LEDs; measuring sockets for command and actual value
- Standardized connector strip pin assignment
- Configuration, parameterization and diagnosis via serial interface

Type VT-VRPD

Technical data			
Operating voltage	U_B	VDC	24; + 40 %; – 10 %
– Upper limit value	$U_B(t)^{max}$	V	35
– Lower limit value	$U_B(t)_{min}$	V	21
Current consumption	I_{max}	A	2.3 (depending on selected valve)
Digital inputs	U	V	log 0 = 0 to 2; log 1 = 15 to U_B
Analogue inputs (R_e = 100 Ω)	U	V	± 10
	I	mA	± 20, 4 to 20 or 0 to 20
Nominal solenoid resistance (20 °C)	R	Ω	2 to 12.7
Output current	I	A	1.3 to 2.5 (clocked)
Output stage clock frequency	f	Hz	190 to 4300
Oscillator frequency	f	kHz	2.5 to 7.8
Scanning rate	T	ms	0,3
Type of connection			48-pin male connector, DIN 41 612, form F
Serial interface			RS 485 (front panel and plug-in connector)
Card dimensions		mm	Euro-card 100 x 160, DIN 41 494
Operating temperature range	ϑ	°C	0 to + 50
Storage temperature range	ϑ	°C	– 20 to + 70
Ramp time	t_{max}	s	100

Detailed information:	**Type of electronics**	
RE 30125	VT-VSPD-1 and VT-VRPD-2	For controlling direct operated proportionalv valves with electrical position feedback
	For parameterization:	
RE 29798	VT 12321	BB-3 hand-held control box
RE 29794	VT 12323	BF-1 control panel
RE 29899	SYS-DigVen-BODIV-02	BODIV PC program

Analogue command value conditioning

- Analogue command value card for controlling valves with integral electronics
- Suitable for 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
- Selection of ramp time through quadrant recognition (24V input) or ramp time call-ups (24V inputs)
- Change-over of the ramp time range using jumpers
- Characteristic curve correction through separately adjustable step-change heights and maximum values
- Enable input

Type VT-SWKA-1

Technical data			
Operating voltage	U_B	VDC	24; + 40 %; – 20 %
Input voltage (analogue):			
– Comm. values 1 to 4 (potentiometer inputs)	U_e	V	0 to ± 10
– Comm. value 5 (differential input)	U_e	V	0 to ± 10
– Comm. value 6 (differential input)	I_e	mA	4 to 20
Output signals (analogue):			
– Control variable voltage	U	V	± 10 ± 2 %; I_{max} = 2 mA
– Control variable current	I	mA	4 to 20 ± 2 %
– Measured signal	U	V	± 10 ± 2 %; I_{max} = 2 mA
Type of connection			48-pin male connector, DIN 41 612, form F
Card dimensions		mm	Euro-card 100 x 160, DIN 41 494
Ambient temperature range	ϑ	°C	0 to + 50
Storage temperature range	ϑ	°C	– 25 to + 85

Amplifier type	**Suitable for valve type**
VT-SWKA-1	Command value card

Detailed information:
RE 30255

Signal converters

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

Detailed information:
1987761327 Chapter 4

Technical data	
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
I/U-mA/V	Module input signal 0 to 20 mA or 4 to 20 mA; output signal 0 to 10 V or 0 to ± 10 V
D/A2-BCD	Input signal BCD (2-digit); output signal 0 to ± 10 V (2 channels)
SIGN-ADAP	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

Analogue command value conditioning

- For controlling valves with integral 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

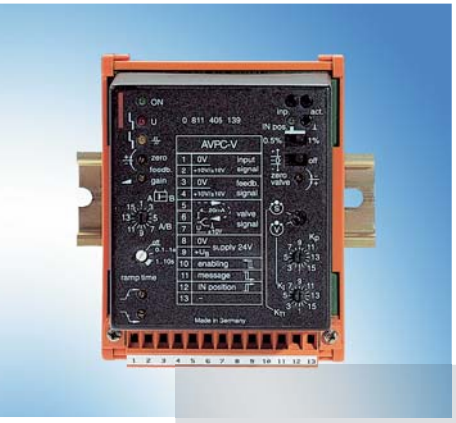
– Command value module VT-SWMAK-1: RE 29903

General accessories of modular design

Assemblies in plastic housing for snapping onto carrier rails to DIN 50 022

Type of electronics		Detailed information:
VT 11003	Switching amplifier module for directional valves	RE 29731
	Operating voltage: 10 to 24 VDC	
	Output voltage: UB – 2.5 V	
VT 11005	Power supply module	RE 29732
	Operating voltage: 10 to 12 VDC	
	Output voltage: ± 15 VDC; 200 mA	
VT 11006	Power supply module	RE 29729
	Operating voltage: 20 to 24 VDC	
	Output voltage: ± 15 VDC; 200 mA	
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

Analogue 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			Plug: 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:
RE 30050

Amplifier type	Suitable for valve type
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 of Euro-card format
- Use as command value card for generating, linking and normalizing signals
- Use as controller card for one closed control loop (VT-HACD-1) or two closed control loops (VT-HACD-2) with PIDT1-controller and state feedback
- Alternating control (e.g. closed-loop position control with superimposed closed-loop pressure control) possible for VT-HACD-2
- Special control algorithms for hydraulic drives
- Digital SSI position measuring system
- 6 analogue inputs, voltage (± 10 V, 0 to 10 V) and current (4 to 20 mA) can be changed over by means of 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 diagnosis purposes
- PC software BODAC for configuration, parameterization and diagnosis
- Online diagnosis function
- Integrated "online manual"
- Field bus system: DeviceNet

Type VT-HACD

Type of electronics		Detailed information:
VT-HACD1	Command value and controller card for one closed control loop	RE 30143
VT-HACD2	Command value and controller card for two closed control loops (alternating control possible)	

