SAFETY INSTRUCTIONS

PUMPS

TRANSLATION OF THE ORIGINAL INSTRUCTIONS EN

NOTE

Keep the operating manual for future use!

ATTENTION

Subject to technical modifications!

Quality notes

The **sera** quality management and quality assurance system is certified in accordance with DIN EN ISO 9001:2015.
The **sera** product complies with the applicable safety requirements and accident prevention regulations.

About this instructions

Special notes in these instructions are marked with text and danger symbols.

NOTE

Notes or instructions that faciliate work and ensure a safe operation.

ATTENTION

The non-observance of these safety instructions can result in malfunctions or material damages.

WARNING

The non-observance of these safety instructions can lead to material damages and personal injuries.

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WARNING

Before commissioning, installation and during operation of the **sera** products the respective regulations valid at the place of installation, these instructions, safety data sheet of the pumped medium (for medium touched products) and especially the safety instructions are to be observed.

Observance of these operating instructions and, in particular, the safety instructions, helps to:

- Avoid dangers to persons, machines and environment.
- Increase reliability and service life of the product and the complete system.
- Reduce repair cost and downtime.

Personnel qualification and training

The personnel for operation, maintenance, inspection and installation must be suitably qualified for their tasks. The owner must clearly define responsibility and supervision of the personnel.
If the personnel do not have the knowledge required, then personnel is to be trained and instructed correspondingly. Such training can be provided by the manufacturer / supplier upon order of the owner. In addition, the owner has to ensure that personnel have understood the operating instructions completely.

Dangers in case of inobservance of the safety instructions

Inobservance of these safety instructions can result in danger to persons, hazards to the environment and damage to the product. Inobservance of the safety instructions may lead to:

- Failure of important functions of the product/system.
- Hazards to the environment through leaking dangerous media.
- Specified maintenance and repair work is no longer feasible or ineffective.
- Danger to people from electrical and mechanical influences.
- Danger to man and machine from aggressive chemical effects or reactions.
- Danger to man and machine from chemical reactions and the formation of explosive atmospheres when dosing aggressive, oxidative media such as ferric (III) chloride (FeCl3) and hydrogen peroxide (H2O2).

Safety conscious working

The safety instructions specified in this operating manual, the national regulations for accident prevention, the safety regulations for the pumped medium valid at the place of installation as well as internal working-, operating-, and safety instructions of the owner are to be observed.

Safety instructions for owner / operator

Leaking hazardous delivery media and operating supplies are to be disposed off in such a way that any danger to persons and the environment is excluded. The legal regulations are to be observed. Danger caused by electrical energy is to be avoided.

Safety instructions for maintenance, servicing and installation work

The owner must ensure that any maintenance-, servicing- and installation work is only entrusted to authorized and suitably qualified personnel who have carefully read and understood the operating instructions.
Only those spare parts and operating supplies are to be used which meet the requirements of the specified operating conditions.

WARNING

Threaded joints and connections may only be disconnected when the system is not under pressure!
Arrange replacement of defective mains power connection cables and signal cables by specialist personnel!

WARNING

The ingress of aggressive media such as ferric (III) chloride (FeCl3) and hydrogen peroxide (H2O2) into the drive or electronics housing can result in the formation of dangerous explosive gases!
The following must be ensured, particularly for aggressive media:

- The diaphragm must be replaced every 3000 hours of operation or at least once a year (see also the corresponding procedure in the operating manual).
- For pumps with Diaphragm Rupture Detection (DRD), this is always installed.
- The pump is never operated with defective diaphragm.

Arbitrary modification and production of spare parts

Modifications of or changements to the pump are only permitted after previous agreement of the manufacturer. Original spare parts and accessories which were approved by the manufacturer are essential for safety reasons.

WARNING

If the pumps (e.g. drive motor) are modified without au-thorization of the manufacturer or spare parts are used which are not approved, any warranty claim becomes null and void.

