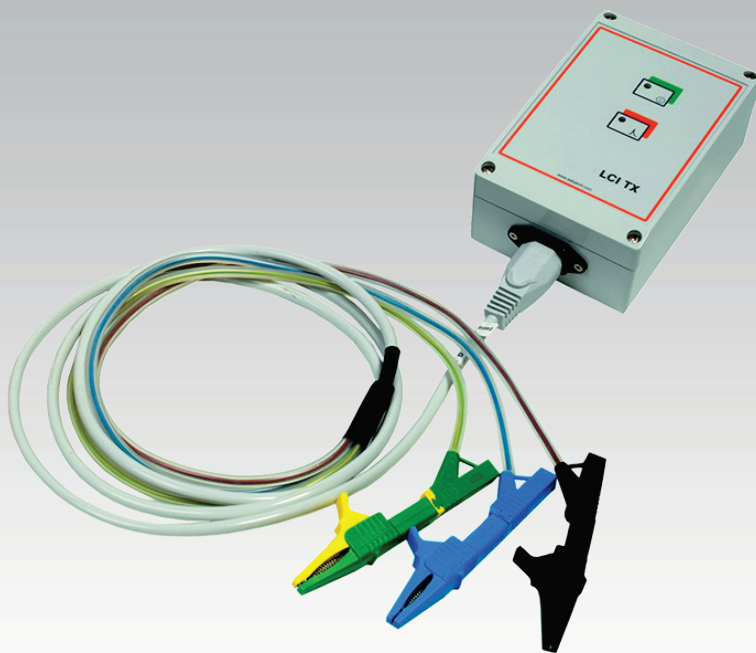


Megger[®]



LCI TX / LCI TX-440 **Cable Identifying Generator**

USER GUIDE

Issue: B (10/2021) - EN



Consultation with Megger

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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.

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Megger warrant that at the time of delivery Megger 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, Megger 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.

Megger 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 Megger.

All warranty claims versus Megger are hereby limited to a period of 12 months from the date of delivery. Each component supplied by Megger 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 Megger 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 Megger. 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, Megger 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	7
2	Technical Description	8
3	Scope of Delivery	10
4	Design	11
5	Safety Mechanisms	12
6	Electrical Connection to Cable Under Voltage	13
6.1	Connecting to power outlet	14
6.2	Connecting to low voltage distribution lines	14
6.3	Direct Connection to LV HRC fuses (Optional)	16
7	Operating	18

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 Megger 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	<ul style="list-style-type: none"> ○ 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 ¹	IP 54
	Operating temperature	-10°C ... 60°C
	Operating humidity	Max. relative humidity 93% at 30°C
	Storage temperature	-10°C ... 60°C
	Measurement category (EN 61010-1)	
	○ LCI TX	Connected via MK 37: 300 V / CAT II Connected via NK 9 and fused clip: 1000 V / CAT III, 600 V / CAT IV
	○ LCI TX-440	1000 V / CAT III, 600 V / CAT IV



¹ The specified IP code (protection against dust and water) can only be assured, if fitting plugs are plugged into all sockets or the sockets are covered with the corresponding protective caps.

3 Scope of Delivery

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

- Black measuring lead with fused alligator clip, 2.0 m
- Blue measuring lead with fused alligator clip, 2.0 m
- Yellow/green measuring lead with alligator clip, 2.0 m

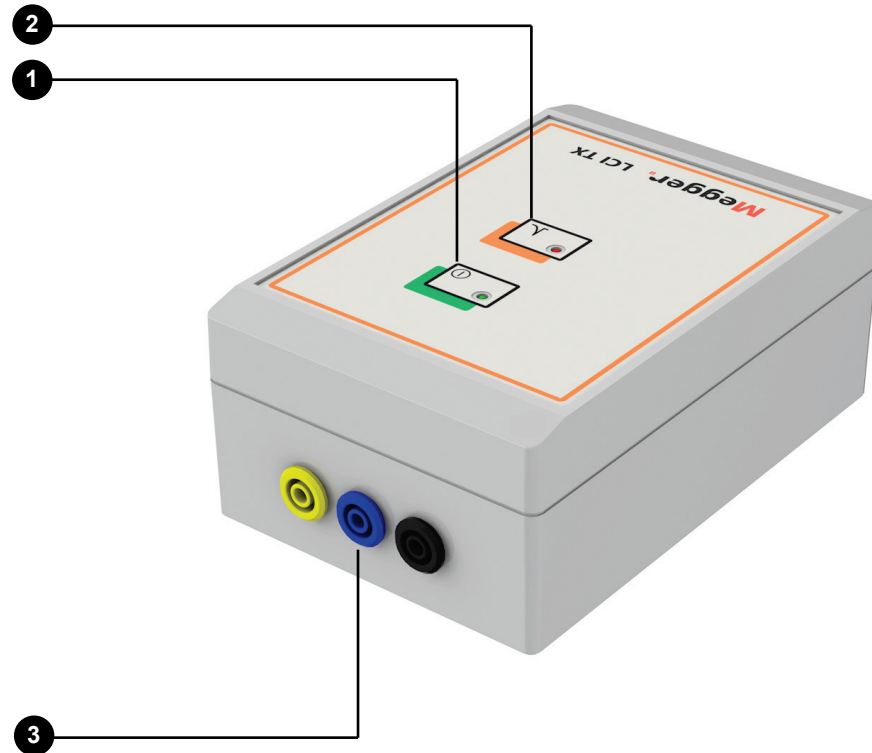
Optional accessories The following accessories can be ordered by your Megger representative, if required:

Accessory	Description	Order number
Case	Suitable for a complete cable identifier system	90004532
Measuring lead MK 55	Adapter for direct measurement on LV HRC fuses (type 00 ... 03) 	820025178
Measuring lead MK 37	Measuring lead for direct connection of the <i>LCI-TX / LCI TX-440</i> to a power outlet 	118304682 (EU) 90020744 (UK) 90020743 (US) 2011453 (AU/CN)

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
①	Power status LED
②	LED for pulse, polarity and error indication
③	<p><i>LCI TX</i>: Laboratory sockets for direct connection to power outlets or low voltage lines up to 240 V</p> <p><i>LCI TX-440</i>: Laboratory sockets for direct connection to low voltage lines up to 440 V</p>

5 Safety Mechanisms

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

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 to power outlet

When connecting the generator to a power outlet in measurement category CAT II (EN 61010-1) environment, the MK 37 measuring lead can be used.

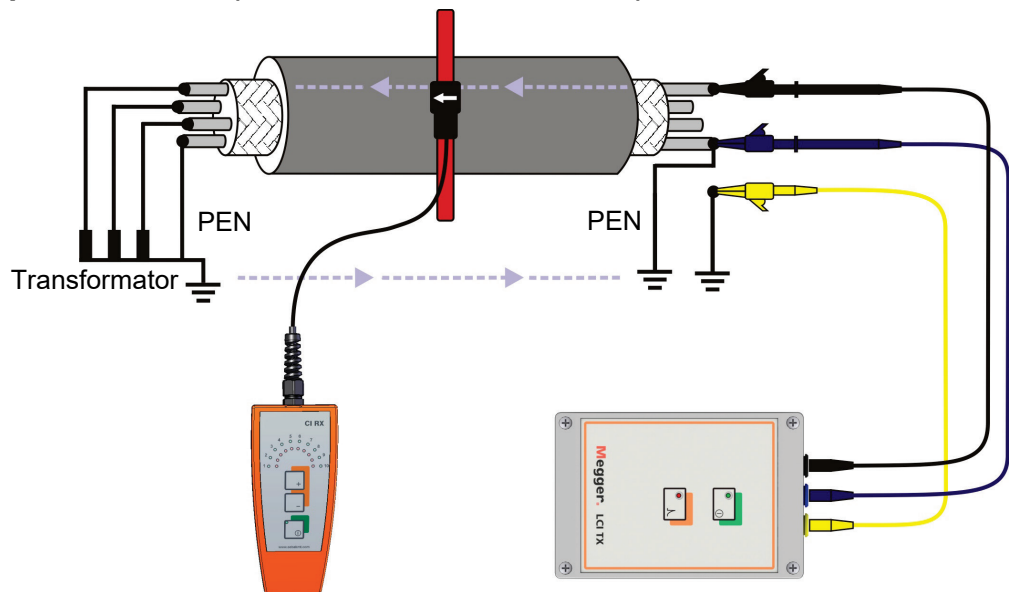
☞ When connecting the generator in combination with special plugs / sockets, make sure a connection to PE is established.

