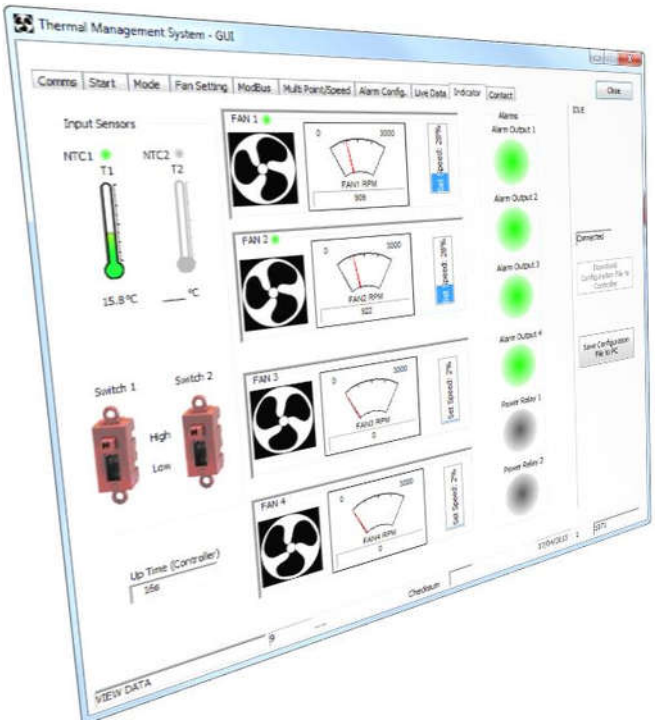
# TMS Graphical User Interface (GUI)
# Instructions For the
# Thermal Management System (TMS)

## Part Number: TMSB00000-01

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






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www.ebmpapst.co.uk/instructions

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DOCUMENT HISTORY

| | | | |
|---|---|---|---|
| | | | |
| 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\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 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 GUI will only work with TMS controller programmed with 950-PRG11016 Issue 1.0.85 software version or later.

# 2 Installation of GUI on PC and Initial Operation

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

Unzip the file and find Thermal Management System Interface 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

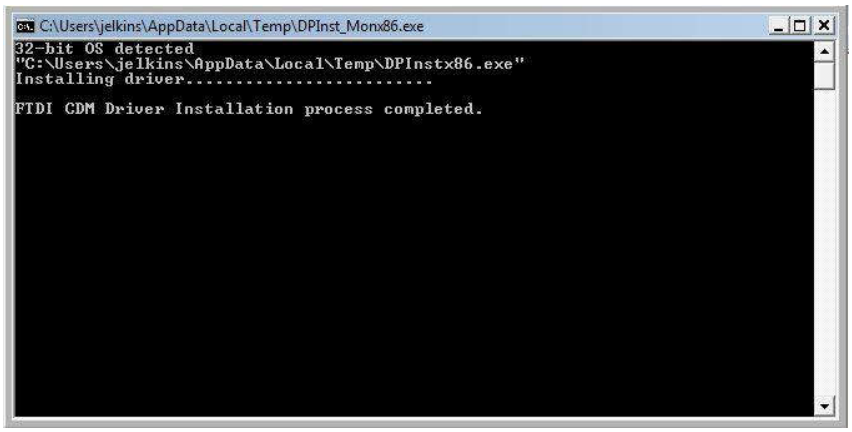
This software has been tested with PCs running Microsoft Windows 7 operating system and will operate correctly with TMS controllers loaded with program number 950-PRG11016_1.0.85 or later.

**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 7 operating system. In an event when the PC does not automatically recognise the device cable, the appropriate driver program must be installed on the PC, instructions below.

**USB Driver software Download:**
The USB adapter driver software is included in the zip file downloaded from the website already stated above. File name is ñCDM20802_Setup.exeò

### *Configuration Software Installation Instructions*

1) Double click on CDM20802_Setup.exe to install the drivers for the configuration cable. The pop-up window shown below should 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 ñCOMò 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 blank 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 address (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

