SICES®
Empowering your control

GC 400

Genset Controller for Synchro/Parallel applications

- **GC400** is the perfect genset controller able to manage the Synchro/Parallel operations for MPM (Multiple Prime Mover) and MSB (Multiple Stand-by) applications.
- **GC400**^{Mains} is your solution for SSTP (Single Short Time Parallel to Mains) applications where the back or reserve synchro are required. The controller includes, in effect, the regulation of the active and reactive power.
- **GC400**^{Link} is the special versions with GPRS/GPS modem included
- True RMS readings on generator voltages and currents. Neutral measure included. Additional current measurement for neutral or ground fault protection (50N+87N)
- Active, Reactive and Apparent power measurement
- Engine speed measurement by pick-up, frequency or W
- 8+1 fully digital Inputs + 4 programmable analogue Inputs and 8 digital Outputs
- Graphic display with self or manual adjustable contrast based on the temperature
- Isolated and Auto-supplied J1939 and MTU MDEC CAN interface
- Interface with traditional analogue engines
- USB serial port, Isolated RS485 serial port and RS232 serial port with MODBUS RTU protocol, Ethernet interface with MODBUS TCP/IP protocol
- Real Time Clock with battery
- Events and data recording
- SI.MO.NE supervision system with App iOS and Android and SICES Supervisor for the remote control

- ***Perfect for groups of RENTAL Gensets***
- ***Great performances at an EXTRAORDINARY PRICE***
- ***New Technology for the remote control***
- ***User friendly, intuitive and easy to use***
- ***Italian design***

MADE IN ITALY

General info

GC400 is an entry level, but also a comprehensive controller particularly suggested for managing different types of Synchro/Parallel applications.
In detail, GC400 is perfect for MPM (Multiple Prime Mover) and MSB (Multiple Stand-by) power plants, where the synchronization and the put in parallel of several gensets is required.
Its design allows an easy and fast installation, thanks to the ***internal Load Sharing*** *and* ***Synchronizer****.*

GC400^{Mains} *is the perfect controller for those plants where the back synchro (also called reverse synchronization) is required in order to avoid any voltage drop on the load.*
In both cases, all the necessary protections and features are included. No extra dongles are required.
GC400 has 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 it can be also used with traditional engines whose measurements are done by the embedded analogue sensors.*
GC400 can be used with all Sices controllers, as GC500, DST4602 and DST4601/PX.
The parameters are programmed using the ***free software tool (BoardPrg)****, which can be downloaded through Sices website or directly using GC400 keyboard.*
The ***graphic display*** *is a user-friendly human interface useful for an immediate 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 devices/tools*** *for the local or remote control.*

The Link version is available including the GPRS/GPS modem, which is perfect for the remote control of groups of rental gensets.

Measures

Mains Voltage:
L1-N, L2-N, L3-N, L1-L2, L2-L3, L3-L1
True RMS measure.
Lx-N max. voltage < 300Vac cat. III
Option 100V available on demand
Generator Voltages:
L1-N, L2-N, L3-N, L1-L2, L2-L3, L3-L1
True RMS measure
Lx-N max. voltage < 300Vac cat. III
Option 100V available on demand
Generator Currents:
L1, L2, L3, N (*)
True RMS measure.
Rated current: 5Aac
Overload measurable current : 4 x 5Aac (sinusoidal).
(*) Neutral generator current as alternative to differential protection or to be used for measure mains power from CT (Standard) or Tore (option)
Bus Reading:
L1-N, L2-N, L3-N, L1-L2, L2-L3, L3-L1
True RMS measure
Lx-N max. voltage < 300Vac cat. III
Generator and Mains Frequency meter:
Resolution = 0.1 Hz.
Accuracy = ±50ppm, ±35ppm/°C (typical)
Battery Voltmeter:
Resolution = 0.1V
Oil Pressure Gauge:
VDO 0-10 Bar, VDO 0-5 Bar, Veglia 0-8 Bar
(Settable curve based on sensors available)
Water or Oil Thermometer:
VDO, Veglia, BERU
(Settable curve based on sensors available)
Fuel Level:
VDO, Veglia
(Settable 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

Power and power factor measures are available as total measure and also for each single phase.
Maximum power and current reached values are memorized with date and time.

Additional measures available based on the isolated and Auto-supplied CAN J1939.

Protections

A set of high efficiency LEDs are used for signalling the current status of the Genset and for the visualization of alarm occurred. By means of text messages it is possible to know the type of the alarm/shutdown occurred.

