

# GENSYS 2.0



## All-in-one genset control and paralleling unit with integrated PLC

- Compact “all-in-one” module
- I/O flexibility
- Internal logic sequences, programmable by equations and the Easy PLC software
- New multi-function graphic display
- Isolated serial ports: RS485, 2 CAN bus,
- SD card reader, Ethernet
- J1939 communications with electronic engines
- Fully compatible with all speed governors and AVR



**The GENSYS 2.0 is a control unit designed for generator electrical panels.**

**This “all-in-one” unit combines all necessary functions:**

- Three phases mains failure
- Engine start/stop and protections
- Alternator control and protections
- Mechanical parameters display
- Electrical parameters display
- Genset synchronization
- Load sharing and kW control
- Load sharing and kVAR control

**GENSYS 2.0 is configurable via its front panel or via a PC with CRE Config software. It has an embedded Web site which is password protected.**

**The GENSYS 2.0 controller has analog load sharing lines and is compatible with most of the types of analog load sharing modules.**

### PROGRAMMING BY EQUATIONS

The GENSYS 2.0 controller is a real PLC unit where equations and sequences can be programmed directly by the user with text editor software or Easy PLC software.

### INPUTS / OUTPUTS WITH NO LIMIT

The number of inputs/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. This extends a large number and a large diversity of inputs/outputs up to 128 digital inputs, 64 digital outputs, 44 analog inputs, 32 analog outputs and CANopen standard module.

### MINIMUM OPTIONS

The GENSYS 2.0 is offered with a minimum of options to fit all types of application without expensive add-on packages. The standard GENSYS 2.0 unit is recommended for all types of power plant, from 1 to 32 generators.

For specific needs, the following options are available :

- Mains paralleling
- Phase shift compensation (ie: Dyn11)
- External start module management

### INTER-UNIT ISOLATED CAN BUS

The GENSYS 2.0 features an isolated CANbus dedicated to inter-module communication (dead busbar management, static paralleling, kW and kVAR load sharing...). CANbus technology provides high reliability communication while maintaining low wiring cost and complexity.

added  
value

### EQUATIONS : Embed your knowledge!

GENSYS 2.0 integrates a real PLC unit in which user equations and sequences can be written using a simple text editor or graphically designed using the Easy PLC software.

## STATIC PARALLELING (Black start synchronization)

In less than 10 seconds, your power plant in standby mode starts all the gensets and fully synchronizes them, meanwhile the breakers are closing on the bus bars.

### Fast response time for heavy load requests.

Static paralleling can be necessary for large electric motor or turbine starting. It is also very useful when loads cannot be shed, in hospitals or heavy industries. In less sensitive industries, a smaller UPS can be used, reducing investment and maintenance costs, without extra investment on the genset power plant side.

### Progressive magnetization of the step-up transformers.

The transformer is magnetized with a low voltage before receiving the genset power. Your power plant benefits from important cost gains (cable, transformer consumption) and better efficiency (quick power plant availability, more stable power...).

CRE Technology is familiar with this specification which is included as standard in the GENSYS 2.0.



## COMPATIBILITY

Thanks to its versatile connectivity the GENSYS family is compatible with peripheral devices:

- Electronic engines: CAN bus J1939/ MTU MDEC
- Speed governors:  $\pm 10 V_{DC}$ /Pulse/ PWM 500Hz
- AVR: 0-10 k $\Omega$ /Pulse
- PLC/HMI: Modbus RTU RS485/ Modbus TCP Ethernet
- Power transducers: 4-20mA
- I/O extensions: CANopen
- Mains: CAN inter-GENSYS
- Analog load sharers

## APPLICATIONS

- Turbo-alternator
- Synchronization and power management module (without engine control).
- 1 generator in change over mode with mains.
- 1 generator in parallel with mains: Base load or Peak shaving.
- 2 to 32 gensets in parallel and change over with mains.
- 2 to 32 gensets in parallel and paralleled with mains for load transfer. In this case, the MASTER 2.0 is used for mains paralleling via CAN bus.
- Static paralleling
- Tie breaker management.

