TM3 monitoring unit

installation and users manual

RTsystems
remote monitoring

contents

introduction

product description

The TM3 Monitoring Unit is a generic environmental monitoring system, capable of interfacing to various sensors and communicating sensor status on Ethernet (web based), GSM and SNMP. Sensors which can be connected include NTC temperature sensors, flood sensors, dry contacts and third party 4-20mA sensors.

The unit can be configured through the web interface and by SMS. Temperature Thresholds can also be configured on the front panel keypad interface. Sensor levels and thresholds, alarm descriptions, alarm profiles, contact details and communication data are configurable on the unit.

The TM3 Unit is capable of logging alarms and analogue sampled data which can be viewed from the web interface. Images from a network enabled camera can be viewed on the web interface. Two onboard relays for controlling external devices and a 12Vdc and 18Vdc power supplies are available on the unit. The unit has battery backup capability during mains power failure. Onboard SD card saves all programmed information. In the event of a unit failing the SD card is removed from the faulty unit and inserted into a new unit and the TM3 is ready to monitor.

document overview

The *TM3 Unit Installation and Users Manual* describes how to install a TM3 Monitoring Unit, how sensors are connected and configuration of the sensor inputs is performed. It also describes maintenance and fault finding. After performing the installation and configuration procedures as set out in this document, the TM3 Unit is ready for installation specific configuration and operational environmental monitoring.

product certification

The TM3 Unit CE certification is pending. The following IEC specifications are applicable to the TM3 Monitoring Unit:

■ Electrical Fast Transients (EFT)	IEC 61000-4-4
■ Electrostatic Discharge (ESD)	IEC 61000-4-2
■ Surges	IEC 61000-4-5
■ Radiated Susceptibility	IEC 801-3
■ Voltage Dips and Interruptions	IEC 61000-4-11
■ Conducted Susceptibility	IEC 61000-4-6
■ Emissions and Harmonics	IEC 61000-3-3 and IEC 61000-3-2
■ General Products Safety Directive	2001/95/EC
■ RoHS Compliance	2002/95/EC

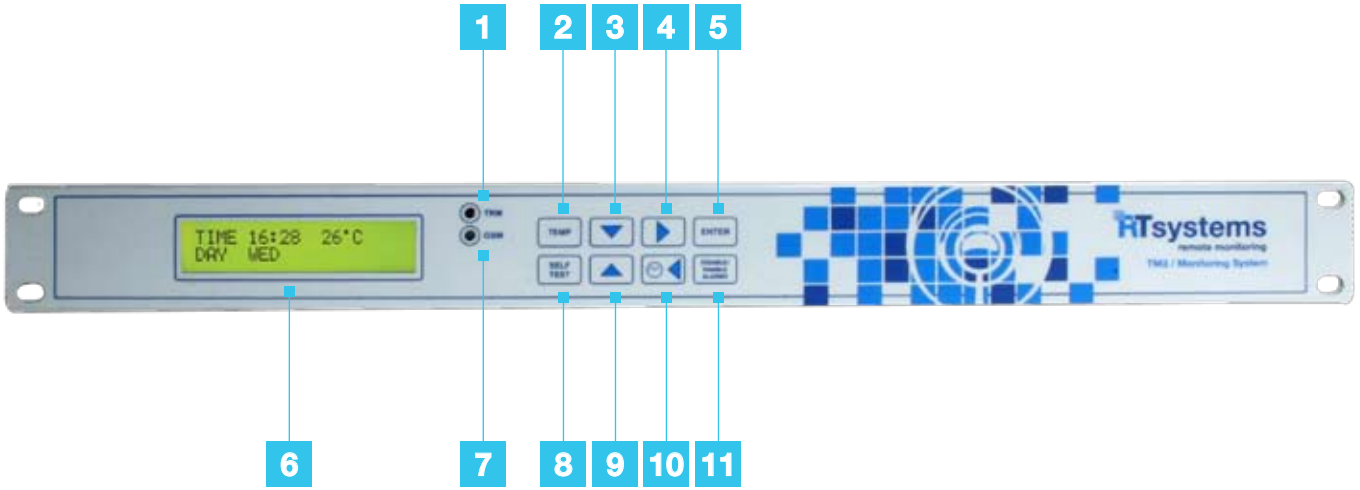
related documents

Unless otherwise noted, the following documentation and software is available on the CD provided with the device or on the applicable product page on the RT Systems website www.rtsystems.co.za

- Installation and Users Manual
- ICASA Approval Certificate
- GSM Module Certification Data
- IP Set Software
- IOD's
- TM3 Base Station Programming Software.
  Refer to the software help file for installation and users instructions.
- SD card default configuration files
- SNMP mib file

physical description

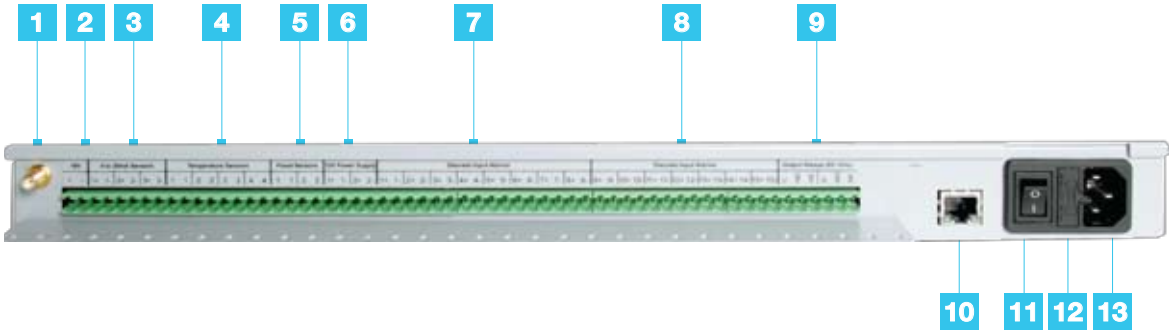
front panel



	item	description
1	TRM	**GSM Transmit Indicator** This is a red LED and will light up during GSM transmission and reception.
2	TEMP	**Temperature setup select key** The temperature sensor thresholds and calibration settings are configured when selecting the TEMP key. Press twice in succession to calibrate the sensors.
3	▼	**Down key** The down key is used to scroll through menus and decrement numerical values during system configuration and setup.
4	▶	**Right key** The right key is used to move the cursor to the right during system configuration and setup.
5	ENTER	**Enter key** Press Enter to enter the telemetry menu where raw input data can be viewed. The Enter key is also used to save setup data.

	item	description
6	LCD	**Liquid Crystal Display** The LCD displays all the system data.
7	GSM	**GSM Status Indicator** ■ Flashing once every second – Initialising, not registered on the GSM network. ■ Flashing once every three seconds – Registered on GSM network.
8	SELF TEST	**Self test select key** By selecting the Self Test key the unit performs a sequence of tests to determine its own health status.
9		**Up key** The up key is used to scroll through menus and increment numerical values during system configuration and setup
10		**Left key/Clock/Cancel** This is a multifunction key. Press to set up the time and date of the unit. When in a setup menu this key can be used to move the cursor to the left. This key is also used to cancel menu selections when in a menu select mode.
11	DISABLE ALL ALARMS	**Disable All Alarms** By selecting this key all alarms will be disabled. To enable alarms select key or unit enables alarms after one hour. This will be indicated on the LCD and on the Web interface.

back panel



	item	description
1	GSM ANTENNA CONNECTOR	SMA connector for GSM antenna connection.
2	VOLTAGE OUTPUT	Provides one 18V dc, 50mA voltage output for sensor supply voltage.
3	4-20MA INPUTS	Three 4-20mA inputs available for connecting third party sensors.
4	TEMPERATURE SENSOR INPUTS	Four inputs available to connect NTC temperature sensors.
5	FLOOD SENSOR INPUTS	Two inputs available for multiple flood sensors in series terminated with a 10kΩ end of line resistor.
6	VOLTAGE OUTPUT	Provide two 12V dc, 200mA voltage outputs for sensor supply voltage.
7	DRY CONTACT INPUTS	Eight dry contacts available for dry contacts.
8	DRY CONTACT INPUTS	Seven dry contacts available for dry contacts.
9	RELAY OUTPUTS	Used for relay controlled external devices.
10	10/100 BASE-T NETWORK PORT	Provides for a 10/100 Base-T network connection with status and link LEDs indicate network traffic.
11	ON/OFF	On/Off switch for unit power.
12	INLET FUSE	Provides for input power protection. See maintenance parts for fuse rating.
13	AC LINE INLET	Provides for the input power connection. See specification on page 54 for voltage information.

inventory

Inspect the contents of the package to ensure that the parts included match those shown below. Report missing or damaged contents to RT Systems or your TM3 reseller. However, if damage was due to shipping, immediately report the damage to the shipping agent.

item	description
	The shipping and packaging materials are recyclable. Please save them for later use or dispose of them appropriately.

TM3 monitoring unit

The main component in the shipment.

utility cd

The utility CD contains the Installation and Users Manual, Certification data, TM3 Base Station Programming Software, IP Set Software, SNMP MIB file, OID'S, SD card default configuration files and Freeware SNMP browser link.

SD card

The SD Card is installed on the TM3 Monitoring Unit and contains default configuration data.

10 position terminal block

Included are six terminal blocks for interfacing to the terminals at the back of the TM3 Monitoring Unit.

GSM antenna

A GSM antenna is supplied. The antenna has a magnetic base for easy fitment.

power cord:

A mains lead with BS 546 plug is supplied.

cross-over ethernet cable

The supplied cross-over Ethernet cable is used for interface directly to a laptop.

installation pack

The supplied installation pack consists of 10 cable ties, 4 screws for mounting TM3 unit on 19" rack and 6 cable tie mounts.

additional parts

Additional parts are not supplied with the TM3 Unit. These parts are installation specific and are supplied by the installer.

NTC temperature sensors

Analogue sensor.

humidity/temperature sensor (dry contact)

Alerts are activated by means of a contact closing/opening when threshold is reached.

flood sensor

The water detector will detect potential flood risks in the server room caused by condensation water form air cons or burst water pipes.

