

Hydraulic Components for industrial applications


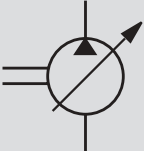
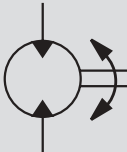
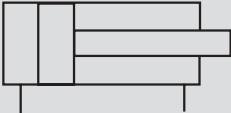
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The Drive & Control Company



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Pumps, motors and cylinders

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GENERAL

Designation	Data sheet no.
Sales and service organisation	02 000
List of data sheets (RR)	01 200
List of data sheets	1 987 760 051
Installation, commissioning and maintenance	
Installation, commissioning and maintenance of pumps and motors	07 080
Installation, commissioning and maintenance of cylinders	07 100 ¹⁾
Hydraulic fluids	
Hydraulic fluids based on mineral oil for pumps and motors	07 075
Hydraulic fluids based on mineral oil for axial piston units	90 220
Environmentally friendly hydraulic fluids for axial piston units	90 221
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¹⁾ = Documentation on enquiry

PUMPS

Axial piston pumps

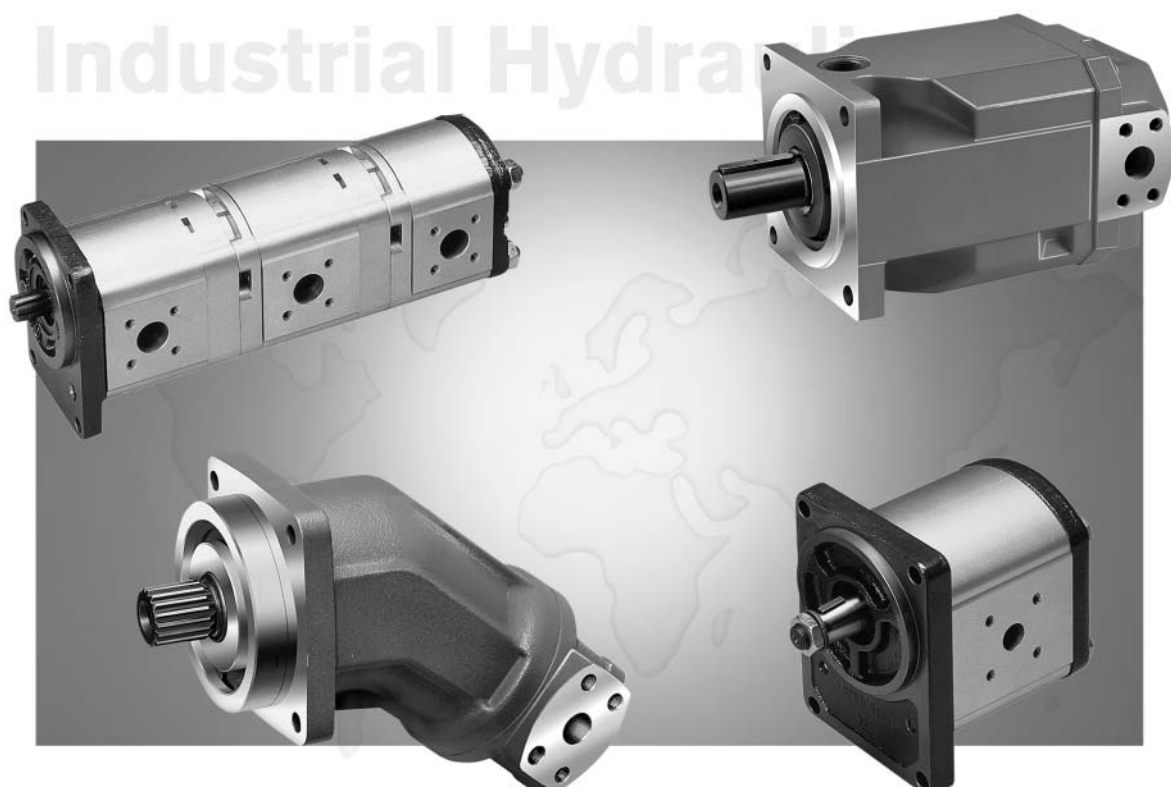
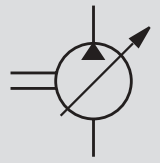
Axial piston pumps are available in swashplate and bent-axis design for the medium and high-pressure range.

Variations in the design, in the performance range and in open and closed-loop control options ensure optimum solutions for stationary applications.

External gear pumps

Gear pumps are "classics" in the field of hydraulics.

Single pumps, multiple pumps and low-noise double pumps in five series offer an almost unlimited number of possible applications.



PUMPS

Internal gear pumps

Internal gear pumps can be used for continuous pressures of up to 315 bar (depending on frame size). Their compact build ensures an excellent high power density and minimum space requirement.

Vane pumps

The vane pump series with variable displacement is mainly used in the lower to medium pressure range.

Radial piston pumps

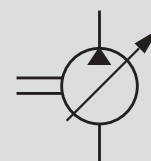
Radial piston pumps are used for high-pressure applications (operating pressures above 400 bar). They are valve-controlled, self-aspirating fixed-displacement pumps.

Industrial Hydraulics



PUMPS

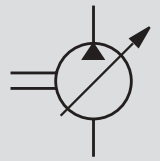
Axial piston units



Designation	Type	Size	Data sheet no.
Fixed displacement axial piston pumps			
Fixed displacement pump, open circuit	A2FO	5...1000	91 401
Fixed displacement pump, open circuit	A4FO	16...500	91 455
Variable displacement axial piston pumps			
Variable displacement pump, open circuit, swashplate	A4VSO	40...1000	92 050
Variable displacement pump, open circuit, swashplate	A10VSO	10	92 713
Variable displacement pump, open circuit, swashplate	A10VSO	18	92 712
Variable displacement pump, open circuit, swashplate	A10VSO	28...140	92 711
Variable displacement pump, open and closed circuit, bent axis	A7VO	55...160	92 202
Variable displacement pump, open and closed circuit, bent axis	A7VO	250...1000	92 203
Variable displacement pump, closed circuit, swashplate	A4VSG	40...1000	92 100
Variable displacement pump, closed circuit, swashplate	A4VB	450; 675	92 120
Variable displacement pump, open circuit		35...130	1 987 760 214
Controllers for A4VS...			
Controller	DR; DP; FR; DFR	40...1000	92 060
Controller	LR2; LR3	40...1000	92 064
Controller	MA; EM	40...500	92 072
Controller	HM; HS; EO	40...1000	92 076
Controller	HD	40...750	92 080
Controllers for A10VSO...			
Controller	ED; EDS; EDP; EDU	18...140	92 707

PUMPS

Gear, vane and radial piston pumps



Designation	Type	Size	Series	Data sheet no.
Gear pumps				
Gear pump, internal toothing, fixed displacement	PGF	1.7...40	2X; 3X	10 213
Gear pump, internal toothing, fixed displacement	PGH	6...250	2X	10 223
Vane pumps				
Vane pump, fixed displacement	PVV; PVQ	18...193	1X	10 335
Vane pump, direct controlled, variable displacement	PV7...A	10...25	1X; 2X	10 522
Vane pump, hydraulic closed-loop control, variable displacement	PV7...C/D	14...150	1X	10 515
Vane pump, direct controlled, variable displacement		16...164		1 987 760 310
Vane pump, direct controlled, variable displacement		16...32		1 987 760 304
Vane pump, direct controlled, variable displacement		8...67		1 987 760 311
Radial piston pumps				
Radial piston pump, fixed displacement (Mini)	R4	0.40...2.00	1X	11 260
Radial piston pump, fixed displacement (Standard)	R4	1.60...20.00	1X	11 263
Pump-motor group				
Pump-motor module	MPM			10 530
Pump-motor assembly	ABAPG			51 062

