Consultation with SebaKMT
The present system manual has been designed as an operating guide and for reference. It is meant to answer questions you might have in an easy way. Should any trouble occur please make use of this manual first.

In doing so please have a look at of the table of contents and read the relevant paragraph carefully. The first step is always: “Check all terminals and connections of the instruments involved”

Should any question remain unanswered, please contact:

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SebaKMT warrant that at the time of delivery SebaKMT products are free from manufacturing or material defects which might considerably reduce their value or usability. This warranty does not apply to faults in the software supplied. During the period of warranty, SebaKMT agree to repair faulty parts or replace them with new parts or parts as new (with the same usability and life as new parts) according to their choice.

SebaKMT reject all further claims under warranty, in particular those from consequential damage. Each component and product replaced in accordance with this warranty becomes the property of SebaKMT.

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Each measure to remedy a claim under warranty shall exclusively be carried out by SebaKMT or an authorized service station.

To register a claim under the provisions of this warranty, the customer has to complain about the defect, in case of an immediately detectable fault within 10 days from the date of delivery.

This warranty does not apply to any fault or damage caused by exposing a product to conditions not in accordance with its specification, by storing, transporting, or using it improperly, or having it serviced or installed by a workshop not authorized by SebaKMT. All responsibility is disclaimed for damage due to wear, will of God, or connection to foreign components.

For damage resulting from a violation of their duty to repair or re-supply items, SebaKMT can be made liable only in case of severe negligence or intention. Any liability for slight negligence is disclaimed.
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1 Technical Description

Technical Description

Non-metallic water pipes are difficult to locate via electromagnetic fields without inserting a transmitter (sonde) into the pipe. Most common non-metallic pipe materials are AC, PE and PVC. This technical problem can often be solved by using the acoustic pulse technique. By mounting an acoustic pulse generator (does not create a water hammer) the pipe is used to carry acoustic vibrations (very low frequency). Depending on type of material, diameter and soil characteristics these vibrations will propagate along the pipe and can be detected on the surface by means of a ground microphone like the HL5000 which has an integrated special acoustic pipe locate mode. The locate distance will differ from case to case and may be up to 300ft. This acoustic locating method can also be applied to metal pipes which carry the generated vibrations even further.

The main application for this device is to locate house services and main where they tap into the main distribution pipe.

1.1 Technical Data

The system is specified by the following parameters:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impacts per sequence</td>
<td>3 impacts per sequence (2 impacts at low battery)</td>
</tr>
<tr>
<td>Pulse repetition rate</td>
<td>40 / 60 / 80 or 120 impacts per minute selectable</td>
</tr>
<tr>
<td>Impact intensity</td>
<td>25 / 50 or 100 % selectable</td>
</tr>
<tr>
<td>Rechargeable battery</td>
<td>NiCd 12 V, 2.8 Ah</td>
</tr>
<tr>
<td>Operating time</td>
<td>≥ 16 h</td>
</tr>
<tr>
<td>Charger</td>
<td>100 - 240 V AC, 12 V DC</td>
</tr>
<tr>
<td>Charging time</td>
<td>approx. 2 h</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>14 °F to +140 °F (-10 °C to +60 °C)</td>
</tr>
<tr>
<td>Dimensions control unit</td>
<td>9.8 x 4.5 x 6.3 in (250 x 115 x 160 mm)</td>
</tr>
<tr>
<td>Weight control unit</td>
<td>4.6 lbs (2.1 kg)</td>
</tr>
<tr>
<td>Dimensions pulse generator</td>
<td>7.5 x 3.7 x 2.6 in (190 x 95 x 65 mm)</td>
</tr>
<tr>
<td>Weight pulse generator</td>
<td>5.7 lbs (2.6 kg)</td>
</tr>
<tr>
<td>Chain length</td>
<td>22.8 in (580 mm)</td>
</tr>
</tbody>
</table>

1.2 Scope of Delivery (Vivax-Metrotech)

The following components are included in the delivery:

- Control unit with rechargeable battery
- Pulse generator with chain
- Charger
- Operating manual
- Transport case

The following optional accessories are available:

- HL5000 and other acoustic receivers
1.3 **Design**

The complete system contains the acoustic pulse generator and a control unit with rechargeable batteries. Both components are connected with each other by means of a multicore cable.

![Components](image)

**Fig 1. Components**

1.3.1 **Pulse Generator**

The pulse generator contains a powerful electromagnet which, being powered by the control unit, knocks against the pipe either directly or through an absorbing flap. It is attached by using of a link chain with a tensioning device. That way the pulse generator can be attached to pipes of many different diameters. The technical system is housed in a surface-finished steel enclosure.

1.3.2 **Control Unit**

The control unit is housed in a case made of shockproof ABS plastic which includes a 12 V NiCd rechargeable battery, the control circuitry and an operating panel where the operator can set impact intensity as well as repetition rate. The batteries can be recharged by means of the delivered charging device.
2 Operation

Operation

Running the system is simple. Nevertheless, we advise to follow the instructions as the proper and successful operation of the system may be affected by inappropriate handling.

