**ULTRASONIC OIL LEVEL GAUGE**
**FOR MERCEDES-BENZ GEARBOXES**

# A1207D
# LEVEL GAUGE

**USER MANUAL**


Acoustic Control Systems – ACS Group
Saarbrücken, Germany


Service Address:

**ACS-Solutions GmbH**
**Science Park 2**
**66123 Saarbrücken, Germany**

**Phone:** **+49 (0) 681-96592270**
**Fax:** **+49 (0) 681-96592280**
**E-mail:** **info@acs-international.com**
**Website:** **www.acs-international.com**


CE

# CONTENTS

## READ FIRST!

Read this manual carefully before using the instrument to ensure safe and proper use.

CE certification acc. to 2014/30/EU (EMC) is provided; requirements of the Federal Communications Commission (FCC) -relevant for delivery, sales and import to USA, as well as corresponding IC prescriptions for Canada, are met likewise.

Liquid ingress protection and solid particle protection of the casing is in conformity with level IP64 (standard EN 60529), so the equipment is splash proof in any direction and dust-tight. Follow the instructions below to maintain water resistance and dust protection. Otherwise, the instrument may be damaged

- Never immerse the equipment into water.
- After contact with clear water, wipe it thoroughly with a clean soft cloth.
- Contact of the instrument with liquids other than water may adversely affect the performance and appearance of the instrument.
- Dropping the instrument and opening it by unqualified personnel may affect the solid particle protection.

Tests with this instrument type in a controlled environment have shown that the requirements of EN 60529, IP64 are met. Despite this classification, it is possible that the instrument will be damaged in certain situations.

**Safety symbols used in this Manual:**

| Symbol | Description |
|---|---|
| ⚠WARNING | Indicates a potential threat. Failure to avoid it can result in death or serious injury. |
| ⚠CAUTION | Indicates a potential threat. Failure to avoid it may result in minor injury. |
| *NOTICE* | Indicates a potentially harmful situation. If it is not avoided, the instrument or something in its vicinity may be damaged. |

