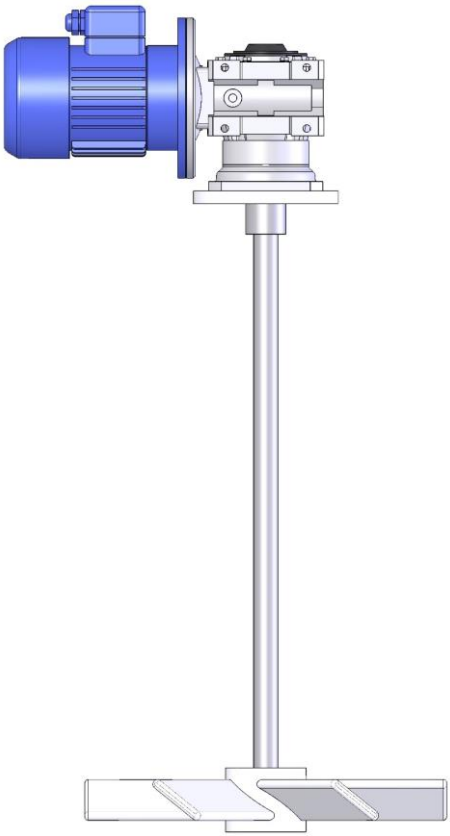
PAGERIS®



Assembly and Operating Manual for PAGERIS - ESM Agitator

Version 1.1

Original in German

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1 Introduction

1.1 General

This Assembly and Operating Manual enables the safe and efficient handling of the PAGERIS - ESM Agitator.

For the EHM-Agitator, as an incomplete machine in accordance with Machinery Directive 2006/42/EC, a prohibition of putting into service applies until it has been incorporated in the final product and a corresponding conformity assessment procedure has been carried out.

The Assembly and Operating Manual is an integral part of the PAGERIS - ESM Agitator and must be kept in the immediate vicinity of the PAGERIS - ESM Agitator as well as accessible to personnel at all times. Before beginning with any work, personnel must read and understand the Assembly and Operating Manual. For safe operation, all safety information and operation instructions contained within this Assembly and Operating Manual must be observed.

Keep this Assembly and Operating Manual for future use.

This Assembly and Operating Manual describes the current version of the PAGERIS - ESM Agitator. If changes or additions become necessary over time, the Assembly and Operating Manual will be amended in future revisions.

The manufacturer reserves the right to change products and their documentation, without informing users of previous versions.

1.1.1 Related documents

Company	Document
C. Ehrensperger AG	ESM list of spare and wear parts
As stated on the name-plate of the electric motor	Instructions – Electric motor
As stated on the name-plate of the gear unit	Instructions – Gear unit

1.2 Copyrights and industrial property rights

The entire content of this Assembly and Operating Manual is subject to copyright.

Any duplication, processing, distribution, transfer to third parties in whole or in part as well as every Type of use beyond what is permitted under copyright requires the written authorization of the manufacturer.

In the case of infringement, the manufacturer reserves the right to take legal action at any time.

1.3 Material defects and defects of title

Claims on the side of the operator to material defects and defects of title require that the defect is claimed in writing without undue delay, but at the latest within two working days.

The manufacturer is in no case responsible for damage to the agitator itself or for consequential damage caused by the agitator if the damage has been caused by incorrect use or handling of the agitator.

In particular, the manufacturer is not responsible for failures or faults caused by modifications undertaken by the operator or other persons.

To the extent that a defect is the responsibility of the manufacturer, the manufacturer is entitled to choose between repair or replacement.

Claims for material defects and defects of title shall expire in the case of non-observance of the requirements of this Assembly and Operating Manual, the relevant statutory provisions and/or other guidance provided by the manufacturer.

No claims exist as to the availability of previous versions or to the retrofitting capacity of delivered units with regard to the current series standard.

1.4 Legend

1.4.1 Symbols

Operating instructions

Operating instructions are presented as follows:

To perform an operation, proceed as follows:

1. Do this.
2. Do that.

➧ This results in this intermediate outcome.

3. Do the following.

✓ You have performed the operation.

Enumerations

Enumerations are represented as follows:

- Enumeration of 1st requirement,
  - Enumeration of 2nd requirement,
  - Enumeration of 2nd requirement,
- Enumeration of 1st requirement.

1.4.2 Hazard classes

In this document, safety information is depicted using standardized pictograms and symbols. Depending on the probability of occurrence and the severity of the consequence, the following hazard classes are used:

DANGER

Indicates a dangerous situation that, if not avoided, will result in serious injury or death.

▶ Measures to avoid the danger

WARNING

Indicates a dangerous situation that, if not avoided, can result in serious injury or death.

- Measures to avoid the danger

ATTENTION

Indicates a potentially hazardous situation that, if not avoided, may result in minor to moderate injury.

- Measures to avoid the danger

NOTE

Application advice and useful information.

1.4.3 Warning signs

	Warning of a danger zone
	Warning of electrical voltage
	Warning of hot surfaces
	Warning of suspended loads

	Warning of risk of crushing
	Warning of risk of slipping

1.4.4 Mandatory signs

	Application advice and other useful information
	Use eye protection
	Use light respiratory protection
	Use protective clothing
	Use hearing protection
	Use protective gloves
	Use safety footwear

1.5 Notes

- A prerequisite for the safe handling of the PAGERIS - ESM Agitator is knowledge of the basic safety requirements.
- This Assembly and Operating Manual contains the most essential instructions for the safe operation of the PAGERIS - ESM Agitator. The initial operation requires a conformity assessment procedure, which is the basis for the EC conformity assessment and marking of the complete machine.
- This Assembly and Operating Manual – in particular the safety information – must be observed by every person who works on or with the PAGERIS - ESM Agitator.
- The applicable rules and regulations for accident prevention must also be observed.

