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

Rexroth
Bosch Group

Program Information
Mobile Hydraulics, Mobile Electronics, Gears

The Drive & Control Company

Welcome to the World of Mobile Hydraulics

Rexroth can supply all the components, modules and systems you need to drive and control your mobile machines mechanically, hydraulically and electronically. In Mobile Hydraulics Rexroth is offering a portfolio of products unrivalled on the market, consisting of axial piston units, external gear units, radial piston motors, mobile controls, compact hydraulics, gears, mobile electronics and service.
The hydraulic solutions supplied by our company are “cast in one”, so that you can rely on components and services that are among the best in their class. Ours is the largest and most extensive range of mobile hydraulics products in the world.

In addition, you can also profit from our unique industry, applications and development know-how. Our engineers analyze your requirements our in special Applications Centers.
This way, complete operational system solutions with perfectly matched components and the fewest possible interfaces are developed in close cooperation with you. The synergistic potential inherent in our association with Bosch is consistently utilized. Supplementary services and worldwide customer service are further integral parts of our range.

In short: Rexroth is your competent partner and supplier for all drive and control systems for mobile machines.

Contents

Application Examples

Wheel, crawler and mining excavators, mini-excavators, backhoe loaders, wheel loaders, skid steer loaders, crawler loaders, bulldozers, road rollers, pavers






Drilling equipment, cranes, fork lift trucks, telehandlers, straddle carrier, aerial work platforms, snow groomers






Concrete pumps, mobile concrete mixers, commercial vehicles, municipal vehicles, forestry machinery, agricultural machinery, wind power plants






Products of Mobile Hydraulics

Axial Piston Units

Fixed Pumps, Variable Pumps, Fixed Motors, Variable Motors

1

External Gear Units

External Gear Pumps, External Gear Motors, Fan Motors

2

Radial Piston Motors

3

Mobile Controls

Control Blocks, Valve Module, Brakes, Steering Units, Pilot Control Devices

4

Compact Hydraulics

Cartridge Valves, Integrated Circuits, Load Holding / Motion Control Valves,
Power Modules, Compact Directional Valves

5

Gears

Travel Drives, Swing Drives, Winch Drives,
Planetary Gearboxes, Generator Gear Units, Pitch and Yaw Drives

6

BODAS Mobile Electronics

Controllers, Amplifiers, Sensors, Joysticks, Displays, Parameterization and
Programming Tools, Application Software and System Solutions

7

Accumulators

Hydropneumatic Accumulators and Accessories for Accumulators

8

Axial Piston Units

Axial piston units are available in the form of pumps and motors in bent axis design or swashplate design for medium- and high-pressure ranges. They are the main components in the hydrostatic transmission. Compact size and high power density, economy and reliability are characteristic advantages promoting the use of hydrostatic transmissions, together with the fact that they meet the demand for high speed and high torque, as well as optimum efficiency.

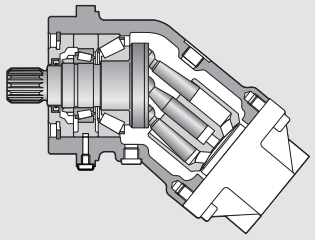
Characteristics:
- Open and/or closed circuit
- Displacement 5 to 1000 cm^3
- Nominal pressure up to 450 bar
- Maximum speed up to 11,000 rpm
- Maximum power output 933 kW

Our versatile transmissions for mobile applications can be combined in a variety of ways with pumps, motors and open or closed loop control devices to offer the optimum design for every drive application and every power range.

Key advantages:
- Infinitely variable speed setting at fixed or variable input speed
- Immediate, jolt-free change in direction of rotation
- Simple, ergonomic operation
- High turnaround
- Automatic torque conversion

Axial piston pumps and motors are used for the travel drive and working hydraulics in a wide variety of mobile machines.

Fixed Pump A2FO



Sizes 5...1000
Axial tapered piston bent axis design
Series 6
Open circuits
Nominal pressure
- Size 5: 315 bar
- Sizes 10...200: 400 bar
- Sizes 250...1000: 350 bar

Peak pressure
- Size 5: 350 bar
- Sizes 10...200: 450 bar
- Sizes 250...1000: 400 bar

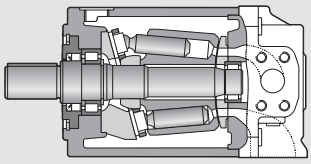
The standard fixed pump for all fields of application in open circuits.
- Service ports SAE flange or thread
- Shaft end parallel with key or spline shaft
- Long-life bearings available (sizes 250...1000)

Detailed information:
A2FO RE 91401

Size				**5**	**10**	**12**	**16**	**23**	**28**	**32**	**45**	**56**	**63**	**80**
Displacement		V_g	cm³	4,93	10,3	12	16	22,9	28,1	32	45,6	56,1	63	80,4
Speed [1]		n_{max}	rpm	5600	3150	3150	3150	2500	2500	2500	2240	2000	2000	1800
Flow	at n_{max}	q_{Vmax}	l/min	27,6	32,4	37,8	50	57	70	80	102	112	126	144
Power	$\Delta p = 315$ bar	P_{max}	kW	14,5	-	-	-	-	-	-	-	-	-	-
Power	$\Delta p = 400$ bar	P_{max}	kW	-	21,6	25	34	38	47	53	68	75	84	96
Torque	$\Delta p = 315$ bar	T_{max}	Nm	24,7	-	-	-	-	-	-	-	-	-	-
Torque	$\Delta p = 400$ bar	T_{max}	Nm	-	65	76	101	145	178	203	290	356	400	511
Weight (approx.)		m	kg	2,5	6	6	6	9,5	9,5	9,5	13,5	18	18	23
Size				**90**	**107**	**125**	**160**	**180**	**200**	**250**	**355**	**500**	**710**	**1000**
Displacement		V_g	cm³	90	106,7	125	160,4	180	200	250	355	500	710	1000
Speed [1]		n_{max}	rpm	1800	1600	1600	1450	1450	1550	1500	1320	1200	1200	950
Flow	at n_{max}	q_{Vmax}	l/min	162	170	200	232	261	310	375	469	600	826	950
Power	$\Delta p = 350$ bar	P_{max}	kW	-	-	-	-	-	-	219	273	350	497	554
Power	$\Delta p = 400$ bar	P_{max}	kW	108	114	133	155	174	207	-	-	-	-	-
Torque	$\Delta p = 350$ bar	T_{max}	Nm	-	-	-	-	-	-	1393	1978	2785	3955	5570
Torque	$\Delta p = 400$ bar	T_{max}	Nm	572	678	795	1020	1145	1272	-	-	-	-	-
Weight (approx.)		m	kg	23	32	32	45	45	66	73	110	155	322	336

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

Fixed Pump A4FO



Sizes 16...500
Axial piston swashplate design
Series 3
Sizes 16...40 and 125...500
Series 1
Size 71
Open circuits
Nominal pressure
Sizes 16...40: 400 bar
Sizes 71...500: 350 bar
Peak pressure
Sizes 16...40: 450 bar
Sizes 71...500: 400 bar

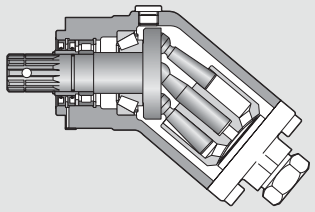
Fixed pump with possibility of through drive for mounting further pumps up to the same size.
Operation possible with HF hydraulic fluids with reduced data (sizes 71...500).

Detailed information:
A4FO RE 91455

Size				16	22	28	40	71	125	250	500
Displacement		V_g	cm³	16	22	28	40	71	125	250	500
Speed [1) 2)]		n_{max}	rpm	4000	3600	3000	2750	2200	1800	1500	1320
Flow	at n_{max}	q_{Vmax}	l/min	64	79	84	110	152	225	375	660
Power	$\Delta p = 350$ bar	P_{max}	kW	-	-	-	-	91	131	219	385
Power	$\Delta p = 400$ bar	P_{max}	kW	43	53	56	73	-	-	-	-
Torque	$\Delta p = 350$ bar	T_{max}	Nm	-	-	-	-	395	696	1391	2783
Torque	$\Delta p = 400$ bar	T_{max}	Nm	102	140	178	254	-	-	-	-
Weight (approx.)		m	kg	13,5	13,5	13,5	16,5	34	61	120	220

[1)] These values are valid at an absolute pressure of 1 bar in suction port S
[2)] Higher speeds permissible for high-speed version (sizes 250, 500)

Fixed Pump KFA



Sizes 23...125
Axial tapered piston bent axis design
Series 6
Open circuits
Nominal pressure
Sizes 23...107: 300 bar
Size 125: 250 bar
Peak pressure
Sizes 23...107: 350 bar
Size 125: 300 bar

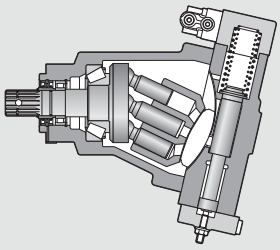
Fixed pump for working equipment in commercial vehicles, such as street tippers, dump trucks, HGV loading cranes, tankers, municipal vehicles, special vehicles, etc. These pumps are compatible with the standardized power take-offs on HGV motors and gearboxes according to European standards. They fulfill all requirements placed on hydraulic drives in these areas.
- No case drain line required
- Simple change of direction of rotation

Detailed information:
KFA RE 91501

Size				23	32	45	63	80	107	125
Displacement		V_g	cm³	22,9	32	45,6	63	80,4	106,7	125
Speed [1]		n_{max}	rpm	2920	2900	2560	2300	2130	1860	1800
Flow	at n_{max}	q_{Vmax}	l/min	67	93	117	145	171	198	225
Power	$\Delta p = 250$ bar	P_{max}	kW	-	-	-	-	-	-	94
Power	$\Delta p = 300$ bar	P_{max}	kW	33	46	58	73	86	99	-
Torque	$\Delta p = 250$ bar	T_{max}	Nm	-	-	-	-	-	-	497
Torque	$\Delta p = 300$ bar	T_{max}	Nm	109	153	218	301	384	509	-
Weight (approx.)		m	kg	5,8	5,8	8	9	11,6	14,5	14,5

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

Variable Pump KVA



Sizes 55...107
Axial tapered piston bent axis design
Series 6
Open circuits
Nominal pressure: 300 bar
Peak pressure: 350 bar

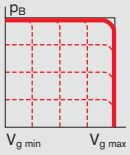
Variable pump for demanding applications and easy control of working equipment in commercial vehicles, e.g. HGV loading cranes, generator drives, compressor drives, drives for air conditioning systems, fan drives, etc.
These pumps are compatible with the standardized power take-offs on HGV motors and gearboxes according to European standards. They fulfill all requirements placed on hydraulic drives in these areas.

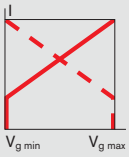
Detailed information:
KVA RE 92250

Size				55	80	107
Displacement		$V_{g\,max}$	cm³	54,8	80	107
Speed [1]	at $V_{g\,max}$	n_{max}	rpm	2500	2240	2150
Flow	at n_{max}	q_{Vmax}	l/min	137	179	230
Power	Δp = 300 bar	P_{max}	kW	68	90	115
Torque	Δp = 300 bar	T_{max}	Nm	261	382	510
Weight (approx.)		m	kg	16	20	24

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

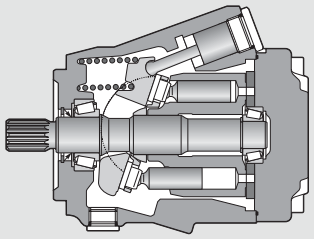
DRS	EP
Pressure control with load sensing function	Electrical control, with proportional solenoid





V_g = Displacement
p_B = Operating pressure
I = Control current

Variable Pump A10VO/5



Sizes 10...85
Axial piston swashplate design
Series 5
Open circuits
Nominal pressure: 250 bar
Peak pressure: 315 bar

Variable pump for pressure ranges up to max. 315 bar
- Short recovery times and favorable power/weight ratio
- Possible to mount additional pumps on through drive up to the same nominal size

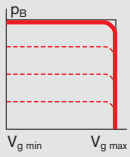
Detailed information:

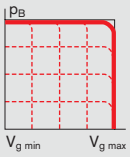
A10VO/5	RE 92703
A10VO ED	RE 92707
A10VO EP/EK	RE 92708
A10VO EF	RE 92709

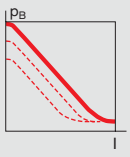
Size				10 *)	28	45	63	85
Displacement		$V_{g\,max}$	cm³	10,5	28	45	60	85
Speed 1) 2)	at $V_{g\,max}$	n_{max}	rpm	3600	3000	2600	2700	2500
Flow	at n_{max}	q_{Vmax}	l/min	38	84	117	162	212
Power	Δp = 250 bar	P_{max}	kW	16	35	49	68	89
Torque	Δp = 250 bar	T_{max}	Nm	42	111	179	250	338
Weight (approx.)		m	kg	8	14	18	22	34

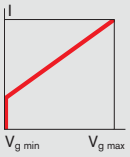
1) These values are valid at an absolute pressure of 1 bar in suction port S
2) Higher speeds permissible for high-speed version (size 45)
* A10VSO

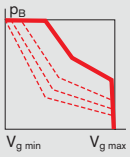
DR	DRF/DRS/EF	ED	EP/EK	LA
Pressure control	Pressure and flow control (EF: electric control)	Electrohydraulic pressure control (not for size 10)	Electroproportional swivel angle control	Power control





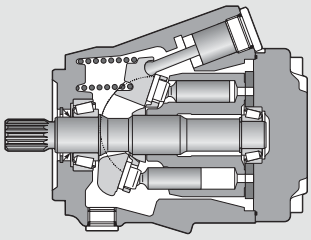






V_g = Displacement
p_B = Operating pressure
I = Control current

Variable Pump A10VNO



Sizes 28...85
Axial piston swashplate design
Series 5
Open circuits
Nominal pressure: 210 bar
Peak pressure: 250 bar

Variable pump for pressure ranges up to max. 250 bar
- Short recovery times and favorable power/weight ratio
- Compact installation size
- Economical version as an alternative to fixed pumps

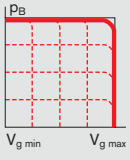
Detailed information:
A10VNO RE 92735

Size				28	45	63	85
Displacement		$V_{g\,max}$	cm³	28	45	63	85
Speed [1]	at $V_{g\,max}$	n_{max}	rpm	3000	1800	2700	1800
Flow	at n_{max}	q_{Vmax}	l/min	84	81	170	153
Power	$\Delta p = 210$ bar	P_{max}	kW	29	28	59	53
Torque	$\Delta p = 210$ bar	T_{max}	Nm	94	150	210	284
Weight (approx.)		m	kg	14	14	18	22

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

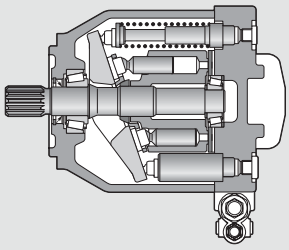
DRS

Pressure and flow control



V_g = Displacement
p_B = Operating pressure

Variable Pump A10VO/3



Sizes 18...140
Axial piston swashplate design
Series 3
Open circuits
Nominal pressure: 280 bar
Peak pressure: 350 bar

Variable pump for pressure ranges up to max. 350 bar
- Possible to mount additional pumps on through drive up to the same nominal size
- Large variety of controls

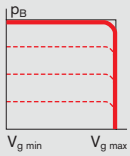
Detailed information:

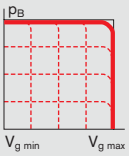
A10VO/3	RE 92701
A10VO ED	RE 92707
A10VO EF	RE 92709

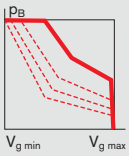
Size				**18 *)**	**28**	**45**	**71**	**100**	**140**
Displacement		$V_{g\,max}$	cm³	18	28	45	71	100	140
Speed [1) 2)]	at $V_{g\,max}$	n_{max}	rpm	3300	3000	2600	2200	2000	1800
Flow	at n_{max}	q_{Vmax}	l/min	59,4	84	117	156	200	252
Power	$\Delta p = 280$ bar	P_{max}	kW	27,7	39	55	73	93	118
Torque	$\Delta p = 280$ bar	T_{max}	Nm	80	125	200	316	445	623
Weight (approx.)		m	kg	12	15	21	33	45	60

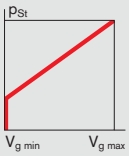
[1]) These values are valid at an absolute pressure of 1 bar in suction port S
[2]) Higher speeds permissible for high-speed version (sizes 45 to 140)
* A10VSO

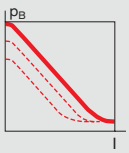
DR	**DFR/EF**	**DFLR**	**FHD**	**ED**
Pressure control	Pressure and flow control	Pressure, flow, and power controller (not for size 18)	Pilot pressure dependent displ. control, with pressure control (not for size 18)	Electrohydraulic pressure control





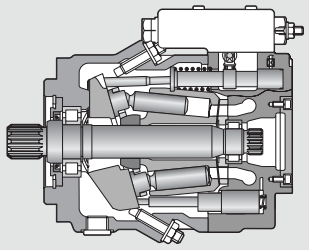






V_g = Displacement
U = Control voltage
p_B = Operating pressure
p_{St} = Pilot pressure
I = Control current

Variable Pump A11VO



Sizes 40...260
Axial piston swashplate design
Series 1
Open circuits
Nominal pressure: 350 bar
Peak pressure: 400 bar

A11VO/A11VLO

Variable pump for high pressure ranges up to max. 400 bar

Particularly high speeds are possible with version A11VLO with charging pump (impeller)

- Universal through drive
- Possible to mount additional pumps on through drive up to the same nominal size
- Large variety of controls

Detailed information:

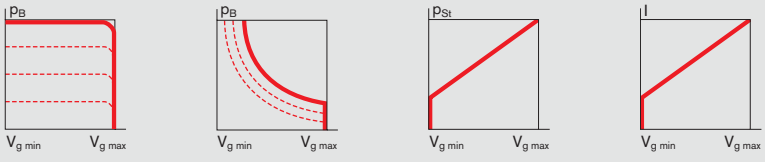
A11VO	RE 92500
A11VLO	RE 92500

Size	A11VO			40	60	75	95	130	145	190	260
Displacement		$V_{g\,max}$	cm^3	42	58,5	74	93,5	130	145	193	260
Speed [1]	at $V_{g\,max}$	n_{max}	rpm	3000	2700	2550	2350	2100	2200	2100	1800
Flow	at n_{max}	q_{Vmax}	l/min	126	158	189	220	273	319	405	468
Power	$\Delta p = 350$ bar	P_{max}	kW	74	92	110	128	159	186	236	273
Torque	$\Delta p = 350$ bar	T_{max}	Nm	234	326	412	521	724	808	1075	1448
Weight (approx.)		m	kg	32	40	45	53	66	76	95	125

Size	A11VLO			130	145	190	260
Displacement		$V_{g\,max}$	cm^3	130	145	193	260
Speed 2)	at $V_{g\,max}$	n_{max}	rpm	2500	2500	2500	2300
Flow	at n_{max}	q_{Vmax}	l/min	325	363	483	598
Power	$\Delta p = 350$ bar	P_{max}	kW	190	211	281	349
Torque	$\Delta p = 350$ bar	T_{max}	Nm	724	808	1075	1448
Weight (approx.)		m	kg	72	73	104	138

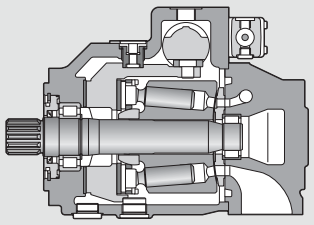
[1]) These values are valid at an absolute pressure of 1 bar in suction port S
[2]) These values are valid at an absolute pressure of 0.8 bar in suction port S

DR	LR	HD	EP
Pressure control	Power control	Hydraulic control, pilot pressure dependent	Electrical control, with proportional solenoid



V_g = Displacement
P_{St} = Pilot pressure
p_B = Operating pressure
I = Control current

Variable Pump A4VSO



Sizes 355...1000
Axial piston swashplate design
Series 3
Open circuits
Nominal pressure: 350 bar
Peak pressure: 400 bar

Variable pump for use in applications requiring very large volumes, e.g. in cranes, excavators, winches, etc.
- Flexible universal through drive enables easy adaptation of the through drive

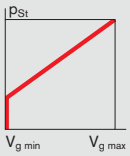
Detailed information:

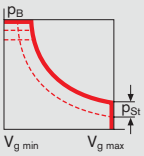
A4VSO	RE 92050
A4VSO for HFC-hydraulic fluids	RE 92053
A4VSO...LR3	RE 92064
A4VSO...HD	RE 92080

Size				355	500	750	1000
Displacement		$V_{g\,max}$	cm³	355	500	750	1000
Speed [1) 2)]	at $V_{g\,max}$	n_{max}	rpm	1500	1320	1200	1000
Flow	at n_{max}	q_{Vmax}	l/min	533	660	900	1000
Power	Δp = 350 bar	P_{max}	kW	311	385	525	583
Torque	Δp = 350 bar	T_{max}	Nm	1976	2783	4174	5565
Weight (approx.)		m	kg	207	320	460	605

[1)] These values are valid at an absolute pressure of 1 bar in suction port S
[2)] Higher speeds permissible for high-speed version (sizes 355 to 500)

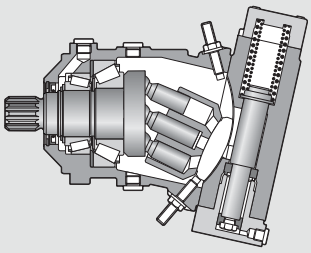
HD	LR3D
Hydraulic control, pilot pressure dependent	Power control, remote controllable with pressure cut-off





V_g = Displacement
p_{St} = Pilot pressure
p_B = Operating pressure

Variable Pump A7VO



Sizes 28...1000
Axial tapered piston bent axis design
Series 6
Open circuits
Nominal pressure: 350 bar
Peak pressure: 400 bar

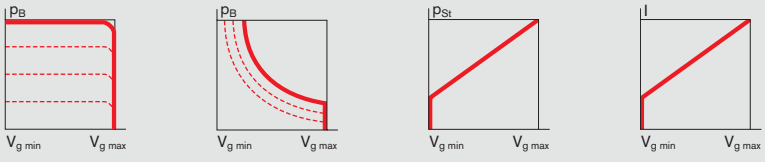
Robust variable pump for versatile use in open circuits
- Proven rotary group technology
- Large variety of controls
- Hyperbolic power control
- Long-life bearings available for longer bearing life (sizes 250...1000)
- Visual or electrical swivel angle indicator on request (sizes 250...1000)

Detailed information:
A7VO 28...160 RE 92202
A7VO 250...1000 RE 92203

Size				28	55	80	107	160	250	355	500	1000
Displacement		$V_{g\,max}$	cm³	28,1	54,8	80	107	160	250	355	500	1000
Speed [1]	at $V_{g\,max}$	n_{max}	rpm	3150	2500	2240	2150	1900	1500	1320	1200	950
Flow	at n_{max}	q_{Vmax}	l/min	89	137	179	230	304	375	469	600	950
Power	$\Delta p = 350$ bar	P_{max}	kW	52	80	105	134	177	212	265	340	538
Torque	$\Delta p = 350$ bar	T_{max}	Nm	156	305	446	596	891	1391	1976	2783	5565
Weight (approx.)		m	kg	17	25	40	49	71	102	173	234	450

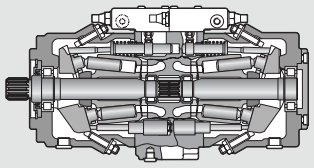
[1] These values are valid at an absolute pressure of 1 bar in suction port S

DR	LR	HD	EP
Pressure control	Power control	Hydraulic control, pilot pressure dependent	Electrical control, with proportional solenoid



V_g = Displacement
P_{St} = Pilot pressure
p_B = Operating pressure
I = Control current

Variable Double Pump A20VO



Sizes 60...520
Axial piston swashplate design
Series 1
Open circuits
Nominal pressure
Size 60: 250 bar
Sizes 95...520: 350 bar
Peak pressure
Size 60: 315 bar
Sizes 95...520: 400 bar

Variable double pump for devices with multi-circuit operation in the open circuit, such as excavators, cranes, drilling equipment etc.

