HEINZMANN®
thinking in drive and control

Si-TEC³ CGC-D / CGC-G

DATA SHEET

Models

Si-TEC³ Genset Control is
available in two variations:

CGC-D - Diesel

CGC-G - Gas

Description

Si-TEC³ is the world's only digital governor with fully integrated generator
functions including automatic synchronising, load control (kW) & sharing
and kVAr/PF control & sharing.

Developed over the last 30+ years HEINZMANN Australia has forged the
way with our unique integrated control philosophy, which empowers
customers worldwide in unlocking the full potential of their Genset power
generation operating capabilities.

These integrated functions significantly improve the operator's ability to
bring the Genset on-line in a faster and safer manner than ever before
which in turn increases the Genset's availability and effectiveness.

This integrated approach lowers Genset down time through enhanced
diagnostics enabling engineers to access real-time data which is
consolidated in one location.

Both Island Isochronous Mode control and Grid Parallel load control are far
superior when utilising this integrated system due to the Si-TEC's ability
to process multiple control functions simultaneously and seamlessly
throughout all control modes in basic as well as complex power generation
applications.

The Si-TEC³ CGC-D & CGC-G is designed for use with a wide range
of Gensets, for either direct engine governing or speed bias control
applications.

With a growing number of global customers, HEINZMANN Australia invites
you to join this network of cutting edge technology.

Key features

Precise speed
governing

Dual Speed Sensor for
redundancy

Automatic engine start
up sequence (including
pre-heat/purge, crank,
start fuel limiting and
speed ramping)

Wide range of PIDs

Boost pressure limiting

Interfacing wide range
of AVR systems

Auto synchronising

kW control & load
share

kVAr/PF control & load
share

Flexible configuration

User-friendly tuning
software (pcTune)

