KINEMATICA
Homogenizing perfected.

MANUAL			
Document	Operating Intructions		
Project	TB 2021 11 68		
System/Unit	RT 5 ELS RT 5 1509		
Issue / Date / Visum	0.0 / 11.04.2022 / CK		
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General Operating Instructions
General Installation Instructions
General Maintenance Instructions

Customer	Allergan Sales LLC
Address	2525 Dupont Drive Irvine, CA 92612 USA
Customer Project / Order-No.	7000416878
Manufacturer	KINEMATICA AG, CH-6102 Malters-Lucerne (KIN)
KIN System Type	REACTRON® RT 5 ELS
KIN Project No.	TB 2021 11 68
KIN Serial No.	RT 5 1509
Year of Manufacture	2022

Made in Switzerland by

KINEMATICA AG
Werkstrasse 7 c-d
CH-6102 Malters

Tel.: +41-41-259 65 65
Fax: +41-41-259 65 75
e-Mail: info@kinematica.ch

SAFETY INDICATIONS

Please pay attention to the meaning of the following warning signs:

	SAFETY INSTRUCTIONS MUST BE OBSERVED TO ENSURE SAFE OPERATION.
	THIS SYMBOL INDICATES HIGH VOLTAGE, WITH RISK TO HEALTH AND ENVIRONMENT.
	CAUTION! BEWARE OF HOT SURFACE.
	CAUTION! BEWARE OF HAZARDOUS CHEMICALS OR MATERIALS THAT ENDANGER HEALTH
	CAUTION! BEWARE OF ROTATING MECHANICAL PARTS.
	CAUTION! DEVICE NOT DESIGNED FOR USE IN EXPLOSION DANGER ENVIRONMENT.
	CAUTION! BEWARE OF MOVING PARTS. NEVER PUT YOUR HANDS OR FINGERS IN BETWEEN. CRUSHING HAZARD.
	CAUTION! DANGER BY PRESSURIZED PARTS
	CAUTION! RISK OF STUMBLING.

GENERAL SAFETY INSTRUCTIONS

	RESPECT THE INSTRUCTIONS GIVEN IN THIS DOCUMENT. ALSO CHECK THE OTHER MANUALS IN YOUR DOCUMENTATION.
	READ THESE OPERATING INSTRUCTIONS BEFORE SWITCHING ON OR OPERATING THE EQUIPMENT.
	IF YOU HAVE ANY QUESTIONS OR DOUBTS REGARDING OPERATING THE UNIT, DO NOT START OR OPERATE THE UNIT AND CONTACT YOUR NEAREST KINEMATICA SERVICE CENTER.
	IMPROPER USE OF THE SYSTEM / UNIT DUE TO UNAUTHORIZED PERSONNEL CAN LEAD TO DAMAGE ON THE SYSTEM / UNIT AND / OR ENDANGER LIFE, CAUSE PERSONAL INJURY AND HARM THE ENVIRONMENT.
	ALL AUTHORIZED PERSONNEL INVOLVED IN THE OPERATION, THE SERVICE OR THE REPAIR OF THE SYSTEM / UNIT HAVE TO READ AND TO UNDERSTAND THIS MANUAL.
	ONLY AUTHORIZED AND INSTRUCTED PERSONNEL / INTENDED USERS ARE ALLOWED TO USE THE SYSTEM.
	THE INTENDED USER ASSURES THAT THE SYSTEM / UNIT WILL BE INSTALLED CORRECTLY IN ORDER TO FULFILL THE INTENDED APPLICATION AND AUTHORIZES OTHER QUALIFIED USERS TO WORK WITH THE SYSTEM / UNIT. HE IS ALSO RESPONSIBLE TO INSTRUCT THE USERS OF THE SYSTEM / UNIT.
	THE SERVICE ENGINEER IS EMPLOYED BY THE INTENDED USER AND MAINTAINS THE SYSTEM / UNIT DURING OPERATION. HE IS A SKILLED CRAFTSMAN WITH MECHANICAL, ELECTRICAL AND ELECTRONIC EDUCATION. THE SERVICE ENGINEER IS RESPONSIBLE FOR THE INSTALLATION AND START-UP OF THE SYSTEM / UNIT AS WELL AS FOR THE MAINTENANCE AND REPAIR OF THE SYSTEM / UNIT. HE MUST BE TRAINED ACCORDINGLY TO CARRY OUT ALL NECESSARY MAINTENANCE WORK.
	ENSURE THAT ALL LEGAL AND ENVIRONMENTAL REGULATIONS OF THE COUNTRY WHERE THE SYSTEM / UNIT WILL BE INSTALLED ARE FOLLOWED.

	DO NOT MODIFY THE SYSTEM / UNIT WITHOUT A WRITTEN CONFIRMATION BY KINEMATICA.
	IT IS STRICTLY FORBIDDEN TO RUN THE SYSTEM / UNIT WITH DISASSEMBLED OR BRIDGED SAFEGUARDS, FOR EXAMPLE SAFETY LIMIT SWITCH, EMERGENCY SWITCH OR COVER.
	FOR REPAIRS, ONLY ORIGINAL SPARE PARTS SHOULD BE USED.
	BEFORE STARTING INSPECTION AND MAINTENANCE WORK ON THE SYSTEM / UNIT (SERVICE, REPAIR ETC.), ALL POWER SUPPLIES MUST BE DISCONNECTED. IT HAS TO BE ENSURED THAT THE POWER SUPPLY CAN NOT BE RECONNECTED BY A THIRD PERSON DURING SUCH WORK (E.G. USE A LOCK TO LOCK OUT THE MAIN SWITCH).
	SERVICE AND MAINTENANCE SHALL ONLY BE PERFORMED BY AUTHORIZED AND SKILLED SERVICE ENGINEERS.
	AFTER EVERY INSPECTION AND MAINTENANCE WORK ON THE SYSTEM / UNIT (SERVICE, REPAIR ETC.) THE SERVICE ENGINEER HAS TO DO A TEST-RUN. DURING TRANSPORT AND STORAGE OPEN PORTS HAVE TO BE COVERED BY A FOREIGN BODY PROTECTION!
	EAR PROTECTION SHOULD ALWAYS BE USED WHEN WORKING IN THE ENVIRONMENT OF THE SYSTEM.
	KEEP THIS OPERATING MANUAL NEARBY THE EQUIPMENT FOR FUTURE REFERENCE.
	THIS DOCUMENT IS PART OF THE SYSTEM / UNIT AND SHOULD NOT BE REMOVED OR STORED ELSEWHERE. EASY ACCESS TO THE OPERATING AND MAINTENANCE CREW MUST BE GRANTED AT ALL TIMES.
	ALTHOUGH KINEMATICA UNITS / SYSTEMS ARE DESIGNED FOR EASY USE, THIS DOES NOT RELEASE YOU FROM THE OBLIGATION TO INSPECT YOUR EQUIPMENT CAREFULLY AND TO CLEAN IT THOROUGHLY.

WARNINGS

	ALL WARNINGS AND RECOMMENDATIONS IN THE FOLLOWING CHAPTERS MUST BE RESPECTED
	THE EQUIPMENT IS NOT ALLOWED TO BE OPERATED IN EXPLOSION ENDANGERED AREAS. IT IS NOT ALLOWED TO WORK WITH FLUIDS WHICH ARE HIGHLY INFLAMMABLE. IT IS NOT ALLOWED TO MIX MATERIALS WHICH CAN CAUSE STRONG EXOTHERMAL REACTIONS
	THE ELECTRICAL INSTALLATION MUST BE DONE BY A QUALIFIED ELECTRICIAN !
	ENSURE THAT THE RATED VOLTAGE OF THE EQUIPMENT MATCHES THE SUPPLY. SEE ALSO SPECIFICATIONS, ELECTRICAL SCHEME AND ELECTRICAL DATA PLATES. IT IS IMPORTANT THAT THE MAINS SUPPLY WHERE THE DEVICE IS CONNECTED TO COMPLIES WITH THE SPECIFICATIONS IN THE DOCUMENTATION AND THE INTERNATIONAL STANDARDS FOR POWER SUPPLIES. IF NOT, SUCCESSFUL OPERATION CANNOT BE GUARANTEED
	ENSURE THAT ENOUGH FREE SPACE IS AVAILABLE AROUND THE UNIT, SO THAT EFFECTIVE AIR FLOW AND COOLING IS ASSURED. INSUFFICIENT COOLING MAY LEAD TO A DECREASE OF POWER OUTPUT AND OVERHEATING.
	DIRECTION OF ROTATION OF THE MOTOR IS INDICATED ON THE MOTOR. SEE ALSO DRAWINGS IN THE DOCUMENTATION.
	THE INTENDED USER MUST ASSURE FREE PRODUCT FLOW THROUGH THE WORKING CHAMBER AT ALL TIME DURING OPERATION.
	DRY-RUN OF MECHANICAL SEALS MUST BE AVOIDED! DRY-RUN CAN DAMAGE THE MECHANICAL SEALS IN SHORTEST TIME.

