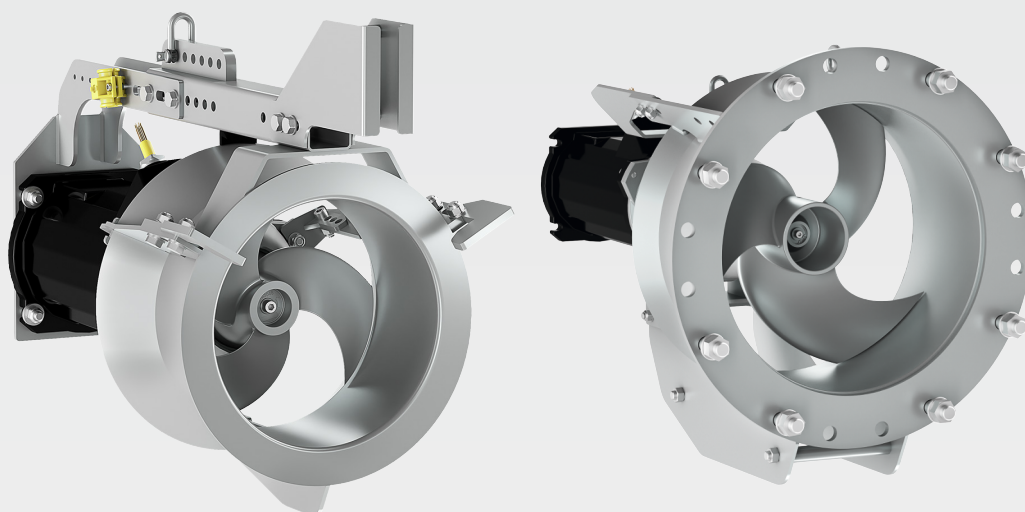


Wilo-Flumen OPTI-RZP 20 ... 80 **Wilo-Flumen EXCEL-RZPE 20 ... 60**



en Installation and operating instructions



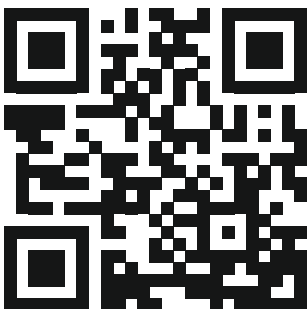
Flumen OPTI-RZP 20 ... 40
<https://qr.wilo.com/924>



Flumen OPTI-RZP 50 ... 80
<https://qr.wilo.com/935>



Flumen EXCEL-RZPE 20 ... 40
<https://qr.wilo.com/923>



Flumen EXCEL-RZPE 50 ... 60
<https://qr.wilo.com/936>

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1 General

1.1 About these instructions

These instructions form part of the product. Compliance with the instructions is essential for correct handling and use:

- Read the instructions carefully before all activities.
- Keep the instructions in an accessible place at all times.
- Observe all product specifications.
- Observe the markings on the product.

The language of the original operating instructions is German. All other languages of these instructions are translations of the original operating instructions.

1.2 Copyright

WILO SE © 2025

The reproduction, distribution and utilisation of this document in addition to communication of its contents to others without express consent is prohibited. Offenders will be held liable for payment of damages. All rights reserved.

1.3 Subject to change

Wilo shall reserve the right to change the listed data without notice and shall not be liable for technical inaccuracies and/or omissions. The illustrations used may differ from the original and are intended as an exemplary representation of the product.

1.4 Exclusion from warranty and liability

Wilo shall specifically not assume any warranty or liability in the following cases:

- Inadequate configuration due to inadequate or incorrect instructions by the operator or the client
- Non-compliance with these instructions
- Improper use
- Incorrect storage or transport
- Incorrect installation or dismantling
- Insufficient maintenance
- Unauthorised repairs
- Inadequate construction site
- Chemical, electrical or electrochemical influences
- Wear

2 Safety

This section contains basic information about the individual stages in the life cycle of the pump. Failure to observe this information leads to:

- Danger to persons
- Danger to the environment
- Property damage
- Loss of claims for damages

2.1 Identification of safety instructions

These installation and operating instructions set out safety instructions for preventing personal injury and damage to property. These safety instructions are shown differently:

- Safety instructions relating to personal injury start with a signal word, are **preceded by a corresponding symbol** and are shaded in grey.



DANGER

Type and source of the danger!

Consequences of the danger and instructions for avoidance.

- Safety instructions relating to property damage start with a signal word and are displayed **without** a symbol.

CAUTION

Type and source of the danger!

Consequences or information.

Signal words

- **DANGER!**
Failure to observe the safety instructions will result in serious injuries or death!
- **WARNING!**
Failure to follow the instructions can lead to (serious) injuries!
- **CAUTION!**
Failure to follow the instructions can lead to property damage and a possible total loss.

- **NOTICE!**
Useful information on handling the product

Markups









- ✓ Prerequisite
- 1. Work step/list
 - ⇒ Notice/instructions
 - ▶ Result

Identifying cross references

The name of the section or table is in inverted commas [“ ”]. The page number follows in square brackets [].

Symbols

These instructions use the following symbols:

-  Danger caused by electric voltage
-  Danger of bacterial infection
-  Danger caused by explosive atmosphere
-  Warning of hand injuries (being crushed, cut)
-  Warning of hot surfaces
-  General warning symbol
-  Observe instructions
-  Useful information

2.2 Personnel qualifications

- Personnel have been instructed on locally applicable regulations governing accident prevention.
- Personnel have read and understood the installation and operating instructions.
- Electrical work: qualified electrician
Person with appropriate technical training, knowledge and experience who can identify and prevent electrical hazards.
- Installation/dismantling work: trained sewage technology professional
Fixation to different construction parts, lifting equipment, wastewater facility basics
- Maintenance work: trained sewage technology professional
Application/disposal of operating fluids used, basic engineering knowledge (installation/dismantling)
- Lifting work: trained specialist for the operation of lifting devices
Lifting equipment, lifting gear, attachment points

Children and persons with limited abilities

- Persons under the age of 16: Use of this product is prohibited.
- Persons under the age of 18: Supervise them during use of the product (supervisor)!
- Persons with limited physical, sensory or mental capacities: Use of this product is prohibited!

2.3 Personal protective equipment

The protective equipment specified is the minimum requirement. Observe the requirements of the work regulations.

Protective equipment: Transport, installation, removal and maintenance

- Safety shoes: Protection class S1 (uvex 1 sport S1)
- Protective gloves (EN 388): 4X42C (uvex C500 wet)

- Safety helmet (EN 397): Conforms to standards, protection against lateral deformation (uvex pheos)
(If lifting equipment is used)

Protective equipment: Cleaning work

- Protective gloves (EN ISO 374-1): 4X42C + Type A (uvex protector chemical NK2725B)
- Safety goggles (EN 166): (uvex skyguard NT)
 - Labelling frame: W 166 34 F CE
 - Labelling disc: 0-0.0* W1 FKN CE
 - * Protection level according to EN 170 not relevant for this work.
- Breathing protection mask (EN 149): Half mask 3M series 6000 with filter 6055 A2

Article recommendations

The branded products in the parentheses constitute non-binding suggestions. Similar products from other brands can also be used. Adherence to the standards mentioned is required.

WILO SE does not assume any liability for the adherence of the aforementioned products to the corresponding standards.

2.4 Electrical work

- Electrical work must be carried out by a qualified electrician.
- Disconnect device from the mains and secure it against being switched on again without authorisation.
- Observe applicable local regulations when connecting to the mains power supply.
- Comply with the requirements of the local energy supply company.
- Train personnel on how to make electrical connections.
- Train personnel on the options for switching off the device.
- Observe the technical information in these installation and operating instructions as well as on the rating plate.
- Earth the device.
- Observe provisions for connection to the electrical switching system.
- Comply with the specifications on electro-magnetic compatibility when using electronic start-up controllers (e.g. soft starter or frequency converter). If required, take special measures into account (e.g. shielded cables, filters, etc.).
- Replace defective connection cables. Contact customer service.

2.5 Monitoring devices

The following monitoring devices must be provided on-site:

Circuit breaker

- Design the power and switching characteristics of the circuit breakers according to the rated current of the connected product.
- Observe local regulations.

Motor protection switch

- Product without plug: install a motor protection switch!
The minimum requirement is a thermal relay/motor protection switch with temperature compensation, differential trip and reactivation lock according to local regulations.
- Instable mains supply systems: if necessary, install further protective devices on-site (e.g. overvoltage, undervoltage or phase failure relays, etc.).

Residual-current device (RCD)

- Install a residual-current device (RCD) in accordance with the regulations of the local energy supply company.
- If people can come into contact with the device and conductive fluids, install a residual-current device (RCD).

2.6 Fluids hazardous to health

Hazardous germs form in sewage or in stagnant water. There is a danger of bacterial infections!

- Wear protective equipment!
- Clean and disinfect the product thoroughly after removal!
- Inform all persons about the pumped fluid and the danger it poses!

2.7 Transport

- Locally applicable laws and regulations on work safety and accident prevention must be complied with.
- Demarcate and cordon off the working area.
- Keep unauthorised persons away from the working area.
- Always attach the lifting gear to the attachment points.
- Ensure that the lifting gear is securely attached.
- Observe packaging instructions:
 - Impact-resistant
 - Ensure that the product is properly fixed in place.
 - Protect it against dust, oil and moisture.

- 2.8 Installing/dismantling**
- Wear a safety harness.
 - Locally applicable laws and regulations on work safety and accident prevention must be complied with.
 - Demarcate and cordon off the working area.
 - Keep working area free from ice.
 - Remove objects lying around from the work area.
 - Keep unauthorised persons away from the working area.
 - If the weather conditions mean it is no longer possible to work safely, stop work.
 - Work must always be carried out by two persons.
 - When working at a height of more than 1 m (3 ft) above the ground, use scaffolding with a safety harness.
 - Ensure enclosed spaces have sufficient ventilation.
 - Toxic or asphyxiating gases may build up in enclosed spaces or buildings. Observe protective measures in accordance with work regulations, e.g. carry a gas detector with you.
 - If there is a risk of explosion, do not carry out welding work or work with electrical devices.
 - Disconnect device from the mains and secure it against being switched on again without authorisation.
 - All rotating parts must stop.
 - Disinfect product.
- 2.9 During operation**
- Depending on the process, the product is activated and deactivated using separate controls. The product may automatically be activated following power cuts.
 - The product must not emerge from the fluid. Observe required water coverage. If the water level fluctuates significantly, install level monitoring.
 - Superior must be informed immediately of any faults or irregularities.
 - The product must be switched off immediately if faults occur.
 - Sound-pressure level depends on several factors (installation, duty point, etc.). Measure the current noise level under operating conditions. Wear hearing protection at noise levels of 85 dB(A) and over. Demarcate the working area!
- 2.10 Maintenance tasks**
- Disconnect device from the mains and secure it against being switched on again without authorisation.
 - Disinfect product.
 - Carry out maintenance work in a clean, dry and well-lit place.
 - Only carry out maintenance tasks described in these installation and operating instructions.
 - Only original parts of the manufacturer may be used. The use of any non-original parts releases the manufacturer from any liability.
 - Collect any leakage of fluid and operating fluid immediately and dispose of it according to the locally applicable guidelines.
- 2.11 Operating fluid**
- The seal housing is filled with white oil. The gear and the pre-chamber are filled with gear oil.
- Absorb leakages immediately.
 - If major leakages occur, contact customer service.
 - If the seal is defective, the oil enters the pumped fluid.
 - **Skin contact:** Rinse skin areas thoroughly with soap and water. If skin irritation occurs, consult a doctor.
 - **Contact with eyes:** Remove the contact lenses. Rinse eye thoroughly with water. If eye irritation occurs, consult a doctor.
- 2.12 Operator responsibilities**
- Provide installation and operating instructions in a language which the personnel can understand.
 - Make sure that the personnel have received the required training for the specified work.
 - Provide protective equipment. Ensure that the protective equipment is worn by personnel.
 - Ensure that safety and information signs mounted on the device are always legible.
 - Train the personnel on how the system operates.
 - Fit dangerous components within the system with an on-site guard.
 - Demarcate and cordon off the working area.
 - Measure the noise level. At noise levels of 85 dB(A) and over, wear hearing protection. Demarcate the working area!
- 3 Transportation and storage**
- 3.1 Delivery**
- After receiving the shipment, check it immediately for defects (damage, completeness).
 - Defects must be noted on the freight documentation.
 - Defects must be notified to the transport company or the manufacturer on the day of receipt of shipment.

