IKA

designed for scientists

IKA Vacstar control

Device setup

Fig. 1

Pos.	Description
1	Handle
2	WiCo (see chapter "Operator panel and display")
3	Rotating/pressing knob
4	Main switch (on/off)
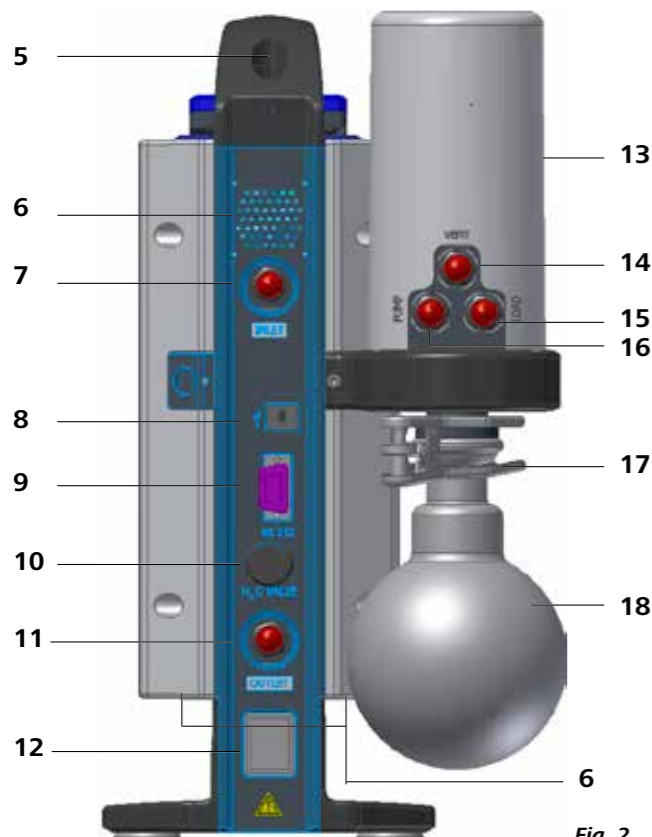
Fig. 2

Pos.	Description
5	Handle securing screw
6	Fan/Ventilation slit
7	Hose connection for suction line d= 8 mm (INLET)
8	USB interface
9	RS 232 interface
10	Water Valve Connection
11	Hose connection for pressure line d= 8 mm (OUTLET)
12	Mains cable connection
13	Pressure Device
14	Hose connection for ventilation line d= 8mm
15	Hose connection for load line d= 8mm
16	Hose connection for suction line d= 8 mm (INLET)
17	Clamp
18	Receiving flask

Source language: German

Contents

EU Declaration of conformity

We declare under our sole responsibility that this product corresponds to the directives 2006/42/EC, 2014/35/EU, 2014/30/EU and 2011/65/EU and conforms with the following standards or normative documents: EN 61010-1, EN 61326-1, EN 60529 and EN ISO 12100. A copy of the complete EU Declaration of Conformity can be requested at sales@ika.com.

Bluetooth® module:
Directive: 2014/53/EU Standards: EN 60950-1, EN 300328, EN 301489-1, EN 301489-17

Explanation of warning symbols

⚠ **DANGER**	Indicates an (extremely) hazardous situation, which, if not avoided, will result in death, serious injury.
⚠ **WARNING**	Indicates a potentially hazardous situation, which, if not avoided, can result in death, serious injury.
⚠ **CAUTION**	Indicates a potentially hazardous situation, which, if not avoided, can result in injury.
⚠ **NOTE**	Indicates practices which, if not avoided, can result in equipment damage.

Warranty

According to **IKA**'s Terms and Conditions of sale and delivery, this product is covered by a warranty for a period of 24 months. Please contact your dealer for any warranty claims. If you wish, you can send the device directly to our factory. Please provide the sales invoice and state the reasons for your guarantee claim. In this case, you are responsible for shipping and handling costs.

The warranty does not cover wearing parts, or defects that are the result of improper use, insufficient care and maintenance or failure to follow the instructions in this operating manual.

Safety instructions

General information

⚠ **DANGER**	**Always wear personal protective equipment in accordance with the hazard class of the media being worked with - otherwise there are dangers due to spraying liquids, and release of toxic or flammable gases.**
⚠ **NOTE**	**Please read the instruction manual in full before use and follow the safety instructions.**

- Keep the instruction manual in a place where it can be accessed easily.
- Ensure that only trained staff use the device.
- Follow the safety instructions, guidelines, occupational health and safety and accident prevention regulations.
- The device and all parts of the device must not be used on people or animals.
- Do not expose human or human body parts to vacuum.

Device setup

⚠ **DANGER**	**Do not use the device in explosive atmospheres, it is not EX-protected.**
	In order to avoid injury to persons and damage to property, observe the relevant protective and accident prevention measures when processing hazardous substances.

- Set up the device in accordance with the chapter "Setting up" and connect the connection lines and interfaces as described.

- Set up the device control in a spacious area on an even, stable, clean, non-slip, dry and fireproof surface.
- Never work with a faulty or incorrectly connected device.
- Connect the vacuum pump to an exhaust line. Ensure that the exhaust line cannot be kinked! The maximum permitted length for the exhaust line is 2 metres.
- Prevent occurence of explosive mixtures; if appropriate connect inert gas for ventilation and/or thinning.

Work with the device

⚠ **DANGER**	**You can prevent the release of solvent vapours into the atmosphere using a the downstream emission condenser VSE1.**
⚠ **WARNING**	**Inhaling or coming into contact with media such as poisonous liquids, gases, spray mists, vapours, dusts or biological materials can endanger the health of the user. Ensure that all connections are well sealed and free of leaks if you are working with such media.**

- The vacuum pump **IKA** Vacstar control must only be operated under the conditions described in the chapter "Technical data".
- Prevent release of the materials. Take measures to protect staff and the environment.
- Pay attention to possible interactions or chemical or physical reactions when working with media at reduced pressure and increased temperature.
- There can be electrostatic processes between the medium and the device which can lead to direct danger.
- Some medium may be released due to the residual leakage rate of the device.
- Before commissioning check that all the housing parts are

present and fastened to the device.
- Do not lift the pump if the handle is loose and the handle securing screw (Fig. 2, 5) is loose or missing!
- Only switch ON the pump if the pump is standing vertically.
- Connect the hose connections (INLET-OUTLET) and interfaces in accordance with the labelling on the device and the operating instructions.
- Ensure that the temperature of the evacuated medium is below its ignition temperature. The pumping process (compression) increases the temperature of the medium additionally.
- Ensure that vapours containing solvent cannot be sucked into the pump.
- Prevent occurence of explosive mixtures; if appropriate connect inert gas for ventilation and/or thinning.
- Do not use the pump to create pressure.
- Observe the permitted pressure at the inlet and outlet side; see the chapter "Technical data".
- The gas flow must only be regulated/throttled in the suction-side line.
- When using the emission condenser VSE1 ensure that the coolant is flowing freely.

For protection of the equipment

⚠ **WARNING**	**Ensure that the substances used with the device are compatible with the materials of the device parts that come into contact with the product; see the chapter "Product contact parts".**

⚠ **CAUTION**	**The specified settings on the rating plate must coincide with the actual mains supply.**

- The device is only disconnected from the mains supply when the power or device plug is removed.
- The socket for the power cord set must be easy to access.

- Covers or parts that can be removed from the device without tools must later be refitted to ensure safe operation, unless anything else is connected at this point. This will prevent the infiltration of foreign objects, liquids and other contaminants.
- Unwanted liquids that have entered can be removed by extracting air during no-load operation.
- Avoid knocks or impact to the device.
- The device must only be opened by trained, skilled personnel (who have been authorised to do so).
- The device must not be modified without authorisation from **IKA**.
- To ensure sufficient cooling for the vacuum pump **IKA** Vacstar control, the ventilation slits on the housing must not be covered.