6.2 Connecting to low voltage distribution lines

Measuring leads The *LCI TX / LCI TX-440* is connected to open distributors by means of the measuring leads (black, blue and 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 for normal cable identification according to the **current impulse method**, proceed as illustrated in the picture below:

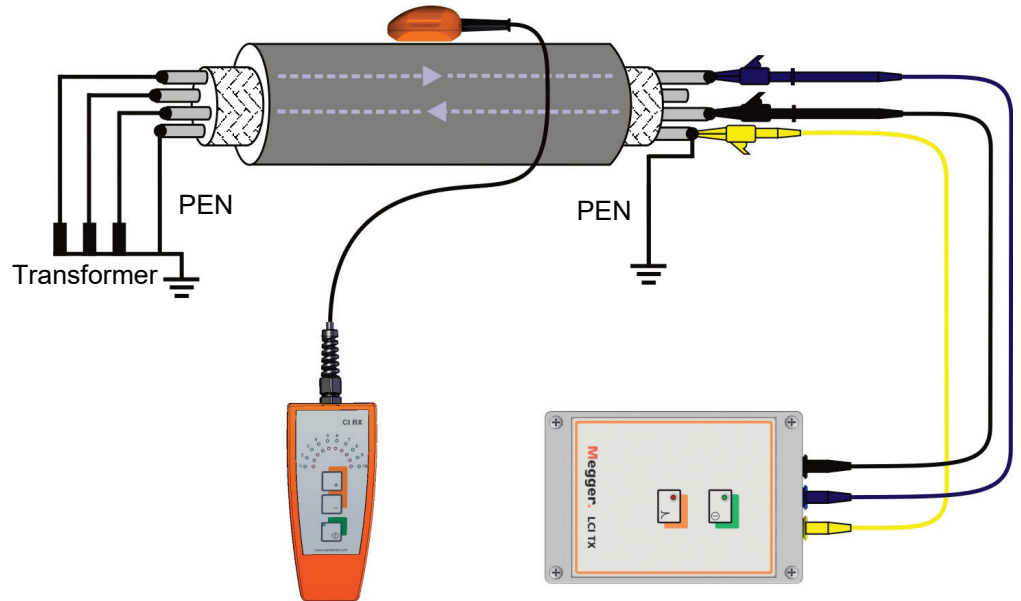


☞ The alternating voltage between the outer conductor and neutral conductor should be at least 240 V, so that the identifying generator can draw the maximum possible pulsed current.

Connection
between phases
(LCI TX-440)

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 blue 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).

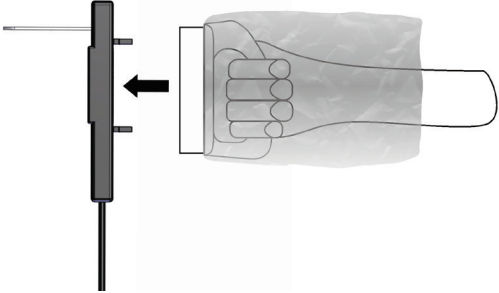
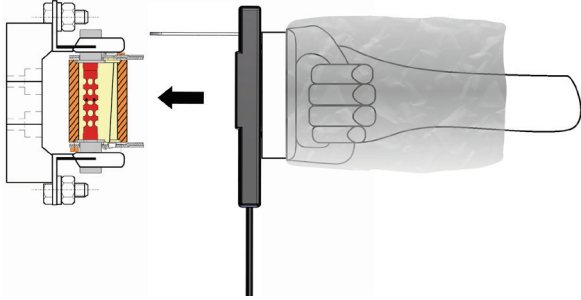
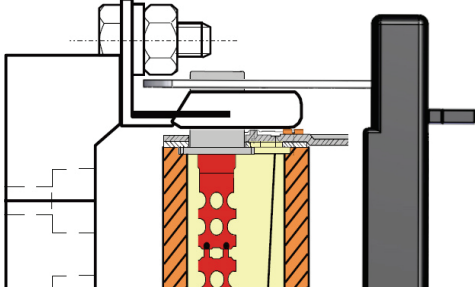


Observe the following safety instructions when using the measuring cable MK 55:

- 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 black measuring cable 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 <i>LCI TX-440</i> generator, the measuring lead has to be connected to the black terminal.

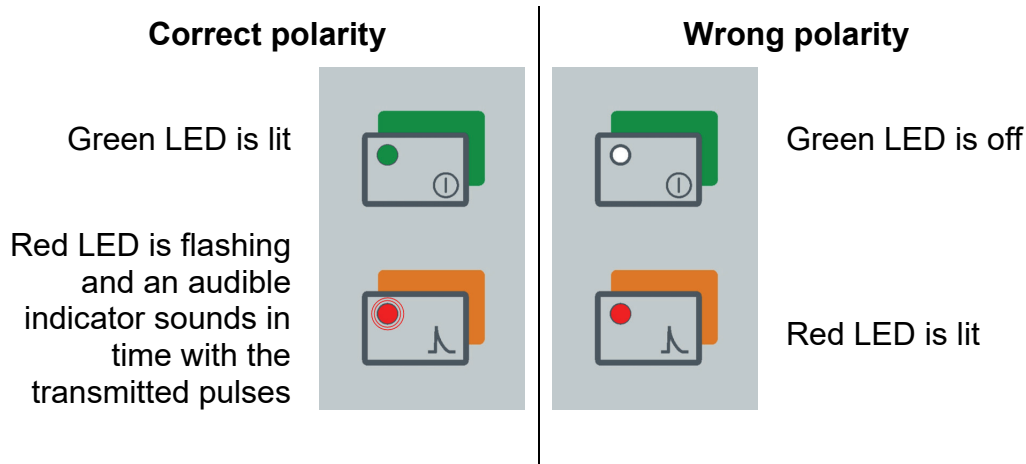
Step	Description
4	<p>Insert the plug-in adapter in the LV HRC fuse replacement handle.</p> 
5	<p>Push the plug-in adapter onto the upper contact blade so that it attaches securely to the fuse attachment.</p> 
6	<p>Detach the LV HRC fuse replacement handle.</p> 
7	<p>After the cable identification, disconnect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

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 MK 37 may have been connected the wrong way round.

Depending on the polarity, the system responds as follows:




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.

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CI RX **Cable Identifying Receiver**

USER GUIDE

Issue: C (11/2023)
EN

Consultation with Megger

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Table of Contents

1	Safety Advice	6
2	Technical Description	7
3	Scope of Delivery	8
4	Design	9
5	Start-up	10
6	Operation	13
6.1	General Handling of the Device	13
6.2	Identifying a Cable Using the DC Pulse Method (Current Flow Direction Determination)	14
6.3	Phase identification using the <i>PAS CI</i> (optional)	15
6.4	Using the “Twisted-Field” Sensor (“Twisted-Field” Method and Load Current Detection)	16
6.4.1	Cable Identification with the “Twisted-Field” Method	16
6.4.2	Load Current Detection	19
7	Troubleshooting	22
8	Changing the Batteries	22

1 Safety Advice

Safety precautions This manual contains basic advice for the installation and operation of the *CI RX*. 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 advice provided by this manual.

Locally applicable regulations have to be observed.