Improper operations

Operating safety of the supplied product is only guaranteed if the product is used as intended, according to the descriptions in Chapter „Intended use" of these operating instructions.

Intended use

The sera product is only to be deployed according to the intended purpose stated in the product description and the acceptance test certificate. If the product is to be used for other applications, then the suitability of the product for the new operating conditions must be discussed with sera beforehand!
Criteria for operation in accordance with the intended use:

- Operating conditions at the place of installation.
- Voltage supply.

Additionally for medium-affected products:

- Observe characteristics of the medium (please see safety- and product data sheet of the delivery medium – the safety data sheet is to be provided by the supplier / owner of the medium).
- Pressure and temperature of the medium.

WARNING

Resistance of the materials which come into contact with the medium!

Personal protection for maintenance and service

The provisions of the German Ordinance on Hazardous Substances (GefStoffV) (§14 Safety Data Shee) and relevant national safety regulations for the pumped medium must strictly be adhered to.
In case of accidents check whether the following substances are emitted:

- Leaking fluids.
- Leaking vapours.
- Noise emissions (sound level).

Emissions are to be monitored by corresponding controly systems of the total installation.

WARNING

Wear protective clothing, gloves, breathing mask and a face protecting mask!

NOTE

Personal protective equipment must be provided by the owner!

Description of symbols see "INTRODUCTION"	Life cycle phase										Safety instructions
	Transport/Storage	Installation/Electrical connections	Start-up/Operation	Operation	Maintenance	Cleaning	Repair	Shutdown	Dismantling	Disposal	
	■	■		■	■		■	■	■		There is a risk of tipping. A suitable fastening must be provided at the installation site. Also ensure that the machine is adequately fixed during maintenance and repair work as well as during dismantling and disposal.
	■	■									Pay attention to weights when lifting and when selecting the installation site and fasteners.
	■										The packaging material must be disposed of properly.
		■	■	■	■		■				Only use intact electrical supply, signal or control cables.
		■		■		■					For pumps with a controller: Seal unused connectors with protective caps.
		■	■	■							Do not operate pump without connected earth conductor.
		■						■	■		Do not use damaged parts and immediately take the damaged pump out of operation.
		■	■	■							For pumps with a controller: Before carrying out any electrical work on the pump, such as wiring the inputs/outputs (control input and output, flow monitor, flow meter, suction lance, INTERFACE MODULE, hand-held control unit), it must be disconnected from the power supply and secured against being switched on again.
		■									If toxic, crystallising or corrosive liquids are conveyed, the pipe system must be equipped with facilities for emptying, cleaning and if necessary rinsing with an appropriate medium.
		■									Mount the pump so that leaking medium cannot cause any damage.
		■									The owner must provide appropriate protective measures (e.g. collecting basin) in the feed line so that any running dry of the tank is prevented in the event of any diaphragm rupture.
		■		■							Install the return line of overpressure protection and/or ventilation valve sloping downward into the associated tank. Always install the pump with pressure relief valve above the suction tank and lay the return line with a downward slope to the suction tank.
			■								Connect hydraulic connection lines free of tension and seal tightly before suctioning pumped medium.
			■								Before connecting the power, ensure that all seals and the hydraulic connection lines are correctly installed and that unused connections are sealed with protective caps.
			■	■							Avoid clogged, closed or shut-off suction and pressure lines.

