

General Catalog

2011



Time to focus
on **research**

Dear customers,

Working in the field of laboratory equipment is a great pleasure. Certain research areas such as bio-chemistry and molecular biology are witnessing a downright surge in knowledge. Other fields like pharmacology have increased in significance and are now academic subjects.

Regardless of the field you work in, we are all striving for the same goal: to alleviate and fight diseases, to generate healthier food and to develop new innovative materials... in short: to enhance people's health and living conditions. **You do the research and we provide you with the necessary support.**

Heidolph Instruments is issuing a complete catalog to inform you at a glance about everything we can offer to you. Not only are our products presented in this catalog but our customer service and innovations are introduced to you in a clearly laid out fashion as well.

We are looking forward to an intensive cooperation with you during which we are going to support you actively and individually. This is what we mean by **"Research made easy"** – to help you concentrate on your research, with your findings, your company and millions of people worldwide in mind.

Kind regards



Wolfgang Jaenicke
Managing Director



Kevan White
Sales & Marketing Director

About us

As an innovative and globally active company, we are a leading manufacturer of laboratory equipment. With a local footprint in more than 100 countries, we support pharmaceutical research, the cosmetics industry, the biology as well as the chemistry sector with our products and services, significantly contributing to the improvement in the quality of people's lives all over the world.

Our organization is headquartered in Schwabach, a city within close proximity to Nuremberg, Germany. It is here that the development and production of our equipment, as well as the coordination of our domestic and international sales, marketing and customer support activities take place.

Respect for the personal and professional development of our employees has created a strong commitment to success, resulting in a dynamic period of growth and prosperity for the Heidolph organization. As a result, the Heidolph team is continuously striving to achieve industry-leading product quality and customer service while maintaining a strong customer-focused approach to developing products and services that help to improve the efficiency of scientific research.

Research made easy.

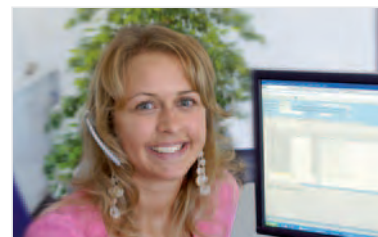


While you concentrate on research, we'll look after your support needs

As we want you to have more time to thoroughly concentrate on your research, the whole Heidolph team enthusiastically provides you with extensive support and helps to reduce your workload.

Our Service Commitment:

- 24 hour service for all inquiries
- Lead times below 10 days for standard equipment
- After sales service provided by your local dealer
- On-time delivery for 98% of all shipments
- Repair time turn-around within 4 working days
- Installation and training onsite
- No obligation evaluation units
- Application support by Chemists
- More than 80 distributors worldwide



Our Quality Commitment:

- Individual quality control for every unit
- Increased lifespan of 10 years on average
- 3 year warranty
- Long-lasting service life of all products due to corrosion-resistant electronics and maintenance-free motors
- Low product failure rates below 1%



Summary

Heidolph Product Range

Rotary Evaporators - Intelligent Evaporation	7
Large Scale Rotary Evaporators - Intelligent Evaporation	35
Parallel Synthesizers - Time-saving Synthesizing	53
Magnetic Stirrers - Safe Heating and Mixing	73
Overhead Stirrers - Powerful Stirring	91
Shakers & Mixers - Temperature Controlled Shaking	109
Peristaltic Pumps - Precise Dosing and Dispensing	131
Homogenizers - Silent Blending	151

**Busy Schedule?
See all
benefits
in 2 minutes!**



Intelligent Evaporation



- Up to 30 % Time Savings
- Industry Leading Safety Features
- Remote Operation Standard

**Reduced Process
Times**

...takes the **thinking** out
of your **work**

Intelligent Evaporation



The average operational **lifespan of 10 years** is backed by a 3 year warranty and makes your purchase a truly worthwhile investment

Operating Panel

Is safety, convenience and flexibility a top priority for you?
The detachable operating panel offers all in one.

Changing all parameters outside the closed fume hood guarantees the highest **safety** level

Immediate access to the panel ensures ultimate control of the process while increasing your ease of use

Hei-GUIDE, the button with a turn and push function navigates you easily through the menu



Standard for all models is a panel with 1.3 m cable connection. Thus **data security** is guaranteed at any time

An optional remote control operating panel allows you to step away from the evaporator and still monitor all process data increasing your **flexibility** at work

Vapor Tube

Is safety, convenience, cost savings and time a top priority for you?

Immediate removal of the vapor tube from the drive facilitates your work



The vapor tube removes easily from the drive and is designed for **years of service life**.

Years of performance life **reduces** your **spare parts budget** up to 75 %

Highest safety: The Hei-VAP vapor tube does not get stuck in the drive eliminating broken glass

Your advantages - our Hei-lights

For your safety

- Two independent safety circuits **avoid an overheat situation** of your heating bath: If bath temperature overshoots by 5 °C and if your water bath runs dry heating will be switched off automatically
- To avoid an over temperature situation and potential thermal damage to your sample, you can pre-program on the Precision model a max. temperature individually **at which the bath shuts off**
- In case of a power-cut, all motor lift models will remove the flask from the heating bath **preventing safety hazards** and potential thermal damage to your sample
- **To protect you from splashes and scalding**, the Hei-VAP heating bath features a pour spout to remove bath fluid safely
- Heating bath is constructed with a **double wall** for your protection against burns and scalding
- The guard hood **covers the entire bath completely** even if the heating bath is adjusted horizontally to its most extreme limit
- A **metal support** between the heating bath and the base unit **prevents bath instability**
- To **prevent short-circuits and systematic corrosion** from your heating bath, the electrical cable coupling complies with the high protection class IP 67
- For your protection the operating panel is located near the base and **keeps your hands out of the dangerous zone** of rotating flasks, steam and splashing bath fluids
- All heating baths feature **non-slip handles** with safety grip to protect you from scalding bath liquids and allow for easy installation/removal of the bath
- A separate on/off switch for heating **prevents unintentional heat up**. The button is illuminated for visual control
- In case of an overshoot of any parameter setting, all models will show **a warning on the operating panel**
- Glassware assemblies are optionally available with **transparent plastic safety coating** ensuring ultimate protection while allowing visual control at all times



For your ease of use

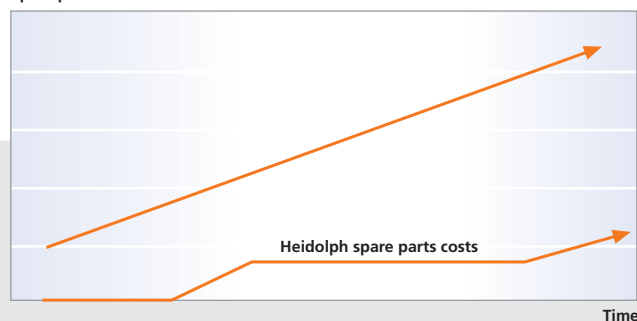
- The detachable operating panel can be attached via Velcro or with a special suspension at eye level for your convenience **outside of closed fume hoods**
- The evaporating flask **clamp can not be lost** due to a connection to the vapor tube coupling ring
- A flask ejector feature of the vapor tube coupling ring allows you to **remove sticking evaporating flasks** from the vapor tube just in seconds in a safe manner
- The universal heating bath can be adjusted horizontally up to 200 mm and offers efficient space to **accommodate even 5 liter flasks**
- For your convenience the **height of 160 mm** and the **angle of the evaporating flask** can be **adjusted easily from 20° to 80°**



Reduce your cost of ownership

- **Reduce your process times** depending on your model and periphery up to 30 %
- The chemically resistant vacuum seal **reduces your spare parts budget** up to 75 % with prolonged operational lifespan
- **Savings** at the same high level are possible due to the long service life vapor tube
- Increase your range of applications by using 5 liter flasks in the universal bath **at no added costs**
- A new coating formula **prevents corrosion** effectively

Spare parts costs



- The flange on the condenser side of the drive is made of PPS (Poly Phenylene Sulfide), a robust industrial designer resin with **superior chemical resistance**, and thus provides more chemical resistance than stainless steel or milled aluminum. That reduces corrosion to a minimum which results in additional savings on maintenance and replacement components associated with corrosion effects of moisture condensation from condenser coupled with common corrosive reagents used in daily laboratory activities
- Only Hei-VAP heating baths **reach a temperature of 210 °C** which is 30 °C higher than other evaporators on the market and allow for a broader range of applications which previously could not be performed on any rotary evaporator (for example bitumen distillation). Thus increasing the range of applications eliminates the need for investments in other equipment
- Reduce your maintenance costs. The sealed housing protects your rotary evaporator from aggressive fumes, liquids and vapors to prevent internal corrosion. This results in an **increased lifespan of 10 years** on average at a reduced maintenance and repair cost

Hei-VAP Value

Affordable model with hand lift for all standard applications

Includes all standard Hei-VAP features for safety, ease of use and reduced cost of ownership plus

- The convenience of large dial controls for adjustment of rotation speed and bath temperature
- For limited budgets we recommend the optional Manual vacuum controller
- For precise vacuum control and reproducible results we recommend the optional digital vacuum controller
- Hei-VAP Value models have no digital display



Models	Glassware	Hand lift (HL)	
		standard	coated
Hei-VAP Value	G1 Diagonal	560-01100-00	560-01110-00
Hei-VAP Value	G3 Vertical	560-01300-00	560-01310-00
Hei-VAP Value	G5 Dry Ice Condenser	560-01500-00	560-01510-00
Hei-VAP Value	G6 Vertical for Reflux	560-01600-00	560-01610-00

Hei-VAP Advantage

For your routine distillation applications and reproducible results

Includes all standard Hei-VAP features for safety, ease of use and reduced cost of ownership plus

- Available in hand lift or motor lift configurations
- Experience the advantages of our large digital 3.5" LCD display which indicates rotation speed, heating bath and vapor temperature
- We recommend the optional Manual vacuum controller
- Experience the advantages of the automatic process timer which turns off your evaporator at a pre-programmed time and removes evaporating flasks from bath on motor lift models
- Upgrade your Hei-VAP Advantage to a Hei-VAP Precision:

Upgrade-KIT Advantage Precision-HL

P/N 569-30009-00

Upgrade-KIT Advantage Precision-ML

P/N 569-40009-00

Large, digital LCD display which allows you to monitor all parameters even from a distance

Convenient motor lift adjusts height by the press of a button

Hei-VAP Advantage ML/G3
P/N 562-01300-00

Hei-GUIDE control knob to navigate the menu and confirm parameters



Hei-VAP Value and Advantage

Models	Glassware	Hand lift (HL)		Motor lift (ML)	
		standard	coated	standard	coated
Hei-VAP Advantage	G1 Diagonal	561-01100-00	561-01110-00	562-01100-00	562-01110-00
Hei-VAP Advantage	G3 Vertical	561-01300-00	561-01310-00	562-01300-00	562-01310-00
Hei-VAP Advantage	G5 Dry Ice Condenser	561-01500-00	561-01510-00	562-01500-00	562-01510-00
Hei-VAP Advantage	G6 Vertical for Reflux	561-01600-00	561-01610-00	562-01600-00	562-01610-00

Hei-VAP Precision

Most demanding applications and the finest integrated vacuum control capabilities

Includes all standard Hei-VAP features for safety, ease of use and reduced cost of ownership plus

- Available in hand lift or motor lift configurations
- Experience the advantages of our large 4.3" color graphic display which features all parameters, integrated vacuum controller and includes programs for automated distillations
- Make your life easier by utilizing the integrated software support which leads you through the capabilities of the evaporator
- For data management Hei-VAP Precision models feature a USB interface
- Save time by configuring the unit - all connected components and periphery devices will be recognized by the evaporator which eliminates the need to configure the unit manually
- Now you can manage even the most demanding applications easily and prevent foaming, excessive bubbling or bumping
- Save time with your individualized pre-programmed parameter settings for your 30 most common applications used on a daily basis by saving them as a ramp in "Favorites" section. Each ramp offers 20 separate steps for demanding applications
- Apply an individual name for those ramps to avoid a mix-up
- Experience the advantages of the automatic process timer which turns off your evaporator at a pre-programmed time by raising the flask on motor lift models and releasing vacuum
- Control your process individually by pre-programming vacuum gradients
- Hei-VAP Precision models feature a built-in vacuum controller as a standard

Large color graphic display for all parameters and automated programs

Save your common applications under an individual name

Even from a distance you will be able to monitor the numbers on the display easily

For increased safety, all bath temperature adjustments can be limited

Hei-VAP Precision ML/G3
P/N 564-01300-00



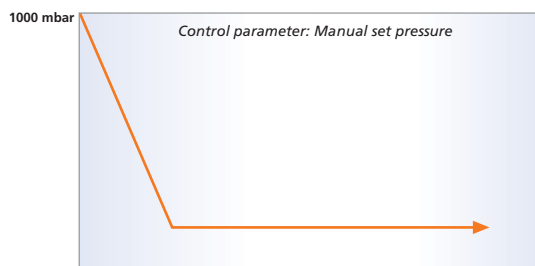
Programs facilitate process control

Reduce your process times significantly by using these three programs for automated distillation

SET_{pressure}

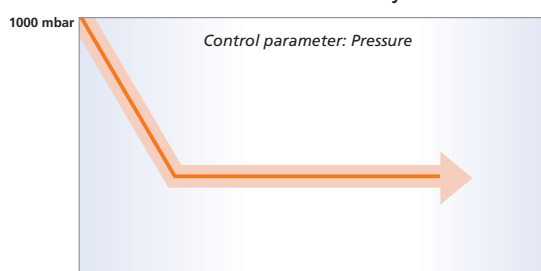
Program for solvent separations. This program holds a pre-set vacuum constant. During the evacuation you have the full flexibility to choose any other level of vacuum by the press of a button

Program: SET_{pressure}



Manually adjusted set vacuum

Program: AUTO_{easy}



Finds boiling point automatically and holds vacuum constant

AUTO_{easy}

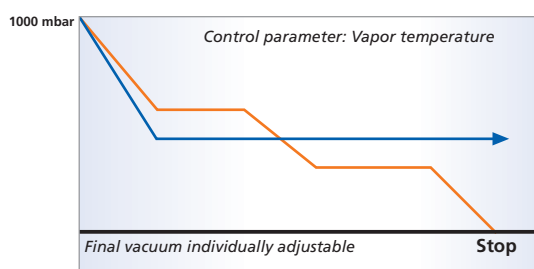
Supports the automatic pressure control for solvent separations. The pressure level for the first boiling point is found automatically. This program can be used with all Heidolph glassware assemblies and does not require any accessories

AUTO_{accurate}

Supports very precise automatic pressure control for solvent separations. This program works similar to AUTO_{easy} but in addition is able to identify multiple boiling points automatically by reducing vacuum accordingly. Also the AUTO_{accurate} program delivers the finest and most precise vacuum control. To take advantage of this program the optional AUTO_{accurate}-sensor is required.

Also this program can not be used on Heidolph G1 and G5 glassware assemblies. Leading parameter of this program is the vapor temperature (AUTO_{accurate} is a combination of the previous programs T_{auto} and P_{auto})

Program: AUTO_{accurate}



Final vacuum individually adjustable

Finds multiple boiling points automatically

➔ Reduce your process times via automated distillation programs

Models	Glassware	Hand lift (HL)		Motor lift (ML)	
		standard	coated	standard	coated
Hei-VAP Precision	G1 Diagonal	563-01100-00	563-01110-00	564-01100-00	564-01110-00
Hei-VAP Precision	G3 Vertical	563-01300-00	563-01310-00	564-01300-00	564-01310-00
Hei-VAP Precision	G5 Dry Ice Condenser	563-01500-00	563-01510-00	564-01500-00	564-01510-00
Hei-VAP Precision	G6 Vertical for Reflux	563-01600-00	563-01610-00	564-01600-00	564-01610-00

The Modular Concept

The Modular Concept consists of rotary evaporator, vacuum pump, controller and chiller

- All components are technically designed to function together perfectly

- Self contained system eliminates the need for water, dry ice and vacuum source

- For higher requirements, you can upgrade your Hei-VAP model at any time

- Heidolph offers you a complete system available from one manufacturer

- Use your space in your lab efficiently: The Modular Concept has a footprint of 470 x 580 mm only



Reduce your process times up to 30 %

Most precise vacuum due to fully automatic speed control

The integrated vacuum controller exactly controls pressure by the specific boiling point → no hysteresis

The evaporating process is increased significantly

The solvent recovery rate is close to 100 %

High efficiency as the time saving will cut down process times and hence cost

Reduced process times lead to sustainable economic benefits and measurable increased efficiency

Valve regulated

= intermittent evaporation

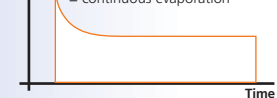


recovery rate



Fully automatic control with speed adjustment

= continuous evaporation



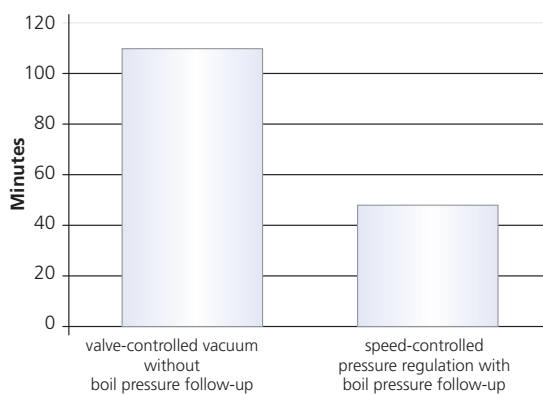
recovery rate



- 30 % reduced process times
- Cost reduction
- Simple ease of use

Time to evaporate

400 grams of ethanol

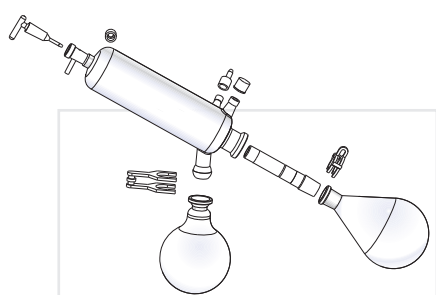


The figures prove significant time saving: When using a speed-controlled system with boil pressure follow-up in comparison with a conventional "open/close" valve control system. Used configuration: Hei-VAP Precision with program AUTO_{accurate}

Glassware - Hei-VAP Series

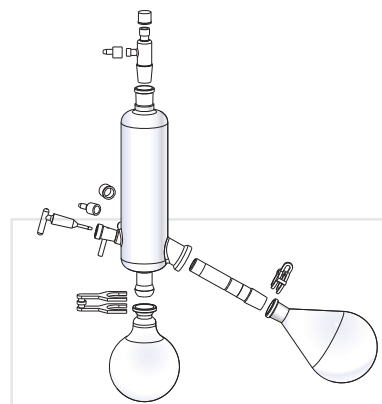
- Glassware set includes one 1,000 ml evaporating flask and one 1,000 ml receiving flask
- All glassware sets are also available with transparent plastic coating (Surlyn® coated) for added safety. Except for glassware set G5 which is Halar coated
- Evaporating flasks and vapor tubes which come with a standard NS 29/32 joint size are also available with NS 24/29 ground joints (available upon request)

- Also available upon request, glassware sets for Soxhlet extraction and descending condenser system
- All glassware sets feature GL 10 thread; the inlet tube can be connected with a threaded fitting
- Glassware G3 and G6 allow for the automated distillation program AUTO_{accurate} on Hei-VAP Precision models



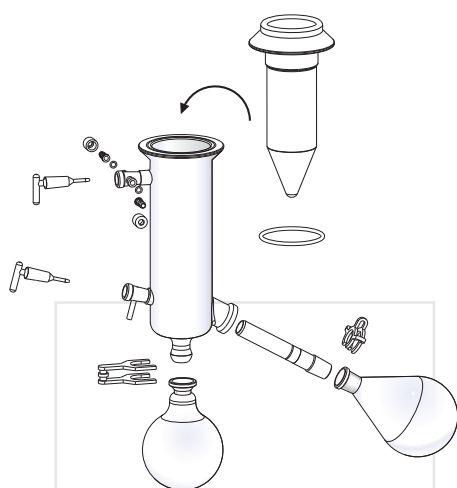
Glassware set G1

- Diagonal condenser for all standard distillations; the option with the **most affordable price**



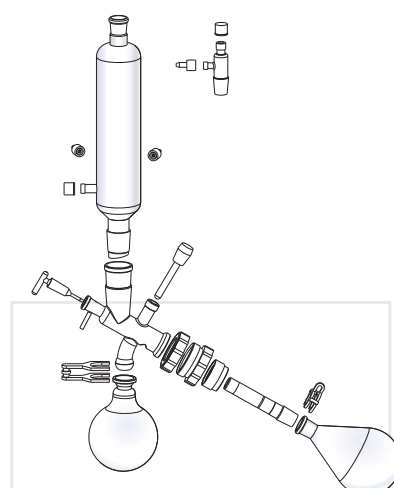
Glassware set G3

- Vertical condenser for all standard distillations; the option with the **smallest space requirement**



Glassware set G5

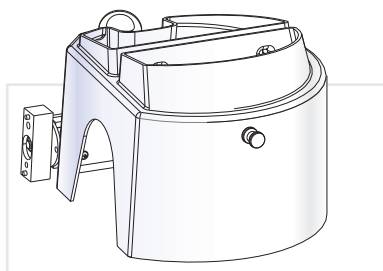
- **Dry Ice** Condenser for low-boiling solvents



Glassware set G6

- Vertical condenser; centerpiece with valve **for reflux distillation**

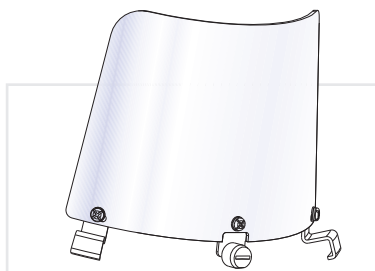
Accessories - Hei-VAP Series



Guard hood

Strong and super-transparent guard hood to protect you from implosions. Excellent visibility to flask. Provides easy and immediate access to flask and bath

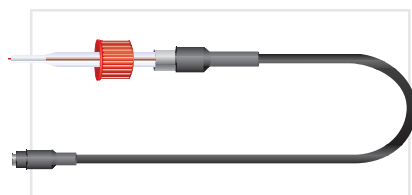
P/N 569-00010-00



Guard shield

Strong and super-transparent guard shield for your protection while changing flasks. Attached at the edge of the bath

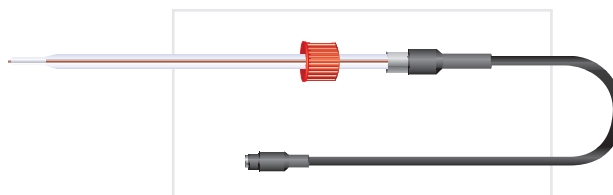
P/N 569-00020-00



Vapor temperature sensor

For Hei-VAP Advantage and Hei-VAP Precision models

P/N 569-00030-00



AUTO_{accurate}-sensor

For Hei-VAP Precision models, only in combination with glassware set G3 and G6

P/N 569-00040-00



Spare PTFE vacuum seal

P/N 23-30-01-01-30



Tube set

6,25 meters vacuum tubing and
6,25 meters water tubing

P/N 591-35000-00



Heating bath liquid (5 L)

Heating bath liquid for temperatures up to 240 °C, mixes with water

P/N 515-31000-00



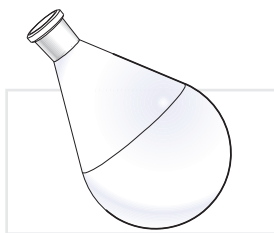
Spare clamping sleeve

P/N 23-30-01-05-31

Spare vapor tube NS 29/32

P/N 514-00000-01

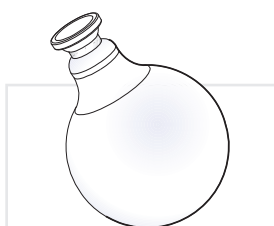
Accessories - Hei-VAP Series



Evaporating flasks

	NS 29/32	NS 24/29
Evaporating flask* 50 ml	514-70000-00	514-70000-01
Evaporating flask 100 ml	514-71000-00	514-71000-01
Evaporating flask 250 ml	514-72000-00	514-72000-01
Evaporating flask 500 ml	514-73000-00	514-73000-01
Evaporating flask 1,000 ml	514-74000-00	514-74000-01
Evaporating flask 2,000 ml	514-75000-00	514-75000-01
Evaporating flask 3,000 ml	514-76300-00	514-76300-01
Evaporating flask 5,000 ml	514-78000-00	514-78000-03

* Evaporating flask NS 14,5 incl. adapter (NS 29 or NS 24)



Receiving flasks

	standard	coated
Receiving flask - S 35/20 100 ml	514-81000-00	514-81000-02
Receiving flask - S 35/20 250 ml	514-82000-00	514-82000-02
Receiving flask - S 35/20 500 ml	514-83000-00	514-83000-02
Receiving flask - S 35/20 1,000 ml	514-84000-00	514-84000-02
Receiving flask - S 35/20 2,000 ml	514-85000-00	514-85000-02
Receiving flask - S 35/20 3,000 ml	514-87000-00	514-87000-02



Powder flasks

	NS 29/32	NS 24/29
Powder flask 500 ml	514-73200-00	514-73200-01
Powder flask 1,000 ml	514-74200-00	514-74200-01
Powder flask 2,000 ml	514-75300-00	514-75300-01



	NS 29/32	NS 24/29
Spider with 6 distillation sleeves NS 14.5 20 ml	15-300-005-09	15-300-005-12
Spider with 12 distillation sleeves NS 14.5 20 ml	15-300-005-10	15-300-005-13
Spider with 20 distillation sleeves NS 14.5 20 ml	15-300-005-11	15-300-005-06



	NS 29/32	NS 24/29
Spider with 5 flasks NS 24 50 ml	15-300-005-04	15-300-005-08
Spider with 5 flasks NS 24 100 ml	15-300-005-07	15-300-005-05



	NS 29/32	NS 24/29
Evaporating cylinder 500 ml	514-00070-00	514-00070-01
Evaporating cylinder 1,500 ml	514-00071-00	514-00071-00



	NS 29/32	NS 24/29
Foam brake with flask clamp	514-00004-00	514-00005-00

Vacuum Accessories - Hei-VAP Series

Switchbox

Connect up to 3 rotary evaporators to one pump and control vacuum individually

- Pump switches off automatically at required vacuum
- Reduces energy consumption of pump
- Increases performance life of the pump due to a complete switch-off if vacuum is reached
- Vacuum valve and non-return valve are required for every evaporator if you work with different pressures at the same time
- Delivery includes 3 non-return valves
- Weight: 0.6 kg
- Dimensions: 80 x 160 x 45 (l x w x h / mm)
- Designed for all Hei-VAP models with valve-regulated vacuum pumps



Switchbox
P/N 569-00400-00

Manual vacuum controller

For Hei-VAP Value and Hei-VAP Advantage models

- Control your house vacuum or any other vacuum source
- Pressure range from 0 to 1,020 mbar
- Scaling on display in steps of 50 mbar
- Adapter for the tube with 8 mm inner diameter
- Support rod included
- Attaches safely to evaporator
- Dimensions: 80 x 80 x 150 (l x w x h / mm)
- A vacuum valve is not required



Manual vacuum controller
P/N 591-26000-00

Vacuum valve

Required to control vacuum for Hei-VAP models with valve regulated pumps

- External attachment design for easy cleaning
- Can be combined with the Woulff Bottle to one unit
- Not required if you utilize a manual vacuum controller

Woulff Bottle (optional)

- Additional recovery of solvent to protect vacuum valve and vacuum pump
- Direct connection to the vacuum valve
- Features connection to vacuum controller
- Volume of 250 ml



Vacuum valve
P/N 569-00060-00

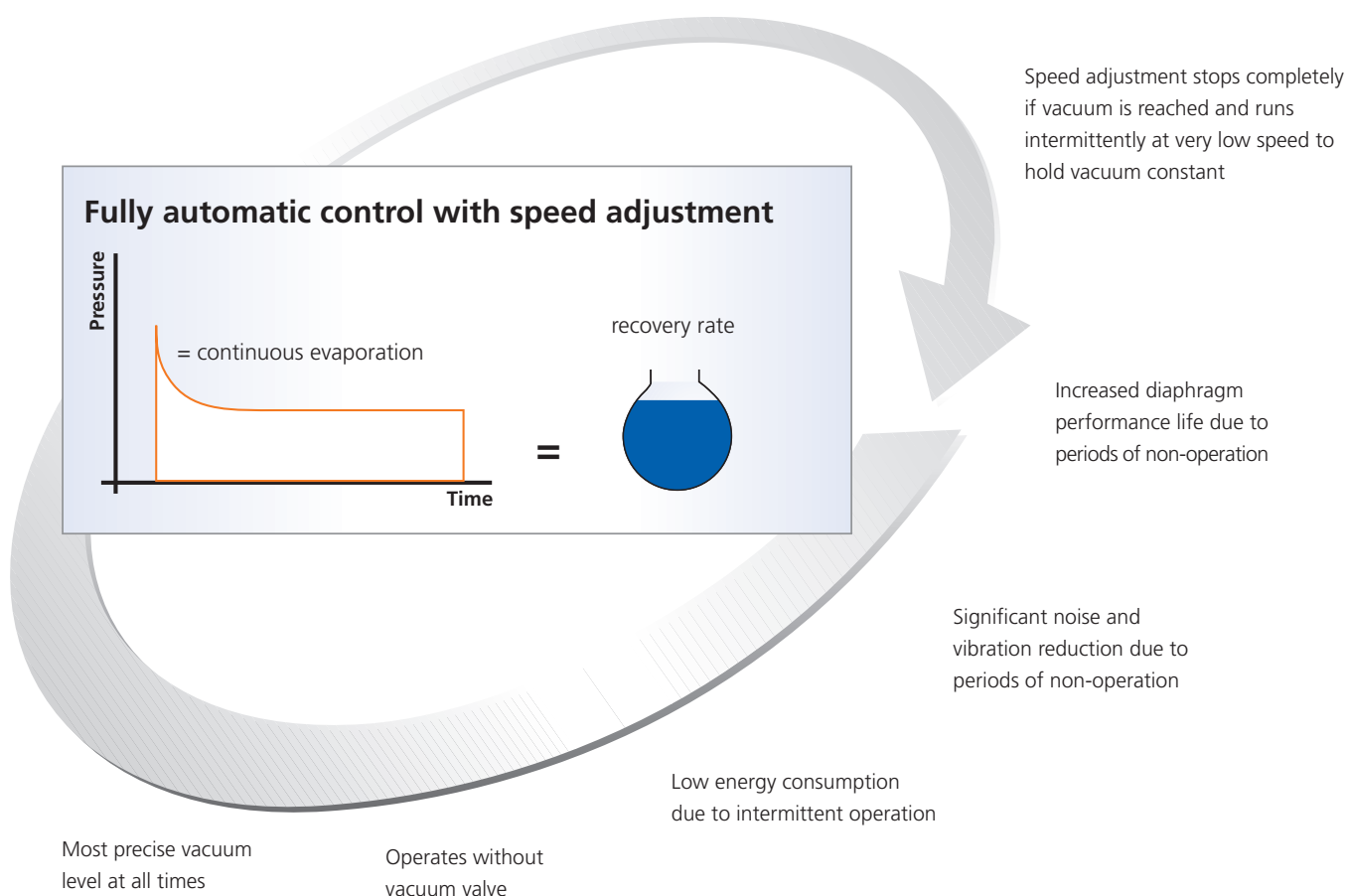
Woulff Bottle
P/N 569-00070-00

RPM Regulated Vacuum System

Designed for the Hei-VAP Precision models

RPM regulated pumps adjust their speed individually and come to a complete stop after required vacuum level is reached

Your advantages



- ➔ Highest distillation rates possible while reducing process time by 30 %
- ➔ Stable distillation conditions accounts for solvent recovery up to 100 %
- ➔ Significant time and energy savings

RPM Regulated Vacuum Pumps

Adjustable speed of the pump produces the most precise vacuum control

Rotavac Vario Control

- Three-stage diaphragm pump is made from chemically resistant material
- High suction capacity of 1.7 m³/h for fastest evacuation
- This pump achieves an ultimate vacuum of 2 mbar
- Can be combined with a condenser
- Power input: 160 W, Weight: 5.4 kg
- Dimensions: 167 x 236 x 196 (l x w x h / mm)



Rotavac Vario Control

P/N 591-00141-00

Condenser

(not shown)

P/N 591-00084-00

Rotavac Vario Tec

- Two-stage diaphragm pump is made from chemically resistant material
- Suction capacity of 1.0 m³/h
- Achieves an ultimate vacuum of 12 mbar
- Can be combined with a condenser
- Power input: 160 W, Weight: 4.3 kg
- Dimensions: 156 x 236 x 196 (l x w x h / mm)



Rotavac Vario Tec

P/N 591-00171-00

Condenser

P/N 591-00084-00

Pumping Unit Rotavac Vario

Fully controllable stand-alone pumping unit includes vacuum controller – all purpose

- Three-stage diaphragm pump is made from chemically resistant material
- High suction capacity of 1.7 m³/h for fastest evacuation
- Achieves an ultimate vacuum of 5 mbar
- Can be combined with a condenser
- Power input: 160 W, Weight: 6.0 kg
- Dimensions: 263 x 193 x 299 (l x w x h / mm)



Pumping Unit Rotavac Vario

P/N 591-00142-00

Condenser

P/N 591-00084-00

Valve Regulated Vacuum Pumps

Designed for all Hei-VAP models

Rotavac Valve Control

- Two-stage diaphragm pump made from chemically resistant material
- High suction capacity of 1.7 m³/h for fastest evacuation
- Suction capacity for up to 3 rotary evaporators at the same time
- Achieves an ultimate vacuum of 9 mbar
- Can be combined with a condenser
- Power input: 180 W, Weight: 10.5 kg
- Dimensions: 185 x 245 x 295 (l x w x h / mm)



Rotavac Valve Control
P/N 591-00130-00
Condenser
P/N 591-00081-00

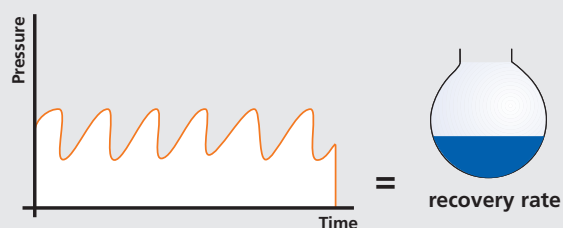
Rotavac Valve Tec

- Two-stage diaphragm pump made from chemically resistant material
- Suction capacity of 0.75 m³/h
- Achieves an ultimate vacuum of 12 mbar
- Can be combined with a condenser
- Power input: 80 W, Weight: 6 kg
- Dimensions: 145 x 315 x 169 (l x w x h / mm)



Rotavac Valve Tec
P/N 591-00160-00
Condenser
(not shown)
P/N 591-00083-00

Valve regulated vacuum pump



Equipment Combinations

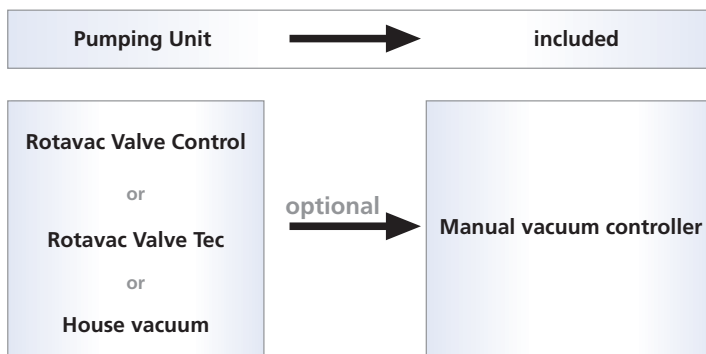
Hei-VAP models

Vacuum source

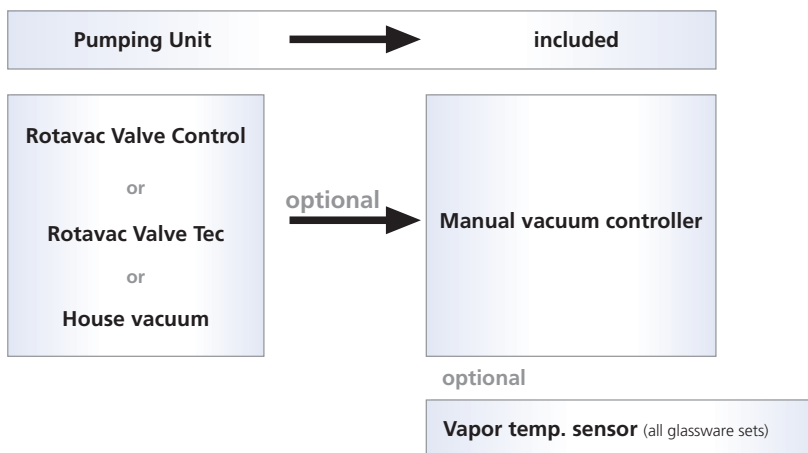
Vacuum control



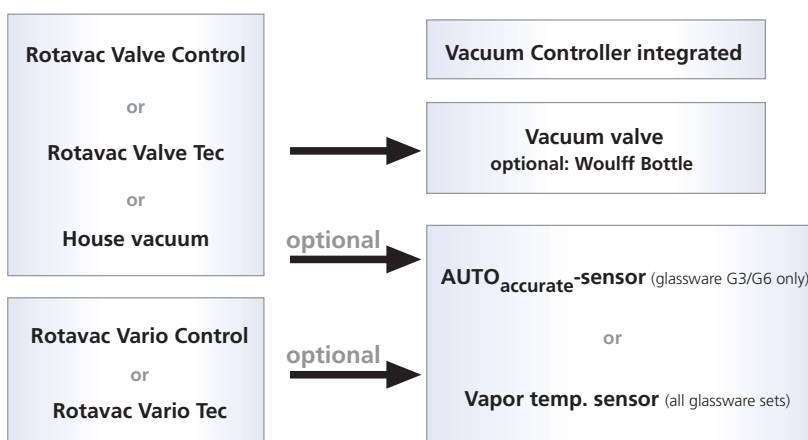
Hei-VAP Value



Hei-VAP Advantage



Hei-VAP Precision



Rotavac Valve Control
with condenser



Rotavac Valve Tec



Rotavac Vario
Control



Rotavac Vario Tec
with condenser



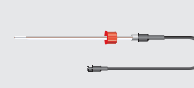
Pumping Unit
Rotavac Vario



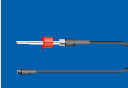
Manual vacuum
controller



Vacuum valve
with Wouff Bottle



AUTOaccurate-sensor



Vapor temp. sensor

Chillers

Rotacool

High cooling capacity - minimal bench space

- The only chiller designed specifically for rotary evaporators
- Minimal bench space due to unique "L" shape design
- Long-lasting service life
- Footprint of chiller: 470 x 580 x 443 mm
- Provides space of 470 x 405 mm for evaporator
- Temperature range: -10 °C to +40 °C
- Small quantity of circulating coolant required due to innovative technology
- Precise temperature control of ± 0.5 °C
- Display for setting temperature and reading out actual temperature

Rotacool
P/N 591-00200-00



Rotacool Mini

Ideal for routine applications

- Chiller for all bench top evaporators
- Small footprint of chiller: 225 x 450 x 400 mm
- Cooling temperature: 7 °C (not adjustable)
- Cooling capacity at 7 °C: 370 W
- No digital display

Rotacool Mini
P/N 591-00210-00



RotaChill

The affordable model

- Temperature range: -20 °C to +100 °C
- Temperature control: ± 0.2 °C
- Footprint of chiller: 210 x 450 x 570 mm
- No digital display

RotaChill
P/N 591-00220-00



		Rotacool	Rotacool Mini	RotaChill
Temperature range	[°C]	-10 to +40	7 (constant)	0 to +100
Coolant volume	[L]	1.5	3.0	6.0
Cooling capacity* at: +20 °C	[W]	420	370	200
0 °C		350		140
- 10 °C		220		100

* at 20 °C ambient temperature

Summary of all Hei-VAP models



- Affordable model with hand lift for all standard applications

Hei-VAP Value with manual vacuum controller



- For your routine distillation applications and reproducible results



Hei-VAP Advantage with Rotavac Valve Control and Rotacool Mini



- For most demanding applications and the finest integrated vacuum control capabilities

Hei-VAP Precision with Rotavac Vario Control and Rotacool

Heidolph Instruments offers you a complete system available from one manufacturer. All components are designed to function together perfectly – that guarantees smooth, safe and efficient operation.

