



FEATURES

- **J1939** CANBus option to connect to the industry standard SAE J1939 'Eco friendly' engine management systems providing engine protection and instrumentation without requiring additional senders.
- **Advanced Multi-set communications port** allowing up to 16 generators to KW and KVar load share with Dead Bus control, starting / stopping independent sets in the system according to load demand.
- **Comprehensive remote communication** via optional RS232 port. Provides RS232 Modem link to PC via either PSTN line or GSM network (using a suitable modem). The module can also signal engineers via their cell phones using the GSM SMS messaging system to advise of system alarms.
- **Powerful state of the art auto-sync and Load Sharing functions** as standard.
- **Optional RS485 'Modbus' output** - using industry standard communication protocol allows full system integration into new and existing building management and control schemes.
- **PIN number protected front panel programming of selected trip points and timers**, allows field changes to be made to the module settings.
- **Clear engine diagnostic information** removes the need for both service equipment and cryptic diagnostic lamp (when used in conjunction with J1939 engines).
- **Built in exercise timer**, that can be set for weekly or monthly intervals.
- **LCD 4-line text based display** to provide 'at-a-glance' diagnosis of fault conditions, instrumentation and operating state.
- **Multiple LCD languages** (English, French, Spanish, German etc) possible.

- **Automatic and Manual operation modes.**
- **Voltage measurement ranges of up to 22,000 volts** can be achieved utilising the provided Voltage Transformer inputs (VT's).
- **Nine configurable auxiliary inputs** for connection to external fault detection equipment.
- **Five configurable outputs** to help produce demanding applications.
- **Independent generator load switching buttons**, providing the 'all in one box' solution.

DESCRIPTION

The Model 5510 is an **Automatic Engine Control Module**. The module is used to automatically start and stop the engine, indicating the operational status and fault conditions by means of an LCD display and a flashing LED on the front panel. Selected operational sequences, timers and alarms can be altered by the user. Alterations to the system are made using the 55xx configuration software with the 810 interface and a PC. This interface also provides real time diagnostic facilities.

It is also possible to monitor the operation of the system either locally or remotely. Access to the module is protected by PIN number to prevent unauthorised access.

Synchronisation and Load Sharing

The 5510 module is equipped with synchronising and load sharing capabilities, to include auto sync control, volts, frequency matching with built in synchroscope and closing onto dead bus facility included.

Direct and flexible outputs from the module are provided to allow connection to the most commonly used speed governors and automatic voltage regulators (AVR's).

Easy push button control

Operation of the module is via pushbutton controls (with security locking facility) mounted on the front panel with STOP/RESET, MANUAL, AUTO and START pushbuttons. Three pushbuttons feature LED 'selected' indications. Further pushbuttons provide LCD DISPLAY SCROLL, LAMP TEST and MUTE functions. Two buttons are also provided for generator load breaker control.

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31/01/05 AP**Instrumentation and Alarms**

The 5510 module provides **metering and alarm facilities** via the LCD display and includes the following instrumentation displays, accessed via the INFORMATION and DISPLAY SCROLL push-buttons:

Generator Volts L1-N, L2-N, L3-N
Generator Volts L1-L2, L2-L3, L3-L1
Generator Amps L1,L2,L3
Generator Frequency Hz
Generator kVA L1,L2,L3, Total
Generator kW L1,L2,L3, Total
Generator pf L1,L2,L3,Average
Generator kVAr L1,L2,L3, Total
Generator kWh
Generator KVAh
Generator KVAh
Generator Phase Sequence
Synchroscope Display with check - sync
Engine Speed RPM
Engine Oil Pressure
Engine Temperature
Plant battery Volts
Engine Hours Run
Number of Start Attempts
Remaining time until Maintenance due

Engine ECU diagnostics information via industry standard SAE J1939 interface.

Enhanced metering via J1939 when connected to a suitably equipped engine.

The instrumentation displays are supplemented further by LCD display pages, which can be set to pages or single list, with auto scroll feature, covering operating status and alarms.

Description continues overleaf...

DESCRIPTION

Continued

LED indication is provided for Alarm present.

4 uncommitted LEDs allow the user to configure the module to provide other status indications from either internal states or from external digital inputs.

The module accepts the following **digital inputs**:

Emergency Stop Input – A normally closed DC positive input.

Fully configurable warning or shutdown inputs.

With the exception of the Emergency Stop input, these are configurable to be either N/C or N/O contacts connected to the -ve DC. The nine fully configurable auxiliary inputs can be selected to be indication, warning or shutdown inputs either immediate or held off during start up to allow for use as protection expansion inputs. Alternatively they may be configured to control extra functions such as Manual Load Switching, Lamp Test or Remote Start input and many others - refer to appropriate manuals for details.

