The Drive & Control Company

Rexroth
Bosch Group

Sytronix – variable-speed pump drives

Energy-efficient | Intelligent | Cost-effective

Sytronix variable-speed pump drives change the game with hydraulic systems and offer new opportunities for innovative designs. Energy-efficient solutions using components matched to the application and an in-depth knowledge of the technology are key.

Investment in energy saving technology using Bosch Rexroth hydraulics can provide fast returns, with energy savings up to 80%.

Sytronix – energy-efficient variable-speed pump systems

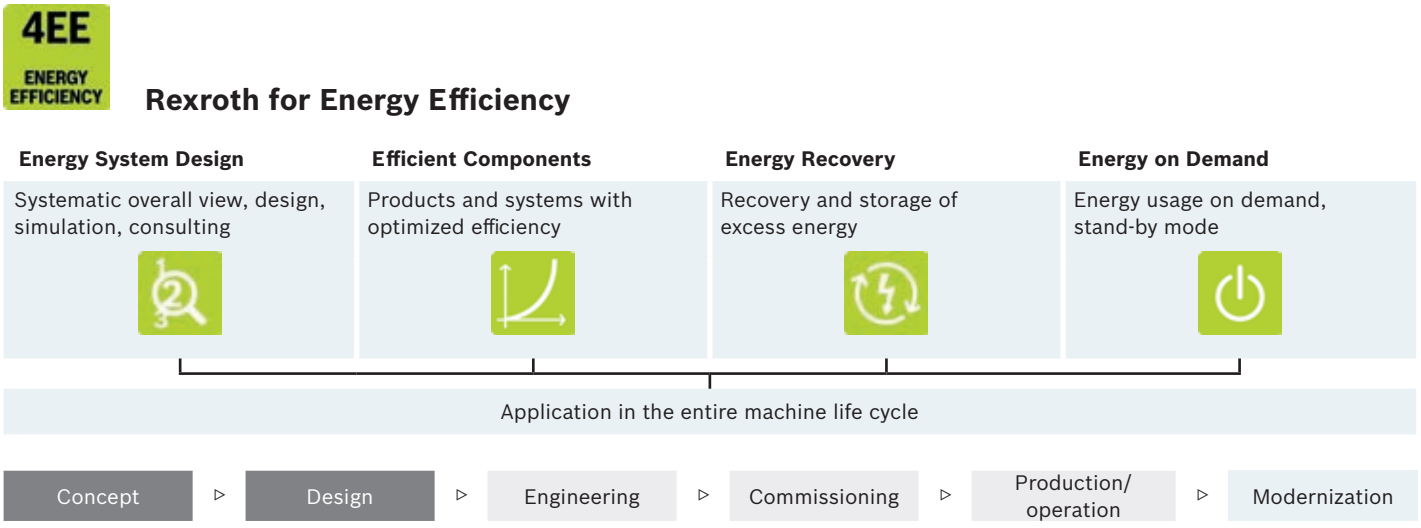
Older machine designs focused on systems that had the capacity to deliver maximum performance, even though it might have only been for a fraction of the total cycle. Today there is a greater emphasis on reducing energy consumption and noise emissions. Higher energy prices and workplace environmental requirements have engineers rethinking their designs.

Using Sytronix (**s**mart interplay of h**y**draulics and elec**troni**cs) variable-speed pump drives can address these issues by combining the advantages of Bosch Rexroth technologies: reliability of high-performance hydraulics and energy-efficiency and dynamics of high-performance drives and electronics.

Sytronix drives combine matched electric motors, hydraulic pumps, and VFDs (variable frequency drives), which has the potential of significant energy savings and a considerable reduction in noise emissions at a cost that provides an attractive return on investment.

Energy on Demand –
powerful hydraulics, intelligent control
By integrating the advantages of hydraulics with the control intelligence of electrical drives, motor speeds can be continually adjusted to match the machine's requirements. The drive speed of the pump can be lowered to an energy-efficient, quiet level when the process requires less than full performance. By having a major portion of the machine cycle time matched to the part-load requirement, energy is saved and noise is reduced.

Sytronix systems are part of Bosch Rexroth's **4EE strategy** for system energy reduction.



Bosch Rexroth AG, R999000332, 2015-08

Sytronix: efficient and versatile

To meet the requirements of pump drive systems – Sytronix systems can provide a number of key advantages:

- Energy savings of up to 80%
- Reduction in noise emissions by up to 20 dB (A)
- Lower investment and reduced operating costs

Sytronix advantages

Reduced energy consumption
Energy savings of up to 80% decrease operating costs and reduce CO_2 emissions.

Lower noise emission
Sytronix drives can reduce the noise emission of the hydraulic power unit up to 20 dB (A). Meeting stringent noise specifications in certain market areas is easier and may be accomplished with noise control measures.

Easier installation and commissioning
Pre-configured Sytronix hydraulic pump drives and assemblies utilize matched components to provide complete pump drive systems. This results in short installation and commissioning times. Rexroth offers more than 100 drive configurations in three different performance classes.

Easier cooling
By lowering the average pump drive speed, variable-speed pump drives can significantly reduce generated heat, minimizing the cost and energy required to cool the hydraulic system.

Lower space requirements
Using Sytronix drives can lower space requirements for the hydraulic system:

- Compact design
- Simpler valve technology and reduced requirements for control electronics
- Reduced hydraulic fluid volume resulting in smaller reservoir requirements
- Reduction in space for cooling due to reduced heat loads and elimination of most noise containment hardware

More reliable operation

- Integrated system design using proven hydraulic and electrical components
- Condition monitoring and diagnosis available in the drive control electronics

Retrofit design assistance
Rexroth can provide customers with support throughout the retrofitting process, from planning to assembly to on-site commissioning.

Compliance with regulatory requirements
Sytronix variable-speed pump drives can assist with compliance for noise control (EU Directive 2003/10/EC) and electric motor energy efficiency (EU Regulation (EC) no. 640/2009).

Application areas

- **Wood and paper processing machines**
- **Plastics processing machines**
- **Die-casting machines**
- **Presses**
- **Machine tools**
- **Metallurgy**

Sytronix system overview

Scalable power and functionality

Sytronix variable-speed pump drives offer a comprehensive range of pumps, controllers, motors and software to suit a wide spectrum of applications. Rexroth provides machine manufacturers support during project planning, utilizing simulation models for system design and component selection. Scalability of performance and function allows for an optimal choice of system components.

When using a cascade system, multiple Sytronix drives can work together to efficiently generate the flow rate required for the process.

Sytronix systems are available as pre-configured systems or as individually configured components.

Always the right Sytronix system

Rexroth offers variable-speed pump drives in three performance classes:

Basic Dynamics
Sytronix FcP – frequency-controlled pump drive
FcP systems are suitable for standard applications with constant pressure control, for open hydraulic systems up to 90 kW. Typical applications are machine tool systems, as well as auxiliary axis movements in different applications such as presses.

High Dynamics
Sytronix SvP – servo-variable pump drive
SvP systems use the high dynamics of servo motors (a.o. synchronous permanent magnet motors) motors to achieve significant energy savings. Capabilities include axis control functions in both open and closed hydraulic circuits requiring high dynamic performance, as well as advanced electrical and electrohydraulic control. Plastics processing machines and presses are key sectors for this technology.

High Power and Dynamics
Sytronix DFE – variable-speed pressure and flow control electronically
DFE systems are suited for high performance applications requiring a favorable price-performance ratio. These systems utilize variable displacement piston pumps and are especially suited for retrofit installations in existing systems. Capable of axis control functions, these drives offer high performance in open hydraulic circuits, and can be used in machines with multiple hydraulic functions.

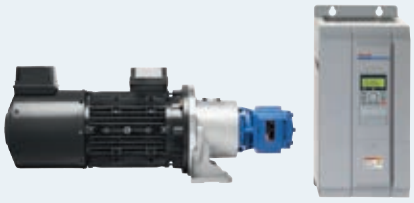
The Sytronix house

Sytronix

Variable-Speed Pump Drives

Preconfigured Sets

Sytronix FcP



Drives for pressure control
- Pressure and flow control

Basic Dynamics

Sytronix SvP

Drives for axis control
- Pressure and flow control
- Force and velocity control
- Positioning

High Dynamics

Sytronix DFE

Drives for axis control
- Pressure and flow control utilizing varibale displacement pumps
- Power limitation

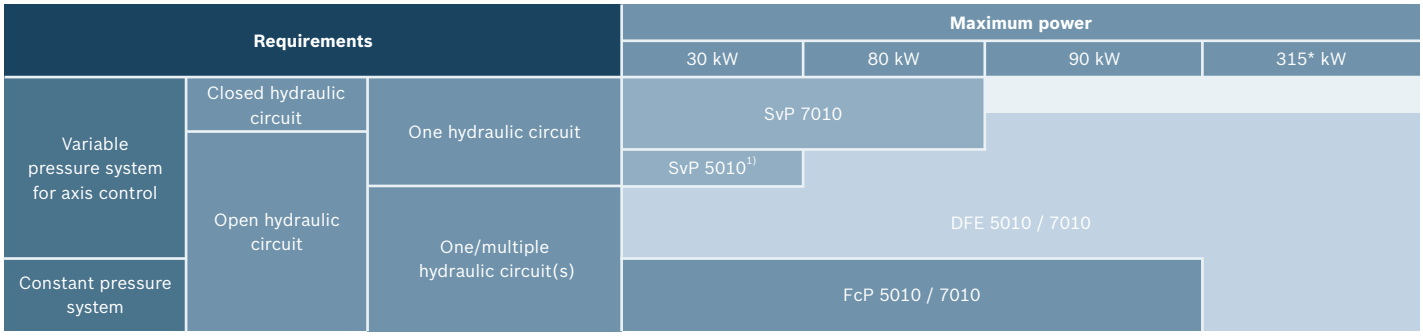
High Dynamics & High Power

Individual Sytronix Solutions

Customizable solutions from Rexroth electric and hydraulic program

- Communication via Ethernet and other fieldbuses
- Cascaded pumps
- Safety on Board
- Custom system functions

Sytronix selection guide



*Higher power range on request [1)]SvP 5010 systems have been designed for the Asian market only

The Sytronix selection guide shows the Rexroth Sytronix product family.

Variable pressure system for axis control

- For closed hydraulic circuits, Sytronix SvP speed-variable drives offer high dynamics and comprehensive electrical and electrohydraulic control options. In open hydraulic circuits, the Sytronix DFE system, utilizing electronic pump control of pressure/flow (p/Q), is an alternative option. DFE-based hydraulic drives offer an addition to the performance portfolio and are suitable for machines with multiple hydraulic using additional valves.
- In cascaded systems, multiple Sytronix drives work together to efficiently generate the flow rate required for the process.

Constant pressure systems

- For constant pressure systems, cost-effective Sytronix FcP drives using VFD driven asynchronous motors are suitable for conventional drives up to 90 kW.

Two options for Sytronix systems

After choosing the appropriate product family using the selection guide, there are two options for the pump system to fit the requirements:

- **Pre-configured system sets** from the product families of FcP, SvP or DFE using the selection guides (see next page).
- Assembly of **individual systems** by combining modules and components using application guidelines and system requirements. This can be done in collaboration with Rexroth applications specialists, for example for Sytronix systems with pump types that are not yet available in the sets (see ”Sytronix individual solutions” on page 47).

Criteria for exclusion of Sytronix systems

- System pressure higher than 400 bar
- Power supply higher than 500 V

On request

- Hydraulic liquid other than HLP
- Electrical power higher than 315 kW
- Ungrounded grid
- Explosion protected components
- Country specific regulations
- Marine certified components

Sytronix system key

The Sytronix system key described in this section helps you to define the system and the used main components. The motor pump units, the frequency converters and the accessories used in the Sytronix systems must be defined in details for ordering purposes.

1		2	3	4		5	6		7		8	9	10	11		12	13		14
SYT	–				–			–		–					–			–	

Example

SYT	–	DFE	50	10	–	D10	xxx	–	S	–	FC2	N	A	xxx	–	FV	xxx	–	NNNN

	Description	Pos.	Designation	Entry
System	Product line	**01**	Sytronix	**SYT**
	Product family	**02**	SvP FcP DFE	**SVP** **FCP** **DFE**
	Series	**03**	Rexroth Fv = 50 IndraDrive Hxx = 70	**50** **70**
	Generation	**04**	10	**10**
Pump	Pump technology	**05**	PGH PGM PGF A10 A4 DFE-A10 DFE-A4	**PGH** **PGM** **PGF** **A10** **A04** **D10** **D04**
	System flow	**06**	l/min	**xxx**
	Coupling	**07**	Direct Standard	**D** **S**
Motor/system pressure/controller	Motor technology	**08**	Servo = MSK Asynchronous = MOT-FC IE2 Servo asynchronous = MAD Servo asynchronous = MAS[1)]	**MSK** **FC2** **MAD** **REA**
	Rated speed	**09**	1500 1750[1)] 2000 3000	**F** **G** **H** **N**
	Motor cooling	**10**	Forced-ventilated (IC 416) Self-ventilated (IC 411) Liquid-cooled Convection	**A** **S** **L** **N**
	Nominal pressure Motor-pump-unit[2)]	**11**	bar	**xxx**
	Controller	**12**	Rexroth Frequency Converter Fv IndraDrive HCS IndraDrive HMV/HMS	**FV** **HC** **HM**
	Performance overload	**13**	%	**xxx**
	Other design	**14**	Standard 3 m power and encoder cable[1)] 5 m power and encoder cable[1)]	**NNNN** **0001** **0002**

[1)] Option possible only for SvP 5010
[2)] Without considering the efficiency ratio of the pump

Selecting pre-configured systems

Use the following selection guides for each product family to determine your options based on the following three parameters.

Three steps for choosing a Sytronix system

1.	**Select a flow** - constant pressure systems: Q_{peff} - variable pressure systems: Q_{max}
2.	**Select a system pressure**
3.	**Select a performance level**

The Sytronix system key guides the user to a system selection. For a definition of the Sytronix system key, please see page 9.

Steps 1 + 2

Selection guide for flow, system pressure, and controller (e.g. Sytronix FcP 5010 with PGF)

Pumps n_{max} = 3600 rpm						Motors MOT-FC IC411 (self-ventilated)							
Type	**NG**	**p_{cont} [bar]**	**p_{max} [bar]**	**Q_{peff} [l/min]**	**Q_{max}* [l/min]**	1.5	2.2	3	4	5.5	7.5	11	P_{nom} [kW]
						4200	4000	4000	4000	4000	4000	3800	n_{max} [rpm]
						p_{eff}** [bar]							
PGF2	006	210	250	14	23	67	98	135					
PGF2	008	210	250	19	29	53	78	107	139				
PGF2	011	210	250	26	39	40	58	80	104	144			
PGF2	013	210	250	31	47	33	48	66	86	119			
PGF2	016	210	250	38	57	27	40	55	71	99	135		
PGF2	019	210	250	46	68	23	34	47	61	84	114		
PGF2	022	180	210	53	66	20	29	40	52	72	98	144	

= Preferred motor-pump-unit ☐ = on request

Controller			K [%]						
	Rexroth Fv FVCA01.1	1K50	118						
		2K20	162	120					
		4K00			164	127			
		5K50				165	118		
		7K50					155	113	
		11K0						160	114
		15K0							157

Selection example for system key

SYT-FCP5010-PGF [***] (1) -S-FC2FS [***] (2) -FV [***] (3) -NNNN ----------> SYT-FCP5010-PGF [047] (1) -S-FC2FS [086] (2) -FV [127] (3) -NNNN

* The maximum allowed speeds of the overall system resulting from the combined motors and pumps were used to calculate the cell values. The flow was calculated without the degree of efficiency.

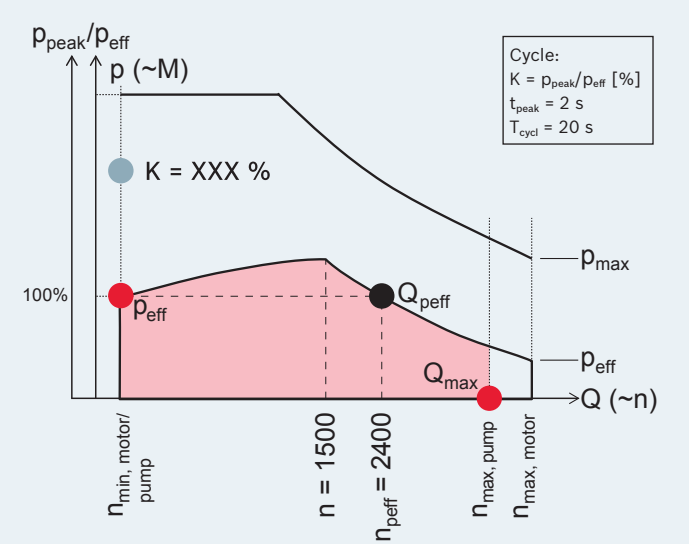
** The effective pressure was calculated without the degree of efficiency.

Step 3

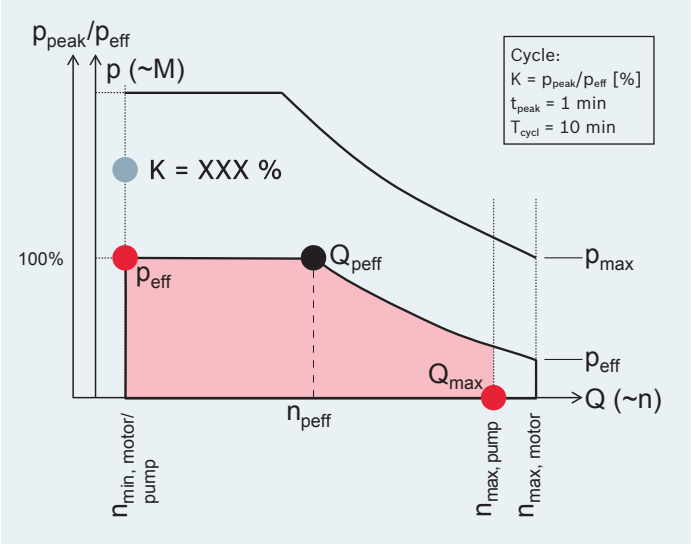
The performance of your pump system is determined by the peak load that can be obtained in intermittent operation, without damage to the pump drive system. It is defined as p_{peak}/p_{eff} and described as the factor K in %.
The individual pump-motor combinations determine the characteristic curves for the appropriate Sytronix system.

Sytronix selection guides for individually configured system components

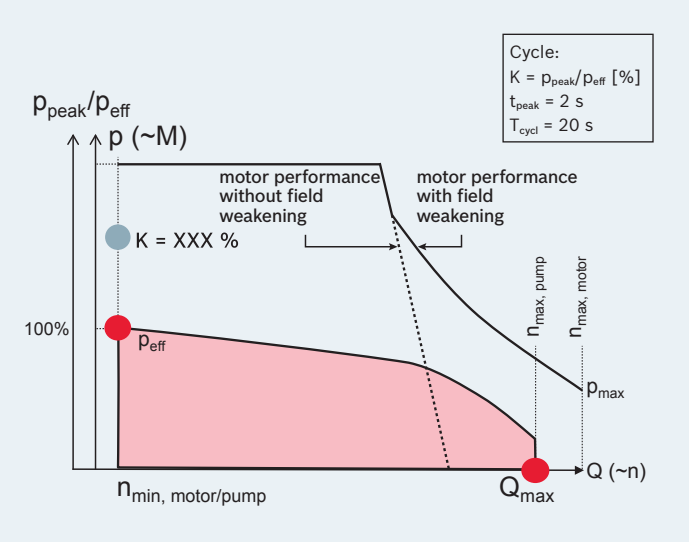
To configure a Sytronix system, all required components are available separately (see ”Components and modules” on page 52). Bosch Rexroth specialists can provide support for the selection process. Steps and selection guides are described in the section ”Individual solutions” (see page 47).



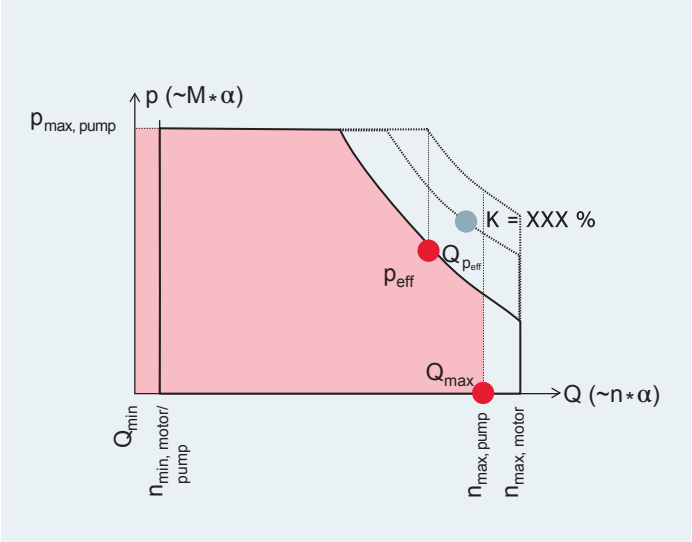
Performance curve for FcP 7010 – self-ventilated motor



Performance curve for FcP 5010 – forced-ventilated motor



Performance curve for SvP 7010 – forced-ventilated motor



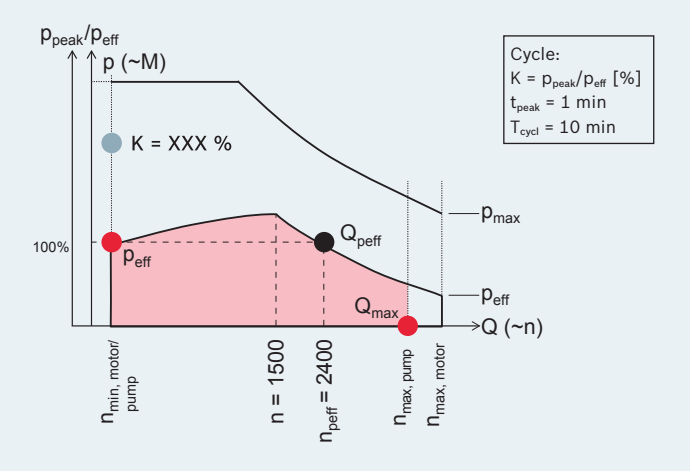
Performance curve for DFE 5010/7010 – self-ventilated motor

Sytronix configuration guide for constant pressure systems, e.g. FcP 5010 solutions

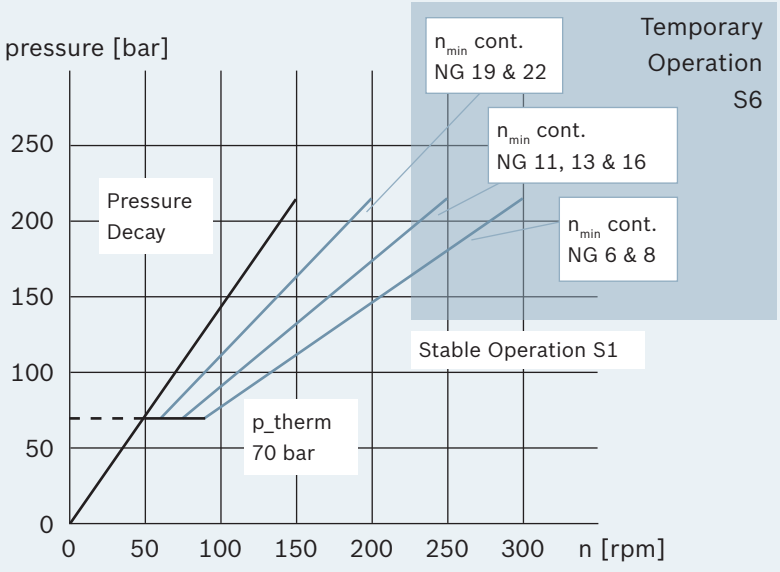
Using a self-ventilated motor (designation: IC411) and a constant pump allows the system to maintain the system pressure p_{eff} indicated in the selection guides beyond the nominal motor speed of 1500 rpm, up to a constant speed of approximately 2400 rpm. With a PGF2 013 internal gear pump, the corresponding flow is calculated (without the degree of efficiency) as follows: $Q_{p_{eff}}$ =(n*V)/1000 --> $Q_{p_{eff}}$ =(2400 rpm*13 cm^3)/1000 --> $Q_{p_{eff}}$ = 31 l/min. E. g. at a p_{eff} of 86 bar as indicated in the selection guide for a PGF2 013, this pressure can be held constant at a flow of 31 l/min.

