

PLC Editor

Mains

GC 600 - GC 600

Controller for gensets working in parallel in island mode and/or with the mains

- **Great performances**
 - **Attractive coloured display**
 - **PLC functions inbuilt**
 - **Several I/O with possibility of expansion modules**
 - **Several communication ports on board**
 - **Integrated hardware watchdog**
 - **Italian design**
- Powerful dual processor-based controller designed to manage production or emergency power plants composed by gensets working in parallel among them and/or with the mains.
 - Available in two versions: GC600 and GC600^{Mains}
 - Graphic colour display TFT 4.3" - 480x272 pixel - Visual area 95 x 54 mm
 - PLC functions included
 - It can be interfaced with both CANBUS J1939 electronic engines and traditional engines with digital/analogue sensors.
 - Measurements: Mains/Bus and Genset Voltage; Genset Currents (.../5A or .../1A); Mains/Bus/Genset Frequency; Active, Reactive and Apparent Power; Engine speed; D+
 - N. 18 Configurable opto-insulated digital Inputs
 - N. 7 analogue Inputs including oil pressure, oil temperature, water temperature, fuel level. , which can be used also as digital Inputs or resistive, voltage or current analogue inputs.
 - N. 2 Insulated outputs for the regulation of the speed control and AVR.
 - PWM (500Hz) direct interface with CATERPILLAR and gensets with similar regulation system
 - N. 18 Configurable digital Outputs
 - Communication: N.2 MODBUS RTU Serial Ports: RS232 and insulated RS485
N.1 Ethernet Port 10/100Mbps
N.1 USB FUNCTION for the configuration and N.1 USB HOST as data logger
Setup for internal WI-FI
 - Internal clock with history log
 - Front protection degree: IP65 with gasket always free
 - Direct interface to SI.MO.NE. for the remote supervision of the plants



General info

GC600 is a new powerful genset controller equipped with a dual processor, designed for **synchro/parallel applications** including plants with multiple gensets and power stations with gensets in parallel with the Mains (Public Utility).

Based on the type of plant, the most convenient version is available:

- **GC600** is well recommended in case of Multiple gensets working in parallel and load-sharing systems (island mode) and Multiple Parallel to the Mains included);
- **GC600^{Mains}** is the perfect solution for the management of a genset working in parallel to the Mains by the internal power regulator. Soft loading and unloading is automatically performed. In this case, the controller is able to directly control the Mains Circuit Breaker also in manual mode, through the specific button on the controller.
This version is especially recommended in case of CHP plants, where some additional performances are required for the management of the auxiliaries of the plant.

Both versions of GC600 have a **PLC with PID blocks**. **Customized logics** are therefore available, avoiding the use of external traditional PLC.

GC600 and GC600^{Mains} can be used for electronic CAN J1939 and traditional MPU engines.

Based on the load demand, the controller is able to automatically start/stop the gensets. In addition, regarding a smart load management, in case of a power station is composed by gensets of different nominal powers, it's possible to automatically select the most convenient gensets able to supply the load, avoiding any waste of fuel and power.

In order to equalize the running hours, it's possible to select the Master genset and to change it at a configurable time or hour.

GC600 and GC600^{Mains} have a **TFT 4.3" and high quality coloured display** as human interface for an easy and immediate visualization of the measures and statuses of the genset.

Comprehensive communications are also available as standard, like USB, RS232, RS485 (insulated) and Ethernet for the remote monitoring. A Wi-Fi interface will be available soon for a quick connection to the controller.

The adjustable parameters of the controllers allow their use for standard and customized tasks. Parameters are programmed using the **free software tool (BoardPRG)**, which can be download thorough Sices web site. It's also possible to set them directly by the keyboard of the controllers.

Also the software is for setting PLC logic (**Plc Editor**) is available for free.

GC600 and GC600^{Mains} offer the storage of the **events and data occurred**. These info can be accessed from the front panel and read on the display.

GC600 and GC600^{Mains} include an hardware watchdog able to advise the user in case of failure of the microprocessor.

Operation mode

PROGRAM/OFF/RESET: access to all programmable parameters. Programming access can be controlled by means a three level passwords. Some parameters can be changed even if the engine is running.

RESET: Engine start inhibition. The load is forced to be supplied from the Mains. When the engine is running and the selector switch is turned to the 'OFF' position, the engine shutdown sequence is activated. Reset of all alarms. Enable parameters change (programming).

