



# KINEMATICA

Homogenizing perfected.



## POLYTRON®

**LABORATORY LINE**

### POLYTRON® PT 3100 D

Stand-disperser (High-End Line), flexible-use disperser

# POLYTRON® PT 3100 D

Efficient, powerful, digital controls.

Applications with the highest demands for reproducibility and scaling up can be efficiently performed with this device. The fully digitized control and regulation system is very easy to operate. The illuminated LCD display shows all the parameters, which can be changed with the membrane keypad.

## THE EXPERT FOR YOUR LABORATORY

Since more than 60 years we are perfecting the rotor/stator technology, working in close cooperation with users and universities. When using our technology, your test samples will be dispersed into homogeneous systems. Depending on the type of samples you will get homogeneous emulsions, dispersions or suspensions. This is the best foundation for all subsequent analyses or formulations.

## ERGONOMICS

- Easy operation with an on-off switch and membrane keypad
- Digital speed control for long equipment life
- Protection against overheating, overload and blocking
- Speed stability even with changes in viscosity
- Easy to adjust motor height (depending on the stand)
- Aggregates quickly switched with Click & Go coupling
- Easy aggregate clean-up with EasyClean Design

## RESULTS ARE CONVINCING

- Smallest sizes of particles/droplets: because precise analysis require homogeneous samples
- Efficient sample preparation: because fast dispersion saves time
- Standard or custom-made aggregates: perfected for and in cooperation with the users
- Cleaning and disassembly: EasyClean Design makes it very simple
- Quick coupling of the aggregates: by using Click & Go
- Best materials available: because without them, we could not call it Swiss Made
- Durability is a Swiss virtue

## SCALE-UP

You can use test results to scale-up to our pilot plant and industrial POLYTRON® machines. The volume range for on batch units is seamlessly available up to 10000 liters.



LABORATORY



LABORATORY & PILOT PLANT



PRODUCTION





#### TECHNICAL INFORMATION

Processing volume (water)	0.1 to 10000 ml
Tip speed	Up to max. 32 m/s
Applicable aggregates	ø 5 mm to 36 mm
Speed range	500 to 30000 rpm
Drive coupling	Aggregates with F coupling
Noise level (drive without aggregate)	66 dB(A) at 25000 rpm 73 dB(A) at 30000 rpm
Motor	Universal with carbon brushes
Drive power	1200W
Connection voltage	110 - 230 V ± 10%, 50Hz/60Hz
Relative humidity (max.)	80% during storage 80% during operation
Operating temperature	0 - 40°C
PC interfaces	RS-232 (D SUB 9) USB socket B
Protection class acc. to DIN	IP 20
Dimensions (LxWxH)	Drive: 240x130x265 mm
Weight	Drive: 3.9 kg
EMC standards	IEC / EN 61000-6-2 / EN 61000-6-3
Safety standard	IEC / EN 61010-2-51



#### USERS / APPLICATION RANGES

- General homogenizer applications
- Dispersions, suspensions and emulsions
- Dispersing of resins and pigments
- Dispersion of plant, animal and human tissue samples in various liquids and volumes
- Dissolving solids even at higher viscosities
- Formulation of lotions, creams and foodstuffs
- Extraction of active pharmaceutical ingredients (API) in pills and tablets
- Preparation of samples for quality assurance / control

This list provides a small selection of possible applications.

# Kinematic dispersion.

Using the rotor / stator system.

Who is the inventor 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.

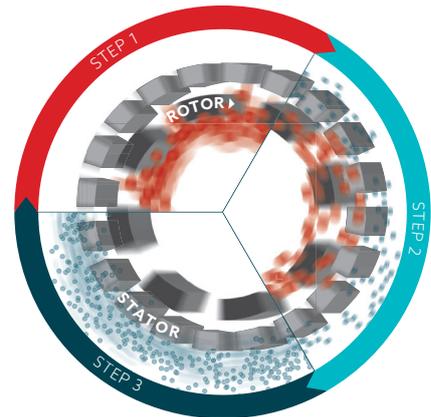
## THE PRINCIPLE:

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.

Your samples are efficiently  
«POLYTRONIZED».



## AGGREGATE TECHNOLOGY - UNRIVALED!

The high efficiency and the uniqueness of our POLYTRON® dispersing aggregate can only be achieved through superior manufacturing precision and the sophisticated Kinematica design method. This is 100 % Swiss Made.

