GENSYS COMPACT PRIME

All-in-one synchronizing and paralleling controller

The **GENSYS COMPACT PRIME** is one controller of a complete range for Energy sources and power plant management : Generators, Mains, Photovoltaic, Batteries storage, Tie breakers. This controller is dedicated for generators used in power plant applications requiring synchronizing, active and reactive load sharing and electrical/mechanical protections. It offers flexibility and time saving thanks to its simple wiring, and easy programming.

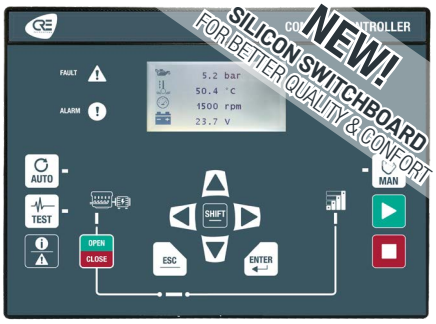
HARDWARE AND DISPLAY

GENSYS COMPACT PRIME is available in both switchboard panel mounted version with display, or core base mounted version and compatible with **i4Gen** touchscreen color display range.

SOFTWARE

GENSYS COMPACT PRIME is configurable from its front panel display, from **i4Gen** HMI, or through the free **i4Gen Suite** PC software.

CORE BASE DIN RAIL MOUNTED VERSION



SWITCHBOARD MOUNTED VERSION WITH DISPLAY

FEATURES

CONTROL AND MANAGEMENT

- Complete engine control of diesel, gasoline or gas generators (preheating, pre-glow, ignition, start/stop…).
- Alternative or consecutive multiple starter management.
- Warm-up and cool down at idle or nominal speed.
- Remote start and test mode available On/Off load.
- Compatible with all J1939 electronic engines. Automatic management of the standard frames.
- **New :** Possibility to create and configure up to 10 customized J1939 frames (read and write). Management of DTC and DPF/SCR (Tier 4 final and Stage 5 engines. Engine ECU address automatic detection. Sniffer/Spy function to analyse the CAN frames. Start/Stop control, speed, 50/60Hz selection.
- **New :** Compatible with MTU MDEC CANbus electronic engine.
- Isochronous and Iso-voltage active and reactive load sharing.
- Fixed kW/kVAR base load or droop mode.
- Frequency and voltage control compensation for generators with droop governors and/or AVR/DVR.
- Synchronization and dead Bus management
- Static synchronization: generators breakers closing without excitation.
- Dynamic synchronization: Frequency, Phase and Voltage synchronization (Synch display available on screen). Synch check (ANSI 25) + Phase sequence protection. Phase shift between 0 and 360 degrees could be added on the synch check relay function (for example to compensate DYN11 MT/BT transformers).
- **New** : optimized PID loop with exceptional performance in synchronization, kW and kVAR control.
- Override mode (protections inhibition + dedicated hour meter) following NFE 37-312 certification.
- Non-essential load trip control on overload or under frequency (load shedding).
- Reserve power management for application with high load variation.
- Battery boost management.
- Configurable maintenance cycle.
- 3 password levels: end user, technician, advanced technician.
- Automatic clock synchronization by CANbus.

DISPLAYED INFORMATIONS

- Engine parameters: oil pressure, coolant temperature, speed, hour run meters (normal and override), number of start attempts, battery voltage, more than 100 parameters available from J1939 ECUs and parameters available from MTU MDEC CANbus.
- Generator electrical parameters:
  - Voltage (3 phases RMS, L-L and L-N)
  - Current (3 phases RMS)
  - Frequency
  - Active power (3 phases + total)
  - Reactive power (3 phases + total)
  - Power factor (3 phases + total)
  - Calculated active energy (KWh)
  - Calculated reactive energy (KWARh)
- Bus electrical parameters:
  - Voltage (3 phases RMS, L-L and L-N)
  - Frequency
  - Active and reactive power (calculated)
  - Power factor (calculated)
- Synchroscope, differential voltmeter and frequency meter and synch check relay authorization values.
- Record of 500 events/alarms/faults with timestamp. Displayed on controller screen and i4Gen with advanced filter.
- Configurable event logger and info pages.

CONFIGURABLE EVENTS LOGGER

- Configurable list of parameters needed.
- Configurable frequency record
- 1350 logged events with timestamp and real-time value, on non volatile memory.

