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

Rexroth
Bosch Group

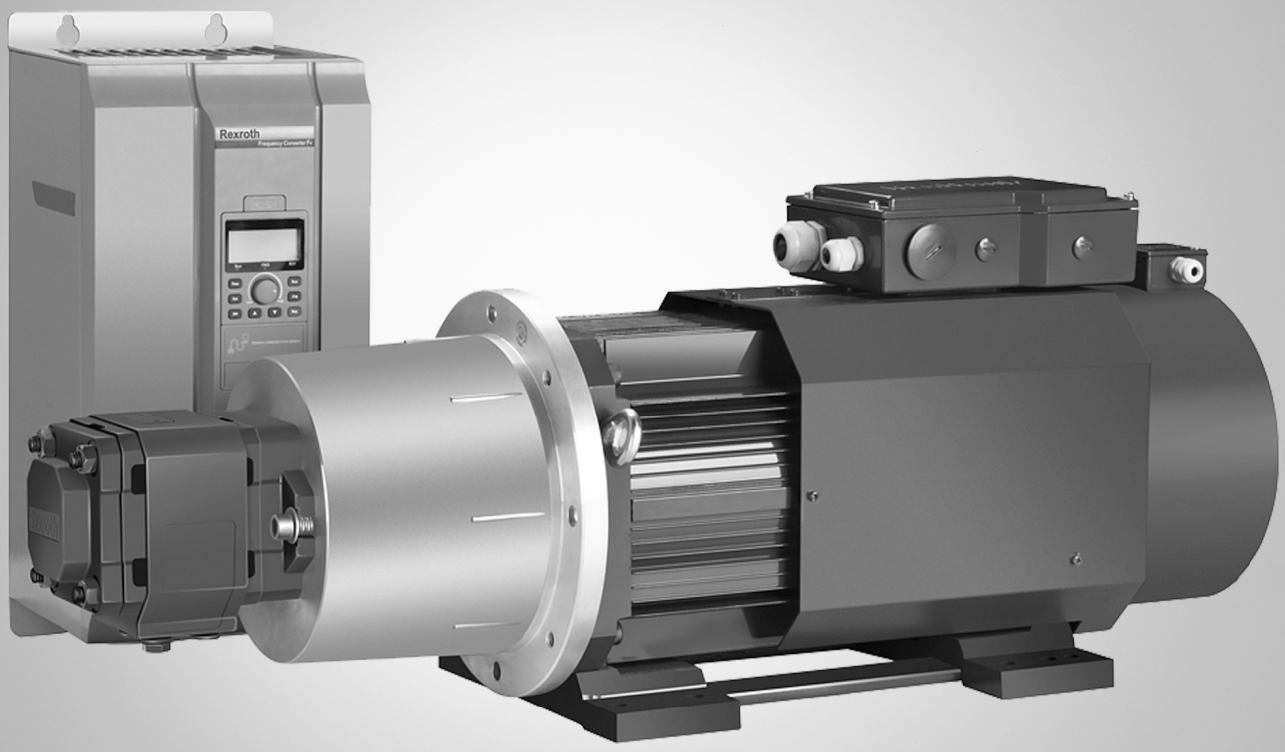
Servo-variable pump system Sytronix SvP5000

ABSVP5

RE 62232-B/05.13

English

Operating instructions



The data specified above serve to describe the product. If there is also information on the use, it is only to be regarded as application examples and proposals. Catalogue information does not constitute warranted properties. The information given does not release the user from the obligation of own judgment and verification. Our products are subject to a natural process of wear and aging.

The cover page shows an example configuration. The product supplied may therefore differ from the photo shown.

The original operating instructions were prepared in German.

Contents

Contents

Contents

Contents

1 About this documentation

1.1 Validity of the documentation

This documentation applies to the following products:

- R988066786, ABSVP5-AE10-080S/FVPGM4/N/D210/03
- R988066787, ABSVP5-AE10-100S/FVPGM4/N/D210/03
- R988066789, ABSVP5-AE10-120S/FVPGM4/N/D210/03
- R988068488, ABSVP5-AE10-150S/FVPGH5/N/D210/03
- R988066791, ABSVP5-AE10-190S/FVPGM5/N/D210/03
- R988070772, ABSVP5-AE1X-100E/FVPGM4/N/D210/03
- R988070773, ABSVP5-AE1X-120E/FVPGM4/N/D210/03
- R988070774, ABSVP5-AE1X-150E/FVPGH5/N/D210/03
- R988070775, ABSVP5-AE1X-190E/FVPGM5/N/D210/03

- As well as to any other variant available according to the type key in data sheet 62232, see Table 1: "Required and amending documentation".

This documentation is intended for assemblers, operators, service engineers and system end-users.

This documentation contains important information on the safe and proper transport, assembly, commissioning, maintenance, disassembly and simple troubleshooting of the product.

▶ You should read this documentation completely and in particular chapter 2 "Safety instructions" before working with the product.

1.2 Required and amending documentation

▶ The product must not be commissioned until you have been provided with the documentation marked with the book symbol 🕮 and you have understood and observed it.

Table 1: Required and amending documentation

	Title	Document number	Document type
🕮	Servo-variable pump system, Sytronix SvP5000	62232	Data sheet
🕮	Internal gear pump, type PGH.-3X	10227-B	Operating instructions
🕮	Internal gear pump, fixed displacement, type PGH	10227	Data sheet
🕮	Internal gear pump, fixed displacement, type PGM	10229	Data sheet
🕮	Rexroth Frequency Converter Fv	R913003734	Operating instructions
🕮	Pressure transducer with integrated electronics – type HM18	30271	Data sheet

1.3 Representation of information

Consistent safety instructions, symbols, terms and abbreviations are used so that you can quickly and safely work with your product using this documentation. For a better understanding, they are explained in the following sections.

1.3.1 Safety instructions

In this documentation, safety instructions are included whenever sequences of actions are explained which bear the danger of personal injury or damage to property. The hazard avoidance measures described must be observed.

Safety instructions are structured as follows:

⚠ SIGNAL WORD
Type and source of danger Consequences in case of non-compliance ▶ Hazard avoidance measures ▶ <Enumeration>

- **Warning sign:** Draws attention to the danger
- **Signal word:** Identifies the degree of danger
- **Type and source of danger:** Identifies the type and source of danger
- **Consequences:** Describes the consequences of non-compliance
- **Precaution:** Specifies how the hazard can be prevented

Table 2: Risk classes according to ANSI Z535.6-2006

Warning sign, signal word	Meaning
⚠ DANGER	Indicates a dangerous situation which will cause death or severe injuries if not prevented.
⚠ WARNING	Indicates a dangerous situation which will cause death or severe injuries if not prevented.
⚠ CAUTION	Indicates a dangerous situation which may cause minor to medium injuries if not prevented.
NOTICE	Indicates damage to property: The product or the environment could be damaged.

1.3.2 Symbols

The following symbols indicate notices which are not safety-relevant but increase the comprehensibility of the documentation.

Table 3: Meaning of the symbols

Symbol	Meaning
	If this information is not observed, the product cannot be used and/or operated optimally.
▶	Single, independent action.
1. 2. 3.	Numbered instruction: The numbers indicate that the actions must be carried out one after the other.

1.3.3 Abbreviations

The following abbreviations are used in this documentation:

Table 4: Abbreviations

Abbreviation	Meaning
SvP system	Servovariables Pumpensystem (German) Servo-variable Pump System (English)
p	Pressure
Q	Flow
n	Speed
PGH	Internal gear pump, constant displacer volume
PGM	Internal gear pump, constant displacer volume
RE	Rexroth document in English language
RX	Rexroth document in another language
SGM IMM	Spritzgießmaschine Injection molding machines
ESD/EMC	Electrostatic discharge/electro-magnetic compatibility
CPU	Central processing unit, processor
Fv	Frequency converter

2 Safety instructions

2.1 General information on this chapter

The product has been manufactured according to the generally accepted codes of practice. However, there is still the risk of personal injury and damage to property if you do not observe this chapter and the safety instructions in this documentation.

- Read this documentation completely and thoroughly before working with the product.
- Keep this documentation in a location where it is accessible to all users at all times.
- Always include the required documentation when you pass the product on to third parties.

2.2 Intended use

This product is an electrohydrostatic drive system.

The SvP system is exclusively intended to be installed in a machine or to be assembled together with other components to form a machine and/or a power unit. The SvP system may only be commissioned after it has been integrated into the machine for which it is designed.

The SvP system may be used as follows:

- For pressure-controlled hydraulic supply with override flow control

The SvP system is not suitable for performing safety-relevant functions.

A plausibility check of the command and actual values (pressure and speed) is not provided for in the SvP system.

- Make sure that the plausibility check is carried out in the machine control.

In order to carry out an application-specific adjustment of the parameters within the scope of the initial commissioning, please contact your Bosch Rexroth account manager.

The product is only intended for professional use and not for private use.

Intended use includes having read and understood this documentation completely, especially chapter 2 "Safety instructions".

2.3 Improper use

Any use deviating from the intended use is improper and thus not admissible.

Bosch Rexroth AG does not assume any liability for damage caused by improper use. The user assumes all risks involved with improper use.

2.4 Qualification of personnel

The activities described in this documentation require basic knowledge of mechanics, hydraulics and electrics as well as knowledge of the appropriate technical terms. For transporting and handling the product, additional knowledge of how to handle lifting tools and the necessary attachment devices is required. In order to ensure safe use, these activities may only be carried out by an expert in the filed or an instructed person under the direction and supervision of an expert.

Experts are persons who are able to recognize potential dangers and take appropriate safety measures due to their technical training, knowledge and experience, as well as their knowledge of the relevant regulations pertaining to the work to be undertaken. An expert must observe the relevant specific professional rules.

The following is required as additional qualification:

- Knowledge of the wiring of the electric components
- Knowledge of the application software parameterization
- Basic control technology knowledge

2.5 General safety instructions

- Observe the valid regulations on accident prevention and for environmental protection.
- Observe the safety regulations and provisions of the country where the product is implemented/used.
- Exclusively use Rexroth products in technically perfect condition.
- Observe all notices on the product.
- Persons who assemble, operate, disassemble or maintain Rexroth products must not be under the influence of alcohol, other drugs or pharmaceuticals that may affect their ability to react.
- Only use accessories and spare parts authorized by the manufacturer in order to exclude hazards to persons due to inappropriate spare parts.
- Comply with the technical data and environmental conditions indicated in the product documentation.
- The installation or use of inappropriate products in safety-relevant applications could result in unintended operating states when being used which in turn could cause personal injuries and/or damage to property. Therefore, only use a product for safety-relevant applications if this use is expressly specified and permitted in the documentation of the product.
- Do not commission the product until you can be sure that the end product (for example a machine or system) where the Rexroth product is installed complies with the country-specific provisions, safety regulations and standards of application.

2.6 Product- and technology-dependent safety instructions

⚠ WARNING

Pressurized system!

Danger to life, risk of injury, severe injury when working on systems that have not been stopped! Damage to property!

- Ensure that the SvP system and/or the machine is completely depressurized.
- Do not disconnect line connections, connections or components as long as the SvP system is pressurized.
- Switch off all force-transmitting components and ports (electric, pneumatic, hydraulic) according to the manufacturer's specifications and secure them against restarting. If possible, remove the main fuse of the system.

Leaking oil mist due to defective or improperly assembled seals!

Risk of fire, risk of explosion, danger due to allergic reactions, environmental pollution!

- Welding work may only be carried out when the SvPsystem is depressurized.
- Keep open fire and ignition sources away from the SvP system.

