HEINZMANN®

Digital control range for grid parallel/bus tie

Si-TEC *Xtend* GSM

DATA SHEET

Si-TEC *Xtend* GSM Master Control is available in 2 variations:

GSM Grid

Grid Synchronising and Import/Export kW & kVAr Control

GSM Sync

For Bus Tie Synchronising (2-way) between Generator Buses

Description

Si-TEC (Smart Integrated Turbine & Engine Control) is the world's only digital governor fully integrated with an automatic synchroniser and kW / kVAr control, and was developed by Dawson Technology Pty Ltd in 1991, which now operates under the name of Heinzmann Australia Pty Ltd as part of the HEINZMANN Group.

With more than 4000 systems now in operation globally, the Si-TEC *Xtend* control provides a further enhancement of this already successful product.

The Si-TEC *Xtend* GSM (Generator System Master) provides multiple functions including synchronising, paralleling, loading and unloading of a 3-phase power generation system with the "Supply Authority Mains or Grid". Up to 24 modules (combination of GSM and CGC) may communicate in a single network.

Key features

- Automatic synchronising (3-phase)
- Import/Export kW ref. control
- Import/Export kVAr ref. control
- Process control
- Grid voltage control
- Import/export kW, kVAr & kVA limiting
- Grouping control (for split bus systems)
- Summing load control (multiple GSMs)
- "Vector Disturbance" detection
- Import/export kWh & kVArh metering
- Flexible configuration
- User-friendly tuning software (PC tune)
- Extensive system diagnostics
- Optional I/O expansion

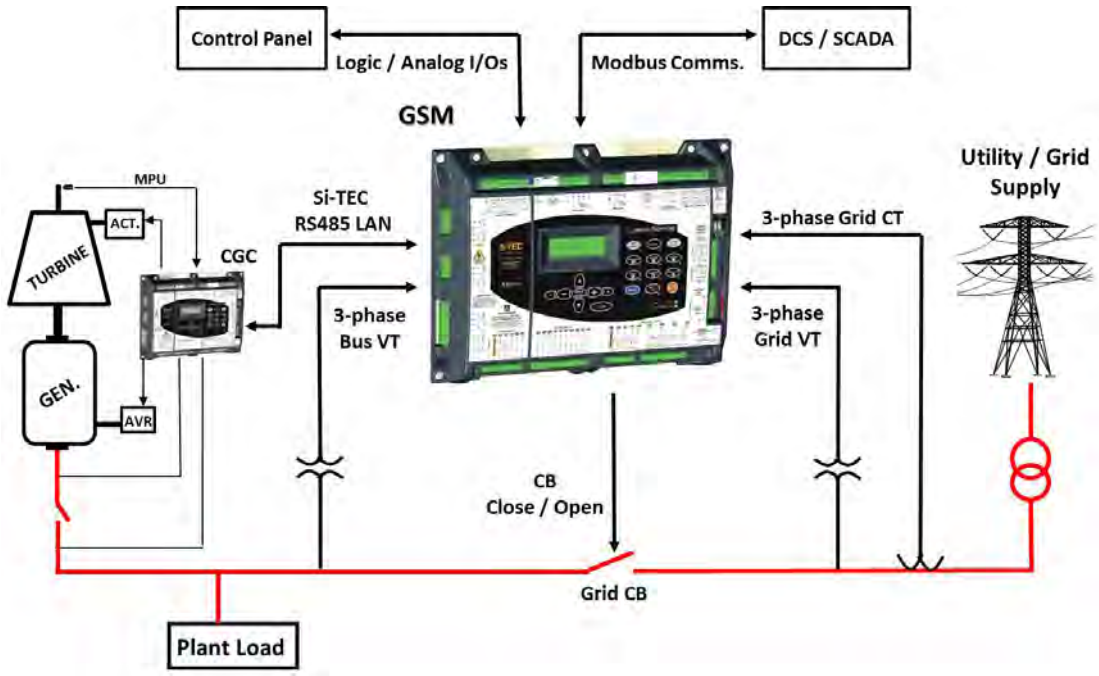
Features

- Automatic synchronising as well as kWatt & kVAr reference control via single logic input ("Go To Grid") function
- kWatt reference control via import/export kWatts, generated kWatts or generated % of rated kWatts, with multiple control mode selection
- kVAr reference control via import/export kVArs, generated kVArs, import/export PF, generated PF, etc., with multiple control mode selection
- Process control for co-generation or control of plant process (e.g. exhaust pressure, temperature, etc.)
- Grid voltage control for relatively "Soft" or "Weak" grids (e.g. high impedance power lines)
- Import/export kWatt, kVAr and kVA limiting, for grid incomer control within safe parameters
- Multiple GSM units in applications involving multiple grid/mains incomer feeders in single network
- Summing control of net load flow across all grid incomers in applications involving multiple masters
- Grouping control of Si-TEC *Xtend* units (GSM and CGC) for multiple electrical bus applications
- "True Time Error" correction at typically less than 30 seconds per year
- "Vector Disturbance" detection and alarm function (Vector 3-phase loss or Vector Phase Unbalance) within 50 mSecs, to maintain full operation of station
- Import kWatt-Hr, export kWatt-Hr, import kVAr-hr and export kVAr-Hr pulsed output and display
- Extensive I/Os that may be expanded (via CAN bus)
- Extensive diagnostic functions