- Only use original replacement parts for maintenance to ensure that the device works reliably.
- Watch out for water condensation inside and outside the device. Warm up the device first, if it has been brought in from a cold environment.
- Never fasten the vaccum pump over a heating bath.
- Ensure that no solids and/or liquids can enter the diaphragm of the vacuum pump **IKA** Vacstar control through the suction line of the pump. This damages the diaphragm and other internal parts of the pump. This reduces flowrate and the final pressure can no longer be achieved. Deposits may be produced in the interior, reducing service life and causing leaks.

Accessories

- Safe operation can only be ensured when working with accessories as described in the "Accessories" section.
- Carefully observe the operating instructions for additional devices (e.g. rotary evaporators), with which the vacuum pump **IKA** Vacstar control is operated.
- The pressure at the gas inlet and outlet must not exceed 1100 mbar.

- Elastic hoes may be deformed under vacuum.
- Only use flexible hose lines.
- Observe your emergency measures for power failure and ensure that the device is put in a safe mode (see the chapter: Commissioning, Operating mode).
- Only use **IKA** approved accessories!
- Use only original **IKA** spare parts!

WiCo

⚠ **DANGER**	**Please note the following safety instructions for the battery pack RB 1 (rechargeable battery).**
⚠ **CAUTION**	**If during operation the battery pack RB 1 (rechargeable battery) becomes fully discharged, the device will continue to run or is shut down depending on the value settings for exceeding the time. If the device is set so that it continues to run when the battery of the Wireless Controller (WiCo) is fully discharged, the only means of switching the station off are the "safe STOP" and the off switch!**

- Keep the battery pack out of reach of children at all times.
- Store the battery pack in a cool, dry place.
- Never throw the battery pack into a fire. Keep it away from direct sunlight and temperatures above 60 °C. High temperatures will damage the battery pack and render it unusable. Temperatures above 100 °C may cause it to explode.
- Never throw the battery pack into water or expose it to moisture. Water may lead to a short-circuit, causing the battery pack to explode.

- Do not deform or crush the battery pack or damage it in any other way. This can cause battery fluid to leak and/or the battery pack to explode.
- When not in use, keep battery packs away from paperclips, coins, keys, nails, screws or other small metal objects which could cause the contacts to be bridged. Short-circuiting may result in an explosion.
- Explosion of a battery pack may release battery fluid and cause a fire.
- The lithium polymer battery pack must only be used and charged in **IKA** products designed for use with this battery pack.
- When the battery pack is inserted it should slide in easily and without resistance. Do not force it.
- If the battery pack is removed for an extended period of time, store it in a sealed plastic bag to prevent short-circuiting due to moisture or contact with metal components.
- The operating temperature range of the battery pack is from 0 °C to +45 °C. Note that the battery pack capacity will be reduced at temperatures below 20 °C.
- Only the rechargeable battery types recommended in the technical data may be used in the device!Do not charge batteries that have leaked or that are discolored, deformed or damaged in any other way.

Disposal instructions

- When disposing of the IKA battery pack, please tape over the contacts with adhesive tape to prevent short-circuiting due to moisture or contact with metal components. Short-circuiting may result in an explosion.

- End users are obliged by law to return all used disposable and rechargeable batteries. Throwing them into the house-hold waste is prohibited! Disposable/rechargeable batteries containing harmful substances are marked with this symbol to indicate that they may not be disposed of as household waste.
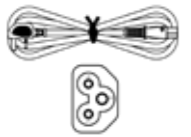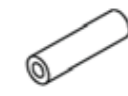
- The device, accessories, packaging and batteries must be disposed of in accordance with local and national regulations.

Unpacking
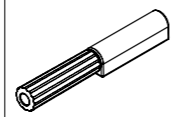- Unpack the device carefully.
- Any damage should be notified immediately to the shipping agent (post office, railway network or transport company).

Scope of delivery

Diaphragm vacuum pump **IKA** Vacstar control		Cover	
Power cord set			
USB A - USB B cable		Screw driver (screw driver to screw WiCo on station)	
USB A - USB micro B			
Vacuum hose 1 m		Bracket	
Vacuum Hose 0.3 m (connection Vacstar to Vacuum Safety VSE 1)			
Vacuum Safety VSE 1		Flask	
Wireless Controller (WiCo)		Spherical clamp	
OS 1.0 power supply unit (for WiCo):	Adapter Europe, Switzerland / Adapter USA, China / Adapter UK / Adapter Australia	User guide	
		Warranty card	

Use

⚠ **WARNING**

The device must not be used for:
- evacuating biological habitats,
- evacuating explosive, corrosive or similar gases,
- throughput/use of liquids

The device is not suitable for:
- pumping up objects
- pumping liquids
- use in potentially explosive atmospheres
- underwater
- underground

Set up the IKA Vacstar control in a spacious area on an even, stable, clean, non-slip, dry and fireproof surface.

The laboratory diaphragm vacuum pump **IKA** Vacstar Control used together with other laboratory devices to create and maintain vacuum. Vacuum controller and vacuum sensor is part of the device.

Along with the accessories recommended by **IKA**, the vacuum pump **IKA** Vacstar control is suitable for controlled evacuation to a specified final pressure e.g. for operating an **IKA** rotary evaporator. It can also be used for classical separation, filtration or drying in the laboratory.

With the integrated vacuum controller, the IKA Vacstar control can operate automatically, for boiling point detection, scheduled pressure-time curves or programs from the solvent library.

Intended use: Tabletop device

Area of use (indoor use only)

Indoor environments similar to that of a laboratory in research, education, commerce or industry.

The safety of the user cannot be ensured:
- if modifications are made to the device or parts of the device by third parties!
- if the device is operated in contravention of the safety instructions!

Wireless remote control
Before using the wireless link between the Wireless Controller (WiCo) and the laboratory device, first check whether your region is included in the radio communications approval for the device. If it is not, WiCo must remain on the station.

⚠ **DANGER**
You can prevent the release of solvent vapours into the atmosphere using a VSE 1.

⚠ **WARNING**
If the pump (station) generates vibration, the Wireless Controller must be bolted to the pump using the screw (p. 11), or positioned remotely from the stirrer (station) whilst it is running.

⚠ **CAUTION**
Special care must be taken when working with gas mixtures that include condensable gases (e.g. solvents). If diaphragm pumps are used with such gases they condense in the pump's air flow. This leads to a build-up of pressure in the vacuum chamber, which in turn influences the effectiveness and service life of the diaphragms and valves.

⚠ **CAUTION**
If liquid or condensate enters the vacuum chambers, the specified minimum working pressure is no longer achieved.

To protect the inner valves and diaphragms against liquid, use an upstream condensate separator, such as a Woulff bottle.

It is generally recommended that you run the pump with no load at the end of the process (no-load operation, approx. 3 up to max. 5 minutes) to dispel any residues in the pump.

If applicable, vent the recipient. To do this, remove the suction line during manual operation.

⚠ **NOTE**
Observe the operating instructions of the relevant devices.

Diaphragm vacuum pumps are oscillating displacement pumps. The diaphragms expand the volume of the vacuum chamber to produce an underpressure, which sucks air into the chamber. The air is then pressed out of the vacuum chamber by subsequent compression. Changes between the inlet and outlet are controlled by diaphragm valves.

The physical unit for pressure is 1 Pascal [Pa].

However people often still use the unit millibar [mbar] colloquially.

1 mbar   = 100 Pa
1 bar   = 10^5 Pa
1 Pa   = 10^{-5} bar
1 Pa   = 0.01 mbar

A distinction is made between different ranges in vacuum technology.

Rough vacuum: 10^5 to 10^2 Pa   (1000 to 1 mbar)
Fine vacuum: 10^2 to 10^{-1} Pa   (1 to 10^{-3} mbar)
High vacuum: 10^{-1} to 10^{-5} Pa   (10^{-3} to 10^{-7} mbar)
Ultra high vacuum < 10^{-5} Pa   (< 10^{-7} mbar)

The periodic movements of the diaphragms create a vacuum at the pump inlet. Diaphragm vacuum pumps work with a rough vacuum of up to 10^2 Pa. Lower pressures cannot be achieved with these pumps.