MOTORS

Axial piston motors

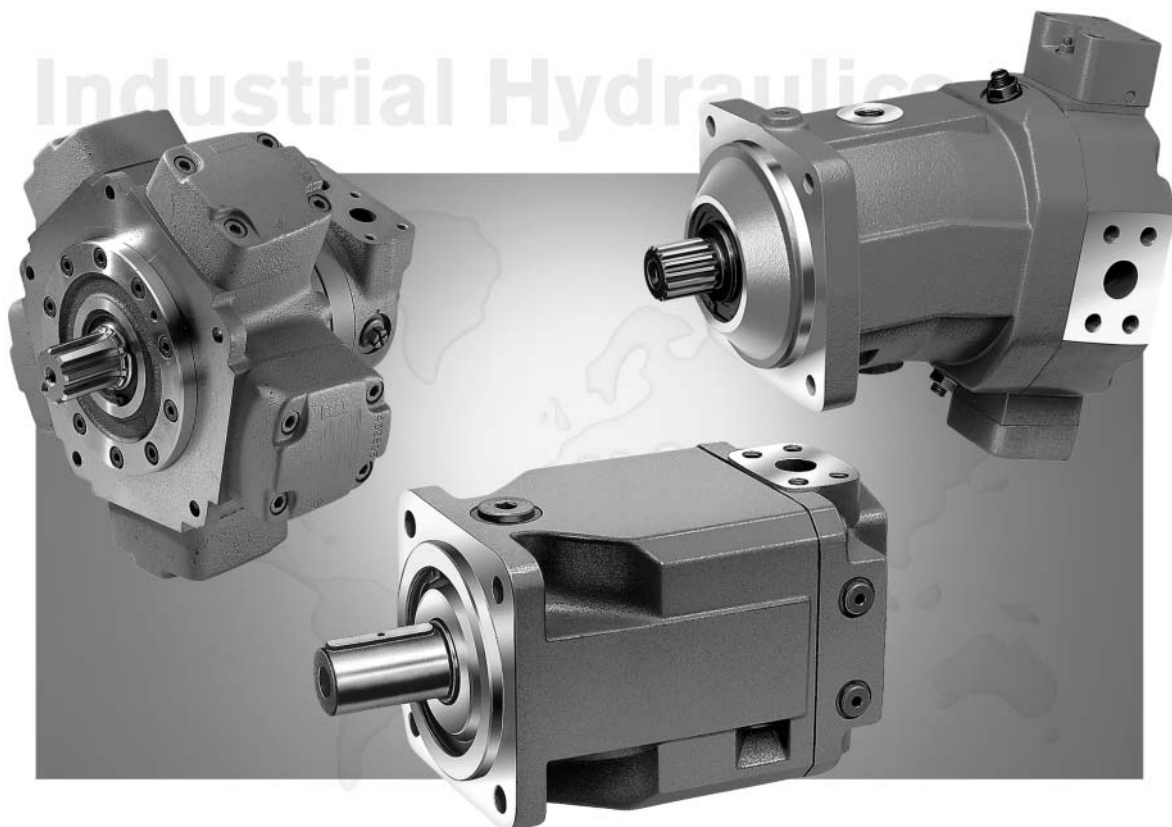
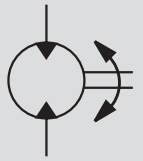
Axial piston motors are available in swashplate and bent-axis design for the medium and high-pressure range.

Our hydrostatic drives for stationary applications are characterised by their robustness, reliability, long service life, low noise emission and high economic and technical efficiency.

Radial piston eccentric motors

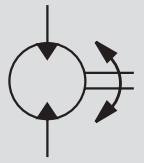
Radial piston eccentric motors of type MR.. are externally pressurised hydraulic motors with fixed displacement.

The direction of rotation is optionally clockwise, anti-clockwise or reversible.



MOTORS

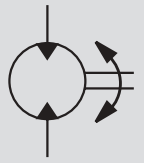
Axial piston units



Designation	Type	Size	Data sheet no.
Axial piston fixed displacement motors			
Fixed displacement motor	A2FM	5...1000	91 001
Fixed displacement motor	A4FM	22...500	91 120
Fixed displacement motor	A10FM	10...63	91 172
Plug-in fixed displacement motors			
Fixed displacement motor	A4FP	40...750	91 125
Fixed displacement motor	A10FP	18	91 175
Axial piston variable displacement motors			
Variable displacement motor	A6VM	28...1000	91 604
Variable displacement motor	A6VE	28...250	91 606
Two-speed motors			
Two-speed motor	A10VM	28...85	91 703

MOTORS

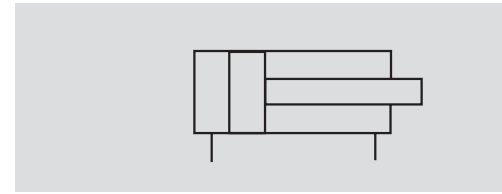
Planetary gear motors (positioning motors) and radial piston eccentric motors



Designation	Type	Size	Data sheet no.
Planetary gear motors (positioning motors)			
Fixed displacement motor	GMRP	50...320	14 355
Radial piston eccentric motors			
Fixed displacement motor	MRT; MRTE	71...108	15 224
Fixed displacement motor	MR; MRE	160...8500	15 228

CYLINDERS

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

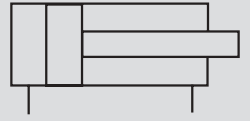


Industrial Hydraulics



CYLINDERS

Tie rod design

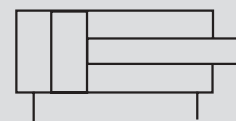


Designation	Type	Size	Series	p_{\max} in bar	Data sheet no.
Tie rod cylinder	CDT3...F	25...200	1X	160	17 039
Tie rod cylinder	CD70	25...200	1X	70	17 016 ¹⁾
Tie rod cylinder	CD210	40...200	1X	210	17 017
Tie rod cylinder with integrated position measuring system	CDW160	40...200	1X	160	17 014
Accessories					
Mounting elements					17 042

¹⁾ = Technical documentation on enquiry

CYLINDERS

Mill type design



Designation	Type	Size	Series	p_{\max} in bar	Data sheet no.
Mill type cylinder	CDL1	25...200	1X	160	17 325
Mill type cylinder	CDM1	25...200	1X	160	17 328
Mill type cylinder	CDH1	40...320	1X; 2X	250	17 331
Mill type cylinder	CDH2	40...320	1X	250	17 334
Mill type cylinder	CDH3	40...320	1X; 2X	350	17 337
Accessories					
Mounting elements					17 042

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GENERAL

Designation	Data sheet no.
Sales and service organisation	02 000
List of data sheets (RR)	01 200
List of data sheets	1 987 760 051
Installation, commissioning and maintenance	
Installation, commissioning and maintenance of industrial valves	07 300
Installation, commissioning and maintenance of hydraulic systems	07 900

SWITCHING VALVES

Directional valves for subplate mounting

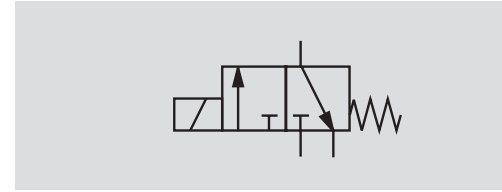
For rational use in production machines we offer direct and pilot operated directional valves with pressure-tight solenoids for subplate mounting.

Pressure control, flow and isolator valves

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

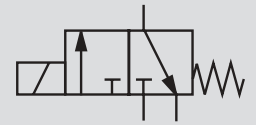
2-way cartridge valves (logic elements)

2-way cartridge valves are elements designed for compact block constructions. The power part is installed in a mounting cavity standardised to DIN ISO 7368 and closed with a cover.



SWITCHING VALVES

Isolator valves

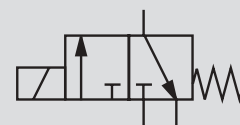


Designation	Type	Size	Series	p_{max} in bar	Data sheet no.	
Check valves, direct operated						
In-line installation	S	6...30	1X	315	20 375	●
Cartridge valve	M-SR	6...30	1X	315	20 380	●
Sandwich plate valve	Z1S	6	3X	315	21 533	●
Sandwich plate valve	Z1S	10	3X	315	21 536	●
Check valves, pilot operated						
Subplate mounting	SV; SL	6	6X	315	21 460	●
Subplate mounting		6; 10; 25			1 987 760 711	
Subplate mounting; threaded connection	SV; SL	10...32	4X	315	21 468	●
Sandwich plate valve	Z2S	6	6X	315	21 548	●
Sandwich plate valve	Z2S	10	3X	315	21 553	●
Sandwich plate valve	Z2S	16	5X	315	21 558	●
Sandwich plate valve	Z2S	22	5X	315	21 564	●
Sandwich plate valve	Z2SRK	6	1X	210	21 543	●
Sandwich plate valve	Z2SRK	10	1X	210	21 549	●
Sandwich plate valve		6; 10			1 987 761 012	
Pre-fill valves						
Flanged and threaded connection	SFA	32...80	1X	350	20 485	●
Flanged connection; tank installation; cartridge valve	SF	125...400	4X	350	20 482	●
Sandwich plate valve	ZSF; ZSFW	32...160	1X	350	20 478	●

