IEC IECEE CB SCHEME

Ref. Certif. No.

**SE-46495**

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

SYSTEME CEI D'ACCEPTATION MUTUELLE DE CERTIFICATS D'ESSAIS DES EQUIPEMENTS ELECTRIQUES (IECEE) METHODE OC

# CB TEST CERTIFICATE

# CERTIFICAT D'ESSAI OC

| | |
|---|---|
| Product<br>Produit | Contactor for household and similar purposes |
| Name and address of the applicant<br>Nom et adresse du demandeur | Zhejiang Chint Electrics Co., Ltd., Chint High-tech Industrial Zone, North Baixiang 325603, Wenzhou, Zhejiang, CHINA |
| Name and address of the manufacturer<br>Nom et adresse du fabricant | Same as applicant |
| Name and address of the factory<br>Nom et adresse de l'usine | Same as applicant |
| Ratings and principal characteristics<br>Valeurs nominales et caractéristiques principales | $U_e$= 230V~ (2-Pole)<br>$I_{th}$= 20A, $I_e$= 20A (AC-7a); $I_e$= 9A (AC-7b)<br>$U_i$= 500V~, $U_s$= 220/230V~, $I_r$= 3000A, $I_q$= 6000A |
| Trademark (if any)<br>Marque de fabrique (si elle existe) | CHNT |
| Model / Type Ref.<br>Ref. De type | NCH8-20 |
| Additional information (if necessary)<br>Les informations complémentaires (si nécessaire) | - |
| A sample of the product was tested and found to be in conformity with<br>Un échantillon de ce produit a été essayé et a été considéré conforme à la | IEC 61095:1992 and A1 |
| As shown in the Test Report Ref. No. which forms part of this Certificate<br>Comme indiqué dans le Rapport d'essais numéro de référence qui constitue partie de ce Certificat | 607539-1 |

This CB Test Certificate is issued by the National Certification Body
Ce Certificat d'essai OC est établi par l'Organisme **National de Certification**

**Intertek Semko AB**
**Box 1103**
**SE-164 22 Kista, Sweden**
**Int +46 8 750 00 00**

Intertek ETL SEMKO

Date: 10 August 2006

Signature:

SVE/Ine



RRL/EKL

Intertek ETL SEMKO

Intertek Testing Services Ltd, Shanghai, ETL SEMKO
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**Your Reference**
JSH006050762 / Joyce Xu

10 August 2006

**Intertek S Mark Certificate with No. 607539**

We are pleased to enclose the Intertek S Mark Certificate you have applied for.

**The S Mark – a marketing resource**
S Mark Certification is a way of making sure that your brand's equity will not be put at risk by a safety failure of the product. The use of the S Mark in your marketing is also a way of adding value to your brand and promoting trust among your customers.

The S Mark is a European safety mark offered by Intertek ETL SEMKO. The letter 'S' tells 450 million people in Europe that your product is safe. The word for safety starts with an 'S' in most of the languages in Europe, e.g. Safety, Sicherheit, Seguridad, Sécurité, Sicurezza, and Säkerhet.

As products become increasingly interchangeable, trust counts more than ever. This is why the S Mark is a key selling point. It is a well known symbol for safety and shows that Intertek has independently tested and certified the product's compliance to applicable European safety requirements. Critical consumers and retailers look for third-party validation to complement their CE marking, as it helps retailers to meet their product liability requirements, and make the consumers' buying process simpler.


Read more about the S Mark and how other companies use it to gain competitive advantage: www.etlsemko.com/s-mark

**Mandatory factory inspections**
In addition to your product certification, it is mandatory for inspections to be performed at your manufacturing site/s. The inspections are carried out by our inspectors or subcontractors. For details of the technical requirements for these inspections, please contact inspection.etlsemko@intertek.com.

Yours sincerely

Intertek Semko AB
Certification

Enclosure: Intertek S Mark Certificate

Intertek ETL SEMKO

Zhejiang Chint Electrics Co., Ltd.
Chint High-tech Industrial Zone
North Baixiang 325603
Wenzhou, Zhejiang
KINA

**Handled by**
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**Reference**
607539
**E-mail**
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**Your reference**

10 August 2006

**CB-Application(s) SE-46495**

We have the pleasure to enclose a (the) requested CB-certificate(s) and the pertaining Test Report.

We also enclose a form for Identity Declaration (ID). The ID shall be filled in by you and be used to verify that the specimen to be submitted to other Certification Bodies is absolutely identical with the one we have tested. On the basis of these documents you may apply for a licence to use the national marks of the countries whose Certification Bodies have signed the agreement. The documents together with a specimen should be submitted in the country where approval is applied for and in accordance with the relevant national procedures.

Yours sincerely

Intertek Semko AB
Product Certification

**Enclosure CB certificate(s)**

# IDENTITY DECLARATION

To

To be issued by the manufacturer

_____

Certification Body, Name and Address

We declare that the electrical product

_____

type designation_____

for which we apply for the licence to use your mark of conformity is identical in all respects (e.g. design, construction, properties, components) to the tested specimen for which the CB Certificate

No _____ Date _____

was issued by

_____

Place / Date

Company

_____ _____

_____

Legally binding signature of the manufacturer

Intertek ETL SEMKO

# TEST REPORT
## IEC 61095
## Electromechanical contactors for household and similar purposes

| | |
|---|---|
| **Report reference No . ..... :** | 607539-1 |
| Tested by (printed name and signature) ..... : | Erik Lundell |
| Approved by (printed name and signature) ..... : | Bo Erlandsson |
| Date of issue ..... : | 2006-08-10 |
| **CB/CCA Testing Laboratory ..... :** | Intertek SEMKO AB |
| Address ..... : | Thorshamnsgatan 43 Box 1103, SE-164 22 Kista SWEDEN |
| Testing location/ procedure ..... : | TL ☐ RMT ☐ SMT ☐ WMT ☐ TMP ☒ |
| Testing location/ address ..... : | Chint High-tech Industrial Zone, North Baixiang 325603, Wenzhou, Zhejiang, P.R.China |
| **Applicant's name ..... :** | Zhejiang Chint Electrics Co., Ltd. |
| Address ..... : | Chint High-tech Industrial Zone, North Baixiang 325603, Wenzhou, Zhejiang, P.R.China |
| **Test specification** | |
| Standard ..... : | IEC 61095:2000 / Edition 1.1<br>EN 61095:1993 + A11:1996 + A1:2000 |
| Test procedure ..... : | CB / CCA |
| Procedure deviation ..... : | N/A |
| Non-standard test method ..... : | N/A |
| **Test Report Form** | |
| Test Report Form No. ..... : | IEC61095A |
| TRF originator ..... : | EZU |
| Master TRF ..... : | dated 01-12 |



