Table of Contents

INTRODUCTION TO CM9001-EMS

CM9001-EMS is an Industrial / Environmental Monitoring System for monitoring of external inputs and Sensor Data for unattended facilities like Data Centres, Server rooms, Wine chillers, Telecoms Base Stations, and Pharmaceutical Freezers. Notification of alarm is via dial out to phone numbers for Voice announcements and SMS messages. This manual shows how to program and operate the product. The CM9001-EMS Installation Guide has installation instructions for the product. Please download the latest version of the manuals from
http://www.cytech.biz/product_details.php?item_id=505

Key Features

- 8 Inputs, 8 Outputs expandable to 96 Inputs, 96 outputs
- 31 Alarm Types (Temperature, UPS, Humidity able to dial to any combination of 16 phone numbers including Voice Phone for alarm anouncements and SMS (requires UCM/GSM4).
- With the UCM/GSM4, SMS can be programmed to resend at regular intervals until the alarm is disarmed or the alarm input has been restored. SMS messages can also show the Temperature, Humidity or other Sensor value beoing Monitored.
- Outputs can be programmed to control equipment
- Time Programs or schedules can be programmed to control equipment or change monitoring modes or to send out regular SMS test messages.
- Up to 15 Keypads can be installed to disarm (silence) the alarm, to monitor temperature, humidity and other sensors, to control equipment, to test the state of the input alarms, and to make changes in the program.
- Cytech mobile apps can be used to monitor the alarms and do control
- Supporting modules eg MSM01 MultiSensor Module, TSM01 Temperature Sensor Module, and IRIO provide temperature and other sensor readings and setpoints which activate temperature and sensor alarms. UCM/Pi allows Graphical display of Sensor values and automatic daily email of sensor values in .csv format

Part Numbers

- CM9001-EMS PCB with terminal blocks, End-of-line Resistors, battery cable. Min firmware 7.160
- EN01D: Metal Enclosure 310 x 350 x 95 mm with Power Supply (Input 90-260 VAC, Output 15VDC 1.6 Amps). Ordered separately.
- KP04AE EMS Keypad (min Firmware 7.014). Display sensor and setpoints. Announces alarm and zone activations, with siren sounds. Up to 15 Keypads in a system. Min Firmware 7.014
- KP04AET EMS Keypad with Built-in Temperature Sensor.
- ETH03 Ethernet Plug in module: for programming by Comfigurator and access by mobile Cytech Comfort app.
- LEM02B: 8 Input expansion, direct plug in to CM9001-EMS or SEM01C
- SEM01C: Slave Expansion Module with 8 Inputs, 0 Outputs. Up to 5 SEMs in a system. OP03 Output submodule with 8 outputs and LEM02B Local expansion module with 8 inputs can plugged in directly on SEM01C PCB.
- MSM01: Multi-Sensor Module with built-in Temperature, Humidity and Water

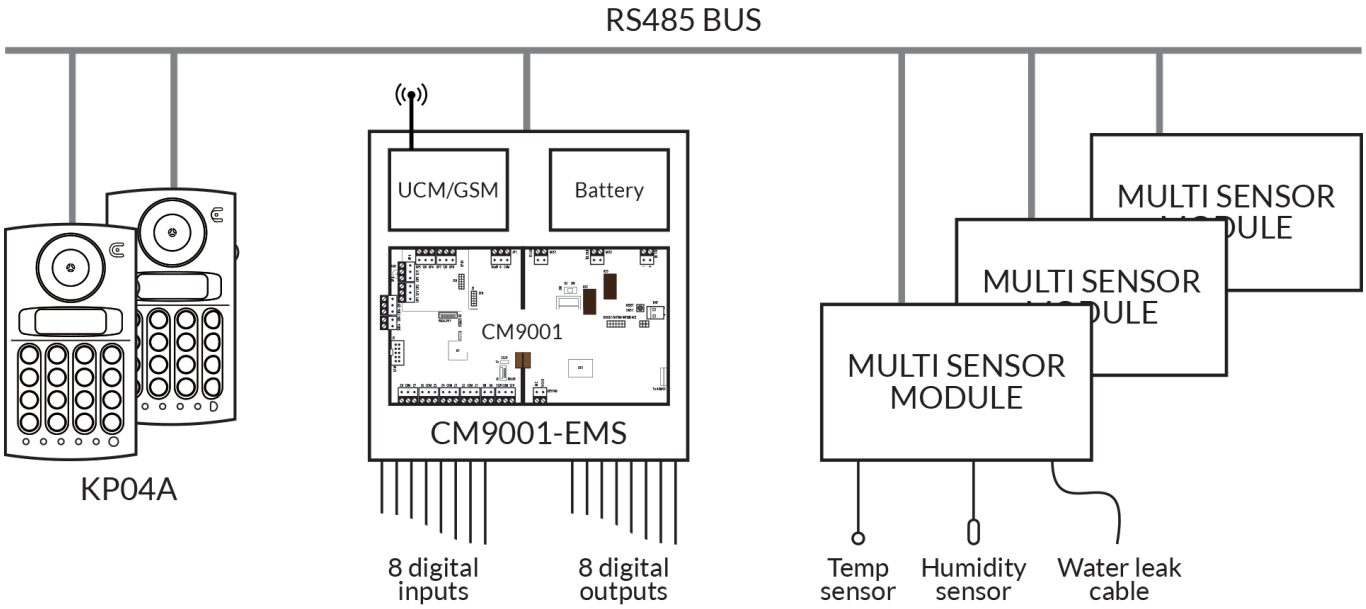
Leakage Sensors, with 4 external Inputs. Min Firmware 7.004 Up to 15 MSMs/TSMs in a system

- TSM01: Temperature Sensor Module with external Thermistor sensor. Up to 15 TSMs and MSMs in a system.
- UCM/Pi – Raspberry Pi interface allows Grphiical display of sensors and daily email of sensor values in .csv format
- IRIO01 Input/Output Module with ISM01 submodule with 4 external Thermistor sensors.
- UCM/USB: USB Interface for programming CM9001-EMS

CM9001-EMS Installation

Please refer to the CM9001-EMS Manual for Installation instructions . Download from http://www.cytech.biz/product_details.php?item_id=505

A typical installation of CM9001-EMS is shown below.
CM9001-EMS, UCM/GSM4 GSM Module, LEM02B expansion (optional) and the 12V 7 AH sealed lead acid battery can fit in the EN01 enclosure (310 x 350 x 95 mm)
1 or more KP04A keypads (max 15), and 1 or more MSM01 (max 15) can be installed.
Note that MSM01 is not needed if Sensor monitoring is not required..

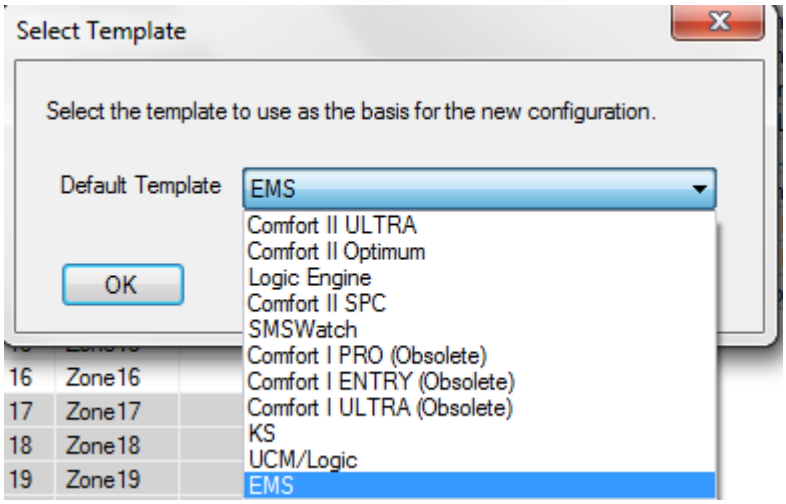


Using Comfigurator

Use the Comfigurator software version 3.12.15 or above to configure CM9001-EMS. The software can be downloaded from http://www.cytech.biz/comfigurator.html
The plug in ETH03, or alternatively a UCM/USB or UCM/Ethernet is required to connect to the computer running Comfigurator.

Load Template

Run Comfigurator, go to File > New, and select EMS from the drop-down list.



This loads the default EMS template. To set EMS as the default template so you can select by default in Comfigurator so to Options Menu > Default Comfort template and select EMS in the same way.
Also go to File > Update Defaults in order to update certain templates and default settings from the Cytech Server via the Internet. You will be asked to restart Comfigurator in order to apply the new defaults.

If MSM01 MultiSensor Module is to be used in the system, load template defmsm.cctx instead using "Browse for Template Files" (see section on MSM01 later)

You can start to program the system without being connected to the CM9001. If CM9001 is connected, see instructions in the next section.

Connecting to CM9001-EMS for Programming

CM9001-EMS can be programmed with the following hardware;

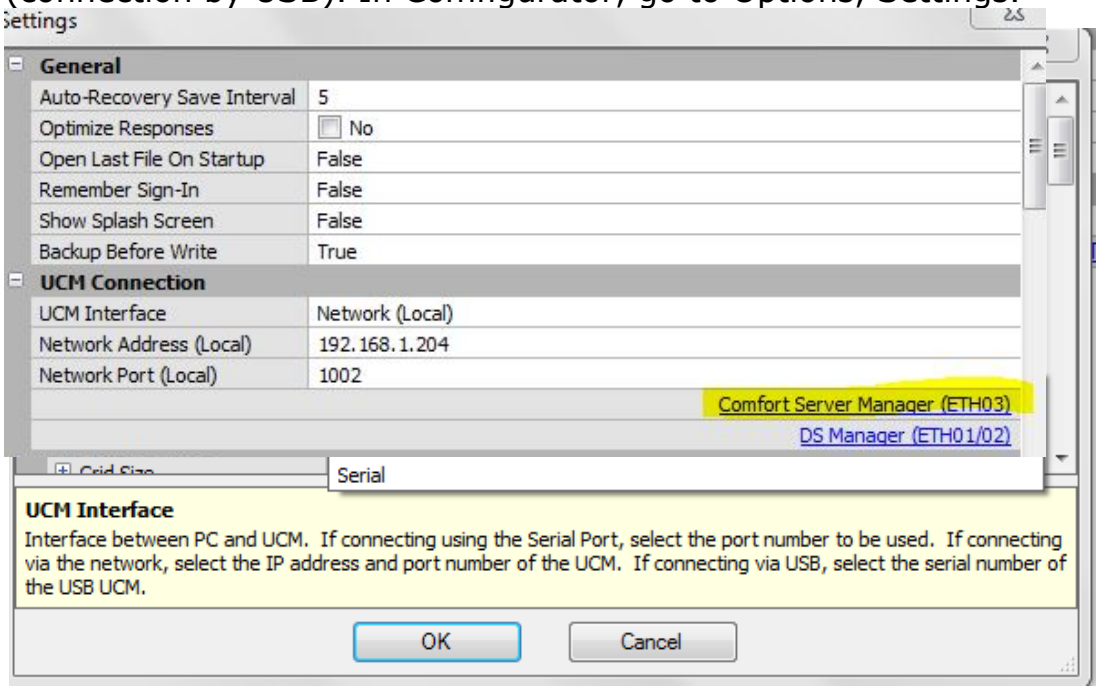
- ETH03 Submodule plug-in on CM9001-EMS PCB
- UCM/ETH03 with ethernet interface or UCM/USB with USB Interface

If the ETH03 submodule is plugged in to CM9001, connect an Ethernet cable between the ETH03 and a switch or router.

ETH03 Submodule (Plug on CM9001 ETH J1 header)

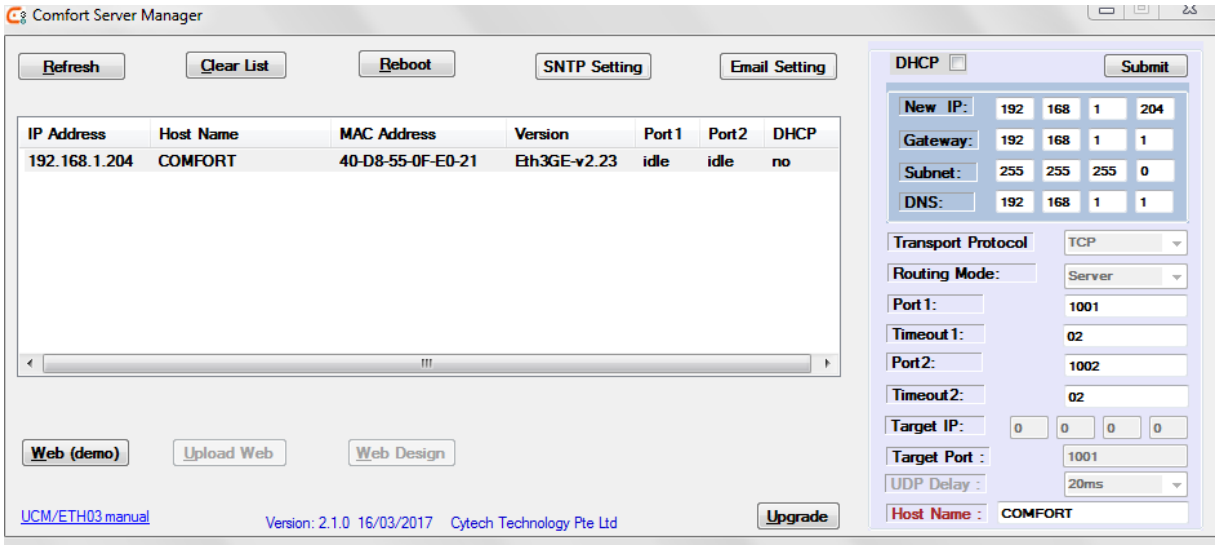
If the ETH03 submodule is not installed, a separate UCM/ETH03 or UCM/USB can be used instead to connect by USB to a PC or via the LAN respectively.

The following describes how to set up ETH03 submodule directly plugged in to CM9001 or by another UCM/ETH03 (connection by Ethernet) or UCM/USB (connection by USB). In Comfigurator, go to Options, Settings.

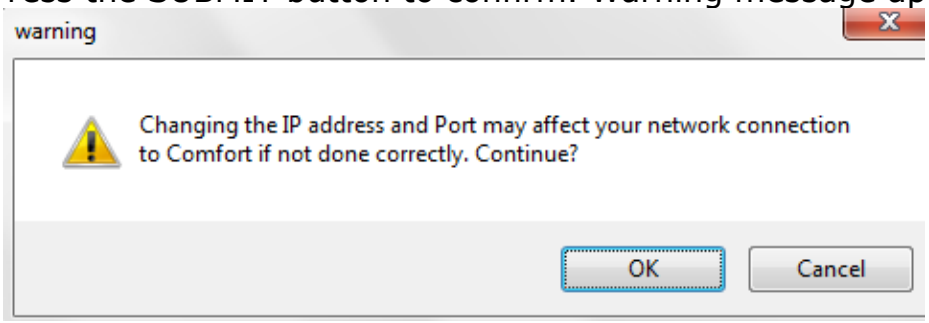


Select Network (Local) for connection by ethernet, USB for connection for USB.Network Connection (ETH03)

For ETH03, click on Comfort Server Manager (highlighted above)

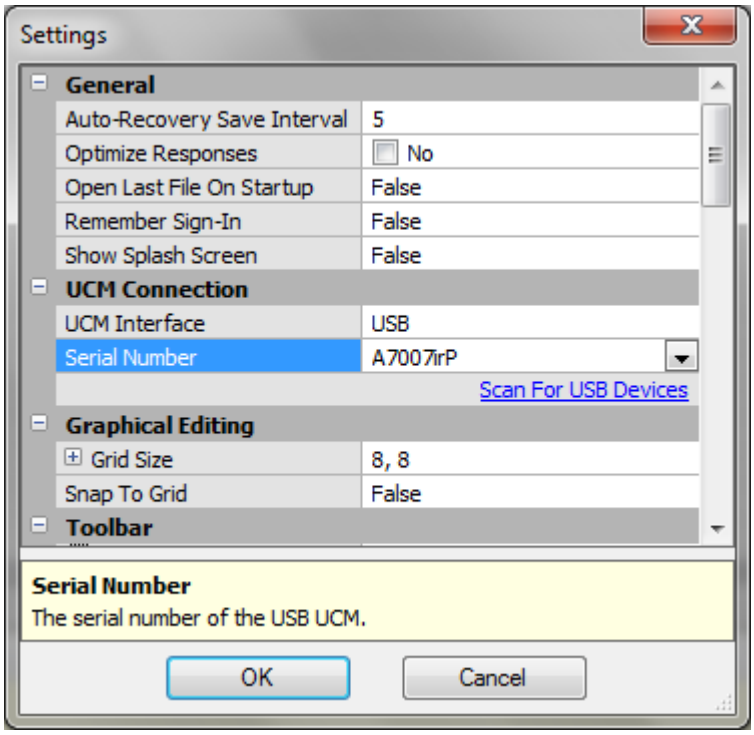


DHCP Box: check this box to automatically assign the IP address via your routers DHCP. Leave unchecked for Fixed IP address
Id DHCP is unchecked, fill in the following fields;
"New IP": Enter IP address of the ETH03
"Gateway" Enter IP address of gateway (router) if remote access is required
"Subnet": enter Subnet of the IP address
"DNS" Enter IP address of DNS server if required. (Not required for local access)
"Port 1": enter 1st port eg 1001
"Port 2": enter 2nd port eg 1002.
ETH03 allows 2 ports to access at the same time
"Timeout" enter time out in minutes for ETH03 to dicsonnect if the connection is idle. 0 means No time out
"Host Name" : Descriptive text of ETH03
Press the SUBMIT button to confirm. Warning message appears as below.