Application range

- Standby power stations where "Bumpless" (delayed soft) transfer back to the supply grid is required, with no exporting of power to the grid
- Standby power stations used for "Peak Shaving" (peak lopping) applications where generators parallel with the supply grid during "Peak Demand" periods, setting a maximum limit for the imported grid supply
- Prime power stations that parallel and are "Base Loaded" (constant supply) to the supply grid, with provision to "Export kWatt" to suit the suppy grid
- Prime power stations that supply power for plant load requirements, and export excess power to the supply grid (e.g. sugar mills, other industries, etc.)
- Prime power stations that supply power for plant load requirements, and require "Standby or Back Up" power from the supply grid
- Automatic synchronising across "Bus Tie" breakers (2-way synchronising) for split bus applications

Si-TEC Xtend GSM application overview



Synchroniser

- Digitally integrated within GSM control
- Phase rotation check during synchronising
- Integrated independent "Synch. Check" relay (3-ph bus & grid check)
- Slip frequency, phase angle & voltage matching
- Typically better than 5 seconds synchronising time for most applications.
- "Bumpless" transfer of active and reactive power upon paralleling or when switching control modes
- Adjustable load/unload ramp rates
- Multi-mode import/export control of kWatts & kVArs/power factor
- Safe operation of grid incomer via import/export kWatt, kVAr and kVA limiting
- Summing control for multiple GSM application
- 4-20 mA and Modbus® communications referencing available

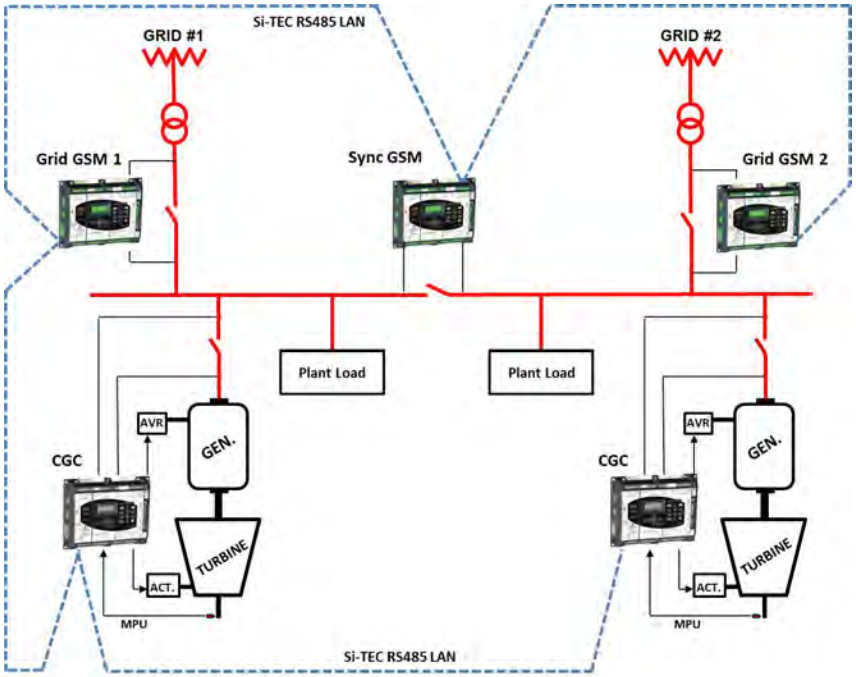
kWatt and kVAr reference control

- Digitally integrates complete power generation system with supply grid system
- kWatt and kVAr digital load sharing by CGC generator units, based on GSM reference control
- Load sharing better than 0.5 % accuracy
- True RMS measurement better than 0.25 % accuracy
- Process Control via reference control of import/export kWatts

Display features

- 4 x 20 character display, with "back-light flash" feature for active alarms
- Extensive multi-level menus for easy & quick access
- Enhanced keypad for direct menu navigation
- "Short Cut" keys for selected displays
- Peak hold values for import/export kWatts and kVArs, phase currents & vector angle
- Accumulated data including import/export kWatt-hrs and kVAr-hrs, etc.

