

Operating Manual

Phase Identification Set Phasenlux PIL 8

Consultation with Megger

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.

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This product meets the security requirements of the European Council Directives:

2014/30/EU Electromagnetic Compatibility
 EN 61000 - 6 - 2: 2005
 EN 61000 - 6 - 4: 2007 + A1: 2011
 EN 61000 - 3 - 2: 2014
 EN 61000 - 3 - 3: 2013

2014/35/EU Low Voltage Directive
 EN 61 010 - 1: 2010

2011/65/EU Restriction of the use of certain Hazardous
 Substances
 EN 50581: 2012

1 General

The Phase Identification Set is used to safely identify the A, B, and C phase of underground cables. The major benefit is the safety it provides. During phasing of a cable the terminated end stays grounded at all times !

The used clamp-on identifiers are passive devices which do not require batteries or external power supply thus making the operation simple and comfortable. The clamp-on identifiers can be left inside small spaces without problem. The operation of the Main Unit is a true one-button-operation with a fully automatic test procedure.

1.1 Principle of Measurement

The Main Unit (audio frequency generator and receiver in one unit) is connected in a trench, manhole, vault, etc. to only one conductor at a time (grounded at the terminated far end) and the corresponding concentric return. With the push of a button it sends a current into the circuit of the grounded conductor and grounded concentric. By induction the clamp-on identifier on the corresponding conductor is supplied with energy and stores this in an internal capacitor. This makes up the power supply for the clamp-on identifier. Only one clamp-on identifier will be supplied with energy at a time and will send a coded audio frequency back on the conductor. The main unit picks up this coded current and displays the clamp identification. The whole procedure takes only a few seconds.

In case of an incomplete transmission of either supplying or coded current an error message will be displayed on the main unit.

1.2 Description of Instruments

The basic set of the PIL 8 for phase identification of three conductors consists of the following components:

1. Main Unit **PIS 8**, audio frequency generator / receiver in common housing
2. Set of Connecting Leads
3. 6 pcs. Clamp-on Identifiers **PIZ 50**

1.3 Technical Specifications

Main Unit PIS 8

- | | | |
|----|--------------------------|---|
| a. | Output Power: | 8 Watts |
| b. | Operating Distance: | approx. 2.5 miles (4 km) |
| c. | Transmission Frequency: | 3 kHz |
| d. | Display: | LCD Display,
4" x 1" (98 x 23 mm) |
| e. | Illumination of Display: | Backlit |
| f. | Power Supply 1.: | Rechargeable Batteries |
| | Power Supply 2.: | 115 VAC 40-60 Hz
(230 VAC optional upon request) |
| | Power Supply 3.: | 12 VDC from external source |
| g. | Operations per Charge: | 100 (with backlight !) |
| h. | Battery Check: | Displayed on LCD during
Program Sequence |
| i. | Program Sequence: | automatic
(One-Button-Operation) |
| j. | Battery Charger: | internal |
| k. | Weight: | 10 lbs. (4.5 kg) |
| l. | Dimensions B x H x T: | 4 1/4" x 11" x 7 1/2"
(110 x 280 x 190 mm) |
| m. | Housing: | Weatherproof |

Clamp-on Identifiers PIZ 50

- | | | |
|----|------------------------|---|
| a. | Inner Diameter: | 2" (50 mm) |
| b. | Weight: | 1.3 lbs. (0.6 kg) |
| c. | Code Set 1: | L1a – L2a – L3a |
| | Code Set 2: | L1b – L2b – L3b |
| | Code Set 3 (optional): | L1c – L2c – L3c |
| d. | Operation: | Neither adjustments nor
Connection Cables
necessary |

1.4 Scope of Supply

Standard Supply of PIL 8 System:

1 pc.	Main Unit		PIS	8
1 pc.	Set of Connecting Cables consisting of:			
a. 2 pcs.	Test Lead 6' (2.0 m)	black	MK	31-B
b. 2 pcs.	Alligator Clips	black	AK	41-B
c. 1 pc.	Ground Cable 4 ½' (1.5 m)	gn/ylw	EK	7
d. 1 pc.	Alligator Clip for Ground	gn/ylw	AK	49-B
e. 2 pcs.	Plug Adaptor 4.0 mm		SAB	41
f. 1 pc.	AC Cord 8' (2.5 m)		NKG	1
6 pcs.	Clamp-on Identifiers with Code L1a-L2a-L3a and L1b-L2b-L3b		PIZ	50
3 pc.	Magnetic Sign			
1 St.	Operating Manual			
1 St.	Hard Case			

Optional:

3 pcs.	Clamp-on Identifiers with Code L1c-L2c-L3c			
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1.5 Power Supply

The universal power supply allows three sources of power:

1.5.1 Rechargeable Battery

A fully charged battery allows approx. 100 operations (with backlight !). The charger is built into the PIS 8 Main Unit. The battery charge is displayed during each test cycle.

1.5.2 External Battery Operation

In case the internal battery has not been charged prior to operation it is possible to supply the Main Unit from an external 12 VDC power input (car battery).

1.5.3 AC Power Input

In case the internal battery has not been charged prior to operation it is also possible to run the Main Unit off 115 / 230

VAC (depending on device version). In this mode the internal battery will be charged simultaneously.

Warning:

Be sure to connect the separate ground cable when using the Main Unit in 115 VAC (or 230 VAC) mode.

2 Controls and Connections of the Main Unit PIS 8

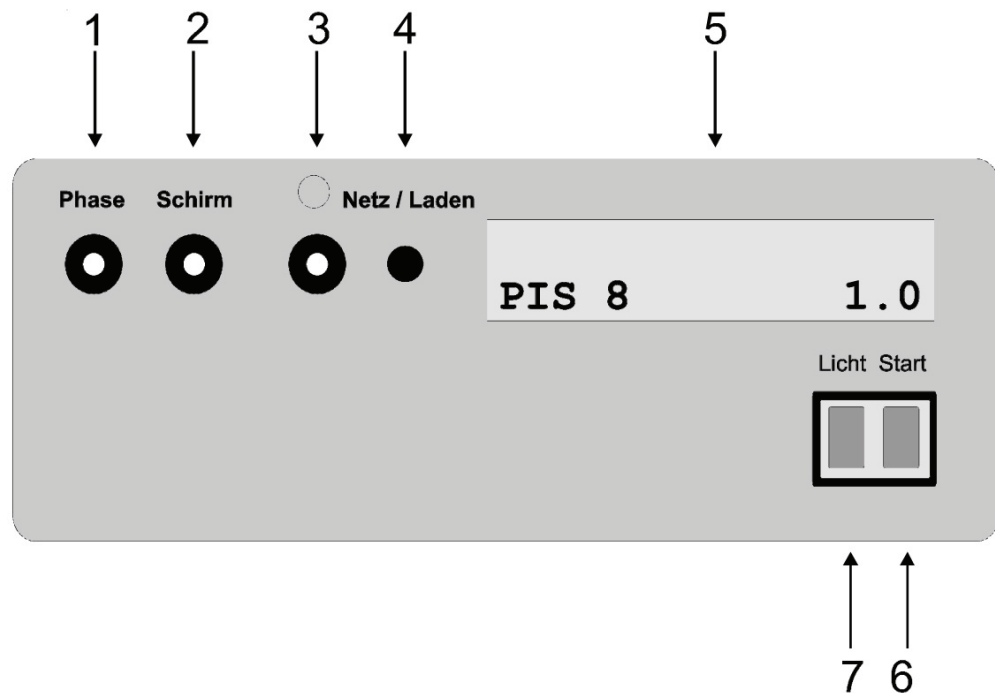


Figure 1 : Controls of Main Unit PIS 8

Indications:

1. Output 1 („Phase“)
2. Output 2 (“Schirm“ = Return)
3. Protective Ground
4. Indicator Light: ON – AC Operation and Charging
5. LCD-Display
6. Pushbutton START
7. Pushbutton for Backlight (“Licht”)

