

M-000002 REV B

# Kest Mixer, KM

Installation and operation manual

# TABLE OF CONTENTS

|   |    |
|---|----|
| LEGEND  | 3  |
| INTRODUCTION                                      | 4  |
| DISPOSAL OF OLD EQUIPMENT                         | 4  |
| HANDLING/UNPACKING                                | 4  |
| SAFETY TO AVOID PERSONAL INJURY                   | 5  |
| PRECAUTIONS TO AVOID PRODUCT DAMAGE               | 5  |
| KEST MIXER KM, GENERAL INFORMATION                | 6  |
| KEST MIXER KM - PART DESCRIPTION                  | 7  |
| MECHANICAL INSTALLATION                           | 9  |
| ELECTRICAL INSTALLATION                           | 12 |
| OPERATION   | 14 |
| CLEANING AND STERILIZING                          | 17 |
| SPARE PARTS & TOOLS                               | 18 |
| APPENDIX A - INSTALLATION CHECKLIST               | 19 |
| APPENDIX B - INSTALLATION QUALIFICATION CHECKLIST | 20 |
| APPENDIX C - MAINTENANCE CHECKLIST                | 21 |
| APPENDIX D - ISO9001:2015 CERTIFICATE             | 23 |
| APPENDIX E - ISO14001:2015 CERTIFICATE            | 24 |

## Notice

The information in this document is subject to change without notice and should not be construed as a commitment by Kest Technology AB or Kest Technology Inc. Kest Technology AB or Kest Technology Inc. assumes no responsibility for any errors that may appear in this document. This manual is believed to be complete and accurate at the time of publication. In no event shall Kest Technology AB or Kest Technology Inc. be liable for incidental or consequential damages in connection with or arising from the use of this manual.

# LEGEND



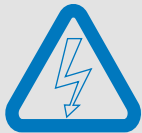
WARNING, TO NEGLECT THIS WARNING CAN RESULT IN PERSONAL AND OR EQUIPMENT DAMAGE.



NOT ALLOWED FOR PERSONS WITH PACEMAKERS TO PERFORM MAINTENANCE ON THE EQUIPMENT.



BE CAREFUL, ITEM CONTAINS STRONG MAGNETS THAT CAN CAUSE PERSONAL AND OR EQUIPMENT DAMAGE.



WARNING, ELECTRICAL INSTALLATION - SHALL BE HANDLE BY AUTHORIZED PERSONAL.



READ THIS PART CLOSELY OBSERVE THAT MORE DOCUMENTS CAN BE AVAILA-  
BLE.

# INTRODUCTION

Thank you for selecting Kest Mixer KM, by reading this manual you will ensure that you get most out of the product. This manual cover mixer parts, installation and operation of the Kest Mixer KM. Additional to this document, manuals for motor and gear box are included separately.

For the installation of the Tank plate read our separate welding instruction delivered with the Tank plate. Always use Kest welding tool during welding operation, to avoid warpage of the tank plate.

The Kest Mixers KM are supplied as a partly completed machinery according to Directive 2006/42/EC. The intended use for KM Mixer is to be installed on a closed tank or vessel where it is utilized to mix liquids and incorporate solid powder into liquids. The mixer is supposed to be used in an indoor environment, protected from weather and wind. The mixer must not be modified, operated outside specified limitations or intended use.

**The instructions in this manual are recommendations and focused on the component, the mixer. Any local legislation or internal procedure etc. shall override the recommendations in this manual. If the local legislation or internal procedure etc. contradicts with the instructions in this manual concerning personal safety or preventing equipment damage, please contact Kest Tecnology AB or our local representative for consultation.**

# DISPOSAL OF OLD EQUIPMENT

This symbol indicates that this equipment should not be disposed of with general household waste. The equipment shall be handed over to the applicable collection point for recycling, so that the material can be disposed of in a responsible manner, in accordance with your national legislation.

Dispose the packaging material at applicable collection point for recycling.

By disposing of this product correctly, you will help to conserve natural resources and will help prevent potential negative effects on the environment and human health.

**SAVE THE PLANET!**



# HANDLING/UNPACKING

**Handling** - The mixer contains strong magnets and shall not be handled by persons with pacemakers. The Kest Mixer is delivered in different sizes, depending on mixer size you might need an appropriate lifting device to move or lift the mixer. Handle all parts with care, if dropped or exposed to physical stress the equipment can be damaged. Keep the equipment dry.

**Transportation/Storage** - The symbols on the packaging gives instructions for transportation and storage conditions.

**Unpacking** - Check that the package contains all ordered parts and documentation. It is recommended that you keep the protective plastic bag on the Mixing head and Outer driving head until installation, to prevent the magnets to attract magnetic particles. Handle all parts with care, if dropped or exposed to physical stress the equipment can be damaged. It is recommended to store the equipment in the packaging until installation.



THE MIXER CONTAINS STRONG MAGNETS - NOT ALLOWED FOR PERSONS WITH PACEMAKERS TO HANDLE THE EQUIPMENT.

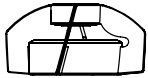
# SAFETY TO AVOID PERSONAL INJURY

- **Personnel with Pacemakers or other implants that might be affected by magnetic field shall not perform maintenance or handle the equipment.**
- The mixer contains strong magnets that can cause personal injury due to the strong magnetic force during connection of the components - be aware of the clamp risk.
- The Drive unit and Mixing head includes rotating parts during operation, keep away to avoid injury.
- Be aware that during operation some mixer parts may become hot.
- All personnel shall use the appropriate protection equipment during installation, operation and maintenance of the Mixer.
- Electrical installation shall be performed by authorized electrician, the mixer drive unit shall be properly grounded.
- All personnel handling the Kest-Mixer shall have read and understood this manual before installing, maintenance or operate the equipment. Failure to do this can result in personal injury and/or damage of the Kest-Mixer.

# PRECAUTIONS TO AVOID PRODUCT DAMAGE

- Make sure to closely follow the welding guideline when installing the tank plate - a warped tank plate will cause the mixer to malfunction.
- It is important to follow the mounting sequence of the mixer parts, deviation can cause damage on the mixer.
- Keep a protective plastic bag on the Mixing head and Outer driving head until installation - the magnets will attract magnetic particles.
- The ceramic material in the Female bearing and Male post are hard but brittle and shall be handled with care. If exposed to physical stress they might get damaged.
- Secure that the tank plate and male post is dry during installation - liquid trapped under the male post during installation might cause the O-ring to burst outwards during SIP. This might cause the male post to unscrew and damage the mixer.
- Handle the Outer driving head on the Drive unit with care - if it gets knocked out of position the shaft needs to be replaced.
- Before starting the mixer, secure that the drive unit rotates in the correct direction.
- Secure that the Outer driving head rotates freely without touching the inside surface of the tank plate.
- The mixer needs to be operated by a frequency converter in order to adjust the speed, control soft start/stop. Trying to run the mixer without a soft start/stop can damage the mixer.
- Never install or remove the mixing head with the drive unit installed - this might damage the bearing.
- The Mixing Head and Male post must be covered by liquid during continues operation.
- The CIP/SIP process will not remove magnetic particles - secure that the process does not contain magnetic particles.
- The strong magnets in the mixer can damage magnetically stored media, keep away from hard drives, credit cards etc.
- Clean the mixer drive unit with a damp cloth, do not flush the mixer drive unit with water.

# KEST MIXER KM, GENERAL INFORMATION



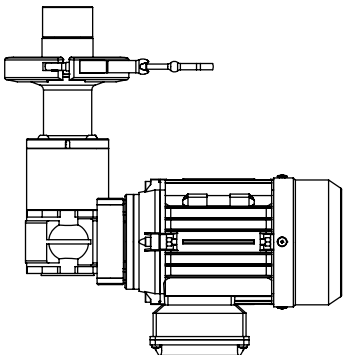
Mixing Head



Male Post



Tank Plate



Drive Unit

Picture 1: Mixer modules.

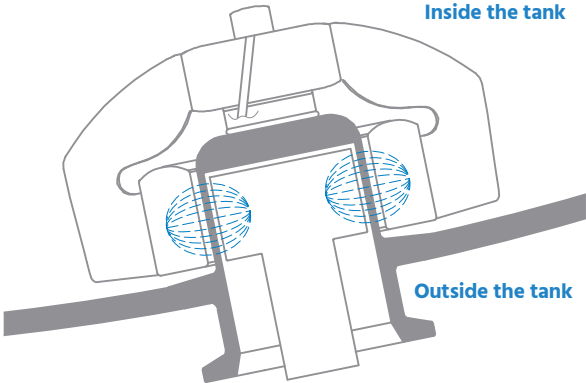
The Kest Mixer is a magnetically coupled mixer containing 4 modules, Mixing head, Male Post, Tank plate and Drive Unit, see Picture 1.

The Tank plate is welded into the bottom dish of the tank and becomes a part of the tank wall.

The Mixing head and Male post is mounted on the tank plate inside the tank.

On the outside the drive unit couples with the mixing head inside the tank through magnetic forces. This means you have no openings in the tank wall and ensures total integrity of the tank, see Picture 2.

When installing the tank plate, make sure to use our welding tool and to follow the separate welding guideline.



Picture 2: The Drive Unit connects to the Mixing head magnetically from the outside through the stainless steel of the tank plate.