ELECTRICAL PROTECTIONS

- Generator electrical protections:
  - <F, >F : ANSI Code 81L, 81H
  - <U, >U : ANSI Code 27, 59
  - >I, >>I, >In, >Ig : ANSI Code 50, 51, 50N, 51G
  - <KW, >KW, -KW : ANSI Code 37P, 32P, 32RP
  - <KVAR, >KVAR, -KVAR : ANSI Code 37Q, 32Q, 32RQ
  - Unbalance I and V : ANSI Code 60P

BREAKERS CONTROL

- The breakers positions feedback could be connected or not.
- Adjustable pulses or latched contact for breaker closing.
- Adjustable pulses or latched contact for breaker opening.
- MN/MX coil management.
- Closing failure, opening failure, unexpected closure, unexpected opening alarm management.

PROGRAMMING FEATURES

- Alternative selection: up to 16 parameters values can be modified by triggering any digital input or ModBus TCP variable.
- Scheduler: Specific functions or modes (ex: auto start, test mode, Boost…) can be programmed on scheduled operation (cyclic or one-time).
- Easy Flex:
  - 50 lines of programming with logic and arithmetic operators and conditions.
  - All inputs/outputs and variables available.
  - **New** : debug mode which display in real time all programming lines variables state or value.
- Generic filling feature:
  - High and low set point from digital or analog input
  - Up or down direction configurable.
- User variables:
  - 100 user variables are available for programming.
  - Each variable has its own label + unit + accuracy.

AUTOMATIC FIRMWARE UPDATE

When module is connected to **i4Gen Suite** PC software, you will automatically be asked for a firmware update to the latest version if applicable

MODBUS TCP SLAVE & MASTER COMMUNICATION PORT

- In Slave application :
  - All data are accessible by ModBus TCP locally or remotely (web, GPRS).
  - Read and write functions + 300 free ModBus TCP address available for custom mapping.
- **New** - in Master application :
  - Possibility to create and configure customized frames.

REMOTE SUPERVISION WITH I4GEN (7, 10 OR 15 INCHES)

- Internet connection: Wan port or Wifi hotspot or 4G modem or Smartphone Access point.
- Visualization - configuration - programming - remote power plant control.
- Up to 10,000 power plants with a single Zoho Assist account. (Zoho Assist PC, MAC, Smartphone application).
- **New :** Monitoring and control of the complete power plant (generators, mains, photovoltaic, batteries storage,..) through a single line diagram generated automatically.
- 1 single i4Gen can monitor the entire power plant.
- Sending emails on events.

Part numbers:
A56-PRIME-10 Core base mounted version
A56-PRIME-00 Switchboard mounted version with display

RELATED PRODUCTS AND CABLES

i4Gen Touchscreen color display range – Ref A56Vxx
MASTER COMPACT – A56-MAST
Additional I/O – Ref BK5150 + KL1488 + KL2408 …
PC Connection Ethernet cable – Ref A53W1
CANbus J1939/CRE/CANopen communication cable – Ref A40xx
Demonstration suitcase – Ref A56X1

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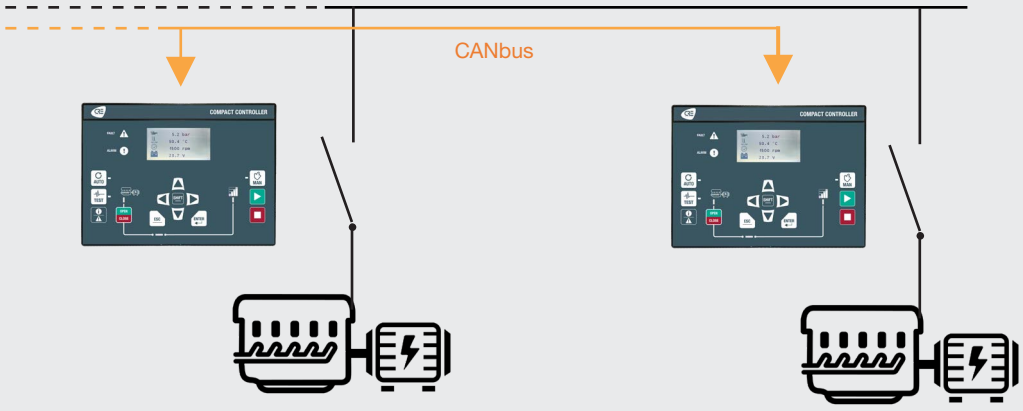
APPLICATIONS

GENSYS COMPACT PRIME is well-suited for any application requiring paralleling of 2 generators or more (up to 32), and an automatic management of load control, synchronization process (on live Bus bar or dead Bus bar), load dependent start/stop and protections.