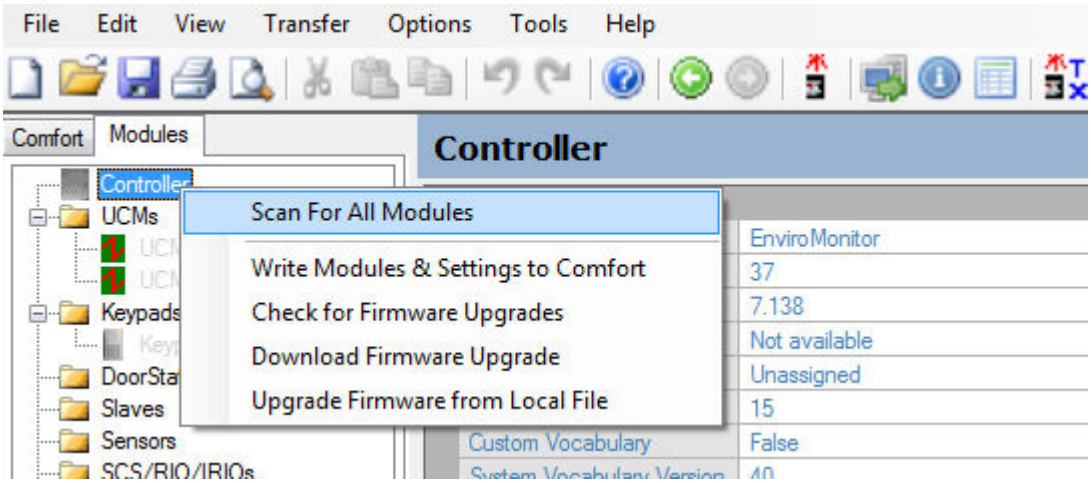


Press OK to confirm. The CS Manager window will become blank
Press the "REFRESH button. This will cause the new parameters to display.

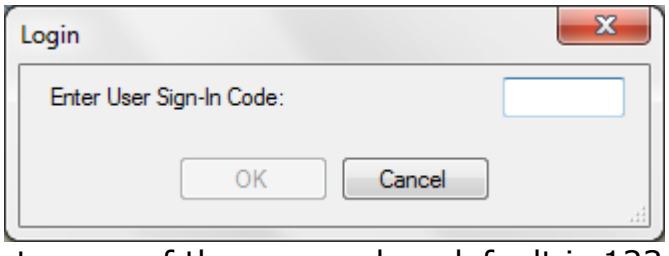
For UCM/USB, after plugging in the USB cable to the PC USB port, in Options > Settings/ UCM Interface, select USB and select the USB Serial Number from the Drop-down list.



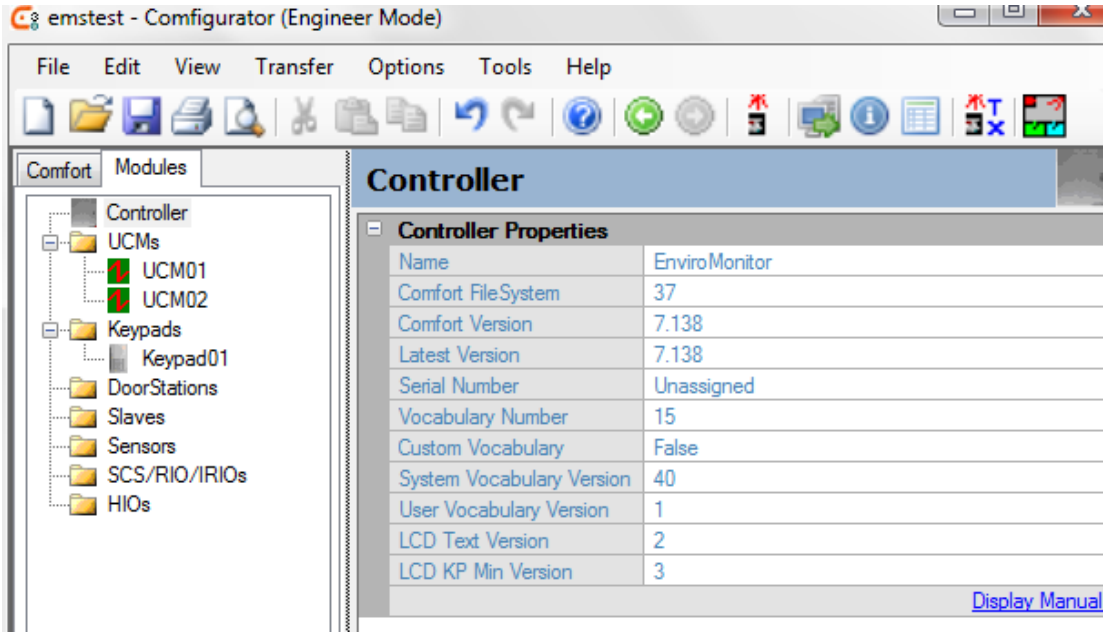
Scan for Modules



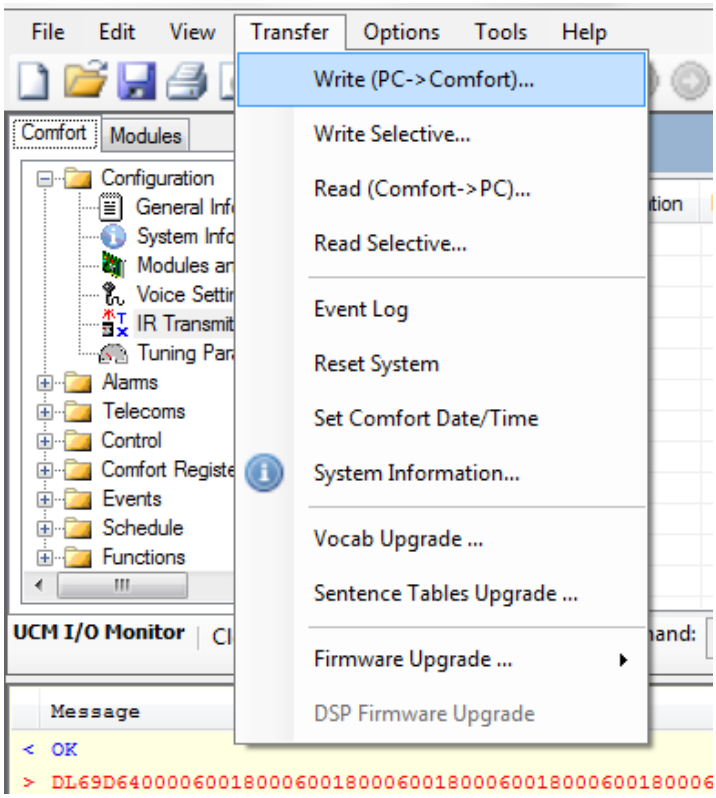
If CM9001-EMS is connected, go to the Modules Tab and right-click on Controller as shown below.
Select "Scan for All Modules". This will automatically detect the CM9001, and all modules which are installed in the system provided the ID of modules are set correctly without any conflict. The login window appears (if you have not logged in previously).



Enter any of the user codes, default is 1234 and press OK

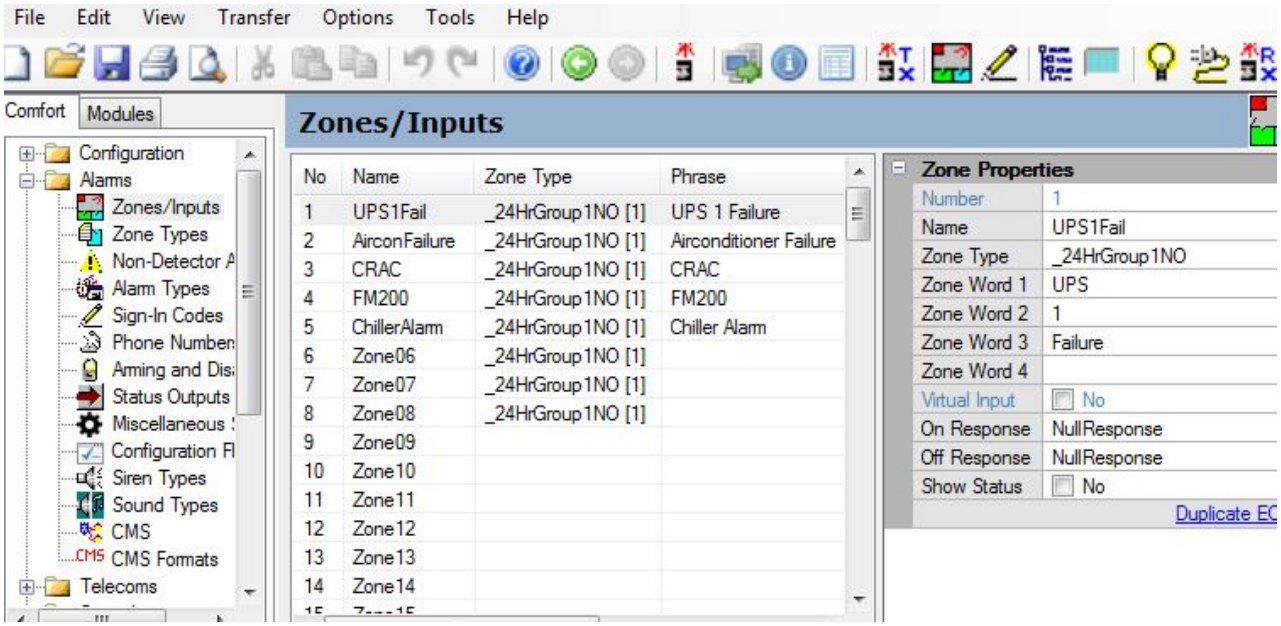


The screen after scanning shows CM9001-EMS firmware as well as other UCMs (KNX or Cbus), MSM, TSM, Keypads installed in the system.
The Menu bar shows the operations;



Transfer > Write (PC to Comfort) : transfer the program to CM9001-EMS
Transfer > Write Selective : transfer the items that have been modified to CM9001-EMS
Read (Comfort to to PC): Read from CM9001 to PC
Read Selective: Read selected items from CM9001 to PC
File > Save to Save the cclx file.
File > Load to Load a cclx file

Zones/Inputs



CM9001-EMS has 8 Zones/Inputs which can be expanded to 96 by adding LEMs and

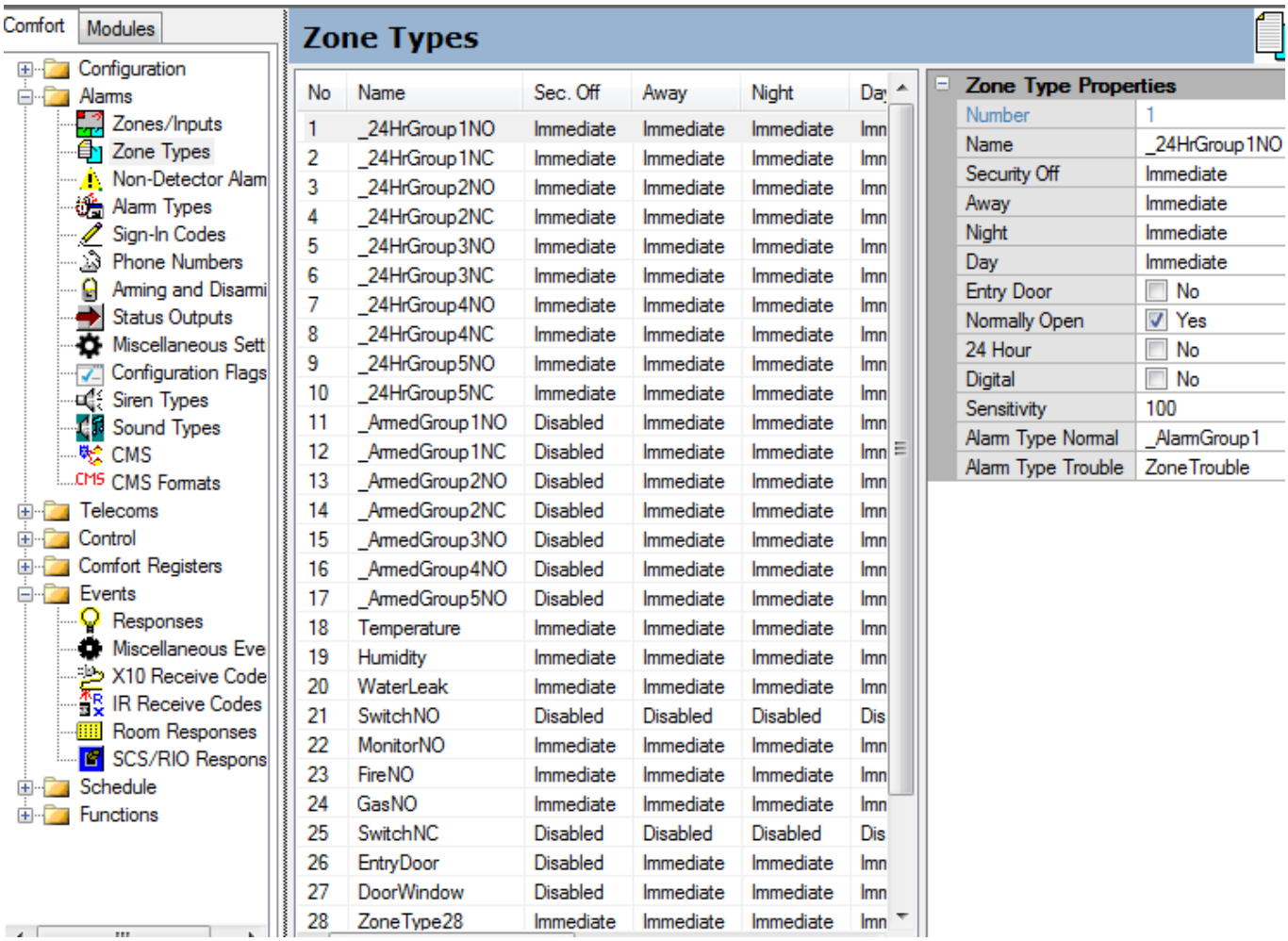
Slaves (SEM01C). The Zones/Inputs screen is for selecting what each Input (also called Zone) in CM9001-EMS is connected to. Default Zones 1 to 6 are pre-programmed as shown above.

- "Name": Enter the text describing the Input, which will appear in the SMS message eg "UPS Fail", "Temperature" etc. The Name is not announced on the keypad. Zone Words (see below) are announced.
- "Zone Type": select a Zone Type. Zone Types are pre-programmmed characterics of the input, eg Bormallly Closed, Normally Open, 24 Hour. Each Zone Type is linked to an Alarm Type. The most common Zone Type is "_24HrGroup1NO" which is Normally Open, 24 Hours, Group 1 Alarm.
- "Zone Words" 1 to 4. These are 4 words that are announced on the keypad or telephone (during dial out) to describe the active zone. If left blank the Zone Number is announced on the keypad/ telephone when in alarm, eg "Zone 1"
- "Virtual Input": this box is checked automaticaly if the Input is Virtual, ie it is triggered by an external device like TSM temperature sensor, or 3rd party systems like KNX and C-Bus. If the box has a check mark, the physical input connected to the Zone/Input is ignored. This cannot be changed by the user. More on this later.
- "On Response": You can select or program a Response or program to be triggered when this input is activated eg control outputs or other devices. This is optional – leave unselected for now.
- "Off Response": You can select or program a Response or program to be triggered when this input is restored eg control outputs or other devices. This is optional – leave unselected for now.
- "Show Status": Check the box to show the real time state of the Inputs (as "On" - active, or "Off" - inactive. The system mist be connected to use this feature.
- "Duplicate EOL": This is related to the End-of-Line option to be discussed later.

