The XGEN 1.5 is a comprehensive Manual and Remote Start unit for multiple generating sets operating in parallel. The unit supports both diesel and gas gensets, with electronic and non-electronic engines. Up to 8 gensets may be combined together using XGEN 1.5 units. The communication between modules is made via digital bus.

The unit is compatible with all electronic speed governors and AVRs (isolated output).

The operation of the unit is controlled with front panel pushbuttons.

The XGEN 1.5 provides a comprehensive set of digitally adjustable timers, threshold levels, input and output configurations and operating sequences. Access to program parameters is given by a 3 level password system. All programs may be modified via front panel pushbuttons, and do not require an external unit. The modification of programs may be disabled also by the hard wired PROGRAM LOCK input.

In AUTOMATIC position, XGEN 1.5 monitors the Remote Start input and controls the automatic starting, stopping, synchronizing and load sharing of the generating set.

On a Remote Start request, the sufficient number of gensets to supply the power are started, synchronized and closed to the busbar. The genset which is to run first is automatically elected as master. Gensets will share the load in equal percentage of each rated genset power. The master unit will start and stop slave gensets automatically. If the master genset fails or the running priority changes, a new master will be elected automatically.

When the generator is running, it monitors internal protections and external fault inputs. If a fault condition occurs, the unit shuts down the engine automatically, indicates the failure source on the LCD display and turns on the red ALARM led.

The fault conditions are considered in 3 categories as Warnings, Load-dumps (soft shut down) and Alarms (hard shut down). Measured values have separate programmable limits for warning and alarm conditions. The service request indicator lamp turns on at the expiration of either engine hours or time limits.

**FEATURES**

- High visibility, blue color 128x64 pixels graphic LCD
- Dual language support
- J1939 electronic engine monitoring and control
- True RMS measurements
- Synchroscope
- Built-in Governor control with external reference
- Fully isolated built-in AVR control
- Fully isolated data link communication port
- Protected semiconductor digital outputs
- Battery backed-up real time clock
- Periodic maintenance request indicator
- Event logging with time stamp
- Statistical counters
- Field adjustable parameters
- Password protected front panel programming
- Output expansion capability
- Configurable led indicators: 5
- Plug-in connection system for easy replacement.

**FUNCTIONS**

- Automatic and manual start/stop control
- Engine and generator electrical protections
- Complete genset power measurements and display
- Busbar voltages and frequency measurements and display
- Multi genset synchronization (up to 8)
- Dead bus management
- Both active and reactive load sharing
- Load dependent automatic Start/Stop
- Soft loading and unloading of gensets
- Load shedding
- Led/Relay output functions selectable from list
- Built-in daily, weekly, monthly exerciser
- Weekly operation schedule programs

**J1939 ENGINE COMMUNICATIONS**

The unit connects to ECU controlled electronic engines through its standard J1939 CANBUS port, providing engine control, protection and instrumentation without extra senders. Various engine parameters are available in display pages. The ECU alarms are displayed in text together with SPN-FMI codes. Various engine brands and models are supported.
**STATISTICS**

Following incremental counters provide statistics about past performance of the generating set:
- Generator KWh, KVAh, KVARh
- Engine Hours Run
- Engine Hours to Service
- Time to Service
- Number of Engine Cranks
- Number of Genset Runs
- Number of genset on Load

**MEASUREMENTS**

- Generator Volts: Phase-phase, Phase-neutral (3 phases RMS)
- Generator Amps: 3 phases RMS
- Generator kW, kVA, kVAR: 3 phases RMS, total
- Generator pf: 3 phases, average
- Generator Frequency
- Busbar Volts: Phase-phase, Phase-neutral (3 phases RMS)
- Busbar Frequency
- Synchronoscope
- Phase Angle, Voltage and Frequency match
- Percent Load
- Battery Voltage
- Engine RPM
- Engine Coolant Temperature
- Engine Oil Pressure
- Engine Oil Temperature
- Engine Fuel Level

**ANALOG INPUTS**

Engine analog inputs are provided for the following functions:
- Coolant temperature
- Oil pressure
- Oil temperature
- Fuel level

The analog inputs connect to resistive sender units. The inputs have programmable sensor characteristics so that they are suitable for any type and any brand of sensors.

