

SDT 8 MS transmitter for ultrasonic hatch cover tightness testing

User 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.

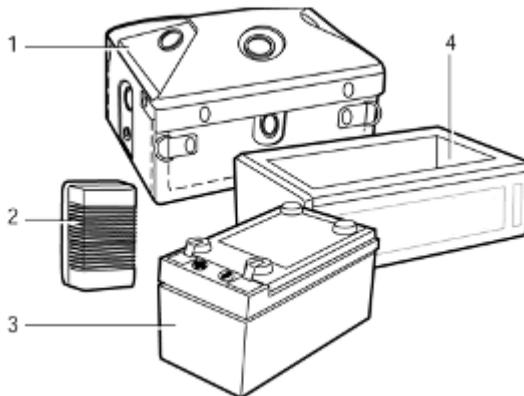
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1 Introduction

This section is directed to anyone who needs to use an ultrasonic transmitter for tightness inspections (e.g. hatch covers, water tight doors, ramp covers, windows, bulkhead openings, etc.). The SDT 8 MS transmitter is to be operated in combination with an SDT ultrasonic receiver (see www.sdt.eu). This section contains information on how to operate the equipment, how to solve and overcome problems and the characteristics of the equipment.

1.1 PACKAGE

The SDT 8 MS transmitter and its related components are included in the Sherlog Kits:

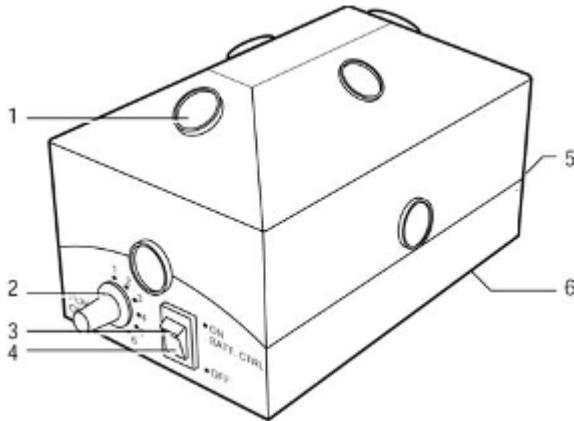


1. Multi-setting transmitter, a leather bag and a shoulder strap
2. SDT 8 MS battery charger
3. Two sealed lead-acid gel 12V - 1.2 Ah batteries
4. Adapter for battery charging and screwdriver (not shown).

The multi-transmitter with its main dedicated components.

1.2 PRESENTATION

The box-shaped multi-transmitter (160 x 100 x 95 mm) is operated with a sealed lead-acid gel battery and weights 1500 grams. The battery allows the transmitter to be used in temperatures ranging from -20 C to +50 °C.



- | | |
|--|--|
| 1. Ultrasonic transducer. | 4. ON-OFF switch. |
| 2. Six position potentiometer
(1 = minimal ultrasonic power). | 5. On-Off switch. |
| 3. Red light on/off indicator. | 6. Battery (underneath at the bottom). |

General view of the multi-transmitter.

The ultrasonic transducers

Eight transducers (1) are laid out in the equipment in such a way that they transmit in the volume of a hemisphere. Each ultrasonic transducer has a power of 125 mW and is frequency and power stabilized. The ultrasonic transmission frequency is 39.2 and 39.6 kHz (bi-sonic mode).

The red light indicator

A red light indicator (3), integrated in the On/Off switch, shows whether the equipment is switched on as well as whether the battery is still charged. Refer to chapter 3 *Recharging the battery* for further information.

1.3 SDT 8 MS TRANSMITTER DESCRIPTION

The on-off switch

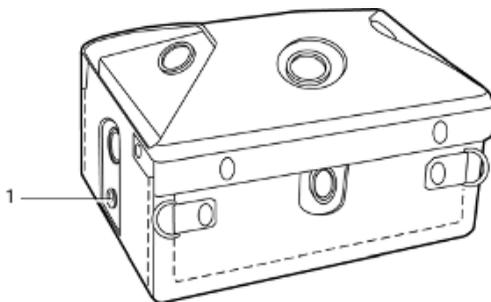
Located at the base, this switch (3) enables the equipment to be switched on (ON position) or off (OFF position).