● = Preferred product range

SWITCHING VALVES

Directional valves



Designation	Type	Size	Series	p_{max} in bar	Data sheet no.	
Directional poppet valves, direct operated						
Electrically operated; DC and AC voltage, wet-pin; subplate mounting	M-.SED	6	1X	350	22 049	●
Electrically operated; DC and AC voltage, wet-pin; subplate mounting	M-.SED	10	1X	350	22 045	●
Electrically operated; DC and AC voltage, air-gap; subplate mounting	M-.SEW	6	3X	420; 630	22 058	●
Electrically operated; DC and AC voltage, air-gap; subplate mounting	M-.SEW	10	1X	420; 630	22 075	●
2/2 directional poppet valve, solenoid operation; cartridge valve	KSDER1	1	A	350	18 136-02	●
3/2 directional poppet valve, solenoid operation; cartridge valve	KSDER1	1	A	350	18 136-03	●
Solenoid poppet valve; cartridge valve					1 987 761 116 ¹⁾	
Directional spool valves, direct operated						
Fluidic operation; subplate mounting	WH; WP	6	5X	315	22 282	●
Mechanical, manual, fluidic operation; subplate mounting	WN; WP; WHD; WM.	10	3X	315	22 331	●
Mechanical, manual operation; subplate mounting	WM.	6	5X	315	22 280	●
Mechanical, manual operation; 5-chamber version; subplate mounting	5-.WMR	10	1X	315	22 312 ¹⁾	●
Mechanical, manual operation; subplate mounting	WMM	16; 25	7X	350	22 371	●
Electrically operated; DC voltage wet-pin; subplate mounting	WE...S	6	6X	315	23 163	●
Electrically operated; AC and DC voltage, wet-pin; subplate mounting		6			1 987 760 610 ¹⁾	

● = Preferred product range

¹⁾ = Technical documentation on enquiry

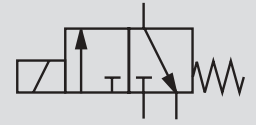
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Designation	Type	Size	Series	p_{max} in bar	Data sheet no.	
Directional spool valves, direct operated						
Electrically operated; AC and DC voltage, wet-pin; subplate mounting	WE...E	6	6X	350	23 178	●
Electrically operated; DC voltage, wet-pin; smoothly switching ; subplate mounting	WE...73	6; 10	3X; 6X	315; 350	23 183	●
Electrically operated; AC and DC voltage, wet-pin; subplate mounting	WE.../C	10	3X; 4X	315	23 327	●
Electrically operated; AC and DC voltage, wet-pin; 5-chamber version; subplate mounting	5-.WE	10	3X	315	23 351	●
Electrically operated; AC and DC voltage, wet-pin; 5-chamber version; subplate mounting		10			1 987 760 611	
Valve with position switch		6; 10			1 987 761 104	
2/2 directional spool valve, solenoid operation; cartridge valve	KKDER1	1	A	350	18 136-06	●
3/2 directional spool valve, solenoid operation; cartridge valve	KKDER1	1	A	350	18 136-04	●
4/2 directional spool valve, solenoid operation; cartridge valve	KKDER1	1	A	350	18 136-05	●
Electrically operated; AC and DC voltage, wet-pin; shut-off valve; sandwich plate valve	Z4WE	6	3X	315	23 193	
Electrically operated; DC voltage, air-gap; shut-off valve; sandwich plate valve		6; 10			1 987 761 012	
Directional spool valves, pilot operated						
Electrohydraulic operation; AC and DC voltage, wet-pin; subplate mounting	WEH; WH	10...32		350	24 751	●
Electrically operated; AC and DC voltage, wet-pin; subplate mounting		10...25			1 987 760 603	
Valve with position switch		16; 25			1 987 761 104	
Electrohydraulic operation; AC and DC voltage, wet-pin; sandwich plate valve	Z4WEH	10	5X	315	24 755	
Accessories						
Accessories for 4/3, 4/2 and 3/2 directional valves	WE; WEH; WH	6...102	1X		24 830	●

● = Preferred product range

SWITCHING VALVES

Pressure valves



Designation	Type	Size	Series	p_{max} in bar	Data sheet no.
Pressure relief valves, direct operated					
Cartridge valve; subplate mounting; threaded connection	DBD	6...30	1X	630	25 402 ●
Cartridge valve; subplate mounting; threaded connection, cartridge valve					1 987 760 711 1 987 761 403
Sandwich plate valve		6; 10			1 987 761 012
Pressure relief valves, pilot operated					
Subplate mounting; threaded connection	DB; DBW	10...32	5X	350	25 802 ●
Cartridge valve; subplate mounting; threaded connection	DB; DBW	10; 25	1X; 4X	350	25 818 ●
Cartridge valve	DB.K	6; 10	4X	315	25 731 ●
Sandwich plate valve	ZDB; Z2DB	6	4X	315	25 751 ●
Sandwich plate valve	ZDB; Z2DB	10	4X	315	25 761 ●
Sandwich plate valve	ZDBK; Z2DBK	6	1X	210	25 754 ●
Sandwich plate valve	ZDBK; Z2DBK	10	1X	210	25 764 ●
Pump safety block	DBA(W); DBAE; 16; 25; 32		2X	350	25 890 ●
Pump safety block	DBA; DBAW;	32; 40	1X	420	25 880 ●
Subplate mounting		6; 10			1 987 760 711
Sandwich plate valve		6; 10			1 987 761 012

● = Preferred product range

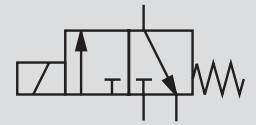
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Designation	Type	Size	Series	p_{max} in bar	Data sheet no.	
Pressure reducing valves, direct operated						
Subplate mounting	DR.DP	6	5X	315	26 564	●
With pressure monitoring; subplate mounting	DRHD; ZDRHD	6	4X	200	26 576	
Subplate mounting	DR.DP	10	4X	210	26 580	●
Sandwich plate valve	ZDR.D	6	4X	210	26 570	●
Sandwich plate valve	ZDR.D	10	5X	210	26 585	●
Subplate mounting		6; 10; 25			1 987 760 711	
Sandwich plate valve		6			1 987 761 012	
Pressure reducing valves, pilot operated						
Subplate mounting; threaded connection	DR	10...32	5X	350	26 892	●
Cartridge valve; subplate mounting; threaded connection	DR	10; 25	1X; 4X	315	26 893	●
Cartridge valve	DR.K	10	3X	315	26 850	●
Sandwich plate valve	ZDR	10	3X	315	26 861	●
Sandwich plate valve	ZDRK	6	1X	210	26 572	●
Sandwich plate valve	ZDRK	10	1X	210	26 864	●
Subplate mounting		10; 25			1 987 760 711	
Sandwich plate valve		10			1 987 761 012	
Pressure sequencing valves, direct operated						
Subplate mounting	DZ.DP	6	5X	315	26 076	●
Subplate mounting	DZ.DP	10	4X	210	26 099	●
Pressure sequencing valves, pilot operated						
Subplate mounting	DZ	10; 25; 32	5X	315	26 391	●
Subplate mounting		10; 25			1 987 760 711	
Pressure shut-off valves, pilot operated						
Cartridge valve; subplate mounting	DA.V	6	4X	315	26 404	●
Subplate mounting	DA; DAW	10; 25; 32	5X	315	26 411	●
Subplate mounting		10; 25			1 987 760 711	

● = Preferred product range

SWITCHING VALVES

Flow valves

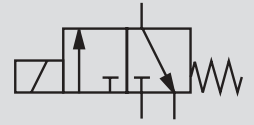


Designation	Type	Size	Series	p_{max} in bar	Data sheet no.	
Throttle valves						
Throttle and throttle check valve; in-line installation	MG; MK	6...30	1X	315	27 219	●
Double throttle check valve; sandwich plate valve	Z2FS	6	4X	315	27 506	●
Double throttle check valve; sandwich plate valve	Z2FS	10	3X	315	27 518	●
Double throttle check valve; sandwich plate valve	Z2FS	16	3X	350	27 526	●
Double throttle check valve; sandwich plate valve	Z2FS	25	3X	350	27 536	●
Double throttle check valve; sandwich plate valve	Z2FSK	6	1X	210	27 510	●
Double throttle check valve; sandwich plate valve	Z2FSK	10	1X	210	27 524	●
Double throttle check valve; sandwich plate valve		6; 10			1 987 761 012	
Throttle and throttle check valve		6			1 987 760 711	
Fine throttle valve; subplate mounting; threaded connection;	F	5; 10	2X; 3X	210	27 761	●
Flow control valves						
2-way version; rotary-knob operation and rectifier sandwich plate	FRM; Z4S	6	3X	315	28 163	●
2-way version; subplate mounting and rectifier sandwich plate	FR.; Z4S	10; 16	3X; 2X	315	28 389	●
2-way version; cartridge valve	FRM.K	6	1X	315	28 155	●
2-way version; sandwich plate valve	Z2FRM	6	2X	315	28 164	●

