SLOVENSKI STANDARD

SIST EN 50340:2010

01-december-2010

Nadomešča:

SIST EN 50340:2002

Hidravlične rezalne naprave za kable - Naprave za uporabo na električnih inštalacijah z nazivno vrednostjo izmenične napetosti do 30 kV

Hydraulic cable cutting devices - Devices to be used on electrical installations with nominal voltage up to AC 30 kV

Hydraulische Kabelschneidgeräte - Geräte zur Verwendung an elektrischen Anlagen mit Nennwechselspannungen bis 30 kV

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Dispositifs coupe câbles hydrauliques - Dispositifs à utiliser sur des installations électriques de tension nominale jusqu'à 30 kV en courant alternatif

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Ta slovenski standard je istoveten z: EN 50340:2010

ICS:

13.260	Varstvo pred električnim udarom. Delo pod napetostjo	Protection against electric shock. Live working

SIST EN 50340:2010 **en,fr,de**

2003-01.Slovenski inštitut za standardizacijo. Razmnoževanje celote ali delov tega standarda ni dovoljeno.

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 50340

May 2010

ICS 13.260; 29.240.20; 29.260.99

Supersedes EN 50340:2001 + corr. Feb.2002

English version

Hydraulic cable cutting devices - Devices to be used on electrical installations with nominal voltage up to AC 30 kV

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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Foreword

This European Standard EN 50340 was prepared by the Technical Committee CENELEC TC 78, Equipment and tools for live working. It was submitted to the formal vote as an amendment and was approved by CENELEC as a new edition of EN 50340 on 2010-04-01.

This EN 50340:2010 supersedes EN 50340:2001.

The principal changes compared to EN 50340:2001 are as follows (minor changes are not listed):

- In the scope were defined limits for the pressure inside the cable cutting devices, to ensure that the products are outside the Pressure Equipment Directive.

- The definitions were corrected and defined more clearly.

- According to the operating method and the local regulation, two possible insulating hose assemblies can be applicable:

  - Method A: The insulating hose assembly has a length of 10 m. Detailed references to EN 62237 with some amendments have been added for checking the insulation hose line. In Annex A is recommended a distance of minimum 10 m as safety zone.

  - Method B: The insulating hose assembly consists of 3 m non insulating hose plus 320 mm hose according to EN 62237 which gives a sufficient insulation for the worker.

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- A note was inserted in 5.6 and 5.12 to consider the kind of working of the safety valve.

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- The parameters of the metal wire were inserted in 5.7.

- Subclause 5.10 was renamed into “Stability” and the conditions of the test were amended.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN and CENELEC shall not be held responsible for identifying any or all such patent rights.

The following dates were fixed:

– latest date by which the amendment has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2011-04-01
– latest date by which the national standards conflicting with the amendment have to be withdrawn	(dow)	2013-04-01

The cable cutting devices specified here are designed to protect the user while he is verifying whether the cable is dead.

In some countries, it is necessary where the cable to be cut is live that the first action of the cutting device is to make, on a multi-phases cable, only a single-phase fault to earth so that the protective devices of the network can operate on a single-phase fault.

This European Standard specifies requirements and tests for these cable cutting devices.

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1 Scope

This European Standard is applicable to cable cutting devices to be used to verify that a cable is dead in accordance with the rules given in EN 50110-1.

The following limits apply to the cable cutting devices:

- pressure less than 1 000 bar or pressure (bar) x volume (l) less than 10 000;
- fluid outside the categories listed in Article 9 Group 1 (explosive, extremely flammable, highly flammable, flammable (where the maximum allowable temperature is above flashpoint), very toxic, toxic, oxidizing) of the Pressure Equipment Directive.

Cable cutting devices specified in this standard are for use on systems with nominal voltage up to 30 kV AC and nominal frequencies up to 60 Hz and shall only be suitable for operation by foot or by hand. This European Standard does not deal with motorised cable cutting devices.

