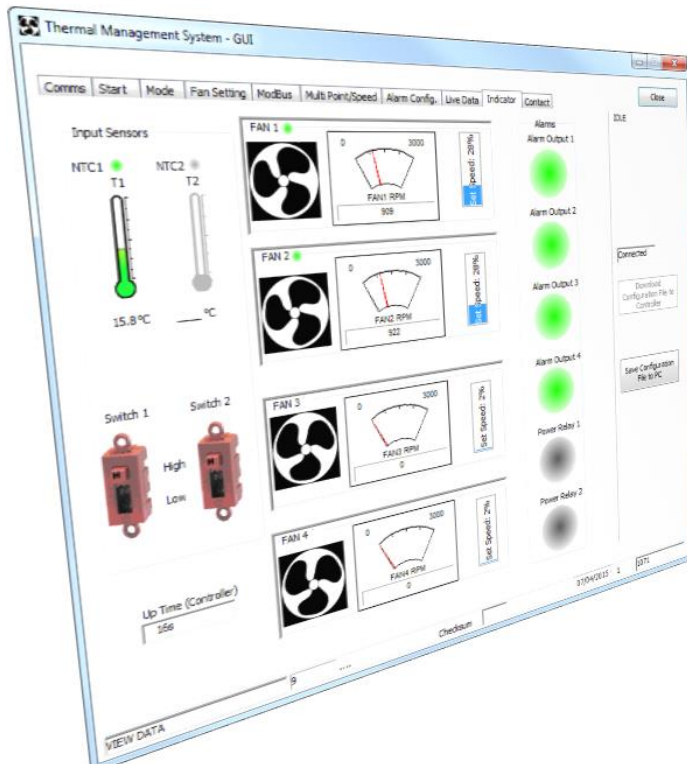# TMS Graphical User Interface (GUI) Instructions For the Thermal Management System (TMS)

Part Number: TMSB00000-01

Fan speed controller, 1 to 4 fans,
11-57V supply, highly configurable, alarm monitoring, enclosure

The most recent version of this document is available for download at:
www.ebmpapst.co.uk

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DOCUMENT HISTORY

5	23 Nov 2023	Win 7, change to Win 10/11	JE
4	06 Dec 2022	Added Modbus Menu Configuration Menu	ME
3	07 Oct 2015	Added info for the driver software for the USB to serial adapter	LA
2	04 Sep 2015	Add software version that the GUI will work with	LA
1	14 April 2015	Draft and First Issue	LA
Issue	Date	Comments	Name

The master of this document is stored at ebm-papst Chelmsford, Essex, UK:
T:\Design Projects\15148 - Controller GUI - epUK\Specifications\OMI

1   Summary

This document should be used in conjunction with the Operation and Maintenance Instructions for the Thermal Management System (TMS), document reference 210-OMI12093.

This document describes how to install a graphical User Interface (GUI) on a PC/Laptop and windows based tablet and how to configure a TMS using the GUI.

There are a number of ways in which the GUI software can be used

- The software can communicate on-line with a TMS controller to program or modify operational parameters

- The software can create and save operational parameters in a configuration file off-line for later download to a TMS controller

- The software can upload the current configuration parameters to view, modify or save to a configuration file for later use

- The software can be used to download a pre-programmed configuration file to a TMS controller

- The software can restore the controller to its original factory default configuration file

Note: The current GUI version will only work with TMS controller programmed with 950-PRG11016 Issue 2.0.0 software version or later.

2   Installation of GUI on PC and Initial Operation

Software:
Download software from the following link www.ebmpapst.co.uk

Unzip the file and find **setup.exe** file. Double click and follow the instructions on the screen. When finished either accept to run the application or start by clicking on the desktop icon

TMS-GUI desktop icon

When the GUI opens start at the Coms tab to connect the PC to TMS and initiate communication. For connection of cables between PC and TMS refer to the Hardware section below.

To fully configure the TMS work through the tabs at the top of the screen following the instructions shown for each tab, see sections 4 to 12 below

This software has been tested with PC's running Microsoft Windows 10 and 11 operating systems and will operate correctly with TMS controllers loaded with program number 950-PRG11016_1.0.85 or later.

Hardware:
For configuration, the TMS is designed to be connected to a PC using an ebm-papst supplied cable assembly ebm-papst part number 210-HAR11887, PC USB to TTL serial data adapter. The cable and the driver software have been tested with the TMS on MS Windows 10 and 11 operating systems. In an event when the PC does not automatically recognise the device cable, the appropriate driver program may require installation.
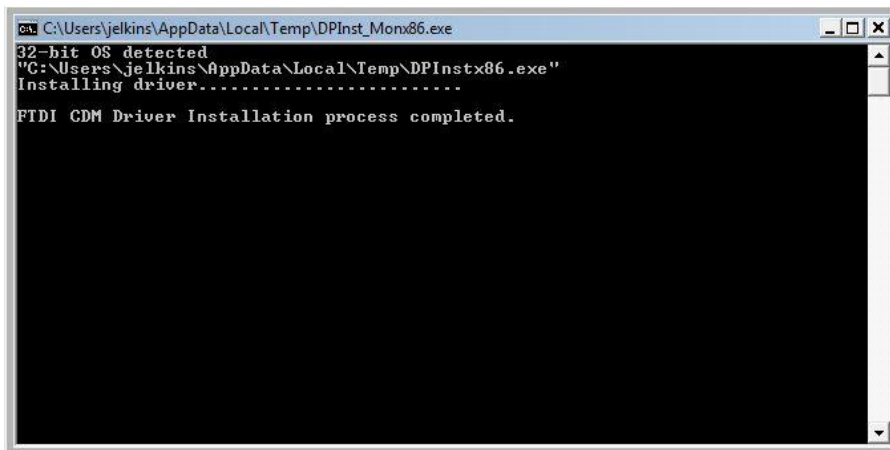
USB Driver software Download:
The USB adapter driver software is available from https://ftdichip.com/drivers/vcp-drivers/