To get started, it is enough to just enter the Name and Zone Type of each input in use. Other fields are optional.

Zone Types

Zone Types are properties assigned to each Zone. The Properties of Zone Types should normally not be altered. If a special Zone Type not in the defaults list is needed, the "unused" Zone Types from 26 to 31 can be changed.The list of Zone Types are shown below.



It is suggested that Zone Types 1 to 10 are used to assign to External Inputs. These zone types are 24 hour, ie active at all times. Zone Types 11 to 16 are disabled in the Security Off Mode ie when the system is disarmed by entering the user code on the keypad – the system has to be armed by pressing the Away, Night or Day key.

- "Name" eg "24HrGroup1NO" is a decriptive text of the Zone Type. The Name is selected in Zones when choosing a Zone Type for the Zone/Input.
- "Security Off": select from Disabled, Immediate, Alert, or Perimeter state when this zone type is active in Security Off mode. Select Immediate or Disabled only. Alert and Perimeter are not used for EMS. See note below
- "Away": select from Disabled, Immediate, Alert, or Perimeter state when this zone type is active in Away Mode. Select Immediate or Disabled only. Alert and Perimeter are not used for EMS.See note below
- "Night": select from Disabled, Immediate, Alert, or Perimeter state when this zone type is active in Night mode. Select Immediate or Disabled only. Alert and Perimeter are not used for EMS.See note below
- "Day": select from Disabled, Immediate, Alert, or Perimeter state when this zone type is active in Day mode. Select Immediate or Disabled only. Alert and Perimeter are not used for EMS.See note below
- "Entry Door": Leave unchecked. Entry Door is not used in EMS
- "Normally Open": check if the zone is Normally Open, uncheck for Normally Closed. A Normally Open zone/input is inactive when the Input is open, and

Active when the Input is closed, and vice versa.

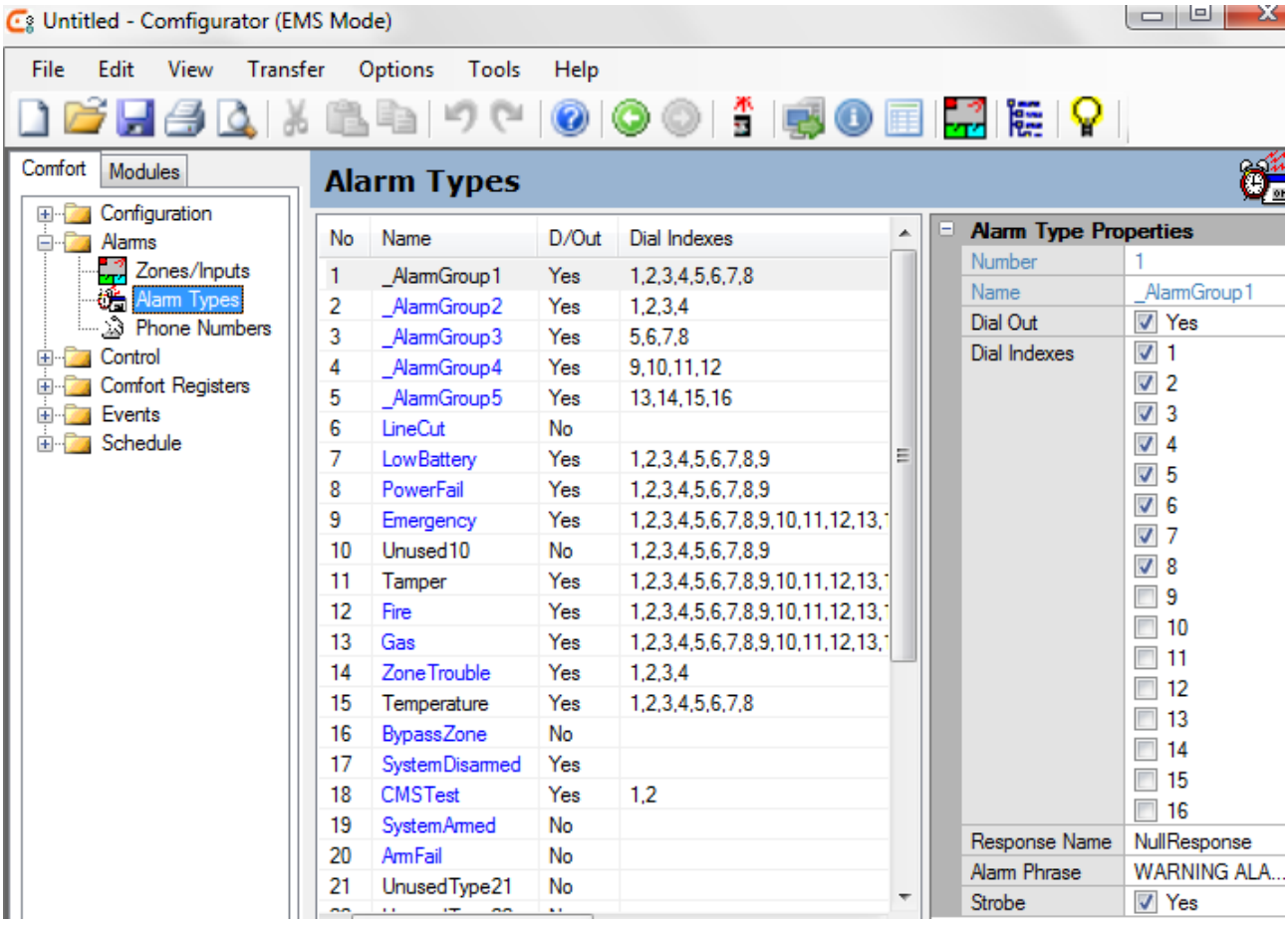
- "24 Hr": leave this unchecked. This is not normally used.
- "Digital": leave unchecked. This is not normally used.
- "Sensitivity": this is the mininum duration in milliseconds that an Input/zone must be active in order to be considered activated to the ON state. From 10 ms to 850 ms.
- "Alarm Type (Normal)": This is the Alarm that is triggered when the Input changes to the ON state.
- "Alarm Type (Trouble)": This is the Alarm that is triggered when the Input changes to the Trouble state. This should only occur if the Zone is set to EOL (In the Zones/Input Screen), End Of Line resistors are used and the wires from the zone contact are cut. If the zone is not EOL, then Zone Trouble should not occur unless an external voltage is applied to the Input (which is not allowed – only voltage-free open/close contacts should be connected).

Note on Security Modes

It is possible to arm the EMS to Away, Night, or Day modes like a burglar alarm system. This feature is usually not required in EMS but it can be used for systems that are combined alarm and monitoring.

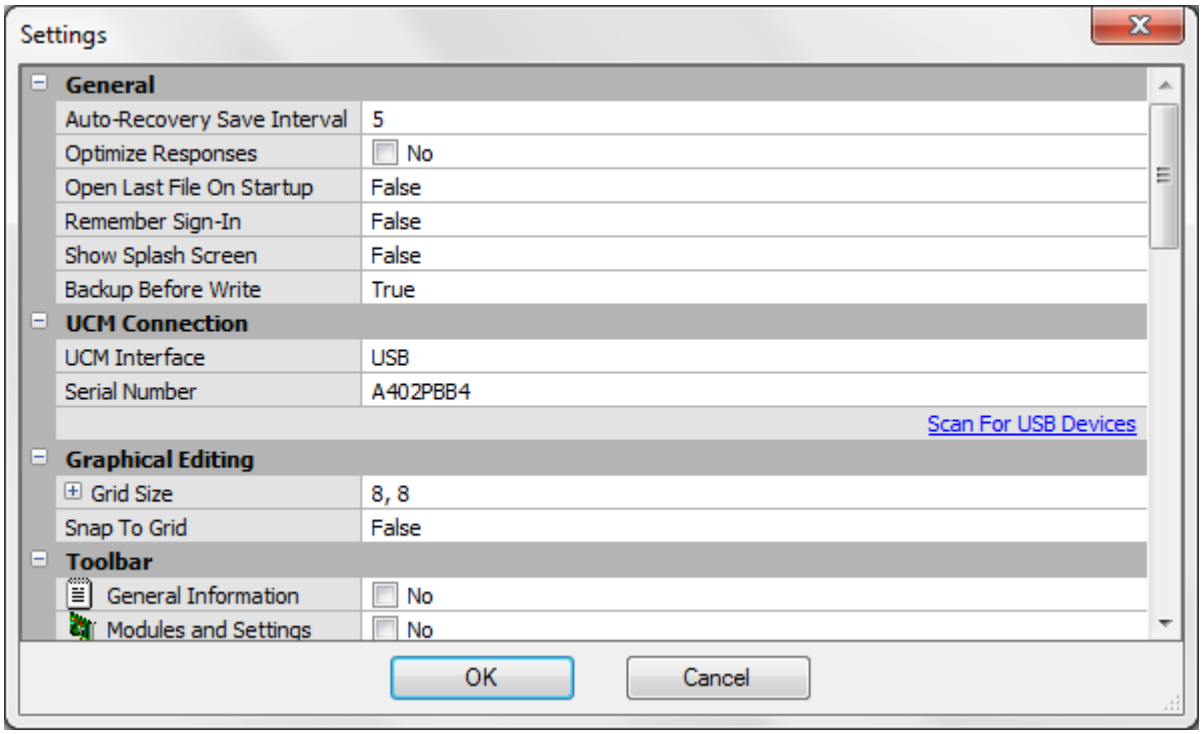
Alarm Types

31 Alarm Types determine the Alarm behaviour of CM9001-EMS.
Each Zone Type is linked to an Alarm Type, for example Zone Type 1 "24HrGroup1NO" triggers "_AlarmGroup1".



The parameters are;

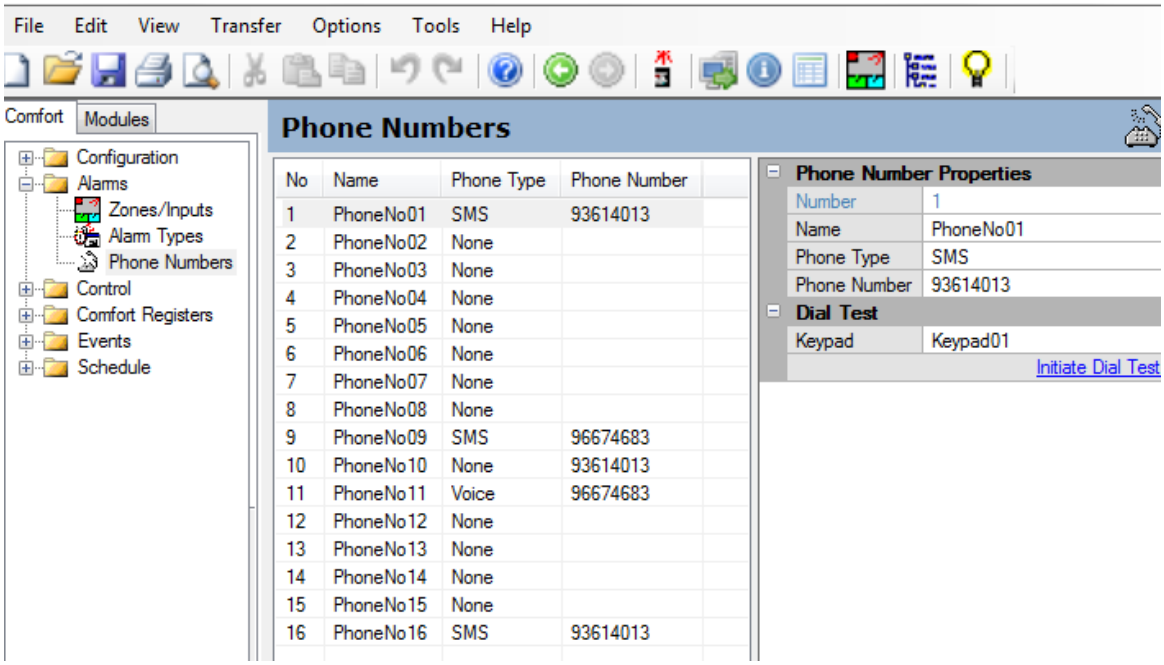
"Name": The name of the Alarm Type. This is the text of the Alarm in the SMS message
"Dial out": Check the box if this alarm should do a Dial out to the selected phones.
"Dial Indexes" 1 to 16: check the box if this alarm should dial to this Phone index. Any combination of 16 phones can be selected for each alarm. See Phone Numbers section below for details.
"Response Name": Enter a Response (or program) which is activated by the Alarm. This can be to control outputs or other facilities.
"Alarm Phrase": This is a voice announcement on the keypad or telephone which is selected from a drop-down list. This is NOT the text of the alarm SMS message.
"Strobe": this determines if the dedicated Strobe Output should be turned on when this alarm occurs.
"Siren Type Name" This is the Siren Type that is activated by this alarm. A 12 siren or sounder may be connected to the SRN-/SRN+ terminals if required.



Phone Numbers

CM9001-EMS is able to dial to 16 phone numbers, selectable for the following Phone Types;

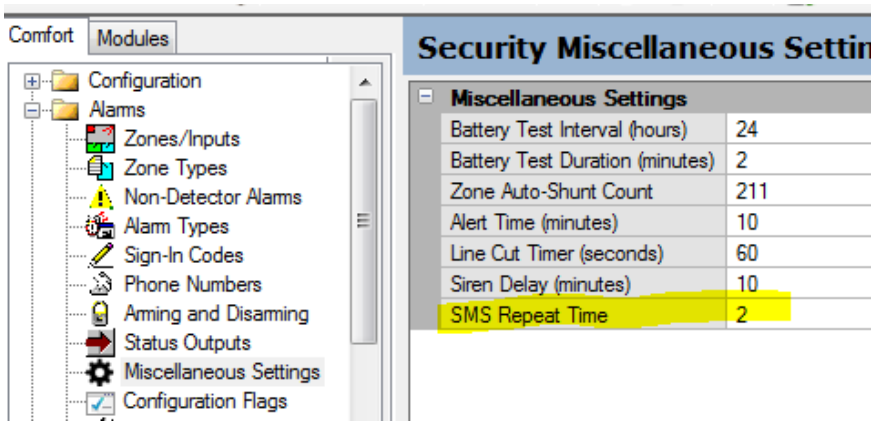
- SMS: Send SMS to the mobile phone. UCM/GSM4 must be installed to see this option
- Voice Phone: ie any phone number to announce the alarm and zone by voice.
- CMS, or Central Monitoring Station. This is normally for Burglar alarm systems to call police response. This option is limited to the 1st 2 phone numbers. If not used, the 2 phones can be used for other phone types.



The 16 phone numbers correspond to the 16 Phone indexes in the Alarm Types.

Dial Test: This button starts a dial out to all the phone nunbers that are programmed. If a keypad is installed in the system the dial tones and call progress can be heard on the keypad. This is a good way to test that the dial out to all the phones are working.