The flow value of 47 l/min specified in the selection guide always refers to the maximum possible speed of either the hydraulic pump $n_{max,\ pump}$ or asynchronous motor $n_{max,\ motor}$. This flow value of 47 l/min can only be achieved temporarily at reduced pressure.

The minimum speeds for the hydraulic pump $n_{min,\ pump}$ and asynchronous motor $n_{min,\ motor}$ depend on the selected Sytronix system and the system pressure. For instancce, refer to the following diagramm for PGF2 pump.



Performance curve for FcP 5010 – self-ventilated motor



- n_{min} cont.: minimum allowed continuous speed, system needs to take flow Q > 0 l/min
- n_{min} @ 0-flow: pump speed at pressure holding function Q = 0 l/min, only temporary until t_{max} @ 0-flow
- valid for viscosity 32 cSt

You can use the SytronixSize design tool to perform detailed calculations for your application.

Sytronix FcP frequency-controlled pump drives

FcP system sets

Sytronix FcP (**f**requency-**c**ontrolled **p**ump drive) systems consist of a motor-pump-unit with a standard asynchronous motor and a VFD with control electronics. With regard to dynamics, accuracy and functionality, the FcP product family covers standard performance hydraulic drives and is suitable in the following applications:

- Constant pressure systems up to 90 kW
- Applications with controlled volume flow profile or where alternating p/Q control is required
- Open hydraulic circuits
- 1-quadrant operation

Starting with the basic FcP system, a PGF family internal gear pump is used for pressure and flow control. For higher pressure and performance, the PGH internal gear pump is utilized, as well as A10 and A4 axial piston variable displacement pumps. When used at high pressures, utilizing variable displacement piston pumps helps to reduce the torque on the electric motor so that a smaller drive can be selected.

FcP 5010 and FcP 7010 utilize different VFD drive electronics. IndraDrive controller and Rexroth Fv VFD. Differences between both types include the type and scope of communication and bus interfaces, as well as additional functionality and user interfaces.

Components

- Hydraulic pump
- Electric motor
- VFD with control electronics
- Pressure transducer

Applications

The FcP systems are energy-efficient variable-speed pump drives for constant pressure systems (e.g. machine tools) with open hydraulic circuits as well as in systems for pressure supply for auxiliary axis movements, such as in presses and metallurgy.

Sytronix FcP systems

Sytronix FcP key advantages:

- Cost-effective, energy-efficient drive
- Intuitive, easy, manual parameterization
- Optional additional control features

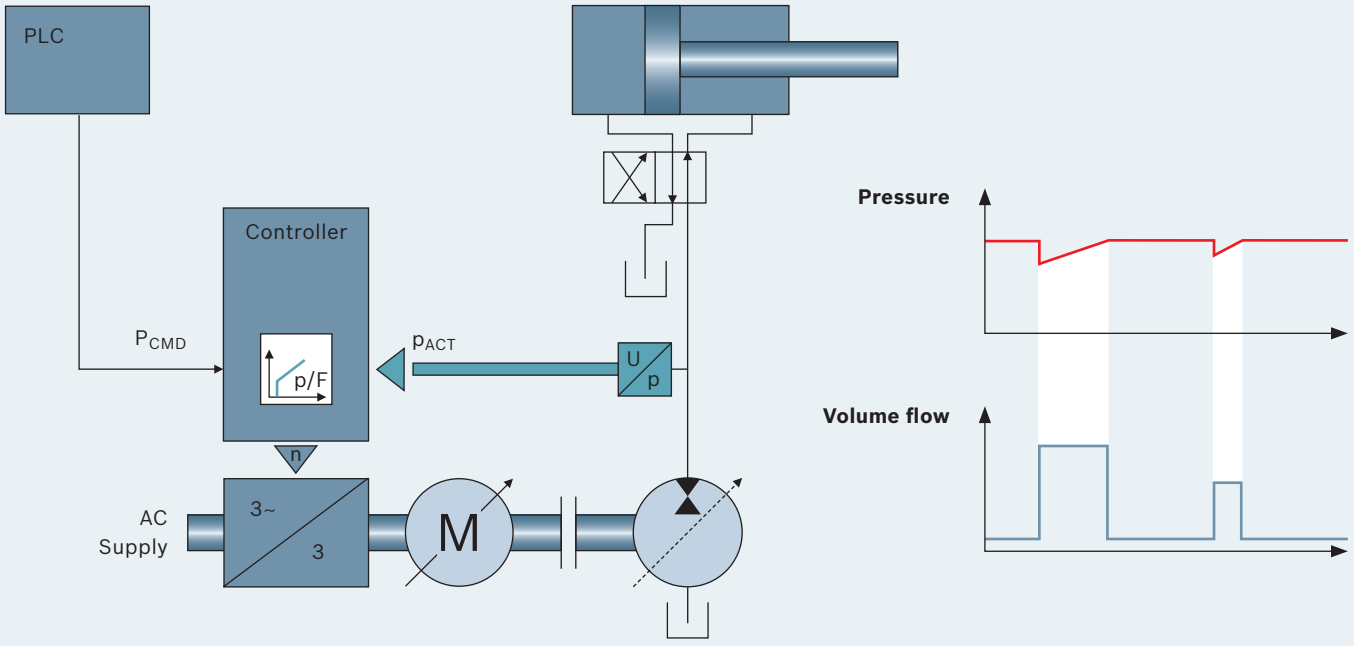
Function

In constant pressure systems, the drive controls the motor speed to maintain constant system pressure. This is accomplished by modulating the flow to provide constant system pressure independent of the flow demand.

Use of additional hydraulic accumulators ensures fast pressure requirements in smaller systems. Conventional directional valves control the flow direction and determine the direction of travel of the hydraulic actuator.

The desired pressure setting is determined by the machine control and used as a command value to the VFD. The VFD control compares the command value with the actual value measured by a pressure transducer and adjusts the motor speed accordingly.

FcP block diagram



FcP 7010

Features

- Performance up to 90 kW effective
- Support for most industry standard buses: CANopen, PROFIBUS, sercos, EtherNet/IP, ProfiNet, and EtherCAT.
- Drive-integrated PLC for enhanced capabilities, based on IEC-61131
- 1-quadrant operation
- ”Safety on Board”, auto-tuning, pump protection, multi-Ethernet communication, condition monitoring

Components

- Motor-pump-unit MPES2 consisting of
  - MOT-FC motor, forced- or self-ventilated
  - Pump, type PGH, A10VZO-EZ4 or A4VSO-EZ
  - Standard coupling elements
- IndraDrive controller (HCS) with scalable basic or advanced control unit

Applications

- Similar to the FcP 5010 series, typical uses are in constant pressure systems for open hydraulic circuits and controlled axis movement. In addition, the FcP 7010 using the IndraDrive controller provides further functional control features.
- Systems up to 20 kW commonly used in machine tools
- Systems up to 90 kW found in axis control in the metallurgy and press industries. In these fields axial piston pumps optimized for higher system pressure operation are typically used.

FcP 7010 with PGH, MOT-FC self-ventilated

Selection guide for Sytronix FcP 7010 with PGH

Pumps[1] n_{max} = 3000 rpm

Motors[1] — **MOT-FC IC411 (self-ventilated)**

Type	NG	p_{cont} [bar]	p_{max} [bar]	Q_{peff} [l/min]	Q_{max} [l/min]	1.5	2.2	3	4	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90
						4200	4000	4000	4000	4000	4000	3800	3800	3800	3800	3800	2800	2800	2800	2800	2800
						P_{nom} [kW] / n_{max} [rpm]															
						p_{eff}** [bar]															
PGH2	005	315	350	12	15	87	128	176	229												
	006	315	350	14	18	73	106	147	191	264											
	008	315	350	19	24	54	80	110	143	198	269										
PGH3	011	315	350	26	33		58	80	104	144	196	288									
	013	315	350	31	39		49	68	88	122	166	244									
	016	315	350	38	48		40	55	71	99	135	198	269								
PGH4	020	315	350	48	60	22	32	44	57	79	108	158	216	264	314						
	025	315	350	60	75	17	26	35	46	63	86	127	172	211	252						
	032	315	350	77	96		20	27	36	49	67	99	135	165	197	267					
	040	315	350	96	120/112*		16	22	29	40	54	79	108	132	157	213	262				
	050	250	310	120	150/140*			18	23	32	43	63	86	106	126	171	209				
PGH5	063	315	350	151	189/176*				18	25	34	50	68	84	100	135	166	202	247		
	080	315	350	192	240/224*					20	27	40	54	66	79	107	131	159	195	266	
	100	315	350	240	300/280*					16	22	32	43	53	63	85	105	128	156	212	255
	125	315	350	300	375/350*						17	25	34	42	50	68	84	102	125	170	204
	160	210	260	384	480/448*							20	27	33	39	53	65	80	97	133	159
	200	170	210	480	600/560*							16	22	26	31	43	52	64	78	106	128
	250	135	170	600	750/700*								17	21	25	34	42	51	62	85	102

= Preferred motor-pump-unit

☐ = on request

* Flow limited by the maximum motor speed

** The effective pressure was calculated without the degree of efficiency.

Controller — Rexroth IndraDrive C

		K [%]																			
HCS01.1E	-W0008	79																			
	-W0018	224	165	125																	
	-W0028			189	146	105															
	-W0054					191	140	100													
HCS02.1E	-W0070						187	133	100												
HCS03.1E	-W0070								161	132	113										
	-W0100										183	135	109								
	-W0150											176	142	117							
	-W0210													179	146	112					
HCS04.2E	-W0350															189	158				
	-W0420																192				

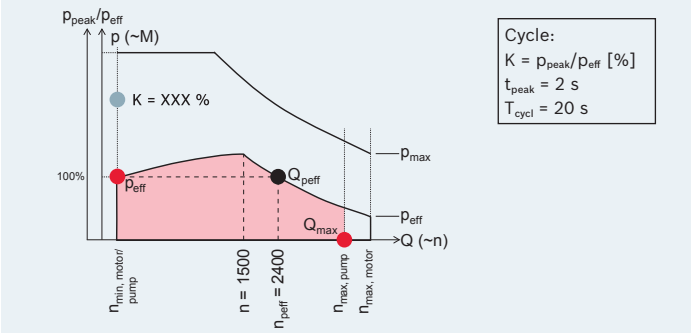
[1] The pump and motor can also be ordered separately as motor-pump-unit MPES2 (see "Motor-pump-units" starting on page 53)

Note: For a detailed explanation of the tables, see page 10

Selection example for system key

SYT-FCP7010-PGH [***] (1) -S-FC2FS [***] (2) -HC [***] (3) -NNNN ---------> SYT-FCP7010-PGH [075] (1) -S-FC2FS [127] (2) -HC [100] (3) -NNNN

Detailed component information:
Motors: see "Motors" starting on page 66
Pumps: data sheets 10227, 10223
Controller: catalog R999000018 (DE), R999000019 (EN)



Performance curve for FcP 7010 – self-ventilated motor

FcP 7010 with PGH, MOT-FC forced-ventilated

Selection guide for Sytronix FcP 7010 with PGH

Pumps[1)] n_{max} = 3000 rpm

Motors[1)] — **MOT-FC IC416 (forced-ventilated)**

Type	NG	p_{cont} [bar]	p_{max} [bar]	Q_{peff} [l/min]	Q_{max} [l/min]	1.5	2.2	3	4	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90
						4200	4000	4000	4000	4000	4000	3800	3800	3800	3800	3800	2800	2800	2800	2800	2800
						P_{nom} [kW] / n_{max} [rpm]															
						p_{eff}** [bar]															
PGH2	005	315	350	8	15	124	182	251													
	006	315	350	9	18	104	152	209	272												
	008	315	350	12	24	78	114	157	204	283											
PGH3	011	315	350	17	33		83	114	149	206	280										
	013	315	350	20	39		70	97	126	174	237										
	016	315	350	24	48		57	79	102	141	192	283									
PGH4	020	315	350	30	60	31	46	63	82	113	154	226	308								
	025	315	350	38	75	25	36	50	65	90	123	181	246	302							
	032	315	350	48	96	19	28	39	51	71	96	141	192	236	281						
	040	315	350	60	120	16	23	31	41	57	77	113	154	188	225	305					
	050	250	310	75	150		18	25	33	45	62	90	123	151	180	244					
PGH5	063	315	350	95	189/176*			20	26	36	49	72	98	120	143	193	237	289			
	080	315	350	120	240/224*			16	20	28	38	57	77	94	112	152	187	228	278		
	100	315	350	150	300/280*				16	23	31	45	62	75	90	122	150	182	222	303	
	125	315	350	188	375/350*					18	25	36	49	60	72	98	120	146	178	243	292
	160	210	260	240	480/448*						19	28	38	47	56	76	93	114	139	190	
	200	170	210	300	600/560*						15	23	31	38	45	61	75	91	111	152	
	250	135	170	375	750/700*							18	25	30	36	49	60	73	89	121	

= Preferred motor-pump-unit

☐ = on request

* Flow limited by the maximum motor speed

** The effective pressure was calculated without the degree of efficiency.

K [%]

Controller				1.5	2.2	3	4	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90
Rexroth IndraDrive C	HCS01.1E	-W0008		79															
		-W0018		224	165	125													
		-W0028				189	146	105											
		-W0054						191	140	100									
	HCS02.1E	-W0070							187	133	100								
	HCS03.1E	-W0070									161	132	113						
		-W0100											183	135	109				
		-W0150												176	142	117			
		-W0210														179	146	112	
	HCS04.2E	-W0350																189	158
		-W0420																	192

[1)] The pump and motor can also be ordered separately as motor-pump-unit MPES2 (see ”Motor-pump-units” starting on page 53)

Note: For a detailed explanation of the tables, see page 10

Selection example for system key

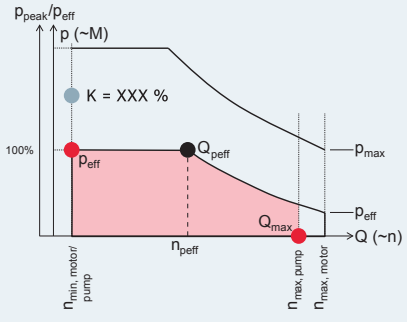
SYT-FCP7010-PGH [***] 1 -S-FC2FA [***] 2 -HC [***] 3 -NNNN ---------> SYT-FCP7010-PGH [075] 1 -S-FC2FA [181] 2 -HC [100] 3 -NNNN

Detailed component information:

Motors: see ”Motors” starting on page 66

Pumps: data sheets 10227, 10223

Controller: catalog R999000018 (DE), R999000019 (EN)



Performance curve for FcP 7010 – forced-ventilated motor

FcP 7010 with A10VZO-EZ4

Selection guide for Sytronix FcP 7010 with A10VZO-EZ4

Pumps[1]							Motors[1]													
							MOT-FC IC411 (self-ventilated)													
Type	NG	p_{cont} [bar]	p_{max} [bar]	n_{max} [rpm]	Q_{peff} [l/min]	Q_{max} [l/min]	1.5	2.2	3	4	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90
							4200	4000	4000	4000	4000	4000	3800	3800	3800	3800	3800	2800	2800	2800	2800	2800
							P_{nom} [kW] / n_{max} [rpm]													
							p_{eff}* [bar]													
A10VZO-EZ4	010	250	315	3600	24	37	59	87	120	156	215									
	018	280	350	3300	43	59	35	51	70	91	126	171								
	028	280	350	3000	67	84	22	33	45	58	81	110	162	220						
	045	280	350	3000	108	135		20	28	36	50	68	101	137	168	200				
	071	280	350	2550	170	181			18	23	32	43	64	87	106	126	171	210	256	
	100	280	350	2300	230	230					23	31	45	62	75	90	122	150	182	222
	140	280	350	2200	308	308					16	22	32	44	54	64	87	107	130	159	217	260
	180	280	350	1800	324	324						17	25	34	42	50	68	83	101	124	169	202

* The effective pressure was calculated without the degree of efficiency

= Preferred motor-pump-unit ☐ = on request

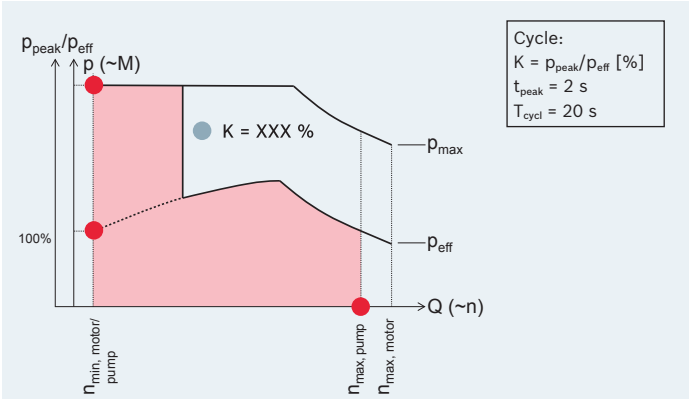
Controller				K [%]
	Rexroth IndraDrive C	HCS01.1E	-W0008	79
			-W0018	224 165 125
			-W0028	189 146 105
			-W0054	191 140 100
		HCS02.1E	-W0070	187 133 100
		HCS03.1E	-W0070	161 132 113
			-W0100	183 135 109
			-W0150	176 142 117
			-W0210	179 146 112
		HCS04.2E	-W0350	189 158
			-W0420	192

[1] The pump and motor can also be ordered separately as motor-pump-unit MPES2 (see "Motor-pump-units" starting on page 53)
Note: For a detailed explanation of the tables, see page 10

Selection example for system key

SYT-FCP7010-A10 [***] 1 -S-FC2FS [***] 2 -HC [***] 3 -NNNN --------> SYT-FCP7010-A10 [084] 1 -S-FC2FS [110] 2 -HC [140] 3 -NNNN

Detailed component information:
Motors: see "Motors" starting on page 66
Pumps: data sheet 91485
Controller: catalog R999000241 (DE), R999000242 (EN)



Performance curve for FcP 7010 –
self-ventilated motor with axial piston pump with two-point displacement

FcP 7010 with A4VSO-EZ

Selection guide for Sytronix FcP 7010 with A4VSO-EZ

Pumps[1]							Motors[1]								
							MOT-FC IC411 (self-ventilated)								
Type	NG	p_{cont} [bar]	p_{max} [bar]	n_{max} [rpm]	Q_{peff} [l/min]	Q_{max} [l/min]	18.5	22	30	37	45	55	75	90	P_{nom} [kW]
							3800	3800	3800	2800	2800	2800	2800	2800	n_{max} [rpm]
							p_{eff}* [bar]								
A4VSO-EZ	040	350	400	2600	96	104	188	225	305						
	071	350	400	2200	156	156	106	127	172	211	257	313			
	125	350	400	1800	225	225	60	72	98	120	146	178	234	292	
	180	350	400	1800	324	324			68	83	101	124	169	202	

* The effective pressure was calculated without the degree of efficiency.

= Preferred motor-pump-unit ☐ = on request

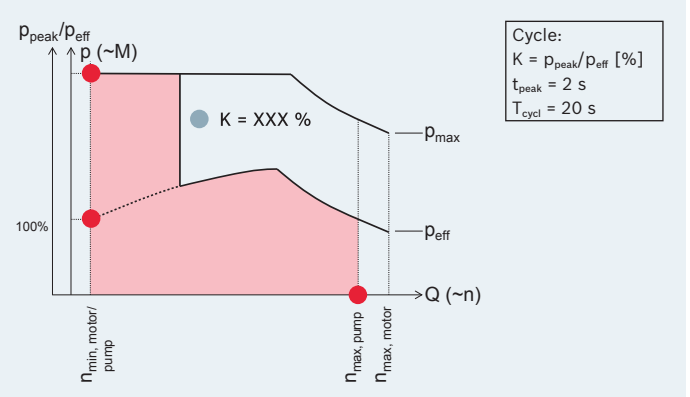
Controller				K [%]								
Rexroth IndraDrive C	HCS03.1E	-W0070		132	113							
		-W0100			183	135	109					
		-W0150				176	142	117				
		-W0210						179	146	112		
	HCS04.2E	-W0350								189	158	
		-W0420									192	

[1] The pump and motor can also be ordered separately as motor-pump-unit MPES2 (see "Motor-pump-units" starting on page 53)
Note: For a detailed explanation of the tables, see page 10

Selection example for system key

SYT-FCP7010-A04 [***] 1 -S-FC2FS [***] 2 -HC [***] 3 -NNNN ---------> SYT-FCP7010-A04 [156] 1 -S-FC2FS [211] 2 -HC [142] 3 -NNNN

Detailed component information:
Motors: see "Motors" starting on page 66
Pumps: data sheet 92050 (for control valve refer to data sheet 91485)
Controller: catalog R999000241 (DE), R999000242 (EN)



Performance curve for FcP 7010 –
self-ventilated motor with axial piston pump with two-point displacement

FcP 5010

Features

- Performance up to 90 kW effective
- FcP 5010 based on the Rexroth Fv VFD offering standard control features and analog and PROFIBUS interfaces. Simple on-board configuration using the interface control panel.
- 1-quadrant operation
- Pump protection

Components

- Motor-pump-unit MPES2 consisting of
  - MOT-FC motor, forced- or self-ventilated
  - Pump, type PGF, PGH, A10VZO-EZ4 or A4VSO-EZ
  - Standard coupling elements
- Rexroth Fv freqency converter, type FVCA01.1 (-XXX-P002)

Applications

- Suitable for use in open hydraulic circuits for central pressure supply in assemblies with multiple axes: i.e. constant pressure systems. FcP is an energy-saving solution and can reduce hydraulic energy consumption by 30 to 70%, depending on the operational cycle. Typically a smaller displacement pump can be used and cooling requirements are reduced for the same hydraulic output.
- Systems up to 20 kW commonly used in machine tools
- Systems from 20 to 90 kW found in axis control in the metallurgy and press industries. In these fields axial piston pumps optimized for higher system pressure operation are typically used.