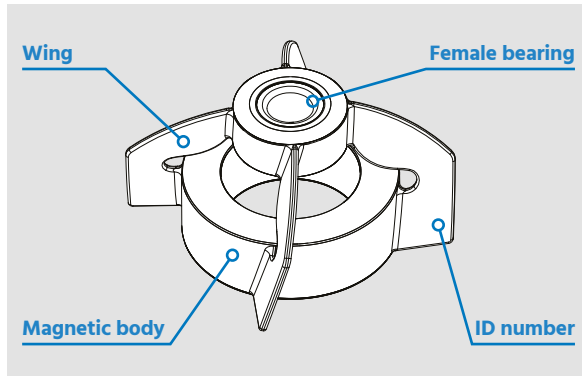


THE DRIVE UNIT IS TO BE OPERATED BY FREQUENCY CONVERTER. CONVERTER PARAMETERS TO BE VALIDATED FOR EACH PROCESS APPLICATION IN RELATION TO VOLUME, VISCOSITY ETC.



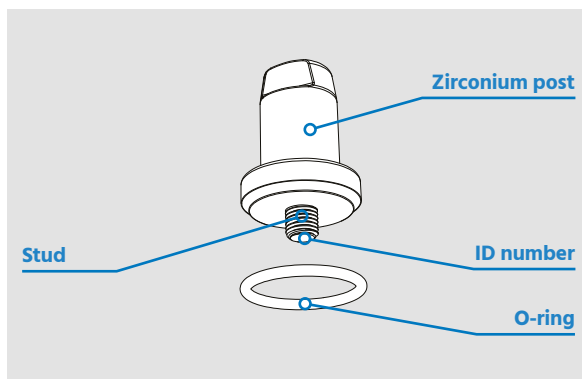
ALWAYS USE A WELDING TOOL AND FOLLOW THE WELDING GUIDE LINE WHEN INSTALLING A KEST MIXER TANK PLATE

# KEST MIXER KM - PART DESCRIPTION



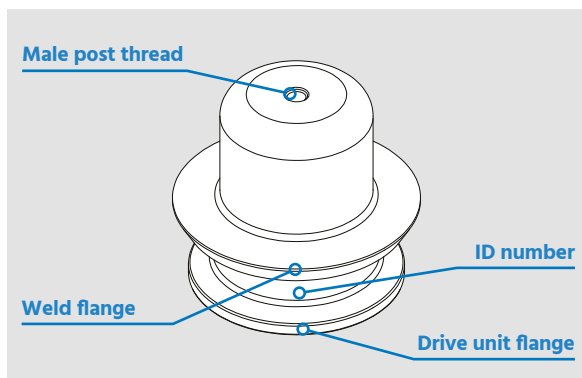
## Mixing head

The Mixing head is the part that does the mixing job in the tank or vessel. All sizes of Mixing head are built up in the same way and with similar parts. Handle the Mixing head with care, the bearing material is hard and brittle and can easily be damaged if exposed to physical stress. Inside the magnetic body are encapsulated magnets, keep the magnetic body away from any magnetic particles. It is recommended to keep the Mixing head in the plastic bag, supplied at the delivery.



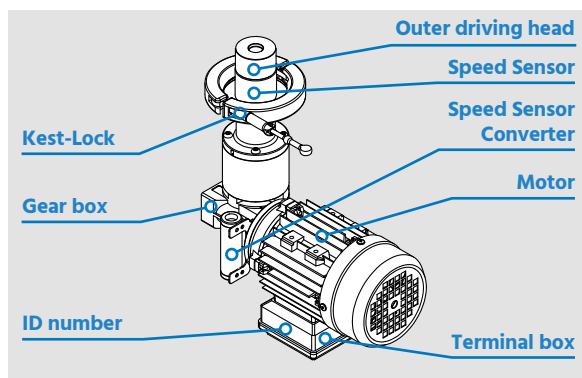
## Male post

All sizes of male posts are designed on same principle, as a solid piece of Zirconium oxide (ZrO<sub>2</sub>), with a stainless-steel threaded stud for attachment to the tank plate. The design with a solid piece of ceramic and a tight O-ring groove ensure highest level of aseptic design. When mounting the male post on the tank plate the O-ring will seal the surfaces to the tank plate.



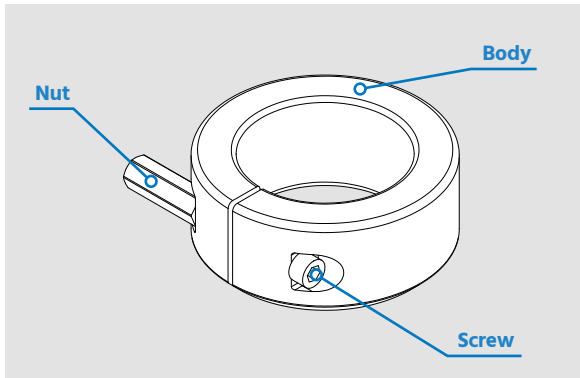
## Tank plate

The tank plate is manufactured from one piece of stainless steel approved for pressure vessels. The tank plate shall be welded into a dished end of a tank. The tank plate is to be seen as an integrated part of a pressure vessel. The tank plate shall therefore be approved along with the pressure vessel, according to valid pressure vessel code. Before installing the tank plate read the separate welding instruction.



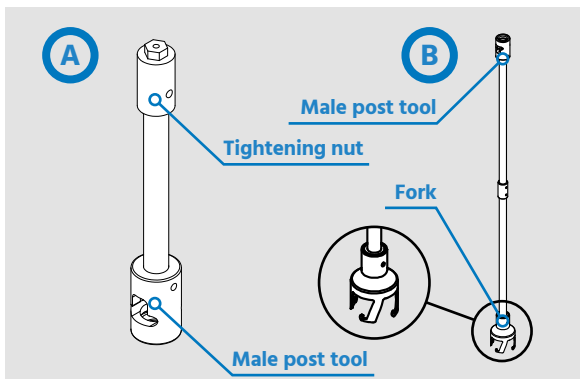
## Drive unit

The outer driving head on the Drive unit creates a magnetic coupling with the Mixing head inside the tank. When the motor starts spinning the Mixing head starts to rotate in the tank. A Speed Sensor can be added to measure the rotation speed of the Mixing head inside the tank. Be careful with the outer driving head, it consists of strong magnets, keep it away from any magnetic particles or sensitive equipment. It is recommended to keep a plastic bag on the Outer driving head.



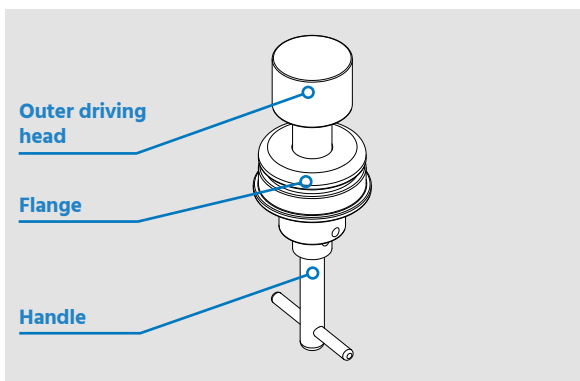
## Welding tool

The welding tool is mounted on the Tank plate during installation. The welding tool transfer some heat away from the tank plate during welding to ensure that the tank plate don't get warped. The mixer is a precision component and a warped tank plate can cause the mixer to malfunction. Always follow the separate tank plate welding guideline and use the welding tool when installing the tank plate.



## Male post and Multi tool

In the case where you can reach the tank plate to mount the male post and mixing head you will need the Male post tightening tool, see picture A. When you can't reach the tank plate you will need a multi tool to mount both the male post and mixing head, see picture B. The multi tool has a fork to grab and lower down the mixing head on the Male post as well as a Male post tightening tool in the other end to mount and dismount the Male post.



## Mixing head attractor

While moving a mobile tank it is important that the mixing head is secured inside to protect the bearing. Normally when the drive unit is attached the mixing head is secured. If the drive unit needs to be detached during transportation a Mixing head attractor shall be used instead. The magnet on the mixing head attractor will keep the mixing head in place and secured from vibrations and bumps that could damage the ceramic bearing.



# MECHANICAL INSTALLATION

**1 Installing the tank plate.** Always consult the separate Tank plate welding guideline for instructions. Always use the welding tool to prevent the tank plate to warp. For more information about how to position and install the tank plate consult the separate tank plate welding guideline delivered with the tank plate.

**2 Installing the male post.** First mount the O-ring on the groove of the Male post see Picture 3. The groove is quite tight to ensure best aseptic design, make sure that the Male post and O-ring are completely dry during this procedure. When the O-ring is in place, lubricate the O-ring with a small amount of purified water to reduce the friction when tightening the male post with the correct torque, see Picture 4.

