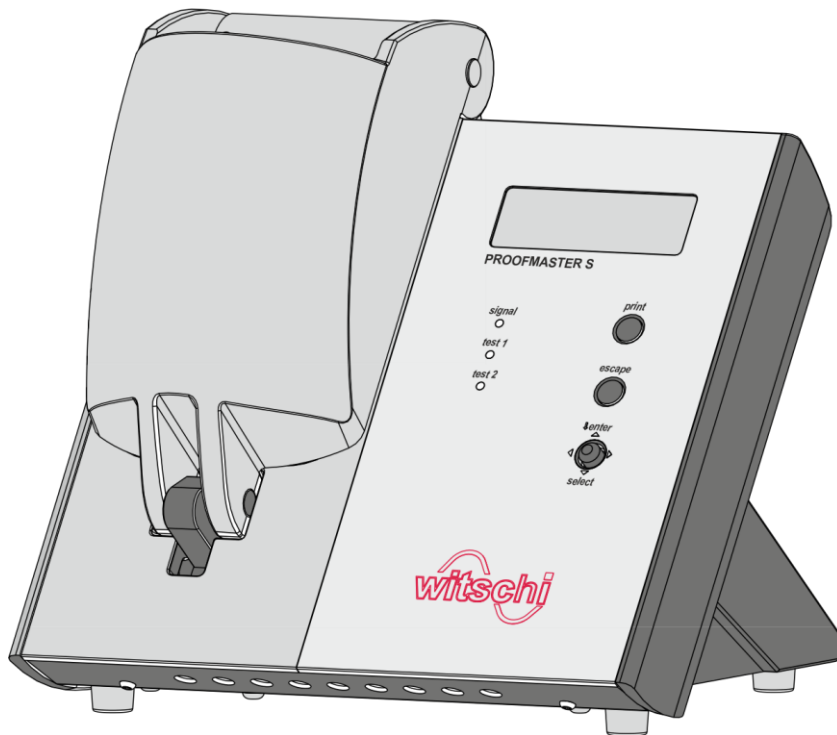




LEADING SWISS PRODUCTS

Operating instructions

Tightness testing device
Proofmaster S



Read the instructions prior to performing any task!

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Wits-25992-CH, PM S_en

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About this manual

This manual enables safe and efficient handling of the leak tightness testing device Proofmaster S (referred to in the following as “device” or “Proofmaster”). The manual is part of the device and must be kept near the device where it can be accessed by personnel at all times.

Personnel must have carefully read through and understood this manual before starting work. The basic prerequisite for safe work is compliance with all the safety indications, warnings and instructions specified in this manual.

In addition, the local health and safety regulations and general safety rules for the area in which the Proofmaster is used apply.

Illustrations in this manual are intended to aid basic understanding and may deviate from the actual design.

Copyright

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Customer service

Your point of sale can provide you with technical information.

You can find your nearest point of sale on our website
"<http://www.witschi.com/de/firma/vertretungen>"

We are also always interested in hearing from you about your experiences of using the device and any information that could help us improve our products.

Customer service information

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1 Overview

1.1 The Proofmaster

Overview

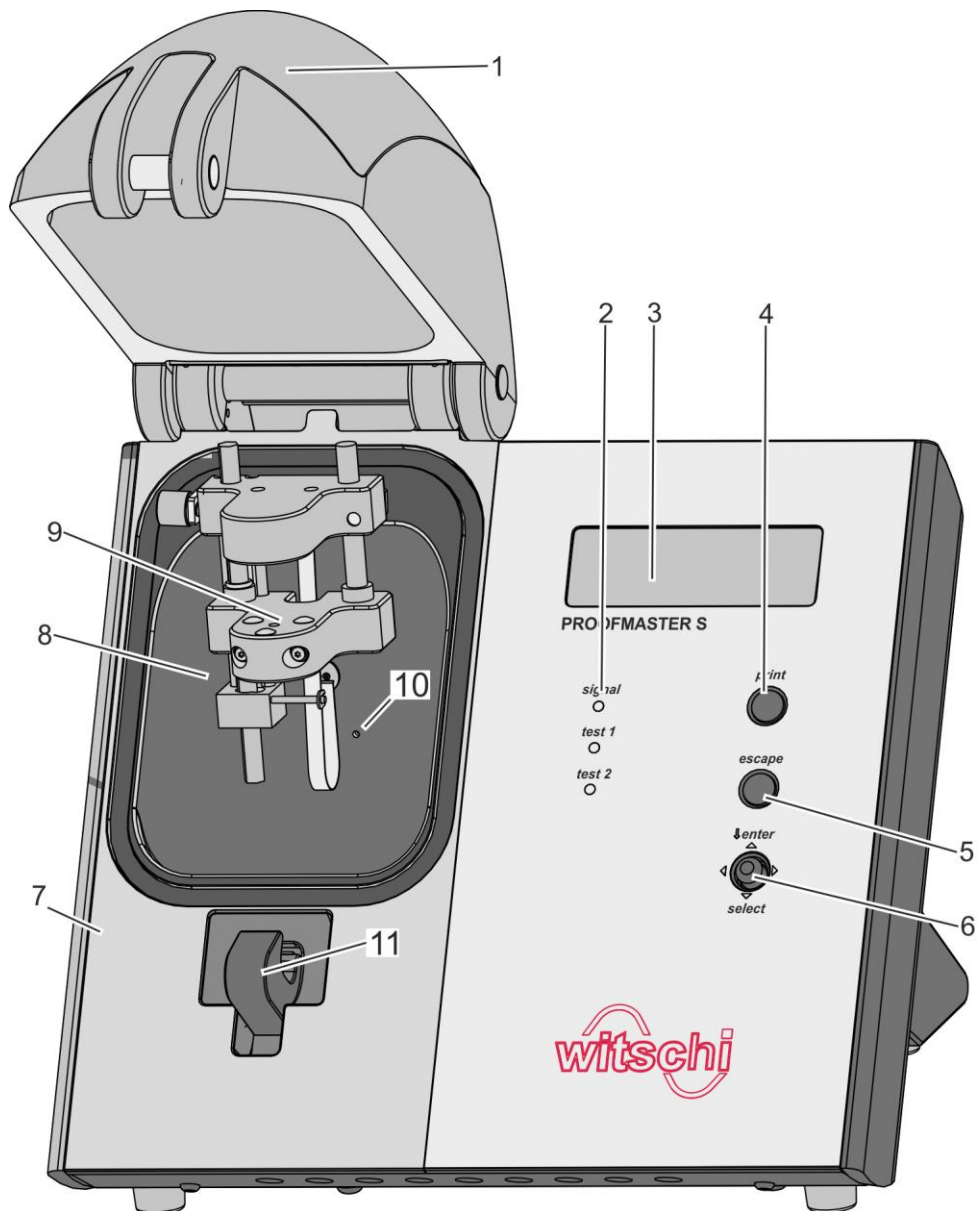


Fig. 1: Proofmaster S

- | | | | |
|---|-----------------|----|---------------------------------|
| 1 | Bell cover | 7 | Base |
| 2 | LED displays | 8 | Test chamber |
| 3 | Display | 9 | Test point |
| 4 | [print] button | 10 | Compressed air inlet and outlet |
| 5 | [escape] button | 11 | Catch |
| 6 | Cursor | | |

Overview

Description

The Proofmaster checks watches for water resistance. To do so, the watch is subjected to positive or negative pressure and the watch is deformed in a controlled manner.

This deformation forms the basis for measuring:

Leak-tight watch

- The deformation remains constant at a constant pressure.

Leaky watch

- The deformation reverts at a constant pressure.
- There is pressure equalisation between the pressure in the test chamber and the pressure in the watch housing.
- The faster the deformation reverts, the larger the leak in the watch case.

After the test, a leaky watch can be prepared for the water test. The water test makes it possible to localise the point of leakage. In this test, the Proofmaster builds positive pressure in the watch case. The operator then submerges the watch in a vessel containing water. The pressure inside the watch escapes, creating rising bubbles in the water. Their point of origin indicates the point of leakage.



For further information about the functional principle, see [Chapter 3.5 'Test procedure' on page 30](#).

Connections and interfaces

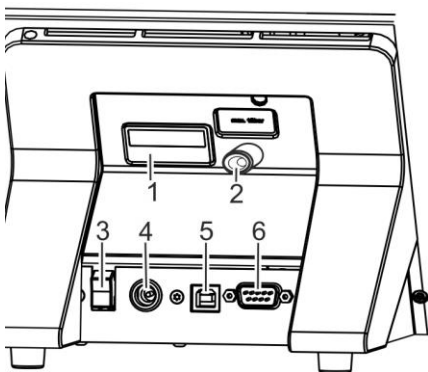


Fig. 2: Reverse

No.	Designation	Function
1	Rating plate	Identifying the device ↪ page 74
2	Compressed air connection	Plug-in coupling for compressed air hose
3	[I/O] switch	Switching the Proofmaster on/off
4	Mains connection	Connection socket for the power supply unit
5	USB port	Connection point for a computer
6	RS232 port	<ul style="list-style-type: none"> ■ Connection point for the printer ■ Connection point for a computer

1.2 Scope of delivery and accessories

Scope of delivery



Fig. 3: Scope of delivery

No.	Designation	Function	For details, see
1	Proofmaster		
2	Dust cover	Protects the Proofmaster against build-up of dust	☞ page 28
3	Compressed air hose	Connection to compressor	☞ page 26
4	Power supply unit (9V ~ 1.2A)	Connection to electricity supply	☞ page 26
5	USB connection cable	Connection to computer	☞ page 28
6	3 watch underlays	For stabilising the watch during the test	☞ page 27

Overview

Not shown in Fig. 3 but included in the scope of delivery:

- 1 manual
- 1 calibration certificate
- 1 warranty information
- 1 information sheet for the demo software

Accessories

Designation	Additional information	Order number
Compressor	<ul style="list-style-type: none"> ■ Output pressure: maximum 12 bar ■ Output pressure to enable full use of the device: 11 bar ■ Pressure vessel volume: min 4 l ■ Additional requirements: ↪ <i>page 29</i> 	Compressor JunAir 6-10: <ul style="list-style-type: none"> ■ 97.91.103 (230 V~) ■ 97.91.104 (115 V~)
Witschi thermal printer	Required to print out the test results if no computer is used (↪ <i>page 29</i>).	JB01-SLK-TE25-S
"Auto-Print" software	Required if the test results are printed out via a printer connected to a computer (↪ <i>page 29</i>).	64.55.901PK1
"Proofmaster M/S" software	Required if the test results are to be evaluated on a computer (↪ <i>page 29</i>).	64.50.792PK1



Ordering information

To order accessories or spare parts, contact your point of sale (↪ *page 3*).

You can find your nearest point of sale on our website "<http://www.witschi.com/de/firma/vertretungen>"

2 Safety

This section provides an overview of all the important safety aspects that ensure personal protection and safe and trouble-free operation. There are additional, task-specific warnings in the sections on the individual lifecycle phases.

2.1 Symbols in this manual

Safety indications and warnings

Safety indications and warnings are identified by symbols in this manual. The safety indications and warnings are introduced by signal words that indicate the extent of the hazard.

**DANGER!**

This combination of symbol and signal word indicates an imminently hazardous situation that will entail death or serious injury if not avoided.

**WARNING!**

This combination of symbol and signal word indicates a potentially hazardous situation that can entail death or serious injury if not avoided.

**CAUTION!**

This combination of symbol and signal word indicates a potentially hazardous situation that can entail minor injury if not avoided.

**NOTICE!**

This combination of symbol and signal word indicates a potentially hazardous situation that can entail material damage if not avoided.

**NOTICE!**

This combination of symbol and signal word indicates possible hazards to the environment.

Safety

Warnings in instructions

Warnings may relate to specific, individual instructions. Warnings of this kind are embedded in the instruction so that they do not distract the reader's attention while performing the action in question. The signal words described above are used.

Example:

1. Loosen screw.

2.



CAUTION!
Risk of pinching on the cover!

Close the cover carefully.

3. Tighten screw.



Tips and recommendations



This symbol draws attention to useful tips and recommendations and to information that helps ensure efficient and trouble-free operation.