4-20mA current transducer

Monitor the amperage of ups and generator distribution boards.

4-20mA humidity sensor

Monitor humidity in server rooms. High humidity – condensation. Low humidity – static.

smoke detector sensor

An important addition to security and safety. These smoke detectors are easy to install and configure. The smoke detector must be mounted on the ceiling for maximum smoke detection.

door contact sensor

Monitor and be alerted when there is access to server rooms, server cabinets.

installation

install the TM3 Unit

The TM3 Monitoring Unit is enclosed in a standard 1U 19” enclosure. Install the unit in the front of the rack, which requires one U of rack space. When installing the TM3 Monitoring Unit, take into consideration the following:

symbol	description
	**Caution:** Only connect approved devices to ports on the unit as directed in this manual. Plugging in other devices may result in equipment damage.
	**Note:** Install the appliance in an environment compatible with the maximum ambient temperature specified in “Specifications” on page 54. Units installed in a closed or multi-unit rack assembly can experience a greater operating ambient temperature than the ambient room temperature.
	**Note:** Install the unit in a way that allows sufficient airflow for safe operation.
	**Note:** When you install the unit in the rack, be sure that you do not create a hazardous condition due to uneven mechanical loading. For example, do not use the unit as a shelf.
	**Note:** When you install the GSM antenna, be sure that you have good GSM reception. Install the antenna preferably outside the rack assembly for improved reception.

power cord, network cable and GSM antenna connections

symbol	description
	**Caution:** Before you energise the appliance, review the electrical specifications to avoid overloading the circuit.
	**Caution**: Make sure you properly ground the appliance by plugging the power cord directly into a wall outlet or by verifying the ground path if using a power strip.
	**Note:** The power cord provided is to be used only with the TM3 Monitoring Unit.
	**Note:** Only use the GSM antenna provided with the unit.

1. Connect the supplied power cord to the AC Line Inlet of the unit.
2. Secure the power cord to the power cord retainer bracket using the tie wraps.
3. Connect the supplied network cable to the 10/100 Base-T Network Port on the unit.
4. Plug the power cord into a power source.
5. Connect the GSM antenna to the unit.

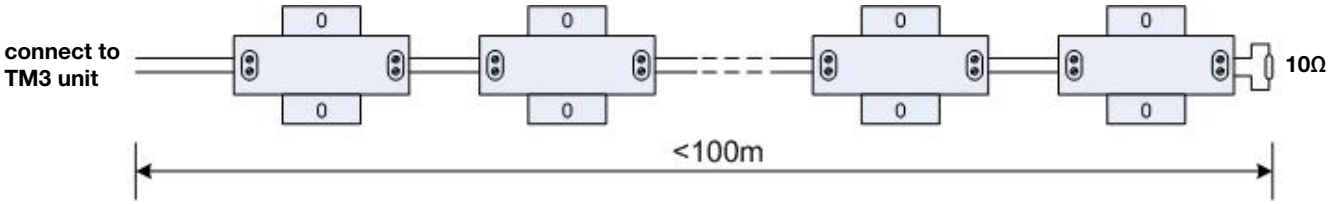
sensor connection

temperature sensors

Connect the NTC temperature sensor at the back of the unit marked “Temperature Sensors” to any one of the available four inputs. Dry Contact Temperature sensors can be connected to any one of the 15 inputs marked “Dry Contact Inputs”. To extend the temperature sensor use standard CAT-5 cable to a maximum distance of 100 metres. Tie the cable to the cable support at the back of the unit using the tie wraps provided.

flood sensors

Use the supplied flood sensors on the TM3 Monitoring Unit. Connect the flood sensor at the back of the unit marked “Flood Sensors” to any one of the available two inputs. The flood sensors can be extended using standard CAT-5 cable to a maximum distance of 100 metres. Tie the cable to the cable support at the back of the unit using the tie wraps provided. Flood sensors to be installed with the 10kΩ end of line resistor terminated on the last flood sensor.



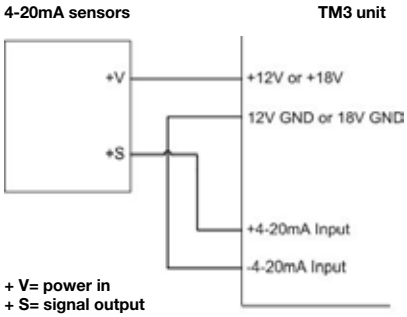
dry contacts

Third party dry contacts can be used (Normally Open or Normally Closed contact). Connect the dry contacts at the back of the unit marked “Dry Contacts” to any one of 15 available inputs. Extend the dry contact using standard CAT-5 cable to a maximum distance of 100 metres. Tie the cable to the cable support at the back of the unit using the tie wraps provided. The dry contacts can be configured active open (HIGH) or active closed (LOW). Follow third party installation instructions provided with the dry contacts.

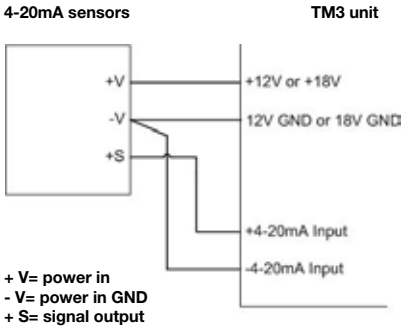
4-20mA sensors

Use third party 4-20mA sensors as per specification on page 8. Connect the 4-20mA sensors at the back of the unit marked “4-20mA Sensors” to any one of three available inputs. Extend the 4-20mA sensors using standard CAT-5 cable to a maximum distance as specified by the sensor manufacturer. Tie the cable to the cable support at the back of the unit using the tie wraps provided. The TM3 Monitoring Unit implements a 100Ω sense resistor to which the 4-20mA sensor connects. At the back of the unit two 12V (200mA) power supply and one 18V (50mA) power supply outputs are available for sensor power supply. Ensure that the 4-20mA sensor does not overload the power supply. Two wire and three wire sensor connections are shown below. 4-20ma sensors that are available: Humidity, Temperature, Amperage.

two wire sensor connection



three wire sensor connection



relay connection

Connect the cable that is connected to external device to the back of the unit to either one of the two relays. Common/Normally Open or Common/Normally Closed contacts can be used. Relays can be Energised/De-energised by either going into the Dry Contacts Alarms Configuration Page and selecting 0 = De-energise or 1 = Energise or by sending an SMS command to the TM3 Unit.

initial configuration

before the unit is used operationally the following minimum configuration is required

symbol	description
N	■ Set the unit's time and date
	■ Connect TM3 to Laptop
	■ Configure the GSM settings
	■ Configure the Ethernet/network

Power up the unit and wait ± 1 minute before starting with initial configuration. An "I" in the right hand corner of the LCD indicates the unit is busy initialising. "I" will only disappear when the GSM configuration is complete. The default display is displayed on the LCD. The data available on the default display is the Time, Day and Temperature value of Temperature Sensor 1.

set the time and date

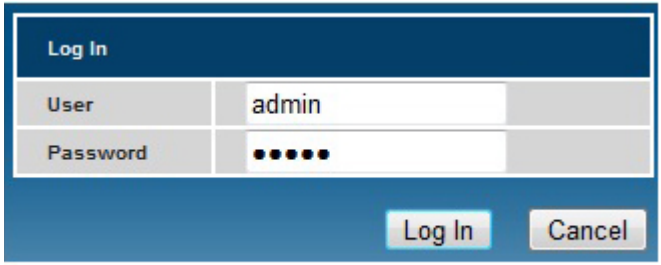
To set the unit's time and date press the "Left/Clock Key" on the front panel of the unit. The data available for configuration is the Time, Day of week and Date. Use the Right and Left keys to move the cursor to the data field which has to be adjusted. By pressing the Up or Down key the data field will be incremented or decremented. After all data fields have been adjusted to the correct values, press the Enter key to store the data.

After the Enter key has been pressed the following display will appear for a couple of seconds.

connecting laptop to TM3

- Connect crossover cable from TM3 to Laptop
- Set the local area connection on Laptop
  - Internet protocol (TCP/IP) Properties
  - General
  - Use the following IP address: 192.168.0.49

Access the web interface by opening Internet Explorer (IE) and enter http://192.168.0.50 in the address bar, the login page of the unit will be displayed on IE. Enter the default administrator user name “admin” and password “admin”, note that all letters are lower case, the user name and password are case sensitive. The Home Page will appear when logged in.

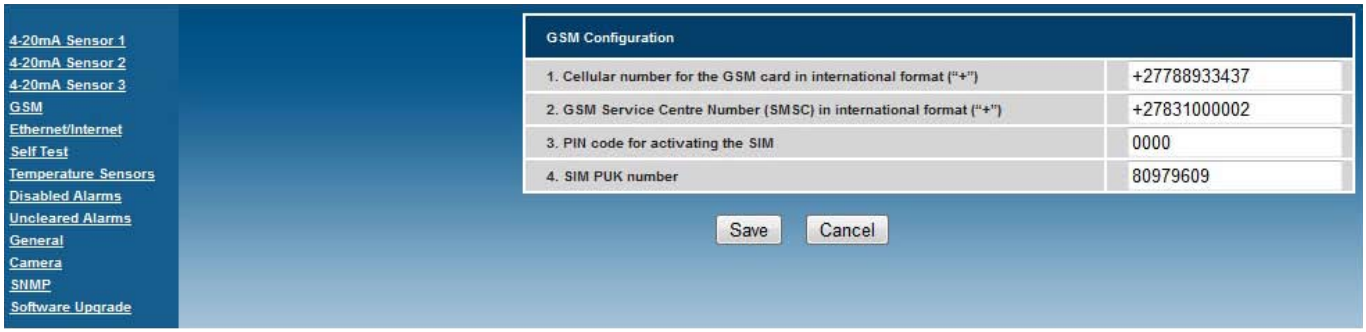


GSM configuration

The GSM needs to be configured before the unit will be able to send SMSs. This is done on the web interface by performing the following steps:

symbol	description
	The GSM configuration should be done before the Sim Card is installed in the unit.

