sebaKMT

Operation manual

Cable Identifying Generator
LCI TX / LCI TX-440

Mess- und Ortungstechnik
Measuring and Locating Technologies

Elektrizitätsnetze
Power Networks

Kommunikationsnetze
Communication Networks

Rohrleitungsnetze
Water Networks

Leitungsortung
Line Locating

Issue: 4 (07/2010)

Consultation with SebaKMT

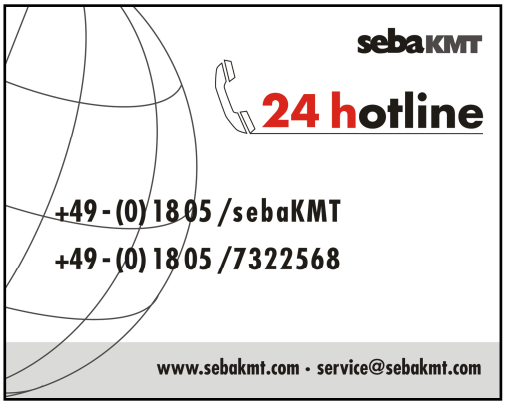
The present system manual has been designed as an operating guide and for reference. It is meant to answer your questions and solve your problems in as fast and easy a way as possible. Please start with referring to this manual should any trouble occur.

In doing so, make use of the table of contents and read the relevant paragraph with great attention. Furthermore, check all terminals and connections of the instruments involved.

Should any question remain unanswered, please contact:

Seba Dynatronic Mess- und Ortungstechnik GmbH	Hagenuk KMT Kabelmesstechnik GmbH
Dr.-Herbert-Iann-Str. 6 D - 96148 Baunach Phone: +49 / 9544 / 68 – 0 Fax: +49 / 9544 / 22 73	Röderaue 41 D - 01471 Radeburg / Dresden Phone: +49 / 35208 / 84 – 0 Fax: +49 / 35208 / 84 249

E-Mail: sales@sebakmt.com
http://www.sebakmt.com



Terms of Warranty

SebaKMT accept responsibility for a claim under warranty brought forward by a customer for a product sold by SebaKMT under the terms stated below.

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.

All warranty claims versus SebaKMT are hereby limited to a period of 12 months from the date of delivery. Each component supplied by SebaKMT within the context of warranty will also be covered by this warranty for the remaining period of time but for 90 days at least.

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 this 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.

Table of Contents

1 Safety Advice 6

2 Technical Description 7

3 Scope of Delivery 8

4 Design 9

5 Safety Mechanisms 10

6 Electrical Connection to Cable Under Voltage 10

6.1 Connecting the *LCI TX* 11

6.2 Connecting the *LCI TX-440* to open distribution systems 12

6.3 Direct Connection to LV HRC fuses (Optional) 14

7 Operating 16

1 Safety Advice

Safety precautions

This manual contains basic advice for the installation and operation of the *LCI TX* and *LCI TX-440* cable identifying generators. It is essential to make this manual accessible to the authorised and skilled operator. He needs to read this manual closely. The manufacturer is not liable for damage to material or humans due to non-observance of the instructions and safety advices provided by this manual.

Locally applying regulations have to be observed.

Symbols used in this manual

Important instructions concerning the protection of staff and equipment as well as technical safety within this document are labelled with one of the following symbols:

Symbol	Description
	Notes have important information and useful tips on the operation of your equipment. Non-observance may result in useless measurement results.
 **CAUTION**	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or material damage.

Working with equipment of SebaKMT

All electrical regulations of the country where the system is operated have to be observed as well as national regulations for prevention of accidents and existing regulations for the safety and operation of equipment of the involved companies.

Original accessories ensure safe operation of the equipment. It is not allowed and the warranty is lost if other accessories than the original ones are used with the equipment.

Intended application

The cable identifying generators *LCI TX* and *LCI TX-440* may only be operated at live low-voltage cables, measurement category 600 V / CAT IV (EN 61010-1), according to their intended application.