FcP 5010 with PGF, MOT-FC self-ventilated

Selection guide for Sytronix FcP 5010 with PGF

Pumps[1] n_{max} = 3600 rpm						Motors[1] MOT-FC IC411 (self-ventilated)							
Type	**NG**	**p_{cont} [bar]**	**p_{max} [bar]**	**Q_{peff} [l/min]**	**Q_{max} [l/min]**	1.5	2.2	3	4	5.5	7.5	11	P_{nom} [kW]
						4200	4000	4000	4000	4000	4000	3800	n_{max} [rpm]
						p_{eff}* [bar]							
PGF2	006	210	250	14	23	67	98	135					
PGF2	008	210	250	19	29	53	78	107	139				
PGF2	011	210	250	26	39	40	58	80	104	144			
PGF2	013	210	250	31	47	33	48	66	86	119			
PGF2	016	210	250	38	57	27	40	55	71	99	135		
PGF2	019	210	250	46	68	23	34	47	61	84	114		
PGF2[2]	022	180	210	53	66	20	29	40	52	72	98	144	

* The effective pressure was calculated without the degree of efficiency.

= Preferred motor-pump-unit ☐ = on request

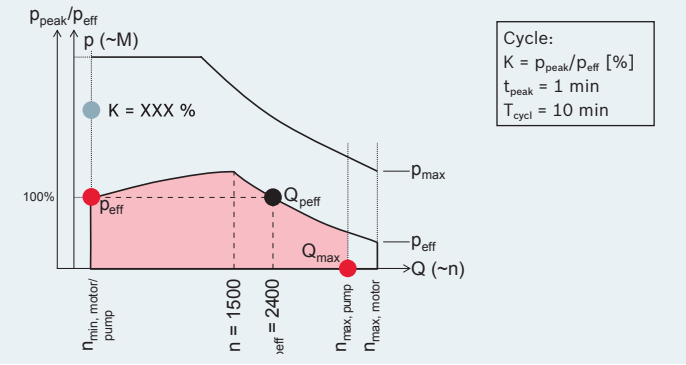
Controller			K [%]							
	Rexroth Fv FVCA01.1	1K50	118							
		2K20	162	120						
		4K00			164	127				
		5K50				165	118			
		7K50					155	113		
		11K0						160	114	
		15K0							157	

[1] The pump and motor can also be ordered separately as motor-pump-unit MPES2 (see "Motor-pump-units" starting on page 53)
[2] 3000 rpm
Note: For a detailed explanation of the tables, see page 10

Selection example for system key

SYT-FCP5010-PGF [***] 1 -S-FC2FS [***] 2 -FV [***] 3 -NNNN ---------> SYT-FCP5010-PGF [047] 1 -S-FC2FS [086] 2 -FV [127] 3 -NNNN

Detailed component information:
Motors: see "Motors" starting on page 66
Pumps: data sheet 10213
Controller: catalog R912004739



Performance curve for FcP 5010 – self-ventilated motor

FcP 5010 with PGF, MOT-FC forced-ventilated

Selection guide for Sytronix FcP 5010 with PGF

Pumps[1] n_{max} = 3600 rpm						Motors[1] MOT-FC IC 416 (forced-ventilated)						
Type	**NG**	**p_{cont} [bar]**	**p_{max} [bar]**	**Q_{peff} [l/min]**	**Q_{max} [l/min]**	1,5	2,2	3	4	5,5	7,5	P_{nom} [kW]
						4200	4000	4000	4000	4000	4000	n_{max} [rpm]
						p_{eff}* [bar]						
PGF2	006	210	250	9	23	96	140	193				
PGF2	008	210	250	12	29	76	111	153	199			
PGF2	011	210	250	17	39	57	83	114	149	206		
PGF2	013	210	250	20	47	47	69	94	123	170		
PGF2	016	210	250	24	57	39	57	79	102	141	192	
PGF2	019	210	250	29	68	33	48	66	86	120	163	
PGF2[2]	022	180	210	33	66	28	41	57	74	103	140	

* The effective pressure was calculated without the degree of efficiency.

= Preferred motor-pump-unit ☐ = on request

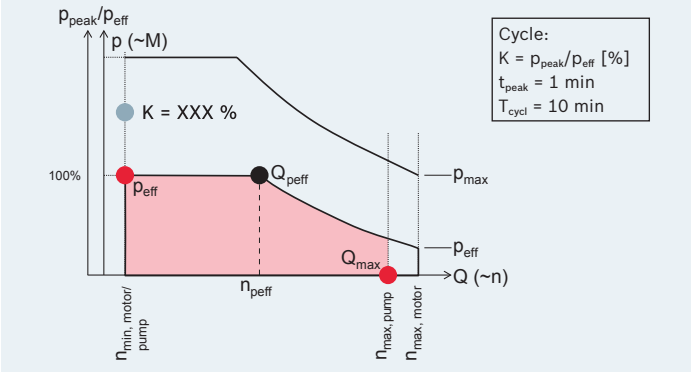
Controller			K [%]						
	Rexroth Fv FVCA01.1	1K50	118						
		2K20	162	120					
		4K00			164	127			
		5K50				165	118		
		7K50					155	113	
		11K0						160	

[1] The pump and motor can also be ordered separately as motor-pump-assembly MPES2 (see „Motor-pump-assemblies“ starting on page 53)
[2] 3000 rpm
Note: For a detailed explanation of the tables, see page 10

Selection example for system key

SYT-FCP5010-PGF [***] 1 -S-FC2A [***] 2 -FV [***] 3 -NNNN ---------> SYT-FCP5010-PGF [047] 1 -S-FC2FA [123] 2 -FV [127] 3 -NNNN

Detailed component information:
Motors: see ”Motors” starting on page 66
Pumps: data sheet 10213
Controller: catalog R912004739



Performance curve for FcP 5010 – forced-ventilated motor

FcP 5010 with PGH, MOT-FC self-ventilated

Selection guide for Sytronix FcP 5010 with PGH

Pumps[1)] n_{max} = 3000 rpm

Motors[1)] **MOT-FC IC 411 (self-ventilated)**

Type	NG	p_{cont} [bar]	p_{max} [bar]	Q_{peff} [l/min]	Q_{max} [l/min]	1,5	2,2	3	4	5,5	7,5	11	15	18,5	22	30	37	45	55	75	90
P_{nom} [kW]																					
n_{max} [rpm]						4200	4000	4000	4000	4000	4000	3800	3800	3800	3800	3800	2800	2800	2800	2800	2800
						p_{eff}** [bar]															
PGH2	005	315	350	12	15	87	128	176	229												
	006	315	350	14	18	73	106	147	191	264											
	008	315	350	19	24	54	80	110	143	198	269										
PGH3	011	315	350	26	33		58	80	104	144	196	288									
	013	315	350	31	39		49	68	88	122	166	244									
	016	315	350	38	48		40	55	71	99	135	198	269								
PGH4	020	315	350	48	60	22	32	44	57	79	108	158	216	264	314						
	025	315	350	60	75	17	26	35	46	63	86	127	172	211	252						
	032	315	350	77	96		20	27	36	49	67	99	135	165	197	267					
	040	315	350	96	120/112*		16	22	29	40	54	79	108	132	157	213	262				
	050	250	310	120	150/140*			18	23	32	43	63	86	106	126	171	209				
PGH5	063	315	350	151	189/176*				18	25	34	50	68	84	100	135	166	202	247		
	080	315	350	192	240/224*					20	27	40	54	66	79	107	131	159	195	266	
	100	315	350	240	300/280*					16	22	32	43	53	63	85	105	128	156	212	255
	125	315	350	300	375/350*						17	25	34	42	50	68	84	102	125	170	204
	160	210	260	384	480/448*							20	27	33	39	53	65	80	97	133	159
	200	170	210	480	600/560*							16	22	26	31	43	52	64	78	106	128
	250	135	170	600	750/700*								17	21	25	34	42	51	62	85	102

= Preferred motor-pump-unit

☐ = on request

* Flow limited by the maximum motor speed

** The effective pressure was calculated without the degree of efficiency.

			K [%]																
Controller	Rexroth Fv FVCA01.1	1K50	118																
		2K20	162	120															
		4K00			164	127													
		5K50				165	118												
		7K50					155	113											
		11K0						160	114										
		15K0							157	118									
		18K5							186	139	115								
		22K0								157	129	110							
		30K0									176	150	111						
		37K0										188	139	112					
		45K0											176	142	117				
		55K0												164	136	111			
		75K0													188	154	117		
		90K0														185	141	117	

[1)] The pump and motor can also be ordered separately as motor-pump-unit MPES2 (see "Motor-pump-units" starting on page 53)

Note: For a detailed explanation of the tables, see page 10

Selection example for system key

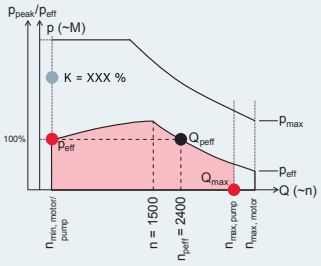
SYT-FCP5010-PGH [***] 1 -S-FC2FS [***] 2 -FV [***] 3 -NNNN ---------> SYT-FCP5010-PGH [075] 1 -S-FC2FS [181] 2 -FV [157] 3 -NNNN

Detailed component information:

Motors: see "Motors" starting on page 66

Pumps: data sheets 10227, 10223

Controller: catalog R912004739



Cycle:
K = p_{peak}/p_{eff} [%]
t_{peak} = 1 min
T_{cycl} = 10 min

Performance curve for FcP 5010 – self-ventilated motor

FcP 5010 with PGH, MOT-FC forced-ventilated

Selection guide for Sytronix FcP 5010 with PGH

Pumps[1] n_{max} = 3000 rpm

Motors[1] **MOT-FC IC 411 (forced-ventilated)**

Type	NG	p_{cont} [bar]	p_{max} [bar]	Q_{peff} [l/min]	Q_{max} [l/min]	1,5	2,2	3	4	5,5	7,5	11	15	18,5	22	30	37	45	55	75	90	P_{nom} [kW]
						4200	4000	4000	4000	4000	4000	3800	3800	3800	3800	3800	2800	2800	2800	2800	2800	n_{max} [rpm]
						p_{eff}** [bar]																
PGH2	005	315	350	8	15	124	182	251														
	006	315	350	9	18	104	152	209	272													
	008	315	350	12	24	78	114	157	204	283												
PGH3	011	315	350	17	33		83	114	149	206	280											
	013	315	350	20	39		70	97	126	174	237											
	016	315	350	24	48		57	79	102	141	192	283										
PGH4	020	315	350	30	60	31	46	63	82	113	154	226	308									
	025	315	350	38	75	25	36	50	65	90	123	181	246	302								
	032	315	350	48	96	19	28	39	51	71	96	141	192	236	281							
	040	315	350	60	120	16	23	31	41	57	77	113	154	188	225	305						
	050	250	310	75	150		18	25	33	45	62	90	123	151	180	244						
PGH5	063	315	350	95	189/176*			20	26	36	49	72	98	120	143	193	237	289				
	080	315	350	120	240/224*			16	20	28	38	57	77	94	112	152	187	228	278			
	100	315	350	150	300/280*				16	23	31	45	62	75	90	122	150	182	222	303		
	125	315	350	188	375/350*					18	25	36	49	60	72	98	120	146	178	243	292	
	160	210	260	240	480/448*						19	28	38	47	56	76	93	114	139	190		
	200	170	210	300	600/560*						15	23	31	38	45	61	75	91	111	152		
	250	135	170	375	750/700*							18	25	30	36	49	60	73	89	121		

= Preferred motor-pump-unit

☐ = on request

* Flow limited by the maximum motor speed

** The effective pressure was calculated without the degree of efficiency.

Controller			K [%]
	Rexroth Fv FVCA01.1	1K50	118
		2K20	162 120
		4K00	164 127
		5K50	165 118
		7K50	155 113
		11K0	160 114
		15K0	157 118
		18K5	186 139 115
		22K0	157 129 110
		30K0	176 150 111
		37K0	188 139 112
		45K0	176 142 117
		55K0	164 136 111
		75K0	188 154 117
		90K0	185 141 117

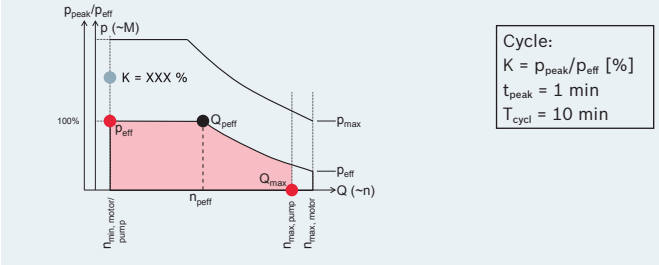
[1] The pump and motor can also be ordered separately as motor-pump-unit MPES2 (see "Motor-pump-units" starting on page 53)

Note: For a detailed explanation of the tables, see page 10

Selection example for system key

SYT-FCP5010-PGH [***] 1 -S-FC2FA [***] 2 -FV [***] 3 -NNNN ---------> SYT-FCP5010-PGH [075] 1 -S-FC2FA [181] 2 -FV [157] 3 -NNNN

Detailed component information:
Motors: see "Motors" starting on page 66
Pumps: data sheets 10227, 10223
Controller: catalog R912004739



Performance curve for FcP 5010 – forced-ventilated motor

FcP 5010 with A10VZO-EZ4

Selection guide for Sytronix FcP 5010 with A10VZO-EZ4

Pumps[1]							Motors[1] MOT-FC IC411 (self-ventilated)												
Type	NG	p_{cont} [bar]	p_{max} [bar]	n_{max} [rpm]	Q_{peff} [l/min]	Q_{max} [l/min]	1.5	2.2	3	4	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90
							4200	4000	4000	4000	4000	4000	3800	3800	3800	3800	3800	2800	2800	2800	2800	2800
							P_{nom} [kW] n_{max} [rpm]												
							p_{eff}* [bar]												
A10VZO-EZ4	010	250	315	3600	24	37	59	87	120	156	215								
	018	280	350	3300	43	59	35	51	70	91	126	171							
	028	280	350	3000	67	84	22	33	45	58	81	110	162	220					
	045	280	350	3000	108	135		20	28	36	50	68	101	137	168	200			
	071	280	350	2550	170	181			18	23	32	43	64	87	106	126	171	210	256
	100	280	350	2300	230	230					23	31	45	62	75	90	122	150	182	222	
	140	280	350	2200	308	308					16	22	32	44	54	64	87	107	130	159	217	260
	180	280	350	1800	324	324						17	25	34	42	50	68	83	101	124	169	202

* The effective pressure was calculated without the degree of efficiency.

= Preferred motor-pump-unit ☐ = on request

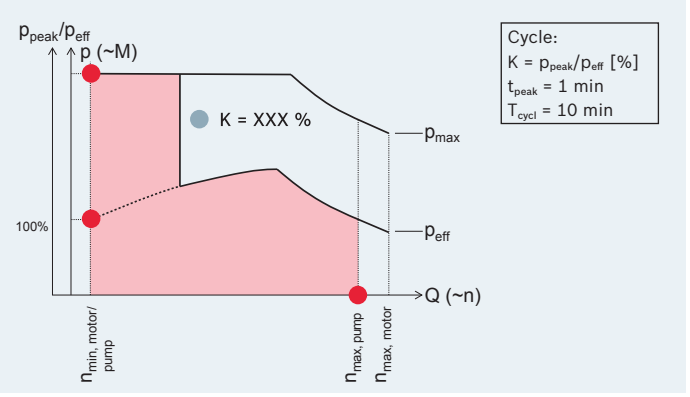
Controller			K [%]
	Rexroth Fv FVCA01.1	1K50	118
		2K20	162 120
		4K00	164 127
		5K50	165 118
		7K50	155 113
		11K0	160 114
		15K0	157 118
		18K5	186 139 115
		22K0	157 129 110
		30K0	176 150 111
		37K0	188 139 112
		45K0	176 142 117
		55K0	164 136 111
		75K0	188 154 117
		90K0	185 141 117

[1] The pump and motor can also be ordered separately as motor-pump-unit MPES2 (see "Motor-pump-units" starting on page 53)
Note: For a detailed explanation of the tables, see page 10

Selection example for system key

SYT-FCP5010-A10 [***] 1 -S-FC2FS [***] 2 -FV [***] 3 -NNNN ---------> SYT-FCP5010-A10 [084] 1 -S-FC2FS [110] 2 -FV [113] 3 -NNNN

Detailed component information:
Motors: see "Motors" starting on page 66
Pumps: data sheet 91485
Controller: catalog R912004739



Performance curve for FcP 5010 –
self-ventilated motor with axial piston pump with two-point displacement

FcP 5010 with A4VSO-EZ

Selection guide for Sytronix FcP 5010 with A4VSO-EZ

Pumps[1]							Motors[1]								
							MOT-FC IC411 (self-ventilated)								
Type	NG	p_{cont} [bar]	p_{max} [bar]	n_{max} [rpm]	Q_{peff} [l/min]	Q_{max} [l/min]	18.5	22	30	37	45	55	75	90	P_{nom} [kW]
							3800	3800	3800	2800	2800	2800	2800	2800	n_{max} [rpm]
							p_{eff}* [bar]								
A4VSO-EZ	040	350	400	2600	96	104	188	225	305						
	071	350	400	2200	156	156	106	127	172	211	257	313			
	125	350	400	1800	225	225	60	72	98	120	146	178	234	292	
	180	350	400	1800	324	324			68	83	101	124	169	202	

* The effective pressure was calculated without the degree of efficiency.

= Preferred motor-pump-unit ☐ = on request

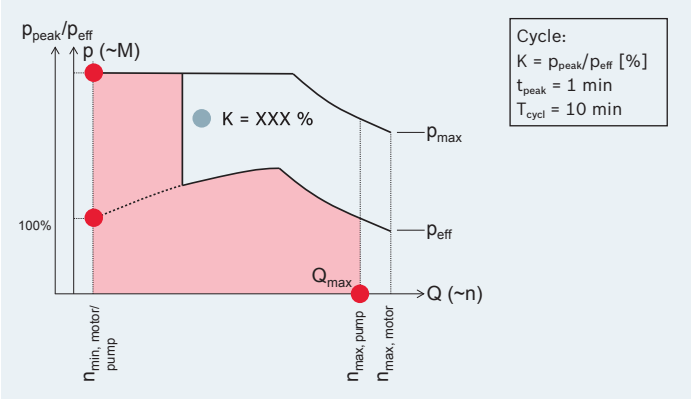
Controller			K [%]							
Rexroth Fv FVCA01.1	18K5		115							
	22K0		129	110						
	30K0		176	150	111					
	37K0			188	139	112				
	45K0				176	142	117			
	55K0					164	136	111		
	75K0						188	154	117	
	90K0							185	141	117

[1] The pump and motor can also be ordered separately as motor-pump-unit MPES2 (see "Motor-pump-units" starting on page 53)
Note: For a detailed explanation of the tables, see page 10

Selection example for system key

SYT-FCP5010-A04 [***] (1) -S-FC2FS [***] (2) -FV [***] (3) -NNNN ---------> SYT-FCP5010-A04 [225] (1) -S-FC2FS [178] (2) -FV [154] (3) -NNNN

Detailed component information:
Motors: see "Motors" starting on page 66
Pumps: data sheet 92050 (for control valve refer to data sheet 91485)
Controller: catalog R912004739



Performance curve for FcP 5010 –
self-ventilated motor with axial piston pump with two-point displacement

Sytronix SvP servo-variable pump drives

SvP system

Sytronix SvP (**s**ervo-**v**ariable **p**ump drive) 7010 systems consist of a motor-pump-unit driven by a permanent magnet synchronous servo motor and servo controller. Whereas, the SvP 5010 systems. which have been designed for the Asian market only, consist of a motor-pump-unit driven by an asynchronous servo motor and a frequency converter.

In the family of Sytronix variable-speed pump drives, the Sytronix SvP offers the highest dynamic performance and control accuracy. SvP systems provide the broadest range of control functionality, from pressure and force control to flow and speed control to position control and alternating control.

SvP 7010 and SvP 5010 utilize different VFD drive electronics: respectively IndraDrive controller and Rexroth Fv. Differences between both types include the type and scope of communication and bus interfaces, as well as additional functionality and user interfaces.

The controller for the SvP 7010 family is part of Rexroth's IndraDrive family using the IndraWorks engineering tool as the interface. In addition to traditional hydraulic control functionality, the SvP system provides further functions of pressure ripple compensation, energy monitoring, condition monitoring, as well as maintenance and troubleshooting aids.

The SvP 7010 system can be configured for required communication interfaces by exchanging the CSH controller. The command and actual values of pressure, flow and position can then be commanded and monitored by a high level machine control system using either an analog interface or industry standard bus interface, thus providing an easy and flexible integration into machine control systems.

Components

- Hydraulic pump
- Synchronous servo motor (SvP 7010)
- IndraDrive servo controller (SvP 7010)
- Asynchronous servo motor (SvP 5010)
- Rexroth Fv frequency converter (SvP 5010)
- Pressure transducer

Applications

The system is suitable for use in either open or closed hydraulic systems controlling hydraulic axes.