This is what we mean by “Research made easy” – to help you concentrate on research, with your findings, your company and millions of people worldwide in mind.



Call us for a no obligation demo

Complete Packages at a special price

Complete Packages BASIC

Standard equipment for your lab

BASIC 1 T

Hei-VAP Value with a 210 °C heating bath and hand lift
incl. coated glassware set G1B, vacuum pump Rotavac
Valve Tec and tube set
P/N 560-91110-00

BASIC 1

Hei-VAP Value with a 210 °C heating bath and hand lift
incl. coated glassware set G1B, vacuum pump Rotavac
Valve Control and tube set
P/N 560-81110-00

Complete Packages STANDARD

For standard distillations without vacuum control

STANDARD 3 T

Hei-VAP Advantage with a 210 °C heating bath and hand lift
incl. glassware set G1, vapor temperature sensor,
vacuum pump Rotavac Valve Tec and tube set
P/N 561-91100-00

STANDARD 4

Hei-VAP Advantage with a 210 °C heating bath and hand lift
incl. coated glassware set G3B, vapor temperature sensor,
vacuum pump Rotavac Valve Control and tube set
P/N 561-81310-00

Complete Packages SUPERIOR

Automated distillation with Hei-VAP Precision hand lift models and valve regulated vacuum control

SUPERIOR 1 T

Hei-VAP Precision with a 210 °C heating bath incl. coated
glassware G1B, vapor temperature sensor, vacuum valve,
vacuum pump Rotavac Valve Tec with condenser
and tube set
P/N 563-61110-00

SUPERIOR 1

Hei-VAP Precision with a 210 °C heating bath incl. coated
glassware set G3B, AUTOaccurate-sensor, vacuum valve,
vacuum pump Rotavac Valve Control with condenser
and tube set
P/N 563-51310-00

Complete Packages PREMIUM

Automated distillation with Hei-VAP Precision motor lift models and rpm-regulated vacuum control

Rotary evaporator with motor lift, a 210 °C heating bath, glassware set, vacuum pump Rotavac Vario Control
with condenser, AUTOaccurate-sensor and tube set

PREMIUM 7	Hei-VAP Precision with glassware set G3	P/N 564-71300-00
PREMIUM 10	Hei-VAP Precision with coated glassware set G3B	P/N 564-71310-00
PREMIUM 10 cool	Same as PREMIUM 10, but in addition with chiller Rotacool	P/N 564-71318-00
PREMIUM 12	Hei-VAP Precision with coated glassware set G6B	P/N 564-71610-00

Made in Germany

“Made in Germany” is an internationally recognized quality seal for reliability, long performance life and low failure rates of the product. In an era of accelerated economic globalization this is becoming an important competitive factor.

Heidolph Instruments is committed to design and manufacture of premium quality products exclusively in Germany.

For all components Heidolph has defined the highest quality standards: Maintenance-free motors “Made in Germany” eliminate down times, frequent warranty periods and costly repairs – it's for these reasons why we stand behind our products to provide you years of continuous operation.

Our central German based R&D and production facilities allow for responding to customer requests quickly. This accounts for product adjustments and for production and for volume equally. A high level of innovation in combination with short lead times make your Heidolph purchase a truly worthwhile investment, considering average operational lifespan is 10 years!



Intelligent Evaporation



- Up to 30 % Time Savings
- Industry Leading Safety Features
- Remote Operation Standard

Reduced Process Times

Technical Specifications - Rotary Evaporators

Model	Hei-VAP Value (HL)	Hei-VAP Advantage (HL)	Hei-VAP Advantage (ML)	Hei-VAP Precision (HL)	Hei-VAP Precision (ML)
Hand / Motor lift	hand lift	hand lift	motor lift	hand lift	motor lift
Height adjustment speed	manual	manual	30 mm/s	manual	30 mm/s
Height adjustment (mm)	155	155	155	155	155
Rotation speed (rpm)	20 - 280	20 - 280	20 - 280	20 - 280	20 - 280
Rotation speed setting	scale	3.5" LCD display	3.5" LCD display	4.3" LCD color graphic display	4.3" LCD color graphic display
Drive	brushless DC motor with electronic speed control				
Heating capacity (W)	1,300	1,300	1,300	1,300	1,300
Temp. range heating bath (°C)	20 - 210	20 - 210	20 - 210	20 - 210	20 - 210
Temperature accuracy bath (°C)	± 1	± 1	± 1	± 1	± 1
Overheat protection bath (°C)	cut-off at 5 °C over set temperature via separate PT 1000				
Bath temperature setting	scale	3.5" LCD display	3.5" LCD display	4.3" LCD color graphic display	4.3" LCD color graphic display
Heating bath temperature control	electronic/digital	electronic/digital	electronic/digital	electronic/digital	electronic/digital
Secondary overtemp. cut-off (°C)	250	250	250	250	250
Material heating bath	stainless steel AISI 316L	stainless steel AISI 316L	stainless steel AISI 316L	stainless steel AISI 316L	stainless steel AISI 316L
Diameter heating bath (mm)	255	255	255	255	255
Volume heating bath (l)	4.5	4.5	4.5	4.5	4.5
Display vapor temperature required accessories	no	yes vapor temperature sensor	yes vapor temperature sensor	yes vapor temperature sensor	yes vapor temperature sensor
Integrated vacuum controller	no	no	no	yes	yes
Timer	no	yes	yes	yes	yes
Vacuum program Set _{pressure} **	no	no	no	yes	yes
Vacuum program AUTO _{easy} **	no	no	no	yes	yes
Vacuum program AUTO _{accurate} ** requires AUTO _{accurate} -sensor	no	no	no	yes	yes
Remote control function					
- Lift	no	no	yes	no	yes
- Start rotation	yes	yes	yes	yes	yes
- Start vacuum	no	no	no	yes	yes
- Start heating bath	yes	yes	yes	yes	yes
Programmable ramps	no	no	no	yes	yes
Supply power (W)	1,400	1,400	1,400	1,400	1,400
Weight (w/o glass assembly) (kg)	16	16	16	17	17
Size (l x w x h) (mm)	395 x 490 x 430	395 x 490 x 430	395 x 420 x 430	395 x 490 x 430	395 x 420 x 430
Protection class**** (DIN EN 60529)	IP 20	IP 20	IP 20	IP 20	IP 20
Operation conditions (°C)	0 - 40 at 80 % rel. humidity	0 - 40 at 80 % rel. humidity	0 - 40 at 80 % rel. humidity	0 - 40 at 80 % rel. humidity	0 - 40 at 80 % rel. humidity
Rate of evaporation* (L/h)					
- Toluene	8.5	8.5	8.5	8.5	8.5
- Acetone	5.8	5.8	5.8	5.8	5.8
- Ethanol	3.5	3.5	3.5	3.5	3.5
- Water	1.2	1.2	1.2	1.2	1.2
Condensing surface (cm ²)	1,200	1,200	1,200	1,200	1,200
Supply voltage *** (V/Hz)	230 / 50/60 115 / 60	230 / 50/60 115 / 60	230 / 50/60 115 / 60	230 / 50/60 115 / 60	230 / 50/60 115 / 60

* ΔT of 40 °C

** Only in combination with vacuum systems

*** Standard 230 V / 50/60 Hz: Others upon request, please specify for order

**** IP 67 cable connection on heating bath

Certificate

To confirm the ability for
continuous operation

of the Hei-VAP Series Rotary Evaporators

Hei-VAP Series Rotary Evaporators feature over temperature safety circuits according to DIN EN 61010-1:2001 and DIN EN 61010-2-010:2003 and therefore, are designed for **continuous operation**.

This statement is made under the precondition that all units are operated in accordance with the operation manual and in accordance with good practice standards for safety in laboratories, rules for accident preventions, and compliance with directions on hazardous materials.

Schwabach, October 2010



i. V. Achim Melching
Technical Director



i. A. Stefan Richter
Quality Control Director

Innovative Vacuum Regulation for Rotary Evaporators

Different methods of vacuum regulation in rotary evaporators are compared according to their benefit for the user. Essential criteria of such analyses are process time, rate of solvent recovery, ease of handling, and flexibility. Speed controlled diaphragm pumps with automatic regulation feature obvious advantages and an extremely long performance life of wear parts.



Fig. 1: Rotary Evaporator, speed-controlled vacuum pump and recirculating cooler as modular system.

1. Vacuum as a tool in the chemistry laboratory

Over the years, the diaphragm pump has become a standard item in a chemistry laboratory. A variety of applications depend on regulated vacuum pressure. A typical example is the rotary evaporator that uses adequate pressure to get as close as possible to the solvent's boiling point and to evaporate solvents at low temperatures (fig. 1). With pressure being too high, evaporation will take too long and with pressure being too low, substance may start foaming. The question is how to regulate pressure best, either manually or automatically and if automatically, how? The method of regulation is essential for all aspects of performance, economy, and environment.

It is unheard of today to adjust the hot bath temperature by hand. A skilled user with enough time, could readjust the temperature with a rotary knob just as well as an electronic control circuit but these people are rare in the modern labs. Today very few people use a mercury thermometer but an electronic control with at least PID characteristics instead.

With some patience, the manual system will reveal proper results but most of the users do not want to monitor the pressure over hours. For this point we need to imagine that a hand-regulated valve will not adjust pressure but suction power instead. During the evaporation process, temperature and solvent composition change continuously. Hence, boiling pressure drifts and the user must readjust the valve by hand permanently. In today's science with its high cost and little time, such action is not adequate.

As a solution, we need to think about developing automatic vacuum regulators which at least maintain a pressure level once set. This is state-of-the-art today.

A conventional method is flow regulation by a 2-point solenoid valve. The pump runs at full power all the time and as soon as the actual pressure exceeds a selected nominal value (nominal plus hysteresis), the valve opens and the system is evacuated suddenly until nominal pressure drops below the nominal value. Such systems used with appropriate knowledge and care will deliver acceptable results. Simple regulators involve problems with pressure "undershoot" or "flutter" which may cause foaming or boiling over of the solvent. Another problem is that such systems with their typical high hysteresis work above their optimum operating pressure most of the time. Low efficiency goes hand-in-hand with long evaporation times and moreover, most of the usual vacuum regulators do not really work automatically and the user needs to know and select the adequate nominal pressure and hysteresis. Unfortunately, such values are different for every solvent mix and temperature.

With evaporation having started, temperature in the evaporating flask is determined by heating power of the hot bath and evaporation heat of the solvent and hence, the quantity of the solvent. Some manufacturers try to compensate for this fact with pressure steps or ramps; this in turn increases the number of vacant parameters that need to be programmed in the controller. How should the user know about the optimum pressure curve? These systems are unable to detect and control boiling pressure levels automatically. Such control action would not be reasonable with a "coarse" method of vacuum regulation, i.e. not using more than one single "open/close" valve.



Fig. 2: speed-controlled diaphragm pump for Heidolph rotary evaporators

2. Speed-controlled vacuum pump systems with fully automatic controller

This approach features continuous vacuum regulation by a speed-controlled motor driving a diaphragm pump. This concept is simple; the economic realization of a frequency control requires detailed technical knowledge. Last but not least, integration of a PID-controller will show all of its talents: undershoot, overshoot and similar deviations are history (fig. 2: Rotavac vario control, by Heidolph Instruments).

Evaporation and drying are intricate processes influenced by a variety of parameters. Simple sequencers for speed-controlled diaphragm pumps hardly show any advantages over "open/close" valves since they also depend on the user programming nominal pressures.

Fully automatic regulators detect boiling point (based on vapor temperature), or boiling points of various substances in the solvent. They approach these points "softly" without any overshoot and follow-up temperature changes in the hot bath. The regulator exactly controls pressure as required by the specific boiling point to achieve an as short as possible process.

3. Comparison: "open/close" valve against fully automatic speed control

The principle of continuous vacuum regulation is shown in fig. 3. Instead of the typical flutter of the actual pressure around nominal is typical for an "open/close" valve control, a continuous approach and follow-up of boiling pressure is reached.

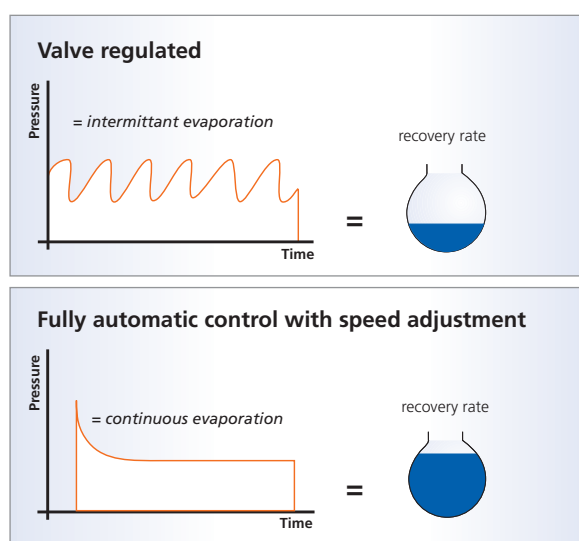


Fig. 3: schematic pressure curve: "open/close" valve control – VARIO-system

The figures show time saving: When using a speed-controlled system with boiling-pressure follow-up in comparison with a conventional "open/close" valve control without boil pressure follow-up, conditions of test show identical. Used configuration: Hei-VAP Precision with program AUTO_{accurate}

Distillation is faster when using a speed-controlled system with boiling-pressure follow-up. This time saving will cut down process times and hence, cost. Integrating daily labor cost while using conventional pump stations in a "cost of ownership" calculation, speed-controlled systems with boiling-point follow-up turn out to be the most effective ones.

Time to evaporate

400 grams of ethanol

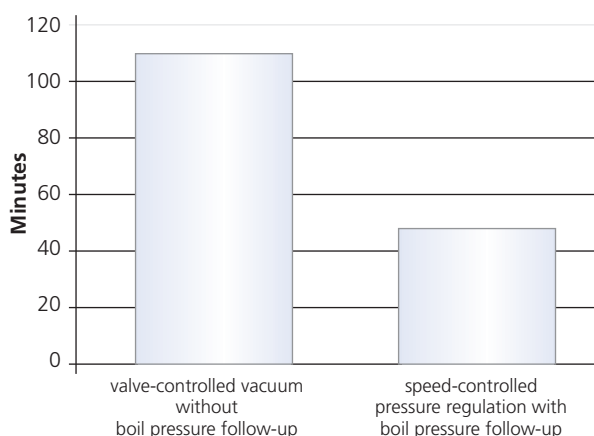


Fig. 4: time to evaporate a solvent: "open/close" valve – speed-controlled system

The speed-controlled system allows for highly efficient distillation. The solvent recovery rate is close to 100 %, a value you hardly achieve with a simple manual "regulation" or programmed pressure steps.

With "open/close" valve systems, a significant quantity of solvent gets into the pump when undershooting nominal pressure which in turn will cause condensation problems in the housing and valves. In particular, 2-cylinder diaphragm pumps are prone to condensation and need gas ballast that in turn affects final pressure. The only solution is a 3-stage pump, preferably with speed control.

In addition to its extraordinary regulating properties, a speed-controlled pump features even more benefits for the user. The pump runs only when needed, i.e. at minimum speed of a few Hertz only, which means low noise, low vibration, extended performance life of diaphragm and valves. Performance life of a diaphragm is expressed in strokes. A 10,000 hour performance life of the diaphragm (at 50 Hz) will mean many years of troublefree operation of Vacuubrand diaphragm pumps in speed-controlled systems.

Acknowledgment

We would like to thank Dr. Jürgen Dirscherl, engineering director of Vacuubrand for his friendly support and supply of information.

Visit us at Heidolph Instruments, Germany



Intelligent Evaporation



- Significant Time and Cost Savings
- Industry Leading Safety Features
- Unattended Operation

**Reduced Process
Times**

...no **task**
too **big**

Intelligent Evaporation



The average operational **lifespan of 10 years** is backed by a 3 year warranty and makes your purchase a truly worthwhile investment

Heating Bath

Do you want safe removal and quick flask changes that require only one person with a product that has the highest safety levels worldwide in industrial rotary evaporation?

With the Laborota 20 series you can be sure you are always on the safe side. If you operate the LR 20 unit just by yourself, changing the flask can be accomplished easily in just a few moments.

For your convenience an outlet allows you to **empty the bath** safely and without spills or unnecessary mess

Protect yourself reliably with safety models:

A guard hood consisting of a metal frame and safety glass covers the bath completely. This prevents any operator contact with steam, splashing bath fluid and splinters of glass in case of an implosion

No hassle or safety concerns due to low fluid levels:

Self-filling water bath takes the worry out of running dry



Non-fogging safety glass provides **clear visible monitoring** of the process in your evaporation

Features **water level regulation system** to prevent water from spilling over and potential floods in your lab

Prevent an overheating situation effectively:

A temperature sensor powers off the bath in case of any uncontrolled heat-up event

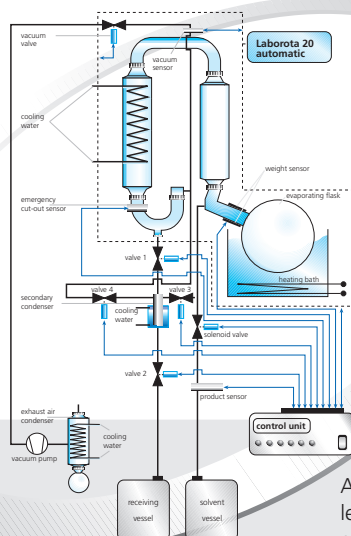
Automated Distillations

Interested in using your work hours more efficiently when evaporating large quantities of solvent?

An automated evaporator allows you to spend a significantly less amount of time on evaporation tasks and more time on other projects to meet your completion deadlines.

Maximize your investment significantly:

The LR 20 automatic is an affordable alternative to common 50 and 100 liter evaporators



Evaporate large quantities overnight

or even on weekends without even being in your lab. This greatly reduces solvent vapor exposure during solution filling and receiving vessel draining procedures

Condensate is received and **continuously drained out** of the system through a series of valves, where it is collected in any vessel of your choice under atmospheric pressure

A weight sensor measures the solvent level and **automatically refills** your evaporation flask to an approximate volume to continue bulk evaporation

Your advantages – our Hei-lights

For your safety

- **Protect yourself reliably with safety models:**
A guard hood consisting of a metal frame and safety glass covers the bath completely. This prevents any operator contact with steam, splashing bath fluid and splinters of glass in case of an implosion
- **Excellent user safety** is achieved by a transparent high impact PMMA door on a metal condenser housing covering the main glassware assembly
- Receiving cassette system **protects glassware** while providing superior flask support. Easy access to receiving cassettes via two latching high impact transparent PMMA doors
- **Prevent a bath overheating situation** effectively:
A temperature sensor shuts off the bath in case of any uncontrolled heat-up
- To effectively prevent accidents and monitor parameters, speed, bath temperature and vacuum setting must be confirmed on **separate On/Off buttons to start operation**
- **Certification** according to **GMP** available: validation for installation (IQ) and operating qualification (OQ)
- **Safety cut-out** in an **over pressure situation** caused by glassware breakage or defective vacuum circuit
- To address **your personal safety requirements** rotation drive must be blocked to remove the evaporating flask
- The interface panel has all parameters for operation and displays **5 safety functions** that require operator action prior to resuming evaporation. The functions are designed to promote a safe use of Laborota 20 evaporator and **inform operator of any potential hazards**
- Features water level regulation system to **prevent water from spilling over** and potential floods in your lab
- Safety sensor **stops rotation if the guard hood is opened** during operation providing user safety
- The press of the **Emergency Off switch** brings the entire unit to a complete stop

Safety features:

Separate digital displays for all relevant settings

Safety related LED indicate user precaution

- Guard hood is open
- Flask removal support not in place or locked
- Rotation drive locked for flask removal
- Over temperature cut-off activated
- Emergency cut-off in process

Emergency Off switch



For your ease of use

- Unique evaporating flask support system allows for **"one person operation"** by safely removing the flask in just moments
- Optional base unit provides you with a **fully maneuverable rotary evaporator** while offering a storage space for vacuum pump, glassware, solvents or accessories
- Receiver cassettes guard against glassware breakage while providing a self-standing flask support and **quick removal** of receiving vessels
- Receiving flasks feature **reinforced bottom drain valves** as standard and are protected by cassettes
- To prevent steam from building up within the guard hood, two strong blowers effectively ventilate the entire area to give you a **clear view of the evaporating flask**
- For your convenience an outlet allows you to **empty the waterbath** safely and without spills or unnecessary mess
- Connect your PC to the RS 232 interface and **save all process data** in a digital file
- Now you can manage even the **most demanding applications** easily and eliminate foaming, excessive bubbling or bumping of solutions with the $T_{(auto)}$ distillation program
- Save time with your individualized **pre-programmed parameter settings** of vacuum and temperature gradients for your most common application on a daily basis by saving it as a ramp in memory
- Make your life easier by using the **automatic process timer** which turns off your evaporation at a pre-programmed time
- Reduce your process times by using the exclusive $T_{(auto)}$ program which automates your distillation using a vapor temperature system that takes **the guess work out** of finding the correct vacuum setting every time
- No hassle and safety concern due to low fluid levels: **Self-filling water bath** takes the worry out of running dry



Reduce your cost of ownership

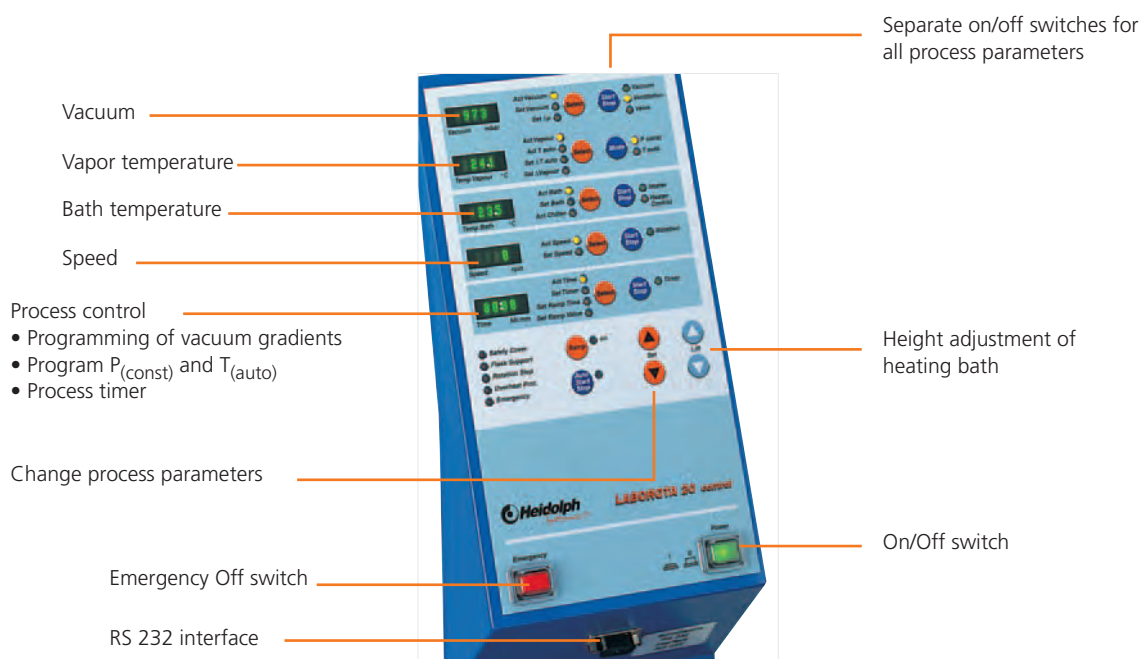
- Do not disturb your colleagues anymore; **remove the flask by yourself** in just moments via the flask support system
- Choose the configuration that **serves you and your budget best**: Wide range of options from low end to high end systems and glassware to match the application
- The water bath refill system allows you to step always from your evaporator and **reduce your supervision responsibility** to zero on baths running dry or overheating
- **No hidden cost**: All components to control vacuum are included as a standard. That accounts for vacuum valve, vacuum controller and vacuum sensor
- Maximize your initial investment significantly: Automatic evaporators are an **affordable alternative** to common 50 and 100 liter evaporators
- Spend your **work hours more effectively** on other challenges which require your attention and evaporate large quantities overnight or even on weekends
- All $T_{(auto)}$ evaporations drive your solution to a variable quantity or dryness then shut off vacuum, heating bath, rotation settings and ventilate system to give you semi-automated capabilities at a **significant cost savings**

Laborota 20 safety

Highest safety and integrated vacuum control capabilities

Includes all standard LR 20 features for safety, ease of use and reduced cost of ownership

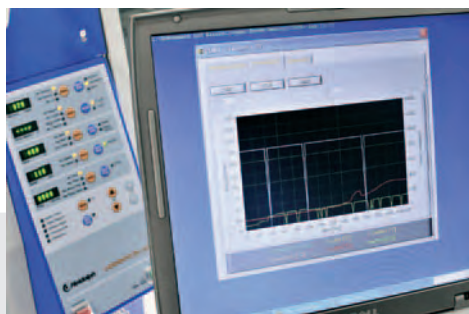
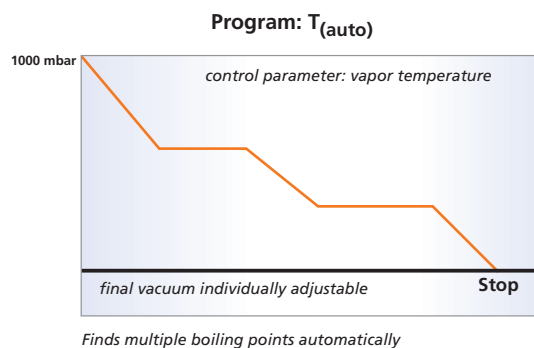
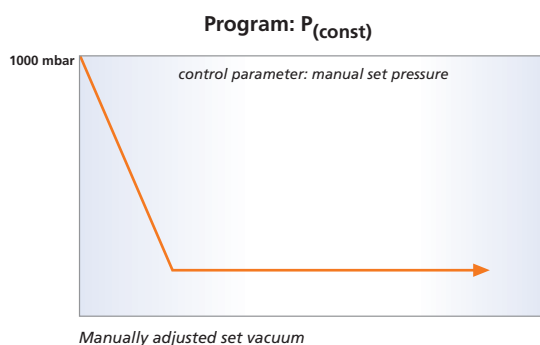




Two programs for your process control

P_(const): Program for solvent separations. This program holds a set vacuum constant and uses a hysteresis

T_(auto): Supports very precise automatic pressure control for solvent evaporation and separations. It is able to identify multiple boiling points automatically by reducing vacuum by use of a vapor temperature system. T_(auto) guides the vacuum control by adjusting valve reaction time to reflect the solvent vapor front collecting on the condenser to yield sustainable distillation. This unique program gives operator ease of use in optimizing the vacuum parameters



PC-Software:

An optional software program allows for all parameter settings and pre-programming ramps via PC. Connect your PC to the RS 232 interface on your LR 20 unit and also save all process data in a digital file
P/N 592-51800-00

Laborota 20 compact

For advanced requirements and integrated vacuum control capabilities

This model features identical specifications as the LR 20 safety but for limited budgets comes without these safety aspects:

- Metal frame and safety glass guard hood covering the bath
- High impact PMMA door covering the glassware assembly
- High impact PMMA latching doors which cover the receiving flask cassettes

Large control panel which includes separate bright displays for all process parameters, programmable ramps as described on page 9

Optional fully maneuverable base which features detachable side panels

Two bath configurations: water bath models with temperatures up to 100 °C and oil bath models with temperatures up to 180 °C available



Laborota 20 compact with water bath and glassware set R
(without base unit)
P/N 518-21100-00

Laborota 20 eco

For standard distillations without vacuum control

Operating panel for standard process parameters: Large, analog dial controls for speed and bath temperature. The digital display gives read out of speed and temperature

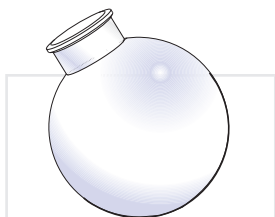
Universal heating bath allows for both water and oil and reaches a temperature of 180 °C

Can be combined with an optional, fully maneuverable eco base unit without side panels



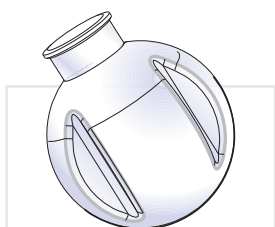
Laborota 20 eco with glassware set R
(without base unit)
P/N 518-31300-00

Accessories - Laborota 20



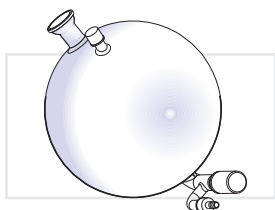
Evaporating flasks

	P/N
Evaporating flask 6 liters	15-300-003-20
Evaporating flask 10 liters	15-300-003-16
Evaporating flask 20 liters (included as a standard)	15-300-003-17



Powder flasks

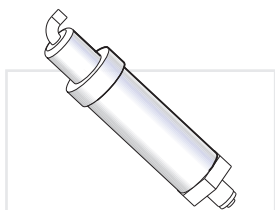
	P/N
Powder flask 10 liters	15-300-003-18
Powder flask 20 liters	15-300-003-19



Receiving flask with drain valves 10 liters

P/N

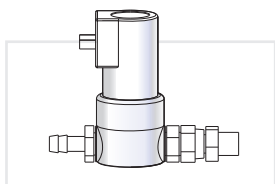
15-300-004-11



Vacuum sensor (included as a standard for LR 20 compact, safety and automatic)

P/N

591-21000-00

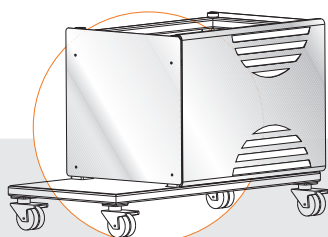


Vacuum valve (included as a standard for LR 20 compact, safety and automatic)

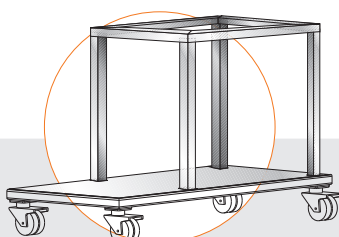
P/N

591-20000-00

	P/N
Heating bath liquid 5 liters	515-31000-00
Tube set	591-34000-00
PC-Software program for LR 20 safety, compact and automatic	592-51800-00



Base for Laborota 20 compact, safety or automatic
P/N 591-23000-00



Base for Laborota 20 eco
P/N 591-23300-00



Vapor temperature sensor
P/N 14-014-003-06

Automated 24 h Distillation

Laborota 20 automatic

Large scale evaporator designed for unattended use. The required solvent is automatically refilled and condensate continuously drained off. The automatic water bath refill system along with an additional control panel for filling and electronics allow for use over an extended period of time.