From the Home Page of the TM3 Monitoring Unit select Configuration, now select GSM from the options and the following GSM setup page will be displayed:



The following data can be configured:

- Cellular Number — Enter the cellular number of the Sim card installed in the unit. International number format is required. The correct number is required for the unit's Self Test function to operate correctly.
- GSM Service Centre Number (SMSC) — Enter the service provider Service Centre Number in this field. Obtain number from the cellular service provider.
- PIN Code — Enter the Sim card PIN code. If Sim does not have a PIN then refer to the section below 'Steps to add Pin to Sim card.'
- PUK Code — Enter the Sim card PUK code.

Select Save to store data on the unit after all fields have been configured. Select Cancel and follow the prompted instructions to revert back to the previous settings. The data will not be stored in this case.

Insert the Sim card in the unit. Refer to the maintenance section of this manual for the location of the Sim card holder. Wait a few seconds and the GSM status indicator will start flashing once every 3 seconds and the "I" on the display will disappear.

symbol	description
	If the "I" does not disappear then unit must be switched off and then on to complete initialisation.

Steps to add PIN to Sim card (Steps 2 to 4 may vary on certain Cellphones):

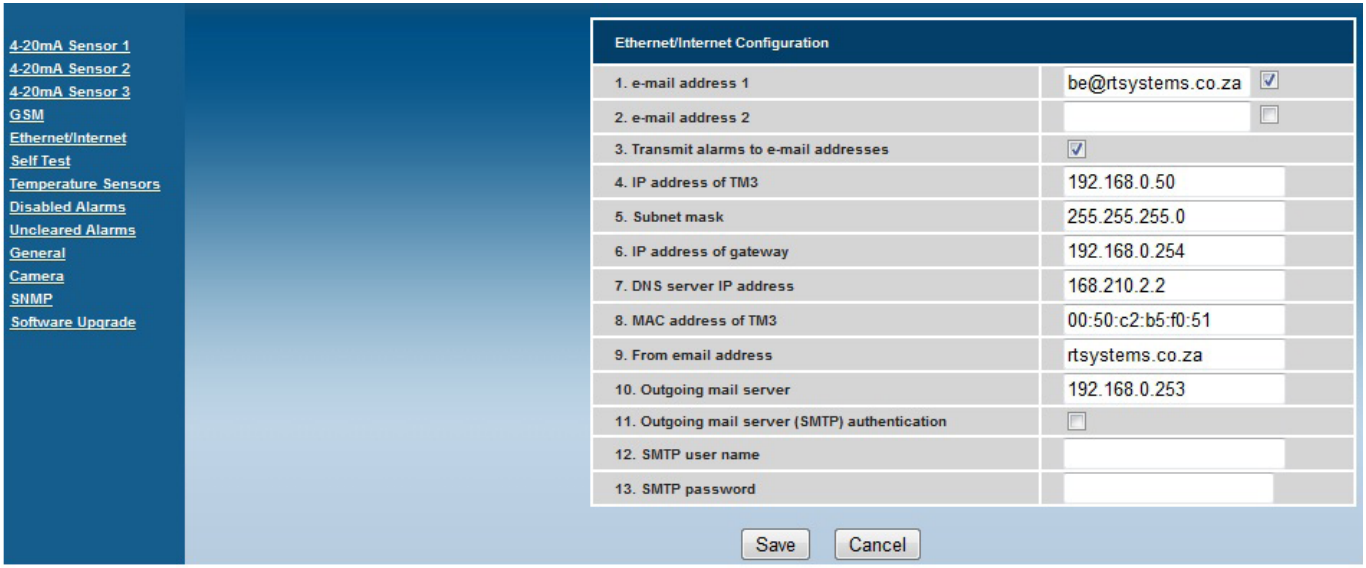
1. Insert Sim into a cellphone
2. Go to 'Security' settings.
3. Select 'Phone and Sim card'
4. Select 'Pin code request'
5. Change to 'On'
6. You will be prompted for a PIN number.
7. Enter a unique Pin, Pin will be rejected 3 times.
8. You will be prompted for the PUK number.
9. Enter the PUK number.
10. Enter Unique Pin.
11. Pin will be accepted, then follow the 'GSM Configuration' steps.

ethernet/internet configuration (first time)

The unit is shipped with the following default network settings:

- IP Address 192.168.0.50
- Gateway Address 192.168.0.2
- Sub-Net Mask 255.255.255.0
- DNS IP Address 192.168.0.4

The Ethernet data can be changed and configured on the web interface. Select Configuration on the Home Page icon bar, now select Ethernet/Internet and the Ethernet/Internet Configuration page appears.



The following data can be configured:

- E-mail address 1 — E-mail address 1 to where alarm messages can be sent. A tick box is available, when ticked this address will be used.
- E-mail address 2 — E-mail address 2 to where alarm messages can be sent. A tick box is available, when ticked this address will be used.
- Transmit alarms to e-mail addresses — Enable the checkbox to send alarm message to the e-mail addresses provided above.
- IP Address of TM3 — Configure a static IP Address for the TM3 Monitoring Unit.
- Subnet Mask — Configure the network subnet mask.
- IP Address of gateway — Configure the network gateway IP Address.
- DNS Server IP Address — Configure the network DNS server IP Address.
- MAC Address of TM3 — A read-only field which displays the Mac Address of the unit
- From e-mail address — Configure the unit's e-mail address.
- Outgoing mail server — Configure the outgoing mail server address.
- Outgoing Mail Server (SMTP) Authentication — Click on checkbox if SMTP server requires authentication.
- SMTP User name — SMTP User name.
- SMTP Password — SMTP Password.

Select Save to store data on the unit after all fields have been configured. Select Cancel and follow the prompted instructions to revert back to the previous settings. The data will not be stored in this case.

The IP Set utility on the CD can be used to set the TM3's IP Address. Enter the unit's Mac Address and the required TM3 IP Address.

symbol	description
	While the majority of SNMP servers do not require authentication, in a case where it is required please provide the information as described in the outgoing mail server (SMTP) authentication section. If you are using the Microsoft Exhange E-mail Service, a mail box needs to be created and the log in credentials entered onto the system.

configuration

This section describes generic configuration procedures which are required to configure a unit for a specific operational installation.

Configuring a unit entails the following basic steps by selecting the appropriate TABS on the web interface TAB bar:

Step 1:	 Contacts	Set up your contacts in the Contacts Configuration Page. Here you specify all the numbers and names to which SMSs have to be sent.
Step 2:	 Alarm Profiles	Set up the alarm profiles in the Alarm Profile Configuration Page. This specifies which alarms have to be sent to which contacts.
Step 3:	 Dry Contact Alarms	Set up the dry contact alarms in the Dry Contact Alarm Configuration Page. Alarm descriptions, active levels and Enable/Disable settings are done on this page.
Step 4:	 Analogue Alarms	Set up the analogue alarms in the Analogue Alarms Configuration Page. Analogue alarms include the temperature, flood, 4-20mA sensors and TM power supply. Transmission selection, Alarm descriptions, and Enable/Disable settings are done on this page.
Step 5:	 Configuration Page	Miscellaneous configuration is performed in the Configuration Page and include the following: ■ 4-20mA Sensors where threshold levels are configured ■ GSM (refer to Initial Configuration GSM Configuration on page 15) ■ Ethernet/Internet (refer to Initial Configuration Ethernet/Internet Configuration on page 17) ■ Self Test where a weekly self test is scheduled ■ Temperature Sensors, where the temperature sensor sampling period, hysteresis levels and threshold levels are configured ■ Disabled Alarms, where a daily disabled alarms report is scheduled ■ Uncleared Alarms, where a daily uncleared alarms report is scheduled ■ General, the Site identification name is specified as well as the dry contact alarm delay time. The software version of the unit is displayed in this page ■ Camera. A network enabled camera can be viewed on the web – interface. In this page the camera IP Address is configured. Change the administrator and user passwords in this page ■ SNMP configuration is done on this page where access parameters are entered
Step 6:	 Security	Change the administrator and user passwords and configure the auto logout on this page.

contact configuration page

From the Home Page of the TM3 Monitoring Unit select Contact Configuration Page. The following page will be displayed:

No.	SMS contacts	Cellular Phone Number (in international format "+")	Detailed name description
1	Contact 1	+27081527777	John Pew
2	Contact 2	+27081527788	Paul Johnston
3	Contact 3	+27081527799	Ricky Mahan
4	Contact 4	+27081527700	Jerry Lawson
5	Contact 5		
6	Base station 1	+27781527766	RT Call Centre
7	Base station 2	+27781527755	RT TM Server 1
8	Self test computer	+27781527744	RT TM Server 2
9	Uncleared/Disabled alarms	+27781527733	RT TM Server 3
10	Global Alarm contact	+27781527722	Henry Jones

Save Cancel

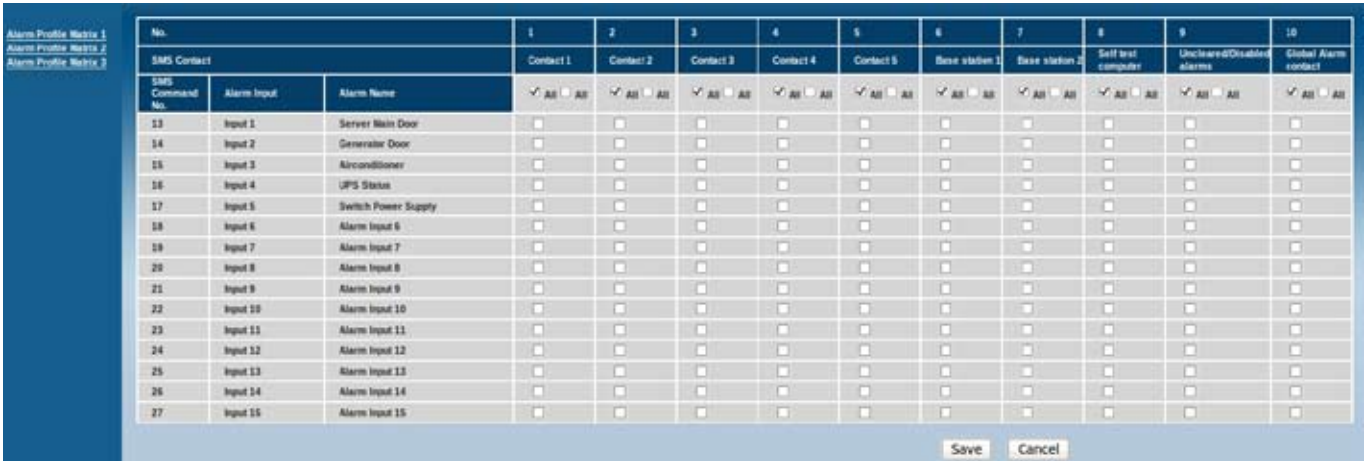
The following data can be configured:

- Cellular Phone Number — Enter the cellular number of the contacts to which SMSs are required to be sent. International number format is required.
- Detailed name description — Enter the name of the contact. This can be a person or machine.