Sytronix SvP systems

Sytronix SvP features key functions:

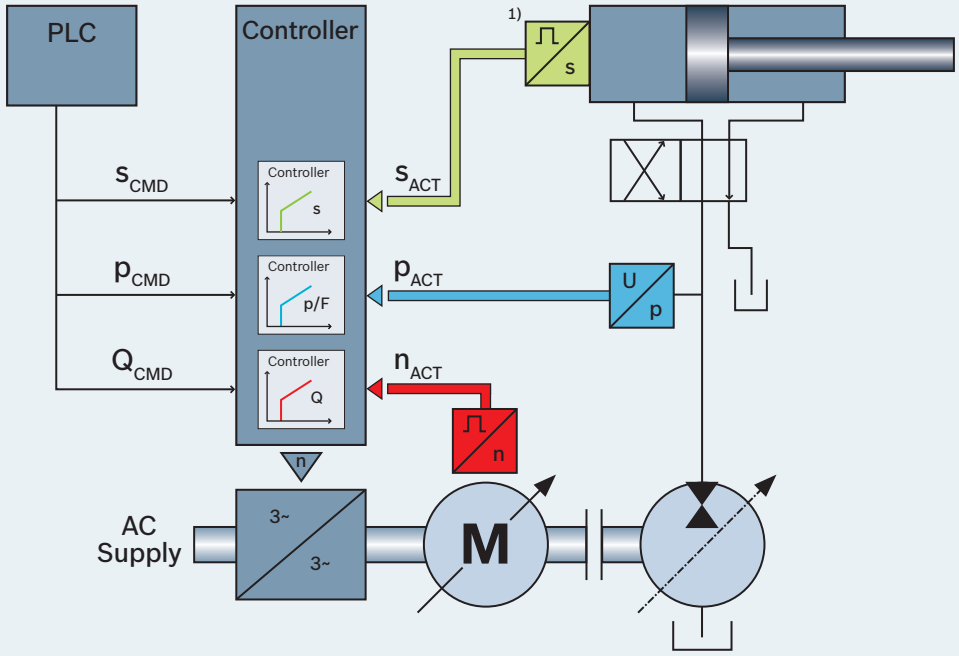
- High efficiency servo motors with a level of standard and direct pump mount versions
- High dynamics and control accuracy
- Broad range of control functionality

Functionality

Using an internal gear pump, type PGH or PGM, the required flow is controlled directly by motor speed. The pumps are optimized for variable-speed operation and achieve a high overall efficiency due to low leakage, and operate with minimum noise.

In operation, sensors measure pressure, actuator position[1)] and the servo motor speed, which are used by the servo controller. Command values, which can be set by the machine control, are compared by the IndraDrive, which adjusts the pump drive speed to match the system requirements.

SvP block diagram



[1)] Applies not for SvP 5010

SvP 7010

Features

- Performance up to 80 kW effective
- Maximum system pressure with PGH pump up to 350 bar, with PGM up to 210 bar, with A10 up to 350 bar
- Suitable for axis control in open and closed hydraulic systems
- 2-quadrant operation

Components

- Motor-pump-unit MPA01 (direct coupling) or MPAS1 (standard coupling) consisting of
  - MSK motor, air- or liquid-cooled
  - Internal gear pump, type PGH, PGM
  - Axial piston pump, type A10
  - Standard coupling elements
- IndraDrive controller (HCS or HMS) with scalable basic or advanced control unit

Application

The SvP 7010 offers performance up to 80 kW and is ideal in the following application areas:

- Plastics processing machines
- Die-casting machines
- Injection molding machines
- Presses[1)]

The controller is optimized for Sytronix applications and compensates for the characteristics of hydraulic systems to provide optimal dynamics and accuracy.

[1)] Consider fan approval and safety directives in press applications

SvP 7010 with PGH, MSK forced-ventilated Direct coupling

Selection guide for Sytronix SvP 7010 with PGH

Pumps[1] n_{max} = 3000 rpm

Motors[1] **(forced-ventilated)**

Type	NG	$p_{cont.}$ [bar]	p_{max} [bar]	Q_{max} [l/min]	MSK101 C-0202	MSK101 C-0300	MSK101 D-0202	MSK101 D-0300	MSK101 E-0202	MSK101 E-0300	MSK101 F-0202	MSK101 F-0300	MSK133 B-0202	MSK133 C-0202	MSK133 D-0202	MSK133 E-0202	
					48.0	48.0	75.0	75.0	105.0	105.0	124.5	124.5	152.0	204.0	263.0	293.0	M_{eff} [Nm]
					110.0	110.0	160.0	160.0	231.0	231.0	310.0	310.0	320.0	425.0	520.0	630.7	M_{max} [Nm]
					p_{eff}* [bar]												
PGH4	020	315	350	60	150	150	234	234									
	025	315	350	75	119	119	186	186	261	261	309	309					
	032	315	350	100	92	92	144	144	202	202	239	239					
	040	315	350	120	75	75	118	118	165	165	195	195					
	050	250	310	150	59	59	93	93	130	130	154	154					
	063	210	250	190	47	47	73	73	102	102	121	121					
PGH5	063	315	350	190									148	198	255	285	
	080	315	350	240									117	157	203	226	
	100	315	350	300									95	128	165	184	
	125	315	350	375									76	102	132	147	
	160	210	260	480									59	79	102	113	

* The effective pressure was calculated without the degree of efficiency.

= Preferred motor-pump-unit ☐ = on request

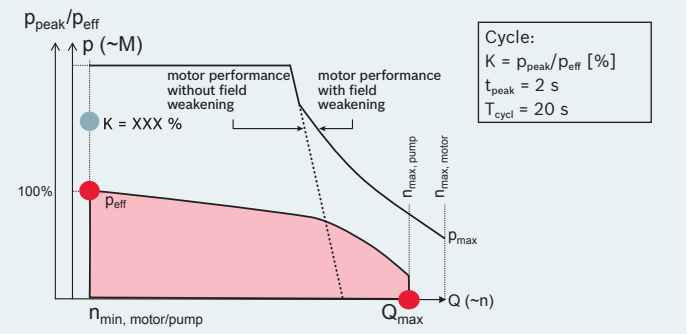
Controller				K [%]												
Rexroth IndraDrive C	HCS02.1E	-W0054		149	123											
		-W0070		188	159	137										
	HCS03.1E	-W0070		227	199	171	135	130		118						
		-W0100			229	206	172	168	138	158	125	138	111			
		-W0150					212	214	184	217	176	188	155	128	115	
		-W0210							220		246	211	208	175	166	
	HCS04.2E	-W0350												198	215	
Rexroth IndraDrive M	HMS01.1N	-W0036		133	111											
		-W0054		199	169	145	110									
		-W0070			188	161	126	121								
		-W0110			229	210	177	173	142	164	130	143	115			
		-W0150					213	217	187	223	181	193	159	132	119	
		-W0210							220		245		208	174	165	
		-W0300												198	191	

[1] Pump and motor can also be ordered separately as motor-pump-unit MPA01 (see "Motor-pump-units" starting on page 53).
Note: For a detailed explanation of the tables, see page 10.

Selection example for system key

SYT-SVP7010-PGH [***] 1 -D-MSKHA [***] 2 -HM [***] 3 -NNNN ---------> SYT-SVP7010-PGH [375] 1 -D-MSKHA [132] 2 -HM [198] 3 -NNNN

Detailed component information:
Motors: see "Motors" starting on page 66
Pumps: data sheet 10227
Controller: catalog R999000018 (DE), R999000019 (EN)



Performance curve for SvP 7010 – forced-ventilated motor

SvP 7010 with PGH, MSK liquid-cooled
Direct coupling

Selection guide for Sytronix SvP 7010 with PGH

Pumps[1] n_{max} = 3000 rpm					Motors[1] MSK133 (liquid-cooled)				
					B-0203	C-0203	D-0203	E-0203	
Type	NG	$p_{cont.}$ [bar]	p_{max} [bar]	Q_{max} [l/min]	162.0	232.5	290.0	342.0	M_{eff} [Nm]
					300.0	400.0	500.0	583.0	M_{max} [Nm]
					p_{eff}* [bar]				
PGH5	063	315	350	190	157	226	282		
	080	315	350	240	125	179	224	264	
	100	315	350	300	102	146	182	214	
	125	315	350	375	81	117	145	171	
	160	210	260	480	63	90	112	132	

* The effective pressure was calculated without the degree of efficiency.

= Preferred motor-pump-unit ☐ = on request

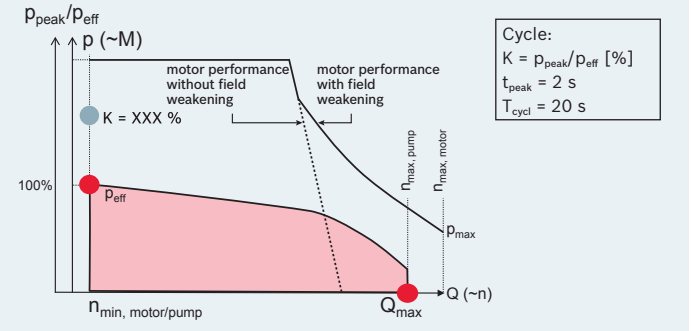
Controller				K [%]			
Rexroth IndraDrive C	HCS03.1E	-W0100		129			
		-W0150		176	136	116	
		-W0210			183	159	142
	HCS04.2E	-W0350				179	184
Rexroth IndraDrive M	HMS01.1N	-W0110		134			
		-W0150		181	140	119	
		-W0210			183	158	141
		-W0300				179	164

[1] Pump and motor can also be ordered separately as motor-pump-unit MPA01 (see "Motor-pump-units" starting on page 53)
Note: For a detailed explanation of the tables, see page 10.

Selection example for system key

SYT-SVP7010-PGH[***]1-D-MSKHL[***]2-HM[***]3-NNNN ---------> SYT-SVP7010-PGH[240]1-D-MSKHL[125]2-HM[134]3-NNNN

Detailed component information:
Motors: see "Motors" starting on page 66
Pumps: data sheet 10227
Controller: catalog R999000018 (DE), R999000019 (EN)



Performance curve for SvP 7010 – liquid-cooled motor

SvP 7010 with PGH, MSK forced-ventilated Standard coupling

Selection guide for Sytronix SvP 7010 with PGH

Pumps[1] n_{max} = 3000 rpm

Motors[1] **(forced-ventilated)**

Type	NG	$p_{cont.}$ [bar]	p_{max} [bar]	Q_{max} [l/min]	MSK071 D-0202	MSK071 D-0300	MSK071 E-0202	MSK071 E-0300	MSK101 C-0202	MSK101 C-0300	MSK101 D-0202	MSK101 D-0300	MSK101 E-0202	MSK101 E-0300	MSK133 B-0202	MSK133 C-0202	MSK133 D-0202	MSK133 E-0202
					26.3	26.3	34.5	35.5	48.0	48.0	75.0	75.0	105.0	105.0	152.0	204.0	263.0	293.0
					66.0	66.0	84.0	84.0	110.0	110.0	160.0	160.0	231.0	231.0	320.0	425.0	520.0	630.7
					p_{eff}* [bar]													
PGH2	006	315	350	18	254	254												
	008	315	350	24	202	202	264	264										
PGH3	011	315	350	33	150	150	197	197										
	013	315	350	39	124	124	163	163										
	016	315	350	48	103	103	135	135										
PGH4	020	315	350	60	82	82	108	108	Direct coupling available. Standard coupling on request.									
	025	315	350	75	65	65	86	86										
	032	315	350	100	51	51	66	66										
	040	315	350	120	41	41	54	54										
	050	250	315	150	33	33	43	43										
PGH5	063	315	350	190					47	47	73	73	102	102	Direct coupling available. Standard coupling on request.			
	080	315	350	240					37	37	58	58	81	81				
	100	315	350	300					30	30	47	47	66	66				
	125	315	350	375					24	24	38	38	53	53				
	160	210	260	480					19	19	29	29	41	41				
	200	170	210	600					15	15	24	24	33	33				
	250	135	170	750							19	19	26	26				

M_{eff} [Nm]
M_{max} [Nm]

= Preferred motor-pump-unit
☐ = on request

* The effective pressure was calculated without the degree of efficiency.

Controller

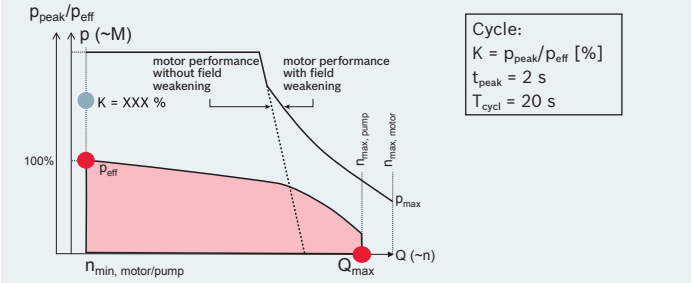
			K [%]														
Rexroth IndraDrive C	HCS02.1E	-W0028	177	146	132												
		-W0054	251	229	206	175	149	123									
		-W0070		251	243	221	188	159	137								
	HCS03.1E	-W0070				243	227	199	171	135	130						
		-W0100						229	206	172	168	138	138	111			
		-W0150								212	214	184	188	155	128	115	
		-W0210										220	211	208	175	166	
	HCS04.2E	-W0350													198	215	
Rexroth IndraDrive M	HMS01.1N	-W0020	150	123	112												
		-W0036	243	206	186	152	133	111									
		-W0054			243	227	199	169	145	111							
		-W0070						188	161	126	121						
		-W0110						229	210	177	173	142	143	115			
		-W0150								213	217	188	193	159	132	119	
		-W0210										220		208	174	165	
		-W0300													198	191	

[1] Pump and motor can also be ordered separately as motor-pump-unit MPAS1 (see "Motor-pump-units" starting on page 53).
Note: For a detailed explanation of the tables, see page 10.

Selection example for system key

SYT-SVP7010-PGH [***] 1 -S-MSKNA [***] 2 -HC [***] 3 -NNNN ---------> SYT-SVP7010-PGH [075] 1 -S-MSKNA [086] 2 -HC [175] 3 -NNNN

Detailed component information:
Motors: see "Motors" starting on page 66
Pumps: data sheets 10223, 10227
Controller: catalog R999000018 (DE), R999000019 (EN)



Performance curve for SvP 7010 – forced-ventilated motor

SvP 7010 with PGH, MSK liquid-cooled
Standard coupling

Selection guide for Sytronix SvP 7010 with PGH

Pumps[1] n_{max} = 3000 rpm					Motors[1] MSK133 (liquid-cooled)				
Type	NG	$p_{cont.}$ [bar]	p_{max} [bar]	Q_{max} [l/min]	B-0203	C-0203	D-0203	E-0203	
					162.0	232.5	290.0	342.0	M_{eff} [Nm]
					300.0	400.0	500.0	583.0	M_{max} [Nm]
					p_{eff}* [bar]				
PGH5	063	315	350	190	Direct coupling available. Standard coupling on request.				
	080	315	350	240					
	100	315	350	300					
	125	315	350	375					
	160	210	260	480					

* The effective pressure was calculated without the degree of efficiency.

= Preferred motor-pump-unit ☐ = on request

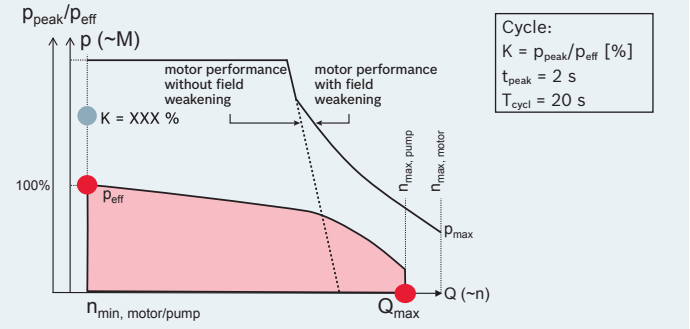
				K [%]				
Modular	Rexroth IndraDrive C	HCS03.1E	-W0100	129				
			-W0150	176	136	116		
			-W0210		183	159	142	
		HCS04.2E	-W0350			179	184	
	Rexroth IndraDrive M	HMS01.1N	-W0110	134				
			-W0150	181	140	119		
			-W0210		183	158	141	
			-W0300			179	164	

[1] Pump and motor can also be ordered separately as motor-pump-unit MPAS1 (see "Motor-pump-units" starting on page 53).
Note: For a detailed explanation of the tables, see page 10.

Selection example for system key

SYT-SVP7010-PGH [***] 1 -S-MSKHL [***] 2 -HM [***] 3 -NNNN ---------> SYT-SVP7010-PGH [300] 1 -S-MSKHL [146] 2 -HM [140] 3 -NNNN

Detailed component information:
Motors: see "Motors" starting on page 66
Pumps: data sheet 10227
Controller: catalog R999000018 (DE), R999000019 (EN)



Performance curve for SvP 7010 – liquid-cooled motor

SvP 7010 with PGM*, MSK forced-ventilated Standard coupling

Selection guide for Sytronix SvP 7010 with PGM

Pumps[1] n_{max} = 3000 rpm					Motors[1]				
					MSK101 (forced-ventilated)				
					C-0202	D-0202	E-0202	F-0202	
Type	**NG**	**$p_{cont.}$ [bar]**	**p_{max} [bar]**	**Q_{max} [l/min]**	48.0	75.0	105.0	124,5	M_{eff} [Nm]
					110.0	160.0	231.0	310,0	M_{max} [Nm]
					p_{eff}* [bar]				
PGM4	025	175	210	75	119				
	032	175	210	100	92	144			
	040	175	210	120	75	118	165		
	050	175	210	150	59	93	130	154	
	063	175	210	190	46	72	101	119	

* The effective pressure was calculated without the degree of efficiency.

= Preferred motor-pump-unit ☐ = on request

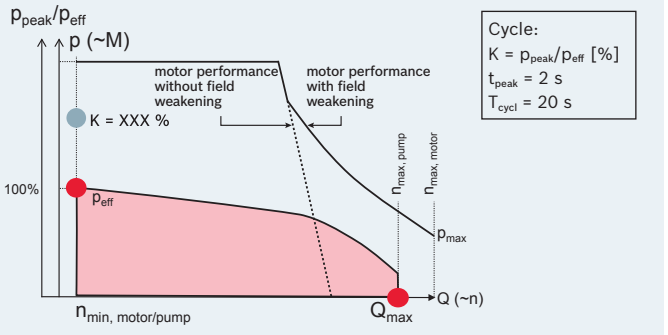
Controller				K [%]			
Rexroth IndraDrive C	HCS02.1E	-W0054		149			
		-W0070		188	137		
	HCS03.1E	-W0070		227	171	130	118
		-W0100			206	168	158
		-W0150				214	217
Rexroth IndraDrive M	HMS01.1N	-W0036		133			
		-W0054		199	145		
		-W0070			161	121	
		-W0110			210	173	164
		-W0150				217	223

[1] Pump and motor can also be ordered separately as motor-pump-unit MPAS1 (see ”Motor-pump-units” starting on page 53)
Note: For a detailed explanation of the tables, see page 10

Selection example for system key

SYT-SVP7010-PGM [***] 1 -S-MSKHA [***] 2 -HC [***] 3 -NNNN --------> SYT-SVP7010-PGM [100] 1 -S-MSKHA [144] 2 -HC [171] 3 -NNNN

Detailed component information:
Motors: see ”Motors” starting on page 66
Pumps: data sheet 10235
Controller: catalog R999000018 (DE), R999000019 (EN)



Performance curve for SvP 7010 – forced-ventilated motor

* SvP drive systems with PGM pumps have been designed for the Asian market only.

SvP 7010 with A10VZO-EZ4, MSK forced-ventilated Standard coupling

Selection guide for Sytronix SvP 7010 with A10VZO-EZ4

Pumps[1]						Motors[1] (forced-ventilated)													
						MSK071				MSK101						MSK133			
						D-0202	D-0300	E-0202	E-0300	C-0202	C-0300	D-0202	D-0300	E-0202	E-0300	B-0202	C-0202	D-0202	E-0202
Type	NG	$p_{cont.}$ [bar]	p_{max} [bar]	n_{max} [rpm]	Q_{max} [l/min]	26.3	26.3	34.5	35.5	48.0	48.0	75.0	75.0	105.0	105.0	152.0	204.0	263.0	293.0	M_{eff} [Nm]
						66.0	66.0	84.0	84.0	110.0	110.0	160.0	160.0	231.0	231.0	320.0	425.0	520.0	630.7	M_{max} [Nm]
						p_{eff}* [bar]														
A10VZO-EZ4	010	250	315	3600	37	157	157	206	212											
	018	280	350	3300	59	92	92	120	124	168	168									
	028	280	350	3000	84	59	59	77	80	108	108	168	168							
	045	280	350	3000	135					67	67	105	105	147	147	212				
	071	280	350	2550	181							66	66	93	93	134				
	100	280	350	2300	230											96	128	165	184	
	140	280	350	2200	308											68	92	118	131	
	180	280	350	1800	324											53	71	92	102	

* The effective pressure was calculated without the degree of efficiency.

= Preferred motor-pump-unit ☐ = on request

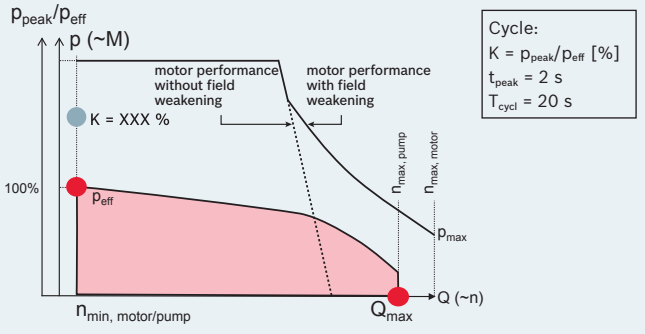
Controller				K [%]											
Rexroth IndraDrive C	HCS02.1E	-W0028		177	146	132									
		-W0054		251	229	206	170	149	123						
		-W0070			251	243	215	188	159	137					
	HCS03.1E	-W0070					237	227	199	171	135	130			
		-W0100							229	206	172	168	138	138	111
		-W0150									212	214	184	188	155	128	115
		-W0210											220	211	208	175	166
	HCS04.2E	-W0350														198	215
Rexroth IndraDrive M	HMS01.1N	-W0020		150	123	112									
		-W0036		243	206	186	152	133	111						
		-W0054				243	227	199	169	145	111				
		-W0070							188	161	126	121			
		-W0110							229	210	177	173	142	143	115
		-W0150									213	217	188	193	159	132	119
		-W0210											220		208	174	165
		-W0300														198	191

[1] Pump and motor can also be ordered separately as motor-pump-unit MPAS1 (see "Motor-pump-units" starting on page 53).
Note: For a detailed explanation of the tables, see page 10.

