

Test Equipment for Steam Traps

VKP 41 plus Ex

VKP 41 plus

EN
English

Original Installation Instructions
819574-02

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Foreword

This installation & operating manual will help you use the steam trap test equipment safely and efficiently for its intended purpose.

TRAPtest VKP 41plus Ex

TRAPtest VKP 41plus

This test equipment for steam traps will be called equipment in this document.

This installation & operating manual is intended for anyone commissioning, using, operating, servicing, cleaning or disposing of this equipment and, in particular, for professional after-sales service technicians, qualified personnel and authorised and trained staff.

All of these persons must read and understand the content of this installation & operating manual.

Following the instructions given in this installation & operating manual helps avoiding danger and increases the reliability and service life of the equipment. Please note that in addition to the instructions given in this installation & operating manual you must also observe all locally applicable rules and regulations concerning the prevention of accidents as well as approved safety guidelines for good professional practice.

Observe and follow the instructions given in the operating manual for the PC software program and the operating instructions issued by the manufacturer of the data collector.

Availability

Keep this operating manual always in the hard case for the equipment or the carrying bag. Make sure that this installation & operating manual is available to the operator.

The installation & operating manual is part of the equipment. Please hand over this installation & operating manual when selling the equipment or passing it on.

Formatting features in the document

Certain text elements of this installation & operating manual feature a specific typographic design. You can easily distinguish the following text elements:

Standard text

Cross-reference

- ▶ Listing
 - ▶ Sub-items in listings
- Steps for action.



Here you will find additional useful information and tips serving to assist you in using the equipment to its fullest potential.

Safety

Use for the intended purpose

The test equipment for steam traps VKP 41plus is designed for detecting waterlogging and steam loss through steam traps. The test equipment for steam traps VKP 41plus must NOT be used or operated in explosion-risk areas.

The test equipment for steam traps VKP 41plus Ex is designed for detecting waterlogging (banking-up of condensate) and steam loss through steam traps in gas-explosion risk areas.

Correct use includes compliance with the instructions given in this installation & operating manual, in particular obedience to all safety instructions.

Correct use includes compliance with all instructions given in the operating manual issued by the manufacturer of the data collector and the operating manual for the PC software.

Any other use of the equipment is considered to be improper.

The equipment is also considered to be used improperly if:

- ▶ equipment that is not explosion proof is used in explosion-risk areas
- ▶ untrained persons use the equipment

Basic safety notes

Explosion hazard

- ▶ Meet the following requirements if you want to use the equipment in gas-explosion risk areas:
 - ▶ For gas-explosion risk areas use only equipment type VKP 41plus Ex together with the measuring transducer (= hand-held probe) type VKPS 40 Ex and the Com Box type VKPC 40plus Ex.
 - ▶ Make sure that all components of the equipment are undamaged.
 - ▶ Never connect or disconnect the components of the equipment in explosion-risk areas.
 - ▶ Never open the components of the equipment in explosion-risk areas.
 - ▶ Do not recharge the batteries of the individual components of the equipment in explosion-risk areas.
- ▶ Risk of explosion if the pipeline to be tested is carrying voltage.
Before starting the test make sure that no part of the pipeline is carrying voltage. You can achieve this e.g. by earthing the pipeline.
- ▶ Risk of explosion if a wrong USB power cable ("charger") is used. Using a wrong USB power cable ("charger") for recharging can damage component parts or the storage battery of the equipment. Note that in this case the equipment is no longer explosion proof.
Use only the supplied USB power cable ("charger") type VKPA 40plus for recharging the Com Box type VKPC 40plus Ex.
- ▶ Risk of explosion due to spark-over.
Do not use any items in the explosion-risk area that could generate sparks. Do not use the supplied file!

Risk of severe injuries

- ▶ Risk of deadly electric shocks if a test is performed on live steam traps!
Make sure that the traps to be tested are not live.
- ▶ The trap to be tested is hot and under pressure. Before carrying out any tests make sure that the following requirements are met:
 - ▶ Make sure there is no skin contact with the trap to be tested or other parts of the installation.
 - ▶ Always wear protective gear when performing the tests.
 - ▶ Make sure that there are no fluid leaks at the area of the trap to be tested.
- ▶ Risk of deadly electric shocks if defective components are used!
 - ▶ Never open the components of the equipment.
 - ▶ Never use any defective or damaged components.
 - ▶ Before recharging the equipment make sure that the used cables are in good working condition.

Information on property damage or malfunctions

- ▶ Condensation may have formed in the equipment in the event of sudden or drastic temperature changes.
 - ▶ After temperature changes leave the equipment switched off until the temperature of the equipment reaches ambient temperature.
 - ▶ Allow any condensation on the equipment to dry out completely.
- ▶ Static charges may cause damage to electronic components and/or lead to malfunctions. Wear electrically insulated shoes when performing tests.
- ▶ Improper handling may cause damage to electronic components and/or lead to malfunctions. Never open the components of the equipment.
- ▶ If the measuring probe does not touch the trap firmly at the right position and angle the readings may be incorrect. Make sure the sensor tip of the measuring probe touches only a bare metallic surface.
- ▶ If the tests are performed on different points on a steam trap the readings may be faulty. Make sure the sensor tip touches always the same test point. Make sure the sensor tip is perpendicular to the surface of the steam trap when it touches the test point.

Qualification of personnel

A qualified person must be acquainted with and experienced in the following:

- ▶ The pertinent on-site rules and regulations for preventing fire and explosions as well as industrial safety regulations
- ▶ Working on pressure equipment
- ▶ Working with dangerous (hot or pressurized) fluids
- ▶ Observing all notes and instructions in this installation & operating manual and the applicable documents
- ▶ Working with portable instruments
- ▶ Working with personal computers (PCs)
- ▶ Working with menu-driven software
- ▶ Analysing and interpreting steam trap test results

Protective gear

The required protective gear depends on the types of fluid used and the regulations on site. For more information on suitable protective clothing and safety gear refer to the safety data sheet of the fluid in question.

Protective gear comprises the following items:

- ▶ protective helmet
- ▶ work boots
- ▶ protective gloves

Depending on local rules and regulations and the noise level generated by the plant some form of ear protection must be worn.

Depending on local rules and regulations and the fluid used in the plant some form of eye protection must be worn.

Typographic features of warning notes



DANGER

Notes with the heading DANGER warn against imminent dangerous situations that can lead to death or serious injuries.



WARNING

Notes with the heading WARNING warn against possibly dangerous situations that could lead to death or serious injuries.



