

Copy of marking plate:

| | |
|---|--|
| GACIA PNB30BE UI 750V UIm 8kV f 50/60Hz Cat A IEC/EN60947-2 | MCCB Ue Icu (V) (kA) 400/415 - 70 Ics=75%Icu IEC/EN60947-2 |
|---|--|

| | |
|---|--|
| GACIA PNB30BE UI 750V UIm 8kV f 50/60Hz Cat A IEC/EN60947-2 | MCCB Ue Icu (V) (kA) 400/415 - 80 Ics=75%Icu IEC/EN60947-2 |
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| GACIA PNB30BE UI 750V UIm 8kV f 50/60Hz Cat A IEC/EN60947-2 | MCCB Ue Icu (V) (kA) 400/415 - 36 Ics=75%Icu IEC/EN60947-2 |
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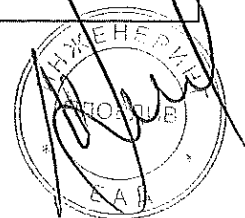
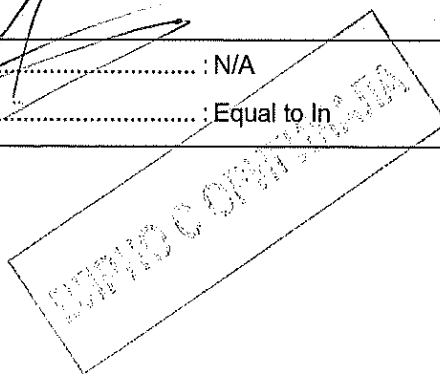
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TRF No. IEC60947_2F

СЕРТИФИКАТ

| | |
|---|--|
| Test item particulars: test item vs. test requirements | |
| 3. Classification | |
| 3.1. Utilization category: (A or B) | : A |
| 3.2. Interruption medium: (air, vacuum, gas Break)..... | : Air |
| 3.3. Design: (open construction, moulded case)..... | : Moulded case |
| 3.4. Method of controlling the operation mechanism: (dependent manual, independent manual, dependent power, independent power) | : Independent manual |
| 3.5. Suitability for isolation: (suitable, not -suitable)..... | : Suitable |
| 3.6. Provision for maintenance: (maintainable, non maintainable)..... | : Non-maintainable |
| 3.7. Method of installation: (fixed, plug in, withdrawable | : Fixed |
| 3.8. Degree of protection: (IP code) | : N/A |
| 4.7. Type of release (thermo-magnetic / electronic) | : Electronic |
| 4.8. Integral fuses (integrally fused circuit-breakers) Type and characteristics of SCPD..... | : N/A |
| 7.3 Electromagnetic compatibility (EMC) | |
| Environment A or B | : A and B |
| Circuit-breaker for use on phase-earthed systems | : N/A |
| Circuit-breaker for use in IT systems..... | : N/A |
| Rated and limiting values, main circuit: | |
| - rated operational voltage: U_e (V) | : 400 / 415 Vac |
| - rated insulation voltage: U_i (V) | : 750 V |
| - rated impulse withstand voltage: U_{imp} (kV)..... | : 8 kV |
| - rated operational current: I_e (A)..... | : 0,9 x 0,4 I_n ~ 1 I_n See page 7 for the value of I_n |
| - kind of current | : AC |
| - conventional free air thermal current: I_{th} (A)..... | : Equal to I_n |
| - conventional enclosed thermal current: I_{the} (A) | : N/A |
| - current rating for four-pole circuit-breakers: (A)..... | : Equal to 70% I_n |
| - number of poles | : 3P and 3P + N (unprotected N pole) |
| - rated frequency: (Hz) | : 50 / 60 Hz |
| - integral fuses (rated values) | : N/A |
| Rated duty : | |
| - eight-hour duty | : N/A |
| - uninterrupted duty: I_u (A) | : Equal to I_n |

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Short-circuit characteristic :

rated short-time making capacity: I_{cm} (kA)..... : PN630HE / LN630HE: 154 kA
 PN630SE / LN630SE: 105 kA
 PN630NE / LN630NE: 73,5 kA

rated ultimate short-circuit breaking capacity: I_{cu} (kA) : PN630HE / LN630HE: 70 kA
 PN630SE / LN630SE: 50 kA
 PN630NE / LN630NE: 35 kA

rated service short-circuit breaking capacity: I_{cs} (kA) : $I_{cs} = 75\% I_{cu}$

rated short-time withstand current: I_{cw} (kA/s)..... : N/A

Control circuits :

Electrical control circuits :

- kind of current: (AC, DC) : N/A

- rated frequency: (Hz) : N/A

- rated control circuit voltage: U_c (nature, frequency, V) .. : N/A

- rated control supply voltage: U_s (nature, frequency V) . : N/A

Air supply control circuits: (pneumatic or electro-pneumatic)

- rated pressure and its limit..... : N/A

- volumes of air, at atmospheric pressure, required for each closing and each opening operation..... : N/A

Auxiliary circuits :

Rated and limiting values, auxiliary circuits:

- rated operational voltage U_e (V) : N/A

- rated insulation voltage: U_i (V) : N/A

- rated operational current: I_e (A)..... : N/A

- kind of current : N/A

- rated frequency: (Hz) : N/A

- number of circuits..... : N/A

- number and kind of contact elements : N/A

- rated uninterrupted current: I_u (A)..... : N/A

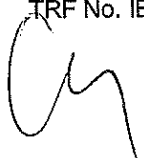
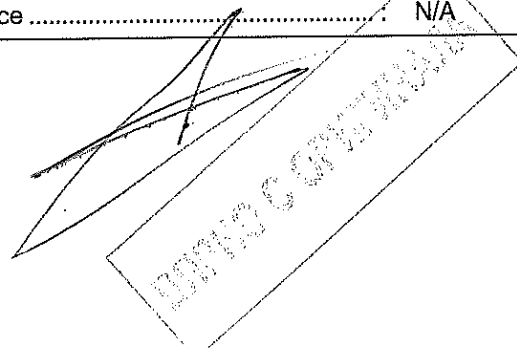
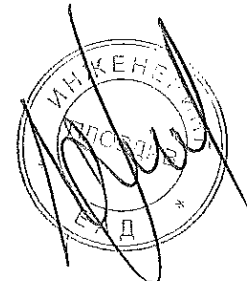
- utilization category: (AC, DC, current and voltage) : N/A

Short-circuit characteristic :

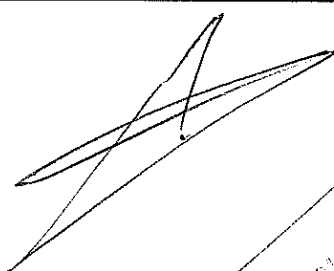
- Rated conditional short-circuit current (kA)..... : N/A

- kind of protective device : N/A

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| Releases : | |
| 1) shunt release | N/A |
| 2) Over-current release | Yes |
| a) instantaneous | Yes |
| b) definite time delay | N/A |
| c) inverse time delay..... | Yes |
| - independent of previous load..... | Yes, electronic release |
| - dependent on previous load; (for example thermal type release) | N/A |
| 3) Undervoltage release (for opening)..... | N/A |
| 4) Other releases | N/A |
| Characteristics : | |
| 1) Shunt release and undervoltage release (for opening) | N/A |
| - rated control circuit voltage: Uc (nature, frequency, V) | N/A |
| - kind of current..... | N/A |
| - rated frequency: (if AC) | N/A |
| 2) Over-current release | Yes |
| - rated current (In)..... | 400 A, 500 A, 630 A |
| - kind of current..... | AC |
| - rated frequency: (if AC)..... | 50 / 60 Hz |
| - current setting (or range of settings)..... | Instantaneous tripping (short circuit condition): Im: 1,5Ir, 2Ir, 3Ir, 4Ir, 5Ir, 6Ir, 7Ir, 8Ir, 10Ir Inverse time delay tripping (overload condition): Ir: 0,90Io, 0,92Io, 0,93Io, 0,94Io, 0,95Io, 0,96Io, 0,97Io, 0,98Io, 1Io Io: 0,40In, 0,45In, 0,50In, 0,55In, 0,63In, 0,70In, 0,80In, 0,90In, 1In |
| - time settings (or range of settings) | Instantaneous tripping: fixed Inverse time delay tripping: fixed |

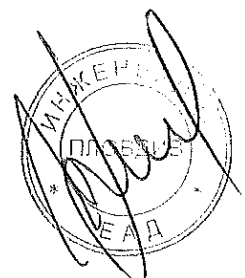
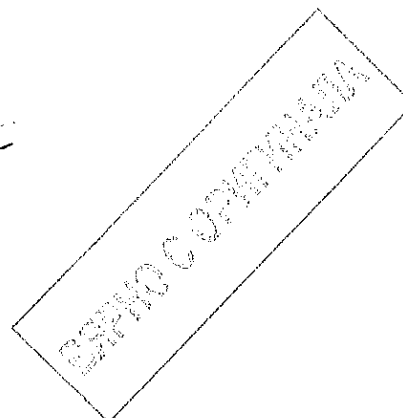





ДИПЛОМОВАНА



| | |
|---|-----------------------------------|
| Classification of installation and use..... | : Fixed |
| Supply Connection | : 3 phase or 3 phase with Neutral |
| Possible test case verdicts: | |
| - test case does not apply to the test object..... | : N/A |
| - test object does meet the requirement..... | : P (Pass) |
| - test object does not meet the requirement..... | : F (Fail) |
| Testing | |
| Date of receipt of test item | : 2012-06 |
| Date (s) of performance of tests | : 2012-06 ~ 2012-11 |
| General remarks: | |
| The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory. "(See Enclosure #)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report. Throughout this report a comma is used as the decimal separator. | |
| Though it is not mentioned on the first page, the following standard was also taken into consideration. No deviation was found: EN 60947-2:2006 + A1:2009 | |
| General product information: | |
| The technical data of the MCCB are listed on page 5 to 8 of this report. The N pole is fully identical to phase pole except the N pole is not protected. | |
| Factory: | |
| ZHEJIANG GACIA ELECTRICAL APPLIANCE CO., LTD. 545# Dongdajie, Baitawang Industrial Zone, Beibaixiang Yueqing Zhejiang, 325603, China | |

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| IEC 60947-2 | | | |
|-------------|---|--|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 5.2 | MARKING Marking check was conducted on PN630HE with rated current of 630 A (3P + N) | | |
| a) | The following data shall be marked on the circuit-breaker itself or on a name plate or nameplates attached to the circuit-breaker, and located in a place such that they are visible and legible when the circuit-breaker is installed. | | |
| | - rated current: | 630 A | P |
| | - suitability for isolation, if applicable, with the symbol  | Suitable for isolation | P |
| | - indication of the open and closed position: with O and I respectively, if symbols are used | | P |
| b) | Marking on equipment not needed to be visible after mounting: | | |
| | - manufacturer's name or trademark | GACIA | P |
| | - type designation or serial number | PN630HE | P |
| | - IEC 60947-2 if the manufacturer claims compliance with this standard. | IEC/EN 60947-2 | P |
| | - utilization category | A | P |
| | - rated operational voltage(s) Ue | 400 / 415 Vac | P |
| | - Circuit-breaker for use in IT systems: Circuit-breaker for which all values of rated voltage have not been tested according to annex H or are not covered by such testing, shall be identified by the symbol  which shall be marked on the circuit-breaker immediately following these values of rated voltage |  is marked | P |
| | - value (or range) of the rated frequency and/or the indication DC (or symbol) | 50 / 60 Hz | P |
| | - rated service short-circuit breaking capacity. Ics | Ics = 75%Icu | P |
| | - rated ultimate short-circuit breaking capacity. Icu | 70 kA | P |
| | - rated short-time withstand current, (Icw) and associated short-time delay, for utilization category B | | N/A |
| | - line and load terminals, unless their connection is immaterial | Line / Load are marked | P |

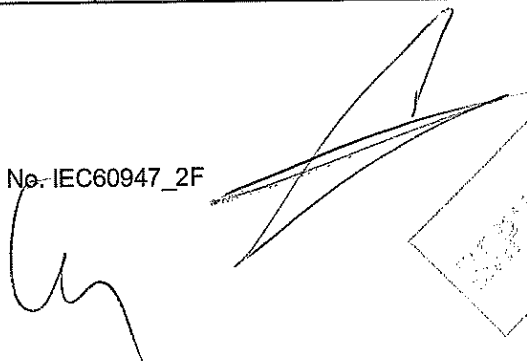
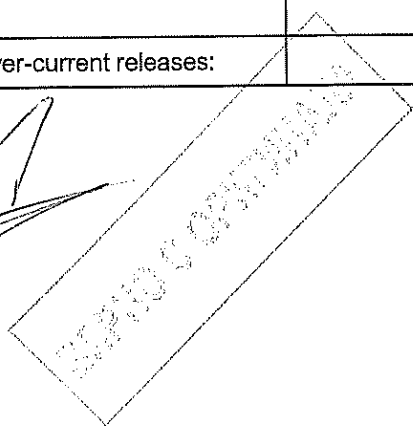
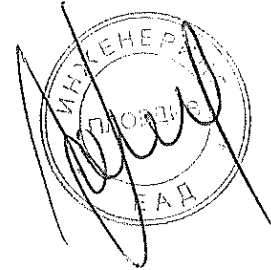
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ВЕРНО СОРТИРОВАНО



| IEC 60947-2 | | | |
|-------------|---|--|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | - neutral pole terminals, if applicable, by the letter N | N is marked | P |
| | - protective earth terminal, where applicable, by the symbol acc. 7.1.9.3 of part 1 | | N/A |
| | - ref. temperature for non-compensated thermal releases, if different from 30°C | | N/A |
| c) | Marked on the circuit-breaker as specified in item b), or shall be made available in the manufacturer's published information: | | |
| | - rated short-circuit making capacity (I _{cm}) (if higher than specified in 4.3.5.1) | | N/A |
| | - rated insulation voltage. (U _i) if higher than the maximum rated operational voltage) | 750 V | P |
| | - rated impulse withstand voltage (U _{imp}), when declared. | 8 kV | P |
| | - pollution degree if other than 3 | | N/A |
| | - conventional enclosed thermal current (I _{the}) if different from the rated current: | | N/A |
| | - IP Code, where applicable: | | N/A |
| | - minimum enclosure size and ventilation data (if any) to which marked ratings apply: | | N/A |
| | - details of minimum distance between circuit-breaker and earthed metal parts for circuit-breaker intended for use without enclosure: | Front / Back: 0 mm, Left / Right : 0 mm, Top / Bottom: 50 mm | P |
| | - r.m.s sensing if applicable, according to F.4.1.1 | | P |
| | - suitability for environment A or B | A and B | P |
| d) | The following data concerning the opening and closing devices of the circuit-breaker shall be placed either on their own nameplates or on the nameplate of the circuit-breaker: | | |
| | - rated control circuit voltage of the closing device, and rated frequency for AC: | | N/A |
| | - rated control circuit voltage of the shunt release and/or of the under-voltage release, and rated frequency: | | N/A |
| | - rated current of indirect over-current releases: | | N/A |

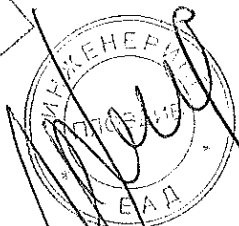
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|-------------|---|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | - number and type of auxiliary contacts and kind of current, rated frequency (if AC) and rated voltages of the auxiliary switches, if different from those of the main circuit. | | N/A |
| e) | Terminal shall be clearly and permanently identified in acc. with IEC 60445 and annex L : | | |
| | - line terminal | Line is marked | P |
| | - load terminal | Load is marked | P |
| | - neutral pole terminal "N" | N is marked | P |
| | - protective earth terminal  | | N/A |
| | - terminal of coils (A/B) | | N/A |
| | - terminal of shunt release (B) | | N/A |
| | - terminals of under-voltage release (D) | | N/A |
| | - terminals of interlocking electromagnets (E) | | N/A |
| | - terminals of indicated light devices (X) | | N/A |
| | - terminals of contact elements for switching devices (no) | | N/A |

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|-------------|--------------------|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |

| | | | |
|----------------|---|----------------------|-----|
| 7.1 | CONSTRUCTION | | |
| 7.1.1 | Withdrawable circuit-breaker | | N/A |
| | In the disconnected position (main- and auxiliary circuits) | | |
| | Isolating distances for circuit-breaker suitable for isolating warranted: | | N/A |
| | Mechanism fitted with a reliable indicating device with indicates the position of the isolating contacts. | | N/A |
| | Mechanism fitted with interlocks which only permit the isolating contacts to be separate or re-closed when main contacts are open | | N/A |
| | Mechanism fitted with interlock, which only permit the main contacts to be closed when the isolating contacts are fully closed. | | N/A |
| | Mechanism fitted with interlock, which only permit the main contacts to be closed when in disconnected position. | | N/A |
| | The isolating distances between the isolating contacts cannot be inadvertently reduced. | | N/A |
| 7.1.2.1 part 1 | Resistance to abnormal heat and fire | See appended table 9 | P |
| 7.1.3 part 1 | Current-carrying parts and their connection | | P |
| 7.1.4 | Clearances and creepage distances: | | |
| | For circuit-breakers for which the manufacturer has declared a value of rated impulse withstand voltage. (Uimp.) | | |
| | Clearances distances: | | |
| | - Uimp is given as: | 8 kV | |
| | - max. value of rated operational voltage to earth | 600 V | |
| | - nominal voltage of supply system: | 400 / 415 Vac | |
| | - overvoltage category: | III | |
| | - pollution degree: | 3 | |
| | - field-in or homogeneous: | Inhomogeneous field | |
| | - minimum clearances (mm): | 8mm | |

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СЕРТИФИКАТ



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| Clause | Requirement + Test | Result - Remark | Verdict |
| | - measured clearances (mm): | Min measured value: 11,3 mm See appended table 8 | P |
| | Creepage distances: | | |
| | - rated insulation voltage Ui (V) | 750 V | |
| | - pollution degree | 3 | |
| | - comparative tracking index (V) | 400 V | |
| | - material group | II | |
| | - minimum creepage distances (mm) | 11 mm | |
| | - measured creepage distances (mm) | Min measured value: 11,3 mm See appended table 8 | P |
| 7.1.5 part 1 | Actuator | | |
| 7.1.5.1 part 1 | Insulation | | |
| | The actuator of the equipment shall be insulated from the live parts for the rated insulation voltage and, if applicable, the rated impulse withstand voltage | | P |
| | If it is made of metal, it shall be capable of being satisfactorily connected to a protective conductor unless it is provided with additional reliable insulation | | N/A |
| | If it is made of or covered by insulating material, any internal metal part, which might become accessible in the event of insulation failure, shall also be insulated from live parts for the rated insulation voltage | | P |
| 7.1.5.2 | Direction of movement | | |
| | The direction of operation for actuators of devices shall normally conform to IEC 60447. | | P |
| | Where devices cannot conform to these requirements, e.g. due to special applications or alternative mounting positions, they shall be clearly marked such that there is no doubt as to the "I" and "O" positions and the direction of operation | | P |

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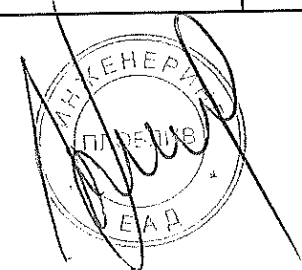
ЗЕРКАЛО С ОФОРМЛЕНИЕМ

ИРКЕНЕРП
ПРОЦЕ
ЕАД

| IEC 60947-2 | | | |
|----------------|---|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 7.1.6 part 1 | Indication of contact position | | |
| 7.1.6.1 part 1 | Indicating means | | |
| | When an equipment is provided with means for indicating the closed and open positions, these positions shall be unambiguous and clearly indicated | | P |
| | This is done by means of a position indicating device (see 2.3.18) | | P |
| | If symbols are used, they shall indicate the closed and open position respectively, in accordance with IEC 60417-2: | | |
| | - 60417-2-IEC-5007 I On (power) | | P |
| | - 60417-2-IEC-5007 O Off (power) | | P |
| | For equipment operated by means of two push-buttons, only the push-button designated for the opening operation shall be red or marked with the symbol "O" | | N/A |
| | Red colour shall not be used for any other push-button | | P |
| | The colours of other push-buttons, illuminated push-buttons and indicator lights shall be in accordance with IEC 60073 | | N/A |
| 7.1.6.2 part 1 | Indication by the actuator | | |
| | When the actuator is used to indicate the position of the contacts, it shall automatically take up or stay, when released, in the position corresponding to that of the moving contacts; in this case, the actuator shall have two distinct rest positions corresponding to those of the moving contacts, but for automatic opening a third distinct position of the actuator may be provided | | P |
| 7.1.7 | Additional safety requirements for equipment suitable for isolation | | |
| 7.1.7.1 | Additional constructional requirements for equipment suitable for isolation (Ue > 50 V): | | |
| | Equipment suitable for isolation shall provide in the open position an isolation distance in acc. with the requirements necessary to satisfy the isolating function. Indication of the main contacts shall be provide by one or more of the following means: | | |
| | - the position of the actuator | | P |

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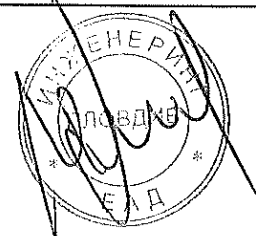
ВЕРСИЯ КОПИРА



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| Clause | Requirement + Test | Result - Remark | Verdict |
| | - a separate mechanical indicator | | N/A |
| | - visibility of the moving contacts | | N/A |
| | When means are provided or to lock the equipment in the open position, locking only be possible when contacts are in the open position | | N/A |
| | Actuator front-plate fitted to the equipment in a manner which ensures correct contact position indication and locking | | P |
| | The indicated open position is the only position in which the specified isolation distances between the contacts is ensured. | | P |
| | - minimum clearances across open contacts (see Table XIII, Part 1) (mm) : | 8 mm | |
| | - measured clearances (mm) : | 18,8 mm | P |
| | - test Uimp across gap (kV) : | 12,3 kV | P |
| 7.1.7.2 | Supplementary requirements for equipment with provision for electrical interlocking with contactors or circuit-breakers: | | |
| | auxiliary switch shall be rated according to IEC 60 947-5-1 | | N/A |
| | If equipment suitable for isolation is provided with an auxiliary switch for the purpose of electrical interlocking with contactor (s) or circuit-breaker(s) and intended to be used in motor circuits, the following requirements shall apply unless the equipment is rated for AC-23 utilization category | | N/A |
| | The time interval between the opening of the contacts of the auxiliary switch and the contacts of the main poles shall be sufficient to ensure that the associated contactor or circuit-breaker interrupts the current before the main poles of the equipment open | | N/A |
| | Unless otherwise stated in the manufacturer's technical literature, the time interval shall be not less than 20 ms when the equipment is operated according to the manufacturer instructions | | N/A |
| | Compliance shall be verified by measuring the time interval between the instant of opening of the auxiliary switch and the instant of opening of the main poles under no-load conditions when the equipment is operated according to the manufacturer's instructions | | N/A |

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ДЕКРА СЕРТИФИКАЦИЯ

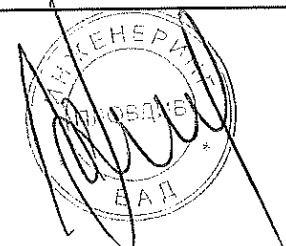


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| Clause | Requirement + Test | Result - Remark | Verdict |
| | During the closing operation the contacts of the auxillary switch shall close after or simultaneously with the contacts of the main poles | | N/A |
| | A suitable opening time interval may also be provided by an intermediate position (between the ON and OFF position) at which the interlocking contact(s) is (are) open and the main poles remain closed | | N/A |
| 7.1.7.3 | Supplementary requirements for equipment provided with means for padlocking the open position: | | |
| | the locking means shall be designed in such a way that it cannot be removed with the appropriate padlock(s) installed | | N/A |
| | Alternatively, the design may provide padlockable means to prevent access to the actuator | | N/A |
| | test force F applied to the actuator in an attempt to operate to the closed position (N) : | | N/A |
| | rated impulse withstand voltage (kV) : | | N/A |
| | test Uimp on open main contacts at the test force | | N/A |
| 7.1.8 | Terminals | | |
| 7.1.8.1 | All parts of terminals which maintain contact and carry current shall be of metal having adequate mechanical strength | | P |
| | Terminal connections shall be such that necessary contact pressure is maintained | | P |
| | Terminals shall be so constructed that the conductor is clamped between suitable surfaces without damage to the conductor and terminal | | P |
| | Terminal shall not allow the conductor to be displaced or to be displaced themselves in a manner detrimental to the operator of equipment and the insulation voltage shall not be reduced below the rated value | | P |
| 7.1.8.2 | Connection capacity | | |
| | type of conductors : | Prepared cable (with cable lug) | P |
| | minimum cross-sectional area of conductor (mm ²) : | 150 mm ² | P |
| | maximum cross-sectional area of conductor (mm ²) : | 2 x 185 mm ² | P |

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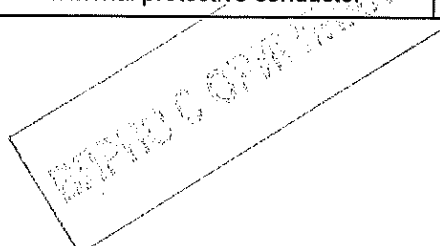




ИЗДАНИЕ 01.07.2015



| IEC 60947-2 | | | |
|--------------|--|------------------------------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | number of conductors simultaneously connectable to the terminal : | 1 | P |
| 7.1.8.3 | Connection | | |
| | terminals for connection to external conductors shall be readily accessible during installation | | P |
| | clamping screws and nuts shall not serve to fix any other component | | P |
| 7.1.8.4 | Terminal identification and marking | | |
| | terminal intended exclusively for the neutral conductor | N is marked | P |
| | protective earth terminal | | N/A |
| | other terminals | | N/A |
| 7.1.9 part 1 | Additional requirements for equipment provided with a neutral pole | | |
| | When equipment is provided with a pole intended only for connecting the neutral, this pole shall be clearly identified to that effect by the letter N (see 7.1.7.4.). | N is marked | P |
| | A switched neutral pole shall break not before and shall make not after the other poles | The neutral pole is unprotected | P |
| | For equipment having a value of conventional thermal current (free air or enclosed, see 4.3.2.1 and 4.3.2.2) not exceeding 63 A, this value shall be identical for all poles | | N/A |
| | For higher conventional thermal current values, the neutral pole may have a value of conventional thermal current different from that of the other poles, but not less than half that value or 63 A, whichever is the higher | The neutral pole current is 70% In | P |
| | if a pole with an appropriate making and breaking capacity is used as a neutral pole, then all poles, incl. the neutral pole, shall operate substantially together. | | N/A |
| 7.1.10 | Provisions for protective earthing | | |
| 7.1.10.1 | The exposed conductive parts (e.g. chassis, framework and fixed parts of metal enclosures) other than those which cannot constitute a danger shall be electrically interconnected and connected to a protective earth terminal for connection to an earth electrode or to an external protective conductor | | N/A |

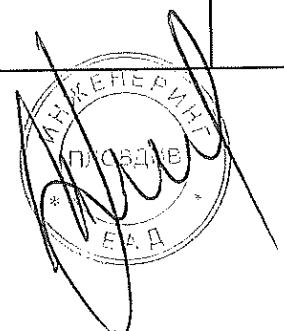
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| Clause | Requirement + Test | Result - Remark | Verdict |
| part 1 | This requirement can be met by the normal structural parts providing adequate electrical continuity and applies whether the equipment is used on its own or incorporated in an assembly | | N/A |
| | Exposed conductive parts are considered not to constitute a danger if they cannot be touched on large areas or grasped with the hand or if they are of small size (approximately 50 mm x 50 mm) or are so located as to exclude any contact with live parts | | N/A |
| 7.1.10.2 part 1 | Protective earth terminal | | |
| | The protective earth terminal shall be readily accessible and so placed that the connection of the equipment to the earth electrode or to the protective conductor is maintained when the cover or any other removable part is removed | | N/A |
| | The protective earth terminal shall be suitably protected against corrosion | | N/A |
| | In the case of equipment with conductive structures, enclosures, etc., means shall be provided, if necessary, to ensure electrical continuity between the exposed conductive parts the equipment and the metal sheathing of connecting conductors | | N/A |
| | The protective earth terminal shall have no other function, except when it is intended to be connected to a PEN conductor (see 2.1.1.5 – Note). In this case, it shall also have the function of a neutral terminal in addition to meeting the requirements applicable to the protective earth terminal | | N/A |
| 7.1.10.3 | Protective earth terminal marking and identification | | |
| | The protective earth terminal shall be clearly and permanently identified by its marking | | N/A |
| | The identification shall be achieved by colour (green-yellow mark) or by the notation PE, or PEN, as applicable, in accordance with IEC 60445, subclause 5.3, or, in the case of PEN, by a graphical symbol for use on equipment | | N/A |
| | Graphical symbol to be used: 60417-2-IEC-5019  Protective earth (ground) in accordance with IEC 60417-2 | | N/A |

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ВІСНІВ С ОРИГІНАЛА



| IEC 60947-2 | | | |
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| Clause | Requirement + Test | Result - Remark | Verdict |
| 7.1.11 | Enclosure for equipment | | |
| 7.1.11.1 | Design | | |
| | The enclosure, when it is opened: all parts requiring access for installation and maintenance are readily accessible | | N/A |
| | Sufficient space shall be provided inside the enclosure | | N/A |
| | The fixed parts of a metal enclosure shall be electrically connected to the other exposed conductive parts of the equipment and connected to a terminal which enables them to be earthed or connected to a protective conductor | | N/A |
| | Under no circumstances shall a removable metal part of the enclosure be insulated from the part carrying the earth terminal when the removable part is in place | | N/A |
| | The removable parts of the enclosure shall be firmly secured to the fixed parts by a device such that they cannot be accidentally loosened or detached owing to the effects of operation of the equipment or vibrations | | N/A |
| | When an enclosure is so designed as to allow the covers to be opened without the use of tools, means shall be provided to prevent loss of the fastening devices | | N/A |
| | If the enclosure is used for mounting push-buttons, it shall not be possible to remove the buttons from the outside of the enclosure | | N/A |
| 7.1.11.2 | Insulation | | |
| | If, in order to prevent accidental contact between a metallic enclosure and live parts, the enclosure is partly or completely lined with insulating material, then this lining shall be securely fixed to the enclosure | | N/A |
| 7.1.12 | Degree of protection of enclosed equipment | | |
| | Degree of protection. | IPXX | |
| | Test for first characteristic. | IPXX | |

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| Clause | Requirement + Test | Result - Remark | Verdict |
| | Test for first numeral : | 1 2 3 4 5 6 | N/A |
| | Test for second characteristic | IPXX | |
| | Test for second numeral : | 1 2 3 4 5 6 7 8 | N/A |
| 7.1.13 part 1 | Conduit pull-out, torque and bending with metallic conduits | | |
| | Polymeric enclosures of equipment, whether integral or not, provided with threaded conduit entries, intended for the connection of extra heavy duty, rigid threaded metal conduits complying with IEC 60981, shall withstand the stresses occurring during its installation such as pull-out, torque, bending | | N/A |

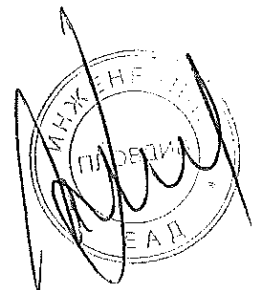
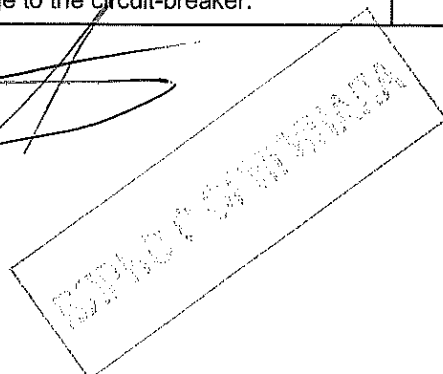
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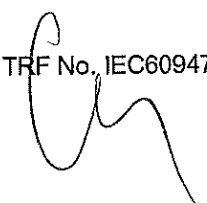
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| Clause | Requirement + Test | Result - Remark | Verdict |
| 7.2 | Performance requirements | | |
| 7.2.1 | Operating condition | | |
| 7.2.1.1 | Closing | | |
| | For a circuit-breaker to be closed safely on to the making current corresponding to its rated short-circuit making capacity, it is essential that it should be operated with the same speed and the same firmness as during the type test for proving the short-circuit making capacity | | P |
| 7.2.1.1.1 | Dependent manual closing | | |
| | For a circuit-breaker having a dependent manual closing mechanism, it is not possible to assign a short-circuit making capacity rating irrespective of the conditions of mechanical operation | | N/A |
| | Such a circuit-breaker should not be used in circuits having a prospective peak making current exceeding 10 kA | | N/A |
| | However, this does not apply in the case of a circuit-breaker having a dependent manual closing mechanism and incorporating an integral fast-acting opening release which causes the circuit-breaker to break safely, irrespective of the speed and firmness with which it is closed on to prospective peak currents exceeding 10 kA; in this case, a rated short-circuit making capacity can be assigned | | N/A |
| 7.2.1.1.2 | Independent manual closing | | |
| | A circuit-breaker having an independent manual closing mechanism can be assigned a short-circuit making capacity rating irrespective of the conditions of mechanical operation | | P |
| 7.2.1.1.3 | Dependent power closing | | |
| | At 110% of the rated control supply voltage, the closing operation performed on no-load shall not cause any damage to the circuit-breaker. | | N/A |

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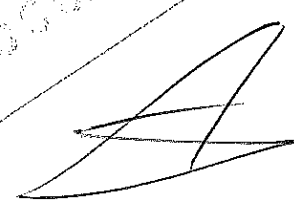
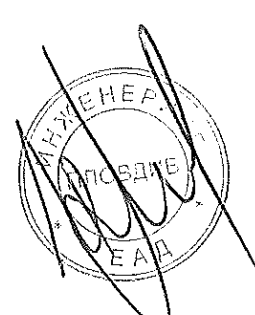


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| Clause | Requirement + Test | Result - Remark | Verdict |
| | At 85% of the rated control supply voltage, the closing operation shall be performed when the current established by the circuit-breaker is equal to its rated making capacity within the limits allowed by the operation of its relays or releases and, if a maximum time is stated for the closing operation, in a time not exceeding this maximum time limit. | | N/A |
| 7.2.1.1.4 | Independent power closing | | |
| | A circuit-breaker having an independent power closing operation can be assigned a rated short-circuit making capacity irrespective of the conditions of power closing | | N/A |
| | Means for charging the operating mechanism, as well as the closing control components, shall be capable of operating in accordance with the manufacturer's specification | | N/A |
| 7.2.1.1.5 | Stored energy closing | | |
| | Capable ensuring closing of the circuit-breaker in any condition between no-load and its rated making capacity | | N/A |
| | - when the stored energy is retained within the circuit-breaker, a device is provided which indicates when the storing mechanism is fully charged. | | N/A |
| | - means for charging the operating mechanism and closing control components operates when auxiliary supply voltage is between 85% and 110% of the rated control supply voltage. | | N/A |
| | - not possible for the moving contacts to move from the open position, unless the charge is sufficient for satisfactory completion of the closing operation. | | N/A |
| | - by manually operated circuit-breaker is the direction of operation indicated. (not for circuit-breaker with an independent manual closing operation.) | | N/A |
| | - For trip free circuit-breaker it shall not be possible to maintain the contacts in the touching or closed position when the release is in the position to trip the circuit-breaker. | | N/A |

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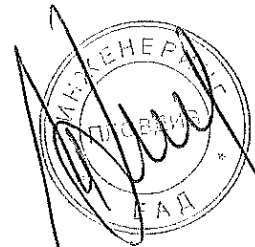


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| Clause | Requirement + Test | Result - Remark | Verdict |
| 7.2.1.2 | Opening | | |
| 7.2.1.2.1 | Circuit-breakers which open automatically shall be trip-free and, unless otherwise agreed between manufacturer and user, shall have their energy for the tripping operation stored prior to the completion of the closing operation | | |
| 7.2.1.2.2 | Opening by undervoltage releases | | |
| 7.2.1.3. a part 1 | Operating voltage | | |
| | An under-voltage relay or release, when associated with a switching device, shall operate to open the equipment even on a slowly falling voltage within the range between 70% and 35% of its rated voltage | | N/A |
| | An under-voltage relay or release shall prevent the closing of the equipment when the supply voltage is below 35% of the rated voltage of the relay or release; it shall permit closing of the equipment at supply voltages equal to or above 85% of its rated value | | N/A |
| | Unless otherwise stated in the relevant product standard, the upper limit of the supply voltage shall be 110% of its rated value | | N/A |
| 7.2.1.3. b part 1 | Operating time | | |
| | For a time-delay under-voltage relay or release, the time-lag shall be measured from the instant when the voltage reaches the operating value until the instant when the relay or release actuates the tripping device of the equipment | | N/A |
| 7.2.1.2.3 | Opening by shunt releases | | N/A |
| 7.2.1.4 part 1 | Limits of operation of shunt releases | | |
| | A shunt release for opening shall cause tripping under all operating conditions of an equipment when the supply voltage of the shunt release measured during the tripping operation remains between 70% and 110% of the rated control supply voltage and, if a.c., at the rated frequency | | N/A |

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| Clause | Requirement + Test | Result - Remark | Verdict |
| 7.2.1.5 part 1 | Limits of operation of current operated relays and released | | |
| | Limits of operation of current operated relays and releases shall be stated in the relevant product standard | | N/A |
| 7.2.1.2.4 | Opening by over-current releases | | |
| a) | Opening under short-circuit conditions | | |
| | The short-circuit release shall cause tripping of the circuit-breaker with an accuracy of 20% of the tripping current value of the current setting for all values of the current setting of the short-circuit current release | | P |
| | Where necessary for over-current co-ordination the manufacturer shall provide information (usually curves) showing | | N/A |
| | - maximum cut-off (let-through) peak current as a function of prospective current (r.m.s. symmetrical) | | N/A |
| | - I^2t characteristics for circuit-breakers of utilization category A and, if applicable, B for circuit-breakers with instantaneous override (see note to 8.3.5) | | N/A |
| b) | Opening under overload conditions | | |
| 1) | Instantaneous or definite time-delay operation | | N/A |
| | The release shall cause tripping of the circuit-breaker with an accuracy of $\pm 10\%$ of the tripping current value of the current setting for all values of current setting of the overload release | | N/A |
| 2) | Inverse time-delay operation | | |
| | At the reference temperature and at 1,05 times the current setting with the conventional non-tripping current, the opening release being energized on all poles, tripping shall not occur in less than the conventional time from the cold state, i.e. with the circuit-breaker at the reference temperature | | P |
| | Moreover, when at the end of the conventional time the value of current is immediately raised to 1,30 times the current setting, i.e. with the conventional tripping current, tripping shall then occur in less than the conventional time later | | P |

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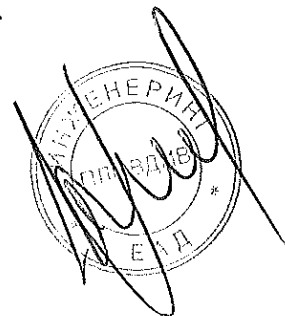
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| Clause | Requirement + Test | Result - Remark | Verdict |
| | If a release is declared by the manufacturer as substantially independent of ambient temperature, the current values of table 6 shall apply within the temperature band declared by the manufacturer, within a tolerance of 0,3%/K | | N/A |
| | The width of the temperature band shall be at least 10 K on either side of the reference temperature | | N/A |
| 7.2.4.2 | Operational performance capability | | |
| 7.2.4.2 part 1 | The operational performance off-load for which the tests are made with the control circuits energized and the main circuit not energized, in order to demonstrate that the equipment meets the operating conditions specified at the upper and lower limits of supply voltage and/or pressure specified for the control circuit during closing and opening operations | | P |
| | The operational performance on-load during which the equipment shall make and break the specified current corresponding, where relevant, to its utilization category for the number of operations stated in the relevant product standard | | P |

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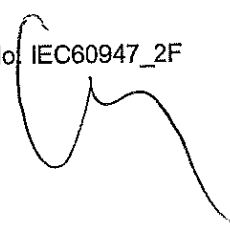





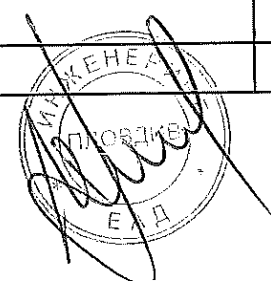
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| Clause | Requirement + Test | Result - Remark | Verdict |

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| 8 | TESTS | | |
| 8.2.4 | Mechanical properties of terminals | | |
| | Mechanical strength of terminals | | |
| | maximum cross-sectional area of conductor (mm ²) : | 2 x 185 mm ² | |
| | diameter of thread (mm) : | 10 mm | |
| | torque (Nm) : | 10 Nm | |
| | 5 times on 2 separate clamping units | | P |
| | Testing for damage to and accidental loosening of conductor (flexion test) | | |
| | conductor of the smallest cross-sectional area (mm ²) : | | |
| | number of conductors of the smallest cross section : | | |
| | diameter of bushing hole (mm) : | | |
| | height between the equipment and the platen : | | |
| | mass at the conductor(s) (kg) : | | |
| | 135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit | | N/A |
| | Pull-out test | | |
| | force (N) : | | |
| | 1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit | | N/A |
| | conductor of the largest cross-sectional area (mm ²) : | | |
| | number of conductors of the largest cross section : | | |
| | diameter of bushing hole (mm) : | | |
| | height between the equipment and the platen : | | |
| | mass at the conductor(s) (kg) : | | |
| | 135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit | | N/A |
| | Pull-out test | | |
| | force (N) : | | |

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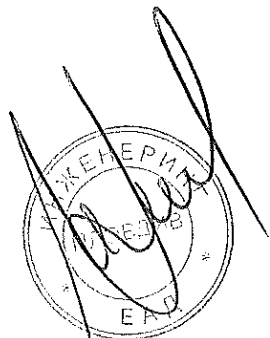
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| | 1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit | | N/A |
| | conductor of the largest and smallest cross-sectional area (mm ²) : | | |
| | number of conductors of the smallest cross section, number of conductors of the largest cross section : | | |
| | diameter of bushing hole (mm) : | | |
| | height between the equipment and the platen : | | |
| | mass at the conductor(s) (kg) : | | |
| | 135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit | | N/A |
| | Pull-out test | | |
| | force (N) : | | |
| | 1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit | | N/A |

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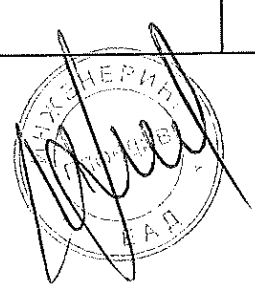


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| | | | |
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| 8.3.3 | TEST SEQUENCE I: GENERAL PERFORMANCE CHARACTERISTICS | | |
| 8.3.3.1 | Tripping limits and characteristic | | |
| 8.3.3.1.2 | Opening under short-circuit conditions | | |
| | Manufacturer's name or trademark | GACIA | |
| | Type designation or serial number | PN630HE / 3P+N | |
| | Sample no: | #01C | |
| | Rated operational voltage: Ue (V) | 400 / 415 Vac | |
| | Rated current: In (A) | 630 A | |
| | Ambient temperature 10-40 °C : | 26,2 °C | P |
| | Value of the tripping current declared by the manufacturer for a single pole, at which value they shall operate. | Im | P |
| | Range of adjustable setting current. (A) | Im: 1,5Ir ~ 10Ir Ir: 0,90Io ~ 1Io Io: 0,40In ~ 1In | P |
| | Time delay stated by the manufacturer, in the case of definite time delay releases. | | N/A |
| | Electromagnetic overcurrent releases | | |
| | Test current: 80% of the rated, or minimum adjustable setting current: (A) | | N/A |
| | Operating time: >0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3: N-Lx: | | N/A |
| | Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3: N-Lx: | | N/A |
| | Test current: 120% of the rated, or minimum adjustable setting current: (A) | | N/A |

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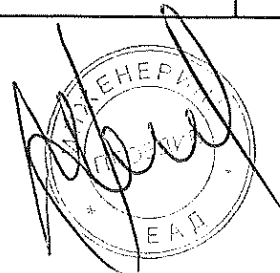
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| Clause | Requirement + Test | Result - Remark | Verdict |
| | Operating time: <0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3: N-Lx: | | N/A |
| | Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3: N-Lx: | | N/A |
| | Test current: 80% of the maximum adjustable setting current: (A) | | N/A |
| | Operating time: >0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3: N-Lx: | | N/A |
| | Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3: N-Lx: | | N/A |
| | Test current: 120% of the maximum adjustable setting current: (A) | | N/A |
| | Operating time: <0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3: N-Lx: | | N/A |
| | Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3: N-Lx: | | N/A |

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| Clause | Requirement + Test | Result - Remark | Verdict |
| | Test current: tripping current declared for single pole operation (A) | | N/A |
| | Operating time: < 0,2 s in case of instantaneous release: L1: L2: L3: N: | | N/A |
| | Operating time: < twice time delay stated by manufacturer in case of definite time delay releases L1: L2: L3: N: | | N/A |
| | Electronic overcurrent releases | | |
| | For circuit-breakers with an electronic overcurrent release, the operation of the short-circuit releases shall be verified by one test only on each pole individually. | | P |
| | Test current: 80% of the rated, or minimum adjustable setting current: (A) | 0,8 x 1,5 x 0,9 x 0,4 x I _n L1: 295 A L2: 290 A L3: 298 A | P |
| | Operating time: >0,2s in case of instantaneous releases: L1: L2: L3: N: | L1: 0,2 s non-tripping L2: 0,2 s non-tripping L3: 0,2 s non-tripping N: | P |
| | Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases: L1: L2: L3: N: | | N/A |
| | Test current: 120% of the rated, or minimum adjustable setting current: (A) | 1,2 x 1,5 x 0,9 x 0,4 x I _n L1: 396 A L2: 401 A L3: 400 A | P |