Digital positioning cards for position-dependent braking

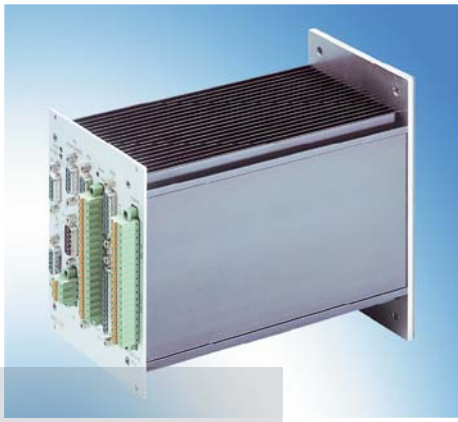
- Digital assemblies of Euro-card format
- Position-dependent braking of a hydraulic axis
- Braking characteristics linear or root-shaped, adjustable
- Traversing profile separately adjustable for A to B and B to A
- Adjustable start-up ramp with rounding option (S-components)
- Setup mode
- Digital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

Type VT-HACDB

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

Digital closed-loop control electronics with NC functionality

- The digital VT-HNC100 axis control is a freely programmable, bus-capable NC control for controlling one or two electrohydraulic or electromechanical drives
- Freely configurable control variants
- Position controller (PDT1) with zero point compensation, overlap jump for proportional valves, command value feedforward and state feedback
- Position-dependent braking
- Velocity controller
- Pressure/force controller (PIDT1) with differential pressure evaluation, pressure limitation and alternating control
- Synchronization control of 2 axes
- Flexibility: NC programming of motion sequences



Type VT-HNC100

Programming and system integration as programmable NC control	
Programming: Parameterization, editing and diagnosis	– Configuration and sequence programming with the help of the Rexroth software WIN-PED that runs on PCs with Windows 9 x or higher
	– Apart from standard NC commands, special NC commands tailored to the specific requirements of hydraulic axes can be implemented
	– Diagnosis function for all system variables
	– Integrated "online manual"
Process interfacing with higher-level control	– Field bus systems: Profibus; Interfbus-S; CAN (CANopen); SERCOS interface (output bus)
	– 8, 16 and 24 digital inputs; 8, 16 and 24 digital outputs
	– Analogue inputs and outputs
Interfaces with the hydraulic axis:	– Measuring system • Incremental or absolute (SSI) • Analogue 0 to ± 10 V and 4 to 20 mA
	– Control variable output ± 10 V or 4 to 20 mA
	– Freely configurable controller variants: • Position controller; pressure/force controller • Position-dependent braking • Alternating control (position/force) • Synchronization control of 2 axes
Interfaces for position measuring systems:	– 2 x incremental TTL
	– 2 x digital absolute (SSI)
	– 1 x 1 Vss
	– 1 x EnDat
	– 4 x analogue (voltage ± 10 V or current 4 to 20 mA)
	– 2 x inductive measuring systems, optional
Interfaces for pressure or force control:	– 4 x analogue (voltage ± 10 V or current 4 to 20 mA)
Free analogue inputs:	– In total 8 x analogue for flexible use in the NC programs
Interface with the control of the drive:	2 x analogue (voltage ± 10 V or current)
	2 x analogue (voltage ± 10 V) for auxiliary functions

Type of electronics			Detailed information:
VT-HNC100	Digital controller assembly for hydraulic drives		RE 30131
	consisting of:	19" Euro-card in aluminium housing, suitable for installation in 19" racks or for wall mounting	
	Fields of application:	– Presses, plastics processing machines, machine tools, steelwork and rolling mill technology, wood processing machines, special machines	
VT-HNC100DEMO with PC software WIN-PED	Simulator of controlled systems for VT-HNC100 – For getting familiar with the functions of the digital VT-HNC100 axis control – Simulation of a hydraulic controlled system with changeover between high and low frequency		RE 30133

Digital controller assembly for the secondary control of axial piston units

- Digital controller assembly with software for open and closed-loop control and monitoring functions tailored specifically to secondary controls
- Assembly in a HF-proof housing for wall-mounting or as plug-in unit for 19" racks
- System parameters saved in a non-volatile EEPROM
- Parameterization and process visualisation with the help of the Rexroth software WIN-PED
- Two modules with monitoring function for the evaluation of signals from inductive swivel angle transducers
- Configured sequence routine for on/off orders with control of isolator valves and brakes, where applicable
- Monitoring functions with error code output for better diagnosis

Type HNC100-SEK

Technical data			
Operating voltage	U_B	VDC	18 to 36
Analogue inputs			4 differential inputs (voltage or current)
			4 impedance converter inputs
Analogue outputs			2 voltage or current outputs and
			2 voltage outputs
Switching inputs			24 digital inputs
Switching outputs			24 digital outputs
Field bus system			Profibus DP
			CANopen, INTERBUS-S
Dimensions of version for wall-mounting (W x H x D)		mm	106.5 x 155 x 204
Ambient temperature range	ϑ	°C	0 to + 50
Storage temperature range	ϑ	°C	– 20 to + 70

Detailed information:
RE 30141

Type of electronics	
SYHNC100-SEK	Digital controller assembly with closed-loop control of speed and open and closed-loop control of torque of secondary controlled A4VS..DS1(E) axial piston units

Multi-axis CNC control

- Continuous path/point-to-point control for hydraulic systems with 2 to 32 axes
- Position controller:
  - Position-dependent braking
  - Following controller
  - State controller
  - Synchronization controller
  - Following controller for several axes
  - Velocity controller
  - Force/differential pressure controller
- Programming:
  - Up to 16 parallel programs
  - PLC functions
  - Comprehensive debugger
- Visualisation, parameterization via industrial PC or terminal
- Measuring systems are optionally analogue, incremental or absolute (SSI) encoders for position sensing or analogue transducers for pressure/force

