



# KINEMATICA

Homogenizing perfected.



## MEGATRON®



**LABORATORY LINE**

## MEGATRON® MT 3100 S<sup>2</sup>

The next generation: New Inline Homogenizing Unit

# MEGATRON® MT 3100 S<sup>2</sup>

Worldwide smallest Inline Dispensing System.

When testing and optimizing formulas, high process safety is paramount. This system enables processing of complex material systems with absolutely minimal loss of mass and minimal energy. This miniature format production system delivers efficient, replicable results like those of our inline machines used in large volume production.

## THE EXPERT FOR YOUR LABORATORY

This system was developed to help you realize your ideas under as realistic conditions as possible in small economic quantities. During subsequent scale-up, the results can be replicated with our large machines. Applications are mainly in recirculation mode.

Depending on the material's system, the components bind into the finest emulsions or suspensions with droplet or particle sizes down to a few microns. These results are achieved by the machine's high speed and the resulting peripheral tip speeds as well as precise rotor/stator geometry. Depending on the material's system being processed, the desired fineness is achieved after a certain period of recirculations and/or using other rotor/stator geometries.



INDUSTRY 4.0    BLUETOOTH™    USB 3.0



#### TECHNICAL INFORMATION

Volume flow	up to approx. 11 l/min
Generators	Four different rotor / stator variants, single-stage
Product inlet	Single-phase (standard version) Multi-phase (with optional injector)
Processing system	Inline product processing Primarily used in recirculating operations
Working chamber	Horizontal, single-stage arrangement Working pressure up to 6 bar Working temperature up to 90 °C Quick coupling for easy disassembly Single-acting mechanical seal with pressureless quench system Autoclavable working chambers are available Viton, EPDM or Kalrez seals Hose nipple connectors G1/8 " or clamp connections
Materials	High-quality 316L stainless steel Product contact parts electropolished, Standard Ra ≤ 1.6 µm
Accessories	Large selection of recirculation systems
Coupling / compatibility	Type F quick coupling for working chamber
Motor	1200 W wear-free high-frequency AC motor Gearless direct drive Continuous speed control Completely enclosed in stainless steel
Speed range	up to 30 000 rpm autoclavable version up to 18 000 rpm
Sound level	< 62 dB(A) at 30 000 rpm (w/o load)
Supply voltage	100 - 230 V ± 10 %, 50Hz / 60Hz
Maximum relative humidity	80 % in storage 80 % during operation
Operating temperature	0 - 40 °C
Protection class according to DIN	IP 20
Drive dimensions	275x220x245 mm
Weight (drive only)	10 kg
EMC standards	IEC / EN 61000-6-2 / EN 61000-6-3
Safety norm	IEC / EN 61010-2-51



#### USERS / APPLICATION RANGES

- Preparing emulsions
- Pharmaceutical or cosmetics products
- Suspending solids in liquids
- Dispersing fine solids in liquids or molten phases
- Suspending additives and solid polymers in mineral oils
- Extracting enzymes from biomass
- Wett milling of solids (e.g. API) in liquids

