

# GENSYS MARINE



## All-in-one paralleling unit for marine applications : PMS

- Compact “all in one” module
- Fully compatible with all speed governors and AVR
- 4 serial ports: RS232, RS485, CAN bus protocol
- Large, multi-function graphic screen
- Internal logic sequences, programmable by equations
- Predefined sequences dedicated to marine applications
- Embedded web site
- BV, LR and DNV Marine certifications



REGISTERED

CLASSIFICATION



DNV

Lloyd's Register

The GENSYS Marine controller is a microprocessor based unit dedicated to marine genset control panels.

This “all in one” module combines all necessary features such as:

- Engine start/stop, control and protections
- Generator control and protections
- Mechanical parameters display
- Electrical parameters display
- Breaker control
- Tie breaker control
- Speed governor: analog or pulse output
- AVR: analog or pulse output
- Synchronization with others generators
- Synchronization with shore
- Isochronous load sharing/de-drooping
- KW load sharing and control by CAN bus
- Kvar load sharing and control by CAN bus
- KW and kvar Load/Unload management
- Electronic engines compatible
- Start on fault
- Heavy consumer management
- Non essential load tripping
- Load/Unload management for power optimization

The GENSYS Marine controller is configurable via its front panel or via a PC without additional software.

The GENSYS Marine controller also has analog load sharing lines and is compatible with all types of analog load sharing modules.

### PROGRAMMING BY EQUATIONS

The GENSYS Marine controller is a real PLC unit where equations and sequences can be programmed directly by the user without any additional software. The programming is written with basic text editor software.

### INPUTS / OUTPUTS WITH NO LIMITS

The number of input/outputs that can be added is one of the most important on the market. Extension modules (DIN rail mounting) can be added on the CAN bus. You can add both digital and analog inputs/outputs.

### AVAILABLE OPTIONS

- Shore paralleling (1 generator)
- Watchdog output on demand
- CAT/Perkins PWM 500 Hz

## HEAVY CONSUMER MANAGEMENT AND NON ESSENTIAL LOAD TRIPPING

These functions are used in marine applications such as using a crane in a harbour, manoeuvring a ship in/out of harbour using bow thrusters, etc.

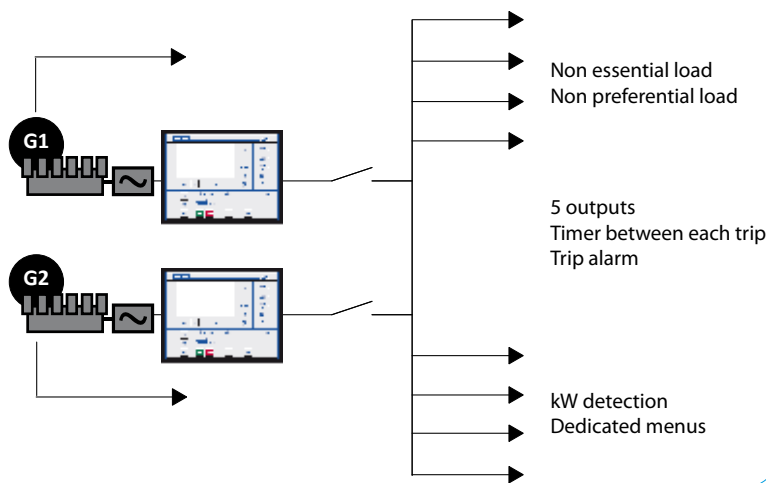
### Heavy consumer Management

Certain external parameters must be analysed by the GENSYS Marine units before accepting heavy consumer load:

- If the Power Plant can accept the load, each GENSYS Marine accepts load.
- If the Power Plant cannot accept the load, another engine is started.
- Analysis of available kW, number of generators on Busbar, or both.

### Non essential load tripping

If the generator reaches the overload or under frequency threshold, the GENSYS Marine triggers outputs to trip non essential loads.



### TIE BREAKER MANAGEMENT

The inter-unit bus allows tie breaker management and synchronisation between port and starboard bus bars. The GENSYS Marine has also an inter-unit CAN bus port for information transfer (dead busbar management, static paralleling, kW and kvar load sharing...).