# 1.1 DELIVERY SET

1

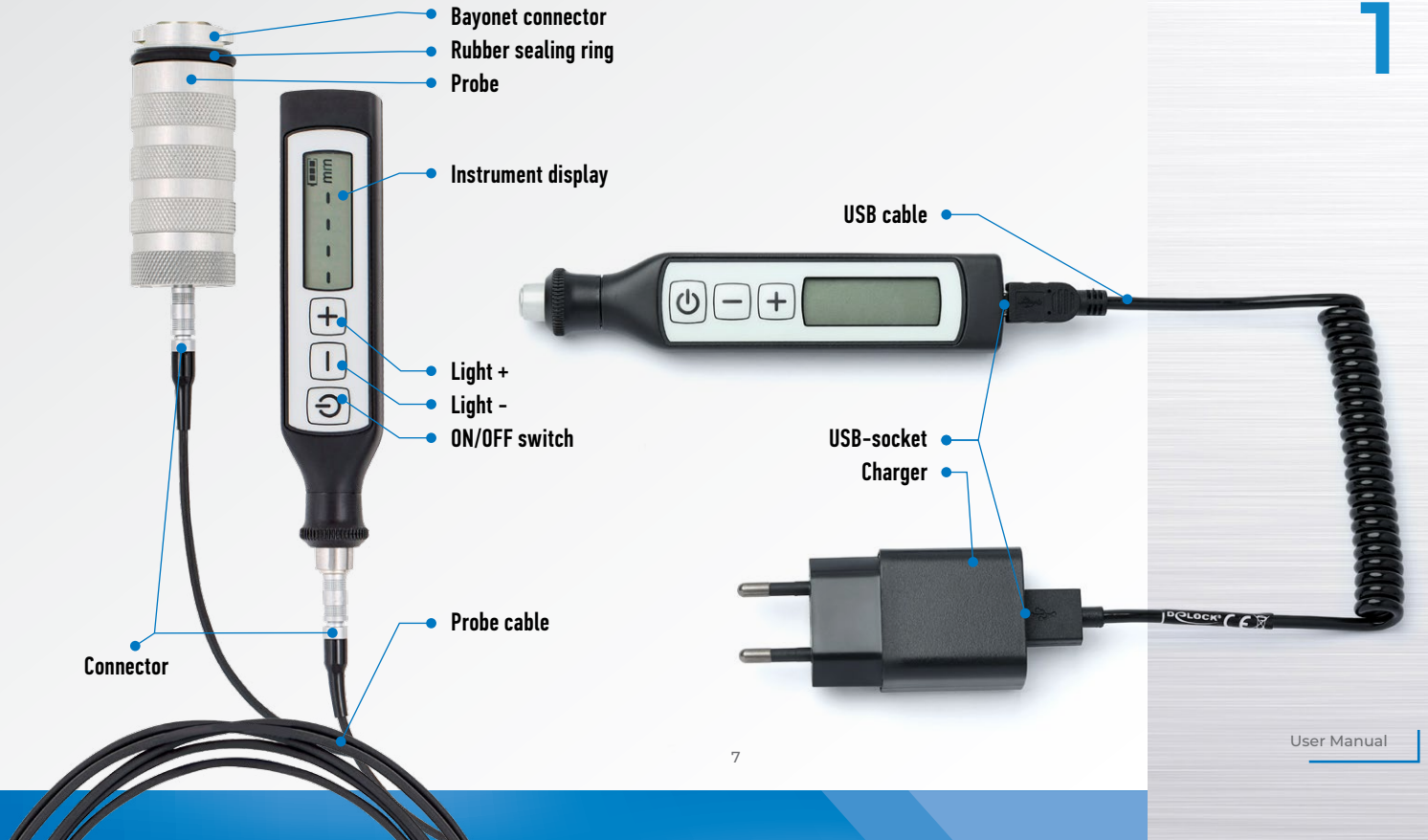

**NOTICE** The supplied items are for use with this unit only and are not compatible with other equipment. Use only ACS approved accessories. Using unapproved accessories will result in poor performance and malfunctions not covered by the warranty.

The instrument has a casing seal. Breaking the seal leads to a loss of warranty.

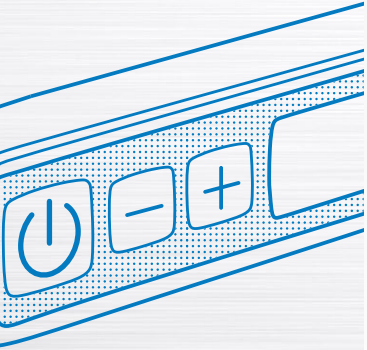
Changes in appearance and technical specifications are subject to change without previous notification.

**Couplant must be ordered separately.*

# 1.2 MAIN COMPONENTS



1




## 1.3 KEYS

| Key | Function |
|---|---|
| ⏻ | 1) ON/OFF<br>2) To switch from mm to inch, press once more with instrument switched ON |
| − | Illumination decrease |
| + | Illumination increase |

## 1.4 RECHARGEABLE BATTERY

**NOTICE** Before first use, fully charge the rechargeable battery. When not in use for prolonged periods, charge the instrument bimonthly to prevent deep discharge.

In the case of total discharge, the rechargeable battery may be destroyed and must be replaced.

**⚠WARNING** Use only ACS approved chargers, batteries, and cables. Unauthorized chargers or cables may cause the battery to explode or damage the instrument.

Incorrect connection of the charger may cause serious damage to the instrument. Damage caused by improper use is not covered by the warranty. If the instrument gets hot during charging, disconnect the charger immediately. Stop charging and do not resume it. Please contact the manufacturer or its representative.

### Charging guidelines:

- Connect the charger to the instrument before plugging it into the mains.
- Charging is complete when the indicator on the instrument shows a full battery status.
- Disconnect the charger from the mains before unplugging it from the instrument.

**NOTICE** Tips and precautions for charging the battery

• Low level of the rechargeable battery is visualized by an “empty battery” symbol.

- In normal mode the instrument switches OFF as soon as the level drops beyond a certain safety limit. It is recommended not to restart the instrument before the charging procedure is complete to avoid damage.
- When the battery is discharged, the instrument will not turn on immediately after it has been connected to the charger. Charge the battery for a few minutes before turning the instrument back on.
- If the instrument is not charged through the USB power supply, but for example via a computer, this may result in a reduced charging speed due to a limited electrical power supply
- You cannot use the instrument while it is being charged.
- A moderate increase of temperature during charging procedure is not critical. In the case of a drastic temperature rise on the other hand, the charging unit must be removed at once.
- The charger does not have an on / off switch. So, you need to disconnect the charger from the power socket when not in use to prevent wasting energy.
- It is advisable to install the charging unit close to the mains connection and to keep the surroundings free, so that easy access is possible anytime.