## ***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.

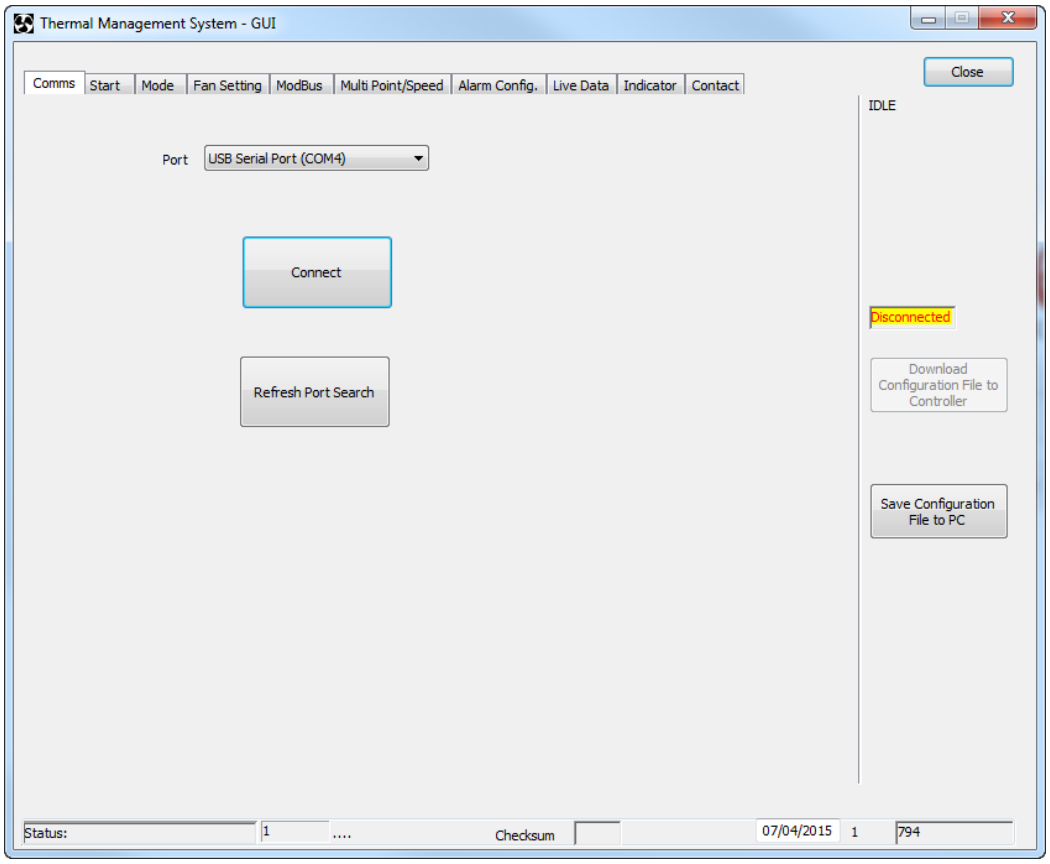
- Download Configuration File to Controller
  - When the GUI software has been connected to the TMS controller this function overwrites the current parameters active on the TMS controller with the parameters in the GUI software. This process takes approximately 60 seconds.
- Save Configuration file to the PC
  - 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 computerôs control panel.

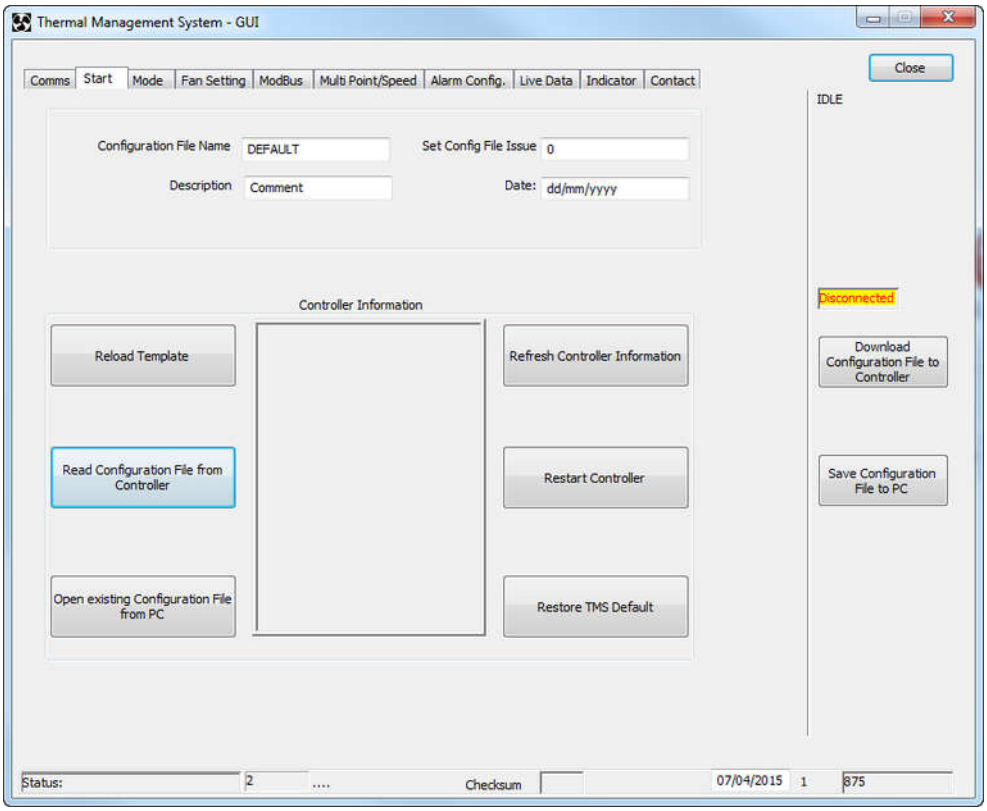


# 5 Start Tab

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
  - The GUI will be loaded with a standard template which will allow operational parameters for the TMS to be started from scratch
- Reload template
  - 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 ñSave Configuration File to PCò)
- Read Configuration File from Controller
  - This function populates the GUI with the parameters currently active on the TMS controller
- Open existing Configuration File from PC
  - 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
  - This function refreshes the information displayed in the Controller Information window with the active configuration file data in the TMS.
- Restart Controller
  - This function causes the controller to reboot
- Restore TMS Default
  - 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 ôRefresh Controller Informationôbutton only extracts the controller information to be shown in this window.