● = Preferred product range

SWITCHING VALVES

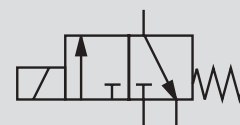
2-way cartridge valves (logic elements)



Designation	Type	Size	Series	p_{max} in bar	Data sheet no.
2-way cartridge valve directional functions	LC; LFA	16 ... 160	2X; 6X; 7X	420	21 010 ●
2-way cartridge valve pressure functions (DB, DZ, DR)	LC; LFA	16 ... 160	6X; 7X	420	21 050 ●
2-way cartridge valve; directional, pressure function		10 ... 50			1 987 761 105
Valve with position switch		16 ... 50			1 987 761 104

SWITCHING VALVES

Accessories, connecting elements



Designation	Type	Size	Data sheet no.
Plug-in connectors			
Plug-in connectors	(RR)		08 006
Plug-in connectors			08 008
Subplates			
Porting pattern to DIN 24 340 form A and C, ISO 4401	(RR)	4	45 050
Porting pattern to DIN 24 340 form A, ISO 4401 and CETOP-RP 121 H	(RR)	6	45 052
Porting pattern to DIN 24 340 form A, ISO 4401 and CETOP-RP 121 H		6	45 053
Porting pattern to DIN 24 340 form A, ISO 4401 and CETOP-RP 121 H	(RR)	10	45 054
Porting pattern to DIN 24 340 form A, ISO 4401 and CETOP-RP 121 H		10	45 055
Porting pattern to DIN 24 340 form A, ISO 4401 and CETOP-RP 121 H	(RR)	16	45 056
Porting pattern to DIN 24 340 form A, ISO 4401 and CETOP-RP 121 H		16	45 057
Porting pattern to DIN 24 340 Form A, ISO 4401 and CETOP-RP 121 H	(RR)	25	45 058
Porting pattern to DIN 24 340 form A, ISO 4401 and CETOP-RP 121 H		25	45 059
Porting pattern to DIN 24 340 form A, ISO 4401 and CETOP-RP 121 H	(RR)	32	45 060
Porting pattern to DIN 24 340 form D, ISO 5781 and CETOP-RP 121 H	(RR)	10; 16; 25	45 062
Porting pattern to DIN 24 340 form E, ISO 6264 and CETOP-RP 121 H	(RR)	10; 16; 25	45 064
Porting pattern to DIN 24 340 form G, ISO 6263 and CETOP-RP 121 H	(RR)	10; 16	45 066

Table of contents of hydraulic components

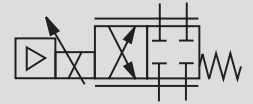
Servo, proportional and high-response valves: Directional, pressure and flow valves

GENERAL

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01

SERVO, PROPORTIONAL AND HIGH-RESPONSE VALVES



Proportional directional valves

02

Proportional pressure valves

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Proportional flow valves

04

High-response valves

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Servo directional valves

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Accessories

07

GENERAL

Designation	Data sheet no.
Sales and service organisation	02 000
List of data sheets (RR)	01 200
List of data sheets	1 987 760 051
Installation, commissioning and maintenance	
Installation, commissioning and maintenance of servo and high-response valves	07 700
Installation, commissioning and maintenance of proportional valves	07 800
Installation, commissioning and maintenance of hydraulic systems	07 900

SERVO, PROPORTIONAL AND HIGH-RESPONSE VALVES

Proportional valves

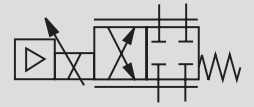
Today, many controls would be unthinkable without proportional valves with integrated control electronics. They reduce the cabling effort and simplify handling – while offering exact reproducibility and high switching performance.

High-response valves

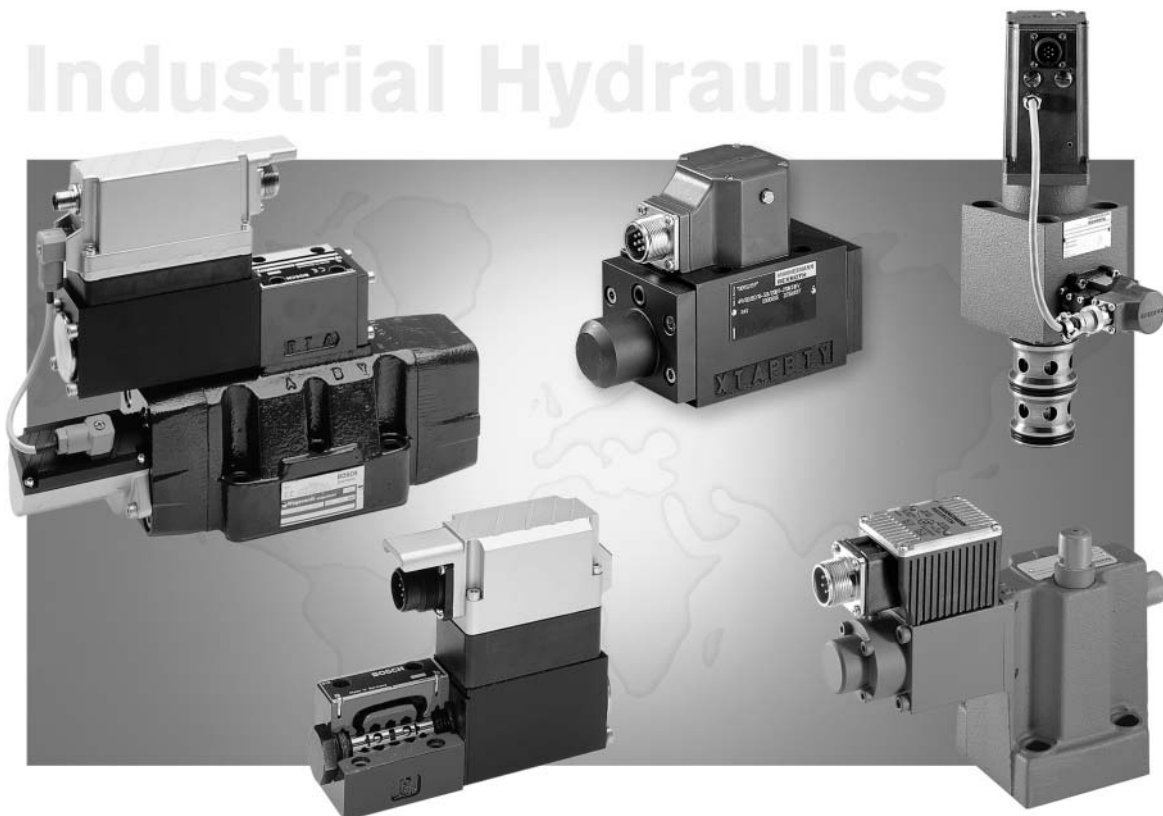
High-response valves are compact and robust, they are convincing through their high dynamics and control accuracy. The core product of size 6 can be optionally combined with main stages – with nominal flows of up to 1000 l.

Servo directional valves

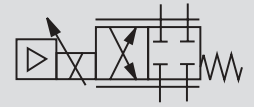
Servo-valves are hydraulically pilot operated 2- or 3-stage directional valves with porting pattern to DIN 24 340 form A. They are mainly used for closed-loop position, force or pressure and velocity controls.