3.2 Transport

3.2.1 Attach lifting equipment: Wilo-Flumen OPTI-RZP/EXCEL-RZPE 20-1

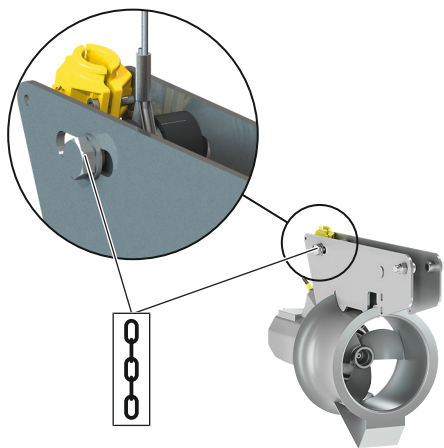


Fig. 1: Flumen attachment point OPTI-RZP/EXCEL-RZPE 20-1

3.2.2 Attach the lifting accessory: Wilo-Flumen OPTI-RZP/EXCEL-RZPE 25-3 ... 80-3

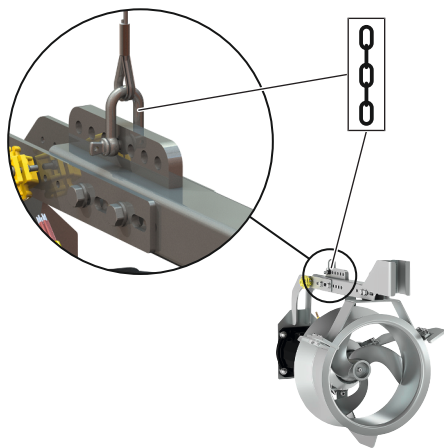


Fig. 2: Slinging point Flumen OPTI-RZP/EXCEL-RZPE 25-3 ... 80-3

3.3 Use of lifting equipment

- Subsequently notified defects can no longer be asserted.
- Wear protective equipment! Observe the work regulations.
 - Protective gloves: 4X42C (uvex C500 wet)
 - Safety shoes: Protection class S1 (uvex 1 sport S1)
- Attach the lifting accessory to the slinging point!
- Protect the connection cable against water ingress.
- Do not remove the outer packaging until you are at the site of use.
- Use tear-proof plastic sacks of sufficient size to package the used recirculation pump for transport in a leak-proof manner.

- ✓ Attach lifting equipment directly to the bolt.
 - ✓ Lifting equipment must have a rope thimble. **NOTICE! Do not use shackles!**
 - ✓ Use the oblong hole to adjust the centre of gravity. Inclination angle of the recirculation pump: approx. 5° downward.
1. Loosen the hexagon nut at the bolt.
 2. Pull out the bolt and remove the plastic sleeve.
 3. Attach the lifting equipment to the bolt.
 4. Fit the plastic sleeve.
 - ⇒ Lifting equipment attached at the bolt between two plastic sleeves.
 5. Insert bolt into the hole and tighten with the hexagon nut.
 - ▶ Lifting equipment is attached.

- ✓ Attach the lifting accessory directly to the frame.
 - ✓ The lifting accessory must have a rope thimble.
 - ✓ Use the holes to adjust the centre of gravity. Inclination angle of the recirculation pump: approx. 5° downward.
1. Remove the shackle from the frame.
 2. Insert the shackle into the rope thimble.
 3. Insert the shackle into the matching hole on the frame and attach it.
 - ▶ Lifting accessory is attached.

If lifting equipment (lifting device, crane, chain hoist ...) is used, observe the following points:

- Wear a safety helmet according to EN 397!
- Comply with local regulations on the use of lifting equipment.
- The technically correct use of the lifting equipment is the operator's responsibility!
- **Lifting gear**
 - Use legally specified and approved lifting gear.
 - Select lifting gear based on the attachment point.
 - Attach lifting gear to the attachment point according to local regulations.
- **Lifting equipment**
 - Check for proper function before use!
 - Only use properly functioning lifting equipment!

- Sufficient bearing capacity.
- Ensure stability during use.
- **Lifting operation**
 - Do not jam the product when lifting and lowering it.
 - Do not exceed the max. permissible bearing capacity!
 - If necessary (e.g. blocked view), assign a second person to coordinate.
 - No one should stand under suspended loads!
 - Do not move loads over workplaces where persons are present!

3.4 Storage



DANGER

Danger due to fluids which are hazardous to health!

Danger of bacterial infection!

- Disinfect the recirculation pump after removal!
- Observe the specifications of the factory regulations!

CAUTION

Total loss due to moisture ingress!

Moisture ingress in the connection cable damages the connection cable and may cause the recirculation pump to be irreparably damaged.

- Never immerse open ends of the connection cables in fluid.
- Seal the connection cables in a watertight manner during storage (avoid condensation).

- Securely position the recirculation pump horizontally on a firm bearing surface.
- Secure the recirculation pump against falling over and slipping!
- Store the recirculation pump for a maximum of one year. Contact customer service before storing the device for more than one year.
- Storage conditions:
 - Maximum: -15 to +60 °C (5 to 140 °F), max. humidity: 90 %, non-condensing.
 - Recommended: 5 to 25 °C (41 to 77 °F), relative humidity: 40 to 50 %.
 - Protect the recirculation pump against direct exposure to sunlight. Extreme heat can cause damage!
- Do not store the recirculation pump in spaces where welding work is carried out. The resulting gases or radiation can corrode the elastomer parts and coatings.
- Protect the connection cable against kinking and damage. Maintain a constant bend radius!
- Turn the propeller at regular intervals (twice a year). This prevents the bearings from jamming and renews the lubrication film on the mechanical seal.

NOTICE! Wear safety gloves!

4 Application/use

4.1 Intended use

For pumping in commercial areas of:

- Sewage containing faeces
- Return activated sludge
- Process water

4.2 Improper use

The recirculation pump must not be used in:

- Drinking water
- Non-Newtonian fluids
- Severely contaminated fluids containing hard components such as stone, wood, metals, etc.
- Highly flammable and explosive fluids in pure form

5 Product description

5.1 Construction

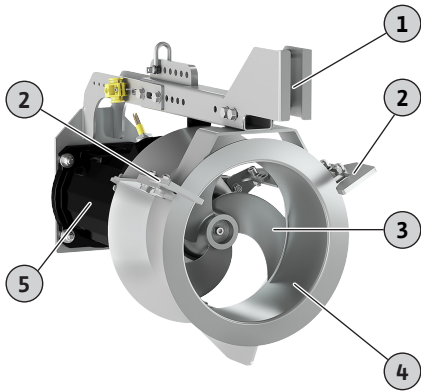


Fig. 3: Overview Flumen OPTI-RZP/EXCEL-RZPE

Recirculation pump: Submersible mixer, directly driven or with single-stage planetary gear and attached flow housing.

1	Guide claw
2	Flange claw
3	Propeller
4	Flow housing
5	Motor

Motor (Flumen OPTI-RZP)

Surface-cooled submersible motor in three-phase current design with permanently lubricated and large-size rolling bearings. The motor winding is equipped with temperature monitoring. The motor heat is given off directly to the surrounding fluid via the motor housing. The connection cable is designed for heavy mechanical loads, sealed water pressure-tight against the fluid and is sealed longitudinally watertight. The connection cable has bare cable ends and is 10 m (33 ft) long as standard.

Motor (Flumen EXCEL-RZPE)

Surface-cooled submersible motor in three-phase current design with permanently lubricated and large-size rolling bearings. The motor winding is equipped with temperature monitoring. The motor heat is given off directly to the surrounding fluid via the motor housing. The connection cable is designed for heavy mechanical loads, sealed water pressure-tight against the fluid and is sealed longitudinally watertight. The connection cable has bare cable ends and is 10 m (33 ft) long as standard.

The submersible motor meets the IE3 motor efficiency class (according to IEC 60034-30).

Sealing (Flumen OPTI-RZP/EXCEL-RZPE 20 ... 40)

Large-volume sealing chamber with double shaft sealing. The sealing chamber is filled with white oil and absorbs the leakage from the seal on the fluid side. A corrosion- and wear-resistant mechanical seal is used on the fluid side. The seal on the motor side involves either a rotary shaft seal or a mechanical seal.

Sealing (Flumen OPTI-RZP/EXCEL-RZPE 50 ... 80)

The system is sealed by a 3-chamber system:

- Pre-chamber
The high-volume pre-chamber has been filled with gear oil to absorb any leakage at the seal on the fluid side. A mechanical seal is used as the seal on the fluid side. A rotary shaft seal seals towards the gear chamber.
- Gear chamber
The gear chamber has been filled with gear oil to guarantee continuous lubrication of the planetary gear and the gear bearings. A mechanical seal seals towards the sealing chamber.
- Sealing chamber
The high-volume sealing chamber is filled with white oil and absorbs any leakage from the gear chamber. A rotary shaft seal seals towards the motor.

Gear (Flumen OPTI-RZP/EXCEL-RZPE 50 ... 80)

Single-stage planetary gear with exchangeable transmission. Gear bearings have been dimensioned large to absorb resulting stirring forces and not transfer these to the motor bearing.

Hydraulics

Propeller made of solid stainless steel investment casting with clogging-free propeller geometry. Pump in non-clog design flow housing with guide claw and two flange claws. The guide claw ensures smooth function when lifting and lowering the recirculation pump. The flange claws can be readjusted, ensure optimum centring on the discharge pipe and stabilise the recirculation pump at high operating pressure.

Alternative version with flange connection for direct screwing to the discharge pipe.

	OPTI-RZP 20-1 ... EXCEL-RZPE 20-1 ...	OPTI-RZP 25-3 ... EXCEL-RZPE 25-3 ...	OPTI-RZP 30 ... EXCEL-RZPE 30 ...	OPTI-RZP 40-1 ... EXCEL-RZPE 40-1 ...	OPTI-RZP 50-4 ... EXCEL-RZPE 50-4 ...	OPTI-RZP 60-4 ... EXCEL-RZPE 60-4 ...	OPTI-RZP 80-3 ...
Propeller nominal diameter in mm (in)	200 (8)	250 (10)	300 (11.5)	400 (16)	500 (20)	600 (24)	800 (31.5)
Connection size	DN 200 DN 250	DN 250	DN 300	DN 400	DN 500	DN 600	DN 800
Standard version	•	•	•	•	•	•	•
Version with flange connection	•	•	•	•	•	•	–

• = available , – = not available

5.2 Operation in an explosive atmosphere

Approval according to	OPTI-RZP 20-1 ... EXCEL-RZPE 20-1 ...	OPTI-RZP 25-3 ... EXCEL-RZPE 25-3 ...	OPTI-RZP 30 ... EXCEL-RZPE 30 ...	OPTI-RZP 40-1 ... EXCEL-RZPE 40-1 ...	OPTI-RZP 50-4 ... EXCEL-RZPE 50-4 ...	OPTI-RZP 60-4 ... EXCEL-RZPE 60-4 ...	OPTI-RZP 80-3 ...
IECEX	–	–	–	–	–	–	–
ATEX	o	o	o	o	o	o	o
FM	o	o	o	o	o	o	o
CSA-Ex	–	–	–	–	–	–	–

Key

– = not possible, o = optional, • = standard

ATEX approval

The pumps are suitable for operation in potentially explosive atmospheres:

- Device group: II
- Category: 2, zone 1 and zone 2

These pumps must not be used in zone 0!

FM approval

The pumps are suitable for operation in potentially explosive atmospheres:

- Protection class: Explosionproof
- Category: Class I, Division 1

Notice: If the cabling is carried out according to Division 1, installation in Class I, Division 2 is also permitted.

5.3 Monitoring devices

Overview of possible monitoring devices for recirculation pumps **without Ex rating**:

	OPTI-RZP 20-1 ... EXCEL-RZPE 20-1 ...	OPTI-RZP 25-3 ... EXCEL-RZPE 25-3 ...	OPTI-RZP 30 ... EXCEL-RZPE 30 ...	OPTI-RZP 40-1 ... EXCEL-RZPE 40-1 ...	OPTI-RZP 50-4 ... EXCEL-RZPE 50-4 ...	OPTI-RZP 60-4 ... EXCEL-RZPE 60-4 ...	OPTI-RZP 80-3 ...
Motor compartment	o	–	–	–	–	–	–
Motor compartment/sealing chamber	–	o	o	o	o	o	–
Sealing chamber (external pencil electrode)	o	o	o	o	–	–	–
Pre-chamber (external pencil electrode)	–	–	–	–	o	o	o
Motor winding: Temperature limiter	•	•	•	•	•	•	•
Motor winding: Temperature controller and limiter	o	o	o	o	o	o	o

Key

– = not possible, o = optional, • = standard

Overview of possible monitoring devices for recirculation pumps **with Ex rating**:

	OPTI-RZP 20-1 ... EXCEL-RZPE 20-1 ...	OPTI-RZP 25-3 ... EXCEL-RZPE 25-3 ...	OPTI-RZP 30 ... EXCEL-RZPE 30 ...	OPTI-RZP 40-1 ... EXCEL-RZPE 40-1 ...	OPTI-RZP 50-4 ... EXCEL-RZPE 50-4 ...	OPTI-RZP 60-4 ... EXCEL-RZPE 60-4 ...	OPTI-RZP 80-3 ...
Motor compartment	o	–	–	–	–	–	–
Motor compartment/sealing chamber	–	–	–	–	–	–	–
Sealing chamber (external pencil electrode)	o	o	o	o	–	–	–
With ATEX approval							
Motor winding: Temperature limiter	•	o	o	o	o	o	o
Motor winding: Temperature controller and limiter	o	•	•	•	•	•	•
Pre-chamber (external pencil electrode)	–	–	–	–	o	o	o
With FM approval							
Motor winding: Temperature limiter	•	•	•	•	•	•	•
Motor winding: Temperature controller and limiter	o	o	o	o	o	o	o
Pre-chamber (external pencil electrode)	–	–	–	–	•	•	•

Key

– = not possible, o = optional, • = standard

5.4 Materials

	OPTI-RZP 20-1 ... EXCEL-RZPE 20-1 ...	OPTI-RZP 25-3 ... EXCEL-RZPE 25-3 ...	OPTI-RZP 30 ... EXCEL-RZPE 30 ...	OPTI-RZP 40-1 ... EXCEL-RZPE 40-1 ...	OPTI-RZP 50-4 ... EXCEL-RZPE 50-4 ...	OPTI-RZP 60-4 ... EXCEL-RZPE 60-4 ...	OPTI-RZP 80-3 ...
Motor housing							
EN-GJL-250 (ASTM A48 Class 35/40B)	–	•	•	•	•	•	•
1.4408 (ASTM A 351)	•	–	–	–	–	–	–
Seal housing							
EN-GJL-250 (ASTM A48 Class 35/40B)	–	–	–	–	•	•	•
1.4408 (ASTM A 351)	•	•	•	•	–	–	–
Gear housing							
EN-GJL-250 (ASTM A48 Class 35/40B)	–	–	–	–	•	•	•
Seal, on the fluid side							
SiC/SiC	•	•	•	•	•	•	•
Seal, on the motor side							
NBR (nitrile)	–	•	•	•	–	–	–
FPM (FKM)	–	–	–	–	•	•	•
SiC/SiC	•	–	–	–	–	–	–
Propeller							
1.4408 (ASTM A 351)	•	•	•	•	•	•	•
Flow housing							
1.4571 (AISI 316Ti)	•	•	•	•	•	•	•

• = standard, – = not available

5.5 Operation with frequency converter

Operation on the frequency converter is permitted. Refer to the appendix for the relevant requirements!

