







Imprint

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1 Important information

Please study this manual carefully, before using the equipment. This will ensure that you will receive maximum benefits from using this test device with its versatile functionality and it will guarantee optimum benefits over its lifetime.

Version: 2



1.1 Use of the operator manual

We strongly recommend you to read the complete manual before using the equipment.

It was our intention to structure this manual in a clear layout, to enable you to get easy and instant access to the information you are looking for. Please keep this manual in a safe place where it is always available for easy access.

Information contained in this document is believed to be accurate and reliable. Anyhow, due to ongoing product developments and new revisions, IMES cannot guarantee the accuracy of this document after the date it is published nor can it accept responsibility for errors or omissions. This document, and the software or hardware which it describes, is subject to change without notice.

1.2 Safety notes

All instructions must be read and observed in order for the handheld device and the pressure sensor to function safely. SAVE THESE INSTRUCTIONS FOR FUTURE REFERENCE AND INCLUDE THEM WITH THE DEVICE WHEN TRANSFERRING IT TO A THIRD PARTY.

Observe the following notes for preventing accidents while using the Compri device:

- Do not make any modifications to the measurement equipment.
- Operate the Compri device only in proper condition.
- Adjustment and/or maintenance work is to be carried out by authorized professionals.
- Before using the Compri device, check it for defects and deficiencies visible on the outside. Immediately notify any changes (including changes in operating behavior) to the competent staff/person. If necessary, immediately put the device out of service and lock/tag it out!
- Keep the operating instructions near the Compri device so as to be readily available at any moment.
- Non-observance of the safety notes contained in these operating instructions may result in property damage, injuries or even death of persons.
- Do not operate the Compri device outside the specified limits.
- Use only original spare parts and accessories.
- Do not operate the Compri device in explosive atmospheres which contains flammable liquids, gases or dust.

1.3 Obligations of the operator

The operator is obliged to operate the Compri device only in proper condition. Hazard areas arising between IMES devices and customer equipment are to be secured by the operator.

The operator must designate and instruct responsible persons:

- Only employ trained or instructed personnel.
- Clearly define the responsibilities of the personnel for operation, maintenance, and repair.
- Regularly check if the personnel is working with due safety and risk awareness whilst observing the operating instructions.
- Before starting work, the personnel assigned to work with the Compri device must have read and understood the operating instructions, in particular the "Safety notes" chapter, as well as the applicable regulations.
- Keep the operating instructions and applicable regulations accessible to the operating and servicing personnel.
- Determine the responsibility of the user and allow him to reject all third-party instructions that are in breach of safety regulations.
- For safe operation of this Compri device it is required to wear safety glasses and gloves. Further protective equipment may has to be worn according to the applicable regulations.



INFO

In addition to the operating instructions, observe and follow general legal and other binding accident prevention and environmental protection regulations.

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2 Scope of supply

The scope of supply includes the following components:

- Compri device with protection cover
- Cylinder pressure sensor
- Tool to mounting and dismounting the pressure sensor
- Adapter M14x1.25 to M18x1.5
- Case with 4 pcs. Mignon LR6 (AA) batteries
- Quickstep manual in English language (printed)
- Transportation case

For the exact scope of supply please refer to the order documents and compare to the delivery note.

2.1 Unpacking inspection

Check for completeness

Check the entire delivery for completeness based on the attached delivery note. In this context, we are referring to our conditions of sale and delivery.

Report any damage

Immediately report to the carrier, insurance company and the delivering dealer any damage to the device due to improper packaging or transportation identified after delivery. Take action to mitigate the damage that has occurred and prevent further damage.

2.2 Packaging

Unless an agreement was made with IMES GmbH regarding the return of the packaging material, the packaging material remains with the customer.



INFO

Disposal that is environmentally compatible and in compliance with the applicable disposal regulations must be ensured. If necessary, employ a waste disposal company to dispose of the packing material.

3 Technical data

3.1 Dimensions and weight of instrument case including

Length: 45 cm
Width: 35 cm
Height: 11cm
Weight of instrument case: 2,7 kg

3.2 Other parameters

Measuring range	060 bar
Accuracy	+/- 1% FS
Engine speed range 4-/2-stroke	50600 rpm
Battery	4 x Mignon LR6 (AA) battery cells
Weight (Compri device incl. batteries)	405g
Dimensions (Compri device)	176mm x 98mm x 43mm
Operating temperature (Compri device)	-0°C45°C
Storage temperature	-20°C+70°C
Relative air humidity max.	90%
Data transmission	Bluetooth LE

Sensor dimensions depend on the supplied pressure sensor type.