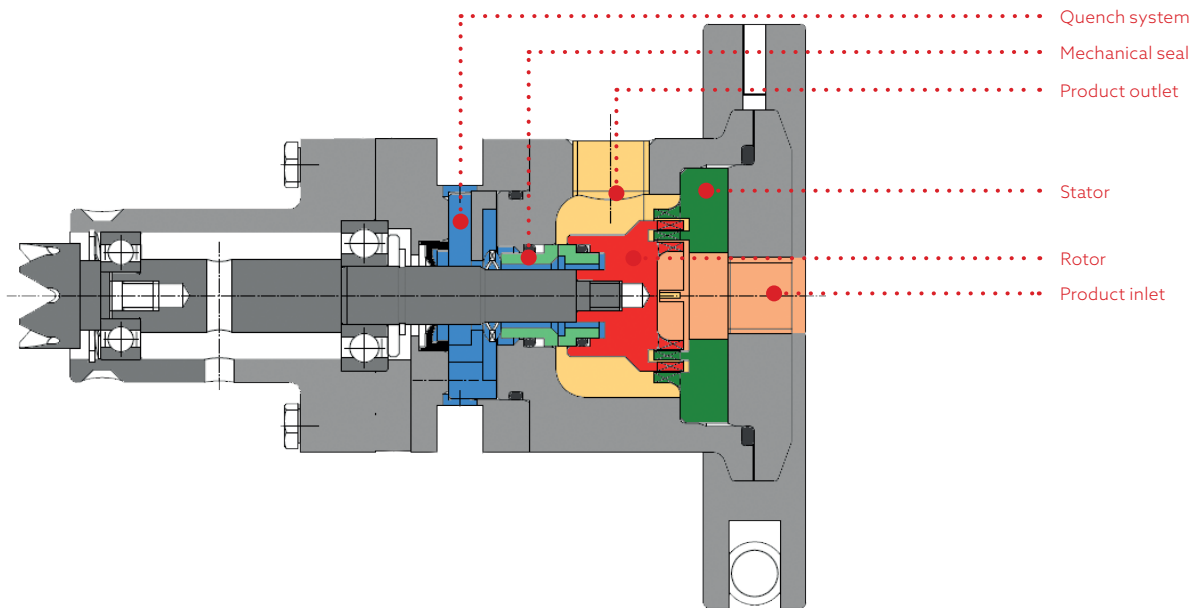
- Extracting active ingredients and substances from plants, for example (when used with REACTRON®)
- Grinding and shredding of solids and fibers in liquids or polymers

This list provides a small selection of possible applications.

# Technical principles of the MT 3100 S<sup>2</sup> Unit.

## The Inline working chamber.

Mechanical rotor/stator system for homogenizing, dispersing, emulsifying and suspending. Depending on the dispersing generator, speed and product features, flow rates of up to 11 l/min are possible. Optional injectors can be used for additional phases of product into the working chamber. Integrating a thermostat to cool the system is recommended for temperature-sensitive products.



### Motor speed (RPM)

Output frequency (Hz), Motor current (A)



### Power (kW)

Motor speed (RPM),  
Output frequency (Hz)



### Motor current (A)

Power (kW), Motor speed (RPM)



Standard display functions



# Complete solutions to meet your needs.

Your small Processing Plant.

Research needs modular, adaptable systems. We offer solutions that are easy to handle and flexible enough not to restrict your creativity. Our MEGATRON® is available to order as a ready-to-use mini-system with all of the devices you wish. Your own devices can be integrated into our systems depending on their design.

- Processing container (single or double-walled steel or borosilicate glass)
- System tubing (fixed or variable)
- Thermostat for double-walled processing container
- Vacuum pump for closed processing container
- Process sensors (e.g. temperature, pressure, pH and much more)
- Injector with feed pump
- REACTRON® laboratory reactor systems with double-walled processing container POLYMIX® anchor stirrer and integrated POLYTRON® batch disperser for pre-crushing
- Small volume recirculation systems available



## DESIGN OF THE MT 3100 S<sup>2</sup> INLINE DISPERSING MACHINE.

- OLED Display with foil keyboard for manual control
- Control over PC (USB 3.0) and Handheld (app for Adroid & iOS) integrated
- Bluetooth™ capable for use with app
- Inline working chamber (autoclavable version available)
- Standard product connections with NW8 hose nipples (clamp version available upon request)
- Working chamber removable through quick coupling
- Injector for additional phase (optional)
- Different standard R/S generator variants
- Parts coming in contact with the product in electro-polished, rust-free 316 L stainless steel
- Single mechanical seal with quench system
- Digital speed control with soft start
- Wear-free motor with direct drive
- Stable speeds as viscosity changes
- Complete recirculation systems upon request



# Kinematic dispersion.

Using the rotor / stator system.

Who is the founder of it?

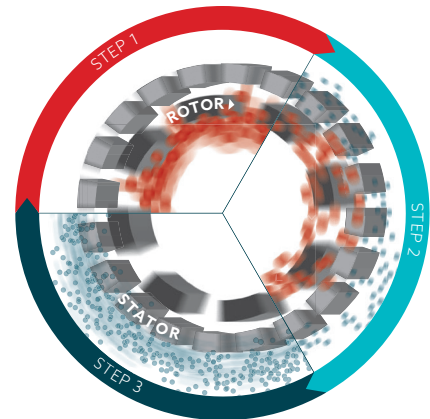
The roots of today's Kinematica began in the former chemical / physical research institute of Prof. P. Willems in Lucerne, Switzerland, the inventor of the modern rotor / stator dispersion technology.