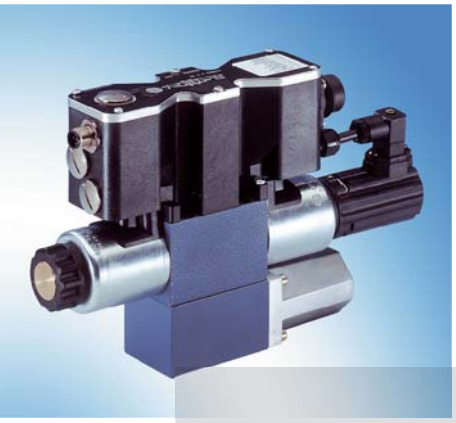
Detailed information:
on inquiry

Type MX4

Programming and system integration	
– Programming and debugging possible on any PC with the help of the MX4 programming software	
– Programs and parameters can be saved in the RAM or EPROM of the MX4	
– 1 MB RAM for program and data per axis card	
– Time-optimized execution due to compiling of the NC programs in the machine code	
– 16 parallel NC programs (multi-tasking)	
– High language-oriented NC language	
– Comfortable debugger with program trace, single-step execution, break points, etc.	
– Version as stand-alone system or: • Operation with the help of the BB-3 hand-held control box or BF-1 control panel • Terminal can be programmed by means of dialogue commands • Visualisation on industrial PC	
– Profibus-DP interfacing, Interbus-S slave interfacing	
Type of electronics	
Continuous path/point-to-point control for up to 32 axes made up from modular hardware components in double Euro-format	
Consisting of:	– MTCB02/MTCB03 rack
	– AM2 or AM4 axis master card
	– AX2 or AX4 axis slave card
	– DEAB02 I/O card
Fields of application:	– Presses
	– Plastics processing machines
	– Steelworks and rolling mill technology
	– Materials handling
	– Automotive industry
	– Shipbuilding
	– Test rig technology
	– Special machines

IAC integrated axis controllers - decentralized intelligence in hydraulic valves

- Integrated axis controller functionality such as pressure, 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 feedforward optionally analogue or via field bus
- Comprehensive diagnosis functions



Integrated axis controllers on the basis of proportional valves

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

Type IAC-P

Detailed information:
RE 29050

Integrated axis controllers on the basis of high-response valves

- Based on 4WRP 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 analogue sensors
- Connection of an incremental (1Vss) or absolute (SSI) position measuring system
- Command value feedforward optionally analogue or via field bus
- For CANopen and Profibus-DP

Type IAC-R

Detailed information:
RE 29090-P

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 analogue 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 analogue control electronics with type DFE1
- Integrated analogue 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 axisl 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 machines

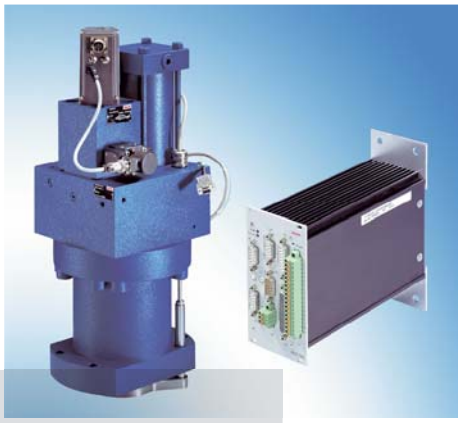
System technology for forming engineering - punching

SYEHL punching axis

- Modular design of the completely assembled axis that is tested according to customer specifications and consists of:
  - Cylinder with integrated position measuring system
  - Highly dynamic high-response valves (cartridge or proportional valve)
  - SYHNC100-NIB closed-loop control electronics
  - Cable set (optional)
- Highly dynamic cylinder axes
  - Punching rates up to 1200 double strokes per minute
  - Nominal force 100 kN to 1200 kN
- Simple and uncomplicated replacement of individual subsystems in the event of a repair

SYHNC100-NIB digital closed-loop control electronics

- 1- or 2-axis controller with specific axis functions for punching axis, down-holding device and shears
- Operating modes
  - Punching
  - Nibbling
  - Forming
  - Engraving
  - Soft punch
- Parameterization and diagnosis with the help of the Rexroth software WIN-PED on a PC with Windows95 or higher
- Sensor interfaces
  - Analogue position measuring system (LVDT)
  - Incremental position measuring system
- Process interfacing with higher-level control
  - Field bus interfacing (Profibus-DP)
  - Digital inputs and outputs



Types SYEHL and SYHNC100-NIB

Detailed information:
– SYEHL: RE 30018
– SYHNC100-NIB: on inquiry

Industry-specific electronics for plastics processing machines – analogue injection electronics

- Analogue amplifiers of Euro-card format for installation in 19" racks
- Injection process control card for controlling injection functions on injection moulding machines
- Separate controllers for
  - Injection speed
  - Pack-&-hold pressure
  - Backpressure during plasticizing
- Can be integrated in the machine concept
- Controlling possible by PLC
- Without valve amplifier

Type SPR.-VLR.

Detailed information:
1987761327 Chapter 8

Type of electronics	Suitable for valve type
SPR2-VLRC	4/4 high-response valves
SPR3-VLRD	4/5 high-response valves with decompression position

Digital injection control electronics

- Digital closed-loop control electronics of Euro-card format
- Open or closed-loop controlling of the injection process
  - Injection control with superimposed pressure control
  - Pack-&-hold pressure
  - Backpressure
  - Worm return
- Command value feedforward
  - Analogue
  - Command value profile
- Sensor interfaces
  - Analogue
  - Absolute position measuring system SSI
  - Incremental position measuring system
  - PC software BODAC for configuration, parameterization and diagnosis
- Online diagnosis function
- Integrated "online manual"

Type VT-HACDI

Detailed information:
RE 30149

HydroControl electronics for the closed-loop control of hydraulic drives in testing technology