1.6 Product label

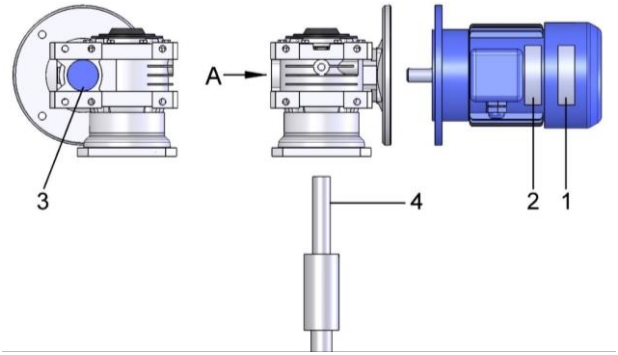


Figure 1 Identification and product label

Item 1 - Device label of the agitator

Item 2 - Product label of the electric motor

Item 3 - Product label of the gearbox

Item 4 - Marking of the agitator shaft
Example: Pageris 10851400

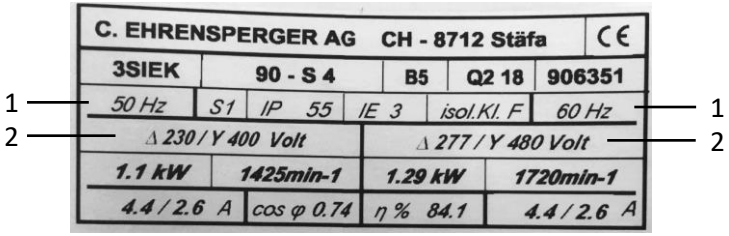


Figure 2 Product label of the electric motor

Figure 3 Product label of the gearbox

Item 1 - Frequency

Item 2 - Operating voltage

Item 3 - Gearbox transmission

Figure 4 Device label of the agitator

1.7 Declaration of incorporation

Manufacturer	C. Ehrensperger AG
Contact	Weierstrasse 11 8712 Stäfa Switzerland
	Tel.: +41 44 927 30 00 / info@pageris.ch
Authorized person	Marco Sigg
	Technical Director
Product	PAGERIS - ESM Agitator
	For the agitation of liquid media as part of a mixing system.
Meets the requirements of the guidelines	EU Machine Directive 2006/42/EC
	EMC Directive 2014/30/EU
	Low Voltage Directive 2014/35/EU
	RoHS Directive 2011/65/EU
	WEEE Directive 2002/96/EC
Meets the harmonized standards	DIN EN ISO 12100:2011 Safety of machinery – General principles for design – Risk assessment and risk reduction (ISO 12100:2010)
	EN ISO 13857:2008 Safety of machinery - Safety distances to prevent hazard zones being reached by upper and lower limbs
	EN 60204-1:2009 Safety of machinery – Electrical equipment of machinery, Part 1
	DIN 28132: Agitators; diameters of shafts for agitators

2 About PAGERIS - ESM Agitator

2.1 Description PAGERIS - ESM Agitator

2.1.1 Overview

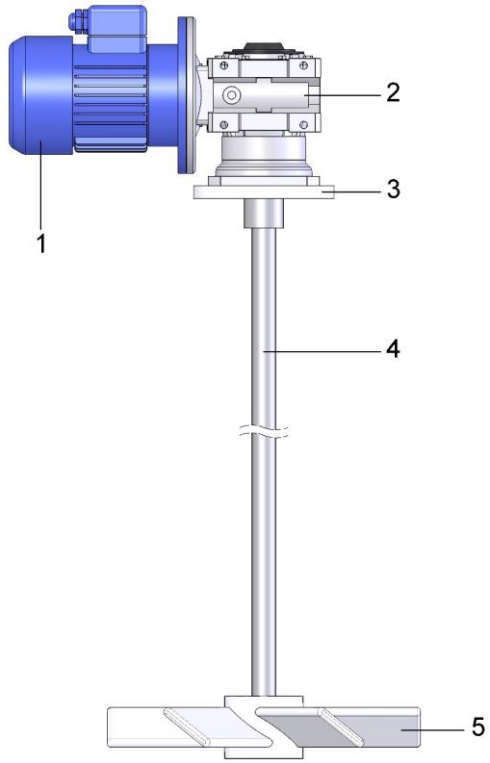


Figure 5 Overview setting up PAGERIS - ESM Agitator (example image)

Item 1 - Electric motor

Item 2 - Gearbox

Item 3 - Sealing flange with shaft seal

Item 4 - Agitator shaft

Item 5 - Agitation impeller

2.1.2 Intended use

The PAGERIS - ESM Agitator may only be put into operation if it has been determined that the machine in which the PAGERIS - ESM Agitator is to be installed complies with the provisions of the directive 2006/42/EC.

The PAGERIS - ESM Agitator is designed exclusively for the "agitation of liquid media" in a "mixing system".

2.1.3 Foreseeable improper use

Any other or extended use of the PAGERIS - ESM Agitator as described in the chapter 2.1.2 Intended use is considered non-compliant and thus inappropriate.

In such cases, the safety in the environment of the machine as well as its protection against destruction can be impaired. The manufacturer assumes no liability for any injury or damage that thereby results.

2.2 Technical specifications

2.2.1 Ambient conditions

The conditions at the place of use of the PAGERIS - ESM Agitator must at least correspond to the conditions listed in this assembly and operating manual as permissible ambient conditions. Admissible are e.g.:

- Non-explosion-endangered environment
- Ambient temperature of -20°C to +40°C
- Relative humidity < 85%
- Installation site maximum 3,000 m above sea level.

Any use under other conditions is prohibited.