| | |
|---|---|
| Test item description ..... : | AC contactor |
| Trademark ..... : | CHINT |
| Model / type reference ..... : | NCH8-20 |
| Manufacturer ..... : | Same as applicant |
| Rating(s) ..... : | $U_e$= 230V~<br>$I_e$= 20A (AC-7a), $I_e$= 9A (AC-7b) |

| | |
|---|---|
| Test items particulars : | |
| - number of poles ..... : | 2 |
| - method of control ..... : | **Automatic** / ~~non-automatic~~ / ~~semi-automatic~~ |
| Rated and limiting values for main circuits : | |
| - rated operational voltage Ue (V)..... : | 230V~ |
| - rated insulation voltage Ui (V)..... : | 500V~ |
| - rated impulse withstand voltage Uimp (V) ... : | N/A |
| - conventional free air thermal current Ith (A) : | 20A |
| - conventional enclosed thermal current Ithe (A) ..... : | N/A |
| - rated operational currents Ie (A)or rated operational powers..... : | 20A (AC-7a), 9A (AC-7b) |
| - rated frequency (Hz) ..... : | 50/60Hz |
| Normal load and overload characteristics..... : | |
| - ability to withstand motor switching overload currents ..... : | N/A |
| - rated making capacity..... : | See utilization category |
| - rated breaking capacity..... : | See utilization category |
| - conventional operational performance..... : | See utilization category |
| Rated conditional short-circuit current ..... : | Ir=3000A, Iq=6000A |
| Utilization category..... : | AC-7a / AC-7b |
| Control circuits: | |
| - kind of current..... : | AC |
| - rated frequency..... : | 50/60Hz |
| - rated control circuit voltage Uc ..... : | N/A |
| - rated control supply voltage Us..... : | 220/230V~ |
| - suitability to be connected to SELV circuits . : | N/A |
| Auxiliary circuits ..... : | N/A |
| Pollution degree ..... : | Pollution degree ~~1~~ / **2** / ~~3~~ / ~~4~~ |
| Test case verdicts | |
| Test case does not apply to the test object ... : | N/A |
| Test item does meet the requirement ..... : | P(ass) |
| Test item does not meet the requirement ..... : | Testing |

Testing

Date of receipt of test item ..... : May 29, 2006

Date(s) of performance of test ..... : From May 30, 2006 to July 10, 2006

General remarks :

**This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.**

This report shall not be reproduced except in full without the written approval of the testing laboratory.

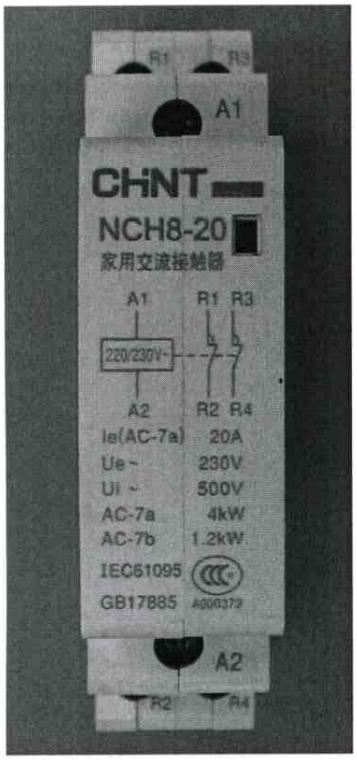
The test results presented in this report relate only to the item(s) tested.

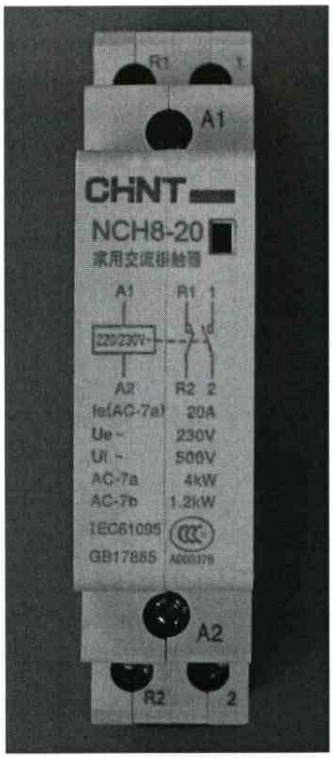
"(see remark #)" refers to a remark appended to the report.

"(see Annex #)" refers to an annex appended to the report.

Throughout this report a comma is used as the decimal separator.

Copy of marking plate and summary of testing (information/comments):



| IEC 61095 | | | |
|---|---|---|---|
| Cl. | Requirement – Test | Result | Verdict |
| 6 | PRODUCT INFORMATION | | |
| 6.1.1 | Identification: | | |
| | - a) manufacturer's name or trade mark ..... : | CHINT | P |
| | - b) type designation or serial number..... : | NCH8-20 | P |
| | - c) number of this standard (on nameplate)..... : | IEC 61095 | P |
| 6.1.2 | Characteristics, basic rated values and utilization | | |
| | - d) rated operational voltages..... : | 230V~ | P |
| | - e) utilization category and rated operational currents (or rated powers), at the rated operational voltage ..... : | AC-7a/AC-7b | P |
| | - f) rated frequency..... : | 50/60Hz | P |
| | - g) rated duty with indication of the class of intermittent duty..... : | Continuous duty;<br>Intermittent duty: class 30 | P |
| | Associated values: | | |
| | - h) rated making and breaking capacities ..... : | See item e) | P |
| | Safety and installation: | | |
| | - i) rated insulation voltage ..... : | 500V~ | P |
| | - j) rated impulse withstand voltage..... : | | N/A |
| | - k) IP code (on enclosure)..... : | | N/A |
| | - l) pollution degree..... : | 2 | P |
| | - m) rated conditional short-circuit current and type, current rating and characteristics of the associated SCPD ..... : | Ir=3000A, Iq=6000A,<br>CBO: NB1-63, C32 | P |
| | - n) switching overvoltages..... : | ⩽1200V | P |
| | Control circuits: (on the coil or on the contactor) | | |
| | - o) rated control circuit voltage (Uc), nature of current and rated frequency ..... : | | N/A |
| | - p) nature of current, rated frequency and rated control supply voltage (Us)..... : | 220/230V~ | P |
| | For contactors with control circuit for a SELV supply: | | |
| | - q) suitability of the control circuit to be connected to a SELV supply..... : | | N/A |
| | Auxiliary circuits: | | |
| | - r) ratings of auxiliary circuits..... : | | N/A |
| 6.2 | Marking | | |
| | Markings are indelible and easily legible | | P |
| | Markings on contactor, preferably on nameplate: | | |
| | - manufacturer´s name or trade mark ..... : | CHINT | P |
| | - type designation or serial number..... : | NCH8-20 | P |