Select Save to store data on the unit after all fields have been configured. Select Cancel and follow the prompted instructions to revert back to the previous settings. The data will not be stored in this case.

alarm profile configuration page

From the Home Page of the TM3 Monitoring Unit select the Alarm Profile Configuration Page. The alarm profiles are configurable on three separate pages ie, Alarm Profile Matrix 1, Alarm Profile Matrix 2 and Alarm Profile Matrix 3. Each has to be configured in order to complete the profiles for all the alarms. The following page will be displayed for matrix 2:



The following selections can be done:

- Alarm tick boxes — A particular alarm can be directed to send an SMS to a specific contact when ticked in the corresponding Alarm Input vs Contact tick box.
- Select/Deselect All — To select or deselect All Alarms. Note that this selection is only applicable to the alarms displayed on this page.

Select Save to store data on the unit after all fields have been configured. Select Cancel and follow the prompted instructions to revert back to the previous settings. The data will not be stored in this case.

dry contact alarm configuration page

From the Home Page of the TM3 Monitoring Unit select the Dry Contact Configuration Page. The following page will be displayed:

Dry Contact Signal ID	SMS Command Number	Name Tag (12 characters)	HI Description Tag (15 characters)	SMS	LO Description Tag (15 characters)	SMS	Alarm Message for LCD (12 characters)	Active		Enable/Disable
								HI	LOW	0 - Disabled 1 - Enabled P - Permanently Disabled
Mains Power	33	TM Unit Mains Power	OK	☑	FAILURE	☑	AC FAILURE			1
Alarm Input 1	13	Server Main Door	Open	☑	Closed	☑	SR Door Open	●	○	1
Alarm Input 2	14	Generator Door Closed	Closed	☑	Open	☑	GN DoorOpen	○	●	1
Alarm Input 3	15	Airconditioner	Fail	☑	Ok	☑	AC Fault	●	○	1
Alarm Input 4	16	UPS Status	Ok	☑	Faulty	☑	UPS Fault	○	●	1
Alarm Input 5	17	Switch Power Supply	Low	☑	Ok	☑	SW PSU Low	●	○	1
Alarm Input 6	18	Alarm Input 6	Alarm 6 Hi	☑	Alarm 6 Low	☑	Alarm 6 Hi	○	●	1
Alarm Input 7	19	Alarm Input 7	Alarm 7 Hi	☑	Alarm 7 Low	☑	Alarm 7 Hi	○	●	1
Alarm Input 8	20	Alarm Input 8	Alarm 8 Hi	☑	Alarm 8 Low	☑	Alarm 8 Hi	○	●	1
Alarm Input 9	21	Alarm Input 9	Alarm 9 Hi	☑	Alarm 9 Low	☑	Alarm 9 Hi	○	●	1
Alarm Input 10	22	Alarm Input 10	Alarm 10 Hi	☑	Alarm 10 Low	☑	Alarm 10 Hi	○	●	1
Alarm Input 11	23	Alarm Input 11	Alarm 11 Hi	☑	Alarm 11 Low	☑	Alarm 11 Hi	○	●	1
Alarm Input 12	24	Alarm Input 12	Alarm 12 Hi	☑	Alarm 12 Low	☑	Alarm 12 Hi	○	●	1
Alarm Input 13	25	Alarm Input 13	Alarm 13 Low	☑	Alarm 13 Hi	☑	Alarm 13 Hi	●	○	1
Alarm Input 14	26	Alarm Input 14	Alarm 14 Hi	☑	Alarm 14 Low	☑	Alarm 14 Hi	○	●	1
Alarm Input 15	27	Alarm Input 15	Alarm 15 Hi	☑	Alarm 15 Low	☑	Alarm 15 Hi	○	●	1
Relay Output 1	28	Generator Start								0
Relay Output 2	29	Server Generator								1

The following data can be configured:

- Name Tag — This is the alarm name which uniquely identifies the alarm.
- HI Description Tag — This is the alarm fault condition if Active HI is selected. If Active LOW is selected the normal condition description of the alarm is entered.
- HI SMS Tick Box — Tick this box if an SMS is required when this alarm condition is activated.
- LO Description Tag — This is the alarm fault condition if Active LOW is selected. If Active HI is selected the normal condition description of the alarm is entered.
- LO SMS Tick Box — Tick this box if an SMS is required when this alarm condition is activated.
- Alarm Message for LCD — Enter the alarm condition description for the LCD.
- Active HI/LOW — Select the Active HI alarm condition for Dry Contacts which are normally closed, activating the alarm when open. Select Active LOW alarm condition for Dry Contacts which are normally open, activating the alarm when closed.
- Enable/Disable — Three selection options are available:

  1 = Enable → Notification of alarm will be made on the LCD and SMS if selected.

  0 = Disable → Notification of alarm is disabled. The daily Disabled Alarms report will include all disabled alarms.

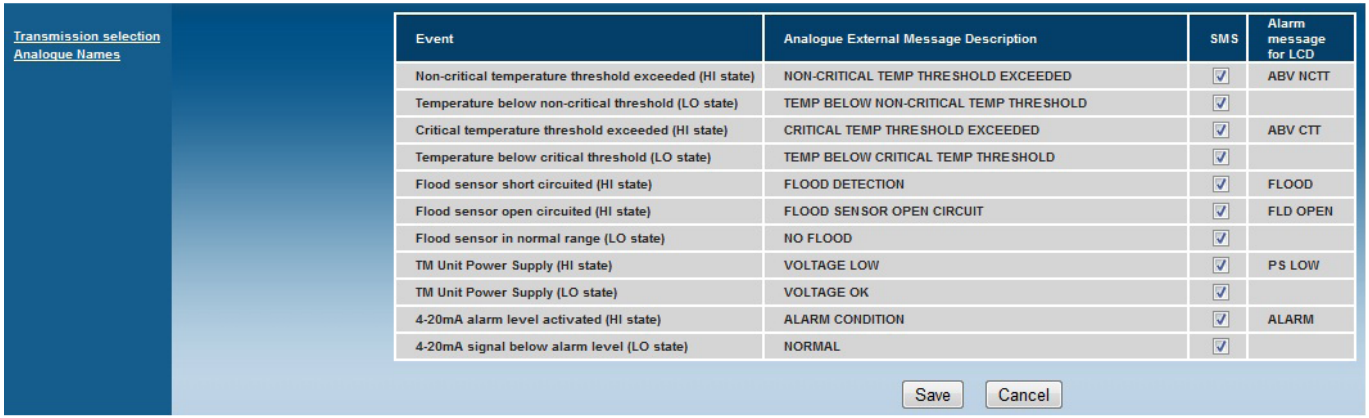
  P = Permanently Disabled → Notification of alarm is disabled and is not included in the Disabled Alarms report.

Select Save to store data on the unit after all fields have been configured. Select Cancel and follow the prompted instructions to revert back to the previous settings. The data will not be stored in this case.

analogue alarms configuration page

transmission selection

From the Home Page of the TM3 Monitoring Unit select Analogue Alarms Configuration Page and Transmission Selection. The following page will be displayed:



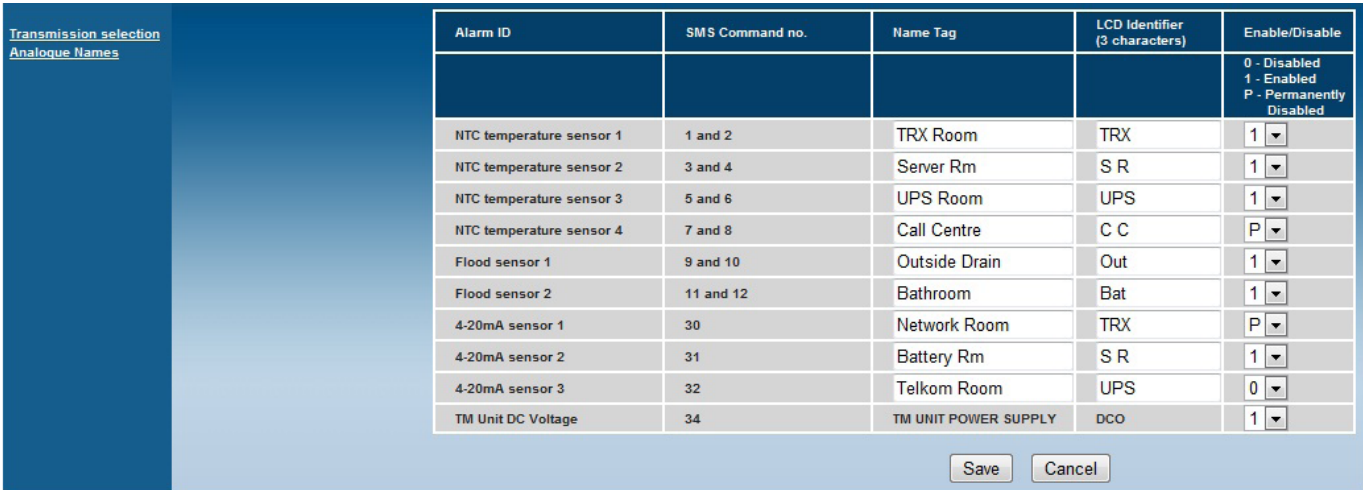
The following data can be configured:

- SMS tick box — Select which alarms will be sent by SMS.

