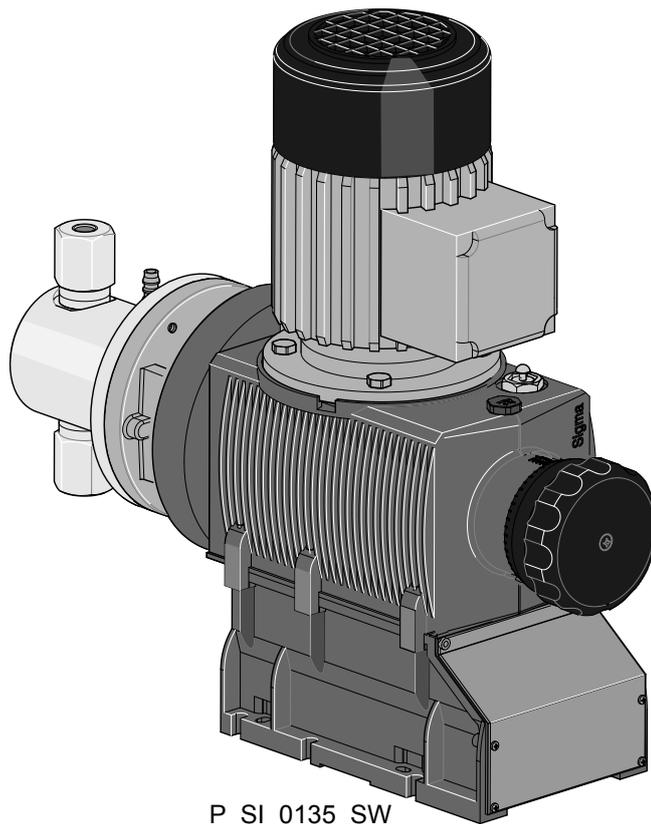


# Operating instructions

## Piston Metering Pump

### Sigma / 2 Basic Type SBKa



**Please carefully read these operating instructions before use! · Do not discard!  
The operator shall be liable for any damage caused by installation or operating errors!  
Technical changes reserved.**

### Supplementary information



Fig. 1: Please read!

Read the following supplementary information in its entirety! Should you already know this information, you will benefit more from referring to the operating instructions.

The following are highlighted separately in the document:

- Enumerated lists

- ➔ Operating guidelines

- ⇒ Outcome of the operating guidelines

- see (reference)

#### Information



*This provides important information relating to the correct operation of the unit or is intended to make your work easier.*

#### Safety notes

Safety notes are identified by pictograms - see Safety Chapter.

### Validity

These operating instructions conform to current EU regulations applicable at the time of publication.

### State the identity code and serial number

Please state identity code and serial number, which you can find on the nameplate when you contact us or order spare parts. This enables the device type and material versions to be clearly identified.

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# 1 Identity code

SBKa	Sigma 2 Basic Type	
HK	Main power end, piston	
	<b>Type:</b>	Capacity
	----- _	Performance data at maximum back pressure and type: refer to nameplate on the pump housing
	<b>Dosing head material</b>	
	SS	Stainless steel
	<b>Seal material</b>	
	T	PTFE
	<b>Displacement body</b>	
	4	Piston (oxide ceramic)
	<b>Dosing head design</b>	
	0	no valve springs
	1	with 2 valve springs, Hastelloy C; 0.1 bar
	<b>Hydraulic connector</b>	
	0	Standard threaded connector (in line with technical data)
	<b>Design</b>	
	0	With ProMinent® logo (standard)
	1	Without ProMinent® logo
	M	Modified* <span style="float: right;">* order-related design, refer to order paperwork for pump features</span>
	<b>Electric power supply</b>	
	_	Connection data - see motor nameplate
	1	No motor, with B14 flange, size 71 (DIN)
	2	No motor, with C 56 flange (NEMA)
	3	No motor, with B 5, size 63 (DIN)
	4	No motor, with B 5, size 71 (DIN)
	5	No motor, with B14 flange, size 80 (DIN)
	<b>Degree of protection</b>	
	0	IP 55 (standard)
	1	Exe design ATEX-T3
	2	Exd version ATEX-T4
	<b>Stroke sensor</b>	
	0	No stroke sensor (standard)
	2	Pacing relay (reed relay)
	3	Stroke sensor (Namur) for hazardous locations
	<b>Stroke length adjustment</b>	
	0	Manual (standard)
	1	With servomotor, 230 V, 50/60 Hz

SBKa	Sigma 2 Basic Type												
												2	With servomotor, 115 V, 50/60 Hz
												3	With control motor 0...20 mA 230 V, 50/60 Hz
												4	With control motor 4...20 mA 230 V, 50/60 Hz
												5	With control motor 0...20 mA 115 V, 50/60 Hz
												6	With control motor 4...20 mA 115 V, 50/60 Hz

## 2 Safety chapter



### CAUTION!

These operating instructions include notes and quotes from German guidelines relating to the system operator's scope of responsibility. This information does not discharge the operator from his responsibility as an operator and is intended only to remind him or make him aware of specific problem areas. This information does not lay claim to being complete, nor applicable to every country and every type of application, nor to being unconditionally up-to-date.

### Identification of safety notes

The following signal words are used in these operating instructions to denote different severities of danger:

Signal word	Meaning
<b>WARNING</b>	Denotes a possibly dangerous situation. If this is disregarded, you are in a life-threatening situation and this can result in serious injuries.
<b>CAUTION</b>	Denotes a possibly dangerous situation. If this is disregarded, it could result in slight or minor injuries or material damage.

### Warning signs denoting different types of danger

The following warning signs are used in these operating instructions to denote different types of danger:

Warning signs	Type of danger
	Warning – hand injuries.
	Warning – high-voltage.
	Warning – hot surface.
	Warning – danger zone.

### Intended use

- Only use the pump to meter liquid metering chemicals.
- In potentially explosive atmospheres in zone 1, device category II 2G, explosion group II C, only operate the pump with the appropriate nameplate (and the respective EC Declaration of Conformity) for pumps for use in areas at risk of explosion in compliance with Directive 94/9/EC in accordance with the European guidelines. The explosion group, category and degree of protection specified on the label should correspond to or be better than the conditions given in the intended field of application.
- Only start up the pump after it has been correctly installed and commissioned in accordance with the technical data and specifications contained in the operating instructions.

- Observe the general limitations with regard to viscosity limits, chemical resistance and density - see also ProMinent Resistance List (in the Product Catalogue or at [www.prominent.com/en/downloads/](http://www.prominent.com/en/downloads/))!
- All other uses or modifications are prohibited.
- Never operate pumps without the relevant nameplate (and the respective EC Declaration of Conformity) for pumps for use in atmospheres at risk from explosion in atmospheres potentially at risk from explosion.
- The pump is not intended for the metering of gaseous media or solids.
- The pump is not intended for the metering of flammable feed chemicals.
- The pump is not intended to meter explosive substances and mixtures.
- The pump is not intended for unprotected outside use.
- The pump is only intended for industrial use.
- The pump should only be operated by trained and authorised personnel.
- Observe the information contained in the operating instructions at the different phases of the device's service life.

### Qualification of personnel

Action	Qualification
Storage, transport, unpacking	Instructed person
Assembly	Technical personnel, service
Planning hydraulic installation	Qualified personnel who have a thorough knowledge of oscillating diaphragm pumps.
Hydraulic installation	Technical personnel, service
Installation, electrical	Electrical technician
Operation	Instructed person
Maintenance, repair	Technical personnel, service
Decommissioning, disposal	Technical personnel, service
Troubleshooting	Technical personnel, electrical technician, instructed person, service

#### Explanation of the terms:

##### Technical personnel

A qualified employee is deemed to be a person who is able to assess the tasks assigned to him and recognise possible dangers based on his/her technical training, knowledge and experience, as well as knowledge of pertinent regulations.

Note:

A qualification of equal validity to a technical qualification can also be gained by several years employment in the relevant work area.

##### Electrical technician

Electrical technicians are deemed to be people, who are able to complete work on electrical systems and recognise and avoid possible dangers independently based on their technical training and experience, as well as knowledge of pertinent standards and regulations.

Electrical technicians should be specifically trained for the working environment in which they are employed and know the relevant standards and regulations.

Electrical technicians must comply with the provisions of the applicable statutory directives on accident prevention.

##### Instructed person

An instructed person is deemed to be a person who has been instructed and, if required, trained in the tasks assigned to him/her and possible dangers that could result from improper behaviour, as well as having been instructed in the required protective equipment and protective measures.

### Service

Customer Service department refers to service technicians, who have received proven training and have been authorised by ProMinent or ProMaqua to work on the system.

### Safety notes



#### WARNING!

- Observe the European Operator Directive 99/92/EC (ATEX 137), implemented in Germany by the Industrial Health and Safety Regulation and the German Ordinance on Hazardous Substances, for the installation and operation of equipment in areas at risk from explosion.
- Observe the European standards EN 1127-1, EN 60079-10, EN 60079-14, EN 60079-17 and EN 60079-25 and EN 50039 for inherently safe electrical circuits. (In Germany these standards are partly implemented by VDE 0165 and VDE 0118).
- Adhere to the respective national regulations outside of the EU.
- Ensure that installations in areas at risk from explosion are checked by a "recognisably trained" skilled operative. This applies specifically to intrinsically safe electrical circuits.
- The following information relates essentially to the unique characteristics in areas at risk from explosion but does not replace the standard operating instructions.
- Only clean plastic parts carefully with a damp cloth to avoid electrostatic charges and sparks.



#### WARNING!

##### Warning of dangerous or unknown feed chemical

Should a dangerous or unknown feed chemical be used: It may escape from the hydraulic components when working on the pump.

- Take appropriate protective measures before working on the pump (e.g. safety glasses, safety gloves, ...). Observe the safety data sheet for the feed chemical.
- Drain and flush the liquid end before working on the pump.



#### WARNING!

##### Danger from hazardous substances!

Possible consequence: Fatal or very serious injuries.

Please ensure when handling hazardous substances that you have read the latest safety data sheets provided by the manufacture of the hazardous substance. The actions required are described in the safety data sheet. Check the safety data sheet regularly and replace, if necessary, as the hazard potential of a substance can be re-evaluated at any time based on new findings.

The system operator is responsible for ensuring that these safety data sheets are available and that they are kept up to date, as well as for producing an associated hazard assessment for the workstations affected.