SMS Repeat Time



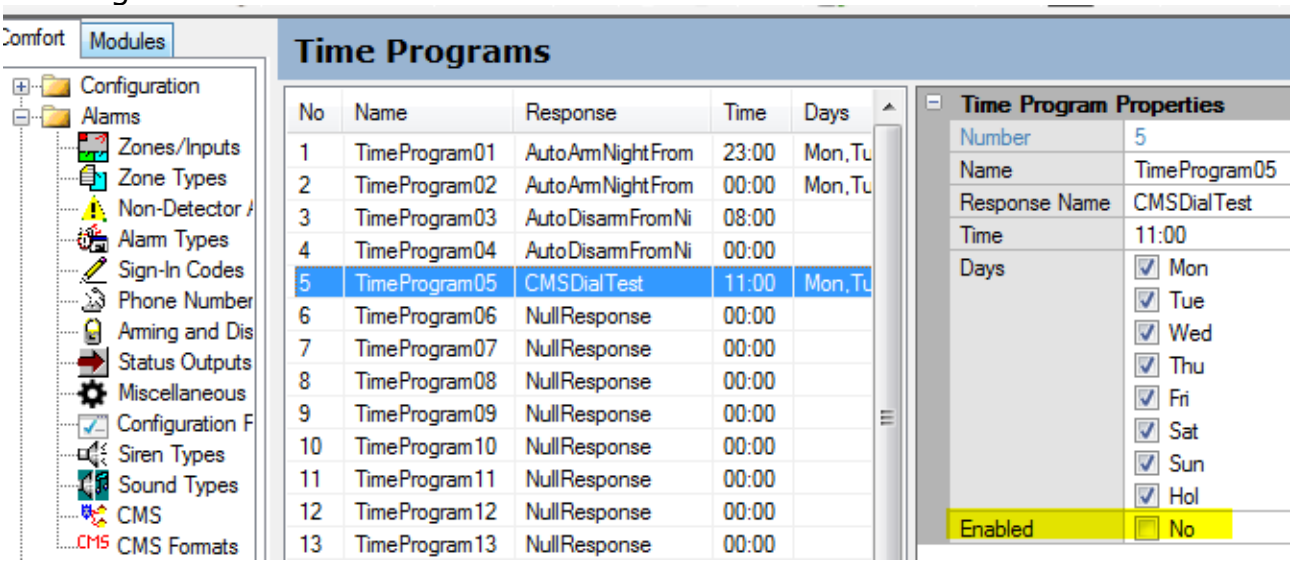
Miscellaneous Alarms > SMS Repeat Time is the time in minutes (0 to 120 minutes) to repeat SMS Messages for the Alarm. CM9001 will resend SMS at the specified interval UNTIL the zone/input causing the alarm has been restored, or the alarm has been disarmed using the Keypad or phone menu. Setting SMS Repeat Time to 0 will disable the repeating SMS.

Zone Auto-Shunt Count

This is the number of succcessive activations of the same Input after which the Input will be de-activated and will not trigger the alarm again, until another Input is triggered. This prevents too many dial outs caused by a faulty Input.

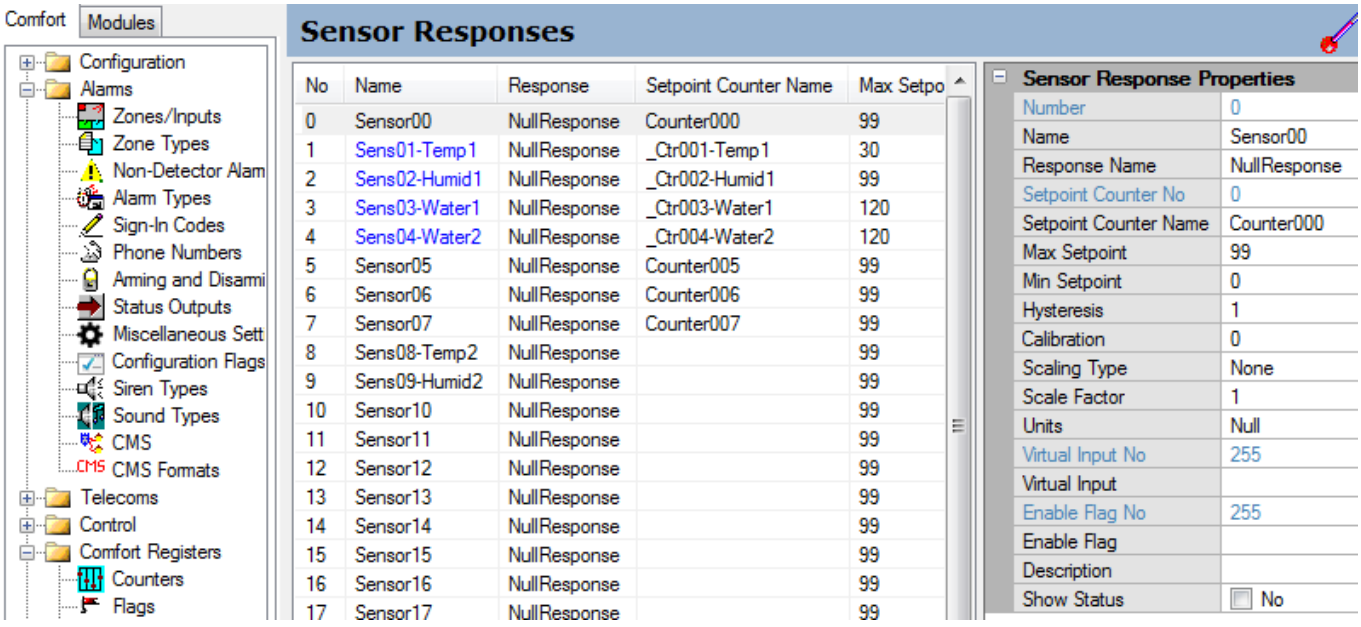
SMS Regular Testing

It is recommended to perform an automatic SMS to programmed phones every day, in case there are problems with the SMS or the SIM card. Go to Schedule > Time Programs



Select Time program 5 which is default programmed for CMS Dial Test. The days of week are set to all days, and time to 11:00 AM. Bby default, the Enable setting is OFF. To enable it set Enable to ON. This will use the Alarm Type "CMS Test" to dial to the programmed Phones by SMS or voice call.

CM9001 Sensors Function



CM9001-EMS has 32 Sensor Registers that are useful for handling Sensor values and Alarms. Sensors can be updated with various values like Temperature, Humidity, Water Level, Current, Power, Lux etc. The sensor values can be obtained from the MSM01, TSM01 or external systems like KNX, Cbus, Modbus etc.
Each Sensor is compared to a Setpoint which is held in a Counter, so that if the sensor value exceeds the setpoint, a Virtual Input which is mapped to the sensor is

activated, thus causing an alarm.

Each Sensor can be assigned to the following parameters;

- "Response": Response or program that is activated when there is a change in Sensor value. Leave as NullResponse if not needed.
- "Counter": The Counter Register in CM9001-EMS holds the Setpoint for the Sensor. Changing the Counter value similarly changes the setpoint.
- "Max Setpoint": Maximum Allowed Setpoint .
- "Min Setpoint"; Minimum Allowed Setpoint.
- "Hysteresis": Hysteresis applied when the sensor has exceeded the Setpoint to prevent excessive switching of Virtual Input and alarm.
- "Calibration": Offset to the Sensor value (-128.0 to +127.0 with 0.1 resolution) to synchronise readings to a reference sensor if required.
- "Scaling Type": A scaling factor can be applied to the sensor value. choose "0", 0-99, Multiply, Divide. "0" means No scaling. "0-99" means the sensor value of 0 to 255 is scaled to 0 to 99. Multiple and divide means the sensor value is multiplied or divided by a Scaling value.
- "Units" Unit text to be displayed in KP04A in EMS Mode. This has not function, it is only display.
- "Virtual Input": When the Sensor Value exceeds the Setpoint (Counter value), and the Flag is enabled, the Virtual Input is activated. See the section on Virtual Inputs below.
- "Enable Flag": A Comfort Flag can be assigned to Enable or Disable the Sensor function. A Flag is a Binary element, it has 2 values Off (0) or On (1). CM9001 has 254 Flags numbered 1 to 254. If a Flag is assigned to the sensor, setting the Flag (to 1) will enable the Sensor comparison, and clearing the Flag (to 0) will disable the Sensor comparison. If the sensor is disabled, the comparison with the counter setpoint will not take place and the Virtual Input becomes 0 (off)
- "Description": This is text that is displayed on the KP04A EMS keypad.
- "Show Status"; Checking this box will show the real time state of the Sensor, Counter, Flag and Virtual Input, provided the CM9001-EMS is connected (see screenshot above). The values of Counter and Flag (but not Sensor) can be changed by entering the value in the fields (Setpoint Value and Flag State), which is very useful for testing as it allows changing of Setpoint and enable/disable of the function.

The default EMS template has Counter 1 to 4 and Flags 1 to 4 assigned to Sensors 1 to 4 (Temperature, Humidity, Water Leak 1 and Water Leak 2) as shown above.

Counters

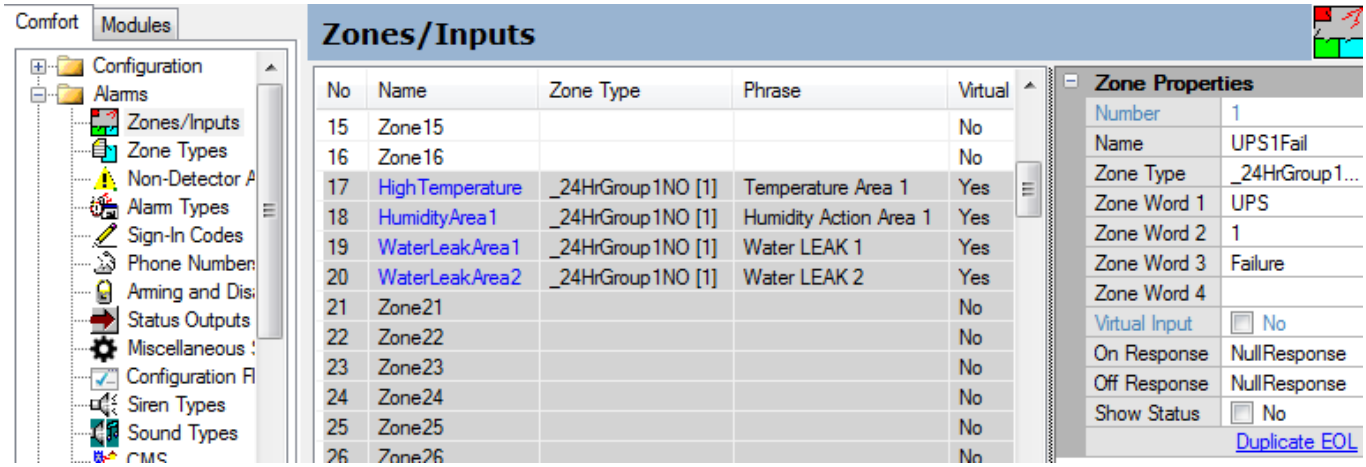
Setpoints for each sensor are kept in Counter Registers. There are 32 Counters in CM9001-EMS which may be assigned. The Setpoint for each sensor can be set or changed by entering a value in the corresponding Counter. If a Counter is not assigned to a sensor that means the sensor is for monitoring only, and Virtual Alarm and alarm will not be triggered by the sensor, and KP04A wiill omly show the sensor value without setpoint. Counters are non-volatile, ie they maintain their value even after loss of power. The Counter value may be changed in KP04A using the Increment (Lock) and Decrement (Moon) keys.

Flags

Flags can be assigned to a sensor. A Flag has a binary state, ie it is either On or Off. A Flag which is assigned to a Sensor is used to enable or disables the Setpoint. Input. In KP04A if the sensor is monitored, pressing the SUN Key alternately enables and Disables the Virtual Input. If disabled, the sensor is displayed only without any setpoint. Flags are non-volatile, ie they maintain their value even after power off.If a Flag is not assigned to the Sensor, the Setpoint is enabled.

Virtual Input

If a Virtual Input is assigned to a Sensor, it will be activated when the sensor value exceeds the setpoint AND the Flag is enabled. Virtual Inputs can be seen in the Zones screen eg Zones 17.18.19 Humidity" below, where the Virtual Input attribute shows "Yes".

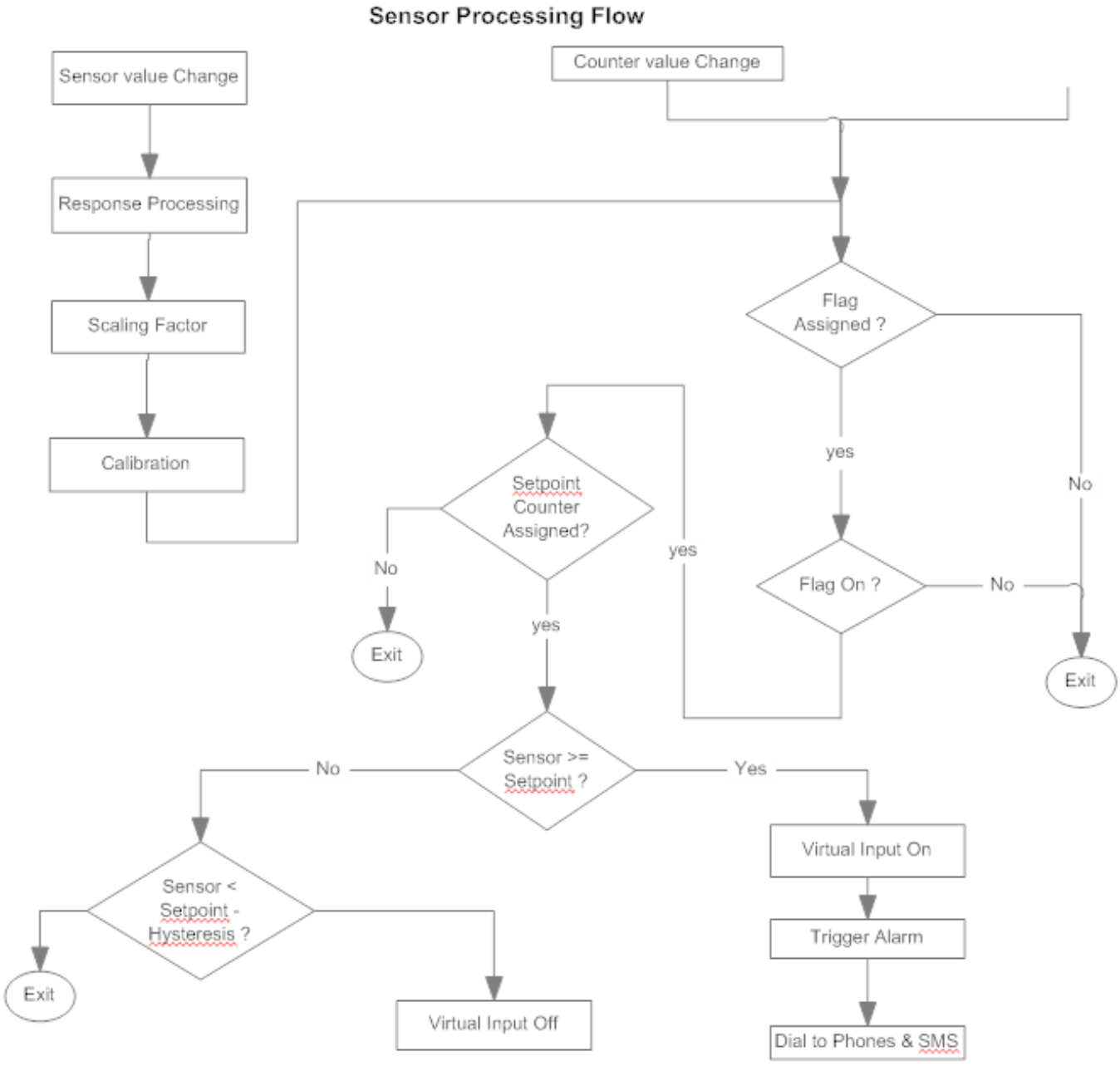


Virtual Inputs can be any unused Input in CM9001 up to Input 96. A Virtual Input need not be on the CM9001, or installed Slave or Local Expansion Modules so that it does not use up a Physical input. The default CM9001-EMS template zones 17 to 20 are programmed as Temperature, Humidity and Water Leakage zones which can be assigned as Virtual Inputs for the Sensors.