| IEC 61095 | | | |
|---|---|---|---|
| Cl. | Requirement – Test | Result | Verdict |
| | Following information (marked and visible after mounting): | | |
| | - direction of movement of the actuator..... : | | N/A |
| | - indication of the position of the actuator..... : | | N/A |
| | - approval or certification mark (on nameplate) .. : | | P |
| | - symbol, colour code or letter code ..... : (for miniaturized contactors) | | N/A |
| | - terminal identification and marking ..... : | A wiring diagram is provided on the product surface and marked with "R1/R2/R3/R4 A1/A2" | P |
| | - IP code and class of protection against electric shock..... : | | N/A |
| | Markings not on screw or removable parts | | P |
| | Data under d) to j) and l) to r) on nameplate, or on contactor, or in manufacture's published literature | | P |
| | Marking of terminals in accordance with annex A of this standard | | P |
| 8 | CONSTRUCTIONAL AND PERFORMANCE REQUIREMENTS | | |
| 8.1.1 | Materials | | |
| 8.1.2 | Strength of screws or nuts other than those on terminals which are intended to be operated during installation or maintenance | | P |
| 8.1.3 | Clearances and creepage distances | | |
| | a) Uimp is declared | | |
| | Rated impulse withstand voltage Uimp (V) ..... : | Not declared | |
| | minimum clearances (mm)..... : | | |
| | measured clearances (mm) ..... : | | N/A |
| | minimum creepage distances (mm)..... : | | |
| | measured creepage distances (mm) ..... : | | N/A |
| | b) Uimp is not declared (see table 2) | | |
| | 1. clearances (mm) ..... : | 3mm *Between live parts of difference polarity* | |
| | measured clearances (mm) ..... : | 3,8mm | P |
| | 2. minimum clearances (mm)..... : | 3(6)mm *Between live parts and exposed conductive parts* | |
| | measured clearances (mm) ..... : | No exposed conductive parts | N/A |
| | 1. minimum creepage distances (mm)..... : | 3mm *between live parts which are separated when the contactor is in the open position* | |
| | measured creepage distances (mm) ..... : | 7,2mm | P |

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|---|---|---|---|
| Cl. | Requirement – Test | Result | Verdict |
| | 2. minimum creepage distances (mm)..... : | 3mm *between live parts of different polarity* | |
| | measured creepage distances (mm) ..... : | 7,2mm | P |
| | 3. minimum creepage distances (mm)..... : | 3(6)mm *Between live parts and exposed conductive parts* | |
| | measured creepage distances (mm) ..... : | No exposed conductive parts | N/A |
| 8.1.4 | Actuator<br>(for manually operated actuator) | | |
| | Insulation | | N/A |
| | Direction of movement<br>(comply with IEC 60447:74) | | N/A |
| | Mounting | | N/A |
| 8.1.5 | Indication of the OFF and ON positions | | |
| | Indicating means | By a mechanical indicator | P |
| | if symbols are used, comply with IEC 60417..... : | | N/A |
| | Only push-button to open circuit is red or marked "O" ..... : | | N/A |
| | Colours push-buttons, illuminated push-buttons and indicator lights comply with IEC 73 | | N/A |
| | Indication by the actuator | | N/A |
| 8.1.6 | Terminals | | |
| | 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 |
| | Terminals shall not allow the conductors to be displaced, or be displaced themselves in a manner detrimental to the operation of the contactor and the insulation voltage shall not be reduced below the rated values | | P |
| | Connecting capacity | | |
| | type of conductors ..... : | Rigid-solid or rigid-stranded | |
| | minimum cross-sections of conductors ($mm^2$).... : | 1,5 $mm^2$ | |
| | maximum cross-sections of conductors ($mm^2$)... : | 4 $mm^2$ | |
| | number of conductors simultaneously connectable to the terminal ..... : | 1 | |
| | Connection | | |
| | Terminals for connection to external conductors shall be readily accessible during installation | | P |

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|---|---|---|---|
| Cl. | Requirement – Test | Result | Verdict |
| | Clamping screws and nuts shall not serve to fix any other component | | P |
| | Terminal identification and marking | | |
| | terminals clearly and permanently identified<br>(comply with IEC 60445) ..... : | R1/R2/R3/R4<br>A1/A2 | P |
| | terminal intended exclusively for the neutral conductor: N ..... : | | N/A |
| | protective earth terminal: symbol..... : | | N/A |
| 8.1.7 | Additional requirements for contactors provided with a neutral pole | | |
| | pole intended only for connecting the neutral terminal: N... ..... : | | N/A |
| | the switched neutral pole not break before and not make after the other poles .....: | | N/A |
| | conventional thermal current..... : | | N/A |
| 8.1.8 | Provisions for earthing | | |
| | Constructional requirements | | N/A |
| | the exposed conductive parts shall be electrically intrerconnected and connected to a protective earth terminal | | N/A |
| | Protective earth terminal | | N/A |
| | the protective earth terminal shall be readily accessible | | N/A |
| | the protective earth terminal shall be suitably protected against corrosion | | N/A |
| | the protective earth terminal have no other function (except PEN) | | N/A |
| | Protective earth terminal marking and identification | | |
| | protective earth terminal is clearly and permanently identified ..... : | | N/A |
| 8.1.9 | Enclosures | | |
| | 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 are electrically connected to the other exposed conductive parts and connected to a terminal which enables them to be earthed | | N/A |
| | removable metal parts of the enclosure are not insulated from the part carrying the earth terminal | | N/A |

| IEC 61095 | | | |
|---|---|---|---|
| Cl. | Requirement – Test | Result | Verdict |
| | removable parts of the enclosure are firmly secured to the fixed parts by a device | | N/A |
| | for enclosures having a degree of protection IP 1X up to and including IP 4X, sufficient space be provided for establishing a drain-hole<br>(comply with IEC 60947-1) | | N/A |
| | Enclosures have adequate mechanical strength | | N/A |
| | no possible to remove any cover of the enclosure without the use of a tool | | 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 |
| | Insulation | | N/A |
| | if the enclosure is partly or completely lined with insulating material, then this lining is securely fixed to the enclosure | | N/A |
| 8.1.10 | Degrees of protection of enclosed contactors | | |
| | degree of protection ..... : | IP20 *to front parts* | P |
| 8.3 | Electromagnetic compatibility | | |
| | Immunity: no tests are required | | P |
| | Emission: no tests are required | | P |