5.6 Rating plate

The following section provides an overview of the abbreviations and associated data on the rating plate:

Rating plate designation	Value
P-Typ	Pump type
M-Typ	Motor type
S/N	Serial number
Art.-No.	Article number
MFY	Date of manufacture*
Q_N	Volume flow duty point
Q_{max}	Max. volume flow
H_N	Delivery head duty point
H_{max}	Max. delivery head
H_{min}	Min. delivery head
n	Speed
T	Max. fluid temperature
IP	Protection class
I	Rated current
I_{ST}	Starting current
I_{SF}	Rated current at service factor
P_1	Power consumption
P_2	Rated power
U	Rated voltage
U_{EMF}	Inductive voltage
f	Frequency
f_{op}	Max. operating frequency
$\cos \varphi$	Motor efficiency
SF	Service factor
OT_s	Operating mode: immersed
OT_e	Operating mode: non-immersed
AT	Starting mode
IM_{org}	Impeller diameter: original
IM_{korr}	Impeller diameter: corrected

*The date of manufacture is stated in accordance with ISO 8601: JJJJww

- JJJJ = year
- W = abbreviation for week
- ww = calendar week

5.7 Type key

Wilo-Flumen OPTI-RZP ...

Example:	Wilo-Flumen OPTI-RZP 40-1.95-6/24Ex S8
Flumen	Submersible mixer, horizontal
OPTI-RZP	Series: Recirculation pump with standard asynchronous motor
40	x10 = nominal propeller diameter in mm
1	Model
95	x10 = nominal propeller speed in rpm
6	Number of poles
24	x10 = stator pack length in mm
Ex	Ex-rated
S8	Propeller code for special propeller (omitted for standard propeller)

Wilo-Flumen EXCEL-RZPE ...

- Example: **Wilo-Flumen EXCEL-RZPE 40-1.95-6/24Ex S8**
- Flumen** Submersible mixer, horizontal
 - EXCEL-RZPE** Series: Recirculation pump with IE3 asynchronous motor
 - 40** x10 = nominal propeller diameter in mm
 - 1** Model
 - 95** x10 = nominal propeller speed in rpm
 - 6** Number of poles
 - 24** x10 = stator pack length in mm
 - Ex** Ex-rated
 - S8** Propeller code for special propeller (omitted for standard propeller)

5.8 Scope of delivery

- Recirculation pump with attached flow housing and connection cable
- Installation and operating instructions

5.9 Accessories

- Lowering device
- Auxiliary lifting device
- Cable bollard to secure the hoist cable
- Additional rope anchoring
- Fixation sets with anchor bolts

6 Installation and electrical connection

6.1 Personnel qualifications

- Electrical work: qualified electrician
Person with appropriate technical training, knowledge and experience who can identify and prevent electrical hazards.
- Installation/dismantling work: trained sewage technology professional
Fixation to different construction parts, lifting equipment, wastewater facility basics
- Lifting work: trained specialist for the operation of lifting devices
Lifting equipment, lifting gear, attachment points

6.2 Operator responsibilities

- Observe locally applicable accident prevention and safety regulations.
- Observe all regulations for working with heavy loads and under suspended loads.
- Provide protective equipment. Ensure that the protective equipment is worn by personnel.
- Demarcate the working area.
- Keep unauthorised persons away from the working area.
- If the weather conditions (e.g. ice formation, strong wind) mean it is no longer possible to work safely, stop work.
- Observe local sewage technology regulations for the operation of sewage systems.
- Structural components and foundations must be of sufficient stability in order to allow the device to be fixed in a secure and functional manner. The operator is responsible for the provision and suitability of the structural component/foundation!
- Check that the available consulting documents (installation plans, installation location, inflow conditions) are complete and accurate.

6.3 Installation types

	OPTI-RZP 20-1 ... EXCEL-RZPE 20-1 ...	OPTI-RZP 25-3 ... EXCEL-RZPE 25-3 ...	OPTI-RZP 30 ... EXCEL-RZPE 30 ...	OPTI-RZP 40-1 ... EXCEL-RZPE 40-1 ...	OPTI-RZP 50-4 ... EXCEL-RZPE 50-4 ...	OPTI-RZP 60-4 ... EXCEL-RZPE 60-4 ...	OPTI-RZP 80-3 ...
Connected to the discharge pipe by means of the lowering device	•	•	•	•	•	•	•
Screwed to the discharge pipe	•	•	•	•	•	•	-

• = available , - = not available

**DANGER****Danger due to fluids hazardous to health during installation!**

Danger of bacterial infection!

- Clean and disinfect installation location.
- Wipe up drips immediately.
- Observe the specifications of the factory regulations!
- If contact with fluids that are hazardous to health is possible, wear the following protective equipment:
 - sealed safety glasses
 - mouth protection
 - safety gloves

**DANGER****Danger of death due to dangerous lone working practices!**

Work in chambers and narrow rooms as well as work involving risk of falling are dangerous work. Such work may not be carried out autonomously!

- Only carry out work with another person!

- Wear protective equipment! Observe the work regulations.
 - Protective gloves: 4X42C (uvex C500 wet)
 - Safety shoes: Protection class S1 (uvex 1 sport S1)
 - Wear a safety harness.
 - Safety helmet: EN 397 Conforms to standards, protection against lateral deformation (uvex pheos)
(When using lifting equipment)
- Prepare the installation site:
 - Clean, free of coarse solids
 - Dry
 - Frost-free
 - Disinfected
- Work must always be carried out by two persons.
- Demarcate the working area.
- Keep unauthorised persons away from the working area.
- From a working height of more than 1 m (3 ft) above the ground, use scaffolding with a safety harness.
- Toxic or asphyxiating gases may build up during work:
 - Observe protective measures in accordance with work regulations (gas measurement, carry a gas detector with you).
 - Ensure adequate ventilation.
 - If toxic or asphyxiating gases accumulate, leave the workplace immediately!
- Install lifting equipment: even surface, clean, firm base. Warehouse and installation location must be easily accessible.
- Do not stay within the swivel range of the hoisting gear.

6.4.1 Minimum clearance to the wall and aeration

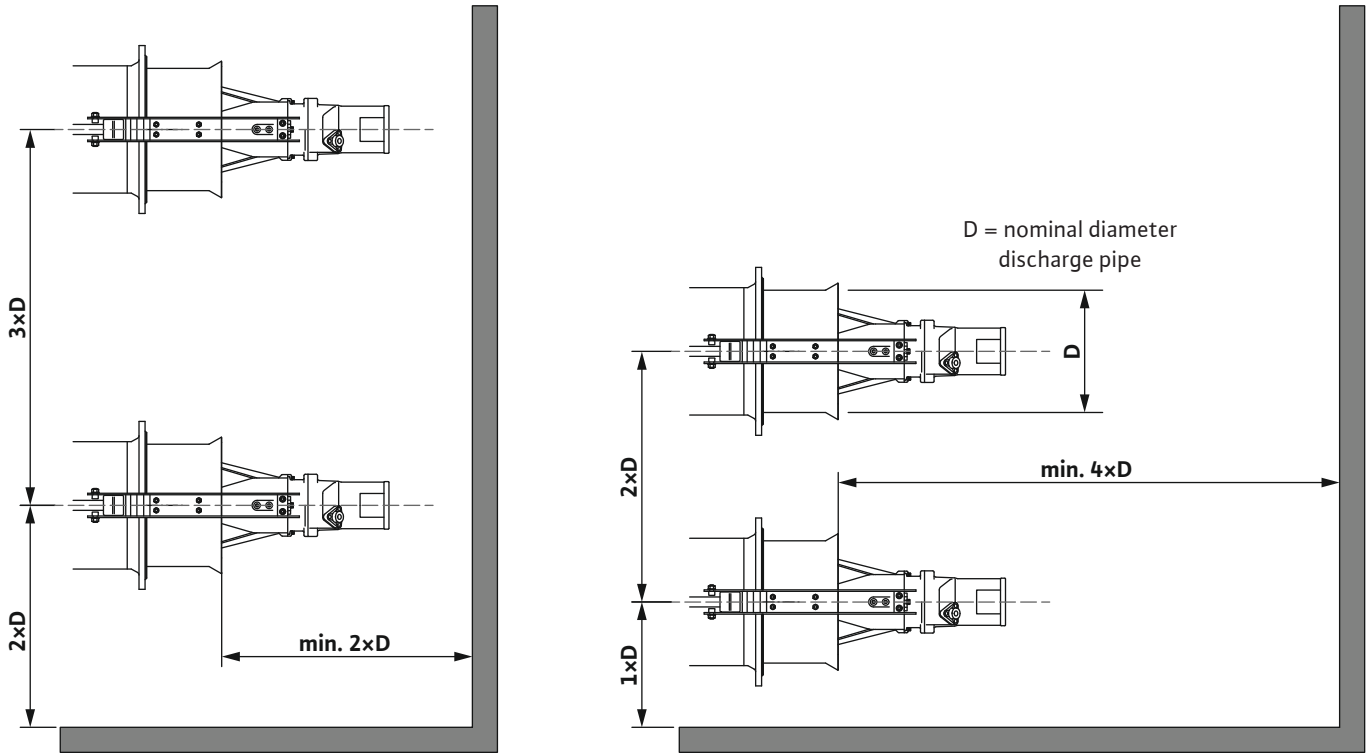


Fig. 4: Observe minimum clearance to walls and fixtures

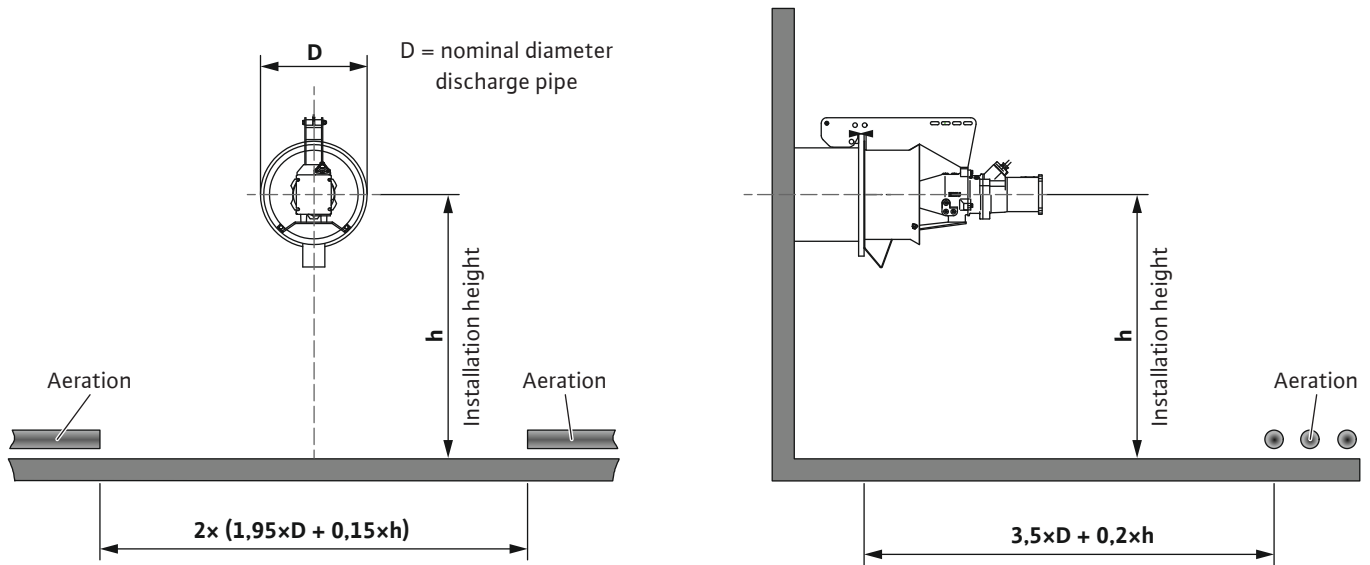


Fig. 5: Minimum clearance to aeration

6.4.2 Connected to the discharge pipe by means of the lowering device



Fig. 6: Installation with lowering device

6.4.3 Adjust the guide claw und flange claws

6.4.3.1 Readjust the guide claw

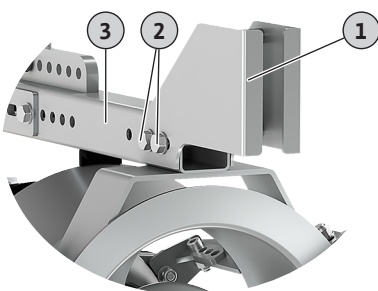


Fig. 7: Readjust guide claw

The recirculation pump is guided to the discharge pipe via a lowering device and connected to the discharge pipe. The guide claw on the flow housing ensures the correct guidance to the discharge pipe. To safely connect the recirculation pump to the discharge pipe, the flange claws enclose the flange on the discharge pipe. Please observe the following points for installation:

- Installation can be performed with empty and full basin.
 - Initial installation:** It is recommended to drain the basin. The connection and disconnection process as well as adjustment of the flange claws can be checked when the basin is empty.
- The recirculation pump may not be operated at different heights.
 - ✓ Initial installation: Basin is drained.
 - ✓ Lifting accessories attached, tilt angle of the recirculation pump: Flow housing approx. 5° downwards.
 - ✓ Connection cable laid out.
 - ✓ Cable routing available.
- 1. Lift recirculation pump.
- 2. Swivel the recirculation pump over the basin.
- 3. Align the guide claw with the lowering device.
- 4. Slowly drain the recirculation pump and insert the lowering device into the guide claw.
- 5. Drain the recirculation pump down to the discharge pipe.
 - CAUTION! Keep the connection cable slightly taut while draining.**
- 6. Repeat connection and disconnection process several times:
 - The flow housing must fully rest against the discharge pipe.
 - The guide claws must enclose the flange on the discharge pipe.
 - The recirculation pump must loosely detach from the flange during lifting.
 If the connection and disconnection process does not run smoothly, readjust the flange claws.
- 7. Guide the connection cable out of the basin, keeping it slightly taut, via a cable guide provided by the customer.
 - CAUTION! Catch the connection cable at the edge of the basin and protect it against damage (crushing, chafing).**
 - ▶ Recirculation pump installed.

