catalogue

GENSETS SOLUTIONS

CRE technology

contents

our range at a glance

engine / genset control

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- ALL-IN-ONE — GENSYS 2.0 — GENSYS 2.0 — RDM 2.0 + GENSYS 2.0 CORE
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accessories

- BATTERY CHARGERS — BP — BPR — COMPACT
- MAGNETIC PICK UP — MPU
- ALTERNATOR VOLT. REGULATION — AVR

product selection table

	MDM	MDA	MDA PLUS	MDX PLUS J1939	TCGEN	MNS	BSMII	BSD	BSD PLUS	SCR	C25	DUOGEN	UNIGEN	UNIGEN PLUS	UNIGEN ILS	GENSYS 2.0 LT	GENSYS 2.0	RDM 2.0	GENSYS 2.0 CORE	MASTER 2.0	GENSYS MARINE	GENSYS 2.0 MARINE	BATTERY CHARGERS	MPU	AVR
FUNCTIONS																									
Manual start/stop	•	•	•	•	•											•	•	•	•		•	•			
Automatic start/stop		•	•	•	•											•	•	•	•		•	•			
Auto transfert switch				•	•	•										•	•		•		•	•			
Synch check relay										•	•	•	•	•		•	•		•	•	•	•			
Automatic mains failure				•	•											•	•		•	•	•	•			
Manual / Auto synchronization												•	•	•		•	•	•	•	•	•	•			
Synchroscope										•	•					•	•	•		•	•	•			
Battery chargers 12V/24V																							•		
Alternator voltage regulators 5/12/20 A																									•
Magnetic pickup for speed detector																								•	
Engine/genset diagnostic and monitoring							•									•	•	•			•	•			
Engine control	•	•	•	•	•											•	•	•	•		•	•			
Remote control		•	•	•	•			•	•							•	•		•		•	•			
Event logging		•	•	•				•	•							•	•		•	•		•			
Genset measurements		•	•	•	•											•	•	•	•		•	•			
Engine measurements		•	•	•	•											•	•	•	•		•	•			
Mains measurements					•	•										•	•	•	•		•	•			
PARALLELING																									
Up to 2 gensets												•													
Up to 8 gensets via CAN bus													•	•											
up to 14 gensets														•	•	•	•		•		•	•			
Mains paralleling (single genset)														•		•	•		•		•	•			
Static paralleling/synchronising												•	•	•		•	•		•			•			
Several mains / several gensets																•	•		•	•	•	•			
Load sharing												•	•	•	•	•	•		•	•	•	•			
Load/unload management												•	•	•		•	•		•	•	•	•			
Load shedding																•	•		•	•	•	•			
SPECIAL FEATURES																									
Internal PLC							•										•		•	•	•	•			
Embedded web site							•	•	•								•		•	•	•	•			
Front panel configuration		•	•	•	•					•						•	•	•		•	•	•			
Setting ajustable by potentiometers											•	•	•	•	•								•		
Inputs / ouputs extension				•	•		•										•		•	•	•	•			
Inputs / putputs configurable		•	•	•	•		•									•	•	•	•	•	•	•			
3 phase mains inputs				•	•											•	•		•	•	•	•			
3 phase genset CT/Volt inputs		•	•	•	•							•				•	•		•		•	•			
Barber Colman "plug and play" replacement													•	•	•										
Super Droop (+/- 0,25 Hz)													•	•		•	•		•			•			
PROTECTIONS																									
Phase sequence protections													•	•		•	•		•	•		•			
Short circuit protections					•															•			•		
Engine electrical protections		•	•	•	•											•	•		•	•	•	•			
Genset electrical protections		•	•	•	•											•	•		•	•	•	•			
Reverse power protection					•								•	•	•	•	•		•	•	•	•			
Mains protections / G59					•											•	•		•	•	•	•			
Low frequency protection					•											•	•		•		•	•			•
DISPLAY																									
YES/NO	N	N	Y	Y	Y	N	N	N	N	Y	Y	N	N	N	N	Y	Y	Y	N	Y	Y	Y	N	N	N
COMMUNICATION / PORTS																									
Isolated ports												•	•	•	•	•	•	•	•	•		•			
Ethernet								•	•							•	•	•	•	•		•			
USB																				•					
SD card																•	•		•	•		•			
CAN bus					•			•	•			•	•	•		•	•		•	•	•	•			
J1939					•											•	•		•		•	•			
Modbus / RS485					•		•	•	•							•	•		•	•	•	•			
RS232		•	•					•	•											•	•	•			
GPRS / GSM									•																
Modbus TCP																•	•		•			•			

engine and genset control

CRE Technology offers a complete range of products from start/stop controllers, auto mains failure, auto transfer switch to remote monitoring and to the more advanced all-in-one modules with synchronization, load sharing and PLC features.

They all benefit from our 30 year technological expertise that gives you a competitive edge in your business.

You also benefit from our dedicated team of engineers and after sales department that will support you in your projects.

MDM

Manual start unit

- Simple and basic unit
- 50/60 Hz compatibility
- Basic engine protection
- Preheat or “Energize to stop” output

The MDM unit from CRE Technology is a basic, microprocessor controlled unit designed to start and stop the genset manually using the key switch and pushbuttons on the front panel. It has high power relay outputs enabling it to interface directly with diesel gensets.

When the engine is running, the unit monitors fault conditions and shuts down the engine automatically if an alarm occurs. The alarms are identified by LEDs.

This unit is perfect for backup mode solution.

A SIMPLE PRODUCT FOR BASIC APPLICATIONS

The manual start and stop sequences have been reduced to their simplest form. The front panel provides “RUN” and “OFF” positions, with a preheat button when required. This button is also used in the “energize to stop” mode. The alarm LEDs show any engine fault conditions: overspeed, underspeed, high engine temperature, low oil pressure, auxiliary shutdown.

ENERGIZE TO STOP CONTROL

The MDM is also able to control ‘Energize to Stop’ engines. When the ‘Energize to Stop’ option is selected, the auxiliary relay output will be energized during the stop timer and the led associated with this condition will be turned on.
The choice of engine type is made using a jumper switch.

50/60 HZ COMPATIBILITY

The limits for the correct generator frequency are 25 to 57 Hz when in 50Hz operation and 25 to 68Hz for 60Hz operation.

RELIABLE AND SIMPLE

The MDM is dedicated to basic applications which require no extra costs or expensive hardware. The MDM has passed EMC and low voltage tests, and all units are 100% tested before delivery.

OUTPUTS

- Fuel solenoid: 10A@28V_{DC}.
- Start: 10A@28V_{DC}.
- Auxiliary: 10A@28V_{DC}.

INPUTS

- DC supply: 12 or 24 V_{DC}, (+) and (-) terminals.
- L1: generator phase voltage.
- Neutral: generator neutral terminal.
- High temp switch.
- Low oil pressure.
- Aux: spare fault input. A negative supply connected to this input will cause the engine to be stopped immediately and an alarm to be triggered (independent of the protection hold-off timer).
- Charge: this terminal will supply the excitation current and measure the voltage of the charge alternator.

OPTIONS

- Engine control (without alternator).

CHARACTERISTICS

Current, voltage and frequency

- Alternator voltage: 15 to 300 V_{AC}
- Alternator frequency: 50 or 60 Hz nominal.
- Overspeed: nominal frequency + 14% (+24% overshoot)
- Underspeed: 25Hz
- DC supply range: 8 to 33 V_{DC}.
- Current consumption: 80mA max. (Outputs open).
- Charge fail threshold: 6 V_{DC}.
- Charge excitation current: via a 82 Ω resistor connected to the FUEL output.

Environment

- Operating temperature: -20°C (-4°F) to 70 °C (158°F).
- Storage temperature: -30°C (-22°F) to 80 °C (176°F).
- Maximum humidity: 95% non-condensing.

Dimensions and weight

- Dimensions: 72x72x38mm (WxHxD)
- Panel cut-out dimensions: 68x68 mm
- Weight: 140g (approx.)

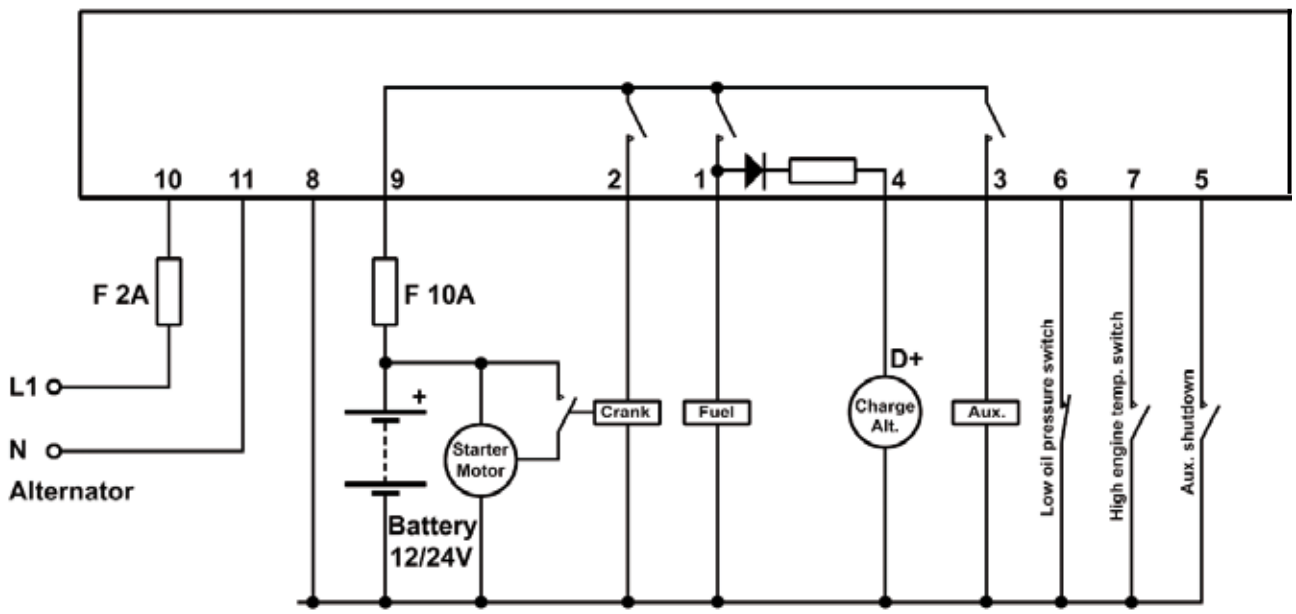
Homologation

- EMC
- Low Voltage

PART NUMBER
A60Z3

SOFTWARE
Rainbow 2.026

MDM



MDA

Automatic start unit

- Simple and basic unit
- 50/60 Hz compatibility
- Basic engine protection
- Preheat or “Energize to stop” output

The MDA unit from CRE Technology is a basic, microprocessor controlled unit designed to start and stop the genset automatically on request of an external Remote Start signal. It has high power relay outputs enabling it to interface directly with diesel gensets.

A SIMPLE PRODUCT FOR BASIC FUNCTIONS

When the engine is running, the unit monitors fault conditions and shuts down the engine automatically if an alarm occurs. The alarms are identified by LEDs. On an OFF position, the module is de-energized and the remote start is disabled with no current consumption. The unit uses high current two part connectors for easy replacement.

ENERGIZE TO STOP CONTROL

The MDA is also able to control ‘Energize to Stop’ engines. When the ‘Energize to Stop’ option is selected, the auxiliary relay output will be energized during the stop timer and the led associated with this condition will be switched on. The selection of engine type is made by a jumper switch.

50/60 Hz COMPATIBILITY

The unit is able to operate with both 50 and 60 Hz systems. The selection is made with a jumper switch.

RELIABLE AND SIMPLE

The MDA is dedicated to basic applications which need no extra costs or expensive hardware. The MDA has passed EMC and low voltage tests, and all units are 100% tested before delivery.

OUTPUTS

- Fuel solenoid: 10A@28V_{DC}.
- Start: 10A@28V_{DC}.
- Auxiliary: 10A@28V_{DC}.

INPUTS

- DC supply: 12 or 24 V_{DC}, (+) and (-) terminals.
- L1: generator phase voltage.
- Neutral: Generator neutral terminal.
- High temp switch: negative closing switch input.
- Low oil pressure: negative closing switch input.
- Remote start: a negative supply connected to this input will run the engine.
- Charge: connect the charge alternator's D+ output to this terminal. This terminal will supply the excitation current and measure the voltage of the charge alternator.

OPTIONS

- Preheat with activate to start
- Energize to stop without preheat.

CHARACTERISTICS

Current, voltage and frequency

- Alternator voltage: 15 to 300 V_{AC}
- Alternator frequency: 50 or 60 Hz nominal.
- Overspeed: nominal frequency + 14% (+24% overshoot)
- Underspeed: 25Hz
- DC Supply Range: 8 to 33 V_{DC}.
- Current consumption: 80mA max. (Outputs open).
- Charge fail threshold: 6 V_{DC}.
- Charge excitation current: via 82 Ω resistor connected to the FUEL output.

Start/Stop sequence

- Preheat delay: 10 s.
- Wait before Start: 0.75 s.
- Start duration: 6 s.
- Wait between starts: 10 s.
- Number of start cycles: 3
- Protection hold-off timer: 12 s.
- Cooldown duration: 2 minutes
- Stop timer: 30 s.

Environment

- Operating temp.: -20°C (-4°F) to 70°C (158°F).
- Storage temp.: -30°C (-22°F) to 80 °C (176°F).
- Maximum humidity: 95% non-condensing.

Dimensions and weight

- Dimensions: 72x72x38mm (WxHxD)
- Panel cut out dimensions: 68x68 mm
- Weight: 140g (approx.)

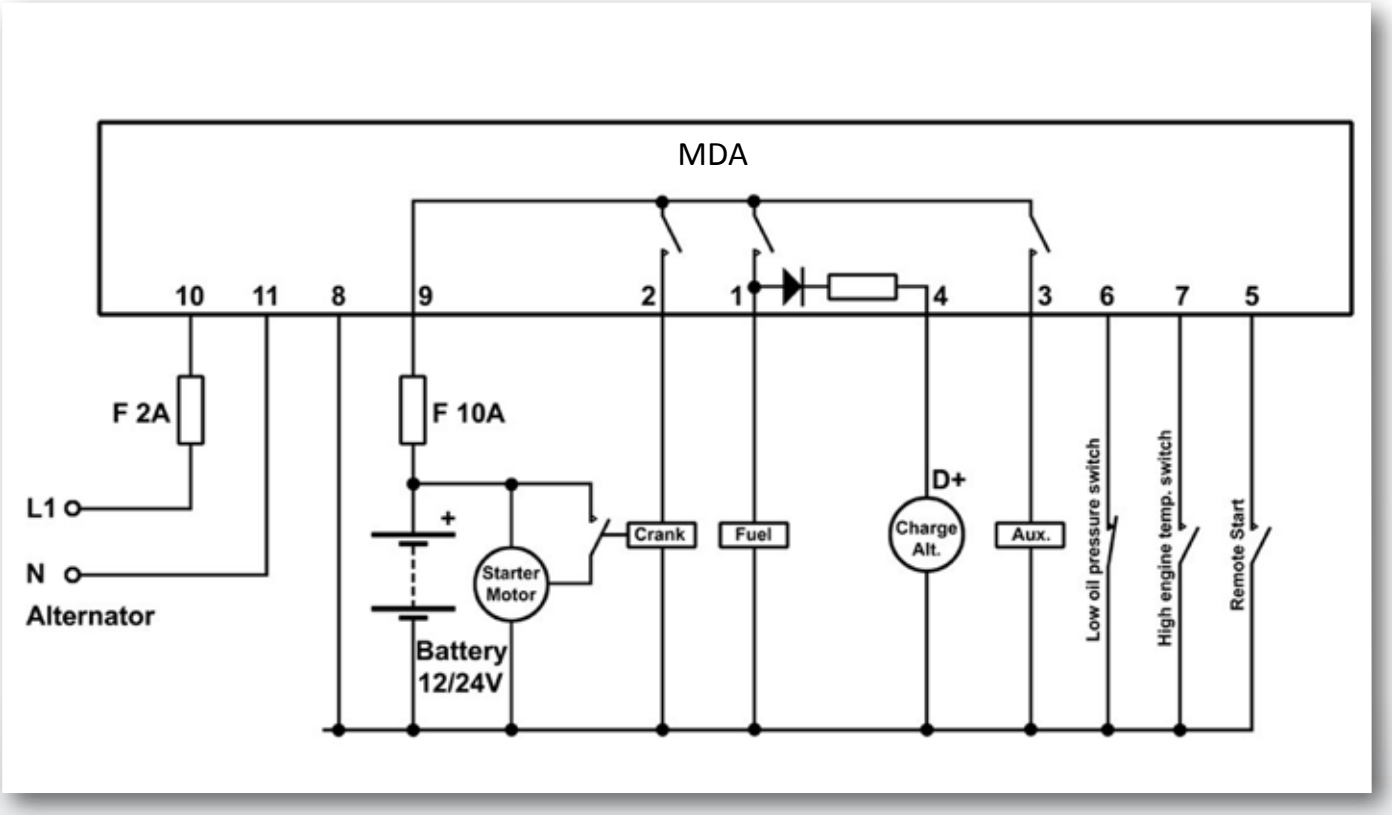
Homologation

- EMC
- Low Voltage

PART NUMBER
A60Y1

SOFTWARE
Rainbow 2.026

ASSOCIATED PRODUCTS
Advanced: MDA PLUS



MDA PLUS

Manual and remote start unit

- Simple and basic unit
- Basic engine protection
- Manual and remote control
- Display
- Automatic or manual start/stop
- Output extensions

The MDA PLUS is a comprehensive generator control unit, designed to start and stop the generating set both manually and remotely.

The manual control is operated via the pushbuttons on the front panel. The remote control is activated via the remote start input signal on the module.

A SIMPLE PRODUCT FOR COMPREHENSIVE FUNCTIONS

In the RUN position, the MDA PLUS controls the automatic start and stop sequence of the generating set. Once the generator is running, it monitors internal protections and external fault inputs. If a fault condition occurs, the unit shuts down the engine automatically and indicates the source of the failure with a warning lamp.

FRONT PANEL CONFIGURATION

The MDA PLUS provides a comprehensive set of digitally adjustable timers, threshold levels, input and output configurations and operating sequences. The unauthorized access to program parameters is prevented by the program lock input. All programs may be modified via front panel pushbuttons, and do not require an external unit.

TELEMETRY AND REMOTE PROGRAMMING

The MDA PLUS module provides the user with large telemetry facilities via its standard RS-232 serial port. The unit can be connected either to a PC or a modem for remote communication. The PC software provides local, Local Area Network (LAN), internet and modem operation capabilities.
The PC program is used for the following purposes:

- parameter upload/download
- remote monitoring
- diagnostics and analysis

CONFIGURABLE INPUTS/OUTPUTS

The unit has 7 configurable digital inputs and 2 configurable analog inputs. The remote start input is not programmable.
The unit also provides 4 relay outputs of which 2 have programmable functions which are selected in a list. In addition to genset control signals, any specific alarm information may be transmitted via a relay output.

STATISTICS AND EVENT LOGGING

The following incremental counters provide statistics about the past performance of the generating set: engine hours run, engine hours to service, time to service, number of crank attemps, and number of genset runs.

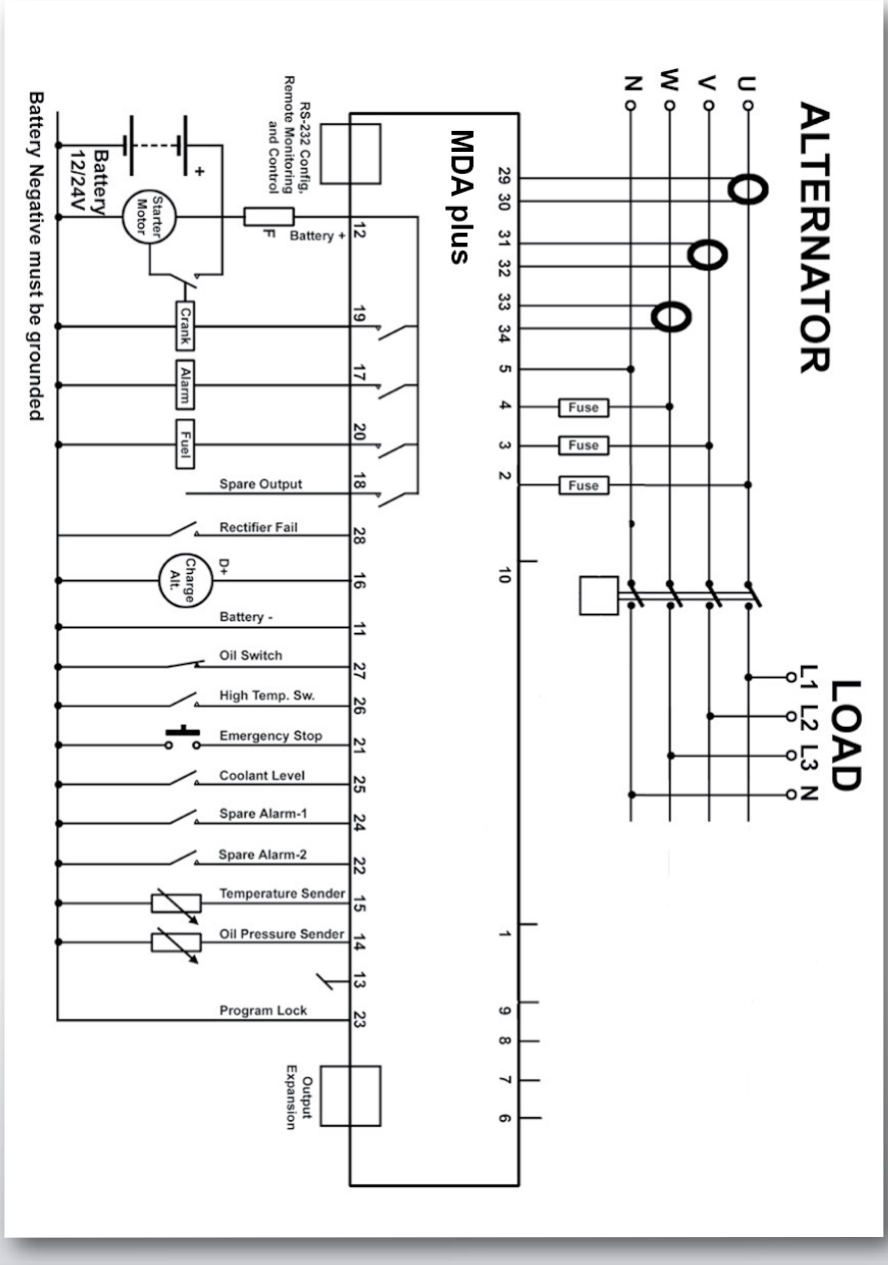
The MDA PLUS also records the last 12 events. These records are displayed on the software.

FEATURES

- Both manual and remote starting and stopping,
- Start/ stop sequences
- Engine protections
- Generator protections
- Built in alarms and warnings
- 3 phase genset voltage inputs
- 3 phase genset CT inputs
- Periodic maintenance request indicator
- Hours run counter
- Event logging
- Statistical counters
- Password capability
- On-site adjustable parameters
- RS-232 serial port
- Free MS-Windows Remote monitoring Software
- Remote Start operation available
- Able to survive cranking dropouts
- Plug-in connection system for easy replacement

INPUTS/OUTPUTS

- Configurable analog inputs: 2
- Configurable digital inputs: 7
- Configurable relay outputs: 2
- Total relay outputs: 4
- Output extension capability



MEASUREMENTS

- Engine oil pressure
- Engine coolant temperature
- Genset active power
- Genset power factor

CHARACTERISTICS

Current, voltage and frequency

- Alternator voltage: 15-300 V_{AC} (Ph-N)
- Alternator frequency: 0-100 Hz.
- DC supply range: 9.0 to 33.0 V_{DC}
- Cranking dropouts: survives 0 V for 100ms.
- Typical standby current: 100 mA
- Max. operating current: 300 mA (relay outputs open)
- Relay outputs: 10 A / 28 V
- Charge excitation current: 54mA @ $12V_{DC}$.

Component details

- Analog input range: 0-5000 Ω.
- Serial port: RS-232, 2400 bauds, no parity, 1 stop bit.

Environment

- Operating temp.: -20°C (-4°F) to 70 °C (158°F).
- Storage temp.: -30°C (-22°F) to 80 °C (176°F).
- Maximum humidity: 95% non-condensing.
- Protection: IP65 for the front panel, IP30 for the rear.
- Case Material: high temperature (110°C)

Dimensions and weight

- Dimensions: 155 x 115 x 48 mm (WxHxD)
- Panel cut-out dimensions: 151x111 mm minimum.
- Weight: 310 g (approx.)

Homologation

- EMC
- Low voltage

PART NUMBER
A60Y3

SOFTWARE
Rainbow 2.026

CABLE
A60R2

MDX PLUS J1939

Automatic mains failure unit

- Automatic Mains Failure
- Basic unit
- Configurable inputs / outputs
- Engine control
- Generator protection
- 6 displays + power plant diagram
- J1939 communication
- Modbus

The MDX PLUS J1939 is a comprehensive AMF unit for a single generating set operating in standby mode. The unit is controlled with front panel pushbuttons.

The MDX PLUS J1939 provides a comprehensive set of digitally adjustable timers, threshold levels, input and output configurations and operating sequences.

A BASIC UNIT WITH ADVANCED FEATURES

The MDX PLUS J1939 monitors mains phase voltages and controls the automatic starting, stopping and load transfer of the generating set in case of a mains failure. Once the generator is running, it monitors internal protections and external fault inputs. If a fault condition occurs, the unit shuts down the engine automatically and indicates the source of the failure with a warning lamp.
The AMF can manage 3 phase mains and 3 phase gensets. It provides 3 CT inputs on the genset side.

J1939 FEATURES

The MDX PLUS J1939 provides a CAN bus port with J1939 in order to communicate with electronic engines controlled by an ECU (standard J1939, Cummins, Perkins, Volvo...). The option also includes Modbus RTU communication (on RS232).

TELEMETRY AND REMOTE PROGRAMMING

The MDX PLUS J1939 module provides the user with extensive telemetry facilities via its standard RS-232 serial port. The unit can be connected either to a PC or to a modem for remote communication. The PC software offers local, Local Area Network (LAN), internet and modem operating capabilities. Note that the modem mode is also compatible with the LAN and internet modes, so that data may be distributed by the PC for reuse on the LAN or internet.
The PC program is used for parameter upload/download, remote monitoring, diagnostics and analysis.

CONFIGURABLE INPUTS/OUTPUTS

The unit has 7 configurable digital inputs, 3 configurable analog inputs and 2 configurable relay outputs (6 relay outputs in all).
MDX PLUS J1939 provides output extension possibilities for up to 16 digital outputs.

