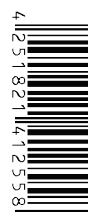




HPA 100/110/120 AC / HPA 130 DC **High Voltage Test Unit**

USER GUIDE

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

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.

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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.

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1 Safety Advice

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.

After working with the equipment, make sure to de-energise, protect against re-energising, discharge, ground and short-circuit the instrument and installations that have been worked on.

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.

Operating personal

Only trained and/or instructed staff is permitted to deal with this system and its peripherals. Keep any other person away from it. Only authorised persons with sufficient expertise are allowed to operate the device.

Repair and maintenance

Repairs and service must only be done by Megger or authorised service departments of Megger. Megger recommends having the equipment serviced and checked once per year at a Megger service location.

Megger also offers direct on-site support. Please contact our service office for more information.

Intended application

Safe operation is only realised when using the equipment for its intended purpose. Using the equipment for other purposes may lead to human danger and damage of equipment of involved installations.

The limits described under technical data may not be exceeded. Operating products of Megger in condensing environment may lead to flash-over, danger and damage. The instruments should only be operated under tempered conditions. It is not allowed to operate Megger products at direct contact with humidity, water or near aggressive chemicals nor explosive gases and fumes.

Behaviour at malfunction of normal operation

The equipment may only be used when working properly. When irregularities or malfunctions appear that cannot be solved consulting this manual, the equipment must immediately be put out of operation and marked as not functional. In this case inform the person in charge who should inform the Megger service to resolve the problem. The instrument may only be operated when the malfunction is resolved.

Five safety rules

The five safety rules must always be followed when working with HV (High Voltage):

1. De-energise
2. Protect against re-energising
3. Confirm absence of voltage
4. Ground and short-circuit
5. Cover up or bar-off neighbouring energised parts



Using cardiac pacemaker

Physical processes during operation of high voltage may endanger persons wearing a cardiac pacemaker when near these high voltage facilities.



Fire fighting in electrical installations

- According to regulations, carbon dioxide (CO₂) is **required to be used** as extinguishing agent for fighting fire in electrical installations.
- Carbon dioxide is electrically non conductive and does not leave residues. It is safe to be used in energized facilities as long as the minimum distances are maintained. A CO₂ fire extinguisher must be always available within electrical installations.
- If, contrary to the regulations, any other extinguishing agent is used for fire fighting, this may lead to damage at the electrical installation. Megger disclaims any liability for consequential damage. Furthermore, when using a powder extinguisher near high-voltage installations, there is a danger that the operator of the fire extinguisher will get an electrical shock from a voltage arc-over (due to the powder dust created).
- It is essential to observe the safety instruction on the extinguishing agent.
- Applicable is DIN VDE 0132.

Dangers when operating with HV

Special attention and safety-conscious behaviour is needed when operating HV facilities and especially non-stationary equipment. The regulations VDE 0104 about setting up and operation of electric test equipment, i.e. the corresponding EN 50191 as well as country-specific regulations and standards must be observed.

- Safety installations may not be by-passed nor deactivated.
- To avoid hazardous electric charges of metallic parts in the vicinity, all metallic parts must be grounded.
- To avoid drawing dangerous arcs, switching should only be done in de energized condition.
- HV test equipment and burn-down equipment is short-circuit proof. Hazardous voltage may be present if a short circuit is opened during operation. If measuring short-circuit current is necessary, it is advisable to connect an arrester in parallel with the measuring instrument (e.g. 90 V glow arrester).
- The equipment and all accessories must be connected according to applicable standards VDE, EN or DIN as well as country-specific regulations.

2 Technical Data

Voltage control unit HSG 10 – 1

Output power	5 kVA
Short-time operation	7,5 kVA
Mains voltage	220 V
Adjustable Voltage	0 ... 250 V
Measuring range	50 / 100 / 150 kV
Dimensions	520 x 430 x 465 mm
Weight	75 kg

High voltage transformer HTR 100/110/120

Nominal voltage	100 / 110 / 120 kV AC
Continuous output	5 kVA
Short-time output	7,5 kVA
Frequency	50 Hz or 60 Hz
Short circuit voltage	appr. 5 %
PD at nominal voltage	> 1 pC
Weight	ca. 225 kg
High voltage rectifier	HGL 150 for 130 kV DC tests

3 General

The Megger High Voltage Test Equipment is designed for mounting in a cable test van and is used for testing of cable installations and for burning down high resistance cable faults with ignition voltages in the high voltage range.



HTR



HSG 10

The equipment mainly consists of

- a) The high voltage control unit HSG 10, whereby the number 10 indicates the power capacity of the control unit.
- b) The high voltage transformer HTR. This transformer can be loaded with 5 kVA. On direct mains connection, i.e. without using the control unit, 10 kVA can be withdrawn from the transformer for a short period of time.