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| Clause | Requirement + Test | Result - Remark | Verdict |
| | Operating time: <0,2s in case of instantaneous releases: L1: L2: L3: N: | 101 ms 99 ms 103 ms | P |
| | Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases: L1: L2: L3: N: | | N/A |
| | Test current: 80% of the maximum adjustable setting current: (A) | 0,8 x 10 x 1 x 1 x In L1: 5190 A L2: 5240 A L3: 5200 A | P |
| | Operating time: >0,2s in case of instantaneous releases: L1: L2: L3: N: | 0,2 s non-tripping 0,2 s non-tripping 0,2 s non-tripping | P |
| | Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases: L1: L2: L3: N: | | N/A |
| | Test current: 120% of the maximum adjustable setting current: (A) | 1,2 x 10 x 1 x 1 x In L1: 7210 A L2: 7080 A L3: 7140 A | P |
| | Operating time: <0,2s in case of instantaneous releases: L1: L2: L3: N: | 43 ms 41 ms 49 ms | P |

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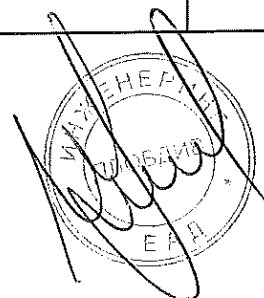
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| Clause | Requirement + Test | Result - Remark | Verdict |
| | Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases: L1: L2: L3: N: | | N/A |
| 8.3.3.1.3 | Opening under overload conditions | | |
| a) | Instantaneous or definite time-delay releases | | |
| | Manufacturer's name or trademark | | |
| | Type designation or serial number | | |
| | Sample no: | | |
| | Rated operational voltage: Ue (V) | | |
| | Rated current: In (A) | | |
| | Ambient temperature 10-40 °C : | | N/A |
| | Value of the tripping current declared by the manufacturer for a single pole, at which value they shall operate. | | N/A |
| | Range of adjustable setting current. (A) | | N/A |
| | Time delay stated by the manufacturer, in the case of definite time delay releases. | | N/A |
| | Test current: 90% of the rated, or minimum adjustable setting current: (A) | | N/A |
| | Operating time: >0,2s in case of instantaneous releases: | | N/A |
| | Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases. | | N/A |
| | Test current: 90% of the maximum adjustable setting current: (A) | | N/A |
| | Operating time: >0,2s in case of instantaneous releases | | N/A |
| | Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases. | | N/A |

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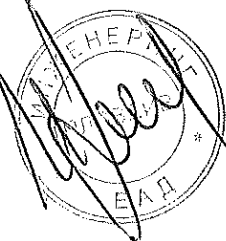
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| IEC 60947-2 | | | |
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| Clause | Requirement + Test | Result - Remark | Verdict |
| | Test current: 110% of the rated, or minimum adjustable setting current: (A) circuit-breaker with neutral pole: 1,2x110% (A) | | N/A |
| | Operating time: <0,2s in case of instantaneous releases: | | N/A |
| | Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases. | | N/A |
| | Test current: 110% of the maximum adjustable setting current: (A) circuit-breaker with neutral pole: 1,2x110% (A) | | N/A |
| | Operating time: <0,2s in case of instantaneous releases | | N/A |
| | Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases. | | N/A |
| b) | Inverse time delay releases | | |
| | Manufacturer's name or trademark | GACIA | |
| | Type designation or serial number | PN630HE / 3P+N | |
| | Sample no: | #01C | |
| | Rated operational voltage: Ue (V) | 400 / 415 Vac | |
| | Rated current: In (A) | 630 A | |
| | For releases dependent of ambient air temperature: Reference temperature | | N/A |
| | Test ambient temperature (°C) | 26,2 °C | P |
| | For releases dependent on ambient air temperature, the operating characteristics shall be verified at the reference temperature, the release being energized on all phase poles. If the test made at a different ambient temperature, a correction shall be made in accordance with the manufacturer's correction temperature/current data | | P |
| | For thermal-magnetic releases independent of ambient temperature: Tests shall be made at 30°C and 20°C or 40°C, the release being energized on all phase poles | | N/A |


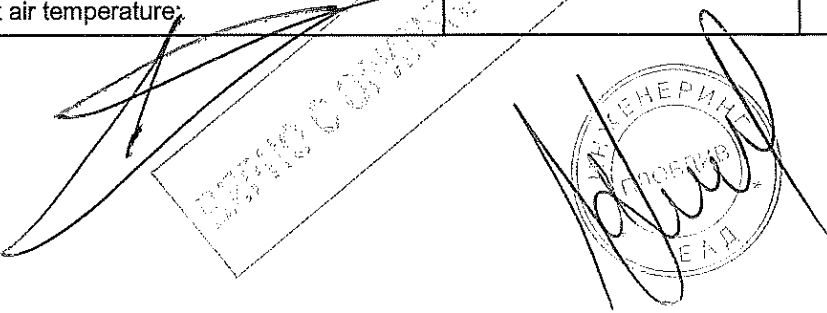
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ЗАЯВЛЕНИЕ
О ПРИЕМКЕ



| IEC 60947-2 | | | |
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| Clause | Requirement + Test | Result - Remark | Verdict |
| | For electronic releases, the operating characteristic shall be verified at the ambient temperature of the test room (see 6.1.1 of IEC 60947-1), the release being energised on all phase poles. | | P |
| | Test ambient air temperature: | 26,2 °C | P |
| | Range of adjustable setting current: (A) | I _r : 0,90I _o ~ 1I _o I _o : 0,40I _n ~ 1I _n | P |
| | Releases, dependent of ambient air temperature: Reference temperature (°C) | | N/A |
| | Thermal Magnetic releases, independent of ambient air temperature: at 30°C | | N/A |
| | Test current: 105% of the rated, or minimum adjustable setting current: (A) | 242 A (1,05 x 0,9 x 0,4 x I _n) | P |
| | Conventional non-tripping time: 1h when I _n < 63A, 2h when I _n > 63 A | 2 h non-tripping | P |
| | Test current: 130% of the rated, or minimum adjustable setting current: (A) | 299 A (1,3 x 0,9 x 0,4 x I _n) | P |
| | For circuit-breakers having an identified neutral pole provided with an overload release (see 8.3.3.1.1), the test current at the conventional tripping current shall be multiplied by the factor 1,2. | | N/A |
| | Conventional tripping time: <1h when I _n < 63A, <2h when I _n > 63 A | 2 min 06 s | P |
| | Test current: 105% of the maximum adjustable setting current: (A) | 672 A (1,05 x 1 x 1 x I _n) | P |
| | Conventional non-tripping time: 1h when I _n < 63A, 2h when I _n > 63 A | 2 h non-tripping | P |
| | Test current: 130% of the maximum adjustable setting current: (A) | 831 A (1,3 x 1 x 1 x I _n) | P |
| | For circuit-breakers having an identified neutral pole provided with an overload release (see 8.3.3.1.1), the test current at the conventional tripping current shall be multiplied by the factor 1,2. | | N/A |
| | Conventional tripping time: <1h when I _n < 63A, <2h when I _n > 63 A | 2 min 02 s | P |
| | Thermal Magnetic releases, independent of ambient air temperature: at 20°C or 40°C | | |
| | Test ambient air temperature: | | N/A |

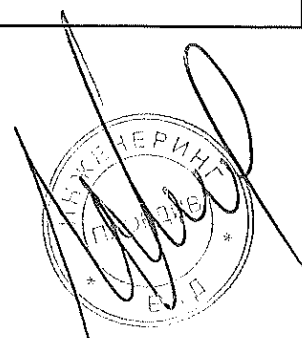
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| Clause | Requirement + Test | Result - Remark | Verdict |
| | Test current: 105% of the rated, or minimum adjustable setting current: (A) | | N/A |
| | Conventional non-tripping time: 1h when $I_n < 63A$, 2h when $I_n > 63 A$ | | N/A |
| | Test current: 130% of the rated, or minimum adjustable setting current: (A) | | N/A |
| | For circuit-breakers having an identified neutral pole provided with an overload release (see 8.3.3.1.1), the test current at the conventional tripping current shall be multiplied by the factor 1,2. | | N/A |
| | Conventional tripping time: <1h when $I_n < 63A$, <2h when $I_n > 63 A$ | | N/A |
| | Test current: 105% of the maximum adjustable setting current: (A) | | N/A |
| | Conventional non-tripping time: 1h when $I_n < 63A$, 2h when $I_n > 63 A$ | | N/A |
| | Test current: 130% of the maximum adjustable setting current: (A) | | N/A |
| | For circuit-breakers having an identified neutral pole provided with an overload release (see 8.3.3.1.1), the test current at the conventional tripping current shall be multiplied by the factor 1,2. | | N/A |
| | Conventional tripping time: <1h when $I_n < 63A$, <2h when $I_n > 63 A$ | | N/A |
| | An additional test, at a current specified by the manufacturer to verify the time/current characteristic of the releases conform to the curves provided by the manufacturer | | |
| | Releases, dependent of ambient air temperature: Reference temperature (°C) | | N/A |
| | Releases, independent of ambient air temperature: at 30°C | | N/A |
| | Test ambient air temperature: | 26,2 °C | P |
| | Test current: at current specified by the manufacturer to verify the time/current characteristic of the releases conform to the curves provided by the manufacturer. % at the rated, or minimum adjustable setting current: (% or A) | 460 A (2 x 0,9 x 0,4 x I_n) | P |

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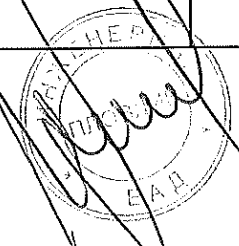
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| Clause | Requirement + Test | Result - Remark | Verdict |
| | Tripping time acc. time/current characteristic of the releases conform to the curves provided by the manufacturer. (within the stated tolerances) | 55 s Tripping time specified by the manufacturer: $45 \text{ s} \leq t \leq 160 \text{ s}$ | P |
| | Test current: at current specified by the manufacturer to verify the time/current characteristic of the releases conform to the curves provided by the manufacturer. % at the maximum adjustable setting current: (% or A) | 1278 A (2 x 1 x 1 x I _n) | P |
| | Tripping time acc. time/current characteristic of the releases conform to the curves provided by the manufacturer. (within the stated tolerances) | 52 s Tripping time specified by the manufacturer: $45 \text{ s} \leq t \leq 160 \text{ s}$ | P |
| | Releases, independent of ambient air temperature: at 20°C or 40°C | | |
| | Test ambient air temperature: | | N/A |
| | Test current: at current specified by the manufacturer to verify the time/current characteristic of the releases conform to the curves provided by the manufacturer. % at the rated, or minimum adjustable setting current: (% or A) | | N/A |
| | Tripping time acc. time/current characteristic of the releases conform to the curves provided by the manufacturer. (within the stated tolerances) | | N/A |
| 8.3.3.1.4 | Additional test for definite time-delay releases | | |
| a) | Time delay | | |
| | Test is made at a current equal to 1,5 times the current setting. If the test current overlaps with another tripping characteristic (e.g. an instantaneous tripping characteristic), the trip setting and the test current shall be reduced as necessary to prevent premature tripping. | | |
| | <u>overload releases:</u> (all phase poles loaded) | | N/A |
| | for circuit-breakers having an identified neutral pole provided with an <u>overload</u> release, the test current for this release shall be 1,5 times the current setting; | | N/A |
| | <u>short circuit releases</u> | | N/A |
| | Electromagnetic release: two poles in series carrying the test current, using successively all possible combinations of poles having a short-circuit release. | | N/A |

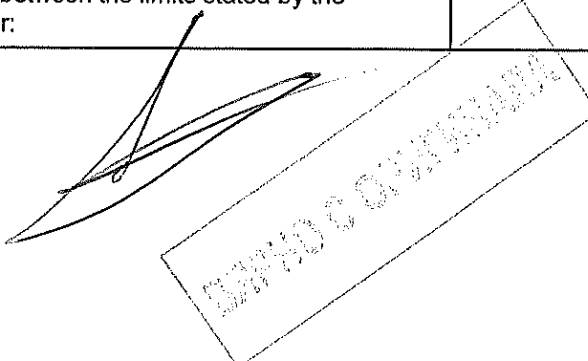
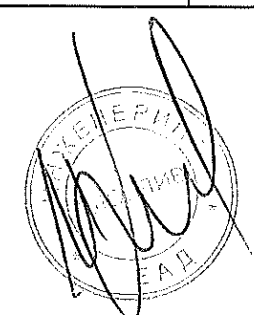
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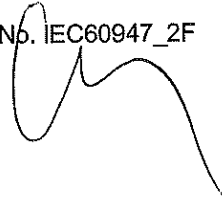
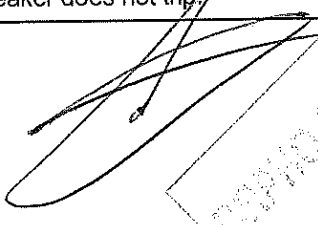
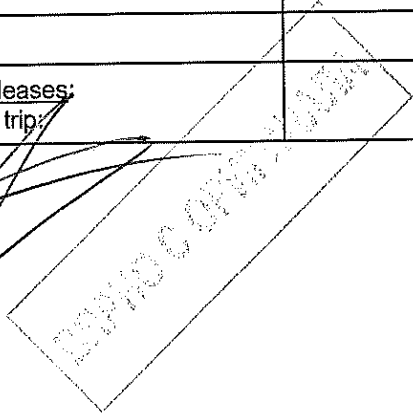
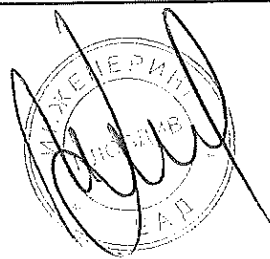
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| Clause | Requirement + Test | Result - Remark | Verdict |
| | Electronic releases: on one pole chosen at random. | | N/A |
| | Test current: 1,5 times of the rated, or minimum adjustable setting current: (A) | | N/A |
| | Operating time, <u>overload releases</u> : (s) | | N/A |
| | Time-delay: between the limits stated by the manufacturer: | | N/A |
| | Operating time, <u>short-circuit releases</u> (electromagnetic): (s) L1-L2: L1-L3: L2-L3: | | N/A |
| | Time-delay: between the limits stated by the manufacturer: | | N/A |
| | Operating time, <u>short-circuit releases</u> (electronic): (s) L1: L2: L3: | | N/A |
| | Time-delay: between the limits stated by the manufacturer: | | N/A |
| | Test current: 1,5 times of the maximum adjustable setting current: (A) | | N/A |
| | Operating time, <u>overload releases</u> : (s) | | N/A |
| | Time-delay: between the limits stated by the manufacturer: | | N/A |
| | Operating time, <u>short-circuit releases</u> (electromagnetic): (s) L1-L2: L1-L3: L2-L3: | | N/A |
| | Time-delay: between the limits stated by the manufacturer: | | N/A |

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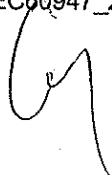
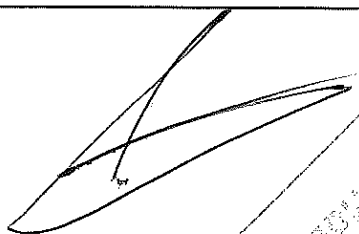
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| Clause | Requirement + Test | Result - Remark | Verdict |
| | Operating time, <u>short-circuit releases (electronic): (s)</u> L1: L2: L3: | | N/A |
| | Time-delay: between the limits stated by the manufacturer: | | N/A |
| b) | Non-tripping duration | | |
| | Firstly, the test current equal to 1,5 times the current setting is maintained for a time interval equal to the non-tripping duration stated by the manufacturer. | | |
| | Then, the current is reduced to the rated current and maintained at this value for twice the time-delay stated by the manufacturer. The circuit-breaker shall not trip. | | |
| | <u>overload releases: (all phase poles loaded)</u> | | N/A |
| | for circuit-breakers having an identified neutral pole provided with an overload release, the test current for this release shall be 1,5 times the current setting; | | N/A |
| | <u>short-circuit releases</u> | | N/A |
| | Electromagnetic release: two poles in series carrying the test current, using successively all possible combinations of poles having a short-circuit release. | | N/A |
| | Electronic releases: on one pole chosen at random. | | N/A |
| | Test current: 1,5 times of the minimum adjustable setting current: (A) | | N/A |
| | non-tripping duration stated by the manufacturer for overload release: (s) | | N/A |
| | non-tripping duration stated by the manufacturer for short-circuit release thermal magnetic: (s) | | N/A |
| | non-tripping duration stated by the manufacturer for short-circuit release electronic: (s) | | N/A |
| | Time duration of current when reduced to the rated current: shall be twice the delay-time stated by the manufacturer: (s) | | N/A |
| | Rated current | | N/A |
| | Operating time, <u>overload releases:</u> the circuit-breaker does not trip: | | N/A |

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| Clause | Requirement + Test | Result - Remark | Verdict |
| | Operating time, <u>short-circuit releases (electromagnetic), shall not trip:</u> (s) L1-L2: L1-L3: L2-L3: | | N/A |
| | Operating time, <u>short-circuit releases (electronic), shall not trip:</u> (s) L1: L2: L3: | | N/A |
| | Test current: 1,5 times of maximum adjustable setting current: (A) | | N/A |
| | non-tripping duration stated by the manufacturer for overload release: (s) | | N/A |
| | non-tripping duration stated by the manufacturer for short-circuit release thermal magnetic: (s) | | N/A |
| | non-tripping duration stated by the manufacturer for short-circuit release electronic: (s) | | N/A |
| | Time duration of current when reduced to the rated current: shall be twice the delay-time stated by the manufacturer: (s) | | N/A |
| | Rated current | | N/A |
| | Operating time, <u>overload releases:</u> the circuit-breaker does not trip: | | N/A |
| | Operating time, <u>short-circuit releases (electromagnetic), shall not trip:</u> (s) L1-L2: L1-L3: L2-L3: | | N/A |
| | Operating time, <u>short-circuit releases (electronic), shall not trip:</u> (s) L1: L2: L3: | | N/A |

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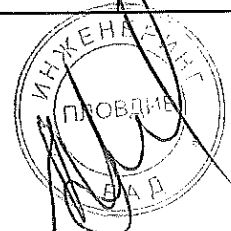


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| Clause | Requirement + Test | Result - Remark | Verdict |
| 8.3.3.2 | Test of dielectric properties, impulse withstand voltage (Uimp indicated): | | |
| 8.3.3.4 part1 | The 1,2/50µs impulse voltage shall be applied five times for each polarity at intervals of 1s minimum | | |
| | - rated impulse withstand voltage (kV) : | 8 kV | P |
| | - sea level of the laboratory: | Sea level | P |
| | - test Uimp main circuits (kV) : | 9,8 kV | P |
| | - test Uimp auxiliary circuits (kV) : | | N/A |
| | - test Uimp control circuits (kV) : | | N/A |
| | - test Uimp on open main contacts (equipment suitable for isolating) (kV) : | 12,3 kV | P |
| a) | Application of test voltage | | P |
| | i) Between all terminals of the main circuit connected together (incl. control and auxiliary circuits connected to the main circuit) and the enclosure or mounting plate, with the contacts in all normal positions of operation. | | P |
| | ii) Between each pole of the main circuit and the other poles connected together and to the enclosure or mounting plate, with the contacts in all normal positions of operation. | | P |
| | iii) Between each control and auxiliary circuit not normally connected to the main circuit and: | | N/A |
| | - the main circuit | | |
| | - other circuits | | N/A |
| | - exposed conductive parts | | N/A |
| | - enclosure of mounting plate | | N/A |
| | iv) equipment suitable for isolation | | P |
| | equipment not suitable for isolation | | N/A |
| | - no unintentional disruptive discharge during the test's | | P |
| | Test of dielectric properties, dielectric withstand voltage (Uimp not indicated): | | |
| | - rated insulation voltage (V) : | 750 V | P |
| | - main circuits, test voltage for 1 min (V) | 2000 V, 5 s | P |
| | - auxiliary circuits, test voltage for 1 min (V) | | N/A |

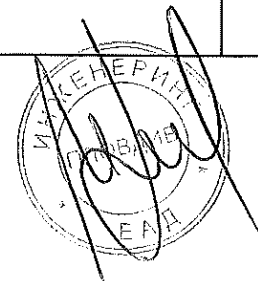
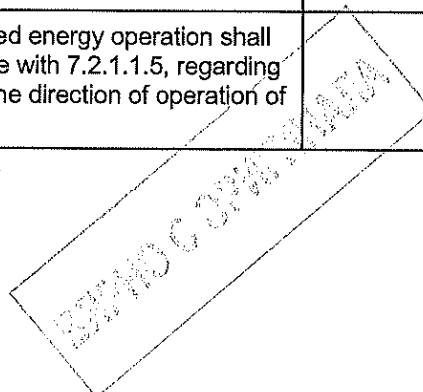
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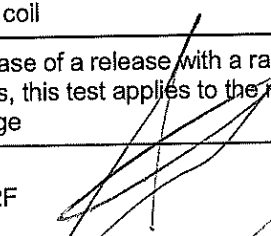
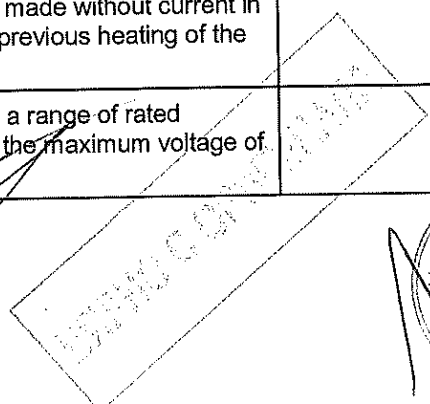
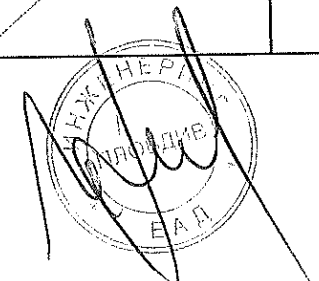



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| Clause | Requirement + Test | Result - Remark | Verdict |
| | - control circuits, test voltage for 1 min (V) | | N/A |
| 8.3.3.2.2 | Application of test voltage | | |
| 1) | with circuit-breaker in the closed position | | |
| | - between all live parts of all poles connected together and the frame of the circuit-breaker . | | P |
| | - between each pole and all the other poles connected to the frame of the circuit-breaker | | P |
| 2) | with the circuit-breaker in the open position and, additionally, in the tripped position, if any. | | P |
| | - between all live parts of all poles connected together and the frame of the circuit-breaker. | | P |
| | - between the terminals of one side connected together and the terminals of the other side connected together. | | P |
| b) | Control and auxiliary circuits | | |
| 1) | - between all the control and auxiliary circuits which are not normally connected to the main circuit, connected together, and the frame of the circuit-breaker. | | N/A |
| 2) | - where appropriate, between each part of the control an auxiliary circuits which may be isolated from the other parts during normal operation and all the other parts connected together. | | N/A |
| | No unintentional disruptive discharge during the tests | | P |
| 8.3.3.2 | For circuit-breaker suitable for isolation, the leakage current shall be measured through each pole with the contacts in the open position, at a test voltage of 1,1 Ue, and shall not exceed 0,5mA. | L1: 0,025 mA L2: 0,024 mA L3: 0,021 mA N: 0,027 mA | P |
| 8.3.3.3 | Mechanical operation and operational performance capability | | |
| 8.3.3.3.2 | Construction and mechanical operation | | |
| a) | Construction | | |
| | A withdrawable circuit-breaker shall be checked for the requirements stated in 7.1.1 | | N/A |
| | A circuit-breaker with stored energy operation shall be checked for compliance with 7.2.1.1.5, regarding the charge indicator and the direction of operation of manual energy storing | | N/A |



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| Clause | Requirement + Test | Result - Remark | Verdict |
| b) | Mechanical operation | | |
| | A circuit-breaker with dependent power operation shall comply with the requirements stated in 7.2.1.1.3 | | N/A |
| | A circuit-breaker with dependent power operation shall operate with the operating mechanism charged to the minimum and maximum limits stated by the manufacturer | | N/A |
| | A circuit-breaker with stored energy operation shall comply with the requirements stated in 7.2.1.5 with the auxiliary supply voltage at 85% and 110% of the rated control supply voltage. | | N/A |
| | It shall also be verified that the moving contacts cannot be moved from the open position when the operating mechanism is charged to slightly below the full charge as evidenced by the indicating device | | N/A |
| | For a trip-free circuit-breaker it shall not be possible to maintain the contacts in the touching or closed position when the tripping release is in the position to trip the circuit-breaker | | P |
| | If the closing and opening times of a circuit-breaker are stated by the manufacturer, such times shall comply with the stated values | | N/A |
| c) | Undervoltage releases | | |
| | Undervoltage releases shall comply with the requirements of 7.2.1.3 of Part 1. For this purpose, the release shall be fitted to a circuit-breaker having the maximum current rating for which the release is suitable | | N/A |
| i) | Drop out voltage | | |
| | It shall be verified that the release operates to open the circuit-breaker between the voltage limits specified | | N/A |
| | The voltage shall be reduced from rated voltage at a rate to reach 0 V in approximately 30 s | | N/A |
| | The test for the lower limit is made without current in the main circuit and without previous heating of the release coil | | N/A |
| | In the case of a release with a range of rated voltages, this test applies to the maximum voltage of the range | | N/A |

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| Clause | Requirement + Test | Result - Remark | Verdict |
| | The test for the upper limit is made starting from a constant temperature corresponding to the application of rated control supply voltage to the release and rated current in the main poles of the circuit-breaker | | N/A |
| | This test may be combined with the temperature-rise test of 8.3.3.6 | | N/A |
| | In the case of a release with a range of rated voltages, this test is made at both the minimum and maximum rated control supply voltages | | N/A |
| ii) | Test for limits of operation | | |
| | Starting with the circuit-breaker open, at the temperature of the test room, and with the supply voltage at 30% rated maximum control supply voltage, it shall be verified that the circuit-breaker cannot be closed by the operation of the actuator | | N/A |
| | When the supply voltage is raised to 85% of the minimum control supply voltage, it shall be verified that the circuit-breaker can be closed by the operation of the actuator | | N/A |
| iii) | Performance under overvoltage conditions | | |
| | With the circuit-breaker closed and without current in the main circuit, it shall be verified that the undervoltage release will withstand the application of 110% rated control supply voltage for 4 h without impairing its functions | | N/A |
| d) | Shunt releases | | |
| | Shunt releases shall comply with the requirements of 7.2.1.4 of Part 1. For this purpose, the release shall be fitted to a circuit-breaker having the maximum rated current for which the release is suitable | | N/A |
| | It shall be verified that the release will operate to open the circuit-breaker at 70% rated control supply voltage when tested at an ambient temperature of $+55\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ without current in the main poles of the circuit-breaker | | N/A |
| | In the case of a release having a range of rated control supply voltages, the test voltage shall be 70% of the minimum rated control supply voltage | | N/A |

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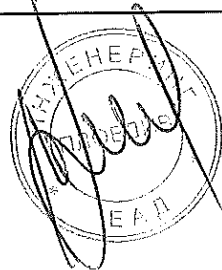


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| Clause | Requirement + Test | Result - Remark | Verdict |
| 8.3.3.3.3 | Operational performance capability without current. | | |
| | Type designation or serial number | PN630HE / 3P+N | |
| | Sample no: | #01C | |
| | Rated current In (A) | 630 A | |
| | Rated operational voltage: Ue (V) | 400 / 415 Vac | |
| | Rated control supply voltage of closing mechanism: Uc (V) | No electric closing mechanism | |
| | Rated control supply voltage of shunt releases: Uc (V) | No shunt releases | |
| | Rated control supply voltage undervoltage releases: Uc (V) | No undervoltage releases | |
| | Ambient temperature 10-40 °C : | 25,9 °C | P |
| | Number of operating cycles per hour | 60 cycles per hour | P |
| | Number of cycles without current (total) (closing mechanism energized at the rated Uc) | 4000 cycles | P |
| | Number of cycles without current (without releases) | 4000 cycles | P |
| | Applied voltage: closing mechanism (V) | | N/A |
| | 10% of total cycles for circuit-breaker with fitted shunt release: (50% at the beginning- and 50% at the end of the test.) Energized at the rated Uc | | N/A |
| | Applied voltage: shunt releases (V) | | N/A |
| | 10% of total cycles for circuit-breaker with undervoltage releases: (50% at the beginning- and 50% at the end of the test.) Energized at the minimum rated Uc | | N/A |
| | 10 cycles without applied voltage at the undervoltage releases. (Shall not possible to close the circuit-breaker.) | | N/A |
| | Applied voltage: undervoltage releases (V) | | N/A |
| | Electrical components do not exceed the value indicated in tab. 7. | | P |

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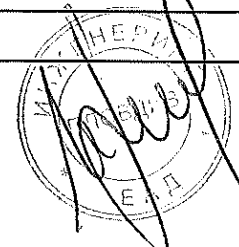
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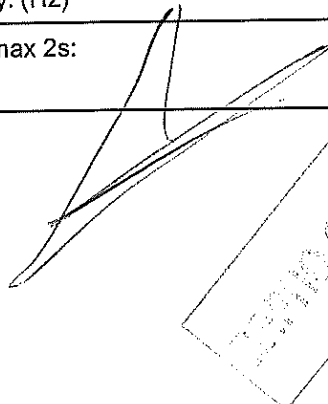
| IEC 60947-2 | | | |
|-------------|--|---|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 8.3.3.3.4 | Operational performance capability with current. | | |
| | Rated current: In (A) | 630 A | |
| | Maximum rated operational voltage: Ue (V) | 415 Vac | |
| | Conductor cross-sectional area (mm ²) : | 2 x 185 mm ² | P |
| | Number of operating cycles per hour | 60 cycles per hour | P |
| | Number of cycles with current (total) (closing mechanism energized at the rated U _c) | 1000 cycles (no electric closing mechanism) | P |
| | Applied voltage: closing mechanism (V) | | N/A |
| | For circuit-breaker fitted with adjustable releases, test shall be made with the overload setting at maximum and short-circuit setting at minimum. | | N/A |
| | Conditions, make/break operations: | | P |
| | - test voltage U/U _e = 1,0 (V)L1-L2:L2-L3:L3-L1: | 421,0 Vac 420,5 Vac 420,6 Vac | P |
| | - test current I/I _e = 1,0 (A) L1: L2: L3: | 657,2 A 653,6 A 659,0 A | P |
| | - power factor/time constant: | 0,84 | P |
| | - frequency: (Hz) | 50 Hz | P |
| | - on-time (ms): | Min. 714,3 ms | P |
| | - off-time (s): | Max. 59,3 s | P |
| | Electrical components do not exceed the value indicated in tab. 7. | | P |
| 8.3.3.3.5 | Additional test of operational performance capability without current for withdrawable circuit-breaker. | | |
| | Number of operations cycles : 100 | | N/A |
| | After test, the isolating contacts, withdrawable mechanism and interlocks shall be suitable for further service. | | N/A |
| 8.3.3.4 | Overload performance | | |
| | this test applies to circuit-breaker of rated current up to and including 630 A | | |
| | Type designation or serial number | PN630HE / 3P+N | |
| | Sample no: | #01C | |

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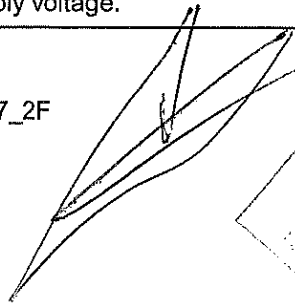
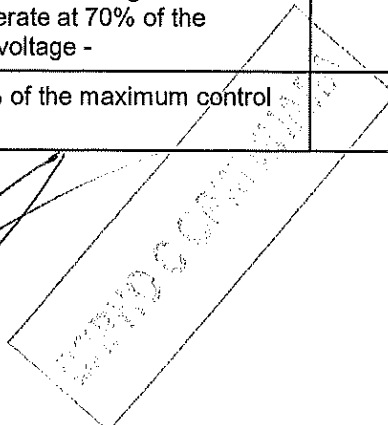
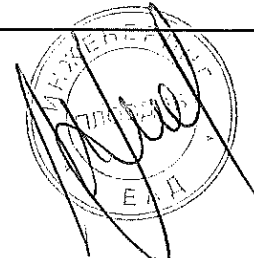


| IEC 60947-2 | | | |
|-------------|--|---|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | Rated current I_n (A) | 630 A | |
| | Rated operational voltage: U_e (V) | 400 / 415 Vac | |
| | Rated control supply voltage of closing mechanism: U_c (V) | No electric closing mechanism | |
| | Rated control supply voltage of shunt releases: U_c (V) | No shunt releases | |
| | Rated control supply voltage undervoltage releases: U_c (V) | No undervoltage releases | |
| | Ambient temperature 10-40 °C : | 26,3 °C | P |
| | Number of operating cycles per hour | 60 cycles per hour | P |
| | Maximum rated operational voltage: U_e (V) | 415 Vac | P |
| | Number of operating cycles per hour | 60 cycles per hour | P |
| | Number of cycles with current (total) (closing mechanism energized at the rated U_c) | 15 cycles (no electric closing mechanism) | P |
| | Applied voltage: closing mechanism (V) | | N/A |
| | For circuit-breaker fitted with adjustable releases, test shall be made with the overload/short-circuit settings at maximum. | | N/A |
| | Conditions, overload operations: | | P |
| | - test voltage $U/U_e = 1,05$ (V)L1-L2:L2-L3:L3-L1: | 437,1 Vac 436,6 Vac 436,4 Vac | P |
| | - test current AC/DC: $I/I_e = 6,0/2,5$ (A) L1: L2: L3: | 3794 A 3771 A 3789 A | P |
| | - power factor/time constant: | 0,49 | P |
| | - Number of cycles manually opened: 9 | 12 manual operations | P |
| | - Number of cycles automatically opened by an overload release: 3 | 3 (at convenient voltage) | P |
| | - frequency: (Hz) | 50 Hz | P |
| | - on-time max 2s: | Min. 235,5 ms Max. 247,4 ms | P |

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|-------------|--|---|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 8.3.3.5 | Verification of dielectric withstand | | |
| | - equal to twice the rated operational voltage with a minimum of 1000 V for 5 seconds | 1000 V, 5 s | P |
| | - no breakdown or flashover | See appended table 5 | P |
| | For circuit-breaker suitable for isolation, the leakage current shall be measured through each pole with the contacts in the open position, at a test voltage of 1,1 U _e , and shall not exceed 2 mA. | L1: 0,024 mA L2: 0,026 mA L3: 0,028 mA N: 0.023 mA | P |
| 8.3.3.6 | Verification of temperature-rise | | |
| | - the values of temperature-rise do not exceed those specified in tab. 7. | See appended table 1 All phase poles are loaded | P |
| | Temperature rise of main circuit terminals ≤ 80 K (K) : | Max:79 K | P |
| | conductor cross-sectional area (mm ²) : | 2 x 185 mm ² | P |
| | test current I _e (A) : | 630 A | P |
| 8.3.3.6 | Verification of temperature-rise | | |
| | - the values of temperature-rise do not exceed those specified in tab. 7. | See appended table 2 N pole and adjacent phase pole are loaded | P |
| | Temperature rise of main circuit terminals ≤ 80 K (K) : | Max: 48 K | P |
| | conductor cross-sectional area (mm ²) : | 2 x 150 mm ² | P |
| | test current I _e (A) : | 441 A | P |
| 8.3.3.7 | Verification of overload releases | | |
| | Test current: 1.45 times the value of their current setting at the reference temperature: (A) | 922 A (1,45 x 1 x 1 x In) | P |
| | Conventional tripping time: <1h when I _n < 63A, <2h when I _n > 63 A | 1 min 51 s | P |
| 8.3.3.8 | Verification of undervoltage and shunt releases | | |
| | Circuit-breaker fitted with undervoltage releases. The release shall not operate at 70% of the minimum control supply voltage - | | N/A |
| | and shall operate at 35% of the maximum control supply voltage. | | N/A |

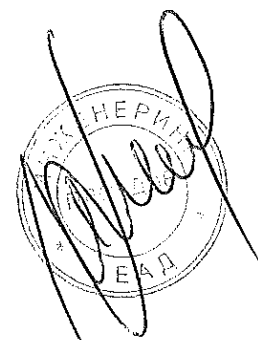





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| Clause | Requirement + Test | Result - Remark | Verdict |
| | Circuit-breaker fitted with shunt releases. The release shall operate at 70% of the minimum rated control supply voltage. Test made at room temperature. | | N/A |
| 8.3.3.9 | Verification of the main contact position for circuit-breakers for isolation | | P |
| | actuating force for opening (N) : | 164 N | — |
| | test force with blocked main contacts for 10 s (N) : | 400 N for 10 s | — |
| | Dependent power operation | | N/A |
| | Supply voltage of 110% of rated voltage (V).....: | | N/A |
| | Three attempts of 5 s to operate the equipment at intervals of 5 min. | | N/A |
| | Independent power operation | | N/A |
| | Three attempts to operate the equipment by the stored energy. | | N/A |
| | Lock ability of driving mechanism in OFF-position at test force and blocked main contacts : | | N/A |
| | Position indicator does not show OFF-position after capture of test force at blocked main contacts | | P |

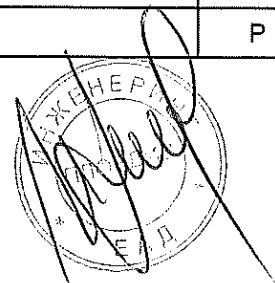
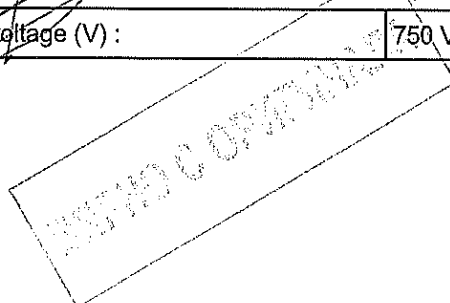
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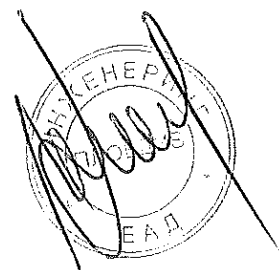
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| Clause | Requirement + Test | Result - Remark | Verdict |
| 8.3.3 | TEST SEQUENCE I: GENERAL PERFORMANCE CHARACTERISTICS | | |
| 8.3.3.1 | Tripping limits and characteristic | | N/A |
| 8.3.3.2 | Test of dielectric properties, impulse withstand voltage (Uimp indicated): | | |
| 8.3.3.4 part1 | The 1,2/50µs impulse voltage shall be applied five times for each polarity at intervals of 1s minimum | | |
| | - rated impulse withstand voltage (kV) : | 8 kV | P |
| | - sea level of the laboratory: | Sea level | P |
| | - test Uimp main circuits (kV) : | 9,8 kV | P |
| | - test Uimp auxiliary circuits (kV) : | | N/A |
| | - test Uimp control circuits (kV) : | | N/A |
| | - test Uimp on open main contacts (equipment suitable for isolating) (kV) : | 12,3 kV | P |
| a) | Application of test voltage | | P |
| | i) Between all terminals of the main circuit connected together (incl. control and auxiliary circuits connected to the main circuit) and the enclosure or mounting plate, with the contacts in all normal positions of operation. | | P |
| | ii) Between each pole of the main circuit and the other poles connected together and to the enclosure or mounting plate, with the contacts in all normal positions of operation. | | P |
| | iii) Between each control and auxiliary circuit not normally connected to the main circuit and: | | N/A |
| | - the main circuit | | |
| | - other circuits | | N/A |
| | - exposed conductive parts | | N/A |
| | - enclosure of mounting plate | | N/A |
| | iv) equipment suitable for isolation | | P |
| | equipment not suitable for isolation | | N/A |
| | - no unintentional disruptive discharge during the test's | | P |
| | Test of dielectric properties, dielectric withstand voltage (Uimp not indicated): | | |
| | - rated insulation voltage (V) : | 750 V | P |



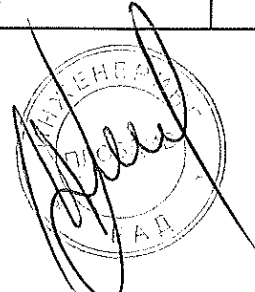
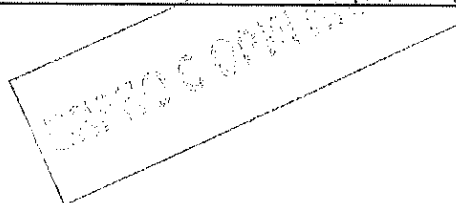
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|-------------|--|--|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | - main circuits, test voltage for 1 min (V) | 2000 V, 5 s | P |
| | - auxiliary circuits, test voltage for 1 min (V) | | N/A |
| | - control circuits, test voltage for 1 min (V) | | N/A |
| 8.3.3.2.2 | Application of test voltage | | |
| 1) | with circuit-breaker in the closed position | | |
| | - between all live parts of all poles connected together and the frame of the circuit-breaker . | | P |
| | - between each pole and all the other poles connected to the frame of the circuit-breaker | | P |
| 2) | with the circuit-breaker in the open position and, additionally, in the tripped position, if any. | | P |
| | - between all live parts of all poles connected together and the frame of the circuit-breaker. | | P |
| | - between the terminals of one side connected together and the terminals of the other side connected together. | | P |
| b) | Control and auxiliary circuits | | |
| 1) | - between all the control and auxiliary circuits which are not normally connected to the main circuit, connected together, and the frame of the circuit-breaker. | | N/A |
| 2) | - where appropriate, between each part of the control an auxiliary circuits which may be isolated from the other parts during normal operation and all the other parts connected together. | | N/A |
| | No unintentional disruptive discharge during the tests | | P |
| 8.3.3.2 | For circuit-breaker suitable for isolation, the leakage current shall be measured through each pole with the contacts in the open position, at a test voltage of 1,1 Ue, and shall not exceed 0,5mA. | L1: 0,026 mA L2: 0,024 mA L3: 0,021 mA | P |
| 8.3.3.3 | Mechanical operation and operational performance capability | | |
| 8.3.3.3.2 | Construction and mechanical operation | | N/A |
| 8.3.3.3.3 | Operational performance capability without current. | | |
| | Type designation or serial number | PN630HE / 3P | |
| | Sample no: | #02B | |

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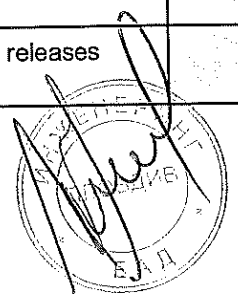
| IEC 60947-2 | | | |
|-------------|---|-------------------------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | Rated current In (A) | 630 A | |
| | Rated operational voltage: Ue (V) | 400 / 415 Vac | |
| | Rated control supply voltage of closing mechanism: Uc (V) | No electric closing mechanism | |
| | Rated control supply voltage of shunt releases: Uc (V) | No shunt releases | |
| | Rated control supply voltage undervoltage releases: Uc (V) | No undervoltage releases | |
| | Ambient temperature 10-40 °C : | 23,0 °C | P |
| | Number of operating cycles per hour | 60 cycles per hour | P |
| | Number of cycles without current (total) (closing mechanism energized at the rated Uc) | 4000 cycles | P |
| | Number of cycles without current (without releases) | 4000 cycles | P |
| | Applied voltage: closing mechanism (V) | | N/A |
| | 10% of total cycles for circuit-breaker with fitted shunt release: (50% at the beginning- and 50% at the end of the test.) Energized at the rated Uc | | N/A |
| | Applied voltage: shunt releases (V) | | N/A |
| | 10% of total cycles for circuit-breaker with undervoltage releases: (50% at the beginning- and 50% at the end of the test.) Energized at the minimum rated Uc | | N/A |
| | 10 cycles without applied voltage at the undervoltage releases. (Shall not possible to close the circuit-breaker.) | | N/A |
| | Applied voltage: undervoltage releases (V) | | N/A |
| | Electrical components do not exceed the value indicated in tab. 7. | | P |
| 8.3.3.3.4 | Operational performance capability with current. | | |
| | Rated current: In (A) | 630 A | |
| | Maximum rated operational voltage: Ue (V) | 415 Vac | |
| | Conductor cross-sectional area (mm ²) : | 2 x 185 mm ² | P |



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|-------------|--|---|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | Number of operating cycles per hour | 60 cycles per hour | P |
| | Number of cycles with current (total) (closing mechanism energized at the rated U _c) | 1000 cycles (no electric closing mechanism) | P |
| | Applied voltage: closing mechanism (V) | | N/A |
| | For circuit-breaker fitted with adjustable releases, test shall be made with the overload setting at maximum and short-circuit setting at minimum. | | N/A |
| | Conditions, make/break operations: | | P |
| | - test voltage U/U _e = 1,0 (V) L1-L2: L2-L3: L3-L1: | 422,0 Vac 421,1 Vac 421,4 Vac | P |
| | - test current I/I _e = 1,0 (A) L1: L2: L3: | 655,9 A 660,1 A 661,0 A | P |
| | - power factor/time constant: | 0,75 | P |
| | - frequency: (Hz) | 50 Hz | P |
| | - on-time (ms): | Min. 1075 ms | P |
| | - off-time (s): | Max. 59 s | P |
| | Electrical components do not exceed the value indicated in tab. 7. | | P |
| 8.3.3.3.5 | Additional test of operational performance capability without current for withdrawable circuit-breaker. | | N/A |
| 8.3.3.4 | Overload performance | | |
| | this test applies to circuit-breaker of rated current up to and including 630 A | | |
| | Type designation or serial number | PN630HE / 3P | |
| | Sample no: | #02B | |
| | Rated current I _n (A) | 630 A | |
| | Rated operational voltage: U _e (V) | 400 / 415 Vac | |
| | Rated control supply voltage of closing mechanism: U _c (V) | No electric closing mechanism | |
| | Rated control supply voltage of shunt releases: U _c (V) | No shunt releases | |
| | Rated control supply voltage undervoltage releases: U _c (V) | No undervoltage releases | |

