
Procon

MINI M2M-A/16

FOR INSTALLERS

INSTALLATION AND OPERATION MANUAL Version 3.00

For safe and correct use, please read this installation manual thoroughly before installing the MINI M2M-A/16.

mitsubishi
ELECTRIC

Preface

Safety warnings

⚠ Caution:

Do not expose to rain or moisture.

⚠ Screened Signal Cables:

Use only screened cables for connecting peripherals to any Procon M2M device to reduce the possibility of interference with radio communications services. Using screened cables ensures that you maintain the appropriate EMC classification for the intended environment.

⚠ CE Notice:

This product has been determined to be in compliance with 2004/108/EC (EMC Directive) and amendments of the European Union.

⚠ European Union, Class A:

Class A products are intended for use in non-residential/non-domestic environments. Class A products may also be utilised in residential/domestic environments but may cause interference and require the user to take adequate corrective measures.

This is a Class A product. In a domestic environment this product may cause radio frequency interference in which case the user may be required to take adequate measures.

A "Declaration of Conformity" in accordance with the preceding directives and standards has been made and is available on request.

If this equipment does cause interference with radio communications services, which can be determined by turning the equipment off and on, you are encouraged to try to correct the interference by one or more of the following measures:

- Reorient the receiving antenna.
- Relocate the Procon M2M with respect to the receiver.
- Move the Procon M2M away from the receiver.

If necessary, consult a Procon M2M technical support representative or an experienced radio/television or EMC technician for additional suggestions.

Disclaimer

⚠ Warranty:

All products manufactured on behalf of Mitsubishi Electric UK are warranted against defective materials for a period of three years from the date of delivery to the original purchaser.

⚠ Warning:

Mitsubishi Electric UK assumes no liability for damages consequent to the user of this product. We reserve the right to change this manual at any time without notice. The information furnished by us is believed to be accurate and reliable. However, no responsibility is assumed by us for its use, nor for any infringements of patents or other rights of third parties resulting from its use.

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1

[Fig. 1]
Included Items

A



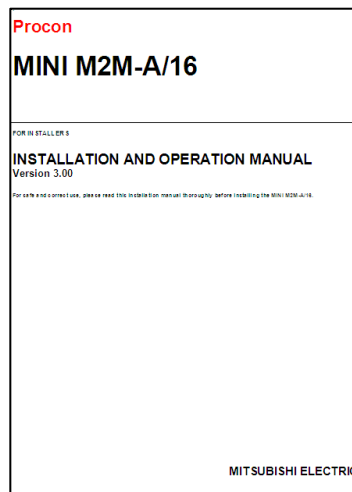
B



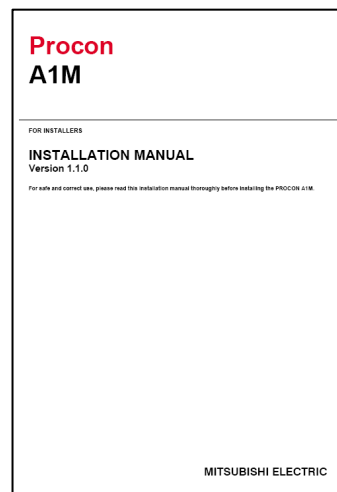
C



D



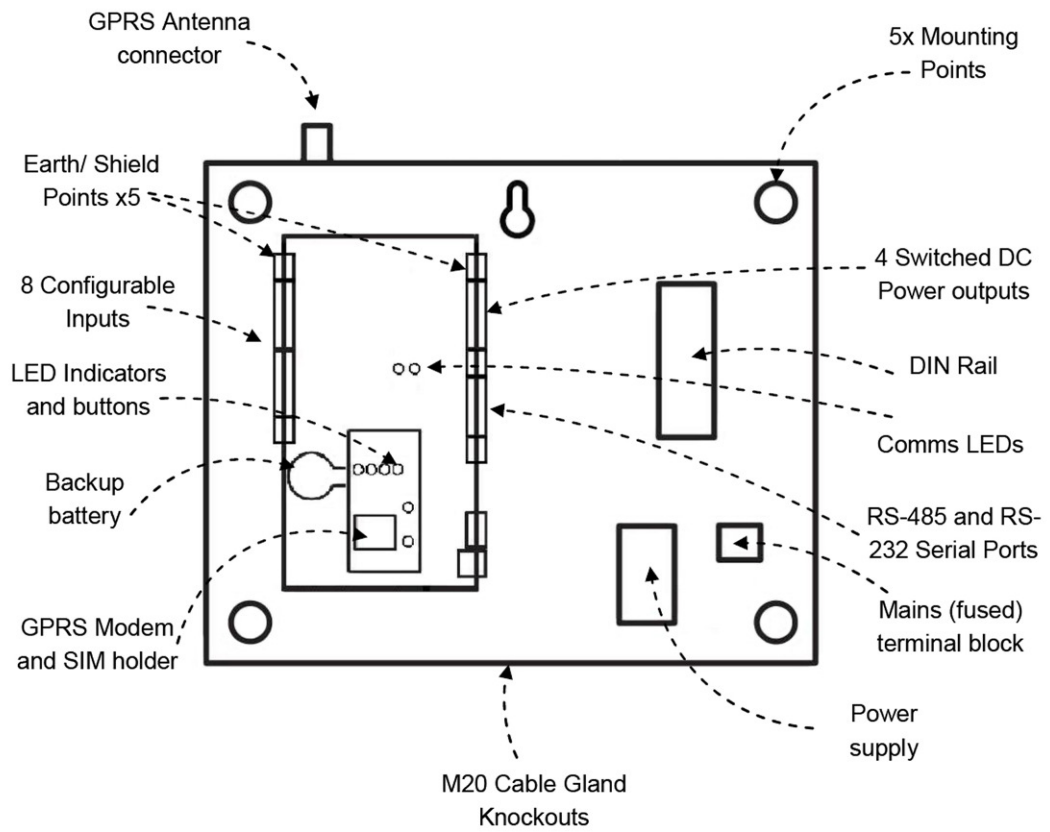
E



- A 1 x M2M-A/16
- B 1 x Aerial
- C 1 x A1M
- D 1 x Procon M2M Manual
- E 1 x A1M Manual

2

[Fig. 2]
Internal Overview



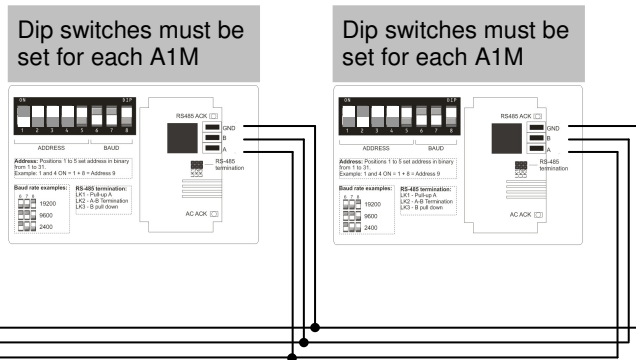
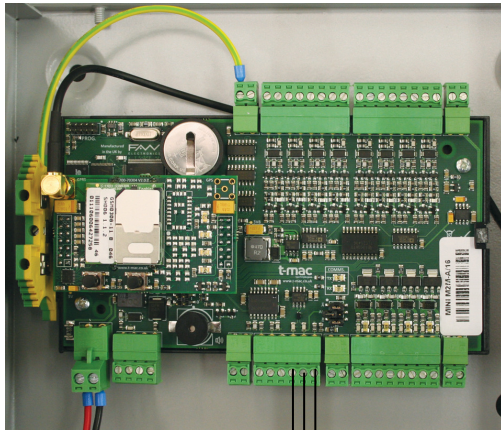
3

[Fig. 3]
Inside the unit



4

**[Fig. 4]
Wiring Diagram**



Notes:

- GND must be connected
- Screened cable must be used
- For communication over RS-485 all 3 connections are needed. These are labelled A, B and GND
- The RS-485 cable must be a screened data cable. Mains flex or other unscreened cable must not be used
- The cable screen must be connected to GND at one end only
- RS-485 has polarised data connections. It is crucial that all 'A's are connected together, all 'B's are connected together and all 'GND's are connected together
- The RS-485 cable must be a daisy-chained network. T-junctions (e.g. star network) are not permitted
- Please see Procon A1M Installation and Operation manual for more details

1. Quick set up

Step 1:

Register the Procon M2M using <http://m2m.mitsubishielectric.co.uk/commissioning>. Please enter your contractor code, if you do not have a code please contact Site Services Department on 0161 866 6089. When the form has been completed and submitted, the SIM card will be activated within 3 working days. The correct serial number (SN*****) of the M2M is required to fill in the form.

Step 2:

Connect the 240VAC power supply but do not switch ON.

Step 3:

Connect the Aerial.

Step 4:

Connect the Modbus network between the Procon Mini M2M and the A1M(s).

Important notes:

- ***A must be connect to A, B to B and GND to GND***
- ***Screened cable must be used***
- ***Each A1M must be addressed***

Step 5:

Switch ON the power supply and check the LED status.

Step 6:

Close the front cover.

Step 7:

Check that the communication with the server is working by logging onto <http://m2m.mitsubishielectric.co.uk> using your login and password. You should have received the login (your Email address) and password when you have registered the M2M (Step 1).

2. Safety precautions

- | |
|--|
| <ul style="list-style-type: none">➤ Before installing the unit, make sure you read all the “Safety precautions”➤ The “Safety precautions” provide very important points regarding safety. Make sure you follow them |
|--|

Symbols used in the text

Warning:

Describes precautions that should be observed to prevent danger of injury or death to the user.

Caution:

Describes precautions that should be observed to prevent damage to the unit.

- | |
|---|
| <p> Warning:
Carefully read the labels affixed to the main unit</p> |
|---|

Warning:

- **Ask the dealer or an authorised technician to install the unit**
 - Improper installation by the user may result in water leakage, electric shock, or fire
- **Use the specified cables for wiring. Make the connections securely so that any outside forces acting on the cables are not applied to the terminals**
 - Inadequate connection and fastening may generate heat and cause a fire
- **Never repair the unit. If the controller must be repaired, consult the dealer**
 - If the unit is repaired improperly, electric shock, or fire may result
- **When handling this product, always wear protective equipment. EG: Gloves, full arm protection and safety glasses**
 - Improper handling may result in injury
- **Have all electric work done by a licensed electrician according to "Electric Facility Engineering Standard", "Interior Wire Regulations" and the instructions given in this manual and always use a special circuit**
 - If the power source capacity is inadequate or electric work is performed improperly, electric shock and fire may result
- **Keep the electric parts away from any water - washing water etc...**
 - Contact may result in electric shock, fire or smoke
- **Do not reconstruct or change the settings of the protection devices**
 - If the protection device is shorted or operated forcibly, or parts other than those specified by Mitsubishi Electric are used, fire or explosion may result
- **To dispose of this product, consult your dealer**

Caution:

- **Ground the unit**
 - Do not connect the ground wire to gas or water pipes, lightning rods, or telephone ground lines. Improper grounding may result in electric shock
- **Install the power cable so that tension is not applied to the cable**
 - Tension may cause the cable to break and generate heat which may, in turn, cause fire
- **Install a leak circuit breaker, as required**
 - If a leak circuit breaker is not installed, electric shock may result
- **Use power line cables of sufficient current carrying capacity and rating**
 - Cables that are too small may leak, generate heat, and cause a fire
- **Use only a circuit breaker and fuse of the specified capacity**
 - A fuse or circuit breaker of a larger capacity or a steel or copper wire may result in a general unit failure or fire
- **Be careful that the installation base is not damaged**
 - If the damage is left uncorrected, the unit may fall and cause personal injury or property damage
- **Safely dispose of the packing materials**
 - Packing materials, such as nails and other metal or wooden parts, may cause stabs or other injuries
 - Tear apart and throw away plastic packaging bags so that children will not play with them - If children play with a plastic bag which has not been torn apart, they face the risk of suffocation

3. Overview

The Procon M2M is an automatic data monitoring, logging, and control device which communicates over the Internet, allowing a user to monitor and control A1M interfaces from anywhere in the world by simply logging onto a web page.

The Procon M2M is connected to the Internet by GPRS using a SIM card. The Procon M2M periodically connects to a web server on the Internet to synchronise its settings with the server, and upload any stored data or configuration changes that may have been specified.

The Procon M2M is supplied with a one year Vodafone SIM card and server contract free of charge.

However after that year, the customer will need to renew the contract.

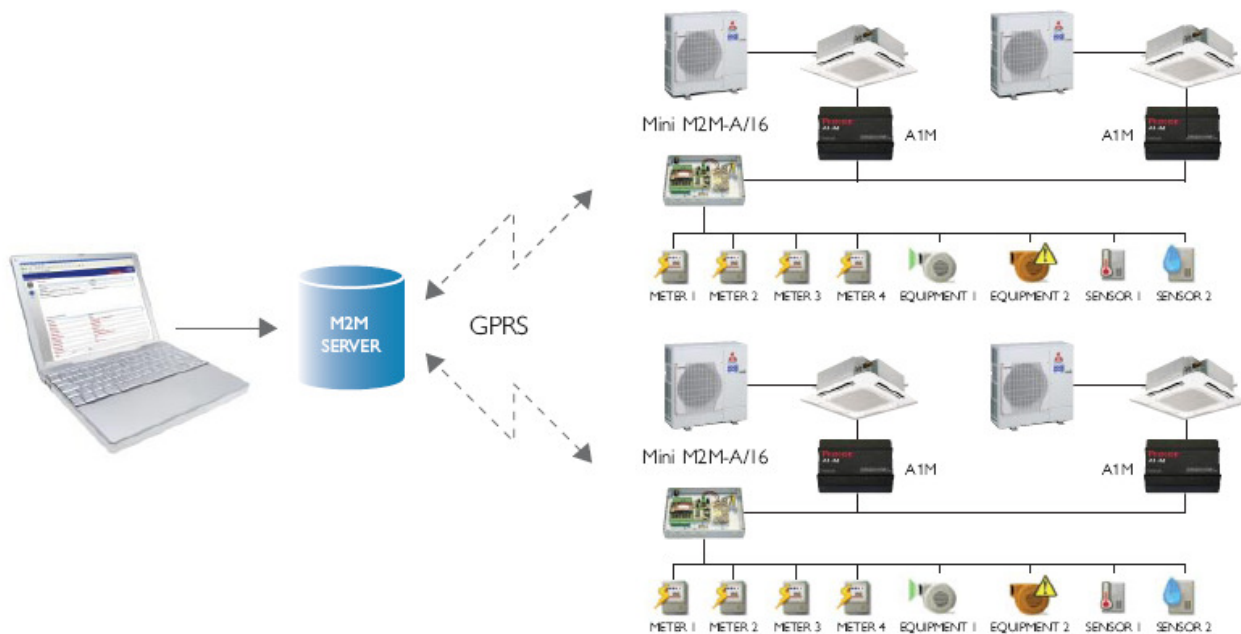


Figure 1 shows the items included with the MINI M2M-A/16.