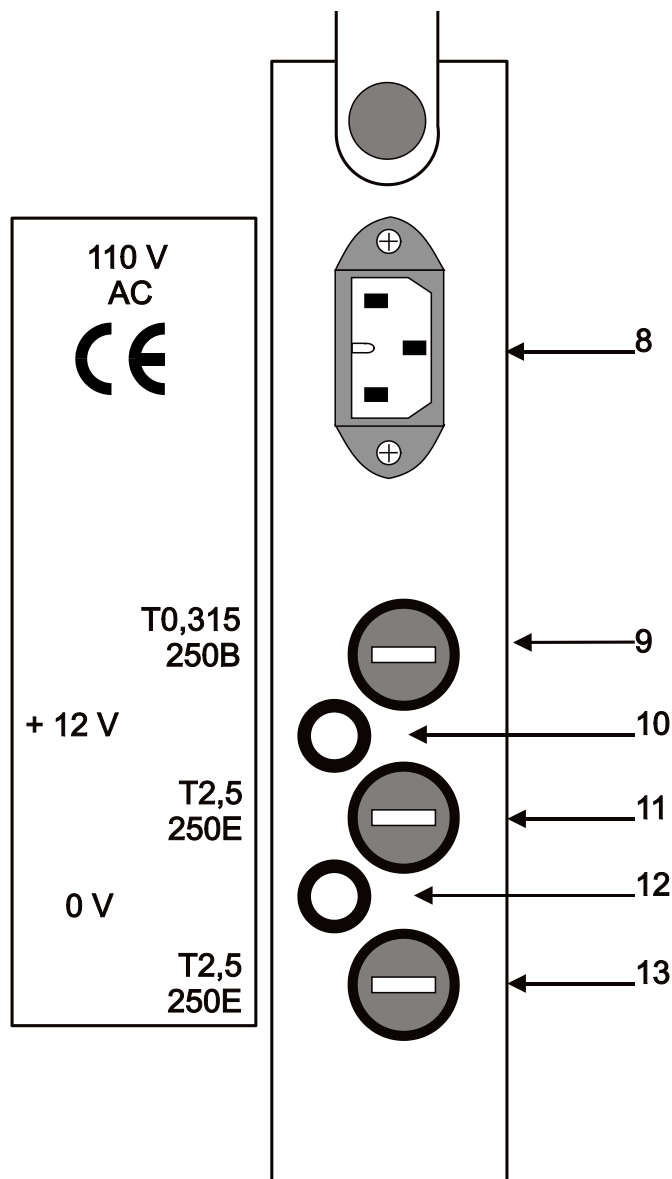


Figure 2 : Power Input and Fuse Ratings for Main Unit PIS 8

Indications:

8. AC connection for 115 VAC or 230 VAC, 45-60 Hz (depending on device version)
9. AC Input Fuse 1 T 0.315 / 250 B (for 230 VAC: M 0.630 / 250B)
10. External Battery Connection + 12 VDC
11. AC Input Fuse 2 T 2.5 / 250 E
12. External Battery Connection – 12 V DC
13. Fuse for external Battery Operation T 2.5 / 250 E

3 Safety

The Main Unit puts out only low voltage (≤ 50 V) thus not posing any danger when touching. Both polarities of the test circuit are insulated to the housing

DANGER !

A danger exists in accidentally connect the Main Unit to a live cable. If the Main Unit is used without the AC cord, which would ground the housing, it is necessary to connect the Main Unit at connection (3) with the supplied protective ground cable (EK 7) and alligator clip (AK 49-B) to a safety ground system.

Since all conductors of the cable the Main Unit is connected to are grounded at the far end, the screen of the cable or one of the conductors not used for identification can be used for grounding.

No specific safety procedures have to be taken on the other end where the cable is grounded, except to make sure that the clamp-on identifiers are only put around a cable or return of a cable which is grounded and the grounding can be confirmed visually. Other than that the local safety procedures apply.

4 Conducting the Phase Identification

The phase identification itself is very simple and can be done by one single person. It is necessary only once to go to the far end of the terminated cable to ground the cable according to local safety and grounding regulations. At that time, after the cable is grounded and all safety procedures have been followed, the clamp-on identifiers are put around the cable (at a section without return) or the return only (see Figure 3). The actual phase identification is done at the open end of the cable (trench, manhole, vault, ...).