Safe operation is only realised when using the equipment for its intended purpose.

The limits described under technical data may not be exceeded.

2 Technical Description

Function

The cable identifying generators are used for selective cable identification on 100 V … 240 V (*LCI TX*) or 240 V … 440 V (*LCI TX-440*) live low-voltage cables.

For such a cable identification procedure, the receiver *CI RX* is required additionally. The handling of the receiver is described in a separate operation manual.

The generator sends out pulses up to a peak current value of 90 A into the cable to be identified. This test current generates an electromagnetic field around the cable which is picked up by a flexible identification clamp attached to the cable.

The test current of these identification permits a determination of the current value and of the direction of the measuring pulse, thus leading to a safe and reliable identification of the cable.

Technical data

Parameter	Value
Indicators	○ Power status LED (green) ○ LED for pulse, polarity and error indication (red)
Operating voltage	
○ LCI TX	100 V … 240 VAC 50/60 Hz
○ LCI TX-440	240 V … 440 VAC 50/60 Hz
Pulse current	80 A ±10 A
Pulse sequence	30 per minute
Pulse width	1.7 ms
Weight	0.5 kg
Dimensions	151 mm x 101 mm x 60 mm
Protection class	IP 54
Operating temperature	-10°C … 60°C
Measurement category (EN 61010-1)	
○ LCI TX	Connected via NKG 1: 300 V / CAT II Connected via NK 9 and fused clip: 1000 V / CAT III, 600 V / CAT IV
○ LCI TX	Connected via MK34, MK35, MK36 measuring leads: 1000 V / CAT III, 600 V / CAT IV

3 Scope of Delivery

Standard scope of delivery

The following items are included with the standard shipment of the *LCI TX* generator:

- Mains supply lead 2.0 m (NKG1)
- Mains measuring lead 2.5 m (NK9-C)

The following items are included with the standard shipment of the *LCI TX-440* generator:

- Black measuring lead with fused alligator clip, 2.0 m (MK34)
- Blue measuring lead with fused alligator clip, 2.0 m (MK35)
- Yellow/green measuring lead with alligator clip, 2.0 m (MK36)

Optional accessories

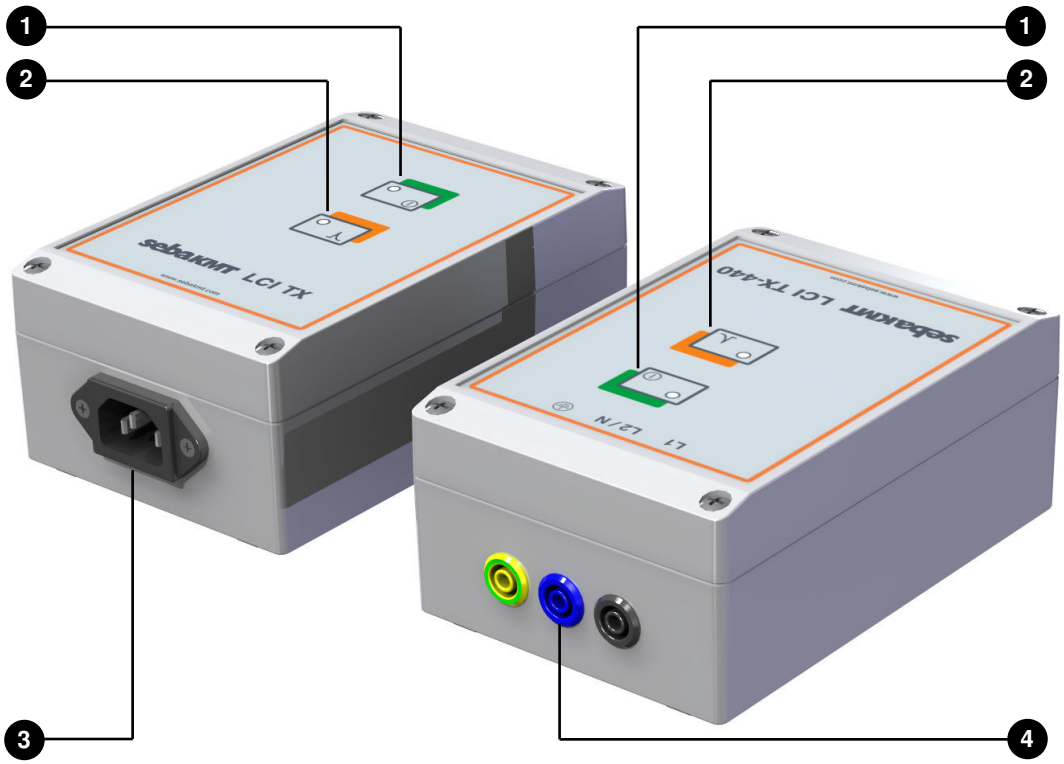
The following accessories can be ordered by your sebaKMT representative, if required:

Accessory	**Description**	**Order number**
Case	Suitable for a complete cable identifier system	820011292
Measuring lead MK 55	Adapter for direct measurement on LV HRC fuses (type 00 … 03)	820025178

4 Design

The *LCI TX(-440)* identifying generator is built into a sturdy ABS plastic housing. The unit is in protection class IP 54.

The following figure shows the generators and their indicators and sockets:



Item	Description
❶	Power status LED
❷	LED for pulse, polarity and error indication
❸	Mains socket for direct connection to power outlets or low voltage lines up to 240 V (*LCI TX* only)
❹	Laboratory sockets for direct connection to low voltage lines up to 440 V (*LCI TX-440* only)

5 Safety Mechanisms

Overvoltage protection

The generator has a built-in overvoltage protection. If a voltage > 270 V (*LCI TX*) or >460 V (*LCI TX-440*) is detected, the fuses blow and, thus, protect the unit from being destroyed.

After the overvoltage protection has been responded, it is necessary to change both internal 5A F fuses (high breaking capacity) in order to put the generator back to operating state.

Over-temperature protection

At too high temperatures, the pulse transmission is automatically stopped until the temperature has dropped below a certain threshold. If the over-temperature protection is active, both LEDs are lit permanently and the audible indicator does not sound.

6 Electrical Connection to Cable Under Voltage

Introduction

The generator has to be connected to the open distal (load) end of the cable. Proper cable identification using the *CI RX* can only be performed between the transformer and the generator.

 **CAUTION**	**Connection sequence** Greatest care must be taken when connecting the generator to ensure that the protective and neutral conductor are connected securely first. Only then may the live phase conductor be connected. Disconnect in reverse order: first disconnect the phase conductor, then the protective and neutral conductor.

6.1 Connecting the *LCI TX*

Connecting to power outlet

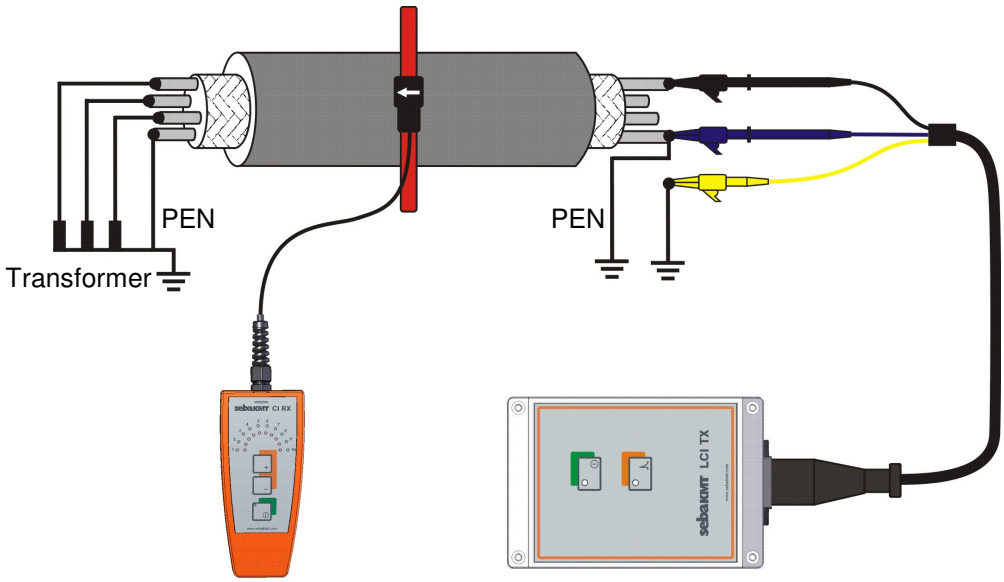
When connecting the generator to a power outlet in measurement category CAT II (EN 61010-1) environment, the NKG1 mains supply lead can be used.