High electrical voltage (above 50 V)!

Danger to life, risk of injury caused by electric shock or severe injury!

- Make sure the relevant system part is de-energized before assembling the SvP system or connecting and disconnecting connectors.
- Protect the system against restarting.
- Only carry out short-time measurements and tests with permanently connected protective earthing conductor at those points of the components intended for this purpose.
- After switch-off, you should generally wait for 30 minutes before you touch an electric component in order to allow the live capacitors to discharge. Measure the electrical voltage of live parts before beginning the work in order to avoid hazards caused by contact.
- Do not touch the electrical connection points of the components if the system is activated.

High housing voltage and high leakage current!

Danger to life, risk of injury caused by electric shock or severe injury!

- Before switch-on and commissioning, ground the components of the SvP system or connect them to the protective earthing conductors at the earthing points.
- Always connect the protective earthing conductors of the SvP system components permanently to the supply network. The leakage current is greater than 3.5 mA.
- Use at least a 10 mm² copper cross-section for the entire route of the protective earthing conductor.

⚠ WARNING

Exposure to magnetic and electro-magnetic fields!

Health hazard for persons with cardiac pacemakers, metal implants and hearing aids in the immediate vicinity of electric components!

- Ban the group of persons specified above from entering the following areas:
  - Areas in which components of the SvP system are mounted, commissioned and operated
  - Areas in which motor parts with permanent solenoids are stored, repaired or mounted
- Consult a doctor if the persons specified above have to work in these areas.

⚠ CAUTION

Hot SvP system surfaces!

Risk of burning! Risk of injury!

- Only touch the surfaces of the SvP system with protective gloves or do not work on hot surfaces.
  During or after the operation, temperatures may rise to values higher than 60 °C (140 °F), depending on the operating conditions.
- Allow the SvP system to cool down sufficiently before touching it.
- Observe the protective measures of the end machine manufacturer.

Slip hazard due to oily surfaces!

Risk of injury!

- Protect and mark the danger zone.
- Use an oil binding agent in order to bind the leaked hydraulic fluid.
- Remove and dispose of the contaminated oil binding agent (see chapter 13 "Disposal").
- Wear your protective equipment, such as safety shoes.

Hydraulic fluid leaking from the SvP system in an uncontrolled form (due to leakage)!

Risk of injury!

- Switch the machine off immediately (emergency stop switch).
- Identify and remedy the cause of the leakage.
- Never try to stop or seal the leak or the oil jet using a cloth.
- Never come into contact with a splashing high-pressure oil jet under any circumstances.
- Carry out visual inspections for leak-tightness of the SvP system and the oil-containing components on a regular basis.

⚠ CAUTION

Contact with hydraulic fluid!

Health hazard / impairment of health, e.g. eye injuries, skin lesions, poisoning when inhaled!

- Avoid contact with hydraulic fluids.
- When dealing with hydraulic fluids, you must observe the safety instructions of the manufacturer.
- Use your personal protective equipment (e. g. safety goggles, protective gloves, suitable working clothes, safety shoes).
- If, nevertheless, hydraulic fluid comes into contact with the eyes or gets into the bloodstream or is swallowed, please consult a doctor immediately.

2.7 Obligations of the machine end-user

The machine end-user of the products by Bosch Rexroth AG is obliged to provide for personnel training on a regular basis regarding the following subjects:

- Observation and use of the operating instructions as well as the legal regulations.
- Intended operation of the product.
- Observation of the instructions of factory security officers and of the operating instructions of the machine end-user.
- Behavior in case of emergency.

Bosch Rexroth AG offers training support measures in specific fields. You can find an overview of the training contents on the Internet at http://www.boschrexroth.com/didactic.

3 General warnings of damage to property and damage to the product

NOTICE

Danger due to improper handling!

Damage to property!

- The SvP system may only be operated according to section 2.2 "Intended use".
- Avoid impacts against functionally relevant areas (e.g. mounting surfaces) and attachment parts (e.g. plug-in connections).

Mixing hydraulic fluids!

Damage to property!

- Any mixing of hydraulic fluids by different manufacturers and/or of different types by the same manufacturer is generally not admissible.

Contamination by fluids and foreign particles!

Premature wear and malfunctions!

- During assembly, provide for cleanliness in order to prevent foreign particles e.g. welding beads or metal chips from getting into the hydraulic lines and causing wear or malfunctions in the SvP system.
- Ensure that all connections, hydraulic lines and attachment parts (e.g. measuring devices) are clean and free of chips.
- For removing lubricants or any other heavy contamination, use industrial residue-free wipes.
- Before commissioning, ensure that all hydraulic and mechanical connections are connected.
- Only carry out cleaning processes on the SvP system if the hydraulic connections are closed.
- Make sure that the cleanliness class of the hydraulic fluid according to ISO4406(c) specified in the data sheet 62232 "Servo-variable pump system, Sytronix SvP5000" is complied with.
- Filter the hydraulic fluid during filling using a suitable filter system in order to minimize solid particle contamination and reduce the water in the system.

Improper cleaning!

Damage to property!

- Close all openings using suitable protective caps and/or fittings in order to prevent cleaning agents from penetrating the system.
- Check that all seals and caps of electric plug-in connections are firmly fitted to prevent the penetration of cleaning agents.
- Do not use aggressive cleaning agents for cleaning. Clean the SvP system using a suitable cleaning liquid.
- The use of a high-pressure washer is not admitted.

General warnings of damage to property and damage to the product

NOTICE

Operation with a lack of hydraulic fluid!

The SvP system may be damaged or destroyed!

- Observe the system manufacturer's specifications regarding the point "Control of the hydraulic fluid" and the prescribed remedial measures for the control result.

Leaking or spilt hydraulic fluid!

Environmental pollution and pollution of the ground water!

- Use an oil binding agent in order to bind the leaked hydraulic fluid.
- When filling and draining the hydraulic fluid, always put a collecting pan under the motor-pump assembly of the SvP system.
- Observe the information in the safety data sheet of the hydraulic fluid and the machine manufacturer's specifications.

4 Scope of delivery

Motor-pump assembly

1 motor-pump assembly

The motor-pump assembly basically consists of an asynchronous servo motor with foot mounting including encoder and power cable, an internal gear pump PGM/PGH, coupling and bell housing.

According to the selected system size, the SvP system comprises one of the following motor-pump assemblies:

- R988067280, SERVOMOTOR SVS08D-XL-13-1800-E-B35
- R901283399, PGM4-3X/032RA11VU2
- R901291583, COUPLING KL A28/38.38H7-25H7 98SHA ALU
- R988066192, BELL HOUSING 250-CZ37384

or

- R988067281, SERVOMOTOR SVS08D-XL-15-2000-E-B35
- R901283400, PGM4-3X/040RA11VU2
- R901291583, COUPLING KL A28/38.38H7-25H7 98SHA ALU
- R988066192, BELL HOUSING 250-CZ37384

or

- R988067282, SERVOMOTOR SVS09C-XL-18.5-1800-E-B35
- R901283401, PGM4-3X/050RA11VU2
- R901292256, COUPLING KL A38/45.42H7-25H7 98SHA ALU
- R988066191, BELL HOUSING 300-CZ37385

or

- R988067283, SERVOMOTOR SVS09D-XL-22-1800-E-B35
- R901147115, PGH5-3X/063RE11VU2
- R901352852, COUPLING NBL KL A42/55.42H7-40H7 98SHA ST
- R988066190, BELL HOUSING 300-CZ37386

or

- R988067284, SERVOMOTOR SVS10C-XL-27-1600-E-B35
- R901283403, PGM5-3X/080RA11VU2
- R901037158, COUPLING NBL AB33-22/KD42-40/55-98
- R988067377, BELL HOUSING 350-CZ37976

or

- R988067280, SERVOMOTOR SVS08D-XL-13-1800-E-B35
- R901283400, PGM4-3X/040RA11VU2
- R901291583, COUPLING KL A28/38.38H7-25H7 98SHA ALU
- R988066192, BELL HOUSING 250-CZ37384

or

- R988067281, SERVOMOTOR SVS08D-XL-15-2000-E-B35
- R901283401, PGM4-3X/050RA11VU2
- R901291583, COUPLING KL A28/38.38H7-25H7 98SHA ALU
- R988066192, BELL HOUSING 250-CZ37384

Scope of delivery

or

- R988067282, SVS09C-XL-18.5-1800-E-B35
- R901147115, PGH5-3X/063RE11VU2
- R901292256, COUPLING KL A38/45.42H7-25H7 98SHA ALU
- R988066191, BELL HOUSING 300-CZ37385

or

- R988067283, SVS09D-XL-22-1800-E-B35
- R901283403, PGM5-3X/080RA11VU2
- R901352852, COUPLING KL A42/55.42H7-40H7 98SHA ST
- R988066190, BELL HOUSING 300-CZ37386

- Or another variant according to the SvP system selected using the type key in data sheet 62232, see Table 1: "Required and amending documentation".

Upon delivery, the following parts are also mounted:

- 2 ring bolts (eyebolts)
- 1 pressure connection flange cover
- 1 suction port flange cover
- 1 protective sleeve for power connector
- 1 protective sleeve for encoder plug

Electronic components

1 frequency converter

The following frequency converters are included in the scope of delivery according to your selected system size:

- R912003656, FVCA01.1-15K0-3P4-MDA-LP-P001-01V01
- R912003657, FVCA01.1-18K5-3P4-MDA-LP-P001-01V01
- R912003658, FVCA01.1-22K0-3P4-MDA-LP-P001-01V01
- R912003659, FVCA01.1-30K0-3P4-MDA-LP-P001-01V01
- R912003660, FVCA01.1-37K0-3P4-MDA-LP-P001-01V01

1-3 FELR braking resistances

Depending on the system size, 1 to 3 braking resistances are included in the scope of delivery:

- R912003718, FELR01.1N-02K0-N047R-D-560-P001

1 pressure transducer

- 0811405540, HM18-1X/210-V-S/V0/0

1 adapter with throttle

- 1833458006, ADAPTER G1/4->G1/4+0.5MM

1 FELB brake chopper

The following brake choppers are included in the scope of delivery according to the system size:

- R912001499, FELB02.1N-30K0-NNONE-A-560-NNNN

5 About this product

5.1 Performance description

Table 5: Overview

Size	Standard	Economic
080	080S	-
100	100S	100E
120	120S	120E
150	150S	150E
190	190S	190E

- Sizes 080S, 100S, 100E and 120E correspond approx. to the flow in l/min with a speed of 2500 rpm.
- Sizes 120S, 150S, 190S, 150E and 190E correspond approx. to the flow in l/min with a speed of 2400 rpm.
- S: Systems for standard requirements in pressure and flow control operation
- E: Systems for standard requirements in pressure and flow control operation with reduced pressure level

For the technical data, operating conditions and limits of use of the SvP system, please refer to data sheet 62232, see Table 1: "Required and amending documentation".