Additional labels

The following labels are used in this manual to draw attention to instructions, results, lists, references and other elements:

Label	Explanation
 1., 2., 3. ...	Step-by-step instructions
⇒	Results of actions
	References to sections of this manual and other documents
■	Lists without a fixed order
[Pushbutton]	Control elements (e.g. pushbuttons, switches), display elements (e.g. signal lamps)
"Button"	Screen elements (e.g. names of windows, buttons)

2.2 Intended use

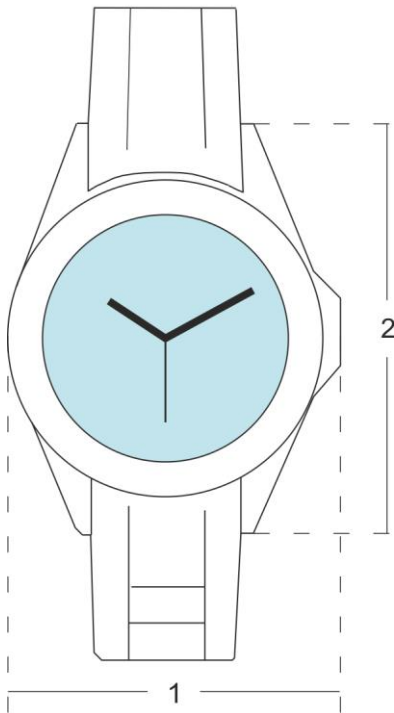


Fig. 4: Maximum size of watch

The “Proofmaster” water resistance testing device is used only to test the water resistance of watches using positive and negative pressure.

The Proofmaster can test both digital watches and analogue watches or pocket watches, taking into consideration the water resistance specifications created by the manufacturer of the watch.

In addition, the Proofmaster can build up positive pressure in the case of a leaky watch to then localise the point of leakage in the water test.

The device is designed for watches with the following maximum size:

- Diameter: 70 mm (Fig. 4/1)
- Thickness: 28 mm
- Width: 85 mm (Fig. 4/2)

The intended use includes compliance with all the information in this manual.

Any use beyond or other than the intended use shall be considered misuse.



WARNING! **Danger in the event of misuse!**

Misuse of the Proofmaster can result in hazardous situations.

- Never place any objects other than watches in the device.
- Never connect a compressor with an output pressure of more than 12 bar.
- Only operate the device on a stable and horizontal surface.
- Never set up or operate the Proofmaster in an explosive atmosphere.

Safety

2.3 Safety signs



WARNING!

Danger in the event of unreadable signage!

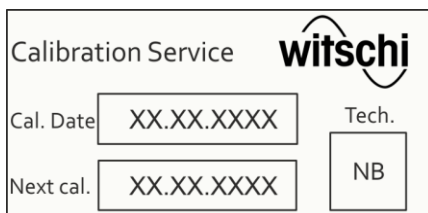
Over time, labels may become dirty or illegible for other reasons, with the result that hazards are not recognised and necessary operating instructions are not followed. This leads to a risk of injury.

- Always keep safety indications and calibration instructions in a clearly legible state.
- Immediately replace any damaged labels.

2.3.1 Labels on the device

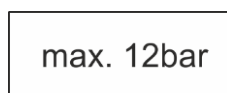
The following labels can be found on the device.

Calibration instruction



The calibration instruction on the underside of the device shows when the device needs to be recalibrated. To ensure reliable measuring results, we recommend observing the proposed date for the next calibration.

Max. inlet pressure



This label indicates the connection point for the compressed air supply. The maximum inlet pressure must not exceed 12 bar.

Electrical and electronic components



Electrical and electronic components in the device contain toxic substances. The device must therefore be handed over to a municipal collection point for disposal or be disposed of by a specialist.

2.3.2 Labels on the power supply unit

The following labels can be found on the power supply unit.

Electrical and electronic components



The power supply unit must not be disposed of as household waste, it must be handed over to a municipal collection point or be disposed of by a specialist.

Protection class 2



The power supply unit has a reinforced or double insulation.

2.4 Residual risks

Compressed air



WARNING!

Risk of injury from compressed air!

An uncontrolled release of compressed air may cause injuries.

- Do not exceed the maximum inlet pressure of 12 bar.
- Take care when working on the compressor and the compressed air hoses.
- Make sure that the compressed air hose is not subjected to any external loads. Specifically, this means that the compressed air hose must not come into contact with sources of heat, oils or greases and it must not be driven over, kinked, pinched or subjected to excessive tensile loads.
- Never force open the device's bell cover.
- Always check the compressed air hose before use.
- Before shutting down the device, completely disconnect the compressed air supply.
- Observe the documentation from the manufacturer of the compressor.

Safety

Cracked glass



WARNING!
Risk of injury from cracked glass!

Leaky watches may absorb the positive pressure fed in during the test. In this case, there will be positive pressure within the watch after the test. This can lead to the glass in the watch splintering or cracking. This can result in serious eye injuries or even loss of sight.

- If this manual requires you to wear safety goggles when performing an activity, do so.
- Make sure that any other people in the room are at an appropriate distance from the device.

Moving parts



WARNING!
Risk of injury from moving parts!

Moving parts inside the device can cause serious injury or loss of limbs.

- Never open the device housing yourself.
- If the device has any defects, return it to the manufacturer without delay.

Risk of crushing



WARNING!
Risk of crushing when closing the bell cover!

When closing the bell cover, there is a risk of crushing between the bell cover and the device housing.

- Before closing the bell cover, make sure that no parts of the body or other objects are within the closing area.

2.5 Risk of material damage

Short-circuit


NOTICE!
Property damage due to short-circuit!

Damage to the insulation on the power supply unit cable or the power supply unit can result in a short-circuit and damage the Proofmaster.

- Only allow the customer service to perform work on the Proofmaster's electronics.
- If the power supply unit cable or power supply unit are damaged, pull out the power supply unit plug and have the unit repaired.
- Route the power supply unit cable so that it cannot be damaged by external influences.
- Before any cleaning, maintenance or troubleshooting work, pull out the power supply unit plug.
- When disconnecting the power supply unit, only pull on the plug itself, never pull on the cable.
- Always keep access to the power socket clear.
- Keep moisture away from live parts. Moisture can result in short-circuit.
- Never immerse the device in water.

Opening the housing


NOTICE!
Material damage due to opening the housing!

Opening the housing causes a risk of damaging components inside the device or damaging the housing.

- Never open the device housing yourself.
- In the event of malfunctions or problems that cannot be solved with the help of this manual, contact the manufacturer.



Opening the housing results in a loss of warranty.

Safety

Unclean compressed air



NOTICE!

Material damage due to the use of unclean compressed air!

Using unclean compressed air causes a risk of damaging the device.

- Only use oil-free, dry and dust-free air.
- Make sure that no condensation water can enter into the device in the compressed air.
- Service the compressor at regular intervals according to the manufacturer documentation.

Excessive test pressure



NOTICE!

Material damage due to excessive test pressure!

Applying excessive test pressure can damage the watch being tested or the Proofmaster.

- Do not exceed an inlet pressure of 12 bar.
- Make sure that the watch is designed for the applied pressure.
- If watches have specifications regarding the maximum water depth, only test them up to that pressure. The following applies: 10 m water depth = 1 bar.
- Test waterproof wristwatches without any specification with a maximum of 2 bar.
- Note the information in the following chapter:
↳ *Chapter 7.1.2 'Determining the test pressure' on page 58:*

Water ingress



NOTICE!

Damage to the watch being tested due to water ingress!

If the leak in the watch is too large, there is a risk of water entering the interior of the watch during the water test.

- Only perform the water test once the "*Leak Finder*" program has been executed and the watch can be submerged in water without risk.
- Remove the watch from the water as soon as the flow of bubbles decreases.

2.6 Owner's responsibilities

Owner's obligations

The device is intended for use in the commercial area. The owner of the device is subject to the statutory obligations of occupational health and safety.

In addition to the safety indications and warnings in this manual, you must comply with the safety, occupational health and safety and environmental protection requirements that apply to the device's area of application.

The following applies in particular:

- The owner must learn about the applicable occupational health and safety requirements and perform a risk assessment to identify additional hazards resulting from the specific working conditions at the device's site of operation. The owner shall use this information to create operating instructions for the device.
- Throughout the entire period that the device is in operation, the owner shall check that the operating instructions created by the owner comply with the current versions of regulations and must adapt the instructions as necessary.
- The owner shall ensure that all persons who handle the device have read and understood this manual. In addition, the owner shall train personnel at regular intervals and inform them of potential risks.
- The owner shall provide personnel with the necessary protective equipment and shall obligate them to wear the necessary protective equipment ↪ *page20*.
- The owner shall ensure that the service intervals described in this manual are complied with.
- The owner shall ensure that the service intervals for the components (especially the compressor) are complied with.

2.7 Personnel qualifications



WARNING!

Risk of injury in the event of inadequate personnel qualifications!

If unqualified personnel perform work on the device or stay in the device's danger zone, this gives rise to hazards that could cause serious injuries and major material damage.

- Only allow personnel to perform activities for which they are qualified.
- Keep unauthorised persons away from the device.

Safety

The following personnel qualifications are required by this manual:

Operator

The operator of the device has all the necessary knowledge and training to handle watches. In addition, the operator has been instructed by the owner about the tasks entrusted to the operator and about possible hazards in the event of improper action. The operator may only perform tasks that exceed normal operation where these are specified in the manual and the owner has specifically entrusted the operator with these tasks.

Basic requirements

Only persons who can be expected to perform their work reliably are acceptable as personnel. Persons whose ability to respond is impaired, e.g. due to drugs, alcohol or medication, are not permitted to operate the device.

When selecting personnel, comply with the age-specific and occupation-specific requirements that apply at the site of operation.

2.8 Personal protective equipment

Personal protective equipment serves to protect persons against health and safety hazards during work.

When performing the various tasks on and with the device, personnel must wear the personal protective equipment specifically mentioned in the individual sections of this manual.

Description of the personal protective equipment



Safety goggles

The safety goggles protect the eyes from flying splinters of glass.

The safety goggles must be worn for the following activities, in particular:

- When removing the watch after a completed test.
- When preparing and performing the water test.

2.9 Spare parts

Incorrect spare parts

**WARNING!****Risk of injury if incorrect spare parts are used!**

Using incorrect or faulty spare parts can result in risks to personnel, as well as damage, malfunctions or complete failure.

- Only use genuine parts from Witschi Electronic Ltd. or spare parts authorised by Witschi Electronic Ltd.
- If in doubt, always contact our customer service (↪ page 3).

Ordering spare parts

To order accessories or spare parts, contact your point of sale (↪ page 3).

You can find your nearest point of sale on our website "<http://www.witschi.com/de/firma/vertretungen>"



For a list of all spare parts, see ↪ Chapter 12 'Accessories and spare parts' on page 75.

Functional description

3 Functional description

3.1 Proofmaster

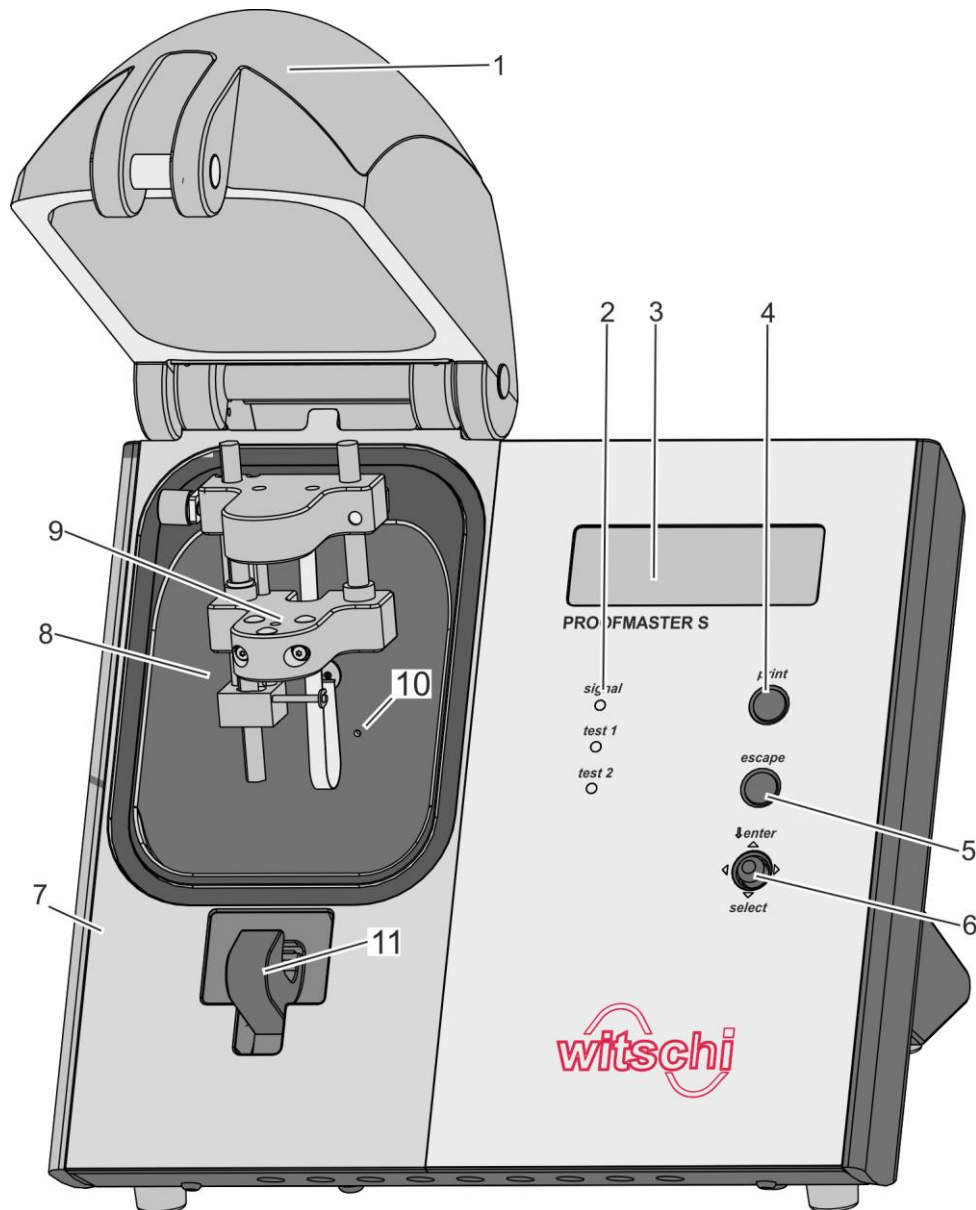
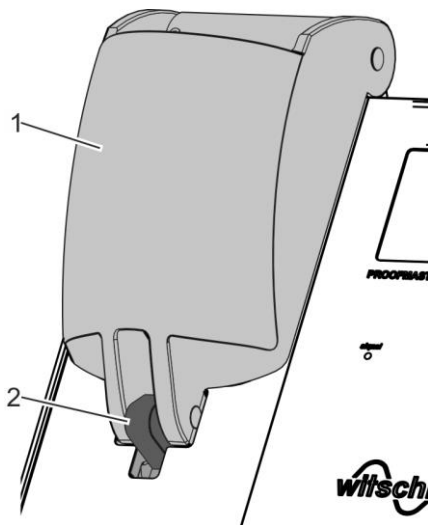