- Modular design in 19“ rack
- Can be integrated in standard software tools
- Modular concept for solving testing tasks
- Closed-loop force and position control
- Sensor interfaces
  - Analogue
  - Absolute position measuring system SSI
  - Incremental position measuring system
- Field bus interfacing
  - Profibus
  - Interbus-S
  - CANopen
- Parameterization and diagnosis with the help of the Rexroth software WIN-PED on a PC with Windows 9 x or higher

HCE

Detailed information:
RE 09400

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; meets requirement class 5 according to DIN V 19250
- 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 concept:
  - 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
– Civil engineering
– Special technology

Electronic signal encoders, signal converters and command value technology

- 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	ca. 6 to 10
	– VT 10406	*F*	N	ca. 7 to 16
	– VT 10399	*F*	N	ca. 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 30754
VT 10399	3 control axes	RE 30755

Command value technology

- Modules and electronic printed circuit boards for generating voltage command values and ramps

Technical data	
POTM-M	10-turn potentiometer for 0 to +10 V or -10 to +10 V
POTM-CARD	2-channel command value call-up card ; 4 x 0 to ± 10 V per channel
RAMP-POTM	Command value and ramp card; 4 x 0 to ± 10 V; ramp time 0.05 to 10 s
RAMP-LIN	Command value and ramp card; 4 x 0 to ± 10 V; ramp time 0.1 to 60 s
POTM-RAMP	Command value and ramp module; 4 x 0 to ± 10 V; ramp time max. 10 s

Detailed information:
1987761327 Chapter 4

Racks and card holders

- 19" racks for accommodating electronic assemblies of Euro-card format
- Universal housing for 2 or 4 printed circuit boards of Euro-card format DIN 41 612
  - 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 of Euro-card format (single and double)
- Separate power supply

Detailed information:	**Technical data**	
1987761327 Chapter 2	Universal housing	DIN 41 612
	Type of electronics	
RE 29768	VT 19101	Rack 1 x 3HE for cards 100 x 160 mm with or without connector backpanel
RE 29768	VT 19102	Rack 2 x 3HE for cards 100 x 160 mm with or without connector backpanel
RE 29768	VT 19103	Rack 3 x 3HE for cards 100 x 160 mm with or without connector backpanel
RE 29768	VT 19110	Bus rack 3HE for cards 100 x 160 mm or 100 x 220 mm
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
- Power supply unit can be snapped onto PS02
- Power supply unit with card holder
- Mains filter module

Detailed information:	**Technical data**		
1987761327 Chapter 3	Power supply unit, can be snapped onto PS02	Input voltage: Output voltage:	115/230 VAC +24 VDC; 4 A
	Power supply unit with card holder	Input voltage: Output voltage:	115/230 VAC +24 VDC; 3 A
	Mains filter module	Input voltage: Output voltage:	24 VDC +24 VDC; 2.5 A
	Type of electronics		
RE 29929	VT-NE30	Input voltage: Output voltage:	115/230 VAC + 26 VDC/2.5 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 29891	VT-NE 40	Input voltage: Output voltage:	115/230 VAC + 30 to 34 VDC/8 A (adjustable)

Field bus-capable active plugs for hydraulic on/off valves

AS-I field bus

- Connection of up to 2 actuators or sensors possible
- Very compact build
- Simple installation with low addressing effort
- LED lamps for a clearer overview
- Integrated reverse polarity protection
- Simple diagnosis
- Separate 24V cable for the power supply of actuators
- Max. cycle time < 5ms
- Type of protection IP67

Technical data			
General			
Valve connection			DIN 43 650 form A
Ambient temperature range	ϑ	°C	– 20 to + 70
Housing			Plastic, hardly inflammable
AS-I bus			
Operating voltage	U_B	V	26.5 to 31.6
Type of voltage			Safety extra low voltage SELV (IEC64)
Addressing			Addressing socket
Power part [1]			
Operating voltage	U_B	VDC	20 to 36
Output			
Output voltage		V	$U_{out} = U_B$ – 1.5 (typical)
Valve connection			Form A, DIN 43 650 (ISO 4400)
Connection of further valves			M12 socket, 5-pin
Inputs			
Input voltage			From AS-I bus to IEC 1131-2
L1, L2 port for external sensor			M12 socket, 5-pin

[1] The external supply voltage must be electrically separated from the AS-I cable in accordance with EN 60947-1.

Type of electronics	IN L1 (M12)	IN L2 (M12)	OUT O1 (form A)	OUT O2 (M12)
A (2x I/0.2 A) + (2x O/2A)	X	X	X	X
B (2x O/2A)	–	–	X	X
C (1x O/2A)	–	–	X	–

Detailed information:
1987760618

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-PP: 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 fed forward 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

Measuring adapters for proportional and high-response valves

- Testing of the signal exchange between the system control and the valve
- Presence of the supply voltage is signalled

Type			Detailed information:
Measuring adapter (7P)	VT-PA-2	For valves with 7-pin integrated elecronics (OBE) and voltage interface	RE 30068
Measuring adapter (12P)	VT-PA-1	For valves with 12-pin integrated elecronics (OBE)	RE 30067
Current measuring adapter		For measuring the valve solenoid current	1987761327
Test adapter	VT-PA-3	For Euro-cards, connector to DIN 41 612-F32	RE 30070

Controlled system simulators for digital axis control

Types VT-HNC100DEMO, VT-HACD-DEMO

Detailed information:
RE 30133

Pressure transducers – pressure switches

- Pressure transducer
- Display unit
- Monitoring electronics with 4 adjustable switching stages and adjustable hysteresis

Type HM 10

Detailed information:
RE 29968

Technical data			
Operating voltage	U_B	VDC	24; ± 10 %
– Upper limit value	$U_B(t)^{max}$	V	27
– Lower limit value	$U_B(t)_{min}$	V	22
Accuracy class			0.5
Output signal	U	V	0 to 10
Relay data			250 V; 2 A; 400 VA; 50 W
Pressure range	p	bar	10 to 450
Ambient temperature range	ϑ	°C	0 to + 50

