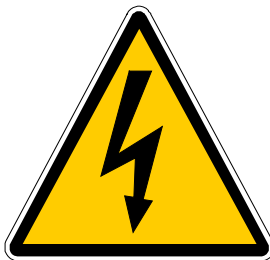




Instruction Manual POLYTRON® System PT 2100



Voltage

- 100-120 V, 50/60 Hz
- 230 V, 50/60 Hz

Make sure the power supply is correct and corresponds with the technical data plate on the instrument

This is a quality product of



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With this **POLYTRON**[®] dispersing instrument you have bought a product of highest quality - we congratulate you on this choice.

To insure greatest satisfaction with your new **POLYTRON**[®] instrument we kindly ask you to read the instruction manual before putting the unit in operation. This will help you to avoid mistakes and thus damages. **POLYTRON**[®] instruments need little maintenance - however do not dispense you from certain checks and, especially, good cleaning.

| | |
|--|--|
| | <ul style="list-style-type: none">• Make sure that the electric voltage of the instrument and the power supply correspond• Do not use this instrument in hazardous area• The instrument should only be opened by a service specialist |
| | <ul style="list-style-type: none">• The POLYTRON[®] PT 2100 is not designed for continuous operation• The recommended maximal uninterrupted working time should not exceed 20 minutes• POLYTRON dispersion aggregates must never run without liquid – the lower slide bearing is cooled and lubricated by the liquid phase of the treated medium• Make sure that the dispersion aggregates are properly cleaned after every use• Never touch a spinning rotor, nor shaft, nor the motor side coupling parts |
| | <ul style="list-style-type: none">• KINEMATICA products are built according all actually valid EEC-directives, are CE-marked and delivered with the corresponding certificate of conformity |



1 Description

1.1 Scope

This manual describes operation of the **KINEMATICA POLYTRON PT 2100** Homogenizer and provides information on installation, maintenance, parts and accessories.

1.2 Purpose

POLYTRON[®] PT 2100 units are designed to homogenise, emulsify, blend and mix small to medium quantities of organic and inorganic materials. Thanks to their small diameter, **POLYTRON**[®]-aggregates can even reach to bottom of small test tubes.

2 **POLYTRON**[®] Drive Unit PT-MR 2100

2.1 Specifications / Technical Data

| | PT 2100 |
|--|--|
| Voltage | 230 Volt, 50/60 Hz 100-120 Volt, 50/60 Hz |
| Power Input / Output | 500 / 280 W |
| Rotor speed | approx. 11'000 – 30'000 ± 5 % min-1 indicated on control knob |
| Weight | 1.560 kg |
| Interference suppression as per E 0875 | grade N, SEV approved |

POLYTRON[®] PT 2100 systems are consisting of:

- Motor drive PT-MR 2100
- Support rod with motor holder (not yet mounted)
- Cable with plug (CH,EU or US)

Motor and speed controller are one unit. This consists of:

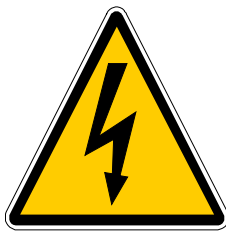
- speed controller and stabiliser
- control for soft-start
- fuse protection (approx. 75 – 85 dB (A) at max. speed)
- safety quick coupling for **POLYTRON**[®] dispersing aggregates



2.2 Taking into operation



- Make sure that the electric voltage of the instrument and the power supply correspond
- Do not use this instrument in hazardous area



- The POLYTRON® PT 2100 is not designed for continuous working
- The recommended maximal uninterrupted working time should not exceed 20 minutes
- POLYTRON® dispersion aggregates must never run without liquid – the lower slide bearing is cooled and lubricated by the liquid phase of the treated medium
- Make sure that the dispersion aggregates are properly cleaned after every use
- Never touch a spinning rotor, nor shaft, nor the motor side coupling parts
- Working with high speeds makes it possible that a noise of 85 dB A is exceeded. The user shall undertake necessary steps for protection.

Before taking the instrument into operation the separately supplied support rod has to be installed on the backside of the drive motor. The necessary key is supplied as well. Make sure that the rod is properly fixed.

It is recommended to run new aggregates in water for approx. 15 min.