Status

- Mains live / Disabled
- Generator live
- GCB status
- MCB status (for GC400^{Mains} only)
- BUS live
- Engine running
- Engine cooling
- Engine start and stop

Engine protections

- Fuel reserve
- Max./Min fuel level
- Battery failure (min./max. Voltage)
- Min./Low oil pressure
- Min./Max. engine temperature
- Closing of mains contactor or genset contactor failed
- Engine over crank
- Over speed from generator frequency or pick-up or W
- Generator overload (from external contact of circuit breaker)
- Belt breakage
- Min./Max. battery voltage
- Min./Max. auxiliary current
- Operating conditions not reached
- Emergency Stop

Generator protections

- Underfrequency (81U)
- Overfrequency (81O)
- Undervoltage (27)
- Overvoltage (59)
- Power direction (32P)
- Loss of excitation (Reverse reactive 32RQ)
- Time dependent overcurrent (51)
- Instantaneous overcurrent (50, 50V)
- Synchro-check (25)
- Phase sequence (47)
- Current and Voltage unbalance (46/47)
- Differential protection (50N)
- Ground fault protection (87N)
- Negative sequence (46-I2)

Mains protections:

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

Inputs, outputs and aux. functions

- N. 8+1 Programmable digital Inputs (N.1 for the Emergency stop push button)
- N. 4 Analogue Inputs, if not used, can be used as not isolated digital inputs
- N. 4 Digital programmable Outputs (4A)
- N. 2 Aux. Relay (5A) for fuel solenoid + Crank
- N. 2 Relay (10A) for the changeover management
- N. 2 Analogue and isolated 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.

As option:

- N. 32 Additional and configurable digital I/O with DITEL module
- N. 10 Additional and configurable analogical Input for sensors measure from Pt100 (DIGRIN), Thermocouples (DITHERM) or 0...10mA - 0...20mA (DIVIT)
- N. 10 Additional and fixed analogical Input listed in CANBUS J1939 protocol
- N. 4 Additional and configurable analogical Output (DANOUT)

Load management

In case of multiple plants with several gensets connected in synchro/parallel on the same bus, it is 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 of a CAN interface or analogue interface. GC400 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

GC400^{Mains} controls AVR directly in order to manage the reactive power.

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
- 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 Support
- 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 interface (J1939 and MTU MDEC)
- Isolated CAN interface for PMCBUS application (LOAD–SHARING and parallel management)
- Up to 16 generator sets connected together
- 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
- In case of multiple gensets in parallel to mains where the back synchronization is required, it is necessary to use one GC400 for each genset + one MC100 for the management of the MCB
- **Multilingual device**. The display languages available are: English, Italian, French, Russian, Spanish and Portuguese/ Brazilian

Communication

GC400 / GC400^{Mains}

- N.1 USB Port
- N.1 RS232 Serial port Modbus RTU for external modem
- N.1 RS485 Isolated serial port Modbus RTU
- N.1 RJ45 Port as Ethernet interface TCP/IP
- N.1 Isolated CANBUS J1939 Interface
- N.1 Additional CANBUS (PMCBUS) for the load sharing

GC400^{Link}

- N.1 USB Port
- N.1 RS232 Serial port Modbus RTU for external modem
- N.1 RS485 Isolated serial port Modbus RTU
- N.1 Isolated CANBUS J1939 Interface
- N.1 Additional CANBUS (PMCBUS) for the load sharing
- GPRS/GPS modem

As option:

- 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 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