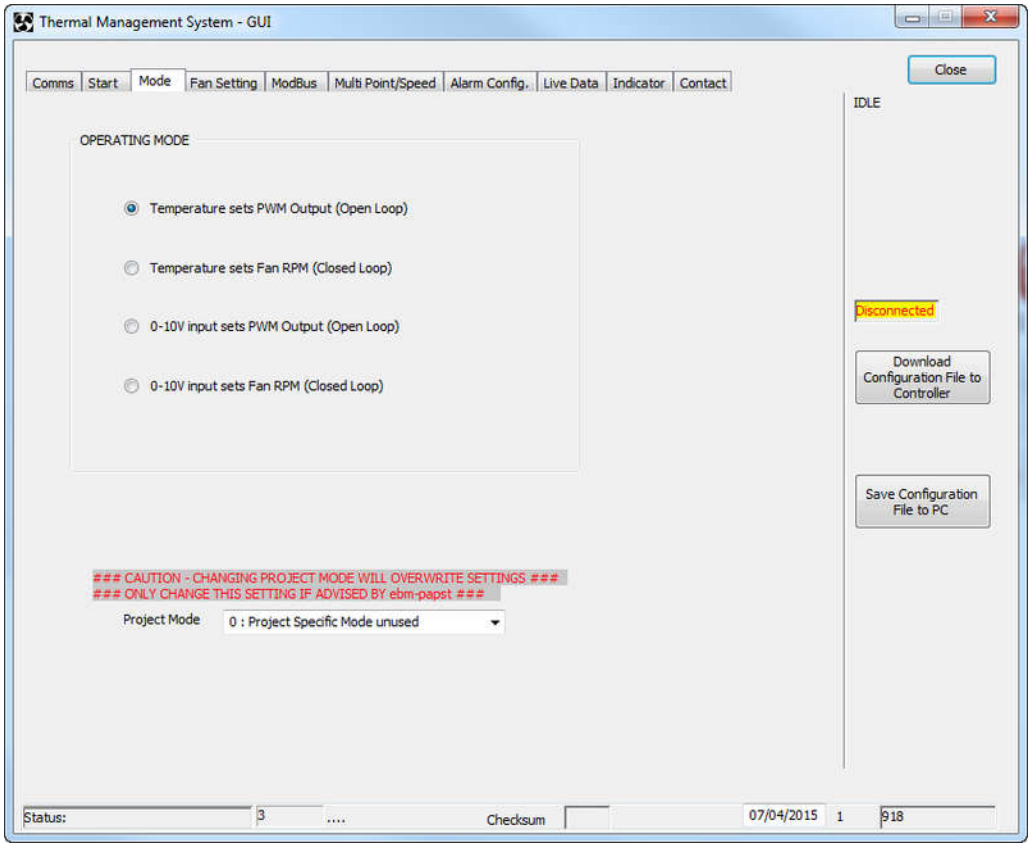
## Naming and saving your work

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 ósave configuration file to PCôbutton. 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 óreload templateôbutton. Up-loading the template, existing files or reading from the controller would overwrite any existing setting in the GUIõs temporary memory. If that configuration file is required it should be saved using the ósave configuration file to PCôbutton before up-loading.

