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SEM3T™ – Embedded Micro Monitoring Module for Thermal




User Guide

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usa.siemens.com/SEM3T

	NOTICE
	<p>The SEM3T thermal monitoring system offers a range of hardware options that affect input ratings. Use only parts and assemblies that are made specifically for use with the SEM3T system. Failure to do so could permanently damage the device. This document provides installation instructions applicable to each hardware option.</p>

	 DANGER	
	<p>Hazardous Voltage Will cause death or serious injury. Turn off and lock out all Power before working on this equipment.</p>	

SUMMARY

These instructions do not purport to cover all details or variations in equipment, nor to provide for every possible contingency to be met in connection with installation, operation, or maintenance. Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes, the matter should be referred to the local the sales office.

THE CONTENTS OF THIS USER MANUAL SHALL NOT BECOME PART OF OR MODIFY ANY PRIOR OR EXISTING AGREEMENT, COMMITMENT OR RELATIONSHIP. THE SALES CONTRACT CONTAINS ALL OBLIGATIONS OF SIEMENS INDUSTRY, INC. THE WARRANTY CONTAINED IN THE CONTRACT BETWEEN THE PARTIES IS THE SOLE WARRANTY OF SIEMENS INDUSTRY, INC.

The use of unauthorized parts in the repair of the equipment or tampering by unqualified personnel will result in dangerous conditions that can cause death, serious injury or property damage.

IMPORTANT

The information contained herein is general in nature and not intended for specific application purposes. It does not relieve the user of responsibility to use sound practices in application, installation, operation, and maintenance of the equipment purchased. Siemens reserves the right to make changes at any time without notice or obligations. Should a conflict arise between the general information contained in this publication and the contents of drawings or supplementary material or both, the latter shall take precedence.

Installation Requirement

A dielectric voltage withstand test is recommended after installation to validate wire insulation integrity, as directed by the applicable industry standards.

QUALIFIED PERSONNEL

For the purposes of this manual and product labels, "qualified personnel" is one who has skills and knowledge related to the construction and operation of the electrical equipment and installations and has received safety training to recognize and avoid the hazards involved. In addition, s/he has the following qualifications:

- (a) **is trained** and authorized to energize, de-energize, clear, ground, and tag circuits and equipment in accordance with established safety practices.
- (b) **is trained** in the proper care and use of protective gear equipment such as rubber gloves, hard hat, safety glasses or face shields, flash clothing, etc., in accordance with established safety procedures.
- (c) **is trained** in rendering first aid



Installation and maintenance of the SEM3T thermal monitoring system should only be performed by qualified, competent personnel that have appropriate training and experience with high voltage. The device must be installed in accordance with all local and national electrical codes.

FCC notice

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 Subpart B of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Standards Compliance

• Approvals and certifications

Accuracy

- Sensor Accuracy range °C / °F 40°C to 105°C (± 2°C) / 104°F to 221°F (± 4°F)

Safety/Construction

- CSA C22.2 No. 1010-1 Safety Requirements for Electrical Equipment for Measurement
- UL61010-1 (IEC 61010-1) Test and Measurement Equipment

Electromagnetic Compatibility

- Compliant with UL 61010-1, CAN/CSA-C22.2 No. 61010-1-12, IEC 61010-1: 2010
- Compliant with EMC standards IEC 61326-1, IEC 61326-2-3
- Compliant with FCC CFR47 Part 15 Subpart B:2018 Class B
- Compliant with IoT Security standard OWASP IoT Top 10-2018

Environmental Conditions

- Altitude up to 3000 meters
- Maximum relative humidity 80% for temperatures up to 31°C decreasing linearly to 50% relative humidity at 40°C
- Pollution Degree 3

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Introduction

This manual discusses features of the SEM3T Thermal Monitoring system and provides configuration instructions.

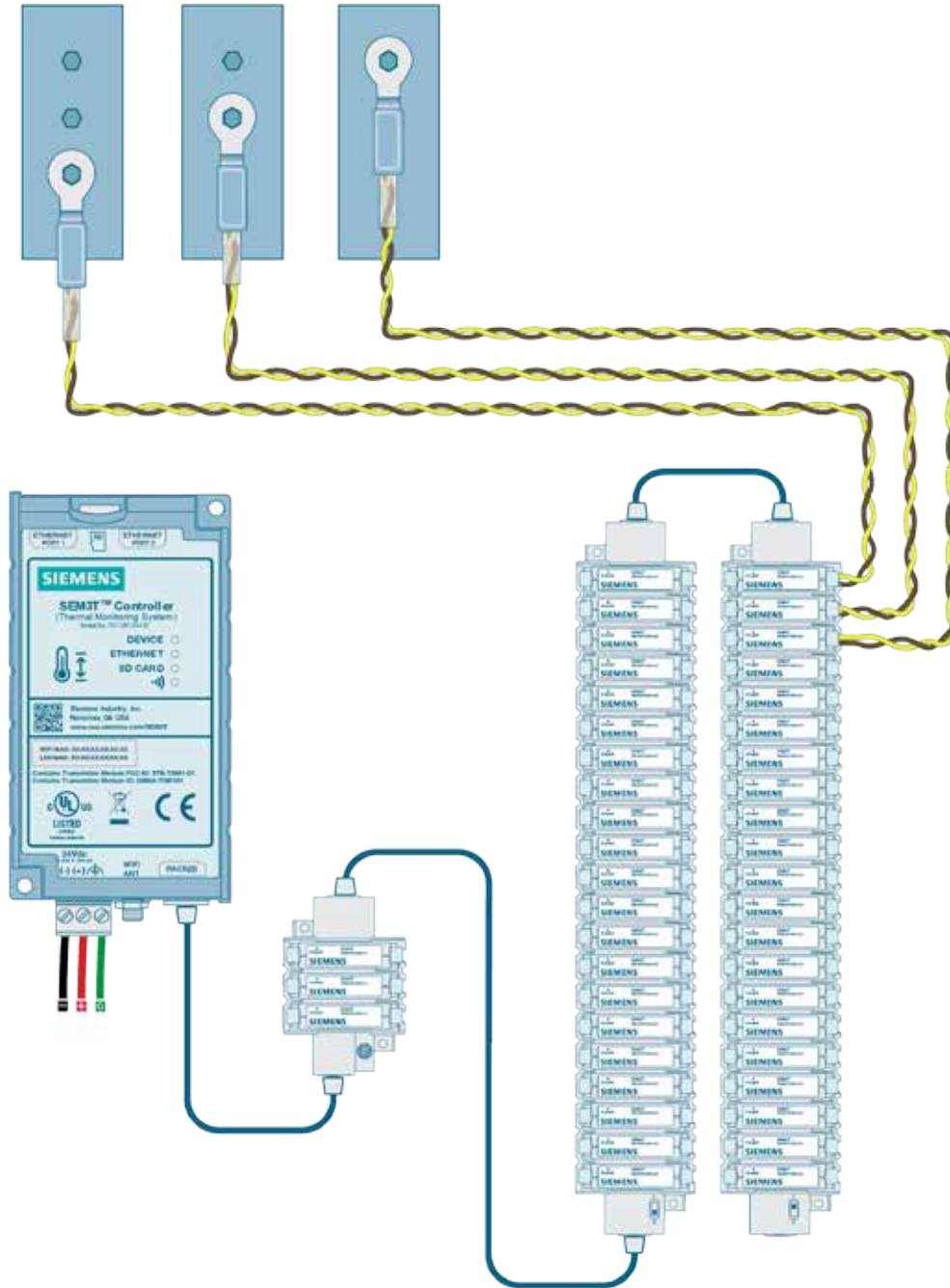
By the time you are ready to use this guide, your thermal system should be installed, most basic SEM3T setup should have been performed, and communications/basic operation should have been verified. If the unit is not yet installed and operational, refer to the SEM3T Install Guide available online at www.usa.siemens.com/SEM3T.

This chapter provides an overview of SEM3T Embedded Micro Monitoring Module for Thermal , and summarizes many of their key features.

SEM3T – Siemens Thermal Monitoring System

Siemens Thermal Monitoring System (SEM3T) is a modular thermal monitoring solution which can provide variety of features such as continuous monitoring, alarm/warning setpoint configuration, notifications, historical logging/ trending, and reporting of data through Modbus protocol. It is designed to be integrated into Siemens low voltage switchgear, power panels, and switchboard systems and can also be used for retrofit applications.

SEM3T System – Thermal Monitoring System



As shown in the image above, the SEM3T system consists of a controller powered by a 24V DC power supply (not shown), communication cable connecting the controller to rack with individual slots for modules to be inserted. Each module is independently wired to a dedicated sensor that is monitoring a specific joint or point of interest.

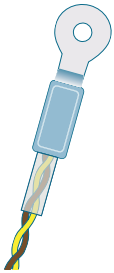
The modularity of the SEM3T system is evident from the design as each controller can talk to 1 – 45 Modules and can be suited to each customer's needs for monitoring requirements. Different sizes of rack assemblies are available to optimize the quantity and space requirements for the customer.

The SEM3T controller derives power from the external 24V DC power supply and provides necessary power to the modules (also known as thermal modules) to energize. The thermal modules are instrumental in energizing the dedicated sensor assembly. The sensors do not need additional power and do not require to be disturbed once installed in system. The following sub-sections briefly discuss the other SEM3T components followed by the specifics about the SEM3T controller.

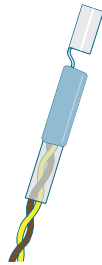
SEM3T System – Thermal Monitoring System

The SEM3T sensors designed specifically for the low voltage application (600V AC or lower) are thermal sensing components. When the sensors are energized, the integrated electronics generate a signal proportional to the temperature the sensor is exposed to. The sensors are designed with a standard length of 10 ft of trailing twisted pair wire. Additionally, a 40 ft of appropriate twisted pair wire type identified in the SEM3T Quick Install guide can be connected to the sensor wires through standard methods of extension to give a maximum length of 50 ft of sensor accessibility to the point of interest from the thermal modules. There are following different variants of the sensors that have been tested and acceptable to use in the SEM3T system.

Catalog Number	Description
7KT1281-2SA00	Sensor Assembly S-Ring 1/4" terminal
7KT1281-2SA01	Sensor Assembly S-Ring 5/16" terminal
7KT1281-2SA02	Sensor Assembly S-Ring 3/8" terminal
7KT1281-2SA03	Sensor Assembly S-Ring 1/2" terminal
7KT1281-2CA00	Sensor Assembly C-Ring cylindrical



SEM3T Sensor
(Ring terminal type)



SEM3T Sensor
(Cylindrical type)

SEM3T Modules

The SEM3T modules, also known as thermal modules, perform the calculation and translation of the signal generated by the sensor and convert into a human recognizable value in °C or in °F. The modules provide this information when queried by the controller to allow the aggregation of data in the controller. The following variant of module has been tested and acceptable to use in the SEM3T system.

Catalog Number	Description
7KT1281-1AA00	SEM3T Thermal Modules



SEM3T Module

SEM3 Racks

The SEM3T system reuses the SEM3 components such as the racks, din rail kit and cables. The following racks have been tested and acceptable to use in the SEM3T system.

Catalog Number	Description
US2:SEM3RACK3	SEM3 3 Position Rack
US2:SEM3RACK6	SEM3 6 Position Rack
US2:SEM3RACK9	SEM3 9 Position Rack
US2:SEM3RACK15	SEM3 15 Position Rack
US2:SEM3RACK21	SEM3 21 Position Rack



SEM3 3 Position Rack (example)

Racks – The module racks have the addresses for the module to controller communications hard coded into them. The 9, 15 and 21 module racks have a two position dip switch for setting one of two address ranges for each. The 3 and 6 module racks have a rotary switch to allow it to be configured for multiple address ranges. The tables on the next two pages show the ranges.

Module Internal Addresses – Dip and rotary switches on the racks are used to assign the unique addresses for the modules. Table 1 indicates rack addresses for Left setting on 9, 15 and 21 module racks and setting 0-7 on 3 module rack, 0-3 on 6 meter module rack. Table 2 indicates addresses for right setting on 9, 15, and 21 module racks and 8-F on 3 module rack, 4-7 on 6 module rack.

SEM3T System – Thermal Monitoring System

Thermal Module Internal Addresses

Dip and rotary switches on the racks are used to assign the unique addresses for the thermal module. Table 1 indicates rack addresses for Left setting on 9, 15 and 21 module racks and setting 0-7 on 3 meter module rack, 0-3 on 6 thermal module rack. Table 2 indicates addresses for right setting on 9, 15, and 21 module racks and 8-F on 3 meter module rack, 4-7 on 6 thermal module rack.

Table 1

Thermal Monitor Modbus Addresses	21 Position Rack Modbus Addresses	15 Position Rack Modbus Addresses	9 Position Rack Modbus Addresses	6 Position Rack Rotary Switch Setting	6 Position Rack Rotary Modbus Addresses	3 Position Rack Rotary Switch Setting	3 Position Rack Modbus Addresses			
1	1	1	1	0 (8)	1	0	1			
2	2	2	2		2		2			
3	3	3	3		3		3			
4	4	4	4		4					
5	5	5	5		5	1	5			
6	6	6	6		6		6			
7	7	7	7				7			
8	8	8	8							
9	9	9	9	1 (9)	9	2	9			
10	10	10	Open Address Space		10		10			
11	11	11			11		11			
12	12	12			12					
13	13	13			13	3	13			
14	14	14			14		14			
15	15	15					15			
16	16	Open Address Space			Open Address Space	2				
17	17						17	4	17	17
18	18			18			18			
19	19		19	19						
20	20									
21	21						21	21		
22	Open Address Space		Open Address Space	Open Address Space			22	5	22	
23								23		
24										
25		Open Address Space			Open Address Space	Open Address Space	3	25	6	25
26								26		26
27								27	27	
28								28		
29							29	7	29	
30						30	30			
31				31						
32										

SEM3T System – Thermal Monitoring System

Thermal Module Internal Addresses

Table 2

Thermal Monitor Modbus Addresses	21 Position Rack Modbus Addresses	15 Position Rack Modbus Addresses	9 Position Rack Modbus Addresses	6 Position Rack Rotary Switch Setting	6 Position Rack Rotary Modbus Addresses	3 Position Rack Rotary Switch Setting	3 Position Rack Modbus Addresses		
33	33	33	33	4	33	8	33		
34	34	34	34		34		34		
35	35	35	35		35		35		
36	36	36	46		36				
37	37	37	37		37	9	37		
38	38	38	38		38		38		
39	39	39	39				39		
40	40	40	40						
41	41	41	41	5	41	A	41		
42	42	42	Open Address Space		42		42		
43	43	43			43		43		
44	44	44			44				
45	45	45			45	B	45		
46	46	46			46		46	46	
47	47	47						47	
48	48	Open Address Space							
49	49		Open Address Space	Open Address Space	6	49	C	49	
50	50					50		50	50
51	51					51		51	51
52	52					52	52		
53	53					53	53	D	53
54		54				54	54		54
55							55		
56									
57	Open Address Space	Open Address Space	Open Address Space	7	57	E	57		
58					58		58		
59					59		59		
60					60				
61					61	F	61		
62					62		62	62	
63							63		

The 3 and 6 module rack can be used as an extension to any of the other racks or pairs of racks. Settings must be such that no address is used more than once. Duplication of addresses will return an error on setup and it could damage thermal module.

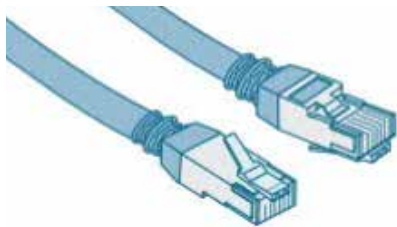
SEM3T System – Thermal Monitoring System

SEM3 Communication cables

The communication between racks and from controller to rack is achieved using the SEM3 communication cables. These are special designed 600V AC rated cables which have been tested and acceptable for the SEM3T system with the following part numbers.

SEM3 Communication Cable Variants

Catalog Number	Description
US2:SEM3CAB6INCH	SEM3 Comm. Cable 6 Inch length
US2:SEM3CAB12INCH	SEM3 Comm. Cable 12 Inch length
US2:SEM3CAB24INCH	SEM3 Comm. Cable 24 Inch length
US2:SEM3CAB36INCH	SEM3 Comm. Cable 36 Inch length
US2:SEM3CAB5FT	SEM3 Comm. Cable 5 ft
US2:SEM3CAB10FT	SEM3 Comm. Cable 10 ft
US2:SEM3CAB20FT	SEM3 Comm. Cable 20 ft



SEM3 Communication cable (example)

NOTE:

Communication cable length for any network should be limited as listed below:

- Total communication cable length from Controller to end of “daisy chained” thermal module run NOT TO EXCEED 160 FEET.

SEM3T Controller

The SEM3T controller can be considered as the central collector for aggregating data from each of the connected modules and provides a gateway for the collected data to be displayed and distributed to external devices/ software.

There are two variants of the SEM3T controller that are available.

Catalog Number	Description
7KT1281-0AA00	SEM3T Controller without Wi-Fi
7KT1281-0AA10	SEM3T Controller with Wi-Fi includes Antenna and Cable

SEM3T Controller Variants



SEM3T without Wi-Fi

SEM3T with Wi-Fi

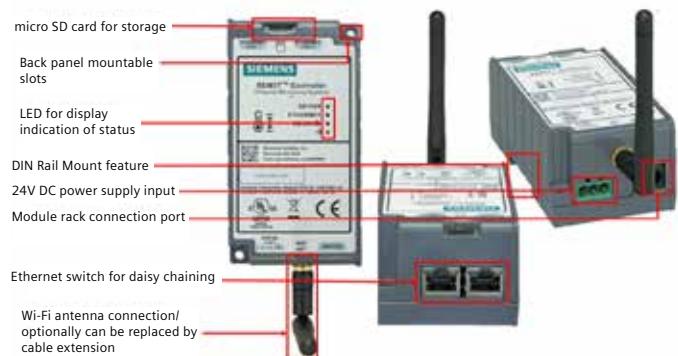
As necessary the features of the SEM3T controller are tailored based on the presence or absence of the Wi-Fi component. Throughout this document, the SEM3T controller features will be described with the Wi-Fi component included. Subtle differences in the feature set will be identified when the non-Wi-Fi controller is being used.

Overview

The SEM3T controller external facing features are identified in the figure below. The controller provides a microSD card slot and comes with a microSD card to be used during the operation for storage of information such as logs. The controller can be mounted to a panel through provided slots. Additional hardware is identified in the SEM3T Quick Install Guide. It is assumed the user follows all installation instructions as provided in the Quick Install Guide that gets shipped with the controller. The controller can also be din rail mounted with provided feature. There are display LED for indication of status on the top face of the controller. The 24V DC power supply input is provided in form of a terminal block for easy assembly. The description regarding the power supply input is listed in the SEM3T Install Guide. The controller provides one rack connection port and additional racks can be daisy chained to the first rack. The controller also provides an Ethernet switch to allow daisy chaining of controller to other controllers or additional networking devices.

The Wi-Fi variant provides the connector for a Wi-Fi antenna connection, optionally a cable extension and antenna can be connected on the slot for mounting the antenna separate from the controller.

In the non-Wi-Fi variant, the antenna connector, the FCC ID and the labels are appropriately removed. The antenna connector slot is replaced by a low-profile rubber plug.



Overview of SEM3T controller features

SEM3T System – Thermal Monitoring System

DC Input Power Supply

The input power supply to the SEM3T controller is +24.0 VDC \pm 10% input, 300mA min through a 3 position terminal block header. There are two power supplies that have been tested and considered as acceptable with the SEM3T system. Both the power supplies require external hardware (wires) to connect the output to the SEM3T controller and the input from source.

Recommended 24V DC Power supplies

Vendor	Part Number
Delta's Chrome Power Supply	DRC-24V100W1AZ
Siemens Logo! Power Supply	6EP33326SB000AY0



Delta's Chrome
Rail Power Supply



Siemens Logo!
Power Supply

SEM3T Antenna Extension kit

The SEM3T controller with Wi-Fi packaging contains an antenna extension kit. If necessary, this kit can be purchased separately. The antenna extension kit consists of a 3 meter long cable and antenna. The following part number has been assigned to this kit.

SEM3T Antenna Kit

Catalog Number	Description
7KT1281-8AN00	Antenna Kit

Further because of the adoption of the FCC ID from the Wi-Fi module vendor, only the following material and parts can be used as part of this kit.

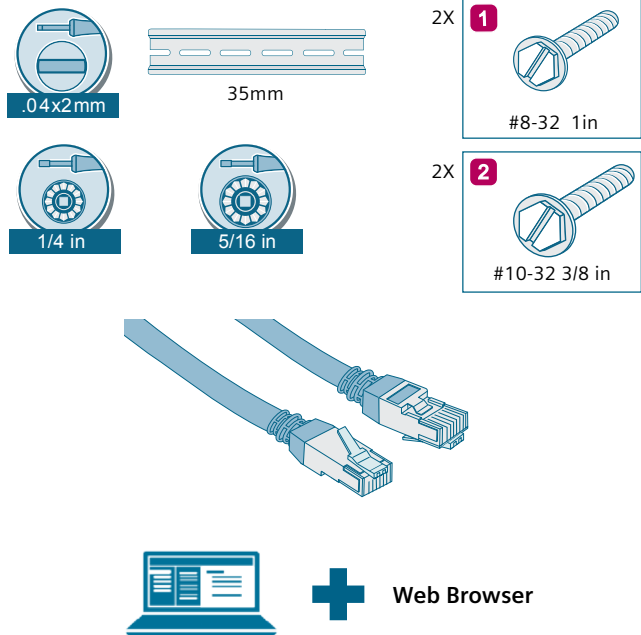
Part Number	Description
001-001	Antenna, LS Research 2.4 – 2.5 GHz Dipole 2dBi, for reverse polarity SMA.
TL-ANT24EC3S	3 Meter Cable, TP-Link or equivalent. 3 Ghz, RP-SMA Male to Female connector.



SEM3T Antenna Kit LED indication

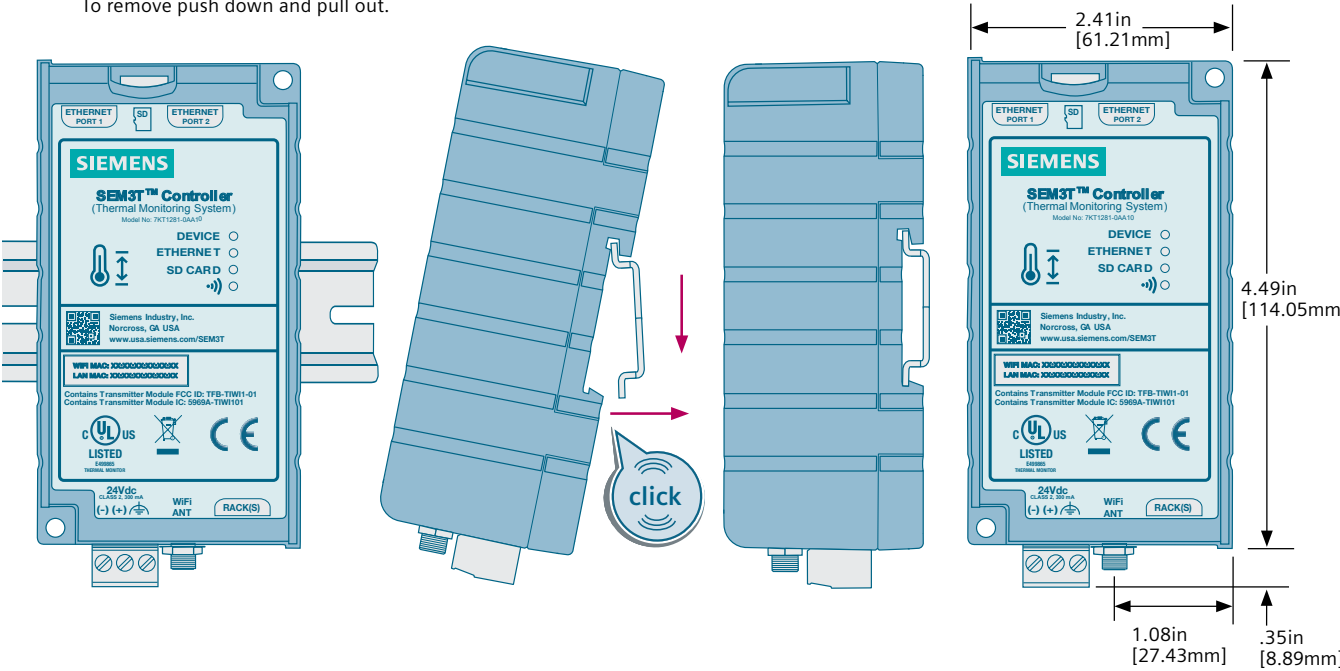
SEM3T Installation

Required tools / Notwendige Werkzeuge / Outils nécessaires / Herramientas requeridas / 必要工具



Assembly / Montage / Montage / Montaje / 安装

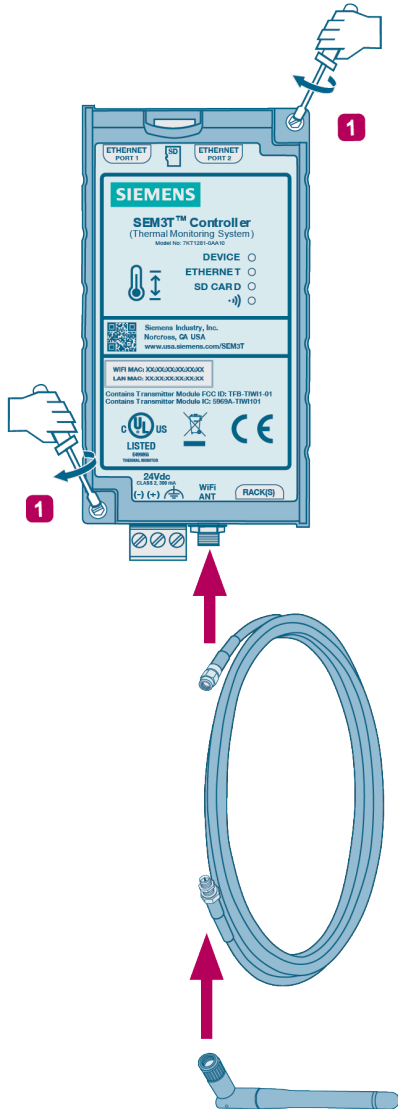
DIN rail: To mount push down and in.
To remove push down and pull out.



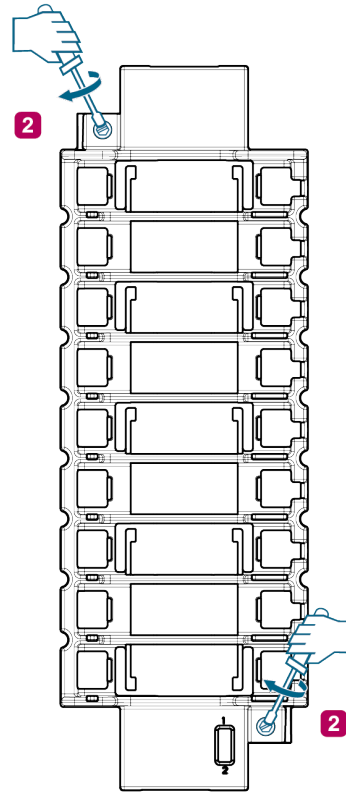
SEM3T Installation



Assembly / Montage / Montage / Montaje / 安装



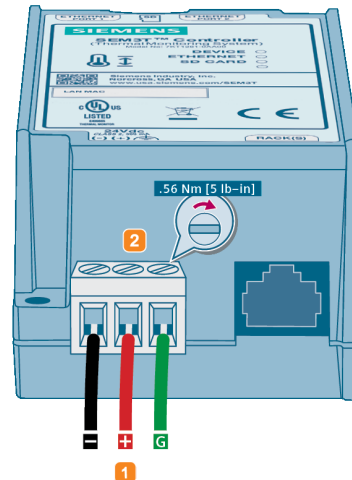
Screw mounted



Connection / Anschluss / Raccordement / Conexión / 连接



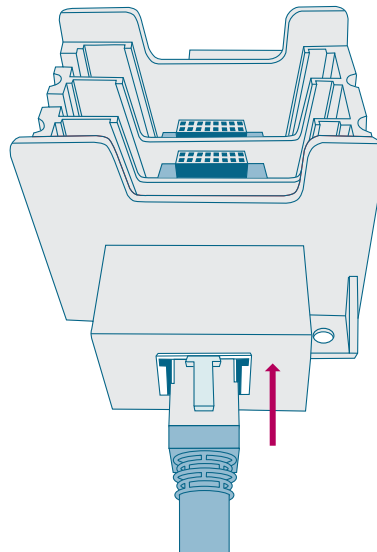
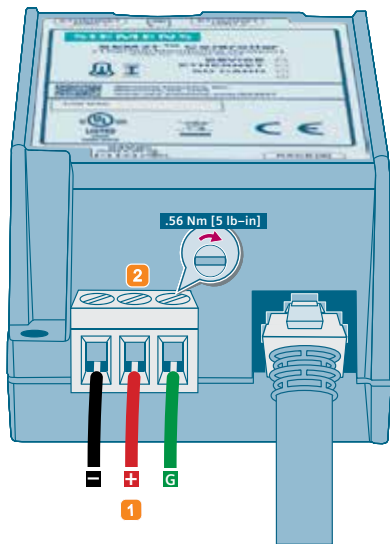
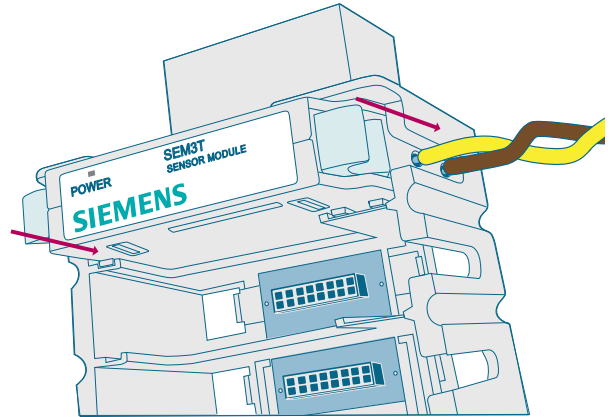
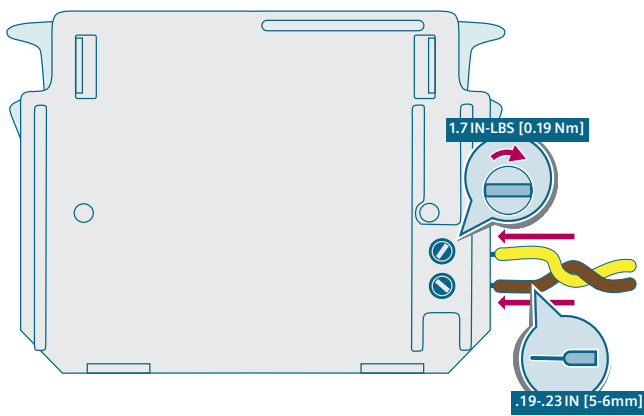
	IN-LBS [Nm]	mm ²	AWG
24 V DC power supply leads	5 [.56]	.50 to 2.50	22 to 14
Thermal Sensor Leads	1.7 [.19]	0.75	18



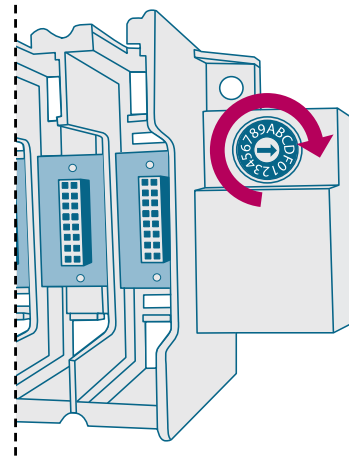
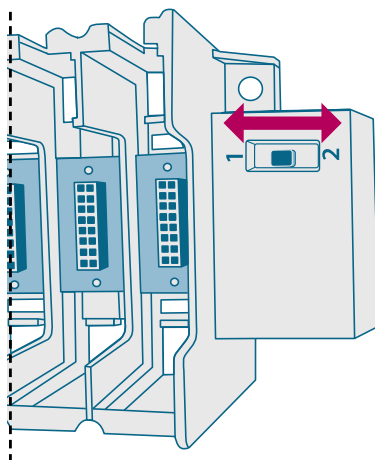
SEM3T Installation



Connection / Anschluss / Raccordement / Conexión / 连接



Rack address options / Rack-Adressenoptionen / Options d'adresses de baie / Opciones de dirección del bastidor / 机架位置选项

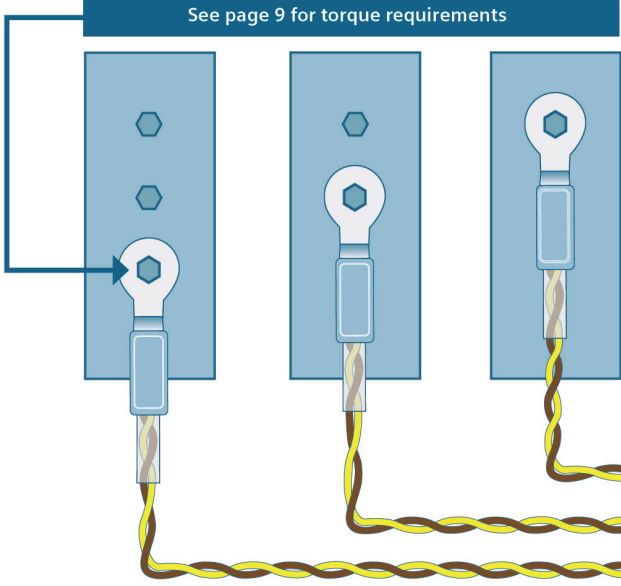


Note: Refer to SEM3T user manual for DIP/Rotary switch configuration details.

SEM3T Installation

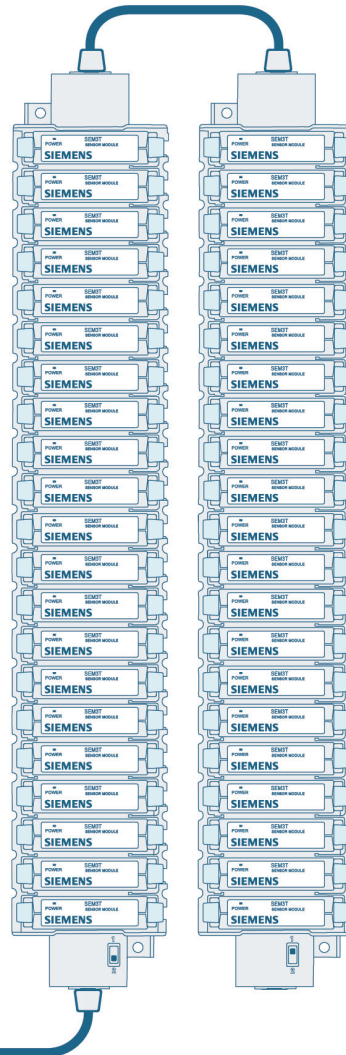
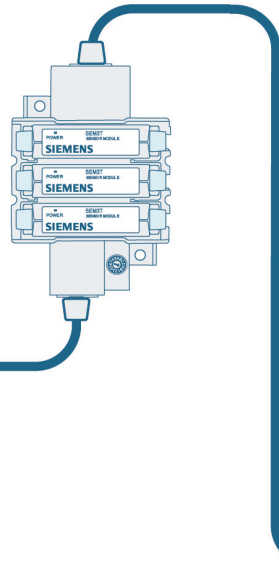
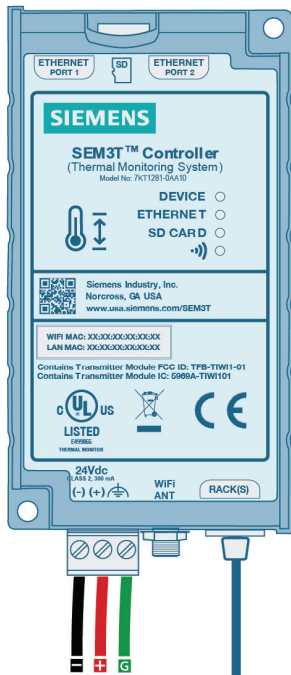
System / Sistema / Système / 系统

See page 9 for torque requirements



EN **⚠ DANGER**

Arc flash hazard. Will cause death or serious injury.
Align the SEM3T sensors and leads to maintain proper over-surface and through-air clearance requirements as directed by the application standards.
A dielectric voltage withstand test is recommended after installation to validate wire insulation integrity, as directed by the applicable industry standards.