2.3 Connection of POLYTRON-Aggregates



The connection of aggregates is effected without tools by a safety quick-coupling. The aggregate has to be inserted into the motor-side coupling and slightly turn into its correct position only – until you hear a clear “click”.

For de-connection of the aggregate simply press the coupling ring towards the front and pull the aggregate off.



When moving the coupling ring the aggregate can fall off the coupling. Hold the dispersing tool when de-coupling and avoid injury of recipients, stand or working bench.



3 POLYTRON-Dispersing aggregates

KINEMATICA dispersion tools are called POLYTRON[®] aggregates. They are manufactured in a variety of different forms and recommended according the dispersion problem.



The POLYTRON[®] PT 2100 is designed to work with all POLYTRON[®] D-Coupling aggregates with diameters of 5 to 20 mm. Please see the actually valid price list for detailed order codes.

- POLYTRON[®]-EC-Aggregate are based on the Rotor/Stator-Technology and are classic KINEMATICA products.
- EC-Aggregate, EC stand for EasyClean, can be disassembled for cleaning very easily. In addition to that, they can be sterilised as per all standard methods, also autoclaved.
- They are double beared by means of RULON-slide bearings. This material convinces by its extraordinary chemical resistance and mechanical characteristics.
- All aggregates are equipped with saw-teeth which efficiently accelerate the pre-cutting out of your sample material.
- The stator teeth are connected to each other by a safety ring what avoids their bending also if working with hard and high viscous materials.



| POLYTRON® Aggregate | PT-DA 05/2EC-D066 | PT-DA 07/2EC-D100 | PT-DA 12/2EC-D148 | PT-DA 20/2EC- D178 |
|------------------------|---|----------------------|----------------------|-----------------------|
| Stator-Diameter | 5.5 mm | 7.5 mm | 12 mm | 20 mm |
| Rotor-Diameter | 3 mm | 5 mm | 9 mm | 15 mm |
| Shaft length | 66 mm | 100 mm | 148 mm | 178 mm |
| Working volume | ca. 0,1 – 5 ml | ca. 0,3 – 10 ml | ca. 2 – 250 ml | ca. 10 – 2000 ml |
| Material | stainless fine steel 1.4435, 316L and RULON | | | |

3.1 Working with POLYTRON®-Aggregates

The optimal immersion depth of the aggregate is approx. 2/3 below the liquid surface and 1/3 above the bottom of the beaker. The lower edge of the lower cleaning hole has to be immersed. B inclined immersion in an angle of approx. 15° the efficiency of the aggregate can be further improved.

The maximum immersion depth is approx. 30 mm below the coupling flange.



- POLYTRON® dispersion aggregates must not be used dry – the lower slide bearing is cooled and lubricated by the liquid phase of the treated medium
- At certain rotor speeds, depending on viscosity and volume of the treated medium, resonances and vibrations may appear. Please avoid these delicate speeds.
- Working with high speeds makes it possible that a noise above 70 (<85) dB (A) is exceeded. The user shall undertake necessary steps for protection.
- Make sure that the dispersion aggregates are properly cleaned after every use
- Never touch a spinning rotor, nor shaft, nor the motor side coupling parts
- Never let a POLYTRON®-aggregate touch the bottom of the vessel



4 Application

4.1 Working and Speed control

Drive and control electronics are in the same housing. As first step please check the mains and run a test with no aggregate by switching ON the main switch on the front of the drive. The speed is selected by the control knob on the left side (from front) of the drive motor.

| | | | | | | |
|---------------------------------|--------|--------|--------|--------|--------|--------|
| Position | 11 | 15 | 19 | 22 | 26 | 30 |
| approx. speed min ⁻¹ | 11'000 | 14'000 | 18'000 | 22'000 | 26'000 | 30'000 |



WARNING

Make sure that the main switch of the drive motor is set on OFF before you are connecting to the mains

Connect the aggregate in OFF status only

Immerse the connected aggregate into the medium and only then start the motor drive

WARNING

Never touch a spinning rotor – danger of injury!

For reaching the best possible effects of a POLYTRON® PT 2100 the rotor speed should be adapted to the dispersion problem. Depending on product different individual speeds are optimal.

IMPORTANT:

The maximum rotor speed depends on the kind of sample and its viscosity. The speed is reduced in case of increasing viscosity in order to protect the drive from overload. If the viscosity is too high, the motor is stopping automatically. An electronic control system avoids injury of the motor drive.