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

The original accessories provided ensure the safe operation of the equipment. It is not allowed and the warranty is voided if any accessories other than the original ones are used with the equipment.

Products of Megger are continuously being enhanced according to the state of the technology but such enhancements shall not constitute any ground for claims of any kind, particularly indemnity claims, for older versions of the product.

Intended application The cable identifying receiver *CI RX* may only be operated with low and medium voltage cables, measurement category 600 V / CAT IV (EN 61010-1), according to the intended application as described in this manual.

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 receiver *CI RX* can be used to identify low voltage cables and medium voltage cables out of a bunch of cables.

The receiver has to be operated in combination with one of the generators (*LCI TX*, *LCI TX-440* or *CI TX*) which transmit specific pulses into the cable to be identified.

These current pulses generate an electromagnetic field around the cable which is picked up by the flexible identification clamp clamped around the cable.

Thus, the operator is able to determine the cable to be identified securely.

Technical data

Parameter	Value
Display	<ul style="list-style-type: none"> ○ Power status LED (green) ○ LEDs for indication of signal strength and gain stage (red/green)
Sensors	<ul style="list-style-type: none"> ○ Flexible identification clamp <i>AZF 250-CI</i>, Ø min. 240 mm ○ Flexible identification clamp <i>AZF 150-CI</i>, Ø min. 130 mm (optional) ○ <i>PAS CI</i> phase identification sensor (optional) ○ “Twisted-Field” sensor <i>TFS CI</i>
Gain stages	10-stage (-3 dB ... 24 dB dynamic range)
Power supply	2 x 1.5 V AA batteries
Operating time	>50 h
Weight	0,4 kg (with batteries and sensor)
Dimensions (w x h x d)	150 mm x 65 mm x 35 mm
Protection class	IP 54
Operating temperature	-10°C ... 60°C
Operating humidity	Max. relative humidity 93% at 30°C
Storage temperature	-10°C ... 60°C
Measurement category	600 V / CAT IV

3 Scope of Delivery

Standard scope of delivery

- Cable identifying receiver *CI RX*
- “Twisted-Field” sensor *TFS CI*
- 2 x 1.5 V AA batteries

Necessary accessories

- Flexible identification clamp *AZF 150-CI* or *AZF 250-CI*

Optional accessories

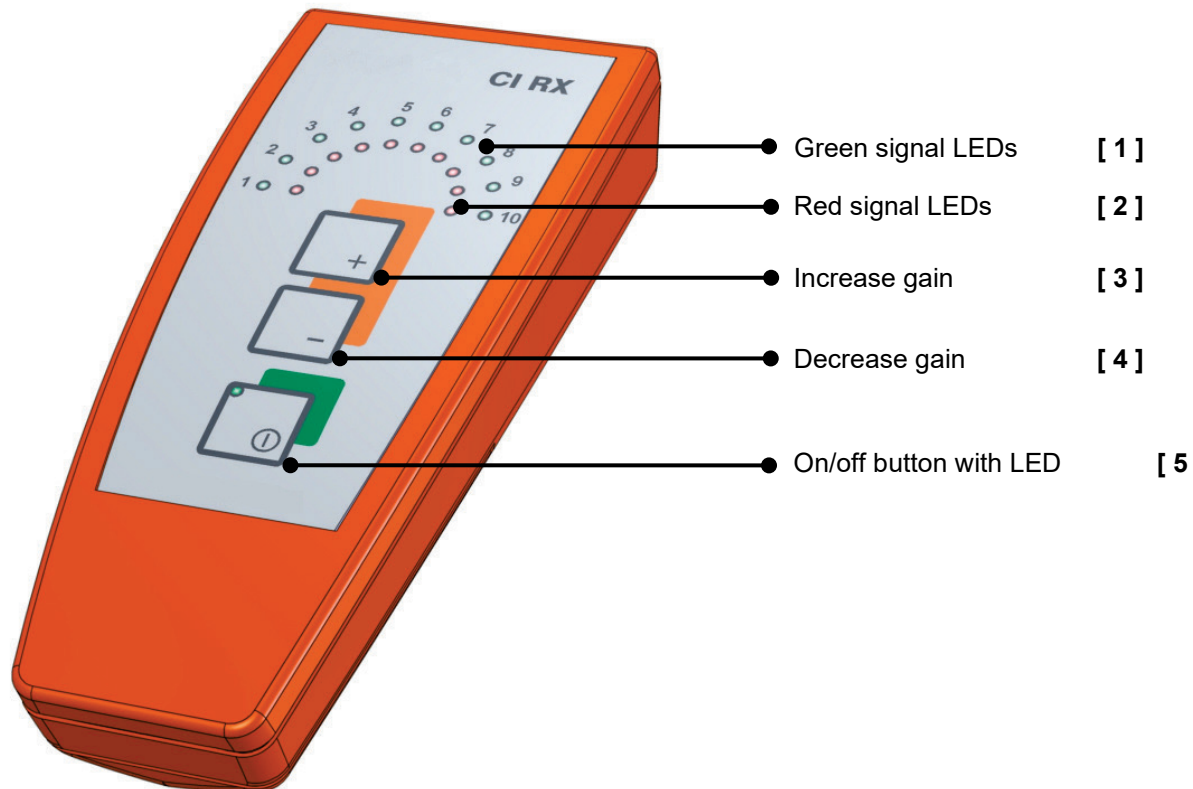
The following accessories can be ordered by your Megger representative, if required:

Accessories	Description	Order number
Case	Suitable for a complete cable identifier system	90004532
Flexible identification clamp <i>AZF 150-CI</i>	Flexible identification clamp (Ø min. 130 mm)	820013106
Flexible identification clamp <i>AZF 250-CI</i>	Flexible identification clamp (Ø min. 240 mm)	820013107
Phase identification sensor <i>PAS CI</i>	Used for the identification of a single phase in low-voltage distribution networks	820014535

4 Design

The *CI RX* identifying receiver is built into a sturdy ABS plastic housing. The integrated flexible identification clamp has a diameter of min. 240 mm (min. 130 mm optional) and a cable length of 1.5 m. The unit is in protection class IP 54.

The following figure shows the receiver and its elementary control and display elements:

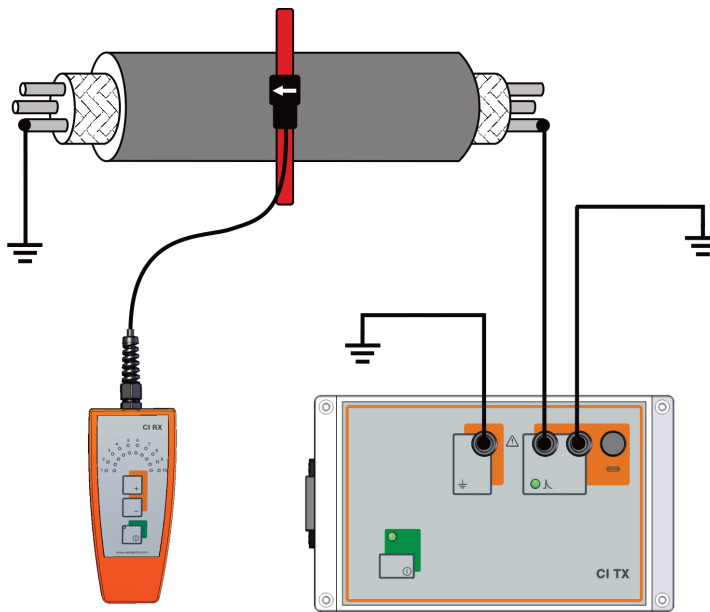


5 Start-up

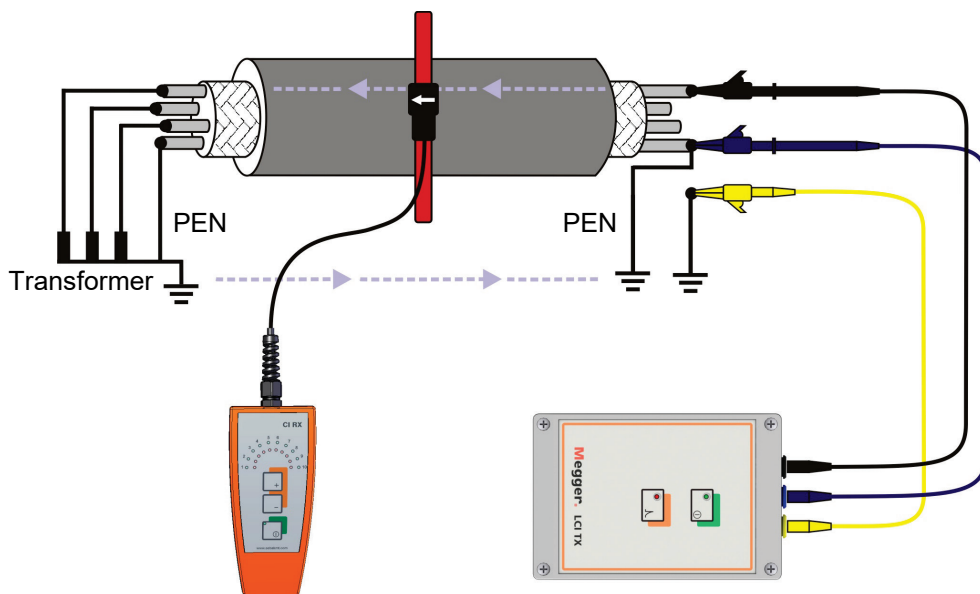
Connecting the flexible identification clamp

When using the DC pulse method to identify a cable, special attention has to be paid to the orientation of the identification clamp.

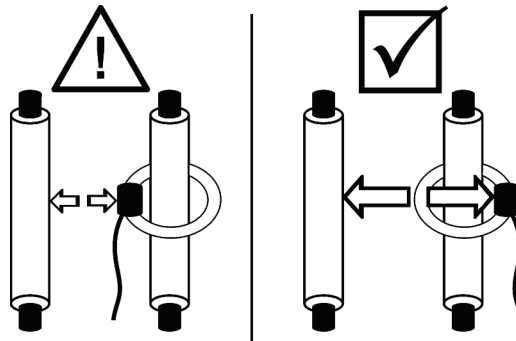
When working with the *CI TX* generator, encircle the cable to be identified in such a way that the direction arrow on the identification clamp points towards the grounded end of the cable as shown in the figure below:



To identify live cables in combination with the *LCI TX* or *LCI TX-440* generator, the identification clamp should be placed around the cable with the direction arrow pointing towards the supply transformer as shown in the figure below:



In order to minimize the risk of stray field induction, the flexible identification clamp (including the connection cable) must be connected at a distance of at least 10 cm from nearby cables. If there is not enough room for this, then at least the clamp closure and the connection cable should be positioned as far away as possible from the nearby cables (see diagram).



It is particularly important for the above instructions to be observed, if measurements are being taken from a multi-conductor cable and if the nearby disruptive object could be a phase of this cable that conducts return current. In the case of accessible individual phases (e.g. in low-voltage distributors), it is generally advisable to use the PAS CI sensor for phase identification (see section 6.3).

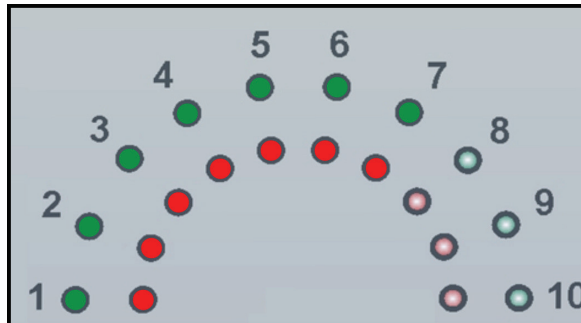
Commissioning the generator

Prior to the actual cable identification with the identification receiver, the generator must be commissioned and connected to the cable to be identified.

For detailed instructions, please refer to the user manual of the respective generator.

Switching-on The unit can be switched-on by pressing the on/off button [5].

If the receiver is ready for operation, the power LED on the on/off button lights up green. Subsequent to the switch-on process, the green [1] and red [2] signal LEDs indicate for three seconds the preselected gain stage (1 up to 10). The following figure shows an example for gain stage 7:



After the three seconds, the receiver starts to evaluate the signal level picked up by the identification clamp. It may take a few seconds until the receiver is able to clearly identify the incoming pulses and to indicate them appropriately.

In the case of low batteries, all red and green signal LEDs are flashing for a short period of time immediately after switch-on. Afterwards, the unit switches off automatically. The batteries have to be replaced (see section 8).

6 Operation

6.1 General Handling of the Device

Prior to the actual cable identification, a control measurement should be performed at the cable to be identified in the immediate vicinity to the generator in order to determine an adequate gain stage.

The gain which can be adjusted in ten 3 dB-stages (-3 dB ... 24 dB) using the soft keys [3] and [4] should be set to the lowest stage which causes all 10 signal LEDs to light up. Afterwards, the receiver can be switched-off, whereby the selected gain stage is saved.

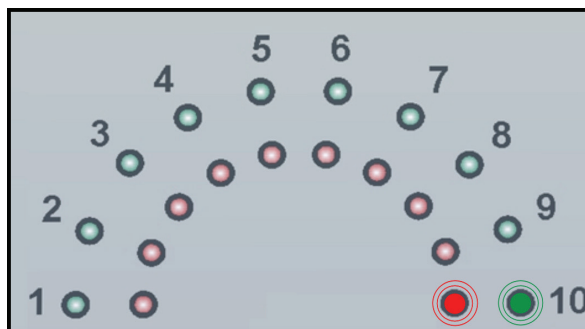
For ideal measuring conditions, a good signal quality should be given even in low gain stages (1 – 4). If you need to increase the gain stage to 5 or higher in order to obtain full deflection, you have to verify and improve the connection conditions of the generator. This is almost imperative since higher gain stages increase the danger to pick up interfering signals which can lead to wrong estimations of the measurement results at worst.

If no deflection of the signal LEDs can be achieved using the preset gain stage, it can be readjusted using the respective soft keys.

If – despite of galvanic coupling of the generator – gain stages >5 are required, the signal transmitted by the generator is compensated by return current for the most part. In this case and in the case of a high signal level difference compared to the control measurement, it is recommended to check the connection conditions.

Automatic switch-off If the receiver is not used for a period, the unit will automatically switch-off three minutes after the last key press.

Overload If the signal level is too high for a certain conclusion, the green and the red stage 10 LEDs flash to indicate overload.



Reduce the gain to resolve the problem.

6.2 Identifying a Cable Using the DC Pulse Method (Current Flow Direction Determination)

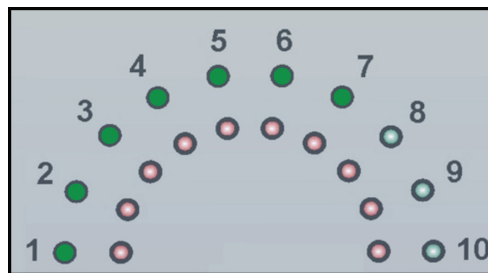
The signal level of the pulses transmitted by the generator is picked up by the flexible identification clamp and indicated by the green [1] or red [2] signal LEDs (depending on the direction of the current flow).

In accordance with the number of signal LEDs, the indication of the signal level is divided into 10 stages.

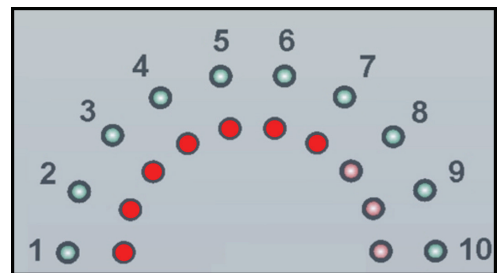
Since the both types of generators are transmitting a single pulse every 2 seconds, the receiver should indicate the pulses with exactly the same offset.