USB Interface Driver Software Installation Instructions

1) If necessary, double click on driver file to install the drivers for the configuration cable. The pop-up window shown below may be displayed briefly (file path will vary):

2) Plug the cable assembly ebm-papst part number 210-HAR11887 into a spare PC USB connector and connect the other end to a powered TMS control PCB "COM" connector.

3   Summary of Main Tabs of the GUI

- Comms

  Configures the communication port on the PC and the connection to the TMS

- Start

  Load a default blank configuration template

  Read configuration file from the TMS

  Open an existing configuration file stored on a PC or network

  Download a configuration file to the TMS

  Save a configuration file for later use

  Reset controller

  Restore factory defaults

- Mode

  Set the operating mode

- Fan setting

  Set fan operation parameters

- Modbus

  Set the Modbus parameters (if used)

- Multi Point/Speed

  Configure the fan response to the sensor input

- Alarm Config.

    Configure the alarm conditions and controller response

- Live data

    A log of live and view tabulated live data

- Indicators

    A graphical view of live data

- Contact details for ebm-papst

Note: Volatile Memory Alert

The information displayed in the GUI software is held in volatile memory which will be lost if the software is shut down. Similarly any changes to the control parameters are written to volatile memory and will not be automatically saved or downloaded to the TMS controller.

To ensure that data is not lost it is recommended that any work on the software is regularly downloaded to the TMS controller or saved to a configuration file. These two actions can be executed using one of the two software buttons on the right hand side of the screen. These software buttons are shown on every tab of the software.

- Download Configuration File to Controller

    o When the GUI software has been connected to the TMS controller this function overwrites the current parameters active on the TMS controller with the parameters in the GUI software. This process takes approximately 60 seconds.

- Save Configuration file to the PC

    o This function saves the parameters active in the GUI software into a configuration file for later use. This process takes a few seconds.

4 COM Port

This tab configures the port connection on the PC to the GUI software. The communication between the PC and the TMS controller is facilitated using a USB serial interface lead and the software will enable communication between the PC and the TMS when the correct COM port is specified.

When connecting to the TMS via the GUI software it is important to ensure that power is applied to the TMS and the USB interface lead is connected to both PC and TMS controller. The TMS should have power applied before launching the GUI software.

The serial interface lead should be assigned a COM port number between 1 & 9. The COM port number for the interface lead can be changed via the Device Manager which can be found in the computer's control panel.