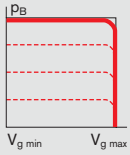
- One suction port, two service ports
- The pump functions using self-priming, tank charging or a charge pump (sizes 190...260).
- Proven rotary group technology
- Possible to mount additional gear pumps and axial piston pumps on through drive

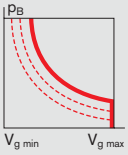
Detailed information:
A20VO RE 93100

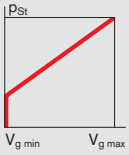
Size				60	95	190 *)	260 *)	520
Displacement		$V_{g\,max}$	cm³	60	93,8	192,7	260	520
Speed [1]	at $V_{g\,max}$	n_{max}	rpm	2700	2350	2500	2300	1450
Flow	at n_{max}	q_{Vmax}	l/min	2 x 157	2 x 214	2 x 467	2 x 580	2 x 754
Power	Δp = 250 bar	P_{max}	kW	135	-	-	-	-
Power	Δp = 350 bar	P_{max}	kW	-	258	560	696	880
Torque	Δp = 250 bar	T_{max}	Nm	477	-	-	-	-
Torque	Δp = 350 bar	T_{max}	Nm	-	1044	2145	2894	5796
Weight (approx.)		m	kg	44	-	-	-	640

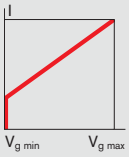
[1]) These values are valid at an absolute pressure of 1 bar in suction port S (sizes 60, 95, 520) or at least 0.8 bar (sizes 190, 260)
* A20VLO (with charge pump)

DR	LR	HD	EP
Pressure control	Power control	Hydraulic control, pilot pressure dependent	Electrical control, with proportional solenoid



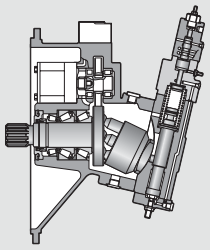






V_g = Displacement
P_{St} = Pilot pressure
p_B = Operating pressure
I = Control current

Variable Double Pump A8VO



Sizes 55...200
Axial tapered piston bent axis design
Series 6
Open circuits
Nominal pressure: 350 bar
Peak pressure: 400 bar

Variable double pump for devices with multi-circuit operation in the open circuit, such as excavators, cranes, drilling equipment etc.
The range of control equipment and the supplementary equipment are tailored to the specific requirements.

- Integrated auxiliary pump with pressure relief valve, optionally with additional pressure reducing valve
- Power take-off for mounting gear pumps and axial piston pumps
- Power override control
- Hydraulic stroke limitation
- Load sensing control

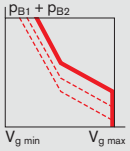
Detailed information:
A8VO RE 93010

Size				55	80	107	140	200
Displacement (per rotary group)		$V_{g\,max}$	cm³	54,8	80	107	140	200
Speed [1]	at $V_{g\,max}$	n_{max}	rpm	2500	2240	2150	2100	1950
Flow	at n_{max}	q_{Vmax}	l/min	2 x 137	2 x 179	2 x 230	2 x 294	2 x 390
Power		P_{max}	kW	160	209	268	294	325
Torque		T_{max}	Nm	611	891	1192	1337	1592
Weight (approx.)		m	kg	82	90	116	146	180

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

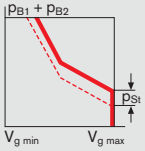
LA0

Individual power control (spring control)



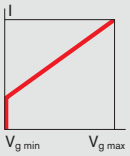
LA1

Individual power control with load limiting control (spring control)



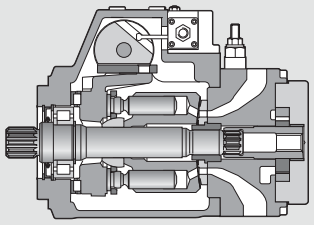
EP

Electrical control, with proportional solenoid



V_g = Displacement
p_{B1} = Operating pressure 1st pump
p_{B2} = Operating pressure 2nd pump
p_{St} = Pilot pressure
I = Control current

Variable Pump A4VG



Sizes 28...250
Axial piston swashplate design
Series 3
Closed circuits
Nominal pressure: 400 bar
Peak pressure: 450 bar

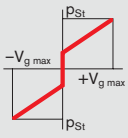
Variable pump, reversible, all components integrated for closed circuits
- For applications in the high pressure range up to 450 bar
- Integrated auxiliary pump for boost and control oil supply
- Combined boost and high-pressure relief valves
- Boost pressure relief valve
- Possible to mount additional pumps on through drive up to the same nominal size
- Large variety of controls

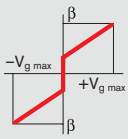
Detailed information:
A4VG RE 92003

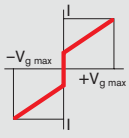
Size				28	40	56	71	90	125	180	250
Displacement		$V_{g\,max}$	cm³	28	40	56	71	90	125	180	250
Speed	at $V_{g\,max}$	n_{max}	rpm	4250	4000	3600	3300	3050	2850	2500	2400
Speed [1]	intermittent	$n_{max\,interm}$	rpm	5000	5000	4500	4100	3800	3450	3000	2700
Flow	at n_{max}	q_{Vmax}	l/min	119	160	202	234	275	356	450	600
Power	$\Delta p = 400$ bar	P_{max}	kW	79	107	134	156	183	237	300	400
Torque	$\Delta p = 400$ bar	T_{max}	Nm	178	255	356	451	572	795	1144	1590
Weight (approx.)		m	kg	29	31	38	50	60	80	101	156

[1]) Intermittent maximum speed: at high idle, at overspeed: $\Delta p = 70...150$ bar and $V_{g\,max}$, at reverse peaks: $\Delta p < 300$ bar and $t < 5$ s

DG	HD	HW	EP	EZ	DA
Direct controlled hydraulic control, pressure dependent	Hydraulic control, pilot pressure dependent	Hydraulic control, mechanical servo	Electrical control, with proportional solenoid	Electrical control with switching solenoid	Hydraulic control, speed dependent

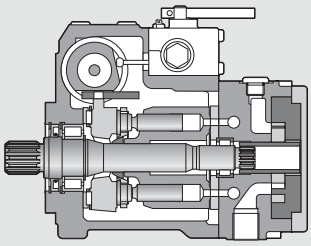






V_g = Displacement
p_{St} = Pilot pressure
ß = Swivel angle
Control lever
I = Control current

Variable Pump A10VG



Sizes 18...63
Axial piston swashplate design
Series 1
Closed circuits
Nominal pressure: 300 bar
Peak pressure: 350 bar

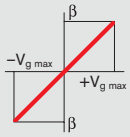
Variable pump, reversible, all components integrated for closed circuits
- For applications in the medium pressure range up to 350 bar
- Integrated auxiliary pump for boost and control oil supply
- Combined boost and high-pressure relief valves
- Boost pressure relief valve
- Possible to mount additional pumps on through drive up to the same nominal size
- Large variety of controls

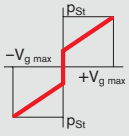
Detailed information:
A10VG RE 92750

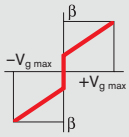
Size				18	28	45	63
Displacement		V_g	cm³	18	28	46	63
Speed	at $V_{g\,max}$	n_{max}	rpm	4000	3900	3300	3000
Speed [1]	intermittent	$n_{max\,interm}$	rpm	5200	4500	3800	3500
Flow	at n_{max}	q_{Vmax}	l/min	72	109	152	189
Power	$\Delta p = 300$ bar	P_{max}	kW	36	55	76	95
Torque	$\Delta p = 300$ bar	T_{max}	Nm	86	134	219	301
Weight (approx.)		m	kg	14	25	27	39

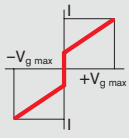
[1]) Intermittent maximum speed: at high idle, at overspeed: $\Delta p = 70...150$ bar and $V_{g\,max}$, at reverse peaks: $\Delta p < 300$ bar and $t < 5$ s

MD	DG	HD	HW	EP	EZ	DA
Mechanical pivot control (for size 18 only)	Direct controlled hydraulic control, pressure dependent	Hydraulic control, pilot pressure dependent	Hydraulic control, mechanical servo	Electrical control, with proportional solenoid	Electrical control with switching solenoid	Hydraulic control, speed dependent (not for size 18)



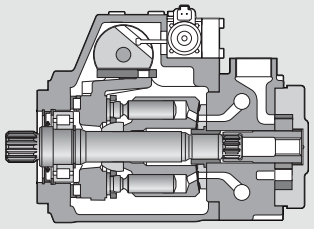






V_g = Displacement
p_{St} = Pilot pressure
ß = Swivel angle
Control lever
I = Control current

Variable Pump A4VTG



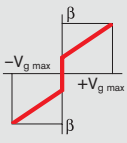
Sizes 71...90
Axial piston swashplate design
Series 3
Closed circuits
Nominal pressure: 400 bar
Peak pressure: 450 bar

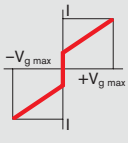
Special design for use in mobile concrete mixers
Variable pump, reversible, all components integrated for closed circuits
- For applications in the high pressure range up to 450 bar
- Integrated auxiliary pump for boost and control oil supply
- Combined boost and high-pressure relief valves
- Boost pressure relief valve
- Through drive possibility
- Compact design

Detailed information:
A4VTG RE 92012

Size				71	90
Displacement		$V_{g\,max}$	cm³	71	90
Speed	at $V_{g\,max}$	n_{max}	rpm	3300	3050
Flow	at n_{max}	q_{Vmax}	l/min	234	275
Power	Δp = 400 bar	P_{max}	kW	156	183
Torque	Δp = 400 bar	T_{max}	Nm	451	572
Weight (approx.)		m	kg	46	48

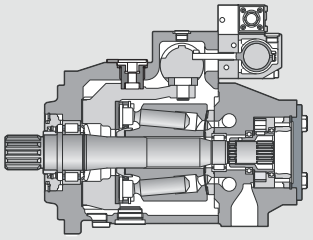
HW	EP
Hydraulic control, mechanical servo	Electrical control, with proportional solenoid





V_g = Displacement
ß = Swivel angle
I = Control current

Variable Pump A4CSG



Sizes 250...750
Axial piston swashplate design
Series 3
Closed circuits
Nominal pressure: 350 bar
Peak pressure: 400 bar

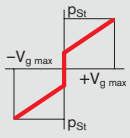
Variable pump, reversible, all components integrated for closed circuits
- Integrated boost pump and valving equipment
- Compact design
- Through drive and pump combination also possible with integrated auxiliary pump

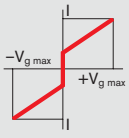
Detailed information:

A4CSG	RE 92105
HD	RE 92080
EP	RE 92084

Size				250	355	500	750
Displacement		$V_{g\,max}$	cm³	250	355	500	750
Speed	at $V_{g\,max}$	n_{max}	rpm	2200	2000	1800	1600
Flow	at n_{max}	q_{Vmax}	l/min	550	710	900	1200
Power	Δp = 350 bar	P_{max}	kW	321	414	525	700
Torque	Δp = 350 bar	T_{max}	Nm	1391	1976	2783	4174
Weight (approx.)		m	kg	214	237	350	500

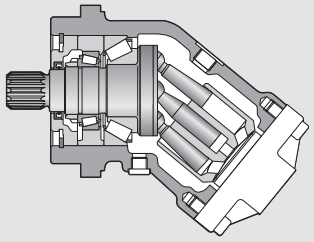
HD	EP
Hydraulic control, pilot pressure dependent	Electrical control, with proportional solenoid





V_g = Displacement
p_{St} = Pilot pressure
I = Control current

Fixed Motor A2FM



Sizes 5...1000
Axial tapered piston bent axis design
Series 6
Open and closed circuits
Nominal pressure

Size 5:	315 bar
Sizes 10...200:	400 bar
Sizes 250...1000:	350 bar

Peak pressure

Size 5:	350 bar
Sizes 10...200:	450 bar
Sizes 250...1000:	400 bar

A2FM
Standard motor
A2FE
Plug-in motor, preferably for installation in mechanical gearboxes

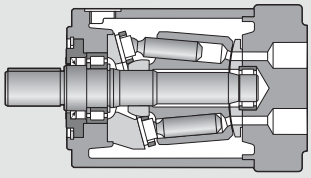
Supplementary equipment:
- Counterbalance valve can be fitted
- Option: Integrated pressure relief valve
- Option: Integrated or built-on flushing and boost pressure valves
- Suitable for use as pump in closed circuits
- Long-life bearings available (sizes 250...1000)

Detailed information:

A2FM 5...1000	RE 91001
A2FE 28...355	RE 91008

Size	**A2FM**			**5**	**10**	**12**	**16**	**23**	**28**	**32**	**45**	**56**	**63**	**80**
	A2FE			**-**	**-**	**-**	**-**	**-**	**28**	**32**	**45**	**56**	**63**	**80**
Displacement		V_g	cm³	4,93	10,3	12	16	22,9	28,1	32	45,6	56,1	63	80,4
Speed		n_{max}	rpm	10000	8000	8000	8000	6300	6300	6300	5600	5000	5000	4500
Flow	at n_{max}	q_{Vmax}	l/min	49	82	96	128	144	176	201	255	280	315	360
Torque	$\Delta p = 315$ bar	T_{max}	Nm	24,7	-	-	-	-	-	-	-	-	-	-
	$\Delta p = 400$ bar	T_{max}	Nm	-	65	76	100	144	178	204	290	356	400	508
Weight (approx.)		m	kg	2,5	5,4	5,4	5,4	9,5	9,5	9,5	13,5	18	18	23
Size	**A2FM**			**90**	**107**	**125**	**160**	**180**	**200**	**250**	**355**	**500**	**710**	**1000**
	A2FE			**90**	**107**	**125**	**160**	**180**	**-**	**250**	**355**	**-**	**-**	**-**
Displacement		V_g	cm³	90	106,7	125	160,4	180	200	250	355	500	710	1000
Speed		n_{max}	rpm	4500	4000	4000	3600	3600	2750	2700	2240	2000	1600	1600
Flow	at n_{max}	q_{Vmax}	l/min	405	427	500	577	648	550	675	795	1000	1136	1600
Torque	$\Delta p = 350$ bar	T_{max}	Nm	-	-	-	-	-	-	1393	1978	2785	3955	5570
	$\Delta p = 400$ bar	T_{max}	Nm	572	680	796	1016	1144	1272	-	-	-	-	-
Weight (approx.)		m	kg	23	32	32	45	45	66	73	110	155	325	336

Fixed Motor A4FM



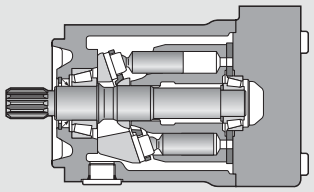
Sizes 22...500
Axial piston swashplate design
Series 3
Sizes 22...56 and 125...500
Series 1
Size 71
Open and closed circuits
Nominal pressure
Sizes 22...56: 400 bar
Sizes 71...500: 350 bar
Peak pressure
Sizes 22...56: 450 bar
Sizes 71...500: 400 bar

Swashplate motor for the pressure range up to max. 450 bar
Particularly well suited for use with the requirements for:
- Compact installation size (though inline construction)
- Series connection (high summated pressure)
- Drives with torsional vibrations
- Through drive possibility for sizes 22...56

Detailed information:
A4FM RE 91120

Size				22	28	40	56	71	125	250	500
Displacement		V_g	cm³	22	28	40	56	71	125	250	500
Speed		n_{max}	rpm	4250	4250	4000	3600	3200	2600	2200	1800
Flow	at n_{max}	q_{Vmax}	l/min	93	119	160	202	227	325	550	900
Power	$\Delta p = 350$ bar	P_{max}	kW	-	-	-	-	132	190	321	525
	$\Delta p = 400$ bar	P_{max}	kW	62	79	106	134	-	-	-	-
Torque	$\Delta p = 350$ bar	T_{max}	Nm	-	-	-	-	395	696	1391	2783
	$\Delta p = 400$ bar	T_{max}	Nm	140	178	255	356	-	-	-	-
Weight (approx.)		m	kg	11	11	15	21	34	61	120	260

Fixed Motor A10FM



Sizes 10...63
Axial piston swashplate design
Series 5
Open and closed circuits
Nominal pressure: 280 bar
Peak pressure: 350 bar

A10FM
Standard motor
A10FE
Plug-in motor, preferably for installation in mechanical gearboxes

Standard motor
- SAE standard connection dimensions
- Option: Integrated anti-cavitation valve, e.g. for fan drives
- Option: Integrated flushing and boost pressure valve

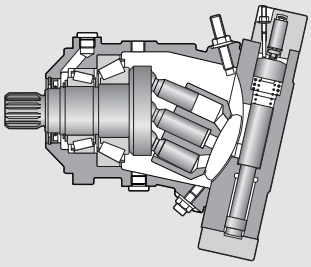
Detailed information:
A10FM RE 91172
A10FE RE 91172

Size	A10FM			-	-	-	-	18	23	28	37	45
	A10FE			10	11	14	16	18	23	28	37	45
Displacement		V_g	cm³	10,6	11,5	14,1	16,1	18	23,5	28,5	36,7	44,5
Speed [1]		n_{max}	rpm	5000	4200	4200	4200	4200	4900	4700	4200	4000
Flow	at n_{max}	q_{Vmax}	l/min	53	48	59	68	76	115	134	154	178
Power	$\Delta p = 280$ bar	P_{max}	kW	24,7	22,5	27,6	31,6	35,3	53,6	62,5	71,8	83,1
Torque	$\Delta p = 280$ bar	T_{max}	Nm	47	51	63	72	80	105	127	163	198
Weight (approx.)		m	kg	5	6,5	6,5	6,5	6,5	12	12	17	17

Size	A10FM			58	63
	A10FE			58	63
Displacement		V_g	cm³	58	63,1
Speed [1]		n_{max}	rpm	3600	3400
Flow	at n_{max}	q_{Vmax}	l/min	209	215
Power	$\Delta p = 280$ bar	P_{max}	kW	97,4	100,1
Torque	$\Delta p = 280$ bar	T_{max}	Nm	258	281
Weight (approx.)		m	kg	22	22

[1] The low pressure of at least 18 bar must be present at max. speed

Variable Motor A6VM



Sizes 28...1000
Axial tapered piston bent axis design
Series 6
Open and closed circuits
Nominal pressure
Sizes 28...200: 400 bar
Sizes 250...1000: 350 bar
Peak pressure
Sizes 28...200: 450 bar
Sizes 250...1000: 400 bar

A6VM
Standard motor
A6VE
Plug-in motor, preferably for installation in mechanical gearboxes

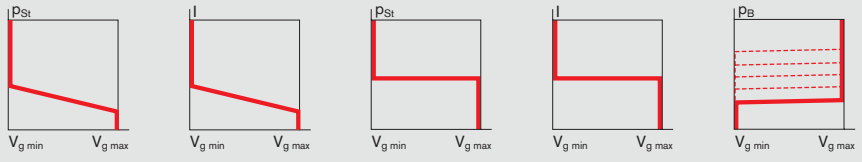
- Wide control range (can be swiveled over zero), high speeds and high torque
- Option: Counterbalance valve, flushing and boost pressure valve
- Option: Swivel angle indicator (sizes 250...1000)

