

Sherlog kit CADET

SDT FLEX.US receiver

+

SDT 8 MS transmitter



Technical and User's Instruction Manual

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The information herein is believed to be accurate to the best of our knowledge.
Due to continued research and development, specifications of this product can change without prior notice.

In this manual, *SDT International n.v. s.a.* is named SDT.

SDT International n.v. s.a.
Bd. de l'Humanité 415,
B – 1190 Brussels (BELGIUM)
Tel: ++32.2.332.32.25
Fax: ++32.2.376.27.07
e-mail: info@sdt.be
web page: <http://www.sdt.eu>

Purpose of the manual:

This User's Manual is designed as an educational guide and reference tool for anyone who wishes to use the Sherlog kit CADET for its intended purposes. Inside you will find information pertaining to:

- The description and functionality of the equipment.
- Its versatility.
- How to care for and maintain the equipment.

SDT produces this User's Manual with the sole purpose of supplying simple and accurate information to the user. SDT shall not be held responsible for any misinterpretation of this User's Manual. The information herein is believed to be accurate to the best of our knowledge. Due to continued research and development, specifications of this product can change without prior notice. If in doubt, contact your local SDT distributor for clarification.

While every effort was made to present a true and accurate text, modifications and/or improvements to the product described herein can be made at any time without corresponding changes being made to this User's Manual.

Please read this User's Manual carefully, and file it in a safe place for future reference. All requests and warnings of this User's Manual must be followed in order to maximize the value of your investment. This User's Manual and its contents remain the inalienable property of SDT.

Operator safety:

The operator must take all necessary precautions when using the equipment in high risk areas (under high noise levels, high light and radiation levels, extreme temperature conditions, chemical corrosive elements, etc.). The user must be particularly vigilant when entering enclosed zones (holds, silos) where a risk of asphyxiation or lack of oxygen is possible. There is no likelihood of direct consequences for the hearing capacities of the operator.

The instrument **MAY NOT** be used inside any classified zone requiring explosion proof equipment.

End of life destruction of the equipment:

When the equipment becomes obsolete, the internal battery pack must be removed from the equipment, and must be disposed of in such a way that conforms to the environmental laws of the country where the equipment is used.

The outer casing and other internal components may be destroyed by the appropriate specialized organizations. The mandatory stipulations of applicable law take precedence over the contents of this User's Manual.

Description of the Sherlog kit CADET:

This entry-level kit of the SDT Sherlog product range contains:

FLEX.US receiver

- 1 x SDT FLEX.US receiver.
- 4 x ordinary AA 1.5V batteries.
- 1 x Quality noise isolating headphones (NRR 25 dB).
- 1 x precision accessory (rubber tip)

SDT 8 MS multi-transmitter

- 1 x SDT 8MS multi-transmitter, multi-setting, with battery.
- 1 x Leather case for multi-transmitter with strap.
- 1 x Spare battery pack for multi-transmitter.
- 1 x Battery loader for SDT 8 multi-transmitter.
- 1 x Battery loader adapter for SDT 8 multi-transmitter.
- 1 x Screw driver for the SDT 8 multi-transmitter battery cover.

Others

- 1 x USB memory stick containing user manuals and other useful documents.

Working principle

- The FLEX.US receiver works like a super microphone, sensitive only to high frequency ultrasounds.
- A sensitive piezoelectric crystal is used as a sensor element. Minute high-frequency sound waves excite or "flex" the crystal, creating an electrical pulse that is amplified and then "heterodyned" or translated into an audible frequency that the operator can hear through a pair of noise-reducing headphones.
- The FLEX.US is based on the successful and popular design of SDT's famous "Flexible Sensor". It consists of an ultrasonic sensor mounted at the end of a flexible metal tube. This tube can be bent and twisted in different directions. Its diameter is small enough to perform inspections through small openings and holes.
- The transmitter generates a distinctive high-frequency sound component which is detected by the sensitive piezoelectric element of the FLEX.US, allowing the operator to direct the instrument towards the leaky area and identify the exact location of the leak with pinpoint accuracy.
- This low budget, but robust and reliable equipment is an ideal solution for operators who are interested in quick, reliable and easy detection of leaky spots with a high level of precision. As detection of leaky spots is based on evaluating the received audible sound only, the Sherlog kit "CADET" combines easy and accurate testing with a minimum of familiarisation.
- The FLEX.US can also be used for other on-board applications such as the detection of electrical partial discharges (tracking, arcing, corona), compressed air leaks, super-heated steam leaks, vacuum leaks and others.