2.2.2 Dimensions quick reference

Electric motor

Type	Height [mm]	Diameter of flange [mm]	Weight [kg]
BG63 to BG132	178 … 532	ø 140 … 300	ca. 4 … 60

Gearbox

Type	Width [mm]	Height [mm]	Diameter of flange [mm]	Weight [kg]
ESG45 to ESG130	160 … 360	137 … 265	ø 110 … 320	ca. 3 … 52

Agitator shaft ESG45 to ESG130

Material	Length [mm]	Diameter [mm]	Weight [kg]
Stainless-steel 1.4435	500 … 4.000	ø 20 … 50	ca. 0,7 … 28
Steel with PE-coating	500 … 4.000	ø 22 … 52	ca. 0,7 … 28

Agitation impeller – 6 and 3 bladed

Type	Material	Diameter [mm]	Weight [kg]
SR6	PP	ø 250 … 1050	ca. 0,2 … 3,5
SR6	PVDF	ø 250 … 1000	ca. 0,5 … 7,5
SR3	Stainless-steel 1.4571	ø 300 … 1200	ca. 3 … 12

Sealing flange ESG45 to ESG130

Material	Height [mm]	Diameter of flange [mm]	Weight [kg]
PP	ca. 16	ø 110 … 320	ca. 0,1 … 1,1
PVDF	ca. 16	ø 110 … 320	ca. 0,2 … 2,2

Radial shaft seal ESG45 to ESG130

Type	Material	Diameter [mm]
ø 47/30 x 10 … 110/70 x 10 PTFE	PTFE	ø 47/30 x 10 … 110/70 x 10
ø 47/30 x 10 … 110/70 x 10 NBR	NBR	ø 47/30 x 10 … 110/70 x 10

2.2.3 Speed of electric motor

Winding	RPM @ 50Hz	RPM @ 60Hz
4 poles	1500	1800
6 poles	1000	1200
8 poles	750	900
8/4 poles	750/1500	900/1800

2.2.4 Electrical specification of electric motor

Current type [Hz] 3~Phase	50 ¦¦ 60
Power [kW] 4 poles 6 poles 8 poles	 0,12 … 5,5 0,12 … 2,2 0,06 … 1,1
Max. Voltage [V]	400 ¦¦ 480
Continuous operation	S1
Protection class	IP 55

Current type [Hz] 1~Phase	50 ¦¦ 60
Power [kW] 4 poles	 0,12 … 0,75
Max. Voltage [V]	230 ¦¦ 240
Continuous operation	S1
Protection class	IP 55

2.2.5 Interfaces to external systems

2.2.6 Electrical interfaces

- Terminal box for integration with plant control systems.

2.2.7 Mechanical interfaces

- Flange for affixing the electric motor to the gearbox.
- Flange for affixing to the stirring tank or to the mixing system.
- Attached using bolts.

2.3 Delivery content

- Electric motor,
- Gearbox,
- Agitation shaft,
- Agitation impeller,
- Sealing flange,
- Radial shaft seal.

3 Safety

3.1 Obligations of the operator

The PAGERIS - ESM Agitator is used in the commercial sector. The operator must comply with the legal obligations for occupational health and safety.

In addition to the safety information in this Assembly and Operating Manual , the local safety, accident prevention and environmental protection regulations must be observed.

Particularly important is:

- The operator is obliged to prepare operating instructions for the individual workstations and, if necessary, to adapt these to the current status of the regulations.
- The operator is obliged to renew the labelling and, if applicable, the engravings on the components of the PAGERIS - ESM Agitator so that they are always clearly legible.

This also includes:

- affixing proper grounding,
- implementing access prohibition for unauthorized persons,
- clear signage for all prohibitions.

3.2 Obligations of the personnel

It is only permitted to work with the
PAGERIS - ESM Agitator if the personnel have read and understood this Assembly and Operating Manual.

3.2.1 Requirements for personnel

Only persons who are expected to perform their tasks reliably are permitted as personnel. Persons whose reaction capability is impaired, e.g. through drugs, alcohol or medication, are NOT permitted.

NOTE

We recommend that the operator has this confirmed in writing.

3.2.2 Training of personnel

This Assembly and Operating Manual is aimed at technical personnel with the following qualifications:

Trained / instructed staff
Personnel who have been instructed and trained in the duties with which they are entrusted and the risks which may arise from incorrect behavior. These personnel have also been advised on the necessary protective devices and precautions. People who are being trained or introduced to the job or undergoing general training should only be allowed to work with the unit under constant supervision of an experienced person.

Technical personnel
The qualified personnel must be able to carry out the work assigned to them and possess adequate professional training, experience and knowledge as well as the knowledge of relevant regulations in order to independently recognize and avoid potential hazards.

Electrician
The electrician must be certified in the specific purview of their activities and know the relevant standards and regulations. They must be able to carry out work on electrical systems and possess adequate training to independently recognize and avoid potential hazards.

3.3 General safety regulations

A detailed explanation of the symbols can be found in chapter 1.4 Legend.

Certain activities may be subject to specific safety requirements. Safety and warning information can be found in the respective chapters of this Assembly and Operating Manual.

3.3.1 Basics

The local safety, accident prevention and environmental regulations must also be observed for the operation of the PAGERIS - ESM Agitator.

The PAGERIS - ESM Agitator should only be operated:

- in accordance with regulations, with regard to safety and potential hazards and in compliance with this Assembly and Operating Manual,
- if all safety equipment is in place and fully functional and,
- when the agitator is in perfect technical condition.

This also includes:

- The labels attached to the agitator must always be complete and clearly legible. Replace damaged or illegible labels.
- Perform configuration and/or maintenance only when the agitator is switched off and secured from being switched on again.
- Clean the working area daily of dirt and contamination.
- Tie back long hair and use a hairnet if necessary.
- Do not wear loose and/or hanging clothing, scarves, ties or jewelry when working with/on the agitator.

3.3.2 Personal protective equipment

Depending on the nature of the mixing medium, use suitable personal protective equipment:

- Eye protection,
- protective clothing,
- protective gloves,
- safety footwear,
- hearing protection,
- light respiratory protection.

3.4 Protection and warning devices

Before initial operation, all safety equipment must be properly attached and functional.

Safety equipment may only be removed

- if there are no persons in the hazard area of the agitator,
- if the agitator is switched off and secured from being switched on again,
- if the area around the agitator is secured against unauthorized access.

DANGER

Possible serious injuries due to the overriding of safety equipment.

- If the disassembly of safety equipment is required, reassemble it immediately after the completion of work.
- Ensure that the safety equipment is fully functional before switching on the agitator.