For devices to be used on systems with nominal voltages above 30 kV AC this standard should be used as a guide but additional requirements and tests shall be agreed between manufacturer and customer to provide for an equivalent level of safety.

These devices are not designed to be used on cables with special armour, or with steel wires or steel tapes more than 1 mm in diameter or thickness.

2 Normative references

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The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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EN 10016-2:1994, *Non-alloy steel rod for drawing and/or cold rolling – Part 2: Specific requirements for general purposes rod*

EN 12164:1998 + A1:2000, *Copper and copper alloys – Rod for free machining purposes*

EN 50110-1:2004, *Operation of electrical installations*

EN 60156:1995, *Insulating liquids – Determination of the breakdown voltage at power frequency – Test method* (IEC 60156:1995)

EN 61111:2009, *Live working – Electrical insulating matting* (IEC 61111:2009)

EN 61230:1995 [1)], *Live working – Portable equipment for earthing or earthing and short-circuiting* (IEC 61230:1993, mod.)

EN 61318:2008, *Live working – Conformity assessment applicable to tools, devices and equipment* (IEC 61318:2007)

EN 62237:2005, *Live working – Insulating hoses with fittings for use with hydraulic tools and equipment* (IEC 62237:2003, mod.)

[1)] Superseded by EN 61230:2008, *Live working – Portable equipment for earthing or earthing and short-circuiting* (IEC 61230:2008).

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HD 437 S1:1984, *Standard conditions for use prior to and during the testing of solid electrical insulating materials* (IEC 60212:1971)

EN ISO 6507-1:2005, *Metallic materials – Vickers hardness test – Part 1: Test method* (ISO 6507-1:2005)

3 Definitions

For the purposes of this document, the following terms and definitions apply.

3.1
cable cutting device
a portable device which is used to cut cables in a safe manner. This device is used to verify that a cable is dead at the work site.

It consists of the following components (see Figure 1):

- a cutting head, this contains the cutting blade(s);
- a hydraulic pump;
- a length of insulating hose with fittings (insulating hose assembly) to connect the cutting head and the pump;
- insulating hydraulic fluid;
- an earthing system

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3.2
cutting head
that part (component) of the device which contains the cutting blade(s) and which is applied to the cable to be cut. The blade(s) is(are) operated by means of hydraulic pressure

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3.3
pump
that part of the device which generates pressure in the insulating hydraulic fluid within the hose to operate the cutting head

3.4
insulating hose
an insulating and pressure resistant hose used as part of an insulating hose assembly

3.5
insulating hose assembly
an insulating and pressure resistant component consisting of an insulating hose with fittings at each end for the connection of parts of hydraulic equipment at different electric potentials

3.6
insulating hydraulic fluid
fluid with suitable electrical insulating properties used to equalize the pressure between the pump and the cutting head

3.7
reverse flow valve
a valve for manual operation which is designed and installed for the backflow of fluid from the pressure compartment to the storage compartment after having cut through the cable completely

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3.8
safety valve
a valve designed and installed to release the pressure of fluid in the pressure compartment when the maximum operating pressure of the hydraulic system is reached, so that it protects the system against overpressure

3.9
hydraulic coupler
a pair of fittings to permit a connection of hydraulic components

NOTE Some couplers can be separated by hand, others may require the use of a tool.

3.10
maximum operating pressure
the operating pressure specified by the manufacturer which shall not be exceeded during the functioning of the cable cutting device

3.11
blade(s)
metallic part(s) with a sharp edge or edges which is designed to penetrate the cable in such a way that the cable will be cut into two separate parts

3.12
earthing system
all those necessary connections, conductors and fittings used to ensure that the electrical potential of an equipment is as close as practicable to the earth potential (i.e. at or about 0 V to earth)

[IEV 604-04-02, mod.]

