

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Generator Automation System**

with type designation(s)
**GC2000 Generator Controller,
GC2000 Generator Controller BASE,
GC2100 Generator Controller BASE MASTER,
UI2000 User Interface,
UI2100 User Interface MASTER**

Issued to

**SELCO ApS
Roskilde, 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	B
Humidity	B
Vibration	A
EMC	A
Enclosure	Required protection according to DNV GL Rules shall be provided upon installation on board

Issued at **Høvik** on **2018-10-11**This Certificate is valid until **2020-10-10**.DNV GL local station: **Copenhagen**Approval Engineer: **Bartosz Kabak**for **DNV GL**

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**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.



Product description

Generator protection and control units:

SELCO PRODUCT NAME	SELCO PART NO#	Software rev.
GC2000 Generator Controller	GC2000.0100	5.03
GC2000 Generator Controller BASE	GC2000.0050	5.03
GC2100 Generator Controller BASE MASTER	GC2100.0050	5.03
UI2000 User Interface	UI2000.0010	5.01
UI2100 User Interface MASTER	UI2100.0010	5.01

System of up to 16 units linked by CAN bus to perform load dependent start/stop, dead bus recovery, active load sharing (droop or isochronous), reactive load sharing (droop or isochronous), auto-synchronising, trip of non-essential consumers, heavy consumer control, etc.

The following alarm, control and protection functions as defined by ANSI are available:

ANSI no.	Function / description
27/59	Under/Over voltage
32P/32Q	Active/Reactive reverse power
51/51N	Current overload / Neutral current overload
81L/81H	Under/Over frequency

Electrical ratings:

Main Power supply: 100V – 480V AC / 1A / 5A – 50/60 Hz
Aux Power supply: 24V DC (8-35V)

Place of manufacture

STAYMATEL
Pôle d'Excellence Jean-louis,
Lot 26, 309, Via Nova
83600 FREJUS, France

Approval conditions

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.

Case-by-case

For each delivery where the product is included (typically a switchboard) the following information related to the GC2000/2100 system 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)
- Functional description, covering all functions of the switchboard
- List of implemented alarm and protection functions (ref. the ANSI lists above) with proposed limits and time delays
- Test program for test at the product manufacturer or the switchboard maker

Product certificate

Each delivery of the application system is to be certified according to Pt.4 Ch.9 Sec.1. The certification test is to be performed before the system is shipped to the yard, that is, at the manufacturer of the application system or at the switchboard manufacturer if agreed and adequate system competence and test facilities are available here. If certified together with the switchboard a combined control system and switchboard certificate may be issued. The certificate must identify this Type Approval Certificate plus

the firmware by versions and date. After the certification the clause for application software control will be in force:

Clause for application software control

All changes in software and parameter settings 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.

Application/Limitation

Bustie breaker control and monitoring

Control and monitoring of bustie breakers is not a standard feature of this product. However an application specific code (PLC equations) is available at SELCO to control and monitor the bustie breakers. The change remains in same software increment and is considered as part of project specific configuration.

Generator Instrumentation

Additional instruments may be required to be fitted in the switchboard, ref. DNV GL Rules Pt.4 Ch.8 Sec.2 [8.2.5].

Overspeed protection

Rule requirements for separate prime mover safety functions (e.g. diesel engine overspeed protection) are to be verified in each case.

Power Management functions

For a specific vessel the Rules may require additional power management functions than those available as standard features of this product, ref. Pt.4 Ch.8 Sec.12 [1.6.2] for electric propulsion vessels and Pt.6 Ch.3 Sec.1 [8.4] for DYNPOS vessels. For DYNPOS(AUTR) and DYNPOS(AUTRO) notations it is required that PMS is designed as a redundant system following vessel DP redundancy intent.

For high speed vessels category B (ref. Pt.4 Ch.8 Sec.2 [6]) the system must be configured so as to ensure that the power management functions are active for each busbar section when the bustie breaker is open. Also, the communication network between units for one busbar section must not be affected by a defective communication network for the other busbar section.

Type Approval documentation

Tests carried out

Applicable tests according to Standard for certification 2.4 April 2006.

Applicable tests according to IEC 60255.

Function test of a representative three-generator system conducted at manufacturer on 2009-03-10.

Function test of a representative three-generator system conducted at manufacturer on 2011-07-17.

Marking of product

The products to be marked with:

- manufacturer name
- model name
- serial number
- power supply ratings

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)

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- 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