Figure 2 shows an internal overview.

Figure 3 shows the inside of the unit.

Figure 4 shows the wiring diagram of the unit.

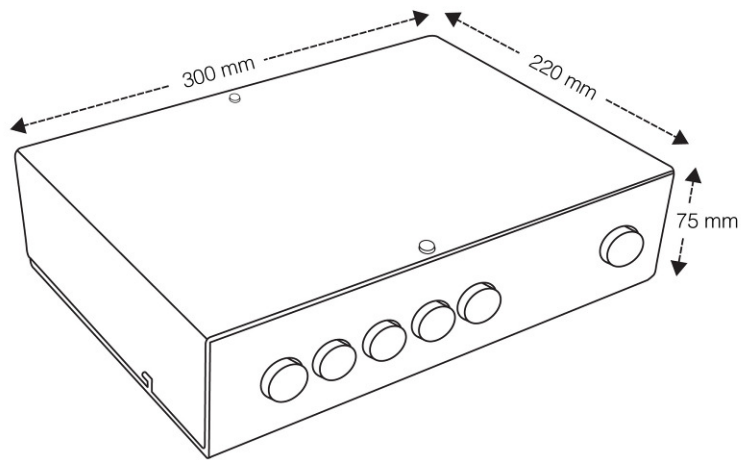
DEMONSTRATION

Visit m2m.mitsubishielectric.co.uk/demo to use the live demonstration space (login: demo / password: demo)

4. Mounting

The Procon M2M should be mounted next to, or near to the building's primary distribution panel. Suitable space should be provided all around the panel for cable conduit and additional equipment.

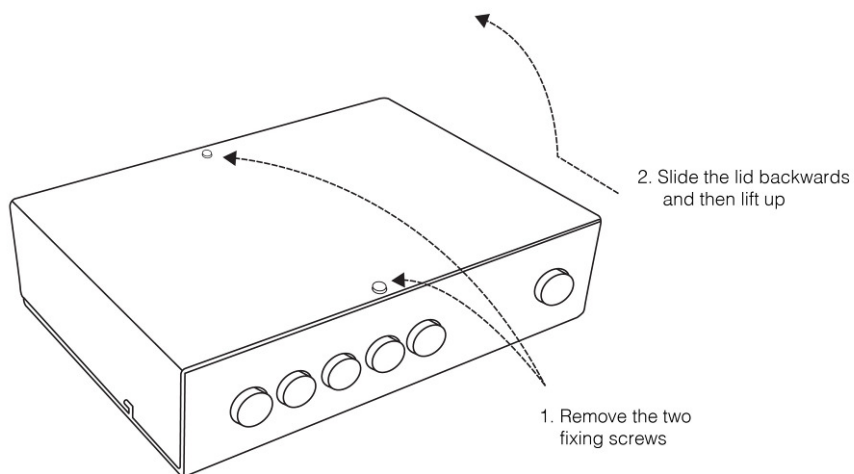
4.1. Enclosure dimensions



Procon MINI M2M dimensions

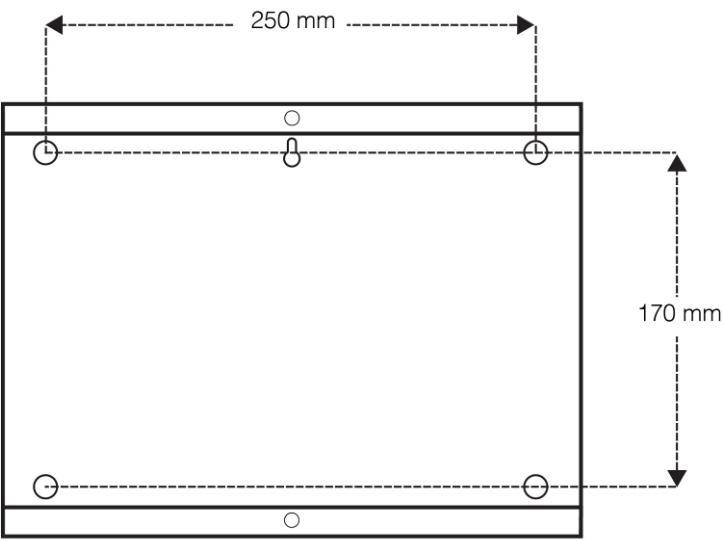
4.2. Removing the enclosure lid

Open the enclosure lid, by removing the two M4 screws on the right hand side of the front face, then open the door (hinged down left hand side).



Procon MINI M2M lid removal

4.3. Mounting points



Procon MINI M2M mounting points

Note: Appropriate wall fixings must be used

5. Connections

The Procon M2M provides continuous remote monitoring of its 8 inputs, and remote modification of its 4 outputs along with functions attached to the A1M interfaces.

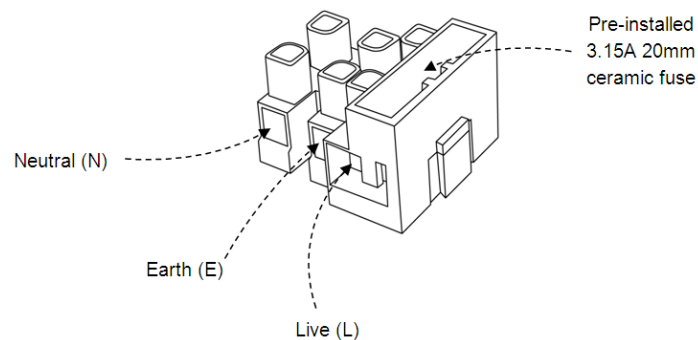
5.1. Power

A double pole (Live and Neutral) 5A switch or circuit breaker must be provided in line with the supply to the Procon M2M and be in close proximity to it. It must be clearly marked as the disconnecting device for the Procon M2M.

The construction of the connections of the conductors should be such that, if the cord were to slip in its anchorage, the protective earth conductor would be the last to take the strain.

Ensure the mains cable supplying the Procon M2M is suitably rated for the intended environment and current draw of the Procon M2M.

Connect Live (L), Neutral (N) and Earth (E) to the terminal block located in the bottom right hand corner of the Procon M2M enclosure, as indicated below.



Mains terminal block connection

5.2. Inputs

The Procon M2M provides 8 analogue inputs, each with 12-bit resolution, and can be configured via the M2M website to specify the type of input, and assign it a name. You can also specify a unit of measure, converting from base units, such as resistance, to measured units, such as °C.

The M2M website can also be used to set alarm set points on any input, or log the readings from any input.

5.3. Outputs

The Procon M2M also provides four power switched outputs with status LED.

5.4. A1M interfacing

The Procon M2M can monitor and control up to 16 splits indoor units using an A1M per indoor unit.

The variables available are listed below:

FUNCTION	NETWORK VARIABLE	NOTES
Control		
	On/Off	Run/Stop
	Mode Operation	Cool / Dry / Heat / Auto / Fan
	Setpoint Adjustment	Cooling 19-30°C Heating 17-28°C Auto 19-28°C
	Fan Speed Control	Lo-M11-M12-Hi
	Time Zone	Weekly scheduling available
Monitor		
	On/Off	Run/Stop
	Mode Operation	Cool / Dry / Heat / Auto / Fan
	Setpoint Adjustment	Cooling 19-30°C Heating 17-28°C Auto 19-28°C
	Fan Speed Control	Lo-M11-M12-Hi
	Fault Code	4 Character code – Indicates all unit alarms
	Room Temperature	-
	Time Zone	Weekly scheduling available

5.5. Sounder

The Procon M2M includes an internal audible sounder, which can be used to alert the operator to particular conditions.

6. Size and weight

The Procon M2M details are:

- Height 400mm
- Width 220mm
- Depth 75mm
- Weight 4.4Kg

7. Getting started

7.1. Unpacking

The Procon M2M is supplied with the following components:

- Procon M2M unit including a 24V 1.1A power supply
- Procon A1M (one)
- Procon A1M manual
- The Vodafone SIM card (already fitted on the Procon M2M)
- This manual

Please contact your supplier if any of these components are missing.

7.2. Before switching ON

Before switching the unit ON, the Procon M2M must be registered onto the M2M server.

To complete the registration, go to <http://m2m.mitsubishielectric.co.uk/commissioning>

Please enter your contractor code, if you do not have a code please contact the Site Services Department on 0161 866 6089.

For more details, refer to **Registering the M2M interface online** section.



7.3. Status indicators

After applying power to the Procon M2M it will attempt to connect to the Procon M2M server, the status indicators show the progress of the connection as follows:

Indicator	Description
Signal	Indicates whether the Procon M2M can obtain a GPRS connection On constantly – The Procon M2M has sufficient signal for GPRS connection Off – There is insufficient signal Fast flash – Indicates an error communicating with the modem, or a PIN number error on the SIM card
Online	Indicates whether the Procon M2M is connected to the internet On constantly – Procon M2M is connected to the internet Off – Procon M2M is not connected to the internet Slow flash – Procon M2M is trying to connect the internet Fast flash – Procon M2M has failed to connect to the internet
Server	Indicates communications with the server Slow flash – Procon M2M is connecting with the server Irregular flash – Procon M2M is transferring data to/from the Procon M2M server Fast flash – Procon M2M is not able to connect to the server, it will retry

7.4. SIM card data usage (6Mb per month included with the Vodafone SIM card)

The Vodafone SIM card supplied with the Procon M2M includes 6Mb of data per month. If the amount of GPRS data exceeds 6Mb per month the contract will terminate earlier.

Any text messages sent from the Procon M2M are not included in the contract and will be charged separately.

The amount of GPRS data each Procon M2M sends is affected by the snapshot logging period, the number of inputs and output being logged, and the server sync interval.

You can monitor your data usage from the Statistics page on the Web Portal for each Procon M2M unit.

Below is a recommendation:

- Deactivate the I/O you may not need to monitor for instance
 - o Prohibit
 - o Air Direction
 - o Etc...

The M2M contract runs for a year but after that, the M2M contract must be renewed at a cost of £175 per year (subject to change) and per Procon M2M.

Refer to **M2M Renewal and Data Storage Update** section for more details.

7.5. Server data usage (15Mb included)

All the data is logged to the M2M server (<http://m2m.mitsubishielectric.co.uk>).

The M2M contract includes 15Mb worth of storage space on the server.

When the server data storage runs out, an Email will be sent out to the registered user(s) and the Procon M2M will be "suspended". There is an option of deleting old data to stop the Procon M2M from being suspended.

The M2M server data storage can be upgraded to 115Mb at a cost of £150 per year (subject to change) per Procon M2M.

Refer to **M2M Renewal and Data Storage Update** section for more details.

8. Registering the Procon M2M interface online

The Procon M2M interface will not work until it has been registered as the Vodafone SIM card is deactivated as standard. The online registration will activate the SIM card within 3 working days.

8.1. Link to the online registration

To complete the registration, go to <http://m2m.mitsubishielectric.co.uk/commissioning>

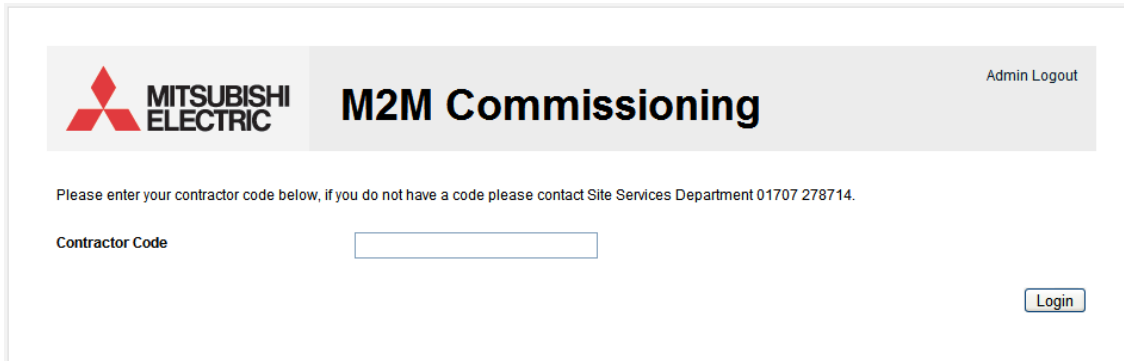


8.2. Online registration, step 1- Contractor code

Enter your contractor code, if you do not have a code please contact Site Services Department 0161 866 6089.