Select Save to store data on the unit after all fields have been configured. Select Cancel and follow the prompted instructions to revert back to the previous settings. The data will not be stored in this case.

analogue names

From the Home Page of the TM3 Monitoring Unit select Analogue Alarms Configuration Page and Analogue Names. The following page will be displayed:



The following data can be configured:

- Name Tag — This is the alarm name which uniquely identifies the alarm.
- LCD Identifier — Enter the alarm condition description for the LCD.
- Enable/Disable — Three selection options are available:

  1 = Enable → Notification of alarm will be made on the LCD and SMS if selected.

  0 = Disable → Notification of alarm is disabled. The daily Disabled Alarms report will include all disabled alarms.

  P = Permanently Disabled → Notification of alarm is disabled and is not included in the Disabled Alarms report.

Select Save to store data on the unit after all fields have been configured. Select Cancel and follow the prompted instructions to revert back to the previous settings. The data will not be stored in this case.

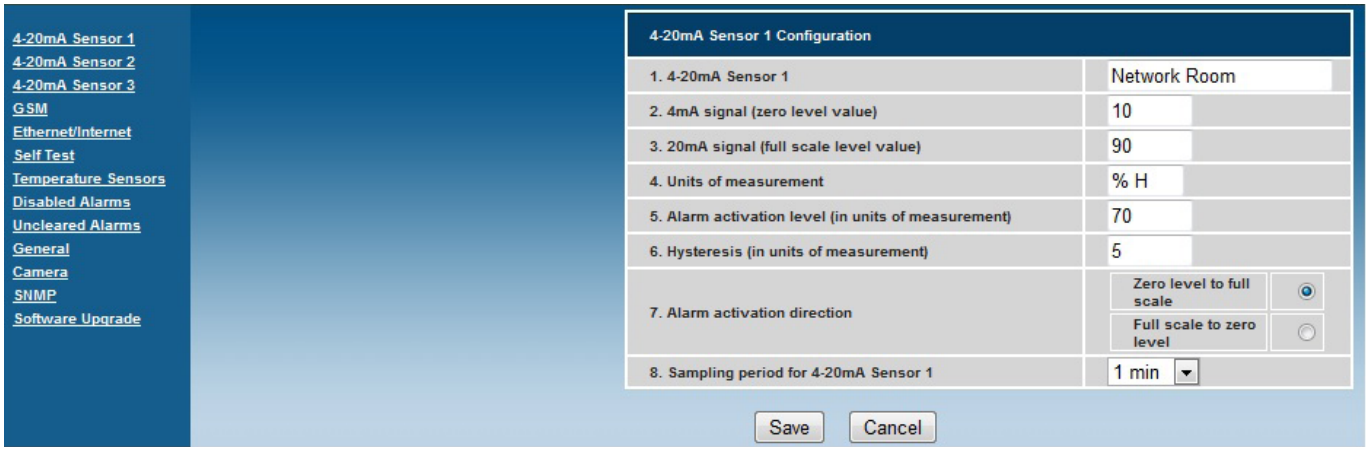
configuration page

The following configuration options are available on the Configuration Page:

- 4-20mA Sensor 1
- 4-20mA Sensor 2
- 4-20mA Sensor 3
- GSM
- Ethernet/Internet
- Self Test
- Temperature Sensors
- Disabled Alarms
- Uncleared Alarms
- General
- Camera
- SNMP

4-20mA sensor configuration page

From the Home Page of the TM3 Monitoring Unit select Configuration Page. Select one of the three 4-20mA Sensor options for configuration. The following page will be displayed. (The configuration procedure for all three sensors is identical.)



The following data can be configured:

- 4mA signal (zero level value) — Enter the zero level of the connected sensor, corresponding to its 4mA level, in this field.
- 20mA signal (full scale level value) — Enter the full scale level of the connected sensor, corresponding to its 20mA level, in this field.
- Units of measure — Enter the connected sensor units of measure, ie %RH for a humidity sensor.
- Alarm activation level — The level at which an alarm needs to be activated is entered in this field.
- Hysteresis — Enter the hysteresis level, below or above (depending on the activation direction) the activation level at which the alarm will be de-activated. (Ref. note 1, pg 31)
- Alarm activation direction — Select the alarm activation direction, ie increasing values or decreasing values.
- Sampling period — Select the sampling period at which the sensor is sampled for display on the Graph View. A maximum of 1 440 sample points are stored.

Select Save to store data on the unit after all fields have been configured. Select Cancel and follow the prompted instructions to revert back to the previous settings. The data will not be stored in this case.

self test configuration page

From the Home Page of the TM3 Monitoring Unit select Configuration Page and from the option list select Self Test. The following page will be displayed:

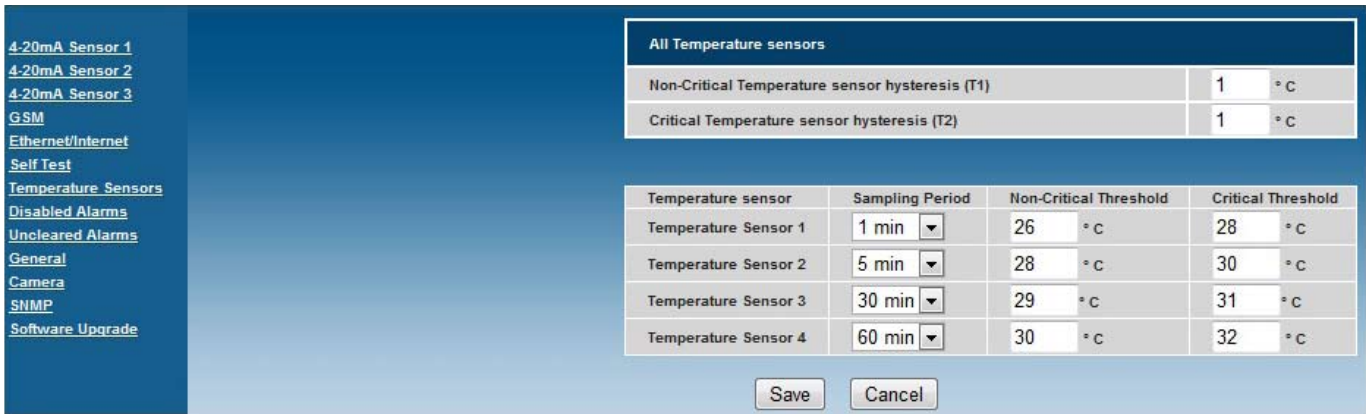
The following data can be configured:

- Day of scheduled weekly Self Test — Select the day of the week when the scheduled self test will be performed.
- Time for scheduled weekly Self Test — Enter the time of day when the scheduled self test will be performed.
- Send Self Test Result to e-mail addresses — Tick this box if the self test result is required to be e-mailed to the addresses configured in the Ethernet/Internet Configuration Page.

Select Save to store data on the unit after all fields have been configured. Select Cancel and follow the prompted instructions to revert back to the previous settings. The data will not be stored in this case.

temperature sensor configuration page

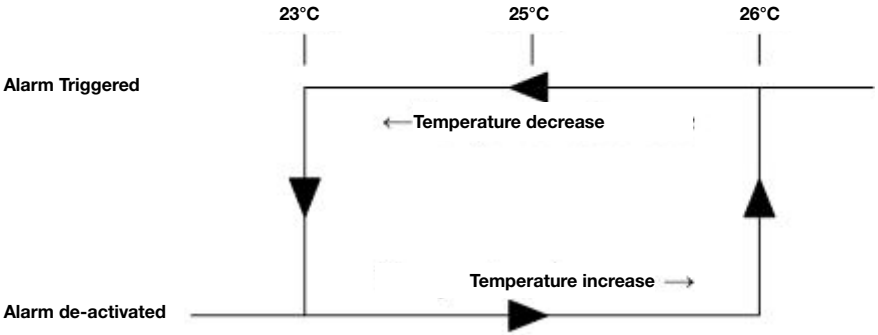
From the Home Page of the TM3 Monitoring Unit select Configuration Page and from the option list select Temperature Sensors. The following page will be displayed:



The following data can be configured:

- Non-critical Temperature sensor hysteresis (T1) — Enter the hysteresis[1] level below the Non-critical Threshold level, at which the alarm will be de-activated.
- Critical Temperature sensor hysteresis (T2) — Enter the hysteresis[1] level below the Critical Threshold level, at which the alarm will be de-activated.
- Sampling Period — Select the sampling period at which the sensor is sampled for display on the Graph View. A maximum of 1440 sample points are stored.
- Non-critical Threshold — Enter the Non-critical Threshold level for the temperature sensor at which the alarm will be activated.
- Critical Threshold — Enter the Critical Threshold level for the temperature sensor at which the alarm will be activated.

Note 1: *Hysteresis represents the difference between the alarm activation set point (threshold) and the alarm cleared value. For example, temperature sensor 1, non-critical alarm will be triggered at 26° C when the temperature increases, the alarm will be de-activated below 24° C due to the configured 1° C hysteresis. The following figure explains hysteresis further.*



Select Save to store data on the unit after all fields have been configured. Select Cancel and follow the prompted instructions to revert back to the previous settings. The data will not be stored in this case.

disabled alarms configuration page

From the Home Page of the TM3 Monitoring Unit select Configuration Page and from the option list select Disabled Alarms. The following page will be displayed:

The following data can be configured:

- Time for broadcasting daily Disabled alarms report — Enter the time of day when the daily Disabled alarms report will be compiled and sent.
- Send Disabled alarms report to e-mail addresses — Tick this box if the Disabled alarms report is required to be e-mailed to the addresses configured in the Ethernet/Internet Configuration Page.