CAUTION

Notes with the heading CAUTION warn against dangerous situations that could lead to minor or moderate injuries.

Formatting features for warnings of property damage

Attention!

This information warns of a situation leading to property damage.

Description

type VKPS 40 Ex of the VKP 41plus equipment are all gas-explosion proof. These components bear additional markings on the name plates.

Scope of supply and equipment specification

Scope of supply

All individual equipment components are in the hard case. Before you can use the equipment connect the components and charge the batteries.

The following items are part of the supply:

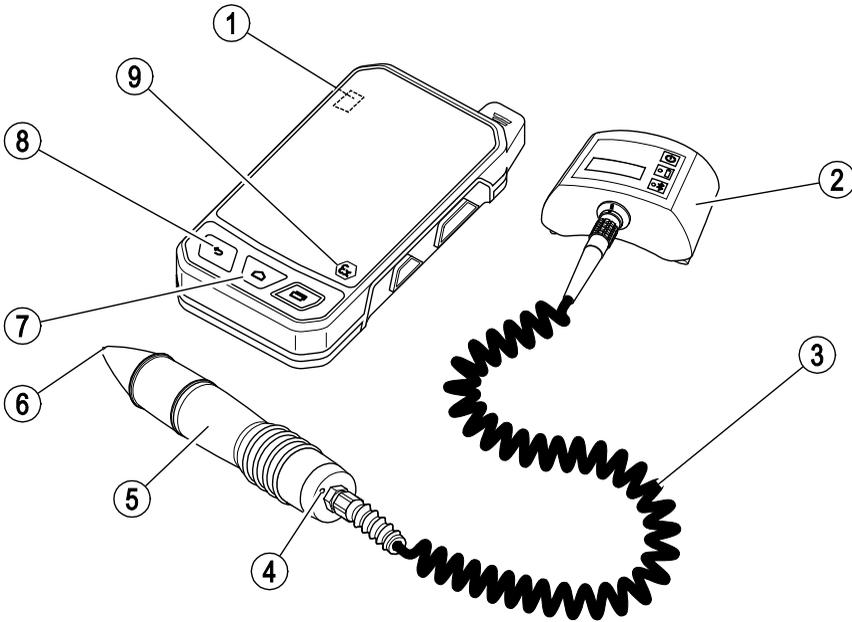
- ▶ Transportation case (hard case)
- ▶ Carrying bag (Note that only the bag with stock code no. 393185 is suitable for use in gas-explosion risk areas.)
- ▶ Strap to fix the Com Box
- ▶ Data collector with accessories (see operating manual issued by the manufacturer):
 - ▶ Charging set with four adaptors for different mains socket-outlets
 - ▶ Belt clip
 - ▶ Multifunction tool
 - ▶ USB data cable with safety box for VKP 41plus Ex or USB data cable for VKP 41plus
- ▶ Measuring probe with connecting cable
- ▶ Com Box VKPC 40plus (Ex)
- ▶ USB power cable ("charger") type VKPA 40plus for Com Box type VKPC 40plus Ex
- ▶ Power supply unit for Com Box
- ▶ Four adapters for power supply unit for different types of mains sockets
- ▶ Data carrier with PC software program for evaluating the test results on a PC
- ▶ Adjustable mirror
- ▶ Identification tags for steam traps (optional)

Do NOT use the supplied file and the adjustable mirror in explosion-risk areas! The file and the mirror are provided with an appropriate warning note.

The data collector, Com Box type VKPC 40plus Ex and the measuring transducer (= hand-held probe)

Equipment specification

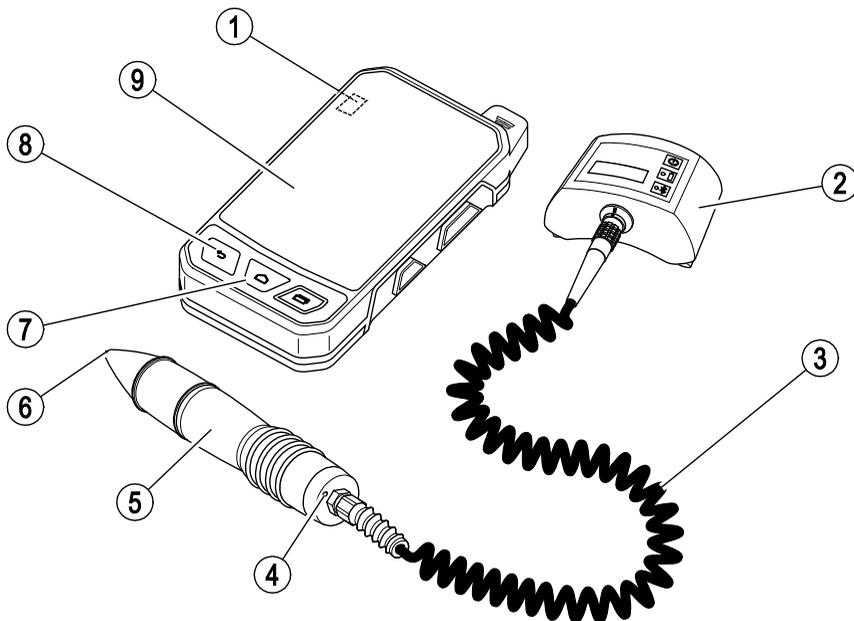
VKP 41plus Ex



Item no.	Name / specification
1	On/Off key (see operating manual for the data collector)
2	Com Box type VKPC 40plus Ex
3	Connecting cable to connect the measuring probe with the Com Box (firmly attached to the measuring probe)
4	Red LED (illuminated during a test)
5	Measuring transducer (=probe) type VKPS 40Ex

Item no.	Name / specification
6	Sensor tip
7	Home key (see operating manual for the data collector)
8	Return key (see operating manual for the data collector)
9	Data collector type VKPN 41plus Ex (see operating manual issued by the manufacturer)