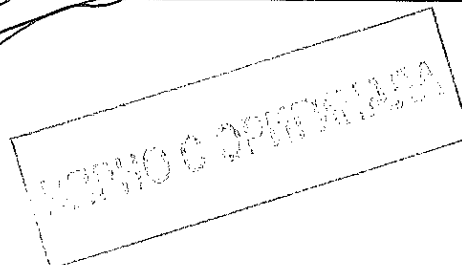


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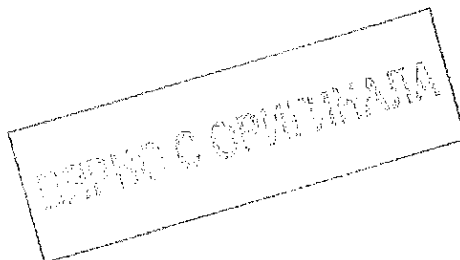
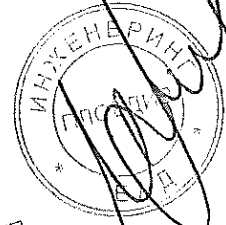
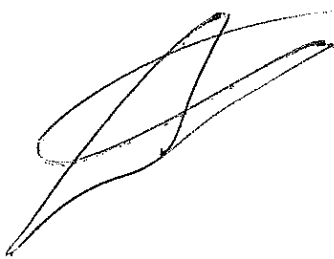


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| Clause | Requirement + Test | Result - Remark | Verdict |
| | Ambient temperature 10-40 °C : | 23,5 °C | P |
| | Number of operating cycles per hour | 60 cycles per hour | P |
| | Maximum rated operational voltage: Ue (V) | 415 Vac | P |
| | Number of operating cycles per hour | 60 cycles per hour | P |
| | Number of cycles with current (total) (closing mechanism energized at the rated Uc) | 15 cycles (no electric closing mechanism) | P |
| | Applied voltage: closing mechanism (V) | | N/A |
| | For circuit-breaker fitted with adjustable releases, test shall be made with the overload/short-circuit settings at maximum. | | N/A |
| | Conditions, overload operations: | | P |
| | - test voltage U/Ue = 1,05 (V)L1-L2:L2-L3:L3-L1: | 437,2 Vac 436,7 Vac 436,5 Vac | P |
| | - test current AC/DC: I/Ie = 6,0/2.5 (A) L1: L2: L3: | 3789 A 3792 A 3784 A | P |
| | - power factor/time constant: | 0,54 | P |
| | - Number of cycles manually opened: 9 | 12 manual operations | P |
| | - Number of cycles automatically opened by an overload release: 3 | 3 (at convenient voltage) | P |
| | - frequency: (Hz) | 50 Hz | P |
| | - on-time max 2s: | Min. 352,6 ms Max. 371,2 ms | P |
| 8.3.3.5 | Verification of dielectric withstand | | |
| | - equal to twice the rated operational voltage with a minimum of 1000 V for 5 seconds | 1000 V, 5 s | P |
| | - no breakdown or flashover | See appended table 5 | P |
| | For circuit-breaker suitable for isolation, the leakage current shall be measured through each pole with the contacts in the open position, at a test voltage of 1,1 Ue, and shall not exceed 2 mA. | L1: 0,028 mA L2: 0,027 mA L3: 0,025 mA | P |

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|-------------|--|-------------------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 8.3.3.6 | Verification of temperature-rise | | |
| | - the values of temperature-rise do not exceed those specified in tab. 7. | See appended table 3 | P |
| | Temperature rise of main circuit terminals ≤ 80 K (K): | Max: 78 K | P |
| | conductor cross-sectional area (mm ²): | 2 x 185 mm ² | P |
| | test current I _e (A): | 632 A | P |
| 8.3.3.7 | Verification of overload releases | | N/A |
| 8.3.3.8 | Verification of undervoltage and shunt releases | | N/A |
| 8.3.3.9 | Verification of the main contact position for circuit-breakers for isolation | | N/A |

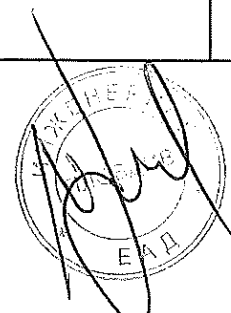



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| Clause | Requirement + Test | Result - Remark | Verdict |
| 8.3.4 | TEST SEQUENCE II (Ics): | | |
| 8.3.4.1 | Test of rated service short-circuit breaking capacity | | |
| | Test sequence of operation: O – t – CO – t – CO | | |
| | Type designation or serial number | PN630HE / 3P+N | |
| | Sample no: | #03B | |
| | Rated current: In (A) | 630 A | |
| | Rated operational voltage: Ue (V) | 400 / 415 Vac | |
| | Rated service short-circuit breaking capacity: (kA) | 53 kA | |
| | Rated control supply voltage of closing mechanism: Uc (V) | No electric closing mechanism | |
| | Rated control supply voltage of shunt release: Uc (V) | No shunt releases | |
| | For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum. | | N/A |
| | closing mechanism energized with 85% at the rated Uc: (V) | | N/A |
| | The circuit-breaker is mounted complete on its own support or an equivalent support. | | P |
| | Test made in free air: | | P |
| | Distances of the metallic screen's: (all sides) | Front / Back: 0 mm, Left / Right: 0 mm, Up / Down: 50 mm | P |
| | The characteristics of the metallic screen: | | |
| | - woven wire mesh | | N/A |
| | - perforated metal | | P |
| | - expanded metal | | N/A |
| | - ratio hole area/total area: 0,45-0,65 | | P |
| | - size of hole: <math><30\text{mm}^2</math> | | P |
| | - finish: bare or conductive plating | | P |
| | Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure. | | N/A |

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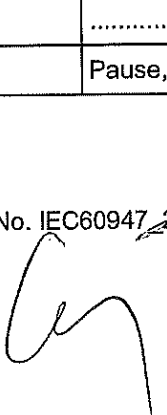
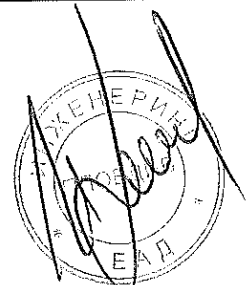
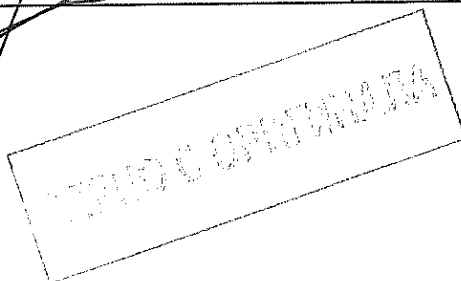


ВЕРНО С ОРИГИНАЛОМ



| IEC 60947-2 | | | |
|-------------|--|---|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | Fuse "F": copper wire: diameter 0,8 mm, 50 mm long | | P |
| | Circuit is earthed at: (load-star- or supply-star point) | Load-star | P |
| | Conductor cross-sectional area (mm ²) : | 2 x 185 mm ² | P |
| | If terminals unmarked: line connected at: (underside/upside) | Line and Load are marked | N/A |
| | Tightening torques: (Nm) | 10 Nm | P |
| | Test sequence of operation: O – t – CO – t – CO | | P |
| | - test voltage U/Ue = 1,05 (V)..... L1-L2: L2-L3: L3-L1: | 436 Vac 437 Vac 436 Vac | P |
| | - r.m.s. test current AC/DC: (A) L1: L2: L3: | 53,2 kA 53,4 kA 53,1 kA | P |
| | power factor/time constant : | 0,16 | P |
| | - Factor "n" | 2,2 | P |
| | - peak test current (A) : | 121 kA | P |
| | Test sequence "O" | | |
| | - max. let-through current: (kA _{peak}) L1: L2: L3: | 27,4 kA 20,7 kA 16,2 kA | P |
| | - Joule integral I ² dt (kA ² s) L1: L2: L3: | 2,04 MA ² s 928 kA ² s 623 kA ² s | P |
| | Pause, t: (min) | 3 min | P |
| | Test sequence "CO" | | |
| | - max. let-through current: (kA _{peak}) L1: L2: L3: | 23,0 kA 20,4 kA 26,8 kA | P |
| | - Joule integral I ² dt (kA ² s) L1: L2: L3: | 1,24 MA ² s 850 kA ² s 2,19 MA ² s | P |
| | Pause, t: (min) | 4 min | P |

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| IEC 60947-2 | | | |
|-------------|--|---|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | Test sequence "CO" | | |
| | - max. let-through current: (kA _{peak}) L1: | 20,1 kA | P |
| | L2: | 23,0 kA | |
| | L3: | 26,6 kA | |
| | - Joule integral I ² dt (MA ² s) L1: | 997 kA ² s | P |
| | L2: | 2,10 MA ² s | |
| | L3: | 1,62 MA ² s | |
| | Melting of the fusible element | No melting of the fusible element | P |
| | Holes in the PE-sheet for test sequence "O" | No holes observed | P |
| | Cracks observed | No cracks observed | P |
| 8.3.4.2 | Operational performance capability with current. | | |
| | Rated current: I _n (A) | 630 A | |
| | Maximum rated operational voltage: U _e (V) | 415 Vac | |
| | Conductor cross-sectional area (mm ²) : | 2 x 185 mm ² | |
| | Number of operating cycles per hour | 60 cycles per hour | P |
| | Number (5% of the number given in column 4, tab. 8) of cycles with current (total) (closing mechanism energized at the rated U _c) | 50 cycles (no electric closing mechanism) | P |
| | Applied voltage: closing mechanism (V) | | N/A |
| | For circuit-breaker fitted with adjustable releases, test shall be made with the overload setting at maximum and short-circuit setting at minimum. | | N/A |
| | Conditions, make/break operations: | | |
| | - test voltage U/U _e = 1,0 (V) L1-L2: | 422,0 Vac | P |
| | L2-L3: | 421,1 Vac | |
| | L3-L1: | 421,4 Vac | |
| | - test current I/I _e = 1,0 (A) L1: | 655,9 A | P |
| | L2: | 660,1 A | |
| | L3: | 661,0 A | |
| | - power factor/time constant: | 0,75 | P |
| | - frequency: (Hz) | 50 Hz | P |
| | - on-time (ms): | Min. 1047 ms | P |
| | - off-time (s): | Max. 59 s | P |

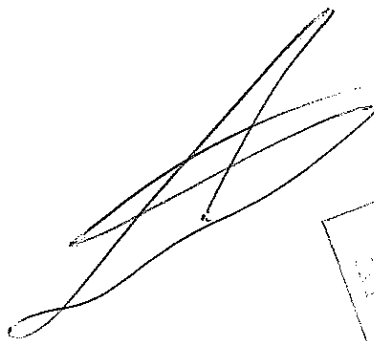
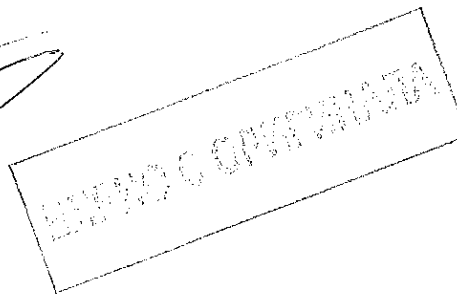
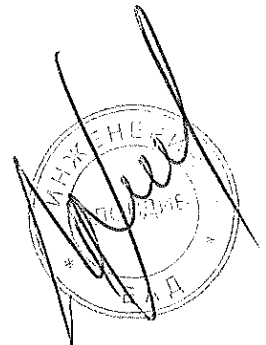
TRF No. IEC60947_2F



КОПИЯ С ОРИГИНАЛА



| IEC 60947-2 | | | |
|-------------|---|--|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 8.3.4.3 | Verification of dielectric withstand | | |
| | - equal to twice the rated operational voltage with a minimum of 1000 V | 1000 V, 5 s | P |
| | - no breakdown or flashover | See appended table 6 | P |
| | - the leaking current for circuit-breaker suitable for isolation: (<2mA / 1.1 Ue) | L1: 0,145 mA L2: 0,061 mA L3: 0,153 mA N: 0,029 mA | P |
| 8.3.4.4 | Verification of temperature-rise | | |
| | - the values of temperature-rise do not exceed those specified in tab. 7. | See appended table 4 | P |
| | Temperature rise of main circuit terminals. ≤ 80 K (K) : | Max: 58 K | P |
| | conductor cross-sectional area (mm ²) : | 2 x 185 mm ² | P |
| | test current Ie (A) : | 630 A | P |
| 8.3.4.5 | Verification of overload releases | | |
| | Test current: 1.45 times the value of their current setting at the reference temperature: (A) | 927 A (1,015 x 1,45 x I _r) Temperature compensation factor for 24,6 °C is 1,015 | P |
| | Conventional tripping time: <1h when I _n < 63A, <2h when I _n > 63 A | 1 min 29 s | P |

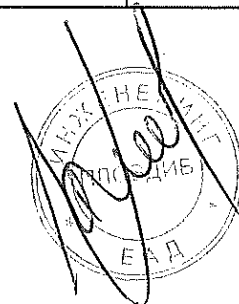
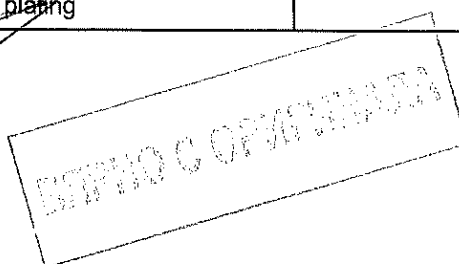
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| IEC 60947-2 | | | |
|-------------|--------------------|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |

| | | | |
|---------|--|--|-----|
| 8.3.4 | TEST SEQUENCE II (Ics): | | |
| 8.3.4.1 | Test of rated service short-circuit breaking capacity | | |
| | Test sequence of operation: O – t – CO – t – CO | | |
| | Type designation or serial number | PN630HE / 3P+N | |
| | Sample no: | #04B | |
| | Rated current: In (A) | 400 A | |
| | Rated operational voltage: Ue (V) | 400 / 415 Vac | |
| | Rated service short-circuit breaking capacity: (kA) | 53 kA | |
| | Rated control supply voltage of closing mechanism: Uc (V) | No electric closing mechanism | |
| | Rated control supply voltage of shunt release: Uc (V) | No shunt releases | |
| | For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum. | | N/A |
| | closing mechanism energized with 85% at the rated Uc: (V) | | N/A |
| | The circuit-breaker is mounted complete on its own support or an equivalent support. | | P |
| | Test made in free air: | | P |
| | Distances of the metallic screen's: (all sides) | Front / Back: 0 mm, Left / Right: 0 mm, Up / Down: 50 mm | P |
| | The characteristics of the metallic screen: | | |
| | - woven wire mesh | | N/A |
| | - perforated metal | | P |
| | - expanded metal | | N/A |
| | - ratio hole area/total area: 0,45-0,65 | | P |
| | - size of hole: <30mm ² | | P |
| | - finish: bare or conductive plating | | P |

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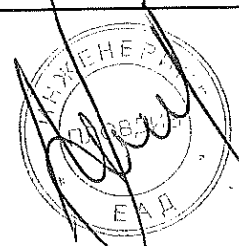


| IEC 60947-2 | | | |
|-------------|--|---|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure: | | N/A |
| | Fuse "F": copper wire: diameter 0,8 mm, 50 mm long | | P |
| | Circuit is earthed at: (load-star- or supply-star point) | Load-star | P |
| | Conductor cross-sectional area (mm ²): | 240 mm ² | P |
| | If terminals unmarked: line connected at: (underside/upside) | Line and Load are marked | N/A |
| | Tightening torques: (Nm) | 10 Nm | P |
| | Test sequence of operation: O – t – CO – t – CO | | P |
| | - test voltage U/U _e = 1,05 (V).....L1-L2:L2-L3:L3-L1: | 436 Vac 437 Vac 436 Vac | P |
| | - r.m.s. test current AC/DC: (A) L1: L2: L3: | 53,2 kA 53,4 kA 53,1 kA | P |
| | power factor/time constant : | 0,16 | P |
| | - Factor "n" | 2,2 | P |
| | - peak test current (A) : | 121 kA | P |
| | Test sequence "O" | | |
| | - max. let-through current: (kA _{peak}) L1: L2: L3: | 25,0 kA 19,5 kA 13,7 kA | P |
| | - Joule integral I ² dt (kA ² s) L1: L2: L3: | 1,55 MA ² s 781 kA ² s 433 kA ² s | P |
| | Pause, t: (min) | 3 min | P |
| | Test sequence "CO" | | |
| | - max. let-through current: (kA _{peak}) L1: L2: L3: | 23,7 kA 17,1 kA 17,3 kA | P |
| | - Joule integral I ² dt (kA ² s) L1: L2: L3: | 1,18 MA ² s 792 kA ² s 1,21 MA ² s | P |

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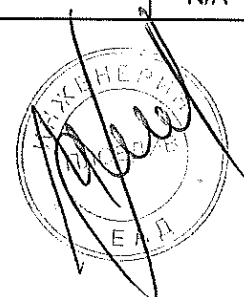
ВІСНОВОК С ПРОВІРАМИ



| IEC 60947-2 | | | |
|-------------|--|--|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | Pause, t: (min) | 4 min | P |
| | Test sequence "CO" | | |
| | - max. let-through current: (kA _{peak}) L1: L2: L3: | 19,7 kA 25,1 kA 17,6 kA | P |
| | - Joule integral I ² dt (kA ² s) L1: L2: L3: | 1,15 MA ² s 1,98 MA ² s 1,13 MA ² s | P |
| | Melting of the fusible element | No melting of the fusible element | P |
| | Holes in the PE-sheet for test sequence "O" | No holes observed | P |
| | Cracks observed | No cracks observed | P |
| 8.3.4.2 | Operational performance capability with current. | | |
| | Rated current: I _n (A) | | |
| | Maximum rated operational voltage: U _e (V) | | |
| | Conductor cross-sectional area (mm ²): | | |
| | Number of operating cycles per hour | | N/A |
| | Number (5% of the number given in column 4, tab. 8) of cycles with current (total) (closing mechanism energized at the rated U _c) | | N/A |
| | Applied voltage: closing mechanism (V) | | N/A |
| | For circuit-breaker fitted with adjustable releases, test shall be made with the overload setting at maximum and short-circuit setting at minimum. | | N/A |
| | Conditions, make/break operations: | | |
| | - test voltage U/U _e = 1,0 (V) L1-L2: L2-L3: L3-L1: | | N/A |
| | - test current I/I _e = 1,0 (A) L1: L2: L3: | | N/A |
| | - power factor/time constant: | | N/A |
| | - frequency: (Hz) | | N/A |
| | - on-time (ms): | | N/A |

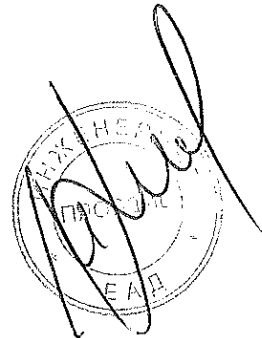
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ЭСНД С ОПИТНИКА

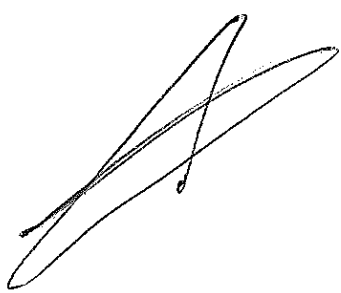


| IEC 60947-2 | | | |
|-------------|---|---|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | - off-time (s): | | N/A |
| 8.3.4.3 | Verification of dielectric withstand | | |
| | - equal to twice the rated operational voltage with a minimum of 1000 V | 1000 V, 5 s | P |
| | - no breakdown or flashover | See appended table 6 | P |
| | - the leaking current for circuit-breaker suitable for isolation: (<2mA / 1.1 Ue) | L1: 390 µA L2: 28,7 µA L3: 51,9 µA N: 11,2 µA | P |
| 8.3.4.4 | Verification of temperature-rise | | |
| | - the values of temperature-rise do not exceed those specified in tab. 7. | | N/A |
| | Temperature rise of main circuit terminals. ≤ 80 K (K) : | | N/A |
| | conductor cross-sectional area (mm²) : | | N/A |
| | test current Ie (A) : | | N/A |
| 8.3.4.5 | Verification of overload releases | | |
| | Test current: 1.45 times the value of their current setting at the reference temperature: (A) | 211 A (1,015 x 1,45 x Ir) Temperature compensation factor for 24,6 °C is 1,015 | P |
| | Conventional tripping time: <1h when In < 63A, <2h when In > 63 A | 1 min 34 s | P |

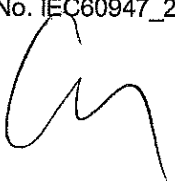
TESTING COMPLETED



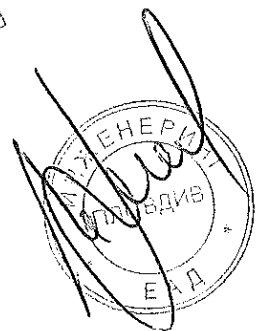
| IEC 60947-2 | | | |
|-------------|---------------------------------|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 8.3.4 | TEST SEQUENCE II/III (Ics=Icu): | | N/A |



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TESTED AND APPROVED

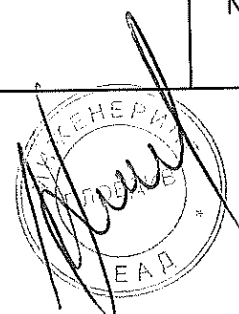


| IEC 60947-2 | | | |
|-------------|--|-------------------------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 8.3.5 | TEST SEQUENCE III (Icu) | | |
| | Rated ultimate short-circuit breaking | | |
| | Except where the combined test sequence applies, this test sequence applies to circuit-breaker of utilization category A and to circuit-breaker of utilization B having a rated ultimate short-circuit breaking capacity higher than the rated short-time withstand current. | | |
| | For circuit-breakers of utilization B having a rated short-time withstand current equal to their rated ultimate short-circuit breaking capacity, this test sequence need not be made, since, in this case, the ultimate short-circuit breaking capacity, is verified when carrying out test sequence IV. | | |
| | For integrally fused circuit-breakers, test sequence V applies in place of this sequence. | | |
| | Type designation or serial number | PN630HE / 3P+N | |
| | Sample no: | #05B | |
| | Rated current: In (A) | 630 A | |
| | Rated operational voltage: Ue (V) | 400 / 415 Vac | |
| | Rated ultimate short-circuit breaking capacity: (kA) | 70 kA | |
| | Rated control supply voltage of closing mechanism: Uc (V) | No electric closing mechanism | |
| | Rated control supply voltage of shunt release: Uc (V) | No shunt releases | |
| | This test sequence need not be made when Icu = Ics | | |
| 8.3.5.1 | The operation of overload releases shall be verified at twice the value of their current setting on each pole separately. | | |
| | The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly. | | |
| | Time specified by the manufacturer: | 45 s ≤ t ≤ 160 s | P |
| | - Operation time: (s) L1: | 2 min 27 s | P |
| | L2: | 2 min 24 s | |
| | L3: | 2 min 25 s | |
| | N : | | |
| 8.3.5.2 | Test of rated ultimate short-circuit breaking capacity | | |
| | The test sequence of operations is O – t – CO | | |
| | For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum. | | N/A |

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СЕРТИФИКАТ

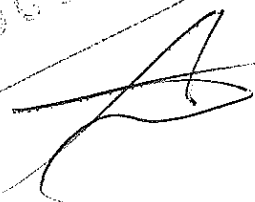
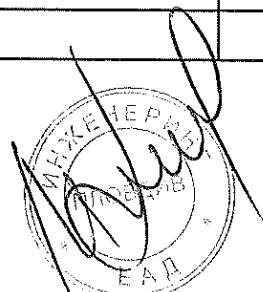


| IEC 60947-2 | | | |
|-------------|--|--|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | closing mechanism energized with 85% at the rated U_c : (V) | | N/A |
| | The circuit-breaker is mounted complete on its own support or an equivalent support. | | P |
| | Test made in free air: | | P |
| | Distances of the metallic screen's: (all sides) | Front / Back: 0 mm, Left / Right: 0 mm, Up / Down: 50 mm | P |
| | The characteristics of the metallic screen: | | |
| | - woven wire mesh | | N/A |
| | - perforated metal | | P |
| | - expanded metal | | N/A |
| | - ratio hole area/total area: 0,45-0,65 | | P |
| | - size of hole: <math> < 30\text{mm}^2 </math> | | P |
| | - finish: bare or conductive plating | | P |
| | Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure: | | N/A |
| | Fuse "F": copper wire: diameter 0,8 mm, 50 mm long | | P |
| | Circuit is earthed at: (load-star- or supply-star point) | Load-star | P |
| | Conductor cross-sectional area (mm^2): | 2 x 185 mm^2 | P |
| | If terminals unmarked: line connected at: (underside/upside) | Line and Load are marked | N/A |
| | Tightening, torques: (Nm) | 10 Nm | P |
| | Test sequence of operation: O – t – CO | | P |
| | - test voltage $U/U_e = 1,05$ (V) L1-L2: L2-L3: L3-L1: | 436 Vac 436 Vac 436 Vac | P |
| | - r.m.s. test current AC/DC: (A) L1: L2: L3: | 70,4 kA 70,6 kA 70,2 kA | P |
| | power factor/time constant : | 0,19 | P |
| | - Factor "n" | 2,2 | P |

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ДЕПАРТАМЕНТ
ЭЛЕКТРОТЕХНИКИ
И ЭЛЕКТРОЭНЕРГЕТИКИ
САНКТ-ПЕТЕРБУРГА

| IEC 60947-2 | | | |
|-------------|---|--|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | - peak test current (Amax) : | 157 kA | P |
| | Test sequence "O" | | |
| | - max. let-through current: (kA _{peak}) L1: L2: L3: | 30,5 kA 24,6 kA 18,1 kA | P |
| | - Joule integral I ² dt (kA ² s) L1: L2: L3: | 2,28 MA ² s 1,17 MA ² s 668 kA ² s | P |
| | Pause, t: (min) | 4 min | P |
| | Test sequence "CO" | | |
| | - max. let-through current: (kA _{peak}) L1: L2: L3: | 20,1 kA 32,3 kA 20,2 kA | P |
| | - Joule integral I ² dt (kA ² s) L1: L2: L3: | 1,77 MA ² s 1,98 MA ² s 1,36 MA ² s | P |
| | Melting of the fusible element | No melting of the fusible element | P |
| | Holes in the PE-sheet for test sequence "O" | No holes observed | P |
| | Cracks observed | No cracks observed | P |
| 8.3.5.3 | Verification of dielectric withstand | | |
| | - equal to twice the rated operational voltage with a minimum of 1000 V for 5 seconds | 1000 V, 5 s | P |
| | - no breakdown or flashover | See appended table 7 | P |
| | - the leaking current for circuit-breaker suitable for isolation: (<6mA / 1,1 U _e) | L1: 269 µA L2: 43,6 µA L3: 11,9 µA N: 10,3 µA | P |
| 8.3.5.4 | Verification of overload releases | | |
| | The operation of overload releases shall be verified at 2,5 times the value of their current setting on each pole separately. | | |
| | The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly. | | |
| | Time specified by the manufacturer: | t ≤ 160 s | P |

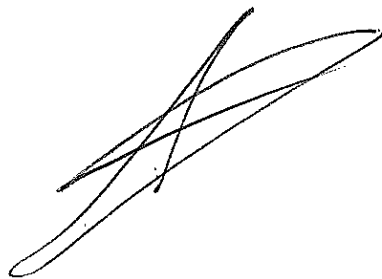
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ЕВРОСЕРТИФИКАЦИЯ



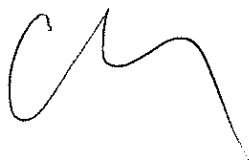
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|-------------|--|--|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | - Operation time: (s) L1: L2: L3: N : | 1 min 26 s 1 min 28 s 1 min 25 s | P |



ВВЕДЕНО В ОБИГОНАТИВ



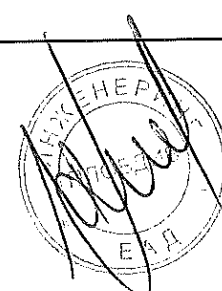
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| IEC 60947-2 | | | |
|-------------|--|-------------------------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 8.3.5 | TEST SEQUENCE III (Icu) | | |
| | Rated ultimate short-circuit breaking | | |
| | Except where the combined test sequence applies, this test sequence applies to circuit-breaker of utilization category A and to circuit-breaker of utilization B having a rated ultimate short-circuit breaking capacity higher than the rated short-time withstand current. | | |
| | For circuit-breakers of utilization B having a rated short-time withstand current equal to their rated ultimate short-circuit breaking capacity, this test sequence need not be made, since, in this case, the ultimate short-circuit breaking capacity, is verified when carrying out test sequence IV. | | |
| | For integrally fused circuit-breakers, test sequence V applies in place of this sequence. | | |
| | Type designation or serial number | PN630HE / 3P+N | |
| | Sample no: | #06B | |
| | Rated current: In (A) | 400 A | |
| | Rated operational voltage: Ue (V) | 400 / 415 Vac | |
| | Rated ultimate short-circuit breaking capacity: (kA) | 70 kA | |
| | Rated control supply voltage of closing mechanism: Uc (V) | No electric closing mechanism | |
| | Rated control supply voltage of shunt release: Uc (V) | No shunt releases | |
| | This test sequence need not be made when Icu = Ics | | |
| 8.3.5.1 | The operation of overload releases shall be verified at twice the value of their current setting on each pole separately. | | |
| | The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly. | | |
| | Time specified by the manufacturer: | 45 s ≤ t ≤ 160 s | P |
| | - Operation time: (s) L1: | 2 min 11 s | P |
| | L2: | 2 min 09 s | |
| | L3: | 2 min 06 s | |
| | N : | | |
| 8.3.5.2 | Test of rated ultimate short-circuit breaking capacity | | |
| | The test sequence of operations is O – t – CO | | |
| | For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum. | | N/A |



DEKRA CERTIFICATE



| IEC 60947-2 | | | |
|-------------|--|--|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | closing mechanism energized with 85% at the rated Uc: (V) | | N/A |
| | The circuit-breaker is mounted complete on its own support or an equivalent support. | | P |
| | Test made in free air: | | P |
| | Distances of the metallic screen's: (all sides) | Front / Back: 0 mm, Left / Right: 0 mm, Up / Down: 50 mm | P |
| | The characteristics of the metallic screen: | | |
| | - woven wire mesh | | N/A |
| | - perforated metal | | P |
| | - expanded metal | | N/A |
| | - ratio hole area/total area: 0,45-0,65 | | P |
| | - size of hole: <30mm ² | | P |
| | - finish: bare or conductive plating | | P |
| | Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure: | | N/A |
| | Fuse "F": copper wire: diameter 0,8 mm, 50 mm long | | P |
| | Circuit is earthed at: (load-star- or supply-star point) | Load-star | P |
| | Conductor cross-sectional area (mm ²) : | 240 mm ² | P |
| | If terminals unmarked: line connected at: (underside/upside) | Line and Load are marked | N/A |
| | Tightening, torques: (Nm) | 10 Nm | P |
| | Test sequence of operation: O – t – CO | | P |
| | - test voltage U/Us = 1,05 (V) | L1-L2: 436 Vac L2-L3: 436 Vac L3-L1: 436 Vac | P |
| | - r.m.s. test current AC/DC: (A) | L1: 70,4 kA L2: 70,6 kA L3: 70,2 kA | P |
| | power factor/time constant : | 0,19 | P |
| | - Factor "n" | 2,2 | P |

TRF No. IEC60947_2F

ПРОТОКОЛ РАБОТЫ

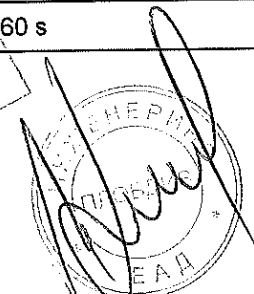




| IEC 60947-2 | | | |
|-------------|---|--|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | - peak test current (Amax) : | 157 kA | P |
| | Test sequence "O" | | |
| | - max. let-through current: (kA _{peak}) L1: L2: L3: | 23,2 kA 29,4 kA 22,3 kA | P |
| | - Joule integral I ² dt (kA ² s) L1: L2: L3: | 1,26 MA ² s 2,36 MA ² s 1,27 MA ² s | P |
| | Pause, t: (min) | 4 min | P |
| | Test sequence "CO" | | |
| | - max. let-through current: (kA _{peak}) L1: L2: L3: | 27,0 kA 15,6 kA 23,4 kA | P |
| | - Joule integral I ² dt (A ² s) L1: L2: L3: | 1,38 MA ² s 535 kA ² s 1,38 kA ² s | P |
| | Melting of the fusible element | No melting of the fusible element | P |
| | Holes in the PE-sheet for test sequence "O" | No holes observed | P |
| | Cracks observed | No cracks observed | P |
| 8.3.5.3 | Verification of dielectric withstand | | |
| | - equal to twice the rated operational voltage with a minimum of 1000 V for 5 seconds | 1000 V, 5 s | P |
| | - no breakdown or flashover | See appended table 7 | P |
| | - the leaking current for circuit-breaker suitable for isolation: (<6mA / 1,1 U _e) | L1: 25,7 μA L2: 74,3 μA L3: 22,1 μA N: 7,7 μA | P |
| 8.3.5.4 | Verification of overload releases | | |
| | The operation of overload releases shall be verified at 2,5 times the value of their current setting on each pole separately. | | |
| | The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly. | | |
| | Time specified by the manufacturer: | t ≤ 160 s | P |

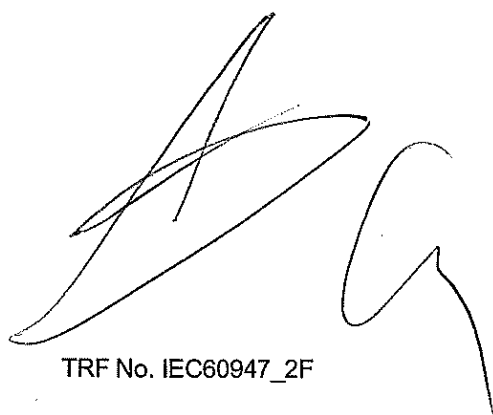
TRF No. IEC60947_2F

EXPANDED OPERATIONAL





| IEC 60947-2 | | | |
|-------------|-----------------------------|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | - Operation time: (s) | L1: 1 min 26 s | P |
| | | L2: 1 min 25 s | |
| | | L3: 1 min 21 s | |
| | | N : | |

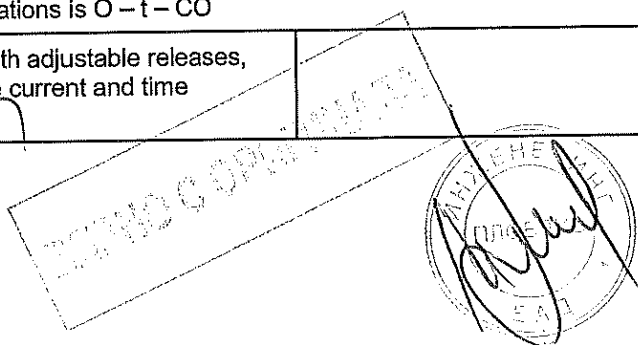


TRF No. IEC60947_2F

ЗАПИСЬ О СЛУЖБЕ



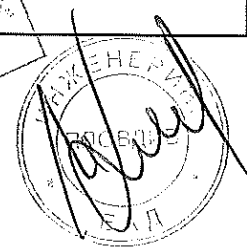
| IEC 60947-2 | | | |
|-------------|--|-------------------------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 8.3.5 | TEST SEQUENCE III (Icu) | | |
| | Rated ultimate short-circuit breaking | | |
| | Except where the combined test sequence applies, this test sequence applies to circuit-breaker of utilization category A and to circuit-breaker of utilization B having a rated ultimate short-circuit breaking capacity higher than the rated short-time withstand current. | | |
| | For circuit-breakers of utilization B having a rated short-time withstand current equal to their rated ultimate short-circuit breaking capacity, this test sequence need not be made, since, in this case, the ultimate short-circuit breaking capacity, is verified when carrying out test sequence IV. | | |
| | For integrally fused circuit-breakers, test sequence V applies in place of this sequence. | | |
| | Type designation or serial number | PN630HE / 3P | |
| | Sample no: | #07B | |
| | Rated current: In (A) | 630 A | |
| | Rated operational voltage: Ue (V) | 400 / 415 Vac | |
| | Rated ultimate short-circuit breaking capacity: (kA) | 70 kA | |
| | Rated control supply voltage of closing mechanism: Uc (V) | No electric closing mechanism | |
| | Rated control supply voltage of shunt release: Uc (V) | No shunt releases | |
| | This test sequence need not be made when Icu = Ics | | |
| 8.3.5.1 | The operation of overload releases shall be verified at twice the value of their current setting on each pole separately. | | |
| | The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly. | | |
| | Time specified by the manufacturer: | 45 s ≤ t ≤ 160 s | P |
| | - Operation time: (s) L1: | 2 min 27 s | P |
| | L2: | 2 min 28 s | |
| | L3: | 2 min 25 s | |
| | N : | | |
| 8.3.5.2 | Test of rated ultimate short-circuit breaking capacity | | |
| | The test sequence of operations is O – t – CO | | |
| | For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum. | | N/A |

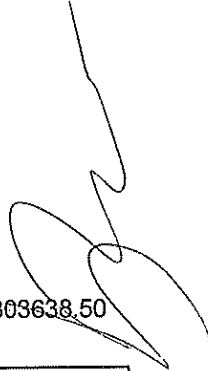


| IEC 60947-2 | | | |
|-------------|--|--|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | closing mechanism energized with 85% at the rated Uc: (V) | | N/A |
| | The circuit-breaker is mounted complete on its own support or an equivalent support. | | P |
| | Test made in free air: | | P |
| | Distances of the metallic screen's: (all sides) | Front / Back: 0 mm, Left / Right: 0 mm, Up / Down: 50 mm | P |
| | The characteristics of the metallic screen: | | |
| | - woven wire mesh | | N/A |
| | - perforated metal | | P |
| | - expanded metal | | N/A |
| | - ratio hole area/total area: 0,45-0,65 | | P |
| | - size of hole: <30mm ² | | P |
| | - finish: bare or conductive plating | | P |
| | Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure: | | N/A |
| | Fuse "F": copper wire: diameter 0,8 mm, 50 mm long | | P |
| | Circuit is earthed at: (load-star- or supply-star point) | Load-star | P |
| | Conductor cross-sectional area (mm ²) : | 2 x 185 mm ² | P |
| | If terminals unmarked: line connected at: (underside/upside) | Line and Load are marked | N/A |
| | Tightening, torques: (Nm) | 10 Nm | P |
| | Test sequence of operation: O – t – CO | | P |
| | - test voltage U/Ue = 1,05 (V) | L1-L2: 436 Vac L2-L3: 436 Vac L3-L1: 436 Vac | P |
| | - r.m.s. test current AC/DC: (A) | L1: 70,4 kA L2: 70,6 kA L3: 70,2 kA | P |
| | power factor/time constant : | 0,19 | P |
| | - Factor "n" | 2,2 | P |

TRE No. IEC60947_2F

СЕРТИФИКАТ

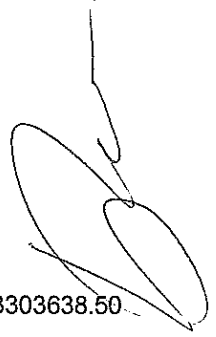




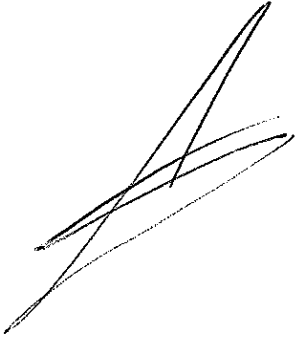
| IEC 60947-2 | | | |
|-------------|---|--|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | - peak test current (A _{max}) : | 157 kA | P |
| | Test sequence "O" | | |
| | - max. let-through current: (kA _{peak}) L1: L2: L3: | 25,7 kA 31,1 kA 16,1 kA | P |
| | - Joule integral I ² dt (kA ² s) L1: L2: L3: | 1,68 MA ² s 1,79 MA ² s 538 kA ² s | P |
| | Pause, t: (min) | 4 min | P |
| | Test sequence "CO" | | |
| | - max. let-through current: (kA _{peak}) L1: L2: L3: | 28,6 kA 18,7 kA 22,9 kA | P |
| | - Joule integral I ² dt (kA ² s) L1: L2: L3: | 1,81 kA ² s 1,02 kA ² s 1,56 kA ² s | P |
| | Melting of the fusible element | No melting of the fusible element | P |
| | Holes in the PE-sheet for test sequence "O" | No holes observed | P |
| | Cracks observed | No cracks observed | P |
| 8.3.5.3 | Verification of dielectric withstand | | |
| | - equal to twice the rated operational voltage with a minimum of 1000 V for 5 seconds | 1000 V, 5 s | P |
| | - no breakdown or flashover | See appended table 7 | P |
| | - the leaking current for circuit-breaker suitable for isolation: (<6mA / 1,1 U _e) | L1: 136 μA L2: 117 μA L3: 64,8 μA | P |
| 8.3.5.4 | Verification of overload releases | | |
| | The operation of overload releases shall be verified at 2,5 times the value of their current setting on each pole separately. | | |
| | The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly. | | |
| | Time specified by the manufacturer: | t ≤ 160.s | P |

ЗАТВЕРЖЕНО

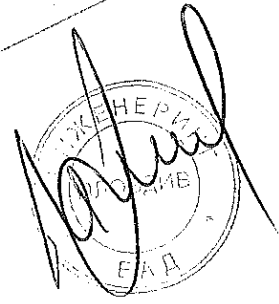




| IEC 60947-2 | | | |
|-------------|-----------------------------|--|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | - Operation time: (s) | L1: 1 min 27 s L2: 1 min 24 s L3: 1 min 24 s N: | P |

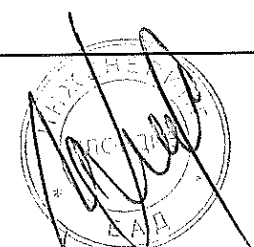



ИЗВЕЩЕНИЕ О ОПЫТАХ



| IEC 60947-2 | | | |
|-------------|--|-------------------------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 8.3.5 | TEST SEQUENCE III (Icu) | | |
| | Rated ultimate short-circuit breaking | | |
| | Except where the combined test sequence applies, this test sequence applies to circuit-breaker of utilization category A and to circuit-breaker of utilization B having a rated ultimate short-circuit breaking capacity higher than the rated short-time withstand current. | | |
| | For circuit-breakers of utilization B having a rated short-time withstand current equal to their rated ultimate short-circuit breaking capacity, this test sequence need not be made, since, in this case, the ultimate short-circuit breaking capacity, is verified when carrying out test sequence IV. | | |
| | For integrally fused circuit-breakers, test sequence V applies in place of this sequence. | | |
| | Type designation or serial number | PN630HE / 3P | |
| | Sample no: | #08B | |
| | Rated current: In (A) | 400 A | |
| | Rated operational voltage: Ue (V) | 400 / 415 Vac | |
| | Rated ultimate short-circuit breaking capacity: (kA) | 70 kA | |
| | Rated control supply voltage of closing mechanism: Uc (V) | No electric closing mechanism | |
| | Rated control supply voltage of shunt release: Uc (V) | No shunt releases | |
| | This test sequence need not be made when Icu = Ics | | |
| 8.3.5.1 | The operation of overload releases shall be verified at twice the value of their current setting on each pole separately. | | |
| | The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly. | | |
| | Time specified by the manufacturer: | 45 s ≤ t ≤ 160 s | P |
| | - Operation time: (s) L1: | 2 min 26 s | P |
| | L2: | 2 min 27 s | |
| | L3: | 2 min 24 s | |
| | N: | | |
| 8.3.5.2 | Test of rated ultimate short-circuit breaking capacity | | |
| | The test sequence of operations is O – t – CO | | |
| | For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum. | | N/A |

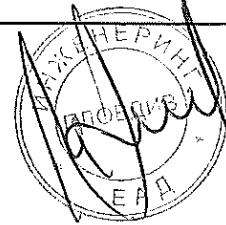
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| IEC 60947-2 | | | |
|-------------|--|--|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | closing mechanism energized with 85% at the rated U_c : (V) | | N/A |
| | The circuit-breaker is mounted complete on its own support or an equivalent support. | | P |
| | Test made in free air: | | P |
| | Distances of the metallic screen's: (all sides) | Front / Back: 0 mm, Left / Right: 0 mm, Up / Down: 50 mm | P |
| | The characteristics of the metallic screen: | | |
| | - woven wire mesh | | N/A |
| | - perforated metal | | P |
| | - expanded metal | | N/A |
| | - ratio hole area/total area: 0,45-0,65 | | P |
| | - size of hole: <30mm ² | | P |
| | - finish: bare or conductive plating | | P |
| | Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure: | | N/A |
| | Fuse "F": copper wire: diameter 0,8 mm, 50 mm long | | P |
| | Circuit is earthed at: (load-star- or supply-star point) | Load-star | P |
| | Conductor cross-sectional area (mm ²) : | 240 mm ² | P |
| | If terminals unmarked: line connected at: (underside/upside) | Line and Load are marked | N/A |
| | Tightening, torques: (Nm) | 10 Nm | P |
| | Test sequence of operation: O – t – CO | | P |
| | - test voltage $U/U_e = 1,05$ (V) | L1-L2: 436 Vac L2-L3: 436 Vac L3-L1: 436 Vac | P |
| | - r.m.s. test current AC/DC: (A) | L1: 70,4 kA L2: 70,6 kA L3: 70,2 kA | P |
| | power factor/time constant : | 0,19 | P |
| | - Factor "n" | 2,2 | P |