Select Save to store data on the unit after all fields have been configured. Select Cancel and follow the prompted instructions to revert back to the previous settings. The data will not be stored in this case.

uncleared alarms configuration page

From the Home Page of the TM3 Monitoring Unit select Configuration Page and from the option list select Uncleared Alarms. The following page will be displayed.

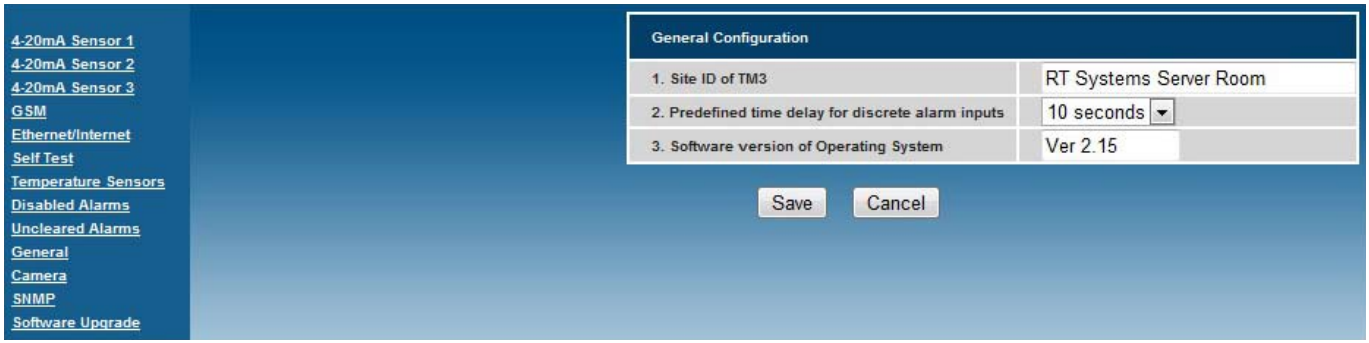
The following data can be configured:

- Time for broadcasting daily Uncleared alarms report — Enter the time of day when the daily Uncleared alarms report will be compiled and sent.
- Send Uncleared alarms report to e-mail addresses — Tick this box if the Uncleared alarms report is required to be e-mailed to the addresses configured in the Ethernet/Internet Configuration Page.

Select Save to store data on the unit after all fields have been configured. Select Cancel and follow the prompted instructions to revert back to the previous settings. The data will not be stored in this case.

general configuration page

From the Home Page of the TM3 Monitoring Unit select Configuration Page and from the option list select General. The following page will be displayed:



The following data can be configured:

- SITE ID of TM3 — Enter a unique identification for the unit.
- Predefined Time Delay for discrete alarm inputs — Select the discrete alarms time delay. This is the elapsed time from activation of the alarm until the alarm is reported. Selection between 1 and 10 seconds are available.

Select Save to store data on the unit after all fields have been configured. Select Cancel and follow the prompted instructions to revert back to the previous settings. The data will not be stored in this case.

camera configuration page

From the Home Page of the TM3 Monitoring Unit select Configuration Page and from the option list select Camera. The following page will be displayed:

The following data can be configured:

- IP address of Camera — Enter the IP Address of the camera to be accessed.

Select Save to store data on the unit after all fields have been configured. Select Cancel and follow the prompted instructions to revert back to the previous settings. The data will not be stored in this case.

CCTV options that the TM3 can interface with:

- IP Camera – Stand-alone IP Camera can be viewed on the TM3 which would just allow viewing
- Digital Video Recorder (DVR) – Can display and record images from up to four cameras. Cameras and recordings can be viewed, managed and configured via the DVR interface. The DVR can be set to record images upon motion detection, record images according to a preset schedule or record images continuously. Communication with a site is available through the use of the audio-in and audio-out functionality. A further four sensor inputs are available on the DVR which can trigger recordings, send email notifications, sound alarms, and activate the available relay-output. To configure this device and the cameras please refer to the CCTV manuals.

SNMP configuration page

From the Home Page of the TM3 Monitoring Unit select Configuration Page and from the option list select SNMP. The following page will be displayed:

The following data can be configured:

- SNMP Manager IP address 1 — IP Address to where SNMP traps are sent.
- SNMP Manager IP address 2 — IP Address to where SNMP traps are sent.
- SNMP Manager IP address 3 — IP Address to where SNMP traps are sent.
- SNMP Version 3 support — Select between SNMP version 1 and SNMP version 3.
- SNMP v3 User — Enter the Read Community for version 1 or the User name for version 3, depending on the selection of point 4.
- SNMP v3 Password — Enter the Write Community for version 1 or the Password for version 3, depending on the selection of point 4.

Select Save to store data on the unit after all fields have been configured. Select Cancel and follow the prompted instructions to revert back to the previous settings. The data will not be stored in this case.

security configuration page

From the Home Page of the TM3 Monitoring Unit select Security. The following page will be displayed:

The following data can be configured:

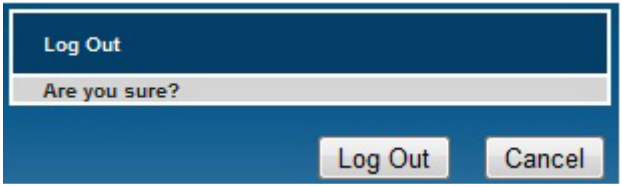
- Administrator password — Change the administrator password. The administrator has read and write access of the data, ie. can view and configure data. The default administrator password is “admin”.
- User password — Change the user password. The user only has read access of the data ie can only view data. The default user password is “user”.
- Log out automatically — If ticked then unit will log out automatically.
- Auto log out timeout (min) — Set the time (1-99 min) of when the unit must log out automatically.

Select Save to store data on the unit after all fields have been configured. Select Cancel and follow the prompted instructions to revert back to the previous settings. The data will not be stored in this case.

symbol	description
	Only one log-in connection is allowed on the TM3 Monitoring Unit. After accessing the web interface log out, see next paragraph.

log out page

From the Home Page of the TM3 Monitoring Unit select Log Out. The following page will be displayed:



The operator will be prompted to confirm log out when Log Out is selected.

front panel functions

On the front panel of the TM3 Monitoring Unit there are a couple of functions available to either configure the unit or select a particular function. The functions available are the following:

- TEMP — Configure the temperature sensor thresholds and calibration data.
- SELF TEST — Performs a self test of the unit.
- Disable/Enable All Alarms — Disables or enables all alarms.
- Clock — Set the time and date of the unit.
- Enter — Displays raw input data for installation/fault finding purposes.

temp

To set a sensor's temperature thresholds press the "Temp" key on the front panel of the unit.

Select the sensor to be configured by pressing "Temp" until the correct sensor number is displayed. Then press "Enter" to display the current sensor threshold values.

The data available for configuration is "Non-Critical" and "Critical". Use the Right and Left keys to move the cursor to the data field which has to be adjusted. By pressing the Up or Down key the data field will be incremented or decremented. After all data fields have been adjusted to the required values, press the Enter key to store the data.

A "Thresholds Stored" message will appear briefly while the data is being stored.

self test

By selecting the Self Test key, the unit performs a sequence of tests to determine its own health status. While the test is in progress, the following screen will be displayed:

Once the self test has been completed, a message will be displayed indicating whether the test has been successful or not. In the event of the test being successful, a “Self Test Pass” message appears on the LCD, else a “Self Test Fail” message will be displayed along with a relevant message indicating the area of failure which can be one of the following:

- GSM Card Fault
- Ethernet Fault. Ethernet functionality will only be tested if the “Transmit alarms to e-mail” is ticked in the Ethernet/Internet Configuration page
- Power Supply Fault

disable/enable all alarms

By selecting the Disable/Enable All Alarms key, all alarms will be disabled. Indication of this condition is displayed on the LCD as well as on the right top corner of the Home Page. To enable all alarms the Disable/Enable All Alarms key must be pushed again. Alarms will enable after one hour if the Disable/Enable All Alarms key is not selected within the hour.

clock

Refer to the initial configuration section for the time and date configuration on page 13.

enter

Press Enter to select the telemetry menu where raw input data can be viewed. The following screen will appear:

Press Enter again to view ADC telemetry data. The following data can be viewed:

- Input voltage level
- Temperature sensors 1 to 4
- Flood sensors 1 and 2
- 4-20mA sensors 1 to 3
- GSM signal strength

To return to the main menu, press the Left/Clock/Cancel key.

GSM sms data access

The TM3 Monitoring Unit can be configured and interrogated using SMS messages. The SMS commands are listed below. Included on the utility CD is a software utility MonitorProg.exe which can be used for configuration of the unit. Refer to the help function of the software for operator instructions.