4.2 Overload Protection

If the motor is overloaded the power supply is cut-off automatically. In this case switch off the main switch to "0", disconnect the aggregate and re-start the instrument as fast as possible, without load, in order to accelerate cooling by the built-in fan.

Often release of the overload fuse indicated a general overload of the instrument.

5 Maintenance

5.1 Maintenance of the drive motor PT 2100

The motor needs no maintenance. There are no serviceable parts inside which can be repaired by the user. The only exceptions are the carbon brushes. In case of failure, please contact KINEMATICA or your supplier.

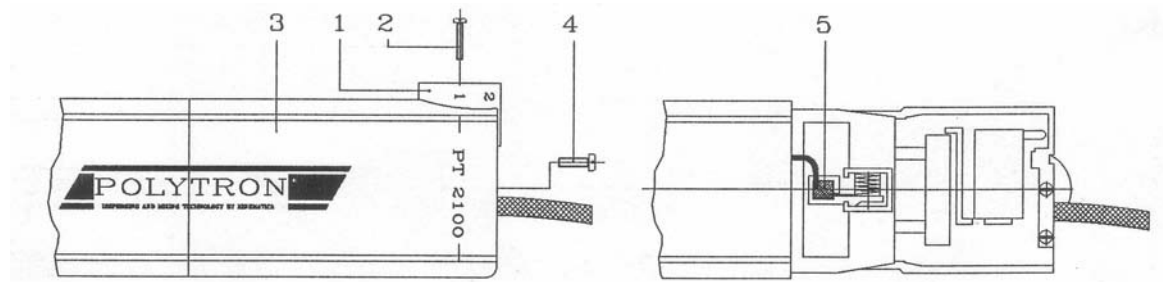


- We recommend service and repairs to be done by specialised staff of our "Authorised Service Centres" only
- Use approved original spare parts only

5.2 Replacement of Carbon Brushes

The replacement of the carbon brushes can be effected after disconnection of all electric supplies.

- disconnect main power supply



The motor housing has to be opened.

- ◆ Remove control knob (1/2) with cross-slotted screw driver. Fix the knob with one hand and carefully release the centric screw.
- ◆ Remove the upper part of the housing (3) by releasing the Philips screw (4)
- ◆ Remove the carbon brushes (5) with adequate tool and replace both. **Use approved original spare parts only and exchange carbon brushes pair-wise**
- ◆ Remount housing part and control knob
- ◆ Take the drive into operation as per this instruction manual and let it run at low speed during approx. 10 min

Weak sparking of brushes is a sign for well run in or flawless carbon brushes. If strong sparking occurs, relieve or switch off motor and exchange carbon brushes, otherwise the collector can be damaged.

5.3 Maintenance and Cleaning of POLYTRON®-Aggregates

- Please carefully read the instructions regarding cleaning, disassembly and assembly in chapter 5.5 and 5.6 of this manual

The POLYTRON® -Aggregates are precision built instruments and with proper care and maintenance they will provide years of trouble free operation.

All POLYTRON® PT-DA 21../2EC dispersion tools are EasyClean models. They can be autoclaved as a complete assembly and need not to be disassembled. However, if it is necessary to disassemble the aggregate for special cleaning or replacement of the bearings, then follow the disassembly instructions.



5.3.1 Cleaning of POLYTRON®-aggregates

POLYTRON® dispersion aggregates are produced especially for the application in food industry, chemistry, pharmacy, for colours and varnishes etc. and made of resistant material.

All parts which are in contact with the product are generally made of fine steel in the quality of V4A, 316L, 1.4531 or the like. KINEMATICA also supplies aggregates of high-alloyed material, e.g. titanium, Hastelloy etc.

Both parts of the double bearing consist of PTFE resp. RULON, besides, it does without a shaft seal. For cleaning and sterilisation we suggest to take those aggregates off.

5.3.2 Corrosion

Unfortunately, stainless fine steel (1.4435, 1.4571, 316L) does not mean that the material is corrosion proof. Certain chemicals can seriously attack this material.

For further relevant information please check with steel keys or contact KINEMATICA AG.