Fig. 5: Proofmaster S

- | | | | |
|---|-----------------|----|---------------------------------|
| 1 | Bell cover | 7 | Base |
| 2 | LED displays | 8 | Test chamber |
| 3 | Display | 9 | Test point |
| 4 | [print] button | 10 | Compressed air inlet and outlet |
| 5 | [escape] button | 11 | Catch |
| 6 | Cursor | | |

3.1.1 Bell cover

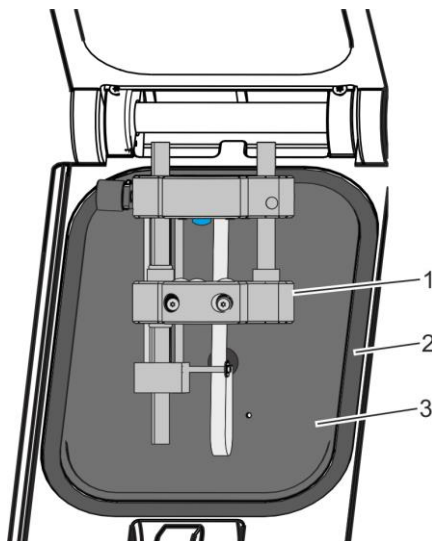


The bell cover covers the test chamber. During testing, the bell cover (Fig. 6/1) is closed and secured in place by a catch (Fig. 6/2).

The bell cover must be closed before testing. After the test, it opens automatically.

Fig. 6: Bell cover

3.1.2 Test chamber



- 1 Test point (↪ page 24)
- 2 O-ring
- 3 Test chamber

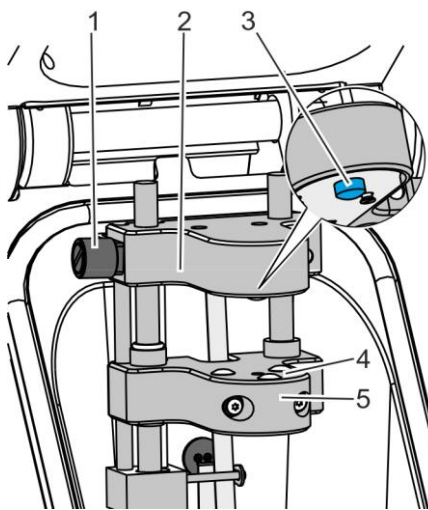
The tightness test is performed in the test chamber (Fig. 7/3). It involves the test point (Fig. 7/1) with the sensor and the watch underlay. When the test starts, the bell cover closes, coming to rest on the O-ring (Fig. 7/2). This seals the test chamber. The appropriate pressure can now be built up and maintained in the airtight chamber during testing

The pressure is built up inside the chamber by a compressor connected to the device. The negative pressure is generated by a Venturi valve built into the device and the connected compressor.

Fig. 7: Test chamber

Functional description

3.1.3 Test point



- 1 Adjustment knob
- 2 Sensor holder
- 3 Sensor
- 4 Support points
- 5 Support

The test point (Fig. 8) with the sensor and watch underlay can measure deformation of the watch. During the test, the watch is stabilised by the three support points (Fig. 8/4) that are built into the support (Fig. 8/5). Depending on the diameter of the watch glass, one of the three watch underlays (☞ 'Watch underlays' on page 27) provided can be inserted into the support. The sensor (Fig. 8/3) built into the sensor holder (Fig. 8/2) rests on the watch glass during the test and can measure any expansion or contraction of the watch housing.

The adjustment knob (Fig. 8/1) is used to lower and raise the sensor holder.

Fig. 8: Test point

3.1.4 Control and display elements

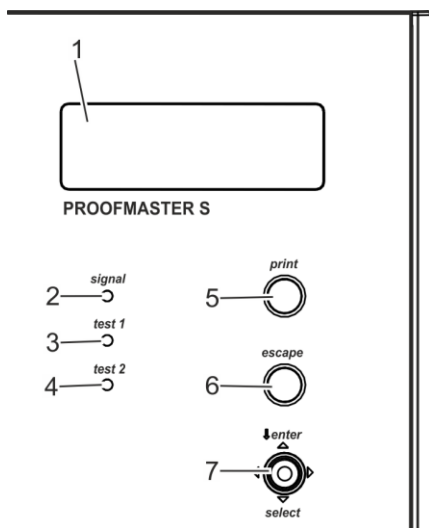


Fig. 9: Operation

Functional description

No.	Designation	Function
1	Screen	<ul style="list-style-type: none"> ■ Displaying the test progress ■ Displaying the set parameters
2	<i>[signal]</i> LED display	Displays whether the sensor is correctly positioned on the watch
3	<i>[Test 1]</i> LED display	Displays the results of the first test <ul style="list-style-type: none"> ■ Green: watch is leak-tight according to this test. ■ Red: watch is leaky according to this test.
4	<i>[Test 2]</i> LED display	Displays the results of the second test <ul style="list-style-type: none"> ■ Green: watch is leak-tight according to this test. ■ Red: watch is leaky according to this test.
5	<i>[print]</i> button	Print the test results
6	<i>[escape]</i> button	Switch to start screen
7	Cursor	Move left, right, up and down: <ul style="list-style-type: none"> ■ scroll through the screen displays ■ Changing parameters Press: <ul style="list-style-type: none"> ■ confirm entry

Functional description

3.2 Accessories included

Power supply unit



Fig. 10: Power supply unit

The power supply unit (Fig. 10) is used to connect the Proofmaster to the power supply.

Input values	<ul style="list-style-type: none"> ■ 230 V ~ or 115 V ~ (depending on the local mains voltage) ■ 50 Hz ■ 16 VA
Output values	<ul style="list-style-type: none"> ■ 9.0 V ~ ■ 1.2 A

Compressed air hose



Fig. 11: Compressed air hose

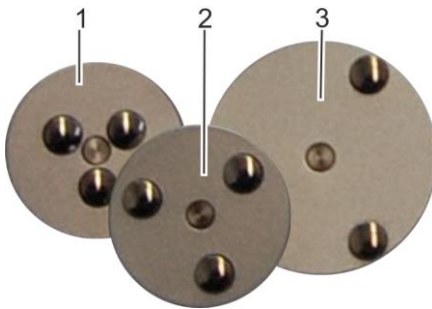
The compressed air hose is used to supply the Proofmaster with compressed air.

- The free end (Fig. 11/1) is connected to the compressed air connection on the Proofmaster.
- The plug-in coupling (Fig. 11/2) is connected to the compressor.



The compressor's coupling must fit the plug-in coupling on the compressed air hose. The following plug-in coupling is used:

Brand: Legris; 1/4 inch plug-in coupling

Watch underlays


The watch underlays (Fig. 12) are placed on the support for the test point. These ensure that the watch is secure and stable on the support during testing. The choice of watch underlay depends on the watch glass diameter:

Fig. 12: Watch underlays

Watch glass diameter	Watch underlay
< 20 mm	Smallest watch underlay (Fig. 12/1)
Between 20 and 40 mm	Medium watch underlay (Fig. 12/2)
> 40 mm	Large watch underlay (Fig. 12/3)



The watch should only be tested without a watch underlay if it is not stable on any of the three underlays. As the three built-in support points are set further apart, the watch is more stable than on the watch underlay support points. However, the larger bearing surface may distort the test results.

Functional description

Dust cover



Fig. 13: Dust cover

The dust cover (Fig. 13) covers the Proofmaster when not in use and protects it against the build-up of dust. Dust or dirt between the sealing ring and the bell cover results in a leaky test chamber.

USB connection cable



Fig. 14: USB connection cable

The USB connection cable can be used to connect the Proofmaster to a computer (↪ Chapter 5.6 'Preparing to use the "Proofmaster M/S" software' on page 40).

3.3 Additional accessories required

Compressor

To operate the Proofmaster, it must be connected to a compressor. The compressor must fulfil the following requirements:

- Connection for the plug-in coupling on the compressed air hose (☞ 'Compressed air hose' on page 26)
- Connection: ¼ inch
- Maximum inlet pressure for Proofmaster: 12 bar
- Inlet pressure to enable full use of the device: 11 bar
- Minimum inlet pressure for Proofmaster: 1 bar higher than the necessary test pressure
- Pressure vessel volume: minimum 4 litres
- The compressed air must be clean and dry. This is guaranteed by using an air filter.



The Jun-Air 6-10 compressor from Witschi Electronic Ltd. fulfils these requirements. For additional information, contact your point of sale (☞ page 3).

3.4 Optional accessories

Thermal printer

The test results can be printed out on the thermal printer. The thermal printer is connected to the Proofmaster via the RS232 port (☞ Chapter 5.4 'Connecting the thermal printer' on page 39).

The test results can be printed out in the following ways:

- Connect the thermal printer from Witschi directly to the Proofmaster and use it.
- Connect a computer to the Proofmaster and print out the results on a printer connected to the computer. To print out the results on an external computer, you need the "Auto-Print" software.

Order number: JB01-SLK-TE25-S

"Auto-Print" software

Instead of the thermal printer, you can also connect to a computer that is connected, in turn, to a printer. The "Auto-Print" software enables you to print out the test results via the connected computer. The computer is connected via the RS232 port (☞ Chapter 5.5 'Preparing to use the "Auto-Print" software' on page 39).

Order number: 64.55.901PK1

"Proofmaster M/S" software

The "Proofmaster M/S" software enables you to evaluate the test results on a computer. You can then print out the test results on a printer connected to the computer. The computer is connected to the Proofmaster using the USB connection cable provided (☞ Chapter 5.6 'Preparing to use the "Proofmaster M/S" software' on page 40).

Order number: 64.50.792PK1

Functional description

3.5 Test procedure



The following section describes the procedure during a test. If a test run is performed with multiple tests, the procedure is repeated.

Determining the initial value

When the test starts, the sensor value is reset to 0. This value provides the initial value for the 1st deformation measurement (↪ 'Deformation measurement' on page 31).

Building up pressure

The test pressure is built up in the test chamber. To compensate for the pressure loss caused by the warming of the air, the applied pressure is 5 % higher than the programmed test pressure.

1st deformation measurement

The sensor measures deformation of the watch due to the applied pressure. If no deformation is identified, the watch has a large leak that is causing immediate pressure compensation. In this case, the test is cancelled and the watch is classified as leaky.

Stabilisation of the deformation begins at the same time as the first deformation measurement.

Stabilising deformation and pressure

Once the test pressure has been reached, the deformation continues to vary slightly. Stabilisation ends once the deformation is stable enough for reliable measurement.

2nd deformation measurement

After stabilisation, the deformation is measured. The measured value provides the initial value for the 2nd deformation measurement.

The continuous measurement process then starts and the leakage rate is calculated continuously.