Industrial Hydraulics



SERVO, PROPORTIONAL AND HIGH-RESPONSE VALVES

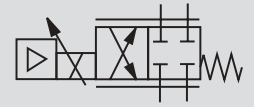


Proportional directional valves

Designation	Type	Size	Series	p_{max} in bar	Data sheet no.	
Direct operated						
Without electrical position feedback; with integrated control electronics	4WRA(E)	6; 10	2X	315	29 055	●
With electrical position feedback; and integrated control electronics	4WRE(E)	6; 10	2X	315	29 061	●
Integrated control electronics; with electrical position feedback; spool position monitoring	4WREEM	6; 10	2X	315	29 064	●
Without electrical position feedback; cartridge valve	KKDSR1	1	A	350	18 139-02	●
With / without electrical position feedback; with / without integrated control electronics		6...10			1 987 761 317	
Pilot operated						
With electrical position feedback	4WRKE	10...25	3X	350	29 075	●
Without electrical position feedback; and integrated control electronics	WRZ(E); WRH	10...52	7X	315; 350	29 115	●
With / without electrical position feedback; with / without integrated control electronics		10...50			1 987 761 328	

● = Preferred product range

SERVO, PROPORTIONAL AND HIGH-RESPONSE VALVES

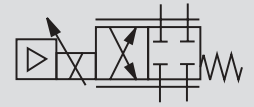


Proportional pressure valves

Designation	Type	Size	Series	p_{\max} in bar	Data sheet no.	
Pressure relief valves, direct operated						
Without electrical position feedback	DBEP	6	1X	100	29 164	●
Without electrical position feedback	DBET(E)	6	5X	350	29 165	
With / without electrical position feedback; with / without integrated control electronics		6...10			1 987 761 317	
Pressure relief valves, pilot operated						
Without electrical position feedback	(Z)DBE; (Z)DBEE	6	1X	315	29 158	●
Without electrical position feedback	DBE(M); DBE(M)E	10; 25	5X	350	29 160	●
Without electrical position feedback	DBE; DBEM	32	3X	350	29 142	●
Pressure reducing valves, direct operated						
Without electrical position feedback	3DREP(E)	6	2X	100	29 184	●
Without electrical position feedback	KBPS				18 139-03	●
With / without electrical position feedback; with / without integrated control electronics		6...10			1 987 761 317	
Pressure reducing valves, pilot operated						
Without electrical position feedback	(Z)DRE	6	1X	210	29 175	●
Without electrical position feedback	ZDRE(E)	10	1X	350	29 179	●
Without electrical position feedback	DRE(M); DRE(M)E	10; 25	5X	315	29 176	●
Without electrical position feedback	DRE(M); DRE(M)E	32	4X	315	29 178	●
Without electrical position feedback	3DRE(M); 3DRE(M)E	10; 16	6X	315	29 186	●

● = Preferred product range

SERVO, PROPORTIONAL AND HIGH-RESPONSE VALVES

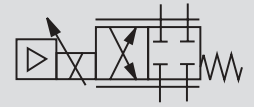


Proportional flow valves

Designation	Type	Size	Series	p_{\max} in bar	Data sheet no.	
2-way throttle valves (cartridge valves)						
Pilot operated throttle valve; with electrical position feedback	2FES(E)	25...63	3X	315	29 209	●
2- and 3-way high-response valves (cartridge valves)						
Pilot operated high-response valve; with electrical position feedback	2WRC; 3WRC	32...160	1X	420	29 135	●
Pilot operated high-response valve; with electrical position feedback	2WRCE; 3WRCE	32...50	2X	420	29 136	●
Pilot operated high-response valve; with electrical position feedback	3FERE	25...50	3X	315	29 218	
2-way flow control valves (subplate mounting)						
Direct operated; with electrical position feedback	2FRE	6	2X	210	29 188	●
Direct operated; with electrical position feedback	2FRE	10; 16	4X	315	29 190	●
2-way; direct operated; with / without electrical position feedback; with / without integrated control electronics			6...10		1 987 761 317	

● = Preferred product range

SERVO, PROPORTIONAL AND HIGH-RESPONSE VALVES

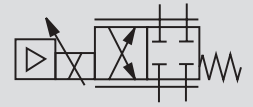


High-response valves

Designation	Type	Size	Series	p_{max} in bar	Data sheet no.	
Direct operated						
With electrical position feedback	4WRSE	6; 10	3X	315	29 067	
With electrical position feedback	4WRSEH	6; 10	3X	315	29 069	
With electrical position feedback (Lvdt DC/DC)	4WRPH	6	2X	315	29 026	●
With electrical position feedback (Lvdt DC/DC, +/- 10 V)	4WRPH	6	2X	315	29 028	●
With electrical position feedback (Lvdt AC/AC)	4WRPH	6	1X	250	29 030	●
With electrical position feedback (Lvdt DC/DC, +/- 10 V)	4WRPH	10	2X	315	29 032	●
With integrated electronics (OBE)	4WRPEH	6	2X	315	29 035	●
With integrated electronics (OBE)	4WRPEH	10	2X	315	29 037	●
With integrated electronics (OBE)	4WRREH	6	1X	315	29 041	●
With electrical position feedback (Lvdt DC/DC, +/- 10 V)	5WRP	10	2X	210	29 043	●
With integrated electronics (OBE)	5WRPE	10	2X	210	29 045	●
With / without electrical position feedback; with / without electrical control electronics		6...10			1 987 761 323	
Pilot operated						
With electrical position feedback	4WRGE	10; 16; 25	1X	315	29 070	●
With integrated electronics (OBE)	4WRVE	10; 16; 25	2X	350	29 077	●
With electrical position feedback (Lvdt DC/DC, +/- 10 V)	4WRL	10...32	3X	315	29 086	●
With integrated electronics (OBE)	4WRLE	10...32	3X	350	29 088	●
With electrical position feedback	4WRDE	10...32	5X	350	29 093	●

● = Preferred product range

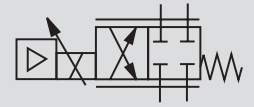
SERVO, PROPORTIONAL AND HIGH-RESPONSE VALVES



Servo directional valves

Designation	Type	Size	Series	p_{\max} in bar	Data sheet no.	
Two-stage; mechanical feedback	4WS2E	6	2X	315	29 564	●
Two-stage; mechanical, electrical and mechanical feedback	4WS2E	10	5X	315	29 583	●
Two-stage; optionally electrical position feedback; DIN porting pattern	4WS2E	16	2X	210/315	29 591	●
Three-stage; with electrical position feedback	4WSE3EE	16; 25; 32	1X; 2X; 4X	315	29 595	●

SERVO, PROPORTIONAL AND HIGH-RESPONSE VALVES




Accessories

Designation	Type	Size	Series	p_{\max} in bar	Data sheet no.
Subplates					
Porting pattern to DIN 24 340 form A, ISO 4401 and CETOP-RP 121 H	(RR)	6			45 052
Porting pattern to DIN 24 340 form A, ISO 4401 and CETOP-RP 121 H		6			45 053
Porting pattern to DIN 24 340 form A, ISO 4401 and CETOP-RP 121 H	(RR)	10			45 054
Porting pattern to DIN 24 340 form A, ISO 4401 and CETOP-RP 121 H		10			45 055
Porting pattern to DIN 24 340 form A, ISO 4401 and CETOP-RP 121 H	(RR)	16			45 056
Porting pattern to DIN 24 340 form A, ISO 4401 and CETOP-RP 121 H		16			45 057
Porting pattern to DIN 24 340 form A, ISO 4401 and CETOP-RP 121 H	(RR)	25			45 058
Porting pattern to DIN 24 340 form A, ISO 4401 and CETOP-RP 121 H		25			45 059
Porting pattern to DIN 24 340 form A, ISO 4401 and CETOP-RP 121 H		32			45 060
Porting pattern to DIN 24 340 form D, ISO 5781 and CETOP-RP 121 H		10; 16; 25			45 062
Porting pattern to DIN 24 340 form E, ISO 6264 and CETOP-RP 121 H		10; 16; 25			45 064
Porting pattern to DIN 24 340 form G, ISO 6263 and CETOP-RP 121 H		10; 16			45 066
Pressure compensators					
Meter-in pressure compensator; sandwich plate version	ZDC	10 ... 32	2X	350	29 224 ●

● = Preferred product range

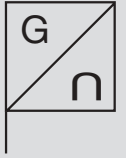
Table of contents of electronic components Amplifiers and electrohydraulic systems

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Amplifiers		02
Electrohydraulic systems		03
Accessories		04

GENERAL

Designation	Data sheet no.
Sales and service organisation	02 000
List of data sheets (RR)	01 200
List of data sheets	1 987 760 051