Detailed information:
A6VM RE 91604
A6VE RE 91606

Size	A6VM			28	55	80	107	140	160	200	250	355	500	1000
	A6VE			28	55	80	107	-	160	-	250	-	-	-
Displacement		$V_{g\,max}$	cm³	28,1	54,8	80	107	140	160	200	250	355	500	1000
Displacement		$V_{g,1}$	cm³	18	35	51	68	88	101	126	190	270	385	762
Speed [1]	at $V_{g\,max}$	n_{max}	rpm	5550	4450	3900	3550	3250	3100	2900	2700	2240	2000	1600
	at $V_g < V_{g,1}$	n_{max}	rpm	8750	7000	6150	5600	5150	4900	4600	3600	2950	2650	2100
Flow	at n_{max}	q_{Vmax}	l/min	156	244	312	380	455	496	580	675	795	1000	1600
Power	$\Delta p = 350$ bar	P_{max}	kW	-	-	-	-	-	-	-	394	464	583	933
	$\Delta p = 400$ bar	P_{max}	kW	104	163	208	253	303	331	387	-	-	-	-
Torque	$\Delta p = 350$ bar	T_{max}	Nm	-	-	-	-	-	-	-	1391	1978	2785	5571
	$\Delta p = 400$ bar	T_{max}	Nm	179	349	509	681	891	1019	1273	-	-	-	-
Weight (approx.)		m	kg	16	26	34	47	60	64	80	90	170	210	430

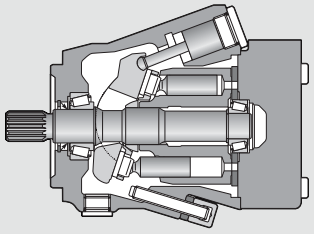
[1] Maintaining $q_{V\,max}$

HD	EP	HZ	EZ	HA	DA
Hydraulic control, pilot pressure dependent	Electrical control, with proportional solenoid	Hydraulic two-point control	Electrical two-point control	Automatic control, high-pressure dependent	Hydraulic control, speed dependent



V_g = Displacement
p_{St} = Pilot pressure
I = Control current
p_B = Operating pressure

Dual Displacement Motor A10VM



Sizes 28...63
Axial piston swashplate design
Series 5
Open and closed circuits
Nominal pressure: 280 bar
Peak pressure: 350 bar

A10VM
Standard motor
A10VE
Plug-in motor, preferably for installation in mechanical gearboxes

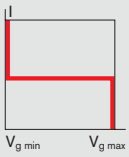
- Hydraulic or electrical two-point control

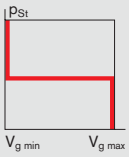
Detailed information:
A10VM RE 91703
A10VE RE 91703

Size	A10VM			28	45	63
	A10VE			28	45	63
Displacement		$V_{g\,max}$	cm³	28	45	62
Speed	at $V_{g\,max}$	n_{max}	rpm	4700	4000	3300
Speed	at $V_{g\,min}$	n_{max}	rpm	5300	4600	3800
Flow	at n_{max}	q_{Vmax}	l/min	131,6	180	205
Power	Δp = 280 bar	P_{max}	kW	61	84	95
Torque	Δp = 280 bar	T_{max}	Nm	125	200	276
Weight (approx.)		m	kg	14	18	26

[1]) The low pressure of at least 18 bar must be present at max. speed

EZ	HZ	DG
Electrical two-point control	Hydraulic two-point control	Direct-controlled two-point control





V_g = Displacement
p_{St} = Pilot pressure
I = Control current

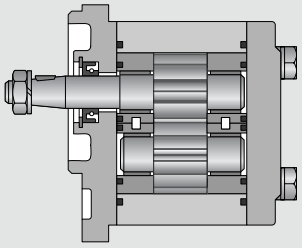
External Gear Units

External gear units are classic hydraulic units and come in the form of pumps and motors. Individual pumps, multiple pumps as well as the low-noise SILENCE versions in seven different series open up a virtually unlimited range of possible uses.

Characteristics:

- Displacement volume 1 to 63 cm^3
- Nominal pressure up to 280 bar
- High quality standard through a uniform production process
- Module-friendly construction
- Integratable valve functions
- Multiple-pump technology available
- Aluminum and gray cast-iron casings
- High power density
- Good efficiency
- Low airborne sound emissions
- Reasonable service-life costs

External Gear Pumps, Standard Version



Fixed pumps
Standard version
Nominal pressure: 280 bar

- Slide bearings for high loads
- Drive shafts acc. to ISO or SAE
- Combinations of several pumps possible
- Line connections: connecting flange or screw-in thread

Detailed information:

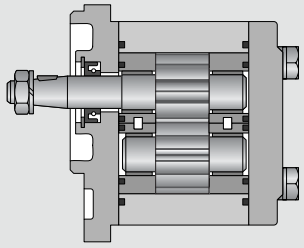
Model F	RE 10089
Model B	RE 10087
Model N	RE 10091
Model G	RE 10093
Brochure	RE 98240

AZ Configurator:
www.boschrexroth.com/azconfigurator

Model B, Series 1X	**Size**		**1**	**2**	**3**	**4**	**5**				
Displacement	V_g	cm³	1	2	3	3,8	4,6				
Max. continuous pressure	p_1	bar	210	210	210	190	140				
Pressure, intermittent	p_2	bar	230	230	230	210	160				
Speed max. at p_2	n	rpm	6000	6000	5000	4000	4000				
Speed min. at p_2	n	rpm	1000	850	850	750	750				
Model B, Series 2X	**Size**		**1**	**2**	**2,5**	**3**	**4**	**4,5**	**5**	**6**	**7**
Displacement	V_g	cm³	1	2	2,5	3,15	4	4,5	5	6,3	7,1
Max. continuous pressure	p_1	bar	250	250	250	250	250	250	250	225	200
Pressure, intermittent	p_2	bar	280	280	280	280	280	280	280	255	230
Speed max. at p_2	n	rpm	6000	5000	5000	4000	4000	4000	4000	3500	3500
Speed min. at p_2	n	rpm	750	750	750	750	750	750	750	750	750
Model F, Series 1X	**Size**		**4**	**5**	**8**	**11**	**14**	**16**	**19**	**22**	**22 [1)]**
Displacement	V_g	cm³	4	5,5	8	11	14	16	19	22,5	22,5
Max. continuous pressure	p_1	bar	250	250	250	250	250	250	210	180	210
Pressure, intermittent	p_2	bar	280	280	280	280	280	280	230	210	230
Speed max. at p_2	n	rpm	4000	4000	4000	3500	3000	3000	3000	2500	3000
Speed min. at p_2	n	rpm	700	700	700	600	500	500	500	500	500
Model F, Series 2X	**Size**		**4**	**5**	**8**	**11**	**14**	**16**	**19**	**22**	**25**	**28**
Displacement	V_g	cm³	4	5,5	8	11	14	16	19	22,5	25	28
Max. continuous pressure	p_1	bar	250	250	250	250	250	250	250	220	195	170
Pressure, intermittent	p_2	bar	280	280	280	280	280	280	280	250	225	200
Speed max. at p_2	n	rpm	4000	4000	4000	3500	3000	3000	3500	3500	3000	3000
Speed min. at p_2	n	rpm	700	700	700	600	500	500	500	500	500	500

[1)] With extended bearings

External Gear Pumps, Standard Version

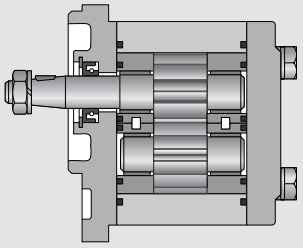


Model N, Series 1X	**Size**		**20**	**22**	**25**	**28**	**32**	**36**
Displacement	V_g	cm³	20	22,5	25	28	32	36
Max. continuous pressure	p_1	bar	230	230	230	210	180	160
Pressure, intermittent	p_2	bar	250	250	250	230	200	180
Speed max. at p_2	n	rpm	3000	3000	3000	2800	2800	2800
Speed min. at p_2	n	rpm	500	500	500	500	500	500
Series N, Series 2X	**Size**		**20**	**22**	**25**	**28**	**32**	**36**
Displacement	V_g	cm³	20	22,5	25	28	32	36
Max. continuous pressure	p_1	bar	250	250	250	230	210	180
Pressure, intermittent	p_2	bar	280	280	280	260	240	210
Speed max. at p_2	n	rpm	3000	3000	3000	2800	2800	2800
Speed max. at 10 bar	n	rpm	3500	3500	3500	3500	3200	3000
Speed min. at p_2	n	rpm	500	500	500	500	500	500
Model G, Series 1X	**Size**		**22**	**28**	**32**	**38**	**45**	**56**
Displacement	V_g	cm³	22,5	28	32	38	45	56
Max. continuous pressure	p_1	bar	210	210	210	200	180	160
Pressure, intermittent	p_2	bar	250	250	250	250	230	200
Speed max. at p_2	n	rpm	3000	2800	3000	2800	2600	2300
Speed min. at p_2	n	rpm	800	800	800	800	800	800

Model G, Series 2X	**Size**		**22**	**25**	**28**	**32**	**36**	**40**	**45**	**50**	**56**
Displacement	V_g	cm³	22,5	25	28	32	36	40	45	50	56
Max. continuous pressure	p_1	bar	250	250	250	250	250	250	250	220	195
Pressure, intermittent	p_2	bar	280	280	280	280	280	280	280	250	225
Speed max. at p_2	n	rpm	3000	3000	3000	2800	2800	2800	2600	2600	2300
Speed max. at 10 bar	n	rpm	3500	3500	3500	3200	3200	3200	3000	3000	2600
Speed min. at p_2	n	rpm	600	600	500	500	500	500	500	500	500

Model G, Series 2X	**Size**		**63**	**70**	**80**	**100**
Displacement	V_g	cm³	63	70	80	100
Max. continuous pressure	p_1	bar	170	120	90	70
Pressure, intermittent	p_2	bar	200	150	120	100
Speed max. at p_2	n	rpm	2300	2200	2000	1700
Speed max. at 10 bar	n	rpm	2600	2500	2300	1900
Speed min. at p_2	n	rpm	500	500	600	800

External Gear Pumps, SILENCE Version



Fixed pumps
SILENCE version
Sizes 4...63
Nominal pressure: 280 bar

- Slide bearings for high loads
- Drive shafts acc. to ISO or SAE
- Combinations of several pumps possible
- Line connections: connecting flange or screw-in thread
- Optimized pressure pulsation reduces noise emissions and oscillations in the system
- Considerably longer service life through reinforced design of shaft and case

Detailed information:

Model S	RE 10095
Model T	RE 10092
Model U	RE 10098
Brochure	RE 98240

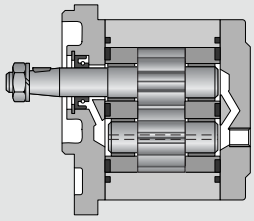
AZ Configurator:
www.boschrexroth.com/azconfigurator

Model S	**Size**		**4**	**5**	**8**	**11**	**14**	**16**	**19**	**22**	**25**	**28**
Displacement	V_g	cm³	4	5,5	8	11	14	16	19	22,5	25	28
Max. continuous pressure	p_1	bar	250	250	250	250	250	250	250	220	195	170
Pressure, intermittent	p_2	bar	280	280	280	280	280	280	280	250	225	200
Speed max. at p_2	n	rpm	4000	4000	4000	3500	3000	3000	3500	3500	3000	3000
Speed min. at p_2	n	rpm	700	700	700	600	500	500	500	500	500	500

Model T, Series 2X	**Size**		**20**	**22**	**25**	**28**	**32**	**36**
Displacement	V_g	cm³	20	22,5	25	28	32	36
Max. continuous pressure	p_1	bar	250	250	250	230	210	180
Pressure, intermittent	p_2	bar	280	280	280	260	240	210
Speed max. at p_2	n	rpm	3000	3000	3000	3000	2800	2600
Speed max. at 10 bar	n	rpm	3500	3500	3500	3500	3200	3000
Speed min. at p_2	n	rpm	500	500	500	500	500	500

Model U, Series 2X	**Size**		**22**	**25**	**28**	**32**	**36**	**40**	**45**	**50**	**56**	**63**
Displacement	V_g	cm³	22,5	25	28	32	36	40	45	50	56	63
Max. continuous pressure	p_1	bar	250	250	250	250	250	250	250	220	195	170
Pressure, intermittent	p_2	bar	280	280	280	280	280	280	280	250	225	200
Speed max. at p_2	n	rpm	3000	3000	3000	2800	2800	2800	2600	2600	2300	2300
Speed max. at 10 bar	n	rpm	3500	3500	3500	3200	3200	3200	3000	3000	2600	2600
Speed min. at p_2	n	rpm	600	600	500	500	500	500	500	500	500	500

External Gear Motors



Fixed motors
Nominal pressure: 280 bar

- Motors for one direction of rotation
- Reversible motors for 2-quadrant and 4-quadrant operation
- Large number of design variants available
- Slide bearings for high loads
- Bearing bushes
- Output shafts acc. to ISO or SAE
- Line connections: connecting flange or screw-in thread

Detailed information:
Model F, N, G RE 14026
Brochure RE 98240

AZ Configurator:
www.boschrexroth.com/azconfigurator

Model B, Series 2X	**Size**		**2,5**	**3**	**4**	**4,5**	**5**	**6**	**7**
Displacement	$V_{g\,max}$	cm³	2,5	3,15	4	4,5	5	6,3	7,1
Max. continuous pressure	p_1	bar	250	250	250	250	250	225	200
Starting pressure max.	p_2	bar	280	280	280	280	280	255	230
Speed max. at p_1	n	rpm	5000	4000	4000	4000	4000	3500	3500
Speed min. at p_1	n	rpm	750	750	750	750	750	750	750
Model F, Series 1X	**Size**		**5 [1)]**	**8**	**11**	**14**	**16**	**19**	**22**
Displacement	$V_{g\,max}$	cm³	5,5	8	11	14	16	19	22,5
Max. continuous pressure	p_1	bar	250	250	250	250	250	180	180
Starting pressure max.	p_2	bar	280	280	280	280	280	210	210
Speed max. at p_1	n	rpm	4000	4000	3500	3000	3000	3000	3000
Speed min. at p_1	n	rpm	700	700	600	500	500	500	500
Model N, Series 1X, 2X	**Size**		**20**	**22**	**25**	**28**	**32**	**36**	
Displacement	$V_{g\,max}$	cm³	20	22,5	25	28	32	36	
Max. continuous pressure	p_1	bar	250	210	210	210	180	160	
Starting pressure max.	p_2	bar	280	240	240	240	210	190	
Speed max. at p_1	n	rpm	3000	3000	3000	3000	3000	3000	
Speed min. at p_1	n	rpm	500	500	500	500	500	500	
Model G, Series 1X	**Size**		**22**	**28**	**32**	**38**	**45**		
Displacement	$V_{g\,max}$	cm³	22,5	28	32	38	45		
Max. continuous pressure	p_1	bar	250	250	250	250	250		
Starting pressure max.	p_2	bar	280	280	280	280	280		
Speed max. at p_1	n	rpm	3000	3000	2800	2600	2600		
Speed min. at p_1	n	rpm	600	600	500	500	500		

[1)] on request

Hydrostatic Fan Drive

Used in material-handling systems, construction machinery, buses, HGV and passenger cars with proportional closed loop speed control. Consists of the following parts:

- External gear motor with proportional pressure relief valve
- Single or multi-channel electronics
- Temperature sensors for fluids and air

- For fan powers up to 20 kW
- Proportional fan speed control
- Failsafe behavior in event of power failure
- Low hydraulic energy losses
- Precise coolant temperature control

Detailed information:
Data sheet 1 987 761 700
Additional information on fan drives (up to 250 kW) RE 98065

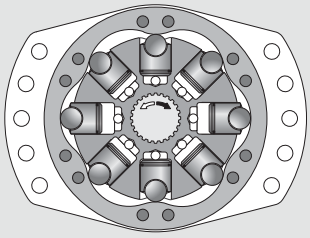
Gear motor with proportional pressure relief valve								
Size			**8**	**11**	**14**	**16**	**19**	**22**
Displacement	$V_{g\,max}$	cm^3	8	11	14	16	19	22,5
Speed max. at p_1	n	rpm	3000	3000	3000	3000	3000	3000
Prop. pressure relief valve, flow rate	Q_{max}	l/min	150	150	150	150	150	150
Prop. pressure relief valve, operating pressure	P_{max}	bar	220	220	220	220	220	220
Solenoid voltage	U	V	12, 24	12, 24	12, 24	12, 24	12, 24	12, 24
Power consumption, solenoid	P	W	18	18	18	18	18	18
Weight	m	kg	3,5	3,6	3,8	4	4,2	4,4
Single-channel electronics								
Type	Analog control amplifier with voltage regulator, an analog input, working range adaptation and a power output with short-circuit protection for one proportional valve.							
Electrical connection	6-pin							
Operating voltage	11...36 V							
Multi-channel electronics								
Type	Analog control amplifier with voltage regulator, setpoint/actual value comparison for three analog inputs, one switch input and one power output with short-circuit protection for one proportional valve.							
Electrical connection	15 pin							
Operating voltage	11...36 V							
PTC sensors								
Type	Fluid					Air		
Measurement range	-30 °C ... 130 °C					-40 °C ... 130 °C		

Radial Piston Motors

The MCR radial piston motors are slowly running hydraulic motors which operate according to the multiple-stroke principle.
The relationship between roll diameter and cam profile is optimized inside the central power unit. This results in the best possible balance of forces between piston and cam path and simultaneously extends the service life. The step-piston power unit or high-displacement power unit yields a very compact drive unit with high power density.
MCR motors can be used both in open as well as in closed circuits.

Characteristics:
- Displacement 160 to 3000 cm^3
- Nominal pressure 250 bar
- Peak pressure up to 450 bar
- Minimum speed 5 rpm

Radial Piston Motors MCR



Sizes 160...3000
Nominal pressure: 250 bar
Peak pressure: 450 bar

- Compact, robust design
- Uniform concentric running, even at very low speeds
- Low running noise
- Reversible
- Sealed tapered roller bearing
- High radial forces permissible on the output shaft
- Shaft seal up to 10 bar case pressure
- Switchable
  - Freewheeling
  - Half the displacement
- Version with holding or service brake (optional)
- Integr. flushing valve (optional)
- Speed measurement (optional)

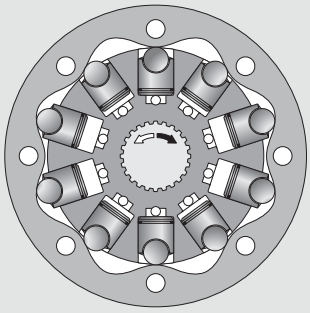
Detailed information:

Frame size 3	RE 15205
Frame size 5	RE 15206
Frame size 10	RE 15207
Frame size 15	RE 15208
Frame size 20	RE 15209

Frame size 3	**Size**		**160**	**225**	**255**	**280**	**325**	**365**	**400**	
Displacement	$V_{g\,max}$	cm³	160	225	255	280	325	365	400	
Torque	T_{max}	Nm	1022	1386	1570	1760	1875	2105	2307	
Speed, intermittent	n_{max}	rpm	400	400	360	330	310	280	260	
Pressure difference 1)	Δp_{max}	bar	450	450	450	450	400	400	400	
Weight	m	kg	20	20	20	20	20	20	20	
Frame size 5	**Size**		**380**	**470**	**520**	**565**	**620**	**680**	**750**	**820**
Displacement	$V_{g\,max}$	cm³	380	470	520	565	620	680	750	820
Torque	T_{max}	Nm	2530	3130	3460	3760	3670	4030	4440	4860
Speed, intermittent	n_{max}	rpm	475	385	350	320	290	265	240	220
Pressure difference 1)	Δp_{max}	bar	450	450	450	450	400	400	400	400
Weight	m	kg	39	39	39	39	39	39	39	39
Frame size 10	**Size**		**780**	**860**	**940**	**1120**	**1250**	**1340**		
Displacement	$V_{g\,max}$	cm³	780	860	940	1120	1250	1340		
Torque	T_{max}	Nm	5134	5660	6187	6859	7432	8027		
Speed, intermittent	n_{max}	rpm	220	200	190	180	150	130		
Pressure difference 1)	Δp_{max}	bar	450	450	450	400	400	400		
Weight	m	kg	69	69	69	69	69	69		

1) Peak pressure

Radial Piston Motors MCR



Sizes 160...3000
Nominal pressure: 250 bar
Peak pressure: 450 bar

- Compact, robust design
- Uniform concentric running, even at very low speeds
- Low running noise
- Reversible
- Sealed tapered roller bearing
- High radial forces permissible on the output shaft
- Shaft seal up to 10 bar case pressure
- Switchable
  • Freewheeling
  • Half the displacement
- Version with holding or service brake (optional)
- Integr. flushing valve (optional)
- Speed measurement (optional)

Detailed information:

Frame size 3	RE 15205
Frame size 5	RE 15206
Frame size 10	RE 15207
Frame size 15	RE 15208
Frame size 20	RE 15209

Frame size 15	**Size**		**1130**	**1250**	**1500**	**1780**	**2150**
Displacement	$V_{g\,max}$	cm³	1130	1250	1500	1780	2150
Torque	T_{max}	Nm	8095	8955	9552	11332	13688
Speed, intermittent	n_{max}	rpm	190	190	170	110	100
Pressure difference 1)	Δp_{max}	bar	450	450	450	400	400
Weight	m	kg	93	93	93	93	93
Frame size 20	**Size**		**1750**	**2100**	**2500**	**3000**	
Displacement	$V_{g\,max}$	cm³	1750	2100	2500	3000	
Torque	T_{max}	Nm	11531	13762	14244	17073	
Speed, intermittent	n_{max}	rpm	160	160	115	115	
Pressure difference 1)	Δp_{max}	bar	450	450	400	400	
Weight	m	kg	110	110	110	110	

1) Peak pressure

3

Mobile Controls

Mobile controls are control and safety systems for the drive and working hydraulics of mobile equipment. The range of products includes all hydraulic function elements necessary for this purpose such as direction, pressure, flow and check functions as well as the corresponding designs (mono and plate blocks, plug-in and externally mounted elements). It is complemented by integrated electronic sensors, controls and control elements.