The leakage rate specifies the percentage variation of deformation over a minute.

This value is compared against a specified tightness limit.

3.6 Definitions

Deformation measurement

The Proofmaster's measuring principle is based on the principle of deformation. The watch is subjected to positive pressure or a vacuum.

	Positive pressure	Vacuum
Deformation:	Watch case is compressed.	Watch case expands.

The deformation provides the basis of the measurement:

Leak-tight watch

- The deformation remains constant at a constant pressure.

Leaky watch

- The deformation reverts at a constant pressure.
- There is pressure equalisation between the pressure in the test chamber and the pressure in the watch case.
- The faster the deformation reverts, the larger the leak in the watch case.

Tightness limit

The tightness limit specifies how large the leak rate (reversion of deformation over a minute) may be for the watch to still be considered waterproof. The standard values per watch glass diameter are as follows:

Watch glass diameter	Tightness limit
< 20 mm	-2%/min
Between 20 and 40 mm	-1%/min
> 40 mm	-0.5%/min



When determining the tightness limit, the following applies: the lower the tightness limit, the longer the measuring times.

Leak rate

The leak rate specifies the percentage by which deformation has reverted over a minute. If the leak rate exceeds the predefined tightness limit, the watch being tested is classified as leaky.

The measurement of the leak rate begins after the stabilisation time.

Functional description

3.7 Reference to ISO 22810

Leak-tight watch in accordance with standard ISO 22810

Standard ISO 22810 specifies that a watch shall be considered leaky if less than 50 µg of air enters the watch per minute at a test pressure of 2 bar.

Relation to the principle of deformation

The tightness test in accordance with the principle of deformation, as used in the Proofmaster, does not measure the weight of air flowing in, it measures the deformation. Nevertheless, it is possible to relate the weight of inflowing air to the reversion in deformation.

Ratio between volume and deformation

For a medium-sized watch (free volume in the watch: 2140 mm³) and a test pressure of 2 bar, 50 µg of inflowing air per minute corresponds to a reversion in deformation of 1% per minute. In the predefined programs, the tightness limit is therefore 1% per minute.

Standard ISO 22810 does not take the volume of the watch into consideration, i.e. the leak rate of 50 µg per minute applies to all watches, regardless of their size.

When testing according to the principle of deformation, the reversion depends on the free volume in the watch. A watch with a small volume exhibits a greater reversion of deformation with the same quantity of penetrating air. To test in accordance with the standard, the tightness limit has to be programmed according to the free volume in the watch.

Tightness limit reference values

Watch glass diameter	Tightness limit
< 20 mm	-0.5%
Between 20 and 40 mm	-1%
> 40 mm	-2%

Interpreting ISO 22810



The standard is based on a pressure of 2 bar or 0.5 bar. No limits are specified for other pressures. It can therefore be assumed that the limit of 50 µg per minute applies for all test pressures.

3.8 Programs

The Proofmaster offers two types of programs:

- **Fixed programs:** Programs predefined by the manufacturer ↗ *page33.*
- **Customer programs:** Free definition of all parameters ↗ *page34.*

Preset programs

There are 10 different preset programs available. The predefined parameters cannot be changed.

Overview of preset programs

No.	Name	Info on program
P01	"Safe Test"	<ul style="list-style-type: none"> ■ Suitable for all watches ■ Imprecise results with hard watch cases
P02	"Men Standard"	For men's watches with plastic or metal case
P03	"Ladies"	For ladies' watches
P04	"Hard Case"	<ul style="list-style-type: none"> ■ For hard, sturdy watches ■ For watches with ceramic case and mineral or sapphire glass
P05	"Jewelry"	<ul style="list-style-type: none"> ■ For jewellery watches ■ For watches with an unstable case
P06	"Diver 100m"	For diving watches classified as waterproof to a depth of 100 m
P07	"Pressure only"	<ul style="list-style-type: none"> ■ For watches that may not be tested using vacuum ■ Quick testing with one test using positive pressure, without vacuum
P08	"two pressures"	<ul style="list-style-type: none"> ■ For watches that may not be tested using vacuum ■ Quick testing with two tests using positive pressure, without vacuum
P09	"Altimeter Prg1"	<ul style="list-style-type: none"> ■ For watches with a built-in altimeter and pressure sensor ■ Testing with one test in which the pressure is built up in stages
P10	"Altimeter Prg2"	<ul style="list-style-type: none"> ■ For watches with a built-in altimeter and pressure sensor ■ Testing with two tests in which the pressure is built up in stages

Functional description

Parameters for the preset programs

No.	Name	Pressure 1	Pressure 2	Stabilisation time / measuring time	Limit	Case	Size	Test mode
P01	"Safe Test"	-0.2bar	2.0bar	Auto/Auto	-1.0 %	Std	20-40mm	MStand
P02	"Men Standard"	-0.4bar	3.0bar	Auto/Auto	-1.0 %	Std	20-40mm	MStand
P03	"Ladies"	-0.4bar	2.0bar	Auto/Auto	-2.0 %	Std	<20mm	MStand
P04	"Hard Case"	-0.7 bar	3.0bar	Auto/Auto	-1.0 %	Hard	20-40mm	MStand
P05	"Jewelry"	-0.2bar	1.0bar	Auto/Auto	-2.0 %	Std	<20mm	MStand
P06	"Diver 100m"	-0.7 bar	10.0bar	Auto/Auto	-1.0 %	Hard	20-40mm	MStand
P07	"Pressure only"	2.0bar	-	Auto/Auto	-1.0 %	Std	20-40mm	MStand
P08	"two pressures"	0.5bar	3.0bar	Auto/Auto	-1.0 %	Std	20-40mm	MStand
P09	"Altimeter Prg1"	0.5bar	-	Auto/Auto	-1.0 %	Std	20-40mm	MStand
P10	"Altimeter Prg2"	0.5bar	3.0bar	Auto/Auto	-1.0 %	Std	20-40mm	MStand

Customer programs

There are 11 storage locations available for customer programs. The parameters can be defined for each inspection characteristic. The C11 customer program is designed for watches with a built-in altimeter and pressure sensor. The C11 program can be adapted individually by means of two tests during which the pressure is increased in stages. The customer programs remain stored on the Proofmaster even after the device is switched off.



For additional information about customer programs, see [Chapter 7.1 'Creating custom programs'](#) on page 56.

4 Delivery and storage

4.1 Delivery and storage

Improper transport



CAUTION!

Risk of injury and property damage due to improper transport!

In the event of improper transport, the device may fall or topple. This can cause serious injuries or major property damage.

- Always transport packages upright and never throw them.
- Only remove packaging immediately before first use.
- Only transport the device when it is shut down (☞ Chapter 10 'Shutdown and disposal' on page 70).
- Always use both hands when transporting the device.

4.2 Delivery

The Proofmaster is delivered by a local logistics company. All the components included in the scope of delivery are delivered together in a single package.

4.3 Transport inspection

On receipt of the delivery, check it without delay to ensure that it is complete and undamaged.

If there is any visible external transport damage, proceed as follows:

- Do not accept the delivery.
- Make a note of the scope of damage on the carrier's delivery note.
- Lodge a complaint.



Lodge a complaint for each defect as soon as it is identified. Claims for damages can only be made within the applicable claim periods.

Delivery and storage

4.4 Storage

Store the device and packages under the following conditions:

- Proofmaster is shut down (☞ 'Shutdown' on page 70).
- Do not store outdoors.
- Store in a dry and dust-free condition.
- Do not expose to any aggressive media.
- Protect against sunlight.
- Avoid mechanical shocks.
- Do not place anything on top of the device packaging.
- Storage temperature: 0 °C – 50 °C
- Relative humidity: 10 % – 80 %, non-condensing.

5 Initial operation

5.1 Requirements for location


NOTICE!
An unsuitable location may distort test results!

To achieve precise test results, the Proofmaster and the test object must be at the ambient temperature.

- Do not position the Proofmaster and test object in the vicinity of heaters or open windows.
- Do not place the Proofmaster and test object in direct sunlight.
- Operate the Proofmaster on a level, horizontal surface.

5.2 Connecting the power supply unit


NOTICE!
Risk of property damage if an unsuitable power supply unit is used!

Using an unsuitable or damaged power supply unit can result in a short-circuit. This can damage the device.

- Only use the power supply unit provided.
- Route the power supply unit cable so that it cannot be damaged by external influences.

Personnel: ■ Operator

1. Make sure that the local mains voltage is appropriate for the power supply unit.

Input values

- 230 V ~ or 115 V ~
- 50 Hz
- 16 VA

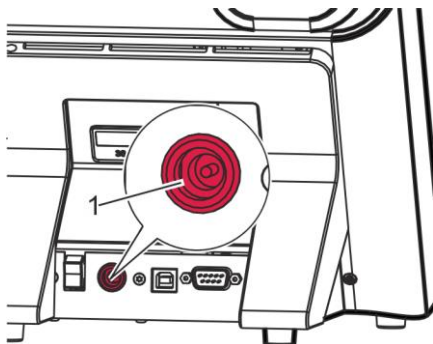


Fig. 15: Mains connection

2. Insert power supply unit adapter in the main connection (Fig. 15/1).
 3. Connect the power supply unit plug to the local mains supply.
- ⇒ The power supply is now connected.

Initial operation

5.3 Connecting the compressed air



WARNING!
Risk of injury due to uncontrolled release of compressed air!

An uncontrolled release of compressed air may cause injuries.

- Do not exceed the maximum inlet pressure of 12 bar.
- Make sure that the compressor fulfils all the requirements (☞ 'Compressor' on page 29).
- Observe the documentation from the manufacturer of the compressor.

Personnel: ■ Operator

1. Put the compressor into operation as specified in the manufacturer's documentation.
2. Make sure that the compressor is switched off and its compressed air valve is closed.
3. Connect the plug-in coupling on the compressed air hose to the compressor.
4. Insert the free end of the compressed air hose into the compressed air connection on the Proofmaster (Fig. 16/1).
 - ⇒ The compressed air hose is secured in place in the device by barbs and cannot be pulled out.
5. Check that the compressed air hose is secured by pulling gently on it.
 - ⇒ The compressed air supply is now connected.

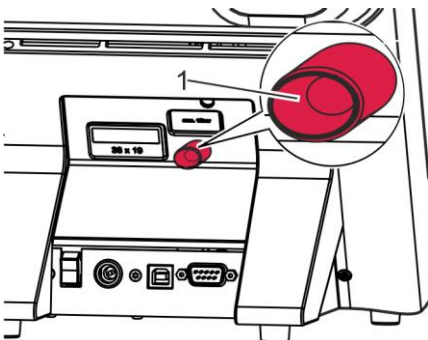


Fig. 16: Connecting the compressed air hose

5.4 Connecting the thermal printer



Only perform the following steps if you wish to use a thermal printer.

Personnel: ■ Operator

Materials: ■ RS232 cable

1. Connect the connector on the RS232 cable to the thermal printer.
2. Tighten the 2 screws on the connector.
3. Insert the coupling on the RS232 cable into the RS232 port (Fig. 17/1).
4. Tighten the 2 screws on the coupling.
 - ⇒ The thermal printer is now connected.

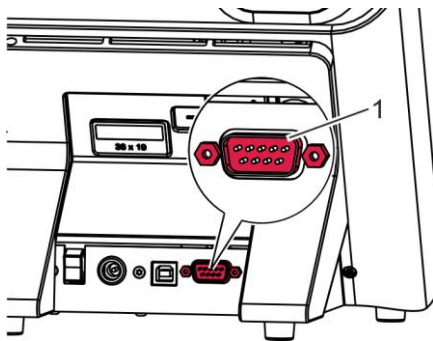


Fig. 17: RS232 port



Consult the manufacturer's documentation before using the thermal printer.

5.5 Preparing to use the "Auto-Print" software

The "Auto-Print" software is required to print out the test results via a connected computer. The software is not included in the standard scope of delivery. If required, you can order it from your point of sale. Only perform the following steps if you wish to use the "Auto-Print" software.

Personnel: ■ Operator

Materials: ■ AT link cable
 ■ Computer

1. Connect the AT link cable connector to the computer.
2. Tighten the 2 screws on the connector.

Initial operation

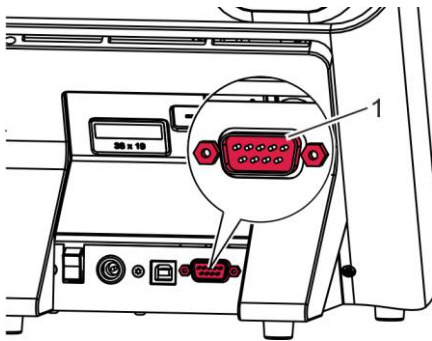


Fig. 18: RS232 port

3. Insert the coupling on the AT link cable into the RS232 port (Fig. 17/1).
 4. Tighten the 2 screws on the coupling.
- ⇒ The computer is now connected.