When connecting the generator using the NKG1 mains supply lead in combination with special plugs / sockets, make sure a connection to PE is established.

Connecting to low voltage distribution lines

For connection to open distribution lines (measurement categories CAT III and IV), the NK9-C mains measuring lead has to be used. To prevent arcing in the event of a short circuit in the system measuring lead, the blue and the black test terminals are fitted with 10 A fuses. The maximum switch load of these fuses is 50 kA.

The following figure illustrates how the *LCI TX* generator is connected using the NK9-C measuring lead:



In contrast to the *LCI TX-440,* the *LCI TX* is only suitable to be connected between phase and neutral conductor. The device must not be connected between two phases!

6.2 Connecting the *LCI TX-440* to open distribution systems

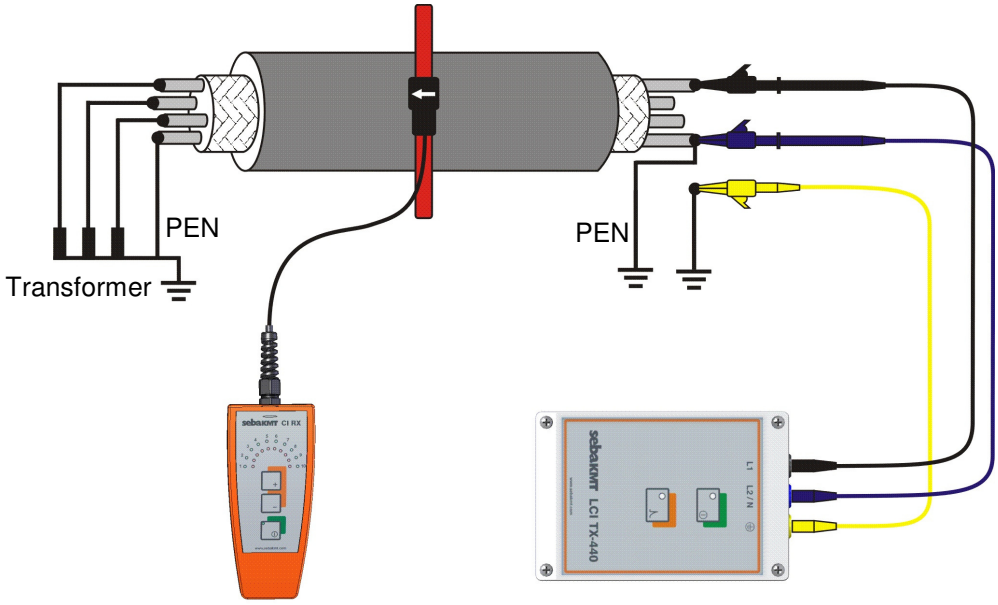
Measuring leads

The *LCI TX-440* is connected to open distributors by means of the measuring leads MK34 (black), MK35 (blue) and MK36 (yellow/green). It is essential that the measuring leads are connected to the generator in accordance with the colour coding!

To prevent arcing in the event of a short circuit in the system measuring lead, the blue and the black test terminals are fitted with 10 A fuses. The maximum switch load of these fuses is 50 kA.