Pressure transducers – pressure display units

- Evaluation electronics with analogue output
- 3-digit LED display
- Supply voltage for the pressure transducer (HM 5 only)
- Potential-free limit value contacts (HM 3 only)
- Standardized housing for control panel installation

Types HM 2, HM 3, HM 5

Detailed information:
– HM 2 pressure display unit:
RE 29973
– HM 3 pressure display unit:
RE 29974
– HM 5 pressure display unit:
RE 29975

Technical data			
Operating voltage	U_B	VAC	110 / 220
Input signal			
– HM 2, HM 3	I	mA	4 to 20
– HM 5	U	V	0 to 10
Analogue output	U/I		0 to 10 V; 5 mA
Pressure range	p	bar	10 to 600 (630)
Ambient temperature range	ϑ	°C	0 to + 50

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, HM 18

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

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

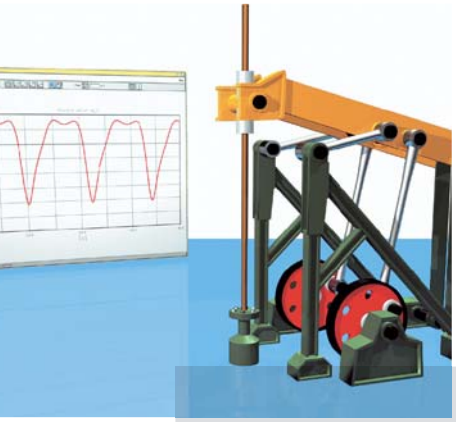
Programmable electronic pressure switches

- 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 or one analogue 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

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

Detailed information:
RE 30275



Simulation technology – 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 technology

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

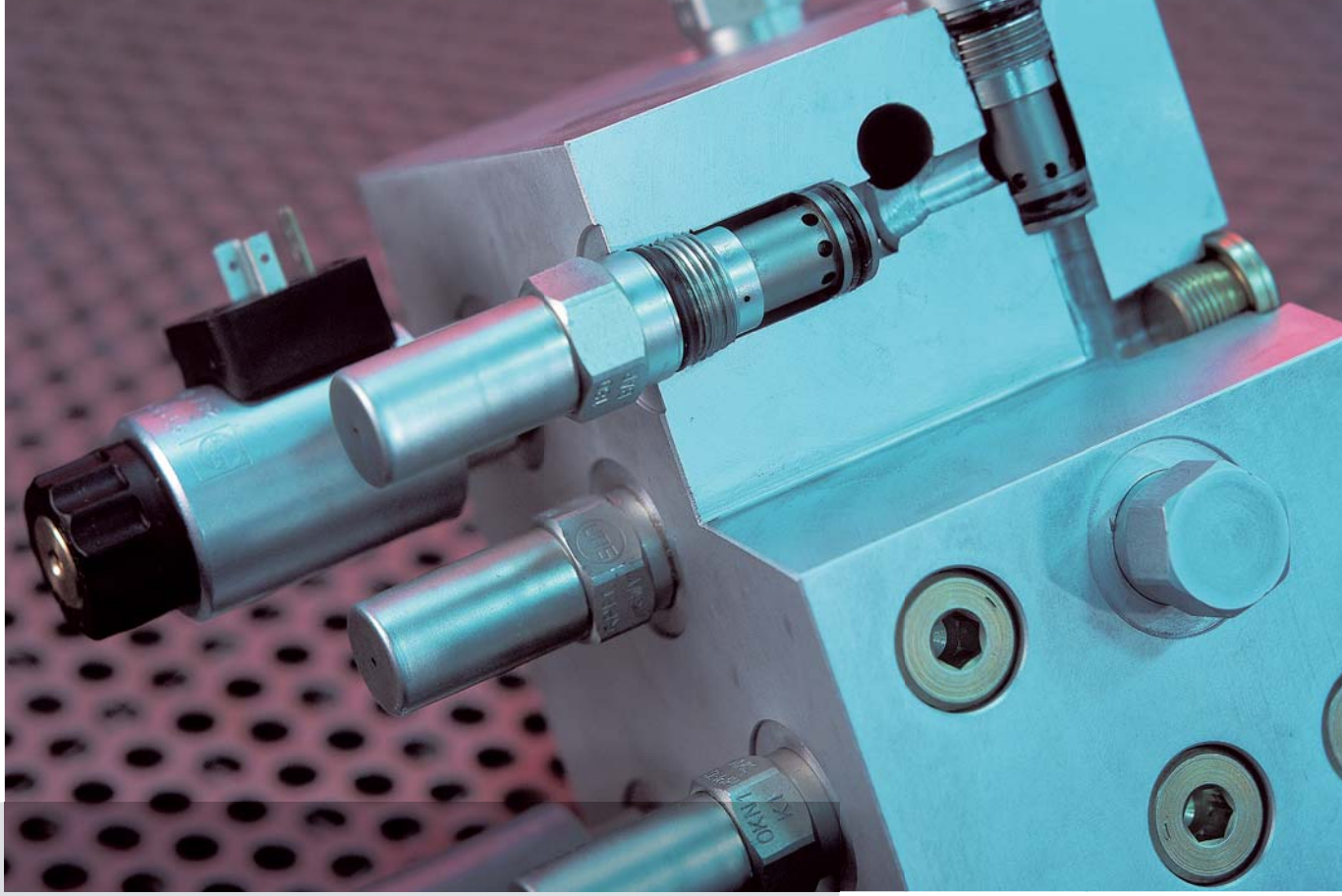
Detailed information:
on inquiry

Simulation technology – 3D animation and multi-media 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.