**CAUTION!**

**Warning of feed chemical spraying around**

Feed chemical can spray out of the hydraulic components if they are manipulated or opened due to pressure in the liquid end and adjacent parts of the system.

- Disconnect the pump from the mains power supply and ensure that it cannot be switched on again by unauthorised persons.
- Depressurise the system before commencing any work on hydraulic parts.



**CAUTION!**

**Warning of feed chemical spraying around**

An unsuitable feed chemical can damage the parts of the pump that come into contact with the chemical.

- Take into account the resistance of the wetted materials when selecting the feed chemical - see the ProMinent product catalogue or visit [www.prominent.com/en/downloads](http://www.prominent.com/en/downloads).



**CAUTION!**

**Danger of personnel injury and material damage**

The use of untested third party parts can result in personnel injuries and material damage.

- Only fit parts to metering pumps, which have been tested and recommended by ProMinent.



**CAUTION!**

**Danger from incorrectly operated or inadequately maintained pumps**

Danger can arise from a poorly accessible pump due to incorrect operation and poor maintenance.

- Ensure that the pump is accessible at all times.
- Adhere to the maintenance intervals.

**Safety equipment**



**WARNING!**

- Attach the following safety note to pumps that contain parts made of electrically non-conductive plastic.
- Ensure that the label is always fitted and legible.

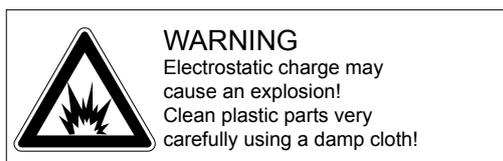


Fig. 2

**Isolating protective equipment**

All isolating protective equipment must be installed for operation:

- Drive front cover
- Motor fan cowling
- Terminal box cover, motor
- Protective cover - see figure.

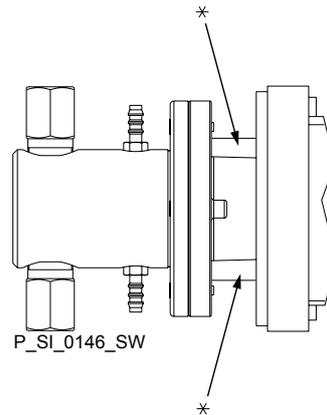


Fig. 3: Protective cover, two-section (\*)

Only remove them when the operating instructions request you to do so.

### Information in the event of an emergency

In the event of an electrical accident, disconnect the mains cable from the mains or press the emergency cut-off switch fitted on the side of the system!

If feed chemical escapes, also depressurise the hydraulic system around the pump as necessary. Adhere to the safety data sheet for the feed chemical.

### Safety information relating to the operating instructions

Prior to commissioning the system or system component, the system operator is obliged to obtain the latest safety data sheet from the supplier for the chemicals / resources to be used with the system. The operator should create the legal framework for safe operation of the system or system component, such as for example the preparation of operating instructions (operator duties), based on the information provided in the data sheets concerning health and safety, water and environmental protection and taking into consideration the actual operating environment on site.

### Sound pressure level

Sound pressure level LpA < 70 dB according to EN ISO 20361

at maximum stroke length, maximum stroke rate, maximum back pressure (water)

### 3 Storage, transport and unpacking

#### Safety notes



#### WARNING!

Only return the metering pump for repair in a cleaned state and with a flushed liquid end - refer to the chapter "Decommissioning"!

Only return metering pumps with a completed Decontamination Declaration form. The Decontamination Declaration constitutes an integral part of an inspection / repair order. A unit can only be inspected or repaired when a Declaration of Decontamination Form is submitted that has been completed correctly and in full by an authorised and qualified person on behalf of the pump operator.

The "Decontamination Declaration Form" can be found at [www.prominent.com/en/downloads](http://www.prominent.com/en/downloads).



#### WARNING!

#### Slings can tear

ProMinent only supplies non-reusable slings. These can tear with repeated use.

- Only use the slings once.



#### CAUTION!

#### Danger of material damage

The device can be damaged by incorrect or improper storage or transportation!

- The unit should only be stored or transported in a well packaged state - preferably in its original packaging.
- Only transport the unit when the red gear bleeding plug is pushed in.
- The packaged unit should also only be stored or transported in accordance with the stipulated storage conditions.
- The packaged unit should be protected from moisture and the ingress of chemicals.

#### Scope of supply

Compare the delivery note with the scope of supply:

#### Storage

Personnel:  Technical personnel

1. Plug the caps on the valves.
2. Check if the red gear bleeding plug is pushed in.
3. Preferably place the pump standing vertically on a pallet and secure against falling over.
4. Cover the pump with a tarpaulin cover - allowing rear ventilation.

Store the pump in a dry, sealed place under the ambient conditions according to chapter "Technical Data".

## 4 Overview of equipment and control elements

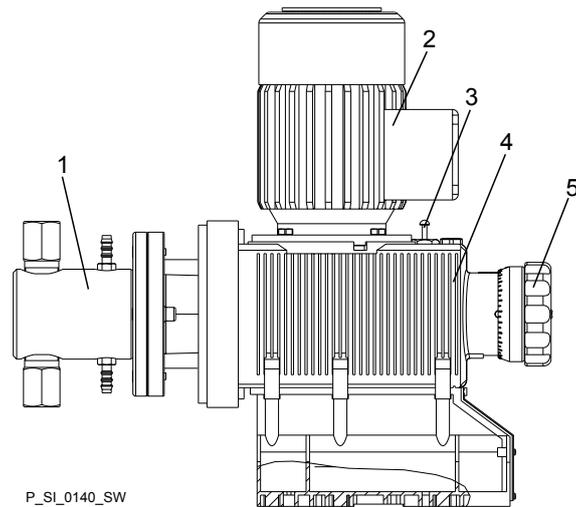


Fig. 4: Overview of equipment and control elements SBKa

- 1 Liquid end
- 2 Drive motor
- 3 Gear bleeding plug
- 4 Drive unit
- 5 Stroke length adjustment knob

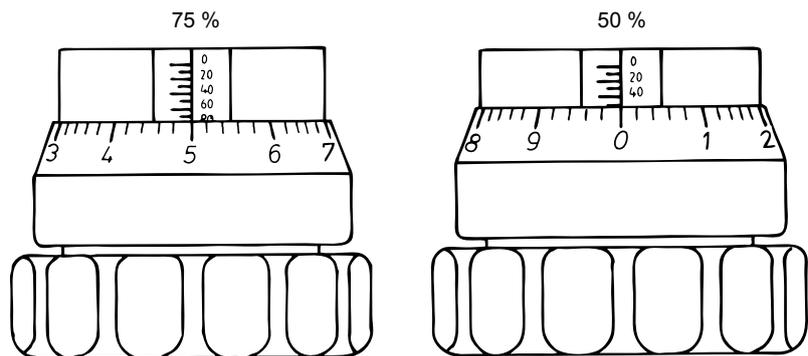
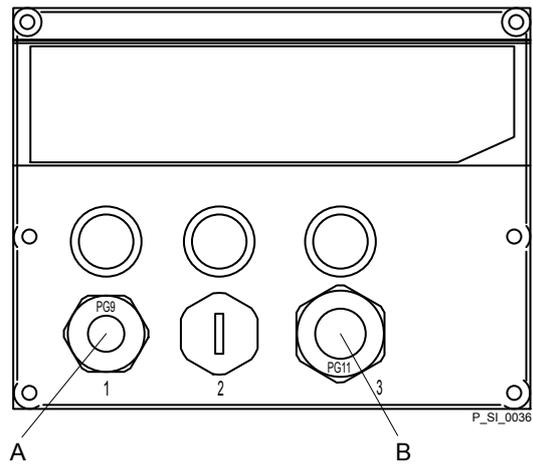


Fig. 5: Adjusting the stroke length

- 100 % = 10 rotations
- 10 % = 1 rotation
- 0.2 % = 1 scale mark on stroke adjustment dial



*Fig. 6: Front cover for version with pacing relay*

- A Pacing relay cable
- B Supply voltage cable for pacing relay PCB

## 5 Functional description

### 5.1 Drive unit

The metering pump is an oscillating diaphragm pump, the stroke length of which can be adjusted. An electric motor drives the pump.

### 5.2 Liquid End

The heart of the liquid end is a highly resistant piston (4) made from coated stainless steel. The suction valve (1) closes as soon as the piston (4) is moved in to the dosing head and the feed chemical flows through the discharge valve (3) out of the dosing head. As soon as the piston moves in the opposite direction, the discharge valve (3) closes due to the negative pressure in the dosing head and fresh feed chemical flows through the suction valve (1) into the dosing head.

Use the flushing collar (6) to flush the sealing surface of the piston.

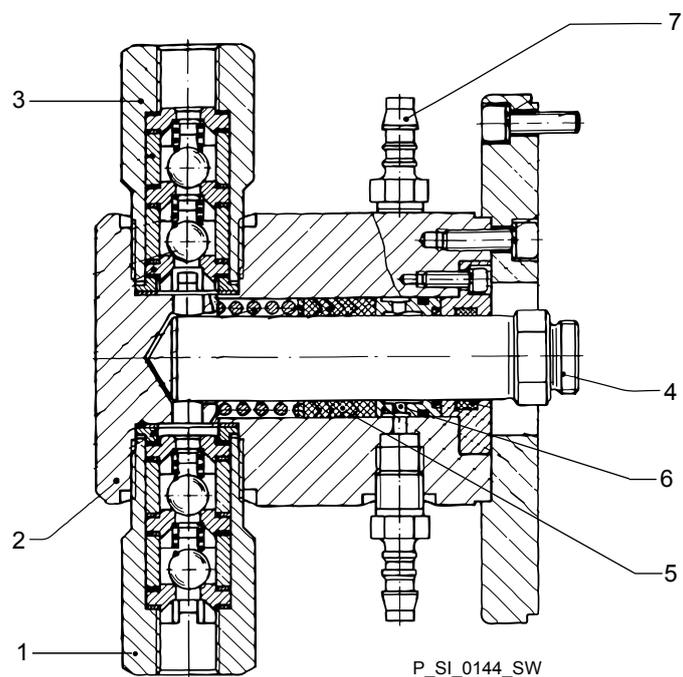


Fig. 7: Cross-section through the liquid end

- 1 Suction valve
- 2 Dosing head
- 3 Discharge valve
- 4 Piston
- 5 Packing collar
- 6 Flushing collar
- 7 Flushing connector

## 6 Assembly



Compare the dimensions on the dimension sheet and pump.