The 6 position multi-setting potentiometer

It regulates the total output power of the ultrasonic signal; level 1 provides the minimum level and 6 the maximum.

The charge connector

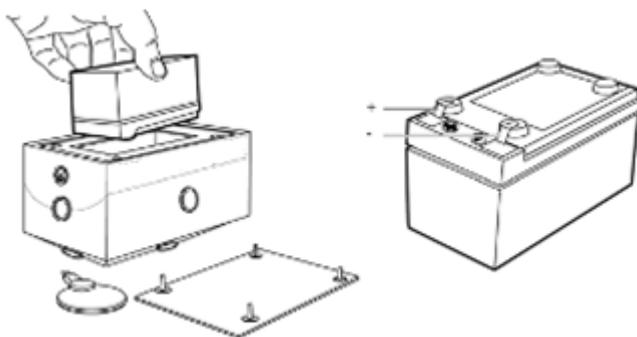
Marked LOAD, the charge connector enables to re-load the internal battery without removing it. Overcharging is not possible when used with the SDT charger provided. Batteries can be charged during use. (Batteries will charge slower when the equipment is in use)



The charge connector is located on the side of the multi-transmitter.

The battery

The sealed lead-acid gel type battery is accessible after having removed the bottom protection plate. The rated voltage is 12V and its capacity is 1.2Ah at 20 °C; the autonomy is 2.5 to 3.5 hour for a full charge. The position of the battery in its compartment is of no importance from a polarity point of view.



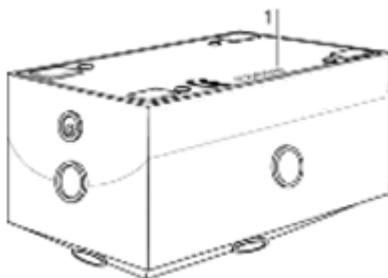
The battery is accessible from the bottom

The battery of the transmitter is IATA proved.

Warning: if a battery of a different brand than the one provided by SDT is used, it is essential to respect the polarity arrangement of the terminals as shown in the diagram above. Failing to do so can cause serious damage and impair the good functioning of the multi-transmitter.

The multi-transmitter serial number

It is located at the bottom, on the removable plate.



Localization of the serial number of the multi-transmitter.

2 Using the multi-setting transmitter

2.1 RECOMMENDATIONS

The multi-transmitter must be used:

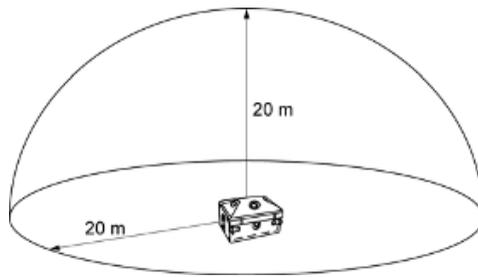
- In combination with an *SDT ultrasonic* receiver;
- Outside any classified zone requiring intrinsic and fireproof safety.
- Away from discharge of water and must never be immersed. It is important to prevent any foreign bodies entering the ultrasonic transducers, such as grease, dust, etc.
- Within hygrometric and temperature limits stipulated in the technical characteristics.

Note: If necessary, the transmitter can be protected / covered by thin / fine mesh cloth (e.g. nylon stockings) to prevent dust from entering into the transducers when working in a dusty atmosphere.

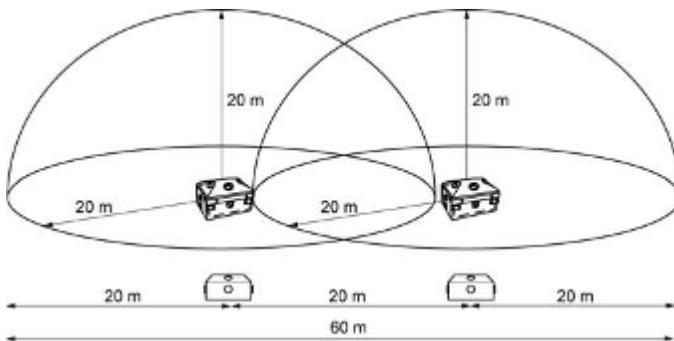
2.2 WORKING POSITION

When preparing for testing the weathertightness of hatch covers and determining the OHV (Open Hatch Value), the multi-transmitter should be placed, ideally, in the center of the tank top.