Symbol description see „INTRODUCTION"	Life cycle phase										Safety instructions
	Transport/Storage	Installation/Electrical connections	Start-up/Operation	Operation	Maintenance	Cleaning	Repair	Shut-down	Disassembly	Disposal	
			■	■							For pumps with a controller, check the parametrisation and control signals. Unforeseen start-up of the pump can occur.
			■	■							Sudden start-up. Maintain sufficient distance from parts under high voltage.
			■	■	■						Avoid contact of pumped medium with live cables.
			■	■	■	■	■	■	■	■	Pay attention to the safety data sheet of the pumped medium. The owner must take appropriate accident prevention measures to rule out any hazard to the operating personnel from the pumped media used.
			■								Check resistance of the pumped medium with the materials used, The pump is designed exclusively for the operating conditions specified in the order confirmation.
			■								Check the resistance of the test medium to the pumped medium. Completely remove remaining liquid residues from the pump test (water). Unwanted reactions between test and pumped medium can occur in the case of non-observance.
			■								The operation of the pump results in heating of the drive motor. Do not touch the motor during operation.
			■	■	■						Avoid briefly switching the supply voltage off and on again.
			■	■	■	■	■	■	■	■	Knowledge of the operating manual is a prerequisite for carrying out assembly work on the pump.
			■	■		■					The pump is exclusively intended for the designed operating conditions in the operating manual and order confirmation.
				■							Only operate the pump on a fused mains supply.
				■							Ensure that there is adequate lighting.
					■	■	■	■	■		Wear suitable protective clothing such as protective suit, protective gloves and suitable face and respiratory protection. Observe safety data sheets.
				■	■						All wear parts, connection and fastening elements must be checked for perfect condition at regular intervals and replaced if necessary.
					■						Only use sera spare parts.
					■		■	■			Disconnect the pump from the power supply before maintenance, repair and decommissioning and secure it against being switched on again.

Symbol description see „INTRODUCTION"	Life cycle phase										Safety instructions
	Transport/Storage	Installation/Electrical connections	Start-up/Operation	Operation	Maintenance	Cleaning	Repair	Shut-down	Disassembly	Disposal	
					■		■				Disconnect the pump from the power supply before replacing the wear parts. When changing the diaphragm, observe the specifications of the electronics (for pumps with a controller).
	■				■	■	■		■		Before maintenance and repair work, removal, packing, transport and dismantling, the pump must be drained, rinsed with suitable liquid if necessary and contact with aggressive and/or toxic media must be avoided.
					■		■	■			All work must only be performed on depressurised systems that are disconnected from the power supply.
					■						Check compatibility of operating materials and pumped media. Only the operating materials described in the operating manual are permitted to be used.
					■						Provide a container with appropriate liquid in the immediate vicinity of the pump to be able to remove splashes of the pumped medium.
					■		■				Repairs to the lifting gear may only be carried out by sera. The pump should only be opened by sera or after previous consultation with sera.
					■		■				Before starting all work, ensure that the required wear and/or spare parts are available. Set down / deposit components so that no damage occurs or contamination is introduced. Carry out all work at a clean workplace.
					■		■				Pay attention to the cleanliness of sealing surfaces when replacing wear parts. Any soiling can result in inadequate leak tightness.
						■					Only clean parts that are not in contact with the media with water or a mild alkaline cleaning agent. Pay attention to compatibility with the pumped medium.
						■					When cleaning, completely remove the pumped medium. Pay attention to the safety data sheet of the pumped medium.
						■					For pumps with a controller: Do not use any solvents. These can attack the surfaces of the electronics.
							■	■	■		Only let authorised and qualified personnel perform work on the machine.
										■	Ensure proper disposal.
										■	The consignor is responsible for damage caused by leaking lubricants or liquid residues.
										■	For pumps with a controller: Dispose of electronics separately.