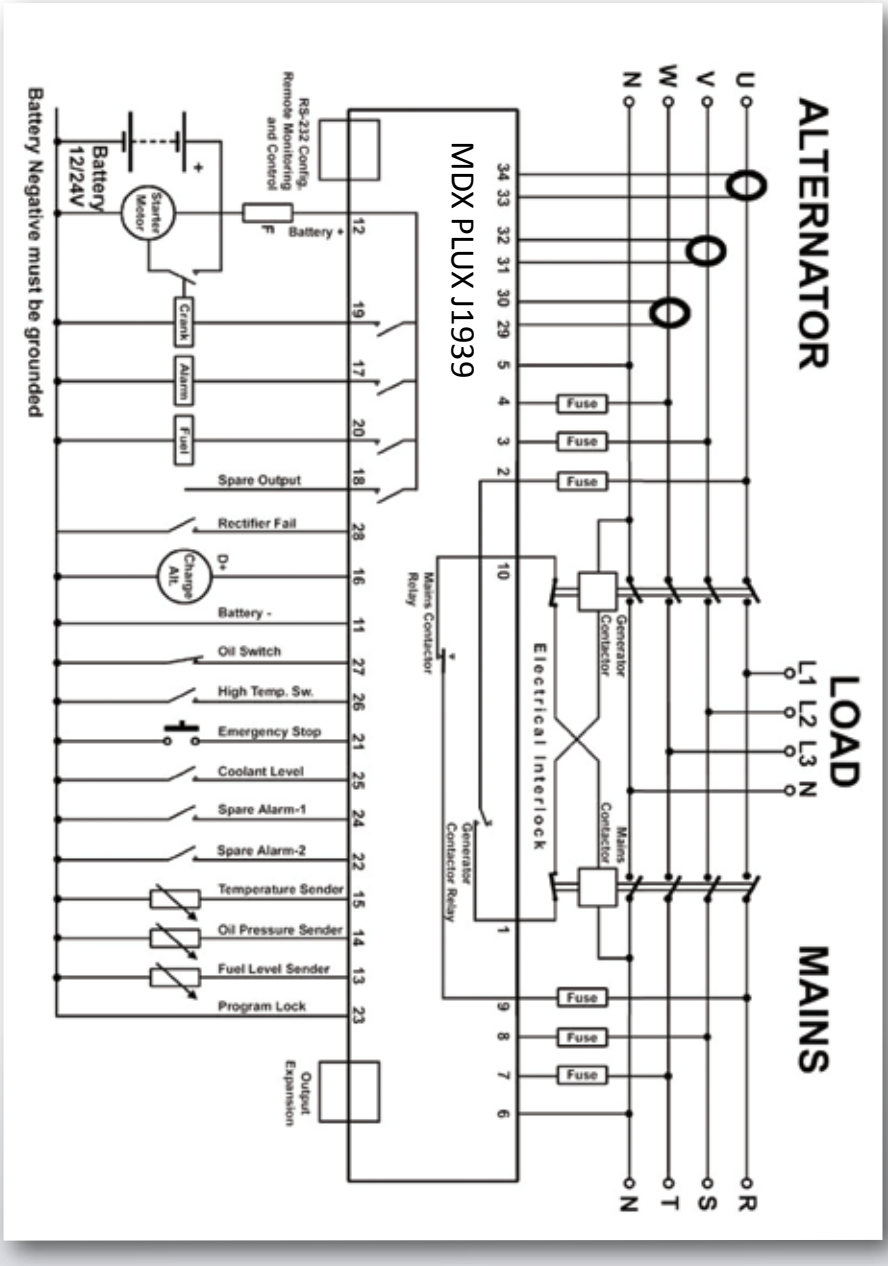
STATISTICS AND EVENT LOGGING

The unit provides event logging with a time stamp (last 12 events) and incremental counters about past genset performance:

- Engine hours run, engine hours to service
- Time to service, number of engine cranks
- Number of genset runs, number of gensets on load

FEATURES

- Automatic mains failure
- Engine control
- Generator protection
- Built in alarms and warnings
- 3 phase mains voltage inputs
- 3 phase genset voltage inputs
- 3 phase genset CT inputs
- Engine oil pressure measurement
- Engine coolant temperature measurement
- Fuel level measurement
- Genset active power measurement
- Genset power factor measurement
- Periodic maintenance request indicator
- Daily / weekly / monthly exerciser
- Event logging with time stamps
- Statistical counters
- Real time clock with battery back-up
- Weekly operation schedule
- On site adjustable parameters
- RS-232 serial port
- Remote start operation available
- Survives cranking dropouts
- Plug-in connection system for easy replacement



MEASUREMENTS

- Generator voltage: U-N
- Generator current: U
- Generator kW single phase (phase U)
- Generator power factor (phase U)
- Generator frequency
- Mains voltage: R-N, S-N, T-N, R-S, S-T, T-R
- Battery voltage
- Engine coolant temperature, oil pressure

CHARACTERISTICS

Current, voltage and frequency

- Alternator voltage: 15-300 V-AC (Ph-N)
- Alternator frequency: 0-100 Hz.
- Mains voltage: 300 V-AC max. (Ph-N)
- Mains frequency: 50/60 Hz.
- DC supply range: 9.0 to 33.0 V-DC
- Typical standby current: 100 mA-DC
- Maximum operating cCurrent: 350 mA-DC
- Generator breaker relay output: 16 A / 250V
- Mains Breaker Relay Output: 16 A / 250V
- DC Relay Outputs: 10 A / 28V
- Charge excitation current: 54mA @ 12V-DC.

Component details

- Analog input range: 0-5000 Ω.
- Serial port: RS-232, 2400 bauds, 1 stop bit

Environment

- Operating temp.: -20 °C to 70 °C .
- Storage temp.: -30 °C to 80 °C .
- Maximum humidity: 95% non-condensing.
- Protection: IP65 for the front panel, IP30 for the rear.
- Case Material: High Temperature (110 °C)

Dimensions and weight

- Dimensions: 180x125x48mm
- Panel cut-out dimensions: 176x121 mm minimum.
- Weight: 460 g

Homologation

- EMC
- Low Voltage

PART NUMBER
A60V7

SOFTWARE
Rainbow 2.026

TCGEN

Automatic mains failure unit with remote display

- Automatic Mains Failure
- Graphic remote display
- Configurable inputs / outputs
- Gensets and mains Protections
- Full communication ports :
  RS232/RS485 Modbus/LAN/CAN J1939
- Multilingual :
  French, Spanish, English, Chinese, Russian, Italian, Polish, German

TCGEN controller is a supervision equipment for generators with remote display and starts the genset in case of mains failure.
This controller is composed of 2 different modules:

• Remote display module
The remote diplay module provides information about the status of the device and, at the same time, allows the user to interact with it. With this visualization module the user is able to control, program and configure the functions of the unit.

• Core unit
The core unit controls and monitors the control board. It is located in the rear part of the panel, in order to reduce the wiring and to avoid electromagnetic disturbances. Every signal, sensor and actuator is connected to this module.

Connection between those 2 modules is made by a CAN bus (Communication bus).

HIGH PROTECTION
TCGEN offers large numbers of protection for the Genset, as well as the different instruments and devices connected to the genset.

COMPLETE SET OF MEASUREMENTS
The unit allows a complete monitoring of the genset without any additional module or external sensors. Besides the protections, TCGEN offers a continuous monitoring of the genset with his digital display: voltage, currents, frequency, fuel level, tachometer (hour counter), power consumption, charge alternator voltage, battery voltage, engine temperature, oil pressure, current power measures, power factor, status of the programmable inputs, total energy consumption measures, alarm control.

GREAT VERSATILITY
This device could be easily adapted to any specific requirement and several configurations could be assigned to the same device. From a standard design, it is possible to extend those configurations according to your needs. The same control panel can also be used with different voltages and with different electrical supply voltages: 12/24V (stock reduction).

SIMPLE

Installation is really simple and the wiring system is shortened. It is easy to switch from automatic to manual mode. With one simple programming of the control panel you can adjust measures and levels. Power outputs remain protected. The unit allows up to 64 units on the same CAN communication bus and up to a 1.000 meters distance without any signal repeaters.

FAST PROGRAMMING

It is possible to personalize the features of the control panel to your own application. Apart from programming measure parameters, thresholds, timings, alarms, regulations, etc, you can also program the control panel to stop the genset (with or without cooling time) or trip a warning without stopping the engine.

DIFFERENT STARTING MODE

Manual start, automatic start, mains failure, or free voltage contact.
Its "locked mode" inhibits the pushbuttons on the front panel and prevents any operating mistakes.

PROTECTIONS

Engine:

- High water temperature
- Low oil pressure
- Battery charger alternator
- Start Failure
- Low coolant level
- Fuel storage
- Overspeed
- Underspeed
- Battery low voltage
- High coolant temperature by sensor
- Low oil pressure by sensor
- Low fuel level by sensor
- Unexpected shutdown
- Stop Failure
- Low Engine temperature
- Genset voltage Droop
- Emergency stop
- Genset contactor switching failure

Generator:

- Overload
- Genset voltage asymmetry
- Maximum genset voltage
- Minimum genset voltage
- Maximum genset Frequency
- Minimum genset Frequency
- Erroneous phase sequence of the genset
- Reverse power
- Shortcircuit

Mains

- Maximum mains voltage
- Minimum mains voltage
- Maximum mains frequency
- Minimum mains frequency
- Mains phase sequence failure
- Mains power failure
- Mains contactor switching failure

Programming timer

The programming timer informs the controller device about the current date and hour.
This device allows the weekly programming of:

- Programmed starts.
- Programmed cut-outs.
- Programmed engine and maintenance tests.
- Extension of the fault history.
- Power counters (day, month, year).

The maximum capacity of the timer is 5 daily programs. The TCGEN must be in automatic mode to carry out the programming.

focus on

EXTENSIONS

Multi-visualization

You can add as much display modules as you wish to one core unit via the CAN connection.

Users Softwares

The Monitoring software allows to control, program and monitorize the TCGEN either in local or remote mode.
In local mode, the Monitoring software can be up to 1km distance away by using 2 CAN/BUS cables.
The Telecontrol functions in local mode are :

- Possibility of total management from PC
- Input/Output status visualization.
- Memory events visualization with date/hour (history records till 100 events)
- Alarms visualization
- Time programming from PC.
- Parameters management

Related software :

- Configuration software
- Monitoring software

TCGEN

FEATURES

Engine alarm inputs:

- Fuel reserve.
- Oil pressure.
- Coolant temperature.
- Coolant level.
- Emergency stop. (stop button).

Analogic engine inputs

- Fuel level.
- Oil pressure.
- Coolant temperature.
- Configurable input (i.E. Oil temperature).
- Battery charge alternator voltage.

5 Configurable inputs to carry on:

- Mains contactor feedback.
- Genset contactor feedback.
- Rate change notice.
- Rate change.
- Start disabling.
- External start.
- Test.
- Manual override.
- 3 programmable alarms.

Engine statistics:

- Number of working hours.
- Number of starts.

Controls engine's functions:

- Pre-heating or Glow Plug.
- Stop.
- Start.
- Coolant heater.
- Fuel Transfer pump.
- Alternator excitation.
- Monitoring outputs of the operative conditions of the controller:
  - Engine running (on).
  - Control board alarm.
  - 3 programmable outputs which monitor the control board alarm conditions or the inputs about the engine data.
- 3 relay outputs incorporated:
  - Mains contactor output.
  - Genset contactor output.
  - Fuel pump / water heating output.

MEASUREMENTS

- Phase to neutral voltage.
- Phase to phase voltage.
- Phase amperage.
- Frequency.
- Real, apparent and reactive powers.
- Power factor and cos (φ).
- Instant power (kWh) and historical power (day, month, year).

CHARACTERISTICS

Current, voltage and frequency

- Voltage supply: min. 8V max. 30V
- Maximum amperage consume when rest: 100mA
- Starting output amperage: 70A in transitory regime, 40A during one second. 20 A in regime of stationary work.
- Output amperage when engine stop: (exc./des) 70A in transitory regime, 40A during one second. 20 A in regime of stationary work.
- Pre-heating output amperage: 70A in transitory regime, 40A during one second. 20 A in regime of stationary work.
- Alarm contact amperage, Engine working 1A
- Genset/Mains contactors max. amperage 8A
- Genset frequency status: 30-80 Hz
- Pick-up frequency status: 100 Hz at 8 kHz

Component details

- Fuel level resistance: 330 Ω.
- Measure Accuracy: 1%

Environment

- Operating temp.: -20 °C to 80 °C .
- Protection rank: IP65 (on control panel)

Dimensions and weight

- Visualization module dimensions: 210x160x35,5mm
- Visualization module weight: 437 g
- Measurement module dimensions: 202x117x36mm
- Measurement module weight: 324 g

Other

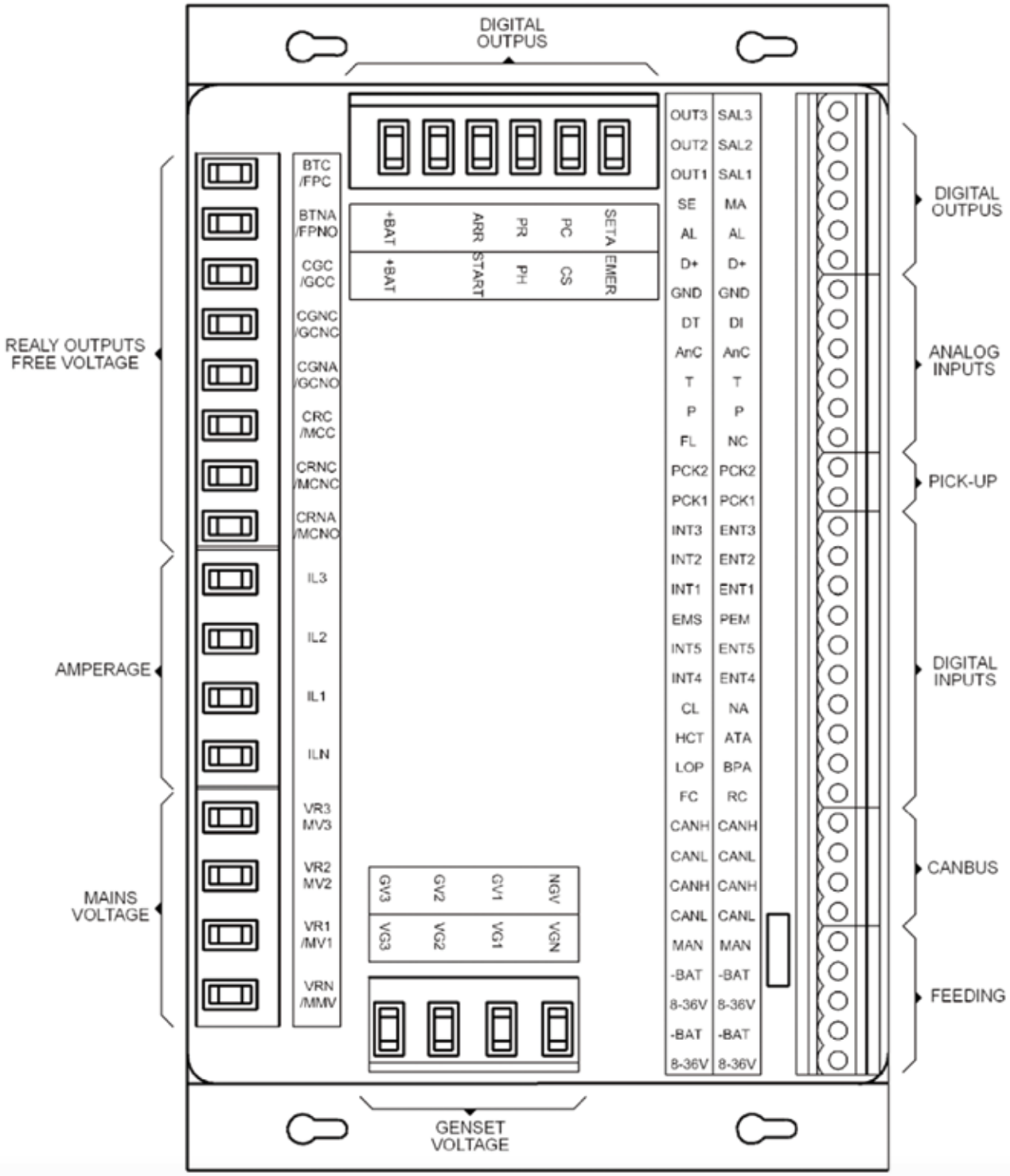
- Languages : French, Spanish, English, Chinese, Russian, Italian, Polish, German

PART NUMBER
A62Z0

SOFTWARE
Monitoring Soft/ Configuring Soft

CABLE
A60W5 (CAN/USB)

ASSOCIATED PRODUCTS
Reduced: MDX PLUS J1939
Complementary: GENSYS 2.0


DIGITAL OUTPUS
REALY OUTPUTS FREE VOLTAGE
AMPERAGE
MAINS VOLTAGE
GENSET VOLTAGE
DIGITAL OUTPUS
ANALOG INPUTS
PICK-UP
DIGITAL INPUTS
CANBUS
FEEDING
BTC /FPC
BTNA /FPNO
CGC /GCC
CGNC /GCNC
CGNA /GCNO
CRC /MCC
CRNC /MCNC
CRNA /MCNO
IL3
IL2
IL1
ILN
VR3 MV3
VR2 MV2
VR1 /MV1
VRN /MMV
+BAT
+BAT
ARR START
PR PH
PC CS
SETA EMER
GV3 VG3
GV2 VG2
GV1 VG1
NGV VGN
OUT3 SAL3
OUT2 SAL2
OUT1 SAL1
SE MA
AL AL
D+ D+
GND GND
DT DI
AnC AnC
T T
P P
FL NC
PCK2 PCK2
PCK1 PCK1
INT3 ENT3
INT2 ENT2
INT1 ENT1
EMS PEM
INT5 ENT5
INT4 ENT4
CL NA
HCT ATA
LOP BPA
FC RC
CANH CANH
CANL CANL
CANH CANH
CANL CANL
MAN MAN
-BAT -BAT
8-36V 8-36V
-BAT -BAT
8-36V 8-36V

MNS

Auto transfert switch unit

- Simple and effective unit
- 3 phase mains voltage monitoring
- Adjustable voltage with potentiometer
- Remote start output

The MNS is a basic, microprocessor controlled unit designed to monitor 3-phase mains voltages, send remote start commands to the generating set, and manage changeover of both the generator and the mains contactors.

The genset should be controlled by a Remote Start control unit.

A SIMPLE PRODUCT FOR BASIC APPLICATIONS

The functions have been reduced to the minimum. The front panel mimic diagram provides information about the mains and generator power availability as well as contactor positions.
The MNS continuously monitors the AC mains phase voltages. If at least one of the phase voltages goes outside set limits, it triggers a transfer cycle.

SPECIAL TEST MODE FUNCTION

The MNS provides a TEST mode pushbutton allowing the genset to be tested without a mains failure. The Test mode is also called the Emergency Backup mode which keeps the genset running and makes a quick transfer in the event of a mains failure.

HIGH COMPATIBILITY AND FLEXIBILITY

Because of the simplicity of its connections, the MNS may be used with most commercially available or custom built engine control systems.
The lower limit of the mains and genset voltages may be manually adjusted via the potentiometer found on the left hand side of the unit. The upper voltage limit is factory set.
The unit uses two part connectors for easy replacement

RELIABLE AND EASY TO USE

The MNS is dedicated to basic applications which require no extra costs or expensive hardware.
All CRE Technology products aim to provide the same satisfaction levels. The MNS has passed EMC and low voltage tests, and each unit is 100% tested before delivery.

INPUTS

- DC SUPPLY: 12 or 24 volts DC, (+) and (-) terminals.
- R-S-T: mains phase voltages.
- MN: mains neutral terminal.
- G: Generator phase voltage.
- GN: Generator neutral terminal.

OUTPUTS

MAINS CONTACTOR:

Normally closed relay output connecting the phase-R voltage to the terminal. (10amps@250V-AC)

GENERATOR CONTACTOR:

Normally open relay output connecting the phase-G voltage to the terminal. (10amps@250V_{AC})

REMOTE START:

Normally open engine start request relay output. Connects the battery positive to the terminal. (10amps@28V-DC)

CHARACTERISCTICS

Current, voltage and frequency

- Alternator Voltage: 15-300 V-AC (Ph-N)
- Mains voltages: 300 V-AC max (Ph-N)
- DC supply range: 9 to 33 V-DC.
- Current consumption: 80mA max. (Outputs open).
- Low Voltage Limit: Adjustable from 70 to 270V-AC.
- High voltage Limit: 320 V-AC Ph-N (fixed)

Sequence timer

- Wait Before Remote Start: 3 sec.
- Engine Heating Period: 5 sec.
- Generator Contactor Delay: 0.75 sec.
- Mains Return Delay: 30 sec.
- Mains Contactor Delay: 0.75 sec.

Environment

- Operating temp.: -20 °C (-4 °F) to 70 °C (158 °F).
- Storage temp.: -30 °C (-22 °F) to 80 °C (176 °F).
- Maximum humidity: 95% non-condensing.

Dimensions and weight

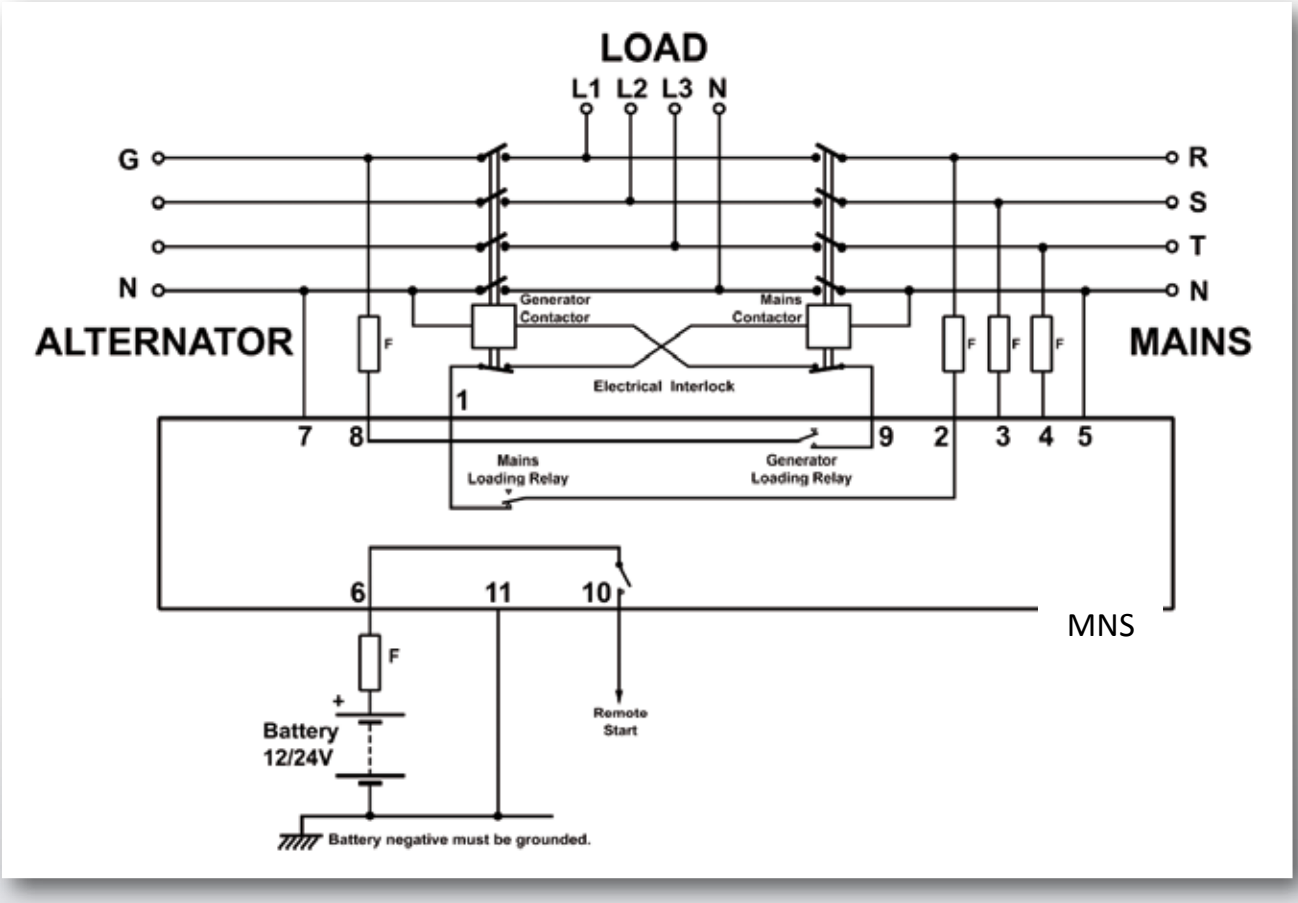
- Dimensions: 72x72x38mm (WxHxD)
- Panel cut-out dimensions: 68x68 mm
- Weight: 140g (approx.)

Homologation

- EMC
- Low voltage

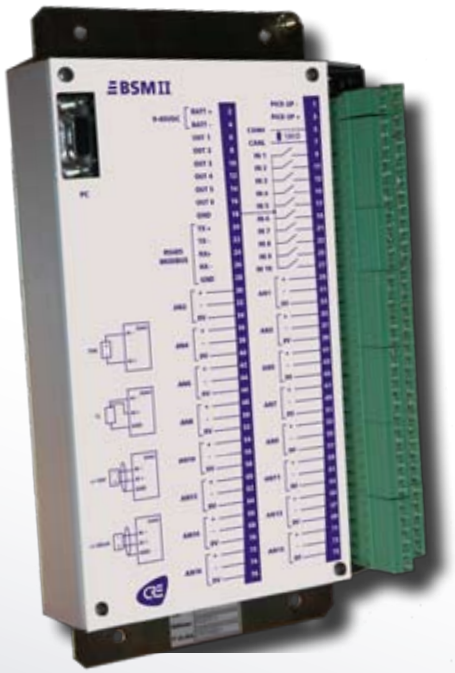
PART NUMBER
A60W1

ASSOCIATED PRODUCT
Complementary: MDA PLUS



BSM II

Archiving, monitoring and remote surveillance



- Archiving, monitoring and remote surveillance
- Acquisition and processing of signals from all types of digital or analog sensors : K and J thermocouples, PT 100, Ω, 0-20 A, 0-10 V_{DC}
- Embedded PLC
- Extended communication ports
- CAN bus, RS485 Modbus

CRE provides a global solution for engine diagnostics, control and maintenance: the BSM II.

A complete configurable electronic unit that integrates all the functions necessary for the control of an engine powered installation in a compact module.

INTERNAL PLC

The embedded PLC enables the processing of internal or external variables and the writing of equations to generate thresholds, events, and alarms, or to detect faults.

DATA MONITORING

Data monitoring can be done via an Internet browser or standard spreadsheet software (PC connection or electronic diary).
Thanks to its integrated HTML web server communication, the BSM II is compatible with all operating systems.

YEARS OF RECORDS

The parameters can be recorded and archived indefinitely in the BSM II memory (FIFO), thus preserving the "life history" of the plant or engine.
This memory is password protected. The data is stored in a flash memory. An internal backup battery maintains time and date.

ARCHIVING MODES

The archiving function has 4 options:

Circular archiving:
Parameters which are chosen by the user are recorded with date and hour at specified intervals.

Event archiving:
Selected parameter values are stored before and after the event. The user can choose the number of records and the interval between each of them.