Following installation, perform a function test. The function test checks whether the recirculation pump fully rests against the discharge pipe and simply detaches again:

- If the flow ring does not fully rest against the discharge pipe, the duty point is not reached.
- If the recirculation pump does not detach from the discharge pipe, the recirculation pump cannot be pulled from the basin.

To ensure smooth connection and disconnection from the discharge pipe, adjust the following settings:

- Readjust the guide claw: Set the clearance between flow housing and discharge pipe.
- Readjust the flange claws: Adjust the clearance of the flange claws to the discharge pipe flange.

1	Guide claw
2	Fastening screws
3	Frame

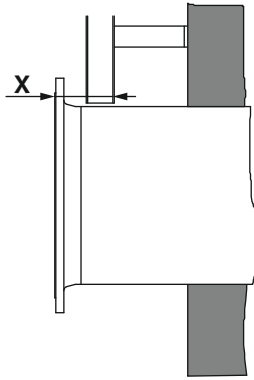


Fig. 8: Clearance "X"

6.4.3.2 Readjust the flange claws

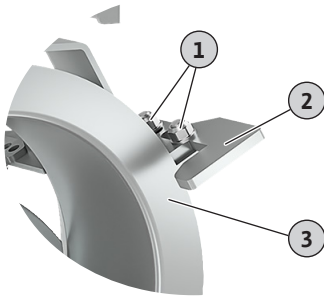


Fig. 9: Readjust the flange claw

- ✓ Recirculation pump placed on a level work surface.
- ✓ 2x ring wrench
- ✓ Torque wrench
- ✓ Liquid thread-locking fluid, e.g. Loctite 243
- ✓ Clearance "X"

1. Loosen both fastening screws.

2. Set clearance: Clearance "X" +5 mm.

3. Tighten both fastening screws by hand.

CAUTION! The guide claw must always rest against the frame with the fastening screws.

4. Check the connection and disconnection process.

⇒ The connection and disconnection process does not run smoothly: Repeat the adjustment process.

⇒ The connection and disconnection process works smoothly: Continue with step 5.

5. Wet the fastening screw with thread-locking fluid (see manufacturer's instructions for use).

6. Tighten both fastening screws with the tightening torque according to the table.

▶ Guide claw set.

1	Fastening screws
2	Flange claw
3	Flange area flow housing

- ✓ Recirculation pump placed on a level work surface.

- ✓ 2x ring wrench

- ✓ Torque wrench

- ✓ Liquid thread-locking fluid, e.g. Loctite 243

- ✓ Flange thickness discharge pipe.

1. Loosen both fastening screws.

2. Set the clearance between flow housing flange surface and flange claw inner edge: Flange thickness discharge pipe =5 mm.

3. Tighten both fastening screws by hand.

4. Repeat the process on the second flange claw.

5. Check the connection and disconnection process.

⇒ The connection and disconnection process does not run smoothly: Repeat the adjustment process.

⇒ The connection and disconnection process runs smoothly: Continue with step 6.

6. Wet the fastening screw with thread-locking fluid (see manufacturer's instructions for use).

7. Tighten all fastening screws with the tightening torque according to the table.

▶ Flange claws set.

6.4.4 Screwed to the discharge pipe

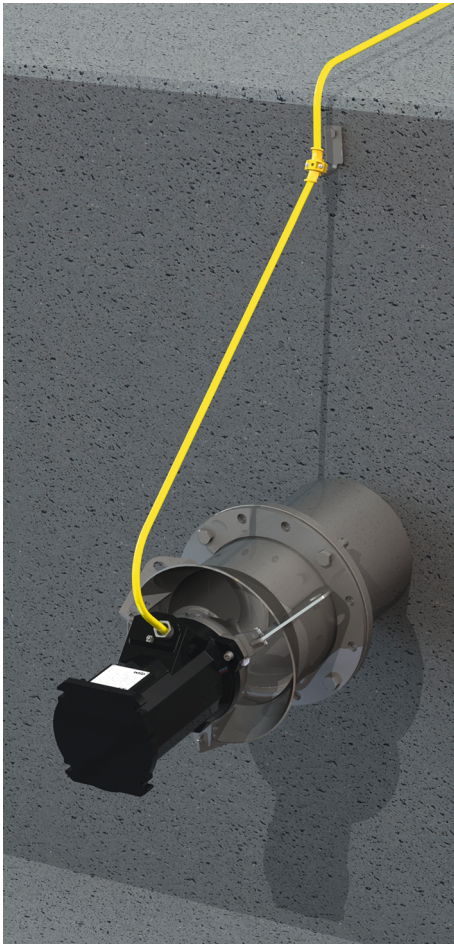


Fig. 10: Recirculation pump with flange connection

6.5 Electrical connection

The flow ring is fitted with a flange to screw the recirculation pump to the discharge pipe. Screw the recirculation pump to the discharge pipe using technically approved screws. Installation may **only** be performed when the basin is empty.

- ✓ Basin is drained.
- ✓ Work area cleaned and disinfected.
- ✓ Lifting equipment and lifting accessories available.
- ✓ Transport space available for lifting and aligning the recirculation pump.
- ✓ Scaffolding erected.
- ✓ Fixation material available.

1. Position the recirculation pump horizontally on the transport space.
2. Secure the recirculation pump against slipping and falling over.
3. Lift the transport space and align the flange with the discharge pipe.
4. Screw the recirculation pump to the discharge pipe.

NOTICE! Observe the tightening torque and strength class of the screws!

5. Guide the connection cable out of the basin, keeping it slightly taut.

CAUTION! Catch the connection cable at the edge of the basin and protect it against damage (crushing, chafing).

- ▶ Recirculation pump installed.



DANGER

Danger of death due to electrical current!

Improper conduct when carrying out electrical work can lead to death due to electric shock!

- Before all electrical work, disconnect the product from the mains and secure it against being switched on again without authorisation.
- Electrical work must be carried out by a qualified electrician!
- Observe local regulations!



DANGER

Risk of explosion due to incorrect electrical connection!

If the pump is used in hazardous areas, there is danger of death from explosion if the electrical connection is faulty! Observe the following points when using the pump in hazardous areas:

- Establish the electrical connection outside the hazardous area.
- If the connection must be established within hazardous areas, the electrical connection must be carried out in an Ex-rated housing (ignition protection class according to EN 60079-0).
- Connect the potential equalisation to the earth terminal indicated. The earth terminal is installed in the area of the connection cable. The equipotential bonding cable must comply with local regulations.
- Connect thermal motor monitoring using an Ex-certified evaluation relay.
- The temperature limit deactivation must take place with a reactivation lock. Reactivation must only be possible if an unlock button has been pressed manually!
- Connect the external pencil electrode via an Ex-approved evaluation relay with an intrinsically safe circuit.
- Observe the further information in the explosion protection section for the electrical connection!

- Mains connection corresponds to the information on the rating plate.
- Power supply on mains side with clockwise rotating field for three-phase AC motors (3-motor).
- Route the connection cables according to the local regulations and connect them according to the wire assignment.
- Connect **all** of the monitoring devices and check their function.
- Secure the earthing in accordance with the local regulations.

6.5.1 Fuse on mains side

Circuit breaker

- Design the power and switching characteristics of the circuit breakers according to the rated current of the connected product.
- Observe local regulations.

Motor protection switch

- Product without plug: install a motor protection switch!
The minimum requirement is a thermal relay/motor protection switch with temperature compensation, differential trip and reactivation lock according to local regulations.
- Instable mains supply systems: if necessary, install further protective devices on-site (e.g. overvoltage, undervoltage or phase failure relays, etc.).

Residual-current device (RCD)

- Install a residual-current device (RCD) in accordance with the regulations of the local energy supply company.
- If people can come into contact with the device and conductive fluids, install a residual-current device (RCD).

6.5.2 Maintenance tasks

6.5.2.1 Checking the insulation resistance of the motor winding

- Check the insulation resistance of the motor winding.
 - Check the resistance of the temperature sensors.
- ✓ Insulation tester 1000 V
1. Check the insulation resistance.
 - ⇒ Measured value at initial commissioning: $\geq 20 \text{ M}\Omega$.
 - ⇒ Measured value at interval measurement: $\geq 2 \text{ M}\Omega$.
 - ▶ Insulation resistance checked. If the measured values deviate from the specifications, consult the customer service.

6.5.2.2 Test the resistor of the temperature sensor

- ✓ Ohmmeter available.
1. Measure the resistance.
 - ⇒ Measured value **Bimetallic strip**: 0 ohms (passage).
 - ⇒ Measured value **3x PTC sensor**: between 60 and 300 ohm.
 - ⇒ Measured value **4x PTC sensor**: between 80 and 400 ohm.
 - ▶ Resistance checked. If the measured value deviates from the specification, consult the customer service.

6.5.3 Connection of the three-phase AC motor

- Connection cable with bare cable ends.
- The supplied connection diagram contains detailed information about the connection cable:
 - Cable version
 - Wiring diagram
- Connect the connection cable to the on-site control.

Wiring diagram of the direct starting power connection

U, V, W	Mains connection
PE (gn-ye)	Earth

Wiring diagram of the power connection for star-delta starting

U1, V1, W1	Mains connection (start of winding)
U2, V2, W2	Mains connection (end of winding)
PE (gn-ye)	Earth

6.5.4 Monitoring equipment connection

- Refer to the attached connection diagram for more precise details regarding the version.
- The individual wires are designated according to the connection diagram. Do not cut the wires! There is no additional assignment between the wiring diagram and connection diagram.

Overview of possible monitoring devices for recirculation pumps **without Ex rating**:

	OPTI-RZP 20-1 ... EXCEL-RZPE 20-1 ...	OPTI-RZP 25-3 ... EXCEL-RZPE 25-3 ...	OPTI-RZP 30 ... EXCEL-RZPE 30 ...	OPTI-RZP 40-1 ... EXCEL-RZPE 40-1 ...	OPTI-RZP 50-4 ... EXCEL-RZPE 50-4 ...	OPTI-RZP 60-4 ... EXCEL-RZPE 60-4 ...	OPTI-RZP 80-3 ...
Motor compartment	o	–	–	–	–	–	–
Motor compartment/sealing chamber	–	o	o	o	o	o	–
Sealing chamber (external pencil electrode)	o	o	o	o	–	–	–
Pre-chamber (external pencil electrode)	–	–	–	–	o	o	o
Motor winding: Temperature limiter	•	•	•	•	•	•	•
Motor winding: Temperature controller and limiter	o	o	o	o	o	o	o

Key

– = not possible, o = optional, • = standard

6.5.4.1 Monitoring of motor compartment

Connect the electrodes via an evaluation relay. Relay “NIV 101/A” is recommended for this. The threshold is 30 kOhm.

Wiring diagram

DK	Electrode connection
----	----------------------

The system must be deactivated when the threshold is reached!

6.5.4.2 Motor compartment/sealing chamber monitoring

Connect the electrodes via an evaluation relay. Relay “NIV 101/A” is recommended for this. The threshold is 30 kOhm.

Wiring diagram

DK	Electrode connection
----	----------------------

The system must be deactivated when the threshold is reached!

6.5.4.3 Sealing chamber monitoring (external electrode)

Connect the external electrode via an evaluation relay. Relay “NIV 101/A” is recommended for this. The threshold is 30 kOhm.

Once the threshold is reached, a warning must be output or the unit must be switched off.

CAUTION

Trigger status for sealing chamber monitoring

The pencil electrode detects water ingress into the sealing chamber. The threshold value is reached when a certain amount of water is present in the oil. An alarm is triggered or the pump is switched off via the evaluation relay:

- The pump may be a total loss if only an alarm occurs.
- Recommendation: Always switch off the pump!

Note the additional information in the chapter on potentially explosive areas found in the appendix!

6.5.4.4 Pre-chamber monitoring (external electrode)

Connect the external electrode via an evaluation relay. Relay "NIV 101/A" is recommended for this. The threshold is 30 kOhm.

Once the threshold is reached, a warning must be output or the unit must be switched off.

Note the additional information in the section on potentially explosive areas in the appendix!

