

Si-TEC BDG

DATA SHEET

Model

Si-TEC BDG Turbine Control
(Basic Digital Governor)

BDG

For steam turbine
drive applications

Description

The Si-TEC BDG (Basic Digital Governor) is a steam turbine control specially designed for mechanical drive applications (i.e. pumps, fans, shredders, mills, etc.). The BDG design is based on the very successful Si-TEC *Xtend* ADG steam turbine controller. The compact design, user friendly interface, onboard data logging and wide range of PIDs makes the BDG a standard choice for steam turbine control solutions. With more than 4000 Si-TEC systems now in operation globally, the Si-TEC control provides a further enhancement of this already successful product range.

The Si-TEC range of integrated digital governing controls is internationally recognised as providing the highest level of governing control, and for a wide range of applications including steam turbines and for reciprocating engine (diesel or gas) applications.



Features

Precise speed governing

Dual redundant speed sensors with open circuit detection

Automatic turbine start sequence

Wide range of PIDs

Process control (for variable speed applications)

Control functions via front keypad, start/stop, sequence hold, hot start, etc.

Actuator output linearisation curve

Flexible configuration

User-friendly tuning software (pcTune)

SD card for system diagnostics and logging

Dual dynamic logging

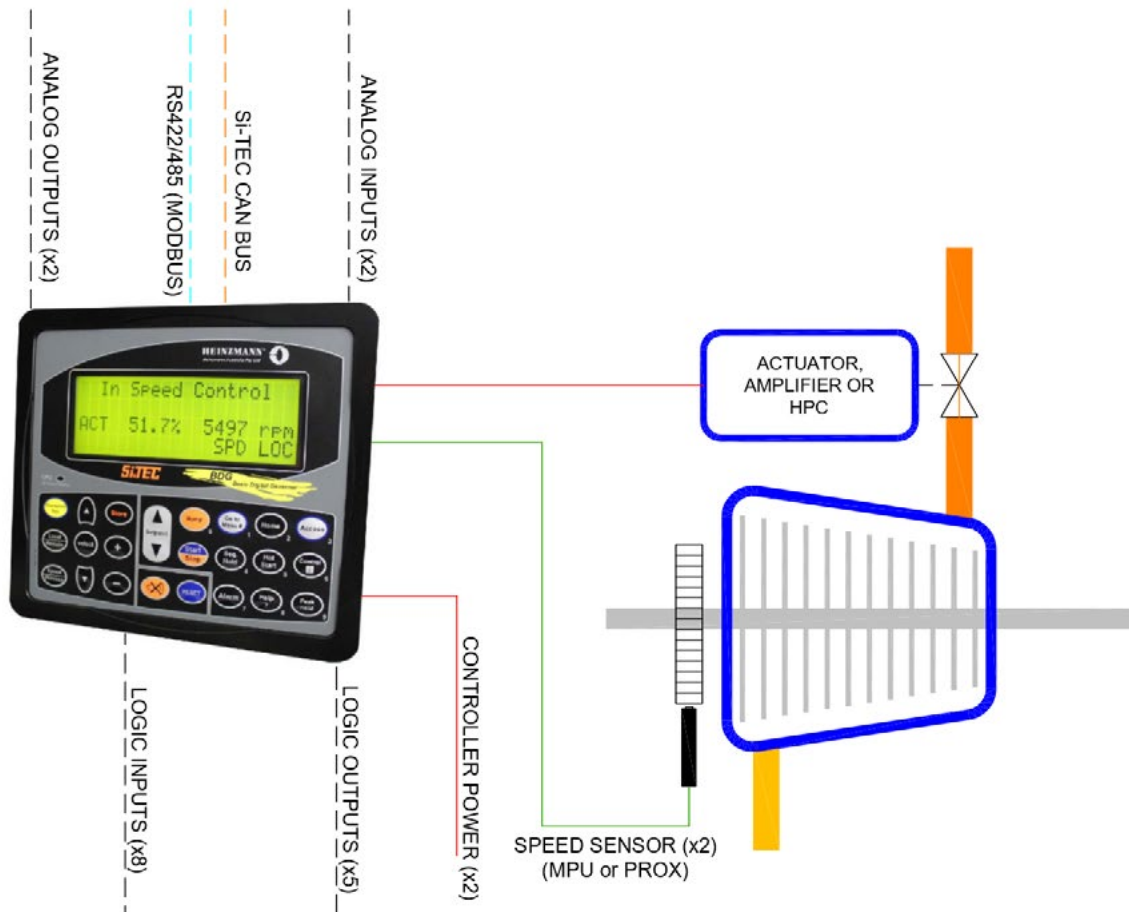
Optional I/O expansion

Certified for hazardous locations

BDG features

- Precise speed governing typically within 0.1 % of operating (rated) speed at steady state
- Automatic start/stop sequence initiated by a single logic input or via front keypad
- Multiple and wide range PIDs
- Redundant MPU or proximity sensors with open circuit detection
- Rapid start cycle „Hot Start“ for warm turbine
- Controlled „Over Speed“ trip testing
- Configurable alarms can be multi-functional
- Actuator bump function for tuning optimisation
- Onboard data logging and event log
- Mini SD card for system diagnostics and logging
- User selected 4 ... 20 mA inputs and outputs
- User selected relay outputs
- External I/O interface to PLC/DCS/SCADA, etc.
- Expandable I/Os - Digital, analogue and thermocouple
- Configuration using Si-TEC BDG keypad or via computer
- RS-232 communications port for configuration, tuning and diagnostics
- Modbus RS-485 port for interface to DCS, SCADA, etc. for remote monitoring and control
- Process control (e.g. suction pressure control, discharge pressure control, level control, etc.)

Si-TEC BDG application layout



Application range

- Wide range of mechanical drives including pumps, compressors, mills, shredders, fans, blowers, etc.
- Variable speed governing control referenced from internal or external set points
- Constant speed governing control referenced from internal set points
- Process control - for variable speed applications

Turbine start up

- Preset warm up stages for start sequence
- Shortened start sequence for warm turbines
- „Fast“ start for turbines at operational temperatures
- Remote 4 ... 20 mA start speed referencing - available
- Two critical speed ranges - operational in all warm up modes
- Normal and fast speed ramp rates for start up