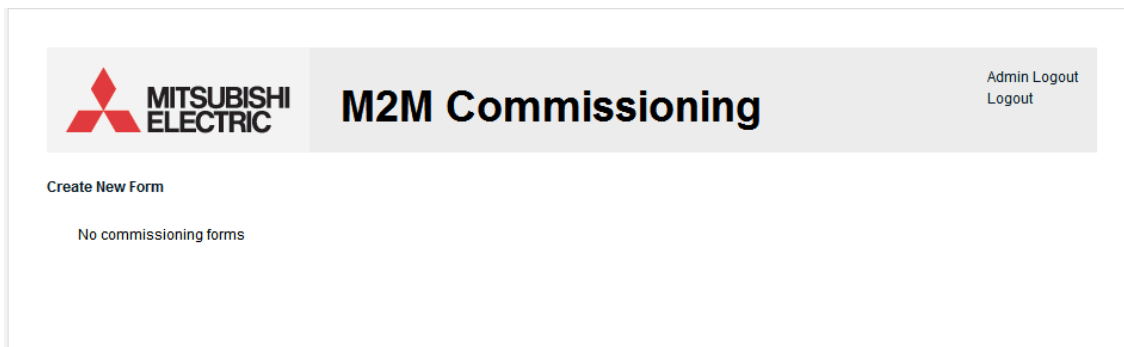
The contractor code can be used for any other Procon M2M installation.

Enter the contractor code and select *Login*.



8.3. Online registration, step 2 – Create new form


Select *Create New Form*



8.4. Online registration, step 3 – Enter serial number

Enter the M2M serial number and select the Sales Office you bought the unit from.

Click *Next*.

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M2M Commissioning

Admin Logout
Logout


M2M Details

Serial Number

Sales Office

8.5. Online registration, step 4 – Enter address

Enter the site address and click *Next*.

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M2M Commissioning

Admin Logout
Logout

Client Details

Client company name

Site name

Other site name

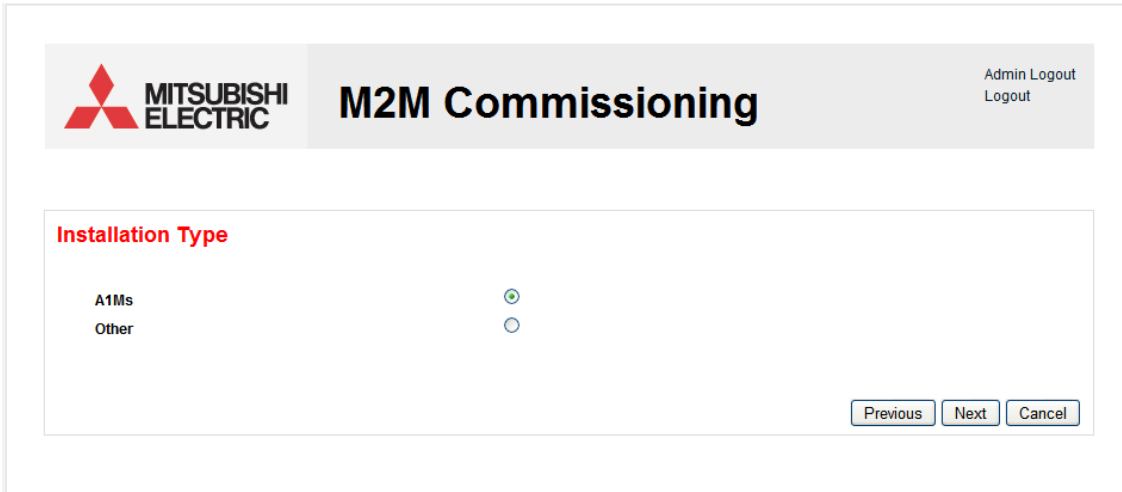
Installation address

Installation postcode

8.6. Online registration, step 5 – Setup the A1Ms

Select A1Ms.

Click *Next*.



MITSUBISHI ELECTRIC M2M Commissioning Admin Logout Logout

Installation Type

A1Ms

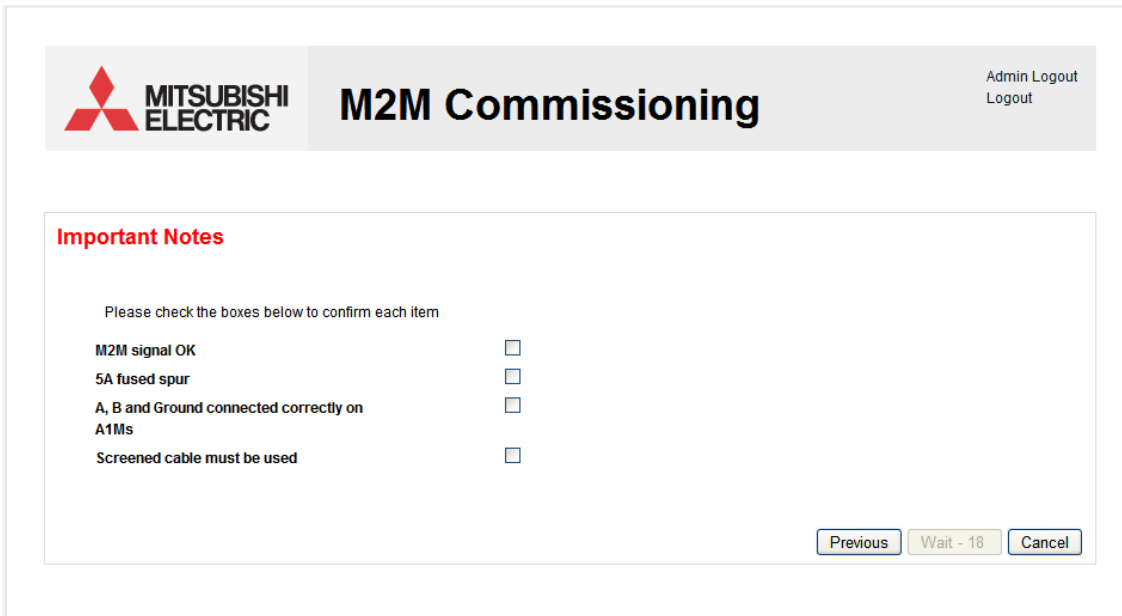
Other

Previous Next Cancel

8.7. Online registration, step 6 – Important notes

Confirm each important note.

Click *Next*.



MITSUBISHI ELECTRIC M2M Commissioning Admin Logout Logout

Important Notes

Please check the boxes below to confirm each item

M2M signal OK

5A fused spur


A, B and Ground connected correctly on A1Ms

Screened cable must be used

Previous Wait - 18 Cancel

8.8. Online registration, step 7 – A1Ms Grouping

Enter each group. Select *Add* to add group and *Remove* to delete a group. Click *Next*.




M2M Commissioning

Admin Logout
Logout

A1M Groups

Number	Name	
1	Meeting Room	
2	Office	Remove
3	<input type="text"/>	Add



Address: Positions 1 to 5 set address in binary from 1 to 31.
Example: 1 and 4 ON = 1 + 8 = Address 9


Baud rate: See user manual for full list.
Default 9600 bps: (6 ON, 7 ON, 8 OFF)

RS-485 termination: J1 - A-B Termination

IMPORTANT NOTE: RS485 is polarised and must have a common ground.

8.9. Online registration, step 8 – Email addresses

Enter Email addresses. Make sure that they are correct as the password will be sent to them and select *Next*.



M2M Commissioning

Admin Logout
Logout

Users

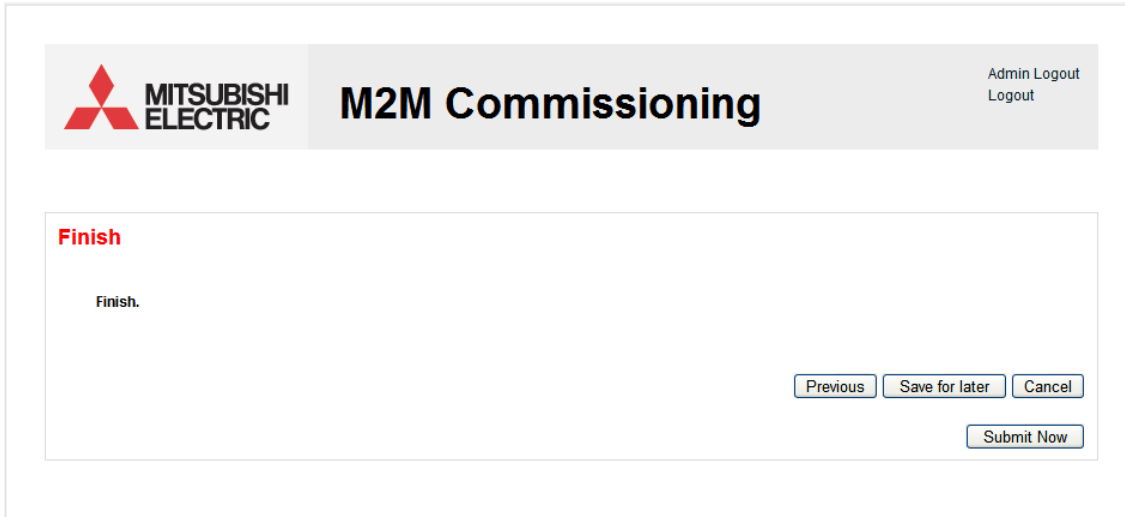
Enter at least one user email address to create portal accounts. Passwords will be automatically generated and emailed to the user.

User 1 Email Address	<input type="text" value="m2m@meuk.mee.com"/>
User 2 Email Address	<input type="text"/>
User 3 Email Address	<input type="text"/>
User 4 Email Address	<input type="text"/>
User 5 Email Address	<input type="text"/>

8.10. Online registration, step 9 – Submit

The registration is completed. You can save it for later or submit it.

Click on *Submit Now* to submit the form to Mitsubishi Electric automatically.

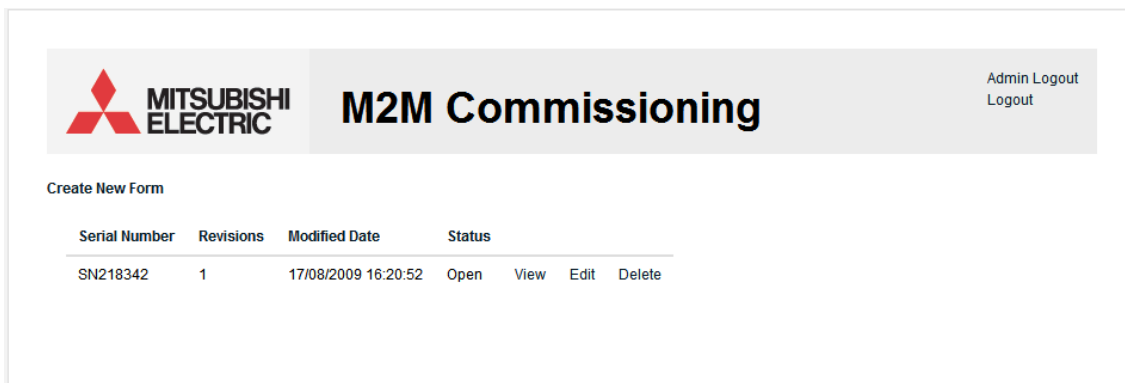


The screenshot shows the 'Finish' step of the M2M Commissioning process. At the top left is the Mitsubishi Electric logo. The main header reads 'M2M Commissioning'. In the top right corner, there are links for 'Admin Logout' and 'Logout'. The main content area contains the word 'Finish' in red, followed by the text 'Finish.' Below this, there are four buttons: 'Previous', 'Save for later', 'Cancel', and 'Submit Now'.

8.11. Online registration, list of sites

If you select Save for later, you will then see a list of all the forms submitted but also saved.

You can also View, Edit and Delete each form.



The screenshot shows the 'List of sites' screen. At the top left is the Mitsubishi Electric logo. The main header reads 'M2M Commissioning'. In the top right corner, there are links for 'Admin Logout' and 'Logout'. Below the header, there is a link for 'Create New Form'. A table lists the submitted forms with columns for 'Serial Number', 'Revisions', 'Modified Date', and 'Status'. The table contains one row with the following data:

Serial Number	Revisions	Modified Date	Status
SN218342	1	17/08/2009 16:20:52	Open

Below the table, there are links for 'View', 'Edit', and 'Delete' for each form.

If you submit a form and later realise it is not correct, submit another form with the same M2M serial number.

9. Installation

9.1. Selecting an installation site

- Avoid locations with poor mobile phone signal
- Avoid locations in direct sunlight
- Avoid locations exposed to steam or oil vapour
- Avoid locations where combustible gas may leak, settle or be generated
- Avoid installation near machines emitting high-frequency waves
- Avoid places where acidic solutions are frequently handled
- Avoid places where sulphur-based or other sprays are frequently used
- Avoid areas of high humidity
- Install inside the building
- Install near the connected indoor units

9.2. Installation

9.2.1. Physical unit installation

Please secure the Procon M2M before powering the unit on.

9.2.2. Power supply

⚠ Warning:

Electrical work should be done by qualified electrical engineer / electrician in accordance with "Engineering Standards for Electrical Installation" and supplied installation manuals. Dedicated circuits should also be used. If the power circuit lacks capacity or has an installation failure, it may cause a risk of electric shock or fire.

The Procon M2M comes with a power supply which requires 240VAC.

⚠ Caution:

Do not use anything other than the correct capacity breaker and fuse. Using fuse, wire or copper wire with too large capacity may cause a risk of malfunction or fire.

- Be sure to take power from the special branch circuit
- Install the unit to prevent any of the control circuit cables coming into direct contact with power cables
- Ensure that there is no slack on all wire connections
- Never connect the power cable to leads for the transmission cables. This will damage the transmission cables

10. Communications between Procon M2M and M2M server

This chapter describes how to communicate with Procon M2M using GPRS along with information about the LED indicators.

The Procon M2M is provided with a GPRS modem, which works in conjunction with a suitable SIM card to provide a wireless connection to the Internet for uploading data and downloading configuration settings.