SEM3T System – Thermal Monitoring System

LED indication

There are 4 LED in both variant of the SEM3T controller. In the non-Wi-Fi variant the functionality related to the Wi-Fi capability are not implemented. The following table identifies the LED indication capability.

LED Color	Description	State
Device Green	Device powered and communicating with modules	Green blinking at 500 ms On/Off rate
	Firmware upgrade in progress	Green solid till firmware upgrade process is complete
	In-Circuit Diagnostic Test in progress	Green solid till In-circuit Diagnostic Test is complete
	Firmware upgrade failure	Green blink for 5 seconds
	Crypto chip image verification failure	Green solid
Ethernet Green	Modbus TCP connection is active	Green Solid till connection is closed
	Device boot up is in progress and load firmware image to eMMC during initial boot	Green - Alternate flashing with Wireless (Green) until device boot process is complete (500ms On/Off)
	In-Circuit Diagnostic Test in progress	Green solid till In-circuit Diagnostic Test is complete
	Crypto chip image verification failure	Green Solid
	Crypto chip I2C communication failure	Green Solid
microSD Card (Red)	Every Webpage access/request	Red solid for the time taken to load all webpage files for requested page
	Firmware upgrade in progress	Red solid till firmware upgrade process is complete
	Device boot up is in progress and load firmware image to eMMC during initial boot	Red solid till firmware image load to eMMC is complete
	No microSD card present	Red blink (1000 ms On/Off)
	Failed to load firmware image to eMMC during initial boot	Red blink (500 ms On/Off)
	In-Circuit Diagnostic Test in progress	Red solid till In-circuit Diagnostic Test is complete
	Firmware upgrade failure	Red blink for 5 seconds
	Crypto chip I2C communication failure	Red Solid
Blank/Wireless Symbol (*) (Green and Red)	Wi-Fi enabled access point/ Bluetooth not enabled (*)	Green Blink (1000 ms On/Off)
	Wi-Fi enabled client mode/ Bluetooth not enabled (*)	Green Blink (500 ms On/Off)
	Wi-Fi enabled client mode and connected to a Wi-Fi router/ Bluetooth not enabled (*)	Green Solid
	Bluetooth enabled/ Wi-Fi not enabled (*)	Red Solid
	Wi-Fi enabled access point and Bluetooth enabled (*)	Orange (red and green) Blink (1000 ms On/Off)
	Wi-Fi enabled client mode and Bluetooth enabled (*)	Orange (red and green) Blink (500 ms On/Off)
	Wi-Fi enabled client mode and connected to a Wi-Fi router and Bluetooth enabled (*)	Orange (red and green) solid
	Device boot up is in progress and load firmware image to eMMC during initial boot	Green - Alternate flashing with TCP/IP (Green) until device boot process is complete (500ms On/Off)
	In-Circuit Diagnostic Test in progress	Red/Green - Alternate flashing (500ms pulse On/Off)
	Crypto chip image verification failure	Red Solid
	Crypto chip I2C communication failure	Red Solid

Note (*) – only applicable to the SEM3T controller with Wi-Fi variant

SEM3T System – Thermal Monitoring System

microSD card support

The controller provides a microSD card slot and comes with a microSD card to be used during the operation for storage of information such as logs. The standard part is shipped out of factory with an 8 GB microSD card. The microSD card interface can support microSD cards with up to 128 GB storage capacity and class 10 speed grade. The following microSD cards are acceptable to use with the SEM3T controller and one of the two acceptable part is shipped with the device from factory. The microSD card is already inserted into the card slot, so no further action is needed from the customer.

Acceptable microSD card parts

Vendor	Part Number
SanDisk	SDSDQAF3-008G-I
Kingston	SDCIT/8GBSP

During normal operation of SEM3T, the user should not remove the microSD card when the system is powered. The access to microSD card is acceptable only when the system is powered down.

The microSD card stores the data logs, debug logs, database and alarm logs. Data on the microSD card is stored in an encrypted format to prevent unauthorized usage. The application will not start, if there is no SD card present the controller. Storage SD card has only one (data) partition and it does not contain any firmware files.

For the SEM3T controller (in powered down state)

1. If a user removes a microSD card and powers up the controller with no microSD card, the controller application will not start and the microSD card LED blinks with RED color for 1 sec ON/OFF rate as detailed in the LED table.
2. If a user removes a microSD card and inserts another microSD card with existing data (unrelated to SEM3T), the controller application will format the microSD card and create a correct encrypted partition and populate with a default database.
3. If a user removes a microSD card from one controller and replaces it with another microSD card from another SEM3T controller, the default database will not be recreated, the controller will use the alternate controller's database as retrieved from the microSD card inserted. Only the serial number is retained, all other configuration will be inherited from the alternate controller's database.

Prior to swapping of the microSD card, the customer must follow the following steps to retain specific configuration data:

1. SEM3T controller (w. or w/o Wi-Fi) is powered ON and functional (normal function).

2. User navigates to the Tools > Import/Export config page and Clicks on "Export Configuration" button to export and saves a configuration file "export.json".
3. User disconnects power to SEM3T controller.
4. User actively removes Storage microSD card from slot.
5. User inserts a Blank Storage microSD card of 8GB or higher memory (128GB or less memory) in slot.
6. User connects power to SEM3T controller.
7. After normal booting process, User logs in to the Controller and navigates to the Tools > Import/Export config page and Clicks on "Import Configuration" button to import the saved configuration "export.json".

If the above steps are not followed carefully, the existing configuration database from the previous microSD card will not be retained in the new microSD card. A default database will be created. The serial number and MAC addresses will be retained on swapping the previous microSD card with an empty microSD card.

Ethernet Switch

The SEM3T Controller comes equipped with 2 RJ45 Ethernet ports that can function as an Ethernet switch. In a situation where multiple controllers are configured in a system, the second Ethernet port can be used to connect the devices in a ring or line network topology for example. When connecting several controllers together in daisy chain application, the user should take care to change the IP addresses on the controllers to ensure no network collisions occur. Properly configured, the switch will allow the user to update the firmware of any uniquely identified controller connected using just the embedded webpages.

Both Ethernet ports support 10/100 Mbps link connections through the physical RJ45 connectors. The two ports have a single MAC but two separate PHY. The LAN MAC address is same for both Ethernet ports.

Max. Module connections

The SEM3T controller and its power supply is tested to be able to support a total of 45 modules. Since each module is individually connected to a single sensor, the SEM3T controller can accommodate a maximum of 45 different temperature measurement points.

Modbus Protocol

The device supports Modbus TCP protocol in server mode to provide requested information to clients on network. A maximum of 5 Modbus TCP client connections (irrespective of the webpage connection) can access the SEM3T controller simultaneously. The port 502 is used for the communication in this protocol.

SEM3T System – Thermal Monitoring System

Embedded Web Pages

Embedded within the controller are webpages that allow the user to interface with the data being collected by the modules. The user can reach the webpages by accessing the embedded webserver using the Ethernet port. Many of the webpages allow the user to create or change various configurations of the controller including alarm setpoints, network settings, firmware upgrades, and data logs. Each webpage also has a help dialogue box to explain the use of the features of each page.

Location of Web Pages

Unlike other versions of Siemens embedded devices, the webpages are stored locally on the non-volatile memory within the device and they get updated along with the firmware package. The webpages are not stored in the microSD card.

User access levels

The SEM3T webpages have three distinct user access levels.

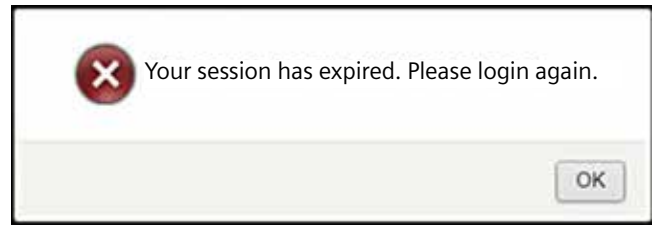
User Access Level Summary

User Access Level	Settings
Supervisor	This user access has the highest administrative properties for the webpages. The Supervisor level has unrestricted access to every page and function necessary to run and configure the controller. This level can create other user access as well as delete other user accesses except itself. Some key highlights are view and configure all configurable parameters, all logs, dashboards, upgrade firmware, and can import/export a configuration file.
Controller	This user access level has limited rights on the web pages to view the information displayed. The system configuration page is not available for this user. The controller user access can clear active alarms on Realtime page. The controller can also view the dashboards. The Controller level can login, view the About page, view the real time page, view, print, and download the System Event log, modify data on the User profile page, view the Module Serial Numbers page, and can export a configuration file.
Observer	The observer has all the same rights as the Controller but cannot clear alarm flags.

The webpage sections following are defined as they are viewable for a Supervisor user access level. The relevant sections where additional user access levels are involved are highlighted within that section.

User inactivity state

If the SEM3T webpages are unmodified for 15 minutes, they system will logout the current user of the webpages when the next activity of navigation is initiated.



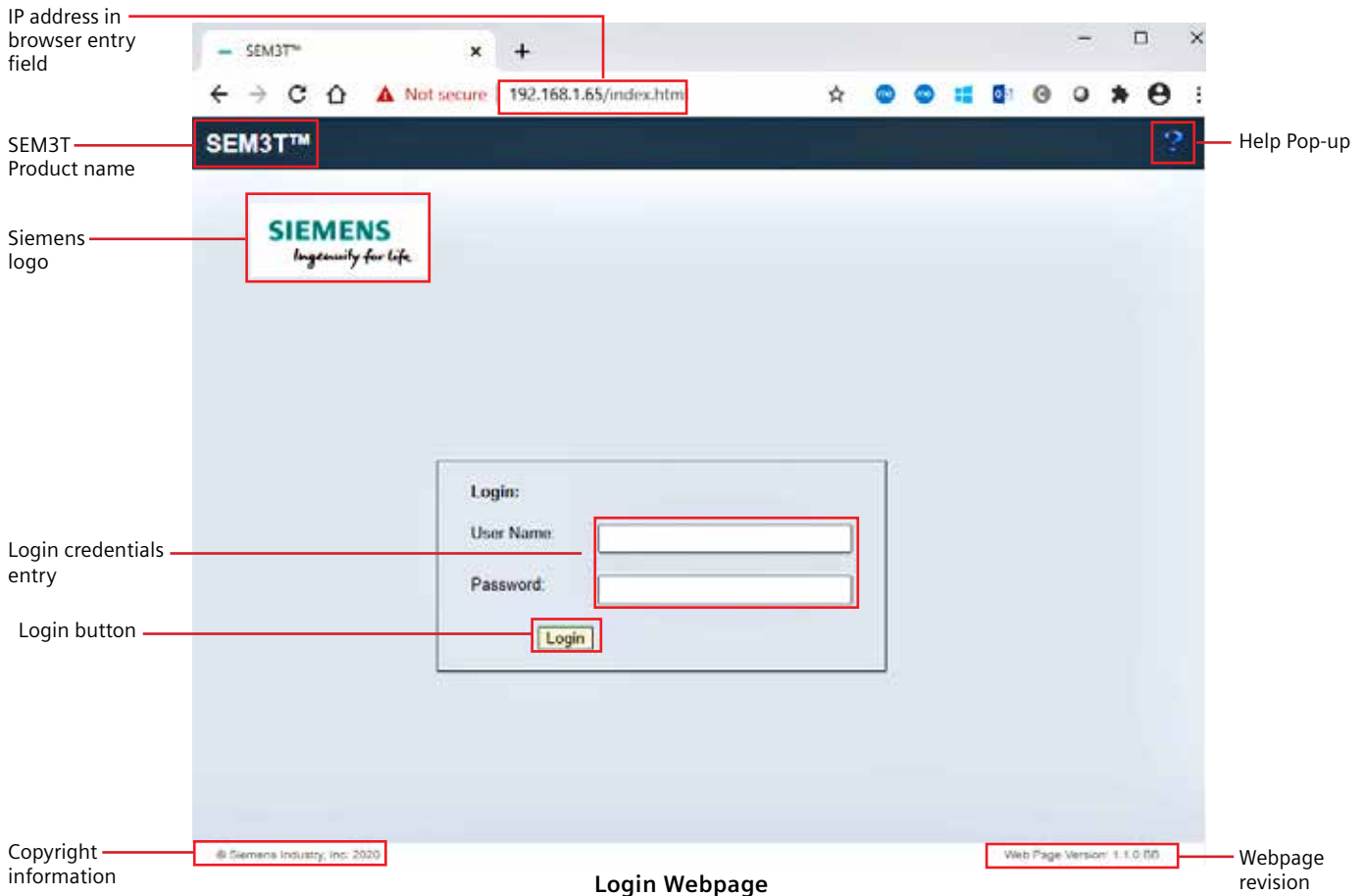
User Inactivity – Session expiration

In case when configuration data are in process of being saved, and the user delays the saving of the data beyond the inactivity period, upon saving of the settings, it may result in an error. The system may respond with message "JSON parse failed". The user needs to logout of the system and re-login again.

SEM3T System – Thermal Monitoring System

Login Page

The login page of the SEM3T controller webpage is accessed by entering the IP address of the product in the browser input field. For the first login, the IP address will be 192.168.1.65 otherwise, the IP address can be discovered through standard discovery means.



Login Webpage

The login page shows, the Product name in the top of the page, Help link defined by a question mark (?) on the top right corner, Siemens "Ingenuity for Life" logo, Login user name and password to be entered by the user in the provided fields.

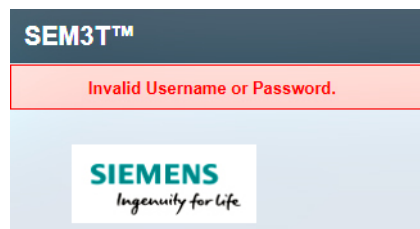
Default admin login information are defined as

Username: admin

Password: sem3

Login is completed by clicking on the Login button. The Login page also lists the webpage version in the bottom right corner and the Siemens Industry Inc. copyright information is listed in the bottom left corner. If invalid credentials are input, the page will display an error message at the top of the screen.

If invalid credentials are entered, the page will display an error message at the top of the screen.



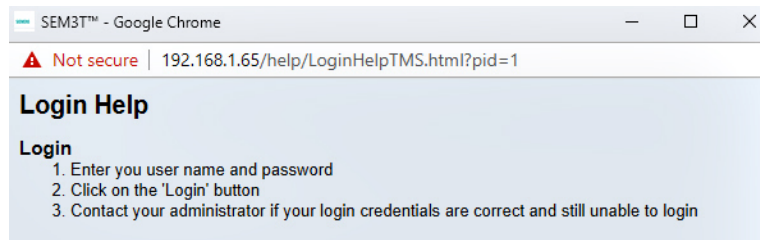
Incorrect Login

After successful login, the real time page is the landing page of the SEM3T controller webpages.

SEM3T System – Thermal Monitoring System

Login Help Page

The Login Help Page has information about usage of the Login page.



Login Help Page

Note:

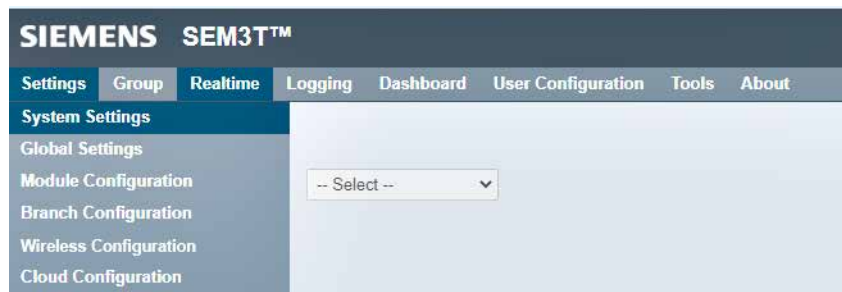
User shall install signed certificate for web page security

Navigation sub menus

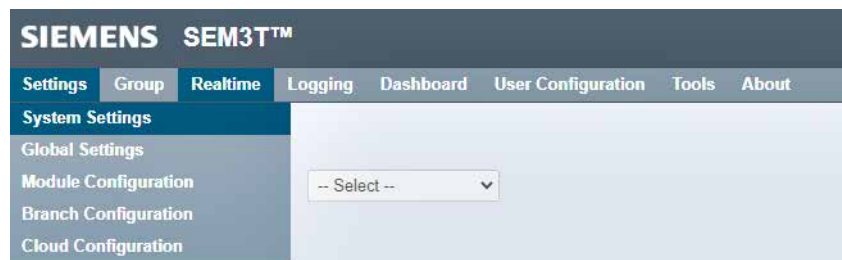
There are several navigation sub-menus in the main navigation menu.

Settings Sub-Menu

The Settings sub-menu helps the user to navigate between System Settings, Global Settings, Module Configuration, Branch Configuration, Wireless Configuration and Cloud configuration. In case of non-Wi-Fi controller, the Wireless Configuration sub menu is not available.



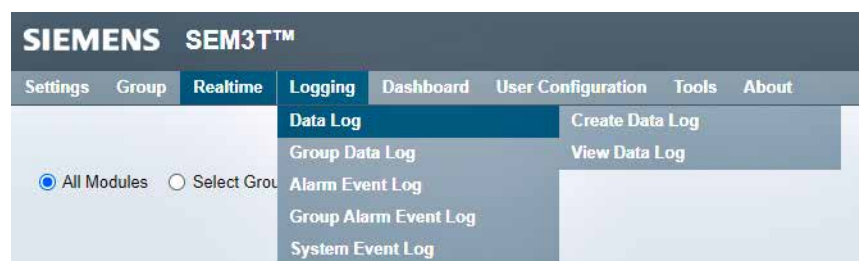
Settings Sub-menu (Wi-Fi)



Settings Sub-menu (non Wi-Fi)

Logging Sub-Menu

The Logging sub-menu helps the user to navigate between data logs, group data logs, alarm event logs, group alarm event logs and system event log. Further the Data log has another sub-sectional menu for creating data logs and viewing data logs.



Logging - Data Log sub-menu

SEM3T System – Thermal Monitoring System

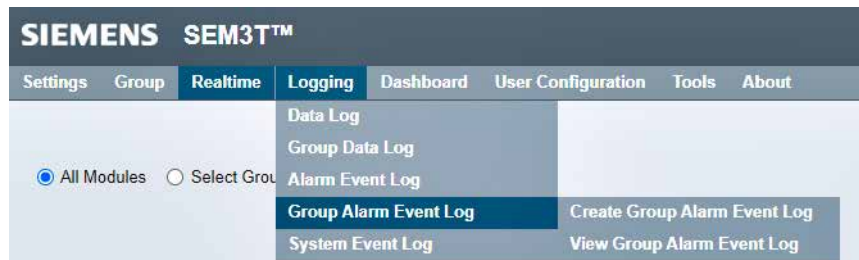
Similar sub-sectional menus are available for Group Data Log, Alarm Event Log and Group Alarm Event Log.



Logging - Group Data Log sub-menu



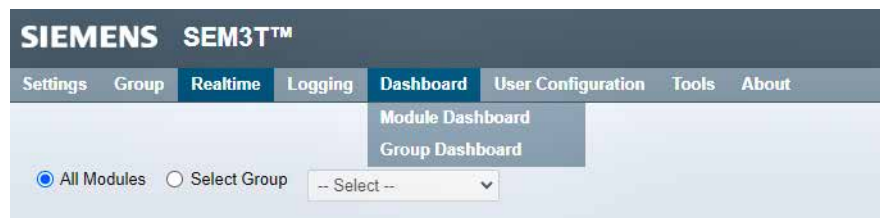
Logging - Alarm Event Log sub-menu



Logging - Group Alarm Event Log sub-menu

Dashboard Sub-Menu

The Dashboard sub-menu helps the user to navigate to the Module Dashboard and the group module dashboard webpages.

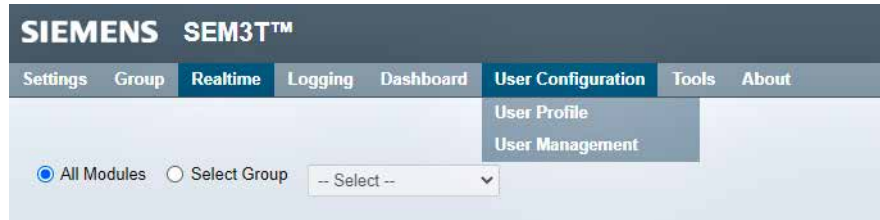


Dashboard sub-menu

SEM3T System – Thermal Monitoring System

User configuration Sub-Menu

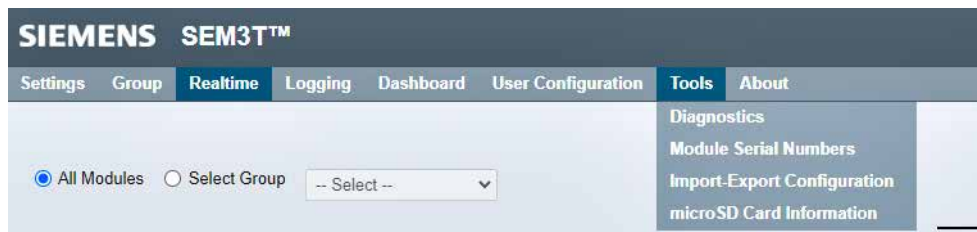
The user configuration sub-menu helps the user navigate between the user profile and the user management sub-menus.



User configuration sub-menu

Tools Sub-Menu

The tools sub-menu helps the user to navigate between diagnostics webpage, serial numbers of communicating modules, import and export of configuration information, and microSD card information.



Tools sub-menu

All the sub-menus are translatable when the user selects the separate language to review the webpages in German, Spanish or French apart from English.

SEM3T System – Thermal Monitoring System

System Settings Configuration

The System Setting page allows the user to configure various system wide settings like IP addresses, temperature units, date format etc. Changes made on this page will be reflected in the System Event Log. As shown in the sub-menu navigation section, the System Settings is navigated from the Settings navigation menu.

First time setup/Initial Commissioning

The default mode for SEM3T controller is configured in static IP mode. Further the default IP address set for the SEM3T controller from factory is 192.168.1.65. This can be modified in the System settings page.

Note: When configuring more than one SEM3T controller the user shall clear browser cache between controllers.

When the system is first time setup in field/ during initial commissioning, the following configurations are required.

- a. Set correct IP configuration mode (DHCP/Static).
- b. Set correct IP address (if in Static IP mode) to match respective network needs.

Set correct Device Description

- d. Set correct Time to match local time or NTP server (where applicable).
- e. Set correct Module configuration (in separate Module Configuration page)
- f. Set correct Global Settings for setpoints, warnings etc.

Following steps are recommended for advanced users or users with specific individual needs from the SEM3T controller.

- g. Set correct email configuration.
- h. Set correct Wireless network configuration (for SEM3T with Wi-Fi variant only)
- i. Set correct Cloud configuration to access data remotely through a previously configured cloud service.
- j. Set correct user configuration (for assigning separate Supervisor, Controller and Observer user access levels).
- k. Set correct Groups/Logs etc. based on individual needs.

The screenshot shows the SEM3T System Settings interface. The top navigation bar includes 'Settings', 'Group', 'Realtime', 'Logging', 'Dashboard', 'User Configuration', 'Tools', and 'About'. A 'Logout' button and a language dropdown set to 'English' are in the top right. The main content area is divided into several sections:

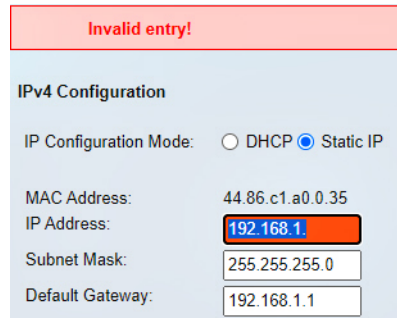
- IPv4 Configuration:** Includes fields for IP Configuration Mode (DHCP/Static), MAC Address, IP Address (192.168.1.65), Subnet Mask (255.255.255.0), and Default Gateway (192.168.1.1).
- IPv6 Configuration:** Includes fields for IP Configuration Mode (DHCP/Static), IP Address (2001:db8:0:1::3), Prefix Length (64), and Default Gateway (2001:db8:9000:0001:0000:0000:0000:0002).
- Web Settings:** Includes 'Realtime refresh interval' (10 seconds) and 'Decimal accuracy' (2).
- System Information:** Displays Firmware Version (1.1.8.BB), Serial No. (AE4W632P6100011523), Device Description (SEM3T_Demo), Offline Configuration Support (3.5), Bootloader Version (U-Boot 2017.01), and Webpage Version (1.1.0.BB).
- Debug Log Configuration:** Includes a 'Log Configuration' dropdown set to 'DEBUG'.
- Temperature Unit:** Includes a 'Unit' dropdown with radio buttons for Celsius and Fahrenheit (selected).
- Email Configuration:** Includes fields for SMTP Server Name, SMTP Port (None), User Name, and Password.
- Systems Time Setup:** Includes 'Synchronize with NTP server?' (Yes/No), Date (09/17/2023), Time (11:25:26), Time Zone ((GMT -5:00) Eastern Time (US & Canada) Bogota, Lima), and Date Format (MM.DD.YYYY).

At the bottom, there are 'Save' and 'Reset' buttons. Red lines and labels point to various elements: 'Help pop-up' (top left), 'Logout' (top right), 'Translations' (English dropdown), 'Web settings configuration' (Web Settings section), 'System information' (System Information section), 'Debug log configuration' (Debug Log Configuration section), 'Temperature unit configuration' (Temperature Unit section), 'Email configuration' (Email Configuration section), 'System time configuration' (Systems Time Setup section), and 'Save and reset button' (bottom).

SEM3T System – Thermal Monitoring System

The following sub-sections describe the individual components available for configuration on the System Settings page.

- a. IP Configuration – The user can set the static IPv4 and IPv6 addresses, as well as configure either in DHCP mode or static IP mode. The user should take care when changing these settings as the webpages could become inaccessible or could cause network collisions. If the entries in these fields are not properly formatted or left blank, the page will display an error at the top of the screen and highlight the incorrect fields.



Invalid entry!

IPv4 Configuration

IP Configuration Mode: DHCP Static IP

MAC Address: 44.86.c1.a0.0.35

IP Address: **192.168.1**

Subnet Mask: 255.255.255.0

Default Gateway: 192.168.1.1

Incorrect Entry for IP configuration

In static IP mode, the user may continue to use the IPv4 or the IPv6 addresses to access the SEM3T controller embedded webpages.

When the IP assignment mode is changed to DHCP the selection for the IP address, subnet mask and default gateway are not available to modify. Further when the user clicks "Save" (with selection to DHCP mode), the application shall wait for ~10 seconds (on each reboot as well) to get a valid IP address from the DHCP server (router). If it gets a valid IP address, it will assign the same and save this new IP address in the database. If the IP address is not set by the DHCP server within 10 seconds, the default IP parameters will be set to the controller. The same functionality will be applied for the IPv6 functionality.

Once the DHCP selection is made, IP configuration Mode will remain DHCP even after default IP parameters are configured by the controller because of delay in IP address assignment from the DHCP server/router. The device can be power cycled to allow additional attempt by the DHCP server/router to assign correct IP address. Further when the DHCP server does assign new IP parameters, they will be assigned to the controller.

Default IPv4 Parameters :

IP address: 192.168.1.65

Subnet Mask: 255.255.255.0

Default gateway: 192.168.1.1

Default IPv6 Parameters :

IP address: 2001:db8:0:1::3

Prefix Length: 64

Default gateway: 2001:db8:0:1::2

SEM3T System – Thermal Monitoring System

In DHCP mode, the user must identify the IP address of the SEM3T controller prior to accessing the webpages. The user can use an IP scanner utility such as Advance IP scanner utility to scan on a Windows machine for connected devices when the Windows machine is in the same network as the connected SEM3T controller in DHCP mode. The user can use its own Windows machine IP address to identify the range of IP address to scan using the utility.

- b. Email Configuration – The SEM3T controller can send automated emails using Simple Mail Transfer Protocol (SMTP). The user can enter the server name and port number and the credentials for an external SMTP sever, such as GMAIL, Outlook, etc. By default, these fields are left blank. Once they have been set, the webpage will display an error if any of the fields are not properly formatted or left blank. The information that can be transferred through the SMTP protocol can be found in Section covering SMTP and email configuration.

The screenshot shows the 'Email Configuration' form with the following fields:

- SMTP Server Name: smtp.gmail.com
- SMTP Port: 587 (Secure) (dropdown menu)
- User Name: 1@gmail.com (highlighted in red, indicating an error)
- Password: (empty field)

Incorrect Entry for Email configuration

The user is expected to enter a valid SMTP server name using name of the SMTP server. There is a limitation of 63 characters for entering this information.

Default port for communicating email across the internet using SMTP without TLS encryption is port 25. Typical SMTP port number is 587 for sending email to secure SMTP server with TLS encryption. Typical examples of SMTP server names for sending supported are Gmail – smtp.gmail.com, Yahoo! - smtp.mail.yahoo.com, Office365 - smtp.office365.com, AOL – smtp.aol.com. All these SMTP servers support both the standard port (Port 25) and Secure port (587). The user must enter a valid username of the SMTP server and a valid password of the SMTP server.

- c. System Time Setup – The user can configure the date and time for the system manually or by synchronizing with a Network Time Protocol (NTP) server.

If the user decides to manual update the date, a calendar window allows the selection when the Date selection window is clicked.

The screenshot shows the 'Date' field with the value '09/17/2020' and a calendar window below it. The calendar is for September 2020 and shows the following dates:

Su	Mo	Tu	We	Th	Fr	Sa
30	31	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	1	2	3
4	5	6	7	8	9	10

Manual Date selection

SEM3T System – Thermal Monitoring System

Similar drop down menu choices are available for the manual time update for Hour, Minute and Seconds selection. If the user decides to synchronize using the NTP server, in addition the user can select how to connect to the Network time server.

System Time Setup

Synchronize with NTP server? Yes No

Network time server by: IP Address ▾

IP Address:

Date:

Time: hr min sec

Time Zone: ▾

Date Format: ▾

System Time Synchronization with NTP server

The user can select either select the NTP server using its IP address or a Domain Name. By default, IP address is selected. In case of IP address selection, the user shall enter the correct IP address of the NTP server the controller is required to synchronize with.

Network time server by: IP Address ▾

IP Address:

IP Address
Domain Name
IP Address

Network time server identification selection

In case the user selects, Domain Name to identify the NTP server, the user shall enter the correct Domain Name and DNS name to identify the NTP server. The domain name is limited to 80 alphanumeric characters (dots and dash allowed). (example pool.ntp.org). The DNS name is the DNS address of the specific NTP server. (example 8.8.8.8)

Network time server by: Domain Name ▾

Domain Name:

DNS Name:

Network time server identification by Domain Name

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The user can also set the time zone and date format manually. The time zone options are all Greenwich Mean Time (GMT) offsets. The time zone is selected by default to (GMT – 5:00) Eastern Time (US & Canada), Bogota, Lima.

Available Time Zones
(GMT -11:00) Midway Island, Samoa
(GMT -10:00) Hawaii
(GMT -9:30) Taiohae
(GMT -9:00) Alaska
(GMT -8:00) Pacific Time (US & Canada)
(GMT -7:00) Mountain Time (US & Canada)
(GMT -6:00) Central Time (US & Canada), Mexico City
(GMT -5:00) Eastern Time (US & Canada), Bogota, Lima
(GMT -4:00) Atlantic Time (Canada), Caracas, La Paz
(GMT -3:00) Brazil, Buenos Aires, Georgetown
(GMT -2:00) Mid-Atlantic
(GMT -1:00) Azores, Cape Verde Islands
(GMT) Western Europe Time, London, Lisbon, Casablanca
(GMT +1:00) Brussels, Copenhagen, Madrid, Paris
(GMT +2:00) Kaliningrad, South Africa
(GMT +3:00) Baghdad, Riyadh, Moscow, St. Petersburg
(GMT +3:30) Tehran
(GMT +4:00) Abu Dhabi, Muscat, Baku, Tbilisi
(GMT +4:30) Kabul
(GMT +5:00) Ekaterinburg, Islamabad, Karachi, Tashkent
(GMT +5:30) Bombay, Calcutta, Madras, New Delhi
(GMT +5:45) Kathmandu, Pokhara
(GMT +6:00) Almaty, Dhaka, Colombo
(GMT +6:30) Yangon, Mandalay
(GMT +7:00) Bangkok, Hanoi, Jakarta
(GMT +8:00) Beijing, Perth, Singapore, Hong Kong
(GMT +8:45) Eucla
(GMT +9:00) Tokyo, Seoul, Osaka, Sapporo, Yakutsk
(GMT +9:30) Adelaide, Darwin
(GMT +10:00) Eastern Australia, Guam, Vladivostok
(GMT +10:30) Lord Howe Island
(GMT +11:00) Magadan, Solomon Islands, New Caledonia
(GMT +12:00) Auckland, Wellington, Fiji, Kamchatka
(GMT +12:45) Chatham Islands
(GMT +13:00) Apia, Nukualofa
(GMT +14:00) Line Islands, Tokelau

Available Time Zones

The date format can be set to either “Month, Day, Year” or “Day, Month, Year” and will be reflected on the webpages. It should be noted that changing this feature will not change the format of any data or alarm logs already configured.

SEM3T System – Thermal Monitoring System

User Name:	(GMT -11:00) Midway Island, Samoa
Password:	(GMT -10:00) Hawaii
System Time Setup	(GMT -9:30) Taiohae
Synchronize with NTP server	(GMT -9:00) Alaska
Network time server by:	(GMT -8:00) Pacific Time (US & Canada)
Domain Name:	(GMT -7:00) Mountain Time (US & Canada)
DNS Name:	(GMT -6:00) Central Time (US & Canada), Mexico City
Date:	(GMT -5:00) Eastern Time (US & Canada), Bogota, Lima
Time:	(GMT -4:00) Atlantic Time (Canada), Caracas, La Paz
Time Zone:	(GMT -3:00) Brazil, Buenos Aires, Georgetown
	(GMT -2:00) Mid-Atlantic
	(GMT -1:00) Azores, Cape Verde Islands
	(GMT) Western Europe Time, London, Lisbon, Casablanca
	(GMT +1:00) Brussels, Copenhagen, Madrid, Paris
	(GMT +2:00) Kaliningrad, South Africa
	(GMT +3:00) Baghdad, Riyadh, Moscow, St. Petersburg
	(GMT +3:30) Tehran
	(GMT +4:00) Abu Dhabi, Muscat, Baku, Tbilisi
	(GMT +4:30) Kabul
	(GMT +5:00) Ekaterinburg, Islamabad, Karachi, Tashkent
	(GMT -5:00) Eastern Time (US & Canada), Bogota, Lima

Time zone selection

Date Format:	MM-DD-YYYY
	MM-DD-YYYY
	DD-MM-YYYY

Date Format selection

When configured to use the NTP server, the SEM3T controller will synchronize with the NTP server every 15 minutes.