To create fine, high and ultra high vacuums, oil-sealed vacuum pumps, screw pumps, diffusion pumps or turbomolecular pumps must be used, for example. Diaphragm vacuum pumps are often used as pumps for the preliminary stage in these contexts.

Compressing and releasing the pressure on air creates a noise. The pump is quieter the less air is transported. This means that there is less operating noise during normal operation if the pressure is reduced.

The **IKA** Vacstar control is controlled via a Wireless Controller (WiCo). If the WiCo is attached to the station, data exchange between the pump (station) and WiCo is performed via the contacts (page 11, (A/Q)) "Home" symbol appears on the display of the WiCo. If the WiCo is neither bolted to the station the data exchange between the pump and WiCo is performed via Bluetooth®. In this case the Bluetooth® symbol is displayed. Depending on the structure of the building, the WiCo can be operated at a distance of up to 150 m from the station, using the Bluetooth® connection. The WiCo can be attached to the pump (station), or can be installed in a safe place easily accessible by the user while the pump is running. If the WiCo is attached to the station, the rechargeable battery is automatically recharged via the contacts (page 11, (A/Q)) The rechargeable battery can also be charged via the USB port of the WiCo.

In automatic operation with controlled speed the pump reduces its speed when it reaches the target value. If the leakage rate in the entire system is low enough, the speed may even be set to "zero".

Analogue speed control

With this control, the speed of the pump, and therefore its suction power, is reduced the closer the measured pressure reaches the target value. Once the target value is reached, the pump only operates according to the leakage rate of the system. This enables quiet functioning, precise vacuum control and a long service life for the moving pump parts. Exact automatic boiling point recognition is possible with this type of control, meaning that the system reaches and keeps the solvent at its boiling point in automatic mode.

Schematic view of speed vacuum control
mbar
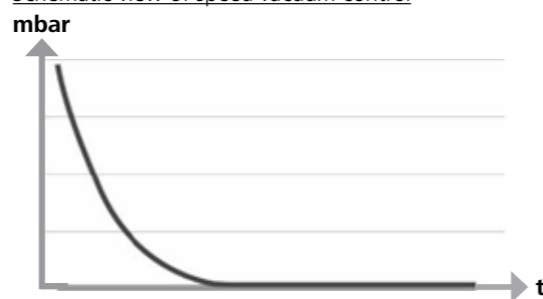
Charging the RB 1 battery pack (rechargeable battery)

The battery pack of the Wireless Controller can be charged by any of the following means:
· on the Vacstar station
· via a USB cable at the PC or station
· via an OS 1.0 power supply unit.

Assembly and setting up
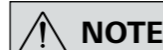
> ⚠️ **NOTE**

Ensure that you follow the general rule, that the recipient (load/vacuum container/glass condenser) should always be connected to the suction line at its highest point. This reduces the risk of liquids entering the vacuum pump.

Liquid in the pump chambers makes the pump properties worse.

Connect the hose connections (IN-LET/OUTLET) and interfaces in accordance with the labelling on the pump and the operating instructions.

The connections are barbed hose connectors. Ensure that the hoses have hose clips if applicable.

Lay the hoses in such a way that no condensate can flow into the pump.

Ensure that the air can enter the ventilation slit (Fig. 2, 6) unhindered.

Install a condensate separator (e.g. a VSW 1 in the suction line before the intake spigot of the pump to protect against water coming in.

If solvent vapours are sucked in, the emission condenser after the pump helps to condense it, and prevents it being released into the atmosphere.
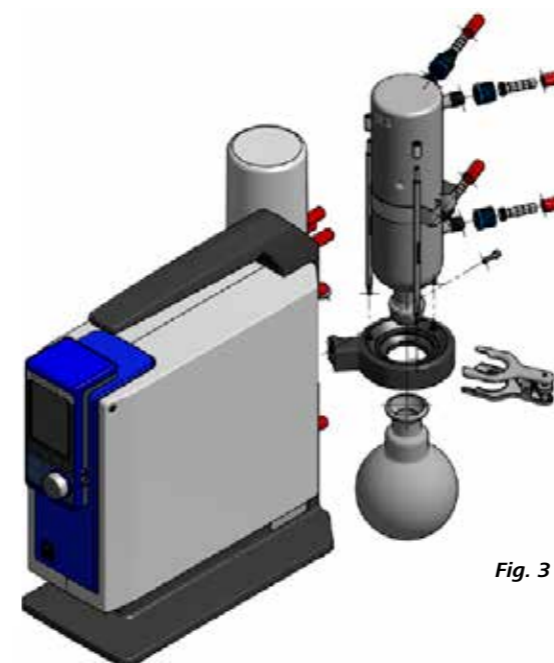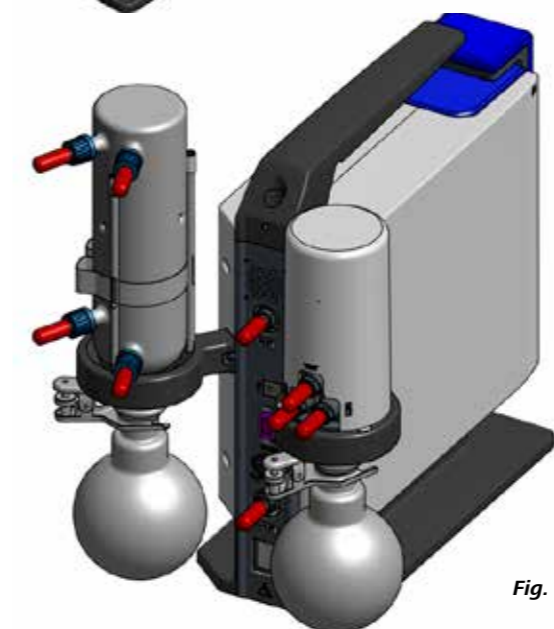

Fig. 3

Fig. 4

Water in

Water out

Fig. 5

Connection of interfaces

Link this connection to the emission condenser with a vacuum hose, or fit a sound absorber to the end.

⚠ **NOTE**	**Put the end of the hose in the fume hood!**
	Check there is a free outlet on the pressurised side!
	Do not use a throttle on the pressurised side and do not close the outlet! Connect the exhaust line to this connection.

Connect the vacuum pump **IKA** Vacstar control to a PC with a USB A - USB B cable. Any device software updates can be loaded using the **IKA** FUT software tool.

You can connect the **IKA** Vacstar control vacuum pump to a PC using an RS 232 interface cable. The pump can be operated in conjunction with other devices with labworld*soft*® laboratory device software. For further information see the chapter "Interfaces and outputs".

Connect the optional water throttle valve (VSW1) to the diaphragm vacuum pump. The water flow to the emission condensor is controlled using the water valve. The valve is opened as soon as the pump is switched on.

Connect the suction line to this connection.
Link this connection to the recipient (rotary evaporator condenser, laboratory reacor etc.) with a vacuum hose.

Check that the voltage information on the rating plate matches your mains supply. Connect the power cord set to supply electricity.

Configuration

⚠ **NOTE**	**Observe the operating instructions for the devices.**

When the target value is reached, the speed of the pump is automatically reduced to a minimum of "0 rpm". If the target value has been reached, the pump sucks according to the leakage rate of the vacuum system. Automatic boiling point detection is possible.