# 6 Mode

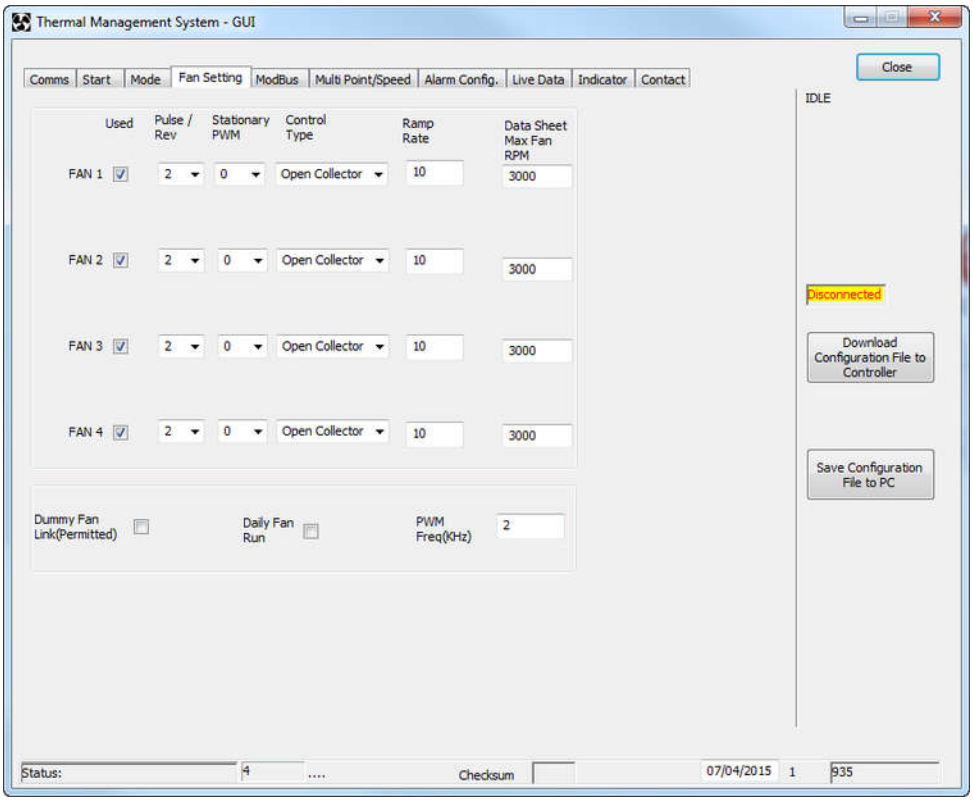



| Operational Mode | Description |
|---|---|
| Temperature sets PWM output (Open Loop) | The controller responds to temperature sensor input and will vary the control signal to the fan based on the programmed temperature profile (see section 9). |
| Temperature sets Fan RPM (Closed Loop) | The controller responds to 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<br>Options:<br>0 ï Fan alarm output / No Tacho output<br>1 ï One pulse per revolution<br>2 ï Two pulses per revolution<br>3 ï Three pulses per revolution<br>6 ï 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<br>• Open Collector - fan responds to an open collector PWM signal<br>• 0-10V - Fan responds to a 0-10V analogue signal |
| Ramp Rate | The rate at which the fan speed changes (Default setting =10)<br>• 1 = slow response<br>• 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 |
| Daily Fan Run | Causes the fans to run for a brief period, once per day to check for correct operation. (Used if it is believed that the fans will be idle for long periods of time) |
| PWM Frequency | Set the clock frequency of the PWM signal |