3.4.1 Control and monitoring of the mixing system

The PAGERIS - ESM Agitator is delivered without electrical components, e.g. circuit breaker, control unit, level monitoring.

To ensure that the agitation impeller is always immersed sufficiently deeply in the mixing medium, a redundant level monitoring of the mixing medium in accordance with EN IEC 61511 (SIL 2) must be provided by the operator.

3.4.2 Separating protective equipment

Secure the agitator against contact during operation, e.g. with:

Access cover

- Shaft protection
- Guard tube
- Access cover on the container

Control unit (half open containers)

- Two-hand control with self-monitoring and synchronous actuation of control elements
- Command device with automatic reset outside the hazard zone or switch-off device at the edge of the cover

3.5 General warnings

Possible irreversible injuries due to uncontrolled startup.

- Only undertake work on the agitator if you have been sufficiently well trained.
- Ensure that the mixing system is secured against unintentional startup before undertaking any work on the agitator.
- Assign a second person who, in case of emergency, activates the emergency stop of the mixing system.

Possible impacts and/or injuries due to the tipping over of the container or ejection of liquids.

- Use only approved and undamaged containers that fit the container mount.
- Regularly clean the agitator shaft and agitation impeller of deposits to avoid imbalances and the tipping over of the container.
- Use eye protection and protective gloves.

Possible injuries due to slipping or tripping.

- Remove loose cables and objects from the floor of the working area.
- Arrange and lay all cables in such a way that no tripping hazards arise.
- Always keep the working area clean and dry.
- Use safety footwear.

3.6 Mechanical hazards

Crushing of the limbs and/or possible entrapment due to incorrect operation or negligence.

- Only operate the agitator when there are no persons in the hazard area.
- In the event of disruptions and emergencies, immediately activate the emergency stop of the mixing system.
- Use protective gloves and safety footwear.

3.7 Electrical hazards

Possible life-threatening electric shocks due to voltaged parts.

- Work on electrical components may only be carried out by a certified electrician.
- When working on voltaged parts, assign a second person to operate the emergency stop of the mixing system in case of an emergency.

- Always close the electrical cabinet of the mixing system and keep the keys out of the reach of unauthorized persons.
- Regularly check electrical components for damage and wear. Immediately remove any loose connections and/or damaged cables.

3.8 Hazards from materials / substances

Possible injuries through contact with hazardous substances.

- Consult the safety data sheets of the used mixing media.
- Avoid skin contact with the used mixing media.
- Depending on the nature of the mixing medium, use suitable personal protective equipment.

3.9 Ergonomic hazards

Possible disorders due to unilaterally straining physical work.

- Keep the displays and controls clean and clearly legible.
- Make sure to maintain a healthy posture.

3.10 Hazards from operational environment

Possible serious injury due to explosion.

- Dangerous electrostatic charging of non-conductive parts and materials, including solids, liquids and dusts, may occur.
- **Operation in a potentially explosive atmosphere is not permitted.**

4 Preparation for use

4.1 Setting up PAGERIS - ESM Agitator

Electric motor,
Gearbox,
Agitation shaft,
Agitation impeller,
Sealing flange with radial shaft seal.

4.2 Transport and storage

4.2.1 Transportation

WARNING

Possible impacts from dropping the agitator from the means of transportation.

- Do not step or reach underneath the suspended load.
- Secure the agitator to the means of transportation.
- Pay attention to the weight and maximum dimensions of the agitators.
- Use protective gloves and safety footwear

The PAGERIS - ESM Agitator is delivered by freight carrier.

Check the condition of the agitator immediately after delivery. Record any shipping damage in writing (and photographically) and report this immediately to both the carrier and the manufacturer or supplier.

4.2.2 Center of gravity and anchor points

Components	Center of gravity	Anchor points
Agitation impeller	Central	-
Agitation shaft	Center	-
Electric motor	Center	Flange
Gearbox	Center	Flange

4.2.3 Packaging

The disposal of the packaging must be in accordance with local disposal regulations and environmental laws.

The packaging is made of cardboard or wood and is fully recyclable.

4.2.4 Storage

- The agitator should be stored on a level, firm and clean surface.
- Do NOT store the agitator outdoors.
- Store the agitator shaft for as long as possible in the original packaging.
- Secure the components of the agitator against deformation during positioning.
- Avoid lateral forces on the agitator shaft.

Storage temperature [°C]	5 - 30
Relative humidity [%]	< 70

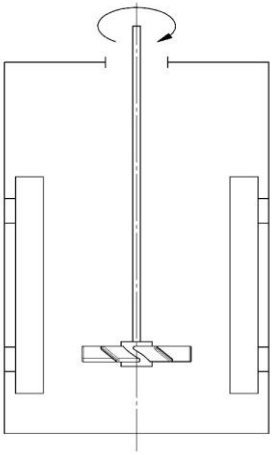
4.3 Assembly

4.3.1 Installation and assembly instructions

Please observe the following notes for setting up and assembling the agitator:

- Only undertake work on the agitator if you have been sufficiently well trained.
- Use only approved and undamaged containers.
- Position the agitator on a level surface.

- Use a bracket to secure the agitator and the container to the mixing system.
- Avoid imbalances during operation.
- During lateral positioning, leave enough space between the agitation impeller and the wall of the container.
- Do not reach between the intersections of the individual components and/or the mixing system.
- Use protective gloves and safety footwear.



To avoid rotating the mixing medium without actual agitation in the cylindrical container, install at least 3 baffles laterally in the container.

Baffles are usually not required in rectangular containers.

Figure 6 Assembling the baffles

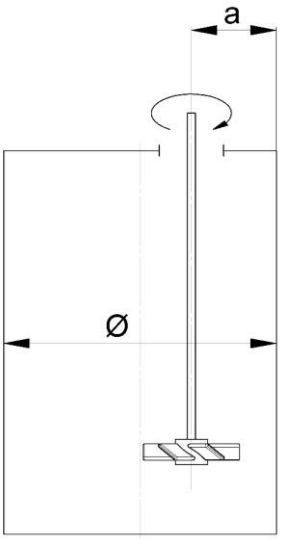


Figure 7 Distances

Where applicable, a vertical, off-center arrangement of the agitator is sufficient in cylindrical containers to prevent rotation of the mixing medium without agitation.