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4 System introduction

The Compri electronic indicator is a hand-held, battery powered and portable device to measure and evaluate cylinder compression pressure on 2- and 4-stroke petrol, diesel and gas engines at speed up to 600 RPM.

The device is equipped with a high temperature pressure sensor for direct measurement of cylinder pressure on spark plug ports of small and medium size engines.

The Compri device measures the compression pressure while the engine is being cranked and calculates peak pressure and engine speed. Additionally, several consecutive pressure cycles with full resolution are stored. The measured data and the first few pressure curves are displayed in the imesCompri visualization app which is available for MS Windows, Android and iOS.

Up to 20 cylinders can be measured with the Compri device.

5 Software installation

5.1 Microsoft® Windows



Your computer must have Microsoft® Windows 10 or 11 installed to run IMES Compri visualization software. The imesCompri App is available on the Microsoft® Store. Search for "imesCompri" or follow this link: https://www.microsoft.com/store/apps/9PJW2TCPK89K



5.2 Android



Your Android device must run on Android 11 or newer.

The imesCompri app is available on Google Play Store. Search for "imesCompri" or follow this link: https://play.google.com/store/apps/details?id=de.imes.imescompri



5.3 Apple iOS



Your Apple device must run on iOS 11 or newer.

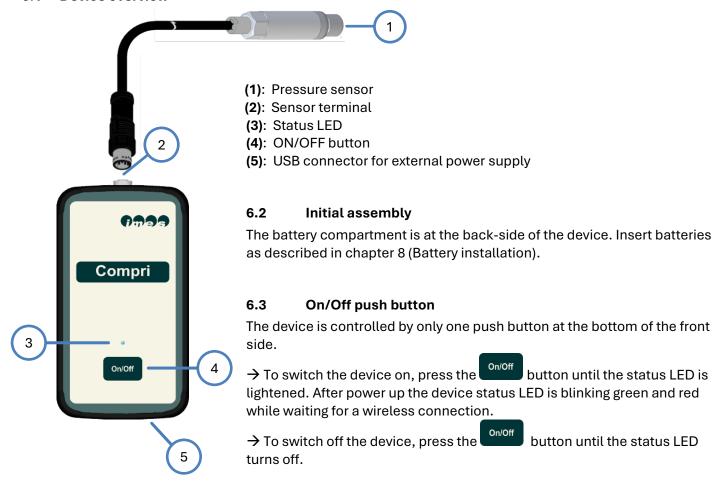
The imesCompri app is also available on the Apple Store. Search for "imesCompri" or follow this link: https://apps.apple.com/de/app/imescompri/id6596754539?itsct=apps_box_link&itscg=30200

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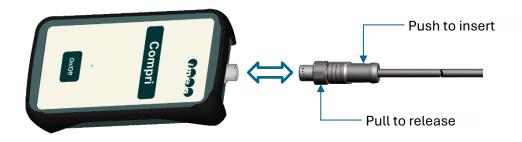


6 Compri device operation

6.1 Device overview



6.4 Connect the sensor wire to the Compri device





6.5 Connect the Compri device and prepare measurement

Switch the Compri device on by pressing the on/off button. The status LED flashes green and red alternately.

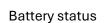
Start the imesCompri visualization software on the computer or your mobile device. The software searches for nearby Compri devices and automatically connects to the device. (If there is more than one active device in range, you need to select the correct device from the displayed list).



In case the software can't find any device in range within a few seconds, you can restart the scanning process by pressing the "scan" button on the upper right corner of the application.



The connection status and the battery status are displayed on the top right corner of the application:





Connection status (On Android and iOS this icon also indicates the signal quality level.)

Once the device is connected, the system is ready for measurement.

6.6 New measurement



A completely new measurement can be started by pressing the button "New measurement". The current measurement will be deleted after request.

Make sure that you save the current measurement by pressing the "Save measurement" button if you want to keep the current measurement values before starting a new measurement.

If you intend to test another engine, please remember to open the engine data form and change the engine information accordingly.