210-OMI13962, Iss.5
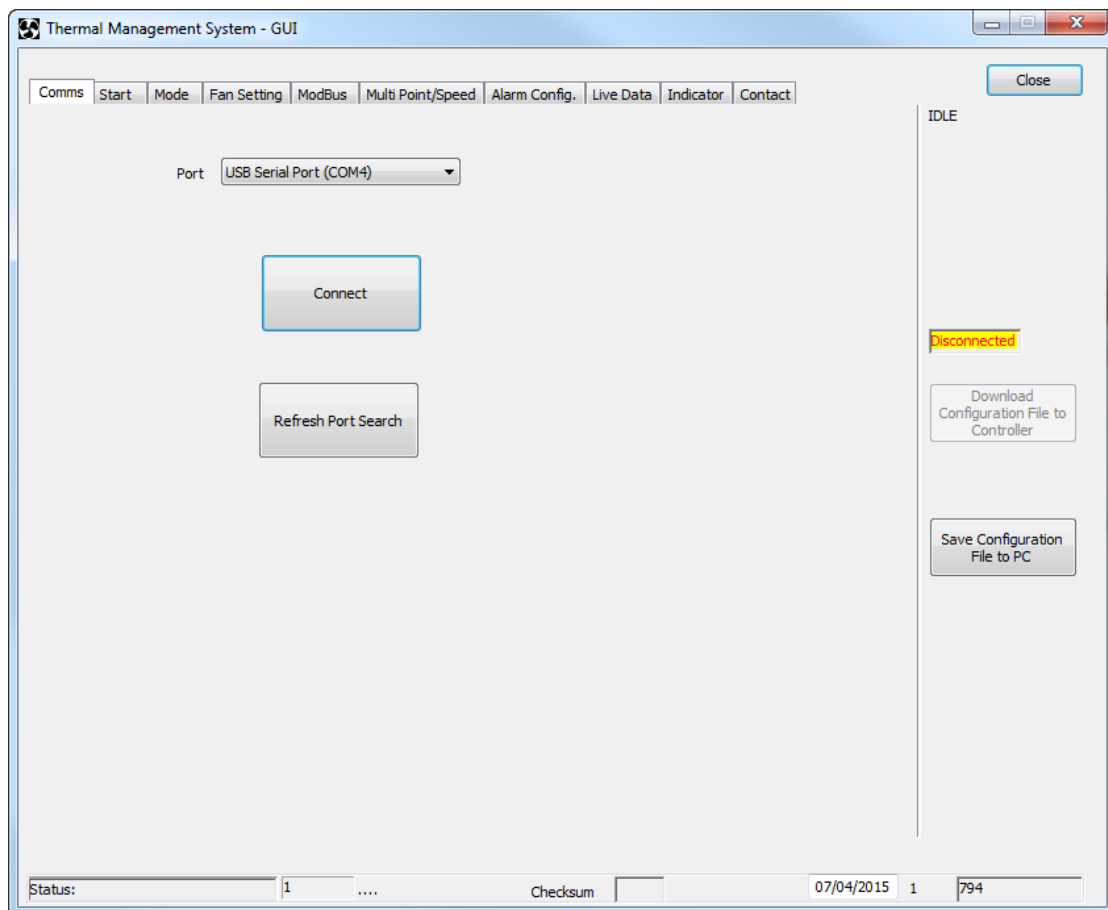
5 Start Tab

Once communication between PC and TMS controller has been successfully established, the options in the start tab allow you to define how the GUI will function.

The following actions can be undertaken and information seen in this tab;

- Default setting on software start up
  - o The GUI will be loaded with a standard template which will allow operational parameters for the TMS to be started from scratch
- Reload template
  - o This function re-loads the standard template into the GUI clearing any previous configuration. It is recommended that any previous work is saved before executing this option (see "Save Configuration File to PC")
- Read Configuration File from Controller