Message Structure Symbol Descriptions:

□ = Space
Y = Relay 1 or 2
YY = Alarm Number
XX = Minutes

no.	sms message text description	command string value	valid message structure
	general		
1	What is your Site ID?	abc123	abc123
2	What is your signal strength?	dabc12	dabc12
3	What is your time, day and date?	9aaaaa	9aaaaa
4	What is the software version of the Operating System?	nBg006	nBg006
	contacts		
	what is name and number of contact		
5	What is the name and number of Contact 1?	Anjm46	Anjm46
6	What is the name and number of Contact 2?	Lmki12	Lmki12
7	What is the name and number of Contact 3?	Alop12	Alop12
8	What is the name and number of Contact 4?	192ui7	192ui7
9	What is the name and number of Contact 5?	zzxxcc	zzxxcc
10	What is the name and number of Base station 1?	1op901	1op901
11	What is the name and number of Base station 2?	anqoka	anqoka
12	What is the name and number of Self Test Computer?	cvbnam	cvbnam
13	What is the name and number of Un-cleared/Disabled Alarms?	qpoilm	qpoilm
14	What is Name and No. of Global Alarm Contact?	tsv319	tsv319
	alarm status		
15	Disable all alarms	hgFeda	hgFeda

no.	sms message text description	command string value	valid message structure
16	Disable all alarms for XX minutes	nBg022	nBg022□XX
17	Re-enable all alarms	Kkp5ef	Kkp5ef
18	Disable alarm number YY	jhgFed	jhgFed□YY
19	Permanently disable alarm number YY	Vaq7b1	Vaq7b1□YY
20	Re-enable alarm number YY	Lkp6ef	Lkp6ef□YY
21	What is the status of alarm number YY? (Active or Not)	9aaaac	9aaaac□YY
	relays		
22	Make Output Y HI (Y = 1 or 2)	9aaaad	9aaaad□Y
23	Make Output Y LO (Y = 1 or 2)	9aaaae	9aaaae□Y
24	What is the Name Tag of Output Y? (Y = 1 or 2)	nBg011	nBg011□Y
	dry contact alarms		
	name tag		
25	What is the Name Tag of alarm number YY?	Jkp2ef	Jkp2ef□YY
	hi description tag		
26	What is the HI Description of alarm number YY?	Gkp9ef	Gkp9ef□YY
	lo description tag		
27	What is the LO Description of alarm number YY?	Hkp0ef	Hkp0ef□YY
	configuration		
	self test		
28	Perform a self test	gFedab	gFedab
29	What is your scheduled Self Test day and time?	nBg007	nBg007
	un-cleared alarm transmission		
30	What is the scheduled time for un-cleared alarm transmissions?	nBg014	nBg014
	disabled alarm transmission		
31	What is the scheduled time for disabled alarm transmissions?	nBg012	nBg012
	temperature sensors		
	temperature 1		
32	What is the value of temperature 1?	9aaaab	9aaaab
33	What is the non-critical temperature threshold for sensor 1?	nBg018	nBg018

no.	sms message text description	command string value	valid message structure
34	What is the critical temperature threshold for sensor 1?	nBg019	nBg019
	temperature 2		
35	What is the value of temperature 2?	6kjG25	6kjG25
36	What is the non-critical temperature threshold for sensor 2?	6kjG28	6kjG28
37.	What is the critical temperature threshold for sensor 2?	6kjG29	6kjG29
	temperature 3		
38	What is the value of temperature 3?	6kjG26	6kjG26
39	What is the non-critical temperature threshold for sensor 3?	6kjG32	6kjG32
40	What is the critical temperature threshold for sensor 3?	6kjG33	6kjG33
	temperature 4		
41	What is the value of temperature 4?	6kjG27	6kjG27
42	What is the non-critical temperature threshold for sensor 4?	Vaq1b2	Vaq1b2
43	What is the critical temperature threshold for sensor 4?	Vaq1b3	Vaq1b3

view data

The TM3 Monitoring Unit displays and collects numerous types of data which can be viewed on the web interface. Data can also be accessed by SNMP and GSM SMS. On the web interface the following data can be viewed:

Home Page		On the Home Page some configuration data is displayed. Alarm status and analogue values are displayed.
Alarm Log		A record of the last 240 alarms can be viewed.
Graph View		A graph of the temperature and 4-20mA sensors can be viewed. The graph contains 1 440 data samples.
Camera View		Connected camera images can be viewed on this page.

home page

The Home Page of the TM3 Monitoring Units displays the following information:

- Site IP address
- GSM number of the unit
- Site ID
- All alarms enable/disable status
- Individual alarms enabled/disabled status
- Temperature values of all four temperature sensors
- 4-20mA values with units
- Status of all alarms, red filled indicates alarm condition
- Relay condition, green filled indicates energised

alarm log

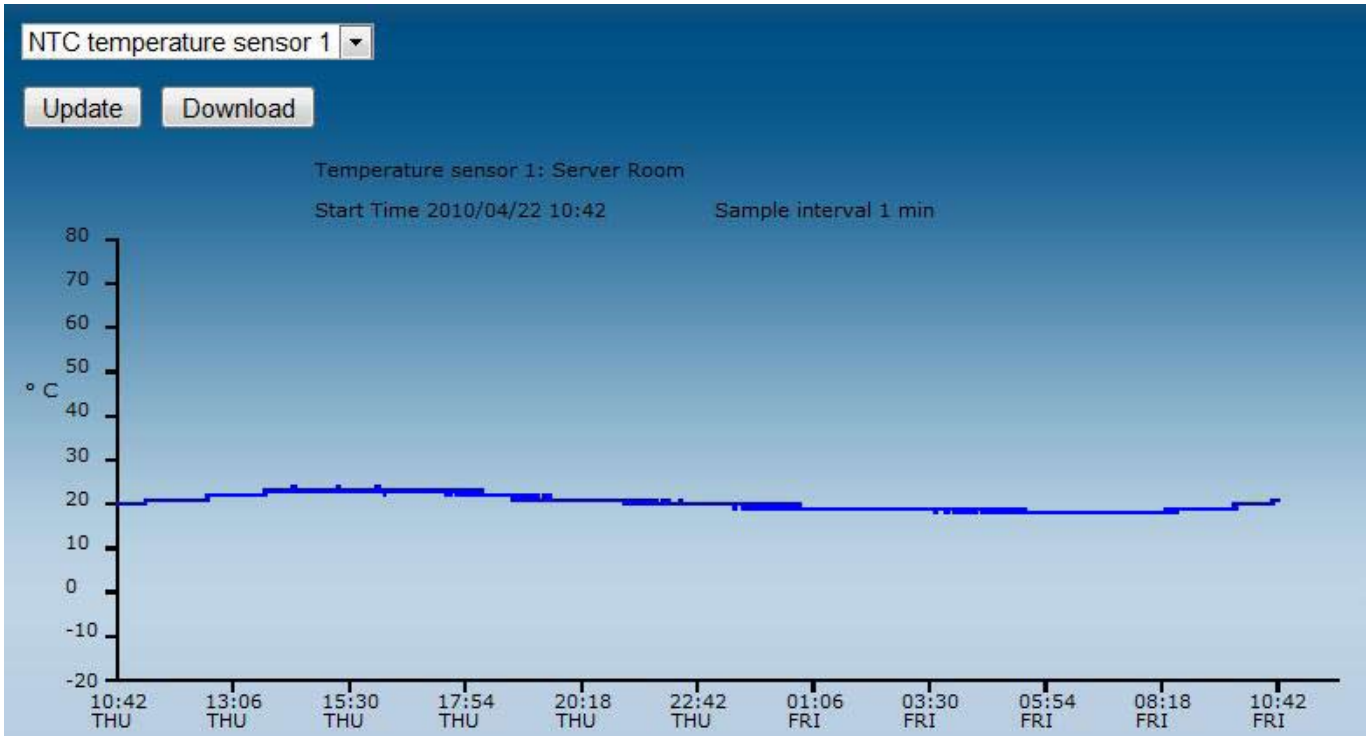
The time, date and alarm description is displayed on the alarm log. Up to 240 log entries are stored.

Time Alarm Flagged	Alarm Description
2010-04-21 08:11:14	Alarm 13 Input 1 Server Main Door Closed
2010-04-21 08:14:02	Alarm 3 Temp 2 Printer Room NON-CRITICAL THRESHOLD EXCEEDED
2010-04-21 08:14:11	Alarm 4 Temp 2 Printer Room CRITICAL THRESHOLD EXCEEDED
2010-04-21 08:14:28	Alarm 11 Flood 2 Printer Room FLOOD DETECTION

Clear Log

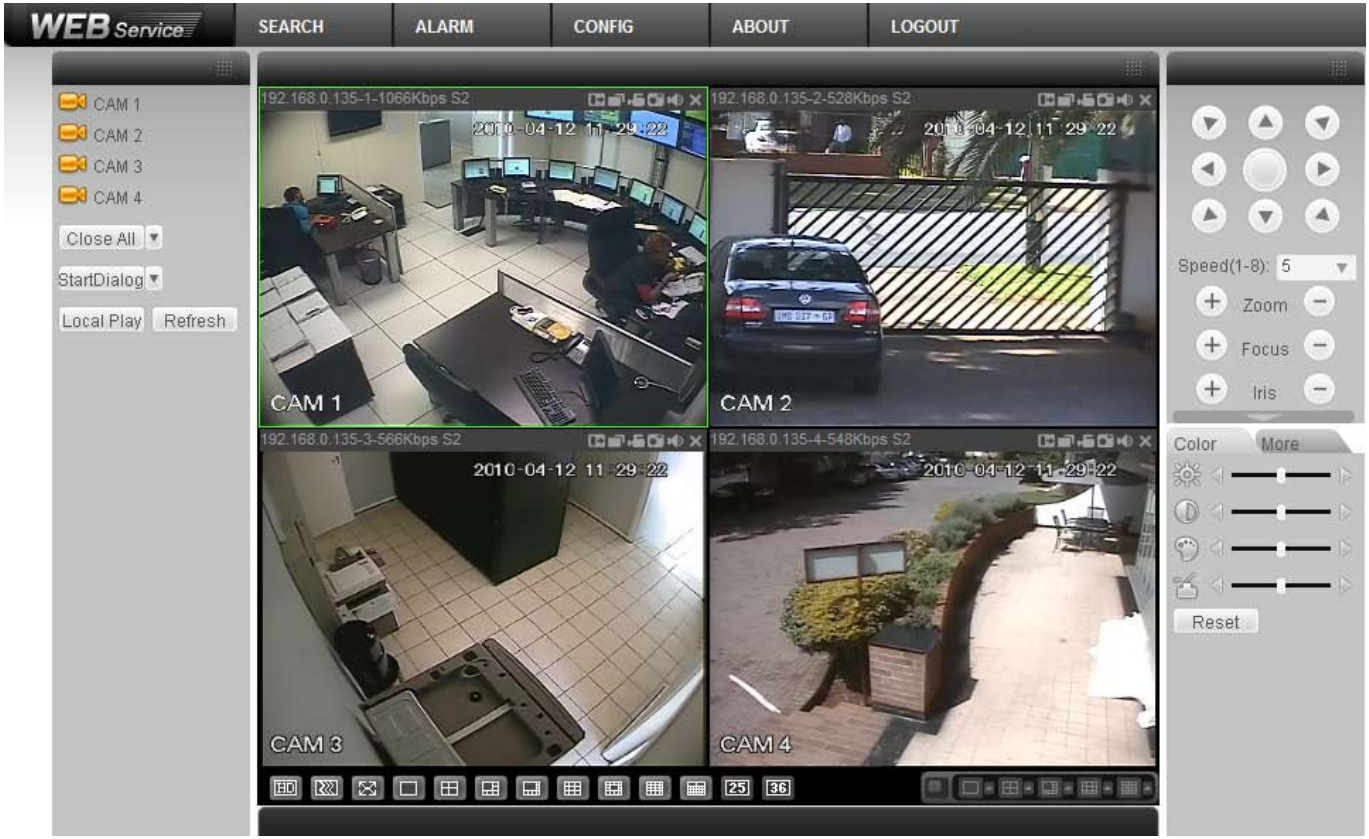
graph view

The analogue sensors sampled data are viewable on the web interface. The sensor name, start date and time as well as the sampling period are displayed on the graph. Select the required sensor graph from the drop down list and select Update. By selecting Download, Graph data can be viewed or saved on a PC in Microsoft Office Excel Worksheet Format.



camera view

Typical camera image of a computer room displayed on the web interface.