ELECTRONIC COMPONENTS AND SYSTEMS

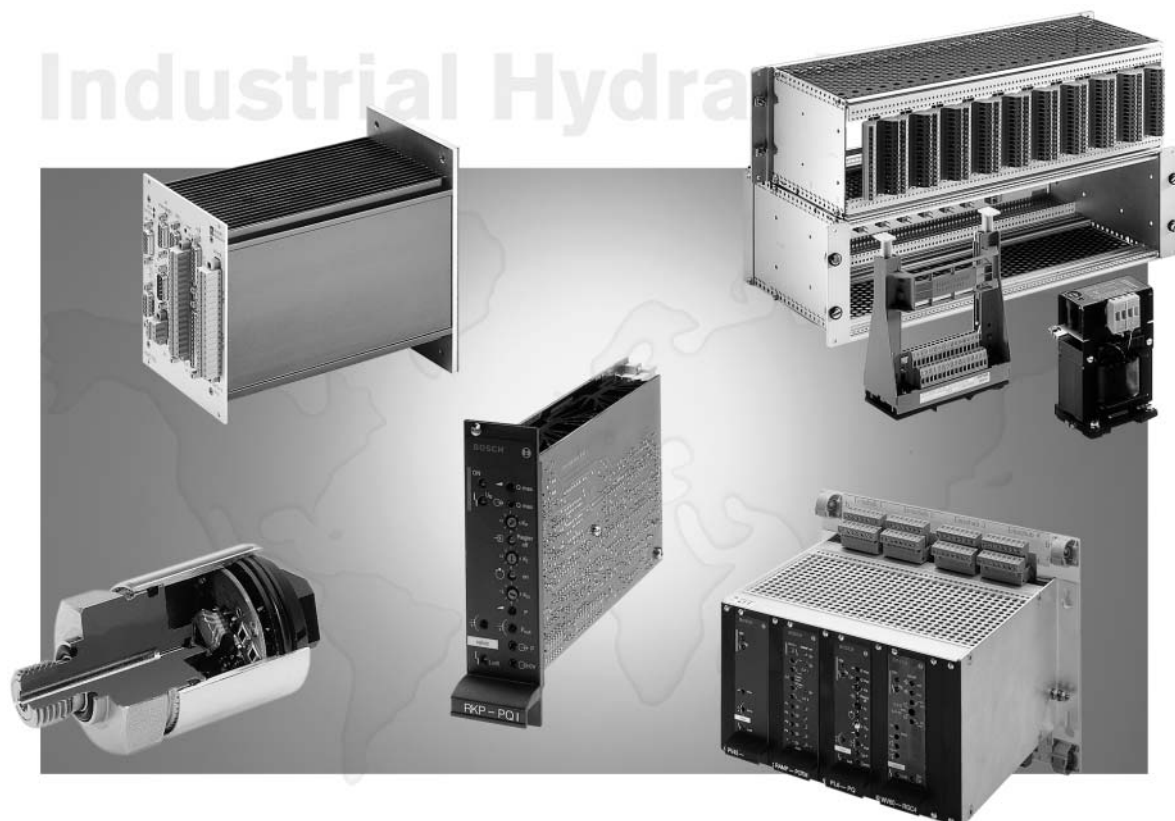


Electrohydraulic open and closed-loop control systems for:

- Controlling A4VS variable displacement axial piston pumps
- Controlling A10VSO variable displacement axial piston pumps
- Digital single and double-axis CNCs
- Analogue and digital valve amplifiers in Euro-card format and of modular design

The accessories product range

- Card holders and racks
- Power supply technology
- Command value cards and modules
- Pressure and position sensors
- Pressure and force controllers
- Position and speed controllers (analogue and digital)
- Test unit for all valves and electronic cards
- Signal encoders



ELECTRONIC COMPONENTS AND SYSTEMS

Amplifiers



Designation	Type	Series	Data sheet no.
Amplifiers, analogue, Euro-card format			
For prop. pressure valves without el. position feedback	VT 2000	5X	29 904
For proportional valves with electrical position feedback	VT 5001...VT5004	2X	29 945
For flow control with proportional valves	VT 5035	1X	29 955
For flow control with proportional valves	VT 3026	3X	30 093
For prop. pressure valves without el. position feedback	VT-VSPA1(K)-1	1X	30 111
For prop. directional valves without el. position feedback	VT-VSPA2-1	1X	30 112
For proportional valves without electrical position feedback	VT-VSPA2-50	1X	30 113
For prop. flow control valves without el. position feedback	VT-VRPA1-50 to 53	1X	30 117
For proportional valves with electrical position feedback	VT-VRPA2-1 and 2	1X	30 119
For DFE1 control of A10VSO axial piston units	VT 5041	2X	30 241
For high-response valves with inflected characteristic curve	VT-VRRA1	2X	30 040
For high-response valves with el. position feedback	VT-VRRA1; VT-VRPA1	2X	30 041
For high-response valves with inflected characteristic curve	VT-VRRA1-527-10/V0	1X	30 042
For pilot operated high-response valves with electrical position feedback	VT-VRRA1-527-20/ V0/K40-AGC-2ST	3X	30 043
For pilot operated high-response valves with electrical position feedback	VT-VRPA1-527-20/ V0/RTS-2STV	3X	30 044
For pilot operated high-response valves with electrical position feedback	VT-VRRA1-527-20/ V0/2STV	3X	30 045
For high-response valves with linear characteristic curve	VT-VRRA1-...KV-AGC	2X	30 046
For proportional directional valves	VT-VRPA2	1X	30 047
For proportional directional valves	VT-VRPA2	1X	30 048
For 2 x 4WRPH high-response valves sizes 6 and 10 (double Euro-card)	VT-KRRA2	2X	30 049

Designation	Type	Series	Data sheet no.
Amplifiers, analogue, Euro-card format (continued)			
For servo-valves with electrical position feedback	VT-SR1	1X	29 979
For servo-valves without electrical position feedback	VT-SR2	1X	29 980
Amplifier card for flow control with servo-valves	VT-SR7	1X	29 993
For proportional flow control valves with with electrical position feedback	VT-SR31 ... VT-SR38	1X	29 931
Amplifiers, analogue, modular design			
For prop. pressure valves without el. position feedback	VT11007; VT11016	1X	29 728
For prop. directional valves without el. position feedback	VT11011; VT11012	1X	29 737
For controlling a proportional solenoid	VT11029; VT11030	1X	29 741
For servo-valves without electrical position feedback	VT11021	1X	29 743
For proportional pressure valves with el. position feedback	VT11025	1X	29 751
For proportional throttle valves with el. position feedback	VT11037	1X	29 756
For directional valves with electrical position feedback	VT11076 ... VT11079	2X	29 758
For proportional pressure valves without electrical position feedback	VT11010; VT11031	1X; 2X	29 760
For proportional pressure valves without electrical position feedback	VT11008/09; VT11017/18	1X	29 762
Amplifier for flow control with proportional valves	VT11019	1X	29 763
For proportional pressure valves without electrical position feedback	VT11032; VT11165	1X	29 764
For prop. flow control valves with el. position feedback	VT11033; VT11034	1X	29 774
For proportional pressure valves without electrical position feedback	VT11131; VT11132	1X	29 865
For proportional pressure valves without electrical position feedback	VT11724	1X	29 866
For proportional pressure valves without electrical position feedback	VT11550 ... VT11554	2X	29 870
For proportional valves without el. position feedback	VT11118	1X	30 218
For proportional directional valve with el. position feedback	VT-MRPA2-1; VT-MRPA2-2	1X	30 219
For proportional pressure valves without electrical position feedback	VT11004/15/26	1X	30 226
Analogue amplifiers in Euro-card format			
Analogue amplifiers of modular design			1 987 761 327

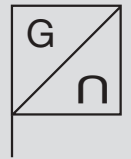
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Designation	Type	Series	Data sheet no.
Command value cards and modules			
Analogue command value card	VT-SWKA-1	1X	30 255
Command value module, analogue	VT-SWMA-1	1X	29 902
Command value module, analogue	VT-SWMAK-1	1X	29 903
Digital cards			
For proportional valves without el. position feedback	VT-VSPD-1	1X	30 123
For proportional valves with el. position feedback	VT-VRPD-1; VT-VRPD-2	1X	30 125
Digital command value card	VT-SWKD-1	1X	30 121
Controller cards			
Digital controller card	VT-SWKD-2	1X	30 122
HNC100 digital axis control	VT-HNC100	2X	30 131
Analogue position controller	VT-MACAS-500-10/V0	1X	30 050
IP252mH product information	VT16000; VT16005		29788-P ¹⁾