Selection example for system key

SYT-SVP7010-A10 [***] 1 -S-MSKHA [***] 2 -HC [***] 3 -NNNN ---------> SYT-SVP7010-A10 [084] 1 -S-MSKHA [168] 2 -HC [171] 3 -NNNN

Detailed component information:
Motors: see "Motors" starting on page 66
Pumps: data sheet 91485
Controller: catalog R999000018 (DE), R999000019 (EN)



Performance-curve for SvP 7010 – forced verntilated

SvP 7010 with A10VZO-EZ4, MSK liquid-cooled Standard coupling

Selection guide for Sytronix SvP 7010 with A10VZO-EZ4

Pumps[1]						Motors[1] MSK133 (liquid-cooled)				
						B-0202	C-0202	D-0202	E-0202	
Type	**NG**	**$p_{cont.}$ [bar]**	**p_{max} [bar]**	**n_{max} [rpm]**	**Q_{max} [l/min]**	152.0	204.0	263.0	293.0	M_{eff} [Nm]
						320.0	425.0	520.0	630.7	M_{max} [Nm]
						p_{eff}* [bar]				
A10VZO-EZ4	045	280	350	3000	135	226				
	071	280	350	2550	181	143				
	100	280	350	2300	230	102	146	182	215	
	140	280	350	2200	308	73	104	130	153	
	180	280	350	1800	324	57	81	101	119	

* The effective pressure was calculated without the degree of efficiency.

= Preferred motor-pump-unit ☐ = on request

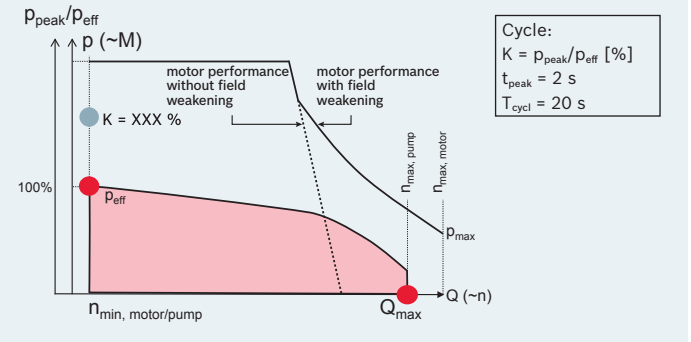
Controller				K [%]			
Rexroth IndraDrive C	HCS03.1E	-W0100		129			
		-W0150		176	136	116	
		-W0210			183	159	142
	HCS04.2E	-W0350				179	184
Rexroth IndraDrive M	HMS01.1N	-W0110		134			
		-W0150		181	140	119	
		-W0210			183	158	141
		-W0300				179	164

[1] Pump and motor can also be ordered separately as motor-pump-unit MPAS1 (see "Motor-pump-units" starting on page 53).
Note: For a detailed explanation of the tables, see page 10.

Selection example for system key

SYT-SVP7010-A10 [***] 1 -S-MSKHL [***] 2 -HC [***] 3 -NNNN ---------> SYT-SVP7010-A10 [230] 1 -S-MSKHL [182] 2 -HC [116] 3 -NNNN

Detailed component information:
Motors: see "Motors" starting on page 66
Pumps: data sheet 91485
Controller: catalog R999000018 (DE), R999000019 (EN)



Performance curve for SvP 7010 – liquid-cooled motor

SvP 5010

Features

- Special pressure controller software with automatic switch-over between closed-loop speed and pressure control.
- Simple conversion from conventional pump drive systems to pressure and volume control by comparable interfaces.
- High accuracy and dynamics in volume and pressure control.
- Minimum noise level due to pump design and speed adjustment
- Pump drive system with optimized dynamics designed for use with a power supply of 380 V.

Components

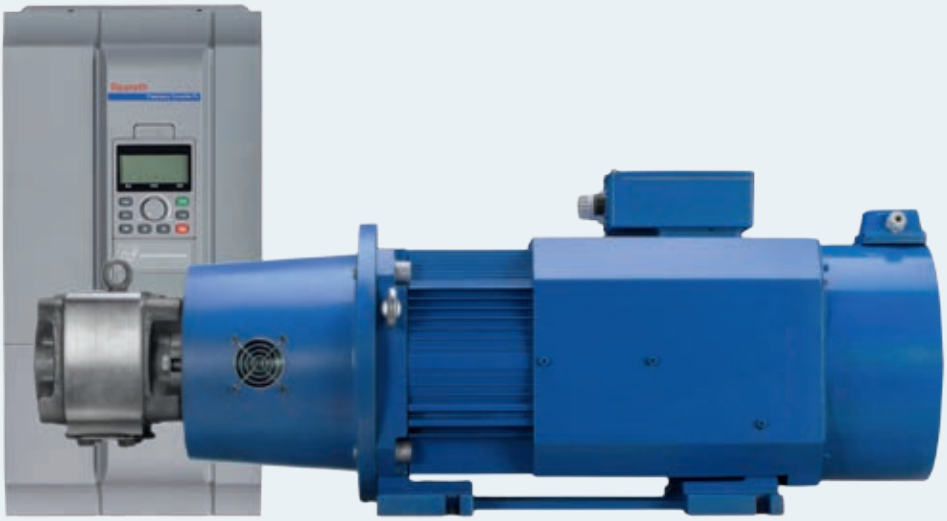
- Motor-pump-unit MPAT1 consisting of
  - Asynchronous servo motor with air cooling
  - Encoder and power cable (3m or 5m)
  - Internal gear pump PGM
  - Standard coupling elements
- Rexroth Fv frequency converter, type FVCA01.1 (-XXX-P002)
- Additional components:
  - Pressure transducer kit SUP-E01-SYT-HM20-XXX
  - Braking resistor
  - Brake chopper
- Optional accessories:
  - Mains choke
  - Junction box and communication line for master/slave pump function

Applications

SvP 5010 offers performance up to 22 kW. Its software has been especially optimized for the requirements of the injection molding, blow molding and die casting machines.

The frequency converter is optimized for Sytronix applications and compensates for the characteristics of hydraulic systems to provide optimal dynamics and accuracy.

SvP 5010 systems have been designed for the Asian market only.



SvP 5010* with PGM, Asynchronous servo motor forced-ventilated Standard coupling

Selection guide for Sytronix SvP 5010 with PGM

Pumps[1]					Motors[1]					
n_{max} = 3000 rpm					MAS (forced-ventilated)					
Type	NG	p_{cont} [bar]	p_{max} [bar]	Q_{max} [l/min]	9	13	15	18.5	22	P_{nom}[2] [kW]
					50	71.5	71	101	120	M_{nom} [Nm]
					8000	6000	6000	6000	6000	n_{max} [rpm]
					p_{eff}* [bar]					
PGM4[3]	032	3000	210	80	100	140				
	040	3000	210	100		112	112			
	050	3000	210	120			90	127		
	063	3000	210	150				100	120	

* The effective pressure was calculated without the degree of efficiency of pump and motor (around 80%)

= Preferred motor-pump-unit ☐ = on request

			K [%]
Controller	Rexroth Fv FVCA01.1	11K0	134
		15K0	124
		18K5	130
		22K0	122
		30K0	142

[1] The pump and motor can also be ordered separately as motor-pump-unit MPAT1 (see "Motor-pump-units starting on page 53)
[2] Higher power range on request
[3] PGM4-4X/NG25 on request

Selection example for system key

SYT-SVP5010-PGM [***] -S-FC2FS [***] -FV [***] -000 ---------> SYT-SVP5010-PGM [120] -S-REAGA [127] -FV [122] -0001 (120S)
1 2 3 1 2 3

Performance class Standard -S	Performance class Standard -E
SYTSVP5010-PGM080-S-REAGA140-FV124-0001/2(80S)	SYT-SVP5010-PGM080-S-REAGA100-FV134-0001/2 (80E)
SYTSVP5010-PGM100-S-REAHA112-FV130-0001/2(100S)	SYT-SVP5010-PGM100-S-REAGA112-FV124-0001/2 (100E)
SYTSVP5010-PGM120-S-REAGA127-FV122-0001/2(120S)	SYT-SVP5010-PGM120-S-REAHA090-FV130-0001/2 (120E)
SYTSVP5010-PGM150-S-REAGA120-FV142-0001/2(150S)	SYT-SVP5010-PGM150-S-REAGA100-FV122-0001/2 (150E)

*** SvP 5010 systems have been designed for the Asian market only.**

Sytronix DFE variable-speed pressure and flow control electronically

DFE systems
Sytronix DFE systems consist of an electrohydraulically controlled axial piston pump, driven by a variable-speed asynchronous motor

Pump drives DFE 5010 and DFE 7010 are based on the proven DFE pressure and flow pump control system.

Using industry standard inverter duty motors, up to 315 kW, results in a high price/performance ratio and high performance capabilities.

When using the **"teach-in" version**, the machine cycle pressure and flow profile is stored in the DFE control electronics. This allows the DFE system to accelerate the electric motor ahead of a required flow demand.

In machines operating without a predictable operating cycle, such as wood and metallurgy applications, a **"real-time" mode** can be used. The DFE controller calculates an optimal combination of motor speed and pump swivel angle to maximize energy savings.

Identical mechanical interfaces permit cost-effective retrofitting, e.g. of a DFE 5010, as a replacement for a SYDFEE/SYDFEC by simply exchanging the integrated pump valve electronics.

The control system is available for A10 and A4 pumps and can thus be used for a wide variety of applications.

Components
- Axial piston variable pump with integrated control electronics
- MOT-FC standard asynchronous motor
- VFD to control motor speed
- Pressure transducer

Applications
Sytronix DFE is suitable for use in open hydraulic systems, with one or multiple hydraulic consumers, for control of pressure and flow.

Sytronix DFE systems

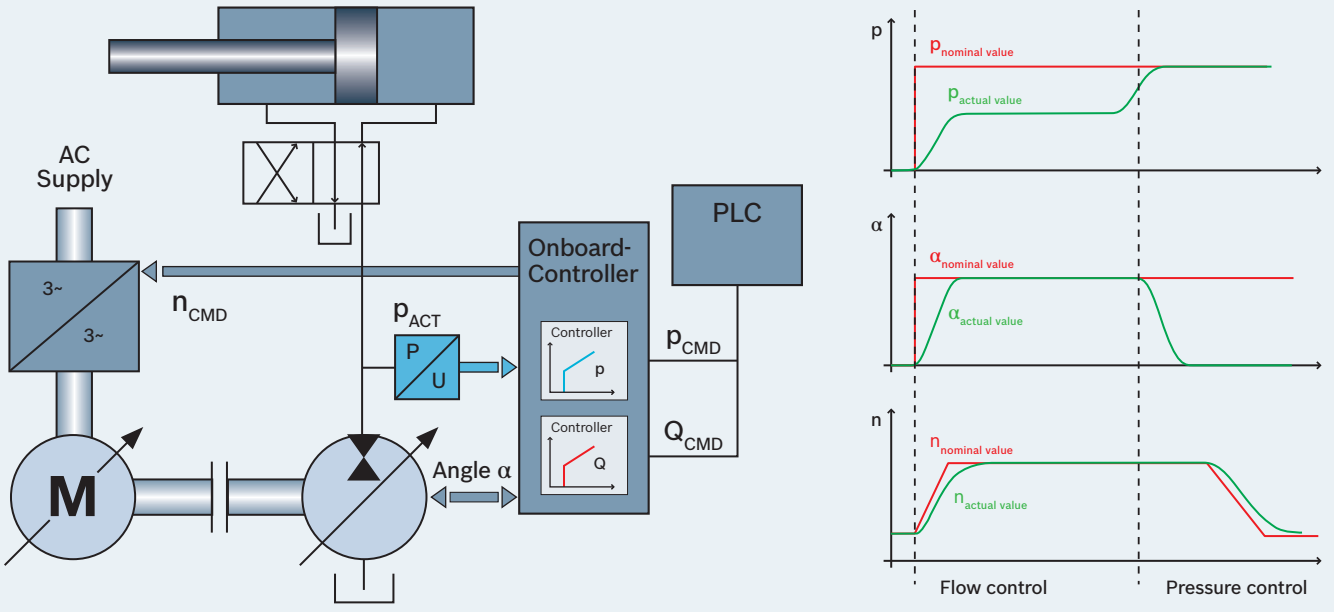
- Reduction of installed power by speed and flow control
- Easy retrofit for power units with variable displacement pumps (refer to RE30637)
- High performance capability
- Multi-consumer system capability

Function

A DFE system utilizes an electrohydraulically controlled axial piston pump to command the pump's VFD drive.

The digital on-board electronics calculates the optimal combination of swivel angle and motor speed based on system pressure. By reducing the pump swivel angle during pressure holding, the motor load is reduced and pump flow matches the system demand. With an optimal design, the power of installed electric motors can be reduced when compared to traditional designs.

DFE block diagram



DFE 7010

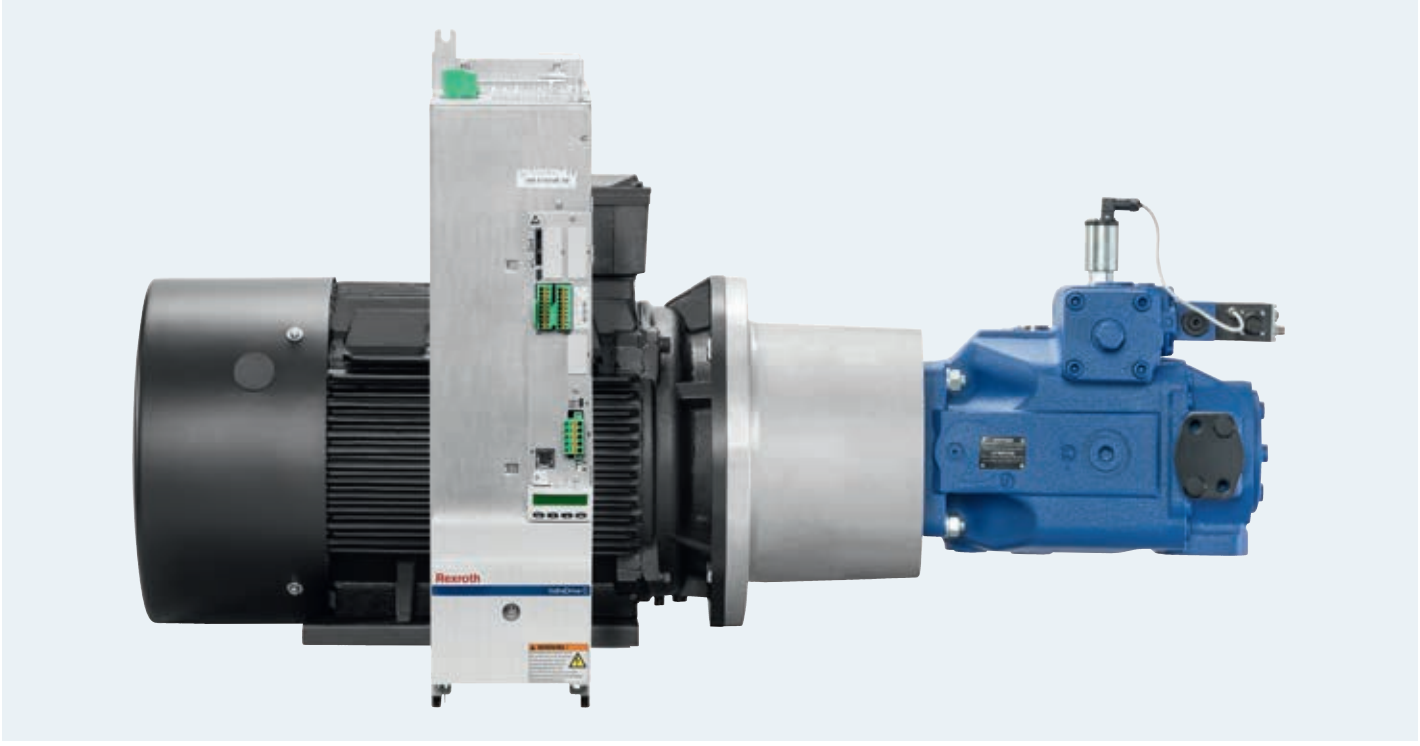
Features
- Performance up to 315 kW effective
- Suitable for use in open hydraulic systems with one or more hydraulic consumers, with pressure and flow control.
- 2-quadrant operation

Components
- Motor-pump-unit MPES2/3 consisting of
  - MOT-FC motor, self-ventilated
  - Pump system, type SYDFEn-3X, SYHDFEn-1X
  - Standard coupling elements
- IndraDrive controller (HCS) with scalable basic or advanced control unit

Applications

Covering a power range up to 315 kW (on request up to 630 kW), it is particularly suited for use in harsh industrial environments, such as for presses, plastics processing machines, wood and metal industries.

Based on its mechanical interface, Sytronix DFE is suitable for designing pump combinations for multi-circuit systems and master-slave operation. This allows for direct energy coupling and mechanical regeneration via the pump shaft. No drive system capable of line regeneration is required!



DFE 7010 with SYDFEn-3X (A10VSO)

Selection guide for Sytronix DFE 7010 with SYDFEn-3X (A10VSO)

Pumps[1]						Motors[1]													
						MOT-FC IC411 (self-ventilated)													
Type	NG	p_{cont} [bar]	p_{max} [bar]	n_{max} [rpm]	Q_{max} [l/min]	4	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	P_{nom} [kW]
						4000	4000	4000	3800	3800	3800	3800	3800	2800	2800	2800	2800	2800	n_{max} [rpm]
						p_{eff}* [bar]													
A10VSO	071	280	350	2550	181	23	32	43	64	87	106	126	171	210	256				
	100	280	350	2300	230		23	31	45	62	75	90	122	150	182	222			
	140	280	350	2200	308			22	32	44	54	64	87	107	130	159	217	260	
	180	280	350	1800	324				25	34	42	50	68	83	101	124	169	202	

* The effective pressure was calculated without the degree of efficiency.

= Preferred motor-pump-unit ☐ = on request

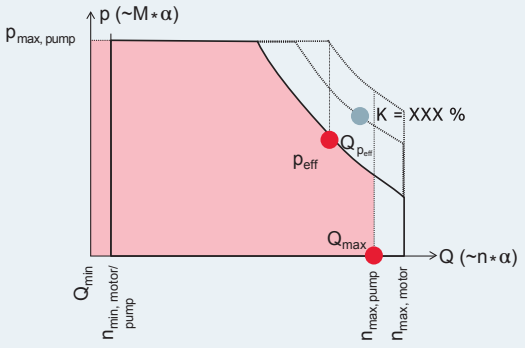
Controller				K [%]														
Rexroth IndraDrive C	HCS01.1E	-W0028	146	105														
		-W0054		191	140	100												
	HCS02.1E	-W0070			187	133	100											
	HCS03.1E	-W0070					161	132	113									
		-W0100							183	135	109							
		-W0150								176	142	117						
		-W0210										179	146	112				
	HCS04.2E	-W0350												189	158			
		-W0420													192			

[1] The pump and motor can also be ordered separately as motor-pump-unit MPES2 (see "Motor-pump-units" starting on page 53)
Note: For a detailed explanation of the tables, see page 10

Selection example for system key

SYT-DFE7010-A10 [***] (1) -S-FC2FS [***] (2) -HC [***] (3) -NNNN ---------> SYT-DFE7010-A10 [230] (1) -S-FC2FS [122] (2) -HC [135] (3) -NNNN

Detailed component information:
Motors: see "Motors" starting on page 66
Pumps: data sheet 62241
Controller: catalogs R999000018 (DE), R999000019 (EN), R999000241 (DE), R999000242 (EN)



Performance curve for DFE 7010 – self-ventilated motor

DFE 7010 with SYHDFEn-1X (A4VSO)

Selection guide for Sytronix DFE 7010 with SYHDFEn-1X (A4VSO)

Pumps[1]						Motors[1]											
						MOT-FC IC411 (self-ventilated)											
Type	NG	p_{cont} [bar]	p_{max} [bar]	n_{max} [rpm]	Q_{max} [l/min]	18.5	22	30	37	45	55	75	90	110	132	160	200	250	315	P_{nom} [kW]
						3800	3800	3800	2800	2800	2800	2800	2800	2500	2500	2500	2500	2200	2200	n_{max} [rpm]
						p_{eff}* [bar]														
A4VSO	125	350	400	1800	225	60	72	98	120	146	178	243	292							
	180	350	400	1800	324			68	83	101	124	169	202	246	297					
	250	350	400	1900	475				60	73	89	121	146	177	214	259	323			
	355	350	400	1700	603					51	63	85	103	125	150	182	227	285	358	

* The effective pressure was calculated without the degree of efficiency.

= Preferred motor-pump-unit ☐ = on request

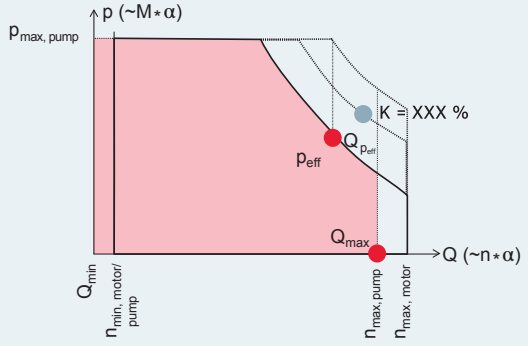
Controller				K [%]													
Rexroth IndraDrive C	HCS03.1E	-W0070		132	113												
		-W0100			183	135	109										
		-W0150				176	142	117									
		-W0210						179	146	112							
	HCS04.2E	-W0350								189	158	129	108				
		-W0420									192	157	132	110			
		-W0520										192	161	134	107		
		-W0640												168	135	109	
		-W0790													172	139	110
		-W1010														171	136

[1] The pump and motor can also be ordered separately as motor-pump-unit MPES2 (see "Motor-pump-units" starting on page 53)
Note: For a detailed explanation of the tables, see page 10

Selection example for system key

SYT-DFE7010-A04 [***] (1) -S-FC2FS [***] (2) -HC [***] (3) -NNNN ---------> SYT-DFE7010-A04 [324] (1) -S-FC2FS [169] (2) -HC [189] (3) -NNNN

Detailed component information:
Motors: see "Motors" starting on page 66
Pumps: data sheet 62242
Controller: catalogs R999000018 (DE), R999000019 (EN), R999000241 (DE), R999000242 (EN)



Performance curve for DFE 7010 – self-ventilated motor

DFE 5010

Features
- Performance up to 90 kW effective
- Suitable for use in open hydraulic systems with one or more hydraulic consumers, with pressure and flow control.
- 2-quadrant operation

Components
- Motor-pump-unit MPES2/3 consisting of
  - MOT-FC motor, self-ventilated
  - Pump system, type SYDFEn-3X, SYHDFEn-1X
  - Standard coupling elements
- Rexroth Fv freqency converter,
  type FVCA01.1 (-XXX-P002)

Applications
Covering a power range up to 90 kW, it is suited for use in presses, plastics processing machines, wood and metal industries.