  - o This function populates the GUI with the parameters currently active on the TMS controller
- Open existing Configuration File from PC
  - o This function populates the GUI with the parameters of a previously saved configuration file stored on the PC or other memory device
- Refresh Controller information
  - o This function refreshes the information displayed in the Controller Information window with the active configuration file data in the TMS.
- Restart Controller
  - o This function causes the controller to reboot
- Restore TMS Default
  - o This function restores the parameters on the TMS to the factory default condition erasing any currently programmed profile
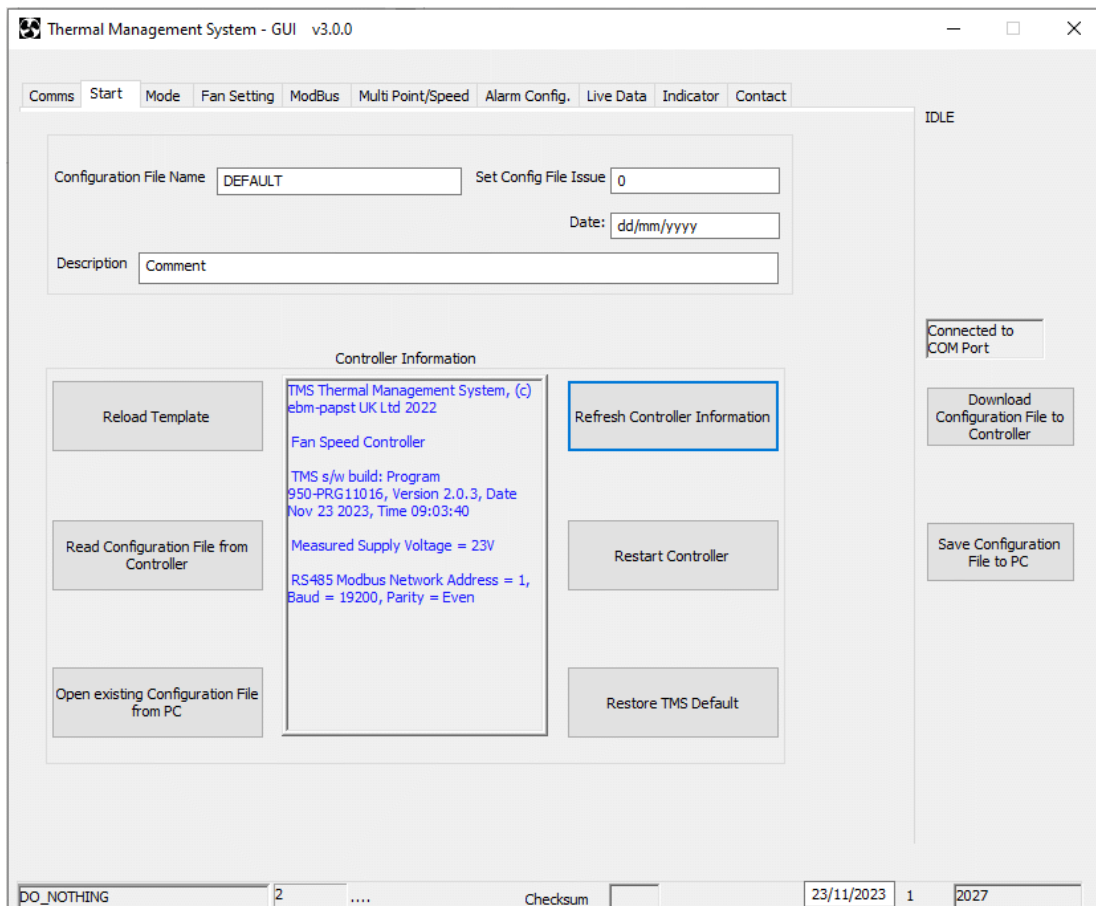
Controller Information