	MECHANICAL SEALS MUST BE OPERATED WITH A SUITABLE SEALANT LIQUID.
	PROTECT MECHANICAL SEALS AGAINST STROKES AND POKES, IT CAN BE DAMAGED EASILY. NEVER GREASE THE SLIDE SURFACES AND ROTATING RINGS.
	WHEN REPLACING A MECHANICAL SEAL, DO NOT REPLACE SINGLE PARTS. WE RECOMMEND TO TAKE A WHOLE NEW SPARE MECHANICAL SEAL AND SEND THE DAMAGED ONE BACK TO THE NEAREST KINEMATICA REPRESENTATIVE.
	COUNTERPRESSURE SEALING SYSTEMS FOR THE MECHANICAL SEALS MUST BE MONITORED BY THE INTENDED USER
	THE MAX. OPERATIONAL SPEED IS INDICATED ON THE DATA PLATE
	THE INTENDED USER HAS TO ENSURE THAT NO FOREIGN PARTICLES / BODIES WHICH MIGHT LEAD TO A DAMAGE CAN PASS THROUGH THE UNIT
	THE ASSEMBLY AND DISASSEMBLY PROCEDURE IS DESCRIBED IN THIS MANUAL AND/OR CORRESPONDING DOCUMENTATION. THE UNIT IS ONLY ALLOWED TO BE OPERATED WHEN ASSEMBLED COMPLETELY
	NEVER REMOVE ANY COMPONENTS OR REMOVE CONNECTIONS OF THE SYSTEM DURING OPERATION.
	NEVER OPEN ANY CONNECTIONS OF THE COUNTERPRESSURE SEALING SYSTEM DURING OPERATION. NEVER OPEN ANY CONNECTIONS OF THE COUNTERPRESSURE SEALING SYSTEM AS LONG AS IT IS PRESSURIZED.
	THE SYTEM SHOULD BE CLEANED AFTER EVERY OPERATION / BATCH RUN.

	THE INTENDED USER HAS TO ENSURE THAT USED SOLVENTS AND CLEANING MATERIALS ARE COMPATIBLE WITH THE MATERIAL OF THE SEALS AND COMPONENTS OF THE UNIT.
	THE RESPONSIBILITY OF KEEPING THE OPERATING PARAMATERS SUCH AS PRESSURE, TEMPERATURE, SPEED AND PRODUCT FLOW WITHIN THE SPECIFIED LIMITS LIES WITH THE INTENDED USER. IN CASE OF HIGH PRESSURE AND / OR HIGH TEMPERATURE (IF PERMITTED) THE INTENDED USER HAS TO INSTALL PROPER PROTECTIVE COVERS.
	NEVER PUT ANY PRESSURE OR VACUUM TO A SYSTEM OR TO PARTS OF IT WHICH ARE NOT DESIGNED FOR SUCH OPERATION. SEE ALSO TECHNICAL DATA SHEET.
	PRESSURIZED COMPONENTS LIKE THE COUNTERPRESSURE SEAL POT OR WORKING CHAMBER HAVE TO BE DEPRESSURIZED BEFORE OPENING. RISK OF INJURIES!
	IN THE EVENT THAT HAZARDOUS CHEMICALS OR MATERIALS THAT ENDANGER HEALTH CAN INFLUENCE THE SURROUNDINGS OR USE OF THE EQUIPMENT, APPROPRIATE COUNTERMEASURES MUST BE TAKEN.
	WHEN HANDLING DANGEROUS PRODUCTS, TAKE CARE THAT THE LOCAL SAFETY REGULATIONS ARE RESPECTED.
	AT LONG TERM USE AND HEAVY DUTY LOAD THE BEARING HOUSING / COUPLING MAY GET HOT – DANGER OF SKIN BURN.
	NEVER TOUCH ANY ROTATING OR COUPLING PARTS AS LONG AS THE SYSTEM IS UNDER OPERATION OR CONNECTED TO MAINS SUPPLY – DANGER OF HEAVY INJURIES.
	IF THE SYSTEM / UNIT IS USED FOR ANY OTHER PURPOSE THAN THE INTENDED APPLICATION OR IF THE SYSTEM / UNIT WILL BE OPERATED BEYOND THE TECHNICAL DATA RANGE WITHOUT THE WRITTEN APPROVAL BY KINEMATICA, IMPROPER USE IS DECLARED AND KINEMATICA WILL TAKE NO RESPONSIBILITY, NOR WILL GRANT ANY GUARANTEE.

	IMPROPER USE OF THE SYSTEM / UNIT CAN RESULT IN PERSONAL INJURY OR IN DAMAGE OF THE EQUIPMENT. KINEMATICA WILL NOT BE LIABLE AND WILL TAKE NO RESPONSIBILITY IN SUCH AN EVENT.
	IF THE PROCESSED MEDIA TENDS TO HARDEN OR STICK IN THE SYSTEM / UNIT, THE PRODUCT HAS TO BE REMOVED COMPLETELY FROM THE SYSTEM / UNIT AFTER EVERY RUN
	PAY ATTENTION THAT THE TEMPERATURE DIFFERENCE BETWEEN ACTUAL TEMPERATURE OF THE SYSTEM / UNIT AND CLEANING TEMPERATURE IS KEPT TO A MINIMUM.
	A TEMPERATURE SHOCK CAN DAMAGE STRUCTURAL COMPONENTS.
	THE CLEANING LIQUID SHOULD BE COMPATIBLE WITH THE PARTS WETTED BY THE PRODUCT.
	ALL MAINTENANCE WORK HAS TO BE DONE BY SPECIALISTS OR ENGINEERS.
	BEFORE STARTING THE DISASSEMBLY, ALL ELECTRICAL PARTS HAVE TO BE DISCONNECTED.
	BE SURE THAT MOTORS / DRIVES CANNOT BE STARTED FROM ANOTHER PERSON, WHILE YOU ARE WORKING (E.G. USE A LOCK TO LOCK OUT THE MAIN SWITCH)
	CRANES AND/OR LIFTING EQUIPMENT MUST BE USED TO MOVE AND TRANSPORT HEAVY SYSTEMS OR PARTS.
	ALL PARTS HAVE TO BE INSPECTED FOR SIGNS OF WEAR AND DAMAGE. IF NECESSARY, THEY HAVE TO BE REPLACED.
	BEFORE REASSEMBLY, ALL SCREWS HAVE TO BE GREASED. NEVER GREASE THE SEALING FACES OF MECHANICAL SEALS.

RESIDUAL DANGERS

When the system/equipment is used in accordance with rules and regulations, residual dangers are minimal.

Residual dangers	Counter measurements
 Tripping over feed or re-turn or supply lines, piping	These should be laid appropriately.
 Breakage of piping, vessels	Wear protective clothing (gog-gles etc.). 
 Leakage of product or other supply	
 Hearing loss due to loud noise.	According to the application ear protection must be used. 
 Tilting of the device	Use stable, non-slip base

1 INTRODUCTION

KINEMATICA is a specialist for design and manufacturing of dispersing and mixing Systems. The aim of this document is to instruct new users in the effective and safe utilization of our equipment.

The KINEMATICA batch homogenizing system **REACTRON® RT 5 ELS** has been designed and manufactured according to the EC guidelines, the actual technical standards and applicable safety rules and is marked with the CE mark.

This document is valid for the KINEMATICA batch homogenizing system REACTRON® RT 5 ELS.

The system is designed and manufactured for the intended application consisting of:

- Batch processing of flowable and pumpable products under the considerations and limitations (see "Technical Data Sheet" – Documentation / Chapter 1)
- The processed media must be compatible with all constructional parts wetted by the product.
- If minimum and maximum filling levels are complied with.
- If suitable precautions to personnel are taken to prevent any harm due to noise emission.
- The user assures that during operation no personal can access the inside of the vessel.
- The use of the system with no structural, mechanical or electrical changes different from the original scope of supply.

Typical applications:

- preparing emulsions
- pharmaceutical or cosmetics products
- suspending solids in liquids (such as liquid polymers)
- dispersing fine solids in liquids or molten phases
- suspending additives and solid polymers in mineral oils
- extracting enzymes from biomass
- extracting active ingredients and substances from plants
- grinding and shredding of solids and fibers in liquids or polymers

If the system is used for purposes different than or over and above the capabilities specified herein, KINEMATICA does not guarantee proper function and assumes no obligation or liability.

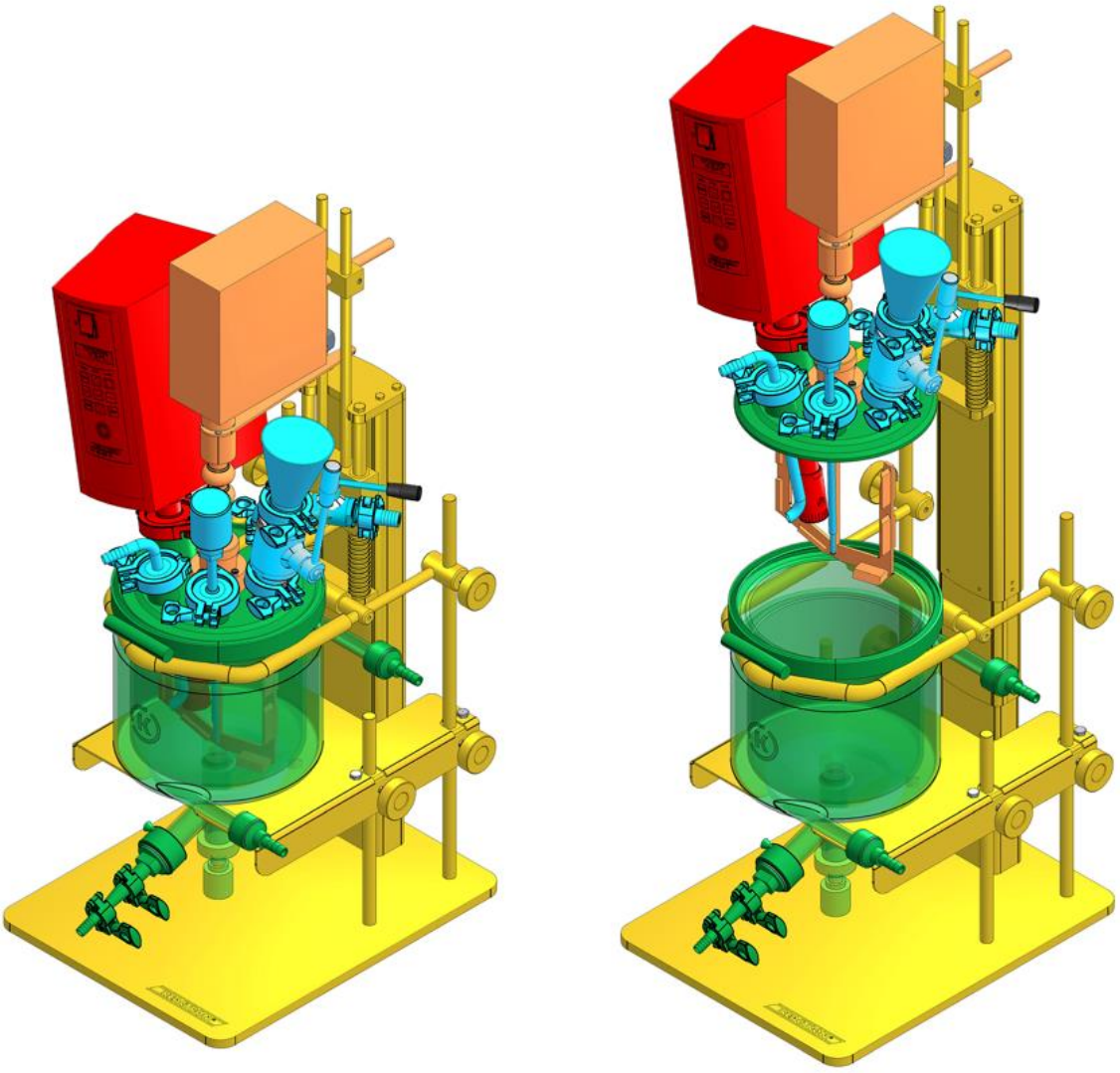
Should you have any questions which are not answered in this document, please contact KINEMATICA.