5.2 Component overview

5.2.1 System components

Irrespective of the performance classes, an SvP system, in its basic configuration, consists of the subsequently listed assemblies and/or components:

Motor-pump assembly

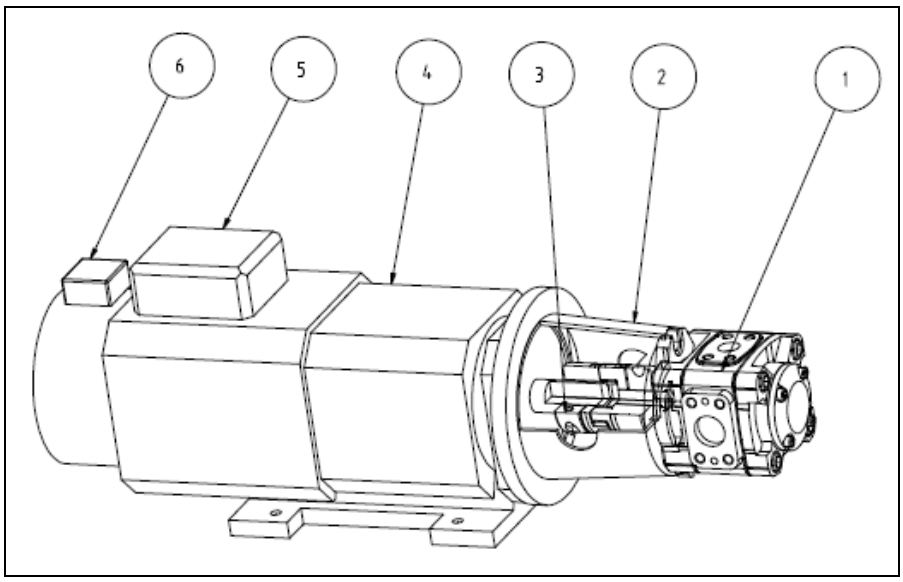


Fig. 1: Motor-pump assembly

1	Internal gear pump PGH or PGM	**4**	Asynchronous servo motor
2	Bell housing	**5**	Terminal box (motor)
3	Coupling	**6**	Terminal box (fan)

As accessories for the motor-pump assembly, a pressure transducer for recording the actual pressure value is supplied for attachment in the pressure line of the motor-pump assembly.

Frequency converter

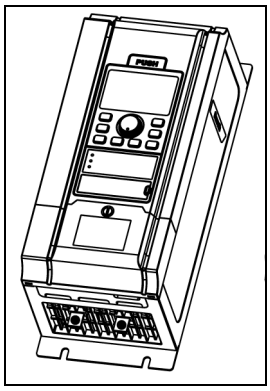


Fig. 2: Basic set-up of an Fv frequency converter

For more information on the frequency converter and the other electric components, please refer to the documentation "Rexroth Frequency Converter Fv"; see Table 1: "Required and amending documentation".

5.2.2 Set-up of the SvP system

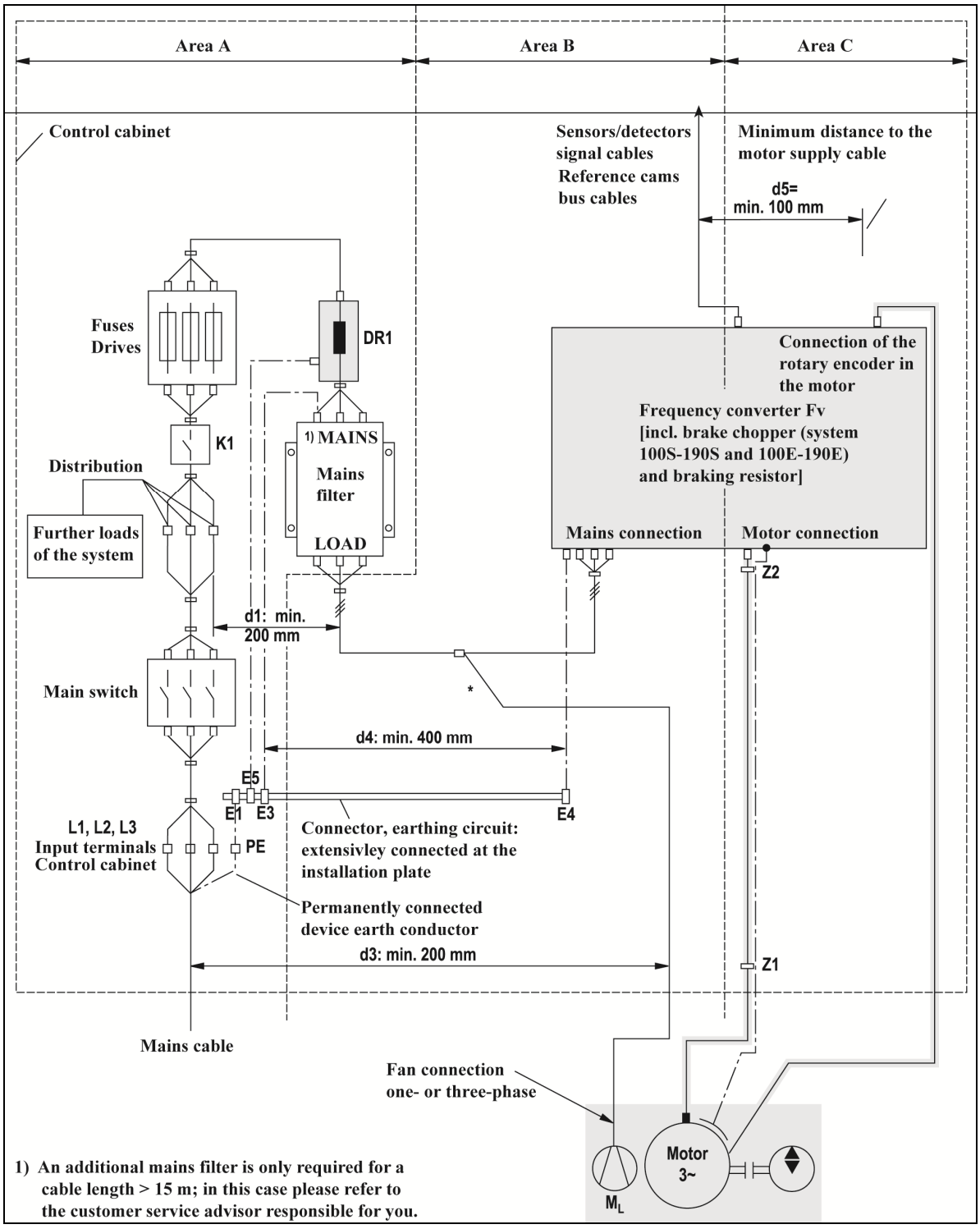


Fig. 3: Set-up of the SvP system

DR1	Mains throttle	Z1, Z2	Shield connections for cables
E1...E5	Earth conductor of the equipment or the components	Assembling within the control cabinet according to areas of dysfunction – sample arrangement	
K1	External mains contactor		
M_L	Motor fan		Included in the package

5.3 Product description

An SvP system is used to realize a pressure-controlled hydraulic supply with override flow control. There is also the possibility to operate it as exclusively pressure-controlled hydraulic supply.

The pressure command value for the frequency converter is set by the superior machine control. The actual pressure value is measured by a pressure transducer in the hydraulic system and fed back to the frequency converter. The frequency converter controls the speed of the asynchronous servo motor so that the internal gear pump driven by it displaces exactly the oil volume required for providing the command pressure. Alternatively, a flow command value for the frequency converter is set. The frequency converter then controls the speed of the asynchronous servo motor so that the internal gear pump driven by it displaces exactly the oil volume corresponding to the flow command value.

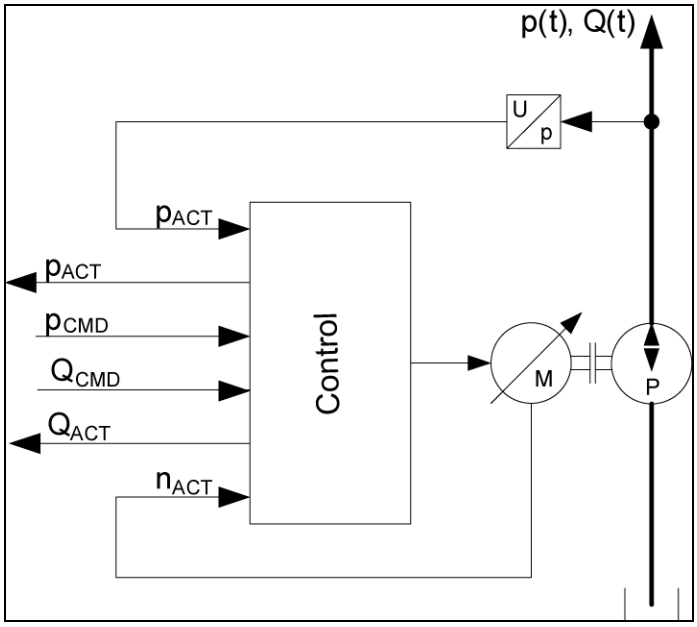


Fig. 4: System principle

5.4 Input and output allocation at the frequency converter

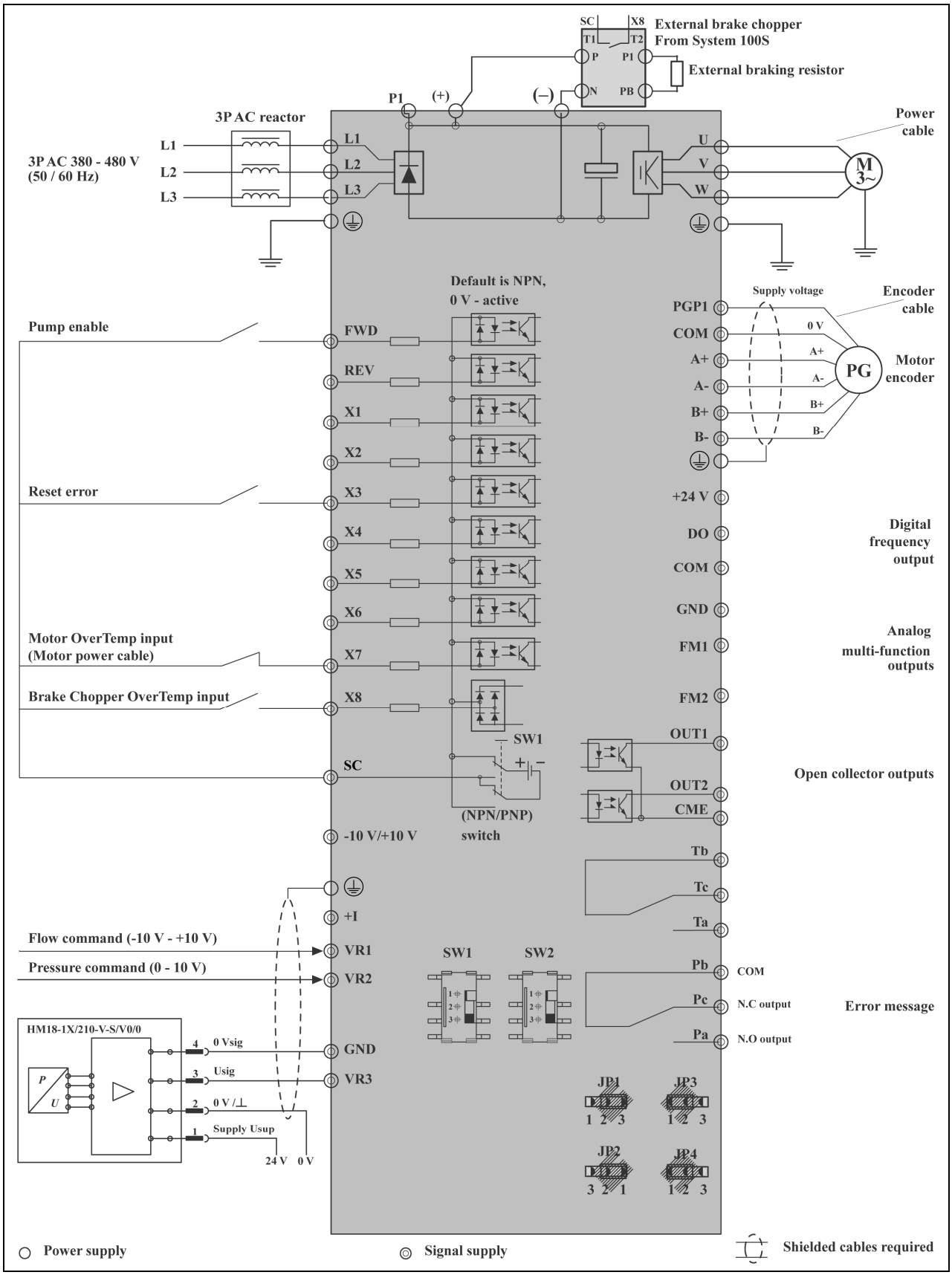


Fig. 5: Input/output allocation at the frequency converter

The following tables show the standard allocation of the I/O signals of the frequency converter power terminal and control terminal.