Counter:
Records and counts the number of operating hours. Other counters such as the number of starts can be programmed easily with equations.

Identification plate:
Records details of the plant and the engines such as serial number, engine type, dates...

EVENTS AND MAINTENANCE

Archiving upon event:

Recording is programmed for events such as faults. The electronic unit stores the parameters and their evolutions before and after the fault.

Maintenance:

Equations are programmed to generate a maintenance management schedule. The maintenance alarms occur according to the number of engine operating hours or according to the user's schedules.

Maintenance helper:

During maintenance and commissioning, the BSM II is used as a real time recorder. The datas recorded during on site tests are available for immediate use or for later drawing-up reports.

CONTROL AND SAFETY

The thresholds, which are programmable by channel, enable the control of a sequence, the triggering of an emergency stop or the signalling of a fault.

ACCESS AND USE

The BSM II can be configured with any Internet browser.

Configuration:

Simple and safe to program, any non computer savvy person can configure the module thanks to its pre programmed templates.

Data access:

The stocked data is recovered using any PC browser linked to Internet. The data can be accessed immediately using standard spreadsheet softwares.

The BSM II measurements can be displayed in real time.

Communication:

Modbus can be connected to a PLC, a PC or a modem.

INPUT/OUTPUT SIGNALS

16 configurable analog inputs:

- Thermocouples: type K, J...
- Current inputs: 0-1 mA, 0-20 mA, 4-20 mA, ± 20 mA or every direct current with or without external supply.
- Voltage Inputs: 0-5 V, 0-10 V, ± 1 V_{DC}, ± 10 V, every direct or alternating voltage.
- Resistive inputs: PT100, sensors (Jaeger, VDO, etc.).

Speed or frequency input:

Configurable for either resistive sensors or the W terminal of a charge alternator. Ranges from 10Hz to 15 KHz, 0.2 V_{AC} minimum.

10 digital inputs:

2 available configurations: normally open or normally closed.

6 digital outputs:

Solid state outputs which are normally energized or de-energized.

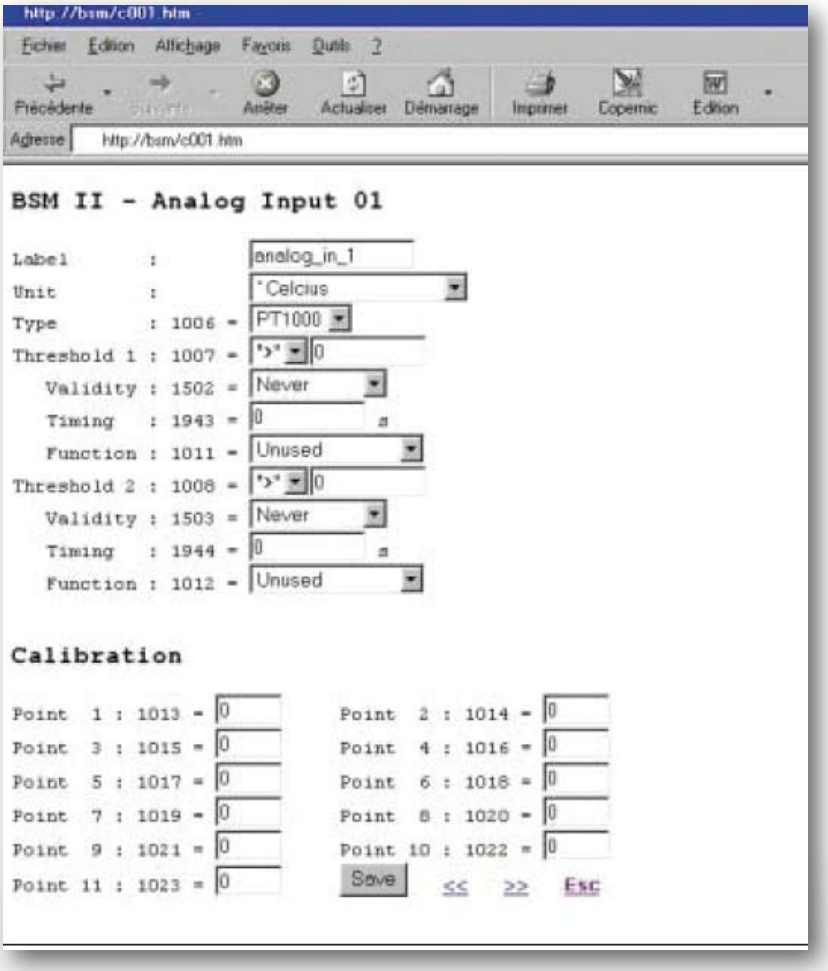
CHARACTERISTICS

- Temperature: 0° to + 70°C (Lloyd's norm).
- Supply: 8-38 V_{DC} (EC norms).
- Vibrations: tested from 5 to 500Hz at 25G.
- EMC: CE Marked
- Waterproof: IP65 (optional).
- Humidity: 95% at 35°C.
- Dimensions (mm): 260 x 160 x 90.
- Communication ports: RS 232, RS485, CAN bus

PART NUMBER
A43Z3

SOFTWARE
Embedded website

ASSOCIATED PRODUCTS
Advanced: BSD / BSD PLUS
Complementary: GENSYS 2.0



BSMII vizualisation

BSD - BSD PLUS

Remote monitoring box

- Alarm management
- Monitoring and control
- Data logging and trending

The CRE Technology BSD is a single-box solution for remote monitoring of generating sets. It has built-in alarm handler, data logger and web based data presentation.

The product brings new opportunities to the generator market as it provides an easy-to-use solution for remote communication in a cost effective way. It includes pre configurations for the interfaced CRE products and also offers Modbus interfacing to third party controllers, allowing great flexibility.

REMOTE MANAGEMENT TO IMPROVE CUSTOMER SERVICE AND CUT COSTS

Making power plants accessible through a remote communication link saves time and money throughout the organization. Remote management will reduce travel costs, minimize downtime, provide accurate information instantaneously and make it possible to bring customer service to a new level.

Depending on access level and configuration, it is also possible to start and stop the gensets remotely.

PLUG AND PLAY CONFIGURATIONS

The solution includes plug and play configurations for CRE products that makes integration easy and avoids expensive investments, redesign and engineering work. The integrated web server provides easy access to live data and operational trends.

FULL INFORMATION AVAILABILITY

BSD collects data from the genset controller and stores the information internally. The built-in web server makes the information available to the user through common web browsers. The information in the unit can be accessed using Ethernet LAN, the Internet and mobile phone networks (GSM/GPRS).

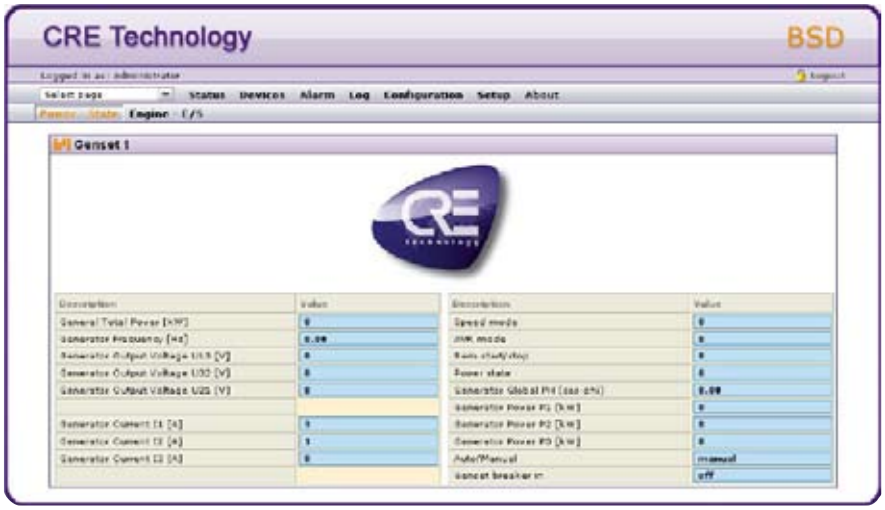
FEATURES

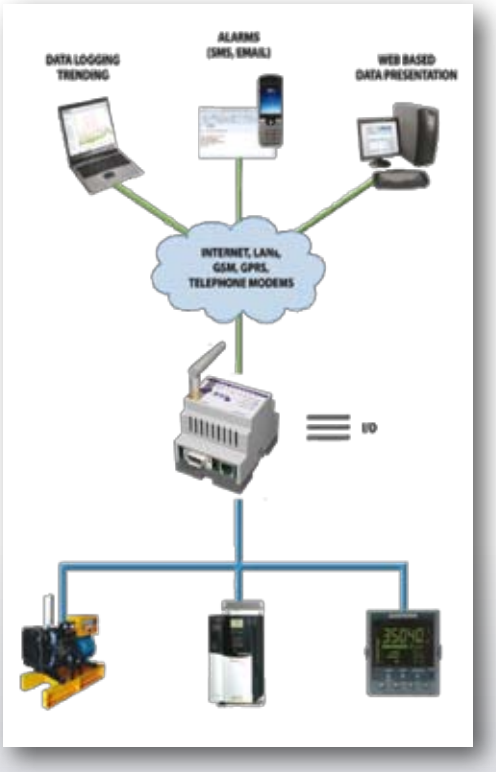
- Built in web interface for data monitoring
- Built in alarm manager for SMS, E-mail and SNMP
- Built in data logger of historical trends
- Built-in web server for accessing device data
- “Plug and play “ solution with CRE products
- Built-in digital I/O
- GSM/GPRS modem included (BSD PLUS)
- Remote access from any location
- GPS input for localization (BSD PLUS)
- Configuration using a standard web browser
- 10/100 Mbit/s Ethernet
- Password restricted access to control for security
- Compatible with other products using Modbus protocol
- All software included
- No license cost
- Full compatibility with information gathering server (third party service, not CRE Technology).

COMPARATIVE TABLE

Order code	BSD	BSD Plus
Ethernet baud rate	NO	YES
GSM/GPRS	RS-232	RS-232
Serial port #1	RS-232 / RS-485	RS-232 / RS-485 / RS-422
Serial port baud rate	Up to 115.2 kbits/sec	Up to 115.2 kbits/sec
Protocol	Modbus RTU, ASCII, TCP/IP	Modbus RTU, ASCII, TCP/IP
Type of housing	Norm, 4 modules, IP20	Norm, 4 modules, IP20
DIN Rail / Wall mounting	YES / NO	YES / NO
Mechanical dimensions	90mm x 70mm x 58mm	90mm x 70mm x 58mm
Operating temperature	-40 to +85°C	-40 to +85°C
Power supply	9-28V AC/DC	9-28V AC/DC
Power consumption	2W	2W

Free demo available on http://bsd.cretechnology.com:8080





CHARACTERISCTICS

- Ethernet baud rate: 10/100Mbit/S
- GSM/GPRS: yes
- Serial port #1: RS-232
- Serial port #2: RS-232 / RS-485 / RS-422
- Serial port baud rate: Up to 115,2 kbit/sec
- Protocol: Modbus RTU, ASCII, TCP/IP
- Type of housing: norm, 4 modules, IP20
- DIN rail/Wall mounting: Yes / No
- Dimensions: 90mm x 70mm x 58mm
- Operating temperature: -40 to +85°C
- Power supply: 9-28V DC
- power consumption: 2W

PART NUMBERS
BSD: A61Z0
BSD PLUS: A61Z1S

SOFTWARE
Embedded software/ BSD Config

CABLES
BSD: A40W6 (CAN RS485)
BSP PLUS: A61Z1-3

ASSOCIATED PRODUCT
Complementary: GENSYS 2.0

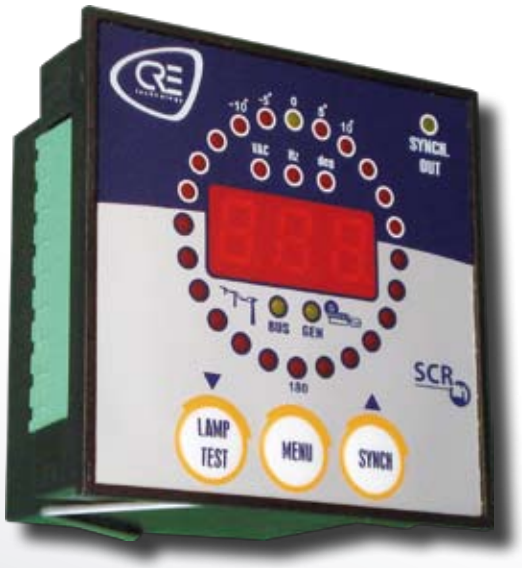
paralleling

Generating sets and mains paralleling units are at the heart of CRE Technology expertise. The company is world renowned for its “all-in-one” products designed to cover the maximum of functions and the most various applications possible. This specific expertise is instilled in our basic and advanced units.

Whether on a marine, commercial, military or on an offshore platform project, our range of paralleling modules can fulfill any specifications or requirements.

SCR

Synch check relay



- Synch check relay
- Front panel configurable
- 50/60 Hz compatibility
- Basic unit

The SCR is a microprocessor controlled synchroscope with programmable synch check relay in a DIN72 front panel mounted package. It monitors the voltage and frequency of 2 independent power networks as well as the instantaneous phase angle between them.

The measured parameters are displayed on the 3 digit digital display. The 24 led circular synchroscope displays the phase angle between the 2 networks. The synchroscope display is only activated if both network voltages are within the set limits.

The SCR is mainly used in manual genset synchronization applications for synchronization checking between a genset and the genset busbar or between the genset busbar and the mains.

A SIMPLE PRODUCT FOR BASIC FUNCTIONS

Synchronization checking is enabled either via the SYNCH CHECK ENABLE signal input or by pressing the front panel SYNCH pushbutton.
If all the necessary conditions are satisfied for 4 consecutive busbar cycles then the SYNCH CHECK relay will be energized immediately. If the busbar is not powered up, synch checking may be overridden with the DEAD BUS ENABLE signal input.

FRONT PANEL CONFIGURATION

The SCR module provides a comprehensive set of digitally adjustable threshold levels and timers. All settings are modified via front panel pushbuttons, and do not require an external unit. The MENU pushbutton allows the digital display to navigate between various measured parameters.

RELIABLE AND SIMPLE

The SCR is dedicated to basic applications which require no extra costs or expensive hardware.
All CRE Technology products aim to provide the same satisfaction levels. The SCR has passed EMC and low voltage tests, and each unit is 100% tested before delivery.

RELAY OUTPUTS

The unit provides a synch check relay output with volt free contacts.
The relay output is capable of driving a 10A/28V-DC load.

DIGITAL INPUTS

The unit has 2 digital inputs:
- Synch check enable
- Dead-bus enable

The inputs will be active when connected to the battery negative. The input function will be disabled if the input is left open.

FEATURES

- 24 led circular synchroscope
- Programmable ΔV, Δf, Δθ for check synch relay
- 1 phase genset voltage input
- 1 phase busbar voltage input
- Synch check enable input
- Dead bus enable input
- Auto power off
- Adjustable parameters
- Front panel configurable
- Survives cranking dropouts
- Plug-in connection system for easy replacement

MEASUREMENT

- Generator voltage: U-N
- Generator frequency
- Busbar voltage: R-N
- Busbar frequency
- Frequency difference between busbar and generator
- Voltage difference between busbar and generator
- Phase angle between busbar and phase U

CHARACTERISTICS

Current, voltage and frequency

- Generator voltage: 300 V_{AC} max. (Ph-N)
- Generator frequency: 0-100 Hz.
- Busbar voltage: 300 V_{AC} max. (Ph-N)
- Busbar frequency: 50/60 Hz.
- Digital inputs: 0 - 30 V_{DC}
- DC supply range: 9.0 to 33.0 V_{DC}
- Cranking dropouts: survives 0 V for 100ms.
- Typical standby current: 100 mA-DC
- Maximum operating current: 150 mA-DC (Relay outputs open)
- Synch check relay output: 10 A / 28V_{DC}

Environment

- Operating temp.: -20°C (-4°F) to 70 °C (158°F).
- Storage temp.: -30°C (-22°F) to 80 °C (176°F).
- Maximum humidity: 95% non-condensing.
- IP Protection: IP65 for the front panel, IP30 for the rear.
- Case Material: High Temperature ABS (UL94-V0, 100°C)

Size and weight

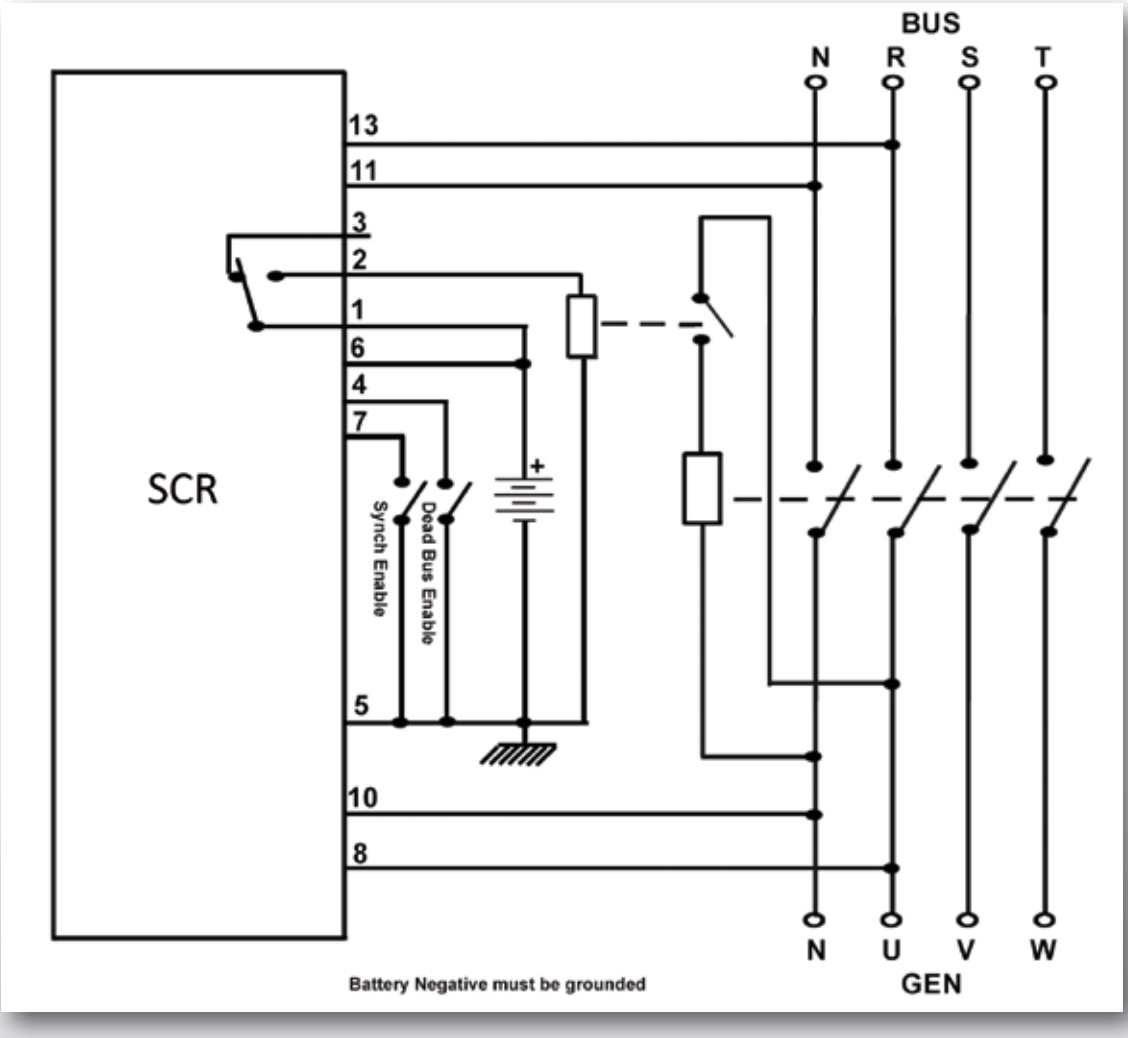
- Dimensions: 72x72x52 mm (WxHxD)
- Panel cut-out dimensions: 68x68 mm minimum.
- Weight: 130 g (approx.)

Certifications

- Low voltage
- CEM

PART NUMBER
A60X1

ASSOCIATED PRODUCTS
Advanced : C2S
Complementary : UNIGEN PLUS



C2S

Auto synchronizer and safety column

- Led synchronoscope
- Protections
- Manual and Automatic modes

This second generation of microprocessor module combines all the visualization and control functions needed to couple a generator to a bus bar manually: display of the phase, frequency and voltage differences, a safety relay which monitors these three parameters and indicates the status of the installation.

This new version does not need an external DC power supply, as it takes it from the busbar. The reduced size allows the use of DIN92 format tools and its heavy duty metal case can operate in extreme environment.

SYNCHRONIZATION COLUMN

Led synchroscope:

18 LEDs spread over 360° display the phase difference. The synchroscope lines up when the frequency difference is less than 0.5 Hz.

Differential frequency meter:

The frequency difference is displayed by a 17 LED bar graph corresponding to ± 5 Hz with an expanded scale over 1 Hz.

Differential voltmeter:

The voltage difference is displayed by a 17 LED bar graph corresponding to ± 20%.

SAFETY RELAY

The coupling authorization relay monitors the difference in frequency, voltage and phase. It authorizes coupling only when all the parameters meet the requirements of the installation.

Frequency difference:

Coupling authorization is given for a frequency difference of less than 0.1 Hz.

Phase difference:

The phase difference which authorizes coupling is adjustable between ± 5° and ± 20°.

Voltage difference:

The voltage difference which authorizes coupling is adjustable between ± 2.5% and ± 20%.

LED INFORMATION

Presence of generator voltage (Vgen):

Shows that the voltage of the generator or the power source to be coupled is between 85% and 115% of its nominal value.

Presence of bus voltage (Vbus):

Shows that the voltage of the bus to which the generator must be coupled is between 85% and 115% of its nominal value.

Voltage difference fault (ΔV):

Shows that the voltage difference between the generator and the bus is greater than the safety relay setting.

Coupling in automatic mode (Auto):

Shows that the installation is in automatic coupling mode. The synchronization column is active but the other signalling LEDs and the safety relay are inactive.

Safety relay:

Shows that the safety relay which authorizes coupling is closed.

MEASUREMENTS

Measuring generator voltage input ±15%:

Reference	AC Voltage
A25Z0	100 V_{AC}
A25Z1	230 V_{AC}
A25Z2	400 V_{AC}

50 and 60 Hz
(maximum consumption <4 VA).

Measuring bus voltage input ±15%:

Reference	AC Voltage
A25Z0	100 V_{AC}
A25Z1	230 V_{AC}
A25Z2	400 V_{AC}

50 and 60 Hz
(maximum consumption <0.1 VA).

CHARACTERISTICS

Current, voltage and frequency

- Output relay: Isolated contact
- 8 A with the 250 V_{AC} nominal voltage, maximum voltage 440 V_{AC}
- 2000 VA switched power on resistive load.

Environment

- Operating temperature: -20 to +85°C.
- Can be mounted in all positions.
- Humidity: will function normally in humid conditions (Tropic-proof circuits).

Size and weight

- Weight: 0.9 Kg
- Size: 160x96x68mm
- Fixing: 4 x 3mm screws with 82x 150mm spacing

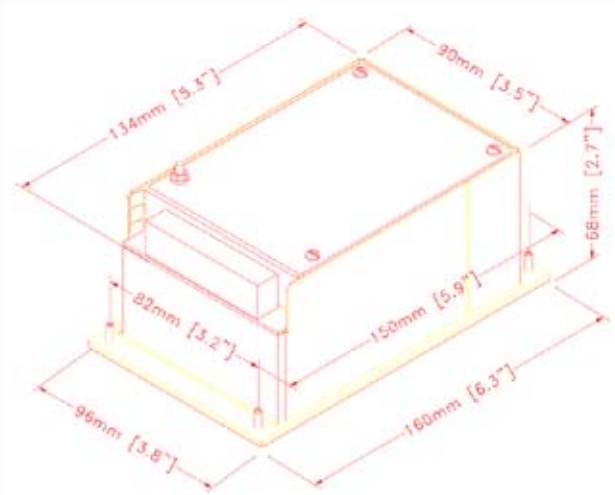
Certifications

CE Mark: the C2S complies with European CE Mark requirements.

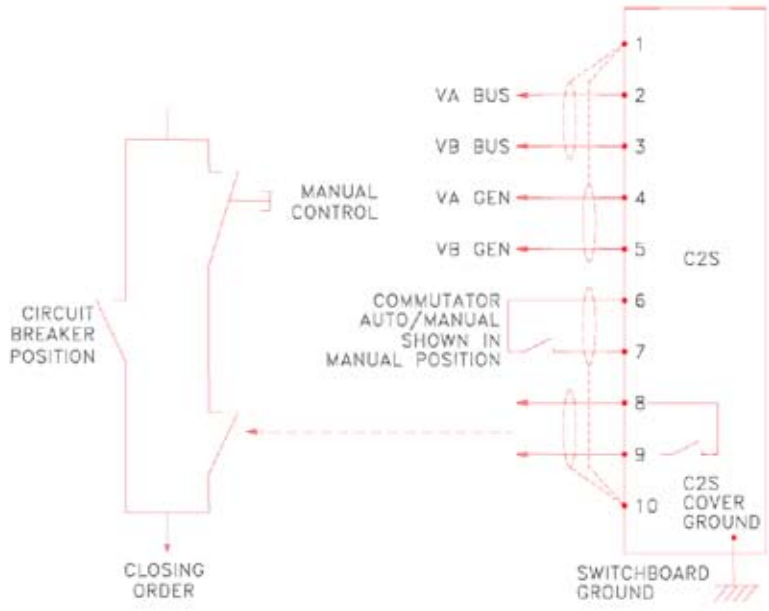
PART NUMBERS
A25Z0
A25Z1
A25Z2

ASSOCIATED PRODUCTS
Reduced: SCR
Complementary: UNIGEN FAMILY

Dimensions



Wiring Diagram



DUOGEN

Two gensets controlled by a single unit

- Cost effective solution
- Manual and auto synchronization
- Load sharing (kW/kVAR)
- 50 / 60 Hz compatibility
- Fast commissioning

DUOGEN is a microprocessor based module which controls two generators.

DUOGEN carries out manual and auto synchronization, isochronous load sharing or droop load sharing.

ONE UNIT – TWO GENSETS

DUOGEN is a cost effective and innovative unit for synchronization and load sharing with 2 gensets. It combines the following features:

- 1 digital input for auto synchronization.
- 1 sync check relay to monitor phase, frequency and voltage differences.
- 1 'Load shedding' output relay which start/stop the generators depending on power requirements. This allows a better power plant global efficiency.
- 2 isochronous kW sharing controls.
- 2 constant voltage kVAR sharing controls.
- 2 reverse power protections.