The following rule of thumb serves as a guideline:

$$\text{Wall clearance [a]} \cong \frac{\text{Diameter [ø]}}{3{,}5}$$

4.3.2 Assembling motor and gearbox

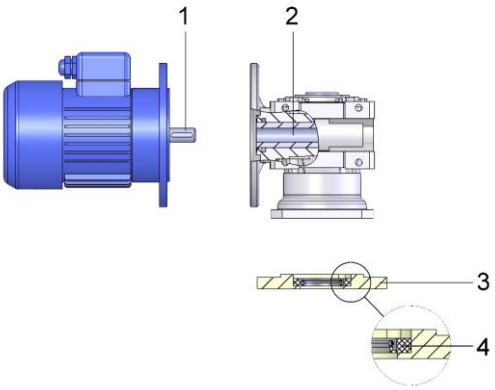


Figure 8 Motor und gearbox

Item 1 - Motor shaft

Item 2 - Motor shaft inlet

Item 3 - Sealing flange (optional)

Item 4 - Radial shaft seal (optional)

To assemble the PAGERIS - ESM Agitator , proceed as follows:

1. Switch off the master switch of the mixing system and secure it against being switched on again.
2. Before assembling, check the rating plates of all components for conformity.
3. Clean and lightly grease the contact surfaces of the motor shaft (Item 1) and the motor shaft inlet (Item 2).
4. Carefully push the motor onto the gearbox.
5. Tighten 4 suitable bolts to the motor flange to secure it to the gearbox.
6. Lightly grease the radial shaft seal (Item 4) in the sealing flange (Item 3).

7. Push the sealing flange (Item 3) with the centering of the flange in the direction of the gear unit until the flat surfaces of the sealing flange and gearbox flange are in contact with each other.
8. Hang the preassembled unit on a crane using suitable lifting equipment, and position it in the correct position on the mixing system, e.g. on a crossbeam. on a crossbeam.

WARNING

Possible impacts from dropping the electric motor or gearbox from the means of transportation.

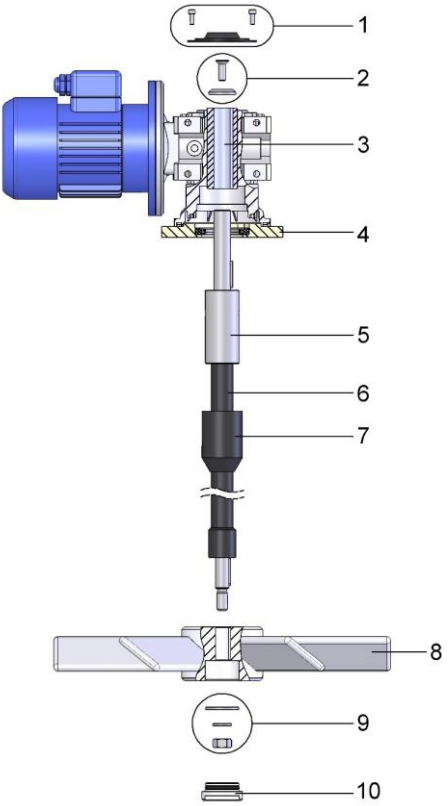
- Do not step or reach underneath the suspended load.
- Use only suitable and undamaged lifting equipment.
- Secure the components whilst still on the means of transportation.
- Note the weights and maximum dimensions of the components.
- Use protective gloves and safety footwear.

9. Tighten 4 suitable bolts in the gearbox flange to secure it to the mixing system.

✓ The motor and gearbox are now assembled.

At this point, it is recommended to carry out the electrical installation in accordance with chapter 4.4 in order to check the direction of rotation.

4.3.3 Assembling the agitator shaft



Item 1 - Gearbox cover

Item 2 - Tension rod plate and bolt

Item 3 - Shaft inlet

Item 4 - Sealing flange with radial shaft seal (optional)

Item 5 - Shaft coupling

Item 6 - Agitator shaft

Item 7 - Coupling protection sleeve (only if shaft is coated)

Item 8 - Agitator impeller

Item 9 - Pressure disk, nut

Item 10 - Protective cover

Figure 9 Agitator shaft

To assemble PAGERIS - ESM Agitator, proceed as follows:

1. Switch off the master switch of the mixing system and secure it against being switched on again.
2. Assemble the motor and gearbox; see chapter 4.3.2.
3. Loosen and remove the bolts on the gearbox cover (Item 1).
4. Loosen and remove the tension rod plate and the bolts (Item 2).

5. Clean and lightly grease the contact surfaces of the shaft inlet (Item 3) in the gearbox and the agitator shaft (Item 6) as well as the shaft coupling (Item 5).
6. From underneath, push the agitator shaft (Item 6) and the shaft coupling (Item 5) through the sealing flange (Item 4) into the shaft inlet (Item 3) as far as it will go. When doing this, pay attention to the correct alignment of the feather key.
7. Assemble the tension rod plate and the bolts (Item 2) and tighten them with the appropriate torque (see Table 1: Tightening torque).
8. In the case of a plastic-coated shaft, push the coupling protection sleeve (Item 7) flat against the radial shaft seal (Item 4) without pressure (only press, do not press through).
9. Attach the gearbox cover (Item 1).
10. Loosen the nut, thrust washer (Item 9) and the protective cover (Item 10) and remove them.
11. From below, slide the agitation impeller (Item 8) onto the shaft. When doing this, pay attention to the correct alignment of the feather key.
12. Mount the nut, pressure disk (Item 9) and protective cover (Item 10).

✓ The PAGERIS - ESM Agitator is assembled.