| | |
|---|---|
| | • Range of 1kHz to 25kHz |

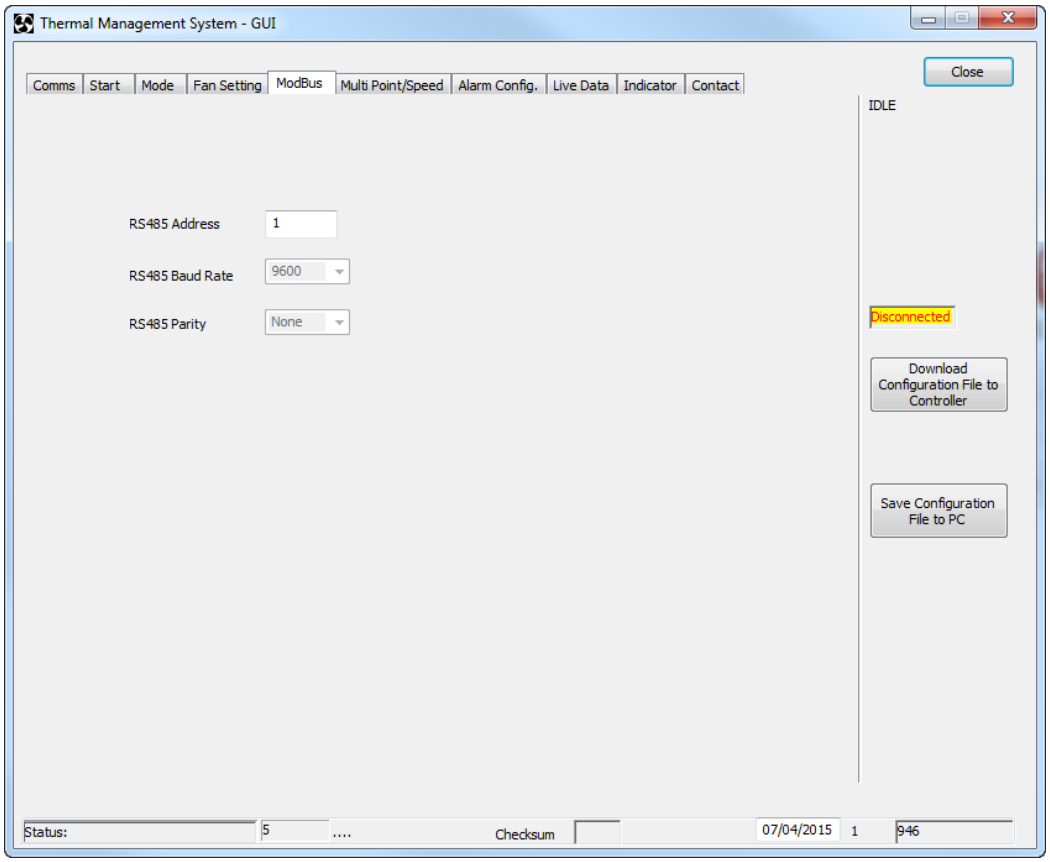
## *Warning*

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*

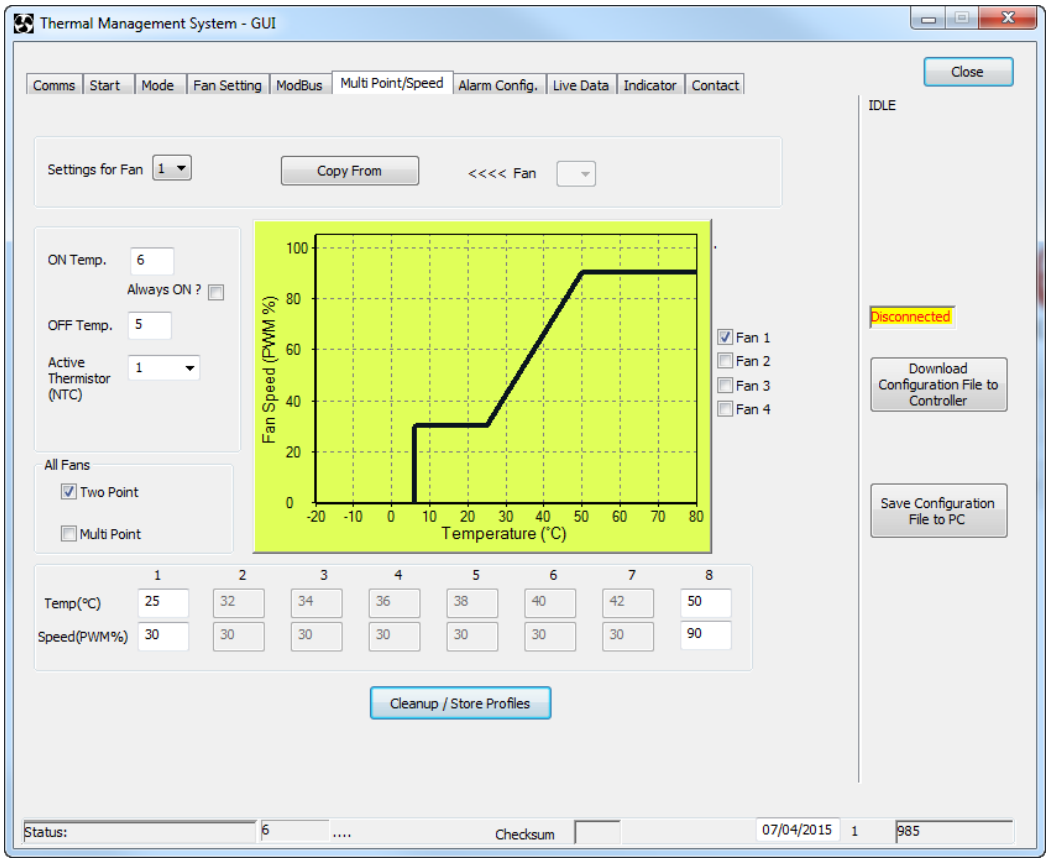
To invert the control profile from positive *(Increasing %PWM output = Increasing speed)* to negative *(Increasing %PWM output = Decreasing speed)*, enter ó100ô in the ñStationary PWMò parameter setting. Consult fan data sheet for correct setting.

# *8 Modbus*




For this current release, only the Address for the RS485 can be set. This setting is for specifc users.