¹⁾ = Technical documentation on enquiry

ELECTRONIC COMPONENTS AND SYSTEMS

Electrohydraulic systems



Designation	Type	Series	Data sheet no.
Systems			
Controller and monitoring electronics for the speed control of secondary units	VT12000	2X	29 775
Control systems for A10VSO pumps with DFE1 control	SYDFE1	2X	30 024
Pressure and flow control system for A10 pumps	SYDFEC	2X	30 027
Pressure and flow control system for A10 pumps	SYDFEE	2X	30 030
Control system for A4 pumps with HS(3) control			30 021
Control system for A2 pumps with EO1 control			30 020
of A4VS..DS1(E) axial piston units	SYHNC100-SEK	2X	30 141
Testing technology			
Measuring socket card	BK1 VTS0404	1X	57 725
Measuring socket card	BK2 VT-BK-2	1X	57 726
SR91 amplifiers for servo-valves with electrical position feedback	VTS0615	1X	57 850
SR92 amplifiers for servo-valves without electrical position feedback	VTS0616	1X	57 851
SR98 amplifiers for servo-valves without electrical position feedback	VTS0617	1X	57 852
PC plug-in board	PCE5 VTS0985	1X	57 881
HydroControl electronics	SYHCE-1	2X	57 901
Sensors and signal encoders			
Pressure transducer	HM12; HM13	1X	29 933
Pressure transducer	HM16	1X	30 266
Pressure transducer	HM17	1X	30 269
Electronic pressure transducer	HM18	1X	30 271

Designation	Type	Series	Data sheet no.
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Sensors and signal encoders (continued)

Signal encoder; single-axis version	VT10468	3X	29 753
Signal encoder; two-axis version	VT10406	3X	29 754
Signal encoder; three-axis version	VT10399	5X	29 755

Extension accessories product range

19" rack	VT19101 ... VT19110	1X	29 768
Connection adapter	VT10812	2X	30 105

ELECTRONIC COMPONENTS AND SYSTEMS




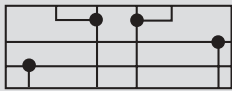

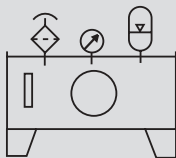
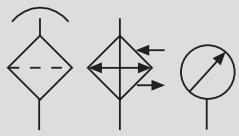
Accessories

Designation	Type	Series	Data sheet no.
General accessories			
Power supply unit	VT-NE1	3X	29 713
Power supply unit	VT-NE3	3X	29 712
Compact power supply units	VT-NE30 ... VT-NE32	1X	29 929
NT3 power supply unit	VTS0908	1X	29 772
Power supply module; 24 V	VT11006	1X	29 729
Switching amplifier module	VT11003	1X	29 731
Power supply module; 12 V	VT11005	1X	29 732
Relay module; 12 V or 24 V	VT11027; VT11028	1X	29 742
Capacitor module	VT11073	1X	29 750
Stabilisation units	VT-SE1; VT-SE3	3X	29 714
FUW1 frequency/voltage converters for VT12000	VTS0102	1X	29 761
Card holder	VT3002	2X	29 928
Enclosed card holder	VT12302	2X	30 103
Interface converter	VT12304	2X	30 104
Testing and servicing units			
Service case with test unit for servo-valve without integrated electronics	VT-SVTSY-1	1X	29 681
Service case with test unit for servo, proportional and high-response valve with integrated electronics	VT-VETSY-1	1X	29 685
BB-3 hand-held control box for controller-supported components	VT12321	2X	29 798
PC-program BODIV for digital amplifier cards			29 899
Controlled-system simulator for digital axis control, type VT-HNC100-1	VT-HNC100DEMO	2X	30 133
Test box I	VT-PE-TB1		30 063
Test box II	VT-PE-TB2		30 064
Test box III	VT-PE-TB3		30 065

Designation	Type	Series	Data sheet no.
Testing and servicing units (continued)			
Measuring adapter (11P + PE) for OBE	VT-PA-1		30 067
Measuring adapter (6P + PE) for OBE	VT-PA-2		30 068
Test adapter for amplifiers	VT-PA-3		30 070
Plug-in connectors			
Plug-in connectors for controlling electrically operated valves and sensors	(RR)		08 006
Plug-in connectors for controlling electrically operated valves and sensors			08 008
Pressure sensors; plug and housing; testing and servicing units			1 987 761 327

Table of contents of hydraulic components

Control plates, power units and accessories

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GENERAL

Designation	Data sheet no.
Sales and service organisation	02 000
List of data sheets (RR)	01 200
List of data sheets	1 987 760 051
Installation, commissioning and maintenance	
Installation, commissioning, maintenance of hydraulic motors and hydraulic pumps	07 080
Installation, commissioning, maintenance of industrial valves	07 300
Installation, commissioning, maintenance of hydraulic systems	07 900
Hydraulic fluids	
Hydraulic fluids based on mineral oil for hydraulic motors and hydraulic pumps	07 075
Plug-in connectors	
Plug-in connectors for controlling electrically operated valves and sensors (RR)	08 006
Plug-in connectors for controlling electrically operated valves and sensors	08 008

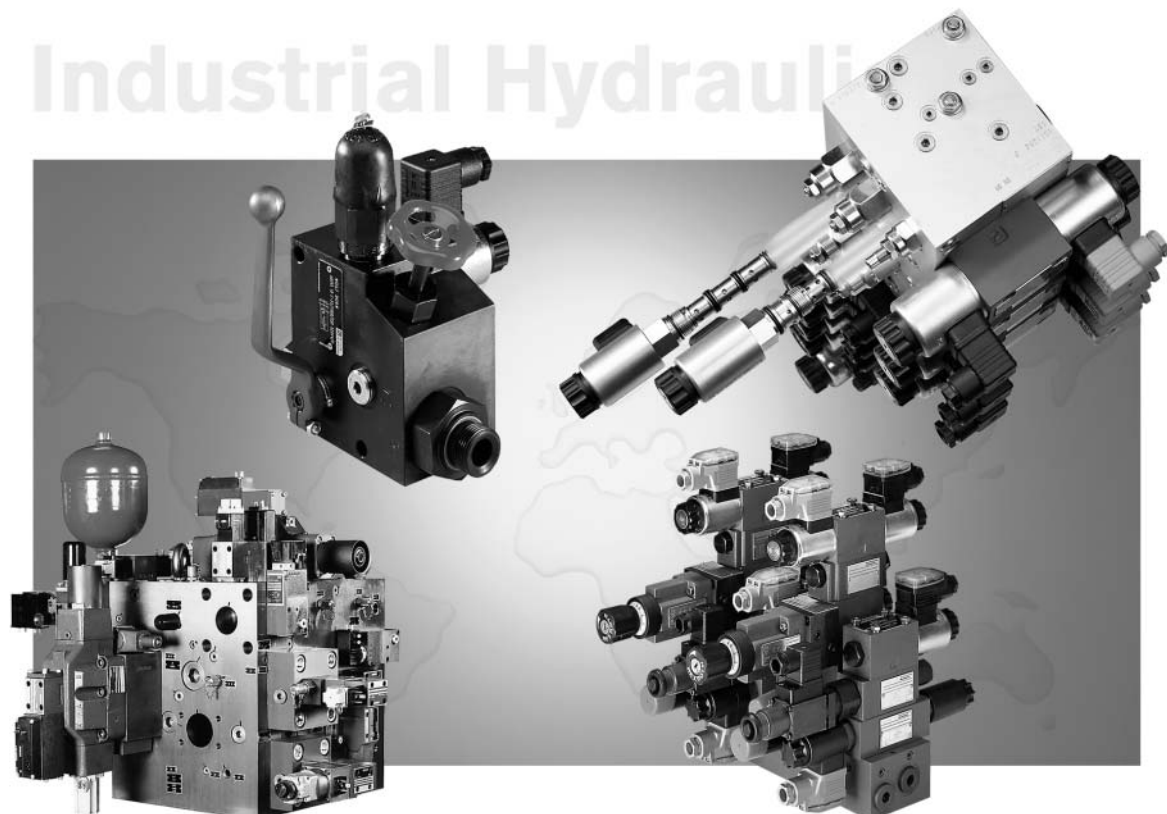
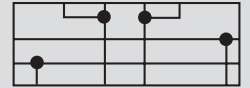
CONNECTING ELEMENTS

Connecting elements are integrated hydraulic controls, designed to be combined with integrated or flanged-on functional elements.

They are selected on the basis of schematic diagrams, on which the position of ports and operating elements is indicated.