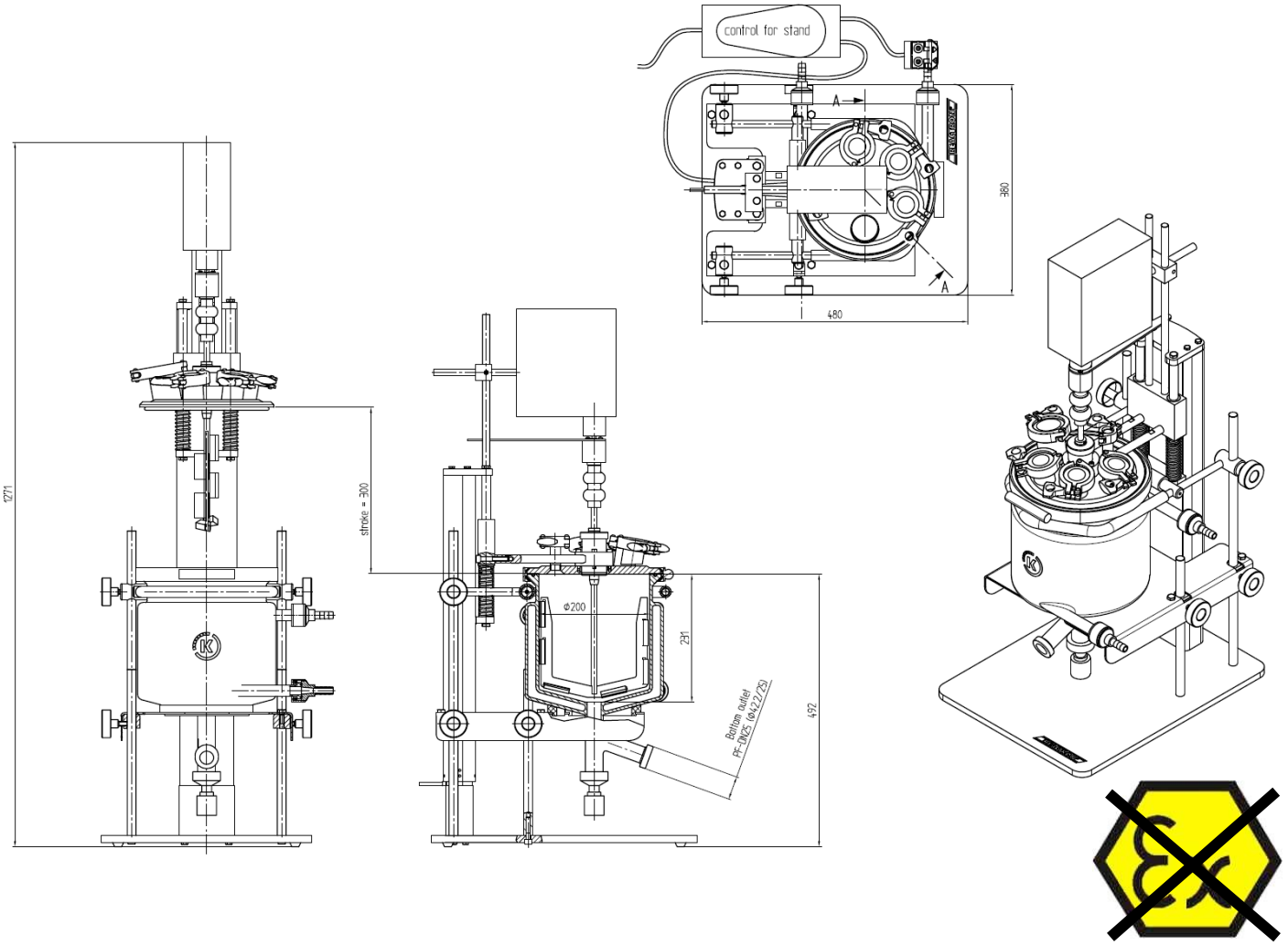
Check on www.kinematica.ch for your closest contact address.

2 DESCRIPTION OF THE EQUIPMENT

The system REACTRON® RT 5 ELS is designed is designed for the batch use within an isolator and consists of the following main parts:

- Base Frame with electrical stand
- Process vessel
- POLYTRON® Batch Homogenizer
- POLYMIX® Anchor Stirrer
- ICA components

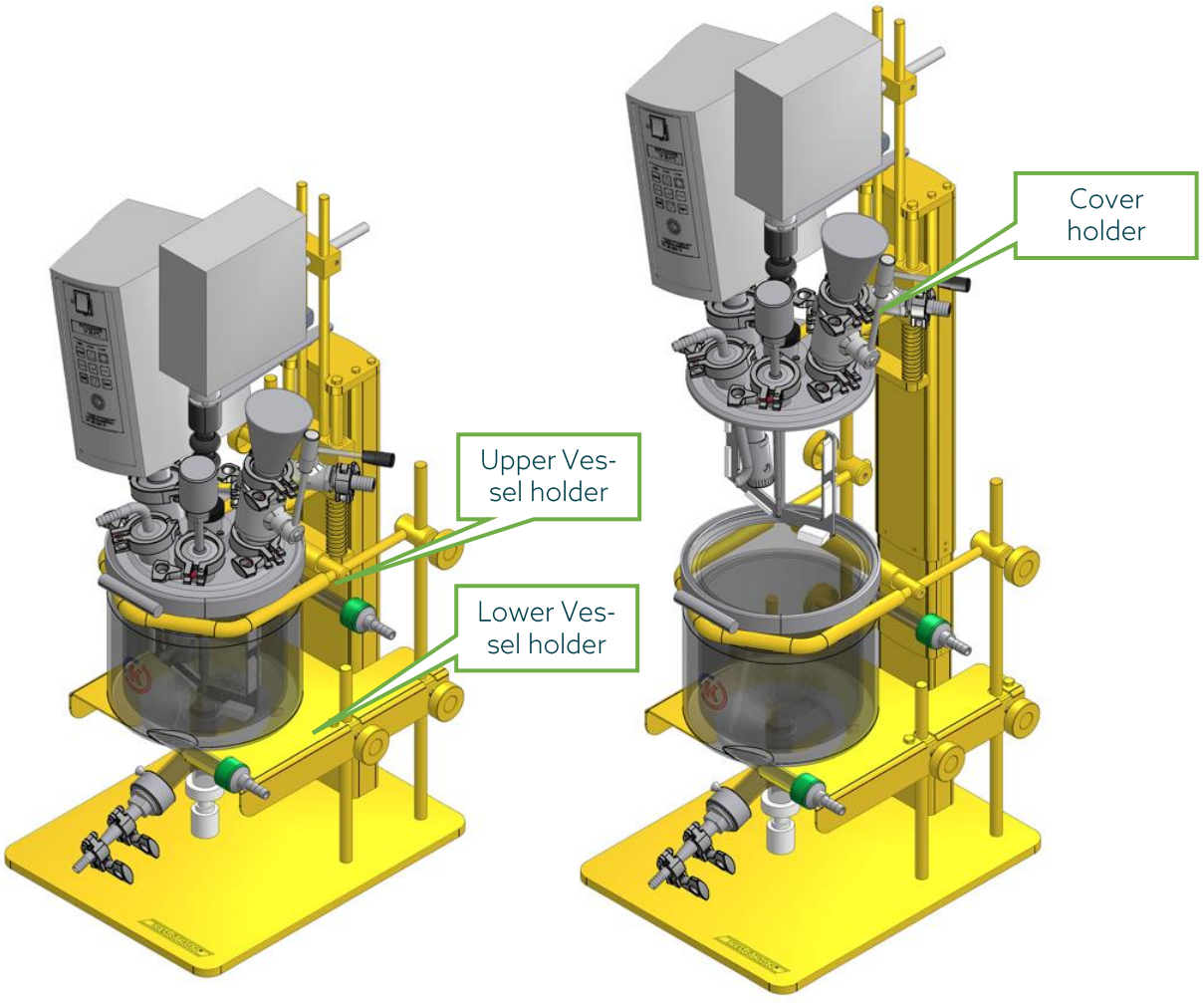




	See „Technical Datasheet“ for further information. ➔ Documentation / 01_TDS
	See „Drawings / PartsList“ for further details. ➔ Documentation / 03_Drw

2.1 Base Frame with Electrical Stand

The REACTRON® RT 5 ELS is built on a base frame with an electrical stand.
The lid of the process vessel is fixed to the electrical stand allowing the lid with all instruments, anchor stirrer and homogenizer to be lifted out of the process vessel.