The Controller information window shows hex file part number and issue date and RS485 settings of the connected TMS. The 'Refresh Controller Information' button only extracts the controller information to be shown in this window.

Naming and saving your work

When creating a new set of parameters to be downloaded to the TMS it is recommended that the configuration file is assigned a name, description, issue number and date. This data can be entered in the text boxes at the top of the page. It is also recommended to save the file at this point by pressing the 'save configuration file to PC' button. This will open a standard windows format file window where the location to save the configuration file can be chosen. Regularly saving the parameters to the configuration file will avoid the risk of losing work.

Warning

The standard template can be reloaded at any time by pressing the 'reload template' button. Up-loading the template, existing files or reading from the controller would overwrite any existing setting in the GUI's temporary memory. If that configuration file is required it should be saved using the 'save configuration file to PC' button before up-loading.
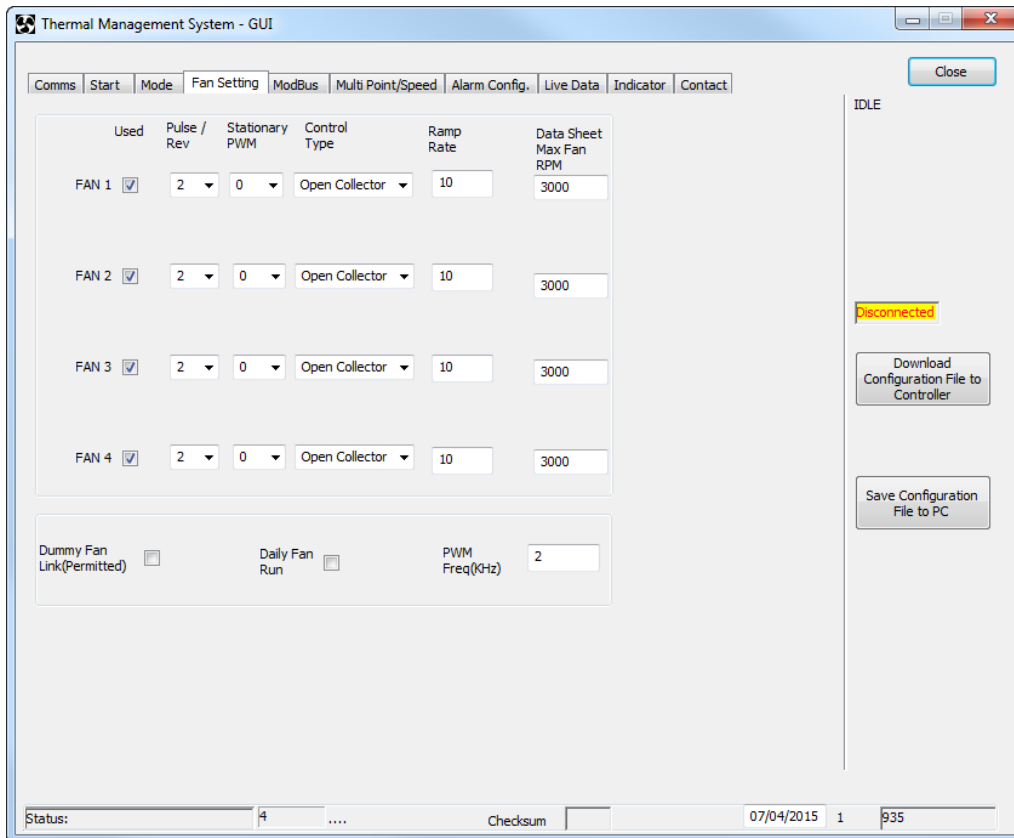
6 Mode
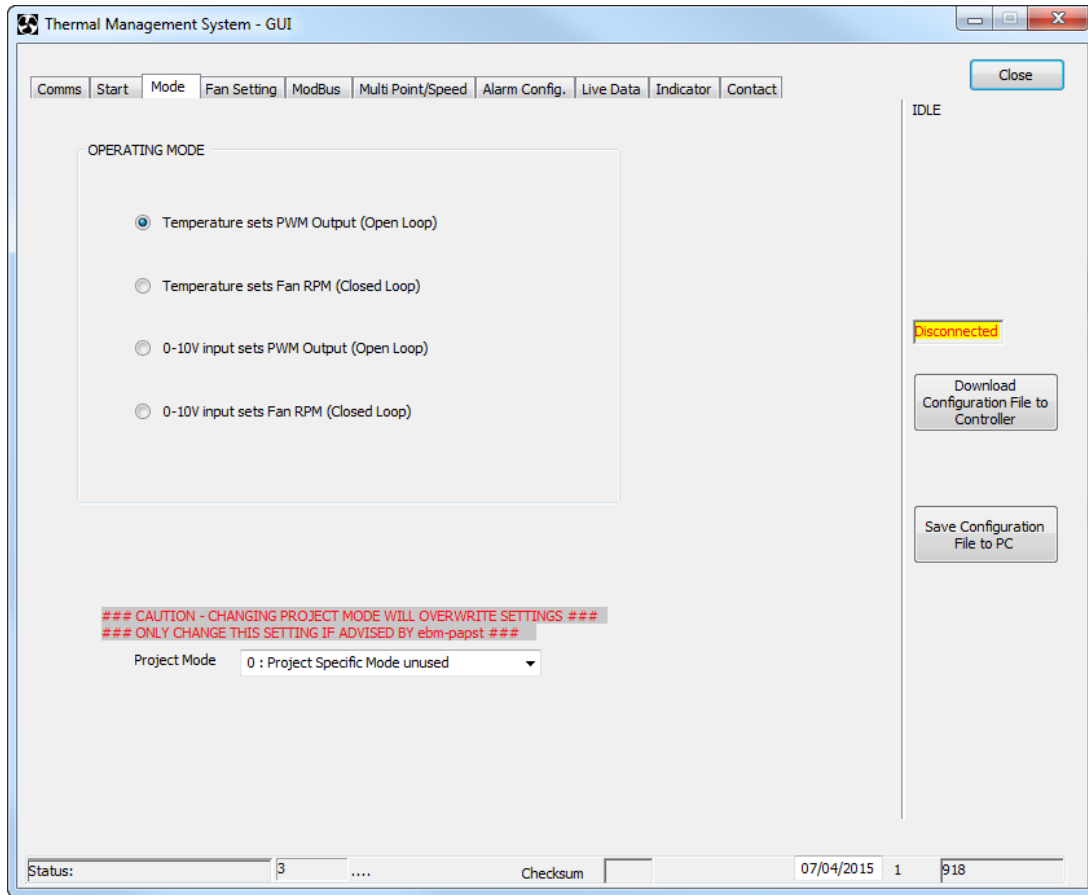
Operational Mode	Description
Temperature sets PWM output (Open Loop)	The controller responds to NTC temperature sensor input and will vary the control signal to the fan based on the programmed temperature profile (see section 9).
Temperature sets Fan RPM (Closed Loop)	The controller responds to NTC temperature sensor input and will vary the fan speed based on the programmed temperature profile (see section 9).
0-10V Input sets PWM Output (Open Loop)	The controller responds to 0-10V input signal and will vary the control signal to the fan based on the programmed response profile (see section 9).
0-10V input sets Fan RPM (Closed Loop)	The controller responds to 0-10V input signal and will vary the fan speed based on the programmed response profile (see section 9).
Project Specific Mode	This is the access point for customer specific software features and should only be changed if advised by ebm-papst