SI.MO.NE - Central monitor system

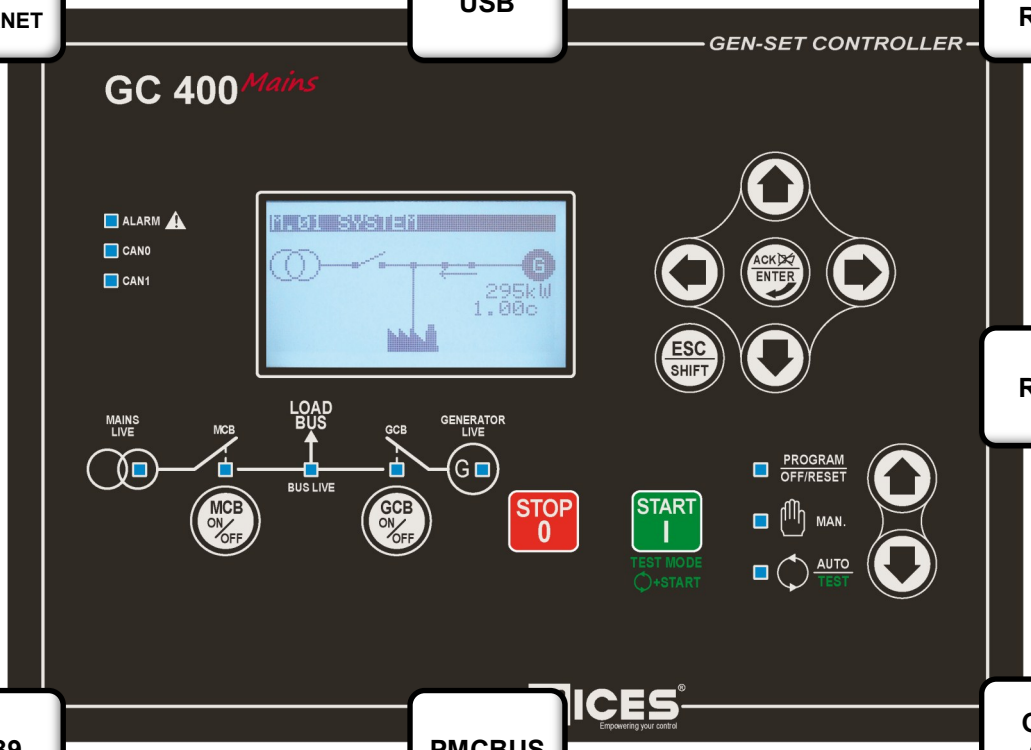
PC

REMOTE MONITORING CONTROL

RJ45 ETHERNET

USB

ISOLATED RS485



RS232

J1939

PMCBUS

GPRS GSM

ELECTRONIC ENGINE

GSM/SMS

E-MAIL

(on GC400Link)

EXPANSION MODULES

FOR DIGITAL AND ANALOGUE I/O

UP TO 16 GENSETS

IN PARALLEL ON THE SAME BUS

SICES®
Empowering your control

GC400[Link]

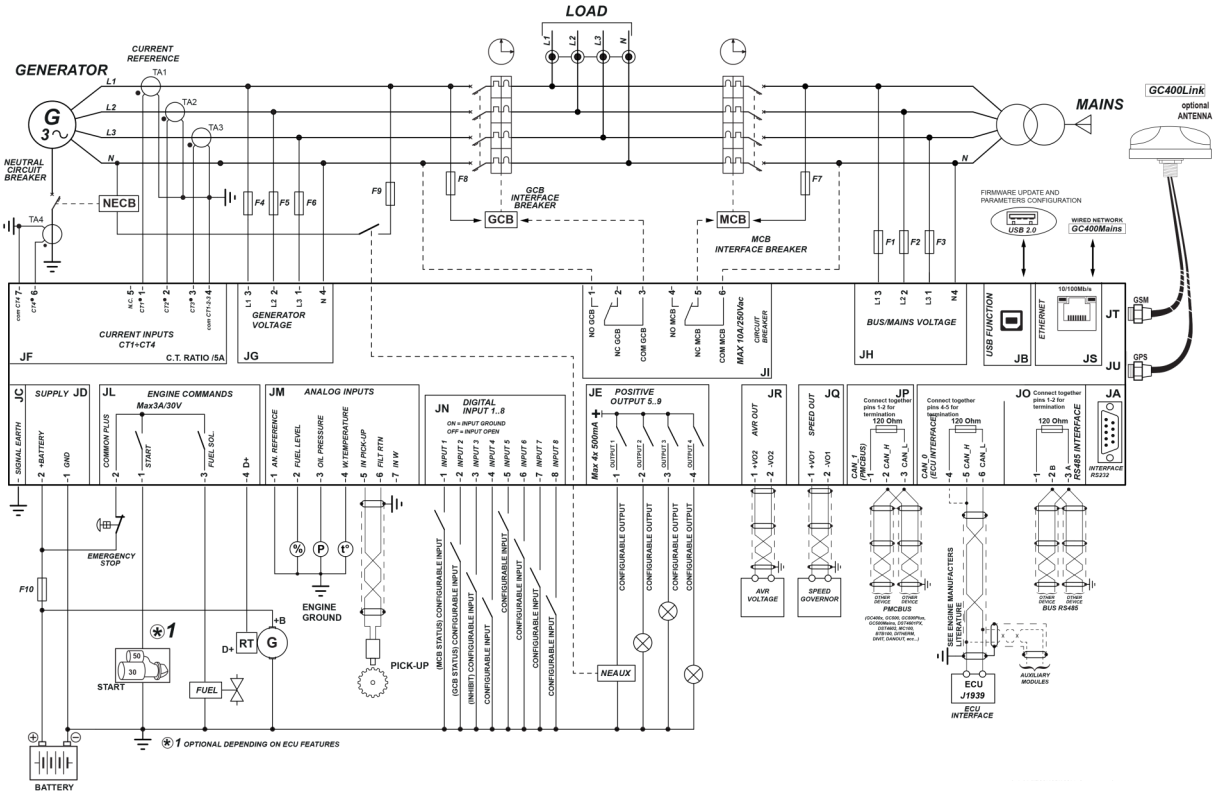
with MODEM GPRS and Antenna GPS built-in!