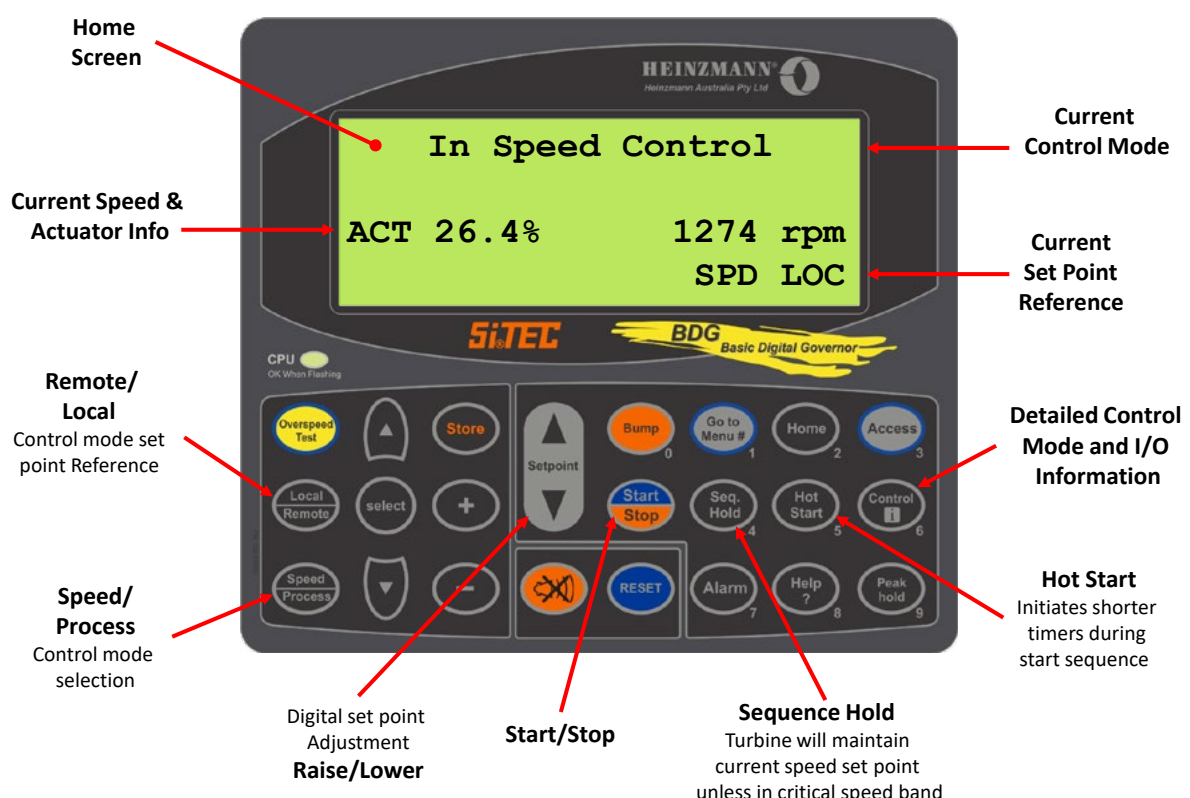
Control

- Operating speed can be referenced from:
 - Digital set point (raise/lower)
 - External 4 ... 20 mA input
 - Modbus communications
- Menu set minimum and maximum operating speeds
- Speed ramp rates used when changing set point
- Multiple speed PIDs
- Process control PID

Display features

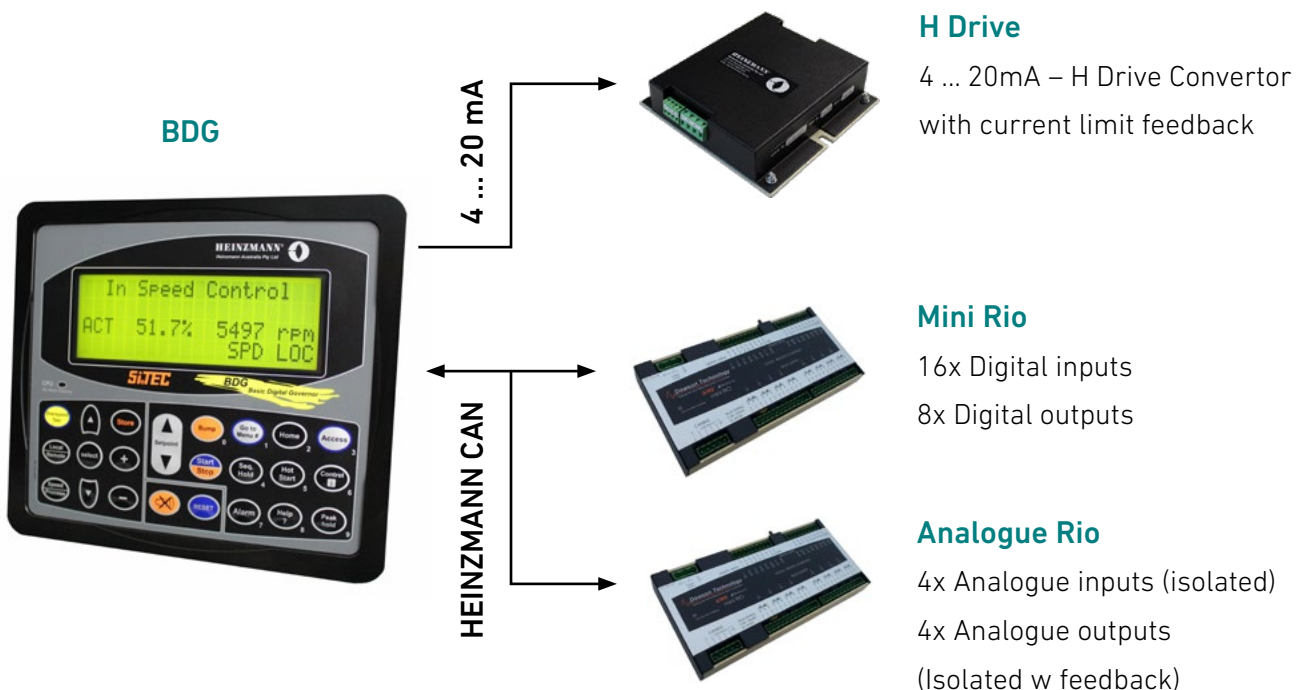
- 4x 20 character display, with „back-light flash“ feature for active alarms
- Extensive multi-level menus for easy and quick access
- Enhanced keypad for menu navigation
- Special keys for control functions as well as jump to selected menu locations
- Peak hold values
- Full system details can be displayed on menus
- Display of accumulated data