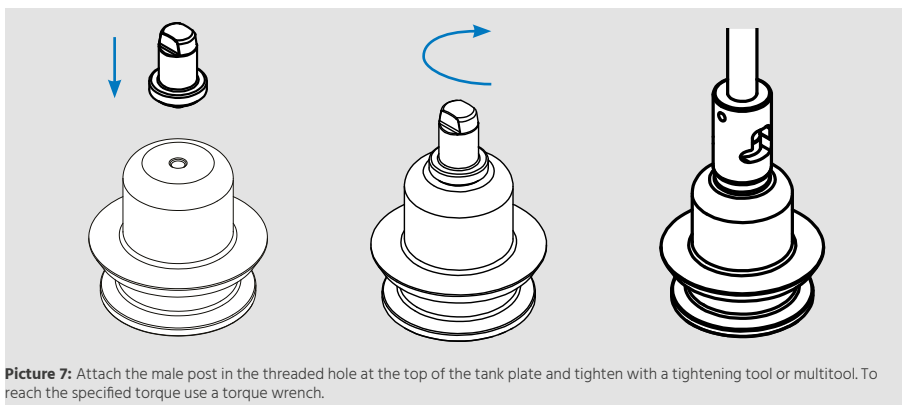
| Male post Ø<br>mm [in] | Torque<br>Nm | Male post Ø<br>mm [in] | Torque |
|------------------------|--------------|------------------------|--------|
| 12 mm [0.472 in]       | 6 Nm         | 20 mm [0.787 in]       | 10 Nm  |
| 16 mm [0.630 in]       | 6 Nm         | 30 mm [1.181 in]       | 30 Nm  |

Picture 4: Torque

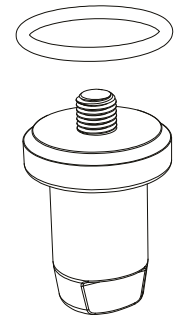
Use the male bearing tightening tool and a torque wrench to install the male post. If you don't reach the tank plate use the multi tool and a torque wrench, see Picture 5.

Make sure that the threaded connection of the Tank plate and Male post are completely dry, clean and free from foreign material. If liquid is trapped under the male post it can vaporize during sterilization and burst the O-ring out of the groove, see Picture 6. This can cause the male post to unscrew and damage the mixer.

Mount the Male post on the Tank plate by carefully screwing the stud into the threaded hole of the tank plate, see Picture 7.



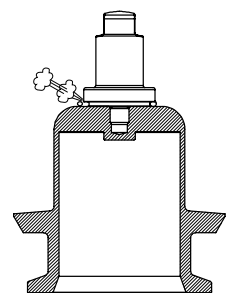
Picture 7: Attach the male post in the threaded hole at the top of the tank plate and tighten with a tightening tool or multitool. To reach the specified torque use a torque wrench.



Picture 3: Mount O-ring on Male post

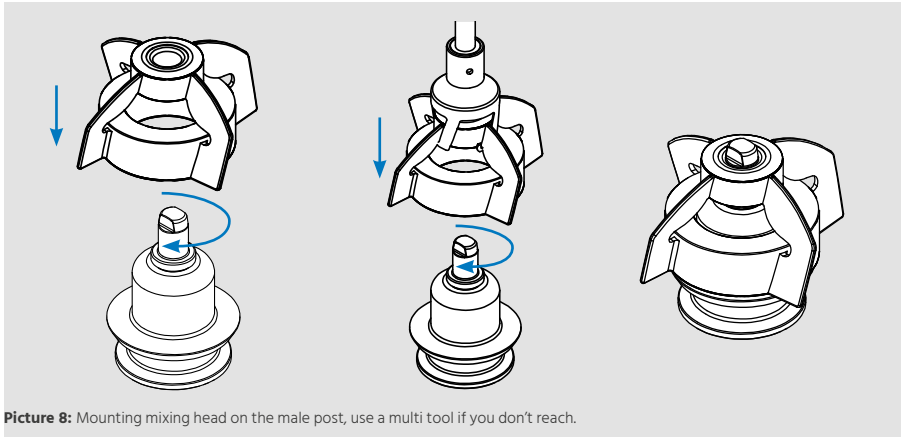


Picture 5: Installation with a multi tool when you can't reach the tank plate.



Picture 6: Secure that no liquid is trapped under the male post - it might burst the O-ring during sterilization.

**3 Installing the mixing head.** Secure that the drive unit is removed from the Tank plate, before you start. Carefully lower the Mixing head on the male post by twisting it slightly, use Kest Multi tool if you don't reach the tank plate, see Picture 8. The tolerances between the Male post and female bearing are very precise and needs to be aligned in order to get the Mixing head on, don't let go of the Mixing head until it is all the way down. Don't push the mixing head on with force this might damage the bearing. Secure that the mixing head don't touches the tank plate by rotating it slowly.



Picture 8: Mounting mixing head on the male post, use a multi tool if you don't reach.



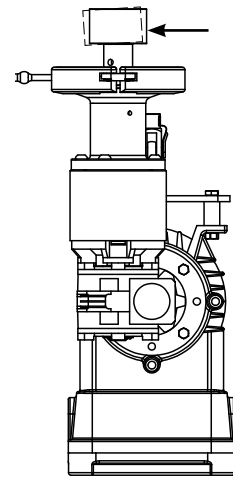
THE MIXER CONTAINS STRONG MAGNETS - NOT ALLOWED FOR PERSONS WITH PACEMAKERS TO HANDLE THE EQUIPMENT.

**4 Installing the drive unit (Standard).** When handling the drive unit be careful with the outer driving head, if this gets knocked out of position it might collide with the tank plate during operation and the shaft needs to be replaced, see Picture 9.

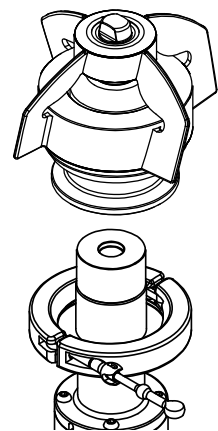
Carefully lift the drive unit so the outer driving head goes into the hole of the tank plate, see Picture 10.

**Be aware of the clamp risk** - when the drive unit couples with the mixing head it will pull up the drive unit towards the tank plate. Lock the drive unit on the tank plate, the locking device is different depending on size, see Picture 11.

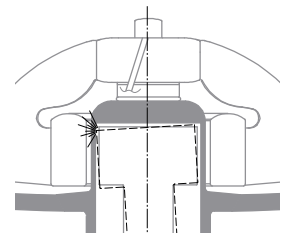
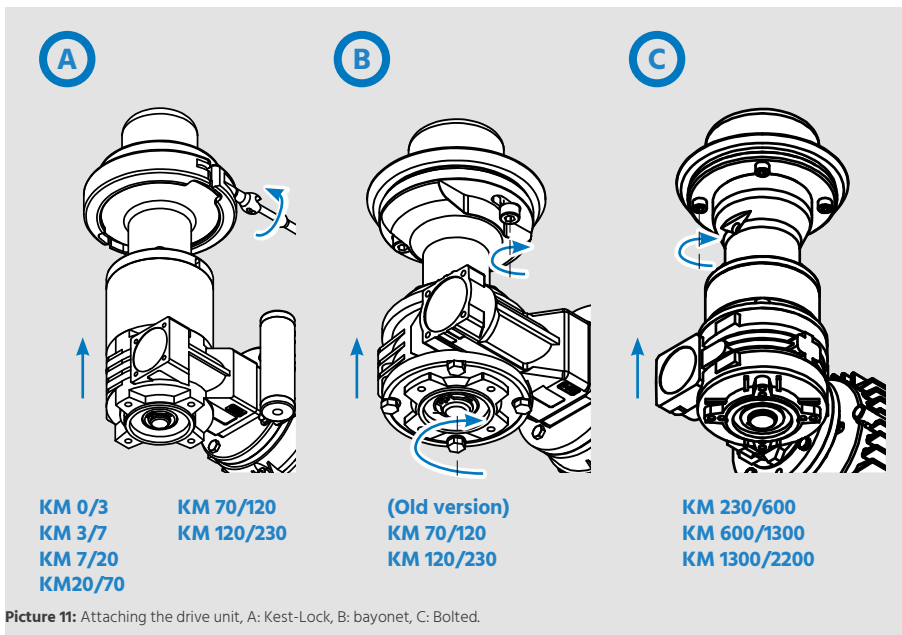
Before putting the mixer into operation, it is important to secure that the outer driving head on the drive unit is rotating freely and not scratches the surface inside the tank plate, see Picture 12.



Picture 9: Handle the drive unit with care, if the outer driving head is knocked out of position it might damage the tank plate during operation.



Picture 10: Attache the drive unit carefully to the tank plate.



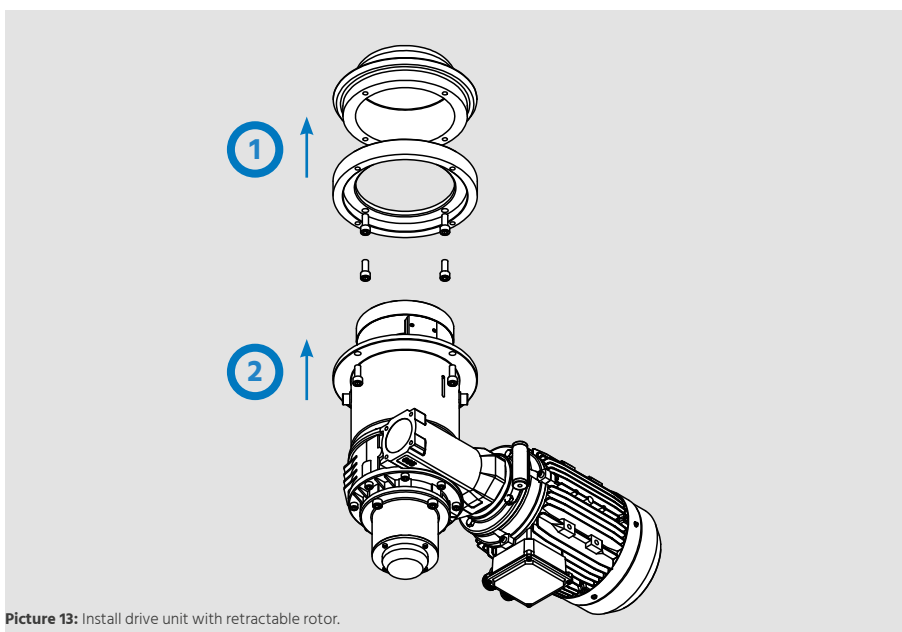
**Picture 12:** Secure that the outer driving head don't scratch the inside surface of the tank plate when rotating.