Note

Changing operating mode will reset many of the temperature / control and alarm parameters to default settings for the chosen mode.

7 Fan setting

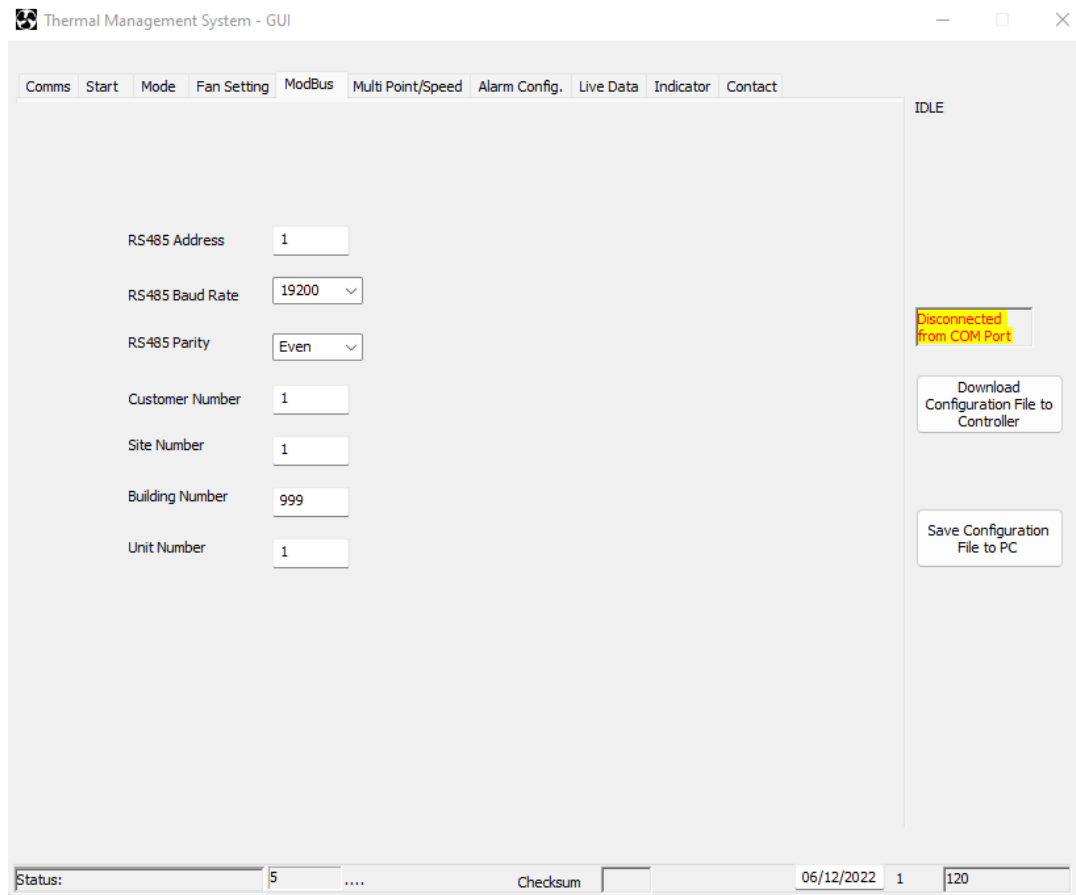| Parameter	Options
Used	The TMS controller is capable of controlling a maximum of 4 fans. Boxes should be checked according to the position that the fan is connected to the TMS
Pulses/Rev	The number of tachometer pulses per revolution, see Fan Data Sheet. Options: 0 – Fan alarm relay or Open Collector output / No Tacho output 1 – One pulse per revolution 2 – Two pulses per revolution 3 – Three pulses per revolution 6 – six pulses per revolution
Stationary PWM	The specific PWM output from the controller that will stop the fan (0-100%). A feature for fans with non-standard PWM profile, default setting to 0%.
Control Type	Control Signal input to the fan • Open Collector - fan responds to an open collector PWM signal • 0-10V - Fan responds to a 0-10V PWM signal
Ramp Rate	The % rate at which the fan speed changes (Default setting =10) • 1 = slow response • 100 = fast response
Data Sheet Max Fan RPM	The maximum speed of the fan as stated in fan data sheet.
Dummy Fan Link Permitted	Allow the simulation of fan presence using a dummy fan connector, 210-HAR12141, PWM-Tacho link.
Daily Fan Run	Causes the fans to run for a brief period, once per day to check for correct operation. (Used if it is expected that the fans may be idle for long periods of time)
PWM Frequency	Set the clock frequency of the Fan speed control PWM signal • Range of 1kHz to 25kHz, see Fan Data Sheet

Warning

If the **Control Type** is incorrectly set to 0-10V when an Open Collector fan is fitted the maximum input control voltage limit may be exceeded which may damage the fan.

Note

To invert the control profile from positive *(Increasing %PWM output = Increasing speed)* to negative *(Increasing %PWM output = Decreasing speed)*, enter '100' in the "Stationary PWM" parameter setting. Consult fan data sheet for correct setting.

8   Modbus

Parameter	Options
RS485 Address	Sets the Modbus address (1-247)
RS485 Baud Rate	Sets the Modbus Baud rate (9600 or 19200)
RS485 Parity	Sets the Modbus parity (Even, Odd or None)
Customer Number	Sets the Customer Number (1 - 9999)
Site Number	Sets the Site Number (1 - 9999)
Building Number	Sets the Building Number (1 - 999)
Unit Number	Sets the Unit Number (1 - 999)

Use of the Modbus interface is optional.

Refer to document 210-OMI14013 TMS Modbus Interface Instructions for Modbus Register addresses.