INPUTS/OUTPUTS FOR EACH GENSET

- 3 phase genset voltages (3 or 4 wires, 100 to 440 V_{AC}).
- 3 phase genset currents (1A or 5A CTs).
- 1 digital input: feedback of the genset breaker position.
- 1 digital input: unload request (adjustable ramp time).
- 1 analog input for externalspeed control (± 5 V_{DC} or potentiometer).
- 2 output relays: trip request and reverse power protection.
- 1 analog output: active power monitor (0-5V or 0-1mA adjustable).
- Proportional and integral gain potentiometers for synchronization.
- 1 analog output for speed control which is adjustable with Gain and offset potentiometers, compatible with most electronic governors (Barber Colman, Woodward, GAC, Heinzmann, Ambac, DDEC, MDEC…).
- 1 analog output for voltage control, adjustable with Gain and Offset potentiometers, compatible with most AVRs (Leroy Somer, Stamford, Basler…).

APPLICATIONS

- Two gensets in change over mode:
  Manual mode: speed potentiometer for synchronization and kW control.
  Auto mode: automatic synchronization and load sharing.
- Two gensets in change over mode + no break return to mains with soft load transfer:
- Gas, fuel, and turbines:
  Duogen can be installed regardless of the type of prime mover or fuel.

COMMON INPUTS/OUTPUTS

'SYNCH OK' output relay:

Synch output relay is always active and stays open in dead bus conditions.
The coupling authorization safety relay only allows paralleling when frequency, voltage and phase differences meet the requirements of the installation.

'LOAD SHEDDING' output relay:

Load shedding relay is active when the plant needs the power of the two gensets :

- 1 digital input: remote synchronization request.
- 1 digital input: droop mode.
  (Stability and load sharing potentiometer for ILS).

CHARACTERISTICS

Current, voltage and frequency

- Output relay contacts: Volt free contacts, 5 A at 250 V_{AC}.
- Maximum cutting voltage 440 V_{AC} with a 1250 VA resistive load.
- Power supply: 9 to 40V_{DC} – 10 W
- Frequency: 50 or 60Hz.
- Voltage and current measuring input:

Reference	Switch	GE 1 and 2
A40R0	pos. 1	110 V_{AC}
	pos. 2	240 V_{AC}
	pos. 3	440 V_{AC}

Environment

- Operating temperature: -20 to +85 °C.
- Mounting: can be mounted in all positions.
- Humidity: will function normally in humid conditions (Tropic-proof circuits).

Dimensions and weight

- Weight: 1.5 kg
- Size: 200x275x26 mm

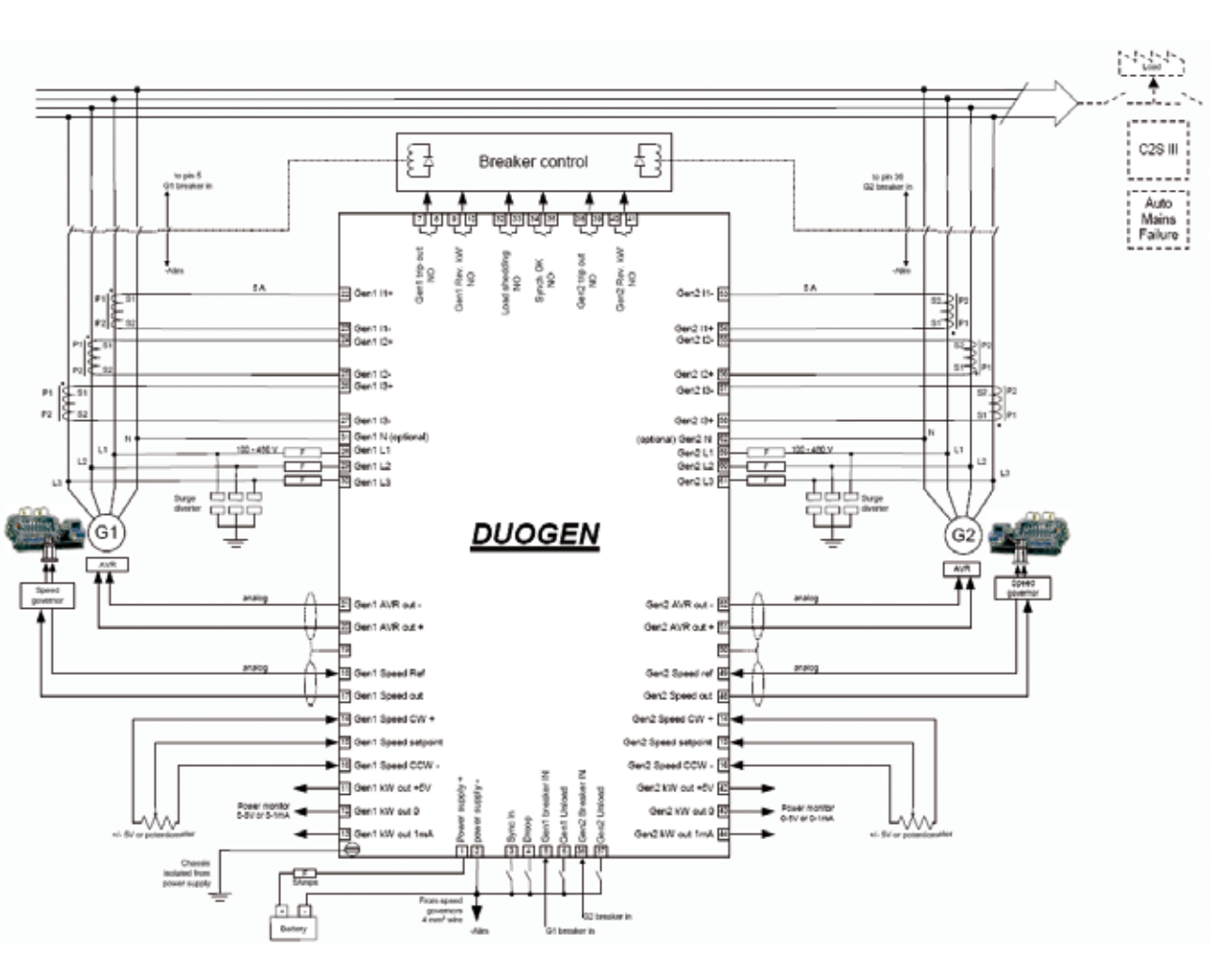
Certifications

CE Mark: Duogen complies with European CE Mark requirements.

PART NUMBER
A40R0

SOFTWARE
Embedded website

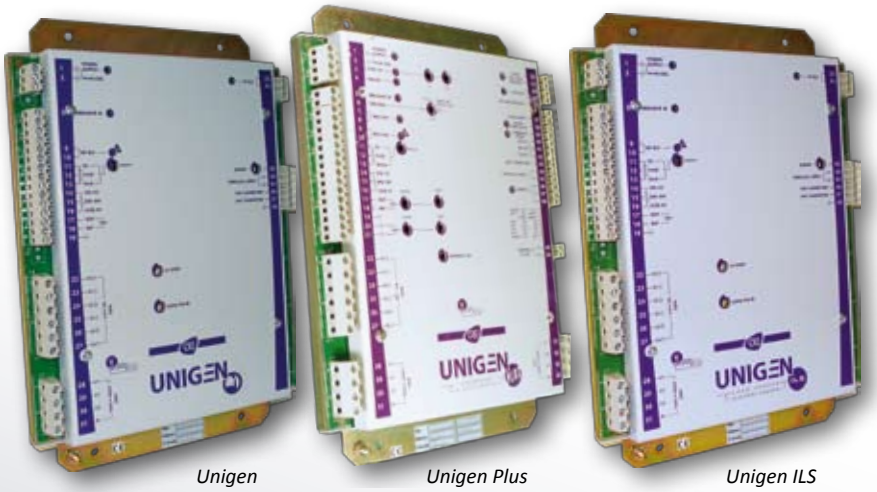
ASSOCIATED PRODUCTS
Advanced: UNIGEN FAMILY
Complementary: C2S



UNIGEN FAMILY

Manu/Auto synchroniser and load sharer

- Auto and manual synchronization
- Load sharing (kW/kVAR)
- Compatible with all AVR and speed governors
- Compatible with CAT PWM 500Hz
- Direct replacement for Barber Colman products



Unigen *Unigen Plus* *Unigen ILS*

The UNIGENs are used on generator sets that require synchronising, load sharing, load and unload management as well as paralleling features.

UNIGEN PLUS and UNIGEN can be used to parallel up to 8 gensets together with the CAN bus communication.

UNIGEN PLUS and UNIGEN ILS can be used without limit through the parallel lines (0-3V).

UNIGEN PLUS can be used to parallel either a single genset with the mains.One unit is needed per generating set.

SUPER DROOP FUNCTION

UNIGEN and UNIGEN PLUS offer this CRE exclusivity in their standard version.

Perfect for mobile or remote genset applications

With its digital « Super Droop » function (wireless load sharing), UNIGEN and UNIGEN PLUS make mobile genset paralleling simple as communication between the units is not needed.

Unique on the market

No communication between UNIGEN units is needed to achieve the paralleling. The curve is almost isochronous at +/-0,25Hz.

NO COMPUTER NEEDED

All the settings are adjustable by potentiometers. With a 16 bit microprocessor, UNIGEN and UNIGEN PLUS are, in regards to digital technology, very fast.

CAN BUS “PLUG AND PLAY”

The address of each UNIGEN doesn’t need to be adjusted. All UNIGEN units connected on the CAN bus will automatically detect the others. Up to 8 gensets can be paralleled together.

OBSOLETE BARBER COLMAN REPLACEMENT

Offered at a very competitive price, UNIGEN replaces Dyn2-90300, UNIGEN PLUS replaces PowerCon and UNIGEN ILS replaces Dyn2-80100/80108/80109 units without any changes to the installation. The units use analog outputs. (Refer to Unigen Family Comparative Table)

PWM 500 Hz Speed output

UNIGEN PLUS is compatible with electronic CAT and Perkins engines through a PWM signal. The specific reference is A51Z1-OPT1.

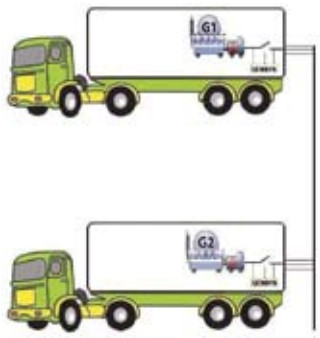
Focus on

SUPER DROOP

Super Droop was developed by CRE Technology to provide an innovative new solution to the genset industry. Thanks to its Super Droop feature, your plant does not need extra communication ports for load sharing. The units only communicate via the busbar.

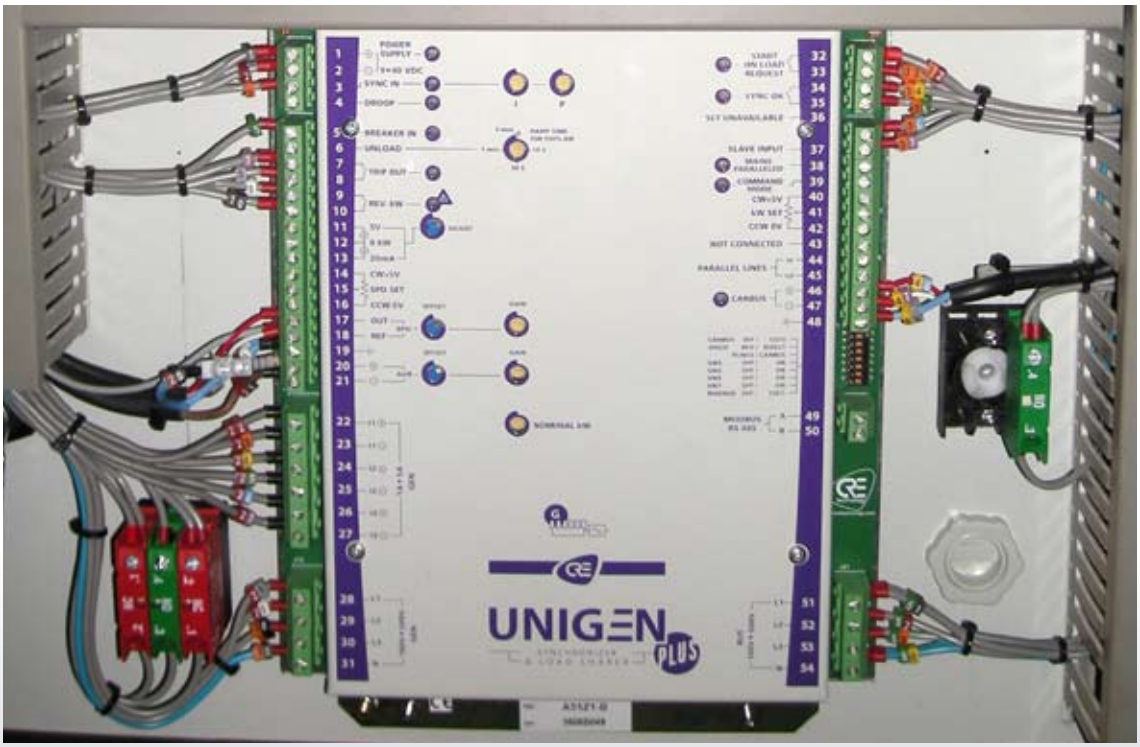
In Super Droop mode, the load sharing is managed between 50.50Hz (0% load) and 50.00Hz (100% load). This is adjustable.
For this specific droop, it is not necessary to set the engine speed precisely, and no connections are required between each unit.

- The kW load sharing is managed with super droop
- The unit includes the usual protections (phase sequence protection included)



UNIGEN FAMILY COMPARATIVE TABLE

	UNIGEN	UNIGEN PLUS	UNIGEN ILS
Synchronization	Manu and Auto	Manu and Auto	Manu
Load sharer	•	•	•
1 genset with Mains paralleling		•	According to the power plant
Up to 8 gensets paralleling	•	•	•
Super Droop	•	•	
Parallel lines compatibility		•	•
CAN bus plug and play	•	•	
Speed out	•	•	•
PMW 500 Hz Speed out		•	
Voltage out	•	•	
Trip out	•	•	
Ramps	•	•	
REV KW	•	•	•
KW monitor	•	•	•
Power factor		•	
Modbus (Read and write function)		•	
Command mode		•	
400 Hz compatible			On request
Analog droop			•
FP relay			•
DYN2-80108/9 replacement			•
DYN2-80100 replacement			•
Dyn2 9402x repl.		•	
Pow-R-Con replacement		•	
Dyn2 90300 replacement	•		



UNIGEN FAMILY

FEATURES

Synch check relay

UNIGEN and UNIGEN PLUS monitor the voltage, frequency, phase differences and phase sequence protection between the generator to be paralleled and the bus bar. The synch check relay authorizes the closing of the generator breaker either in Automatic or Manual mode.

Automatic and manual synchronisation

The automatic mode of UNIGEN and UNIGEN PLUS modifies the voltage, the frequency, and the phase to achieve quick and precise coupling. Using the manual mode, the speed can be adjusted by an external 10 kΩ potentiometer.

Power load sharer (kW and kVAR):

The units manage load and unload ramps during the launch and the stop of the genset. It can manage gensets of various powers and/or with an electronic speed regulator of a different brand.

Load dependant start

« Start on load request » is activated to start/stop slave generator sets depending on the load request.

Reverse kW protection

The 'REV kW' relay closes upon reverse power.

Analog kW output

Compatible with PLC and 0-5 V, 0-20 mA or 4-20 mA gauges.

Modbus communication

Read and write function through RS485 port, UNIGEN PLUS only.

CHARACTERISTICS

Current, voltage and frequency

- Voltage measurement:110 V_{AC} to 500V_{AC}
- Current input: 1A to 5A
- Frequency: 50 or 60 Hz.
- Output relays: volt free contacts, 5 A at 250 V_{AC}, maximum cutting voltage 440 V_{AC}. 2000 VA switched power on resistive load.
- Power supply: 9 – 40V_{DC}.

Environment

- Mounting: can be fixed in all positions.
- Operating temperature: -20°C to + 70°C.
- Vibrations: 5 to 500 Hz at 25G.

Dimensions and weight

- Weight: 1, 5 kg
- Dimensions: - 200x275x26 mm.

Certifications

- CE mark: UNIGENs complies with European CE Mark requirements.
- CEM: EN 50081-2 et EN 61000-6-2

PART NUMBERS

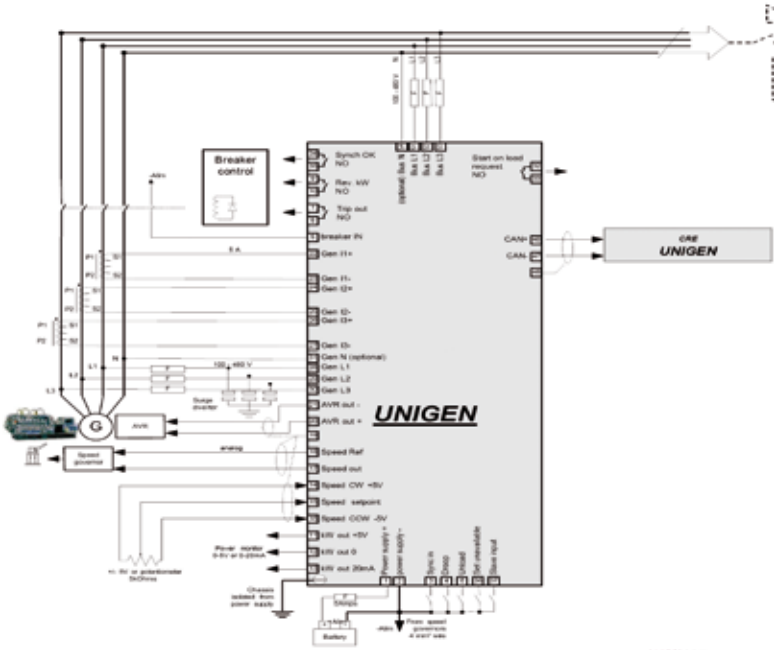
UNIGEN: A51Z2
UNIGEN PLUS: A51Z1
UNIGEN PLUS PWM: A51Z1-OPT 1
UNIGEN ILS : A51Z3

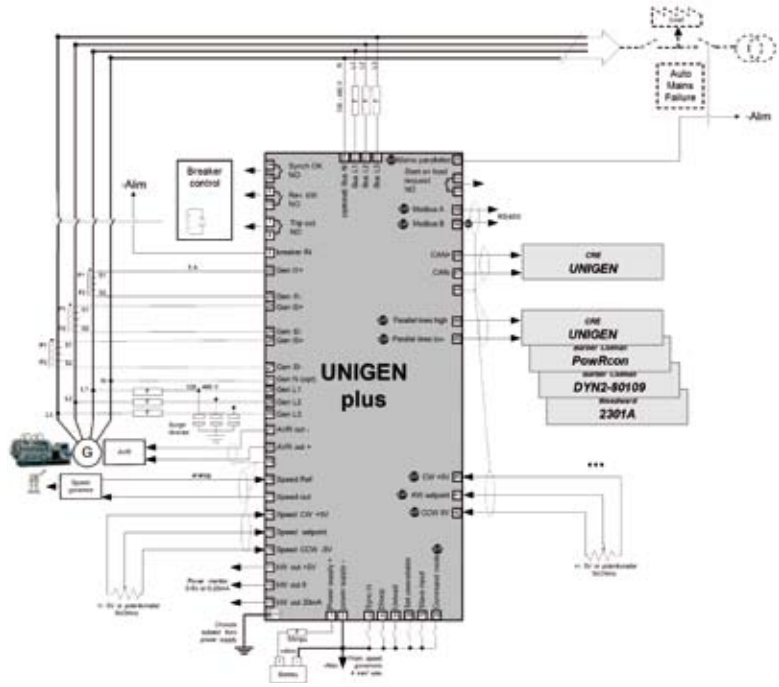
SOFTWARE

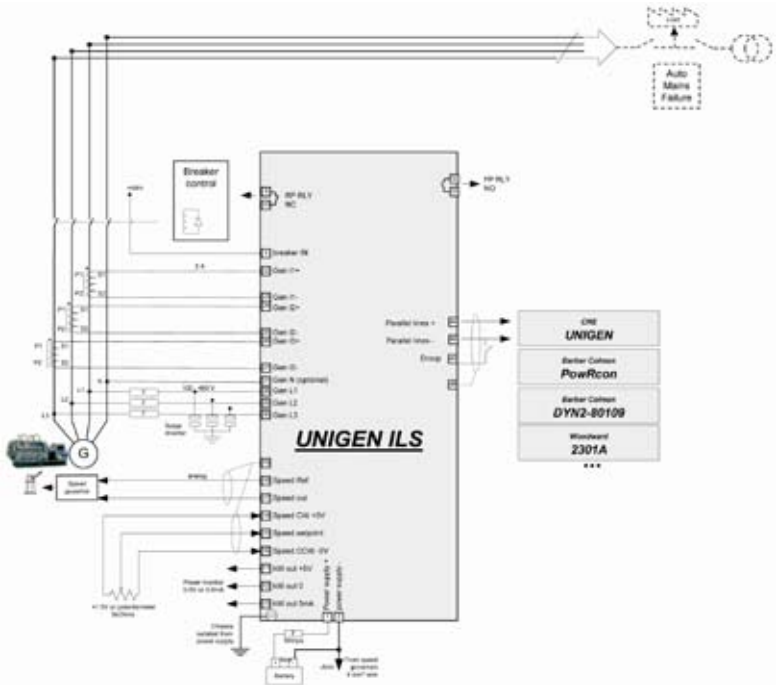
Embedded website

ASSOCIATED PRODUCTS

Complementary: MDX PLUS J1939


Breaker control
UNIGEN
CRE UNIGEN


Auto Mains Failure
Alim
Breaker control
UNIGEN plus
CRE UNIGEN
CRE UNIGEN
PowRcon
DYN2-80109
2301A


Auto Mains Failure
Breaker control
UNIGEN ILS
CRE UNIGEN
PowRcon
DYN2-80109
2301A

GENSYS 2.0 LT

All-in-one genset control and paralleling unit

- Compact “all-in-one” module
- 5 isolated serial ports: RS485, 2 CAN bus, Ethernet, SD card reader
- New multi-function graphic display
- Fully compatible with all speed governors and AVRs
- J1939 communications with electronic engines

The GENSYS 2.0 LT is a control unit designed for generator electrical panels.

This “all-in-one” unit combines all necessary functions:

- **Three phase mains failure**
- **Engine start/stop and protection**
- **Alternator control and protection**
- **Mechanical parameters display**
- **Electrical parameters display**
- **Genset synchronization**
- **Load sharing and kW control**
- **Load sharing and kVAR control**

GENSYS 2.0 LT is configurable via its front panel or via a PC with CRE Config Software **(cf p64).**

The GENSYS 2.0 LT controller has analog load sharing lines and is compatible with all types of analog load sharing modules.

MINIMUM OPTIONS

This compact controller is offered with a minimum of options to fit all types of application without expensive add-on packages. The GENSYS 2.0 LT unit is recommended for all types of power plant, from 1 to 14 generators.

For specific needs, GENSYS 2.0 LT can include the following options:

- Mains paralleling
- Phase shift compensation (ie: DYN 11)

INTER-UNIT ISOLATED CAN BUS

The GENSYS 2.0 LT has an inter-unit isolated CAN bus port for information transfer (dead busbar management, static paralleling, kW and kVAR load sharing...).

APPLICATIONS

- Gas and fuel generators
- Cogeneration
- Turbo-alternator
- Synchronization and power management module (without engine start sequence).
- 1 generator in change over mode with mains.
- 1 generator in no break C.O.
- 1 generator in parallel with mains: base load or peak shaving.
- 2 to 14 gensets in parallel and change over with mains.
- 2 to 14 gensets in parallel and paralleled with mains for load transfer. In this case, the MASTER 2.0 is used for mains paralleling via CAN bus.
- Static paralleling (engine stopped).

focus on

CRE CONFIG SOFTWARE

cf p64

CRE Technology developed a new software, use for the GENSYS 2.0 LT module. It is PC operated via an Ethernet communication port.

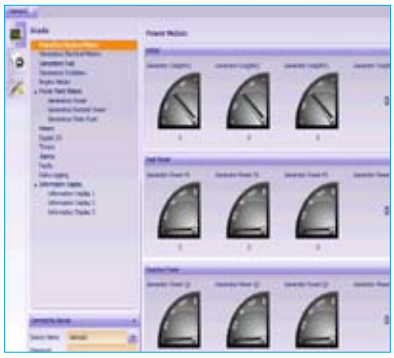
This user friendly software allows you to control, configure and monitor your power plant.

After logging in your user name and password for more security, you will access the 3 modes of the interface:

Scada mode:
Monitors electrical, mechanical parameters and above all supervises your engines in real time.

Configuration mode:
Configures the GENSYS 2.0 LT parameters by changing the values of the functions like input / output, start/ stop or speed control, amongst others.

System mode:
Configures general parameters (date, time, screen saver, language,...)
CRE Config software can configure and monitor multiple GENSYS simultaneously.



GENSETS WITH MAINS

When several generators are paralleled with mains, the MASTER 2.0 is used (connection via inter-module CAN bus) for:

- Three phase mains failure
- Paralleled gensets with several mains control
- Electrical protection for power plant and mains
- Electrical parameters display for power plant and mains
- Manual and automatic paralleling with mains (frequency, phase and voltage)
- Power factor control when paralleling with mains.
- KW power management with several modes:
- No break change over with load transfer
- Permanent paralleling in base load
- Permanent paralleling in peak shaving mode (export/import)

GENSYS 2.0 LT

FEATURES

Control and management

- Manual and automatic engine control.
- J1939 compatibility (Cummins, Volvo, Scania, MTU, CAT...)
- Automatic start/stop control depending on load demand.
- Dead busbar management.
- Isochronous or droop kW load sharing control (via CAN bus serial port, up to 14 generators)
- Constant voltage (or droop) kVAR load sharing control (via CAN bus serial port, up to 14 generators)
- Power factor control when paralleling with mains.
- KW control (base load or peak shaving) when paralleling with mains.

Protections

- Generator electrical protections: <F, >F, <U, >U, >I, >In, >P, <P, <-P, >Q, <Q, <-Q
- Mains electrical protections (option) : <F, >F, <U, >U, >P, <P, <-P, >Q, <Q, <-Q, df/dt, vector jump.
- Phase sequence protection, phase shift compensation.
-

Synchronization

- Manual and automatic frequency and phase synchronization (differential frequency meter + synchroscope available on screen).
- Manual and automatic voltage synchronization (differential voltmeter available on screen).
- Static paralleling.

Information display

- Engine parameters display: oil pressure, water temp, speed, hours run meter...
- Generator electrical parameters display:
  - Phase-phase Voltage (3 phase RMS)
  - Phase-neutral Voltage (3 phase RMS)
  - Current (3 phase RMS)
  - Frequency
  - Active power (3 phase + total)
  - Reactive power (3 phase + total)
  - Power factor (3 phase + total)
  - Active power energy (kWh)
  - Reactive power energy (kVARh)
- Mains electrical parameters display:
  - Phase-phase Voltage (3 phase RMS)
  - Current (3 phase)
  - Frequency
  - Active power
  - Reactive power
  - Power factor
  - Import active power energy (kWh)
  - Import reactive power energy (kVARh)

Alarms and events

- The last 50 alarms and last 50 shutdowns are recorded on non volatile memory.
- Data logging every 100ms.
-

Other

- Electronic droop function (droop <1%). Allows load sharing without inter-unit communication. Quasisochronous® load sharing.
- "Watchdog" digital output for microprocessor life signal.