5.4.1 Power terminal

Table 6: Pin assignment of the power terminal

Terminal	Description
L1, L2, L3	Mains voltage
U, V, W	Frequency converter outputs (to be connected to the motor)
PB	Reserved terminal for the external braking resistance
P1, (+)	Output link connection, positive pole
(–)	Output link connection, negative pole

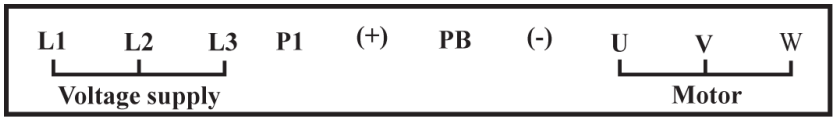


Fig. 6: Power terminal 0.4 to 15 kW

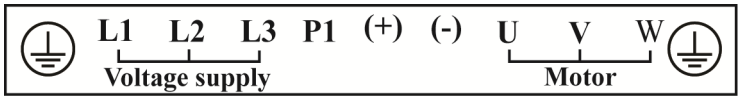


Fig. 7: Power terminal from 18.5 kW

5.4.2 Pin assignment

Table 7: Pin assignment of the control terminal

Type	Terminal	Signal and/or function	Description	Signal requirement
Digital input signals	FWD	FWD/stop		Input decoupled by optocoupler, 24 V DC, 8 mA for external power supply. NPN/PNP switch
	X3; X7; X8	Multifunctional inputs	X3 = resets an active error X7 = indicates an overtemperature of the motor (motor power cable) X8 = indicates an overtemperature of the braking resistance	
	SC	Terminal for reference potential, digital	Isolated from ground (GND)	
Analog input signals	±10 V	Supply voltage for the entry of external frequency command values	Voltage supply for speed control	±10 V (current max. 10 mA)
	VR1	Analog command value specification	Flow command value	Input voltage range: -10 to 10 V; Input resistance: 100 kΩ; Resolution: 1/2000
	VR2		Pressure command value	
	VR3		Actual pressure value	
	GND	Terminal for reference potential, analog (0 V)	Isolated from COM	
Digital input signals	OUT1-CME	Open collector output 1	Programmable switch output with multiple functions	Open collector outputs: Max. output voltage: +24 V DC Max current: 50 mA
	OUT2-CME	Open collector output 2		
	DC-COM	Pulse output	Programmable pulse output with multiple functions	Open collector outputs via optocoupler: Output frequency: Max. of 50.0 kHz Max output voltage: +24 V DC
	Tc	Relay output 1	In case of protection caused by an error: Tc - Tb closed	Contact load capacity 250 V AC, 3 A 30 V DC, 3 A
	Tb	Relay 1, common contact		
	Pc	Relay output 2	Programmable relay output with multiple functions: Pb – Pc closed	Contact load capacity 250 V AC, 3 A 30 V DC, 3 A
	Pb	Relay 2, reference potential terminal		
	+24 V	Positive pole 24 V DC	-	-
Analog output signals	FM1-GND	Analog multifunctional output 1	Programmable analog output with multiple functions	Output voltage / current can be set for FM1 by means of JP3 and for FM2 by means of JP4: Output voltage: 0 / 2 to 10 V Output current: 0 / 4 to 20 mA
	FM2-GND	Analog multifunctional output 2		

Type	Terminal	Signal and/or function	Description	Signal requirement
Rotary encoder signals	PGP1-COM	Supply voltage +24 V	Voltage supply 1 for the rotary encoder	Max output current: 100 mA
	A+	Rotary encoder signal A	Rectangular curve with 180° pulse width	Voltage range of rotary encoder for the differential inputs: +8 to 24 V Max. input frequency: 200 kHz
	A–		Counter-directional rectangular curve to A+	
	B+	Rotary encoder signal B	90° phase-offset to A+	
	B–		90° phase-offset to A–	

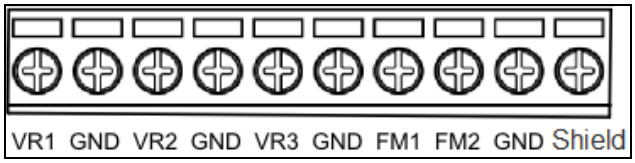


Fig. 8: Pin assignment for analog signals

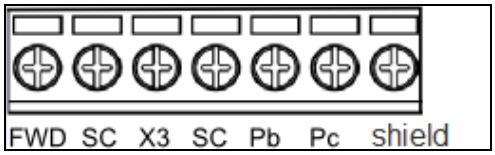


Fig. 9: Pin assignment for digital signals

5.5 Product identification

For more detailed information on the model and type, please refer to data sheet 62232, see Table 1: "Required and amending documentation".

The name plate of the SvP system can be found on the pump carrier of the motor-pump assembly, see Fig. 1: "Motor-pump assembly"

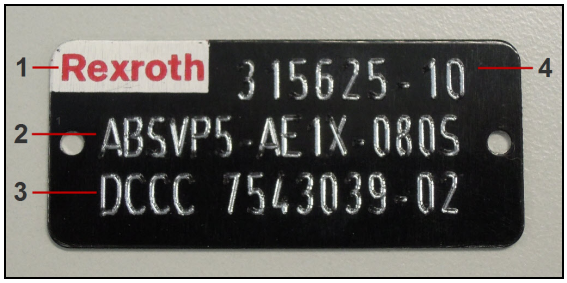


Fig. 10: Name plate

1 Rexroth logo
2 Material short text
3 Serial number
4 Order number

6 Transport and storage

WARNING

Tipping over, falling or uncontrolled change in position of the SvP system components!

Danger to life, risk of injury or damage to property!

- Check the weight and also the location of the center of gravity of the SvP system components.
- Always use adequate lifting tools and, if necessary, floor conveyors to transport the SvP system.
- Only use the intended locations and attachment devices for securing the means of transport and/or lifting the product.
- Observe the maximum load-bearing capacity of the attachment devices and floor conveyors.
- Place the product on a suitable ground.
- Ensure that no unauthorized persons are within the danger zone.

CAUTION

Hazard due to overload and/or unsuitable posture during lifting and transport!

Most severe injuries and injuries that adversely affect posture!

- Always lift the SvP system using attachment devices and adequate lifting tools.

Uncontrolled motions of the tensioning belts upon separation/loosening!

Risk of injury!

- Keep an adequate distance and separate the tensioning belts carefully.

6.1 Transporting SvP systems

- Observe the transport instructions on the packaging.
- For storing and transporting the product, always observe the environmental conditions referred to in chapter 6.1.1 "Transport conditions".
- Only transport the motor-pump assembly in the horizontal position.
- Use suitable shock absorbers if major shocks might occur during transport.
- If the packaging has to be opened e.g. for control purposes, you should reseal the packaging to restore the condition as supplied.
- Wherever possible, the packaging should not be removed until directly before assembling the unit.

Upon delivery, the motor-pump assembly is packed in a wooden crate together with the other SvP system components. The SvP system is provided with protective sleeves and covers. During transport and storage, these protective devices must remain on the SvP system.

6.1.1 Transport conditions

- Comply with the transport conditions specified in the following table:

Table 8: Transport conditions

Temperature:	–25….70 °C
Relative air humidity:	5….75 %
Absolute air humidity:	1….60 g/m³; climate class 2K3
Condensation:	Not admissible
Icing:	Not admissible

6.1.2 Transport using cranes or similar lifting tools

The unit may only be transported by means of cranes and similar lifting tools if adequate attachment devices e.g. lifting straps, belts and chains are used. Upon delivery, the motor-pump assembly is equipped with attachment points on the pump as well as on the electric motor, see the following table:

Table 9: Attachment points

System	Motor	Pump
080S 100S	2 x ring bolt DIN580 M8	1 x ring bolt DIN580 M8
120S	2 x ring bolt DIN580 M10	1 x ring bolt DIN580 M8
150S	2 x ring bolt DIN580 M10	1 x ring bolt DIN580 M10
190S	2 x ring bolt DIN580 M12	1 x ring bolt DIN580 M10

For more detailed information on the load-bearing capacity of the ring bolts, please refer to the standard DIN 580/092010.

- Use only the intended points and attachment points when lifting (see Fig. 11: "Lifting the motor-pump assembly ").
- Always mount the attachment devices at two attachment points of the motor-pump assembly. Never lift the motor-pump assembly using only one attachment point.
- Lift and lower the motor-pump assembly slowly and carefully.

Fig. 11: Lifting the motor-pump assembly (1)

Fig. 12: Lifting the motor-pump assembly (2)

6.2 Storing the SvP system

Bosch Rexroth generally recommends storing all components until the actual time of installation in the machine as follows:

- In the original packaging
- Dry and dust-free
- At room temperature
- Free of vibrations and oscillations
- Protected from light and direct sunlight

Protective sleeves and covers may be fixed to our products at the factory. During transport and storage, they must remain on the components. Only remove these parts shortly before assembling the unit.

Please note that the warranty period is not prolonged if you store the products!

6.2.1 Storage conditions

Table 10: Storage conditions

Temperature:	-25….55 °C
Relative air humidity:	5….95 %; climate class 1K3
Absolute air humidity:	1….29 g/m³; climate class 1K3
Condensation:	Not admissible
Icing:	Not admissible

6.2.2 Storage times

The maximum storage time is 24 months.

Motor-pump assembly

Internal gear pump:

- Storage up to 9 months: Leave the internal gear pump in its condition as supplied (wetted with mineral oil).
- Storage up to 24 months: Fill the internal gear pump with mineral oil.

Electronic components

- In case of long-term storage, operate the frequency converter once per year for at least 1 hour with mains voltage $U_{LN.}$
- In case of long-term storage, operate the brake chopper once per year for at least 1 hour with direct voltage $U_{DC.}$

After expiry of the maximum storage time, we recommend having the motor-pump assembly checked by a competent Rexroth service employee including replacement of the seals as a precaution.

7 Assembly and installation

This chapter describes the assembly of the SvP system at its place of use as well as the connection to the hydraulic system and the electrical systems of the machine.

For information regarding the installation in the machinery, particularly regarding its overall function and logic mode of operation, please refer to the instructions and/or the documentation for the machinery.

7.1 Unpacking

- Remove the packaging of the SvP system.
- Dispose of the packaging in accordance with the provisions valid in your country.

7.2 Installation conditions

7.2.1 Installation conditions for motor-pump assembly

Ensure the following steps are carried out before assembling the motor-pump assembly:

- Procure tools, auxiliary materials, measurement and test equipment.
- Check the components for visible damage. Defective components must not be assembled.
- Make sure that all machine dimensions and tolerances are suitable for attachment of the assembly.

For more detailed information on dimensions and tolerances of the motor-pump assembly, please refer to data sheet 62232, see Table 1: "Required and amending documentation".

