



TYPE APPROVAL CERTIFICATE

Certificate No:
TAA0000214
Revision No:
1

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, Sjælland, Denmark

is found to comply with

DNV 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.

Location classes:

Temperature	B
Humidity	B
Vibration	A
EMC	A
Enclosure	Required protection according to DNV Rules shall be provided upon installation on board

Issued at **Høvik** on **2022-06-01**

for **DNV**

This Certificate is valid until **2023-10-10**.

DNV local station: **Denmark CMC**

Approval Engineer: **Bartosz Kabak**

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Jan Tore Grimsrud
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.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.



Form code: TA 251

Revision: 2021-03

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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 Production
 Lot 23, 1108 Avenue des Lions
 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 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 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 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

Drawing No.	Rev.	DNV No.	Title
--	2018-06	7	GC2000 Generator Controller (data sheet)
--	A	8	GC2000-Generator-Controller_web (data sheet)
--	2018-04-19	9	GC2000 Generator Controller Manual

Reference: NPS project 262.1-000953:

- GENSYS BLUE Data sheet
- Generator Management module, Technical Documentation Z090004-I, January 2006
- List of predefined variables, software versions, etc. A40 Z 0 90030-I Variables.xls
- GENSYS Help File A40Z090014-F.chm
- DNV Functional test proposal.doc dated 18/01/2009
- Parameter set and logic for GENSYS module 2, time tagged Mar 09 2009 10:39:56
- GYL Technologies, No.263103-SE-1-a, Test Report Gensys measurements and protections According to client technical document A40Z1-Protections_60255

Environmental test reports:

- DSF, No. 04030002, LR8 power supply variation test, dated April 8, 2003
- LCIE, No.39530010, Climatic and mechanical tests, dated 30 August 2002
- LCIE, No.39530020, EMC tests, dated April 16, 2002
- GYL technologies, No.263103-EB-1-a, Temperature class B, dated December 16, 2008
- GYL technologies, No. 263103-DB-1-a, EMC test report, dated 19 January 2009

Extension with GENSYS 2.0 e.a. in December 2011:

Drawing No.	Rev.	DNV No.	Title
A53 Z0 9 0020	E	10025	GENSYS 2.0 Generator management module Technical Documentation
A53Z0	4	10026	GENSYS 2.0 leaflet
A54Z0	4	10027	MASTER 2.0 leaflet
A53Y0		10028	RDM 2.0 leaflet
	12 07 2011	10016	CRE Technology, DNV FUNCTIONAL TEST
	17 07 2011	10015	CRE Technology, DNV FUNCTIONAL TEST (Complementary report)
263104-ED-1-a	09 05 2011	10020	GYL Technologies, Mechanical Type Test report, GENSYS 2.0
263105-ED-1-a	11 05 2011	10021	GYL Technologies, Mechanical Type Test report, RDM 2.0
263106-ED-1-a	13 05 2011	10022	GYL Technologies, Mechanical Type Test report, GENSYS 2.0 CORE
263108-ED-1-a	26 10 2011	10023	GYL Technologies, Environmental Type Test report, GENSYS 2.0, GENSYS 2.0 CORE and RDM 2.0
62118102	06 11 2008	10024	THALES, EMC/EMI Type test report, GENSYS 2.0

R10-015-EC	12 05 2010	10018	Centrale Marseille, EMC Type test report, MASTER/GENSY2.0
R10-015A-EC	24 06 2010	10017	Centrale Marseille, EMC Type test report, MASTER/GENSY2.0 (Complementary report on the surge immunity test)
R11-016-EC	20 06 2010	10019	Centrale Marseille, EMC Type test report, RDM 2.0
R12-011-EC	20-21 06 2012	10031	EMC test report - RDM 2.0 A53Y3 (addition to the R11-016-EC tests)
R12-012-EC	20-21 06 2012	10029	EMC test report - Gensys 2.0 A53Z3 (addition to the 62118102 tests)
R12-019-EC	12 07 2012	10032	EMC test report - RDM 2.0 A53Y3 (emissions 150k-30MHz, addition to the R11-016-EC tests and the additional tests R12-011-EC)
R12-020-EC	12 07 2012	10030	EMC test report - Gensys 2.0 A53Z3 (emissions 150k-30MHz, completes the 62118102 tests)
1002/2021	1.0	10	EMC test report - Gensys 2.0 Marine A53Z3-J (immunity 2000-6000 MHz)
1027/2021	1.0	11	EMC test report - Gensys 2.0 Marine A53Z3-J (emission 1000-6000 MHz)

SW update notes:

No	Title
FME2120	RDM 2.0 v4.66a1
FME2133	GENSY2.0 v4.66a3
FME2135	GENSY2.0 v4.66a5
FME2142	GENSY2.0 v4.77
FME2145	GENSY2.0 v4.77a1
FME2146	GENSY2.0 v5.00
FME2148	RDM 2.0 v5.00
FME2151	GENSY2.0 v5.00a1
FME2152	RDM 2.0 v5.00a1
FME2155	GENSY2.0 v5.00a2
FME2166	GENSY2.0 v5.01
FME2170	RDM 2.0 v5.01
FME2177	GENSY2.0 v5.02
FME2178	GENSY2.0 v5.03
FME2184	GENSY2.0 v5.03a1
FME2201	RDM 2.0 v5.04 / GENSY2.0 v5.04 + client specific variants 5.04d1 and 5.04m1
FME2203	GENSY2.0 v5.05
FME2210	GENSY2.0 v5.05a1
RD0004	RDM 2.0 v5.05

TA assessment report by DNV Marseille dated 2020-09-16
 TA assessment report by Denmark CMC dated 2021-05-11

Tests carried out

Applicable tests according to class guideline DNV-CG-0339, August 2021.
 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)
- 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