Tightening torques for bolts (Item 2)

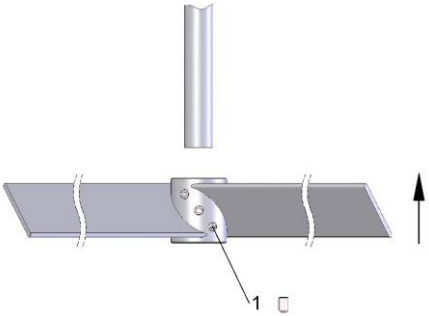
M8	max. 7 Nm
M10	max. 14 Nm
M12	max. 25 Nm
M16	max. 50 Nm

Table 1: Tightening torque

NOTE

If a propeller with an M16 thread (customized version) is used instead of an oblique blade agitator, the agitator may only be operated in such a way that the shaft rotates clockwise when viewed from above.

4.3.4 Assembling adjustable impellers



Item 1 - Threaded pressure pins

Figure 10 Adjustable impellers

To mount an adjustable impeller, proceed as follows:

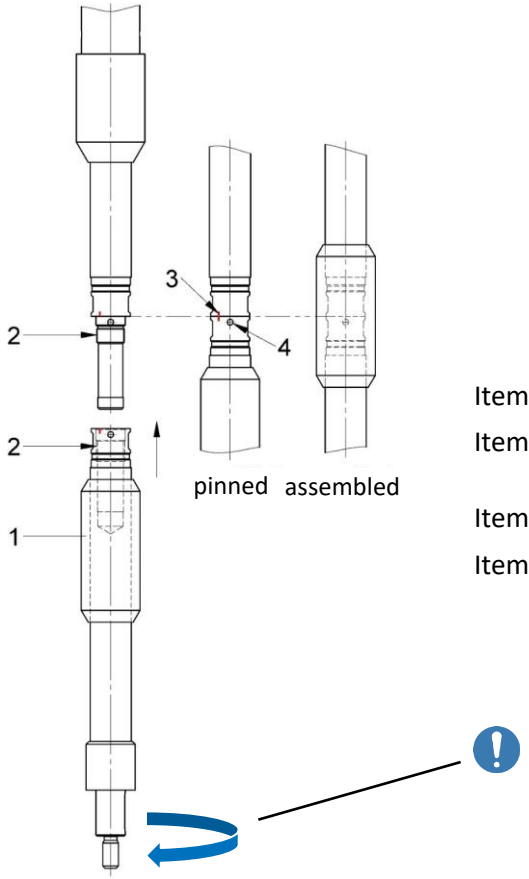
1. From below, slide the agitation impeller onto the shaft.
2. Position the blades at the desired height and tighten all threaded pins (Item 1) with an appropriate torque (see Table 2: Tightening torques for threaded pressure pins).

Tightening torques for threaded pins on the agitation impeller

M10	max. 16 Nm
M16	max. 65 Nm

Table 2: Tightening torques for threaded pressure pins

4.3.5 Assembling two-piece agitator shafts



Item 1 - Sealing sleeve

Item 2 - Threads / contact surfaces

Item 3 - Marking

Item 4 - Taper pins

Figure 11 Two-piece agitator shaft

NOTE

In order for the screw coupling to not loosen, the agitator may only be operated in such a way that the shaft rotates clockwise when viewed from above.

To assemble PAGERIS - ESM Agitator with a split shaft, proceed as follows:

1. If it is a plastic-coated shaft, push the sealing sleeve (Item 1) on the upper part of the shaft away from the threaded coupling so that you have unrestricted access.
2. To assemble the upper part of the shaft, perform steps 1 - 9 of chapter 4.3.3.
3. Clean and generously grease both contact surfaces of the threaded coupling (Item 2).
4. By hand, carefully screw in the lower shaft piece. Ensure that the thread is not jammed or tilted. Only at the very end of this process, use a tool to tighten the shaft so that the markings (Item 3) overlap on both shaft parts.
5. Insert the taper pin.
6. For plastic-coated shafts, lubricate the plastic above and below the threaded coupling with soapy water and then push the sealing sleeve over the threaded coupling. When completed, no metal should be exposed.
7. To assemble the agitation impeller, perform steps 10 - 12 of chapter 4.3.3.

✓ The PAGERIS - ESM Agitator is assembled.

4.4 Electrical installation

DANGER

Possible life-threatening electric shocks due to voltaged parts.

- Work on electrical components may only be carried out by a certified electrician.
- Ensure that the mixing system is secured against unintentional startup before undertaking any work on the agitator.
- When working on voltaged parts, assign a second person to operate the emergency stop of the mixing system in case of an emergency.

To assemble the PAGERIS - ESM Agitator, proceed as follows:

1. Assemble the PAGERIS - ESM Agitator, see chapter 4.3 Assembly.
2. Before assembling, check the rating plates of all components for conformity.
3. Check the direction of rotation of the electric motor so that the agitation impeller conveys the medium downwards (clockwise rotation).
4. Connect the electric motor to the control system of the mixing system; see chapter 1.1.1 Related documents.
5. Perform a grounding measurement and record the results of the measurement.

✓ The PAGERIS - ESM Agitator is installed.

4.5 Initial operation

The initial operation requires a conformity assessment procedure, which is the basis for the EC conformity assessment and marking.

DANGER

Possible serious injuries due to the overriding of safety equipment.

- Ensure that the safety equipment is fully functional before switching on the agitator.

WARNING

Possible injuries due to the deflection of the agitator shaft

- Make sure that the running of the agitator is steady and low-vibration.
- Ensure that the agitation impeller is immersed to at least half of its diameter.

Consult the following notes on the initial operation of the agitator:

- Before initial operation, check all connections and hose lines for damage and/or loose connections.
- Use a bracket to secure the container to the mixing system.
- Observe the safety data sheets of the used mixing media.
- Observe the specified limit values; see chapter 2.2 Technical specifications.

5 Operating the PAGERIS - ESM Agitator

5.1 General

WARNING

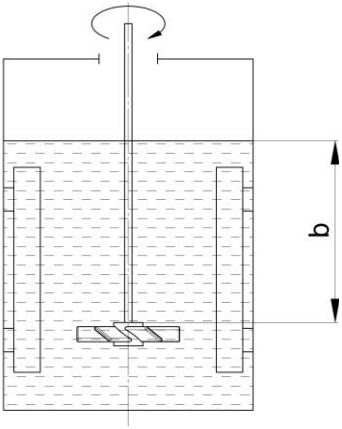
Possible injuries due to splashing of the mixing medium.