6.5.4.5 Monitoring of motor winding

With bimetallic strips

Connect the bimetallic strips directly to the switchgear or via an evaluation relay. Connection values: max. 250 V (AC), 2.5 A, $\cos \varphi = 1$

Wiring diagram for bimetallic strip

Temperature limiter

20, 21	Bimetallic strip connection
--------	-----------------------------

Temperature controller and limiter

21	High temperature connection
----	-----------------------------

20	Centre terminal
----	-----------------

22	Low temperature connection
----	----------------------------

With PTC sensor

Connect the PTC sensor via an evaluation relay. "CM-MSS" relay is recommended for this purpose.

PTC sensor wiring diagram

Temperature limiter

10, 11	PTC sensor connection
--------	-----------------------

Temperature controller and limiter

11	High temperature connection
----	-----------------------------

10	Centre terminal
----	-----------------

12	Low temperature connection
----	----------------------------

Trigger status for temperature controller and limiter

The installed sensor specifies the trigger temperature as part of thermal motor monitoring using bimetallic or PTC sensors. Depending on the thermal motor monitoring version, the following triggering status must occur when the trigger temperature is reached:

- Temperature limiter (1 temperature circuit):
The unit must be deactivated once the trigger temperature has been reached.
- Temperature controller and limiter (2 temperature circuits):
Once the trigger temperature for the low temperature is reached, the motor can deactivate with automatic reactivation. Upon reaching the trigger temperature for the high temperature limit, the motor must deactivate with manual reactivation.

Note the additional information in the section on potentially explosive areas described in the appendix!

6.5.5 Motor protection adjustment

6.5.5.1 Direct activation

- **Full load**
Set the motor protection to the rated current according to the rating plate.
- **Partial load operation**
Set the motor protection to 5 % above the current measured at the duty point.

6.5.5.2 Star-delta starting

- The motor protection setting depends on the installation:
 - Motor protection in the motor line: Set the motor protection to 0.58 x rated current.
 - Motor protection installed in the mains supply cable: Set the motor protection to the rated current.
- The maximum start-up time in the star connection: 3 s

6.5.5.3 Soft starter

- **Full load**
Set the motor protection to the rated current according to the rating plate.
- **Partial load operation**
Set the motor protection to 5 % above the current measured at the duty point.

Please observe the following points:

- Current consumption must always be below the rated current.
- Complete starting and stopping within 10 s.
- To avoid power dissipation, bypass the electronic starter (soft start) once normal operation is reached.

6.5.6 Operation with frequency converter

Operation on the frequency converter is permitted. Refer to the appendix for the relevant requirements!

7 Commissioning



NOTICE

Automatic activation after power cut

Depending on the process, the product is activated and deactivated using separate controls. The product may automatically be activated following power cuts.

7.1 Personnel qualifications

- Operation/control: Operating personnel, instructed in the functioning of the complete system

7.2 Operator responsibilities

- Providing installation and operating instructions by the pump or at a place specially reserved for it.
- Making the installation and operating instructions available in the language of the personnel.
- Making sure that the installation and operating instructions are read and understood by all personnel.
- All safety devices and emergency cut-outs on the system-side must be active and checked to ensure that they work properly.
- The pump is suitable for use under the specified operating conditions.

7.3 Direction of rotation check for three-phase AC motor

The pump requires a clockwise rotating field at the mains connection. The pump is **not** suitable for operation with a counter-clockwise rotating field.

1. Check the rotating field at the mains connection with a rotating-field testing device.
 - ⇒ Clockwise rotating field: Direction of rotation correct.
 - ⇒ Counter-clockwise rotating field: Incorrect direction of rotation. Correct the rotating field at the mains connection (see point 2).
2. To **correct** the rotating field at the mains connection:
 - ⇒ Direct starting: exchange two phases at the mains connection.
 - ⇒ Star-delta starting: Swap the connections of two windings (e.g. U1/V1 and U2/V2).

7.4 Operation in an explosive atmosphere

Approval according to	OPTI-RZP 20-1 ... EXCEL-RZPE 20-1 ...	OPTI-RZP 25-3 ... EXCEL-RZPE 25-3 ...	OPTI-RZP 30 ... EXCEL-RZPE 30 ...	OPTI-RZP 40-1 ... EXCEL-RZPE 40-1 ...	OPTI-RZP 50-4 ... EXCEL-RZPE 50-4 ...	OPTI-RZP 60-4 ... EXCEL-RZPE 60-4 ...	OPTI-RZP 80-3 ...
IECEX	-	-	-	-	-	-	-
ATEX	0	0	0	0	0	0	0
FM	0	0	0	0	0	0	0
CSA-Ex	-	-	-	-	-	-	-

Key

– = not possible, o = optional, • = standard

Identification of Ex-rated pumps

The pump is labelled as follows on the rating plate for use in explosive atmospheres:

- “Ex” symbol of the corresponding approval
- Ex classification

Observe the explosion protection section!**ATEX approval**

The pumps are suitable for operation in potentially explosive atmospheres:

- Device group: II
- Category: 2, zone 1 and zone 2

These pumps must not be used in zone 0!

FM approval

The pumps are suitable for operation in potentially explosive atmospheres:

- Protection class: Explosionproof
- Category: Class I, Division 1

Notice: If the cabling is carried out according to Division 1, installation in Class I, Division 2 is also permitted.

7.5 Before switching on

Check the following prior to activation:

- Has the electrical connection been carried out in accordance with regulations?
- Has the connection cable been routed safely?
- Accessories attached correctly?
- Temperature of the pumped fluid observed?
- Immersion depth observed?
- Intermittent operation: Is the max. switching frequency complied with?
- Minimum water coverage defined and monitored?
- Min. fluid temperature can drop below 3 °C: Monitoring device with automatic deactivation installed?

7.6 Switch on and off

The pump is switched on and off using a separate operating point (on/off switch, switchgear) provided by the customer.

- When the pump starts, the rated current is exceeded for a short time.
- During operation, do not exceed the rated current any more.

CAUTION! Material damage! If the pump does not start, switch off the pump immediately. Motor failure! Remove the fault first before reactivation.

7.7 During operation**WARNING****Risk of injury from rotating components!**

No persons are allowed to be present in the working area of the pump. There is a risk of injury!

- Demarcate and cordon off the working area.
- If there are no persons in the working area, activate the pump.
- If persons enter the working area, switch off the pump immediately.

Please regularly check the following points:

- Pump is free of deposits.
- Connection cable is not damaged.
- Minimum water coverage ensured.
- Quiet and low-vibration running.
- Max. switching frequency not exceeded.
- Mains connection tolerances:
 - Operating voltage: +/-10 %
 - Frequency: +/- 2 %
 - Current consumption between the individual phases: max. 5%
 - Voltage difference between the individual phases: max. 1%

Monitoring minimum water coverage

The pump must not emerge from the fluid during operation. Minimum water coverage specifications must be observed! If fluid levels fluctuate significantly, install a level monitoring device. If the water coverage falls below the minimum level, switch off the pump.

8 Shut-down/dismantling

8.1 Personnel qualifications

- Operation/control: Operating personnel, instructed in the functioning of the complete system
- Electrical work: qualified electrician
Person with appropriate technical training, knowledge and experience who can identify and prevent electrical hazards.
- Installation/dismantling work: trained sewage technology professional
Fixation to different construction parts, lifting equipment, wastewater facility basics
- Lifting work: trained specialist for the operation of lifting devices
Lifting equipment, lifting gear, attachment points

8.2 Operator responsibilities

- Locally applicable accident prevention and safety regulations of trade associations.
- Observe regulations for working with heavy loads and under suspended loads.
- Provide the necessary protective equipment and make sure that the personnel wears it.
- Provide adequate aeration in closed rooms.
- Take immediate countermeasures if there is a build-up of toxic or suffocating gases!

8.3 Shut-down

The pump is deactivated, but remains installed. This ensures that the pump is always ready for operation.

✓ Completely immerse the pump in the fluid to protect the pump from frost and ice.

✓ Minimum fluid temperature: +3 °C (+37 °F).

1. Switch off the pump.
2. Secure the operating point against being switched on again by unauthorised persons (e.g. lock main switch).
 - ▶ The pump is decommissioned.

If the pump remains installed after decommissioning, observe the following points:

- Ensure that the aforementioned requirements are maintained for the complete period of shutdown. Remove the pump if meeting these requirements cannot be guaranteed!
- For an extended period of shutdown, carry out a function test at regular intervals:
 - Period: monthly to quarterly
 - Running time: 5 minutes
 - Only run a function test in valid operating conditions!

8.4 Removal



DANGER

Danger due to fluids which are hazardous to health!

Danger of bacterial infection!

- Disinfect the pump after removal!
- Observe the specifications of the work regulations!



DANGER

Danger of death due to electrical current!

Improper conduct when carrying out electrical work can lead to death due to electric shock!

- Before all electrical work, disconnect the product from the mains and secure it against being switched on again without authorisation.
- Electrical work must be carried out by a qualified electrician!
- Observe local regulations!



DANGER

Danger of death due to dangerous lone working practices!

Work in chambers and narrow rooms as well as work involving risk of falling are dangerous work. Such work may not be carried out autonomously!

- Only carry out work with another person!



WARNING

Risk of burns from hot surfaces!

Motor housing can become hot during operation. It may cause burns.

- Allow the pump to cool down at ambient temperature after switching it off!

Wear the following protective equipment while performing the work:

- Safety shoes: Protection class S1 (uvex 1 sport S1)
- Protective gloves: 4X42C (uvex C500 wet)
- Safety helmet: EN 397 Conforms to standards, protection against lateral deformation (uvex pheos)
(When using lifting equipment)

If contact with hazardous fluid occurs during work, wear the following additional protective equipment:

- Safety goggles: uvex skyguard NT
 - Labelling frame: W 166 34 F CE
 - Labelling disc: 0-0.0* W1 FKN CE
- Breathing protection: Half mask 3M series 6000 with filter 6055 A2

The protective equipment specified is the minimum requirement. Observe the specifications of the work regulations!

* Protection level according to EN 170 not relevant for this work.

8.4.1 Using a lowering device

- ✓ Recirculation pump is decommissioned.
 - ✓ Protective equipment put on according to factory regulations.
1. Disconnect the recirculation pump from the power supply.
 2. Disconnect and wind up the connection cable.
 3. Insert the lifting accessory in hoisting gear.
 4. Slowly lift recirculation pump and remove it from the basin. During the lifting procedure, detach the connection cable from the lifting accessory and wind it up.
DANGER! The recirculation pump and connection cable come directly out of the fluid. Wear protective equipment according to factory regulations!
 5. Swivel the recirculation pump and set it down on a firm surface.
 - ▶ Dismantling is complete.
 - ▶ Thoroughly clean the recirculation pump and storage area, disinfect if necessary.
 - ▶ Store recirculation pump.

8.4.2 Mounted on the discharge pipe

- ✓ Recirculation pump is decommissioned.
 - ✓ Protective equipment put on according to factory regulations.
 - ✓ Basin drained – removal can only be carried out when the basin is empty.
 - ✓ Work area cleaned and disinfected.
 - ✓ Lifting accessories
 - ✓ Mobile transport surface for setting down the recirculation pump.
 - ✓ Scaffolding
1. Disconnect the recirculation pump from the power supply.
 2. Disconnect and wind up the connection cable.
 3. Position the mobile transport surface directly below the recirculation pump.
 4. Loosen the flange connection.
 5. Secure the recirculation pump against slipping and tipping over on the transport surface.
 6. Lift the recirculation pump out of the basin using a suitable aid.
 - ▶ Dismantling is complete.
 - ▶ Thoroughly clean the recirculation pump and storage area, disinfect if necessary.
 - ▶ Store recirculation pump.

8.5 Clean and disinfect

- Wear protective equipment! Observe the work regulations.
 - Safety shoes: Protection class S1 (uvex 1 sport S1)
 - Breathing protection: Half mask 3M series 6000 with filter 6055 A2
 - Protective gloves: 4X42C + Type A (uvex protector chemical NK2725B)
 - Safety goggles: uvex skyguard NT
- Use of disinfectants:

- Use strictly according to the manufacturer’s instructions!
- Wear protective equipment according to the manufacturer’s instructions!
- Dispose of rinsing water in accordance with the local regulations, e.g. feed it into the sewer!
- ✓ Recirculation pump has been dismantled.
- 1. Ensure that the bare cable ends are packed in a watertight manner!
- 2. Attach the lifting accessory to the slinging point.
- 3. Lift the recirculation pump approximately 30 cm (10 in) above the ground.
- 4. Spray the recirculation pump with clean water from top to bottom.
- 5. Spray the propeller and flow housing from all sides.
- 6. Disinfect the recirculation pump.
- 7. Dispose of dirt residue on the ground, e.g. flush it into the sewer.
- 8. Allow the recirculation pump to dry.

9 Maintenance and repair

9.1 Personnel qualifications

- Electrical work: qualified electrician
Person with appropriate technical training, knowledge and experience who can identify and prevent electrical hazards.
- Maintenance work: trained sewage technology professional
Application/disposal of operating fluids used, basic engineering knowledge (installation/dismantling)

9.2 Operator responsibilities

- Provide the necessary protective equipment and make sure that the personnel wears it.
- Collect operating fluids in suitable tanks and dispose of properly.
- Dispose of protective clothing used in accordance with regulations.
- Use only original parts of the manufacturer. The use of any non-original parts releases the manufacturer from any liability.
- Collect any leakage of fluid and operating fluid immediately and dispose of it according to the locally applicable guidelines.
- Provide the tools required.
- If flammable solvents and cleaning agents are used, fire, naked flames and smoking are prohibited.
- Document maintenance tasks in the system’s inspection list.