1   Recipient (load, e.g. rotary evaporator, reactor)
2   Vacuum separator (e.g. Woulff bottle)

vacuum: ————
signal / power: — — —
cooling: ————

IN

cooling IN   OUT

cooling OUT

115/230 VAC
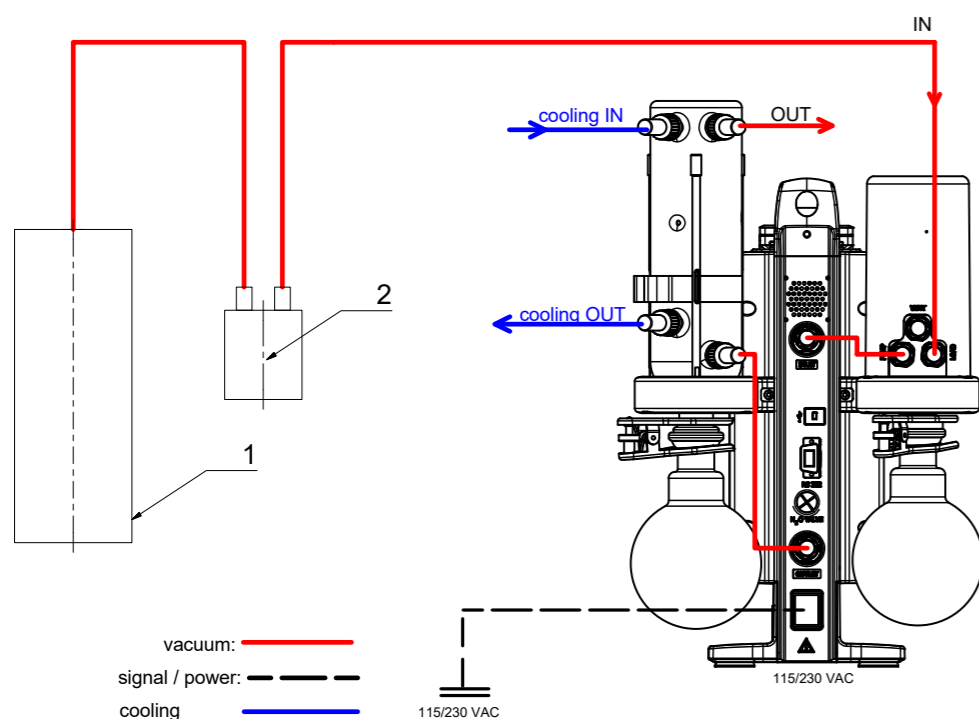
Wireless controller (WiCo)

⚠ **DANGER**	**Please comply with the relevant safety instructions in the "Safety instructions" section for the RB 1 battery pack!**
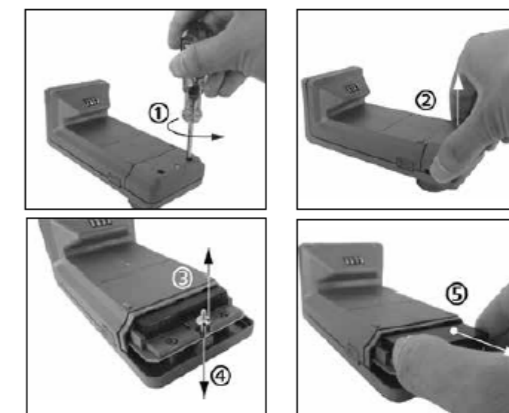
Attach the Wireless Controller (WiCo) to the charging contact provided on the station, and bolt it to the Vacstar station with the screw.

Operator panel and display

Vacstar control Station

Pos.	Name	
A	PCB Contact	Station PCB contact for WiCo
B	Bluetooth® LED	Communication light
C	PCB light	Communication light
D	Bluetooth® Recall key	WiCo connection
E	Safe Stop	Stop any function when WiCo is unavailable
F	Screw point	WiCo to station securing position
G	Displays	Display the values and settings
H	"Menu" key	Press it once: main menu is displayed Press it a second time: back to the working screen
I	"Back" key	Return to the previous menu level
J	USB interface	Charging WiCo and connection to computer
K	Rotating/ pressing knob	Navigation, selecting and changing the settings in the menu
L	Securing screw	Secure the Wico to the station
M	On/Off key	Switching the Wireless Controller on and off
N	Lock key	Key disable and rotary/push knob disable
O	"Vent" key	To vent the load if necessary during the vacuum process
P	"Pause" key	Temporarily stop the function of the device for required period. *Note:* can resume the function by pressing the button again
Q	PCB Contact	WiCo contact PCB to station

WiCo

Commissioning

⚠ NOTE	**Observe the operating instructions for the devices.**

Check if the voltage specified on the type plate matches the available mains voltage. If these conditions are met, the device is ready for operation when it is plugged in to the mains.

Otherwise safe operation is not guaranteed or the device may be damaged.
Observe the ambient conditions indicated under "Technical data".

The socket used must be earthed (grounded contact).

Switching on

After switching off via the main switch (Fig. 1, (4)), the device type, device designation, user-defined device name and the firmware version are shown in the display.
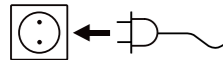
Firmware Update Tool

After the start screen, the information start screen for the Firmware Update Tool appears. You can use the tool to update the software of your IKA device to the latest version. Firmware updates contain new functions or optimisations of previous functions. You can download the Firmware Update Tool at www.ika.de/fut.

IKA®
VACUUM PUMP
VACSTAR control

VACSTAR control

Version: 0.0.024

IKA®
Keep your device up-to-date!

Download the IKA®
Firmware Update Tool
>> www.ika.com/fut

Working screen (factory settings)

The following working screen appears automatically in the display.

Explanation of symbols on the working screen

🔑 Lock key:
This symbol means that the function of the key and of the rotary knob for controlling the vacuum controller are disabled. The symbol no longer appears if the functions are enabled once again by pressing the lock key a second time (min. 1 sec.).

📶 Bluetooth®:
This symbol means the station and the WiCo are communicating via Bluetooth®. The symbol no longer appears if no Bluetooth® communication is being performed.

B Operating mode:
The operating mode currently selected (A, B, C, D).

USB:
The vacuum controller is communicating via a USB cable. The symbol no longer appears if no USB cable is being used for communicating with the station.

Timer:
Appears when the timer display is active in the display.

PC:
The vacuum controller is connected to a computer and the device is being controlled from the computer.

Mode: Manual

1010
actual mbar

200
set mbar

PR:
The device is being controlled from the selected program.

🔄 Running mode:
The vacuum pump is running in a measurement

Vent:
The venting is enabled.

V2G Vacuum:
The current pressure is less than the existing atmospheric pressure.

Detection:
This symbol is displayed during the automatic boiling point search, the system pressure is reduced further.

Boiling:
This symbol indicates that a boiling point has been found automatically, the system pressure is kept constant.

🏠 Home:
The Wireless Controller is connected to the station and is communicating with the station via the charging contacts. The symbol no longer appears if the WiCo is removed from the station.

🔋 Battery pack (rechargeable battery):
The charging status of the RB 1 battery pack within the WiCo. The charging symbol appears if the WiCo
• is connected to a PC via a USB cable
• is connected to the power supply unit OS 1.0 via a USB cable
• is connected to the station via the charger contacts.

Navigation menu and menu structure:

Navigation menu:

IKA® VACSTAR control

— H
— I

— K

☞ Press "Menu" key (H).
☞ Select the menu by turning the rotating/pressing knob (K) to the right or left to select the desired menu or sub-menu, which can then be selected by pressing the rotating/pressing knob (K).
☞ Press or turn the rotating/pressing knob (K) again to select the desired menu option and edit the values or settings, or activate/deactivate a function.
☞ Turn the rotating/pressing knob to "OK" and press the "Back" (I) or "Menu" key (H) to end the procedure and return to the previous menu or working screen.

Note: The menu option activated is highlighted blue in the display. Menus which are grayed out are inactive.