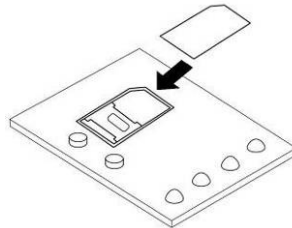
To install the GPRS SIM card follow the instructions below.

10.1. Fitting a SIM card

This section only applies when you are not using the Vodafone SIM card already fitted.

Before using Procon M2M, a valid SIM card with GPRS capability must be installed. To do this:

- Ensure the power to the unit is switched off
- Remove the two screws on the front of the casing
- Slide the SIM card into the SIM holder with the contacts facing down and the bevel edge facing away from the Modem.



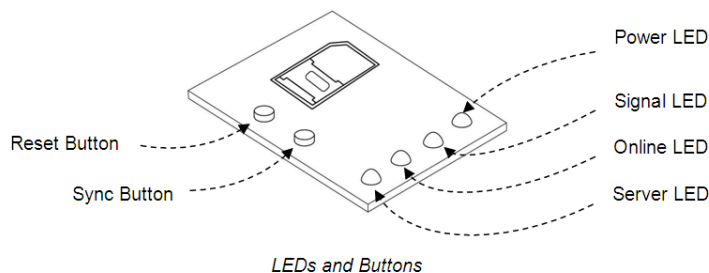
Ensure the Antenna is screwed tightly to the Antenna connector at the top of the enclosure.

The antenna should be located on a metal surface, as the antenna has a magnetic base.

The most suitable location for the antenna can be discovered by checking the antenna signal strength via the Procon M2M Commissioning Software. Refer to **M2M commissioning software** section for more details.

10.2. Initial power ON

Once the SIM card has been installed, apply power to the unit.



The Power indicator will light up and the unit will beep twice to indicate that it has started.

When power is first applied, providing Procon M2M has been set up for the SIM card installed, Procon M2M will attempt to connect to the GPRS network and will then connect to the Procon M2M server to update settings.

10.3. To select a mobile network (As standard set to Vodafone)

Each mobile network has unique GPRS settings, and the Procon M2M is set as default to work with the supplied Vodafone SIM card however the Procon M2M can be set to the other networks before it can connect to the internet.

Configuration for O2, T-Mobile, Vodafone or Orange UK contract SIM cards can be performed using the push buttons on the front panel.

- Push and hold the **Reset** button for five seconds.

The **Power** indicator will flash to indicate that Procon M2M is in mobile network setting mode.

The **Signal**, **Online**, and **Server** indicators are illuminated to indicate the current network setting as follows:

Setting	Signal	Online	Server
O2	ON	OFF	OFF
T-Mobile	ON	ON	OFF
Vodafone	OFF	OFF	ON
Orange	OFF	ON	OFF

- Press the **Reset** button briefly to step through each of the network options until the indicators corresponding to the network you want to use are illuminated.
- Press and hold the **Reset** button for two seconds to save your selection.

The indicators will flash to indicate that your selection has been saved.

Alternatively, press the **Sync** button at any time to exit from mobile network setting mode without changing the original settings.

For other networks Procon M2M must be configured from either the Procon M2M Commissioning Software application via a PC connected to the RS-232 port.

10.4. Status LEDs

After applying power to the Procon M2M it will attempt to connect to the Procon M2M server, the status indicators show the progress of the connection as follows:

Indicator	Description
Signal	Indicates whether the Procon M2M can obtain a GPRS connection On constantly – The Procon M2M has sufficient signal for GPRS connection Off – There is insufficient signal Fast flash – Indicates an error communicating with the modem, or a PIN number error on the SIM card
Online	Indicates whether the Procon M2M is connected to the internet On constantly – Procon M2M is connected to the internet Off – Procon M2M is not connected to the internet Slow flash – Procon M2M is trying to connect the internet Fast flash – Procon M2M has failed to connect to the internet
Server	Indicates communications with the server Slow flash – Procon M2M is connecting with the server Irregular flash – Procon M2M is transferring data to/from the Procon M2M server Fast flash – Procon M2M is not able to connect to the server, it will retry

11. Connecting the inputs and outputs

This chapter gives information about connecting to the analogue and digital inputs and outputs provided on the Procon M2M.

11.1. Overview

The Procon M2M provides the following inputs and outputs (I/Os):

11.1.1. 8 x Configurable inputs (12bit resolution)

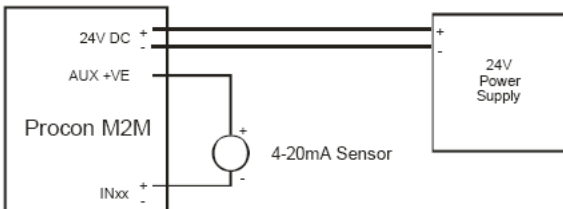
All 8 inputs can be configured to measure 0-25mA, 0-10V or resistance analogue input circuits or can measure volt free digital inputs. Configuration is via the web portal.

11.1.2. 4 x switched power outputs

These are digital outputs.

11.2. Configurable inputs (IN01 to IN08)

11.2.1. Current inputs



To connect a 4-20mA sensor requiring loop power:

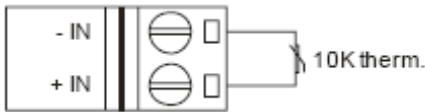
- Connect the positive (+) terminal on the sensor to the 24V DC positive supply
- Connect the negative (-)/signal terminal on the sensor to the required positive (+) analogue input terminal on Procon M2M (e.g. IN01+)

The negative input terminal (e.g. IN01-) does not need to be connected as the negative connections are internally connected to the negative supply.

11.2.2. Voltage inputs



11.2.3. Resistance inputs

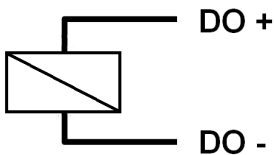


11.2.4. Digital inputs



11.3. Outputs

11.3.1. Switched power outputs (DO01...DO04)



11.4. Connecting expansion modules

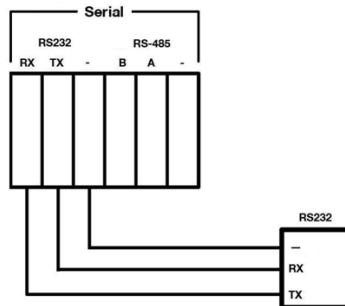
The Procon M2M has two different serial interface types, which can be utilised to expand the Procon M2M system. These interfaces allow Procon M2M to connect to 3rd party devices which support the Modbus RTU protocol.

Modbus RTU communications is achieved via either the RS-485 or RS-232 ports. Procon M2M (as standard) can only use either RS-232 or RS-485, not both together.

RS-485 is a multi-drop bus architecture which allows up to 30 different devices to be connected to the same port. RS-232 on the other hand is a one-to-one interface, allowing only one device to be connected to the same port.

11.4.1. RS-232

RS-232 is direct one-to-one interface, and connections should not exceed 5m from the Procon M2M.

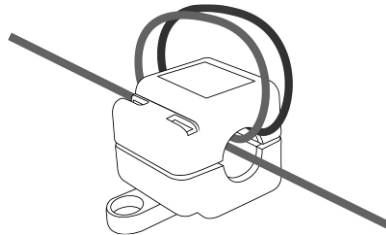


RS-232 Wiring Diagram

To power the RS-232 device, the Procon M2M can be used to provide +24VDC and Ground from the AUX output connections.

Ensure the current draw of the device does not result in the PSU exceeding its maximum current rating (See the Technical Specification at the rear of this manual).

If an external power source is used to power the device ensure that Procon M2M and the device have a shared ground connection (the RS-232 '-' terminal can be used for this).



⚠ Caution:

To maintain appropriate EMC class levels all RS-232 connections must be installed with a ferrite core (Wuerth 7427151). The cable must pass through the ferrite 3 times, and the ferrite must be located inside of the Procon M2M enclosure.

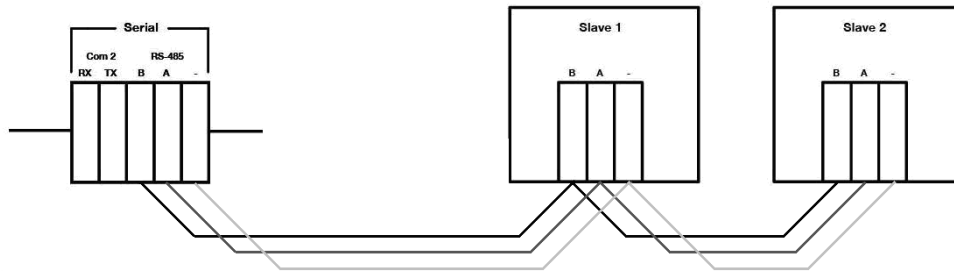
⚠ Caution:

Use only shielded cables for connecting the RS-232 device to reduce the possibility of interference with radio communications services. Using shielded cables ensures that you maintain the appropriate EMC classification for the intended environment.

Screw terminals are provided next to each I/O port with a direct connection to Earth.

11.4.2. RS-485

An RS-485 Modbus bus is a multi-drop bus architecture, which is wired in a daisy chain configuration. The bus should not extend further than 1200m from the Procon M2M.

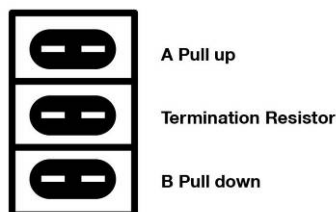


⚠ Caution:

Use only shielded twisted-pair cables for connecting the RS-485 network to reduce the possibility of interference with radio communications services. Using shielded cables ensures that you maintain the appropriate EMC classification for the intended environment.

Screw terminals are provided next to each I/O port with a direct connection to Earth.

Depending upon the application and the equipment connected to the Procon M2M, termination and/or pull up/down resistors will be required. The Procon M2M has built in jumper selectable termination and pull up/down resistors.



To power the RS-485 devices, the Procon M2M can be used to provide +24VDC and Ground from the AUX output connections. Ensure the current draw of the device does not result in the PSU exceeding its maximum current rating (See the Technical Specification at the rear of this manual).

If an external power source is used to power the device ensure that the Procon M2M and the device have a shared ground connection (the RS-485 '-' terminal can be used for this).

12. Configuring the inputs and outputs

This chapter describes the configuration options for the inputs and outputs.

12.1. Inputs

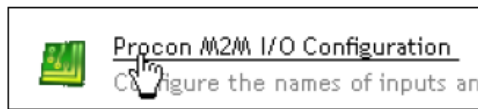
To configure the function of an input you need to perform three steps:

- Set the jumper to the appropriate position on the Procon M2M circuit board
- Specify the status of the input on the M2M website
- Specify the units of measure, and optionally define a response characteristic

12.2. Changing the web site configuration

After changing a jumper on the Procon M2M circuit board you need to change the configuration of the same input on the M2M website to reflect the change.

- Connect to <http://m2m.mitsubishielectric.co.uk/> and log in to the M2M website using the Engineering Portal level
- Select the appropriate site, and the Procon M2M on the site, to display the Procon M2M status page
- On the toolbar click *Settings* and then select *Procon M2M I/O Configuration* from the settings page



The Change I/O Configuration page will be displayed:

Analogue Input	Logging			Low Setpoint	High Setpoint	Device
	None	Display Only	Log & Display			
EXT004: City Multi G50 Group 1 - Inlet Temperature (°C)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	-	-	G50 Controller - Group 1[1]
EXT012: City Multi G50 Group 2 - Inlet Temperature (°C)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	-	-	G50 Controller - Group 2[2]
EXT023: Ventilation	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	-	-	G50 Controller - Group 1[1]
EXT030: Ventilation	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	-	-	G50 Controller - Group 2[2]
EXT039: Inlet Temperature (°C)	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	-	-	Lossnay[10]
EXT040: Ventilation	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	-	-	Lossnay[10]
FRQ1: Frequency Input 1 (Hz)	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	-	-	
FRQ2: Frequency Input 2 (Hz)	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	-	-	
FRQ3: Frequency Input 3 (Hz)	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	-	-	
FRQ4: Frequency Input 4 (Hz)	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	-	-	
IN01: Controls Room Temperature (°C)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	-	-	
IN04: Classroom CO2 Level (ppm CO2)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	-	-	
IN05: Configurable Input 5 (V)	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	-	-	
IN06: Configurable Input 6 (V)	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	-	-	
IN07: Configurable Input 7 (V)	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	-	-	
IN08: Configurable Input 8 (V)	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	-	-	
IN09: Configurable Input 9 (V)	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	-	-	
IN10: Configurable Input 10 (V)	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	-	-	
IN11: Configurable Input 11 (V)	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	-	-	

Click the input you want to configure; e.g. IN05.

The Change I/O Configuration page then allows you to specify information about the input.

- Enter a descriptive name for the input in the Friendly name field; e.g. Room temperature
- Specify the jumper setting on the I/O type drop-down menu

The screenshot displays the Mitsubishi Electric web interface for configuring an input. The header shows the user is logged in as 'Internet Demo Login' with the status 'Basic User' and the time '10:13:26 am'. The navigation menu on the left includes options like 'Hatfield Demo Site', 'Demo Internet Site', 'Maxi M2M - Demo', 'Reports', 'Views', 'Users', 'Contacts', 'UOMs', 'Dashboards', and 'Downloads'. The main content area is titled 'EDIT IN05' and features a blue header with 'IN05'. The configuration form includes the following fields:

- Tag:** IN05 (Analogue Input)
- Friendly name:** Room Temperature
- I/O type:** 10K thermistor input[Ohms]
- UOM:** Default resistance[Ohms]

Below the form, there are two sections for setpoints:

- Low setpoint:** Use low setpoint?
- High setpoint:** Use high setpoint?

At the bottom of the form, there are two buttons: 'Save changes' and 'Cancel'. The footer of the page contains links for 'change password', 'help', 'contact us', and 'log out'.