### STANDARD AGGREGATES (EC DESIGN, WITH TWO OR MORE SPROCKETS)

This is all you need for popular applications in the preparation of samples and formulation development. The cutting teeth embedded in the head of the tool optimize the pre-crushing of the sample. An enclosed ring design provides optimum protection for those teeth and prevents them from bending.

### SPECIAL AGGREGATES (W, M, B, DS, Z DESIGN)

Specializations in the chemical, pharmaceutical, cosmetic and food industry, as well as the life sciences, makes new designs inevitable. These aggregates are based on state-of-the-art technology and only available from Kinematica.

The highly specialized tool is subject to further development that involves close cooperation with our customers and universities. Thus, it is continuously perfected for specific applications.

### MATERIALS

Whether you need a tool with standard or special geometry, all aggregates are manufactured from high-alloy stainless steel 316L, electrolytically polished and made in Switzerland.

### BEARINGS

Depending on the diameter, our aggregates are made with high-quality PTFE / VALFLON, special carbide or bronze / carbide bearings. They have excellent mechanical properties and chemical resistance

and have FDA approvals. Super high-speed ball bearings are used in the couplings to provide stability speeds up to 30 000 rpm.

### CLEANING AND DISASSEMBLY

EasyClean: Our technology ensures the simplest removal and fast cleaning, either by hand, dishwasher or autoclave. Disassembling the precisely fitting components is simple and fast.

### LOCKING SYSTEM

All our POLYTRON® aggregates are fitted with a high-precision quick-release system: The Click & Go.

# Comfort at the highest level.

## The electric plate stand.

Modern laboratories want equipment that is easy to handle. This rugged electric tripod offers a variety of benefits.

### REQUIREMENTS

The processing of large sample volumes or viscous products requires larger, higher torque drive units and larger aggregates which are quite heavy. These factors were the reasons for making this stand available to our customers.

Now, what has long been a part of the standard equipment in the pilot plants, is now available for laboratory use.

### PRINCIPLE

- Powerful motor mounted onto the telescopic lifting arm
- Durable, robust construction
- High stability due to the massive aluminum base plate

### RESULT

- Easy height adjustment by means of two buttons
- Anti-slip mat included
- Available with optional vessel holder



### OTHER STANDS AND ORDER NUMBERS

Sales No.	Product	Description
11040025	ST-F 10 / 600	H-foot stand made of anodized aluminum and the height adjustable, swiveling PTFE-coated work table with vessel holder. Weight: 5.5 kg

#### Electric plate stand

Electric plate stand with lifting telescopic bar for more ease of use. Incl. operating device and anti-slipping pad for vessel. The electronics are designed for ambient temperatures of +5°C to +40°C and were tested per EN 60335-1 and UL 962. Weight: 11 kg

11040033	ST-P 14 / 590+500, 230 V	With EU-power cable
11040036	ST-P 14 / 590+500, 230 V	With CH-power cable
11040037	ST-P 14 / 590+500, 230 V	With UK-power cable
11040034	ST-P 14 / 590+500, 100 - 120 V	With power cable



### STAND ACCESSORIES

Sales No.	Product	Description
11036005	Vessel holder	For fixing any dispersing vessels, with guide for ST-P 14 / 590 + 500

# Dispersing aggregates for PT 3100 D.

Your applications, our solution.

Kinematica aggregates solve all problems you are faced with every day in the laboratory. Using our Click & Go quick release makes the changing of aggregates very easy.



## EC «STANDARD DISPERSING AGGREGATE»

### Design

The universal geometry uses two rows of teeth, is suitable for a large spectrum of laboratory applications, and it is reliable and efficient.

### Selection and applications

- All standard dispersing tasks
- Grinding of animal and human tissue samples in a variety of fluids and volumes
- Sample preparation for the extraction and dissolution of organic materials
- Sample preparation for medical diagnostic procedures as well as DNA analysis
- Extractions of systems/substances from vegetable-derived samples
- Disruption of animal and human cells
- Deagglomeration of united cell structures
- Intensive mixing



## M «OUTSIDE CUTTING BLADES»

### Design

Outside blades pre-cut samples that are larger than the rotors diameter. Subsequently, they can be dispersed inside the generator.