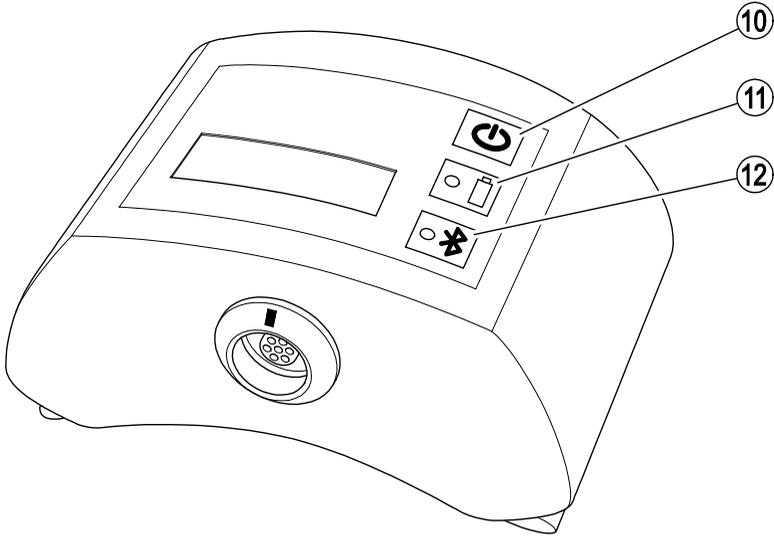
VKP 41plus



Item no.	Name / specification
1	On/Off key (see operating manual for the data collector)
2	Com-Box type VKPC 40plus
3	Connecting cable to connect the measuring probe with the Com Box (firmly attached to the measuring probe)
4	Red LED (illuminated during a test)
5	Measuring transducer (=probe) type VKPS 40Ex

Item no.	Name / specification
6	Sensor tip
7	Home key (see operating manual for the data collector)
8	Return key (see operating manual for the data collector)
9	Data collector type VKPN 41plus (see operating manual issued by the manufacturer)

Indicators and adjustors on the Com box



Item no.	Description
10	ON/OFF button
11	<p>Charge indicator</p> <ul style="list-style-type: none"> ● LED illuminated green: the battery of the Com Box is charged. The Com Box is not connected to the mains power. ● LED pulsing green: the Com Box is connected to the mains power and the battery is being charged. ● LED illuminated amber: the charge of the battery of the Com Box is low. Please recharge the battery at the next opportunity. ● LED illuminated red: the charge of the battery of the Com Box is too low. Recharge the battery. <p>If the LED is not illuminated the storage battery of the Com Box is charged. Disconnect the Com Box from the mains power.</p>
12	<p>Status indicator for Bluetooth connection</p> <ul style="list-style-type: none"> ● LED illuminated blue: Bluetooth connection established to the data collector. ● LED pulsing blue: the Bluetooth connection to the data collector is being established or data are being transferred. <p>There is no Bluetooth connection to the data collector if the LED is not illuminated.</p>

Name plate

The individual components are provided with name plates.

- ▶ Data collector:
 - ▶ Name plate on back of the device
 - ▶ The name plate of the explosion-proof equipment (VKP 41plus Ex) also specifies the ATEX code number.
- ▶ Com Box: Name plate on the back, behind the strap
- ▶ USB network cable / charger for Com Box: Lasered onto the probe body
- ▶ Measuring probe: Lasered onto the probe body

The name plates contain the following indications:

- ▶ Manufacturer
- ▶ Type designation
- ▶ Serial number
- ▶ Admissible range of service temperature

ATEX-/IECEx Directive

The VKP 41plus Ex is approved for use in explosion-risk areas. For more information on the data collector for VKP 41plus Ex see the operating manual for the data collector.

The following components are approved for application in explosion-risk area:

- ▶ data collector with Ex marking
- ▶ measuring transducer (hand-held probe) type VKPS 40 Ex with Ex marking
- ▶ Com Box type VKPC 40plus Ex with Ex marking
- ▶ carrying bag (stock code no. 393185)

Do NOT use the supplied file and the adjustable mirror in explosion-risk areas! The file and the mirror are provided with an appropriate warning note.

The data collector bears the following markings:
II 2G Ex ib IIC T4 Gb IP64
IECEx EPS 14.0093X
EPS 14 ATEX 1 767X

For more information on the markings on the data collector see the operating manual for the data collector.

The Com Box bears the following marking:

VKPC 40plus Ex
II 2G Ex ib IIC T4 Gb
BVS 15 ATEX E002
Ex ib IIC T4 Gb
IECEx BVS 18.0048

Connect only measuring transducers (= probes) type VKPS 40 Ex marked Ex ib IIC T4 Gb to the Com Box type VKPC 40plus Ex.

The measuring transducer bears the following marking:

VKPS 40Ex
Ex ib IIC T4 Gb

Task and function

Purpose

The test equipment VKP 41plus is designed for checking steam traps for steam loss and banking-up condensate.

The test equipment VKP 41plus Ex is designed for checking steam traps in explosion-risk areas for steam loss and banking-up of condensate.

To perform the test you have the following test options:

- ▶ Test jobs prepared on the computer: all test objects that are part of the test job are shown.
- ▶ Quick check: A test object is created during the test.

During the test procedure the surface temperature of the tested steam trap is also measured, which makes it possible to detect waterlogged steam traps. In order to do so you have to enter the service pressure upstream of the test object. The boiling point associated with this service pressure is then compared with the temperature reading. If the measured temperature is below 40 % of the boiling point, the steam trap is waterlogged and banking up condensate.

If the test results are affected by noise produced by other components of the plant you can perform a foreign noise measurement. This will help you to test and evaluate the influence of foreign noise on the test results.

The test objects are selected and the test results evaluated on the computer. The necessary software program is part of the scope of supply. For more information on the program refer to the supplied software operating manual.

Function

Ultrasonic vibrations are generated when fluid flows through a steam trap. These ultrasonic vibrations are sensed by pressing the sensor tip of the hand-held measuring probe onto the test point of the steam trap. A thermocouple integrated in the measuring probe measures the temperature simultaneously.

The measuring probe then translates the readings into digital signals. These signals are then transferred to the Com Box via the firmly attached cable. The Com Box then transfers the readings to the data collector via Bluetooth. The data collector records the data and displays the readings visually.

If the data collector is used in areas where a potentially explosive atmosphere is present use the supplied USB data cable with safety box to connect the data collector to a computer.

If the data collector is not used in potentially explosive areas you can use an ordinary USB cable to connect it to a computer.

The test readings can then be transferred to a data base on the computer.

The evaluation of the test results is based on limit sound values (LV). These reference sound values have been ascertained empirically by the manufacturer.

A steam trap is operating correctly if all the following requirements are met:

- ▶ at least one of the readings is below the threshold value (TV) and
- ▶ the measured temperature is 40 % above the set point

A steam trap is also operating correctly if all the following requirements are met:

- ▶ some readings are above the threshold value and
- ▶ the mean value of all readings of the test does not reach the limit sound value
- ▶ the measured temperature is 40 % above the set point

If this is not the case the steam trap is either faulty or the test was affected by foreign noise. To detect any foreign noises you should perform a foreign noise measurement. In this case you will be asked

to do so in the menu of the data collector once the test has been finished.

