



KINEMATICA

Homogenizing perfected.

REACTRON®



REACTRON® System RT 2 Basic
Operating Instructions

MANUAL			
Document	Operating Instructions		
System/Unit	REACTRON® RT 2 Basic		
Issue / Date	04 / 08.02.2022		
Page	2	of	40










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.

MANUAL			
Document	Operating Instructions		
System/Unit	REACTRON® RT 2 Basic		
Issue / Date	04 / 08.02.2022		
Page	3	of	40

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.

Document	Operating Instructions		
System/Unit	REACTRON® RT 2 Basic		
Issue / Date	04 / 08.02.2022		
Page	4	of	40











	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.

Document	Operating Instructions		
System/Unit	REACTRON® RT 2 Basic		
Issue / Date	04 / 08.02.2022		
Page	5	of	40

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.

Document	Operating Instructions		
System/Unit	REACTRON® RT 2 Basic		
Issue / Date	04 / 08.02.2022		
Page	6	of	40











	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.

MANUAL

Document	Operating Instructions		
System/Unit	REACTRON® RT 2 Basic		
Issue / Date	04 / 08.02.2022		
Page	7	of	40

	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 PARAMETERS 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.










Document	Operating Instructions		
System/Unit	REACTRON® RT 2 Basic		
Issue / Date	04 / 08.02.2022		
Page	8	of	40

	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.

MANUAL			
Document	Operating Instructions		
System/Unit	REACTRON® RT 2 Basic		
Issue / Date	04 / 08.02.2022		
Page	9	of	40

RESIDUAL DANGERS

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

Residual Danger	Countermeasures
 Tripping over feed or re-turn or supply lines, piping	These should be laid appropriately.
 Breakage of piping, vessels	Wear protective clothing (goggles 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

MANUAL			
Document	Operating Instructions		
System/Unit	REACTRON® RT 2 Basic		
Issue / Date	04 / 08.02.2022		
Page	10	of	40

List of Content

1	INTRODUCTION.....	11
2	DESCRIPTION OF THE EQUIPMENT	12
2.1	BASE FRAME	14
2.2	PROCESS VESSEL.....	17
2.2.1	Outlet valve	18
2.3	POLYTRON® BATCH HOMOGENIZER	20
2.3.1	Drive Unit	20
2.3.2	Dispersing Aggregate.....	21
2.4	POLYMIX® ANCHOR STIRRER.....	24
2.5	ICA COMPONENTS	26
3	INSTALLATION AND START-UP.....	27
3.1	DELIVERY.....	27
3.2	STORAGE.....	27
3.3	INSTALLATION.....	28
3.3.1	Mechanical Installation.....	28
3.3.2	Electrical Installation.....	28
3.4	START-UP.....	29
3.5	SHUT-DOWN.....	30
3.6	CLEANING	31
4	MAINTENANCE WORK.....	32
4.1	MAINTENANCE AND INSPECTION PLAN	33
4.1.1	Daily / Weekly Inspection Work	33
4.1.2	Yearly Inspection Work and Maintenance	33
5	SPARE PARTS.....	34
5.1	ORDERING OF SPARE PARTS	34
5.2	RECOMMENDED SPARE PARTS	35
5.2.1	Drawing and Parts Lists	35
5.2.2	Primary Spare Parts.....	35
5.2.3	Secondary Spare Parts.....	35
6	FAULTS AND REMEDIES.....	37
7	TECHNICAL DATA	38
7.1	COMPLETE ASSEMBLY.....	38
7.2	PROCESS VESSEL.....	38
7.3	POLYTRON® HOMOGENIZER AND DISPERSING AGGREGATE	39
7.4	POLYMIX® STIRRER.....	39
7.5	ACCESSORIES	39
8	WARRANTY	40

MANUAL			
Document	Operating Instructions		
System/Unit	REACTRON® RT 2 Basic		
Issue / Date	04 / 08.02.2022		
Page	11	of	40

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 2 Basic** has been designed and manufactured according 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 2 Basic.

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")
- 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.

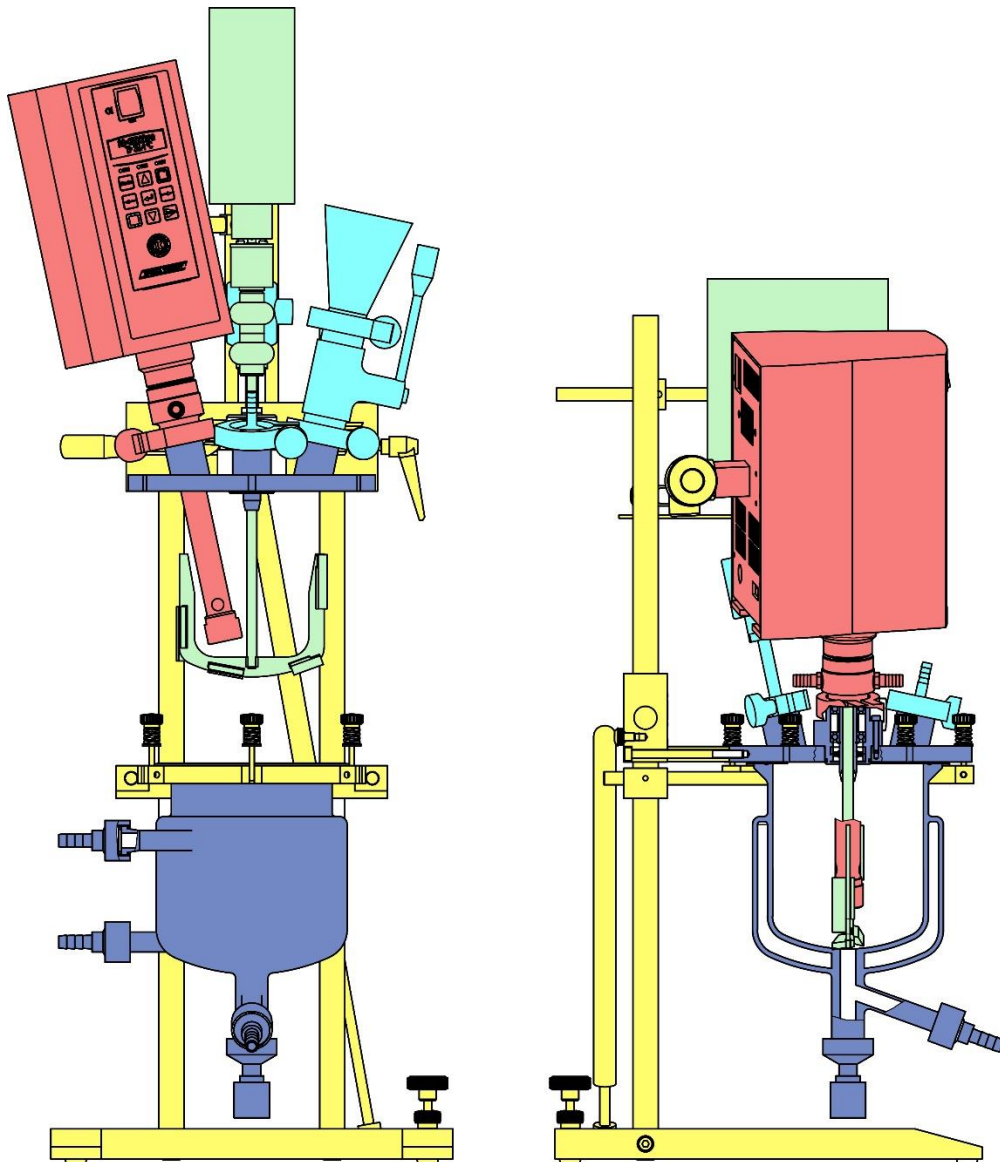
Check on www.kinematica.ch for your closest contact address.