# 9 Multi Point/Speed

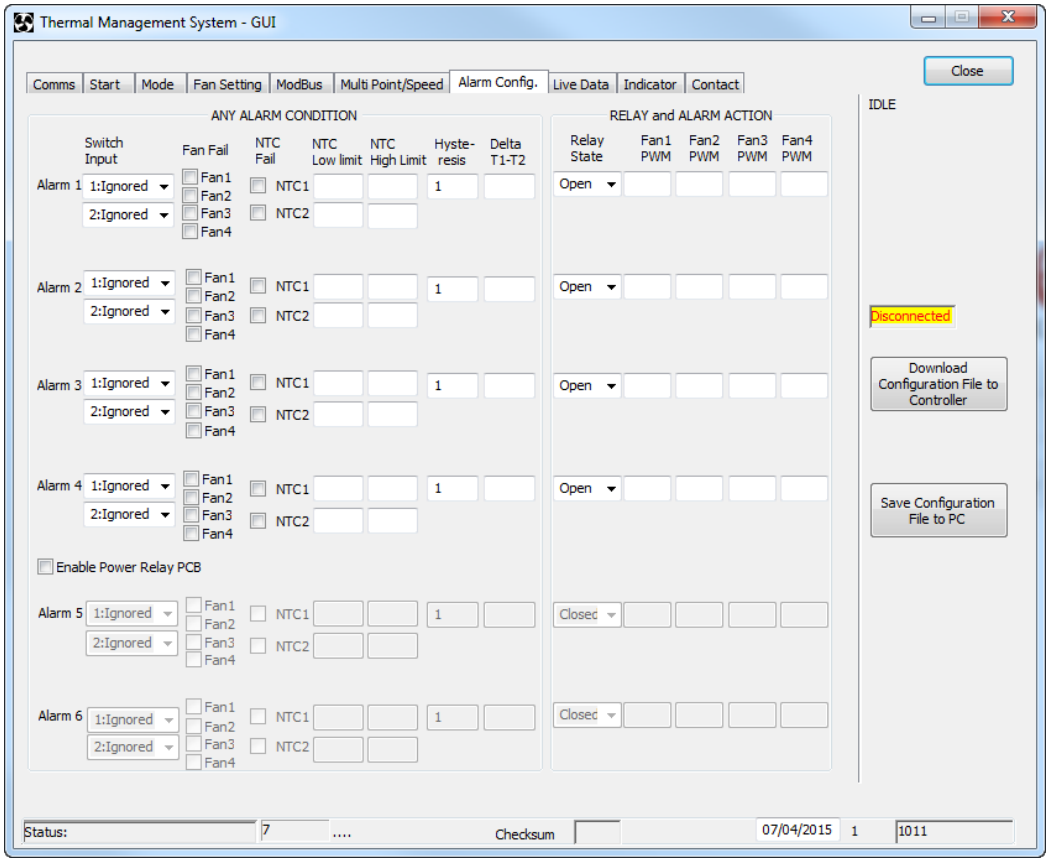



| Parameter | Options |
|---|---|
| Setting for Fan | Activates the control profile for the fan specified (Fans 1 to 4) |
| Copy From | Overwrites the control profile for the fan specified in the ó Settings for Fanô parameter with the current control profile as specified in ó<<<< Fanô |
| On Temp | Temperature 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 | Thermistor input controlling the fan speed<br>1 ï Thermistor input 1<br>2 ï Thermistor input 2<br>1 or 2 ï 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 up to 8 set points |
| Temp (°C) / Input Voltage | 2 ï 8 point Control. Ascending values from Point1 to point 8 |
| Speed PWM% / RPM | 2 - 8 point fan response corresponding to the control input. (No negative numbers allowed) |

## *Note*

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

# 10 *Alarm Configuration*

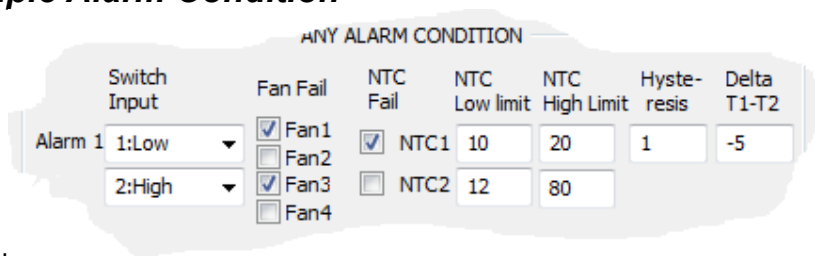



There are 4 standard alarm outputs and two optional additional on the TMS controller (*see Enable Power Relay PCB)*. In an event of specified conditions with the fan(s) and NTC(s) and switch input(s), there can be consequent pre-set action(s). These alarm conditions are configurable within this Tab and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

| 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:<br>Low Limit Alarm ï Alarm off when temperature exceeds the low limit alarm point by the hysteresis value<br>High Limit Alarm ï Alarm off 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 Power Relay PCB | Provides two additional alarm conditions and corresponding actions. This is optional and available if the Power Relay daughter board PCB is connected to the main controller board |

| Response | Description of operation |
|---|---|
| Relay State | Open ï Relay opens when alarm is triggered<br>Closed - Relay closes when alarm is triggered |
| Fan 1<br>Fan 2<br>Fan 3<br>Fan 4 | Fan defaults to the set parameter value |

## *Example Alarm Condition*




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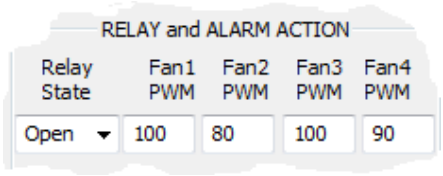
Alarm 1 will trigger if the controller senses any one of the following conditions:

- Switch input 1 experiences a Low signal (Switch input bridged 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 ï Alarm off when temperature exceeds 11°C
- NTC 2 falls below 12°C ï Alarm off when temperature exceeds 13°C
- NTC 1 exceeds 20°C ï Alarm off when temperature falls below 19°C
- NTC 2 exceeds 80°C ï Alarm off when temperature falls below 79°C
- The difference of temperature between NTC1 & 2 exceeds 5°C

