

Si-TEC *Xtend* CGC-T

DATA SHEET

Model

Si-TEC *Xtend* CGC Turbine Control is available in 4 variations:

CGC-T

Condensing/Backpressure Turbines

CGC-TS

Condensing/Backpressure Turbines
Split Range Dual Actuators

CGC-TS2

Condensing/Backpressure Turbines
Split Range Dual Actuators & Extended I/Os

CGC-TS3

Condensing/Backpressure Turbines
Split Range Triple Actuators & Extended I/Os



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 in 1991.

With more than 4000 systems now in operation throughout Australia, Asia & internationally, the Si-TEC *Xtend* control Provides a further enhancement of this already successful product.

Designed for use with all sizes of generator, the Si-TEC *Xtend* can be used for Islanded or Co-generation on a wide range of steam turbines including condensing, backpressure and controlled-extraction applications.

Key features

Precise speed governing

Dual MPU for redundancy

Automatic turbine start sequence

Driving wide range of actuators (incl. HEINZMANN all-electric)

Wide range of PIDs

Interfacing wide range of AVR systems

Auto synchronising

kW control & load share

kVAr/PF control & load share

Process control (inlet pressure)

Actuator /valve linearization curves

Flexible configuration

User-friendly tuning software (PC tune)

Extensive system diagnostics

Optional I/O expansion

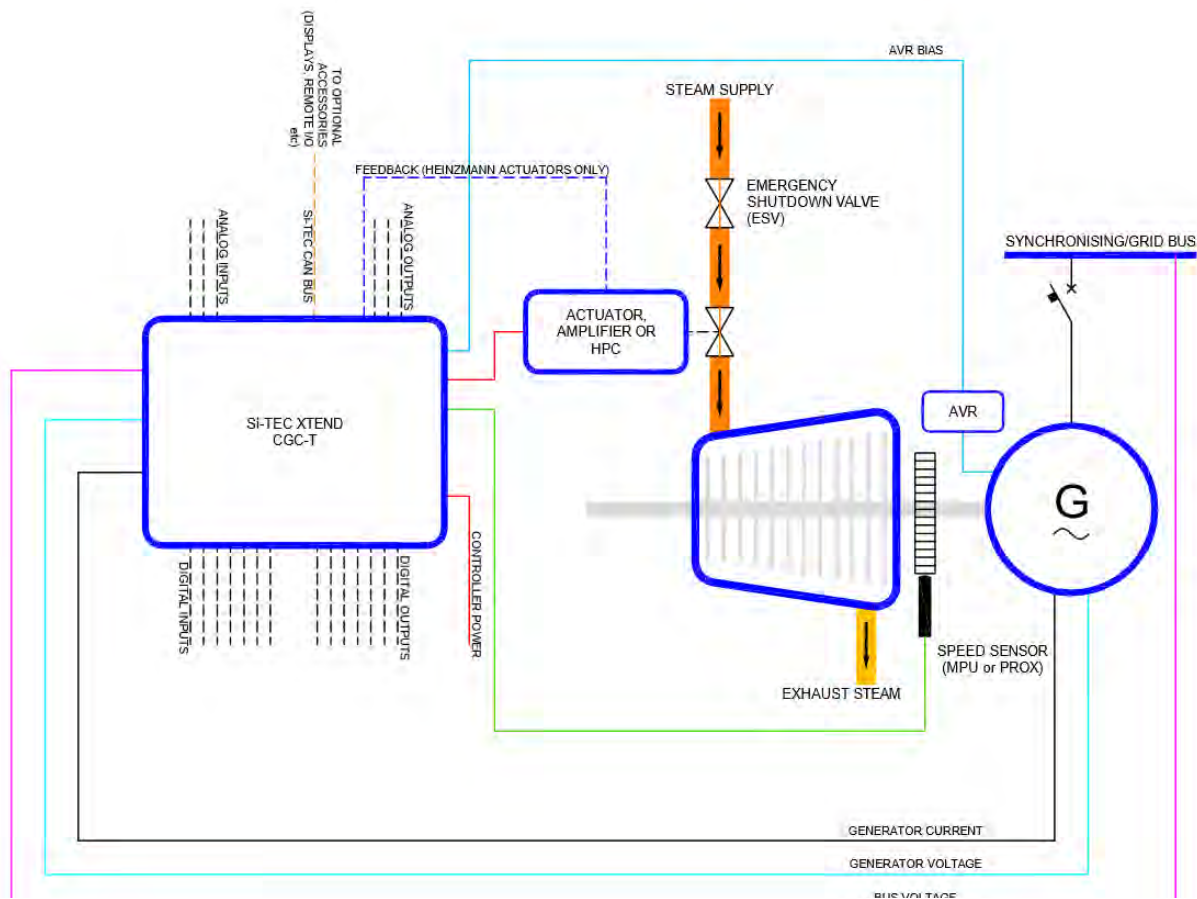
Features

- Precise speed governing typically within 0.1 % of operating (rated) speed at steady state
- Dual MPU (or prox.) speed sensors for redundancy
- Automatic start/stop sequence initiated by a single logic input to give fuel limited "Guaranteed Start®"
- Typically interfaces with all-electric actuators that provide "instantaneous" position feedback
- Capable of driving wide range of actuators including electro-hydraulic (e.g. 0-200 mA, 4-20 mA, 0-5 V, +/-10 V, etc.), electric, and pneumatic actuators
- Multi-point linearization curves for actuators
- Multiple and wide range PIDs (includes 6 x speed PIDs, kW PID, process PID, voltage bias control, synchronising control, kVAR/PF control, etc.)
- Extensive I/Os that may be expandable via CAN bus (e.g. remote digital I/Os, thermo-couples, multi-valve actuators for large turbine applications, etc.)
- Noise and harmonic issues eliminated by design
- 3-phase AC RMS voltage and current sensing
- Configurable alarms can be multi-functional
- Bump® feature to optimise tuning of governor
- Live display (via pcTune) of control overview (speed, kW & process control)
- Accumulated data recording of turbine running hours, kW hours, kVAR hours, etc.
- Extensive diagnostic functions
- Turbine monitoring via Onyx HMI Touchscreen
- CGC-T – for single actuator application
- CGC-TS – for dual actuator application
- CGC-TS2 – for dual actuator application and extended I/Os
- CGC-TS3 – for triple actuator application and extended I/Os