Extensive system
diagnostics

Optional I/O expansion

Built-in SD Card with
dual dynamic logging

Trip and Alarm Event
Recording

Ethernet
Communications

Real-time clock
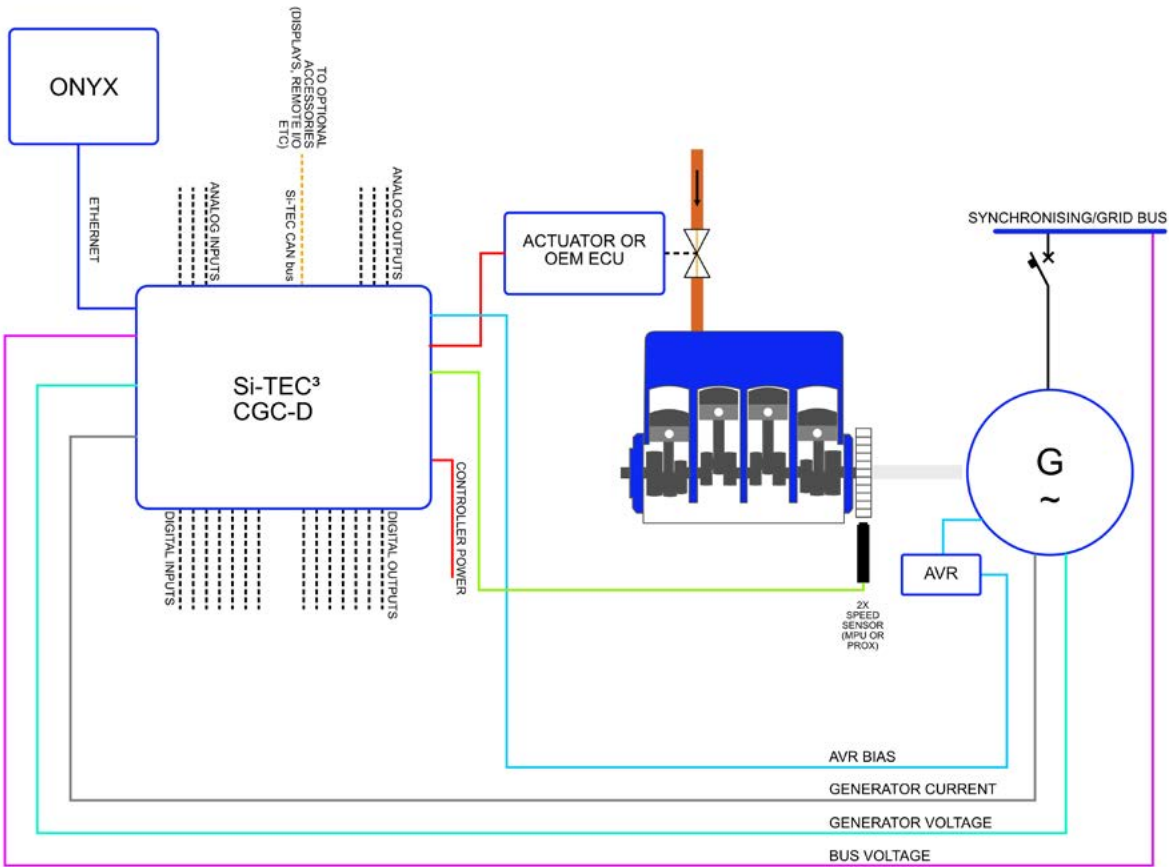synchronising

Features

- Precise speed governing typically within 0.1 % of operating (rated) speed at steady state
- Dual redundant speed sensors (Software configurable MPU or proximity)
- Automatic actuator feedback calibration for HEINZMANN Actuators
- Automatic start/stop sequence initiated by a single logic input
- Typically interfaces with all-electric actuators that provide "instantaneous" position feedback
- Capable of driving wide range of actuators including electro-hydraulic (e.g. HEINZMANN, 0-200 mA, Solenoid, etc.) and engine ECU systems (4-20 mA, 0-5 V, +/-3 V, PWM & J1939)
- Multiple and wide range PIDs (includes 5x speed PIDs, kW PID, process PID, voltage bias control, synchronising control, kVAr/PF control, etc.)
- Multi-point "Boost Pressure" limiting curve
- Grouping Control logic allows "Bumpless" transfer from single bus to split bus applications (& vice versa)
- Extensive I/Os that may be expandable via CANbus (e.g. remote digital I/Os, thermo-couples, etc.)
- 3-phase AC RMS voltage and current sensing
- Smart self-tuning torsional filtering
- Configurable alarms can be multi-functional
- Bump feature to optimise tuning of governor
- Accumulated data recording of engine running hours, kW hours, kVAr hours, etc.
- Extensive diagnostic functions
- Engine monitoring via Opal Generator Annunciator
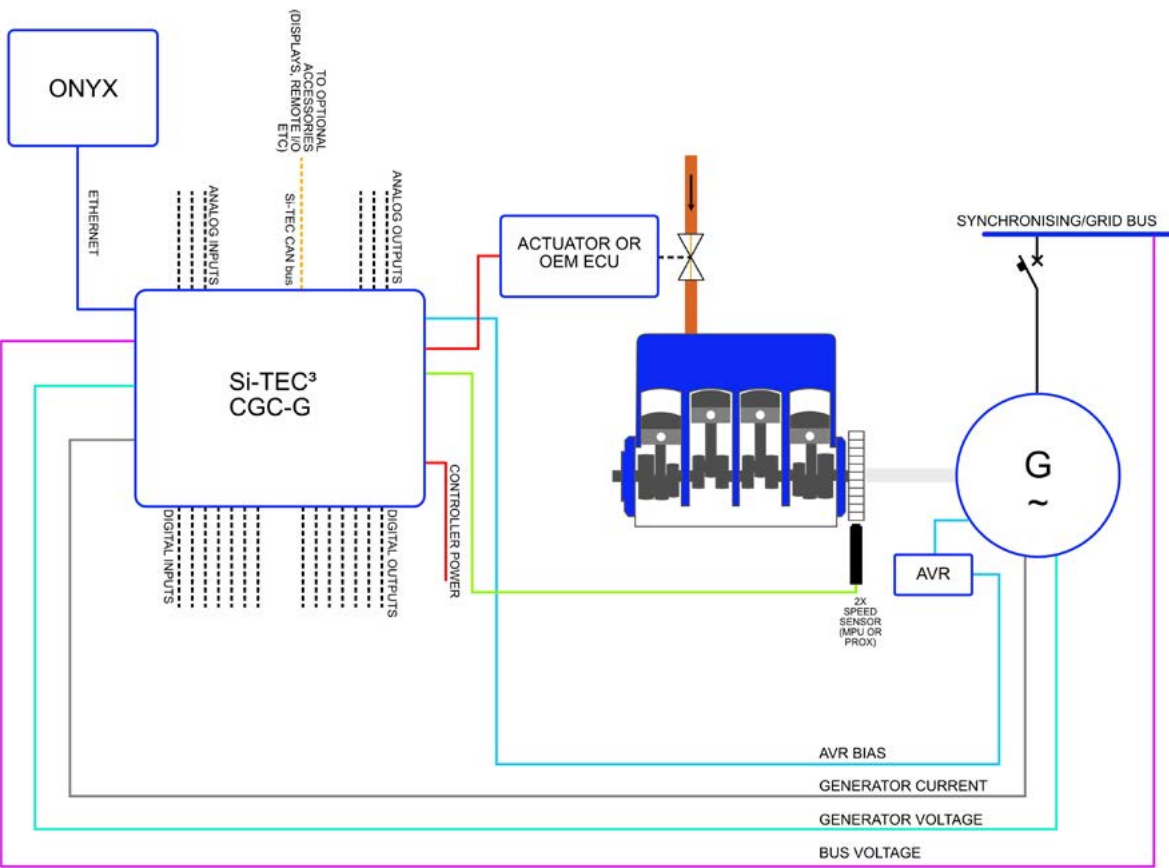
Application range