GENSYS COMPACT PRIME is able to manage diesel, gasoline or gas engine start and stop sequences, as well as interfacing with Auto-Start controllers and ECUs, by using I/Os or J1939 CANbus protocol or MTU MDEC CANbus protocol. **GENSYS COMPACT PRIME** offers also a solution for redundancy system, with an automatic switch Master to Slave.

Up to 32 generators in parallel



- Synchronizing and load sharing
- Automatic Start/Stop depending on load

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SPECIFICATIONS

ELECTRICAL SYSTEM
Compatible with 3 or 4 wires three-phase, or two-phase or single phase systems.

CURRENT, VOLTAGE AND FREQUENCY
- DC Power supply: 7...38V_{DC}, Max voltage 45V_{DC} during 15mn, current consumption at 24V_{DC} = 130mA + the sum of maximum consumption of each logic ouput.
- AC Voltage inputs: 80...500V_{AC}. Consumption = 100mA max. Accuracy: 1%. 3ph + N for generator / 3ph + N for Bus. Neutral terminal does not need to be connected.
- AC Current inputs: 4 wires. (3ph) for generator / 2 wires (1ph) for Earth. 0...5A. 1VA. Overload 15A during 10s. Accuracy: 0.5%.
- AC Frequency measurement: 35...75 Hz; 15V_{AC} minimum between phase and neutral.

INPUTS, OUTPUTS
- 9 x Digital inputs: NO or NC to ground. Adjustable timer On and Off.
- 32 x Digital inputs expansion via CANopen.
- 3 x Analog inputs: Resistive (0...500Ω) or 0...20mA (with external resistor). Could be used as digital input. Library of sensors available. Configuration curve with up to 31 points.
- 16 Analog inputs expansion via CANopen (0-20mA, 0-10VDC , PT100, Thermocouple,…).
- 6 x Digital outputs: NE or ND. 1.8A, over-current protected. Adjustable timer.
- 32 x Digital outputs expansion via CANopen.
- 2 x Relay outputs (breaker control): 5A, 240VAC.
- 2 x Analog outputs +/-10VDC : isolated output with adjustable span and offset. Could be used for Speed/ frequency and Voltage control or could be used to display any analog variable.
- Magnetic pick up input: Frequency from 50Hz...10kHz, Voltage 0.5...40VAC.

COMMUNICATION PORTS
3 isolated com ports are available:
- 1 CANbus: J1939 and MTU MDEC electronic engine and I/O extensions.
- 1 CANbus: CRE protocol for communication between all COMPACT controllers.
- 1 Ethernet: PC communication/ModBus TCP.

FREQUENCY AND KW CONTROL
- Configurable +/-10VDC analog output.
- Pulses outputs control (+f/-f).
- J1939 CANbus port for Baudouin, Caterpillar, Cummins, Daimler, Detroit, Deutz, Doosan, FPT/Iveco, John Deere, MAN, MTU, MWM, Perkins, Scania, Volvo, Waukesha, Weichai, Weifu, yanmar, Yuchai, Zenith…
- Alarm of speed control output abnormal deviation.
- **New** : patented feature Easy Calib : this feature allows the speed governor stability control and adjusting automatically the speed analog outputs (offset, range and direction).

VOLTAGE AND KVAR AND POWER FACTOR CONTROL
- Configurable +/-10VDC analog output.
- Pulses outputs control (+U/-U).
- Compatible with: AEM, AVK, Basler Electric, Caterpillar, Kia, Leroy Sommer, Marathon, Marelli Motori, Meccalte, Sincro, Stamford…
- Alarm of voltage control output abnormal deviation.
- **New** : patented feature Easy Calib: this feature allows the control of AVR voltage stability, and adjusting automatically the voltage analog outputs (offset, range and direction).

ENVIRONMENT
- Operating temperature: -30...70°C (-22...158°F).
- Storage temperature: -40...70°C (-40...158°F).
- Humidity: 95% non-condensing.
- Altitude: Up to 4000m for 480V_{AC}. Up to 5000m for 400V_{AC}.
- IP Front: IP65/NEMA rating 4 - IP20/NEMA rating 1 for core base version.
- IP Rear: IP20/NEMA rating 1.