To secure this, rotate the drive unit slowly and listen for any noise that indicates that the outer driving head on the drive unit is touching the tank plate. Remove the drive unit and inspect the outer driving head for scratch marks.

If it is detected that the outer driving head on the drive unit is touching the tank plate call your Kest representative for consultation.

#### Installing drive unit with retractable rotor (optional).

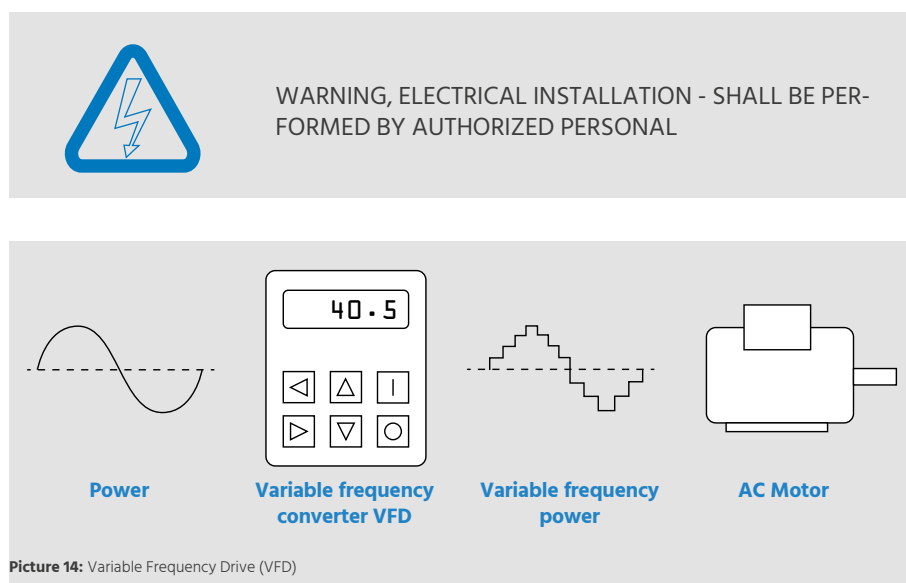
1. Install the extension flange on the tank plate and tighten the bolts, see Picture 13 step 1.
2. Install the drive unit with retractable rotor on the extension flange and tighten the bolts, see Picture 13 step 2.



# ELECTRICAL INSTALLATION

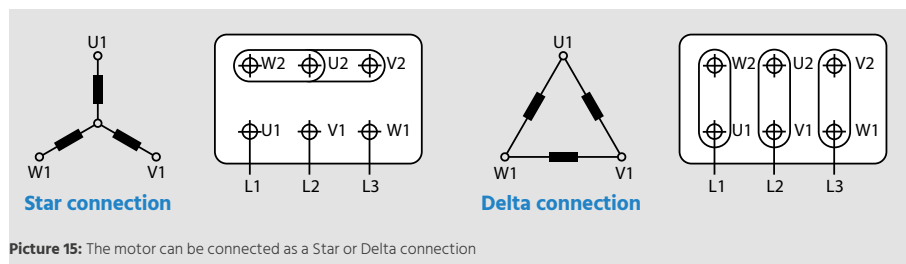
## Motor

The motor is a 3 phase AC motor and must be run with a frequency converter (VF-D=Variable Frequency Drive), see Picture 14. To protect the magnetic coupling from decoupling the VFD must be set to a minimum acceleration and deceleration time of 20 seconds, starting and stopping the mixer. The exact times shall be validated for each application to make sure that the magnetic coupling does not decouples. Decoupling of the mixing head might damage the bearings. The variable frequency converter is also used to set the optimal speed during the operation phases.



Before connecting the motor read the provided Instructions for use and maintenance for the motor and gear box. Those instructions contain important information around the electrical connections, heat protection and maintenance.

The motor has the option to be connected as a Delta or Star connection, see Picture 15. Set up the connecting plates accordingly, consult the motor Instruction for use and maintenance provided for further instructions.



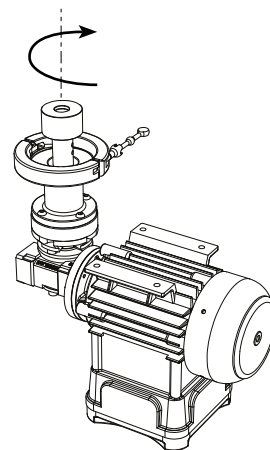
## Motor heat protection

The motor is equipped with thermo-contacts to protect it from overheating. The thermo-contacts monitors the temperature in the motor windings, and the signal shall be used to switch off the motor or send an error signal. You will find instruction on how to wire the thermo-contacts in the attach motor documentation.

## Direction of rotation

When the motor is electrically connected, check that the rotation of the Outer driving head rotates clockwise, see Picture 16. A label on the motor fan cover indicates correct rotation of the motor. IF the motor rotates in WRONG direction, reconnect and check again.

Wrong rotation direction will not generate the validated mixing performance of your system.



Picture 16: Secure direction of rotation

## Speed Sensor (Optional)

The Kest Mixer speed sensor unit is an integrated sensor system that enables secure verification of the actual rotation speed of the mixer head.

An integrated function in the Kest-Mixers speed sensor also verifies that the mixer head is rotating in the correct direction.

The unit consists of a sensor, that is located underneath the magnetic rotor, and a converter unit, that is located on the drive unit.

The output signal from the sensor is 1 pulse/rotation as standard.

For visual indication of the different functions there are three different LED,s located on the converter unit indicating the following functions:

**- Green LED: Power supply - Yellow LED: Clockwise rotation - Blue LED: Signal/Pulse**

| MECHANICAL SPECIFICATIONS      |   |                    |  |
|--------------------------------|---|--------------------|--|
|                                | Sensor holder   | Cabel              | Converter housing  |
| Material grade                 | POM C   | 5 meter, open ends | PMMA   |
| Design Temperature             | [0°C to +150°C] [+32°F to +302°F]   |                    | [0°C to +40°C] [+32°F to +104°F]   |
| Electrical Specifications      |   |                    |  |
| Type                           | Hall effect switch, PNP closing circuit                                   |                    |  |
| Voltage                        | 8-30 V DC   |                    |  |
| Rated Current                  | 200 mA  |                    |  |
| Protection class               | IP 67 (contacts)  |                    |  |
| Connection type sensor unit    | 4-pole female connection, M8x1  |                    |  |
| Connection type converter unit | Input: 4-pole male connection, M8x1. Output: 4-pole male connection M12x1 |                    |  |
| Socket wiring identification   |   |                    | <b>1: L + Power supply 8-30 VDC</b><br><b>2: + PNP rotation direction</b><br><b>3: L - Negative/Ground</b><br><b>4: Pulse signal 8-30. VDC</b> |

# OPERATION

## General data and operation parameters

Tank Plate, Male Post and Mixing Head

| DESCRIPTION                      | MIN                   | MAX                    |
|----------------------------------|-----------------------|------------------------|
| Design Temperature               | 5°C [+41°F]           | 150°C [+302°F]         |
| Temperature operating the mixer  | 5°C [+41°F]           | 135°C [+275°F]         |
| Pressure                         | -1 bar(g) [-14.5 psi] | + 10 bar(g) [+145 psi] |
| pH                               | 1                     | 14                     |
| Viscosity                        | 1 cP                  | 800 cP                 |
| Acceleration & retardation times | 20 s                  | -                      |

Drive unit

| DESCRIPTION | MIN   | MAX           |
|-------------|---|---------------|
| Temperature | 0°C [+32°F]   | 40°C [+104°F] |
| Noise level | According to ISO 1680, max level by CEI 2-24 & IEC 34-9 |               |

| MODEL        | MOTOR POWER<br>50/60Hz [kW] | FREQUENCY<br>[Hz] | CURRENT<br>230/400V [A] | GEAR BOX<br>RATIO<br>[] | SPEED RANGE<br>[RPM] |
|--------------|-----------------------------|-------------------|-------------------------|-------------------------|----------------------|
| KM-0/3       | 0.25/0.30                   | 50/60             | 1.3/0.75                | 1:7                     | 50-490               |
| KM-3/7       | 0.25/0.30                   | 50/60             | 1.3/0.75                | 1:7                     | 50-490               |
| KM-7/20      | 0.25/0.30                   | 50/60             | 1.3/0.75                | 1:7                     | 50-490               |
| KM-20/70     | 0.25/0.30                   | 50/60             | 1.3/0.75                | 1:7                     | 50-490               |
| KM-70/120    | 0.55/0.68                   | 50/60             | 2.4/1.4                 | 1:7                     | 50-490               |
| KM-120/230   | 0.75/0.90                   | 50/60             | 3.3/1.9                 | 1:7                     | 50-490               |
| KM-230/600   | 1.10/1.30                   | 50/60             | 4.7/2.7                 | 1:7                     | 50-490               |
| KM-600/1300  | 1.50/1.80                   | 50/60             | 6.2/3.6                 | 1:7                     | 50-490               |
| KM-1300/2200 | 3.00/3.50                   | 50/60             | 11.8/6.8                | 1:10                    | 35-340               |

## Media

Media used with this mixer shall not contain magnetic particles or very hard particles with a grinding effect.