- Power generation applications where up to 24 generators can be paralleled together. Multiple groups can be combined via GSM modules.
- Single or multiple GSMs for more complex applications, e.g. multiple bus and/or feeders
- Co-generation operation – parallel to the grid for:
  - Soft "bumpless" transfer of loads
  - Peak shaving – set max. limit for import power
  - Base Loaded to the grid
  - Export excess power to the grid
  - Prime power – only export to grid
- Systems requiring high quality power based upon precise frequency and calculations of active and reactive power
- Generating sets in power and general industry, mining sites and townships, rural & remote communities, hospitals, commercial buildings, marine & shipping, defence & telecommunications facilities as well as oil & gas industry

Si-TEC³ CGC-D System Overview

Si-TEC³ CGC-G System Overview

Synchroniser

- Digitally integrated with governor
- Better than 10 secs (typically within 5 secs for 0.1Hz, 1.0 % Volts & 5° phase match) for most applications
- Phase rotation check during synchronising
- Integrated independent "Sync Check" hardware (3-ph bus & gen check)
- Optional "Permissive" synchronising function
- Intelligent "Dead Bus" detection and closure
- Menu adjustable synchronising parameters

Load sharing and load control

- Digitally integrated with governor
- Automatic and isochronous (islanded) kW and kVAr load sharing
- Load sharing accuracy to better than 0.5 %
- True RMS AC measurement (3-phase voltage & current) better than 0.25 % accuracy
- Optimum control of active power (kWs) and reactive power (kVAr/PF) when grid paralleled
- "Bumpless" transfer of active and reactive power
- kW limiting based on temperature, boost pressure, etc. (via 4-20 mA signal)
- Adjustable load/unload ramp rates
- Multi-mode kW & kVar power factor control

- AVR bias to directly interface wide range of AVRs (digital outputs or +/- 8.4 VDC) for PF sharing/control
- 4-20 mA and Modbus RS-485 referencing available
- Power factor or kVAr control when base loaded
- Vector disturbance feature senses loss of grid within 40 mSec to maintain full operation of station

Digital features via ONYX HMI Touchscreen

- The ONYX HMI touch screen is a dedicated remote display unit for the Si-TEC³ control range (via Ethernet). A high-resolution 15" capacitive LCD touch screen allows operators to view real-time engine and generator information from the Si-TEC³.
- Genset monitoring features including engine speed, oil pressure, oil temperature, water temperature, boost pressure and control voltage.
- Metering of all essential generator parameters that include generator voltage, frequency, current, real power, power factor (lag & lead), generator & mains CB statuses. This further reduces the need for conventional meters and transducers.
- Alarms including audible, visual, pre-warn & shutdown. Status from Si-TEC³ which includes current alarms and alarm history. A CSV file can be exported via USB.