Connection between phase and earth

When connecting the *LCI TX-440* for normal cable identification according to the **current impulse method**, proceed as illustrated in the picture below:

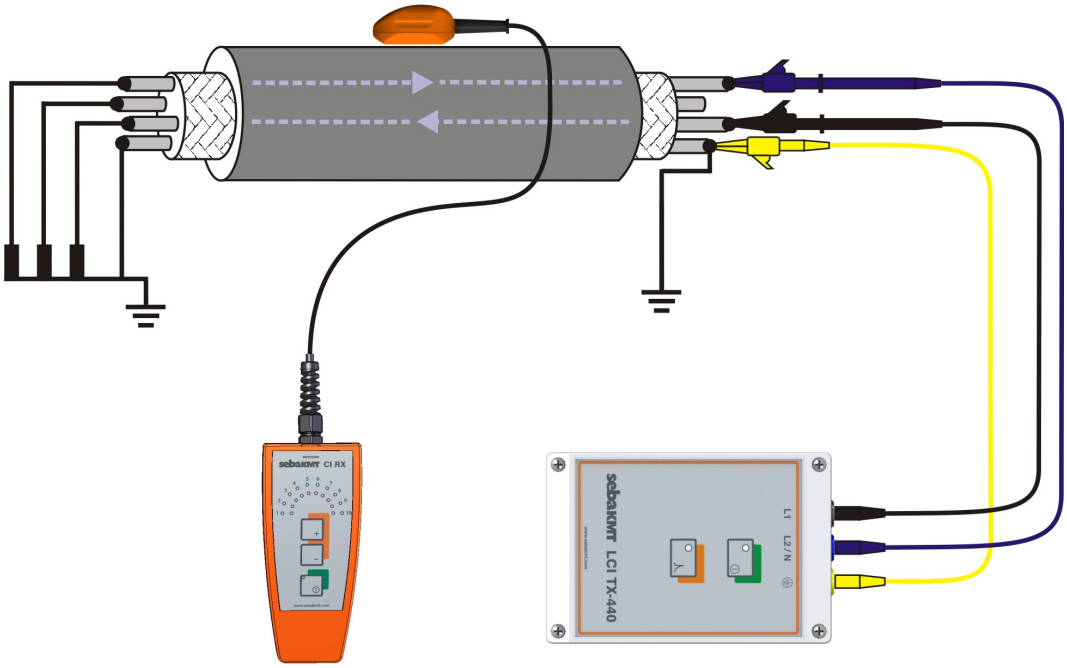


The alternating voltage between the outer conductor and neutral conductor should be at least 240 V, so that the identifying generator can draw the maximum possible pulsed current.

Connection between phases

The *LCI TX-440* generator can also be connected between two phases of a multi-conductor cable. With this type of connection, the identification of the cable is performed **according to the "Twisted-Field" method** by means of the optional *TFS CI* sensor (moved along or around the cable).

The black and the red test lead must be connected to any two phases of the cable. The use of a protective conductor is not necessary from a metrological point of view, is recommended however for safety reasons.



Due to its limited overvoltage protection, the identifying generator *LCI TX* is not suitable for phase to phase connection!

6.3 Direct Connection to LV HRC fuses (Optional)

Using the measuring cable MK 55 (available as a special accessory) the both generators, the *LCI TX* and the *LCI TX-440*, can be directly connected to LV HRC fuses of size 00 – 3 (6 … 630 A).