If the identification clamp is placed the right way round, the green signal LEDs indicate the cable to be identified.

For all adjacent cables, either no signal or a signal with reverse current flow direction (indicated by the red LEDs) should be received.



Right current flow direction



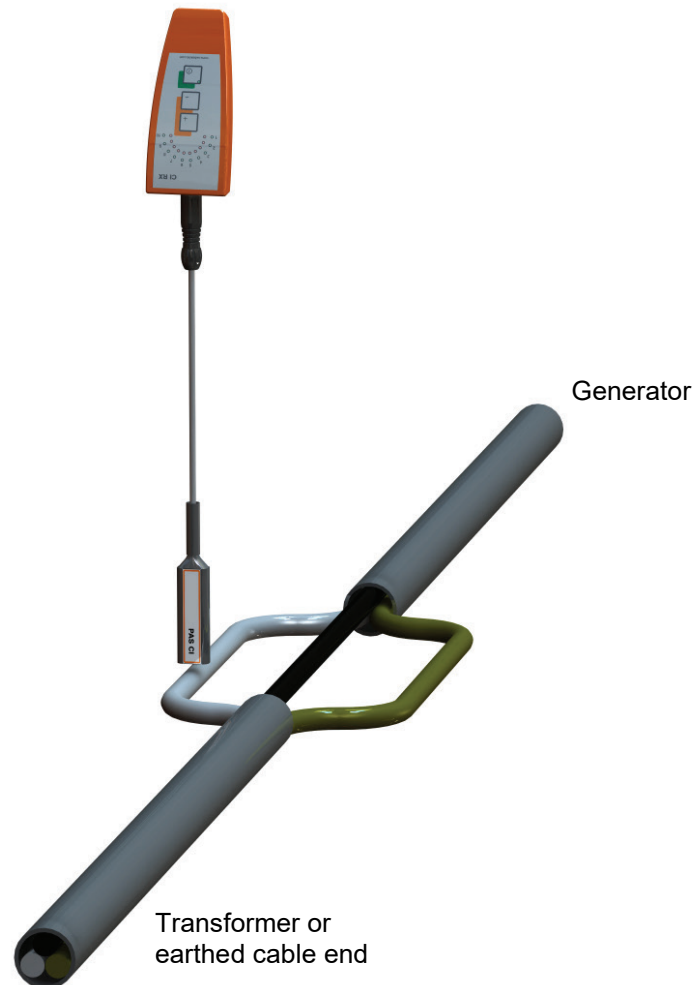
Wrong current flow direction

If more than one cable cause a deflection of the green LEDs, the identification clamp may be placed the wrong way round (see previous section).

6.3 Phase identification using the *PAS CI* (optional)

When using the *PAS CI* to identify a single phase of an energized or de-energized cable (in combination with the *LCI TX* or the *CI TX*), the sensor must be placed as shown in the picture below.

The type label must face the direction of the feeding transformer / grounded end. Consequentially, the white arrow on top of the sensor points towards the same direction.




The identification of the phase is basically performed the same way as the identification of a cable (see section 6.2).

If the sensor orientation is correct, the green LEDs [1] should only light up on the phase which is connected to the generator, while the red LEDs [2] should light up on all other conductors.

Any return currents flowing through the conductors of adjacent cables should always result in the red LEDs lighting up.

6.4 Using the “Twisted-Field” Sensor (“Twisted-Field” Method and Load Current Detection)

 The *TFS CI* sensor is only to be used for cable identification according to the “Twisted Field” method and load current detection as described in this section. Using it for the identification of untwisted cables may lead to false identification!

6.4.1 Cable Identification with the “Twisted-Field” Method

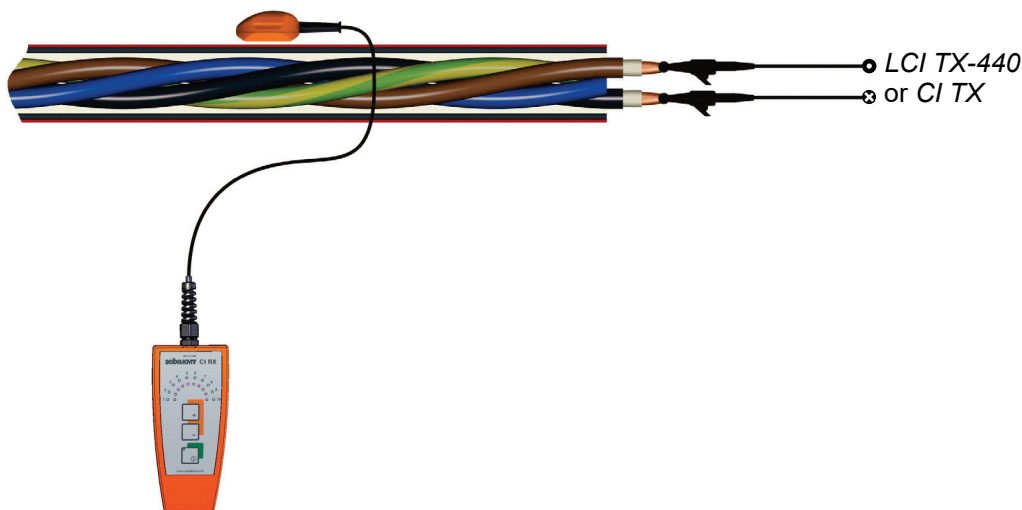
Purpose The cable identification with the ‘Twisted-Field’ method, which is required by various standards, is used specifically in the following scenarios:

- Inaccessible cables (cannot be gripped by identification tongs)
- Cable systems without alternative earth return path (e.g. IT networks)
- Undefined return current conditions (e.g. paper-insulated lead covered (PILC) cables with metal sheath in contact with earth)

Prerequisites Unlike in normal cable identification, the identification generator must be connected between two phases when using the “Twisted-Field” method. Only the identification generators *LCI TX440* (identification under voltage) and *CI TX* can be used.

For detailed information how to connect the generator to the cable to be identified, please refer to the user manual of the generator.