Document	Operating Instructions		
System/Unit	REACTRON® RT 2 Basic		
Issue / Date	04 / 08.02.2022		
Page	12	of	40

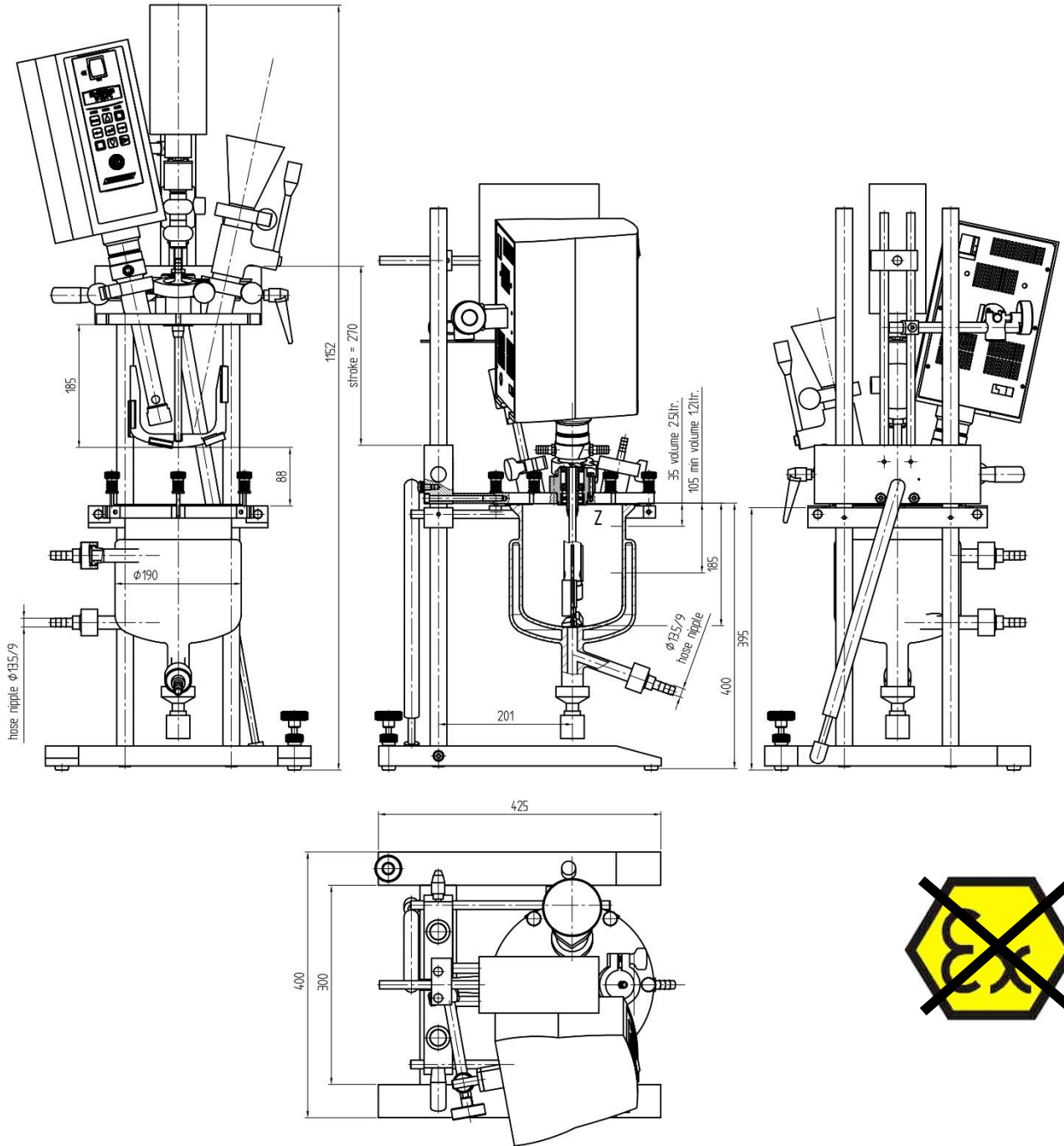
2 DESCRIPTION OF THE EQUIPMENT

The system REACTRON® RT 2 Basic is designed for the batch use within a lab and consists of the following main parts:

- Base Frame
- Process vessel
- POLYTRON® Batch Homogenizer (optional)
- POLYMIX® Anchor Stirrer
- ICA components (optional)



Document	Operating Instructions		
System/Unit	REACTRON® RT 2 Basic		
Issue / Date	04 / 08.02.2022		
Page	13	of	40



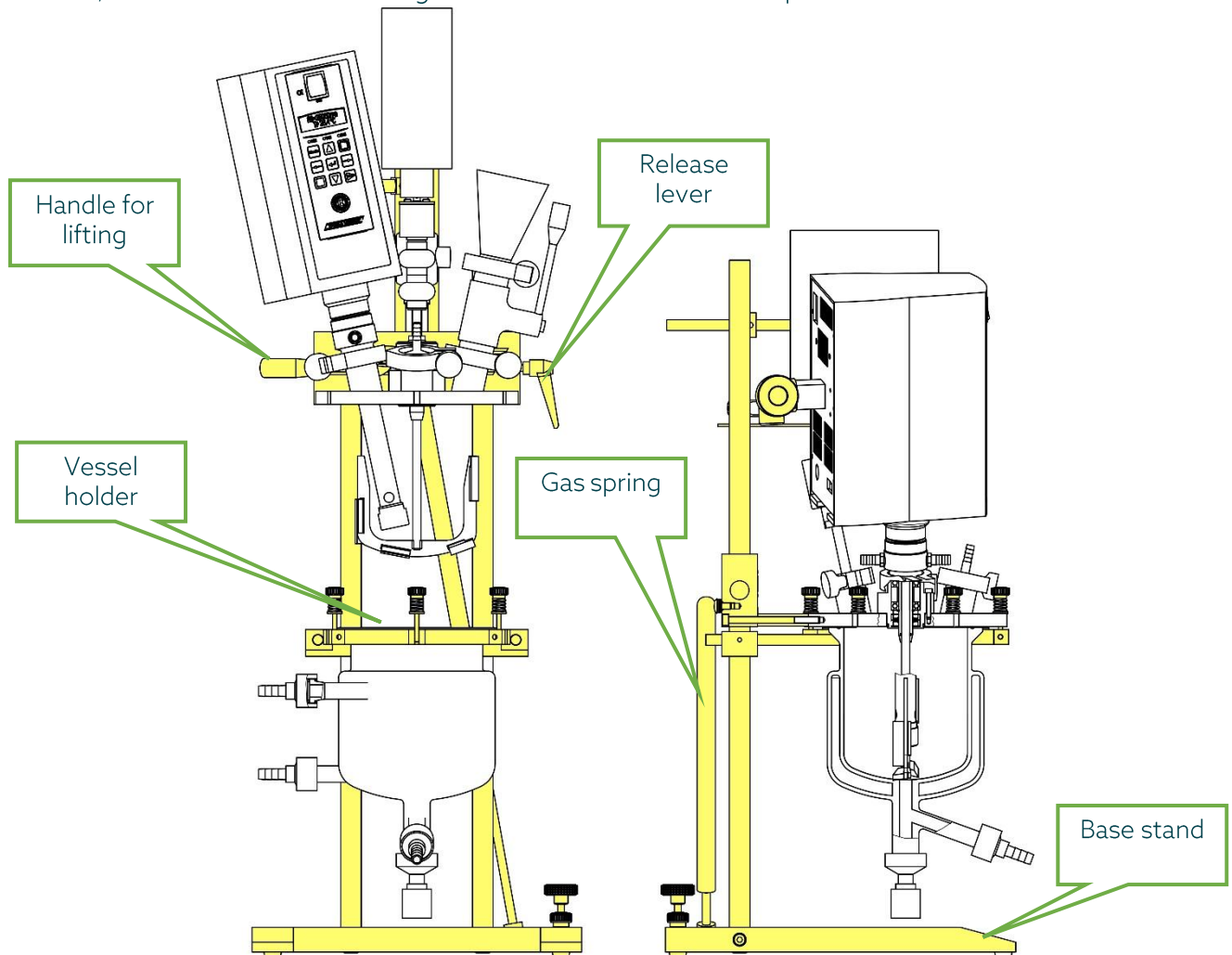
See „Technical Data“ for further information.