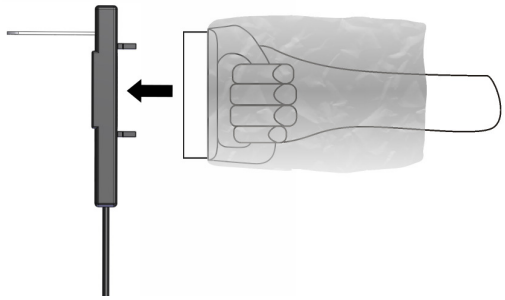
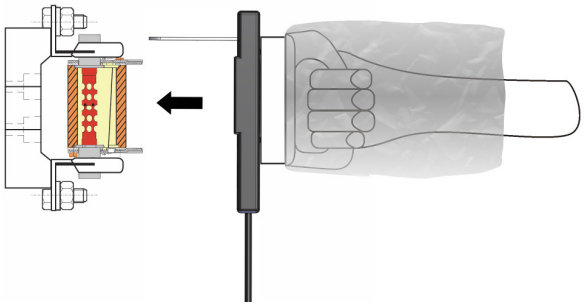
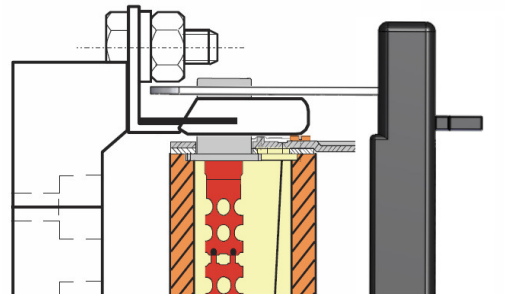
CAUTION

Observe the following safety instructions when using the measuring cable MK 55:

- The measuring cable MK 55 may only be used by qualified electricians or persons who have been instructed in electrical principles.
- Only safety handles conforming to DIN VDE 0636-201 (EN 60269-2) or DIN VDE 0680-4 (for work performed under live voltage) may be used for operation.
- When performing assembly work under live voltage, the work-specific instructions and documentation of the network operator, as well as national safety regulations (such as the German TRBS 2131) are to be observed.
- It is not intended that the fuse in the plug-in adapter of the measuring cable be replaced by the user.

Connect to an LV HRC fuse as follows:

Step	Description
1	Connect the identifying generator to the protective conductor with the yellow/green measuring lead and to the neutral conductor with the blue measuring lead.
2	The front part of the black alligator clip on the measuring cable NK9-C (*LCI TX*) or MK34 (*LCI TX-440*) must be exchanged for the screw-on adapter supplied with the MK 55. The existing fuse must continue to be used. Afterwards, the MK 55 can be attached to the black measuring lead.
3	Connect the MK 55 to the generator. When using the *LCI TX-440* generator, the measuring lead has to be connected to the black terminal.

Step	Description
4	Insert the plug-in adapter in the LV HRC fuse replacement handle. 
5	Push the plug-in adapter onto the upper contact blade so that it attaches securely to the fuse attachment. 
6	Detach the LV HRC fuse replacement handle. 
7	After the cable identification, disconnect by reversing this sequence of steps.

7 Operating

Polarity check

The identifying generator switches itself on automatically after being connected to the cable.

Subsequently, the generator automatically checks the polarity. This is necessary as the CEE 7/7 (Schuko) plug of the mains supply lead NKG1 may have been connected the wrong way round.

Depending on the polarity, the system responds as follows:

Correct polarity		Wrong polarity	
Green LED is lit			Green LED is off
Red LED is flashing and an audible indicator sounds in time with the transmitted pulses			Red LED is lit

In the case of wrong polarity, the polarity of the connection lead has to be changed (the NKG 1 CEE 7/7 (Schuko) plug has to be turned round). The connection lead must not be reconnected before the device has totally turned off after appr. 3 seconds (both LEDs go out).

If the polarity change does not affect the LED status, it must be assumed that the protective earth conductor is not connected. In this case, testing cannot be carried out.

Practical use

Once the polarity check has been successfully completed, the identifying generator should be in operating status. The LEDs should now indicate that the unit is working perfectly. The pulse indicator and an audible signal should indicate a measuring pulse every 2 seconds. Cable identification can now be started using the *CI RX* identifying receiver with the flexible clamp.

A detailed description of the procedure is provided in the operating *CI RX* operating manual.

The identification of the test signal can be impaired by asymmetrical operating currents in the cable as well as by pulse shaped noise.