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ЗАКОННОСТЬ
ДЕКРА





| IEC 60947-2 | | | |
|-------------|---|---|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | - peak test current (A _{max}) : | 157 kA | P |
| | Test sequence "O" | | |
| | - max. let-through current: (kA _{peak}) L1: L2: L3: | 27,7 kA 24,3 kA 15,0 kA | P |
| | - Joule integral I ² dt (kA ² s) L1: L2: L3: | 1,71 MA ² s 1,05 MA ² s 453 kA ² s | P |
| | Pause, t: (min) | 4 min | P |
| | Test sequence "CO" | | |
| | - max. let-through current: (kA _{peak}) L1: L2: L3: | 17,3 kA 28,5 kA 14,9 kA | P |
| | - Joule integral I ² dt (A ² s) L1: L2: L3: | 1,15 MA ² s 1,49 MA ² s 955 kA ² s | P |
| | Melting of the fusible element | No melting of the fusible element | P |
| | Holes in the PE-sheet for test sequence "O" | No holes observed | P |
| | Cracks observed | No cracks observed | P |
| 8.3.5.3 | Verification of dielectric withstand | | |
| | - equal to twice the rated operational voltage with a minimum of 1000 V for 5 seconds | 1000 V, 5 s | P |
| | - no breakdown or flashover | See appended table 7 | P |
| | - the leaking current for circuit-breaker suitable for isolation: (<6mA / 1,1 U _e) | L1: 369 µA L2: 37,2 µA L3: 10,6 µA | P |
| 8.3.5.4 | Verification of overload releases | | |
| | The operation of overload releases shall be verified at 2,5 times the value of their current setting on each pole separately. | | |
| | The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly. | | |
| | Time specified by the manufacturer: | t ≤ 160 s | P |

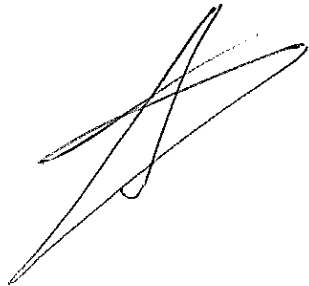
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СЕРТИФИКАТ

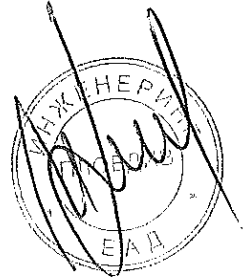




| IEC 60947-2 | | | |
|-------------|-----------------------------|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | - Operation time: (s) | L1: 1 min 28 s | P |
| | | L2: 1 min 29 s | |
| | | L3: 1 min 24 s | |
| | N : | | |




ОБЪЕКТУ СЕРТИФИЦИРОВАНО



| IEC 60947-2 | | | |
|-------------|--|--|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 8.3.5 | TEST SEQUENCE III (Icu) | | |
| | Rated ultimate short-circuit breaking | | |
| | Except where the combined test sequence applies, this test sequence applies to circuit-breaker of utilization category A and to circuit-breaker of utilization B having a rated ultimate short-circuit breaking capacity higher than the rated short-time withstand current. | | |
| | For circuit-breakers of utilization B having a rated short-time withstand current equal to their rated ultimate short-circuit breaking capacity, this test sequence need not be made, since, in this case, the ultimate short-circuit breaking capacity, is verified when carrying out test sequence IV. | | |
| | For integrally fused circuit-breakers, test sequence V applies in place of this sequence. | | |
| | Type designation or serial number | PN630HE / 3P+N test for phase + N | |
| | Sample no: | #09B | |
| | Rated current: I _n (A) | 630 A | |
| | Rated operational voltage: U _e (V) | 400 / 415 Vac | |
| | Rated ultimate short-circuit breaking capacity: (kA) | 42 kA (60% I _{cu}) at 415 V / √3 | |
| | Rated control supply voltage of closing mechanism: U _c (V) | No electric closing mechanism | |
| | Rated control supply voltage of shunt release: U _c (V) | No shunt releases | |
| | This test sequence need not be made when I _{cu} = I _{cs} | | |
| 8.3.5.1 | The operation of overload releases shall be verified at twice the value of their current setting on each pole separately. | | |
| | The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly. | | |
| | Time specified by the manufacturer: | 45 s ≤ t ≤ 160 s | P |
| | - Operation time: (s) L1: 56 s | | P |
| | L2: | | |
| | L3: | | |
| | N: | | |

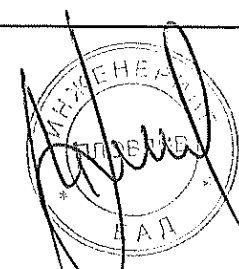
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| IEC 60947-2 | | | |
|-------------|--|--|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 8.3.5.2 | Test of rated ultimate short-circuit breaking capacity | | |
| | The test sequence of operations is O – t – CO | | |
| | For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum. | | N/A |
| | closing mechanism energized with 85% at the rated U_c : (V) | | N/A |
| | The circuit-breaker is mounted complete on its own support or an equivalent support. | | P |
| | Test made in free air: | | P |
| | Distances of the metallic screen's: (all sides) | Front / Back: 0 mm, Left / Right: 0 mm, Up / Down: 50 mm | P |
| | The characteristics of the metallic screen: | | |
| | - woven wire mesh | | N/A |
| | - perforated metal | | P |
| | - expanded metal | | N/A |
| | - ratio hole area/total area: 0,45-0,65 | | P |
| | - size of hole: <math><30\text{mm}^2</math> | | P |
| | - finish: bare or conductive plating | | P |
| | Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure: | | N/A |
| | Fuse "F": copper wire: diameter 0,8 mm, 50 mm long | | P |
| | Circuit is earthed at: (load-star- or supply-star point) | Load-star | P |
| | Conductor cross-sectional area (mm^2): | 2 x 185 mm^2 | P |
| | If terminals unmarked: line connected at: (underside/upside) | Line and Load are marked | N/A |
| | Tightening, torques: (Nm) | 10 Nm | P |
| | Test sequence of operation: O – t – CO | | P |
| | - test voltage $U/U_e = 1,05$ (V) | N-L1: 256 Vac | P |
| | | L2-L3: | |
| | | L3-L1: | |

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| IEC 60947-2 | | | |
|-------------|--|-----------------------------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | - r.m.s. test current AC/DC: (A) L1: L2: L3: | 42,7 kA | P |
| | power factor/time constant : | 0,23 | P |
| | - Factor "n" | 2,1 | P |
| | - peak test current (Amax) : | 90,6 kA | P |
| | Test sequence "O" | | |
| | - max. let-through current: (kA _{peak}) L1: L2: L3: | 12,2 kA | P |
| | - Joule integral I ² dt (kA ² s) L1: L2: L3: | 384 kA ² s | P |
| | Pause, t: (min) | 3 min | P |
| | Test sequence "CO" | | |
| | - max. let-through current: (kA _{peak}) L1: L2: L3: | 19,0 kA | P |
| | - Joule integral I ² dt (kA ² s) L1: L2: L3: | 1,03 MA ² s | P |
| | Melting of the fusible element | No melting of the fusible element | P |
| | Holes in the PE-sheet for test sequence "O" | No holes observed | P |
| | Cracks observed | No cracks observed | P |
| 8.3.5.3 | Verification of dielectric withstand | | |
| | - equal to twice the rated operational voltage with a minimum of 1000 V for 5 seconds | 1000 V, 5 s | P |
| | - no breakdown or flashover | See appended table 7 | P |
| | - the leaking current for circuit-breaker suitable for isolation: (<6mA / 1,1 U _e) | L1: 52,3 μA N: 28,7 μA | P |

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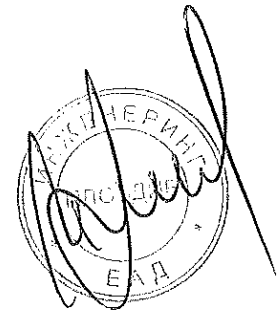
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| IEC 60947-2 | | | |
|-------------|---|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 8.3.5.4 | Verification of overload releases | | |
| | The operation of overload releases shall be verified at 2,5 times the value of their current setting on each pole separately. | | |
| | The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly. | | |
| | Time specified by the manufacturer: | t ≤ 160 s | P |
| | - Operation time: (s) L1: L2: L3: N : | 37 s | P |

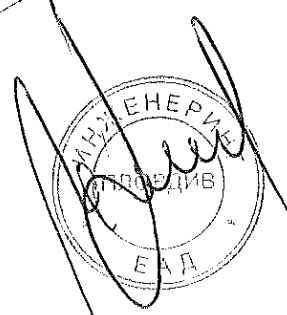
ВЗАИМОСВЯЗАННО

| IEC 60947-2 | | | |
|-------------|--|---------------------------------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 8.3.5 | TEST SEQUENCE III (Icu) | | |
| | Rated ultimate short-circuit breaking | | |
| | Except where the combined test sequence applies, this test sequence applies to circuit-breaker of utilization category A and to circuit-breaker of utilization B having a rated ultimate short-circuit breaking capacity higher than the rated short-time withstand current. | | |
| | For circuit-breakers of utilization B having a rated short-time withstand current equal to their rated ultimate short-circuit breaking capacity, this test sequence need not be made, since, in this case, the ultimate short-circuit breaking capacity, is verified when carrying out test sequence IV. | | |
| | For integrally fused circuit-breakers, test sequence V applies in place of this sequence. | | |
| | Type designation or serial number | PN630HE / 3P+N test for phase + N | |
| | Sample no: | #10B | |
| | Rated current: In (A) | 400 A | |
| | Rated operational voltage: Ue (V) | 400 / 415 Vac | |
| | Rated ultimate short-circuit breaking capacity: (kA) | 42 kA (60% Icu) at 415 V / $\sqrt{3}$ | |
| | Rated control supply voltage of closing mechanism: Uc (V) | No electric closing mechanism | |
| | Rated control supply voltage of shunt release: Uc (V) | No shunt releases | |
| | This test sequence need not be made when Icu = Ics | | |
| 8.3.5.1 | The operation of overload releases shall be verified at twice the value of their current setting on each pole separately. | | |
| | The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly. | | |
| | Time specified by the manufacturer: | 45 s ≤ t ≤ 160 s | P |
| | - Operation time: (s) L1: | 52 s | P |
| | L2: | | |
| | L3: | | |
| | N: | | |

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СЕРТИФИКАТ

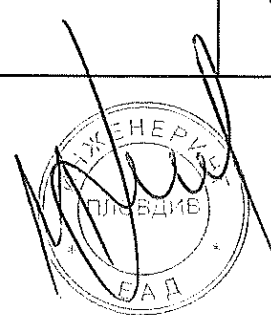




| IEC 60947-2 | | | |
|-------------|--|--|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 8.3.5.2 | Test of rated ultimate short-circuit breaking capacity | | |
| | The test sequence of operations is O – t – CO | | |
| | For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum. | | N/A |
| | closing mechanism energized with 85% at the rated Uc: (V) | | N/A |
| | The circuit-breaker is mounted complete on its own support or an equivalent support. | | P |
| | Test made in free air: | | P |
| | Distances of the metallic screen's: (all sides) | Front / Back: 0 mm, Left / Right: 0 mm, Up / Down: 50 mm | P |
| | The characteristics of the metallic screen: | | |
| | - woven wire mesh | | N/A |
| | - perforated metal | | P |
| | - expanded metal | | N/A |
| | - ratio hole area/total area: 0,45-0,65 | | P |
| | - size of hole: <30mm ² | | P |
| | - finish: bare or conductive plating | | P |
| | Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure: | | N/A |
| | Fuse "F": copper wire: diameter 0,8 mm, 50 mm long | | P |
| | Circuit is earthed at: (load-star- or supply-star point) | Load-star | P |
| | Conductor cross-sectional area (mm ²) : | 240 mm ² | P |
| | If terminals unmarked: line connected at: (underside/upside) | Line and Load are marked | N/A |
| | Tightening, torques: (Nm) | 10 Nm | P |
| | Test sequence of operation: O – t – CO | | P |
| | - test voltage U/Ue = 1,05 (V)L1-L2:L2-L3:L3-L1: | 256 Vac | P |

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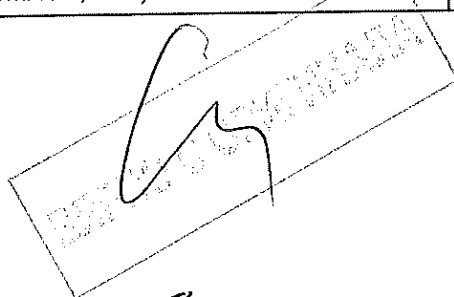
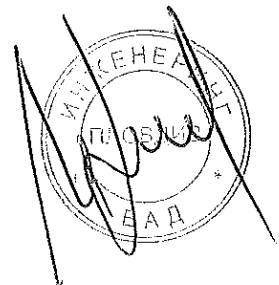
СТАНДОС ОРИЕНТИРАНА





| IEC 60947-2 | | | |
|-------------|--|-----------------------------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | - r.m.s. test current AC/DC: (A) L1: L2: L3: | 42,7 kA | P |
| | power factor/time constant : | 0,23 | P |
| | - Factor "n" | 2,1 | P |
| | - peak test current (Amax) : | 90,6 kA | P |
| | Test sequence "O" | | |
| | - max. let-through current: (kApeak) L1: L2: L3: | 16,5 kA | P |
| | - Joule integral I ² dt (kA ² s) L1: L2: L3: | 936 kA ² s | P |
| | Pause, t: (min) | 3 min | P |
| | Test sequence "CO" | | |
| | - max. let-through current: (kApeak) L1: L2: L3: | 19,8 kA | P |
| | - Joule integral I ² dt (A ² s) L1: L2: L3: | 1,09 MA ² s | P |
| | Melting of the fusible element | No melting of the fusible element | P |
| | Holes in the PE-sheet for test sequence "O" | No holes observed | P |
| | Cracks observed | No cracks observed | P |
| 8.3.5.3 | Verification of dielectric withstand | | |
| | - equal to twice the rated operational voltage with a minimum of 1000 V for 5 seconds | 1000 V, 5 s | P |
| | - no breakdown or flashover | See appended table 7 | P |
| | - the leaking current for circuit-breaker suitable for isolation: (<6mA / 1,1 Ue) | L1: 22,7 μA N: 9,6 μA | P |

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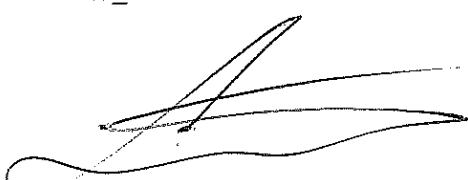



| IEC 60947-2 | | | |
|-------------|---|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 8.3.5.4 | Verification of overload releases | | |
| | The operation of overload releases shall be verified at 2,5 times the value of their current setting on each pole separately. | | |
| | The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly. | | |
| | Time specified by the manufacturer: | $t \leq 160$ s | P |
| | - Operation time: (s) L1: L2: L3: N : | 35 s | P |

ИЗДАНИЕ 2013




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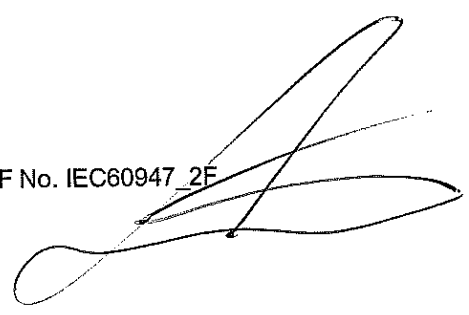
| IEC 60947-2 | | | |
|-------------|--|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 8.3.6 | TEST SEQUENCE IV | | N/A |
| 8.3.7 | TEST SEQUENCE V | | N/A |
| 8.3.8 | TEST SEQUENCE VI: Combined test sequence | | N/A |
| Annex B | Circuit-breakers incorporating residual current protection | | N/A |
| Annex C | Individual pole short-circuit test sequence | | N/A |



ИЗДАНО С ПОДПИСЬЮ



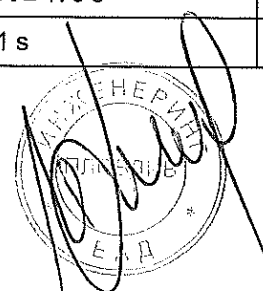
TRF No. IEC60947_2F



| IEC 60947-2 | | | |
|-------------|--|--|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| Annex F | Additional tests for circuit-breakers with electronic over-current protection Error! Reference source not found. , $I_n = 400\text{ A}$, 3P+N, sample no #11C | | P |
| F4 and F5 | Verification of electromagnetic compatibility (EMC) | | |
| | The current setting shall be set at minimum.....,: | $I_r = 0,9 I_o$, $I_o = 0,4 I_n$ | P |
| | Short-time and instantaneous release settings shall each, if applicable, be adjusted to minimum value but to not less than 2,5 times I_r: | Short-time release: N/A Instantaneous release: $3 \times I_r$ | P |
| | Current was applied on two-phases chosen at random according to Figure F.2 | | P |
| F4 | Immunity test | | P |
| F.4.1 | Harmonic currents | | P |
| | Type designation or serial number | Error! Reference source not found. | |
| | Sample no: | #11C | |
| | Rated current: I_n (A) | 400 A | |
| | The tests shall be performed at the rated frequency(Hz) | 50 Hz | P |
| F.4.1.2 | Test of option b) | | P |
| | Amplitude of third harmonic > 60%.....: | 76,92% | P |
| | Amplitude of fifth harmonic > 14%.....: | 40,49% | P |
| | Amplitude of seventh harmonic > 7%.....: | 8,63 % | P |
| | Peak factor $I_p/I_{rms} \geq 2,1$: | 2,31 | P |
| | Current conduction time, for each half-wave is $\leq 21\%$ of the period.....: | 21% | P |
| F.4.1.3 | First, test current at $0,9 I_r$: | 129,6 A | P |
| | Test duration, 10 times of the tripping time at $2 I_r$..: | 1600 s | P |
| | No tripping was observed | | P |
| | Then, test current at $2 I_r$: | 288 A | P |
| | The operating time shall be within 0,9 times the minimum value and 1,1 times the maximum value stated by the manufacturer for twice the current setting | | |
| | Time specified by the manufacturer.....: | $40,5\text{ s} \leq t \leq 176\text{ s}$ | P |
| | Trip time.....: | 1 min 51 s | P |

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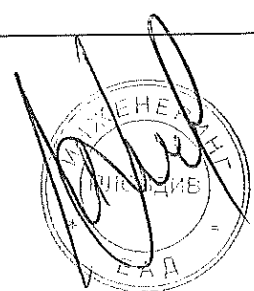


| IEC 60947-2 | | | |
|-------------|--|---|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| F.4.2 | Electrostatic discharges | | P |
| | Type designation or serial number | Error! Reference source not found. | |
| | Sample no: | #11C | |
| | Rated current: In (A) | 400 A | |
| | Discharge test voltage.....: | 8 kV air | P |
| | Polarity of discharges.....: | positive/negative | P |
| | 10 positive and 10 negative discharge with interval time of 1s | | P |
| | During the test, the current 0,9 Ir.....: | 129,6 A | P |
| | After the test, test current at 2,0 Ir.....: | 288 A | P |
| | The operating time shall be within the value stated by the manufacturer for twice the current setting | | |
| | Time specified by the manufacturer.....: | 45 s ≤ t ≤ 160 s | P |
| | Trip time.....: | 118,71 s | P |
| F.4.3 | Radiated radio-frequency electromagnetic fields | | P |
| | Type designation or serial number | PN630HE / 3P+N | |
| | Sample no: | #11C | |
| | Rated current: In (A) | 400 A | |
| | Test level | 10 V/m | P |
| | Frequency range.....: | 80 MHz - 1 GHz 1,4 - 2,0 GHz | P |
| | During test, the current 0,9 Ir.....: | 129,6 A | P |
| | Sweeping the frequency range, the dwell time of the amplitude modulated carrier for each frequency shall be between 500ms and 1000ms, and the step size shall be 1% of the previous frequency. | | P |
| | No tripping was observed | | P |
| | Then, test current at 2Ir.....: | 288 A | P |
| | the test shall be performed at each of the following frequencies: 80; 100; 120; 180; 240; 320; 480; 640; 960; 1400 and 1920MHz, the operation being verified after the field at each frequency has stabilized. | | P |

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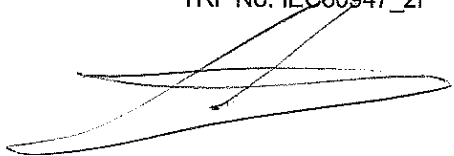
ИЗВЕЩЕНИЕ
О РЕЗУЛЬТАТАХ
ИСПЫТАНИЙ



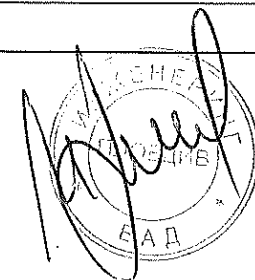


| IEC 60947-2 | | | |
|-------------|---|---|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | The operating time shall be within 0,9 times the minimum value and 1,1 times the maximum value stated by the manufacturer for twice the current setting | | |
| | Time specified by the manufacturer.....: | 40,5 s ≤ t ≤ 176 s | P |
| | Trip time.....: | Horizontal: 100,44 s; 103,79 s; 123,11 s; 96,67 s; 107,32 s; 102,71 s; 97,81 s; 90,77 s; 101,72 s; 106,26 s; 106,21 s. Vertical: 100,91 s; 98,25 s; 120,21 s; 102,36 s; 101,23 s; 110,21 s; 127,29 s; 121,37 s; 115,21 s; 126,39 s; 130,41 s | P |
| F.4.4 | Electrical fast transients/bursts (EFT/B) | | P |
| | Type designation or serial number | PN630HE / 3P+N | |
| | Sample no: | #11C | |
| | Rated current: In (A) | 400 A | |
| | Test level.....: | 4 kV | P |
| | tr/Th:5/50ns | | P |
| | Repetition frequency.....: | 5 KHz | P |
| | Test duration.....: | 1 min | P |
| | During test, the current 0,9 Ir.....: | 129,6 A | P |
| | No tripping was observed | | P |
| | Then, test current at 2Ir.....: | 288 A | P |
| | The operating time shall be within 0,9 times the minimum value and 1,1 times the maximum value stated by the manufacturer for twice the current setting | | |
| | Time specified by the manufacturer.....: | 40,5 s ≤ t ≤ 176 s | P |
| | Trip time.....: | Positive: 116,18 s Negative: 116,34 s | P |
| F.4.5 | Surges | | P |
| | Type designation or serial number | PN630HE / 3P+N | |
| | Sample no: | #11C | |
| | Rated current: In (A) | 400 A | |

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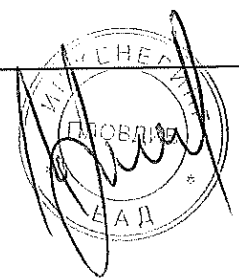





| IEC 60947-2 | | | |
|-------------|---|---|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | Test level.....: | 4 kV (line to earth) 2 kV (line to line) | P |
| | tr/Th:1,2/50 µs | | P |
| | Pulses with both positive and negative polarity shall be applied, the phase angles being 0° and 90°. | | P |
| | A series of five pulses is applied for each polarity and each phase angel(total number of pulses:20), the interval between two pulses being approximately 1min. | | P |
| | During the test, the current 0,9 Ir.....: | 129,6 A | P |
| | After the test, test current at 2,0 Ir.....: | 288 A | P |
| | The operating time shall be within the value stated by the manufacturer for twice the current setting | | |
| | Time specified by the manufacturer.....: | 45 s ≤ t ≤ 160 s | P |
| | Trip time.....: | 118,21 s (line to earth) 118,43 s (line to line) | P |
| F.4.6 | Conducted disturbances induced by radio-frequency fields (common mode) | | P |
| | Type designation or serial number | PN630HE / 3P+N | |
| | Sample no: | #11C | |
| | Rated current: In (A) | 400 A | |
| | Test level | 10 V | P |
| | Frequency range.....: | 0,15 - 80 MHz | P |
| | During test, the current 0,9 Ir.....: | 129,6 A | P |
| | Sweeping the frequency range, the dwell time of the amplitude modulated carrier for each frequency shall be between 500ms and 1000ms, and the step size shall be 1% of the precious frequency. | | P |
| | No tripping was observed | | P |
| | Then, test current at 2Ir.....: | 288 A | P |
| | the test shall be performed at each of the following frequencies: 0,150; 0,300; 0,450; 0,600; 0,900; 1,20; 1,80; 2,40; 3,60; 4,80; 7,20; 9,60; 12,0; 19,2; 27,0; 49,4; 72,0 and 80,0MHz, the operation being verified after the level of the disturbing voltage at each frequency has stabilized. | | P |

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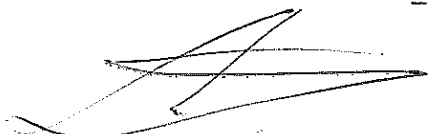
КЕРТО С ОРАТ РАД

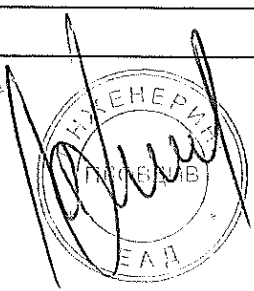


| IEC 60947-2 | | | |
|-------------|---|---|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | The operating time shall be within 0,9 times the minimum value and 1,1 times the maximum value stated by the manufacturer for twice the current setting | | |
| | Time specified by the manufacturer.....: | 40,5 s ≤ t ≤ 176 s | P |
| | Trip time.....: | 106,73 s; 91,93 s; 97,84 s; 113,11 s; 136,91 s; 141,35 s; 137,21 s; 135,28 s; 118,21 s; 132,14 s; 117,25 s; 110,28 s; 119,24 s; 130,27 s; 122,48 s; 98,26 s; 101,01 s; 100,47 s. | P |
| F.4.7 | Current dips | | P |
| | Type designation or serial number | PN630HE / 3P+N | |
| | Sample no: | #11C | |
| | Rated current: I _n (A) | 400 A | |
| | Initial test current 0,9 I _r: | 129,6 A | P |
| | I _D is dip the test current, T is period of the sinusoidal current | | P |
| | Test duration, 3–4 times of the tripping time at 2 I _r or 10 min, whichever is lower.....: | 480 s | P |
| | Test no. 1 with I _D = 0 and Δt = 0,5T | | P |
| | No tripping was observed | | P |
| | Test no. 2 with I _D = 0 and Δt = 1T | | P |
| | No tripping was observed | | P |
| | Test no. 3 with I _D = 0 and Δt = 5T | | P |
| | No tripping was observed | | P |
| | Test no. 4 with I _D = 0 and Δt = 25T | | P |
| | No tripping was observed | | P |
| | Test no. 5 with I _D = 0 and Δt = 50T | | P |
| | No tripping was observed | | P |
| | Test no. 6 with I _D = 0,4 × I _r and Δt = 10T | | P |
| | No tripping was observed | | P |
| | Test no. 7 with I _D = 0,4 × I _r and Δt = 25T | | P |
| | No tripping was observed | | P |
| | Test no. 8 with I _D = 0,4 × I _r and Δt = 50T | | P |

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ИЗДАНО С ОРИГИНАЛОМ



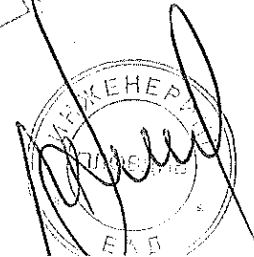


| IEC 60947-2 | | | |
|-------------|--|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | No tripping was observed | | P |
| | Test no. 9 with $I_D = 0,7 \times I_r$ and $\Delta t = 10T$ | | P |
| | No tripping was observed | | P |
| | Test no. 10 with $I_D = 0,7 \times I_r$ and $\Delta t = 25T$ | | P |
| | No tripping was observed | | P |
| | Test no. 11 with $I_D = 0,7 \times I_r$ and $\Delta t = 50T$ | | P |
| | No tripping was observed | | P |
| F.5 | Emission tests | | P |
| F.5.1 | Harmonics | | N/A |
| | The electronic control circuits operate at very low power and hence create negligible disturbances; therefore no tests are required. | | N/A |
| F.5.2 | Voltage fluctuations | | N/A |
| | The electronic control circuits operate at very low power and hence create negligible disturbances; therefore no tests are required. | | N/A |
| F.5.3 | Conducted RF disturbances (150 kHz – 30 MHz) | | N/A |
| | Circuit-breakers covered by this annex are independent of line voltage or of any auxiliary supply and have no direct coupling to the supply; the electronic circuits operate at very low power. These circuit-breakers create negligible disturbances and therefore no tests are required. | | N/A |
| F.5.4 | Radiated RF disturbances (30 MHz – 1 GHz) | | P |
| | Type designation or serial number | PN630HE / 3P+N | P |
| | Sample no: | #11C | P |
| | Rated current: I_n (A) | 400 A | P |
| | Limits of Class A of CISPR11 / CISPR22 | | N/A |
| | Limits of Class B of CISPR11 / CISPR22 | | P |
| | The product does not exceed the limits | | P |
| F6 | Suitability for multiple frequencies | | N/A |
| F.7. | Dry heat test | | N/A |
| F.8. | Damp heat test | | N/A |

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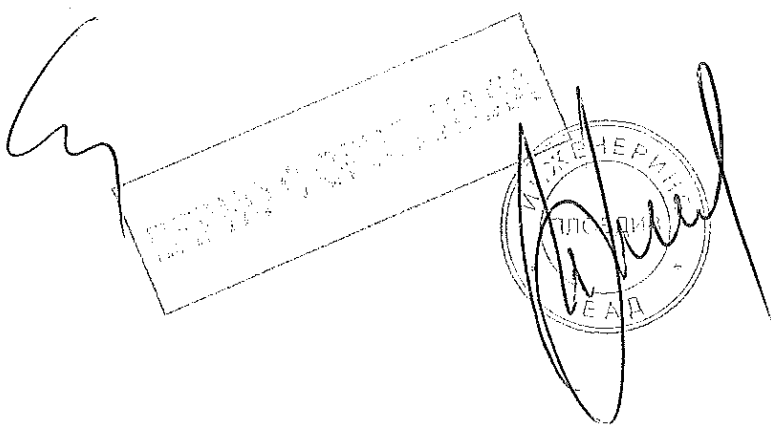


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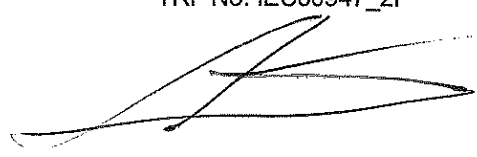


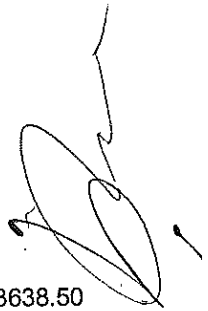


| IEC 60947-2 | | | |
|-------------|--|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| F.9. | Temperature variation cycles at a specified rate of change | | N/A |



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| IEC 60947-2 | | | |
|-------------|---|--|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| Annex F | Additional tests for circuit-breakers with electronic over-current protection | | P |
| F4 and F5 | Verification of electromagnetic compatibility (EMC) | | N/A |
| F6 | Suitability for multiple frequencies | | N/A |
| F.7. | Dry heat test | | P |
| | Type designation or serial number | PN630HE / 3P+N | |
| | Sample no: | #12B | |
| | Rated current: In (A) | 630 A | |
| F.7.1 | The test shall be performed on the circuit-breaker in accordance with 7.2.2 at the maximum rated current for a given frame size, on all phase poles, at an ambient temperature of 40 °C | In = 630 A | |
| | The duration of the test, once temperature equilibrium is reached, shall be 168 h | | |
| | Tightening torques applied to the terminals shall be in accordance with the manufacturers' instructions. In absence of such instructions, table 4 of IEC 60947-1 shall apply | Torque = 10 Nm | |
| | As an alternative, the test may be performed as follows: | | |
| | - measure and record the highest temperature rise of the air surrounding the electronic components, during the temperature rise verification of test sequence 1 | | |
| | - install the electronic controls in the chamber | | |
| | - supply the electronic controls with their input energizing value | | |
| | - adjust the temperature of the test chamber to a value of 40 K above the temperature rise recorded for the surrounding the electronic components and maintain this temperature for 168 h | Chamber temperature: 48,8 °C | |
| | Test carried out.....: | <input type="checkbox"/> normal <input checked="" type="checkbox"/> alternative | |
| F.7.2 | Test results | | P |
| | The circuit-breaker and the electronic controls shall meet the following requirements: | | |
| | - no tripping of the circuit-breaker shall occur | | P |

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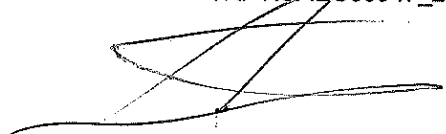
TEST & OPERATIONS





| IEC 60947-2 | | | |
|-------------|--|---|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | - no operating of the electronic controls which would cause the circuit-breaker to trip shall occur | | P |
| F.7.3 | Verification of the overload releases | | P |
| | Following the test F.7.1, the operation of the overload releases of the circuit-breaker shall be verified in accordance with 7.2.1.2.4, item b). | | P |
| 7.2.1.2.4 | Opening by over-current releases | | P |
| b) | Opening under overload conditions | | |
| 1) | Instantaneous or definite time-delay operation | | N/A |
| | The release shall cause tripping of the circuit-breaker with an accuracy of + 10% of the tripping current value of the current setting for all values of current setting of the overload release | | N/A |
| 2) | Inverse timer-delay operation | | |
| | At the reference temperature and at 1,05 times the current setting with the conventional non-tripping current, the opening release being energized on all poles, tripping shall not occur in less than the conventional time from the cold state, i.e. with the circuit-breaker at the reference temperature | 672 A (1,05 x Ir) Ir = 1Io, Io = 1In 2 hours non-tripping | P |
| | Moreover, when at the end of the conventional time the value of current is immediately raised to 1,30 times the current setting, i.e. with the conventional tripping current, tripping shall then occur in less than the conventional time later | 831 A (1,3 x Ir) Ir = 1Io, Io = 1In Tripping time: 2 min 09 s | P |
| | At the reference temperature and at 1,05 times the current setting with the conventional non-tripping current, the opening release being energized on all poles, tripping shall not occur in less than the conventional time from the cold state, i.e. with the circuit-breaker at the reference temperature | 154 A (1,05 x Ir) Ir = 0,9Io, Io = 0,4In 2 hours non-tripping | P |
| | Moreover, when at the end of the conventional time the value of current is immediately raised to 1,30 times the current setting, i.e. with the conventional tripping current, tripping shall then occur in less than the conventional time later | 190 A (1,3 x Ir) Ir = 0,9Io, Io = 0,4In Tripping time: 1 min 42 s | P |
| | If a release is declared by the manufacturer as substantially independent of ambient temperature, the current values of table 6 shall apply within the temperature band declared by the manufacturer, within a tolerance of 0,3%/K | | P |

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РЕЗУЛТАТ ОЦЕНКИ

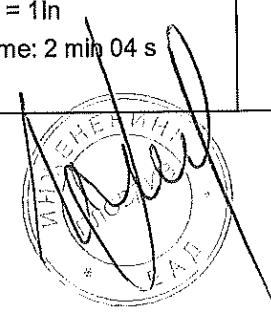


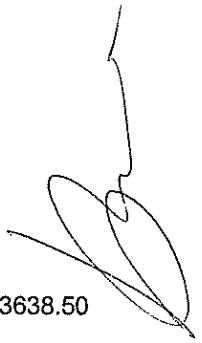


| IEC 60947-2 | | | |
|-------------|--|---|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | The width of the temperature band shall be at least 10 K on either side of the reference temperature | | P |
| F.8. | Damp heat test | | P |
| F.8.1 | Test procedure | | P |
| | The test shall be performed according to IEC 60068-2-30 (12 +12 hours cycle) | | |
| | Test Db temperature cycle between 25°C and upper temperature | | |
| | The upper temperature shall be 55°C ± 2 °C (variant 1) and number of cycles shall be six. | | |
| | The relative humidity is maintained at a high level at the upper temperature | | |
| | The test may be performed with only the electronic controls in the test chamber | | |
| | Test result.....: | | P |
| F.8.2 | Verification of the overload releases | | P |
| | Following the test F.8.1, the operation of the overload releases of the circuit-breaker shall be verified in accordance with 7.2.1.2.4, item b). | | P |
| 7.2.1.2.4 | Opening by over-current releases | | P |
| b) | Opening under overload conditions | | |
| 1) | Instantaneous or definite time-delay operation | | N/A |
| | The release shall cause tripping of the circuit-breaker with an accuracy of + 10% of the tripping current value of the current setting for all values of current setting of the overload release | | N/A |
| 2) | Inverse timer-delay operation | | |
| | At the reference temperature and at 1,05 times the current setting with the conventional non-tripping current, the opening release being energized on all poles, tripping shall not occur in less than the conventional time from the cold state, i.e. with the circuit-breaker at the reference temperature | 672 A (1,05 x Ir) Ir = 1Io, Io = 1In 2 hours non-tripping | P |
| | Moreover, when at the end of the conventional time the value of current is immediately raised to 1,30 times the current setting, i.e. with the conventional tripping current, tripping shall then occur in less than the conventional time later | 831 A (1,3 x Ir) Ir = 1Io, Io = 1In Tripping time: 2 min 04 s | P |

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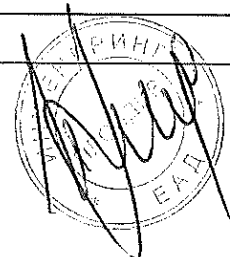


| IEC 60947-2 | | | |
|-------------|--|---|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | At the reference temperature and at 1,05 times the current setting with the conventional non-tripping current, the opening release being energized on all poles, tripping shall not occur in less than the conventional time from the cold state, i.e. with the circuit-breaker at the reference temperature | 154 A (1,05 x Ir) Ir = 0,9Io, Io = 0,4In 2 hours non-tripping | P |
| | Moreover, when at the end of the conventional time the value of current is immediately raised to 1,30 times the current setting, i.e. with the conventional tripping current, tripping shall then occur in less than the conventional time later | 190 A (1,3 x Ir) Ir = 0,9Io, Io = 0,4In Tripping time: 1 min 44 s | P |
| | If a release is declared by the manufacturer as substantially independent of ambient temperature, the current values of table 6 shall apply within the temperature band declared by the manufacturer, within a tolerance of 0,3%/K | | P |
| | The width of the temperature band shall be at least 10 K on either side of the reference temperature | | P |
| F.9. | Temperature variation cycles at a specified rate of change | | P |
| F.9.1 | Test conditions | | P |
| | Each design of electronic controls shall be submitted to temperature variation cycles in according with figure F.15 | | |
| | The rise and fall of temperature during the rate of variation shall be 1 K/min ± 0,2 K/min. | | |
| | Their temperature, once reached, shall be maintained for at least 2 h. | | |
| | The number of cycles shall be 28. | | |
| F.9.2 | Test procedure | | P |
| | The test shall be carried out according IEC 60068-2-14. | | |
| | For the these test, the electronic controls may be mounted inside the circuit-breaker or separately. | | |
| | The electronic controls shall be energized to simulate service conditions. | | |
| | Where the electronics controls are mounted inside the circuit-breaker, the main circuit shall not be energized. | | |
| F.9.3 | Test results | | P |

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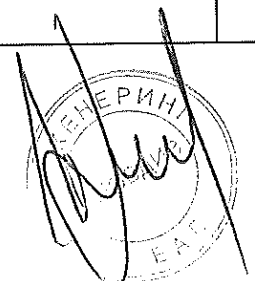
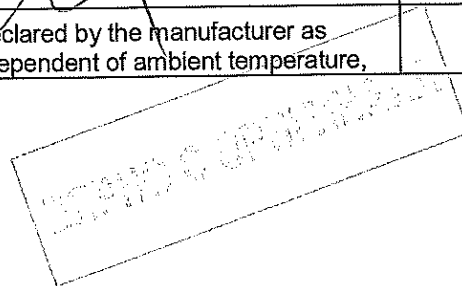


КОПИО С ОФИЦИАЛНОТО СЕРТИФИКАТНО СЪДЪРЖАНО




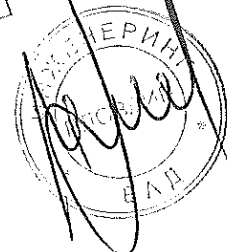
| IEC 60947-2 | | | |
|-------------|--|---|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | The electronic controls shall meet the following requirement. | | P |
| | No operation of the electronic controls which would cause the circuit-breaker to trip during the 28 cycles shall occur. | | P |
| F.9.4 | Verification of overload releases | | P |
| | Following the test F.8.1, the operation of the overload releases of the circuit-breaker shall be verified in accordance with 7.2.1.2.4, item b). | | P |
| 7.2.1.2.4 | Opening by over-current releases | | P |
| b) | Opening under overload conditions | | |
| 1) | Instantaneous or definite time-delay operation | | N/A |
| | The release shall cause tripping of the circuit-breaker with an accuracy of + 10% of the tripping current value of the current setting for all values of current setting of the overload release | | N/A |
| 2) | Inverse timer-delay operation | | P |
| | At the reference temperature and at 1,05 times the current setting with the conventional non-tripping current, the opening release being energized on all poles, tripping shall not occur in less than the conventional time from the cold state, i.e. with the circuit-breaker at the reference temperature | 672 A (1,05 x Ir) Ir = 1Io, Io = 1In 2 hours non-tripping | P |
| | Moreover, when at the end of the conventional time the value of current is immediately raised to 1,30 times the current setting, i.e. with the conventional tripping current, tripping shall then occur in less than the conventional time later | 831 A (1,3 x Ir) Ir = 1Io, Io = 1In Tripping time: 2 min 07 s | P |
| | At the reference temperature and at 1,05 times the current setting with the conventional non-tripping current, the opening release being energized on all poles, tripping shall not occur in less than the conventional time from the cold state, i.e. with the circuit-breaker at the reference temperature | 154 A (1,05 x Ir) Ir = 0,9Io, Io = 0,4In 2 hours non-tripping | P |
| | Moreover, when at the end of the conventional time the value of current is immediately raised to 1,30 times the current setting, i.e. with the conventional tripping current, tripping shall then occur in less than the conventional time later | 190 A (1,3 x Ir) Ir = 0,9Io, Io = 0,4In Tripping time: 1 min 40 s | P |
| | If a release is declared by the manufacturer as substantially independent of ambient temperature, | | P |

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| IEC 60947-2 | | | |
|-------------|--|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | the current values of table 6 shall apply within the temperature band declared by the manufacturer, within a tolerance of 0,3%/K | | |
| | The width of the temperature band shall be at least 10 K on either side of the reference temperature | | P |

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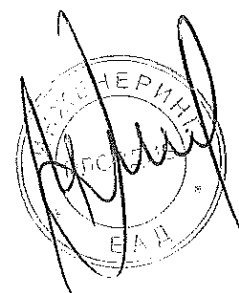

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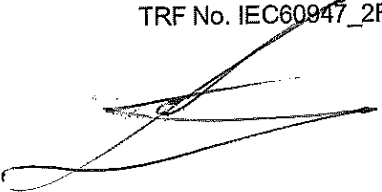
| IEC 60947-2 | | | |
|-------------|--|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| Annex H | Individual pole short-circuit test sequence | | N/A |
| Annex J | Electromagnetic compatibility (EMC) – Requirements and test methods for circuit-breakers | | N/A |
| Annex L | Circuit-breakers not fulfilling the requirements for overcurrent protection | | N/A |
| Annex M | Modular residual current devices (without integral current breaking device) | | N/A |
| Annex N | Electromagnetic compatibility (EMC) – Additional requirements and test methods for devices not covered by Annexes B, F and M | | N/A |
| Annex O | Instantaneous trip circuit-breakers (ICB) | | N/A |




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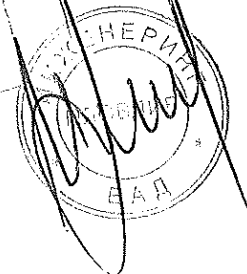
| IEC 60947-2 | | | |
|-------------|--------------------|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |

| TABLE 1: Heating Test (Seq I, 8.3.3.6, sample number #01C) | | | P |
|--|-------------------------------------|-----------------------------|---|
| Test current (A): | | 630 A | — |
| Ambient (°C): | | 29,4 °C | — |
| Thermocouple Locations | max. temperature rise measured, (K) | max. temperature limit, (K) | |
| Terminal of top left phase pole | 60 K | 80 K | |
| Terminal of top centre phase pole | 70 K | 80 K | |
| Terminal of top right phase pole | 79 K | 80 K | |
| Terminal of bottom left phase pole | 66 K | 80 K | |
| Terminal of bottom centre phase pole | 73 K | 80 K | |
| Terminal of bottom right phase pole | 69 K | 80 K | |
| Actuator | 31 K | 35 K | |
| Front side | 28 K | 50 K | |
| Side | 51 K | 60 K | |

| TABLE 2: Heating Test (Seq I, 8.3.3.6, sample number #01C) | | | P |
|--|-------------------------------------|-----------------------------|---|
| Test current (A): | | 441 A | — |
| Ambient (°C): | | 29,7 °C | — |
| Thermocouple Locations | max. temperature rise measured, (K) | max. temperature limit, (K) | |
| Terminal of top right phase pole | 41 K | 80 K | |
| Terminal of top N pole | 48 K | 80 K | |
| Terminal of bottom right phase pole | 35 K | 80 K | |
| Terminal of bottom N pole | 40 K | 80 K | |