- d. Web Settings – The user can configure the refresh rate of the Realtime page to be from 10 to 900 seconds. If the user attempts to set the refresh rate outside of these bounds, the webpage displays an error. The user can also set the decimal resolution from the dropdown list in this section. The decimal resolution will be reflected on all the webpages and will overwrite any setpoints by rounding to the decimal point set.

Invalid value. The range is (10 - 900)

Incorrect entry web settings

Decimal accuracy:	1
	0
System Information	1
	2

Decimal resolution selection

SEM3T System – Thermal Monitoring System

- e. System Information – In this section, the firmware version, controller serial number, offline configuration support, and bootloader version and webpage version are displayed. The user can also change the device description which could be useful to differentiate controllers in a multi-controller system. This description should not be blank but should be shorter than 63 characters. This description will also be displayed on Mindsphere if configured properly.
- f. Debug Log Configuration – The user can configure the level of debug statements that are stored in the debug log. The log will record all the levels above and including the level selected. For example, the default level is set to DEBUG. That means the log will collect all levels from FATAL down to DEBUG. Since this debug log is stored on the SD card, the more levels included, the more memory this log will use, and the user should determine what is the best level based on their storage needs. The user has the option to delete the debug logs from the microSD card information page to reduce the memory usage as needed.

The debug logs are beneficial in troubleshooting if the controller is misbehaving in field.

Debug Log Configuration

Log Configuration: DEBUG ▾

Temperature Unit

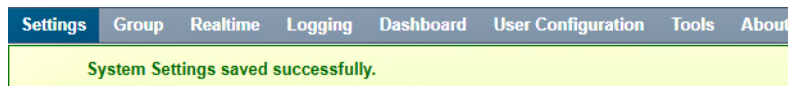
Unit:

FATAL
ALERT
CRIT
ERROR
WARN
NOTICE
INFO
DEBUG
TRACE

Debug Log Configuration

- g. Temperature Unit – The user can select the displayed temperature units to be either Celsius or Fahrenheit. Any change in the temperature unit will be reflected on all the webpages and will overwrite any setpoints by rounding to the decimal point set. This change will not affect any data or alarm logs already configured.

For saving the configurations made on the System settings page, the user must click the “Save” button. In case during the configuration, the user intends to reset to previously saved configuration, the user can click on “Reset” button. Upon successful saving, a feedback in form of System Settings saved successfully is shown in the banner area.



SEM3T System – Thermal Monitoring System

System Settings Help Page

The System Settings help page displays helpful information regarding the system setting configuration for reference.

System Settings Help

IPv4 Configuration

- Configure IPv4 settings for controller.
- Select "Static IP" to configure settings manually or "DHCP" to configure settings automatically.
- Default Settings:
 - **IP Address:** 192.168.1.65
 - **Subnet Mask:** 255.255.255.0
 - **Default Gateway:** 192.168.1.1

IPv6 Configuration

- Configure IPv6 settings for controller.
- Select "Static IP" to configure settings manually or "DHCP" to configure settings automatically.
- Default Settings:
 - **IP Address:** 2001:db8:0:1::3
 - **Prefix Length:** 64
 - **Default Gateway:** 2001:0db8:0000:0001:0000:0000:0000:0002

Email Configuration

- Configure email settings to send logs to user.
- User can configure "SMTP Server Name", "SMTP Port", "Username", and "Password".
- Default Settings: Default Email Configuration settings are blank.
- SMTP server examples:
 - **Gmail:** smtp.gmail.com
 - **Yahoo:** smtp.mail.yahoo.com
 - **Office365:** smtp.office365.com
 - **AOL:** smtp.aol.com
- **Note:** The above mentioned SMTP servers support both the SMTP port "25 (Standard)" and "587 (Secure)".

System Time Setup

- This allows user to enable/disable time synchronization with NTP server.
- If enabled, user can select time server using "IP Address" or "Domain Name".
- If disabled, user can manually set system time. User can enter date, time and timezone.
- User can select "MM-DD-YYYY" or "DD-MM-YYYY" date format. Same date format will be displayed on the realtime page.

Web Settings

- Set refresh rate for "Realtime" page by entering a number in the text entry field page.
 - **Range:** 10 to 900
 - **Default:** 30 seconds
- Set the digits shown after the decimal point on the "Realtime" page by selecting an option from the 'Decimal Accuracy' drop down menu.

System Information

- "Serial Number", and "Firmware Version" are all useful for troubleshooting and customer support (For the first time the "Serial Number" should be written down)
- A device description can be entered in order to differentiate between multiple controllers (63 characters max)
- Firmware can be upgraded through the 'Diagnostics' page.

Debug Log Configuration

- Configure the debug log level information for stored information in the SD card.

Temperature Units

- This allows user to select temperature unit in Celsius/ Fahrenheit.

Note: No settings will be applied unless the "Save" button at the bottom is clicked after changes.

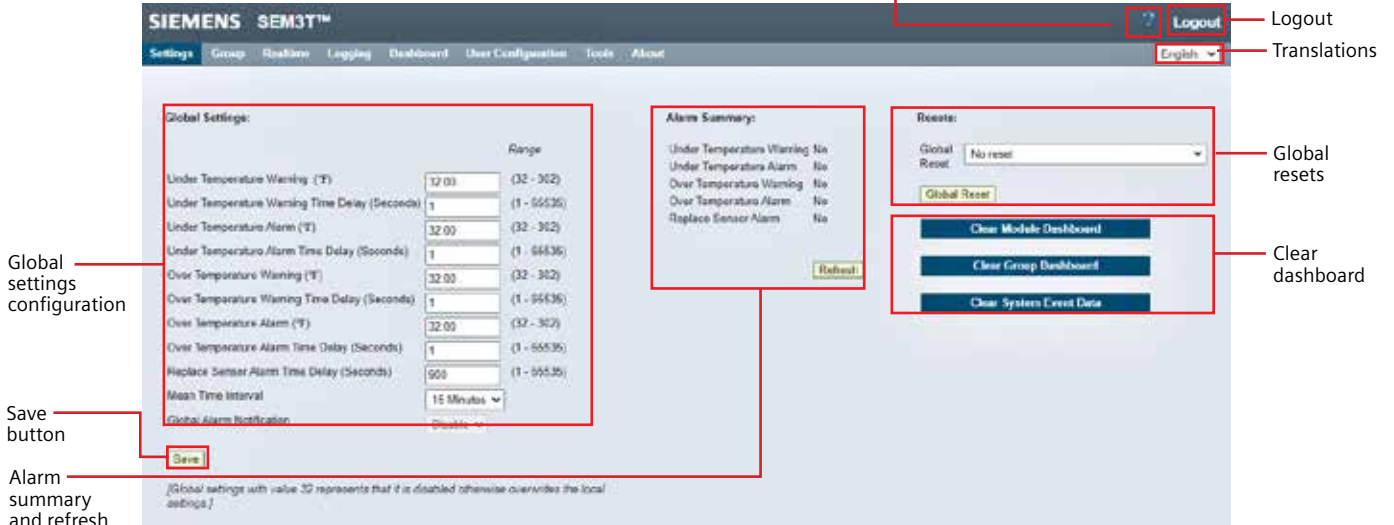
System Settings help page

SEM3T System – Thermal Monitoring System

Global Settings Configuration

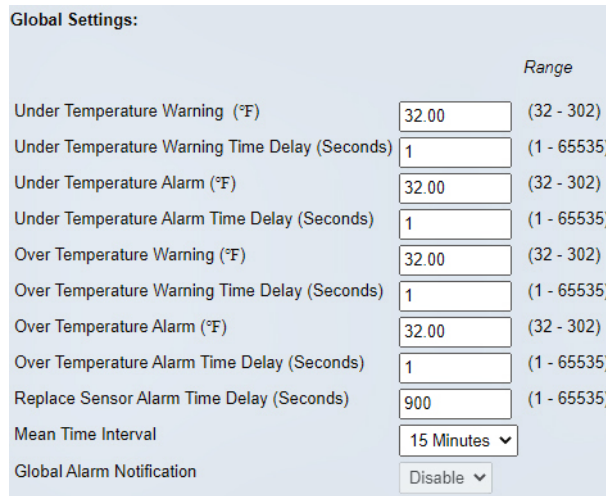
The Global Settings page allows users to create alarm, warning sets points and time delays, clear dashboard data, set the mean time interval, view current alarms summary, and designate an email in which to send global notifications. Changes made on this page will be reflected in the System Event Log.

Help Pop-up



Global Settings page

- a. Global Settings – The user can set Global Alarms and Warnings and the corresponding time delays for the entire system. The user can insert temperatures in the range of 0-150 °C (32-302 °F if configured) and times in the range 1-65535 seconds. The temperature resolution will display to what is set on the System Settings page.



Global Settings when temperature is configured in Fahrenheit

SEM3T System – Thermal Monitoring System

Global Settings:		Range
Under Temperature Warning (°C)	<input type="text" value="0.00"/>	(0 - 150)
Under Temperature Warning Time Delay (Seconds)	<input type="text" value="1"/>	(1 - 65535)
Under Temperature Alarm (°C)	<input type="text" value="0.00"/>	(0 - 150)
Under Temperature Alarm Time Delay (Seconds)	<input type="text" value="1"/>	(1 - 65535)
Over Temperature Warning (°C)	<input type="text" value="0.00"/>	(0 - 150)
Over Temperature Warning Time Delay (Seconds)	<input type="text" value="1"/>	(1 - 65535)
Over Temperature Alarm (°C)	<input type="text" value="0.00"/>	(0 - 150)
Over Temperature Alarm Time Delay (Seconds)	<input type="text" value="1"/>	(1 - 65535)
Replace Sensor Alarm Time Delay (Seconds)	<input type="text" value="900"/>	(1 - 65535)
Mean Time Interval	<input type="text" value="15 Minutes"/>	
Global Alarm Notification	<input type="text" value="Disable"/>	

Global Settings when temperature is configured in Celsius

If the user updates any of these fields with invalid data or data outside the designed range, the page will display an error. When the user updates the Global Warning and Alarm temperature or Time Delays, any local (i.e. individual module's) alarm or warning temperature or time delay settings will be overwritten.

Global Settings:		Range
Under Temperature Warning (°C)	<input type="text" value="151"/>	(0 - 150)
Under Temperature Warning Time Delay (Seconds)	<input type="text" value="1"/>	(1 - 65535)

Invalid entry for global settings

The user has the option to set the following alarms and Warnings.

- i. Under Temperature Warning
- ii. Under Temperature Warning Time Delay
- iii. Under Temperature Alarm
- iv. Under Temperature Alarm Time Delay
- v. Over Temperature Warning
- vi. Over Temperature Warning Time Delay
- vii. Over Temperature Alarm
- viii. Over Temperature Alarm Time Delay
- ix. Replace Sensor Alarm Time Delay

Most of the alarms and warnings and corresponding time delays are self-explanatory. The alarms and warnings are disabled when they have a value of 0. The replace sensor alarm time delay is the time required for the Replace Sensor Alarm to be enabled or generated after the Sensor Error (-SE-) has been reported in the real time page. The default value for the replace sensor alarm time delay is set to 900 seconds.

SEM3T System – Thermal Monitoring System

- b. Mean Time Interval – The user can set the mean time interval (MTI) of the system as desired to 15 minutes, or 1, 6, or 24 hours. The MTI is used to calculate the temperature rise displayed on the expanded module view on the Realtime page and the predicted values on the Module Dashboard page. The default value of the mean time interval is set as 15 minutes.

Mean Time Interval setting

- c. Global Alarm Notification – The global alarm notification can be sent to an email address configured for the specific user. If no valid email has been configured, the notification option is not available and disabled. However, if a valid email is configured, the notification can be enabled or disabled with the drop-down menu.

Enable/Disable Global Alarm Notification

If a valid email is configured and a valid STMP server is setup, the user can enable the controller to send alarm notifications to one or multiple emails. Once enable is selected from the drop-down menu, an option is available to select the available email addresses configured for the system to send the notifications. The user can select all the email addresses or only specific email address to send the notifications. The user can select multiple email addresses by dragging the mouse or using the control button to make selection with the mouse click.

Email notification recipient address selection

The user must click save button to save the changes. A feedback in form of Global Settings saved successfully is shown in the banner area.

Successful save of global settings

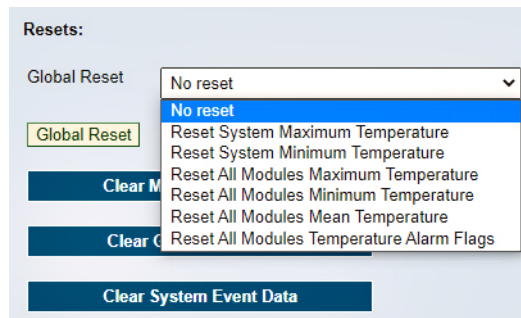
SEM3T System – Thermal Monitoring System

d. Alarm Summary – The user can observe the current alarm summary from the Global Settings page. If any of the modules has an active alarm, the page will display the type in this section. The user can refresh the display using the Refresh button.

Following alarms and warning summary are displayed

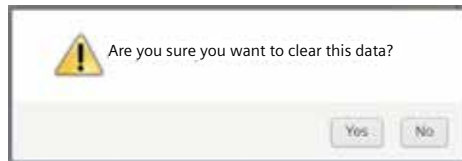
- i. Under Temperature Warning
- ii. Under Temperature Alarm
- iii. Over Temperature Warning
- iv. Over Temperature Alarm
- v. Replace Sensor Alarm

e. Resets – From the dropdown menu, the user can perform several global resets from the Global Settings page. The user can reset the system maximum and minimum temperature and reset the maximum, minimum, mean temperature and alarm data for all the configured modules. The user needs to highlight the specific reset option and click on Global Reset button to complete the operation



Global Resets

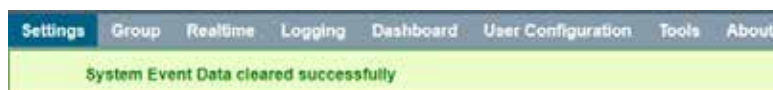
f. Clear dashboard and event log – The supervisor user can clear all module dashboard data and all group dashboard data using the provided buttons. When the buttons are pressed, the user is requested to agree to clear the data so if the button is pressed in accident it can be rescinded.



User confirmation for clearing data

The user can also clear the system event log by using the appropriate button. The user is requested to provide confirmation prior to the data deletion.

If the user confirms to clear the data, a feedback in form of respective data cleared successfully is shown in the banner area.



Successful clearing of System Event Data

SEM3T System – Thermal Monitoring System

Global Settings Help Page

The Global Settings help page displays helpful information regarding the global settings configuration for reference.

Global Settings Help

These settings should be set first. Settings saved will overwrite all other settings. This should be completed prior to branch configuration.

Global Settings

- **Under Temperature Warning:** The Under Temperature Warning is generated when the temperature value falls below the Under Temperature warning setpoint.
- **Under Temperature Warning Time Delay:** The time required for the under temperature warning to be enabled (generated) once the temperature has fallen below the warning setpoint.
- **Under Temperature Alarm:** The Under Temperature Alarm is generated when the temperature value falls below the configured Under Temperature alarm value.
- **Under Temperature Alarm Time Delay:** The time required for the under temperature alarm to be enabled (generated) once the temperature has fallen below the alarm setpoint.
- **Over Temperature Warning:** The Over Temperature Warning is generated when the temperature value rises above the Under Temperature warning setpoint.
- **Over Temperature Warning Time Delay:** The time required for the over temperature warning to be enabled (generated) once the temperature has risen above the setpoint.
- **Over Temperature Alarm:** The Over Temperature Alarm is generated when the temperature value rises above the configured Over Temperature alarm value.
- **Over Temperature Alarm Time Delay:** The time required for the over temperature alarm to be enabled (generated) once the temperature has risen above the setpoint.
- **Replace Sensor Alarm Time Delay:** The time required for the Replace Sensor Alarm to be enabled (generated) once the Sensor Error (-SE-) has been reported.
- **Mean Time Interval:** It is used to calculate value for specific time interval. Select any (15 Minutes, 1 Hour, 6 Hours, 24 Hours) from the drop down.
- **Global Alarm Notification:** To Enable Global Alarm Notification, Configure at least one user with Email Id. On being Enable, this is used to send emails to the configured users for all the configured alarm's generation and reset events.

Alarm Summary

- This provides a quick summary of active and inactive alarms. Click on the "Refresh" button for update.

Resets

- No Reset
- Reset System Maximum temperature
- Reset System Minimum temperature
- Reset all Module Maximum Temperatures
- Reset all Module Minimum Temperatures
- Reset all Module Mean Temperatures
- Reset all Module Temperature Alarm Flags

Clear Module Dashboard

- A button to clear module dashboard data.

Clear Group Dashboard

- A button to clear group dashboard data.

Clear System Event Data

- A button to clear system event data.

Note:

- No settings will be applied unless the "Save" button at the bottom is clicked after changes.

Global Settings help page

SEM3T System – Thermal Monitoring System

Module Configuration

The Module Configuration page allows the user to configure up to 45 thermal modules per controller. The page displays a table of all possible modules with highlighting based on their availability.

Help Pop-up

SIEMENS SEM3T™

Settings Group Realtime Logging Dashboard User Configuration Tools About

Logout English

Module Detection:

1	Thermal Module 1	33	Not Present
2	Thermal Module 2	34	Not Present
3	Thermal Module 3	35	Not Present
4	Not Present	36	Not Present
5	Not Present	37	Not Present
6	Not Present	38	Not Present
7	Not Present	39	Not Present
8	Not Present	40	Not Present
9	Not Present	41	Not Present
10	Not Present	42	Not Present
11	Not Present	43	Not Present
12	Not Present	44	Not Present
13	Not Present	45	Not Present
14	Not Present	46	Not Present
15	Not Present	47	Not Present
16	Not Present	48	Not Present
17	Not Present	49	Not Present
18	Not Present	50	Not Present
19	Not Present	51	Not Present
20	Not Present	52	Not Present
21	Not Present	53	Not Present
22	Not Present	54	Not Present
23	Not Present	55	Not Present
24	Not Present	56	Not Present
25	Not Present	57	Not Present
26	Not Present	58	Not Present
27	Not Present	59	Not Present
28	Not Present	60	Not Present
29	Not Present	61	Not Present
30	Not Present	62	Not Present
31	Not Present	63	Not Present
32	Not Present		

Refresh

Legend:

Available Modules Configured Not Responding

Thermal Module Configuration:

Available Modules

Configured Modules

Thermal Module 1

Thermal Module 2

Thermal Module 3

Module detection

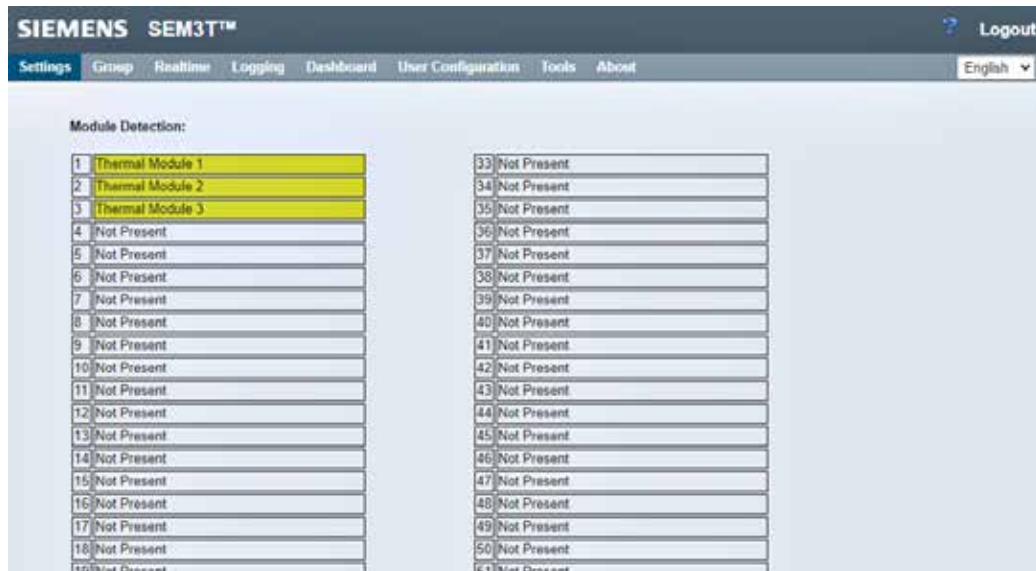
Legend

Available and configured modules

Module Configuration page

SEM3T System – Thermal Monitoring System

Any available modules will be listed by their name (Thermal_Module_##) with no highlight, any configured modules will display highlighted yellow, and any modules that have been configured but are no longer responding will be highlighted red. The number and position of available modules will depend on how the module rack has been configured.



Module Detection:	
1	Thermal Module 1
2	Thermal Module 2
3	Thermal Module 3
4	Not Present
5	Not Present
6	Not Present
7	Not Present
8	Not Present
9	Not Present
10	Not Present
11	Not Present
12	Not Present
13	Not Present
14	Not Present
15	Not Present
16	Not Present
17	Not Present
18	Not Present
19	Not Present
33	Not Present
34	Not Present
35	Not Present
36	Not Present
37	Not Present
38	Not Present
39	Not Present
40	Not Present
41	Not Present
42	Not Present
43	Not Present
44	Not Present
45	Not Present
46	Not Present
47	Not Present
48	Not Present
49	Not Present
50	Not Present
51	Not Present

Module Detection

The user can click on the refresh button to refresh the list of modules in the module detection. A feedback in the form of refresh successfully is shown in the banner area.

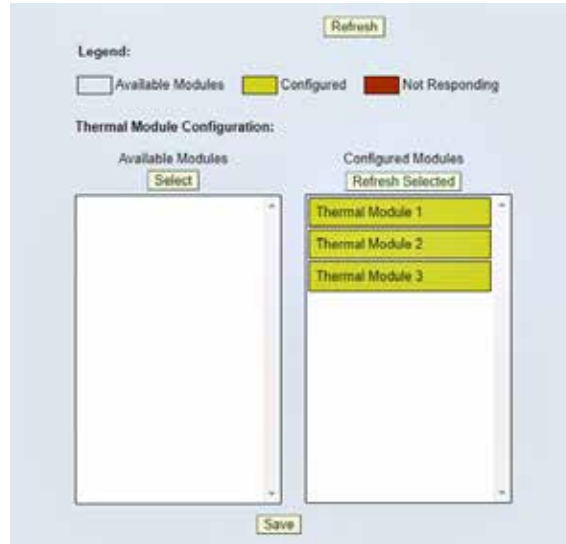


Successful Refresh

To configure a module, the user can select one or multiple modules under the Available Modules pane by holding the “CTRL” button on the keyboard and selecting individual modules or holding the “SHIFT” key to select a range of available modules, then clicking the Select button above the Available Modules pane. Configured modules can be deselected by the same process from the Configured Modules pane using the Refresh Selected button. The same selection can be made by clicking the mouse on the first selection and dragging till the last selection and clicking the Select button or Refresh Selected button in respective panes.

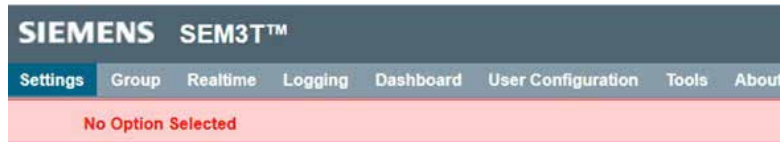
Once the desired modules have been configured, click the Save button to save the configuration. No changes will remain until the save button have been clicked.

SEM3T System – Thermal Monitoring System



Available and Configured Modules

If no Module is selected and either the Select or Refresh Selected button is clicked, a feedback in form of no option selected is shown in the banner area.



Incorrect option selected

On successful saving of the configuration, a feedback in form of module configuration saved successfully is shown in the banner area.



Successful saving of module configuration

SEM3T System – Thermal Monitoring System

If for a module, logging is enabled, user cannot reconfigure that module. User must remove all the enabled logs for that module. If a module is part of any group, user cannot reconfigure that module. User must remove that module from group. For either of the above operations, a feedback in form of an incorrect selection message is shown in the banner area.



Incorrect selection for a grouped or logged module

Module Configuration Help Page

The Module configuration help page displays helpful information regarding the module configuration for reference.

Module Configuration Help

Module List

- The "Module Detection" panel contains list of Available modules, Configured modules, Unconfigured modules, Not Present modules and Unresponsive modules.
 - **Note:** A module may become unresponsive due to a module not providing feedback or being moved to different location after being updated on the list.
- Configured modules will be colored (use the legend below to determine configuration type), whereas unconfigured modules will remain transparent until configured using the tool below.
 - **Note:** Unconfigured modules will not update data on the "Realtime" page.
- Use the "Refresh" button to get the current list of configured modules.

Configuring an Unconfigured Module

- Select one or multiple module(s) from the "Available Modules" list and click the button "Select" to configure the modules.
 - **Note:** Only modules which are selected will be considered for the configuration, if any module which is selected, but is not configurable, it will not be placed into the configuration but will be left into the "Available Modules" List.
- Click the "Save" button.
 - **Note:** More than one module may be configured at a time

Reconfiguring a Configured Module

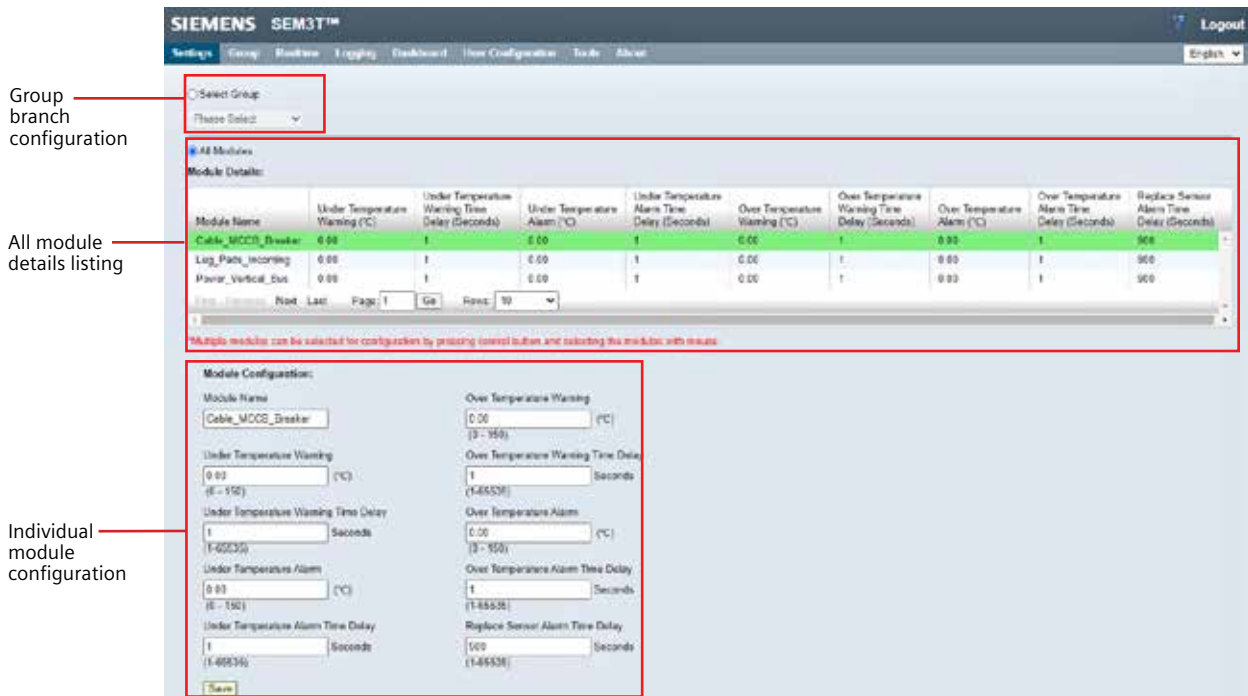
- Click the "Refresh Selected" button.
 - **Note:** All the selected modules under the Configured modules would be refreshed and moved to "Available Modules".
- Follow the instructions for configuring an unconfigured module.
 - **Note:** More than one module may be reconfigured at a time.
 - If for a module, logging is enabled, user cannot reconfigure that module. User has to remove all the enabled logs for that module.
 - If a module is part of any group, user cannot reconfigure that module. User has to remove that module from group.

Module Configuration help page

SEM3T System – Thermal Monitoring System

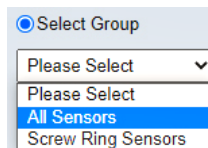
Branch Configuration

On the Branch Configuration page, the user can set local temperature warnings and alarms and time delay set points for any configured module. The user can also change the display name for the module to something relevant to the system.



Branch Configuration page

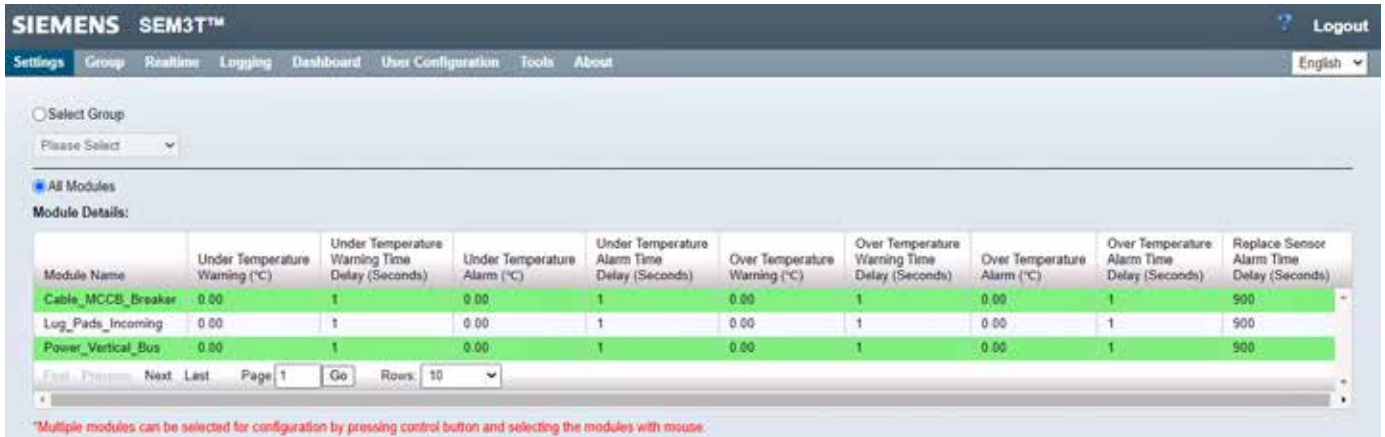
The user has the option to view and update information of a specific grouped modules, any specific individual module or a collection of modules which are not grouped yet. By default, the page shows All modules. The user can navigate to grouped modules by selecting the Select Group radial button and using the drop down menu to select previously configured grouped modules. Selecting the specific group will only show the modules part of the group.



Grouped branch configuration

SEM3T System – Thermal Monitoring System

The user can select multiple modules either in the grouped modules view or the all modules view to edit by holding the “CTRL” button on the keyboard and selecting individual modules or holding the “SHIFT” key to select a range of modules.



The screenshot shows the SEM3T web interface. At the top, there is a navigation bar with links for Settings, Group, Realtime, Logging, Dashboard, Users Configuration, Tools, and About. A language dropdown is set to English. Below the navigation bar, there is a section for selecting a group, with a dropdown menu currently set to "Please Select". Underneath, the "All Modules" view is active, displaying a table of module details. The table has the following columns: Module Name, Under Temperature Warning (°C), Under Temperature Warning Time Delay (Seconds), Under Temperature Alarm (°C), Under Temperature Alarm Time Delay (Seconds), Over Temperature Warning (°C), Over Temperature Warning Time Delay (Seconds), Over Temperature Alarm (°C), Over Temperature Alarm Time Delay (Seconds), and Replace Sensor Alarm Time Delay (Seconds). Three rows are highlighted in green, indicating they are selected: Cable_MCCB_Breaker, Log_Pads_Incoming, and Power_Vertical_Bus. Below the table, there is a pagination control showing "Page 1" and "Rows: 10". A red note at the bottom of the screenshot states: "Multiple modules can be selected for configuration by pressing control button and selecting the modules with mouse."

Multiple selection of modules

Once the selection of an individual module or grouped modules is made, the user can perform the configuration. The Module name field allows user to enter alpha-numeric characters without any special characters. The user can insert temperatures in the range of 0-150 °C (32-302 °F if configured in Fahrenheit) as floating point and times in the range 1-65535 seconds as integers. The temperature resolution will display to what is set on the System Settings page.

Module Configuration:

Module Name <input type="text" value="Cable_MCCB_Breaker"/>	Over Temperature Warning <input type="text" value="0.00"/> (°C) (0 - 150)
Under Temperature Warning <input type="text" value="0.00"/> (°C) (0 - 150)	Over Temperature Warning Time Delay <input type="text" value="1"/> Seconds (1-65535)
Under Temperature Warning Time Delay <input type="text" value="1"/> Seconds (1-65535)	Over Temperature Alarm <input type="text" value="0.00"/> (°C) (0 - 150)
Under Temperature Alarm <input type="text" value="0.00"/> (°C) (0 - 150)	Over Temperature Alarm Time Delay <input type="text" value="1"/> Seconds (1-65535)
Under Temperature Alarm Time Delay <input type="text" value="1"/> Seconds (1-65535)	Replace Sensor Alarm Time Delay <input type="text" value="900"/> Seconds (1-65535)

Individual module configuration

SEM3T System – Thermal Monitoring System

If grouped modules are being configured, the name field is removed.

Module Configuration:	
Under Temperature Warning <input type="text" value="0"/> (°C) (0 - 150)	Over Temperature Warning <input type="text" value="0"/> (°C) (0 - 150)
Under Temperature Warning Time Delay <input type="text" value="1"/> Seconds (1-65535)	Over Temperature Warning Time Delay <input type="text" value="1"/> Seconds (1-65535)
Under Temperature Alarm <input type="text" value="0"/> (°C) (0 - 150)	Over Temperature Alarm <input type="text" value="0"/> (°C) (0 - 150)
Under Temperature Alarm Time Delay <input type="text" value="1"/> Seconds (1-65535)	Over Temperature Alarm Time Delay <input type="text" value="1"/> Seconds (1-65535)
<input type="button" value="Save"/>	Replace Sensor Alarm Time Delay <input type="text" value="900"/> Seconds (1-65535)

Grouped module configuration

If the user updates any of these fields with invalid data or data outside the designed range, the page will display an error. When the user updates the Global Warning and Alarm temperature or Time Delays on the Global Settings page, any local alarm or warning temperature or time delay settings will be overwritten.

In case of incorrect entry, a feedback is provided in form of invalid value in the banner area.

SIEMENS SEM3T™							
Settings	Group	Realtime	Logging	Dashboard	User Configuration	Tools	About
Invalid value. The range is (0 - 150)							

Incorrect entry – branch configuration

In case of successful save, a feedback in form of successful save is provided in the banner area.