The inter-unit bus allows more information exchanges between modules and reduces the wiring and the number of I/O used on each module.

### APPLICATIONS

- Synchronization and power management system module (without engine control).
- 1 generator in change over mode with shore.
- Generators in parallel and change over with shore.
- Generators in parallel and paralleled with shore for load transfer.
- Generators in parallel with tie breaker management.

### CRE TECHNOLOGY SERVICES

Like every CRE Technology product, the unit also benefits from our technical support. All CRE products are delivered with one year warranty, and if necessary we will be happy to come on site for product commissioning or troubleshooting.

CRE Technology and their distributors can also provide pre-programmed GENSYS Marine according to customer requirements.

The company offers specific trainings to control the large GENSYS Marine applications and program the module.

### FEATURES

- Manual, semi-automatic and automatic engine control.
- Engine parameters display: oil pressure, water temperature, speed, hours run meter...
- Generator electrical parameters display:
  - Phase-phase voltage (3 phase RMS)
  - Phase-neutral voltage (3 phase RMS)
  - Current (3 phase RMS)
  - Frequency
  - Active power (3 phase + total)
  - Reactive power (3 phase + total)
  - Power factor (3 phase + total)
  - Active power energy (kWh)
  - Reactive power energy (kvarh)
- Shore electrical parameters display (option):
  - Phase-phase voltage (1 phase)
  - Current (1 phase)
  - Frequency
  - Active power
  - Reactive power
  - Power factor
  - Import active power energy (kWh)
  - Import reactive power energy (kvarh)
- Manual and automatic frequency and phase synchronization (differential frequency meter + synchroscope available on screen).
- Manual and automatic voltage synchronization (differential voltmeter available on screen). Isochronous kW load sharing control (by CAN bus serial port, up to 14 generators)
- Constant voltage kvar load sharing control (by CAN bus serial port, up to 16 generators)
- Frequency centre / de-drooping function
- Dead busbar management.
- Generator electrical protections: <F, >F, <U, >U, >I, >In, >P, <-P, >Q, <Q, <-Q
- Shore electrical protections (option) : <F, >F, <U, >U, >P, <P, <-P, >Q, <Q, <-Q, phase shift, df/dt.
- The last 20 alarms and last 20 shutdowns are recorded with time and hour.
- Automatic start/stop control depending on load demand.
- Help request on fault function.
- Broadcast data inter GENSYS:
  - Each GENSYS can send via CAN bus: 2 analog and 10 digital values.
- Tie breaker synchronisation via the CAN bus.
- Read and write Modbus functions (from 3 to 6 functions).
- Up to 128 additional input and 64 output via remote I/O.

# GENSYS MARINE



## CHARACTERISTICS

### Current, voltage and frequency

- DC voltage power supply input: 8 to 35VDC, 600mA at 12VDC and 300mA at 24VDC.
- AC voltage inputs: 100 to 480VAC, 100mA max. Neutral terminal does not need to be connected.
- AC current inputs: 0 to 5A, 1VA. Each phase is isolated from the others.
- AC current overload: 15A during 10s.
- Frequency measurement: 45 to 70 Hz – 15VAC minimum between phase and neutral.
- Magnetic pick up input: 100 to 10.000Hz, 2VAC minimum.
- Digital inputs: NO or NC to ground.
- Emergency stop input: Normally closed, 24V.
- Relay outputs (crank and fuel): 5A. The 24V is provided via the emergency push button.
- Relay outputs (breakers): 5A, 230VAC max. NO + NC available.
- Transistor outputs: 350mA, over-current protected.

### Inputs and outputs

- Analog inputs (oil pressure and water temperature): 0 to 400 ohms. Calibration is configurable.
- Analog inputs (spare 1 and spare 2): 0 to 10KOhms. Calibration is configurable.
- Analog input (+/-20mA or +/-10V): 50 Ohms (current) or 20KOhms (voltage).
- Analog load sharing line: 0 to 3VDC (5Vmax).
- Speed control signal: The speed and frequency control is made either by a +/-10VDC output with adjustable span and offset or by speed+/speed- contacts.
- Voltage control signal: The voltage control (AVR) is made either by a +/-10VDC output with adjustable span and offset or by voltage+/voltage - contacts.