| | TEST SEQUENCE A:<br>3 samples: $I_{th}$ =20A, $I_e$ =20A, AC-7a | A1 | A2 | A3 | |
|---|---|---|---|---|---|
| 9.3.3.3 | Temperature-rise limits | | | | |
| | ambient air temperature 10-40°C ..... : | 23°C | | | |
| | test enclosure W x H x D (mm x mm x mm) ..... : | Not applied | | | |
| | material of enclosure ..... : | Not applied | | | |
| | Main circuit, test conditions: | | | | |
| | conventional free air thermal current Ith (A) ..... : | 20A | | | |
| | conventional enclosed thermal current Ithe (A) .. : | Not applied | | | |
| | cross-section of conductors ($mm^2$) ..... : | 2,5 $mm^2$ | | | |
| | temperature-rise: | [K] | [K] | [K] | |
| | Terminal (65K) ..... : | 40 | 37 | 44 | P |
| | Parts intended to be touched but not hand-held: non-metallic (40K) ..... : | 12 | 15 | 10 | P |
| | Control circuits: | | | | |
| | temperature-rise: | [K] | [K] | [K] | |
| | Terminal (65K) ..... : | 15 | 16 | 13 | P |
| | Coils of electromagnets (Class B: ⩽110K) | | | | |
| | temperature rise ..... : | [K] | [K] | [K] | |

| IEC 61095 | | | | | |
|---|---|---|---|---|---|
| Cl. | Requirement – Test | Result | | | Verdict |
| | -eight-hour duty (continuouse duty) windings..... : | 44 | 41 | 42 | P |
| | -intermittent duty windings..... : | 40 | 38 | 40 | P |
| | Auxiliary circuits | | | | |
| | temperature rise | Not applied | | | N/A |
| 9.3.3.2 | Operation and operating limits | | | | |
| | rated control supply voltage Us (V) ..... : | 220/230V | | | |
| | limits of close satisfactorily at any value between 85% and 110% of rated control supply voltage Us: | 187V~253V | | | P |
| | limits of drop out and open fully are:<br>75% to 20% of rated control supply voltage Us ... : | 58V | 64V | 69V | P |
| | Limits for closing are applicable with the coil circuit resistance at +40°C ..... : | | | | P |
| | Limits for drop-out are applicable with the coil circuit resistance at -5°C ..... : | | | | P |
| 9.3.3.5 | Rated making and breaking capacities | | | | |
| | utilization category..... : | AC-7a | | | |
| | rated operational voltage Ue (V) ..... : | 230V | | | |
| | rated operational current Ie (A) or power (kW) ... : | 20A | | | |
| | Conditions, make/break operations: | | | | |
| | - test voltage U/Ue = 1,05 (V)..... : | L1: 242V<br>L2: 242V<br>L3: - | | | P |
| | - test current I/Ie = 1,5(A) ..... : | L1: 30A<br>L2: 30A<br>L3: - | | | P |
| | - power factor ..... : | L1: 0,8<br>L2: 0,8<br>L3: - | | | P |
| | - on-time (ms)..... : | 50ms | | | P |
| | - off-time (s)..... : | 10s | | | P |
| | - number of make/break cycles..... : | 50 | | | P |
| | Behaviour and condition during and after the test: | | | | |
| | - no permanent arcing | | | | P |
| | - no flash-over between poles | | | | P |
| | - no blowing of the fusible element in the earth circuit | | | | P |
| | - no welding of the contacts | | | | P |
| | Dielectric test: | | | | |
| | test voltage (2 Ue, minimum of 1000 V) for 1 min: | 1000V~ | | | |

| IEC 61095 | | | |
|---|---|---|---|
| Cl. | Requirement – Test | Result | Verdict |
| | No flashover or breakdown | | P |
| | Characteristics of transient recovery voltage | | |
| | only for category AC-7b | | N/A |
| | Switching overvoltages | | N/A |

| | | | | | |
|---|---|---|---|---|---|
| | TEST SEQUENCE A:<br>3 samples: $I_{th}$ =20A, $I_e$ =9A, AC-7b | A4 | A5 | A6 | |
| 9.3.3.3 | Temperature-rise limits | | | | |
| | ambient air temperature 10-40°C ..... : | 23°C | | | |
| | test enclosure W x H x D (mm x mm x mm)..... : | Not applied | | | |
| | material of enclosure ..... : | Not applied | | | |
| | Main circuit, test conditions: | | | | |
| | conventional free air thermal current Ith (A)..... : | 20A | | | |
| | conventional enclosed thermal current Ithe (A).. : | Not applied | | | |
| | cross-section of conductors ($mm^2$)..... : | 2,5 $mm^2$ | | | |
| | temperature-rise: | [K] | [K] | [K] | |
| | Terminal (65K) ..... : | 38 | 39 | 43 | P |
| | Parts intended to be touched but not hand-held: non-metallic (40K) ..... : | 11 | 11 | 13 | P |
| | Control circuits: | | | | |
| | temperature-rise: | [K] | [K] | [K] | |
| | Terminal (65K) ..... : | 14 | 16 | 17 | P |
| | Coils of electromagnets (Class B: ≤110K) | | | | |
| | temperature rise ..... : | [K] | [K] | [K] | |
| | -eight-hour duty (continuouse duty) windings..... : | 41 | 38 | 40 | P |
| | -intermittent duty windings..... : | 37 | 36 | 35 | P |
| | Auxiliary circuits | | | | |
| | temperature rise | Not applied | | | N/A |
| 9.3.3.2 | Operation and operating limits | | | | |
| | rated control supply voltage Us (V) ..... : | 220/230V | | | |
| | limits of close satisfactorily at any value between 85% and 110% of rated control supply voltage Us: | 187V~253V | | | P |
| | limits of drop out and open fully are:<br>75% to 20% of rated control supply voltage Us ... : | 68V | 75V | 65V | P |
| | Limits for closing are applicable with the coil circuit resistance at +40°C ..... : | | | | P |
| | Limits for drop-out are applicable with the coil circuit resistance at -5°C ..... : | | | | P |