Based on its mechanical interface, Sytronix DFE is suitable for designing pump combinations for multi-circuit systems and master-slave operation. This allows for direct energy coupling and mechanical regeneration via the pump shaft. No drive system capable of line regeneration is required!

DFE 5010 with SYDFEn-3X (A10VSO)

Selection guide for Sytronix DFE 5010 with SYDFEn-3X (A10VSO)

Pumps[1]						Motors[1]												
						MOT-FC IC411 (self-ventilated)												
Type	NG	p_{cont} [bar]	p_{max} [bar]	n_{max} [rpm]	Q_{max} [l/min]	4	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	P_{nom} [kW]
						4000	4000	4000	3800	3800	3800	3800	3800	2800	2800	2800	2800	2800	n_{max} [rpm]
						p_{eff}* [bar]												
A10VSO	071	280	315	2550	181	23	32	43	64	87	106	126	171	210	256			
	100	280	350	2300	230		23	31	45	62	75	90	122	150	182	222		
	140	280	350	2200	308			22	32	44	54	64	87	107	130	159	217	260
	180	280	350	1800	324				25	34	42	50	68	83	101	124	169	202

* The effective pressure was calculated without the degree of efficiency.

= Preferred motor-pump-unit ☐ = on request

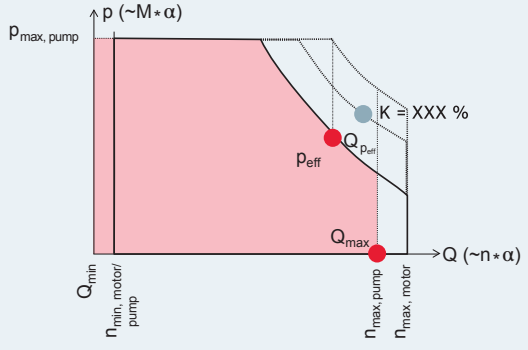
Controller			K [%]													
	Rexroth FvCA01.1	4K00	127													
		5K50	165	118												
		7K50		155	113											
		11K0			160	114										
		15K0				157	118									
		18K5				186	139	115								
		22K0					157	129	110							
		30K0						176	150	111						
		37K0							188	139	112					
		45K0								176	142	117				
		55K0									164	136	111			
		75K0										188	154	117		
		90K0											185	141	117	

[1] The pump and motor can also be ordered separately as motor-pump-unit MPES2 (see ”Motor-pump-units” starting on page 53)
Note: For a detailed explanation of the tables, see page 10

Selection example for system key

SYT-DFE5010-D10 [***] 1 -S-FC2FS [***] 2 -FV [***] 3 -NNNN ---------> SYT-DFE5010-D10 [308] 1 -S-FC2FS [087] 2 -FV [139] 3 -NNNN

Detailed component information:
Motors: see ”Motors” starting on page 66
Pumps: data sheet 62241
Controller: catalogs R999000241 (DE), R999000242 (EN)



Performance curve for DFE 5010 – self-ventilated motor

DFE 5010 with SYHDFEn-1X (A4VSO)

Selection guide for Sytronix DFE 5010 with SYHDFEn-1X (A4VSO)

Pumps[1]						Motors[1]								
						MOT-FC IC411 (self-ventilated)								
Type	NG	p_{cont} [bar]	p_{max} [bar]	n_{max} [rpm]	Q_{max} [l/min]	18.5	22	30	37	45	55	75	90	P_{nom} [kW]
						3800	3800	3800	2800	2800	2800	2800	2800	n_{max} [rpm]
						p_{eff}* [bar]								
A4VSO	125	350	400	1800	225	60	72	98	120	146	178	243	292	
	180	350	400	1800	324			68	83	101	124	169	202	
	250	350	400	1900	475				60	73	89	121	146	
	355	350	400	1700	603					51	63	85	103	

* The effective pressure was calculated without the degree of efficiency.

= Preferred motor-pump-unit ☐ = on request

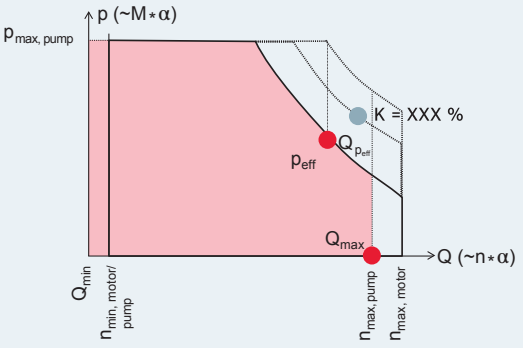
			K [%]							
Controller	Rexroth FvCA01.1	18K5	115							
		22K0	129	110						
		30K0	176	150	111					
		37K0		188	139	112				
		45K0			176	142	117			
		55K0				164	136	111		
		75K0					188	154	117	
		90K0						185	141	117

[1] The pump and motor can also be ordered separately as motor-pump-unit MPES2 (see "Motor-pump-units" starting on page 53)
Note: For a detailed explanation of the tables, see page 10

Selection example for system key

SYT-DFE5010-A04 [***] 1 -S-FC2FS [***] 2 -FV [***] 3 -NNNN ---------> SYT-DFE5010-A04 [324] 1 -S-FC2FS [169] 2 -FV [117] 3 -NNNN

Detailed component information:
Motors: see "Motors" starting on page 66
Pumps: data sheet 62242
Controller: catalogs R999000241 (DE), R999000242 (EN)



Performance curve for DFE 5010 – self-ventilated motor

Sytronix individual solutions

Individually configured systems

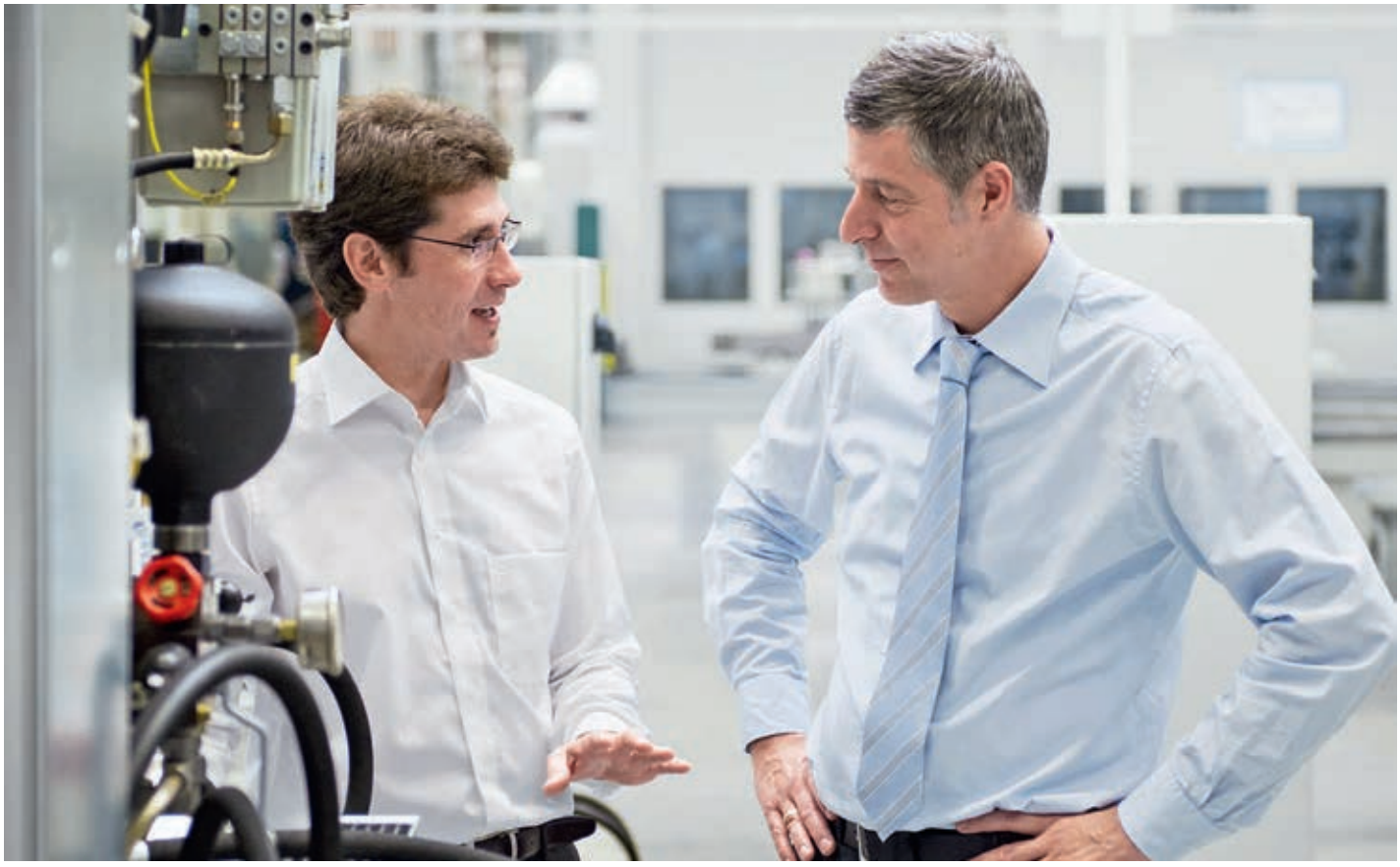
In addition to preconfigured systems in the FcP, SvP, and DFE Sytronix series, the Sytronix product range also provides the option of configuring **individual solutions**.

These systems can be planned and configured by combining modules and individual components, using questionnaires on application criteria and system parameters, in collaboration with Rexroth specialists.

Rexroth – synonymous with planning security

- Sytronix product range for customized solutions
- Products with excellent dynamics and control accuracy
- Proven product quality for high machine reliability
- Industry-specific consulting and engineering support
- Global Rexroth presence and support

Components and modules for Sytronix systems can be found in ”Components and modules” starting on page 52.



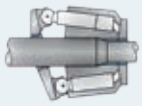
8 steps for a system solution

	Step	Example	Help
1	**Determine system requirements** ▶ Hydraulics schematic (open/closed circuit) ▶ General conditions (fluid, filtration, supply voltage, interface, or high-level control system, etc.) ▶ Load cycle (pressure, flow, worst case, etc.) ▶ Performance (control accuracy, dynamics)	**Pressure supply for core shooter systems** ▶ Open hydraulic circuit ▶ Constant pressure: 100 bar ▶ Average flow: 30 l/min ▶ Maximum flow: 100 l/min ▶ Fluid: HLP 46 ▶ Line voltage: 400 VAC ▶ Analog set points ▶ High dynamic performance	**Guidelines for energy-efficient hydraulics assemblies** Questionnaire
2	**Select required Sytronix features** ▶ Control quality ▶ Dynamics ▶ Open or closed loop ▶ Pressure or flow control ▶ Alternating pressure/flow control ▶ Force control, speed control, position control	**SvP 7010** ▶ Pressure control ▶ High dynamic performance	**FcP, SvP, DFE systems** FcP: starting on page 13 SvP: starting on page 27 DFE: starting on page 39
3	**Select pump** ▶ Maximum pressure ▶ Maximum flow ▶ Minimum speed ▶ Open or closed loop	**PGH4-3X/050 internal gear pump** ▶ Continuous nominal pressure: 315 bar ▶ Maximum flow: 150 l/min ▶ Open circuit	**SytronixSize program for system dimensioning** **Pumps** starting on page 70
4	**Determine drive requirements** (Load cycle conversion using the pump displacement) ▶ RMS torque, maximum torque ▶ Average speed, maximum speed	**Parameters** ▶ RMS torque: 85 Nm ▶ Maximum torque: 118 Nm ▶ Average speed: 630 rpm ▶ Maximum speed: 2,050 rpm	**SytronixSize program for system dimensioning**
5	**Select drive/motor combination** ▶ Torques, speed ▶ Drive family ▶ Compact or modular power unit ▶ Electrical connection on the motor ▶ Motor cooling type ▶ Encoder	**IndraDrive C with MPA01** HCS03.1E-W0100-A-05-NNBV MPA01-PGH4P-NN-VBB-M11EBHA-S3F-NN ▶ Stall torque: 105 Nm ▶ Maximum torque: 180.6 Nm ▶ Maximum speed: 2,400 rpm	**SytronixSize program for system dimensioning** **Power units, motor-pump-units, motors** starting on page 53

	Step	Example	Help
6	**Determine controller configuration (IndraDrive only)** ▶ Interface to the higher-level control system ▶ Encoder ▶ Inputs and outputs ▶ Safety technology	**ADVANCED controller without bus communication** CSH01.1C-NN-ENS-NNN-MA1-NN-S-NN-FW ▶ High performance ▶ No bus communication ▶ IndraDyn standard encoder ▶ Standard operator panel ▶ Analog I/O extension	**Control units** page 63
7	**Define firmware functionality (for IndraDrive only)** ▶ Basic OPEN LOOP or CLOSED LOOP package ▶ Extension packages ▶ Motion logic ▶ Technology functions	**Basic CLOSED LOOP package with motion logic and SvP application software** FWA-INDRV*-MPH-08VRS-D5-1-NNN-ML FWS_MLDSYx_IMC_xxVxx_D0_MP08 ▶ No extension packages ▶ Motion logic ▶ Application software for SvP systems	**Firmware** page 64
8	**Select accessories** ▶ Line filters and line chokes ▶ Braking resistors, brake units ▶ Additional capacity ▶ Electrical connections ▶ Engineering software ▶ Pressure transducer ▶ Mechanical connections	▶ Line filter NFD03.1-480-130 ▶ Line choke HNL01.1E-0362-N0080-A-500-NNNN ▶ Power cable RKL0042/005.0 ▶ Encoder cable RKG0047/005.0 ▶ Basic accessories HAS01.1-255-NNN-CN ▶ Shield connection HAS02.1-005-NNN-NN ▶ Pressure transducer SUP-E01-SYT-HM20-2X/250-H-K35-A-N	**Accessories** starting on page 79 **Motor-pump-units** starting on page 53 **Engineering tool IndraWorks**

In the following section, you can get some hints helping you select the right single components for your pump drive system.

Pump selection guide

Pump	Internal gear pump		Axial piston pump	
				
Type	PGF	PGH	A10	A4
n_{min} @ p_{cont} [rpm]	200	200	On request	On request
n_{max} [rpm]	3600	3000	3600	3200
V_{geo} [cm^3]	1.7 ... 40	20 ... 250	6 ... 180	5 ... 1000
p_{cont} [bar]	250	315	315	350
p_{max} [bar]	350	350	350	400
maxPhyd [kW]	34	134	151	656
Operation mode	2, 1 - Q	2, 1 - Q	4, 2, 1 - Q	4, 2, 1 - Q
Characteristic	Quiet	Quiet	Universal	Universal
Documentation	RE10213	RE10227	RE91485	RE92050

Frequency converter selection guide

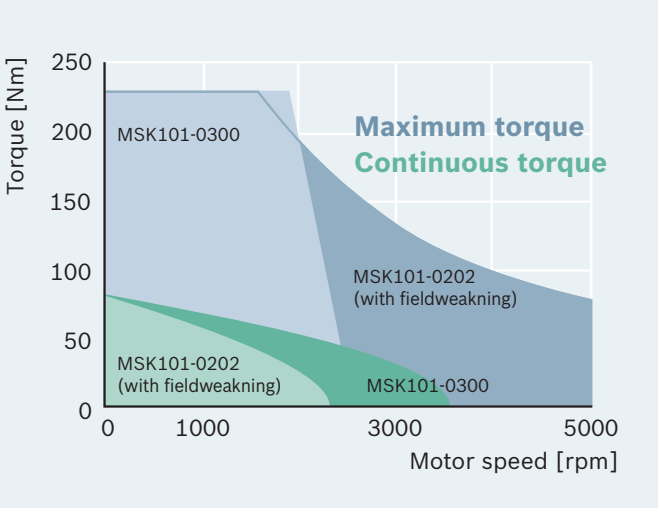
	Rexroth Fv	IndraDrive
Interface	analog/digital, Profibus	analog/digital, various fieldbusses and MultiEthernet
Functionality	p/Q alternating control	p/Q alternating control, Position force control, Integrated PLC
Pump protection	Basic	Advanced
Commissioning	Manually, Converter PC	IndraWorks
Commissioning	++	+

Motor selection guide

	MOT-FC	MSK
Dynamics (acceleration[1] scale)	>300 ms	< 100 ms
Position control[2]	-	++
Minimal rpm[3] (leckage)	100	0
Dimensions	O	+
Price	++	O

[1] Accelaration to 1500 rpm
[2] Only with IndraDrive possible
[3] Normally the pump is the limiting component in the system

Synchronous motor selection guide (with/without fieldweakning)

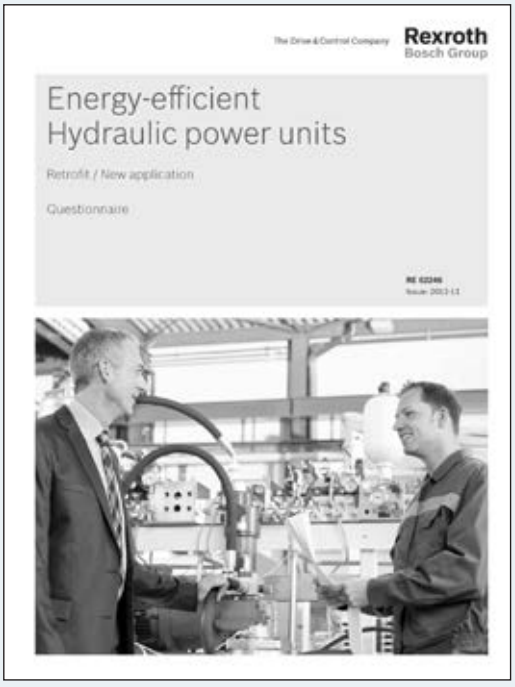


Tools

Energy-efficient hydraulics assemblies – questionnaire

To implement a variable-speed drive solution, for retrofit or new applications, a customer-specific series of application conditions needs to be considered. This is in addition to the load profile of the machine. In hydraulics, critical factors such as the type of fluid, hydraulics schematic diagram, cooling requirements, and the presence of an accumulator can affect the configuration of a Sytronix system. Electrical parameters, such as supply voltage, the higher-level control system used, ambient temperatures, and performance required for the overall system are critical factors in the configuration of a Sytronix solution.

The questionnaire for energy-efficient hydraulic assemblies is intended as an aid for documenting all of the required information. Contact a Bosch Rexroth sales partner for more information.



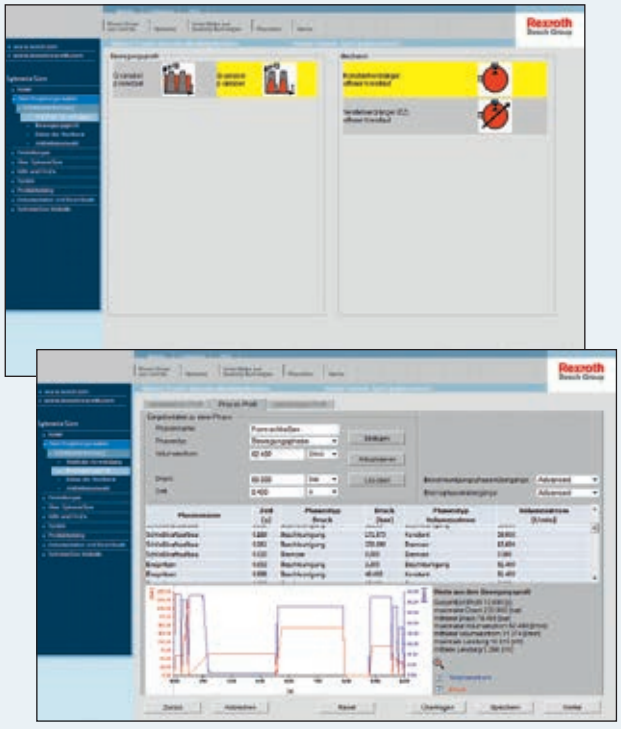
RE 62246

SytronixSize software tool

Sizing components to meet the machine's energy requirement is key to an energy-efficient, cost-effective variable-speed drive solution. SytronixSize, Bosch Rexroth's design tool, is configured to provide the answers.

The choice of hydraulic pump is made using the design criteria followed by selection of the electric motor and matching VFD or servo drive controller from the Bosch Rexroth product portfolio.

SytronixSize is only available for use by Bosch Rexroth applications specialists. Availability of SytronixSize to third parties is currently not planned due to legal restrictions. Please ask a Bosch Rexroth sales partner for more information.



Components and modules

Rexroth offers a comprehensive range of pumps, power units, motors and control software for Sytronix variable-speed pump drives. Rexroth can provide support in the selection of individual components for custom designed Sytronix systems.

Motor-pump-units

A selection of standard motor-pump-units is available for Sytronix variable-speed pump drives, consisting of a motor, coupling and pump. The flexible solutions of preassembled modules are available in a variety of mounting configurations.

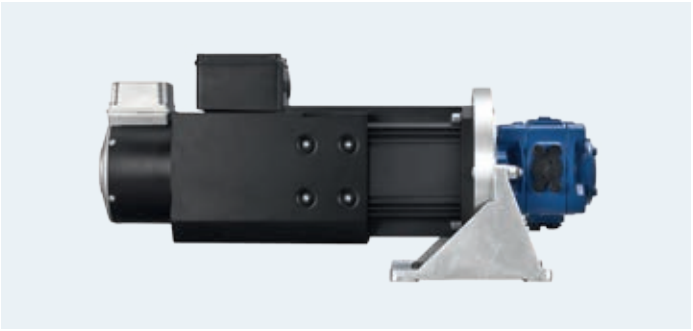
Motor-pump-unit MPA01
The MPA01 unit was developed specifically for the SvP 7010 system and features direct motor-pump coupling.