4.1 Placing the Clamp-on Identifiers

The clamp-on identifiers are placed around the conductors at the terminated cable end in the substation / transformer / switchgear at a location where the return is already separated from the conductor according to Figure 3 (if this is not possible, other connections will be discussed later).

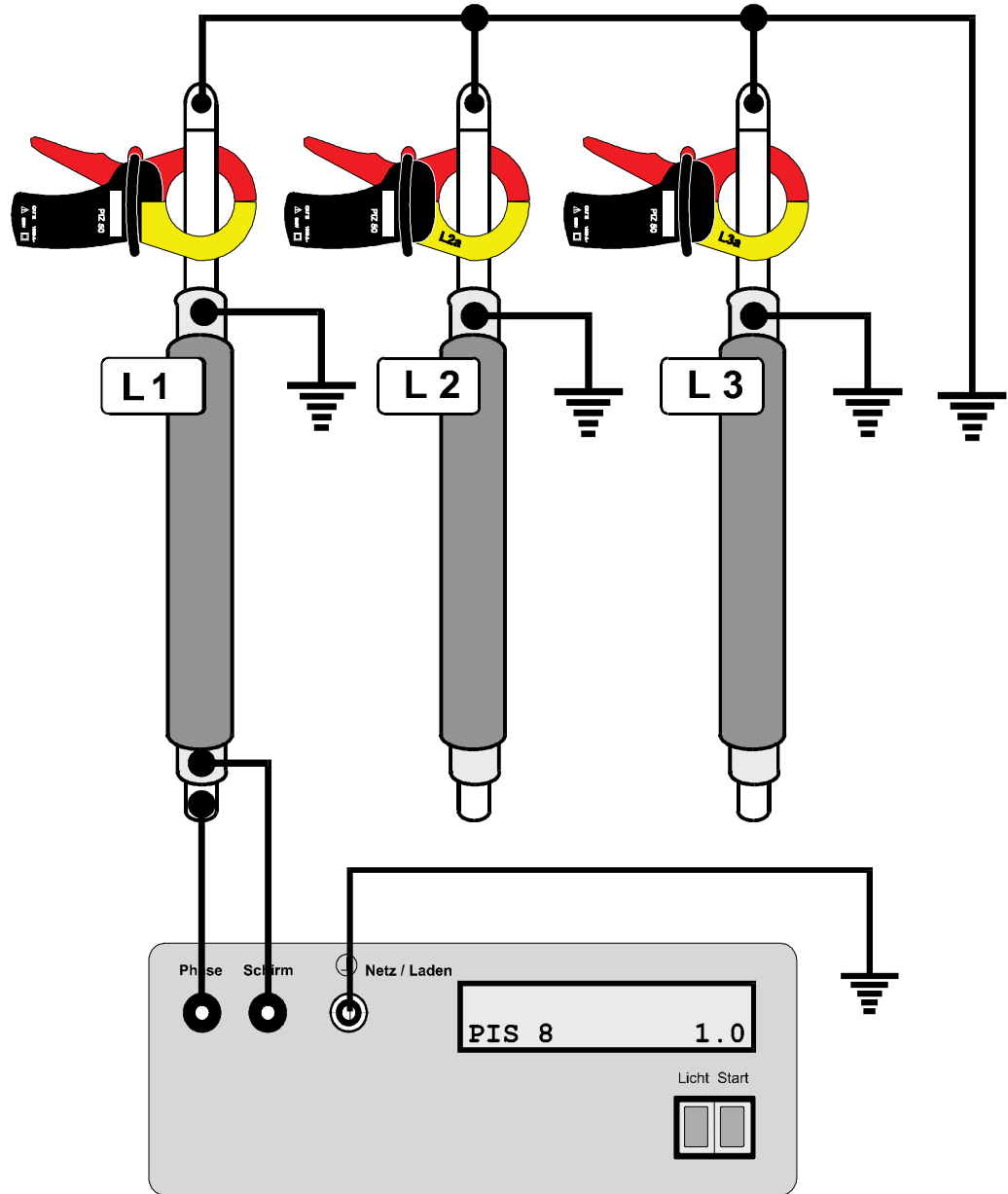


Figure 3 : Placing the Clamp-on Identifiers and Conducting the Test

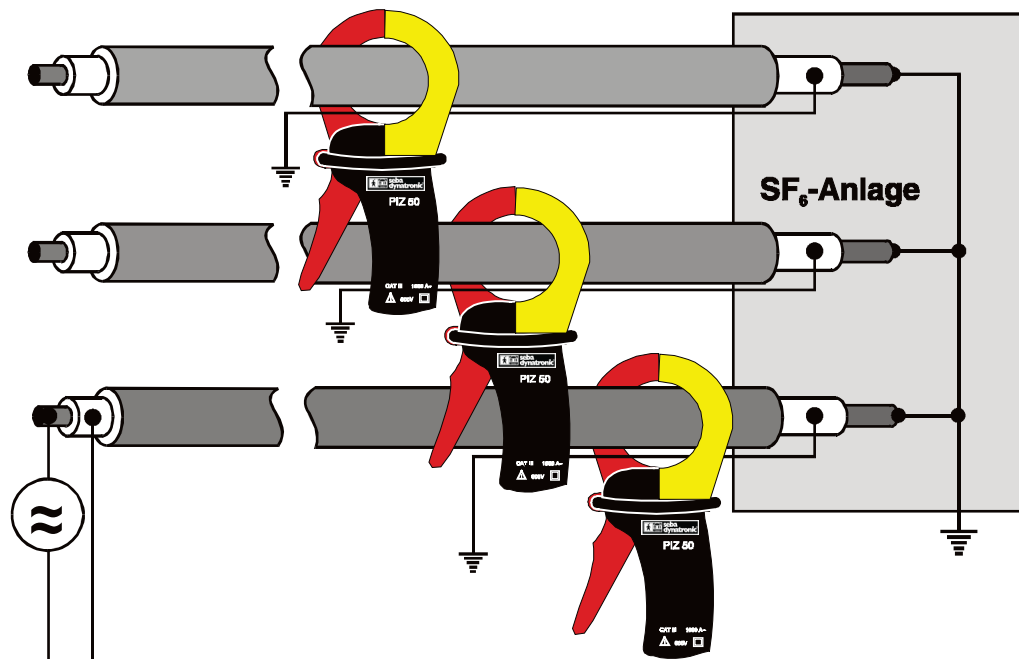


Figure 4 : Placing the Clamp-on Identifiers on SF₆-Switchgear