- Depending on the nature of the mixing medium, use suitable personal protective equipment.
- During normal operation (medium conveyed downwards), the distance between the blade and the floor should be at least half of the blade diameter.

ATTENTION

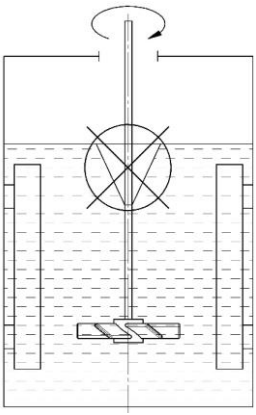
Possible minor burns due to hot surfaces.

- Do not touch hot surfaces during operation, e.g. the electric motor casing.
- The radial shaft seal is not a pressure seal and serves only to limit emissions (vapors and splashes).



During normal operation, the immersion depth (dimension b) of the agitation impeller in the mixing medium must be at least half of the blade diameter.

If possible, avoid lowering the liquid level to the level of the agitation impeller during operation.



To avoid vibration, avoid the formation of strong vortexes.

Where applicable, increase the level of the mixing medium until the vortex dissipates. Alternatively, the agitator can also be run in the reverse direction, so that the medium is conveyed upwards.

ATTENTION

Crushing of the limbs and/or possible entrapment due to incorrect operation or negligence.

- Only operate the agitator when there are no persons in the hazard area.
- In the event of disruptions and emergencies, immediately activate the emergency stop of the mixing system.

Observe the following notes on the operation of the agitator:

- Before operation, check all connections and hose lines for damage and/or loose connections.
- Only operate the agitator with the container closed.
- Make sure that the running of the agitator is steady and low-vibration.
- Observe the safety data sheets of the used mixing media.
- Observe the specified limit values; see chapter 2.2 Technical specifications.
- Pay attention to the safety instructions of the operator

5.2 Procedure for blockages

Contact the manufacturer.

5.3 Exceptional / emergency situations

Press the emergency stop switch of the mixing system:

- If there is a risk of injury,
- If there is a risk of damaging the mixing system or agitator.

Observe the operating manual of the mixing system.

Take immediate action in the event of an accident and call the local emergency number.

6 Malfunction

6.1 Procedure for malfunctions

For troubleshooting, please also observe the related documents; see chapter 1.1.1 Related documents.

In case of malfunction, proceed as follows:

1. Contact the maintenance personnel.
2. Ensure that there is no danger to persons or objects. In case of imminent risk, use the emergency stop function of the mixing system.
3. Determine the cause of the malfunction.
4. If you have to enter the hazard area of the mixing system, inform the person responsible at the site of operation.
5. Turn off the mixing system after depressurization and loss off energy.
6. Use the fault table to check whether you can rectify the malfunction yourself or have this performed by authorized personnel.
7. If the malfunction has not been caused by the agitator, refer to the operating manual of the mixing system.

6.1.1 Troubleshooting and fault resolution

Fault	Cause	Corrective action	Rectification by
Vibration / imbalance during operation	Incorrect / loose attachment of the agitator	Check fixation of agitator, reattach if necessary	Technical personnel
	Agitator shaft bent	Check concentricity of agitator shaft, replace if necessary	Technical personnel
Formation of a vortex during operation	Mixing medium rotates	Add flow breakers in the container	Technical personnel
	Insufficient immersion depth	Increase liquid level	Operator
Unusual running noises	Bearings defective	Exchange bearings by specialist	Customer service

6.1.2 Initial operation after resolution of malfunctions

Visually inspect the components of the agitator for damage and/or contamination.

Replace damaged parts or clean the agitator if it is heavily contaminated.

7 Servicing and maintenance

7.1 General

ATTENTION

Possible minor burns due to hot surfaces.

- Before working on the agitator, ensure that the surfaces (electric motor) have cooled down sufficiently.

Please observe the following notes on maintenance:

- Only undertake work on the agitator if you have been sufficiently well trained.
- Do not reach between the intersections of the individual components and/or the mixing system.
- Use protective gloves and safety footwear.
- The procedure for the maintenance of the electric motor is described in its manual; see chapter 1.1.1 Related documents.
- Use suitable cleaning agents.
- Observe the safety instructions provided by the respective manufacturer of the cleaning agents.
- Clean the agitator of deposits.

7.2 Servicing and maintenance schedule

Adjust the maintenance interval depending on the conditions at the place of use and the nature of the mixing medium.

The maintenance of the motor is based on the operating manual of the motor (see chapter 1.1.1 Related documents) or if not further specified, according to the table below.

In case of damage and wear, order the necessary spare parts from the supplier / manufacturer.

Interval	Maintenance work
Daily	Cleaning
Monthly	Visual inspection for damage and wear Check the radial shaft seal (Item 5) and replace if necessary.
Every 24 months or 20,000 operating hours	Inspection and maintenance of the electric motor in accordance with The operating manual of the motor (see chapter 1.1.1 Related documents)
Every 4,000 operating hours	For gearboxes with size ≥ 110: Changing the oil of the gearbox in accordance with the operating manual for the gearbox (see chapter 1.1.1 Related documents). Note the filling quantity as stated on the nameplate.

7.2.1 Replacing the radial shaft seal

WARNING

Possible irreversible injuries due to uncontrolled startup.

- Only undertake work on the agitator if you have been sufficiently well trained.
- Ensure that the mixing system is secured against unintentional startup before undertaking any work on the agitator.
- Assign a second person who, in case of emergency, activates the emergency stop of the mixing system.

To replace the radial shaft seal, proceed as follows:

1. Switch off the master switch of the mixing system and secure it against being switched on again.
2. Disassemble the sealing flange; see chapter 8.3 Disassembly.
3. Loosen the fastening bolts on the radial shaft seal.
4. Remove the radial shaft seal.
5. Insert a new radial shaft seal.
6. Tighten the fastening bolts on the radial shaft seal.
7. Assemble the sealing flange; see chapter 4.3 Assembly.
8. Check the agitator for proper functioning.