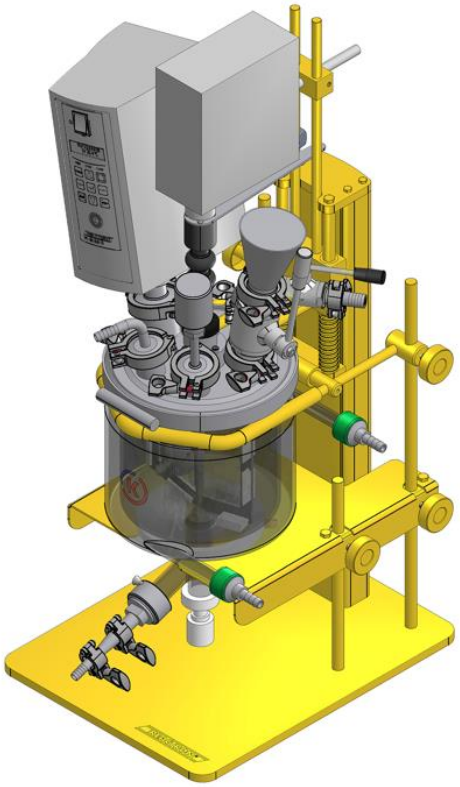


⚠	See „Technical Datasheet" for further information. → Documentation / 01_TDS
⚠	See „Drawings / PartsList" for further details. → Documentation / 03_Drw
⚠	During operation it is not allowed to move the system.

To open the process vessel, first release any vacuum on the system, if any.
Also remove any product or supply line fixed to the cover or to armatures / instruments on the cover.

Then untighten the vessel clamp (pos. 15) till the lid is free to move.

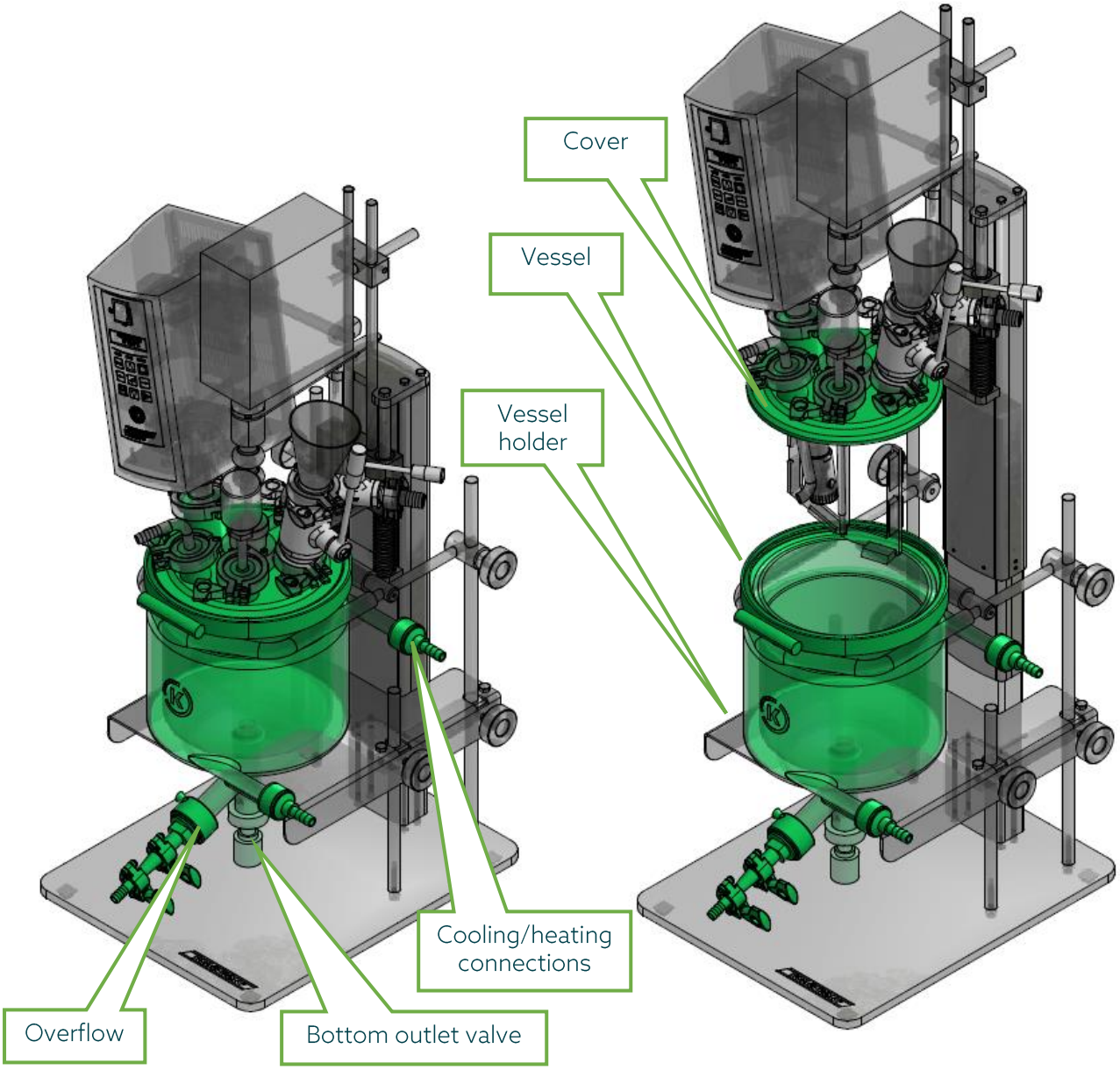
(see also assembly drawing)



Then use control unit (pos. 80) for electrical stand will support the lifting till the desired height is reached.

	During operation cover and vessel have to be closed tightly using the O-ring seal and clamping screws/knurled head nut. The clamping lever of the telescopic stand has to be tightened.
	Under no circumstances it is allowed to operate the homogenizer or anchor stirrer when the cover is lifted.
	Before the vessel can be opened remove any product or supply line fixed to the cover or to armatures / instruments on the cover.

2.2 Process Vessel



The process vessel has the following setup:

Design	• Made from borosilicate glass • Working volume approx. 5 Liter • Volume total approx. 7.5 Liter • With cooling/heating jacket • Dished bottom, including manual bottom outlet valve • With flat cover, O-ring sealing • Vessel fixed to the base frame; cover fixed to electrical stand

Working Conditions	Process vessel • Working temperature: max. 90°C • Working pressure: pressureless / vacuum Jacket • Working temperature: max. 90°C • Working pressure: pressureless
Dimensions:	• Inner-Ø: approx. 200 mm • height: approx. 231 mm
Cooling / Heating Jacket:	• Yes
Insulation	• No
Mounting	• Vessel fixed to base frame, cover fixed to electrical stand
Equipment / Connections	On the cover • 1x Central lead through for anchor stirrer with shaft seals • 1x TC 2″ for Polytron • 1x TC 1.5″ for/with Temperature probe PT 100 • 1x TC 1.5″ for/with returning line • 1x TC 1.5″ for/with feeding funnel with ball valve • 1x TC 0.75″ for/with vacuum port with ball valves and hose nipples On the shell • N/A On the jacket • Hose nipple Ø13.5 for cooling / heating On the bottom • Bottom outlet valve, manual, outlet connection hose nipple Ø13.5

	See „Technical Datasheet“ for further information. → Documentation / 01_TDS
	See „Drawings / PartsList“ for further details. → Documentation / 03_Drw
	Connected cooling/heating lines, supply lines or product lines (hoses, tubes, piping) are not allowed to transfer any forces, torques or vibrations to the unit / system / connections. Always check connected lines for leakage.
	It is only allowed to apply vacuum or pressure if the unit / system is designed for vacuum or pressure applications.
	Mind the MIN-MAX filling levels.

2.3 INLINE EMULSIFIER MEGATRON® MT 3100 S²

2.3.1 DRIVE UNIT

The REACTRON® RT 5 ELS is equipped with a homogenizer drive unit of type MEGATRON® MT 3100 S², which contains the powerful three-phase high frequency motor (with quick coupling for the working chamber) controlled by the integrated VFD installed in a stainless-steel housing.
The speed setting and control is directly done at the drive unit.

⚠	See „Technical Datasheet" for further information. → Documentation / 01_TDS
⚠	See „General manual" for drive unit MEGATRON® MT 3100 S² for further information. → Documentation / 02_General Operation
⚠	See „Drawings / PartsList" for further details. → Documentation / 03_Drw

2.3.2 WORKING CHAMBER

The REACTRON® RT 5 ELS is equipped with a dispersing working chamber MTO 3100 Q-E. The dispersing working chamber is coupled to the dispersing device drive MT 3100 S^2 by means of a quick coupling and connected to the process tank via the recirculation line using hose nipple connections.