## Mobile tanks

When moving a mobile tank, you need to secure that the mixing head is secured in place. If you need to remove the drive unit when moving the tank, we recommend that you use a Mixing head attractor. This device will protect the ceramic bearing from vibrations and physical stress that otherwise can cause damage.

## Mixing to the last drop

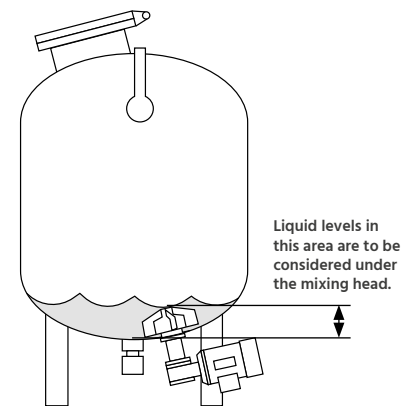
The Kest Mixer can mix all the way to the last drop, when the media level reaches below the mixing head, see Picture 17, the mixer shall be operated according to properties in Picture 18. It is the customers responsibility to secure that proper measure devices are installed to be able to manage this condition.

**Note! For continues operation, the liquid level needs to cover the mixer head.**

**Note! Never run the mixer from a completely dry state!**

| Mixer size   | Max speed (rpm) | Max time (min) |
|--------------|-----------------|----------------|
| KM-0/3       | 100             | 15             |
| KM-3/7       | 100             | 15             |
| KM-7/20      | 100             | 15             |
| KM-20/70     | 100             | 15             |
| KM-70/120    | 100             | 15             |
| KM-120/230   | 100             | 15             |
| KM-230/600   | 50              | 10             |
| KM-600/1300  | 50              | 10             |
| KM-1300/2200 | 50              | 10             |

Picture 18: Operation properties for levels under mixing head



Picture 17: When the liquid level reaches below the mixing head while emptying the tank it can run according to specifications in table 2.

## Before start-up

- Secure that installation is correct performed on all parts.
- Secure the parameter for the PLC program is correct, for both maximum speed and acceleration
- Secure that the bearing surfaces always are lubricated by the liquid in the tank during operation of the mixer.
- The mixer is magnetic coupled, and therefore be careful and regulate speed, acceleration etc. so that the magnetic coupling will not be decoupled.
- If there is any signs of malfunction, abnormal noise, stop the mixer immediately.
- Note that the maximum temperature for running the mixer is 135°C inside the tank, and to exceed this limit can cause damage on the bearings.

## Startup

The startup phase is the most critical for the mixer, because of new installed equipment and electrical installation, including the program for the PLC. Be careful and check that the equipment is proper installed and electrical connected.

**Note that the tank shall be filled with liquid, so that the bearing will be lubricated.**

- Check that all parts are properly installed.
- Fill the tank with liquid, to ensure that the bearing on the mixer head is covered.
- Start the mixer in slow speed, to ensure that the mixer function is correct, after this increase the speed

## Disassembly

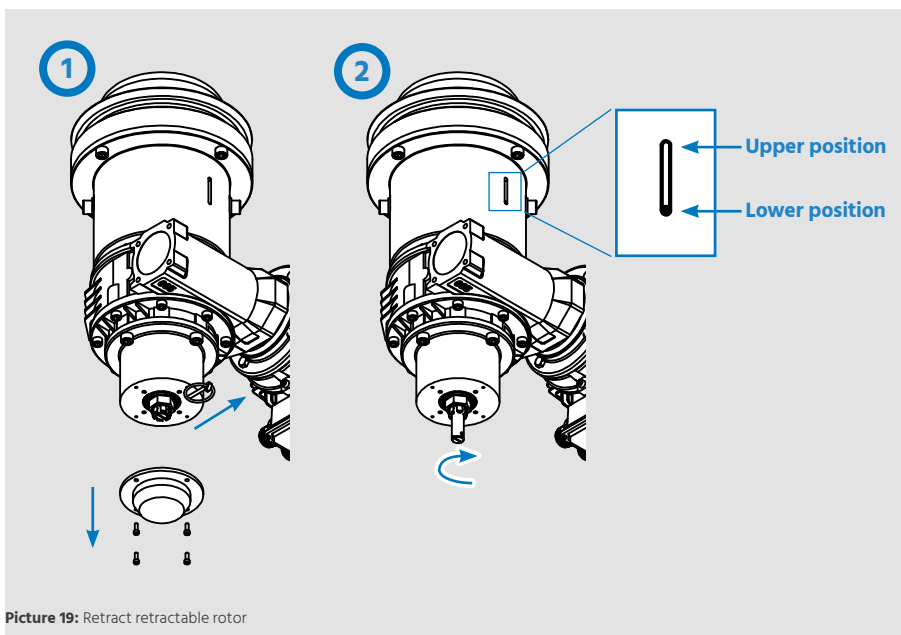
- Check and secure that the power supply is turned off
- Check and secure that the tank is empty and ventilated (no pressure inside the tank)
- Check and secure that all media connections are shut off.
- If entering the tank, follow safety regulations.
- Disconnect and dismount the Drive Unit or retract the rotor (only on drive units with retractable rotor) as first step. Note that the drive unit can be heavy on larger sizes of mixers.

## Retracting the rotor

If you have a mixer with retractable rotor follow the steps below.

1. Remove the lid and the sprint, see Picture 19 step 1.
2. Turn the nut until the position indicator is at the lower position, see Picture 19 step 2.
3. The rotor is retracted.

**Do not run the mixer with the rotor in retracted position!**



## Put the rotor back in operation

1. Turn the nut until the position indicator is in upper position, see Picture 19, you will feel a distinct stop. When you feel the stop turn the nut to the closest position to align with the sprint hole in the shaft, mount and lock the sprint.

**Do not overtighten the nut (max 1 Nm), it will put unnecessary pressure on the bearings that will cause them to wear out faster!**

2. Fasten the lid on the drive unit.



DO NOT OVERTIGHTEN THE NUT (MAX 1 NM), IT WILL PUT UNNECESSARY PRESSURE ON THE BEARINGS THAT WILL CAUSE THEM TO WEAR OUT FASTER!



# CLEANING AND STERILIZING

## Cleaning - general information

The Kest Mixer is designed to be CIP (cleaned in place) by using a cleaning device like a spray ball, rotary jet head or similar. During the cleaning cycle the mixing head is rotating slowly in the tank. The cleaning cycle needs to be validated with the rest of the system as a part of the validation. Make sure that the chemical properties of the cleansing media are compatible with the material of the wetted parts of the mixer. The cleaning process will not remove any magnetic particles that are stuck on the magnets of the mixing head, make sure the mixing head is not exposed to particles that are magnetic. If the system has been exposed to magnetic particles dismantle the mixing head according to the instructions in this manual and carefully remove the magnetic particles. Magnetic particles on the mixing head can severely damage the mixer and vessel.

## Cleaning in place (CIP) - Non submerged

When using the non-submerged method, the maximum rotation speed of the mixing head is 100 rpm, see Picture 20. If the tank is completely dry when initiating the cleaning, start the cleaning device before the mixer to ensure that the cleansing media lubricates the bearings of the mixer.

## Cleaning in place (CIP) - Submerged

When cleaning the mixer using the submerged method the mixer can be run within the validated speed range, see Picture 21. We recommend using speeds that avoid strong vortex formations. First submerge the Mixing head to ensure lubrication of the bearings and then turn on the mixer.

## Sterilizing in place (SIP)

The Kest mixer is designed to be SIP (sterilized in place). The most common way to do this is to use saturated steam. The sterilization cycle needs to be validated with the rest of the system as a part of the validation.

The mixer can be intermittently operated during the initial condensate phase of the sterilization sequence up to 100°C (212°F). Recommended maximum speed is 50 rpm for maximum 30 seconds.

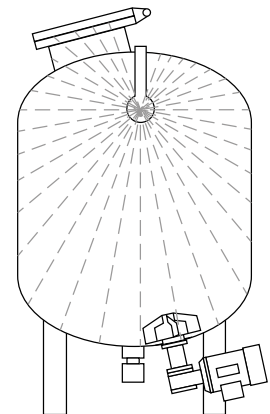
After a completed sterilization cycle, before starting the mixer, add liquid in the tank enough to cover the mixing head

## Sterilizing with autoclave

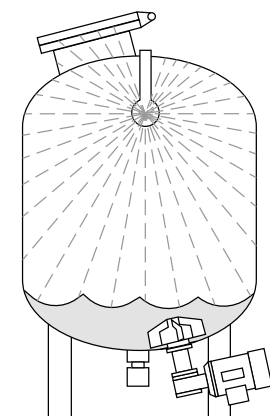
The Kest mixer can be sterilized using an autoclave. The sterilization cycle needs to be validated with the rest of the system as a part of the validation.

**First remove the mixer drive unit, the drive unit will be damaged if autoclaved.**

Use a mixing head attractor to lock the mixing head in place, this device protects the bearings and keeps the mixing head in place when moving the tank. When the tank is sterilized remove the mixing head attractor and put the drive unit back according to the instruction in this manual.