## Removal of the rechargeable battery

**⚠WARNING** The rechargeable battery is permanently installed in the instrument and is not intended to be replaced by the operator. For safety reasons, do not attempt to remove the battery.

Incorrect removal of the battery may result in damage to the battery and the instrument, personal injury, and / or equipment damage including impairment of safety.

ACS is not liable for any damage or loss (whether contractually or unauthorized, including negligence) caused by not following this warning.

Safety precautions:

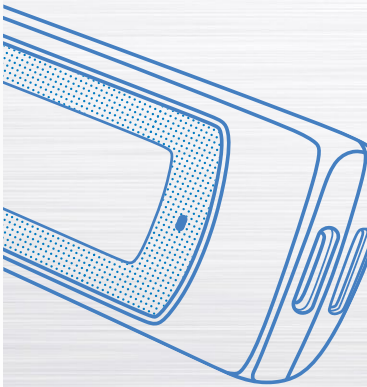
- Do not short-circuit the battery terminals.
- Do not expose the battery to fire or high temperatures.
- Do not immerse the battery in water or other liquids.

Improper handling of the rechargeable battery may cause fire, explosion, or leakage of hazardous substances.

Dispose of used batteries and the instruments containing them in accordance with local regulations.







2

INSTRUMENT USAGE AND LIMITATIONS

## 2.1 APPROPRIATE USE

**⚠WARNING** This section contains safety-relevant information and defines minimum requirements for user groups. Use of the instrument outside the intended use and by unintended user groups may result in damage.

### Intended use

This instrument has been designed for manual measurement of gear oil level in cars. It is used in roofed buildings and only in non-hazardous areas.

### User groups

| Group | Minimum Age: | Qualification: | Task: |
|---|---|---|---|
| Qualified Operator | 18 years | Trained in handling of measurement equipment, trained in work safety for the corresponding area | Measurement of gear oil level in cars |
| Apprentices/Trainees/ Students: | 16 years | Trained in handling of measurement equipment, trained in work safety for the corresponding area | Measurement of gear oil level in cars |
| Public (e.g. visitors) | No user group. The handling of the measuring instrument is prohibited for these persons. | | |
| Vulnerable persons (e.g. pregnant women) | No user group. The handling of the measuring instrument is prohibited for these persons. | | |

### Ambient limits

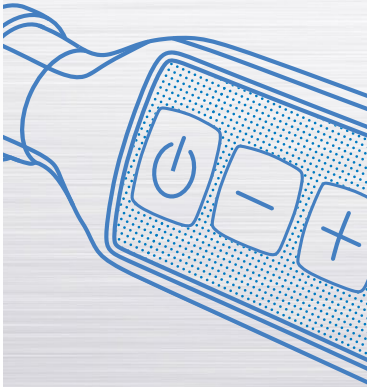
Temperature Range
Storage: From -20 °C to +60 °C,
Operation: From -10°C to +50°C
For measurement at the gearbox: From -10°C to +80 °C
: Relative humidity 85%

Contamination
Despite the provided protection acc. to IP 64 (dust, splash water), use in clean, dry environment is advisable.
After use, the instrument must be cleaned and stored in the transport box provided for this purpose.

## 2.2 REASONABLY FORESEEABLE MISUSE

**NOTICE** The instrument may only be operated by trained personnel. Nevertheless, misuse is not excluded if care is not taken. For troubleshooting, see „Chapter 8 Troubleshooting“

| Problem cause | Consequence |
|---|---|
| Incorrect use of the calibration block (coupling and determination of temperature compensation) | Incorrect measurement |
| Inadequate couplant | Incorrect measurement |
| Excessive quantity of couplant | Incorrect measurement |
| Insufficient quantity of couplant | No signal  |
| Skewed / improper insertion of the probe into the guide at the oil pan | Damage of the bayonet connector, incorrect measurement |
| Damaged probe | No signal  |
| Damaged probe cable | No signal  |
| Dropping the instrument | Damage of casing, rechargeable battery, display, electronics. Loss of IP protection. |



3

SAFETY

**⚠WARNING** The general safety instructions listed in this section relate to the use of the instrument in a workshop environment when measuring the gear oil level on cars under controlled conditions

**⚠WARNING** Without exception, working with the instrument requires the previous risk assessment of the workplace according to national and international requirements by a qualified person or a specialist for occupational safety of the employer.

