SICES®
Empowering your control

# Customized AMF control panel

The electric automatic control panel SICES, if combined to a **stand-by genset** or to a **single prime mover genset,** allows to have a system that, within a few seconds by the Mains failure detection, starts the engine and manage the Mains/Genset switch, connecting the load to the genset.

The control panel is built in a rugged steel sheet carpentry, which is properly processed and subjected to a painting treatment using high resistance epoxy powder.

All the control circuits and signalisations are inbuilt in a **reliable microprocessor based genset controller model GC315$^{Plus}$, GC310 or GC350** mounted on the front door. In case of replacement, the controller can be replaced easily even by unskilled personnel.

The main difference among **GC315$^{Plus}$, GC310 and GC350** control panel is the number of I/O and the communication systems available.

SICES AMF panel is highly customizable according to the customer's needs. Several auxiliary circuits are availble in order to match every specific request.

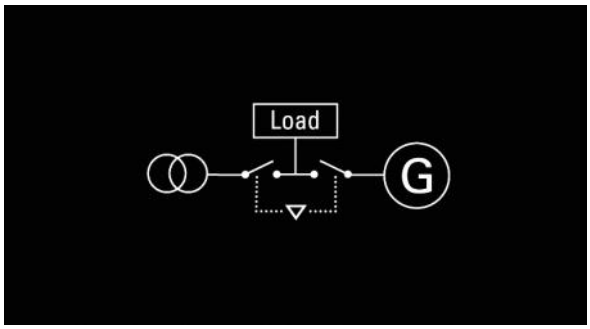
All internal devices with voltage live are compliant to IEC rules.

*Benefits*:

- High-quality standard
- Possibility of customization
- Made in Italy

## General info

*In case of mains failure, the electric control panel GC315Plus, GC310 or GC350 detects the voltage failure and it starts the stand-by genset. The control panel manage the Mains/Genset switch connecting the load to the genset.*
*During the genset operation, both the engine and the alternator are monitored by the microprocessor controller, which displays any alarms with a text message and stops the genset, if needed.*
*The power circuit, when required, is normally separated in a safe place of the cabinet, in order to protect the service people. Only parts of primary brands are used.*
*The carpentry is made of a high-grade steel, which is pre-formed and welded prior to the application of a high-grade powder coated paint finish to withstand hard industrial conditions.*
*Tags and symbols of the control panel are compliant to the international code of the field.*
*Several options are available in order to match any special and customized requirement.*




## Operation sequence

By means of the keyboard of the microprocessor genset controller, which is equipped with push buttons and LEDs on the front, it is possible to select different operation modes:

**OFF/RESET**: engine start inhibition, with forced control of the load supply from the Mains. When the engine is running and the selector switch is turned to the 'OFF' position, the engine shut-down sequence is activated.
Reset of all alarms that cause the engine shut-down.

**PROGRAM**: access to all programmable parameters listed in the "LIST OF SETTING PARAMETERS".

**MANUAL**: engine manual start and stop controls are enabled. The Genset protection devices are activated. The starting control is automatically disabled when the engine is running.

**AUTOMATIC**: automatic start in case of Mains failure. The engine starts through a cycle of starting attempts, each followed by breaks. In case of starting failure, the controller gives an optical signal and forces the Genset to shut-down, avoiding the battery discharge. Upon engine starting, the starting engine is automatically disconnected by the electronic controller. Once the rated conditions are reached, the Genset is connected to the load. The Genset is automatically managed by the proper protection devices. When the Mains is restored within the normal limits, the Genset is automatically disconnected from the load.
The load is then supplied by the Mains and the engine is stopped after an adjustable cooling time.

**TEST:** automatic start for periodical testing operations with safety protections enabled.
The Mains/Genset switch is disabled. Upon Mains failure, the load is immediately supplied by the Genset.

## Power circuit

The power circuit, when required, is separated from the auxiliary control circuits, as per the current safety regulations.
In standard configuration, with front door open, the level of mechanical protection is equivalent to IP20.

Standard configuration is available in 4 versions:

- With only 4 poles motorized changeover switch Mains/Gen Set (160 ÷ 1600A) or couple of mechanical interlocked contactors (40A ÷ 125A)
- With only 3 or 4 poles automatic, fixed and manual handled gen set circuit breaker for the alternator protection.
- With 4 poles motorized changeover switch Mains/Gen Set + Automatic, fixed and manual handled gen set circuit breaker 3 or 4 poles
- Without power circuit

The control panel is also equipped with protection against over current. When the Mains/Genset switch is external to the Control Panel, dedicated contacts for the switch control (connected to an internal terminal board) are supplied inside the Controller.

## Auxiliary circuits and devices

The Control Panel includes, as standard features:

- Microprocessor AMF+ATS controller GC315Plus, GC310 or GC350
- Automatic battery charger 5A - 12/24Vdc or 10A - 24Vdc
- Single-phase voltage supply for engine preheating
- Acoustic alarm horn
- Programmable periodic automatic test
- Genset events and conditions are logged in the microprocessor controller

*OPTIONAL:*

- Control for electric pump 230V for fuel refilling
- Control for electric pump 400V for fuel refilling
- Circuit for couple electric pump (one in back up to the other)
- Control for engine pre-lubrication
- Feeder for engine preheating water composed by contactor + electric pump water recirculation
- Lighting and socket container or engine room
- Feeder for motorized louvers
- Feeders for motorized fans and radiators
- Feeder for speed governor
- Dry contacts
- Feeder for anti-condensation panel and alternator
- Double electric starter management

## Controls

The control system includes an easy-to-use, full function operator panel and LED indicators.
The keyboard of the microprocessor controller is used to select the different operation modes: Off/Reset, Program, Manual, Automatic.