Navigation menu: → Press the "Menu" key (H) and turn the rotary/push knob (K):
← Press the "Back" key (I) or the "Menu" key (H)

Mode: Pump %
23 actual mbar
100 set %

MENU

PUMP

Pump
Modes
Cleaning
Limits
Solvent library
Actions after step

Pump
Cleaning
Start after
Duration
Pump speed
Clean now

Note: If you press the "Menu" key (H), the system skips directly back to the working screen.
If you press the "Back" key (I), the system skips back to the previous display.
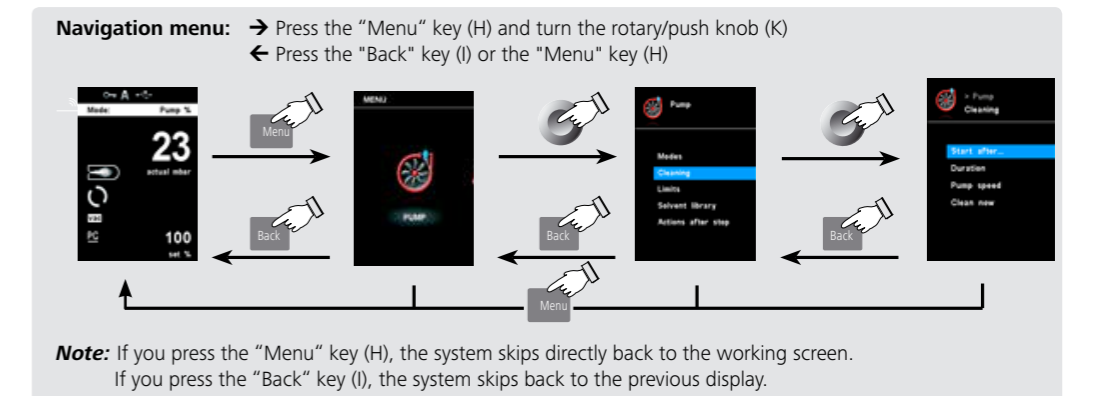
				Factory settings
Pump	Modes	Automatic		Deactivated
		Manual		Activated
		Pump %		Deactivated
		Program		Deactivated
	Cleaning	Start after		05:00 [mm:ss]
		Duration		06:00 [mm:ss]
		Pump speed		20 %
		Clean now		-
	Limits	Manual	Minimum	2 mbar
			Maximum	1100 mbar
		Pump %	Minimum	0 %
			Maximum	100 %
	Solvent library	Add solvente (No.1 ~ 5)		-
		Acetonitril		-
		N-Amylalkohol		-
		...		-
	Actions after stop	Open water valve		Activated
		Open vacuum valve		Activated
		Cleaning		Deactivated
Timer	Timer functions	Time		00:00:01 [hh:mm:ss]
		Beep after stop		Deactivated
		Activate		Deactivated
	Display			Deactivated
Operating Mode	A			Deactivated
	B			Activated
	C			Deactivated
	D			Deactivated
Display	Timer			Deactivated
Programs	Program 01			-
	....			-
	Program 10	Select		-
		Edit	Edit/Insert/Delete	-
		Delete		-
	Last measurement	Select		-
		Edit	Edit/Insert/Delete	-
		Delete		-
Safety	Time			00:30
	Safe pressure			1100 mbar
	Safe pump rate			20 %
	Password			000
Service	Valves	Venting valve	Close/Open	Open
		Water valve	Close/Open	Open
	Pump			Deactivated
Settings	Languages	English		Activated
		Deutsch		Deactivated
		...		Deactivated
	Units	Pressure	mbar	Activated
			hPa	Deactivated
			mmHg	Deactivated
			torr	Deactivated
		Temperature	°C	Activated
			°F	-
	Display	Background	Black/White	Black
		Brightness	Standard Mode	100 %
			Battery Mode	80 %
		Factory update info		Activated
	Sound	Volume		10 %
		Key tone		Activated
	Factory setting	Menu values		-
		Programs		-
		All		-
	Communication	Device name		Vacstar control
		Bluetooth®.		Activated
		Remote control		Activated
		Paring		-
	Information	Firmware Update Info		Activated
		Display version		-
		Logic version		-
		Operating mode		B
		Pressure max.		1100 mbar
		Pressure min.		2 mbar
		Pump % max.		100 %
		Pump % min.		0 %

Menu

Menu details

Pump

1. Press the "Menu" key (N).
2. Select the menu "Pump" and confirm the input.
3. Select the following settings:
   - Modes
   - Cleaning
   - Limits
   - Solvent library
   - Actions after stop

Modes

Automatic:

In the "Modes" menu, you can enable automatic boiling point recognition by selecting the "Automatic" menu item. No other parameters must be set. The boiling point is detected automatically. For rotary evaporators with heating bath, it must be ensured that the tempering medium and solvents have a constant temperature (e.g. 60 °C).

Manual

In the "Manual" menu item, the target value can be specified (e.g. in "mbar"). The system is evacuated until the target value.
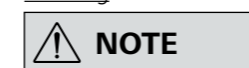
Pump %

By selecting the "Pump %" menu item, the pump can be operated continuously with a running performance of between 100 % and 1 %.

Program

Under the "Program" menu, 10 user-defined pressure-time profiles can be created. The last measurement which is in manual mode can be saved as a program. The target value and the running performance can only be entered within the set limits (see menu item "Limits") switching to the working screen and pressing the rotary/push knob starts the process. Pressing the knob again stops the process.

Cleaning

⚠ **NOTE**

The "Cleaning" menu item increases the service life of the pump, since solvent residues do not remain inside the pump.

The cleaning of the pump ensures that solvent residues are removed in the pump after the measurement. For this purpose, the pump should run at a low speed rate while the system is venting. The air flowing through the pump ensures that the solvent residues are discharged from the pump. If the cleaning option is selected, the cleaning process will start after the measurement has finished (see "Actions after stop").

You can also clean the pump without using the corresponding menu item. To do this, remove the hoses and operate the pump at the end of a working cycle (test, test series, end of the day ...) at idling speed.

Start after…

Start a cleaning process after a measurement was running for at least a interval. The default time is 5 minutes. This means that a measurement must be run for at least 5 minutes, so that cleaning is performed at the end of the measurement.
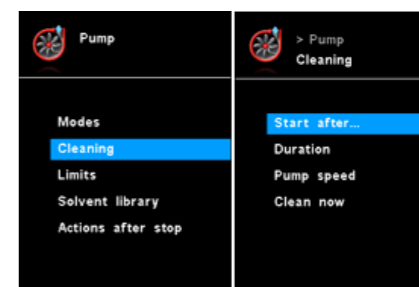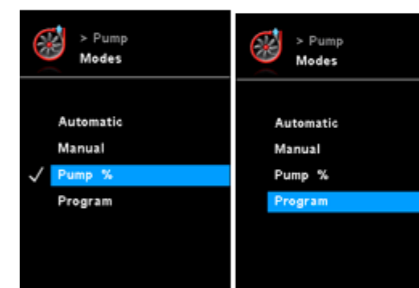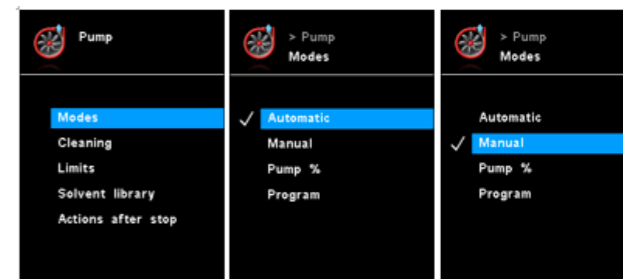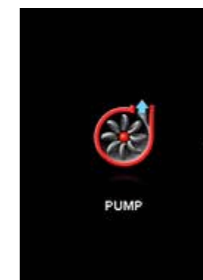
Duration

Specifies how long the cleaning process should be performed.

Pump speed

Determines at what power (in %) the pump is operated during cleaning. If the power is set too high this can lead to a pressure drop in the system.

Clean now

If you want to perform a cleaning, you can select it with this setting.

Limits
In this menu, limits for the target value can be set.

Solvent Library
In the "solvent library", the most common solvents are assigned a function to determine the steam temperature at the set pressure and vice versa. This provides assistance when setting these parameters in manual mode, for example, evaporation processes with a rotary evaporator.