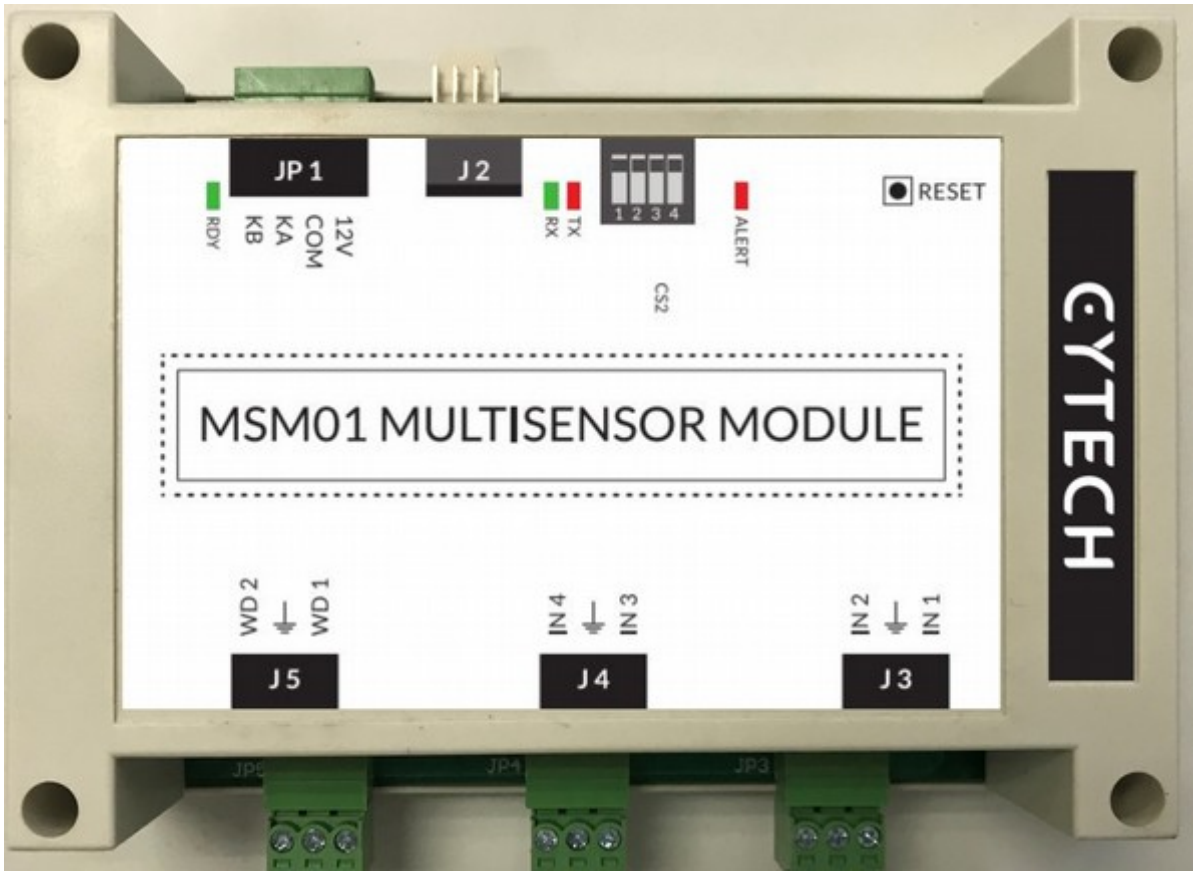
A Virtual Input behaves just like a physical input, ie it has a Zone Type which triggers an Alarm Type, and activates On and Off Responses. In Alarms > Zones, the Virtual Input setting is seen. Note that a Virtual Input will ignore anything that is connected to the Input terminal.

Processing of Sensors

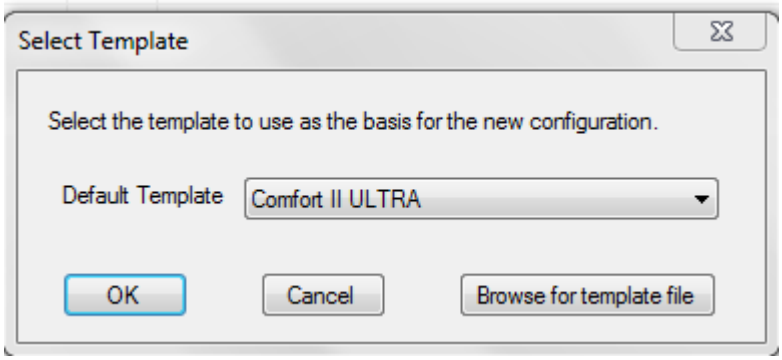
The flowchart below will give a better idea of how the Sensors, Counters, Flags and Virtual Inputs are processed from the sensor value to the Virtual Input and Alarm.



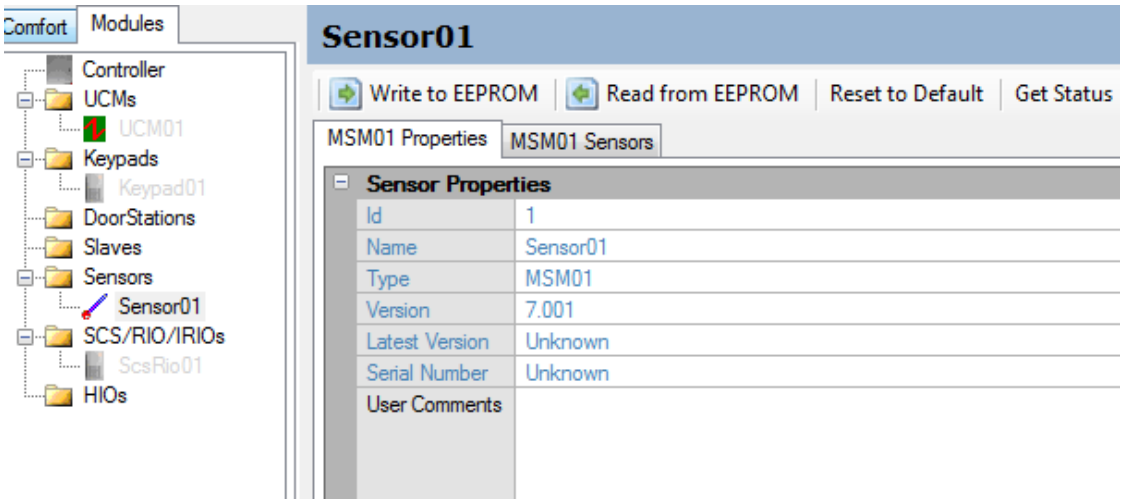
MSM01 PROGRAMMING



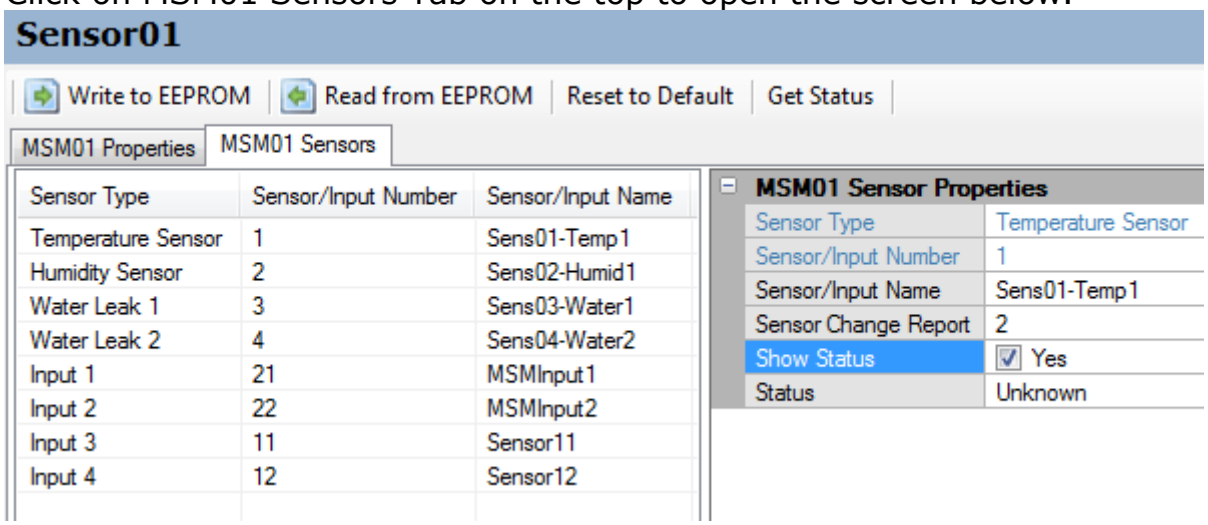
The MSM01 Multi-Sensor Module includes a Temperature Sensor, a Humidity Sensor, 2 Water Leakage Cable Inputs, and 4 Digital Inputs for External equipment failure monitoring. The MSM01 provides the sensor values and External Input events to CM9001-EMS Environmental Monitoring System. MSM01 is needed only if Sensor monitoring is required.
See the MSM01 Installation Manual for information on installation and connections.



The default file for EMS does not include settings for MSM01. To load the template for EMS with MSM01, Go to File > New and select "Browse for Template File", and select "defmsm.cctx".
Select Sensor01 in Sensors folder in the left pane. The MSM01 Properties can be seen.



Click on MSM01 Sensors Tab on the top to open the screen below.



The menu on the top is as follows;

Write to EEPROM

Write configuration to MSM01 internal memory. Do this when you have changed any parameter or setting in MSM01

Read from EEPROM

Read from MSM01 Internal memory. This shows the current configuration in MSM01 EEPROM. The file can be saved in the File menu.

Reset to Default

Reset the MSM01 properties to default. Note that this does not write to EEPROM.

Get Status

Shows the error state of MSM01 . The normal status should be "Normal/No Error" which can be seen on the bottom left of the Comfigurator screen.

MSM01 Mapping

Temperature Sensor

Map the Internal Temperature Sensor value to a CM9001 Sensor Register. Select a Sensor Register 0 to 31. The CM9001 Sensor register will be constantly updated with the internal Temperature in degrees Celsius. In the default template, the Temperature is mapped to Sensor 1 named "Sens01-Temp1".

Temp Sensor Change Report

This is the minimum change in temperature value before a new value is reported by MSM01 to CM9001. For example a value of 1 means that any change of value >1 will be reported to CM9001. This is to reduce the number of reports to CM9001 if the number of changes is expected to be high. Set to 0 to report any change of value.

Humidity Sensor

Map the Internal Humidity Sensor value to a CM9001 Sensor Register. Select a Sensor Register 0 to 31. The CM9001 Sensor register will be constantly updated with the internal Humidity in % RH. In the default template, the Humidity is mapped to Sensor 2 named "Sens02-Humid1".

Humidity Sensor Change Report

This is the minimum change in humidity value before a new value is reported by MSM01 to CM9001. For example a value of 1 means that any change of value >1 will be reported to CM9001. This is to reduce the number of reports to CM9001 if the number of changes is expected to be high. Set to 0 to report any change of value.

Water Leakage (1-2)

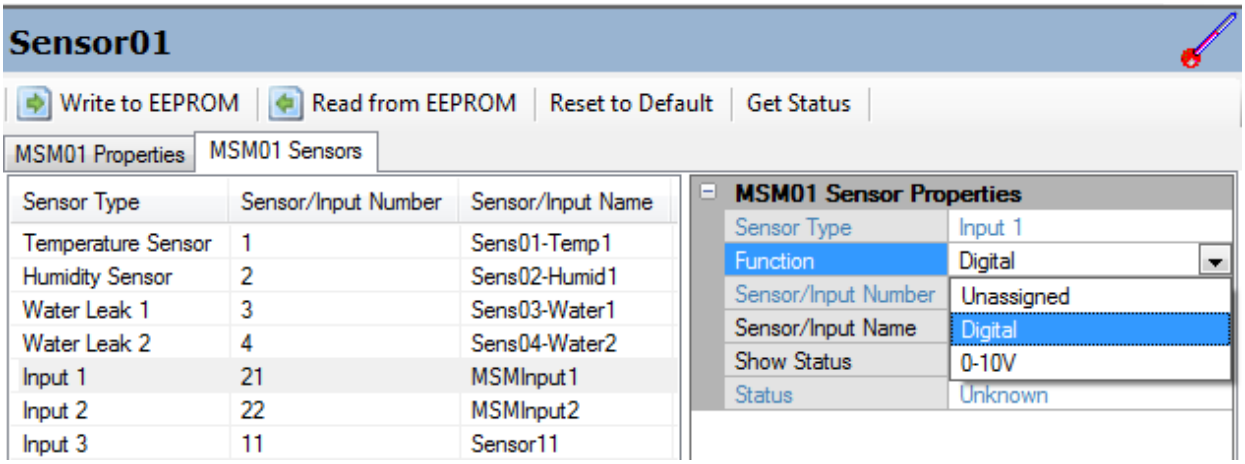
This applies to Water Leak Inputs 1 and 2.Map the Water Leakage Sensor value to a CM9001 Sensor Register. Select a Sensor Register 0 to 31. The CM9001 Sensor register will be constantly updated with the Water Leakage sensor value. In the default template, Water Leak Input 1 is mapped to Sensor 3 named "Sens03-Water1, and Water Leak Input 2 is mapped to Sensor 4 named "Sens04-Water2".

Water Leak (1-2) Sensor Change Report

This is the minimum change in sensor value before a new value is reported by MSM01 to CM9001. For example a value of 1 means that any change of value >1 will be reported to CM9001. This is to reduce the number of reports to CM9001 if the number of changes is expected to be high. Set to 0 to report any change of value.

Input (1-4) Function

This applies to the 4 external Inputs 1 to 4. Select a Function for the Input; Digital, or 0-10V



Digital Input means the Input is a Normally Open voltage-free contact, . This is used to connect external inputs from equipment to indicate some failure or Fault. The Digital Input is mapped to a CM9001 Zone 1 to 96 as virtual Input.
0-10V means an analog input from 0 to 10 volts is connected to the Input. This voltage value is mapped to a CM9001 sensor in the range 0 to 255. 0 V = sensor value 0 and 10V = 255

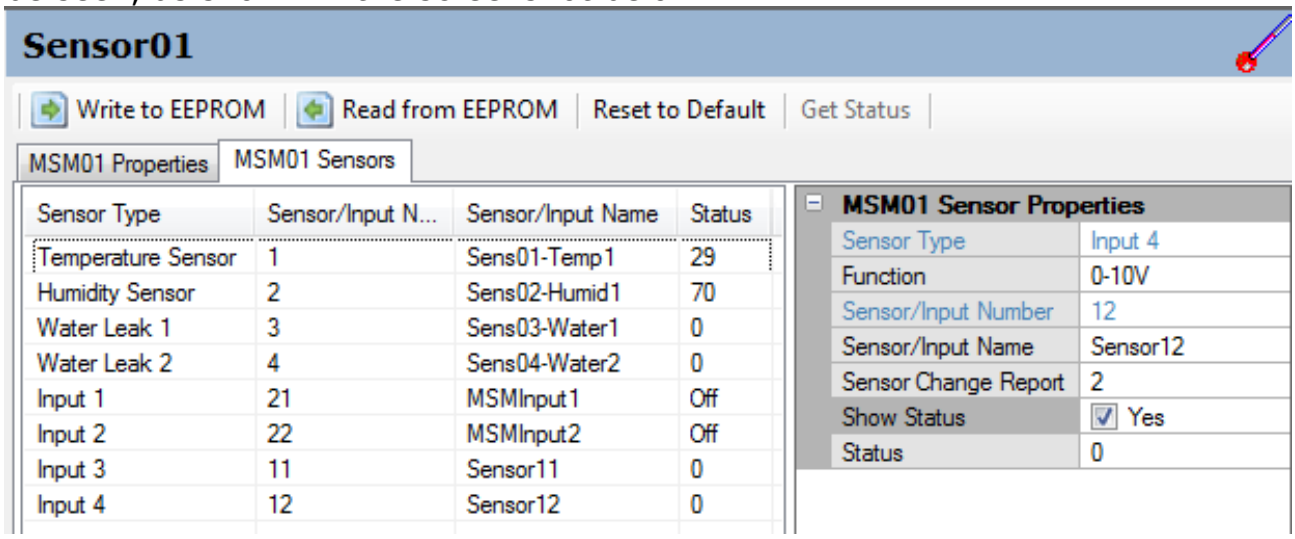
Input (1 – 4) (Sensor or Virtual Input)

For Digital Input, select a CM9001 Zone/Input as Virtual Input. A Virtual Input is like a Physical Input on CM9001 – it has Zone Type Properties, and triggers an Alarm Type which has up to 16 phone numbers assigned for dial out. Virtual Inputs are a powerful mechanism for activating Alarms based on sensors values. A Zone/Input that is assigned as a Virtual Input will ignore its physical input terminal.