Operating the FLEX.US:

The FLEX.US is equipped with two buttons:

- A **black two-position slide switch** on the right hand side of the device. This switch should be put in the **OFF or "non-continuous" position** resp. when the device is not in use or when it is used in the "non-continuous mode". This switch should be put in the **ON position** for using the FLEX.US in the "continuous mode", which is the recommended mode when performing hatch cover tightness tests.
- A **yellow three-position push button** on the front of the device. Pushing this button on the **upper side** (with "+" mark) increases the amplification level. Pushing this button on the **lower side** (with "-" mark) decreases the amplification level. Pressing this button in the **middle** (between the "+" and "-" mark) temporarily turns the FLEX.US on when working in "non-continuous mode". For listening comfort and enhanced efficiency/safety while performing a hatch cover tightness test, this button allows the operator to adjust the amplification level and instrument sensitivity (7 amplification levels).

A red LED indicates if the unit is operational (when the black slide switch is in the ON position and/or when the yellow push button is pressed). If the LED does not illuminate as expected, check that the batteries have sufficient power, and replace if necessary.

Method of use:

Within the scope of hatch cover tightness testing, the FLEX.US receiver is to be used in combination with the SDT 8 MS transmitter. The SDT 8 MS generates an ultrasonic signal that will be picked up by the FLEX.US receiver. For hatch cover tightness testing, the following procedures should be followed:

1. Put the SDT 8 MS transmitter in the middle of the hatch to be tested and turn on the SDT 8 MS. The SDT8 MS emits a characteristic (bi-sonic) signal that can be heard through the headphones of the FLEX.US.

2. On the FLEX.US receiver, select the ON position and/or press the yellow button which will allow for continuous monitoring. The LED will light up.
3. Prior to starting a survey around the hatch, it is recommended that the operator listens to the sound produced by the SDT 8 MS transmitter in way of an open hatch.
4. Once he has familiarised himself with the sound of an open hatch (or access hatch), the operator can start to scan the hatch covers for areas with lack of compression (leaks).
5. As the position of leaky spots/areas is unknown, it is recommended that the operator increases the amplification level until the maximum level is reached. The equipment will now be extremely sensitive and allow the operator to pick up the slightest variations in sound in way of the hatch cover sealing system.
6. When the hatch covers and openings giving access to the hold are properly closed, the operator will either hear no sound at all, or might hear the typical bi-sonic sound as a slight background noise. Any variation in sound indicates a sealing problem which should be investigated further.
7. When approaching a leaky spot, the bi-sonic sound will steadily increase in volume until it reaches a peak sound. Thanks to the directionality of ultrasonic waves, the place where the peak value is heard will be the origin of the leak.
8. When using the FLEX.US equipment for tightness testing, operators will focus on variations in sound. The higher the amplification level used, the more sensitive the equipment will be and the better sound variations can be heard and identified. In case the sound in way of a leaky spot should be too loud for comfort, then the operator may decide to lower the amplification level to a more comfortable level. However, operators should ensure that the amplification level and equipment sensitivity is increased again before continuing the survey after a leak has been identified.
9. To turn off the receiver, switch the black slide switch in the OFF-position. The LED will go out.

Some comments:

- The FLEX.US is not waterproof. Exposing it to water or directly to steam may cause damage. It cannot be immersed in water. The sensitivity of the equipment is negatively affected if the sensor becomes damaged in any way.
- The FLEX.US is equipped with a special headset with excellent external noise attenuation for use in extreme noisy areas. The headset of the Sherlog kit CADET represents the best technology available for this kind of instrument. Using any other headset than the one shipped with your FLEX.US can cause internal damage to the detector, and automatically voids the warranty.

