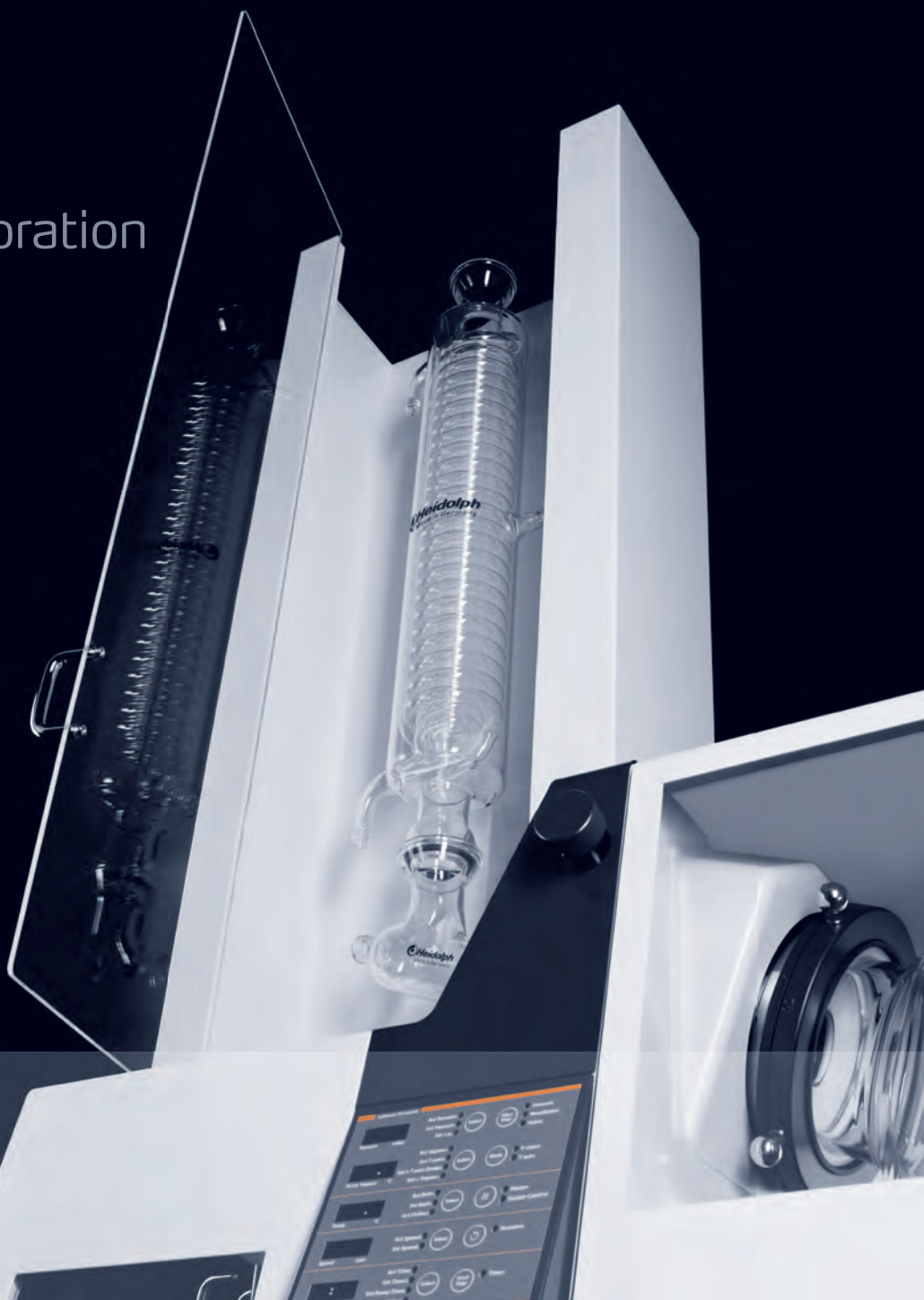


Intelligent Evaporation



Leading Safety Standards

Superior Ease of Use

Reduced Cost of Ownership



Do you require safe and quick flask removal by one person with industry leading safety standards?

