CS INSTRUMENTS GmbH

EN - English

Operating manual

Leakage detector

LD 400

1 Contents

2 Important information

Dear customer,

thank you for purchasing our leakage detector **LD400**! Please read these operating instructions thoroughly and observe our notices before performing the commissioning. Only if the described regulations and notices are precisely observed, can the flawless function of the device and the safe operation be guaranteed.

In case of a non-observance or non-compliance, no claims for the resulting damages can be asserted based on the manufacturer's liability.

Any kind of modification of the equipment, provided that it does not correspond to the intended and described processes, will lead to the expiry of the warranty and exclusion of liability.

The device is solely intended for the described purpose.

CS instruments GmbH shall not assume any warranty with respect to the suitability for any particular purpose, and shall not assume any kind of liability for errors which are printed in this manual. Nor for consequential damages in connection with the delivery, performance or use of this device.

CS INSTRUMENTS GmbH

Sales Office North

Am Oxer 28c
D-24955 Harrislee
Tel.: +49 (0) 461 700 20 25
Fax: +49 (0) 461 700 20 26
Mail: info@cs-instruments.com
Web: http://www.cs-instruments.com

Sales Office South

Zindelsteiner Str.15
D-78052 VS-Tannheim
Tel. : +49(0) 7705 978 99 0
Fax : +49 (0) 7705 978 99 20
Mail : info@cs-instruments.com
Web : http://www.cs-instruments.com

3 Safety instructions

- Always switch on the device, **before** putting on the headphones! In case of high signal levels (bar graph in the red zone), the volume can be correspondingly high. The volume can be reduced with the help of the sensitivity adjustment.
- Please maintain a sufficient safety distance during the leak checking on electric systems, in order to avoid dangerous electrical shocks!
- Never point the laser directly into the eyes! Absolutely devoid a direct irradiation of the eyes of humans and animals!
- Observe the prescribed storage and operating temperatures.
- The warrantee shall be void in case of an improper use or an exposure to excessive force.

4 General function description

Noises in the ultrasonic range develop when gases escape from leaks in piping systems (for example, leaking screw connections, corrosion etc.). With the LD 400 even the smallest leaks, which are inaudible to the human ear and also non-visible due to their size, can be detected even if they are several meters away. The LD 400 converts the inaudible ultrasonic to audible frequencies. With the conveniently wearable and soundproof headphones, these sounds can even be perceived in noisy environments.
The LD 400 is the further development of the proven LD 300, and is able to perform convincingly through a significantly more sensitive sensor technology as well as an improved support during the leak detecting process.