| IEC 61095 | | | |
|---|---|---|---|
| Cl. | Requirement – Test | Result | Verdict |
| 9.3.3.5 | Rated making and breaking capacities | | |
| | utilization category ..... : | AC-7b | |
| | rated operational voltage Ue (V) ..... : | 230V | |
| | rated operational current Ie (A) or power (kW) ... : | 9A | |
| | Conditions, make/break operations: | | |
| | - test voltage U/Ue = 1,05 (V) ..... : | L1: 242V<br>L2: 242V<br>L3: - | P |
| | - test current I/Ie = 8 (A) ..... : | L1: 72,4A<br>L2: 72,4A<br>L3: - | P |
| | - power factor ..... : | L1: 0,45<br>L2: 0,45<br>L3: - | P |
| | - on-time (ms) ..... : | 50ms | P |
| | - off-time (s) ..... : | 10s | P |
| | - number of make/break cycles ..... : | 50 | P |
| | Behaviour and condition during and after the test: | | |
| | - no permanent arcing | | P |
| | - no flash-over between poles | | P |
| | - no blowing of the fusible element in the earth circuit | | P |
| | - no welding of the contacts | | P |
| | Dielectric test: | | |
| | test voltage (2 Ue, minimum of 1000 V) for 1 min: | 1000V~ | |
| | No flashover or breakdown | | P |
| | Characteristics of transient recovery voltage | | |
| | only for category AC-7b | | P |
| | Switching overvoltages | 960V | P |

| | | | | | |
|---|---|---|---|---|---|
| | TEST SEQUENCE B<br>3 samples: $I_{th}$ =20A, $I_e$ =20A, AC-7a | B1 | B2 | B3 | |
| 9.3.3.4 | Dielectric properties | | | | |
| | a) Test of dielectric properties, rated impulse withstand voltage (Uimp) declared: | | | | N/A |
| 9.3.3.4.1 | - rated impulse withstand voltage (V) ..... : | | | | |
| | - test Uimp (V) (table 16) ..... : | 4 kV | | | P |
| | b) Test of dielectric properties, rated impulse withstand voltage (Uimp) not declared | | | | P |
| 9.3.3.4.2 | - rated insulation voltage Ui (V) ..... : | 500V | | | |

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|---|---|---|---|
| Cl. | Requirement – Test | Result | Verdict |
| | value of test voltage: | | |
| | - a) for the main circuit and for control and auxiliary circuits<br>( are not covered by paragraph b) ) ..... : | ~~1000 / 2000~~ / 2500 V a.c. | P |
| | - b) for control circuits and auxiliary circuits<br>(unsuitable for connection to the main circuit)..... : | ~~1000V~~ / 2Ui+1000 V (2000V) | P |
| | - c) for contactors to be used in SELV<br>(between live parts of safety extra-low voltage circuits and any other circuit)..... : | ~~4000 V~~ | N/A |
| | no disruptive discharge | | P |
| 9.3.3.6 | Conventional operational performance | | |
| | utilization category..... : | AC-7a | |
| | rated operational voltage Ue (V) ..... : | 230V | |
| | rated operational current Ie (A) or power (kW) ... : | 20A | |
| | Conditions, make/break operations or **make operation** AC-7a: | | |
| | - test voltage U/Ue= 1,05 (V)..... : | L1: 242V<br>L2: 242V<br>L3: - | P |
| | - test current I/Ie= 1,0 (A) ..... : | L1: 20A<br>L2: 20A<br>L3: - | P |
| | - power factor ..... : | L1: 0,8<br>L2: 0,8<br>L3: - | P |
| | Conditions, break operation AC-7a: | | |
| | - test voltage U/Ue = 1,05 (V)..... : | L1: 242V<br>L2: 242V<br>L3: - | P |
| | - test current I/Ie (A) = 1,0 (A) ..... : | L1: 20A<br>L2: 20A<br>L3: - | P |
| | - power factor ..... : | L1: 0,79<br>L2: 0,79<br>L3: - | P |
| | - on-time (ms)..... : | 50ms | P |
| | - off-time (s)..... : | 10s | P |
| | - number of make/break cycles..... : | 30000 | P |
| | Behaviour and condition during and after the test: | | |
| | - no permanent arcing | | P |

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|---|---|---|---|
| Cl. | Requirement – Test | Result | Verdict |
| | - no flash-over between poles | | P |
| | - no blowing of the fusible element in the earth circuit | | P |
| | - no welding of the contacts | | P |
| | Dielectric test: | | |
| | test voltage (2 Ue, minimum of 1000 V) for 1 min: | 1000V~ | |
| | No flashover or breakdown | | P |

| | | | |
|---|---|---|---|
| | TEST SEQUENCE B<br>3 samples: $I_{th}$ =20A, $I_e$ =9A, AC-7b B4 B5 B6 | | |
| 9.3.3.4 | Dielectric properties | | |
| | a) Test of dielectric properties, rated impulse withstand voltage (Uimp) declared: | | N/A |
| 9.3.3.4.1 | - rated impulse withstand voltage (V)..... : | | |
| | - test Uimp (V) (table 16)..... : | 4kV | P |
| | b) Test of dielectric properties, rated impulse withstand voltage (Uimp) not declared | | P |
| 9.3.3.4.2 | - rated insulation voltage Ui (V)..... : | 500V | |
| | value of test voltage: | | |
| | - a) for the main circuit and for control and auxiliary circuits<br>( are not covered by paragraph b) )..... : | ~~1000 / 2000~~ / 2500 V a.c. | P |
| | - b) for control circuits and auxiliary circuits<br>(unsuitable for connection to the main circuit)..... : | ~~1000V~~ / 2Ui+1000 V (2000V) | P |
| | - c) for contactors to be used in SELV<br>(between live parts of safety extra-low voltage circuits and any other circuit)..... : | ~~4000 V~~ | N/A |
| | no disruptive discharge | | P |
| 9.3.3.6 | Conventional operational performance | | |
| | utilization category..... : | AC-7b | |
| | rated operational voltage Ue (V) ..... : | 230V | |
| | rated operational current Ie (A) or power (kW) ... : | 9A | |
| | Conditions, make/break operations or **make operation** AC-7b: | | |
| | - test voltage U/Ue= 1,0 (V)..... : | L1: 230V<br>L2: 230V<br>L3: - | P |
| | - test current I/Ie= 6,0 (A) ..... : | L1: 56,1A<br>L2: 56,1A<br>L3: - | P |