Motor-pump-unit MPAS1
Like the MPA01, the MPAS1 unit was also developed for the SvP 7010 system, but uses a conventional motor-pump coupling.

Motor-pump-unit MPAT1
The MPAT1 unit was developed specifically for the SvP 5010 system (only for the Asian market) and features a conventional motor-pump coupling.

Motor-pump-unit MPES2
The MPES2 units are used with FcP 5010, FcP 7010, DFE 5010, and DFE 7010 systems. These assemblies use conventional motor-pump coupling; MPES2 is designed for the European and Asian markets.

Motor-pump-unit MPA01 with MSK & PGH



Features

- Available with 3 motor configurations
- Available with 8 pump configurations
- Mounting options: flange, foot mount, or motor feet (only MSK133)
- Direct coupling
- Reduced overall length
- Horizontal and vertical mounting possible

Product description

The MPA01 with direct coupling provides a compact solution, offering a range of motor and pump options.

Detailed information:
Operating instructions: R911339822 (DE), R911339824 (EN)
Mounting instructions: R911339498 (DE), R911339499(EN), R911341599(DE), R911341600(EN)

Technical data

Motor	MSK101	MSK133	MSK133
Overall length	C, D, E, F	B, C, D, E	B, C, D, E
Cooling	Forced-ventilated	Forced-ventilated	Liquid-cooled
Pump	PGH4	PGH5	PGH5
Nominal size	20 ... 63	63 ... 160	63 ... 160

Motor-pump-unit MPAS1 with MSK & PGM, PGH, A10

Features

- Available with 3 motor configurations
- Available with 3 pump configurations
- Mounting options: flange, foot mounting
- Standard motor-pump coupling
- Horizontal and vertical mounting possible
- MPAS1 with PGM pumps designed for the Asian market only

Product description

The MPAS1 uses a conventional motor-pump coupling with a bell mounting adapter.

Detailed information:
Operating instructions: R911343223 (DE), R911343224 (EN)
Mounting instructions: R911342439 (DE), R911342449 (EN)

Technical data

Motor	MSK071	MSK101	MSK101	
Overall length	D, E	C, D, E, F	C, D, E	
Cooling	Forced-ventilated	Forced-ventilated	Forced-ventilated	
Pump	PGH2, PGH3, PGH4	PGM4	PGH5	
Nominal size	6 ... 50	25 ... 63	63 ... 250	

Motor	MSK071	MSK101	MSK133	MSK133
Overall length	D, E	C, D, E	B, C, D, E	B, C, D, E
Cooling	Forced-ventilated	Forced-ventilated	Forced-ventilated	Liquid-cooled
Pump	A10VZO-EZ4	A10VZO-EZ4	A10VZO-EZ4	A10VZO-EZ4
Nominal size	10 ... 28	18 ... 71	45 ... 180	45 ... 180

Motor-pump-unit MPAT1
with asynchronous servo motor & PGM

Features

- Available with 5 motor configurations (ranging from 9 kW to 22 kW)
- Available with PGM pumps
- Encoder and power cable (3m or 5m) included

Product description

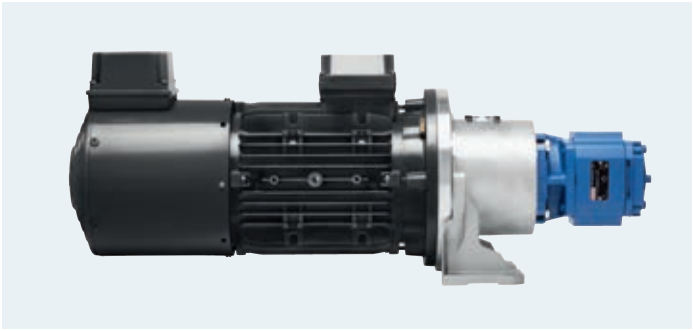
MPAT1 uses a conventional motor-pump coupling with a bell mounting adapter. MPAT1 has been designed for the Asian market only.

Detailed information:
Mounting instructions: R912005194 (EN), R912005195 (ZH)

Technical data

Motor	MAS
Performance kW	9 ... 22
Cooling	Forced-ventilated
Pump	PGM4
Nominal size	32 ... 63

Motor-pump-unit MPES2
with MOT-FC & PGF, PGH, A10, A4, SYDFEn-3X, SYHDFEn-1X



Features

- Wide range of motor-pump-units
- Available with different pump configurations, depending on the pump type
- Mounting options: varies, based on motor size
- Horizontal and vertical mounting possible

Product description

MPES2 is designed for the European and Asian markets. The MPES2 assembly uses a conventional motor-pump coupling and a bell mount adapter.

Detailed information:
Mounting instructions: R911345045 (DE), R911345047 (EN), R911345046 (DE), R911345048 (EN)

Technical data

Motor		MOT-FC	MOT-FC	MOT-FC	MOT-FC	MOT-FC
Performance	kW	1.5 ... 11	1.5 ... 7.5	1.5 ... 90 kW	1.5 ... 90	1.5 ... 90
Cooling		Self-ventilated	Forced ventilated	Self-ventilated	Forced-ventilated	Self-ventilated
Pump		PGF2	PGF2	PGH2, PGH3, PGH4, PGH5	PGH2, PGH3, PGH4, PGH5	A10VZO-EZ4 (2-point adjustment)
Nominal size		6 ... 22	6 ... 22	5 ... 250	25 ... 250	10 ... 180

Motor		MOT-FC	MOT-FC	MOT-FC
Performance	kW	18.5 ... 90	4 ... 90	18.5 ... 315
Cooling		Self-ventilated	Self-ventilated	Self-ventilated
Pump		A4VSO-EZ (2-point adjustment)	SYDFEn-3X	SYHDFEn-1X
Nominal size		40 ... 355	71 ... 180	125 ... 355

Drives

Drives
Drive units are converters or inverters based on the IndraDrive family portfolio or frequency converters Rexroth Fv (VFD). The IndraDrive units consists of a power component and a control section, for the control of servo and standard motors. The part of the drive controller equipped with all the control functions and interfaces for installation in the power unit is referred to as the control section. The power component contains the power electronics to control the motors and is used to hold the control section. The converter (IndraDrive C - HCS) takes the line voltage with its fixed amplitude and frequency and generates a three-phase alternating current with variable amplitude and frequency.

The inverter (IndraDrive M - HMS) takes the DC bus voltage and generates a three-phase alternating current with variable amplitude and frequency.

The frequency converter Rexroth Fv (VFD) includes the power and control function in one device to control standard asynchronous motors. The VFD converts the fixed amplitude and frequency line power into variable amplitude and frequency three-phase alternating current.

IndraDrive – compact drives
- Power range from 1.5 kW to 630 kW, with maximum current from 12 A to 1535 A
- High overload capacity
- Compact design for single-axis applications
- Can be connected to a converter for cost-effective solutions
- Direct line connection from 200 V to 500 VAC

Rexroth Fv VFD
The Rexroth Fv VFD is the drive solution optimized for automation applications with a power range up to 90 kW.

Firmware
Unit-specific software for automation applications. With the IndraDrive servo drives and the Rexroth Fv VFDs, firmware is stored in read-only memory. IndraDrive has the option of updating the firmware using CompactFlash.

Drives – IndraDrive
Converter HCS02.1E-W0028/-W0054/-0070

Features

- Continuous power from 1.5 kW to 11 kW
- Internal or external braking resistors
- 2.5x overload capacity
- Maximum current from 28 A to 70 A
- Can be connected to a converter for cost-effective solutions
- Direct line connection from 200 V to 500 VAC

Product description

IndraDrive HCS02 series of drives integrate inverter and power supply in one unit. Contains line connections for compact construction making it suitable for single-axis applications.

Detailed information:
Instructions R911309635 (DE), R911309636 (EN)
Catalog R999000018 (DE), R999000019 (EN)

Technical data

Continuous current[1)]	A	11.3 ... 28.3
Maximum current	A	28.3 ... 70.8
DC bus continuous power without/with choke	kW	5.1 ... 9/5.1 ... 14
Maximum output without/with choke	kW	8 ... 14/10 ... 19
Line voltage	V	3 AC 200 ... 500, 1 AC 200 ... 250 (±10 %)
Continuous input line current	A	13 ... 30
Dependence of output on line voltage		at U_{LN} < 400 V: 1% power reduction per 4 V at U_{LN} > 400 V: 1% power gain per 5 V
Maximum braking power	kW	10 ... 25
Control voltage, external	V	DC 24 ±20% (DC 24 ±5% when supplying motor holding brake)
Power consumption	W	14 ... 23
Dimensions (H x W x D)	mm	65 to 105 x 352 x 252
Weight	kg	3.8 ... 6.8

All data for nominal rating at 3 AC 400 V line voltage and 4 kHz switching frequency. [1)] In case of output frequency less than 4 Hz the output current will be reduced.

Drives – IndraDrive
Converter HCS03.1E-W0070/-W0100/-W0150/-W0210

Features

- Continuous power with/without choke
  kW 13 to 42/25 to 85
- High overload capacity
- Maximum current from 70 A to 210 A
- Can be connected to a converter for cost-effective solutions
- Direct line connection from 400 V to 500 V

Product description

IndraDrive HCS03 series of drives integrate inverter and power supply in one unit. Contains line connections for compact construction making it suitable for singles axis applications.

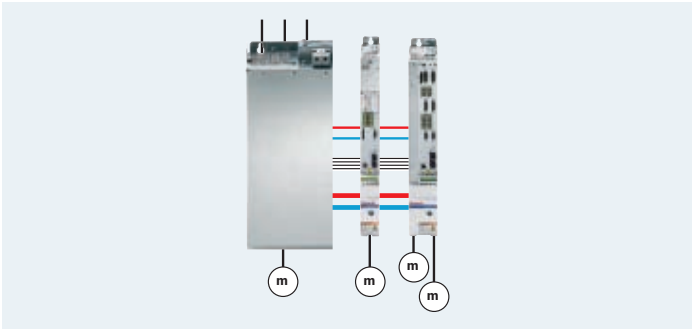
Detailed information:
Instructions R911309635 (DE), R911309636 (EN)
Catalog R999000018 (DE), R999000019 (EN)

Technical data

Continuous current[1)]	A	45 ... 145
Maximum current	A	70 ... 210
DC bus continuous power without/with choke	kW	13 ... 42/25 ... 85
Maximum output without/with choke	kW	20 ... 68/40 ... 124
Line voltage (+10%/–15%)	V	3 AC 400 ... 500
Continuous input line current	A	50 ... 146
Dependence of output on line voltage		at U_{LN} < 400 V: 1% power reduction per 4 V decrease in voltage
Maximum braking power	kW	42 ... 137
Control voltage, external	V	DC 24 ±20% (DC 24 ±5% when supplying motor holding brake)
Power consumption	W	22.5 ... 30
Dimensions (H x W x D)	mm	125 ... 350 x 440 x 315
Weight	kg	13 ... 38

All data for nominal rating at 3 AC 400 V line voltage and 4 kHz switching frequency. [1)] In case of output frequency less than 4 Hz the output current will be reduced.

Drives – IndraDrive
Power supply HMV01.1E, HMV01.1R, HMV02.1R



Features

- Power range from 18 kW to 120 kW
- Direct line connection from 400 V to 480 V
- Protection to IP20
- Energy-saving line regeneration (optional)
- Integrated line contactor
- Integrated braking resistor

Product description

IndraDrive HMV power supply units are used in conjunction with modular HMS inverters.

Detailed information:
Catalog R999000018 (DE), R999000019 (EN)

Technical data

Line voltage	V	3 AC 400 ... 480 (+10%/–15%)
Supply frequency	Hz	48 ... 62
DC bus continuous output	kW	18 ... 120
Overload capacity		1.5x/1.5 ... 2.5x
Suitable for cabinet depth	mm	HMx01: 400
Line contactor/brake chopper/braking resistor		Internal[1] / internal[1] / internal[1]
Control voltage DC 24 V		External
Environmental rating		IP20
Installation height	m	1000 above sea level, with derating to 4000[2]
Ambient temperature	°C	0 to +40, with derating to +55
Cooling type		Air cooling
CE mark		Low Voltage Directive 73/23/EEC, EMC Directive 89/336/EEC
Certifications/EMC		EN 61800-5-1, EN 61800-3, UL 508C, C22.2 No. 14-05/C3 (EN 61800-3)

All data for nominal rating at 3 AC 400 V line voltage and 4 kHz switching frequency. [1] Not applicable for HMV01.1R-W0120; [2] HCS04 only up to 3000 m.

Drives – IndraDrive
Inverter HMS01, HMS02

Features

- Modular single-axis inverter
- Single-axis inverter with maximum current from 20 A to 350 A
- Space-saving design with multi-axis applications
- Can be powered via power supply unit
- Power sharing via common DC bus
- Can be connected to a converter for cost-effective solutions

Product description

IndraDrive HMS inverter series for single and dual axes in the modular drive system. They have a power output to drive a motor and operate with HMV01/02 supply units and HCS02 and HC03 drive controllers.

Detailed information:
Instructions R911309635 (DE), R911309636 (EN)
Catalog R999000018 (DE), R999000019 (EN)

Technical data

Continuous current	A	12.1 ... 250
Maximum current	A	20 ... 350
DC bus capacity	mF	–/0.14/0.27
Control voltage, external	V	DC 24 ±20% (DC 24 ±5% when supplying motor holding brake)
Power consumption without control unit and motor brake	W	10 ... 218 (including HAB blower unit)
Continuous current without control unit and motor brake	A	0.4 ... 9.1 (including HAB blower unit)
Width	mm	50 ... 350
Height	mm	352/440 [1)]
Depth	mm	252/309
Weight	kg	5.3 ... 31.7

All data apply to nominal rating at 3 AC 400 V line voltage and 4 kHz switching frequency
[1)] Overall height HSM01.1N-W0350 with auxiliary fan HAB: 748 mm

Drives – IndraDrive
Control unit CSH01 ADVANCED

Features

- Solution for standard and high-end applications
- Integrated motion logic with advanced features
- Open interfaces for international use
- On request, certified safety technology per EN 13849-1 and EN 62061
- Use with Sytronix SvP
- Option: safety on board
- Available with standard performance and functionality, CSB01 BASIC version, for use with Sytronix

Product description

The ADVANCED control unit offers the highest performance and dynamics. In addition to performance, a wide range of control communications and encoder interfaces are available. Digital and analog inputs and outputs are available in the base controller using an I/O expansion. The controller can be equipped with certified safety technology per EN 13849-1 and EN 62061, as an option. The ADVANCED controller is an ideal platform for a drive-integrated PLC with IndraMotion MLD.

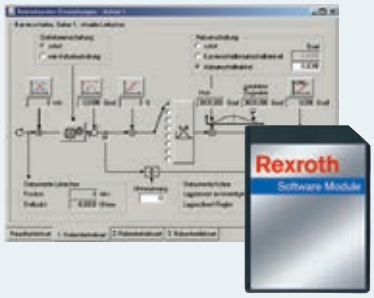
Using a PC with the engineering tool IndraWorks, a complete configuration and startup can be performed.

Detailed information:
Catalog R999000018 (DE), R999000019 (EN)

Technical data

Control communication	Optional: analog interface, PROFIBUS, SERCOS III, ProfiNet, EtherCat, EtherNet/IP, CANopen, DeviceNet
Digital inputs	7
Digital inputs for measuring probe	2
Digital inputs/outputs (configurable)	4
Analog inputs	1
Analog outputs	2
Relay outputs	1

Firmware FWS



Features

- All standard functions included
- Function extensions
- Industry-specific functions
- Integrated IEC-compliant logic
- Hydraulic power unit (HPU): constant pressure control
- Injection molding control (IMC)
- Position force control (PFC)

Product description

The stock firmware can perform standard drive functions – from simple V/f control through positioning control mode. Extension packages provide options of electronic synchronization, servo functions and main spindle drives. The freely-programmable motion logic with integrated PLC conforming to IEC 61131-3 and ready-to-use functions enable simple execution of complex machine processes.

Detailed information:
Catalog R999000018 (DE), R999000019 (EN)

Technical data

Technology functions	HPU	IMC	PFC
FcP 7010	p = const		
SvP 7010	p = const	p/Q control	x/F control

Rexroth Fv Frequency Converter for Sytronix FVCA01.1 (-XXX-P002)

Features

- Quality and reliability
- Worldwide service
- CE-compliant
- UL-listed
- Multiple operating modes to suit a variety of applications
- Simple operation and maintenance
- Removable fan
- LCD operator interface panel
- Advanced functionality and high performance
- Optional PROFIBUS control communication

Product description

The Rexroth Fv VFD for Sytronix is an optimal drive solution for automation of a variety of applications with power ratings up to 90 kW. It can operate in voltage/frequency (V/f), sensorless vector control (SVC), or field-oriented vector control (FOC) modes to suit a wide range of applications.

Detailed information:
Instructions R912004739 (EN)

Technical data

Rated motor power	kW	1.5 ... 90
Nominal motor voltage	V	0 ... 480
Line voltage	V AC	380 ... 480
Supply frequency	Hz	50 ... 60
Rated continuous current	A	4 ... 183
Overload capacity	%	200 (in 1 s)/150 (in 1 min)
Motor cable length (internal line filter C3)	m	5/10
Motor cable length (external line filter C3)	m	50/75
Ambient temperature	°C	–10 ... +40
Controller		PID
Bus systems		Modbus/PROFIBUS
Display		LCD: pressure, speed, voltage, current, etc.

Motors

Synchronous and asynchronous motors for use in Sytronix variable-speed pump drive systems.

IndraDyn S synchronous servo motors (MSK)
- Maximum torque up to 631 Nm
- Environmental protection: IP65
- Choice of cooling systems
- High dynamic performance
- Compact design

IndraDyn A asynchronous servo motors (MAD)
- Rated power up to 93 kW
- Maximum speed up to 11000 rpm
- Encoder systems for a wide range of applications
- Environmental protection: IP65
- Motor designed for easy maintenance

IndraDyn E standard asynchronous motors (MOT-FC)
- Energy efficiency class IE2 (Europe/Asia)
- NEMA Premium efficiency (North America)
- Low ”total cost of ownership”
- Standard product series

Asynchronous servo motors (MAS)
- Rated outputs up to 27 kW
- Maximum speed up to 8000 rpm
- Equiped with TTL encoder
- Environmental protection: IP 54
- For use only in Asian market in combination with SvP 5010

IndraDyn synchronous servo motor MSK071, MSK101, MSK133

Features

- Maximum torques up to 631 Nm
- Axial or radial blower optional
- Environmental protection: IP65
- Choice of cooling systems
- fan cooling
- liquid cooling stainless steel (MSK133)
- Compact and powerful
- Broad performance range
- Multiple models to match load requirements
- Maximum torque up to 631 Nm
- Maximum speed up to 6000 rpm

Product description

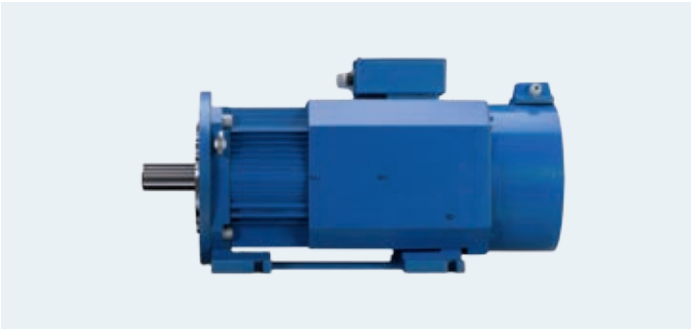
Outstanding features of the MSK range of motors include broad power range and model variants to match load requirements. Encoders are available in single or multi-turn versions. Additional options include shaft keyways, holding brakes, and increased runout to match any application. For applications with high continuous power operation, blowers are available for axial and radial installation.

Detailed information:
Catalog R999000018 (DE), R999000019 (EN)

Technical data

Type			MSK071	MSK101	MSK133
Maximum speed	n_{max}	rpm	3500 ... 6000	3300 ... 6000	3300
Continuous torque at stall	M_0	Nm	12 ... 23	32 ... 70	152 ... 293
Maximum torque	M_{max}	Nm	44 ... 84	110 ... 231	320 ... 631
Continuous current at stall	I_0	A	5.2 ... 20	14.9 ... 58.3	63 ... 115
Maximum current	I_{max}	A	23.4 ... 90.1	67.1 ... 262.4	160 ... 305
Moment of inertia	J	kgm^2	0.00173 ... 0.0029	0.0065 ... 0.0164	0.0476 ... 0.09
Flange size	A	mm	140	192/208	260
Motor length	O	mm	272 ... 352	350 ... 688	582 ... 732
Max. motor height	H	mm	202	262/276	370
Shaft diameter	D	mm	32	38	48
Weight		kg	13.9 ... 23.5	28.3 ... 53.5	91.6 ... 146.0

Asynchronous servo motor MAS



Features

- Maximum speed up to 8000 rpm
- Equipped with 5V TTL encoder
- Environmental protection: IP 54
- Mounting option: B35
- Rated power up to 27 kW
- Maximum torque up to 273 Nm
- Designed for the Asian market only

Product description

Low voltage three-phase servo induction motors for VFD operation (inverter duty).
MAS motor family is optimized for use in SvP 5010 with frequency converters.

Technical data

Model			**MAS-ANB35-09k0-132C-BG** (80E)	**MAS-ANB35-13k0-132D-BG** (805, 100E)	**MAS-ANB35-15k0-132D-BH** (1005, 120E)	**MAS-ANB35-18k5-160B-BG** (1205, 150E)	**MAS-ANB35-22k0-160C-BG** (1505, 190E)	**MAS-ANB35-27k0-180B-BF** (1905)
Rated torque	M_n	Nm	50	71.5	71	101	120	160
Maximum torque	M_{max}	Nm	80	128	128	163	203	273
Rated current	I_n	A	18.5	26.5	30	36	42	51
Maximum current	I_{max}	A	38	65	75	74	78	122
Rated speed	n_n	min^{-1}	1734	1738	2020	1745	1745	1605

IndraDyn E standard asynchronous motor MOT-FC: Europe/Asia

Features

- Motor design conforming to DIN EN 60034 (IEC 72)
- Standard asynchronous motors – MOT-FC (IEC) for use outside of North America
- Environmental protection: IP55
- For use with VFD or IndraDrive Bosch Rexroth recommends MOT-FC standard asynchronous motors for FcP 5010/7010 and DFE 5010/7010.