Actions after stop
Here you can define actions that should be performed when a test has ended.
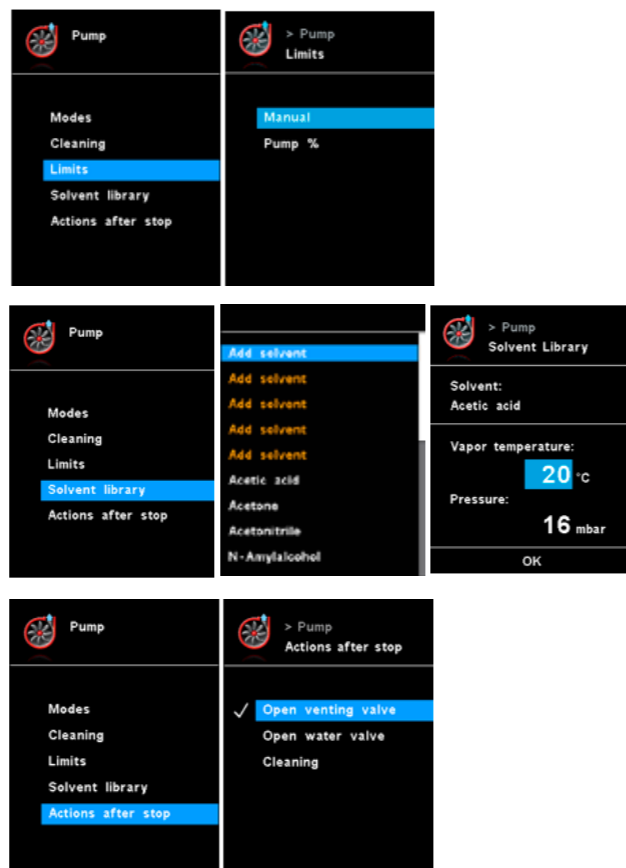
Timer
1. Press the "Menu" key (N).
2. Select the menu "Timer" and confirm the input.
3. Select the following settings:
   - Timer functions
   - Display

Timer functions

⚠ **NOTE**	**Timer function is disabled in auto and program mode**

You can stop the evacuation procedure before expiry of the set time. In this case the countdown of the timer is interrupted.

In the "Timer" menu you can specify that the timer is displayed on the display/working screen. A tick (✓) shows that the option is activated. This setting specify the actual time for the evacuation procedure.
A default time can also be set for the timer. This setting start evacuation for a standard time. The device can emit a signal (beep) after the set target time has elapsed.
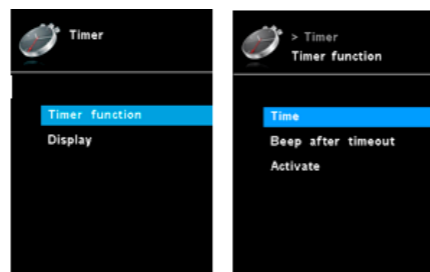
Operating mode
1. Press the "Menu" key (N).
2. Select the menu "Operating mode" and confirm the input.
3. Select the following settings.

Operating mode A
In this operating mode, the set target value is not saved when the current run comes to an end or the device is switched off.

Operating mode B
In this operating mode, the set target value is saved when the current run comes to an end or the device is switched off, and the value can be changed.

Operating mode C
In this operating mode, the set target value is saved when the current run comes to an end or the device is switched off and the value cannot be changed.

Operating mode D
In this operating mode, the set pressure value will be set with a short display and is saved when the current run ends or the device is switched off.

Display
1. Press the "Menu" key (N).
2. Select the menu "Display" and confirm the input.
3. Select the following settings:
   - Timer

In the "Display" menu you can specify what information will be displayed on the main screen.
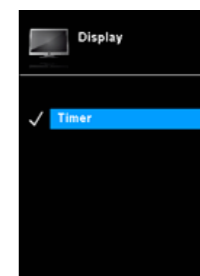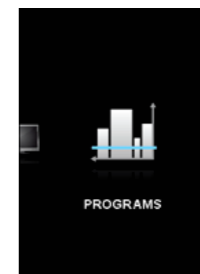

Programs
1. Press the "Menu" key (N).
2. Select the menu "Programs" and confirm the input.

Select
To select a program, use the rotary/push knob and press "Select". Only a program which has the right parameters can be selected. When a program has been successfully selected, this is indicated by a tick mark (✓). The vacuum controller is then in program mode. In the main screen, the program view can then be selected by turning the knob to the right. Turning the knob to the left returns to the main screen.

Start
To start a selected program, the push knob must be pressed in the main screen.

Edit
Edit the selected program parameters. Start to edit the selected program parameters by pressing on menu option "Edit" with rotary/push knob. You can edit, delete or insert one selected program segment in the program.

Delete
Deletes the selected program. If a selected program is deleted by pressing on menu option "Delete" with rotary/push knob, all the program parameters will be emptied. The tick (✓) disappears.

Details for editing the program
In this program, you can define up to 10 segments. The selected segment is highlighted. Then, you can edit, delete or insert a segment in this program. The program is save automatically.

Edit
If the background of a selected value is yellow, you can change the setting of the pressure value or the time value.

Delete
When a highlighted segment is deleted, the subsequent segments move upward, closing the gap created by the deleted segment.
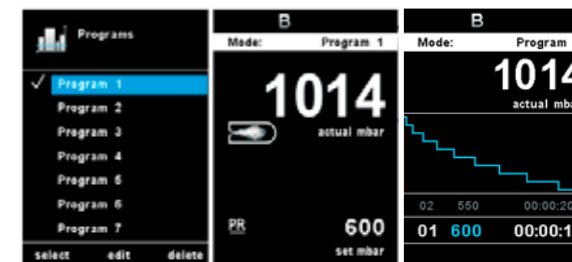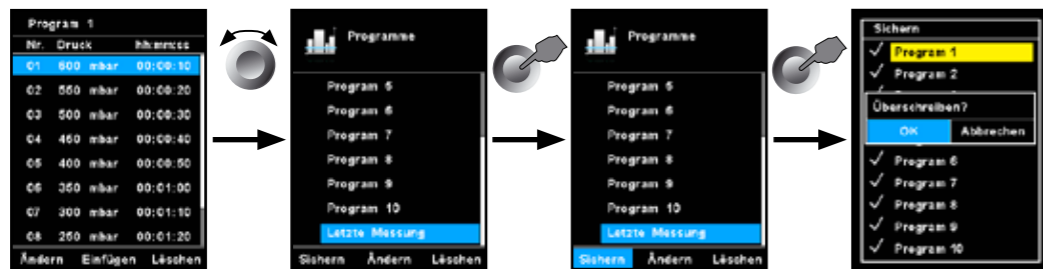
When a program is being edited, following screen appears. Sample for editing the program

Edit pressure


Edit time

Example of saving the last measurement

Safety
1. Press the "Menu" key (N).
2. Select the menu "Safety" and confirm the input.

In the "Password" menu, you can protect the WiCo settings using a password. (factory setting: 000)

Time Out
In the "Time Out" menu, you can set a time limit. This time limit applies if there is a communication failure between the IKA Vacstar and the WiCo or the communication range is exceeded. The IKA Vacstar will continue to run at the set speed until the set time has expired. After that the IKA Vacstar will continue to run at the set safety pressure (manual mode) or safety pump rate(Pump % mode) (see the "Safety" menu).
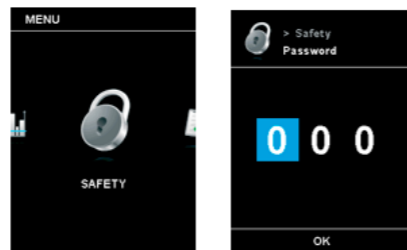
> ⚠ **NOTE** — **The initial setting for the time limit is 30 seconds. You can set a value of up to 60 minutes for this time limit.**

Safe speed
In the "Safety" menu, you can specify a pressure or pump rate that is appropriate and safe for the suction task. The safety pressure or safety pump rate applies if there is a communication failure between the IKA Vacstar and the WiCo or the communication range is exceeded.
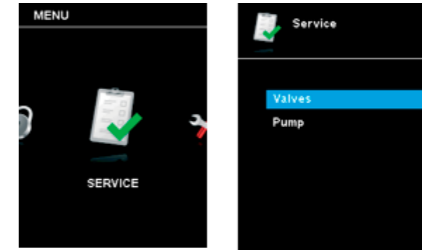
> ⚠ **NOTE** — **The initial setting of the safety pressure is 1100 mbar and or safety pump rate is 20 %. it is implemented after expiry of the time limit (see "Time out").**

Service
1. Press the "Menu" key (N).
2. Select the menu "Service" and confirm the input.