Consult the manufacturer's documentation before using the "Auto-Print" software.

5.6 Preparing to use the "Proofmaster M/S" software

The "Proofmaster M/S" software is used to evaluate the test results on a connected computer. The software is not included in the standard scope of delivery. If required, you can order it from your point of sale.

Only perform the following steps if you wish to use the "Proofmaster M/S" software.

Personnel: ■ Operator

Materials: ■ USB connection cable

■ Computer

1. Connect the flat connector (type A) on the USB connection cable to the computer.
2. Insert the square connector (type B) into the USB port (Fig. 19/1) on the device.

⇒ The computer is now connected.

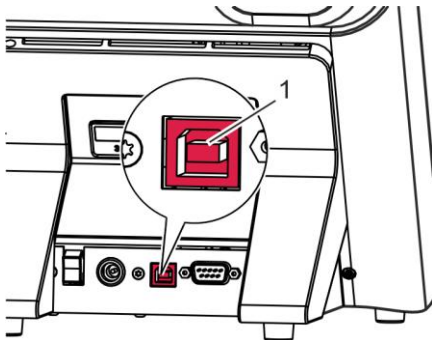


Fig. 19: USB port



Consult the manufacturer's documentation before using the "Proofmaster M/S" software.

6 Operation

6.1 Safety during operation

Cracked glass

**WARNING!****Risk of injury from cracked glass!**

Leaky watches may absorb the positive pressure fed in during the test. In this case, there will be positive pressure within the watch after the test. This can lead to the glass in the watch splintering or cracking. This can result in serious eye injuries or even loss of sight.

- If this manual requires you to wear safety goggles when performing an activity, do so.
- Make sure that any other people are at an appropriate distance from the device.

Compressed air

**WARNING!****Risk of injury from compressed air!**

An uncontrolled release of compressed air may cause injuries.

- Never force open the device's bell cover.

Risk of crushing

**WARNING!****Risk of crushing when closing the bell cover!**

When closing the bell cover, there is a risk of crushing between the bell cover and the device housing.

- Before closing the bell cover, make sure that no parts of the body or other objects are within the closing area.

Operation

6.2 Opening the bell cover in an emergency



The chamber can be opened manually in the following cases:

- Test was cancelled. The watch has to be removed from the chamber.
- The chamber does not open automatically, e.g. after a power failure.

Personnel: ■ Operator

Protective equipment: ■ Safety goggles

1. Switch off the compressor as specified in the manufacturer's documentation.
2. Drain the compressor's compressed air hose.
3. Switch off the Proofmaster with the [I/O] switch (Fig. 20/1) in the direction of the arrow (Fig. 20).

⇒ The remaining pressure in the chamber is purged.

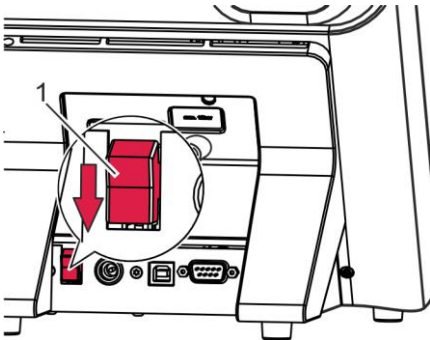


Fig. 20: Switching off the Proofmaster

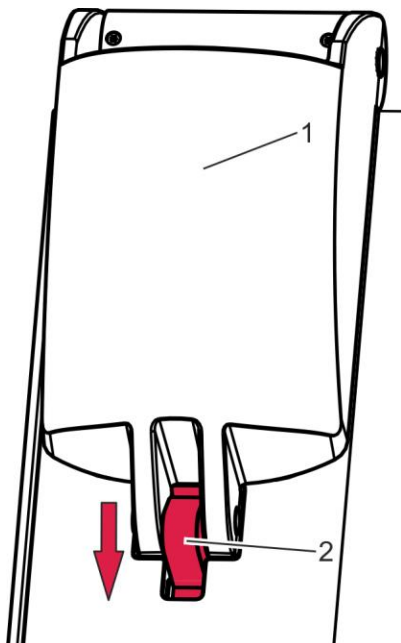


Fig. 21: Releasing the lock

4.



WARNING!
Risk of injury from flying parts!

- Do not force the bell cover open.
- Wear safety goggles.

Push down slightly on the catch (Fig. 21/2) and lift the bell cover (Fig. 21/1).

⇒ If it is possible to push down the catch with little effort, the chamber is depressurised.

If the catch does not move down, the pressure has to be released manually. To do so, proceed to step 5.

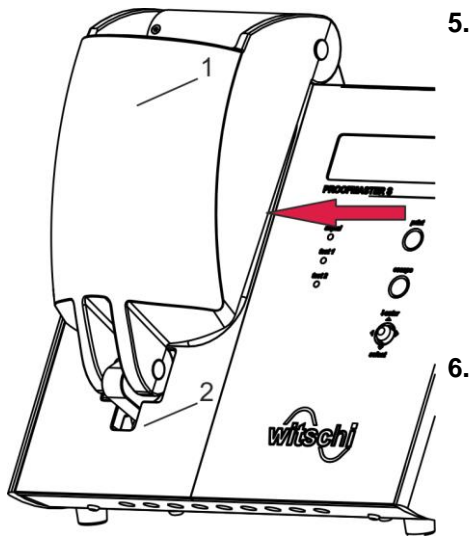
Releasing the pressure manually


Fig. 22: Releasing pressure

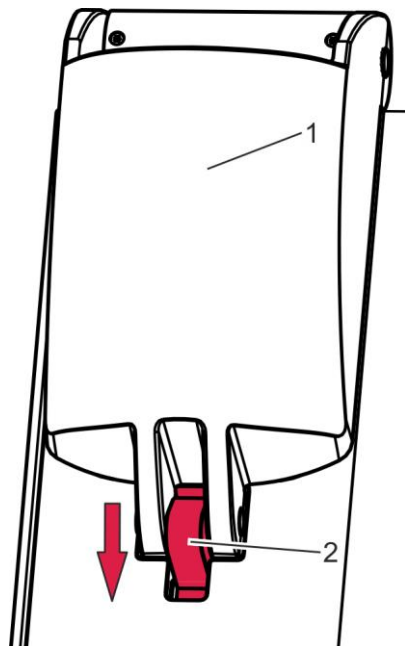


Fig. 23: Releasing the lock


NOTICE!

Risk of property damage if sharp or scratching objects are used!

Carefully slide a thin object (e.g. credit card) between the bell cover (Fig. 22/1) and base (Fig. 22/2).

⇒ The pressure is released.

6. Wait until the pressure has equalised completely.

7. Push down slightly on the catch (Fig. 23/2) and lift the bell cover (Fig. 23/1).

⇒ If it is possible to push down the catch with little effort, the chamber is depressurised.

If the catch does not move down, contact customer service (☎ page 3).

Operation

6.3 Switching on the Proofmaster

Personnel: ■ Operator

Prerequisite:

- The Proofmaster has been commissioned correctly (↪ *Chapter 5 'Initial operation' on page 37*).

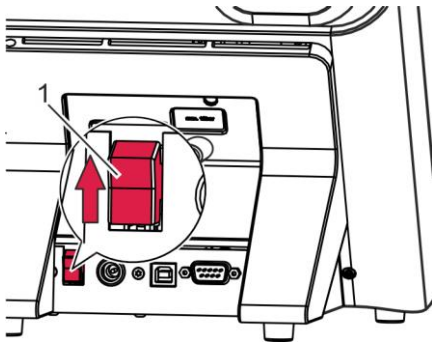


Fig. 24: Switching on the Proofmaster

1. Switch on the Proofmaster with the [I/O] switch (Fig. 24/1) in the direction of the arrow (Fig. 24).
 - ⇒ The welcome screen is displayed.
The last program to be used is displayed.
2. Make sure that the pressure reducing valve on the compressor is set to a maximum of 11 bar and at least 1 bar higher than the desired test pressure.
3. Switch on the compressor as specified in the manufacturer's documentation.
 - ⇒ The Proofmaster is ready for operation.



*If the wrong language is set, set the language (↪ *Chapter 7.2 'Adjusting system parameters' on page 61*).*

6.4 Switching off the Proofmaster

Personnel: ■ Operator

1. Switch off the compressor as specified in the manufacturer's documentation.
2. Close the bell cover (Fig. 25/1).
⇒ The lock (Fig. 25/2) engages.

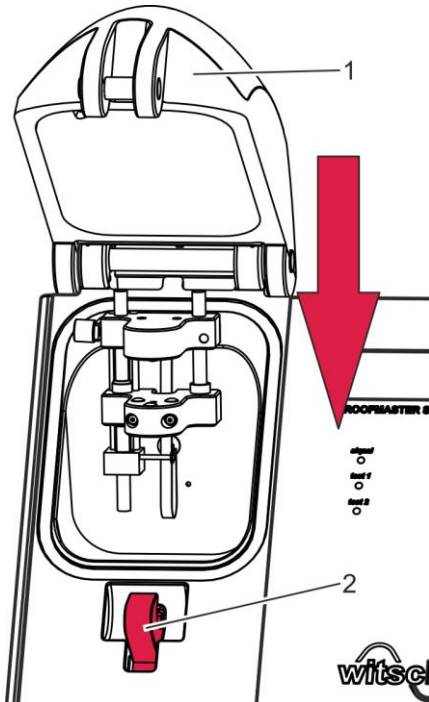


Fig. 25: Closing the bell cover

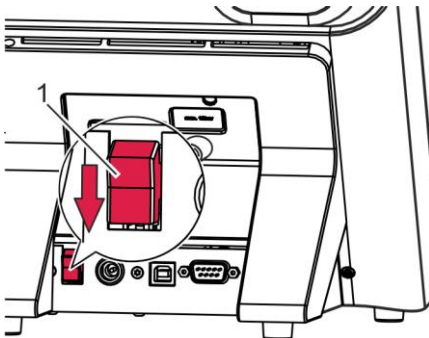


Fig. 26: Switching off the Proofmaster

3. Switch off the Proofmaster with the [I/O] switch (Fig. 26/1) in the direction of the arrow (Fig. 26).
4. Cover the Proofmaster with the dust cover.



-
- If you are not planning to use the Proofmaster for a longer period, shut it down (☞ Chapter 10 'Shutdown and disposal' on page 70).

Operation

6.5 Checking a watch for water resistance

Excessive test pressure



NOTICE!

Damage to the watch due to excessive pressure!

Excessive positive or negative pressure can damage the watch.

- Before each inspection, check that the correct program is selected.
- Do not test a watch with a higher pressure than the watch's specification permits.
- Before testing a watch with overpressure (> 3 bar), it should be tested first with a vacuum of at least -0.2 bar. That is for preventing a glass from being pushed out if a watch is not tight, which would damage the sensor.

6.5.1 Cancelling the test

escape



Personnel: ■ Operator

Protective equipment: ■ Safety goggles

1. To cancel an ongoing test, press the *[escape]* button.
⇒ The test is cancelled.
2. Open the bell cover manually (☞ *Chapter 6.2 'Opening the bell cover in an emergency' on page 42*).
3. Before restarting the test, open the watch case to release the excess pressure.

6.5.2 Selecting a program



For information about creating and changing customer programs, see [Chapter 7.1 'Creating custom programs'](#) on page 56.

For information about the fixed programs, see [Chapter 3.8 'Programs'](#) on page 33.

Personnel: ■ Operator

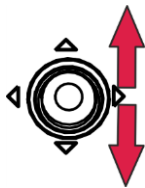


1. Press the [escape] button to go to the program level.



Fixed programs and customer programs are identified as follows:

- Fixed programs: P01 - P10
- Customer programs: C01 - C11



2. Move the cursor up and down until the program you require is displayed on the screen.
 - ⇒ The program is selected.

6.5.3 Positioning the watch



Note the following information to optimise the test results.

Temperature

The watch must be at the same ambient temperature as the Proofmaster during the test. Temperature fluctuations in the housing during testing may distort the test results.

- Keep the watch next to the Proofmaster before testing.
- If the watch has come directly from the user, wait until it has adjusted to the ambient temperature.
- If it is not possible to cool down or heat up the timepiece to the ambient temperature before the test, it is useful to activate thermal stabilisation.

Operation

Positioning the watch correctly

If the watch is not positioned correctly, the test results may be distorted.

- Remove protective adhesive covers or labels from the housing.
- In the case of watches with an uneven base, turn the watch around and place the glass on the watch underlay.

Positioning the watch

Personnel: ■ Operator

Prerequisites:

- The Proofmaster is switched on (☞ Chapter 6.3 'Switching on the Proofmaster' on page 44).
- The bell cover is open.