- ✓ Designed for 24 h continuous use
- ✓ For continuous operation overnight and at the weekend
- ✓ Affordable alternative to common 50 and 100 liter evaporators
- ✓ Particularly suitable for solvent processing
- ✓ Reduced exposure to solvent vapor and spills

Every automatic evaporator consists of these components:

- Your choice of an LR 20 model with integrated vacuum sensor and vacuum valve. Automated distillation with constant pressure $P_{(const)}$ or with vapor temperature control $T_{(auto)}$
- 4-head vacuum pump, chemically resistant, rated at 3 m³/h, final pressure 9 mbar, 350 W connection power. Vacuum pump comes with separator and exhaust waste vapor condenser is integrated into system
- Additional operating panel for LR 20 control automatic specific flask refill settings

Distillation process:

Automatic product charging

- Drive head features weight sensor which is responsible for refilling the evaporating flask according to the amount of solvent distilled off
- Adjustable max. and min. filling level of evaporating flask
- Charging of product controlled via solenoid valve with the help of the systems vacuum and end fill sensor that indicates solution evaporation is complete

Automatic discharge of condensate

- The discharge from the vacuum system works in a quasi-continuous way. Several times per minute the processor-controlled valve matrix releases out a small volume of condensate

End of distillation

- Termination with the built-in timer
- After reaching an adjustable end pressure (only with $T_{(auto)}$)
- Terminating the distillation by operator



Shown here with Glassware A: One condenser and one expansion vessel

Additional automatic control panel

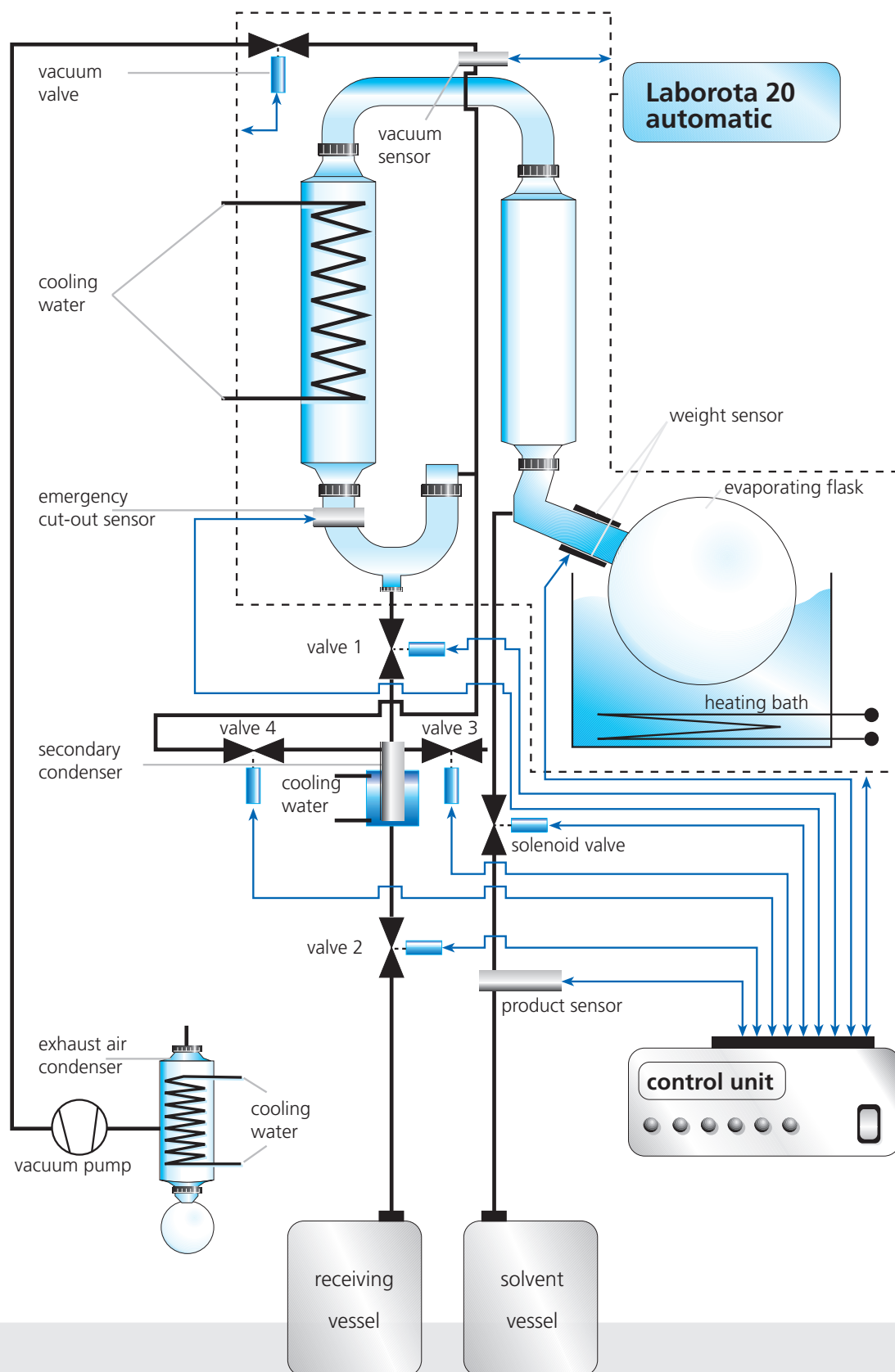
Standard LR 20 operating panel as described on page 9

Processor controlled valve matrix to discharge condensate

Certification according to GMP available for this model: Validation for Installation (IQ) and Operating Qualification (OQ)

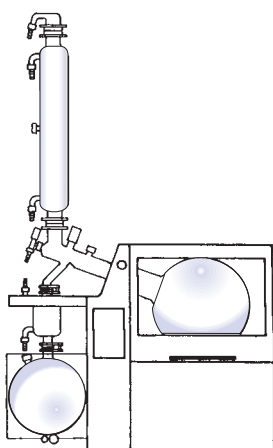


Laborota 20 automatic safety with water bath and glassware set A
(without base unit)
P/N 518-17100-00



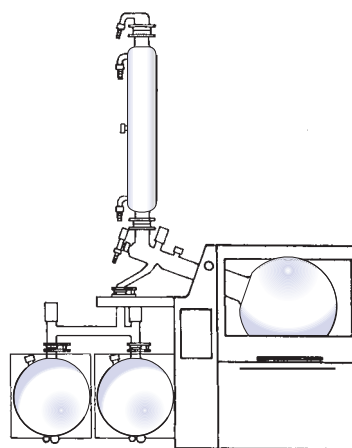
Automated 24 h Distillation

Glassware – Laborota 20



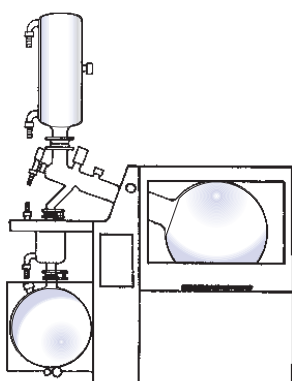
Glassware R

- This glassware assembly includes one ascending condenser, one 20 l evaporating flask, one 10 l receiving flask and is recommended **for all standard distillations**



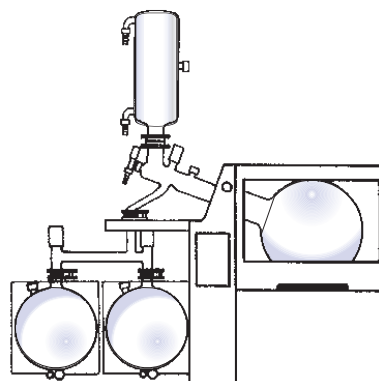
Glassware RC

- Identical to glassware assembly R and features two receiving flasks



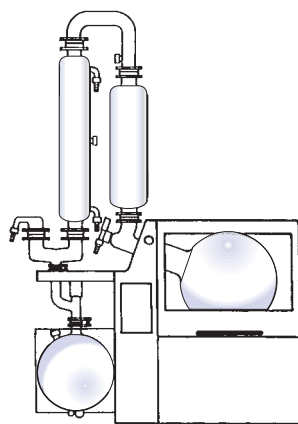
Glassware Shorty R

- Identical to glassware R, but features a condenser that is 320 mm shorter. Distillation capacity remains the same. This is ideal in laboratories for hood applications or where height is restricted



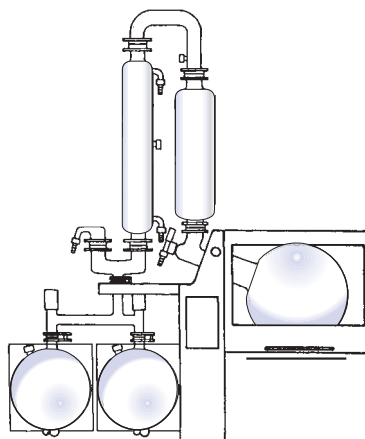
Glassware Shorty RC

- Identical to glassware assembly Shorty R and features two receiving flasks



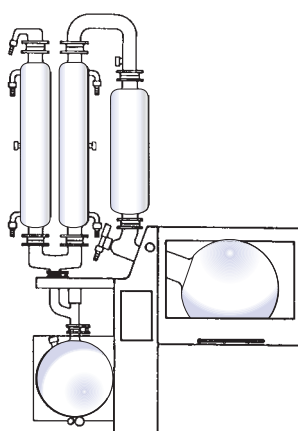
Glassware A

- This glassware assembly includes one descending condenser, one expansion vessel, one 20 l evaporating flask, one 10 l receiving flask and is recommended **for solvents that tend to splash and foam**



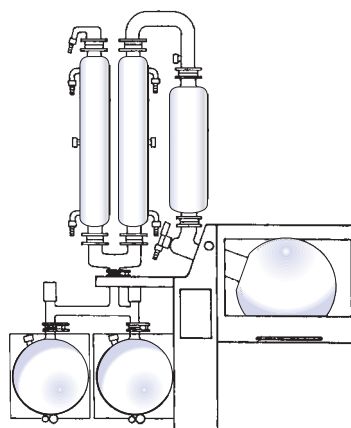
Glassware AC

- Identical to glassware assembly A and features two receiving flasks



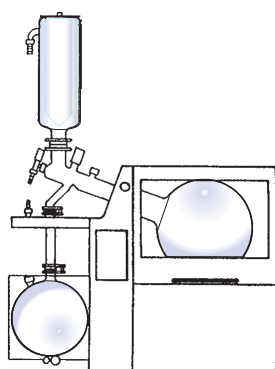
Glassware A2

- This glassware assembly includes one ascending, one descending condenser and one expansion vessel, one 20 l evaporating flask, one 10 l receiving flask **for low-boiling solvents and highest recovery rates**



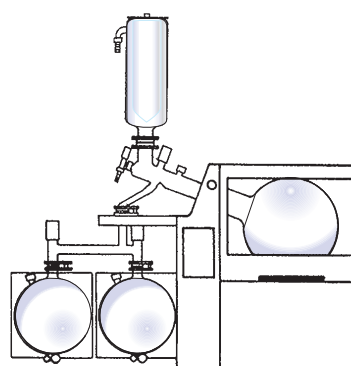
Glassware A2C

- Identical to glassware assembly A2 and features two receiving flasks



Glassware K

- Condensate trap **for low-boiling solvents; cooling by dry-ice**. Comes with one 20 l evaporating flask and one 10 l receiving flask



Glassware KC

- Identical to glassware assembly K and features two receiving flasks

Part numbers – Laborota 20

Laborota 20 safety – without base unit

Glassware	Water bath	Oil bath
R	518-11100-00	518-11200-00
Shorty R	518-18100-00	518-18200-00
RC	518-12100-00	518-12200-00
Shorty RC	518-19100-00	518-19200-00
A	518-13100-00	518-13200-00
AC	518-15100-00	518-15200-00
A2	518-14100-00	518-14200-00
A2C	518-16100-00	518-16200-00
K	518-18102-00	518-18202-00
KC	518-19102-00	518-19202-00



Laborota 20 compact – without base unit

Glassware	Water bath	Oil bath
R	518-21100-00	518-21200-00
Shorty R	518-28100-00	518-28200-00
RC	518-22100-00	518-22200-00
Shorty RC	518-29100-00	518-29200-00
A	518-23100-00	518-23200-00
AC	518-25100-00	518-25200-00
A2	518-24100-00	518-24200-00
A2C	518-26100-00	518-26200-00
K	518-28102-00	518-28202-00
KC	518-29102-00	518-29202-00



Laborota 20 eco – without base unit

Glassware	Heating bath for water & oil
R	518-31300-00
Shorty R	518-38300-00
RC	518-32300-00
Shorty RC	518-39300-00
A	518-33300-00
AC	518-35300-00
A2	518-34300-00
A2C	518-36300-00
K	518-38302-00
KC	518-39302-00



Laborota 20 automatic – without base unit

Glassware	Water bath	Oil bath
Safety version		
A	518-17100-00	518-17200-00
A2	518-17101-00	518-17201-00
Compact version		
A	518-27100-00	518-27200-00
A2	518-27101-00	518-27201-00



Technical specifications - Large Scale Rotary Evaporator Laborota 20 series

Rotation speed (rpm)	6 - 160
Rotation speed setting	digital
Hand / Motor lift	motor lift
Height adjustment speed	45 mm/s
Height adjustment (mm)	200
Drive	capacitor motor
Heating capacity (W)	4,000
Temperature range (°C)	20 - 100 (H ₂ O)
heating bath	20 - 180 (oil)
Temperature accuracy (°C)	± 1
Overheat cut-off protection (°C)	110 (H ₂ O) / 210 (oil)
Bath temperature setting	digital
Automatic heating bath control	micro processor
Material heating bath	V4A (1.4404)
Heating bath (mm)	400
Volume heating bath (l)	24 (H ₂ O) / 22 (oil)
Display vapor temperature (required accessories)	digital temperature sensor

Vacuum controller	yes
Timer	yes
Vacuum control program $p_{(const)}$ **	yes
Vacuum control program $P_{(auto)}$ requires $T_{(auto)}$ sensor	yes
Programmable ramps	yes
Supply power (W)	4,500
Weight (without glass assembly) (kg)	approx. 120
Size (w/o glass assembly)(l x w x h)(mm)	1,000 x 700 x 1,620
Protection class (DIN EN 60529)	IP 20
Operation conditions (°C)	0 - 40 at 80 % rel. humidity
Rate of evaporation (L/h) by 40 °C temperature difference	
- Toluene	26.0
- Acetone	25.9
- Ethanol	12.9
- Water	4.7
Maximum Condensing surface (m ²)	1.2
Supply voltage *** (V/Hz)	400 V / 50 Hz 230 V / 50/60 Hz

The model **Laborota 20 eco** does not include all above mentioned technical specifications - Details on page 10

* ΔT = difference between heating bath temperature and boiling temperature

** only in combination with vacuum systems

*** Standard 400 V / 50 Hz: Others upon request, please specify for order

Certificate

To confirm the ability for
continuous operation

of the LR 20 Series Large Scale Rotary Evaporators

The LR 20 Series Large Scale Rotary Evaporators feature over temperature safety circuits according to DIN EN 61010-1:2001 and DIN EN 61010-2-010:2003 and therefore, are designed for **continuous operation**.

This statement is made under the precondition that all units are operated in accordance with the operation manual and in accordance with good practice standards for safety in laboratories, rules for accident preventions, and compliance with directions on hazardous materials.

Schwabach, October 2010



i. V. Achim Melching
Technical Director



i. A. Stefan Richter
Quality Control Director

Certificate of Compliance

Certificate: 2203276

Master Contract: 238858

Project: 2203276

Date Issued: September 16, 2009

Issued to: Heidolph Instruments GmbH & Co KG
Walpersdorferstrasse 12
D-91126 Schwabach
GERMANY

Attention: Mr. Achim Melching

The products listed below are eligible to bear the CSA Mark shown with adjacent indicators 'C' and 'US' for Canada and US or with adjacent indicator 'US' for US only or without either indicator for Canada only



Issue by: Hans-Werner Zeller

Authorized by: Maurice Hoendervangers
Area Director



PRODUCTS

CLASS 8721 05 - LABORATORY ELECTRICAL EQUIPMENT

CLASS 8721 85 - ELECTRICAL EQUIPMENT FOR LABORATORY USE (Certified to U.S. Standards)

Rotary Evaporator Modular System, Heating bath type Heizbad Hei-VAP, rated AC 115 V or AC 230 V; 50/60 Hz; 1300 W, 20 °C - 210 °C supplied only by base control units types Basis Hei-VAP Value, Basis Hei-VAP HL and Basis Hei-VAP ML, rated AC 115 V or AC 230 V; 50/60 Hz; 1400 W, Pollution Degree 2, Installation Category II.

APPLICABLE REQUIREMENTS

- | | |
|---|--|
| CAN/CSA-C22.2 No. 61010-1-04 | - Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use, Part 1: General Requirements |
| CAN/CSA-C22.2 No. 61010-2-010-04 | - Part 2-010; Particular Requirements for laboratory equipment for heating of materials |
| UL Std. No. 61010-1 (2 nd Edition) | - Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use - Part 1: General Requirements |
| IEC 61010-2-010 (ed.2) | - Part 2-010; Particular Requirements for laboratory equipment for heating of materials |

CONDITIONS OF ACCEPTABILITY

[Cord connected equipment] The equipment is supplied with an approved power supply cord set or power supply cord with plug that is acceptable to the authorities in the country where the equipment is to be used.

Time-saving

Synthesizing



- Process times reduced by 80 %
- 24 reactions simultaneously
- 4 separate heating zones

**Increase your
reaction throughput**

... if only there were **more than
24 hours** in a day

Time-saving Synthesizing

One base unit only accepts 3 reaction blocks **for solid phase** or 3 reaction blocks **for solution phase** applications with gentle vortexing that does not damage resin

Reaction block features four heating zones which allow you to **apply selectively different temperatures** and facilitate reaction optimization

Fast heat transfer from the heating zone allows for sample temperature settings **up to 160 °C**

Perform reactions at **temperatures as low as -80 °C** via external chiller



Exceptional chemical resistance due to PTFE and PFA material – **resin will not stick** to inner walls of reaction vessel

Exceptional visual control of sample and reaction in each vessel and immediate access to every sample due to circular design

Optional temperature sensor positioned in the reaction vessel enables the most **accurate temperature control** and reproducibility

The average operational **lifespan of 10 years** is backed by a 3 year warranty and makes your purchase a truly worthwhile investment

80 % reduced process times

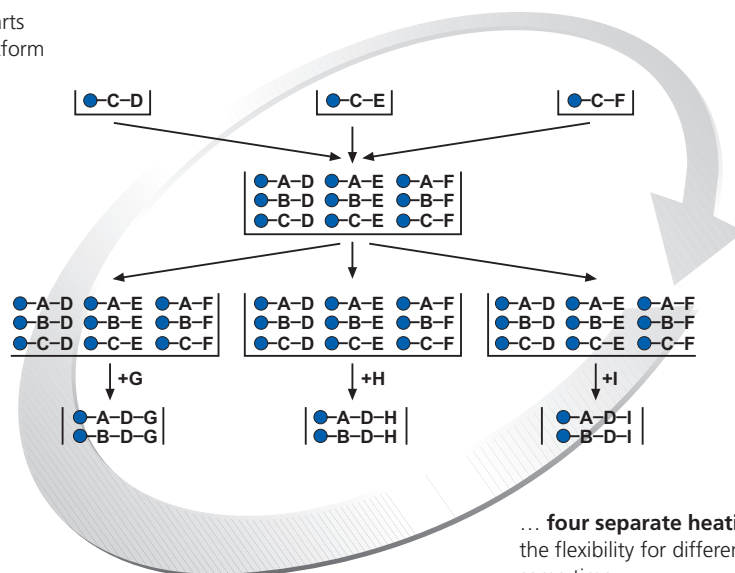
In the fast paced world of combinatorial chemistry and drug research, it must no longer be that first class results are necessarily associated with time consuming process times.

Do you wish to have a synthesizer which saves you time and provides faster results than conventional methods?

Synthesis 1 allows you time savings up to 80 % - because...

... you can perform up to **24 samples simultaneously**

... your **work-up phase** starts right on the Synthesis 1 platform and increases your overall efficiency



... your results are highly **reproducible and repeatable**

... **four separate heating zones** give you the flexibility for different temperatures at the same time

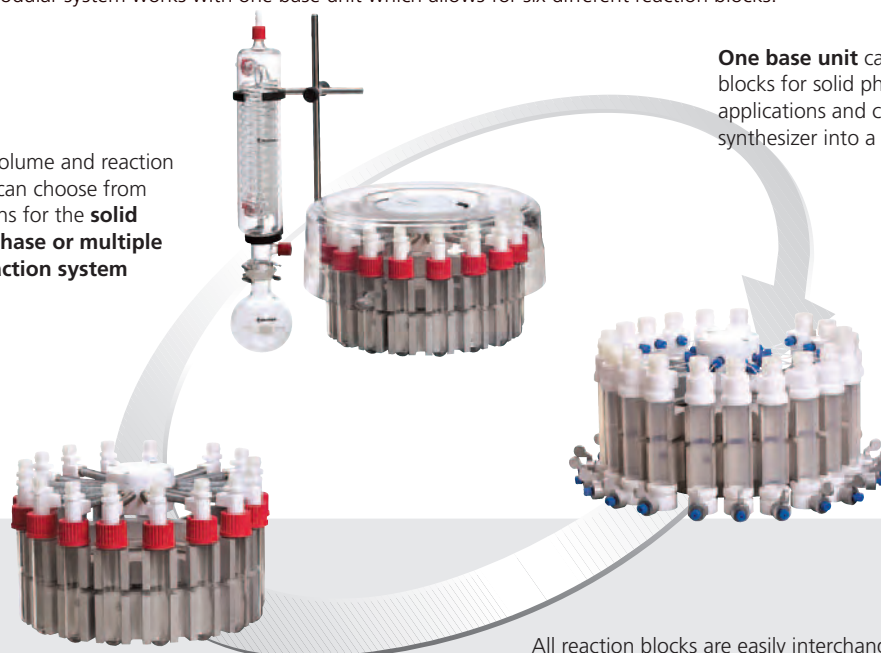
Three methods – all in one

Do you prioritize your purchasing decisions on necessary equipment only or struggle with how to allocate funding to be able to handle all your application needs for your research?

Synthesis 1 covers a wide range of applications – based on a single investment only!

The Synthesis 1 modular system works with one base unit which allows for six different reaction blocks:

Depending on volume and reaction vessel size, you can choose from 3 possible options for the **solid phase, liquid phase or multiple evaporator reaction system**



One base unit can accept reaction blocks for solid phase or solution phase applications and can convert your synthesizer into a multiple evaporator

All reaction blocks are easily interchangeable and allow you to choose different methods **without losing time**

Your advantages - our Hei-lights

For your ease of use

- Each reaction block features **four heating zones** which allows you to apply different temperatures to four independent vessel groups that makes process optimization easier than traditional methods
- Exceptional **visual control** of reactions in each vessel and immediate access to every sample due to circular design of the reaction block
- Turn the entire reaction block clockwise and counterclockwise by 60° in each direction for **easy sample access** in just seconds
- Optional temperature sensor positioned in the reaction vessel guarantees the **most accurate temperature** control and **reproducibility**
- An additional **condensation zone** allows for **refluxing** solvents or condensed vapors to remain in the vessel
- When operating at temperatures below 0 °C, the optional inert gas box will **eliminate the forming of ice** on your Synthesis 1 unit
- The materials used along with the design of the Synthesis 1 unit allow for **low temperatures** down to **- 80 °C** via external chillers
- A **drip collecting tray** ensures that condensate or melting ice on the reaction block is drained off for collection and doesn't build-up on your bench
- **Document your process data** in an electronic file; software is provided and data is transported to your PC via RS 232 interface on your Synthesis 1 unit
- Save time with your individualized **pre-programmed parameter settings as a ramp function in memory**: temperature gradients with up to 9 steps each allow for repeatability of your most common applications
- Make your life easier by using the **automatic process timer** which turns off your experiment at a pre-programmed time
- A **distributor connection for vacuum and inert gas** connects to each reaction vessel to provide sample protection to your reactions
- Electronically controlled vortex motion mixing up to 1,000 rpm to ensure quick mixing results and **avoid any damage** to the resin for all solid phase reactions
- Exchange reaction blocks in just minutes and keep your **flexibility**
- Eliminate the need for multiple stir bars by using the Synthesis 1 mixing technology – **solutions vortex with ease**



Optional PC-Software

Optional
temperature sensor



For your safety

- An optional guard hood is attachable by an easy to use hinge for added safety that **protects you from burns** and contacting scalding surfaces. In just seconds, you have immediate access to every single reaction vessel while keeping you safe
- To avoid any damage to the silicone septa and **protect you from solvents** or aggressive media such as acids, a PTFE coating gives the septa additional resistance
- The vessel and septa have been specifically engineered to ensure for optimal septa fixing, **even at high speeds** and in a robust environment
- To **rule out accidents** and ensure optimal operator safety, the Synthesis 1 has been designed with a low center of gravity which prevents gliding at high speed, including placement on a damp surface

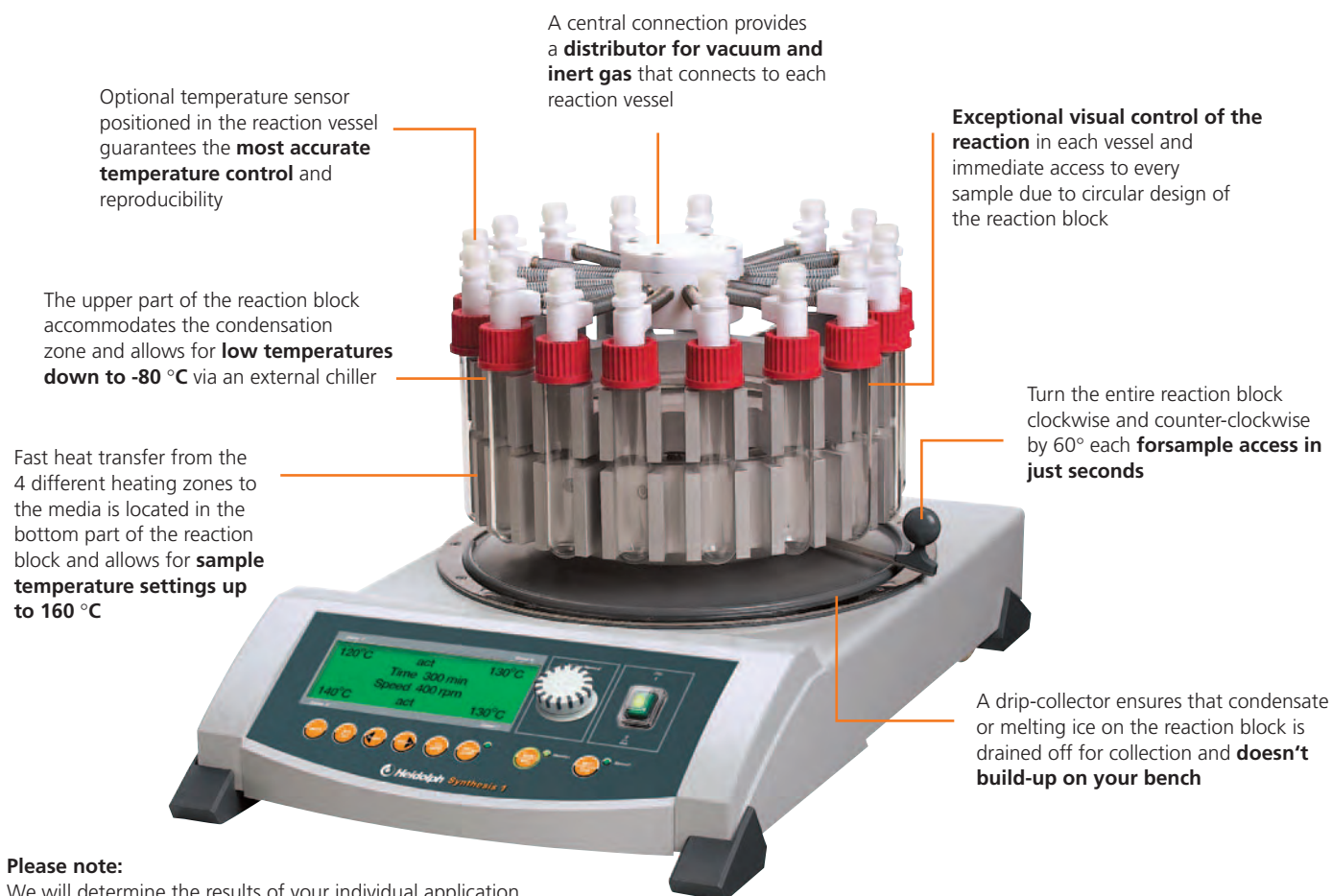
Optional guard hood



Reduce your cost of ownership

- Performing up to 24 reactions simultaneously at different temperature settings **reduces your process times up to 80 %** and increases the throughput in your lab especially in process optimization experiments
- One base unit can accept reaction blocks for solid phase or solution phase applications and for converting your synthesizer into a multiple evaporator. That **eliminates future investments** for other equipment while maintaining all options to explore new applications
- All reaction vessels are made of glass, PTFE or PFA which are chemically resistant polymers that provide long service life. This **reduces your spare parts or consumable budget** considerably
- Reduce your maintenance costs: the sealed housing protects your Synthesis 1 unit from aggressive fumes, liquids and vapors to prevent internal corrosion. This results in an **increased lifespan of 10 years** on average along with **reduced maintenance and repair costs**

The Synthesis 1 Series



Please note:

We will determine the results of your individual application. Please contact your local Heidolph representative with information regarding application such as:

- Particle size
- Density – ratio solid/liquid
- Viscosity
- If there is use of solids which tend to clump

Each reaction block features **four heating zones** which allow you to apply selectively different temperatures to different reaction vessel groups simultaneously

Knob to easily adjust variable **speed up to 1,000 rpm**

Make your life easier by using the **automatic process timer** which turns off your experiment at a pre-programmed time

"Identic button" feature resets all four heating zones to an **identical heating temperature**



Change all process **parameters easily**

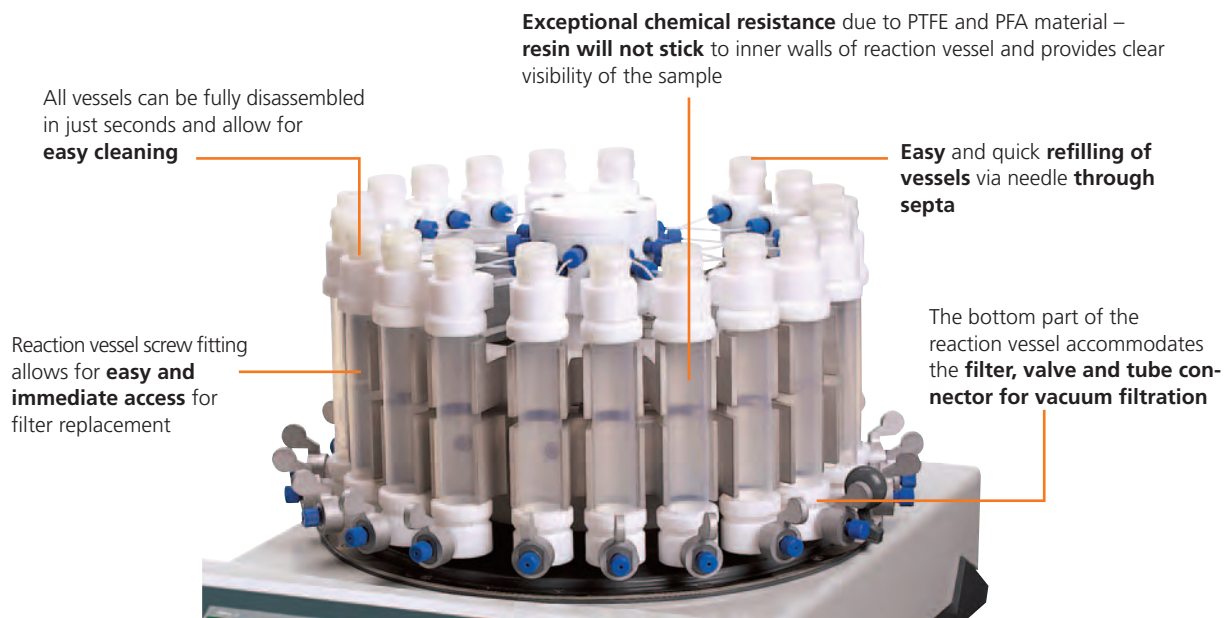
To **effectively prevent accidents** and monitor parameters; speed (rpm) and temperature settings must be confirmed on separate On/Off buttons to start operation

Save time with your individualized pre-programmed parameter settings as a **ramp function** in memory: Temperature gradients with up to 9 steps for each heating zone separately

Synthesis 1 Solid

For solid phase reactions and process by immobilization of the material with a resin. Synthesis 1 allows for adding samples, splitting off or cleaving from the resin, filtration of by-products and purification of the product.

Includes all standard features for safety, ease of use and reduced cost of ownership plus



Waste Cube

Special waste manifold for the vacuum filtration of washing solvents in a vessel. After synthesis process the product will be recovered by vacuum and collected in the test tubes. Clear visibility at all times due to transparent glass door

Interchangeable reaction block

Choose three different reaction blocks for different sample volumes and quantities:

- Solid 16 for 16 reaction vessels of 42 ml each
- Solid 20 for 20 reaction vessels of 25 ml each
- Solid 24 for 24 reaction vessels of 8 ml each



Waste Cube for 20 test tubes
P/N 552-42500-00

P/N

Synthesis 1 Solid 16 552-14200-00
Base with reaction block for solid phase synthesis and 16 reaction vessels of 42 ml each

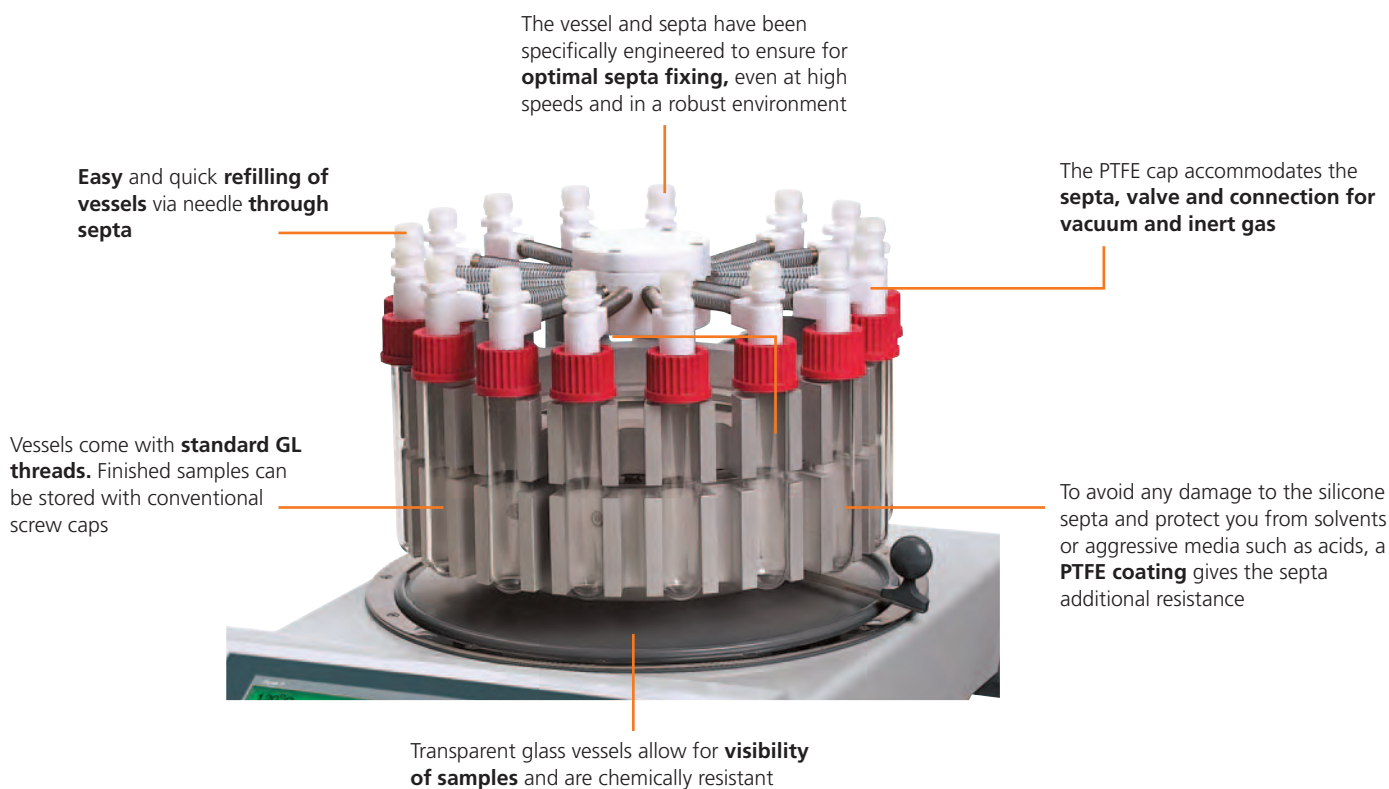
Synthesis 1 Solid 20 552-12500-00
Base with reaction block for solid phase synthesis and 20 reaction vessels of 25 ml each

Synthesis 1 Solid 24 552-10800-00
Base with reaction block for solid phase synthesis and 24 reaction vessels of 8 ml each

Synthesis 1 Liquid

Synthesis 1 Liquid is best for reactions and processes without the use of resins. Synthesis 1 allows for synthesis and work up of solution phase chemical synthesis.