Symbol description see „INTRODUCTION"	Life cycle phase										Safety instructions
	Transport/Storage	Installation/Electrical connections	Start-up/Operation	Operation	Maintenance	Cleaning	Repair	Shut-down	Disassembly	Disposal	
i				■							Pay attention to sufficient dimensioning of the power supply cable.
⚠			■	■							An overpressure protection (e.g. pressure relief valve) must generally be provided if the permissible operating pressure can be exceeded.
⚠			■	■	■		■				For pumps with diaphragm rupture detection (DRD): The operational safety of the pump is reduced by incorrect adjustment of the sensitivity of the DRD, faulty installation, contamination or destruction, e.g. after diaphragm rupture.
⚠			■	■	■	■		■			Pay attention to the compatibility of the rinsing and pumped medium. Completely remove remaining liquid residues. Among other things, non-observance can result in reactions between the rinsing and pumped media.
⚠			■	■	■	■	■				When changing the pumped medium, check the compatibility of the media with each other! Pay attention to possible liquid residues in the pump body and valves!
⚠			■	■		■	■				Impurities and solids in the pumped medium and/or in the suction and pressure pipes can damage the pump and/or reduce the service life of wear parts and promote the escape of pumped medium.
i			■								Warning notices, control, connection and display elements must be kept clean!
i			■	■	■						The display and control elements must be easy to read and use at all times.
i			■	■	■						The meaning of the error codes for the Pro controller can be found in the operating manual.

The following misuse is assigned to the life cycles of the machine.

WARNING

Misuse can result in danger to the operating personnel!

A	General for all pumps
B	Supplement for the diaphragm pump
C	Supplement for the pumps with a control
E	Supplement for the pumps with a vent valve
KM	Supplement for the piston diaphragm pumps
MBE	Supplement for the pumps with a diaphragm rupture monitoring device
ÜV	Supplement for the pumps with an integrated overflow valve
iSTEP	Supplement for the stepper motor pumps

Transport

A	• Tipping behavior during transport, loading and unloading ignored. • Weight for lifting underestimated.

Assembly and installation

A	• Power supply not fuse protected (no fuse/fuse too large, power supply not conforming to standards). • No or improper fastening material of the pump. • Improper connection of the pressure pipes, wrong material i.e. PTFE tape and unsuitable connection pieces. • Liquid pipes confused. • Threads overturned/damaged. • Pipes bent during connection in order to compensate for alignment errors. • Supply voltage connected without earthed conductor. • Socket for safe disconnection of the power supply difficult to reach. • Wrong connecting cables for supply voltage (cross-section too small, wrong insulation). • Parts damaged (e.g. vent valve, flow meter broken off). • Wrongly dimensioned pressure and suction pipe. • Incorrect dimensioned and improperly fastened pump panel (panel broken off). • Removal of protective caps of unused connections. • Non-observance of the ambient conditions (temperature, indoors or weather-protected placement).
C	• Mains plug cut off (direct connection), safe disconnection impossible. Safe disconnection e.g. by 2-pin main switch. • Short circuit of the internal power supply (15V DC) at the control cable during installation. • Admissible current load of the digital outputs exceeded • No **sera** sensors for flow or filling level ► damage to the electronics. • No diode for external control power supply connection ► electronics overloaded/destroyed. • Electronics opened in order to connect the mains cable directly to the power supply ► electric shock or damage to the electronics. • Connection of wrong supply voltage or mains frequency ► electronics or vent valve destroyed.
E	• The pumped medium is conveyed into the environment in the case of pumps with automatic or manual vent valve if the return pipe was improperly fitted or not fitted at all ► danger for the operator.
iSTEP	• Connection of the cubic connector (mains connection) without seal.

FORESEEABLE MISUSE

Start-up

A	• Cover on vent openings (e.g. motor). • Suction or pressure pipes closed (i.e. foreign matters, particle size, stop valves). • Start-up with damaged system. • Removal of protective caps of unused connections during the commissioning. • Incorrect control of the pump or incorrect control signals ►sudden start-up.
C	• Sensor cable damaged (electronics <–> stroke mechanism), wrong or no recognition of the stroke length ► wrong dosing volume and resulting process error. • Wrong parameterization of the pump ► inadvertent start. • Distance between dosing pump and other dosing pumps or electrical consumers insufficient ► fault by electro-magnetic radiation.. • Control cables too long >> 30m ► malfunctions due to EMC. • Control cable and power cable laid in parallel ► malfunctions due to EMC.
E	• Operation without connected return pipe of the vent valve.
KM	• Wrong setting of the hydraulic compensating valve.
ÜV	• Integrated overflow valve misadjusted (no protection function). • Operation without connected return pipe of the integrated overflow valve. • No free return flow of the overflow valve.