9.3 Operating fluid

9.3.1 Oil types

White oil

- ExxonMobile: Marcol 52
- ExxonMobile: Marcol 82
- Total: Finavestan A 80 B (NSF-H1 certified)

CLP gear oil (ISO VG 220)

- Aral: Degol BG 220
- BP: Energol Gr-XP 220
- Shell: Omala S2 GX 220
- Tripol: FoodProof 1810/220 (USDA-H1 approved)

9.3.2 Grease

- Esso: Unirex N3
- Tripol: Molub-Alloy-Food Proof 823 FM (USDA-H1 approved)

9.3.3 Filling quantities

The filling quantities indicated apply only in the case of horizontal installation. Other filling quantities apply for different installation types; see the data sheet for the relevant order.

	OPTI-RZP 20-1 ... EXCEL-RZPE 20-1 ...	OPTI-RZP 25-3 ... EXCEL-RZPE 25-3 ...	OPTI-RZP 30 ... EXCEL-RZPE 30 ...	OPTI-RZP 40-1 ... EXCEL-RZPE 40-1 ...	OPTI-RZP 50-4 ... EXCEL-RZPE 50-4 ...	OPTI-RZP 60-4 ... EXCEL-RZPE 60-4 ...	OPTI-RZP 80-3 ...
Sealing chamber	0.4 l 13.5 US.fl.oz.	1.2 l 41 US.fl.oz.	1.2 l 41 US.fl.oz.	1.2 l 41 US.fl.oz.	1.10 l 37 US.fl.oz.	1.10 l 37 US.fl.oz.	2 l 68 US.fl.oz.
Gear chamber	-	-	-	-	0.50 l 17 US.fl.oz.	0.50 l 17 US.fl.oz.	1.10 l 37 US.fl.oz.

	OPTI-RZP 20-1 ... EXCEL-RZPE 20-1 ...	OPTI-RZP 25-3 ... EXCEL-RZPE 25-3 ...	OPTI-RZP 30 ... EXCEL-RZPE 30 ...	OPTI-RZP 40-1 ... EXCEL-RZPE 40-1 ...	OPTI-RZP 50-4 ... EXCEL-RZPE 50-4 ...	OPTI-RZP 60-4 ... EXCEL-RZPE 60-4 ...	OPTI-RZP 80-3 ...
Pre-chamber	–	–	–	–	1.2 l 41 US.fl.oz.	1.2 l 41 US.fl.oz.	2 l 68 US.fl.oz.

9.4 Maintenance intervals

- Regularly carry out maintenance tasks.
- Contractually adjust maintenance intervals depending on the actual environmental conditions. Contact customer service.
- If strong vibrations occur during operation, check the installation.

9.4.1 Maintenance intervals for normal conditions

8000 operating hours or after 2 years

- Visual inspection of the connection cables
- Visual inspection of cable brackets and cable tensioning
- Visual inspection of the recirculation pump
- Visual inspection of accessories
- Function test of monitoring devices
- Oil change

80000 operating hours or after 10 years

- Complete overhaul

9.4.2 Maintenance intervals for harsh conditions

Under the following operating conditions, shorten the specified maintenance intervals in consultation with the customer service:

- Fluids with long-fibre components
- Highly corrosive or abrasive fluids
- Strongly gassing fluids
- Operation at an unfavourable duty point

If there are harsh operating conditions, it is recommended to conclude a maintenance contract.

9.5 Maintenance measures



WARNING

Risk of injury from sharp edges!

Sharp edges can form on the propeller blades. There is a danger of cuts and similar injuries!

- Wear protective gloves!

Before starting maintenance work, meet the following requirements:

- Wear protective equipment! Observe the factory regulations.
 - Safety shoes: Protection class S1 (uvex 1 sport S1)
 - Protective gloves: 4X42C (uvex C500 wet)
 - Safety goggles: uvex skyguard NT

For detailed marking of frame and disc, see “Personal protective equipment [► 5]” section.

- The recirculation pump has been thoroughly cleaned and disinfected.
- Motor must have cooled down to the ambient temperature.
- Workplace:
 - Clean, good lighting and ventilation.
 - Firm and stable work surface.
 - Secured against falling over and slipping.

NOTICE! Only perform the maintenance work described in these installation and operating instructions.

9.5.1 Recommended maintenance measures

Regular inspection of current consumption and the operating voltage in all three phases is recommended for smooth operation. In normal operation, these values remain constant. Slight fluctuations depend on the characteristics of the fluid.

Based on the current consumption, damage or malfunctions of the recirculation pump can be detected and rectified at an early stage. Larger voltage fluctuations strain the motor winding and can cause breakdown. Regular inspections can therefore largely prevent major secondary damage and reduce the risk of total breakdown. In this regard, it is recommended to use remote monitoring for regular inspections.

- 9.5.2 Rotating the propeller**
- ✓ Protective equipment used!
 - ✓ The recirculation pump is disconnected from the power supply!
1. Place the recirculation pump horizontally on a solid work surface.
 2. Secure the recirculation pump against falling over or slipping.
 3. Grip the propeller carefully and rotate the propeller.
- 9.5.3 Visual inspection of the connection cable**
- Check connection cable for:
- Bubbles
 - Cracks
 - Scratches
 - Abrasion
 - Pinch points
- If the connection cable is damaged:
- Decommission the pump immediately!
 - Have the connection cable replaced by the customer service!
- CAUTION! Material damage! Damaged connection cables cause water to enter the motor. Water in the motor leads to total damage of the pump.**
- 9.5.4 Visual inspection of cable brackets and cable tensioning**
- Check cable brackets and anchoring for material fatigue and shrinkage.
- Replace worn or defective components immediately.
- 9.5.5 Visual inspection of the recirculation pump**
- Check the housing and propeller for damage and wear. If there are defects, observe the following:
- Repair damaged coating. Order repair kits from the customer service.
 - If components have worn, contact customer service!
- 9.5.6 Function test of the monitoring device**
- To test resistances, the pump must be cooled down to the ambient temperature!
- 9.5.6.1 Test the resistor of the temperature sensor**
- ✓ Ohmmeter available.
1. Measure the resistance.
 - ⇒ Measured value **Bimetallic strip**: 0 ohms (passage).
 - ⇒ Measured value **3x PTC sensor**: between 60 and 300 ohm.
 - ⇒ Measured value **4x PTC sensor**: between 80 and 400 ohm.
 - ▶ Resistance checked. If the measured value deviates from the specification, consult the customer service.
- 9.5.6.2 Testing the resistor of the external electrode for sealing chamber control**
- ✓ Ohmmeter available.
1. Measure the resistance.
 - ⇒ Measured values “infinite (∞)”: Monitoring device OK.
 - ⇒ Measured value ≤ 30 kOhm: Water in oil. Change oil.
 - ▶ Resistance checked. If the measured value still deviates after the oil change, consult customer service.
- 9.5.6.3 Check the resistance of the external electrode for pre-chamber monitoring**
- ✓ Ohmmeter available.
1. Measure the resistance.
 - ⇒ Measured values “infinite (∞)”: Monitoring device OK.
 - ⇒ Measured value ≤ 30 kOhm: Water in oil. Change oil.
 - ▶ Resistance checked. If the measured value still deviates after the oil change, consult customer service.
- 9.5.7 Visual inspection of accessories**
- Accessories must be checked for:
- Correct fixation
 - Smooth function
 - Signs of wear, e.g. cracks caused by frequencies
- Any defects detected must be repaired immediately or the accessories must be replaced.

9.5.8 Oil change

**WARNING****Operating fluid under pressure!**

High pressure can build up in the motor! This pressure is released when the screw plugs are **opened**.

- If screw plugs are opened without due caution, they can be ejected at high speed!
- Hot operating fluid may spray out!
 - Wear protective equipment!
 - Allow the motor to cool down to ambient temperature before carrying out any work!
 - Adhere to the prescribed sequence of work steps!
 - Unscrew the screw plugs slowly.
 - As soon as the pressure escapes (audible whistling or hissing of air), stop turning the screw plug any further!
 - Only when the pressure has been completely released, fully unscrew the screw plug.

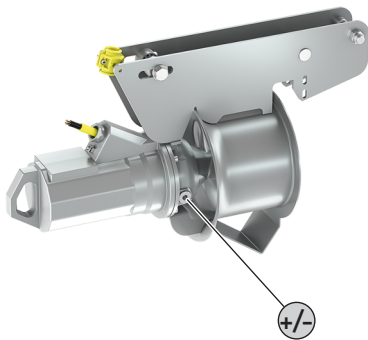
9.5.8.1 Seal housing oil change: Flumen OPTI-RZP/EXCEL-RZPE 20


Fig. 11: Position of the screw plugs

+/-	Drain/fill seal housing oil
-----	-----------------------------

- | | |
|---|--|
| ✓ | Protective equipment put on. |
| ✓ | Recirculation pump removed, cleaned and disinfected. |
| | 1. Place the recirculation pump horizontally on a solid work surface. |
| | 2. Secure the recirculation pump against falling over and slipping. |
| | 3. Position a suitable tank to collect the operating fluid. |
| | 4. Unscrew the screw plug (+/-). |
| | 5. Tip the recirculation pump and allow the operating fluid to drain out. |
| | 6. Check the operating fluid: <ul style="list-style-type: none"> ⇒ Operating fluid clear or contaminated (black): Fill with new operating fluid. ⇒ Operating fluid milky/cloudy: Water in oil. Minor leakage through the mechanical seal is normal. If the ratio of oil to water is less than 2:1, the mechanical seal may be damaged. Change the oil and check again four weeks later. If water is again present in the oil during the second check, contact customer service. ⇒ Metal chips in the operating fluid: Contact customer service. |
| | 7. Readjust the recirculation pump so that the opening points upwards. |
| | 8. Pour the new operating fluid in through the hole for the screw plug (+/-). <ul style="list-style-type: none"> ⇒ Comply with the specifications for operating fluid type and quantity. |
| | 9. Clean the screw plug (+/-), replace the seal ring and screw it back in. Max. tightening torque: 8 Nm (5.9 ft·lb)! |
| | 10. Restore corrosion protection: Seal screw plug, e.g. with Sikaflex. |

9.5.8.2 Seal housing oil change: Flumen OPTI-RZP/EXCEL-RZPE 30 ... 40

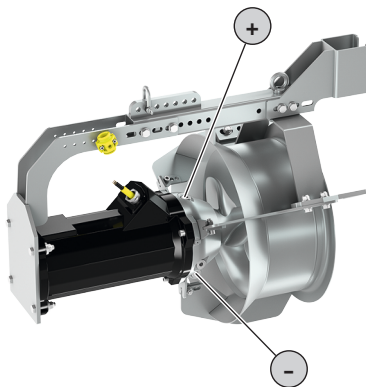


Fig. 12: Position of the screw plugs

+	Fill oil in the seal housing
-	Drain oil in the seal housing

- ✓ Protective equipment put on.
 - ✓ Recirculation pump removed, cleaned and disinfected.
1. Place the recirculation pump horizontally on a solid work surface.
 2. Secure the recirculation pump against falling over and slipping.
 3. Position a suitable tank to collect the operating fluid.
 4. Unscrew the screw plug (+).
 5. Unscrew the screw plug (-) and drain the operating fluid.
NOTICE! Flush the sealing chamber to drain it completely.
 6. Check the operating fluid:
 - ⇒ Operating fluid clear or contaminated (black): Fill with new operating fluid.
 - ⇒ Operating fluid milky/cloudy: Water in oil. Minor leakage through the mechanical seal is normal. If the ratio of oil to water is less than 2:1, the mechanical seal may be damaged. Change the oil and check again four weeks later. If water is again present in the oil during the second check, contact customer service!
 - ⇒ Metal chips in the operating fluid: Contact customer service.
 7. Clean the screw plug (-), replace the seal ring and screw it back in. **Max. tightening torque: 8 Nm (5.9 ft·lb)!**
 8. Pour new operating fluid in through the hole for the screw plug (+).
⇒ Comply with the specifications for operating fluid type and quantity.
 9. Clean the screw plug (+), replace the seal ring and screw it back in. **Max. tightening torque: 8 Nm (5.9 ft·lb)!**
 10. Restore corrosion protection: Seal screw plug, e.g. with Sikaflex.

9.5.8.3 Oil change for sealing and gear chamber as well as pre-chamber: Flumen OPTI-RZP/EXCEL-RZPE 50 ... 80

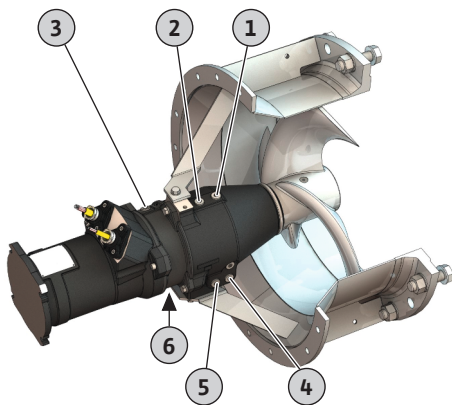


Fig. 13: Position of the screw plugs

- ✓ Protective equipment put on.
 - ✓ Recirculation pump removed, cleaned and disinfected.
1. Place the recirculation pump horizontally on a solid work surface.
 2. Secure the recirculation pump against falling over and slipping.
 3. Position a suitable tank to collect the operating fluid.
 4. Remove the screw plug from the filler hole:
 - ⇒ 1 = pre-chamber
 - ⇒ 2 = gear chamber
 - ⇒ 3 = sealing chamber
 5. Unscrew the screw plug of the drain hole and drain the operating fluid:
NOTICE! Flush the pre-, gear and sealing chamber to drain it completely.
 - ⇒ 4 = pre-chamber
 - ⇒ 5 = gear chamber
 - ⇒ 6 = sealing chamber
 6. Check the operating fluid:
 - ⇒ Operating fluid clear or contaminated (black): Fill with new operating fluid.
 - ⇒ Operating fluid milky/cloudy: Water in oil. Minor leakage through the mechanical seal is normal. If the ratio of oil to water is less than 2:1, the mechanical seal may be damaged. Change the oil and check again four weeks later. If water is again present in the oil during the second check, contact customer service.
 - ⇒ Metal chips in the operating fluid: Contact customer service.
 7. Clean the drain hole screw plug, change the seal ring and replace the screw plug. **Max. tightening torque: 8 Nm (5.9 ft·lb)!**
 8. Pour the operating fluid through the filler hole.
⇒ Comply with the specifications for operating fluid type and quantity.
 9. Clean the filler hole screw plug, change the seal ring and replace the screw plug. **Max. tightening torque: 8 Nm (5.9 ft·lb)!**
 10. Restore corrosion protection: Seal screw plug, e.g. with Sikaflex.