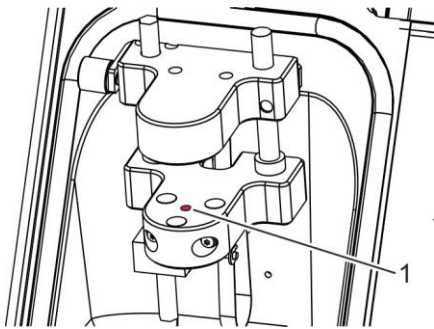


Fig. 27: Inserting the watch underlay

1. Place the correct watch underlay in the opening (Fig. 27/1) provided for that purpose.

Watch glass diameter	Watch underlay
< 20 mm	Smallest watch underlay
Between 20 and 40 mm	Medium watch underlay
> 40 mm	Large watch underlay



The watch should only be tested without a watch underlay if it is not stable on any of the three underlays. As the three built-in support points are set further apart (diameter), the watch is more stable than on the watch underlay support points. However, the larger bearing surface may distort the test results.

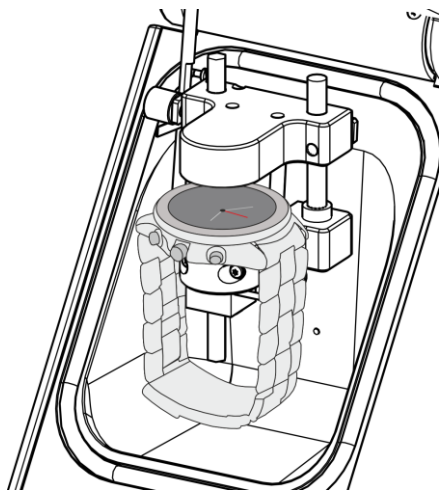


Fig. 28: Watch positioned

2. Place the watch on the watch underlay (Fig. 28). Note the following:
 - In the case of watches with an uneven base, turn the watch around and place the glass on the watch underlay.
 - Position the watch so that the sensor can be lowered onto the centre.
 - Position the watch straps so that the watch is stable on the watch underlay. If necessary, remove the watch straps.
 - Make sure that the watch strap does not come into contact with any part of the device.
- ⇒ The watch is positioned horizontally on the three support points.

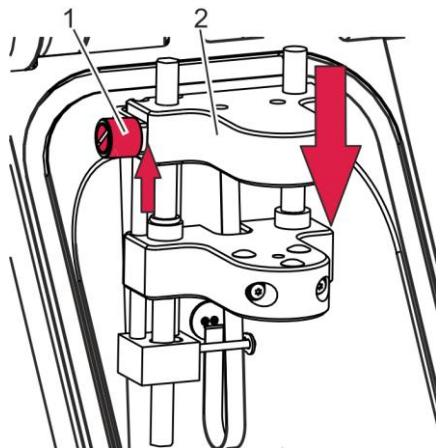


Fig. 29: Lowering the sensor

3. Lift the adjustment knob (Fig. 29/1) and lower it together with the sensor holder (Fig. 29/2) until the sensor is in contact with the watch.
4. Release the adjustment knob.
 - ⇒ The sensor holder is held in position.
 - If the *[signal]* LED display lights up yellow, the sensor is positioned correctly.
 - If the *[signal]* LED display does not light up, the sensor holder has to be lowered onto the watch again or the watch needs to be repositioned.

6.5.4 Start test



- A test can last between 3 and 20 minutes, depending on which parameters are chosen. The more pressures that are tested and the larger the chosen positive or negative pressure, the longer the test lasts.
- The test can be cancelled with the *[escape]* button.

Personnel: ■ Operator

Prerequisite:

- The correct program is selected.

1. To start the test, close the bell cover.

Operation



⇒ If the *[signal]* LED display lights up orange, the sensor is positioned correctly and the test starts.

If the *[signal]* LED display does not light up, the watch is not positioned correctly. The bell cover opens and you have to reposition the watch (↪ *Chapter 6.5.3 'Positioning the watch' on page 47*).

During testing, information about the test progress is displayed continuously (↪ *Chapter 6.5.5 'Monitoring the test progress' on page 50*).

After the test, the bell cover opens.

The test results are displayed.

6.5.5 Monitoring the test progress

The following information is continuously updated:

- Number of the program
- Pressure used
- Test step (stabilisation or measurement)
- Time to end of test step
- During stabilisation:
 - Current deformation
- During measurement:
 - Leak rate
 - Change of deformation in [μm]
 - Defined tolerance



The test results are displayed via the *[test 1]* and *[test 2]* LED displays:

- LED lights up green: watch is leak-tight according to this test.
- LED lights up red: watch is leaky according to this test.

6.5.6 Evaluating test results

Prerequisite:

- The test was performed successfully. The test results are displayed on the screen.
1. Evaluate the test results using the table below.
 2. Then continue testing according to the information in the right-hand column.

Results text	Meaning	Further action
"Test good"	Watch is leak-tight	Watch can be classified as leak-tight according to the principle of deformation.
"Test bad"	Watch is leaky	Localise the point of leakage (↪ Chapter 6.6 'Localising the point of leakage' on page 52).
"Major leak"	Watch is leaky	Localise the point of leakage (↪ Chapter 6.6 'Localising the point of leakage' on page 52).
"Very large leak or no deformation"	Watch has a very large leak.	The point of leakage must not be localised with the water test.
	Watch is so hard that it cannot be measured with the chosen parameters.	<ul style="list-style-type: none"> ■ Check parameters (particularly housing type and watch size, ↪ page 57). ■ If possible and permissible, repeat the test with a higher test pressure (↪ Chapter 6.5 'Checking a watch for water resistance' on page 46).



NOTE!

Watches that are not tight must not be tested several times in succession. Otherwise, that will falsify the result. The watch should be opened before the second test to release the excess pressure.

Operation

6.6 Localising the point of leakage

6.6.1 Preparing the watch with the "Leak Finder" program

A leak in a leaky watch can be localised in the water test. Here, the "Leak Finder" program is used to build up positive pressure inside the watch housing. The watch is then placed in a container filled with water and the rising bubbles indicate the point of leakage.

If the watch was tested previously for water resistance and discovered to be leaky, it should then be prepared for the water test using the "Leak Finder" program.

However, the "Leak Finder" program can also be used without checking for water resistance first.



Preparing for the water test can take up to ten minutes.

Personnel: ■ Operator

Protective equipment: ■ Safety goggles

Materials: ■ Transparent container with distilled water

Prerequisite:

- The watch was positioned correctly (↪ *Chapter 6.5.3 'Positioning the watch' on page 47*).



Fig. 30: Selecting a program

1. To select the "Leak Finder" program, move the cursor to the left or right (Fig. 30).

⇒ The test parameters are displayed.



NOTICE!

Property damage due to excessive test pressure!

- Do not test a watch with a higher pressure than the watch's specification permits.

2. Change the parameter values. The following table shows the initial values and possible changes:

Type	Pr	Time
Selection: <ul style="list-style-type: none"> ■ "Std Case" ■ "Soft Case" ■ "Hard Case" 	Selection: <ul style="list-style-type: none"> ■ 2 bar – 10 bar 	Selection: <ul style="list-style-type: none"> ■ "Auts" ■ 60 s – 600 s
The value from the previous test is copied. The value cannot be changed.	The value from the previous test is copied. However, the value can be changed.	The time is calculated automatically ("Auts") by default. The value can be changed. Automatic time calculation provides a reliable result.

3. In preparation for the water test, fill a transparent container with water.



Use distilled water to avoid lime scale on the watch.

4. Close the bell cover.



If the [signal] LED display lights up orange, the sensor is positioned correctly and the test starts.

If the [signal] LED display does not light up, the watch is not positioned correctly. The bell cover opens and you have to reposition the watch (↪ Chapter 6.5.3 'Positioning the watch' on page 47).

The "Leak Finder" program starts.

Operation

6.6.2 Evaluating the results of the "Leak Finder" program

Personnel: ■ Operator

Prerequisite:

■ The "Leak Finder" program has been executed successfully.

1. Evaluate the results of the "Leak Finder" program using the table below.
2. Proceed according to the instructions in the right-hand column.

Display	Meaning	Further action
"Big Leakage" "Watertest impossible"	The leak is too large. The watch must not be immersed in water.	Do not perform the water test.
"No or small Leak" "Continue Watertest"	The water test must not be performed.	Perform the water test (☞ Chapter 6.6.3 'Performing the water test' on page 54).

6.6.3 Performing the water test



NOTICE!

Damage to the watch if water test is performed improperly!

The watch only remains leak-tight in the water test for as long as there is positive pressure in the housing. Note the following during the water test:

- Only perform the water test if the "Leak Finder" program has been executed and it permits a water test.
- Perform the water test immediately after the "Leak Finder" program ends. The watch can only be safely immersed in water for as long as there is positive pressure in the housing.
- If the number of rising bubbles starts to decrease, the positive pressure is decreasing: remove the watch from the water without delay.

Personnel: ■ Operator

Protective equipment: ■ Safety goggles

Materials: ■ Transparent container with distilled water

Prerequisites:

- The watch was prepared for the water test with the "Leak Finder" program. There is positive pressure in the housing.
 - The "Leak Finder" program permits a water test.
1. Take the watch from the test shelf and place it without delay in the prepared transparent container with distilled water.
 - ⇒ Bubbles escape from the point of leakage in the housing.



If the leak is very small, it takes a few minutes before the bubbles start to rise.

2. Once the point of leakage has been localised or, at the latest, once the number of bubbles decreases, remove the watch from the water.

Programming

7 Programming

7.1 Creating custom programs



NOTICE!

Damage to the watch due to unsuitable parameters!

The watch may become damaged if it is subjected to excessively high or low pressures.

- Before programming the customer programs, read *Chapter 3 'Functional description' on page 22.*
- Make sure that only persons with experience of handling the device create customer programs.

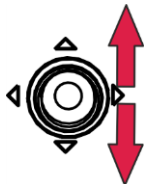


Once the values have been changed, they need to be saved. If you exit the program without saving, the changes are discarded (see Chapter 7.1.7 'Saving a custom program' on page 60).

If the values are saved, the changes are retained when the device is switched back on again.

Personnel: ■ Operator

Selecting a customer program



1. Move the cursor up and down until the program you wish to edit is displayed on the screen.

⇒ The program is selected.



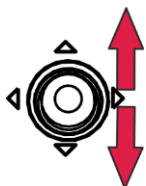
2. To switch to edit mode, press the cursor down.

⇒ Edit mode is active.

Navigating in edit mode



3. Move the cursor left and right to switch between parameters.



4. Move the cursor up and down to change a value.

7.1.1 Defining the watch characteristics

7.1.1.1 Selecting the case type

The following selection is available:

Option	Use
Soft	<ul style="list-style-type: none"> ■ Plastic housing ■ Thin-walled metal housing with large deformation
Stnd	Metal housing with medium deformation
Hard	<ul style="list-style-type: none"> ■ Ceramic housing with little deformation ■ Metal and carbide housing with little deformation

7.1.1.2 Selecting the watch size

The following selection is available:

Option	Use
< 20 mm	Small ladies' watches
20 mm – 40 mm	Classic men's watches
> 40 mm	Large watches Diving watches

Programming

7.1.2 Determining the test pressure

Unsuitable pressure settings



NOTICE!

Damage to the watch due to unsuitable pressure settings!

- If jewellery watches or thin watches are subjected to excessive vacuum, the base or glass of the watch may burst.
Do not subject jewellery watches or thin watches to a pressure below -0.3 bar.
- Do not test a watch with a higher pressure than the watch's specification permits.
- Do not use excessive pressures. In the case of soft watch housings, the force exerted may damage the watch movement. Note the table for the force effect on the watch (↪ Table 'Force effect on the watch' on page 58).

Note for the pressure settings

To optimise the test results, note the following:

- The pressure of the subsequent test must always be greater than the pressure in the previous test.
- Perform the first test with a vacuum. The test with a vacuum can identify faults that cannot be identified in the test with positive pressure:
 - Insufficient sealing of housing base
 - Insufficient pressing of battery cover against O-ring
- If watches have specifications regarding the maximum water depth, only test them up to that pressure. The following applies: 10 m water depth = 1 bar.
- Test waterproof wristwatches without any specification with a maximum of 2 bar.
- Maximum pressure: +10 bar
- Vacuum: -0.8 bar

Force effect on the watch

Watch size	Vacuum			Pressure			
	-0.2 bar	-0.4 bar	-0.7 bar	1 bar	2 bar	5 bar	10 bar
Diameter:							
- 20 mm	5.9 N	12.7 N	21.6 N	31.4 N	61.8 N	154 N	307.9 N
- 28 mm	11.8 N	24.5 N	42.4 N	60.8 N	120.6 N	302 N	604.1 N
- 36 mm	19.6 N	40.2 N	69.6 N	100 N	200.1 N	499.2 N	998.3 N

Vacuum

The Proofmaster can generate a maximum vacuum of 85% of the ambient pressure. The maximum vacuum that can be generated alters according to the Proofmaster's location.