SIEMENS SEM3T™							
Settings	Group	Realtime	Logging	Dashboard	User Configuration	Tools	About
Module Configurations saved successfully.							

Successful branch configuration saved

SEM3T System – Thermal Monitoring System

Branch Configuration Help Page

The branch configuration help page displays helpful information regarding the module configuration for reference.

Branch Configuration Help

These setting should be altered after the global settings have been changed and saved.

Any changes saved here will overwrite global settings; however any changes to global settings will overwrite all specific branch settings.

Change Basic Attributes of a Branch

- Select a module from the "Module Details" table (module name should be highlighted in green)
- Make edits:
 - Module name: Delete current name from text entry field and enter preferred name in its place. In module name, only alphanumeric characters are allowed.
- Click "Save" button

Set Specific Branch Warnings and Alarms

- Select a module from the "Module Details" table (module name should be highlighted in green)
- Set warnings and alarms by entering numbers in the text entry field taking note of the ranges to the right and the units of each setting.
- Click "Save" button

Note: The table may not show all modules. To see additional modules use the scroll bar on the side of the table, or a scroll wheel on a mouse when the pointer is overlaying the table data.

Group Module Configuration

- User shall be able to select a group and configure modules associated with each group.
- Following are the steps to configure modules in a group:
 - Select a group from drop down list. Webpage will display module details for that group.
 - Perform module configurations.
 - Save (settings will be applied to all the modules in selected group).

Note: Multiple modules can be selected for configuration by pressing control button and selecting the modules with mouse.

Branch Configuration help page

Wireless configuration

The user can configure the controller as a Wi-Fi access point or a Wi-Fi station or transfer the controller configuration to a mobile device via Bluetooth.



Wireless configuration page

SEM3T System – Thermal Monitoring System

In the Wi-Fi configuration tab, the user can configure the on-board wireless radio (on the Wi-Fi variant controller) for Wi-Fi capability. The user can at any time either enable or disable the radio.



Wi-Fi configuration – enable/disable

By default, the Wi-Fi access point mode is selected for configuration when the Wi-Fi is enabled.

The access point mode has several security levels to choose from and allows custom security key and the station point mode scans for available networks and displays them on the webpage.

- a. Wi-Fi Access Point – To enable the controller as an access point, the user must select Enable from the dropdown menu on the Wi-Fi Configuration tab then click the Wi-Fi Access Point radial button. The user can then enter a custom SSID of maximum 32 characters. The user can select the level of security desired for the access point. The recommended security level is WPA2 or WPA/WPA2 for most applications. The user can input a custom security key for the access point. The security key must be a minimum of 8 and a maximum of 63 characters. Once the settings are fixed, the user must click the Save button to save the configuration.

A confirmation message will display with the MAC address and the IP address of the access point. The controller's Wi-Fi LED will be green (or orange if Bluetooth is also configured) and will blink once a second while the controller is configured as access point.

 A screenshot of the 'Wi-Fi Configuration' web page. The page has two tabs: 'Wi-Fi Configuration' (active) and 'Bluetooth Configuration'. The configuration fields are as follows:

- Wi-Fi Configuration: Enable (dropdown)
- Wireless Mode: Wi-Fi Access Point, Wi-Fi Station
- SSID*: SiTherm1200Cont#3
- Security Type*: WPA/WPA2 (dropdown)
- Security Key*: Siemens12TMS, with a checked 'Show Password' checkbox.
- A green 'Save' button is located below the Security Key field.

 At the bottom, there is a 'Connection Details' section with a table:

Connection Name:	SiTherm1200Cont#3
MAC Address:	44.86.c1.0.0.a3
IP Address:	192.168.0.19

Wi-Fi as an access point configuration

SEM3T System – Thermal Monitoring System

In the access point mode, only 8 station devices can be connected with the SEM3T controller. The Wi-Fi module cannot function as access point and station mode simultaneously. Further single band 2.4 Ghz radio is supported.

- b. Wi-Fi Station - To enable the controller as an access point, the user must select Enable from the dropdown menu on the Wi-Fi Configuration tab then click the Wi-Fi Station radial button. The user must click the Scan button to scan available networks then select the desired wireless network. Special characters are supported when scanning for available Wi-Fi access points. The SEM3T controller cannot be connected to open Wi-Fi access points. Hence open Wi-Fi access points will not be displayed in the list of available Wi-Fi access points. The user must input the correct security key if applicable and click the Connect button.

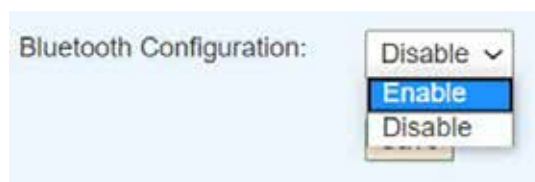
The page will display a confirmation message with the assigned IP address of the controller. The controller's Wi-Fi LED will be green (or orange if Bluetooth is also configured) and remain lit while the controller is connected. The controller does not check for valid internet access, so the user should ensure that the network has continuous internet access. Loss of the email, NTP, and Cloud functionality will occur if the external wireless network loses internet.



Wi-Fi as a station mode configuration

While functioning as a Wi-Fi station, the SEM3T controller with Wi-Fi will not work as a Wi-Fi access point and vice versa.

The Bluetooth configuration is a proof of concept feature that allows the user to transfer to a Bluetooth enabled device with a Bluetooth server enabled. The user can connect using the device's name or the device's MAC address. Like the Wi-Fi configuration, the user can at any time enable or disable the radio.

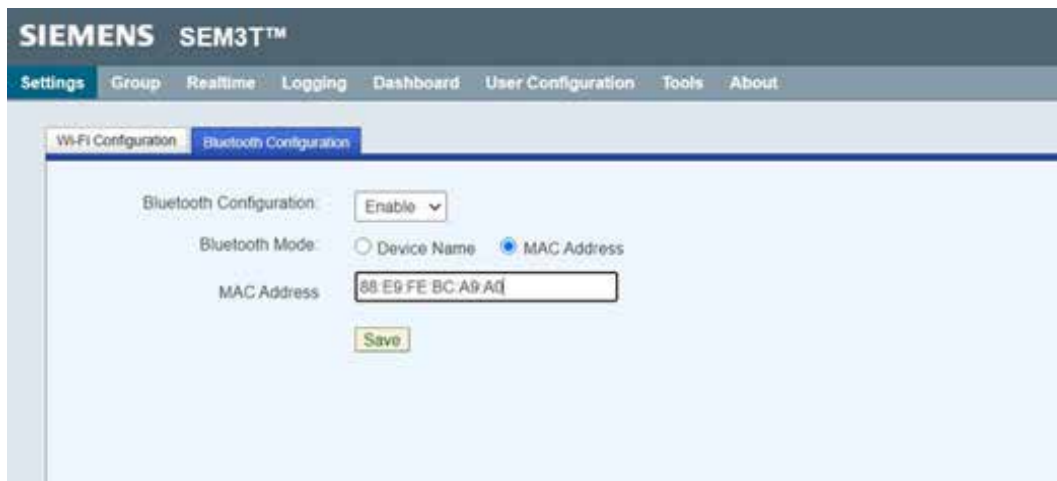


Bluetooth configuration - enable/disable

SEM3T System – Thermal Monitoring System

To enable a Bluetooth transfer, the user must select Enable from the dropdown menu on the Bluetooth Configuration tab. The user must determine the device name or MAC address of the device that is hosting the Bluetooth transfer/server.

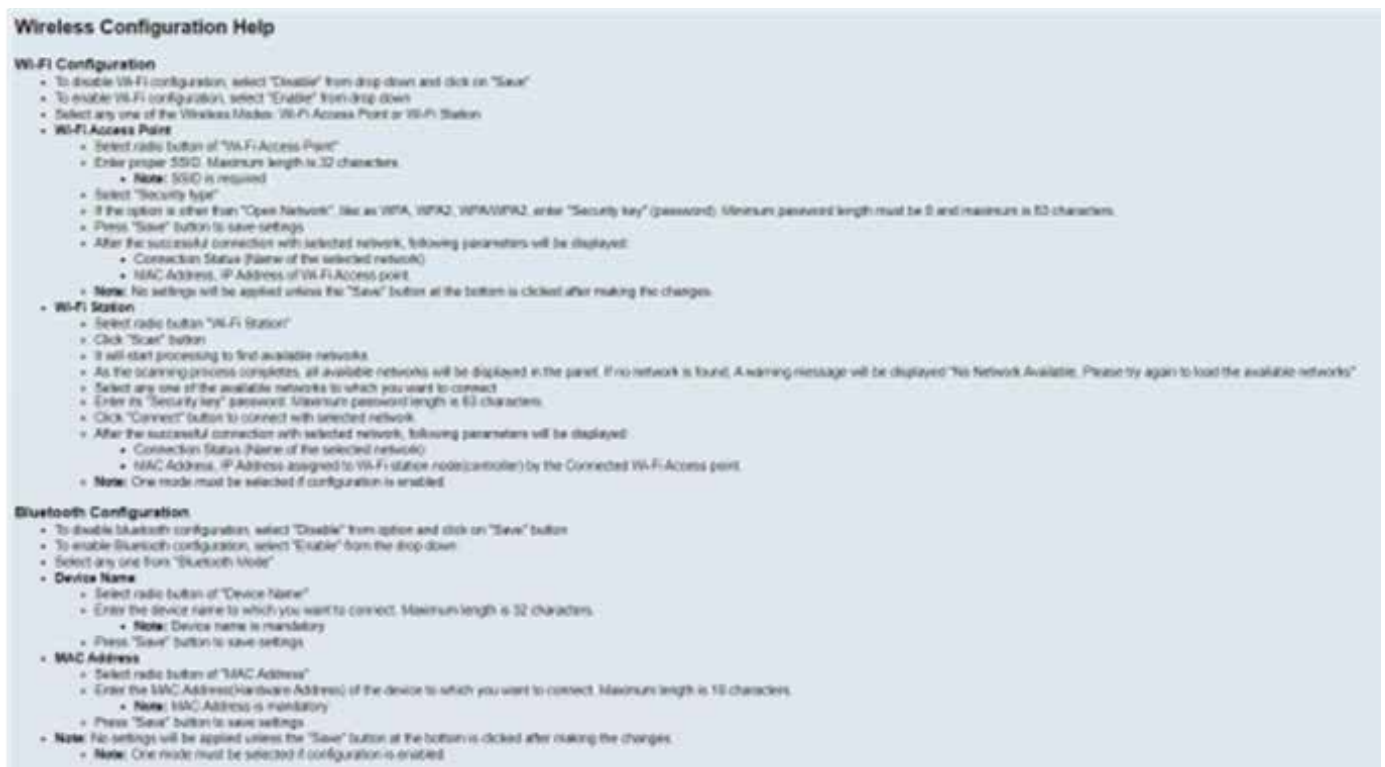
The user must click whichever radial button is applicable then type in the appropriate device name or MAC address. If using MAC address (maximum length supported is 18 characters), the address must be formatted with colons between each byte (i.e. 44:86:C1:00:00:A4, etc.). If using device name, the name must be a maximum of 32 characters in length. Once details are set, click the Save button. The page will display a confirmation message or an error message depending on the success of transfer. A transferred file Thermaldata_Config.csv is received on the client device. Regardless of transfer, if Bluetooth is enabled, the Wi-Fi LED will light red. If Wi-Fi and Bluetooth are enabled, the Wi-Fi LED will light orange, and will follow the blinking pattern based on access point or station configuration.



Bluetooth configuration

Wireless Configuration Help Page

The wireless configuration help page displays helpful information regarding the wireless configuration for reference.



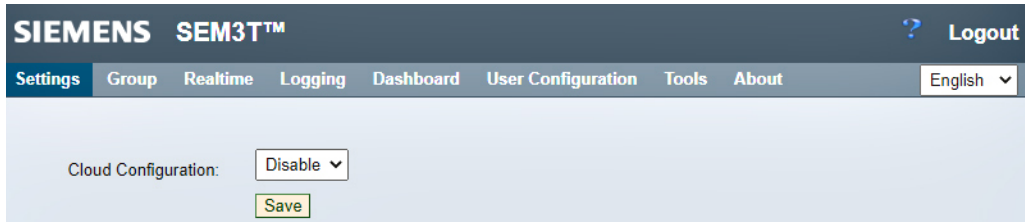
Wireless configuration help page

SEM3T System – Thermal Monitoring System

Cloud Configuration

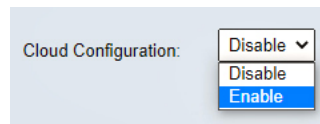
The SEM3T controller supports the transfer of periodic module data to a cloud database such as Siemens cloud platform known as Mindsphere. It is assumed that uninterrupted internet connectivity is established between the SEM3T controller and the Mindsphere. Only one-way communication is possible from the SEM3T controller to Mindsphere.

The SEM3T Controller can connect to Mindsphere via an embedded software component called MindConnect library. On the Cloud Configuration webpage, the user can input the necessary credentials to connect the controller to Mindsphere.



Cloud configuration page

To enable configuration, select Enable from the dropdown menu.



Cloud configuration – enable/disable

All the fields load with the default options to connect except the Initial Access Token Field, the user must generate access token. Once the access token has been copied into the Initial Access Token Field, click save to finish configuring. It should be noted that the Cloud configuration will stay enabled even if the network loses connection. The user must ensure constant internet connection for full Cloud functionality.

SEM3T System – Thermal Monitoring System

The screenshot shows the SEM3T Cloud Configuration page. At the top, there is a navigation bar with 'Settings' selected. The main content area is titled 'Cloud Configuration' and contains several fields:

- Cloud Configuration:** A dropdown menu currently set to 'Enable'.
- Hostname:** A text input field containing 'https://southgate.eu1.mindsphere.io'.
- Port:** A text input field containing '443'.
- Profile:** A dropdown menu set to 'SHARED_SECRET'.
- Proxy Hostname:** An empty text input field.
- Proxy Port:** A text input field containing '0'.
- Initial Access Token:** An empty text input field.
- Tenant:** A text input field containing 'emlpprm'.

 A 'Save' button is located at the bottom of the configuration area.

Cloud configuration default fields for MindSphere connection

The hostname field has a maximum allowed length of 256 characters. Port has a range of 1 to 65535. Profile supports only SHARED_SECRET method. Proxy hostname and Proxy Port are optional and can be kept blank. The Proxy hostname field entries cannot be 255.255.255.255 or 0.0.0.0. Initial Access token has a maximum allowed length of 1000 characters. Tenant field has a maximum allowed length of 256 characters.

Cloud Configuration Help Page

The cloud configuration help page displays helpful information regarding the cloud configuration for reference.

The screenshot shows the 'Cloud Configuration Help' page. It features a heading 'Cloud Configuration' followed by a paragraph: 'Cloud configuration feature allows the user to send various data to MindSphere cloud based on configuration provided by the user.' Below this is a bulleted list:

- To disable cloud configuration, select "Disable" from drop down and click on "Save" button
- To enable cloud configuration, select "Enable" from the drop down and click on "Save" button
- Hostname**
 - It is host name of MindSphere is baseURL for configuring object. This parameter is mandatory.
- Port**
 - It is Port number of MindSphere which is typically 443. If not set by the user, port is set to 443 by default as this parameter is mandatory.
- Profile**
 - It is security profile for the communication with MindSphere. It can take values either SHARED_SECRET (default) or RSA_3072.
- Proxy Hostname**
 - It is host name of the proxy server if the connection to MindSphere is preferred to be established through a proxy. This is an optional parameter and is NULL by default.
- Proxy Port**
 - It is Port number of the proxy server. This is an optional parameter and is 0 by default.
- Initial Access Token**
 - Initial access token is provided in cloud configuration object obtained using MindSphere Launchpad. This is a mandatory parameter.
- Tenant**
 - It is tenant name on MindSphere. This is a mandatory parameter.

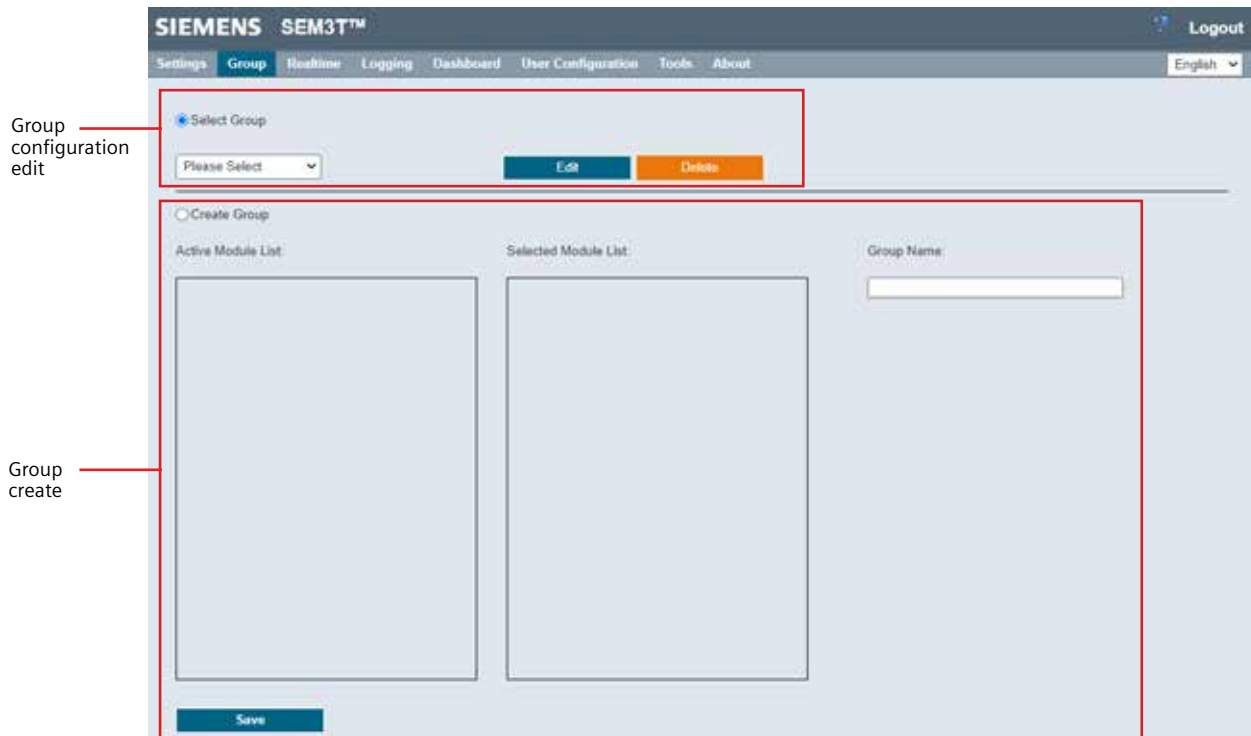
 At the bottom, it says 'Click "Save" button to save cloud configuration.'

Cloud Configuration help page

Group Module Configuration

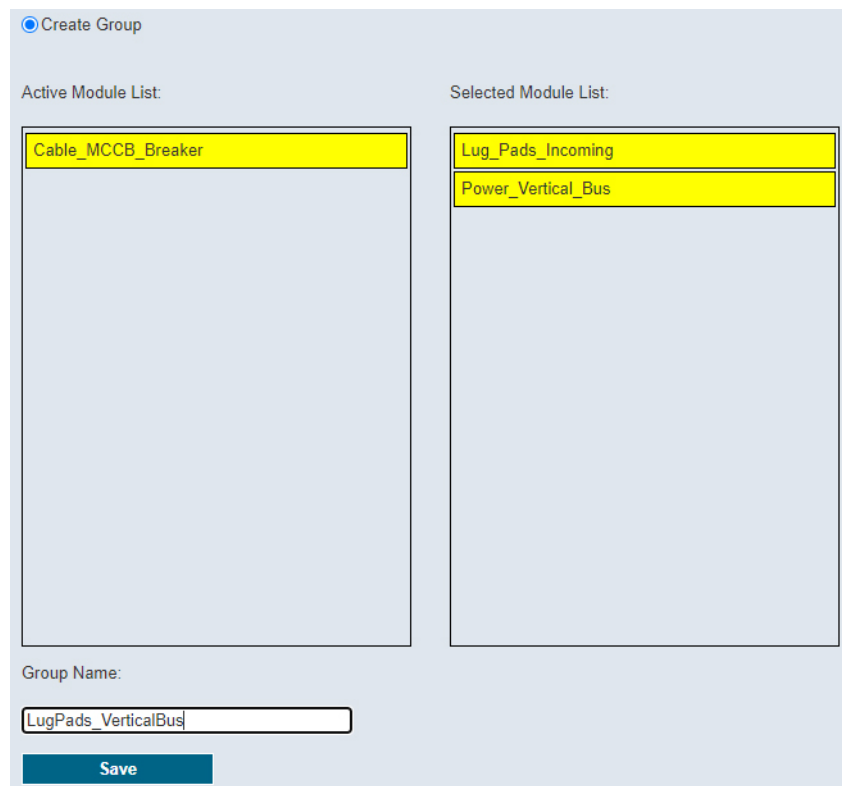
The user can group the modules together for displaying on the webpages. By grouping modules, the user can create data or alarm logs and view trending data based on whatever metric the user decides to group the modules. From this webpage, the user can also edit or delete existing groups. The controller will allow the user to create up to 16 groups.

SEM3T System – Thermal Monitoring System



Group configuration page

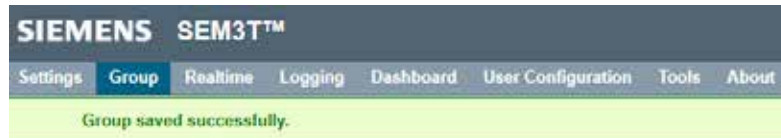
To create a new group, the user must click the Create Group radial button. Drag the desired modules from the Active Module List pane to the Selected Module List pane. Then type in a distinguishing group name in the Group Name field. The group name must start with a letter and can be a maximum of 19 characters. Once finished, click the Save button to save the configuration.



Create Group action

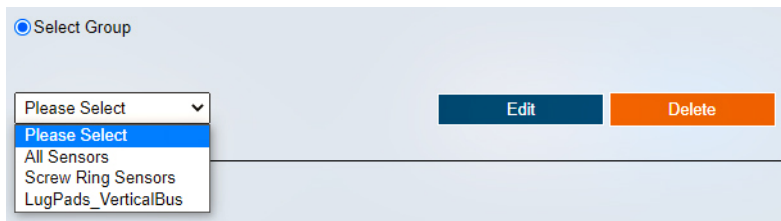
In case of successful save, a feedback in form of successful save is provided in the banner area.

SEM3T System – Thermal Monitoring System



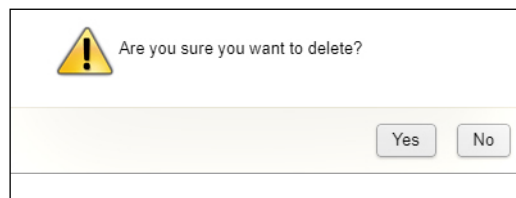
Successful group saved

To edit or delete an existing group, click the Select Group radial button. Then select the desired group from the dropdown list and click the Edit or Delete button. If editing, make necessary changes and click the Save button.



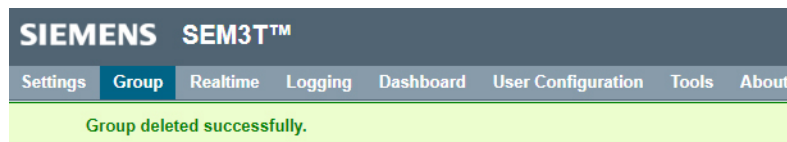
Editing a configured group

If deleting, the page will display a confirmation message. Click the Yes button to finish deleting the group. The webpage will display a message to confirm update.



Confirmation for deleting a created group

In case of a successful delete, a feedback in form of successful deletion is provided in the banner area.



Successful deletion of group

Group Configuration Help Page

The group configuration help page displays helpful information regarding the group configuration for reference.

Group Help

- This page provides a configuration screen that allows user to select thermal module to be part of a group for totalized display of values and alarms based on the location where the modules are installed.
- A save button is provided for the user to save the configuration.
- Max. 16 groups can be created.
- To create a group:
 - Select "Create Group"
 - Drag modules from "Active Module list" and drop it to "Selected Module List"
 - Assign group name
 - Hit "Save".
- To edit a group:
 - Select "Group" from drop down.
 - Click on "Edit" Button.
 - User should be able to update details in selected group.
- To delete a group:
 - Select "Group" from drop down.
 - Click on "Delete" Button and system should remove it from drop down.

Note: For any of the group, if logging is enabled, user will not be able to delete that group.

Group configuration help page

SEM3T System – Thermal Monitoring System

Realtime Page

The Realtime page is the landing page when the user successfully logs into the embedded webpages. It shows the system data and individual module data in tabular format. From the Realtime page, the user can view and clear alarm flags and view individual module maxima and minima in an expanded view of the modules. The user can also view group data on this webpage. The data on this page will display based on the configurations set on the System Settings page including the decimal resolution, refresh rate, and date format. For the average data calculation, if any of the individual modules are showing as error, the value is not included in the System average calculation.

Display selection (points to: All Modules | Select Group | Select)

System summary (points to: Total System Minimum (°C) 21.13, system Minimum Timestamp: 09-14-2020 13:59, Total System Maximum (°C) 27.26, System Maximum Timestamp: 09-12-2020 16:58, Total System Average (°C) 25.27, Reset button)

Reset alarm button (points to: Reset button)

Data display area (points to: Main data table)

Name	Temp (°C)	Minimum		Maximum		Reset	Alarm
		Value (°C)	Timestamp	Value (°C)	Timestamp		
1 Cable_MCCB_Breaker	26.16	21.26	09-14-2020 13:59	27.67	09-18-2020 16:55	<input type="checkbox"/>	<input type="checkbox"/>
2 Lug_Fault_Incoming	25.23	21.13	09-14-2020 13:09	27.67	09-19-2020 16:58	<input type="checkbox"/>	<input type="checkbox"/>
3 Power_Verical_Bus	26.42	23.52	09-23-2020 00:56	28.67	09-27-2020 16:02	<input type="checkbox"/>	<input type="checkbox"/>
4						<input type="checkbox"/>	<input type="checkbox"/>
5						<input type="checkbox"/>	<input type="checkbox"/>
6						<input type="checkbox"/>	<input type="checkbox"/>
7						<input type="checkbox"/>	<input type="checkbox"/>
8						<input type="checkbox"/>	<input type="checkbox"/>
9						<input type="checkbox"/>	<input type="checkbox"/>
10						<input type="checkbox"/>	<input type="checkbox"/>
11						<input type="checkbox"/>	<input type="checkbox"/>
12						<input type="checkbox"/>	<input type="checkbox"/>
13						<input type="checkbox"/>	<input type="checkbox"/>
14						<input type="checkbox"/>	<input type="checkbox"/>
15						<input type="checkbox"/>	<input type="checkbox"/>
16						<input type="checkbox"/>	<input type="checkbox"/>
17						<input type="checkbox"/>	<input type="checkbox"/>
18						<input type="checkbox"/>	<input type="checkbox"/>
19						<input type="checkbox"/>	<input type="checkbox"/>
20						<input type="checkbox"/>	<input type="checkbox"/>
21						<input type="checkbox"/>	<input type="checkbox"/>
22						<input type="checkbox"/>	<input type="checkbox"/>
23						<input type="checkbox"/>	<input type="checkbox"/>
24						<input type="checkbox"/>	<input type="checkbox"/>
25						<input type="checkbox"/>	<input type="checkbox"/>
26						<input type="checkbox"/>	<input type="checkbox"/>
27						<input type="checkbox"/>	<input type="checkbox"/>
28						<input type="checkbox"/>	<input type="checkbox"/>
29						<input type="checkbox"/>	<input type="checkbox"/>
30						<input type="checkbox"/>	<input type="checkbox"/>
31						<input type="checkbox"/>	<input type="checkbox"/>
32						<input type="checkbox"/>	<input type="checkbox"/>
33						<input type="checkbox"/>	<input type="checkbox"/>

Legend (points to: Legend section)

- IN: Module not configured
- EM: Module with Active Alarm
- SE: Module with Sensor Error
- CE: Communication Error
- Under Temperature Warning
- Under Temperature Alarm
- Over Temperature Warning
- Over Temperature Alarm
- Replace Sensor Alarm

Temperature Rise is always shown upto 4 decimal places.

Realtime page

To view all the modules in the system, the user must click the All Modules radial button in the display selection area.

SEM3T System – Thermal Monitoring System

The screenshot shows the SEM3T Realtime monitoring interface. At the top, there is a navigation bar with tabs: Settings, Group, Realtime (selected), Logging, Dashboard, User Configuration, Tools, and About. Below the navigation bar, there are radio buttons for 'All Modules' (selected) and 'Select Group', followed by a dropdown menu set to '-- Select --'. The main content area displays system statistics:

- Total System Minimum (°C): 21.13, System Minimum Timestamp: 09-14-2020 13:09
- Total System Maximum (°C): 27.86, System Maximum Timestamp: 09-18-2020 15:58
- Total System Average (°C): 26.27

Below the statistics is a table with columns for Name, Temp. (°C), Value (°C), Minimum Timestamp, Maximum Value (°C), Maximum Timestamp, and Alarm. The first three rows are highlighted with red boxes:

	Name	Temp. (°C)	Minimum		Maximum		Reset	Alarm
			Value (°C)	Timestamp	Value (°C)	Timestamp		
1	Cable_MCCB_Breaker	26.16	21.26	09-14-2020 13:09	27.67	09-18-2020 15:55	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	Lug_Pads_Incoming	26.23	21.13	09-14-2020 13:09	27.67	09-18-2020 15:58	<input type="checkbox"/>	<input type="checkbox"/>
3	Power_Vertical_Bus	26.42	23.52	09-23-2020 08:50	26.67	09-27-2020 16:02	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Realtime – View all modules

The user can view individual module information in the expanded view (will appear on the right side of the screen) by clicking the module number. The expanded view shows temperature rise data, alarm setpoints, module serial number and other relevant information.

The temperature value per module is available every 10 seconds. The display on the real-time page is dependent on the refresh rate defined in the System settings page.

The Temperature rise is calculated per the below formula

$$\text{Temperature Rise} = \frac{\text{End Temperature} - \text{Start Temperature}}{\text{Mean Time Interval}}$$

This gives a Temperature rise value in °C/minute if the temperature unit is selected as °C. The temperature rise parameter will remain at 0 °C/minute until at least one-time interval has elapsed. The time interval is defined in the Global settings page. value is calculated as an average value of all instantaneous temperature values over an interval.

$$\text{Mean Value} = \frac{\sum \text{Temperature entries over Mean Time Interval}}{\text{Mean Time Interval} * 6}$$

The multiplication factor of 6 is to account for a maximum of 6 entries per minute. The Mean Time interval is in minutes.

SEM3T System – Thermal Monitoring System

Monitoring Data:[Cable_MCCB_Breaker]

Temperature (°C): 26.16
 Temperature Rise (°C/ min.): 0.0007
 Mean Temperature (°C): 26.13
 Minimum Temperature (°C): 21.26
 Maximum Temperature (°C): 27.67
 Minimum Timestamp: 09-14-2020 13:09
 Maximum Timestamp: 09-18-2020 15:55
 Device Type: Thermal Module
 Slave Address: 1
 Serial Number: AE57673K01001Y1935
 Under Temperature Warning (°C): 0.00
 Under Temperature Alarm (°C): 72.00
 Under Temperature Warning Time Delay (Seconds): 1
 Under Temperature Alarm Time Delay (Seconds): 1
 Over Temperature Warning (°C): 0.00
 Over Temperature Alarm (°C): 0.00
 Over Temperature Warning Time Delay (Seconds): 1
 Over Temperature Alarm Time Delay (Seconds): 1
 Replace Sensor Alarm Time Delay (Seconds): 900

Alarm Data:

Under Temperature Warning
 Under Temperature Alarm
 Over Temperature Warning
 Over Temperature Alarm
 Replace Sensor Alarm

[Clear Alarm](#)

Realtime – expanded information

The module number column (left most column) will outline red if there are any active warnings or alarms and the Alarm column will display a colored flag based on what type of alarm is present.

	Name	Temp. (°C)	Minimum		Maximum		Reset	Alarm
			Value (°C)	Timestamp	Value (°C)	Timestamp		
1	Cable_MCCB_Breaker	26.16	21.26	09-14-2020 13:09	27.67	09-18-2020 15:55	<input type="checkbox"/>	
2	Lug_Pads_Incoming	26.23	21.13	09-14-2020 13:09	27.67	09-18-2020 15:58	<input type="checkbox"/>	
3	Power_Vertical_Bus	26.42	23.52	09-23-2020 08:50	26.67	09-27-2020 16:02	<input type="checkbox"/>	

Realtime – example of Alarm raised on Module

The user must manually clear any alarms as the flags will not reset if the warning or alarm condition is no longer present. The user can reset all alarm flags preset on multiple by ticking the check boxes next to the modules or individual modules and clicking the Reset button at the top of the page.

SEM3T System – Thermal Monitoring System

SIEMENS SEM3T™

Settings Group **Realtime** Logging Dashboard User Configuration Tools About

All Modules Select Group -- Select --

Total System Minimum (°C): 21.13 System Minimum Timestamp: 09-14-2020 13:09 **Reset**

Total System Maximum (°C): 27.86 System Maximum Timestamp: 09-18-2020 15:58

Total System Average (°C): 26.27

	Name	Temp. (°C)	Minimum		Maximum		Reset	Alarm	Name	Temp. (°C)
			Value (°C)	Timestamp	Value (°C)	Timestamp				
1	Cable_MCCB_Breaker	26.16	21.26	09-14-2020 13:09	27.67	09-18-2020 15:55	<input checked="" type="checkbox"/>	■	33	-
2	Lug_Pads_Incoming	26.16	21.13	09-14-2020 13:09	27.67	09-18-2020 15:58	<input checked="" type="checkbox"/>	■	34	-
3	Power_Vertical_Bus	26.42	23.52	09-23-2020 08:50	26.67	09-27-2020 16:02	<input checked="" type="checkbox"/>	■	35	-

Reset all Alarms

The user can clear individual alarms in the expanded individual module view by clicking the checking boxes of the active alarms and clicking the Clear Alarm button. The page will gray out any boxes of alarms that are not present.

SIEMENS SEM3T™

Settings Group **Realtime** Logging Dashboard User Configuration Tools About

All Modules Select Group -- Select --

Total System Minimum (°C): 21.13 System Minimum Timestamp: 09-14-2020 13:09 **Reset**

Total System Maximum (°C): 27.86 System Maximum Timestamp: 09-18-2020 15:58

Total System Average (°C): 26.27

	Name	Temp. (°C)	Minimum		Maximum		Reset	Alarm	Name	Temp. (°C)
			Value (°C)	Timestamp	Value (°C)	Timestamp				
1	Cable_MCCB_Breaker	26.16	21.26	09-14-2020 13:09	27.67	09-18-2020 15:55	<input checked="" type="checkbox"/>	■	33	-
2	Lug_Pads_Incoming	26.23	21.13	09-14-2020 13:09	27.67	09-18-2020 15:58	<input type="checkbox"/>	■	34	-
3	Power_Vertical_Bus	26.35	23.52	09-23-2020 08:50	26.67	09-27-2020 16:02	<input type="checkbox"/>	■	35	-

Reset individual Module Alarms

SEM3T System – Thermal Monitoring System

Over Temperature Alarm (°C): 25.00
 Over Temperature Warning Time Delay (Seconds): 1
 Over Temperature Alarm Time Delay (Seconds): 1
 Replace Sensor Alarm Time Delay (Seconds): 900

Alarm Data:

Under Temperature Warning
 Under Temperature Alarm
 Over Temperature Warning
 Over Temperature Alarm
 Replace Sensor Alarm

Clear Alarm

Reset individual alarm in individual module

Should any of the modules have any issues, the page will display an error message in the row of the module with the error.