9 Multi Point/Speed
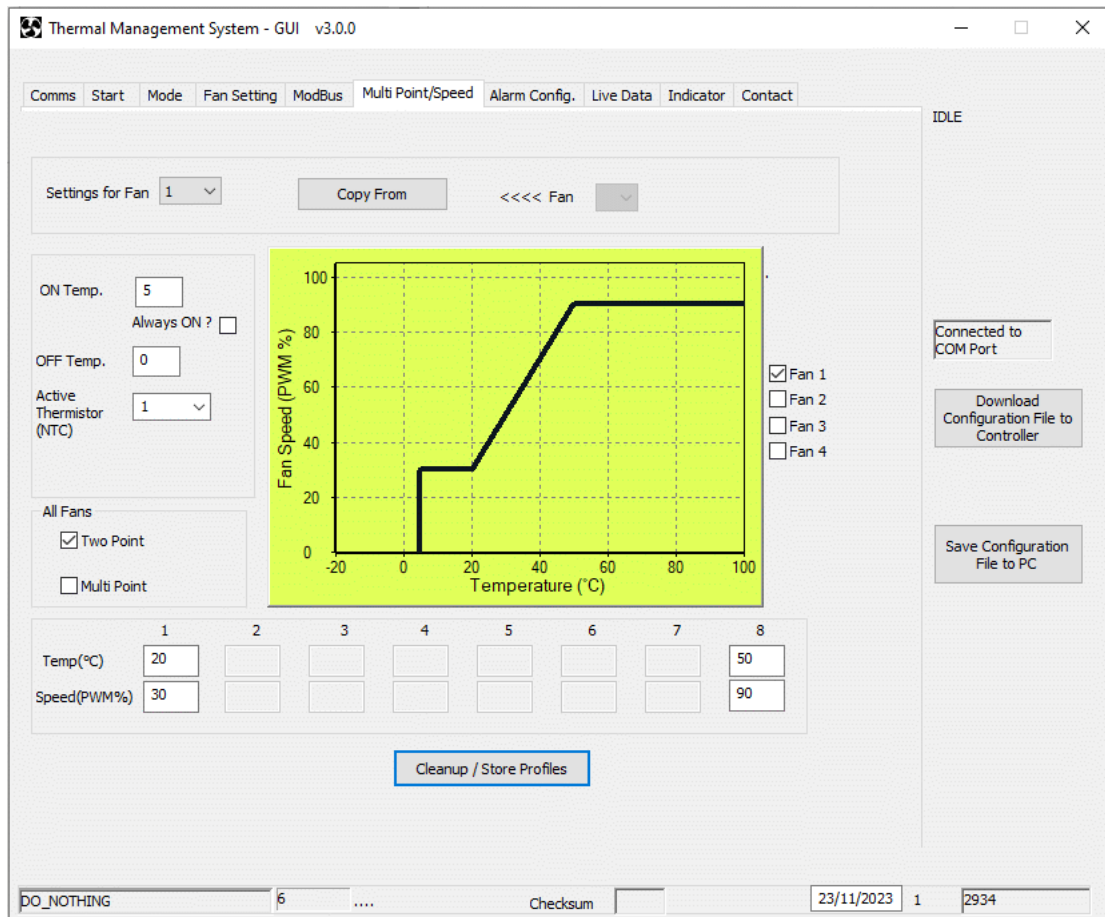
Parameter	Options
Setting for Fan	Activates the control profile for the fan specified (Fans 1 to 4)
Copy From	Overwrites the control profile for the fan specified in the 'Settings for Fan' parameter with the current control profile as specified in '<<<< Fan'
On Temp	Temperature at which the fan will switch on
Off Temp	Temperature at which the fan will switch off
Always On	This will ignore Off Temp and ON temp setting and the fan will continuously run at minimum speed below the minimum set point
Active Thermistor	NTC Thermistor input controlling the fan speed 1 – Thermistor input 1 2 – Thermistor input 2 1 or 2 – The highest temperature sensed by thermistors 1 or 2
Two Point	Simple control profile with minimum and maximum points only
Multi point	Complex control profile with 8 set points
Temp (°C) / Input Voltage	2 or 8 point Temperature Setpoint values, -20C to +99C, or Voltage 0-10V,
Speed PWM% / RPM	2 or 8 point fan response corresponding to the control input, 0 to 100% PWM, or RPM up to Max. set on "Fan Setting" page.

Note

It is important to use the 'Clean-up/Store Profiles' button to save the changes before downloading to the controller or saving to the PC.

10 Alarm Configuration

There are 4 standard alarm outputs and two optional additional on the TMS controller (*see Enable Virtual Relay Alarms*). In an event of specified conditions with the fan(s) and NTC(s) and switch input(s), there can be consequent pre-set action(s). These alarm conditions are configurable within this Tab and consist of:

Alarm condition	Description of operation
Input 1	Switch Input 1 state (High/low) as an Alarm Condition
Input 2	Switch Input 2 state (High/low) as an Alarm Condition
Fan Bad	Fan fail alarm condition - based on expected tacho/alarm feedback
NTC 1	NTC 1 open / short circuit as an alarm condition
NTC 2	NTC 2 open / short circuit as an alarm condition
NTC 1 Low limit	Temperature (T1) falling below this value as an Alarm Condition
NTC 2 Low limit	Temperature (T2) falling below this value as an Alarm Condition
NTC 1 High limit	Temperature (T1) rising above this value as an Alarm Condition
NTC 2 High limit	Temperature (T2) rising above this value as an Alarm Condition
Hysteresis	Alarm hysteresis: Low Limit Alarm – Alarm inactive when temperature exceeds the low limit alarm point by the hysteresis value High Limit Alarm – Alarm inactive when temperature is below the high limit alarm point by the hysteresis value
Delta T1-T2	An alarm will be raised if the difference between T1 and T2 exceeds the value set in this parameter
Enable Virtual Relay Alarms	Provides two additional alarm conditions and corresponding actions. This is optional and allows extension or the Alarm Detect / Alarm Action logic.

Response	Description of operation
Relay State	Open – Relay opens when alarm is triggered / active Closed - Relay closes when alarm is triggered / active
Fan 1 Fan 2 Fan 3 Fan 4	Fan changes to the Alarm set parameter value. Alarm set speed has priority over Multipoint/Set speed. Alarm 1 highest priority.