The Unit of Measure drop-down menu will show the default unit of measurement for the I/O type you have specified.

For information about defining a new unit of measure refer to **Defining units of measure (UOM)**.

- Click the *Save changes* button to save the definition of the input.

The Change I/O Configuration page will be displayed showing the new definition for the input.

- Select the logging type in the Logging column to turn on logging for the input you have defined:

Logging can be:

- None
- Display Only
- Log & Display
- Log Only

The screenshot shows the 'MAXI M2M - DEMO I/O CONFIGURATION' page. The table below represents the data shown in the screenshot:

Analogue Input	Logging				Low Setpoint	High Setpoint	Device
	None	Display Only	Log & Display	Log Only			
EXT004: City Multi G50 Group 1 - Inlet Temperature (°C)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	-	-	G50 Controller - Group 1[1]
EXT012: City Multi G50 Group 2 - Inlet Temperature (°C)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	-	-	G50 Controller - Group 2[2]
EXT023: Ventilation	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	-	-	G50 Controller - Group 1[1]
EXT030: Ventilation	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	-	-	G50 Controller - Group 2[2]
EXT039: Inlet Temperature (°C)	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	-	-	Lossnay[10]
EXT040: Ventilation	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	-	-	Lossnay[10]
FRQ1: Frequency Input 1 (Hz)	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	-	-	
FRQ2: Frequency Input 2 (Hz)	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	-	-	
FRQ3: Frequency Input 3 (Hz)	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	-	-	
FRQ4: Frequency Input 4 (Hz)	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	-	-	
IN01: Controls Room Temperature (°C)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	-	-	
IN04: Classroom CO2 Level (ppm CO2)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	-	-	
IN05: Room Temperature (°C)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	-	-	
IN06: Configurable Input 6 (V)	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	-	-	
IN07: Configurable Input 7 (V)	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	-	-	
IN08: Configurable Input 8 (V)	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	-	-	
IN09: Configurable Input 9 (V)	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	-	-	
IN10: Configurable Input 10 (V)	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	-	-	
IN11: Configurable Input 11 (V)	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	-	-	

Click the *Save configuration* button at the bottom of the page to save this change.

The value of the input you have selected will automatically be uploaded to the server at the next expected log-in defined on the Status page, but you can force an immediate update:

- Press the Sync button on the Procon M2M

This will download the new status of the input to the Procon M2M to start logging data for the input. Once the connection has completed:

- Press the Sync button again

This will upload the logged data to the Procon M2M server, so that it is available on the M2M website

The Status page will show the value of the input you have specified:

MITSUBISHI ELECTRIC
AIR CONDITIONING SYSTEMS

username: Internet Demo Login status: Basic User time: 10:24:24 am

Navigation: Status, Events, Tasks, Stats, Settings

Maxi M2M - Demo

STATUS

Periodic logging: Enabled.
 Last logged in: 20/08/2009 10:18:49
 Next expected login: 20/08/2009 10:33:49 (00:09:34 remaining)
 Direct Status: IDLE

Snapshot: 20/08/2009 10:16:38

Inputs Outputs External

		Low Setpoint	High Setpoint
Analogue Inputs			
[EXT004]	City Multi G50 Group 1 - Inlet Temperature	17.0°C	-
[EXT012]	City Multi G50 Group 2 - Inlet Temperature	17.0°C	-
[EXT023]	Ventilation	2	-
[EXT030]	Ventilation	2	-
[FRO1]	Frequency Input 1	0.00Hz	-
[IN01]	Controls Room Temperature	21.99°C	-
[IN04]	Classroom CO2 Level	20ppm CO2	-
Analogue Outputs			
[EXT005]	City Multi G50 Group 1 - Mode	5	-
[EXT006]	City Multi G50 Group 1 - Temperature Setpoint	21°C	-
[EXT007]	City Multi G50 Group 1 - Air Direction	3	-
[EXT008]	City Multi G50 Group 1 - Fan Speed	0	-
[EXT013]	City Multi G50 Group 2 - Mode	0	-
[EXT014]	City Multi G50 Group 2 - Temperature Setpoint	21°C	-
[EXT015]	City Multi G50 Group 2 - Air Direction	0	-

change password help contact us log out

- Repeat the previous process for any other inputs you want to configure

12.3. Defining units of measure (UOM)

The M2M website allows you to define one or more units of measure which convert from base units, such as resistance, to measured units, such as °C.

A simple unit of measure can define a linear relationship, such as 10 pulses = 1kWh. This only requires you to enter two data points defining the straight-line slope.

Alternatively you can enter multiple data points; a curve will be fitted to the points to define the relationship. You can also define a Digital Unit of Measure which simply assigns aliases, such as On and Off, to the High and Low signals.

To define a new analogue UOM

- On the M2M website click *UOMs* in the tree-view

The Unit of Measure page will be displayed listing the analogue and digital UOMs that you have defined:

The screenshot shows the Mitsubishi Electric UOMs management interface. The page title is 'UOMs'. The user is logged in as 'Business Unit Administrator' at 11:39:18 am. The interface includes a sidebar with a navigation tree where 'UOMs' is selected. The main content area displays a table of defined units of measure.

Unit of Measure	Analog / Digital	Edit	Delete
Flow Meter(ltr/min)	Analog	Edit	In use
kWh (100 pulses = 1kWh)(kWh)	Analog	Edit	In use
5 Min kWh Count to Average kW(kW)	Analog	Edit	In use
Mitsubishi Sensor(°C)	Analog	Edit	In use
Epcos Thermistor(°C)	Analog	Edit	In use
ltr (1 pulse = 1ltr)(ltr)	Analog	Edit	In use
Wh (1 pulse = 1Wh)(Wh)	Analog	Edit	In use
Wh/min to W(W)	Analog	Edit	In use
Litres / minute(ltr/min)	Analog	Edit	In use
Flow transducer(l/min)	Analog	Edit	In use
PT100 (Digirail module)(°C)	Analog	Edit	In use
Mitsubishi Sensor 2(°C)	Analog	Edit	Delete
Mitsubishi Sensor 5(°C)	Analog	Edit	In use
Thermistor Suitcase (°C)	Analog	Edit	Delete
Thermistor Suitcase 2(°C)	Analog	Edit	In use
kWh (1 pulse = 1kWh)(kWh)	Analog	Edit	Delete
Iskra (100 pulses = 1 kWh)(kWh)	Analog	Edit	In use
Flow Transducer(20mAmps=375Litres)(l/min)	Analog	Edit	Delete
New Analog UOM			
New Digital UOM			

- Click the New analog UOM link

The Unit of Measure screen allows you to define the Unit of Measure, and enter data to specify the relationship.

- Enter a description for the UOM, the measured units, for example °C, and the base units, which will typically be one of: Volts, Milliamps, Ohms, or Count
- Select Allow inheritance to allow Procon M2M in sub-business units to access this UOM
- In the Out-of-range behaviour section specify the option to be used for values outside the range of UOM data you specify:

Option	Description
Do not store	Will not log data outside the specified range (useful for 4-20mA sensors)
Use nearest gradient	Will extrapolate the specified data to the measured value
Use min/max clipping	Will clip the data to the nearest value in the table

[unnamed]

EDIT [UNNAMED]

UOM description:

Units:

Convert from:

Decimal places:

Allow inheritance?

Out-of-range behaviour: Do not store
 Use nearest gradient
 Use min/max clipping

UOM Data

Data state: Invalid - Not enough data

Data:

No table entries

[change password](#) | [help](#) | [contact us](#) | [log out](#)

- Click the *Save details* button to save the details of the Unit of Measure.

To enter the data values

- On the Units of Measure screen, click the *Edit* link to the right of the unit of measure you want to edit
- On the Unit of Measure screen, in the UOM Data section enter the first values defining a data point, and click the *Add* button to add it to the table:

[unnamed]

EDIT [UNNAMED]

UOM description:

Units:

Convert from:

Decimal places:

Allow inheritance?

Out-of-range behaviour: Do not store
 Use nearest gradient
 Use min/max clipping

UOM Data

Data state: Invalid - Not enough data

Data:

10	1	Delete		
<input type="text"/>	<input type="text"/>		<input type="button" value="Add"/>	

[change password](#) | [help](#) | [contact us](#) | [log out](#)

You must add at least two data points to define a valid UOM. For example, for the simple linear relationship 10 pulses = 1 kWh you also need to add 0 pulses = 0 kWh.

Data state: Valid - UOM is ready for use		
Data:	kWh	
0	0	Delete
10	1	Delete
<input type="text"/>	<input type="text"/>	Add

For a curved characteristic, such as for a thermistor, you should add pairs of values at intervals across the working range:

Data state: Valid - UOM is ready for use		
Data:	Ohms	°C
12500	20	Delete
15720	15	Delete
19920	10	Delete
25440	5	Delete
<input type="text"/>	<input type="text"/>	Add

Points can be concentrated around the expected operating value for increased accuracy in non-linear relationships.

13. M2M commissioning software

The Procon M2M Commissioning Software is a PC application that allows local (onsite) testing and commissioning of the Procon M2M system (and connected devices).

It connects to Procon M2M using a customised RS-232 cable and utilises Procon M2M's GPRS connection to communicate with the Procon M2M server.

13.1. Download

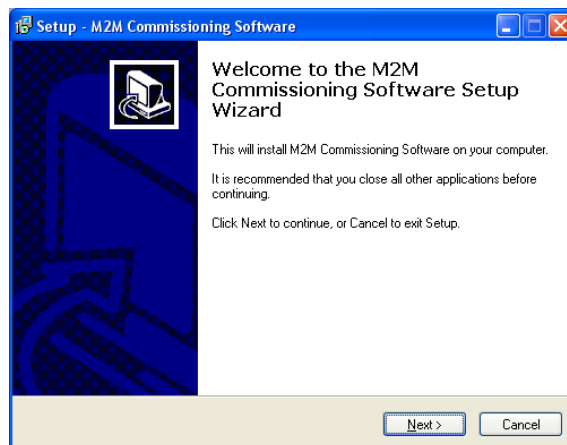
The Procon M2M Commissioning software is available on www.mitsubishi-aircon.co.uk.

Select Tool and Resources, Download and M2M Commissioning Tools.

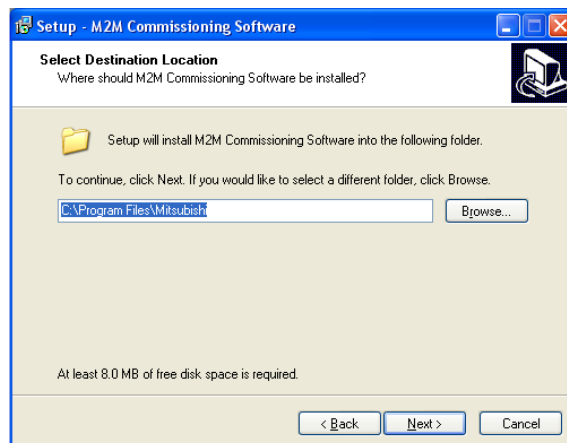
13.2. Installing the Procon M2M Commissioning Software

Once you have downloaded the Procon M2M Commissioning Software installer, please follow the following steps...

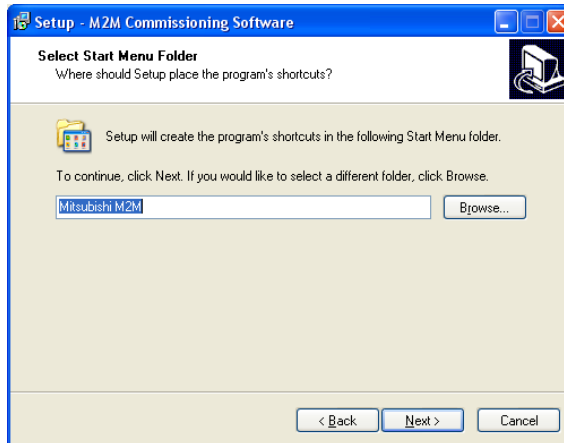
Run the Commissioning Software installer and click "Next>" on the first screen



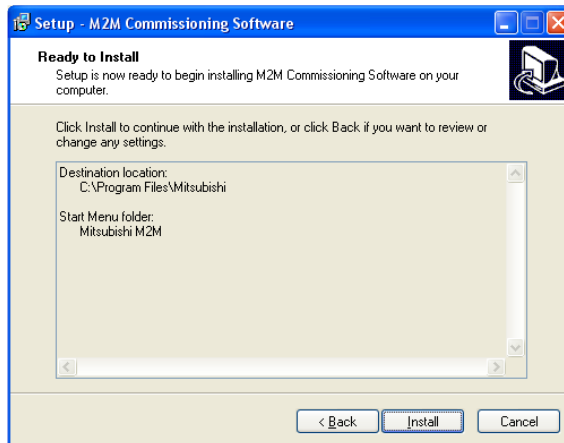
Select where to install the software



Select a Start menu folder



The software is now ready to install, click the "Install" button



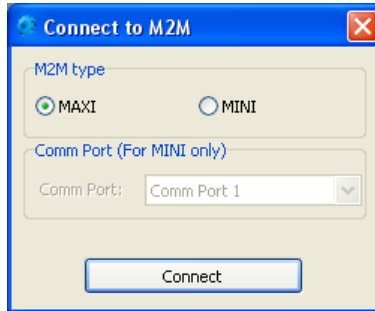
The software installation is complete, click "Finish"



13.3. Using the Procon M2M Commissioning Software

Connect the Procon M2M to the PC with a RS-232 cable. Power the Procon M2M with the Sync button held in. Launch the Commissioning Software from the Start menu.