In the "Service" menu, the valves and the pump can be operated individually and also checked to ensure that they are operating correctly.

Settings
1. Press the "Menu" key (N).
2. Select the menu "Settings" and confirm the input.

Languages
The "Languages" option allows you to select the desired language by turning and pressing the rotary/pressing knob (B). A tick (✓) indicates the language that is set for the system.

Units
The "Units" option allows you to select the desired unit for displaying the pressure by turning and pressing the rotary/push knob. For the pressure, the choice is "mbar", "hPa", "mmHg" or "Torr". A tick (✓) indicates the unit that is set for the system.

Display
The "Display" option allows you to change the background color and brightness of the working screen.

Sound
The "Sound" option allows you to activate/deactivate the keypress sound and to set the volume.

Factory settings
You can choose this function if you want to reset the system parameters. There are three options to choose: "menu values", "programs" and "all". Select the option which is going to be reset.

Communication
The "Device name" option allows you to input a device name. The device name appears on the opening screen when the device is switched on. This can be useful when using multiple devices with different set- tings. This also facilitates the identification of each device when communicating with a PC via USB, RS232 and Bluetooth®, for example.
Note: The coupling "Pairing" can only be performed if the wireless controller is mounted on the station (see chapter "Device setup" Fig. 1).

Information
The "Information" option offers you an overview of the most important system settings of the IKA Vacstar Control.
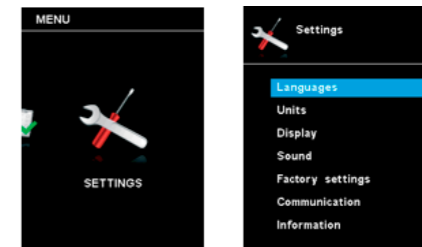
Interfaces and outputs

Please comply with the system requirements together with the operating instructions and help section included with the software.

The device can be operated in "Remote" mode via an RS 232 or USB interface using the laboratory software labworld*soft*®. The RS 232 interface (M) at the back of the device is fitted with a 9-pole SUB-D jack which can be connected to a PC. The pins are assigned serial signals.

USB Interface
The Universal Serial Bus (USB) is a serial bus system which allows the device to be connected to the PC. Devices that support USB can be connected to each other whilst they are running (hot plugging) and provide automatic recognition of the connected devices and their properties.
Use the USB interface in conjunction with labworldsoft® for operation in "Remote" mode and for updating the firmware using the "Firmware update tool".

Installation
Before the device is connected with the PC using the USB data cable, the USB driver must be installed.
The USB driver can be downloaded from the website.

Serial interface RS 232 (V 24)
Configuration:
- The functions of the interface circuit between the dev ice and the automation system are a selection from the signals specified in the EIA standard RS232 as per DIN 66020 Part 1.
- Standard RS 232, corresponding to DIN 66259 Part 1 is valid for the electric characteristics of the interface circuits and assignment of signal states.
- Transmission process: Asynchronous character transmission in start-stop operation.
- Transmission type: Full duplex.
- Character format: Character composition according to data format in DIN 66022 for start-stop operation. 1 start bit, 7 character bits, 1 parity bit (even), 1 stop bit.
- Transmission speed: 9600 Bits/s.
- Data flow control: none
- Access method: Data transmission from the device to the computer only occurs after a request from the computer.

Command syntax and format
The following points should be noted for the instruction set:
- Commands are generally sent from the computer (master) to the device (slave).
- The device only responds to requests from the computer. Even error messages are not send spontaneously from the device to the computer (automation system).
- The commands are transmitted in captial letters.
- Commands and parameters, as well as consecutive parameters, must be separated by at least one space (code: hex 0x20).
- Each individual command (including parameters and data) and all responses are completed with CRLF (code: hex 0x20 hex 0x0d hex 0x0A) and can have a maximum length of 50 characters.
- The dot is used for decimal separators in a floating-point value (code: hex 0x2E).

The details given above generally comply with the recommendations of NAMUR (NAMUR recommendations for the design of electrical plug-in connectors for analogue and digital signals in laboratory MSR devices. Rev. 1.1).

The NAMUR commands and the additional IKA specific commands are only used as low-level commands for communication between the device and the PC. With an appropriate terminal or communication program, these commands can be transmitted directly to the device.

NAMUR commands   Function

Command	Firmware Version	Description
IN_PARA1	0.0.020	Return the actual values
OUT_PARA1	0.0.020	Set the set values for the pump control
OUT_PARA2	0.0.020	Set the set values for Bluetooth connection
OUT_STATUS	0.0.020	Send the actual device status
IN_STATUS	0.0.020	Reads the status of a device
IN_VERSION	0.0.020	Read the version of the firmware
IN_DATE	0.0.020	Read the release date of the display/logic firmware
IN_NAME	0.0.020	Read the name of the device
IN_DEVICE	0.0.020	Read the device type.
IN_ADDRESS	0.0.020	Read mac address of Wico.
IN_PARING	0.0.020	Read paired mac address of station.
OUT_ADDRESS	0.0.020	Write new paired mac addresses of both station and Wico.
IN_SP_66	0.0.020	Reads the set pressure value
OUT_SP_66	0.0.020	Sets set point pressure value
IN_PV_66	0.0.020	Reads the actual pressure value
IN_MODE_66	0.0.020	Reads the evacuating mode
OUT_MODE_66	0.0.020	Sets the evacuating mode
IN_ERROR	0.0.020	Reads error state
OUT_ERROR	0.0.020	Test Error. Sends out error code
IN_BT_NAME	0.0.020	Reads Bluetooth Device Name
IN_CUSTOM_DEVICE_NAME	0.0.020	Reads custom device name
OUT_CUSTOM_DEVICE_NAME	0.0.020	Sets custom device name
IN_WD1@	0.0.020	Reads communication watchdog time
OUT_WD1@	0.0.020	Sets communication watchdog time
OUT_WD2@	0.0.020	Set PC communication watchdog time 2
OUT_SP_41 n (0 -100 %)	0.0.020	Set the PC safety pump rate
OUT_SP_42	0.0.020	Set the PC safety pressure
RESET	0.0.020	Switch to normal operating mode
START_66	0.0.020	Starts the measurement
STOP_66	0.0.020	Stops the measurement
ENTER_IAP	0.0.020	Starts IAP mode
CALIB_66	0.0.020	It is used to calibrate vacuum.
IN_CALIB_66	0.0.020	It is used to read vacuum calibration values
OUT_CALIB_66	0.0.020	It is used to calibrate vacuum.

"Watchdog" functions; monitoring of the serial data flow
If, once this function has been activated (see NAMUR commands), there is no retransmission of the command from the computer within the set time ("watchdog time"), the Evacuation function is switched off in accordance with the set "watchdog" mode or is returned to previously set target values. The data transmission may be interrupted by, for example, a crash in the operating system, a power failure in the PC or an issue with the connection cable between the computer and the device.

"Watchdog" mode 1
If event WD1 should occur, the evacuation function is switched off and WD1 Watchdog Error is displayed. Set watchdog time to m (20 - 1,500) seconds, with watchdog time echo. This command launches the watchdog function and must be transmitted within the set watchdog time.

"Watchdog" mode 2
If there is an interruption in data communications (longer than the set watchdog time), the speed target value is changed to the set WD safety speed limit. The warning PC 2 is displayed. The WD2 event can be reset with OUT_WD2@0 - this also stops the watchdog function.
Set watchdog time to m (20 - 1,500) seconds, with watchdog time echo. This command launches the watchdog function and must be transmitted within the set watchdog time.