## THE PRINCIPLE:

The spinning rotor generates a vacuum. The sample is drawn in and discharged to the outside through the stator's slots. Between the rotor/stator (shear gap), the product is subject to high deceleration-tangential and radial acceleration forces. The individual particles/droplets are torn apart and thus reduced in size; they are reduced to several micrometers in size through additional cutting and crashing effects.

## THE RESULT:

Microscopic dispersions, emulsions, suspensions and foams are generated. Droplets, particles, and gas bubbles are reduced to several micrometers or smaller. Small and large substances are dispersed more economically, faster and better than with any other system.



## SCALE-UP FOR INLINE DISPERSING MACHINES.

The collected data and experiences can seamlessly be used for upscaling to larger processing volumes. Kinematica has solutions for all kinds of throughputs from lab to pilot plant to production. For inline operation with throughputs up to 250 000 liters per hour we can always supply the most suitable and customer-oriented process solution.



LABORATORY



LABORATORY & PILOT PLANT



PRODUCTION

# Kinematica solution for industry 4.0.

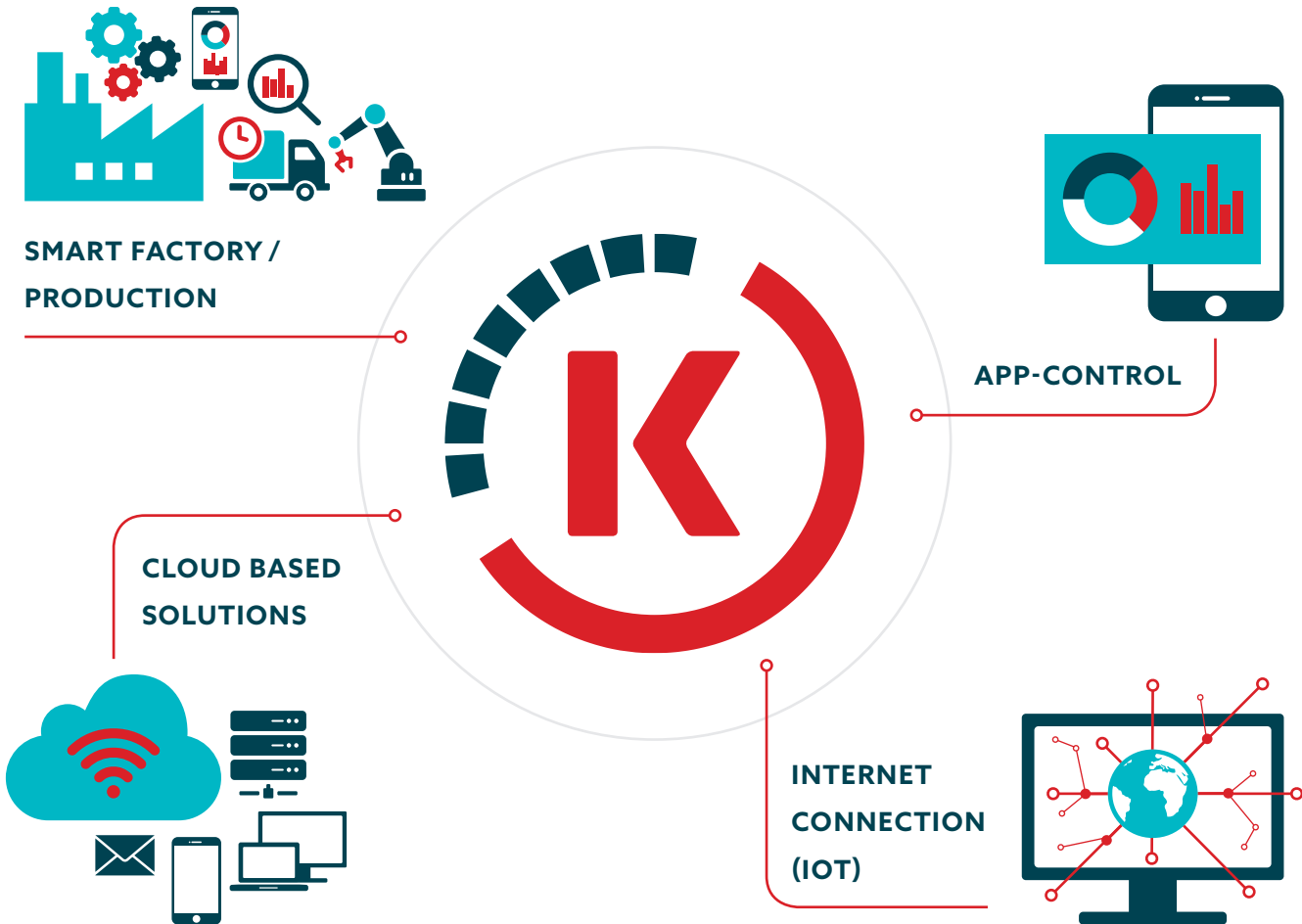
Automation and data exchange in manufacturing technologies.