MAN/AUTO/TEST: Engine manual START and STOP controls are enabled. The Genset protection devices are activated. The starting command is automatically disabled when the engine is running. MCB and GCB pushbuttons are enabled when the genset is in operating range. Their function depend on the operating mode selected. Manual synchronization can easily accomplished by built in function.

AUTOMATIC: The operating mode depends on the selected one: Single Prime Mover, Stand-by, Stand-by and Short Time Parallel, Single Parallel to Mains, Multiple Prime Mover, Multiple Parallel to Mains.

TEST: Automatic start for testing operations with safety protections enabled. Test can be made unloaded, loaded or in parallel to mains. Upon Mains failure, the load is immediately supplied by the Genset.

Measured Values

Mains/Bus Voltage:

L1-N, L2-N, L3-N, L1-L2, L2-L3, L3-L1

True RMS measure.

Lx-N max. voltage < 300Vac cat. IV.

100/400V Nominal Voltage input reading available with auto adjustment.

Generator Voltages:

L1-N, L2-N, L3-N, L1-L2, L2-L3, L3-L1

True RMS measure.

Lx-N max. voltage < 300Vac cat. IV.

100/400V Nominal Voltage input reading available with auto adjustment.

Generator Currents:

L1, L2, L3, N (*)

True RMS measure.

Nominal max. current: 5Aac and 1Aac.

Integrated CTs.

(*) Neutral generator current as alternative to differential protection or to be used for measure mains power from CT (Standard) or Tore (option).

Battery Voltmeter:

Resolution = 0.1V

Oil Pressure Gauge:

VDO 0-10 Bar, VDO 0-5 Bar, Veglia 0-8 Bar (Configurable curve based on sensors available).

Water and Oil Thermometer:

VDO, Veglia, BERU

(Configurable curve based on sensors available).

Fuel Level:

VDO, Veglia

(Configurable curve based on sensors available).

Engine revolution counter:

By pick-up. Programmable teeth number.
Same input can be used by W signal.

D+ for the measure of the voltage alternator battery charger

Active and reactive power, power factor are available as total measure and also for each single phase.

Maximum power and current reached values, are memorized with date and time.

Additional analogical measures related to the engine are available in case of engines with CANBUS J1939 interface.

Status

- Mains live / Disabled (for GC600^{Mains} only)
- Generator live
- GCB status
- MCB status (for GC600^{Mains} only)
- BUS live
- Engine running
- Engine cooling
- Engine start and stop

Derived Values

- Active power
- Reactive power
- Apparent power
- Power factor: Total and phase by phase
- Active and reactive energy counter
- Hour counter for maintenance/rental
- Start Counter

Engine Protections

- Overspeed (12)
- Incomplete sequence (48)
- Belt-break
- Engine temperature warning and alarm
- Oil pressure warning and alarm
- Oil temperature warning and alarm
- Water level warning and alarm
- Max. power
- Fuel level
- Battery failure (min./max. Voltage)

Generator Protections

- Underfrequency (81U)
- Overfrequency (81O)
- Undervoltage (27)
- Overvoltage (59)
- Power direction (32)
- Loss of excitation (Reverse reactive 32RQ)
- Time dependent overcurrent (51) IDMT
- Instantaneous overcurrent (50)
- Synchro-check (25)

- Phase sequence (47)
- Current and Voltage unbalance (46/47)
- Ground Fault Protection (51N or 51GN) as alternative to neutral measure (64)
- Negative sequence (I2)
- Phase overcurrent with voltage restraint/control (51V)

Mains Protections

For Mains parallel applications, there are the following protections:

- Rate of Change of Frequency (81R ROCOF)
- Vector shift
- Undervoltage (27)
- Overvoltage (59)
- Underfrequency (81U)
- Overfrequency (81O)
- 27T - Low voltage protection time-dependent (FNN-VDE Q-U-protection)
- 27Q - Low Voltage Protection with Directional reactive (FNN-VDE Q-U-protection)

Dynamic Mains Support

Automatic adjustment of the power output based on the mains frequency value. This feature allows to maintain the safety conditions of the genset in case the mains frequency drops under acceptable values for the genset.

Load management

In case of multiple plants with several gensets connected in synchro/parallel on the same bus, it's possible to set different automatic logics for start/stop gensets based on the load request. In detail:

- Manual setting of the master genset by means of a selector switch on the control panel
- Automatic rotation of the Master genset after a fixed time per day.
- Automatic rotation of the Master genset after an elapsed time.
- Automatic selection of working gensets having a matching power with the request on load (NEW) (*)
- Automatic start/stop of gensets in order to maintain "ON" the minimum quantity of gensets able to supply the load (NEW) (*).