Si-TEC Xtend CGC & GSM used for grid parallel application



I/O features

- 16 logic inputs, with LED status indication, of which 12 are user defined for a wide range of use including, “kWatt Control Mode”, “kVAr Control Mode”, “Process Control”, “Zero Imp/Exp”, “Alarm Reset”, etc.
- 9 relay outputs, with LED status indication, of which 8 are user defined for control or alarm functions

  Typical control functions include:
  - “Grid CB Open”, “Controlling Master”
  - “kWatt Switches 1 & 2”, “Sum kWatt Switch”
  - “kVAr Switches 1 & 2”, “Sum kVAr Switch”
  - “kVA Switch”, “Sum kVA Switch”, etc.
  - Grid failed/restored for auto generator start stop, resync to grid, etc.

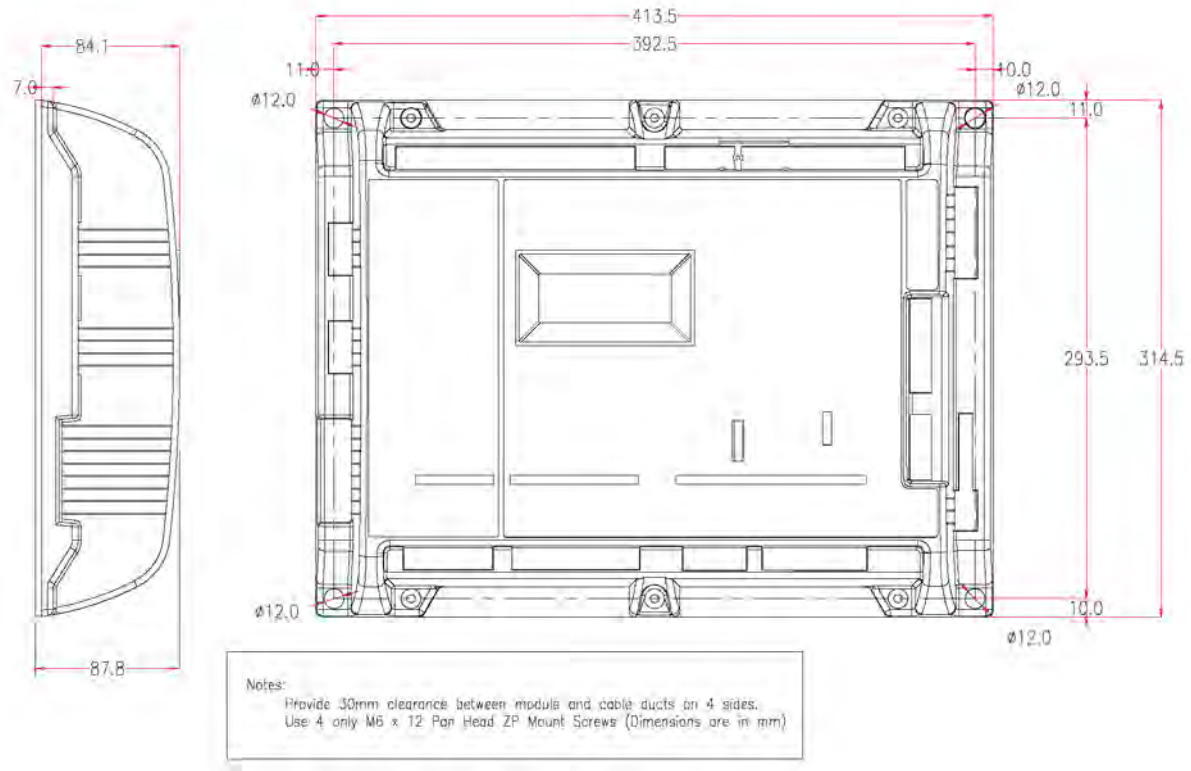
  Typical alarm functions include:
  - “Under/Over Frequency”
  - “Under/Over Voltage”
  - “Vector Disturbance”
  - “High kWatt Import”
  - “High kWatt Export”
  - “High kVAr Import”
  - “High kVAr Export”
  - “DC Supply Volts Low”, etc.
- Individual output relays can have multiple functions by “Combined Alarms”
- Each “alarm” can be selected to directly “Trip” the grid incomer CB
- 4 analogue inputs (3 x 4-20mA, 1 x RTD) for user select applications. E.g. import/export kWatt ref., generated PF ref., process input, process ref.,
- 3 analogue outputs (4-20mA) for direct driving user applications, e.g. kW, kVAr, PF meters, process reference, etc.
- Existing I/Os may be further expanded if required
- I/O connections utilise plug-in terminal strips

Communications

- “RS232 Diagnostic Port” for Si-TEC pc software
- “User RS485 LAN” has read/write facility for a wide range of registers. Standard LAN protocol is either “Modbus” RTU or “Modbus” ASCII.
- “Si-TEC LAN” for inter-module communications for up to 24 Si-TEC *Xtend* units of any type combination
- “CAN Bus” port for I/O expansion, and for other special applications