Includes all standard Synthesis 1 features for safety, ease of use and reduced cost of ownership



Interchangeable reaction blocks

Choose three different reaction blocks for different sample volumes and quantities:

- Liquid 12 for 12 reaction vessels of 50 ml each
- Liquid 16 for 16 reaction vessels of 25 ml each
- Liquid 24 for 24 reaction vessels of 10 ml each

Upgrade your Synthesis 1 Liquid to a multiple evaporator by connecting the reaction block to your Heidolph rotary evaporator glassware assembly

Adaptor for Heidolph rotary evaporator

P/N 552-50071-00

Product numbers

Synthesis 1 Liquid 12 552-25000-00

Base with reaction block for liquid phase synthesis and 12 reaction vessels of 50 ml each

Synthesis 1 Liquid 16 552-22500-00

Base with reaction block for liquid phase synthesis and 16 reaction vessels of 25 ml each

Synthesis 1 Liquid 24 552-21000-00

Base with reaction block for liquid phase synthesis and 24 reaction vessels of 10 ml each



Synthesis 1 Multiple Evaporator

Most appropriate for simultaneous evaporation or concentration of up to 24 samples. The multiple evaporator is an ideal addition to the liquid phase Synthesis 1.

This model is identical with Synthesis 1 liquid and features in addition

Glassware assembly for the Synthesis 1 allows for **solvent recovery**

Guard and temperature hood to avoid a loss of heat and **ensures fast heat up** under constant sample temperature. In addition, the hood serves for added safety to the operator



Four heating zones on each reaction block allow you to **evaporate solvents with different boiling points** simultaneously

Interchangeable reaction blocks

Choose three different reaction blocks for different sample volumes and quantities:

- Multiple evaporator 12 for 12 reaction vessels of 50 ml each
- Multiple evaporator 16 for 16 reaction vessels of 25 ml each
- Multiple evaporator 24 for 24 reaction vessels of 10 ml each

Product numbers

Synthesis 1 multiple evaporator 12 552-35000-00

Base with reaction block for liquid phase synthesis and 12 reaction vessels of 50 ml each with glassware set Synthesis 1 and guard hood

Synthesis 1 multiple evaporator 12 for extraction vessels 552-35000-05

Base with reaction block for liquid phase synthesis for 12 extraction vessels of 50 ml each with glassware set Synthesis 1 and guard hood. For Dionex vessels

Synthesis 1 multiple evaporator 16 552-32500-00

Base with reaction block for liquid phase synthesis and 16 reaction vessels of 25 ml each with glassware set Synthesis 1 and guard hood

Synthesis 1 multiple evaporator 24 552-31000-00

Base with reaction block for liquid phase synthesis and 24 reaction vessels of 10 ml each with glassware set Synthesis 1 and guard hood

Periphery

Vacuum pump Rotavac Valve Control

Two-stage diaphragm pump made from chemically resistant materials. High suction capacity of 1.7 m³/h, for fastest evacuation. The Rotavac Valve Control achieves an ultimate vacuum of 9 mbar. Significant noise and vibration reduction. Minimal bench space requirements. This vacuum pump can be combined with a condensate cooler



Rotavac Valve Control
(shown with condensate cooler)
P/N 591-00130-00
Condensate cooler
P/N 591-00081-00

Vacuum pump Rotavac Valve Tec

Two-stage diaphragm pump made from chemically resistant materials. Suction capacity of 0.75 m³/h. The Rotavac Valve Tec achieves an ultimate vacuum of 12 mbar and can be combined with a condensate cooler P/N 591-00083-00



Rotavac Valve Tec
P/N 591-00160-00

Pumping Unit Rotavac Vario

Fully controllable stand-alone pumping unit including vacuum controller - all-purpose.

Three-stage diaphragm pump made from chemically resistant materials, high suction capacity of 1.7 m³/h for fastest evacuation, the Rotavac Vario Pumping Unit achieves an ultimate vacuum of 5 mbar and can be combined with a condensate cooler P/N 591-00083-00



Pumping Unit Rotavac Vario
P/N 591-00142-00

Digital vacuum controller Vac Control Automatic RS

Control your house vacuum or any other vacuum source. Features 3 displays for actual, set vacuum and operating mode. Process timer allows for unattended operation. Reduces pressure during distillation. Includes vacuum sensor and vent valve, but requires a separate vacuum valve P/N 591-24000-00



Vac Control Automatic RS
P/N 591-00341-00

Inert gas box

Ideal for operation with the Synthesis 1 while working at temperatures below 0 °C. The box prevents the formation of ice on the Synthesis 1 unit by exchanging moisture containing air with a dry inert gas. Inert gas box is made of transparent PMMA panels to provide clear visibility of all samples and for added safety



Inert gas box
P/N 552-50093-00

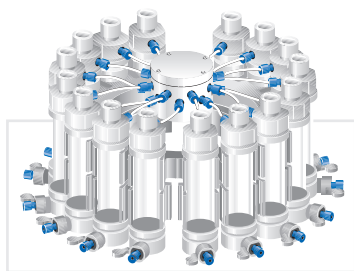
Software

An optional software program allows for all parameter settings and pre-programming ramps via PC. Connect your PC to the RS 232 interface on your Synthesis 1 unit and also save all process data in a digital file



Software Synthesis 1
P/N 592-55200-00

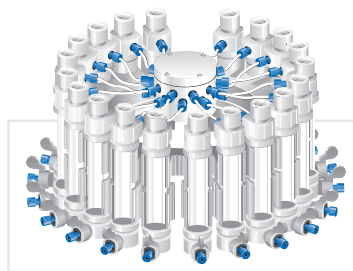
Accessories for Solid Phase Synthesizers



Reaction Block Solid 16

Interchangeable reaction block with 16 reaction vessels of 42 ml each and vacuum distributor

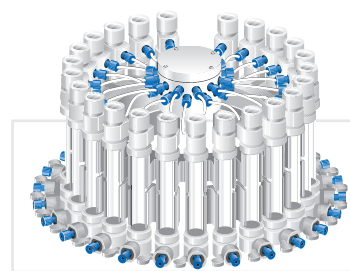
P/N 552-14210-00



Reaction Block Solid 20

Interchangeable reaction block with 20 reaction vessels of 25 ml each and vacuum distributor

P/N 552-12510-00



Reaction Block Solid 24

Interchangeable reaction block with 24 reaction vessels of 8 ml each and vacuum distributor

P/N 552-10810-00



Reaction Vessel Solid 16

for 42 ml with valve, connectors, filter & septa

Recommended capacity: 20 ml

P/N 552-14230-00

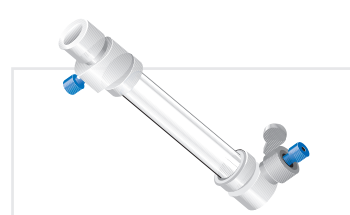


Reaction Vessel Solid 20

for 25 ml with valve, connectors, filter & septa

Recommended capacity: 12 ml

P/N 552-12530-00

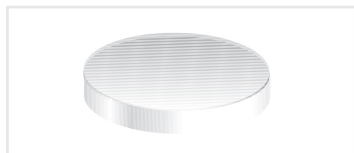


Reaction Vessel Solid 24

for 8 ml with valve, connectors, filter & septa

Recommended capacity: 5 ml

P/N 552-10830-00



Filter 16, pore size 25 μ

for reaction vessel Solid 16

P/N 23-30-01-03-68



Filter 20, pore size 25 μ

for reaction vessel Solid 20

P/N 23-30-01-03-69



Filter 24, pore size 25 μ

for reaction vessel Solid 24

P/N 23-30-01-03-70



Septa Solid

P/N 23-30-01-03-67



PTFE Tube (1/16'')

to connect vacuum distributor and Waste Cube to reaction vessel

P/N 23-30-01-03-66



Clamp Ring for PTFE Tubes (1/16'')

P/N 23-30-01-03-71



PTFE Vacuum Tube

to connect vacuum source to vacuum distributor

outer $\varnothing$ 8 mm; inner $\varnothing$ 6 mm

P/N 23-30-01-03-15



Temperature Sensor (135 mm)

for sample temperature, PTFE coated. Temperature control on base unit ensures that set temperature is reached precisely

P/N 552-50090-00

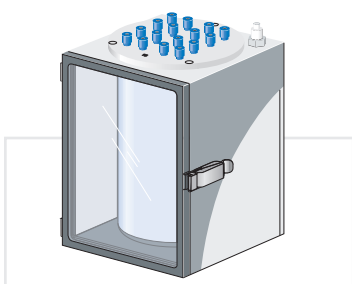


Guard Hood

with attachable hinge for added safety prevents condensation in reaction vessel

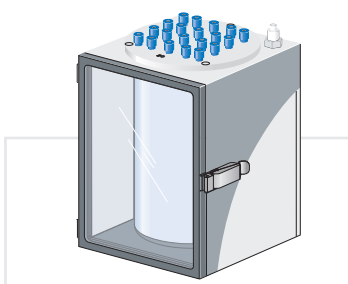
P/N 552-50091-00

Accessories for Solid Phase Synthesizers



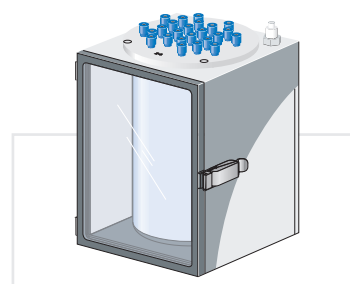
Waste Cube 16

with test tube rack, 16 test tubes, Waste Cube vessel, insert and 16 m PTFE tube
P/N 552-44200-00



Waste Cube 20

with test tube rack, 20 test tubes, Waste Cube vessel, insert and 20 m PTFE tube
P/N 552-42500-00



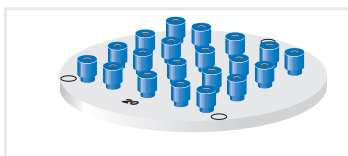
Waste Cube 24

with test tube rack, 24 test tubes, Waste Cube vessel, insert and 24 m PTFE tube
P/N 552-40800-00



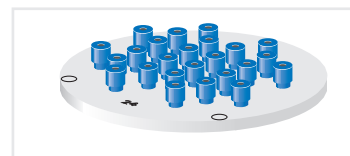
Insert for Waste Cube 16*

P/N 552-44210-00



Insert for Waste Cube 20*

P/N 552-42510-00



Insert for Waste Cube 24*

P/N 552-40810-00



Test Tube Rack 16 for Waste Cube 16*

with 16 test tubes of 42 ml each
P/N 552-44220-00



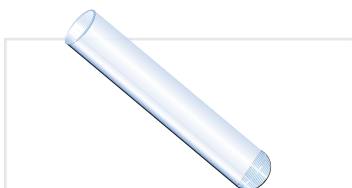
Test Tube Rack 20 for Waste Cube 20*

with 20 test tubes of 25 ml each
P/N 552-42520-00



Test Tube Rack 24 for Waste Cube 24*

with 24 test tubes of 8 ml each
P/N 552-40820-00



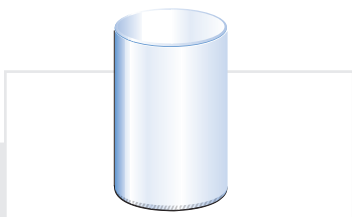
Test Tube for Test Tube Rack 16
for Waste Cube 16 (ø 25 x 150 mm)
P/N 552-44260-00



Test Tube for Test Tube Rack 20
for Waste Cube 20 (ø 20 x 150 mm)
P/N 552-42560-00



Test Tube for Test Tube Rack 24
for Waste Cube 24 (ø 14 x 130 mm)
P/N 552-40860-00



Waste Cube Vessel

for collection of washing solvents in Waste Cube; ø 120 x 187 mm
P/N 552-400600-00

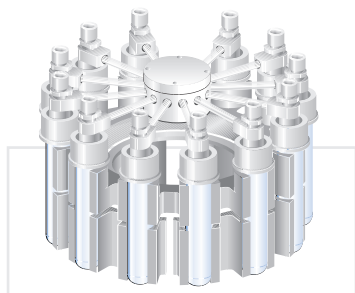


Blanking Screw Cap

for closing reaction vessels that will not be put under vacuum or inert atmosphere
P/N 23-30-01-03-72

* To convert an existing Waste Cube to a different number of test tubes

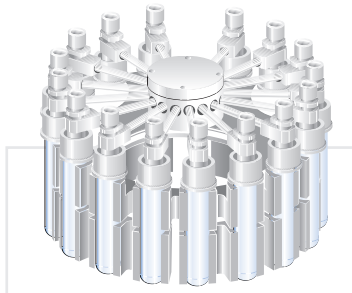
Accessories for Liquid Phase Synthesizers



Reaction Block Liquid 12

Interchangeable reaction block with 12 reaction vessels of 50 ml each, with vacuum distributor

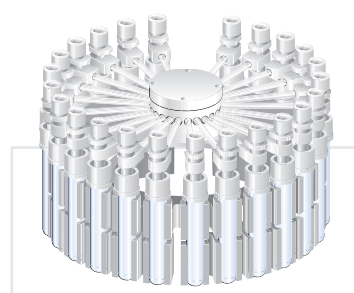
P/N 552-25010-00



Reaction Block Liquid 16

Interchangeable reaction block with 16 reaction vessels of 25 ml each, with vacuum distributor

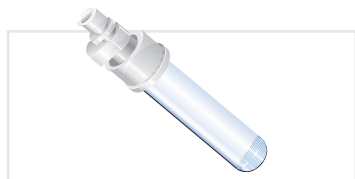
P/N 552-22510-00



Reaction Block Liquid 24

Interchangeable reaction block with 24 reaction vessels of 10 ml each, with vacuum distributor

P/N 552-21010-00



Reaction Vessel Liquid 12

Reaction vessel 50 ml with screw cap, valve, connector & septa
Recommended capacity: 25 ml

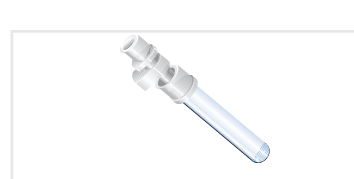
P/N 552-25030-00



Reaction Vessel Liquid 16

Reaction vessel 25 ml with screw cap, valve, connector & septa
Recommended capacity: 12 ml

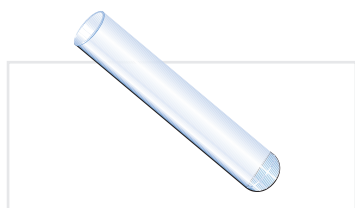
P/N 552-22530-00



Reaction Vessel Liquid 24

Reaction vessel 10 ml with screw cap, valve, connector & septa
Recommended capacity: 5 ml

P/N 552-21030-00



Glass Vessel Liquid 12 for 50 ml

P/N 552-25060-00



Glass Vessel Liquid 16 for 25 ml

P/N 552-22560-00



Glass Vessel Liquid 24 for 10 ml

P/N 552-21060-00



Temperature Sensor (135 mm) for Liquid 24

for sample temperature, PTFE coated.
Temperature control on base unit ensures that set temperature is reached precisely

P/N 552-50090-00

Temperature Sensor (170 mm) for Liquid 12 and 16

P/N 552-50092-00



PTFE Vacuum Tube

outer $\varnothing$ 8 mm; inner $\varnothing$ 6 mm

P/N 23-30-01-03-15

PTFE Connecting Tube 12 & 16

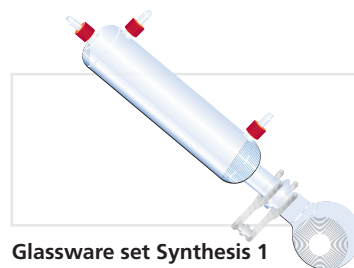
for reaction vessels Liquid 12 & 16
outer $\varnothing$ 8 mm; inner $\varnothing$ 6 mm

P/N 552-28680-00

PTFE Connecting Tube 24

for reaction vessels Liquid 24
outer $\varnothing$ 6 mm; inner $\varnothing$ 4 mm

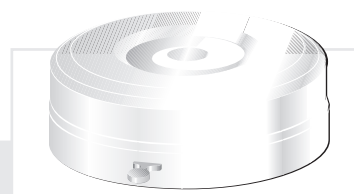
P/N 552-26480-00



Glassware set Synthesis 1 with attachment.

Upgrade to a multiple evaporator

P/N 552-50070-00



Guard Hood

with attachable hinge for added safety
prevents condensation in reaction vessel (comes as standard with multiple evaporator)

P/N 552-50091-00



Septa Liquid

P/N 23-30-01-03-73

StarFish Workstations

Have you always been looking for a means to perform numerous reactions on a small footprint to significantly reduce space and process times?

Turn your magnetic stirrer with our attachments into an efficiency increasing reaction station for up to 45 samples simultaneously

Upgrade your magnetic stirrer to a product with multiple capabilities; starting from simple heating and mixing tasks including chemical reactions, concentrations, extractions under vacuum and by providing protective gas

No special glassware purchase required - use your own glassware and cherry-pick the appropriate attachments for your applications

Base Plate

Base Plate with optional handles fits securely on to the top plate, maintaining good thermal contact with the heated surface

StarFish Base Plate (145 mm)	505-81000-00
StarFish Base Plate Handles (Pair)	505-81001-00



MonoBlocks

MonoBlocks are single blocks with multiple wells all of the same size and are ideal for experiments using the same vessel

MonoBlock for 5 x 250 ml Flasks	505-80001-00
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Inserts for MonoBlock 5 x 250 ml

150 ml Flask Insert	505-80040-00
100 ml Flask Insert	505-80041-00
50 ml Flask Insert	505-80042-00
25 ml Flask Insert	505-80043-00
10 ml Flask Insert	505-80044-00
5 ml Flask Insert	505-80045-00

MonoBlock for 16 x 25 mm Tubes	505-80002-00
MonoBlock for 16 x 24 mm Tubes	505-80003-00
MonoBlock for 40 x 16 mm Tubes	505-80004-00
MonoBlock for 40 x 12 mm Tubes	505-80005-00

MonoBlock for 16 x 28 mm Vials	505-80006-00
MonoBlock for 20 x 21 mm Vials	505-80007-00
MonoBlock for 40 x 17 mm Vials	505-80008-00
MonoBlock for 40 x 15 mm Vials	505-80009-00
MonoBlock for 40 x 12 mm Vials	505-80010-00

Numerous combinations

Cherry-pick from different PolyBlock options in different sizes or one MonoBlock system for identical round bottom flasks or vials. In addition you can choose from a large selection of inserts ranging from 5 ml to 150 ml to customize your MonoBlock 505-80001-00



StarFish Components

PolyBlocks

PolyBlocks are smaller segments (5 per StarFish) which can be mixed to accommodate any combination of vessel; allowing the use of different vessel types and sizes at the same time

PolyBlock for 1 x 250 ml Flask 505-80020-00

PolyBlock for 3 x 25 mm Tubes 505-80021-00

PolyBlock for 3 x 24 mm Tubes 505-80022-00

PolyBlock for 9 x 16 mm Tubes 505-80023-00

PolyBlock for 9 x 12 mm Tubes 505-80024-00

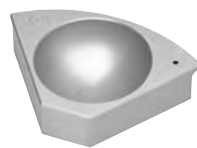
PolyBlock for 3 x 28 mm Vials 505-80025-00

PolyBlock for 3 x 21 mm Vials 505-80026-00

PolyBlock for 7 x 17 mm Vials 505-80027-00

PolyBlock for 9 x 15 mm Vials 505-80028-00

PolyBlock for 9 x 12 mm Vials 505-80029-00



Universal 5-way Clamps

The StarFish clamp allows you to hold glassware of virtually any size and comes with a choice of Silicone rubber or Velcro support straps. Each clamp features 5 telescopic arms which can be extended and locked in place to suit your needs. Using different straps on separate clamps allows you to grip the flask neck with the Silicone rubber strap for lifting, whilst the condenser above slides through the Velcro strap.



5-way Clamp
(Velcro)
P/N 505-81010-00



5-way Clamp
(Silicone strap and handle)
P/N 505-81020-00

Water Distribution Manifold

Allows coolant from a single source to be evenly distributed to up to five condensers and then the flow re-combined to one outlet pipe. Two manifolds are used in each set-up, one to distribute water to the condensers and one to collect coolant for recirculation or to drain. Connectors feature leak-proof shut-off valves



Water Manifold
with connector
P/N 505-81030-00

Gas/Vacuum Distribution Manifold

Allows gas or a vacuum from a single source to be evenly distributed to up to five positions or vessels (does not control or regulate gas/vacuum flow). Connectors feature leak-proof shut-off valves



Gas/Vacuum Manifold
with connector
P/N 505-81040-00

Replacement Self Adhesive Velcro Pads, 200 mm P/N 505-81070-00
(pack of 10)

Replacement Velcro Loop Strips, 200 mm P/N 505-81080-00
(pack of 5)

Replacement Silicone Straps, 200 mm P/N 505-81090-00
(pack of 5)

650 mm, Support Rod P/N 505-81050-00

650 mm, Support Split Rod P/N 505-81060-00

Technical specifications - Parallel Synthesizers

Model		Synthesis 1 Solid Phase Synthesis	Synthesis 1 Liquid Phase Synthesis	Synthesis 1 Multiple Evaporator
P/N		Synthesis 1 Solid 16: 552-14200-00 Synthesis 1 Solid 20: 552-12500-00 Synthesis 1 Solid 24: 552-10800-00	Synthesis 1 Liquid 12: 552-25000-00 Synthesis 1 Liquid 16: 552-22500-00 Synthesis 1 Liquid 24: 552-21000-00	Multiple Evaporator 12: 552-35000-00 Multiple Evaporator 16: 552-32500-00 Multiple Evaporator 24: 552-31000-00
Footprint (w x d)	(mm)	310 x 500	310 x 500	310 x 500
Material of reaction vessels		transparent PFA & PTFE	glass, PTFE caps	glass, PTFE caps
Vibration frequency	(rpm)	100 – 1,000	100 – 1,000	100 – 1,000
Orbit	(mm)	3	3	3
Drive		brushless, electronic D. C. motor	brushless, electronic D. C. motor	brushless, electronic D. C. motor
Heating		4 different heating zones with individual heat control and temperature display	4 different heating zones with individual heat control and temperature display	4 different heating zones with individual heat control and temperature display
Heating power	(W)	1,000	1,000	1,000
Temperature range / heating	(°C)	up to 160	up to 160	up to 160
Temperature range / cooling		down to - 80 by external chiller	down to - 80 by external chiller	down to - 80 by external chiller
Temperature accuracy	(°C)	± 1	± 1	± 1
Temperature display		digital	digital	digital
Temperature ramping		4 heating zones with individual heat control allow for programming of auto- mated temp. ramping with up to 9 steps	4 heating zones with individual heat control allow for programming of auto- mated temp. ramping with up to 9 steps	4 heating zones with individual heat control allow for programming of auto- mated temp. ramping with up to 9 steps
Number of reaction vessels and volume		16 reaction vessels of 42 ml each 20 reaction vessels of 25 ml each 24 reaction vessels of 8 ml each	12 reaction vessels of 50 ml each 16 reaction vessels of 25 ml each 24 reaction vessels of 10 ml each	12 reaction vessels of 50 ml each 16 reaction vessels of 25 ml each 24 reaction vessels of 10 ml each
Connection for inert gas atmosphere / vacuum		via distributor block	via distributor block	via distributor block
Adding of solvent		via injection needles through septa	via injection needles through septa	via injection needles through septa
Capacity of Waste Cube		1,000 ml	-	-
Interface RS 232		for monitoring and controlling temperature, vibration frequency and pressure*	for monitoring and controlling temperature, vibration frequency and pressure*	for monitoring and controlling temperature, vibration frequency and pressure*
Operating conditions	(°C)	0 - 40 at 80 % relative humidity	0 - 40 at 80 % relative humidity	0 - 40 at 80 % relative humidity
Protection class	(DIN EN 60529)	IP 20	IP 20	IP 20
Weight	(kg)	27,5	27,5	28,5
Timer	(min)	0 - 999	0 - 999	0 - 999
Over temperature protection		electronic	electronic	electronic
Supply power	(W)	1,120	1,120	1,120
Supply voltage	(**)	230 V / 50/60 Hz 115 V / 50/60 Hz	230 V / 50/60 Hz 115 V / 50/60 Hz	230 V / 50/60 Hz 115 V / 50/60 Hz

* Pressure can be controlled via optional vacuum controller only

** Standard 230 V / 50/60 Hz: others upon request, please specify for order

Technical Service



Stefan Schwarz

Head of Technical Service

Stefan Schwarz is responsible for all Technical Service Operations of the Repair Department. His team assists researchers and distributors in after sales subjects worldwide.

- Professional product repairs performed at authorized repair facilities
- Repair time turn-around within 4 days
- No charge quotes for all repairs
- No charge loaners are often available during repair period
- Most repair facilities will organize logistics on your behalf

Extension: +49 9122/9920-74 · **E-Mail:** Stefan.Schwarz@Heidolph.de

+49-9122-992074

We respond in less than 24 hours . . .

Guaranteed!

Reaction Optimization in the mg Range

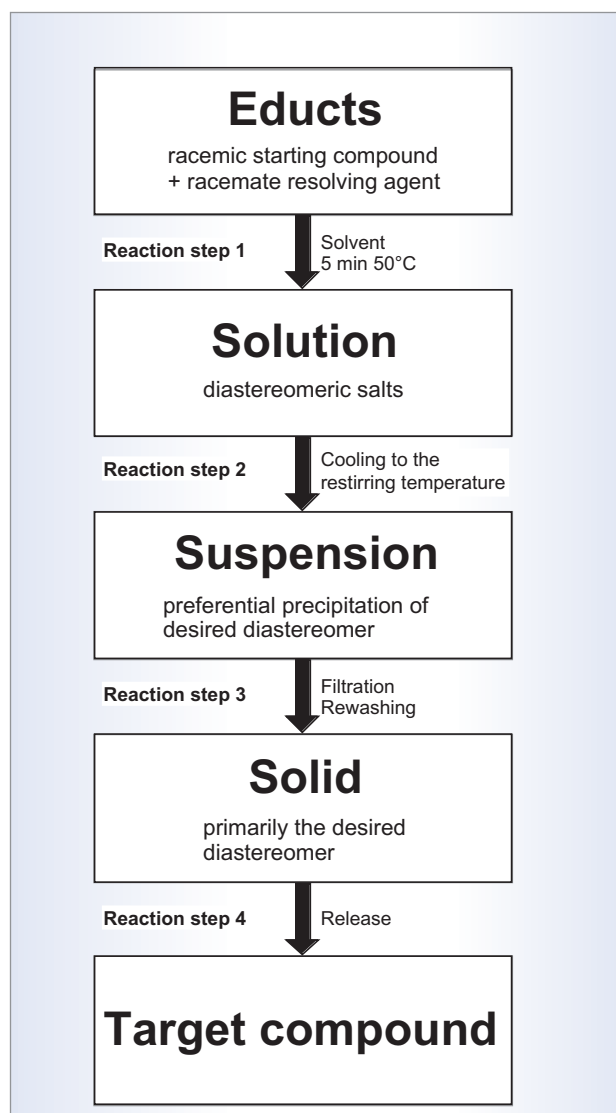


Diagram 1:
Procedure of the Screening and Optimization Phase

Johannes Keil, Jörg Rieke-Zapp*
Aventis Pharma Deutschland GmbH, Industriepark Höchst,
Building G838, 65926 Frankfurt

Predominantly manual processes using reaction blocks have become established as the method of choice for the screening of reaction conditions during chemical development, when 10 to 100 reactions are to be tested. The advantage of this small-volume system with an effective volume of 5-20 ml per reactor is a flexible, block-type approach to the screening phase. This is a time-saving process with the educts often available only in small amounts.

Efforts to use these screening systems for optimizing reaction conditions showed that magnetically stirred systems do, in fact, produce internally consistent results in heterogeneous reactions; however, a considerable scale-up effect is often observed later.

These effects are attributable to reactor geometry, heat transfer, and above all the grinding effects of the magnetic stirrer. The Synthesis 1 now offers - apart from reactor geometry - suitably adaptable heating-cooling behavior and accomplishes the mixing by shaking the reaction vessels. After initial positive results with screening, the equipment was then also used for optimizing heterogeneous reactions, in which previously employed magnetically stirred systems have not proven effective thus far. Finally, the screening and optimization phase of a classical racemate resolution is described, which later was also run on the kg scale.

Experimental Work

In the racemate resolution process described here, diastereomeric salt pairs of the starting compound were first formed with a suitable racemate resolving agent. The preferential crystallization of the desired diastereomer from the reaction solution took place the release of the target compound from the salt, which had previously been isolated by filtration (Diagram 1).

The objective for the reaction step optimized here was to isolate the desired enantiomer from the starting compound in a yield of 75 - 80% (based on the pure enantiomer) and an optical purity of > 60% ee.

Screening of the Reaction Solvent

Selecting the correct solvent for the process was vitally important. In a first block test, 16 reactions (Diagram 1) were run simultaneously with different solvents in Synthesis 1 to determine the best process solvent. Based on the results, 2-propanol was identified as the solvent of choice.

Table 1: First Optimization Block with Statistical Test Planning

Batch No.	RA/[equiv.]	Sol _P /[ml]	Sol _W /[ml]	t/[h]	T/[°C]	ee-value/[%]	Yield [%]*
1	0.5	4	4	2	10	46	15
2	1.0	4	4	2	30	35	79
3	0.5	10	4	2	30	73	33
4	1.0	10	4	2	10	49	77
5	0.5	4	10	2	30	61	44
6	1.0	4	10	2	10	39	43
7	0.5	10	10	2	10	67	37
8	1.0	10	10	2	30	52	65
9	0.5	4	4	24	30	68	54
10	1.0	4	4	24	10	35	74
11	0.5	10	4	24	10	68	45
12	1.0	10	4	24	30	50	83
13	0.5	4	10	24	10	68	41
14	1.0	4	10	24	30	27	89
15	0.5	10	10	24	30	80	45
16	1.0	10	10	24	10	60	70

RA: racemate resolving agent; Sol_P: solvent (process); Sol_W: solvent (washing);

t: restirring time; T: restirring temperature

*isolated yield from reaction step 3 (based on the desired enantiomer)

Optimizing the Reaction Conditions

Statistical reaction planning was used in the optimization phase. The procedure again followed Diagram 1. The factorial plan was created and evaluated using the software STAVEX (AICOS Technologies AG). The amount of solvent for the first reaction step (see Diagram 1), the amount of the racemate resolving agent (based on the starting compound), temperature and time for the second reaction step, and the solvent volume for rewashing the filter residue were used first as the variable parameters. The evaluation of the test series (Table 1) led to a factor reduction for further optimization. The volumes for the reaction and rewashing were maintained in the subsequent optimization step. The time frame for the second reaction step was expanded to 6-30 hours and the amount of added racemate resolving agent was varied between 0.8 and 1.2 equivalents. The tests together with the results are listed in Table 2. The validity of the calculated model was tested with two verification tests with regard to yield and the ee value (see Fig. 1). The experimentally and theoretically obtained data are compared in Table 3. As a result, the model was confirmed on the small scale. A scale-up test and the subsequent transfer to the kg scale in the pilot plant showed no scale-up effects. The objective for the process could be easily achieved.

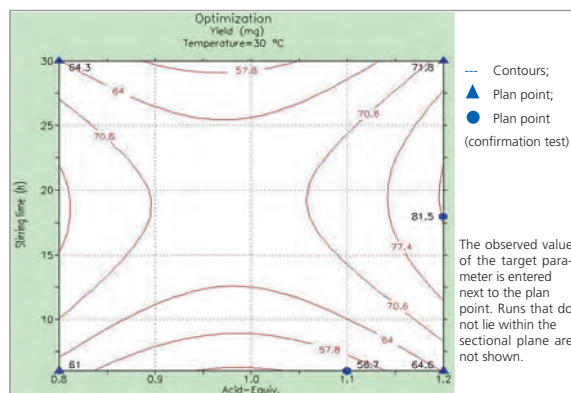


Fig. 1. Contour plot

Summary

Both solvent screening and optimization of reaction conditions for the scale-up of a racemate resolution could be performed with the use of Synthesis 1. Here, Synthesis 1 was superior to the conventional screening blocks with magnetic stirring - the obtained results could be applied 1:1 to the scale-up phase. The screening and optimization tests for the studied racemate resolution were successfully completed with < 10 g of starting material in less than a week.

Table 2. Second Optimization Block after Factor Reduction

Batch No.	RA/[equiv.]	Sol _P /[ml]	Sol _W /[ml]	t/[h]	T/[°C]	ee-value[%]	Yield [%]*
1	0.8	4	4	6	10	55	61.5
2	1.2	4	4	6	10	56	54.3
3	0.8	4	4	30	10	51	62.2
4	1.2	4	4	30	10	54	61.2
5	0.8	4	4	6	30	53	61.0
6	1.2	4	4	6	30	62	64.6
7	0.8	4	4	30	30	55	64.3
8	1.2	4	4	30	30	61	71.8
9	1.0	4	4	18	20	51	67.4
10	0.9	4	4	18	20	53	68.1
11	1.1	4	4	18	20	60	69.0
12	1.0	4	4	10	20	65	56.7
13	1.0	4	4	26	20	53	61.1
14	1.0	4	4	18	15	56	62.2
15	1.0	4	4	18	25	59	68.5

RA: racemate resolving agent; Sol_P: solvent (process); Sol_W: solvent (washing); t: restirring time; T: restirring temperature

*isolated yield from reaction step 3 (based on the desired enantiomer)

Table 3. Confirmation Tests (90% confidence region)

Confirmation test Yield			Yield[%] experimental	Yield[%] experimental	ee value [%]* experimental
RA/[equiv.]	t/[h]	T/[°C]			
1.2	18	30	85.02	81.5	72.2

Confirmation test ee value			ee value [%]* calc. mean	ee value [%]* experimental	Yield[%] experimental
RA/[equiv.]	t/[h]	T/[°C]			
1.1	6	30	63.85	62.6	56.7

RA: racemate resolving agent; t: restirring time; T: restirring temperature

*isolated yield from reaction step 3 (based on the desired enantiomer)

Certificate

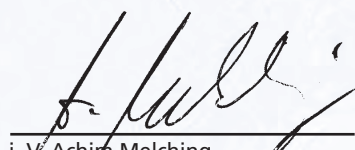
To confirm the ability for
continuous operation

of the MR Series Magnetic Stirrers with hotplate

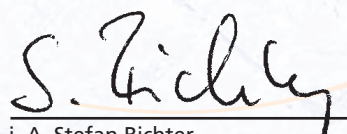
The MR Series Magnetic Stirrers with hotplate feature over temperature safety circuits according to DIN EN 61010-1:2001 and DIN EN 61010-2-010:2003 and therefore, are designed for **continuous operation**.

This statement is made under the precondition that all units are operated in accordance with the operation manual and in accordance with good practice standards for safety in laboratories, rules for accident preventions, and compliance with directions on hazardous materials.

Schwabach, October 2010



i. V. Achim Melching
Technical Director



i. A. Stefan Richter
Quality Control Director

Safe Heating and Mixing



- 800 Watt heating power
- Chemically resistant hotplate
- Overtemperature cut off

Short heat up times

...don't **worry**
about **a thing**

Safe Heating and Mixing

The extended heating capacity of **800 W**
reduces heat up times by 35 % compared
to other units at 600 W

Hermetically **sealed housing**
protects all mechanical and
electronic components **from**
aggressive environments

KeraDisk® allows for **immediate heat**
transfer resulting in quick heat up times
and **chemically resistant** surface

In case the heating
function fails, stirring
will not be discontinued
to **avoid thermal damage**
to your sample

An **over temperature**
circuit switches off the hot
plate if an over temperature
situation occurs. The **unit will**
power off completely in case
of a short-circuit, damage to the
temperature sensor or other incidences
during operation

A damage to the stirrer is categorically ruled out even if
exposed to the highest temperatures – all models come
with a **fire resistant aluminum die-cast housing**

A separate on/off button for heating
prevents unintentional heat up – the
button is illuminated for visual control



The average operational **lifespan of 10 years** is backed by a 3 year warranty
and makes your purchase a truly worthwhile investment

Kera-Disk® top plate

Fast heat up times and chemical resistance of top plate is no longer a competing relationship. The Kera-Disk® material coating makes this a reality.