4 Design

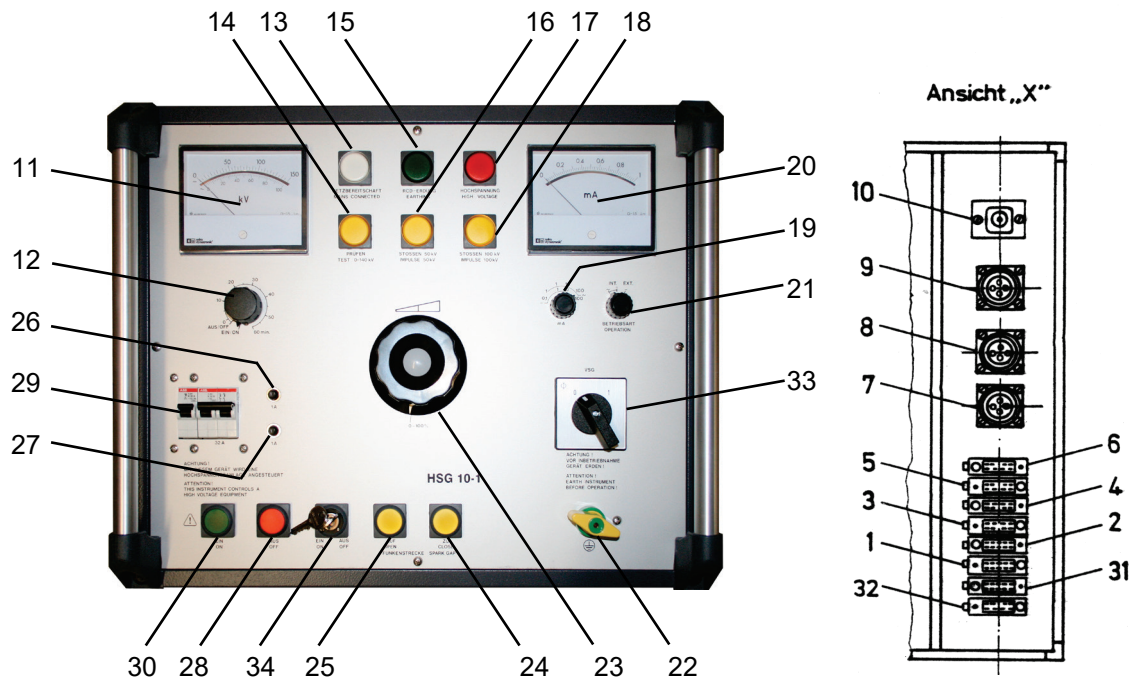


Figure 1 : Operation panel

- | | |
|---------------------------------------------|----------------------------------------|
| 1. Bu.2-Earthing switch | 18. Pilot lamp "Shock discharge 100kV" |
| 2. Bu.7-Indication panel | 19. mA-Range switch |
| 3. Bu.3-Impulsing/Testing | 20. Milliammeter |
| 4. Bu.4-Impulsing 50kV/100kV | 21. Operation selection switch |
| 5. Bu.5-Emergency-Off-Switch | 22. Earth terminal |
| 6. Bu.6-Spark gap | 23. Regulating transformer |
| 7. Mains 220V-50Hz | 24. Spark gap " - " |
| 8. HV transformer | 25. Spark gap " - " |
| 9. Bu.1-Pre-switching unit | 26. Fuse 1A |
| 10. Bu.8-External kV-testing | 27. Fuse 1A |
| 11. kV-Meter | 28. Switch "Off" |
| 12. Timer 0 – 60 min. | 29. Circuit breakers 32A |
| 13. Pilot lamp "Ready for mains connection" | 30. Switch "On" |
| 14. Pilot lamp "Testing" | 31. Bu.9-Secondary current |
| 15. Pilot lamp "Ready for operation" | 32. Bu.10-VSG "Ventilator" |
| 16. Pilot lamp "Shock discharge 50kV" | 33. VSG "On-Off" |
| 17. Pilot lamp "High voltage" | |

