



GC400

Gen-set controller for Synchro/parallel applications

DESCRIPTION

GC400 is a comprehensive controller particularly suggested for managing different types of synchro/parallel applications, especially for MPM (Multiple Prime Mover) and MSB (Multiple Stand-by) power plants, where the synchronization of several gensets is required.

GC400 design allows an easy and fast installation, thanks to the internal load sharing and synchronizer.

GC400Mains version, is the perfect controller for those plants where the reverse synchronization is required to avoid any drop voltage on load.

In both cases, all the necessary protections and features are included.
No extra dongles are required.

All the **GC400** versions have a direct interface via CAN J1939 with a wide range of electronic engines (Volvo Penta, Scania, Perkins, MTU, Deutz, Cummins, John Deere, Caterpillar and others) and they can be also used with traditional engines by the embedded analogue sensors.

This controller can be combined with all Sices controllers, as GC600, DST4602Evolution.

All the parameters can be set directly by the controller's keyboard or, alternatively using the free software tool (**BoardPRG3**), available from SICES' website.

The graphic display is a user-friendly interface, useful for a quick visualization of measures and alarms coming from the genset.

Events and DTC logs can be accessed from the front panel and read on the display.

GC400 supports several communication interfaces for the local or remote control.

A version with built in GPRS/GPS tracking (**GC400Link**) is particularly suited for mobile or rental applications, where asset tracking and monitoring is required.

INPUTS - OUTPUTS AND AUXILIARY FUNCTIONS



8 Digital inputs



8 Digital outputs



3 Analogue inputs



2 Analogue outputs



AND/OR
Logic control



Event
history log



USB port



RS232



RS485



Ethernet connection
GC400 Versions only



GPRS/GPS
Link Versions only



TIER4 final STAGE V



5G ready
Link Versions

- N. 8 opto-insulated digital Inputs.
- N. 8 digital outputs.
- N. 3 Analogue inputs including oil pressure, oil temperature, coolant temperature, fuel level, which can be used also as digital inputs or resistive, voltage analogue inputs.
- N. 2 Insulated analogue outputs for the regulation of frequency and voltage.

Communication:

N.2 MODBUS RTU serial ports: RS232 and insulated RS485.

N.1 Ethernet Port 10/100Mbps (**GC400**).

N.1 USB FUNCTION for the configuration.

GPRS modem 2G/4G/5G ready (**GC400Link**).

Direct interface to SIMONE for remote plant supervision

MAIN FEATURES

- > True RMS readings on generator voltages and currents. Neutral measure included.
- > Additional current measurement for neutral or ground fault protection.
- > Active, reactive and apparent power measurements.
- > Engine speed measurement by pick-up, frequency or W.
- > Graphic display with self or manual adjustable contrast based on the temperature.
- > Insulated and auto-supplied J1939 and MTU MDEC CAN interface.
- > Interface with traditional MPU engines.
- > USB, RS232 and insulated RS485 serial port with MODBUS RTU protocol, ethernet interface with MODBUS TCP protocol.
- > Real time clock with battery.
- > Events and data recording.
- > **SIMONE** and **SicesSupervisor** monitoring system for remote control (App iOS and Android available).

Load management

In case of several gensets connected on the same bus, it is possible to set different automatic starting/stopping logics for the gensets based on the load request.

In details:

- Manual setting of the master genset by means of a selector switch on the control panel.
- Automatic rotation of the Master genset at a fixed time of the day.
- Automatic rotation of the Master genset after an elapsed time.
- Manual priority assignment to each single genset.
- Automatic running hours equalization.
- Automatic selection of the best combination of gensets (depending on rated powers), for supplying the load. (function available for up to 5 gensets).

Load sharing

The Load sharing is performed by means of CAN interface.

GC400 controls speed and voltage, in order to have the same power percentages among the gensets.

Power modulation

GC400 operates on the speed governor to control the active power.

For electronic engines a CAN interface is available for speed regulation, for traditional engines is however available a dedicated analogue interface.

Reactive power regulation

GC400 operates on the AVR directly in order to manage the reactive power.