Intelligent Evaporation

With the Laborota 20 series you are always on the safe side with the safety enclosure protecting you and your glassware! You can operate the Laborota 20 unit just by yourself and change flasks easily in just minutes!

Leading Safety Standards

- **Protect yourself reliably with safety models:** a guard hood consisting of a metal frame and ESG rated 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
- **A temperature sensor** powers 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-off** in an **overpressure 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 operators of any potential hazards**
- Features water-level regulation system to **prevent water from spilling over** and potentially flooding your lab
- Safety sensor **stops rotation if the guard hood is opened** during operation, thus providing user safety
- Pressing the **Emergency-off switch** brings the entire unit to a complete stop

➤ Safety features

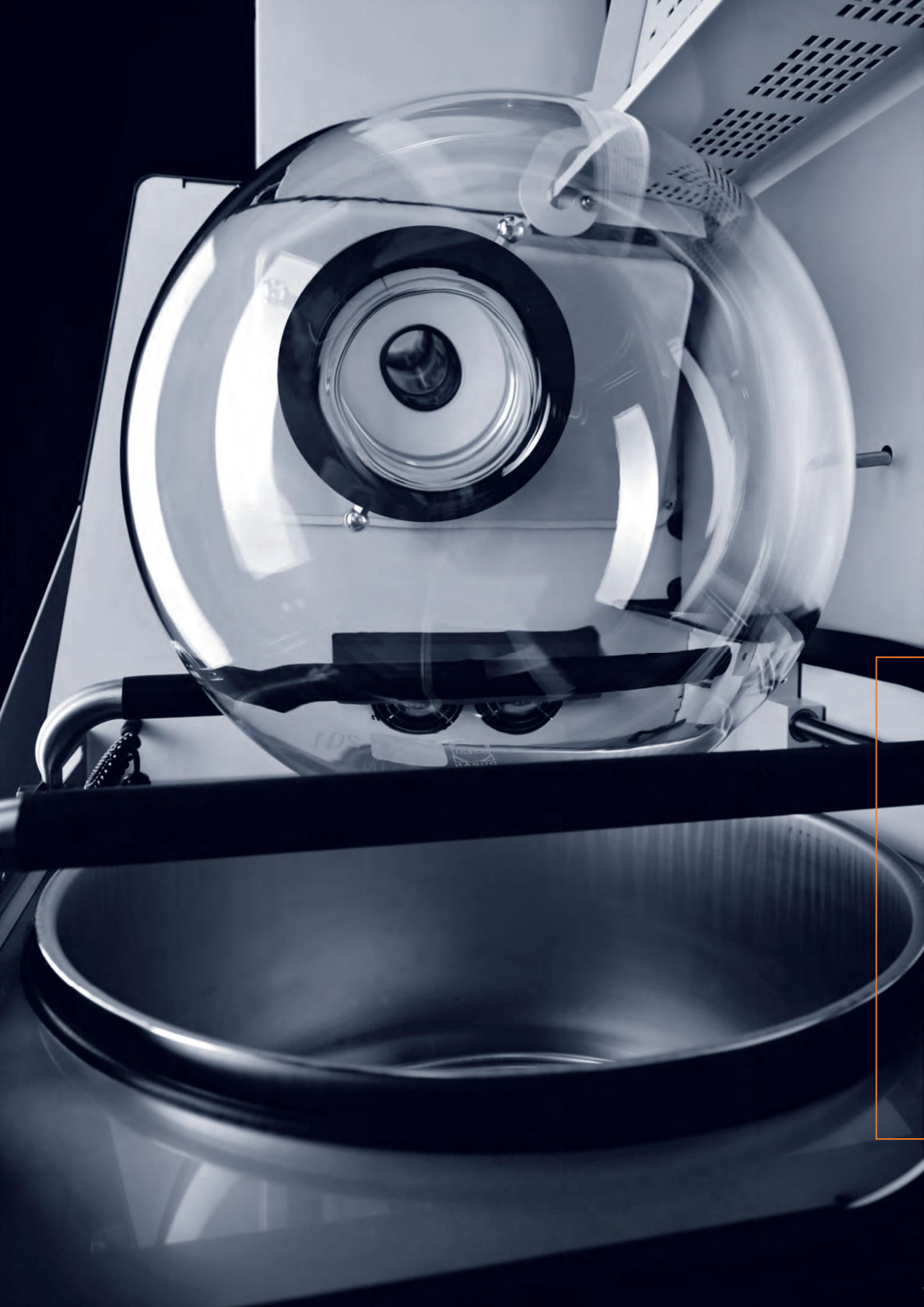


1) Separate digital displays for all relevant settings

2) Safety-related LEDs indicate user precaution:

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

3) Emergency-off switch



Superior **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 water bath** 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
- The **automatic process timer** 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 guesswork 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
- The optional automatic module Laborota 20 Distimatic allows for **continuous and unattended automatic operations**

Reduced **Cost** of Ownership

- The water bath refill system allows you to step away from your evaporator at any moment and **reduce your supervision responsibility to zero** for baths that run dry or overheat
- **No hidden cost:** all components to control vacuum are included as a standard. This includes vacuum valve, vacuum controller and vacuum sensor
- $T_{(auto)}$ 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 with **significant cost savings**
- **Spend your working hours more effectively** on other challenges which require your attention and evaporate large quantities continuously with the automatic module Laborota 20 Distimatic
- Maximize your initial investment significantly: The automatic module Laborota 20 Distimatic is an **affordable and more flexible alternative** to common 50 or 100-liter evaporators

➤ Laborota 20 control panel

- Vacuum _____
- Vapor temperature _____
- Bath temperature _____
- Speed _____
- Process control _____
 - Programming of vacuum gradients
 - Program $P_{(const)}$ and $T_{(auto)}$
 - Process timer
- Emergency-off switch _____
- RS 232 interface _____



Separate on/off switches for all process parameters

Height adjustment of heating bath

Change process parameters

on/off switch

➤ Two programs for your process control

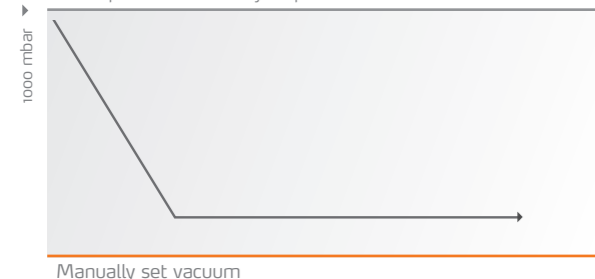
$P_{(const)}$

Program for solvent separations

- This program holds a set vacuum constant and uses a hysteresis

Program: $P_{(const)}$

Control parameter: manually set pressure



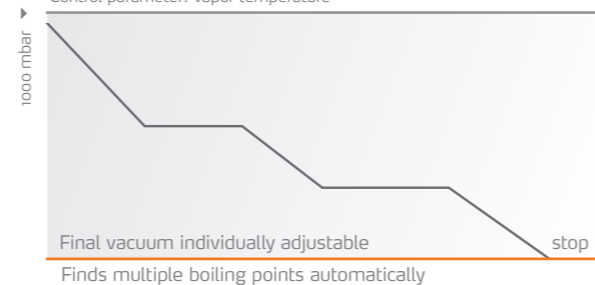
$T_{(auto)}$

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

Program: $T_{(auto)}$

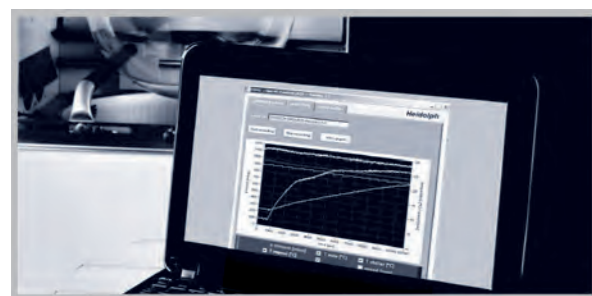
Control parameter: vapor temperature



PC software

An optional software program allows for all parameter settings and pre-programming ramps. Connect your PC to the RS 232 interface on your Laborota 20 unit and also save all process data in a digital file