✓ The radial shaft seal is replaced.

7.2.2 Replacing the agitation impeller

WARNING

Possible irreversible injuries due to uncontrolled startup.

- Only undertake work on the agitator if you have been sufficiently well trained.
- Ensure that the mixing system is secured against unintentional startup before undertaking any work on the agitator.
- Assign a second person who, in case of emergency, activates the emergency stop of the mixing system.

To replace the agitation impeller, proceed as follows:

1. Switch off the master switch of the mixing system and secure it against being switched on again.
2. Clean the agitator of deposits.
3. Disassemble the agitation impeller; see chapter 8.3 Disassembly.
4. Assemble a suitable, undamaged agitation impeller; see chapter 4.3 Assembly.
5. Check the agitator for proper functioning.

✓ The agitation impeller is replaced.

8 Decommissioning

8.1 General

ATTENTION

Possible minor burns due to hot surfaces.

- Before working on the agitator, ensure that the surfaces (electric motor) have cooled down sufficiently.

Please observe the following notes on shutting down and disassembling the agitator:

- Only undertake work on the agitator if you have been sufficiently well trained.
- Do not reach between the intersections of the individual components and/or the mixing system.
- Use protective gloves and safety footwear.

8.2 Electrical uninstallation

DANGER

Possible life-threatening electric shocks due to voltaged parts.

- Work on electrical components may only be carried out by a certified electrician.
- Ensure that the mixing system is secured against unintentional startup before undertaking any work on the agitator.
- When working on voltaged parts, assign a second person to operate the emergency stop of the mixing system in case of an emergency.

To disassemble PAGERIS - ESM Agitator, proceed as follows:

1. Switch off the master switch of the mixing system and secure it against being switched on again.

2. Disconnect the electric motor from the control systems of the mixing system; see chapter 1.1.1 Related documents.

✓ The PAGERIS - ESM Agitator is uninstalled.

8.3 Disassembly

8.3.1 Disassembly agitator shaft

NOTE

The item numbers refer to Figure 9 Agitator shaft.

WARNING

Possible irreversible injuries due to uncontrolled startup.

- Ensure that the mixing system is secured against unintentional startup before undertaking any work on the agitator.
- Assign a second person who, in case of emergency, activates the emergency stop of the mixing system.

To disassemble the PAGERIS - ESM Agitator, proceed as follows:

1. Switch off the master switch of the mixing system and secure it against being switched on again.
2. Loosen the protective cover (Item 10), the nut and pressure disk (Item 9) or threaded pin, and remove these items.
3. Pull off the agitation impeller (Item 8).
4. For a split shaft: push the sealing sleeve upwards, remove the taper pin and loosen the threaded coupling with a suitable tool. Then unscrew the lower part of the shaft.
5. Loosen and remove the gearbox cover (Item 1).

6. Loosen the bolt and the tension rod plate (Item 2).
7. Pull the agitator shaft (Item 6) downwards out of the shaft inlet (Item 3).
8. Screw the bolt, tension rod plate (Item 2), nut, pressure disk (Item 9) or threaded pin and gearbox cover (Item 1) back in so that they are not lost.

✓ The PAGERIS - ESM Agitator shaft is disassembled.

8.3.2 Disassembly motor and gearbox

NOTE

The item numbers refer to Figure 8 Motor und gearbox.

WARNING

Possible irreversible injuries due to uncontrolled startup.

- Ensure that the mixing system is secured against unintentional startup before undertaking any work on the agitator.
- Assign a second person who, in case of emergency, activates the emergency stop of the mixing system.

To disassemble the PAGERIS - ESM Agitator, proceed as follows:

1. Switch off the master switch of the mixing system and secure it against being switched on again.
2. Loosen the 4 fastening bolts of the gearbox flange.

WARNING

Possible impacts by dropping the electric motor from the means of transportation.

- Do not step or reach underneath the suspended load.
- Use only suitable and undamaged lifting equipment.
- Secure the electric motor to the means of transportation.
- Note the weight and maximum dimensions of the electric motor.
- Use protective gloves and safety footwear.

3. Using suitable lifting equipment, hang the electric motor and the gearbox (together as a single unit) on a crane.
4. Pull the sealing flange (Item 3) off the gearbox flange.
5. Pull the motor off the gearbox.
6. Screw in the removed bolts again so that they are not lost.

✓ The PAGERIS - ESM Agitator is disassembled.

8.4 Storage

Please also observe the related documents; see 1.1.1 Related documents.

WARNING

Possible severe injuries due to imbalances caused by incorrect storage.

- Avoid lateral forces on the agitator shaft so that it does not bend.
  A bent agitator shaft can cause an imbalance in operation.
- Do NOT store the agitator outdoors.

For storage, proceed as follows:

1. Clean the agitator of contaminants and grease slightly, if necessary.
2. Pack the agitator properly, where applicable using the original packaging.
3. The agitator should be stored on a level, firm and clean surface.
4. Avoid lateral forces on the agitator shaft.
5. Secure the agitator against deformation during positioning.

Storage temperature [°C]	5 - 30
Relative humidity [%]	< 70

8.5 Disposal and recycling

If the PAGERIS - ESM Agitator has reached the end of its life cycle, the disassembly must result in safe and proper disposal, in particular of environmentally harmful parts and/or substances.

Disposal of the PAGERIS - ESM Agitator (including operating equipment) must take due account of local disposal regulations and environmental laws.

Cleaning agents and fluids used in the course of maintenance must be disposed of in accordance with statutory regulations.

To avoid risks to the environment, an authorized specialist company must be commissioned with proper disposal. Your local authorities can provide you with more information.

Materials that can be recycled must be disposed of properly with consideration for the environment.

The packaging material consists of cardboard or wood and must be recycled separately in an environmentally sound manner according to the materials used.

9 Appendix

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