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СЕРТИФИКАТ



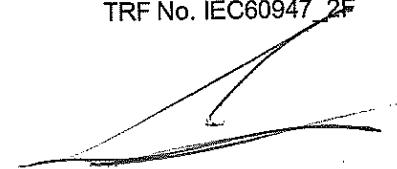
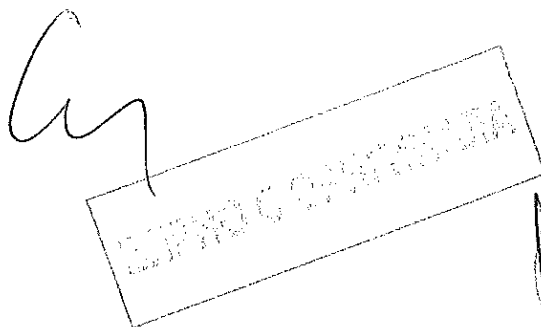


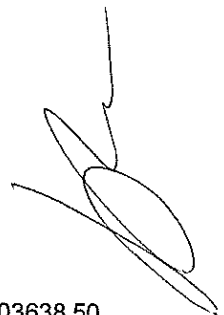
| IEC 60947-2 | | | |
|-------------|--------------------|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |

| TABLE 3: Heating Test (Seq I, 8.3.3.6, sample number #02B) | | | P |
|--|-------------------------------------|-----------------------------|---|
| Test current (A): | | 630 A | — |
| Ambient (°C): | | 25,4 °C | — |
| Thermocouple Locations | max. temperature rise measured, (K) | max. temperature limit, (K) | |
| Terminal of top left phase pole | 78 K | 80 K | |
| Terminal of top centre phase pole | 78 K | 80 K | |
| Terminal of top right phase pole | 73 K | 80 K | |
| Terminal of bottom left phase pole | 65 K | 80 K | |
| Terminal of bottom centre phase pole | 75 K | 80 K | |
| Terminal of bottom right phase pole | 77 K | 80 K | |
| Actuator | 33 K | 35 K | |
| Front side | 26 K | 50 K | |
| Side | 42 K | 60 K | |

| TABLE 4: Heating Test (Seq II, 8.3.4.4, sample number #03B) | | | P |
|---|-------------------------------------|-----------------------------|---|
| Test current (A): | | 630 A | — |
| Ambient (°C): | | 24,5 °C | — |
| Thermocouple Locations | max. temperature rise measured, (K) | max. temperature limit, (K) | |
| Terminal of top left phase pole | 43 K | 80 K | |
| Terminal of top centre phase pole | 58 K | 80 K | |
| Terminal of top right phase pole | 43 K | 80 K | |
| Terminal of bottom left phase pole | 47 K | 80 K | |
| Terminal of bottom centre phase pole | 55 K | 80 K | |
| Terminal of bottom right phase pole | 48 K | 80 K | |

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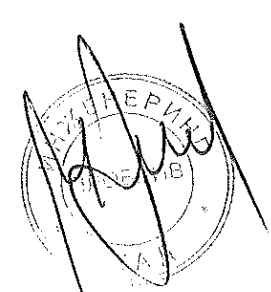
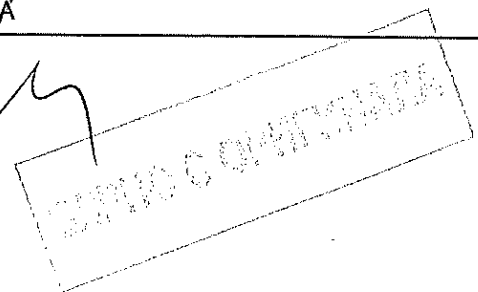
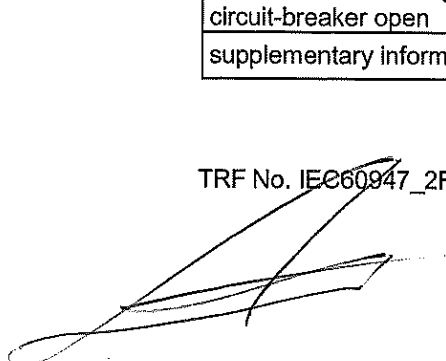
| IEC 60947-2 | | | |
|-------------|--------------------|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |

| TABLE 5: dielectric strength (Seq I, 8.3.3.5, sample number #01C and #02B) | | | P |
|---|----------------------------|--------------------------------|---|
| test voltage applied between: | test potential applied (V) | breakdown / flashover (Yes/No) | |
| Between all the terminals of the main circuit connected together and the enclosure or mounting plate, with the contacts in all normal positions of operation | 1000 V | No | |
| Between each pole of the main circuit and the other poles connected together and to the enclosure or mounting plate, with the contacts in all normal positions of operation | 1000 V | No | |
| Between the incoming and outgoing terminals with the circuit-breaker open | 1000 V | No | |
| supplementary information: N/A | | | |

| TABLE 6: dielectric strength (Seq II, 8.3.4.3, sample number #03B and #04B) | | | P |
|---|----------------------------|--------------------------------|---|
| test voltage applied between: | test potential applied (V) | breakdown / flashover (Yes/No) | |
| Between all the terminals of the main circuit connected together and the enclosure or mounting plate, with the contacts in all normal positions of operation | 1000 V | No | |
| Between each pole of the main circuit and the other poles connected together and to the enclosure or mounting plate, with the contacts in all normal positions of operation | 1000 V | No | |
| Between the incoming and outgoing terminals with the circuit-breaker open | 1000 V | No | |
| supplementary information: N/A | | | |

| TABLE 7: dielectric strength (Seq III, 8.3.5.3, sample number #05B, #06B, #07B, #08B, #09B and #10B) | | | P |
|---|----------------------------|--------------------------------|---|
| test voltage applied between: | test potential applied (V) | breakdown / flashover (Yes/No) | |
| Between all the terminals of the main circuit connected together and the enclosure or mounting plate, with the contacts in all normal positions of operation | 1000 V | No | |
| Between each pole of the main circuit and the other poles connected together and to the enclosure or mounting plate, with the contacts in all normal positions of operation | 1000 V | No | |
| Between the incoming and outgoing terminals with the circuit-breaker open | 1000 V | No | |
| supplementary information: N/A | | | |

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|-------------|--------------------|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |

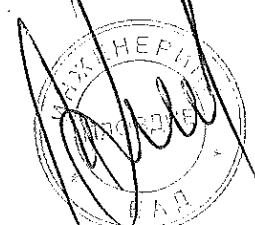
| TABLE 8: clearance and creepage distance measurements | | | | | | | P |
|---|--------|-----------|------------------|---------|-------------------|----------|---|
| clearance cl and creepage distance dcr at/of: | Ui (V) | Uimp (kV) | required cl (mm) | cl (mm) | required dcr (mm) | dcr (mm) | |
| Between poles | 750 V | 8 kV | 8 mm | 28,2 mm | 11 mm | 54,1 mm | |
| Between live parts and parts intended to be earthed | 750 V | 8 kV | 8 mm | 18,0 mm | 11 mm | 21,9 mm | |
| Between the contacts in the open position | 750 V | 8 kV | 8 mm | 18,8 mm | 11 mm | 20,4 mm | |
| Between live parts and actuator | 750 V | 8 kV | 8 mm | 14,2 mm | 11 mm | 17,5 mm | |
| Between circuit conductors at different voltages | 750 V | 8 kV | 8 mm | 11,3 mm | 11 mm | 11,3 mm | |

| TABLE 9: Resistance to fire (Glow wire test) | | | | | | | P |
|--|------------------------|--------|----------|---------------------|-------|-----------------|---|
| No. | Description | Colour | Temp. °C | burning after t (s) | drops | support burning | — |
| 1 | Base | Black | 960 °C | 2 s | No | No | P |
| 2 | Cover | Black | 960 °C | 2 s | No | No | P |
| 3 | Handle | Black | 960 °C | 2 s | No | No | P |
| 4 | Axis of moving contact | White | 960 °C | 0 s | No | No | P |
| 5 | Box of contact | White | 960 °C | 0 s | No | No | P |

| TABLE 10: Resistance to tracking (tracking test) | | | | | | | P |
|--|--------|-------------|------------|---------|-------------|------------------|---------|
| Specimen | | | | | | | Verdict |
| Description | Colour | Drops (no.) | Thick (mm) | Burning | Current (A) | Test voltage (V) | |
| Base | Black | 50 | 3 mm | N | < 0,5 A | 400 V | P |
| Cover | Black | 50 | 3 mm | N | < 0,5 A | 400 V | P |
| Handle | Black | 50 | 3 mm | N | < 0,5 A | 400 V | P |
| Axis of moving contact | White | 50 | 3 mm | N | < 0,5 A | 400 V | P |
| Box of contact | White | 50 | 3 mm | N | < 0,5 A | 400 V | P |

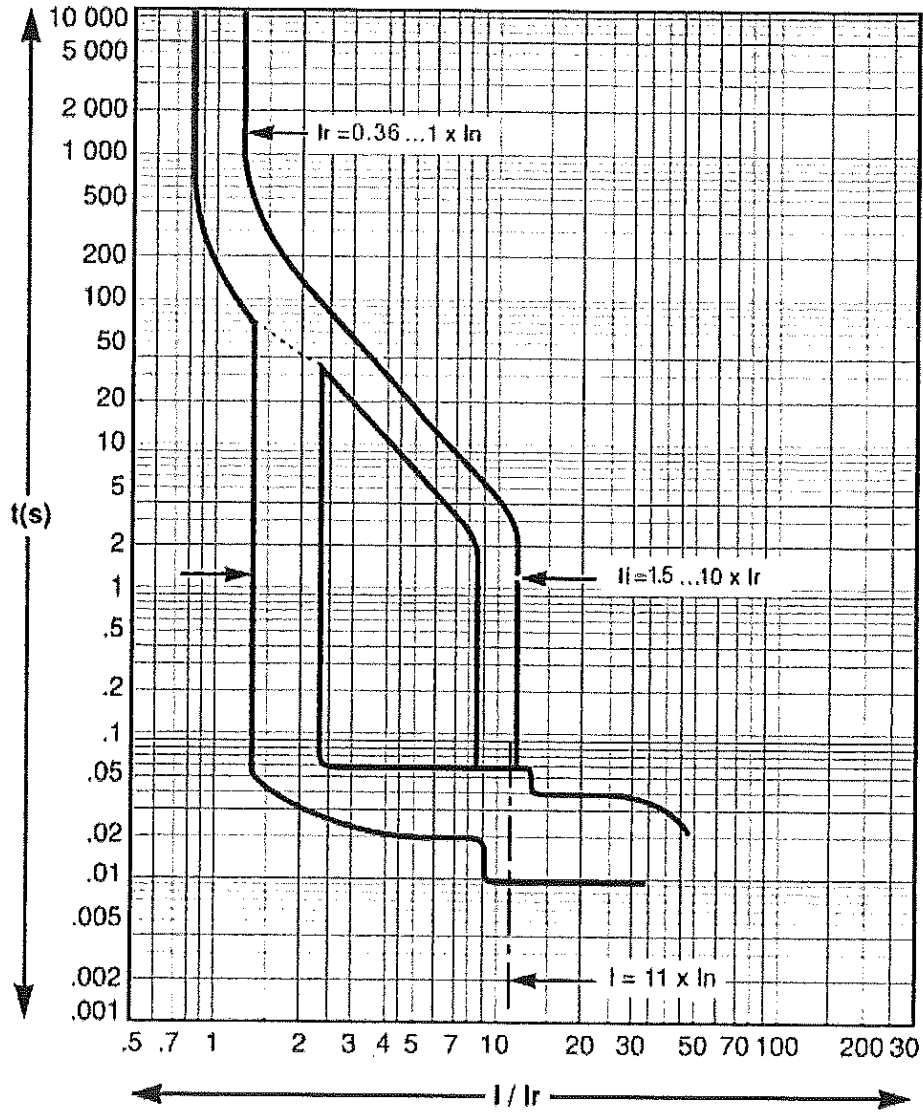
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Time current characteristics



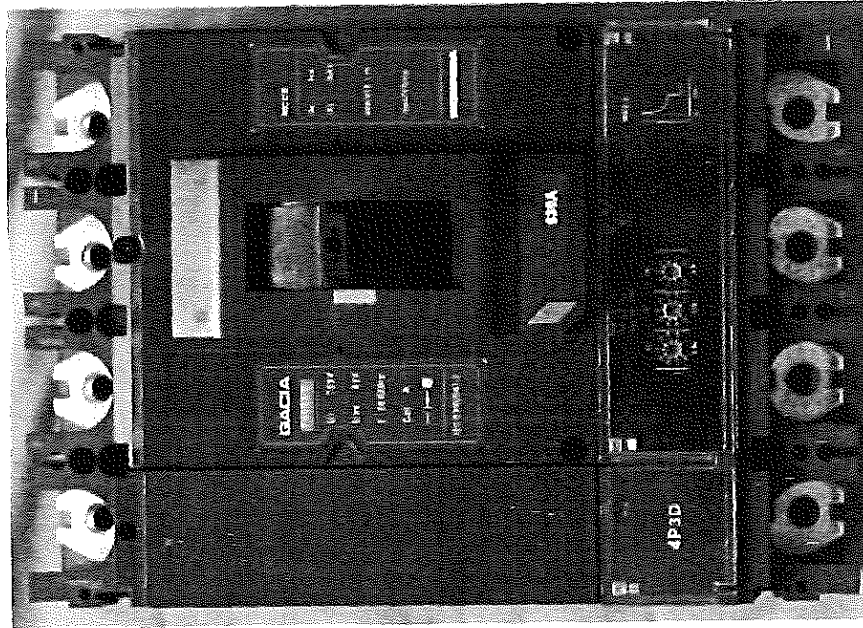
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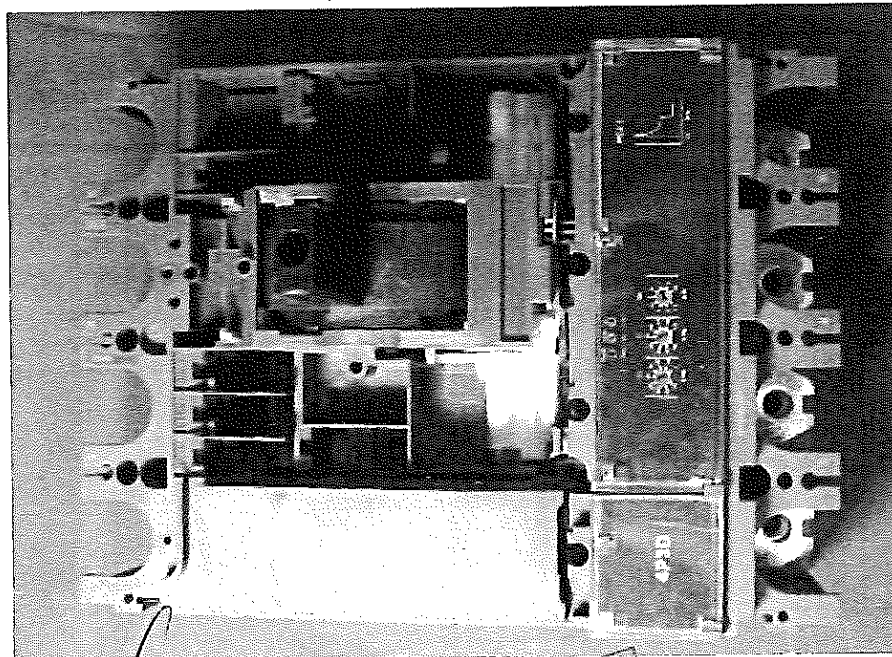
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Photographs
Front view, 3P + N MCCB



Open view, 3P + N MCCB



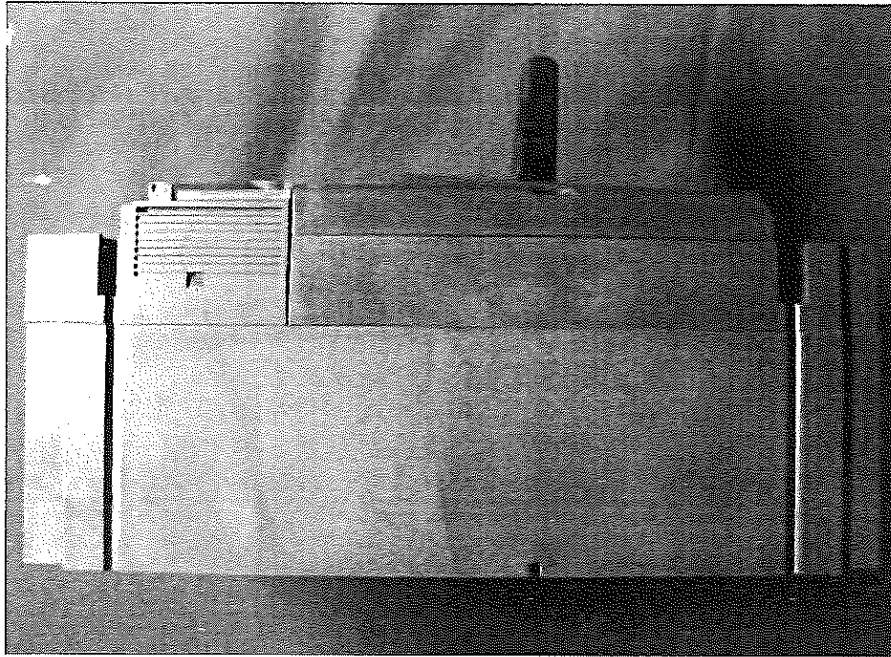
Side view, 3P + N MCCB

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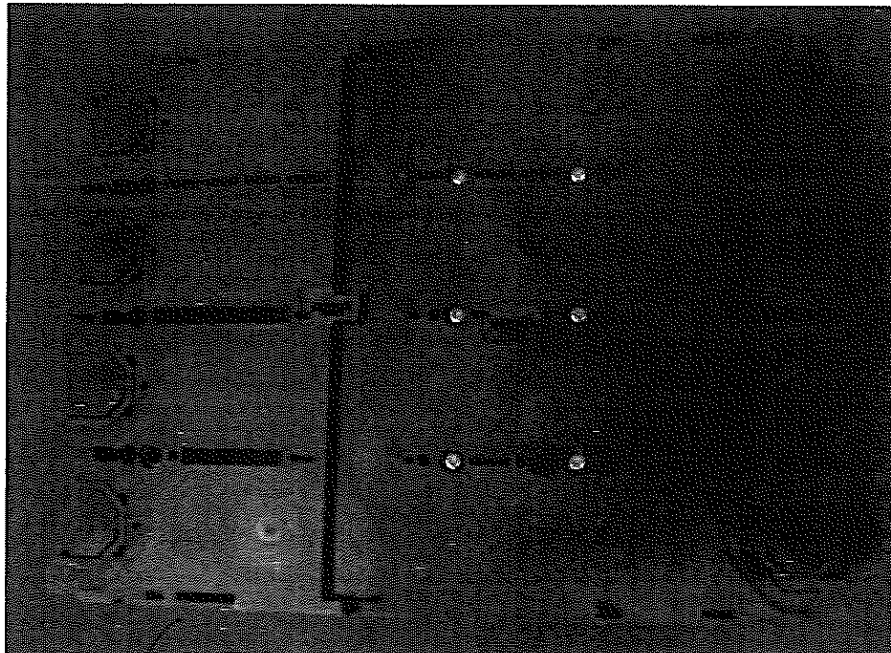
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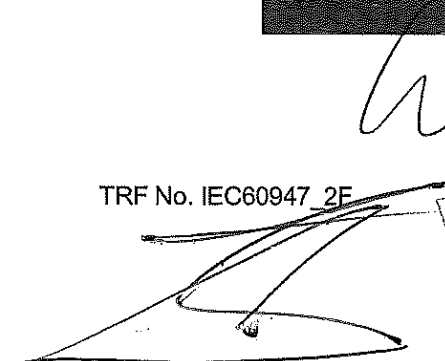
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Back view, 3P + N MCCB



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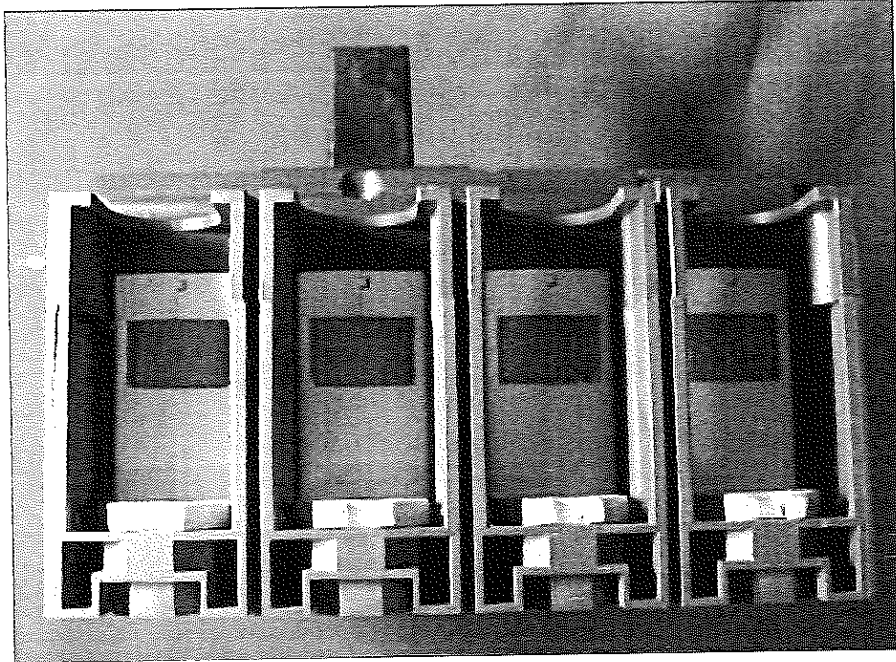
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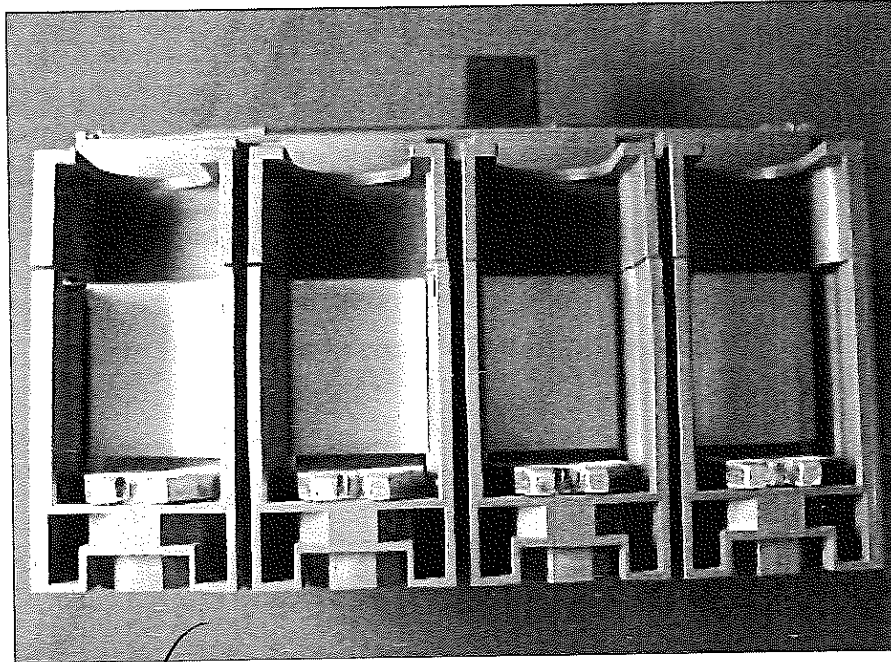


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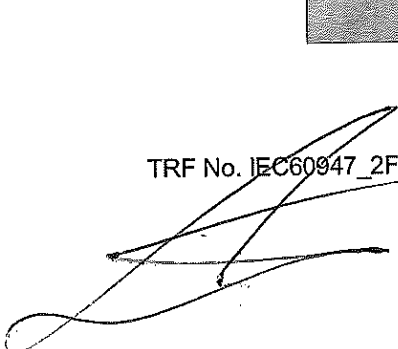
Line terminal view, 3P + N MCCB



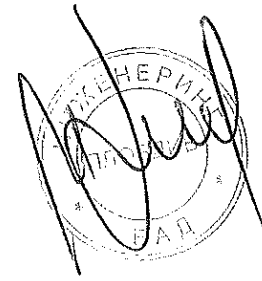
Load terminal view, 3P + N MCCB

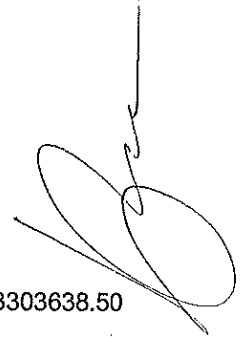


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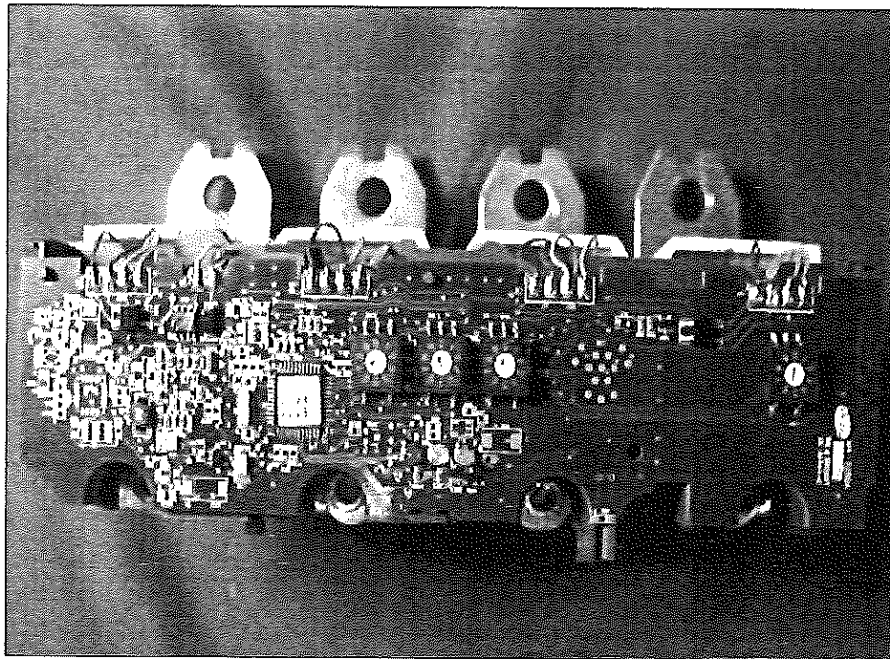
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ДЕКРА



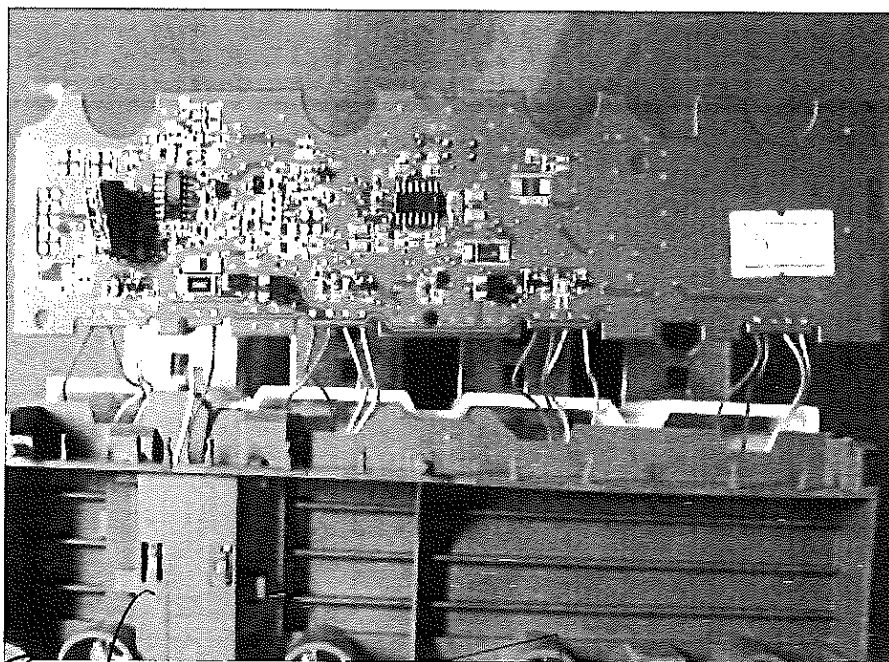


IEC 60947-2

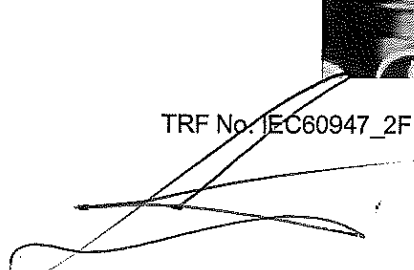
PCB of electronic release, 3P + N MCCB



PCB of electronic release, 3P + N MCCB



TRF No. IEC60947_2F

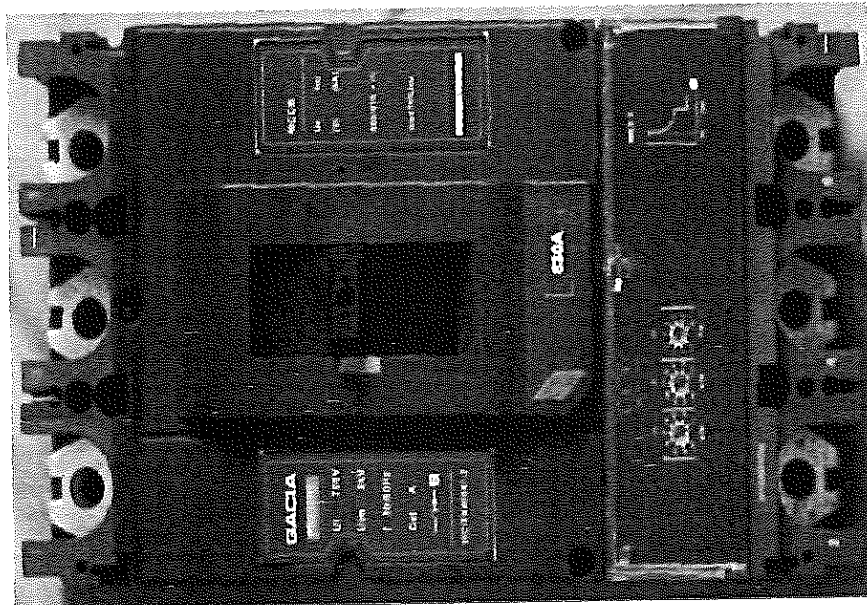


СЕРТИФИКАЦИЯ

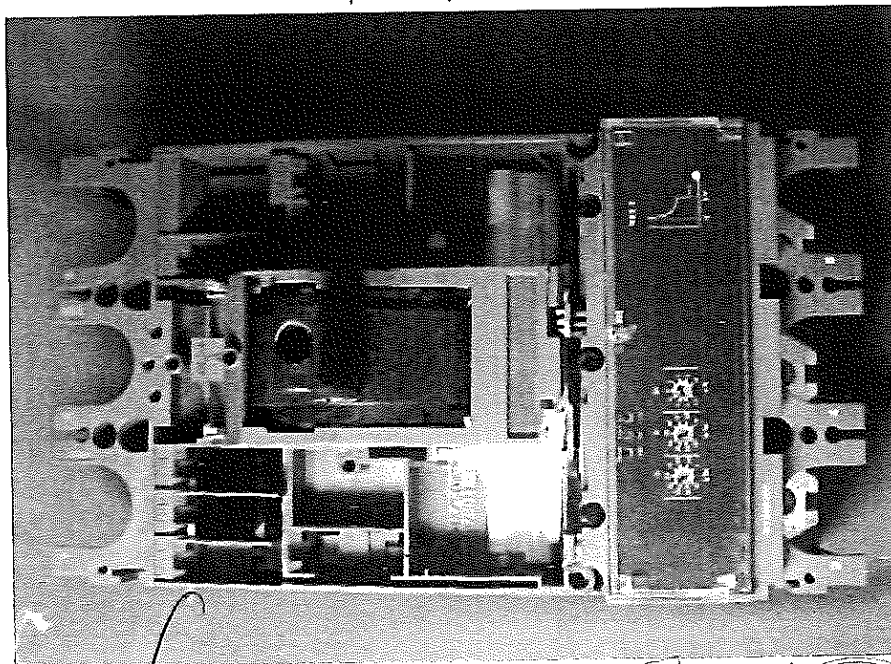


IEC 60947-2

Front view, 3P MCCB



Open view, 3P MCCB

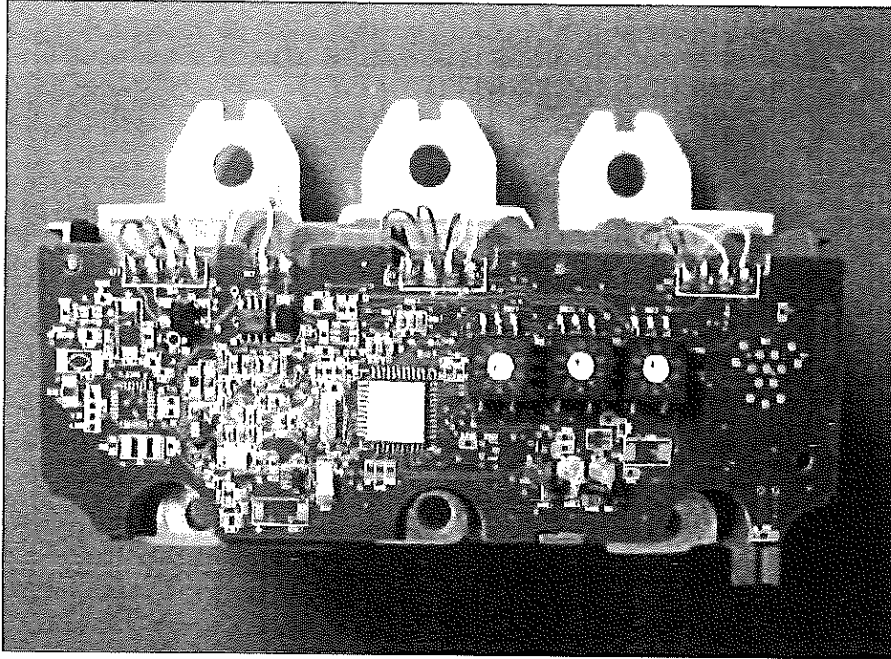


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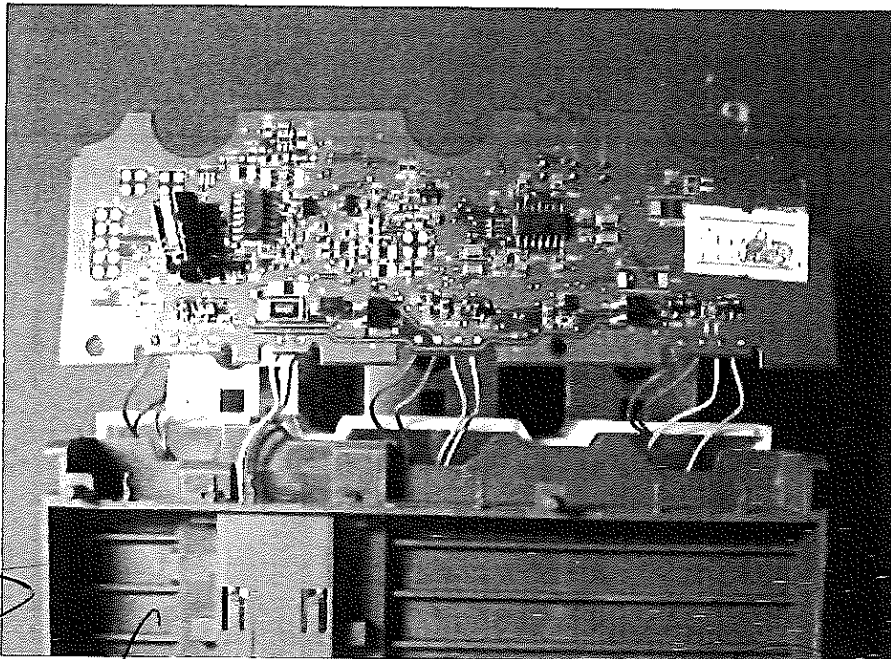
СЕРТИФИКАТ

IEC 60947-2

PCB of electronic release, 3P MCCB



PCB of electronic release, 3P MCCB

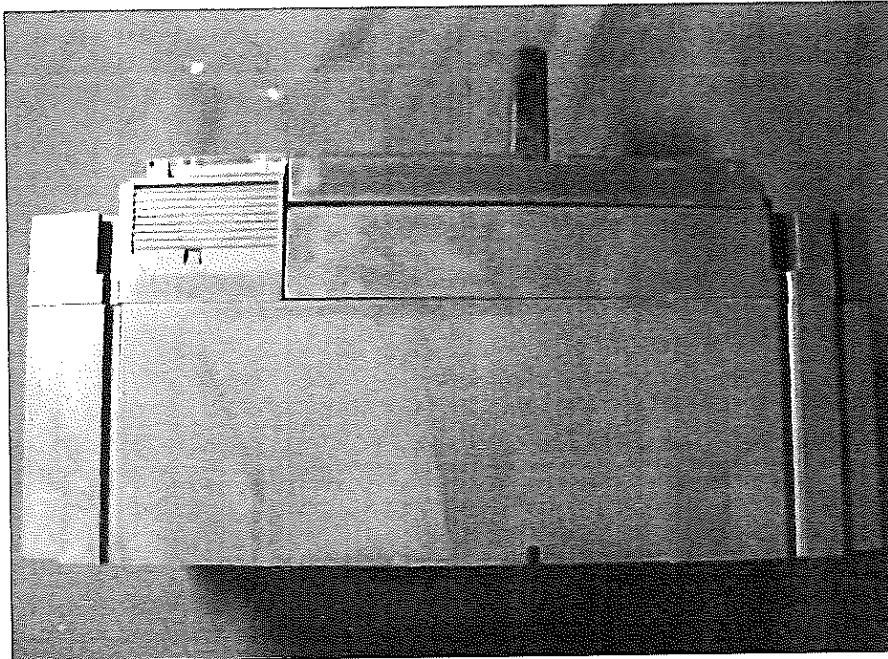


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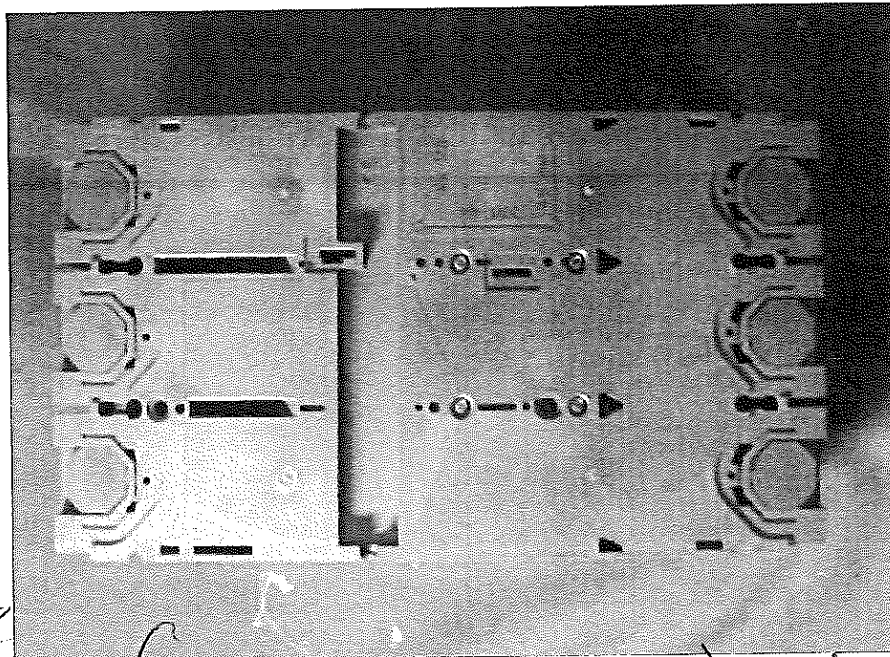
ВЕРНО С ОРИГИНАЛОМ

IEC 60947-2

Side view, 3P MCCB



Back view, 3P MCCB

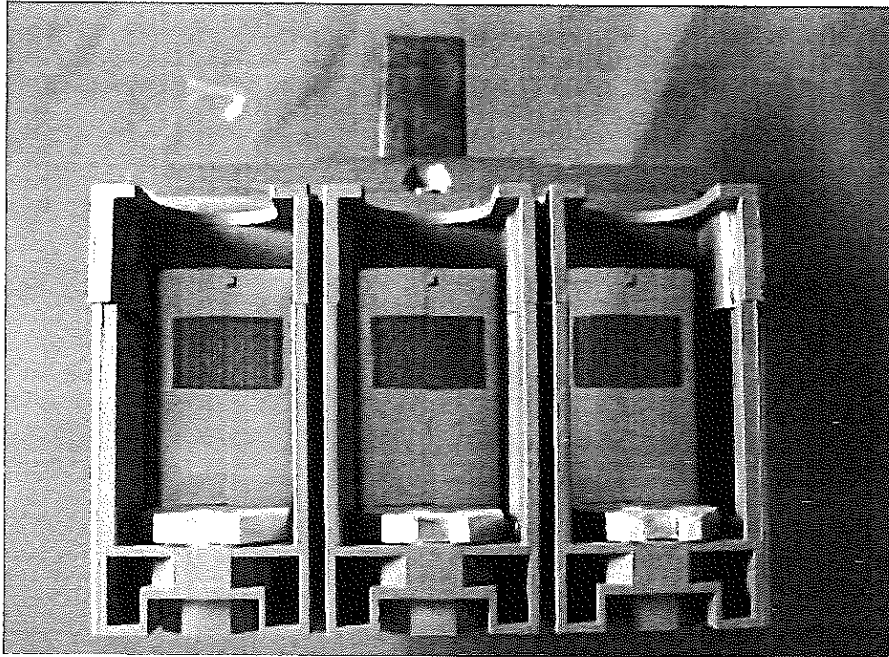


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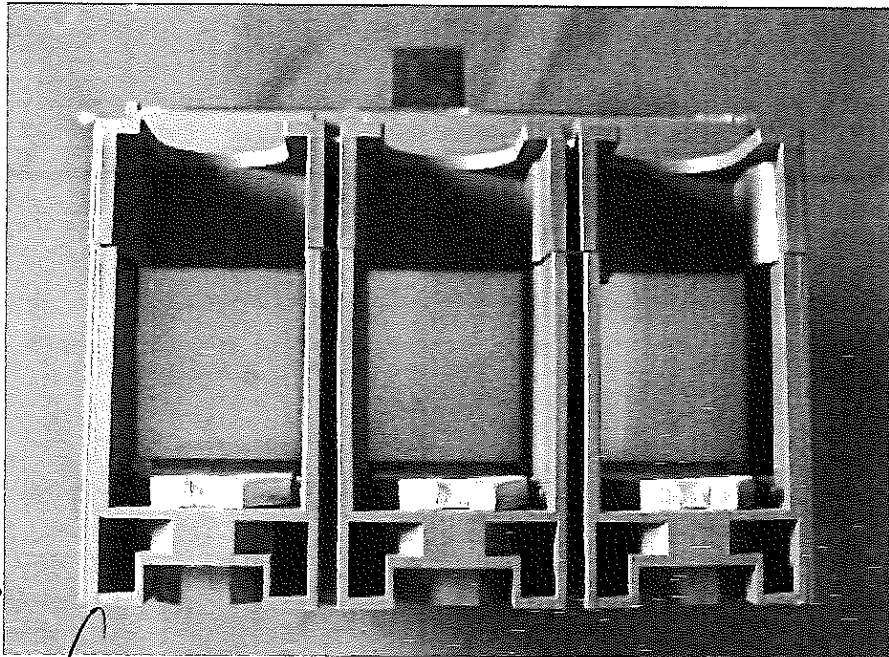
DEKRA CERTIFIED

IEC 60947-2

Line terminal view, 3P MCCB



Load terminal view, 3P MCCB



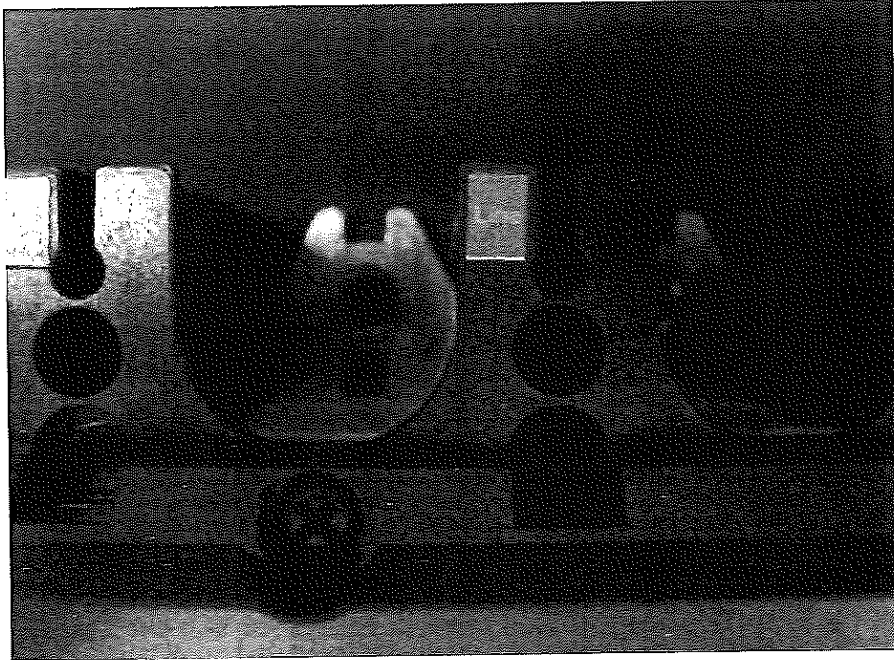
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ВСТУПНО С ОПИСАНИЕМ ЗА