1. The NC error message is displayed if the module is not configured in the Module Configuration page (It is available but has not been configured as a Thermal Module).
2. The CE error message is displayed if the controller is not communicating with a module.
3. The SE error message is displayed if the controller is communicating with the module, but the sensor is not relaying temperature information or if the sensor value is outside the operating temperature of the sensor.

The user can then troubleshoot the modules in question.

1	Top Bus Bar	26.35	25.41	11-12-2018 08:09	26.35	11-12-2018 08:52
2	Thermal Module 2	-CE-	-CE-	-CE-	-CE-	-CE-
3	Thermal Module	26.54	25.47	11-12-2018 08:01	26.60	11-12-2018 08:56

Communication Error

1	Top Bus Bar					
2	Thermal Module 2	-SE-	-SE-	-SE-	-SE-	-SE-
3	Thermal Module	26.42	25.47	11-12-2018 08:01	26.60	11-12-2018 08:56

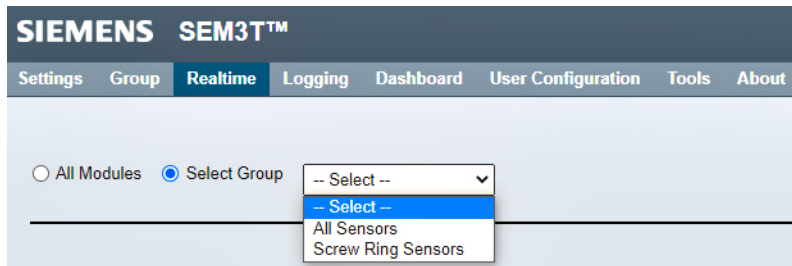
Sensor Error

1	Top Bus Bar	26.23	25.41	11-12-2018 08:09	26.35	11-12-2018 08:52	<input type="checkbox"/>
2	-NC-	-NC-	-NC-	-NC-	-NC-	-NC-	<input type="checkbox"/>
3	Thermal Module 3	26.60	25.47	11-12-2018 08:01	26.60	11-12-2018 08:56	<input type="checkbox"/>

Not configured error

SEM3T System – Thermal Monitoring System

To display group data, the user must click the Select Group Radial button in the display selection area and select the desired group from the dropdown list. The page will display group information as well as the individual modules in the group. The user can then perform all the tasks available in the All Modules page.



Select group option

SIEMENS SEM3T™

Settings Group **Realtime** Logging Dashboard User Configuration Tools About

English

All Modules
 Select Group
 Screw Ring Sensors

Group Average (°C):	26.38	Group Mean (°C):	26.39	Reset	
Group Minimum (°C):	21.13	Minimum Timestamp:	09-16-2020 14:14		
Group Maximum (°C):	27.86	Maximum Timestamp:	09-18-2020 15:59		

Name	Temp. (°C)	Minimum		Maximum		Alarm
		Value (°C)	Timestamp	Value (°C)	Timestamp	
2 Lug_Pads_Incoming	26.29	21.13	09-14-2020 13:09	27.67	09-18-2020 15:58	■
3 Power_Vertical_Bus	26.48	23.52	09-23-2020 08:50	26.67	09-27-2020 16:02	■

Legend:

-NC-	Module not configured	■	Under Temperature Warning
nn	Module with Active Alarms	■	Under Temperature Alarm
-SE-	Module with Sensor Error	■	Over Temperature Warning
-CE-	Communication Error	■	Over Temperature Alarm
		■	Replace Sensor Alarm

* - Temperature Rise is always shown upto 4 decimal places.

Monitoring Data:[Lug_Pads_Incoming]

Temperature (°C):	26.29
Temperature Rise (°C/ min.):*	0.0007
Mean Temperature (°C):	26.30
Minimum Temperature (°C):	21.13
Maximum Temperature (°C):	27.67
Minimum Timestamp:	09-14-2020 13:09
Maximum Timestamp:	09-18-2020 15:58
Device Type:	Thermal Module
Slave Address:	2
Serial Number:	AE57673K01001B1935
Under Temperature Warning (°C):	0.00
Under Temperature Alarm (°C):	0.00
Under Temperature Warning Time Delay (Seconds):	1
Under Temperature Alarm Time Delay (Seconds):	1
Over Temperature Warning (°C):	0.00
Over Temperature Alarm (°C):	25.00
Over Temperature Warning Time Delay (Seconds):	1
Over Temperature Alarm Time Delay (Seconds):	1
Replace Sensor Alarm Time Delay (Seconds):	900

Group Data Display

SEM3T System – Thermal Monitoring System

Realtime Help Page

The real-time help page displays helpful information regarding the real-time page.

Realtime Help

- This page contains constantly updated information for all configured and responding modules. The "Total" System Temperature status (as set in the branch configuration page) are displayed at the top of the page.
- Basic information for all modules are displayed in the table along with any alarms if they are active for a particular module.

Detailed Status

- Click a grid number on the list to display detailed information about that particular module.
- A table with more detailed information should appear to the right.
- Not Configured (-NC-) Module:** If a thermal module is connected with the module rack but not configured, then -NC- error message should be displayed in all data fields for that module.
- Sensor Error (-SE-) Module:** If a thermal sensor is not connected with the thermal module or if the module temperature value is found less than -50° C or greater than 150° C, then -SE- error message should be displayed in all data fields for that module.
 - Note:** The temperature value of the modules with sensor error will be displayed in the exponential format (ex: -9.22337e+18) in the detailed information of the particular module.
- Communication Error (-CE-) Module:** If a thermal module is configured but not in communication, then -CE- error message should be displayed in all data fields for that module.
- Temperature Rise:** It will display the rise in temperature, this will remain at 0 °C/min or 0 °F/min as per the configured temperature unit until at least one time interval has been elapsed.
 - Note:** Temperature Rise is always shown upto 4 decimal places.
- Timestamp:** Minimum and Maximum Timestamp value will be displayed in MM-DD-YYYY HH.MM or DD-MM-YYYY HH.MM format as saved on "System Settings" page.

Clearing Alarm Data

- Click a grid number on the list with an active alarm.
 - Note:** Refer to the legend below for alarm designation and information.
- Alarm options will appear to the right below the detailed information.
- Select the alarm options to clear.
- Click "Clear Alarm" button.

Note: This can only be done by users with supervisor or controller access level.

Alarms

- Under Temperature Warning:** The under temperature warning is generated when the temperature value has fallen below the setpoint.
- Under Temperature Alarm:** The under temperature alarm is generated when the temperature value falls below the under temperature alarm value configured.
- Over Temperature Warning:** The over temperature warning alarm is generated when the temperature value has risen above the setpoint.
- Over Temperature Alarm:** The over temperature alarm is generated when the temperature value rises above the over temperature alarm value configured.
- Replace Sensor Alarm:** The replace sensor alarm is generated when the temperature value rises above 150° C or falls below the -50° C or if the thermal sensor is not connected with the thermal module.
 - Note:** Sensor temperature has exceeded the operating temperature of the sensor, to avoid further damage and avoid erroneous temperature reading, the customer shall replace the sensor to acknowledge the alarm.

Reset Alarms

- All the generated alarms for modules can be reset by selecting the checkbox under "Reset" field for every configured modules, and click on "Reset" button to reset the alarms.

Group Modules

- Select "Group" from Drop down and all Modules would be display.
- The whole "Group" Temperature status is displayed at the top of the page.
- Click a grid number on the list to display detailed information about that particular module.
- A table with more detailed information should appear to the right.
- Select "All Modules" Options to display all Modules.

Realtime help page

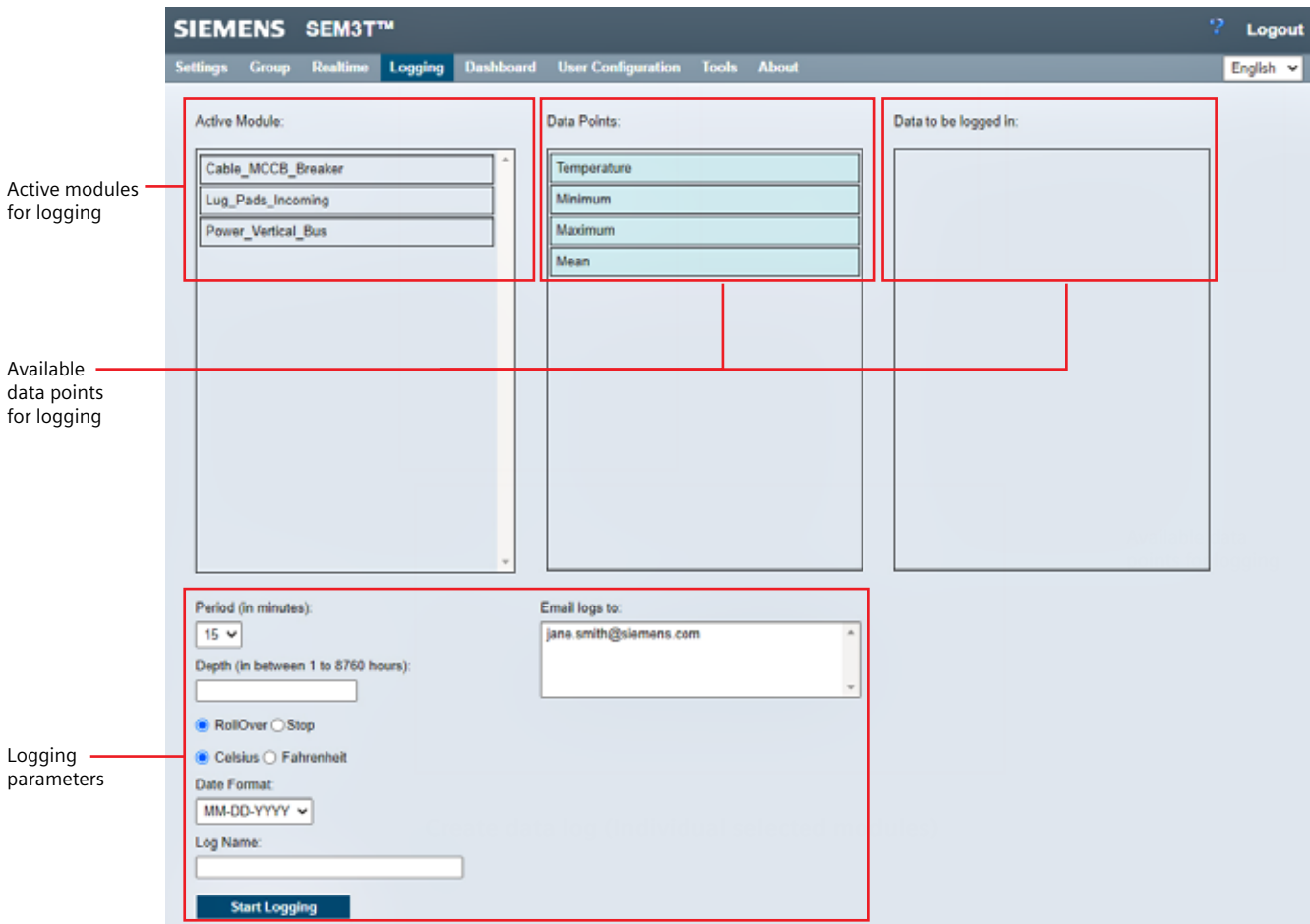
Logging

The user can create data and alarm event logs for individual modules as well as configured groups. The user can also view, print, and download the system event log. All these logs are stored on the microSD card for download through the microSD card information page.

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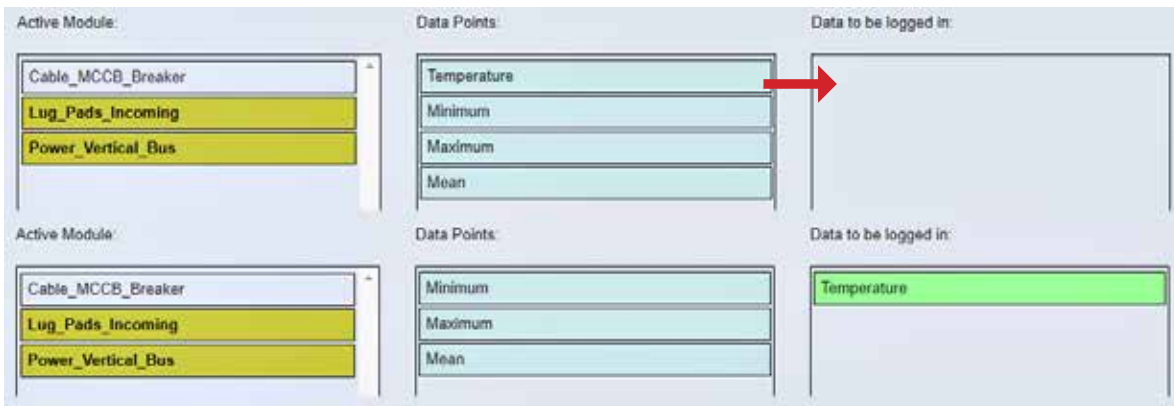
Data Log

The user can create and view data logs from the webpages for individually selected modules as well as group data logs. The user can create up to 16 data logs for individual selected modules. The webpage will display an error if the allowed number of logs is exceeded.



Create Data Log (Individual selected modules)

The user needs to highlight the individual modules that are required to be logged from the active module column. The user then needs to drag the data points to be logged from the Data points column to the Data to be logged in column. The user can configure all or some of data points from the list of Temperature, Minimum, Maximum and Mean temperature to log.



Configuration of log - Data points

The user needs to include the parameters for logging when saving the logs. The user can select how often the data is written to the log. Minimum is 1 minute, and Max is at 1 hour intervals. A default of 15 minutes is chosen.

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Configuration of log - Parameters - Period

The depth of the log allows user to define how long the log will be active between 1 hour to 8760 hours (~equivalent of 1 year).

The user can identify the disposition of the log after the end of the depth – either rollover or stop. If rollover is selected, the oldest logged data values will be written over in the log when the depth is exceeded.

The user can also identify what units the temperature values are stored in the log. This can be independent of the units the values are displayed in the Realtime page. The user can define the format of the date to be displayed in the log. The default is MM-DD-YYYY format.

Configuration of log - Parameters - Date format

After the selection of above mandatory fields, the user shall identify a name for the log.

There are other optional features which can be used if the log needs to be emailed to recipients.

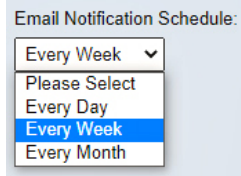
Configuration of Log - Parameters - Email settings

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The user can schedule the log to be emailed to a specific user or all users with email addresses identified as an attachment to the email. Multiple users can be selected by using a combination of control key and the mouse click.

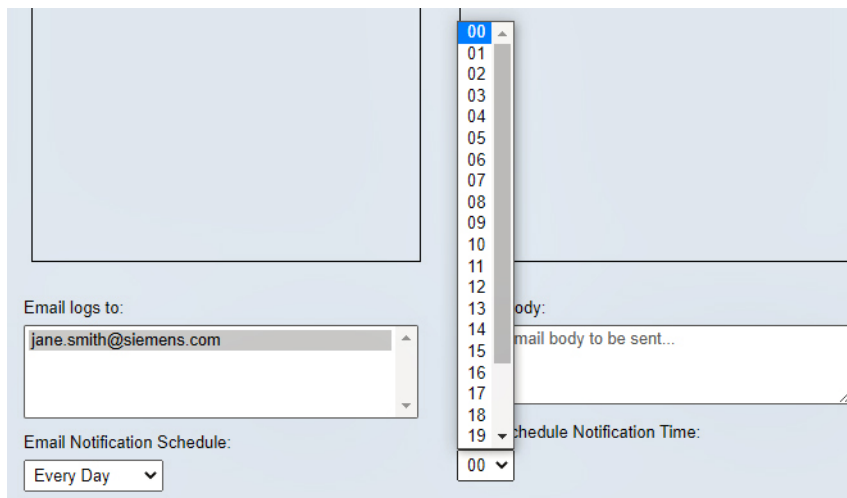
The user can enter a note for the body of the email. The maximum email body message limit is 250 letters.

The email schedule is defined by the selection on the drop-down menu. By default, every day is selected.

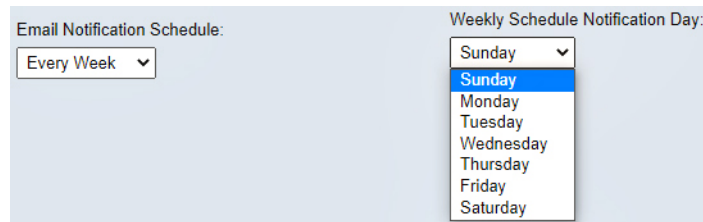


Email schedule selection

Further based on the schedule selection, the specific schedule selection appears.



Day schedule selection



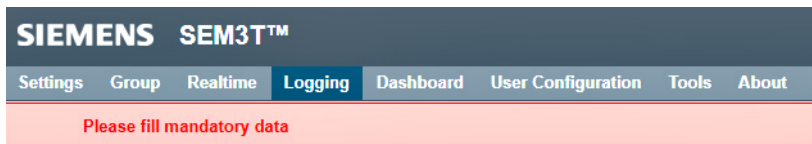
Weekly schedule selection

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The screenshot shows a configuration form with several fields. A dropdown menu is open, displaying a list of numbers from 00 to 19. Below the menu, the 'Email logs to' field contains 'jane.smith@siemens.com'. The 'Email Notification Schedule' is set to 'Every Day'. Other fields include 'Schedule Notification Time' (set to 00) and a text area for 'Email body to be sent...'.

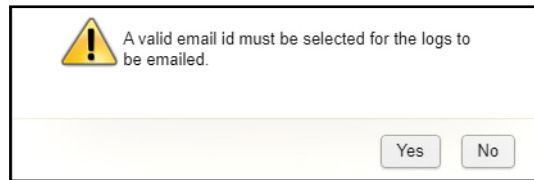
Monthly schedule selection

After all parameters have been entered, the user shall click on “Start Logging” to start the logging operation. If there are missing data or incorrect data, an error message will be displayed in the banner area.



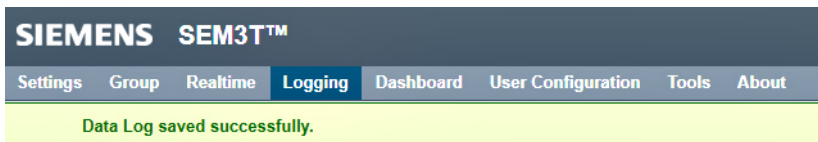
Incorrect data error

In case during the creation of the log, the user does not select the optional parameters (email settings) or the email ID is not configured from the User Profile/User Management webpage, a reminder is shown to allow the user to acknowledge. If the user wants to proceed, the yes button is clicked. If the user desires to enter the email settings, the no button is clicked, and the email settings can be configured.



Email settings reminder

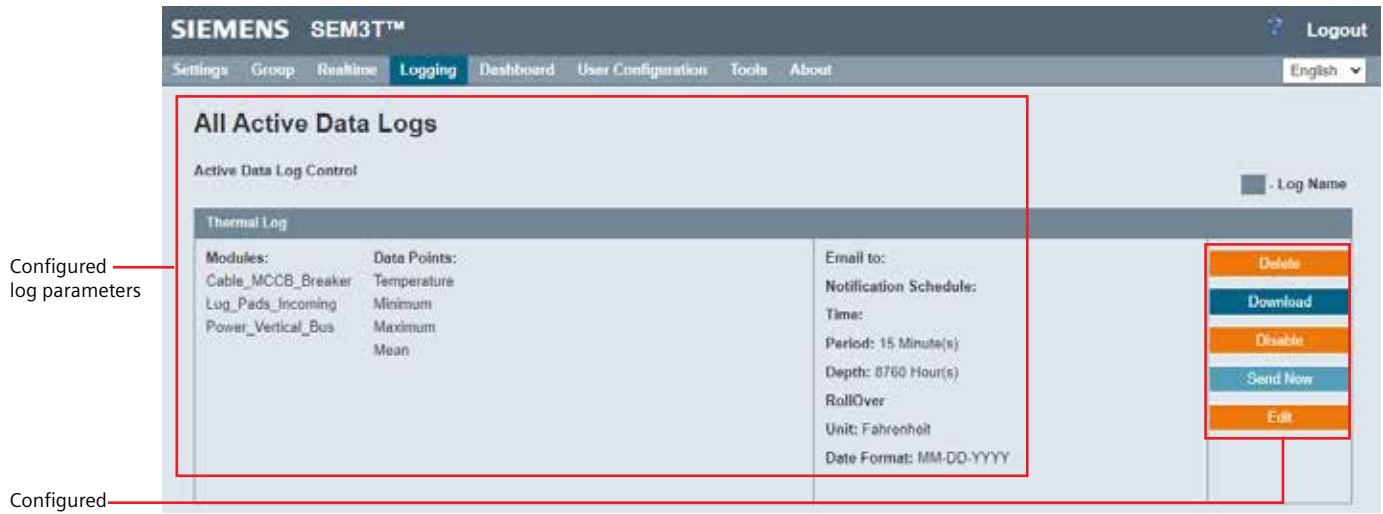
On successful configuration of a log, the success message is displayed in the banner area.



Successful Data log saved

SEM3T System – Thermal Monitoring System

The view data logs page shows the configured data logs with all parameters.



View configured data logs

As part of the configured log operations, the user can delete, download, disable and edit a log. The user can also force sending of the log as email immediately upon clicking the send now button. The edit button will navigate the user to the configuration page to modify the parameters of the previously log.

A previously configured log can no longer be edited if it had been configured to stop when the depth is exceeded, and it has reached its stop stage. If the specific data log has not reached its stop stage or if email is not in progress of being delivered, the user can edit the active modules, period, log name and email parameters. A disabled log (Stopped or disabled via button) is not sent by email, when the pre-specified time is reached during the log configuration.

A previously configured log when downloaded can be imported into a spreadsheet application. The download CSV files needed to be converted to UTF-8 encoding format to visualize the data properly.

The data log file contains a timestamp, module name and the parameters which are selected to be logged.

Date (MM-DD-YY)	ModuleName	Temperature (°F)	Minimum (°F)	Maximum (°F)	Mean (°F)
9/14/2020 13:00	Cable_MCCB_Breaker	70.49	70.26	74.23	70.38
9/14/2020 13:00	Lug_Pads_Incoming	70.15	70.04	79.55	70.09
9/14/2020 13:00	Power_Vertical_Bus	70.38	70.15	79.43	70.26
9/14/2020 13:15	Cable_MCCB_Breaker	70.94	70.26	74.23	70.68
9/14/2020 13:15	Lug_Pads_Incoming	70.72	70.04	79.55	70.43
9/14/2020 13:15	Power_Vertical_Bus	70.83	70.15	79.43	70.61
9/14/2020 13:30	Cable_MCCB_Breaker	72.08	70.26	74.23	71.42
9/14/2020 13:30	Lug_Pads_Incoming	72.08	70.04	79.55	71.31
9/14/2020 13:30	Power_Vertical_Bus	72.19	70.15	79.43	71.56
9/14/2020 13:45	Cable_MCCB_Breaker	72.64	70.26	74.23	72.33
9/14/2020 13:45	Lug_Pads_Incoming	72.53	70.04	79.55	72.31

Downloaded log file in spreadsheet

SEM3T System – Thermal Monitoring System

Create Datalog help page

The create data log help page displays helpful information regarding the create data log page.

Data Logging help

Data logging feature allows the user to log metering data based on various configuration. The user will be able to configure up to 16 data logs based on particular application.

Once data logging is enabled, the controller periodically writes the values of specific data points to files on the microSD card. The user can delete, download, enable/disable, email and edit data logs if required.

To configure a data log:

- Select modules from "Active Module" list
- Drag required data points on "Data to be logged in" list
- Set Period from the drop down menu
- Enter the Depth of data within the given range
- Select "Rollover" or "Stop" radio button
- Select "Celsius" or "Fahrenheit" radio button to configure temperature unit
- Select "MM-DD-YYYY" or "DD-MM-YYYY" date format and that date format will be displayed on the log
- Specify "Log Name"
- Email Logs to(Optional): List of all configured Email IDs
- Email Notification Schedule(Optional): Select any one from the drop down "Every Day", "Every Week" or "Every Month"
- Notification Time(Optional)
- Email Body(Optional)
- Hit "Start Logging"

Where,

Period: It is the time interval in minutes at which data logs will be written.

Depth: It is the number of hours for which data logs will be written.

RollOver: In case of log file is full, Rollover happens i.e. data logging will be started from the 1st line.

Stop: After the configured Depth(hours) data logging will be stopped.

Unit: Module data will be logged in the selected temperature unit.

Email: List of configured Email IDs to notify data log as an email attachment on the configured notification schedule. Email Body message box will be displayed only when the user selects the email ID from the drop down of Email IDs list. Maximum Email body message limit is 250 letters.

Note: The maximum 10 emails with the attachment file size of 7 MB will be sent to a configured email address.

Create Data Log help page

View Data log help page

The view data log help page displays helpful information regarding the view data log page.

View Active Data Logs Help

Configured logs will be populated on this page identified by its unique "Log Name".

User can perform following actions on this page:

- Enable/disable specific data log
- Delete a log
- Download log in CSV format
- Email log using "Send Now" button.
- Edit specific log parameters like addition/deletion of configured/new modules, addition or modification of email address, modification of email frequency, renaming of log name and the period(a lower value only).

Note:

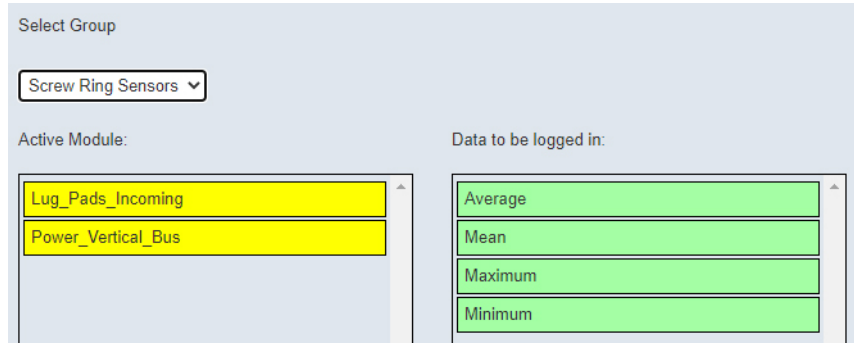
- An email will be sent to the user(s) selected as part of data log configuration. Data log will be available as csv attachment and body message will be part of email content.
- It is required to configure SMTP on "System Settings" page for email feature.
- The log cannot be edit if a configured log has reached its "Stop" point.

View Data log help page

Group Data Log

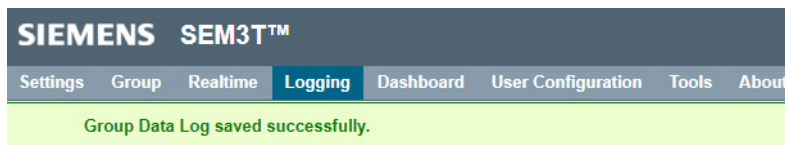
For group logs, the user can create up to 16 combined data and alarm event logs (e.g. 8 group data logs and 8 alarm event logs, 5 group data logs and 11 group alarm event logs, etc.). While configuring a group data log like the individual module data log, the user shall select the group that is needed to be logged. Upon selection of the group, the respective modules in the group are populated in the Active Module column. The data to be logged in group data logs is fixed to the default parameters (average, mean, maximum, and minimum). The rest of the configuration is like the individual module data log page.

SEM3T System – Thermal Monitoring System



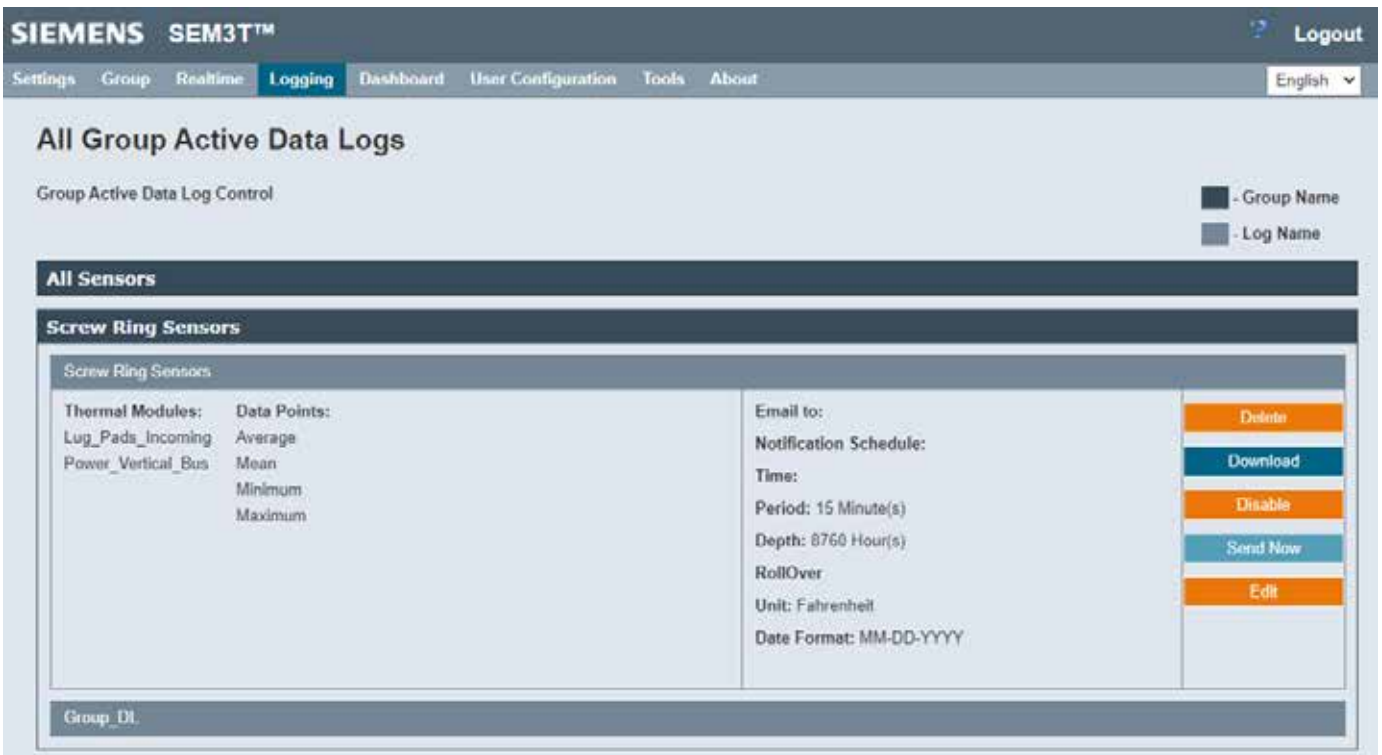
Create Group Data log configuration

On successful saving of the group data log, a success message appears on the banner area.



Successful group data log saved

Like individual data logs, the user can view the group data log and perform the operations like the individual data logs.



View group data log

The group data log file contains the Group Name, timestamp and the data points to be logged.

SEM3T System – Thermal Monitoring System

Create Group Data log help page

The Create group data log help page has relevant information for the group data log configuration.

Group Data Logging Help

Group Data logging feature allows user to log metering data based on various configuration. The user will be able to configure up to 16 group logs based on particular application.

Once group data logging is enabled, the controller periodically writes the values of specific data points to files on the microSD card. The user can delete, download, enable/disable, email and edit data logs if required.

To configure a group data log:

- Select group from "Select Group" dropdown.
- All available data points are applicable to Group Data Log.
- Set Period from the drop down menu.
- Enter the Depth of data within the given range.
- Select "Rollover" or "Stop" radio button.
- Select "Celsius" or "Fahrenheit" radio button to configure temperature unit.
- Select "MM-DD-YYYY" or "DD-MM-YYYY" date format and that date format will be displayed on the log.
- Specify "Log Name".
- Email Logs to(Optional): List of all configured Email Ids.
- Email Notification Schedule(Optional): Select any one from the drop down "Every Day", "Every Week" or "Every Month".
- Notification Time(Optional).
- Email Body(Optional).
- Hit "Start Logging".

Where,

Period: It is the time interval in minutes at which data logs will be written.

Depth: It is the number of hours for which data logs will be written.

RollOver: In case of log file is full, Rollover happens i.e.data logging will be started from the 1st line.

Stop: After the configured Depth(hours) data logging will be stopped.

Unit: Module data will be logged in the selected temperature unit.

Email: List of configured Email Ids to notify data log as an email attachment on the configured notification schedule. Email Body message box will be displayed only when the user selects the email ID from the drop down of Email IDs list. Maximum Email body message limit is 250 letters.

Note: The maximum 10 emails with the attachment file size of 7 MB will be sent to a configured email address.

Create Group Data Log help page

View Group Data log help page

The view group data log help page displays helpful information regarding the view group data log page.

View Active Group Data Logs Help

Configured logs will be populated on this page identified by its unique "Log Name".

User can perform following actions on this page:

- Enable/disable specific group data log
- Delete a log
- Download log in CSV format
- Email log using "Send Now" button.
- Edit specific log parameters like addition or modification of email address, modification of email frequency, renaming of log name and the period(a lower value only).

Note:

- An email will be sent to the user(s) selected as part of group data log configuration. Group Data log will be available as csv attachment and body message will be part of email content.
- It is required to configure SMTP on "System Settings" page for email feature.
- The log cannot be edit if a configured log has reached its "Stop" point.

View Group Data log help page

SEM3T System – Thermal Monitoring System

Alarm Event Log

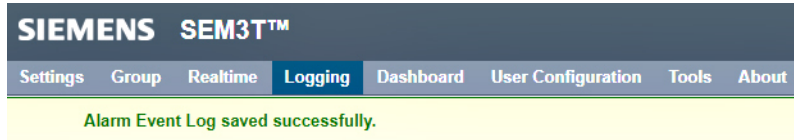
Like the Individual modules data log page, the individual modules alarm event log allows the user to select the modules for which logs need to be configured. The user can configure a maximum of 16 alarm event logs. The page allows the user to select from list of available alarm events that can be logged at the same time.

Create Alarm Event Log page

The user can select all or some of the data points from the list of Under Temperature Warning, Under Temperature Alarm, Over Temperature Warning, Over Temperature alarm, Replace Sensor Alarm as possible data points to log.

The rest of the configurable parameters is like the data log configuration page. The depth in case of Alarm events is the number of maximum entries and is between 1 to 5000 entries. Upon successful creation of the alarm event log, a message appears in the banner area.

SEM3T System – Thermal Monitoring System



Successful Alarm event log saved

The view alarm event log page shows the previously configured alarm event logs. The operations allowed on this page are like the operations discussed under the individual modules view data log page.

If the specific alarm event log has not reached its stop stage or if email is not in progress of being delivered, the user can edit the active modules, log name and email parameters.