Advantage of the block design over individual piping:

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



CONNECTING ELEMENTS



Designation	Type	Size	Series	p_{\max} in bar	Data sheet no.
Cover plates					
Porting pattern to DIN 24 340 form A and J4, ISO 4401 and CETOP-RP 121 H	HSA	4 ... 35	3X		48 042
Sandwich plates					
Porting pattern to DIN 24 340 form A, ISO 4401 and CETOP-RP 121 H	HSZ	6			48 050
Porting pattern to DIN 24 340 form A, ISO 4401 and CETOP-RP 121 H	HSZ	10			48 052
Porting pattern to DIN 24 340 form A, ISO 4401 and CETOP-RP 121 H	HSZ	16			48 054
Adapter plates					
Porting pattern to DIN 24 340 form A, ISO 4401 and CETOP-RP 121 H	HSE	4 ... 32	3X	315; 630	48 045
Multistation manifold plates/control plates					
Multistation manifold plates	HSR	6	2X; 3X	315	48 107
Multistation manifold plates	HSR	10	1X; 3X	315	48 110
Subplates					
Porting pattern to DIN 24 340 form A and C, and ISO 4401		4			45 050
Porting pattern to DIN 24 340 form A, ISO 4401 and CETOP-RP 121 H	(RR)	6			45 052
Porting pattern to DIN 24 340 form A, ISO 4401 and CETOP-RP 121 H		6			45 053
Porting pattern to DIN 24 340 form A, ISO 4401 and CETOP-RP 121 H	(RR)	10			45 054
Porting pattern to DIN 24 340 form A, ISO 4401 and CETOP-RP 121 H		10			45 055
Porting pattern to DIN 24 340 form A, ISO 4401 and CETOP-RP 121 H	(RR)	16			45 056
Porting pattern to DIN 24 340 form A, ISO 4401 and CETOP-RP 121 H		16			45 057
Porting pattern to DIN 24 340 form A, ISO 4401 and CETOP-RP 121 H	(RR)	25			45 058

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Designation	Type	Size	Series	p_{\max} in bar	Data sheet no.
Subplates (continued)					
Porting pattern to DIN 24 340 form A, ISO 4401 and CETOP-RP 121 H		25			45 059
Porting pattern to DIN 24 340 form A, ISO 4401 and CETOP-RP 121 H		32			45 060
Porting pattern to DIN 24 340 form D, ISO 5781 and CETOP-RP 121 H		10; 16; 25			45 062
Porting pattern to DIN 24 340 form E, ISO 6264 and CETOP-RP 121 H		10; 16; 25			45 064
Porting pattern to DIN 24 340 form G, ISO 6263 and CETOP-RP 121 H		10; 16			45 066

ACCUMULATORS AND ACCUMULATOR ACCESSORIES

Accumulators and accumulator accessories

Hydraulic accumulators are mainly used to minimise the pump output power, to balance flows, to cover pressure peaks, as energy accumulators and as pulsation dampers.



Industrial Hydraulics

ACCUMULATORS AND ACCUMULATOR ACCESSORIES



Designation	Type	Size	Series	p_{\max} in bar	Data sheet no.
Accumulator safety block	ABZSS	10; 20; 30	3X	350	50 131
Accumulator assemblies	ABSBG				50 135
Diaphragm-type accumulators, bladder-type accumulators, safety and shut-off blocks, accessories					1 987 761 403

HYDRAULIC POWER UNITS AND ACCESSORIES

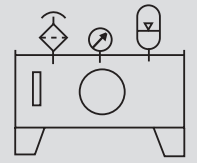
Hydraulic power units

Hydraulic power units form the core of a hydraulic system.

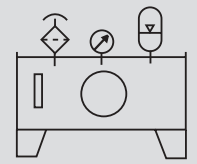
Their dimensioning and concept are decisive for environmental friendliness and the efficiency of the system as a whole.

Accessories

- Measuring and monitoring equipment
- Filters
- Couplings
- Heat exchangers
- Pump mounting brackets



HYDRAULIC POWER UNITS AND ACCESSORIES



Designation	Type	Size	Series	p_{\max} in bar	Data sheet no.
Tanks					
Tanks to DIN 24 339					50 025 ¹⁾
Steel tanks (round tanks)	ABTSR	1000 ... 20000			51 135
Pump power units					
Modular standard power units	ABSKG	20; 40; 60			51 013
Hydraulic primary power unit	ABPAG	63 ... 400		360	51 018
Low-noise compact units	ABFAG	100 ... 630		315	51 096
Standard power unit	ABSAS	100 ... 630	2X	315	51 101
Hydraulic drive power unit	ABHSG	400 ... 1000		315	51 027
Pump-motor group					
Pump-motor module	MPM				10 530
Pump-motor group	ABAPG				51 062
Pump-motor group	ABUPG		1X		51 066
Clamping and drive module					
Clamping and drive module	UPE 2		1X	700	51 142
Control block for clamping and drive module	UPE 2		1X	500	51 144
Clamping and drive module	UPE 3		1X	700	51 147
Drive module	UPE 5		1X	250	51 145
Control block for clamping and drive module	UPE 5		1X		51 149

¹⁾ = Technical documentation on enquiry

Designation	Data sheet no.
Accessories	
Flexible reservoir bulkhead seals for suction lines	AB 12-03
Pressure measuring ports PN 400 / 630	AB 20-11
Isolator valve ND 350	AB 21-14
Water valve, thermostatically controlled	AB 21-22
Isolator valves with or without limit or inductive limit switch PN 16	AB 21-29
Hoses with DKO fittings at both ends	AB 23-10
Float switch without protective tube, with one or two switching contacts, with one thermostat	AB 31-01
Float switch with protective tube and two switching contacts	AB 31-04
Float switch without protective tube, with one or two switching contacts	AB 31-06
Pressure gauge with glycerine fill DN 63 and DN100, connection at the bottom	AB 31-11
Pressure gauge with glycerine fill DN 63 and DN100, connection at the rear	AB 31-13
Thermostats, measuring range 0...80° C and 10...120° C	AB 31-14
Thermometer with long-distance cable, indicator range 0 to 100° C	AB 31-15
Resistance thermometer	AB 31-17
Oil level indicator ND 3	AB 31-21
Thermostat, adjustment range 5...100° C	AB 31-32
Heat exchanger, oil/water system: Single tube	AB 32-09
Heat exchanger, heater	AB 32-10
Heat exchanger, oil/water system: Plate heat exchanger	AB 32-12
Double-U motor mounting	AB 33-10
Couplings, rotary flexible type KD	AB 33-22
Accessories with flexible and rigid pump mounting brackets, motor frame size 71 to 400	AB 41-20
Pressure control unit DN 10, PN 315	AB 42-15

ACCESSORIES (measuring and monitoring equipment, filters)

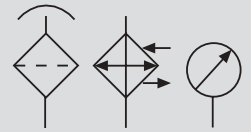
Measuring and monitoring equipment
Apart from filters, further components are used:

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

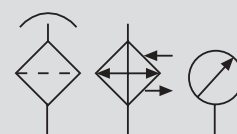
Filters

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

- Tank breather filters
- Pressure filters
- Return line filters



ACCESSORIES (measuring and monitoring equipment, filters)



Designation	Type	Size	Series	p_{\max} in bar	Data sheet no.
Pressure indicator units					
Pressure gauge isolator valve; subplate mounting; threaded connection	AF	6	4X	300	50 031
Multi-circuit gauge isolator; in-line installation	MS; MSL	6	2X	315	50 034
Pressure switches					
Piston-type pressure switch, electrohydraulic; switching pressure-related	HED1		4X	500	50 040
Piston-type pressure switch, electrohydraulic	HED5		2X	630	50 055
Piston-type pressure switch, electrohydraulic	HED8		1X	630	50 060
Bourdon tube pressure switch; electrohydraulic; constant switching pressure differential	HED2		2X	400	50 045
Bourdon tube pressure switch; electrohydraulic; adjustable switching pressure differential	HED3		3X	400	50 050
Electronic pressure switch with integrated analogue output	HEDE10				30 275
Pressure switch, electrohydraulic					1 987 760 711
Filters					
Tank breather filter	ELF; BF; BL	3; 4; 5; 7; 162			50 070
Pressure filter for pressure line installation	ABZFD		1X	420	50 076
Return line filter for direct tank mounting	ABZFR		1X	25	50 081
Coolers					
Pump mounting brackets with oil/air cooler	PTK				50 092
Filtering cooling circulation circuit	ABUKG				50 121
Valves, valve accessories					
Flow indicator	HDM	10	1X	16	30 180 ¹⁾
Throttle and shut-off valve/ throttle check valve	DV; DRV	6 ... 40	1X	350	32 502 ¹⁾

¹⁾ = Technical documentation on enquiry