5 Electrical Connection

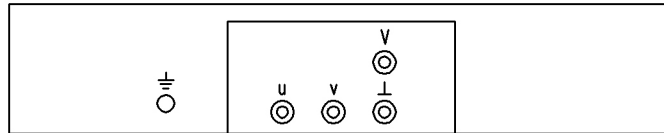
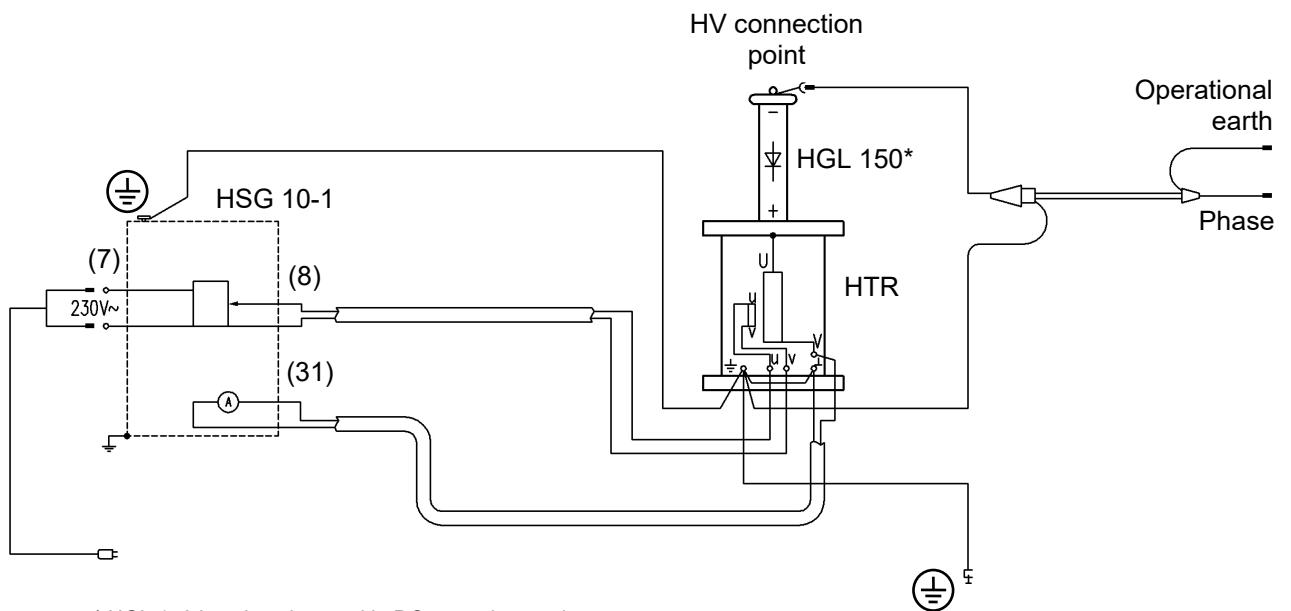


Figure 2 : HTR connection panel



* HGL 150 is only to be used in DC operation mode

Figure 3 : Electrical connection

6 Putting into Operation

1. Set variac (23) to position ZERO.
2. Set current range switch (19) to the largest test range.
3. Set operation selection switch (21) to the desired operation mode.
4. Switch on the circuit breaker (29). Now the green pilot lamp (15) lights up indicating that the instrument is ready for operation.
5. Press push button ON (30). The red pilot lamp (17) lights up.
6. Set desired test voltage by means of the variac (23) and read it off on the kV-meter (11).
7. Read off the test current on the mA-meter (20) and set current range switch (19) to suitable test range.
8. After the full test voltage has been reached, the desired test period can be set on timer (12). After the test period set, the instrument switches off automatically.
9. After the test is completed, set variac (23) to Zero position. Switch off the control unit by means of push button OFF (28). If high voltage is still indicated, this means that the cable under test has not been discharged.

CAUTION !

In the case of DC voltage testing, the cable under test is still charged. Discharge is effected by operating push button OFF (35) on the mains operation panel in the test van.

10. Push buttons (24, 25) of the control unit serve for connection of the spark gap, provided this is built-into the test van.
11. The voltage present at the output can be read off from the kV-meter (11).

7 Overcurrent Protection

As soon as overcurrent (e.g. due to shorted HV output) is detected, the circuit breaker (29) blows. The high voltage transformer is immediately disconnected and the HSG 10-1 is switched off. The variac (23) has to be set to Zero position (fully to the left).

After an adequate cool down period, the circuit breaker (29) can be switched and the system can be put into operation again.

8 Discharging the Cable System

After the test has been finished, the cable capacitance has to be safely discharged and, afterwards, visibly earthed according to VDE 0105.

If available, the cable is automatically discharged via the discharge device installed in the test van. Otherwise, a discharge rod with appropriate dimensions has to be used.

The maximum test voltage and the maximum cable capacitance applicable for a particular discharge rod can be taken from the following table:

Name	Max. test voltage	Max. cable capacitance
EST 20	25 kV	30 μ F
EST 50	50 kV	8 μ F
EST 70	70 kV	6 μ F
EST 100	100 kV	3 μ F

The discharge rod must already be connected to the operational earth (using the earthing lead) before the test is started

After the test voltage has been switched off, the head of the discharge rod has to be slowly moved towards the energized phase until a short voltage flash-over occurs. Afterwards, direct contact between the phase and the head of the discharge rod has to be maintained for 2 to 5 more seconds before the discharge rod can be hooked in position.

During this procedure, the discharge rod may only be held by the handle.



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 изхвърля като битов отпадък. Тъй като е B2B продукт, не бива да се изхвърля и в градски пунктове за отпадъци. Ако желаете да изхвърлите продукта, го занесете в пункт, специализиран в изхвърлянето 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 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 kotilousjätteen 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 dhiúscairt sa chóras fuíoll teaghlaigh. Os rud é gur táirgeadh ghnó le (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 sainfheidhmíonn i ndiúscairt sean-fhearas leictirigh.



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 απορρίμματα. 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 dobní. Ha a terméket ki szeretné dobní, 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.



Št 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, kad jūo paženklīnto 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 joghgbok ghamel dan kif suppost billi tiehdu ghand organizzazzjoni fil-qrib li tispeċjalizza 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 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 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 výrobek triedy B2B, nesmie sa likvidovať ani na mestských skládkach odpadu. Ak chcete tento výrobek 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 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 avfallshantering av förbrukad elektrisk utrustning i ert närområde.