View Alarm event log page

The Alarm event log file contains a timestamp, Module name, alarm type, alarm acknowledge time if applicable and the username which acknowledged the alarm and a reference id.

SEM3T System – Thermal Monitoring System

Create Alarm Event log help page

The create alarm event log help page displays helpful information for the create alarm event log page.

Alarm Logging Help

Alarm logging feature allows the user to log various alarms based on configuration provided by the user. The user will be able to configure up to 16 alarm logs based on particular application.

Once the alarm log is enabled, the controller periodically writes the values of specific alarms to files on the microSD card. The user can delete, download, enable/disable, email and edit data logs if required.

To configure an alarm log:

- Select modules from "Active Module" list
- Drag required data points on "Data to be logged in" list
- Enter the Depth of data within the given range
- Select "Rollover" or "Stop" radio button
- Select "MM-DD-YYYY" or "DD-MM-YYYY" date format and that date format will be displayed on the log
- Specify "Log Name"
- Email Logs to(Optional): List of all configured Email Ids
- Email Notification Schedule(Optional): Select any one from the drop down "Every Day", "Every Week" or "Every Month"
- Notification Time(Optional)
- Email Body(Optional)
- Hit "Start Logging"

Where,

Depth: It is the number of hours for which data logs will be written.

RollOver: In case of log file is full, Rollover happens i.e data logging will be started from the 1st line.

Stop: After the configured Depth(hours) data logging will be stopped.

Email: List of configured Email Ids to notify data log as an email attachment on the configured notification schedule. Email Body message box will be displayed only when the user selects the email ID from the drop down of Email IDs list. Maximum Email body message limit is 250 letters.

Note: The maximum 10 emails with the attachment file size of 7 MB will be sent to a configured email address.

Create Alarm Event log help page

View Alarm Event log help page

The view alarm event log help page displays help information about the view alarm event log page.

View Active Alarm Event Log Help

Configured logs will be populated on this page identified by its unique "Log Name".

User can perform following actions on this page:

- Enable/disable specific Alarm log
- Delete a log
- Download log in CSV format
- Email log using "Send Now" button.
- Edit specific log parameters like addition or modification of email address, modification of email frequency and renaming of log name.

Note:

- An email will be sent to the user(s) selected as part of Alarm log configuration. Alarm log will be available as csv attachment and body message will be part of email content.
- It is required to configure SMTP on "System Settings" page for email feature.
- The log cannot be edit, if a configured log has reached its "Stop" point.

View Alarm event log help page

SEM3T System – Thermal Monitoring System

Group Alarm Event Log

As mentioned under group data logs, for group logs, the user can create up to 16 combined data and alarm event logs (e.g. 8 group data logs and 8 alarm event logs, 5 group data logs and 11 group alarm event logs, etc.). Like the group data log, the group event log page allows the user to select previously configured groups and configure logs for the modules part of the group.

Select Group
Screw Ring Sensors

Active Module:

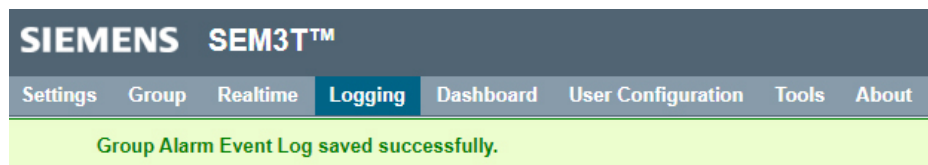
- Lug_Pads_Incoming
- Power_Vertical_Bus

Data to be logged in:

- Under Temperature Warning
- Under Temperature Alarm
- Over Temperature Warning
- Over Temperature Alarm
- Replace Sensor Alarm

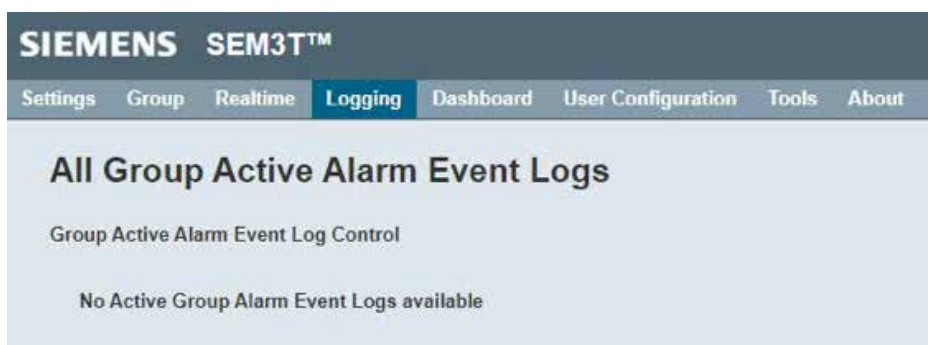
Create group alarm event log

The alarms included in the group alarm event log are fixed to the available alarms. The rest of the configuration is like the individual module alarm event log page. Upon successful saving of a group alarm event log, a success message is displayed in the banner area.



Successful group alarm event log saved

If no logs are configured navigating the view log page will show a message saying no logs are configured. This is same for all types of logs (data, alarm event logs, both individual and group).



No available configured logs

SEM3T System – Thermal Monitoring System

When group alarm event logs are configured, the view page shows the available configured group alarm event logs.

View group alarm event log page

The features of the view group event log page are like the group data log event page with operations and parameters of the configured group logs visible.

A group alarm event log contains a group name, timestamp, module name, alarm type, acknowledge time, a username associated when alarm is acknowledged and a reference id.

Create Group Alarm Event log help page

The create group alarm event log help page displays helpful information for the group create alarm event log help page.

Create group alarm event log help page

SEM3T System – Thermal Monitoring System

View Group Alarm Event log help page

The view group alarm event log help page displays helpful information for the view group alarm event log help page.

View Active Group Alarm Event Logs Help

Configured logs will be populated on this page identified by its unique "Log Name".

User can perform following actions on this page:

- Enable/disable specific group alarm log
- Delete a log
- Download log in CSV format
- Email log using "Send Now" button.
- Edit specific log parameters like addition or modification of email address, modification of email frequency and renaming of log name.

Note:

- An email will be sent to the user(s) selected as part of group alarm log configuration. Group alarm log will be available as csv attachment and body message will be part of email content.
- It is required to configure SMTP on "System Settings" page for email feature.
- The log cannot be edit if a configured log has reached its "Stop" point.

View group alarm event log help page

System Event Log

The System Event Log page allows to the user to see all the logged system events. The user can also download the log as a *.CSV file or print the log from this page. The log will hold 1000 items. Once the maximum has been reached, the log will overwrite older entries. The row of the most recent entry is highlighted in yellow.

SIEMENS SEM3T™
Logout

Settings Group Realtime **Logging** Dashboard User Configuration Tools About
English ▾

Download

Print

Event Id	Module Id	Parameter Id	Date (MM-DD-YYYY)	Time	Parameter Value	User Name
000	Module 1	Under Temperature Warning	09-28-2020	08:55:42 AM	0.00 (°C)	admin
001	Module 1	Under Temperature Warning Time Delay	09-28-2020	08:55:42 AM	1 Seconds	admin
002	Module 1	Under Temperature Alarm	09-28-2020	08:55:42 AM	72.00 (°C)	admin
003	Module 1	Under Temperature Alarm Time Delay	09-28-2020	08:55:42 AM	1 Seconds	admin
004	Module 1	Over Temperature Warning	09-28-2020	08:55:42 AM	0.00 (°C)	admin
005	Module 1	Over Temperature Warning Time Delay	09-28-2020	08:55:42 AM	1 Seconds	admin
006	Module 1	Over Temperature Alarm	09-28-2020	08:55:42 AM	0.00 (°C)	admin
007	Module 1	Over Temperature Alarm Time Delay	09-28-2020	08:55:42 AM	1 Seconds	admin
008	Module 3	Under Temperature Warning	09-28-2020	08:55:42 AM	0.00 (°C)	admin
009	Module 3	Under Temperature Warning Time Delay	09-28-2020	08:55:42 AM	1 Seconds	admin
010	Module 3	Under Temperature Alarm	09-28-2020	08:55:42 AM	72.00 (°C)	admin

Recording operations

System event logs

System event log page

SEM3T System – Thermal Monitoring System

The page captures an event identification parameter, module id which can be a system event or an event occurring with a specific module, parameter id which denotes the specific system event, a date/time of the event, the value of the parameter followed by the user triggering the event either the system or the specific user logged into the system.

Among the events logged following are captured.

1. Controller power-up events: At every power, up the configured IPv4 and IPv6 address are captured along with the power-up event.
2. Firmware upgrade: When the controller firmware is field upgraded, the success of the firmware upgrade is captured.
3. Ethernet IP state and IP address change: When the controller IP state changes from static to DHCP or when the IPv4/IPv6 address are changed, the new fields are captured. Likewise, the changes in the default gateway, subnet mask, prefix length are captured.
4. When the offline configuration is imported, the event logger captures the event.
5. Any global resets are captured as system event.
6. If any of the thermal module configuration values are changed, the system event is captured.
7. When the temperature unit is changed from °C to °F or vice versa, a system event is captured.
8. When the temperature alarms are acknowledged a system, event is captured.
9. When the time synchronization with an NTP server is successful, NTP sync event is displayed.

System Event log help page

The system event log help page displays helpful information for the system event log page.

Event Logging Help

This page displays a time stamped log of various events associated with SEM3T controller and modules. This feature will store the logs in the SD card within the controller.

Events are recorded with following information:

- Event ID (000 to 999)
- Module ID
- Parameter ID
- Date and time of the change
- New value of the parameter
- User name

The Event Logger shall log following events:

- System Specific Events:
 - Controller Power-up
 - Firmware Upgrade
 - IPv4 Static / DHCP configuration
 - Subnet Mask
 - Default Gateway
 - IPv6 Static / DHCP configuration
 - Prefix length
 - Default Gateway
 - Offline configuration import
 - Global resets
 - Thermal module configuration change
 - Temperature unit
 - Thermal module alarm acknowledgement
- Module Specific Events:
 - All module configuration available on Branch Configuration page.

Note:

- Event logger will always log "power up" event and "system IP address" when system power is up.

Download and Print Event Logs:

The "Download" button allows the user to download the log in CSV format. The "Print" button allows the user to open the print dialogue. Event log HTML page can be printed using print dialogue.

System Event log help page

SEM3T System – Thermal Monitoring System

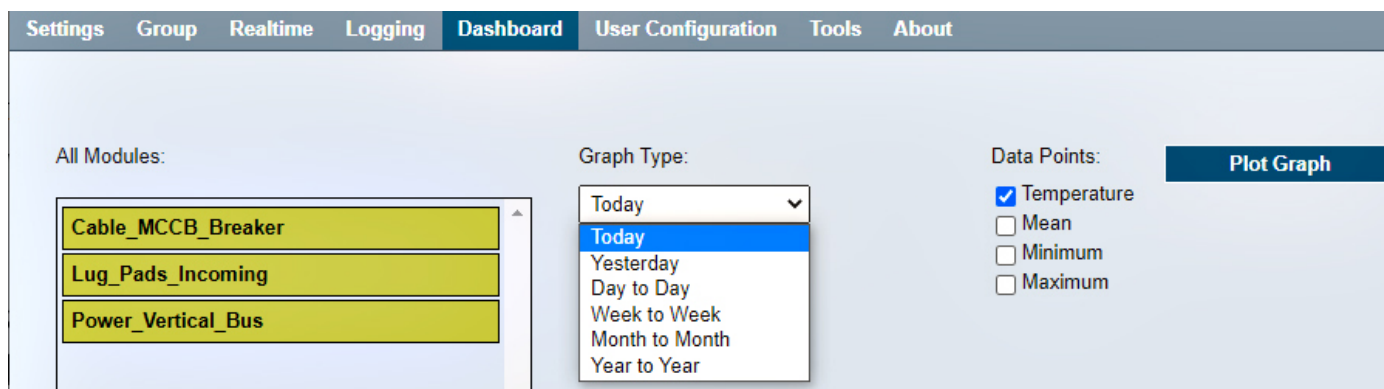
Dashboard

The user can view graphical representations of the temperature data on the Module and Group Dashboard pages. The temperature units will correspond to the unit selected on the System Settings page. The Module Dashboard page can display the temperature, mean, maxima, and minima for up to 5 modules for the current or previous day, and can display the Day-to-Day, Week-to-Week, Month-to-Month, or Year-to-Year mean, maxima, and minima for up to 5 modules.



Modular dashboard page

To display the data, the user must click the desired modules (which will highlight green), select the graph type from the dropdown menu, and click the checkboxes for the desired data points then click the Plot Graph button.



Data selection

SEM3T System – Thermal Monitoring System



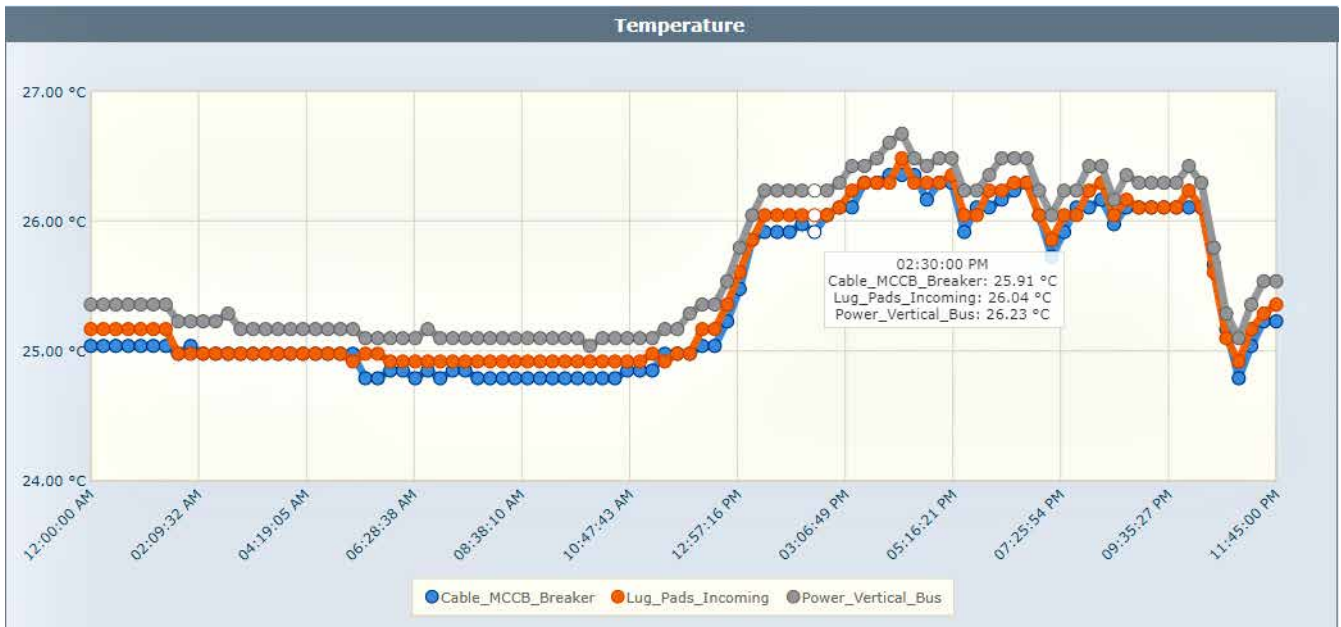
Trends

The Today temperature graph will include predicted data based on the temperature rise calculated using the Mean Time Interval set on the Global Settings page. The temperature rise is calculated on a rolling window from the data collected by the controller. The user can hover over the data points to see the actual data and time.

Each predicted trending data is calculated using the Temperature rise value.

$$\text{Predictive Temperature Value} = \text{Last known Temperature Value} + (\text{Temperature Rise} * 15)$$

The predictive temperature value is displayed using transparent data points on the graph.



In graph value display

SEM3T System – Thermal Monitoring System

If more than 5 modules are selected to display the information, a feedback message is displayed in the banner area.



Feedback message for incorrect data selection

In case of a sensor error from any specific module which is displayed in the trends, the temperature value of 0 °C will be displayed in the graph.

The Group Dashboard page can display the average, mean, maxima, and minima for up to 5 groups for the current or previous day, and can display the Day-to-Day, Week- to-Week, Month-to-Month, or Year-to-Year mean, maxima, and minima for up to 5 groups. To display the data, click the desired modules (which will highlight green), select the graph type from the dropdown menu, and click the radial for the desired data points then click the Plot Graph button.



Data selection and trends

SEM3T System – Thermal Monitoring System

Module Dashboard help page

The module dashboard help page displays helpful information for the module dashboard page.

Dashboard for Selected Modules

- This page allows the user to plot different type of charts for various metering data.
- For selected module, following type of graphs will be available:
- In case of modules with Sensor Error or Communication Error [-SE- or -CE-], data point value will be 0 for (°C), and 32 for (°F)

Graph #	Graph Name	Description
1	Today's Graph	Line chart with real-time data at every 15 min interval (00:00 am till now)
2	Yesterday's Graph	Line chart with data plotted for yesterday at every 15 min interval (00:00 am to 11:45 pm)
3	DTD	Line chart for last 7 days comparison (today and last 6 days)
4	WTW	Line chart for last 4 weeks (current and last 3 weeks)
5	MTM	Line chart for 6 months (current and last 5 months)
6	YTY	Line chart for 3 years (current and last 2 years)

Steps to generate dashboard for a module:

- Select a module from module list (maximum 5 modules can be selected)
- Select graph type (any 1 of 6)
- Select the data point(s).
- Hit "Plot Graph" button

Predictive Data Trending

- Based on temperature rise value, a future data trending information of the temperature will also be displayed.

Dashboard requires Chrome version 44.

Module dashboard help page

Group Dashboard help page

The group dashboard help page displays helpful information for the group dashboard page.

Dashboard for Selected Group

- This page allows user to plot different type of charts for various group metering data.
- For selected group, following type of graphs will be available:

Graph #	Graph Name	Description
1	Today's Graph	Line chart with real-time data at every 15 min interval (00:00 am till now)
2	Yesterday's Graph	Line chart with data plotted for yesterday at every 15 min interval (00:00 am to 11:45 pm)
3	DTD	Line chart for last 7 days comparison (today and last 6 days)
4	WTW	Line chart for last 4 weeks (current and last 3 weeks)
5	MTM	Line chart for 6 months (current and last 5 months)
6	YTY	Line chart for 3 years (current and last 2 years)

Steps to generate dashboard for groups

- Select groups (any 5)
- Select "Graph Type" (any 1 of 6)
- Select a data point to plot (any 1 of 4)
- Hit "Plot Graph"

Dashboard requires Chrome version 44.

Group dashboard help page

SEM3T System – Thermal Monitoring System

User Profile

From the User Profile page, the user can change the information for the logged in user. The User ID and Access Level fields can be edited from the User Management page by a Supervisor level user but are not editable from this page. All required fields are marked with an asterisk. The First, Last, and Company Name fields can take a maximum of 20 characters. The Email field must follow the format "x@x.x" and can take a maximum of 50 characters. The Phone field must have exactly 10 numbers. The user can also choose the default language from the Language dropdown list. If any of the fields are incorrect, the webpage will display an error message when the user clicks outside of the field. The user can also change the password by clicking the checkbox, entering the existing password and entering a new password. The password can be a maximum of 10 characters. It is not recommended to change the password to the admin profile. Once the data has been entered, click the Save button to save the profile.

User Profile help page

User Profile help page

The user profile help page lists the information about the user profile page.

SEM3T System – Thermal Monitoring System

User Profile Help

This page is used to update the information for the user logged in. It also displays the current access level for the current user.

User Access

Supervisor: Access to all pages with administrator rights.

Controller: Access to "Home", "Realtime", "System Event Log" and "User Profile", "Module Serial Numbers" pages with alarm acknowledgement.

Observer: Access to "Home", "Realtime", "System Event Log" and "User Profile", "Module Serial Numbers" pages.

Update Profile

- Make appropriate changes in the white text entry fields.
- Already existing email id can not be configured again.
- A user cannot modify User ID and Access Level. By default these fields are disabled.
- Click the "Save" button at the bottom.

Change Password

- Check the box labeled "Would you like to modify the password?"
- Enter your current password, a new password, and retype the new password for confirmation.
- Click the "Save" button at the bottom.

Note: User access level changes and password resets must be completed by a supervisor.

User profile help page

User Management

On the User Management page, Supervisor level users can add, delete, and update any configured users' information. The controller will accept up to 10 users to be configured. By default, there are 4 users configured: admin (supervisor access), user_supervisor (supervisor access), user_controller (controller access), and user_observer (observer access). The predefined users shall have sem3 as password. The user ID cannot be modified during operation/commissioning.

The screenshot displays the SEM3T User Management interface. At the top, there is a navigation bar with 'Settings', 'Group', 'Realtime', 'Logging', 'Dashboard', 'User Configuration', 'Tools', and 'About'. A 'Logout' button is in the top right corner. Below the navigation bar, there is a 'Users List' table with columns: User ID, First Name, Last Name, Company, Email, Phone, Access Level, and Language. The table contains four rows of predefined users. A red box highlights the table and a message below it: '*A valid email id for the user must be configured for the logs to be emailed'. Below the table is a 'User Detail' form with fields for User ID, First Name, Last Name, Company Name, Email, Phone, Access Level, Language, Password, and Confirm Password. A red box highlights the 'User Detail' form. A red line points from the text 'User summary' to the table, and another red line points from 'User details edit section' to the form.

User ID	First Name	Last Name	Company	Email	Phone	Access Level	Language
admin	Jane	Smith	SIEMENS	jane.smith@siemens.com		Supervisor	English
user_supervisor						Supervisor	English
user_controller						Controller	English
user_observer						Observer	English

*A valid email id for the user must be configured for the logs to be emailed

User Detail:

User ID: admin
 First Name: Jane
 Last Name: Smith
 Company Name: SIEMENS
 Email: jane.smith@siemens.com
 Phone:
 Access Level: Supervisor
 Language: English
 Password:
 Confirm Password:
 Save

User management page

SEM3T System – Thermal Monitoring System

The summary section shows the configured users with their profile information. When the user clicks on any previously configured user summary, the details can be edited. The user can also add a new user or delete a user by highlighting a selected user in the summary section. The mandatory fields are marked by a (*).

User Management help page

The user management help page displays helpful information for the user management page.

User Management Help

This page is used by supervisors to manage all accounts currently registered on the system.

Add User

- Click the "Add User" Button.
- Fill out all white text entry fields and select access level for user being created.
- Create a password and confirm password in the following field.
- Click the "Save" button.
- The new user should now appear in the table above.
- Maximum 10 user can be configured.

Delete User

- Select the user to be deleted from the table (their name should be highlighted in yellow)
- Click the "Delete User" button at the bottom.
- On the following prompt click "OK" to confirm deletion of the selected user.

Edit User/User Password Reset

- Select the user to be edited from the table (their name should be highlighted in yellow).
- Edit:
 - Change user information through the text entry fields.
 - Change user access level through the drop-down menu labeled "Access Level".
 - Already existing email id can not be configured again.
- Reset the password by entering a password and confirming that password in the last two fields.
 - **Note:** All edits require a password reset
- Click the "Save" button at the bottom.

Note:A valid email id for the user must be configured for the logs to be emailed.

User management help page

Diagnostics

The diagnostics page addresses several areas for the user to receive information and provide update to the controller.

SEM3T System – Thermal Monitoring System

The screenshot displays the SEM3T diagnostic interface with several key sections:

- Active module list:** A grid of 32 modules, including Cable_MCCB_Breaker, Lug_Pads_Incoming, and Power_Vertical_Box.
- Modbus map for specific module:** A detailed table of Modbus registers for the selected module, listing parameters like Temperature (°C), Minimum Temperature, and various alarm setpoints.
- Module diagnostic information:** A section showing diagnostic data such as Delta Temp (from 22° C), Serial Number, and Firmware Version.
- Download Modbus Map/Debug Logs/Diagnostic Logs:** Buttons for downloading full register maps, debug logs, and diagnostic logs.
- Firmware Upgrade:** A section showing the last firmware version (1.1.0.BA) and an upload interface for the current version (1.1.0.BB).
- Certificate Upgrade:** A section showing the last certificate update date and an upload interface.
- System Reboot:** A button labeled 'Reset Controller' for performing a system restart.

Diagnostic page

The active module list is provided as a summary to the user. When the user clicks on any specific module grid, an expanded view is shown to the right. This view contains the Modbus map for the specific module temperature parameters and the physical module diagnostic information.

The user can download the complete Modbus map of the controller and download for offline troubleshooting the debug logs, and diagnostics logs.

The user can upgrade the firmware of the controller and the security certificate associated with the controller.

The user can also perform a system reboot.

SEM3T System – Thermal Monitoring System

Firmware upgrade process

The user (supervisor only) can perform a firmware upgrade for the controller which is known as a field upgrade process. The field upgrade can only be performed using a Siemens authorized and released firmware. This specific process is highlighting a process to upgrade to a firmware v1.1.0.AZ however the process is independent of the firmware revision.

The user must navigate to the controller Diagnostics page.

Firmware Upgrade:

Last Firmware Version: 1.1.0.BA
 Updated on Date-Time (MM-DD-YYYY HH:MM:SS): 09-14-2020 14:03:36
 Current Firmware Version: 1.1.0.BB

File name	File size	Percent uploaded
No files selected.		

Certificates Upgrade:

Last Certificates updated on Date-Time (MM-DD-YYYY HH:MM:SS): 10-08-2019 09:48:15
 Current Certificates updated on Date-Time (MM-DD-YYYY HH:MM:SS): 09-14-2020 14:05:23

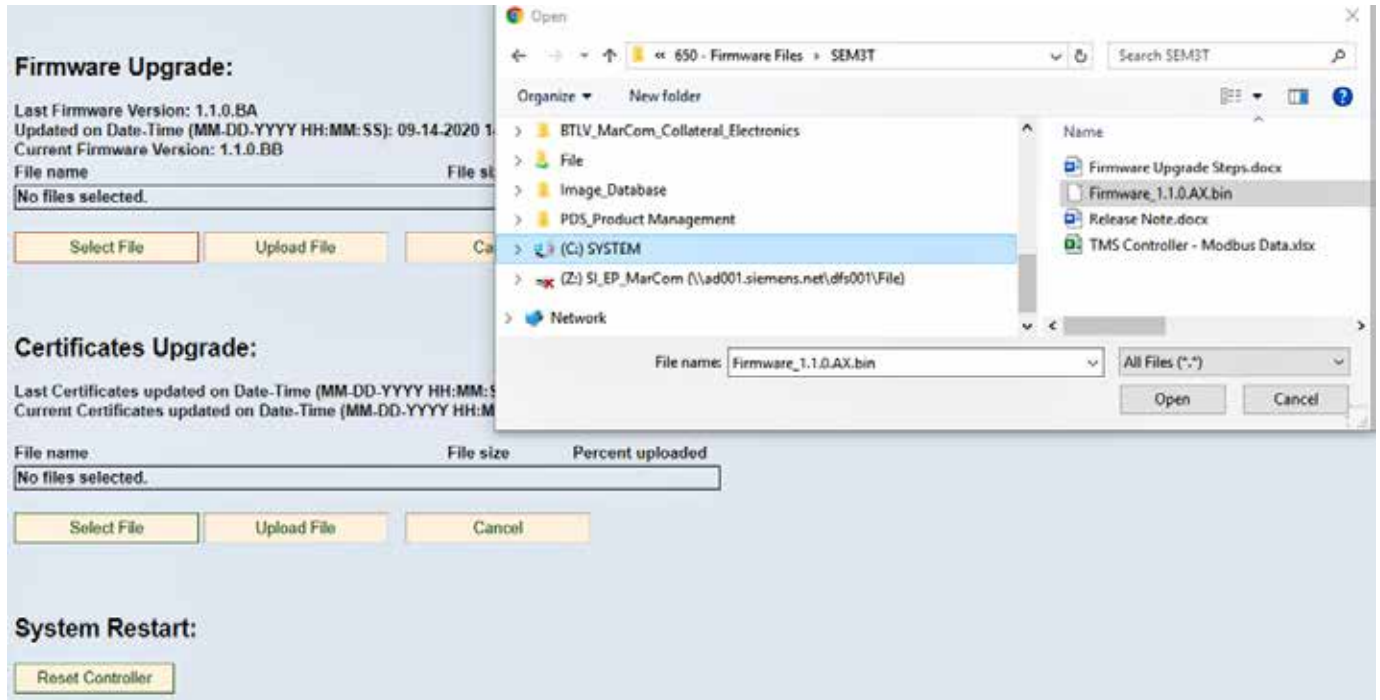
File name	File size	Percent uploaded
No files selected.		

System Restart:

Firmware upgrade - Diagnostics page

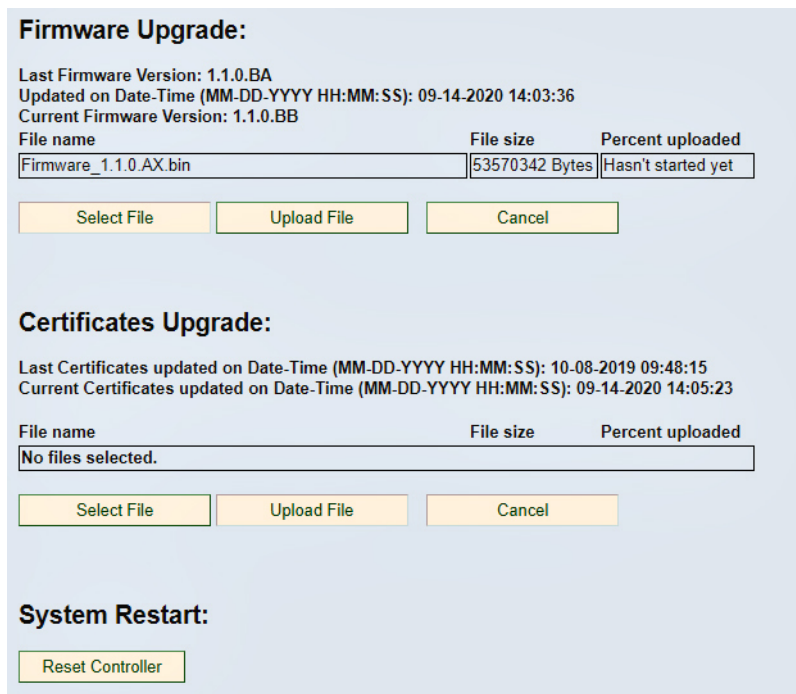
The user must click on select file to navigate to the location the firmware file is located and click to select file for firmware upgrade. Only a single file with format Firmware_<version>.bin is uploaded.

SEM3T System – Thermal Monitoring System



Firmware upgrade - Select files

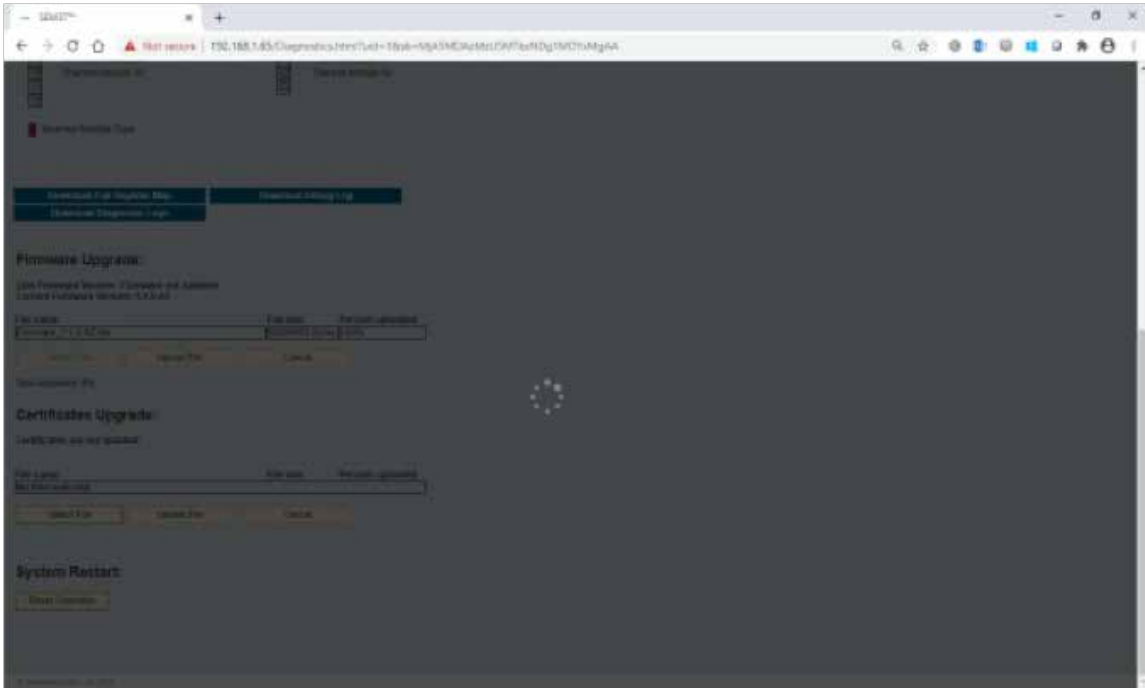
After the user clicks ok, the selected file shows in the webpage view.



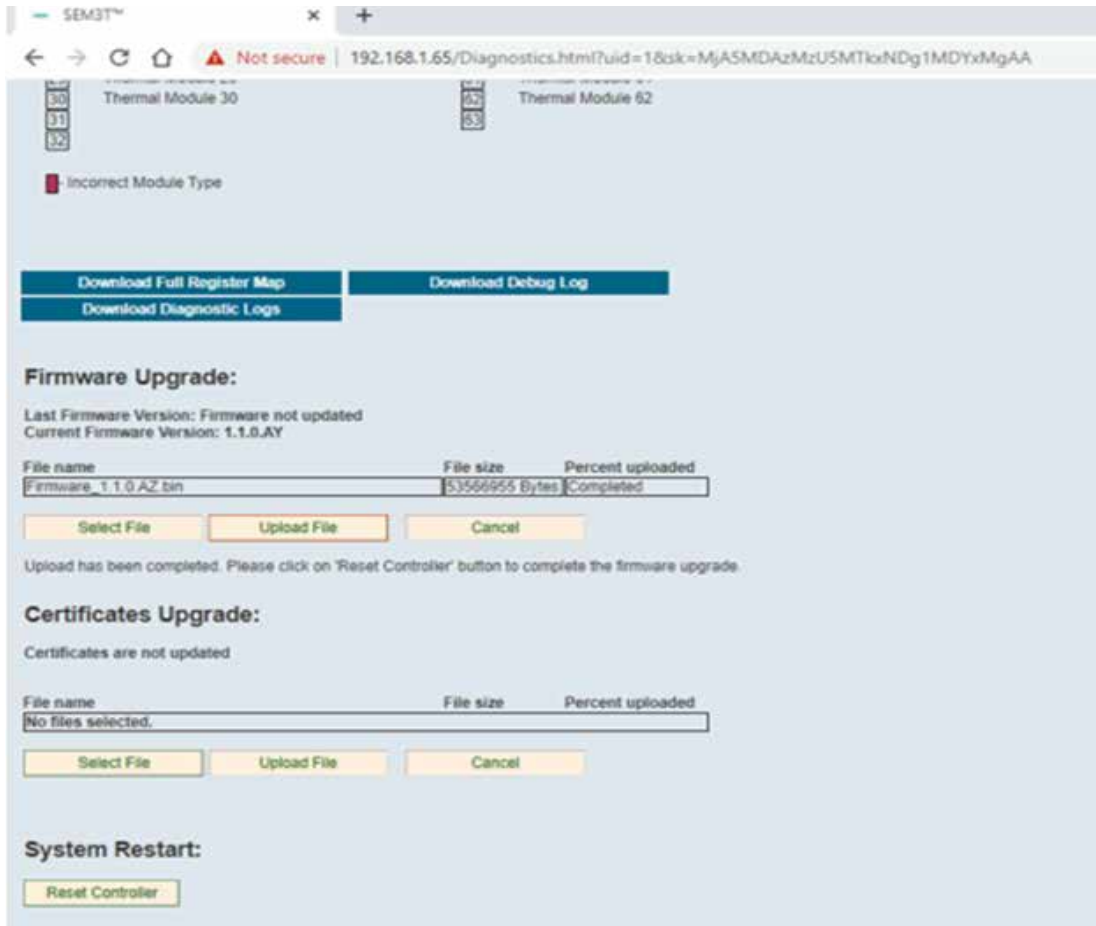
Firmware upgrade - Files selected

The user must click upload to complete uploading the file to the controller. Depending on the network communication and data rate, this file upload may take up to 2 minutes.