### Base

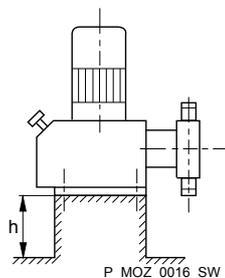


Fig. 8



#### WARNING!

##### Danger of electric shock

If water or other electrically conducting liquids penetrate into the drive housing, in any other manner than via the pump's suction connection, an electric shock may occur.

- Position the pump so that it cannot be flooded.



#### WARNING!

##### The pump can break through the base or slide off it

- Ensure that the base is horizontal, smooth and permanently load-bearing.



#### Capacity too low

Vibrations can disrupt the liquid end valves.

- The supporting floor must not vibrate.

### Space requirement

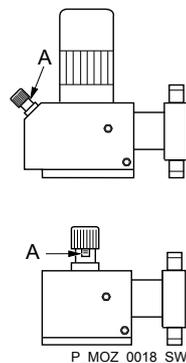


Fig. 9



#### CAUTION!

##### Danger from incorrectly operated or inadequately maintained pumps

Danger can arise from a poorly accessible pump due to incorrect operation and poor maintenance.

- Ensure that the pump is accessible at all times.
- Adhere to the maintenance intervals.

Position the pump so that control elements such as the stroke length adjustment knob or the indicating dial A are easily accessible.

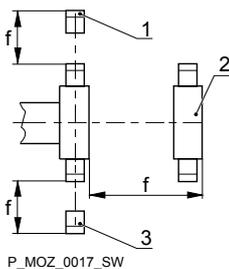


Fig. 10

- 1 Discharge valve
- 2 Dosing head
- 3 Suction valve

Ensure that there is sufficient free space (f) around the dosing head, as well as the suction and discharge valve, so that maintenance and repair work can easily be carried out on these components.

### Liquid end alignment



#### **Capacity too low**

*The liquid end valves cannot close correctly if they are not upright.*

- *Ensure that the discharge valve is upright.*

### Fastening



#### **Capacity too low**

*Vibrations can disrupt the liquid end valves.*

- *Secure the metering pump so that no vibrations can occur.*

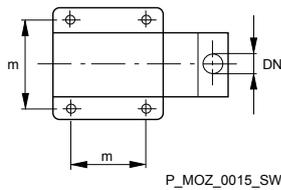


Fig. 11

Take the dimensions (m) for the fastening holes from the appropriate dimensional drawings or data sheets.

Fix the pump base to the base with suitable screws.

## 7 Installation

**CAUTION!****Danger of injury to personnel and material damage**

Disregarding the technical data when installing may lead to personal injuries or damage to property.

- Observe the technical data- refer to chapter "Technical Data" and, where applicable, the operating instructions of the accessories.

### 7.1 Installation, hydraulic

**WARNING!****EX pumps in areas at risk from explosion**

- Metering pumps in areas at risk from explosion are as a matter of course provided with a suitable safety relief valve on the outlet side of the metering pump (which is used to protect against excessive heating due to overloading and impact sparks caused by the breakage of power end parts triggered by overloading).
- Piston metering pumps are designed for applications in temperature class T3. Pumps are suitable for T4 with an additional flow control on the outlet side (to protect it from excess temperature following running dry) or a suitable temperature monitor.
- In the event of differing temperature classes amongst the diverse components, operation of the complete pumps should be based on the component with the lowest temperature class.
- Ensure that installations in areas at risk from explosion are checked by a "recognisably trained" skilled operative.
- Please note the relevant national regulations during installation!

**WARNING!****Warning of feed chemical reactions to water**

Feed chemicals that should not come into contact with water may react to residual water in the liquid end that may originate from works testing.

- Blow the liquid end dry with compressed air through the suction connector.
- Then flush the liquid end with a suitable medium through the suction connector.

**WARNING!**

The following measures are an advantage when working with highly aggressive or hazardous feed chemicals:

- Install a bleed valve with recirculation in the storage tank.
- Install an additional shut-off valve on the discharge or suction ends.



### CAUTION!

#### Warning of feed chemical spraying around

PTFE seals, which have already been used / compressed, can no longer reliably seal a hydraulic connection.

- New, unused PTFE seals must always be used.



### CAUTION!

#### Suction problems possible

The valves may no longer close properly using feed chemicals with a particle size of greater than 0.3 mm.

- Install a suitable filter in the suction line.



### CAUTION!

#### Warning against the discharge line bursting

With a closed discharge line (e.g. due to a clogged discharge line or by closing a valve), the pressure that the metering pump generates can reach several times the permissible pressure of the system or the metering pump. This could lead to lines bursting, resulting in dangerous consequences with aggressive or toxic feed chemicals.

- Install a relief valve that limits the pressure of the pump to the maximum permissible operating pressure of the system.



### CAUTION!

#### Uncontrolled flow of feed chemical

Feed chemicals can leak through a stopped metering pump if there is back pressure.

- Use an injection valve or a vacuum breaker.



### CAUTION!

#### Uncontrolled flow of feed chemical

Feed chemical can leak through the metering pump in an uncontrolled manner in the event of excessive priming pressure on the suction side of the metering pump.

- Do not exceed the maximum permissible priming pressure for the metering pump.
- Configure the installation correctly for this purpose.



### CAUTION!

#### Warning of backflow

Liquid ends, foot valves, back pressure valves, relief valves or spring-loaded injection valves do not constitute absolutely leak-tight sealing elements.

- Use a shut-off valve, a solenoid valve or a vacuum breaker for this purpose.

Standard installation

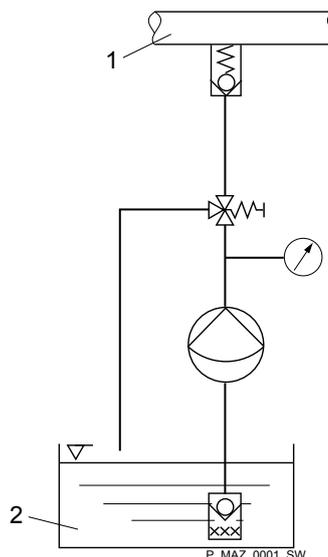


Fig. 12: Standard installation

- 1 Main line
- 2 Storage tank

Symbols for the components

Symbol	Explanation	Symbol	Explanation
	Injection valve		
	Multifunctional valve		Manometer
	Relief valve (alternatively a multifunction valve can be used)		Metering pump
	Level switch		Foot valve with filter meshes

Route the leakage liquid drainage line



**CAUTION!**

If you do not connect any flushing equipment, then you must ensure that no dust and no foreign bodies can enter through the top hose nozzles!

Otherwise this may result in damage to the liquid end. For example, fit a sealing stopper (order no. 359585).

The leakage liquid is drained off via the flushing collar and a hose nozzle, without other parts of the liquid end coming into contact with the medium.

1. ➔ Connect a hose to the lower hose nozzle.
2. ➔ Route the hose into a collection vessel for the leakage liquid.

Connecting the flushing equipment



**CAUTION!**

- A flushing equipment must be connected when using very aggressive or toxic media or when using media with a poor lubricating effect.
- The flushing agent must be compatible with the feed chemical and the wetted materials of the liquid end.
- The flushing medium pressure must not exceed 0.5 bar.

- ➔ Connect the flushing equipment to the hose nozzles via two hoses.

## 7.2 Installation, electrical



**WARNING!**

**EX pump in area at risk from explosion**

- Potential-free switches can be evaluated as simple electrical devices (EN 60079-14 or EN 50020).
- Only connect potential-free as well as non-isolating low voltage switch accessories, such as diaphragm rupture indicators, stroke frequency instruments etc., to an intrinsically safe power circuit in areas at risk from explosion.
- If several electrical components are connected together, test and confirm the technical safety of the entire connected system. This can either be in the form of a declaration of conformity from the supplier (ProMinent) for the entire unit or, with the supply of individual components, with the operator's explosion protection document.
- Only motor protection switches, mains switches and fuses permitted for use in areas at risk from explosion in line with the manufacturer's information may be used as electrical components in areas at risk from explosion.
- Note the enclosed documentation for the individual electrical components.



**WARNING!**

**Danger of electric shock**

Unprofessional installation may lead to electric shocks.

- Cable end sleeves must be crimped onto all cut-to-length cable conductors.
- Only technically trained personnel are authorised to undertake the electrical installation of the device.



**WARNING!**

**Danger of electric shock**

In the event of an electrical accident, it must be possible to quickly disconnect the pump, and any electrical ancillaries which may possibly be present, from the mains.

- Install an emergency cut-off switch in the mains supply line to the pump and any electrical ancillaries which may be present or
- Integrate the pump and electrical ancillaries which may be present in the emergency cut-off management of the system and inform personnel of the isolating option.



**WARNING!**

**Danger of electric shock**

This pump is equipped with a protective earth conductor, to reduce the risk arising from an electric shock.

- Connect the PE conductor to "earth" with a clean and permanent electrical connection.



**WARNING!**

**Danger of electric shock**

A mains voltage may exist inside the motor or electrical ancillaries.

- If the housing of the motor or electrical ancillaries has been damaged, you must disconnect it from the mains immediately. Only return the pump to service after an authorised repair.

Personnel:  Electrician

What requires electrical installation?

- Motor
- External fan (optional)
- Stroke control drive (optional)
- Stroke adjusting drive (optional)
- Stroke sensor (optional)
- Pacing relay (option)
- Frequency converter (optional)

**Motor**

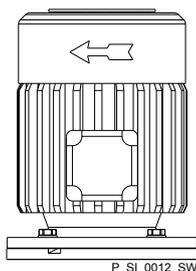


Fig. 13: Direction of rotation of motor



**WARNING!**

- Protect power end motors using a suitable motor protection switch. Only use motor protection permitted for this kind of application with Ex"e" motors. (Protection against heating from overloading)
- Ensure that motors are only installed and inspected by a "recognisably trained" skilled operative in areas at risk from explosion.
- Observe the enclosed operating instructions for the Ex motor.



**CAUTION!**

Provide appropriate motor protection devices (e.g. motor protection switch with thermal overcurrent trip) to protect the motor against overloading. Fuses do not provide motor protection.



**CAUTION!**

**The pump can be damaged**

The pump can be damaged if the motor drives the pump in the wrong direction.

- When connecting the motor, pay attention to the correct direction of rotation indicated by the arrow on the fan cover, as shown in .