(*) Functions available for a max of 5 gensets.

Load sharing

The Load sharing is accomplished in parallel operations by means a CAN interface or analogue interface. GC600 controls the speed regulation in order to have the same percentage power among generator sets.

Power modulation

The Power regulation is allowed through internal power regulator.

For electronic engines a CAN interface is available for speed regulation, for traditional engines is however available a proper analogical interface.

Reactive power regulation

GC600^{Mains} controls AVR directly in order to manage the reactive power.

Multilanguage device

The languages available are: **English, Italian and Brazilian/Portuguese.** French, Spanish and Russian available soon.

Inputs, outputs and aux. functions

- N. 18+1 Programmable digital inputs (N.1 for the Emergency stop push button)
- N. 4 Analogue inputs (water temperature, oil pressure, oil temperature, fuel level), if not used, can be used to:
 - Digital inputs (not insulated)
 - Resistive analogue inputs
 - Voltage analogue inputs 0...10V
 - Current analogue inputs 0...20mA (adding an external resistance)
- N. 2 Additional analogue inputs 0...10V
- N. 1 Analogue input for D+ signal
- N.18 Programmable digital outputs
- N. 2 Analogue and insulated outputs -10 / +10V for the regulation of the speed control and AVR

Further virtual inputs and outputs are available with AND / OR logics for selectable functions.

Expansion modules for additional I/O

- N. 64+64 Additional and configurable digital I/O using 4 DITEL modules.
- N. 30 Additional and configurable analogue inputs for sensors measurement from Pt100 (DIGRIN), Thermocouples (DITHERM) and N.20 Additional and configurable analogue inputs 0...10mA - 0...20mA (DIVIT). Max of 10 modules. The max number of analogue inputs depends on the module used.
- N. 10 Additional and fixed analogue inputs listed in the CANBUS J1939 protocol.
- N. 16 Additional and configurable analogue outputs using 4 DANOUT modules.

Embedded functions

- Engine diagnostic code
- Periodical test
- Real Time Clock with internal rechargeable Lithium battery
- Fuel pump management
- 537 Events log
- Pre-glow and coolant heater management
- Remote start and stop
- Override function
- Hour counter for the maintenance schedule
- Daily counter with embedded calendar for the maintenance
- Embedded alarm horn
- Engine speed measurement by pick-up, frequency or W
- Possibility of graphic customization with low costs
- Programmable by PC or using the keyboard pf the controller
- Remote firmware update

- SMS communication
- NTP (for the automatic clock update), DNS and DHCP support
- N.1 Threshold as load shedding. Additional logics available with the PLC functions.
- Internal active and reactive regulation
- Internal Load-sharing
- Internal Synchronizer
- Powerful Load Management suitable for plants composed by gensets of different powers
- Insulated CAN interface for ECU interface (J1939 and MTU MDEC)
- PWM (500Hz) direct interface with CATERPILLAR
- Insulated CAN interface for PMCBUS application (LOAD-SHARING and parallel management)
- Up to 24 generator sets connected together
- Up to 16 MC100 supported
- Up to 4 different configurations
- Easy plant configuration
- N.3 Levels of power reserve for unexpected changes of load request
- Ramp modulations for load and unload

Communication

GC600 / GC600^{Mains}

- N.1 USB FUNCTION for the configuration and N.1 HOST as data logger (available soon)
- N.1 RS232 Serial port Modbus RTU for external modem
- N.1 RS485 Insulated serial port Modbus RTU
- N.1 RJ45 Port as Ethernet interface TCP/IP
- N.1 Insulated CANBUS J1939 Interface
- N.1 Insulated CANBUS (PMCBUS) for the load sharing

As option:

- N.1 WI-FI interface (available soon)
- REWIND - GPRS/GSM/GPS Device (needed for SI.MO.NE)
- PSTN/GSM Modem management and data call in case of alarm and warning