Picture 20: Non-submerged cleaning



Picture 21: Submerged cleaning

# SPARE PARTS & TOOLS

## Spare parts

| MODEL        | MIXING HEAD | MALE POST |
|--------------|-------------|-----------|
| KM-0/3       | 100433      | 100562    |
| KM-3/7       | 100559      | 100562    |
| KM-7/20      | 101273      | 101385    |
| KM-20/70     | 100451      | 100415    |
| KM-70/120    | 100650      | 100415    |
| KM-120/230   | 100713      | 100415    |
| KM-230/600   | 100442      | 100601    |
| KM-600/1300  | 100544      | 100601    |
| KM-1300/2200 | 101291      | 100601    |

## Drive units

| MODEL        | STANDARD | STANDARD SPEED SENSOR | EXTENSION | EXTENSION SPEED SENSOR | EXTENSION COVER | EXTENSION COVER SPEED SENSOR |
|--------------|----------|-----------------------|-----------|------------------------|-----------------|------------------------------|
| KM-0/3       | 101601   | 101602                | 101604    | 101603                 | 101605          | 101606                       |
| KM-3/7       | 100978   | 100816                | 100979    | 100924                 | 101074          | 101029                       |
| KM-7/20      | 100981   | 100762                | 100982    | 100759                 | 101558          | 100834                       |
| KM-20/70     | 101408   | 100452                | 101042    | 100654                 | 101562          | 101563                       |
| KM-70/120    | 101086   | 100779                | 101249    | 100690                 | 101568          | 101567                       |
| KM-120/230   | 100919   | 101573                | 100944    | 100714                 | 101572          | 101574                       |
| KM-230/600   | 100920   | 101216                | 101286    | 100706                 | 101578          | 101579                       |
| KM-600/1300  | 100921   | 101584                | 101287    | 101585                 | 101583          | 100854                       |
| KM-1300/2200 | -        | -                     | 101298    | 101594                 | 101590          | 101616                       |

## Tools

| MODEL        | MIXING HEAD ATTRACTOR | MALE POST TIGHTENING TOOL | MULTI TOOL | WELDING TOOL |
|--------------|-----------------------|---------------------------|------------|--------------|
| KM-0/3       | 101620                | 100704                    | 101007     | 100446       |
| KM-3/7       | 101620                | 100704                    | 101007     | 100923       |
| KM-7/20      | 101436                | 102422                    | 101342     | 100802       |
| KM-20/70     | 100571                | 102423                    | 100655     | 100802       |
| KM-70/120    | -                     | 102423                    | 100655     | 100780       |
| KM-120/230   | -                     | 102423                    | 100655     | 100717       |
| KM-230/600   | -                     | 102424                    | 101010     | 100800       |
| KM-600/1300  | -                     | 102424                    |            | 100717       |
| KM-1300/2200 | -                     | 102424                    |            | 101300       |

# APPENDIX A - INSTALLATION CHECKLIST

This checklist is to avoid errors during installation. Note that the whole manual shall be read and understood. Use this list as a guideline for the installation.

## Male post

| NO. | DESCRIPTION  | COMPLETE   | COMMENT |
|-----|--|--|---------|
| 1   | Is the correct O-ring used for the male post?  | <input type="checkbox"/> Yes <input type="checkbox"/> No |         |
| 2   | Is the male post clean and undamaged?  | <input type="checkbox"/> Yes <input type="checkbox"/> No |         |
| 3   | Are the threads of the male post clean, dry and free from damage?  | <input type="checkbox"/> Yes <input type="checkbox"/> No |         |
| 4   | Are the threads of the tank plate clean, dry and free from damage?   | <input type="checkbox"/> Yes <input type="checkbox"/> No |         |
| 5   | Ensure correct position of the O-ring in the groove of the male post                                       | <input type="checkbox"/> Yes <input type="checkbox"/> No |         |
| 6   | Is the O-ring lubricated with Purified Water?  | <input type="checkbox"/> Yes <input type="checkbox"/> No |         |
| 7   | Is the male post correctly attached with correct torque using the multi tool or male post tightening tool? | <input type="checkbox"/> Yes <input type="checkbox"/> No |         |

## Mixing head

| NO. | DESCRIPTION  | COMPLETE   | COMMENT |
|-----|--|--|---------|
| 1   | Are the drive unit removed before attaching the mixing head?               | <input type="checkbox"/> Yes <input type="checkbox"/> No |         |
| 2   | Are the mixing head clean and undamaged?                                   | <input type="checkbox"/> Yes <input type="checkbox"/> No |         |
| 3   | Have foreign magnetic particles been removed from the mixing head?         | <input type="checkbox"/> Yes <input type="checkbox"/> No |         |
| 4   | Is the female bearing undamaged?   | <input type="checkbox"/> Yes <input type="checkbox"/> No |         |
| 5   | After installation, does the Mixing head rotate smoothly on the male post? | <input type="checkbox"/> Yes <input type="checkbox"/> No |         |

## Drive unit

| NO. | DESCRIPTION  | COMPLETE   | COMMENT |
|-----|--|--|---------|
| 1   | Before attaching the motor check that the outer driving head rotates clockwise and the fan on the motor rotates counterclockwise.  | <input type="checkbox"/> Yes <input type="checkbox"/> No |         |
| 2   | Make sure the drive unit is correctly connected to a VFD to not override the speed parameters.   | <input type="checkbox"/> Yes <input type="checkbox"/> No |         |
|     | Carefully attach the drive unit, depending on size:  |  |         |
| 3   | KM0/3 to KM70/120 - Check that the Kest-Lock is in open position.<br>KM 70/120 to KM 120/230 align the bayonet.<br>KM 230/600 to KM 1300/2200 align the holes for the bolts. | <input type="checkbox"/> Yes <input type="checkbox"/> No |         |
| 4   | When the drive unit is attached check that the flanges are aligned.  | <input type="checkbox"/> Yes <input type="checkbox"/> No |         |
| 5   | Tighten the locking device and secure that the drive unit is properly attached.  | <input type="checkbox"/> Yes <input type="checkbox"/> No |         |
| 6   | Is the electrical supply to the mixer equipped with an emergency stop?   | <input type="checkbox"/> Yes <input type="checkbox"/> No |         |
| 7   | Check that the drive unit is properly grounded?  | <input type="checkbox"/> Yes <input type="checkbox"/> No |         |

# APPENDIX B - INSTALLATION QUALIFICATION CHECKLIST

Use this installation qualification for each vessel and mixer to ensure that the correct mixer has been installed and that all important information has been gathered for future use.

Different applications require different operating parameters on the frequency converter depending on:

Density of liquid, Viscosity of liquid, Temperature of liquid, Geometry of vessel, Type of mixing required, etc.

## General information

| VESSEL NO. | VESSEL MANUFACTURER | COUNTRY | SITE LOCATION |
|------------|---------------------|---------|---------------|
|------------|---------------------|---------|---------------|

| VESSEL TYPE | VESSEL VOLUME | NOTE |
|-------------|---------------|------|
|-------------|---------------|------|

## KM Mixer information

|             | ID. NO. | CATALOGUE NO. | NOTES |
|-------------|---------|---------------|-------|
| MIXING HEAD |         |               |       |
| MALE POST   |         |               |       |
| TANK PLATE  |         |               |       |
| DRIVE UNIT  |         |               |       |

## Check points - frequency converter settings

| PARAMETER               | ORIGINAL VALUE | NEW VALUE | COMMENT |
|-------------------------|----------------|-----------|---------|
| Min. frequency (Hz)     |                |           |         |
| Max. frequency (Hz)     |                |           |         |
| Acceleration time (sec) |                |           |         |
| Deceleration time (sec) |                |           |         |

## Inspected By

| NAME | SIGNATURE | DATE |
|------|-----------|------|
|------|-----------|------|

# APPENDIX C - MAINTENANCE CHECKLIST

To ensure safety and proper performance, perform quarterly inspection of the KM Mixer according to the following table. Make copies of this table to use at each inspection. Refer to applicable instructions within this guide. Note: Follow all installation recommendations, cautions and warnings in this manual.

| VESSEL NO. | PRODUCT DESCRIPTION | MANUFACTURER | DATE OF MANUFACTURE |
|------------|---------------------|--------------|---------------------|
|------------|---------------------|--------------|---------------------|

| DESIGN PRESSURE | DESIGN TEMPERATURE | VOLUME | VISCOSITY |
|-----------------|--------------------|--------|-----------|
|-----------------|--------------------|--------|-----------|

## Male post

| NO. | DESCRIPTION   | COMPLETE   | COMMENT |
|-----|---|--|---------|
| 1   | Remove and inspect Male post for cracks or abnormal wear.           | <input type="checkbox"/> Yes <input type="checkbox"/> No |         |
| 2   | Make sure the O-ring is not damaged.                                | <input type="checkbox"/> Yes <input type="checkbox"/> No |         |
| 3   | Check for thread deformation.                                       | <input type="checkbox"/> Yes <input type="checkbox"/> No |         |
| 4   | Install and ensure that the male post is tightened to proper torque | <input type="checkbox"/> Yes <input type="checkbox"/> No |         |

## Mixing head

| NO. | DESCRIPTION  | COMPLETE   | COMMENT |
|-----|--|--|---------|
| 1   | Inspect the silicon carbide on the female bearing for damage.        | <input type="checkbox"/> Yes <input type="checkbox"/> No |         |
| 2   | Inspect the inside of the mixing head and bottom surface for damage. | <input type="checkbox"/> Yes <input type="checkbox"/> No |         |
| 3   | Check that the mixing head rotates easily, listen for noise.         | <input type="checkbox"/> Yes <input type="checkbox"/> No |         |
| 4   | Inspect bottom surface of wings for marks and scratches.             | <input type="checkbox"/> Yes <input type="checkbox"/> No |         |
| 5   | Inspect the magnetic body for particles.                             | <input type="checkbox"/> Yes <input type="checkbox"/> No |         |