MANUAL			
Document	Operating Instructions		
System/Unit	REACTRON® RT 2 Basic		
Issue / Date	04 / 08.02.2022		
Page	14	of	40

2.1 Base Frame

The REACTRON® RT 2 Basic is built on a base frame with a built-on telescopic stand with gas spring stroke.

The lid of the process vessel is fixed to the telescopic stand allowing the lid with all instruments, anchor stirrer and homogenizer to be lifted out of the process vessel.



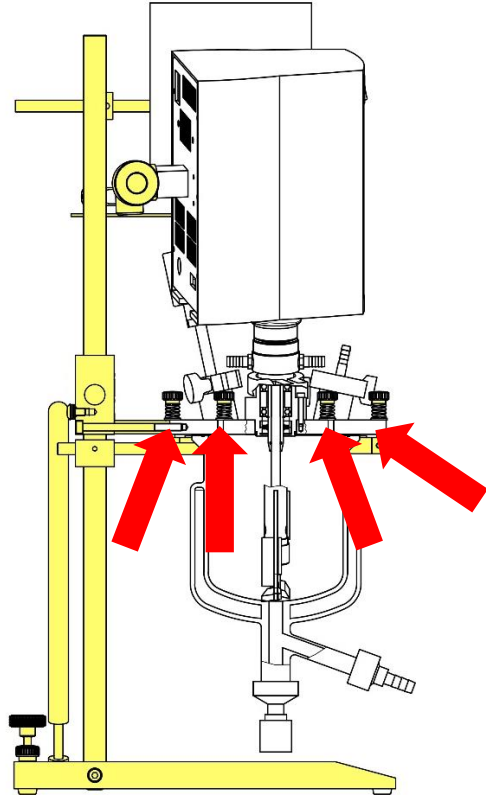
	See „Technical Data“ for further information.
	During operation it is not allowed to move the system.

Document	Operating Instructions		
System/Unit	REACTRON® RT 2 Basic		
Issue / Date	04 / 08.02.2022		
Page	15	of	40

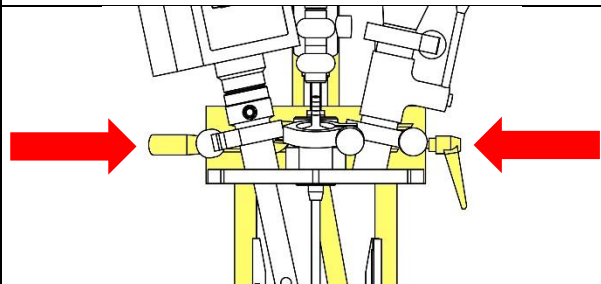
To open the process vessel, first release any vacuum on the system, if any. Also remove any product or supply line fixed to the cover or to armatures / instruments on the cover.

Then unscrew the clamping screws (6x) using the knurled head nuts till they can be tilted and the lid is free to move.

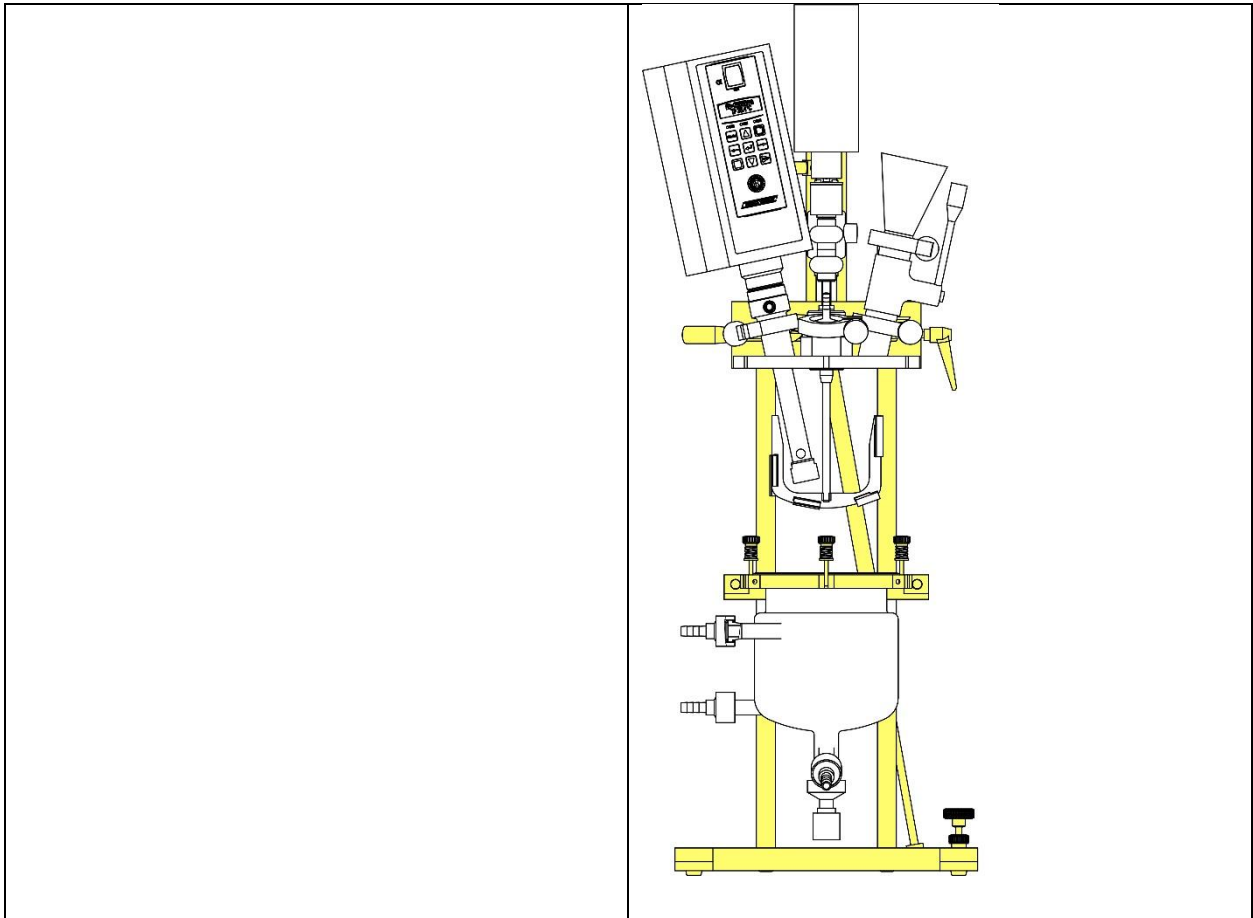
(see also assembly drawing)






Then untighten the release lever and use the lifting handle for lifting and lowering of the vessel lid.