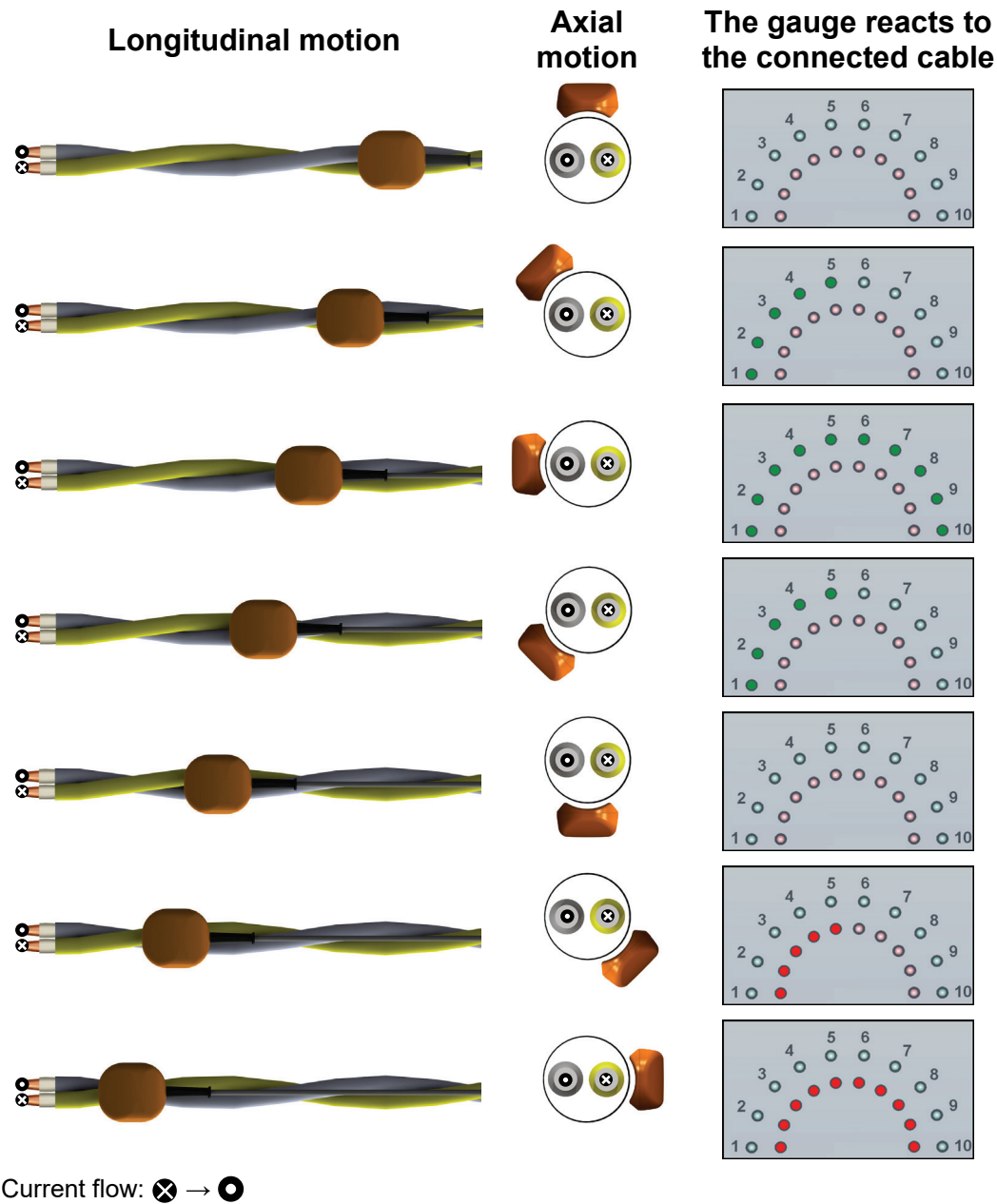
The *TFS CI* sensor must be connected to the receiver instead of the identification tongs. Sensor orientation is not important in simple cable identification.



Process Due to the twist of the conductors along the cable, the fields formed around the two conductors are counter rotating. As the *TFS CI* sensor is moved along or around the cable to be identified, the green [1] and red [2] LEDs on the receiver light up in rotation.

Adjacent cables do not produce any activation of the LEDs.

When examining the sensor travel along a twisted bifilar cable, the following signal behavior becomes apparent:



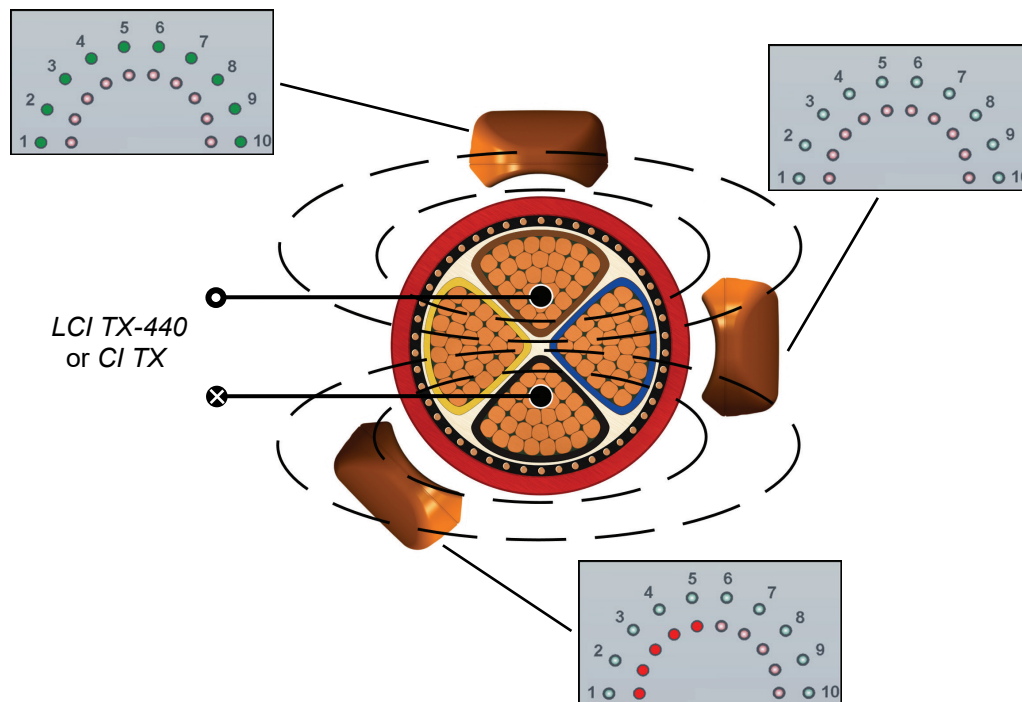
👉 An interval of min. 2 seconds is required between the individual motion phases, which corresponds to the signal pause of the identification generator. Sensor motion must be carried out slowly, taking these signal pauses into consideration!

👉 If the sensor orientation is reversed, the colour of the signal LED is reversed as well.

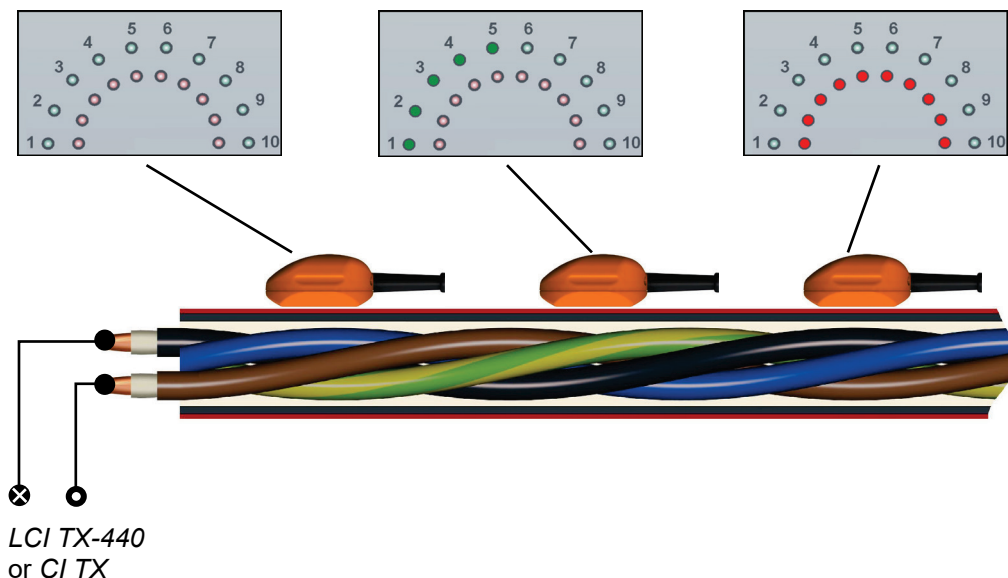
The “Twisted-Field” method can also be applied to three- or four-core cables without any problems.

For four-core cables, it is recommended to connect the identification generator to two opposite strands to be able to identify the described polarity reversal as clearly as possible (see images).