Si-TEC³ CGC used for mains (grid) parallel application
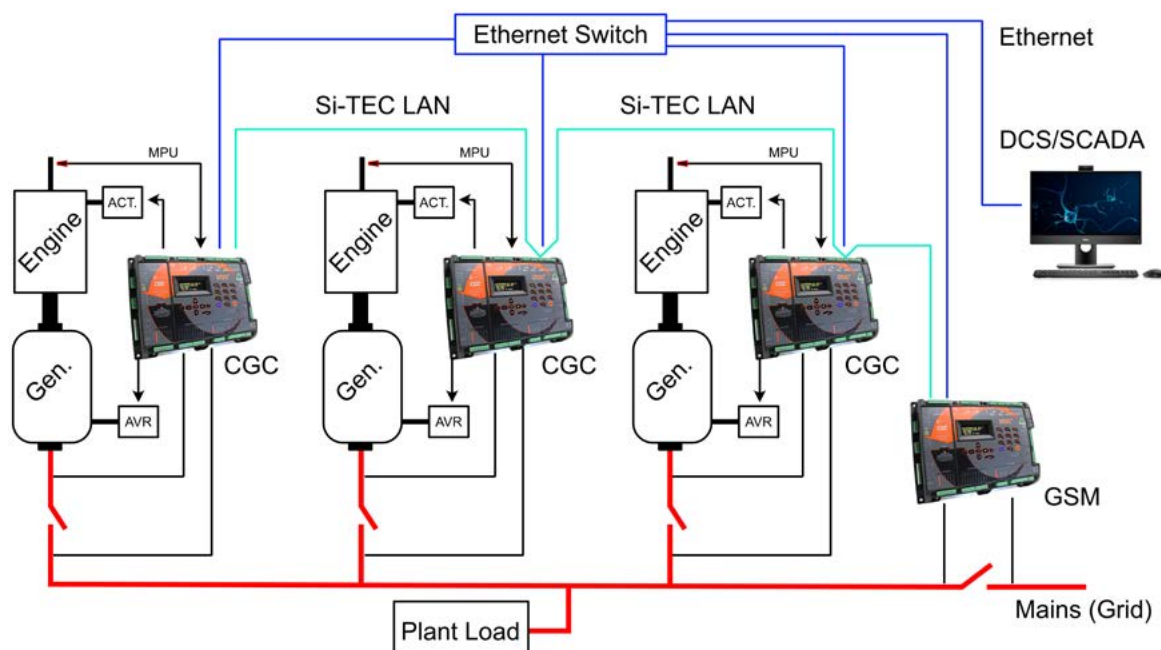
# I/O features

- 1 x actuator output (e.g. HEINZMANN, 0-200mA, solenoid etc) or Speed Bias (4-20mA, 0-5VDC, +/- 3V, PWM & J1939) to engine ECU systems

- 2 x speed sensor inputs (MPU or proximity)

- 16 logic inputs, with LED status indication, of which 12 are user defined for a wide variety of uses, including, "Rated Speed", "Fast Rate", "Sequence Hold", "Base Load", "Overspeed Test (Auto)", etc.

- 9 relay outputs, with LED status indication, of which 8 are user defined for control or alarm functions

- 2 x dedicated Solid State Relays for Voltage Raise/Lower

- 4 analog inputs (4-20 mA) for user selectable applications. E.g. kW, kVAr, PF & base load references, engine temp, etc.

- 3 analog outputs (4-20 mA) for direct driving user applications, E.g. kW, kVAr, PF, RPM meters, actuator position & fuel % indication

- Typical control functions include:
  - "Fuel Solenoid"
  - "Engine Cranking"
  - "Engine Pre-Heat/Pre-Lube"
  - "Generator C/B", etc.

- Typical alarm functions include:
  - "Reverse Power"
  - "Reverse kVAr"
  - "High kW load"
  - "High/Low Frequency"
  - "High/Low Voltage"
  - "Phase out of balance"
  - "Vector Disturbance" etc.

- Individual output relays can have multiple functions by combining alarms

- Each "alarm" can be selected to directly "Trip" the Generator C/B

- I/O connections utilise plug-in terminal strips

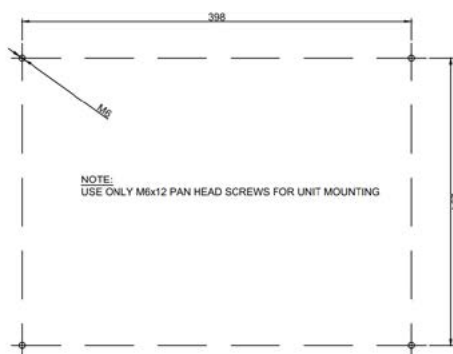- Further I/Os expansion is possible via CAN bus