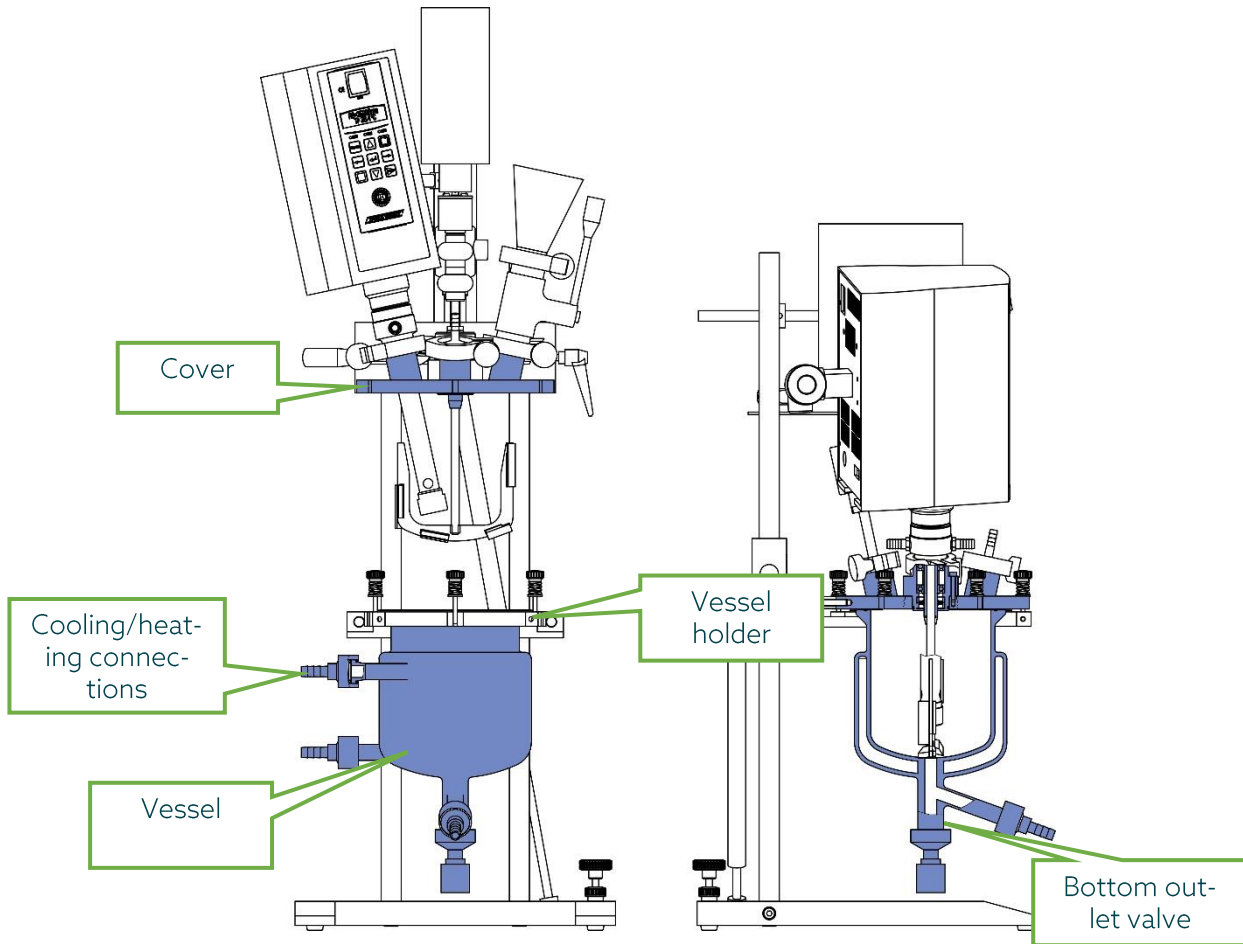
Document	Operating Instructions		
System/Unit	REACTRON® RT 2 Basic		
Issue / Date	04 / 08.02.2022		
Page	16	of	40





	During operation cover and vessel have to be closed tightly using the O-ring seal and clamping screws/knurled head nut.
	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.

Document	Operating Instructions		
System/Unit	REACTRON® RT 2 Basic		
Issue / Date	04 / 08.02.2022		
Page	17	of	40



2.2 Process Vessel



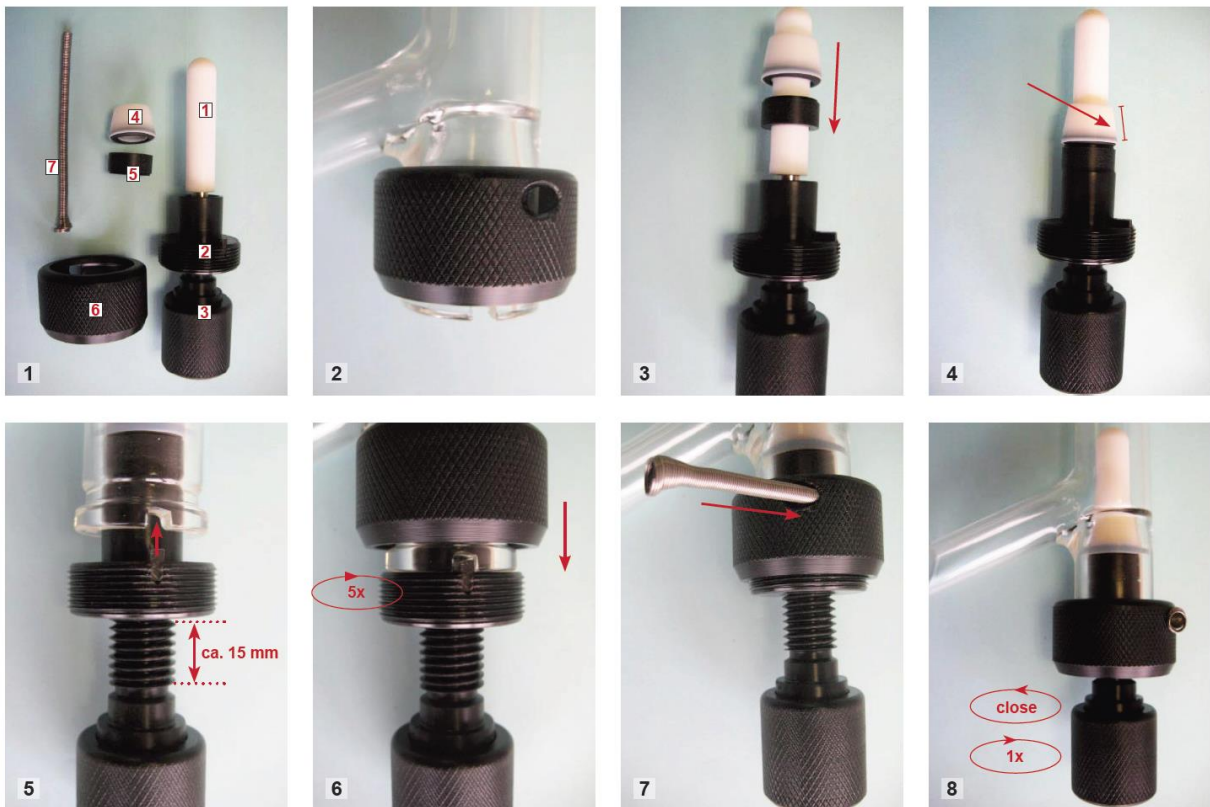
The process vessel has the following setup:

	<p>See „Technical Data“ for further information.</p>
	<p>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.</p>

Document	Operating Instructions		
System/Unit	REACTRON® RT 2 Basic		
Issue / Date	04 / 08.02.2022		
Page	18	of	40

	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.