Engine **analogue inputs** are provided for Oil Pressure, Engine Temperature and Fuel Level. These connect to conventional engine mounted resistive sender units (such as VDO or Datcon type) to provide accurate monitoring and protection facilities. Alternatively they can be configured to interface with digital switch type inputs for Low Oil Pressure and High Engine Temperature shutdowns. A further eight digital and two analogue inputs can be provided by means of the P130 Input Expansion Module (please refer to Deep Sea Electronics for further details).

Relay outputs Five DC positive outputs are provided, one for Fuel solenoid and one for Start output, the remaining three being user configurable, additionally two volt free contacts commonly used for switching device control are also provided. The configurable relay functions can be selected from a range of 100+ different functions, conditions or alarms. Additional output relays can be added by means of up to two 157 Relay Expansion Modules. A total of 21 outputs are available with full expansion of the 5510 Module. This allows the module system to be incorporated into existing telemetry or Building Management Schemes via Volt-free contacts. Refer to appropriate manuals for details.

Multiple alarm channels are provided. Alarms are indicated by an LCD Message, LED illumination and Audible Alarm, to monitor the following.

- Under/Over Generator Volts
- Over-current
- Under/Over Generator Frequency
- Under / Over speed
- Charge Fail
- Emergency Stop
- Low oil pressure
- High engine temperature
- Fail to Start
- Low/High DC Battery Volts
- Fail to Stop
- Generator Short Circuit Protection
- Reverse Power
- Generator Phase rotation error
- Earth Fault Protection
- Loss of speed signal
- Fail to Sync / Out of Sync
- MPU Open circuit failure along with any configurable input alarms as selected.

TIMERS AND INPUT FUNCTIONS

- Start delay timer
- Stop delay timer
- Crank/Crank rest timers
- Engage attempt and manual crank limit timers
- Safety on delay timer
- Warm-up timer
- Cooling timer
- Energise to stop hold timer
- Pre-heat timer / Pre-heat bypass timer
- Smoke limiting control timers
- Fail to stop timer
- Over-speed overshoot timer
- Breaker pulse control timers
- DC Battery alarm delay timers
- Sync/Fail to Sync timer

SPECIFICATION

DC Supply:

8 to 35 V Continuous.

Cranking Dropouts:

Able to survive 0 V for 50 mS, providing supply was at least 10 V before dropout and supply recovers to 5V. *This is achieved without the need for internal batteries.*

Max. Operating Current:

460mA at 12 V. 245 mA at 24 V.

Max. Standby Current:

375 mA at 12 V. 200 mA at 24 V.

Alternator Input Range:

15V(ph-N) to 277V(ph-N) AC (+20%)

Alternator Input Frequency:

50 - 60 Hz at rated engine speed (Minimum: 15V AC Ph-N)

Magnetic Pick-up Voltage Input Range:

+/- 0.5 V to 70 V Peak

Magnetic Input Frequency: 10,000 Hz (max)

Start Relay Output:

16 Amp DC at supply voltage.

Fuel Relay Output:

16 Amp DC at supply voltage.

Auxiliary Relay Outputs:

Three outputs 5 Amp DC at supply voltage.

Two outputs volt free 8 Amp at 250V AC

Dimensions:

240mm x 172 mm x 57mm
(9 1/2" x 3 3/4" x 2 1/4")

Charge Fail / Excitation Range:

0 V to 35 V

Operating Temperature Range:

-30 to +70°C

Built in Governor Control

Fully Isolated

Minimum Load Impedance:

1000 Ω

Gain Volts 0 – 10V DC

Offset Volts + / - 10V DC

Built in AVR Control

Fully Isolated

Minimum Load Impedance:

1000 Ω

Gain Volts 0 – 10V DC

Offset Volts + / - 10V DC

NOTE

An Automatic mains failure version of the 5510 is also available: Model 5520. This combines all the features of the 5510 coupled with built-in mains monitoring and load switching device control, for single running generator solutions. The 5560 is an Automatic Mains Monitoring and Contactor Control module, for use in systems designed around the 5510. Please refer to Deep Sea Electronics for details.

TELEMETRY

The 5510 module provides the user with the option of full telemetry facilities via the optional communications software. The module can be either connected to the PC using the 810 interface or via a suitable modem. RS232 or RS485 available.

The PC software is MS-Windows™ based and allows the operator to control the module from a remote location.

The remote operator can also view the instrumentation, alarm and data log details, and the relay and input status.

All access is password controlled so unauthorised operators cannot log onto the system.

Additionally, in the event of the module detecting an alarm condition, it will initiate a modem dial out to the host PC to inform the remote operator of the problem, giving identification of the module followed by the alarm event and the time and date of occurrence.