Operation

A	• Fault message ignored ► faulty dosing / process error. • Pipes hit, pulsation damper not used ► damage to the pipes, medium is leaking. • Pumped medium contains particles or is contaminated. • External fuse bridged ► no cut off in case of an error. • Ground wire removed ► no cut off by fuse in case of an error, supply voltage directly at the housing. • Insufficient lighting of the working place. • Suction height too high, pump capacity too low ► process error. • Arbitrary modification of the pump (valves, internal fuse, ...). • Wearing of unsuitable protective clothing / no protective clothing at all. • Use or operation of the pump with damaged electrical supply / control cable. • Non-observance of the compatibility of pump components with the pumped media used. The pump is exclusively intended for the pumped media stated in the order confirmation.
E	• No free return of the venting valve (option) or venting valve not connected.
KM	• Setting of the hydraulic compensating valve misadjusted.
MBE	• No check of diaphragm rupture due to removal of the MBE.
ÜV	• Integrated overflow valve misadjusted. • No free return flow of the integrated overflow valve.

Maintenance/Repair

A	• Carrying out work that is not described in the operating manual (work on the drive housing and hand-held control unit). • Disregard of the maintenance intervals specified in the operating manual. • Use of incorrect spare parts/oils (e.g. not sera original spare parts, wear parts, wrong viscosity). • Improper mounting of spare and wear parts (e.g. incorrect tightening torque for pump body). • Oil level not checked. • Use of cables with damaged insulation. • No shutdown / no protection against a restart before maintenance work. • Insufficient removal of the pumped medium before the replacement of spare and wear parts. • Restart without sufficient fastening. • Valves mixed up. • Mix-up of sensor cables. • Pipes not connected (e.g. suction and pressure pipes, vapour recovery pipes). • Seals damaged ► medium leaks. • Seals not installed ► medium leaks. • Wearing of unsuitable protective clothing / no protective clothing at all. • Operation of an uncleaned system. • Pumped medium contaminated with oil. • Poorly ventilated room. • Removal of protective caps during the maintenance. • Ingress of pumped medium or soiling in built-in pump, drive housing and pump body.
B	• Oil level not checked. • Pumped medium contaminated with oil. • Use of wrong soils (wrong viscosity). • Pumped medium or utilities during an oil change insufficiently removed
ÜV	• If the screw-in depth of the setscrew for the integrated overflow valve is not noted, this may lead to dangerous consequences, i.e. rupture of the pressure pipe or leaking medium. …).

Cleaning

A	• Wrong rinsing medium (material changed, reaction with the medium). • Wrong cleaning agent (material changed, reaction with the medium). • Cleaning agent remains in the system (material changed, reaction with the medium). • Protective clothing insufficient or missing. • Use of unsuitable cleaning utensils (material changed, mechanical damage by high pressure cleaner). • Untrained personnel. • Vent openings clogged. • Parts torn off. • Sensors damaged. • Non-observance of the safety data sheet. • Control elements actuated. • Poorly ventilated room.

Shut-down

A	• Pumped medium not completely removed. • Disassembly of pipes with the pump running/with residual pressure. • Disconnection of the electrical connections in a wrong sequence (ground wire first). • Disconnection from the power supply not ensured ► danger through electricity. • Poorly ventilated room. • Falsche oder keine Schutzkleidung.

FORESEEABLE MISUSE

Disassembly

A	• Residues of the pumped medium and utilities in the system. • Use of wrong disassembly tools. • Wrong or no protective clothing at all. • Poorly ventilated room.

Disposal

A	• No marking of hazardous media. • Improper disposal of the pumped medium and materials.
B	• Improper disposal of the utilities.
C	• Wrong disposal of the elctronics.

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