2.2.1 Outlet valve



Components (Picture 1)

- 1: Valve stem PTFE
- 2: Fixing screw
- 3: Valve knob with thread and integrated pressure spring
- 4: Seal seat conical with O-Ring joint
- 5: Spacer
- 6: Coupling nut
- 7: Spring

Note: All parts are exchangeable.

MANUAL			
Document	Operating Instructions		
System/Unit	REACTRON® RT 2 Basic		
Issue / Date	04 / 08.02.2022		
Page	19	of	40

Assembling (Pictures 2 - 8)

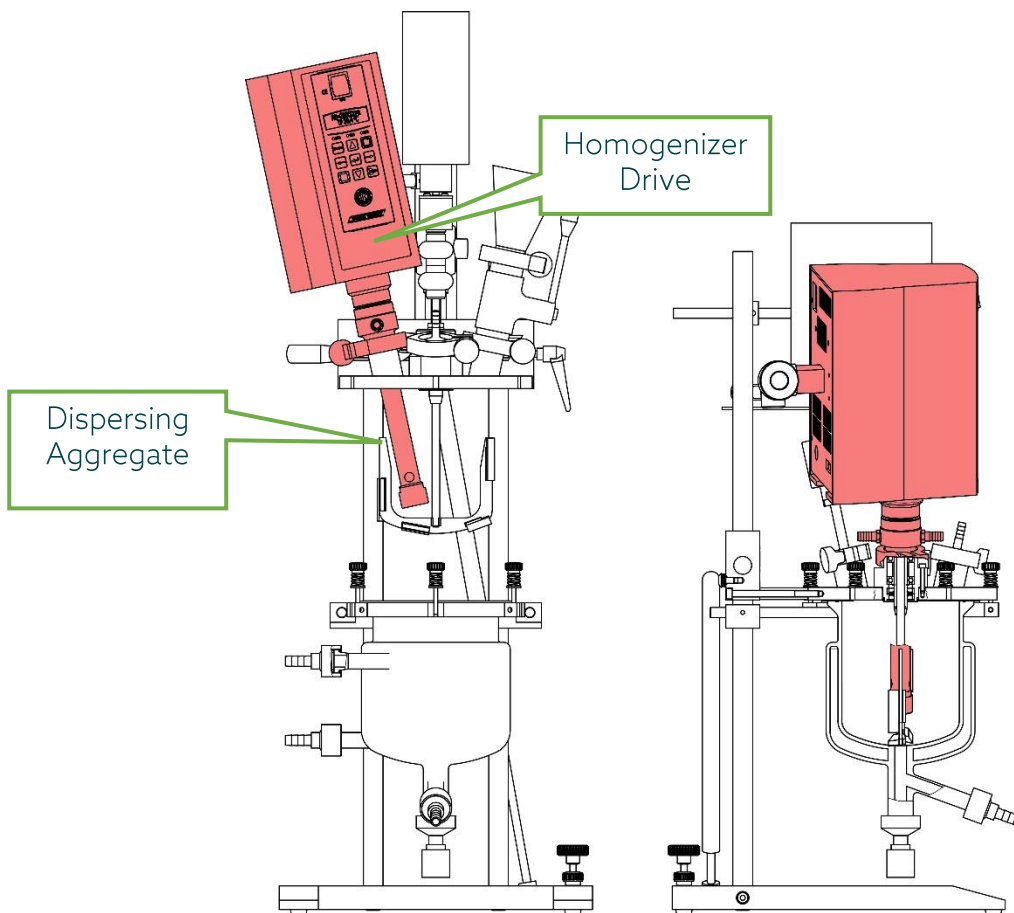
- Place the coupling nut over the glass flange (pict. 2).
- Put the spacer and seal seat over the valve stem (pict. 3 + 4).
- Turn back the valve knob, until approx. 15 mm of the thread is visible (pict. 5).
- Put in the valve into the glass part and pay attention that the shorter end of the seal seat (pict. 4) is placed in the direction of the reactors discharge and the dent of the fixing screw fits into the kerf of the glass part (pict. 5).
- Hint: Insert the valve with circling moves, if the seal seat is blocked.
- Connect the fixing screw with the coupling nut with approx. 5 turns (pict. 6).
- Put in the spring in the opening of the coupling and tighten the screw (pict. 7).
- Close the valve completely and then do 1 turn back (pict. 8).
- Notice: The valve is equipped with a pressure spring to avoid extensions between the glass part and the valve causing dangerous tension. To assure this function the screw should not be closed completely.

Disassembling

- Release the coupling nut and draw out the spring. Draw out the valve with circling moves.
- Hint: In case the seal seat is blocked, put in the valve stem without the spacer for approx. 30 mm and try to draw out the seal seat with circling moves.

MANUAL			
Document	Operating Instructions		
System/Unit	REACTRON® RT 2 Basic		
Issue / Date	04 / 08.02.2022		
Page	20	of	40

2.3 POLYTRON® Batch Homogenizer



2.3.1 Drive Unit

The REACTRON® RT 2 Basic can be equipped with a POLYTRON® homogenizer drive unit, e.g. POLYTRON® PT 10-35 GT, PT 3100 D or PT 6100 D. Speed setting and control is directly done at the drive unit.

The max. allowable speed for attached POLYTRON® dispersing aggregates depends finally on the chosen dispersing aggregate, in general it is 25'000 rpm.



See „General manual“ for the corresponding POLYTRON® drive unit for further information.
→ Additional Documentation





MANUAL			
Document	Operating Instructions		
System/Unit	REACTRON® RT 2 Basic		
Issue / Date	04 / 08.02.2022		
Page	21	of	40

2.3.2 Dispersing Aggregate

The POLYTRON® drive unit can be equipped with different types of dispersing aggregates. When working under vacuum conditions the dispersing aggregate must be a mechanical seal version.

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 1.5" connection.