In the default defmsm.cctx file, MSM Inputs 1 to 4 are mapped to UPS Fail, Aircon Fail, CRAC and FM200 respectively. These can be changed as required,

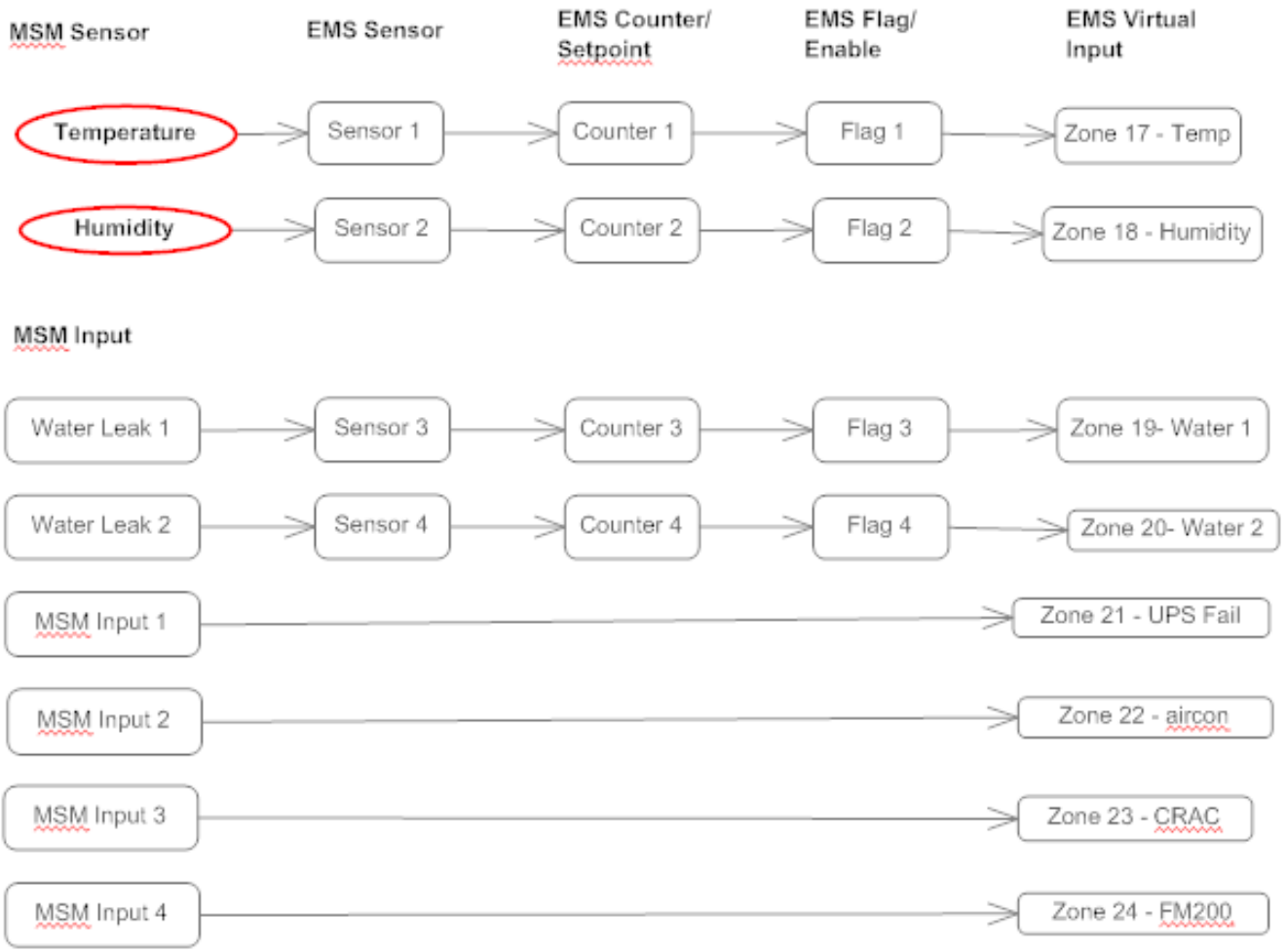
Show Status

When checked the real time values of the assigned sensors and Input registers can be seen, as shown in the screenshot below.



Default Template for MSM (Defmsm.cctx)

The flowchart below graphicallly summarises the settings provided by the defmsm.cctx file. Note that the settings can be changed as required.

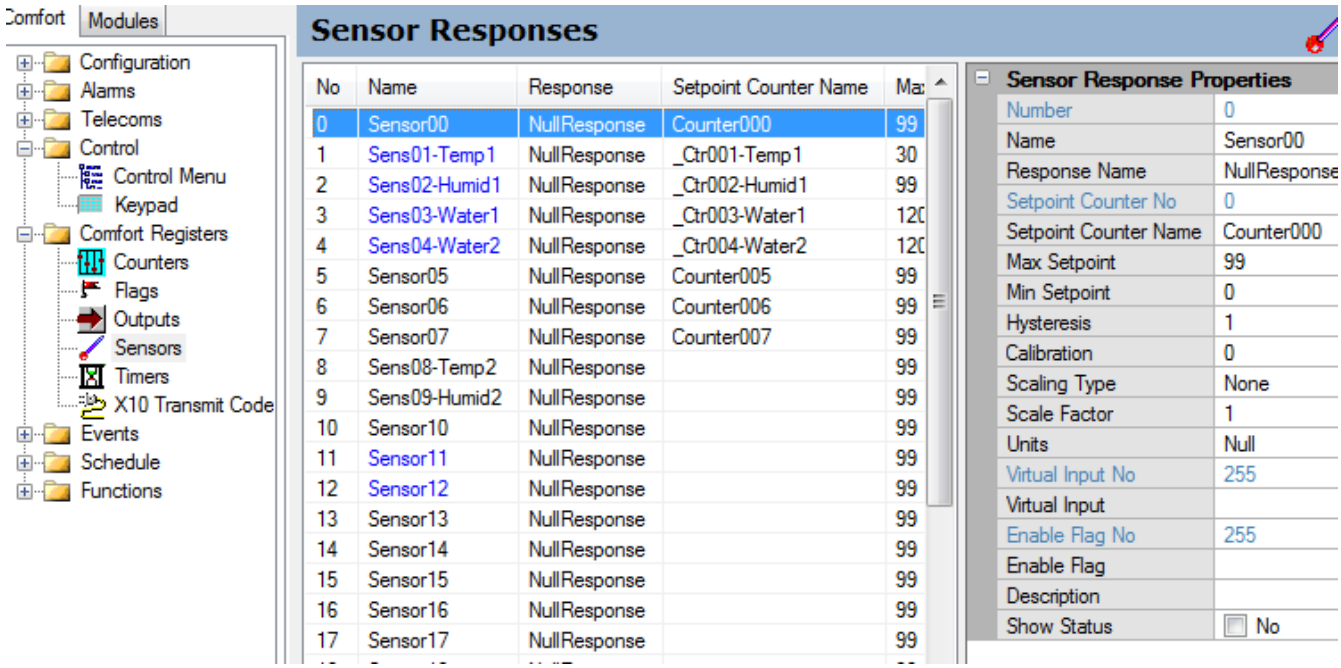


Sensors and Alarms

Sensor values can be obtained from the following sources;

1. MSM01 Temperature/Humidity Sensor Module
2. TSM01 Temperature Sensor
3. IRIO01 with ISM01 submodules with Temperature Sensor
4. External Interface by UCMs eg KNX, Cbus, Modbus

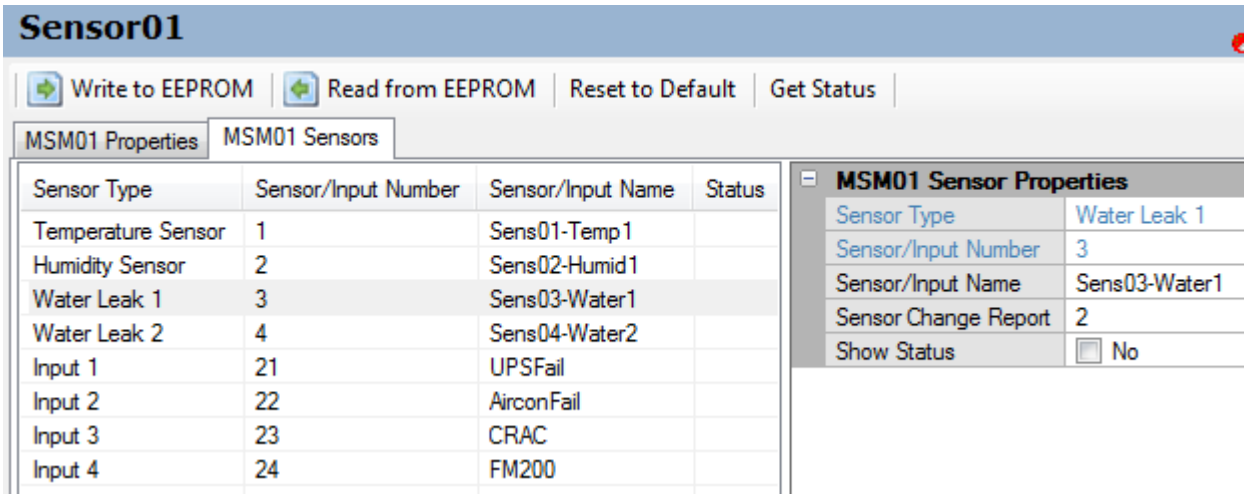
Sensor values from MSM01 can be configured to cause Alarms in CM9001-EMS. The MSM sensor values works with the Sensor registers in CM9001-EMS. The CM9001-EMS Sensors screen is shown below. There are 32 Sensors numbered 0 to 31.



Each Sensor has a Setpoint that is mapped to a setpoint Counter, maximum and minimum setpoint, Hysteresis, Calibration, Scaling factors, Display Units, Virtual Inputs, Enable Flag. When the sensor exceeds the setpoint kept in the mapped Counnter, a Virtual Input is activated which causes an Alarm. The sensor alarm can be enabled or disabled by setting or clearing a Flag in CM9001-EMS Full details on the Sensors Function is in the CM9001-EMS manual.
In the default template defmsm.cctx, Sensors 1 to 4 are assigned to Counters 1 to 4 for setpoints.

Water Leakage Detection

Water Leakage can be detected by connecting the Water Leakage Detection cable WA01-0043 (purchased separately by meters). The WD1 and WD2 Inputs on MSM01 allow 2 water leakage cables to be connected, eg to the ceiling and floor water collection trays. Map the Water Leakage Input 1 or 2 to a Sensor Register.

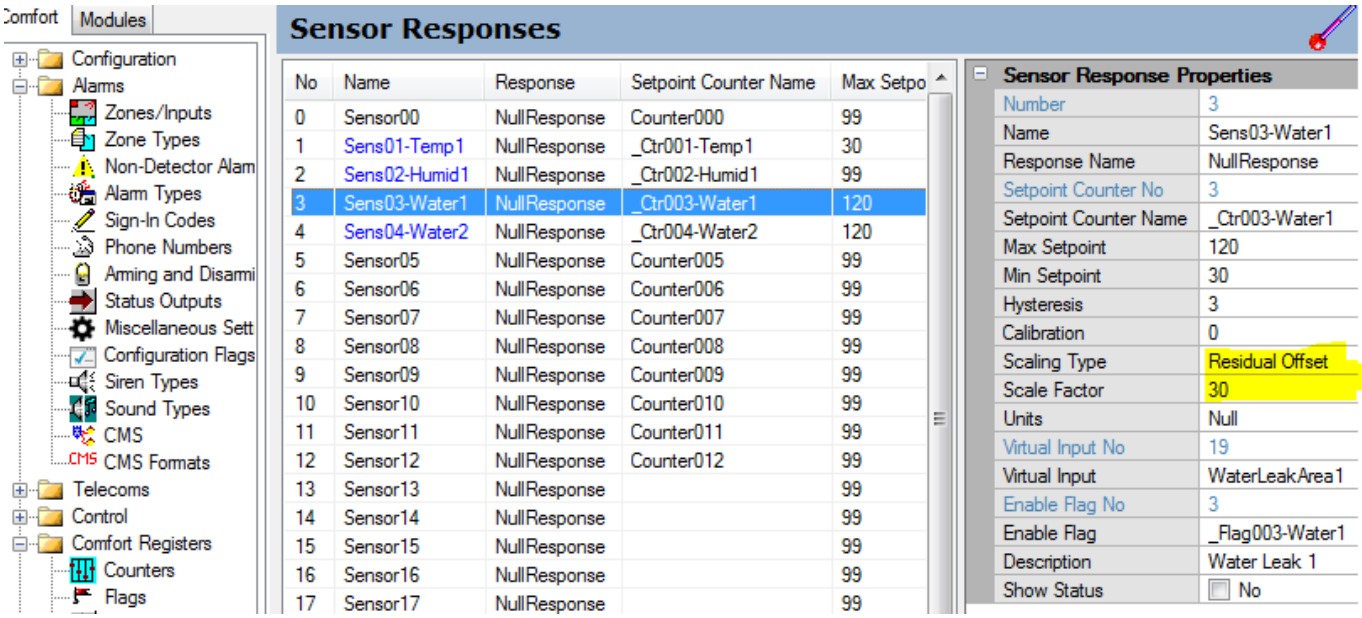


In the above screenshot Water Leak Input 1 is mapped to Sensor 3 in CM9001-EMS and Water Leak Input 2 is mapped to Sensor 4 in CM9001-EMS
The cable in dry state has a high resistance. When the cable is wet the resistance drops corresponding to the degree of immersion. The cable resistance is inversely proportional to the Sensor value (0 to 255). For open circuit (Infinite resistance), the sensor value is 0 (or close to 0). when the resistance decreases, the Sensor value increases. A threshold can be set in the Sensors screen of CM9001 so that when the sensor value exceeds the threshold, the assigned Virtual Input is activated, thus triggering the associated alarm. In the default template defmcm.cctx, the Virtual Inputs for the Water Leakage sensors Zones 19 and 20 have Zone Type 0 ie Disabled. If the Water Leakage detection is used set the zone Type to 24Hr Normally Open (Zone Type 1) or as required.
For example, if the sensor value is 40 units when the cable is wet, the sensor setpoint can be set to 20. The setpoint for water leak input 1 is in Counter 3. This setpoint can be changed in KP04A

Detection of Water Leakage Cable Break

It is possible to trigger a Zone Trouble alarm if the water leak detection cable is broken or not connected. This is achieved by connecting the 100 Kohms (supplied with the cable) at the far end of the cable. The 100K resistor is supplied connected to the Water Detection Inputs WD1 and WD2 so that the Input does not triiger a Zone Trouble Alarm. If the Water Detection Cable is conected, remove the 100K resistor fron the WD1 or WD2 Inputs and connect to the end of the cable. Make sure that the resistor with the cable does not get wet. The principle of operation is similar to the End-of-line resistor in CM9001 Inputs/Zones, where CM9001 is able to trigger a Zone Trouble alarm if the end of line resistors are installed and there is a cable break. For water leak cable break detection, End of Line (EOL) resistor (100K) is required. This is a different value from that used in the double EOL resistors in CM9001.
With the 100K End-of-line resistor connected at the end of the dry cable, the sensor value should be around 60 counts. If the cable is wet the sensor reading should be 100 or more. Hence the Setpoint for water detection should be around 80 counts. The threshold for cable break should be around 30 counts (midway between 0 and 60). To set this, go to Comfort Registers > Sensors and select the Sensor assigned to the water leakage detector ie Sensor 3 and 3 (for WD Input 1 and 2 respectively). In Scaling Type, select “Residual Offset”, and enter the value

of 30 in the Scaling factor. See screenshot below. This has already been set up in the defmsm.cctx template. Write to MSM01, and test that when the cable is disconnected, a Zone Trouble alarm is triggered. The Zone Trouble alarm can be programmed to dial to any combination of the 16 phone numbers.