P/N 592-51800-00



Intelligent Evaporation



Leading Safety Standards

Superior Ease of Use

Reduced Cost of Ownership

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



A guard hood consisting of a metal frame and safety glass covers the bath completely while providing **clear visible monitoring**

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

Excellent user safety: condenser and receiving flasks are protected by high-impact transparent PMMA doors

Unique integrated evaporating flask support system allows for **"one-person operation"** to remove the flask in just moments

Receiver cassettes **guard against glassware breakage** while providing a self-standing support

A temperature sensor **powers off the bath** in case of any uncontrolled heat-up event. In case of overpressure or glassware breakage, the unit powers off entirely

No hassle or safety concerns due to low bath fluid levels: the self-filling water bath takes the worry out of running dry

Continuous unattended evaporation without limits - the automatic module Laborota 20 Distimatic with automatic release of condensate is an affordable and more flexible alternative to common 50 or 100-liter evaporators

➤ Laborota 20 safety

Highest safety and integrated vacuum control capabilities

Includes leading safety standards and features for superior ease of use and reduced cost of ownership, plus:



Laborota 20 safety with water bath and glassware set R
(without base unit)
P/N 518-11100-00

➤ Laborota 20 compact

For advanced requirements and integrated vacuum control capabilities

Features identical specifications as the Laborota 20 safety, but for limited budgets and 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



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

➤ Automatic Module – Laborota 20 Distimatic

For unattended and continuous use – including automatic release of residue

Save time by distilling large volumes in a continuous and unattended way overnight and during the weekend

- Automatic refill of the evaporation flask with the solvent mixture set according to your settings. Continuous automatic release of condensate
- The worldwide unique automatic residue drainage** offers a wide range of new possibilities for automatic distillation
- All parameters can be set individually
- The automatic module is compatible with all Laborota 20 models and also with other comparable large-scale rotary evaporators
- The storage and the collecting tank can be replaced during the process

Automatic solvent supply of the evaporating flask

- Filling level in the evaporating flask is measured by a sensor
- Required filling level can be set individually
- The recharge of the product under vacuum is valve-controlled
- A sensor measures the filling level of the storage tank and stops the distillation process as soon as the liquid is completely evaporated

Automatic solvent supply

- A valve matrix controls the continuous drainage of the condensate from the system into a temporary storage flask. Afterwards the collected condensate will be released into the collecting tank by a diaphragm pump

Automatic release of residue

- The residue in the evaporating flask will be released into a collecting tank. Afterwards the process starts again automatically by refilling the evaporating flask

End of distillation process

- The process can be terminated automatically after evaporation is completed or manually at any time by the operator

YOUR ADVANTAGES

- Affordable alternative to common 50 and 100-liter evaporators
- For your safety – the complete system is sensor-controlled and turns off the automatic module and the connected equipment completely in case of an emergency
- Take advantage of the wide range of possibilities to adjust the settings according to your individual needs
- Save energy costs – the automatic module as well as the connected devices turns off completely after finishing the evaporation process

Laborota 20 Distimatic including automatic release of residue and adapter piece for glassware set A

P/N 591-54000-00

Laborota 20 Distimatic including automatic release of residue and adapter piece for glassware set R