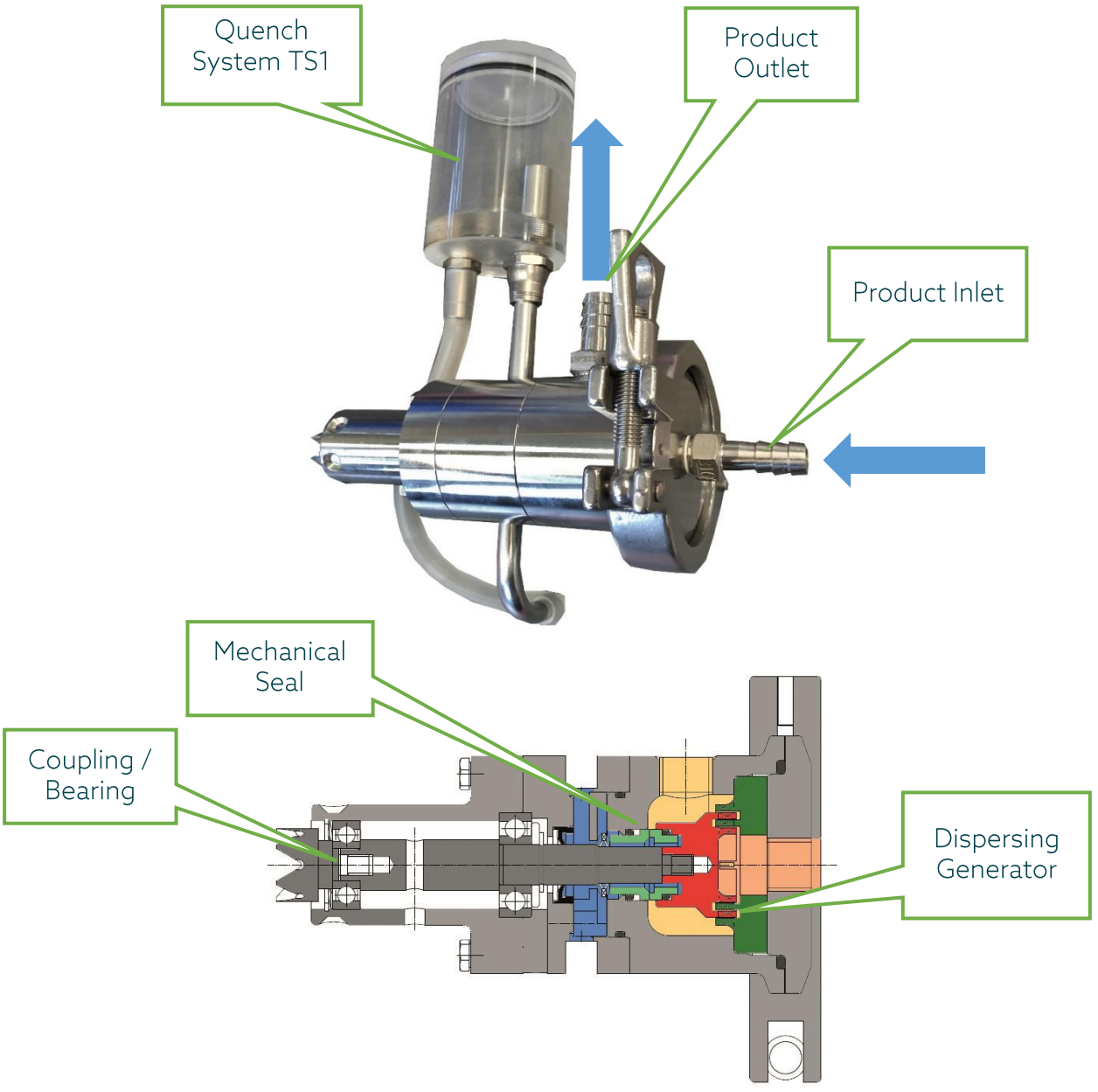
The dispersing working chamber has a mechanical seal against the atmosphere. The maximum permissible rotor speed for the dispersing generator MTG 30/4 F is 18,000 rpm.

⚠	See „Technical Datasheet" for further information. → Documentation / 01_TDS
⚠	See „Drawings / PartsList" for further details. → Documentation / 03_Drw
⚠	The operator is responsible for maintaining the maximum permissible speed.
⚠	The product to be processed must flow freely to the dispersing working chamber or the dispersing generator.
⚠	The mechanical seal must not run dry.

⚠	The dispersing working chamber or the dispersing device drive may only be put into operation if the lid and container are tightly closed with the screw plugs and O-ring seal and the recirculation lines are correctly installed.

The working chamber is an inline flow chamber and consists of the following general parts:

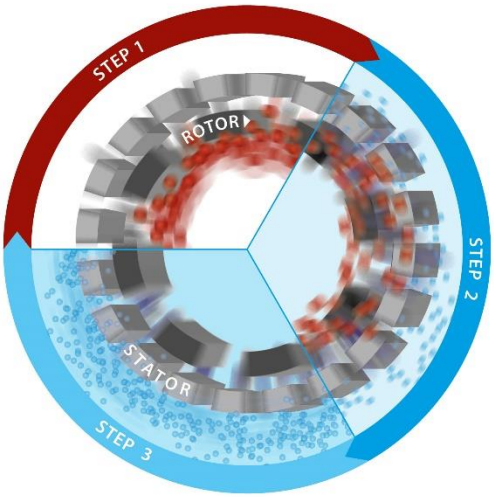
- Bearing
- Mechanical sealing
- Inner chamber with dispersing generator and product inlet/outlet connections
- Cooling/heating jacket (if applicable)



2.3.3 DISPERSING GENERATORS

A dispersing generator consists of a rotor and a stator. Rotor and stator consist of one or more teeth rows each for different levels of fineness.

Turning with high speed, the rotor creates inside the stator high mechanical shear forces and shear stress resulting in size reduction and turbulent mixing of the processed media.



The generators are exchangeable with different types for different particle sizes. Please check the maximum speed allowed for the installed dispersing generator. Do not run the MEGATRON® above this limit.

⚠	See „Technical Datasheet“ for further information. → Documentation / 01_TDS
⚠	See „Drawings / PartsList“ for further details. → Documentation / 03_Drw

Please bear in mind due to operation the dispersing generator(s) belong to the wear and tear parts.

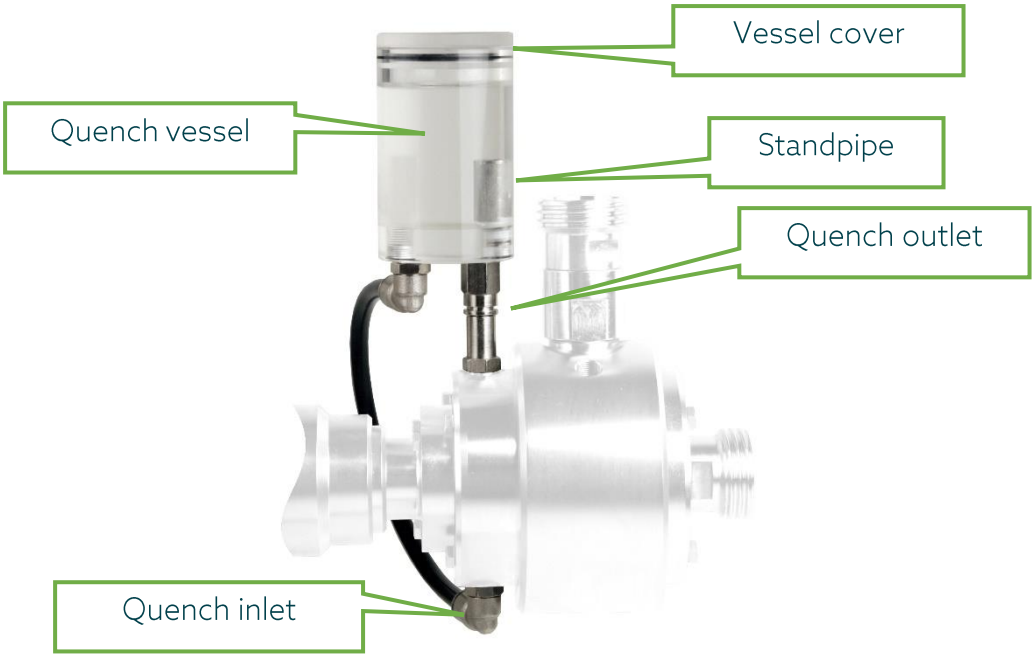
2.3.4 MECHANICAL SEAL

The product side of the working chamber (inner chamber with dispersion generator) must be separated from the non-product or the atmosphere side of the working chamber. For this purpose, a single-acting mechanical seal is installed in the working chamber.

The type and material combination of the mechanical seal was selected for the application described in the contract and should therefore not be used for other purposes without the consent of the manufacturer.

A mechanical seal must not run dry. A mechanical seal must always be lubricated, flushed and cooled with a suitable quenching medium. The quenching medium must also be compatible with the product and materials of construction. The quench medium temperature must always be 40 ° C below the boiling point to prevent damage to the mechanical seal. In the case of a single-acting mechanical seal, a non-pressurized flushing liquid system (quench tank) is used.

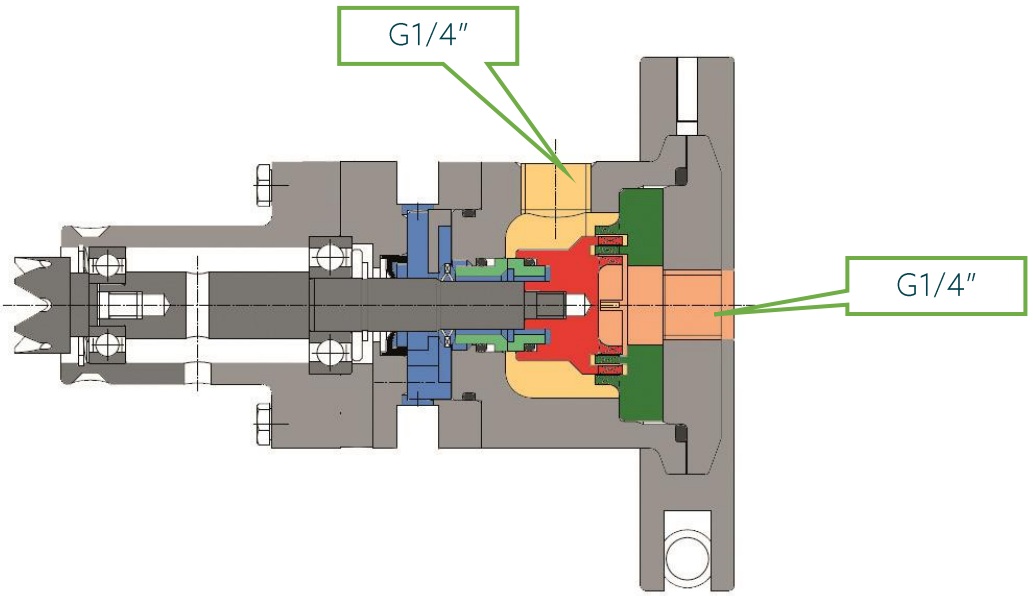
The standard working chambers for the MEGATRON® MT 3100 S^2 are equipped with a KINEMATICA quench system TS1 (also available in PTFE).