Dimensional drawing

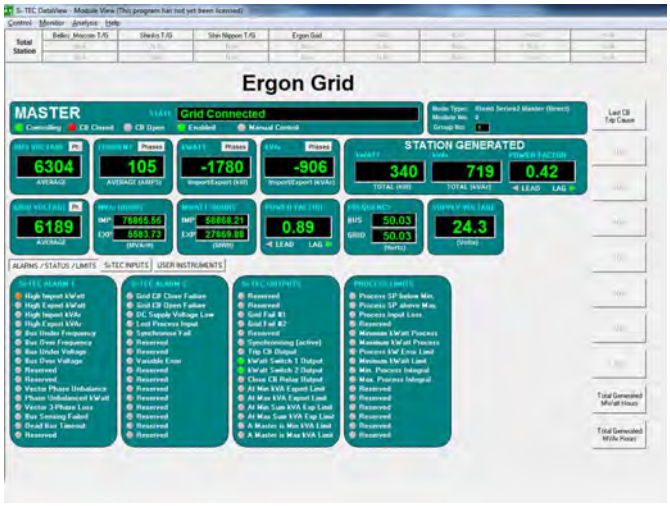
Si-TEC Xtend physical outline with dimensions



Software tools (Windows® based)

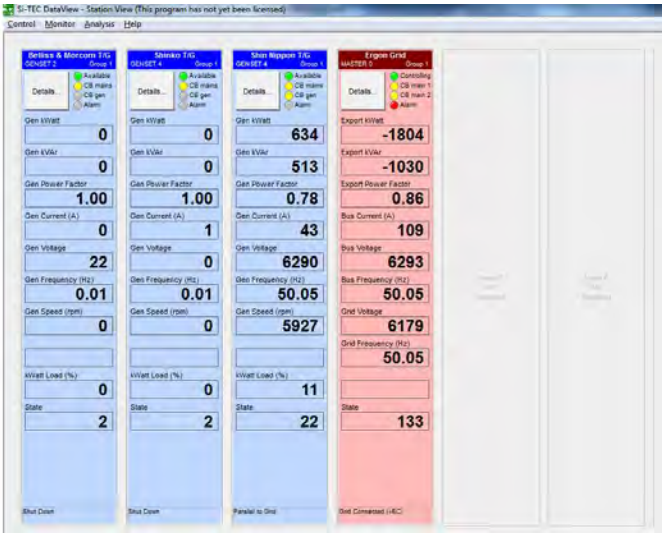
pcConfigure

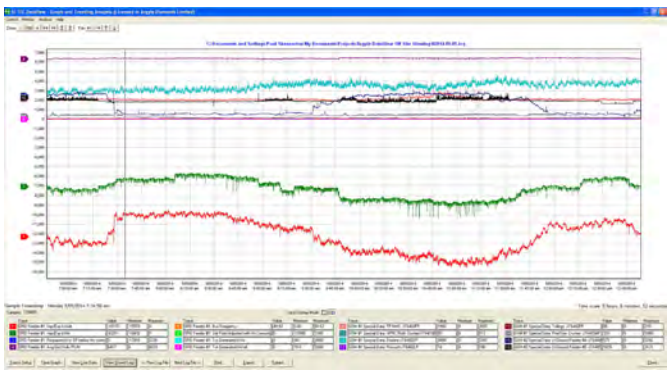
- Allow storage & retrieval of set point parameters to & from a Si-TEC *Xtend* module via a PC
- Operates in a safe controlled environment
- Saves all set point parameters to disk
- Data can be sent by email
- Data can be printed for archival records
- Menu driven set-up & alarm configuration



pcTune

- Allows tuning to be performed remotely and in a controlled environment
- Allows generator tuning to be performed with increased accuracy in true engineering values
- Provides 100 % repeatable results
- Recovery characteristics tested by inducing errors and recording results graphically
- 16 traces of user selected digital values can be selected for display
- Multiple PID tuning menus
- Digital instrument panel included





PSMS Monitoring System (for custom projects)

- Power Station Monitoring System for PC – preconfigured for up to 24 generators
- Data extracted directly using RS485 "User" port
- Operates independent of the system PLC

Si-TEC DataView

- High speed power station monitoring system for PC, configurable for up to 24 nodes (including CGC, GSM, ADG, temp scanner, feeders, etc.)
- Includes extensive data logging (up to 100 data per node), event recording, and archiving (up to several years)
- Data extracted via Modbus RS485 or Ethernet (Modbus TCP/IP)
- Exporting of log file via CSV format for up to 20 parameters
- Operates independent of PLC/SCADA

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