## GENSETS WITH MAINS

When several generators are paralleled with mains, the MASTER 2.0 is used (using CAN bus communication) for:

- Three phase mains failure
- Paralleled gensets with several mains control
- Electrical protection for power plant and mains
- Electrical parameters display for power plant and mains
- Manual and automatic paralleling with mains (frequency, phase and voltage)
- Power factor control when paralleling with mains.
- kW power management with several modes:
  - No break change over with load transfer
  - Permanent paralleling in base load
  - Permanent paralleling in peak shaving mode (export/import)

# GENSYS 2.0



## FEATURES

### Control and management

- Manual and automatic engine control.
- J1939 compatibility (Cummins, Volvo, Scania, MTU, CAT...)
- Automatic start/stop control depending on load demand.
- Dead busbar management.
- Isochronous or droop kW load sharing control (via CAN bus, up to 32 generators)
- Constant voltage or droop kVAR load sharing control (via CAN bus, up to 32 generators)
- Power factor control when paralleling with mains.
- kW control (base load or peak shaving) when paralleling with mains.

### Protections

- Generator electrical protections: <F, >F, <U, >U, >I, >In, >P, <P, <-P, >Q, <Q, <-Q
- Mains electrical protections (option) : <F, >F, <U, >U, >P, <P, <-P, >Q, <Q, <-Q, phase shift, df/dt.
- Phase sequence protection, phase shift compensation.

### Synchronization

- Manual and automatic frequency and phase synchronization (differential frequency meter + synchroscope available on screen).
- Manual and automatic voltage synchronization (differential voltmeter available on screen).

### Information display

- Engine parameters display: oil pressure, water temp, speed, hours run meter (5 programmable information pages)
- 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)
- Mains electrical parameters display:
  - Phase-phase Voltage (3 phase RMS)
  - Current (3 phase)
  - Frequency
  - Active power
  - Reactive power
  - Power factor
  - Import active power energy (kWh)
  - Import reactive power energy (kVARh)

### Alarms and events

- The last 50 alarms and last 50 faults are recorded in non volatile memory.
- Data logging.

### Other

- "Watchdog" digital output for microprocessor life signal.

## CHARACTERISTICS

### Current, voltage and frequency

- DC voltage power supply input: 8 to 40V<sub>DC</sub>, 750mA at 12V<sub>DC</sub> and 400mA at 24V<sub>DC</sub>
- AC voltage inputs: 100 to 480V<sub>AC</sub>, 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 – 15V<sub>AC</sub> minimum between phase and neutral.
- Voltage control signal: The voltage control (AVR) is made either by a +/-10V<sub>DC</sub> output with adjustable span and offset or by voltage+ / voltage- contacts.

### Environment

- Operating temperature: -20 to +70°C
- Storage temperature: -30 to +80°C
- Humidity: 5 to 95%. Tropic-proof circuits for normal operation in humid conditions.
- IP65 : front panel / IP20 : rear panel

### Inputs, outputs

- Digital inputs: NO or NC to ground.
- Emergency stop input: Normally Closed 24V.
- Relay outputs (crank and fuel): 5A. The 24V is provided through the emergency push button.
- Relay outputs (breakers): 5A, 230V<sub>AC</sub> max. NO + NC available.
- Transistor outputs: 350mA, over-current protected.
- Analog inputs (oil pressure and water temp): 0 to 400 Ω. Calibration is configurable.
- Analog inputs (spare 1 and spare 2): 0 to 10 kΩ.
- Calibration for speed and frequency control, either by a +/-10V<sub>DC</sub> output with adjustable span and offset or by speed+ / speed- contacts.
- Magnetic pick up input: 100 to 10kHz, 2V<sub>AC</sub> minimum.
- PWM output for CAT and Perkins engines

### Ports

- Isolated serial ports are available:
  - RS485 for Modbus RTU (read and write) / male Sub-D 9 pins 120 Ω resistors selected by micro-switch.
  - CAN bus for inter-GENSYS / MASTER 2.0 connection: male Sub-D 9 pins 120 Ω resistors selected by micro-switch
  - CAN bus dedicated to options J1939, I/O extensions: male Sub-D 9 pins 120 Ω resistors selected by micro-switch
  - Ethernet: PC communication / Modbus TCP
  - SD card reader