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| Cl. | Requirement – Test | Result | Verdict |
|---|---|---|---|
| | - power factor ..... : | L1: 0,42<br>L2: 0,42<br>L3: - | P |
| | Conditions, break operation AC-7b: | | |
| | - test voltage U/Ue = 0,17 (V)..... : | L1: 39V<br>L2: 39V<br>L3: - | P |
| | - test current I/Ie (A) = 1,0 (A) ..... : | L1: 9,4A<br>L2: 9,4A<br>L3: - | P |
| | - power factor ..... : | L1: 0,42<br>L2: 0,42<br>L3: - | P |
| | - on-time (ms)..... : | 50ms | P |
| | - off-time (s)..... : | 10s | P |
| | - number of make/break cycles..... : | 30000 | P |
| | Behaviour and condition during and after the test: | | |
| | - no permanent arcing | | P |
| | - no flash-over between poles | | P |
| | - no blowing of the fusible element in the earth circuit | | P |
| | - no welding of the contacts | | P |
| | Dielectric test: | | |
| | test voltage (2 Ue, minimum of 1000 V) for 1 min: | 1000V~ | |
| | No flashover or breakdown | | P |

| | | | |
|---|---|---|---|
| | TEST SEQUENCE C<br>1 sample: $I_{th}$ =20A, $I_e$ =9A, AC-7b C1 | | |
| 9.2.1.2 | Resistance to humidity | | |
| | test Ca: damp heat (IEC 60068-2-3) ..... : | 4 days | P |
| | test voltage (2 Ue, minimum of 1000 V) for 1 min: | 1000V~ | |
| | No flashover or breakdown | | P |
| 9.3.5 | Ability to withstand overload currents<br>(only for utilization category AC-7b) | | |
| | test current (8 x Ie max) (A) ..... : | 72,4A | |
| | duration of test..... : | 10 s | |
| | After test contactor in the same condition | | P |
| 9.2.1.5 | Resistance to rusting | | |

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|---|---|---|---|
| Cl. | Requirement – Test | Result | Verdict |
| | 10 min in a 10% solution of ammonium chloride; 10 min in humid ambient; 10 min in heating cabinet at a temperature of 100°C .....: | | |
| | No signs of rust | | P |
| | TEST SEQUENCE D<br>1 sample: $I_{th}$ =20A, $I_e$ =9A, AC-7b D1 | | |
| 9.2.6 | Durability of marking | | |
| | Marking durable and easily legible:<br>15 s water; 15 s petroleum spirit | Marking made by printing | P |
| 9.2.5 | Resistance to impact | | |
| 9.2.5.2.1 | Pendulum hammer test<br>(unenclosed contactors, exposed parts and partially enclosed contactors, covers and cover plates) | | P |
| | 10 blows with a shock energy of 0,5 J | | P |
| | After the test, no damage; live parts not accessible | | P |
| 9.2.5.2.2 | Sphere test<br>(enclosures for contactors) | | |
| | 10 blows with a shock energy of 2 J (figure 9) | | N/A |
| | After the test , no damage; live parts not accessible | | N/A |
| 9.3.3.4 | Verification of clearances when necessary and verification of creepage distances | | |
| | rated impulse withstand voltage Uimp (V).....: | Not declare but tested acc. to 4kV | |
| | 1. minimum clearances (mm) (table 17) .....: | 3mm *Between live parts of difference polarity* | |
| | measured clearances (mm) .....: | 3,8mm | P |
| | 2. minimum clearances (mm) (table 17) .....: | 3mm *Between live parts and exposed conductive parts* | |
| | measured clearances (mm) .....: | No exposed conductive parts | N/A |
| | rated insulation voltage Ui (V) .....: | 500V | |
| | 1. minimum creepage distances (mm) (table 18): | 5mm *between live parts which are separated when the contactor is in the open position* | |
| | measured creepage distances (mm) .....: | 7,2mm | P |
| | 2. minimum creepage distances (mm) (table 18): | 5mm *between live parts of different polarity* | |
| | measured creepage distances (mm) .....: | 7,2mm | P |
| | 3. minimum creepage distances (mm) (table 18): | 3(6)mm *Between live parts and exposed conductive parts* | |

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|---|---|---|---|
| Cl. | Requirement – Test | Result | Verdict |
| | measured creepage distances (mm) ..... : | No exposed conductive parts | N/A |
| | TEST SEQUENCE E<br>1 sample: $I_{th}$ =20A, $I_e$ =9A, AC-7b E1 | | |
| 9.2.4 | Mechanical properties of terminals<br>(not apply to Al terminals or to terminals for connection of Al conductors) | | |
| 9.2.4.2 | Tests of mechanical strength of terminals | | |
| | maximum cross-sectional area of conductor ($mm^2$)..... : | 4 $mm^2$ | |
| | diameter of thread (mm) ..... : | 3,4mm | |
| | torque (Nm) ..... : | 0,8Nm | |
| | 5 times on 2 separate clamping units | | P |
| 9.2.4.3 | Test for damage to and accidental loosening of conductors (flexing test) | | |
| | conductor of the smallest cross-sectional area ($mm^2$)..... : | 1,5 $mm^2$ | |
| | number of conductors of the smallest cross section ..... : | 1 | |
| | diameter of bushing hole (mm) ..... : | 6,4mm | |
| | height between the equipment and the platen .... : | 260mm | |
| | mass at the conductor(s) (kg) ..... : | 0,4kg | |
| | 135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit | | P |
| 9.2.4.4 | Pull-out test | | |
| | force (N) ..... : | 40N | |
| | 1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit | | P |
| 9.2.4.3 | conductor of the largest cross-sectional area ($mm^2$)..... : | 4 $mm^2$ | |
| | number of conductors of the largest cross section ..... : | 1 | |
| | diameter of bushing hole (mm) ..... : | 9,5mm | |
| | height between the equipment and the platen .... : | 279mm | |
| | mass at the conductor(s) (kg) ..... : | 0,9kg | |
| | 135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit | | P |
| 9.2.4.4 | Pull-out test | | |
| | force (N) ..... : | 60N | |