- All corrosive agents should be only for a very short time in contact with the fine steel. Make sure they do not dry out on the metal.
- Make sure that the dispersion aggregates are always properly cleaned after every use. Neutralise lye solutions and acids.
- Always clean your POLYTRON®-aggregate immediately after every use. Only well maintained and cleaned instruments guarantee a trouble-free service
- Protect the ball bearing in the coupling flange and all coupling parts from contact with aggressive agents



5.3.3 *Cleaning without disassembly*

The easiest way of cleaning is by running the aggregate in an adequate solvent, water or a rinsing solution, using a suitable vessel or under a stream.

Likewise, cleaning in an ultrasonic bath is often used and very effective. KINEMATICA offers special POLYMIX[®]-ultrasonic baths, which are designed to clean four aggregates at the same time. Please ask for the respective brochures.

5.3.4 *Sterilisation without disassembly*

- Wet-sterilisation

All POLYTRON[®] aggregates can be sterilised by running them in the corresponding medium.

- Autoclaving

Autoclaving can be effected in assembled state, too.

5.3.5 *Cleaning and sterilisation with disassembly*

EasyClean-Aggregates are specially designed for this method.

This is easiest done with the POLYTRON[®] EC aggregates. Disassembly is possible with a few manipulations; all parts can be cleaned resp. sterilised in the ultrasonic cleaning baths, autoclaves etc.



5.4 Disassembly Instructions

The only parts of the aggregate which have to be replaced from time to time are the bearings. The need to replace the bearings can be easily checked by the following procedure. Turn the aggregate upside down so the rotor/stator part faces up. If the inner part of the aggregate, the rotor shaft with the rotor, falls out of the outer shaft tube with stator, the bearings have to be replaced.



- If the above happens, replace the bearings at once.
Do not use the aggregate until new bearings are installed.



| PT-DA 2105/2EC | PT-DA 2107/2EC | PT-DA 2112/2EC | PT-DA 2120/2EC |
|--|--|--|--|
| | | | |
| Use the supplied universal tool (9751297) to carefully press rotor (1) and rotor-shaft (5) toward coupling | Use the supplied universal tool (9751297) to carefully press rotor (1) and rotor-shaft (5) toward coupling | Use the supplied universal tool (9751297), insert it in the lower end of the aggregate, loosen the rotor (1) counterclockwise and take it off. | Use the supplied universal tool (9751297), insert it in the lower end of the aggregate, loosen the rotor (1) counterclockwise and take it off. |
| | | Possibly you have to lock the rotor-shaft (5) with the recommended universal shaft-clamp (9135031) | |
| | | Push the rotor-shaft (5) backwards out of the shaft tube | |
| The upper bearing (3) can be pulled out of the shaft with the same tool towards coupling | The upper bearing (3) is loose on the shaft (5) | The upper bearing (3) is disassemble with the rotor-shaft (5) and cannot be separated | |
| The lower bearing (4) is slotted, can be opened and pulled over the shaft. | | The lower bearing (4) can be pulled out of the shaft with the same tool towards the generator | The lower bearing (4) can be pulled out of with the shaft tool towards coupling |
| Important | | | |
| Always replace both the lower and the upper bearings at the same time | | | |



5.5 Assembly Instructions

| PT-DA 05/2EC-D066 | PT-DA 07/2EC-D100 | PT-DA 12/2EC-D148 | PT-DA 20/2EC-D178 |
|---|---|---|---|
| Use original spare parts only | | | |
| Important Always replace both the lower and the upper bearings at the same time | | | The upper bearing (3) is not to be replaced |
| Place the upper bearing (3) in the shaft tube (2) | Place the upper bearing (3) into the shaft. | | |
| The lower bearing (4) is slotted, can be opened and pulled over the shaft (5) | | Push the lower bearing (4) from the generator end into the shaft tube (2). | Place the lower bearing (4) into the shaft (5). |
| Carefully push the shaft (5) with lower bearing and rotor through the shaft tube until ist final position | Carefully push the shaft (5) with both bearings and rotor through the shaft tube until ist final position | Carefully push the shaft (5) with upper bearing through the shaft tube until ist final position | Carefully push the shaft (5) with both bearings through the shaft tube until ist final position |
| | | Install the rotor with the supplied tool – clockwise. Tighten them only by hand, do not use any additional tool | |

6 General Accessory

In the actual price list you will find a complete overview on available accessories and tools.