On cables connected to SF₆ – Switchgear the conductor is not accessible at a stretch where the return runs separately. In a case like this the clamp-on identifiers can be connected according to Figure 4. The clamp-on identifier has to surround the whole cable including conductor and return plus the return coming back from the switchgear.

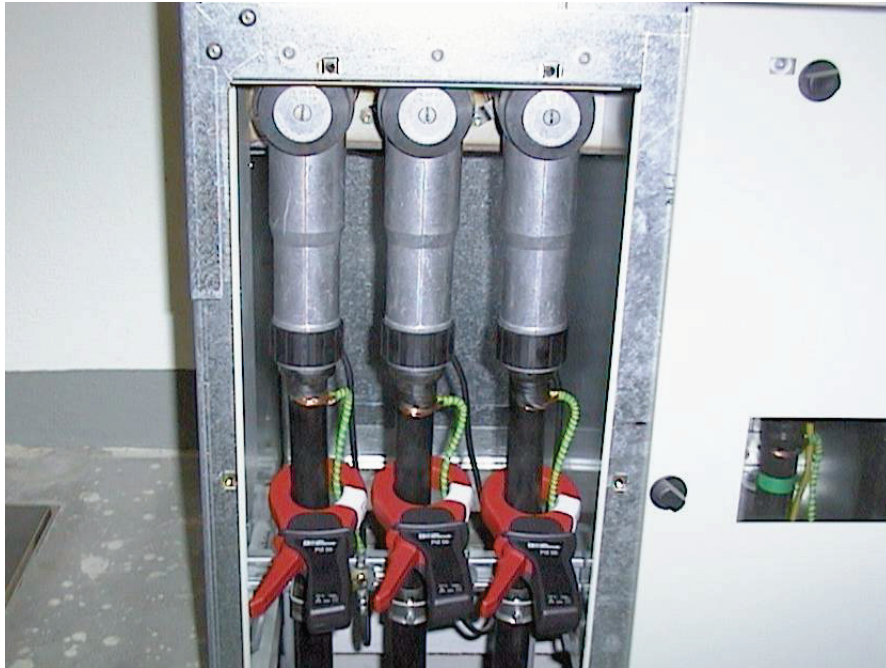
Also in this case it is necessary that the switchgear is in 'Ground' position and the conductors are grounded. Phase identification on open conductors is not possible.