## Drive unit

| NO. | DESCRIPTION  | COMPLETE   | COMMENT |
|-----|--|--|---------|
| 2   | Check shaft and outer driving head rotation and wobbling movement.             | <input type="checkbox"/> Yes <input type="checkbox"/> No |         |
| 3   | Check outer drive head for damage caused by contact with Tank Plate.           | <input type="checkbox"/> Yes <input type="checkbox"/> No |         |
| 4   | Check the gearbox for leakage.   | <input type="checkbox"/> Yes <input type="checkbox"/> No |         |
| 5   | Check the gearbox for noise.   | <input type="checkbox"/> Yes <input type="checkbox"/> No |         |
| 6   | Ensure bolt, screws, nuts and flange are in good condition and free of damage. | <input type="checkbox"/> Yes <input type="checkbox"/> No |         |
| 7   | Check cables for damage.   | <input type="checkbox"/> Yes <input type="checkbox"/> No |         |

## Tank plate

| NO. | DESCRIPTION   | COMPLETE   | COMMENT |
|-----|---|--|---------|
| 1   | Inspect tank plate for scratches, marks, and/or damage. | <input type="checkbox"/> Yes <input type="checkbox"/> No |         |
| 2   | Check for thread deformation.                           | <input type="checkbox"/> Yes <input type="checkbox"/> No |         |

## Inspected By

| NAME | SIGNATURE | DATE |
|------|-----------|------|
|      |           |      |

# Certificate

UTFÄRDAT TILL  
ISSUED TO



## KEST Technology AB

Kungälv, Sweden

**Svensk Certifiering Norden AB intygar härmed att ledningssystemet har granskats och uppfyller kraven i:**

Svensk Certifiering Norden AB certifies that the management system has been reviewed and complies with:

## ISO 9001:2015

**Certifieringens omfattning och villkor framgår av certifieringsbeslutet.**

Details of scope and the range of the certificate are defined in the certification decision.

### Ledningssystemet omfattar:

The management system covers:

Utvecklar och marknadsför processkomponenter för aseptiska processsystem.

Develops and markets process components for aseptic process systems.

Michael Persaud, CEO

SVENSK CERTIFIERING NORDEN AB

**Certifikat nummer:** 9001-0792  
Certificate number:  
**Ursprungsdatum:** 7 Aug 2019  
Date of origin:  
**Utfärdandedatum:** 7 Aug 2019  
Issue date:  
**Giltighet till:** 3 Jul 2022  
Expiry date:



# Certificate

UTFÄRDAT TILL  
ISSUED TO



## KEST Technology AB

Kungälv, Sweden

**Svensk Certifiering Norden AB intygar härmed att ledningssystemet har granskats och uppfyller kraven i:**

Svensk Certifiering Norden AB certifies that the management system has been reviewed and complies with:

## ISO 14001:2015

**Certifieringens omfattning och villkor framgår av certifieringsbeslutet.**

Details of scope and the range of the certificate are defined in the certification decision.

### Ledningssystemet omfattar:

The management system covers:

Utvecklar och marknadsför processkomponenter för aseptiska processsystem.

Develops and markets process components for aseptic process systems.

Michael Persaud, CEO

SVENSK CERTIFIERING NORDEN AB

**Certifikat nummer:** 14001-0792  
Certificate number:  
**Ursprungsdatum:** 7 Aug 2019  
Date of origin:  
**Utfärdandedatum:** 7 Aug 2019  
Issue date:  
**Giltighet till:** 3 Jul 2022  
Expiry date:







[www.kest.se](http://www.kest.se)



## OPERATING AND MAINTENANCE INSTRUCTIONS WISTRO SERIES IL EXTERNAL FAN UNITS

**WISTRO** units are normally supplied ready for installation. The bearings are designed to be maintenance-free for a service life of 40,000 operating hours.

**Protection class IP66** according to EN 60529

**Certified** according to cURus

The relevant safety regulation with regard to protection from touching moving parts (DIN EN ISO 13857) is fulfilled.

**Using standard fans for hazardous areas** is not allowed. Therefore, special fans are available.

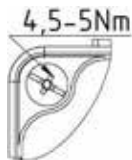
**Before installation** care must be taken that the fan wheel moves freely and the blades of the fan wheel are not deformed or bent. This may cause imbalance, which can have a negative effect on the operating life.

Safety as per DIN EN ISO 13857 at the air outlet side must be ensured by the operator at the place of use.

Wistro-fans can be operated and stored in a temperature range between  $-20^{\circ}\text{C}$  and  $+60^{\circ}\text{C}$ . Low temperature versions can be operated and stored between  $-40^{\circ}\text{C}$  and  $+60^{\circ}\text{C}$ .

**During installation** of the unit, care must be taken that this is carried out correctly, so that the unit is securely attached to the motor housing. The attached closing cap is only intended for transportation; for use as intended, this must be replaced with a suitable cable gland. The cable gland must at least correspond to IP 66 and must be suitable for the ambient conditions in the area of use.

**The electrical connection** is made according to the operating mode (single phase or three phase) in accordance with the connection diagram. The connection diagram is engraved or glued into the cover of the terminal box. The cables to be connected must be provided with insulated fork terminals or insulated eyelets. The nuts need to be tightened to a torque of 2Nm. If necessary, the fan can be protected with an external protection device (e.g. motor protection switch). Please refer to the type plate for the maximum permissible current.



After electrical connection is complete, the terminal box must be attached with screws tightened to a torque of 4.5 - 5Nm.

**After installation** a test run must be carried out. Care must be taken that the air flow is sucked through the ventilation grille and blown over the motor which is to be cooled (see the arrow indicating the direction of rotation on the inner surface of the ventilation grille). The fan grill must not be blocked by obstacles.

Caution: The cooling effect is considerably restricted if the direction of rotation is not correct.

With the low temperature versions ( $-40^{\circ}\text{C}$ ) starting may be more difficult at low ambient temperatures. This does not indicate that the motor is defective.

**During operation** care must be taken that especially in dusty atmospheres, excessive dust deposits do not accumulate on the fan blades or between the hub and the motor housing, as this causes imbalance and rotating resistances, which will reduce the service life. This also applies to atmospheres containing particles, e.g. in the wood processing industry or in coal grinding mills. A protective cover or special fan variant is recommended for these, or similar applications.

A protective cover can easily be retrofitted by loosening the four flange screws (Instar screws), pushing in the fastening bracket and re-tightening the screws.

**For maintenance or repair work** it is essential that the connection is disconnected, and is secured against switching on again.

**The disposal of the fan unit** has to comply with the local waste legislation.

## Additional product information according to ERP327/2011

All of the product information stated in this product information has been determined under the operating conditions listed in Table 1.

|                        |                    |                    |                    |                           |
|------------------------|--------------------|--------------------|--------------------|---------------------------|
| Size                   | 160/180/200<br>ILI | 204/225/249<br>ILI | 250/280/315<br>ILI | 355/400/450/500/560<br>IL |
| Phase                  | 3~                 | 3~                 | 3~                 | 3~                        |
| Rated voltage [V]      | 400                | 400                | 400                | 400                       |
| Circuit                | Y                  | Y                  | Y                  | Y                         |
| Frequency [Hz]         | 50                 | 50                 | 50                 | 50                        |
| Type of data recording | Free-blowing       | Free-blowing       | Free-blowing       | Free-blowing              |

Table 1: Measurement conditions

|   |                    |                    |                    |                           |
|---|--------------------|--------------------|--------------------|---------------------------|
| Size / Model number                         | 160/180/200<br>ILI | 204/225/249<br>ILI | 250/280/315<br>ILI | 355/400/450/500/560<br>IL |
| $\eta$ [%]                                  | 30,2/32,5/33,9     | 20,5/23,9/26,5     | 22,9/26,5/29,4     | 37,7/41,8/45,5/48,6/47,3  |
| Measurement category                        | A                  | A                  | A                  | A                         |
| Efficiency category                         | Static             | Static             | Static             | Static                    |
| Year of manufacture:                        | from 11/2022       | from 2018          | from 2018          | from 2018                 |
| $\eta_{\max}$ [%]                           | 34,8               | 32,1               | 35,9               | 48,7                      |
| $P_e$ [kW] @ $\eta_{\max}$                  | 0,172              | 0,162              | 0,232              | 0,858                     |
| $dV/dt$ [m <sup>3</sup> /h] @ $\eta_{\max}$ | 1480               | 2280               | 3310               | 8350                      |
| $dP_s$ [Pa] @ $\eta_{\max}$                 | 146                | 82                 | 90                 | 180                       |
| $n$ [1/min] @ $\eta_{\max}$                 | 2866               | 1356               | 1374               | 1411                      |
| SFP   | 1                  | 1                  | 1                  | 1                         |

The fans described in these operating instructions have a modular structure. Removal of the fan can be carried out with normal tools.

For better cleaning the fan can be removed from the shaft by removing the circlip using light pressure. The force must be selected so that there is no excessive strain on the fan blades. Further disassembly results in the warranty becoming void. During cleaning care must be taken to avoid entry of dust or water through the shaft outlet.

The measurement was performed with a free-blowing fan with inlet nozzle according to ERP327/2011 and DIN EN 5801.