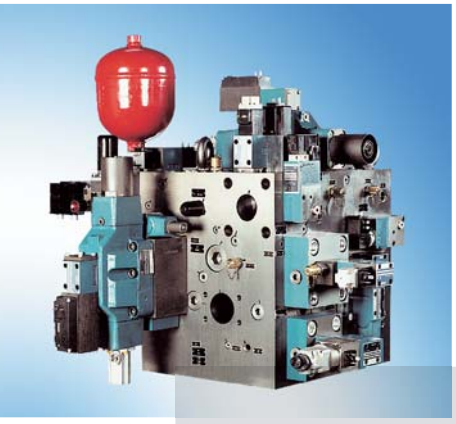
Advantages of the block design over individual piping:

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

Standardized and industry-independent control blocks

- Manifold plates
- Standard functions of sandwich plate design
- Pump control blocks
- Accumulator safety blocks

Detailed information:
on inquiry



Industry-specific and custom 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

Compact hydraulics

- Control blocks of compact design for cartridge valve technology
- The designs are optimized in terms of production and cost and available in standardized or individual application-related versions.
- The increased development investment is directly related to the number produced in series.

Detailed information:
RE 18103

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

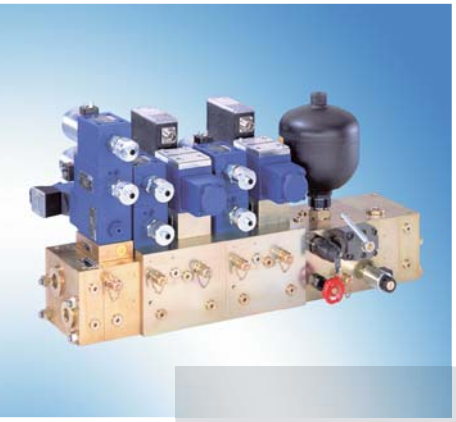
Type HSR

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

Detailed information:
– Size 6: RE 48107
– Size 10: RE 48110
– Size 16: RE 48115

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

Component function	Page
Pressure relief valves	49
Pressure reducing valves	53
Check valves	37
Shut-off valves	38
Double throttle check valves	58
2-way flow control valves	60
Hydro-electric pressure switches for sandwich plate mounting	131



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

Detailed information: on inquiry

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

Accessories

Measuring and monitoring devices

Apart from filters, the following components are available:

- Piston type and Bourdon tube pressure switches
- Pressure gauge isolator valves
- Pressure gauge selector switches
- Pressure gauges
- Level switches
- Thermostats

Filters

This product segment comprises high and low pressure and return line filters for in-line installation and tank mounting as well as accessories.

Performance profile

- Maximum flow 450 litres
- High pressure version up to 420 bar
- For installation in return or pressure lines
- Replaceable cartridges
- Visual and electrical clogging indicators

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

Pressure gauge selector switches

- Series 2, 4, 5, 6 and 7
- Housing valve as in-line valve (type of connection "A" and "F")
- For flange mounting (type of connection "B" and "E")
- For subplate mounting ("C")
- For threaded connection NPT ("G")
- Fixing bores for UNC screws ("H")
- With max. indicator range, optional: up to 40, 63, 100, 180 or 315 bar
- With 5, 6, 8 or 9 measuring points, optional
- With integrated pressure gauge, optional
- Leak-free isolation (type MSL2)

Type MS

Detailed information:
RE 50034

Version			MS2, MSL2	MS4 to MS7
Type of connection			A, B, C, E, F, G, H	A
Operating pressure	p_{max}	bar	315	315

Bourdon tube 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 100, 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	Operations/min		300	50 (briefly 100)

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	Operations/min		80

Detailed information:
RE 50055

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: – Version "OP" and "OA": 50, 100, 200, 350, 630 bar
  – Version "OH": max. 50, 100, 350 bar

Type HED 8

Technical data			
Operating pressure	p_{max}	bar	630
Switching frequency	Operations/min		80

Detailed information:
RE 50060

Pressure switches, mechanical

- Piston type pressure switch without leak-oil port
- 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)
- Optional sandwich plate, pipe or flange connection

Detailed information:
1987760711

Size			6
Operating pressure	p_{max}	bar	315/400
Switching frequency	Operations/min		120

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

Detailed information:
– Type HED 2: RE 50 045
– Type HED 3: RE 50 050

Version			HED 2	HED 3
Operating pressure	p_{max}	bar	400	400
Switching frequency	Operations/min		30	30

Pressure filters for installation in pressure lines

- Filter elements based on inorganic fibre
- 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 rating 10 µm absolute