- Ensure that a minimum distance between fan grid and machine is complied with for aspiration and/or discharge of the air. The distance is determined by the motor construction, see Fig. 13: "Fan distance".

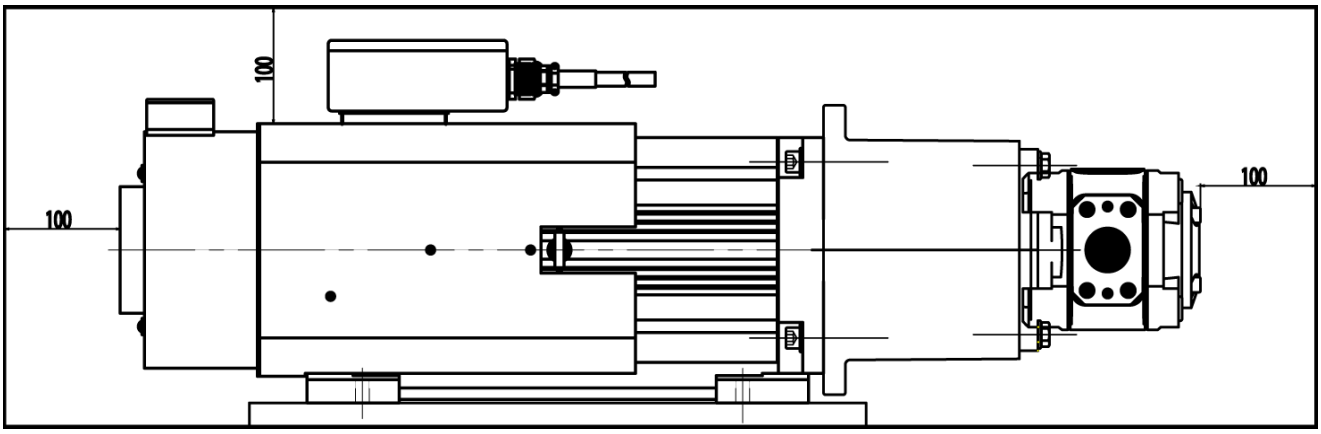


Fig. 13: Fan distance

- Check all components, installation surfaces and threads for cleanliness.
- Make sure that the assembly can be carried out in a dry, dust-free environment.
- Make sure that the motor-pump assembly and all other parts used are free from dirt when they are installed.

- Contamination of the hydraulic fluid may considerably reduce the life cycle of the drive unit. Make sure that the cleanliness class of the hydraulic fluid according to ISO4406(c) specified in the data sheet 62232 "Servo-variable pump system, Sytronix SvP5000" is complied with.

- Make sure that the temperature of the motor-pump assembly corresponds to the ambient temperature of the site of installation. Allow the assembly to acclimatize sufficiently in order to adapt to the temperature conditions.
- Remove fluids from the pump which might have been filled in for storage before assembling the motor-pump assembly.
- Please note that the motor-pump assembly is not suitable for installation of the pump under oil.

7.2.2 Installation conditions for frequency converter and additional components

The frequency converter and its additional components have been designed for installation in control cabinets!

For information on the installation conditions, please refer to the operating instructions "Rexroth Frequency Converter Fv" (R912003734) in chapter 5 "Installation", see Table 1: "Required and amending documentation".

7.3 Assembling the SvP system

7.3.1 Mechanically connecting the motor-pump assembly

Motor-pump assembly with foot mounting

In order to mount the motor-pump assembly in a professional and safe manner, Rexroth recommends the following screws and washers for attachment and mounting:

System	Quantity	Denomination	Washer	Tightening torque
80S/100E	4	Hex. socket head cap screw ISO4762-M10x…-8.8	GB/T95 10	54 Nm
100S/120E	4	Hex. socket head cap screw ISO4762-M10x…-8.8	GB/T95 10	54 Nm
120S/150E	4	Hex. socket head cap screw ISO4762-M14x…-8.8	GB/T95 14	148 Nm
150S/190E	4	Hex. socket head cap screw ISO4762-M14x…-8.8	GB/T95 14	148 Nm
190S	4	Hex. socket head cap screw ISO4762-M20x…-8.8	GB/T95 20	464 Nm

- Only assemble the motor-pump assembly on level, bare, primed or galvanically coated surfaces.
- When choosing the screw-in thread design and the screw length, ensure that the specified tightening torque can be applied with a sufficient degree of security.

7.3.2 Hydraulically connecting the motor-pump assembly

- Remove the flange covers on suction and pressure port.
- Immediately wipe off any leaking oil.
- Check the line for cleanliness.
- Make sure that the line connection contains the intended seals.
- If necessary, secure O-rings against slipping using installation grease.
- Now, hydraulically connect the pump according to the machine manufacturer's specifications.

7.3.3 Electrically connecting the motor-pump assembly

⚠ DANGER

When working in the area of live parts, there is a danger caused by electrical voltage!

Risk of injury or danger to life!

- Work at the electric system may only be performed by a specialized electrician. Electronic tools are absolutely necessary.
- Before commencing the work:
  1. Unlock.
  2. Secure against restarting.
  3. Ensure that there is no voltage.
  4. Ground and short-circuit.
  5. Cover or shield adjacent live parts.
- Using a suitable measuring device, check before the beginning of the work whether parts of the system are still under residual voltage.
- Wait for the discharge time of the electric systems, e.g. capacitors.

⚠ WARNING

Risk of short circuit of live parts due to coolant or lubricant or contamination!

Unforeseeable dangerous situations or damage to property might be caused!

- When installing or exchanging drive components, provide the open slots of power connector plugs with protective caps.
- Only open the terminal boxes for connection purposes and close them again immediately afterwards.

Interrupting or connecting live plug-in connections!

Risk of injury or damage to property!

- Only disconnect or connect plug-in connectors in a dry, de-energized condition.
- Make sure that all connectors are tightly screwed during operation of the machine.

Line connection

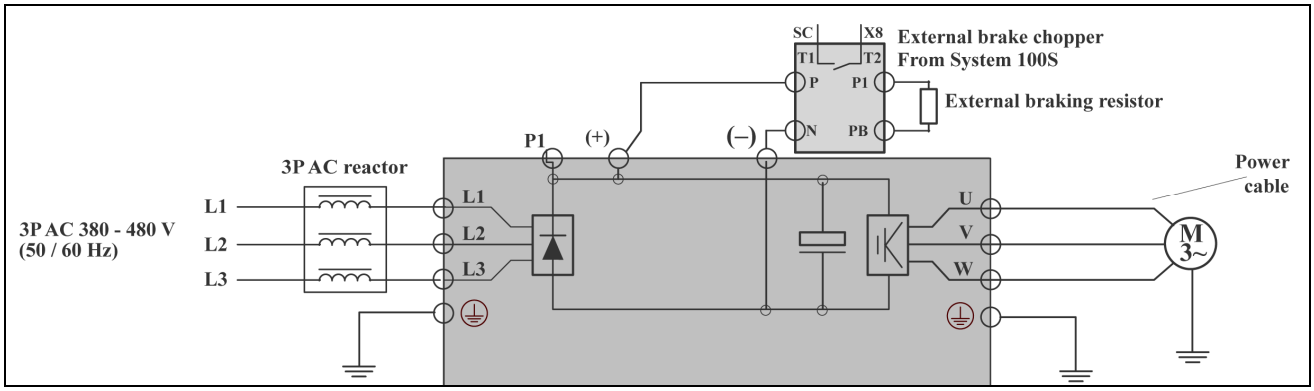


Fig. 14: Connection of the frequency converter to mains and motor

- Connect the motor power cable to the U, V and W terminals.
- Only connect the mains voltage to the L1, L2 and L3 voltage terminals of the frequency converter. Make sure that the mains voltage complies with the admissible voltage specified on the name plate.
- Connect the external brake unit and the braking resistance according to Fig. 14.
- Establish a safe protective earthing connection.

Connection of the motor encoder

▶ Connect the motor encoder according to fig. 15.

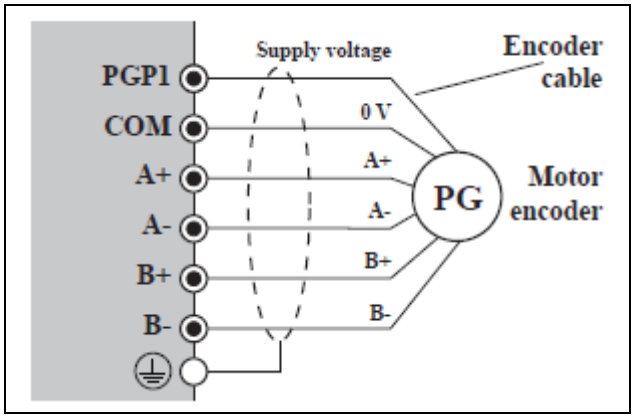


Fig. 15: Connection of the motor encoder at the frequency converter

Connection of the digital inputs/outputs

- Connect the digital inputs/outputs according to Fig. 9, chapter 5.4 "Input and output allocation at the frequency converter".
- After having established all electrical connections, close the terminal box before connecting the power supply.

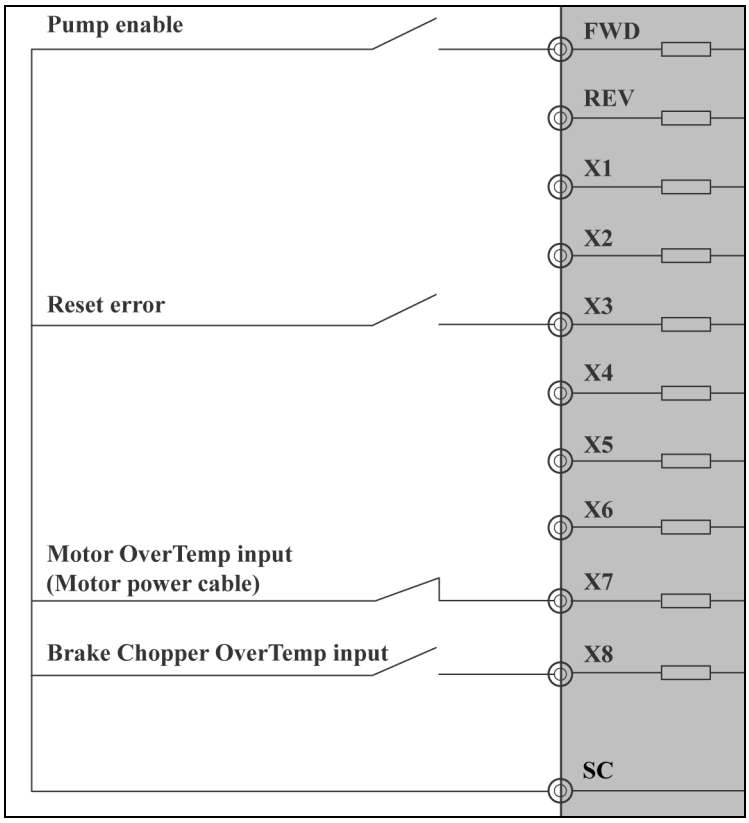


Fig. 16: Connection of the digital inputs/outputs

7.3.4 Electronic component assembly and installation in the control cabinet

NOTICE

High temperature due to wrong arrangement of the components in the control cabinet!

Damage to property!

Due to the power loss in the components, the temperature of the cooling air flow at the device outlet is increased to a level above the ambient temperature at the device inlet.

- When arranging the components in the control cabinet, comply with the specified minimum distances. For information on the minimum distances, please refer to the documentation "Frequency Converter Fv", chapter 6.1, see Table 1: "Required and amending documentation".