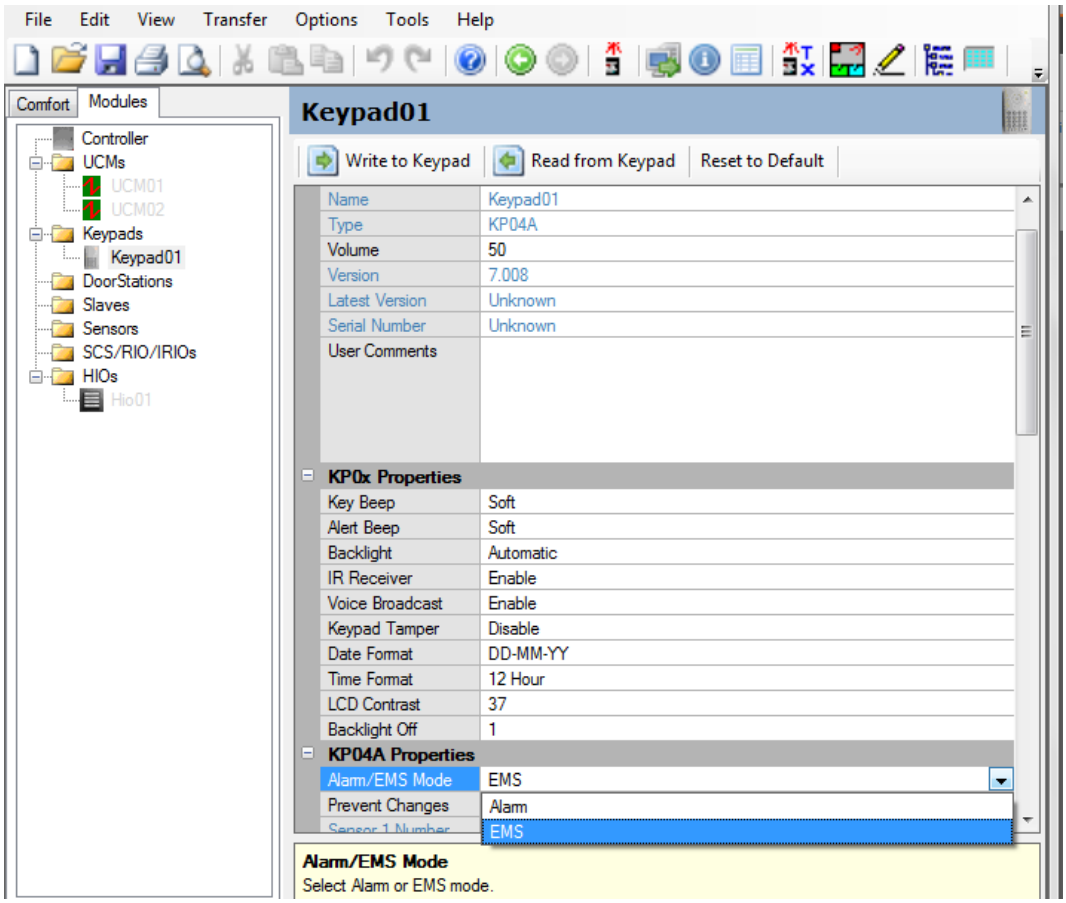


If the cable break end of line resistor is not connected, then Scaling Type should be Null.

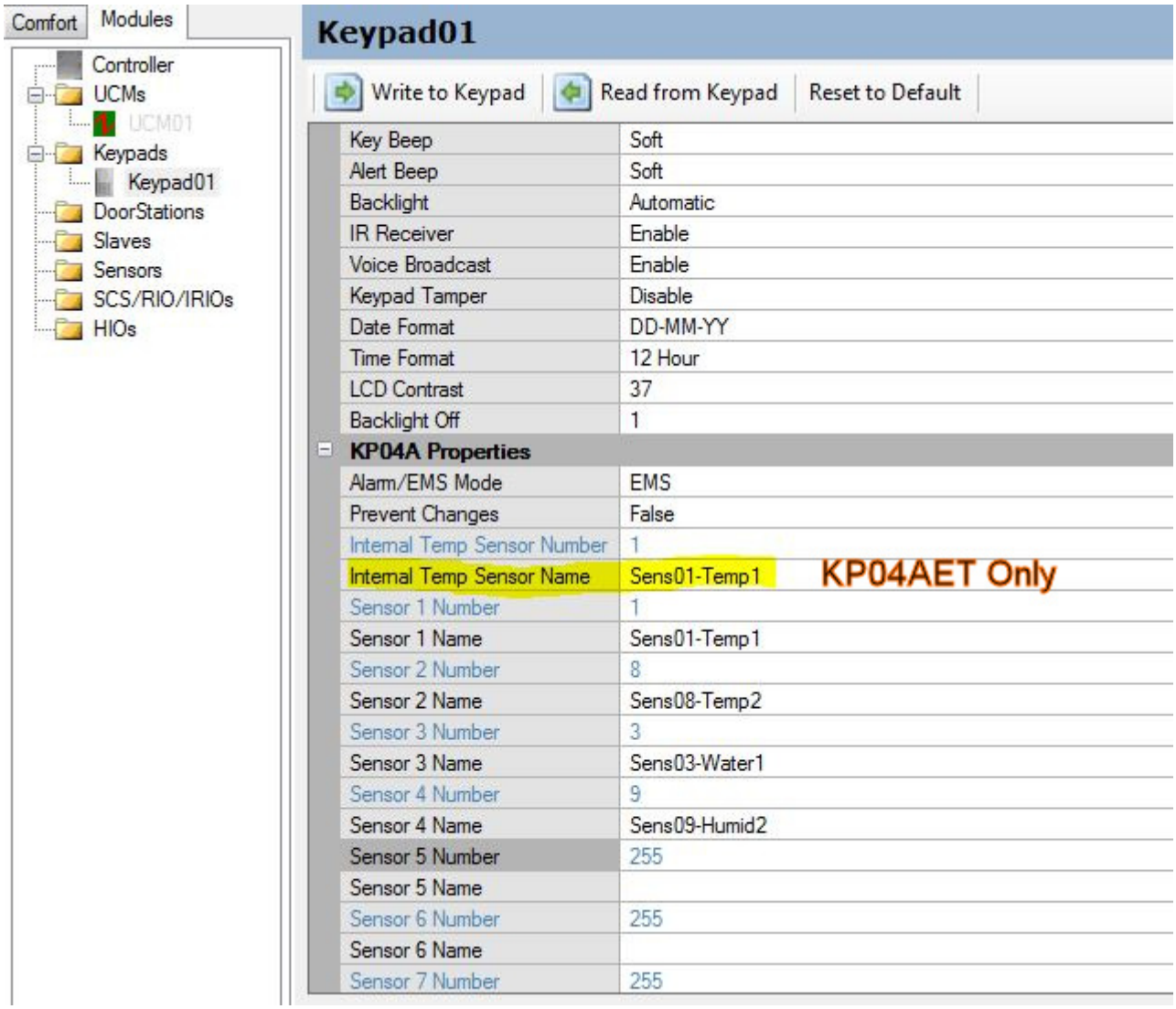
KP04AE IN EMS MODE

KP04A keypad firmware 7.014 and above has an alternate mode for Environmental Monitoring used with CM9001-EMS.
The KP04AE has the following functions for up to 4 sensors.

1. View Sensor values like Temperature and Humidity
2. View and change Setpoints
3. Enable or disable setpoints

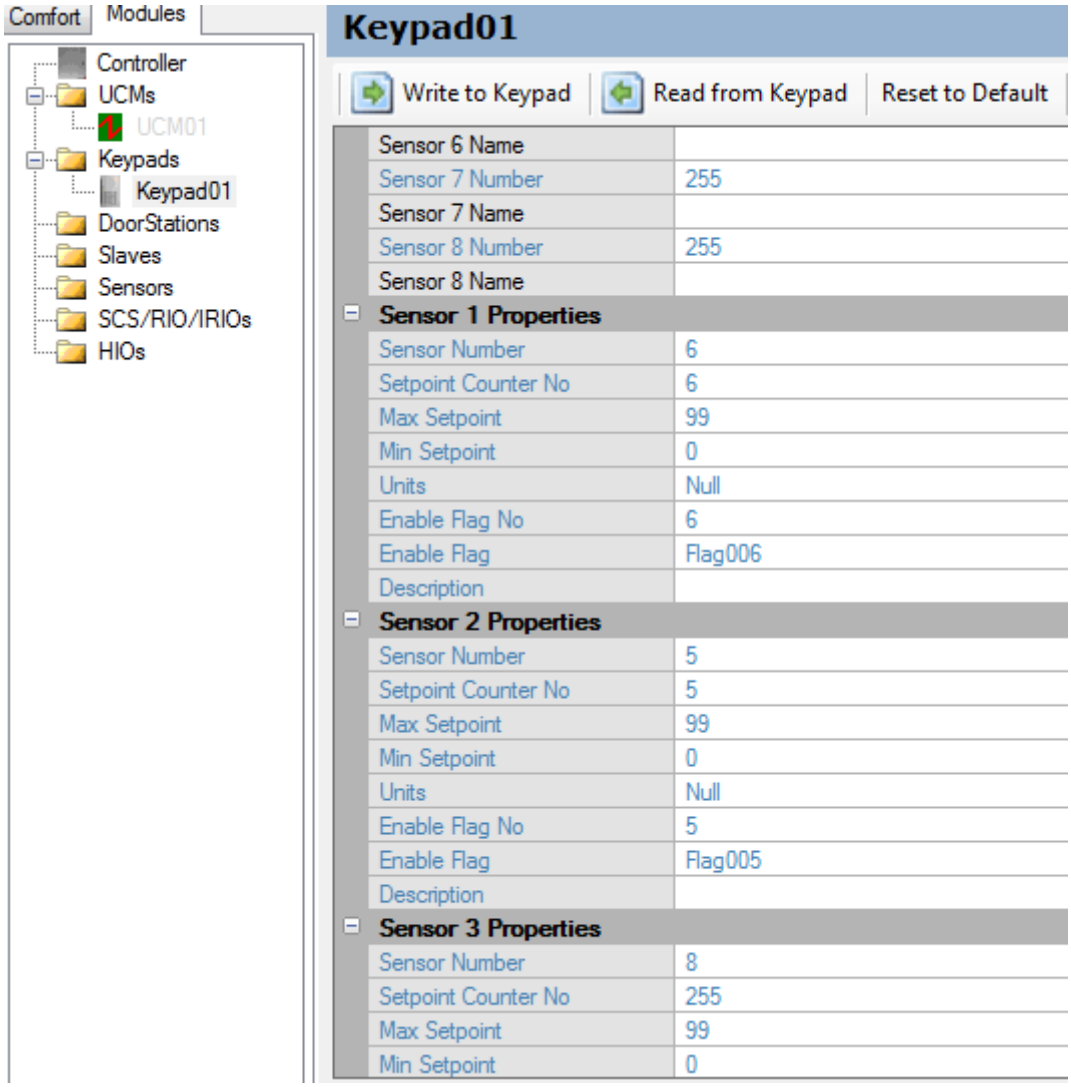


The KP04A Keypad can be in Alarm or EMS Mode. It can be changed to EMS mode by selecting EMS in the Alarm/EMS drop-down list only if the Controller is CM9001-EMS (not Ultra). EMS Mode is needed only for monitoring Sensors and setpoints. There can be a combination of KP04As in Alarm and Sensor modes in the system.
"Prevent Changes": if set to True, this prevents users from making any changes to the setpoints or enable/disable settings.
In EMS mode, KP04A can display up to 8 sensors as shown below;



Note that Internal Temperature Sensor Name is applicable for KP04AET (with internal Temperature sensor) only.

In the example above 4 KP04A sensors are are assigned to Comfort Sensor Registers.



Sensor Number: The Sensor number selected
Setpoint Counter: The Counter assigned to hold the setpoint (in Sensors Table)
Max Setpoint: Maximum allowed value of the setpoint (in Sensors Table)
Min Setpoint: Minimum allowed value of the setpoint (in Sensors Table)
Units: The Units eg degrees, %, lux, W, mW (in Sensors Table)
Enable Flag: The Flag assigned to Enable/Disable setpoint (in Sensors)
Description: Text 16 characters to describe the Sensor (in Sensors Table)

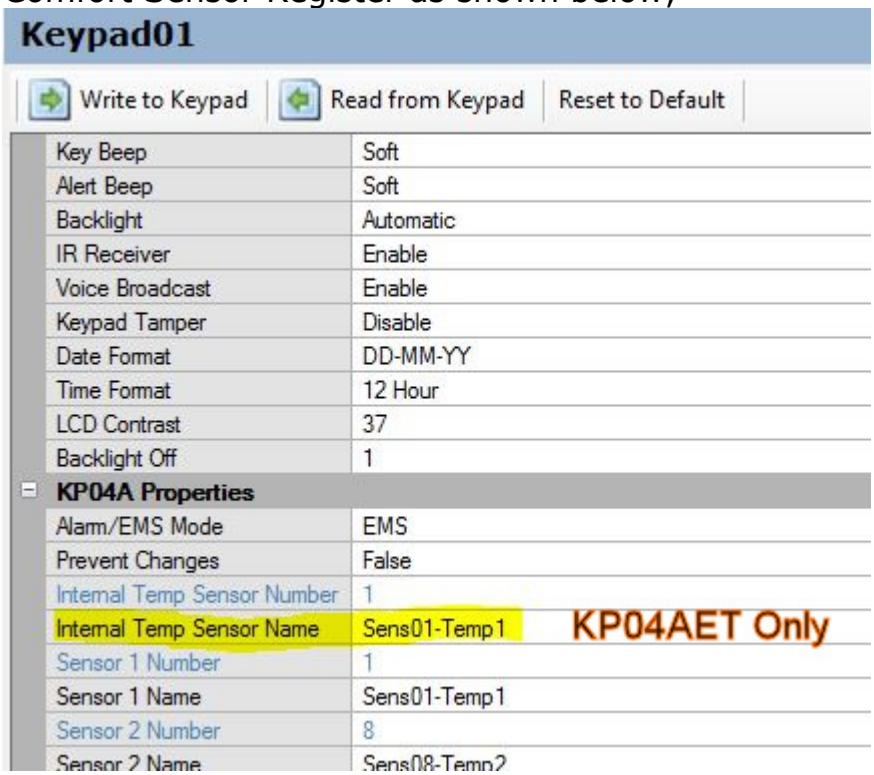
Note that the properties above are Read-Only, and cannot be changed in this screen. These parameters can be changed in the CM9001-EMS Sensors Screen described in the previous section.

If less than 8 sensors are required, leave the remainng positions empty or unassigned. Do a "Write to Keypad: after the sensors are selected.

KP04AET with Temperature Sensor

KP04AET is a variant of KP04A which has a built-in Temperature sensor, which can also be assigned to one of the 8 KP04A sensors displayed in ay of the 15 KP04As in a system.
In KP04A Properties, "Internal Temp Sensor Name" should be assigned to a

Comfort Sensor Register as shown below;



The Same Sensor Register can also be one of the 8 KP04A sensor numbers which are displayed on the LCD, as shown above. For model KP04AE without the built-in Temperature sensor, leave the Internal Temp Sensor Name blank of unassgined.

KP04AE/KP04AET Operation (EMS Mode)

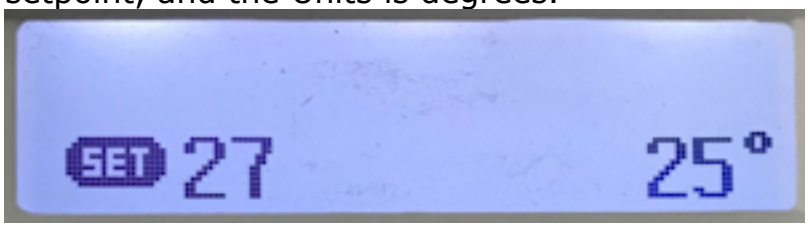
In EMS Mode, the numeric keys 0 to 9, *, # work the same way as in Alarm Mode, ie they can be used to disarm the system or to make selections in the Voice Menu.

The Function keys in the right column have different functions in EMS Mode (compared to Alarm Mode) as follows;

Fn	Function	Go to next Sensor. Also works as Function Key like in Alarm Mode.	Not affected by "Prevent Changes" setting
+	+	+ ie Increment Setpoint	Disabled by "Prevent Changes" setting
-	-	- ie Increment Setpoint	
ON OFF	On/Off	Toggle Enable/Disable Setpoint	
*	*	Press & Hold 4 seconds to enter setup mode	

Note The * key is used to enter setup mode in both EMS and Alarm Modes.
Hence in EMS Mode, the function keys cannot be used to arm the security system
In EMS Mode, if no sensors have been assigned, then the following message will be seen.

EMS mode is not necessary if there are no sensors to be monitored. If this message is seen, go to Comfigurator, KP04A and select at least 1 sensor.
If a Sensor has been assigned to the KP04A, and the CM9001 Sensors screen has been set up (ie Sensor and Counter have been assigned) the display below will be seen (example). The setpoint and Sensor value according to the Sensors Table is seen. Eg the 1st sensor in KP04A is assigned to Sensor 1, and Counter 1 as setpoint, and the Units is degrees.