Type ABZFD

Size			40 to 350
Operating pressure	p_{max}	bar	420
Flow	$q_{V\ max}$	L/min	350

Detailed information:
RE 50076

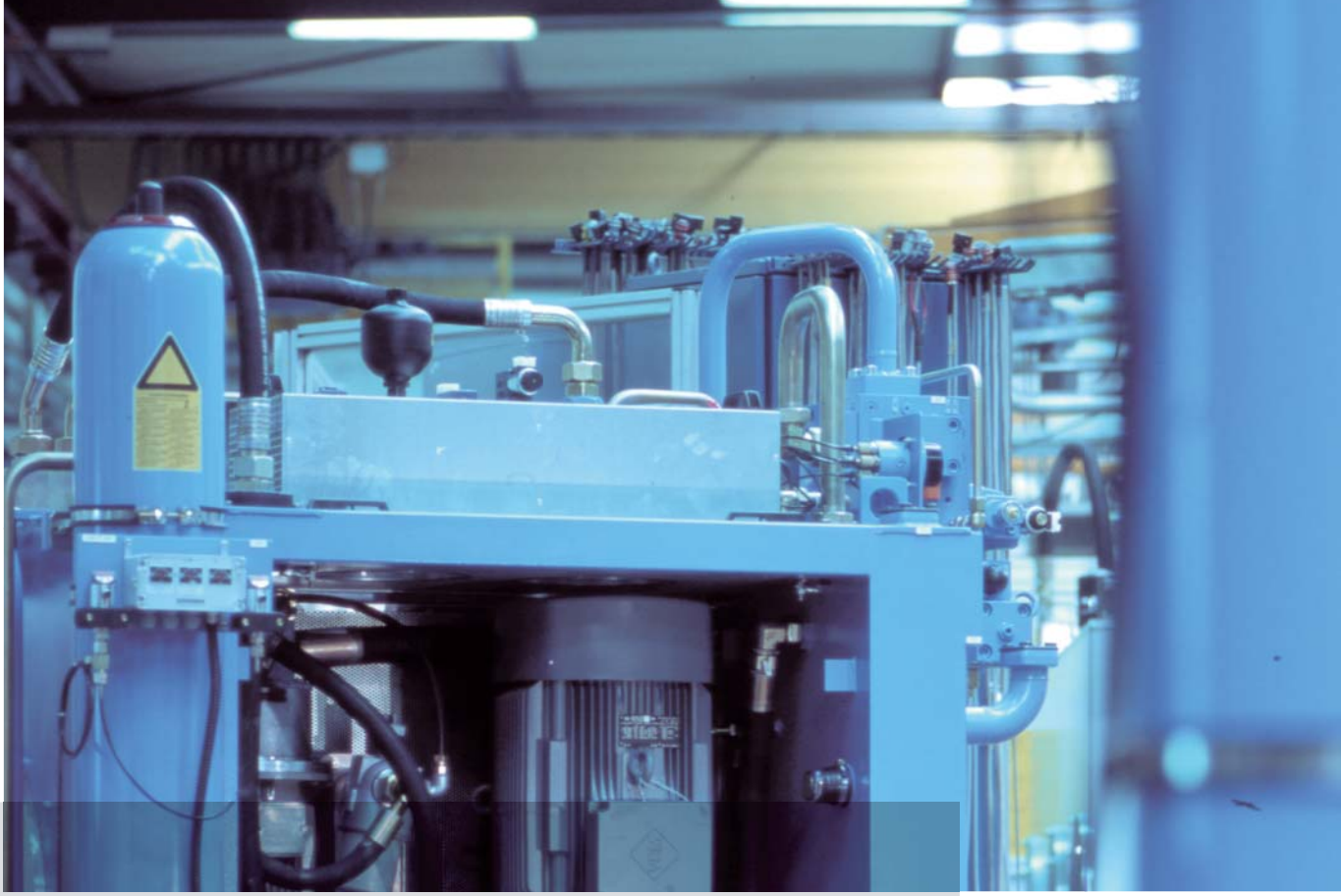
Return flow filter for direct tank installation

- Filter elements based on inorganic fibre
- 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 rating 10 µm absolute

Type ABZFR

Size			50 to 450
Operating pressure	p_{max}	bar	25
Flow	$q_{V\ max}$	L/min	450

Detailed information:
RE 50081



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 litres
- 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 assemblies with safety block to DIN 24 552
- Bladder type 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 block
	DN	L	1 to 50	0.6 to 2	10 to 32
Operating pressure	p_{max}	bar	–	–	330

Accumulator safety blocks

- Protection, isolation and unloading of hydraulic accumulators
- Meets the requirements and safety regulations to DIN 24 552 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

Detailed information:
RE 50131

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

Hydro-pneumatic accumulators

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

Technical data				
Type of accumulator			Bladder accumulator	Diaphragm accumulator
	DN	L	1 to 50	0.075 to 2.8

Detailed information:
1987761403
1987761407

Accumulator safety and shut-off blocks

- Protection, isolation and unloading of hydraulic accumulators
- Meet the requirements and safety regulations to DIN 24 552 pressure vessel regulations and technical rules for pressure vessels (TRB 403 and TRB 404)
- Safety valves type-tested
- Unloading valve electrically or manually operated

Size			20	32
Operating pressure	p_{max}	bar	350	350
Weight	m	kg	6	14.7

Detailed information:
1987761403

Safety valves

- Safety valves type tested
- Protection of hydraulic accumulators
- Acceptance regulations according to pressure vessel regulations and technical rules for pressure vessels TRB 403
- Type test by TÜV

Detailed information:
1987761403

Technical data			
Operating pressure	p_{max}	bar	360
Maximum unloading flow		L/min	150

Accumulator charging valves

- Switching off of a fixed displacement pump
- 2 pressure settings
- Size 6 subplate mounting

Detailed information:
1987761403

Size			**6**
Operating pressure	p_{max}	bar	315
Flow	$q_{V\ max}$	L/min	40

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.

Performance profile

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

Standard power units
- Oil tank with a capacity of 100 to 630 litres
- Driver power 5.5 to 45 kW

Standard whispering power units
- Oil tank with a capacity of 100 to 1000 litres
- 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!

Filter/cooler circulation circuit

Performance profile
- Compact circulation circuit with circulation pump, in-line filters and plate type heat exchanger
- Design according to the modular principle

Bell housing

Performance profile
- With oil/air cooler
- Design damped with regard to structure-borne noise and vibration, low sound pressure level

Modular standard power units

- Tank capacity 20; 40 and 60 litres
- Tank design: Aluminium tank
- Stable aluminium tank
- Modular design
- Compact power unit design
- Individual adaptation possible
- Suitable for a multitude of applications
- 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

Standard power units

- Tank capacity 100; 160; 250; 400 and 630 litres
- Tank design: Steel tank to DIN 24 339, 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