*Install an electrical isolating device in the mains supply cable, e.g. a mains switch, to be able to switch off the pump independently of the entire installation (e.g. for repair).*

1. ➤ Install a motor protection switch, as the motors have no fuse.
2. ➤ Install an emergency cut-off switch or include the motor in the emergency cut-off management plan for the system.
3. ➤ Only connect the motor to the voltage supply using a suitable cable.



- *Key motor data can be found on the nameplate.*
- *Motor data sheets can be requested for more information.*
- *The terminal wiring diagram is located in the terminal box.*

### External fan



#### CAUTION!

Provide a separate power supply for the external fan with motors with external fans (identity code specification "R" or "Z").

### Variable speed motors with frequency converter

Connect the motor according to the wiring diagram for the control unit, if it is controlled by an electronic control unit (such as AC motors by frequency converters).

### Stroke length actuators / control drives

Connect the motors in accordance with the enclosed wiring diagram or according to the wiring diagram affixed to the inside of the housing.



#### CAUTION!

Only operate stroke length actuators / control drives when the pump is running!

Otherwise they will be damaged.

### Stroke sensor (identity code specification "Stroke sensor": 3)

- ➔ Connect the stroke sensor to a suitable monitoring device according to the technical data provided with the monitoring device and that of the stroke sensor - see chapter "Technical data".

### Pacing relay (identity code specification "Stroke sensor": 2)

1. ➤ Install the cable which originates from the pacing relay - see the figure in the chapter entitled "Overview of equipment and control elements": Cable A, left.



*The cable polarity is unimportant.*

2.  Install the power supply cable to the pacing relay PCB - see the figure in the chapter entitled "Overview of equipment and control elements": Cable B, right.



**CAUTION!**

**Warning of overload**

If the current through the relay becomes too high, it can be destroyed by heating.

- Fit a circuit breaker.

**Pacing relay terminal output data**

Data	Value	Unit
Maximum voltage	24	VDC
Maximum current	100	mA
Closing duration, approx.	100	ms
Service life *	50 x 10 <sup>6</sup> (10 V, 10 mA)	Play

\* at rated load

The contacts are potential-free.

The pacing relay is a N/O as standard.

**Supply voltage for pacing relay PCB**

Available supply voltages	Mains supply frequency	Power consumption
230 V AC (180-254 V)	50 / 60 Hz	10 mA (at 230 V, 50 Hz)
115 V AC (90-134 V)	50 / 60 Hz	15 mA (at 115 V, 60 Hz)
24 V DC (20-28 V)	-	10 mA (at 24 V DC)

**Other units**

-  Install the other units in line with their documentation.

## 8 Start up

### Safety notes



**WARNING!**

**EX pump in area at risk from explosion**

- A qualified or skilled operative should check whether the installation information from the "Installation" chapter has been implemented correctly.
- Check whether the installation instructions from the "Installation" chapter have been correctly implemented.



**CAUTION!**

**Warning of personal injury and material damage**

The metering pump may only be operated by trained personnel. The operator is responsible for ensuring that under the given operating conditions (pressure, temperature, corrosiveness, etc.) danger to the operating personnel is avoided by use of appropriate accident prevention measures.



**CAUTION!**

**Feed chemical could escape**

- Check suction and discharge lines and liquid end with valves for leak-tightness and tighten if necessary.
- Check whether the necessary flushing pipes or bleed lines have been connected.



**CAUTION!**

Prior to commissioning, check that the power end motor and corresponding ancillary equipment is connected in compliance with the regulations.



**CAUTION!**

When using pumps with speed control, observe the instructions in the frequency converter operating instructions.



**CAUTION!**

**Possible environmental and material damage**

In event the red gear bleeding plug is sealed, during operation it prevents any pressure compensation between the drive housing and the surroundings. This ensure that oil can be pushed from the drive housing.

- Remove the gear bleeding plug before commissioning.

**Checking for regulation-compliant installation**

Check the installation is regulation-compliant

**Remove the gearbox vent stopper**

Before start up pull the red gearbox vent stopper off, see chapter "Overview of equipment and control elements".

**Checking the oil level**

When the pump is idle, check whether the oil level in the pump is in the middle of the oil level indicator.

This will rule out the pump losing oil and suffering damage.

**Checking the direction of rotation**

When commissioning the unit, check whether the drive motor is rotating correctly - check this against the arrow on the motor housing or the diagram in the chapter entitled "Electrical Installation."

**Adjusting the stroke length**

 *Only adjust the stroke length when the pump is running. This is easier and also better for the pump.*

**Checking for correct leakage**

Check for the correct leakage at the bottom flushing connector.

Leakage for run-in packing:	10 ... 120 drops / min

**Auxiliary equipment**

Check for the correct function of the auxiliary equipment and for correct interplay.

## 9 Maintenance

### Safety notes



#### WARNING!

##### EX pump in area at risk from explosion

- Ensure correct operation in general, particularly of the power end and bearings, by regular monitoring (for leaks, noises, temperatures, smell ...).
- Do not allow the pump to heat up because of lack of oil. With lubricated metering pumps, regularly check the presence of lubricant, for example by checking the fill level, visual leak control etc. If oil is leaking, examine the leakage point immediately and eliminate the cause.
- Check the correct operation of the relief valve downstream of the pump. In premises at risk from explosion, the relief valve should prevent the gear from becoming overloaded and becoming hot.
- When cleaning plastic components, ensure that no electrostatic charges are generated by excessive friction. - see warning label.
- Replace wear parts, such as bearings, as soon as unacceptable wear is detected. (The nominal service life cannot be calculated with lubricated bearings).
- Only use genuine spare parts as replacements.
- Only perform tests and repairs in compliance with DIN EN IEC 60079-17 and only permit "experienced personnel who have the requisite knowledge" to perform the work.
- These measures constitute the minimum protective measurements stipulated by ProMinent. It is the duty of the operator to eliminate any other dangers identified by appropriate measures.



#### WARNING!

It is mandatory that you read the safety information and specifications in the "Storage, Transport and Unpacking" chapter prior to shipping the pump.



#### WARNING!

##### Warning of dangerous or unknown feed chemical

Should a dangerous or unknown feed chemical be used: It may escape from the hydraulic components when working on the pump.

- Take appropriate protective measures before working on the pump (e.g. safety glasses, safety gloves, ...). Observe the safety data sheet for the feed chemical.
- Drain and flush the liquid end before working on the pump.



#### WARNING!

##### Risk of fingers being crushed

Under unfavourable conditions, the stroke axle or displacement body can cause crushing of the fingers.

- Disconnect the pump from the mains power supply and ensure that it cannot be switched on again by unauthorised persons.

**WARNING!****Risk of injury from the fan impeller**

The fan impeller beneath motor's fan cowling can cause severe injuries while it is turning.

- The pump must only be connected to the mains voltage with the fan cowling closed.

**CAUTION!****Warning of feed chemical spraying around**

Feed chemical can spray out of the hydraulic components if they are manipulated or opened due to pressure in the liquid end and adjacent parts of the system.

- Disconnect the pump from the mains power supply and ensure that it cannot be switched on again by unauthorised persons.
- Depressurise the system before commencing any work on hydraulic parts.

**Maintenance work**

*Under heavy loading (e.g. continuous operation) shorter maintenance intervals are recommended than those given.*



*Keep a spare parts kit in stock ready for maintenance work. Order numbers are given in the appendix.*

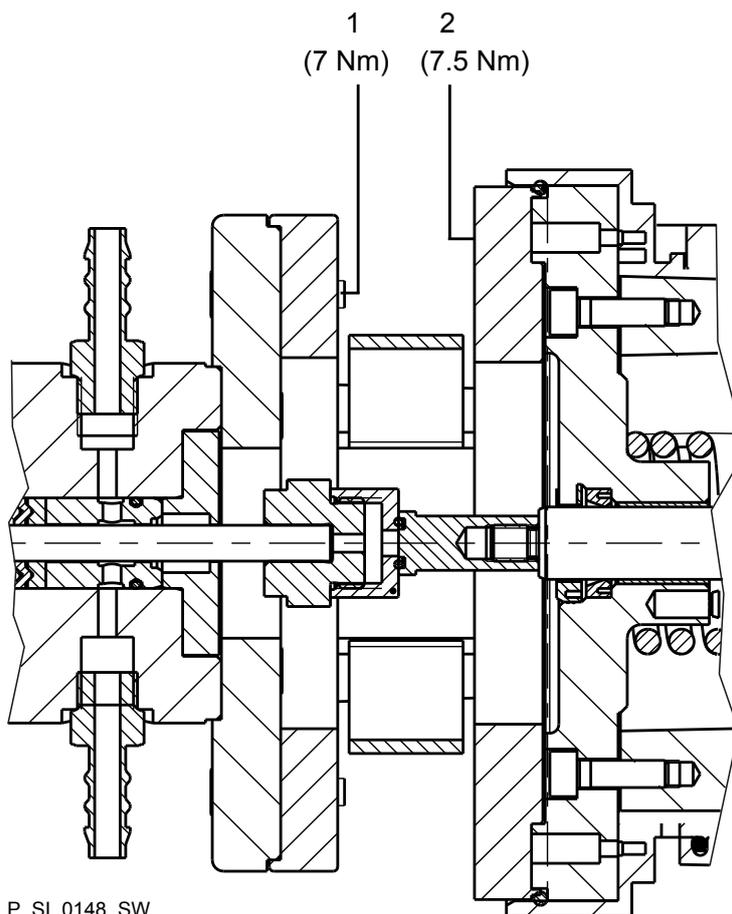


Fig. 14: Liquid end tightening torques

- 1 Dosing head screws
- 2 Turret flange screws

Interval	Maintenance work
Quarterly*	Check the starting torque torques for the dosing head flange screws (1) (7 Nm) and the turret flange screws (2) (7.5 Nm).
	Check that the discharge valve and suction valve are correctly seated.
	Check the correct seating and state of the metering lines at both discharge and suction ends.
	Check the leak-tightness of the entire liquid end!
	Check whether the leakage level is OK: 10 ... 120 drops / min.
	Check the oil level.
	Check that the electrical connections are intact.
	Check whether the pump is transporting media correctly - run briefly at high power. Observe the maximum permissible operating pressure!

Interval	Maintenance work
After approx. 5,000 operating hours *	Change the gear oil.

\* Under normal loading (approx. 30 % of continuous operation)  
 Under heavy loading (e.g. continuous operation): Shorter intervals.

## Changing the gear oil

**WARNING!****Risk of burns due to hot gear oil**

The gear oil may become very hot when the pump is heavily loaded

- When draining oil, avoid contact with the oil running out.

## Gear oil

Gear oil	Supplied quantity	Part no.
Mobilgear 634 VG 460	1.0 l	1004542

## Gear oil filling volumes

Types	Volume, approx.
All	0.5 l

## Changing gear oil

## Draining gear oil

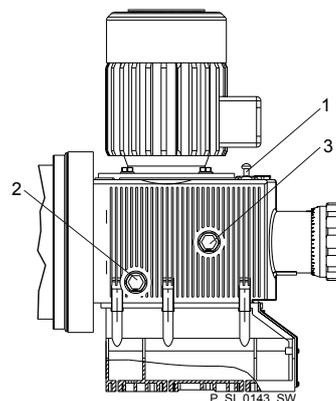


Fig. 15

1. ➤ Remove the vent screw (1).
2. ➤ Place an oil trough under the oil drain plug (2).
3. ➤ Unscrew the oil drain plug (2) from the power end housing.
4. ➤ Allow the gear oil to run out of the power end.
5. ➤ Screw in the oil drain plug (2) with a new seal.

## Filling with gear oil

Prerequisites: Gear oil according to the "Ordering information" chapter is available.

1. ➤ Start the pump.
2. ➤ Slowly pour gear oil through the vent screw (1) opening until the oil inspection window (3) is half covered.
3. ➤ Allow the pump to run for a further 1... 2 minutes
4. ➤ Replace the vent screw (1).

# 10 Repairs

## Safety notes



**WARNING!**

**EX pump in area at risk from explosion**

- Ensure correct operation in general, particularly of the power end and bearings, by regular monitoring (for leaks, noises, temperatures, smell ...).



**WARNING!**

It is mandatory that you read the safety information and specifications in the "Storage, Transport and Unpacking" chapter prior to shipping the pump.



**CAUTION!**

**Warning of feed chemical spraying around**

Feed chemical can spray out of the hydraulic components if they are manipulated or opened due to pressure in the liquid end and adjacent parts of the system.

- Disconnect the pump from the mains power supply and ensure that it cannot be switched on again by unauthorised persons.
- Depressurise the system before commencing any work on hydraulic parts.



**WARNING!**

**Risk of fingers being crushed**

Under unfavourable conditions, the stroke axle or displacement body can cause crushing of the fingers.

- Disconnect the pump from the mains power supply and ensure that it cannot be switched on again by unauthorised persons.



**WARNING!**

**Risk of injury from the fan impeller**

The fan impeller beneath motor's fan cowling can cause severe injuries while it is turning.

- The pump must only be connected to the mains voltage with the fan cowling closed.



**WARNING!**

**Warning of dangerous or unknown feed chemical**

Should a dangerous or unknown feed chemical be used: It may escape from the hydraulic components when working on the pump.

- Take appropriate protective measures before working on the pump (e.g. safety glasses, safety gloves, ...). Observe the safety data sheet for the feed chemical.
- Drain and flush the liquid end before working on the pump.



Unsuitable spare parts for the valves may lead to problems for the pumps.

- Only use new components that are especially adapted to fit your valve (both in terms of shape and chemical resistance).
- Use the correct spare parts kits. In case of doubt, refer to the exploded views and ordering information in the appendix.

## 10.1 Cleaning double ball valves

### Cleaning a discharge valve

#### Taking the discharge valve apart

1. ➤ Unscrew the discharge valve from the dosing head and rinse out.
2. ➤ Dismantle the discharge valve.
3. ➤ Rinse and clean all parts.
4. ➤ Replace the worn parts and seals.

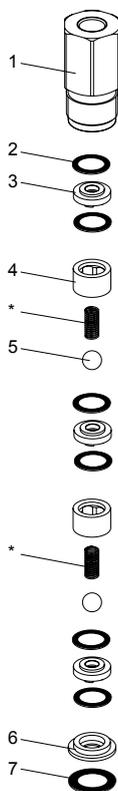
#### Assembling the discharge valve



When assembling, take note of the orientation of the valve seats (3). The valve seats (3) are used as a ball seat on the fine machined side and as a ball cage and spring guide on the other side. The fine machined side must point in the flow direction with all valve seats.

When assembling the valves, take note of the sequence:

Teflon – Metal – Teflon – Metal - ...



1. ➤ Slide into the valve body (1) one after another:
  - one seal (2) and one valve seat (3) - correct!
  - one seal (2) and one valve bushing (4)
  - (If fitted: one spring (\*) into the spring guide of the valve seat (3))
  - one ball (5) into the valve body (1)
  - one seal (2) and the second valve seat (3, correct!)
  - one seal (2) and the second valve bushing (4)
  - (If fitted: the second spring (\*) into the spring guide of the valve seat (3))
  - the second ball (5) into the valve body (1)
  - one seal (2), the third valve seat (3) - (correct!) and a further seal (2)
2. ➤ Position the insert disc (6) with the flare on the packing.



The distance between the edge of the valve body and the insert disk (6) is due to the construction.

3. ➤ Place the larger seal (7) between the insert disk (6) and the dosing head.
4. ➤ Screw in the valve until the stop.

Fig. 16: Discharge valve (double ball valve).

### Cleaning a suction valve

A suction valve is dismantled, cleaned and assembled in the same way as a discharge valve.



*Please note, however, that when assembling, the valve seat (3) must be aligned in the other direction. The fine machined side must point in the flow direction with all valve seats (3).*

## 10.2 Changing the piston



### WARNING!

Observe the safety notes at the beginning of the chapter.

### Removing the liquid end

1. ➤ Flush the suction line, discharge lines and liquid end (activate flushing equipment or immerse suction lance in a suitable medium and pump for a while (consider the effect of the medium on your system first!)) or proceed, as described below.
2. ➤ Stop the pump so that the lock nuts on the slide rod can both be accessed using an open-ended spanner.
3. ➤ Switch off the pump and secure it to prevent it being switched on again.
4. ➤ If the liquid end has not been flushed according to the above processes, then protect yourself against the feed chemical - protective clothing, safety glasses, ...  
  
After dismantling immediately place parts that have been wetting with the medium in a trough with a suitable medium for flushing, in dangerous media were used flush and rinse thoroughly.
5. ➤ Unscrew the hydraulic connectors on the discharge and suction side.
6. ➤ Take off the clear acrylic upper protective cover from the turret.
7. ➤ Loosen the locking nuts on the slide rod and disconnect the piston (2) from the slide rod.
8. ➤ If fitted: Remove the leakage or flushing tubes from the tube nozzles (6).
9. ➤ Remove the turret flange retaining screws (3).



### CAUTION!

The piston is breakable.

- Secure the piston to prevent it falling out.

10. ➤ Remove the liquid end and place onto a solid, even surface with the labelled side facing down.

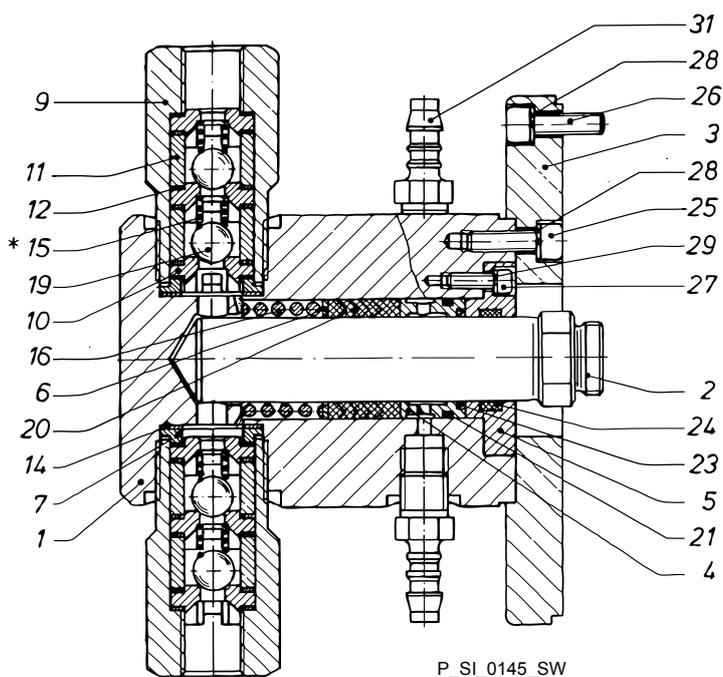


Fig. 17: Cross-section through the liquid end

- 1 Dosing head
- 2 Piston
- 3 Dosing head flange
- 4 Flushing collar
- 5 Guide ring
- 6 Washer
- 16 Spring
- 20 V-sleeve packing
- 21 O-ring
- 23 FOI ring
- 24 Guide band
- 25 Dosing head flange screws
- 26 Liquid end retaining screws
- 27 Guide ring screws
- 31 Tube nozzles for leakage/flushing connector

### Repairing the liquid end

1. ➤ Remove the piston (2)
2. ➤ Loosen the screws (25) of the dosing head flange (3) and remove the dosing head flange.
3. ➤ Loosen the screws (27) of the guide ring (5) and remove it.
4. ➤ Remove the flushing collar (4), the V-sleeve packing (20), the washer (6) and spring (16).
5. ➤ Thoroughly clean the sealing area in the dosing head.
6. ➤ Clean the piston (2), the guide sleeves (6) and the flushing collar (7)
7. ➤ Dispose of the V-sleeve packing (20), the O-ring (21) from the flushing collar, the FOI ring (23) and the guide band (24).
8. ➤ Clean the other removed parts.

Now reassemble the parts using a reverse sequence of steps:

1. Push the spring (16) and the washer (6) into the dosing head.



**CAUTION!**

The piston may be damaged

- Do not damage the sealing lips of the V-sleeve packing (20).

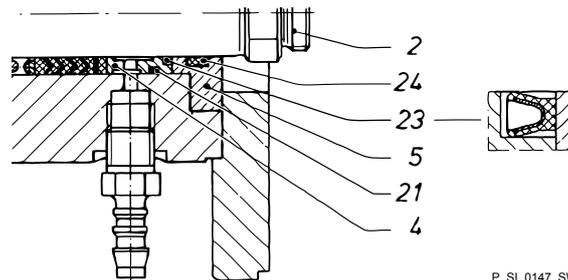
2. Push the V-sleeve packing (20) into the dosing head. The thicker ring comes last!
3. Align the V-type rings with the open side towards the dosing head, as for the FOI ring (23), see Fig. 18.
4. Pull a new O-ring (21) on to the flushing collar (4).
5. Press a new FOI sealing ring (23) into the flushing collar (4). Observe direction! - refer to Fig. 18.
6. Push the flushing collar (4) into the dosing head.
7. Place and tighten the guide ring (5) with a new guide band (24) on the dosing head.
8. Tighten the screws (27):

Tightening torque	5 Nm
-------------------	------

9. Place the dosing head flange (3) on the liquid end and tighten:

Tightening torque	7 Nm
-------------------	------

10. Carefully push the piston (2) into the liquid end.



P\_SL\_0147\_SW

Fig. 18: Section through the liquid end

- 2 Piston
- 4 Flushing collar
- 5 Guide ring
- 21 O-ring
- 23 FOI ring
- 24 Guide band

## Fitting the liquid end

1. Place the liquid end with the discharge valve upwards on the drive flange and secure using the retaining screws (26).

Tightening torque	7.5 Nm
-------------------	--------



**CAUTION!**

The piston is breakable.

- Secure the piston to prevent it falling out.

2. Check that the small O-ring sits on the end of the slide rod.
3. Screw the piston (2) tightly to the slide rod.

4. ➤ Attach the upper protective cover to the turret.
5. ➤ If fitted: Connect the flushing tubes to the hose nozzles.

# 11 Troubleshooting

## Safety notes



**WARNING!**

**EX pumps in areas at risk from explosion**

- Generally ensure proper operation (no leaks, unusual noises, high temperatures, unusual smell ...) especially with the power end and the bearings.
- Do not allow the pump to heat up because of lack of oil. If oil is escaping, investigate the leak immediately and eliminate the cause.
- When cleaning plastic parts, ensure that excessive friction does not cause electrical charges - see warning label.
- Replace wear parts, such as bearings, when there is an identifiable incidence of unacceptable wear. (The nominal service life cannot be calculated with lubricated bearings.)
- Only use genuine spare parts as replacements.
- Carry out inspections and repair in compliance with DIN EN IEC 60079-17 and ensure that they are only performed by "experienced personnel with the requisite knowledge".



**WARNING!**

**Hot surface**

In event the power end motor is loaded excessively, its surface may become very hot.

- Avoid contact.
- If necessary, mount a guard plate.



**WARNING!**

**Danger of an electric shock**

Personnel working on electrical parts can be electrocuted if all electrical lines carrying current have not been disconnected.

- Disconnect the supply cable before working on the motor and prevent it from being reconnected accidentally.
- Any separately driven fans, servo motors, speed controllers or diaphragm rupture sensors fitted should also be disconnected.
- Check that the supply cables are de-energised.



**WARNING!**

**Warning of dangerous or unknown feed chemical**

Should a dangerous or unknown feed chemical be used: It may escape from the hydraulic components when working on the pump.

- Take appropriate protective measures before working on the pump (e.g. safety glasses, safety gloves, ...). Observe the safety data sheet for the feed chemical.
- Drain and flush the liquid end before working on the pump.



**WARNING!**

**Risk of injury from the fan impeller**

The fan impeller beneath motor's fan cowling can cause severe injuries while it is turning.

- The pump must only be connected to the mains voltage with the fan cowling closed.



**CAUTION!**

**Danger of personnel injury and material damage**

The use of untested third party parts can result in personnel injuries and material damage.

- Only fit parts to metering pumps, which have been tested and recommended by ProMinent.



**CAUTION!**

**Warning of feed chemical spraying around**

Feed chemical can spray out of the hydraulic components if they are manipulated or opened due to pressure in the liquid end and adjacent parts of the system.

- Disconnect the pump from the mains power supply and ensure that it cannot be switched on again by unauthorised persons.
- Depressurise the system before commencing any work on hydraulic parts.

**Tasks**

Fault description	Cause	Remedy	Personnel
Pump does not prime in spite of full stroke motion and bleeding.	The valves are dirty or worn.	Repair the valves - see chapter entitled "Repair".	Technical personnel
Pump does not reach high pressure rates.	The valves are dirty or worn.	Repair the valves - see chapter entitled "Repair".	Technical personnel
	The feed chemical has particles larger than 0.3 mm.	Install a suitable filter in the suction line.	Technical personnel
	The motor is wired incorrectly.	1. Check the mains voltage and mains frequency. 2. Wire the motor correctly.	Electrician
	The mains voltage has failed.	Eliminate the cause.	Electrician
The power end motor is very hot.	The discharge line is seriously constricted.	■ Rectify any constriction of the discharge line.	Technical personnel
All other faults.	Other causes.	Call ProMinent® Service.	

## 12 Decommissioning

### Decommissioning



**WARNING!**

**Danger of an electric shock**

When working on the motor or electrical auxiliary equipment, there is a danger of an electric shock.

- Before working on the motor, take note of the safety instructions in its operating instructions!
- Should external fans, servomotors or other auxiliary equipment be installed, these should also be disconnected and checked that they are voltage free.



**WARNING!**

**Danger from chemical residues**

There is normally chemical residue in the liquid end and on the housing after operation. This chemical residue could be hazardous to people.

- It is mandatory that the safety notes relating to the "Storage, Transport and Unpacking" chapter are read before shipping or transporting the unit.
- Thoroughly clean the liquid end and the housing of chemicals and dirt. Adhere to the safety data sheet for the feed chemical.



**WARNING!**

**Warning of dangerous or unknown feed chemical**

Should a dangerous or unknown feed chemical be used: It may escape from the hydraulic components when working on the pump.

- Take appropriate protective measures before working on the pump (e.g. safety glasses, safety gloves, ...). Observe the safety data sheet for the feed chemical.
- Drain and flush the liquid end before working on the pump.



**CAUTION!**

**Warning of feed chemical spraying around**

Feed chemical can spray out of the hydraulic components if they are manipulated or opened due to pressure in the liquid end and adjacent parts of the system.

- Disconnect the pump from the mains power supply and ensure that it cannot be switched on again by unauthorised persons.
- Depressurise the system before commencing any work on hydraulic parts.

**CAUTION!****Danger of damage to the device**

The device can be damaged by incorrect and improper storage or transportation.

- Take into account the information in the "Storage, Transport and Unpacking" chapter if the system is decommissioned for a temporary period.

**(Temporary) decommissioning**

Personnel:  Technical personnel

1.  Disconnect the pump from the mains power supply.
2.  Depressurise and bleed the hydraulic system around the pump.
3.  Drain the liquid end by turning the pump upside down and allowing the feed chemical to run out.
4.  Flush the liquid end with a suitable medium - Observe the safety data sheet! Flush the dosing head thoroughly when using hazardous feed chemicals!
5.  Possible additional work - see chapter "Storage, Transport and Unpacking".

**Final decommissioning**

Personnel:  Technical personnel

-  Also drain the gear oil - refer to the chapter entitled "Maintenance".

**Disposal**

Personnel:  Technical personnel

**CAUTION!****Environmental hazard due to incorrect disposal**

- Note the local guidelines currently applicable in your country, particularly in regard to electronic waste!

**CAUTION!****Environmental hazard due to gear oil**

The pump contains gear oil, which can cause damage to the environment.

- Drain the gear oil from the pump.
- Note the local guidelines currently applicable in your country!

## 13 Technical data

Only for "M - modified" design:



**WARNING!**

**Risk of personal injuries**

Please observe the "Supplement for modified version" at the end of the chapter!

It replaces and supplements the technical data!

### 13.1 Performance data

SBKa under 50 Hz operation

Type	Minimum pump capacity at maximum back pressure			Maximum stroke rate	Suction lift	Permissible priming pressure, suction side	Connector size
	bar	l/h	ml/stroke				
32002	320	1.9	0.46	71	5	160	1/4
23004	230	4.0	0.52	129	5	115	1/4
10006	100	6.4	0.55	195	5	50	1/4
14006	140	6.1	1.42	71	4	70	1/4
10011	100	11.0	1.43	129	4	50	1/4
05016	50	16.7	1.43	195	4	25	1/4
07012	70	12.4	2.90	71	4	35	1/4
04522	45	22.5	2.91	129	4	22.5	1/4
02534	25	34.1	2.92	195	4	12.5	1/4
04022	40	22.4	5.26	71	4	20	3/8
02541	25	41.5	5.37	129	4	12.5	3/8
01264	12	64.0	5.45	195	4	6	3/8

All figures refer to water at 20 °C.

The suction lift applies to filled suction line and filled liquid end - when installed correctly.

SBKa under 60 Hz operation

Type	Minimum pump capacity at maximum back pressure				Maximum stroke rate	Suction lift	Permissible priming pressure, suction side	Connector size
	bar	psi	l/h	gph				
32002	320	4660	2.3	0.6	84	5	160	1/4
23004	230	3335	4.8	1.2	154	5	115	1/4
10006	100	1450	7.6	2.0	233	5	50	1/4
14006	140	2030	7.1	1.8	84	4	70	1/4
10011	100	1450	13.1	3.4	154	4	50	1/4
05016	50	725	20.0	5.2	233	4	25	1/4
07012	70	1015	14.8	3.9	84	4	35	1/4
04522	45	652	26.7	7.0	154	4	22.5	1/4
02534	25	362	40.8	10.8	233	4	12.5	1/4
04022	40	580	26.5	7.0	84	4	20	3/8
02541	25	362	49.2	13.0	154	4	12.5	3/8
01264	12	174	76.0	20.1	233	4	6	3/8

All figures refer to water at 20 °C.

The suction lift applies to filled suction line and filled liquid end - when installed correctly.

Precision

Data	Value	Unit
Reproducibility FK 08	±1.0	% *
Reproducibility, other	±0.5	% *

\* - when installed correctly, under constant conditions, at least 10 % (FK 08: 30 %) stroke length and water at 20 °C and 1 bar back pressure

### 13.2 Shipping weight

Types	Shipping weight
	kg
04022 ... 01264	25
Others	24

### 13.3 Viscosity

The liquid ends are generally suitable for the following viscosity ranges:

Design	Range	Unit
no valve springs	0 ... 200	mPas
with valve springs	200 ... 500	mPas

Design	Range	Unit
with appropriately laid out installation	500 ... 1000	mPas
with appropriately laid out installation and advice from ProMinent	> 1000	mPas

## 13.4 Wetted materials

Liquid end	Suction/pressure connector	Seals / ball seat	Balls	Ball seat	Piston
Stainless steel 1.4571/1.4404	Stainless steel 1.4571/1.4404	PTFE or PTFE with graphite	Oxide ceramic	Stainless steel 1.4571/1.4404	Stainless steel/ ceramic

## 13.5 Ambient conditions

### 13.5.1 Ambient temperatures

Pump, compl.

Data	Value	Unit
Storage and transport temperature	-10 ... +50	°C
Ambient temperature in operation (drive + motor):	-10 ... +45	°C

### 13.5.2 Media temperatures

SST liquid end

Data	Value	Unit
Max. temperature long-term at max. operating pressure	90	°C
Max. temperature for 5 min at max. 2 bar	150	°C
Minimum temperature	-10	°C

### 13.5.3 Air humidity

Air humidity

Data	Value	Unit
Maximum air humidity *:	92	% rel. humidity

\* non-condensing

## 13.6 Motor data

Electrical data

For motor data - refer to the nameplate.



**Motor data sheets, special motors, special motor flanges, external fan, temperature monitoring**

- Motor data sheets can be requested for more information.
- For motors other than those with identity code specifications "S", "M" or "N": Pay special attention to the operating instructions for the motors.
- Special motors or special motor flanges are possible on request.

### 13.7 Stroke sensor "Sigma"



Install the sensor according to the chapter "Installation, electrical".

a) Pacing relay (stroke sensor with ...) (Identity code specification "Stroke sensor": 2)

For more information, see "Pacing relay" in the "Relay" chapter.

b) Namur sensor (identity code specification "Stroke sensor": 3)

5–25 V DC, in accordance with Namur or DIN 60947-5-6, potential-free design.

Data	Value	Unit
Nominal voltage *	8	VDC
Power consumption - active surface uncovered	> 3	mA
Power consumption - active surface covered	< 1	mA
Rated switching distance	1.5	mm

\* Ri ~ 1 kΩ

Cable colour	Polarity
blue	-
brown	+

### 13.8 Relay



The electrical data for the relay are contained in the chapter "Installation, electrical".

## 13.9 Gear oil

Manufacturer	Name	Viscosity class (ISO 3442)	Part no.	Oil volume, supplied	Oil volume, needed
Mobil	Mobil Gear 634 *	VG 460	1004542	1.0 l	0.5 l

\* or comparative gear oil

## 13.10 Sound pressure level

### Sound pressure level

Sound pressure level L<sub>pA</sub> < 70 dB according to EN ISO 20361  
at maximum stroke length, maximum stroke rate, maximum back pressure (water)

## 13.11 Supplementary information for modified versions

(With identity code specification "Version": "M" - "modified")

### Technical data

Technical data of pumps in the modified version can deviate from those of the standard pumps. They can be queried by stating the details of the serial number.

During operation with an automatic stroke length adjustment control together with a variable speed motor, the stroke rate must not fall below 30 strokes / min. Otherwise technical problems occur, because the mechanical resistance of the stroke adjustment spindle becomes too high.

### motor

The motor data sheets for the modified version are valid. They may deviate from the standard motor data sheets.

### Spare parts

With a modified version, it is absolutely necessary to specify the details of the serial number requesting and ordering the spare and replacement parts.

# 14 Diagrams for adjusting the capacity

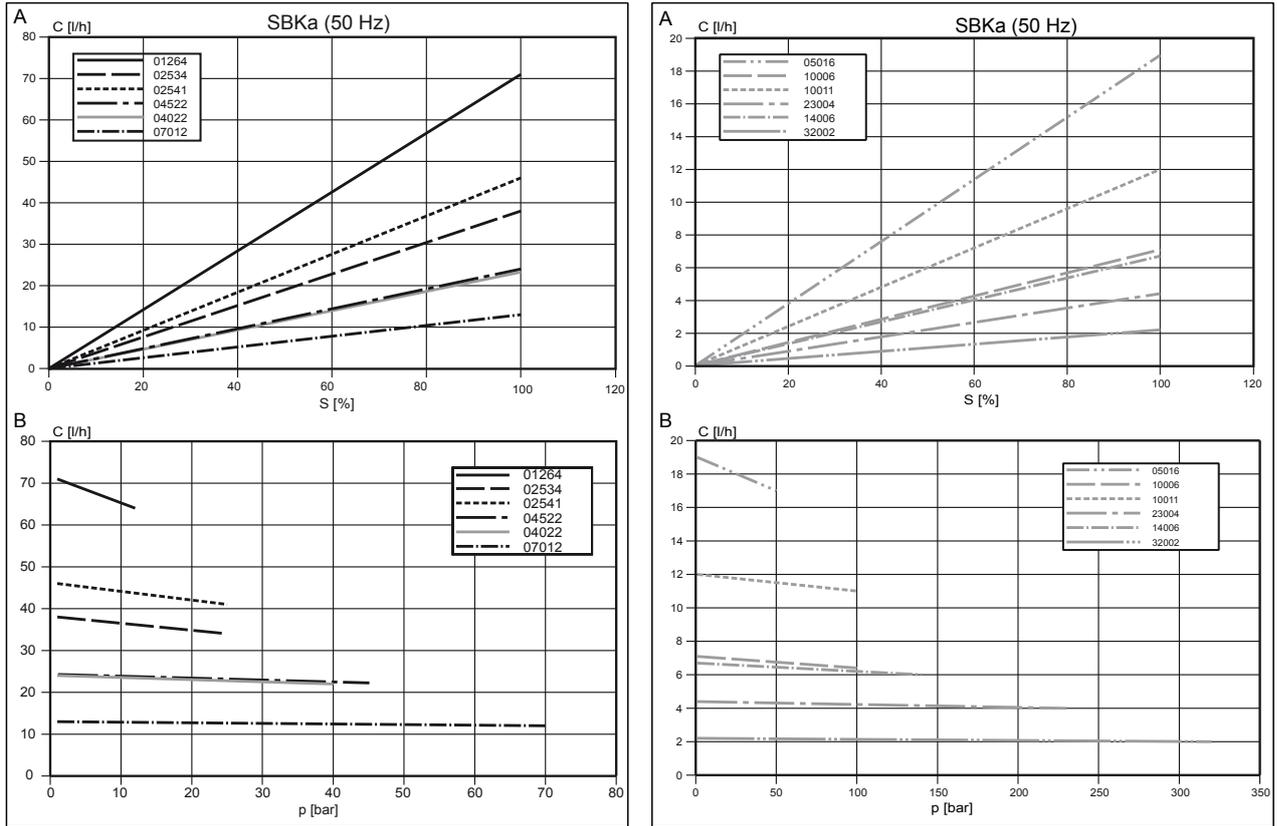


Fig. 19: A) Capacity C at minimum back pressure dependent on the stroke length s. B) Capacity C dependent on the back pressure p.

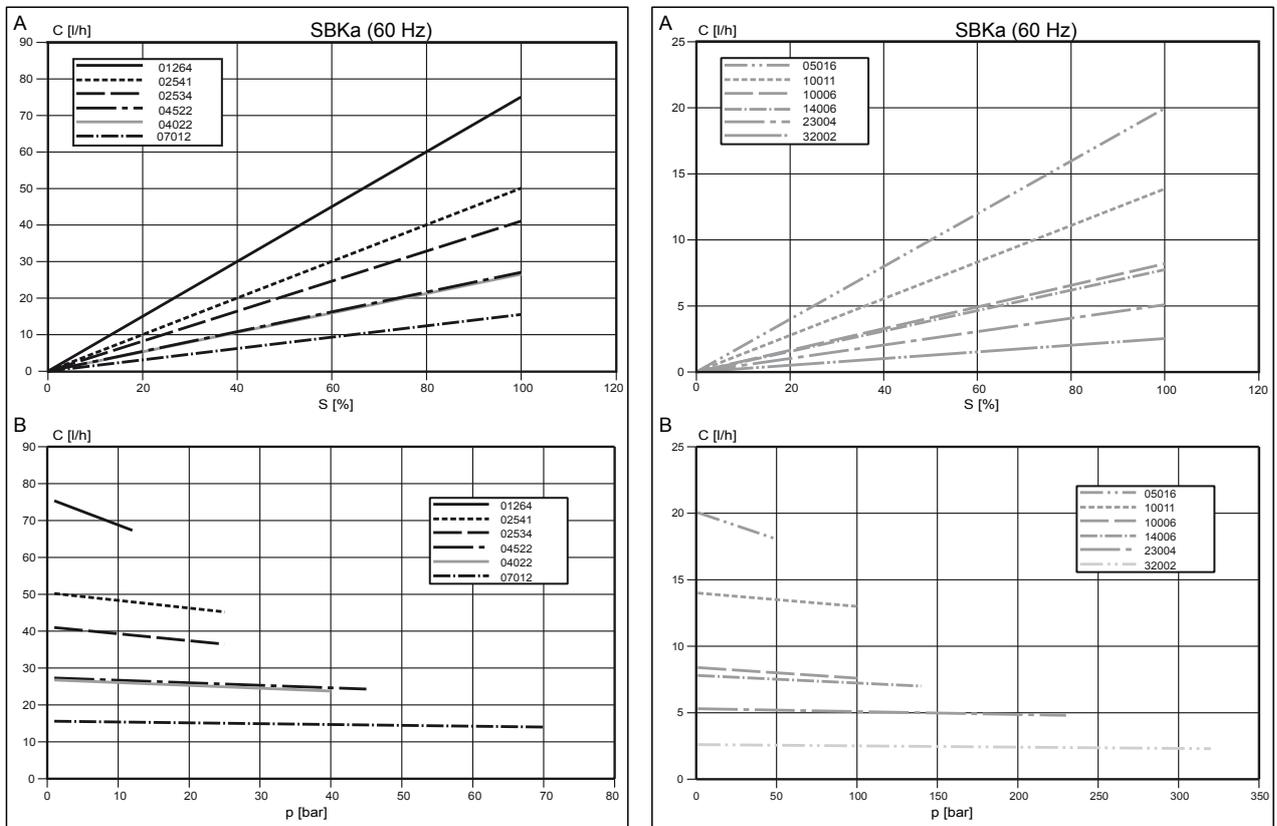
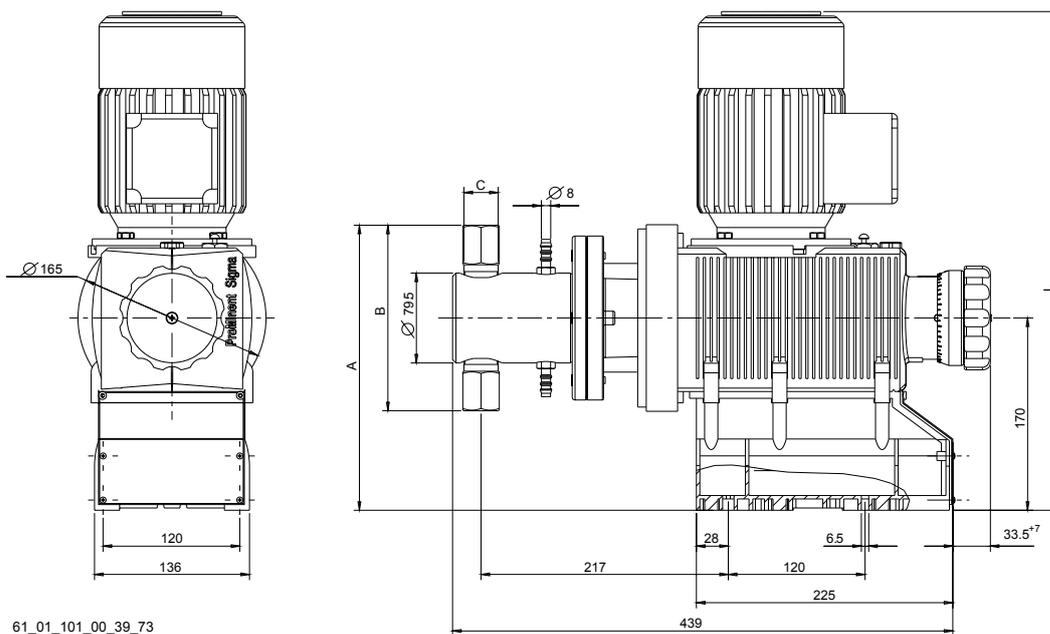


Fig. 20: A) Capacity C at minimum back pressure dependent on the stroke length s. B) Capacity C dependent on the back pressure p.

# 15 Dimensional drawings

## Dimensional drawing Sigma SBKa



61\_01\_101\_00\_39\_73

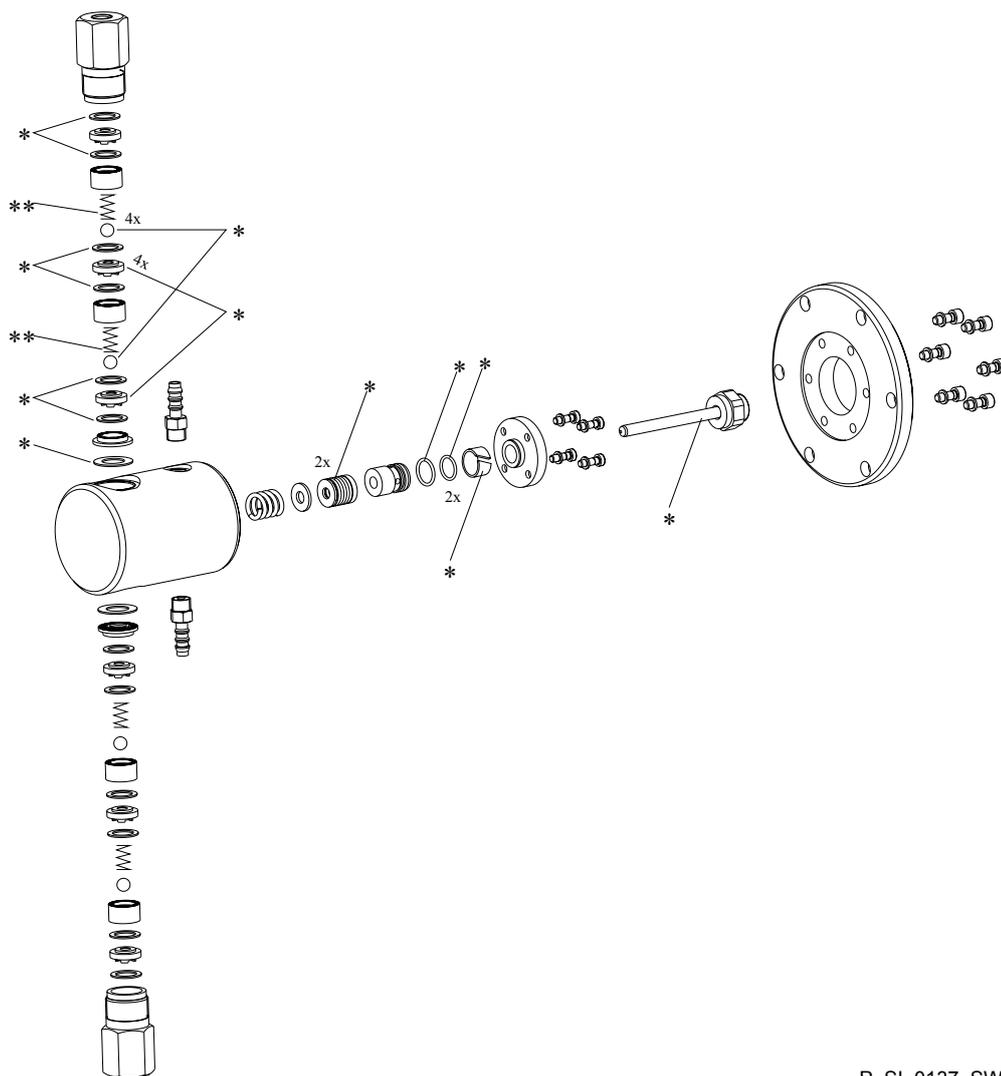
Fig. 21: Dimensional drawing Sigma SBKa - dimensions in mm

Type	Liquid end	A	B	C
32002, 23004, 10006	FK 08	252	164	Rp 1/4 (DN8)
14006, 10011, 05016	FK 12.5	252	164	Rp 1/4 (DN8)
07012, 04522, 02534	FK 25	252	164	Rp 1/4 (DN8)
04022, 02541, 01264	FK 50	259	178	Rp 3/8 (DN10)

	Standard motor	Motor, control-lable	EExe motor	EExde motor	Motor with frequency converter	1 ph. motor
L	426	528	472	448	647	427

# 16 Exploded drawing Sigma piston metering pump

Liquid end



P\_SI\_0137\_SW

Fig. 22: \* The items listed are included in the spare parts kit.

\*\* Optional accessories (not in the spare part kits)

## 17 Sigma/ 2 piston ordering information

Spare parts kits normally include the wearing parts of a liquid end.



*Other locations where ordering information can be found:  
Exploded drawings, ProMinent® product catalogue,  
[www.prominent.com/en/downloads](http://www.prominent.com/en/downloads).*

### Spare parts kits SST (liquid ends)

Spare parts kit	Types 32002, 23004, 10006	Types 14006, 10011, 05016	Types 07012, 04522, 02534	Types 04022, 02541, 01264
FK 08	1001572			
FK 12.5		910470		
FK 25			910471	
FK 50				910472

Scope of supply: see exploded view drawings.

## 18 EC Declaration of Conformity for Machinery

**For pumps without explosion protection:**

In accordance with DIRECTIVE 2006/42/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL, Appendix I, BASIC HEALTH AND SAFETY REQUIREMENTS, section 1.7.4.2. C.

We,

- ProMinent Dosiertechnik GmbH
- Im Schuhmachergewann 5 - 11
- D - 69123 Heidelberg,

hereby declares that the product specified in the following, complies with the relevant basic health and safety requirements of the EC Directive, on the basis of its functional concept and design and in the version distributed by us. This declaration loses its validity in the event of any modification to the product not agreed with us.

**Extract from the EC Declaration of Conformity**

Designation of the product:	Metering pump, Sigma product range
Product type:	SBKa...and SCKa...
Serial number:	refer to nameplate on the device
Relevant EC directives:	EC Machinery Directive (2006/42/EC) EC EMC Directive (2004/108/EC) Compliance with the protection targets of the Low Voltage Directive (2006/95/EC) according to Appendix I, No. 1.5.1 of the Machinery Directive 2006/42/EC
Harmonised standards applied, in particular:	EN ISO 12100 EN 809 EN 61010-1 EN 61000-6-2/4
Date:	12/11/2013

You can find the EC Declaration of Conformity as a download under [www.prominent.com/en/downloads](http://www.prominent.com/en/downloads)

## 19 EC Declaration of Conformity for Machinery Used in Areas at Risk of Explosion

**For pumps with explosion protection:**

In accordance with DIRECTIVE 2006/42/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL, Appendix I, BASIC HEALTH AND SAFETY REQUIREMENTS, section 1.7.4.2. C.

We,

- ProMinent Dosiertechnik GmbH
- Im Schuhmachergewann 5 - 11
- D - 69123 Heidelberg,

hereby declares that the product specified in the following, complies with the relevant basic health and safety requirements of the EC Directive, on the basis of its functional concept and design and in the version distributed by us. This declaration loses its validity in the event of any modification to the product not agreed with us.

**Extract from the EC Declaration of Conformity**

Designation of the product:	Metering pump, Sigma product range Version "Explosion protection" in accordance with "ATEX 95"
Product type:	SBKa- - - - - XY-- Characteristic value "X" = "P" or "L" and characteristic value "Y" = "1" or "2" or "X" = "1, 2, 3, 4 or 5" and "Y" = "A"
Serial number:	refer to nameplate on the device
Relevant EC directives:	EC Machinery Directive (2006/42/EC) EC EMC Directive (2004/108/EC) EC Ex Directive (94/9/EC)
Harmonised standards applied, in particular:	Pump without motor: EN ISO 12100-1/2, EN 809, EN 13463-1/5 Motor Ex "e": EN 50014, EN 50019 Motor Ex "d": EN 50014, EN 50018, EN 50019 Stroke sensor: EN 50014, EN 50020

The combination of the components does not give rise to any new Ex-related dangers.

Pump without motor:	II 2G c IIC T4 X
Motor (characteristic value "Y"="1") :	II 2G EEX e IIC T3
Motor (characteristic value "Y"="2") :	II 2G EEX de IIC T4
Diaphragm rupture sensor:	II 1G EEX ia IIC T6
Overall system:	II 2G c IIC T3 X (for "Y"="1") or II 2G c IIC T4 X (for "Y"="2" or "A")
Date:	11/02/2010

You can find the EC Declaration of Conformity as a download under [www.prominent.com/en/downloads](http://www.prominent.com/en/downloads)

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