The following table shows the maximum vacuum that can be generated at each location and its altitude:

Altitude	0 m	500 m	1000 m	1500 m	2000 m
Maximum vacuum that can be generated	-0.85 bar	-0.81 bar	-0.76 bar	-0.72 bar	-0.68 bar

7.1.3 Determining the stabilisation time


The value "Auts" is shown before the value "15".

1. To calculate the stabilisation time automatically, select "Auts".
2. To determine the stabilisation time, enter a value between 15 and 600 seconds.

7.1.4 Determining the measuring time


The measuring time depends on the measured deformation and the programmed tightness limit. The measuring time is calculated automatically by default.

1. To calculate the measuring time automatically, select "Auts".
2. To determine the measuring time, enter a value between 10 and 600 seconds.

Programming

7.1.5 Determining the tightness limit



The tightness limit is entered as a % per minute, based on a test pressure of 2 bar. The Proofmaster then calculates the tightness limit on the basis of the test pressure entered.

To optimise test results, use the following table to adjust the tightness limit to the volume in the watch:

Watch glass diameter	Tightness limit
< 20 mm	-0.5%
Between 20 and 40 mm	-1%
> 40 mm	-2%

7.1.6 Selecting the test mode

The following test modes are available:

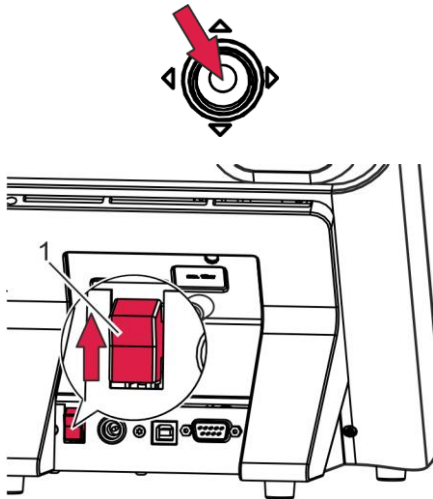
Option	Meaning
Labo	Very precise measurement with long measuring times for laboratory trials and tests. Corresponds to a measurement resolution of 5% of the set tightness limit.
Std	Normal test mode with sufficient precision for a reliable measurement. Corresponds to a measurement resolution of 25% of the set tightness limit.
Prod	Accelerated test mode for production, with reduced precision. Corresponds to a measurement resolution of 40% of the set tightness limit.

7.1.7 Saving a custom program

1. Make sure that all the values for all tests were entered correctly.
2. To save the values, choose "Yes".
 - ⇒ Edit mode is deactivated.
 - The changes were saved.
3. To exit edit mode without saving the changes, choose "No".
 - ⇒ Edit mode is deactivated.
 - The changes were not saved.

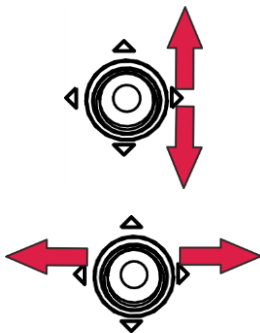
7.2 Adjusting system parameters

Opening the system parameters menu



1. Switch off the Proofmaster (☞ Chapter 6.4 'Switching off the Proofmaster' on page 45).
2. To switch to edit mode for system parameters, press and hold the cursor down.
3. Switch on the device on the reverse while holding down the cursor.
4. Hold down the cursor until the system parameter "Change language" is displayed.

Navigating in the system parameters menu



5. To change a value, move the cursor up and down.
6. To switch between parameters, move the cursor left and right.
Or:
To switch to the next system parameter, press the cursor down.



Once all the system parameters have been displayed, the display switches to the main menu.

7. To go directly to the main menu, press the [escape] button.

The System parameters menu has the following functions:

Function	Additional information
Selecting the language	The following languages are available: <ul style="list-style-type: none"> ■ Danish ("Dansk") ■ German ("Deutsch")

Programming

Function	Additional information
	<ul style="list-style-type: none"> ■ English ("<i>English</i>") ■ Spanish ("<i>Español</i>") ■ French ("<i>Français</i>") ■ Italian ("<i>Italiano</i>") ■ Norwegian ("<i>Norsk</i>") ■ Finnish ("<i>Suomi</i>") ■ Swedish ("<i>Svenska</i>")
Setting the date and time	<p>To reach the next value, press the cursor.</p> <p>Order:</p> <ul style="list-style-type: none"> ■ Day ■ Month ■ Year ■ Time
Printing numerical results	<ul style="list-style-type: none"> ■ Default setting: "Yes" ■ If you want to print numerical results, choose "Yes". ■ If you only want to print a "good/bad evaluation", choose "No".
Activating and deactivating thermal stabilisation	<p>If it is not possible to cool down or heat up the timepiece to the ambient temperature before the test, it is useful to activate thermal stabilisation.</p> <p>Once the test chamber has been closed, the stability of the timepiece is checked for 255 seconds. If the timepiece has reached the ambient temperature once the 255 seconds elapse, the test starts. The test starts after 255 seconds.</p> <p>Default setting: "No"</p>
Activating/deactivating automatic printing	<ul style="list-style-type: none"> ■ Default setting: "No" ■ If you want the results to be printed out after each test, choose "Yes". ■ If you only want the results to be printed when the <i>[print]</i> button is pressed, choose "No".
Displaying the number of tests since first use	Cannot be edited.
Displaying the serial number	Cannot be edited.
Displaying the last calibration date	Cannot be edited.
Displaying the values of the last calibration	<p>Information for the calibration service</p> <p>Cannot be edited.</p>

Function	Additional information
Programming the header	↪ Chapter 7.2.1 'Programming the header' on page 63
Resetting parameters	Reset both system parameters and customer programs.

7.2.1 Programming the header



The system parameter defines what is to be found in the statement in the header.

There are 2 lines available, each with a max. of 20 characters.

Default setting: "Witschi Electronic" in the first line, "CH-3294 Bueren a.A" in the second.

Changing the header

1. To change the first character, move the cursor up and down.
2. To switch to the next character, press the cursor down.
⇒ The next character starts to flash.
3. To change the character, move the cursor up and down.
4. Repeat steps 2 and 3 until all the characters have been changed.

Maintenance

8 Maintenance

8.1 Safety during maintenance

Improper maintenance



WARNING!

Danger to life due to improper maintenance!

Improper maintenance can result in serious injuries or even death due to compressed air.

- Before shutting down the device, completely disconnect the compressed air supply.
- Take care when working on the compressor and the compressed air hoses.
- Observe the documentation from the manufacturer of the compressor.

Short-circuit



NOTICE!

Property damage due to short-circuit!

Damage to the insulation on the power supply unit cable or the power supply unit can result in a short-circuit and damage the Proofmaster.

- Only allow the customer service to perform work on the Proofmaster's electronics.
- If the power supply unit cable or power supply unit are damaged, pull out the power supply unit plug and have the unit repaired.
- Route the power supply unit cable so that it cannot be damaged by external influences.
- Before any cleaning, maintenance or troubleshooting work, pull out the power supply unit plug.
- When disconnecting the power supply unit, only pull on the plug itself, never pull on the cable.
- Always keep access to the power socket clear.
- Keep moisture away from live parts. Moisture can result in short-circuit.
- Never immerse the device in water.

Servicing the compressor

NOTICE!
Damage to the product due to insufficient servicing of the compressor!

There is a risk of material damage to the Proofmaster if the connected compressor is not serviced.

- Service the compressor as specified in the manufacturer's documentation.
- Make sure to comply with the maintenance cycles specified in the following maintenance schedule.

8.2 Maintenance schedule

Interval	Maintenance work	Personnel
After 100,000 tests or every 8 years, at the latest	Send to customer service for servicing. To do so, contact your point of sale (↪ page 3). Note: The "System parameters" menu shows the number of tests since first use.	Operator
Annually	Replace the O-ring (↪ Chapter 8.3 'Replacing the O-ring' on page 66).	Operator
Daily	Clean the O-ring with a dry microfibre cloth.	Operator
	Check that the compressed air hose is secure and in good condition.	Operator
	Make sure that the bell cover is closed at the end of the day (↪ Chapter 6.4 'Switching off the Proofmaster' on page 45).	Operator
If the majority of test results are imprecise or illogical or if requested to do so by calibration instruction on the device	Have the Proofmaster recalibrated. To do so, contact your point of sale (↪ page 3).	Operator
Monthly or after 1000 tests, at the latest	Compressor: clean the air filter. For further information, see the manufacturer's documentation.	Operator
	Compressor: drain condensate. For further information, see the manufacturer's documentation.	Operator
	Compressor: check the oil level. For further information, see the manufacturer's documentation.	Operator

Maintenance

8.3 Replacing the O-ring



You can order a new O-ring from your point of sale.

Order number: NA04-OR130.2x5.34

Prerequisites:

- The Proofmaster is switched off.
- The Proofmaster is disconnected from the compressed air supply.

1. Remove the O-ring (Fig. 31/1) with tweezers.

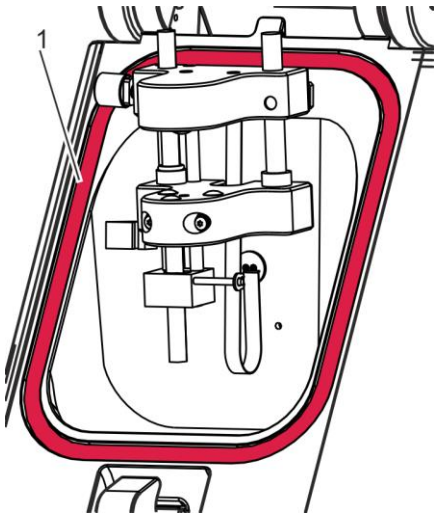


Fig. 31: Removing the O-ring

2. Remove particles of dust and other residue from the bearing for the O-ring (Fig. 32/1).

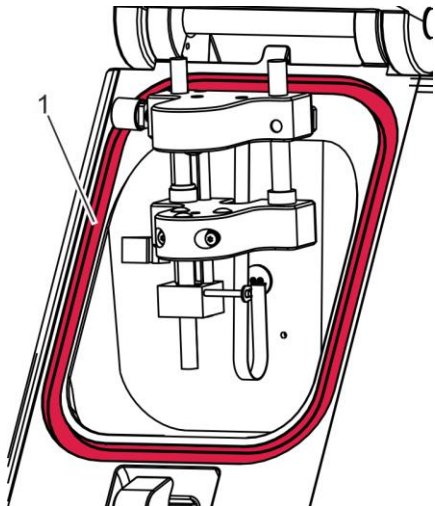
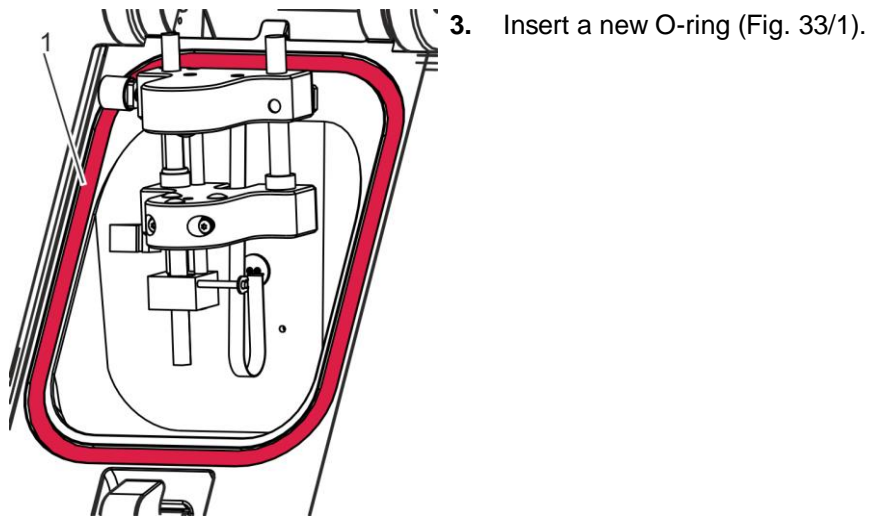


Fig. 32: Cleaning the bearing



3. Insert a new O-ring (Fig. 33/1).

Fig. 33: Inserting an O-ring

Troubleshooting

9 Troubleshooting

9.1 Error messages



Error messages appear when there is a malfunction in the device. The following table provides information about possible causes of an error message and information about possible remedies.