The multi-transmitter covers an operational spherical volume of 20 meters (60 ft) around its position. For larger volumes, the multi-transmitter should be moved several times; it is then necessary to take a new OHV (Open Hatch Value) measurement after having repositioned the transmitter.

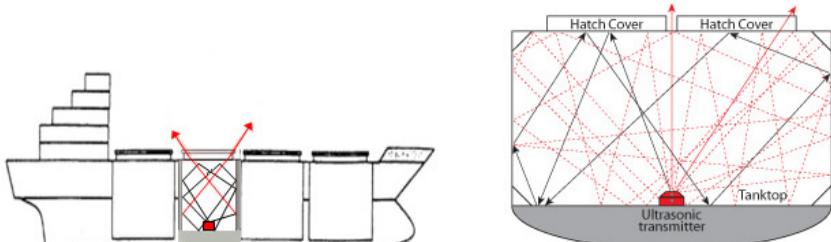


The volume covered by one multi-transmitter.



The zone covered by the multi-transmitter when set to various points.

If the hold is not empty, the multi-transmitter can be placed on top of the cargo.

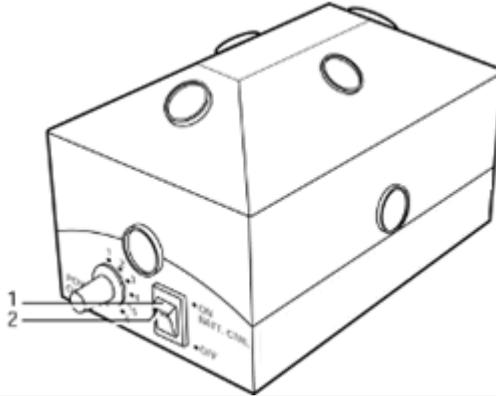


The correct position of the multi-transmitter.

2.3 POWERING ON

Note: The battery packs are charged in our factory for test purpose but the battery packs are discharged before being dispatched, because of international air transport legislation. Upon reception, the battery packs should be charged.

The equipment is powered on by pushing the switch to the ON position (1). The operating light (2) should be lit (if this is not the case then refer to chapter 4 The multi-transmitter operational problems).



The on-off switch (1) and battery control indicator (2).

2.4 SETTING THE TRANSMITTING POWER

When testing the tightness of volumes/holds, set the multi-setting selector according to the volume of the space to be tested.

For larger volumes/holds, the selector should normally be set on position 6. For smaller holds/volumes the selector may have to be set to a lower position.

2.5 MEASUREMENTS

The 8 transducers of the multi-transmitter work in the bi-sonic mode on frequencies stabilized at 39.2 and 39.6 kHz, with total transmission power also stabilized at 8 x 125 mW. The measurements will be carried out by the SDT ultrasonic receiver.

2.6 POWERING OFF

To power off the transmitter, set the switch to the Off position (1). The red operating status light should switch off.

3 Charging the SDT 8 MS transmitter battery pack

3.1 RECHARGING THE BATTERY

The battery packs are charged in our factory for test purposes but the battery packs are discharged before being dispatched, because of international air transport regulations. Upon reception, the battery packs should be recharged.

3.1.1 Recommendations

The battery is a sealed lead-acid gel battery. Therefore:

- Short circuit of the contacts is dangerous.
- The battery must not be discarded onto a flame.
- Recharging in a sealed box is prohibited (gas leaks).
- All mechanical shocks able to break the box may adversely affect the life of the battery.
- In the case of electrolyte coming into contact with the skin, rinse the contaminated area immediately with water.
- Recharge an unused battery pack every three (3) weeks.