For the assembly and installation of the electric components of the SvP system in the control cabinet, you need the following documents:

- Assemble the electric components according to the documentation "Rexroth Frequency Converter Fv", chapter 4 "Installation Fv", see Table 1: „Required and amending documentation".
- Install the electric components according to the pin assignment plan for the p/Q control of the SvP system; see chapter 5.4 "Input and output allocation at the frequency converter".

7.3.5 Connection of the pressure transducer

NOTICE

Malfunction of the SvP system due to use of a pressure transducer not suitable for the SvP system!

Damage to property!

- Use only the pressure transducers of the Bosch Rexroth HM18 series included in the SvP system (see chapter 1.2 "Required and amending documentation", data sheet 30271).

- Connect the current and pressure signal at terminals VR1 and/or VR2.
- Connect the pressure transducer at terminals VR3 and GND acc. to Fig. 17.

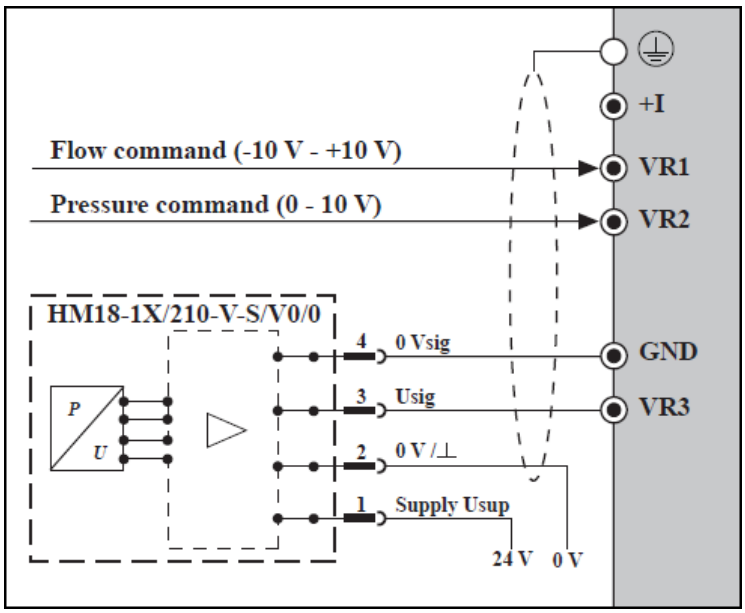


Fig. 17: Connection of the pressure transducer

8 Commissioning

NOTICE

Uncontrolled start-up of the SvP system!

Damage to property!

- Ensure that the standardization of the parameters corresponds to the requirements of your application during the first commissioning of the SvP system.
- If necessary, request missing information or commissioning support from Bosch Rexroth.

Uncontrolled motions of the internal gear pump!

Damage to property!

- Set the command value specification for pressure and flow to the value 0 before resetting the drive enable. This actively reduces the system pressure to the minimum pressure.

Error in the motor-pump assembly control!

Damage to property!

- Make sure that all connections are free of errors.
- Make sure that any and all system safety equipment and monitoring devices are undamaged and in operation.
- Do not operate damaged products.
- If necessary, request missing information or commissioning support from Bosch Rexroth.

The following steps describe the commissioning of the SvP system for the basic application of the p/Q control in an injection molding machine. To commission the SvP system, proceed according to the work steps described in the following chapters.

8.1 Commissioning preparation

- Keep the documentation of all components used at hand.
- Check the SvP system for damage.
- Check all mechanical, hydraulic and electrical connections.
- Make sure that the piping is assembled in a clean and tight manner.
- Make sure that the pump suction channel is unobstructed.
- Check the hydraulic circuit diagram of the machine for direct functions/motions during the build-up of pressure.
- Check the hydraulic fluid tanks for cleanliness.
- Fill in the hydraulic fluid according to the machine manufacturer's regulations. Only use filters with the required minimum retention rate.
- Activate the safety equipment and monitoring systems of the machine.
- Pre-fill the pump with filtered fluid. Depending on the installation position, filling can be effected through the suction, pressure or measuring port. For external information regarding a suitable port, please refer to the operating instructions of the machinery.

8.2 Commissioning of the SvP system

To commission the SvP system, you should proceed as follows:

1. Connect the power via input L1, L2 and L3.
2. Press “JOG” to confirm the motor rotation direction is correct.
3. Press "run" to switch the machine into minimum pressure control 5 bar at 160 rpm, without command value specification or with machine-adjusted command value specification, if applicable, and fill the complete system with hydraulic fluid.
4. Bleed the pump.

   Refer to the operating instructions of the machinery to see how the SvP system is to be bled. If no switchable or automatic bleeding is intended, you have to bleed the pump manually (see chapter 8.2.1)
5. Slowly build up pressure. To do so, follow the instructions of the machine manufacturer.

8.2.1 Filling and bleeding the motor-pump assembly

WARNING

Unintended loosening or even projectile-like ejection of the screw-in stud as well as uncontrolled leaking of hydraulic fluid due to pressurized screw-in studs whose system of units and size do not correspond to the threaded hole. Danger of confusion with thread size ½-20UNF.

Danger to life! Risk of injury! Severe injury!

- To close the bleed and measuring port, only use the supplied G1/4 plug screw.

Manually bleeding the SvP system

The bleed and measuring port of the internal gear pump is by default closed with a G1/4 plug screw.

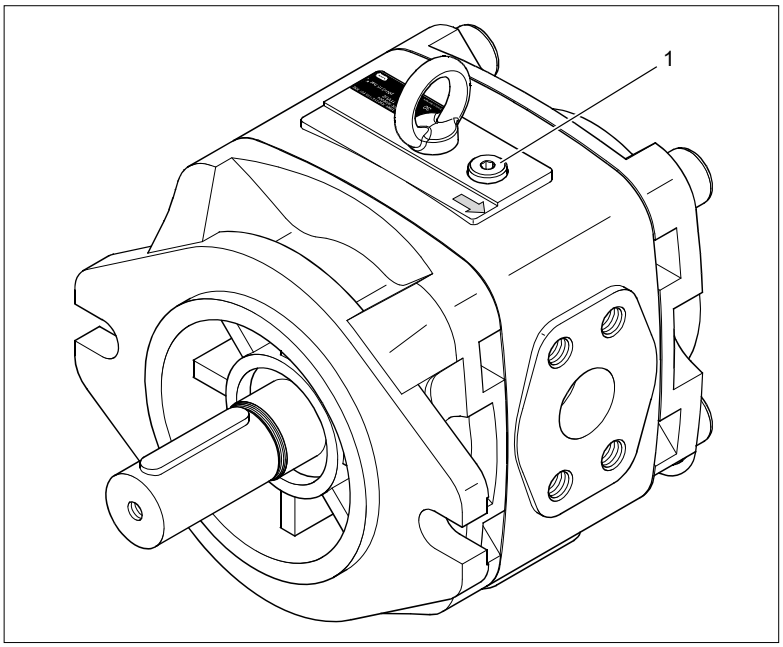


Fig. 18: Bleed and measuring port of the internal gear pump

1 Bleed port

- Open the bleed and measuring port by removing the plug screw and switch to pressureless circulation (command value specification 0, p = 5 bar, n = 160 rpm) according to the machine operating instructions.
- To bleed the SvP system, switch the motor shortly on and immediately off again. Repeat this process until the leaking fluid is free of bubbles and complete bleeding is ensured.
- Now, close the manually opened bleed port again by screwing in the G1/4 plug screw (tightening torque T = 30 Nm).

  The SvP system is now bled.

8.3 Description of the attribute symbols in the parameter tables

The following table explains the meaning of the attribute symbols in the parameter tables.

8.3.1 Description of the parameter marks

Parameter attribute	Description
◇	Parameter setting can be modified when the frequency converter is in operating or standby mode.
◆	Parameter setting cannot be modified when the frequency converter is in operating mode.
◎	Parameter setting cannot be directly modified.

8.4 Parameter functions

8.4.1 Category b: basic parameters

Table 11: Group b0: system parameters

Function code	Designation	Setting range	Smallest unit	Factory setting	Attribute
b0.00	User password	0 to 65535	1	0	◇
b0.01	Display language	0: Chinese; 1: English	1	0	◇
b0.02	Reset to factory setting	0: No action 1: Reset parameters to factory settings Note: The value is automatically set to "0" after resetting to factory setting.	1	0	◆
b0.03	Creating a parameter copy	0: No action 1: Copy parameters from frequency converter to operating unit 2: Copy parameters from operating unit to frequency converter Note: The value is automatically reset to "0" after the copying process.	1	0	◆
b0.04	Mains voltage	380 to 480 V	1 V	380 V	◆
b0.05	PWM pulse frequency	1.0 to 12.0 kHz	0.1 kHz	Dependent on model	◇

Function code	Designation	Setting range	Smallest unit	Factory setting	Attribute
b0.06	Automatic adjustment of the PWM pulse frequency	0: Off 1: On	1	1	◆
b0.07	LCD background lighting	0: Energy saving mode 1: Permanently lit	1	0	◇
b0.08	LCD display in RUN mode	0: Output frequency	1	1	◇
b0.09	LCD display in STOP mode	1: Output speed 2: Set output frequency 3: Set rotation speed 4: Output voltage 5: Output current 6: Output power 7: Link connection voltage 8: Torque-generating current/torque current 9: Exciting current 10: User-defined command value 11: User defined output value 12: Torque command value 13: Reserved 14: Pressure command value 15: PID speed command value 16: Speed command value 17: Actual pressure value 18: Kp 19: Kd 20: Ki 21: Cooling element temperature 22: Actual speed value 23: Multi-parameter transducer - Pressure command value - Output current - Actual pressure value - Output voltage - Speed command value - Output speed	1	17	◇
b0.10	Scaling factor for user-defined values	0.1 % to 1,000.0 %	0.1 %	100.0 %	◇
b0.11	Parameter filter setting	0: b parameters 1: b, S parameters 2: b, S, E parameters 2: b, S, E, H parameters	1	0	◇
b0.12	Cooling element temperature	Read-only	1 °C	Measured value	◎
b0.13	Total operating time	0 to 65535 hours	1 hour	0 hours	◎
b0.14	Firmware version	Read-only			◎

Table 12: Group b1: basic parameters

Function code	Designation	Setting range	Smallest unit	Factory setting	Attribute
b1.00	Mode for frequency setting	0: At the potentiometer of the operating unit 1: Via the operating unit 2: Via the P/Q PID controller 3: Set by pulse frequency 4: Set by digital inputs Up/Down 5: Reserved 6: Set via +I Input	1	2	◆
b1.01	Storing options for digitally set frequency	0: No storage when switched off or stopped 1: No storage when switched off, storage when stopped 2: Storage when switched off, no storage when stopped 3: Storage when switched off and stopped	1	0	◆
b1.02	Converter control commands	0: Enter control commands via operating unit 1: Enter control commands via digital inputs 2: Reserved	1	1	◆
b1.03	Control mode	0: U/f characteristic curve (U/f) 1: Sensorless vector control (SVC) 2: Field-oriented control (FOC)	1	2	◆
b1.04	Digitally set frequency	b1.07 to b1.06	0.01 Hz	50.00 Hz	◇
b1.05	Maximum frequency	50.00 to 400.0 Hz	0.01 Hz	85.00 Hz	◆
b1.06	Maximum frequency threshold	b1.07 to b1.05	0.01 Hz	85.00 Hz	◇
b1.07	Lower frequency threshold	0.00 to b1.06	0.01 Hz	0.00 Hz	◇
b1.08	Direction of rotation	0: Forward rotation 1: Backward rotation	1	0	◇
b1.09	Acceleration time 1	0.1 to 3600.0 s	0.1 s	0.2 s	◇
b1.10	Delay time 1	0.1 to 3600.0 s	0.1 s	0.3 s	◇
b1.11	Acceleration/delay mode	0: Linear mode 1: S characteristic curve	1	1	◆
b1.12	Time S characteristic curve area rising 1	0.0 % to 40 % (of the acceleration time b1.09)	0.1 %	0.0 %	◆
b1.13	Time S characteristic curve rising 3	0.0 % to 40 % (of the acceleration time b1.09)	0.1 %	40.0 %	◆
b1.14	Time S area falling 4	0.0 % to 40 % (of the delay time b1.10)	0.1 %	0.0 %	◆
b1.15	Time S characteristic curve area falling 6	0.0 % to 40 % (of the delay time b1.10)	0.1 %	40.0 %	◆
b1.16	Start mode	0: Start mode 1 1: Start mode 2 2: Speed measurement	1	0	◆