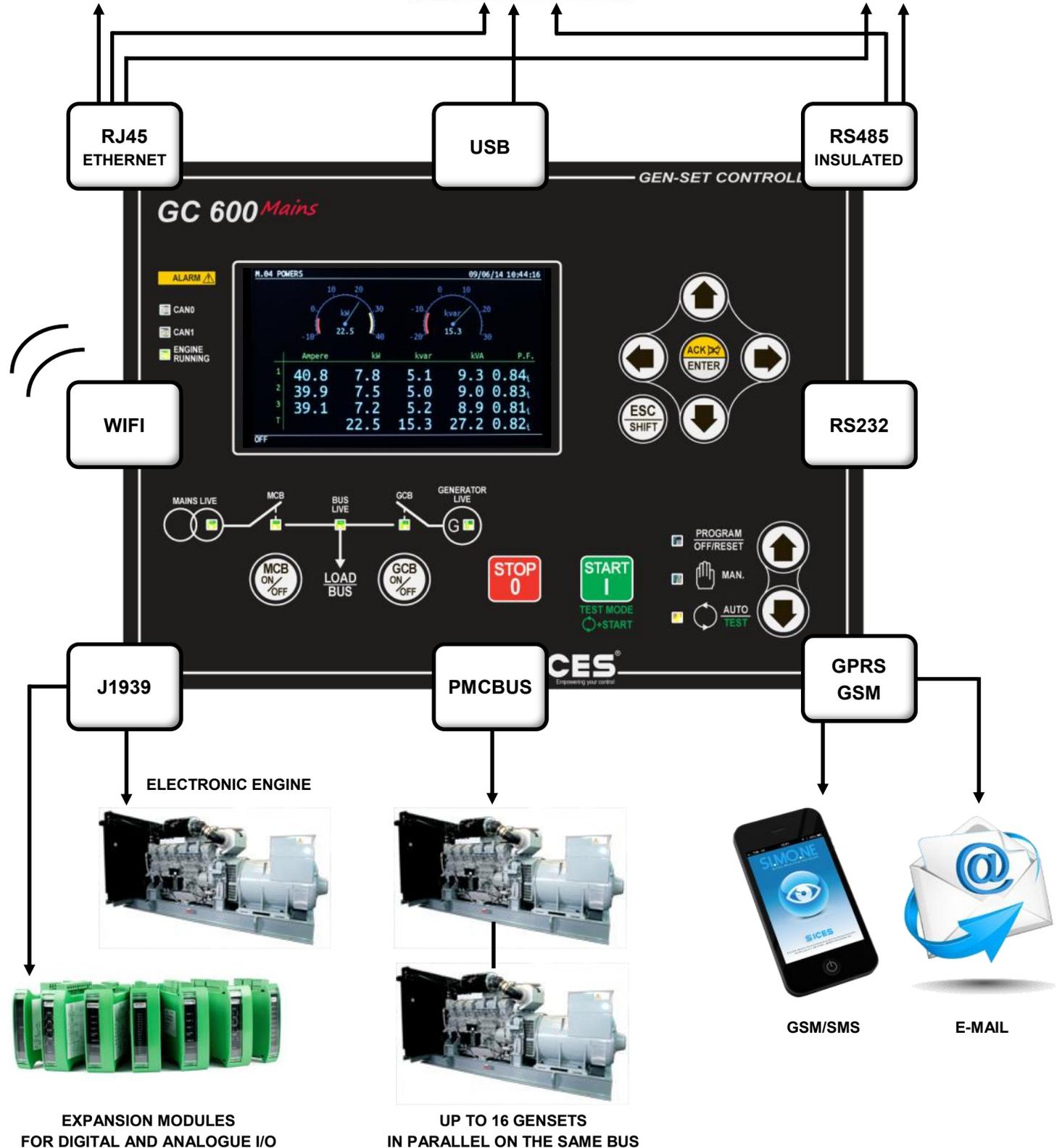
Additional technical data

- Supply voltage: 7...32 Vdc
- Power consumption: typical less than 2W (Auto mode, Stand-by, AMF active, LCD Lamp Saving active)
- Operating frequency 50Hz or 60Hz
- LCD with backlight
- Operating temperature: -25 °C to +65 °C
- Storage temperature: -30 °C to +80 °C
- Burn in @ 50°C for 48h with test report for each controller
- Protection degree: IP65 (gasket included)
- Weight: 1100g
- Overall dimension: 244 (W) x 178 (H) x 83 (D) mm
- Panel cut-out: 218 (W) x 159 (H) mm
- Graphic display resolution: 480x272 pixel
- Display dimensions: Visual area 95 x 54 mm
- Specific function for French market EJP / EJP-T
- EMC: conform to EN61326-1
- Safety: built in conformity to EN61010-1

SI.MO.NE - Central monitoring system

PC

REMOTE MONITORING CONTROL



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