Use the WEB BASED remote monitor software to be advised in case of any alarm.

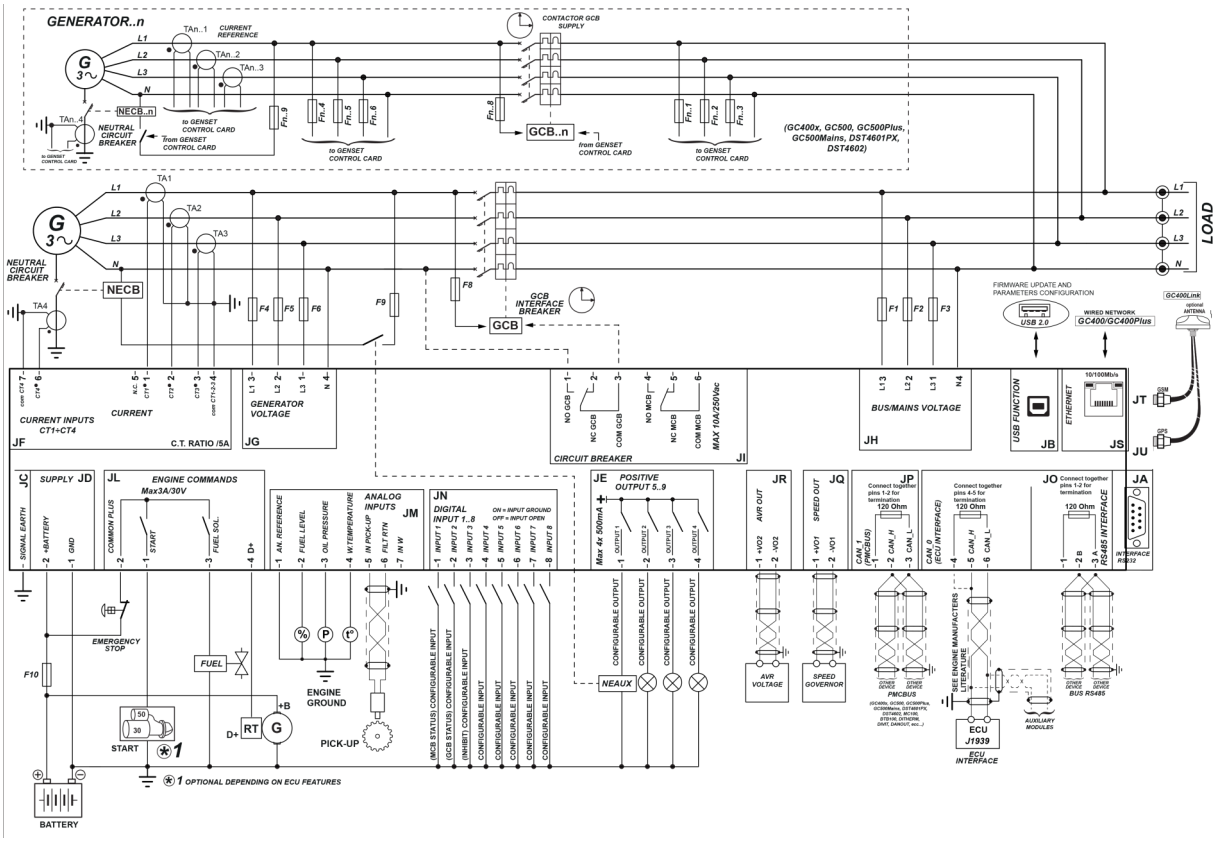
Geo Mapping track plot .

Your solution for rental gensets

SPtM + SSB *(SINGLE PARALLEL to MAINS + SINGLE STAND-BY)*



MMB *(MULTIPLE PRIME MOVER)*



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