CHARACTERISTICS

Current, voltage and frequency

- DC voltage power supply input: 9 to 40V_{DC}, 600mA at 12V_{DC} and 300mA at 24V_{DC}.
- AC voltage inputs: 100 to 480V_{AC}, 100mA max. Neutral terminal does not need to be connected.
- AC current inputs: 0 to 5A, 1VA. Each phase is isolated from the others.
- AC current overload: 15A during 10s.
- Frequency measurement: 45 to 70 Hz – 15V_{AC} minimum between phase and neutral.
- Voltage control signal: The voltage control (AVR) is made either by a +/-10V_{DC} output with adjustable span and offset or by voltage+/ voltage- contacts.

Environment

- Operating temperature: -20 to +70°C
- Storage temperature: -30 to +80°C
- Humidity: 5 to 95%. Tropic-proof circuits for normal operation in humid conditions.

Inputs, outputs

- Digital inputs: NO or NC to ground.
- Emergency stop input: Norm. Closed 24V.
- Relay outputs (crank and fuel): 5A. The 24V is provided through the emergency push button.
- Relay outputs (breakers): 5A, 230V_{AC} max. NO + NC available.
- Transistor outputs: 350mA, overcurrent protected.
- Analog inputs (oil pressure and water temp): 0 to 400 Ω. Calibration is configurable.
- Analog inputs (spare 1 and spare 2): 0 to 10KΩ.
- Calibration for speed and frequency control is made either by a +/-10V_{DC} output with adjustable span and offset or by speed+/ speed- contacts.
- Magnetic pick up input: 100 to 10.000Hz, 2V_{AC} minimum.
- PWM output for CAT and Perkins engines

Ports

- 5 isolated serial ports are available:
  - RS485 for Modbus RTU (read and write)/ male Sub-D 9 pins 120 Ω resistors selected by micro-switch.
  - CAN bus for inter-GENSYS/ MASTER 2.0 connection: male Sub-D 9 pins 120 Ω resistors selected by micro-switch
  - CAN bus dedicated to options J1939: male Sub-D 9 pins 120 Ω resistors selected by micro-switch
  - Ethernet: PC communication/ Modbus TCP
  - SD card reader

Size and weight

- Size: 248x197x57mm (9.76x7.76x2.24in)
- Panel cut out: 177x228mm (6.97x8.98in)
- Weight: 1.9kg (4.2lb)

Certifications

- European Union Directives: EN 50081-2, EN 50082-2, 73/23EEC
- Front panel: IP65 protection. Back panel: IP20 protection.
- CAN bus J1939 – male Sub-D 9 pins - 120 Ω resistors selected by micro-switch.
- Ethernet I/O (remote communication – PC communication): for any requirements, please contact your CRE sales team.
- SD card reader

Other

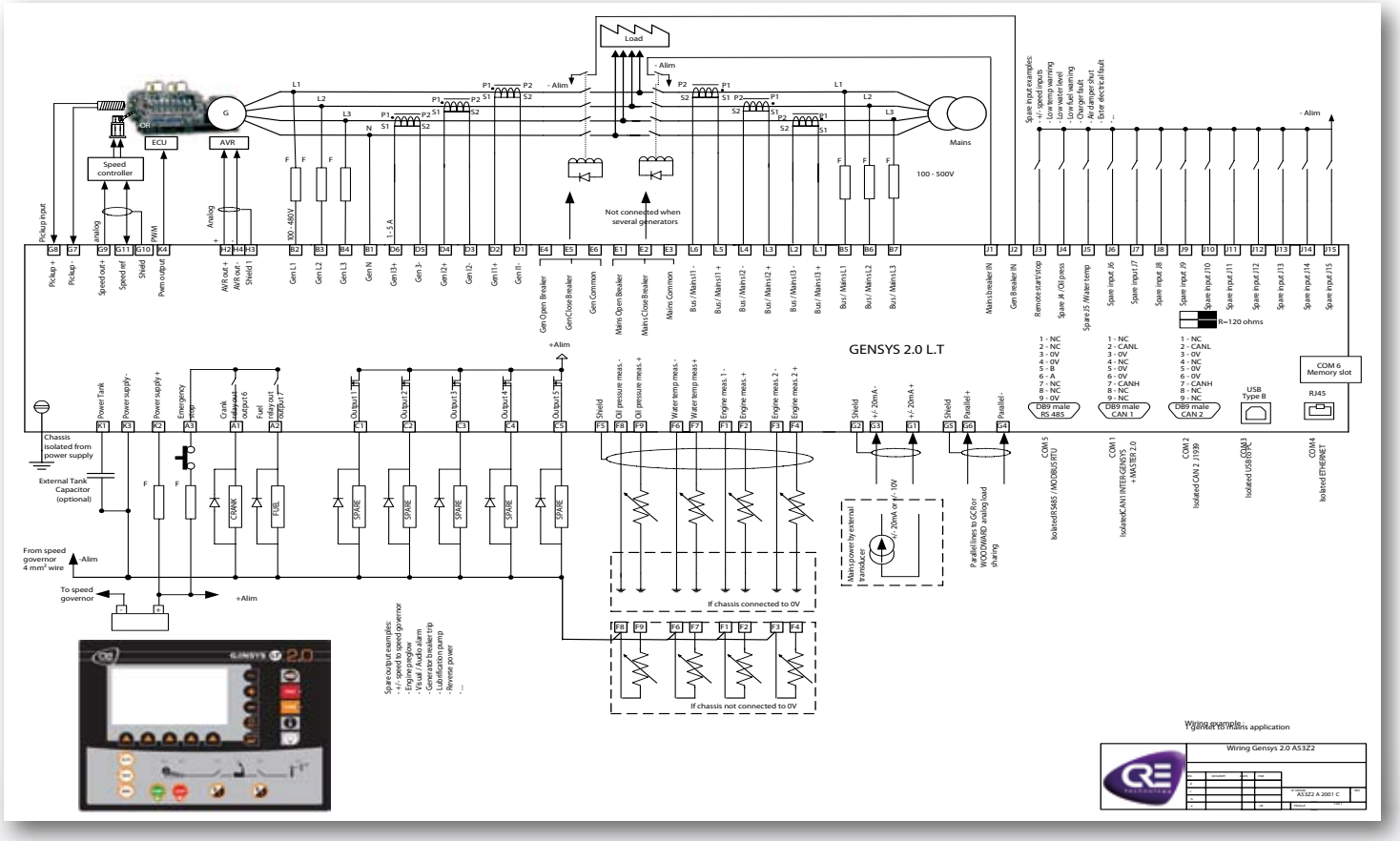
- LCD characteristics: 114x64mm, 60 cd/m² backlight, 3 character sizes.
- Terminals: 2 piece connectors, 2,5mm².
- Standard languages: English, Spanish, French, Italian
- Other custom languages: downlodable on request

PART NUMBER
A53Z2

SOFTWARE
CRE Config / Easy PLC

CABLE
A53W1

ASSOCIATED PRODUCTS
Upgrade: GENSYS 2.0
Complementary: Master 2.0



GENSYS 2.0

All-in-one genset control and paralleling unit with integrated PLC

- Compact “all-in-one” module
- I/O flexibility
- Internal logic sequences, programmable by equations
- New multi-function graphic display
- 5 isolated serial ports: RS485, 2 CAN bus, Ethernet, SD card reader
- J1939 communications with electronic engines
- Fully compatible with all speed governors and AVRs

The GENSYS 2.0 is a control unit designed for generator electrical panels.

This “all-in-one” unit combines all necessary functions:

- **Three phase mains failure**
- **Engine start/stop and protection**
- **Alternator control and protection**
- **Mechanical parameters display**
- **Electrical parameters display**
- **Genset synchronization**
- **Load sharing and kW control**
- **Load sharing and kVAR control**

GENSYS 2.0 is configurable via its front panel or via a PC with CRE Config software (cf. p64). It has an embedded web site which is password protected.

The GENSYS 2.0 controller has analog load sharing lines and is compatible with all types of analog load sharing modules.

PROGRAMMING BY EQUATIONS

The GENSYS 2.0 controller is a real PLC unit where equations and sequences can be programmed directly by the user with text editor software or Easy PLC software (cf p 66).

INPUTS / OUTPUTS WITH NO LIMIT

The number of input/outputs that can be added is one of the most important on the market. Extension modules (DIN rail mounting) can be added on the CAN bus. This extends the inputs/outputs up to 128 digital inputs, 64 digital outputs, 44 analog inputs and 8 analog outputs.

MINIMUM OPTIONS

This compact controller is offered with a minimum of options to fit all types of application without expensive add-on packages. The standard GENSYS 2.0 unit is recommended for all types of power plant, from 1 to 14 generators.

For specific needs, GENSYS 2.0 can include the following options:

- Mains paralleling
- Phase shift compensation (ie: DYN 11)

INTER-UNIT ISOLATED CAN BUS

The GENSYS 2.0 has a inter-unit isolated CAN bus port for information transfer (dead busbar management, static paralleling, kW and kVAR load sharing...).

The inter-unit bus allows more information exchanges between modules and reduces the wiring and the number of I/O used on each module.

focus on

STATIC PARALLELING
(Black start synchronization)

In less than 10 seconds your power plant goes from stand by, starts all the gensets, and has them fully synchronized with breakers closed on the bus bars.

A fast response time for heavy load requests.
This can be necessary for large electric motor or turbine starting for instance. It is also very useful when loads cannot be shed, in hospitals or heavy industries for instance. In less sensitive industries, it allows a smaller UPS, reducing investment and maintenance costs, without extra investment on the genset power plant side.

A progressive magnetization of the step-up transformers.
The transformer is magnetized with a low voltage before receiving the genset power. Your power plant benefits from important cost gains (cable, transformer consumption) and better efficiency (quick power plant availability, more stable power...).
CRE Technology has been familiar with this specification for a long time which is included as standard in the Gensys 2.0.

COMPATIBILITY

Thanks to its versatile connectivity the GENSYS family is compatible with peripheral devices:
- Electronic engines: CAN bus J1939/ MTU MDEC
- Speed govenors: ±10 V_{DC}/Pulse/ PWM 500Hz
- AVR: 0-10 KΩ/Pulse
- PLC/HMI: Modbus RTU RS485/ Modbus TCP ethernet
- Power transducers: 4-20mA
- I/O extensions (only for GENSYS 2.0 and GENSYS 2.0 CORE): CAN open
- Mains: CAN inter-GENSYS
- Analog load sharers: parallel lines

APPLICATIONS

- Gas and fuel generators
- Cogeneration
- Turbo-alternator
- Synchronization and power management module (without engine control).
- 1 generator in change over mode with mains.
- 1 generator in parallel with mains: Base load or Peak shaving.
- 2 to 14 gensets in parallel and change over with mains.
- 2 to 14 gensets in parallel and paralleled with mains for load transfer. In this case, the MASTER 2.0 is used for mains paralleling via CAN bus.
- Static paralleling (engine stopped)
- Tie breaker management.

GENSETS WITH MAINS

When several generators are paralleled with mains, the MASTER 2.0 is used (connection via inter-module CAN bus) for:
- Three phase mains failure
- Paralleled gensets with several mains control
- Electrical protection for power plant and mains
- Electrical parameters display for power plant and mains
- Manual and automatic paralleling with mains (frequency, phase and voltage)
- Power factor control when paralleling with mains.
- KW power management with several modes:
  - No break change over with load transfer
  - Permanent paralleling in base load
  - Permanent paralleling in peak shaving mode (export/import)

GENSYS 2.0

FEATURES

Control and management

- Manual and automatic engine control.
- J1939 compatibility (Cummins, Volvo, Scania, MTU, CAT...)
- Automatic start/stop control depending on load demand.
- Dead busbar management.
- Isochronous or droop kW load sharing control (via CAN bus serial port, up to 14 generators)
- Constant voltage (or droop) kVAR load sharing control (via CAN bus serial port, up to 14 generators)
- Power factor control when paralleling with mains.
- KW control (base load or peak shaving) when paralleling with mains.

Protections

- Generator electrical protections: <F, >F, <U, >U, >I, >In, >P, <P, <-P, >Q, <Q, <-Q
- Mains electrical protections (option) : <F, >F, <U, >U, >P, <P, <-P, >Q, <Q, <-Q, phase shit, df/dt.
- Short circuit protection.
- Phase sequence protection, phase shift compensation.

Synchronization

- Manual and automatic frequency and phase synchronization (differential frequency meter + synchroscope available on screen).
- Manual and automatic voltage synchronization (differential voltmeter available on screen).

Information display

- Engine parameters display: oil pressure, water temp, speed, hours run meter (5 programmable information pages)
- Generator electrical parameters display:
  - Phase-phase Voltage (3 phase RMS)
  - Phase-neutral voltage (3 phase RMS)
  - Current (3 phase RMS)
  - Frequency
  - Active power (3 phase + total)
  - Reactive power (3 phase + total)
  - Power factor (3 phase + total)
  - Active power energy (kWh)
  - Reactive power energy (kVARh)
- Mains electrical parameters display:
  - Phase-phase Voltage (3 phase RMS)
  - Current (3 phase)
  - Frequency
  - Active power
  - Reactive power
  - Power factor
  - Import active power energy (kWh)
  - Import reactive power energy (kVARh)

Alarms and events

- The last 50 alarms and last 50 shutdowns are recorded on non volatile memory.
- Data logging every 100ms.

Other

- Electronic droop function (droop <1%). Allows load sharing without inter-unit communication.
- “Watchdog” digital output for microprocessor life signal.

CHARACTERISTICS

Current, voltage and frequency

- DC voltage power supply input: 8 to $35V_{DC}$, 600mA at $12V_{DC}$ and 300mA at $24V_{DC}$.
- AC voltage inputs: 100 to $480V_{AC}$, 100mA max. Neutral terminal does not need to be connected.
- AC current inputs: 0 to 5A, 1VA. Each phase is isolated from the others.
- AC current overload: 15A during 10s.
- Frequency measurement: 45 to 70 Hz – $15V_{AC}$ minimum between phase and neutral.
- Voltage control signal: The voltage control (AVR) is made either by a +/-$10V_{DC}$ output with adjustable span and offset or by voltage+/ voltage- contacts.

Environment

- Operating temperature: -20 to +70°C
- Storage temperature: -30 to +80°C
- Humidity: 5 to 95%. Tropic-proof circuits for normal operation in humid conditions.

Inputs, outputs

- Digital inputs: NO or NC to ground.
- Emergency stop input: Norm. Closed 24V.
- Relay outputs (crank and fuel): 5A. The 24V is provided through the emergency push button.
- Relay outputs (breakers): 5A, $230V_{AC}$ max. NO + NC available.
- Transistor outputs: 350mA, over-current protected.
- Analog inputs (oil pressure and water temp): 0 to 400 Ω. Calibration is configurable.
- Analog inputs (spare 1 and spare 2): 0 to 10 KΩ.
- Calibration for speed and frequency control is made either by a +/-$10V_{DC}$ output with adjustable span and offset or by speed+/speed- contacts.
- Magnetic pick up input: 100 to 10kHz, $2V_{AC}$ minimum.
- PWM output for CAT and Perkins engines

Ports

- 5 isolated serial ports are available:
  - RS485 for Modbus RTU (read and write)/ male Sub-D 9 pins 120 Ω resistors selected by micro-switch.
  - CAN bus for inter-GENSYS/ MASTER 2.0 connection: male Sub-D 9 pins 120 Ω resistors selected by micro-switch
  - CAN bus dedicated to options J1939, I/O extensions: male Sub-D 9 pins 120 Ω resistors selected by micro-switch
  - Ethernet: PC communication/ Modbus TCP
  - SD card reader

Size and weigh

- Size: 248x197x57mm (9.76x7.76x2.24in)
- Panel cut out: 177x228mm (6.97x8.98in)
- Weight: 1.9kg (4.2lb)

Certifications

- European Union Directives: EN 50081-2, EN 50082-2, 73/23EEC
- Front panel: IP54 protection. Back panel: IP20 protection.

Other

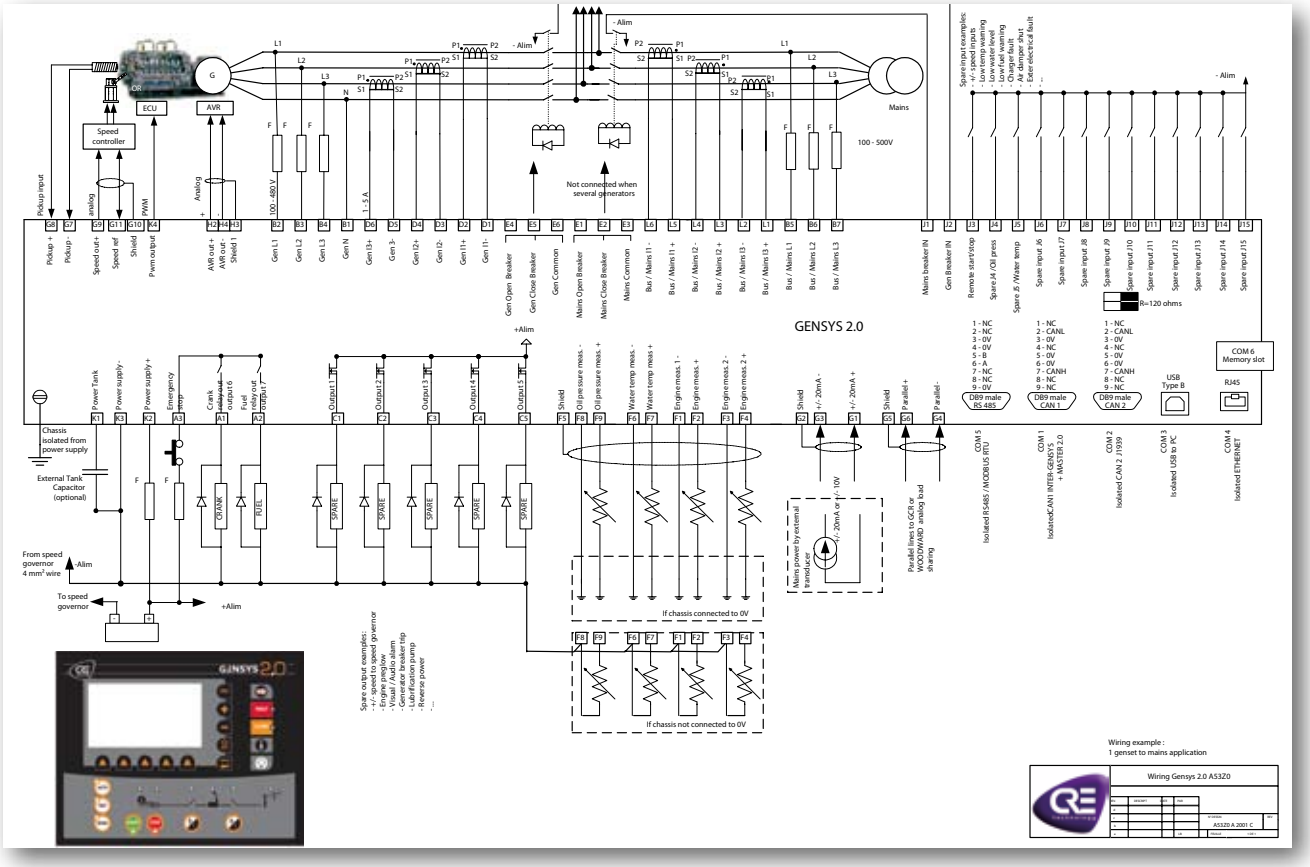
- LCD characteristics: 114x64mm, 60 cd/m² backlight, 3 character sizes.
- Terminals: 2 piece connectors, 2,5mm².
- Languages: English, Spanish, French, Italian.
- Other custom languages: downlodable on request

PART NUMBER
A53Z0

SOFTWARE
CRE Config / Easy PLC

CABLE
A53W1

ASSOCIATED PRODUCTS
Reduced: GENSYS 2.0 LT
Complementary: MASTER 2.0



RDM 2.0

Remote display module for all-in-one genset control and paralleling unit

- RDM 2.0 to be connected to the GENSYS 2.0 CORE
- Can be used as additional remote display
- Several power plants possibilities
- Same multi-function graphic display and same front panel as the GENSYS 2.0

The RDM 2.0 works as a remote display and, combined with the GENSYS 2.0 CORE, can control a single or a multiple generating sets power plant.

RDM 2.0 screen displays the same data as the GENSYS 2.0: front panel buttons on both controllers and works the same way.

The display shows mechanical and electronical parameters for intuitive operation and users can switch screens, set password, change setpoints and view history record.

FEATURES

Information display

- Engine parameters display: oil pressure, water temp, speed, hours run meter...
- Generator electrical parameters display:
  - Phase-phase Voltage (3 phase RMS)
  - Phase-neutral Voltage (3 phase RMS)
  - Current (3 phase RMS)
  - Frequency
  - Active power (3 phase + total)
  - Reactive power (3 phase + total)
  - Power factor (3 phase + total)
  - Active power energy (kWh)
  - Reactive power energy (kVARh)
- Mains electrical parameters display:
  - Phase-phase Voltage (3 phase RMS)
  - Current (3 phase)
  - Frequency
  - Active power
  - Reactive power
  - Power factor
  - Import active power energy (kWh)
  - Import reactive power energy (kVARh)
- User display:
  - 50 spare display lines

CHARACTERISTICS

Current, voltage and frequency

- DC voltage power supply input: 8 to 40V_{DC}, 600mA at 12V_{DC} and 300mA at 24V_{DC}.

Environment

- Operating temperature: -20 to +70°C
- Storage temperature: -30 to +80°C
- Humidity: 5 to 95%. Tropic-proof circuits for normal operation in humid conditions.

Ports

- Ethernet for GENSYS 2.0 CORE
- 4 digital inputs
- 4 digital outputs

Size and weigh

- Size: 248x197x57mm (9.76x7.76x2.24in)
- Panel cut out: 177x228mm (6.97x8.98in)
- Weight: 0.9kg (2lb)

Certifications

- European Union Directives: EN 50081-2, EN 50082-2, 73/23EEC Front panel: IP54 protection. Back panel: IP20 protection.

Other

- LCD characteristics: 114x64mm, 60 cd/m² backlight, 3 character sizes.
- Terminals: 2 piece connectors, 2,5mm².
- Standard languages: English, Spanish, French, Italian
- Other custom languages: downlodable on request

PART NUMBER
A53Y0

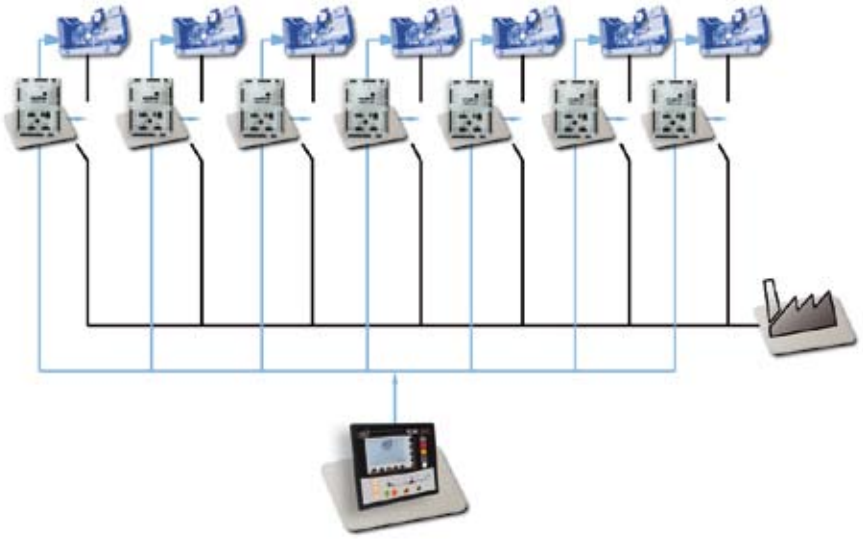
SOFTWARE
CRE Config / Easy PLC

CABLE
A53W1

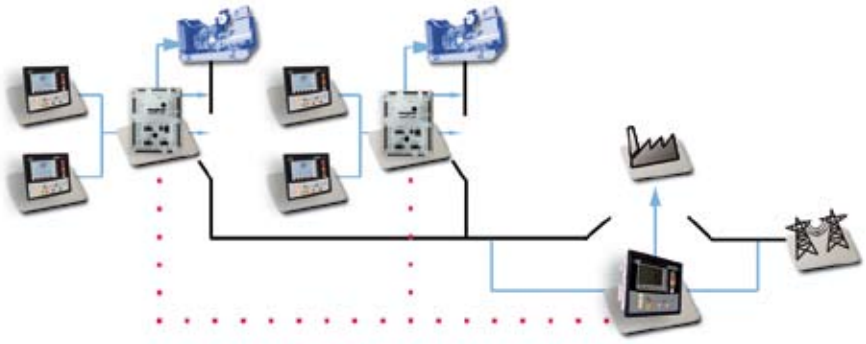
ASSOCIATED PRODUCTS
GENSYS 2.0
Complementary:
GENSYS 2.0 CORE

SEVERAL POWERPLANT POSSIBILITIES

Multi-control HMI:
A single RDM 2.0 can control up to 14 GENSYS 2.0 CORE



HMI redundancy:
up to 4 RDM 2.0 by GENSYS CORE

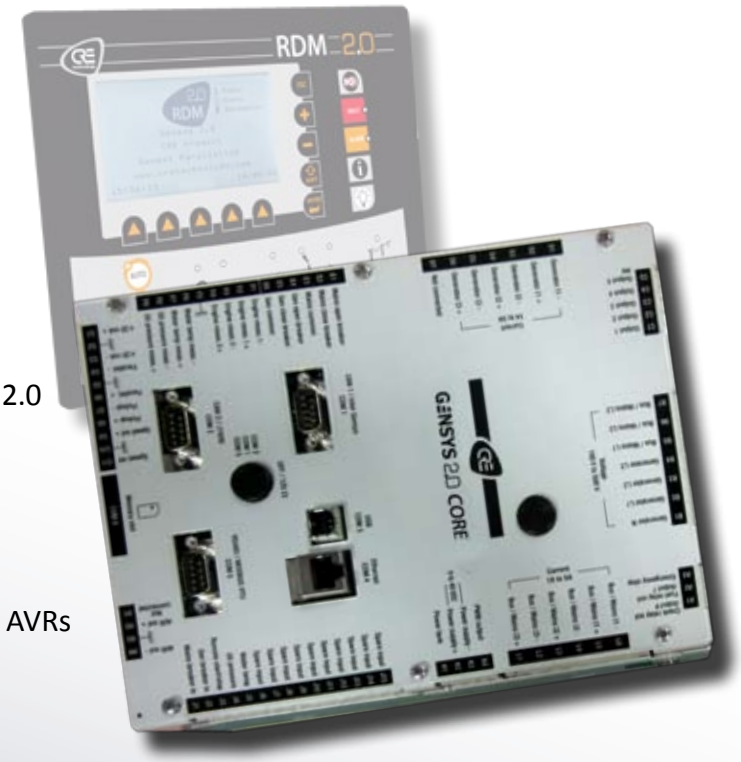


Master 2.0

GENSYS 2.0 CORE

Core unit for all-in-one genset control and paralleling unit with integrated PLC

- Rear mounted control and paralleling module
- Connected to the remote display module RDM 2.0
- Internal logic sequences, programmable by equations
- I/O flexibility
- 5 isolated serial ports: RS485, 2 CAN bus, Ethernet, SD card reader
- Fully compatible with all speed governors and AVRs
- Redundancy on critical applications



The GENSYS 2.0 CORE is an easy-to-use rear-mounted, control and paralleling module which can synchronize up to 14 generators.