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3.13
type test
a test performed of one or more devices made to a certain design to show that the design meets certain specifications

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[IEV 151-04-15]

4 Requirements

4.1 General

4.1.1 The device shall operate correctly and safely indoor, outdoor, under rain and with a range of ambient temperature between -20 °C to +40 °C.

4.1.2 The complete cable cutting device shall safely withstand the maximum operating pressure.

4.1.3 For cable cutting devices which can be dismantled, suitable means for the storage and transportation of the separate components shall be provided. These means shall be designed to prevent damage to the component parts in transit and pollution/contamination of all the insulating parts(i.e. hydraulic fluid, insulating hose assemblies).

4.2 Cutting head

4.2.1 The design of the cutting head shall be such that it can be transported in a safe manner and is safe and easy to locate on a cable.

4.2.2 The mass of the cutting head shall not exceed 20 kg so that it can be safely and readily operated by one person.

4.2.3 The cutting head shall be designed so that when properly applied, it shall not be displaced during a cutting operation except when a short circuit fault occurs.

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4.2.4 The cutting head shall be capable of accepting all cables up to the maximum diameter indicated by the manufacturer.

4.2.5 The blade(s) of the cutting head shall be made of a durable metallic material with a surface hardness ranging between 558 HV5 and 715 HV5 (50 HRC up to 60 HRC) (see EN ISO 6507-1).

4.2.6 The cutting head shall be designed to ensure that cutting is done continuously until the cable is cut through completely.

4.2.7 If the hydraulic pressure disappears for any reason the blade(s) shall return to the starting position.

4.2.8 The cutting head shall be connected to the insulating hose assembly by a coupler which requires the use of a tool to separate it.

4.2.9 The cutting head(s) shall be compatible with the pump as specified by the manufacturer of the pump.

4.3 Insulating hose assembly

According to the operating method and the local regulation, two possibilities can be applicable:

4.3.1 Method A

The insulating hose assembly shall fulfil the following requirements of EN 62237:2005:

- 5.3.1.2 “Electric tests on insulating hoses before exposure to humidity” with a test voltage of 36 kV;
- 5.3.1.3 “Electric tests on insulating hoses after exposure to humidity” with a test voltage of 36 kV;
- 5.3.1.4 “Electric tests on insulating after the infliction of a cut on hoses” with a test voltage of 36 kV;
- 5.4.1 “Hydrostatic test”;
- 5.4.2 “Fatigue test”;
- 5.4.3 “Mechanical impulse test” with a test piece according to group II (min. 600 mm) instead test piece according to group I;
- 5.4.4 “Leakage test”;
- 5.4.5 “Change in length test”;
- 5.4.6 “Burst test” with a test piece according to group II (min. 600 mm) instead test piece according to group I;
- 5.4.7 “Cold bend test“.

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The following additions must be considered:

4.3.1.1 The part of the insulating hose of the hose assembly hoses shall provide the required electric insulation between the operator and the cable even when the cutting head blade(s) reach(es) the highest nominal voltage at power frequency and also under condition of pollution of the outer surface.

4.3.1.2 The complete length of the insulating hose of the hose assembly shall be made of insulating material. It shall be flexible.

4.3.1.3 The insulating hose assembly shall be a single piece and be not less than 10 m long. Moreover, the effective length shall be in accordance with the recommendations for use as mentioned in Annex A.

4.3.2 Method B

The insulating hose of the hose assembly shall fulfil all the requirements of EN 62237.

The length of the insulating hose shall be a minimum of 320 mm, according to the maximum voltage of 36 kV of the installation. This insulating hose assembly shall be extended by a non insulating hose of a length required by the operating method with a minimum of 3 m. Moreover, the effective length shall be in accordance with the recommendations for use as mentioned in Annex A.

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The insulating hose of the insulating hose assembly shall be connected nearby the cutting head.

4.4 Insulating hydraulic fluid

The insulating hydraulic fluid shall withstand a test voltage of at least 10 kV.