### Selection and applications

- Dispersing of large samples made simple
- All standard dispersing applications similar to EC aggregate



## Z «Z-DESIGN»

### Design

Breaking up of hard samples, with integrated V-notch technology. Additional, integrated holes for cleaning.

### Selection and applications

- Hard and brittle material
- Sweet corn and grain
- Breaking, opening and dispersing of pills
- Breaking, hard grains

Sales No.	Description	ø / length mm	Volume ml	max. Tip speed m/s
<b>EC «STANDARD DISPERSING AGGREGATE»</b>				
11030297	PT-DA 05 / 2EC-F078	5 / 78	0.1 – 5	5
11030298	PT-DA 07 / 2EC-F101	7 / 101	0.3 – 10	8
11030299	PT-DA 12 / 2EC-F154	12 / 154	3 – 250	14
11030302	PT-DA 20 / 2EC-F193	20 / 193	20 – 2000	22
11030305	PT-DA 30 / 2EC-F250	30 / 250	100 – 4000	30
11030311	PT-DA 30 / 4EC-F250	30 / 250	100 – 4000	30
11030313	PT-DA 36 / 2EC-F250	36 / 250	200 – 4500	34
11030317	PT-DA 36 / 4EC-F250	36 / 250	200 – 4500	34

Sales No.	Description	ø / length mm	Volume ml	max. Tip speed m/s
<b>M «OUTSIDE CUTTING BLADES»</b>				
11030300	PT-DA 12 / 2MEC-F154	12 / 154	3 – 250	14
11030303	PT-DA 20 / 2MEC-F193	20 / 193	20 – 2000	22
11030307	PT-DA 30 / 2MEC-F250	30 / 250	100 – 4000	30
11030308	PT-DA 30 / 2MG-F273*	30 / 273	100 – 4000	30
11030315	PT-DA 36 / 2MEC-F250	36 / 250	200 – 4500	34
*M-design aggregate in gas-tight model				
<b>Z «Z-DESIGN»</b>				
11030310	PT-DA 30 / 2ZEC-F250	30 / 250	100 – 4000	29



Step 1



Step 2



Step 3



#### W «W-DESIGN»

##### Design

The W-design prevents fibrous, stringy or solid samples from clogging the rotor / stator.

##### Selection and applications

- Dispersing fibrous, stringy or solid samples (e.g., pieces of meat)
- All standard dispersing applications similar to EC aggregate



#### G «GAS TIGHT»

##### Design

Integrated mechanical seals.

##### Selection and applications

- Under pressure or vacuum
- Preventing air from being added to emulsions
- Corrosive acid mixtures



#### DEC «DISSOLVER»

##### Design

A processing head with teeth. The product is radially accelerated.

##### Selection and applications

- Fast mixing and homogenizing of solids in liquid
- Processing of highly viscous products



#### B «BIOTRONA® HIGH-TURBULENCE MIXER»

##### Design

High-turbulence mixing head with the least possible shear forces and energy inputs.

##### Selection and applications

- Quick removal and suspension of solid particles; also suitable for high viscosity applications



#### TiN «TITANIUM NITRATED» - UPGRADE

##### Design

Rotor and/or stator with up to three rows of teeth with a titanium nitrated (TiN) coating.

##### Selection and applications

- All dispersing applications with abrasive samples

Sales No.	Description	ø / length mm	Volume ml	max. Tip speed m/s
<b>W «W-DESIGN»</b>				
11030301	PT-DA 12 / 2WEC-F154	12 / 154	3 - 250	14
11030304	PT-DA 20 / 2WEC-F193	20 / 193	20 - 2000	22
11030294	PT-DA 20 / 2WEG-F210*	20 / 210	20 - 2000	30
11030309	PT-DA 30 / 2WEC-F250	30 / 250	100 - 4000	30
11030345	PT-DA 30 / 2WMEC-F250**	30 / 250	100 - 4000	30
11030319	PT-DA 36 / 2WEC-F250	36 / 250	200 - 4500	34
11030346	PT-DA 36 / 2WMEC-F250**	36 / 250	100 - 4500	34
	* W-design aggregate in gas-tight model			
	** W-design aggregate with knives			

#### TiN «TITANIUM NITRATED» - UPGRADE

11035050	TiN rotor for the selected dispersing aggregate	ø 12 - 36mm
11035150	TiN stator for the selected dispersing aggregate	ø 12 - 36mm