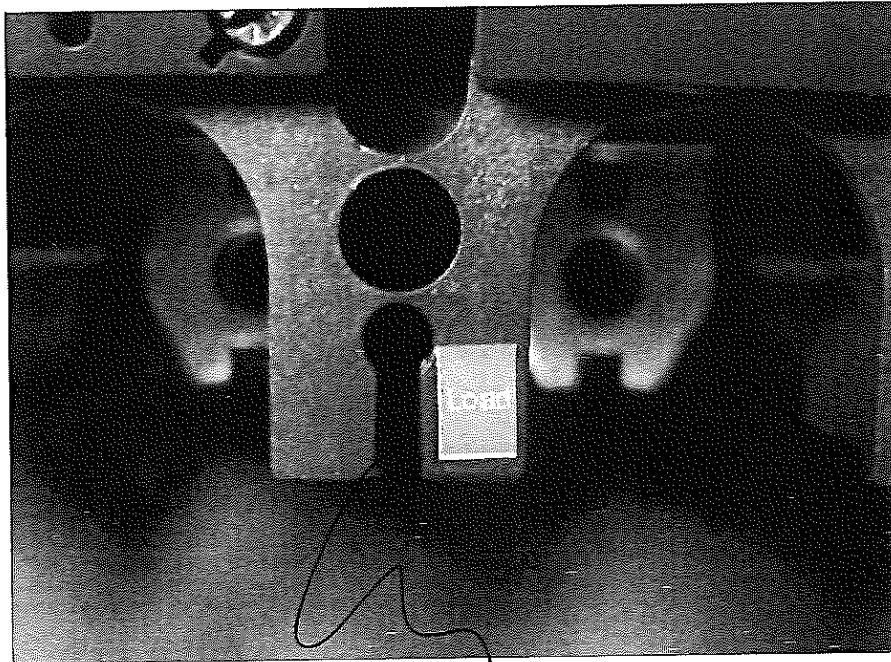


IEC 60947-2

LINE mark

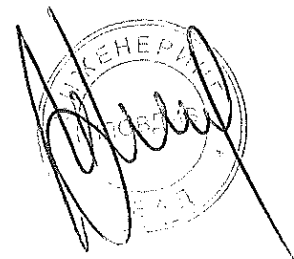


LOAD mark



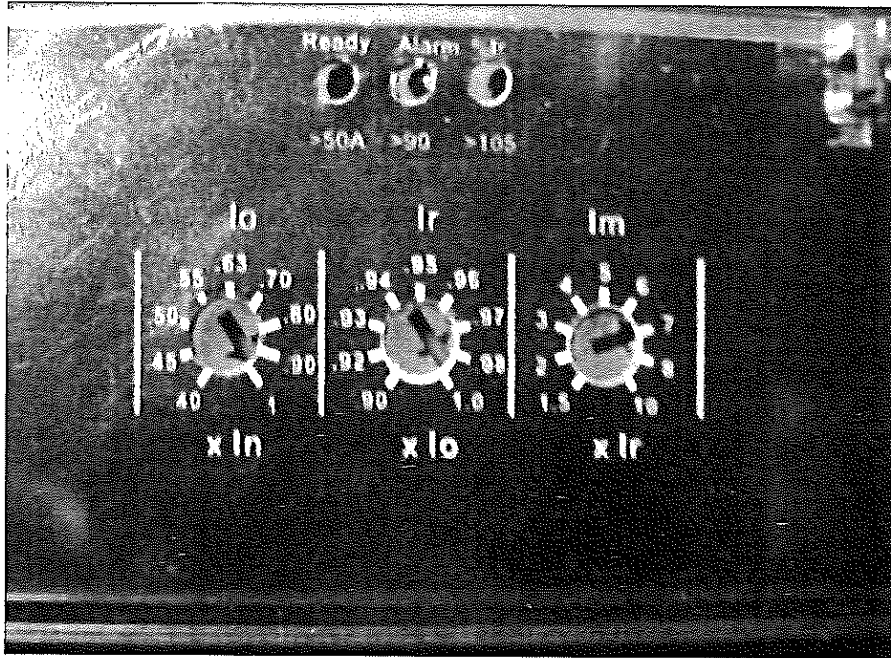
TRF No. IEC60947_2F

ИЗДАНИЕ 6 01/2013

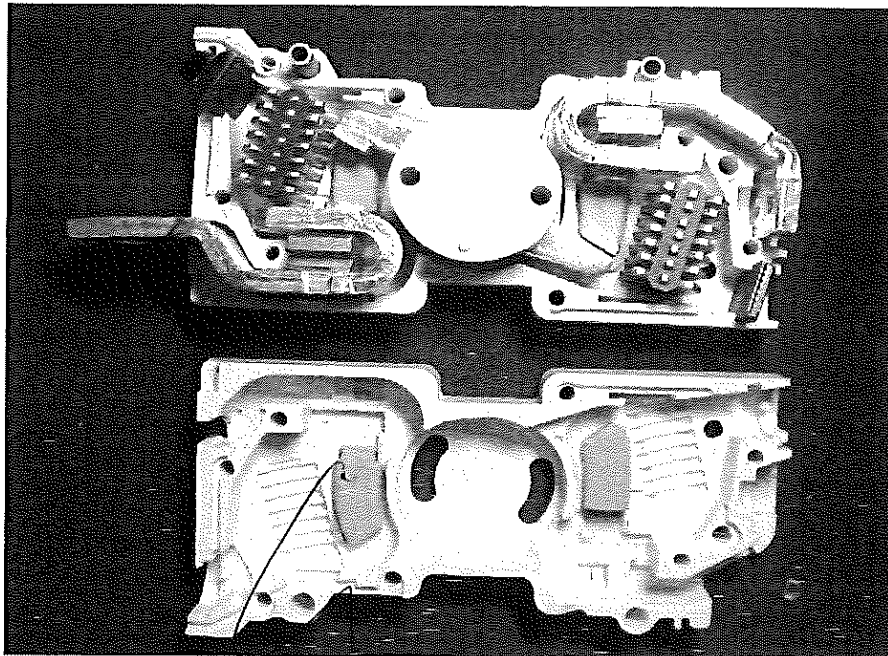


IEC 60947-2

Electronic overcurrent release



Box of contact



TRF No. IEC60947_2F

СТАНДАРТОВ
И ТЕХНИЧЕСКИХ УСЛОВИЙ

CERTIFICATE

Issued to:
Applicant:
**Zhejiang Gacia Electrical Appliance
Co., Ltd**
545# Dongdajie, Baitawang Industrial Zone,
Beibaixiang, Yueqing, Zhejiang, 325603, China

Manufacturer/Licensee:
**Zhejiang Gacia Electrical Appliance
Co., Ltd**
545# Dongdajie, Baitawang Industrial Zone,
Beibaixiang, Yueqing, Zhejiang, 325603, China

Product(s) : Moulded-case circuit breaker
Trade name(s) : GACIA
Type(s)/model(s) : PN630NE, PN630SE, PN630HE, LN630NE, LN630SE, LN630HE

The product and any acceptable variation thereto is specified in the Annex to this certificate and the documents therein referred to.

DEKRA hereby declares that the above-mentioned product has been certified on the basis of:

- a type test according to the standard EN 60947-2:2006 + A1:2009; IEC 60947-2:2006 + A1:2009;
- an inspection of the production location according to CENELEC Operational Document CIG 021
- a certification agreement with the number 2157361

DEKRA hereby grants the right to use the KEMA-KEUR certification mark.

The KEMA-KEUR certification mark may be applied to the product as specified in this certificate for the duration of the KEMA-KEUR certification agreement and under the conditions of the KEMA-KEUR certification agreement.

This certificate is issued on: 15 January 2013 and expires upon withdrawal of one of the above mentioned standards.

Certificate number: 3303638.01

DEKRA Certification B.V.

на основании чл. 36а, ал. 3 от ЗОП

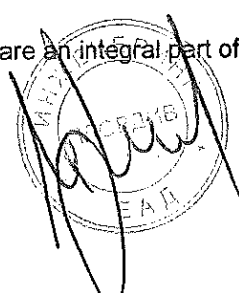
drs. G.J. Zoetbrood
Managing Director

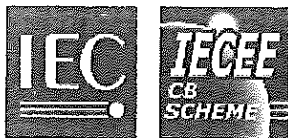
F.S. Strikwerda
Certification Manager

© Integral publication of this certificate is allowed.

All testing, inspection, auditing and certification activities of the former KEMA Quality are an integral part of the DEKRA Certification Group.

ACCREDITED BY
THE DUTCH COUNCIL
FOR ACCREDITATION





CB TEST CERTIFICATE

Ref. Certificate No.

NL-25203

IEC SYSTEM FOR MUTUAL RECOGNITION OF TEST CERTIFICATES FOR ELECTRICAL EQUIPMENT (IECEE) CB SCHEME

Issued by: DEKRA Certification B.V.

Product: Moulded-Case Circuit Breaker

Applicant: ZHEJIANG GACIA ELECTRICAL APPLIANCE CO.,LTD. 545# Dongdajie, Baitawang Industrial Zone, Beibaixiang Yueqing Zhejiang, 325603 China

Manufacturer: ZHEJIANG GACIA ELECTRICAL APPLIANCE CO.,LTD. 545# Dongdajie, Baitawang Industrial Zone, Beibaixiang Yueqing Zhejiang, 325603 China

Factory: ZHEJIANG GACIA ELECTRICAL APPLIANCE CO.,LTD. 545# Dongdajie, Baitawang Industrial Zone, Beibaixiang Yueqing Zhejiang, 325603 China

Rating and principal characteristics: Ue: 400 / 415 Vac, Ui: 750 Vac, Uimp: 8 kV, In: 400 A, 500 A, 630 A
 3P and 3P + N (unprotected N pole)
 PN630HE / LN630HE: Icu = 70 kA
 PN630SE / LN630SE: Icu = 50 kA
 PN630NE / LN630NE: Icu = 35 kA
 Ics = 75% Icu
 See annex for further ratings

Trade mark (if any): GACIA

Model/Type reference: PN630NE,PN630SE,PN630HE,LN630NE,LN630SE,LN630HE

Additional information:

Sample of product tested to be in conformity with IEC: 60947-2(ed.4);am1

Test Report Ref. No: 3303638.50

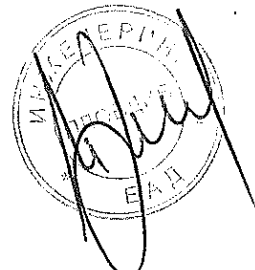
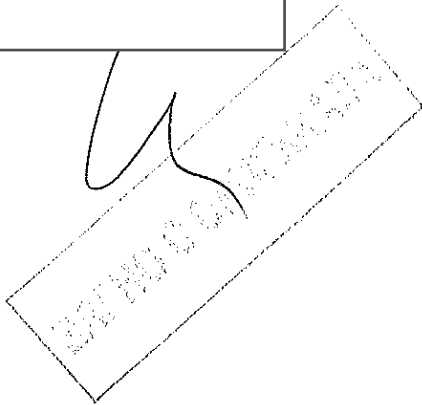
This CB Test Certificate is issued by the National Certification Body:

DEKRA Certification B.V.
 Utrechtseweg 310
 P.O. Box 5185
 6802 ED Arnhem
 The Netherlands

на основании чл. 36а, ал. 3 от ЗОП

Signed by: F.S.Strikwerda

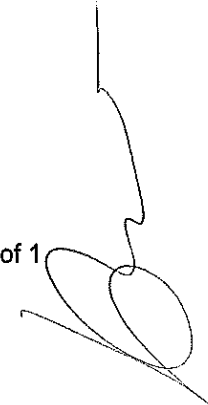
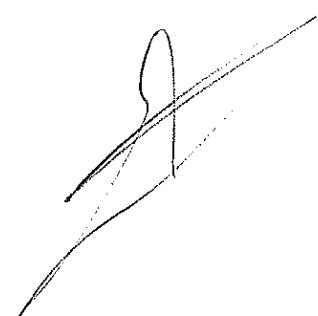
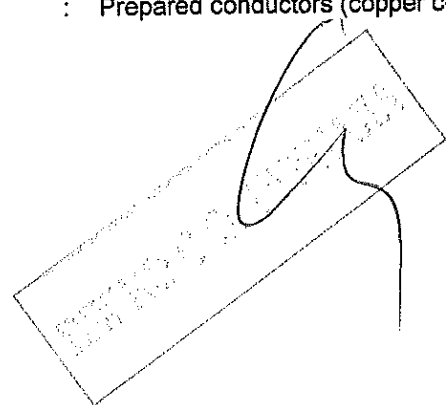
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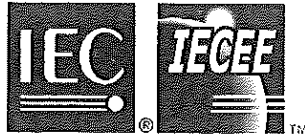


1/1

Ratings:

| | |
|--|---|
| number of poles | : 3P and 3P + N (unprotected N pole) |
| protected pole | : 3 |
| rated operational voltage (Ue) | : 400 / 415 Vac |
| rated insulation voltage (Ui) | : 750 Vac |
| rated impulse withstand voltage (Uimp) | : 8 kV |
| rated current (In) | : 400 A, 500 A, 630 A |
| rated operational current (Ie) | : Equal to In |
| conventional thermal current (Ith) | : Equal to In |
| current rating for four-pole circuit-breakers | : Equal to 70%In |
| rated frequency | : 50 / 60 Hz |
| rated ultimate short-circuit breaking capacity (Icu) | : PN630HE / LN630HE: Icu = 70 kA PN630SE / LN630SE: Icu = 50 kA PN630NE / LN630NE: Icu = 35 kA |
| rated service short-circuit breaking capacity (Ics) | : Ics = 75%Icu |
| suitable for isolation | : Suitable |
| utilization category | : A |
| safety distance (screen-circuit breaker) | : Front / Back: 0 mm, Left / Right : 0 mm, Up / Down: 50 mm |
| instantaneous release | : Electronic type, adjustable, Im: 1,5Ir, 2Ir, 3Ir, 4Ir, 5Ir, 6Ir, 7Ir, 8Ir, 10Ir |
| time setting of the instantaneous release | : Fixed |
| inverse time delay release | : Electronic type, adjustable Ir: 0,90Io, 0,92Io, 0,93Io, 0,94Io, 0,95Io, 0,96Io, 0,97Io, 0,98Io, 1Io Io: 0,40In, 0,45In, 0,50In, 0,55In, 0,63In, 0,70In, 0,80In, 0,90In, 1In |
| time setting of the inverse time delay release | : Fixed |
| method of mounting | : Fixed |
| EMC environment | : A and B |
| circuit-breaker for use on phase-earthed systems | : N / A |
| circuit-breaker for use in IT systems | : N / A |
| line/load terminal connection | : Line and Load are marked Prepared conductors (copper conductor with cable lug) |

Certificate of Acceptance

To participate
in the IECEE CB Scheme – IEC System of Conformity Assessment Schemes for Electrotechnical
Equipment and Components (IECEE)

DEKRA Certification B.V.
Meander 1051NL-6825 Arnhem MJ Netherlands
NL-6802 ED Arnhem

has been assessed and determined to fully comply with the requirements of ISO/IEC 17025: 2005-05,
The Basic Rules, IECEE 01: 2016-10 and Rules of Procedure IECEE 02: 2017-06, and the relevant IECEE CB-Scheme
Operational Documents.

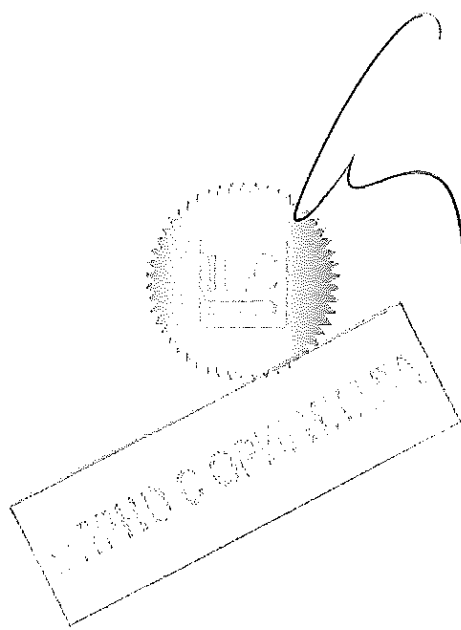
DEKRA Certification B.V.

is therefore entitled to operate as a CB Testing Laboratory (CBTL) under the responsibility of DEKRA Certification B.V.as
National Certification Body (NCB) and to carry out testing within the IECEE CB Scheme for the
Scope (Product Category(ies) and Standard(s)) as listed in the relevant part of the IECEE Web Site at www.iecee.org,
and is subject to all other terms as set forth in the IECEE Basic Rules and Rules of Procedure

The IECEE membership status of this CBTL can be verified on the aforementioned site.

на основание чл. 36а, ал. 3 от ЗОП

Date of Issue: 2017-07-31
TL011



Kerry McManama
IECEE Executive Secretary



Превод от английски език

лого IEC
лого IECSEE

СЕРТИФИКАТ ЗА ОДОБРЕНИЕ

да участие в IECSEE СВ Схема – IEC Система за Оценка на Съответствието на Електротехническо Оборудване и Компоненти (IECSEE)

ДЕКРА Сертификейшън Б.В.
Меандер 1051 NL-6825 Арnhem МДжей Холандия
NL-6802 ЕД Арnhem

е оценена и определена, че напълно съответства на изискванията на ISO/IEC 17025:2005-05, Основните правила, IECSEE 01:2016-10 и Правилата на процедура IECSEE 02:2017-06, и свързаната IECSEE СВ-Scheme Оперативни документи

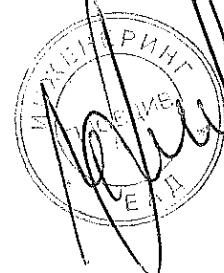
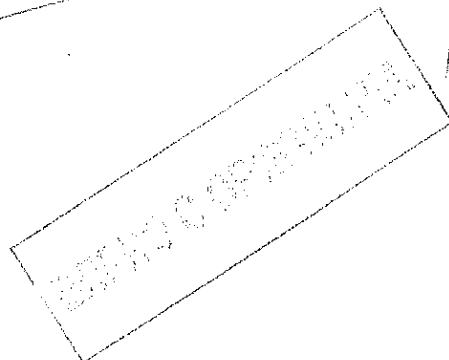
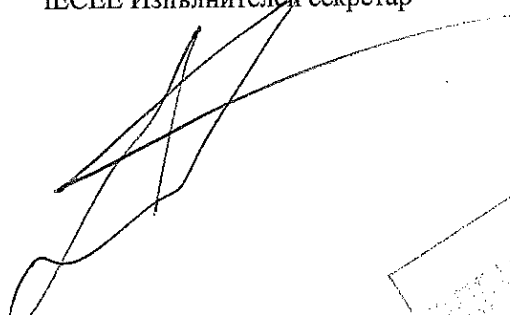
ДЕКРА Сертификейшън Б.В.

следователно има право да работи като СВ изпитвателна лаборатория (CBTL) под ръководството на DEKRA Certification BV като Национален Сертифициращ Орган (NCB) и да извършва изпитвания в рамките на IECSEE СВ схемата за обхвата (Категория (и) продукти и Стандарт (и)), изброени в съответната част от IECSEE уеб сайта на www.iecsee.org, и е предмет на всички останали условия, както е посочено в IECSEE Основни правила и процедурни правила.

Статусът на IECSEE за членство в този CBTL може да бъде проверен на гореспоменатия сайт.

Дата на издаване 2017-07-31
TL 011

Подпис: (не се чете)
Кери МакМаана
IECSEE Изпълнителен секретар





CERTIFICATE OF ACCEPTANCE

TO PARTICIPATE IN THE IECEE CB-SCHEME

DEKRA Testing Services (Zhejiang) Co., Ltd.

No. 5. Changjiang Road, Great Bridge Industrial Park, North Baixiang, Wenzhou, Zhejiang, 325603, P.R.China

has been assessed and determined to fully comply with the requirements of ISO/IEC 17025: 2005-05, The Basic Rules, IECEE 01: 2014-11 and Rules of Procedure IECEE 02: 2015-06, and the relevant IECEE CB-Scheme Operational Documents.

DEKRA Testing Services (Zhejiang) Co., Ltd.

is therefore entitled to operate as a Chinese CB Testing Laboratory under the responsibility of DEKRA Certification B.V. as National Certification Body and to carry out testing within the IECEE CB Scheme for the Scope (Product Category(ies) and Standard(s)) as listed in the relevant part of the IECEE Web Site at www.iecee.org, and is subject to all other terms as set forth in the IECEE Basic Rules and Rules of Procedure

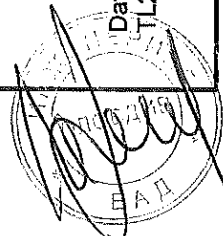
This certificate remains valid until December 31st 2017 at which time it will be reissued by the IECEE Executive Secretary upon successful completion of the normally scheduled 3-year Reassessment Programme administered by the IECEE CB Scheme.

Signed by:

На
ОСНОВ
ание
Чл.
36а,
ал. 3
ОТ
ЗООП

Katy McMANAMA
IECEE EXECUTIVE SECRETARY AND COO

Date of Issue: 2017-02-17
TL241



Превод от английски език

Международна Електротехническа комисия

лого **IEC**

лого **IECEE**

Международна Система за Тестване и Сертификация на Електротехническо
Оборудване и Компоненти (**IECEE**)

СЕРТИФИКАТ ЗА ОДОБРЕНИЕ

За участие в **IECEE CB** Схема

ДЕКРА Тестинг Сървисис (Джейджанг) Ко., ООД

№ 5, ул. Чангджианг, Грейт Бридж Индустриал Парк, Северен Бейксианг, Уенджоу,
Джейджанг, 325603 Н.Р. Китай

е оценена и определена, че напълно съответства на изискванията на ISO/IEC
17025:2005-05, Основните правила, IECEE 01:2014-11 и Правилата на процедура
IECEE 02:2015-06, и свързаната IECEE CB-Scheme Оперативни документи

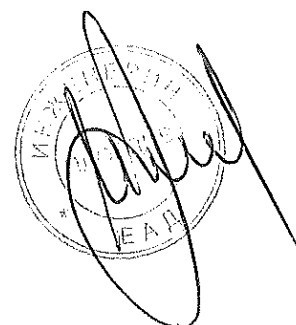
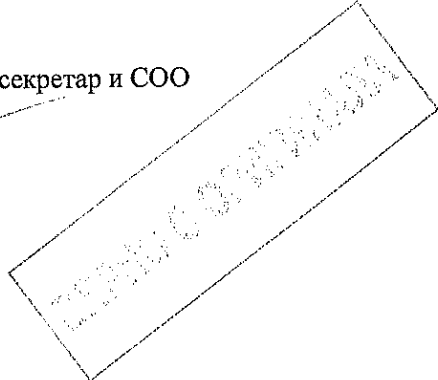

ДЕКРА Тестинг Сървисис (Джейджанг) Ко., ООД

следователно има право да работи като Китайска CB изпитвателна лаборатория под
ръководството на DEKRA Certification BV като Национален Сертифициращ Орган
и да извършва изпитвания в рамките на IECEE CB схемата за обхвата (Категория
(и) продукти и Стандарт (и)), изброени в съответната част от
IECEE уеб сайта на www.iecee.org, и е предмет на всички останали условия, както е
посочено в IECEE Основни правила и процедурни правила.

Този сертификат е валиден до 31 Декември 2017, през което време той ще бъде
преиздаден от IECEE Изпълнителният секретар при успешно завършване на
нормално насрочено 3-годишна програма и преоценка, администрирана от IECEE
CB схемата.

Дата на издаване 2017-02-17
TL 241

Подпис: (не се чете)
Кери МакМаана
IECEE Изпълнителен секретар и СОО





China National Accreditation Service for Conformity Assessment

LABORATORY ACCREDITATION CERTIFICATE

(Registration No. CNAS L2643)

DEKRA Quality Testing Services(Zhejiang) Co., Ltd.

No.5, Changjiang Road, Great Bridge Industrial Park,

Beibaixiang, Wenzhou, Zhejiang, China

is accredited to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories(CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence of testing.

The scope of accreditation is detailed in the attached appendices bearing the same registration number as above. The appendices form an integral part of this certificate.

Date of Issue: 2015-02-15

Date of Expiry: 2018-02-14

Date of Initial Accreditation: 2006-04-25

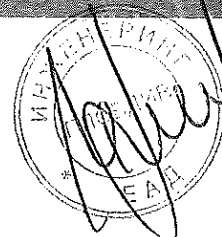
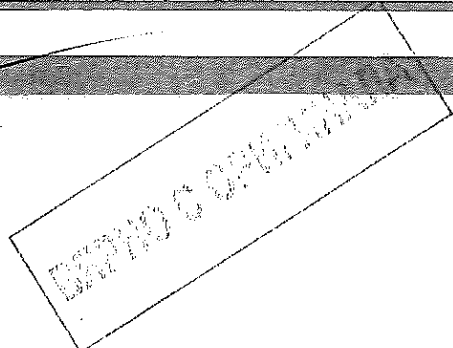
на основании чл. 36а, ал. 3 от ЗОП

**Signed on behalf of China National Accreditation Service
for Conformity Assessment**

China National Accreditation Service for Conformity Assessment (CNAS) is authorized by Certification and Accreditation Administration of the People's Republic of China (CNCA) to operate the national accreditation schemes for conformity assessment. CNAS is the signatory to International Laboratory Accreditation Cooperation Multilateral Recognition Arrangement (ILAC MRA) and Asia Pacific Laboratory Accreditation Cooperation Multilateral Recognition Arrangement (APLAC MRA).

No.CNAS AL2

0012503



Превод от английски език

Лого на IAS-MRA
Лого на CNAS

Китайска Национална Акредитационна Служба за Оценка на Съответствието

СЕРТИФИКАТ ЗА АКРЕДИТАЦИЯ НА ЛАБОРАТОРИЯ
(Регистрационен № CNAS L2643)

ДЕКРА Куалити Тестинг Сервисес (Джейджанг) Ко., Лтд.
Чангжианг Роуд № 5, Грийт Бридж Индустриал Парк,
Беибаиксианг, Уенджоу, Джейджанг, Китай

е акредитирана към ISO/IEC 17025:2005 Основни изисквания за Компетенция на Лаборатории за Тестване и Калибрация (CNAS-CL01 Акредитационни Критерии за Компетентност на Лаборатории за Тестване и Калибрация) за компетентност на тестване.

Обхвата на акредитацията е детайлизиран в прикрепен списък, носещ същия регистрационен номер както горния. Формите притурки интегрална част от този сертификат.

Дата на издаване: 2015-02-15

Дата на изтичане: 2018-02-14

Дата на първоначална акредитация: 2006-04-25

Подпис: (не се чете)

Подписано от страна на Китайска Национална Акредитационна Служба за Оценка на Съответствието

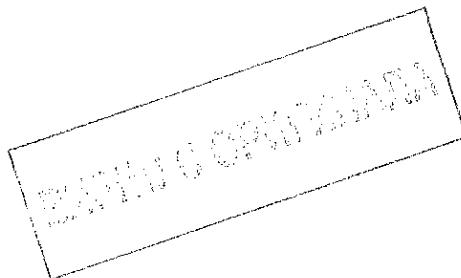
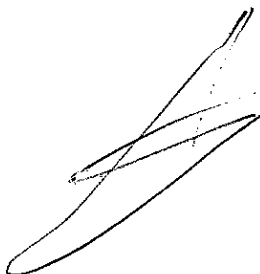
Китайската Национална Акредитационна Служба за Оценка на Съответствието (CNAS) е оторизирана от Сертифицираща и Акредитираща Администрация на Народна република Китай (CNCA) да оперира националните акредитационни системи за оценка на съответствието. CNAS е подписваща страна към Международната Кооперация за Акредитации на Лаборатории Споразумение за Взаимно Признаване (ILACMRA) и подписваща страна към Азия Пасифик Кооперация за Акредитации на Лаборатории Споразумение за Взаимно Признаване (APLAC MRA).

№ CNAS AL 2

0012503

Списък на изпитванията от типови изпитания:

- Продуктова информация
 - Основна информация;
 - Маркировка;
 - Инструкции за инсталация, работа и поддръжка;
- Условия за нормално обслужване, монтаж и транспорт;
 - Нормални сервизни условия;
 - Условия по време на транспорт, съхранение и монтаж;
- Конструктивни и изисквания за поведение;
 - Конструктивни изисквания;
 - Изисквания за поведение;
 - Електромагнитна съвместимост;
- Тестове:
 - Типов тест;
 - Рутинен тест;
 - Тестване на образци;
 - Съответствие с изискванията за конструкции;
 - = Материали;
 - = Оборудване;
 - = Приложение за оборудване;
 - = Механични характеристики на клемите;
 - = Потвърждаване на ефективността на индикацията на главната контактна позиция на оборудването подходящо за изолация;
 - = Тест за разтягане, усукване и огъване;
 - Поведение
 - = Честота на тестване;
 - = Главни условия за тестване;
 - = Поведение при липса на натоварване, нормално натоварване и при претоварване;
 - = Поведение при условия на късо съединение;
 - EMC тест;



ИНСТРУКЦИИ ЗА ТРАНСПОРТ, СКЛАДИРАНЕ, МОНТИРАНЕ, ПОДДЪРЖАНЕ И ЕКСПЛОАТАЦИЯ

МЕХАНИЧНО НАТОВАРВАНЕ НА КЛЕМОВИТЕ СЪЕДИНЕНИЯ

Транспортиране и складиране:

Автоматичните прекъсвачи лят корпус трябва да се транспортират в заводската си опаковка, добре застопорени, за избягване на наранявания на корпуса, механични повреди и в следствие отклонения от характеристиките и създаване на нежелани условия за нарушаване безопасността на електрическата верига и работа. Прекъсвачите трябва да се съхраняват в сухи помещения и нормална температура.

1. Инсталиране и обслужване.

1.1. Инсталиране

1.1.1. Проверете маркировката за да се убедите, че е в съответствие с нормалните работни условия.

1.1.2. Превключете ръчно няколко пъти автоматичния прекъсвач за да няма задържане. Проверете го и се убедете, че няма видими повреди по него и тогава го инсталирайте.

1.1.3. Фиксирайте автоматичния прекъсвач на монтажната шина и натиснете застопоряващия механизъм нагоре. По този начин той няма да може да се освободи от монтажната шина. Натиснете надолу застопоряващия механизъм за да извадите автоматичния прекъсвач.

1.1.4. Схемата е включена и символа „ON“ ще се покаже, когато ръкохватката е в затворено положение. Схемата е изключена и символа „OFF“ ще се покаже, когато ръкохватката е в отворено положение.

1.1.5. Входящата линия се свързва в горната страна на автоматичния прекъсвач, а изходящата линия се свързва в долната страна на прекъсвача. Не разменяйте страните на свързване. Напречното сечение на медните проводници е дадено в таблица 3. Поставете проводниците в отворите за свързване, след това завийте винта. Проводниците не би трябвало да са хлабави и да не се местят. Не оставяйте оголени проводници извън терминала за връзка.

1.1.6. Автоматичният прекъсвач би трябвало да се превключи няколко пъти преди да се свърже към схемата. Механизмът трябва да бъде подвижен, заслужаващ доверие и без задържане.

1.2. Обслужване

1.2.1. Проверете автоматичния прекъсвач по разписание по време на неговата работа. Според експлоатационния режим определете контролния период.

1.2.2. След прекъсване на ток на претоварване или ток на късо съединение, би трябвало първо да се отстрани дефекта преди да се включи прекъсвача, иначе това може да въздейства злополучно на издръжливостта на прекъсвача.

1.2.3. Не трябва да има вода и продукта не трябва да се поврежда по време на работа, когато е на склад или при транспортиране.

2. Предупреждения за безопасност.

2.1. Не тествайте функцията на продукта, като свързвате проводник под напрежение непосредствено към земята или към нулата, иначе това ще въздейства на личната безопасност.

2.2. Завийте винта до края така, че проводниците да не са хлабави и да не се местят, когато ги свързвате към автоматичния прекъсвач. Не оставяйте

оголени проводници извън отворите на връзката.

3. Често срещани неизправности повреди и начини за отстраняване то им.

Често срещаните неизправности и начините за отстраняването им са показани в

| Неизправност | Причина | Метод за отстраняване | Забележка |
|---|---|---|-----------|
| Прекъсвача не може да затвори | Късо съединение в защитаваната верига. | Елиминирайте късото съединение | |
| | Дефект в механизма | Заменете продукта. | |
| | Номиналният ток на прекъсвача не съответства на тока на товара. | Променете спецификацията на продукта. | |
| Загриване в горната част. | Винта не притиска плътно проводника или е хлабав. | Стегнете винта! | |
| | Напречното сечение на проводника е малко. | Променете спецификацията на проводника. | |
| Прекъсвача не може да изключи при условие на късо съединение. | Прекъсвача е в несъответствие с работните условия на товара. | Променете спецификацията на продукта | |
| Прекъсвача не осъществява верига. | Оголени проводник е твърде къс. | Оголете проводника отново | |
| | Винта не притиска плътно проводника или е хлабав. | Стегнете винта! | |

Механично натоварване на клемовите съединения:

За автоматични прекъсвачи лят корпус 100A, 160A, 250A:

Макс. напречно сечение на проводник (mm^2):

120 mm^2 , Готови проводници (кабели с обувка)

диаметър на резба (мм): 8мм

въртящ момент (Nm): 6Nm

5 пъти по 2 отделни единици затягане: Готови проводници (кабели с обувка)

За автоматични прекъсвачи лят корпус 630A:

Макс. напречно сечение на проводник (mm^2):

2 x 240 mm^2 , Готови проводници (кабели с обувка)

диаметър на резба (мм): 10мм на клемова връзка към кабел,

6 мм на клемова връзка към прекъсвач

въртящ момент (Nm): 10Nm на клемова връзка към кабел,

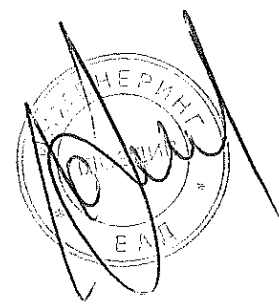
3Nm на клемова връзка към прекъсвач;

5 пъти по 2 отделни единици затягане: Готови проводници (кабели с обувка)

За автоматични прекъсвачи лят корпус 1000A, 1250A:

Мин. напречно сечение на проводник (mm^2): 16 mm^2

въртящ момент (N/mm^2): $\leq 15 \text{ N/mm}^2$ на напречно сечение на проводника



ИНСТАЛАЦИЯ, РАБОТА И РЕМОНТ НА АВТОМАТИЧНИ ПРЕКЪСВАЧИ ЛЯТ КОРПУС

Инсталация и работа

За безопасността на лицето и електрическо оборудване, трябва да се спазват следните инструкции, преди да пуснете в експлоатация автоматичните прекъсвачи лят корпус:

- Моля, прочетете тази инструкция за експлоатация внимателно преди инсталиране на автоматични прекъсвачи.

- Автоматичните прекъсвачи лят корпус трябва да се използват при нормални условия на експлоатация.

- Проверете възможностите на прекъсвач за точното му приложени, преди инсталацията.

- Измерете изолационното съпротивление с помощта на 500V мегом метра преди инсталацията. Измерената стойност не трябва да бъде по-ниска от 10M при стайна температура 20 ± 5 , и относителна влажност 50% до 70%. В противен случай, прекъсвачът трябва да се изсуши, и не може да се използва, докато не подобри съпротивление на изолацията съгласно изискванията.

- Инсталацията на прекъсвач в избрана позиция е възможно, без влияние върху неговата ефективност. Но определеното разстояние отгоре, отдолу, отстрани и отпред, както и от другите прекъсвачи следва да бъде спазено за безопасна работа.

- Прекъсвача може да се монтира на неподвижна опора или плоча-база със стандартни винтове.

- Трябва да се внимава да не попаднат чужди проводими предмети в прекъсвача, когато го инсталирате.

- Кабелите, използвани за свързване на прекъсвач трябва да бъде гладки, ненаранени и да не са пречупени при инсталацията на прекъсвача за предотвратяване на повреди на прекъсвач и отклонения от неговите стандартни характеристики.

- След като инсталирате прекъсвача, следните оперативни тестове се провеждат преди да се пусне веригата. Тя не може да бъде пусната в експлоатация докато всички условия не са коректни и точни:

1) Проверете внимателно дали няма да има чужди частици в трифазовите проводници и кабели. Премахнете, ако има такива. Прекъсвачът трябва да се пази в чиста състояние.

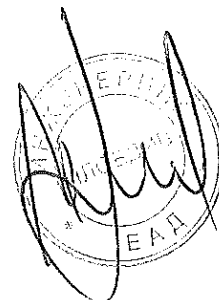
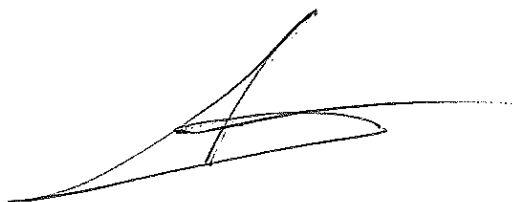
2) Ако прекъсвачът е оборудван с електрически аксесоари или електрически работен механизъм, трябва да се свърже с допълнителна верига с тях в съответствие с диаграмата в техническия каталог, а след това проверка на съответствието на номинално работно напрежение от напрежение освобождаване, шунт и мотор със захранващото напрежение.

3) Проверка на текущите настройки на защитите от претоварване и късо съединение.

4) След всички проверки и инспекции, допълнителната верига може да бъде пусната. Само в този случай, прекъсвачът може да бъде затворен, след като защитата е затворен.

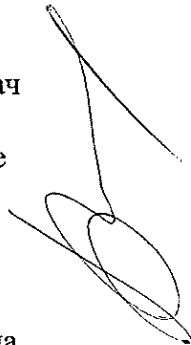
5) Ръчен тест на работа на прекъсвача: Ръчно включване и ръчно изключване няколко пъти. Прекъсвачът трябва да се държи нормално.

6) Електрически тест на работа на прекъсвача: включване от електрически работен механизъм, а след това изключване от него няколко пъти Прекъсвачът трябва да се държи нормално



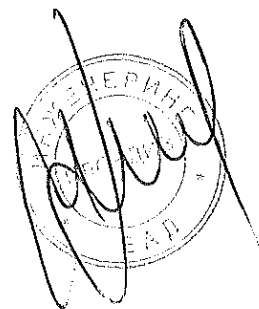
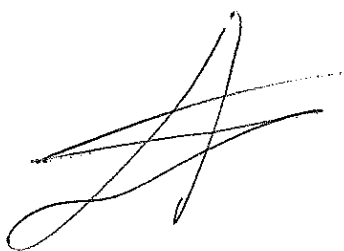
Поддръжка

- По време на работа, прекъсвачът се проверява периодично в съответствие с посочените по-горе процедури.
- Почистете всяко прекомерно натрупване на прах, за да бъде изолацията на прекъсвач в добро състояние.
- Проверка на условията за експлоатация на прекъсвача след всяко кратко прекъсване на прекъсвача, сменете нов, ако не е в състояние да бъде използван.



Ремонт

Проблеми могат да възникнат по време на инсталация, настройка или експлоатация на прекъсвача. Решаването на проблемите се извършва от квалифицирани лица или можете да се свържете с офис на дистрибутора, където инженери ще ви помогнат и ще предоставят допълнителни услуги.



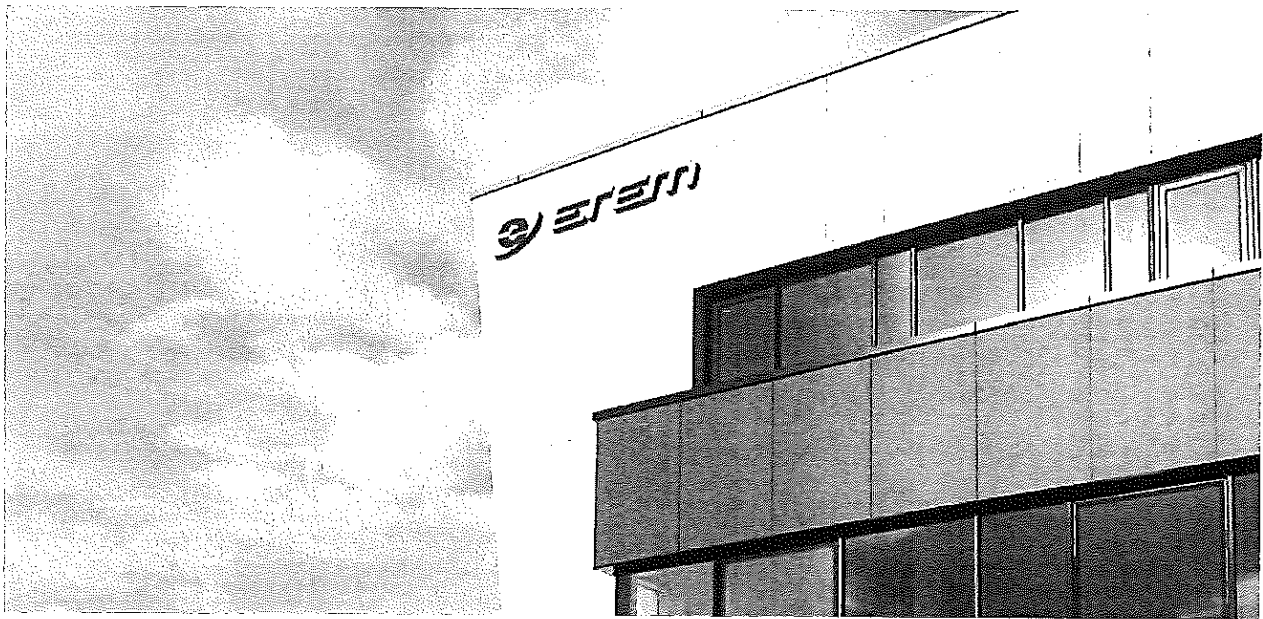
The stamp is circular and contains the text "ИНЖЕНЕРИНСКИ СЪВЕТ" (ENGINEERING COUNCIL) around the top edge and "БАНСКО" (BANSKO) at the bottom. The signature is written over the stamp.

ИНДУСТРИАЛНИ АЛУМИНИЕВИ ПРОФИЛИ

ETEM

ЕАД

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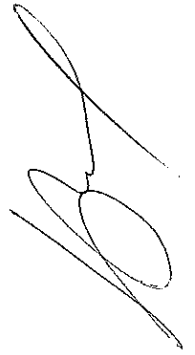
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УЧЕБНО-МЕТОДИЧЕСКОЕ ПОСОБИЕ

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УЧЕБНО-МЕТОДИЧЕСКОЕ ПОСОБИЕ
ЕАД

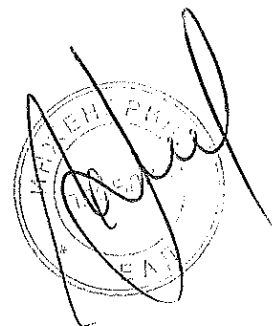
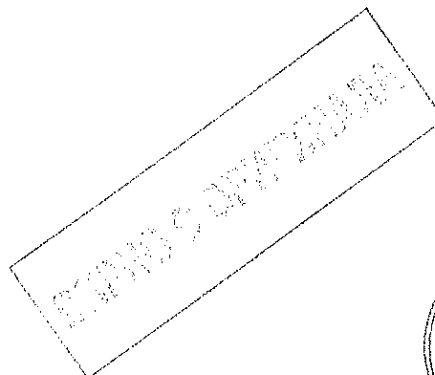
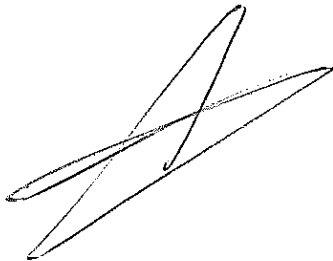
За ETEM



ETEM е една от водещите компании за екструдирани алуминиеви профили в Югоизточна Европа. Основана е през 1971 г. като част от най-големия металообработващ холдинг на Балканите. С над 40 годишен опит ETEM напълно интегрира процесите на проектиране и производство на алуминиеви профили за индустриални приложения и архитектурни системи.

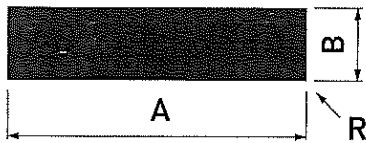
Модерното оборудване позволява на ETEM да разработва високотехнологични и прецизни профили на базата на клиентски чертежи. 70% от продукцията се експортира към над 20 държави в Европа с приложение в следните области:

- строителство
- машиностроене
- автомобилна промишленост
- корабостроене
- отопление и вентилация
- соларни колектори и фотоволтаични панели
- интериорен дизайн
- душ кабинни
- изложбено оборудване
- рекламни съоръжения
- стълби, скелета и опорни съоръжения
- електронно и електрическо оборудване
- слънцезащитни системи и др.