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|---|---|---|---|
| Cl. | Requirement – Test | Result | Verdict |
| | 1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit | | P |
| 9.2.4.3 | conductor of the largest and smallest cross-sectional area ($mm^2$) ..... : | 4 $mm^2$ / 1,5 $mm^2$ | |
| | number of conductors of the smallest cross section, number of conductors of the largest cross section ..... : | 1/1 | |
| | diameter of bushing hole (mm) ..... : | 9,5mm / 6,4mm | |
| | height between the equipment and the platen .... : | 279mm / 260mm | |
| | mass at the conductor(s) (kg) ..... : | 0,9kg / 0,4kg | |
| | 135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit | | P |
| 9.2.4.4 | Pull-out test | | |
| | force (N) ..... : | 60N / 40N | |
| | 1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit | | P |
| 9.2.4.5 | Test for insertability of unprepared round copper conductors having the maximum specified cross-section | | |
| | form and marking of gauge (table 13)..... : | A3 | P |
| 9.2.2 | Test on screws or nuts other then those on terminals which are intended to be operated during installation or maintenance | | |
| | Torque test: | | |
| | - 10 times for thread of insulating material | | N/A |
| | - 5 times for other | | P |
| | - diameter (mm); torque (Nm) ..... : | 3,4mm / 0,8Nm | P |
| | - diameter (mm); torque (Nm) ..... : | | N/A |
| | - diameter (mm); torque (Nm) ..... : | | N/A |
| | - diameter (mm); torque (Nm) ..... : | | N/A |
| 9.2.1.3 | Resistance to heat | | |
| | Test on contactor | | |
| | a) ball pressure test: test temperature 125°C for 1 h; diameter of impression ≤ 2 mm (mm)..... : | 1,2mm<br>*Enclosure and the frame of coil* | P |
| | b) ball pressure test: test temperature °C for 1 h; diameter of impression ≤ 2 mm (mm)..... : | | N/A |
| | c) test temperature 100°C to reach thermal equilibrium (not less than 1 h): | | P |
| | - no damage, no live parts accessible (test finger 5 N) | | P |
| | - marking still legible | | P |

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|---|---|---|---|
| Cl. | Requirement – Test | Result | Verdict |
| | Tests on materials (material of at least 2 mm) | | |
| | a) ball pressure test: test temperature 125°C for 1 h; diameter of impression ≤ 2 mm (mm) ..... : | 1,2mm *movable contactor block* | P |
| | b) ball pressure test: test temperature °C for 1 h; diameter of impression ≤ 2 mm (mm) ..... : | | N/A |
| 9.2.1.4 | Resistance to abnormal heat and fire | | |
| | Test on parts of the contactors | | |
| | Glow-wire test at (850 °C): | 850°C *Enclosure and the frame of coil* | P |
| | No visible flames and no sustained glowing, or if flame and glowing, extinguish within 30 s ..... : | No visible flames | P |
| | No ignition of the tissue paper or scorching of the board | | P |
| | Glow-wire test at (650 °C): | 650°C *the red indicator* | P |
| | No visible flames and no sustained glowing, or if flame and glowing, extinguish within 30 s ..... : | No visible flames | P |
| | No ignition of the tissue paper or scorching of the board | | P |
| | Tests on materials | | |
| | a) flammability classification test, in accordance with IEC 60707 | 850°C *movable contactor block* | P |
| | b) hot wire ignition (HWI) test, as described in annex G | | N/A |
| 9.2.1.6 | Resistance to tracking | | |
| | 50 drop, solution A, test voltage (V) ..... : | 225V | P |
| | No flashover or breakdown | | P |
| | TEST SEQUENCE F<br>1 sample: $I_{th}$ =20A, $I_e$ =9A, AC-7b F1 | | |
| 9.2.1.1 | Resistance to ageing | | |
| | resistance to ageing at temperature 70 °C for 7 days (168 h) | 70 °C for 7 days | P |
| | After the test, no crack visible, and no traces of cloth and not stick to the cloth | | P |
| 9.2.3 | Degrees of protection | | |
| | Test procedure is under consideration | IP20 *to front parts* | P |

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|---|---|---|---|
| Cl. | Requirement – Test | Result | Verdict |
| | TEST SEQUENCE G<br>4 samples: $I_{th}$ =20A, $I_e$ =9A, AC-7b G1 | | |
| 9.3.4 | Performance under short-circuit conditions | | |
| | Conditional short-circuit current | | |
| | type of SCPD .....: | CBO: NB1-63 | |
| | ratings of SCPD .....: | 230/400V, C32,<br>$I_{cs}$= $I_{cn}$= 6000A | |
| 9.3.4.2.1 | prospective current Ir (kA) .....: | 3kA | |
| | test voltage (V) .....: | L1: 262V<br>L2: 262V<br>L3: - | |
| | r.m.s. test current (A) .....: | L1: 3040A<br>L2: 3040A<br>L3: - | |
| | power factor .....: | 0,87 | |
| | 1) one breaking operation of the SCPD shall be performed with SCPD and the contactor closed prior to the test | | P |
| | 2) one breaking operation of the SCPD shall be performed by closing the contactor on to the short-circuit | | P |
| 9.3.4.2.2 | rated conditional short-circuit Iq (kA) .....: | 6kA | |
| | test voltage (V) .....: | L1: 262V<br>L2: 262V<br>L3: - | P |
| | r.m.s. test current (A) .....: | L1: 6080A<br>L2: 6080A<br>L3: - | P |
| | power factor .....: | 0,65 | |
| | 1) one breaking operation of the SCPD shall be performed with SCPD and the contactor closed prior to the test | | P |
| | 2) one breaking operation of the SCPD shall be performed by closing the contactor on to the short-circuit | | P |
| | Result to be obtained: | | |
| | A Fault current successfully interrupted by SCPD; fuse or solid connection between the enclosure and supply not melted | | P |
| | B Door or cover of the enclosure not blown open and it is possible to open door or cover | | P |