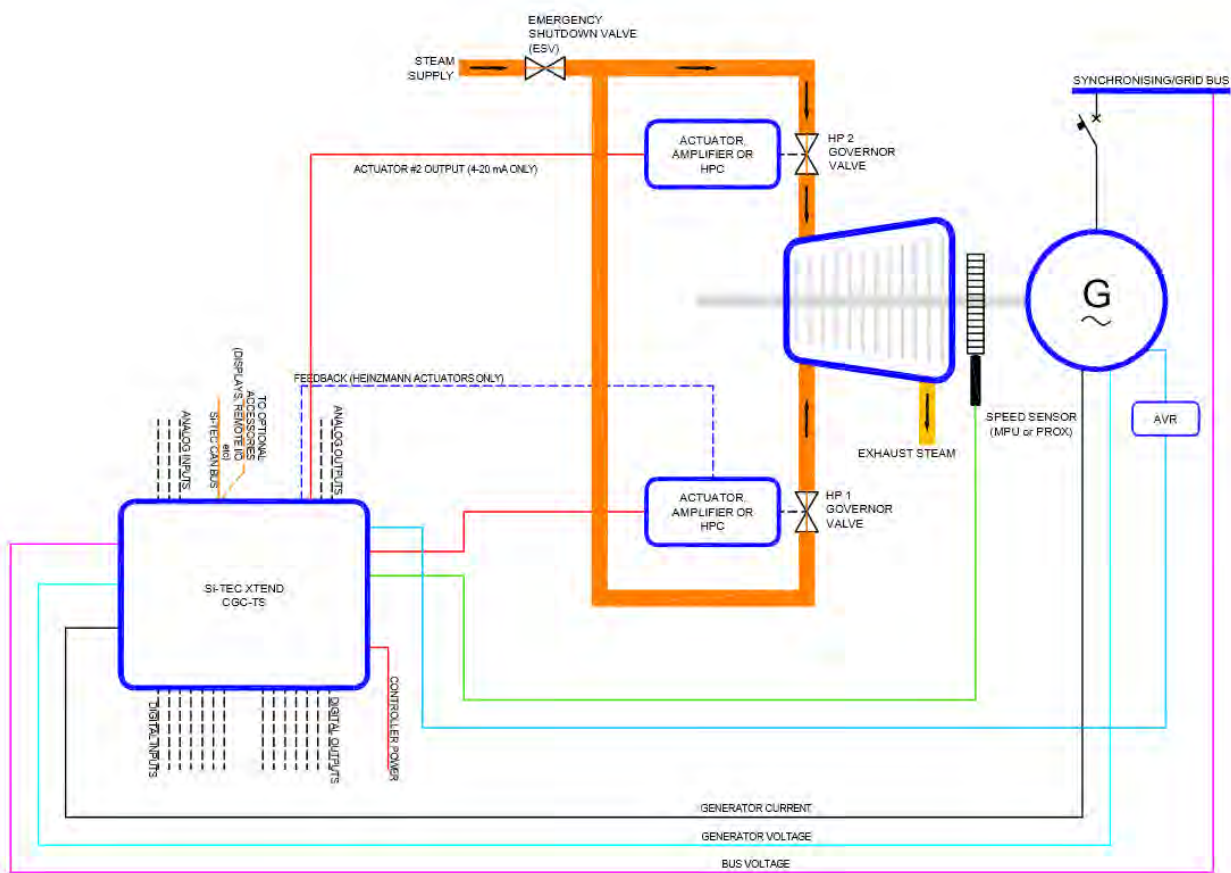
Application range

- Power generation applications where up to 24 generators can be paralleled together. Multiple groups can be combined via GSM (Generator System Master) modules.
- Single or multiple GSMs for more complex applications, eg, multiple bus and/or feeders and applications for more than 24 nodes
- 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 sugar, mining and general industry, mining sites and townships, rural & remote communities, hospitals, commercial buildings, marine & shipping, defence & telecommunications facilities as well as oil & gas industry