### Ports

- RS232 for PC connection – female Sub-D 9 pins.
- RS485 for Modbus RTU (read and write) – male Sub-D 9 pins.
- CAN bus inter-GENSYS connection – male Sub-D 9 pins.
- CAN bus dedicated to options J1939, I/O extensions: male Sub-D 9 pins.

### Environment

- Operating temperature: 0°C to +55°C
- Storage temperature: -30 to +70°C
- Humidity: 5 to 95%. Tropic-proof circuits for normal operation in humid conditions. Front panel: IP54 protection. Rear panel: IP20 protection.
- Altitude: 2000m

### Size and weight

- Size: 248x197x57mm (9.76x7.76x2.24in)
- Weight: 1.9kg (4.2lb)
- Panel cut out: 177x228mm (6.97x8.98in)
- Mounting: will function in any position, but the visibility of the display should be taken into account.

### Certifications

- European Union Directives: EN 50081-2, EN 50082-2, 73/23EEC
- BV, LR and DNV Marine certifications

### Other

- LCD characteristics: 114x64mm, 60 cd/m<sup>2</sup> backlight, 3 character sizes.
- Terminals: 2 piece connectors, 2,5mm<sup>2</sup>.
- Languages: English, Spanish, French, German, Dutch, Italian

#### PART NUMBER

A40Z1-M121

#### SOFTWARE

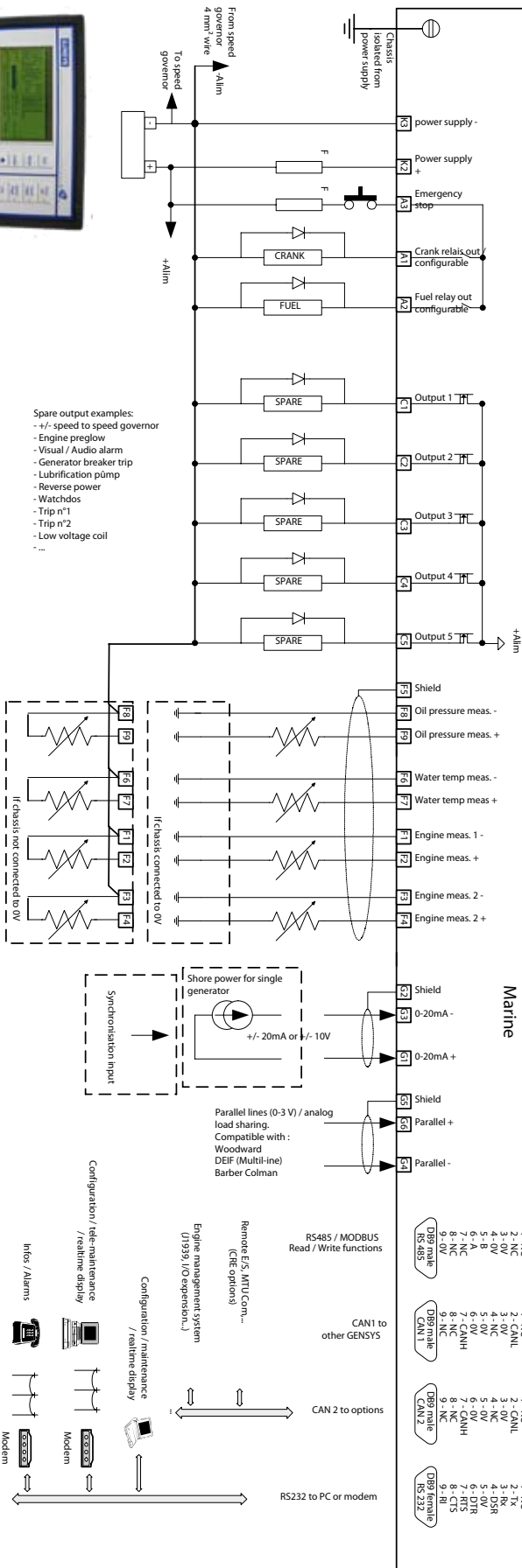
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#### CABLE