General safety instructions:

- The equipment should not be handed over to persons not aware of inherent risks, or not knowing the content of this manual.
- Be sure to stand securely when measuring with the instrument.
- Pay attention to your environment and potential hazards during the measurement.
- Motor components and the underside of the car may be hot, protective clothing may be required and avoid contact with hot surfaces.
- Cars are always subject to contamination by oil or other dangerous liquids. Use suitable protective equipment and pay attention to national and international laws and regulations for cleaning and disposal.
- The operation of internal combustion engines produces toxic gases. Always ensure adequate exhaust ventilation.
- Use only approved and checked lifting equipment.
- When using coupling agents, pay attention to the safety instructions given in the safety data sheet.

**NOTICE** For this measuring instrument, calibration is mandatory. It shall be included in the measuring equipment monitoring program of the enterprise.

## 4.1 PREVENTIVE MAINTENANCE

| Frequency | Parts Concerned | Action |
|---|---|---|
| Before each use | Instrument, cable, probe | Check for visible damage |
| Before establishing connection | Plugs and jacks | Check for dirt and foreign particles |
| Before functionality check | Calibration block | Check for damage |
| Before each test | The instrument connected via probe to the calibration block | Perform functional check |
| After each use | Instrument, cable, probe | Remove dirt and couplant; check for damage |
| Once per year | Instrument, cable, probe | Inspection and calibration by ACS or an authorized dealer |

## 4.2 INSPECTION AND TEST EQUIPMENT

Correct functionality shall be verified using the calibration block included in the set.

**NOTICE** The process is described in Section 5.4.

## 4.3 MAINTENANCE DOCUMENTATION

Annual inspections shall be documented by the manufacturer's service center or by an authorized person responsible for measuring equipment monitoring.

## 4.4 REPAIR

Repairs shall be performed by the manufacturer's service center or an authorized dealer.

5

OPERATION

## 5.1 COUPLANT

The instrument is designed for use with brake paste Mercedes-Benz “Bremspaste bräunlich”, A002 989 37 51.

**⚠WARNING** Couplant must be ordered separately. The coupling agent used has an influence on the proper functioning of the instrument. Choose a coupling agent with non-corrosive properties so as not to damage the probe. Always pay attention to the safety instructions given in the safety data sheet.

## 5.2 PROBE CONNECTION

1. First connect the probe cable to the measuring instrument, by inserting the plug of the cable into the socket. The plug at either end of the cable is identical.
2. Repeat the connecting procedure for the probe.

**⚠CAUTION** Pay attention to ease of movement when making the plug connection. Before making the connection, there must be no dirt or foreign objects in the sockets.

3. When separating the probe cable from the instrument or probe, carefully grasp the connector by the knurled sleeve and straightly draw it back.

**⚠CAUTION** Pay attention to ease of movement when releasing the plug connection. Exaggerated application of a force can damage the plug connection. Avoid bending or levering on the plug connections.

## 5.3 SWITCHING ON

Press and release ⏻ - key

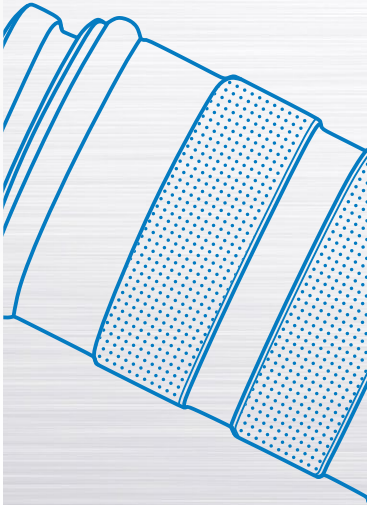
## 5.4 FUNCTIONAL CHECK

**NOTICE** The functional check must be carried out before each measuring task.

1. Apply a sufficient amount of couplant to the probe.
2. Calibration block and probe must be mutually connected, by insertion into the bayonet connector and careful turning.
3. Switch ON the instrument.
4. The value displayed must be within the range of the values specified on the calibration block label.
5. If the value is out of tolerance, refer to troubleshooting section 6, or consult factory service.