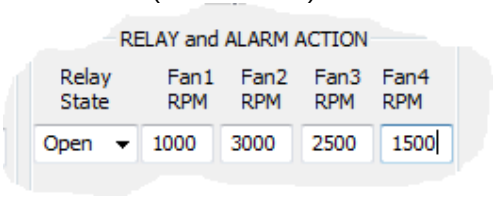
When the alarm state is triggered by one or more of the conditions, the alarm relay and each fan can be programmed to respond either by sending a PWM signal or specifying an RPMé

e.g

Fan Programmed by Open Loop PWM
(see section 6)



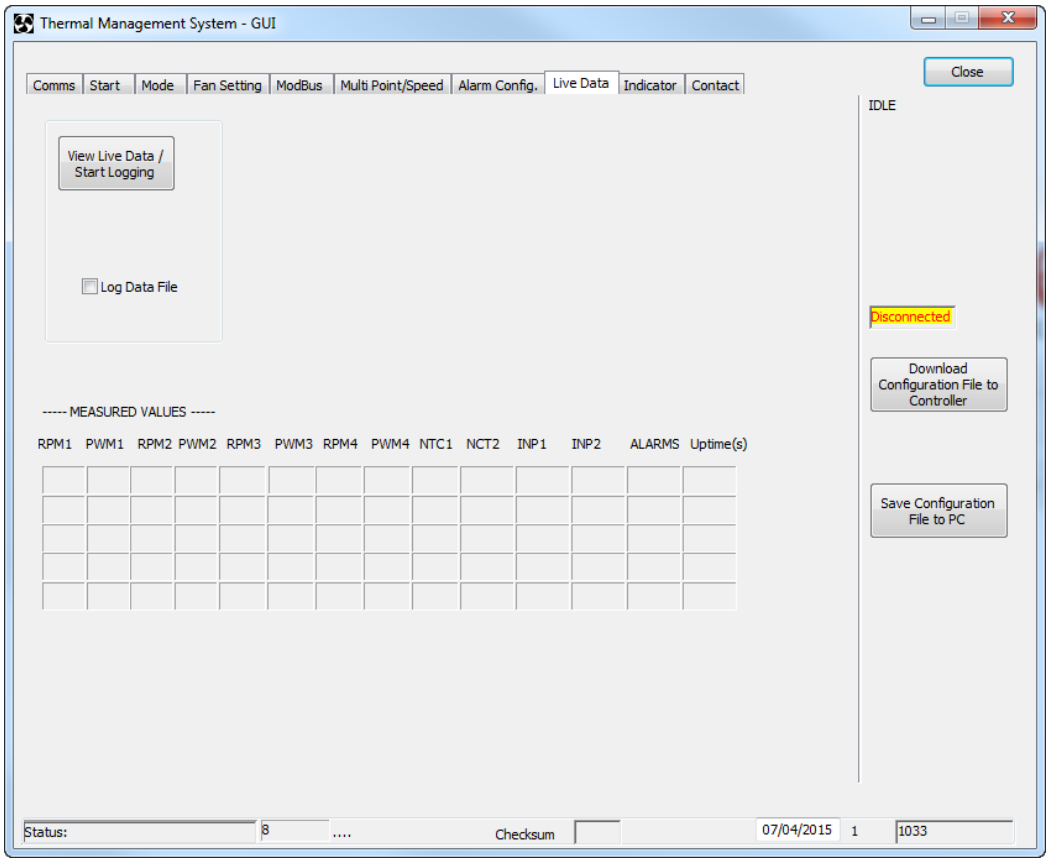

Fan programmed by RPM
(see section 6)




- Alarm Relay action (select Contacts Open for Alarm or Contacts Closed for Alarm)
- 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)