Example Alarm Condition

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Alarm 1 will trigger if the controller senses any one of the following conditions:
- Switch input 1 experiences a Low signal (Switch input linked to 0V)
- Switch input 2 experiences a High signal (Switch input open/floating)
- Fan 1 fails (Based on the fan tacho/alarm output signal)
- Fan 3 fails (Based on the fan tacho/alarm output signal)
- NTC 1 fails (Open / short circuit)
- NTC 1 falls below 10°C – Alarm off when temperature exceeds 11°C
- NTC 2 falls below 12°C – Alarm off when temperature exceeds 13°C
- NTC 1 exceeds 20°C – Alarm off when temperature falls below 19°C
- NTC 2 exceeds 80°C – Alarm off when temperature falls below 79°C
- The difference of temperature between NTC1 & 2 exceeds 5°C

When the alarm state is triggered by one or more of the conditions, the alarm relay and each fan can be programmed to respond either by sending a PWM signal or specifying an RPM…

e.g

Fan Programmed by Open Loop PWM
(see section 6)

Fan programmed by RPM
(see section 6)

- Alarm Relay action (select Contacts Open for Alarm, Fail Safe default operation)
- Fan 1 PWM/RPM alarm action (Fan set to this PWM/RPM)
- Fan 2 PWM/RPM alarm action (Fan set to this PWM/RPM)
- Fan 3 PWM/RPM alarm action (Fan set to this PWM/RPM)
- Fan 4 PWM/RPM alarm action (Fan set to this PWM/RPM)

All these settings can be configured separately for alarms 1 – 6.
Note – Alarm 1 has highest priority, Alarm 2 next highest, etc.
The PWM/RPM can only be positive numbers.

11 Live Data

This tab is a tabular representation of all the measured values from the TMS Controller.
When TMS is connected and running, use the 'View Live data/Start logging' button to view the data coming from TMS. Logging this data is possible by checking the 'Log Data File' check box. It will prompt the user for a file name and location to store the data as a csv text file.

12 Indicators
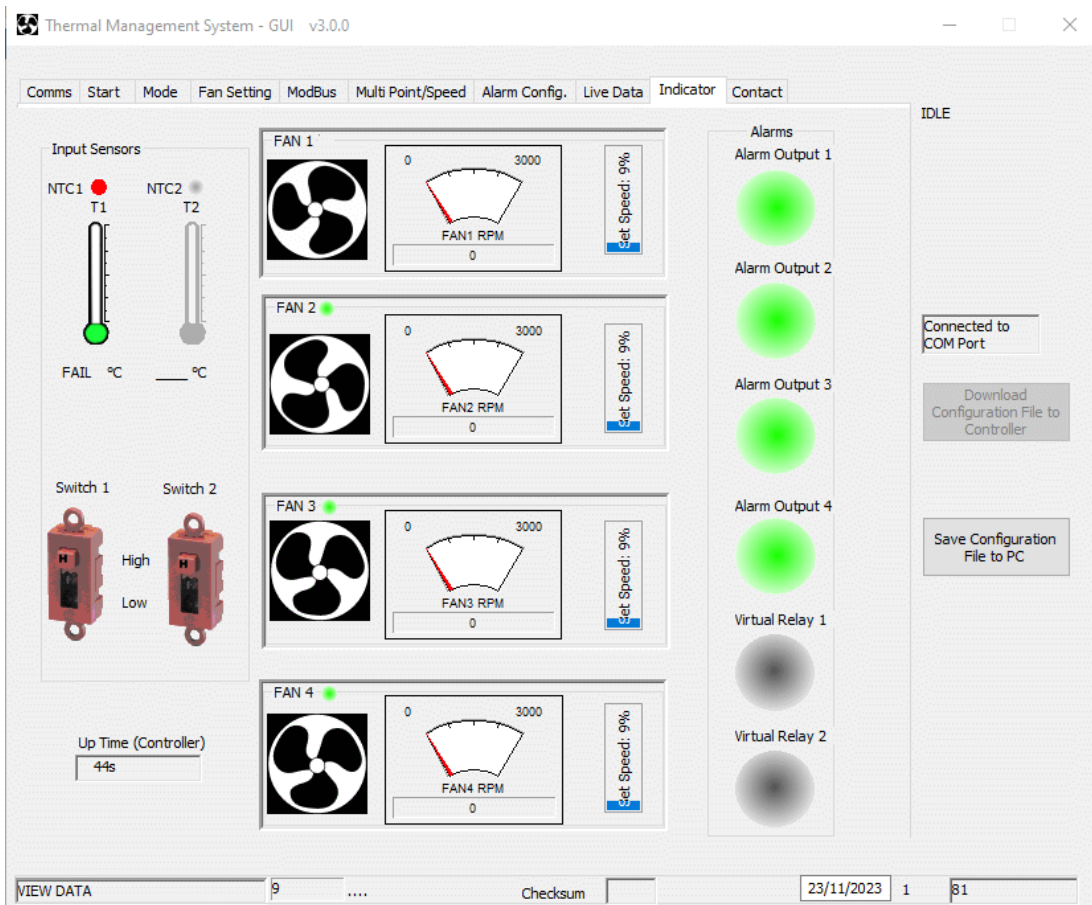
This tab is a graphical representation of all the measured values from the TMS Controller. It will only be active when TMS is running and connected to the software. Any symbol in grey signifies that that device is not active, red/flashing red signifies alarm/fault state and green signifies all is well with that device.

13 Contact details

This tab shows company contact details and the website from which the current software version can be obtained.