For thermodynamic steam traps a certain limit frequency of operations is used to evaluate its performance.



If you did not enter the service pressure, the equipment will only check whether the temperature exceeds 40 °C. In this case banking-up of condensate will not be indicated.

For more information on how the readings are evaluated and interpreted see the operating instructions for the PC software program.

Storing and transporting the equipment

- Use only the supplied hard case for storing the equipment.
- If you do not use the equipment recharge the data collector and the Com box at least every six months.

Storing the equipment

- Please observe the following items when storing the equipment:
 - ▶ Protect the equipment and all components against hard shocks and impacts.
 - ▶ Store the equipment only indoors.
 - ▶ The requirements specified under "Technical Data" on page 31 must be observed.
- Make sure that all these requirements are always met when storing the equipment.
- Please contact the manufacturer if you cannot comply with the recommended storage conditions.

Transporting the equipment

- Meet the requirements for storage also when transporting the equipment.
- When transporting the equipment make sure that you meet the requirements specified in the section "Technical Data" on page 31.
- Use only the supplied hard case for transporting the equipment outside explosion-risk areas.
- When transporting the equipment on site make sure that it is not damaged by mechanical shocks and cannot fall down.
- The equipment must be connected and inside the carrying bag if you want to transport the equipment in explosion-risk areas.
- When transporting the equipment observe international regulations for the transport of lithium-ion batteries.

Operation

Preparing tests

Recharging the batteries



DANGER

Sparks generated when charging the equipment can cause an explosion.

- Recharge the batteries of the Com box and the data collector only outside the explosion-risk area.



DANGER

Risk of explosion if a wrong USB power cable ("charger") is used!

- Use only the supplied USB power cable ("charger") for recharging the battery of the Com Box type VKPC 40plus Ex

If another USB power cable ("charger") is used parts of the Com Box may be damaged. In this case the equipment is no longer explosion proof.

The correct USB power cable ("charger") and the connection for the USB power cable ("charger") on the Com Box are marked with the stock code number 393081 of the USB power cable ("charger").

Attention!

If the equipment is used after sudden and/or drastic temperature changes condensation may form in the equipment. This can lead to malfunctions or damage.

- After temperature changes leave the equipment switched off until the temperature of the equipment reaches ambient temperature.
- Do not recharge the equipment during this time.

Attention!

Risk of data loss if the equipment is not fully charged.

- Before using the equipment make sure all components are fully charged.
- Recharge the equipment immediately if the state-of-charge indicator on the display of the data collector is red.

If the battery charge is too low the COM Box will switch off automatically. If it is then switched on again without prior recharging the battery may be exhausted completely. The battery may be damaged and data may be lost.

- To avoid this allow the battery to charge for at least 30 minutes before switching the COM box on again.

Before using the equipment for the first time you have to charge the batteries in the Com box and in the data collector.



If the temperature of the battery is too high or too low the charging process of the data collector and the Com Box is stopped automatically to prevent the batteries from overloading.

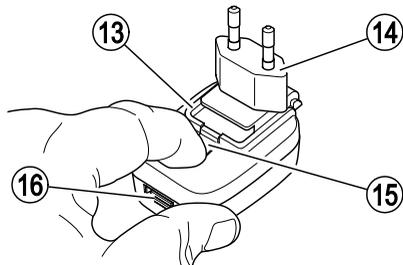
The max. temperature is 35 °C (95 °F), the min. temperature 0 °C (32 °F).

The charging process will continue automatically as soon as the temperature of the battery is again within the admissible temperature limits.

- Charge the battery of the data collector as described in the operating manual for the data collector.

To connect the Com Box to networks with different mains sockets attach the suitable adapter to the power supply unit. To change the adapter proceed as follows:

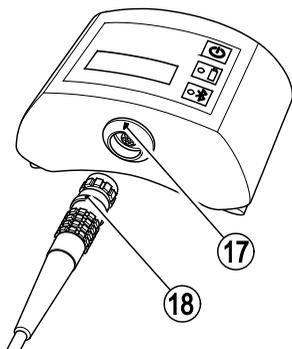
- Press down the locking mechanism (15) of the adapter.
- Detach the adaptor (14) from the power supply unit (13).
- Push the suitable adaptor onto the power supply unit until it latches into place.
- Make sure that the USB connector is firmly plugged into the USB port (16).



The drawing shows the power supply unit for the Com Box (stock code number 393226). The power supply unit (stock code number 393080) can also be used.

To charge the battery of the Com Box proceed as follows:

- Unplug the connecting cable of the measuring probe from the jack (17) in the Com Box.
- Align the marking on the plug of the USB power cable ("charger") (18) with the marking on the jack (17).
- Insert the plug into the jack until it hits a stop.
- Connect the USB power cable ("charger") with the power supply unit to the power supply.



Connecting components

- Take the equipment out of the transport packaging.
- Check the equipment for transport damage.
- Contact the manufacturer if you detect any kind of shipping damage.



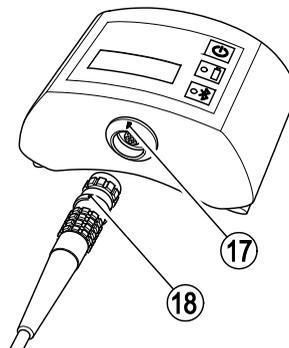
DANGER

Sparks generated when connecting the equipment can cause an explosion.

- Connect the Com box and the measuring probe always outside the explosion-risk area!

To connect the Com box with the data collector proceed as follows:

- Align the marking on the plug (18) with the marking on the jack (17).
- Insert the plug into the jack until it hits a stop.



The back of the Com box is provided with belt straps. If you do not want to carry the Com box during the test procedure you can attach it to your belt or to the supplied strap.

Switching on the equipment

Attention!

If the equipment is used after sudden and/or drastic temperature changes condensation may form in the equipment. This can lead to malfunctions or damage.

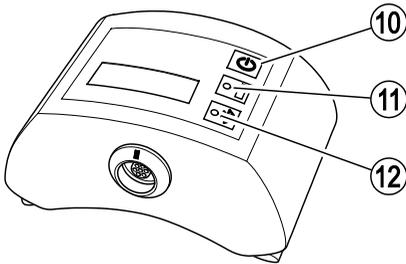
- After temperature changes leave the equipment switched off until the temperature of the equipment reaches ambient temperature.
- Do not recharge the equipment during this time.

➤ To switch the Com Box on press the ON/OFF button (10).

The LEDs (11, 12) on the Com Box light up briefly.