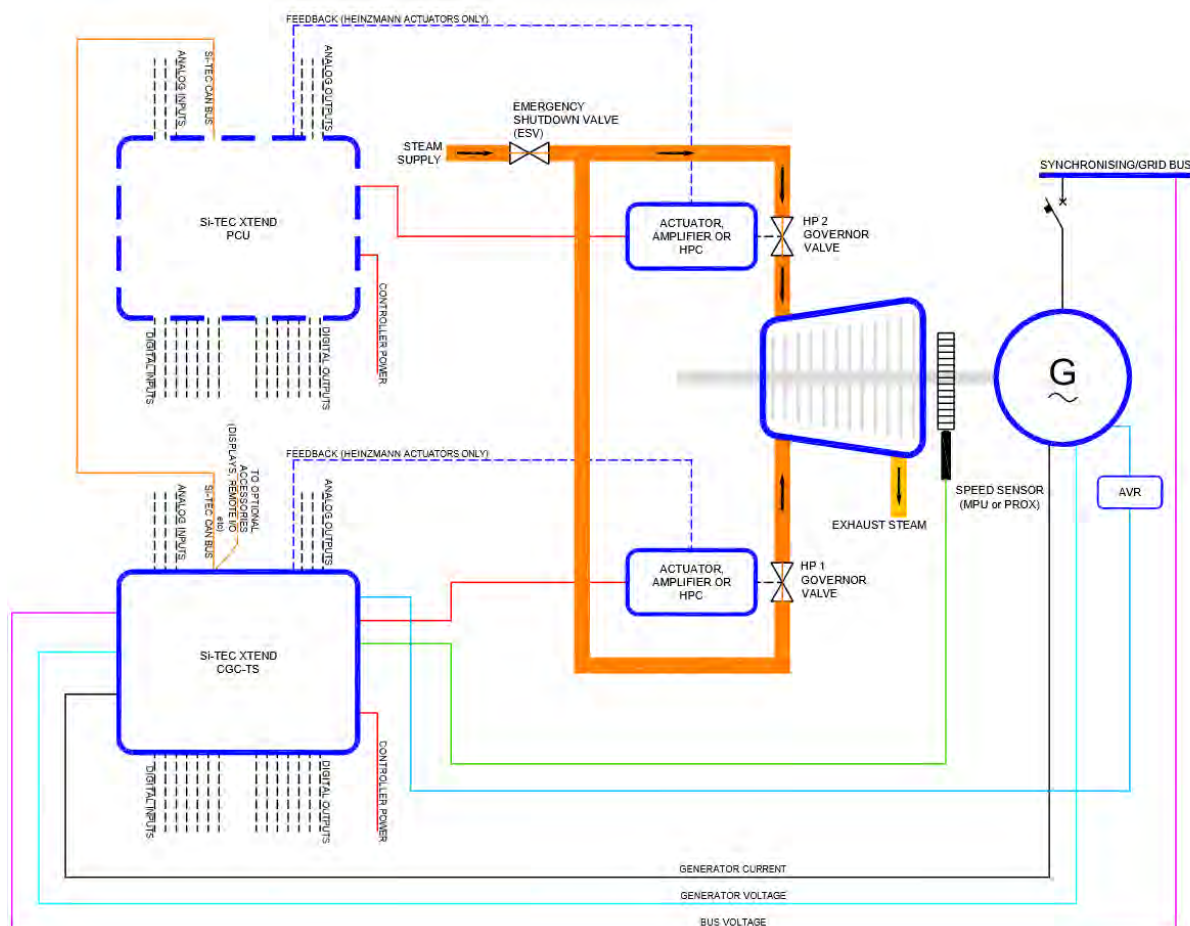
Si TEC Xtend CGC-T System Overview



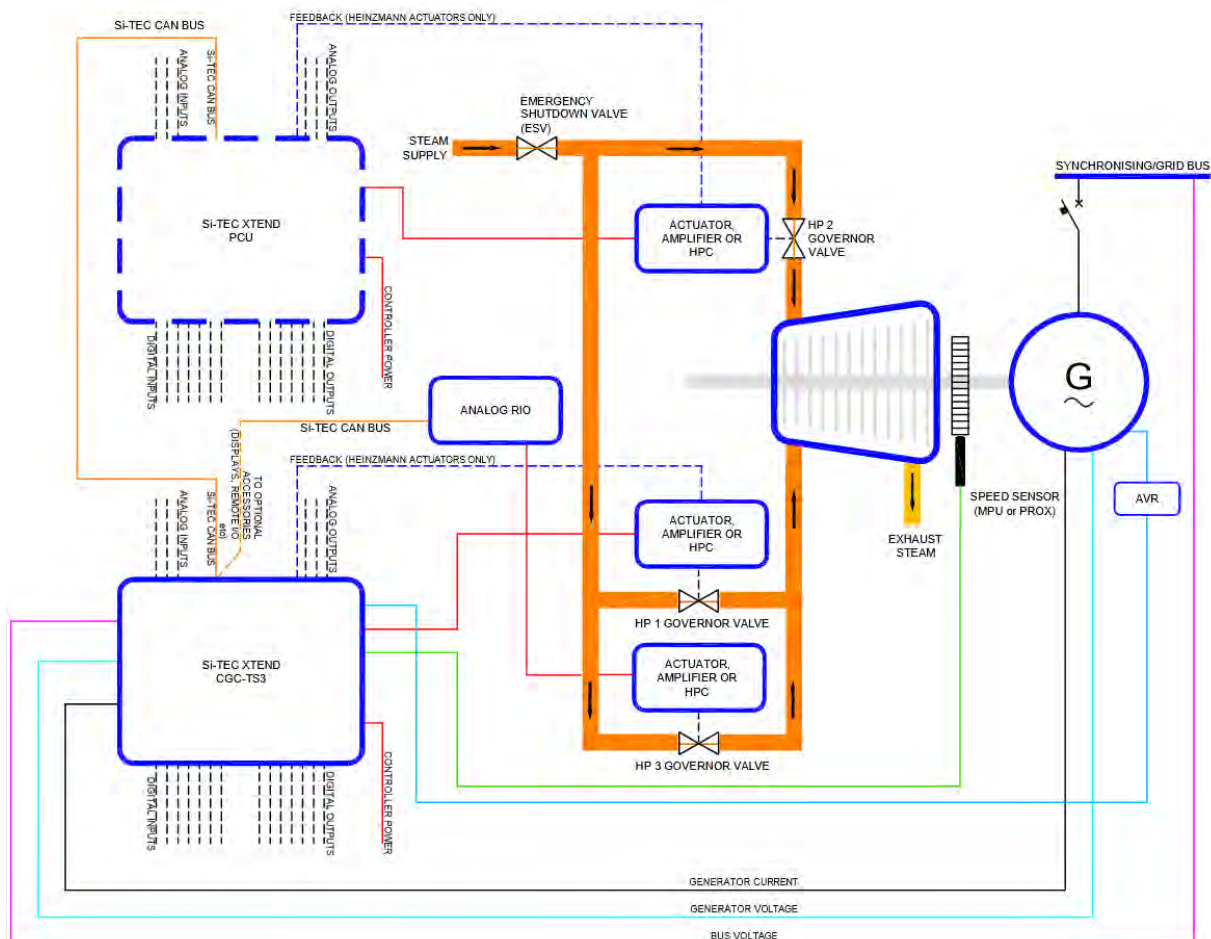
Si TEC Xtend CGC-TS System Overview



Si TEC Xtend CGC-TS2 System Overview



Si TEC Xtend CGC-TS3 System Overview



Synchroniser

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

Load sharing and load control

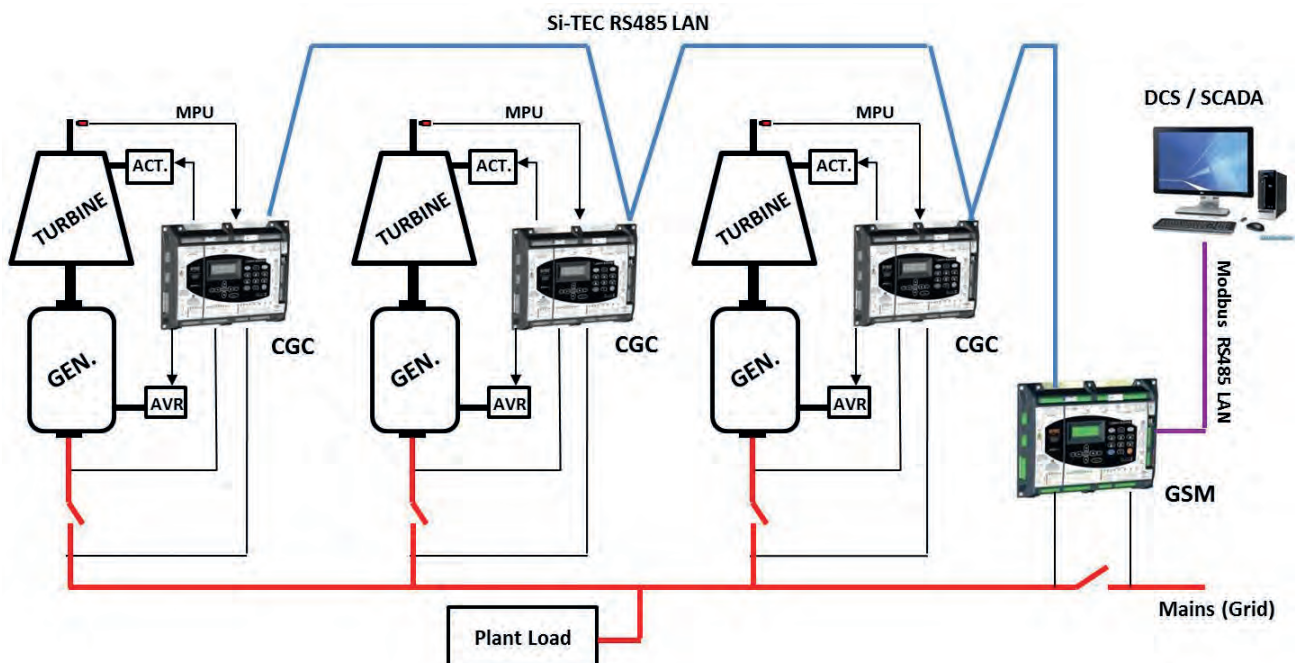
- Digitally integrated with governor
- Automatic and isochronous (islanded) kW and kVAr load sharing
- Load sharing accuracy to better than 0.5 %
- True RMS AC measurement (3-phase voltage & current) better than 0.25 % accuracy
- Optimum control of active power (kW) and reactive power (kVAr/PF) when grid paralleled
- "Bumpless" transfer of active and reactive power
- Mains/grid droop function for large turbine applications
- Process control (e.g. exhaust pressure control)

- Adjustable load/unload ramp rates
- Multi-mode kW & kVAr/power factor control
- AVR bias to directly interface wide range of AVR's (digital outputs or +/- 8.4 VDC) for PF sharing/control
- 4-20 mA and Modbus® RS485 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

Display features via opal turbine annunciator

- 4 x 20 character LCD display, with "back-light flash" feature for active alarms
- Metering of essential generator information (e.g. voltage, frequency, real power and power factor)
- Multiple "Short-Cut" keys to display useful data (e.g. peak hold, running hours, control status & alarms)
- Turbine monitoring parameters including inlet pressure, exhaust pressure, lube oil pressure, etc.
- Various alarms and shutdown conditions (e.g. low inlet, high exhaust, low lube oil, overspeed etc.)