4.2 Placing variants

4.2.1 Air insulated switchgear



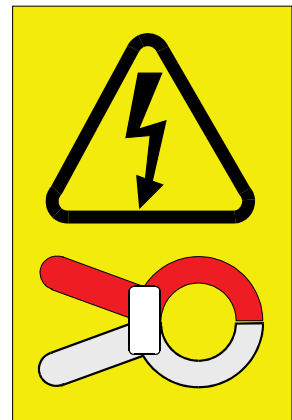
4.2.2 SF 6 insulated switchgear



4.3 Magnetic Sign

This magnetic sign shown in Figure 7 can be put near the location where the clamp-on identifiers are set up. This way it is possible to advise others of the work performed on the cable.

Figure 5 : Magnetic Sign



4.4 Phasen Identification

4.4.1 Connecting the Main Unit PIS 8

After placing the clamp-on identifiers at the grounded end of the cable (terminated end) it is possible to conduct the phase identification. Connect the Main Unit PIS 8 according to Figure 6.

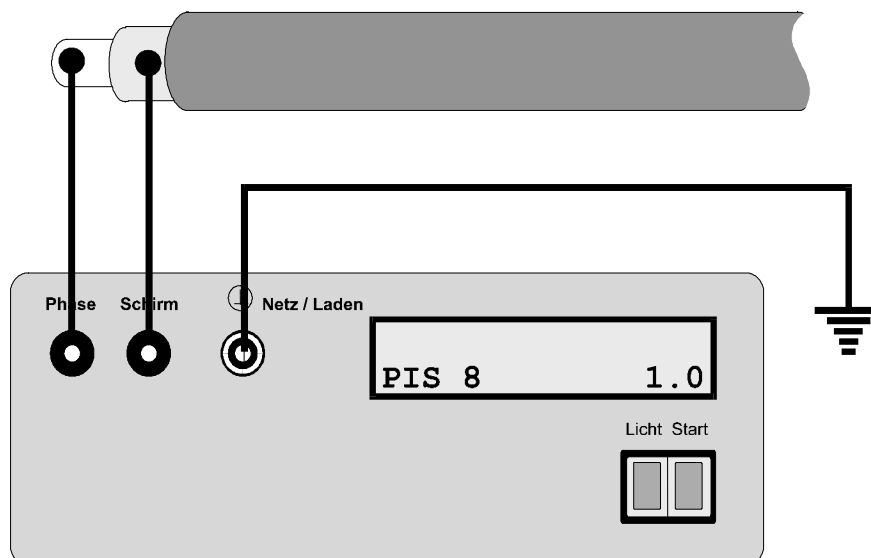


Figure 6 : Hook-up of the Main Unit PIS 8

The black connecting cables may be interchanged without consequences. The numbering 1 and 2 only indicates that these two outlets have to be connected to the cable to be identified.

4.4.2 Backlighting

Pushbutton 7 activates the backlighting of the LCD display. This switch will not automatically flip back after the test. The power consumption of the backlight is minute and reduces the number of cycles per charge only slightly.