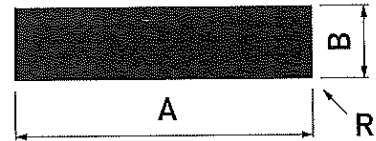
FB Шини

| Продукт # | A | B | R | Тегло [g/m] |
|-----------|----|-----|---|-------------|
| 9165 | 8 | 8 | | 173 |
| 9169 | 10 | 5 | | 135 |
| 9003 | 10 | 10 | | 270 |
| 9145 | 12 | 5 | | 162 |
| 9174 | 12 | 6 | | 194 |
| 9017 | 12 | 12 | | 389 |
| 9019 | 15 | 2 | | 81 |
| 11094 | 15 | 3 | | 121 |
| 9021 | 15 | 4 | | 162 |
| 9022 | 15 | 5 | | 202 |
| 9023 | 15 | 6 | | 243 |
| 9320 | 15 | 8 | | 324 |
| 17037 | 15 | 10 | | 405 |
| 17144 | 15 | 15 | | 607 |
| 31181 | 16 | 3 | | 129 |
| 9118 | 16 | 8 | | 345 |
| 30135 | 17 | 2.5 | | 115 |
| 9101 | 20 | 4 | | 216 |
| 9034 | 20 | 8 | | 432 |
| 9033 | 20 | 10 | | 540 |
| 17038 | 20 | 12 | | 648 |
| 9153 | 20 | 15 | | 810 |
| 9004 | 20 | 20 | | 1080 |
| 30625 | 22 | 5 | | 297 |
| 31174 | 25 | 2.5 | | 169 |
| 9037 | 25 | 3 | | 202 |
| 9038 | 25 | 4 | | 270 |
| 9039 | 25 | 5 | | 337 |
| 17039 | 25 | 6 | | 405 |
| 17040 | 25 | 8 | | 540 |
| 9041 | 25 | 12 | | 810 |
| 17041 | 25 | 15 | | 1012 |
| 17042 | 25 | 20 | | 1350 |



FB Шини

| Продукт # | A | B | R | Тегло [g/m] |
|-----------|-------|------|------|-------------|
| 9201 | 25 | 25 | | 1687 |
| OB028001 | 28 | 7 | | 529 |
| 30136 | 30 | 1.5 | | 121 |
| 9132 | 30 | 3 | | 243 |
| 9044 | 30 | 4 | | 324 |
| 9317 | 30 | 4 | 2 | 315 |
| 9045 | 30 | 5 | | 405 |
| 9046 | 30 | 6 | | 486 |
| 9047 | 30 | 8 | | 648 |
| 9314 | 30 | 8 | 2 | 639 |
| 9048 | 30 | 10 | | 810 |
| 9049 | 30 | 12 | | 972 |
| 9154 | 30 | 15 | | 1215 |
| 9322 | 30 | 20 | | 1620 |
| 17043 | 30 | 25 | | 2025 |
| 9294 | 30 | 30 | | 2430 |
| 9161 | 31.7 | 2.4 | | 205 |
| 9339 | 31.75 | 4.76 | | 408 |
| 9051 | 35 | 2 | | 189 |
| 9052 | 35 | 3 | | 283 |
| 17044 | 35 | 5 | | 472 |
| OB035005 | 35 | 6 | | 567 |
| 17045 | 35 | 8 | | 756 |
| 30688 | 35 | 10 | | 945 |
| 17046 | 35 | 15 | | 1417 |
| OB035009 | 35 | 25 | | 2362 |
| SB035001 | 35 | 35 | | 3307 |
| 9340 | 38.1 | 4.76 | | 489 |
| 9059 | 40 | 2 | | 216 |
| 9061 | 40 | 3 | | 324 |
| 9318 | 40 | 3.7 | 1.85 | 392 |
| 9062 | 40 | 4 | | 432 |
| 9110 | 40 | 5 | | 540 |
| 9105 | 40 | 6 | | 648 |
| 9063 | 40 | 8 | | 864 |
| 9064 | 40 | 10 | | 1080 |
| 9065 | 40 | 12 | | 1296 |
| 9324 | 40 | 15 | | 1620 |
| 9181 | 40 | 20 | | 2160 |
| 12384 | 40 | 25 | | 2700 |



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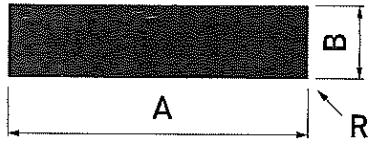
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FB Шини



| Продукт # | A | B | R | Терно [g/m] |
|-----------|----|----|---|-------------|
| 9302 | 40 | 30 | | 3240 |
| 9295 | 40 | 40 | | 4320 |
| 17047 | 45 | 3 | | 364 |
| 17048 | 45 | 5 | | 607 |
| OB045006 | 45 | 6 | | 729 |
| 17049 | 45 | 8 | | 972 |
| OB045004 | 45 | 10 | | 1215 |
| OB045005 | 45 | 15 | | 1822 |
| OB048001 | 48 | 8 | | 1037 |
| 9122 | 50 | 3 | | 405 |
| 9071 | 50 | 4 | | 540 |
| 9124 | 50 | 5 | | 675 |
| 9113 | 50 | 6 | | 810 |
| 9072 | 50 | 8 | | 1080 |
| 9073 | 50 | 10 | | 1350 |
| 9143 | 50 | 12 | | 1620 |
| 9325 | 50 | 15 | | 2025 |
| 9298 | 50 | 20 | | 2700 |
| 17050 | 50 | 25 | | 3375 |
| 17051 | 50 | 30 | | 4050 |
| 17052 | 50 | 40 | | 5400 |
| 17145 | 50 | 50 | | 6750 |
| OB055002 | 55 | 6 | | 891 |
| 9162 | 60 | 3 | | 486 |
| 17053 | 60 | 4 | | 648 |
| 9082 | 60 | 5 | | 810 |
| 9296 | 60 | 6 | | 972 |
| 9079 | 60 | 8 | | 1296 |
| 9080 | 60 | 10 | | 1620 |
| 9327 | 60 | 12 | | 1944 |
| 9328 | 60 | 15 | | 2430 |
| 9148 | 60 | 20 | | 3240 |
| 17055 | 60 | 30 | | 4860 |
| 17056 | 60 | 40 | | 6480 |
| SB060001 | 60 | 60 | | 9720 |
| OB065002 | 65 | 6 | | 1053 |
| 17057 | 70 | 3 | | 567 |
| 17058 | 70 | 5 | | 945 |

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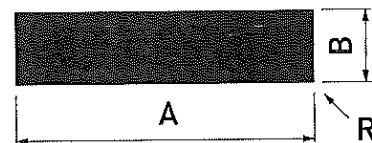
Handwritten signature or mark in the bottom left corner.

Handwritten signature and a rectangular stamp containing text, possibly a date or reference number.

Official circular stamp with the word 'ЕНЕРИНГ' (ENERG) visible, and a handwritten signature over it.

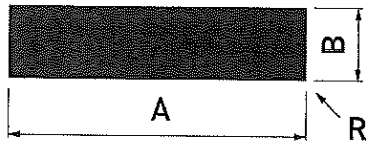
FB Шини

| Продукт # | A | B | R | Терло [g/m] |
|-----------|-----|-----|---|-------------|
| 17059 | 70 | 6 | | 1134 |
| 12388 | 70 | 8 | | 1512 |
| 9084 | 70 | 10 | | 1890 |
| 17060 | 70 | 15 | | 2835 |
| 10796 | 70 | 20 | | 3780 |
| 17061 | 70 | 25 | | 4725 |
| OB070016 | 70 | 50 | | 9450 |
| SB070002 | 70 | 70 | | 13230 |
| 9185 | 80 | 3 | | 648 |
| 17062 | 80 | 4 | | 864 |
| 9088 | 80 | 5 | | 1080 |
| 9329 | 80 | 6 | | 1296 |
| 9198 | 80 | 8 | | 1728 |
| 9186 | 80 | 10 | | 2160 |
| 17063 | 80 | 12 | | 2592 |
| 9089 | 80 | 15 | | 3240 |
| 17064 | 80 | 20 | | 4320 |
| 17065 | 80 | 25 | | 5400 |
| 17066 | 80 | 30 | | 6480 |
| OB080022 | 80 | 40 | | 8637 |
| OB080021 | 80 | 50 | | 10800 |
| 17067 | 90 | 10 | | 2430 |
| 17068 | 90 | 15 | | 3645 |
| 31107 | 91 | 3 | | 737 |
| OB100018 | 100 | 1.5 | | 405 |
| 17069 | 100 | 3 | | 810 |
| 9277 | 100 | 4 | | 1080 |
| 9128 | 100 | 5 | | 1350 |
| 9142 | 100 | 6 | | 1620 |
| 9191 | 100 | 8 | | 2160 |
| 9092 | 100 | 10 | | 2700 |
| 17070 | 100 | 12 | | 3240 |
| 17071 | 100 | 15 | | 4050 |
| 17072 | 100 | 20 | | 5400 |
| 17073 | 100 | 25 | | 6750 |
| 9278 | 100 | 30 | | 8100 |
| OB100021 | 100 | 50 | | 13500 |
| OB104001 | 104 | 46 | | 12914 |
| 30155 | 106 | 2.9 | | 830 |
| OB120011 | 120 | 4 | | 1296 |
| 17074 | 120 | 5 | | 1620 |



КОНСТРУКЦИОННИ ПРОФИЛИ

FB Шини

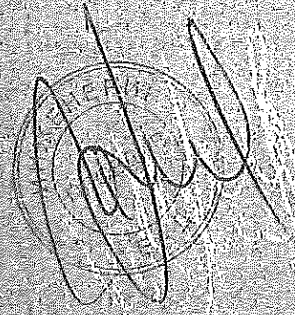
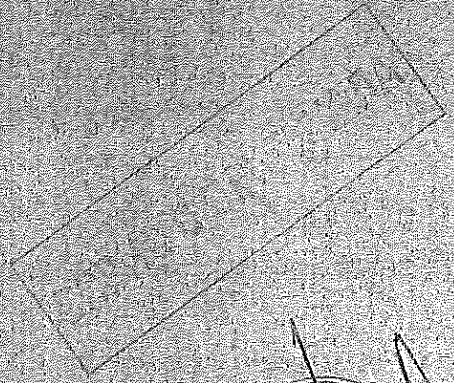
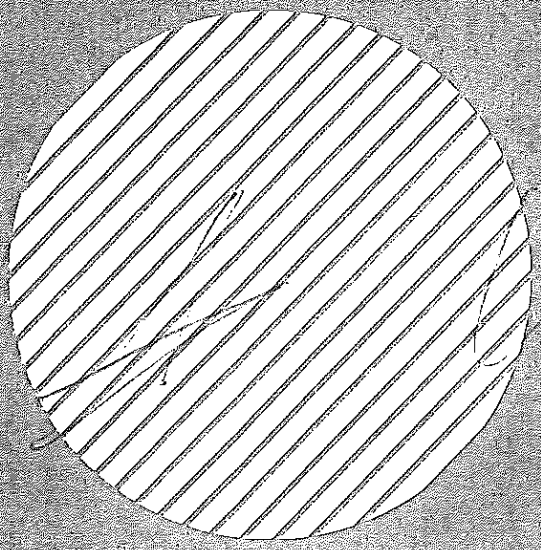


| Продукт # | A | B | R | Тегло [g/m] |
|-----------|-----|----|---|-------------|
| OB120010 | 120 | 6 | | 1944 |
| 11100 | 120 | 8 | | 2592 |
| 9095 | 120 | 10 | | 3240 |
| 17075 | 120 | 12 | | 3888 |
| 17076 | 120 | 15 | | 4860 |
| 17078 | 125 | 15 | | 5062 |
| OB130002 | 130 | 6 | 1 | 2103 |
| OB130001 | 130 | 10 | | 3510 |
| 10797 | 140 | 10 | | 3780 |
| 17079 | 150 | 5 | | 2025 |
| 12389 | 150 | 8 | | 3240 |
| 9166 | 150 | 10 | | 4050 |
| 9303 | 150 | 15 | | 6075 |
| OB160002 | 160 | 10 | | 4320 |

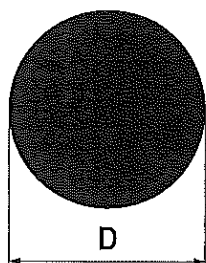
СИМОН С. САНЧЕВ, И.О.О.

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RV кръгли пръти



RB Кръгли пръти



| Продукт # | D | Тегло [g/m] |
|-----------|----|-------------|
| 9229 | 12 | 305 |
| RB014001 | 14 | 416 |
| 9156 | 15 | 477 |
| 9312 | 16 | 543 |
| RB018001 | 18 | 687 |
| 9164 | 20 | 848 |
| RB021001 | 21 | 934 |
| RB022001 | 22 | 1026 |
| RB024001 | 24 | 1220 |
| 17109 | 25 | 1325 |
| RB033001 | 33 | 2309 |
| RB034001 | 34 | 2452 |
| 30995 | 35 | 2598 |
| RB037001 | 37 | 2903 |
| 17110 | 40 | 3393 |
| 17111 | 50 | 5301 |
| RB052002 | 52 | 5735 |
| RB055001 | 55 | 6415 |
| RB060001 | 60 | 7634 |
| RB070001 | 70 | 10391 |
| RB075001 | 75 | 11928.4 |
| RB080001 | 80 | 13571.9 |

ИЗПЪЛНЕНИЕ НА ЗАКАЗ

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**Профили със
специални условия
за продажба**

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L Профили

| Продукт # | A (mm) | B (mm) | S (mm) | R | r | Тегло [g/m] |
|-----------|--------|--------|--------|-----|-----|-------------|
| 4077 | 10 | 10 | 1.5 | | | 75 |
| 30227 | 10 | 10 | 2 | | | 97 |
| 4066 | 15 | 10 | 2 | | | 124 |
| 4078 | 15 | 15 | 1.5 | | | 115 |
| LP018501 | 18 | 18 | 1.3 | | | 122 |
| 4067 | 20 | 10 | 2 | | | 151 |
| 4167 | 20 | 20 | 1.5 | | | 156 |
| 4104 | 20 | 20 | 2 | | | 205 |
| 17000 | 20 | 20 | 4 | | | 389 |
| 4071 | 25 | 15 | 2 | | | 205 |
| 4032 | 25 | 25 | 3 | | | 380 |
| 30664 | 30 | 20 | 1 | | | 132 |
| 4034 | 30 | 20 | 2 | | | 259 |
| 4108 | 30 | 25 | 3 | | | 421 |
| 4191 | 30 | 30 | 1.5 | | | 237 |
| 4223 | 30 | 30 | 5 | | | 742 |
| 30669 | 40 | 15 | 1.5 | | | 216 |
| 4159 | 40 | 20 | 2.5 | | | 388 |
| 17006 | 40 | 20 | 4 | | | 605 |
| 4193 | 40 | 22 | 1.4 | | | 229 |
| 17008 | 40 | 30 | 4 | | | 713 |
| 4169 | 50 | 20 | 2 | | | 367 |
| 4157 | 50 | 50 | 3 | | | 785 |
| 4062 | 60 | 30 | 3 | | | 704 |
| 34379 | 63.5 | 38.1 | 6.35 | 0.4 | 0.4 | 1634 |
| 17022 | 100 | 20 | 2 | | | 637 |
| LP100011 | 100 | 50 | 8 | | | 3067.2 |



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ПРОФИЛИ

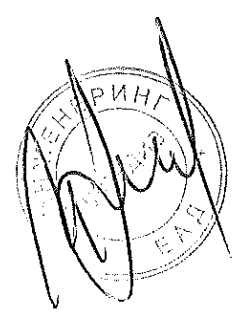
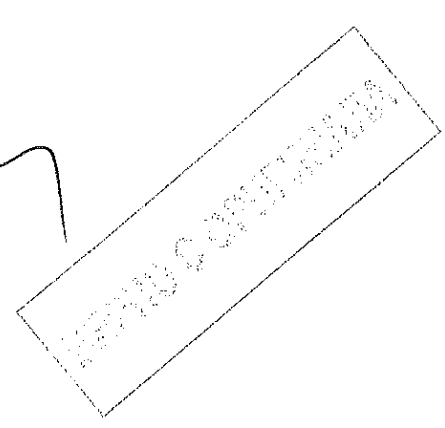
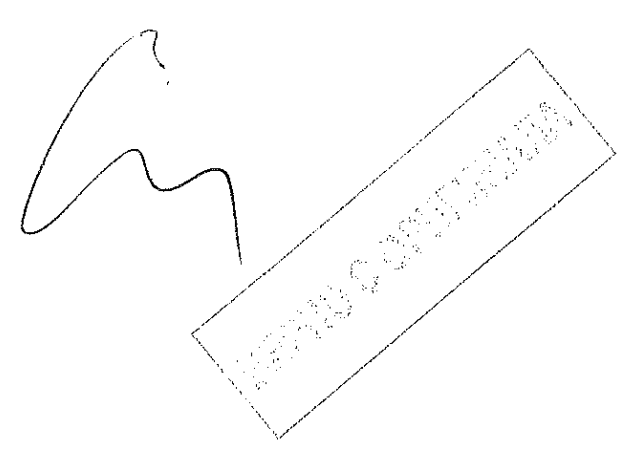
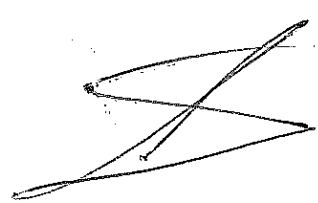


U Профили

| Продукт # | A (mm) | B (mm) | S (mm) | R | r | Тегло [g/m] |
|-----------|--------|--------|--------|---|---|-------------|
| 17162 | 10 | 10 | | | | 109 |
| 5200 | 15 | 15 | | | | 170 |
| 5083 | 16 | 20 | | | | 214 |
| 5108 | 20 | 20 | | | | 231 |
| 5051 | 20 | 20 | | | | 302 |
| 5167 | 20 | 25 | | | | 271 |
| 17180 | 60 | 30 | | | | 1209 |

T Профили

| Продукт # | A (mm) | B (mm) | S (mm) | R | r | Тегло [g/m] |
|-----------|--------|--------|--------|---|---|-------------|
| 6023 | 20 | 20 | 2 | | | 205 |
| 6024 | 25 | 25 | 2 | | | 259 |
| 6039 | 40 | 40 | 3 | | | 624 |



RT Кръгли тръби

| Продукт # | D (mm) | S (mm) | Тегло [g/m] |
|-----------|--------|--------|-------------|
| 30716 | 6 | 1 | 42 |
| 30221 | 8 | 1 | 59 |
| RT008004 | 8 | 1.1 | 65 |
| RT008003 | 8 | 1.5 | 83 |
| 30575 | 8.5 | 1.5 | 89 |
| 7434 | 10 | 1 | 76 |
| RT-102 | 10 | 1.5 | 108 |
| 7435 | 12 | 1 | 93 |
| RT012003 | 12 | 2 | 170 |
| 30721 | 13 | 0.8 | 83 |
| 17113 | 14 | 1 | 110 |
| 30712 | 15 | 1 | 119 |
| 29694 | 15.875 | 3.25 | 348 |
| 30399 | 16 | 1 | 127 |
| 7602 | 16 | 1.5 | 184 |
| 30714 | 18 | 1 | 144 |
| 30713 | 19 | 0.8 | 124 |
| 7531 | 19 | 1 | 153 |
| 30468 | 19 | 1.1 | 167 |
| 30690 | 20 | 1 | 161 |
| 7172 | 20 | 1.5 | 235 |
| 30645 | 21 | 1 | 170 |
| 30051 | 21.5 | 1.1 | 190 |
| 30233 | 22 | 1 | 178 |
| 7180 | 25 | 2 | 390 |
| 7167 | 25 | 3 | 560 |
| 29546 | 25.4 | 1.62 | 327 |
| 29695 | 25.4 | 4.76 | 834 |
| 30052 | 27 | 1.25 | 273 |
| RT030008 | 30 | 1 | 246 |
| 7173 | 30 | 2 | 475 |
| 30723 | 32 | 1 | 263 |
| 7184 | 32 | 1.5 | 388 |
| RT034006 | 34 | 1 | 281 |
| 30569 | 35 | 1 | 288 |
| 7614 | 35 | 2 | 560 |
| 30607 | 40 | 1 | 331 |
| 11612 | 40 | 1.2 | 395 |
| 7406 | 40 | 1.5 | 490 |
| 30487 | 50 | 1 | 416 |
| 11613 | 50 | 1.2 | 497 |
| 7233 | 50 | 1.5 | 617 |
| 17124 | 50 | 10 | 3393 |
| 17126 | 60 | 2.5 | 1219 |
| 7149 | 63.5 | 1.02 | 541 |
| 10761 | 80 | 1 | 570 |
| 7480 | 80.3 | 2.15 | 1425 |
| RT101002 | 101 | 1.1 | 953 |
| 29538 | 101.6 | 3.25 | 2711 |
| 17137 | 115 | 5 | 4665 |
| 29703 | 127 | 3.25 | 3413 |
| RT140002 | 140 | 4 | 4614 |

OT Ортогонални тръби

| Продукт # | A (mm) | B (mm) | S (mm) | R | r | Тегло [g/m] |
|-----------|--------|--------|--------|---|---|-------------|
| 7081 | 20 | 15 | 1.3 | | | 227 |
| 7425 | 30 | 15 | 1.5 | | | 340 |
| 7297 | 30 | 20 | 1.5 | | | 380 |
| 14263 | 40 | 20 | 1 | | | 313 |
| 7444 | 40 | 20 | 1.5 | | | 461 |
| 7022 | 50 | 40 | 2 | | | 929 |
| 7313 | 60 | 20 | 1.5 | | | 623 |
| 17095 | 100 | 18 | 2 | | | 1231 |
| 7486 | 100 | 20 | 1.3 | | | 824 |

ST Квадратни тръби

| Продукт # | A (mm) | S (mm) | R | r | Тегло [g/m] |
|-----------|--------|--------|-----|-----|-------------|
| 31006 | 10 | 1 | | | 97 |
| 30599 | 15 | 1 | | | 151 |
| 17146 | 15 | 1.5 | | | 218 |
| 30244 | 15.7 | 0.85 | | | 136 |
| 7379 | 40 | 1.5 | | | 623 |
| 7237 | 40 | 2.5 | | | 1012 |
| 13936 | 80 | 1.5 | | | 1271 |
| 10495 | 80 | 5 | | | 4050 |
| 30788 | 13.8 | 0.85 | | | 119 |
| ST015007 | 15 | 0.8 | | | 123 |
| ST015008 | 15 | 0.9 | | | 137 |
| 7145 | 15 | 1.3 | 1.5 | | 187 |
| 30798 | 15.3 | 1 | 1 | | 154 |
| 31138 | 16.5 | 0.95 | | | 159 |
| 7158 | 18 | 1.3 | | | 234 |
| 7143 | 19 | 1.4 | 0.8 | 0.6 | 265 |
| 7436 | 20 | 1 | | | 205 |

ПРОФИЛИ И ТЕХНИЧЕСКИ УСЛОВИЯ

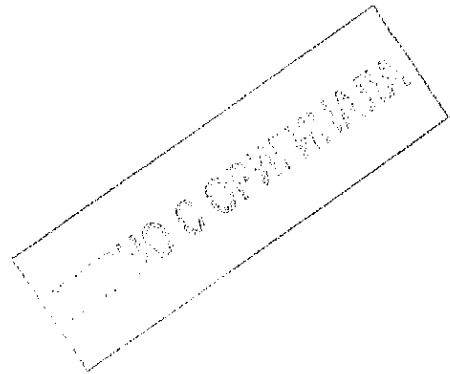
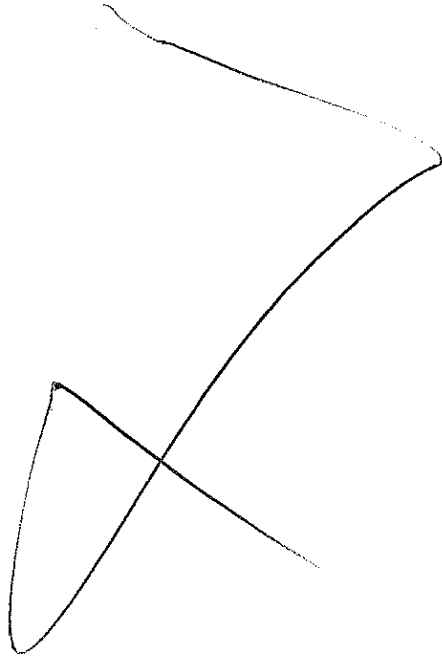
FB Шини

| Продукт # | A (mm) | B (mm) | R | Тегло [g/m] |
|-----------|--------|--------|-----|-------------|
| 34327 | 38.1 | 31.75 | 0.4 | 3264 |
| 30216 | 10 | 1.4 | | 38 |
| 30684 | 10 | 2 | | 54 |
| 17036 | 10 | 3 | | 81 |
| 30215 | 11.5 | 2.5 | | 77 |
| 9029 | 20 | 2 | | 108 |
| 9030 | 20 | 3 | | 162 |
| 9031 | 20 | 5 | | 270 |
| 9032 | 20 | 6 | | 324 |
| 9036 | 25 | 2 | | 135 |
| 9057 | 25 | 10 | | 675 |
| 9043 | 30 | 2 | | 162 |
| 9053 | 35 | 4 | | 378 |
| 34385 | 44.45 | 19.05 | 0.4 | 2284 |
| 9070 | 50 | 2 | | 270 |
| 34303 | 50.8 | 9.53 | 0.4 | 1307 |
| 9077 | 60 | 2 | | 324 |
| 17054 | 60 | 25 | | 4050 |
| 34387 | 76.2 | 4.76 | 0.4 | 980 |
| 0B090001 | 90 | 3 | | 729 |
| 17077 | 120 | 20 | | 6480 |

ПРОДУКТИ С ОРИГИНАЛЕН

RB Кръгли пръти

| Продукт # | D (mm) | Тегло [g/m] |
|-----------|--------|-------------|
| 11617 | 6 | 76 |
| 30214 | 7.8 | 129 |
| 12036 | 8 | 136 |
| 9155 | 10 | 212 |
| 9157 | 30 | 1909 |



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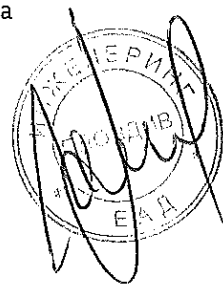
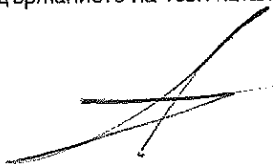
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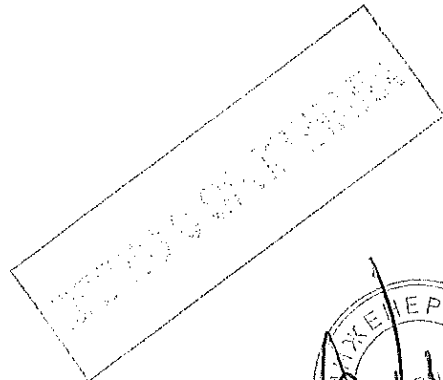
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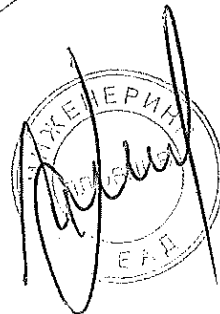





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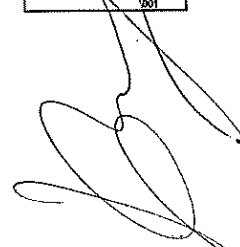


СЕРТИФИКАТ



ИНЖЕНЕРИ
ЕАЭ





ТЕХНИЧЕСКА СПЕЦИФИКАЦИЯ

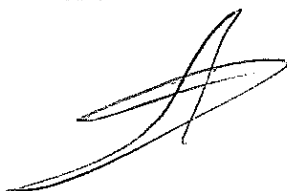
Наименование на материала: Шина пресувани, правоъгълни,
алуминиева сплав Al – 99,5 %,
дължина 6 m.

I. Описание на материала:

| Размери на профила | Код на профила | Тегло на една дължина (6m) | Допустими отклонения от форма и размери съгласно изискванията на клиента |
|--------------------|----------------|------------------------------|--|
| 15 x 3 mm | 11094 | 0.73kg | |
| 20 x 3 mm | 9030 | 0.97 kg | |
| 25 x 3 mm | 9037 | 1.21 kg | |
| 30 x 4 mm | 9044 | 1.94 kg | |
| 40 x 4 mm | 9062 | 2.59 kg | широчина ±0,60 mm; дебелина ±0,35 mm |
| 40 x 5 mm | 9110 | 3.24 kg | |
| 50 x 5 mm | 9124 | 4.05 kg | широчина ±0,60 mm; дебелина ±0,35 mm |
| 50 x 6 mm | 9113 | 4.86 kg | |
| 60 x 6 mm | 9296 | 5.83 kg | широчина ±0,85 mm; дебелина ±0,40 mm |
| 80 x 6 mm | 9329 | 7.78 kg | |
| 100 x 6 mm | 9142 | 9.72 kg | |
| 60 x 8 mm | 9079 | 7.78 kg | широчина ±0,85 mm; дебелина ±0,40 mm |
| 80 x 8 mm | 9198 | 10.37 kg | широчина ±1,00 mm; дебелина ±0,45 mm |
| 100 x 8 mm | 9191 | 12.96 kg | |
| 120 x 8 mm | 11100 | 15.55 kg | |
| 60 x 10 mm | 9080 | 9.72 kg | |
| 80 x 10 mm | 9186 | 12.96 kg | |
| 100 x 10 mm | 9092 | 16.20 kg | широчина ±1,00 mm; дебелина ±0,50 mm |
| 120 x 10 mm | 9095 | 19.44 kg | |

Забележка:

1. Предлаганите профили са с радиус на закръгление $r = 0,3 \text{ mm}$.
2. Допустими отклонения от форма и размери: съгласно изискванията на клиента за съответните габарити.



СЪГЛАСНО С ОРИГИНАЛА



II. Изисквания към изпитванията:

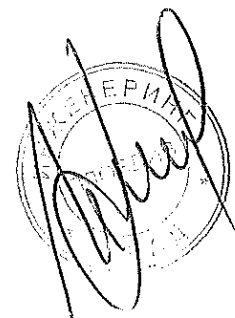
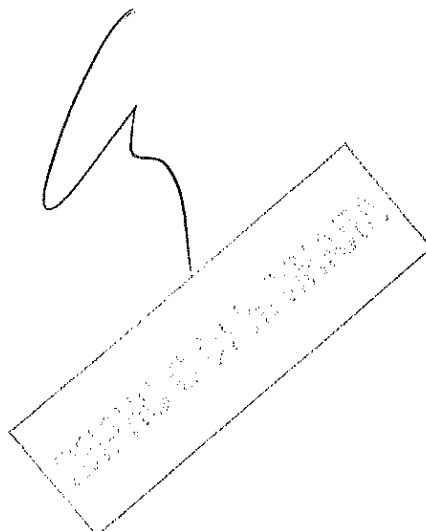
| Параметър | Изискване на клиента | Предложение на производителя |
|---------------------------------------|---|---|
| Алуминиева сплав | EA1 – 99,5 % | Al – 99,5 % (EN AW-1050) |
| Химичен състав на алуминиевата сплав: | | Химично съдържание съгласно стандарт EN 753-3. |
| Al | min 99,5 % | 99,5 % |
| Si | max 0,10 | 0,25 |
| Fe | max 0,40 | 0,4 |
| Cu | max 0,05 | 0,05 |
| Mn | max 0,01 | 0,05 |
| Cr | max 0,01 | 0 |
| Zn | max 0,05 | 0,07 |
| Mg | | 0,05 |
| Плътност: | 2,71 g/cm ³ | 2,71 g/cm ³ |
| Електрическо съпротивление | Max 0,0290 Ω | Не разполагаме с необходимите инструменти за измерване на изискваната величина. |
| Механични свойства: | | Съгласно стандарт БДС EN 755-2 |
| Якост на опън | 70 N / mm ² | Профилите ще бъдат в състояние FO ! |
| Относително удължение | 15 % | Якост на опън Rm = min 60 MPa Отн.удължение A _{50 mm} =min 23 % |
| Дължина | 6000 +30 mm | 6000 +30 mm |
| Изпълнение | а) по повърхностите на шините не трябва да има цепнатини, разслоения на материала, неметални включвания и петна с корозионен произход. | Производителя ще осигури изискването на клиента. |
| | б) по повърхностите на шините не трябва да има дефекти като вдлъбнатини, драскотини, мехури, запресовки и други подобни, при зачистването на които размерите на шините излизат от допустимите отклонения. | Производителя ще осигури изискването на клиента. |
| | в) по повърхностите на шините не трябва да има светли и тъмни петна и следи от технологични масла / греси. | Производителя ще осигури изискването на клиента. |
| | г) общото усукване на шините около надлъжната им ос не трябва да бъде по-голямо от 12°. | Производителя ще осигури изискването на клиента. |
| | д) общата надлъжна кривина на шините, в която и да е плоскост, включително и на ребро, трябва да бъде плавна и не трябва да по-голяма от 24 mm. | Производителя ще осигури изискването на клиента. |
| | е) вълнообразността на шините не | Производителя ще осигури изискването |

| <i>Параметър</i> | <i>Изискване на клиента</i> | <i>Предложение на производителя</i> |
|------------------|--|---|
| | трябва да бъде по-голяма от 2 mm. | <i>на клиента.</i> |
| Маркировка | Всяка шина трябва да бъде маркирана на разстояние не по-голямо от 20 mm от външния ѝ край с наименованието или логото на производителя, означението на алуминиевата сплав и номера на партидата. | Не можем да изпълним искането на клиента за маркиране на профилите. |
| Опаковка | а) шините трябва да бъдат доставени на връзки, превързани с алуминиева жица, с тегло не повече от 300 kg. | <i>Екструдираните профили ще бъдат опаковани по следния начин:</i> <ul style="list-style-type: none"> - с хартия на всеки ред; - пакета ще бъде опакован с найлон и поставен на дървена скара; - тегло на пакета: 500 kg. |
| | б) на всяка връзка трябва да бъде прикрепен етикет, на който трябва да бъдат написани четливо най-малко следните данни: наименованието или логото на производителя, означение на алуминиевата сплав, размерите на шината, номера на партидата и стандарта, в съответствие с който шината е произведена. | <i>Етикета ще включва следната информация:</i> <ul style="list-style-type: none"> - лого на производителя; - означение на алуминиевата сплав и исканото от клиента състояние (F0); - номера на профила; - размерите на шината. |
| Съхранение | Шините трябва да бъдат съхранявани в сухи и чисти складови помещения, несъдържащи вредни изпарения и газове. | <i>Производителя ще осигури изискването на клиента.</i> |
| Транспорт | При транспортиране шините трябва да бъдат защитени от механични повреди, влага и активни химически вещества. | |

III. Изисквания към документацията:

| Документ | Приложение N (или текст) |
|--|--|
| Точно обозначение на типа, производителя и страна на произход и последно издание на каталога на производителя | <i>Документ за произход – приложение N1</i> |
| Техническо описание, гарантирани параметри и характеристики, тегло и др. | <i>т. II – изисквания към изпитванията</i> |
| Протоколи от типови изпитвания на английски или български език, проведени от независима изпитвателна лаборатория – заверено копие, с приложен списък на отделните изпитвания – заверено копие. | <i>Издаване на документ за качество в съответствие със стандарта EN 10204 по точка 3.1 в включващ номер и хим. състав на партидата, с която е произведен профила както и измерени механични показатели: Rm; Rp0,2 и A50 тт %. Изпитванията се извършват в лабораторията на „Стилмет“ АД. – приложение N2</i> |
| Изисквания за съхранение и транспорт | |
| Декларация за възможностите за рециклиране или за начина на ликвидиране | |
| Описание на потенциалната заплата за увеличаване опасността и рисковете на околната среда и класификация на отпадъците съгласно Наредба N3 / 2004 за класификация на отпадъците, издадена от министъра на околната среда и водите и министъра на здравеопазването, обн. ДВ, бр.44 от 25.05.2004 г. | |
| Кратко описание на системата за управление на качеството на производството с приложен сертификат за внедрена система за управление на качеството по ISO 9001 или БДС EN ISO 9001. | <i>Приложение N3, приложение N4 и приложение N5</i> |

Изготвил: Живка Доксинова
НОТдел „ТКК“



Prufprotokoll

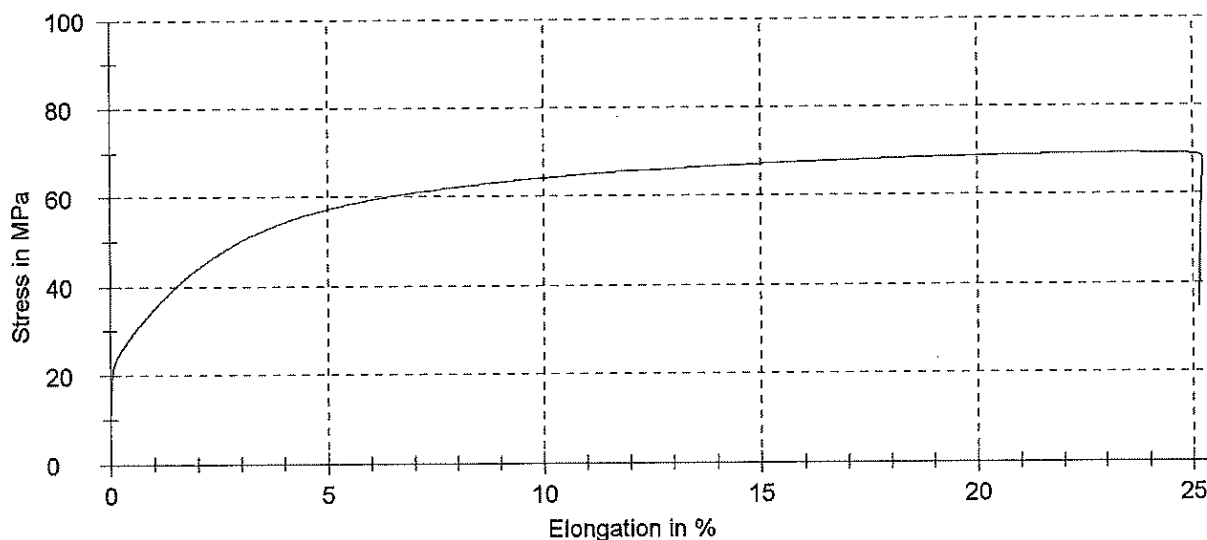
Customer : ELEKTROGEC Specimen removal : profile no.9327
 Prufnorm : BDS EN 10002-1 Specimen type : order no. 99994
 Type and designation of : Notes... : Alloy 1050 F0 W0 Demag
 Material : 1050 batch no.9100361

Pre-load : 0,5 MPa Speed Yield point : 10 MPa/s
 Speed E-Modulus : 30 MPa/s Prufgeschwindigkeit : 0,008 1/s

Prufergebnisse:

| Nr | R _m MPa | R _{p0.2} MPa | A ₅₀ % | E GPa | F _m kN | a ₀ mm | b ₀ mm | L _e mm | A _{gt (corr.)} % | r _B MPa | S ₀ mm ² | L ₀ mm |
|----|-----------------------|--------------------------|----------------------|----------|----------------------|----------------------|----------------------|----------------------|------------------------------|-----------------------|-----------------------------------|----------------------|
| 1 | 69 | 25 | 25,1 | 80 | 6,92 | 10 | 10 | 50,00 | 23,54 | 30,000 | 100,00 | 50,00 |

Series graph:



Statistics:

| Series n = 1 | R _m MPa | R _{p0.2} MPa | A ₅₀ % | E GPa | F _m kN | a ₀ mm | b ₀ mm | L _e mm | A _{gt (corr.)} % | r _B MPa | S ₀ mm ² | L ₀ mm |
|-----------------|-----------------------|--------------------------|----------------------|----------|----------------------|----------------------|----------------------|----------------------|------------------------------|-----------------------|-----------------------------------|----------------------|
| \bar{x} | 69 | 25 | 25,1 | 80 | 6,92 | 10 | 10 | 50,00 | 23,54 | 30,000 | 100,00 | 50,00 |
| s | - | - | - | - | - | - | - | - | - | - | - | - |
| v | - | - | - | - | - | - | - | - | - | - | - | - |

[Handwritten signature]

[Faint stamp: TÜBEN GERMANY]

[Circular stamp with handwritten signature]

www.steelmet.bg



To:

Subject: Test Report No.

Sofia, Ilentzi Str 119 A, ☎ +359/2/9219111, 📠 +359/2/9311239

Ref.No.

Dated: 9/17/2010

TEST REPORT No. / 00-00-10

INSPECTION CERTIFICATE EN 10204 / 3.1

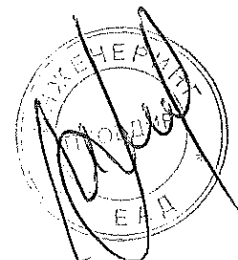
CUSTOMER:
CUSTOMER ORDER No.
PACKING LIST No.


Checked by ERP system

| Code | Profile | ORDER No | Alloy Batch N | Temper | Fe | Si | Cu | Zn | Ti | Mn | Cr | Mg | Rm N/mm ² | Rp 0.2 N/mm ² | A50 MM % |
|------|---------|----------|---------------|--------|----|----|----|----|----|----|----|----|----------------------|--------------------------|----------|
| | | | | | | | | | | | | | | | |

на основание чл. 36а, ал. 3 от ЗОП

eng. Doksinova:
(eng. Dimitrova:)



| | |
|---|-----------------------------|
| www.steelmet.bg  | До: |
| | Декларация за съответствие |
| гр.София, бул. Илиенци 119 А, ☎ 02/9219111, 📠 02/9311239 | Относно: |
| | Изх.№ _____ Дата: 6/22/2011 |

ОД 05-01-08

Декларация за съответствие

„СТИЛМЕТ” АД с адрес на управление:
гр.София, кв. Военна Рампа, бул. Илиенци 119А декларира ,че продуктът / продуктите

произведени в „СТИЛМЕТ” АД, за които се отнася тази декларация, са произведени в условията на въведена и поддържана от производителя система за производствен контрол и е в съответствие със следните стандарти:

EN 573 Алуминий и алуминиеви сплави. Химичен състав и форма на деформираните продукти (1÷4 част);

EN 755 Алуминий и алуминиеви сплави. Пресувани пръти, тръби и профили (1÷9 част);

EN 12020 Алуминий и алуминиеви сплави. Пресувани прецизни профили от сплави EN AW-6060 и EN AW-6063 (1÷2 част) и съответствието е оценено съгласно Наредбата за съществените изисквания към строежите и оценяване на съответствието на строителните продукти.

Настоящата декларация се издава въз основа на:

Сертификат за Система за управление на качеството N SOF0368012, издаден от Lloyd's Register Quality Assurance, удостоверяващ съответствието с

BS EN ISO 9001:2008 / EN ISO 9001:2008 ISO 9001:2008

Сертификат за производствен контрол „СЕ” N 1857 – CPD – 01346, издаден от нотифициран орган ОТС, удостоверяващ съответствието с

EN 15088:2005 (Приложение ZA)

Произведените профили са с български произход.

Декларирам, че ми е известна отговорността, която нося съгласно чл. 313 от НК.