Sales No.	Description	ø / length mm	Volume ml	max. Tip speed m/s
<b>G «GAS TIGHT»</b>				
11030295	PT-DA 20 / 2G-F210	20 / 210	20 - 2000	22
11030306	PT-DA 30 / 2G-F273	30 / 273	100 - 4000	30
11030312	PT-DA 30 / 4G-F273	30 / 273	100 - 4000	30
11030316	PT-DA 36 / 2G-F273	36 / 273	200 - 4500	34
11030318	PT-DA 36 / 4G-F273	36 / 273	200 - 4500	34

#### DS «DISSOLVER»

11030344	PT-DA 30 / DEC-F250	30 / 250	500 - 10000	30
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#### B «BIOTRONA® HIGH-TURBULENCE MIXER»

11030355	PT-DA 07 / BEC-F101	07 / 101	10 - 100	7
11030354	PT-DA 12 / BEC-F154	12 / 154	50 - 500	12
11030296	PT-DA 20 / BEC-F193	20 / 193	20 - 2000	21
11030314	PT-DA 36 / BEC-F250	36 / 250	500 - 10000	34

# Dispersing vessels.

For best results.

Choosing the right dispersing aggregate is crucial for good results. The right vessel also contributes to achieve the desired result.

## THE PROBLEM

For normal cylindrical beakers, the flow creates a vortex. The mixing and dispersing efficiency decreases considerably since the product is no longer being optimally processed through the dispersing generator head. This lengthens processing times, requiring more energy input. Depending on the shape of the vortex, this may also lead to additional air being introduced.

## THE SOLUTION

Our specially designed GS jars have a cloverleaf-like shape. This effectively interrupts the flow in the radial direction and generates additional counteracting forces. These high turbulences maximize the mixing and dispersion efficiency, thus minimizing processing time and requiring less energy.

## THE SELECTION

Our GS-glasses are available in chemical- and temperature-resistant borosilicate glass or in stainless steel, with working volumes from a few milliliters to several liters, with or without lid and with or without sealed feedthrough.



GS vessel principle (viewed from top)



### CLOVERLEAF-LIKE SHAPED BOROSILICATE VESSEL

Sales No.	Product	Ø/H (mm)	Process volume	Thickness	Thread	Description
Open on top						
11051010	GS 15	30 / 100	35ml	2.8mm	-	-
11051011	GS 25	54 / 150	150ml	3.5mm	-	-
11051012	GS 40	80 / 200	500 ml	3.5mm	-	-
11051013	GS 50	90 / 250	1000ml	3.5mm	-	-
11051014	GS 60	100 / 300	1300ml	3.5mm	-	-
With screw cap and sealing						
11051020	GS 15K	30 / 100	35 ml	2.8mm	GL25	-
11051021	GS 25K	54 / 150	150 ml	3.5 mm	GL45	-
11051022	GS 40K	80 / 200	500 ml	3.5 mm	GL45	-
11051023	GS 50K	90 / 250	1000 ml	3.5 mm	GLS80	-
11051024	GS 60K	100 / 300	1300 ml	3.5 mm	GLS80	-
Incl. cover with sealing and hole						
11051030	GS 15KL08	30 / 100	35ml	2.8mm	GL25	8 mm hole
11051031	GS 15KL12	30 / 100	35ml	2.8mm	GL25	12 mm hole
11051040	GS 25KL12	54 / 150	150ml	3.5mm	GL45	12mm hole
11051041	GS 25KL20	54 / 150	150 ml	3.5 mm	GL45	20mm hole
11051050	GS 40KL20	80 / 200	500 ml	3.5 mm	GL45	20mm hole
11051051	GS 40KL26	80 / 200	500 ml	3.5 mm	GL45	26 mm hole
11051060	GS 50KL20	90 / 250	1000 ml	3.5 mm	GLS80	20 mm hole
11051061	GS 50KL26	90 / 250	1000 ml	3.5 mm	GLS80	26 mm hole
11051070	GS 60KL20	100 / 300	1300 ml	3.5 mm	GLS80	20 mm hole
11051071	GS 60KL26	100 / 300	1300 ml	3.5 mm	GLS80	26 mm hole