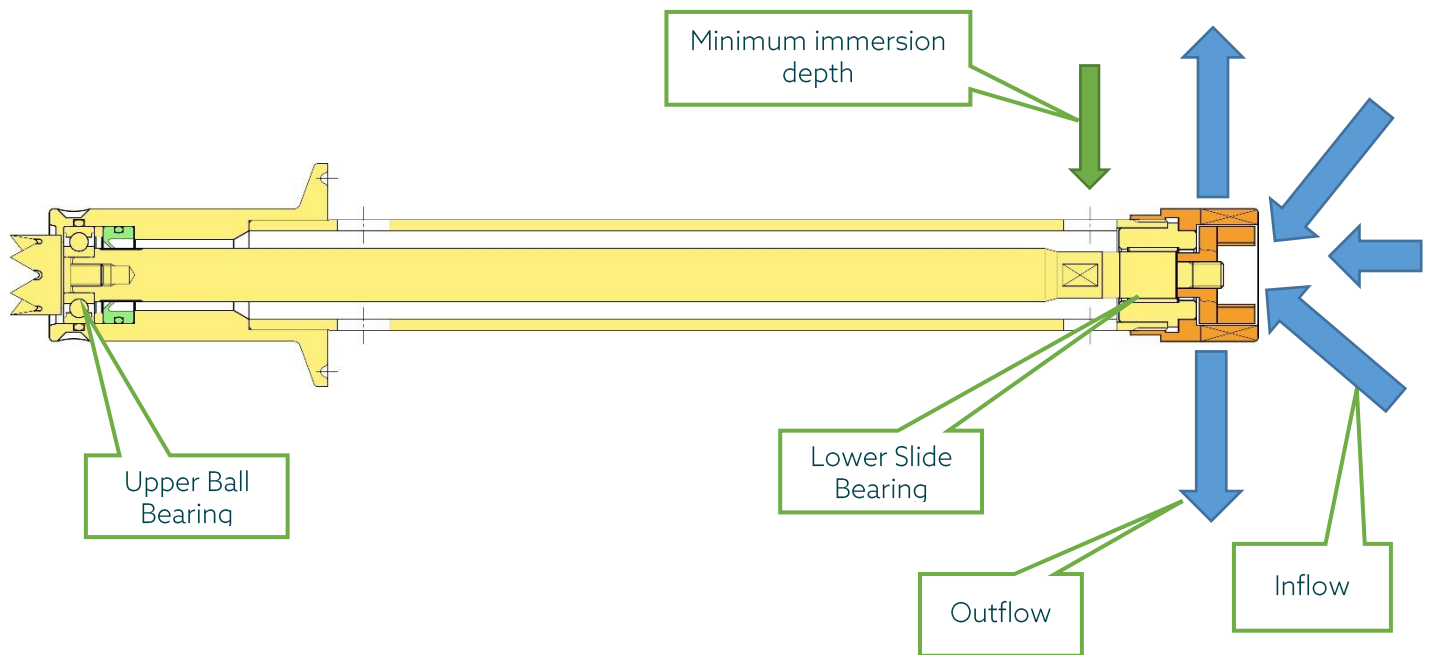
The max. allowable speed for attached POLYTRON® dispersing aggregates depends finally on the chosen dispersing aggregate, in general it is 25'000 rpm.

	See „General manual“ for the corresponding POLYTRON® drive unit for further information. → Additional Documentation
	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.

MANUAL			
Document	Operating Instructions		
System/Unit	REACTRON® RT 2 Basic		
Issue / Date	04 / 08.02.2022		
Page	22	of	40

A typical dispersing aggregate consists of the following general parts:

- Bearing (upper/lower) / Shaft / Stator tube
- Shaft sealing / Sealing housing
- Dispersing generator



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

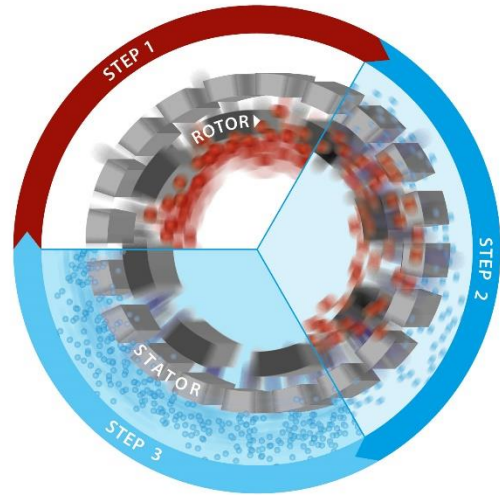


MANUAL			
Document	Operating Instructions		
System/Unit	REACTRON® RT 2 Basic		
Issue / Date	04 / 08.02.2022		
Page	23	of	40

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.

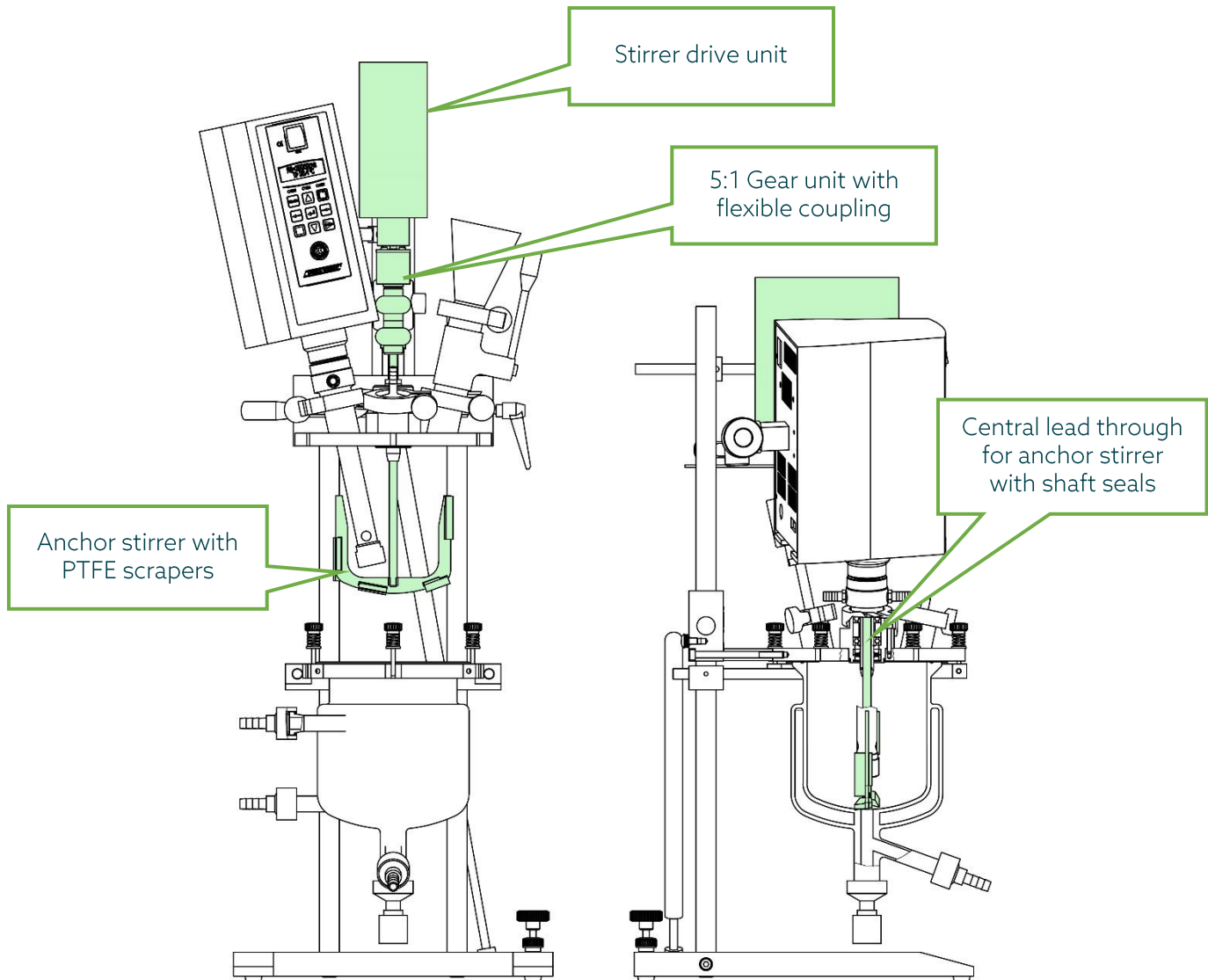
The generators are exchangeable with different types for different particle sizes.




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





MANUAL			
Document	Operating Instructions		
System/Unit	REACTRON® RT 2 Basic		
Issue / Date	04 / 08.02.2022		
Page	24	of	40

2.4 POLYMIX® Anchor Stirrer



	See „Technical Data “ for further information.
	See „General manual“ for stirrer drive unit → Additional Documentation
	The user is obliged to observe and keep the speed within the given limits.