9.5.9 General overhaul

The following components are checked for wear and damage as part of general maintenance:

- Motor bearings
- Gear bearing and planetary gear speed
- Propeller
- Shaft sealings
- O-rings
- Connection cable
- Fitted accessories

Damaged components are replaced with original parts. This will ensure correct operation. The general overhaul is performed by the manufacturer or an authorised service centre.

9.6 Repairs



WARNING

Risk of injury from sharp edges!

Sharp edges can form on the propeller blades. There is a danger of cuts and similar injuries!

- Wear protective gloves!

CAUTION

Only operate the recirculation pump with the propeller!

The propeller secures the mechanical seal in place. If the recirculation pump is operated without a propeller, the mechanical seal will be destroyed!

The following preconditions must be met prior to starting repair work:

- Wear protective equipment. Observe the factory regulations.
 - Safety shoes: Protection class S1 (uvex 1 sport S1)
 - Protective gloves: 4X42C (uvex C500 wet)
 - Safety goggles: uvex skyguard NT

For detailed marking of frame and disc, see “Personal protective equipment [► 5]” section.

- The recirculation pump has been thoroughly cleaned and disinfected.
- Motor must have cooled down to the ambient temperature.
- Workplace:
 - Clean, good lighting and ventilation.
 - Firm and stable work surface.
 - Secured against falling over and slipping.

NOTICE! Only carry out the repair work described in these installation and operating instructions.

For repair work, the following applies:

- Wipe up spillage quantities of fluid and operating fluid immediately!
- Always replace O-rings, seals and screw locking devices!
- Observe the tightening torques in the appendix!
- The use of force is strictly prohibited!

9.6.1 Instructions on using screw locking devices

A screw locking device can be used on the screws. Screw locking is done at the factory using two different methods:

- Thread-locking fluid
- Mechanical screw locking device

Always re-apply the screw locking device!

Thread-locking fluid

Medium-strength thread-locking fluid (e.g. Loctite 243) is used for the liquid screw locking compound. This threadlocker can be loosened with increased force. If the thread-locking fluid cannot be loosened, then the compound must be heated to approx. 300 °C (572 °F). Clean the components thoroughly after dismantling.

Mechanical screw locking device

The mechanical screw locking device consists of two Nord-Lock wedge lock washers. The screw connection is secured by a clamping force.

9.6.2 Which repair work may be carried out

- Replacement of the propeller
- Replacement of mechanical seal on the fluid side.

9.6.3 Flumen OPTI-RZP/EXCEL-RZPE 20 ... 40 propeller replacement

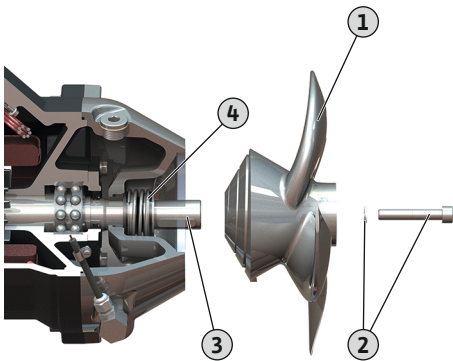


Fig. 14: Flumen OPTI-RZP/EXCEL-RZPE 20 ... 40 propeller replacement

1	Propeller
2	Propeller attachment: Interior hexagonal head screw and washer
3	Shaft
4	Mechanical seal

- ✓ Recirculation pump set down on a firm surface and secured.
 - ✓ Tools are ready for use.
1. Loosen and unscrew the propeller attachment. **NOTICE! Fix the propeller in place with suitable equipment.**
 2. Carefully remove the propeller from the shaft. **CAUTION! The mechanical seal is now no longer secured.**
 3. Clean the shaft and apply new lubricating grease.
 4. Carefully slide the propeller back on as far as it will go.
 5. Coat the interior hexagonal head screw with the thread-locking fluid, insert the washer and screw it into the shaft.
 6. Tighten the propeller attachment. Max. tightening torque: see appendix.
 7. Turn the propeller by hand and check that it rotates easily.
 - ▶ Propeller is changed. Check the oil in the seal housing and fill up if required.

9.6.4 Flumen OPTI-RZP/EXCEL-RZPE 50 ... 80 propeller replacement

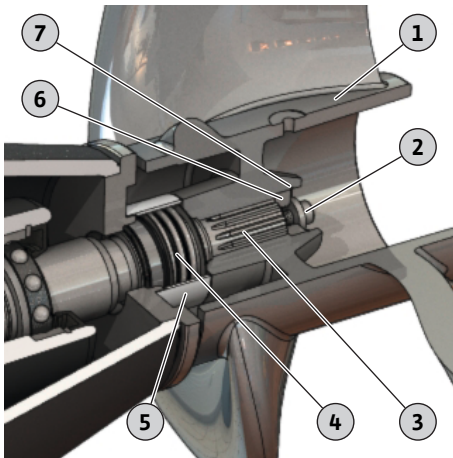


Fig. 15: Flumen OPTI-RZP/EXCEL-RZPE 50 ... 80 propeller replacement

1	Propeller
2	Propeller attachment: Interior hexagonal head screw and washer
3	Shaft
4	Mechanical seal
5	Packing sleeve
6	Pressure disc
7	Retaining ring

- ✓ Recirculation pump set down on a firm surface and secured.
 - ✓ Tools are ready for use.
 - ✓ Forcing screw M16 (article number: 6037091) for OPTI-RZP/EXCEL-RZPE 50-4 and 60-4.
 - ✓ Forcing screw M20 (article number: 6010679) for OPTI-RZP 80-3.
 - ✓ Loctite 242 screw locking device.
 - ✓ Lubricating grease
1. Loosen and unscrew the propeller attachment. **NOTICE! Fix the propeller in place with suitable equipment.**
 2. Check if the retaining ring is positioned correctly. The retaining ring secures the pressure disc.
 3. Carefully remove the propeller from the shaft: Screw the forcing screw into the pressure disc. This presses the propeller from the shaft. **CAUTION! The mechanical seal is no longer secured!**
 4. Clean the shaft and apply new lubricating grease.
 5. Carefully slide the propeller back on as far as it will go.
 6. Securing the propeller: Coat the interior hexagonal head screw with the thread-locking fluid, insert the washer and screw it into the shaft.
 7. Tighten the propeller attachment. Max. tightening torque: see appendix.
 8. Turn the propeller by hand and check that it rotates easily.
 - ▶ Propeller is changed. Check the oil quantity in the pre-chamber and if necessary, top up oil.

9.6.5 Replacement of mechanical seal on the fluid side: Flumen OPTI-RZP/ EXCEL-RZPE 20 ... 40

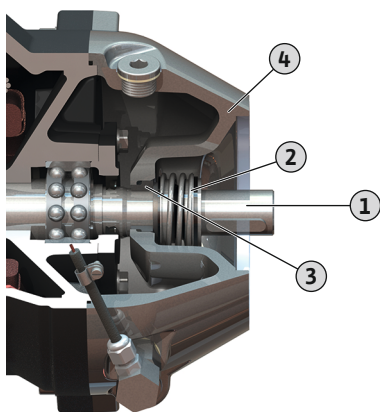


Fig. 16: Flumen OPTI-RZP/EXCEL-RZPE 20 ... 40 mechanical seal replacement

1	Shaft
2	Mechanical seal: Spring
3	Mechanical seal: Stationary ring
4	Seal housing

- ✓ Recirculation pump set down on a firm surface and secured.
 - ✓ Tools are ready for use.
 - ✓ Oil drained from seal housing.
 - ✓ Propeller removed.
1. Remove key from the shaft.
 2. Remove the spring of the mechanical seal with support washer from the shaft.
 3. Push the stationary ring of the mechanical seal out of its seating and remove from the shaft.
 4. Clean the shaft and check for wear and corrosion. **WARNING! Contact customer service if the shaft has been damaged!**
 5. Lubricate the shaft using wetted water or detergent. **CAUTION! Do not use oil or grease as lubricants!**
 6. Press in a new stationary ring for the mechanical seal into the housing using an assembly unit. **CAUTION! Do not tilt the stationary ring when pushing it in. If the stationary ring is tilted or installed at an angle when it is pushed in, the stationary ring will fracture. The mechanical seal can then no longer be used!**
 7. Insert new spring of the mechanical seal with support washer onto the shaft.
 8. Clean the key and lay it in the groove of the shaft.
 9. Mount the propeller.
 - ▶ Mechanical seal is replaced. Fill oil in the seal housing.

9.6.6 Replacement of mechanical seal on the fluid side: Flumen OPTI-RZP/ EXCEL-RZPE 50 ... 80

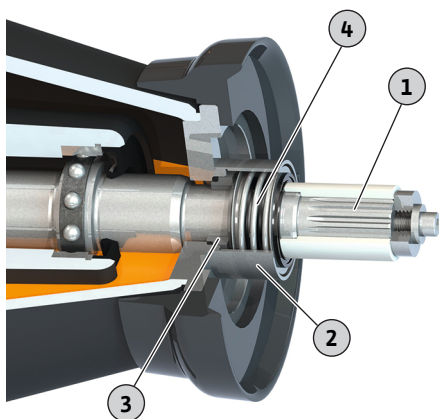


Fig. 17: Flumen OPTI-RZP/EXCEL-RZPE 50 ... 80 mechanical seal replacement

1	Shaft
2	Packing sleeve
3	Mechanical seal: Stationary ring
4	Mechanical seal: Spring

- ✓ Recirculation pump set down on a firm surface and secured.
 - ✓ Tools are ready for use.
 - ✓ Oil drained from the pre-chamber.
 - ✓ Propeller removed.
1. Remove the mechanical seal spring from the shaft.
 2. Carefully remove the packing sleeve using a rubber mallet.
 3. Push the stationary ring of the mechanical seal out of its seating and remove from the shaft.
 4. Clean the shaft and check for wear and corrosion. **WARNING! Contact customer service if the shaft has been damaged!**
 5. Lubricate the shaft using wetted water or detergent. **CAUTION! Do not use oil or grease as lubricants!**
 6. Press in a new stationary ring for the mechanical seal into the housing using an assembly unit. **CAUTION! Do not tilt the stationary ring when pushing it in. If the stationary ring is tilted or installed at an angle when it is pushed in, the stationary ring will fracture. The mechanical seal can then no longer be used!**
 7. Installing the packing sleeve: Coat the packing sleeve mating surface using Loctite 262 or 2701. Press on the packing sleeve in position using a rubber mallet.
 8. Install a new mechanical seal spring on the shaft.
 9. Mount the propeller.
 - ▶ Mechanical seal is replaced. Top up oil in the pre-chamber.



WARNING

Risk of injury from rotating components!

No persons are allowed to be present in the working area of the pump. There is a risk of injury!

- Demarcate and cordon off the working area.
- If there are no persons in the working area, activate the pump.
- If persons enter the working area, switch off the pump immediately.

Fault: Recirculation pump does not start up

1. Mains connection interrupted or short-circuit/earth fault in the cable or motor winding.
 - ⇒ Have the connection and motor checked by a qualified electrician and replace if necessary.
2. Tripping of fuses, of the motor protection switch or the monitoring device.
 - ⇒ Have the connection and the monitoring device checked by a qualified electrician and change it if necessary.
 - ⇒ Have the motor protection switches and fuses installed and adjusted according to technical specifications by a qualified electrician and reset the monitoring devices.
 - ⇒ Check that the propeller rotates easily, and clean the propeller and mechanical seal if necessary.
3. The sealing chamber or pre-chamber monitoring (optional) has broken the electric circuit (connection-related).
 - ⇒ See "Fault: Mechanical seal leakage, pre-chamber/sealing chamber monitoring reports fault or switches the recirculation pump off"

Fault: Recirculation pump starts up, motor protection trips after short period

1. Motor protection switch set incorrectly.
 - ⇒ Have the setting of the trigger checked and corrected by a qualified electrician.
2. Increased current consumption due to major voltage drop.
 - ⇒ Have the voltage of individual phases checked by a qualified electrician. Contact the power grid operator.
3. The connection only has two phases.
 - ⇒ Have the connection checked and corrected by a qualified electrician.
4. Voltage differences between the phases are too great.
 - ⇒ Have the voltage of individual phases checked by a qualified electrician. Contact the power grid operator.
5. Incorrect direction of rotation.
 - ⇒ Have the connection corrected by a qualified electrician.
6. Increased current consumption due to clogging.
 - ⇒ Clean propeller and mechanical seal.
 - ⇒ Check the pre-treatment.
7. The density of the fluid is too high.
 - ⇒ Check unit design.
 - ⇒ Contact customer service.