➤ To switch the Com Box off press the ON/OFF button (10) and hold it down for three seconds.

The measuring probe is switched on as soon as it is connected to the Com Box and the Com Box is switched on.



➤ To switch on the data collector press the On/Off button.

Setting up the data collector

Before running a test establish the following settings:

- Language
- Activating Bluetooth function
- Proceed as described in the operating manual for the data collector.

Using TRAPtest software program

➤ To start the TRAPtest program touch the corresponding icon on the display of the data collector.

The main menu appears.

The program name is shown in the title bar. The button next to it to the right opens the submenus.

- To open the submenus touch this button.
- To obtain information on the manufacturer of this program touch the entry "Imprint".
- To view a list of abbreviations touch the entry "Terms and Definitions".
- To pair the data collector with the Com Box via Bluetooth touch the entry "Bluetooth".

The pairing procedure is described on page 17.

The status of the Bluetooth pairing with the data collector and the battery charging status are shown underneath the title bar. The charging status of the Com Box ("VKPC") will only be indicated if the Com Box is paired with the data collector.

Below the status indicator are command buttons for the program. The "Data Transfer" button will only be indicated if the data collector is connected to a computer.

- To view a list of test jobs touch the "Test Jobs" button.
- To start a quick test touch the "Quick Check" button .
- To transfer data to a computer touch the "Data Transfer" button .
- To view information on the program touch the "Info" button .
- To exit the program, touch the "Exit" button .

- Confirm the security enquiry to exit the TRAPtest program.

For more detailed information on the functions refer to the following chapters.

Establishing a Bluetooth connection

To establish a Bluetooth connection for data transfer between the data collector and the Com Box ("pairing"), proceed as follows:

- Switch on the data collector.
- Make sure that the Bluetooth connection to the data collector is active.
- Start the TRAPtest program.
- Switch on the Com Box.
- Touch the "Menu" icon.
- Select the submenu item "Bluetooth".

The submenu "VKPC Pairing" will open up.

- To find Bluetooth sources in the signal reception area touch the "Start Bluetooth Scan" button.

The display shows "Searching VKPC" The data collector is searching for Bluetooth sources in the signal reception area.

When the search run has stopped the Com Boxes with their respective device names and serial numbers will be shown. The device name is "VKPxyz". The serial number "xyz" corresponds to the number indicated on the name plate of the Com Box.

- To pair the data collector with the desired Com Box touch the corresponding entry.



You can establish only one data connection between the Com Box and a data collector.

- Touch the "Continue" button.

A password dialogue box opens up. The password for the Com Box is "1234".

- Enter the password as described in the operating instructions for the data collector.

The two devices are being paired. The display indicates "Connected VKP" as well as the type and serial number of the Com Box. The charge of the Com Box is shown.

Should an error occur during the pairing routine, the message "Error during pairing" is shown.

- In this case repeat the pairing routine.

Installing the program on a PC

To create test objects and to evaluate the tests you have to install the supplied software on your computer.

To install the software on a computer the following system requirements must be met:

- Operating system: Microsoft Windows® 7 SP1 or higher
- SQL Server® 2014 LocalDB
- Microsoft .NET Framework 4.0.2 or higher
- Microsoft Windows® Mobile Device Center
- 4.2 GB free hard disk memory
- at least 4 GB RAM

Attention!

Data from older program versions may be lost when a new version is installed.

- Back up all existing data before installation.

- Back up all data from older program versions that you do not want to delete.
- Close all other applications on your computer.

To install the software on your computer you must have full administrator rights.

- Connect the supplied data carrier to your computer.

For more information on how to install the PC program refer to the "ReadMe" file on the data carrier.

The installation program should start automatically. If the autostart function has been deactivated, start the installation program manually. To do so proceed as follows:

- Find the "SETUPW.exe" installation file on the data carrier.
- Double-click on the installation file.

The installation program starts.

- Follow the on-screen prompts to complete the installation.

A "GESTRA" folder is created during installation in which the program files are stored.

A program icon is shown on the desktop.

Establishing test objects on the computer

- To start the TRAPtest program double-click on the program icon.

For more information on the PC program see the operating instructions for the PC program.

- Specify the test objects as described in the operating manual for the software program.
- Download the test jobs to the data collector as described on page 18.

Establishing test objects on the data collector

You can also enter test objects directly in the data collector. After the test you can upload these test objects to the computer.

In order to do so run and save the test as "Quick Check". To make it easier to relate the test to the test object later on the computer, you should note the reference number of the respective quick check.

This procedure is more time consuming than using pre-defined test objects. You should therefore use the quick check option only in exceptional cases.

We recommend quick checks only in the following cases:

- ▶ To add test objects that are not yet defined in the data base
- ▶ To repeat tests several times for a more accurate identification of a faulty trap
- Perform the quick check as described on page 26.
- Note all necessary data of the test object.

You will find a template in the file "Data records.doc" under "Programs/GESTRA/TRAPtest_VKP" on your computer.

- After the test touch the "Save" button.

- Write down the indicated storage number.

The test result is stored under the test job "9999".

This test job is not allocated to any company.

- To assign the quick check test results to a company in the data base on the computer follow the instructions given in the operating manual for the PC software program.

Transferring data between the data collector and computer



The TRAPtest program uses the developer setting "USB debugging" of the data collector. The developer settings must therefore remain enabled.

When you transfer data for the first time the option "USB debugging" is shown.

- To enable data transfer, touch the "OK" button.

To transfer data between the data collector and the computer, do the following:

- Start the PC program on your computer.
- Switch on the data collector.
- Select the TRAPtest program on the data collector.
- Use the supplied USB cable to connect the data collector to the computer.
- If the data link between the data collector and the computer is active, the "Data transfer" button is enabled.
- Touch the "Data transfer" button on the data collector.

The display of the data collector shows a data transfer message.

- To return to the main menu, touch the "Exit" button.

Performing tests

- Start the TRAPtest program.

The main menu appears. For more information on the main menu see page 16.

- To start a test touch the "Test Jobs" button .

The procedure how to test a steam trap is described on page 19.

- To perform a quick check touch the "Quick Check" button.

The procedure how to perform a quick check is described on page 26.

- To switch the Com Box on briefly press the ON/OFF button.

For information on the indicating facilities of the Com Box see page 16.

The measuring probe is switched on as soon as it is connected to the Com Box and the Com Box is switched on.

Selecting test object on data collector

With the aid of the menu item "Test job" you can check steam traps for loss of live steam. For this purpose first you have to create test jobs on your computer and download them to the data collector.