SEM3T System – Thermal Monitoring System



Firmware upgrade - File upload in progress

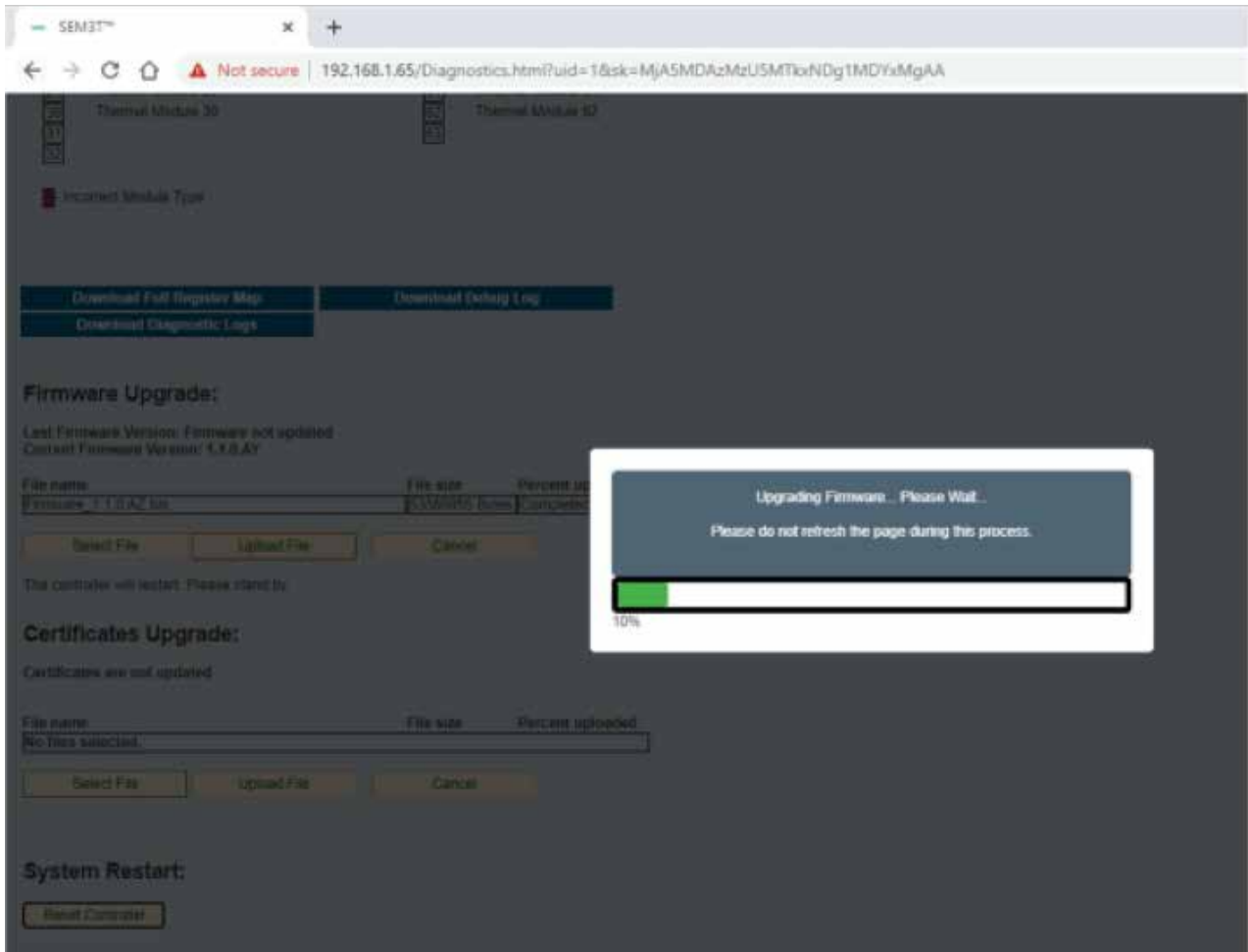


Firmware upgrade - File upload complete

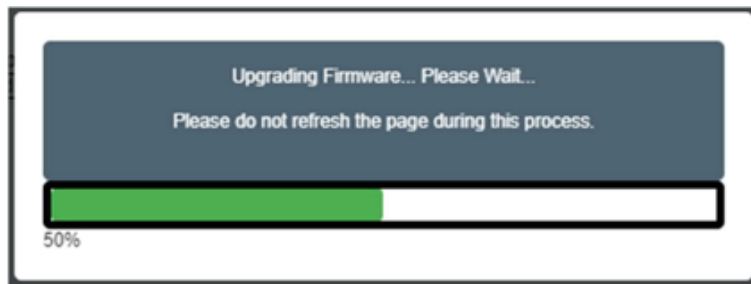
SEM3T System – Thermal Monitoring System

After the completion of the file upload a message will appear underneath the firmware upgrade section. "Upload has been completed. Please click on 'Reset Controller' button to complete the firmware upgrade.

The user must click on the Reset controller button in the System Restart section.

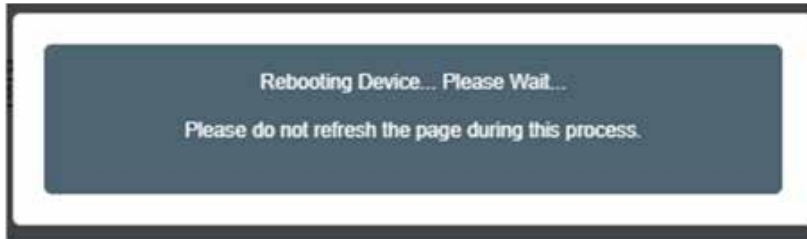


Firmware upgrade - upgrading firmware – 1



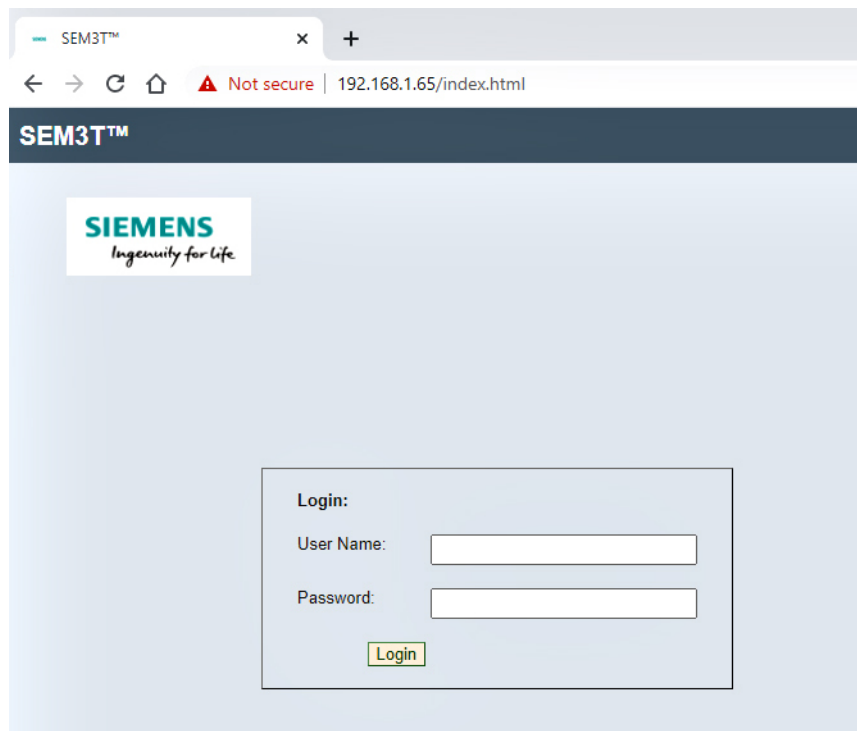
Firmware upgrade - upgrading firmware – 2

SEM3T System – Thermal Monitoring System



Firmware upgrade - rebooting device

Throughout the firmware upgrade process, the user shall not navigate away from the diagnostic page.



Firmware upgrade - Login

The user shall pay attention to the LED status (boot process and In-Circuit Diagnostics test completion) and the appearance of the login page to confirm the firmware upgrade process to be complete.

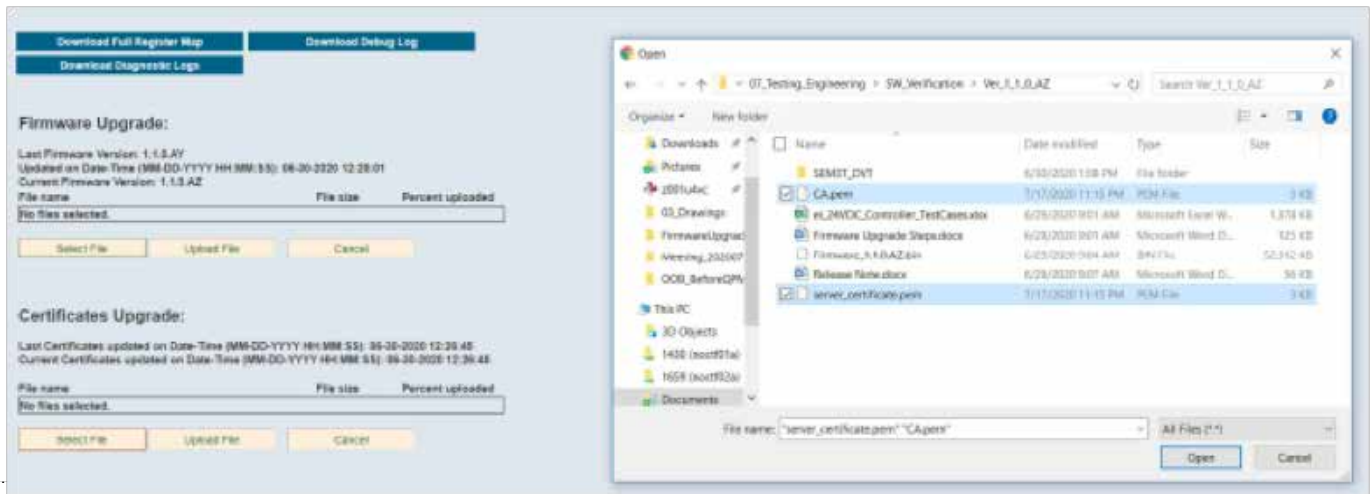
After the completion of the firmware upgrade, the user can verify the new firmware versions in the System setting and Diagnostics pages.

Certificate upgrade process

Typical firmware upgrade will include certificates embedded within and hence user does not have to upgrade certificate separately. However, if the certificates need to be upgraded, the following steps are needed.

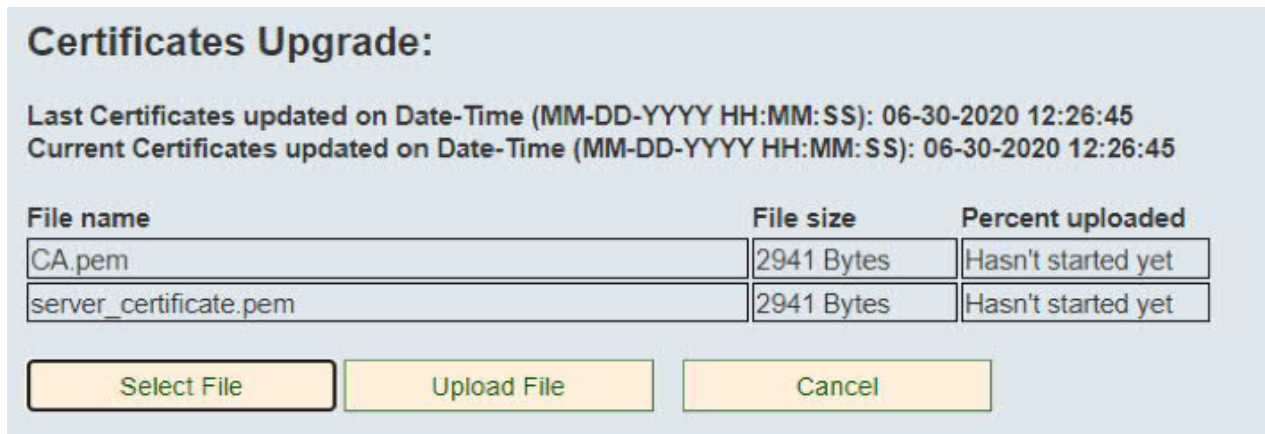
The user shall click on Select Files and navigate to the location containing the certificate files. Two files are needed for the certificates – CA.pem and server_certificate.pem.

SEM3T System – Thermal Monitoring System



Certificate upgrade - Select files

The user must click open to select the files.



Certificate upgrade - Selected files

The user must click on upload file to complete the certificate upgrade. After the upload process is complete, the user must click on Reset controller like the firmware upgrade process to complete the certificate upgrade process.

In-case of failure or upload does not complete for any reason, a message "Failed to upgrade the certificate, please try again" will be displayed on the Diagnostic web page.

During the upgrade process, the certificates will be verified using "OpenSSL" utility.

In-case of the invalid certificates, an error message "Failed to upgrade the certificate, please try again" will be displayed on the Diagnostic web page. Further, before upgrading the new certificate, the firmware will back up the existing certificates to "Iusr/sem3/backup/" directory and it will restore if the new upgraded certificate is not valid or corrupted.

Diagnostics help page

The diagnostics help page contains additional information pertaining to the information on the diagnostics page.

SEM3T System – Thermal Monitoring System

Diagnostics Help

This will provide necessary, specific modbus register address information for individual modules for integrating with electrical power monitoring system, building management system, SCADA and third party outside systems.

Read Appropriate Modbus Register Addresses

- Click the grid number of the module you would like to read.
 - Note:** The delta temperature value of the modules with sensor error will be displayed in exponential format (ex: -9.22337e+18) in the expanded view of the module.
- All register addresses along with data type and size will appear on the right hand side of the screen.
 - Note:** The grid number currently being viewed will have a bold outline.

Note: It is possible to copy the Modbus registers from this page to an Excel spreadsheet using the copy and paste commands.

Firmware Upgrade

- You need the latest version of Adobe Flash Player or web browser that support HTML5 to use the Uploader.
- Click on the 'Select File' button to select the firmware upgrade .bin file.
- Once the file is added to the upload list, click on the 'Upload File' button in order to upload it to the controller.
- After successful uploading of .bin file, a message will be displayed for completion of the upload process.
- In case of any error during Firmware Upgrade process, log out and log in again and redo the steps above.
- Device and SDCard LED shall remain ON to indicate the Firmware Upgrade process.
- Device and SDCard LED shall blink for 5 seconds to indicate the Firmware Upgrade failure.

Certificates Upgrade

- You need the latest version of Adobe Flash Player or web browser that support HTML5 to use the Uploader.
- User must select two files "CA.pem" and "server_certificate.pem" to upgrade the certificates.
- Click on the 'Select File' button to select the certificate files "CA.pem" and "server_certificate.pem".
- Once the files are added to the upload list, click on 'Upload File' button in order to upload to the controller.
- After successful uploading of "CA.pem" and "server_certificate.pem" file, a message will be displayed for completion of the upload process.
- In case of any error during certificate upgrade process, refresh the page and redo the steps above.

System Restart

- Click on the 'Reset Controller' button to restart the controller.
- It is mandatory to restart the controller after firmware upgrade other than that it is required to restart the controller only when it is required.

Download modbus register map

- This page provides following buttons:
 - Download Debug Log:** This will allow user to download the Debug log into a .tar.gz file.
 - Download Full Register Map:** This will allow user to download the Modbus mini monitor register map into a .CSV file
 - Download Diagnostic Log:** This will allow user to download the Incircuit Diagnostics test log into a .CSV file

Warning Indications

- The system shall display a warning indication in case of
 - Incorrect Module Type

Note: Scroll to the bottom of the page in case firmware upgrade, certificate upgrade section and system restart are not visible.

Diagnostics help page

Module Serial numbers

The user can display the serial numbers of each of the connected modules from the Module Serial Numbers page. The table highlights unconfigured modules white and configured modules green.

Module Name	Module ID	Serial Number
Cable_MCCB_Breaker	Module 1	AE57673K01001Y1935
Lug_Pads_Incoming	Module 2	AE57673K01001B1935
Power_Vertical_Bus	Module 3	AE57673K0100AC1935

Thermal module serial number page

The user can download the module serial number list as a csv file for review offline. The module serial number list file contains Module name, Module id, serial number and the modules' configuration status as thermal module.

Module Serial Numbers help page

The module serial number help page identifies the information relevant to the module Module Serial Numbers help page. The module serial number help page identifies the information relevant to the module serial number page.

SEM3T System – Thermal Monitoring System

Module Serial Numbers Help

This page shows all the serial numbers for all the modules configured for the system.

Download Module Serial List:

The "Download Module Serial List" button allows the user to download the Module Serial List number in the CSV format.

Module serial number help page

Import/Export configuration

The user can export and import a configuration of the controller settings in JSON file format. A maximum of 10 offline configured files can be uploaded and stored.

Import/Export configuration page

To export the user must click the Export button. The webpage will export a JSON file to the Downloads folder (or another folder if set differently). This file can be imported to another controller.

To import a configuration, the user must click the Select File button and select the correct JSON configuration file. Once the file has uploaded, the user can select it from the dropdown menu and click Import Configuration. The user will be prompted to confirm and then the controller will reset. The user should be aware when importing a configuration on a multi-controller system to configure the IP addresses of the controllers to be different. If not, network crashes will occur, and the controllers may become unreachable until fixed IP address is fixed.

SEM3T System – Thermal Monitoring System

Import/Export Configuration help page

The import/export configuration help page provides valuable information to use in the import/export configuration page.

Import Configuration Help

This page shows a list of available configurations in the system, of which user can select a configuration and import the same.

Following are the steps to upload/import the configuration:

- To upload a configuration file, browse the file using the 'Select File'(select only .json file) button.
- Click the 'Upload Files' button to upload the configuration file on the SD card on the system.
- The drop-down list will list-out all the available configuration files on SEM3T system.
- User can select a configuration from the drop-down and import it using the 'Import Configuration' button.
- User has an option to delete the selected configuration file from the list using 'Delete' button.

Export Configuration Help

This page allows user to download a complete configuration from the current target SEM3T controller. Click on the "Export" button to download a "Export.json" file containing the configuration of this SEM3T controller.

Import/Export configuration help page

microSD card information

The microSD information page allows the user to get a summary of available memory in the microSD card and to delete or download logs for safekeeping while cleaning up space for additional usage

SIEMENS SEM3T™
Logout

Settings Group Realtime Logging Dashboard User Configuration **Tools** About
English ▾

microSD Card Information:

Capacity (MB)	Free Space (MB)	Used Space (%)
7328	6902	1

Storage SD card in use.

Delete logs:

Data Logs Group Data Logs
 Alarm Logs Group Alarm Logs
 Debug Logs Diagnostics Logs
 All Logs

Delete Selected Logs

Download and Delete Selected Logs

microSD card information page

The user can select individual logs or all logs and choose to delete the logs or choose to download and then delete the selected logs. Additionally, the type of microSD card in use is displayed as message. For field operation, this shall always say “Storage SD card in use”.

SEM3T System – Thermal Monitoring System

In case when the SD card usage of data partition is greater than 80%, a message appears on the page “The controller does not have enough space to log the new data entries in the logger files. Consider deleting the logger files you no longer need.”

microSD card information help page

The microSD card information help page provides information for the microSD card information page.

microSD Card Information Help

microSD Card Information:

- The microSD card information displays the storage capacity (MB), free space (MB) and used space (%) and depending on the inserted microSD card, it will display microSD card type (Storage/Production).
- When the memory usage of the microSD card will greater than 80%, the message “The controller does not have enough space to log the new data entries in the logger files. Consider deleting the logger files you no longer need” will be displayed.
- An email notification will be sent to a configured email address of the supervisor user when storage usage reached 80%, next notification again every 5% increment until 95% (80% - 95%) and between 95% - 100% notification send for every 1% increment.

Delete logs:

- User can select multiple log files using checkbox to “delete/download and delete” log files from the SD card.

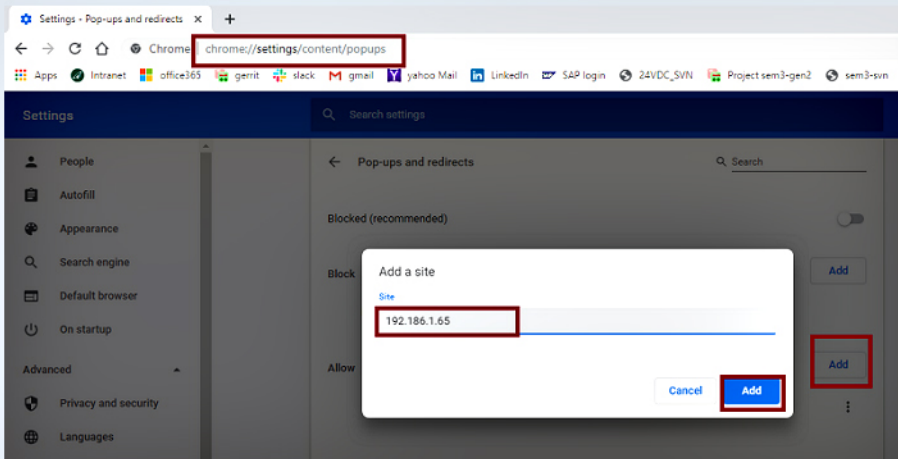
Delete Selected logs:

- This will allow the user to delete the selected log files.

Download and Delete Selected Logs:

- This will allow the user to download and delete multiple log files.

Note: Please configure Web browser parameters to download multiple files from the Controller without pop-up blocker.
Google Chrome:
 open link “chrome://settings/content/popups”
 In the “Allow” section select “Add” button and insert board IP address.



Mozilla Firefox:
 Open link “about:preferences#privacy”
 In the Permission section, Select “Block pop-up windows” using the checkbox.
 Select “Exceptions...” button and insert board IP address and Select “Allow”.

microSD card information help page

About Page

The About page displays information about the SEM3T product.

SEM3T System – Thermal Monitoring System



SEM3T controller about page

About help page

The help page shows navigation and logout help information.

About Help

Navigation

- Use the links below the title to switch between pages.
- The link with orient color is the webpage the user is currently on ("About" should currently be orient)
- Links will become highlighted with bold font when hovered on to make navigation easier

Logging Out

1. Click the link in the top right labeled "Logout".
 - **Note:** Every page contains a logout link.

About help page

SMTP and Email Configuration

The SEM3T controller supports Simple Mail Transfer Protocol (SMTP) to send emails to specific user email addresses. The configuration of the SMTP protocol is provided on the system settings page. The email received by the specific user email address will be from the user credentials entered in the system settings page.

SEM3T System – Thermal Monitoring System

Data, Alarm and Group Log Emails

The SEM3T controller allows for data, alarm or Group logs to be sent by email to the specified user email addresses. When the user configures the logs as detailed in the Logging section under various log configuration pages, the emails are sent per the schedule either automatically or on demand.

When the user clicks the Send now button to send the email on demand a feedback is available upon completion of the operation. If the log file is sent successfully, the message is displayed appropriately. If there are errors during the operation, the corresponding error message is displayed such as given host is not resolved, time out error, invalid login ID/password, file not found etc. If the user attempts to perform an operation on the specific log while the corresponding email is being transmitted, a message will appear to show that email is in progress.

The email contains the log files as attachment with user specific email body letter which is configured during the log configuration. The email attachments are sent to the recipients in the form of *.csv (comma separate value) format to the user configured emails. The body of the email can be suitably configured by the user when the log is being configured. The maximum email attachment file size is 7 MB.

The maximum number of emails a customer shall receive is 10 for a single created log. Based on a maximum attachment size of 7 MB, a total of 70 MB of latest recorded logs shall be provided to the user through emails when logging is configured.

When the memory usage of the microSD card will greater than 80%, the message “The controller does not have enough space to log the new data entries in the logger files. Consider deleting the logger files you no longer need” will be displayed during the log configuration on new logs.

An email notification will be sent to a configured email address of the supervisor user when storage usage reached 80%, next notification again every 5% memory usage increment until 95% (80% - 95%) and between 95% - 100% notification send for every 1% memory usage increment. In the received email, the subject is “SD card usage notification”. The email body is “The controller uses <x%> memory of the SD card. Consider deleting the logger files you no longer need of the following controller: Serial Number: <aaaa>, Device description: <bbbb>” where <x%> is the % of memory usage and <aaaa> and <bbbb> are configured information from the System settings page.

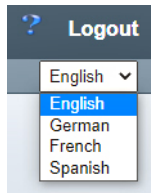
Global Alarm Notifications

Global alarm notifications can be configured in the Global settings page. When enabled and selection for email addresses is correctly made with the SMTP server configured in the System settings page, the controller can send global alarm notifications to selected users. The selected user (s) will receive alarm-event notification email based on the change of state of alarm condition (newly generated alarms or acknowledged alarms) of all configured modules. The minimum time for the change of state recognition is 10 seconds.

The alarm notification contains following information in the body of the email – timestamp, thermal module name/label, temperature value, temperature threshold value (warning/alarm setpoint), alarm event type (warning/alarm), alarm acknowledge status, username (acknowledging username).

Multilingual Web Pages

The embedded webpages are translatable in 4 different languages. The default selection is English. The alternate language can be selected by using the drop down menu at the corner of each webpage. When a specific language is selected the current refreshes with the selected language translation. Additionally, the help page also dynamically updates when the user changes the selected language.



Selection of alternate language for view

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The options for alternate languages are English, German, French (Canada) and Spanish (Mexico).

Alternately, when the user profile is being updated, the user can select a default language to allow the webpages to be displayed in the specific language. Further in the user management page, the Supervisor user can assign a default language for a specific user to use when the user is navigating through the webpages.

Real time clock

In the SEM3T controller, an external Real time clock (RTC) is present. The RTC is backed by a super cap which keeps the RTC running during the period when the supply voltage of the controller is turned off. Based on empirical testing, the super cap voltage allows the RTC to keep running for 3 days and 7 hours in room temperature conditions when supply voltage is absent.

When the super cap does fully discharge, the default date and time is set by the RTC chip.

The system time is saved in a database every 1 second after initial time of 500 seconds has elapsed. On every power cycle, the database is compared with RTC and if the RTC is less than the database time, the system time and RTC time is updated with the database time.

If the device is synchronized with NTP, the network time is stored in non-volatile memory and external RTC time will be updated with the stored time on every power cycle and likewise at every synchronization with NTP server (every 15 minutes).

NTP and DNS

The SEM3T controller supports Network Time Protocol (NTP) to allow the user to setup system date and time from webpage and synchronize with an external NTP server every 15 minutes.

The SEM3T controller supports Domain Name System (DNS) to allow the user to be able to configure the fully qualified domain name for the NTP server to allow the synchronization of the controller clock with an external NTP server. The configuration of the settings for time synchronization are discussed in the system time setup under system settings section.

LLDP

The SEM3T controller supports LLDP protocol to advertise its identity on a local network.

The device can be queried using LLDP tool such as Advanced IP Scanner (Client Utility) and discovered in a local network using a Windows based machine. The user must enter an IP range and search using key SIEMENS-SEM3T to display the discovered devices.

Crypto-Authentication Chip

The SEM3T controller employs a crypto-authentication chip to enable encryption and decryption of the firmware boot images. If during the booting process, the image verification fails or if the crypto chip is not communicating the controller stops further execution of the booting process.

In-Circuit Diagnostics tests

The SEM3T controller performs a self-test of all identified peripherals once in 24 hours at 12.00.00 AM and at every power up stage. In case any peripheral is not functioning as expected, a corrective action is attempted and if necessary, the device is rebooted. The self-test includes testing the eMMC, Wi-Fi, Bluetooth, Ethernet ports, RTC, Crypto-authentication chip, the RS485 ports, firmware revision and the type of microSD card currently in use.

Results for last 15 tests are stored and can be exported to a *.CSV file format either in the diagnostics page or in the self-test application webpage.

The self-test application webpage showing the In-Circuit Diagnostics highlights the most recent result with yellow color. A download diagnostic logs button is provided to export the test results to a *.CSV file.

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Addressing the measured variables

You can use the Modbus function code 0x03 on all the measured variables listed below. SEM3T uses zero base addressing where protocol address i.e 0 -> 40001

SEM3T Monitor Data Registers

Thermal Monitor Data Registers								
Modbus External	Monitor ID	Reg. Size	Format	Access	Range	Default	Unit	Description
Address offset		Data	Reg. Size	Format	Access	Range	Default	Unit
Base		Temperature Reading	2	Float-32	RO	—	—	Celsius
Base+2		Minimum Temperature	2	Float-32	RO	—	150	Celsius
Base+4		Minimum Temperature Timestamp	2	Uint-32	RO	—	0	second
Base+6		Maximum Temperature	2	Float-32	RO	—	-50	Celsius
Base+8		Maximum Temperature Timestamp	2	Uint-32	RO	—	0	second
Base+10		Mean Temperature	2	Float-32	RO	—	—	Celsius
Base+12		Under Temperature Warning Setpoint	2	Float-32	RW	0, 1-150	0	Celsius
Base+14		Under Temperature Warning Time Delay	1	Uint-16	RW	1-65535	1	second
Base+15		Under Temperature Alarm Setpoint	2	Float-32	RW	0, 1-150	0	Celsius
Base+17		Under Temperature Alarm Time Delay	1	Uint-16	RW	1-65535	1	second
Base+18		Over Temperature Warning Setpoint	2	Float-32	RW	0, 1-150	0	Celsius
Base+20		Over Temperature Warning Time Delay	1	Uint-16	RW	1-65535	1	second
Base+21		Over Temperature Alarm Setpoint	2	Float-32	RW	0, 1-150	0	Celsius
Base+23		Over Temperature Alarm Time Delay	1	Uint-16	RW	1-65535	1	second
Base+24		Replace Sensor Alarm Time Delay	1	Uint-16	RW	1-65535	900	second
Base+25		Active Alarms	1	Bit Field	RW	—	0x0000	—

Modbus Address	Thermal Monitors	Reg. Count
430301	Monitor 1 base address	26
430327	Monitor 2 base address	26
430353	Monitor 3 base address	26
430379	Monitor 4 base address	26
430405	Monitor 5 base address	26
430431	Monitor 6 base address	26
430457	Monitor 7 base address	26
430483	Monitor 8 base address	26
430509	Monitor 9 base address	26
430535	Monitor 10 base address	26
430561	Monitor 11 base address	26
430587	Monitor 12 base address	26
430613	Monitor 13 base address	26
430639	Monitor 14 base address	26
430665	Monitor 15 base address	26
430691	Monitor 16 base address	26
430717	Monitor 17 base address	26
430743	Monitor 18 base address	26
430769	Monitor 19 base address	26
430795	Monitor 20 base address	26
430821	Monitor 21 base address	26
430847	Monitor 22 base address	26
430873	Monitor 23 base address	26
430899	Monitor 24 base address	26
430925	Monitor 25 base address	26
430951	Monitor 26 base address	26
430977	Monitor 27 base address	26
431003	Monitor 28 base address	26
431029	Monitor 29 base address	26
431055	Monitor 30 base address	26
431081	Monitor 31 base address	26

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SEM3T Monitor Data Registers (cont'd)

Modbus Address	Thermal Monitors	Reg. Count
431107	Monitor 32 base address	26
431133	Monitor 33 base address	26
431159	Monitor 34 base address	26
431185	Monitor 35 base address	26
431211	Monitor 36 base address	26
431237	Monitor 37 base address	26
431263	Monitor 38 base address	26
431289	Monitor 39 base address	26
431315	Monitor 40 base address	26
431341	Monitor 41 base address	26
431367	Monitor 42 base address	26
431393	Monitor 43 base address	26
431419	Monitor 44 base address	26
431445	Monitor 45 base address	26
431471	Monitor 46 base address	26
431497	Monitor 47 base address	26
431523	Monitor 48 base address	26
431549	Monitor 49 base address	26
431575	Monitor 50 base address	26
431601	Monitor 51 base address	26
431627	Monitor 52 base address	26
431653	Monitor 53 base address	26
431679	Monitor 54 base address	26
431705	Monitor 55 base address	26
431731	Monitor 56 base address	26
431757	Monitor 57 base address	26
431783	Monitor 58 base address	26
431809	Monitor 59 base address	26
431835	Monitor 60 base address	26
431861	Monitor 61 base address	26
431887	Monitor 62 base address	26
431913	Monitor 63 base address	26
Total Registers		1638

System Data Registers								
Modbus External	Monitor ID	Reg. Size	Format	Access	Range	Default	Unit	Description
419910	System Minimum Temperature	2	Float-32	RO	—	0	Celsius	Minimum temperature from all thermal modules
419912	System Minimum Temperature Timestamp	2	Uint-32	RO	—	0	second	Seconds since Coordinated Universal Time (UTC) Epoch
419914	System Maximum Temperature	2	Float-32	RO	—	0	Celsius	Maximum temperature from all thermal modules
419916	System Maximum Temperature Timestamp	2	Uint-32	RO	—	0	second	Seconds since Coordinated Universal Time (UTC) Epoch
419918	System Average Temperature	2	Float-32	RO	—	0	Celsius	Instantaneous average of temperature from all thermal modules
419920	Global Temperature Alarm Flags	1	Bit Field	RO	—	0x0000	—	Alarm Active bits: (set when any Thermal Module sets the equivalent alarm bit) 0x0010 - Under Temperature Warning bit 0x0020 - Under Temperature Alarm bit 0x0040 - Over Temperature Warning bit 0x0080 - Over Temperature Alarm bit 0x0100 - Replace Sensor Alarm bit
Total Registers		11						

SEM3T System – Thermal Monitoring System

SEM3T Monitor Data Registers (cont'd)

System Data Registers Part 1								
Modbus External	Monitor ID	Reg. Size	Format	Access	Range	Default	Unit	Description
420001	Firmware Version	4	ASCII	RO	ASCII	—	—	Version number of Controller firmware (set in firmware)
420005	Serial Number	16	ASCII	RO	ASCII	—	—	Controller Serial Number
420021	User Text	32	ASCII	RW	ASCII	—	—	Area available to the user for descriptive information
420073	Global Resets	1	Bit Field	WO	Bit Field	0x0000	—	Global Reset bits: (write 1 to reset): SEM3T Reset bits: 0x0200 = Reset System Maximum Temperature 0x0400 = Reset System Minimum Temperature 0x0800 = Reset all Module Maximum Temperatures 0x1000 = Reset all Module Minimum Temperatures 0x2000 = Reset all Module Mean Temperatures 0x4000 = Reset all Module Temperature Alarm Flags
420078	System Time: seconds	2	Uint-32	RW	0, 1-4294967295	0	second	Seconds since controller is powered up
Total Registers		55						