If using a GSM modem, the module is also able to send SMS text messages to a GSM cell phone to indicate genset, site and alarm condition.

EVENT CAPTURE

The standard module features **event capture facilities**, this records the last 25 shutdown alarms allowing the operator to view the recent operating history of the module to assist in fault finding, etc.



Event Log:-

Event Log

19 Jan 2005 16:12:44

Low Water Level

CONFIGURATION

Many settings can be adjusted by means of the module front panel configuration utility.

PC based configuration software allows for fast, simple and secure configuration of module parameters. Utilising the P810 interface to provide a safe isolated link to the PC, changes can easily be made to the system by authorised personnel. Access is PIN number protected.

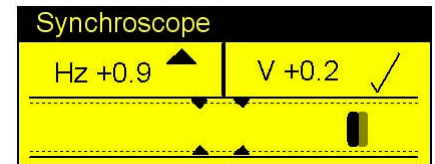
Complex configurations can be saved and loaded from disk or output to a printer for reference. Diagnostic facilities allow for fault finding and monitoring during test and installation.

BUILT-IN FUNCTIONS

- Alternator Under/Over Volts Warning/Shutdown
- Alternator Under/Over Freq. Warning/Shutdown
- Under/Over Speed Warning/Shutdown
- Low Oil Pressure Warning/Shutdown
- High Engine Temp Warning/Shutdown
- Low Temperature Warning
- High/Low Battery Volts Warning
- Over-current Warning/Electrical Trip/Shutdown
- Reverse Power Electrical Trip/Shutdown.
- Phase sequence Electrical Trip/Shutdown.
- Earth Fault Shutdown.
- Short Circuit Fault Electrical Trip/Shutdown
- Adjustable crank cycle/attempts
- Maintenance due alarm function
- External remote start input (On load/Off load/on load demand)
- Built in Exercise Scheduler
- Magnetic Pick-up and / or Alternator speed monitoring
- Event Logging of Shutdown Alarms
- Full Remote Control and Telemetry.
- Graphic LCD Display for true Multi-lingual use
- Multiple Language Display options available.
- 9 Digital inputs - Fully user configurable
- 5 Configurable relay outputs (100+ Control functions)
- LCD Back-lighting for low light level operation
- System lock input
- Load switching control push-button inputs
- Security via PIN Number restricted access
- SMS messaging capability with suitable GSM Modem
- Limited configuration from front panel - including user language selection

SYNCHRONISING AND LOAD SHARING

- Synchroscope with auto sync control.
- Volts and Frequency matching
- Phase angle and Phase rotation indication.
- Dead bus sensing
- Multi-set load demand operation
- KW and Kvar load sharing with multiple generators.
- Direct communication from the module to the governor and AVR.
- KW export when in parallel with the mains supply.



ENVIRONMENTAL TESTING STANDARDS

Electromagnetic Compatibility

BS EN 50081-2 EMC Emission Standard for the Industrial Environment

BS EN 50082-2 EMC Immunity Standard for the Industrial Environment

Vibration

BS EN 60068-2-6 Ten sweeps (up and back down) at 1 octave/minute in each of the three major axes.

5Hz to 8 Hz @ +/-7.5mm constant displacement.

8Hz to 500 Hz @ 2gn constant acceleration

Temperature

Cold:

BS EN 60068-2-1-to -30° C

Hot:

BS EN 60068-2-2 to 70° C

Humidity

BS EN 2011 part 2.1 93% RH @ 40° C for 48 hours

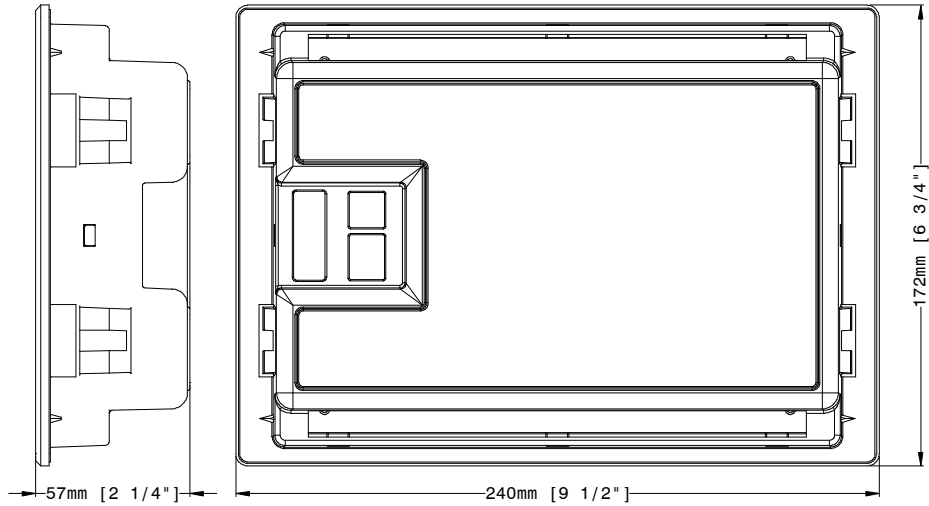
Shock

BS EN 60068-2-27 Three half sine shocks in each of the three major axes 15gn amplitude. 11mS duration.