The modules are designed to work with independent remote display module RDM 2.0 screens which are connected by ethernet. GENSYS 2.0 CORE is configured with CRE Config software (cf p64) or via embedded website

The kit GENSYS 2.0 CORE and RDM 2.0 has the same properties as the GENSYS 2.0 and allows several power plant possibilities. It is an extendable system that can be optimized to your space facility.

PROGRAMMING BY EQUATIONS

The GENSYS 2.0 CORE module is a real PLC unit where equations and sequences can be programmed directly by the user with text editor software or Easy PLC software (cf p 66).

INPUTS / OUTPUTS EXTENSION

The number of inputs/outputs that can be added is one of the most important on the market. Extension modules (DIN rail mounting) can be added on the CAN bus. This extends the inputs/outputs up to 128 digital inputs, 64 digital outputs, 44 analog inputs and 8 analog outputs.

MINIMUM OPTIONS

This panel controller is offered with a minimum of options to fit all types of application without expensive add-on packages. For specific needs, GENSYS 2.0 CORE can include the following options:

- Mains paralleling
- Phase shift compensation (ie: DYN 11)

focus on

COMPATIBILITY

Thanks to its versatile connectivity the GENSYS family is compatible with peripheral devices:

- Electronic engines: CAN bus J1939/MTU MDEC
- Speed govenors: ±10 V_{DC}/Pulse/ PWM 500Hz
- AVR: 0-10 KΩ/Pulse
- PLC/HMI: Modbus RTU RS485/ Modbus TCP ethernet
- Power transducers: 4-20mA
- I/O extensions (only for GENSYS 2.0 and GENSYS 2.0 CORE): CANopen
- Mains: CAN inter-GENSYS
- Analog load sharers: parallel lines

INTER-UNIT ISOLATED CAN BUS

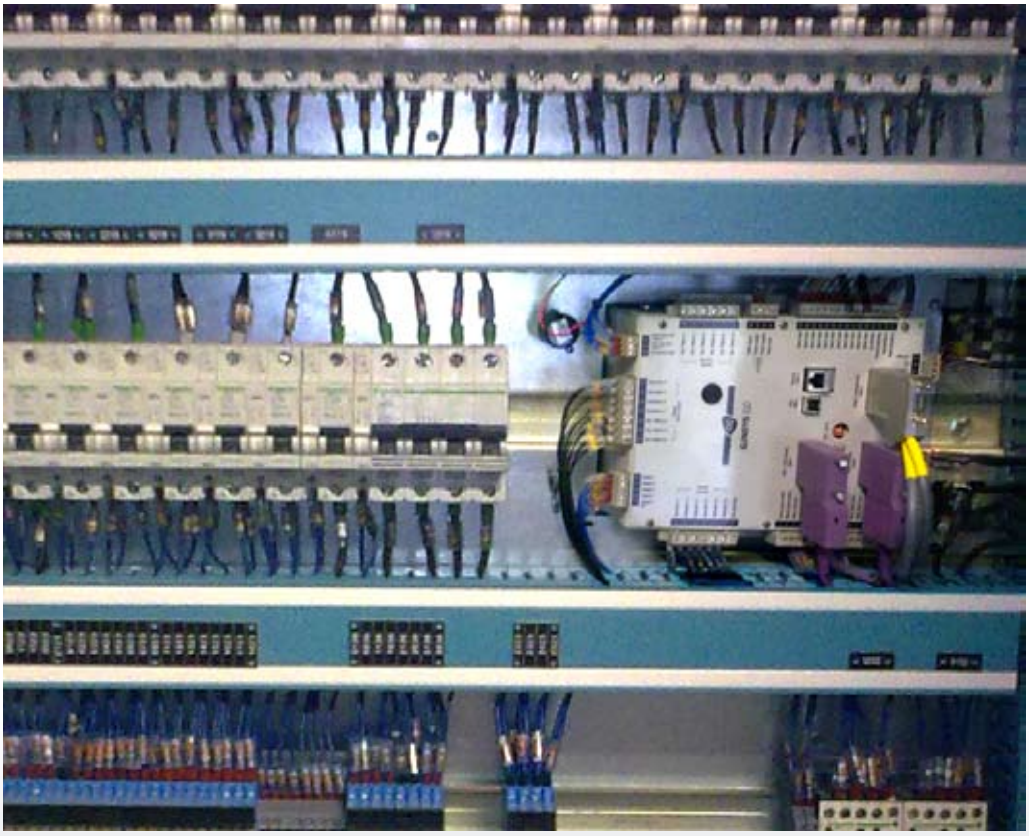
The GENSYS 2.0 CORE has a inter-unit isolated CAN bus port for information transfer (dead busbar management, static paralleling, kW and kVAR load sharing...). The inter-unit bus allows more information exchanges between modules and reduces the wiring and the number of I/O used on each module.

GENERATORS WITH MAINS

The GENSYS 2.0 CORE allows paralleling applications for one generator with mains

When several generators are paralleled with mains, the MASTER 2.0 is used (connection via inter-module CAN bus) for:

- Three phase mains failure
- Paralleled gensets with several mains control
- Electrical protection for power plant and mains
- Electrical parameters display for power plant and mains
- Manual and automatic paralleling with mains (frequency, phase and voltage)
- Power factor control when paralleling with mains.
- KW power management with several modes:
  - No break change over with load transfer
  - Permanent paralleling in base load
  - Permanent paralleling in peak shaving mode (export/import)



GENSYS 2.0 CORE

FEATURES

Control and management

- Manual and automatic engine control.
- Automatic start/stop control depending on load demand.
- Dead busbar management.
- Isochronous or droop kW load sharing control (via CAN bus serial port, up to 16 generators)
- Constant voltage (or droop) kVAR load sharing control (via CAN bus serial port, up to 14 generators)
- Power factor control when paralleling with mains.
- KW control (base load or peak shaving) when paralleling with mains.
- Tie breakers management

Protections

- Generator electrical protections: <F, >F, <U, >U, >I, >In, >P, <P, <-P, >Q, <Q, <-Q
- Mains electrical protections (option) : <F, >F, <U, >U, >P, <P, <-P, >Q, <Q, <-Q, phase shit, df/dt.
- Short circuit protection.
- Phase sequence protection, phase shift compensation.

Synchronization

- Manual and automatic frequency and phase synchronization (differential frequency meter + synchroscope available on screen).
- Manual and automatic voltage synchronization (differential voltmeter available on screen).

Alarms and events

- The last 50 alarms and last 50 shutdowns are recorded on non volatile memory.
- Data logging every 100ms.

Other

- Electronic droop function (droop <1%). Allows load sharing without inter-unit communication.
- “Watchdog” digital output for microprocessor life signal.

CHARACTERISTICS

Current, voltage and frequency

- DC voltage power supply input: 8 to 35V_{DC}, 600mA at 12V_{DC} and 300mA at 24V_{DC}.
- AC voltage inputs: 100 to 480V_{AC}, 100mA max. Neutral terminal does not need to be connected.
- AC current inputs: 0 to 5A, 1VA. Each phase is isolated from the others.
- AC current overload: 15A during 10s.
- Frequency measurement: 45 to 70 Hz – 15V_{AC} minimum between phase and neutral.
- Voltage control signal: The voltage control (AVR) is made either by a +/-10V_{DC} output with adjustable span and offset or by digital outputs +/- pulses.

Environment

- Operating temperature: -20 to +70°C
- Storage temperature: -30 to +80°C
- Humidity: 5 to 95%. Tropic-proof circuits for normal operation in humid conditions.

Inputs, outputs

- Emergency stop input: norm. closed 24V.
- Relay outputs (crank and fuel): 5A. The 24V is provided through the emergency push button.
- Relay outputs (breakers): 5A, 230V_{AC} max. NO + NC available.
- Transistor outputs: 350mA, over-current protected.
- Analog inputs (oil pressure and water temp): 0 to 400 Ω. Calibration is configurable.
- Analog inputs (spare 1 and spare 2): 0 to 10KΩ.
- Calibration for speed and frequency control is made either by a +/-10V_{DC} output with adjustable span and offset or by speed+/speed- contacts.
- Magnetic pick up input: 100 to 10.000Hz, 2V_{AC} minimum.
- PWM output for CAT and Perkins engines

Ports

- 5 isolated serial ports are available:
  - RS485 for Modbus RTU (read and write)/ male Sub-D 9 pins 120 Ω resistors selected by micro-switch.
  - CAN bus for inter-GENSYS/ MASTER 2.0 connection: male Sub-D 9 pins 120 Ω resistors selected by micro-switch
  - CAN bus dedicated to options J1939, I/O extensions: male Sub-D 9 pins 120 Ω resistors selected by micro-switch
  - Ethernet: PC communication/ GENSYS 2.0 CORE and RDM 2.0 connection/ Modbus TCP
  - SD card reader

Size and weigh

- Size: 248x197x57mm (9.76x7.76x2.24in)
- Panel cut out: 177x228mm (6.97x8.98in)
- Weight: 1kg (2.2lb)

Certifications

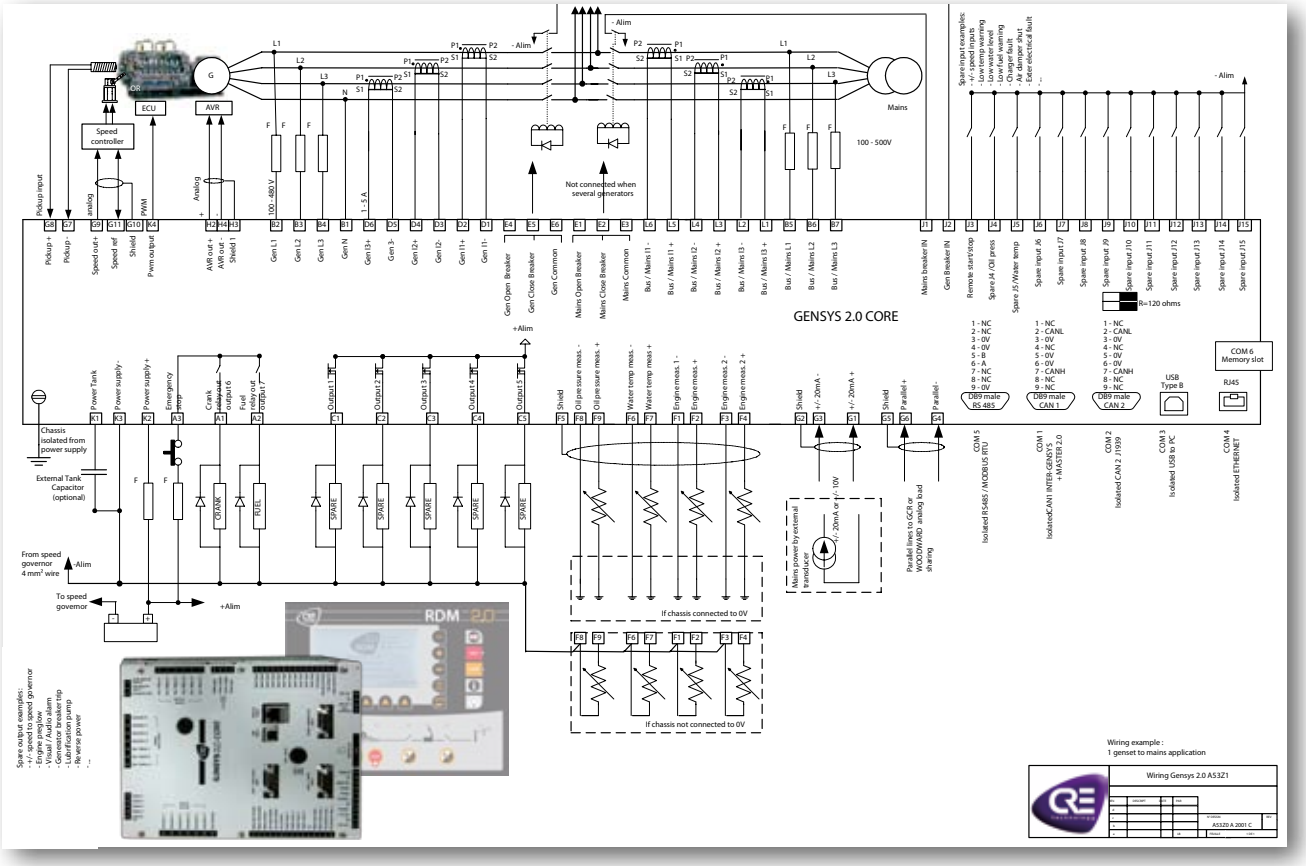
- European Union Directives: EN 50081-2, EN 50082-2, 73/23EEC

PART NUMBER
A53Z1

SOFTWARE
CRE Config / Easy PLC

CABLE
A53W1

ASSOCIATED PRODUCTS
GENSYS 2.0
Complementary: RDM 2.0



MASTER 2.0

All-in-one mains paralleling unit with integrated PLC

- Compact “all in one” module
- Fully compatible with GENSYS 2.0 and most analog load sharing modules
- Internal logic sequences, programmable by equations
- 5 isolated ports: RS485, 2 CAN bus, Ethernet, SD card reader
- All mains paralleling sequences management
- Large, multi-function graphic display
- Embedded web site

The MASTER 2.0 is a power plant controller for gensets in parallel with one or several mains.

This “all-in-one” unit includes all necessary functions:

- **Several mains management**
- **Three phase mains failure detection**
- **Electrical protection**
- **Electrical parameters display**
- **Manual and automatic paralleling with mains (frequency, phase and voltage)**
- **KW power management with several modes:**
- **No break change over with load transfer**
- **Permanent paralleling in base load**
- **Permanent paralleling in peak shaving mode**
- **Power factor control when paralleling with mains.**
- **Dyn11 capabilities (HV phase compensation)**
- **Analog control for all load sharing modules.**

PROGRAMMABLE EQUATIONS

The MASTER 2.0 controller is a real PLC unit where equations and sequences can be programmed directly by the user with text editor software or Easy PLC software (cf p 66).

INPUTS / OUTPUTS WITH NO LIMITS

The number of input/outputs that can be added is one of the most important on the market. Extension modules (DIN rail mounting) can be added on the CAN bus. You can add both digital and analog inputs/outputs.

MAINS AND POWER PLANT ELECTRICAL PARAMETERS

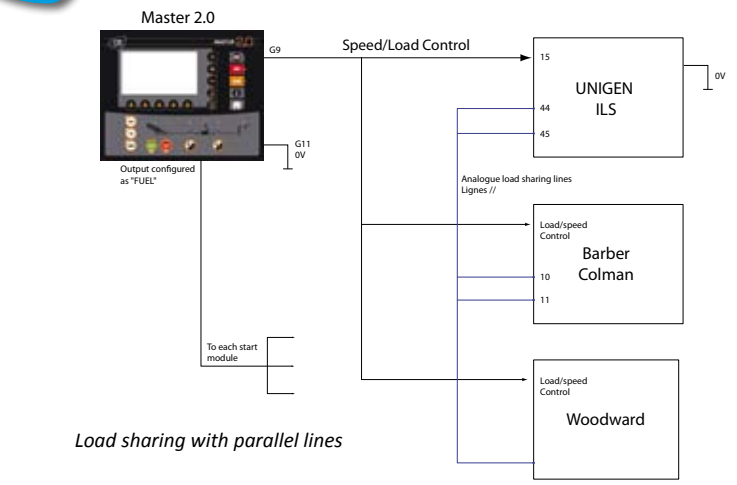
Not only the MASTER 2.0 parallels the power plant with mains, it also protects the power plant and measures electrical parameters.

CRE CONFIG SOFTWARE

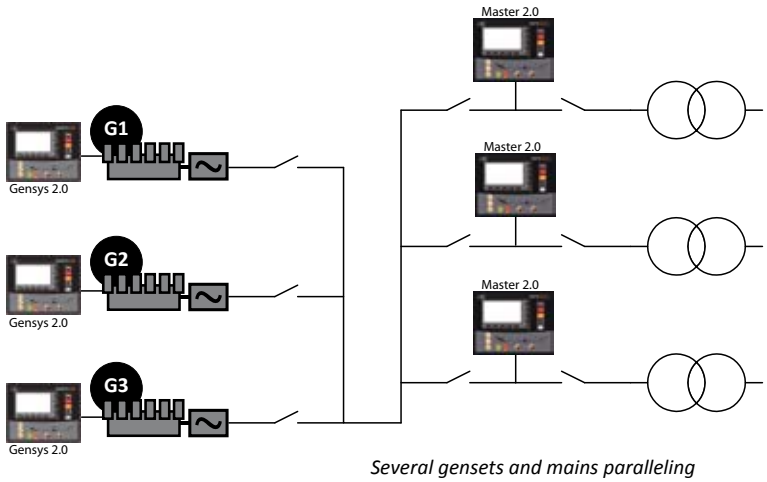
The MASTER 2.0 controller is configurable eather via its front panel and a dedicated CRE software: the CRE Config software (cf p64).

focus on

WIRING EXAMPLES



Load sharing with parallel lines



Several gensets and mains paralleling

APPLICATIONS

Constant generating set power:

In this mode, the generating sets provide constant power. The mains power varies according to the load.

Constant mains power:

In this mode, the mains power (imported or exported) remains constant. The generating sets vary their power according to the load.

Power plant control with several mains:

- 1 MASTER 2.0 per mains
- No-break change-over with load transfer.
- Transfer-switch unit control.

EXTENSIONS

With BSM II

When more inputs/outputs are needed, a BSM II (engine monitoring module) can be connected to Master 2.0 via CAN bus. It offers 16 configurable analog inputs (0-1V, 0-10V, 4-20mA, Thermocouple K, PT100...), 10 digital inputs and 6 digital outputs.
The BSM II also provides a 512 Kbytes non-volatile memory to record generator data.

With I/O external modules

A large range of modules are compatibles with the MASTER 2.0 via CAN bus. You can add more than 150 analog and digital I/O:

- Analog inputs: PT100, 4-20mA, 0-10V, THK...
- Analog outputs: 4-20mA, 0-10V, PWM...
- Digital inputs
- Digital outputs

MASTER 2.0

FEATURES

- Power plant electrical parameters display:
  - Power plant overview
  - Generator state
  - Individual generator alarm
  - Phase-phase Voltage (3 phase RMS)
  - Phase-neutral Voltage (3 phase RMS)
  - Current (3 phase RMS)
  - Frequency
  - Active power (3 phase + total)
  - Reactive power (3 phase + total)
  - Power factor (3 phase + total)
  - Active power energy (kWh)
  - Reactive power energy (kVARh)
- Mains electrical parameters display:
  - Phase-phase voltage (3 phase RMS)
  - Phase-neutral voltage (3 phase RMS)
  - Current (3 phase RMS)
  - Frequency
  - Active power (3 phase + total)
  - Reactive power (3 phase + total)
  - Power factor (3 phase + total)
  - Active power energy (kWh)
  - Reactive power energy (kVARh)
- Manual and automatic frequency and phase synchronization (differential frequency meter + synchroscope available on screen).
- Manual and automatic voltage synchronization (differential voltmeter available on screen).
- Active power control (by CAN bus port, up to 14 GENSYS 2.0/ Master 2.0 units).
- Power factor control (by CAN bus port, up to 14 GENSYS 2.0/ MASTER 2.0 units).
- Power management with several mains.
- Phase sequence protection.
- Phase shift compensation (ie: DYN 11).
- Short-circuit protection.
- Generator electrical protections: <F, >F, <U, >U, >I, >In, >P, <P, <-P, >Q, <Q, <-Q
- Mains electrical protections (option) : <F, >F, <U, >U, >P, <P, <-P, >Q, <Q, <-Q, phase shift, df/dt.
- The last 50 alarms and last 50 shutdowns are recorded in non volatile memory.

CHARACTERISTICS

Current, voltage and frequency

- DC voltage power supply input: 8 to 35V_{DC}, 600mA at 12V_{DC} and 300mA at 24V_{DC}.
- AC voltage inputs: 100 to 480V_{AC}, 100mA max. Neutral terminal does not need to be connected.
- AC current inputs: 0 to 5A, 1VA. Each phase is isolated from the others.
- AC current overload: 15A during 10s.
- Frequency measurement: 45 to 70 Hz – 15V_{AC} minimum between phase and neutral.
- Digital inputs: NO or NC to ground.
- Emergency stop input: normally closed, 24V.
- Relay outputs: 5A. The 24V is provided via the emergency push button.
- Relay outputs (breakers): 5A, 230V_{AC} max. NO + NC available.
- Transistor outputs: 350mA, overcurrent protected.

Inputs and outputs

- 2 analog inputs: 0 to 400 Ω. Calibration is configurable.
- 2 analog inputs (spare 1 and spare 2): 0 to 10KΩ. Calibration is configurable.
- Analog input (+/-20mA or +/-10V): 50 Ω (current) or 20 KΩ (voltage).
- Analog load sharing line: 0 to 3V_{DC} (5Vmax).
- Analog output between +/- 10 V_{DC}

Ports

- 5 isolated serial ports are available:
  - RS485 for Modbus RTU (read and write)/ male Sub-D 9 pins 120 Ω resistors selected by micro-switch.
  - CAN bus for inter-GENSYS/ MASTER 2.0/GENSYS 2.0 COREconnection: male Sub-D 9 pins 120 Ω resistors selected by micro-switch
  - CAN bus dedicated to options I/O extensions: male Sub-D 9 pins 120 Ω resistors selected by micro-switch
  - Ethernet: PC communication/ Modbus TCP
  - SD card reader

Environment

- Operating temperature: -20 to +70°C
- Storage temperature: -30 to +70°C
- Humidity: 5 to 95%. Tropic-proof circuits for normal operation in humid conditions. Front panel: IP54 protection. Rear panel: IP20 protection.
- Altitude: 2000m

Size and weight

- Size: 248x197x57mm (9.76x7.76x2.24in)
- Panel cut out: 228x177 mm (8.98x6.97 in)
- Mounting: functions in any position, but visibility of the display should be taken into account.
- Weight: 1.9kg (4.2lb)

Certifications

- European union directives: EN 50081-2, EN 50082-2, 73/23EEC

Other

- LCD characteristics: 114x64mm, 60 cd/m² backlight, 3 character sizes.
- Terminals: 2 piece connectors, 2,5mm².
- Standard languages: English, Spanish, French, Italian
- Other custom languages: downlodable on request

CABLES AND CONNECTORS

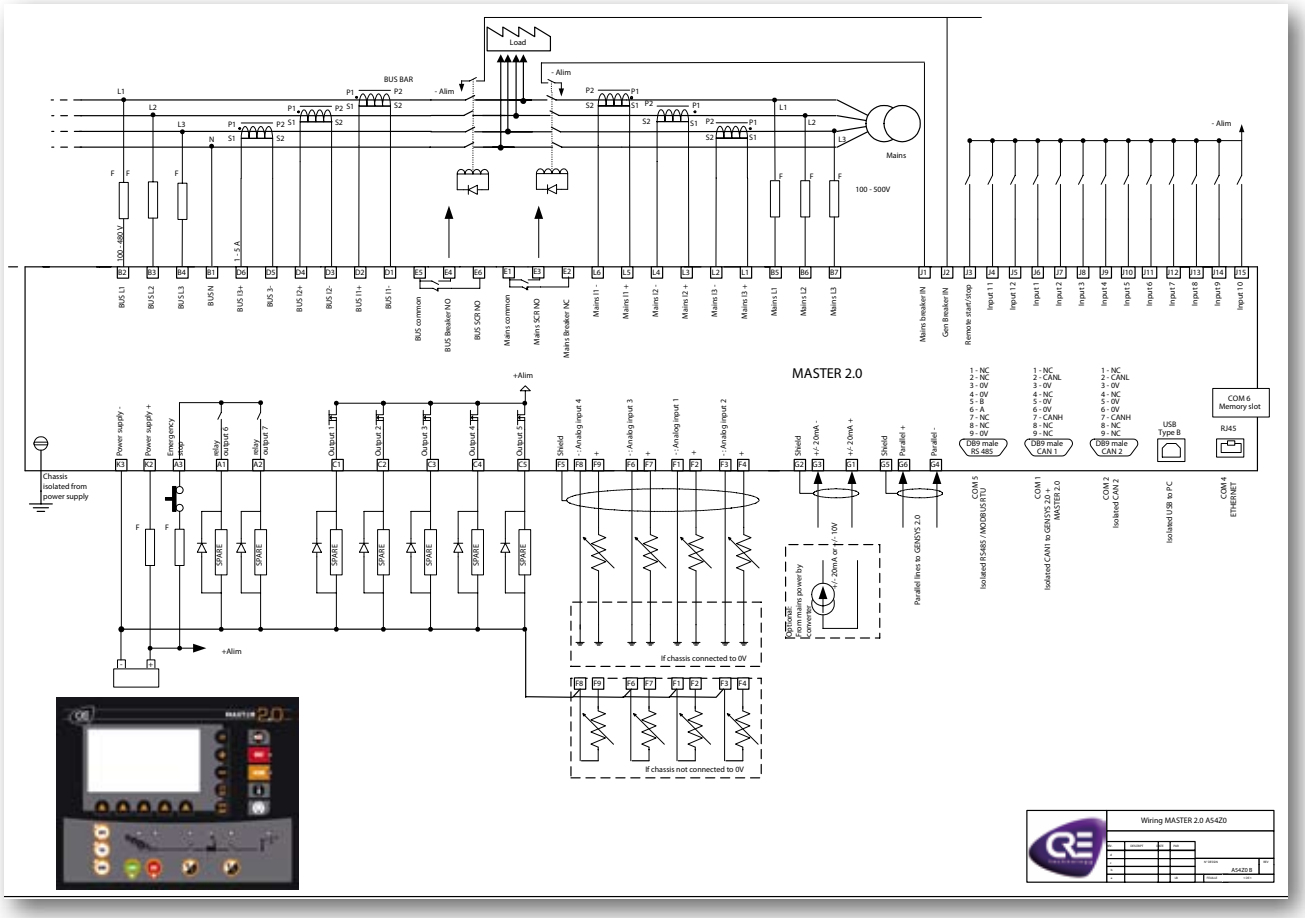
- A53W: Master 2.0 to PC cable - USB/USB - 3m.
- A40W8: CAN© inter GENSYS 2.0 / MASTER 2.0 cable for 2 generators - DB9/DB9 - 7m.
- A40W6: CAN© inter GENSYS 2.0 / MASTER 2.0 cable for more than 2 generators or CANopen© I/O modules - DB9/free wires - 7m.
- A40W3: DB9/Terminals connector to be used with more than 2 generators for double connection (with screws).
- A40W4: communication cable (RS485, CAN, RS232) – per meter.