Function code	Designation	Setting range	Smallest unit	Factory setting	Attribute
b1.17	Start frequency	0.00 to 15.00 Hz	0.01 Hz	0.00 Hz	◆
b1.18	Start frequency holding time	0.0 to 10.0 s	0.1 s	0.0 s	◆
b1.19	Stop mode	0: Decelerating until coming to a stop 1: Running down until coming to a stop	1	0	◆
b1.20	DD brake time for start-up	0.0 to 20.0 s (0.0 deactivates DC braking)	0.1 s	0.0 s	◆
b1.21	Switch-off frequency of DC brake	0.00 to 10.00 Hz	0.01 Hz	0.00 Hz	◆
b1.22	Switch-off time of DC brake	0.0 to 20.0 s (0.0 deactivates DC braking)	0.1 s	0.0 s	◆
b1.23	DC brake current	0.0 % to 150.0 % (of the nominal converter current)	0.1 %	0.0 %	◆

8.5 Re-commissioning

- Check the SvP system and the machine for leakage.
  - Leaks are an indication of leakage below the hydraulic fluid level.
  - An increased hydraulic fluid level in the tank is an indication of leakage above the hydraulic fluid level.
- If the SvP system is arranged above the hydraulic fluid level, the pump may run empty due to leakage, e.g. a worn shaft seal ring.
  - Bleed the system again when re-commissioning it.
  - Initiate the repair.
- Recommission the SvP system as described in chapter 8.2 "Commissioning of the SvP system".

9 Operation

- During operation, ensure compliance with the described environmental conditions.
- Monitor noises, temperature and vibration at the machine at all times.
- After some operating time, check the hydraulic fluid in the tank for bubble or foam formation at the surface.

Changes in operating speed, temperatures, increasing noise or power consumption are an indication of wear or damage on the machine or the SvP system. In case of deviations, please proceed according to chapter 10.2 "Inspection" and chapter 15 "Troubleshooting".

9.1 Modes

The SvP system supports the following modes of operation:

- Standby mode
- Parameter mode
- Operating mode
- Error mode

9.1.1 Standby mode

Standby mode is automatically reached after every re-start, if no error was generated or identified during ramp-up.

9.1.2 Parameter mode

You can switch over to the parameter mode by pressing the "Func" button on the operating unit.

If the standard parameterization is not sufficient for your application, contact the responsible Bosch Rexroth account manager.

9.1.3 Operating mode

Parameter	Setting range	Description
b1.02	0: Set control, commends via operating panel	Frequency converter control command
	1:Set control commends via digital inputs	
	2: Reserved	

- b1.02 = 0, operating mode can be started by pressing the "Run" button on the operating unit.
- b1.02 = 1, operating mode is triggered by the "High" signal level at the "FWD" digital input.

9.1.4 Error mode

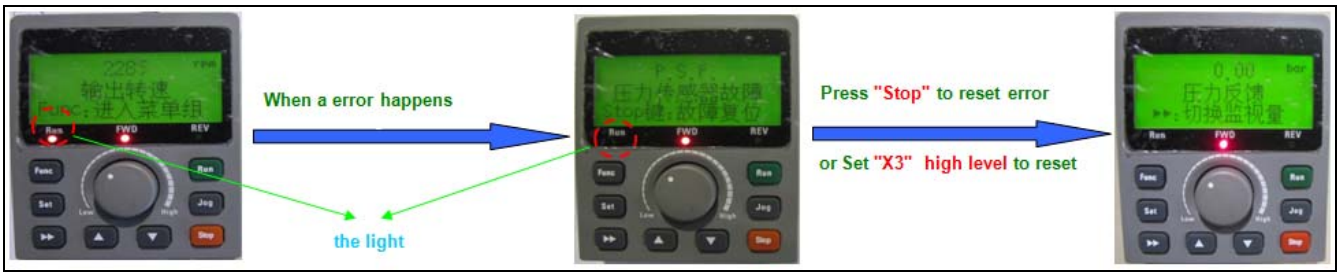


Fig. 19: Error mode

10 Maintenance and repair

10.1 Cleaning and care (maintenance)

Excessive dirt, dust or chips may affect the function of the SvP system in a negative way and in extreme cases even lead to failure of the servo motor. At regular intervals (after expiry of one year at the latest), you should therefore clean the motor cooling ribs in order to achieve a sufficiently dimensioned heat radiation surface. If cooling ribs are partly covered with dirt, sufficient heat dissipation via the ambient air is no longer possible.

Insufficient heat radiation may have undesired consequences. The bearing life cycle is reduced by operation at inadmissibly high temperatures (bearing grease decomposition).

10.2 Inspection

Compliance with the following operating parameters has to be ensured by means of regular inspections:

- Required fluid cleanliness according to data sheet
- Operating temperature range according to data sheet
- Filling level of the operating medium according to the documentation of the machinery

Apart from that, the SvP system and the machine are to be checked for changes in the following parameters at regular intervals:

- Vibrations
- Noise
- Temperature difference pump - fluid tank
- Foam formation in the tank
- Leak-tightness

In order to achieve a high operational safety of the SvP system in the machine, we recommend checking the parameters mentioned above continuously and automatically and shutting the system off automatically in case of changes exceeding the usual fluctuations in the intended operating range.

Changes in these parameters indicate wear of components (e. g. servo motor, pump, coupling).

- ▶ Determine the cause and remedy it.
- ▶ Moreover, check the connection cables at regular intervals for damage and replace them, if necessary.
- ▶ Check available energy-conducting chains (drag chains) for defects.
- ▶ Check the connections for the protective earthing conductor at regular intervals for proper condition and tight seat and renew them, if necessary.

10.3 Maintenance schedule

For maintaining the SvP system, observe the maintenance intervals of the installed individual components (chapter 10.4 "Maintenance").

For safe operation and long life cycle of the SvP system, a maintenance schedule is to be drawn up by the machine manufacturer for the machinery. The maintenance schedule must guarantee that the operating conditions of the SvP system stay within the prescribed limits during the entire period of use.

10.4 Maintenance

Asynchronous motor

Within the specified operating conditions and life cycle, the asynchronous servo motor of the SvP system is maintenance-free.

The bearings of the asynchronous motor have a nominal life cycle of L10h = 30000 h according to DIN ISO 281, edition 1990, if the admissible radial and axial forces are not exceeded.

The motor bearings should be exchanged if

- the nominal life cycle was achieved,
- running noises occur.

Internal gear pump

For preventive maintenance of the pump, we recommend exchanging the shaft seal ring after a max. operating time of 5 years.

Drive coupling

Plastic components of drive couplings should be replaced regularly, however, after 5 years at the latest. The relevant manufacturer's specifications must be complied with.

If faults occur or maintenance measures must be carried out on the SvP system, perform the following steps:

1. Observe the instructions in the operating instructions for the machinery.
2. Bring the drive to a standstill in a controlled form, using the machine control commands.
3. Switch off the power and control voltage of the controller.
4. Switch off the protective motor switch for the fan unit.
5. Switch off the machine's main switch and secure it against unauthorized restarting.
6. Secure the machine against unforeseeable motions and against operation by unauthorized persons.
7. Wait for the discharge time of the electric systems and then disconnect all electric connections.
8. If necessary, secure the motor-pump assembly before the disassembly against falling down or motions before loosening the mechanical connections.

We recommend having the maintenance work performed by the Bosch Rexroth service.

10.5 Replacing spare and wear parts

NOTICE

Malfunction of the SvP system due to the use of incorrect spare parts!

Damage to property!

- Only use components listed in the product-specific documentation (parts list).
- Only use new seals with the required resistance to media.
- As the sealing material may differ despite being of identical appearance, the material number should be checked.

Please send any spare part order to your nearest Bosch Rexroth service center or directly contact the headquarters. The addresses are available at www.boschrexroth.com

- Order spare parts in writing. In urgent cases you can also order by phone, but you are kindly requested to confirm your order in writing e.g. by fax.
- Please provide the following information when ordering spare parts:
  - Material number and order number of the SvP system (name plate)
  - Material number of the respective component
  - Required quantity
  - The desired type of dispatch (e.g. as express parcel, freight, air freight, by courier service, etc.)

11 Decommissioning

Decommission the machinery as described in the related operating instructions.

To do so, carry out the following steps:

- Observe the instructions in the operating instructions for the machinery.
- Bring the drive to a standstill in a controlled form, using the machine control commands.
- Switch off the power and control voltage of the controller.
- Switch off the protective motor switch for the fan unit.
- Depressurize the pressure side (P line).
- Switch off the machine's main switch.
- Secure the system against restarting.

12 Disassembly and replacement

12.1 Preparing for disassembly

Decommission the machinery as described in chapter 11 "Decommissioning".

- Do not work on running or unsecured systems.
- Before starting to work, secure the machine against unforeseeable movements and against operation by unauthorized persons.
- Allow the SvP system to cool down before starting to work.
- Do not work on hot surfaces.

12.2 Disassembling the hydraulic product

- Make sure that the system is depressurized before starting to work.
- Wait for the discharge time of the electric components and then disconnect all electric connections.
- Seal the suction port of the motor-pump assembly. Observe the instructions in the operating instructions for the machinery.
- Secure the components of the SvP system and the connection lines against falling down or motions before loosening the mechanical connections.
- Loosen the piping on the pressure side.
- Immediately take up leaking residual oil using a suitable container, e.g. an oil tray.
- Loosen the mounting screws of the SvP system components.
- Disassemble the SvP system components and store or dispose of them in a professional manner.

13 Disposal

The packaging materials consist of cardboard, wood, and styrofoam. They can be recycled everywhere without problems. For ecological reasons, they should not be returned to us.

In the disposal of the SvP system, the following must be observed:

- Dispose of the SvP system components in accordance with the currently applicable national regulations in your country.
- Disassemble the SvP system components into their individual components.
- After the disassembly, separate the different materials in order to recycle them or dispose of them as special waste.
- Separate:
  - Steel
  - Aluminum
  - Copper
  - Brass
  - Magnetic materials
  - Plastics
  - Electronic components and assemblies
- The electronic components can be returned to us for disposal purposes at no costs. However, the precondition is that there are no interfering adherences like oils, greases or any other contamination. Furthermore, there must be no inappropriate foreign substances or third party components when products are returned.

Products have to be sent carriage paid to the following address:

Bosch Rexroth AG

Electric Drives and Controls

Bürgermeister-Dr.-Nebel-Straße 2

97816 Lohr am Main

13.1 Environmental protection

The products are produced using energy- and raw material-optimized production processes which simultaneously allow for recycling and utilization of the incurring waste. We regularly try to replace polluted raw, auxiliary and operating materials by environmentally compatible alternatives.