Product description

Low voltage three-phase squirrel cage motors for VFD operation (inverter duty).

Rexroth's MOT-FC motor family is optimized for use in FcP 5010/7010 and DFE 5010/7010 with frequency converters.

Detailed information:
See R911343624

Technical data

Mechanical version		**IEC**
Power range	kW	1.5 ... 315
Nominal voltage	V	< 3 kW (230/460 V); > 3 kW (400/690 V)
Number of poles 1500 rpm		4
Energy efficiency		IE2
Type of construction (EN 60034-7)		IM B35; IM B 5, IM V1
Housing material		Aluminum (1.5 ... 7.5 kW), gray cast iron (from 11 kW)
Cooling (EN 60034-6)		IC 411 (self-ventilated); IC 416 (forced-ventilated)
Permissible ambient temperature	°C	–20 ... +40
Permissible installation height	m	1000
Motor/winding protection (DIN EN 60947-8)		PTC
Terminal box position (IEC 60034-7 AMD 1)		Above

Pumps

A variety of pump types can be used with Sytronix variable-speed drives.

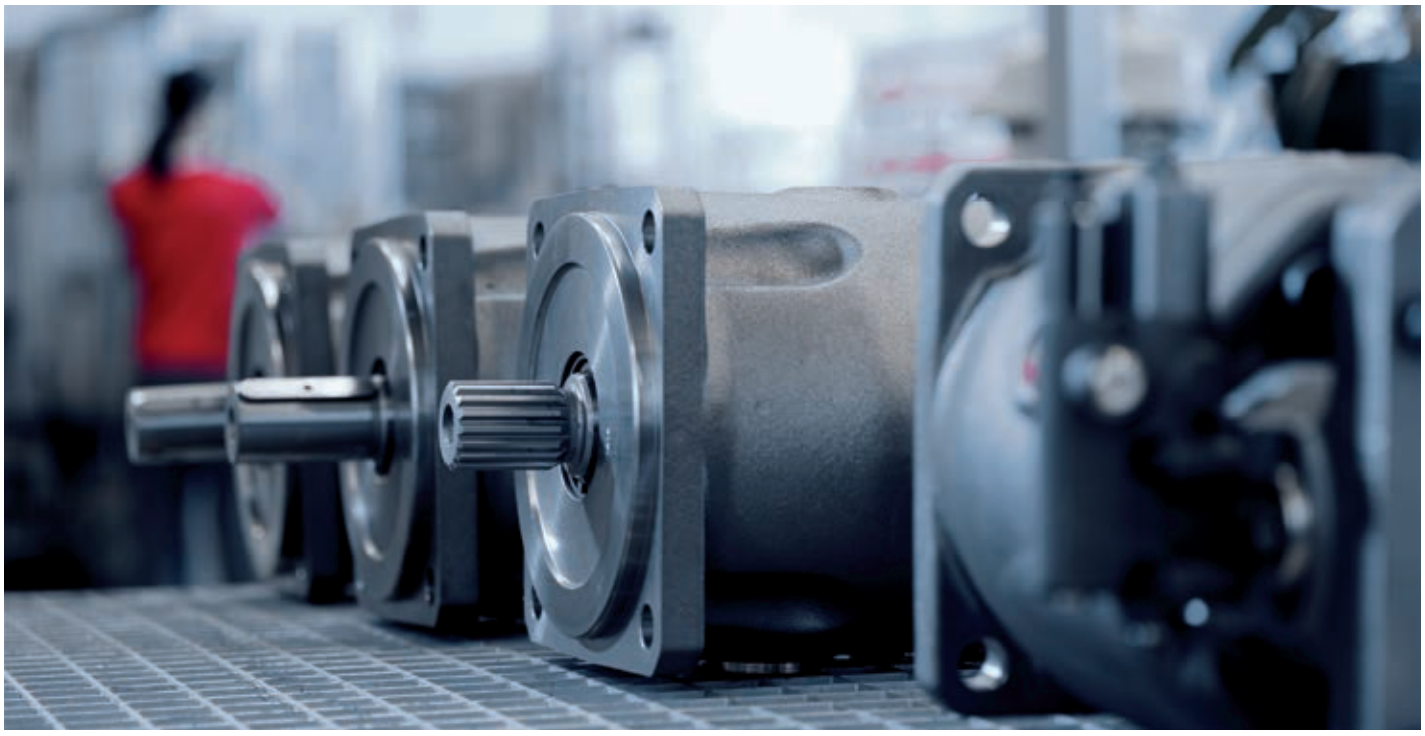
Internal gear pumps
Internal gear pumps, type PGF-2X, PGH-2X / PGH-3X, and PGM-4X, are suitable for use in Sytronix systems. Operating in open hydraulic circuits, they are capable of a maximum continuous pressure of respectively 210 bar, 315 bar and 175 bar, dependent on the type. Reverse rotation is permissible for 2-quadrant operation. The internal gear pumps are ideal for low noise requirements and use in pressure holding operation due to low internal leakage.

Axial piston pumps
The series A10 and A4 axial piston pumps are also suitable for use in Sytronix systems.

The A10 series can be used in pressure holding operation for long duration due to leakage flow being externally drained. They can also deliver flow in both directions for closed circuit operation, and additionally be used as motors.

The A4 series axial piston pumps are very robust and have proven successful in many press applications due to large displacements and pressure capability up to 400 bar.

Suitable for extended pressure holding, these pumps are ideal for use in Sytronix drives thanks to an external leakage drain and wide range of drive speeds.



Internal gear pump
PGF-2X

Features

- Fixed displacement
- Low operating noise
- Low flow ripple
- High efficiency
- Long service life
- Suitable for a wide range of viscosities and speeds
- Excellent suction characteristics
- Can be used in a variety of system sizes and combinations
- Can be combined with other pumps

Product description

PGF fixed displacement internal gear pumps are pressure-balanced to minimize internal leakage. They are suitable for low to medium power Sytronix drives, up to mid-pressure operation in industrial applications, such as machine tool applications

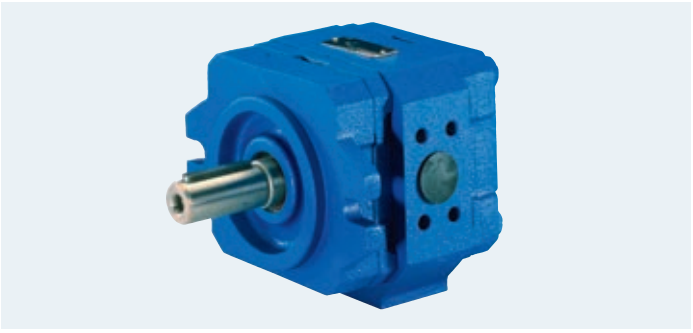
Detailed information:
Data sheet 10213

Technical data

Frame size			2
Nominal size		NG	6 ... 22
Displacement		cm^3	6.5 ... 22.0
Pressure	p_{nom}	bar	210[1]
	p_{max}	bar	250
Speed	n_{min}	rpm	200
	n_{max}	rpm	3600
Flow[2]	q_v	l/min	9.4 ... 31.9
Fluid			HL mineral oil (DIN 51524 part 1); HLP mineral oil (DIN 51542 part 2); HEES fluids (DIN ISO 15380); HEPR fluids (DIN ISO 12380)
Temperature	HLP fluid	°C	–20 ... +100
	Ambient	°C	–20 ... +60
Filtration class		Class	20/18/15

[1] When NG = 22: p_{nom} = 180; p_{max} = 210; n_{max} = 3000
[2] Measured at n = 1450 rpm and p = 10 bar

Internal gear pump PGH-2X



Features

- Fixed displacement
- Low operating noise
- Low flow ripple
- High efficiency at low speeds and viscosities due to dynamic pressure balancing
- Suitable for a wide range of viscosities and speeds
- Can be used in a variety of system sizes and combinations
- Size 2: Nominal size 5 to 8
- Size 3: Nominal size 11 to 16
- Maximum pressure 350 bar
- Maximum displacement 16 cm^3
- Series 2X

Product description

PGH fixed displacement internal gear pumps are pressure balanced to minimize internal leakage. The driven pinion shaft is supported by hydrodynamic bearings and drives an internal toothed ring gear. Fluid is pumped within the gear tooth cavities and a sickle-shaped segment assembly. Axial sealing plates are dynamically pressure-balanced to ensure optimal sealing of the pump gears.

Detailed information:
Data sheet 10223

Technical data

System size			2	3
Nominal size			5 ... 8	11 ... 16
Displacement	V_g	cm^3	5.24 ... 8.2	11.0 ... 16.0
Speed	n_{min}	rpm	600	600
	n_{max}	rpm	3000	3000
Flow[1)]	q_V	l/min	7.5 ... 11.8	15.8 ... 23.0
Pressure	p_{nom}	bar	315	315
	p_{max}	bar	350	350
Temperature	HLP fluid [2)]	°C	−10 ... +80	−10 ... +80
	Ambient	°C	−20 ... +80	−20 ... +80
Filtration class		Class	20/18/15	20/18/15

[1)] Measured at n = 1450 rpm and p = 10 bar
[2)] HLP mineral oil (DIN 51524) part 2

Internal gear pump
PGH-3X

Features

- Fixed displacement
- Low operating noise
- Low flow ripple
- High efficiency, even at low speeds and viscosities due to dynamic pressure balancing
- Suitable for a wide range of viscosities and speeds
- Suitable for use with HFC fluid
- For more information on pressure fluids, see the data sheet
- Size 4: Nominal size 20 to 50
- Size 5: Nominal size 63 to 250
- Maximum pressure 350 bar
- Maximum displacement 250 cm^3
- Series 3X
- Pump with iron cast housing

Product description

PGH fixed displacement internal gear pumps are pressure balanced to minimize internal leakage. The driven pinion shaft is supported by hydrodynamic bearings and drives an internal toothed ring gear. Fluid is pumped within the gear tooth cavities and a sickle-shaped segment assembly. Axial sealing plates are dynamically pressure-balanced to ensure optimal sealing of the pump gears.

Detailed information:
Data sheet 10227

Technical data

System size			4	5
Nominal size			20 ... 63	63 ... 250
Displacement	V_g	cm^3	20.1 ... 65.5	64.7 ... 250.5
Speed	n_{min}	rpm	200	200
	n_{max}	rpm	3000	3000
Flow[1)]	q_V	l/min	28.9 ... 94.1	92.8 ... 359.6
Nominal pressure, continuous	p_N	bar	210 ... 315	135 ... 315

[1)] Measured at n = 1450 rpm and p = 10 bar

Internal gear pumps
PGM-4X

Features

- Fixed displacement
- Very low operating noise
- Low flow ripple
- High efficiency at low speeds and viscosities due to dynamic pressure balancing
- Suitable for a wide range of viscosities and speeds
- Size 4: Nominal size 25 to 63
- Maximum pressure 210 bar
- Pump with aluminum housing

Product description

PGM-4X fixed displacement internal gear pumps are pressure-balanced to minimize internal leakage.

Available in large displacements and suitable for medium pressure operation, these pumps are ideally suited for variable-speed operation along with frequent pressure cycling and are ideal for use in plastics processing machines.

Detailed information:
Data sheet 10235

Technical data

System size			4
Nominal size			25 ... 63
Displacement		cm^3	25.3 ... 65.5
Pressure	p_{nom}	bar	175
	p_{max}	bar	210
Speed	n_{min}	rpm	200
	n_{max}	rpm	3000
Flow[1)]	q_v	l/min	36.3 ... 94.0
Fluid			HLP mineral oil (DIN 51524) part 2
Fluid temperature – HLP		°C	–10 ... +80
Ambient temperature		°C	–20 ... +60
Filtration class			20/18/15

[1)] Measured at n = 1450 rpm and p = 10 bar

Axial piston pumps
A4VSO

Features

- Variable displacement
- Excellent suction characteristics
- Low noise
- Long service life
- HFC operation with a special version, see RD 92053
- Mineral oils and HFD pressure fluids
- Modular design
- Fast control times
- Multiple through-drive options
- Visual swivel angle indicator
- No restrictions on mounting position
- Operation with HF fluid with restrictions

Product description

A4VSO axial piston variable pumps feature a swashplate design and are suitable for open circuit operation.

Detailed information:
Data sheet 92050

Technical data

Nominal size			40 ... 500
Displacement		cm^3	40 ... 500
Pressure	p_{nom}	bar	350
	p_{max}	bar	400
Speed	n_{min}	rpm	On request
	n_{max}	rpm	1900 ... 3200
Flow[1)]	q_v	l/min	60 ... 533
Pump operation			Yes
Motor operation			No
Performance ($\triangle p$ = 350 bar; Vg_{max}; n = 1500 rpm)	P_{max}	kW	35 ... 311
Torque ($\triangle p$ = 350 bar, Vg_{max})	M_{max}	Nm	223 ... 1976

[1)] Measured at n = 1500 rpm

Axial piston pumps
A10FZO, A10FZG, A10VZO, A10VZG

Features

- Suitable for variable-speed operation
- Designed for start/stop service
- Capable of long pressure holding operation
- Usable as a pump or motor
- Mineral oils (HL, HLP) in accordance with DIN 51524, part 2
- Proven A10 technology
- Optional through drive
- High efficiency

Product description

As an advanced design of the proven A10 family of pumps, these products are specifically adapted for variable speed drives in energy-efficient systems.

A10 family axial piston pumps are available as fixed displacement pumps in open (A10FZO) or closed (A10FZG) circuits, or as variable displacement pumps in open (A10VZO) or closed (A10VZG) circuits.

Detailed information:
Data sheet 91485

Technical data

Type			A10FZO	A10FZG	A10VZO	A10VZG
Nominal size			6 ... 45[1)]	6 ... 45[1)]	10 ... 180	10 ... 63[2)]
Displacement		cm^3	6 ... 45	6 ... 45	10.8 ... 180	10 ... 63
Pressure	p_{nom}	bar	315	315	250 (NG10)/315	315
	p_{max}	bar	350	350	315 (NG10)/350	350
Speed	n_{min}	rpm	On request	On request	On request	On request
	n_{max}	rpm	3000 ... 3600	3000	1800 ... 3600	3000
Flow[3)]	q_v	l/min	9 ... 67.5	9 ... 67.5	15 ... 270	15 ... 94.5
Performance	P_{max}	kW	1.5 ... 11.25	1.5 ... 11.25	2.5 ... 45	2.5 ... 15.75
Torque	M_{max}	Nm	9.5 ... 72	9.5 ... 72	17 ... 286	17 ... 101

[1)] 58 to 63 on request [2)] On request
[3)] Measured at n = 1500 rpm

Variable-speed pressure and flow control pump system SYHDFEn-1X

Features

- Pressure transducer
- A4VSO axial piston variable displacement pump
- VT-DFPn-2X proportional valve with integrated electronic control system
- Swivel angle transducer
- Suitable for HFC fluids as per RD 92053
- Mineral oil in accordance with DIN 51524 (HL/HLP)
- Use in Sytronix DFE systems
- Infinitely variable flow control
- Long service life
- Real-time mode for non-cyclic processes
- ”Teach-in” mode for cyclic processes
- Universal through drive

Product description

The SYHDFEn-1X electrohydraulically controls the displacement, pressure and power/torque of an axial piston variable displacement pump.

The control utilizes the following components:

- A4VSO axial piston variable displacement pump
- VT-DFPn-2X proportional pilot valve, with spool position feedback and integrated electronics.
- Swivel angle transducer
- Pressure transducer

Detailed information:
Data sheet 62242 , Retrofit guidelines for A4VSO pumps 30637

Technical data

Nominal size			125	180	250	355
Displacement	$V_{g\,max}$	cm^3	125	180	250	355
Max. speed	$n_{0\,max}$	rpm	1800	1800	1800	1500
Min. speed	n_{min}	rpm	50	50	50	50
Max. flow at max. speed	$q_{v0\,max}$	l/min	225	324	450	533
Max. flow at n_E = 1500 rpm		l/min	186	270	375	533
Max. performance (△p = 280 bar) at max. speed	$P_{0\,max}$	kW	131	189	263	311
Max. performance (△p = 280 bar) at n_E = 1,500 rpm		kW	109	158	219	311
Mass (without fluid)	m	kg	88	102	184	207
Suction pressure	p	bar	0.8 ... 30	0.8 ... 30	0.8 ... 30	0.8 ... 30
Max. permissible operating pressure	p_{max}	bar	350	350	350	350
Min. operating pressure	p_{min}	bar	≥20	≥20	≥20	≥20

Variable-speed pressure and flow control pump system SYDFEn-3X

Features

- Pressure transducer (order separately)
- SYDZ pre-load sequence valve (optional)
- A10VSO ... /32 axial piston variable displacement pump
- VT-DFPn-2X proportional valve with integrated electronic control system
- Swivel angle transducer
- Mineral oils (HL, HLP) in accordance with DIN 51524, part 2
- Use in Sytronix DFE systems
- Infinitely variable flow control
- Long service life
- With pulsation damping
- High-speed version
- Universal through drive

Product description

The SYDFEn-3X electrohydraulically controls the displacement, pressure and power/torque of an axial piston variable displacement pump.

The control utilizes the following components:

- A10VSO ... /32 variable displacement axial piston pump
- VT-DFPn-2X proportional pilot valve, with spool position feedback and integrated electronics
- Swivel angle transducer
- Pressure transducer
- SYDZ pre-load sequence valve with pressure limiting function

Detailed information:
Data sheet 62241

Technical data

Nominal size			71	100	140	180
Displacement	$V_{g\,max}$	cm^3	71.1	100	140	180
Max. speed	$n_{0\,max}$	rpm	2550	2300	2200	1800
Min. speed	n_{min}	rpm	50	50	50	50
Max. flow at max. speed	$q_{v0\,max}$	l/min	181	230	308	324
Max. flow at n_E = 1,500 rpm		l/min	106.7	150	210	270
Max. performance (△p = 280 bar) at max. speed	$P_{0\,max}$	kW	84	107	144	151
Max. performance (△p = 280 bar) at n_E = 1,500 rpm		kW	50	70	98	125
Mass (without through drive, incl. pilot valve)	m	kg	49	71	75	80
Nominal pressure	p_{nom}	bar	280	280	280	280
Max. permissible operating pressure	p_{max}	bar	350	350	350	350
Min. operating pressure	p_{min}	bar	≥20	≥20	≥20	≥20

Accessories

A comprehensive range of accessories is available for your Sytronix system.

Line filters
Line filters ensure that the EMC limit values are adhered to and suppress leakage current generated by line capacitors.

Braking resistors
Braking resistors provide energy dissipation, in the form of heat, resulting from dynamic braking of the drive.

Line chokes
Line chokes reduce the harmonics coupled into the supply grid. As an IndraDrive accessory, they are used to increase the continuous DC bus output and to suppress harmonics.

Power and encoder cables
Power cables are used to connect the motor to the drive unit. Encoder cables are used to connect the feedback encoder to the drive.

Auxiliary components
Accessories for connecting modules, such as the HAS01, include bus bars, fastening materials, etc. Additional items include shielded motor cables and kits for connecting to drive units (HAS02, FVAM01), mounting flange assemblies (HAS07) and commissioning accessories (RKB0001, FEAA01, ...).

Cabinets
CAB-X is a standard solution for hydraulic power unit controls with Rexroth Fv for FcP 5010 Sytronix systems.

Detailed information:
R999000018, Catalog (DE), R999000019 Catalog (EN)
R912004739

Pressure transducers for hydraulic applications
SUP-E01-SYT-HM20-2X

Features

- Sensor utilizing thin-film technology
- Stainless steel wetted surfaces
- Enhanced reliability including high burst pressure, reverse polarity, overvoltage and short-circuit protection
- Excellent temperature characteristics
- UL-listed for the US and Canadian markets
- 3 pressure levels: 100/250/400
- Electrical connection:: plug, 4-pin, M12x1
- Angled connector

Product description

Pressure transducers are used for measurement and control in hydraulic systems. Measured pressure produces a linear electrical output signal. A kit is available including angled plug and cable, and in three standard pressure ranges for Sytronix drives.

Detailed information:
Data sheet 30272

Technical data

Operating voltage	U	V DC	16 ... 36
Output signals	U	V	0.1 ... 10
	I	mA	4 ... 20
Pressure range	p	bar	0 ... 100/250/400
Accuracy class			0.5
Settling time (10 to 90%)	t	ms	< 1
Temperature coefficient	T_c	%	< 0.1/10 K
Fluid temperature range	T_{Fluid}	°C	–40 ... +90
Ambient temperature range	$T_{Ambient}$	°C	–40 ... +85
Environmental rating			IP65/IP67
Electrical connection			M12 plug, 4-pin
Pressure port			G1/4

Control Cabinet CAB-X Standard for Hydraulic Power Unit Sytronix FcP 5010

Features

- Cabinet size depending on the frequency converter RAL7035
- Motor feeder complete incl. frequency converter Fv 1,5 kW to 90 kW
- Thermistor- and pump protection function
- Power supply unit 24VDC regulated
- Control transformer 400/230VAC (Fv > 55 kW)
- Connectability external emergency stop
- Connectability external start / stop
- Monitoring oil level minimum (Indication lamp and switch-off function)
- Monitoring oil level maximum (Indication lamp and switch-off function)
- Monitoring oil temperature max. (Indication lamp and switch-off function)
- Monitoring oil filter (Indication lamp)
- Interface for integration in a machinery control (terminal strip)
- External setpoint value (Oil-pressure, oil-flow)
- Main switch
- Emergency stop

Product description

CAB-X is a standard solution for hydraulic power unit controls with Rexroth Fv for FcP 5010 Sytronix systems.

Technical data

Power class of frequency converter	kW	1,5 ... 15	18,5 ... 45	55 ... 90
Power supply voltage	V	3AC 380 ... 480 (-15/+10%)	3AC 400 ... 460 (+/-10%)	3AC 400 (+/-10%)
Power supply frequency	Hz	50/60 (+/-5%)	50/60 (+/-5%)	50/60 (+/-5%)
Degree of protection		IP54		
Ambient temperature		0 to +35 °C, from 35 to 40 °C with power derating down to 90 %		
Relative humiditiy		< 90 % RH (without condensation)		
Pre fuse mains supply	A	16 ... 315		
Width	mm	400 ... 1200		
Height	mm	500 ... 1400		
Depth	mm	210 ... 500		
Weight (incl. converter)	kg	25 ... 300		

The Drive & Control Company

Rexroth
Bosch Group

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Find your personal contact person here:
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Further information:
www.boschrexroth.com/sytronix

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