

Информацията по-долу е заличена  
съгл. чл. 45 и чл. 59, ал. 1 от ЗЗЛД,  
във връзка с чл.36а, ал.3 от ЗОП

Side 1 av 19



## AKKREDITERINGSKORT

### TEST 033

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Postboks 73 Blindern  
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Akkrediteringen omfatter akkrediteringsområdet som er angitt i de neste sidene i dokumentet.

Akkreditering er første gang innvilget 27.03.1995. Akkrediteringen er gitt i henhold til "Lov om det frie varebytte i EØS (EØS-vareloven)" av 14.04.2013. Organisasjonen tilfredsstiller kravene i NS-EN ISO/IEC 17025 (2005)

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**Permanent laboratorium**

**P05 Elektrisk prøving**

| Objekt  | Parameter                   | Referansestandard | Intern metode identitet | Merknad   |
|---|-----------------------------|-------------------|-------------------------|---|
| Switches for household and similar permanent installations  | General safety requirements | EN 60669-1        |                         | Includes also standards referring to or based on the reference standard.  |
| Elektroniske brytere for husholdnings- og lignende faste installasjoner                             | Spesielle krav              | EN 60669-2-1      |                         | Includes also standards referring to or based on the reference standards. Clause 101.3 short-cut tests and clause 26 EMC are not accredited. Equivalent to IEC 60669-2-1 A1, A2 |
| Flate, ikke demonterbare to-pol plugger 2,5 A 250 V med ledning for tilkobling til klasse 2 apparat | Generelle sikkerhetskrav    | EN 50075          | P21305                  | Includes also standards referring to or based on the reference standard.  |
| Brannalarmer og brannalarm-systemer   | Electrical tests            | EN 54-4           | TM-NO/FSC/204           | Clause 9.2 and 9.3  |
| Radio Equipment - PMR integral antenna  | Radio characteristics       | EN 300 296        | TM-NO/WLS/500           |   |
| Lyskilder   | Sikkerhetskrav              | NEK IEC 60969     |                         |   |

**Permanent laboratorium**

**P06 EMC, Elektromagnetisk kompatibilitet**

| Objekt   | Parameter   | Referansestandard | Intern metode identitet | Merknad  |
|--|-------------|-------------------|-------------------------|--|
| Associated equipment for sound and television broadcast receivers  |             | EN 55013          |                         | Includes Amendment A1 (2003)                         |
| Household appliances, electric tools and similar apparatus         |             | EN 55014-1        |                         | Includes Amendment A1 (2001) and Amendment A2 (2002) |
| Elektriske motordrifter for variabelt turtall                      | EMC-testing | EN 61800-3        |                         | Includes Amendment A11 (2000)                        |
| Produktfamiliestandard for heiser, rulletrapper og rullende fortau | Emission    | EN 12015          |                         |  |

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**P06 EMC, Elektromagnetisk kompatibilitet**

| Objekt   | Parameter  | Referansestandard | Intern metode identitet | Merknad  |
|--|--|-------------------|-------------------------|--|
| Produktfamiliestandarder for heiser, rulletrapper og rullende fortau                         | Immunity   | EN 12016          |                         |  |
| Telecommunication network equipment  | EMC tester   | NS-EN 300 386-2   |                         |  |
| Uninterruptible power systems (UPS)  | EMC tester   | EN 50091-2 UTGÅTT |                         |  |
| Electrical lighting and similar equipment  | Disturbance voltage AC/DC mains port   | EN 55015          |                         | Includes amendment A1 (2001) and Amendment A2 (2002) |
| Electrical and electrical equipment  | Generic standards. Immunity for residential, commercial and light-industrial                       | EN 61000-6-2      |                         |  |
| Electrical and electrical equipment  | Generic standards. Emission standard for residential, commercial and light-industrial environments | EN 61000-6-3      |                         | Includes Amendment A11 (2004)                        |
| household appliances, electric tools and similar apparatus                                   | Immunity   | EN 55014-2        |                         | Includes Amendment A1 (2001)                         |
| Audio, video, audio-visual and entertainment lighting control apparatus for professional use | Emission   | EN 55103-1        |                         |  |
| Audio, video, audio-visual and entertainment lighting control apparatus for professional use | Immunity   | EN 55103-2        |                         |  |
| Switches for household and similar fixed electrical installations                            | Particular requirements - Electronic switches  | EN 60669-2-1      |                         | Includes Amendment A2 (2001)                         |
| Automatic electrical controls for household and similar use                                  | General requirements   | EN 60730-1        |                         | Includes Amendment A1 (2004)                         |
| Maritime navigation and radiocommunication equipment and systems                             | General requirements - Methods of testing and required test results                                | EN 60945          |                         |  |

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**P06 EMC, Elektromagnetisk kompatibilitet**

| Objekt   | Parameter   | Referansestandard | Intern metode identitet | Merknad   |
|--|---|-------------------|-------------------------|---|
| Low-voltage switchgear and controlgear                           | General rules   | EN 60947-1        |                         | Includes Amendment A2 (2001)  |
| Arc welding equipment  | Electromagnetic compatibility (EMC) requirements                                | EN 60974-10       |                         |   |
| Electrical/electrical equipment                                  | Generic standards. Emission standard for industrial environments                | EN 61000-6-4      |                         |   |
| Low voltage power supplies, d.c. output                          | Electromagnetic compatibility (EMC)   | EN 61204-3        |                         |   |
| Electrical equipment for measurement, control and laboratory use | General requirements  | EN 61326-1        |                         | Includes Amendment A1 (1998), Amendment A2 (2001) and Amendment A3 (2003)   |
| EMC immunity requirements  | EMC immunity requirements   | EN 61547          |                         | Includes Amendment A1(2000)   |
| Alarm systems  | Immunity requirements for components of fire, intruder and social alarm systems | EN 50130-4        |                         |   |
| ISM-utstyr   |   | EN 55011          |                         | Frequency range limited to 10 kHz to 6 GHz. Testing of microwave ovens according to clause 5.9 is not part of the scope.  |
| Electrical and electrical equipment                              | Immunity  | EN 61000-6-1      | TM-NO/EMC/400           |   |
| Information technology equipment                                 | Immunity  | EN 55024          | TM-NO/EMC/400           |   |
| Immunitetsproving  | Elektrostatisk utlading   | EN 61000-4-2      | TM-NO/EMC/402           | Includes also standards referring to or based on the reference standard or international version. International version: IEC 61000-4-2                                    |
| Electrical and electronic equipment                              | Radiated, radio frequency electromagnetic field immunity test                   | ENV 50140         | TM-NO/EMC/403           | Includes also standards referring to or based on the reference standard or the international version. Frequency 80-1000 MHz. Not modulated and Amplitude modulation: (AM) |
| Electrical and electronic equipment                              | Radiated, radio frequency electromagnetic field immunity test                   | ENV 50204         | TM-NO/EMC/403           | Includes also standards referring to or based on the reference standard or the international version. Frequency: 80-1000 MHz. Pulse modulation (PM)                       |