Aluminum top plates allow for an immediate heat transfer but are not chemically resistant or scratch proof

Glass ceramic top plates are chemically resistant and scratch proof but produce longer heat up times



Kera-Disk® top plates include the best of two worlds:

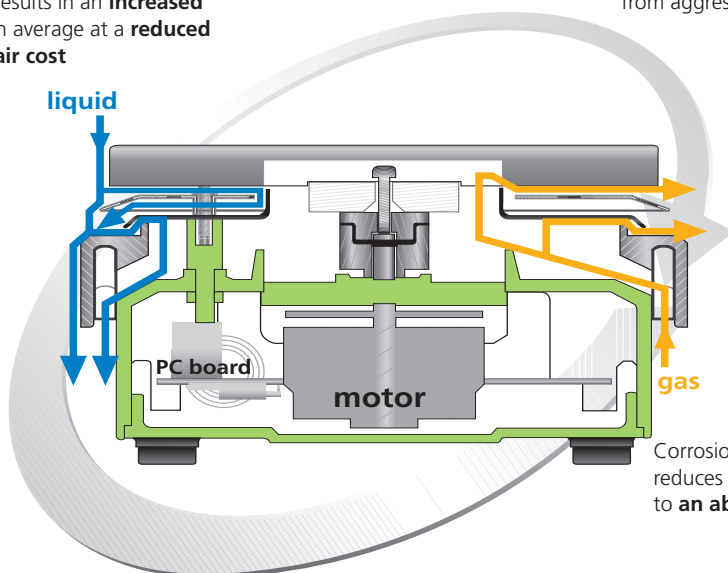
The aluminum top plate allows for immediate heat transfer for quick heat up times and a thin layer of ceramic coating makes the top plates chemically resistant and scratch proof

Sealed housing

Do you require extended performance life and reduced maintenance for your hotplates?

The sealed housing protects your magnetic stirrer from aggressive fumes, liquids and vapors to prevent internal corrosion. This results in an **increased lifespan of 10 years** on average at a **reduced maintenance and repair cost**

Hermetically **sealed housing** protects all mechanical and electronic components from aggressive environments



Corrosion is prevented effectively which reduces maintenance and repair costs to **an absolute minimum**

The hermetically sealed housing that protects the PC board and the motor is marked in **green**.

The way a liquid would take flowing down from the hotplate is marked in **blue**. As one can see, even if the liquid reaches the heat shields, it cannot penetrate to where the PC board or the motor is but will be led outwards.

The **yellow** marked line shows that gas cannot penetrate and get to the PC board and the motor.

The apparent crack is due to temperature insulation. Because of that crack the temperature inside the magnetic stirrer stays substantially lower by what the durability of the magnetic stirrer is significantly increased.

For protection against liquid and gas, the heating elements are completely embedded in ceramic.

Your advantages - our Hei-lights

For your safety

- To prevent accidents or laboratory fires, all magnetic stirrers feature an **over temperature circuit** which switches off the hotplate if an over temperature situation occurs - in combination with Heat-On attachments you can convert your lab into a "safety zone"
- A damage to the stirrer even if exposed to the highest temperatures is categorically ruled out – all models came with a **fire resistant aluminum die-cast housing**
- Hotplate **residual heat indicator** in the digital display is illuminated when unit is turned off and hotplate temperature is above 50 °C to warn operator of potential burn hazards
- For your safety the **unit will power off** in case of a short-cut, a damage to the temperature sensor, a motor failure or other incidences during operation
- To protect you from splashes and scalding from bath media, rotation speed **ramps up slowly** until unit has reached the pre-programmed speed
- In case the heating function fails, stirring will not be discontinued to **avoid thermal damage** to your sample
- A separate on/off switch for heating **prevents an unintentional heat up**. If heating is switched on, the on/off button is illuminated for visual control



For your ease of use

- All units with digital display allow for easy setting and monitoring values on the **illuminated read out**
- You can even **work with dry ice** - a robust thermal insulation prevents corrosion inside the housing by preventing condensate collecting and dripping on any electronic components
- An optional **software** program is available for the MR Hei-End to aid you in **automating your process**, and software saves all data in electronic files
- The unique Kera-Disk® coating is extremely chemically resistant and scratch proof and can be **cleaned easily** if solvents, oil or other contaminations are spilled on the plate
- The strong magnetic field allows for **stirring** of even higher **viscosity media with ease**



Reduce your cost of ownership

- **Reduce your process times!** The extended heating capacity of 800 W reduces your heat up time by 35 % compared to other units at 600 W
- The sealed housing protects the electronics and the non maintenance of sparkless motors **reduce down times**
- The design and features give an **increased lifespan of 10 years** along with significantly **reduced maintenance and repair costs**

Magnetic stirring hotplates

Preferred use of MR Series magnetic stirrers includes smooth to intense mixing and heating of low-viscosity fluids. Your first choice for decomposing organic and inorganic substances.

Include all standard features for safety, ease of use and reduced cost of ownership plus

- The hotplate reaches a maximum temperature of 300 °C and due to the 800 W heating power in a significantly reduced time
- Safety circuits avoid an overheat situation of your hotplate: If the temperature overshoots the heating will be powered off immediately
- The strong magnetic field allows for stirring of even higher viscosity media or stirring a volume of 20 liters of water with ease
- Variable speed is adjustable from 30 to 1,400 rpm at an accuracy of $\pm 1\%$ for gentle mixing



Convert your magnetic stirrer over to a time saving multiple reaction workstation



By far the safest, fastest and most time efficient method to heat and stir a sample in a round bottom flask

Heat-On systems



MR Hei-Standard

Model for standard applications without display



MR Hei-Standard
P/N 505-20000-00

- For your protection, an independent safety circuit will switch off heating if hotplate temperature goes above 25 °C of set temperature
- Upgrade this magnetic stirrer with the optional digital thermometer, EKT Hei-Con, that provides precise temperature control to give you temperature overshoot protection and reproducible results
- A separate on/off switch for heating prevents an unintentional heat up. If heating is switched on, the on/off button is illuminated for visual control
- Large analog knobs allow for convenient speed setting from 100 to 1,400 rpm at an accuracy of 2 % and temperature setting up to 300 °C

MR Hei-Tec

Model for higher requirements and reproducible results



MR Hei-Tec
P/N 505-30000-00

- This unit features a digital display and allows for easy setting and monitoring values on the illuminated read out
- For your protection, an independent safety circuit will switch off heating if hotplate temperature goes above 25 °C of set temperature
- Digital speed setting from 100 to 1,400 rpm at an accuracy of 2 % and temperature setting up to 300 °C
- A separate on/off switch for heating prevents an unintentional heat up. If heating is switched on, the on/off button is illuminated for visual control
- Upgrade this magnetic stirrer with the optional digital thermometer, EKT Hei-Con, that provides precise temperature control to give you temperature overshoot protection and reproducible results

MR Hei-End

Model for highest safety



MR Hei-End
P/N 505-50000-00

- An independent safety circuit switches off heating at an operator pre-programmed temperature value between 10 - 25 °C above your set temperature
- Additional operational safety step is required to change parameters which prevents unwanted changes to the actual setting
- Digital display allows for easy setting and monitoring values on the illuminated read out. Speed setting from 30 to 1,400 rpm at an accuracy of 1 % and temperature setting up to 300 °C
- Hotplate residual heat indicator in the digital display illuminates when unit is turned off and hotplate temperature is above 50 °C to prevent accidental operator injury
- To protect your sample from overheating, a safety circuit switches off heating if the temperature sensor is not immersed in your media vessel
- A separate on/off switch for heating prevents an unintentional heat up. If heating is switched on, the on/off button is illuminated for visual control

Software

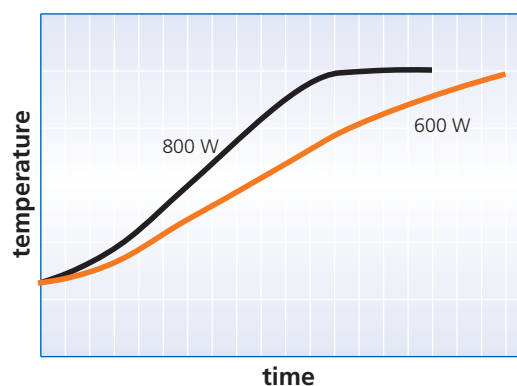
- Utilize the optional software to control and document the entire process. Unit features a digital RS 232 and analog interface for connecting the optional software easily



Hei-PC-Control MR Hei-End Software
P/N 592-50500-00

Heat up graph

- Take advantage of a built-in PID controller that ensures fastest heat up times while preventing an over temperature situation of your sample



Contact thermometer EKT Hei-Con

Medium temperature control made easy

- For precise temperature control we recommend the optional **EKT Hei-Con** which is suitable for the **MR Hei-Standard** and **MR Hei-Tec** models
- Take advantage of the built-in Fuzzy-Logic controller that ensures the fastest heat up while preventing an over temperature situation
- Works efficiently in a very hot environment or under steamy conditions
- Double-spaced digital display for convenient monitoring of the illuminated read out
- By the press of the MAX-button you can see the over temperature at which the unit for safety reasons will power off
- All heating settings of the hotplate will be indicated on the EKT Hei-Con display
- To make troubleshooting easy, a sensor feature signals if any short-circuit or breakage occurs on the display to inform operator of disruption
- Equipment automatically switches off heating if temperature sensor is not in contact with the media or is removed from the vessel unintentionally

Accessories

- Temperature sensors are available in two different options: stainless steel or glass coated sensor for improved chemical resistance
- Please order stay bar and temperature sensor holder separately

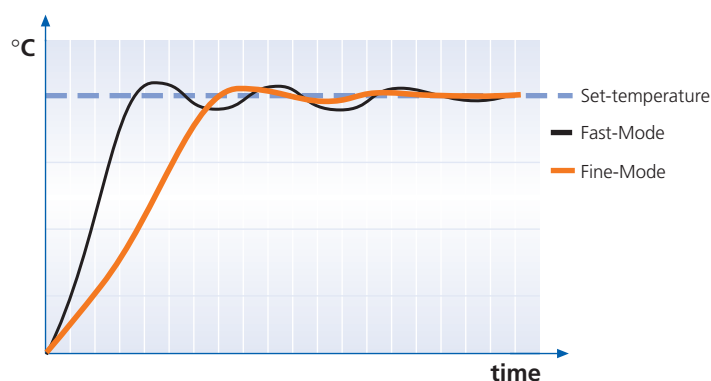


EKT Hei-Con
stainless steel sensor
P/N 509-88000-00

EKT Hei-Con G
glass coated sensor
P/N 509-88100-00

Select between these two modes:

- The time-saving **Fast-Mode** – guarantees **shortest heating-up times**
- The precise **Fine-Mode** – ideal to **prevent an over temperature situation** categorically



Contact thermometer EKT Hei-Con

Temperature range	(°C)	-50 to +300
Resolution	(°C)	1
Accuracy of measurement	(°C)	± 1
Measuring cycle	(sec)	1.5
Control accuracy	(°C)	± 0.5
Temperature sensor EKT Hei-Con		Pt 1000, V2A
Temperature sensor EKT Hei-Con G		Pt 1000, glass
Sensor length	(mm)	210

Cable length	(mm)	700
Min. immersion depth	(mm)	20
Ambient temperature range	(°C)	-5 to +60
Housing		Polyamide
Weight	(kg)	0.3
Dimension l x w x h	(mm)	54 x 22 x 126
Protection class	(DIN EN 60529)	IP 40
Power supply	(V)	8 -15

Magnetic stirrers without heating

For gentle stirring in biology and microbiology applications

Hei-Mix D / Hei-Mix L

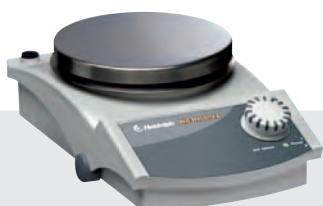


- Top plate is insulated from the motor and protects your heat sensitive samples from any thermal damage
- To treat your sample gently and protect it from damage the rotation speed ramps up slowly until it has reached the pre-programmed speed
- Top plate diameter of 145 mm and a speed range from 100 to 1,400 rpm is ideal for quantities up to 20 liter
- Hermetically sealed housing prevents corrosion and increases the service life of your unit
- You can even work with dry ice - a robust thermal insulation prevents corrosion inside the housing minimizing any dripping of condensate on the electronic components
- These models comes with a top plate material of finest quality stainless steel

Hei-Mix S



- Stir quick and efficiently with an extended speed range up to 2,200 rpm
- Long lasting polyamide housing and PVDF top plate material
- Ideal for titrations due to white colored top plate
- Space saving unit for efficiently mixing sample sizes up to 5 liter. Small footprint of 126 x 80 x 140 mm only, and the top plate comes with a diameter of 104 mm



MR Hei-Mix L (without display)
P/N 505-00000-00



MR Hei-Mix D
P/N 505-01000-00



MR Hei-Mix S
P/N 503-02000-00

Heat-On attachments

Is safety at work and fire prevention from oil baths or heating mantles a priority in your lab?

Do you want to minimize the messy oil clear ups from changing oil or removing flasks from an oil bath?

Our attachments are by far the safest, fastest and most efficient method for heating and mixing solutions in round bottom flasks from 10 ml to 5 liter.

Heat-On aligns accurately to every flask insuring maximum surface contact and fast heat transfer.

Eliminates the mess from cleaning flasks after removing from an oil bath or hazardous spills when an oil bath slips off a stirring plate. As a result oil as a heat transfer media is made redundant and your lab is a safer place with the Heat-On block system.

For your safety

- Prevents accidents, fires and contamination by completely banning all oil baths from your laboratory
- This unique design prevents glass breakage and protects you from spilled chemicals or solvents
- The high temperature range provides unlimited safety for applications up to 260 °C

For your ease of use

- A unique PFA coating on the aluminum Heat-On body allows for superior chemical resistance and many years of service life
- Control temperature precisely inside the vessel or on the heating block with a thermocouple port that provides actual block temperature back to your MR Series hotplate

Reduce your cost of ownership

- Increase your daily work throughput significantly and reduce your over all process times by quick changing of Heat-On blocks
- 1,000 ml of water heats up 66 % faster than conventional oil baths
- 150 ml of water boils in less than 11 minutes



Flask Volume	Volume of Water	Hotplate Temperature	Time to reach boiling
10 ml	6 ml	300 °C	6.8 mins
25 ml	15 ml	300 °C	8.0 mins
50 ml	30 ml	300 °C	8.5 mins
100 ml	60 ml	300 °C	8.8 mins
150 ml	100 ml	300 °C	10.0 mins
250 ml	150 ml	300 °C	10.8 mins
500 ml	300 ml	300 °C	16.4 mins
1,000 ml	600 ml	300 °C	21.1 mins
2,000 ml	1,200 ml	300 °C	35.1 mins
5,000 ml	3,000 ml	300 °C	75.5 mins

For best results, we recommend round-bottom flasks which complies with DIN EN ISO 4797 and DIN EN ISO 24450

Heat-On Blocks

Each Heat-On block is a stand-alone product that can be placed directly onto the stirring hotplate

Heat-On 250 ml Block	505-80067-00
Heat-On 250 ml Block with flask sidearm cutouts	505-80067-01
Heat-On 500 ml Block	505-80069-00
Heat-On 1 Liter Block	505-80071-00
Heat-On 2 Liter Block	505-80073-00
Heat-On 3 Liter Block	505-80075-00
Heat-On 5 Liter Block	505-80076-00



Heat-On 250 ml Block with flask sidearm cutouts



Heat-On 2 Liter Block

Multi-Well Holder and Inserts

This unique Multi-Well Holder is designed to hold either one or two inserts for flasks*.

The inserts are available for 10 ml, 25 ml, 50 ml, 100 ml and 150 ml flasks. Flask inserts also feature cut-away sides for use with two or three neck flasks and accept the optional safety lifting handles.

*Only accepts one 150 ml insert

Inserts for Multi-Well Holder

Heat-On 10 ml Insert	505-80061-00
Heat-On 25 ml Insert	505-80062-00
Heat-On 50 ml Insert	505-80063-00
Heat-On 100 ml Insert	505-80064-00
Heat-On 150 ml Insert	505-80065-00



Heat-On Multi-Well Holder
P/N 505-80060-00



Heat-On 10 ml Insert



Heat-On 50 ml Insert

Heat-On Multi-Well Packages

Package Heat-On Multi-Well Basic including 1x Multi-Well holder and 3 inserts for 25, 50 and 100 ml flasks	505-81300-00
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Package Heat-On Multi-Well including 1x Multi-Well holder and 6 inserts, 2 each for 25, 50 and 100 ml flasks	505-81200-00
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Heat-On Accessories

Support Rod for Heating bath 4 L	509-97000-00
Retort Clamp	505-81075-00
Boss Head	570-31100-00

Flask Stand & Clamp Kit (including Support Rod for Heating bath 4 L, Retort Clamp, Boss Head)	505-81400-00
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Adapter Plate for 135 mm hotplate	505-81000-01
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Heat-On Safety Handles (pair)
P/N 505-80077-00

PTFE Safety Cover

for Heat-On Multi-Well Holder	505-80080-00
for Heat-On 200-300 ml Block	505-80081-00
for Heat-On 500 ml Block	505-80082-00
for Heat-On 1 Liter Block	505-80083-00



Heat-On Safety Cover 500 ml

StarFish workstations

Have you always been looking for a means to perform numerous reactions on a small footprint to significantly reduce space and process times?

Turn your magnetic stirrer with our attachments into an efficiency increasing reaction station for up to 45 samples simultaneously

Upgrade your magnetic stirrer to a product with multiple capabilities; starting from simple heating and mixing tasks including chemical reactions, concentrations, extractions under vacuum and by providing protective gas

No special glassware purchase required - use your own glassware and cherry-pick the appropriate attachments for your applications

Base Plate

Base Plate with optional handles fits securely on to the top plate, maintaining good thermal contact with the heated surface

StarFish Base Plate (145 mm)	505-81000-00
StarFish Base Plate Handles (Pair)	505-81001-00



MonoBlocks

MonoBlocks are single blocks with multiple wells all of the same size and are ideal for experiments using the same vessel

MonoBlock for 5 x 250 ml Flasks	505-80001-00
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Inserts for MonoBlock 5 x 250 ml

150 ml Flask Insert	505-80040-00
100 ml Flask Insert	505-80041-00
50 ml Flask Insert	505-80042-00
25 ml Flask Insert	505-80043-00
10 ml Flask Insert	505-80044-00
5 ml Flask Insert	505-80045-00

MonoBlock for 16 x 25 mm Tubes	505-80002-00
MonoBlock for 16 x 24 mm Tubes	505-80003-00
MonoBlock for 40 x 16 mm Tubes	505-80004-00
MonoBlock for 40 x 12 mm Tubes	505-80005-00

MonoBlock for 16 x 28 mm Vials	505-80006-00
MonoBlock for 20 x 21 mm Vials	505-80007-00
MonoBlock for 40 x 17 mm Vials	505-80008-00
MonoBlock for 40 x 15 mm Vials	505-80009-00
MonoBlock for 40 x 12 mm Vials	505-80010-00

Numerous combinations

Cherry-pick from different PolyBlock options in different sizes or one MonoBlock system for identical round bottom flasks or vials. In addition you can choose from a large selection of inserts ranging from 5 ml to 150 ml



PolyBlocks

PolyBlocks are smaller segments (5 per StarFish) which can be mixed to accommodate any combination of vessels; allowing the use of different vessel types and sizes at the same time

PolyBlock for 1 x 250 ml Flask 505-80020-00

PolyBlock for 3 x 25 mm Tubes 505-80021-00

PolyBlock for 3 x 24 mm Tubes 505-80022-00

PolyBlock for 9 x 16 mm Tubes 505-80023-00

PolyBlock for 9 x 12 mm Tubes 505-80024-00

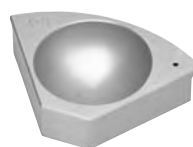
PolyBlock for 3 x 28 mm Vials 505-80025-00

PolyBlock for 3 x 21 mm Vials 505-80026-00

PolyBlock for 7 x 17 mm Vials 505-80027-00

PolyBlock for 9 x 15 mm Vials 505-80028-00

PolyBlock for 9 x 12 mm Vials 505-80029-00



Universal 5-way Clamps

The StarFish clamp allows you to hold glassware of virtually any size and comes with a choice of Silicone rubber or Velcro support straps. Each clamp features 5 telescopic arms which can be extended and locked in place to suit your needs. Using different straps on separate clamps allows you to grip the flask neck with the Silicone rubber strap for lifting, whilst the condenser above slides through the Velcro strap



5-way Clamp
(Velcro)
P/N 505-81010-00



5-way Clamp
(Silicone strap and handle)
P/N 505-81020-00

Water Distribution Manifold

Allows coolant from a single source to be evenly distributed to up to five condensers and then the flow re-combined to one outlet pipe. Two manifolds are used in each set-up, one to distribute water to the condensers and one to collect coolant for recirculation or to drain. Connectors feature leak-proof shut-off valves



Water Manifold
with connector
P/N 505-81030-00

Gas/Vacuum Distribution Manifold

Allows gas or a vacuum from a single source to be evenly distributed to up to five positions or vessels (does not control or regulate gas/vacuum flow). Connectors feature leak-proof shut-off valves



Gas/Vacuum Manifold
with connector
P/N 505-81040-00

Replacement Self Adhesive Velcro Pads, 200 mm P/N 505-81070-00
(pack of 10)

Replacement Velcro Loop Strips, 200 mm P/N 505-81080-00
(pack of 5)

Replacement Silicone Straps, 200 mm P/N 505-81090-00
(pack of 5)

650 mm, Support Rod P/N 505-81050-00

650 mm, Support Split Rod P/N 505-81060-00

Accessories



1 L Heating Bath
PTFE coated
P/N 504-93100-00



2 L Heating Bath
PTFE coated
P/N 504-92100-00



4 L Heating Bath
PTFE coated
P/N 504-91100-00



1 L Heating Bath for Oil
max. temperature 250 °C
P/N 504-93000-00



2 L Heating Bath for Oil
max. temperature 250 °C
P/N 504-92000-00



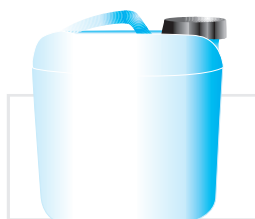
4 L Heating Bath for Oil
max. temperature 250 °C
P/N 504-91000-00



Concave Block Adaptor
for 1 L round bottom flasks
P/N 504-94000-00



Temperature Sensor Holder
for EKT Hei-Con or Pt 1000
P/N 509-67000-00



Heating Bath Fluid 5 L
for up to 240 °C, mixable
with water
P/N 515-31000-00



Pt 1000 Temperature Sensor - glass coated
for model: MR Hei-End
P/N 509-67920-00
Pt 1000 Temperature Sensor - stainless steel
for model: MR Hei-End
P/N 509-67910-00



Support Rod
for temperature sensor
length: 425 mm, Ø 13 mm
material: stainless steel
P/N 509-81000-00
Support Rod for 4 L Heating Bath/Heat-On
P/N 509-97000-00



Holding Device MR Hei
for safe fixation on lab frames to gain extra lab space. Comes with clamp as standard.
P/N 509-96000-00



Silicone Protective Cover
Replaceable cover against splashes and dripping water for MR Hei-Mix D, MR Hei-Mix L, MR Hei-Tec and MR Hei-End
P/N 23-07-06-05-59
for MR Hei-Standard
P/N 23-07-06-05-63



Stirring Bars, cross shape



Stirring Bars, oval shape



Stirring Bars, elliptical shape

Stirring Bars

Stirring Bars - cylindrical shape (25, 40, 50 mm each)	509-56000-00
Stirring Bars - cross shape (10 mm) pack of 40 pcs. for 5 to 10 ml flasks	509-58400-00
Stirring Bars - cross shape (16.5 mm) pack of 20 pcs. for 25 to 50 ml flasks	509-58500-00
Stirring Bars - elliptical shape (25 mm) pack of 10 pcs. for 100 to 400 ml flasks	509-58600-00
Stirring Bars Evaluation Kit pack of 10	509-58300-00

Stirring Bars - oval shape (15x6 mm) pack of 3 pcs. for 10 ml flasks	509-53000-00
Stirring Bars - oval shape (25x10 mm) pack of 3 pcs. for 25 to 50 ml flasks	509-54000-00
Stirring Bars - oval shape (30x10 mm) pack of 3 pcs. for 100 to 250 ml flasks	509-55000-00
Stirring Bars - oval shape (40 mm) pack of 5 pcs. for 500 to 1000 ml flasks	509-58100-00
Stirring Bars - oval shape (50 mm) pack of 5 pcs. for 2000 ml flasks	509-58200-00

Complete packages at a special price

Package MR Hei-Standard

This package includes:

- Magnetic Stirrer MR Hei-Standard
- EKT Hei-Con with temperature sensor
- Support Rod for EKT Hei-Con
- Clamp for temperature sensor

P/N 505-20090-00

Packages Heat-On

Package MR Hei-Tec Multi-Well

This package includes:

- Magnetic Stirrer MR Hei-Tec
- EKT Hei-Con with temperature sensor
- Support Rod for EKT Hei-Con
- Heat-On Multi-Well system including Multi-Well Holder and the following inserts: 2 x 25 ml, 2 x 50 ml, 2 x 100 ml
- 2 x Retort Clamp, 2 x Boss Head

P/N 505-81600-00

Package MR Hei-Standard Multi-Well

This package includes:

- Magnetic Stirrer MR Hei-Standard
- EKT Hei-Con with temperature sensor
- Support Rod for EKT Hei-Con
- Heat-On Multi-Well system including Multi-Well Holder and the following inserts: 2 x 25 ml, 2 x 50 ml, 2 x 100 ml
- 2 x Retort Clamp, 2 x Boss Head

P/N 505-81500-00

Package StarFish

Package MR Hei-End Multi Workstation

This package includes:

- Magnetic Stirrer MR Hei-End
- Temperature Sensor Pt 1000
- Base Plate
- MonoBlock for 5 x 250 ml Flasks
- 2 x 100 ml Flask Insert
- 2 x 50 ml Flask Insert
- 1 x 25 ml Flask Insert
- 5-way Clamp (Velcro Strap)
- 5-way Clamp (Silicone Strap & Long Handle)
- 2 x Water Manifold
- 1 x Gas/Vacuum Manifold
- 650 mm Split Rod

P/N 505-81100-00



Heidolph Instruments offers you a complete system available from one manufacturer.

All components are designed to function together perfectly – that guarantees smooth, safe and efficient operation.

This is what we mean by „Research made easy“ – to help you concentrate on research, with your findings, your company and millions of people worldwide in mind.



Call us for a no obligation demo

Technical Specifications - Magnetic Stirrers

Model		MR Hei-Mix S	MR Hei-Mix L	MR Hei-Mix D	MR Hei-Standard	MR Hei-Tec	MR Hei-End
P/N	(230 V)	503-02000-00	505-00000-00	505-01000-00	505-20000-00	505-30000-00	505-50000-00
Speed, max.	(rpm)	2,200	1,400	1,400	1,400	1,400	1,400
Speed accuracy	(%)	± 5	± 2	± 2	± 2	± 2	± 1
Display		-	-	digital	-	digital	digital
Analog/digital interface		-	-	-	-	-	yes
Heating power	(W)	-	-	-	800 *	800 *	800 *
Hotplate temperature	(°C)	-	-	-	20 - 300	20 - 300	20 - 300
Medium temperature, max.	(°C)	-	-	-	250	250	250
Accuracy temperature setting	(°C)	-	-	-	± 5	± 1	± 1
External temperature sensor		-	-	-	EKT Hei-Con	EKT Hei-Con	Pt 1000
Temperature accuracy with external temperature sensor	(°C)	-	-	-	± 1	± 1	± 0.2
Sensor breakage protection		-	-	-	with EKT Hei-Con	with EKT Hei-Con	with Pt 1000
Temperature control		-	-	-	electronic	electronic	microprocessor
Temperature accuracy hotplate	(°C)	-	-	-	± 5	± 5	± 5
Safety circuit hotplate	(°C)	-	-	-	25 °C over hotplate temperature	25 °C over hotplate temperature	10 - 25 °C over nominal temperature
Stirring capacity, max. (H ₂ O)	(l)	5	20	20	20	20	20
Load, max.	(kg)	6	25	25	25	25	25
Power consumption	(W)	7	20	20	820	820	825
Permissible ambient temperature	(°C)	0 - 40	0 - 40	0 - 40	0 - 40	0 - 40	0 - 40
Max. relative humidity	(%)	80	80	80	80	80	80
Max. permitted operation	(%)	100	100	100	100	100	100
Plate diameter	(mm)	ø 104	ø 145	ø 145	ø 145	ø 145	ø 145
Plate material		PVDF	V2A	V2A	Kera-Disk® (Silumin with ceramic coating)	Kera-Disk® (Silumin with ceramic coating)	Kera-Disk® (Silumin with ceramic coating)
Weight	(kg)	1.2	2.6	2.6	2.9	2.6	2.6
Dimension l x w x h	(mm)	126 x 140 x 80	173 x 277 x 94	173 x 277 x 94	173 x 277 x 94	173 x 277 x 94	173 x 277 x 94
Protection class	(DIN EN 60529)	IP 21	IP 32	IP 32	IP 32	IP 32	IP 32
Supply voltage**	(V/Hz)	230 / 50 115 / 60	230 / 50 115 / 60	230 / 50 115 / 60	230 / 50 115 / 60	230 / 50 115 / 60	230 / 50 115 / 60

* 600 W for 115 V-units

** Standard 230 V / 50 Hz: Others upon request, please specify for order

Made in Germany

"Made in Germany" is an internationally recognized quality seal for reliability, long performance life and low failure rates of the product. In an era of accelerated economic globalization this is becoming an important competitive factor.

Heidolph Instruments is committed to design and manufacture of premium quality products exclusively in Germany.

For all components Heidolph has defined the highest quality standards: Maintenance-free motors "Made in Germany" eliminate down times, frequent warranty periods and costly repairs – it's for these reasons why we stand behind our products to provide you years of continuous operation.

Our central German based R&D and production facilities allow for responding to customer requests quickly. This accounts for product adjustments and for production and for volume equally. A high level of innovation in combination with short lead times make your Heidolph purchase a truly worthwhile investment, considering average operational lifespan is 10 years!



Premium Distributors



All our Premium Distributors have successfully completed the required qualifications for the Heidolph Premium Distributor Program. They are all committed to execute the following services and are pleased to serve you at the highest level of service requirements in the industry!



Powerful Stirring



- Highest Torque in its Class
- Constant Speed under Changing Loads
- Longevity in Challenging Environments

**Outstanding Mixing
Results**

... getting you **out of
sticky** situations

Powerful Stirring

A through-shaft design allows for adjusting of the impeller position to make **height adjustment more convenient**

Sealed housing guarantees longevity and maintenance-free **24 hour operation** in an aggressive environment

The motor will be **switched off** if a high **thermal load situation** occurs to provide operator safety

Remote control allows for the **highest operational safety** from outside a closed fume hood



2 gear stage design guarantees the **highest power over the entire speed** range and is designed for continuous operation, even in polymer research

All electronic stirrers maintain **exact speed under changing loads** and even can accept 200 % peak overload for a limited period of time without interrupting the process

Reduce process times by utilizing patented inoJET® Impellers for **mixing gels** and other challenging media **with ease**

The average operational **lifespan of 10 years** is backed by a 3 year warranty and makes your purchase a truly worthwhile investment

Powerful Stirring

Do you require an all purpose stirrer that provides the best mixing results even for very challenging applications?

The powerful RZR Series stirrers can accomplish the most demanding tasks while providing the highest safety and increased performance life

Your safety is our concern!

An over temperature sensor preventatively shuts off the unit in a dangerous heat up situation – particularly valuable for you in case of unattended continuous operation

The durable design of the RZR Series promotes longevity in an **aggressive environment**: The sealed housing protects against corrosion and ensures years of maintenance-free operation



2 gear stage design guarantees the **highest power** over the entire speed range

All units are designed for continuous **24 hour operation** – including difficult high viscosity applications or polymer research

These stirrers come with the **highest torque** in its class yielding 1st class results

Impellers

Have you been searching for an impeller which serves you for both standard applications and extremely challenging media?

You will be surprised to learn how easily this unique impeller line evenly mixes high viscosity media such as gels or tooth paste

Do you require **accessories for your stirring tasks?**

We provide stirrer guides for applications under vacuum or pressure, flex-couplings and flex-shafts that increase your available options

Reduce your process times by utilizing patented technology which creates turbulent flows and a new dynamic motion that stirs gels with ease



Through thick and thin:
Large selection of impellers for every flow and viscosity

Choose from impellers made of high quality **stainless steel, plastics or Teflon coated**:
We have the right one for your specific needs

Your advantages - our Hei-lights

For your safety

- Important for continuous operation:
The motor will be switched off if a high thermal load situation occurs to increase safety in your lab and to **preventatively avoid accidents**
- Additional safety is provided by sparkless motors which **reduce incidents** in a **volatile environment**
- All models feature a smooth start operation which **prevents spills and splashing media**. The speed will ramp up slowly until your set rpm has been reached
- An optional shaft guard **prevents any accidents** involving contact with the impeller shaft running at high speeds
- Use an optional remote control via cable to start and stop your electronic stirrer outside a **closed fume hood**

Shaft guard



Remote control



For your ease of use

- A through-shaft design allows for adjusting of the impeller position to make **height adjustment more convenient** for you
- **Reduce your work time** and yield excellent mixing results in challenging high viscosity media
- Optional **software** programs for all electronic stirrers aid you in **automating your process** and software saves all data in electronic files
- Due to the **light weight design** all set-ups in your lab are easy and fast
- **A single grip** allows you to re-adjust the height of your stirrer on the optional telescope stand
- Our clear and **self-explanatory front panel** layout is for your ease of operation
- Use your lab space efficiently: The slim and space saving design allows to **fit in to any glassware set-up** nicely



Software

Reduce your cost of ownership

- Reduce your maintenance costs: The sealed housing protects your stirrer from aggressive fumes, liquids and vapors to prevent internal corrosion. This results in an **increased lifespan of 10 years** on average at a **reduced maintenance and repair cost**
- The high torque accounts for better mixing results in less time that **reduces your process time** and your work hours significantly
- Maintenance free motors **reduce repairs and down times** significantly to ensure years of continuous operation
- Patented impeller technology for demanding applications that mix gels and other similar media in shorter times which **reduces process cost and work hours**

Mechanical Stirrers

These models are ideal for standard stirring tasks. They are designed to mix and disperse media that require no-reproducible results of high viscosity applications under high speeds. The torque to speed graph is provided below to represent this dynamic relationship.

Stirrer line includes all standard features for safety, ease of use and reduced cost of ownership plus:



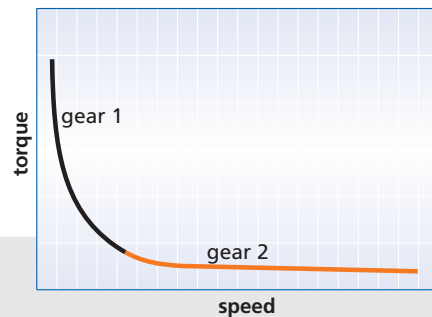
A through-shaft design allows for easy adjustment of the impeller position that is most convenient for you

A 2 gear stage design guarantees the highest power over the entire speed range

The speed is adjustable over a large scale from 40 – 2,000 rpm

An optional shaft guard prevents any accidents involving contact with the impeller shaft running at high speeds

Shipment includes a 10 mm chuck as standard



Mechanical stirrers
High torque at low speed

Mechanical Stirrers

For Standard Applications

Both the RZR 2020 and 2021 are outstanding choices for all medium to high viscosity mixing tasks with a maximum viscosity of 60,000 mPa s



Model RZR 2021 features a bright digital display for accurate speed settings. Model RZR 2020 is designed for applications that do not require accurate settings and comes without a display.