PART NUMBER
A54Z0

SOFTWARE
CRE Config / Easy PLC

CABLE
A53W1

ASSOCIATED PRODUCTS
Reduced: CPA
Complementary: GENSYS 2.0



GENSYS MARINE

All-in-one paralleling unit for marine applications : PMS

- Compact “all in one” module
- Fully compatible with all speed governors and AVRs
- 4 serial ports: RS232, RS485, CAN bus protocol
- Large, multi-function graphic screen
- Internal logic sequences, programmable by equations
- Predefined sequences dedicated to marine applications
- Embedded web site
- BV, LR and DNV Marine certifications

The GENSYS M**arine controller is a microprocessor based unit dedicated to marine genset control panels.**
This “all in one” module combines all necessary features such as:

- **Engine start/stop, control and protections**
- **Generator control and protections**
- **Mechanical parameters display**
- **Electrical parameters display**
- **Breaker control**
- **Tie breaker control**
- **Speed governor: analog or pulse output**
- **AVR: analog or pulse output**
- **Synchronization with others generators**
- **Synchronization with shore**
- **Isochronous load sharing/de-drooping**
- **KW load sharing and control by CAN bus**
- **Kvar load sharing and control by CAN bus**
- **KW and kVAR Load/Unload management**
- **Electronic engines compatible**
- **Start on fault**
- **Heavy consumer management**
- **Non essential load tripping**
- **Load/Unload management for power optimization**

The GENSYS Marine controller is configurable via its front panel or via a PC without additional software.
The GENSYS Marine controller also has analog load sharing lines and is compatible with all types of analog load sharing modules.

PROGRAMMING BY EQUATIONS

The GENSYS Marine controller is a real PLC unit where equations and sequences can be programmed directly by the user without any additional software. The programming is written with basic text editor software.

INPUTS / OUTPUTS WITH NO LIMITS

The number of input/outputs that can be added is one of the most important on the market. Extension modules (DIN rail mounting) can be added on the CAN bus.
You can add both digital and analog inputs/outputs.

AVAILABLE OPTIONS

- Shore paralleling (1 generator)
- Watchdog output on demand
- CAT/Perkins PWM 500 Hz

focus on

HEAVY CONSUMER MANAGEMENT AND NON ESSENTIAL LOAD TRIPPING

These functions are used in marine applications such as using a crane in a harbour, manoeuvring a ship in/out of harbour using bow thrusters, etc.

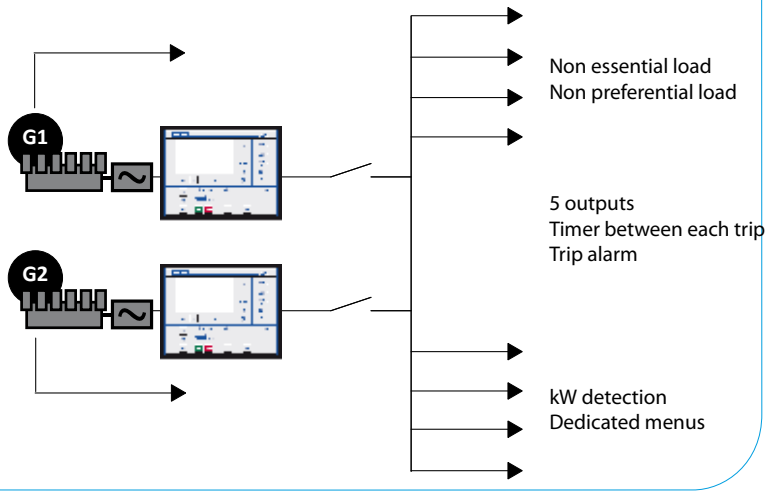
Heavy consumer Management

Certain external parameters must be analysed by the GENSYS Marine units before accepting heavy consumer load:

- If the Power Plant can accept the load, each GENSYS Marine accepts load.
- If the Power Plant cannot accept the load, another engine is started.
- Analysis of available kW, number of generators on Busbar, or both.

Non essential load tripping

If the generator reaches the overload or under frequency threshold, the GENSYS Marine triggers outputs to trip non essential loads.



TIE BREAKER MANAGEMENT

The inter-unit bus allows tie breaker management and synchronisation between port and starboard bus bars.
The GENSYS Marine has also an inter-unit CAN bus port for information transfer (dead busbar management, static paralleling, kW and kVAR load sharing...).
The inter-unit bus allows more information exchanges between modules and reduces the wiring and the number of I/O used on each module.

APPLICATIONS

- Synchronization and power management system module (without engine control).
- 1 generator in change over mode with shore.
- Generators in parallel and change over with shore.
- Generators in parallel and paralleled with shore for load transfer.
- Generators in parallel with tie breaker management.

CRE TECHNOLOGY SERVICES

Like every CRE Technology product, the unit also benefits from our technical support. CRE Technology and their distributors can also provide pre-programmed GENSYS Marine according to customer requirements.
The company offers specific trainings to control the large GENSYS Marine applications and program the module.

GENSYS MARINE

FEATURES

- Manual, semi-automatic and automatic generator control.
- Engine parameters display: oil pressure, water temperature, speed, hours run meter…
- Generator electrical parameters display:
  - Phase-phase voltage (3 phase RMS)
  - Phase-neutral voltage (3 phase RMS)
  - Current (3 phase RMS)
  - Frequency
  - Active power (3 phase + total)
  - Reactive power (3 phase + total)
  - Power factor (3 phase + total)
  - Active power energy (kWh)
  - Reactive power energy (kVARh)
- Shore electrical parameters display (option):
  - Phase-phase voltage (1 phase)
  - Current (1 phase)
  - Frequency
  - Active power
  - Reactive power
  - Power factor
  - Import active power energy (kWh)
  - Import reactive power energy (kVARh)
- Manual and automatic frequency and phase synchronization (differential frequency meter + synchroscope available on screen).
- Manual and automatic voltage synchronization (differential voltmeter available on screen). Isochronous kW load sharing control (by CAN bus serial port, up to 14 generators)
- Constant voltage kVAR load sharing control (by CAN bus serial port, up to 14 generators)
- Frequency centre / de-drooping function
- Dead busbar management.
- Generator electrical protections: <F, >F, <U, >U, >I, >In, >P, <P, <-P, >Q, <Q, <-Q
- Shore electrical protections (option) : <F, >F, <U, >U, >P, <P, <-P, >Q, <Q, <-Q, phase shift, df/dt.
- The last 20 alarms and last 20 shutdowns are recorded with time and hour.
- Automatic start/stop control depending on load demand.
- Pre-alarm: help request on fault function.
- Broadcast data inter GENSYS:
- Each GENSYS can send via CAN bus: 2 analog and 10 digital values.
- Tie breaker synchronisation via the CAN bus.
- Read and write Modbus functions (from 3 to 6 functions).
- Up to 128 additional intput and 64 output via remote I/O.

CHARACTERISTICS

Current, voltage and frequency

- DC voltage power supply input: 8 to 35V_{DC}, 600mA at 12V_{DC} and 300mA at 24V_{DC}.
- AC voltage inputs: 100 to 480V_{AC}, 100mA max. Neutral terminal does not need to be connected.
- AC current inputs: 0 to 5A, 1VA. Each phase is isolated from the others.
- AC current overload: 15A during 10s.
- Frequency measurement: 45 to 70 Hz – 15V_{AC} minimum between phase and neutral.
- Magnetic pick up input: 100 to 10.000Hz, 2V_{AC} minimum.
- Digital inputs: NO or NC to ground.
- Emergency stop input: Normally closed, 24V.
- Relay outputs (crank and fuel): 5A. The 24V is provided via the emergency push button.
- Relay outputs (breakers): 5A, 230V_{AC} max. NO + NC available.
- Transistor outputs: 350mA, overcurrent protected.

Inputs and outputs

- Analog inputs (oil pressure and water temperature): 0 to 400 Ω. Calibration is configurable.
- Analog inputs (spare 1 and spare 2): 0 to 10KΩ. Calibration is configurable.
- Analog input (+/-20mA or +/-10V): 50 Ω (current) or 20KΩ (voltage).
- Analog load sharing line: 0 to 3V_{DC} (5Vmax).
- Speed control signal: The speed and frequency control is made either by a +/-10V_{DC} output with adjustable span and offset or by speed+/speed- contacts.
- Voltage control signal: The voltage control (AVR) is made either by a +/-10V_{DC} output with adjustable span and offset or by voltage+/ voltage - contacts.

Ports

- RS232 for PC connection – female Sub-D 9 pins.
- RS485 for Modbus RTU (read and write) – male Sub-D 9 pins.
- CAN bus inter-GENSYS connection – male Sub-D 9 pins.
- CAN bus dedicated to options J1939, I/O extensions: male Sub-D 9 pins.

Environment

- Operating temperature: 0°C to +55°C
- Storage temperature: -30 to +70°C
- Humidity: 5 to 95%. Tropic-proof circuits for normal operation in humid conditions. Front panel: IP54 protection. Rear panel: IP20 protection.
- Altitude: 2000m

Size and weight

- Size: 248x197x57mm (9.76x7.76x2.24in)
- Weight: 1.9kg (4.2lb)
- Panel cut out: 177x228mm (6.97x8.98in)
- Mounting: will function in any position, but the visibility of the display should be taken into account.

Certifications

- European Union Directives: EN 50081-2, EN 50082-2, 73/23EEC
- BV, LR and DNV Marine certifications

Other

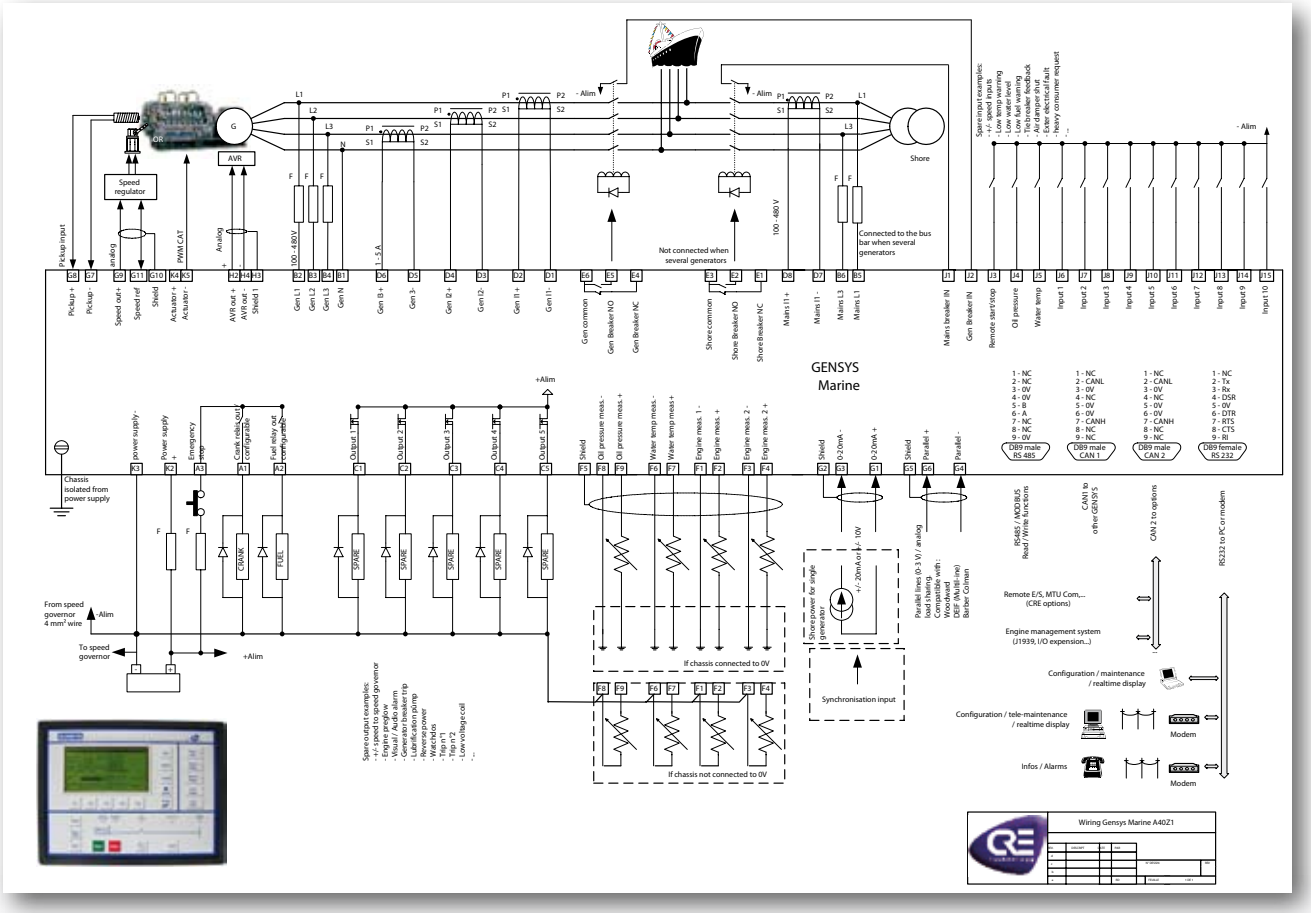
- LCD characteristics: 114x64mm, 60 cd/m² backlight, 3 character sizes.
- Terminals: 2 piece connectors, 2,5mm².
- Languages: English, Spanish, French, Italian

PART NUMBER
A40Z1-M121

SOFTWARE
Embedded website

CABLE
A40W0

ASSOCIATED PRODUCT
Upgrade: GENSYS 2.0 Marine
Complementary: BSM II



GENSYS 2.0 MARINE

All-in-one paralleling unit for marine applications : PMS

- Compact «All-in-one» module
- 5 isolated serial ports: RS485, 2 CAN bus, Ethernet, SD card reader
- I/O flexibility
- New multi-function graphic display
- Internal logic sequences, programmable by equations
- Predefined sequences dedicated to marine applications
- Fully compatible with all speed governors and AVRs
- J1939 communications with electronic engines
- Marine functions

The GENSYS 2.0 Marine is a control unit designed for marine generator switchboards panels.

This Power Management System unit combines all necessary functions:

- **Engine start/stop and protection**
- **Alternator control and protection**
- **Mechanical parameters display**
- **Electrical parameters display**
- **Genset synchronization**
- **Load sharing and kW control**
- **Load sharing and kVAR control**
- **Breaker control**
- **Synchronization with shore**
- **KW and kVAR Load/ Unload Management**
- **Tie breaker control**
- **Modbus TCP**

GENSYS 2.0 Marine is configurable via its front panel or via a PC with CRE Config software (cf p64).

The GENSYS 2.0 Marine controller has an analog load sharing line compatible with all types of analog load sharing modules.

PROGRAMMING BY EQUATIONS

The GENSYS 2.0 Marine controller is a real PLC unit where equations and sequences can be programmed directly by the user with a text editor software or Easy PLC software (cf p 66).

INPUTS / OUTPUTS WITH NO LIMIT

The number of input/outputs that can be added is one of the most important on the market. Extension modules (DIN rail mounting) can be added on the CAN bus. This extends the inputs/outputs up to 128 digital inputs, 64 digital outputs, 44 analog inputs and 8 analog outputs.

MINIMUM OPTIONS

This compact controller is offered with a minimum of options to fit all types of application without expensive add-on packages. The standard GENSYS 2.0 Marine unit is recommended for all types of marine projects, from 1 to 14 generators.
For specific needs, GENSYS 2.0 Marine can be configured accordingly.

INTER-UNIT ISOLATED CAN BUS

The inter-unit CAN bus allows more information exchanges between modules and reduces the wiring and the number of I/O used on each module.
The GENSYS 2.0 Marine has an inter-unit isolated CAN bus port for information transfer (dead busbar management, kW and kVAR load sharing...).

focus on

HEAVY CONSUMER MANAGEMENT AND NON ESSENTIAL LOAD TRIPPING

These functions are used in Marine applications such as using a crane in a harbour, manoeuvring a ship in/out of harbour using bow thrusters, etc.

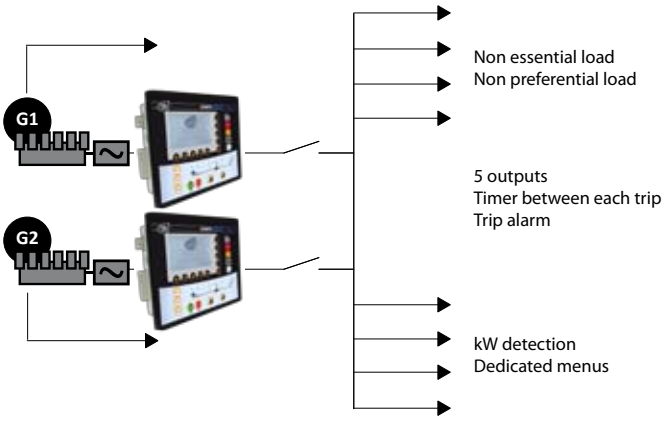
Non essential load tripping

If the generator reaches the overload or under frequency threshold, the GENSYS 2.0 Marine triggers outputs to trip non essential loads.

Heavy consumer Management

Certain external parameters must be analysed by the GENSYS Marine units before accepting heavy consumer load:

- If the Power Plant can accept the load, each GENSYS 2.0 Marine accepts load.
- If the Power Plant cannot accept the load, another engine is started.
- Analysis of available kW, number of generators on Busbar, or both.



APPLICATIONS

- Gas and fuel generators
- Synchronization and power management module (without engine control).
- 1 generator in parallel with shore: Base load or Peak shaving.
- Gensets in parallel and change over with shore.
- Gensets in parallel and paralleled with shore for load transfer.
- Unbalance power management
- Uneven load sharing

CRE TECHNOLOGY SERVICES

Like every CRE Technology product, the unit also benefits from our technical support. CRE Technology and their distributors can also provide pre-programmed GENSYS 2.0 Marine according to customer requirements.

The company offers specific trainings to control the large GENSYS 2.0 Marine applications and program the module.

GENSYS 2.0 MARINE

FEATURES

Control and management

- Manual and automatic engine control.
- J1939 compatibility (Cummins, Volvo, Scania, MTU, CAT...)
- Automatic start/stop control depending on load demand.
- Dead busbar management.
- Isochronous or droop kW load sharing control (via CAN bus serial port, up to 16 generators)
- Constant voltage (or droop) kVAR load sharing control (via CAN bus serial port, up to 16 generators)
- Power factor control when paralleling with shore.
- KW control (base load or peak shaving) when paralleling with shore
- Shore paralleling (1 generator).

Protections

- Generator electrical protections: <F, >F, <U, >U, >I, >In, >P, <P, <-P, >Q, <Q, <-Q
- Phase sequence protection, phase shift compensation.

Synchronization

- Manual and automatic frequency and phase synchronization (differential frequency meter + synchroscope available on screen).
- Manual and automatic voltage synchronization (differential voltmeter available on screen).

Information display

- Engine parameters display: oil pressure, water temp, speed, hours run meter....
- Generator electrical parameters display:
- Phase-phase Voltage (3 phase RMS)
- Phase-neutral Voltage (3 phase RMS)
- Current (3 phase RMS)
- Frequency
- Active power (3 phase + total)
- Reactive power (3 phase + total)
- Power factor (3 phase + total)
- Active power energy (kWh)
- Reactive power energy (kVARh)
- Shore electrical parameters display:
- Phase-phase Voltage (3 phase RMS)
- Current (3 phase)
- Frequency
- Active power
- Reactive power
- Power factor
- Import active power energy (kWh)
- Import reactive power energy (kVARh)

Alarms and events

- The last 50 alarms and last 50 shutdowns are recorded on non volatile memory.
- Data logging every 100ms.

Other

- Electronic droop function (droop <1%). Allows load sharing without inter-unit communication. Quasisochronous® load sharing.
- “Watchdog” digital output for microprocessor life signal.

CHARACTERISTICS

Current, voltage and frequency

- DC voltage power supply input: 8 to 35V_{DC}, 600mA at 12V_{DC} and 300mA at 24V_{DC}.
- AC voltage inputs: 100 to 480V_{AC}, 100mA max. Neutral terminal does not need to be connected.
- AC current inputs: 0 to 5A, 1VA. Each phase is isolated from the others.
- AC current overload: 15A during 10s.
- Frequency measurement: 45 to 70 Hz – 15V_{AC} minimum between phase and neutral.
- Voltage control signal: the voltage control (AVR) is made either by a +/-10V_{DC} output with adjustable span and offset or by voltage+/ voltage- contacts.

Environment

- Operating temperature: -20 to +70°C
- Storage temperature: -30 to +80°C
- Humidity: 5 to 95%. Tropic-proof circuits for normal operation in humid conditions.

Inputs, outputs

- Digital inputs: NO or NC to ground.
- Emergency stop input: Norm. Closed 24V.
- Relay outputs (crank and fuel): 5A. The 24V is provided through the emergency push button.
- Relay outputs (breakers): 5A, 230V_{AC} max. NO + NC available.
- Transistor outputs: 350mA, overcurrent protected.
- Analog inputs (oil pressure and water temp): 0 to 400 Ω. Calibration is configurable.
- Analog inputs (spare 1 and spare 2): 0 to 10KΩ.
- Calibration for speed and frequency control is made either by a +/-10V_{DC} output with adjustable span and offset or by speed+/ speed- contacts.
- Magnetic pick up input: 100 to 10.000Hz, 2V_{AC} minimum.

Compatibility

- PWM output for CAT and Perkins engines 500Hz
- Fully compatible with all speed governors and AVRs
- Pulse output to control speed and AVRs

Ports

- 5 isolated serial ports are available:
  - RS485 for Modbus RTU (read and write)/ male Sub-D 9 pins 120 Ω resistors selected by micro-switch.
  - CAN bus for inter-GENSYS communication: male Sub-D 9 pins 120 Ω resistors selected by micro-switch
  - CAN bus dedicated to options J1939, I/O extensions: male Sub-D 9 pins 120 Ω resistors selected by micro-switch
  - Ethernet: PC communication/ Modbus TCP
  - SD card reader

Size and weigh

- Size: 248x197x57mm (9.76x7.76x2.24in)
- Panel cut out: 177x228mm (6.97x8.98in)
- Weight: 1.9kg (4.2lb)

Certifications

- European Union Directives: EN 50081-2, EN 50082-2, 73/23EEC
- Front panel: IP54 protection. Back panel: IP20 protection.
- DNV Marine Certification

Other

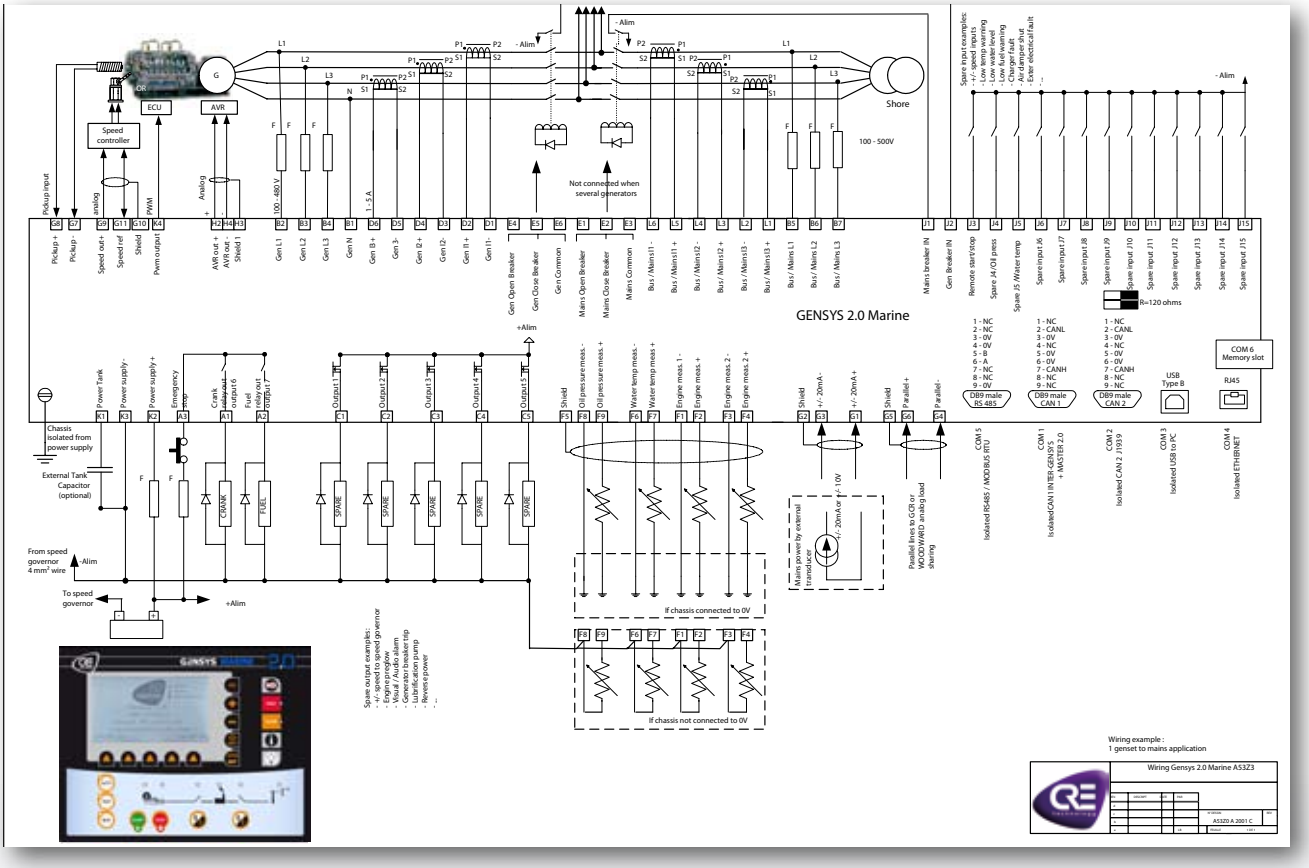
- LCD characteristics: 114x64mm, 60 cd/m² backlight, 3 character sizes.
- Terminals: 2 piece connectors, 2,5mm².
- Languages: English, Spanish, French, Italian

PART NUMBER
A53Z3

SOFTWARE
CRE Config / Easy PLC

CABLE
A53W1

ASSOCIATED PRODUCTS
MASTER 2.0
Complementary: BSM II



cre softwares

CRE Technology dedicated softwares will ensure the users an easy to use configuration and monitoring of our modules.

CRE CONFIG

Configuration software

- Easy-to-use software
- Different modes
- Full parameters configuration
- Real-time monitoring

CRE Technology developed a new PC software which allows you to connect to multiple GENSYS 2.0 modules.

This user-friendly software allows you to control, configure and monitor your power plant in real-time.

After registering, you will be given a password and a device name (for security purposes).

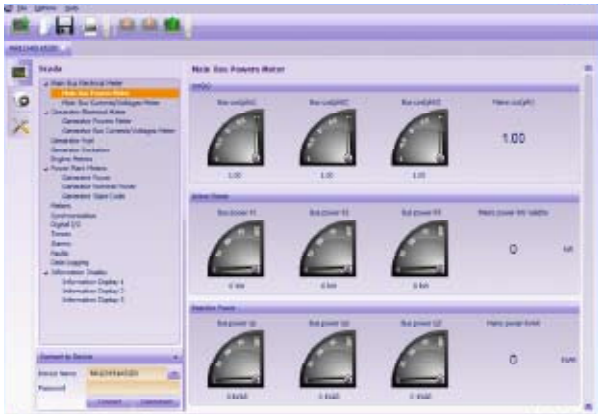
You will then have access to the software interface, which is composed of three parts:

- **SCADA mode**
- **Configuration mode**
- **System Mode**

CRE Config software allows you to configure and monitor up to 14 modules.