The data collector must have a Bluetooth connection to the respective Com box.



You can also perform ad hoc tests without having to create test jobs beforehand. For this purpose open the menu item "Quick Check". For more information see page 26.

- Open the TRAPtest program.
- Touch the "Test Job" button.

A list of all specified test jobs appears. For each test job the serial number, the name of the plant and the name of the plant section are indicated.

- To select a test job touch the respective test job.

The following information on the selected test job will be shown:

- ▮ Serial no. of test job
- ▮ Name of the plant
- ▮ Name of the plant section
- ▮ Number of steam traps per test job

For each steam trap in a test job the following additional information is given:

- ▮ Place of installation

▮ Type designation

The steam traps of a test job that have already been tested are ticked off with a green check mark.

These steam traps cannot be tested again within this test job. For these steam traps only the test results are shown. The buttons for other functions are deactivated.



Once the test job is completed, the respective number will be highlighted in green.

- To select a steam trap, touch the respective entry.

If a steam trap has not yet been tested the submenu "Test" opens. The display shows the message "...waiting for VKPS data". You can either start a test or enter a comment.

- To enter a comment for the selected steam trap touch the "Comment" button.

For more information see page 25.

- To start the test firmly press the sensor tip onto the test object.
- Perform the test.

The test result will be shown. You can save the test result or repeat the test.

- To save the test result touch the "Save" button.
- To repeat the test touch the "Repeat" button .

Checking steam trap



DANGER

Risk of explosion if the pipeline to be tested is carrying voltage.

- Before starting the test make sure that no part of the pipeline is carrying voltage.

You can achieve this e.g. by earthing the pipeline.



DANGER

Risk of explosion due to spark-over.

- Do not use any items in the explosion-risk area that could generate sparks.
- Do not use the supplied file!

-
- Select a steam trap as test object as described on page 19.
 - Make sure that the test point is not covered by paint or dirt.
 - Be sure to use the same test point that you used for the last tests.
 - If necessary, mark the test point on the steam trap.

The identification tags help allocating the test objects to the respective data in the data collector.

You can order more identification tags (stock code number 389315) from the manufacturer.

Attention!

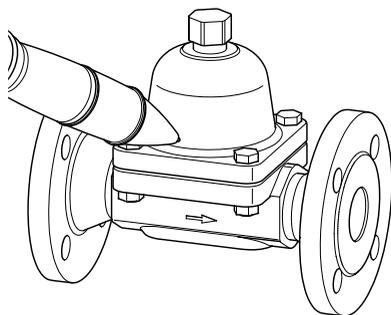
If the measuring probe does not touch the trap firmly at the right position and angle the readings may be incorrect.

- Make sure the sensor tip of the measuring probe touches only a bare metallic surface.
 - Make sure the sensor tip touches always the same test point.
 - Make sure the sensor tip is perpendicular to the surface of the steam trap when it touches the test point.
-

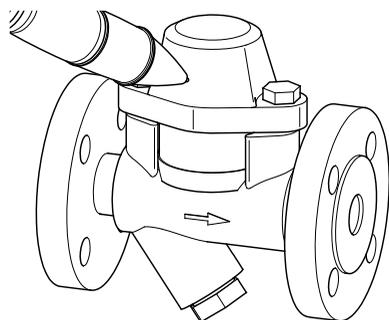
If you want to check a thermostatic steam trap, the sensor tip must touch the steam trap at one of the following points:

- ▶ the area between the cover and the cover flange
- ▶ the side of the cover

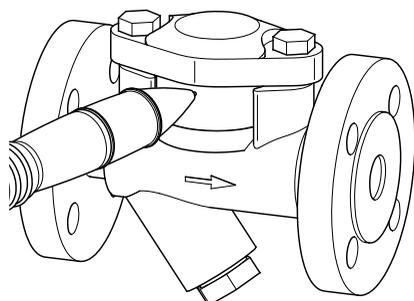
Examples of test points on thermostatic steam traps



Steam trap type BK 45 with bimetallic regulator



Steam trap type BK 15 with bimetallic regulator

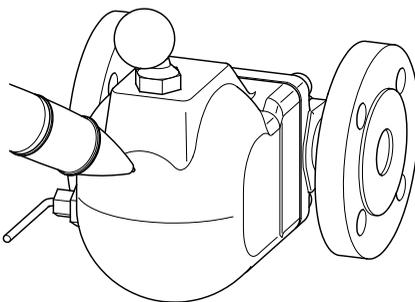


Thermostatic steam trap type MK 45 with membrane regulator

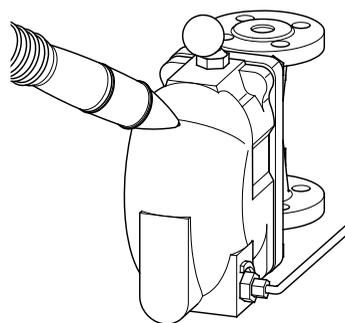
If you want to check a float trap, the sensor tip must touch the steam trap at one of the following points:

- ▶ the highest point of the cover
- ▶ the side of the cover

Examples of test points on ball float traps



Ball float trap type UNA 1



Ball float trap type UNA 2

- Position the sensor tip perpendicular onto the test point.
- Press down the sensor tip until it hits a stop.

The test commences. The LED on the measuring probe is illuminated.

During the data transfer from the Com Box to the data collector the blue LED on the Com Box is pulsing. The display of the data collector shows the message "... Test running".

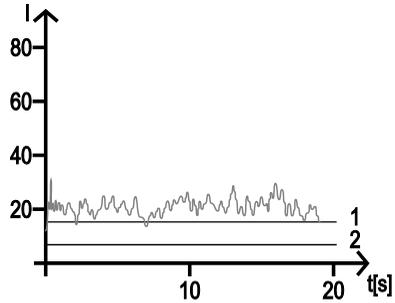
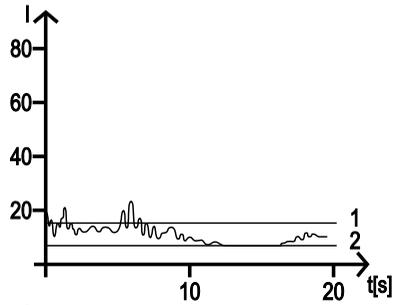
If the measured noise level reaches the threshold value within 10 seconds, the test will be automatically finished after 10 seconds.

If not, the test will automatically end after 20 seconds.

After the test the readings and results are shown graphically and in plain text.

The following graphical representation shows two example test results:

- ▶ The upper diagram shows the test results of a steam trap in good working condition.
- ▶ The lower diagram shows the test results of a faulty steam trap.