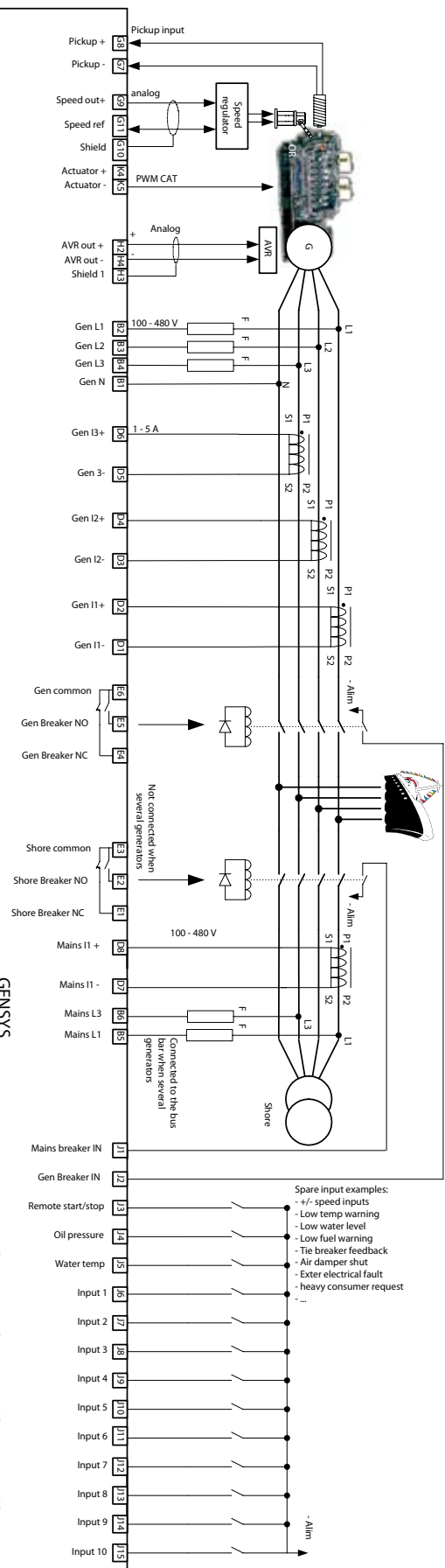
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#### ASSOCIATED PRODUCT

Upgrade: GENSYS 2.0 Marine  
Complementary: BSM II



- Spare output examples:**
- +/- speed to speed governor
  - Engine preglow
  - Visual / Audio alarm
  - Generator breaker trip
  - Lubrification pump
  - Reverse power
  - Watchdos
  - Trip n°1
  - Trip n°2
  - Low voltage coil
  - ...



**Wiring Gensys Marine A40Z1**

Terminal	Function	Notes
S8	Pickup +	
S7	Pickup -	
S9	Speed out+	
S11	Speed ref	
S10	Speed ref	
S12	Shield	
S15	Actuator +	
S16	Actuator -	
S19	AVR out +	
S20	AVR out -	
S23	Shield 1	
S25	Gen L1	
S26	Gen L2	
S27	Gen L3	
S28	Gen N	
S31	Gen I3+	
S32	Gen 3-	
S33	Gen I2+	
S34	Gen I2-	
S35	Gen I1+	
S36	Gen I1-	
S45	Gen common	
S46	Gen Breaker NO	
S47	Gen Breaker NC	
S51	Shore common	
S52	Shore Breaker NO	
S53	Shore Breaker NC	
S55	Mains I1+	
S56	Mains I1-	
S59	Mains L3	
S60	Mains L1	
S65	Mains breaker IN	
S66	Gen Breaker IN	
S69	Remote start/stop	
S70	Remote start/stop	
S71	Oil pressure	
S72	Oil pressure	
S73	Water temp	
S74	Water temp	
S75	Input 1	
S76	Input 2	
S77	Input 3	
S78	Input 4	
S79	Input 5	
S80	Input 6	
S81	Input 7	
S82	Input 8	
S83	Input 9	
S84	Input 10	