### CYLINDRICAL-SHAPED STAINLESS STEEL VESSEL

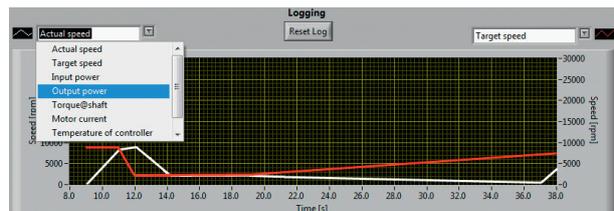
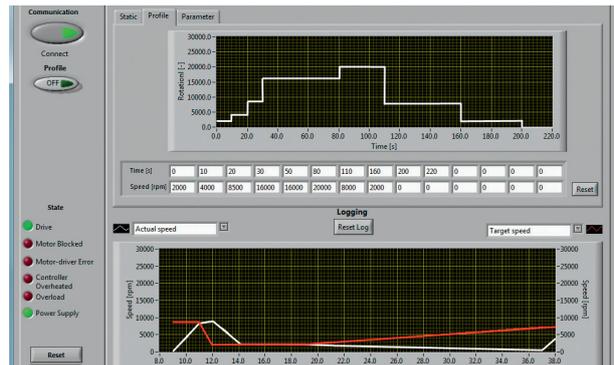
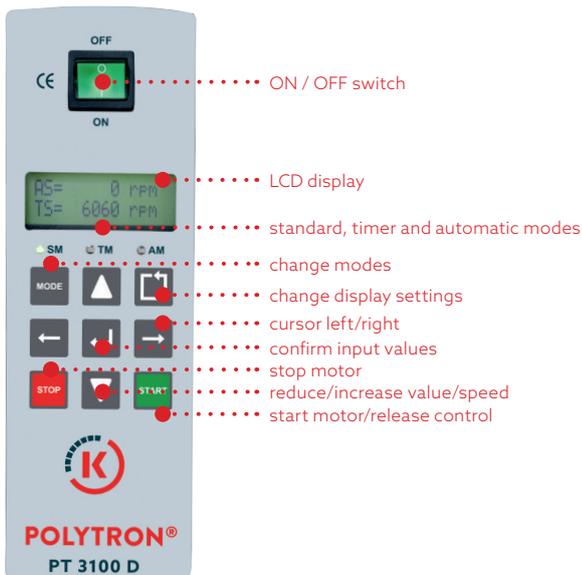
Sales No.	Product	Ø/H (mm)	Process volume	Thickness	Weight	Description
With hook grips						
11052001	GS100-1	105 / 150	1000ml	1.0mm	412 g	-
11052002	GS100-2	135 / 170	2000ml	1.2mm	580g	-
11052003	GS100-3	165 / 180	3000ml	1.2mm	725g	-
11052004	GS100-4	185 / 185	4000ml	1.2mm	872g	-
11052005	GS100-5	185 / 225	5000ml	1.2mm	998g	-
11052006	GS100-6	185 / 265	6000ml	2.0mm	1122g	-
11052008	GS100-8	210 / 270	8000ml	2.0mm	1350g	-
11052010	GS100-10	230 / 280	10000ml	2.0mm	1550g	-
With hook grips and a cover with a drop handle						
11052101	GS100-1.C	105 / 150	1000 ml	1.0 mm	495 g	-
11052102	GS100-2.C	135 / 170	2000 ml	1.2 mm	720 g	-
11052103	GS100-3.C	165 / 180	3000 ml	1.2 mm	905 g	-
11052104	GS100-4.C	185 / 185	4000 ml	1.2 mm	1099 g	-
11052105	GS100-5.C	185 / 225	5000 ml	1.2 mm	1225 g	-
11052106	GS100-6.C	185 / 265	6000 ml	2.0 mm	1349 g	-
11052108	GS100-8.C	210 / 270	8000 ml	2.0 mm	1671 g	-
11052110	GS100-10.C	230 / 280	10000 ml	2.0 mm	1922 g	-
With hook grips, equipped with a baffles part inset and a cover with a drop handle						
11052201	GS100-1.C.B.	105 / 150	1000 ml	1.0 mm	-	-
11052202	GS100-2.C.B.	135 / 170	2000 ml	1.2 mm	-	-
11052203	GS100-3.C.B.	165 / 180	3000 ml	1.2 mm	-	-
11052204	GS100-4.C.B.	185 / 185	4000 ml	1.2 mm	-	-
11052205	GS100-5.C.B.	185 / 225	5000 ml	1.2 mm	-	-
11052206	GS100-6.C.B.	185 / 265	6000 ml	2.0 mm	-	-
11052208	GS100-8.C.B.	210 / 270	8000 ml	2.0 mm	-	-
11052210	GS100-10.C.B.	230 / 280	10000 ml	2.0 mm	-	-



# PC control software.

«User Interface» for the PT 3100 D.