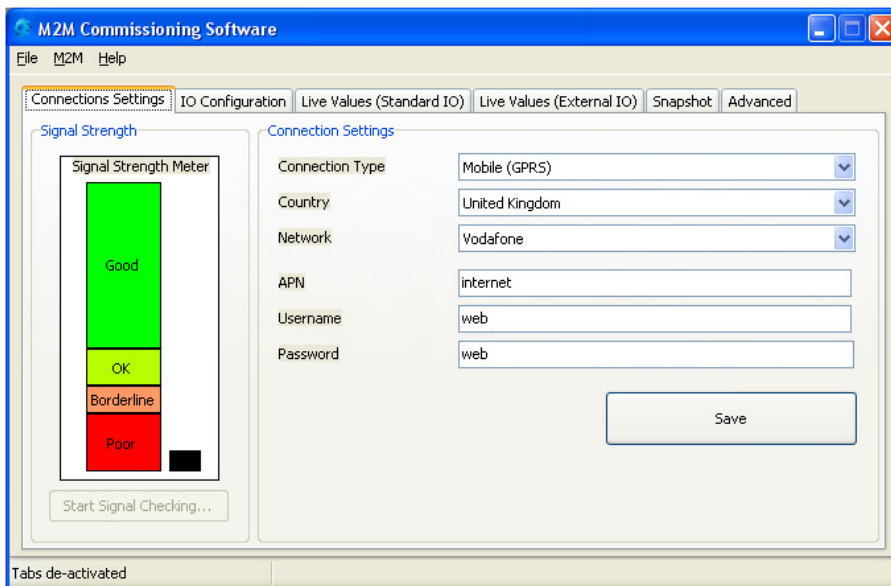
Select MINI as the Procon M2M type and click “Connect”.



13.3.1. Basic Information and Signal Checking

The “Connection Settings” tab allows you to view and update the connection settings for the Procon M2M. Use the drop-down boxes to select the connection type and related settings.

This page also shows a signal strength meter. To test how different antenna positions affect the signal strength click the “Start Signal Checking” button. Now move the antenna and leave in the new position for a few seconds, the signal strength meter will now update with the new signal strength.



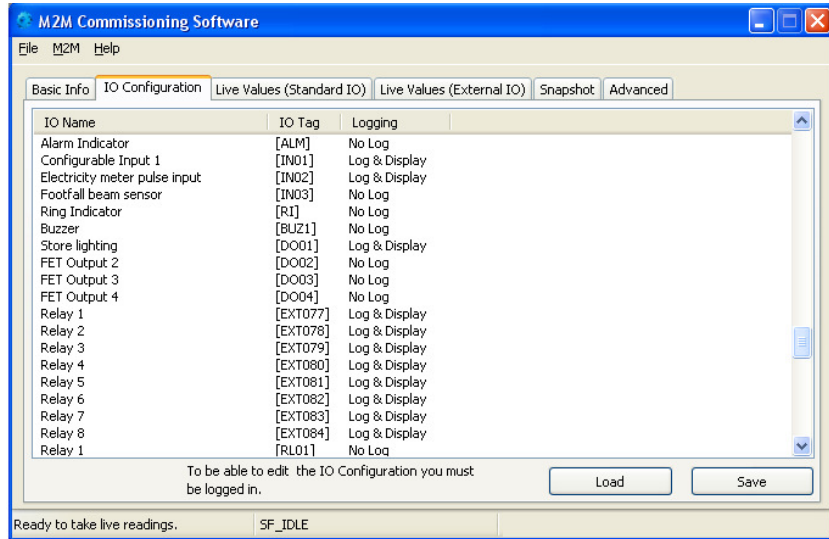
13.3.2. Logging On

Some features require you to login using your Procon M2M portal account. From the menu select M2M > Logon. Enter the email address and password that you use to log on to the Procon M2M portal. If you do not have a login, please contact your provider.

13.3.3. I/O Configuration

The I/O Configuration tab allows you to view the I/O Configuration.

The Load button downloads the I/O Configuration from the server and Save uploads any I/O Configuration changes back to the server.



Double clicking on an I/O brings up a dialog that allows you to change the configuration of an I/O (Only if logged in).

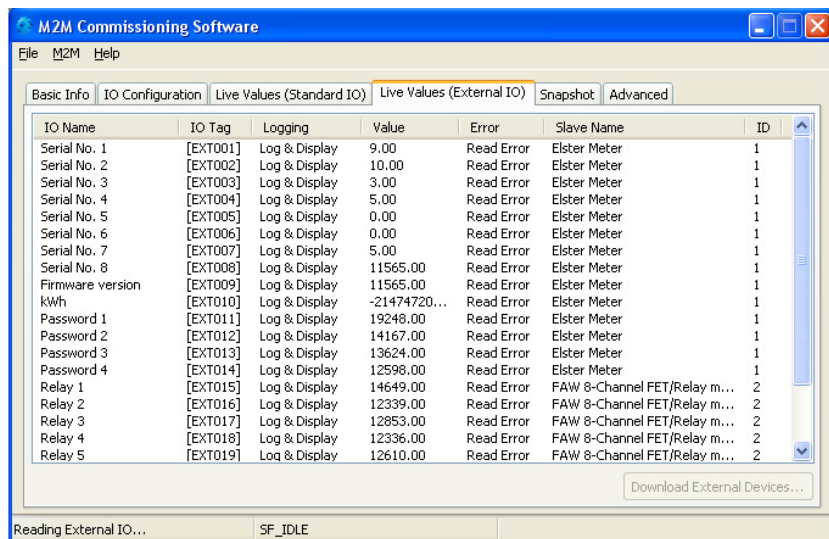
The name, type of I/O (only for configurable I/Os, IN01, IN02 etc.), unit of measure and the logging option can be changed.

Clicking “Save” stores the change locally. To commit the change you need to click “Save” on the I/O Configuration tab in the main dialog.

13.3.4. Live Values (Standard and External)

The Live Values (Standard I/O) and Live Values (External I/O) can show live data from the Procon M2M’s I/Os. For example if you had IN01 configured for a temperature sensor you would be able to see the live temperature value.

The Live Values (External I/O) tab displays some extra information such as the Error, Slave Name and Slave ID. This information can be used to identify any external devices that are not communicating.



14. Serial expansion devices

The Procon M2M can utilise one of the two serial interfaces (RS-232, RS-485) at any one time. For applications which require more than one serial interface please contact Mitsubishi Electric for more information.

14.1. *RS-485 Modbus RTU expansion device*

This section describes the method for connecting RS-485 Modbus RTU devices:

- Isolate the Procon M2M power
- Open the panel as described in the Mounting section
- We recommend adding one Modbus device at a time to your RS-485 network, working through each of the steps below, before moving onto the next device
- Connect the RS-485 Modbus RTU device as per the section Connecting Expansion Modules
- The device's baud rate and parity must be pre-configured to that of the Procon M2M (Default: Baud rate-9600, Parity-None)
- The device should be configured to have a unique ID/Address in the range of 1...247
- The device should now be added to the Procon M2M portal (see the online help for instructions on how to do this)
- Reconnect the Procon M2M power (and the device power if separate from the Procon M2M), whilst observing precaution on any live (240VAC) areas within the enclosure
- Wait for between 30 seconds to 1 minute for the Procon M2M to login to the Procon M2M servers (this is indicated by the Power, Signal and Online LEDs being on constantly, and the Server LED flashing irregularly)
- When the Server LED goes off, if the RS-485 device is wired correctly and setup correctly on the Procon M2M portal the "Comms" LEDs located above the serial ports should both be flashing to indicate comms is OK
- If the Comms LEDs are not both flashing, try pressing the Sync button. If this does not resolve the issue, re-check each step has been completed above
- When all devices are successfully communicating with the Procon M2M, the Procon M2M commissioning software (as described in the chapter Using the Procon M2M commissioning software) can be used to view data received from the expansion device. If the device has outputs, these can be tested in a similar way described in the section Outputs

14.2. *Modbus Registers*

The maximum total number of registers which the Procon M2M can read is 255. This total can be made up from as many slave devices as needed (Modbus supports up to 247 slave devices).

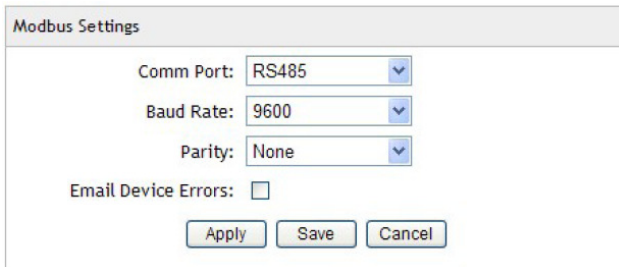
As an example:

- You could connect one Modbus device and read up to 255 registers from it
- You could connect two Modbus devices and read 120 from the first and 135 from the second
- You could connect three Modbus devices and read 20 registers from the first, 110 from the second and 125 from the third
- You could connect 255 Modbus devices and read one register from each
- You could NOT connect one Modbus device and read 256 registers from it
- You could NOT connect two Modbus devices and read 90 from the first and 166 from the second
- You could NOT connect 256 Modbus devices and read one register from each

Any combination is possible as long as the total number of registers does not exceed 255.

14.3. Adding Modbus Devices

You can add a new Modbus device by clicking on  in the toolbar and then selecting *Modbus Settings*. You will then be taken to the Modbus Settings page where you should enter the Communication Settings as the following illustration shows:



The Modbus Settings dialog box contains the following fields and controls:

- Comm Port: RS485 (dropdown menu)
- Baud Rate: 9600 (dropdown menu)
- Parity: None (dropdown menu)
- Email Device Errors:
- Buttons: Apply, Save, Cancel

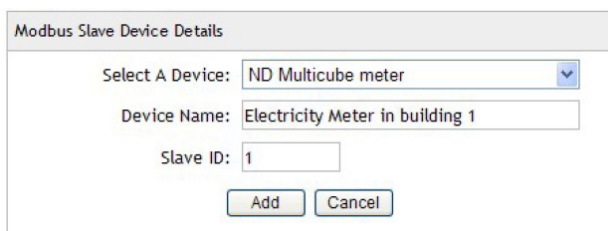
The Baud Rate and Parity settings have to match the settings in the Modbus device you wish to add. These can usually be setup on the device itself, if not then you may need to contact your supplier of the device for further help. Click on *Apply* to save the settings.

When these settings have been saved click on *Add Modbus slave device* as shown below:





The Modbus Slave Devices page displays the message "No Modbus slave devices specified." and a button labeled "Add Modbus slave device" which is highlighted with a red box.

You will then be asked to select a Modbus Device, as shown below:



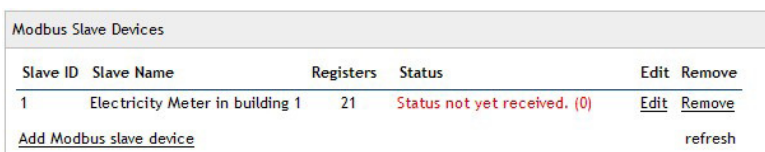
The Modbus Slave Device Details dialog box contains the following fields and controls:

- Select A Device: ND Multicube meter (dropdown menu)
- Device Name: Electricity Meter in building 1 (text input)
- Slave ID: 1 (text input)
- Buttons: Add, Cancel

If the device you want to add is not in the *Select A Device* drop down menu then click on  in the toolbar and then on .

Refer to the **Creating a Modbus device** section for more information on how to create a new Modbus device.

When a Modbus device is selected, enter a name for it and change the Slave ID if needed. Click *Add* and then the device will be added to the list of Modbus slave devices, as shown below:



Slave ID	Slave Name	Registers	Status	Edit	Remove
1	Electricity Meter in building 1	21	Status not yet received. (0)	Edit	Remove
Add Modbus slave device					refresh

You can add another Modbus device if necessary or edit / remove existing devices, but remember the total number of registers must not exceed 255.

The 'Status' column shows whether the Procon M2M can currently successfully communicate with the Modbus device or not. Having just added a device the 'Status' will be shown as **Status not yet received. (0)**. This indicates that the Procon M2M is yet to communicate with the Modbus device and the status is unknown.

The Modbus information will only get transferred to the Procon M2M the next time it synchronizes and so the Status will remain unchanged. As soon as the Procon M2M connects for a second time the Status will change to reflect the current Status, this will either be **Communicating correctly. (1)** or **Error communicating with device (2)**. By clicking on *refresh* the current Status will be shown.

If the Status is **Communicating correctly. (1)**, this indicates that all registers are being read correctly by the Procon M2M. If the Status is **Error communicating with device (2)** then somewhere the communication between the Procon M2M and Modbus device has been unsuccessful.

When the device has been successfully added the registers for the device will appear on the 'Edit I/O Configuration' page, all with 'EXT' prefixes, as shown below:

EXT05:	Multicube kWh (kWh)	<input checked="" type="checkbox"/>	-	-	ND Multicube Meter [100]
EXT06:	Multicube kVAh (kVAh)	<input checked="" type="checkbox"/>	-	-	ND Multicube Meter [100]
EXT07:	Multicube kVArh (Ind) (kVArh)	<input checked="" type="checkbox"/>	-	-	ND Multicube Meter [100]
EXT08:	Multicube kVArh (Cap) (kVArh)	<input checked="" type="checkbox"/>	-	-	ND Multicube Meter [100]
DWM01:	DWM 1 (%)	<input type="checkbox"/>			

14.4. Creating Modbus Devices

To create a new device, when on the 'Add Modbus Device' page click on  and then on .

A new Modbus device can then be added:

Modbus Device Settings

Device Name:

Default Slave ID:

Allow Inheritance:

Enter a name for the device and enter a default Slave ID (when you add an already created device to a Procon M2M the default Slave ID will appear as default in the 'Slave ID' box). Tick *Allow Inheritance* if you want the Modbus device you are creating to be available for selection for the Procon M2Ms in sub-business units.

Click *Apply* and then registers can be added to the device.

Click on *New Modbus register* as shown below:

Modbus Registers

No Modbus registers specified.