Item no.	Abbreviation	Description
1	LV	Limit sound value (LV)
2	TV	Threshold value

The following test results are possible:

Message	Description
Steam trap O.K.	The test object is in good working condition and not leaking steam.
Defective	The test object is faulty. Authorize qualified personnel to replace the faulty steam with a new one.
FN (foreign noise)	The test object is affected by foreign noise. Consequently, the test results are distorted. Perform a foreign noise measurement (see page 26).
BC (banking-up of condensate)	The test object may be waterlogged. (This option is only available if the required operating pressure of the test object was entered in the system.) Authorize qualified personnel to check the plant parameters and the steam trap settings.
Cold	The temperature of the test object is below 40 °C. Check the condition of the installation. Repeat the test when the test object is operating.
Check	The mean value of the measured sound exceeds the limit sound value. In addition one of the following conditions exists: <ul style="list-style-type: none"> ● The temperature of the test object is below 40 °C. ● The specified operating pressure of the test object does not match the measured temperature. ● The place of installation "Heat Exchanger" was selected. Authorize qualified personnel to check the plant parameters and the settings of the test object .
Comment	There is a comment on the test object. Read the comment.

If faults occur during the test procedure one of the following messages will be indicated:

Message	Description
Abort!	The test was stopped by touching the "Back" button. Repeat the test.
Error!	An error occurred during the data transfer from the Com Box. Check the Bluetooth connection shown on the display. Check the connecting cable of the measuring probe. Repeat the test. Should this error occur again have all equipment components tested by the manufacturer.
Check sum!	A check sum error occurred during the data transfer from the Com Box. Check the Bluetooth connection shown on the display. Check the connecting cable of the measuring probe. Repeat the test. Should this error occur again have all equipment components tested by the manufacturer.
Tip without contact	During the test the sensor tip was lifted off and lost contact with the test object. As a result the test was interrupted. Press the sensor tip firmly onto the test object. Continue the test.
Timeout!	Timeout occurred during the data transfer from the Com Box. Check the Bluetooth connection shown on the display. Check the connecting cable of the measuring probe. Repeat the test. Should this error occur again have all equipment components tested by the manufacturer.
...awaiting VKPS data	The sensor tip does not have contact with the test object. Testing has not yet started. To start the test firmly press the sensor tip onto the test object.

- To repeat the test touch the "Repeat" button .
- To save the test result in the data collector touch the "Save"button.

A green check mark indicates that the respective steam trap has been tested.

- To return to the main menu without saving the test results touch the "Back" button .

Entering comments

If a steam trap has not been checked yet you can enter and save a comment on the test object.

The available comments are explained in the following table. Most comments allow checking the test objects.

Comment	Description
Test object not installed	The test object has been removed from the plant.
Test object out of operation	The test object is not operating.
Incorrect designation	The test object and its name in the test job do not match. Change the test job and the operating data.
Seal defective	A sealing gasket in the test object is defective. Replace the gasket with a new one.
Installed incorrectly	The test object is installed incorrectly. Install the test object in its correct mounting position.
Test object cold	The fluid temperature in the test object is cold. Check the parameters of the plant and the settings of the test object.
Not accessible	The test object is not accessible for testing because of its location. Install the test object in a different position.
Wrong type	The test object is of a different type than specified in the data base. Change the specification in the data base. You can also change the trap type before starting the test.
Test object insulated	The insulation lagging of the test object makes the test point inaccessible. Remove the lagging at the test point.
Shut-off valve faulty	The shut-off valve for the test object is defective. Replace the shut-off valve with a new one.
Shut-off valve closed	The shut-off valve for the test object is closed. Open the shut-off valve.
Test object O.K.	The test object is in good working condition and not leaking steam. The test object is not waterlogged, i. e. no banking-up of condensate. You may perform a test.
Test object faulty	The test object has failed open and is blowing off too much steam.

- To enter a comment touch the respective entry.
- To test a steam trap with a faulty seal touch the "Save" button.
- To test a steam trap of the wrong type select the respective trap type stated in the list.
- Then touch the "Yes" button.

Measuring foreign noise (FN)

The ultrasonic test can be affected by foreign noises. If the mean value of the measured noise exceeds the preset noise limit, the message "Foreign noise test" pops up on the display.

In this case proceed as follows:

- Measure the sound intensity at various points upstream and downstream of the test object.
- Compare the measured sound intensity with the mean value of test result.

If the measured sound intensity is below the mean value, the test was not impaired by foreign noise.

- In this case select the item "Foreign noise NO" in the menu.

For more information on the test results see table Test Results in Chapter "Performing Tests".

- To save the test result in the data collector touch the "Save" button.
- Observe the notes on the test results given in the table.

If, however, the measured sound intensity is above the mean value, the test was impaired by the foreign noise.

- In this case select the item "Foreign noise YES" in the menu.

For more information on the test results see table 'Test Results' in Chapter "Performing Tests".

- To save the test result in the data collector touch the "Save" button.
- Observe the notes on the test results given in the table.

Performing a quick check

The menu item "Quick Check" allows you to perform tests without first having to create a test job on the computer. This is the best option for newly mounted or modified traps. You can repeat a quick check as often as necessary. It makes sense to do this if you want to detect and diagnose faults.

The test results of the quick check can also be saved. In this case the test is automatically added to the test job "9999".

- Open the TRAPtest program.
 - Touch the "Quick Check" button.
- Buttons indicating the possible places of installation "Steam tracers", "Steam line" and "Heat exchanger" pop up.

- Touch the button with the desired place of installation.

Buttons indicating the different types of steam traps pop up. The following trap types are available:

- bimetallic
 - capsule with membrane regulator
 - ball float trap
 - inverted bucket trap
 - thermodynamic
- Touch the button with the desired trap type.

The selection menu "Operating pressure" will be shown.

- Touch the item indicating the desired operating pressure.
- If you do not want to enter a saturated steam temperature, touch the entry "Bar ((or PSI))???" (pressure unknown)".

The operating pressure will be saved. This pressure will then be shown with the next quick check

- Perform the test as described on page 19.
- To save the test result touch the "Save" button.

The display shows the reference number. This reference number helps allocating the test results later in the PC program.

- Write down the storage number.

You can use the quick check option to create a new test object or a test object with modified features. If you want to create a new test object in the PC program you have to enter additional information. If you data log important test information, it will be easier to enter the test object afterwards into the data base,

- Note down all other essential details necessary for creating a test object.