Industry 4.0 fosters what has been called a «smart factory». Within modular structured smart factories, cyber-physical systems monitor physical processes, create a virtual copy of the physical world and make decentralized decisions.



### CONNECTED TO THE WORLD

- Industry 4.0 compliancy roadmap to fit industrial internet standards (controllable by web app)
- Ready to be integrated into Cloud-based services for data analytics
- Ready to be integrated into open platform architectures for smart production



# Recirculating systems.

A complete process system.

Complete recirculation systems according to customer specifications can also be delivered. Process containers (single- or double-walled, steel or borosilicate glass), system tubing, valves, thermostat for double-walled process container, vacuum pump for closed process container, temperature sensor.

Sales No.	Product	Description
13050015	MT 3100 S <sup>2</sup> /0.4l	With double wall glass vessel, bottom outlet valve, thermometer, piping/direct coupling with inlet flange for working chamber MT 3100 S <sup>2</sup> .
13050002	MT 3100 S <sup>2</sup> /2l	With single wall vessel from borosilicate glass 2000 ml/DN150 with bottom discharge valve, vessel cover DN 150 from borosilicate glass with 3 x NS29/32 and 1 x NS 14/32 connections and stable stand for the complete circulation system.
13050001	MT 3100 S <sup>2</sup> /2l	With double wall vessel from borosilicate glass 2000 ml/DN150 with bottom discharge valve, vessel cover DN 150 from borosilicate glass with 3 x NS29/32 and 1 x NS 14/32 connections and stable stand for the complete circulation system, heating/cooling connections: hose connections D 9 mm.



MT 3100 S<sup>2</sup>/0.4l



# Order information and accessories.

Authorized extension of your system.

Our MT 3100 S<sup>2</sup> drive can be expanded with functional accessories according to your wishes and requirements. Our experts will gladly assist you if you have any application-related questions or other concerns.

## DRIVES



Sales No.	Product	Description
13010060	MT 3100 S <sup>2</sup> , 230 V	CH-power cable, ready for App control
13010061	MT 3100 S <sup>2</sup> , 230 V	EU-power cable, ready for App control
13010062	MT 3100 S <sup>2</sup> , 230 V	UK-power cable, ready for App control
13010063	MT 3100 S <sup>2</sup> , 100 – 120 V	Incl. transformer, power cable, ready for App control

## WORKING CHAMBERS



With single mechanical seal, material combinations:

A: QBV (SiC-Carbon resin impregnated-Viton) / B: QBE (SiC-Carbon resin impregnated-EPDM) / C: QBE (SiC-Carbon resin impregnated-Kalrez6375) / D: QBE (SiC-Carbon resin

impregnated-Kalrez6230), with quench with TS1 vessel made from PMMA, pressureless, for cooling and lubricating of the mechanical seal, In- / Outlet connections: hose fittings NW8, product wetted O-ring made from A: Viton / B: EPDM / C: Kalrez6375 / D: Kalrez6230.