MANUAL			
Document	Operating Instructions		
System/Unit	REACTRON® RT 2 Basic		
Issue / Date	04 / 08.02.2022		
Page	25	of	40

	The anchor stirrer has 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 2 Basic 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 POLYMIX® stirrer drive unit.

Between drive and stirrer shaft there is a gear unit (5:1) including torque support installed.

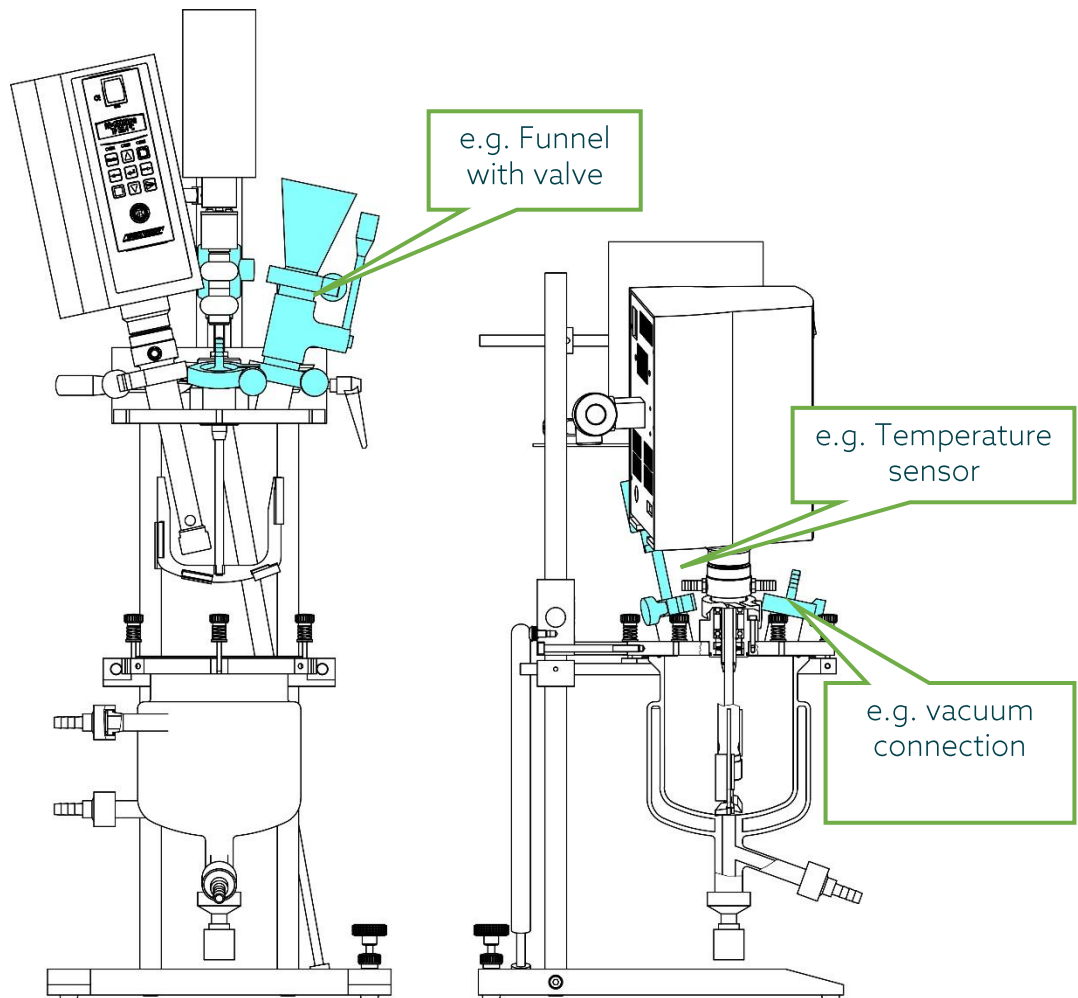
The speed for the stirrer is set (and displayed if applicable) directly at the drive unit. Because of the gear unit the actual speed at the stirrer shaft is x5 lower and the torque x5 higher.



The maximum allowed speed (actual) of the anchor stirrer is 150 rpm.

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

MANUAL			
Document	Operating Instructions		
System/Unit	REACTRON® RT 2 Basic		
Issue / Date	04 / 08.02.2022		
Page	26	of	40

2.5 ICA Components



	See „Technical Data“ for further information.
	The user is responsible for the correct usage of the components.

The cover of the REACTRON® RT 2 Basic is equipped with four Tri-Clamp TC 1 ½" connections allowing to install additional ICA components like:

- Temperature sensor
- Funnel (approx. 300 ml) with valve
- Vacuum port
- Other armatures and sensors

MANUAL			
Document	Operating Instructions		
System/Unit	REACTRON® RT 2 Basic		
Issue / Date	04 / 08.02.2022		
Page	27	of	40

3 INSTALLATION AND START-UP


3.1 Delivery

The unit REACTRON® RT 2 Basic 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 80%.
---	--

MANUAL			
Document	Operating Instructions		
System/Unit	REACTRON® RT 2 Basic		
Issue / Date	04 / 08.02.2022		
Page	28	of	40

3.3 Installation

	See „Technical Data“ for further information
	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 tube fitting Ø13.5/9mm	-
Cooling jacket process vessel (inlet / outlet)	2x tube fitting Ø13.5/9mm	-








3.3.2 Electrical Installation

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

POLYTRON®-Drive unit (if applicable)	1x 230V / 50Hz or 1x 115V / 60 Hz Check motor data plate	Mains cable CH, EU, UK or US
POLYMIX® Stirrer Drive unit	1x 115V/230V / 50/60Hz Check motor data plate	Mains cable CH, EU, UK or US

MANUAL			
Document	Operating Instructions		
System/Unit	REACTRON® RT 2 Basic		
Issue / Date	04 / 08.02.2022		
Page	29	of	40

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 (if applicable) 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 funnel).
- If needed, start/open the cooling / heating water supply for the process vessel.
- Start the POLYMIX® anchor stirrer and set the appropriate speed level.
- Start the POLYTRON® homogenizer (if applicable) and set the appropriate speed level.
- Check functions of the system.







MANUAL			
Document	Operating Instructions		
System/Unit	REACTRON® RT 2 Basic		
Issue / Date	04 / 08.02.2022		
Page	30	of	40

3.5 Shut-Down

- Stop the POLYTRON® Homogenizer (Set speed to 0), then shut-down the drive (if applicable).
- Stop the POLYMIX® 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 telescopic stand.

MANUAL			
Document	Operating Instructions		
System/Unit	REACTRON® RT 2 Basic		
Issue / Date	04 / 08.02.2022		
Page	31	of	40

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.

- After every operation run the product wetted parts of the system and especially the POLYTRON® dispersing aggregate (if applicable) 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).

MANUAL			
Document	Operating Instructions		
System/Unit	REACTRON® RT 2 Basic		
Issue / Date	04 / 08.02.2022		
Page	32	of	40


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 systemry.
	Before starting the disassembly, all electrical parts have to be disconnected.
	Be sure that drives / motors cannot be started from another person, while you are working.
	See also "Disassembly instructions" for further information.
	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.

MANUAL			
Document	Operating Instructions		
System/Unit	REACTRON® RT 2 Basic		
Issue / Date	04 / 08.02.2022		
Page	33	of	40

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
---	--

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 / shaft seal

MANUAL			
Document	Operating Instructions		
System/Unit	REACTRON® RT 2 Basic		
Issue / Date	04 / 08.02.2022		
Page	34	of	40

5 SPARE PARTS

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

- 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.