⚠	If no TS1 quench system is used, pressureless flow cooling (e.g. with tap water) with a flow rate of ≤ 1 l / min must be connected

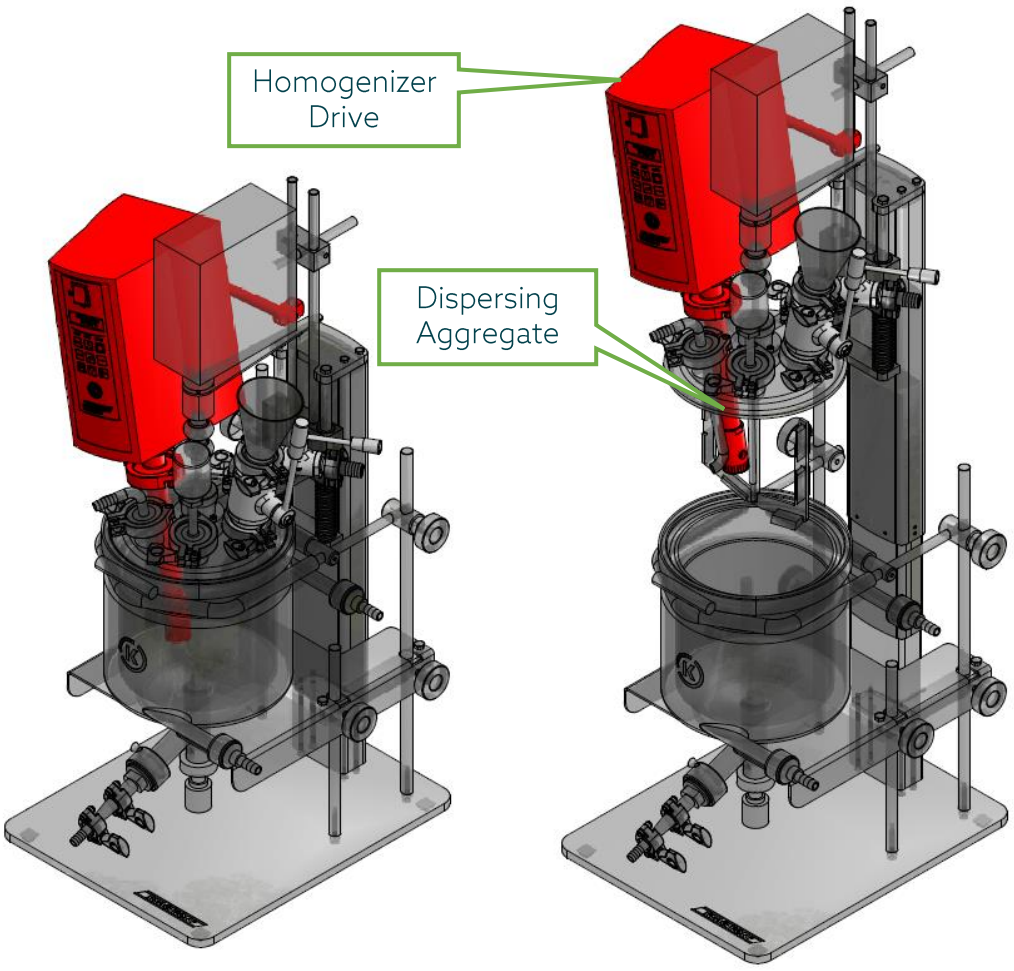
2.3.5 FITTINGS FOR PRODUCT INLET & OUTLET

The standard inlet and outlet connections at the working chamber are inside thread G1/4".



The MT 3100 S^2 working chamber is equipped with tube olive fittings Ø12/8 as standard. Other fittings available on request.

2.4 POLYTRON® Batch Homogenizer



2.4.1 DRIVE UNIT

The REACTRON® RT 5 ELS is equipped with a homogenizer drive unit of type POLYTRON® PT 6100 D. Speed setting and control is directly done at the drive unit.
The max. allowable speed for the attached dispersing aggregate PT-DA 36/2 G F-255 is 15'000 rpm.

	See „Technical Datasheet" for further information. → Documentation / 01_TDS

	See „General manual" for drive unit POLYTRON® PT 6100 D for further information. → Documentation / 02_General Operation
	See „Drawings / PartsList" for further details. → Documentation / 03_Drw

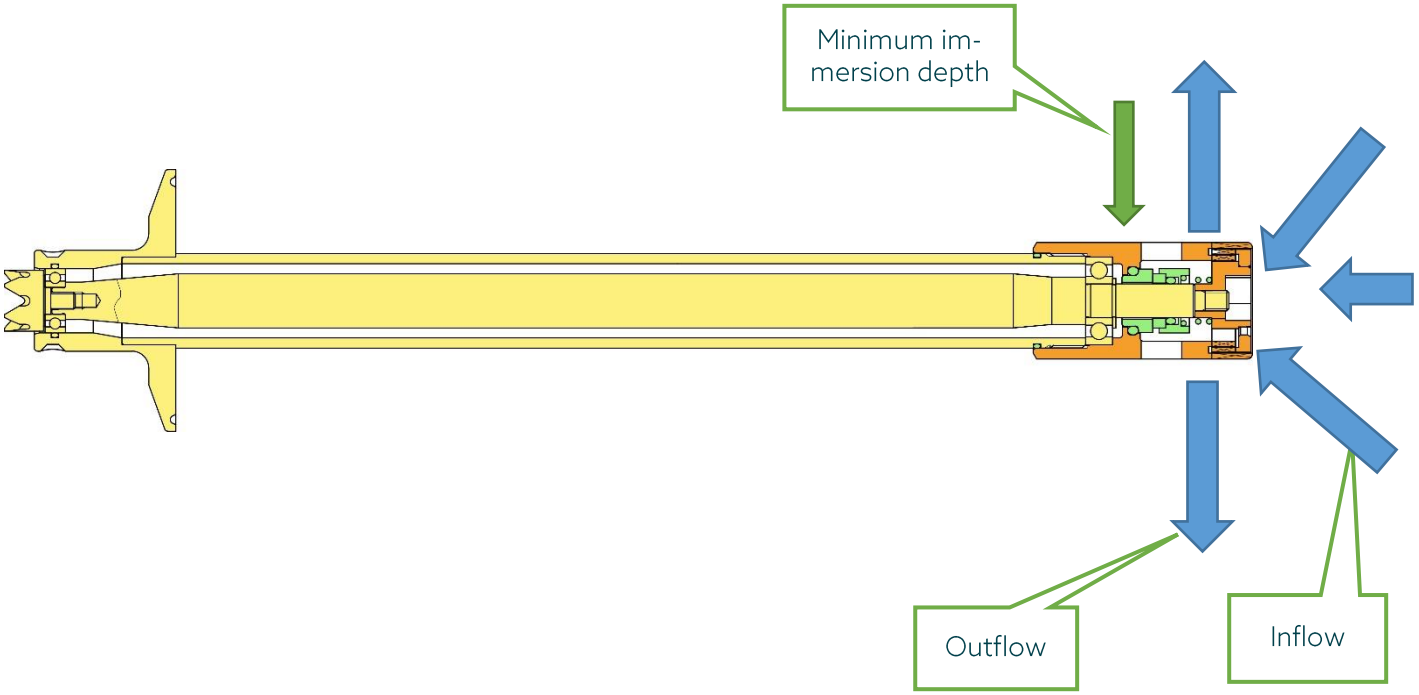
2.4.2 Dispersing Aggregate

The REACTRON® RT 5 ELS is equipped with a dispersing aggregate PT-DA 36/2 G F-255.
The aggregate is connected to the drive unit by means of its quick coupling and connected / sealed to the process vessel cover by a TriClamp 2" connection.
The dispersing aggregate has a single mechanical seal (at the dispersing generator head) against the atmosphere. The maximum allowable rotor speed of the dispersing aggregate PT-DA 36/2 G F-255 is 15'000 rpm.

	See „Technical Datasheet" for further information. → Documentation / 01_TDS
	See „Disassemble" for disassembly of the dispersing aggregate. → Documentation / 04_Diassembly
	The user is obliged to observe and keep the speed within the given limits.
	The dispersing aggregate and the dispersing generator (rotor/stator) respectively have to be immersed into the product during operation.
	The dispersing aggregate and the drive unit respectively are only allowed to be operated when cover and vessel are closed tightly using the O-ring seal and clamping screws/knurled head nut.

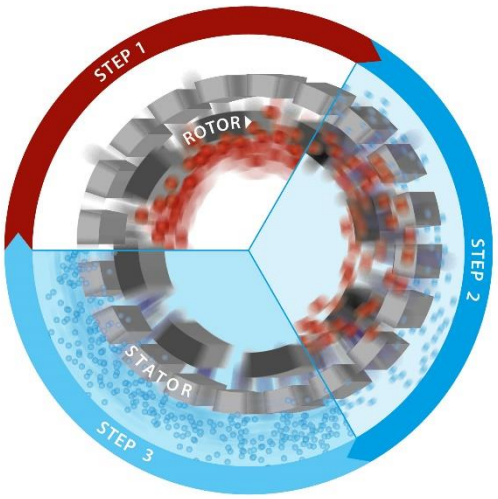
The dispersing aggregate consists of the following general parts:

- Bearing / Shaft / Stator tube (yellow)
- Mechanical sealing / Sealing housing (green)
- Dispersing generator (orange)



A dispersing generator consists of a rotor and a stator. Rotor and stator consist of one or more teeth rows each for different levels of fineness.