2.1 Commissioning the Pulse Generator

Follow Fig 2 or Fig 3 when attaching the pulse generator. Arrange the pulse generator in horizontal position, if possible. You may use some other arrangement, if need be, but the covered range will probably be different.

Make sure that the fixing chain is tensioned tightly, but not too much. Proper tension has been achieved if the pulse generator, attached in horizontal direction, does not slip down!
2.1.1 Using the Absorbing Flap

According to Fig 4, the contact surface of the pulse generator is equipped with an absorbing flap.

The magnet ram (bolt), being set into motion, knocks against the absorbing flap. Thus the impact does not hit the pipe directly. The following figures show the different modes of coupling.
2.1.2 Positioning the Pulse Generator

Do not arrange the acoustic pulse generator in the immediate vicinity of a wall. In Fig 7 the distance is approx. 50 cm (1.5 ft). In this event the nodal points of vibration coincide with the position of the wall. Propagation is not obstructed.

Place of coupling

![Fig 7. Advantageous Coupling (Without Attenuation)](image)

Fig 7 shows that, if the pulse generator is placed very close to a wall, the vibration antinode directly coincides with the wall and thus the vibration is heavily attenuated.

Place of coupling

![Fig 8. Disadvantageous Coupling (With Attenuation)](image)

2.2 Commissioning the Control Unit

Connect the acoustic pulse generator to the 5-pin socket [1] of the control unit by using the connecting cable which is attached to it. Observe the locating key on the plug. After that, engage the sleeve nut by turning it clockwise.

![Fig 9. Socket for Pulse Generator Connection](image)

a) Socket of the control unit for pulse generator connection.

Caution!

Do not connect any other devices or systems to socket [1] of the control unit. Doing so would mean a very high risk of damage to your instrument!
2.2.1 Operating Panel
You find all controls and indicator lights on the operating panel of the control unit.

![Operating Panel of Control Unit](image)

b) Rotary switch for On-Off and impact intensity (2)
c) Signal lamp of pulse output (3)
d) Signal lamp of device status (4)
e) Rotary switch for pulse repetition rate (5)

2.2.2 Switching the Device On/Off
Use rotary switch [2] to switch the control unit on. Make absolutely sure that the pulse generator has been connected before.

![Device On / Off](image)

2.2.3 Adjusting Impact Intensity
Using rotary switch [2] the device not only is switched on, but also the desired impact intensity can be adjusted.

![Adjustment of Impact Intensity](image)
2.2.4 Adjusting Pulse Repetition Rate
Use rotary switch [5] for adjusting the impact package repetition rate.

<table>
<thead>
<tr>
<th>step</th>
<th>impacts per minute</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>120</td>
</tr>
<tr>
<td>2</td>
<td>80</td>
</tr>
<tr>
<td>3</td>
<td>60</td>
</tr>
<tr>
<td>4</td>
<td>40</td>
</tr>
</tbody>
</table>

2.2.5 Pulse Output Signal Lamp
By lighting up, the red signal lamp [3] indicates that the pulse output is active. Differences in impact intensity are not indicated.

2.2.6 Status Signal Lamp
The green signal lamp [4] indicates the status of the device.

<table>
<thead>
<tr>
<th>Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not lit</td>
<td>Device is switched off</td>
</tr>
<tr>
<td>Permanently lit</td>
<td>Device is switched on</td>
</tr>
<tr>
<td>Flashing</td>
<td>Battery is low</td>
</tr>
</tbody>
</table>

The instrument will be functional for another 2 hours from the time when the lamp has started flashing.

2.2.7 Low Battery Indication
As soon as the battery capacity has dropped to a certain degree, the green signal lamp [4] starts flashing. At the same time the standard number of impacts per impact package is reduced from 3 to 2. This is an indication to the operator that he can expect no more than another two hours of operation if the device isn’t recharged.
First attach the acoustic pulse generator to the pipe to be searched and switch the instrument on. Then start locating the unknown route of the pipe by listening to the ground-borne sound by means of a ground microphone (HL5000), starting from the place of coupling. You will be more successful, however, using the HL5000 in “acoustic pipe locate” mode with tracking counter and display. It is difficult to perceive minor differences in loudness just by listening via earphones.

Be very careful in selecting a proper position for the ground microphone. Large solid masses such as curbs are not suitable since sound is concentrated in such places. When listening to the sound in soft grounds, e.g. in a meadow, you should use an earth spike attached to the ground microphone or a contact mic PAM-B2 with tip and aluminum rod. It allows getting “closer” to the sound.

Fig 13. Microphone Earth Spike Or PAM-B2
Charging the Battery

Connect the delivered charger (LG RSP-3) with socket [6] of the control unit in order to recharge the built-in battery. The charging process starts immediately. Charging time is approx. 2 hours.

![Charging Socket](image)

**Caution!**
Do not use any other charging device but the delivered one!

We recommend recharging the device only after total discharge in order to avoid the memory effect of the built-in NiCd rechargeable battery.
Notes:

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