P/N 591-55000-00

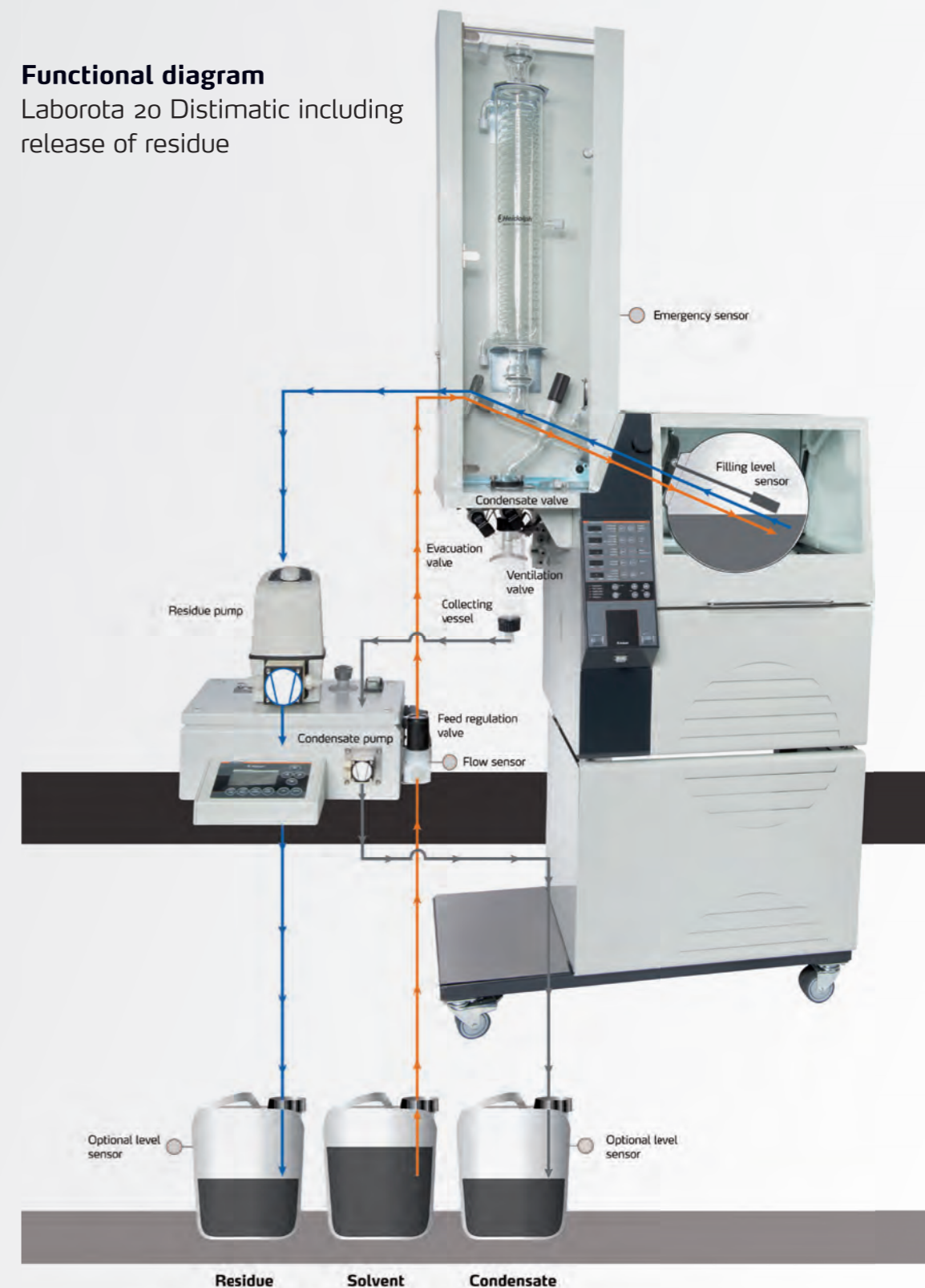
Laborota 20 Distimatic without automatic release of residue

P/N 591-52000-00



Functional diagram

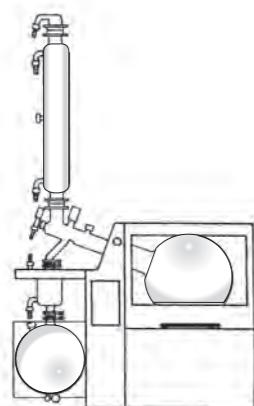
Laborota 20 Distimatic including release of residue



Rate of evaporation (continuous operation)

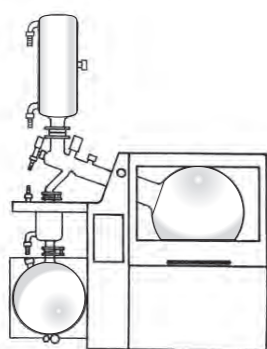
Laborota 20 Distimatic	Delta T 40°C
L/h Water	4.7
L/h Ethanol	12.9
L/h Acetone	25.9
L/h Toluene	26.0