Our products do not contain any hazardous materials that could be released during intended use. So normally, no adverse effects on the environment have to be expected.

Careless disposal of the SvP system components may, however, lead to environmental pollution.

- Thus, dispose of the SvP system components in accordance with the currently applicable national regulations in your country.
- Dispose of hydraulic fluid residues according to the respective safety data sheets valid for these hydraulic fluids.

14 Extension and modification

You will be considered responsible for any extensions to or modifications of the product.

Declarations become invalid

If you effect any extensions to or modifications of the product marketed by Bosch Rexroth or changes in the software, this means you are changing the condition of the product as supplied. Any statements made by Bosch Rexroth regarding this product will then become invalid.

If you have any questions, please contact your nearest Bosch Rexroth service center or directly contact the headquarters. The addresses are available at www.boschrexroth.com

15 Troubleshooting

15.1 How to proceed for troubleshooting

- Always work systematically and focused, even when under time pressure. Random and thoughtless disassembly and changing of settings might result in the inability to determine the original error cause.
- First get a general overview of how your product works in conjunction with the machinery.
- Try to find out whether the product has worked properly in conjunction with the machinery before the error occurred first.
- Try to determine any changes of the machinery in which the product is integrated:
  - Were there any changes to the product's operating conditions or operating range?
  - Have modifications (e.g. refitting) or repairs been carried out on the overall system (machine, electrical system, control) or on the product? If yes: What were they?
  - Was the product or machine used as intended?
  - How did the fault become apparent?
- Try to get a clear idea of the cause of error. If necessary, ask the actual (machine) operator.
- Document the error state and compare it to the initial condition.

If you could not remedy the error, please contact one of the addresses that you can find at www.boschrexroth.com.

15.2 Diagnostic messages and functions

15.2.1 O.C.-1 error: Overcurrents at constant speed

Cause of error	Troubleshooting
1. Fluctuating or unusual load behavior in the "Run" mode	▶ Check the load.
2. Mains voltage too low	▶ Check the voltage supply: AC 380 – 480 V (–15 % / +10 %)
3. Motor and converter power not adjusted	▶ Adjust motor and converter power to each other.
4. Excessive inertia or load	▶ Check motor power, converter power and load.
5. Pulse encoder fault	▶ Check impulse generator and its function.

15.2.2 O.C.-2 error: Overcurrents during acceleration

Cause of error	Troubleshooting
1. Excessive start-up frequency	▶ Reduce the start-up frequency.
2. Excessive inertia, excessive load influence	▶ Reduce the acceleration, avoid excessive load steps.
3. Inappropriate motor parameter setting	▶ Adjust the motor parameters manually or select the "Auto Tuning" function (group S2).
4. Direct start during motor start-up	▶ Restart the system after a motor stop or start with speed recording (group b1).
5. Acceleration time too short	▶ Increase the acceleration time.
6. Motor and converter power not adjusted	▶ Adjust motor and converter power to each other.
7. Faulty impulse generator	▶ Check the impulse generator and its function.
8. Inappropriate U/f characteristic curve	▶ Adjust the U/f characteristic curve and increase the motor torque.

15.2.3 O.C.-3 error: Overcurrents during delay

Cause of error	Troubleshooting
1. Inappropriate motor parameter setting	▶ Adjust the motor parameters manually or select the "Auto Tuning" function (group S2).
2. Excessive load inertia	▶ Use suitable braking components (braking resistance, ...).
3. Declaration time too short	▶ Increase the declaration time.
4. Motor and converter power not adjusted	▶ Adjust motor and converter power to each other.
5. Faulty impulse generator	▶ Check the impulse generator and its function.

15.2.4 O.E.-1 error: Overvoltage at constant speed

Cause of error	Troubleshooting
1. Acceleration/declaration time too short	▶ Increase the acceleration/declaration time.
2. Unusual input voltage	▶ Check the voltage supply: AC 380 – 480 V (–15 % / +10 %)
3. Load cycle too frequent	▶ Use suitable braking components (braking resistance, ...).
4. Inappropriate setting of the speed control parameters in vector control	▶ Adjust the values of the PI controller to the speed control (group S1).

15.2.5 O.E.-2 error: Overvoltage during acceleration

Cause of error	Troubleshooting
1. Acceleration time too short	▶ Increase the acceleration time.
2. Unusual input voltage	▶ Check the voltage supply: AC 380 – 480 V (–15 % / +10 %)
3. Direct start during motor start-up	▶ Restart the system after a motor stop or start with speed recording (group b1).

15.2.6 O.E.-3 error: Overvoltage during delay

Cause of error	Troubleshooting
1. Excessive load inertia	▶ Use suitable braking components (braking resistance, ...).
2. Declaration time too short	▶ Increase the declaration time.

15.2.7 O.L.-1 error: Frequency converter overload

Cause of error	Troubleshooting
1. Overload operation too long	▶ Reduce the overload time and/or the load. Overload capability of the Fv: 150 % of the rated current for 60 s 180 % of the rated current for 10 s
2. Inappropriate U/f characteristic curve	▶ Adjust the U/f characteristic curve and increase the motor torque.
3. Motor and converter power not adjusted	▶ Adjust motor and converter power to each other.
4. Inappropriate motor parameter setting	▶ Adjust the motor parameters manually or select the "Auto Tuning" function (group S2).
5. Direct start during motor start-up	▶ Restart the system after a motor stop or start with speed recording (group b1).
6. Mains voltage too low	▶ Check the voltage supply: AC 380 – 480 V (–15 % / +10 %)
7. Acceleration time too short	▶ Increase the acceleration time.

15.2.8 O.L.-2 error: Motor overload

Cause of error	Troubleshooting
1. Blocked motor	▶ Remove the blocking.
2. Motor is running too long with high load and at low speed	▶ Use motors that are suitable for the Fv operation or increase the Fv output frequency.
3. Mains voltage too low	▶ Check the voltage supply: AC 380 – 480 V (–15 % / +10 %)
4. Inappropriate U/f characteristic curve	▶ Adjust the U/f characteristic curve and increase the motor torque.
5. Blocked motor rotor or sudden load step	▶ Check the load.
6. Inappropriate setting of the factor for the motor overload protection	▶ Adjust the value of the factor for the motor overload protection (group E4).

15.2.9 R.E. error: CPU read/write error

Cause of error	Troubleshooting
1. Incorrect or inadmissible data in the read/write area of the control board	▶ Please contact your service manager.

15.2.10 KEY-. error: Operating unit read/write error

Cause of error	Troubleshooting
1. Incorrect or inadmissible data in the read/write area of the operating unit	▶ Please contact your service manager.

15.2.11 M.O.H. error: Motor overheating

Cause of error	Troubleshooting
1. Pressure-holding operation too long	▶ Only use especially designed motors.
2. Overload	▶ Reduce the overload time and/or the load.
3. Faulty temperature sensor	▶ Replace the temperature sensor or contact your service manager.

15.2.12 F. error: Power interruption

Cause of error	Troubleshooting
1. Current recording does not work	▶ Please contact your service manager.

15.2.13 PULSE error: Impulse generator speed measurement

Cause of error	Troubleshooting
1. Faulty impulse generator	▶ Check the correction function of the mechanical and electric parts of the encoder, the voltage supply and the connections.
1. Incorrect wiring of the impulse generator	▶ Replace the encoder connection cable.
2. Inappropriate encoder parameter setting	▶ Adjust the encoder parameters to the impulse generator.

15.2.14 B.O.H. error: Brake chopper overheat

Cause of error	Troubleshooting
1. Too high brake ratio [S.3.13]	▶ Decrease brake ratio.
2. Signal missing	▶ Check the validity of overheat signal from brake chopper.
3. Connection fault	▶ Check the connection between brake chopper and digital input X8.

15.2.15 CPU error - EMC error

Cause of error	Troubleshooting
1. CPU malfunction due to EMC faults	▶ Remove the environmental or EMC faults.

15.2.16 S.C. error: Short-circuit

Cause of error	Troubleshooting
2. Excessive output current	▶ Check the motor for short-circuit or overload.
3. Faulty power section	▶ Please contact your service manager.

15.2.17 P.S.F. error: Pressure sensor fault

Cause of error	Troubleshooting
1. Motor reserve speed exceeds the settings of [E4.07] for more than time of [E4.08]	▶ Check if the pressure sensor is normal. ▶ Increase [E4.07] and [E4.08]. ▶ Decrease motor reverse speed and shorten motor reverse run time.
2. Pressure feedback exceeds the settings of [E4.09] for more than time of [E4.10] at system halt stage.	▶ Check if the pressure sensor is normal. ▶ Increase [E4.09] and [E4.10].

15.2.18 IPH.L error: Input losses L1, L2, L3

Cause of error	Troubleshooting
1. Inappropriate, missing wiring or cable break of the Fv power section	▶ Observe the operating instructions when checking the wiring for correctness, remove excessive and faulty connections.
2. Defective fuse	▶ Check the fuse.
3. Asymmetry in the (three-phase) input current	▶ Check the circuit and the input voltage.

15.2.19 OPH.L error: Output losses U, V, W

Cause of error	Troubleshooting
1. Inappropriate, missing wiring or cable break of the Fv outputs	▶ Check the Fv wiring for correctness, remove excessive and faulty connections.
2. Asymmetry in the (three-phase) output current	▶ Check the motor.

15.2.20 C.O.H. error: Fv overheating

Cause of error	Troubleshooting
1. Fv overheating	▶ Reduce the ambient temperature, improve the ventilation; remove dirt and deposits from the cooling ribs; check the fan and its voltage supply.
2. Incorrect temperature recording	▶ Please contact your service manager.

15.2.21 PRSE error: Wrong parameter setting

Cause of error	Troubleshooting
1. Inappropriate parameter setting	▶ Check the parameter values.

15.2.22 TUNE error: Wrong parameter default setting

Cause of error	Troubleshooting
1. Motor power is not compatible with Fv power	▶ Check whether a special motor is concerned; check whether the Fv is compatible with the motor.
2. Parameter set does not correspond to the one on the motor name plate	▶ Set the parameters so that they comply with the name plate.
3. Incorrect Fv/motor connection	▶ Check the motor cable connections.

16 Technical data

For the technical data, the device dimensions and the weight of the ABSvP5... SvP system, please refer to data sheet 62232, "Servo-variable pump system, Sytronix SvP5000" (see Table 1: "Required and amending documentation").

17 Service and support

17.1 Sales and service network

Please contact your personal account manager first.

If you do not have a personal account manager, please contact the next sales organization. For the corresponding contact data, please refer to chapter 17.2 "Internet contact"

17.2 Internet contact

For additional information on service, repair and training as well as the current addresses of our sales organizations, please refer to:

http://www.boschrexroth.com

17.3 Preparation of information

We can help you in a fast and efficient way if you keep the following information available:

- Detailed description of the failure and the boundary conditions
- Information on the name plate of the products concerned, particularly type key and serial numbers
- Phone, fax numbers and email address under which you are available in case of enquiries.

On the basis of this information we will process your request quickly and efficiently.

Specify the hydraulic set-up of the machine (e. g. hydraulic circuit diagram or sketch; place of installation of the pressure transducer, check valves, if applicable, set-up of suction area).

Rexroth
Bosch Group

Bosch Rexroth AG
Hydraulics
Zum Eisengießer 1
97816 Lohr am Main
Germany
Phone +049 9352 18-0
documentation@boschrexroth.de
www.boschrexroth.com

Subject to change without notice
Printed in Germany
RE 62232-B/05.13