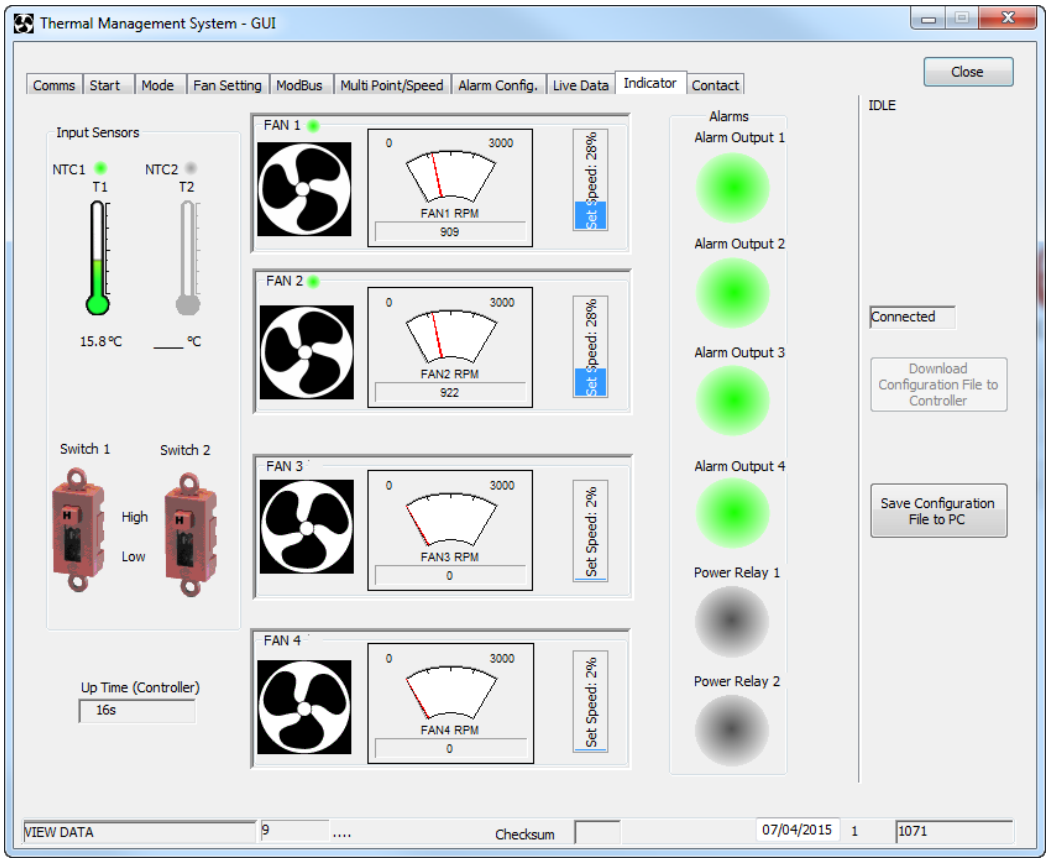
All these settings can be configured separately for alarms 1 ï 6.
Note ï Alarm 1 has highest priority, Alarm 2 next highest, etc. And the PWM/RPM can only be positive numbers.

## 11 Live Data



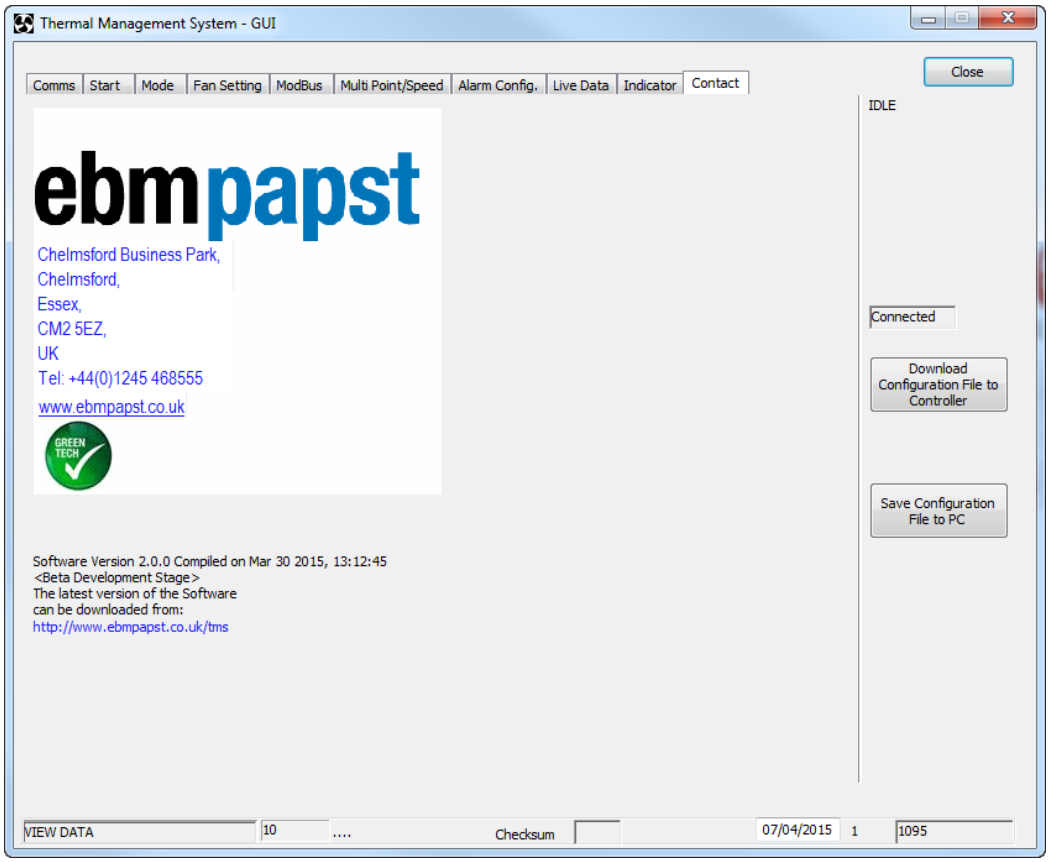

This tab is a tabular representation of all the measured values from the TMS Controller. When TMS is connected and running, use the ôView Live data/Start loggingô button to view the data coming from TMS. Logging this data is possible by checking the ôLog Data Fileô check box. It will prompt the user for the a file name and location.

## 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.