Display/reaction	Description of error	Cause	Remedy
<p>"PC - Aborted"</p> <p>"No vacuum / No air"</p> <p>The bell cover opens after closing.</p>	It was not possible to build up the pressure for the test.	<ul style="list-style-type: none"> ■ Inlet pressure is too weak. ■ Vacuum is reduced due to location. The higher the altitude, the more difficult it is to create a vacuum. 	<ul style="list-style-type: none"> ■ Check the compressor's output pressure. ■ The output pressure must be at least 1 bar higher than the chosen test pressure.
<p>"PC - Aborted"</p> <p>"Sensor out of range"</p> <p>The bell cover opens after closing.</p>	The sensor is out of the measuring range.	The watch is not positioned correctly.	Check that the watch is positioned correctly (↪ Chapter 6.5.3 'Positioning the watch' on page 47).
		Not possible to lower sensor.	Close the test chamber manually and check whether the movement of the sensor is impaired.
<p>"PC - Aborted"</p> <p>"Chamber not tight"</p> <p>The bell cover opens after closing.</p>	A loss of pressure or vacuum was identified because the chamber is leaky.	Dirt or debris on the bell cover's seat.	<ul style="list-style-type: none"> ■ Clean the bell cover's seat (without fluids). ■ Clean the O-ring.
		O-ring exhibits signs of damage.	Replace the O-ring (↪ Chapter 8.3 'Replacing the O-ring' on page 66).

Display/reaction	Description of error	Cause	Remedy
"PC - Aborted" "Chamber not closed"	Bell cover cannot be locked or unlocked	Mechanical or electrical fault.	If bell cover is open: <ul style="list-style-type: none"> ■ Contact customer service (☎ page 3). If bell cover is closed: <ul style="list-style-type: none"> ■ Release the pressure manually and open the bell cover (☎ Chapter 6.2 'Opening the bell cover in an emergency' on page 42). ■ Then contact customer service (☎ page 3).
"PC - Aborted" "Motor 1"	Not possible to close or open bell cover.		

9.2 Malfunctions

Description of malfunction	Cause	Remedy
Distorted test results	The watch is not positioned correctly.	Reposition the watch (☎ Chapter 6.5.3 'Positioning the watch' on page 47).
	Adhesive or protective foil on the watch case.	Remove adhesive or protective foil.
	Watch is not at ambient temperature.	Wait until the watch has warmed up or cooled down. Repeat the test.
	Sequence of pressures not followed.	Adjust pressures (☎ Chapter 7.1.2 'Determining the test pressure' on page 58). Repeat the test.
	If distorted test results occur often, the device is not calibrated properly.	Have the device calibrated by customer service (☎ page 3).
Results are not printed out.	Printer out of paper.	Insert a new roll of paper. See the manufacturer's documentation.
	Automatic printing of results is not switched on.	Switch on automatic printing of the test results (☎ Chapter 7.2 'Adjusting system parameters' on page 61).

Shutdown and disposal

10 Shutdown and disposal

Shutdown



WARNING!

Risk of injury from compressed air!

An uncontrolled release of compressed air may cause injuries.

- Before shutting down the device, completely disconnect the compressed air supply.
- Observe the documentation from the manufacturer of the compressor.

Prerequisite:

- The Proofmaster has been switched off (☞ Chapter 6.4 'Switching off the Proofmaster' on page 45).

1. Switch off the compressor as specified in the manufacturer's documentation.
2. Disconnect the compressor from the compressed air hose as specified in the manufacturer's documentation.
3. To release the catch on the compressed air connection, push back the black ring (Fig. 34/1) on the compressed air connection and hold it back.
4. Pull the compressed air hose out of the compressed air connection.

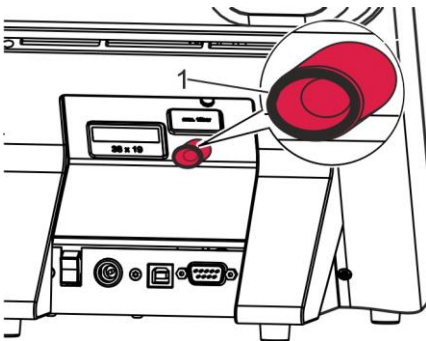


Fig. 34: Compressed air connection

5. Pull the power supply unit adapter from the mains connection (Fig. 35).

⇒ Proofmaster is shut down.



If you used additional accessories, first switch these off properly and then disconnect them from the RS232 port or USB port on the Proofmaster.

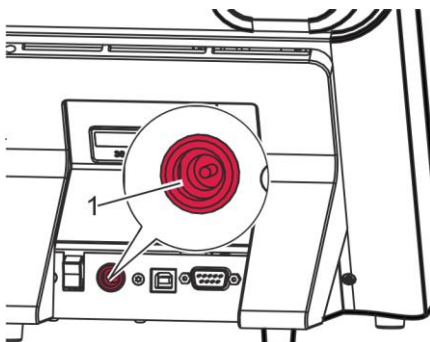


Fig. 35: Mains connection

Disposal

If no return or disposal agreement has been made, take the device to a recycling facility.



NOTICE!
Incorrect disposal poses an environmental hazard!

Incorrect disposal may result in hazards to the environment.

- Only have authorised specialists dispose of the device.
- If in doubt about environmentally sound disposal, contact your local authority or a specialist waste disposal company.

Electrical and electronic components



The device must not be disposed of as household waste, it must be handed over to a municipal collection point or be disposed of by a specialist.

Technical data

11 Technical data

Mass and weight

Data	Value	Unit
Weight	6	kg
Width	250	mm
Height	250	mm
Depth	240	mm

Test range

Data	Value	Unit
Vacuum range	-0.2 – -0.8	bar
Pressure range	0.2 – 10	bar
Precision of test pressure	± 3	%



The Proofmaster can generate a maximum vacuum of 85% of the ambient pressure. The maximum vacuum that can be generated therefore alters according to the altitude at which the Proofmaster is used. For additional information about the maximum vacuum that can be generated, see [☞ 'Vacuum'](#) on page 59.

Mains supply connection values

Data	Value	Unit
Mains voltage	230 or 115	V AC
Mains frequency	50	Hz



Before connecting the device, make sure that the local mains voltage matches the specified voltage on the power supply unit.

Technical data
Power supply unit output values

Data	Value	Unit
Voltage	9	V AC
Current consumption	1.2	A
Power consumption, maximum	10	W

Pneumatic connection values

Data	Value	Unit
Maximum inlet pressure	12	bar
Inlet pressure to enable full use of the device	11	bar
Compressed air requirements, testing with pressure	10	l/test
Compressed air requirements, testing with vacuum	40	l/test
Quality	Dry and dust-free	

Measuring characteristics

Data	Value	Unit
Measuring time	10 – 600	s
Stabilisation time	10 – 600	s
Tightness limit	-0.1 – -3	%/min
Measurement resolution	0.02	µm

Operating conditions

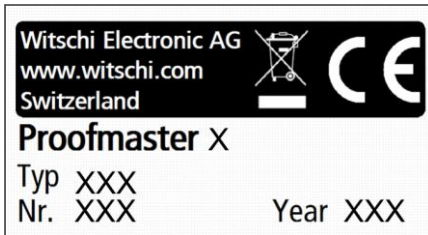
Data	Value	Unit
Temperature range	10 – 40	°C
Relative humidity, maximum	10 – 80	%, non-condensing

Technical data

Emissions

Data	Value	Unit
Noise emissions	< 80	dB(A)
Noise emissions (with new vacuum generator, as of mid 2016)	< 65	dB(A)

Proofmaster rating plate



The Proofmaster's rating plate is located on the reverse of the device and contains the following information:

- Manufacturer
- Type
- Serial number
- Year of manufacture

Fig. 36: Proofmaster rating plate

Power supply unit rating plate



The power supply unit's rating plate contains the following information:

- Manufacturer
- Type
- Specification

Fig. 37: Power supply unit rating plate

12 Accessories and spare parts

Ordering spare parts

To order accessories or spare parts, contact your point of sale (☞ *page 3*).

You can find your nearest point of sale on our website "<http://support.witschi.com>" on the "Service point" tab.

Compressed air

Accessories	Order number
Compressor JunAir 6-10 with automatic drainage	97.91.103 (230 V~)
	97.91.104 (115 V~)
Pneumatic connection with hose	31.10.311
Pneumatic T-piece	KA03-3104.06.00

Printing

Accessories	Order number
Thermal printer, 100-240 V~ with ticket cutter	JB01-SLK-TE25-S
Thermal paper, spare roll for JB01-740RS232 and JB01-SLK-TE25-S	JB01-MM60-740RS
Automatic switchbox 4: makes it possible to connect up to 4 devices to one printer.	95.8020PK1

Software

Accessories	Order number
Auto-Print	64.55.901PK1
Proofmaster M/S	64.50.792PK1

Accessories and spare parts

Power supply units

Accessories	Order number
Power supply unit 230V~ EU	95.64.101
Power supply unit 115V~	95.64.104
Power supply unit 230V~ UK	95.64.103

Watch underlays

Accessories	Order number
Set of watch underlays (8, 13 and 21 mm)	31.20.801
Watch underlay 8 mm	31.20.802
Watch underlay 13 mm	31.20.803
Watch underlay 21 mm	31.20.804
Watch underlay 26 mm	31.20.805

Additional accessories

Accessories	Order number
PMM/S protective cover	31.20.04.30
USB connection cable	JB03-11.02.8818
O-ring	NA04-OR130.2x5.34

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Appendix

14 Appendix

A Declaration of conformity

<p>Declaration of conformity <i>Dichiarazione di conformità CE</i> Declaración de conformidad</p>		 EN IT ES
<p>We La / Nosotros:</p>	<p>Witschi Electronic AG Bahnhofstrasse 26 CH-3294 Büren a.A. Switzerland / Svizzera / Suiza</p>	
<p>declare under our sole responsibility that the product <i>dichiaro sotto la sua esclusiva responsabilità che il prodotto</i> declaramos por responsabilidad propia, que el producto</p>		
<p>Name nome / denominación:</p>	<p>Proofmaster S</p>	
<p>Typ-Nr. N. tipo / N° de tipo:</p>	<p>31.21</p>	
<p>Serial-Nr. N. di serie / N° de fabricación:</p>	<p>001 - 5'000</p>	
<p>Function funzione / función:</p>	<p>test instrument for leak test</p>	
<p>Year Anno di costruzione / Año de fabricación:</p>	<p>2013</p>	
<p>doc. management Gestione doc. / Administración de documentos</p>	<p>Witschi Electronic AG, Roman Siegfried, Bahnhofstr. 26, CH-3294 Büren a.A.</p>	
<p>Quality mgt. systems QMS certificate / Sistema de gestión de calidad</p>	<p>SQS, ISO 9001:2008, Scope 19 / Reg. Nr. 12228</p>	
<p>to which this declaration applies, is in conformity with the following EC-Directive(s) and standard(s) or other normative document(s): <i>a cui si riferisce la presente dichiarazione è conforme ai requisiti previsti dalle direttive CE ed alle norme o ai documenti normativi elencati qui di seguito:</i> al cual hace referenc a esta declaración, satisface las disposiciones de la(s) siguiente(s) directiva(s) u E y norma(s) o documento(s) normativo(s):</p>		
<p>Richtlinien/Guidelines</p>		
2004/108/EG	<input checked="" type="checkbox"/>	electromagnetic compatibility
2006/95/EG	<input type="checkbox"/>	EC low voltage directive
2006/42/EG	<input checked="" type="checkbox"/>	EC machinery directive
<p>Normen</p>		
EN 61326-1: 2006	<input checked="" type="checkbox"/>	Electrical equipment for measurement, control and laboratory use. EMC requirements. General requirements
EN 61010-1: 2010	<input type="checkbox"/>	Safety requirements for electrical equipment for measurement, control and laboratory use. General requirements
EN ISO 12100-x	<input checked="" type="checkbox"/>	Safety of machinery
EN 55022:2006	<input checked="" type="checkbox"/>	Information technology equipment. Radio disturbance characteristics. Limits and methods of measurement
EN 60555-x	<input checked="" type="checkbox"/>	Disturbances in supply systems caused by household appliances and similar electrical equipment
IEC 1000-4-x	<input checked="" type="checkbox"/>	Electromagnetic compatibility (EMC). HF. Burst, Surge, Cond, Immunity, 50Hz Magn. Puls, Dips
<p>Büren a.A., den <u>11.03.2013</u></p>		
	 Daniel Hug Leiter Entwicklung	 Roman Siegfried Leiter Produktions-Management

The logo for 'witschi' features the word in a bold, lowercase, grey sans-serif font. A red curved line arches over the 'i' and 's', and another red curved line arches under the 'i' and 's', framing the central part of the text.

witschi