➤ Glassware – Laborota 20



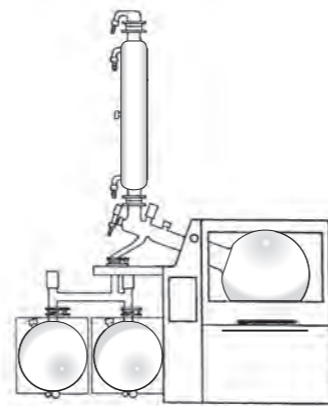
Glassware R

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



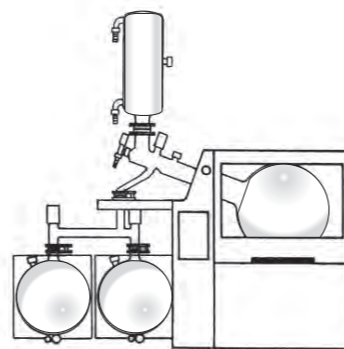
Glassware Shorty R

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



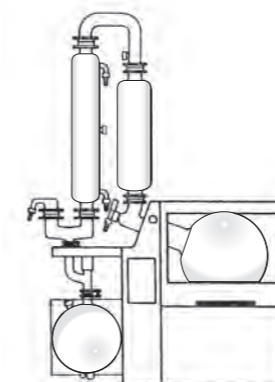
Glassware RC

- Identical to glassware assembly R, but features two receiving flasks



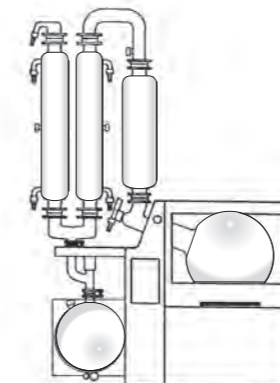
Glassware Shorty RC

- Identical to glassware assembly Shorty R, but features two receiving flasks



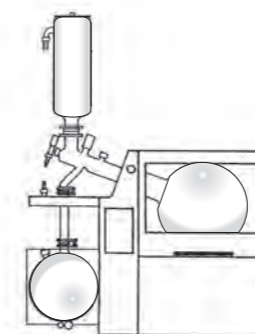
Glassware A

- 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**



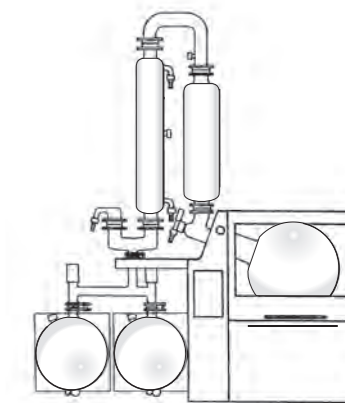
Glassware A2

- 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**



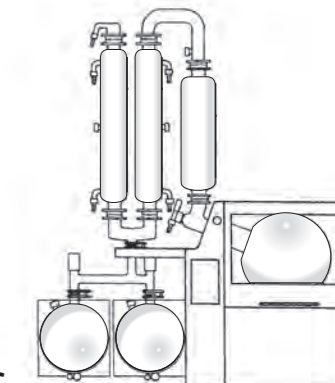
Glassware K

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



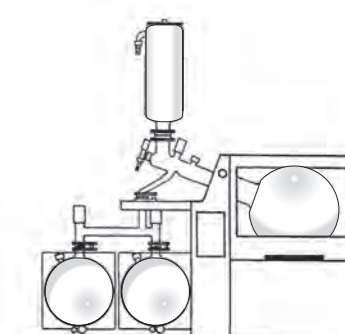
Glassware AC

- Identical to glassware assembly A, but features two receiving flasks



Glassware A2C

- Identical to glassware assembly A2, but features two receiving flasks



Glassware KC

- Identical to glassware assembly K, but features two receiving flasks

➤ Vacuum Pump

Valve-regulated vacuum pump Rotovac 20

Includes secondary condenser and air intake separation vessel

This vacuum system can be applied in many different fields in order to evacuate, evaporate and pump out gases and vapors. Thanks to the emission condenser it is possible to achieve a chemical recovery of almost 100%

