

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Electrical Measuring and Protection Relay**

with type designation(s)

Uni-line Generator controls

Issued to

**DEIF A/S
SKIVE, Denmark**

is found to comply with

DNV GL rules for classification – Ships, offshore units, and high speed and light craft**Application :****Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.****Location classes:**

| | |
|--------------------|--|
| Temperature | D |
| Humidity | B |
| Vibration | A |
| EMC | A |
| Enclosure | Required protection according to the Rules to be provided upon installation on board. |

This Certificate is valid until **2019-01-09**.Issued at **Høvik** on **2017-01-10**for **DNV GL**DNV GL local station: **Aalborg**Approval Engineer: **Bartosz Kabak**

.....

Odd Magne Nesvåg
Head of Section

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid. The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

Place of system modules manufacture

DEIF A/S

Skive
Denmark

Product description

The uni-line comprising:

| | |
|------------------------------|--|
| RMV-112D/ RMV-122D/ RMV-132D | Voltage relays 3-phase |
| RMV-142D | Voltage relays 1-phase |
| RMC-111D/ RMC-122D | Short circuit/ overcurrent relays |
| RMC-121D | Short circuit current relay |
| RMC-132D | Double over current relay |
| RMC-131D | Differential current relays |
| RMP-111D | Overload relays |
| RMP-112D | Overload/ reverse power relays |
| RMP-121D | Reverse power relays |
| RMQ-111D | Loss of excitation relays |
| RMQ-121D | Over excitation relay |
| RMF-112D | Frequency relays |
| HAS-111DG | Paralleling relay |
| LMR-111D | Loss of mains relays |
| FAS-113DG | Synchronizers |
| FAS-115DG | Synchronizers w/voltage match. (dyn) |
| FAS-125DG | Synchronizers w/voltage match. (stat) |
| LSU-112DG | Load sharing unit |
| LSU-113DG | Load sharing unit (and-P> protectio) |
| LSU-114DG | Load sharing unit (start/stop outputs) |
| LSU-122DG | Var Load sharing unit |
| EPN-110DN | Electronic Potentiometer |
| RMT-111Q96 | Phase sequence indicator/ relay |

Application/Limitation

1. The Type Approval is valid for systems made by production facilities listed under Place of Manufacture
2. The Type Approval covers hardware and basic software listed under Product description

Documentation requirement:

For each delivery where the product is included (typically a switchboard) the following information related to Uni-line Generator controls is to be submitted for approval:

- Reference to this Type Approval Certificate
- System block diagram
- Power supply arrangement (may be part of the System block diagram)
- List of hardware and software modules as identified in this Type Approval Certificate
- List of implemented alarm and protection functions with proposed limits and time delays

Product certificate

As long as the delivered system is covered by this Type Approval, a product certificate according to Pt.4 Ch.9 Sec.1 [1.2.3] is not required. Correct configuration and set up for the delivery to be tested during commissioning after installation onboard.

Software update notification

When the type approved software is revised (affecting all future deliveries) DNV GL is to be informed by forwarding updated software version documentation. If the changes are judged to affect functionality for which rule requirements apply a new functional type test may be required and the certificate may have

Job Id: **262.1-001953-7**
 Certificate No: **TAA0000022**

to be renewed to identify the new software version.

Type Approval documentation

| TYPE | Technincal Specification | Environmental Report |
|------------------------------|--------------------------|----------------------|
| RMV-112D/ RMV-122D/ RMV-132D | 4921240096E | IPG0092 |
| RMV-142D | 4921240128D | IPG0092 |
| RMC-111D/ RMC-122D/RMC-132D | 4921240102D | IPA0274 |
| RMC-121D | 4921240260A | IPG0093 |
| RMC-131D | 4921240104F | IPG0093 |
| RMP-111D | 4921240108E | IPG0094 |
| RMP-112D | 4921240110E | IPG0094 |
| RMP-121D | 4921240106F | IPG0094 |
| RMQ-111D/RMQ-121D | 4921240112D | IPG0094 |
| RMF-112D | 4921240223B | IPG0095 |
| HAS-111DG | 4921240144G | IPG0095 |
| LMR-111D | 4921240214C | IPG0096 |
| FAS-113DG | 4921240114D | IPG0097 |
| FAS-115DG | 4921240116D | IPG0097 |
| FAS-125DG | 491240141D | IPG0097 |
| LSU-112DG | 4921240118D | IPG0098 |
| LSU-113DG | 4921240120F | IPG0098 |
| LSU-114DG | 4921240122D | IPG0098 |
| LSU-122DG | 4921240124D | IPG0098 |
| EPN-110DN | 4921240126E | IPG0099 |
| RMT-111Q96 | 4921240131F | IPG0100 |

Amendments 2004: Due to internal hardware changes, new environmental tests have been carried out according to applicable sections in S.f.C No.2.4 for a representative no. of components in the Uni-line product range. Ref. report no. IPA0175

Quality Manual 4010030001A(UK) sheet 1-7, software controls doc. 4034050007F dated 97-12-18, Type test doc. ref.: \DNV\B980323.1JU dated 1998-01-23.

Amendments 2010:

| Drawing No. | Rev. | Title |
|--------------|------|---|
| 20100305/JST | | HAS111 dead bus options B2 and B3 Type Test (configuration) |
| 240144 | G | data sheet, HAS-111DG paralleling relay |
| 4189340135 | J | Uni-line Customisation manual |
| 4921240130 | N | Uni-line Voltage Relays table of products |

Amendment 2012: Due to internal hardware changes for RMC-111D/ RMC-122D/RMC-132D new environmental tests have been carried out according to applicable sections in S.f.C No.2.4, ref. report no. IPA0274

| Drawing No. | Rev. | Title |
|-------------|------|--|
| 4921240102E | | data sheet, RMC-111D, RMC-122D, RMC-132D |

Amendment 2013:

| Drawing No. | Rev. | Title |
|-------------|------|---|
| n.a. | | data sheet, ANSI code 25 FAS-113DG synchronisers incl. option I (re. sync to dead bus in ABB version) |

Type Approval assement report dated 2016-11-14

Job Id: **262.1-001953-7**
Certificate No: **TAA0000022**

Tests carried out

Applicable tests according to Standard for Certification 2.4 (report Nos. IPA0175 and IPA0274)

Marking of product

Each module shall be externally marked to enable identification in accordance with the documentation and be marked with the manufacturer's name.

Periodical assessment

The scope of the periodical assessment is to verify that the conditions stipulated for the type are complied with, and that no alterations are made to the product design or choice of systems, software versions, components and/or materials.

The main elements of the assessment are:

- Ensure that type approved documentation is available
- Inspection of factory samples, selected at random from the production line (where practicable)
- Review of production and inspection routines, including test records from product sample tests and control routines
- Ensuring that systems, software versions, components and/or materials used comply with type approved documents and/or referenced system, software, component and material specifications
- Review of possible changes in design of systems, software versions, components, materials and/or performance, and make sure that such changes do not affect the type approval given
- Ensuring traceability between manufacturer's product type marking and the type approval certificate

A renewal assessment will be performed at renewal of the certificate.

END OF CERTIFICATE