A 2 gear stage design guarantees the highest power over the entire speed range of 40 - 2,000 rpm

A maintenance-free sparkless motor ensures 27 W output power and performs stirring torque peaks up to 400 Ncm

RZR 2021
P/N 501-20210-00

RZR 2020 (not shown)
P/N 501-20200-00

For High Viscosity

The model RZR 2041 is an excellent choice for any high viscosity mixing with a maximum viscosity up to 100,000 mPa s

This model features a bright digital display for accurate speed settings

A 2 gear stage design guarantees the highest power over the entire speed range of 40 - 2,000 rpm

A maintenance-free sparkless motor ensures 37 W output power and performs stirring torque peaks up to 520 Ncm



RZR 2041
P/N 501-20410-00

Electronic Stirrers

These models are ideal for any demanding stirring task in which the viscosity varies during the entire process either through reaction or due to mixing. Electronic stirrers maintain exact speed under changing load. The displayed torque gives information relating to the actual viscosity and all results are reproducible.

Stirrer line includes all standard features for safety, ease of use and reduced cost of ownership plus:



All electronic stirrers accept 200 % peak overload for a limited period of time. Your process therefore will not be interrupted in an event such as short-term overload

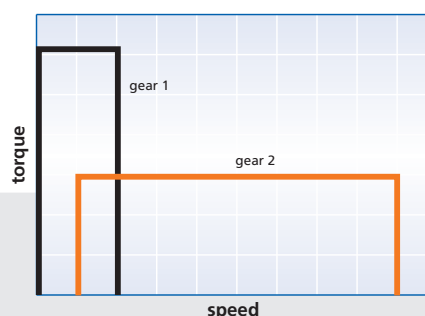
Calibrate your torque at the beginning or even during your process to monitor viscosity changes over time. Reproducible results made easy

Set your speed of choice on the self-explanatory panel or via digital interface from 30 – 2,000 rpm

Enhanced bright digital display for torque and speed

Constant speed under changing loads over the entire span of every gear setting

Shipment includes a 10 mm chuck as standard



Electronic Stirrers
Constant torque over entire speed range within each gear stage

Electronic Stirrers

For Standard Applications

Both RZR 2051 control and RZR 2052 control are 1 gear stage stirrers which hold speed constant under changing loads



RZR 2051 control: Accepts torque of 40 Ncm in an overload situation and 20 Ncm for continuous operation at speeds from 50 – 2,000 rpm. Viscosity range up to 10,000 mPa s

RZR 2052 control: Accepts torque of 180 Ncm in an overload situation and 90 Ncm for continuous operation at speeds from 30 – 1,000 rpm. Viscosity range up to 40,000 mPa s

Calibrate your torque at the beginning or even during your process to monitor viscosity changes over time

Speed control uses rheostat or interface

Enhanced bright digital display for torque and speed

RZR 2051 control
P/N 501-20511-00

RZR 2052 control (not shown)
P/N 501-20521-00

For High Viscosity

Both models RZR 2102 control and RZR 2102 control Z are 2 gear stage stirrers which hold speed constant under significant load changes such as sticky media like polymers for example

Choose between 2 options for gear setting and experience the power of the 100 W output motor which allows for torque of 400 Ncm in an overload situation and 200 Ncm for continuous operation at speeds from 12 - 2,000 rpm

Calibrate your torque at the beginning or even during your process to monitor viscosity changes over time

Speed control uses rheostat or interface

Viscosity range up to 100,000 mPa s



RZR 2102 control
P/N 501-21021-00

RZR 2102 control Z
P/N 501-21024-00



Planet gear (4:1 ratio) of the RZR 2102 control Z

RZR 2102 control Z features identical technical specifications as the RZR 2102 control except for

- Speed: 4 - 540 rpm
- Torque: 800 Ncm in an overload situation
700 Ncm at continuous operation
- An additionally flanged planet gear for extreme viscosities up to 350.000 mPa s

The RZR 2102 control Z does not feature the through-shaft design for impeller adjustment

Impellers

Selection parameters:

Precise working with an overhead stirrer depends on the right choice of the stirrer tool. When choosing a stirrer tool, you have to consider its different characteristics and their effects: e.g. the flow the tool causes in the medium, the tools adequate field of application depending on the speed range, and the execution of the tool according to the viscosity it is destined for.

Application examples:

1. Gassing of liquids < 500 mPa s: Radial Flow Impeller
2. Homogenizing and suspending in liquids < 500 mPa s: Propeller-Type or Blade Impeller
3. Medium with a viscosity > 500 mPa s: Anchor-Type Impeller, Blade Impeller BR 13, inoJET®
4. Stirring of gel: inoJET®

Please ensure that for radial flow, blade, half-moon and inoJET® impellers the beaker size and position of your impeller complies with the guidelines below to accomplish superior mixing results

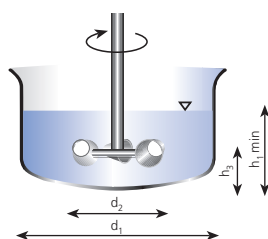
Operational guidelines

Position of the stirring tool

- In center
- Distance to the bottom (h_3/d_2): 0,3
- Diameter vessel (h_1/d_1): 1
- inoJET® diameter ratio (d_2/d_1): 0.4 - 0.6

Circumferential speed

- 3 - 15 m/sec: Radial Flow Impeller
- 2 - 5 m/sec: inoJET®, Blade and Anchor-Type Impeller

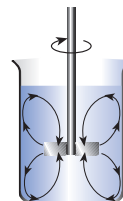


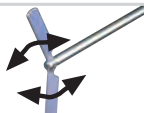
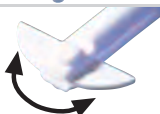
Blade and Half-Moon Impeller

These impellers are recommended for applications which require an average speed

For mixing tasks with little or average viscosity

Models BR 12, BR 14 and HR 18 come with collapsible blade for narrow neck vessels



	Type	Blade size [mm]	Material	Length [mm]	Shaft dia. [mm]	P/N
	BR 10 Crossed Blade Impeller	50 x 12	stainless steel AISI 304	400	8	509-10000-00
	BR 11 Straight Blade Impeller	50 x 12	stainless steel AISI 304	400	8	509-11000-00
	BR 12 Pivoting Blade Impeller	60 x 15	stainless steel AISI 304	400	8	509-12000-00
	BR 13 Square Blade Impeller	70 x 70	stainless steel AISI 304	450	8	509-13000-00
	BR 14 Collapsible Blade Impeller	90 x 10	stainless steel AISI 304	400	8	509-14000-00
	HR 18 Half-Moon Impeller	65 x 18 x 3	PTFE	350	8	509-18000-00

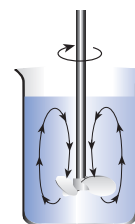
Propeller-Type Impeller

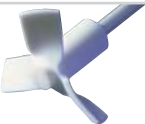
These impellers are recommended for applications which require an average or high speed

For mixing tasks with medium or high viscosity

Excellent mixing properties for homogenization and suspensions

These models create an axial flow



	Type	Prop. dia. [mm]	Material	Length [mm]	Shaft dia. [mm]	P/N
	PR 39 Pitched Blade Impeller	75	PTFE	350	8	509-39000-00
	PR 30 Pitched Blade Impeller	58	stainless steel AISI 304	400	8	509-30000-00
	PR 31 Ringed Propeller	33	stainless steel AISI 316Cb	400	8	509-31000-00
	PR 32 Ringed Propeller	45	stainless steel AISI 316Cb	400	8	509-32000-00
	PR 33 Ringed Propeller	66	stainless steel AISI 316Cb	400	8	509-33000-00

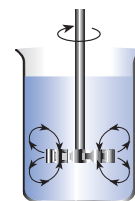
Radial Flow Impeller

These impellers are recommended for applications which require an average speed

For mixing tasks with little or average viscosity up to < 500 mPa s

Ideal for gassing of liquids

These impellers create a radial flow

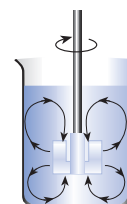


	Type	Ø Turbine size [mm]	Material	Length [mm]	Shaft dia. [mm]	P/N
	TR 20 Radial Flow Impeller	29	stainless steel AISI 316Cb	400	8	509-20000-00
	TR 21 Radial Flow Impeller	50	stainless steel AISI 316Cb	400	8	509-21000-00

Anchor-Type Impeller

These impellers are recommended for applications which require a low speed

For mixing tasks with medium or high viscosity



	Type	Blade size [mm]	Material	Length [mm]	Shaft dia. [mm]	P/N
	AR 19 Anchor-Type Impeller	60 x 40 x 5	PTFE	350	8	509-19000-00

inoJET® Impellers

The all-rounder for thick and thin

Reduce your process times significantly while performing the best mixing results ever

This technology allows for **de-gassing of gels** while preventing air intake and foaming



One system for literally all mixing tasks for low to high viscosity media

Patented cone-principle creates even at low speeds a **turbulent flow which is unique to the inoJET®**

Even with high-viscosity media and gels which naturally do not mix by using common impellers you will observe an immediate flow through the entire beaker



Type	Ø [mm]	Material	Length [mm]	Shaft dia. [mm]	Speed range [rpm]	For vessel dia. [mm]	P/N
inoJET® - 60 mm	60	stainless steel AISI 316Ti	500	10	200 - 800	80 - 150	509-16060-00
inoJET® - 80 mm	80	stainless steel AISI 316Ti	500	10	200 - 700	115 - 200	509-16080-00
inoJET® - 80 mm	80	impeller: plastic (POM) hub: brass shaft: polyamide coated	500	10	200 - 700	115 - 200	509-16081-00
inoJET® - 120 mm	120	stainless steel AISI 316Ti	500	10	120 - 500	170 - 300	509-16120-00
inoJET® - 120 mm	120	impeller: plastic (POM) hub: brass shaft: polyamide coated	500	10	120 - 500	170 - 300	509-16121-00

inoJET® - 60 mm
stainless steel



inoJET® - 80 mm
plastic (POM)



inoJET® - 120 mm
stainless steel



Application Examples

Worldwide the only impeller capable of completely mixing larger quantities of high-viscosity liquids and gels

Fields of use:

Beverage production, dairy products, food, sugar & candy production, chemistry/cetrochemistry, ceramics, water treatment, cosmetic, colorant/paint production and paper manufacture etc.

Principle of Functionality

The worldwide patented inoJET® Mixing System from INOTEC GmbH is the result of the so-called cone-principle.

Turbulent flows are created at the taper end by acceleration, displacement and retardation.

These flows advance through the stirred medium and result in the new dynamic mixing motion.

See operational guidelines on page 12

Accessories



Universal Stand S2
Stand tube Ø: 25 mm
Length: 700 mm
Weight: 5.8 kg
P/N 570-12000-00



Stand S2 XXL
Stand tube Ø: 25 mm
Length: 1000 mm
Weight: 6.0 kg
(Recommended for
RZR 2102 control Z)
P/N 570-12200-00



Telescope Stand
Stand tube Ø: 32 mm
Adjustable length:
725 - 1025 mm
Weight: 7.7 kg
P/N 570-12100-00



**Clamp for stand S2,
stand S2 XXL and
telescope stand**
Ø 13-32 mm
P/N 570-22000-00



Chuck 8 mm
for RZR 1
P/N 509-01000-00



Chuck 10 mm
For RZR 2020 – 2102
P/N 509-02000-00

For RZR 2102 control Z
P/N 11-001-001-56



**Stirrer Guide
(NS 29/32)**
PTFE with adjustable seal,
accepts Ø 8 mm shafts
P/N 509-09000-00



Flex-coupling
Chuck capacity Ø 5-8 mm
(Recommended for RZR 1)
P/N 509-03100-00



Flex-coupling
Includes clamping stud
for stirrer shaft, accepts
10 mm dia. max.
P/N 509-03000-00



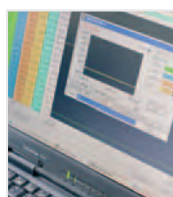
Shaft Guard
Material: PMMA
Adjusts between
187 mm and 312 mm
For RZR 2020 – 2102
P/N 509-08000-00



Flex-coupling
Comes with chuck.
Not for RZR 2102
control Z
P/N 509-07000-00



Remote Control
With start/stop function
P/N 591-40000-00



**Software
Watch & Control**
For all electronic stirrers.
See below
P/N 592-20000-00

Complete Packages at a Special Price

RZR 2020 package

This package includes:

- 1 RZR 2020 stirrer
- 1 PR 30 impeller
- 1 S2 stand and a clamp

P/N 501-20209-00



RZR 2052 control package

This package includes:

- 1 RZR 2052 control stirrer
- 1 PR 30 impeller
- 1 S2 stand and a clamp

P/N 501-20529-00



RZR 1

For simple mixing tasks

For media up to 40,000 mPa s and volumes of 20 liter

This model allows for torque up to 100 Ncm at a power of 18 W

Slim design fits nicely into your research environment

A manual scale for speed adjustments from 35 - 2,200 rpm

A 2 gear stage design allows for high torque at various speeds and provides excellent mixing in short times



RZR 1
P/N 501-11000-00

Powerful Stirring



- ➔ Highest Torque in its Class
- ➔ Constant Speed under Changing Loads
- ➔ Longevity in Challenging Environments

Outstanding Mixing Results

Technical specifications - Overhead Stirrers

Model	RZR 1	RZR 2020	RZR 2021	RZR 2041	RZR 2051 control	RZR 2052 control	RZR 2102 control	RZR 2102 control Z
P/N (230 V)	501-11000-00	501-20200-00	501-20210-00	501-20410-00	501-20511-00	501-20521-00	501-21021-00	501-21024-00
Power rating, motor input/output (W)	77/18	50/27	50/27	70/37	80/50	140/100	140/100	140/100
Number of speed gears	2	2	2	2	1	1	2	2
Speed range (rpm)	35 - 250 280 - 2,200	40 - 400 200 - 2,000	40 - 400 200 - 2,000	40 - 400 200 - 2,000	50 - 2,000	30 - 1,000	12 - 400 60 - 2,000	4 - 108 17 - 540
Speed indicator	scale	scale	digital	digital	digital	digital	digital	digital
Speed control	mechanic	mechanic	mechanic	mechanic	electronic	electronic	electronic	electronic
Torque, maximum (Ncm) - overload mode	100	400	400	520	20 40	90 180	200 400	700 800
Power reserve under overload (%)	-	-	-	-	200	200	200	200
Torque indicator (Ncm)	-	-	-	-	digital	digital	digital	digital
Overload protection	automatic cut-out	automatic cut-out	automatic cut-out	automatic cut-out	automatic cut-out features LED	automatic cut-out features LED	automatic cut-out features LED	automatic cut-out features LED
Motor protection	overheat protection reset by power switch	overheat protection reset by power switch	overheat protection reset by power switch	overheat protection reset by power switch	overheat protection reset by power switch	overheat protection reset by power switch	overheat protection reset by power switch	overheat protection reset by power switch
Viscosity up to (mPa s)	40,000	60,000	60,000	100,000	10,000	40,000	100,000	350,000
Stirring cap. H ₂ O up to (l)	20	25	25	40	40	100	100	100
Analog / digital interface	-	-	-	-	yes	yes	yes	yes
Shaft diameter up to (mm)	8	10	10	10	10	10	10	10
Ambient temp. range (°C)	0 - 40	0 - 40	0 - 40	0 - 40	0 - 40	0 - 40	0 - 40	0 - 40
Humidity up to (%)	95, no condensation	95, no condensation	95, no condensation	95, no condensation	95, no condensation	95, no condensation	95, no condensation	95, no condensation
Dimensions (w x h x d) (mm)	71 x 250 x 172	82 x 206 x 176	82 x 206 x 176	82 x 211 x 176	72 x 206 x 176	82 x 211 x 176	82 x 211 x 176	82 x 292 x 176
Stay bar size (dia. x l) (mm)	13 x 300	13 x 160	13 x 160	13 x 160	13 x 160	13 x 160	13 x 160	13 x 160
Weight (kg)	2.7	3.0	3.0	3.3	2.8	3.7	3.7	4.7
Protection class (DIN EN 60529)	IP 20	IP 40	IP 40	IP 40	IP 40	IP 40	IP 40	IP 40
Supply voltage * (V/Hz)	230 / 50 115 / 60	230 / 50 115 / 60	230 / 50 115 / 60	230 / 50 115 / 60	230 / 50 115 / 60	230 / 50 115 / 60	230 / 50 115 / 60	230 / 50 115 / 60

*Standard 230 V: Others upon request, please specify for order

Certificate

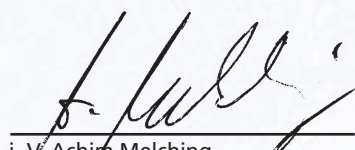
To confirm the ability for
continuous operation

of the RZR Series Overhead Stirrers

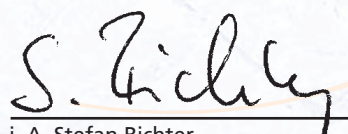
The RZR Series Overhead Stirrers feature over temperature safety circuits according to DIN EN 61010-1:2001 and DIN EN 61010-2-010:2003 and therefore, are designed for **continuous operation**.

This statement is made under the precondition that all units are operated in accordance with the operation manual and in accordance with good practice standards for safety in laboratories, rules for accident preventions, and compliance with directions on hazardous materials.

Schwabach, October 2010



i. V. Achim Melching
Technical Director



i. A. Stefan Richter
Quality Control Director

Excellent 2nd ranking for Heidolph Instruments

In a comparative study of 113 companies involved in customer relation services, the consultant agency HT-CON has selected and awarded Heidolph Instruments the outstanding recognition of 2nd in class of 113.

During the last years we worked intensely to improve our customer service programs.

This is what we mean by "Research made easy" and our commitment to support scientific excellence through the use of Heidolph products



Temperature Controlled Shaking



- 6 shaking motions
- Optional incubating system
- Controlled temperature to your sample

**Always the
Right Motion**

... for all your **growing
needs**

Temperature Controlled Shaking

Rule out accidents: all models have been designed with a low center of gravity which prevents gliding at high speed, even on a damp surface

An over temperature sensor preventatively shuts off the unit in a **dangerous heat-up situation** – particularly valuable for you in case of unattended continuous operation

Choose between different shaking motions, orbits, angles and load capacities **the right model for your specific application**



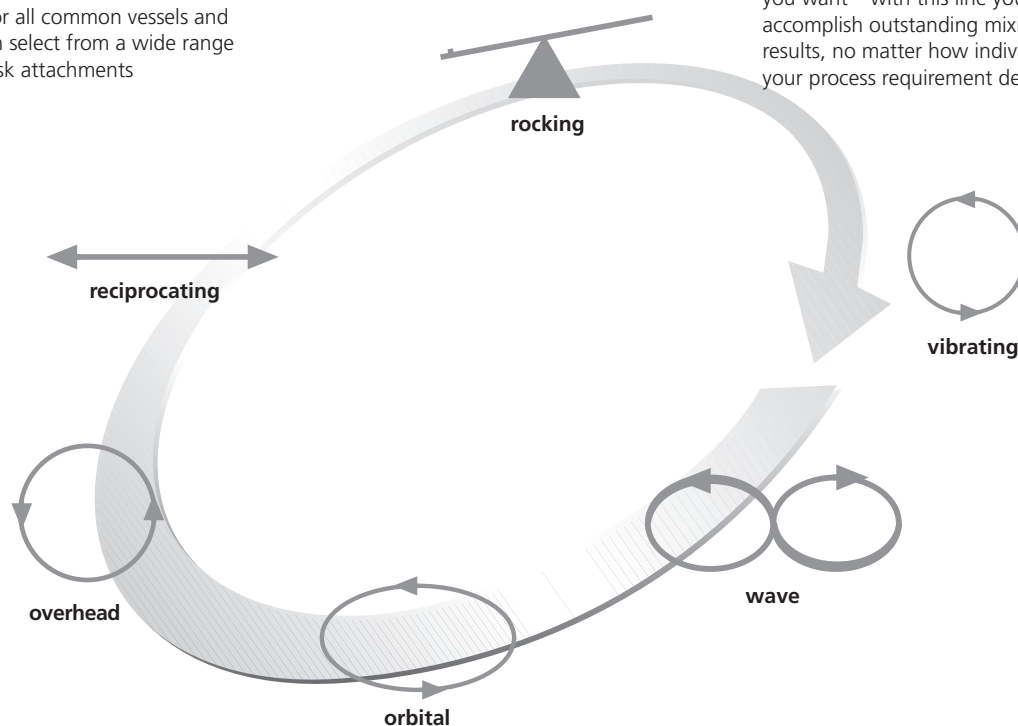
The average operational **lifespan of 10 years** is backed by a 3 year warranty and makes your purchase a truly worthwhile investment

Always the right motion

Our complete range of bench top shakers provides you with any possible movement for your research. That makes us the right choice for the right motion of your application.

No spills: For all common vessels and sizes you can select from a wide range of secure flask attachments

No compromise: Shake whatever you want – with this line you shall accomplish outstanding mixing results, no matter how individualized your process requirement demands



No limitations: Choose from 6 specific motions, from one to three dimensional movements - many models offer options of different orbits and angles to provide increased mixing in the motion range

Optional Incubator System

Your sample needs an adjustable temperature environment that gives precise heating up to 65 °C?

Upgrade your platform shaker instantly to an **affordable incubator system** using the modular concept

Use your limited bench space more efficiently: The modular incubator system comes with the **smallest footprint** compared to any other common shaker system



Full flexibility! No matter how large your vessels are, three incubator hood sizes allow for volumes up to 2 liter Erlenmeyer flasks

Your advantages - our Hei-lights

For your safety

- An **over temperature sensor** preventatively **shuts off** the unit if a dangerous heat-up situation occurs - particularly valuable for you in case of unattended continuous operation or sensitive research
- Our shaker stays in place **to rule out accidents**: All models have been designed with a low center of gravity which prevents gliding at high speed, including placement on a damp surface
- All platform shakers come with an unique non-skid rubber mat that **prevents vessels from sliding** including models performing three dimensional movements



Clear and self-explanatory front panel layout allows for easy operation

For your ease of use

- Your work requires multiple shaking motions and flask sizes? A large range of shakers and load capacities - from test tube shakers to large multi-tier platform shakers - can help serve your needs while **making your life easy with one brand**
- We offer selected accessories and **attachments specific to each model** that matches best for your application needs
- **Choose from 6 specific motions**, from one to three dimensional movements: Vibrating, orbital, reciprocating, rocking, wave and overhead rotation
- Within one specific shaking motion you can even **choose different shaking orbits and angles** to differentiate between soft or rigid shaking
- Choose from two or three different load capacities of 2, 5, or 10 kg depending on model to **save bench space** or for **high sample throughput**

Reduce your cost of ownership

- **Increase your sample throughput and reduce your process times** with the modular system for shaking, mixing and heating – all in one
- Are you working with heat sensitive samples? Platform shakers come with an insulated system to prevent any heat transfer from the motor that could cause potential thermal damage to your sample. **That saves you time and money**
- Maintenance free motors **reduce repairs and down times** significantly to ensure years of continuous operation backed by the Hei-dolph 3 year warranty
- The sealed housing on many models protects your shaker from aggressive fumes, liquids and vapors to prevent internal corrosion. This results in an **increased lifespan of 10 years on average** at reduced maintenance and repair costs

Test tube shakers – vibrating

Reax models

Ideal for mixing samples in Eppendorf tubes, vials and similar vessels of different diameters at extremely high speed rates. The ridged mixing orbit yields consistent results and is ideal for product dissolution.

Shakers include all standard features for safety, ease of use and reduced cost of ownership plus:

Plate for 20 mm diameter test tubes is included as a standard. Test tube tray for flasks up to 50 mm diameter is optionally available in the accessory section.

Reax top – The standard model

P/N 541-10000-00

Accessories: [Category: A](#)

The **strong 5 mm vibration orbit** accomplishes best results even **with high viscosity media or solids** out of solution to give smooth and even dispersion quickly

Features an analog dial speed control, no settings of specified rpm numbers



Switch to continuous mode – the unit performs a permanent vibration motion

Fast and dependable mixing results due to high vibration frequency that rates up to 2,500 rpm

Switch to automatic mode: The unit will start once a vessel is pressed to the plate and will stop automatically once this pressure is released

Reax control – The accurate model

P/N 541-11000-00

Accessories: [Category: A](#)

Includes all Reax top features, plus:

Improve your results by the electronic speed control that provides constant rpm output even at very low speed and under changing loads



Features analog dial speed control with accurate rpm numbers setting

Test tube shakers – vibrating

Multi Reax – The all purpose

P/N 545-10000-00

Accessories: Category: H

Unique shaker to accommodate up to 26 vessels with various diameters

Shipment includes as a standard:

Attachment for 26 vessels with diameters from 10 to 16 mm

Attachment for 12 vessels with diameters from 16 to 32 mm

The **3 mm vibration orbit** accomplishes excellent results especially in large vessels. The Multi Reax allows for **ridged to smooth** dispersion of viscous media and solids

Set and continuously adjust the variable speeds from 150 to 2,000 rpm on the digital display



Your digital process timer allows for unattended operation and can be set from 1 to 999 minutes. After time expires this model sends an acoustic alarm and operation is stopped

Platform shakers – vibrating

Vibramax and Titramax models

Do you perform research which requires ridged or gentle shaking for small samples on microtiter plates or test tubes? Five options with different load capacities and shaking orbits are available for you!

Shakers include all standard features for safety, ease of use and reduced cost of ownership plus:

Vibramax 100 – The compact model

P/N 544-21200-00

Accessories: [Category: B](#)

A large selection of attachments is provided for the use of various vessels and sizes

Optional attachment with tension rollers accepts any glassware size



Vibramax 100 is a compact and space saving unit with a load capacity of 2 kg

The **3 mm vibration orbit** gives excellent results especially in large vessels – allows for **smooth to ridged** mixing of viscous media and solids

Your analog process timer allows for unattended operation and can be set from 1 to 120 minutes. After time expires this model sends an acoustic alarm and operation is stopped

Set and continuously adjust the variable speed on the analog control knob from 150 to 1,350 rpm

Vibramax 110 – The efficient model

P/N 544-31200-00

Accessories: [Category: C](#)

Ideal for the optional attachment to use 49 test tubes that increases your throughput significantly



Includes all Vibramax 100 features, plus:

The **shaking orbit of 1.5 mm** performs a gentle motion for sensitive samples

Set and continuously adjust the variable speed on the analog control knob from 150 to 2,500 rpm

Platform shakers – vibrating

Titramax 100 – The compact model

P/N 544-11200-00 (not shown)

Titramax 101 – The strong model

P/N 544-11300-00

Titramax 100 is a compact and space saving unit that accepts load capacities of 2 kg and space for 4 microtiter plates



Are you working with heat sensitive samples?
Platform shakers come with an insulated system to prevent any heat transfer from the motor that could cause potential thermal damage to your sample

The **1.5 mm vibration orbit** performs **gentle mixing** with best results using small sample volumes. The Titramax 101 has a **3.0 mm orbit** which was designed **for larger sample volumes**

Your analog process timer allows for unattended operation and can be set from 1 to 120 minutes. After time expires this model sends an acoustic alarm and operation is stopped

Set and continuously adjust the variable speed on the analog control knob from 150 to 1,350 rpm

Titramax 1000 – The incubating model

P/N 544-12200-00

This model is suitable for the modular incubator system and is recommended for applications which require variable temperature control of up to 65 °C



Includes all Titramax 100 features, plus:

The use of 6 microtiter plates increases your throughput by 50 %

Titramax 1000 is a medium sized model and accepts load capacities of 5 kg

The **1.5 mm vibration orbit** performs **gentle mixing** with best results using small sample volumes

Titramax package

P/N 544-12209-00

This package includes:

- One vibrating platform shaker Titramax 1000
- One heating module and
- One flat incubator hood



Platform shakers – orbital

Rotamax and Unimax models

Cultivation of cells and microorganisms requires time and peace. What to do if you need to spend time on other priorities?

The slow and constant rotation of the Rotamax and Unimax models keeps your samples continuously in motion.

Shakers include all standard features for safety, ease of use and reduced cost of ownership plus:

Rotamax 120 – The compact model

P/N 544-41200-00

Accessories: [Category: B](#)

Wide range of accessories, attachments and clamps for up to 16 Erlenmeyer flasks available

Rotamax 120 is a compact and space saving unit that accepts load capacities of 2 kg and offers space for 4 medium sized culture plates



Your analog process timer allows for unattended operation and can be set from 1 to 120 minutes. After time expires this model sends an acoustic alarm and operation is stopped

Set and continuously adjust the variable speed on the analog control knob from 20 to 300 rpm

The shaking orbit of 20 mm performs a gentle motion for sensitive samples and supports culture plates and Erlenmeyer flasks

Platform shakers – orbital

Unimax 1010 – The incubating model

P/N 543-12310-00

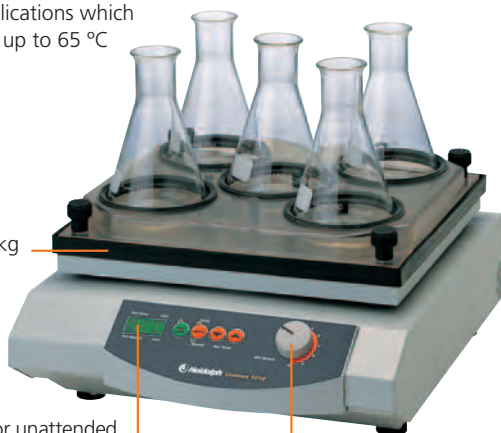
Accessories: [Category: D](#)

This model is suitable for the modular incubator system and is recommended for applications which require variable temperature control up to 65 °C

Includes all Rotamax/Unimax features, plus:

The shaking orbit of 10 mm performs a gentle motion for sensitive samples and supports culture plates and Erlenmeyer flasks

The Unimax 1010 is a medium sized model and accepts load capacities of 5 kg



Your digital process timer allows for unattended operation and can be set from 1 to 999 minutes. After time expires this model sends an acoustic alarm and operation is stopped

Set and continuously adjust the variable speed on the digital display from 30 to 500 rpm

Unimax 2010 – The resilient model

P/N 542-10020-00

Accessories: [Category: E](#)

The Unimax 2010 is a large model and accepts a load capacity of 10 kg for high sample throughput

Includes all Unimax 1010 features, plus:

The shaking orbit of 20 mm performs a gentle motion for sensitive samples and supports culture plates and Erlenmeyer flasks

Increase your sample throughput with the optional multi-tier attachment for a variety of vessel sizes



Your digital process timer allows for unattended operation and can be set from 1 to 120 minutes. After time expires this model sends an acoustic alarm and operation is stopped

Set and adjust continuously variable speed on the digital display from 20 to 400 rpm

Unimax package

P/N 543-12319-00

This package includes:

- One orbital platform shaker Unimax 1010
- One heating module and
- One high incubator hood



Platform shakers – rocking

Duomax model

You focus on cell culture, mix in large media bottles and require a two dimensional motion with flexibility to heat? The Duomax is available in two different angle configurations which are recommended for culture plates/bottles, media bottles and Erlenmeyer flasks to help cultivate cells.

Shakers include all standard features for safety, ease of use and reduced cost of ownership plus:

Duomax 1030 – The incubating model

P/N 543-32205-00 features tilt angle of 5°

P/N 543-32210-00 features tilt angle of 10°

Accessories: Category: D

This model is suitable for the modular incubator system and is recommended for applications which require variable temperature settings

The Duomax 1030 is a medium sized model and accepts load capacities of 5 kg

Choose your angle between these two options:
Tilt angle of 5° for soft and gentle movements or
tilt angle of 10° for a much stronger motion



Your analog process timer allows for unattended operation and can be set from 1 to 120 minutes. After time expires this model sends an acoustic alarm and operation is stopped

Set and continuously adjust the variable speed on the analog control knob from 2 to 50 rpm – ideal for media bottles

Platform shakers - reciprocating

Promax models

Are you missing the right shaker for separations in chemistry or performing soil testing? All Promax models are designed especially for phase separations using separatory funnels or applications that require reciprocating motion.

Shakers include all standard features for safety, ease of use and reduced cost of ownership plus:

Promax 1020 – The incubating model

P/N 543-22332-00

Accessories: [Category: D](#)

This model is suitable for the modular incubator system and is recommended for applications which require variable temperature control up to 65 °C

The Promax 1020 is a medium sized model and accepts load capacities of 5 kg

Your digital process timer allows for unattended operation and can be set from 1 to 999 minutes. After time expires this model sends an acoustic alarm and operation is stopped

Wide range of accessories, attachments and clamps for separatory funnels available

With a stroke length of 32 mm the Promax model performs an ideal motion for separatory funnels

Set and continuously adjust the variable speed on the digital display from 30 to 250 rpm



Promax 2020 – The resilient model

P/N 542-20020-00

Accessories: [Category: E](#)

The Promax 2020 is a large model and accepts a load capacity of 10 kg for high sample throughput

Your digital process timer allows for unattended operation and can be set from 1 to 120 minutes. After time expires this model sends an acoustic alarm and operation is stopped

Includes all Promax 1020 features, plus:

With a stroke length of 20 mm this Promax model can mix larger volumes with ease

Set and continuously adjust the variable speed on the digital display from 20 to 400 rpm – ideal for separations



Platform shakers – wave

Polymax models

Nothing beats a three dimensional motion: For best mixing results of viscous media such as gels for electrophoresis, you can also choose the tilt angle that works best for the application.

Shakers include all standard features for safety, ease of use and reduced cost of ownership plus:

Polymax 1040 – The incubating model

P/N 543-42205-00 features tilt angle of 5°

P/N 543-42210-00 features tilt angle of 10°

Accessories: [Category: D](#)

This model is suitable for the modular incubator system and is recommended for applications which require variable temperature control up to 65 °C

The Polymax 1040 is a medium sized model and accepts load capacities of 5 kg



Choose your angle between these two options:
Tilt angle of 5° for soft and gentle movements or
tilt angle of 10° for a much stronger motion

Use this model for any vessel
– from culture plates, media
bottles and Erlenmeyer flasks
– there is no limit

Your analog process timer allows for unattended operation and can be set from 1 to 120 minutes. After time expires this model sends an acoustic alarm and operation is stopped

Set and continuously adjust the variable speed on the analog control knob from 2 to 50 rpm – ideal for cell culture plates

Polymax 2040 – The resilient model

P/N 542-40005-00 features tilt angle of 5°

P/N 542-40010-00 features tilt angle of 10°

Accessories: [Category: E](#)

The Polymax 2040 is a large model and accepts a load capacity of 10 kg for high sample throughput



Includes all Polymax 1040
features, plus:

Your digital process timer allows for unattended operation and can be set from 1 to 120 minutes. After time expires this model sends an acoustic alarm and operation is stopped

Set and continuously adjust the variable speed on the digital display from 2.5 to 50 rpm – ideal for cell culture plates

Incubator 1000

Your platform shaker has no space in your heating oven or incubator cabinet? Adjustable temperature and visual control is a key priority for you?