System Registers Part 2								
Modbus External	Monitor ID	Reg. Size	Format	Access	Range	Default	Unit	Description
420251	Webpage Temperature Units	1	Uint-16	RW	0- Celsius 1- Fahrenheit	0	—	Temperature units used when displaying values on realtime page, graphs, trends
420252	Global Under Temperature Warning Setpoint	2	Float-32	RW	0, 1-150	0	Celsius	Global setpoint value, 0 disables (a write to this register overwrites local module settings)
420254	Global Under Temperature Warning Time Delay	1	Uint-16	RW	1-65535	1	second	Global alarm delay in seconds (a write to this register overwrites local module settings)
420255	Global Under Temperature Alarm Setpoint	2	Float-32	RW	0, 1-150	0	Celsius	Global setpoint value, 0 disables (a write to this register overwrites local module settings)
420257	Global Under Temperature Alarm Time Delay	1	Uint-16	RW	1-65535	1	second	Global alarm delay in seconds (a write to this register overwrites local module settings)
420258	Global Over Temperature Warning Setpoint	2	Float-32	RW	0, 1-150	0	Celsius	Global setpoint value, 0 disables (a write to this register overwrites local module settings)
420260	Global Over Temperature Warning Time Delay	1	Uint-16	RW	1-65535	1	second	Global alarm delay in seconds (a write to this register overwrites local module settings)
420261	Global Over Temperature Alarm Setpoint	2	Float-32	RW	0, 1-150	0	Celsius	Global setpoint value, 0 disables (a write to this register overwrites local module settings)
420263	Global Over Temperature Alarm Time Delay	1	Uint-16	RW	1-65535	1	second	Global alarm delay in seconds (a write to this register overwrites local module settings)
420264	Global Replace Sensor Alarm Time Delay	1	Uint-16	RW	1-65535	900	second	Global alarm delay in seconds (a write to this register overwrites local module settings)
420265	Mean Temperature Interval Length	1	Uint-16	RW	0-15 minutes 1- 1 hour 2- 6 hours 3- 24 hours	0	—	Length of time for each Mean Temperature Interval
Total Registers		15						
Total Populated Registers		15						

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SEM3T Monitor Data Registers (cont'd)

Multi-Monitor Communication Status Registers								
Modbus External	Monitor ID	Reg. Size	Format	Access	Range	Default	Unit	Description
420301	Monitor 1 status (bit set = communicating) Monitor 2 status (bit set = communicating) Monitor 3 status (bit set = communicating) Monitor 4 status (bit set = communicating) Monitor 5 status (bit set = communicating) Monitor 6 status (bit set = communicating) Monitor 7 status (bit set = communicating) Monitor 8 status (bit set = communicating) Monitor 9 status (bit set = communicating) Monitor 10 status (bit set = communicating) Monitor 11 status (bit set = communicating) Monitor 12 status (bit set = communicating) Monitor 13 status (bit set = communicating) Monitor 14 status (bit set = communicating) Monitor 15 status (bit set = communicating) Monitor 16 status (bit set = communicating)	1	Bit Field	RO	—	—	—	0x0001 - Monitor 1 installed 0x0002 - Monitor 2 installed 0x0004 - Monitor 3 installed 0x0008 - Monitor 4 installed 0x0010 - Monitor 5 installed 0x0020 - Monitor 6 installed 0x0040 - Monitor 7 installed 0x0080 - Monitor 8 installed 0x0100 - Monitor 9 installed 0x0200 - Monitor 10 installed 0x0400 - Monitor 11 installed 0x0800 - Monitor 12 installed 0x1000 - Monitor 13 installed 0x2000 - Monitor 14 installed 0x4000 - Monitor 15 installed 0x8000 - Monitor 16 installed
420302	Monitor 17 status (bit set = communicating) Monitor 18 status (bit set = communicating) Monitor 19 status (bit set = communicating) Monitor 20 status (bit set = communicating) Monitor 21 status (bit set = communicating) Monitor 22 status (bit set = communicating) Monitor 23 status (bit set = communicating) Monitor 24 status (bit set = communicating) Monitor 25 status (bit set = communicating) Monitor 26 status (bit set = communicating) Monitor 27 status (bit set = communicating) Monitor 28 status (bit set = communicating) Monitor 29 status (bit set = communicating) Monitor 30 status (bit set = communicating) Monitor 31 status (bit set = communicating) Monitor 32 status (bit set = communicating)	1	Bit Field	RO	—	—	—	0x0001 - Monitor 17 installed 0x0002 - Monitor 18 installed 0x0004 - Monitor 19 installed 0x0008 - Monitor 20 installed 0x0010 - Monitor 21 installed 0x0020 - Monitor 22 installed 0x0040 - Monitor 23 installed 0x0080 - Monitor 24 installed 0x0100 - Monitor 25 installed 0x0200 - Monitor 26 installed 0x0400 - Monitor 27 installed 0x0800 - Monitor 28 installed 0x1000 - Monitor 29 installed 0x2000 - Monitor 30 installed 0x4000 - Monitor 31 installed 0x8000 - Monitor 32 installed
420303	Monitor 33 status (bit set = communicating) Monitor 34 status (bit set = communicating) Monitor 35 status (bit set = communicating) Monitor 36 status (bit set = communicating) Monitor 37 status (bit set = communicating) Monitor 38 status (bit set = communicating) Monitor 39 status (bit set = communicating) Monitor 40 status (bit set = communicating) Monitor 41 status (bit set = communicating) Monitor 42 status (bit set = communicating) Monitor 43 status (bit set = communicating) Monitor 44 status (bit set = communicating) Monitor 45 status (bit set = communicating) Monitor 46 status (bit set = communicating) Monitor 47 status (bit set = communicating) Monitor 48 status (bit set = communicating)	1	Bit Field	RO	—	—	—	0x0001 - Monitor 33 installed 0x0002 - Monitor 34 installed 0x0004 - Monitor 35 installed 0x0008 - Monitor 36 installed 0x0010 - Monitor 37 installed 0x0020 - Monitor 38 installed 0x0040 - Monitor 39 installed 0x0080 - Monitor 40 installed 0x0100 - Monitor 41 installed 0x0200 - Monitor 42 installed 0x0400 - Monitor 43 installed 0x0800 - Monitor 44 installed 0x1000 - Monitor 45 installed 0x2000 - Monitor 46 installed 0x4000 - Monitor 47 installed 0x8000 - Monitor 48 installed
420304	Monitor 49 status (bit set = communicating) Monitor 50 status (bit set = communicating) Monitor 51 status (bit set = communicating) Monitor 52 status (bit set = communicating) Monitor 53 status (bit set = communicating) Monitor 54 status (bit set = communicating) Monitor 55 status (bit set = communicating) Monitor 56 status (bit set = communicating) Monitor 57 status (bit set = communicating) Monitor 58 status (bit set = communicating) Monitor 59 status (bit set = communicating) Monitor 60 status (bit set = communicating) Monitor 61 status (bit set = communicating) Monitor 62 status (bit set = communicating) Monitor 63 status (bit set = communicating)	1	Bit Field	RO	—	—	—	0x0001 - Monitor 49 installed 0x0002 - Monitor 50 installed 0x0004 - Monitor 51 installed 0x0008 - Monitor 52 installed 0x0010 - Monitor 53 installed 0x0020 - Monitor 54 installed 0x0040 - Monitor 55 installed 0x0080 - Monitor 56 installed 0x0100 - Monitor 57 installed 0x0200 - Monitor 58 installed 0x0400 - Monitor 59 installed 0x0800 - Monitor 60 installed 0x1000 - Monitor 61 installed 0x2000 - Monitor 62 installed 0x4000 - Monitor 63 installed
	Total Registers	4						

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SEM3T Monitor Data Registers (cont'd)

Communication Configuration Settings Registers								
Modbus External	Monitor ID	Reg. Size	Format	Access	Range	Default	Unit	Description
420404	Web content refresh rate	1	Uint-16	RW	10 - 900	30	second	Content refresh rate for 'Realttime' web page, units in seconds
420405	IP Mode	1	Enum	RW	0 - DHCP 1 - Static IP	1	—	IP Configuration mode
420407	IP Address Word 1	1	Uint-16	RW	IPV4: 1 - 00FF	192	—	For IPv4, one octet is stored per word Note: This field will only be changed, if the correct value for all 3 - IP Address, Subnet Mask and Default Gateway is correct (In range of IP network)
420408	IP Address Word 2	1	Uint-16	RW	IPV4: 1 - 00FF	168	—	
420409	IP Address Word 3	1	Uint-16	RW	IPV4: 1 - 00FF	1	—	
420410	IP Address Word 4	1	Uint-16	RW	IPV4: 1 - 00FF	65	—	
420411	IP Address Word 5	1	Uint-16	RW	IPV4: 1 - 00FF	0	—	
420412	IP Address Word 6	1	Uint-16	RW	IPV4: 1 - 00FF	0	—	
420413	IP Address Word 7	1	Uint-16	RW	IPV4: 1 - 00FF	0	—	
420414	IP Address Word 8	1	Uint-16	RW	IPV4: 1 - 00FF	0	—	
420415	Subnet Mask Word 1	1	Uint-16	RW	IPV4: 1 - 00FF	255	—	For IPv4, one octet is stored per word Note: This field will only be changed, if the correct value for all 3 - IP Address, Subnet Mask and Default Gateway is correct (In range of IP network)
420416	Subnet Mask Word 2	1	Uint-16	RW	IPV4: 1 - 00FF	255	—	
420417	Subnet Mask Word 3	1	Uint-16	RW	IPV4: 1 - 00FF	255	—	
420418	Subnet Mask Word 4	1	Uint-16	RW	IPV4: 1 - 00FF	0	—	
420419	Subnet Mask Word 5	1	Uint-16	RW	IPV4: 1 - 00FF	0	—	
420420	Subnet Mask Word 6	1	Uint-16	RW	IPV4: 1 - 00FF	0	—	
420421	Subnet Mask Word 7	1	Uint-16	RW	IPV4: 1 - 00FF	0	—	
420422	Subnet Mask Word 8	1	Uint-16	RW	IPV4: 1 - 00FF	0	—	
420423	Gateway Word 1	1	Uint-16	RW	IPV4: 1 - 00FF	192	—	For IPv4, one octet is stored per word Note: This field will only be changed, if the correct value for all 3 - IP Address, Subnet Mask and Default Gateway is correct (In range of IP network)
420424	Gateway Word 2	1	Uint-16	RW	IPV4: 1 - 00FF	168	—	
420425	Gateway Word 3	1	Uint-16	RW	IPV4: 1 - 00FF	1	—	
420426	Gateway Word 4	1	Uint-16	RW	IPV4: 1 - 00FF	1	—	
420427	Gateway Word 5	1	Uint-16	RW	IPV4: 1 - 00FF	0	—	
420428	Gateway Word 6	1	Uint-16	RW	IPV4: 1 - 00FF	0	—	
420429	Gateway Word 7	1	Uint-16	RW	IPV4: 1 - 00FF	0	—	
420430	Gateway Word 8	1	Uint-16	RW	IPV4: 1 - 00FF	0	—	
420431	Time Synchronization	1	Enum	RW	0 - No 1 - Yes	0	—	Time Synchronization with SNTP server
420432	Time Server Addressing Option	1	Enum	RW	0 - Domain Name 1 - IP Address	1	—	Whether to use Domain Name or IP Address of the SNTP server for time sync
420433	Time Server IP Address Word 1	1	Uint-16	RW	IPV4: 1 - 00FF	0	—	For IPv4, one octet is stored per word
420434	Time Server IP Address Word 2	1	Uint-16	RW	IPV4: 1 - 00FF	0	—	
420435	Time Server IP Address Word 3	1	Uint-16	RW	IPV4: 1 - 00FF	0	—	
420436	Time Server IP Address Word 4	1	Uint-16	RW	IPV4: 1 - 00FF	0	—	
420437	Time Server IP Address Word 5	1	Uint-16	RW	IPV4: 1 - 00FF	0	—	
420438	Time Server IP Address Word 6	1	Uint-16	RW	IPV4: 1 - 00FF	0	—	
420439	Time Server IP Address Word 7	1	Uint-16	RW	IPV4: 1 - 00FF	0	—	
420440	Time Server IP Address Word 8	1	Uint-16	RW	IPV4: 1 - 00FF	0	—	
420441	Time Server Domain Name	32	ASCII	RW	ASCII	—	—	Domain Name of the SNTP sever
420473	Time Server DNS Address word 1	1	Uint-16	RW	IPV4: 1 - 00FF	8	—	DNS address of SNTP server
420474	Time Server DNS Address word 2	1	Uint-16	RW	IPV4: 1 - 00FF	8	—	
420475	Time Server DNS Address word 3	1	Uint-16	RW	IPV4: 1 - 00FF	8	—	
420476	Time Server DNS Address word 4	1	Uint-16	RW	IPV4: 1 - 00FF	8	—	
420477	Time Server DNS Address word 5	1	Uint-16	RW	IPV4: 1 - 00FF	0	—	
420478	Time Server DNS Address word 6	1	Uint-16	RW	IPV4: 1 - 00FF	0	—	
420479	Time Server DNS Address word 7	1	Uint-16	RW	IPV4: 1 - 00FF	0	—	
420480	Time Server DNS Address word 8	1	Uint-16	RW	IPV4: 1 - 00FF	0	—	
Total Registers		76						

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SEM3T Monitor Data Registers (cont'd)

Single-Phase Monitor Diagnostic Registers								
Modbus External	Monitor ID	Reg. Size	Format	Access	Range	Default	Unit	Description
Base+1	Phase Selected/Device ID	1	Uint-16	RO	10 - Thermal	—	—	10 indicates a Thermal Module
Base+2	Temperature (from 22° C)	2	Float-32	RO	—	—	Celsius	
Base+4	Modbus Address	1	Uint-16	RO	1-63	—	—	
Base+5	Device Serial Number	16	Char-32	RO	—	—	—	32 ASCII characters
Base+21	Firmware Version Number	4	Char-8	RO	—	—	—	8 ASCII characters
Modbus Address External	Single-Phase Monitors	Reg. Count						
420501	Monitor 1 base address	24						
420525	Monitor 2 base address	24						
420549	Monitor 3 base address	24						
420573	Monitor 4 base address	24						
420597	Monitor 5 base address	24						
420621	Monitor 6 base address	24						
420645	Monitor 7 base address	24						
420669	Monitor 8 base address	24						
420693	Monitor 9 base address	24						
420717	Monitor 10 base address	24						
420741	Monitor 11 base address	24						
420765	Monitor 12 base address	24						
420789	Monitor 13 base address	24						
420813	Monitor 14 base address	24						
420837	Monitor 15 base address	24						
420861	Monitor 16 base address	24						
420885	Monitor 17 base address	24						
420909	Monitor 18 base address	24						
420933	Monitor 19 base address	24						
420957	Monitor 20 base address	24						
420981	Monitor 21 base address	24						
421005	Monitor 22 base address	24						
421029	Monitor 23 base address	24						
421053	Monitor 24 base address	24						
421077	Monitor 25 base address	24						
421101	Monitor 26 base address	24						
421125	Monitor 27 base address	24						
421149	Monitor 28 base address	24						
421173	Monitor 29 base address	24						
421197	Monitor 30 base address	24						
421221	Monitor 31 base address	24						
421245	Monitor 32 base address	24						
421269	Monitor 33 base address	24						
421293	Monitor 34 base address	24						
421317	Monitor 35 base address	24						
421341	Monitor 36 base address	24						
421365	Monitor 37 base address	24						
421389	Monitor 38 base address	24						
421413	Monitor 39 base address	24						
421437	Monitor 40 base address	24						
421461	Monitor 41 base address	24						
421485	Monitor 42 base address	24						
421509	Monitor 43 base address	24						
421533	Monitor 44 base address	24						
421557	Monitor 45 base address	24						
421581	Monitor 46 base address	24						

SEM3T System – Thermal Monitoring System

SEM3T Monitor Data Registers (cont'd)

Thermal Monitor Diagnostic Registers								
Modbus External	Monitor ID	Reg. Size	Format	Access	Range	Default	Unit	Description
Base+1	Phase Selected/Device ID	1	Uint-16	RO	10 - Thermal	–	–	10 indicates a Thermal Module
Base+2	Temperature (from 22° C)	2	Float-32	RO	–	–	Celsius	
Base+4	Modbus Address	1	Uint-16	RO	1-63	–	–	
Base+5	Device Serial Number	16	Char-32	RO	–	–	–	32 ASCII characters
Base+21	Firmware Version Number	4	Char-8	RO	–	–	–	8 ASCII characters
Modbus Address External	Thermal Monitors	Reg. Count						
421605	Monitor 47 base address	24						
421629	Monitor 48 base address	24						
421653	Monitor 49 base address	24						
421677	Monitor 50 base address	24						
421701	Monitor 51 base address	24						
421725	Monitor 52 base address	24						
421749	Monitor 53 base address	24						
421773	Monitor 54 base address	24						
421797	Monitor 55 base address	24						
421821	Monitor 56 base address	24						
421845	Monitor 57 base address	24						
421869	Monitor 58 base address	24						
421893	Monitor 59 base address	24						
421917	Monitor 60 base address	24						
421941	Monitor 61 base address	24						
421965	Monitor 62 base address	24						
421989	Monitor 63 base address	24						
Total Registers		1512						

Thermal Module Alarms								
Modbus External	Monitor ID	Reg. Size	Format	Access	Range	Default	Unit	Description
40001	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–	SEM3T Alarm bits: 0x0010 - Under Temperature Warning bit 0x0020 - Under Temperature Alarm bit 0x0040 - Over Temperature Warning bit 0x0080 - Over Temperature Alarm bit 0x0100 - Replace Sensor Alarm bit
40002	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–	
40003	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–	
40004	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–	
40005	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–	
40006	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–	
40007	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–	
40008	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–	
40009	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–	
40010	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–	
40011	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–	
40012	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–	
40013	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–	
40014	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–	
40015	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–	
40016	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–	
40017	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–	
40018	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–	
40019	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–	
40020	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–	
40021	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–	
40022	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–	
40023	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–	
40024	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–	

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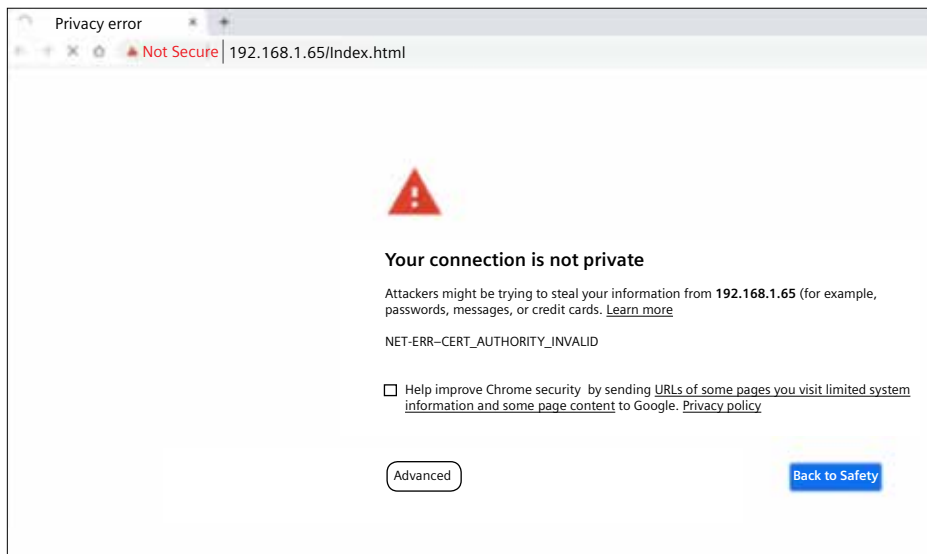
SEM3T Monitor Data Registers (cont'd)

Thermal Module Alarms											
Modbus External	Monitor ID	Reg. Size	Format	Access	Range	Default	Unit	Description			
40025	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–	SEM3T Alarm bits: 0x0010 - Under Temperature Warning bit 0x0020 - Under Temperature Alarm bit 0x0040 - Over Temperature Warning bit 0x0080 - Over Temperature Alarm bit 0x0100 - Replace Sensor Alarm bit			
40026	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–				
40027	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–				
40028	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–				
40029	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–				
40030	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–				
40031	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–				
40032	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–				
40033	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–				
40034	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–				
40035	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–				
40036	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–				
40037	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–				
40038	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–				
40039	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–				
40040	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–				
40041	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–				
40042	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–				
40043	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–				
40044	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–				
40045	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–				
40046	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–				
40047	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–				
40048	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–				
40049	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–				
40050	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–				
40051	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–				
40052	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–				
40053	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–				
40054	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–				
40055	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–				
40056	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–				
40057	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–				
40058	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–				
40059	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–				
40060	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–				
40061	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–				
40062	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–				
40063	Monitor Alarm Flags	1	Bit Field	RW	–	0x0000	–				
Total Registers		63									

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Trouble Shooting

- 1 The controller application will not start if there is no SD card inserted This is also not a typical case. Controllers in field are expected to have a microSD card in the appropriate card slot. The device is checked in factory prior to release to ensure only storage microSD cards are present prior to shipping. However, if a device is encountered in field to have no microSD card, a recommended microSD card shall be inserted to the device and power cycled. After the relevant boot process is complete, the device application shall start and function as expected.
2. When the super cap is fully discharged, the default date is reverted to October 1, 2019.
3. If the SEM3T controller is powered down before 500 seconds have elapsed on initial power up, an updated system time may not be saved in the database correctly.
The system time is saved in the database every second after the initial 500 seconds of initial power up. The 500 seconds delay is necessary to resolve the Device and Wi-Fi LED blink inconsistency during the initial power up sequence (boot and self-test).
4. The Ethernet TCP/IP IP address and the Wi-Fi IP address are required to be in different ranges. The same subnet mask should not be used on different interfaces as it would break routing. The router wouldn't know which hosts were reachable through each of the interfaces (Ethernet/Wi-Fi). It is recommended that the IP range for different interfaces (Ethernet and Wi-Fi) should not be the same.
5. When the user logs in to the SEM3T controller in private network for the first time, there will be a security notice because of the HTTPS server usage. This is expected behavior as in the private network the certificates have not been validated.



First time login security message

The user shall click on "Advanced" button to navigate further.

This server could not prove that it is **192.168.1.65**; its security certificate is not trusted by your computer's operating system. This may be caused by a misconfiguration or an attacker intercepting your connection.

[Proceed to 192.168.65 \(unsafe\)](#)

First time login advanced security message

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The user shall click on “Proceed to 192.168.1.65 (unsafe)” link to continue. Subsequent logins will no longer require the same message navigation.

6. During the firmware upgrade process, uninterrupted power supply is required for successful firmware upgrade.
7. Web browser used to access the SEM3T controller must have the capability to encrypt/decrypt AES-256-CBC hashes.
8. A maximum of 5 Modbus TCP client connections (irrespective of the webpage connection) can access the SEM3T controller simultaneously.
9. While functioning as a Wi-Fi access point, the SEM3T controller with Wi-Fi will not work as Wi-Fi station and vice versa.
10. A maximum of 8 Wi-Fi station devices can be connected simultaneously to the SEM3T controller with .
10. The SEM3T controller cannot be connected to open Wi-Fi access points. Hence open Wi-Fi access points will not be displayed in the list of available Wi-Fi access points when the SEM3T controller is functioning as a Wi-Fi station mode.
11. Only one-way communication is possible between SEM3T controller and Mindsphere – from the SEM3T controller to Mindsphere.

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User Input Field Requirements The following table summarizes the user input fields in the SEM3T web pages.

User Field#	User Field Tag	Webpage name	Max. Char. Length	Default Value/Range where applicable	Type of characters allowed	Notes
1	Username	Login	20	Admin	Alphanumeric (A-Z, a-z, 0-9), At sign (@), Hyphen/Dash sign (-), Underscore (_), Pound/Hashtag (#), Dot sign (.)	White space not allowed
2	Password	Login	10	sem3	Alphanumeric (A-Z, a-z, 0-9), At sign (@), Hyphen/Dash sign (-), Underscore (_), Pound/Hashtag (#)	White space not allowed. Dot sign not allowed.
3	IPv4 address	System Settings	15	192.168.1.65	Numbers (0-9), Dot sign (.)	Alphabets not allowed. Other special characters not allowed.
4	Subnet Mask	System Settings	15	255.255.255.0	Numbers (0-9), Dot sign (.)	Alphabets not allowed. Other special characters not allowed.
5	Default Gateway	System Settings	15	192.168.1.1	Numbers (0-9), Dot sign (.)	Alphabets not allowed. Other special characters not allowed.
6	IPv6 address	System Settings	39	2001:db8:0:1::3	Numbers (0-9), Alphabets (a to f) and colon (:)	Other special characters not allowed.
7	Prefix length	System Settings	3	64 (1-128)	Numbers (0-9),	Alphabets not allowed. Other special characters not allowed.
8	Default Gateway	System Settings	39	2001:0db8:000:0001:0000:0000:0000:0002	Numbers (0-9), Alphabets (a to f) and colon (:)	Other special characters not allowed.
9	SMTP Server Name	System Settings	63	N/A	Alphanumeric (A-Z, a-z, 0-9), Hyphen/Dash sign (-), Dot sign (.)	White space not allowed. Other special characters not allowed.
11	SMTP username	System Settings	63	NA	Alphanumeric (A-Z, a-z, 0-9), At sign (@), Hyphen/Dash sign (-), Dot sign (.)	White space not allowed. Other special characters not allowed.
12	SMTP user password	System Settings	63	NC	Alphanumeric (A-Z, a-z, 0-9), At sign (@), Hyphen/Dash sign (-), Underscore (_), Pound/Hashtag (#), Dot sign (.) etc. and other special characters.	White Space is allowed in the beginning/middle/end of the field.
13	Realtime refresh interval	System Settings	3	30 (10 – 900)	Numbers (0-9)	White space not allowed. Other special characters not allowed.
14	Device Description	System Settings	63	NA	Alphanumeric (A-Z, a-z, 0-9), At sign (@), Hyphen/Dash sign (-), Underscore (_), Pound/Hashtag (#), Dot sign (.), Comma (,)	White Space is allowed in the beginning/middle/end of the field.
15	Under Temperature Warning (°C)	Global Settings/ Branch Configuration	4	0.00 (0 – 150)	Numbers (0-9), Dot sign (.)	White space not allowed. Other special characters not allowed.
16	Under Temperature Warning Time Delay	Global Settings/ Branch Configuration	5	1 (1 – 65535)	Numbers (0-9)	White space not allowed. Other special characters not allowed.
17	Under Temperature Alarm (°C)	Global Settings/ Branch Configuration	4	0.00 (0 – 150)	Numbers (0-9), Dot sign (.)	White space not allowed. Other special characters not allowed.

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User Input Field Requirements (cont'd)

User Field#	User Field Tag	Webpage name	Max. Char. Length	Default Value/Range where applicable	Type of characters allowed	Notes
18	Under Temperature Alarm Time Delay	Global Settings/Branch Configuration	5	1 (1 – 65535)	Numbers (0-9)	White space not allowed. Other special characters not allowed.
19	Over Temperature Warning (°C)	Global Settings/Branch Configuration	4	0.00 (0 – 150)	Numbers (0-9), Dot sign (.)	White space not allowed. Other special characters not allowed.
20	Over Temperature Warning Time Delay	Global Settings/Branch Configuration	5	1 (1 – 65535)	Numbers (0-9)	White space not allowed. Other special characters not allowed.
21	Over Temperature Alarm (°C)	Global Settings/Branch Configuration	4	0.00 (0 – 150)	Numbers (0-9), Dot sign (.)	White space not allowed. Other special characters not allowed.
22	Over Temperature Alarm Time Delay	Global Settings/Branch Configuration	5	1 (1 – 65535)	Numbers (0-9),	White space not allowed. Other special characters not allowed.
23	Replace Sensor Alarm Time Delay	Global Settings/Branch Configuration	5	900 (1-65535)	Numbers (0-9)	White space not allowed. Other special characters not allowed.
24	Module Name	Branch Configuration	19	Thermal Module x (where x is the location)	Alphanumeric (A-Z, a-z, 0-9)	White Space is allowed in the middle/end of the field. Other special characters not allowed.
25	SSID	Wi-Fi configuration (Access Point)	32	NA	Alphanumeric (A-Z, a-z, 0-9), At sign (@), Hyphen/Dash sign (-), Underscore (_), Pound/Hashtag (#), Dot sign (.) etc. and other special characters.	White space allowed in the middle of the field.
26	Security Key	Wi-Fi configuration (Station Mode)	63	NA (Min. 8 characters)	Alphanumeric (A-Z, a-z, 0-9), At sign (@), Hyphen/Dash sign (-), Underscore (_), Pound/Hashtag (#), Dot sign (.) etc. and other special characters.	White space not allowed.
27	Hostname	Cloud configuration	256	https://southgate.eu1.mindsphere.io	Alphanumeric (A-Z, a-z, 0-9), colon (:), Dot sign (.), Slash (/)	White space not allowed.
28	Port	Cloud configuration	5	443 (1 - 65535)	Numbers (0-9)	White space not allowed. Other special characters not allowed.
29	Proxy hostname	Cloud configuration	15	NA	Numbers (0-9), Dot sign (.)	Alphabets not allowed. Other special characters not allowed.
30	Proxy Port	Cloud configuration	5	NA 0 – 65535	Numbers (0-9)	White space not allowed. Other special characters not allowed.
31	Initial Access token	Cloud configuration	1000	NA	Alphanumeric (A-Z, a-z, 0-9), At sign (@), Hyphen/Dash sign (-), Underscore (_), Pound/Hashtag (#), Dot sign (.) etc. and other special characters.	

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User Input Field Requirements (cont'd)

User Field#	User Field Tag	Webpage name	Max. Char. Length	Default Value/Range where applicable	Type of characters allowed	Notes
32	Tenent	Cloud configuration	256	emlpprm	Alphanumeric (A-Z, a-z, 0-9), At sign (@), Hyphen/Dash sign (-), Underscore (_), Pound/Hashtag (#), Dot sign (.) etc. and other special characters.	
33	Group Name	Group	19	NA	Alphanumeric (A-Z, a-z, 0-9), At sign (@), Hyphen/Dash sign (-), Underscore (_), Pound/Hashtag (#), White space in between the name.	No Trailing or leading white space. Must start with an alphabet.
34	Depth	Data log/ Group Data Log	4	NA (1 – 8760)	Numbers (0-9)	White space not allowed. Other special characters not allowed.
35	Log Name	Data Log/ Group Data Log/ Alarm Event Log/ Group Alarm Event Log	19	NA	Alphanumeric (A-Z, a-z, 0-9), At sign (@), Hyphen/Dash sign (-), Underscore (_), White space in between the name.	No Trailing or leading white space. Must start with an alphabet.
36	Email Body	Data Log/ Group Data Log/ Alarm Event Log/ Group Alarm Event Log	250	NA	Alphanumeric (A-Z, a-z, 0-9), At sign (@), Hyphen/Dash sign (-), Underscore (_), Pound/Hashtag (#), Dot sign (.) etc. and other special characters.	
37	Depth	Alarm Event Log/ Group Alarm Event Log	4	NA (1 – 5000)	Numbers (0-9)	White space not allowed. Other special characters not allowed.
38	First Name	User Profile/User management	20	NA	Alphanumeric (A-Z, a-z, 0-9), At sign (@), Hyphen/Dash sign (-), Underscore (_), Pound/Hashtag (#), Dot sign (.)	White space not allowed. Other special characters not allowed.
39	Last Name	User Profile/User management	20	NA	Alphanumeric (A-Z, a-z, 0-9), At sign (@), Hyphen/Dash sign (-), Underscore (_), Pound/Hashtag (#), Dot sign (.), Apostrophe sign (')	White space not allowed. Other special characters not allowed.
40	Company Name	User Profile/User management	20	NA	Alphanumeric (A-Z, a-z, 0-9), At sign (@), Hyphen/Dash sign (-), Underscore (_), Pound/Hashtag (#), Dot sign (.), Apostrophe sign (')	White space not allowed. Other special characters not allowed.
41	Email	User Profile/User management	50	NA	Alphanumeric (A-Z, a-z, 0-9), At sign (@), Hyphen/Dash sign (-), Dot sign (.)	White space not allowed in the beginning/middle/end of the field. Other special characters not allowed.
42	Phone	User Profile/User management	10	NA	Numbers (0-9).	Alphabets are not allowed in this field. Other special characters are not allowed. White space not allowed in the beginning/middle/end of the field.
43	Existing Password	User Profile	10	NA	Alphanumeric (A-Z, a-z, 0-9), At sign (@), Hyphen/Dash sign (-), Underscore (_), Pound/Hashtag (#), Dot sign (.)	White space not allowed in the beginning/middle/end of the field. Other special characters not allowed.

Webpage Access by User Denomination. The SEM3T system web pages access is restricted based on the user access level.

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Webpages / Actions	Supervisor	Controller	Observer
Login Page	X	X	X
About Page	X	X	X
System Settings Page	X		
Global Settings Page	X		
Module Configuration Page	X		
Branch Configuration Page	X		
Configure Branch Module Parameter	X		
Configure Grouped Branch Module Parameter	X		
Wi-Fi/Bluetooth configuration	X		
Cloud configuration	X		
Group configuration			
Real-time Page	X	X	X
Viewing of real-time Grouped Meter data	X	X	X
Clearing of Active Alarms	X	X	
Data Log Page (Create/View)	X		
Group Data Log Page (Create/View)	X		
Alarm Event Log (Create/View)	X		
Group Alarm Event Log (Create/View)	X		
System Event Log Page	X	X	X
Download the Event Log	X	X	X
Print the Event Log	X	X	X
Clear System Event Log	X		
Module Dashboard Page	X	X	X
Group Dashboard Page	X	X	X
User Profile Page	X	X	X
Modify information in the user profile (including change password)	X	X	X
User Management Page	X		
Diagnostic Page	X		
Thermal Module Serial Numbers Page	X	X	X
Import Configuration Page	X		
Export Configuration Page	X	X	X
microSD card information Page	X		

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Acronyms and Abbreviations

Acronyms/ Abbreviations	Definitions/Description
BLE	Bluetooth low energy
CE	Communication Error
DDR	Direct Data Rate
DHCP	Dynamic host configuration protocol
DNS	Domain name system
EDR	Enhanced Data rate
eMMC	Embedded Multi-media card
FCC	Federal Communication Commission
IoT	Internet of Things
LED	Light Emitting Diode
LUKS	Linux Unified Key Setup
MD6	Message Digest algorithm
NC	Not configured
NTP	Network Time Protocol
RCA	Root Cause Analysis
RGA	Returned Goods Authorization
RISC	Reduced Instruction Set Computer
RMA	Returned Material/Merchandise Authorization
RTC	Domain name system
RTU	Remote terminal unit
SE	Sensor Error
SEM3	Siemens Embedded Micro Metering Module Also interchangeably called Siemens Embedded Micro Monitoring Module
SMTP	Simple Mail Transfer Protocol
SSID	Service Set Identifier
TCP	Transmission Control Protocol
UART	Universal Asynchronous Receiver/ Transmitter

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