Turning with high speed the rotor creates inside the stator high mechanical shear forces and shear stress resulting in size reduction and turbulent mixing of the processed media.



The generators are exchangeable with different types for different particle sizes.

Please bear in mind due to operation the dispersing generator(s) belong to the wear and tear parts.

2.4.3 Mechanical seal

	See „Technical Data Sheet"for further information regarding the installed mechanical seal. → Documentation / 01_TDS
	See also "Mechanical Seal Manual" → Documentation / 08_Mechanical Seal

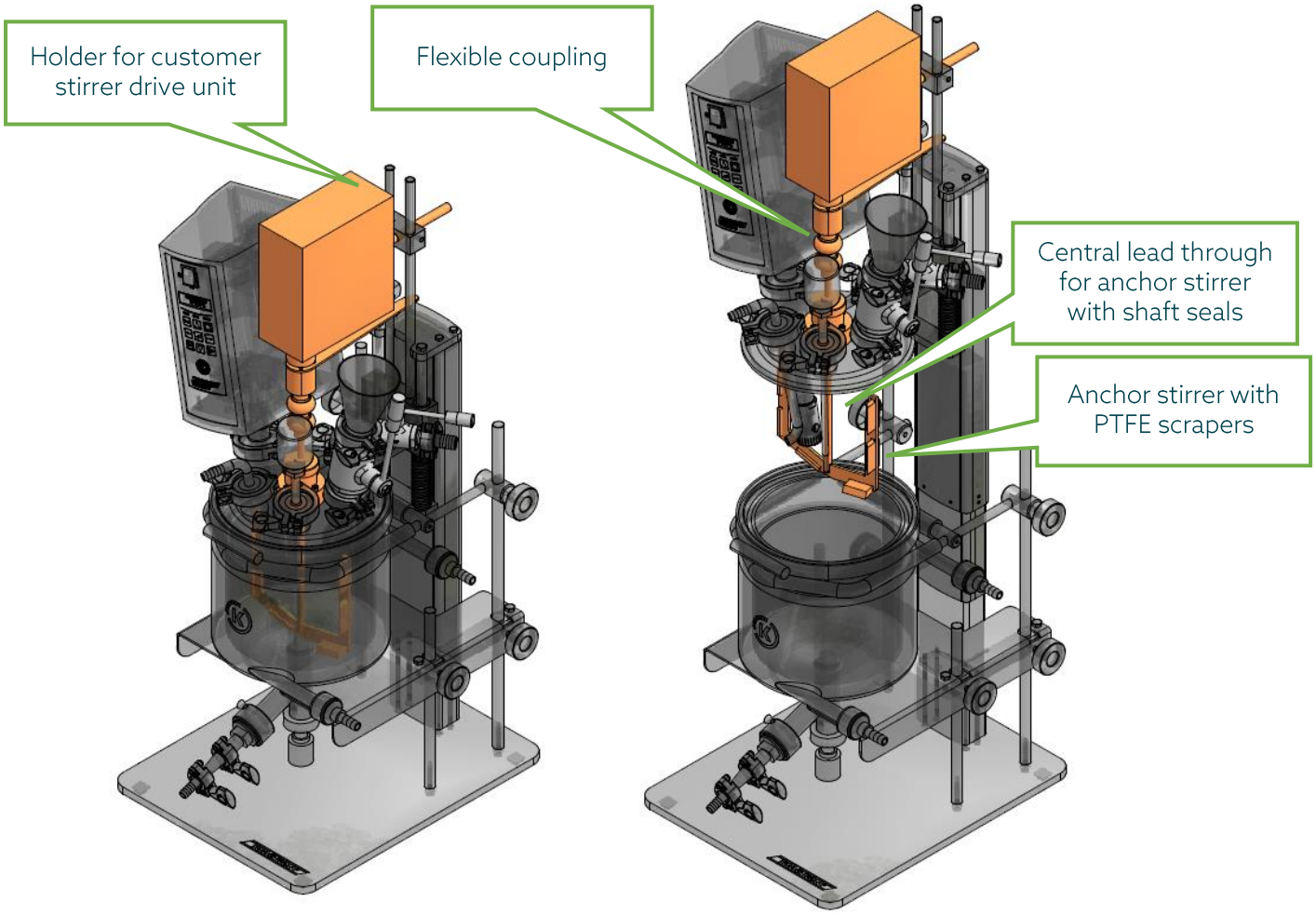
The product side (inside the process vessel) has to be separated from the non-product or atmospheric side. For that purpose, a single mechanical seal is installed as part of the dispersing aggregate.

The type and material combination of the mechanical seal have been chosen for the application described in the contract and should therefore not be used for other purposes without the permission of the manufacturer.

A mechanical seal is not allowed to run dry. Moreover, it has always to be lubricated, flushed and cooled by a suitable sealing lubricant. The lubricant must also be compatible with the product and the materials of construction. The lubricant temperature has always to be 40°C below the boiling point to prevent any damages to the sealing system.

In this case the mechanical seal runs within the product. So, the product is the lubricant and has to be used correspondingly.

2.5 POLYMIX® Anchor Stirrer



⚠	See „Technical Datasheet“ for further information. → Documentation / 01_TDS
⚠	See „General manual“ for stirrer drive unit → Documentation / 02_General Operation
⚠	The user is obliged to observe and keep the speed within the given limits.

	The anchor stirrer and the dispersing generator (rotor/stator) respectively have to be immersed into the product during operation.
	The anchor stirrer and the stirrer drive unit respectively are only allowed to be operated when cover and vessel are closed tightly using the O-ring seal and clamping screws/knurled head nut.

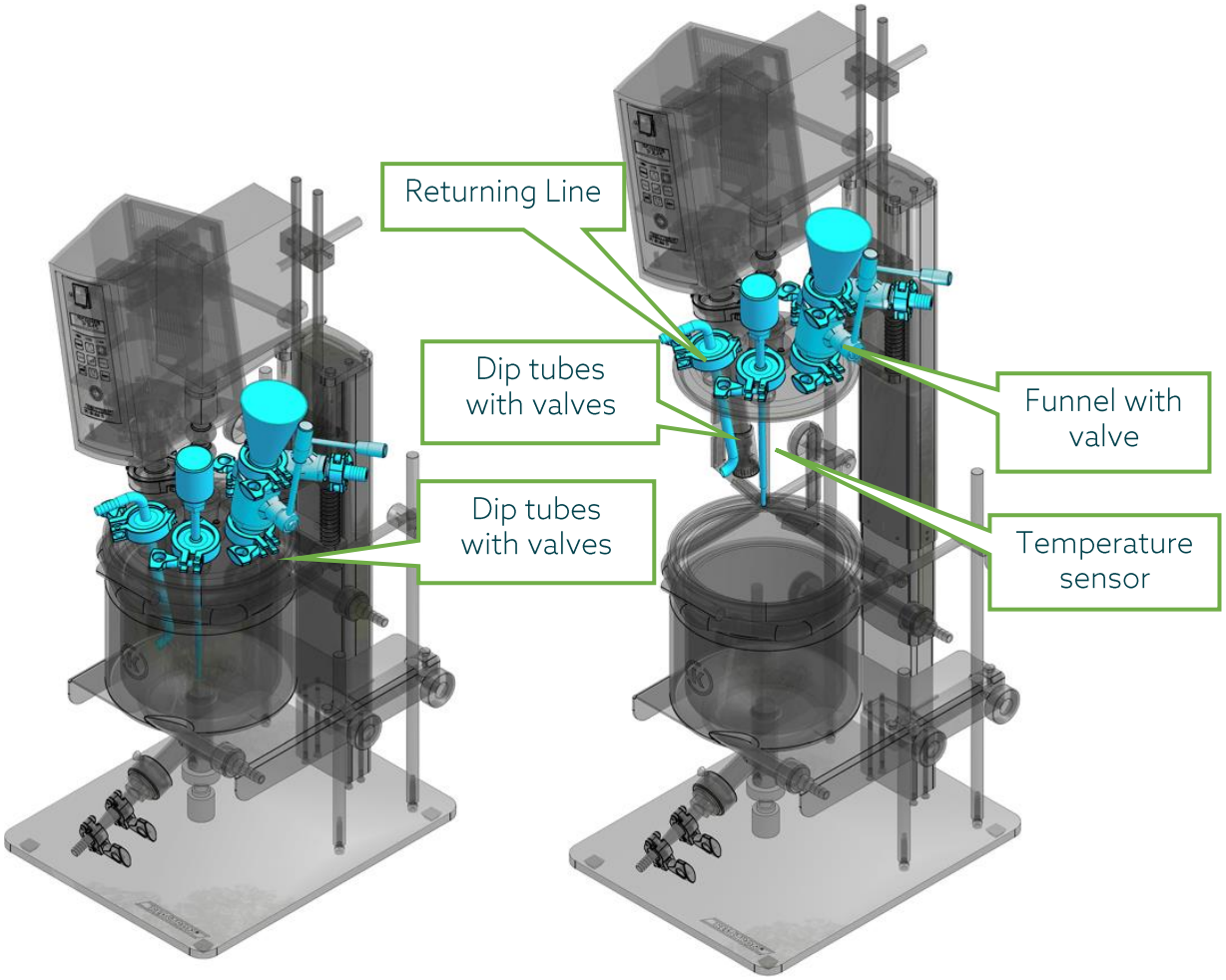
The REACTRON® RT 5 ELS is equipped with an anchor stirrer with PTFE scrapers. The shaft is sealed and guided through a central lead-through fixed on the vessel cover. The sealing is done with shaft seals.