Sales No.	Product	Description
<b>Standard</b> (w/o heating/cooling jacket)		
13032051	MTO 3100 Q-V	A: QBV (SiC-Carbon resin impregnated-Viton)
13032057	MTO 3100 Q-E	B: QBE (SiC-Carbon resin impregnated-EPDM)
13032058	MTO 3100 Q-K6375	C: QBE (SiC-Carbon resin impregnated-Kalrez6375)
13032059	MTO 3100 Q-K6230	D: QBE (SiC-Carbon resin impregnated-Kalrez6230)
<b>Standard</b> (with heating/cooling jacket)		
13032053	MTK 3100 Q-V	A: QBV (SiC-Carbon resin impregnated-Viton)
13032060	MTK 3100 Q-E	B: QBE (SiC-Carbon resin impregnated-EPDM)
13032061	MTK 3100 Q-K6375	C: QBE (SiC-Carbon resin impregnated-Kalrez6375)
13032062	MTK 3100 Q-K6230	D: QBE (SiC-Carbon resin impregnated-Kalrez6230)

With single mechanical seal, material combinations: A: QBE (SiC-Carbon resin impregnated-EPDM) / B: QBE (SiC-Carbon resin impregnated-Kalrez6375) / C: QBE (SiC-Carbon resin impregnated-Kalrez6230), with quench with TS1 vessel made

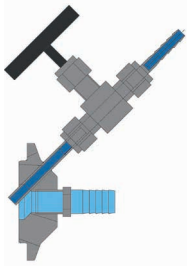
from PTFE, pressureless, for cooling and lubricating of the mechanical seal, In- / Outlet connections: TC 1 / 2", product wetted O-ring made from A: EPDM / B: Kalrez6375 / C: Kalrez6230.

### Autoclavable version (w/o heating/cooling jacket)

13032052	MTO 3100 Q-E-A	A: QBE (SiC-Carbon resin impregnated-EPDM)
13032064	MTO 3100 Q-K6375-A	B: QBE (SiC-Carbon resin impregnated-Kalrez6375)
13032063	MTO 3100 Q-K6230-A	C: QBE (SiC-Carbon resin impregnated-Kalrez6230)

### Autoclavable version (with heating/cooling jacket)

13032065	MTK 3100 Q-E-A	A: QBE (SiC-Carbon resin impregnated-EPDM)
13032066	MTK 3100 Q-K6375-A	B: QBE (SiC-Carbon resin impregnated-Kalrez6375)
13032067	MTK 3100 Q-K6230-A	C: QBE (SiC-Carbon resin impregnated-Kalrez6230)



### INJECTORS

Certain applications, such as chemical reactions, first require a controlled mixing process in the generator chamber.

- controlled mixing
- gas, oil or other phase inputs
- prevents uncontrolled reactions

Sales No.	Product	Description
13095002	Inlet flange	With injector for MTO/MTK 3100 Q, injector with hose nipple $\varnothing 4/2$ mm
13095004	Inlet flange	With injector and needle valve for MTO/MTK 3100 Q, product connection G1/4" with hose fitting $\varnothing 13/8$ mm, injector with tube $\varnothing 6/4$ mm, with needle valve and hose nipple $\varnothing 6/4$ mm
13095006	Inlet flange	With injector and needle valve for MTO/MTK 3100 Q, product connection TC 1/2", injector with tube $\varnothing 6/4$ mm, with needle valve and hose nipple $\varnothing 6/4$ mm

### GENERATORS

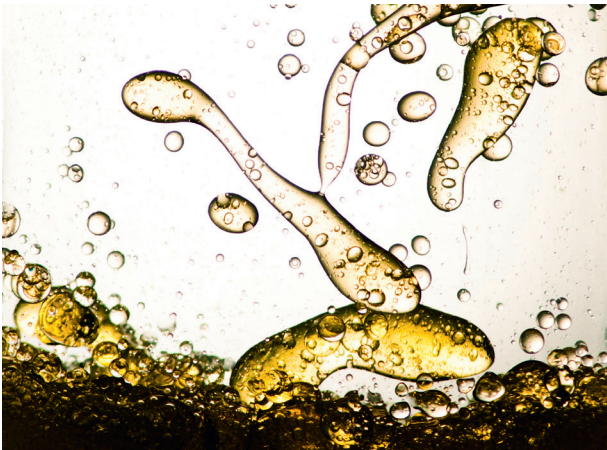
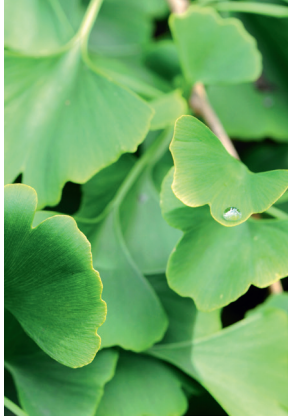