Specially recommended are the clover-leaf shaped homogenizing vessels – an exclusivity of KINEMATICA. Thanks to their extraordinary flow geometric they help saving time and can further improve the efficiency.



6.1 Stands

The POLYTRON® PT 2100 is normally supplied with a stand as per our choice. It is important that the instrument is safely fixed to an adequate stand as its centre of gravity is relatively high.



- Please make sure that stable and safe stands and fixations are used only
- Make sure that the slider of the motor drive is fixed safely and cannot move downwards. Insufficient fixation may cause damage of the instrument and injure the user, the sample, the bench or other instruments
- Fix the safety positioning ring (Option) prior to use in order to avoid moving of the motor-drive

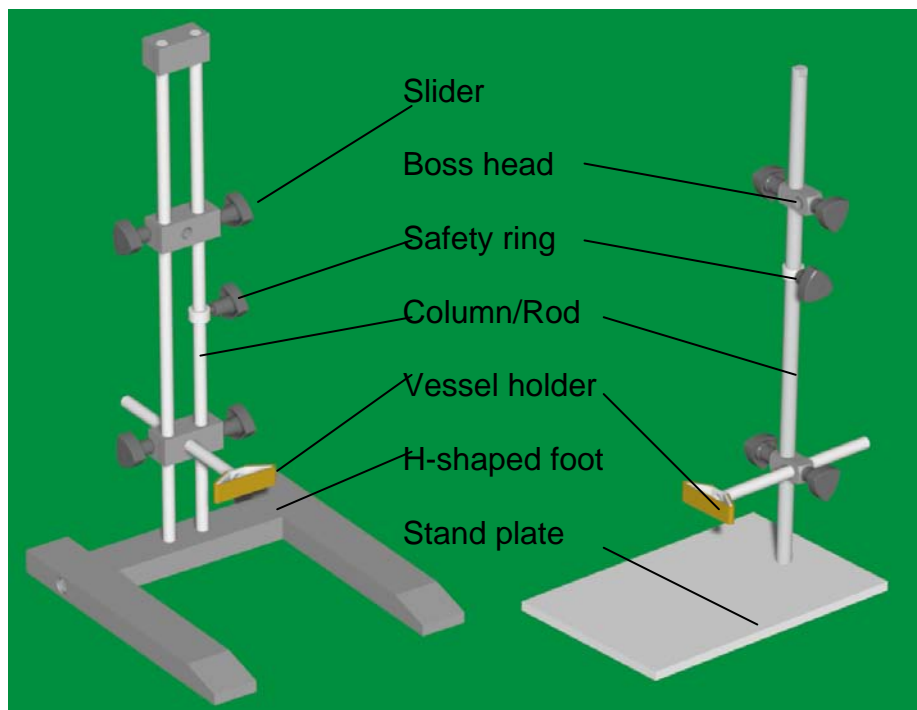
6.2 Assembly of stands

See enclosed assembly instruction.



6.3 Accessories to stands

| Order. Nr. | Type | Description |
|------------|-------------------|--|
| 11040015 | ST-P11/600 | Plate stand (one rod design) |
| 11040020 | ST-F20/600 | H-shape feet stand |
| 11040051 | ST-P20/600 | Plate stand (two rod design) |
| Options: | | |
| 11045010 | | Vessel holder with boss head for ST-P11/600 |
| 11045011 | | Vessel holder with boss head for ST-F20/600 / ST-P20/600 |
| 11045030 | | Safety positioning ring for ST-P11/600 |
| 11045031 | | Safety positioning ring for ST-F20/600 / ST-P20/600 |





7 Warranty

This KINEMATICA AG instrument is warranted to be free from defects in material and workmanship for a period of 12 months from the date of delivery.

KINEMATICA AG will repair or replace free of charge the defect parts which were found defective upon receipt if an inspection finds that the defect is due to materials or workmanship.

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 of KINEMATICA AG or its designated representative nor to any instrument 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 AG reserves the right to change, alter, modify or improve any of its instruments without obligation to make corresponding changes to any instrument previously sold.

In case of technical problems, in need of spare parts or advice please contact our regional appointed agent or directly ourselves at:

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