Only original KINEMATICA spare parts will guarantee a trouble-free operation of the machine.

5.1 Ordering of Spare Parts

When ordering spare parts, please indicate:

1. KINEMATICA Project No. (e.g. TB 2008 06 05), if applicable
2. Type of unit (e.g. REACTRON® RT 2 Basic)
3. Serial-No. indicated on the data plate (e.g. RT 2 1234 or PF-915-0015-01_01)
4. Position, description and ident number according to the Parts List (e.g. Pos. 1, Shaft, 9757843)

MANUAL			
Document	Operating Instructions		
System/Unit	REACTRON® RT 2 Basic		
Issue / Date	04 / 08.02.2022		
Page	35	of	40

5.2 Recommended Spare Parts

5.2.1 Drawing and Parts Lists

The recommended spare parts are based on the following drawing(s)/parts list(s), (without further accessories):

Drawing No.	8.030-0053-2	Overall Assembly
	6.030-0138-3	Stirrer Seal Pack
Parts list No.	8.030-0052-S	Overall Assembly
	6.030-0139-S	Stirrer Seal Pack

5.2.2 Primary Spare Parts

Pcs	Description	Position	Ident-No.
Overall Assembly			
* 1	O-Ring Ø162x4 Viton	21	9343226
* 4	Clamp Gasket TC 1 1/2" - Viton	61	9324042
* 3	O-Ring to XT-connection - Viton	70	9340169
Stirrer Seal Pack			
* 2	Shaft seal	20	9340324
* 1	O-Ring Ø 9.52x1.78 Viton	21	9341189
1	O-Ring Ø 20.24x2.62 Viton	22	9320066
* 1	O-Ring Ø 40.95x2.62 Viton	23	9320317

* Product wetted parts

5.2.3 Secondary Spare Parts

Pcs	Description	Position	Ident-No.
Overall Assembly			
* 1	Scraper RT 2 L=54, B=22	31	9753191
* 1	Scraper RT 2 L=54, B=22	32	9753193
* 1	Scraper RT 2 L=35, B=22	33	9753195
* 1	Scraper RT 2 L=31, B=22	34	9753194
Stirrer Seal Pack			
1	Retaining Ring Ø17 A	11	9990077
1	Retaining Ring Ø35 I	12	9951149
2	Ball Bearing Ø17/35	13	9322001
1	Compensation Disc Ø34.5/28x0.5	14	9340323

* Product wetted parts



KINEMATICA

Homogenizing perfected.

MANUAL

Document	Operating Instructions		
System/Unit	REACTRON® RT 2 Basic		
Issue / Date	04 / 08.02.2022		
Page	36	of	40

MANUAL			
Document	Operating Instructions		
System/Unit	REACTRON® RT 2 Basic		
Issue / Date	04 / 08.02.2022		
Page	37	of	40

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 <ul style="list-style-type: none"> in process vessel 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 <ul style="list-style-type: none"> 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
The cover does not raise automatically.	The pneumatic-spring may be damaged.	Change the pneumatic-spring of the stand
Leakage of liquid between cover and vessel.	O-Ring is damaged.	Replace the O-Ring
	O-Ring, vessel and cover are not centered well	Recenter these components (O-Ring has to be in the flute of the bottom side of the cover)

MANUAL			
Document	Operating Instructions		
System/Unit	REACTRON® RT 2 Basic		
Issue / Date	04 / 08.02.2022		
Page	38	of	40

7 TECHNICAL DATA

7.1 Complete Assembly

Type	<ul style="list-style-type: none"> • REACTRON® RT 2 Basic • Acc. Drawing No. 8.030-0044-2 • Acc. Parts List No. 8.030-0043-S
Ambient Conditions	<ul style="list-style-type: none"> • Ambient temperature: ≤ 40°C • Ambient humidity: ≤ 80%
Base Frame	<ul style="list-style-type: none"> • H-shaped base from anodized aluminum with telescopic stand by gas spring for process vessel cover. Max. stroke of 250 mm.
Materials of product wetted parts	<ul style="list-style-type: none"> • Stainless steel 316L, Ra ≤ 1.6, electropolished • Borosilicate glass • PTFE • Viton
Other parts	<ul style="list-style-type: none"> • Stainless steel 304 • Aluminum anodized • Viton
Dimensions	<ul style="list-style-type: none"> • Approx. 400 mm x 480 mm x 915 mm (+250mm)
Weight	<ul style="list-style-type: none"> • Approx. 35 kg (without specific accessories)

7.2 Process Vessel

Design	<ul style="list-style-type: none"> • Made from borosilicate glass • Working volume approx. 2 Liter • Volume total approx. 3 Liter • With cooling/heating jacket • With round bottom and outlet valve • With flat cover, O-ring sealing • Vessel fixed to the base frame, cover fixed to telescopic stand
Working Conditions	<p><u>Process vessel</u></p> <ul style="list-style-type: none"> • Working temperature: max. 90°C • Working pressure: 100 mbar (a) up to pressureless <p><u>Jacket</u></p> <ul style="list-style-type: none"> • Working temperature: max. 90°C • Working pressure: pressureless
Dimensions:	<ul style="list-style-type: none"> • Inner-Ø: approx. 190 mm • height: approx. 185 mm
Cooling / Heating Jacket:	<ul style="list-style-type: none"> • Yes
Insulation	<ul style="list-style-type: none"> • No
Mounting	<ul style="list-style-type: none"> • Vessel fixed to base frame, cover fixed to telescopic stand

MANUAL			
Document	Operating Instructions		
System/Unit	REACTRON® RT 2 Basic		
Issue / Date	04 / 08.02.2022		
Page	39	of	40

Equipment / Connections	<p><u>On the cover</u></p> <ul style="list-style-type: none"> • 1x Central lead through for anchor stirrer with shaft seals • 1x TC 1.5" for e.g. homogenizer • 1x TC 1.5" for e.g. temperature probe or additional accessories (free port) • 1x TC 1.5" for e.g. feeding funnel or additional accessories (free port) • 1x TC 1.5" for e.g. vacuum connection or additional accessories (free port) <p><u>On the shell</u></p> <ul style="list-style-type: none"> • N/A <p><u>On the jacket</u></p> <ul style="list-style-type: none"> • Connections Inlet/Outlet: Schott Flat DN15 with hose nipple fitting Ø13.5mm <p><u>On the bottom</u></p> <ul style="list-style-type: none"> • Bottom outlet valve, manual, outlet connection DN15 (Schott flat) with hose nipple fitting Ø13.5mm
-------------------------	---

7.3 POLYTRON® Homogenizer and Dispersing Aggregate

Technical Data	<ul style="list-style-type: none"> • See separate Manual(s)
----------------	--

7.4 POLYMIX® Stirrer

Design	<ul style="list-style-type: none"> • Anchor stirrer with PTFE-scrapers • Gear drive 5:1 with torque support
Working conditions	<ul style="list-style-type: none"> • Max. speed of anchor stirrer: 150 rpm
Technical Data for Drive unit	<ul style="list-style-type: none"> • See separate Manual

7.5 Accessories

Technical Data	<ul style="list-style-type: none"> • See separate Manual(s)
----------------	--

MANUAL			
Document	Operating Instructions		
System/Unit	REACTRON® RT 2 Basic		
Issue / Date	04 / 08.02.2022		
Page	40	of	40

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