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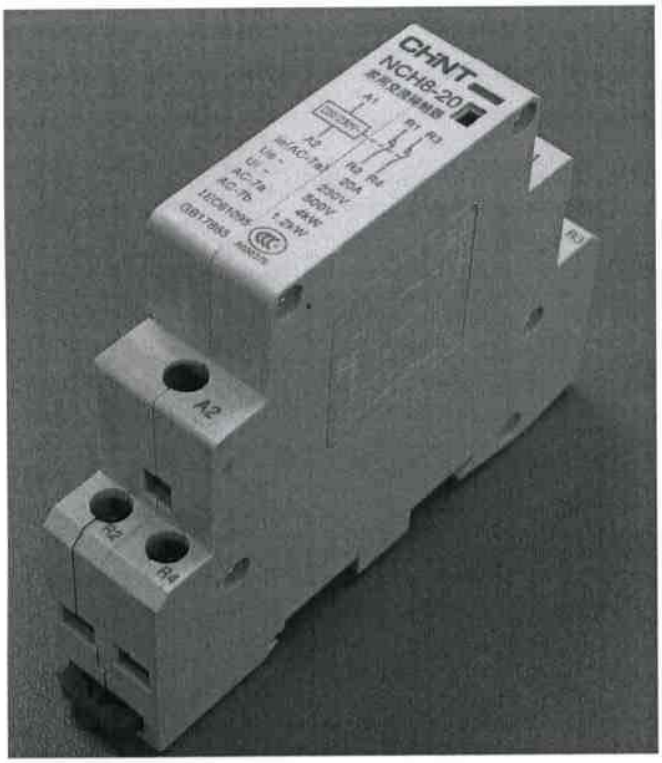
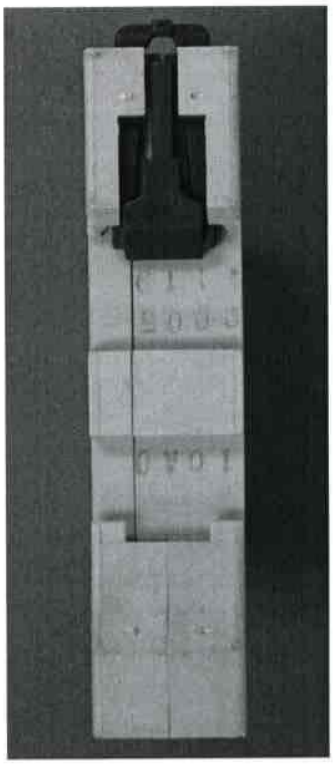
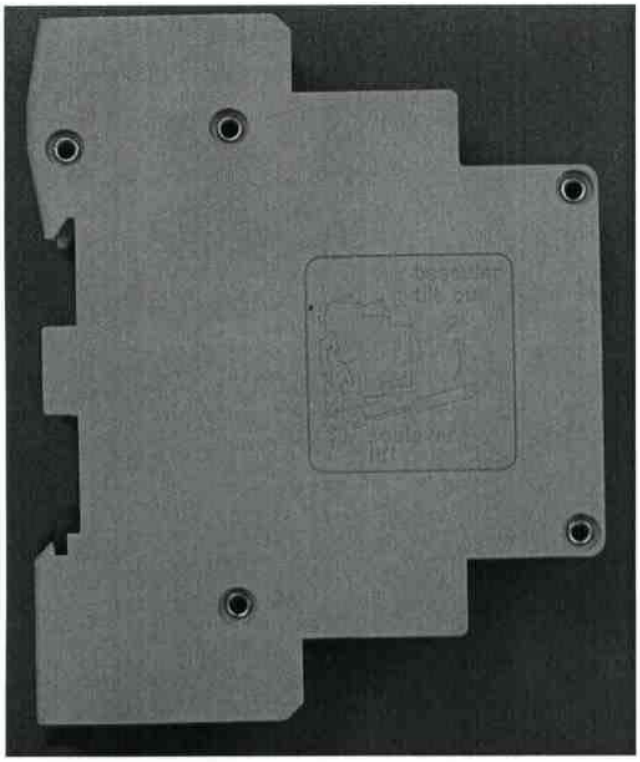
|---|---|---|---|
| Cl. | Requirement – Test | Result | Verdict |
| | C No damage to the conductor or terminals ; no conductor separated from the terminals | | P |
| | D No cracking or breaking of insulating base | | P |
| | E No discharge of parts beyond the enclosure | | P |

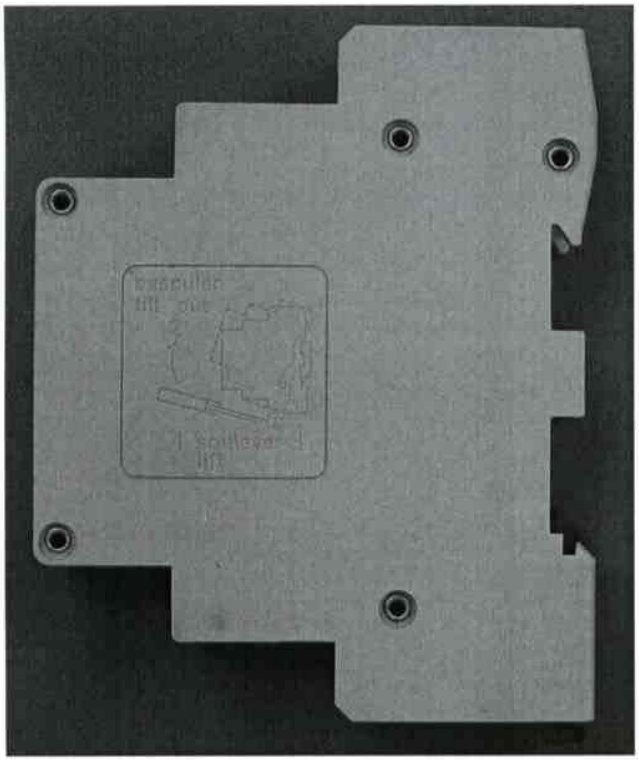
Photos of sample:



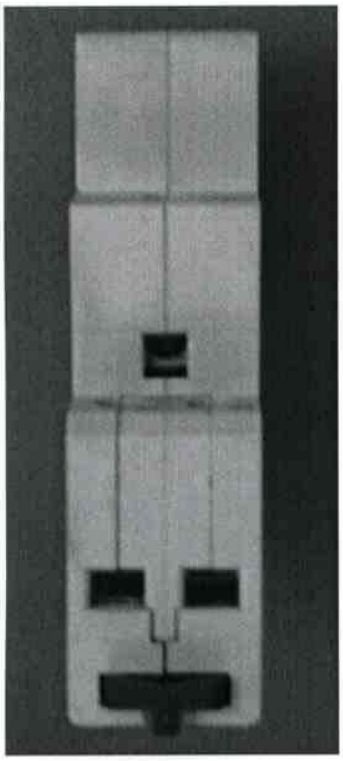



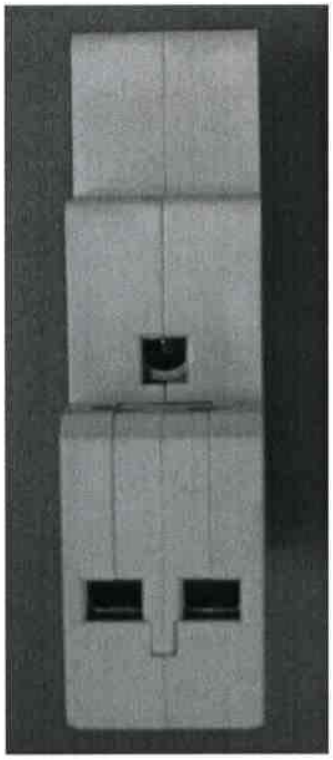
Photos of sample:





Photos of sample:





Photos of sample: