



SLOVENSKI STANDARD
SIST EN 50216-3:2002
01-oktober-2002

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Power transformer and reactor fittings -- Part 3: Protective relay for hermetically sealed liquid-immersed transformers and reactors without gaseous cushion

Zubehör für Transformatoren und Drosselspulen -- Teil 3: Schutzrelais für ohne Gaspolster hermetisch verschlossene flüssigkeitsgefüllte Transformatoren und Drosselspulen

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Accessoires pour transformateurs de puissance et bobines d'inductance -- Partie 3: Relais de protection pour transformateurs et bobines d'inductance hermétiques immergés dans un liquide et sans matelas gazeux

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EUROPEAN STANDARD

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Power transformer and reactor fittings
Part 3: Protective relay for hermetically sealed liquid-immersed
transformers and reactors without gaseous cushion

Accessoires pour transformateurs
de puissance et bobines d'inductance
Partie 3: Relais de protection pour
transformateurs et bobines d'inductance
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This European Standard was approved by CENELEC on 2001-09-25. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

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

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

This European Standard was prepared by the Technical Committee CENELEC TC 14, Power transformers.

The text of the draft was submitted to the formal vote and was approved by CENELEC as EN 50216-3 on 2001-09-25.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2002-10-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2004-10-01

EN 50216-3 is to be read in conjunction with EN 50216-1.

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1 Scope

EN 50216-3 applies to protective relays for hermetically liquid-immersed transformers, complying with the EN 60076 series, and reactors, complying with EN 60289, without gaseous cushions for indoor or outdoor installation.

This part of EN 50216 defines the

- operating limits,
- outline and mounting details,
- operational performance,
- electrical characteristics,
- dynamic characteristics.

Should environmental conditions and dynamic stress requirements differ from those detailed in clause 3 of EN 50216-1, EN 50216-3 may then be applied by agreement between purchaser and supplier for those parts which are not affected by such abnormal installation conditions.

NOTE EN 50216-3 may be used as far as applicable for relays with mercury switches. Restrictions on the use of mercury devices may be imposed by national regulations.

2 Normative references

Addition to EN 50216-1:

EN 50005	1976	Low-voltage switchgear and controlgear for industrial use - Terminal marking and distinctive number - General rules
EN 50102	1995	Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)
EN 60076 series		Power transformers (IEC 60076 series)
EN 60289	1994	Reactors (IEC 60289:1988, mod.)
EN 60947-5-1 + A12	1997 1999	Low-voltage switchgear and controlgear - Part 5-1: Control circuits devices and switching elements - Electromechanical control circuit devices (IEC 60947-5-1:1997)

3 Identification of relays

Two types are identified in EN 50216-3 which shall meet the following functions:

Table 1 – Identification of relays

Function	Relay type 1	Relay type 2
Gas and leakage detection	1 contact	1 contact
Overpressure detection	1 contact	1 contact
Over temperature detection		2 contacts (alarm/tripping)
Temperature indicator	Yes	Yes
Visual leakage control	Yes	Yes
NOTE The two functions gas and leakage detection are usually actuated by one contact in common.		

Other types of relay having additional functions to those defined in Table 1 are acceptable by agreement.

4 Service conditions

In addition to the service conditions specified in EN 50216-1, the relay shall meet the conditions detailed in this clause.

Lower protection against environmental conditions may be agreed between purchaser and supplier for indoor installation.

4.1 Maximum inclination

The relay is intended to function in a vertical position. An inclination of up to 5° to the vertical axis shall be admissible in the direction of the liquid flow (mobile equipment, trailer...).

Other values may be agreed between purchaser and supplier.

4.2 Operating pressure

The maximum continuous operating pressure shall be 50 kPa.

4.3 Sensitivity of the relay contacts to magnetic fields

The relay shall be able to withstand a d.c. magnetic field up to 25 mT in any direction and any polarity without inadvertent operation.

NOTE During operation and in case of faults, the surroundings of the transformers or reactors are subjected to magnetic fields which could produce inadvertent operation of the relays equipped with magnetic contacts (reed type).

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5 Outline and mounting details

See Figures 1 to 4.

6 Operational performance

6.1 General

Contacts shall be potential free.

Materials of the protective relay shall be heat resistant at 115 °C.

This relay shall also permit partial refilling of liquid of transformer.

The level of the liquid shall be visible.

6.2 Gas collection

The alarm contact shall operate for a volume of gas collected up to 170 cm³.

6.3 Leakage detection

The contact shall operate for a liquid leakage when the internal volume of the relay drops by 170 cm³.

6.4 Pressure detection

The pressure detecting device shall operate at a pressure of 50 kPa or according to transformer or reactor manufacturer's requirement.

6.5 Temperature detection (for relay type 2)

The relay shall be equipped with two adjustable contacts for the range from 30 °C to 120 °C or to 150 °C. Accuracy for the temperature releasing alarm or tripping shall be $\pm 1,5 \%$ of the maximum temperature of the range. This accuracy shall be fulfilled over the whole range.

6.6 Temperature indicator

The temperature indicator shall be from + 30 °C to + 120 °C or to 150 °C with a resettable maximum pointer.

NOTE This device should not operate when the transformer is submitted to a short circuit test performed in accordance with EN 60076-5.

7 Electrical characteristics of switch

This device is based on EN 60947-5-1.

7.1 Rated currents

The rated current shall be 2 A r.m.s. with the short time current 10 A r.m.s. for 30 ms.

7.2 Breaking and making capacity

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 Table 2 – Breaking capacities (NO and NC contacts)
<https://standards.iteh.ai/catalog/standards/sist/en-50216-3-2002/ef99fd951b7e/sist-en-50216-3-2002>

Voltage	Current	Breaking capacity	
		Power	Time
48 V d.c. to 127 V d.c.	2 A	250 W	L/R < 40 ms
230 V a.c.	2 A	400 VA	Cos φ > 0,5

Other values may be agreed between purchaser and supplier.

The minimum contact life shall be 1 000 operations.

The switch shall also be able to make a low current down to 10 mA for any value of voltage defined in Table 2 even after one year of non-operation.

7.3 Operation time

During operation, the contacts shall operate within 0,5 s maximum.

8 Mechanical requirements

8.1 Terminal box

A terminal box shall be provided with three terminals for each function and one earth terminal. The thread of the earth terminal should be M4 or larger.

The earth terminal shall be clearly marked.

The terminals shall be designed to accept cables having a cross sectional area between 1,5 mm² and 2,5 mm². It shall be possible to fit this cable box with two cable glands Pg 21.

The terminal box cover shall be to class IP 55 in accordance with EN 60529 and equipped with sealable unremovable fastening.

Mechanical impact protection shall be to class IK 07 in accordance with EN 50102.

8.2 Testing facilities

Checking of the contact operation for all the functions shall be possible without the contacts or their operating mechanism being damaged.

8.3 Gas sampling

The relay shall be equipped with an easily accessible sampling petcock. The sampling petcock shall not leak.

A facility shall be allowed for the connection of 3,17 mm (1/8") tubing and it shall be possible to seal it to prevent inadvertent opening.

8.4 Presence of gas in the relay

It shall be possible to visually check the presence of any gas from at least three sides.

9 Nameplate

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The nameplate shall contain at least the following information:

- name of supplier;
- serial number, [SIST EN 50216-3:2002](https://standards.iteh.ai/catalog/standards/sist/b8e27493-93b2-4041-aa20-498951b7e6d0/sist-en-50216-3-2002)
- number of this standard and year of edition, [#98951b7e6d0/sist-en-50216-3-2002](https://standards.iteh.ai/catalog/standards/sist/b8e27493-93b2-4041-aa20-498951b7e6d0/sist-en-50216-3-2002)
- type of relay;
- connection diagram;
- seismic withstand class.

The type of relay shall allow identification of the relay characteristics from the operating and maintenance manual supplied by the supplier.

10 Tests

Reference to EN 60076-1 shall be made for definitions concerning testing.

In addition to the tests specified in EN 50216-1, the following tests shall be carried out:

10.1 Routine tests

10.1.1 Oil leakage test

The relay shall be subjected to an oil leakage test by application of 100 kPa of hot oil at 90 °C for a period of 30 min.

The relay shall not leak.