You will find a template in the file "Data records.doc" under "Programs/GESTRA/TRAPtest_VKP" on your computer.

- To complete the test measurement and return to the main menu touch the "Continue" button.

Evaluating the test results on a computer

You can use your computer to evaluate and interpret the test results. For this purpose the supplied PC program must be installed on your computer. To upload the data to your computer you have to connect the data collector to the computer.



For more information see the operating instructions for the PC program.

After operation

Switching the equipment off

- To exit the TRAPtest program, touch the "Exit" button in the main menu.

Data that have not been saved are stored in the flash file system of the data collector. The TRAPtest program is closed.

- To switch the data collector off press and hold down the ON/OFF button on the data collector for three seconds.
- To switch the Com box off press the ON/OFF button and hold it down for three seconds.
- Charge the batteries of all components as described on page 13.

Maintaining the equipment

The equipment does not require any particular maintenance.

Removing external dirt deposits

Attention!

If fluids penetrate the equipment it may get damaged.

- Make sure that fluids cannot get into the equipment.
- Use only a slightly moistened cloth to clean the equipment.

-
- To remove dirt deposits rinse the equipment with fresh water and wipe it with a clean, lint-free cloth.
 - To remove any persistent residues use a cleaning agent that is suitable for the material and carefully wipe the equipment with a clean, lint-free cloth.

Checking the component parts for damage

- Be sure that all components are in good working condition before and after using them.
- Do not use damaged or defective components.
- Replace any damaged or defective component.

Servicing the equipment and installing spare parts

Any defective component must be replaced with a new one.

Designation	Stock code #	
	VKP 41plus	VKP 41plus Ex
Data collector	393133	393120
Com Box	393079	392997
Power supply unit for Com Box (PSU, adapter)	393226	
USB power cable / charger type VKPA 40plus for Com Box	393081	
Measuring transducer (=probe) type VKPS 40Ex	392995	
Charging set with four adaptors for data collector	393199	393199
USB cable for data collector	393126	–
USB cable with safety box for data collector	–	393122
Identification tags	389315	

Troubleshooting

Problem	Cause	Remedy
The Com Box cannot be switched on.	The battery of the Com Box is flat.	Recharge the battery of the Com Box only outside the explosion-risk area.
	The battery of the Com Box is defective.	Return the Com Box to the manufacturer to get a new one.
The data collector cannot be switched on.	The battery of the data collector is flat.	Recharge the battery of the data collector only outside the explosion-risk area.
	The battery of the data collector is defective.	Return the data collector to the manufacturer to get a new one.
There is not Bluetooth connection between the Com Box and the data collector. The blue LED on the Com Box is not illuminated. The display states "Pairing error".	The Bluetooth connection (pairing) has been interrupted or could not be established.	Establish a Bluetooth connection by pairing the Com Box with the data collector.
	The Bluetooth transfer on the data collector has been deactivated.	Activate the Bluetooth transfer on the data collector as described in the operating manual issued by the manufacturer.
The LED on the measuring probe is not illuminated.	The measuring probe was not positioned correctly onto the trap.	Put the measuring probe vertically onto the test object. Press down the sensor tip until it hits a stop.
	The LED is defective.	Return the measuring probe to the manufacturer to get a new one.
The data collector did not receive the test results.	The connection is interrupted because the permissible range has been exceeded.	Reduce the distance between the data collector and the Com Box. Establish a Bluetooth connection between the Com Box and the data collector. Repeat the test.
The data collector did not receive the test results. Error "13" is indicated.	The equipment is defective or has a malfunction.	Return the Com Box and measuring probe to the manufacturer for inspection. If a component is faulty get a new one from the manufacturer.
It is hard or impossible to press the sensor tip inwards.	The sensor tip is bent.	Return the measuring probe to the manufacturer to get a new one.
The LED on the USB power cable ("charger") is illuminated red.	A fault occurred during charging.	Detach the USB power cable ("charger") from the Com Box and the power supply. Repeat the charging process.

- If faults occur that are not listed above or cannot be corrected, please contact our Technical Service or authorized agency in your country.

Putting the equipment out of operation

Removing the equipment

- Switch off the data collector and the Com box.
- Outside the explosion-risk area detach the connecting cable of the measuring probe from the jack in the Com box.
- If necessary recharge the data collector and the Com box.
- Store the equipment as described on page 13.

Disposing of the equipment

The equipment is made from the following materials:

Component part	DIN / EN
Data collector	See operating instructions for the data collector
Body of the measuring probe	3.7035
Housing of the Com Box	ABS (acrylonitrile butadiene styrene)
Identification tags	1.4301
Transportation case (hard case)	Aluminium / plywood / TCN film / foamed plastic / cardboard
Carrying bag	Nylon Cordura fabric Samoa

The equipment and its components contain electronic parts that must be disposed of separately.

- Send the equipment with all components back to the manufacturer.

Technical data

Dimensions and weights

Components	VKP 41plus		VKP 41plus Ex	
	Dimensions (H × B × T) [mm]	Weight [g]	Dimensions (H × B × T) [mm]	Weight [g]
Transportation case (hard case), without content	173 × 450 × 340	4,900	173 × 450 × 340	4,900
Transportation case (hard case), cpl. with content		approx. 6,500		approx. 7,250
Carrying bag, without content	320 × 300 × 40	330	320 × 300 × 40	330
Carrying bag, cpl. with content		approx. 1,300		approx. 2,150
Data collector	137 × 72.1 × 20.8	290	137 × 72.1 × 26.9	370
Com-Box	83.0 × 96.0 × 32.0	160	83.0 × 96.0 × 32.0	approx. 560
Measuring probe (diameter × length)	36 × 210	440	36 × 210	440

Pressure & temperature ratings

Components	Service temperature [°C]	Storage temperature [°C]	Air humidity
Data collector ¹	-20 to +50	-10 to +50	0–95 % (not condensing)
Com Box ¹	-10 to +50		
Hand-held measuring probe (measuring transducer)	-10 to +60		

1 Charging temperature: 0 to +35 °C

Min. upstream pressure for temperature measurement	1.1 bar
Max. differential pressure	20 bar
Bluetooth range distance	8 m
Capacity of batteries ("battery life")	Data collector: approx. 8 h Com box: approx. 8 h

Manufacturer's declaration

For more information on the Conformity Assessment according to European rules refer to our Declaration of Conformity or our Declaration by Manufacturer.

To download the current Declaration of Conformity or Declaration by Manufacturer go to www.gestra.com/documents or contact:

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This declaration is no longer valid if modifications are made to the equipment without consultation with us.



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