### Size and weigh

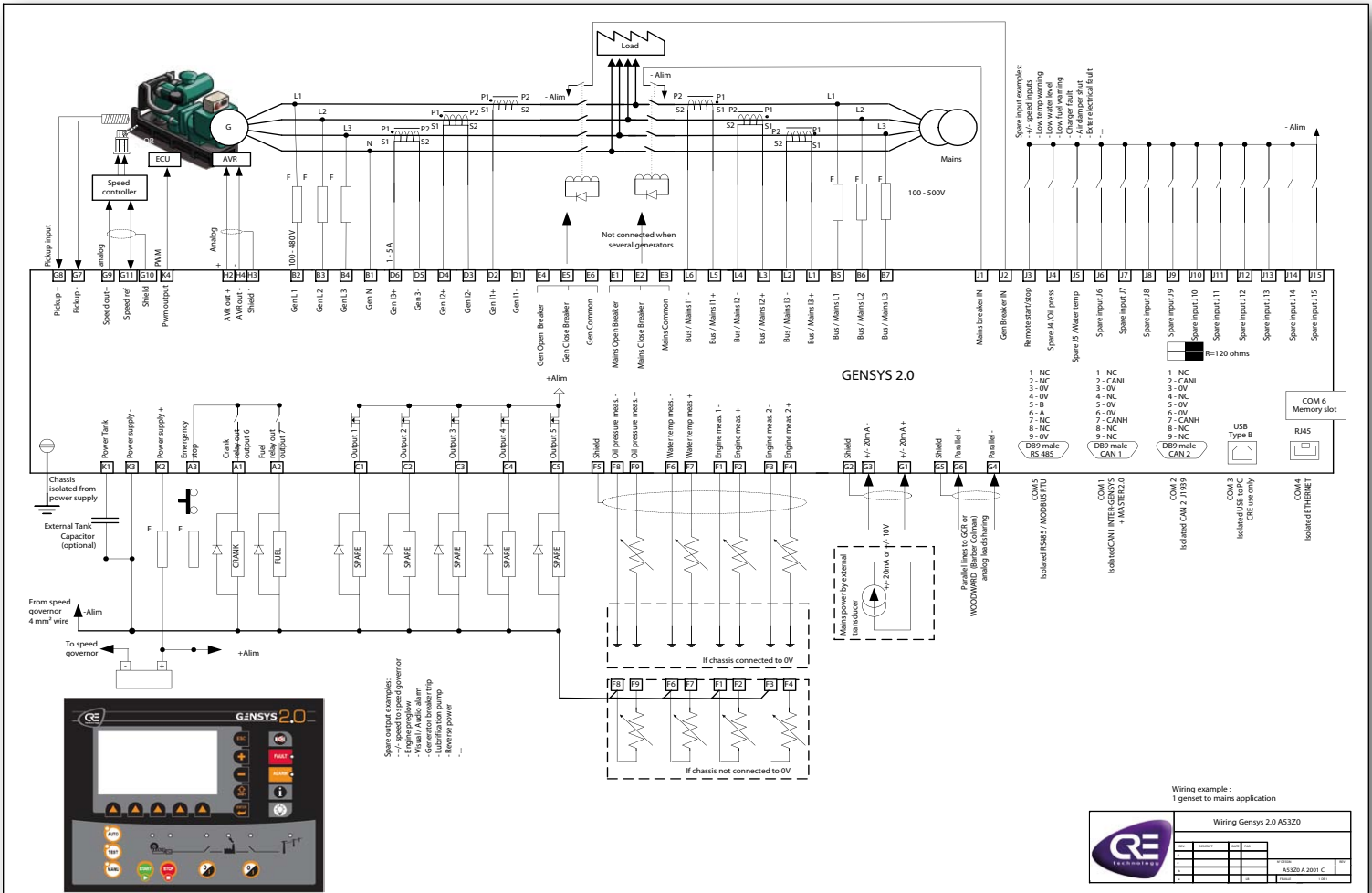
- Size: 248x197x57mm (9.76x7.76x2.24in)
- Panel cut out: 177x228mm (6.97x8.98in)
- Weight: 1.9kg (4.2lb)

### Certifications

- European Union Directives: EN 50081-2, EN 50082-2, 73/23EEC

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, Italian.
- Other custom languages: downlodable on request



**PART NUMBER**  
A5320

**SOFTWARE**  
CRE Config / Easy PLC

**CABLE**  
A53W1

**ASSOCIATED PRODUCTS**  
Reduced: GENSYS 2.0 LT  
Complementary: MASTER 2.0