Characteristics:

Control blocks
- Open Center (OC)
- Load Sensing (LS)
- Load-independent flow distribution (LUDV)
- Flow up to 1600 L/min
- Nominal pressure up to 350/420 bar
- Medium and high pressure
- Mono-block and sandwich design
- Mechanical, hydraulic, electromagnetic and electrohydraulic control with or without onboard electronics (OBE)

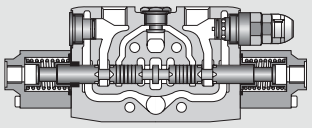
Valve modules
- EHR control valves
- Central hydraulics
- Cylinder safety lock valve
- Stabilizing valves
- Screw-in valves
- Flow dividers
- Flow, pressure, check valves

Pilot control devices
- Ergonomic grip
- Various characteristics
- Low actuating forces

Brakes
- Hydraulic remotely powered brake systems
- Trailer brake valve

Steering units
- Open Center
- Closed Center
- Reaction and non-reaction
- With or without speed control
- Priority valves

Open Center Control Block SM



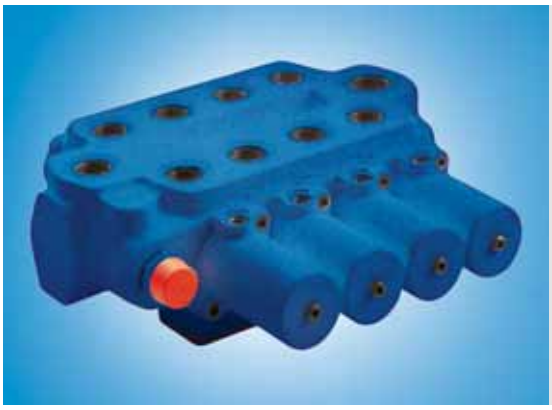
Applications:
Mini-excavators, tractors, fork lift trucks

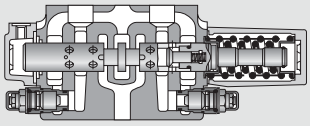
Control block for mobile machines
- Open Center system for fixed pumps
- Sandwich design
- Low hysteresis
- Adjustable stroke limitation
- Primary and secondary safeguard
- High-pressure version (350 bar)

Detailed information:
SM RE 64122

Size				**12**
Flow	Port P	q_V	l/min	70
	Ports A, B	q_V	l/min	70
Max. operating pressure	Pump side	p_{max}	bar	250
	Actuator side	p_{max}	bar	300
Piston axes, max.				10
Activation	Mechanical			◆
	Hydraulic			◆
	Electrohydraulic			◆
Circuit types	Parallel			◆
	Tandem			◆
	Series			◆

Open Center Control Block MO





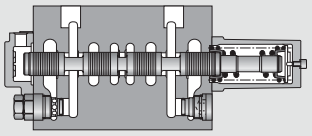
Applications:
Excavators, cranes, drilling equipment

Control block for mobile machines
- Open Center system for fixed and variable pumps
- Mono-block design
- Low circulation pressure
- Primary and secondary safeguard
- Brake piston for travel drives
- Pressure transmittance
- Load-sustaining valves

Detailed information:
MO-16, 22, 32 RE 64354

Size				16	22	32	40	52
Flow		q_V	l/min	110	200	410	680	1600
Max. operating pressure	Pump side	p_{max}	bar	350	350	350	350	350
	Actuator side	p_{max}	bar	420	420	420	420	420
Activation	Mechanical			◆	◆	◆	◆	◆
	Hydraulic			◆	◆	◆	◆	◆
	Electrohydraulic			◆	◆	◆	◆	◆
Circuit types	Parallel			◆	◆	◆	◆	◆
	Tandem			◆	◆	◆	◆	◆
	Parallel/tandem combination			◆	◆	◆	◆	◆

Open Center Control Block M8



Applications:
Excavators, drilling equipment

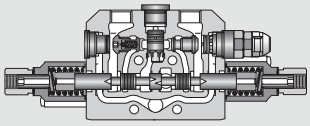
Control block for mobile machines
- Open Center system for fixed and variable pumps
- Mono-block design
- Low hysteresis
- Priority function for slew drive
- Primary and secondary safeguard
- Two pump inlets
- Integrated tank preloading function
- Automatic straight travel function for tracked vehicles
- Integrated summation

Detailed information:
M8 RE 64294

Size				18	22	25	32
Flow		q_V	l/min	150	230	300	450
Max. operating pressure	Pump side	p_{max}	bar	350	350	350	350
	Actuator side	p_{max}	bar	420	420	420	420
Piston axes, max.				3+3 (4; 5)+S*	3+3+S*	3+2+S*	4+2(3)+S*
Activation	Hydraulic			◆	◆	◆	◆
	Electrohydraulic			◆	◆	◆	◆
Circuit types	mixed parallel/tandem or series pistons as an option						

* S = Summation axis

LUDV Control Block SX



Applications:
Mini-excavators, backhoe loaders, telehandlers

Control block for mobile machines
- LUDV* system
  - Closed Center for variable pumps
  - Open Center for fixed pumps
- Sandwich design
- Load-pressure-compensated flow
- Low hysteresis
- Secondary safeguard
- LS pressure limitation
- Priority function for steering (SX14)
- High-pressure version for SX14 (350 bar)

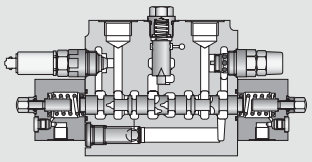
* LUDV = Load-independent flow distribution system

Detailed information:

SX-12	RE 64128
SX-14	RE 64125

Size				12	14
Flow	Port P	q_V	l/min	120	175
	Ports A, B	q_V	l/min	70	120
Max. operating pressure	Pump side	p_{max}	bar	250	250
	Actuator side	p_{max}	bar	300	300
Piston axes, max.				10	10
Activation	Mechanical			◆	◆
	Hydraulic			◆	◆
	Electrically			◆	◆
	Electrohydraulic			◆	◆

LUDV Control Block M6



Applications:
Wheeled loaders, bulldozers, telehandlers

Control block for mobile machines
- LUDV* system
  - Closed Center for variable pumps
  - Open Center for fixed pumps
- Mono-block/sandwich design
- Load-pressure-compensated flow
- Low hysteresis
- Adjustable stroke limitation
- Priority function for steering
- Primary and secondary safeguard
- LS pressure limitation
- Regeneration function
- Overflow-oil-free operating connections

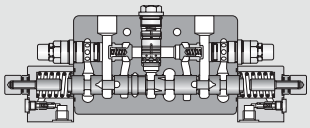
* LUDV = Load-independent flow distribution system

Detailed information:

M6-15	RE 64284
M6-22	RE 64286

Size				15	22
Flow	Port P	q_V	l/min	200	350
	Ports A, B	q_V	l/min	160	300
Max. operating pressure	Pump side	p_{max}	bar	350	350
	Actuator side	p_{max}	bar	420	420
Piston axes, mono-block (max. with plates)				2 (7)	-
Activation	Hydraulic			◆	◆
	Electrohydraulic			◆	◆

LUDV Control Block M7



Applications:
Excavators, cranes, drilling equipment, forestry machinery

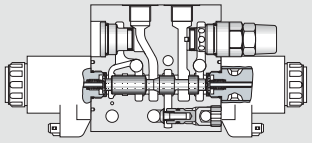
Control block for mobile machines
- LUDV* system
  - Closed Center for variable pumps
- Mono-block/sandwich design
- Load-pressure-compensated flow
- Low hysteresis
- Adjustable stroke limitation
- Priority function for slew drive
- Primary and secondary safeguard
- LS pressure limitation
- Load-sustaining function
- Unloading function

* LUDV = Load-independent flow distribution system

Detailed information:
M7-22 RE 64295

Size				20	22
Flow	Port P	q_V	l/min	350	420
	Ports A, B	q_V	l/min	250	350
Max. operating pressure	Pump side	p_{max}	bar	350	350
	Actuator side	p_{max}	bar	420	420
Piston axes, mono-block (max. with plates)				5 (9)	3 or 5 (9)
Activation	Hydraulic			◆	◆
	Electrohydraulic			◆	◆

Load Sensing Control Block SP-08



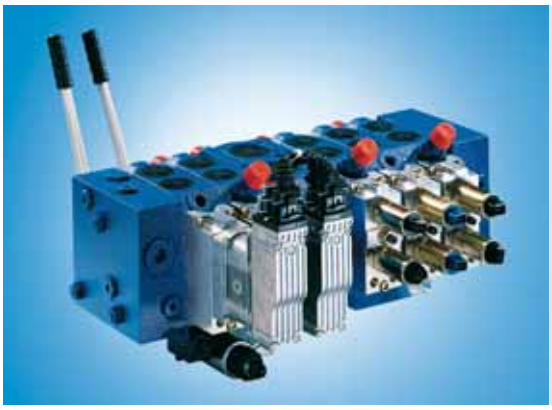
Applications:
HGV hydraulic systems, drilling equipment, aerial working platforms, cranes, construction machinery, agricultural machines, municipal vehicles

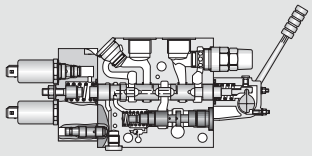
Control block for mobile machines
- Load Sensing system (LS control)
  - Closed Center for variable pumps
  - Open Center for fixed pumps
- Mono-block/sandwich design
- Load-pressure-compensated flow
- Low hysteresis
- LS pressure limitation for mono-block

Detailed information:
SP-08 RE 64139

Size				08 Sandwich	08 Mono
Flow	Port P	q_V	l/min	75	140
	Ports A, B	q_V	l/min	50	70
Max. operating pressure	Pump side	p_{max}	bar	250	300
	Actuator side	p_{max}	bar	300	320
Piston axes, max. (can be expanded with plates)				8	8
Activation	Mechanical			◆	-
	Hydraulic			◆	-
	Electrohydraulic			-	◆
	Electromagnetic			◆	-

Load Sensing Control Block M4





Applications:
Drilling equipment, forestry machinery, HGV hydraulic systems, municipal vehicles, aerial working platforms

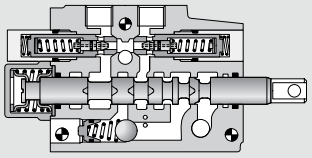
Control block for mobile machines
- Load Sensing system (LS control)
  - Closed Center for variable pumps
  - Open Center for fixed pumps
- Sandwich design
- Load-pressure-compensated flow
- Low hysteresis
- Programmable control electronics
- Adjustable stroke limitation
- Priority function (M4-15)
- Primary and secondary safeguard
- LS pressure limitation for each operating connection
- Modular system
- Combinable sizes:
  - M4-12 with M4-15
  - M4-15 with M4-22

Detailed information:

M4-12	RE 64276
M4-15	RE 64283
M4-22	RE 64279

Size				**12**	**15**	**22**
Flow	Port P	q_V	l/min	150	200	400
	Ports A, B	q_V	l/min	130	190	400
Max. operating pressure	Pump side	p_{max}	bar	350	350	350
	Actuator side	p_{max}	bar	420	420	420
Piston axes, max.				20	18	8
Activation	Mechanical			◆	-	◆
	Hydraulic			◆	◆	◆
	Electrohydraulic			◆	◆	◆
	Superimposed hand-lever operation			◆	◆	-

Load Sensing Control Block SB12-LS



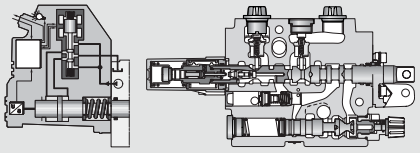
Applications:
Industrial trucks, harvesters, municipal vehicles

- Directional-control valve based on Load Sensing technology for use with fixed or variable pump
- Mechanically, electromagnetically (EM) or electrohydraulically (EHS) controlled
- SB12LS-EHS position-controlled with onboard electronics
- Analog or digital interface via CAN bus
- Integratable check, shock, anti-cavitation and post-suction valves or secondary pressure relief valve
- Flow control or limiting by flow control valves or individual pressure compensator
- Can be combined with priority valve for steering
- Representation of the emergency stop safety functions required in ISO 3691
- Optional integrated inductive position sensors for measuring the slide valve travel

Detailed information:
SB12-LS RE 64386

Series				SB12-LS
Flow	Ports A, B	q_V	l/min	80
Operating pressure	Pump side	p_{max}	bar	250
	Actuator side	p_{max}	bar	300
Number of directional-control valves, max.				10
Activation	Mechanical			◆
	Electromagnetic EM			EM1 switching/EM2 proportional
	Electrohydraulic EHS			SPA/PWA/CAN
Power supply		U_S	V	12, 24
Protection class				IP65 (SB12LS-EM), IP67 (SB12LS-EHS)

Load Sensing Control Block SB23-LS



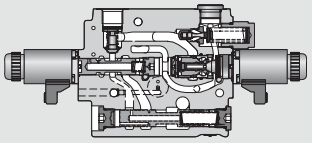
Application:
Tractors

- Directional-control valve based on Load Sensing technology for use with fixed or variable pump
- Mechanically or electrohydraulically (EHS) controlled
- SB23LS-EHS position-controlled with onboard electronics
- Analog or digital interface via CAN bus
- Flash memory for programming of software and valve parameters by the user
- Software for self-diagnosis
- Directional-control valve can be combined with EHR valve and priority valve for steering or constant pressure
- Overflow-oil-free operating connections
- Hydraulic kick-out function

Detailed information:
SB23-LS RE 66130

Series				SB23-LS
Flow	Ports A, B	q_V	l/min	100
Operating pressure	Pump side	p_{max}	bar	250
	Actuator side	p_{max}	bar	280
Number of directional-control valves, max.				10
Activation	Mechanical			◆
	Electrohydraulic EHS			SPA/PWA/CAN
Power supply		U_S	V	12, 24
Protection class				IP67 (SB23-LS-EHS)

Control Valves EHR



Application:
Electronic-hydraulic hitch control in tractors

- EHR control valve can be combined with directional-control valves for the working hydraulics
- EHR control valve in flange (EHR5) or segment (EHR23) design
- Position control, tension control, mixed control
- Pressure control, slip control
- Active vibration damping during transport
- Software for self-diagnosis
- Complete system with optimally matched components
- EHR system components:
  - EHR control valves
  - Controllers (EHR-B, SRC6-10)
  - Sensors (KMB, AN1, PO1, DSC)
  - EHR control panel

Detailed information:
EHR control valves RE 66125

Additional information on EHR controllers, sensors and control panel can be found in chapter Mobile Electronics under "Electrohydraulic hitch control for tractors"

Control valve type			EHR 5 OC	EHR 5 LS	EHR 23 ZM
Flow	q_{Vnom}	l/min	60	60	90
Operating pressure	p_{max}	bar	220	220	250
Power supply	U_S	V	12	12	12
Protection class			IP64A	IP64A	IP64A

Central Hydraulics for Tractors CHP

CHP central hydraulics
Valve series of central hydraulic components for application in tractors with closed-center/load-sensing hydraulic systems

- Prioritized supply of
  - Steering (170 to 200 bar)
  - Trailer and front axle brake (max. 150 bar)
  - Low pressure supply (17 to 22 bar) for gear shifting or control oil circuit
  - Working hydraulics (210 bar)
  - Brake (max. 150 bar)
  - Hitch (up to 210 bar)
- Accumulator charging valve for external brake systems (LT59) combinable with LT41 and LT42

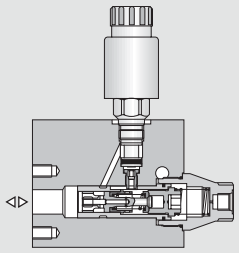
Detailed information:

LT41	RE 66233
LT43	RE 66235

Technical data			
Flow	q_{Vnom}	l/min	200
Operating pressure	p_{max}	bar	210
	p_{Peak}	bar	250

Combination possibilities of the valve slices		
LT41	**LT42**	**LT43**
Steering priority valve Low-pressure priority valve		Steering priority valve Low-pressure priority valve
	Steering priority valve Trailer brake valve	Steering priority valve Trailer brake valve

Flow Divider MH2FA/RTM



MH2FA: Sizes 12...32
RTM: sizes 16...25

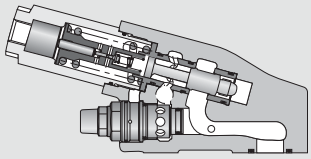
- Hydraulic differential lock for hydrostatically driven vehicles
- Suitable for operation in open and closed circuits
- Various constant division ratios
- Double-acting
  • Dividing
  • Summating
- With/without free wheel operation
- With dividing function which can be switched on and off
- With integrated boost valves
- Electrically adjustable dividing accuracy

Detailed information:

MH2FA	RE 64582
RTM	RE 64592

MH2FA	**Size**		**12**	**18**	**22**	**32**
Flow	q_V	l/min	70	140	220	300
Operating pressure	p_{max}	bar	420	420	420	420
RTM	**Size**		**16**	**25**		
Flow	q_V	l/min	160	440		
Operating pressure	p_{max}	bar	500	500		

Pipe Burst Safety Valves MHRB
Check-Q-Meter FD



Pipe Burst Safety Valves MHRB

Sizes 16...22

- Used in mobile hydraulics, e.g. excavators, excavator loaders, cranes
- No lowering of the load in the neutral position (additional anti-drift valves are no longer required)
- Direct flange connection to the cylinder
- Very good, uniform precision control characteristics in each cylinder position
- Leakage-free design

Check-Q-Meter FD

Sizes 12...32

Designs

• Cartridge

• Subplate

- Pilot operated check valve (leak-free)
- Outflow controlled in accordance with the inflow on the side opposite the consumer
- By-pass valve, free flow in the opposite direction
- Used in hydraulic systems for load-independent speed control of hydraulic motors and cylinders with pulling loads
- With/without secondary limitation
- Ratio of control pressure : load pressure = 1 : 20

Detailed information:

MHRB	RE 64623
FD	RE 27551

MHRB	**Size**		**16**	**22**		
Flow	q_V	l/min	200	400		
Nominal pressure	p_{nom}	bar	350	350		
Operating pressure	p_{max}	bar	420	420		
FD	**Size**		**12**	**16**	**25**	**32**
Flow	q_V	l/min	80	200	320	560
Operating pressure: actuator port	p_{max}	bar	420	420	420	420
Operating pressure: directional valve port	p_{max}	bar	315	315	315	315

Stabilizing Module RSM2
Pilot Oil Supply System MHSTE

Stabilizing Module RSM2

Sizes 10...25

The RSM2 stabilizing module is used in wheeled vehicles (e.g. wheeled loaders, fork lift trucks) and damps the pitching movements which occur when driving.

- Higher transport speed
- Higher handling rates
- Stable steering characteristics
- Shorter braking distance
- Higher comfort for the driver
- Fewer repairs and down times with identical handling rates
- Electrical activation, 12 or 26 V
- Version A = original equipment
  Version B = retrofit kit

Pilot Oil Supply System MHSTE

Compact unit for supplying pilot oil circuits in the low-pressure range

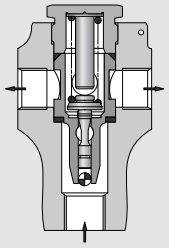
- Valve combination to supply pilot control devices with reduced pressure
- Can be connected to one or two high pressure circuits on the primary side

Detailed information:

RSM2-10	RE 64614
RSM2-16	RE 64617
RSM2-25	RE 64618
MHSTE	RE 64588

RSM2	Size		10	16	25
Flow	q_V	l/min	80	150	300
Operating pressure	p_{max}	bar	350	350	350
MHSTE					
Inlet pressure, max.	bar	350			
Operating pressure	bar	35/50			
Tank back pressure, max.	bar	2			

Pressure, Flow, Check Valves



Applications: Material-handling systems, agricultural and municipal vehicles and general market

Pressure Relief Valves

- Type of connection for pipe and block installation
- Adjustment such as fixed, hand wheel, lead-seal capable or with scale (with and without lock)

Flow Control Valves

- 3-way flow control valve invariable or adjustable
- Flow divider, for line installation

Check Valves

- Check valves
- Check and pressure relief valves

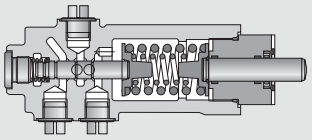
Detailed information:

Pressure relief valves	RE 25860
Flow control valves	RE 27574
Check valves	RE 20402

Pressure relief valves						
Pressure	p_{max}	bar	350			
Flow	Q_{max}	l/min	120, dependent on set pressure and line cross section			
Thread (line installation)			M18x1,5 / G 1/2			
Thread (block installation)			M26x1.5 / M30x1,5			
Flow control valves, invariable						
Pressure	p_{max}	bar	210			
Total flow	Q_P	l/min	55			
Directly controlled constant flow	Q_A	l/min	30			
Pilot-controlled const. flow	Q_A	l/min	30			
Thread (line installation)			M18x1,5			
Flow control valves, adjustable						
Pressure	p_{max}	bar	250			
Total flow	Q_P	l/min	114			
Constant flow	Q_{REG}	l/min	1 ... 30 / 1 ... 47 / 1 ... 75			
Thread (line installation)			M22x1,5 / M27x2			
Flow divider						
Pressure	p_{max}	bar	310			
Division ratio			1:1			
Thread (line installation) [1]			M18x1,5 / M22x1,5 / M27x2			
Check valves						
Pressure	p_{max}	bar	250	200	250	300
Flow	Q_{max}	l/min	45	50	60	80
Thread (line installation)			M18x1,5	M18x1,5 / G 1/2	M18x1,5	M18x1,5
Thread (block installation)			M22x1,5	-	-	-

[1] Port P

Hydraulic Remotely Powered Brake LT



Remotely Powered Brake Systems LT

- For use in construction machinery and motor vehicles
- For machines with hydraulic system, no additional compressed air system necessary
- Operation with fixed pumps (Open Center) or in Load Sensing hydraulic systems

Modular Design

- Brake system with open construction allows flexibility in the arrangement of the elements
- Brake system consisting of:
  - Foot brake valve LT05 (1-circuit) or LT07 (2-circuit)
  - Pedal LT19
  - Accumulator charging valve LT06
  - Hand brake valve LT08
  - Relay valve LT09
  - Brake valve, inching LT31

Compact Design

- Brake system with compact construction, minimal piping required
- Complete brake system consisting of
  - Compact brake block LT12 (1-circuit) or LT13 (2-circuit)
  - Accumulator charging valve
  - Circuit separation by means of inverted shuttle valve
  - Hand brake valve (mechanical or electrical control)
  - Separate pedal LT20
- Complete brake system consisting of
  - Compact brake block LT17 (2-circuit)
  - Accumulator charging valve
  - Circuit separation by means of inverted shuttle valve
  - Installation option for pressure accumulator
  - Pedal
  - Hand brake valve (electrically controlled)
  - Energy supply for a second hydraulic hand brake valve LT08 possible

Accessories

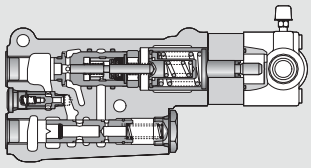
- Brake light switch
- Accumulator warning switch
- Parking brake warning switch
- Spring accumulator cylinder (for parking or hand brake)
- Pressure accumulator (energy accumulator)

Detailed information:

LT05	RE 66143
LT06	RE 66191
LT07	RE 66146
LT08	RE 66148
LT09	RE 66152
LT12	RE 66218
LT13	RE 66221
LT17	RE 66228
LT31	RE 66227

Type		LT05	LT06	LT07	LT08	LT13	LT17	LT31
Brake pressure	bar	25 to 125	-	40 to 125	-	40 to 125	40 to 125	40 to 125
Parking brake pressure	bar	-	-	-	25 to 125	40 to 150	150	-
System pressure, max.	bar	200	200	200	200	200	200	210
Inching pressure	bar	-	-	-	-	-	-	30
Flow	l/min	45	70	60	51	40	70	12

Trailer Brake Valve BV1



Trailer Brake Valve BV1

Hydraulic remotely powered brake for trailers in agricultural vehicles

- Priority function for hydraulic trailer brake
- For use in OC or LS systems
- Proportional deceleration between tractor and trailer
- Simple matching of the trailer brake to the tractor brake
- Limitation of the max. trailer brake pressure
- Simple integration in the hydraulic system
- Pressure safeguarding for trailer brake pressure max. 150 bar

LT03

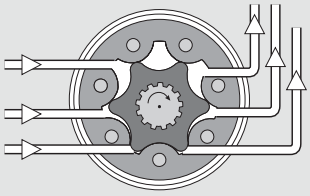
- Designed for the CC-LS system
- Pressure safeguarding for trailer brake pressure max. 150 bar
- Can be mounted directly on the gearbox
- Used as front axle brake valve (i = 1:4)
- Braking between tractor vehicle and trailer

Detailed information:

BV1	1 987 760 506
LT03	on request

Trailer brake valve			BV1 for threaded / flange connection	LT03
Nominal flow	Q_N	l/min	80	-
Operating pressure	p_{max}	bar	250	210
Installation location			arbitrary / Bleed valve at top / Vertical	arbitrary / Bleed valve at top
Line connections			Screw-in thread	-
Pressure fluid to trailer brake			Mineral-oil based hydraulic fluids	Mineral-oil based hydraulic fluids
Pressure fluid in control head			Mineral-oil based hydraulic fluids or ATE brake fluid	Mineral-oil based hydraulic fluids (other fluids on request)
Transmission ratios			1:1 / 1:1.78 / 1:2.78 / 1:4 / 1:5.44 / 1:7 / 1:11.1 / 1:13	1:9 - 1:33

Hydrostatic Steering Units LAG



Steering Unit LAG

- LAG steering units are used in the hydraulic steering circuits of motor vehicles and mobile machines with high axle loads and driving speeds of up to 50 km/h (60 km/h in Germany).
- Even heavy vehicles can be easily steered. The absence of a mechanical connection between the steering unit and the steering axle allows the implementation of solutions that would not be feasible with conventional steering systems.
- Includes all valves that are required in the hydraulic steering circuit for the protection of the steering unit and cylinder. No need for additional piping.
- If the oil supply fails, the LAG can be used to steer manually – emergency steering capability. The LAG then functions as a handpump to the steering cylinder.

LAGC and LAGL

Steering units with constant flow in normal (servo) and limp home mode

LAGU and LAGZ

Steering units with automatic flow reduction for reducing the actuating force in the event of failure of the oil supply. Quite often, this is sufficient for maintaining the limit values for manual steering. In many cases, it is possible to forego a second oil supply for the event of an emergency.

LAGU

LAGU steering units work according to the chamber isolation principle.
In limp home mode, the displacement is reduced by one half.
The installation dimensions are identical with those of the same size LAGC.

LAGZ

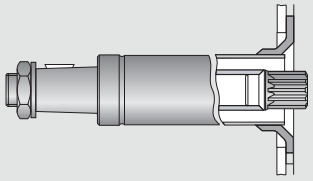
LAGZ steering units have two rotor sets which function in normal (servo) operation.
In limp home mode, the oil transport of a rotor set switches off. The actuating force is reduced in the same ratio as the displacement.

Detailed information:

LAGC	RE 14365
LAGL	RE 11872
LAGU	RE 11867
LAGZ	RE 11868

Size																	
	LAGC	40	50	63	70	80	100	125	160	200	250	320	400	-	-	-	-
	LAGL	-	-	-	-	-	-	-	-	-	-	-	-	500	630	800	1000
	LAGU	-	-	-	-	-	-	125	160	200	250	320	-	-	-	-	-
	LAGZ	-	-	-	-	-	-	-	160	200	250	320	400	500	-	-	-
Variants		LS = Load sensing-non reaction or reaction															
Flow	q_V	50 l/min (LAGL = 80 l/min)															
Operating pressure	p_{max}	175 bar															

Priority Valve LPS
LAB Steering Columns and Sensor



Priority Valve LPS

- Used in combination with steering units in load sensing systems
- Guarantees the priority supply of the steering circuit, before all other actuators, according to statutory regulations
- For supplying the steering system and other actuators only one pump is required
- Energy-saving hydraulic systems can be realized by using priority valves in combination with variable pumps
- Can also be used as sequencing valve, flow divider or pressure relief valve when combined with other valves
- LS signal: dynamic (standard) or static

LAB Steering Columns and Sensor

- Used as connecting element between steering wheel and LAG steering unit
- Sensor ensures contactless measurement of rotary movements. Signal is triggered by a measuring gear wheel.
- The LAB sensor is preferably used in combination with the steering column and steering unit to control the electric motor of the pump supplying the steering circuit.
- The digital output signal delivers a pulse after a rotational angle of 2°
- The proportional output signal is proportional to the steering wheel speed

Detailed information:

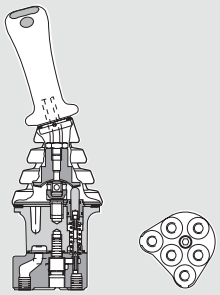
LPS	RE 27548
LAB	RE 11874

LPS priority valve		**Size**		**40**	**80**	**120**	**160**
Flow		q_V	bar	40	80	120	160
Max. operating pressure	Ports P, EF	p_{max}	bar	250	250	250	250
	Ports CF, LD, R, L	p_{max}	bar	175	175	175	175

LPS priority valve	
Connection type	Flanged onto steering units, pump mounting on gear pumps, installation in piping
Steering wheel connections	Pipe thread according to DIN 3852 / Metric ISO thread acc. to 3852 / UNF thread according to SAE

LAB steering columns and sensor	**Size**	**65**	**80**	**154**	**300**	**450**	**650**	**762**
Mounting flange types		Flat or curved						
Steering wheel connections		A, C, D (others on request)						
Signal connection (for acoustic alarm switch)		with or without						
Sensor		with or without						

Hydraulic and Electronic Pilot Control Devices TH



Hydraulic Pilot Control Devices TH

- Used for controlling the working hydraulics in mobile equipment
- Suitable for installation in arm rests (4TH6)
- Sensitive control due to low actuating forces and proportional control behavior
- Various characteristics for optimum matching to the working hydraulics to be controlled
- Raster and reference positions for identifying working positions for the operator
- Maintenance-free, long service life
- Different grip models available

2TH6

- Sandwich device for controlling a piston axis
- Up to six sandwich elements can be flanged together

4TH5/4TH6

- Mono-block device for controlling up to two piston axes
- Single-lever operation

THF5/THF6

- Device for controlling two piston axes
- Single-lever operation
- Control of additional piston axes possible

THE5 Electronic Pilot Control Device

- Signal version, CAN bus
- Suitable for mobile machines due to comparable ergonomics and robustness of hydraulic products
- Up to four proportional axes

THE6 Programmable Electronic Remote Control

- Direct proportional control of solenoids
- For programming characteristics and ramps
- Hand or foot control

Detailed information:

2TH6	RE 64552
2TH6R	RE 64551
TH6NR	RE 64554
4TH5/4TH6	RE 64555
THF5	RE 64557
THF6	RE 64553
THE5	RE 29881
THE6	RE 29771

TH	Series	2TH6	2TH6R	TH6NR	4TH5	4TH6	THF5	THF6
Inlet pressure, max.	bar	50	50	50	35	50	30	30
Control flow	l/min	16	16	16	13	16	13	16
Tank back pressure	bar	3	3	2	3	3	3	3
Hysteresis, max.	bar	1	1	1	1	1	1	1

THE	Series	THES5	THEC5	2THE6	2THE6R
Version		Hand control	Hand control	Hand control	Foot pedal
Axes		up to 4	up to 4	1 (2)	1 (2)
Output		V	CAN	PWM	PWM
Supply	V	12, 24	12, 24	12, 24	12, 24

Compact Hydraulics

With the acquisition of Oil Control Group and the integration of its product range in its own, Bosch Rexroth aims at becoming an even stronger player in the world of systems for mobile machinery. The variety of compact products now available – covering virtually every conceivable OEM's necessity, from load holding valves to power packs – puts Bosch Rexroth in the position to act as a 360° partner in the design of safe, performing and cost effective mobile machines.

Rexroth's compact hydraulics range consists of five product lines:

- Cartridge Valves
- Integrated Circuits
- Load Holding / Motion Control Valves
- Power Modules
- Compact Directional Valves

All of these product lines have their own range of standard products, upon which you can find detailed information in the literature listed in the right column. Moreover they all work in co-operation with their customers to develop custom solutions for the most diverse applications.

Available literature:

Standard Cartridge Program:

RE 00162-01, Part 1: Rexroth
RE 00162-02, Part 2: Oil Control
RE 00164 Overview and preferred products

Integrated Circuits:

RE 00169 Standard manifold program

Standard Load Holding / Motion Control Valves:

RE 00171 Program Information
RA 90810 Priority flow controls (US only)

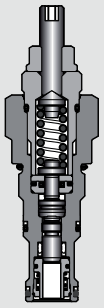
Power Modules:

RE 00198 ME, KE and K series

Compact Directional Valves:

RE 00157 Cetop 2 (NG4) valves
RE 00158 Flow diverters
RA 90811 Flow diverters (US)
RE 00159 Modular directional valves
RE 00169 Special directional valves

Cartridge Valves: Counterbalance Valves



Counterbalance valves are also known as over-centre valves or motion control valves.
They are designed to control the motion of overrunning loads.
Technical requirements:

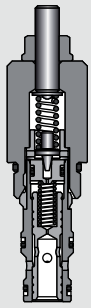
- Load holding at "zero leakage"
- Excellent control of negative loads during operations and throughout flow range
- Quick response time
- Pressure relief protection against overloads
- Energy saving
- Tolerance to oil contamination
- Compact design

The check valve function allows free flow from the directional valve (port 2); when load pressure at port 1 rises above the pressure setting, the relief function is activated and flow is relieved from 1 to 2.
Pressure compensated counterbalance valves are available in different versions: relief compensated, 3-ports atmospherically vented, 4-ports vented.
Fixed setting versions available.
Special setting versions available.

Detailed information:
RE 00162-02

VBSN standard		
Flow	l/min	up to 320
Max operating pressure	bar	420
Pilot Ratio		1.5 to 9
Cavity		common industry and market interchange
VBSP relief compensated		
Flow	l/min	up to 320
Max operating pressure	bar	420
Pilot Ratio		3 and 4
Cavity		common industry and market interchange
VBST atmospherically vented		
Flow	l/min	up to 320
Max operating pressure	bar	420
Pilot Ratio		1,5 to 4
Cavity		common industry and market interchange
VBSY 4-ports vented		
Flow	l/min	up to 240
Max operating pressure	bar	420
Pilot Ratio		1,5 to 4
Cavity		market interchange

Cartridge Valves: Mechanical Valves



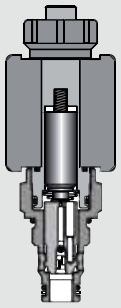
Rexroth offers a complete range of screw-in type cartridge valves designed to meet virtually any application necessity for hydraulic systems of mobile machinery.

For this product line Rexroth has adopted the cavity patterns which are today most widely employed by the industry worldwide, with UNF threads, according to SAE standards, nominal size 08-10-12-16-20.

Detailed information:
RE 00162-01
RE 00162-02

Pressure control valves	**Flow (l/min)**	**Pressure range (bar)**
Pressure relief valves (direct and pilot operated)	up to 350	up to 420
Pressure reducing valves (reducing and reducing/relieving)	up to 150	up to 420
Sequence valves	up to 150	up to 420
Pressure cut-off	up to 150	up to 420
Isolator valves	**Flow (l/min)**	**Pressure range (bar)**
Check valves	up to 350	up to 420
Pilot to close check valves	up to 120	up to 350
Pilot to open check valves	up to 240	up to 350
Shuttle valves	up to 40	up to 420
Flow control valves	**Flow (l/min)**	**Pressure range (bar)**
Restrictors	up to 150	up to 350
Restrictors, free reverse flow	up to 150	up to 350
Flow control and Priority valves (2-way, 3-way version)	up to 200	up to 350
Flow divider / combiner	up to 165	up to 350
Logic elements and directional valves	**Flow (l/min)**	**Pressure range (bar)**
Logic elements for pressure and flow control	up to 360	up to 350
Pressure compensator	up to 120	up to 350
Hose burst check valves, Shut-off valves and Hand pumps	up to 150	up to 350
Directional valves, mechanical operated (manual, pneumatic, hydraulic operated)	up to 150	up to 350

Cartridge Valves:
Solenoid Operated Directional Valves, Poppet Type



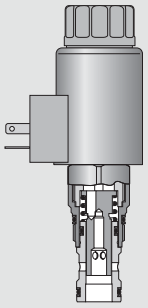
Poppet type solenoid operated directional valves are meant to control the direction of flow in hydraulic circuits.
Technical requirements:
- Leakage free
- Wide operating pressure range
- Long life cycle
- Constant quality
- Compact design
- Wide coil voltage range
- Wide coil connection range

Poppet type solenoid operated directional valves are available in a wide range of configuration:
- Single lock and double lock
- Normally open and normally closed
- Side-in/Nose-out and viceversa
- With internal reverse check
- Energy saving
- With extra spring
- Cavity: common industry, size 08 to 16

Detailed information:
RE 00162-02

2/2 directional poppet valves, pilot operated	**Flow (l/min)**	**Max Inlet Pressure (bar)**
Size 08	up to 40	350
Size 10	up to 70	350
Size 12	up to 150	350
Size 16	up to 200	350
2/2 directional poppet valves, pilot operated, double lock	**Flow (l/min)**	**Max Inlet Pressure (bar)**
Size 08	up to 40	350
Size 10	up to 70	350
Size 12	up to 150	350
Size 16	up to 200	350
Continuous duty coils		
Connectors:	DIN 43650 - ISO 4400 / AMP JUNIOR / SINGLE LEAD / AMP SUPERSEAL-V	
	DEUTSCH DT04-2P-L / DEUTSCH DT04-2P-V	
Voltage:	12 V DC / 24 V DC / 24 V RAC / 110 V RAC / 220 V RAC / 14 V DC / 26 V DC	

Cartridge Valves: Solenoid Operated Direct. Poppet Valves KSDE and Directional Spool Valves KKDE



Directional Poppet Valves KSDE.

The directional poppet valves KSDE. are available in sizes 1 and 8 (for pilot flow).
The KSDEU provides leakfree operation up to pressures of 500 bar.
2 Way / 2 Position as well as
3 Way / 2 Position valves are available in several configurations.
As valves of Rexroth's High Performance Cartridge valve line all KSDE feature a high durability of 10 Million life cycles.

Directional Spool Valves KKDE.

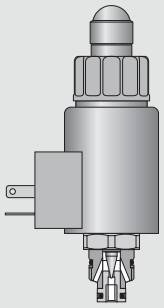
The directional spool valves KKDE are also offered in sizes 1 and 8 (for pilot flow).
The range includes the following functions:
- 2 Way / 2 Position
- 3 Way / 2 Position
- 4 Way / 2 Position

The complete range is available either as High Performance valve up to 350 bar and 10 Million life cycles or Standard Performance valve featuring 250 bar maximum pressure and 2 Million life cycles.

Detailed information:
RE 00162-01

Directional poppet valves type KSDER / KSDEU					
Denomination	**Size**	**Pressure (bar)**	**2/2 Flow (l/min)**	**3/2 Flow (l/min)**	
KSDEU	8	up to 500	5	–	
KSDER	1	up to 350	20	12	
KSDEU	1	up to 500	20	12	
Directional spool valves type KKDEN / KKDER					
Denomination	**Size**	**Pressure (bar)**	**2/2 Flow (l/min)**	**3/2 Flow (l/min)**	**4/2 Flow (l/min)**
KKDEN	8	up to 250	25	20	–
KKDER	8	up to 350	45	30	–
KKDEN	1	up to 250	30	35	30
KKDER	1	up to 350	55	60	40

Cartridge Valves: Prop. Pressure Relief Valves KB.S and Pressure Reducing Valves FTDRE / MHDRE



Proportional Pressure Relief Valves Type KB.S

Proportional pressure relief valves type KB.S are modular valves consisting of the KBPS pilot stage which can be combined with a variety of main stages to achieve different pressure relief and reducing functions.

Proportional Directional Valves Type KKDSR

The proportional directional valve type KKDSR allows smooth flow control function up to 350 bar.

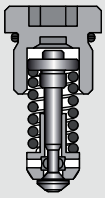
Proportional Pressure Reducing Valves Type FTDRE / MHDRE

Proportional pressure reducing valves type FTDRE and MHDRE provide smooth pressure control function as pilot stages in mobile control blocks as well as in gear box and clutch control applications.

Detailed information:
RE 00162-01

Proportional directional valves type KKDSR				
Denomination	**Size**	**Pressure (bar)**	**Flow (l/min)**	
KKDSR	1	up to 350	30	
Proportional pressure relief valves type KB.S				
Denomination	**Size**	**Pressure (bar)**	**Flow (l/min)**	**Features**
KBPS.8A	8	up to 420	2	increasing characteristic curve
KBPS.8B	8	up to 420	2	decreasing characteristic curve
KBVS.3A	3	up to 350	200	increasing characteristic curve
KBVS.3B	3	up to 350	200	decreasing characteristic curve
Proportional pressure reducing valves type FTDRE / MHDRE				
Denomination	**Size**	**Max. inlet pressure (bar)**	**Max. red. pressure (bar)**	**Flow (l/min)**
FTDRE 2K	8	up to 100	up to 18	2
FTDRE 4K	8	up to 210	up to 30	5
MHDRE 2K	8	up to 100	up to 30	2,5
MHDRE 04K	8	up to 100	up to 33	5
MHDRE 06SK	1	up to 50	up to 30	40

Cartridge Valves: Insert Type Valves



From the compact controls product line Rexroth also offers a wide range of insert type cartridge valves. Among them, the VMA valves family represent an interesting solution since they combine in one small insert cartridge the typical function of a direct acting relief valve and the anticavitation function through the check valve.

Thanks to the very limited size they are very suited for use in pumps, directional control valves as well as integrated circuits.

Various configurations in order to get different functions are available in the VMA family:

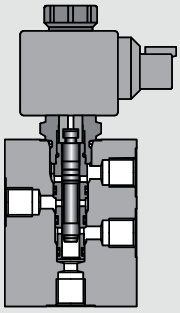
- Pressure relief and anticavitation function - fixed setting
- Pressure relief (without anticavitation)- fixed setting
- Anticavitation function only
- Pressure relief and anticavitation - adjustable setting

The insert type cartridge line also includes a variety of check valves, pressure compensated flow controls and hose burst valves.

Detailed information:
RE 00162-02

Pressure relief valves	Max flow (l/min)	Max pressure (bar)
VMA1.025	30	210
VMA1.050	60	380
VMA1.060	75	380
VMA1.080	90	400
VMA1.180	180	400
Pressure compensated flow regulator	**Max flow (l/min)**	**Max pressure (bar)**
SFC1	45	210
VCD1	150	315
Check valves	**Max flow (l/min)**	**Max pressure (bar)**
VUH1	80	350
VUB1	80	350
Hose burst valves	**Max flow (l/min)**	**Max pressure (bar)**
VPN1	150	315

Standard Manifolds



A complete range of manifolds is available for all standard cartridges, in both single and double cavity configuration.
Manifolds are available in high strength aluminium for working pressure up to 250 bar or in zinc plated steel for high pressure (up to 450 bar) or heavy duty and fatigue applications.

The standard configuration is for inline mounting, with BSPP or SAE threaded ports: flanged versions are available on request, as well as special ports dimensions (ISO 6149 with o-ring, JIS 2351-90 type 0, etc.)

Detailed information:
RE 00162-02
RE 00199

		Cavities threaded											
		Size 08 (3/4 16-UNF-2B)			Size 10 (7/8 14-UNF-2B)			Size 12 (1-1/16 12-UN-2B)		Size 16 (1-5/16 12-UN-2B)			Size 20 (1-5/8 12-UN-2B)
		2 Way	3 Way	4 Way	2 Way	3 Way	4 Way	2 Way	3 Way	2 Way	3 Way	4 Way	3 Way
Ports threaded	G 1/4	A-S	A	A		A	A						
	G 3/8	A-S	A-S	A	A-S	A-S	A-S						
	G 1/2				A-S	A-S		A-S	A-S				
	G 3/4				S					A-S	A-S	A-S	
	G 1									A-S	A-S		
	G 1-1/4												A-S
	7/16-20	c.f.											
	9/16-18	c.f.	c.f.		c.f.	c.f.	c.f.						
	3/4-16				c.f.								
	7/8-14				c.f.	c.f.			c.f.				
	1-1/16-12									c.f.		c.f.	
	1-5/16-12										c.f.		
	1-5/8-12												c.f.

Legenda: A = Aluminium
S = Steel
c.f. = consult factory

Available on request manifolds with market interchangeable cavity and with ISO 6149 and JIS B 2351-90 type 0 ports.

Customized Integrated Circuits

Customized Integrated Circuits

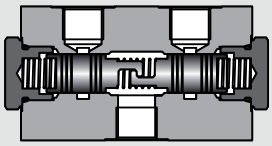
Customized integrated solutions are designed and produced according to Customers' requirements or following specific applications' demands.
The criteria which guide our team is to give the best possible solution in terms of balance between optimal performance, compact dimension and targeted price.
Product reliability and cost effectiveness are granted by the fact that all the components are taken from our wide range of already available standard products (mechanical and solenoid operated cartridges, compact directional valves, cetop valves...): these are combined into customized multifunctional steel or aluminium blocks able to fit the demands of many mobile applications.

The advantages for machine designers are many: piping and installation time is minimized, the dimensions of the block can be adapted to fit the available clearance on the machine, testing time is drastically reduced (all our customized blocks are supplied fully tested), hydraulic circuit maintenance becomes easier and quicker.
Blocks production process is fully internally controlled and it takes advantage of the use of the most advanced CNC machining tools available on the market: aluminium manifolds are available on request with black anodizing finishing for improved corrosion and dirt resistance, while steel manifolds are always provided zinc plated.

Typical Mobile Applications:

- Self propelled and truck mounted aerial platforms (lifting, steering, traction, stabilizers' positioning)
- Self propelled and truck mounted cranes (outrigger control, load limiting, joystick pressure control)
- Telehandlers (pilot supply, boom speed limiters, steering control, load suspension systems, frame levelling, rear axle and stabilizers locking)
- Excavators, backhoe and front loaders (pilot supply, inloader and unloader valves, ride control systems, pump displacement control)
- Fork lift trucks (lifting/lowering control, proportional braking, steering, differential lock)
- Agricultural machines and tractors (attachments control, suspension system control, 4WD drive)
- Municipal vehicles (blocks for sweepers and garbage compactors)
- Road construction machines (control blocks for pavers, differential lock for road rollers, attachments' control)

Pressure, Flow, Pilot Operated Check Valves



Pressure Control Valves

- Pressure limiting valves, sequence valves and pressure reducing valves
- Dual cross over relief and anti-cavitation valves for in line installation or directly flangeable on motors

Flow Valves

- Pressure compensated 2-way, 3-way, 3-way combination type adjustable flow regulators
- Pressure compensated flow dividers and combiners

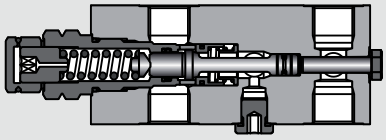
Pilot Operated Check Valves

- Single and dual acting pilot operated check valves

Detailed information:
RE 00171

Pressure control and cross over relief valves							
Flow	l/min	up to 150					
Max operating pressure	bar	350					
Flow valves							
Two way pressure compensated adjustable flow regulators							
Total flow	l/min	up to 200					
Max operating pressure	bar	210					
Thread (line installation)			G 1/4	G 3/8	G 1/2	G 3/4	G 1
Three way pressure compensated adjustable flow regulators							
Total flow	l/min	up to 200					
Max operating pressure	bar	210					
Thread (line installation)				G 3/8	G 1/2	G 3/4	G 1
Three way combination type pressure compensated adjustable flow regulators							
Total flow	l/min	up to 200					
Max operating pressure	bar	210					
Thread (line installation)				G 3/8	G 1/2	G 3/4	G 1
Pressure compensated flow dividers - combiners							
Total flow	l/min	up to 150					
Max operating pressure	bar	210					
Division ratio		50 / 50					
Thread (line installation)				G 3/8	G 1/2	G 3/4	G 1
Pilot operated check valves							
Flow	l/min	up to 100					
Max operating pressure	bar	350					
Thread (line installation)			G 1/4	G 3/8	G 1/2	G 3/4	G 1
Flangeable types							

Motion Control Valves



Applications:
cranes, lifting working platforms, telehandlers, backhoe loaders, concrete pump trucks, drilling equipment, winches and in general on mobile hydraulics.

This series of "parts in body" motion control valves is formed by a standard or customer tailored manifold, incorporating the proper internal elements and fitted to a flange directly on the actuator or connected in pipeline.

Good stability during load lowering control is by far the primary and most commonly required feature of a motion control valve. This is often in contrast with other required specifications, such as energy saving, good relief characteristic and prompt response time in opening and closing.

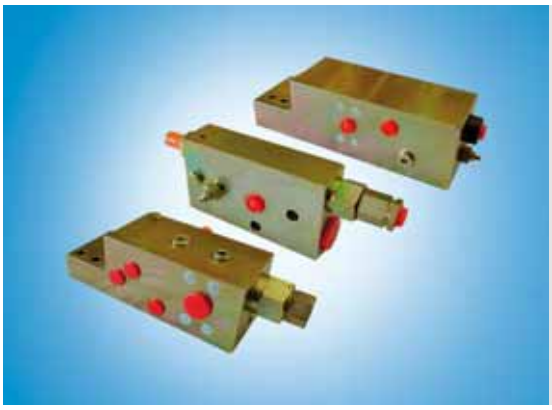
The great flexibility of the "parts in body" concept provides optimised solutions on each of the required characteristics and supplies high performance valve modules dedicated to the different applications.

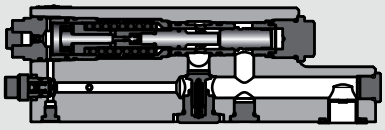
The concept and the production process of the "parts in body" modules allow highly customised solutions, both in term of performances and clearance, in co-design with the machine original manufacturer. Further developments, performance increasing, additional requirements that the machine could have during its life time are more easily feasible without changing the cylinder interface.

Detailed information:
RE 00171

VBSO	**Size**	**78**	**30**	**90**	**33**	**42**
Flow	l/min	40	60	100	150	350
Operating pressure	bar	350	350	350	350	350
Relief compensated and fully compensated types						
In pipeline and flange installation - wide range of port options						
VAA-B-SICN	**Size**	**50**	**150**	**250**		
Flow	l/min	40	120	200		
Operating pressure	bar	350	350	350		
Thread (line installation)		G 3/8"	G 3/4"	G 1"		
Versions with 2 adjustable pressure levels: high pressure setting for starting, low pressure setting for smooth braking						

Cylinder Safety Lock Valve – A-VBC





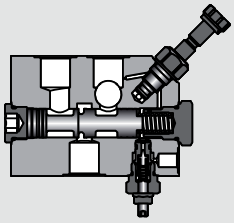
Applications:
On earth moving machines such as excavators, backhoe loaders and cranes.

- Minimal pressure drop during the lifting process
- No lowering of the load in neutral position – leak free design
- Anti-shock and relief protection against overloads with very flat hysteresis free relief characteristic
- Metering and possibility to stop the outlet flow in case of hose burst (intended for use on load handling machines subject to the requirements of European Standard 474-1994 / ISO Standard 8643
- Designed for direct flange mounting (SAE port pattern) or for in pipeline installation
- A-VBC-N enhances a very fine metering charateristics for maximum sensivity – spool with notches – and a fail safe mode design

Detailed information:
RE 00171

A-VBC	**Size (line installation)**	**78**	**90**	**33**
Flow	l/min	40	100	150
Max operating pressure	bar	420	420	420
A-VBC	**Size (flange installation)**	**90**	**33**	**42**
Flow	l/min	120	200	500
Max operating pressure	bar	420	420	420
A-VBC-N	**Size (flange installation)**	**15**	**18**	**22**
Flow	l/min	200	350	450
Max operating pressure	bar	420	420	420

Heavy Duty Priority Flow Control



The A-VRFC3C series provide a simple and efficient way to supply hydraulic power to auxiliary work tools and attachments, especially on earth moving machines such as loaders and excavators.

These valves have a 3-way configuration: one pump inlet port and two outlet ports for priority and by-pass flow. The priority port gives fully pressure compensated flow, power limited by a relief valve and available on demand by energizing the solenoid cartridge. Priority flow rate and relief pressure are adjustable. The inlet flow in excess of the priority flow is directed to the by-pass port.

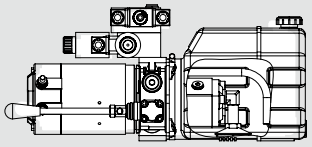
Similar operation is found in the two pumps version with two pump inlets and one combined priority port. Series A-VRFC2C is designed for installation on load sensing systems.

- Precise metering of the pressure compensated flow independent of all working pressures
- Solenoid actuated control to engage priority flow with wide range of connections and voltages available
- Wide range of flow ranges and port options
- Low leakage from priority outlet with solenoid not energized
- Zinc plated, steel body for heavy duty application

Detailed information:
RE 00171
RA 90810

Three way combination type pressure compensated flow regulators with by-pass, relief and solenoid control					
Single pump inlet A-VRFC3C-VEI-VS					
Inlet flow	l/min	100	200	300	400
Regulated priority flow (max)	l/min	85	140	220	300
Operating pressure	bar	350	350	350	350
Double pump inlet A-VRFC3-VEI-VS-2E					
Inlet flow	l/min	2x100	2x200	2x300	
Regulated priority flow (max)	l/min	150	250	400	
Operating pressure	bar	350	350	350	
Single pump inlet for LS system A-VRFC2C-VEI-VS-LS					
Inlet flow	l/min	140			
Regulated priority flow	l/min	20 per turn			
Operating pressure	bar	350			

Compact Power Module KE Series



Compact power units with minimal piping including:
- Gear pump
- AC/DC electric motor
- Central manifold with valves
- Oil reservoir
- External modular elements

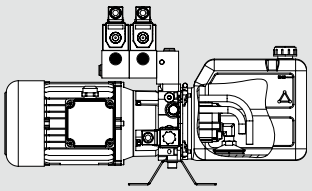
Drive units in vehicles and material handling systems primary for lifting and lowering.

- Central manifold with a large variety of built in circuits
- Fast and easy mounting system
- Flexible and expandable modular solutions
- Combination of several motors, pumps and tanks
- Precision control through proportional lowering function

Detailed information:
RE 00198

Pump group 1	**Size**		**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**
Displacement	V_{max}	cm^3	0,82	1,1	1,6	2,1	2,7	3,2	3,7	4,2	4,8	5,8	8,0	9,9
Intermittent max. pressure	P2	bar	230	230	230	230	230	210	210	210	190	190	160	150
Peak max. pressure	P3	bar	270	270	270	270	270	250	250	250	230	230	200	190
Valve housing versions	**Name**				**M02**	**M03**	**M04**	**M05**	**M09**	**M15**	**M16**	**M19**	**M21**	**M25**
2/2 Solenoid valve					•	•	•	•						
4/3 Solenoid valve													•	•
3/2 Solenoid valve										•	•			
Start-up valve									•			•		
Modular interface					•	•	•		•	•	•		•	•
Electric motors	**Power**													
DC motor 12V, 24V	P	kW			0,15	0,5	0,8	1,5	1,6	2,0	2,2	2,4	3,0	
AC 3-phase motor														
- 230/400V - 4 poles	P	kW			0,18	0,25	0,37	0,55	0,75	1,1	1,5	2,2	3	4
- 230/400V - 2 poles	P	kW				0,25	0,37	0,55	0,75	1,1	1,5	2,2	3	4
AC single-phase motor														
- 220V - 4 poles	P	kW			0,18	0,25	0,37	0,55	0,75	1,1	1,5	2,2		
- 220V - 2 poles	P	kW				0,25	0,37	0,55	0,75	1,1	1,5	2,2		
AC electric motors have standard frame size B14 (IEC 72-1)														
Oil reservoir	**Capacity**													
Sheet metal tank	1 – 60 L													
Plastic tank	1 – 12 L													
Aluminium tank	10 L													

Compact Power Module K Series



Compact power units with minimal piping including:
- Gear pump
- AC/DC electric motor
- Central manifold with valves
- Oil reservoir
- External modular elements

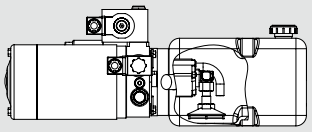
Drive units in vehicles and material handling systems primary for lifting and lowering.

- Large variety of design versions
- Fast and easy mounting system
- Flexible and expandable modular solutions
- Combination of several motors, pumps and tanks
- Precision control through proportional lowering function
- Wide range of special configuration/accessories

Detailed information:
RE 00198

Pump group 05	**Size**		**L1**	**L2**	**L3**	**L4**	**L5**	**L6**	**L7**	**L8**				
Displacement	V_{max}	cm^3	0,18	0,25	0,5	0,62	0,75	1,0	1,25	1,5				
Intermittent max. pressure	P2	bar	190	190	190	190	190	190	190	190				
Peak max. pressure	P3	bar	230	230	230	230	230	230	230	230				
Pump group 1	**Size**		**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**
Displacement	V_{max}	cm^3	0,82	1,1	1,6	2,1	2,7	3,2	3,7	4,2	4,8	5,8	8,0	9,9
Intermittent max. pressure	P2	bar	230	230	230	230	230	210	210	210	190	190	160	150
Peak max. pressure	P3	bar	270	270	270	270	270	250	250	250	230	230	200	190
Central manifold	**Name**		**A1**	**A12**	**A14**	**A16**								
2/2 Solenoid valve				•	•	•								
Adjustable flow regulator					•									
Modular interface			•	•	•	•								
Electric motors	**Power**													
DC motor 12V, 24V	P	kW	0,15	0,5	0,8	1,5	1,6	2,0	2,2	2,4	3,0			
AC 3-phase motor														
- 230/400V - 4 poles	P	kW	0,18	0,25	0,37	0,55	0,75	1,1	1,5	2,2	3	4		
- 230/400V - 2 poles	P	kW		0,25	0,37	0,55	0,75	1,1	1,5	2,2	3	4		
AC single-phase motor														
- 220V - 4 poles	P	kW	0,18	0,25	0,37	0,55	0,75	1,1	1,5	2,2				
- 220V - 2 poles	P	kW		0,25	0,37	0,55	0,75	1,1	1,5	2,2				
AC electric motors have standard frame size B14 (IEC 72-1)														
Oil reservoir	**Capacity**													
Sheet metal tank	1 – 60 L													
Plastic tank	1 – 12 L													
Aluminium tank	10 L													

Compact Power Module ME Series



Compact power units with minimal piping including:
- Gear pump
- AC/DC electric motor
- Central manifold with valves
- Oil reservoir
- External modular elements

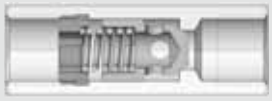
Drive units in vehicles and material handling systems primary for lifting and lowering.

- Smallest and lightest unit of the range
- Large variety of design versions
- Fast and easy mounting system
- Flexible and expandable modular solutions
- Combination of several motors, pumps and tanks
- Precision control through proportional lowering function

Detailed information:
RE 00198

Pump group 05	**Size**		**L1**	**L2**	**L3**	**L4**	**L5**	**L6**	**L7**	**L8**
Displacement	V_{max}	cm^3	0,18	0,25	0,5	0,62	0,75	1,0	1,25	1,5
Intermittent max. pressure	P2	bar	190	190	190	190	190	190	190	190
Peak max. pressure	P3	bar	230	230	230	230	230	230	230	230
Valve housing versions	**Name**		**M52**	**M53**	**M55**	**M57**	**M54**	**M58**		
2/2 Solenoid valve			•	•	•	•				
4/2 Solenoid valve							•	•		
Manometer port 1/8"					•	•		•		
Modular interface				•		•				
Electric motors	**Power**									
DC motor 12V, 24V	P	kW	0,15	0,5	0,8	1,5	1,6	2,0	2,2	
AC 3-phase motor										
- 230/400V - 4 poles	P	kW	0,09	0,18	0,25	0,37	0,55	0,75		
- 230/400V - 2 poles	P	kW		0,13	0,25	0,37	0,55	0,75	1,1	
AC single-phase motor										
- 220V - 4 poles	P	kW	0,09	0,18	0,25	0,37	0,55	0,75		
- 220V - 2 poles	P	kW		0,13	0,25	0,37	0,55	0,75	1,1	
AC electric motors have standard frame size B14 (IEC 72-1)										
Oil reservoir	**Capacity**									
Sheet metal tank	0,5 – 1 L									
Plastic tank	0,5 – 2,5 L									
Aluminium tank	3 – 6 L									

Inline Valves



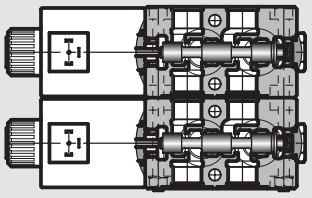
Rexroth offers a complete range of Inline valves which are used in a variety of mobile applications.

- Wide range of sizes.
- BPS standard threads.
- High pressure and high flow rate versions available.
- Stainless steel versions available.

Detailed information:
on request

Check valves	**Flow (l/min)**	**Pressure range (bar)**
CA check valves	up to 700	up to 400
CAB double acting check valves	up to 80	up to 400
LCA check valves with adjustable pressure	up to 80	up to 400
Piloted check valves	**Flow (l/min)**	**Pressure range (bar)**
OV piloted check valves	up to 150	up to 350
OV piloted check valves with decompression poppet	up to 80	up to 400
Flow regulator valves	**Flow (l/min)**	**Pressure range (bar)**
VCST pressure compensated adjustable flow regulator	up to 33	up to 250
GSU flow regulator with by-pass	up to 70	up to 300
SU unidirectional flow control valves	up to 150	up to 350
RU unidirectional flow control valves	up to 140	up to 450
SD bidirectional flow control valves	up to 140	up to 350
RD bidirectional flow control valves	up to 140	up to 450
End stroke valves	**Flow (l/min)**	**Pressure range (bar)**
FCNC normally closed	up to 60	up to 250
FCNA normally open	up to 30	up to 250
End stroke valves	**Flow (l/min)**	**Pressure range (bar)**
EM vertical/horizontal versions		up to 400

Flow Diverters



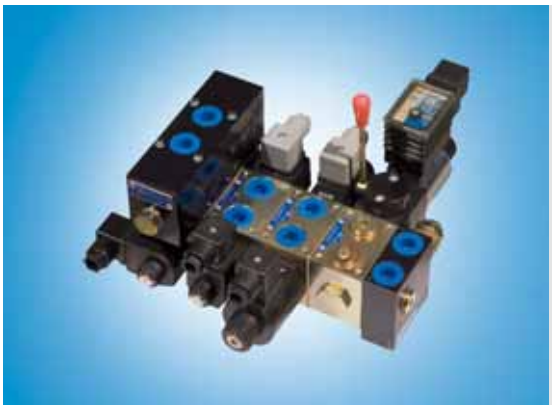
Applications in attachments, telehandlers, excavators, backhoe loaders, front end loaders, agricultural machinery.

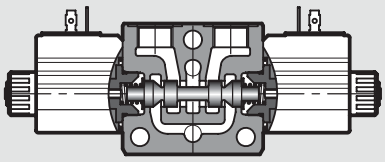
Directional 3/2, 6/2 and bankable 6/2 (6-14 way) diverter valves
- Simplifies the hydraulic circuit when two contemporary movements are not required
- Compact design and easy mounting
- DIN, Deutsch, AMP-J and cable connections available

Detailed information:
RIE 00158
RA 90811

	Size				**04**	**06**	**12**	
3 Way	Port				1/4" G SAE 4	3/8" G - SAE 6 1/2" G - SAE 8	1/2" G - 3/4" G SAE 12	
	Flow		q_v	l/min	25	50-60	120-140	
	Maximum operating pressure							
		Internal drain	p_{max}	bar	250	250	250	
		External drain	p_{max}	bar	310	310	310	
	Circuit types				2	5	5	
	Actuation	Electrical			•	•	•	
		Hydraulic			•	•	•	
		Manual push and twist knob			•	•	•	
	Size				**04**	**06**	**12**	**16**
6 Way	Port				1/4" G - SAE 4 1/4" G JIS-B	3/8" G -1/2" G SAE 8	1/2" G - 3/4" G SAE 12	1" G
	Flow		q_v	l/min	25	50-60	120-140	220
	Maximum operating pressure							
		Internal drain	p_{max}	bar	250	250	250	250
		External drain	p_{max}	bar	310	310	310	310
	Circuit types				4	5	5	1
	Actuation	Electrical			•	•	•	•
		Hydraulic			•	•	•	pilot operated
		Manual push and twist knob			•	•	•	
	Size				**04**	**06**	**10**	
6-14 Way - Bankable	Port				1/4" G SAE 4	3/8" G -1/2" G SAE 8 - M18x1.5	1/2" G - SAE 10 - M18x1.5 1/2" G JIS B	
	Flow		q_v	l/min	20	50	90	
	Maximum operating pressure							
		Internal drain	p_{max}	bar	250	250	250	
		External drain	p_{max}	bar	310	310	310	
	Max bankable (sandwich) elements				4 (12 way)	5 (14 way)	5 (14 way)	
	Circuit types				2	5	5	
	Actuation	Electrical			•	•	•	
		Hydraulic			•	•	•	
		Manual push and twist knob			•	•	•	
	Modular elements with cross line pressure relief valves				-	•	•	

Modular Directional Valves





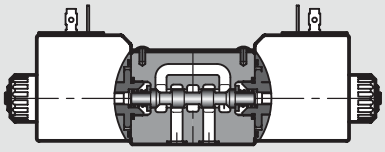
Applications in backhoe loaders, wheel loaders, pavers. Drilling equipment, small cranes, fork lift trucks, telehandlers, portal-type fork lift trucks, aerial work platforms. Municipal vehicles, forestry machinery, agricultural machinery.