Si-TEC BDG keypad layout



I/O features

- 2x (redundant) power supply 24 VDC nominal
 - 1A @ 18 ... 32 VDC each
- 2x (redundant) speed signals
 - MPU inputs (200 ... 30,000 Hz) @ (1 ... 40 VRMS)
 - Gear tooth range (10 ... 500 teeth)
- 1x Actuator output
 - (a) 4 ... 20 mA
 - (b) 0 ... 200 mA (option via I/O expansion module)
 - (c) All HEINZMANN electric actuators from 6 to 180 Nm (option via I/O expansion module)
- 8x Logic inputs: (LED status indication)
 - 1x "Enable Run" (fixed logic input)
 - 1x "Start" (fixed logic input)
 - 6x Configurable logic inputs, including, „Fast Rate“, „Sequence Hold“ and „Overspeed Test“ etc.
- 5x Relay outputs: (LED status indication)
 - Programmable relay outputs for alarm, trip, speed switch, etc. Individual output relays can have multiple functions by combining alarms.
 - Rated for 5 A @ 24 VDC
- 2x Analogue inputs
 - 4 ... 20 mA individually isolated
 - User defined, e.g. speed reference, steam pressures, process control, etc.
- 1x Analogue output
 - 4 ... 20 mA individually isolated
 - User defined, e.g. speed read out, actuator position readout, process control, etc.
- 1x CAN bus port
 - For I/O expansion
 - Additional 16x logic inputs, 8 x relay outputs and/or 4x analogue inputs, 4x analogue outputs
- 1x RS-485/RS-422
 - Modbus communication port with read and write function
- 1x RS-232
 - Communication port for BDG configuration and tuning software
- 1x SD card
 - For diagnostics (alarm history) and BDG data logging, including event log
 - Special dual dynamic logging, high speed traces for trip events and continuous logging for viewing of historical data up to 3 years