**Schalldruckpegel [dB(A)], Baureihe ILI**  
**noise level [dB(A)], type ILI**  
**niveau de pression acoustique [dB(A)], version ILI**  
**Nivel sonoro [dB(A)], variante de serie ILI**  
**Livello di pressione acustica [dB(A)], serie ILI**

| Bg<br>Frame size<br>HA<br>Tamaño<br>mod. | 400V 50Hz        | 460V 60Hz        | 400V 50Hz        | 460V 60Hz        | 400V 50Hz        | 460V 60Hz        |
|--|------------------|------------------|------------------|------------------|------------------|------------------|
|  | 3 ~ Y<br>2-polig | 3 ~ Y<br>2-polig | 3 ~ Y<br>4-polig | 3 ~ Y<br>4-polig | 3 ~ Δ<br>4-polig | 3 ~ Δ<br>4-polig |
| 63                                       | 47               | 52               | /                | /                | /                | /                |
| 71                                       | 51               | 56               | /                | /                | /                | /                |
| 80                                       | 54               | 58               | /                | /                | /                | /                |
| 90                                       | 59               | 63               | 40               | 45               | /                | /                |
| 100                                      | 60               | 65               | 43               | 47               | /                | /                |
| 112                                      | 62               | 66               | 45               | 50               | /                | /                |
| 132                                      | 67               | 71               | 52               | 56               | /                | /                |
| 160                                      | 73               | 77               | 56               | 60               | /                | /                |
| 180                                      | 73               | 77               | 56               | 60               | /                | /                |
| 200                                      | 74               | 78               | 56               | 61               | /                | /                |
| 204                                      | /                | /                | 61               | 65               | 62               | 67               |
| 225                                      | /                | /                | 62               | 66               | 63               | 67               |
| 249                                      | /                | /                | 62               | 66               | 64               | 69               |
| 250                                      | /                | /                | 66               | 71               | 68               | 72               |
| 280                                      | /                | /                | 67               | 71               | 68               | 73               |
| 315                                      | /                | /                | 68               | 71               | 70               | 74               |
| 355                                      | /                | /                | 76               | 81               | 77               | 82               |

DIN EN ISO 4871 2009-11/ Hüllfläche nach DIN 45635-38 1986-04 beträgt 42,6m<sup>2</sup>  
 DIN EN ISO 4871 2009-11/ enveloping surface DIN 45635-38 1986-04 amounts 42,6m<sup>2</sup>

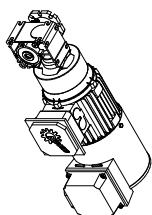
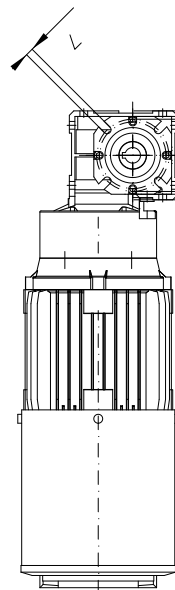
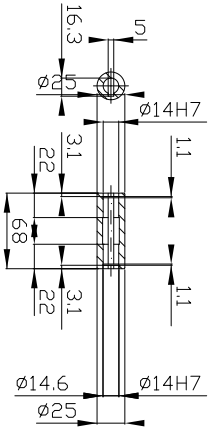
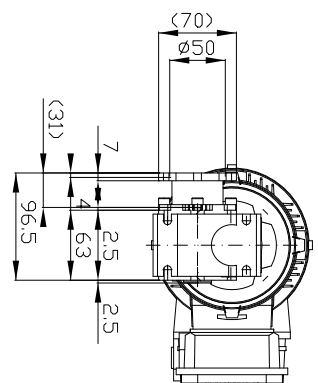
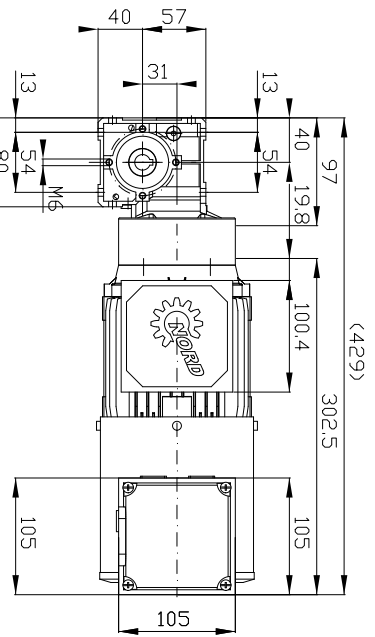
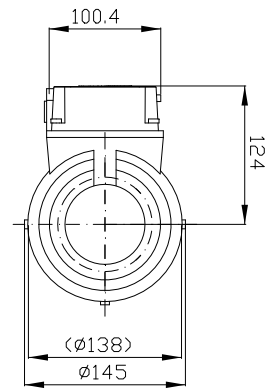
mit b-seitigem Referenzlagerschild  
 with bearing shield of reference on side b  
 avec de référence flasque latérale b  
 placa de referencia en el lado b  
 con targhetta cuscinetti di riferimento lato b

Stand: 15.03.2021

**Volumenstrom [m<sup>3</sup>/h], Baureihe ILI**  
**Air current capacity [m<sup>3</sup>/h], type ILI**  
**Courant en volumes [m<sup>3</sup>/h], version ILI**  
**Caudal volumétrico [m<sup>3</sup>/h], variante de serie ILI**  
**Portata in volume[m<sup>3</sup>/h], serie ILI**

| Bg<br>Frame size<br>HA<br>Tamaño<br>mod. | 400V 50Hz        | 460V 60Hz        | 400V 50Hz        | 460V 60Hz        | 400V 50Hz        | 400V 60Hz        |
|--|------------------|------------------|------------------|------------------|------------------|------------------|
|  | 3 ~ Y<br>2-polig | 3 ~ Y<br>2-polig | 3 ~ Y<br>4-polig | 3 ~ Y<br>4-polig | 3 ~ Δ<br>4-polig | 3 ~ Δ<br>4-polig |
| 63                                       | 54               | 69               | /                | /                | /                | /                |
| 71                                       | 78               | 99               | /                | /                | /                | /                |
| 80                                       | 128              | 151              | /                | /                | /                | /                |
| 90                                       | 216              | 258              | 109              | 130              | /                | /                |
| 100                                      | 278              | 328              | 141              | 164              | /                | /                |
| 112                                      | 355              | 418              | 180              | 210              | /                | /                |
| 132                                      | 550              | 650              | 290              | 340              | /                | /                |
| 160                                      | 980              | 1160             | 520              | 620              | /                | /                |
| 180                                      | 1200             | 1379             | 619              | 695              | /                | /                |
| 200                                      | 1324             | 1575             | 656              | 776              | /                | /                |
| 204                                      | /                | /                | 1062             | 1237             | 1103             | 1313             |
| 225                                      | /                | /                | 1283             | 1467             | 1337             | 1580             |
| 249                                      | /                | /                | 1457             | 1714             | 1532             | 1832             |
| 250                                      | /                | /                | 1672             | 1919             | 1764             | 2097             |
| 280                                      | /                | /                | 2170             | 2472             | 2319             | 2760             |
| 315                                      | /                | /                | 2560             | 2935             | 2747             | 3274             |
| 355                                      | /                | /                | 4069             | 4665             | 4263             | 5022             |
| 400                                      | /                | /                | 5166             | 5922             | 5355             | 6245             |
| 450                                      | /                | /                | 6351             | 7444             | 6583             | 7850             |
| 500                                      | /                | /                | 8072             | 9254             | 8367             | 9758             |
| 560                                      | /                | /                | 9688             | 11216            | 10042            | 11827            |

mit b-seitigem Referenzlagerschild /with bearing shield of reference on side b /avec de référence flasque  
 latérale b / placa de referencia en el lado b /con targhetta cuscinetti di riferimento lato b



Centermark! - DIN 332 Teil 2  
 General tolerances DIN ISO 8062-3 - DCTG 9-12  
 Denne ritning skal opføres med NORDCAD 9300 . - Med reservation for tekniska förändringar!

Einbaulage/Mounting Pos.: M1

Angewandte Normen

Applied Standards

Vollwellen bis Ø50 nach ISO M6  
 Vollwellen über Ø50 nach ISO M6  
 Hohlwellen nach ISO H7  
 Passfedern nach DIN6885  
 Zentriergründe nach DIN 332/2  
 Flanschzentrierung bis Ø230 nach ISO J6  
 Flanschzentrierung über Ø230 nach ISO M6

Shafts up to Ø50 according to ISO M6  
 Shafts above Ø50 according to ISO M6  
 Hollow shafts according to ISO H7  
 Keyways according to DIN 6885  
 Center Hole Thread according to DIN 332/2  
 Flange centering up to Ø230 according to ISO J6  
 Flange centering above Ø230 according to ISO M6

Motor:

Skizze / Outline:

|  |             |                         |  |            |                   |             |
|--|-------------|-------------------------|--|------------|-------------------|-------------|
| <b>Getriebebau NORD</b><br>GmbH & Co. KG<br>Getriebebau-Nord-Strade 1<br>D-22941 Burgwedel<br>Tel. 04302/291-1 Fax. 04302/291-1111<br>www.nord.com |             | <br><b>DRIVESYSTEMS</b> | Disassemble protection note according to ISO 16016<br>Name | Scale: 1:1 | Format: A3        | Page 1 of 1 |
| Create: 30.04.2024<br>Check:   | Date: Hylen |                         |  | Status:    | Document numbers: | Revision:   |

|   |   |   |   |     |        |      |      |                            |         |
|---|---|---|---|-----|--------|------|------|----------------------------|---------|
| 1 | 2 | 3 | 4 | Rev | Change | Date | Name | Umschreib.-No./Pre-fab-No. | T-Fasik |
|---|---|---|---|-----|--------|------|------|----------------------------|---------|