The following diagram illustrates the signal response when the sensor is moved around a four-core cable in a radial direction:



The following diagram illustrates the signal response when the sensor is moved along a four-core cable:

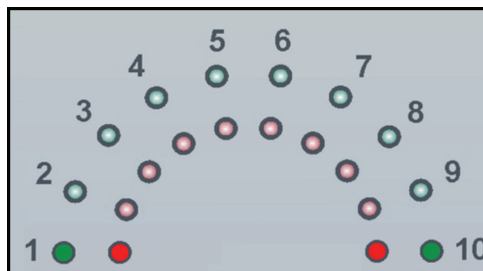


6.4.2 Load Current Detection

 <p>CAUTION</p>	<p>It is only possible to detect load current for shielded cables to a very limited degree.</p>
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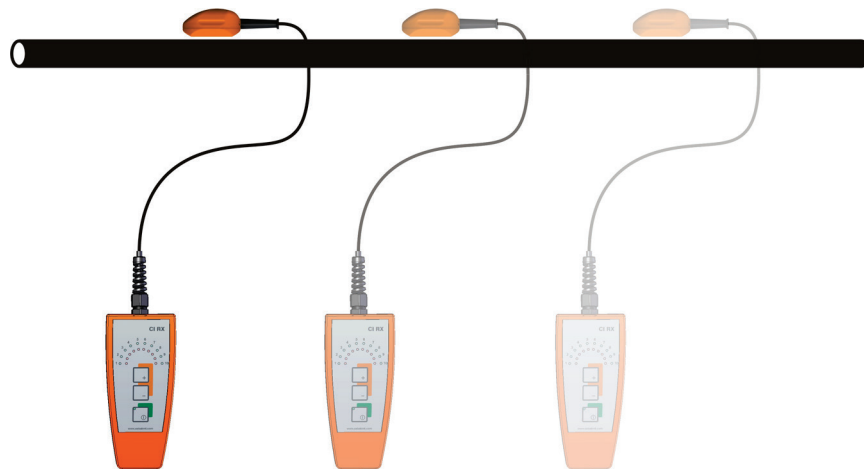
Purpose The determination of the current flow direction and the “Twisted-Field” identification represent straightforward and reliable cable identification methods. An additional recording of load currents with a frequency of 50 Hz or 60 Hz can further increase the reliability of the cable identification in certain cases, e.g. in the case of two cables of which only one is definitely under voltage.

Switching to load current detection When the receiver is switched on, it is always in identification mode. To switch to load current detection mode, press the + [3] and – [4] buttons simultaneously (for 2 seconds). After the mode has been switched successfully, the following continuous display shows that load current detection is activated:



Gain adjustment Setting the gain is performed in a similar way to the identification mode (see section 6.1). Unlike the identification mode, in load current detection mode, LEDs 1 and 10 flash to display overload. If this happens even when gain stage 1 is selected, then you should increase the distance between the sensor and the cable (e.g. by placing your hand in between them).

Procedure To perform load current identification, the *TFS CI* sensor must be placed onto the cable that is to be checked. The sensor should be kept in this position for several seconds. If the display on the receiver does not respond, this means that no load current could be detected. This result should be verified at other points along the cable for good measure.

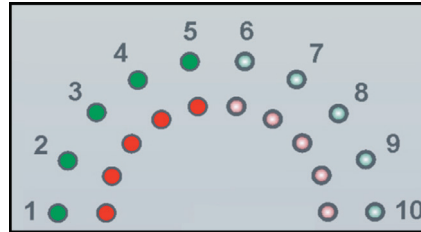


WARNING

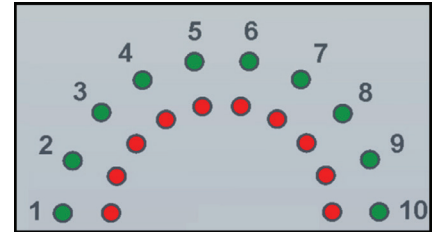
Even if no load current has been detected, the cable must not necessarily be de-energized! The *CI RX* cannot be used to test the absence of voltage!

If load current has been detected, on the other hand, the cable must be considered as live.

If a detectable current is flowing through the cable, then this is signaled by the red and green LEDs flashing every second. The following differentiation is made:



Half-scale deflection



Full-scale deflection

Depending on the gain setting of the *CI RX*, the following conclusions can be drawn:

	Gain					
	1 ... 5	6	7	8	9	10
Full-scale deflection	>50 A					
Half-scale deflection	>10 A	>7 A	>5 A	>3,5 A	>2,5 A	>1.75 A



CAUTION

The detection of load current does not replace a current measurement with a calibrated current clamp. Ampere measurements can only be considered as estimated values and they are independent of the sensor's distance and position with relation to the current-conducting phases / shields.

Load current detection can also be performed when a cable identifying generator is connected. However, a comparative measurement should be taken near to the generator in advance in order to estimate whether a reading can be expected at the actual measurement point.

7 Troubleshooting

Failure to identify a cable clearly may be due to the following reasons:

- The cable to be identified is not among the cables tested.
- The identifying generator (only for *LCI TX / LCI TX-440*) has been connected to an IT or TT protective-conductor system. Connection is ineffective in this case owing to the system's isolation from earth.
- The cable to be identified is in a ring.
- The cable to be identified consists of several parallel cables, resulting in current distribution of the test pulse (only for *LCI TX / LCI TX-440*).
- The current in the cable to be identified is > 120 A or the transient disturbances are too high (only for *LCI TX / LCI TX-440*).
- The battery of the identifying receiver is flat.
- Reverse currents which are carried by the cable screen, PEN or metal sheath are compensating the signal.
- Sensor motion too fast during twisted field identification.

8 Changing the Batteries

The battery housing is located on the back side of the unit and can be opened using the slide closure. Two identical 1.5 V AA batteries have to be used as replacement.



Tento symbol indikuje, že výrobek nesoucí takovéto označení nelze likvidovat společně s běžným domovním odpadem. Jelikož se jedná o produkt obchodovaný mezi podnikatelskými subjekty (B2B), nelze jej likvidovat ani ve veřejných sběrných dvorech. Pokud se potřebujete tohoto výrobku zbavit, obraťte se na organizaci specializující se na likvidaci starých elektrických spotřebičů v blízkosti svého působiště.



Dit symbool duidt aan dat het product met dit symbool niet verwijderd mag worden als gewoon huishoudelijk afval. Dit is een product voor industrieel gebruik, wat betekent dat het ook niet afgeleverd mag worden aan afvalcentra voor huishoudelijk afval. Als u dit product wilt verwijderen, gelieve dit op de juiste manier te doen en het naar een nabij gelegen organisatie te brengen gespecialiseerd in de verwijdering van oud elektrisch materiaal.



This symbol indicates that the product which is marked in this way should not be disposed of as normal household waste. As it is a B2B product, it may also not be disposed of at civic disposal centres. If you wish to dispose of this product, please do so properly by taking it to an organisation specialising in the disposal of old electrical equipment near you.



Този знак означава, че продуктът, обозначен по този начин, не трябва да се извърля като битов отпадък. Тъй като е B2B продукт, не бива да се извърля и в градски пунктове за отпадъци. Ако желаете да извърлите продукта, го занесете в пункт, специализиран в извърлянето на старо електрическо оборудване.



Dette symbol viser, at det produkt, der er markeret på denne måde, ikke må kasseres som almindeligt husholdningsaffald. Eftersom det er et B2B produkt, må det heller ikke bortskaffes på offentlige genbrugsstationer. Skal dette produkt kasseres, skal det gøres ordentligt ved at bringe det til en nærliggende organisation, der er specialiseret i at bortskaffe gammelt el-udstyr.



Sellise sümboliga tähistatud toodet ei tohi käidelda tavalise olmejäätmena. Kuna tegemist on B2B-klassi kuuluva tootega, siis ei tohi seda viia kohalikku jäätmekäitluspunkti. Kui soovite selle toote ära visata, siis viige see lähimasse vanade elektriseadmete käitlemisele spetsialiseerunud ettevõttesse.



