

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Electrical Control System**

with type designation(s)

Unitrol 1010 (3BHE035301Rxxxx) & Unitrol 1020 (3BHE030579Rxxxx)

Issued to

**ABB Schweiz AG
Turgi, AG, Switzerland**

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.****Temperature C****Humidity B****Vibration B****EMC A****Enclosure Required protection according to relevant rules shall be provided upon installation on board**Issued at **Hamburg** on **2019-05-02**This Certificate is valid until **2023-12-03**.for **DNV GL**DNV GL local station: **Augsburg**Approval Engineer: **Jens Dietrich****Joannis Papanuskas
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.



Product description

Compact voltage regulator for synchronous machines (AVR)

-Excitation Input (AC/DC).

AC: 0..250 V, max. 300 V, 40..600Hz

DC: 0..300V.

-Auxiliary Power Supply Input (AC/DC)

3-ph AC nominal voltage: 9..250 VAC

1-ph AC nominal voltage: 16..250 VAC

DC nominal voltage (min/max): 18..300 VDC

-Excitation Output – Maximum Ratings:

UNITROL 1010: Continuous current at 55 °C: 10 A, max. 20A (10s)

UNITROL 1020: Continuous current at 55 °C: 20 A, max. 38A (10s)

3 Analog Inputs, 2 Analog Outputs: +/-10V; 4 Digital Inputs, 0..28V;

8 Digital In-/Outputs, 0..28VDC (configurable)

Communication Interfaces: Ethernet 10/100MBit/s

CAN 500 kBit/s, max cable length 30m; RS-485 max. cable length 500m

Keyboard and Panel Display (UNITROL 1020).

SW-version: 6

Application/Limitation

The Type Approval covers hardware and software listed under Product description.

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 to be renewed to identify the new software version.

Clause for application software control.

All changes in software are to be recorded as long as the system is in use on board. The records of all changes are to be forwarded to DNV GL for evaluation and approval.

Major changes in the software are to be approved before being installed in the computer.

A Certification of Application Functions may be required for the particular vessel.

Compliance with the requirements given in DNV GL Pt.4 Ch.8 is to be checked for the respective application. For voltage regulation of the vessel's power plant given in Pt.4 Ch.8 Sec.5, and, for vessels with electric propulsion, the requirements for preventing one defective voltage regulator from tripping the complete power plant given in Pt.4 Ch.8 Sec.12, 1.5 must be ensured and as far as possible it must be possible to verify that compliance by review of power system documentation.

In case of use of the optional SYNC function the compliance with requirements given in DNV GL Pt.4 Ch.8 Sec.2 are to be checked. UNITROL 1000 Application Notes are to be observed.

Testing onboard should be limited to confirming compliance already verified by design review.

Applicable electrical type tests/product certification must be performed with the actual generator case by case (see DNV GL Pt.4 Ch.8 Sec.1).

Tests carried out

Applicable tests according to DNV GL CG-0339, November-2016.

Type tests in accordance with DNV GL Rules Pt.4 Ch.8 Sec.5, voltage regulation test short circuit test.

Marking of product

ABB Switzerland Ltd, UNITROL-1010 or UNITROL-1020, Part Number, Software Version, Year of Production.

Periodical assessment

Job Id: **262.1-010370-3**
Certificate No: **TAA00002B4**

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

Periodical assessment is to be performed after 2 years and after 3.5 years. A renewal assessment will be performed at renewal of the certificate.

END OF CERTIFICATE