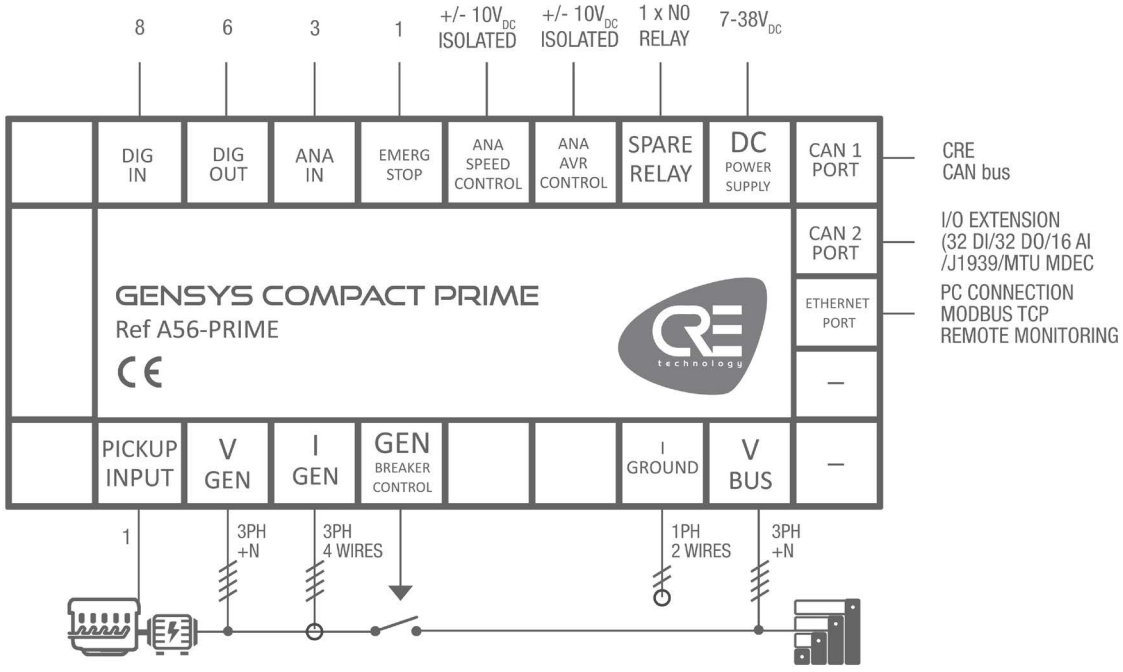
DIRECTIVES
- EMC Directive 2014/30/UE - EMC General Requirements EN 61326-1: Immunity according with EN 61000-6-2 and Emission according with EN 61000-6-4.
- Electrical Safety Directive 2014/35/UE: According with EN 60950-1.
- Vibrations and shocks: According with EN(IEC) 60068-2-6 and IEC 60068-2-27.
- Temperature: EN (IEC) 60068-2-30; EN (IEC) 60068-2-1 EN (IEC) 60068-2-2; EN 60068-2-78.

SIZE AND WEIGHT
- Switchboard mounted version with display:
  - Dimensions: 245x182x40mm (9.64x7.16x1.57in).
  - Panel cut out: 220x160mm (8.7x6.3in).
- Core base mounted version:
  - Dimensions: 260x157x44mm (10.24x6.18x1.73in) (depth with connectors).
  - Fixing dimensions (4 screws): 238x129mm (9.37x5.08in). Fixing hole: Ø5.24mm (0.21in).
  - Optional DIN rail mounting.
- Weight: 0.7kg (1.54lb).

LCD DISPLAY CHARACTERISTICS
- Size: 40x70mm (1.50x2.75in).
- Pixels:1024x512.Backlight:50cd/m²typical,configurable.
- Contrast: configurable.

LANGUAGES
English, French, Italian, Spanish in standard.
Portuguese, Russian, German and other custom languages are available on request.