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P06 EMC, Elektromagnetisk kompatibilitet

| Objekt                              | Parameter   | Referansestandard  | Intern metode identitet | Merknad  |
|-------------------------------------|---|--------------------|-------------------------|--|
| Elektrisk og elektronisk utstyr     | Utstråling, radiofrekvent, elektromagnetisk felt-immunitetsprøving            | IEC 61000-4-3      | TM-NO/EMC/403           | Includes also standards referring to or based on the reference standard or the international version.                                      |
| Elektrisk/elektronisk utstyr        | Immunitet mot raske, repeterende transienter                                  | EN 61000-4-4       | TM-NO/EMC/404           | Includes also standards referring to or based on the reference standard or the international version. International version: IEC 61000-4-4 |
| Electrical and electronic equipment | Surge immunity test   | EN 61000-4-5       | TM-NO/EMC/405           | Includes also standards referring to or based on the reference standard or the international version. International version: IEC 61000-4-5 |
| Elektrisk og elektronisk utstyr     | Immunitet mot ledningsbundne forstyrrelser, forårsaket av radiofrekvensfelter | EN 61000-4-6       | TM-NO/EMC/406           | Includes also standards referring to or based on the reference standard or the international version.                                      |
| Elektrisk og elektronisk utstyr     | Immunity to power frequency magnetic fields                                   | EN 61000-4-8       | TM-NO/EMC/408           | Includes Amendment A1 (2001) 50/60 Hz  |
| Elektrisk og elektronisk utstyr     | Immunity to pulsed magnetic fields  | EN 61000-4-9       | TM-NO/EMC/409           | Includes Amendment A1 (2001) 6.4/1 µsec puls   |
| Elektrisk og elektronisk utstyr     | Immunity to voltage dips and interruptions                                    | EN 61000-4-11      | TM-NO/EMC/411           | Includes Amendment A1 (2001) Inrush <430A  |
| Electrical and electronic equipment | Supply voltage / frequency variations   | EN 60945           | TM-NO/EMC/414           | Includes also standards referring to or based on the reference standard or the international version. International version: IEC 60945     |
| Information technology equipment    | Emissions   | EN 55022           | TM-NO/EMC/500           |  |
| Electrical and electronic equipment | Disturbance voltage AC/DC mains port  | EN 55014-1         | TM-NO/EMC/501           | Includes also standards referring to or based on the reference standard or the international version.                                      |
| Elektrisk og elektronisk utstyr     | Disturbance voltage AC/DC mains port  | FCC CFR 47 Part 15 | TM-NO/EMC/501           | Includes also standards referring to or based on the reference standard or the international version.                                      |
| Elektrisk og elektronisk utstyr     | Disturbance voltage AC/DC mains port  | EN 60945           | TM-NO/EMC/501           | Includes also standards referring to or based on the reference standard or the international version.                                      |
| Elektrisk og elektronisk utstyr     | Disturbance voltage AC/DC mains port  | EN 55011           | TM-NO/EMC/501           | Includes also standards referring to or based on the reference standard or the international version. International version: CISPR 11      |

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**Permanent laboratorium**

**P06 EMC, Elektromagnetisk kompatibilitet**

| Objekt                              | Parameter                             | Referansestandard | Intern metode identitet        | Merknad   |
|-------------------------------------|---------------------------------------|-------------------|--------------------------------|---|
| Electrical and electronic equipment | Disturbance voltage AC/DC mains port  | EN 55013          | TM-NO/EMC/501                  | Includes also standards referring to or based on the reference standard or the international version.                                 |
| Electrical and electronic equipment | Disturbance voltage AC/DC mains port  | EN 55015          | TM-NO/EMC/501                  | Includes also standards referring to or based on the reference standard or the international version. International version: CISPR 15 |
| Elektrisk og elektronisk utstyr     | Radiated disturbance                  | EN 55022          | TM-NO/EMC/501                  | Includes also standards referring to or based on the reference standard or the international version. International version: CISPR 22 |
| Electrical and electronic equipment | Disturbance voltage AC/DC output port | EN 55015          | TM-NO/EMC/502                  | Includes also standards referring to or based on the reference standard or the international version.                                 |
| Elektrisk og elektronisk utstyr     | Discontinuous disturbance voltage     | EN 55014-1        | TM-NO/EMC/502                  | Includes also standards referring to or based on the reference standard or the international version.                                 |
| Elektrisk og elektronisk utstyr     | Radiated disturbance                  | EN 55022          | TM-NO/EMC/503                  | Includes also standards referring to or based on the reference standard or the international version.                                 |
| Electrical and electronic equipment | Disturbance voltage Telecom port      | EN 55022          | TM-NO/EMC/504                  | Includes also standards referring to or based on the reference standard or the international version. International version: CISPR 22 |
| Elektrisk og elektronisk utstyr     | Discontinuous disturbance voltage     | EN 55014-1        | TM-NO/EMC/505                  | Includes Amendment A1 (2001) and Amendment A2 (2002)  |
| Electrical and electronic equipment | Radiated electromagnetic disturbance  | EN 55015          | TM-NO/EMC/506                  | Includes also standards referring to or based on the reference standard or the international version. International version: CISPR 15 |
| Electrical and electronic equipment | Disturbance power                     | EN 55013          | TM-NO/EMC/507                  | Includes also standards referring to or based on the reference standard or the international version.                                 |
| Elektrisk og elektronisk utstyr     | Discontinuous disturbance voltage     | EN 55014-1        | TM-NO/EMC/507                  | Includes also standards referring to or based on the reference standard or the international version.                                 |
| Elektrisk og elektronisk utstyr     | Radiated disturbance                  | EN 55011          | TM-NO/EMC/508                  | Includes Amendment A1 (1999) and Amendment A2 (2002) 10kHz - 30 MHz   |
| Elektrisk og elektronisk utstyr     | Radiated disturbance                  | EN 60945          | TM-NO/EMC/508                  | 10kHz - 30MHz   |
| Elektrisk og elektronisk utstyr     | Radiated disturbance                  | EN 60945          | TM-NO/EMC/509<br>TM-NO/EMC/510 | Includes also standards referring to or based on the reference standard or the international version.                                 |

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**Permanent laboratorium**

**P06 EMC, Elektromagnetisk kompatibilitet**

| Objekt   | Parameter                        | Referansestandard  | Intern metode identitet        | Merknad   |
|--|----------------------------------|--------------------|--------------------------------|---|
| Elektrisk og elektronisk utstyr                    | Radiated disturbance             | EN 55011           | TM-NO/EMC/509<br>TM-NO/EMC/510 | Includes also standards referring to or based on the reference standard or the international version. International version: CISPR 11. Frequency range limited to 30 MHz to 6 GHz |
| Elektrisk og elektronisk utstyr                    | Radiated disturbance             | FCC CFR 47 Part 15 | TM-NO/EMC/509<br>TM-NO/EMC/510 | Includes also standards referring to or based on the reference standard.  |
| Elektrisk og elektronisk utstyr                    | Radiated disturbance             | EN 55022           | TM-NO/EMC/509<br>TM-NO/EMC/510 | Includes also standards referring to or based on the reference standard or the international version.   |
| Elektrisk og elektronisk utstyr                    | Harmonic current emission        | EN 61000-3-2       | TM-NO/EMC/511                  | Includes also standards referring to or based on the reference standard or the international version.   |
| Elektrisk og elektronisk utstyr                    | Voltage fluctuations and flicker | EN 61000-3-3       | TM-NO/EMC/512                  | Includes also standards referring to or based on the reference standard or the international version.   |
| Brannalarm utstyr                                  | Produkt standard                 | EN 54-2            | TM-NO/FSC/202                  | Clause 15   |
| Brannalarmanlegg - Akustisk alarmorgan             | EMC                              | NS-EN 54-3         | TM-NO/FSC/203                  | Clause 5  |
| Brannalarm utstyr                                  | Produkt standard                 | EN 54-4            | TM-NO/FSC/204                  | Clause 9  |
| Brannalarmanlegg                                   | EMC prøving                      | NS-EN 54-11        | TM-NO/FSC/211                  | A1 (2005)   |
| Fire detection and fire alarm systems              | EMC testing                      | EN 54-16           | TM-NO/FSC/216                  |   |
| Brannanlegg - Kortslutningsisolatorer              | EMC prøvning                     | NS-EN 54-17        | TM-NO/FSC/217                  |   |
| Brannalarmanlegg - Inngang- og utgangsinnretninger | EMC                              | NS-EN 54-18        | TM-NO/FSC/218                  | Clause 5  |
| Elektrisk og elektronisk utstyr                    | Compass safe distance            | EN ISO 694         | TM-NO/MET/501                  |   |
| Elektrisk og elektronisk utstyr                    | Compass safe distance            | EN 60945           | TM-NO/MET/501                  |   |

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**P17 Miljø**

| Objekt | Parameter | Referansestandard | Intern metode identitet | Merknad |
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P17 Miljø

| Objekt  | Parameter                            | Referansestandard | Intern metode identitet | Merknad  |
|---|--------------------------------------|-------------------|-------------------------|--|
| Brannalarm utstyr   | Produkt standard                     | EN 54-2           | TM-NO/FSC/202           | Clause 15  |
| Brannalarmanlegg - Akustisk alarmanlegg   | Environmental tests                  | NS-EN 54-3        | TM-NO/FSC/203           | Clause 5   |
| Brannalarm utstyr   | Produkt standard                     | EN 54-4           | TM-NO/FSC/204           | Clause 9   |
| Brannalarmanlegg  | Miljøproving                         | NS-EN 54-11       | TM-NO/FSC/211           | A1 (2005)  |
| Fire detection and fire alarm systems   | Miljøtesting                         | EN 54-16          | TM-NO/FSC/216           |  |
| Brannanlegg - Kortslutningsisolatorer   | Miljøproving                         | NS-EN 54-17       | TM-NO/FSC/217           |  |
| Brannalarmanlegg - Inngangs- og utgangsinnevinger   | Environmental tests                  | NS-EN 54-18       | TM-NO/FSC/218           | Clause 5 (Excluding clause 5.7 SO2 Corrosion test) |
| Navigasjonsutstyr skip  | Produktstandard                      | EN 60945          | TM-NO/REL/501           |  |
| Elektrisk og elektronisk utstyr   | Kulde                                | EN 60068-2-1      | TM-NO/REL/501           | Test Ad  |
| Electrical, control and instrumentation equipment, marine computers and peripherals covered by classification | Dry heat, Damp heat, Vibration, Cold | IACS E10          | TM-NO/REL/501           |  |
| Navigasjonsutstyr skip  | Produktstandard                      | EN 60945          | TM-NO/REL/502           |  |
| Elektrisk og elektronisk utstyr   | Dry heat                             | EN 60068-2-2      | TM-NO/REL/502           | Test Bd  |
| Electrical, control and instrumentation equipment, marine computers and peripherals covered by classification | Dry heat, Damp heat, Vibration, Cold | IACS E10          | TM-NO/REL/502           |  |
| Electrical/electronic and mechanical equipment  | Damp heat, Cyclic                    | EN 60068-2-30     | TM-NO/REL/503           | Test Db  |
| Navigasjonsutstyr skip  | Produktstandard                      | EN 60945          | TM-NO/REL/503           |  |
| Electrical, control and instrumentation equipment, marine computers and peripherals covered by classification | Dry heat, Damp heat, Vibration, Cold | IACS E10          | TM-NO/REL/503           |  |
| Electrical and electronic equipment   | Ingres protection (IP)               | IEC 60529         | TM-NO/REL/505           |  |

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P17 Miljø

| Objekt   | Parameter                   | Referansestandard | Intern metode identitet | Merknad  |
|--|-----------------------------|-------------------|-------------------------|--|
| Elektroniske og mekaniske komponenter                          | Syklisk salttåke            | IEC 60068-2-52    | TM-NO/REL/506           | Includes also standards referring to or based on the reference standard or the international version. International version IEC 60068-2-52 |
| Electrical and electronic equipment                            | Salt mist                   | IEC 60068-2-11    | TM-NO/REL/507           | Includes also standards referring to or based on the reference standard or the international version. International version IEC 60068-2-11 |
| Electrical/electronic equipment                                | Vibration (sinusoidal)      | IEC 60068-2-6     | TM-NO/REL/508           | Includes also standards referring to or based on the reference standard or the international version. International version IEC 60068-2-6  |
| Electrical/electronic equipment                                | Vibration, broadband random | IEC 60068-2-64    | TM-NO/REL/508           | Includes also standards referring to or based on the reference standard or the international version. International version IEC 60068-2-64 |
| Mekaniske komponenter/strukturer og elektromekaniske apparater | Fuktighet                   | IEC 60068-2-78    | TM-NO/REL/504           |  |
| Elektroniske og mekaniske komponenter                          | Støt/bump                   | IEC 60068-2-27    | TM-NO/REL/509           |  |

Permanent laboratorium

P18 Oppførsel

| Objekt   | Parameter                                       | Referansestandard | Intern metode identitet | Merknad         |
|--|---|-------------------|-------------------------|-----------------|
| Fire detection and fire alarm systems - Control and indicating equipment | Functional requirements and design requirements | EN 54-2           | TM-NO/FSC/202           | Clauses 4 to 14 |
| Fire detection and fire alarm systems - Sounders                         | Functional                                      | NS-EN 54-3        | TM-NO/FSC/203           | Clauses 4 and 5 |
| Fire detection and fire alarm systems - Power supply equipment           | Functional requirements                         | EN 54-4           | TM-NO/FSC/204           | Clauses 4-8     |

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**P18 Oppførsel**

| Objekt   | Parameter  | Referansestandard | Intern metode identitet | Merknad         |
|--|------------|-------------------|-------------------------|-----------------|
| Fire detection and fire alarm systems - Manual call points                           | Functional | NS-EN 54-11       | TM-NO/FSC/211           | A1 (2005)       |
| Fire detection and fire alarm systems - Voice alarm control and indicating equipment | Functional | EN 54-16          | TM-NO/FSC/216           |                 |
| Fire detection and fire alarm systems - Short-circuit isolators                      | Functional | NS-EN 54-17       | TM-NO/FSC/217           |                 |
| Fire detection and fire alarm systems - Input/output devices                         | Functional | NS-EN 54-18       | TM-NO/FSC/218           | Clauses 4 and 5 |

**Permanent laboratorium**

**P20 Sikkerhet**

| Objekt  | Parameter  | Referansestandard | Intern metode identitet | Merknad                              |
|---|--|-------------------|-------------------------|--------------------------------------|
| Non-laser light source equipment intended for therapeutic, diagnostic, monitoring and cosmetic/ aesthetic use | Particular requirements for the basic safety and essential performance | IEC 60601-2-57    |                         |                                      |
| Anaesthetic workstations  | Particular requirements for the basic safety and essential performance | EN ISO 80601-2-13 |                         |                                      |
| Dental equipment  | Particular requirements for the basic safety and essential performance | IEC 80601-2-60    |                         |                                      |
| Pulse oximeter equipment  | Particular requirements for the basic safety and essential performance | ISO 80601-2-61    |                         |                                      |
| Medical electrical equipment  | General requirements for basic safety and essential performance        | EN 60601-1        |                         | Including IEC 60601-1, Including A1. |
| Medical electrical equipment  | Collateral standard, Usability   | EN 60601-1-6      |                         | Including IEC 60601-1-6              |

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**P20 Sikkerhet**

| Objekt  | Parameter  | Referansestandard | Intern metode identitet | Merknad                  |
|---|--|-------------------|-------------------------|--------------------------|
| Medical electrical equipment  | Collateral Standard: General requirements, tests and guidance for alarm systems in medical electrical equipment and medical electrical systems | EN 60601-1-8      |                         | Including IEC 60601-1-8  |
| Medical electrical equipment  | Collateral Standard: Requirements for the development of physiologic closedloop controllers  | EN 60601-1-10     |                         | Including IEC 60601-1-10 |
| Medical electrical equipment  | Collateral standard: Requirements for medical electrical equipment and medical electrical systems used in the home healthcare environment      | EN 60601-1-11     |                         | Including IEC 60601-1-11 |
| High frequency surgical equipment and high frequency surgical accessories | Particular requirements for the basic safety and essential performance   | EN 60601-2-2      |                         | Including IEC 60601-2-2  |
| Cardiac defibrillators  | Particular requirements for the basic safety and essential performance   | EN 60601-2-4      |                         | Including IEC 60601-2-4  |
| Ultrasonic physiotherapy equipment  | Particular requirements for the basic safety and essential performance   | EN 60601-2-5      |                         | Including IEC 60601-2-5  |
| Nerve and muscle stimulators  | Particular requirements for the basic safety and essential performance   | EN 60601-2-10     |                         | Including IEC 60601-2-10 |
| Haemodialysis, haemodiafiltration and haemofiltration equipment           | Particular requirements for the basic safety and essential performance   | EN 60601-2-16     |                         | Including IEC 60601-2-16 |
| Endoscopic equipment  | Particular requirements for the basic safety and essential performance   | EN 60601-2-18     |                         | Including IEC 60601-2-18 |
| Infant incubators   | Particular requirements for the basic safety and essential performance   | EN 60601-2-19     |                         | Including IEC 60601-2-19 |
| Infant transport incubators   | Particular requirements for the basic safety and essential performance   | EN 60601-2-20     |                         | Including IEC 60601-2-20 |

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P20 Sikkerhet

| Objekt  | Parameter  | Referansestandard | Intern metode identitet | Merknad                  |
|---|--|-------------------|-------------------------|--------------------------|
| Infant radiant warmers  | Particular requirements for the basic safety and essential performance | EN 60601-2-21     |                         | Including IEC 60601-2-21 |
| Surgical, cosmetic, therapeutic and diagnostic laser equipment              | Particular requirements for the basic safety and essential performance | EN 60601-2-22     |                         | Including IEC 60601-2-22 |
| Transcutaneous partial pressure monitoring equipment                        | Particular requirements for the basic safety and essential performance | EN 60601-2-23     |                         | Including IEC 60601-2-23 |
| Electrocardiographs   | Particular requirements for the basic safety and essential performance | EN 60601-2-25     |                         | Including IEC 60601-2-25 |
| Electroencephalographs  | Particular requirements for the basic safety and essential performance | EN 60601-2-26     |                         | Including IEC 60601-2-26 |
| Electrocardiographic monitoring equipment                                   | Particular requirements for the basic safety and essential performance | EN 60601-2-27     |                         | Including IEC 60601-2-27 |
| Invasive blood pressure monitoring equipment                                | Particular requirements for the basic safety and essential performance | EN 60601-2-34     |                         | Including IEC 60601-2-34 |
| Ultrasonic medical diagnostic and monitoring equipment                      | Particular requirements for the basic safety and essential performance | EN 60601-2-37     |                         | Including IEC 60601-2-37 |
| Surgical luminaires and luminaires for diagnosis                            | Particular requirements for the basic safety and essential performance | EN 60601-2-41     |                         | Including IEC 60601-2-41 |
| Operating tables  | Particular requirements for the basic safety and essential performance | EN 60601-2-46     |                         | Including IEC 60601-2-46 |
| Ambulatory electrocardiographic systems                                     | Particular requirements for the basic safety and essential performance | EN 60601-2-47     |                         | Including IEC 60601-2-47 |
| Multifunction patient monitoring equipment                                  | Particular requirements for the basic safety and essential performance | EN 60601-2-49     |                         | Including IEC 60601-2-49 |
| Recording and analysing single channel and multichannel electrocardiographs | Particular requirements for the basic safety and essential performance | EN 60601-2-51     |                         | Including IEC 60601-2-51 |

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Gaustadalleen 30  
0314 OSLO

**Permanent laboratorium**

**P20 Sikkerhet**

| Objekt  | Parameter  | Referansestandard | Intern metode identitet | Merknad   |
|---|--|-------------------|-------------------------|---|
| Medical beds  | Particular requirements for the basic safety and essential performance | EN 60601-2-52     |                         | Including IEC 60601-2-52  |
| Medical device software                                       | Software life cycle processes  | IEC 62304         |                         |   |
| Medical devices   | Application of usability engineering to medical devices                | EN 62366          |                         | Including IEC 62366   |
| Critical care ventilators                                     | Particular requirements for the basic safety and essential performance | EN ISO 80601-2-12 |                         | Including ISO 80601-2-12  |
| Automated non-invasive sphygmomanometers                      | Particular requirements for the basic safety and essential performance | EN 80601-2-30     |                         | Including IEC 80601-2-30  |
| Husholdnings- og tilsvarende elektriske apparater             | Generelle krav   | EN 60335-1        | P4530-01                | Includes IEC 60335-1  |
| Sikkerhetskrav til elektroniske apparater for nettilkobling.  | General safety requirements  | EN 60065          |                         | Including IEC 60065. Includes also standards referring to or based on the reference standard. Clause 18: Implosion test of CRT (and corresponding clause in IEC 60065) is not included in the accreditation.  |
| Information technology equipment                              | General safety requirements  | EN 60950-1        |                         | Including IEC 60950-1. Includes also standards referring to or based on the reference standard or the international version. Annex 3: "High current arching test" (and corresponding clause in the IEC 60950) is not included in the accreditation. |
| Informationsteknologisk utstyr                                | Sikkerhetskrav   | EN 60950-22       |                         | Including IEC 60950-22.   |
| Light sources   | Safety requirements  | EN 62471          |                         | 200 nm - 1700 nm  |
| Nerve and muscle stimulators                                  | General safety requirements  | EN 60601-2-10     | P31110                  | Includes also standards referring to or based on the reference standard. Including IEC 60601-2-10   |
| Hoists for the transfer of disabled persons                   | Requirements and test methods  | ISO 10535         | P31300                  |   |
| Vacuum cleaners and water-suction cleaning appliances         | Safety requirements  | EN 60335-2-2      | P4530-02-02             | Including IEC 60335-2-2   |
| Stationary cooking ranges, hobs, ovens and similar appliances | Safety requirements  | IEC 60335-2-6     | P4530-02-06             |   |

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P20 Sikkerhet

| Objekt  | Parameter           | Referansestandard | Intern metode identitet | Merknad                  |
|---|---------------------|-------------------|-------------------------|--------------------------|
| Shavers, hair clippers and similar appliances                               | Safety requirements | IEC 60335-2-8     | P4530-02-08             |                          |
| Grills, toasters and similar portable cooking appliances                    | Safety requirements | IEC 60335-2-9     | P4530-02-09             |                          |
| Deep fat fryers, frying pans and similar appliances                         | Safety requirements | EN 60335-2-13     | P4530-02-13             | Including IEC 60335-2-13 |
| Kitchen machines  | Safety requirements | EN 60335-2-14     | P4530-02-14             | Including IEC 60335-2-14 |
| Appliances for heating liquids  | Safety requirements | EN 60335-2-15     | P4530-02-15             | Inkl. IEC 60335-2-15     |
| Storage water heaters   | Safety requirements | IEC 60335-2-21    | P4530-02-21             |                          |
| Refrigerating appliances, ice-cream appliances and ice makers               | Safety requirements | IEC 60335-2-24    | P4530-02-24             |                          |
| Sewing machines   | Safety requirements | IEC 60335-2-28    | P4530-02-28             |                          |
| Room heaters  | Safety requirements | IEC 60335-2-30    | P4530-02-30             |                          |
| Cooking fume extractors   | Safety requirements | IEC 60335-2-31    | P4530-02-31             |                          |
| Instantaneous water heaters   | Safety requirements | IEC 60335-2-35    | P4530-02-35             |                          |
| Commercial refrigerating appliances with incorporated or remote refrigerant | Safety requirements | IEC 60335-2-89    | P4530-02-89             |                          |

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P01 Akustikk

| Objekt        | Parameter | Referansestandard         | Intern metode identitet | Merknad |
|---------------|-----------|---------------------------|-------------------------|---------|
| Høreapparater | Akustikk  | IEC 60118-0               | TM-NO/HAC/401           |         |
| Høreapparater | Akustikk  | IEC 60118-2               | TM-NO/HAC/401           |         |
| Høreapparater | Akustikk  | IEC 60118-6               | TM-NO/HAC/401           |         |
| Høreapparater | Akustikk  | IEC 60118-7               | TM-NO/HAC/401           |         |
| Høreapparater | Akustikk  | Nordic Requirements (NSH) | TM-NO/HAC/401           |         |
| Høreapparater | Akustikk  | IEC 60118-1               | TM-NO/HAC/401A          |         |

**Permanent laboratorium**

P05 Elektrisk prøving

| Objekt  | Parameter          | Referansestandard       | Intern metode identitet | Merknad  |
|---|--------------------|-------------------------|-------------------------|--|
| Teleterminalutstyr, for analog aksess uten talefunksjon                   | Fysiske målinger   | TBR 21                  |                         | Also includ. ES201187, ES201729 and ES203021 -1, 2 & 3 |
| Teleterminalutstyr for 2048 kbit/s ustrukturert leid samband (ONP)        | Fysiske målinger   | TBR 12                  | COMLAB 1004             |  |
| Felles aksess profil  | Protokolltest      | TBR 14                  | COMLAB 1005             |  |
| Teleterminalutstyr for 2048 kbit/s strukturert leid samband (D2048S)      | Fysiske målinger   | TBR 13                  | COMLAB 1015             |  |
| Teleterminalutstyr, PSTN  | Fysiske tester     | AS/ACIF S002            | COMLAB 1027             |  |
| Terminals for connection to analogue interfaces of the Telephone Networks | Physical tests     | ETSI ES 103 021-1,-2,-3 | COMLAB 1027             |  |
| Telecommunication equipment, analog access-Speech and DTMF                | Physical tests     | ETSI EN 301 437         | COMLAB 1027             |  |
| Teleterminalutstyr for analog aksess med talefunksjon                     | Akustiske målinger | AS/ACIF S004            | COMLAB 1029             |  |

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**P05 Elektrisk prøving**

| Objekt  | Parameter                                | Referansestandard | Intern metode identitet | Merknad   |
|---|--|-------------------|-------------------------|---|
| Teleterminalutstyr, for analog aksess med talefunksjon  | Akustiske målinger                       | TBR 38            | COMLAB 1029             |   |
| Teleterminalutstyr for ledelinjer A20/A2S   | Fysiske målinger                         | TBR 15            | COMLAB 1030             |   |
| Teleterminalutstyr for leide linjer (OPN) A40/A2S   | Fysiske målinger                         | TBR 17            | COMLAB 1030             |   |
| DECT radio aksess   | Radioteknisk karakteristikk              | EN 301 406        | TM-NO/WLS/401           |   |
| DECT telefoni   | Akustiske målinger , protokolltest       | TBR 10            | TM-NO/WLS/402           | CAT-iq, CS03 part V, ITU-p.370, EN 300 176-2 (CAT-iq Audio, HAC and ROLR) |
| Digital Enhanced Cordless Telecommunications (DECT)   | Speech and audio coding and transmission | ETSI EN 300175-8  | TM-NO/WLS/402           |   |
| DECT GAB  | Protokolltest                            | TBR 22            | TM-NO/WLS/403           |   |
| Radioutstyr - bredbånds dataoverføringsutstyr 2,4 GHz ISM-bånd                                      | Radio characteristics                    | EN 300 328        | TM-NO/WLS/500           |   |
| Radioutstyr for lukkede nett - analog tale  | Radio characteristics                    | EN 300 086        | TM-NO/WLS/500           |   |
| Radioutstyr - Lav effekt utstyr (SRD) 9 kHz - 25 MHz og induktiv loop systemer 9 kHz - 30 MHz (RES) |  | EN 300 330        | TM-NO/WLS/500           |   |
| Trådløse mikrofoner 25MHz til 3GHz  |  | EN 300 422        | TM-NO/WLS/500           |   |
| Radioutstyr - VHF radiotelefonutstyr for redningsflåter, bærbart, toveis (RES)                      |  | ETS 300 225       | TM-NO/WLS/500           |   |
| Radioutstyr for lukkede nett - digital tale og eller data   |  | EN 300 113        | TM-NO/WLS/500           |   |
| Radioutstyr - Maritim UHF On Board  | Radiotekniske egenskaper                 | EN 300 720        | TM-NO/WLS/500           |   |

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**P05 Elektrisk prøving**

| Objekt   | Parameter  | Referansestandard | Intern metode identitet | Merknad                    |
|--|--|-------------------|-------------------------|----------------------------|
| Radioutstyr - lav effekt utstyr 25 - 1000 MHz (RES)                                    |  | EN 300 220        | TM-NO/WLS/500           |                            |
| Privatradioutstyr (CEPT PR 27)   |  | EN 300 135        | TM-NO/WLS/500           |                            |
| Radio equipment - VHF inland water ways  | Radio characteristics  | EN 300 698        | TM-NO/WLS/500           |                            |
| Radioutstyr - Intern personsøking (RES)  |  | EN 300 224        | TM-NO/WLS/500           |                            |
| Maritime VHF radiotelefonisendere og mottakere (RES)                                   |  | EN 300 162        | TM-NO/WLS/500           |                            |
| Radioutstyr for lukkede nett - analog tale og spesifikk respons                        |  | EN 300 219        | TM-NO/WLS/500           |                            |
| Bredbånds Audio Links  | Radiotekniske egenskaper                                     | EN 300 454        | TM-NO/WLS/500           |                            |
| Broadband Radio Access Networks (BRAN); 5 GHz high performance RLAN                    | Radio characteristics  | ETSI EN 301 893   | TM-NO/WLS/500           | Do not include DFS testing |
| Short range devices; Radio equipment to be used in the 1 GHz to 40 GHz frequency range | Radio characteristics  | ETSI EN 300 440   | TM-NO/WLS/500           |                            |
| Radio equipment - Marine VHF - portable  | Radio characteristics  | EN 301 178        | TM-NO/WLS/500           |                            |
| Radio equipment - Cordless audio   | Radio characteristics  | EN 301 357        | TM-NO/WLS/500           |                            |
| Radio equipment - VHF aeronautical mobile service                                      | Radio characteristics  | ETSI EN 300 676-1 | TM-NO/WLS/500           |                            |
| Radio equipment - VHF aeronautical mobile service                                      | Essential requirements of article 3.2 of the R&TTE Directive | ETSI EN 300 676-2 | TM-NO/WLS/500           |                            |
| Radio equipment - VHF maritime mobile service  | Radio characteristics  | ETSI EN 301 929-1 | WLS/406                 |                            |
| Radio equipment - VHF maritime mobile service  | Radio characteristics  | ETSI EN 301 929-2 | WLS/406                 |                            |

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**P06 EMC, Elektromagnetisk kompatibilitet**

| Objekt                              | Parameter   | Referansestandard  | Intern metode identitet        | Merknad  |
|-------------------------------------|---|--------------------|--------------------------------|--|
| Immunitetsprøving                   | Elektrostatisk utladning  | EN 61000-4-2       | TM-NO/EMC/402                  | Includes also standards referring to or based on the reference standard or the international version. International version: IEC 61000-4-2                   |
| Elektrisk og elektronisk utstyr     | Utstråling, radiofrekvent, elektromagnetisk felt-immunitetsprøving            | EN 61000-4-3       | TM-NO/EMC/403                  | 80 MHz - 6,0 GHz. Includes also standards referring to or based on the reference standard or the international version. International version: IEC 61000-4-3 |
| Elektrisk/elektronisk utstyr        | Immunitet mot raske, repeterende transienter                                  | EN 61000-4-4       | TM-NO/EMC/404                  | Includes also standards referring to or based on the reference standard or the international version.  |
| Electrical and electronic equipment | Surge immunity test   | EN 61000-4-5       | TM-NO/EMC/405                  | Includes also standards referring to or based on the reference standard or the international version. International version: IEC 61000-4-5                   |
| Elektrisk og elektronisk utstyr     | Immunitet mot ledningsbundne forstyrrelser, forårsaket av radiofrekvensfelter | EN 61000-4-6       | TM-NO/EMC/406                  | Includes also standards referring to or based on the reference standard or the international version.  |
| Elektrisk og elektronisk utstyr     | Immunity to voltage dips and interruptions                                    | EN 61000-4-11      | TM-NO/EMC/411                  | Includes also standards referring to or based on the reference standard or the international version.  |
| Electrical and electronic equipment | Disturbance voltage AC/DC/ mains port   | EN 55013           | TM-NO/EMC/501                  | Includes also standards referring to or based on the reference standard or the international version CISPR 13  |
| Elektrisk og elektronisk utstyr     | Disturbance voltage AC/DC mains port  | EN 55011           | TM-NO/EMC/501                  | Includes also standards referring to or based on the reference standard or the international version CISPR 11  |
| Elektrisk og elektronisk utstyr     | Disturbance voltage AC/DC mains port  | EN 60945           | TM-NO/EMC/501                  | Includes also standards referring to or based on the reference standard or the international version IEC 60945   |
| Elektrisk og elektronisk utstyr     | Disturbance voltage AC/DC mains port  | FCC CFR 47 Part 15 | TM-NO/EMC/501                  | Includes also standards referring to or based on the reference standard  |
| Elektrisk og elektronisk utstyr     | Radiated disturbance  | EN 55022           | TM-NO/EMC/504                  | Includes also standards referring to or based on the reference standard or the international version. International version: CISPR 22.                       |
| Elektrisk og elektronisk utstyr     | Emissions   | EN 55022           | TM-NO/EMC/509<br>TM-NO/EMC/510 | 30 MHz - 6 GHz, Includes also standards referring to or based on the reference standard or the international version. International version: CISPR 22        |

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**P06 EMC, Elektromagnetisk kompatibilitet**

| Objekt   | Parameter                        | Referansestandard | Intern metode identitet        | Merknad  |
|--|----------------------------------|-------------------|--------------------------------|--|
| Maritime navigation and radiocommunication equipment and systems | Radiated Disturbance             | IEC 60945         | TM-NO/EMC/509                  | 30 - 2000 MHz  |
| Electrical and electronic equipment                              | Radiated disturbance             | CISPR 16-2-3      | TM-NO/EMC/509<br>TM-NO/EMC/510 | 30 MHz - 18 GHz, Includes also standards referring to or based on the reference standard                           |
| Elektrisk og elektronisk utstyr                                  | Harmonic current emission        | EN 61000-3-2      | TM-NO/EMC/511                  | Includes also standards referring to or based on the reference standard or the international version IEC 61000-3-2 |
| Elektrisk og elektronisk utstyr                                  | Voltage fluctuations and flicker | EN 61000-3-3      | TM-NO/EMC/512                  | Includes also standards referring to or based on the reference standard or the international version IEC 61000-3-3 |
| Horeapparater  | EMC                              | IEC 60118-13      | TM-NO/HAC/401                  |  |

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# Technical Construction File

## PRODUCTS:

LineTroll 110 E /LineTroll 110Eµr

NorTroll®

Prepared by: E. BJERKAN  
R&D Manager  
Nortroll AS



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## 2. Product Identification

This technical construction file covers the products identified as follows:

**Brand Name:** LineTroll 110 -

**Models:** 110 Eu  
110 EuR

**Part Numbers:**

| Nortroll part no: | Description:   | Comments: |
|-------------------|--|-----------|
| 1200              | Linetroll 110 E u Controller operated, phase mounted short circuit indicator with LED indication |           |
| 1250              | Linetroll 110 EuR, same as above but with short range radio communication                        |           |
| 04-1200-XX        | Linetroll 110Eu & EuR, same as above but with new lineclamp for line Ø: 5-36mm                   |           |
| 04-1200-11/12     | Same as above, but with sealed lens IP68   |           |

**Manufacturer:** Nortroll AS  
Havnev.17  
P.O. 133  
N-7601 Levanger  
Norway

## 3. Principles of Operation

The Principles of Operation of the Linetroll 110 Eu/EuR is given in the datasheet:  
[\\LT 110Eu\DataSheet\DS LT 110Eu June 2006.pdf](#)

LineTroll 110 Eu/EuR is a microcontroller-based, phase mounted, short circuit indicator for detection of single- or multi-phase overcurrent on MV overhead lines.

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## 4. Design, Manufacture and Quality

### 4.1 Design and Manufacture

The design and manufacture of the product is described in the following documents;

- Schematic circuit:  
H:\Sensorer og Indikatorer for luftlinje\LineTroll 110Eu\Kretsskjema
- Printed Circuit Board layout drawing:  
H:\Sensorer og Indikatorer for luftlinje\LineTroll 110Eu\PCB
- Test Specification:  
*Not yet issued*
- Manufacturing documents including BOMs:  
H:\Sensorer og Indikatorer for luftlinje\LineTroll 110Eu\Produksjon

#### 4.1.1 EMC Critical Components

N/A

#### 4.1.2 Safety Critical Components

N/A

#### 4.1.3 Network Critical Components

N/A

### 4.2 Quality System

The Nortroll AS Quality Management System is in accordance with ISO 9001:2000.

The Quality Manual and associated procedures are partially available on request.

Particular attention should be paid to the implementation the Change Management System and its effect on the contents of this TCF:

*Procedure 5.12 with corresponding form 6.14*

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## 5. Certification to Harmonised Standards

Copies of Conformity Certificates and test reports appear in Appendix A-D of this TCF.

### 5.1 Protection degree of enclosures

|            |   |
|------------|---|
| EN 60529:  | Verification of protection-degree (IP-Ingress Protection *)<br>*) PN: 04-1100 -11/-12 have extended protection degree;<br>IP68 Tested at 15 feet @48hours; ref IEEE 495-4.4.2 |
| IEC 62262: | IK 09 (Impact energy 10Joule) for both Alum. & Plastic clamp  |

### 5.2 Climatic Tests

|                |   |
|----------------|---|
| EN 60068-2-1:  | Low temp.(Cold) - Test Aa; (sudden change) -40°C  |
| EN 60068-2-2:  | Dry Heat - Test Ba; (sudden change) +70°/+85°C Dry heat   |
| EN 60068-2-30: | Damp Heat (Cyclic) – Test Db; +23°C to +55°C 95%RH  |
| EN 60068-2-11: | Salt mist chamber – Test Ka; 168 hours  |
| EN 60068-2-14: | Change of temp. Test Na; (-40° to +55° to + 85°)  |
| EN 60255-21-1: | Vibration (Sinus)   |
| EN 60255-21-2: | Shock & bump  |
| IEEE 495-1986: | Change of temp. Test: 4.4.1; (-40° to +55° to + 85°)<br>Ingress protection: §4.4.2 15 feet @ 48 hours |

### 5.3 Electrical Tests

|                |  |
|----------------|--|
| EN 61000-6-3:  | Emmision (EN 55022)                        |
| EN 61000-6-2:  | Immunity to electrical disturbances        |
| IEC 61000-4-2: | Immunity to electrostatic discharges (ESD) |
| IEC 61000-4-3: | Immunity to electromagnetic fields         |
| IEC 61000-4-8: | Immunity to power frequency fields         |

IEEE 495-1986: Testing Faulted Circuit Indicators

EN 300 440 – 1 V1.3.1 (2001-09)

Electromagnetic compatibility and Radio spectrum Matters (ERM); Short range devices; Radio equipment to be used in the 1 GHz to 40 GHz frequency range; Part 1: Technical characteristics and test methods

LT3100 is tested for EN 300 440 and notified body (NEMKO) has accepted all other products using same reference layout as LT3100. This also applies to LT110 EuR. The testreport for LT3100 is therefore submitted to this TCF as sufficient documentation of fulfilling EN 300 440-1

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## 6 Electrical Safety

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Article 3 of the RTTE directive requires protection of the health and safety of the user and any other person, including the objectives with respect to safety requirements contained in the Low Voltage Directive, 73/23/EEC, but with no voltage limit applying.

This product satisfies the requirements of this clause, as it poses no safety threat.

The Low Voltage Directive 72/23/EEC applies to all apparatus operating on any AC supply between 50 and 1000 Volts or DC supply between 75 and 1000 Volts.

This product is powered by a battery and therefore does not need to meet the requirements of the Low Voltage Directive.

Special requirements apply to handling of Lithium batteries. For further information please see *Material/Product Safety Data Sheet* from Saft Batteries:

[http://www.saftbatteries.com//130-Catalogue/PDF/msds\\_psd\\_s\\_lisoc12\\_en.pdf](http://www.saftbatteries.com//130-Catalogue/PDF/msds_psd_s_lisoc12_en.pdf)

## 7 Product Marking

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In accordance with the requirements of Annex VII to the R&TTE Directive 1999/5/EC and the Electromagnetic Compatibility Directive 89/336/EEC, amended by 92/31/EEC & 93/68/EEC products are **CE** marked.

In accordance with clause 5 of Annex VII of the R&TTE Directive 1999/5/EC, products shall be marked with an equipment class identifier if class 2. This product lies in the category of class 1 (subclass 21) and does therefore not need a class identifier marking.

The product is also marked according to the requirements of 2002/96/EC Waste Electric and Electronic Equipment (WEEE) Directive.

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## Appendix

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- A Declaration of Conformity
- B LT3100 R&TTE Test Report NEMKO/Comlab
- C IEEE 495 Test Report SINTEF
- D EMC Test Report NEMKO
- E Environmental Test Report NEMKO  
Report no: E07283.02 Date: 11.02.2010  
File ref: 141463 rev02 ENV TRF LT110Eur

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# NORTROLL AS

Postboks 133, 7601 Levanger, NORWAY  
Tel: (+47) 7408 5500 Fax: (+47) 7408 5501

## Declaration of Conformity

|   |  |
|---|--|
| <b>Date of Issue:</b>                   | May 18. 2005   |
| <b>Certificate ref:</b>                 | F:\Kvalitetsikring\Samsvarserklæringer\DoC_LT110Eµ.doc   |
| <b>EU Directive:</b>                    | 89/336/EEC Electromagnetic Compatibility Directive,<br>amended by 92/31/EEC & 93/68/EEC  |
| <b>Conforming Product:</b>              | LINETROLL-110E   |
| <b>Company:</b>                         | NORTROLL AS,<br>Postbox 133,<br>Havneveien 17,<br>7600 LEVANGER<br>NORWAY  |
| <b>Harmonised Standards Referenced:</b> | EN 50082-2, March 1995; Generic immunity standard,<br>Part 2: Industrial environment<br><br>EN 50081-1, January 1992; Generic emission standard,<br>Part 1: Residential, commercial and light industry |
| <b>Technical file:</b>                  | DNV Report No. 96-1034, date: 96-04-09 and<br>Norske EMC lab as file: D1294.DOK  |

We hereby declare that the product described above, conforms with the protection requirements of Council Directive 89/336/EEC (the EMC Directive), amended by Council Directives 91/32/EEC and 93/68/EEC.

Signed:

Signatory: Runar Myhre, Man.director

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# Test Report

|   |  |   |
|---|--|---|
| Product   | Programmable fault current indicator   |   |
| Name and address of the applicant   | Nortroll AS<br>Havneveien 6<br>7600 Levanger, NORWAY   |   |
| Name and address of the manufacturer  | Nortroll AS<br>Havneveien 6<br>7600 Levanger, NORWAY   |   |
| Model   | LINETROLL LT110E $\mu$ r   |   |
| Rating  | 3,6V Internal battery  |   |
| Brand name  | -  |   |
| Serial number   | Unnumbered   |   |
| Additional information  | -  |   |
| Tested according to   | EN 61000-6-3 (2001) + A11 (2004)<br>EN 61000-6-2 (2005)  |   |
| Order number  | 80086-1  |   |
| Tested in period  | 2007-01-29 to 2007-02-21   |   |
| Issue date  | 2007-02-27   |   |
| Name and address of the testing laboratory  | <br>P.O. Box 73 Blindern,<br>N-0314 Oslo, Norway  | Telephone<br>(+47) 22 96 03 30<br>Fax<br>(+47) 22 96 05 50  |
|   |  | <br>ACCREDITED REPORT<br>REF. NO. - TEST 033<br>An accredited technical test executed under the Norwegian accreditation scheme |
|   | <div style="border: 1px solid black; padding: 10px; display: flex; justify-content: space-between;"> <div style="width: 45%; text-align: center;"> <br/>                 Prepared by [Jon Fredrik Mo]             </div> <div style="width: 45%; text-align: center;"> <br/>                 Approved by [Roger Berget]             </div> </div> |   |
| This report shall not be reproduced except in full without the written approval of Nemko.<br>Opinions and interpretations expressed within this report are not part of the current accreditation.<br>This report was originally distributed electronically with digital signatures. For more information contact Nemko. |  |   |

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## REVISIONS

| Revision number | Date       | Order # | Description     |
|-----------------|------------|---------|-----------------|
| 1.0             | 2007-02-27 | 80086   | Initial version |
|                 |            |         |                 |
|                 |            |         |                 |

## GENERAL REMARKS

This report applies only to the sample(s) tested. It is the manufacturer's responsibility to assure the additional production units of this product are manufactured with identical electrical and mechanical components. The manufacturer is responsible to the Competent Authorities in Europe for any modifications made to the product, which result in non-compliance to the relevant regulations.

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

Opinions expressed within this report regarding general assessments and qualifications for **PASS** or **FAIL** to the standards limits and requirements, are not part of the current accreditation. Neither is opinions expressed regarding model variants covered by the testing of this report.

## CALIBRATION

All instruments used in the tests given in this test report are calibrated and traceable to national or international standards. Between calibrations all test set-ups are controlled and verified on a regular basis.

The instruments specified in immunity testing are subject to periodic calibration. Monthly controls ensure, with 95% confidence that the instruments remain within the calibrated levels.

## MEASUREMENT UNCERTAINTY

Measurement uncertainties are calculated or considered for all instruments and instrument set-ups used during these tests. Uncertainty figures are found in an appendix to this report.

Further information about measurement uncertainties is provided on request.

## EVALUATION OF RESULTS

If not explicitly stated otherwise in the standard, the test is passed if the measurement value is equal to or below the limit line, regardless of the uncertainty of the measurement. If the measurement value is above the limit line, the test is not passed - ref. IECEE/CTL (Sec) 056/94 (CTL = Committee of Testing Laboratories).

The instrumentation accuracy is within limits agreed by the IECEE/CTL (ref. Nemko proc. P227).



## EQUIPMENT UNDER TEST (EUT)

### SYSTEM DESCRIPTION

The equipment under test is a phase mounted programmable fault current indicator for 6-69kV overhead lines. The indicator indicates earth- and shortcircuit faults.

### MODEL VARIATIONS

The following model variations are considered covered by this report

| VA no. | Variant        | Comment                                       | Investigated |
|--------|----------------|---|--------------|
| 1      | LT110E $\mu$ r |   | Yes          |
| 2      | LT110E $\mu$   | Same as LT110E $\mu$ r, without radiofunction | No           |

Notes: Items that are shaded have been subject to testing documented in this report. Opinions expressed regarding application of test results to variant models are not part of our current accreditation.

### AVAILABLE OPERATING MODES

The equipment can be programmed in several functional operating modes. The following settings have been used during these testing.

Switch setting LT110E $\mu$ r: 0x00 (di/dt sensor, 6A threshold, current start criteria, no CB trip, timer reset 2h)

### ACCESSORIES APPLIED DURING TEST

| AE no. | Description     | Manufacturer | Type                              | Serial no. |
|--------|-----------------|--------------|-----------------------------------|------------|
| 1      | Collector       | Nortroll     | ComTroll 110C Quicklink Collector |            |
| 2      | DC power supply | Delta        |                                   |            |

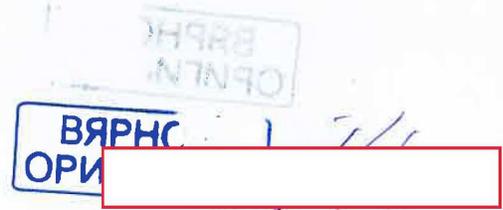
Notes:

### EQUIPMENT MODIFICATIONS

No equipment modifications were required to achieve compliance with the applied standards.

### ADDITIONAL INFORMATION RELATED TO TESTING

No further information.

## GENERAL TEST CONDITIONS

### LOCATION

The following Nemko test facilities have been utilized for the tests documented in this report:

|   |   |  |                                     |
|---|---|--|-------------------------------------|
| ✓ | <b>Gaustad site</b><br>Gaustadalleen 30,<br>N-0314 Oslo, Norway   | Norwegian Accreditation<br>(Identification # TEST 033) |                                     |
| ✓ | <b>Skar site</b><br>Maridalsveien 621,<br>N-0890 Oslo, Norway     | Norwegian Accreditation<br>(Identification # TEST 033) |                                     |
| ✓ | <b>Kjeller site</b><br>Gåsevikkveien 8,<br>N-1300 Kjeller, Norway | Norwegian Accreditation<br>(Identification # TEST 031) | Spurious radiation test<br>in annex |

All Nemko test facilities are accredited by Norsk Akkreditering, according to ISO 17025.

Note: Nemko is a EU Competent/Notified Body for the EMC Directive and the Radio & Telecommunications Terminal Equipment (R&TTE) Directive.

### POWER SUPPLIED TO EUT

Filtered electrical power was available for operation of EuT in all the test sites.

Voltage type: internal DC battery powerd

Grounding: Not grounded

### CLIMATIC CONDITIONS

All tests and measurements were performed in a shielded enclosure or a controlled environment suitable for the tests conducted.

The climatic conditions in the laboratory environment was according to EN 60068-1 (1988) + A1 (1992):

|                      |                                  |
|----------------------|----------------------------------|
| Ambient temperature  | 23°C (EN 60068-1: 15 - 35°C)     |
| Relative humidity    | 45%RH (EN 60068-1: 25 - 75%RH)   |
| Atmospheric pressure | 100kPa (EN 60068-1: 86 - 106kPa) |

Note: The climatic conditions in the test areas are automatically controlled and recorded continuously.

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## EVALUATION OF PERFORMANCE

### FUNCTIONS MONITORED DURING IMMUNITY TESTS

In order to verify acceptable performance by the EuT during the applied tests, the following functions were monitored

| #      | Function              | Monitoring method   |
|--------|-----------------------|---|
| 1      | No false detections   | Visual on the LEDs and readout from communication   |
| 2      | Radiocommunication Tx | LT110Eµr was set to transmit continuously and read by Comtroll 110C.  |
| 3      | Radiocommunication Rx | A test signal was sent from Comtroll 110C, LT110 Eµr receives the signal and transmit back to Comtroll 110C, relays closes. |
| Notes: |                       |   |

### PERFORMANCE CHECKS

The following functional tests were conducted to verify correct performance of the EuT before and after each test.

| #      | Functional test   |
|--------|---|
| 1      | Radiocommunication Rx was checked                                       |
| 2      | Radiocommunication Tx was checked                                       |
| 3      | A check to control the thresholds programmed in the unit was performed. |
| Notes: |   |

### PERFORMANCE CRITERIA

The following performance criteria have been applied during the immunity tests.

| Criteria | General description  | Criteria modified by manufacturer |
|----------|--|-----------------------------------|
| A        | The device shall continue to operate as intended both during and after the test. No degradation of performance or loss of function is allowed below the expected performance level of the device |                                   |
| B        | The device shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below the expected performance level of the device                 |                                   |
| C        | Temporary loss of function during test is allowed, provided the function is self-recoverable or can be restored by the operation of the controls   |                                   |
| Notes:   |  |                                   |

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## SUMMARY OF TESTING

### APPLIED STANDARDS

- » EN 61000-6-3 (2001)  
+ A11 (2004)

*Electromagnetic compatibility (EMC) -- Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments*

- » EN 61000-6-2 (2005)

*Electromagnetic compatibility (EMC) -- Part 6-2: Generic standards - Immunity for industrial environments*

### APPLIED TESTS

| Test items                        | Test methods  | Result |
|-----------------------------------|---|--------|
| Mains Port Disturbance Voltage    | EN 61000-6-3 (2001) + A11 (2004)                    | NA     |
| Signal Port Disturbance Voltage   | EN 61000-6-3 (2001) + A11 (2004)                    | NA     |
| Discontinuous Disturbance Voltage | EN 61000-6-3 (2001) + A11 (2004)                    | NA     |
| Radiated Disturbance (30-1000MHz) | EN 61000-6-3 (2001) + A11 (2004)                    | PASS   |
| Harmonics                         | EN 61000-6-3 (2001) + A11 (2004)                    | NA     |
| Flicker                           | EN 61000-6-3 (2001) + A11 (2004)                    | NA     |
| Electrostatic Discharges          | EN 61000-6-2 (2005)<br>EN 61000-4-2 (2001), Ed.1.2  | PASS   |
| Radiated RF Field                 | EN 61000-6-2 (2005)<br>EN 61000-4-3 (2001), Ed.2.0  | PASS   |
| Electric Fast Transients          | EN 61000-6-2 (2005)<br>EN 61000-4-4 (2001), Ed.1.1  | NA     |
| Surge                             | EN 61000-6-2 (2005)<br>EN 61000-4-5 (2001), Ed.1.1  | NA     |
| Conducted RF Disturbance          | EN 61000-6-2 (2005)<br>EN 61000-4-6 (2003), Ed.2.0  | NA     |
| Power Frequency Magnetic Field    | EN 61000-6-2 (2005)<br>EN 61000-4-8 (2001), Ed.1.1  | PASS   |
| Dips/Interruptions                | EN 61000-6-2 (2005)<br>EN 61000-4-11 (2001), Ed.1.1 | NA     |

Note: An asterisk (\*) placed after the verdict in the Result column indicates test items that are not within Nemko's scope of accreditation.

Note: A grid (#) placed after the verdict in the Result column indicates test items that are only partly covered by Nemko's scope of accreditation. Further information is detailed in the test section.

### DEVIATIONS AND EVALUATIONS

Nemko has not recorded any deviations to the applied standards.

Nemko has made no general evaluations.

# Test Results

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[Redacted Signature]

[Redacted Signature]

## EMISSION – RADIATED DISTURBANCE

### TEST DESCRIPTION

#### Method

CISPR 16-2-3 Ed.1.0 (2003) + A1 (2005) + A2 (2005)

Specification for radio disturbance and immunity measuring apparatus and methods - Part 2-1: Methods of measurement of disturbances and immunity - Radiated disturbance measurements.

#### Set-up

A preliminary test is performed in an anechoic chamber. EuT is connected to filtered mains supply and placed on a wooden table 10 cm (floor-standing) / 80 cm (tabletop) above the floor. The measuring antenna was located 3 meters from EuT.

The final measurements are performed on an open area test site (OATS). EuT is connected to filtered mains supply and placed on a wooden table 10 cm (floor-standing) / 80 cm (tabletop) above the groundplane, in the centre of the turntable. The measuring antenna is located 3 meters from EuT.

#### Procedure

A screening test was first performed to decide the most disturbing operating mode of the EuT, maximizing the cable layout and deciding the proper dwell time for the measurements.

A preliminary test is then run in the anechoic chamber, both for horizontal and vertical polarization of the antenna, and at 0°, 90°, 180° and 270° turntable azimuth (antenna height 100 cm).

The frequency is swept in the range specified under Severity.

A comparison of the levels measured at each measurement positions is then made, and the highest level at each frequency is stored. This "Worst Case" sweep with peak detector is presented in the report.

At the frequencies where the peak values of the emission are exceeding the applicable [limit - offset], the emission is also measured with the quasi-peak detector on the OATS. Cables connected to EuT are fixed to cause maximum emission.

A maximum emitting point for each frequency is found by rotating EuT 360°, and sweep the antenna height between 100 cm and 400 cm.

A quasi-peak detector measurement is then performed at the maximum emitting point. The emission level is calculated in the following matter:  $E_{level} = E_{reading} + E_{antenna} + E_{cable}$

#### Instruments used during measurement

Instrument list:           Antenna: EMCO 3149 (N-4227) (4/07)  
                                  Antenna: EMCO 3143 (N-3641) (7/06)  
                                  EMI Receiver: Rohde&Schwarz ESCS 30 (N-3924) (7/07)  
                                  EMI Receiver: Rohde&Schwarz ESCI 3 (N-4259) (3/07)  
                                  Preamplifier: Amplifier Research LN1000AM3 (N-3884) (3/07)

#### Comments

No recorded comments.

#### Severity

|                  |                   |
|------------------|-------------------|
| Port:            | Enclosure Port    |
| Frequency range: | 30 MHz – 1000 MHz |
| Frequency step:  | 80 kHz            |
| Dwell time:      | 20 mSec           |
| Bandwidth:       | 120 kHz           |
| Meas. distance:  | 10 meter          |

#### Conformity

|                |                |
|----------------|----------------|
| Verdict:       | PASS           |
| Test engineer: | Jon Fredrik Mo |