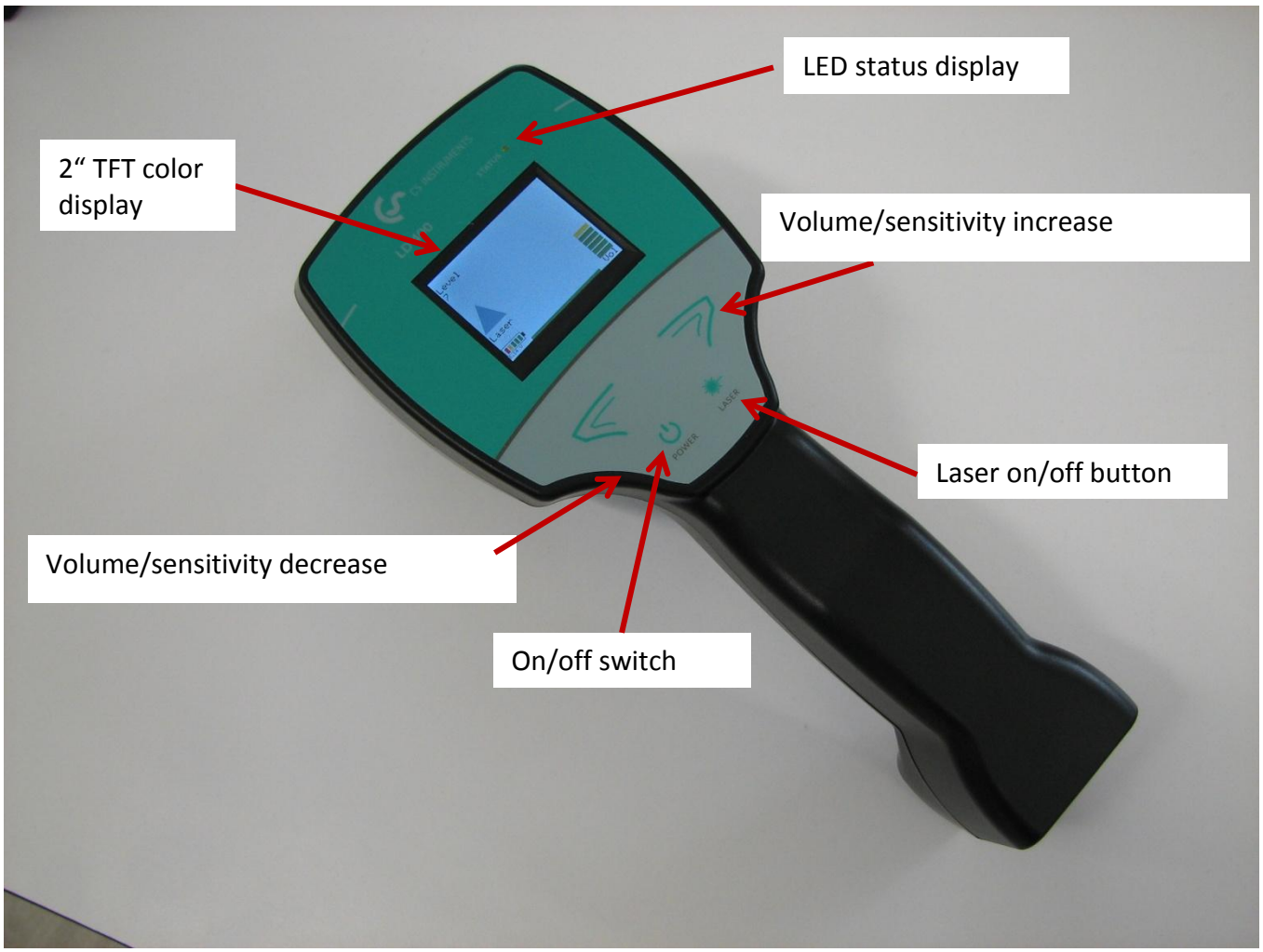
With the help of an integrated laser pointer, which serves as a targeting device, the leak can be located even more accurately.

The sensitivity of the device can be further improved through the use of a specially designed sound cone, which can ensure a greater concentration of the sound waves.
This sound cone acts as a directional microphone, that suppresses annoying background noises and also facilitates the precise localization of leaks in inaccessible areas.
The internal laser pointer can also be used without restrictions due to the special construction of the sound cone.

5 Device components and controls

5.1 The front side

The device components and controls of the front side are described in the following picture.



5.2 Sensor head and connections

6 Accessories

Further accessories are available for the LD400 with which the leak detection can be facilitated and improved.

6.1 Sound cone

Through the concentration of sound waves, the sound cone creates an acoustic amplification which enables a more precise detection of the leak. Through its special design, the integrated laser pointer will remain usable. The sound cone is simply placed onto the sensor head and slightly twisted until the latch head reaches the stopper. While doing this, please proceed with caution to prevent an over-winding of the cone.

6.2 Shotgun with tip

The shotgun with the tip is used for the detection of very small leaks, in order to locate and pinpoint them precisely. Just like with the sound cone, the tube is placed onto the sensor head and latched with a twisting motion.

7 Commissioning

7.1 Switching-on

A pressing and holding of the on/off button for about 1s, will switch on the device and a Start-Up sequence will appear on the display. Pressing the button again will switch off the device.

7.2 Louder/quieter

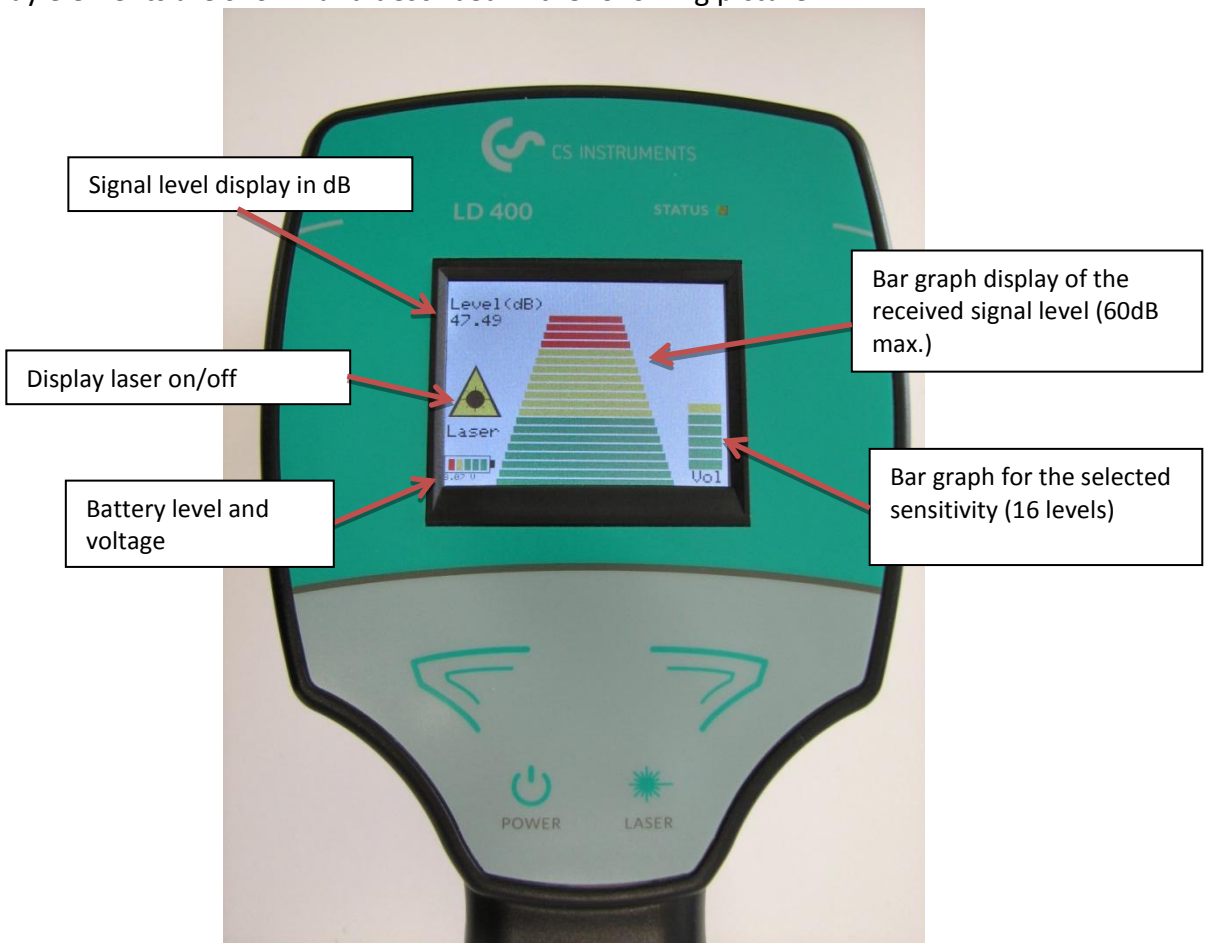
With the volume increase and decrease buttons the volume in the earpiece and the sensitivity can be increased or respectively decreased in 16 steps. By pressing and holding the respective button, the value will automatically increase or decrease.

7.3 Laser

The integrated laser pointer can be switched on or off with the laser on/off button. In the on state, a laser warning symbol will appear in the display. In the off state, the triangle will remain grey.

8 Display

The display elements are shown and described in the following picture.



8.1 Signal strength (level)

In the middle of the display, a bar graph is displayed depending on the received signal strength. A numerical value of the received signal strength in dB will also appear in the upper-left corner of the display. The max. level to be displayed is **60 dB**.

8.2 Volume/sensitivity

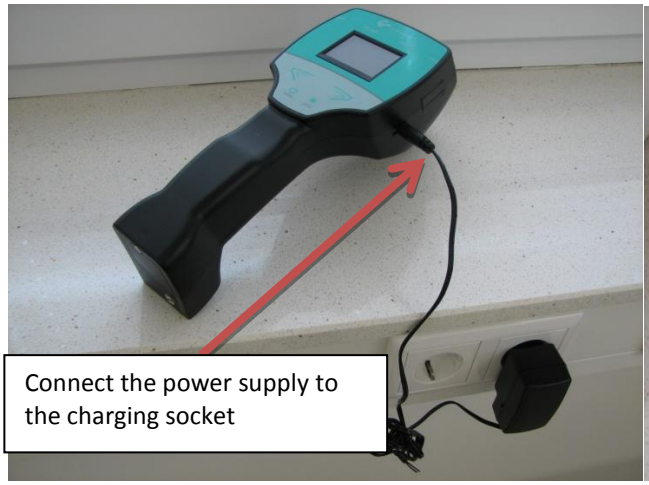
The selected volume/sensitivity will appear on the right side in a bar with up to 16 steps.

8.3 Battery level

On the bottom left, a battery symbol is displayed with a battery level bar. The current battery voltage in volts is also displayed below it.

9 Battery charging

The battery is charged within the device. For this, the supplied plug-in power supply is connected to the built-in charging socket of the LD400 and the 230V socket.



The LD400 checks the charge status of the battery and automatically starts the charging process. The following scenarios are possible:

- If the battery is sufficiently charged, the status LED will flash green after the connection of the power supply and no additional charging will be performed.
- If the charge state of the battery is too low, the charging process will automatically start and the LED will light up red. The charging is automatically discontinued after the battery reaches its full capacity. The LED will then be permanently illuminated in green.

Comment:
During the charging, the unit will not be operational. Additionally, it cannot be switched on during the charging process. A switched on device will automatically switch off if the power supply for the battery charging is connected.

10 Applications

The typical applications for the LD 400 include the detection of:

- Leaks in pressure and vacuum systems
- Leaks in containers
- Leakage points in the pneumatic brakes of trucks and trains
- Leaks in piping systems
- Leaks in oxygen connections in hospitals
- Leaks in steam separators - leaky valves
- electrical partial discharges on seals

Also defective bearings in engines and transmissions produce sounds in the ultrasonic range, which can be protected with the LD400.

A handy ultrasonic transmitter is also available as an optional accessory for the detection of leaks in pressureless systems (also refer to Chapter 12, Scope of delivery). The transmitter is positioned in such a manner that the sound can penetrate the piping system. The ultrasonic signal can penetrate even the smallest openings, which can then be detected with the LD 400.
To this is possible to detect even the smallest leaks on ship hatches, doors and windows, which in turn opens up a further application area when checking seals.

10.1 Leakage detection in compressed air systems

Compressed air is one of the most costly forms of energy. In Germany alone, 60,000 compressed air systems are consuming 14.000.000.000 KWh of electricity each year. 15% to 20% of these could easily be saved (Peter Radgen, Fraunhofer Institut, Karlsruhe). Much of these costs are attributable to leaks in compressed air systems. The air simply "escapes" unused.

Large openings can be detected easily (you can clearly hear the hissing sound), but often holes smaller than 1 mm^2 remain undetected because they cannot be heard. The LD 400 is perfectly suited for the detection of these small openings.

The unit is focused on the pipe or the component where leaks are suspected. Initially the sensitivity will be set to half of the full value. The integrated laser will assist the location detection from a certain distance. The sensitivity will then be varied with the volume control until the characteristic sound can be heard.

A significant sensitivity improvement can already be attained with the help of the sound cone which is already included in the set. Through this, it is possible to determine leakages even from larger distances. To detect very small openings, a shotgun with a directional tip is attached onto the sensor, and the suspicious points are directly approached in close proximity.

10.2 Determination of leaks in non-pressurized systems

As already mentioned the LD 400 can also be used for the leak detection on the seals of doors, windows and containers. For this purpose, an ultrasonic sound generator (0554 0103) is positioned inside of the room or the container. If small openings exist on the seals, then the ultrasonic signals will penetrate through these towards the outside. By "traveling" along these sealing areas these leaks can be detected precisely, through the appropriate sound in the headphones. The intensity of sound illustrates the magnitude of the leak. The louder the sound is heard, the bigger the leak!

11 Special product features

- Ruggedness and low weight ensure a fatigue-free operation within industrial environments
- improved detection of leakages with an optional sound cone
- modern lithium-ion battery with a high capacity and an external battery charger
- Operating time > 10 h
- simple operation via keypad

12 Scope of delivery

The LD400 is available either as a stand-alone device or as a set. The set contains all the components and accessories, which are housed protected in a rugged and shock-resistant carrying case.

The following table lists the components with their respective order numbers.

Description	Order number
LD 400 ultrasound detector set, consisting of:	**0601 0104**
LD 400 **ultrasound detector basic device**	0560 0104
Sound cone	0530 0109
Soundproof headphones	0554 0104
Shotgun with directional tip	0530 0104
Power supply (battery charger)	0554 0009
Carrying case	0554 0106
Operating manual	0554 0011
Optional accessories not included in the set:	
Ultrasonic transmitter	0554 0103

13 Technical Data LD400

CE	
Handheld case dimensions	263 x 96 x 88 mm
Weight	0.4 kg, complete set in the case approx. 2.8kg
Frequency range	40kHz (+/- 2kHz)
Power supply	Internal 7.4 V lithium-ion battery
Operating time	> 10 h
Operating temperature	-5°C to +55°C
Charging	Ext. battery charger (included in the scope of delivery)
Charging time	approx. 1.5 h
Storage temperature	-10°C to +50°C
Laser	Wavelength 645-660nm, output < 1mW (Laser class 2)
Connections	3.5 mm jack for headphones, power jack for connecting an external charger

14 Appendix

In the appendix on the following pages you will find the Declaration of Conformity for the electromagnetic compatibility and the Test Report of the Li-ion batteries used.

CS Instruments GmbH

EC declaration of conformity
In accordance with the directive of the Council on the approximation of the legislation of the member countries regarding the electromagnetic compatibility (89/336/EEC)

Ultrasound leak detection device

LD 400

CS instruments GmbH as the manufacturer, hereby declares that the above-mentioned leak detection device corresponds to the requirements of the following directive:

Electromagnetic compatibility (EMC) (89/336/EEC)

The following standards were used to assess the devices:

DIN EN 61326	Electrical measuring, control and laboratory equipment EMC requirements

The following tests/measurements were performed:

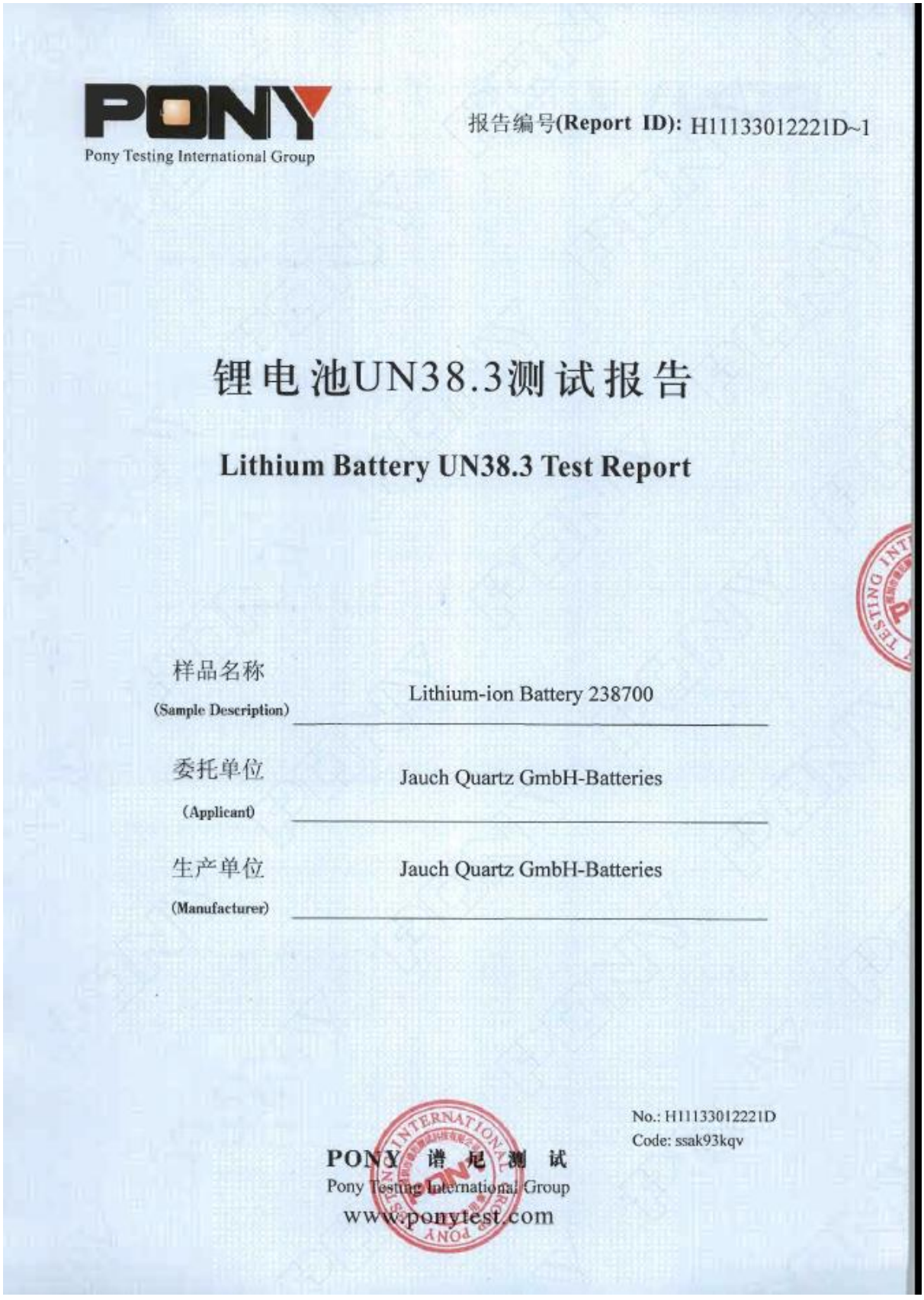
Transient emissions	**DIN EN 55011 (2011-04) ISM equipment class A**
Electromagnetic immunity	**DIN EN 61000-4-2 (2009-12) and DIN EN 61000-4-3 (2011-04)**
Discharge of static electricity / ESD	**EN 61000-4-2**
High-frequency electromagnetic fields	**EN 61000-4-3 (12/2006)**