Fault: Recirculation pump runs, but system parameters are not reached

1. Propeller clogged.
 - ⇒ Clean propeller.
 - ⇒ Check the pre-treatment.
2. Incorrect direction of rotation.
 - ⇒ Have the connection corrected by a qualified electrician.
3. Signs of wear on propeller.
 - ⇒ Inspect propeller and replace if necessary.
4. The connection only has two phases.
 - ⇒ Have the connection checked and corrected by a qualified electrician.

Fault: Recirculation pump runs unevenly and noisily

1. Improper duty point.
 - ⇒ Check fluid density and viscosity.
 - ⇒ Inspect system configuration, and contact customer service.
2. Propeller clogged.
 - ⇒ Clean propeller and mechanical seal.

- ⇒ Check the pre-treatment.
- 3. The connection only has two phases.
 - ⇒ Have the connection checked and corrected by a qualified electrician.
- 4. Incorrect direction of rotation.
 - ⇒ Have the connection corrected by a qualified electrician.
- 5. Signs of wear on propeller.
 - ⇒ Inspect propeller and replace if necessary.
- 6. Motor bearings have worn.
 - ⇒ Inform customer service; return recirculation pump to the factory for overhaul.

Fault: Pre-chamber/sealing chamber monitoring reports fault or switches the recirculation pump off

1. Condensation water build-up due to extended storage or high temperature fluctuations.
 - ⇒ Operate the recirculation pump for a short period (max. 5 min.) without pencil electrode.
2. Increased leakage when running in new mechanical seals.
 - ⇒ Change the oil.
3. Pencil electrode cable is defective.
 - ⇒ Replace the pencil electrode.
4. Mechanical seal is defective.
 - ⇒ Inform customer service.

Further steps for troubleshooting

If the points listed here do not rectify the fault, contact customer service. Customer service can assist in the following ways:

- Telephone or written support.
- On-site support.
- Inspection and repair at the factory.

Costs may be incurred if you request customer services! Please contact customer services for more information.

11 Spare parts

Spare parts are ordered via customer service. To avoid return queries and incorrect orders, the serial or article number must always be supplied. **Subject to change without prior notice!**

12 Disposal

12.1 Oils and lubricants

Operating fluids must be collected in suitable containers and disposed of in accordance with the locally applicable guidelines. Wipe up drips immediately!

12.2 Protective clothing

Used protective clothing must be disposed off in accordance with the locally applicable guidelines.

12.3 Information on the collection of used electrical and electronic products

Proper disposal and appropriate recycling of this product avoids environmental damage and risks to personal health.



NOTICE

Disposal in domestic waste is prohibited!

In the European Union this symbol may be included on the product, the packaging or the accompanying documentation. It means that the electrical and electronic products in question must not be disposed of along with domestic waste.

Please note the following points to ensure proper handling, recycling and disposal of the used products in question:

- Hand over these products at designated, certified collection points only.
- Observe the locally applicable regulations!

Please consult your local municipality, the nearest waste disposal site, or the dealer who sold the product to you for information on proper disposal. Further recycling information at <http://www.wilo-recycling.com>.

13 Appendix

13.1 Tightening torques

Rust-free screws A2/A4			
Threaded	Tightening torque		
	Nm	kp m	ft·lb
M5	5.5	0.56	4
M6	7.5	0.76	5.5
M8	18.5	1.89	13.5
M10	37	3.77	27.5
M12	57	5.81	42
M16	135	13.77	100
M20	230	23.45	170
M24	285	29.06	210
M27	415	42.31	306
M30	565	57.61	417

If a Nord-Lock screw locking device is used, increase the tightening torque by 10 %!

13.2 Frequency converter operation

The motor in series design (confirming to IEC 60034-17) can be operated with a frequency converter. Contact customer service if the rated voltage is above 415 V/50 Hz or 480 V/60 Hz. Plan the rated power of the motor to be approx. 10% higher than the power requirement of the recirculation pump due to the additional heating caused by harmonics. For frequency converters with a low-harmonic output, it is possible to reduce the 10 % power reserve. Harmonic waves are reduced by means of output filters. Synchronise the frequency converter and the filter with each other!

The configuration of the frequency converter depends on the rated motor current. Make sure that the recirculation pump operates without jerks and oscillations (without oscillations, resonances, pendulum torques) across the entire control range. Otherwise, the mechanical seals may leak or be damaged. Increased motor noise caused by the harmonics of the power supply is normal.

During parameterisation of the frequency converter, observe the setting of the quadratic characteristic curve (U/f characteristic curve) for submersible motors! The U/f characteristic curve ensures that the output voltage at frequencies below the rated frequency (50 Hz or 60 Hz) is adjusted to the power requirement of the recirculation pump. Newer models of frequency converters feature an automatic power optimisation function – this automation achieves the same effect. For the frequency converter setting, refer to its installation and operating instructions.

Motor monitoring faults may occur if the motor is operated with a frequency converter. The following measures can reduce or avoid these faults:

- Keeping within the limit values stated in IEC 60034-25 for overvoltage and rise speed. If necessary, install output filters.
- Vary the pulse frequency of the frequency converter.
- In the event of a fault in the internal sealing chamber monitoring, use the external double-rod electrode.

The following construction measures can help to reduce or prevent faults:

- Separate connection cables for the main and control cable (depending on the motor size).
- Keep an adequate distance between main and control cable during routing.
- Use shielded connection cables.

Summary

- Min./max. frequency during continuous duty:
 - Asynchronous motors: 30 Hz to rated frequency according to design data sheet.
- Observe additional measures with regard to EMC regulations (choice of frequency converter, using filters, etc.).
- Do not exceed the rated current or rated speed of the motor.
- Connection for bimetallic or PTC sensor.

13.3 Ex rating

This section contains further information on the operation of the pump in an explosive atmosphere. All personnel must read this section. **This section applies only to Ex-rated pumps!**

13.3.1 Identification of Ex-rated pumps

The pump is labelled as follows on the rating plate for use in explosive atmospheres:

- “Ex” symbol of the corresponding approval
- Ex classification
- Certification number (depending on the approval)

If required by the approval, the certification number is printed on the rating plate.

13.3.2 Protection class

The motor’s design version corresponds to the following protection classes:

- Flameproof enclosure (ATEX)
- Explosionproof (FM)

In order to limit the surface temperature, the motor must be equipped with at least one temperature limiter (1-circuit temperature monitoring). It may also be equipped with a temperature controller (2-circuit temperature monitoring).

13.3.3 Intended use

ATEX approval

The pumps are suitable for operation in potentially explosive atmospheres:

- Device group: II
- Category: 2, zone 1 and zone 2

These pumps must not be used in zone 0!


FM approval

The pumps are suitable for operation in potentially explosive atmospheres:

- Protection class: Explosionproof
- Category: Class I, Division 1

Notice: If the cabling is carried out according to Division 1, installation in Class I, Division 2 is also permitted.

13.3.4 Electrical connection



DANGER
Danger of death due to electrical current!
 Improper conduct when carrying out electrical work can lead to death due to electric shock!

- Before all electrical work, disconnect the product from the mains and secure it against being switched on again without authorisation.
- Electrical work must be carried out by a qualified electrician!
- Observe local regulations!

- Always connect the pump to an electrical outlet outside the explosive area. If the connection must be made within the explosive area, then the connection must be made in an Ex-rated housing (ignition protection class EN 60079-0)! Non-compliance may lead to danger of death from explosion! The connection must always be made by a qualified electrician.
- All monitoring devices outside the “spark-proof areas” must be connected via an intrinsically safe circuit (e.g. Ex-i relay XR-4...).
- The voltage tolerance may not be higher than max. ±10 %.

Overview of possible monitoring devices for recirculation pumps **with Ex rating**:

	OPTI-RZP 20-1 ... EXCEL-RZPE 20-1 ...	OPTI-RZP 25-3 ... EXCEL-RZPE 25-3 ...	OPTI-RZP 30 ... EXCEL-RZPE 30 ...	OPTI-RZP 40-1 ... EXCEL-RZPE 40-1 ...	OPTI-RZP 50-4 ... EXCEL-RZPE 50-4 ...	OPTI-RZP 60-4 ... EXCEL-RZPE 60-4 ...	OPTI-RZP 80-3 ...
Motor compartment	o	-	-	-	-	-	-
Motor compartment/sealing chamber	-	-	-	-	-	-	-
Sealing chamber (external pencil electrode)	o	o	o	o	-	-	-

With ATEX approval

Motor winding: Temperature limiter	•	o	o	o	o	o	o
Motor winding: Temperature controller and limiter	o	•	•	•	•	•	•
Pre-chamber (external pencil electrode)	-	-	-	-	o	o	o

With FM approval

	OPTI-RZP 20-1 ... EXCEL-RZPE 20-1 ...	OPTI-RZP 25-3 ... EXCEL-RZPE 25-3 ...	OPTI-RZP 30 ... EXCEL-RZPE 30 ...	OPTI-RZP 40-1 ... EXCEL-RZPE 40-1 ...	OPTI-RZP 50-4 ... EXCEL-RZPE 50-4 ...	OPTI-RZP 60-4 ... EXCEL-RZPE 60-4 ...	OPTI-RZP 80-3 ...
Motor winding: Temperature limiter	•	•	•	•	•	•	•
Motor winding: Temperature controller and limiter	o	o	o	o	o	o	o
Pre-chamber (external pencil electrode)	–	–	–	–	•	•	•

Key

– = not possible, o = optional, • = standard

13.3.4.1 Monitoring of motor winding



DANGER

Risk of explosion due to overheating of the motor!

If the thermal motor monitoring is connected incorrectly there is a risk of explosion due to overheating of the motor!

- Thermal motor monitoring deactivation must take place with a reactivation lock!
Reactivation must only be possible if an unlock button has been manually actuated!

The threshold value for thermal motor monitoring is determined by the built-in sensor. Depending on the version of the thermal motor monitoring, the following triggering status must arise:

- Temperature limiter (1 temperature circuit)
If the threshold value is reached, deactivation must take place **with a reactivation lock!**
- Temperature control (2 temperature circuits)
 - Deactivation with automatic reactivation can occur if the low temperature threshold is reached.
CAUTION! Motor damage due to overheating! If automatic reactivation takes place, comply with the specifications for max. switching frequency and switching break!
 - If the high temperature threshold is reached, deactivation must take place **with a reactivation lock!**
- Connect thermal motor monitoring via an Ex-approved evaluation relay (e.g. "CM-MSS").
- If a frequency converter is used, connect the thermal motor monitoring to the Safe Torque Off (STO). Deactivation on hardware side is thus ensured.
- Connect pencil electrode via an Ex-approved evaluation relay (e. g. "XR-4 ...").
- Make connection with intrinsically safe circuit!
- Connect the external pencil electrode via an Ex-rated evaluation relay! Relay "XR-4..." is recommended for this.
The threshold is 30 kOhm.
- The connection must be made using an intrinsically safe circuit!
- Frequency converter type: Pulse-width modulation
- Min./max. frequency during continuous duty:
 - Asynchronous motors: 30 Hz to rated frequency according to design data sheet.
- Min. switching frequency: 4 kHz
- Max. overvoltage at the terminal board: 1350 V
- Output current at the frequency converter: max. 1.5 times rated current
- Max. overload time: 60 s
- Torque applications: quadratic pump curve or automatic energy optimisation procedure (e.g. VVC+)
Required speed/torque curves are available on request!
- Observe additional measures with regard to EMC regulations (choice of frequency converter, filters, etc.).
- Do not exceed the rated current or rated speed of the motor.
- It must be possible to connect the motor's own temperature monitor (bimetallic or PTC sensor).
- If the temperature class is marked as T4/T3, temperature class T3 applies.

13.3.4.2 External pencil electrode

13.3.4.3 Pre-chamber monitoring (external electrode)

13.3.4.4 Frequency converter operation

13.3.5 Commissioning



DANGER

Risk of explosion if incorrect pumps are used!

There is a risk of fatal injury from explosion if non-approved pumps are used in potentially explosive atmospheres!

- Only use approved pumps inside potentially explosive atmospheres.
- Check the Ex labelling on the rating plate.

13.3.6 Maintenance and repair

- The operator is responsible for defining the potentially explosive area.
- Only use pumps with the appropriate Ex rating within potentially explosive atmospheres.
- Do not exceed the **max. fluid temperature!**
- Provide the following safety device in accordance with EN 50495 for category 2:
 - SIL Level 1
 - Hardware fault tolerance 0
- Carry out maintenance tasks according to the regulations.
- Only carry out maintenance tasks described in these installation and operating instructions.
- The spark-proof gaps must **only** be repaired according to the manufacturer's design specifications. Carrying out repairs according to the values in tables 2 and 3 of EN 60079-1 is **not** permitted.
- Only use screws as stipulated by the manufacturer, which at a minimum correspond to a strength class of 600 N/mm² (38.85 long tons-force/inch²).

13.3.6.1 Repair of housing coating

If the housing coating has to be repaired, the maximum coat thickness is 2 mm (0.08 in)! The paint layer can become electrostatically charged in cases of thicker coats.

DANGER! Risk of explosion! A discharge can cause an explosion in explosive atmospheres!

13.3.6.2 Replacing the connection cable

Damaged connection cables may only be replaced by customer service or a certified workshop.

13.3.6.3 Changing the mechanical seal

Motor seals may only be replaced by customer service or a certified workshop.







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