Accessories: PC 1.1 cable (device to PC)
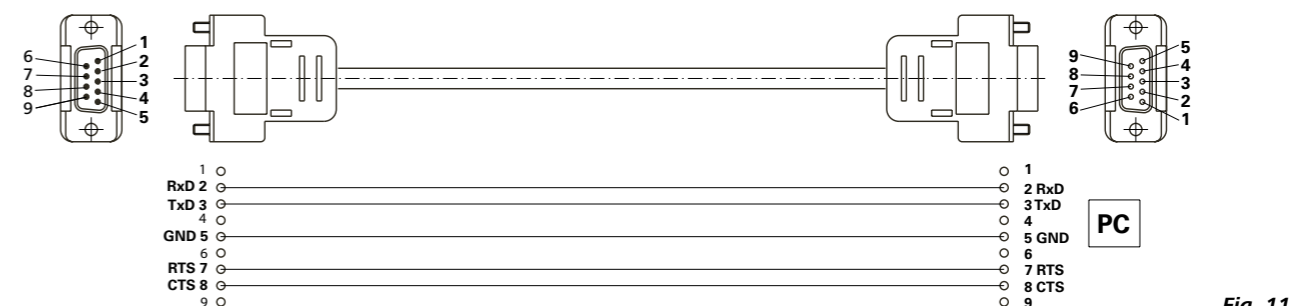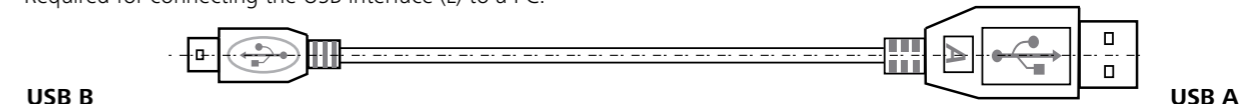Required for connecting the 9-pin socket to a PC.

Fig. 10

Fig. 11

USB A - USB B cable
Required for connecting the USB interface (L) to a PC.

USB B   **USB A**

Maintenance and cleaning

The device is maintenance-free. It is only subject to the natural wear and tear of components and their statistical failure rate.

Cleaning
For cleaning disconnect the mains plug!
Use only cleaning agents which have been approved by IKA to clean IKA devices.
These are water (with tenside) and isoproApanol.
Wear protective gloves during cleaning the devices.
Electrical devices may not be placed in the cleansing agent for the purpose of cleaning.
Do not allow moisture to get into the device when cleaning.
Before using another than the recommended method for cleaning or decontamination, the user must ascertain with IKA that this method does not destroy the device.

Spare parts order
When ordering spare parts, please give:
- device type.
- serial number, see type plate.
- position number and description of spare part, see www.ika.com.

Repair
Please only send devices in for repair that have been cleaned and are free of materials which might present health hazards.

For repair, please request the "**Safety Declaration** (**Decontamination Certificate**)" from IKA or use the download printout of it from IKA website at **www.ika.com**.

If your appliance requires repair, return it in its original packaging. Storage packaging is not sufficient when sending the device - also use appropriate transport packaging.

Error codes

If an error occurs, this is shown in an error on the display (B), e.g. Error 4.
Proceed as follows:
- Switch the device off on the device switch,
- Take corrective measure,
- Switch device back on.

Error code	Description	Detection	Reason	Action
Error 3	Device temperature error	The temperature of device has exceeded the limit.	The temperature is too high.	Stop the device for a while and restart again. If the problem occurs again and again, please call service department.
Error 4	Motor overload	Motor overload	The motor is blocked because of overload.	Stop the device for a while and restart again. If the problem occurs again and again, please call service department.
Error 8	Speed sensor fault.	Device can't detect the pump speed.	The sensor occurs some unknown errors that device can't read the speed value.	Call service department.
Error 9	Storage Error	Read or write internal flash error.	Read or write internal flash error.	Call service department.

In the event that the fault cannot be eliminated using the measures described or another error code is displayed:
- Please contact the Service Department,
- Send the device and a brief description of the fault.

Accessories

- Vacuum hose **IKA** VH.SI.8
- PC 1.1 cable (RS 232)
- Woulff bottle/water valve set VSW1

For further accessories see www.ika.de

Product contact parts

Name	Material
Connection spigot	PPS
Connection piece	PPS
Distributor	PPS
Head piece	PPS
Diaphragm valve/O-ring	FFPM
Diaphragm	NBR/PTFE
Clamp	PPS
Connection piece	PTFE
Pressure sensor	AL203

Technical data

	Base unit	Value
Pump rate max.	**[m³/h]**	1.32
Pump rate max.	**[l/min]**	22
Final pressure without gas ballast	**[mbar]**	2
Suction levels	**[-]**	4
Cylinder	**[-]**	4
Connection diameter suction side	**[mm]**	8
Connection diameter pressure side	**[mm]**	8
Input pressure min.	**[mbar]**	2
Input pressure max.	**[mbar]**	1030
Boiling point detection	**[-]**	yes
Solvent library	**[-]**	yes
Analog speed vacuum control	**[-]**	yes
Speed control	**[-]**	Turning knob
Display	**[-]**	TFT
Pressure unit / scale	**[-]**	mbar, hPa, mmHg, Torr
Vacuum sensor	**[-]**	yes
Vacuum sensor type	**[-]**	ceramic Al_2O_3
Pressure max. for pressure sensor	**[bar]**	1.2
Measurement range (absolute) min.	**[mbar]**	1
Measurement range (absolute) max.	**[mbar]**	1030
Resolution pressure	**[mbar]**	1
Measurement uncertainty	**[mbar]**	1
Venting valve	**[-]**	yes
Condensate trap	**[-]**	yes
Emission condenser	**[-]**	yes
Timer	**[-]**	yes
Noise at low. pressure	**[dB(A)]**	54
Material in contact with medium	**[-]**	Al_2O_3, PTFE, FPM, PPS
Housing material	**[-]**	Alu-cast coating
Mode automatic	**[-]**	yes
Mode manual	**[-]**	yes
Mode pump %	**[-]**	yes
Mode program	**[-]**	yes
Width	**[mm]**	270
Depth	**[mm]**	500
Height	**[mm]**	435
Weight	**[kg]**	14
Permissible ambient conditions		5 °C to 31 °C at 80 % relative humidity. 32 °C to 40 °C decreasing linearly to a maximum 50 % relative humidity.
Protection class	**[-]**	I
Overvoltage category	**[-]**	II
Degree of contamination	**[-]**	2
Use above max. MSL	**m**	2000

	Base unit	Value
Firmware update	[-]	yes
Protection class according to DIN EN 60529	[-]	IP 20
USB interface	[-]	yes
RS 232 interface	[-]	yes
Voltage	[V]	100-240
Frequency	[Hz]	50/60
Power input	[W]	140
Power input standby	[W]	3
Note		
Protective earth conductor	The protective earth conductor (PE) is not connected to the metal housing. (Internally encapsulated DC power supply)	

Average values.
Subject to technical changes!

IKA

designed for scientists

IKA-Werke GmbH & Co. KG

Janke & Kunkel-Straße 10, 79219 Staufen, Germany

Phone: +49 7633 831-0, Fax: +49 7633 831-98

eMail: sales@ika.de

USA
IKA Works, Inc.
Phone: +1 910 452-7059
eMail: usa@ika.net

KOREA
IKA Korea Ltd.
Phone: +82 2 2136 6800
eMail: sales-lab@ika.kr

BRAZIL
IKA Brasil
Phone: +55 19 3772 9600
eMail: sales@ika.net.br

MALAYSIA
IKA Works (Asia) Sdn Bhd
Phone: +60 3 6099-5666
eMail: sales.lab@ika.my

CHINA
IKA Works Guangzhou
Phone: +86 20 8222 6771
eMail: info@ika.cn

POLAND
IKA Poland Sp. z o.o.
Phone: +48 22 201 99 79
eMail: sales.poland@ika.com

JAPAN
IKA Japan K.K.
Phone: +81 6 6730 6781
eMail: info_japan@ika.ne.jp

INDIA
IKA India Private Limited
Phone: +91 80 26253 900
eMail: info@ika.in

UNITED KINGDOM
IKA England LTD.
Phone: +44 1865 986 162
eMail: sales.england@ika.com

VIETNAM
IKA Vietnam Company Limited
Phone: +84 28 38202142
eMail: sales.lab-vietnam@ika.com

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Technical specifications may be changed without prior notice.