Technical specifications of the SDT FLEX.US receiver:

Controls:	- Continuous or non-continuous operation switch. - Silicone rubber press-button to control stop-start non-continuous operation and volume adjustment.
Amplification:	7 levels: 20, 30, 40, 50, 60, 70 and 80 dB.
Ultrasound sensor:	Open sensor with a 16 mm (1/2"Ø) (internal) diameter (19 mm - 3/4"Ø - exterior), Central frequency of 40 kHz.
Detected frequencies:	38.4 kHz, ± 2 kHz (- 3dB).
Audio output:	Stereo jack connector of 6.35 mm (1/4") (use only the headset supplied with the unit).
Power:	Two alkaline AA batteries, 1.5 V. Rechargeable batteries can also be used but the usage time will be reduced.
Usage time:	± 20 hours. This can vary based on several variables including the charge of the battery in the detector, the level of amplification used and the quality of the batteries.
Body:	Made with machined and assembled sheets of high impact polystyrene, it is also shock resistant.
Dimensions:	Body: 170 x 42 x 31 mm (6.70 x 1.65 x 1.22 inches) Flexible tube length: 400 mm (15.75 inches).
Weight:	412 grams with the batteries (14.53 ounces).
Operating temperature range:	From -10°C to +50°C / 14°F to 122°F.

Guarantee:

Subject as hereinafter set out, **SDT** undertakes to remedy any defect of the equipment resulting from faulty materials or workmanship. The guarantee undertaking includes measures for repairing or replacing the equipment. This liability is limited to defects, which appear:

- For the battery of the SDT 8 MS and accessories (such as charger, headphones, sensors, ...) within six (6) months from the delivery of the equipment to the customer,
- For the SDT FLEX.US receiver and SDT 8 MS multi-transmitter within twenty-four (24) months from the delivery of the equipment to the customer.

On receipt of the customer's written notification falling within this guarantee **SDT** shall remedy the defect forthwith and at its own expense. The customer shall return to **SDT** the equipment, in which a defect covered by this guarantee has appeared, for repair or replacement by **SDT**, and the delivery to the customer of the equipment properly repaired or replaced shall be deemed to be a fulfillment by **SDT** of its obligations and a sole and exclusive remedy under this guarantee in respect of such defective equipment.

The customer shall bear the cost and risk of packing and transport of the defective equipment and of the repaired or replaced equipment.

SDT's liability shall apply only to defects that appear under the conditions of operation provided for by this User Manual and in proper use. It does not cover defects due to causes arising after delivery. In particular it does not cover defects arising from the customer's faulty maintenance, installation, handling, service or inspection or non-compliance with **SDT's** instructions in this User Manual, in **SDT's** Technical Specifications or given otherwise or from repairs, alterations or adjustments carried out without **SDT** prior written consent or from repairs, alterations or adjustments carried out improperly by the customer or arising from an accident, nor does it cover normal deterioration, wear and tear.

Limitation of liability:

If the customer fails to give notice of a defect that falls within this guarantee during the above stated guarantee period, **SDT** shall be under no liability even in respect of defects due to causes existing before the expiry of the above stated guarantee period.

SDT liability under this guarantee shall in all cases be limited to fifteen per cent (15%) of the purchase price of the equipment. In addition, it is expressly agreed that the customer shall have no claim in respect of personal injury or of damage to property arising before, during or after the above stated guarantee period nor for loss of profit, loss of use or any other indirect, consequential, punitive, special or incidental damages of any kind, whether or not **SDT** has been advised of the possibility of such loss or damage.

Responsibility limits:

Neither the company SDT International, nor any related company, will in any circumstances be liable for any damages, including, without limitation, damages for loss of business, business interruption, loss of information, defect of the Sherlog equipment unit or its accessories, bodily harm, loss of time, financial or material loss or any other indirect or consequential loss arising out of the use, or inability to use this product, even when it has been warned of possible damages.