CS Instruments GmbH
Am Oxer 28 c
24955 Harrislee
Tel. +49 (0) 0461 700 20 25
Fax +49 (0) 0461 700 20 26

Harrislee, March 5, 2014

Niels Schuldt

This declaration does not include any assurances regarding characteristics.
The safety instructions of the accompanying product documentation must be observed.



PONY
Pony Testing International Group

报告编号(Report ID): H11133012221D~1

锂电池UN38.3测试报告

Lithium Battery UN38.3 Test Report

样品名称 (Sample Description)	Lithium-ion Battery 238700
委托单位 (Applicant)	Jauch Quartz GmbH-Batteries
生产单位 (Manufacturer)	Jauch Quartz GmbH-Batteries

No.: H11133012221D
Code: ssak93kqv

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www.ponytest.com

Report ID: H11133012221D~1 Page 1 of 11

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I、SAMPLE DESCRIPTION

Sample Name	Lithium-ion Battery		Battery Type	238700	
Client	Jauch Quartz GmbH-Batteries				
Manufacturer	Jauch Quartz GmbH-Batteries				
Nominal Voltage	7.2V	Rated Capacity	2600mAh	Limited Charge Voltage	8.56±0.025V
Charge Current	1250mA	Maximum Continuous Charge Current	2600mA	End Charge Current	100mA
Cut-off Voltage	5.5V	Maximum Discharge Current	5200mA	Use	---
Cells Number	2PCS	Cell Model	18650	Rated Capacity	2600mAh
Manufacturer of cell	Samsung SDI Co., Ltd				
Chemical component	Li-Ion				
Client date	2013-11-12		Finished date	2013-12-02	

II、REFERENCE METHOD

《United Nations Recommendations On The Transport Of Dangerous Goods, Manual Of Tests And Criteria》 (ST/SG/AC.10/11/Rev.5/Amend.1).

III、TEST ITEM

1. Altitude simulation
2. Thermal test
3. Vibration
4. Shock
5. External short circuit
6. Impact
7. Overcharge
8. Forced discharge

IV、CONCLUSION

ITEM	SAMPLE NUMBER	STANDARD	CONCLUSION
Altitude simulation	N1~N4 C1~C4	UN38.3	PASS
Thermal test			PASS
Vibration			PASS
Shock			PASS
External short circuit			PASS
Impact	N9~N13		PASS
Overcharge	N5~N8 C5~C8		PASS
Forced discharge	N14~N23 C9~C18		PASS

The submitted battery and component cell were complied with the UN Manual of Tests and Criteria, Part III, sub-section 38.3.

Prepared by: Pony Xiu Kun Checked by: zhengpeng Approved by: Li You

Approval Date: December 2, 2013

PONY 谱尼测试 Pony Testing International Group

www.ponytest.com Hotline 400-819-5688