| Temperature | Displayed value |
|---|---|
| 10 °C / 50°F | 54,5 ± 0,3 mm |
| 15 °C / 59°F | 54,7 ± 0,3 mm |
| 20 °C / 68°F | 54,9 ± 0,3 mm |
| 25 °C / 77°F | 55,1 ± 0,3 mm |
| 30 °C / 86°F | 55,3 ± 0,3 mm |

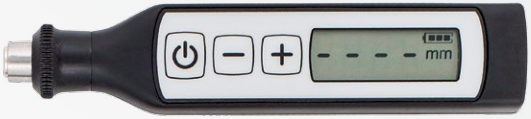




5

## 5.5 CHANGING THE DIMENSIONAL UNIT

Switch ON the instrument and press, ⏻ - key once more to change from mm to inch or vice versa.





## 5.6 MEASUREMENT

1. Switch ON the instrument.
2. Apply a sufficient amount of couplant to the probe.
3. Connect the probe to the car gearbox by turning the bayonet connector.

**NOTICE** Measuring positions usually vary depending on the type of vehicle. It is essential that the connecting positions at the car and at the probe are clean. In order to prevent jamming of the probe, correct orientation during insertion into the connector is essential. If insertion turns out to be difficult, remove the probe in a careful rotation.

**NOTICE** We recommend conducting the measurement after the vehicle's engine has been running for 10–15 minutes, allowing the oil in the gearbox to warm up.

4. Compare the displayed result to the value correlating to the measured oil temperature from the diagnosis instrument.

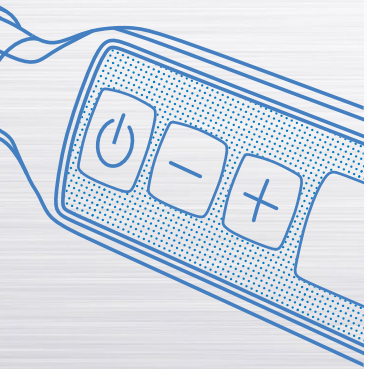
## 5.7 SWITCHING OFF

Press and release ⏻ - key

**NOTICE** Do not forget to clean the instrument and to store it in its hard case.

## 5.8 STORAGE

The instrument has to be stored in the hard case included in the delivery.



| Problem | Possible Reason(s) | Action |
|---|---|---|
| Incorrect measurement during functionality check | Calibration block has not adequately been used. | - Disconnect the probe from the calibration block.<br>- Verify the quantity of couplant<br>- The coupling surface must be clean, not damaged and without adherent foreign particles.<br>- Establish the connection again.<br>- Read the correction value for temperature from the table, and check the result. |
| Incorrect measurement | Improper couplant. | Replace couplant |
| Incorrect measurement | Excessive quantity of couplant. | Remove some couplant. |
| No signal  | Insufficient quantity of couplant. | Add some couplant. |
| Incorrect measurement, no result | The probe has been introduced in a skewed manner into the guide of the oil pan. | - Detach the probe<br>- Insert it again, correctly oriented. |
| No signal  | Damaged probe | Probe must be replaced. |
| No signal  | Damaged probe cable | Cable must be replaced. |
| Damaged casing, rechargeable battery, display and electronics | Instrument has been dropped | Send the instrument back for repair in its original box, or hand it over to a designated collection point for recycling.<br>**NOTICE** The product must not be disposed of with the domestic waste. |

7

# MEASURES AT THE END OF THE LIFETIME OF THE EQUIPMENT

**⚠CAUTION** This electronic instrument must not be disposed of with the domestic waste. Local authorities inform about the address of designated collection points for recycling.

**NOTICE** Recycling of the product: This product consists of valuable materials and components, to be reintroduced into the reusable materials cycle. The illustrated symbol shows that the product is subject to European Directive 2002/96/EC:

Never dispose of your product with other domestic waste. Please refer to the regional guidelines for the separation of electrical and electronic products. The proper disposal of your old product protects against potential and negative effects on the environment and human health.