3.1.2 Generalities on charging

Charging will be carried out:

- Either to maintain the charge of the battery. A continuous charge is not harmful to the life of the battery, as long as the charger provided with the multi-transmitter is used.
- Or after the flashing of the indicator of the battery.

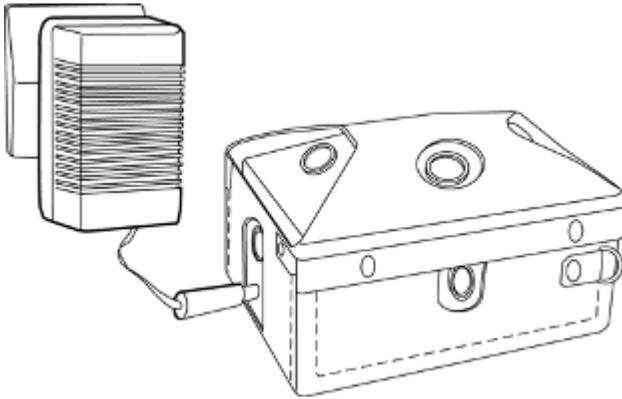
The following table details the state of battery charge in relation to the information provided by the indicator:

Power switch	Indicator light	Transmitter
On	Continuous	- Transmitter is switched on. - Battery charge is correct.
On	Flashing	- Transmitter is switched on. - Battery charge is incorrect. - The speed of the flashing increases as the charge decreases.
On	Off (no light)	Insufficient charge, or no battery.
Off		Transmitter is switched off.

3.1.3 Without removing the battery

Proceed as follows:

- Before every recharging operation, unplug the battery charger from the mains and re-plug it, in order to reset the internal timer.
- Connect the plug to the socket marked LOAD on the multi-transmitter.
- Connect the charger to the mains.
- Leave it on charge for 6 hours for a completely flat battery. There is no maximum charge indicator.

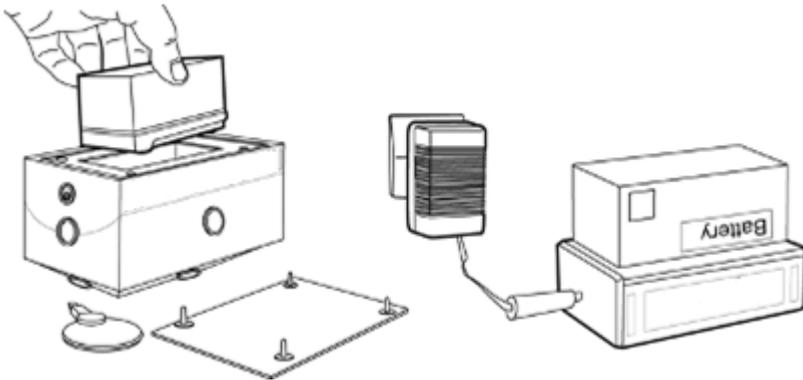


Recharging a battery via the transmitter (without removing it).

3.1.4 When removing the battery

Proceed as follows:

- Remove the lid at the base of the multi-transmitter by means of the screwdriver provided with the SDT Sherlog Kit and remove the battery. Before every recharging operation, unplug the battery charger from the mains and re-plug it, in order to reset the internal timer.
- Connect the plug to the battery's support socket.
- Place the battery in the support (contacts inside). There is no preferential direction for the battery.
- Leave the battery on charge for 6 hours for a completely flat battery. There is no indicator for a maximum charge.
- Batteries should be discharged from time to time to avoid build-up effect.



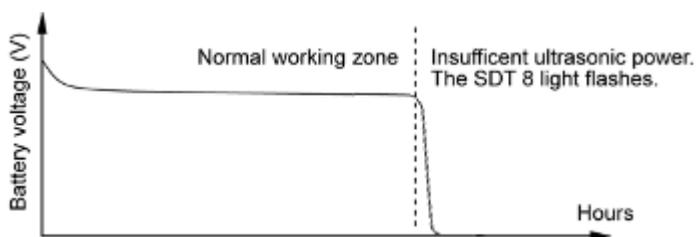
Removing the battery and charging same with the provided support

4 The multi-transmitter operational problems

4.1 ULTRASONIC TRANSDUCER

4.1.1 Decreasing ultrasonic signal

The main reason, when an unstable signal is read/displayed on the SDT ultrasonic receiver, is that the battery is not fully charged. The discharge curve of the battery is constant over a long period. Any variation in power will immediately stop the transmitter in order to prevent incorrect measurements.