This truly unique system gives you all in one: Shaking, mixing and heating with visual reaction control at all times. These platform shakers are compatible with the incubator system: Duomax 1030, Polymax 1040, Titramax 1000, Unimax 1010 und Promax 1020

Use ONE incubator for numerous shakers - interchangeability is ensured and takes less than 2 minutes. You can incubate and mix simultaneously or independently

Immediate access: The incubator hood opens instantly and interlocks in any position

Heating module allows for **gentle temperature** adjustments up to 65 °C

Electrical heater allows for quick and **even temperature distribution** throughout the entire enclosure

Unlimited **visual reaction control** at all times: The transparent and non-fogging PETG construction offers it all

Three options available: A flat hood for small vessels and microtiter plates, a high hood for all common medium sized vessels and even a high hood XL for larger Erlenmeyer flasks up to 2,000 ml



Heating module

P/N 549-90010-00

Electrical heater comes with **low-noise blower** and provides accuracy of $\pm 2\text{ }^{\circ}\text{C}$ up to 50 °C and $\pm 4\text{ }^{\circ}\text{C}$ over 50 °C

To protect your sample from thermal damages this unit features a safety circuit to **prevent overheating**

Heating capacity of 300 W allows for quick temperature adjustments

Digital temperature settings **up to 65 °C** and separate display for actual temperature



Incubator hoods

Flat hood

For small vessels

The small incubator hood comes with a total height of 163 mm

Recommended especially for microtiter plates, culture plates, small flasks, media bottles and Erlenmeyer flasks up to 100 ml

Transparent and non-fogging PETG material allows for sample viewing and is easily cleaned



Flat hood
P/N 549-90040-00



High hood
P/N 549-90030-00

High hood XL

For 2,000 ml vessels

The high hood XL comes with a total height of 428 mm

Recommended especially for 2,000 ml Erlenmeyer flasks

Transparent and non-fogging PETG material allows for sample viewing and is easily cleaned



High hood XL
P/N 549-90060-00

Accessories



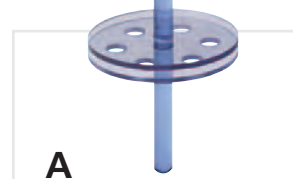
A
Test tube tray, large
for test tubes and flasks up to 50 ml
P/N 549-19000-00



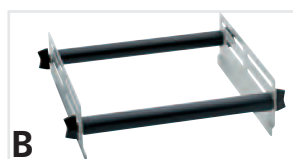
A
Test tube holding device
Attachment to hold one test tube safely for continuous shaking
P/N 549-20000-00



A
Attachment for 10 test tubes
Foam attachment provides space for 10 test tubes for simultaneously mixing with just one shaker
P/N 549-01000-00



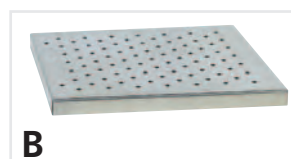
A
Test tube stand
for up to 6 Eppendorf vessels (1.5 ml)
P/N 549-04000-00



B
Tension roller attachment
Attachment with 2 tension rollers
P/N 549-81000-00



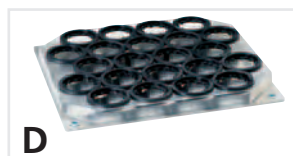
B
Spare tension roller
1 tension roller for attachment
P/N 549-81000-00
P/N 11-008-007-08



B
Perforated platform 100
Universal perforated platform allows for individual arrangement of vessels
P/N 549-59100-00



C
Test tube attachment
for up to 49 test tubes with Ø 12 mm, length up to 80 mm
P/N 549-82000-00
for up to 36 test tubes with Ø 16 mm, length up to 80 mm
P/N 549-83000-00



D
25 ml Erlenmeyer attachment
Attachment for up to 22 Erlenmeyer flasks with a size of 25 ml
P/N 549-72000-00



D
50 ml Erlenmeyer attachment
Attachment for up to 14 Erlenmeyer flasks with a size of 50 ml
P/N 549-73000-00



D
100 ml Erlenmeyer attachment
Attachment for up to 9 Erlenmeyer flasks with a size of 100 ml
P/N 549-74000-00



D
250 ml Erlenmeyer attachment
Attachment for up to 5 Erlenmeyer flasks with a size of 250 ml
P/N 549-75000-00



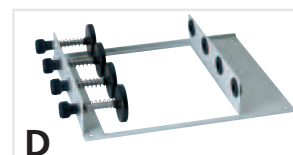
D
500 ml Erlenmeyer attachment
Attachment for up to 4 Erlenmeyer flasks with a size of 500 ml
P/N 549-76000-00



D
1000 ml Erlenmeyer attachment
Attachment for up to 2 Erlenmeyer flasks with a size of 1000 ml
P/N 549-77000-00



D
Perforated platform 1000
Universal perforated platform allows for individual arrangement of vessels
P/N 549-59200-00



D
Separatory funnel attachment
Attachment for 4 separatory funnels (50 ml, conical) or 4 separatory funnels (100 ml, conical)
P/N 549-78000-00

Accessories for:

A Reax top/control

B Vibramax 100, Rotamax 120

C Vibramax 110

D Unimax 1010, Duomax 1030, Polymax 1040, Promax 1020

E Unimax 2010, Promax 2020, Polymax 2040

F Reax 2

G Reax 20/4 · 20/8 · 20/12

H Multi Reax

Accessories



Frame with tension roller
Attachment with 2 tension rollers
P/N 549-70000-00



Spare tension roller
1 tension roller as accessory for
attachment P/N 549-70000-00
P/N 549-71000-00



**Separatory funnel clamp
(250 ml, 500 ml, 1000 ml)**
For perforated platform 2000,
space for max. 4 (250 ml),
3 (500 ml) or 3 (1000 ml) clamps
P/N 549-57000-00



**Separatory funnel clamp
(2000 ml)**
For perforated platform 2000,
space for max. 2 clamps
P/N 549-61000-00



Perforated platform 2000
Universal perforated platform
allows for individual
arrangement of vessels
P/N 549-59000-00



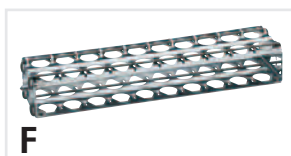
Frame tension roller
Frame without tension roller
P/N 549-50000-00



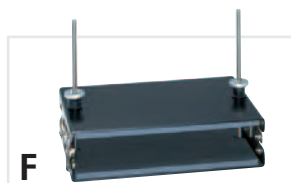
Tension roller
1 tension roller for the frame
P/N 549-50000-00 please order
2 pcs. min.
P/N 549-58000-00



Multi-tier attachment
Includes perforated platform 2000
and 4 supporting rods
P/N 549-62000-00



Adapter for 20 test tubes
Allows for simultaneously mixing
20 test tubes Ø 10-18 mm with
just one shaker
P/N 549-21000-00



Universal adapter
Allows for using common
vessels and test tube racks;
max. span height: 160 mm
P/N 549-30000-00



Attachment for 1 l bottles
(Set of 4) Allows for the use
of four 1 liter bottles
P/N 549-26000-00



Attachment for 0.5 l bottles
(Set of 4) Allows for the use
of four 0.5 l bottles
P/N 549-27000-00



Tension plate for caps
Allows for the use of common
bottles with Ø 94 mm
P/N 11-001-001-81



**Carousel attachment
for up to 26 test tubes**
(Ø 10-16 mm, length 160 mm)
P/N 549-01600-00



**Carousel attachment
for up to 12 test tubes**
(Ø 16-32 mm, length 120 mm)
P/N 549-03000-00

Clamp for the perforated platform 100, 1000 and 2000

		Size 1 for 25 ml Erlenmeyer flasks	Size 2 for 50 ml Erlenmeyer flasks	Size 3 for 100 ml Erlenmeyer flasks	Size 4 for 250 ml Erlenmeyer flasks	Size 5 for 500 ml Erlenmeyer flasks	Size 6 for 1000 ml Erlenmeyer flasks	Size 7 for 2000 ml Erlenmeyer flasks
P/N		549-51000-00	549-52000-00	549-53000-00	549-54000-00	549-55000-00	549-56000-00	549-63000-00
for platform 100		max. 16	max. 16	max. 8	max. 5	max. 3	max. 2	-
for platform 1000		max. 20	max. 20	max. 14	max. 8	max. 4	max. 4	max. 2
for platform 2000		max. 36	max. 36	max. 23	max. 12	max. 9	max. 5	max. 3

Overhead shakers

Complies with standards for the determination of elutriation with water.

Shakers include all standard features for safety, ease of use and reduced cost of ownership plus:

Reax 20

Overhead shakers for 4, 8 or even 12 bottles

Other vessels with 160 - 290 mm height and max. 136 mm diameter can be used with a tension plate accessory



Set and continuously adjust the variable speed on the analog control knob from 1 to 16 rpm – ideal for waste water analysis

Other rotation speeds available upon request, for example 0.5 to 8 rpm or 2 to 32 rpm

Easy and fast attachments of bottles

Reax 20/4 (not shown)

P/N 541-20004-00

Accessories: [Category: G](#)

Reax 20/8

P/N 541-20008-00

Accessories: [Category: G](#)

Reax 20/12 (not shown)

P/N 541-20012-00

Accessories: [Category: G](#)

Reax 2

P/N 541-21001-00

Accessories: [Category: F](#)

In addition an optional adapter is available for the use of 20 test tubes at a time



Quickly clamps in 2 vessels of any size and accepts load capacities up to 1 kg

Speed continuously adjustable from 20 to 100 rpm

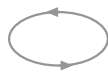
Universal adapter allows for the use of various vessels of 50 - 160 mm height

Summary of all Shaker & Mixer models

Choose from six different shaking motions the right one for your application



vibrating



orbital



reciprocating



rocking



wave



overhead

The optional incubator system is suitable for all 5 kg platform shakers and offers you a great alternative to common heating cabinets



Duomax 1030

Polymax 1040

Titramax 1000

Unimax 1010

Promax 1020

Temperature Controlled Shaking



- 6 shaking motions
- Optional incubating system
- Controlled temperature to your sample

**Always the
Right Motion**

Heidolph Instruments offers you a complete system available from one manufacturer. All components are designed to function together perfectly – that guarantees smooth, safe and efficient operation.

This is what we mean by „Research made easy“ – to help you concentrate on research, with your findings, your company and millions of people worldwide in mind.



Call us for a no obligation demo

Technical specifications - Shakers and Mixers

Model	Reax top	Reax control	Multi Reax	Titramax 100	Titramax 101	Titramax 1000	Vibramax 100	Vibramax 110	Rotamax 120
Motion	vibrating	vibrating	vibrating	vibrating	vibrating	vibrating	vibrating	vibrating	orbital
Rotation speed (rpm)	0 - 2,500	0 - 2,500	150 - 2,000	150 - 1,350	150 - 1,350	150 - 1,350	150 - 1,350	150 - 2,500	20 - 300
Rotation speed setting	analog	electronic contr.	digital	electronic contr.	electronic contr.	electronic contr.	electronic contr.	electronic contr.	electronic contr.
Orbit (mm)	5	5	3	1.5	3	1.5	3	1.5	20
Angle (°)	-	-	-	-	-	-	-	-	-
Operating mode	automatic or continuous	automatic or continuous	timer or continuous	timer or continuous	timer or continuous	timer or continuous	timer or continuous	timer or continuous	timer or continuous
Input power (W)	51	51	50	31	31	31	31	46	33
Weight (kg)	2.8	2.8	9.8	5.5	5.5	6.5	5.5	5.0	5.5
Dimensions (w x h x d) (mm)	134 x 105 x 172	134 x 105 x 172	270 x 172 x 410	245 x 125 x 310	245 x 125 x 310	320 x 125 x 375	245 x 125 x 310	245 x 146 x 310	245 x 125 x 310
Platform size (mm)	-	-	-	220 x 220	220 x 220	290 x 258	220 x 220	140 x 140	220 x 220
Accessories included	-	-	2 carousel attachments	space for 4 microtiter plates	space for 4 microtiter plates	space for 6 microtiter plates	non-skid rubber mat	non-skid rubber mat	non-skid rubber mat
Load capacity (kg)	-	-	1.5	2	2	5	2	2	2
Overheat protection	self-resetting	self-resetting	self-resetting	self-resetting	self-resetting	self-resetting	self-resetting	self-resetting	self-resetting
Permissible ambient temperature (°C)	5-40 at 85% relative humidity	5-40 at 85% relative humidity	0-50 at 80% relative humidity	0-50 at 80% relative humidity	0-50 at 80% relative humidity	0-50 at 80% relative humidity	0-50 at 80% relative humidity	0-50 at 80% relative humidity	0-50 at 80% relative humidity
Protection class (DIN EN 60529)	IP 22	IP 22	IP 30	IP 30	IP 30	IP 40	IP 30	IP 30	IP 30
Supply voltage* (V/Hz)	230 / 50 115 / 60	230 / 50 115 / 60	230 / 50 115 / 60	230 / 50 115 / 60	230 / 50 115 / 60	230 / 50 115 / 60	230 / 50 115 / 60	230 / 50 115 / 60	230 / 50 115 / 60

Model	Unimax 1010	Unimax 2010	Promax 1020	Promax 2020	Duomax 1030	Polymax 1040	Polymax 2040	Reax 2	Reax 20/4 Reax 20/8 Reax 20/12
Motion	orbital	orbital	reciprocating	reciprocating	rocking	wave	wave	overhead	overhead
Rotation speed (rpm)	30 - 500	20 - 400	30 - 250	20 - 400	2 - 50	2 - 50	2.5 - 50	20 - 100	1 - 16
Rotation speed setting	digital	digital	digital	digital	electronic contr.	electronic contr.	digital	analog	electronic contr.
Orbit (mm)	10	20	32	20	-	-	-	-	-
Angle (°)	-	-	-	-	5/10	5/10	5/10	-	-
Operating mode	timer or continuous	timer or continuous	timer or continuous	timer or continuous	timer or continuous	timer or continuous	timer or continuous	-	-
Input power (W)	50	115	50	115	115	115	115	27	280
Weight (kg)	8.0	16	8.0	16	8.0	8.0	16	5.2	23, 28, 33
Dimensions (w x h x d) (mm)	320 x 125 x 375	426 x 135 x 435	320 x 125 x 375	426 x 135 x 435	320 x 185 x 375	320 x 195 x 375	426 x 208 x 435	510 x 180 x 235	490 x 465 x 520
Platform size (mm)	290 x 258	390 x 340	290 x 258	390 x 340	290 x 258	290 x 258	390 x 340	-	770 x 465 x 520
Accessories included	non-skid rubber mat	non-skid rubber mat	non-skid rubber mat	non-skid rubber mat	non-skid rubber mat	non-skid rubber mat	non-skid rubber mat	universal adapter	1050x465 x 520
Load capacity (kg)	5	10	5	10	5	5	10	1	30
Overheat protection	self-resetting	self-resetting	self-resetting	self-resetting	self-resetting	self-resetting	self-resetting	self-resetting	self-resetting
Permissible ambient temperature (°C)	0-50 at 80% relative humidity	0-50 at 80% relative humidity	0-50 at 80% relative humidity	0-50 at 80% relative humidity	0-50 at 80% relative humidity	0-50 at 80% relative humidity	0-50 at 80% relative humidity	0-40 at 80% relative humidity	0-40 at 80% relative humidity
Protection class (DIN EN 60529)	IP 40	IP 20	IP 40	IP 20	IP 40	IP 40	IP 20	IP 21	IP 21
Supply voltage* (V/Hz)	230 / 50 115 / 60	230 / 50 115 / 60	230 / 50 115 / 60	230 / 50 115 / 60	230 / 50 115 / 60	230 / 50 115 / 60	230 / 50 115 / 60	230 / 50 115 / 60	230 / 50 115 / 60

* Standard 230 V / 50 Hz: Others upon request, please specify on order

Certificate

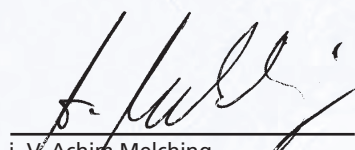
To confirm the ability for
continuous operation

of the SMG Series Test Tube- and Platform Shakers

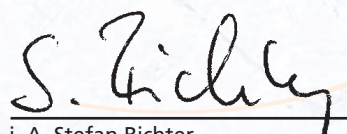
The SMG Series Test Tube- and Platform Shakers feature over temperature safety circuits according to DIN EN 61010-1:2001 and DIN EN 61010-2-010:2003 and therefore, are designed for **continuous operation**.

This statement is made under the precondition that all units are operated in accordance with the operation manual and in accordance with good practice standards for safety in laboratories, rules for accident preventions, and compliance with directions on hazardous materials.

Schwabach, October 2010



i. V. Achim Melching
Technical Director



i. A. Stefan Richter
Quality Control Director

Heidolph Instruments Certification



CERTIFICATE

This is to confirm that the organisation

Heidolph-Elektro GmbH & Co. KG
Starenstrasse 23
93309 Kelheim
Germany

including the sites (details please see attachment):
Heidolph České elektromotory s.r.o., 345 01 Mrákov, Czech Republic
Heidolph Instruments GmbH & Co. KG, 91126 Schwabach, Germany

has implemented and maintains a Management System
in accordance with the standard

DIN EN ISO 9001:2008

The scope of the certification covers:

**Development, production and sales of electric drives and laboratory
equipment**

This certificate is valid until 2013-10-31
and is subject to annual surveillance audits.

Registration Number: 714100/QM/10.01

Audit report 714100-9100-0001/131396

Initial certification was given in 1995.

VDE Prüf- und Zertifizierungsinstitut GmbH
VDE Testing and Certification Institute
Certification


M. Stowasser

Date: 2010-11-08

Merianstraße 28, 63069 Offenbach, Germany
Telefon: +49 69 83 06-0, Telefax: +49 69 83 06-555
E-Mail: vde-institut@vde.com, <http://www.vde-institut.com>
VDE certificates are valid only when published on:
<http://www.vde.com/certificate>

The VDE Testing and Certification Institute is accredited by DAR Accreditation
Bodies according to DIN EN ISO/IEC 17020 and DIN EN ISO/IEC 17021 and notified in the
EU under ID. No. 0366.



VDE
INSTITUT

Precise

Dosing and Dispensing



- Flow rates starting at 0.005 ml/min
- Doesn't crush organic cell cultures
- Single and multiple channel operations

**Control
every drop**

... **good** to the
last **drop**

Precise Dosing and Dispensing

Safety for continuous unattended operation: the motor will be switched off if a high thermal load situation occurs to **preventatively avoid accidents**

High precision, even for flow rates starting at 0.005 ml/min



Optional foot-pedal remote control via cable to operate pump drive **outside a closed fume hood** and facilitates operation

All models feature a smooth start operation which **prevents spills and splashing media**. The speed will ramp up slowly until your set rpm has been reached

For the use in cell biology just use a pump head which features convex rollers and **does not squeeze** the tubing as conventional rollers

The average operational **lifespan of 10 years** is backed by a 3 year warranty and makes your purchase a truly worthwhile investment

Precise Dosing and Dispensing

Are you in need of a system that provides the most accurate pumping and dosing of aggressive, corrosive or even sterile media without any compromise to precision?

The versatile PD Series can offer you all these options with flow rates ranging from 0.005 to 3,900 ml per minute depending on configuration.

If you are looking for standard pumping or highly accurate interval dosing and pause setting capabilities to meter into wells, the **PD Series has it all**



The pumped media remains in the tubing and never comes in contact with you – keeping **you and your application safe**

Your application media never comes in contact with the pump head – **eliminating cross-contamination** and the need to clean the unit between projects

Choose from 6 different pump drives, 3 pump heads for single-channel use, and 3 additional pump heads for multi-channel use that can accommodate up to 12 cassettes

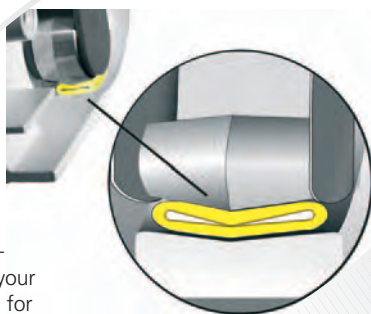
The PD Series is **self-priming** and **comes without any valves** providing care-free operation

Pump Heads

Are you engaged in a highly specialized application such as cell biology and need to transfer the cells without causing damage?

The PD Series offers you solutions for standard applications and highly sophisticated challenges that require added control.

Choose quickly and easily – a software configuration program selects those components which **meet your application requirements best**



For the use in cell biology, choose a pump head which features convex rollers that **do not squeeze** the tubing compared to conventional rollers

A wide range of tubing material is available – choose the **most appropriate material** for your research whether it is FDA approved material for food analysis or material for aggressive media such as acids – you find it right here

Consequently, organic cell cultures **are not crushed** and your samples are transported safely

Your advantages – our Hei-lights

For your safety

- Important for continuous unattended operation: The motor will be switched off if a high thermal load situation occurs to increase safety in your lab and to **prevent accidents**
- Additional safety is provided by sparkless motors which **reduce incidents such as fires** in **volatile environments**
- All models feature a smooth start operation which **prevents spills and splashing of media**. The speed will ramp up slowly until your set rpm has been reached
- Protection class IP 55 for PD 5100 and 5200 models protects your unit from highly aggressive vapors or liquids – and thus **eliminates accidents, short-cuts and failures**
- Use an optional foot pedal remote control via cable to start and stop your pump drive outside a **closed fume hood increasing your personal safety**
- The pumped media remains in the tubing and never comes in contact with you – keeping you and **your application safe**

For your ease of use

- The PD Series is **self-priming** and **comes without any valves** providing care-free operation
- Analog and digital interfaces **facilitate operation** for example by connecting the optional foot pedal or PC software program
- Use your valuable lab space efficiently and stack one pump drive on top of the other to build a **two-layer system** that saves you space
- Use a single-channel pump head and **upgrade your model** to multi-channel operation in just minutes with a different pump head
- Our standard single-channel models can take up to 2 pump heads at a time **doubling your throughput**
- Our clear and **self-explanatory front panel** layout is for your ease of operation
- Make your life easier and rely on the **accurate liquid delivery** as low as 0.005 ml/min

Reduce your cost of ownership

- Reduce your maintenance costs: The sealed housing protects your pump from aggressive fumes, liquids and vapors to prevent internal corrosion. This results in an increased **lifespan of 10 years** on average at a reduced maintenance and repair cost
- Complete packages including pump drive, head and compatible tubing reduce your selection process and gives you a **reduced package price**
- The two-pump head per drive system allows to **reduce your investment** greatly while **increasing your throughput** by 100 %
- Maintenance free motors **eliminate repairs and down times** to ensure years of continuous operation

For standard applications – liquid transfer

Pump drive PD 5001 / PD 5006

Pump includes all standard features for safety, ease of use and reduced cost of ownership plus:



PD 5001

Flow rates of 0.8 - 790 ml/min with single-channel pump heads

- Low speed range from 10 - 120 rpm
- This pump drive is suitable for multi-channel operation
- Multi-channel flow rates from 0.005 - 320 ml/min
- Upgrade your PD 5001 for multi-channel operation in just minutes with a pump head adaptor: P/N 523-50013-00

PD 5001
P/N 523-50010-00

PD 5006

Flow rates of 3.6 - 3,900 ml/min with single-channel pump heads

- High speed range from 50 - 600 rpm
- This pump drive is not suitable for multi-channel operation

PD 5006
P/N 523-50060-00

Your advantages / Pump drive 5001 / 5006

For reproducible results – liquid transfer

Pump drive PD 5101 / PD 5106

Pump includes all standard features for safety, ease of use and reduced cost of ownership plus:

Control the speed (rpm) in a clockwise or counterclockwise direction and On/Off via **analog interface** for 0 – 10 V or 4 – 20 mA

Adjust the variable speed on the analog control knob from 5.0 - 600 rpm. **Your speed is held constant** even under changing loads

A press of the max button **accelerates** the **filling and draining** of your tubing

At the press of a button the pump operates **clockwise or counter-clockwise**

This model connects to an optional foot pedal **remote control** via cable to start and stop your pump drive outside a closed fume hood increasing your personal safety or ease of use in multiple sample fills



This model features electronic speed control at an **accuracy of $\pm 3.5\%$**

PD 5101

Flow rates of 0.3 - 790 ml/min with single-channel pump heads

- Low speed range from 5 - 120 rpm
- This pump drive is suitable for multi-channel operation
- Multi-channel flow rates from 0.005 - 320 ml/min
- Upgrade your PD 5101 for multi-channel operation in just minutes with a pump head adaptor: P/N 523-51013-00

PD 5106

Flow rates of 1.3 - 3,900 ml/min with single-channel pump heads

- High speed range from 24 - 600 rpm
- This pump drive is not suitable for multi-channel operation

PD 5101
P/N 523-51010-00

PD 5106
P/N 523-51060-00

Reproducibility - pumping and dosing

Pump drive PD 5201 / PD 5206

Pump includes all standard features for safety, ease of use and reduced cost of ownership plus:

Control the speed (rpm) in clockwise or counterclockwise direction and On/Off via **analog interface** for 0 – 10 V or 4 – 20 mA or **digital RS 232 interface**

Calibrate your flow volume and flow rate individually

At the press of a button the pump operates **clockwise or counterclockwise**

A press of the max button **accelerates the filling and draining** of your tube

This model features electronic speed control and an **accuracy of $\pm 0.5\%$**



Flow characteristic of pump heads in combination with various tubing diameters is **pre-programmed** for accurate flow rate numbers

Digital read-out of:

- Speed (rpm)
- Tubing diameter
- Flow rate in ml/min
- Dosing volume
- Interval dosing
- Pause function

Easily change all process parameters via these buttons

This model connects to an optional foot pedal **remote control** via cable to start and stop your pump drive outside a closed fume hood increasing your personal safety or easy use in multiple sample fills

PD 5201

Flow rates of 0.3 - 790 ml/min with single-channel pump heads

- Low speed range from 5 - 120 rpm
- This pump drive is suitable for multi-channel operation
- Multi-channel flow rates from 0.005 - 320 ml/min
- Upgrade your PD 5201 for multi-channel operation in just minutes with a pump head adaptor: P/N 523-52013-00

PD 5201
P/N 523-52010-00

PD 5206

Flow rates of 1.3 - 3,900 ml/min with single-channel pump heads

- High speed range from 24 - 600 rpm
- This pump drive is not suitable for multi-channel operation

PD 5206
P/N 523-52060-00

Single-channel pump heads

SP quick

- Fast and convenient tube changes
- Low pulsation due to 5 roller system
- Pump head features ball bearings
- Rollers made of stainless steel
- For tubes with a 1.6 mm or 2.5 mm wall thickness (wt)
- Depending on drive and tubing, the flow rate ranges from 0.4 to 3,300 ml per minute



SP quick

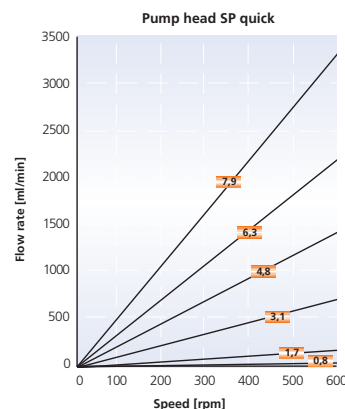
P/N 527-11100-00 (wt 1.6 mm)
P/N 527-11300-00 (wt 2.5 mm)

SP quick d (not shown)

P/N 527-11120-00 (wt 1.6 mm)
P/N 527-11320-00 (wt 2.5 mm)

SP quick d

- Choose SP quick in combination with SP quick d to attach two pump heads to one drive
- This combination is suitable for pump drives PD 5001/5101/5201 only



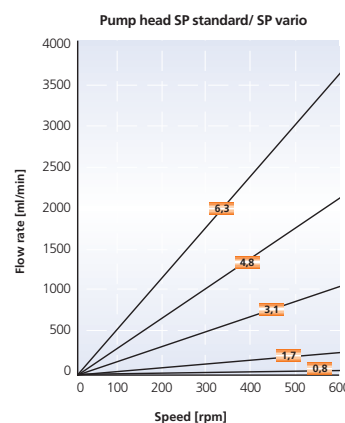
SP standard

- Recommended for standard applications
- Convex rollers do not squeeze or crush organic cell cultures
- Pump head features ball bearings
- Rollers made of stainless steel and polyamide
- For tubes with a 1.6 mm or 2.5 mm wall thickness (wt)
- Depending on drive and tubing, the flow rate ranges from 0.3 to 3,900 ml per minute



SP standard

P/N 523-43010-00 (wt 1.6 mm)
P/N 523-43030-00 (wt 2.5 mm)



SP vario

- Suitable for most Heidolph tubing due to adjustable roller spacing
- Convex rollers do not squeeze or crush organic cell cultures
- Pump head features ball bearings
- Rollers made of stainless steel and aluminum
- Depending on drive and tubing, the flow rate ranges from 0.3 to 3,900 ml per minute



SP vario

P/N 523-45110-00



+



+



=

Single-channel pump

Tubing sizes for single-channel pumps

Tubing sizes						
Inner diameter	(mm)	0.8	1.7	3.1	4.8	6.3
Outer diameter	(mm)	4	4.9	6.3	8	9.5
Wall thickness (wt)	(mm)	1.6	1.6	1.6	1.6	1.6
Max. pressure (continuous / short time)	(bar)	0.7 / 1.7	0.7 / 1.7	0.7 / 1.7	0.5 / 1.5	0.5 / 1.5
Suction height	(mH ₂ O)	8.8	8.8	8.8	8.8	6.7

Average flow rates in combination with pump head and pump drive:

SP quick		min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
PD 5106 / 5206	(ml/min)	2	33	8	186	26	653	59	1,529	89	2,072
PD 5006	(ml/min)	4	35	17	197	57	695	123	1,494	186	1,765
PD 5101 / 5201	(ml/min)	0.38	9	2	40	5	126	12	233	17	409
PD 5001	(ml/min)	0.83	9	3	41	11	134	25	292	36	413
SP standard / SP vario		min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
PD 5106 / 5206	(ml/min)	1	26	11	257	43	1,017	105	2,549	167	4,056
PD 5006	(ml/min)	3	33	22	249	93	1,037	228	2,613	364	4,151
PD 5101 / 5201	(ml/min)	0.36	9	2	55	9	221	21	530	33	813
PD 5001	(ml/min)	0.65	8	5	61	19	223	44	519	75	861

Tubing P/N (per meter):

Silicone	525-33000-00	525-34000-00	525-36000-00	525-30027-00	525-30028-00
Viton®	525-53000-00	525-54000-00	525-56000-00	525-50027-00	525-50028-00
PharMed®	525-23000-00	525-24000-00	525-26000-00	525-20027-00	525-20028-00
Tygon® (standard)	525-63000-00	525-64000-00	525-66000-00	525-60027-00	525-60028-00
Tygon® (hydrocarbon)	525-73000-00	525-74000-00	525-76000-00	525-70027-00	525-70028-00
Tygon® 2001 (food)	525-83000-00	525-84000-00	525-86000-00	525-80027-00	525-80028-00

Tubing sizes				
Inner diameter	(mm)	4.8	6.3	7.9
Outer diameter	(mm)	9.8	11.3	12.9
Wall thickness (wt)	(mm)	2.5	2.5	2.5
Max. pressure (continuous / short time)	(bar)	0.8 / 1.8	0.8 / 1.8	0.8 / 1.8
Suction height	(mH ₂ O)	8.8	8.8	8.8

Average flow rates in combination with pump head and pump drive:

SP quick		min.	max.	min.	max.	min.	max.
PD 5106 / 5206	(ml/min)	58	1,527	85	2,248	113	3,171
PD 5006	(ml/min)	123	1,580	180	2,411	257	3,436
PD 5101 / 5201	(ml/min)	12	299	18	435	25	630
PD 5001	(ml/min)	26	299	38	454	50	636
SP standard / SP vario		min.	max.	min.	max.		
PD 5106 / 5206	(ml/min)	92	2,390	139	3,821		
PD 5006	(ml/min)	203	2,426	313	3,782		
PD 5101 / 5201	(ml/min)	15	491	28	769		
PD 5001	(ml/min)	42	493	68	773		

Tubing P/N (per meter):

Silicone	525-35000-00	525-39000-00	525-32000-00
Viton®	525-55000-00	525-59000-00	525-52000-00
PharMed®	525-25000-00	525-29000-00	525-22000-00
Tygon® (standard)	525-65000-00	525-69000-00	525-62000-00
Tygon® (hydrocarbon)	525-75000-00	525-79000-00	525-72000-00
Tygon® 2001 (food)	not suitable for pump drive PD 5006 525-85000-00	525-89000-00	-

Flow rates pertain to Tygon (standard) tubing and water

Multi-channel pumps

Pump includes all standard features for safety, ease of use and reduced cost of ownership plus:

- These pump drives are able to be configured for multi-channel use: PD 5001, PD 5101 and PD 5201
- Increase your throughput by running up to 12 individual cassettes on one single pump drive and pump head system
- Separate metering into multiple vessels with different feed rates at the same time by using different tubing dimensions to adjust flow rates
- Save time: Tubing change is done in just seconds
- In addition to standard pump heads which feature a 4 roller system you can choose 8 roller pump heads for low pulsation
- Change your cassettes easily, even during operation – there are no restrictions
- Cassettes adjustments and changes are simple, just click in place
- No additional pump drive purchase needed: Upgrade your single channel pump drive with just an adaptor for multi-channel use and pick the head/cassette configuration that matches your application needs



PD 5101 + pump head C 4 + cassette small

Multi-channel pump heads



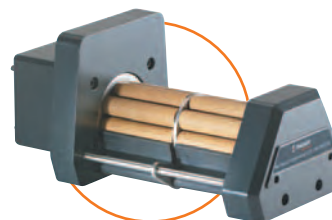
Multi-channel pump head C 4

Accepts 4 cassettes small.
8 rollers for low-pulsation.
P/N 524-80420-00



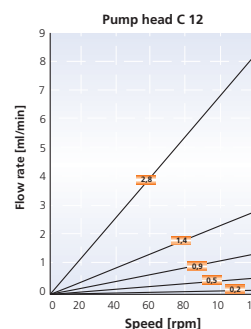
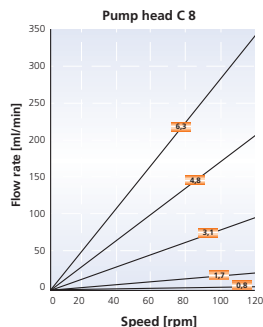
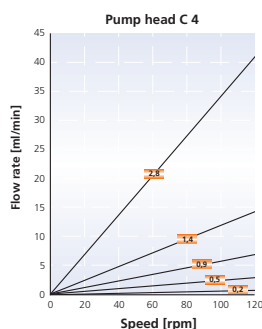
Multi-channel pump head C 8

Accepts 8 cassettes medium or
4 cassettes large. Medium and large
size cassettes may be used together.
4-roller design.
P/N 524-40810-00



Multi-channel pump head C 12

Accepts 12 cassettes small.
Built-in reduction gear allows
feeding of smallest quantities.
8 rollers minimizing pulsation.
P/N 524-81220-00



Flow rates pertain to water



Multi-channel cassettes

General advantages

- Setting screws to adjust roller contact pressure
- Cassettes easily change even while pumping
- All cassettes accept different tube materials and sizes (refer to page 14)

Cassette small

- Flow rates from 0.005 to 37 ml/min
- Suitable for tubes with 0.9 mm wall thickness (wt)
- Tube diameters available: 0.2 / 0.5 / 0.9 / 1.4 and 2.8 mm
- Two-Stop-Tubing (40 cm) required to operate cassette small
- Stoppers secure tube in place
- Couplings and tube extensions allow extra hose length in 1 m increments
- Combinations:
 - C 4 multi-channel pump head: Max. 4 cassettes small
 - C 12 multi-channel pump head: Max. 12 cassettes small



Cassette small
P/N 524-90022-00



Pic.: Two-Stop-Tubing

Cassette medium

- Flow rates from 0.3 to 25 ml/min
- Suitable for tubes with 1.6 mm wall thickness (wt)
- Tube diameters available: 0.8 and 1.7 mm
- Tube available in requested sizes
- Combinations:
 - C 8 multi-channel pump head: Max. 8 cassettes medium



Cassette medium
P/N 524-90021-00

Cassette large

- Flow rates from 1 to 320 ml/min
- Suitable for tubes with 1.6 mm wall thickness (wt)
- Tube diameters available: 1.7 / 3.1 / 4.8 and 6.4 mm
- Tube available in requested sizes
- Combinations:
 - C 8 multi-channel pump head: Max. 4 cassettes large



Cassette large
P/N 524-90010-00

Tubing sizes for multi-channel pumps

Tubing sizes		0.2	0.5	0.9	1.4	2.8
Inner diameter	(mm)	0.25	0.51	0.89	1.42	2.79
Outer diameter	(mm)	2.05	2.31	2.69	3.22	4.59
Wall thickness (wt)	(mm)	0.9	0.9	0.9	0.9	0.9
Max. pressure (continuous / short time)	(bar)	0.5 / 1.5	0.5 / 1.5	0.5 / 1.5	0.5 / 1.5	0.5 / 1.5
Suction height	(mH ₂ O)	7	7	7	7	7

Average flow rates in combination with cassette, pump head and pump drive:

PD 5101 / PD 5201		min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	max. number of cassettes
Cassette small / pump head C 12	(ml/min)	0.005	0.11	0.01	0.54	0.03	1	0.10	3	0.29	9	12
Cassette small / pump head C 4	(ml/min)	0.02	0.49	0.08	2	0.24	6	0.60	14	2	36	4
PD 5001		min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	
Cassette small / pump head C 12	(ml/min)	0.005	0.11	0.02	0.42	0.10	1	0.23	3	0.69	8	12
Cassette small / pump head C 4	(ml/min)	0.04	0.53	0.17	2	0.57	6	1	15	4	37	4