SNMP

The TM3 Monitoring Units implements SNMPv1 and SNMPv3 selectable on the SNMP Configuration Page. SNMPv3 has the advantage of authentication above SNMPv1.

The following SNMP functionality is available on the TM3 Monitoring Unit.

Refer to the TM3 MIB.txt file supplied on the utility disc. The TM3 unit has been tested on the following freeware MIB browsers:

1. **iReasoning**
2. **Whats up Gold**
3. **Service Check**

sensor reading:

Read or Get of all four temperature sensor values and 4-20mA sensor values.

sensor alarm thresholds:

Read or Get[1] and Set[2] on all four temperature sensors for critical and non-critical thresholds as well as the 4-20mA thresholds.

alarm status:

Read or Get and Walk[3] of all alarms 1 to 34 alarm status. This includes all temperature sensors, 4-20mA sensors, Flood Sensors, TM Unit, DC voltage, Mains Power, Discrete Input Alarms and Relay Status.

traps:

Traps[4] are sent for all alarms 1 to 34 as described above.

Note 1: *Get is an SNMP function to retrieve data from the unit.*

Note 2: *Set is an SNMP function to modify data on the unit.*

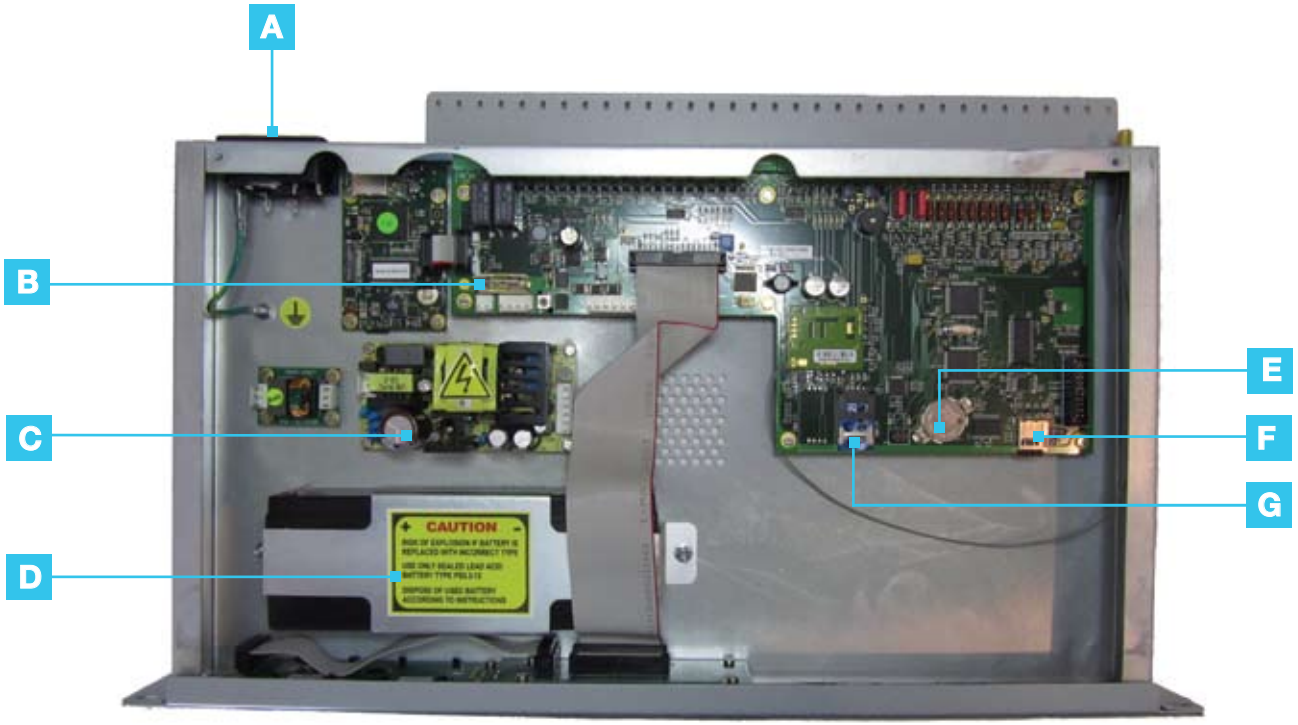
Note 3: *Walk is an SNMP function to retrieve all the status data from the unit.*

Note 4: *Traps are SNMP messages of alarm triggers, transmitted by the unit to a network management system which monitors the unit outputs.*

maintenance

symbol	description
	**NOTE**: only qualified service and installation personnel are allowed to perform maintenance tasks on the TM3 Monitoring Unit.
	**WARNING**: high voltage (110V/2240Vac) warning inside the TM3 enclosure.

The following items can be replaced as part of required maintenance.



item	description
A	Power Inlet Fuse, 2A, 250V, 5x20 Glass Fuse
B	Battery Fuse, 2A, 250V
C	Power Supply
D	12V, 2.3AH Sealed Lead Acid Battery, PN PS2.3-12
E	3V Coin Cell Battery, CR2032
F	SD Card
G	GSM Sim Card

trouble shooting

problem cause/correction

Unit does not complete initialization	■ Check that SD Card is installed and that default or specific configuration data is on the SD Card. Copy default configuration files from CD if not on SD Card. ■ Check that the Sim Card is installed in the GSM Board. ■ Check that the Sim Card PIN is configured correctly.
GSM Card Failure during Self Test	■ Check that the GSM number is correct on the GSM Configuration Page. The unit sends an SMS to itself during self test and if the number is incorrect the SMS is not received.
The unit does not turn on	■ Check the fuse on the inlet AC adapter and replace if fused.
Unit switches off during mains failure	■ Check Battery Fuse and replace if fused. ■ Check that backup battery is charged and healthy.
No SMS is sent when alarm is activated	■ Check that the GSM number is correct on the GSM Configuration Page. Number must be in international format. ■ Check that the SMSC number is correct on the GSM Configuration Page. Number must be in international format (check with your local cellular service provider for SMSC number) ■ Check that the PIN number is correct on the GSM Configuration Page. Follow steps on page 16 if PIN on SIM is not activated. ■ Check that the PUK number is correct on the GSM Configuration Page. ■ Check that SMS tick box is ticked in Dry Contacts Configuration Page.

- Check that SMS tick box is ticked in the appropriate Alarm Profile Matrix.
- Check that the associated contact number is entered and correct.
- Check that the GSM signal strength is at least more than 10.
- Check that your Sim card is paid up.

clean the TM3 monitoring unit

To clean the TM3 Monitoring Unit, gently wipe surfaces with a clean, dry cloth.

disposal

symbol	description
	**WARNING**: The TM3 unit contains replaceable lithium coin cell and lead acid batteries. Please take the batteries into consideration when disposing of the unit.

specifications

electrical

■ Input voltage, nominal	110–240 VAC; 50/60 Hz
■ Maximum total current draw	0,5 A

physical

■ Dimensions (H x W x D)	44,45 x 480 x 282mm (Standard 1U 19” Rack)
■ Weight	4,6 kg

environmental

■ Elevation (above MSL)	
Operating	0 to 3 000 m (0 to 10 000 ft)
Storage	0 to 15 000 m (0 to 50 000 ft)
■ Temperature	
Operating	0 to 45° C
Storage	–15 to 65° C
■ Humidity	
Operating	0 to 95%, non-condensing
Storage	0 to 95%, non-condensing

output voltages

■ Voltages	2 x 12Vdc and 1 x 18Vdc
■ Current	2 x 200mA and 1 x 50mA

sensor inputs

Temperature sensors	±3°C
4-20mA sensors	±5%

power backup

■ Battery backup time	4 to 6 hours, depending on current drawn on external power supplies

compliance (pending)

■ Electrical Fast Transients (EFT)	IEC 61000-4-4
■ Electrostatic Discharge (ESD)	IEC 61000-4-2
■ Surges	IEC 61000-4-5
■ Radiated Susceptibility	IEC 801-3
■ Voltage Dips and Interruptions	IEC 61000-4-11
■ Conducted Susceptibility	IEC 61000-4-6
■ Emissions and Harmonics	IEC 61000-3-3 and IEC 61000-3-2
■ General Products Safety Directive	2001/95/EC
■ RoHS Compliance	2002/95/EC

Notes

Notes

RT Systems Johannesburg

physical address
157 Barry Hertzog Ave
Emmarentia Ext 1
2195
South Africa

postal address
Postnet Suite 93
Private Bag X7
Parkview
2122

tel
+27 11 646 5250

fax
+27 11 646 5704

e-mail
info@rtsystems.co.za

www.rtsystems.co.za

RT Systems Cape Town

physical address
34 Wandel Street
Gardens
Cape Town
8001

cell
+27 83 547 9740

tel
+27 21 461 0558

fax
+27 21 461 7457

e-mail
devon@rtsystems.co.za