The free-of-charge software «User Interface PT 3100 D» was developed for the operation and control of the laboratory dispersing system POLYTRON® PT 3100 D. A USB or RS232 interface provides the communication to the computer. The data transmission protocol complies with the Modbus specifications.



## OPERATING MODE

- STANDARD MODE: Operation by manual control
- TIMER MODE: Automatic shutdown by recording speed and time
- AUTO MODE: Complete control through the included Kinematica software

## KINEMATICA SOFTWARE

- Set the speed via PC
- Store speed / time profile to reproduce formulas or processes
- Adjustable temperature limits as stop criterion, for example, to prevent product overheating (with Pt100 temperature probe)
- Graphical representation of parameters with time diagram
- Continuous recording of all parameters listed above in MS Excel format
- PC software and cable included

## ADDITIONAL FEATURES

- Memory function: remembers the last speed setting and the time when the device shut off
- Displays the product temperature by means of the optional Pt100 temperature probe

## PARAMETERS RETRIEVABLE VIA LCD DISPLAY

- Actual speed [AS, rpm]
- Target speed [TS, rpm]
- Power in [Pin, W]
- Power out [Pout W]
- Moment of force [M Ncm]
- Motor current [I, A]
- Supply voltage [U, V]
- Product temperature (with optional Pt100 temperature probe) [TP, °C]
- Internal temperature controller [Tc, °C]
- Operating hours meter [Oh, h]
- Firmware

## SYSTEM REQUIREMENTS:

- Operating system:  
Windows® XP / 7 / 8 / 10
- Required interfaces:  
1 x USB or 1 x RS-232



# Order information and accessories.

Authorized extension of your system.

Depending on your specific requirements, it is possible to expand the PT 3100 D drive with our functional accessories. Our expert personnel will be happy to assist you and answer all the questions you might have.

## DRIVES

Sales No.	Product	Description
<b>Drive Unit</b>		
11010120	PT 3100 D, 230 V	CH-power cable, PC software, RS-232/USB connection cable
11010121	PT 3100 D, 230 V	EU-power cable, PC software, RS-232/USB connection cable
11010122	PT 3100 D, 230 V	UK-power cable, PC software, RS-232/USB connection cable
11010123	PT 3100 D, 100 – 120 V	Power cable, PC software, RS-232/USB connection cable
<b>Drive Unit is sold with stand and accessories</b>		
11090070	PT 3100 D, 230 V, Package	Drive Unit. CH-Power cable, stand ST-F10/600, PC software, RS-232/USB connection cable
11090071	PT 3100 D, 230 V, Package	Drive Unit. EU-Power cable, stand ST-F10/600, PC software, RS-232/USB connection cable
11090073	PT 3100 D, 230 V, Package	Drive Unit. UK-Power cable, stand ST-F10/600, PC software, RS-232/USB connection cable
11090072	PT 3100 D, 100 – 120 V, Package	Drive Unit. Power cable, stand ST-F10/600, PC software, RS-232/USB connection cable



## ADAPTER

Sales No.	Product	Description
11035001	Adapter PT-DA/PTA (F/A)	This adapter connects older A-coupling dispersing aggregates such as PT-K/PT-G with F-coupling drive units.



## TEMPERATURE PROBE

Sales No.	Product	Description
11020050	PT 100 (for POLYTRON® PT 3100 D and PT 6100 D, for measuring the product temperature. The probe can be directly connected to the rear panel of the device).	<ul style="list-style-type: none"> <li>- Temperature range 0°C to 120°C</li> <li>- Temperature displayed on LCD display</li> <li>- If the temperature probe is used with the PC software, the temperature is displayed and you can set temperature limits and have the software record the current temperatures.</li> </ul>



# 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.



## HEADQUARTERS

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**PHARMA**



**CHEMICAL**



**COSMETICS**



**FOOD**



**LIFE SCIENCE**