Tubing P/N:

Silicone	Two-Stop-Tubing for cassette small				525-30014-00	525-30015-00	525-30016-00
	Extension tube (per meter)				525-30024-00	525-30025-00	525-30026-00
Viton®	Two-Stop-Tubing for cassette small				525-50014-00	525-50015-00	525-50016-00
	Extension tube (per meter)				525-50024-00	525-50025-00	525-50026-00
PharMed®	Two-Stop-Tubing for cassette small	525-20012-00	525-20013-00	525-20014-00	525-20015-00	525-20016-00	
	Extension tube (per meter)	525-20022-00	525-20023-00	525-20024-00	525-20025-00	525-20026-00	
Tygon® (standard)	Two-Stop-Tubing for cassette small	525-60012-00	525-60013-00	525-60014-00	525-60015-00	525-60016-00	
	Extension tube (per meter)	525-60022-00	525-60023-00	525-60024-00	525-60025-00	525-60026-00	
Fittings for extension tubes (PTFE)				526-22000-00			

Tubing sizes		0.8	1.7	3.1	4.8	6.3
Inner diameter	(mm)	0.8	1.7	3.1	4.8	6.3
Outer diameter	(mm)	4	4.9	6.3	8	9.5
Wall thickness (wt)	(mm)	1.6	1.6	1.6	1.6	1.6
Max. pressure (continuous/short time)	(bar)	0.7 / 1.7	0.7 / 1.7	0.7 / 1.7	0.7 / 1.7	0.5 / 1.5
Suction height	(mH ₂ O)	8.8	8.8	8.8	8.8	6.7

Average flow rates in combination with cassette, pump head and pump drive:

PD 5101 / PD 5201		min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	max. number of cassettes
Cassette medium / pump head C 8	(ml/min)	0.24	7	1	26							8
Cassette large / pump head C 8	(ml/min)			1	27	4	90	8	192	11	329	4
PD 5001		min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	
Cassette medium / pump head C 8	(ml/min)	0.55	6.97	2.17	27							8
Cassette large / pump head C 8	(ml/min)			2	27	7	85	18	246	26	364	4

Tubing P/N (per meter):

Silicone	525-33000-00	525-34000-00	525-36000-00	525-30027-00	525-30028-00
Viton®	525-53000-00	525-54000-00	525-56000-00	525-50027-00	525-50028-00
PharMed®	525-23000-00	525-24000-00	525-26000-00	525-20027-00	525-20028-00
Tygon® (standard)	525-63000-00	525-64000-00	525-66000-00	525-60027-00	525-60028-00
Tygon® (hydrocarbon)	525-73000-00	525-74000-00	525-76000-00	525-70027-00	525-70028-00
Tygon® 2001 (food)	525-83000-00	525-84000-00	525-86000-00	525-80027-00	525-80028-00

Flow rates pertain to Tygon (standard) tubing and water

Complete Packages at a special price

For standard applications

Package PD 5001 SP quick

Flow rate from 11 to 130 ml per minute

- Pump drive PD 5001
 - Complete with pump head SP quick 1.6
 - Set includes 1 m each Tygon (standard) and Silicone tubing (inner Ø 3.1 mm)
- P/N 523-50019-00

Package PD 5006 SP quick

Flow rate from 57 to 695 ml per minute

- Pump drive PD 5006
 - Complete with pump head SP quick 1.6
 - Set includes 1 m each Tygon (standard) and Silicone tubing (inner Ø 3.1 mm)
- P/N 523-50069-00

Package PD 5006 SP standard

Flow rate from 313 to 3,800 ml per minute

- Pump drive PD 5006
 - Complete with pump head SP standard 2.5
 - Set includes 1 m each Tygon (standard) and Silicone tubing (inner Ø 6.3 mm)
- P/N 523-50068-00

For high requirements

Package PD 5101 SP quick

Flow rate from 0.3 to 9.0 ml per minute

- Pump drive PD 5101
 - Complete with pump head SP quick 1.6
 - Set includes 1 m each Tygon (standard) and Silicone tubing (inner Ø 0.8 mm)
- P/N 523-51019-00

Package PD 5106 SP quick

Flow rate from 26 to 650 ml per minute

- Pump drive PD 5106
 - Complete with pump head SP quick 1.6
 - Set includes 1 m each Tygon (standard) and Silicone tubing (inner Ø 3.1 mm)
- P/N 523-51069-00

Package PD 5106 SP standard

Flow rate from 140 to 3,800 ml per minute

- Pump drive PD 5106
 - Complete with pump head SP standard 2.5
 - Set includes 1 m each Tygon (standard) and Silicone tubing (inner Ø 6.3 mm)
- P/N 523-51068-00

For highest requirements

Package PD 5201 SP quick

Flow rate from 0.3 to 9.0 ml per minute

- Pump drive PD 5201
 - Complete with pump head SP quick 1.6
 - Set includes 1 m each Tygon (standard) and Silicone tubing (inner Ø 0.8 mm)
 - Min. dispensing volume: 0.1 ml
- P/N 523-52019-00

Package PD 5201 SP quick

Flow rate from 5 to 127 ml per minute

- Pump drive PD 5201
 - Complete with pump head SP quick 1.6
 - Set includes 1 m each Tygon (standard) and Silicone tubing (inner Ø 3.1 mm)
 - Min. dispensing volume: 1.2 ml
- P/N 523-52019-10

Package PD 5206 SP quick

Flow rate from 26 to 650 ml per minute

- Pump drive PD 5206
 - Complete with pump head SP quick 1.6
 - Set includes 1 m each Tygon (standard) and Silicone tubing (inner Ø 3.1 mm)
 - Min. dispensing volume: 5.9 ml
- P/N 523-52069-00

Package PD 5206 SP quick

Flow rate from 90 to 2,100 ml per minute

- Pump drive PD 5206
 - Complete with pump head SP quick 1.6
 - Set includes 1 m each Tygon (standard) and Silicone tubing (inner Ø 6.3 mm)
 - Min. dispensing volume: 20.5 ml
- P/N 523-52069-20

Package PD 5206 SP standard

Flow rate from 140 to 3,800 ml per minute

- Pump drive PD 5206
 - Complete with pump head SP standard 2.5
 - Set includes 1 m each Tygon (standard) and Silicone tubing (inner Ø 6.3 mm)
 - Min. dispensing volume: 33.4 ml
- P/N 523-52068-00

For multi-channel operations

Package PD 5201 MC C 4

Flow rate from 0.1 to 2.0 ml per minute

- Pump drive PD 5201 complete with adaptor
 - Multi-channel pump head C 4
 - 4 Cassette small
 - Tubing set:
 - 4 pcs. Two-Stop-Tubing Tygon (standard) (inner Ø 0.5 mm)
 - 2 m Extension Tube Tygon (standard) (inner Ø 0.5 mm)
 - 8 pcs. Fittings for Extension Tube
 - Min. dispensing volume: 23 µl
- P/N 523-52017-00

Tubing options

Tygon® standard

- Application: For standard applications
- Features:
 - Non-toxic, non-oxidizing
 - Good resistance to acids, bases and inorganic media
 - Very low gas permeability, good performance life
- **Material:** Thermoplastic soft PVC, transparent
- **Complies with the standards:** FDA (21 CFR 177.2601) and GLP
- **Temperature range:** -50 to +75 °C
- **Sterilization:** Can be autoclaved for 30 min at 1 bar and 120 °C (material may change color) or with ethylene oxid
- **Restriction:** Segregation of plasticizers is possible



- Use with:

• Acids:	good
• Lyes:	good
• Solvents:	unsuitable
• Pressure:	good
• Vacuum:	good
• Viscous media:	excellent
• Sterile media:	conditional

Tygon® 2001 for food

- Application: Food industry, well suited to products with high fat contents
- Features:
 - Extremely chemically resistant; e. g. appropriate for the use of polar solvents
 - Plasticizer and oil free
 - Superior flex life in peristaltic pumps
 - Translucent to ease visual inspection
 - Outstanding flexibility
- **Material:** Thermoplastic tube, transparent
- **Complies with the standards:** USP Class VI, FDA (21 CFR 177.2600) and GLP
- **Temperature range:** -78 to +71 °C
- **Sterilization:** Can be autoclaved for 30 min at 1 bar, sterilized by irradiation or with ethylene oxid
- **Restriction:** Not suitable for pump drive PD 5006



- Use with:

• Acids:	excellent
• Lyes:	excellent
• Solvents:	good
• Pressure:	good
• Vacuum:	good
• Viscous media:	good
• Sterile media:	good

Tygon® for hydrocarbons

- Application: Especially for hydrocarbons, mineral oil products and distillates
- Features:
 - Ideal for petrol, kerosene, heating oil, cutting solutions and coolants on a glycol base
 - Resistant to ozone and UV
- **Material:** Thermoplastic soft PVC, translucent yellow
- **Complies with the standards:** GLP conform
- **Temperature range:** -40 to +75 °C
- **Sterilization:** Sterilization is not recommended
- **Restriction:** Not suitable for concentrated acids, lyes, food and pharmaceuticals



- Use with:

• Acids:	good
• Lyes:	good
• Solvents:	conditional
• Pressure:	good
• Vacuum:	good
• Viscous media:	excellent
• Sterile media:	conditional

PharMed®

- Application: Ideal for medical, lab and research uses
- Features:
 - High fatigue strength under repeated reversed bending stresses
 - Non-toxic, biocompatible
 - Very low gas permeability
 - Well suited to acids and bases
- **Material:** Thermoplastic elastomer on a polypropylene basis with plasticizers; excellent tensile strength; opaque
- **Complies with the standards:** FDA (21 CFR 177.2600), USP Class VI, GLP, Pharmacopoea and Europaea
- **Temperature range:** -60 to +135 °C
- **Sterilization:** Can be autoclaved or sterilized with ethylene oxide or sterilized by irradiation
- **Restriction:** Additives may migrate



- Use with:

• Acids:	good
• Lyes:	good
• Solvents:	unsuitable
• Pressure:	good
• Vacuum:	excellent
• Viscous media:	good
• Sterile media:	excellent

Silicone

- Application: Platinum-coated silicone hose for use in pharmaceuticals and biology
- Features:
 - Extremely smooth interior prevents bacterial growth
 - Biocompatible, minimal adsorption and absorption
 - Best flow properties, high temperature stability
 - Absolutely inert, softener-free
- **Material:** Polydimethyl siloxane with siliceous earth and silicone additives; translucent white; excellent resistance to initial pressure
- **Complies with the standards:** USP Class VI, FDA, meets GLP and NSF
- **Temperature range:** -80 to +200 °C
- **Sterilization:** Can be autoclaved for 30 min at 1 bar or sterilized by irradiation
- **Restriction:** Not suitable for concentrated solvents, oils, acids or dilute caustic soda; relatively high permeability to gas



- Use with:

• Acids:	conditional
• Lyes:	conditional
• Solvents:	unsuitable
• Pressure:	satisfactory
• Vacuum:	good
• Viscous media:	satisfactory
• Sterile media:	excellent

Viton®

- Application: Excellent acid resistance at high temperatures
- Features:
 - Low gas permeability
 - Resistant to solvents and corrosives at high temperatures
- **Material:** Fluorocarbon rubber, thermoformed Viton B (67% fluorinated); opaque black
- **Complies with the standards:** GLP conform
- **Temperature range:** -30 to +205 °C
- **Sterilization:** 16 hours at +250 °C with hot air circulation recommended
- **Restriction:** Limited performance life



- Use with:

• Acids:	excellent
• Lyes:	excellent
• Solvents:	varies; tests recommended
• Pressure:	good
• Vacuum:	good
• Viscous media:	good
• Sterile media:	satisfactory

Tubing compatibility

Chemical	P	S	T	TU	TK	V
A <u>Acetaldehyde</u>	D	C	D	D	D	D
Acetic acid, 10 % in W.	A	A	A	A	A	-
Acetic acid, 100 %	B	D	D	D	-	-
Acetic anhydride	A	A	D	D	A	D
Acetone	D	C	D	D	C	D
Acetonitrile	D	D	D	D	B	D
Acetyl bromide	C	D	D	D	C	-
Acetyl chloride	C	D	D	D	C	A
Aliphatic hydrocarbons	D	D	D	B	D	-
Aluminium chloride, 53 % in W.	A	A	A	A	A	A
Aluminium sulfate, 50 % in W.	A	A	A	A	A	A
Alums	A	A	A	A	A	-
Ammonia, gas and liquid	A	D	B	B	B	D
Ammonium acetate, 45 % in W.	A	A	A	A	A	-
Ammonium carbonate, 20 % in W.	A	A	A	A	A	-
Ammonium chloride	A	C	A	A	A	A
Ammonium hydroxide, 30 % in W.	A	D	A	C	A	A
Ammonium nitrate	A	C	A	A	A	-
Ammonium phosphate	A	A	A	A	A	-
Ammonium sulfate	A	A	A	A	A	A
Amyl acetate	B	D	D	D	D	D
Amyl alcohol	D	D	D	A	A	A
Amyl chloride	C	D	D	D	D	-
Aniline	C	D	D	D	D	-
Aniline hydrochloride	C	D	D	D	D	D
Aqua regia (80 % HCl, 20 % HNO ₃)	D	D	D	D	A	-
Aromatic hydrocarbons	D	D	D	D	D	-
Arsenic salts	A	A	A	A	A	-
B <u>Barium salts</u>	A	A	A	A	A	-
Benzaldehyde	D	C	D	D	C	D
Benzene	D	D	D	D	-	-
Benzenesulfonic acid	D	D	D	D	D	A
Boric acid, 4 % in W.	A	A	A	A	A	A
Bromine	D	D	D	D	D	A
Butane	A	A	A	A	B	A
Butanol (butyl alcohol)	D	D	D	A	A	A
Butyl acetate	B	D	D	D	D	D
Butyric acid	B	D	D	C	D	-
Chemical	P	S	T	TU	TK	V
C <u>Calcium oxide</u>	A	A	A	A	A	-
Carbon bisulfide	D	D	D	D	D	-
Carbon tetrachloride	D	D	D	D	D	A
Chlorine, wet	D	D	B	B	C	B
Chloracetic acid, 20 % in W.	B	A	A	D	A	D
Chlorobenzene	D	D	D	D	C	A
Chloroform	D	D	D	D	C	A
Chlorobromomethane	B	D	D	D	-	A
Chromic acid, 20 % in W.	A	D	B	C	B	A
Chromic acid, 50 % in W.	C	D	C	D	-	-
Copper salts	A	A	A	A	A	-
Cyclohexane	D	D	D	C	C	A
Cyclohexanone	D	D	D	D	C	D
Chlorosulfonic acid	D	D	D	D	D	D
D <u>Diesel</u>	D	D	-	B	-	-
Dimethyl formamide	B	A	D	D	A	D
E <u>Ethanol (ethyl alcohol)</u>	A	B	D	B	A	A
Ether	C	D	D	C	D	-
Ethyl acetate	B	D	D	D	D	D
Ethyl bromide	D	D	D	D	C	-
Ethyl chloride	C	D	D	D	D	A
Ethylamine	D	C	D	D	B	-
Ethylene chlorhydrin	A	B	D	B	A	A
Ethylene dichloride	C	D	D	D	D	B
Ethylene glycol	A	A	A	A	A	A
Ethylene oxide	A	A	A	A	A	D
F <u>Fatty acids</u>	C	C	C	C	C	C
Ferric chloride 40 % in W.	A	A	A	A	A	B
Ferric sulfate 5 % in W.	A	A	A	A	A	A
Ferrous chloride 43 % in W.	A	A	A	A	A	-
Ferrous sulfate 5 % in W.	A	A	A	A	A	-
Fluoboric acid, 10 % in W.	D	D	A	A	A	-
Fluoroborate salts	A	-	A	A	A	-
Fluosilicic acid	C	B	D	B	A	-
Formaldehyde, 37 % in W.	D	C	D	D	C	D
Formic acid, 25 % in W.	A	A	A	C	A	D
Freon 11	A	A	A	A	-	-
Fruit juice	A	A	A	A	A	A
G <u>Gasoline, high-aromatic</u>	D	D	D	B	D	A
Gasoline, non-aromatic	D	D	D	B	D	A
Glycerin	A	A	A	A	A	A

Tubing:

P = PharMed®
 S = Silicone
 T = Tygon® standard
 TU = Tygon® hydrocarbon
 TK = Tygon® 2001 food
 V = Viton®

Resistance:

A = excellent
 B = good
 C = conditional
 D = unsuitable
 - = not tested

Please note:

- All information provided is not guaranteed
 - Recommended testing of tubing prior to application use

Chemical								Chemical								
		P	S	T	TU	TK	V			P	S	T	TU	TK	V	
<u>H/I</u>	Hydrobromic acid, 20 - 50 %	D	D	A	A	A	A	<u>P</u>	Potassium hydroxide, <10 % in W.	A	A	A	D	-	B	
	Hydrochloric acid, 10 % in W.	A	A	A	A	A	A		Potassium iodide, 56 % in W.	A	A	A	A	A	-	
	Hydrochloric acid, 37 % in W.	B	D	A	D	A	B		Propanol (propyl alcohol)	C	A	D	D	A	B	
	Hydrocyanic acid	A	A	A	A	A	A		Pyridine	C	D	D	D	C	D	
	Hydrofluoric acid, 10 % in W.	D	D	A	A	A	B		<u>S</u>	Silicone oils	C	D	B	A	B	A
	Hydrofluoric acid, 50 %	D	D	B	D	A	A			Silver nitrate, 55 % in W.	A	A	A	A	A	A
	Hydrogen peroxide, 10 % in W.	A	A	A	A	A	A			Soap solutions	B	A	A	A	A	A
	Hydrogen peroxide, 90 % in W.	B	C	D	D	B	-			Sodium bicarbonate, 7 % in W.	A	A	A	A	A	A
	Hydroiodic acid	B	B	A	A	A	-			Sodium bisulfate	A	-	A	A	A	-
	Hypochlorous acid, 25 % in W	A	A	A	A	A	A			Sodium borate	A	A	A	A	A	A
Iodine solutions	A	C	A	A	A	-	Sodium carbonate	A	A	A	A	A	B			
<u>K/L</u>	Ketones	D	D	D	D	C	-	Sodium ferrocyanide	A	A	A	D	-	-		
	Lactic acid, 10 % in W.	A	A	A	A	A	-	Sodium hydrosulfite	A	-	A	A	A	-		
	Lactic acid, 85 % in W.	B	D	D	D	-	-	Sodium hydroxide, 10 - 15 % in W.	A	A	A	D	A	B		
	Lead acetate, 35 % in W.	A	A	A	A	A	-	Sodium hydroxide, 30 - 40 % in W.	A	C	A	D	A	B		
<u>M</u>	Manganese salts	A	A	A	A	A	-	Sodium nitrate, 3.5 % in W.	A	A	A	A	A	-		
	Magnesium chloride, 35 % in W.	A	A	A	A	A	A	Sodium sulfate, 3.6 % in W.	A	A	A	A	-	A		
	Magnesium sulfate, 25 % in W.	A	A	A	A	A	-	Sodium sulfide, 13 % in W.	A	A	A	A	A	-		
	Mercury salts	A	A	A	A	A	-	Stearic acid, 5 % in Alc.	C	D	D	B	B	-		
	Methane	A	-	A	A	A	A	Sulfuric acid, 10 % in W.	A	A	A	B	A	A		
	Methanol	A	B	D	B	A	D	Sulfuric acid, 30 % in W.	A	B	A	B	A	A		
	Methyl Ethyl Ketone	D	D	D	D	C	D	Sulfuric acid, 95 - 98 % in W.	D	D	D	D	C	A		
	Monoethanolamine	C	D	D	D	D	D	Sulfurous acid	A	A	A	A	A	A		
<u>N</u>	Naphtha	D	D	D	D	D	A	<u>T</u>	Tannic acid, 75 % in W.	B	A	B	D	A	-	
	Nickel salts	A	A	A	A	A	-		Tartaric acid, 56 % in W.	A	A	A	A	A	A	
	Nitric acid, 10 % in W.	A	C	A	D	A	A		Tin salts	A	A	A	A	A	-	
	Nitric acid, 35 % in W.	A	D	A	D	A	A		Toluene (toluol)	D	D	D	D	C	A	
	Nitric acid, 68 - 71 % in W.	D	D	D	D	A	-		Trichloroacetic acid, 90 % in W.	B	A	A	D	A	C	
	Nitrobenzene	D	D	D	D	C	-		Trichlorethylene	C	D	D	D	C	A	
	Nitrous acid, 10 % in W.	A	B	A	C	A	-		Trisodium phosphate	A	A	A	A	A	A	
	<u>O</u>	Oils, animal	C	A	D	A	B		-	Turpentine	D	D	D	B	A	A
Oils, mineral		D	D	C	A	D	A	Urea, 20 % in W.	A	A	A	A	A	-		
Oleic acid		C	B	D	B	D	B	Uric acid	A	A	A	C	A	-		
<u>P</u>	Perchloric acid, 67 % in W.	A	D	C	D	A	A	<u>W/Z</u>	Xylene	D	D	D	D	C	B	
	Perchlorethylene	C	D	D	D	D	A		Zinc chloride, 80 % in W.	A	A	A	A	A	A	
	Phenol, 91 % in W.	A	B	D	C	A	-									
	Phosphoric acid 25 % in W.	A	D	A	A	A	A									
	Phthalic acid, 9 % in Alc.	A	B	D	C	B	-									
	Potassium carbonate, 55 % in W.	A	A	A	A	A	-									
	Potassium cyanide, 33 % in W.	A	A	A	A	-	-									

Accessories



Foot pedal

P/N 526-14100-00

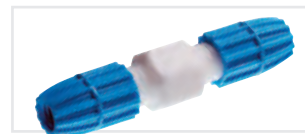
For start and stop
(PD 5101 / PD 5106 and
PD 5201 / PD 5206 only)



Adaptor for multi-channel pump heads

P/N 526-16000-00

To connect pump drive to
multi-channel pump head



Fitting for extension tubes

P/N 526-22000-00

For tubing diameter 0.2 -2.8 mm

Precise Dosing and Dispensing



- Flow rates starting at 0.005 ml/min
- Doesn't crush organic cell cultures
- Single and multiple channel operations

Control every drop

Technical specifications - Peristaltic Pumps

Model	PD 5001	PD 5006	PD 5101	PD 5106	PD 5201	PD 5206
P/N (230 V)	523-50010-00	523-50060-00	523-51010-00	523-51060-00	523-52010-00	523-52060-00
P/N (230 V)						
incl. multi-channel adaptor	523-50013-00	-	523-51013-00	-	523-52013-00	-
Flow rates						
single-channel pumps (ml)	0.8 - 790	3.6 - 3,900	0.3 - 790	1.3 - 3,900	0.3 - 790	1.3 - 3,900
Flow rates						
multi-channel pumps (ml)	0.005 - 320	-	0.005 - 320	-	0.005 - 320	-
Flow rate accuracy *	± 5	± 5	± 3.5	± 3.5	± 1	± 2
Speed range (rpm)	10 - 120	50 - 600	5 - 120	24 - 600	5 - 120	24 - 600
Speed setting	scale	scale	scale	scale	digital	digital
Electronic						
speed control	analog	analog	digital	digital	digital	digital
Control accuracy motor (%)	± 2	± 2	± 0.5	± 0.5	± 0.5	± 0.5
Select direction of rotation	CW / CCW	CW / CCW	CW / CCW	CW / CCW	CW / CCW	CW / CCW
Motor power (W)	71	71	100	100	100	100
Supply power (W)	150	150	140	140	140	140
Analog interface	-	-	for speed 0 - 10 V / 4 - 20 mA direct. of rotation start/stop	for speed 0 - 10 V / 4 - 20 mA direct. of rotation start/stop	for speed 0 - 10 V / 4 - 20 mA direct. of rotation start/stop	for speed 0 - 10 V / 4 - 20 mA direct. of rotation start/stop
Digital interface	-	-	-	-	RS 232	RS 232
Flow rate indicator	-	-	-	-	digital	digital
Volume dosing ** (ml)	-	-	-	-	0.1 - 9,999	0.1 - 9,999
Interval dosing ** (ml)	-	-	-	-	0.1 - 9,999 in breaks 0.1 sec - 750 h	0.1 - 9,999 in breaks 0.1 sec - 750 h
Smooth start	-	-	-	-	yes	yes
Electronic brake	-	-	-	-	yes	yes
Foot pedal connection	-	-	yes	yes	yes	yes
Operation time (per day)	24 hr	24 hr	24 hr	24 hr	24 hr	24 hr
Safety feature	overheat protection	overheat protection	electr. current limiter and overheat protection	electr. current limiter and overheat protection	electr. current limiter and overheat protection	electr. current limiter and overheat protection
Weight (kg)	6.8	6.2	8.2	7.6	8.3	7.7
Protection class (DIN EN 60529)	IP 30	IP 30	IP 55	IP 55	IP 55	IP 55
Permissible ambient temperature (°C)	0 - 40 °C at 80 % rel. humidity	0 - 40 °C at 80 % rel. humidity	0 - 40 °C at 80 % rel. humidity	0 - 40 °C at 80 % rel. humidity	0 - 40 °C at 80 % rel. humidity	0 - 40 °C at 80 % rel. humidity
Dimensions (wxhxdh) (mm)	166 x 256 x 225	166 x 256 x 225	166 x 256 x 225	166 x 256 x 225	166 x 256 x 225	166 x 256 x 225
Supply voltage ***	230 V / 50/60 Hz 115 V / 60 Hz	230 V / 50/60 Hz 115 V / 60 Hz	230 V / 50/60 Hz 115 V / 60 Hz	230 V / 50/60 Hz 115 V / 60 Hz	230 V / 50/60 Hz 115 V / 60 Hz	230 V / 50/60 Hz 115 V / 60 Hz

* Flow rate accuracy pertains to water without counter pressure

** Tubing size 0.2; 0.5; 0.9 pertains to µl measurement, not ml

*** Standard 230 V / 50/60 Hz: others upon request, please specify for order

Heidolph Support Center

Individual Solutions

- Application Support
- No obligation demo units
- Installation and Training onsite



Our Commitment

- Ease of use
- Long performance life
- 3 Year Warranty for all Heidolph products



Online Support

- Catalogs and Manuals for download
- Software-based configuration tools
- Spare part lists for download



As we want you to have more time to thoroughly concentrate on your research, the whole Heidolph team enthusiastically provides you with extensive support and helps to reduce your workload.

Quality Control

- Individual quality control for every unit
- Calibration Certificates available upon request
- IQ-OQ validation for Large Scale Evaporators



Heidolph Support Center

Customer Service:
+49 9122/99 20 68

Online Support:
www.heidolph.com

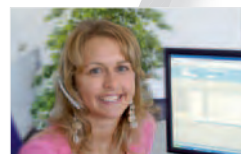


Service Seminars

- At Heidolph's facilities for all distributors
- Field service in many countries around the world
- Full documentation provided

Repair Support

- We organize equipment pick-up onsite
- Assistance with logistics
- Loaner units if available upon request



Repair Services

- Onsite or at our repair facilities
- Repair in 4 working days
- No Charge Repair Quotes



We respond in less than 24 hours . . .

Guaranteed!

Silent Blending



- ➔ Maintenance Free Magnetic Drive
- ➔ No Heat Transfer to Sample
- ➔ Speeds up to 75,000 rpm

**Disperse without
distraction**

... **no** one likes
a **loud lab**

While you concentrate on research, we'll look after your support needs

As we want you to have more time to thoroughly concentrate on research, the whole Heidolph team enthusiastically provides you with extensive support and helps to reduce your workload.

- 24 hour service for all inquiries
- Individual application support
- Short delivery time for standard items
- After sales service provided by your local dealer
- More than 80 distributors worldwide
- Priority technical service
- Long-lasting service life of all products due to maintenance free magnetic drive
- 3 year warranty

Silent Blending

Your first choice for disruption of tissue in biotechnology, for sample preparation in medicine, for enzymatic treatment in food industry and various applications in pharmaceutical, cosmetic, paint & lacquer industry and in petrochemistry.

Are you exposed to highly critical noise levels or even wear ear plugs when homogenizing a sample?

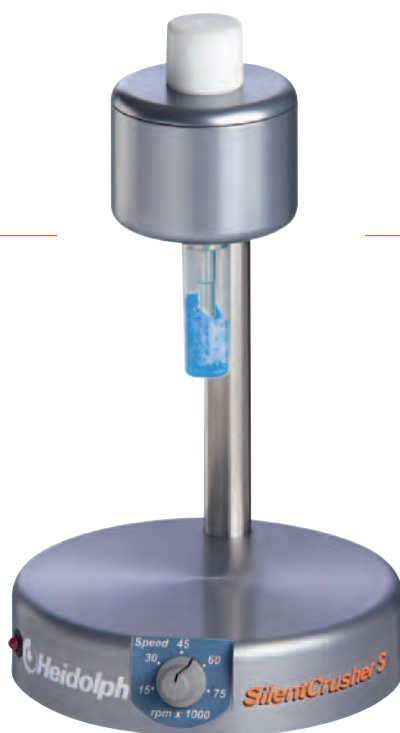
SilentCrusher models operate at a significantly reduced noise and in addition at an outstanding high speed. This unique combination is made possible by an electromagnetic field that eliminates noise from conventional motors.

The wearless drive guarantees numerous **years of maintenance free operation**. As a result you will experience **no down times, no maintenance or spare part costs**

The drive unit is designed without any clutches and therefore the **level of noise is reduced to a minimum**

Operate the SilentCrusher without ear plugs and **without any risk to your ears' health**

This technology allows for **usage in reduced particle environment**



- ➔ Maintenance Free Magnetic Drive
- ➔ No Heat Transfer to Sample
- ➔ Speeds up to 75,000 rpm

Disperse without distraction

SilentCrusher M

Model for all standard applications

Complete package SilentCrusher M at a special price: Includes SilentCrusher M, plate stand, 2 cross sleeves and vessel holding bracket **(no generators)** P/N 595-06009-00

Choose from 13 different sterilizable generators: From 6 – 22 mm diameter you will find options which meet your specification

SilentCrusher M
P/N 595-06000-00
(without generator)

Allows for any viscosity up to 5,000 mPa s

Your first choice for any quantities from 0.8 – 2,000 ml

With a speed range up to 26,000 rpm the SilentCrusher M is the most silent homogenizer in the world

Large digital display allows for easy setting and read out even from a distance

Speed can be adjusted individually from 5,000 – 26,000 rpm

SilentCrusher S

Small model for use in microbiology

Choose from three different sterilizable generators: 3, 5 or 7 mm – these options will certainly include a generator that works best for your needs

SilentCrusher S
P/N 595-05000-00
(without generator)

Ideal for homogenizing sample quantities from 0.8 – 10 ml and a viscosity up to 5,000 mPa s

If required, you can easily cool down samples by using ice or cold water. Three discs are included in every shipment which allow for height positioning of any cooling tray

Featuring a speed range up to 75,000 rpm the SilentCrusher S is by far the fastest and most silent homogenizer in the world

To protect your sample effectively from any thermal damage the drive system switches off automatically after 90 seconds

The ease of use will elate you: Simply drop the reaction vessel into the drive system and it will start automatically

Technical Data: SilentCrusher M

- Input Power: 130 W
- Dimensions:
Drive: (w x h x d mm): 90 x 174 x 90
Power Supply Pack: (w x h x d mm): 196 x 51 x 88
- Voltage: 100-240 V, 47-63 Hz
- Protection Class: IP 30
- Weight: 1.0 kg

Technical Data: SilentCrusher S

- Input Power: 24 W
- Dimensions:
Drive: (dia. x h mm): 125 x 197
Power Supply Pack: (w x h x d mm): 106 x 30 x 65
- Voltage: 100-240 V, 47-63 Hz
- Protection Class: IP 30
- Weight: 0.8 kg

Generators and Accessories

SilentCrusher M – Generators

- Homogenize with high quality generators made of corrosion resistant stainless steel AISI 316
- SilentCrusher generators are easily disassembled for quick and convenient cleaning – ideal for multiple samples
- Generators are autoclavable up to 130 °C or allow for air sterilization up to 180 °C
- Due to interchangeable ball bearings and chemically resistant PTFE, all bearings are designed for years of unlimited usage
- For larger samples it may be necessary to pre-crush samples. In this case we recommend generators which feature additional sprockets (except for 18 G, 18 DG, 22 G)
- For applications under vacuum down to 20 mbar or pressure up to 6 bar we recommend our sealed generators*

Model	Stator ø outer [mm]	Rotor ø [mm]	Slot width [mm]	Shaft length [mm]	Volume [ml]	Original particle size [mm]	Tip speed in water [m/s]	Max. speed [rpm]	Max. noise [dB (A)] in 1 m distance	P/N
6 F	5.3	3.2	0.6	60	0.8 - 30	< 0.4	4.4	26,000	73	596-06010-00
8 F	8.2	6.6	0.6	80	3 - 50	< 0.4	9	26,000	44	596-08010-00
8 DF*	8.2	6.6	0.6	75	3 - 50	< 0.4	9	26,000	44	596-08110-00
12 F	12	9	0.6	120	25 - 250	< 2.0	12.2	26,000	62	596-12010-00
12 G	12	9	2.0	120	25 - 250	< 2.0	12.2	26,000	62	596-12020-00
12 DF*	12	9	0.6	115	25 - 250	< 2.0	12.2	26,000	62	596-12110-00
12 DG*	12	9	2.0	115	25 - 250	< 2.0	12.2	26,000	62	596-12120-00
18 F	18	12.5	1.5	180	100 - 1,500	< 4.0	17	26,000	74	596-18010-00
18 G	18	12.5	3.0	180	100 - 1,500	< 4.0	17	26,000	74	596-18020-00
18 DF*	18	12.5	1.5	175	100 - 1,500	< 4.0	17	26,000	68	596-18110-00
18 DG*	18	12.5	3.0	175	100 - 1,500	< 4.0	17	26,000	68	596-18120-00
22 F	22	16.5	1.5	180	100 - 2,000	< 4.0	17.3	20,000	73	596-22010-00
22 G	22	16.5	3.0	180	100 - 2,000	< 4.0	17.3	20,000	73	596-22020-00



Type 8 F



Type 18 F



Type 22 G

SilentCrusher M – Accessories



Vessel holding bracket
incl. 2 retainer rings

P/N 570-30100-00

For different vessels dia. 20 - 105 mm



Boss head for SilentCrusher M / Heat-On
P/N 570-31100-00

Please note: 2 clamps are required to attach the SilentCrusher M and the vessel holding bracket

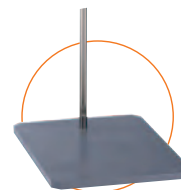


Plate stand
P/N 570-17000-00

Footprint: 180 x 245 mm

Shaft: ø 13 mm, Length: 600 mm

SilentCrusher S – Generators

- Homogenize with high quality generators made of corrosion resistant stainless steel AISI 316
- SilentCrusher generators are easily disassembled for quick and convenient cleaning – ideal for multiple samples
- Generators are autoclavable up to 130 °C or allow for air sterilization up to 180 °C
- To ensure years of unlimited usage the ball bearings and the attachment for the generators are made of chemically resistant PTFE
- 10 Polypropylene vessels which perfectly fit your generator of choice are included as a standard

Model	Stator ø outer [mm]	Rotor ø [mm]	Slot width [mm]	Shaft length [mm]	Volume [ml]	Original particle size [mm]	Tip speed in water [m/s]	Max. noise [dB (A)] in 1 m distance	Application with	P/N Generators	P/N Replacement vessels (100 pcs)
3 F	3.3	2	0.6	26	0.8 - 1.0	< 0.4	7.85	47	Eppendorf- vessel	596-03010-00	596-00003-00
5 F	5	3.2	0.6	38	2.0 - 4.0	< 0.4	11.8	50	Test tube	596-05010-00	596-00005-00
7 F	7	3.9	0.6	55	6.0 - 10.0	< 0.4	17.7	54	Test tube	596-07010-00	596-00007-00



3 F



5 F



7 F

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Imprint

Published by: **Heidolph Instruments GmbH & Co. KG**
Walpersdorfer Straße 12
D - 91126 Schwabach

Publication date: 01/2011

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