WIRING DIAGRAM



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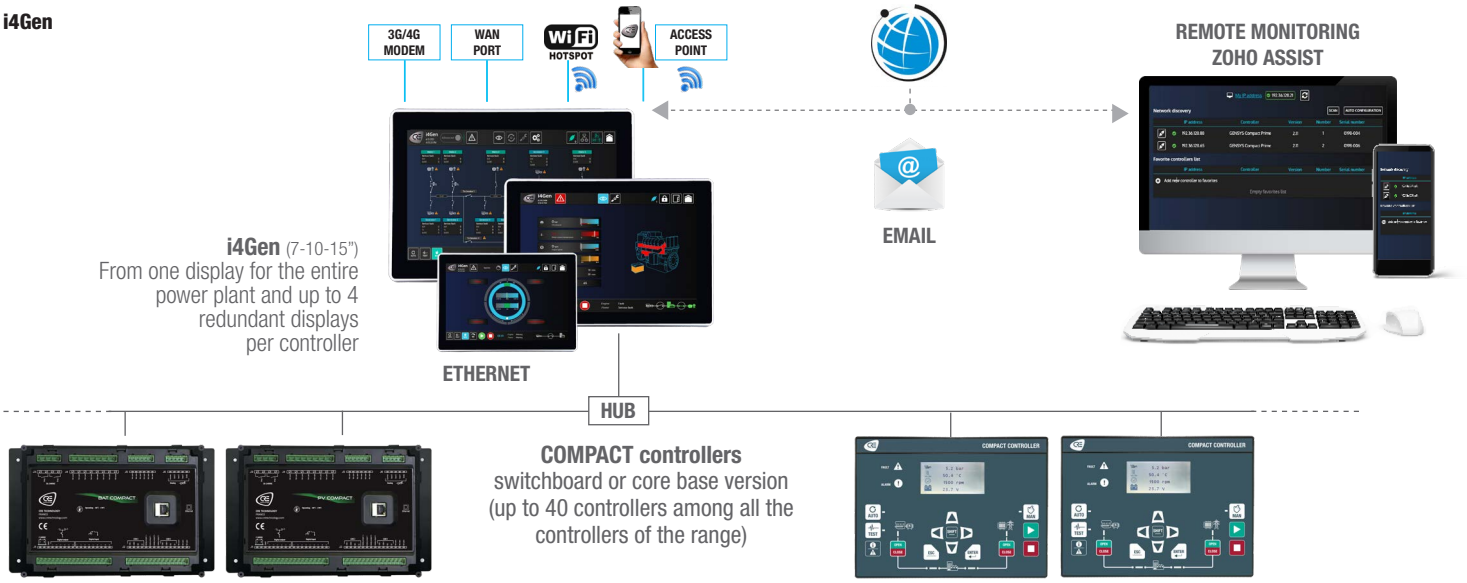
ASSOCIATED I4GEN MULTI-TOUCHSCREEN RANGE & MAIN FUNCTIONS

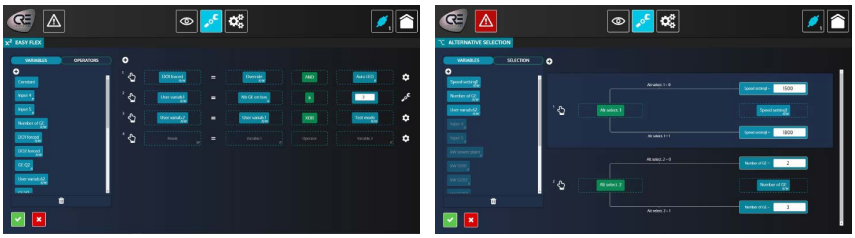


- **The i4Gen touchscreen and color display range (7, 10 and 15 inches) is available for the COMPACT controllers.**
- **i4Gen offers configuration, control, monitoring and logging (parameters, measures, events) of COMPACT controllers.**
- **i4Gen display can be duplicated on computer locally by LAN or remotely by internet or GPRS**
- **Thanks to its WIFI function, i4Gen offers also the capability of remote service and support by connecting your smartphone in connection sharing.**

NEW - SINGLE LINE DIAGRAM AUTOMATICALLY GENERATED FROM EACH COMPACT CONTROLLER CONFIGURATION

In addition to its very advanced functions, the i4Gen now offers you the display of the single-line diagram of your complete power plant, as well as the production curves of each source.

EASY FLEX PROGRAMMING EXAMPLE



It is possible to customize your application by programming specific features with **Easy Flex**, available directly from **i4Gen Suite** PC software. **Easy Flex** allows user to write up to 50 lines of equation trough an intuitive editor, giving the opportunity to fit with any specific application and to extend standard features. Ex: Programmable relays, timers, sensor treatment, dynamic modification of the power supply…

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