- Modular 4/2, 4/3 direct. valves
- Flexible sandwich ON-OFF, load sense and proportional valves, entry plates and closing plates for building hydraulic circuits
- DIN, Deutsch and AMP-J connections available
- Compact, easy to install system

Detailed information:
RIE 00159

Size				**06**	**06**	
Port	A, B			3/8" G SAE 6	1/2" G SAE 8	
Flow		q_v	l/min	30	50	
Maximum operating pressure	P	p_{max}	bar	250	250	Standard inlet plate (alluminium)
	A-B	p_{max}	bar	310	310	
	T	p_{max}	bar	180	250	
Valve body type	Parallel			•	•	
	Integrated antishock valves			•	-	
	LS Signal			•	•	
Number of directional valves max.						
	Parallel			10	10	
Actuation	Electrical			•	•	
	Proportional			•	-	
	Hydraulic			•	•	
	Lever override			•	•	
	Manual and push override			•	•	
Stacking module	Pilot check valves			•	-	
	Cross-over relief valves			•	-	
	Flow regulator valves			•	-	
	Overcenter valves			•	-	
Inlet plate	P, T and M			3/8" G, SAE 6, 1/2" G, SAE 8		
	Standard			•	•	
	With relief valve			•	•	
	With LS port			•	•	
	With relief valve and LS port			•	•	
	With relief valve and unloading valve			•	•	
	With relief valve compensated flow regulator and LS			•		
	With relief valve, unloading and compensated flow regulator				•	
	With relief valve and compensated priority flow regulator				•	
	With relief valve and 3way compensated prop. flow regulator			•	•	
Closing plate	With or without P and T ports			•	•	
Intermediate slices with in line check valve(s) and emergency pump port				•	-	

CETOP 2 (NG4)



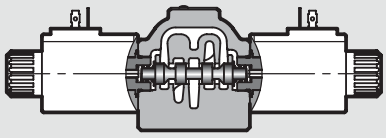
Cetop 2 pattern valves which can be used on any max 25 lpm circuits.

Solenoid valves
- ON-OFF and proportional directional valves
- Sandwich valves and plates
- Compact design and reduced dimensions
- Low leakage, low pressure drop
- Various accessories for emergency overrides
- DIN, Deutsch, AMP-J and cable connections available on coils
- Wide selection of voltages
- 45 types of spool available

Detailed information:
RE 00157
RI 00157

Size				**04**	**04**
Interface				CETOP 2 - P02	CETOP 2 - R02
Flow		q_v	l/min	25	25
Maximum operating pressure	A, B and P	p_{max}	bar	310	310
	T static	p_{max}	bar	210	210
	T dynamic	p_{max}	bar	180	180
Actuation	Electrical			•	•
	Proportional			•	-
	Hydraulic			•	•
	Lever			•	•
	Electrical with explosion proof coil			•	•
	Push-botton override			•	•
	Override screwed			•	•
Modular	Sandwich directional valve			•	
	Pilot check valve			•	
	Pressure relief			•	
	Flow regulator valve			•	
	Compensated flow regulator valve			•	
	Pressure reducing valve			•	
	Sequence valve			•	
	Compensated quick-slow valve			•	
	2 Way compensator with shuttle valves			•	
	3 Way compensator with shuttle valves			•	
Plate	Single			•	
	Multi-station			•	•

Special Directional Valves



Applications in excavators, mini-excavators, backhoe loaders, wheel loaders, skid steer loaders, crawler loaders, pavers. Drilling equipment, cranes, fork lift trucks, telehandlers, portal-type fork lift trucks, aerial work platforms. Concrete pumps, mobile concrete mixers, commercial vehicles, municipal vehicles, forestry machinery, agricultural machinery.

Typical usages include:
- 2 or 3 STEER MODE systems (special low leakage version)
- Fan inversion
- Quick hitch (for attachments on excavators)

- Flexible size 6 valve with integrated threaded ports
- Various accessories for emergency overrides
- Compact, easy to install system
- DIN, Deutsch, AMP-J and cable connections available on coils
- Wide selection of voltages
- In line piping
- 55 types of spools available

Detailed information:
RE 00169
RI 00169

Size				**06**	**06**
Port				3/8" G SAE 8	1/2" G SAE 8
Flow		q_v	l/min	35	70
Maximum operating pressure					
	P, A, B	p_{max}	bar	310	310
	T	p_{max}	bar	180	250
Actuation	Electrical			•	•
	Hydraulic			•	•
	Push-botton override			•	•
	Override screwed			•	•
	Lever override			-	•

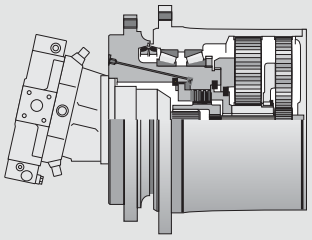
Gears

Rexroth offers a wide selection of planetary gearboxes for mobile equipment, industrial applications and for wind turbines.
Planetary gearboxes in mobile equipment are used as propel drives in tracked vehicles or as wheel drives in wheeled vehicles as well as swing drives for rotary motion and as winch drives for lifting and lowering loads.
The planetary gearboxes have two, three or more planetary stages. They are available with a number of different Rexroth hydraulic motor variants.

For industrial applications, Rexroth supplies planetary gearboxes with two, three or four planetary stages or combined with spur gear stage or bevel stage. The planetary gearboxes are available with numerous Rexroth hydraulic motors. A combination with electric motors is also possible.

For wind turbines, Rexroth can supply generator gear units for power ratings from 660 to 5,000 kW as well as pitch and yaw drives. Reasons for selecting the Rexroth planetary gearboxes include a high power density and a compact design. All planetary gearboxes can be combined with many Rexroth hydraulic motor variants. The used plug-in motors and externally mounted motors are characterized by their optimal efficiency.

Travel Drives HYDROTRAC GFT



For travel drives in tracked and wheeled vehicles
Also suitable for other applications, e.g. rotary motion sequences, drum drives, milling drum drives etc.
Output torques from 7 to 1300 kNm
Ratios from 16.3 to 1209.7
Larger versions available on request

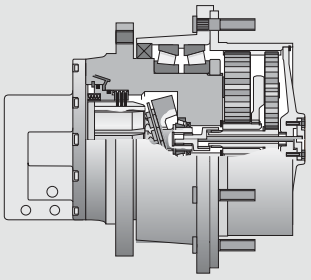
- Compact two-, three- or four-stage planetary gearboxes
- Cageless planetary gear bearing
- Robust main bearing
- Optimized seals
- Integr. multi-disc parking brake
- Optional with wheel drives: mechanical disconnecting device
- Optional for mounting Rexroth fixed or variable motors (A2FM/E, A6VM/E, A10VM/E)
- Easy mounting
- Easy oil change
- Low-noise operation

Detailed information:
HYDROTRAC GFT RE 77110

Type / version			**GFT 7 T2**	**GFT 9 T2**	**GFT 13 T2**	**GFT 17 T2**	**GFT 17 T3**	**GFT 24 T3**
Output torque	$T_{2\,max}$	Nm	7000	9000	13000	17000	17000	24000
Ratio		i	30,9 - 62,6	38,3 - 47,6	16,3 - 60,2	26,4 - 54	78 - 102,6	90,1 - 137,2
Weight without motor (approx.)		kg	45	67	92	90	105	115
Type / version			**GFT 26 T2**	**GFT 28 T3**	**GFT 34 T2**	**GFT 36 T3**	**GFT 40 T2**	**GFT 50 T3**
Output torque	$T_{2\,max}$	Nm	26000	28000	34000	36000	40000	50000
Ratio		i	42,9 - 62	64,3 - 79,3	42,9 - 50,5	67 - 161	35,9 - 59,1	66,3 - 146,4
Weight without motor (approx.)		kg	155	140	165	170	215	220
Type / version			**GFT 60 T2**	**GFT 60 T3**	**GFT 80 T2**	**GFT 80 T3**	**GFT 110 T3**	**GFT 160 T3**
Output torque	$T_{2\,max}$	Nm	60000	60000	80000	80000	110000	160000
Ratio		i	23	94,8 - 197	55,5	76,7 - 185,4	95,8 - 215	161,8 - 251
Weight without motor (approx.)		kg	205	260	570	405	505	680
Type / version			**GFT 220 T3**	**GFT 330 T3**	**GFT 330 T4**	**GFT 450 T4**		
Output torque	$T_{2\,max}$	Nm	220000	330000	330000	450000		
Ratio		i	97,7 - 365	168,9 - 302,4	451,7 - 1209,7	320,3 - 421,7		
Weight without motor (approx.)		kg	1370	1250	1320	1240		
Type / version [1)]			**GFT 600 N**	**GFT 800 N**	**GFT 1100 N**	**GFT 1300 N**		
Output torque	$T_{2\,max}$	Nm	600000	800000	1100000	1300000		
Ratio		i	243,5 - 326,5	284,8	401,6	458,5		
Weight without motor (approx.)		kg	2670	3750	7050	7500		

[1)] GFT ... N: Large travel drive with spur gear stage

Travel Drives HYDROTRAC GFT-A10VT



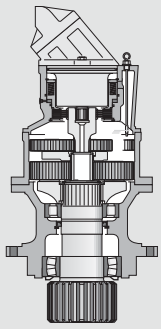
For travel drives in tracked and wheeled vehicles
Output torques from 7 to 40 kNm
Ratios from 25.1 to 170.2

- Very compact two- or three-stage planetary gearboxes with integrated hydraulic motor
- Robust main bearing
- Optimized seals
- Complete, easy-to-mount unit
- For closed circuits with external brake release connection
- For open circuits with complete valving (brake release valve, pressure relief valve) integrated into motor port plate
- Integrated multi-disc parking brake
- Optional mechanical disconnecting device available
- Easy oil change
- Low-noise operation

Detailed information:
HYDROTRAC
GFT-A10VT RE 77111

Travel drives with integrated hydraulic motor A10VT						
Type / version			**GFT 7 T2**	**GFT 9 T2**	**GFT 17 T3**	**GFT 32 T2**
Output torque	$T_{2\,max}$	Nm	7000	9500	17000	32000
Ratio		i	30,9 - 62,6	25,1 - 55,3	70,2 - 170,2	50,7
Hydraulic motor up to size			A10VT28	A10VT45	A10VT45	A10VT140
Hydraulic motor version			Open/closed circuits	Open/closed circuits	Open circuits	Open circuits
Weight incl. motor (approx.)		kg	70	70	98	250
Type / version			**GFT 36 T3**	**GFT 40 T2**		
Output torque	$T_{2\,max}$	Nm	36000	40000		
Ratio		i	99,1 - 161	61,9		
Hydraulic motor up to size			A10VT45	A10VT140		
Hydraulic motor version			Open circuits	Open circuits		
Weight incl. motor (approx.)		kg	310	335		

Swing Drives MOBILEX GFB



For the swing drive of all types of excavators and cranes, for ship unloading equipment, for forestry equipment and for all applications where precise positioning is necessary
Output torques from 4 to 94.5 kNm
Ratios from 17.3 to 186.4
Larger versions available on request

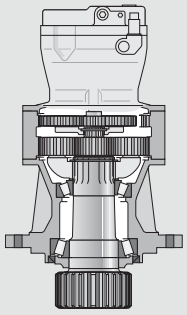
- Compact two- or three-stage planetary gearboxes
- Cageless planetary gear bearing
- Integrated multi-disc parking brake
- Rexroth hydraulic motor: fixed motor in space-saving plug-in design
- Easy mounting
- Low-noise operation
- Easy oil change

Detailed information:
MOBILEX GFB RE 77201

Swing drives with hydraulic motor in bent axis design A2FM/E

Type / version			**GFB 9 T2**	**GFB 17 T2**	**GFB 17 T3**	**GFB 24 T3**	**GFB 26 T2**
Output torque, crane	$T_{2\,max}$	Nm	7000	12700	12700	17500	16500
Output torque, excavator	$T_{2\,max}$	Nm	4000	7700	7700	10600	10000
Ratio		i	26,1 - 48,6	17,3 - 45,7	79 - 105,6	91,1 - 138,2	31,4 - 63
Weight without motor (approx.)		kg	85	130	130	165	240
Type / version			**GFB 36 T2**	**GFB 36 T3**	**GFB 40 T2**	**GFB 50 T3**	**GFB 60 T2**
Output torque, crane	$T_{2\,max}$	Nm	28500	28500	29000	38000	48500
Output torque, excavator	$T_{2\,max}$	Nm	17500	17500	18000	22000	27800
Ratio		i	20,7 - 28,9	68 - 117,6	42 - 60,1	126,7 - 147,4	40,4
Weight without motor (approx.)		kg	260	225	260	315	390
Type / version			**GFB 60 T3**	**GFB 80 T3**	**GFB 84 T2**	**GFB 110 T3**	**GFB 144 T2**
Output torque, crane	$T_{2\,max}$	Nm	48500	68300	68300	93300	94500
Output torque, excavator	$T_{2\,max}$	Nm	27800	38200	38200	52000	54000
Ratio		i	87,5 - 170,9	62,3 - 186,4	35,1	174,9	49,3
Weight without motor (approx.)		kg	425	540	515	680	1050

Swing Drives MOBILEX GFB-A10FD



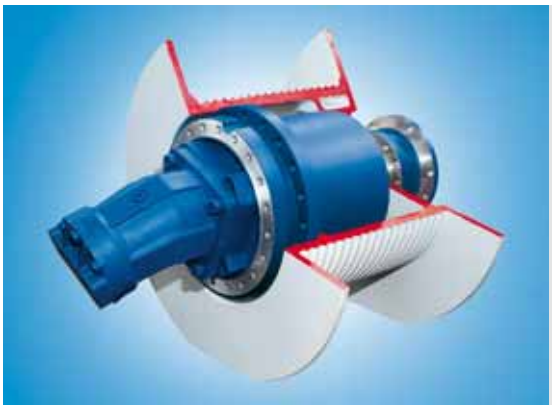
For the swing drive of excavators
Output torques from 5 to 10 kNm
Ratios from 17.3 to 33.4

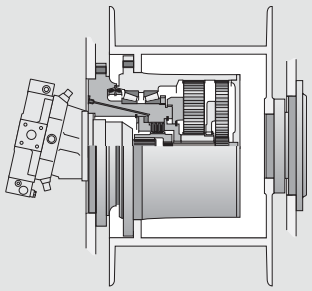
- Compact two-stage planetary gearboxes
- Cageless planetary gear bearing
- Integrated multi-disc parking brake
- Rexroth hydraulic motors in swashplate design
- Easy mounting
- Low-noise operation
- Easy oil change

Detailed information:
MOBILEX
GFB-A10FD RE 77204

Swing drives with swashplate hydraulic motor A10FD					
Type / version			**GFB 9 T2**	**GFB 17 T2**	**GFB 24 T2**
Output torque, excavator	$T_{2\,max}$	Nm	5000	7700	10000
Ratio		i	20,3 - 33,4	17,3 - 24,7	25,9 - 27
Hydraulic motor up to size			A10FD45/35	A10FD85	A10FD85
Weight without motor (approx.)		kg	65	130	160

Winch Drives MOBILEX GFT-W





For installation in the winch drum of all kinds of hoisting gear, e.g. in mobile and crawler cranes, in railway cranes, in deck-, harbor and container cranes.
Output torques from 9.5 to 275 kNm
Cable forces from 50 to 595 kN
Ratios from 16.3 to 302.4

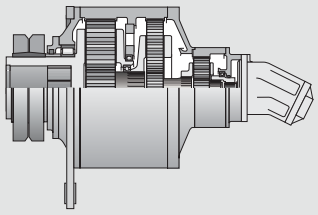
- Compact two- or three-stage planetary gearboxes
- Robust bearing to accommodate the rope pull force
- Cageless planetary gear bearing
- Optimized seals
- Integrated multi-disc parking brake
- Optional with A2FM/E fixed motor or A6VM/E variable motor available
- Easy mounting
- Easy oil change
- Low-noise operation

Detailed information:
MOBILEX GFT-W RE 77502

Type / version			GFT 0013 W2	GFT 0017 W2	GFT 0017 W3	GFT 0024 W3	GFT 0026 W2
Output torque [1]	$T_{2\,max}$	Nm	9500	14000	14000	19000	18000
Ratio		i	16,3 - 37,6	26,4 - 45,4	77,9 - 102,6	90,1 - 137,2	42,9 - 62
Cable force [2]		kN	50	67	74	99	84
Weight without motor (approx.)		kg	85	105	115	130	140
Type / version			**GFT 0036 W3**	**GFT 0040 W2**	**GFT 0050 W3**	**GFT 0060 W3**	**GFT 0080 W3**
Output torque [1]	$T_{2\,max}$	Nm	26000	27000	37500	42500	67000
Ratio		i	67 - 138,8	35,9 - 59,1	84,2 - 146,4	63,8 - 169,9	61,3 - 185,4
Cable force [2]		kN	118	108	150	164	231
Weight without motor (approx.)		kg	155	219	238	230	430
Type / version			**GFT 0110 W3**	**GFT 0160 W3**	**GFT 0220 W3**	**GFT 0330 W3**	
Output torque [1]	$T_{2\,max}$	Nm	100000	140000	200000	275000	
Ratio		i	79,5 - 215	161,8 - 251	97,7 - 293	168,9 - 302,4	
Cable force [2]		kN	300	373	471	595	
Weight without motor (approx.)		kg	515	680	850	1380	

[1] Designed according to FEM L2T5M5
[2] At a theoretical winding diameter Dws in the 1st position

Planetary Gearboxes REDULUS GMH/GME



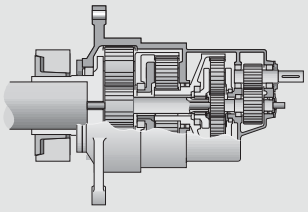
For all applications which require excellent true running at low speed, e.g. for shredders, continuous casting plants, conveyor systems, mining machines, offshore systems, roller mills and many others
Output torques from 7 to 3300 kNm
Ratios from 17 to 2334

- Compact two-, three- or four-stage planetary gearboxes
- Can be combined with spur gear or bevel stages
- Suitable for installation in horizontal and vertical positions
- Variant options on the drive side and output side
- REDULUS GMH for Rexroth hydraulic motors as fixed or variable motors
- REDULUS GME for directly mounting electric motors
- Easy mounting
- Optional with brake
- Smooth operation

Detailed information:
REDULUS
GMH/GME RE 76120

Type / version			**GMH/ GME0017 T**	**GMH/ GME0036 T**	**GMH/ GME0040 T**	**GMH/ GME0050 T**	**GMH/ GME0060 T**
Output torque	$T_{2\ Dauer}$	Nm	7100	14500	12000	20000	24000
Ratio		i	17 - 106	17 - 154	37 - 49	18 - 1052	17 - 141
Type / version			**GMH/ GME0080 T**	**GMH/ GME0102 T**	**GMH/ GME0110 T**	**GMH/ GME0160 T**	**GMH/ GME0200 R**
Output torque	$T_{2\ Dauer}$	Nm	31000	34000	46000	70000	78600
Ratio		i	17 - 1096	42 - 57	17 - 1096	18 - 576	28 - 2334
Type / version			**GMH/ GME0220 T**	**GMH/ GME0300 R**	**GMH/ GME0330 T**	**GMH/ GME0425 R**	**GMH/ GME0600 T**
Output torque	$T_{2\ Dauer}$	Nm	105000	117000	150000	162000	300000
Ratio		i	19 - 366	28 - 1506	21 - 303	28 - 981	24
Type / version			**GMH/ GME0615 R**	**GMH/ GME0870 R**	**GMH/ GME1100 R**	**GMH/ GME1500 R**	**GMH/ GME2300 R**
Output torque	$T_{2\ Dauer}$	Nm	245000	328000	470000	670000	1000000
Ratio		i	29 - 981	29 - 1137	29 - 1137	29 - 1137	25 - 50
Type / version			**GMH/ GME2800 R**	**GMH/ GME3400 R**	**GMH/ GME4600 R**	**GMH/ GME7000 R**	
Output torque	$T_{2\ Dauer}$	Nm	1300000	1500000	2050000	3300000	
Ratio		i	26 - 50	28 - 56	-	-	

REDULUS GPV Generator Gear Units for Wind Turbines from 300 to 5,000 kW



REDULUS GPV Generator Gear Units for Generator Ratings up to 2,300 kW

- Compact design due to a combination of a planetary gear stage and two spur gear stages
- Proven gearbox concept
- Smooth operation
- State of the art gearbox design

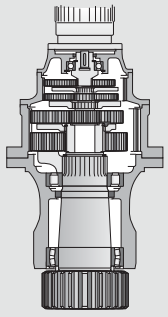
REDULUS GPV D Generator Gear Units for Systems Rated above 2,300 kW

- Differential gear concept with high power density
- Weight reduction compared to conventional concept
- Smooth operation
- Easy to service due to modular design
- State of the art gearbox design

Detailed information:
REDULUS GPV on request

Type / version		GPV 290	GPV 302	GPV 306	GPV 401	GPV 420
Generator power	kW	750	660	850	1750	1500
Rotor diameter	m	46	47	58	66	72
Input torque	kNm	229	243	350	865	910
Ratio	i	50:1	53:1	74 / 62:1	79:1	70 / 87:1
Weight (approx.)	kg	4300	3900	4500	11500	13800
Type / version		**GPV 442**	**GPV 451**	**GPV 453**	**GPV 455**	**GPV 500 D**
Generator power	kW	2000	1500	1500	1500	2500
Rotor diameter	m	80	77	77	83	94
Input torque	kNm	1260	870	870	950	1600
Ratio	i	92 / 100 / 110 / 113 / 120:1	73 / 89 / 98:1	78 / 98:1	86 / 108:1	117:1
Weight (approx.)	kg	15300	13900	14500	15000	19500
Type / version		**GPV 510 D**	**GPV 530 D**			
Generator power	kW	2500	3300			
Rotor diameter	m	90	100			
Input torque	kNm	1700	2072			
Ratio	i	72:1	117:1			
Weight (approx.)	kg	19000	22000			

Pitch and Yaw Drives MOBILEX GFB



For the pitch and yaw adjustment in wind turbines
Static output torques from 3 to 110 kNm
Ratios from 62 to 1671

- Compact, space-saving two-, three- or four-stage planetary gearboxes
- Robust antifriction bearing system for reliable absorption of the forces from the rotor blade- and yaw bearing connection
- Easy oil change
- Low-noise operation

Detailed information:
MOBILEX GFB RE 76111

Swing drives for pitch and yaw adjustment with electric motor

Type / version			**GFB 2 T2**	**GFB 7 T2**	**GFB 7 T4**	**GFB 9 W3**	**GFB 17 T3**
Output torque	$T_{2\ nom.}$	Nm	1200	3000	3000	3760	7700
	$T_{2\ static}$	Nm	3000	5800	5800	7500	14000
Ratio		i	62	63.6	1671.5	148.66	105.6
E-motor	Shaft (k6)		28x60	28x60	19x40	28x60	28x60
	Flange		A250	A250	A200	A250	A250
Weight without motor (approx.)		kg	54	70	65	100	160
Type / version			**GFB 24 T3**	**GFB 24 T4**	**GFB 24 T4**	**GFB 24 T4**	**GFB 60 T4**
Output torque	$T_{2\ nom.}$	Nm	15300	15300	15300	15300	41000
	$T_{2\ static}$	Nm	25000	25000	25000	25000	76000
Ratio		i	121.5	724.5	1692	1428.2	1235.8
E-motor	Shaft (k6)		42x110	28x60	19x40	24x50	28x60
	Flange		A350	A250	A200	A200	A250
Weight without motor (approx.)		kg	160	200	120	150	330
Type / version			**GFB 60 T4**	**GFB 110 T4**			
Output torque	$T_{2\ nom.}$	Nm	41000	55000			
	$T_{2\ static}$	Nm	76000	110000			
Ratio		i	1151.5	915.6			
E-motor	Shaft (k6)		28x60	42x110			
	Flange		A250	A350			
Weight without motor (approx.)		kg	500	670			

BODAS Mobile Electronics

With BODAS, Rexroth supplies a suitable and unique system which meets all requirements for the electronic control of mobile equipment.