Curve illustrating a decreasing ultrasonic signal.

4.1.2 Low but constant level ultrasonic signal

If the signal measured from a transducer during the function test (when the Amplification level is set at 10 and the transmitter selector switch position in position 1) is significantly lower than $95 \text{ dB}\mu\text{V}$ and however remains constant, this indicates that the functioning of the transducer is impaired by some clogging/damage. In this case, clean the transducer(s) or protective grid. Do not use compressed air to clean/blow out any impurities.

4.1.3 Defective transducers

Transducers may become damaged due to:

- A mechanical shock/impact: return the equipment to your distributor in order to change one or more transducers as necessary.
- Water in the transducers: leave to dry and check that there is no water left, etc.
- Dust, debris and grease: try to clean gently, do not use compressed air to clean/blow out any impurities.

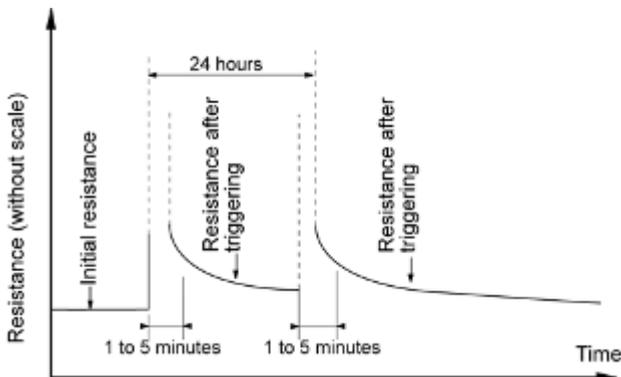
Above damages/problems will reduce the transmission power significantly which may result in incorrect measurements so that corrective action is required.

Note: The failure of one or two transducers will not prevent you from carrying out a correct tightness test. The remaining total output will still be sufficient in most cases.

4.2 CONTROL FUSE

If, despite an apparently correctly charged battery, the transmitter (whilst in good working order), does not produce any ultrasonic signal, a chemical control fuse located in the internal electronics as well as in the battery support unit may have been triggered.

Contrary to a standard type fuse, such a fuse contains a progressive reset time corresponding to the following curve. In this case, wait 1 to 5 minutes and try again.



Automatic reset curve of the chemical fuse.



Never replace the chemical fuse with a different type. Successive occurrences of triggering are caused by a failure in the equipment. It is therefore advisable to return the equipment to the distributor for repairs.

5 Technical specifications

5.1 TRANSMISSION CHARACTERISTICS

Function	Ultrasonic multi-transmitter
Frequencies	Stabilized at 39.2 and 39.6 kHz (bi-sonic mode).
Nbr of transducers	8
Transmission power	Power control in 6 levels Typical values form 1 to 6 : -20dB, -15dB, -9dB, -6dB, -2dB, max.
Maw trans. Power	8 x 125 mW
Dispersion	240 °

5.2 SUPPLY

Voltage/capacity	12V DC/1,2 Ah.
Battery	Sealed lead-acid gel type rechargeable.
Recharge	By means of an external charger and integrated connector (without removing the battery) or by using a charge adapter (removing the battery).
Autonomy	2.5 to 3.5 hours at 20 °C. (depends on the selected level)
Charging time	6 hours.
Safety	Chemical control fuse with automatic reset.

5.3 ON / OFF SWITCH

Command	By On/Off switch
Visual indication	On/Off/Battery charge control indicator. Flashes when undercharged.

5.4 OTHERS

Temperature range	-20° C to +50° C (°F)
Dimensions	160 x 100 x 95 mm (L x W x H)
Weight	1.5 kg

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