The anchor stirrer is driven by a stirrer drive unit.

The maximum speed of the anchor stirrer is 400 rpm.

If necessary the PTFE scrapers can be easily be detached from the anchor stirrer.

2.6 ICA Components



⚠	See „Technical Data Sheet“ for further information → Documentation / 01_TDS
⚠	The user is responsible for the correct usage of the components.

The following additional ICA components are installed on the REACTRON® RT 5 ELS:

- Temperature sensor with connection for drive unit POLYMIX DLH. Display of the product temperature on the drive unit display.
- Funnel (approx. 300 ml) with ball valve (manual). Connections TriClamp TC 1.5“.
- Vacuum port with ball valve (manual). Connections TriClamp TC 0.75“.
- Two dip tubes (through one clamp connection) with ball valves (manual) and tube hoses Ø 13.5
- Returning line. Connection TriClamp TC 1.5“.

3 INSTALLATION AND START-UP

3.1 Delivery

The unit REACRON® RT 5 ELS will be delivered completely assembled in a wooden box.

Always check the delivery note and check immediately when unpacking the unit. Always report immediately any irregularities.

3.2 Storage

To store the REACTRON® it has to be completely emptied und flushed; all product wetted parts should be cleaned thoroughly.

	The REACTRON® has to be stored in a dry, dust-free and vibration-free area. High temperature fluctuations are not allowed and the relative humidity should be below 90%.

3.3 Installation

	See „Technical Data Sheet" for further information → Documentation / 01_TDS
	See „Drawings / Parts List" for further information → Documentation / 03_DRW
	Installation, Service and Repair work are only allowed when completely disconnected from any power supply. Only certified electricians or qualified persons are allowed to carry out these works.
	Connected product and supply lines are not allowed to transfer any forces, tensions or vibrations to the connections at the unit / system.

3.3.1 Mechanical Installation

- The REACTRON® has to be positioned on an even surface or foundation, vibration-free. Ensure that no vibrations can be transmitted onto the system. Please check if there is a sufficient air circulation.
- The following lines can be connected, if needed

Product outlet	1x hose nipple Ø13.5	-
Cooling jacket process vessel (inlet / outlet)	2x hose fitting Ø13.5	-
Dip tubes, recirculation hoses	2x hose fitting Ø13.5	-

3.3.2 Electrical Installation

- The system has to be connected to an electrical power supply by the customer.

MEGATRON®-Drive unit	1x 230V / 50Hz / 5.7A	Mains cable EU
Stirrer Drive	1x 80-260V / 50-60Hz	-

3.4 Start-Up

	During operation it is not allowed to move the system or parts of it. Check for tilting stability prior to start-up.
	Prior to start-up check if all connections, piping and supply lines are tight and mounted correctly.
	The dispersing aggregate and the drive unit respectively are only allowed to be operated when cover and vessel are closed tightly using the O-ring seal and clamping screws/knurled head nut.
	The anchor stirrer and the stirrer drive unit respectively are only allowed to be operated when cover and vessel are closed tightly using the O-ring seal and clamping screws/knurled head nut.
	Mechanical seals are not allowed to run dry.
	Mind the MIN-MAX filling levels.
	The user is obliged to observe and keep the speed within the given limits.

- Check the (tilting) stability of the complete set-up before start-up.

- Check, whether the outlet valve is closed.
- Close the vessel with the cover by using the telescopic stand, clamping screws and O-ring sealing
- Fill the process vessel with the product to be processed (e.g. through the dip tubes or the funnel).
- If needed, start/open the cooling / heating water supply for the process vessel.
- Start the anchor stirrer and set the appropriate speed level.
- Start the MEGATRON® homogenizer and set the appropriate speed level.
- Check functions of the system.

3.5 Shut-Down

- Stop the POLYTRON® Homogenizer (Set speed to 0), then shut-down the drive.
- Stop the anchor stirrer (Set speed to 0), then shut-down the drive.
- Stop or close the cooling / heating circuit, if necessary.
- Empty the process vessel through the bottom outlet valve
- If necessary, unscrew the clamping screws and lift the cover by using the electrical stand.

3.6 Cleaning

	Check the compatibility of the cleaning liquid with the materials of construction prior to cleaning.
	If the processed media tends to harden or stick, the product has to be removed completely from the process vessel after every use.
	When using hazardous or toxic materials that endanger health and/or influence the surroundings appropriate countermeasures must be taken.
	Pay attention that the temperature difference between actual temperature of the system and cleaning temperature is kept to a minimum. A temperature shock can damage structural components.
	If the system is not operated for a longer time or before any maintenance work is carried out, the working chamber has to be cleaned.
	See also "Disassembly instructions" for further information. ➔ Documentation / 04_Disassembly

- After every operation run the product wetted parts of the system and especially the POLYTRON® dispersing aggregate should be cleaned.
- If the processed media tends to harden or stick, the product has to be removed completely from the process vessel after every use and the dispersing aggregate has to be cleaned thoroughly.
- There are different methods to clean the system, depending on the customer's facilities and customer's SOP.
- A simple way of cleaning is to fill the process vessel with a suitable cleaning liquid and let the homogenizer and anchor stirrer run (CIP: Cleaning in Place). By disassembling the system, each part can be cleaned separately (COP: Cleaning out of Place).

4 MAINTENANCE WORK

	All maintenance work has to be done by authorized specialists or engineers.
	Cranes and/or lifting equipment must be used to move and transport heavy system.
	Before starting the disassembly, all electrical parts have to be dis-connected.
	Be sure that drives / motors cannot be started from another person, while you are working.
	See also "Disassembly instructions" for further information. ➔ Documentation / 04_Disassembly)
	All parts have to be inspected for signs of wear and damage. If necessary, they have to be replaced.
	Before reassembly, all screws have to be greased.
	Never grease the sealing faces of mechanical seals.
	After every maintenance or service a test-run (e.g. with water as product) should be carried-out.

4.1 Maintenance and Inspection Plan

The REACTRON® has to be inspected regularly in order to assure an optimum and safe operation. An important aspect is the cleaning after a production run.

	See also „Disassembly instructions" for additional information → Documentation / 04_Disassembly)

4.1.1 Daily / Weekly Inspection Work

- Leakage of the whole piping system
- Foreign bodies within the process vessel
- Overheated bearing/coupling housing
- Noise level too high or unusual noises

4.1.2 Yearly Inspection Work and Maintenance

(or every 3000 operation hours)

- Signs of wear of the generator, deformation of the generator
- Check the coupling for wear
- Checking and/or replacing the ball bearings
- Phenomena of wear and damages on the mechanical seal

5 SPARE PARTS

See "Recommended Spare Parts" for further information.
→ Documentation / 03_DRW)

To avoid any inconvenience or time delays when handling service or repair cases it is strongly recommended to hold on stock some main and/or critical components like

- Mechanical seals
- Ball bearings
- O-Rings
- Shaft
- Dispersing Generator(s)

Please bear in mind that some components have lead times of several weeks.

Don't hesitate to contact KINEMATICA for a corresponding quotation or advice.

6 FAULTS AND REMEDIES

Fault	Possible causes	Remedy
Noise in the bearing housing	Dusty, dirty or damaged bearings	Replace the bearings
High whistling sound	Mechanical seal runs dry	Check sealing system, mechanical seals
Rattle noise	Foreign body • in working chamber • between rotor and stator	Remove foreign body
	Faulty bearing	Replace the bearings
	Touching of rotor / stator, loose impeller	Check rotor and stator, tighten the impeller
Vibrations	Twisted shaft	Replace the shaft
	Faulty bearings	Replace the bearings
	Foreign body • in working chamber • between rotor and stator	Remove foreign body
	Rotational speed exceeded	Reduce the speed
	Reverberation	Change / reduce speed
Bearing housing hot	Faulty bearing housing	Replace bearing housing
	Damaged bearings	Replace bearings
	Wrong grease	Use specified grease
	Rotational speed exceeded	Reduce the speed
Motor / Drive does not run	Motor / Drive overloaded	Reduce speed; check product properties
	Motor / Drive defect	Replace motor / drive
	Active failure	Check alarms

7 TECHNICAL DATA

	See „Technical Data Sheet“ for further information → Documentation / 01_TDS

8 WARRANTY

This KINEMATICA unit is warranted to be free from defects in material and workmanship without wear and tear parts for a period of 24 months.

KINEMATICA will repair or replace and return free of charge any part which is returned to its factory within said period, transportation prepaid by the user and which is found upon inspection to have been defective in materials or workmanship. The warranty includes both, parts and service, without charge.

This warranty does not include normal wear from use; it does not apply to any instrument or part which has been altered by anyone other than an employee which has been damaged through accident, negligence, failure to follow operating instructions, the use of electric currents or circuits other than those specified in this manual, misuse or abuse.

KINEMATICA reserves the right to change, alter, modify or improve any of its instruments without obligation to make corresponding changes to any instrument previously sold or shipped.

The foregoing obligations are in lieu of all other obligations and liabilities including negligence and all warranties, of merchantability or otherwise, expressed or implied in fact or by law and state our entire and exclusive liability and buyer's exclusive remedy for any claim of damages in connection with the sale or furnishing of goods or parts.
KINEMATICA will in no event be liable for any special or consequential damages whatsoever and their liability under no circumstances will exceed the contract price for the goods for which liability is claimed.

Made in Switzerland by

KINEMATICA AG
Werkstrasse 7 c-d
CH-6102 Malters

Tel.: +41-41-259 65 65
Fax: +41-41-259 65 75
e-Mail info@kinematica.ch