**DIGITAL INPUTS/OUTPUTS**

The unit has 12 fully configurable digital inputs. Each input has following programmable parameters:
- input channel name: selectable from a list
- alarm type: hard shutdown / soft shut down (load-dump) / warning / no alarm
- alarm polling: on engine running / always
- latching / non-latching operation,
- contact type: NO / NC
- switching: BAT+ / BAT-

The unit provides 8 semiconductor outputs with programmable functions, selectable from a list. In addition to genset control signals, any specific alarm information may be output as a relay contact.

Using two XGEN 1.5 Relay Expansion Modules, the number of relays may be increased up to 24, 16 of them being volt-free contacts.

**FOCUS ON:**

**MULTI-GENSET SYNCHRONIZATION**

The unit allows the synchronization scheme defined in the picture hereunder. The application is made with standard units and standard software, without extra cost. No additional parts are needed.

Basic features are below:
- Simple and cost effective application
- Automatic start/stop, synchronization and load sharing
- Both active and reactive load sharing
- Gensets do not need to be identical
- Equal aging, user defined run/stop priority levels
- Every unit monitors status of all available gensets
- Genset run/stop based on user defined power levels and time delays

![Multi-Genset Synchronization Diagram](image)
TELEMETER AND REMOTE PROGRAMMING

The USB adaptor module allows PC connection and large telemetry facilities. One module allows communication with all units connected on the same Data Link loop.

The PC program is used for below purposes:
- parameter upload/download: program parameters may be saved to the PC or downloaded from PC. This provides the user with the capability of preparing standard configurations for different applications and taking backup copies of parameter values.
- remote monitoring: measured values may be visualized on the PC screen and also stored on disk for further analysis.
- diagnosis and analysis: the daily evolution of recorded values may be displayed or printed in a graphical form.

WEEKLY OPERATION SCHEDULE

In AUTO mode only, the unit offers the capability of defining a weekly operation schedule. Programmable parameters allow the genset to operate automatically only in defined time limits of each weekday.

EVENT LOGGING

The XGEN 1.5 records last 64 events with date and time stamp. Recorded events are:
- Hard shutdowns (alarms), soft shutdowns (load-dumps) and warnings
- generator on-load/off-load information

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TECHNICAL SPECIFICATIONS

- Alternator voltage: 0 to 300 V-AC (Ph-N)
- Alternator frequency: 0-200 Hz
- Busbar voltage: 0 to 300 V-AC (Ph-N)
- Busbar frequency: 0-200 Hz
- DC Supply Range: 9.0 to 33.0 V-DC
- Current consumption: 250 mA-DC max.
- Current Inputs: from current transformers. .../5A.
- Digital inputs: input voltage 0 to 35 V-DC.
- Analog input range: 0-5000 ohms.
- Digital Outputs: Protected mosfet semiconductor outputs, rated 1Amp@28V-DC
- Measurement Category: CAT II
- Air Category: Pollution degree II
- Cranking dropouts: survives 0V for 100ms.
- Magnetic pickup voltage: 0.5 to 50Vpk.
- Magnetic pickup frequency: 0 to 20 kHz
- GOV Control Output: 0–10VDC with external reference
- AVR Control Output: 0-10VDC, fully isolated
- Charge Alternator Excitation Current: 150mA min.
- Data Link Port: Fully isolated, 115.2Kb, canbus levels.
- Operating temperature: -20°C to 70°C (-4 to +158 °F).
- Storage temperature: -40°C to 80°C (-40 to +176°F).
- Maximum humidity: 95% non-condensing.
- IP Protection: IP65 from front panel, IP30 from the rear.
- Dimensions: 235 x 167 x 48 mm (WxHxD)
- Panel Cut-out Dimensions: 219 x 151 mm minimum.
- Weight: 550 g (approx.)
- Case Material: High Temperature Self Extinguishing ABS/PC (UL94-V0, 110°C)
- Mounting: Front panel mounted with rear retaining plastic brackets.
- Conformity EU Directives
  - 2006/95/EC (low voltage)
  - 2004/108/EC (electro-magnetic compatibility)
- Norms of reference:
  - EN 61010 (safety requirements)
  - EN 61326 (EMC requirements)