Modular Architecture

As a system, BODAS distinguishes itself with its consistent modular architecture with matched interfaces. As a result, it is very easy to integrate all components. Effective machine controls can, thus, be developed quickly and affordably. Existing solutions can easily be extended with additional functions. The optimal matching of the BODAS system to Rexroth hydraulics also increases the efficiency of the entire working machine.
The proven, freely programmable RC controllers are the heart of the BODAS hardware modules. Sensors, displays and joysticks round out the line of BODAS hardware modules. Thus, BODAS supplies all components for a complete electrohydraulic drive system from a single source. Complete solutions combining travel functions and working functions are optimally matched to one another.

Reliability

Thanks to the BODAS RC controllers and peripheral devices which have been tried and tested in demanding day-to-day use of mobile equipment, BODAS is able to ensure high reliability and availability of your machine in spite of harsh mechanical demands, extreme summer and winter conditions or strong electromagnetic disturbances.

Flexibility

The BODAS software, which contains the specific Rexroth application know-how, is modularly structured as well. Depending on the desired function, select from software modules which are matched to one another and configure them yourself. Individual and customized concepts are also possible with the BODAS system. Building on the software modules or starting from scratch, you can develop your own solutions yourself – or draw upon Rexroth's experience as a proven service provider. You can create the programs with either BODAS-design according to standard IEC61131-3 or in C using the BODAS C-API system libraries. In both cases, you are supported with user-friendly documentation.

Service

In addition to the BODAS-design programming system, additional tools provide important assistance while performing simulations or diagnostics during the optimization of the entire machine control.

The Bosch Factor

The BODAS system profits from the close cooperation between Rexroth and Bosch. This "Bosch factor" in development, testing and automotive large-series production results in a stable and extremely high product quality. It contributes to high availability of your machine in demanding daily use.

In addition to the BODAS system, mobile electronics are also available as 'integrated electronics and sensor systems' in hydraulic components. These are described with the respective hydraulics components.

BODAS Controllers RC

BODAS controllers for quickly and affordably creating a mobile-hydraulic complete solution without time-consuming and expensive hardware development.
The RC controllers are the heart of the BODAS system. They form a modular and scalable system. All sensor inputs are matched to the BODAS sensors. All inputs support the use of various functions, such as analog, digital or frequency input. The outputs optimally control Rexroth electrohydraulics. A 16-bit computer with clock speeds up to 40 MHz forms the basis for use in highly dynamic applications. Thus, the BODAS RC controllers can optimally meet the requirement of a given application.

For applications with numerous functions, the capacity of inputs and outputs can be easily and affordably increased with the RCE CAN I/O- extension module. In complex applications, multiple controllers can be connected via the CAN bus to form a network. Safety features integrated in the standard version enable simple and reliable machine diagnostics. They form the basis for the safety concept of the machine.
Matched to the RC controllers, the BODAS software modules offer preconfigured application solutions for drive and working hydraulics. For custom solutions, you can use the BODAS RC controllers as a freely programmable platform.

Features

- Safety features:
  - Detection of cable break
  - Detection of short circuit
  - Monitoring the outputs
  - Bosch watchdog module
  - Central switch for all power outputs
- Output stages with pulse-width-modulated current regulation (PWM)
- Robust case
- High EMC > 100 V/m
- Download the software from a PC to the flash memory
- CAN bus or RS232 interfaces
- Interfaces matched to Rexroth electrohydraulics

Detailed information:

RC/20	RE 95200
RC2-2/21	RE 95201
RC/22	RE 95202
RCE/22	RE 95220

Technical Data of the BODAS RC Controllers

Type / series	Inputs	Maximum possible input functions					Outputs		Interfaces	
	Total	Analog	Digital	Frequency	DSM	Temp.	PWM	Digital	RS232	CAN bus
RC2-2/20	10	6	10	2	-	-	2	2	1	2
RC2-2/21	16	8	16	8	2	4	2	2	1	1
RC4-4/20	18	15	18	3	-	-	4	4	1	2
RC4-6/22	21	10	17	8	2	2	4	6	-	2
RC6-9/20	25	20	25	5	-	-	6	9	1	2
RC8-8/22	27	12	21	10	4	2	8	8	-	2
RC12-8/22	33	15	27	10	4	2	12	8	-	2
RC12-18/20	46	24	46	10	-	-	12	18	2	2
RCE12-4/22	33	15	29	-	2	2	12	4	-	1

BODAS Application Software

Application Software (AS)

The BODAS application software is an immediately available standard software system. Complex functions which go beyond the basic functions are already included in the standard version. Thus, no time is lost to programming and you can get started with the implementation of your machine right away. The functional scope and the behavior of the software are individually set on your machine with BODAS-service using parameters. Extensive documentation guides you through the commissioning process.

Custom Software from Rexroth

Rexroth can quickly and affordably produce an extended or customized software package for you on the basis of a BODAS application software (AS) system adapted to meet your needs. We can program custom machine functions according to your requests on the basis of a specification defined together with you. We guarantee the high quality of this software through the use of an integrated software development process in accordance with CMMI Level 2.

Self-created Software

You can implement your own ideas and functions yourself, independent of Rexroth, using BODAS-design or the C-API.

Detailed information:

AGS	RE 95370
DPC	RE 95325
DRC	RE 95320
AFC	RE 95360
CEM	RE 95340
LLC	RE 95310
SPC	RE 95300
VAC	RE 95350

BODAS Application Software (AS)

Travel drive control	
AGS	**Automatic gear shifting** for wheeled vehicles
DPC	**Dual path control** for track drives
DRC	**Travel drive control** for wheeled vehicles with reversing, speed control, load limiting control
Machine functions	
AFC	**Automatic fan control** with reversing function and CAN interface
CEM	**CAN I/O extension function** for functional system extension
LLC	**Diesel management** for protecting the diesel engine
MSC	**Slew drive control** of the MSC-16 valve blocks via joystick valve signal
SPC	**Closed loop speed control** for the control of hydraulic motors to a constant speed with variable pump speed
VAC	**Electronic valve control** via joystick signal
Modules for the function extension of BODAS AS	
ADC	**Automotive driving** by coupling the vehicle speed to the combustion engine speed
ASR	**Anti-slip control** for traction control on slippery undergrounds
DDI	**Display data interface** for providing data to the BODAS DI via the CAN bus
ECO	**Ecodrive** for reducing consumption, noise and wear
EDP	**Electronic accelerator pedal** for controlling the combustion engine via CAN

BODAS Tools

Parameterization and Diagnostics with BODAS-service

A PC software system can be used to easily and comfortably parameterize and diagnose BODAS controllers. Machine values, parameters and diagnostic messages are displayed in plain text. This facilitates fast access to diagnostics. Parameters can be easily set, even without programming knowledge. With the integrated data logger, you can plot measured variables over time. This considerably simplifies optimization of the machine parameters. Password protection ensures that the machine operator has access to diagnostic facilities at all times while at the same time ensuring that no unauthorized changes can be made to parameters.

Programming with BODAS-design or BODAS C-API

BODAS-design is a development environment for the comfortable programming of BODAS controllers. You use this tool to create software on a graphical PC interface in the programming languages of the IEC61131-3 standard. BODAS-design supports you during this process with integrated simulation and debugging functions. Development documentation is generated automatically. In this way, you can quikkly and efficiently create custom and high-quality application software for BODAS controllers.
The BODAS C-API (C application interface) supplies you with predefined controller functions in a library. You can use these to easily transfer the programs written in C to BODAS controllers.

Development Accessories

For commissioning or machine diagnostics, you can use the measuring port to comfortably and easily measure all of the controller's electrical signals.
During the development of application software at the workplace, you can use the test box to simulate all of the BODAS controller's input and output signals.
You can use the BODAS Flashtool to load application software from the PC onto a BODAS controller via the serial or CAN interface.

Detailed information:

BODAS-service	RE 95085
BODAS-design	RE 95110
C-API	RE 95115
MA	RE 95090
TB	RE 95091
FT2	RE 95082
FT3	RE 95083

Parameterization, Diagnostics and Programming

Type	Designation
BODAS-service	PC software for parameterization and diagnostics
BODAS-design	Development environment according to IEC 61131-3
C-API	C application program interface

Accessories

Type	Designation
MA	Measuring port for controller signals
TB	Test box for software development
FT2 / FT3	Flashtool for downloading software

BODAS Sensors

As a component of the BODAS system, the sensors supply the controller with important machine and environment information. Sensors for mobile equipment must be able to withstand extreme ambient loads, particularly if installed near the hydraulic power packs and engines.
The sensors for different measured variables are based on robust, failsafe, usually contactless measurement principles.
The sensor elements are reliably integrated in suitable cases where they are protected against vibrations, impacts and harmful fluids, and are equipped with cables or plug connectors suitable for mobile use.

Features

- Matched to BODAS controllers and Rexroth mobile hydraulics
- High temperature range
- Short-circuit and reverse-connect protection (in some cases)
- High electromagnetic compatibility (EMC)
- High IP degree of protection for mobile use

Detailed information:

DSM	RE 95132
HDD	RE 95135
ID	RE 95130
PR2	RE 95138
WS1	RE 95140
TSF	RE 95180
TSA	RE 95181
TS	RE 95145
VS	RE 95148

Technical Data of the Sensors

Type	Measurement	Min. value	Max. value	Supply	Application (typical)
DSM	Speed	1 Hz	5000 Hz	12 V	Universal, use on wheels, installation in axial piston units and gear machines with direction of rotation detection and diagnostics
HDD	Speed	2 Hz	6000 Hz	8 ... 32 V	Installation in axial piston units, with direction of rotation detection
ID	Speed	500 Hz	4000 Hz	-	Detection of engine speed, installation in axial piston units without direction of rotation detection
PR2	Pressure	0...160 bar	0...600 bar	5 V	Universal
WS1	Angle	-	-45°...+45°	5 V	Universal
TSF	Temperature	-30°C	130°C	-	Universal for fluids
TSA	Temperature	-40°C	130°C	-	Universal for air
TS	Temperature	87°C	92°C	-	Temperature switch, universal
VS	Contamination	-	-	-	Universal, contamination switch for hydraulic fluids

BODAS Joysticks and Display

The display and electronic joysticks form the user interface in the BODAS system. The joysticks specify the setpoints and actions for the controllers. The display informs the operator of important machine and system data.

BODAS Joysticks

There are two different series available in the BODAS system for various applications:
The THE5 electronic joystick is designed for robust applications in mobile equipment and is used especially in earthmoving equipment. Due to its compact size, the EJ electronic joystick can be installed in arm rests and is, thus, particularly well suited for use in tractors and lift trucks.

Features of the Joystick

- Suitable for precision control of drive and work functions
- Internal sensors with contactless measurement principles
- Available with different grip types and grip configurations

BODAS Display

The BODAS display DI2 is used to display graphically process data, operating conditions, and alarm and event messages in mobile equipment. Using buttons, the operator can interact with the system and adapt it to the current ambient and working conditions by setting parameters. The BODAS display is designed for installation in the operating consoles of mobile equipment and is even designed to be resistant to steam jets on the front side.

Features of the Display

- Easy operation via function keys
- Application-specific functions can be programmed
- Integrated diagnostics and parameterization functions for BODAS controllers
- Backlighting
- CAN bus
- Front enclosure acc. to IP69K, suitable for mounting outside of the cabin

Detailed information:

THE5	RE 29881
EJ	on request
DI2	RE 95089

Technical Data of the Joysticks

Type	Grip	Output signals	Application (typical)
THE5	EC2000, EC2000+, EC4000	Voltage / PWM / CAN	Universal, earthmoving equipment
EJ	EC2000	CAN	Universal, tractors, lift trucks

Technical Data of the Displays

Type	Graphics	Number of buttons	Interface	Supply	Application (typical)
DI2	240 x 128 pixels	7	CAN 2.0B	8 ... 32 V	Universal, outdoor use

Analog Amplifier RA

The electronic analog amplifier is used to control up to two proportional solenoids and one switch function.
As input variable, the control voltage specified by a potentiometer is processed in the amplifier. As output variable, the analog amplifier returns a controlled electric current for controlling the proportional solenoids.
If the setpoint voltage at the input is increased, the output current for the respective proportional solenoids increases linearly. Time-ramp functions are implemented in the analog amplifier. These functions can be used to set the time within which the output current is adjusted to a changed setpoint.

The RA analog amplifiers are used to control one or two proportional solenoids, e.g. to control a reversible axial piston unit or a valve slice. Anywhere no complex operations and only a few inputs/outputs are needed, the RA analog amplifiers offer a very affordable alternative to digital controllers.
The amplifiers are parameterized via potentiometers directly at the device without additional tools.

Features

- Optional interlocking of the control of the proportional solenoids
- Separately adjustable time for up and down ramps for each solenoid
- Separately adjustable minimum and maximum currents for each solenoid
- Externally adjustable PWM frequency
- Power supply for external setpoint potentiometer
- Monitoring of the setpoint potentiometer for cable break and short circuit
- Externally controllable switched output
- Error output
- Overload protection, overvoltage protection, conditional short-circuit protection

Detailed information:
RA RE 95230

Technical Data of the Amplifiers

Type / series	Inputs			Outputs	
	Analog	Digital	Frequency	PWM	Digital
RA1-0/10	1	-	-	1	-
RA2-1/10	2	1	-	2	1

Electrohydraulic Hitch Control for Tractors EHR

The electrohydraulic hitch control for tractors is an optimized, complete system consisting of hydraulic and electronic components, specially developed for the harsh conditions experienced in agricultural use.

Features

- Different system configurations for tractors of different power classes
- EHR-B basic system with modified functionality for tractors with low and medium drive power
- SRC6-10 with CAN bus communication and the option for controlling additional functions
- The EHR5-OBE valve with integrated electronics (on-board electronics) is available as an alternative to the EHR-B and SRC6-10 controllers

Detailed information:

EHR control panel	RE 95255
KMB	RE 95170
AN1	RE 95142
PO1	RE 95160
PR2	RE 95138
EHR-B, SRC6-10	on request

EHR Components

Type	Designation	Min. value	Max. value	Supply
EHR control panel	Control panel	-	-	8 ... 12 V
KMB	Draft	25 kN	150 kN	8 ... 12 V
AN1	Angle sensor	+/- 17°	+/- 44°	5 ... 12 V
PO1	Position sensor	-	10 mm	5 ... 12 V
PR2	Pressure sensor	0...160 bar	250 bar	5 V
EHR-B, SRC6-10	Controller	-	-	8 ... 12 V

EHR Functions

Function	Controller with software	
	EHR-B	SRC6-10
Tractive effort, position and mixed control	•	•
External control (control of an attachment)		•
Pressure control		•
Anti-slip control in traction		•
Vibration damping	•	•
System diagnostics	•	•
Rear actuation	•	•
CAN bus	•	•
Flash programming via CAN	•	•
Alternative front/rear control		•
Simultaneous front/rear control		•

Electrohydraulic Header Height Control EMR

Supplementing the hydraulic systems with electronics and sensor systems increases the variety of uses and harvesting performance of combine harvesters. Complex controls make for greater safety and relieve the burden on the machine operator.

Functions

- Cutting table guided parallel to the ground
- Optional: Slope compensation of the cutting table EMR operation modes

Operating Modes of the EMR

1. Transport mode:
Active vibration damping of the cutting table while driving
2. Position control:
Cutting table is maintained in the preselected position
3. Distance control:
Cutting table is maintained at the preselected cutting height
4. Ground pressure control:
Cutting table is guided over the ground with fixed contact pressure

Detailed information:

AN1	RE 95142
PO1	RE 95160
PR2	RE 95138
SRC6-10	on request

EMR Components

Type	Designation	Min. value	Max. value	Supply
AN1	Angle sensor	+/- 17°	+/- 44°	5 ... 12 V
PO1	Position sensor	-	10 mm	5 ... 12 V
PR2	Pressure sensor	0...160 bar	250 bar	5 V
SRC6-10	Controller	-	-	12 V ±30%

Automatic Fan Control AFC

The AFC digital electronic fan control is a BODAS system solution for the easily adjustable control of hydrostatic fan drives. The BODAS RC controller controls one or two fan drives as a function of up to four temperature values and up to four digital inputs. The temperature values are recorded via sensors or via the CAN bus with the SAE J1939 protocol. Compared to standard solutions, the AFC considerably reduces energy requirements, noise emissions, fuel consumption and exhaust values. The control behavior can be influenced via the switch signals.

The integrated reversing function is used to reverse the direction of rotation of the fan motor for a short, adjustable period of time. This can be used in the case of very dusty ambient air to blow the cooler clear and restore optimal cooling performance. The cold-running phase of the combustion engine is reduced considerably by the standstill function. This further reduces fuel consumption and emissions.

The AFC fan control is perfectly matched to the Rexroth A10VO variable pump with ED electrohydraulic pressure control and one fixed motor. It is equipped with a fail-safe function which brings the fan motor to full speed in the event of faults, thereby safely preventing overheating of the combustion engine.

Diagnostics and parameterization of the system can be easily performed on site with the BODAS-service PC software.

Detailed information:

TSF	RE 95180
TSA	RE 95181
RC2-2/21	RE 95221
AFC	RE 95360

AFC Components

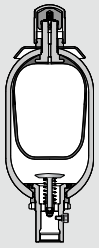
Type	Designation	Min. value	Max. value	Supply
TSF	-	-30°C	130°C	-
TSA	-	-40°C	130°C	-
RC2-2/21	Controller	-	-	12 or 24V ±30%
AFC20	Application software	-	-	-

Accumulators

Hydraulic accumulators are used above all to minimize the pump drive power, to equalize volumes, to smooth pressure peaks, to store energy and to dampen pulsation.

Characteristics:
- Bladder accumulators from 1 to 50 l
- Diaphragm accumulators from 0.075 to 3.5 l
- Safety and shutoff block
- Charging and testing devices
- Fixing elements
- Safety elements
- Accumulator charging valve

Hydropneumatic Accumulators and Accumulator Accessories



Hydropneumatic Accumulators

- Bladder or diaphragm accumulators
- Charging and testing devices
- Fixing elements
- Safety elements
- Type and pressure test certificates according to pressure vessel directive 97/23/EC

Accumulator Charging Valve

- Disconnection of a fixed pump
- 2 pressure settings
- Plate connection size 6

Accumulator, Safety and Shutoff Blocks

Sizes 20 and 30

- Safeguarding, shutting off and relieving hydraulic accumulators
- Fulfill the requirements and safety regulations specified by DIN 24 552 and pressure vessel directive 97/23/EC
- Type-tested safety valves
- Electrical or manual relief valve

Safety Valves

Type examination according to TÜV

- Type-tested safety valves
- For safeguarding hydraulic accumulators
- Acceptance testing according to pressure vessel directive 97/23/EC

Detailed information:

Diaphragm accumulators	RE 50150
Bladder accumulators	1987761403
Safety valves	RE 50153

Hydropneumatic accumulators				
Accumulator type		Bladder accumulators		Diaphragm accumulators
Volume	L	1 to 50		0.075 to 3.5
Accumulator, safety and shutoff blocks				
Size			**20**	**30**
Operating pressure	p_{max}	bar	350	350
Weight	m	kg	6	14,7
Safety valves				
Operating pressure	p_{max}	bar	360	
Blow-off flow		l/min	up to 150	
Accumulator charging valve				
Size			**6**	
Operating pressure	p_{max}	bar	315	
Weight	m	kg	40	

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