Sales No.	Product	$\varnothing$ Stator / Rotor (mm)	Throughput max.	max. Tip speed m/s	Applications
13031520	MTG 20/2 FFV	20/15.5	5l/min	24	<ul style="list-style-type: none"> <li>- dispersing, mixing and dissolving of solids in liquids</li> <li>- suspending, deagglomeration, extraction</li> <li>- pre-crushing of organic materials in liquids</li> <li>- intensive mixing</li> </ul>
13031530	MTG 30/2M	30/24	11l/min	38	<ul style="list-style-type: none"> <li>- dispersing, mixing and dissolving of solids in liquids</li> <li>- suspending, deagglomeration, extraction</li> <li>- crushing of organic materials in liquids</li> <li>- intensive mixing</li> <li>- producing of emulsions (coarse to medium droplet sizes)</li> </ul>
13031531	MTG 30/4F	30/26	7l/min	41	<ul style="list-style-type: none"> <li>- producing of fine suspensions and emulsions</li> <li>- intensive dissolving of solids</li> <li>- gassing of liquids</li> <li>- crushing of fibers, tissue and cell materials in liquids</li> <li>- producing of microspheres</li> <li>- acceleration of reactions and chemical precipitations</li> </ul>
13031532	MTG 30/4 FFV	30/26.5	6l/min	42	<ul style="list-style-type: none"> <li>- producing of super fine suspensions and emulsions (very small droplet sizes)</li> <li>- gassing of liquids</li> <li>- crushing of fibers and tissue materials in liquids</li> <li>- producing of microspheres</li> <li>- acceleration of reactions and chemical precipitations</li> <li>- in general for applications which requires high shear rates</li> </ul>

# Users / application ranges.

Best solution for every application.

Since 1962 we are a leading supplier of dispersing solutions for applications in the chemical, biotechnology, pharmaceutical, cosmetics and food industries. Due to our close relationships with our customers we detect new trends early and we always look for ways to find an ideal solution for you.





# Our mission. Your solution.

Homogenizing perfected: for every industry.

Kinematica's broad portfolio of solutions can address almost every dispersing application for the pharmaceutical, cosmetic, chemical, food and life science industry. Innovative powder-induction systems, solutions for completely sterile environments, or fully-compliant ATEX architecture are just some examples of the broad portfolio that Kinematica can offer with true scalability from pilot-plant to large plant configurations.

Our state-of-the-art technology, in addition to a professional consulting and engineering suite of services, can address a variety of processes such as blending / mixing / stirring, emulsifying, deagglomerating, foaming, crushing and homogenizing with particle size reduction from a few micrometers down to nanometers in size: the proprietary design and innovative geometry of our aggregates / generators can downsize and provide perfect statistical particle distribution for the finest emulsions / suspensions and foam dispersions.



**PHARMA**



**CHEMICAL**



**COSMETICS**



**FOOD**



**LIFE SCIENCE**



## HEADQUARTERS

### Kinematica AG

Luzernerstrasse 147a  
CH-6014 Luzern  
Switzerland

Phone +41 41 259 65 65

Fax +41 41 259 65 75

info@kinematica.ch

kinematica.ch

## EUROPE

**Kinematica GmbH** / Germany / Phone +49 7634 504 800 0 / info@kinematica.de

-

## NORTH AND SOUTH AMERICA

**Kinematica, Inc.** / USA / Phone +1 631 750 6653 / info@kinematica-inc.com

-

## RUSSIA AND CIS

**Kinematica AG** / Switzerland / Phone +41 41 259 65 65 / info@kinematica.ch

-

## GREATER CHINA

**Kinematica Asia Limited** / Hong Kong / Phone +852 249 769 65 / info@kinematica.ch