- Excellent compatibility with chemicals and condensate
- Excellent ultimate vacuum of 2 mbar
- Very quiet and very low vibration
- Very high suction capacity of 3.0 m³/h
- Size: W350 / D275 / H 495 mm
- Weight: 19.9 kg



P/N 591-07210-00

➤ Accessories - Laborota 20



Evaporating flasks

Evaporating flask 6 l

P/N 15-300-003-20

Evaporating flask 10 l

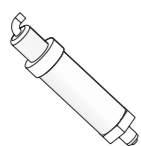
P/N 15-300-003-16

Evaporating flask 20 l

(Included as a standard)

P/N 15-300-003-17

Evaporating flasks NS 14,5 incl. adaptor (NS 29 or NS 24)



Vacuum sensor

Included as a standard for Laborota 20 compact and Laborota 20 safety

P/N 591-21000-00



Heating bath liquid 5 l

P/N 591-31000-00



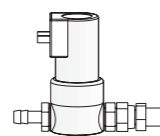
Powder flasks

Powder flask 10 l

P/N 15-300-003-18

Powder flask 20 l

P/N 15-300-003-19



Vacuum valve

Included as a standard for Laborota 20 compact and Laborota 20 safety

P/N 591-20000-00



PC software

For Laborota 20 compact, safety and automatic

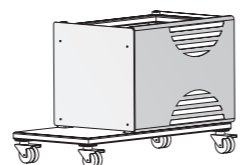
P/N 592-51800-00



Receiving flask

With drain valves 10 l

P/N 15-300-004-11



Base

For Laborota 20 compact and Laborota 20 safety

P/N 591-23000-00



Tube set

6.25 meter vacuum tubing and 10 meter water tubing

P/N 591-34000-00



Vapor temperature sensor

P/N 14-014-003-06

➤ 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
Az	518-14100-00	518-14200-00
AzC	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
Az	518-24100-00	518-24200-00
AzC	518-26100-00	518-26200-00
K	518-28102-00	518-28202-00
KC	518-29102-00	518-29202-00



➤ Technical Specifications - Large-Scale Rotary Evaporators Laborota 20 Series

Model	Laborota 20
Rotation speed (rpm)	6 – 160
Rotation speed setting	digital
Hand / Motor lift	motor lift
Height adjustment speed (mm/s)	45
Height adjustment (mm)	200
Drive	capacitor motor
Heating capacity (W)	4,000
Temperature range heating bath (°C)	20 – 100 (H ₂ O) 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)
Diameter heating bath (mm)	400
Volume heating bath (l)	24 (H ₂ O) / 22 (oil)
Display vapor temperature (required accessories)	digital temperature sensor

Model	Laborota 20
Vacuum controller	yes
Timer	yes
Vacuum control program P _(const) **	yes
Vacuum control program T _(auto) requires T _(auto) -sensor**	yes
Programmable ramps	yes
Supply power (W)	4,500
Weight (without glass assembly) (kg)	approx. 120
Dim. (w/o glass assembly) (l x w x h)	1,000 x 700 x 1,620
Protection class (DIN EN 60529)	IP 20
Operating conditions (°C)	0 - 40 at 80 % rel. humidity
Rate of evaporation (L/h) at 40 °C * temperature difference	
- Toluene	26.0
- Acetone	25.9
- Ethanol	12.9
- Water	4.7
Maximum condensing surface (m ²)	1.2

* ΔT = difference between heating bath temperature and boiling temperature

** Only in combination with vacuum systems

Standard supply voltage: 400 V - other voltages upon request, please specify for order

Certificate

To confirm the ability for
continuous operation

of the Laborota 20 Series Large-Scale Rotary Evaporators

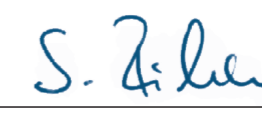
The Laborota 20 Series Large-Scale Rotary Evaporators feature overtemperature safety circuits according to DIN EN 61010-1:2001 and DIN EN 61010-2-010:2003 and therefore are designed for continuous operation.

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, January 2013



i. V. Jan Welzien
Technical Director



i. V. Stefan Richter
Quality Control Director



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