На основание чл. 36а, ал. 3
от ЗОП

/ Ръководител РКК: Живка Доксинова /

Стр.1 от 1

" ЕЛПРОМ ЕМЗ " ООД ГРАД ШАБЛА

ГАМА ТОКОВИ ИЗМЕРВАТЕЛНИ ТРАНСФОРМАТОРИ НН ТИП СТ-1; СТ-2, СТ-3 И СТ-4

ТЕЛЕФОНИ ЗА КОНТАКТИ:

Управление: 05743 / 45 - 68

Електроизмерител: 05743 / 42 - 84

Търг. Отдел: 05743 / 41 - 84

Факс/тел.секретар: 05743 / 50 - 20

E-mail: elpromemz@mbx.infotel.bg

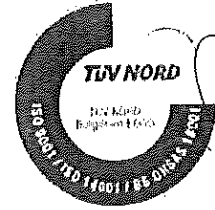


таблица 1.

| Тип Туро | Проводно отношение I _{pn} /I _{sn} Rated current ratio A / A | Най-високо работно напрежение Rated voltage power network kV | Клас на точност Class of accuracy % | Номинална мощност Sn Rated power VA | Номинален ток на терм. устойчивост Rated short-time thermal stability I _{th} , kA | Номинален ток на дин. устойчивост Rated short-time dynamic stability I _{dyn} , kA | Номинален коэффициент на безоп. Security factor for apparatus Fs | Заводски шифър Serial number |
|--|--|---|---|--|---|---|---|------------------------------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| СТ - 1 първич и вторич | 30 / 5 | 0,72 | 0.2; 0.5; 0.5S | 5 ; 10 | 60 I _{pn} | 2,5 I _{th} | 5 ; 10 | 1210302 - XXXX |
| | 50 / 5 | 0,72 | 0.2; 0.5; 0.5S | 5 ; 10 | 60 I _{pn} | 2,5 I _{th} | 5 ; 10 | 1210502 - XXXX |
| | 75 / 5 | 0,72 | 0.2; 0.5; 0.5S | 5 ; 10 | 60 I _{pn} | 2,5 I _{th} | 5 ; 10 | 1210752 - XXXX |
| | 100 / 5 | 0,72 | 0.2; 0.5; 0.5S | 5 ; 10 | 60 I _{pn} | 2,5 I _{th} | 5 ; 10 | 1211002 - XXXX |
| СТ - 2 шина 30x10 40x10 кабел φ36 | 150 / 5 | 0,72 | 0.5 | 5 | 60 I _{pn} | 2,5 I _{th} | 5 ; 10 | 1221505 - XXXX |
| | 200 / 5 | 0,72 | 0.5 | 5 | 60 I _{pn} | 2,5 I _{th} | 5 ; 10 | 1222005 - XXXX |
| | 250 / 5 | 0,72 | 0.5 | 5 | 60 I _{pn} | 2,5 I _{th} | 5 ; 10 | 1222505 - XXXX |
| | 300 / 5 | 0,72 | 0.5 | 5 | 60 I _{pn} | 2,5 I _{th} | 5 ; 10 | 1223005 - XXXX |
| СТ - 3 шина 30x10 40x10 φ36 | 300 / 5 | 0,72 | 0.2; 0.5; 0.5S | 5 ; 10 | 60 I _{pn} | 2,5 I _{th} | 5 ; 10 | 1233005 - XXXX |
| | 400 / 5 | 0,72 | 0.2; 0.5; 0.5S | 5 ; 10 | 60 I _{pn} | 2,5 I _{th} | 5 ; 10 | 1234005 - XXXX |
| | 500 / 5 | 0,72 | 0.2; 0.5; 0.5S | 5 ; 10 | 60 I _{pn} | 2,5 I _{th} | 5 ; 10 | 1235005 - XXXX |
| | 600 / 5 | 0,72 | 0.2; 0.5; 0.5S | 5 ; 10 | 60 I _{pn} | 2,5 I _{th} | 5 ; 10 | 1236005 - XXXX |
| СТ - 3 шина 60x10 φ48 | 600 / 5 | 0,72 | 0.5; 0.5S | 5; 10; 15 | 60 I _{pn} | 2,5 I _{th} | 5 ; 10 | 1235005 - XXXX |
| | 600 / 5 | 0,72 | 0.5; 0.5S | 5; 10; 15 | 60 I _{pn} | 2,5 I _{th} | 5 ; 10 | 1236005 - XXXX |
| | 750 / 5 | 0,72 | 0.2; 0.5; 0.5S | 5; 10; 15 | 60 I _{pn} | 2,5 I _{th} | 5 ; 10 | 1237505 - XXXX |
| | 800 / 5 | 0,72 | 0.2; 0.5; 0.5S | 5; 10; 15 | 60 I _{pn} | 2,5 I _{th} | 5 ; 10 | 1238005 - XXXX |
| СТ-4 за шина 60x10 или кабел φ73 | 300 / 5 | 0,72 | 0.5; 0.5S | 5 | 60 I _{pn} | 2,5 I _{th} | 5 ; 10 | 1243005 - XXXX |
| | 400 / 5 | 0,72 | 0.5; 0.5S | 5 | 60 I _{pn} | 2,5 I _{th} | 5 ; 10 | 1244005 - XXXX |
| | 500 / 5 | 0,72 | 0.5; 0.5S | 5 | 60 I _{pn} | 2,5 I _{th} | 5 ; 10 | 1245005 - XXXX |
| | 600 / 5 | 0,72 | 0.2; 0.5; 0.5S | 5; 10; 15 | 60 I _{pn} | 2,5 I _{th} | 5 ; 10 | 1246005 - XXXX |
| | 750 / 5 | 0,72 | 0.2; 0.5; 0.5S | 5; 10; 15 | 60 I _{pn} | 2,5 I _{th} | 5 ; 10 | 1247505 - XXXX |
| | 800 / 5 | 0,72 | 0.2; 0.5; 0.5S | 5; 10; 15 | 60 I _{pn} | 2,5 I _{th} | 5 ; 10 | 1248005 - XXXX |
| | 1000 / 5 | 0,72 | 0.2; 0.5; 0.5S | 5; 10; 15 | 60 I _{pn} | 2,5 I _{th} | 5 ; 10 | 1241005 - XXXX |
| | 1200 / 5 | 0,72 | 0.2; 0.5; 0.5S | 5; 10; 15 | 60 I _{pn} | 2,5 I _{th} | 5 ; 10 | 1241205 - XXXX |
| | 1250 / 5 | 0,72 | 0.2; 0.5; 0.5S | 5; 10; 15 | 60 I _{pn} | 2,5 I _{th} | 5 ; 10 | 1241255 - XXXX |
| | 1500 / 5 | 0,72 | 0.2; 0.5; 0.5S | 5; 10; 15 | 60 I _{pn} | 2,5 I _{th} | 5 ; 10 | 1241505 - XXXX |

на основание чл. 36а, ал. 3
от ЗОП

УПРАВЛЕНИЕ

инж. Д. АРНАУДОВ





РЕПУБЛИКА БЪЛГАРИЯ
Български институт по метрология
REPUBLIC OF BULGARIA
Bulgarian Institute of Metrology



**УДОСТОВЕРЕНИЕ
ЗА ОДОБРЕН ТИП СРЕДСТВО ЗА ИЗМЕРВАНЕ**
Measuring Instrument Type-approval Certificate

№ 16.03.5100

Издадено на производител: „ЕЛПРОМ ЕМЗ“ ООД, гр. Шабла, ул. Нефтяник № 38
Issued to manufacturer:

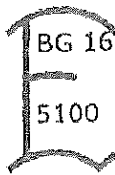
На основание на:
In Accordance with:

чл. 32, ал. 1 от Закона за измерванията (ДВ, бр. 46 от 2002 г., изм. бр. 88 от 05 г., изм. и доп. бр. 95 от 2005 г.)

Относно:
In Respect of:

измервателен токов трансформатор тип СТ-х

Знак за одобрен тип:
Type Approval Mark:



Технически и метрологични
характеристики:
Technical and metrological
characteristics:

приложение, неразделна част от настоящото
удостоверение за одобрен тип средство за измерване

Срок на валидност:
Valid until:

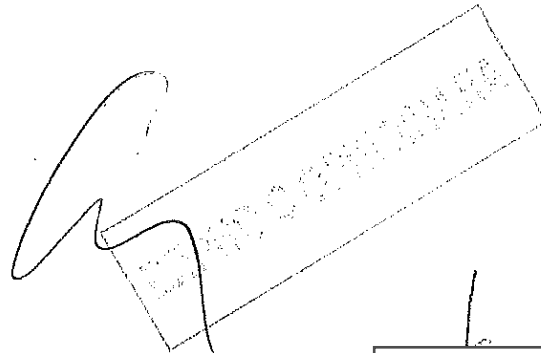
14.03.2026 г.

Вписва се в регистъра на
одобрените за използване
типове средства за
измерване под №:
Reference №:

5100

Дата на издаване на
удостоверението за
одобрен тип:
Date:

14.03.2016 г.



на основание чл. 36а, ал. 3
от ЗОП

И. Д. ПРЕДСЕДАТЕЛ:

Паун Илчев



страница 1 от 3



Приложение към удостоверение за одобрен тип № 16.03.5100

Издадено на производител: „ЕЛПРОМ ЕМЗ“ ООД; гр. Шабла, ул. Нефтяник № 38

Относно: измервателен токов трансформатор тип СТ-х

1. Описание на типа:

Измервателните токови трансформатори тип СТ-х се използват за измерване и защита на електрически мрежи с максимално работно напрежение 0,72 kV.

Измервателните токови трансформатори тип СТ-1 се състоят от тороидален магнитопровод с първична и вторична намотки, поместени в кутия от пластмаса. Магнитопровода е направен от силициева ламарина, Ми-метал или пермалой. Върху магнитопровода е намотана вторичната намотка равномерно по целия обем. Това осигурява ефективното магнитно взаимодействие на първичната и вторичната намотки. Броят на навивките на вторичната намотка се определя от отношението между първичния и вторичния номинален ток. Първична и вторична намотки са поместени в кутийка от пластмаса, изработена от пластмаса тип Tecomid NB40 NL E с клас на възпламеняемост съгласно IEC 707-V-0. Началото и края на вторичната намотка са изведени на клеми разположени в горната част на трансформатора и са защитени с прозрачна пластмасова капачка, която е отваряема и има възможност за plombиране.

Измервателните токови трансформатори тип СТ-2, тип СТ-3 и тип СТ-4 са проходен тип, пригодени за монтаж за шина или за кабел. Състоят се от магнитопровод с вторична намотка и са поместени в пластмасова кутия, изработена от пластмаса тип Tecomid NB40 NL E с клас на възпламеняемост съгласно IEC 707-V-0.

Измервателните токови трансформатори тип СТ-х са предназначени за експлоатация на закрито, при надморска височина до 1000 m, температура на околната среда от минус 35 °C до 45 °C и относителна влажност до 70 %. Изолацията спрямо магнитопровода и намотките е суха, с клас на топлоустойчивост В.

При измервателните токови трансформатори тип СТ-х има възможност да се plombира кутията на трансформатора с цел предотвратяване на неправилен достъп до магнитопровода и намотките. Има възможност да се plombира и капачката, която предпазва клемите на вторичната намотка на трансформатора.

2. Технически и метрологични характеристики:

| Характеристики | Тип на трансформатора | | | |
|-----------------------------------|-----------------------|-------------------------|----------------------|--|
| | СТ-1 | СТ-2 | СТ-3 | СТ-4 |
| Максимално работно напрежение, kV | 0,72 | | | |
| Честота, Hz | 50 | | | |
| Номинален първичен ток, A | 30; 50; 75; 100; 150 | 100; 150; 200; 250; 300 | 400; 500; 600 | 750; 800; 1000; 1200; 1250; 1500; 1600; 2000; 2500; 3000 |
| Клас на точност | 0,2; 0,25; 0,5; 0,55 | 0,5; 0,55 | 0,2; 0,25; 0,5; 0,55 | 0,2; 0,25; 0,5; 0,55 |
| Номинален вторичен ток, A | 5 | | | |
| Мощност, VA | 5; 10 | 5; 10 | 5; 10; 15 | 5; 10; 15 |
| Коефициент на сигурност, FS | FS5; FS10 | | | |

ЕЛПРОМ ЕМЗ

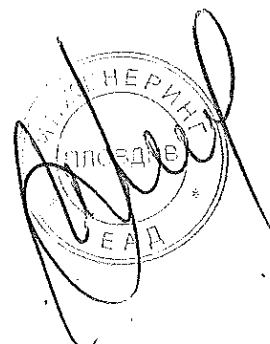
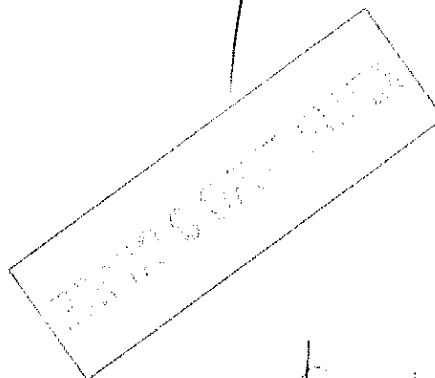
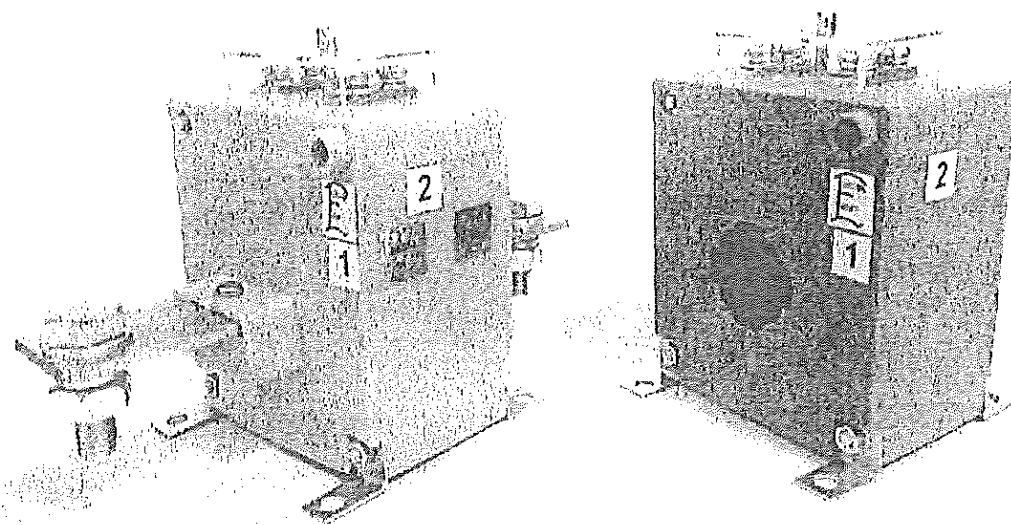
[Signature]

ЕЛПРОМ ЕМЗ
ЕАД
Страница 2 от 3

3. Типово означение: СТ-х (СТ-1; СТ-2; СТ-3; СТ-4)

4. Описание на местата, предназначени за поставяне на знаци от метрологичен контрол:

- 1 - Знак за одобрен тип;
- 2 - Знак за първоначална проверка (марка за залепване).





РЕПУБЛИКА БЪЛГАРИЯ
Български институт по метрология
REPUBLIC OF BULGARIA
Bulgarian Institute of Metrology



ДОПЪЛНЕНИЕ № 17.11.5100.1

КЪМ УДОСТОВЕРЕНИЕ
ЗА ОДОБРЕН ТИП СРЕДСТВО ЗА ИЗМЕРВАНЕ № 16.03.5100
Measuring Instrument Type-approval Certificate-Revision 1

Издадено на
производител: „ЕЛПРОМ ЕМЗ“ ООД, гр. Шабла, ул. Нефтяник № 38
Issued to manufacturer:

На основание на: чл. 32, ал.1 от Закона за измерванията
In Accordance with:

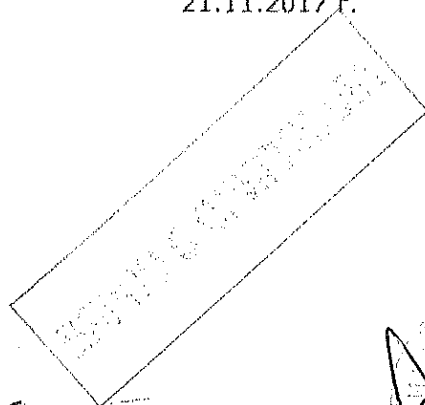
Относно: измервателни токови трансформатори тип СТ-х
In Respect of:

Технически и метрологични характеристики: приложение, неразделна част от настоящото удостоверение за одобрен тип средство за измерване
Technical and metrological characteristics:

Срок на валидност: 14.03.2026 г.
Valid until:

Средството за измерване е вписано в регистъра на одобрените за използване типове средства за измерване под №: 5100
Reference №:

Дата на издаване на допълнението към удостоверението за одобрен тип: 21.11.2017 г.
Date:



И.Д. ПРЕДСЕДАТЕЛ



на основание чл. 36а, ал. 3 от ЗОП

страница 1 от 4

Издадено на производител: „ЕЛПРОМ ЕМЗ“ ООД, гр. Шабла, ул. Нефтяник № 38

Относно: измервателни токови трансформатори тип СТ-х

Описание на допълнението към удостоверение за одобрен тип № 16.03.5100:

• Към т.1 **Описание на типа** се добавя:

„Три броя измервателни токови трансформатори тип СТ-х (СТ-2, СТ-3 и СТ-4) могат да се монтират в обща пластмасова кутия. Тези трансформатори са с еднакви метрологични характеристики, с изведени начало и край на вторичната намотка (на трите отделни токови трансформатора), съответно в долният или горният край на общата кутия“.

• Към т.4 **Описание на местата, предназначени за поставяне на знаци от метрологичен контрол** се добавят местата за знаци върху общата пластмасова кутия при монтаж на 3 броя трансформатора:

При монтаж на 3 трансформатори в обща пластмасова кутия описанието на типа и местата, предназначени за поставяне на знаци от метрологичен контрол се допълват и добиват следният вид:

1. Описание на типа:

Измервателните токови трансформатори тип СТ-х се използват за измерване и защита на електрически мрежи с максимално работно напрежение 0,72 kV.

Измервателните токови трансформатори тип СТ-1 се състоят от тороидален магнитопровод с първична и вторична намотки, поместени в кутия от пластмасата.

Магнитопроводът е направен от силициева ламарина, Мн-метал или пермалой. Върху магнитопровода е намотана вторичната намотка равномерно по целия обем. Това осигурява ефективното магнитно взаимодействие на първичната и вторичната намотки. Броят на навивките на вторичната намотка се определя от отношението между първичния и вторичния номинален ток.

Първична и вторична намотки са поместени в кутийка от пластмаса, изработена от пластмаса тип Tecomid NB40 NL E с клас на възпламеняемост съгласно IEC 707-V-0.

Началото и края на вторичната намотка са изведени на клеми разположени в горната част на трансформатора и са защитени с прозрачна пластмасова капачка, която е отваряема и има възможност за plombиране.

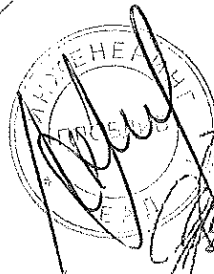
Измервателните токови трансформатори тип СТ-2, тип СТ-3 и тип СТ-4 са проходен тип, пригодени за монтаж за шина или за кабел. Състоят се от магнитопровод с вторична намотка и са поместени в пластмасова кутия, изработена от пластмаса тип Tecomid NB40 NL E с клас на възпламеняемост съгласно IEC 707-V-0.

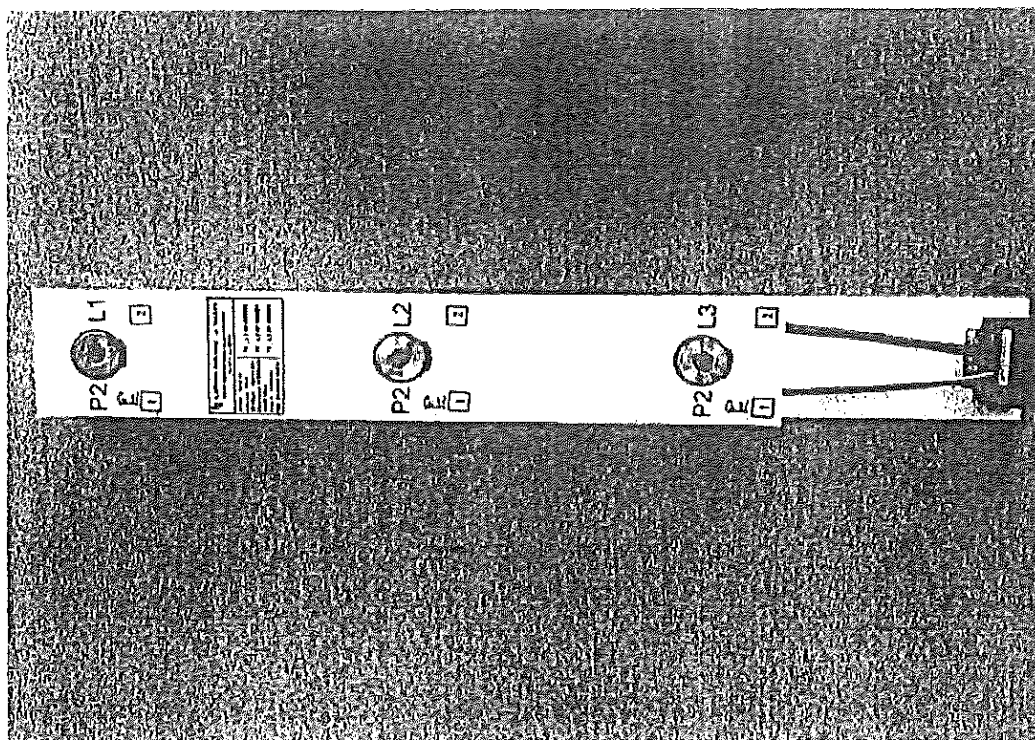
Измервателните токови трансформатори тип СТ-х са предназначени за експлоатация на закрито, при надморска височина до 1000 m, температура на околната среда от минус 35°C до 45°C и относителна влажност до 70%. Изолацията спрямо магнитопровода и намотките е суха, с клас на топлоустойчивост В.

При измервателните токови трансформатори тип СТ-х има възможност да се plombират, както кутията на трансформатора, с цел предотвратяване на неправилен достъп до магнитопровода и намотките, така и plombиране на капачката, която предпазва клемите на вторичната намотка на трансформатора.

Три броя измервателните токови трансформатори тип СТ-х (СТ-2, СТ-3 и СТ-4) могат да се монтират в обща пластмасова кутия. Тези трансформатори са с еднакви метрологични характеристики, с изведени начало и край на вторичната намотка (на трите отделни токови трансформатора), съответно в долният или горният край на общата кутия - фиг. 1

ЕЛПРОМ ЕМЗ ООД

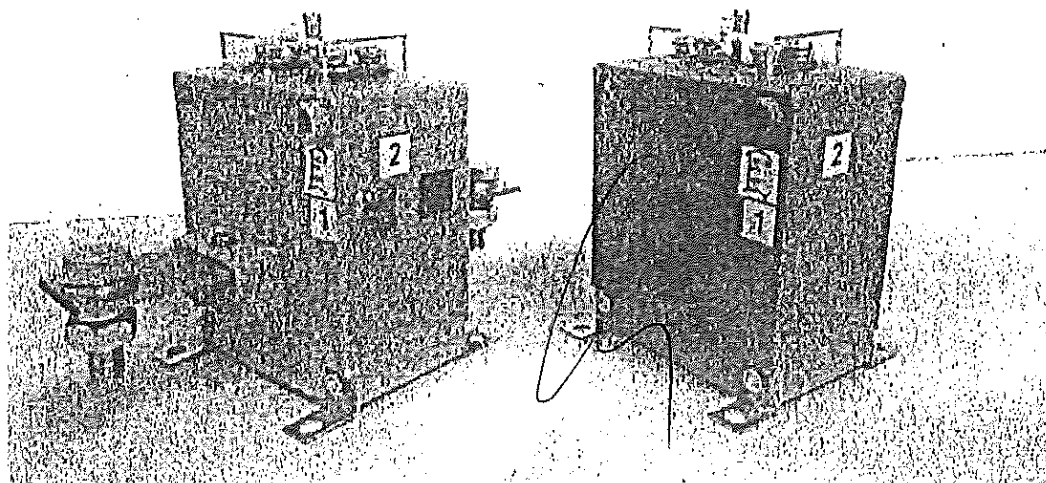




Фиг. 1

Върху общата кутия се поставят табелката с метрологичните характеристики на трите трансформатора и фабричните им номера.

4. Описание на местата, предназначени за поставяне на знаци от метрологичен контрол:

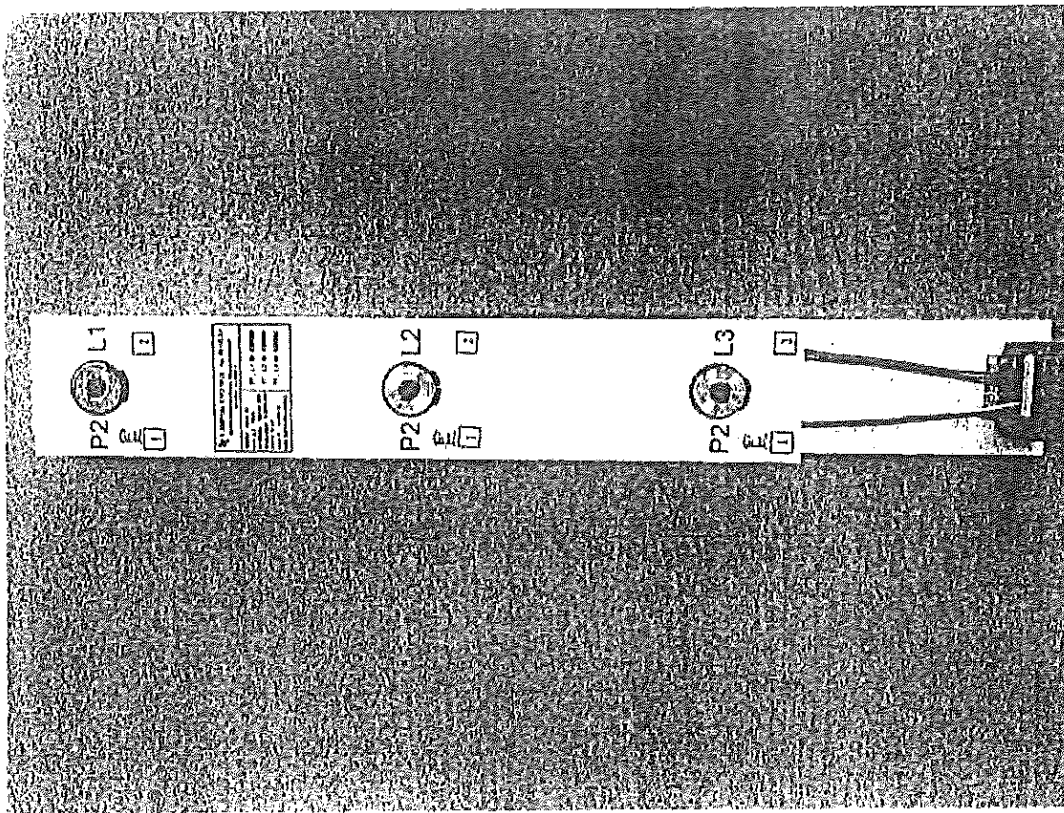


- 1 - Знак за одобрен тип;
- 2 - Знак за първоначална проверка (марка за залепване).

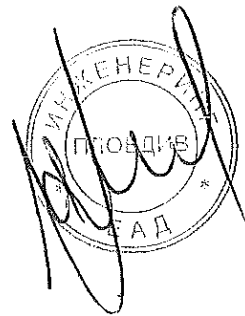
Handwritten signature and a rectangular stamp with the text "МАШИНОСТРОИТЕЛЕН ЦЕНТЪР" (Machinery Center).

Official circular stamp of "МАШИНОСТРОИТЕЛЕН ЦЕНТЪР" (Machinery Center) with a handwritten signature over it.

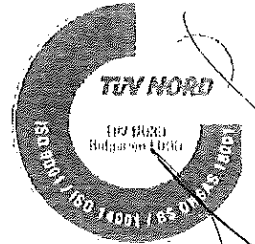
Три броя измервателни токови трансформатори тип СТ-х (СТ-2, СТ-3 и СТ-4) монтирани в обща пластмасова кутия:



- 1 - Знак за одобрен тип;
- 2 - Знак за първоначална проверка (марка за залепване).



“ЕЛПРОМ ЕМЗ” ООД град ШАБЛА



ТЕЛЕФОННИ КОНТАКТИ:

Управител 05743 / 45 - 68
 Главен счетоводител 05743 / 42 - 84
 Търг. Отдел 05743 / 41 - 84
 Факс/тел.секретар 05743 / 50 - 20
 E-mail: office@elpromemz.bg

ТЕХНИЧЕСКО ОПИСАНИЕ

**ГАМА ТОКОВИ ИЗМЕРВАТЕЛНИ ТРАНСФОРМАТОРИ,
 тип СТ-1, СТ-2, СТ-3 и СТ-4 за НН до 1000V
 ПРОИЗВОДСТВО НА “ ЕЛПРОМ ЕМЗ ” ООД град ШАБЛА**

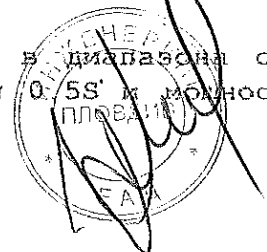
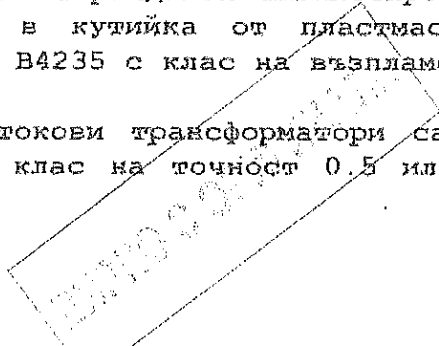
Токови измервателни трансформатори тип СТ-1; тип СТ-2, тип СТ-3 и тип СТ-4 са за ниско напрежение до 1000V за вътрешен монтаж с клас на точност 0.2; 0.5 или 0.5S и номинална мощност до 50VA в диапазона от номинални токове до 3000A съгласно БДС EN 61869-2:2012 и IEC 61869-2:2012.

- **Тип СТ-1** се състои от тороидален магнитопровод с първична и вторична намотки, поместени в кутийка от пластмаса изработена от пластмаса тип Rosap - B4235 с клас на възпламеняемост съгласно IEC 707 - V-0.

Произвежданите токови трансформатори са в диапазона от 30/5 A до 150/5 A с клас на точност 0.2, 0.5 или 0.5S с мощност 5VA и 10VA.

- **Тип СТ-2 Тип, СТ-3 и Тип СТ-4** са проходни типове токови измервателни трансформатори пригодени съответно за шина или кабел - състоят се от тороидален магнитопровод с вторична намотка, поместени в кутийка от пластмаса изработена от пластмаса тип Rosap - B4235 с клас на възпламеняемост съгласно IEC 707 - V-0.

Произвежданите токови трансформатори са в диапазона от 150/5A до 2000/5A с клас на точност 0.5 или 0.5S и мощност 5VA; 10VA и 15VA.



ТЕХНИЧЕСКИ ДАННИ Тип СТ-1, Тип СТ-2, Тип СТ-3 и Тип СТ-4

Условия на работа: Токовете измервателни трансформатори за средно напрежение се монтират на закрито при температура на околната среда от -35С до +45С и височина над морското равнище до 1000м.

- | | |
|--|------------------|
| 1. Номинално напрежение | - до 0,75 kV |
| 2. Честота | - 50 Hz |
| 3. Номинален първичен ток I_{pn} | - до 2000 A |
| 4. Номинален вторичен ток I_{sn} | - 5 A |
| 5. Клас на точност на ядрото за мерене | - 0.2, 0.5, 0.5S |
| 6. Номинална мощност | - 5, 10, 15VA |
| 7. Номинален ток на термична устойчивост I_{th} , kA | - 60 I_{pn} |
| 8. Номинален ток на динамична устойчивост I_{dyn} , kA | - 2,5 I_{th} |
| 9. Номинален коефициент на безопасност F_s | - 5 или 10 |
| 10. Маса, в кг в зависимост от преводното отношение от | - 0.485 до 1,070 |
| 11. Изолация - суха, клас на топлоустойчивост | B |

Стандартизирани документи: Изделието отговаря на БДС EN 61869-2:2012 и IEC 61869-2:2012.

При всичките произведени от " ЕЛПРОМ ЕМЗ " ООД град Шабла токови измервателни трансформатори е предвидена възможност за plombиране както на кутията на трансформатора с цел предотвратяване на неправилен достъп до магнитопровода и самите намотки, така и на предпазната калачка, която предпазва клемите на вторичната намотка на трансформатора.

на основание чл. 36а, ал. 3
от ЗОП

УПРАВИТЕЛ :

/ инж. Д. Арнаудов /

БЪЛГАРСКИ ИНСТИТУТ ПО МЕТРОЛОГИЯ
ДИРЕКЦИЯ „ИЗПИТВАНЕ НА СРЕДСТВА ЗА ИЗМЕРВАНЕ, УСТРОЙСТВА И СЪОРЪЖЕНИЯ“
ОТДЕЛ „ИЗПИТВАНЕ НА СРЕДСТВА ЗА ИЗМЕРВАНЕ“
1040 София, бул. Г. М. Димитров 52 Б

ПРОТОКОЛ ОТ ИЗПИТВАНЕ
№3-ИСИ/24.02.2016 г.

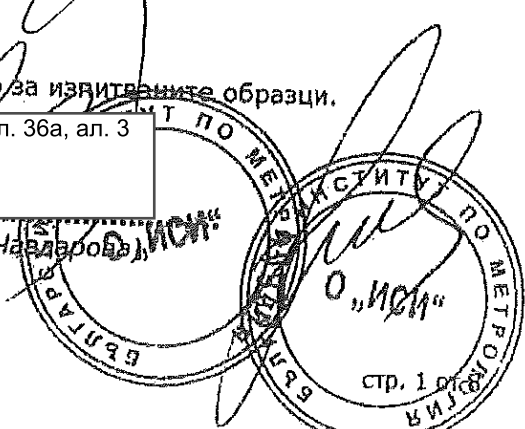
- 1. **Обект на изпитване:** Токов измервателен трансформатор тип **СТ-1, СТ-3 и СТ-4**
- 2. **Номер на заявление:** АУ - 000029 №463/08.01.2016
- 3. **Заявител:** „ЕЛПРОМ ЕМЗ“ ООД
(име и адрес) ул. „Нефтяник“ №38;
9680 гр. ШАБЛА
- 4. **Производител:** „ЕЛПРОМ ЕМЗ“ ООД
- 5. **Метод на изпитване:** БДС EN 61869-1:2009 Измервателни трансформатори.
Част 1: Общи изисквания
БДС EN 61869-2:2012 Измервателни трансформатори.
Част 2: Допълнителни изисквания за токови трансформатори
П-504-01-08 Процедура за изпитване на измервателни трансформатори
- 6. **Период и място на изпитване:** 15.02.2016 ÷ 18.02.2016 г. в лабораторията на „АЛФА ЕЛ“ ЕООД, гр. Шабла
- 7. **Изпитвани образци:** Трансформатор №1 - ф. №1610302-282855
Трансформатор №2 - ф. №1611502-282858
Трансформатор №3 - ф. №1636002-282857
Трансформатор №4 - ф. №16430002-282820
Трансформатор №5 - ф. №16430002-282821

Резултатите в протокола се отнасят само за изпитваните образци.

на основание чл. 36а, ал. 3
от ЗОП

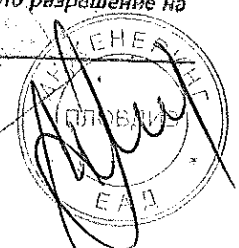
НАЧАЛНИК ОТДЕЛ ИСИ:

(Златка Чавдарова)



Протоколът от изпитване може да бъде възпроизвеждан само цялостно и само с писменото разрешение на началник отдел „Изпитване на средства за измерване“.

ВЪРНА
СЕРТИФИКАТ



8. Технически и метрологични характеристики:

Трансформатори тип СТ-1, СТ-3 и СТ-4

| № | Характеристики | Стойности | | |
|----|--|----------------------------|---------------------|----------------------------|
| | | Тр. №1; Тр. №2 тип СТ-1 | Тр. №3 тип СТ-3 | Тр. №4; Тр. №5 тип СТ-4 |
| 1. | Ниво на изолация, kV | 0,72 / 3 / - | | |
| 2. | Максимално работно напрежение, kV | 0,72 | | |
| 3. | Номинален първичен ток, А | 30; 150 | 600 | 3000 |
| 4. | Номинален вторичен ток, А | 5 | 5 | 5 |
| 5. | Мощност и клас на точност - измервателна намотка | 0,2S; 5 VA | 0,2S; 5 VA и 10 VA | 0,2S; 5 VA |
| 6. | Номинален термичен ток 1 s, I _{th} | 60 I _{pn} | 60 I _{pn} | 60 I _{pn} |
| 7. | Номинален динамичен ток, I _{dyn} | 2,5 I _{th} | 2,5 I _{th} | 2,5 I _{th} |
| 6. | Номинална честота, Hz | 50 Hz | | |

9. Технически средства използване при изпитването:

1. Уредба за проверка на токови измервателни трансформатори тип КНТ-05 (уредба), ТТИ-5000.5 (еталонен токов трансформатор), НТТ 50.5-1 (товар), с фабричен №41-10 (КНТ-05), 176-10 (ТТИ-5000.5), 59-10 НТТ (50.5-1), свидетелство за калибриране №046-ЕЕИ/22.04.2014 г..
2. Цифров термохигрометър тип НС 520, с фабричен №ТХ1, сертификат за калибриране №09467/14.11.2014 г.

10. Условия на изпитването:

Температура на околната среда: от 21,2°C до 21,5°C
 Относителна влажност на въздуха: от 56 % до 58 %

11. Проведени изпитвания:

| № по ред | Вид изпитване | Точка от БДС EN 61869-1, БДС EN 61869-2 и Процедура за изпитване на измервателни трансформатори П-504-01-08 | стр. |
|----------|---------------------------------------|---|------|
| 1. | Маркировка табелка с технически данни | БДС EN 61869-1 – т. 6.13 и БДС EN 61869-2 – т. 6.13.202 Процедура П-504-01-08, т. 4.1.1 | 3 |
| 2. | Маркировка на изводите | БДС EN 61869-1; БДС EN 61869-2 – т. 6.13.202 Процедура П-504-01-08, т. 4.1.1 | |

Протоколът от изпитване може да бъде възпроизведен само цялостно и само с писменото разрешение на началник отдел „Изпитване на средства за измерване“.

ВЕРНО
 СТЕФИАНКА



| | | | |
|----|--|---|---|
| 3. | Изпитване на издържано напрежение с промишлена честота на първичната намотка | БДС EN 61869-1; БДС EN 61869-2 – т. 7.3.1 Процедура П-504-01-08, т. 4.1.5 | 5 |
| 4. | Изпитване на издържано напрежение с промишлена честота на вторичните намотки | БДС EN 61869-1 – т. 7.3.4 Процедура П-504-01-08, т. 4.1.5 | 5 |
| 5. | Изпитване за точност | БДС EN 61869-2 – т. 7.2.6 (т. 7.2.6.201; т. 7.2.6.202; т. 7.2.6.203) Процедура П-504-01-08, т. 4.1.7 | 5 |

12. Резултати от изпитването.

12.1 Маркировка на табелката с технически данни.

| № по ред | Изискване от БДС EN 61869-1 – т. 6.13, БДС EN 61869-2 – т. 6.13.202 и Процедура П-504-01-08, т. 4.1.1 | Изпълнение | | |
|----------|--|--------------------------------------|--------------------------------------|--------------------------------------|
| | | Тр. №1 | Тр. №2 | Тр. №3 |
| | Върху всеки измервателен трансформатор или върху табелка, здраво закрепена към него, трябва да са нанесени следните данни: | | | |
| 1. | името на производителя или друг знак, по който лесно може да бъде идентифициран; | ЕЛПРОМ ЕМЗ ООД, град Шабла | | |
| 2. | означението на типа и идентификационния номер; | Тип СТ-1 Зав. №1610 302-282855 | Тип СТ-1 Зав. №1611 502-282858 | Тип СТ-3 Зав. №1636 002-282857 |
| 3. | обявените първичен и вторичен ток на трансформатора; | $I_{pn}/I_{sn} = 30/5 \text{ A}$ | $I_{pn}/I_{sn} = 150/5 \text{ A}$ | $I_{pn}/I_{sn} = 600/5 \text{ A}$ |
| 4. | обявената изходна мощност и съответния клас на точност; | $S_n = 5 \text{ VA}$ клас 0.2S | $S_n = 5 \text{ VA}$ клас 0.2S | $S_n = 5 \text{ VA}$ клас 0.2S |
| 5. | номинална честота; | $f_n = 50 \text{ Hz}$ | $f_n = 50 \text{ Hz}$ | $f_n = 50 \text{ Hz}$ |
| 6. | максимално напрежение на мрежата; | $U_m = 0.72 \text{ kV}$ | $U_m = 0.72 \text{ kV}$ | $U_m = 0.72 \text{ kV}$ |
| 7. | обявено ниво на изолацията. | Изол. ниво: $0.72/3/- \text{ kV}$ | Изол. ниво: $0.72/3/- \text{ kV}$ | Изол. ниво: $0.72/3/- \text{ kV}$ |
| 8. | обявеният ток на термична устойчивост | $I_{th} = 60 I_{pn}$ | $I_{th} = 60 I_{pn}$ | $I_{th} = 60 I_{pn}$ |
| 9. | обявеният ток на динамична устойчивост; | $I_{dyn} = 2.5 I_{th}$ | $I_{dyn} = 2.5 I_{th}$ | $I_{dyn} = 2.5 I_{th}$ |

Протоколът от изпитване може да бъде възпроизвеждан само цялостно и само с писменото разрешение на Началник отдел „Изпитване на средства за измерване“.

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| № по ред | Изискване от БДС EN 61869-1 - т. 6.13, БДС EN 61869-2 - т. 6.13.202 и Процедура П-504-01-08, т. 4.1.1 | Изпълнение | |
|----------|--|-----------------------------------|-----------------------------------|
| | | Тр. №4 | Тр. №5 |
| | Върху всеки измервателен трансформатор или върху табелка, здраво закрепена към него, трябва да са нанесени следните данни: | | |
| 1. | името на производителя или друг знак, по който лесно може да бъде идентифициран; | ЕЛПРОМ ЕМЗ ООД, град Шабла | |
| 2. | означението на типа и идентификационния номер; | Тип СТ-4 Зав. №16430002-282820 | Тип СТ-4 Зав. №16430002-282821 |
| 3. | обявените първичен и вторичен ток на трансформатора; | $I_{pn}/I_{sn}=3000/5\text{ A}$ | $I_{pn}/I_{sn}=3000/5\text{ A}$ |
| 4. | обявената изходна мощност и съответния клас на точност; | $S_n = 5\text{ VA}$ клас 0.2S | $S_n = 5\text{ VA}$ клас 0.2S |
| 5. | номинална честота; | $f_n=50\text{ Hz}$ | $f_n=50\text{ Hz}$ |
| 6. | максимално напрежение на мрежата; | $U_m=0.72$ | $U_m=0.72$ |
| 7. | обявено ниво на изолацията. | Изол. ниво: 0.72/3/- kV | Изол. ниво: 0.72/3/- kV |
| 8. | обявеният ток на термична устойчивост | $I_{th}=60I_{pn}$ | $I_{th}=60I_{pn}$ |
| 9. | обявеният ток на динамична устойчивост; | $I_{dyn}=2.5\text{ I}_{th}$ | $I_{dyn}=2.5\text{ I}_{th}$ |

12.2 Маркировка на изводите.

| № по ред | Изискване от БДС EN 61869-2 - т. 6.13.201; Процедура П-504-01-08, т. т. 4.1.1 | Изпълнение | | |
|----------|--|-------------------|-------------------|-------------------|
| | | Тр. №1 | Тр. №2 | Тр. №3 |
| | Изводите на трансформаторите трябва да са маркирани така, че да идентифицират: | | | |
| 1. | първични и вторични намотки; | P1 - P2; S1-S2 | P1 - P2; S1-S2 | P1 - P2; S1-S2 |
| 2. | относителните полярности на намотките. | "+" ; "-" | "+" ; "-" | "+" ; "-" |

| № по ред | Изискване от БДС EN 61869-2 - т. 6.13.201; Процедура П-504-01-08, т. т. 4.1.1 | Изпълнение | |
|----------|--|------------|--------|
| | | Тр. №4 | Тр. №5 |
| | Изводите на трансформаторите трябва да са маркирани така, че да идентифицират: | | |

Протоколът от изпитване може да бъде възпроизвеждан само цялостно и само с писменото разрешение на началник отдел „Изпитване на средства за измерване“.

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|----|--|-------------------|-------------------|
| 1. | първични и вторични намотки; | P1 - P2; S1-S2 | P1 - P2; S1-S2 |
| 2. | относителните полярности на намотките. | "+" ; "-" | "+" ; "-" |

12.6 Изпитване на издържано напрежение с промишлена честота на първичната намотка.

Изпитването е проведено съгласно БДС EN 61869-1; БДС EN 61869-2 - т. 7.3.1 и Процедура П-504-01-08, т. 4.1.5. Изпитвателното напрежение е 3 kV:

Продължителността е 60 s. Изпитвателното напрежение се прилага между свързаната нахъсо първична намотка и земя. Вторичната намотка, свързана нахъсо, и корпуса са заземени.

Трансформаторите преминаха успешно изпитването.

12.9 Изпитване на издържано напрежение с промишлена честота на вторичните намотки.

Изпитването е проведено съгласно БДС EN 61869-1 т. 7.3.4 и Процедура П-504-01-08, т. 4.1.5. Изпитвателното напрежение е 3 kV и е приложено за 60 s между късо съединените изводи на всяка вторична намотка и земя. Всички други намотки са свързани заедно и са заземени.

Трансформаторите преминаха успешно изпитването.

12.10 Изпитване за точност.

Изпитването е проведено съгласно БДС EN 61869-2 - т. 7.2.6 (т. 7.2.6.201; т. 7.2.6.202; т. 7.2.6.203) и Процедура П-504-01-08, т. 4.1.7.

Токовете и ъгловите грешки на трансформаторите са определени чрез прилагането на диференциално-нулевия метод с използването на еталонни трансформатори. Стойностите на токовата грешка и фазовото изместване не надвишават посочените в таблици 201, 202 и 203 от БДС EN 61869-2 и таблици 2.1, 2.3 и 2.4 от Процедура П-504-01-08.

Стойностите на токовата грешка и фазовото изместване на трансформаторите с клас на точност 0,2 S са определени при стойности 1%, 5%, 20%, 100% и 120% от номиналния ток, за вторичен товар 25% и 100% от номиналния.

Непосредствено преди измерването на грешките на токовете трансформатори е извършено размагнитване на магнитопроводите.

Резултатите са дадени в таблиците по-долу.

Допустими стойности

(съгласно БДС EN 61869-2 - т. 7.2.6 и Процедура П-504-01-08, т.4.1.7)
Токова грешка в проценти и фазово изместване в минути за стойности от ном. ток

| кл. на точност | 1% I _n | | 5% I _n | | 20% I _n | | 100% I _n | | 120% I _n | |
|----------------|-------------------|-------------|-------------------|-------------|--------------------|-------------|---------------------|-------------|---------------------|-------------|
| | т. гр. % | ф.изм [min] | т. гр. % | ф.изм [min] | т. гр. % | ф.изм [min] | т. гр. % | ф.изм [min] | т. гр. % | ф.изм [min] |
| 0,2 S | ±0,75 | ±30 | ±0,35 | ±15 | ±0,2 | ±10 | ±0,2 | ±10 | ±0,2 | ±10 |

Протоколът от изпитване може да бъде възпроизвеждан само цялостно и само с писменото разрешение на началник отдела „Изпитване на средства за измерване“.

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