Pressing the AWAY (+) key will increment the setpoint and pressing the Night (-) key will decrement it. The display will revert to show the Setpoint/temperature if no buttons are pressed.
Pressing the Day key will Toggle, ie alternately disable and enable the setpoint. If the setpoint is disabled, the Setpoint is not shown, and only the sensor value is shown (see below). This means that there will be no sensor alarm for this sensor.

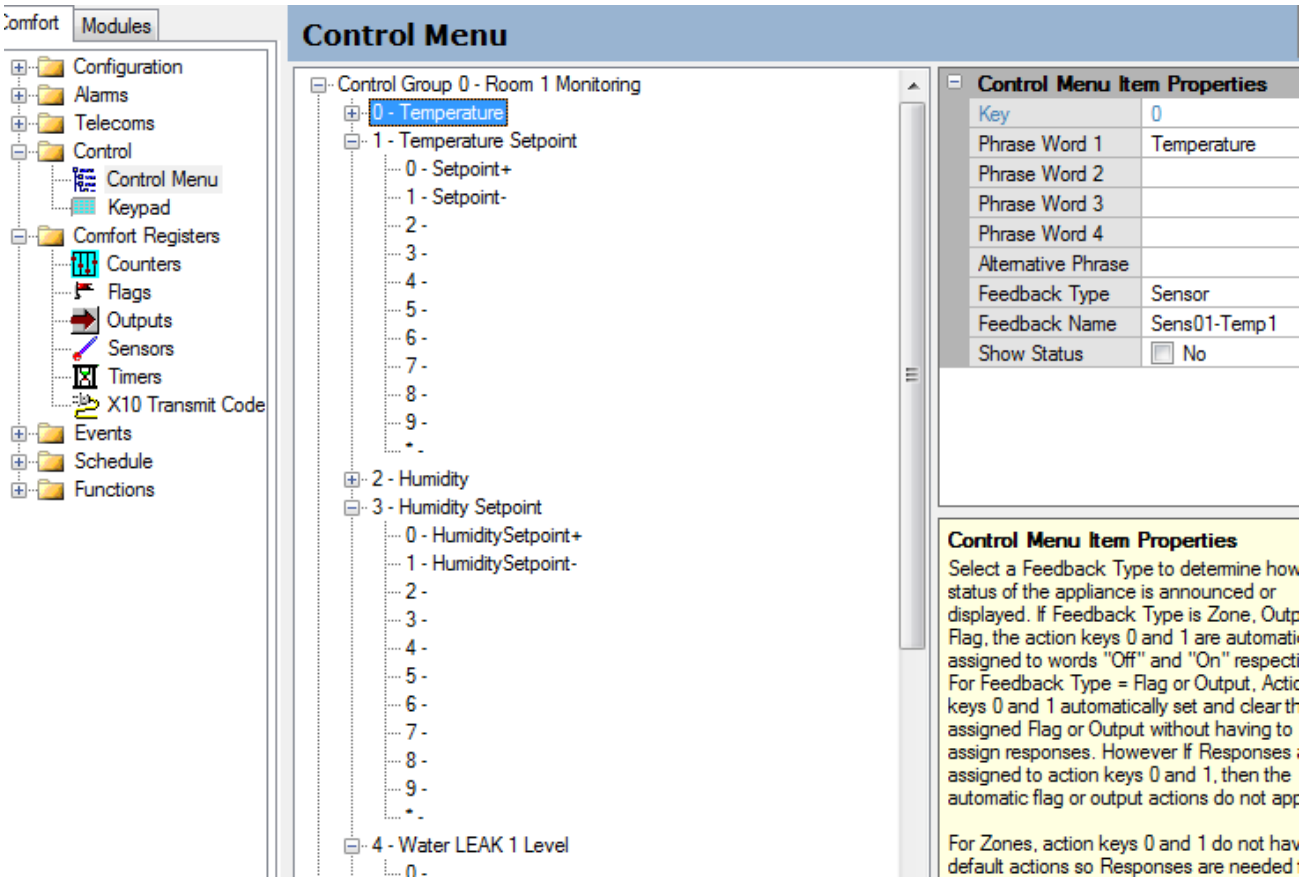
If the sensor value exceeds the Setpoint, then the Virtual Input defined in the CM9001-EMS Sensors screen is activated. Depending on the Zone Type and Alarm Type, this can trigger an Alarm and dial or SMS to the programmed numbers for the alarm type.

Humidity can also be displayed in one of the 4 sensor slots as shown below with or without setpoint.


38%

CONTROL MENU

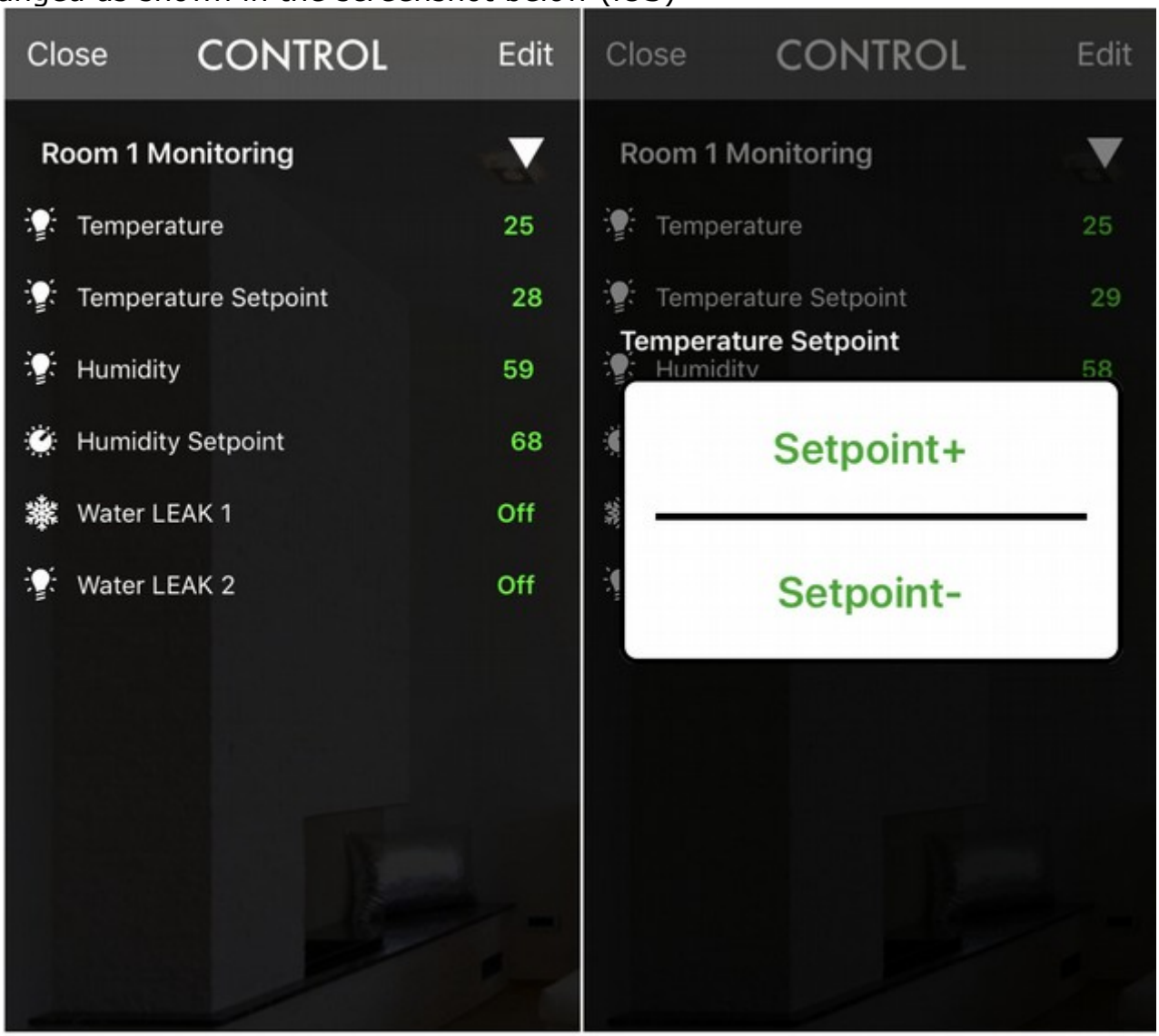
The default template for EMS with MSM01, defmsm.cctx includes the settings for the Control Menu.



The control menu allows the Temperature, Humidity and Water Level sensors values to be monitored, and the Temperature and Humidity Setpoints to be monitored and changed.
The Control menu can be accessed by Keypad, Telephone Call, SMS or iOS/Android apps.

IOS/ANDROID APPS

The default control menu allows the current temperature, temperature setpoint, current humidity, humidity setpoint, Water Leakage sensor 1 and 2 levels to be viewed via the Cytech iOS or Android apps, and also allows the setpoints to be changed as shown in the screenshot below (iOS)



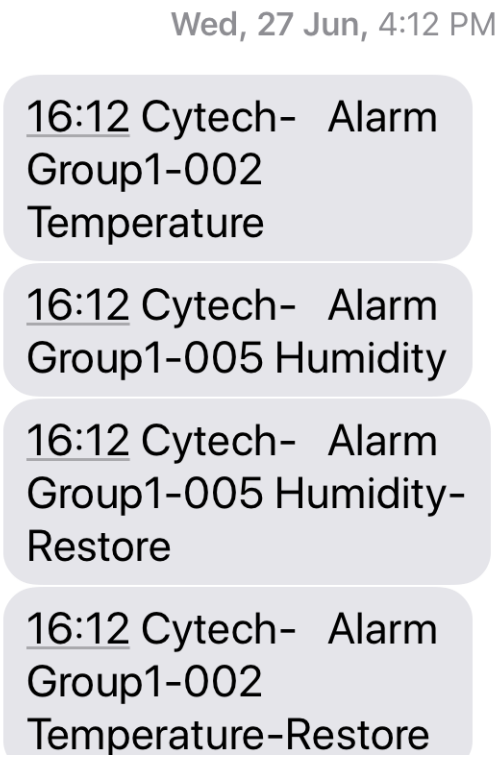
SMS MONITORING

- Acts as a backup for alarm dialout when the land line is faulty or cut, or can be used as the primary dialler without a fixed telephone line, for installations where a telephone line is not available.
- Allows the user to dial to the GSM number instead of the fixed telephone line to access Voice menus.
- Allows CM9001-EMS to report alarms to the users mobile phones via SMS. The SMS message will show time stamp, Alarm type and Zone (Input) Name.
- Allows authorised Mobile phones to send SMS commands to control or check the status of Inputs, Temperature, Humidity or other sensors.

Refer to the UCM/GSM4 Manual (download from http://www.cytech.biz/ucmg_sm_manual.html) for installlation and programming of UCM/GSM4.

The SMS format to send to CM9001-EMS to see the sensor values and setpoints depends on the Control menu programmmed in CM9001-EMS

Alarm Messages are sent by SMS as show below



Users can send SMS messages to CM9001 to query the sensor values and setpoints and to change the setpoints as shown below

(400)

Room 1 Monitoring
> Temperature
> 021.

(400) - Temperature

Text Message

(401)

Room 1 Monitoring
> Temperature Setpoint
> 024.

(401) - Temperature Setpoint
(4010) - Set -
(4011) - Set +

(4011)

Room 1 Monitoring
> Temperature Setpoint
> 025.

(401) - Temperature Setpoint

(402)

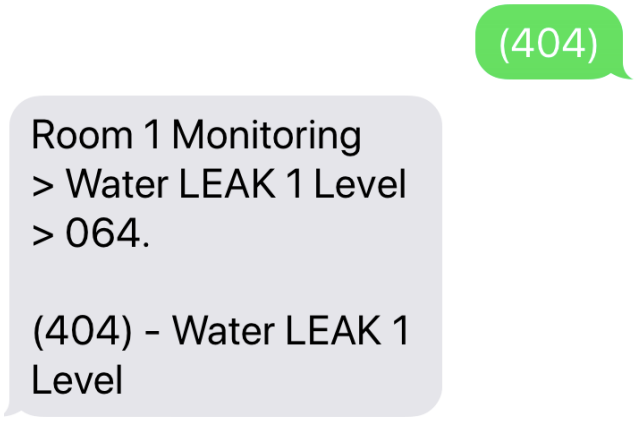
Room 1 Monitoring
> Humidity
> 064.

(402) - Humidity

(403)

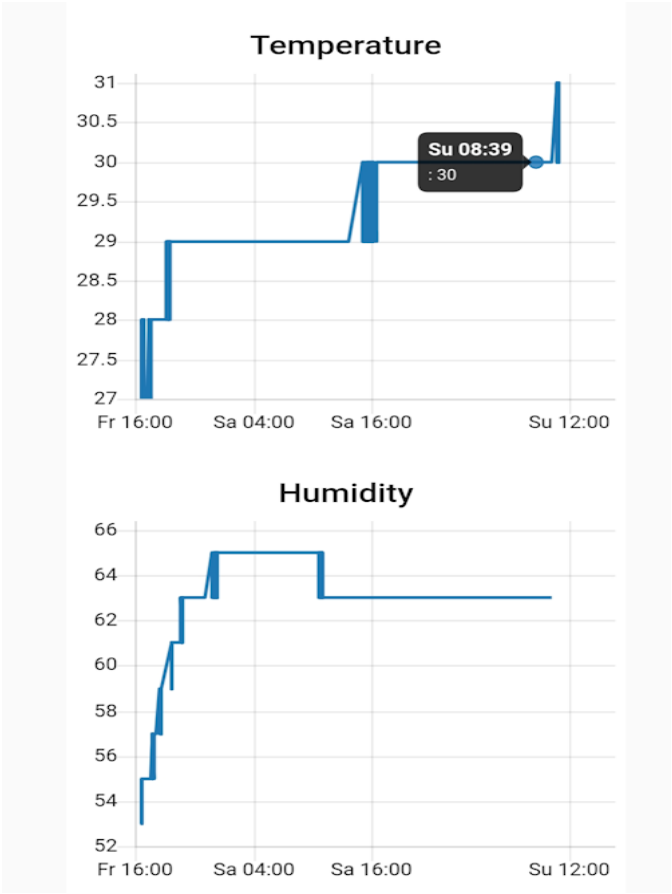
Room 1 Monitoring
> Humidity Setpoint
> 069.

(403) - Humidity Setpoint
(4030) - Set -
(4031) - Set +


(404)
Room 1 Monitoring
> Water LEAK 1 Level
> 064.
(404) - Water LEAK 1 Level

GRAPHICAL SENSOR DISPLAY

The optional UCM/Pi (Raspberry Pi Interface) allows graphical display of up to 32 sensor values over time on mobile phone or computer as shown in the example below.



	A	B	C	D
	Date	Temperature	Humidity	
	5/4/2019 8:43	28	53	
	5/4/2019 8:43	28	53	
	5/4/2019 8:43	28	53	
	5/4/2019 8:43	28	53	
	5/4/2019 8:43	28	53	
	5/4/2019 8:45	28	53	
	5/4/2019 8:45	28	53	
	5/4/2019 8:45	28	53	
	5/4/2019 8:45	28	53	
	5/4/2019 8:45	28	55	
	5/4/2019 8:45	28	53	
	5/4/2019 8:45	28	55	
	5/4/2019 8:46	28	53	
	5/4/2019 8:46	28	55	
	5/4/2019 8:46	27	55	
	5/4/2019 8:47	28	55	
	5/4/2019 8:47	27	55	
	5/4/2019 8:47	28	55	
	5/4/2019 8:47	27	55	
	5/4/2019 8:48	28	55	
	5/4/2019 8:48	27	55	
	5/4/2019 8:49	28	55	
	5/4/2019 8:49	27	55	
	5/4/2019 8:50	28	55	

This can also be configured to send daily (or at other interval) emails with sensor values in .csv format. The recording intervals can be configured eg 5 minutes, 1 hour etc.

Document History

- 27 February 2018 Initial release
- 10 June 2018 Added KP04A, UCM/GSM4
- 17 July 2018 added MSM01
- 20 May 2019 – added UCM/Pi Graphical Sensor display, KP04AT
- 5 Sept 2019 – Added KP04AET, 8 sensors Display