**NOTICE**

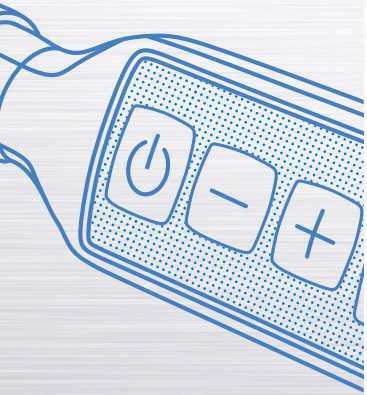
Battery disposal:

Your product includes a built-in, rechargeable battery that is covered by European Directive 2006/66 / EC, which states that the battery should not be disposed of with normal domestic waste. Please refer to the regional guidelines on battery separation. The proper disposal of batteries protects against potential and negative effects on the environment and human health. Note for products with non-replaceable, built-in batteries:

Removing (or attempting to remove) the battery automatically invalidates the warranty. This procedure is only applied when the product life has expired.

| Description | Dimension | Value |
|---|---|---|
| | Interfaces | |
| Human-Instrument interaction | | Digital display, buttons |
| IT – Instrument | | Bluetooth interface |
| Power supply to the instrument | | USB Connection |
| Instrument – material supply | | Couplant to be applied by user |
| | Time Limits | |
| Uninterrupted operation | Hours | 16 hours max. |
| Lifetime for instrument and probe: | Hours | 18.000 |
| Functionality check | | Before each use |
| Cleaning | | After each use |
| Inspection | | Once per year |
| | General description | |
| Dimensions | mm | 125 x 25 x 15 |
| Weight | g | 40 |
| Display | mm | 30 x 10 |
| Display update rate | Hz | 10 |
| Probe connection | | LEMO 0 |
| Operating time of accumulator | Hours | > 8 |
| Ambient temperature | °C | -10 to +80 |
| Dimensional units | | mm / inch selectable |
| | Performance | |
| Measuring range, sonic run-time | µS | 16 to 160 |
| Tolerance | µS | ± 1 |

8



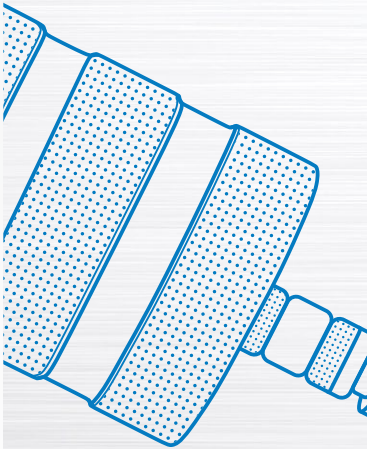
**NOTICE** The sound velocity in liquids like oil, and solids like the calibration block, depends on temperature. For this reason, a correct measurement requires a previous temperature measurement for the test object. The results must be compared with the corresponding table.

**⚠WARNING** Accessories for temperature measurement are not included in the delivery.

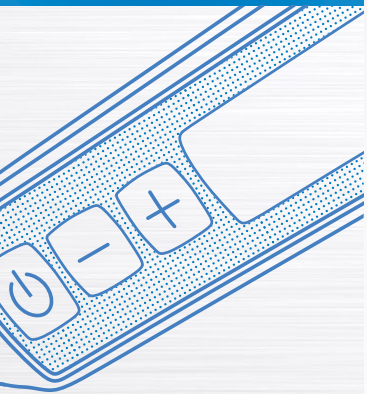
Nominal values with respect to temperature are supplied by the manufacturer of the workshop diagnosis equipment.

Inappropriate temperature determination and / or an incorrect correction value table can lead to incorrect measurements and the resulting consequential damage.

ACS is not liable for any damage or loss (whether contractually or unauthorized, including negligence) caused by not following this warning.



## NOTES



## NOTES


ACS

# ULTRASONIC OIL LEVEL GAUGE FOR MERCEDES-BENZ GEARBOXES

## A1207D **LEVEL GAUGE**

## USER MANUAL

Acoustic Control Systems – ACS Group
Saarbrücken, Germany