Tällä merkinnällä ilmoitetaan, että kyseisellä merkinnällä varustettua tuotetta ei saa hävittää tavallisen kotitalousjätteen seassa. Koska kyseessä on yritysten välisen kaupan tuote, sitä ei saa myöskään viedä kuluttajien käyttöön tarkoitettuihin keräyspisteisiin. Jos haluatte hävittää tämän tuotteen, ottakaa yhteys lähimpään vanhojen sähkölaitteiden hävittämiseen erikoistuneeseen organisaatioon.



Ce symbole indique que le produit sur lequel il figure ne peut pas être éliminé comme un déchet ménager ordinaire. Comme il s'agit d'un produit B2B, il ne peut pas non plus être déposé dans une déchetterie municipale. Pour éliminer ce produit, amenez-le à l'organisation spécialisée dans l'élimination d'anciens équipements électriques la plus proche de chez vous.



Cuireann an siombail seo in iúl nár cheart an táirgeadh atá marcáilte sa tsíol seo a dhiúscairt sa chóras fuoil teaghlaigh. Os rud é gur táirgeadh ghnó le gnó (B2B) é, ní féidir é a dhiúscairt ach oiread in ionaid dhiúscairthe phobail. Más mian leat an táirgeadh seo a dhiúscairt, déan é a thógáil ag eagraíocht gar duit a sainfheidhmiú in ndiúscairt sean-fhearas leictreach.



Dieses Symbol zeigt an, dass das damit gekennzeichnete Produkt nicht als normaler Haushaltsabfall entsorgt werden soll. Da es sich um ein B2B-Gerät handelt, darf es auch nicht bei kommunalen Wertstoffhöfen abgegeben werden. Wenn Sie dieses Gerät entsorgen möchten, bringen Sie es bitte sachgemäß zu einem Entsorger für Elektroaltgeräte in Ihrer Nähe.



Αυτό το σύμβολο υποδεικνύει ότι το προϊόν που φέρει τη σήμανση αυτή δεν πρέπει να απορρίπτεται μαζί με τα οικιακά απορρίματα. Καθώς πρόκειται για προϊόν B2B, δεν πρέπει να απορρίπτεται σε δημοτικά σημεία απόρριψης. Εάν θέλετε να απορρίψετε το προϊόν αυτό, παρακαλούμε όπως να το παραδώσετε σε μία υπηρεσία συλλογής ηλεκτρικού εξοπλισμού της περιοχής σας.



Ez a jelzés azt jelenti, hogy az ilyen jelzéssel ellátott terméket tilos a háztartási hulladékokkal együtt kidobni. Mivel ez vállalati felhasználású termék, tilos a lakosság számára fenntartott hulladékgyűjtőbe dobni. Ha a terméket ki szeretné dobni, akkor vigye azt el a lakóhelyéhez közel működő, elhasznált elektromos berendezések begyűjtésével foglalkozó hulladékkezelő központhoz.



Questo simbolo indica che il prodotto non deve essere smaltito come un normale rifiuto domestico. In quanto prodotto B2B, può anche non essere smaltito in centri di smaltimento cittadino. Se si desidera smaltire il prodotto, consegnarlo a un organismo specializzato in smaltimento di apparecchiature elettriche vecchie.



Ští zíme noráda, ka izstrādājumu, uz kura tā atrodas, nedrīkst izmest kopā ar parastiem mājaiemniecības atkritumiem. Tā kā tas ir izstrādājums, ko cits citam pārdod un lieto tikai uzņēmumi, tad to nedrīkst arī izmest atkritumos tādās izgāztuvēs un atkritumu savāktuvēs, kas paredzētas vietējiem iedzīvotājiem. Ja būs vajadzīgs šo izstrādājumu izmest atkritumos, tad rīkojieties pēc noteikumiem un nogādājiet to tuvākajā vietā, kur īpaši nodarbojas ar vecu elektrisku ierīču savākšanu.



Šis simbols rāda, ka jūo paženklinto gaminio negalima išmesti kaip paprastų buitinių atliekų. Kadangi tai B2B (verslas verslui) produktas, jo negalima atiduoti ir buitinių atliekų tvarkymo įmonėms. Jei norite išmesti šį gaminį, atlikite tai tinkamai, atiduodami jį arti jūsų esančiai specializuotai senos elektrinės įrangos utilizavimo organizacijai.



Dan is-simbolu jindika li l-prodott li huwa mmarkat b'dan il-mod m'ghandux jintrema bħal skart normali tad-djar. Minhabba li huwa prodott B2B , ma jistax jintrema wkoll f'centri civici għar-rimi ta' l-iskart. Jekk tkun tixtieq tarmi dan il-prodott, jekk jogħġbok għamel dan kif suppost billi tiegħu għand organizzazzjoni fil-qrib li tispeċjalizza fir-rimi ta' tagħmir qadim ta' l-eletriku.



Dette symbolet indikerer at produktet som er merket på denne måten ikke skal kastes som vanlig husholdningsavfall. Siden dette er et bedriftsprodukt, kan det heller ikke kastes ved en vanlig miljøstasjon. Hvis du ønsker å kaste dette produktet, er den riktige måten å gi det til en organisasjon i nærheten som spesialiserer seg på kassering av gammelt elektrisk utstyr.



Ten symbol oznacza, że produktu nim opatrzonego nie należy usuwać z typowymi odpadami z gospodarstwa domowego. Jest to produkt typu B2B, nie należy go więc przekazywać na komunalne składowiska odpadów. Aby we właściwy sposób usunąć ten produkt, należy przekazać go do najbliższej placówki specjalizującej się w usuwaniu starych urządzeń elektrycznych.



Este símbolo indica que o produto com esta marcação não deve ser deixado fora juntamente com o lixo doméstico normal. Como se trata de um produto B2B, também não pode ser deixado fora em centros civicos de recolha de lixo. Se quiser desfazer-se deste produto, faça-o correctamente entregando-o a uma organização especializada na eliminação de equipamento eléctrico antigo, próxima de si.



Acest simbol indică faptul că produsul marcat în acest fel nu trebuie aruncat ca și un gunoi menajer obișnuit. Deoarece acesta este un produs B2B, el nu trebuie aruncat nici la centrele de colectare urbane. Dacă vreți să aruncați acest produs, vă rugăm s-o faceți într-un mod adecvat, ducând-ul la cea mai apropiată firmă specializată în colectarea echipamentelor electrice uzate.



Tento symbol znamená, že takto označený výrobek sa nesmie likvidovať ako bežný komunálny odpad. Keďže sa jedná o výrobok triedy B2B, nesmie sa likvidovať ani na mestských skládkach odpadu. Ak chcete tento výrobok likvidovať, odnesť ho do najbližšej organizácie, ktorá sa špecializuje na likvidáciu starých elektrických zariadení.



Ta simbol pomeni, da izdelka, ki je z njim označen, ne smete zavreči kot običajne gospodinske odpadke. Ker je to izdelek, namenjen za druge proizvajalce, ga ni dovoljeno odlagati v centrih za civilno odlaganje odpadkov. Če želite izdelek zavreči, prosimo, da to storite v skladu s predpisi, tako da ga odpeljete v bližnjo organizacijo, ki je specializirana za odlaganje stare električne opreme.



Este símbolo indica que el producto así señalado no debe desecharse como los residuos domésticos normales. Dado que es un producto de consumo profesional, tampoco debe llevarse a centros de recogida selectiva municipales. Si desea desechar este producto, hágalo debidamente acudiendo a una organización de su zona que esté especializada en el tratamiento de residuos de aparatos eléctricos usados.



Den här symbolen indikerar att produkten inte får blandas med normalt hushållsavfall då den är förbrukad. Eftersom produkten är en så kallad B2B-produkt är den inte avsedd för privata konsumenter, den får således inte avfallshanteras på allmänna miljö- eller återvinningsstationer då den är förbrukad. Om ni vill avfallshandla den här produkten på rätt sätt, ska ni lämna den till myndighet eller företag, specialiserad på avfallshandling av förbrukad elektrisk utrustning i ert närområde.