[New Modbus register](#)

Now the details of the new register can be added:

Modbus Register Details

Modbus Register/Address: 5

Register Type: Analogue Output (unsigned long, most sig. word fir)

Register IO Name: KWh Total

Unit of Measure: Default variable

Add Cancel

The 'Modbus Register/Address' of the register is an integer with a value between 0 and 65535. The 'Register Type' is one of the types described in the 'Modbus Register Types' section.

Refer to the Modbus device's documentation for information on its Modbus registers.

The 'Unit of Measure' (UOM) is set to 'Default variable' by default, if no UOM is set up for the register yet then this can be left as 'Default variable' and changed at a later point. For more information on UOMs refer to the **Defining Units Of Measure** section.

Click *Add* to save the register.

When all registers have been entered, save the device and then it will be selectable when adding a new Modbus device to a Procon M2M.

15. Connecting to A1M interfaces

This chapter describes how to connect the Procon M2M to A1M interfaces and how to configure it.

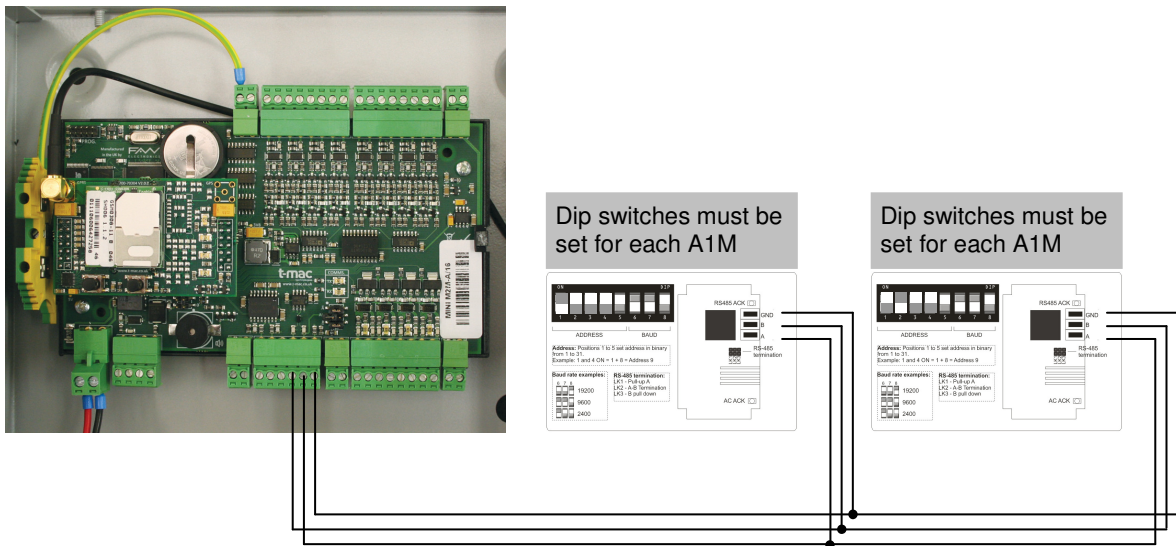
15.1. Physical connections

The Procon M2M communicates with the A1M using Modbus RTU over an RS485 serial bus. When connecting the A1M shielded cable should be used. The RS485 A, B and GND connections on the A1M must directly connect onto the RS485 A, B and GND connections on the Procon M2M.

If multiple A1Ms are connected to the Procon M2M then each A1M must be configured to have a unique address. Please refer to the A1M Installation and operation manual for details on connecting and configuring the Procon A1M converter.

15.2. Wiring diagram

The following diagram shows how to connect A1Ms to the Procon M2M:



Please note that:

- The Modbus network must be connected A to A, B to B, GND to GND
- Screened cable must be used on the Modbus network
- The Modbus network must be daisy chained and not in a star network
- Each A1M must be addressed
- 1 A1M unit is required per indoor unit (or one per system on the master if using twins / triples / quads)
- The split units must have CN92 / CN105 connection. This connection is only on units produced on or after 2006

15.3. Procon M2M configuration

Trough the M2M website an A1M group can be added by navigating to the *Modbus Settings* page, then clicking on *Add new Modbus device*. A Modbus device for the A1M has been created already and can be selected from the drop-down list. The Slave ID you assign to the Modbus device has to match the A1M address for the group being added.

When a new Modbus device has been created for the A1M, go to the *Edit I/O Configuration* page and select which I/O settings are to be logged. The writeable settings can be changed via 'Actions' and 'Tasks' thorough the website.

Find below an example:

Modbus Slave Devices						
Address	Protocol	Slave Name	Registers	Status	Edit	Remove
1	RTU	A/C No. 1	7	Communicating correctly.(1)	Edit	Remove
2	RTU	A/C No. 2	7	Communicating correctly.(1)	Edit	Remove
Add Modbus slave device						Refresh

16. Air Conditioning Web Interface Dashboard

This chapter describes how to control the Mitsubishi Electric Air Conditioning systems via A1Ms over the web using the web interface Dashboard.

16.1. Overview

The Air Conditioning web interface Dashboard allows the A1M interfaces to be monitored and managed across the internet.

16.2. M2M server access

Connect to <http://m2m.mitsubishielectric.co.uk/>

The Web Portal has 2 level of access:

- M2M Web Portal which offers access directly to the dashboard
- Engineering Portal which offers an engineering level










The screenshot shows the login page for the Mitsubishi Electric M2M web portal. At the top right is the Mitsubishi Electric logo with the text 'MITSUBISHI ELECTRIC AIR CONDITIONING SYSTEMS'. Below the logo, the text reads 'Welcome to the Mitsubishi Electric M2M web portal' followed by 'Please enter your details below and click 'Login''. There are two input fields for 'Email Address' and 'Password'. Below the password field are two checkboxes: 'Remember me on this computer' (checked) and 'Remember my password' (unchecked). Under the 'Portal:' label, there are two radio button options: 'M2M Web Portal' and 'Engineering Portal'. The 'Engineering Portal' option is selected and highlighted with a red box. A 'Login' button is located below the radio buttons. At the bottom, there are links for 'Forgotten Password' and 'Contact Us'.

16.3. Engineering Portal

16.3.1. Accessing the Dashboard

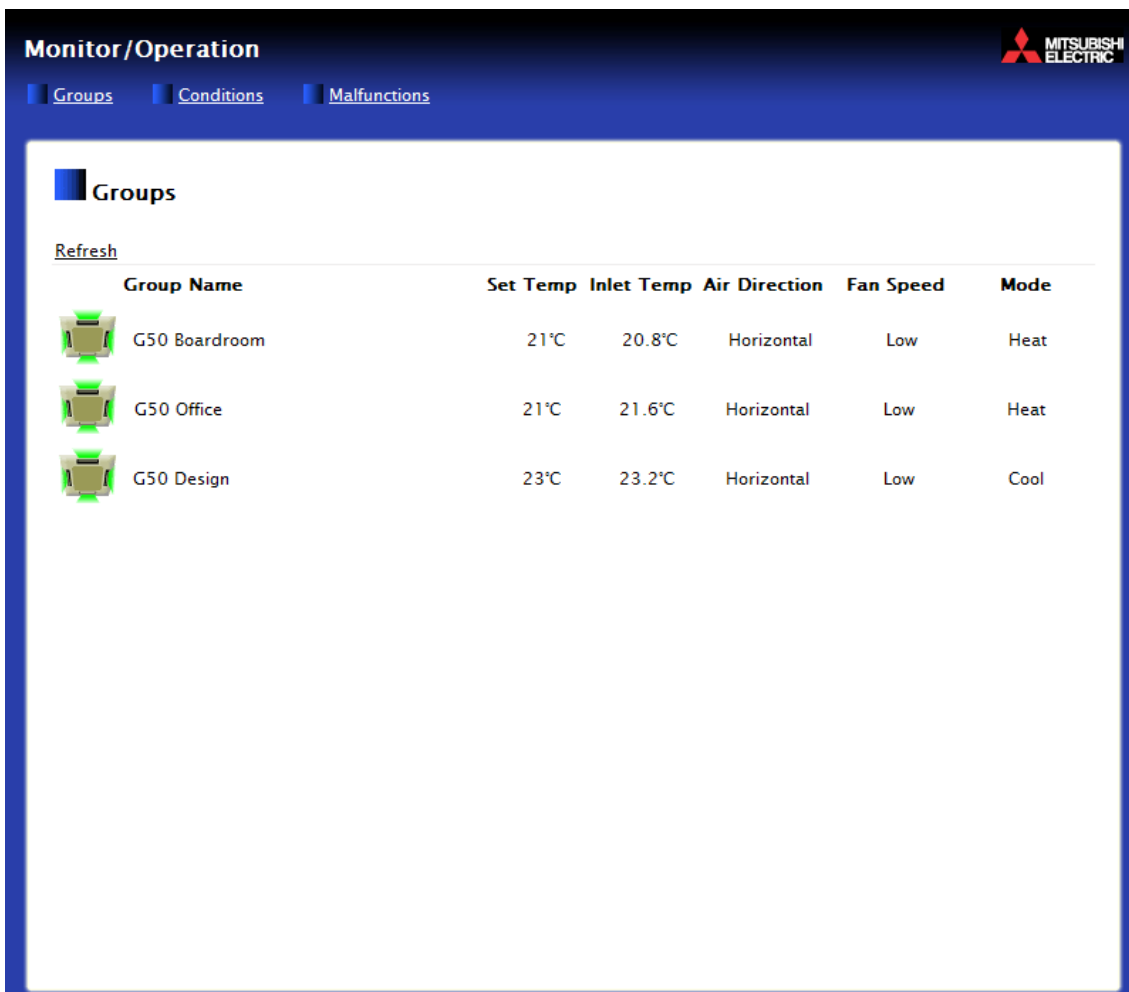
Enter Email address, type in Password, select *Engineering Portal* and click on *Login*.

- Expand the dashboards section on the tree view
- A dashboard link will be shown for A1M interfaces connected to a Procon M2M
- Click on the link to the Air Conditioning Dashboard




- ⊕  Reports
- ⊕  Views
- ⊕  Users
- ⊕  Contacts
- ⊕  UOMs
- ⊖  Dashboards
 -  G50 Controller - G50 Dashboard

16.3.2. Dashboard functionality

The main page on the dashboard is the 'Groups' page, the groups page shows a list of all the groups configured on the A1M interfaces and the current readings taken from the device.



The screenshot shows the 'Monitor/Operation' dashboard for Mitsubishi Electric. It features a navigation bar with 'Groups', 'Conditions', and 'Malfunctions' tabs. The 'Groups' tab is active, displaying a table of air conditioning groups. Each group is represented by an air conditioning icon and includes details such as Group Name, Set Temp, Inlet Temp, Air Direction, Fan Speed, and Mode.

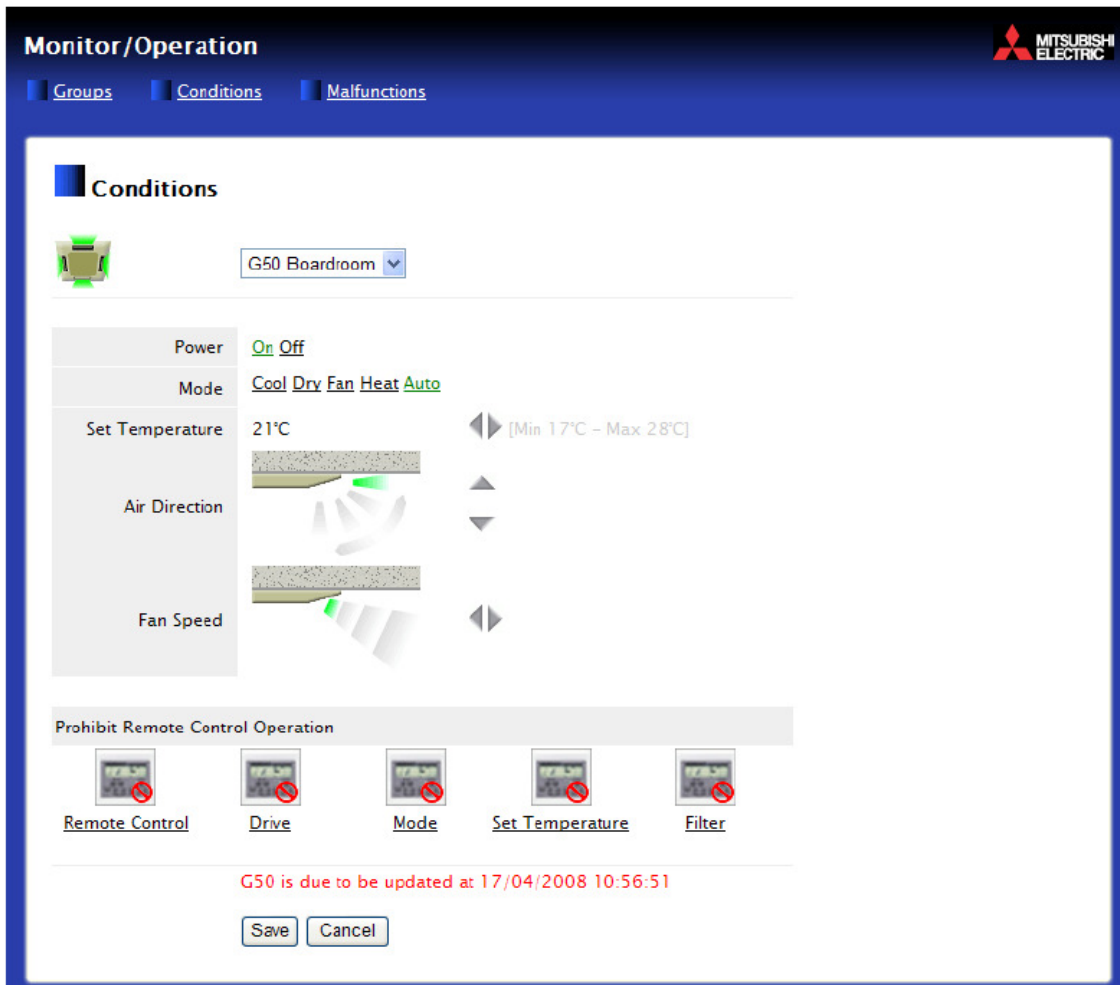
Group Name	Set Temp	Inlet Temp	Air Direction	Fan Speed	Mode
 G50 Boardroom	21°C	20.8°C	Horizontal	Low	Heat
 G50 Office	21°C	21.6°C	Horizontal	Low	Heat
 G50 Design	23°C	23.2°C	Horizontal	Low	Cool

To change group settings click on the air conditioning icon or the 'Conditions' link at the top of the page.