MEASURES

Mains Voltages/Bus voltages:	L1-N, L2-N, L3-N, L1-L2, L2-L3, L3-L1. True RMS measures. Lx-N max. voltage < 300Vac cat. IV. Option 100V available on demand.
Generator voltages:	L1-N, L2-N, L3-N, L1-L2, L2-L3, L3-L1. True RMS measures. Lx-N max. voltage < 300Vac cat. IV. Option 100V available on demand.
Generator currents:	L1, L2, L3, N (*). True RMS measures. Rated current: 5Aac. Overload measurable current: 4 x 5Aac (sinusoidal). (*) Neutral generator current as alternative to differential protection or to be used for measures mains power from CT (Standard) or Tore (option).
Generator and mains frequency meter:	Resolution = 0.1 Hz. Accuracy = $\pm 50\text{ppm}$, $\pm 35\text{ppm}/^{\circ}\text{C}$ (typical).
Battery voltmeter:	Resolution = 0.1V.
Oil pressure gauge:	Configurations for the most commonly used sensors are available.
Coolant or Oil Thermometer:	Configurations for the most commonly used sensors are available.
Fuel level:	Configurations for the most commonly used sensors are available.
Engine revolution counter:	By pick-up. Programmable teeth number. Same input can be used by W signal.
D+	for the measure of the alternator battery charger voltage.

Powers and power factor measures are available as total measure and also for each single phase. The peak value of power and currents are stored with date and time. Additional measures available based on the isolated and Auto-supplied CAN J1939.

PROTECTIONS

- Status**
- Mains live / Disabled.
 - Generator live.
 - GCB status.
 - MCB status (for **GC400 Mains** only).
 - BUS live.
 - Engine running.
 - Engine cooling.

- Generator protections**
- Underfrequency (81U).
 - Overfrequency (81O).
 - Undervoltage (27).
 - Overvoltage (59).
 - Reverse power (32P).
 - Loss of excitation (Reverse reactive 40).
 - Time dependent overcurrent (51,51V).
 - Instantaneous overcurrent (50, 50V).
 - Generator overload (from external contact of circuit breaker).
 - Max. auxiliary current.
 - Synchro-check (25).
 - Phase sequence (47).
 - Currents and Voltages unbalance (46/47).
 - Differential protection (64).
 - Ground fault protection (50N).
 - Negative sequence (46-12).

- Engine protections**
- Fuel reserve.
 - Min./Max fuel level.
 - Battery failure (min./max. Voltage).
 - Min./Low oil pressure.
 - Min./Max. coolant and oil temperature.
 - Closing failure of mains contactor or genset contactor.
 - Engine over crank.
 - Belt breakage.
 - Operating conditions not reached.
 - Emergency Stop
 - Max power.

- Mains protections**
- Rate of Change of Frequency (81R ROCOF).
 - Vector shift.
 - Undervoltage (27).
 - Overvoltage (59).
 - Underfrequency (81U).
 - Overfrequency (81O).

EMBEDDED FUNCTIONS

- > Engine diagnostic code.
- > Periodical test.
- > Real time clock with internal rechargeable lithium battery.
- > Fuel pump management.
- > 126 Events log.
- > Pre-glow and coolant heater management.
- > Remote start and stop.
- > Override function.
- > Hours 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.
- > Programmable by PC or using the keyboard of the controller.
- > Remote firmware update.
- > SMS communication.
- > DHCP, DNS, NTP and SNMP Support are available.
- > N.1 Threshold as load shedding.
- > Internal active and reactive regulation.
- > Internal load-sharing.
- > Internal synchronizer.
- > Powerful load management suitable for plants composed by gensets of different powers.
- > CAN interface for ECU connection (J1939 and MTU MDEC).
- > Insulated CAN interface for PMCBUS application (LOAD-SHARING and parallel management).
- > Up to 16 gensets connected together.
- > Up to 4 alternative configurations.
- > Easy plant configuration.
- > N.3 Levels of power reserve for expected changes of load.
- > Load and unload ramps.

In case of multiple gensets in parallel to mains where the reverse synchronization is required, it is necessary to use one **GC400** for each genset + one MC400 for the management of the MCB.

Multilingual device

The display languages available are:
English, Italian, French, Russian, Spanish and Portuguese/Bra.