> SCADA MODE:

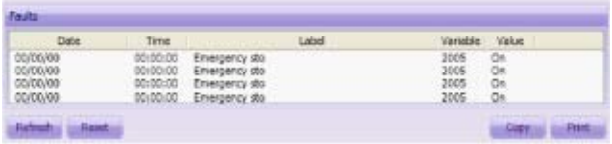
- Monitors electrical and mechanical parameters and variables.
- Supervises your engines and your plant in real time.
- Allows the reading and the printing of more than 50 data, this mode is starting when your module is connected to the user PC with the corresponding password level.



focus on

Alarms, faults and data logging management

- Check the historic alarms, faults and data logging and print them out.



> CONFIGURATION MODE:

Fill in all the parameters of you power plant: number of gensets, nominal value of the genset, etc.

Once you have set the parameters according to your power plant, you then have to upload the settings:

- Select “Transfer current page to device”
- Select “Transfer all page to device”

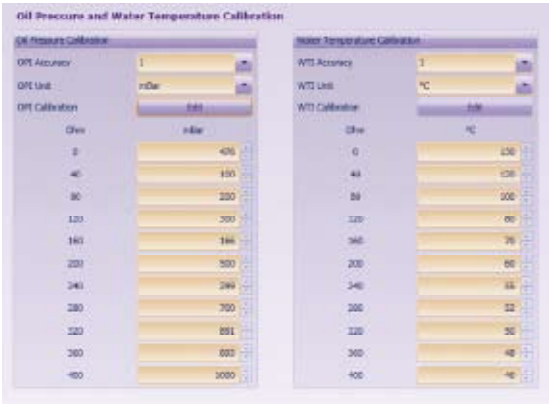
CRE ADVICE:
Refer to the module user manual to use the correct adjustments. Insert Device Name and Password to select the right module to connect before transfering the settings.

Focus on

Calibrate the analog input and make a graph

You can edit and calibrate the following analog sensors:

- Oil pressure (Bar, mBar, kPa, Mpsi)
- Water Temperature (°C, °F)
- Engine (V, kV, mA, A, kA, Hz, kW, kWh, kVAR, kVARh, rpm, %, Bar, mBar, kPa, PSI, °C; °F, L, m3, mm3 , Gal, seconds, hours, days, Hz/s, m3/h, L/h, Gal/h)



Modify your datas directly on the graph by dragging the cursor and adjust it to the right value.

> SYSTEM MODE:

Configure general values and parameters of your controller system: language, screen saver, date/time, etc.

Focus on

“Modify a variable by its number”

This short cut allows you to fetch a variable in the system, using its corresponding number and modify the value without going through all the pages again.

If your authorization level is sufficient, you can also enable the writing mode via “Modbus/PLC” of the variable. If denied, the variable remains on a read only mode (by default).

PART NUMBER
A70Z1

ASSOCIATED PRODUCTS
GENSYS 2.0
RDM 2.0 / GENSYS 2.0 CORE
GENSYS 2.0 LT

EASY PLC

Program and customize your internal logical sequences

- Inputs, outputs
- Arithmetic equations
- Logical sequences

CRE's Easy PLC is a logic editor which provides graphical interface to program PLC equations. The tool is able to generate CRE propriety equations on GENSYS 2.0 family.

Easy PLC simplifies the process of writing propriety equations thanks to a user-friendly graphic environment. That includes many sheets in which the user can create inputs and outputs equations through "operators".

INPUTS AND OUTPUTS

The software contains all input / output variables divided into categories such as voltage, current or power. The user can find the required variable selecting the wanted category in the drop-down menu or typing it in the variable name field. The predefined variable list can be modified according to situations.
Each sheet manages a maximum of 10 inputs or values and 10 outputs.

OPERATOR EQUATIONS

Operators must be connected to both inputs and outputs.
Each operator can be a simple or a complex equation.
They are classified into 4 categories:

LOGIC :

- AND
- NAND Not And
- OR
- XOR Exclusive OR between two variables
- NOT
- Rising edge
- Falling edge

ARITHMETIC :

- + Plus
- - Minus
- * Multiply
- / Divide
- INC Increment by 1
- DEC Decrement by 1

COMPARISON :

- ≠ Not equal
- ≥ Greater or Equal
- > Greater Than
- ≤ Lower or Equal
- < Lower Than

SPECIAL FUNCTIONS :

- 4:1 Multiplexer output : the value is selected between 4 input values
- Timer : has two inputs (RUN and MAX) and one output. When RUN is different from zero, the timer will start counting up to MAX. When RUN is zero, the timer is reset to zero. The output is set to one when the timer has reached MAX value. Otherwise it is set to zero.
- Filter : the input is sampled every PLC cycle. The output is the mean value of the memorized samples. Number of samples is an input of the operator.

focus on

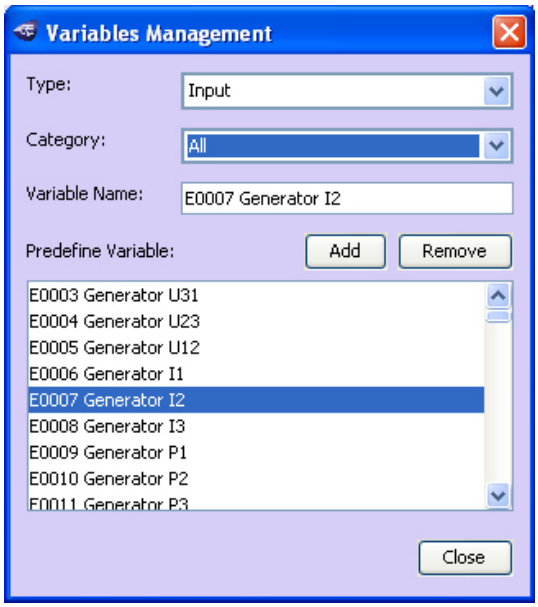
Graphic interface

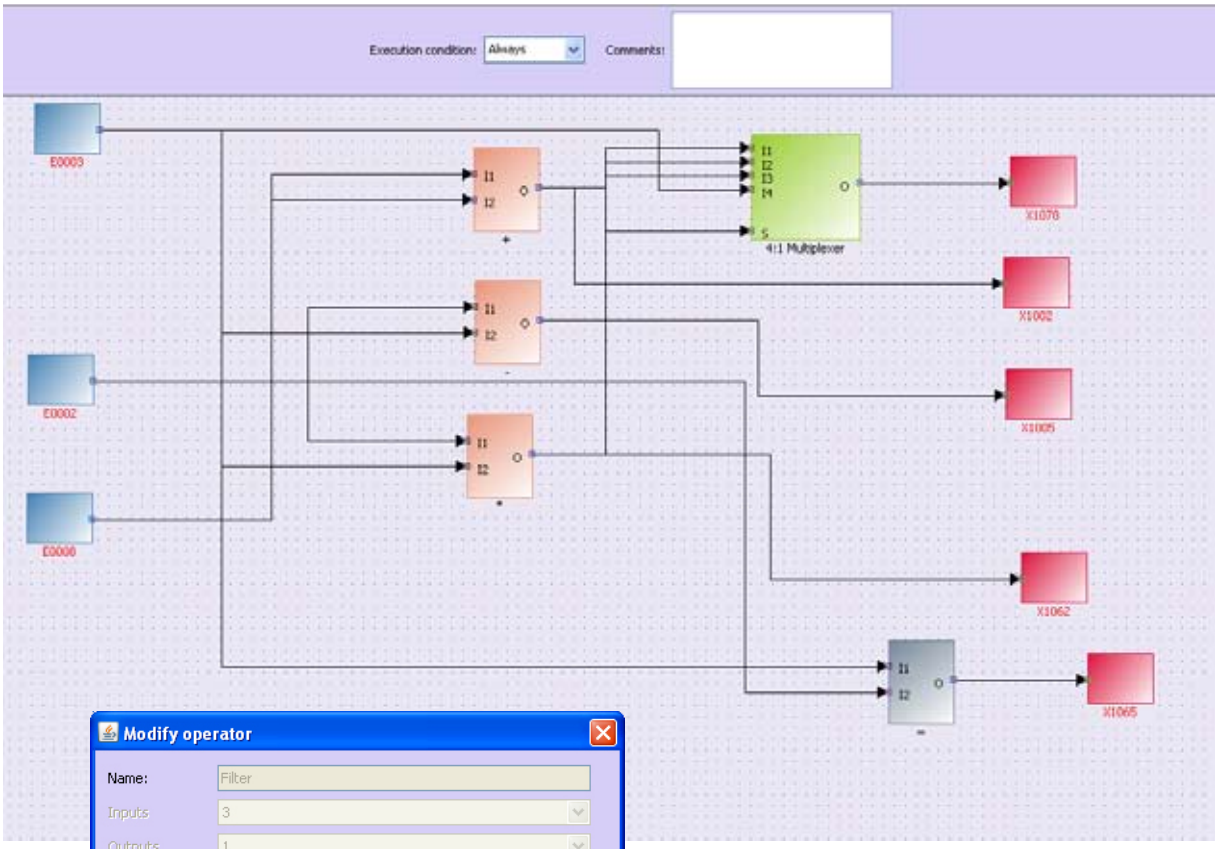
Each project manages up to of 50 graphic files: users can add, rename or remove them independently.

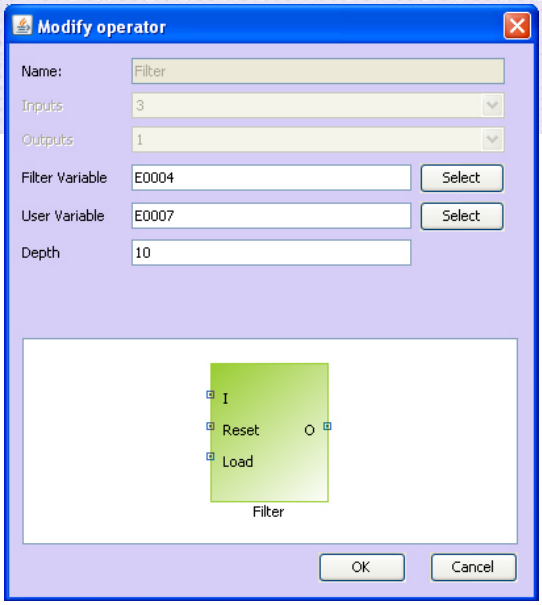
In each file, you can create objects, moving them around and connect them to other objects by dragging the links with the mouse..

You can manage a maximum of 5 operators, connected to 10 inputs and 10 outputs. Each operator can be simple or complex function.

The equations on sheet will only be executed when the equations match toghether







PART NUMBER
A70Z2

ASSOCIATED PRODUCTS
GENSYS 2.0
RDM 2.0

accessories

CRE Technology has developed specific accessories regarding energy control: an extended range of battery chargers, alternator voltage regulators and magnetic pick ups.

BP, BPR & COMPACT

Battery chargers for generators

CRE range of battery chargers are designed to supply constant voltage to the battery with a permanent connection and a maximum of efficiency.

3 RANGES OF PRODUCTS

The BP, the BPR and the Compact series. From 3 to 20 Amps, with or without failure output relay and an AC input range from 85 to 264 V_{AC}. The failure output relay notifies a failure on the integrated protections.

INTEGRATED PROTECTIONS

- Short circuit
- Overload
- Overvoltage
- OverTemperature

FEATURES

- Universal AC Input
- Cooling by free air convection
- Can be installed on DIN rail TS-35/7.5 or 15
- LED Indicator for power on
- 100% full load burn-in test
- 3 year warranty
- Adjustable DC output by potentiometer
- CE certified

ENVIRONMENT

Thanks to a heavy duty case and its free air convection cooling device, our battery chargers can operate in extreme temperature situations (between -20°C and +70°C).

Whether in stock or in operating mode, it can sustain any extreme environment.

cre's quality

OUR COMMITMENT

At CRE, we are so confident in the quality and reliability of our battery chargers that we are pleased to offer you a 3 year warranty for each product purchased.

PART NUMBERS

BPR0512M	BP2024M
BPR0324M	BPR1012M
BP0524M	BPR0524M
BP1012M	BPR1024M
BP1024M	BPR2024M

TECHNICAL SPECIFICATIONS

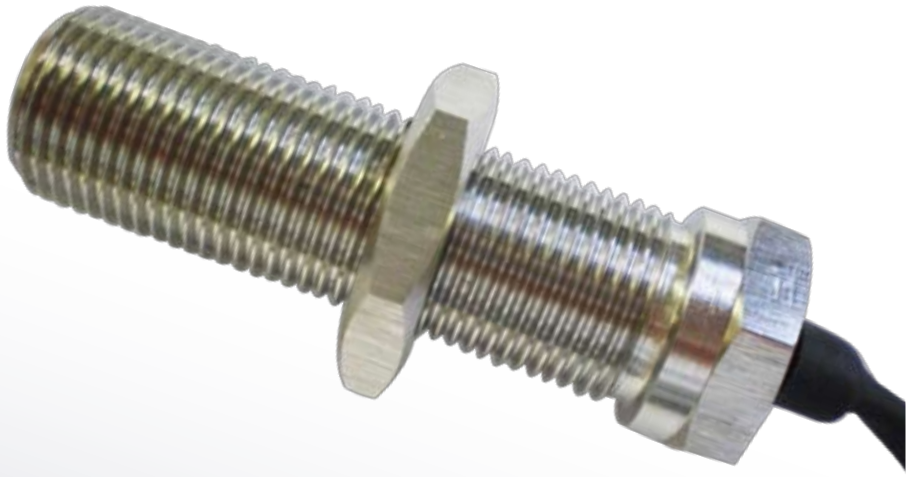
BP RANGE	UNIT	BP 0524M	BP 1012M	BP 1024M	BP 2024M
OUTPUT CURRENT	A	5	10	10	20
OUTPUT VOLTAGE	V_{DC}	24 - 28	12 - 14	24 - 28	24 - 28
AC INPUT SELECTABLE BY SWITCH	-	Yes	Yes	No	No
DC VOLTAGE ADJUSTABLE	-	Yes	Yes	No	No
INPUT VOLTAGE RANGE	V_{AC}	88 ~ 132 176 ~ 264 by switch	88 ~ 132 176 ~ 264 by switch	85 - 264	180 - 264
INPUT FREQUENCY RANGE	Hz	47 - 63	47 - 63	47 - 63	47 - 63
EFFICIENCY (AT FULL LOAD)	%	84	80	84	89
WORKING TEMPERATURE	°C	-10 / +60	-10 / +60	-10 / +70	-20 / +70
STORAGE TEMPERATURE	°C	-20 / +85	-20 / +85	-20 / +85	-20 / +85
WIDTH	mm	65,5	125,5	125,5	227
HEIGHT	mm	125,2	125,5	125,5	125,2
DEPTH	mm	100	100	100	100
WEIGHT	kg	0,79	0,79	1,2	2,4

BPR RANGE	UNIT	BPR 0524M	BPR 1012M	BPR 1024M	BPR 2024M
OUTPUT CURRENT	A	5	10	10	20
OUTPUT VOLTAGE	V_{DC}	24 - 28	12 - 14	24 - 28	24 - 28
DC VOLTAGE ADJUSTABLE (ON FRONT PANEL)	-	Yes	Yes	Yes	Yes
INPUT VOLTAGE RANGE	V_{AC}	88 - 264	88 - 264	88 - 264	90 - 264
INPUT FREQUENCY RANGE	Hz	47 - 63	47 - 63	47 - 63	47 - 63
EFFICIENCY (AT FULL LOAD)	%	91	89	94	94
WORKING TEMPERATURE	°C	-25/ +70	-25/ +70	-25/ +70	-25/ +70
STORAGE TEMPERATURE	°C	-40 / +85	-40 / +85	-40 / +85	-40 / +86
WIDTH	mm	40	40	63	85,5
HEIGHT	mm	125,2	125,2	125,2	125,2
DEPTH	mm	113,5	113,5	113,5	128,5
WEIGHT	kg	0,67	0,67	1,03	1,6

COMPACT RANGE	UNIT	BPR 0324M	BPR 0512M
OUTPUT CURRENT	A	2,5	5
OUTPUT VOLTAGE	V_{DC}	24 - 30	12 - 15
DC VOLTAGE ADJUSTABLE (ON FRONT PANEL)	-	Yes	Yes
INPUT VOLTAGE RANGE	V_{AC}	85 - 264	85 - 264
INPUT FREQUENCY RANGE	Hz	47 - 63	47 - 63
EFFICIENCY (AT FULL LOAD)	%	88	86
WORKING TEMPERATURE	°C	-20 / +70	-20 / +70
STORAGE TEMPERATURE	°C	-40 / +85	-40 / +85
WIDTH	mm	40	40
HEIGHT	mm	90	90
DEPTH	mm	100	100
WEIGHT	kg	0,33	0,33

MAGNETIC PICK UP

Speed sensor



- Detects steel sensing gears
- Produces electrical frequency
- Easy installation on engine
- Different sizes and connectors

The magnetic pick ups (MPU) is the communication link between the engine and the electronic governor control.

The MPU is installed next to the drive shaft gear made of a material which reacts to a magnetic field.

As the fly-wheel rotates it interrupts the MPU's magnetic field and produces an AC signal which corresponds to the engine speed.

EASY-TO-USE PRODUCT

- Screw magnetic pickup into flywheel housing until contact is made with top surface of gear tooth on flywheel. Back magnetic pickup out one complete revolution and tighten nut.
- Connect electrical leads.
  The MPU must show 2.5V for an efficient speed reading.

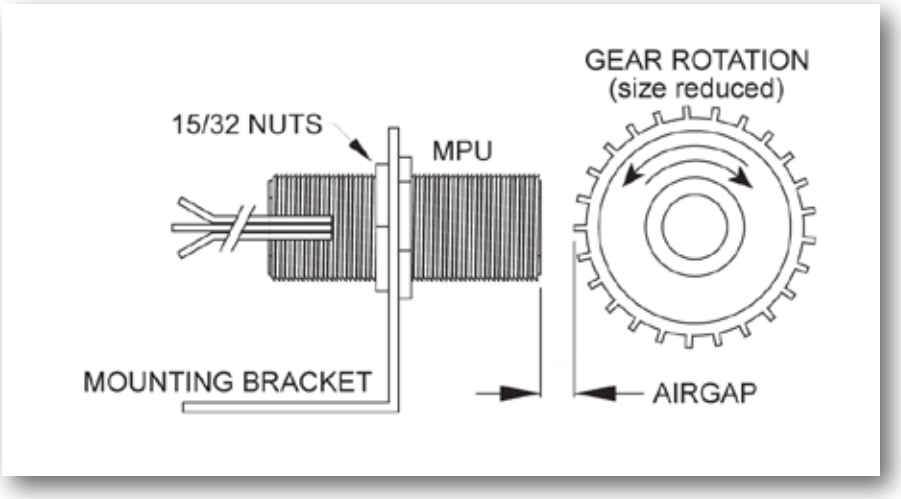
FULLY COMPATIBLE WITH ALL GENERATORS

Wether in inches or in metrics, CRE Technology provides a range of MPUs : they are available in different lengths, thread and connector types.

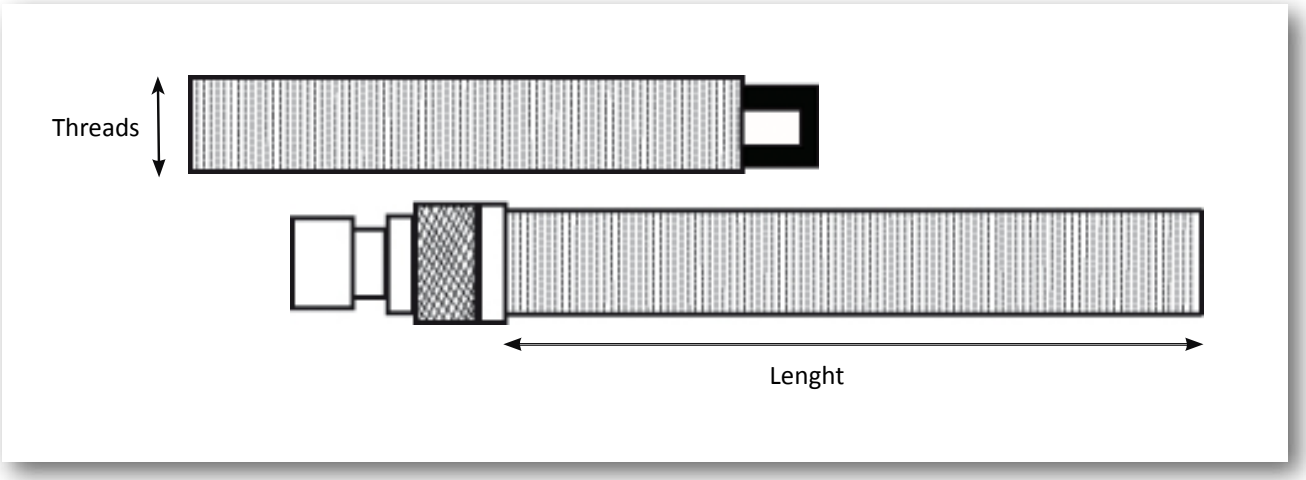
AFTER SALES SERVICE

Like every CRE Technology product, the unit also benefits from our technical support. All CRE products are delivered with one year warranty.

INSTALLATION



OUTLINE DRAWING



TECHNICAL SPECIFICATIONS

REFERENCE	LENGHT	THREADS	CONNECTING
MPU16S-0	70 mm	M16 x 1,5	2 x "1/4 spade
MPU5/85-0	70 mm	5/8" - 18	2 x «1/4 spade
MPU16C-0	92 mm	M16 x 1,5	MS3106A 10SL-S
MPU3/4W-0	60 mm	3/4"	2 wires

Dimensions inclues jam nut

PART NUMBER

MPU16C-0
MPU16S-0
MPU3/4W-0
MPU5/8S-0

AVR-20

Alternator voltage regulator

- 0-115 volts output
- 20A output current
- Relay-less circuit design
- Built-in voltage adjustment
- Remote voltage adjustment input

AVR series voltage regulators are electronic devices which allow the alternator to produce a fixed output voltage.

The device measures the voltage between one of the alternator phases and the neutral point and adjusts the DC voltage applied to the excitation winding until reaching the desired voltage.

The output stage of the device is a half wave thyristor output associated with a freewheeling diode.

EXCELLENT COMPATIBILITY

Basically the unit is compatible with all brushless type alternators. A stability adjustment potentiometer is also provided for this purpose.

RUGGED DESIGN FOR TROUBLE FREE OPERATION

The device has a special relay-less electronic circuit design. The required minimum residual voltage for build up is 5 V-AC. The unit does not include moving parts; therefore it is able to operate in highly vibrating environments.
The device includes a low frequency protection circuit. This circuit reduces the output voltage during overload or engine stop.
Therefore the diesel engine is protected from excessive torque generated by high start-up currents of large electrical equipments.
Similarly, the diesel engine may be stopped under load without damage.

CONSTANT MONITORING

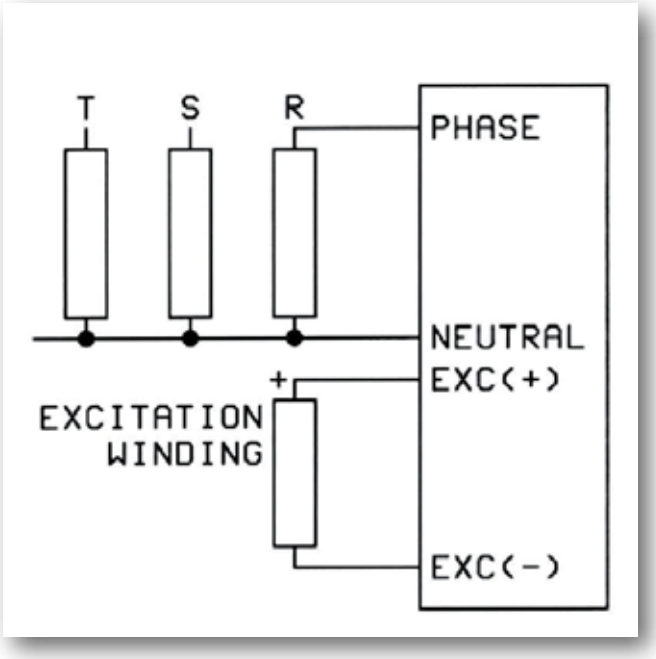
During operation, the device continuously monitors the input voltage and increases/decreases the excitation voltage in order to maintain the input voltage to a constant value.

The device keeps the alternator voltage change in minimum limits in case of a load change, and helps to reach the required voltage value quickly.

The regulation is of a P-I type, the proportional reaction is fast while the slow acting integral reaction helps the unit to recover the precise set voltage.

The stability potentiometer adjusts the reaction speed of the device. This helps the unit to comply with a large variety of alternators.

The unit is able to source the rated current continuously.



EASY ADJUSTMENT

The alternator voltage may be adjusted via the built in potentiometer. Also external voltage adjustment feature is provided. If used, the external potentiometer value shall be 1 KΩ.

INTEGRATED PROTECTION

The low frequency protection circuit shuts off the excitation voltage in order to prevent damage during engine stopping under load. The factory set value for the protection is 45Hz.

AFTER SALES SERVICE

Like every CRE Technology product, the unit also benefits from our technical support. All CRE products are delivered with one year warranty.

FEATURES

- Half wave thyristor output
- 0-115 volts output
- Relay-less circuit design
- Low frequency protection
- Built-in voltage adjustment
- Stability adjustment
- Remote voltage adjustment inputs
- Easy connection diagram
- Compatible with various types of alternator

CHARACTERISTICS

Current, voltage and Frequency

- Phases: single phase.
- Voltage Adjustment Range: 210-250 Volts min
- Frequency: 50/60Hz.
- Frequency Protection Adj. Range: 40-50Hz
- Output Voltage: 0-115 volts-DC @ 230 V-AC
- Output Current:
- 20A continuous
- Residual Voltage For Build Up: 5 volts minimum
- Regulation: +/- 2% typical.
- Voltage Adjustment Input: 0-1000 Ω.
- Power Output Stage: Half Wave thyristor.

Environment

- Operating temp.: -10°C (14°F) to 60 °C (140°F).
- Storage temp.: -20°C (-4°F) to 80 °C (176°F).
- Maximum humidity: 95% non-condensing.

Mounting

- The device has open chassis, resin moulded design and is intended to be mounted in the alternator's terminal box.
- Dimensions: 125x68x35mm (L x W x H)
- Fixing centres: 115mm, 2xM6
- Weight: 280grams.

PART NUMBER
A60S3

ASSOCIATED PRODUCT
Complementary: CB 12/24

after sales service

All CRE Technology products are delivered with one year warranty, and if necessary we will be happy to come on site for product commissioning or troubleshooting. The company also provides specific trainings on our products and softwares.

Our team of dedicated engineers will help you on the field or over the phone from Monday to Friday between 8 am to 8 pm nonstop (GMT+1):

on: +33 492 38 86 86

or on +33 619 35 07 78
outside office hours

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