6.7 Save measurements



If there are (changed) measurement data available, you can save the measurement to a local file on your device at any time. Enter a descriptive filename or take over the pre-

filled one. Further changes during the same measurement can be saved to the same file.

6.8 Load saved measurement



Navigate to the "Measurements" tab where all saved measurements are listed and select the measurement you want to open.

Delete a file by pressing on the $\overline{\mathbb{H}}$ symbol.

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6.9 Compression Pressure Measurement

6.9.1 Preparations

It is recommended to do the compression measurements on a warm/hot engine, however, it can be done on a cold engine as well.

- Mark the spark plug wires before removing them to make sure that you don't cross them when putting them back later.
- Remove <u>ALL</u> spark or glow plugs and disable the fuel system.
- Also, the ignition system should be disabled.



WARNING

Risk of injury due to hot parts or oil

Take care while working on hot engines. Protect yourself from hot parts or oil sprays.

- Wear safety goggles
- Wear proper gloves



WARNING

Risk of injury due to sparks

If the ignition system is not disabled, it is still charged and can achieve a spark and shock someone.

- Disable the ignition system OR
- make sure that the ignition system can't achieve a grounded spark



CAUTION

Property damage due to incomplete test preparation!

The engine must not start during the measurement. The sensor may be damaged by high combustion pressure or high temperatures due to hot gas.

- Make sure that the fuel system is disabled all the time during the measurement.



INFO

Always refer to and follow the engine manufacturer's instructions for compression pressure measurement.

6.9.2 Sensor installation

It is recommended to start the measurement with cylinder 1, but it can be done in any order.

- (1) Disconnect the sensor from the Compri device.
- (2) If necessary, screw a suitable adapter into the spark or glow plug hole of the cylinder you want to test first.
- (3) Screw the sensor into the spark or glow plug hole or the installed adapter.
- (4) Tighten the sensor using the special wrench supplied with the Compri device.
- (5) Connect the sensor wire to the Compri device.

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6.9.3 Compression test



Risk of injury

- Danger of injuries when cranking the engine while someone is working around the engine.
 - Make sure NOT to spin the engine until you are ready for measurement.
 - Keep hands clear of moving parts while cranking the engine.



CAUTION

WARNING

Property damageDamage of the Compri device or engine parts.



- Place the Compri device on a safe location during the measurement.
- Make sure that the Compri device can't fall into the engine compartment where it can get damaged by moving parts or damage engine parts.

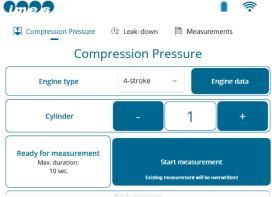


INFO

Check the engine data whenever you intend to test a new engine.

- The engine data will be printed on the report and is saved with the measurement data.
- The last engine data entries are automatically loaded at application start.

- (1) Check the engine information by opening the corresponding screen with the "Engine data" button.
- (2) Make sure that the correct engine type is selected (4- stroke or 2-stroke).
- (3) Select the cylinder number you want to measure and start the measurement process by pressing the "Start measurement" button:



- (4) The box left of the start button provides status information. After pressing the start button, the Compri device is preparing for measurement. Please wait until this process is completed:
- (5) When the Compri device is ready it shows the following status message:
- **(6)** Crank the engine at least a few seconds or for the configured maximum duration. During the measurement the elapsed time is displayed:
- (7) The measurement stops automatically when the maximum measurement duration is reached. Otherwise, you need to manually stop the measurement by pressing the "Stop measurement" button.
- (8) After the measurement is finished, the software downloads a pressure cycle record which will take some time:

Preparing
Please wait...

Crank the engine...

Measurement duration

3 sec.

Loading pressure curves

Please wait...

(9) Disconnect the sensor wire from the Compri device, remove the sensor and screw it into the spark or glow plug hole of the next cylinder you want to test.

Proceed with the measurement by repeating the steps 3 to 9 for each cylinder.

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6.9.3.1 Measurement details

While measuring the compression of a cylinder the screen shows several actual values.



- The peak pressure section shows the pressure readings of the current measurement. The peak pressure of each working cycle is displayed in the line chart on the left side. The latest measurement value is shown on the right side as well as the maximum peak pressure of this measurement.
- The bottom section shows the maximum compression pressure values of all completed measurements. The bar chart provides an overview of the peak pressure deviations between the cylinders.

The gauge on the right side displays the latest engine speed.

6.9.4 Measurement evaluation

A measurement evaluation can be displayed at any time by pressing the button "Evaluation". Selecting one of the saved measurements also shows the evaluation screen.



- Measurement type, filename (- if a saved measurement was opened) and the date of the measurement are listed at the top of the evaluation screen.
- Press the "engine data" button if you want to modify the engine data.
- Use the comment entry box to add a comment to your measurement.
- The data table provides an overview of the measured compression pressure values. The deviation from the mean pressure is an important indicator for the condition of each cylinder.
- Graphical comparison of the peak pressure values for each cylinder.
- The evaluation also displays one chart with pressure curves of the first few working cycles for each cylinder.

 Scroll the screen to review all the recorded pressure curves.
- Create and open the PDF report or share the PDF report. The button "Save changes" is enabled in case of unsaved modifications.

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6.10 Leak Down Test (Pressure Loss Measurement)

6.10.1 Preparations

It is recommended to do the leak down measurements on a warm/hot engine, however, it can be done on a cold engine as well.

- Mark the spark plug wires before removing them to make sure that you don't cross them when putting them back later.
- Remove ALL spark or glow plugs.
- Apply the hand break.
- Shift the engine into high gear.
- Adjust the piston of the cylinder you want to measure to its firing TDC (top death center) position All valves must be closed now.



WARNING

Risk of injury due to hot parts or oil

Take care while working on hot engines. Protect yourself from hot parts or oil sprays.

- Wear safety goggles
- Wear proper gloves



WARNING Risk of injury

Risk of injury due to rotating engine.

- Do not pressurize the cylinder before everything is prepared for the measurement.
- The engine must not turn (or even start) during the measurement.



CAUTION

Property damage due to incomplete test preparation!

The pressure regulator can be damaged if the inlet pressure is too high.

- The supply pressure (from the compressor or compressed air system) must be between 6.5 and a maximum of 18 bar.



INFO

Always refer to and follow the engine manufacturer's instructions for leak down tests.

6.10.2 Calibration



INFO

Check the engine data whenever you intend to test a new engine.

- The engine data will be printed on the report and is saved with the measurement data.
- The last engine data entries are automatically loaded at application start.

The inlet pressure must be adjusted prior to the measurement. To do so, start the calibration mode by pressing the "Calibrate" button if it is not already active.

Status:

Not calibrated

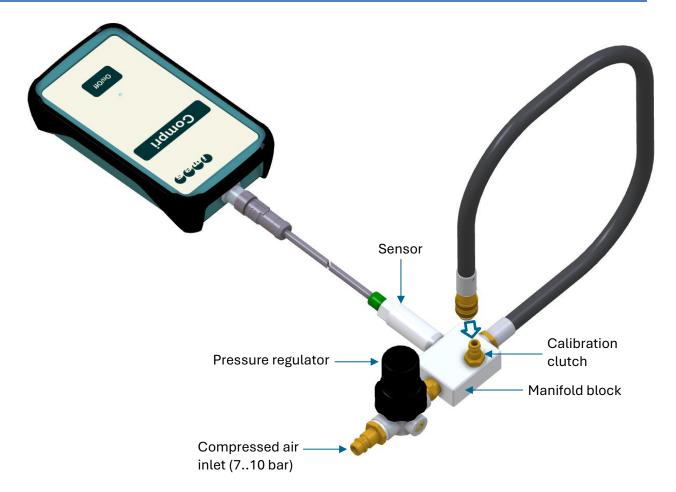
Calibrate

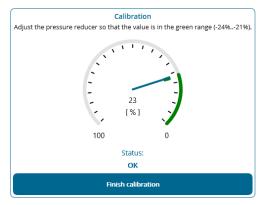
Prepare the test setup for calibration:

- (6) Screw the pressure sensor into the manifold block.
- (7) To calibrate the test setup, connect the outlet hose to the calibration clutch on the manifold block.
- (8) Connect the pressure regulator to compressed air (\rightarrow 7..10 bar).

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- **(9)** Adjust the pressure regulator until the displayed pressure is in the green area of the gauge (\rightarrow 23%).
- (10) As soon as the display is at 23%, lock the pressure regulator and press the "Finish calibration" button.
- (11) Release the pressure outlet from the calibration clutch.

The system is now ready for measurement.

6.10.3 Leakage test

Da

WARNING

Risk of injuryDanger of injuries by unexpected spinning of the crankshaft when pressure is applied to the piston.

- Don't leave tools attached to the crankshaft
- Keep hands clear of possibly moving parts.
- Make sure the hand brake is applied and shifted into high gear.

1

CAUTION

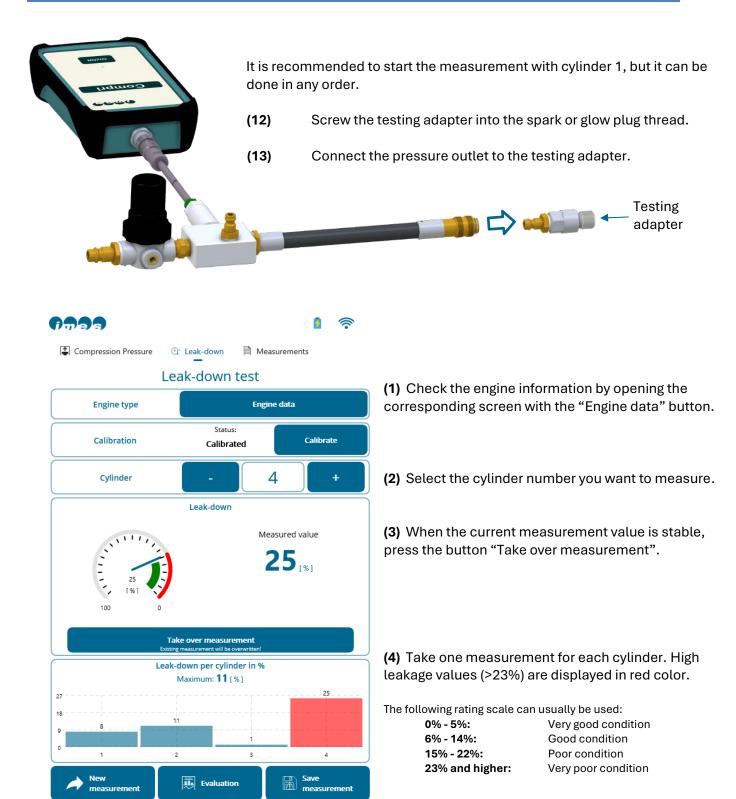
Damage of the Compri device or engine parts.

Property damage

- Place the Compri device on a safe location during the measurement.
- Make sure that the Compri device can't fall into the engine compartment where it can get damaged by moving parts or damage engine parts.

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- (5) Disconnect the outlet hose from the testing adapter.
- (6) Screw the testing adapter into the spark or glow plug thread of the next cylinder.
- (7) Adjust the piston of the next cylinder you want to measure to its firing TDC (top death center) position All valves must be closed now.
- (8) Select the number of the cylinder you want to measure.
- (9) Connect the pressure outlet to the testing adapter. Continue with step (3)...

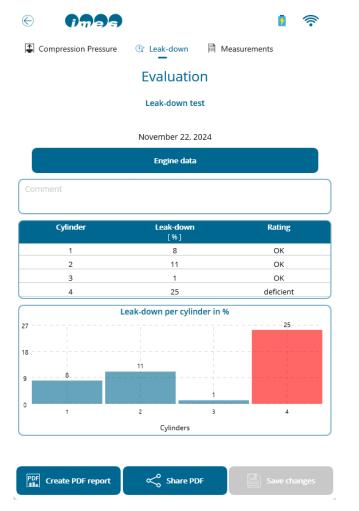
Once you have measured all cylinders, save the measurement and review the evaluation report.

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6.10.4 Measurement evaluation

A measurement evaluation can be displayed at any time by pressing the button "Evaluation". Selecting one of the saved measurements also shows the evaluation screen.



- Measurement type, filename (- if a saved measurement was opened) and the date of the measurement are listed at the top of the evaluation screen.
- Press the "engine data" button if you want to modify the engine data.
- Use the comment entry box to add a comment to your measurement.
- The data table provides an overview of the measured leakage values and basic rating.
- Graphical comparison of the leakage values for each cylinder.

High leakage values (>23%) are displayed in red color.

 Create and open the PDF report or share the PDF report.

The button "Save changes" is enabled in case of unsaved modifications.

The following rating scale can usually be used:

0% - 5%:Very good condition6% - 14%:Good condition15% - 22%:Poor condition23% and higher:Very poor condition

Also take the differences between the cylinders into account of your rating. Usually, a difference of about 4% is acceptable.

In case of leakage try to spot the leak by listening to the noise of blowing air.

Possible places of leakage are:

- Inlet or exhaust valve

Piston ring

- Cylinder head

Noise can be located at e.g.:

- Intake or exhaust manifold
- Oil filler neck
- Cooling liquid filler neck



7 Firmware update

We are constantly working on improving the IMES Compri and offer free firmware updates for your device. By installing the latest firmware, you can benefit from our most recent developments. The update is simple and uncomplicated.

- Connect to the Compri device.
- Open the firmware update page in the software.
- Make sure that your computer or mobile device is connected to the internet and click the button "Check for updates".
- If a new firmware is available, some information about the new firmware is displayed and you can download the update file to your computer.
- Once the file has been downloaded, you can go ahead and install the firmware to the Compri device

CAUTION



Device malfunction

Damage of the Compri device.

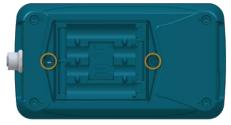
- Make sure that the batteries are in good condition.
- Do not close the application during firmware installation.
- Do not power off the Compri device during firmware installation.
- When you click the button "Install firmware to device" the upload process starts. This takes several minutes. Be patient and wait until the installation has been completed.
- When the upgrade is completed, the Compri device restarts and the app tries to re-connect to the device.
- Once the device is reconnected, new firmware information is displayed:

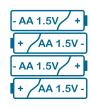


8 Battery installation

The IMES Compri uses 4x AA (Mignon, LR6, 1.5V) battery cells for power supply in standalone operation. IMES recommends using quality non-rechargeable batteries.

- Switch off the device.
- Remove the protection cover from the IMES Compri enclosure.
- Open the battery compartment by removing the two screws at the back side of the device.
- Replace/insert batteries in the battery compartment. Observe the polarity!
- Close the battery compartment and insert the screws.







INFO

When not in use for a long period, remove the batteries.

Always replace all batteries at the same time and use only batteries from the same type/manufacturer.

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Maintenance and Service

Maintenance and Cleaning

- Only store and transport the Compri device and the sensor in the protection case provided. Always keep the device and all accessories clean.
- Never immerse the Compri device or the pressure sensor in water or other liquids.
- Wipe off any dirt using a damp, soft cloth. Do not use any detergents or solvents.
- Take particular care of the pressure sensor, which must be handled with care.
- If the Compri device or any accessory needs to be repaired, send it off in the protection case.

Service

Our after-sales service responds to your questions concerning maintenance and repair of your product as well as spare parts. The IMES team will be happy to help you with any questions about our products and their accessories.

Contact the service team at info@imes.de

10 **Troubleshooting**

Problem	Action
Device doesn't turn on	Replace batteries
(LED remains off)	
App doesn't find any device	Check if Bluetooth is enabled on your mobile device or computer
	Retry scanning for devices by tapping on the "SCAN" button
App can't connect to device	Close and restart the app, as well as power off and on the device
Sudden loss of wireless connection	Check batteries and replace them if necessary
No pressure and RPM values are	Check whether the sensor is properly installed and connected
displayed when cranking the engine	No compression. Check if the sensor works on another cylinder.
	Sensor is defective. Please contact IMES support.

Disposal 11

Electronic devices, pressure sensors, batteries, accessories and packaging should be sorted out for environmental friendly recycling. Do not dispose of the Compri device, pressure sensor or batteries with household waste!

According to the Directive 2012/19/EU, electronic devices that are no longer usable, and according to the directive 2006/66/EC, defective or used batteries must be collected separately and disposed of in an environmentally correct manner. The consumer is required by law to properly dispose of electronic devices, as well as batteries, at the end their life.

12 Warranty disclaimer

IMES Intelligent Measuring Systems GmbH assumes no liability and provides no warranty for damage resulting from improper installation/mounting, improper use of the product or from failure to observe the operating instructions and/or safety notes.

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