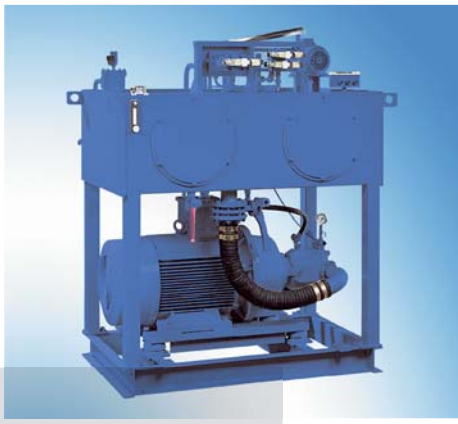
Type ABSAS

Detailed information:
RE 51101

Technical data (pump/motor)			
Type of pump			Axial piston pump (variable)
Displacement	$V_{g\ max}$	cm^3	18 to 100
Operating pressure	p_{max}	bar	315
El. motor power	P	kW	5.5 to 45

Standard power units

- Tank capacity 400, 630, 800 and 1000 litres
- 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:
RE 51027

Hydraulic tanks

- Tank capacity 1000 to 20 000 litres
- 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 13 000
- Ladders in tanks for tank sizes 16 000 to 20 000

Type ABTSR

Detailed information:
RE 51135

Hydraulic drive power units

- Tank capacity 100 to 1000 litres
- 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

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 litres
- 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

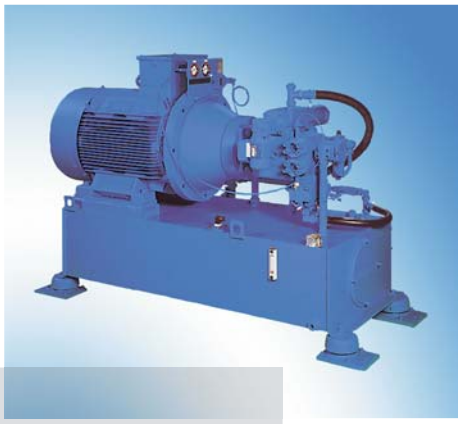
Type ABFAG

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 litres
- 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:
RE 51018

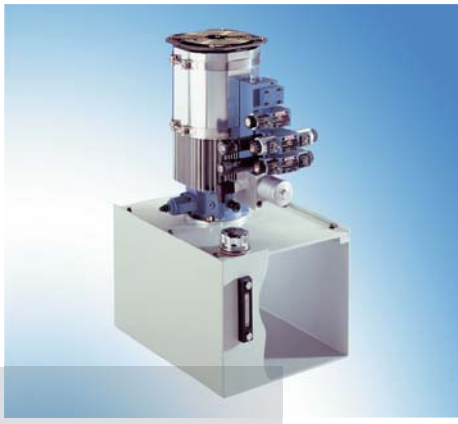
Motor/pump modules

Vane pump

- Low power losses
- Low operating noise
- Low flow pulsation
- Very short control times

MPM

- Sizes 20 to 32
- No additional cooling of hydraulic system required
- Very compact build
- Multi-station manifold plate can be directly mounted
- Integrated pressure filter possible



Type MPM

Size			**20**	**25**	**30**	**32**
Type of pump			Variable displ.	Variable displ.	Variable displ.	Fixed displ.
Displacement	$V_{g\ max}$	cm^3	20	25	30	32
Speed	n	min^{-1}	900 to 1800	900 to 1800	900 to 1800	900 to 1800
Operating pressure	p_{max}	bar	100	80	60	–
El. motor power	P	kW	3.0	3.0	3.0	3.0
Voltage	U	V	400 Y / 380 to 420 Y		460 Y / 440 to 480 Y	
Frequency	f	Hz	50	50	60	60

Detailed information:
RE 10530

Clamping and drive modules

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

Type UPE 1

Detailed information:
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 litres
- 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

Detailed information:
RE 51142
RE 51144

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

Clamping and drive modules

- Tank capacity 8.5 to 11 litres
- 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 51144
RE 51147

Drive modules

- Tank capacity 26 litres
- 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

Technical data (pump/motor)					
Type of pump			External gear pump (fixed displacement)	Internal gear pump (fixed displacement)	Vane pump (variable displacement)
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

Detailed information:
RE 51145
RE 51149

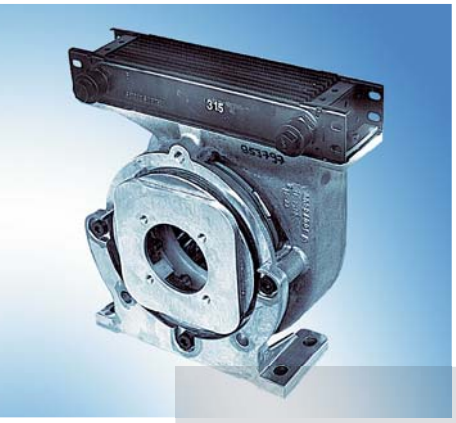
Filter/cooler circulation circuits

- Compact circulation circuit with circulation pump (type PGF2 or PVV), built-on low pressure filter and plate type heat exchanger
- El. motor frame sizes 80 to 112
- Design according to the modular principle

Type ABUKG

Detailed information:
RE 50121

Technical data (pump/motor)				
Type of pump			Internal gear pump (fixed)	Vane pump (fixed)
Heat dissipation capacity	***P***	kW	4 to 37	4 to 37



Bell housing with oil/air cooler

- Size for el. motor 80 to 180
- Nominal pressure 8 bar
- Design damped with regard to structure-borne noise and vibration, low sound pressure level
- High cooling capacity and low space requirement
- Suitable as main flow cooler
- Short, compact build, simple installation and removal of heat exchanger

Type PTK

Detailed information:
RE 50092

Size			**2001**	**200**	**250**	**300**	**350**	**3501**
Air throughput		m^3/h	90	90	210	360	850	850
Operating pressure	p_{max}	bar	8	8	8	8	8	8
Power	***P***	kW	0.55 to 0.75	1.1 to 1.5	2.2 to 4	55.5 to 7.5	11/15	18.5/22
Speed [1]	n_{max}	min^{-1}	1500	1500	1500	1500	1500	1500
Weight	***m***	kg	4	4	6	9	13	13

[1] other speeds 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

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

Detailed information:
RE 51066

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