Software tools

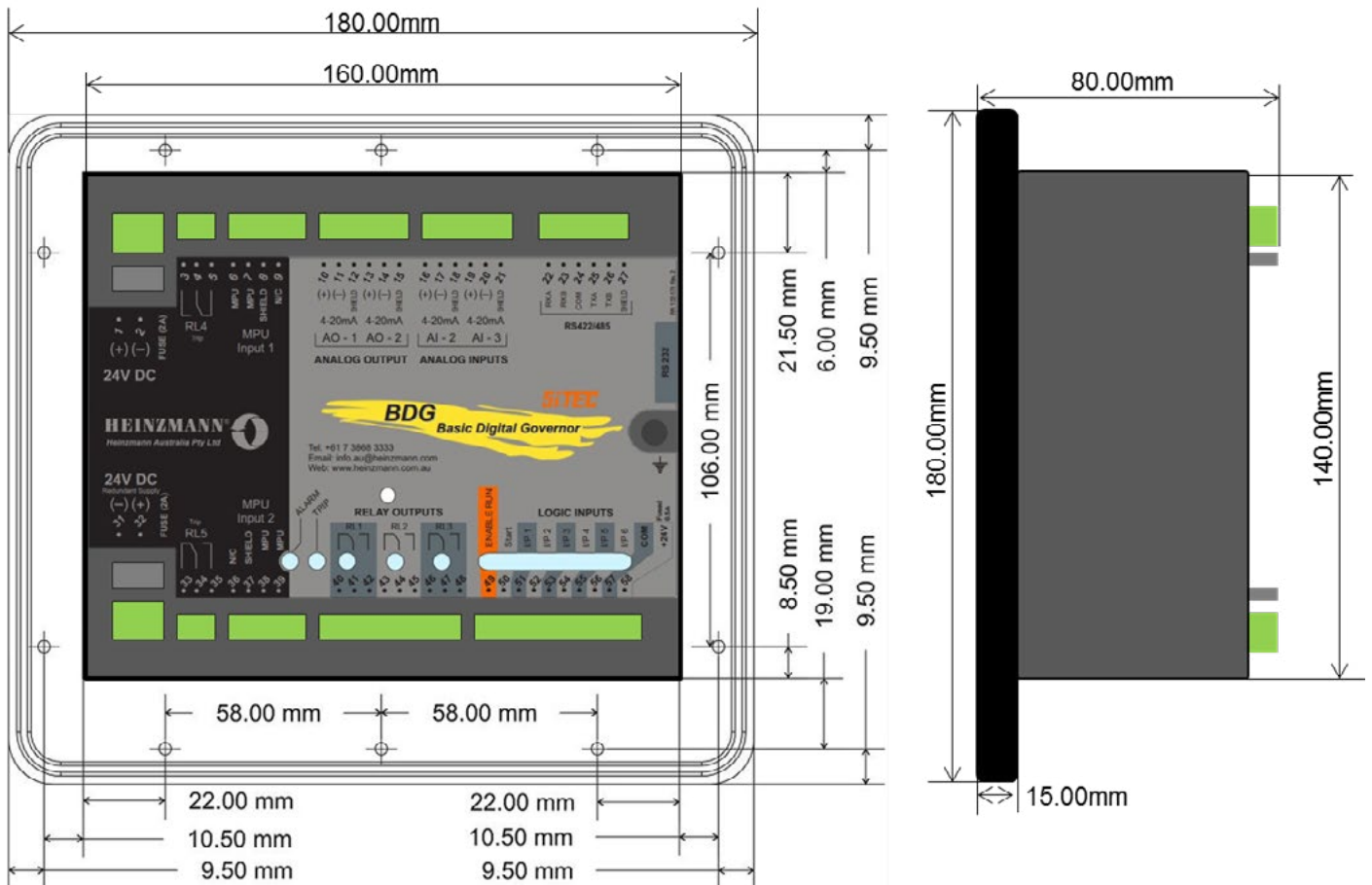
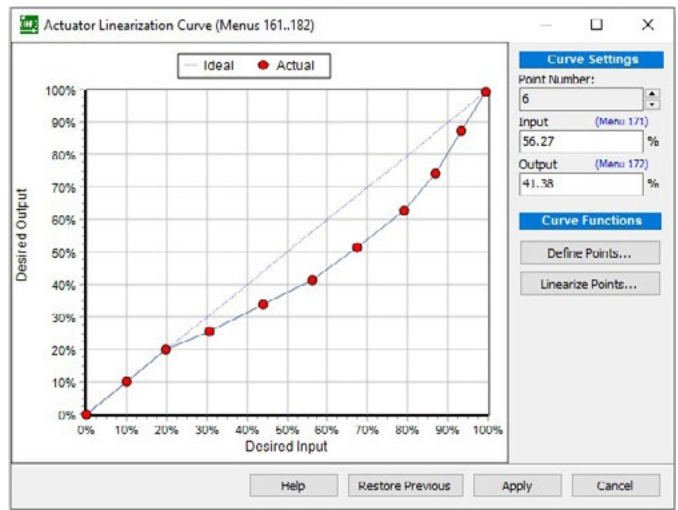
Our software tools are Windows® based.

■ pcConfigure

- Allows storage & retrieval of set point parameters to and from a Si-TEC BDG 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 turbine and process control to be precisely tuned. Remote diagnostics/tuning may also be performed.
- Allows turbine 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



Si-TEC BDG certificates

- International certification currently pending
 - IECEx Zone II, Category 3, G, Ex nA, IIC, T6, Gc
- This certification also applies to the BDG panel mount version as long as the unit is mounted to an ATEX approved IP54 enclosure or better.



Si-TEC BDG including optional Zone II compliant enclosure

Si-TEC BDG ONYX

- Optional display
- The BDG can also be optioned as a full touch screen version in either 12" or 15".
- This will also give the BDG the added feature of 2x TCP-IP Modbus communications ports for monitoring and control.



Si-TEC BDG ONYX