4.4.3 Test Sequence

Pushing the pushbutton 6 (Start) activates the fully automatic test sequence. The indicator light 4 will light up green during the test cycle and cannot be stopped manually. The test cycle will take approx. 15 seconds. The messages from Figure 7 will appear on the LCD display:



PIS 8 1.0



Phasen-
identifikation

(Phase identification)



Batterie: 12.6 V

(Battery: 12.6 V)



Zange aufladen

(charge clamp)



Phase: L1a

Figure 7 : Sequence of the automatic Phase Identification

In case it is necessary to identify the three phases of two cable ends in the same trench, i.e. when splicing two ends together, it is possible to use the second set of three clamp-on identifiers (L1b-L2b-L3b) on the other cable. Also a third set is available as an option (L1c-L2c-L3c), if for example a T-splice-location has to be phased in three directions.

According to this procedure all three conductors are to be identified and marked.

Warning !

For Safety Reasons all three Conductors must be identified separately!

4.4.4 Error Messages

Make sure that the core surfaces of the clamp-on identifiers are clean and that the identifier closes well. If clamp-on identifiers are not closed completely an error message will appear during phase identification:

**Keine Antwort
von der Zange!**

(No answer from clamp!)

Figure 8 : Error Message “Keine Antwort von der Zange”

“Keine Antwort von der Zange“ indicates that the clamp-on identifier cannot be charged. Make sure the core surfaces of the clamp-on identifiers are clean and completely closed and that you are testing the right cable.

This message will also appear if the cable length is more than 4 km (2.5 miles) or if the ground resistance of the far end (terminated end) is too high.

A phase identification is not possible if the cable is interrupted and a section is substituted with overhead lines due to the fact that in this case the return path is interrupted.

The interruption of the return in a joint or splice will have the same effect and the same error message will be displayed.

Übertragungs- fehler	(Transmission error)
---------------------------------	----------------------

Figure 9 : Error Message “Übertragungsfehler”

The error message “Übertragungsfehler” is a sign for interference and noise on the coded phasing signal. This can be the case if strong stray currents are present in the ground path of the signal current. It can occur i.e. close to electrical train tracks.

This message will also come up when the resistance of the short circuiting at the terminated end in the switchgear is too high.

5 Charging the internal Battery

The Main Unit PIS 8 can be charged by simply connecting it to 115 VAC, 45-60 Hz using the provided AC cord (accordingly with 230 VAC if model is equipped for this voltage).

The AC input socket 8 is located on the side of the instrument (see Figure 3 on page 8). The indicator light 4 will light up red. The red light will turn off when the charging is completed. This can take up to 5 hours.

Note: The clamp-on identifiers do not have to be charged. The Main Unit will supply them with power via the underground power cable that they are connected to during the test sequence.



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 působíště.



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.



Selleli sümbooliga tähistatud toodet ei tohi käidelda tavalise olmejäätmena. Kuna tegemist on B2B-klassi kuuluva tootega, siis ei tohi seda viia kohaliku 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 tsíl seo a dhíúscairt sa chóras fuíoll teaghlaigh. Os rud é gur táirgeadh ghnó le gnó (B2B) é, ní féidir é a dhíúscairt ach oiread in ionaid dhíúscairthe phobail. Más mian leat an táirgeadh seo a dhíúscairt, déan é a thógáil ag eagraíocht gar duit a sainfheidhmiú i ndíúscairt sean-thearas leictrigh.



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.



Šī zīme norāda, ka izstrādājumu, uz kura tā atrodas, nedrīkst izmest kopā ar parastiem mājsaimniecības atkritumiem. Tā kā tas ir izstrādājums, ko citām 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 rodo, kad juo 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 bhal skart normali tad-djar. Minhabba li huwa prodott B2B , ma jistax jintrema wkoll f'centri civici ghar-rimi ta' l-iskart. Jekk tkun tixtieq tarmi dan il-prodott, jekk jogh'gbook ghamel dan kif suppost billi tiehdu ghand organizzazzjoni fil-qrib li tispécializza fir-rimi ta' taghmir 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 opatrzonemu 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 cívicos 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, odneste 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 gospodinjске 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 señalizado 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 avfallshantering av förbrukad elektrisk utrustning i ert närområde.