Si-TEC Xtend CGC turbine used for mains (grid) parallel application

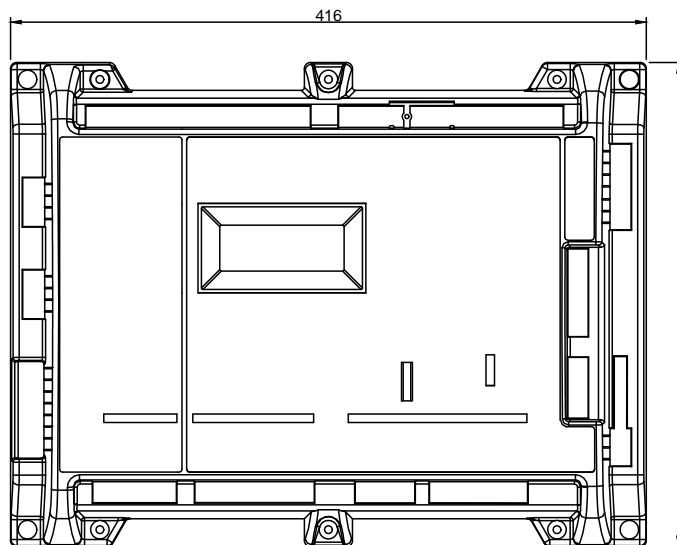


I/O features

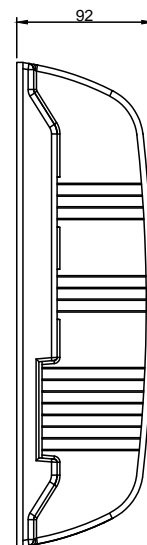
- 1 actuator driver output (may be expanded for multi-valve actuators for larger turbine applications)
- 2 MPU speed sensor inputs
- 16 logic inputs, with LED status indication, of which 12 are user defined for a wide variety of uses, including, "Hot Start", "Sequence Hold", "Speed Raise/Lower", "Voltage Raise/Lower", "Base Load", "Overspeed Test", "Process Enabled", etc.
- 9 relay outputs, with LED status indication, of which 8 are user defined for range of applications
- Typical control functions include:
 - "Turbine Started"
 - "AVR Priming"
 - "Synchronising"
 - "Generator C/B" close & trip
 - "kW & kVAr" switches
- Typical alarm functions include:
 - "Speed Sensor" failure
 - "Loss of Actuator Feedback"
 - "Process Signal" failure
 - "Reverse kW/kVAr" load
 - "High kW/kVAr" load
 - "High/Low Frequency"
 - "High/Low Voltage"
- Individual output relays can have multiple functions by being assigned as "Combined Alarms"
- Each "alarm" can be selected to directly "Trip" the generator C/B
- 4 analogue inputs (3 x 4-20 mA, 1 x RTD) for user selectable applications. E.g. kW, kVAr, & PF load references, process signal & reference, etc.
- 3 analogue outputs (4-20 mA) for direct driving user applications, E.g. kW, kVAr, PF, RPM meters, actuator position, process reference etc.
- Further I/Os expansion is possible via CAN bus

Dimensional drawing

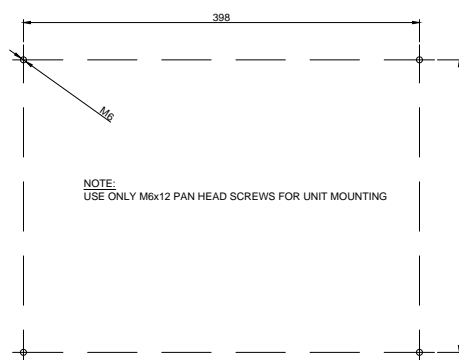
Si-TEC Xtend Physical



FRONT VIEW



SIDE VIEW



MOUNTING DETAIL