4.5 Pump

4.5.1 The pump shall be fitted with a safety valve, a reverse flow valve and a pressure gauge to indicate the operating pressure.

4.5.2 To ensure that the pump does not move or tip during pumping, the part of the pump in contact with the ground shall be designed to provide sufficient stability during operation.

4.5.3 The pump shall be suitable for operation by foot or by hand.

4.5.4 Any means provided to adjust the maximum operating pressure shall only be accessible via a cover/plate, or enclosure which needs a special tool for removal.

4.5.5 The pressure level at which the safety valve shall function shall be reached with no more than 100 strokes of the pump operating mechanism.

4.6 Safety valve

4.6.1 The safety valve shall release pressure in excess of the operating pressure by diverting the flow of the insulating fluid back into the storage compartment.

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4.6.2 The safety valve shall close automatically when the pressure in the system decreases below the maximum operating pressure.

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4.7 Reverse flow valve

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The reverse flow valve shall be readily operated from the operating position.

4.8 Pressure gauge

4.8.1 The pressure indicated by the pressure gauge shall be clear and unambiguous when viewed from the operating position.

4.8.2 The pressure gauge shall either be protected against mechanical damage or be sufficiently robust in construction.

4.8.3 The range of pressure shown by the pressure gauge shall extend from « No pressure » to a value not less than 1,2 times the maximum operating pressure. The « maximum operating pressure » shall be clearly indicated by a marking in red. The indication shall be clear and unambiguous when viewed from the operating position.

4.9 Hydraulic coupler

4.9.1 The mating parts of the coupler shall be capable of being easily connected by hand on the pump and by a tool on the head.

4.9.2 The mating parts of the coupler, once properly connected, shall neither separate itself under pressure nor leak.

4.9.3 To protect against the ingress of foreign bodies and pollutants, each part of any coupler shall be provided with a readily removable cover or cap.

NOTE These covers and caps should be made captive to their individual parts of the couplers, so they are not lost.

4.10 Bonding and earthing system

The cable cutting device shall be equipped with termination fittings on identified earthing terminals on the cutting head and on the pump where suitable earthing links can be connected.

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4.10.1 The pump shall be equipped with termination fittings to allow the connection of earthling cables with a minimum cross section of at least 16 mm^2.

4.10.2 The cutting head shall be equipped with termination fittings to allow the connection of earthing cables which meet the requirements of EN 61230.

NOTE The earthing terminal shall be placed on the cutting head on such a position that the function of the cutting head will not be effected by possible damages caused by the occurrence of high fault currents.

4.11 Marking

4.11.1 Marking shall be legible and durable.

4.11.2 The following marking shall appear on the cable cutting device.

4.11.2.1 Cutting head

- mark of origin (name or trademark of the manufacturer),
- year of manufacture,
- type,
- number of production or serial number,
- maximum operating pressure,
- maximum cable diameter,
- double triangle symbol (see Figure 2).

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4.11.2.2 Insulating hose

The marking specified shall appear along the length of the hose and the interval between the end of a mark and the beginning of the next identical mark shall not be greater than 500 mm.

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- mark of origin (name or trademark of the manufacturer),
- year of manufacture,
- type,
- nominal diameter.

4.11.2.3 Insulating hose assembly

The marking specified may be placed on the coupler parts or adjacent to the coupler parts. If marking is placed on the hydraulic hose it shall be clearly distinguished from the marking of 4.11.2.2.

- mark of origin (name or trademark of manufacturer),
- year and month of manufacture,
- maximum operating pressure,
- double triangle symbol (see Figure 2).

4.11.2.4 Pump

- mark of origin (name or trademark of the manufacturer),
- year of manufacture,
- type,
- number of production or serial number,
- maximum operating pressure,
- indication of the types of cutting head(s) to be used with the pump,
- double triangle symbol (see Figure 2).