- START Engine start push-button
- STOP Engine stop push-button
- ACK Acoustic alarm silencing push-button
- UP/DOWN Push buttons for the display selection
- Manual Control for changeover switch
- Emergency stop push-button
- ARROW keys for the LCD display selection mode, window selection, parameter change, etc.
- EXIT, ENTER and SHIFT keys
- Fuses on the front for an easy replacement, when needed.

## Measures

**Generator Voltages:**

L1-N, L2-N, L3-N, L1-L2, L2-L3, L3-L1 (GC315$^{Plus}$)

L1-L2, L2-L3, L3-L1 (GC310/GC350)
True RMS measure.
Lx-N max. voltage < 300Vac cat. IIII
High voltage pulse = 6kV 1.2/50 us
Max. measurable voltage = 25.000V (by external TV).

**Generator Currents:**

L1, L2, L3, N (GC315$^{Plus}$)

L1, L2, L3 (GC310/GC350)
True RMS measure.
Nominal max. current: 5Aac
Overload measurable current : 4 x 5Aac (sinusoidal).
Internal current transformer.
Max. nominal current = 6000A (by external TA).

**Mains Voltage:**

L1-N, L2-N, L3-N, L1-L2, L2-L3, L3-L1 (GC315$^{Plus}$)

L1-L2, L2-L3, L3-L1 (GC310/GC350)
Average measure calibrated to RMS.
Lx-N max. voltage < 300Vac cat. IV
High voltage pulse = 6kV 1.2/50 us
Max. measurable voltage = 25.000V (by external TV).

**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 curves available in case of different sensors, using the BoardPRG3)

**Water Thermometer:**
VDO, Veglia (settable curves available in case of different sensors, using the BoardPRG3)

**Fuel Level:**
VDO, Veglia (settable curves available in case of different sensors, using the BoardPRG3)

**Engine revolution counter:**
By pick-up. Programmable teeth number.
Same input can be used by W signal.
**Generator Power and Power factor** measures are available as total measure and also for each single phase.
**Maximum power and current reached values**, are logged with date and time.

## Protections

A set of high efficiency leds are used for signalling the current status of the Genset and for the visualization of the alarm occurred. Secondary alarms are represented by their corresponding display code.

**Status**

- Mains live
- Generator live
- Mains contactor closed
- Generator contactor closed
- Engine running
- Engine cooling
- Engine start and stop

**Engine protections**

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

**Generator protections**

- Under frequency (81U)
- Over frequency (81O)
- Under voltage (27)
- Overvoltage (59)
- Power direction (32)
- Time dependent overcurrent (51)
- Instantaneous overcurrent (50)
- Phase sequence (47)
- Current and voltage asymmetry (46/47)
- Damage protection (51N) - OPTION
- Maximum current phase protection temporized on voltage cut
- Negative sequence I2 (GC315$^{Plus}$)

Other led signalling is available to show the measures selected on the display and the cumulative alarms.

## Communication

- N.1 USB Serial port (GC315$^{Plus}$)
- N.1 RS232 MODBUS Serial port (GC315$^{Plus}$/GC310/GC350)
- N.1 RS485 Modbus RTU serial port (GC315$^{Plus}$/GC350)
- N.1 RJ45 ETHERNET Modbus TCP/IP serial port (GC315$^{Plus}$)
- Direct management  modem PSTN and GSM
- CANJ1939 interface

*OPTIONAL:*

- Rewind as GSM/GPRS/GPS interface
- Dance as Ethernet interface
- Analogic modem
- RS482/RS232/USB Converter
- SI.MO.NE

## Additional features

- Engine diagnostic code
- Periodical test
- Real Time Clock
- Pre-glow and coolant heater management
- Remote start and stop
- Maintenance working
- Embedded alarm horn
- Password protected access for adjust the operating parameters
- Graphic display 70x38mm - 128 x 64 pixel
- LCD: transflective with LED backlight
- Multilanguage device: IT, EN, FR, RU, PT/BR, ES

## Additional technical features

Supply voltage: 230 ÷ 400 Vac (other to be specified)
Auxiliary voltage: 12 Vdc or 24 Vdc
Frequency: 50 Hz or 60 Hz
Insulation: > 50 Mohm
Dielectric strength AC: 2500V/1'
Dielectric strength DC: 1000 V/1'
Level of protection: IP40
Colour: RAL 7032 or RAL7035
Ambient temperature: - 20° to  + 70 °C
Conforming to CEI – IEC – EN rules
2006/95/CE – LOW VOLTAGE DIRECTIVE
2004/108/CE – EMC DIRECTIVE
93/68/CEE – CE STAMP REGULATION
SICES Control panel is designed and manufactured in ISO9001 certified facility


GC310

GC350

GC315

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