Electrical Safety

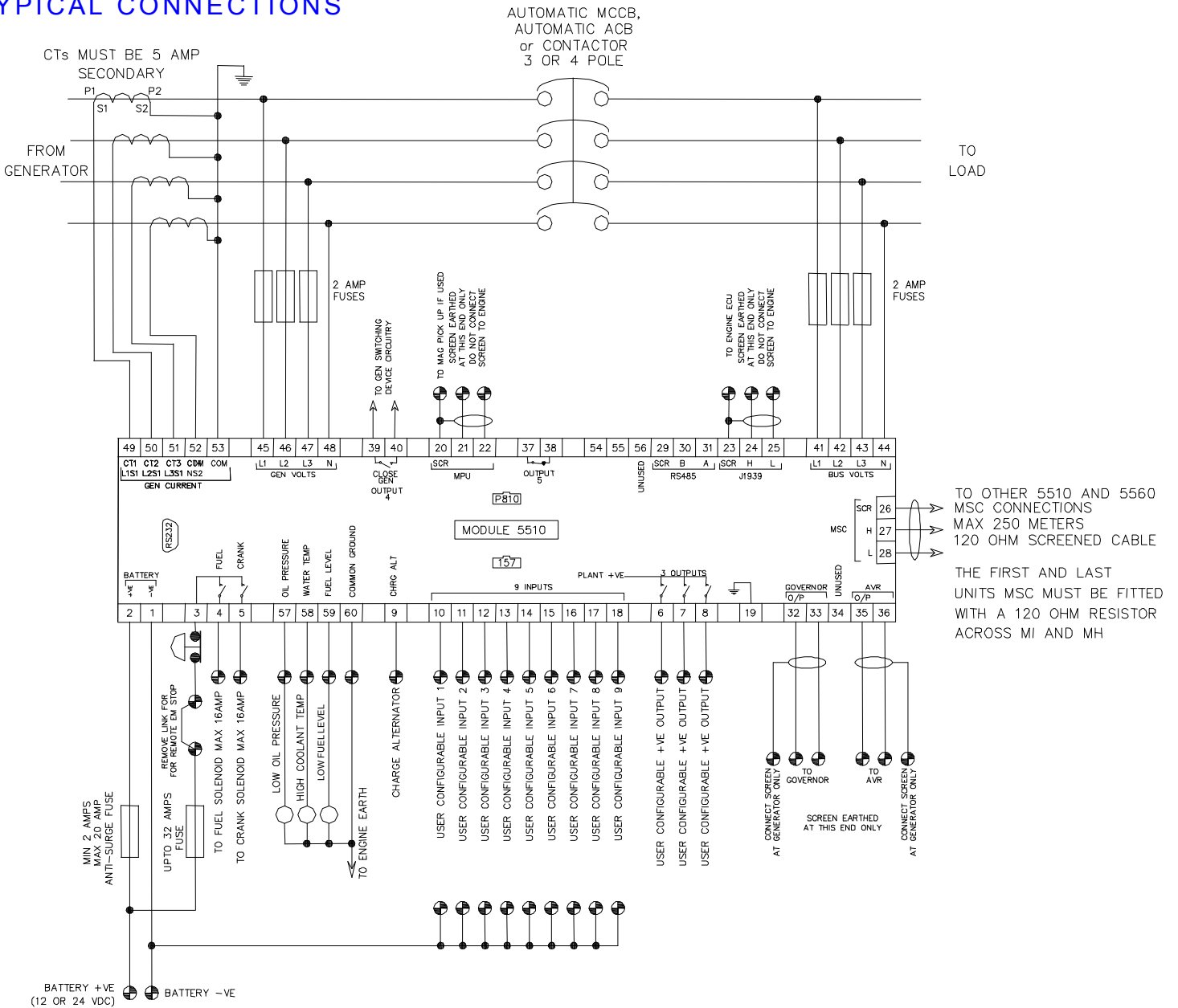
BS EN 60950 Low Voltage Directive/Safety of information technology equipment, including electrical business equipment.

CASE DIMENSIONS



Panel cut-out 220mm x 160mm (8.7" x 6.3")

TYPICAL CONNECTIONS



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