Dimensional drawing

FRONT VIEW   SIDE VIEW

NOTE:
USE ONLY M6x12 PAN HEAD SCREWS FOR UNIT MOUNTING
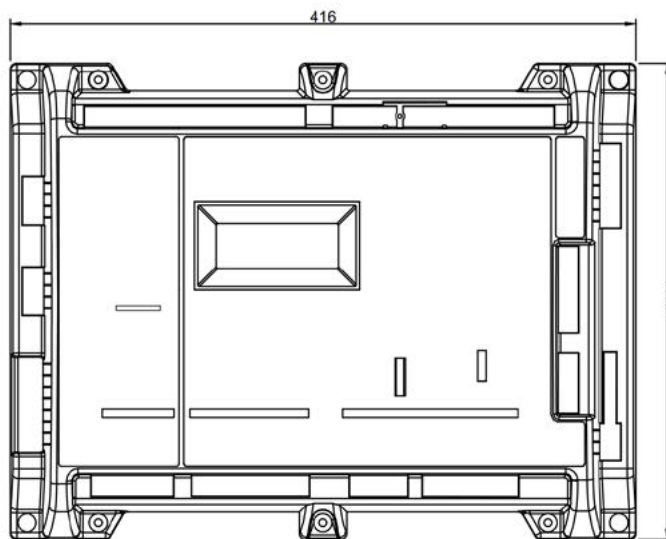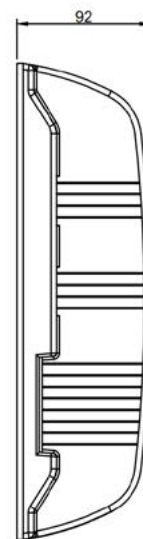
MOUNTING DETAIL

Communications

- Ethernet port using Modbus TCP and/or "Fast Tune" protocol

- "Customer RS-485 LAN" has read/write facility for a wide range of registers. Standard LAN protocols are Modbus RTU and ASCII.

- "Si-TEC LAN" for inter-module communications for up to 24 Si-TEC modules of any type combination

- "CAN Bus" port for CGC to Opal & RIO interface

- RS-232 Diagnostic port for Si-TEC[3] support software

Software tools
(Windows® based)

pSi-TEC pcConfigure

- Allow storage & retrieval of set point parameters to and from a Si-TEC[3] module via a PC

- Graphical configuration of "Boost Pressure" mapping & linearisation curve

- 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

- Software interface via PC or remote access

Si-TEC pcTune

- Allows generator 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
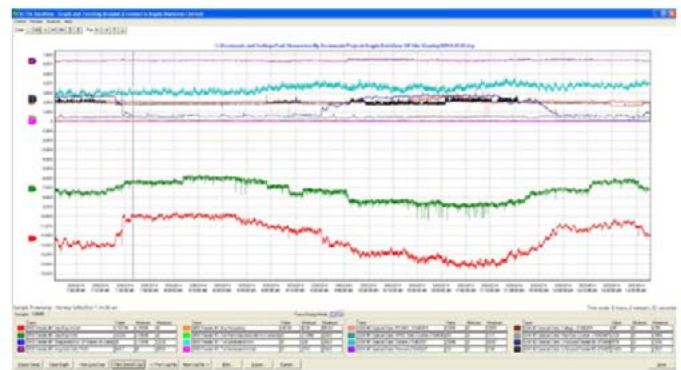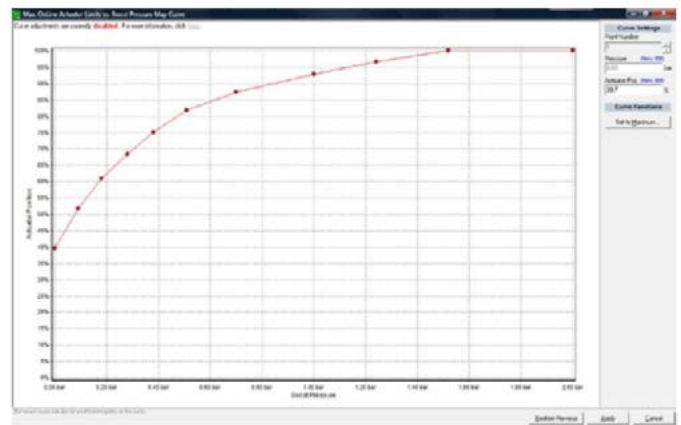
- Other displays include "Digital Instrument Panel", "System Overview" and "Live Steam Map"

- Data can be sent by email

- Data can be printed for archival records

- Software interface via PC or remote access

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 RS-485 or Ethernet (Modbus TCP/IP)

- Exporting of log file via CSV format for up to 20 parameters

- Operates independent of PLC/SCADA