COMMUNICATIONS

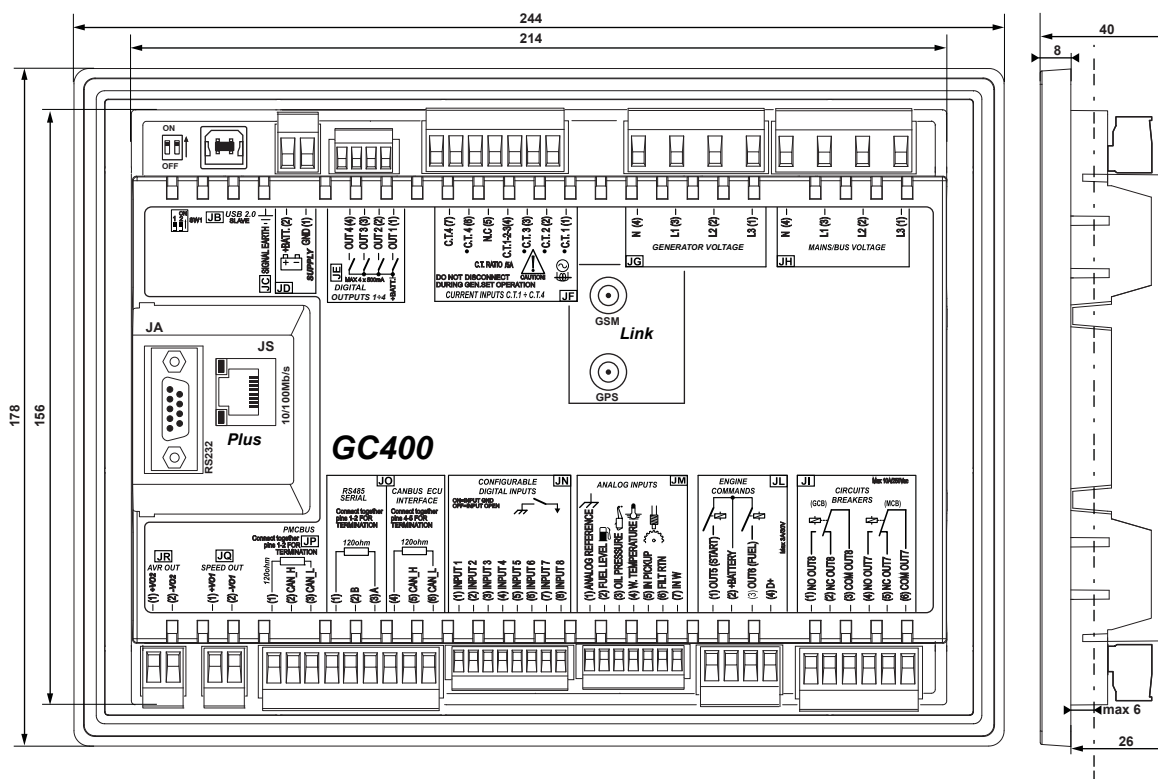
- GC400 / GC400Mains**
- N. 1 USB port.
 - N. 1 RS232 Serial port Modbus RTU (support external modem).
 - N. 1 RS485 Insulated serial port Modbus RTU.
 - N. 1 RJ45 Port as Ethernet interface TCP/IP.
 - N. 1 Insulated CANBUS J1939 and MTU MDEC interface.
 - N. 1 additional CANBUS (PMCBUS) for the load sharing.

- GC400Link**
- N. 1 USB port.
 - N. 1 RS232 Serial port Modbus RTU.
 - N. 1 RS485 Insulated serial port Modbus RTU.
 - N. 1 Insulated CANBUS J1939 interface.
 - N. 1 additional CANBUS (PMCBUS) for the load sharing.
 - GPRS/GPS (2G/4G/5G ready) modem.

- As option**
- REWIND - GPRS/GSM/GPS Device (SMS in case of alarms / warnings).
 - PSTN Modem (data calls in case of alarm and warning).

TECHNICAL DATA

- > Supply voltage: 7...32 Vdc.
- > Power consumption: typical less than 2W (Auto mode, Standby, AMF active, LCD Lamp Saving active).
- > Operating frequency 50Hz or 60Hz.
- > LCD with backlight.
- > Operating temperature: -25 °C to 60 °C.
- > Burn in @ 50°C for 48h with test report for each controller.
- > Protection degree: IP65 (gasket included).
- > Weight: 750gr.
- > Overall dimension: 244 (W) x 178 (H) x 40 (D) mm.
- > Panel cut-out: 218 (W) x 159 (H) mm.
- > Graphic display dimensions: 70x38mm - 128x64 pixel.
- > Specific function for French market EJP / EJP-T.
- > EMC: conform to EN61326-1.
- > Safety: built in conformity to EN61010-1.



CERTIFIED MANAGEMENT SYSTEM
ISO 9001 - ISO 14001
BS OHSAS 18001



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