16.3.3. Condition list

The 'Conditions' page shows the current settings for the selected group. Each setting can be changed by clicking the appropriate button or link. For example to set the group into *Heat* mode click the *Heat* link. To save the changes click the *Save* button.

NOTE: The Procon M2M will have to login and download the settings before the A1M interfaces are updated. The date and time when this will occur is shown in red above the save and cancel buttons. Should you want to cancel the changes you must do this before the Procon M2M downloads the settings.



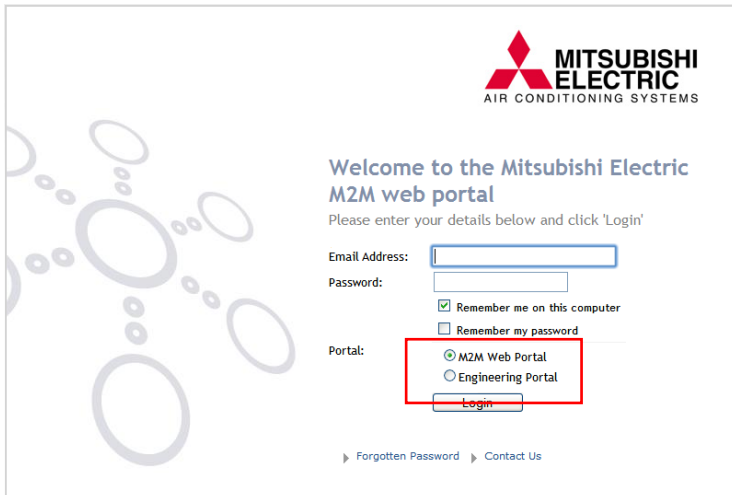
16.3.4. Malfunctions

The 'Malfunctions' page shows a list of errors that may have occurred, a malfunction message is for an individual air conditioning unit not a group. Malfunctions will only appear if you have added a Modbus device for the air conditioning unit. For details of how to do this see the Procon M2M configuration section of the chapter - **Connecting to A1M interfaces**.

16.4. M2M Web Portal (for End User)

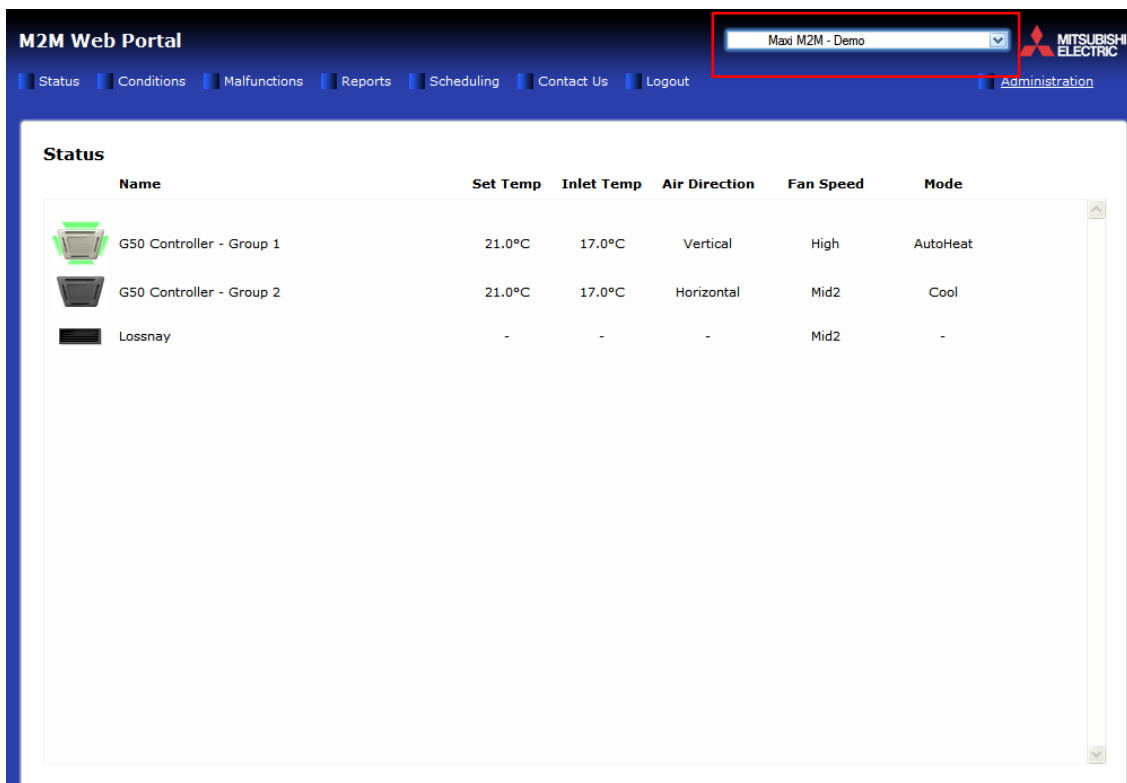
16.4.1. Accessing the Dashboard

Enter Email address, type in Password, select *M2M Web Portal* and click on *Login*.






The screenshot shows the login page for the Mitsubishi Electric M2M web portal. At the top right is the Mitsubishi Electric logo with the text "AIR CONDITIONING SYSTEMS". Below the logo, it says "Welcome to the Mitsubishi Electric M2M web portal" and "Please enter your details below and click 'Login'". There are input fields for "Email Address:" and "Password:". Below the password field are two checkboxes: "Remember me on this computer" (checked) and "Remember my password" (unchecked). A "Portal:" dropdown menu is highlighted with a red box, showing "M2M Web Portal" (selected) and "Engineering Portal". A "Login" button is below the dropdown. At the bottom, there are links for "Forgotten Password" and "Contact Us".

Site can be selected using the drop down button



The screenshot shows the dashboard of the Mitsubishi Electric M2M Web Portal. At the top left, it says "M2M Web Portal". At the top right, there is a dropdown menu for site selection, currently showing "Maxi M2M - Demo", which is highlighted with a red box. Below the site selection, there is a navigation bar with buttons for "Status", "Conditions", "Malfunctions", "Reports", "Scheduling", "Contact Us", "Logout", and "Administration". The main content area is titled "Status" and contains a table with the following data:

Name	Set Temp	Inlet Temp	Air Direction	Fan Speed	Mode
 G50 Controller - Group 1	21.0°C	17.0°C	Vertical	High	AutoHeat
 G50 Controller - Group 2	21.0°C	17.0°C	Horizontal	Mid2	Cool
 Lossnay	-	-	-	Mid2	-

16.4.2. Condition list

M2M Web Portal | Neville Tucker Head Office | MITSUBISHI ELECTRIC

Status | Conditions | Malfunctions | Reports | Scheduling | Contact Us | Logout | Administration

Conditions

Training Room

Power: On Off
 Mode: Cool Dry Fan Heat Auto
 Set Temperature: 19°C [Min 19°C - Max 30°C]
 Air Direction: Horizontal
 Fan Speed: High

Prohibit Remote Control Operation

Remote Control | Drive | Mode | Set Temperature | Filter

Update is due to commence at 20/08/2009 16:08:40

Save | Cancel

16.4.3. Scheduling

Scheduling can be set to time clock the Air Conditioning and other third party equipment.

M2M Web Portal | Maxi M2M - Demo | MITSUBISHI ELECTRIC

Status | Conditions | Malfunctions | Reports | Scheduling | Contact Us | Logout | Administration

Scheduling

Type New Schedule Name Here

asdasd

Actions			
Output	Active Value	Inactive Value	
City Multi G50 Group 1 - Filter Sign	False	True	
City Multi G50 Group 1 - Error Sign	False	False	
City Multi G50 Group 2 - Drive	Off	Off	
City Multi G50 Group 1 - Temperature Setpoint	<input type="text"/> °C	<input type="text"/> °C	

Times		
Day	Start	Finish
Monday	10:00	16:15
Monday	23:45	21:30
Tuesday	08:30	13:15
Sunday	<input type="text"/>	<input type="text"/>

21

ar

Select the times first and then the actions like for instance On/Off.

M2M Web Portal | Max M2M - Demo | MITSUBISHI ELECTRIC

Navigation: Status | Conditions | Malfunctions | Reports | **Scheduling** | Contact Us | Logout | Administration

Scheduling

Schedules: +

asdasd

Output	Active Value	Inactive Value	
City Multi G50 Group 1 - Filter Sign	False	True	✖
City Multi G50 Group 1 - Error Sign	False	False	✖
City Multi G50 Group 2 - Drive	Off	Off	✖

Day	Start	Finish	
Monday	10:00	16:15	✖
Monday	23:45	21:30	✖
Tuesday	08:30	13:15	✖
Sunday			+

Dropdown menu items: Drive, City Multi G50 Group 2 - Temperature Setpoint, City Multi G50 Group 2 - Fan Speed, Min Cool/Dry Temp Setpoint, Max Cool/Dry Temp Setpoint, Min Heat Mode Temp Setpoint, Max Heat Mode Temp Setpoint, Min Auto Temp Setpoint, Max Auto Temp Setpoint, Min Cool/Dry Temp Setpoint, Max Cool/Dry Temp Setpoint, Min Heat Mode Temp Setpoint, Max Heat Mode Temp Setpoint, Min Auto Temp Setpoint, Max Auto Temp Setpoint, Drive, Filter Sign

16.4.4. Grouping

Select *Administration* and then *Groups*. Groups can be added with Slave ID address (Group ID) and the names.

M2M Web Portal | Max M2M - Demo | MITSUBISHI ELECTRIC

Navigation: Status | Conditions | Malfunctions | Reports | Scheduling | Contact Us | Logout | **Administration**

Groups Administration

Name	Type	Slave ID	
G50 Controller - Group 1	G50 Controller (with new regs)	1	✖
G50 Controller - Group 2	G50 Controller (with new regs)	2	✖
Lossnay	Lossnay (V2.51 onwards)	10	✖
<input type="text"/>	Procon A1M	3	+

16.4.5. Users

Select *Administration* and *Users*.

The screenshot displays the 'User Administration' interface within the M2M Web Portal. The page has a dark blue header with the 'M2M Web Portal' logo and the Mitsubishi Electric logo. A navigation menu includes 'Status', 'Conditions', 'Malfunctions', 'Reports', 'Scheduling', 'Contact Us', 'Logout', and 'Administration'. The main content area is titled 'User Administration' and features an 'Add User' button. Below this is a table with the following columns: 'Name', 'Email Address', and 'User Type'. The table contains 12 rows of user entries. The 'User Type' column lists 'Basic User' and 'Business Unit Administrator'. Some rows have edit and delete icons. The page also features a vertical scrollbar on the right side.

Name	Email Address	User Type
		Basic User
		Business Unit Administrator
		Business Unit Administrator
		Business Unit Administrator
		Business Unit Administrator
		Basic User
		Business Unit Administrator
		Business Unit Administrator
		Business Unit Administrator
		Basic User
		Business Unit Administrator
		Basic User

16.4.6. Malfunctions

The 'Malfunctions' page shows a list of errors that may have occurred, a malfunction message is for an individual air conditioning unit not a group. Malfunctions will only appear if you have added a Modbus device for the air conditioning unit. For details of how to do this see the Procon M2M configuration section of the chapter - **Connecting to A1M interfaces**.

17. Updating information with Procon M2M

There are 3 ways of updating the data with the Procon M2M:

- Wait for the sync time to happen
- Press the sync button on the Procon M2M
- Click on the new Connect and Log button using the Engineering Portal

17.1. Waiting for sync period to elapse

The sync period is set using the Engineering Portal.

- Connect to <http://m2m.mitsubishielectric.co.uk/> and log in to the M2M website using the Engineering Portal access
- Select the appropriate site, and the Procon M2M on the site, to display the Procon M2M status page
- On the toolbar click *Settings* and then select *Procon M2M Settings* from the settings page



Procon M2M Settings

Configure Internet connection settings, logging periods and synchronisation settings

Select the *Log period* and the *Sync interval*:

Data logging

Log period:	<input type="text" value="20"/>	<input type="text" value="mins"/>	Estimated GPRS traffic
Number of logs:	<input type="text" value="0"/>	0 = use all available, max.1024	
Upload when full:	<input checked="" type="checkbox"/>		
Upload when syncing:	<input checked="" type="checkbox"/>		

Server settings

Server IP address:	<input type="text" value="83"/>	<input type="text" value="166"/>	<input type="text" value="168"/>	<input type="text" value="41"/>
G50 IP Address:	<input type="text" value="192"/>	<input type="text" value="168"/>	<input type="text" value="1"/>	<input type="text" value="1"/>
Backup Server IP Address 1:	<input type="text" value="78"/>	<input type="text" value="136"/>	<input type="text" value="14"/>	<input type="text" value="125"/>
Backup Server IP Address 2:	<input type="text" value="89"/>	<input type="text" value="105"/>	<input type="text" value="105"/>	<input type="text" value="187"/>
Port number:	<input type="text" value="1000"/>			
Sync interval:	<input type="text" value="25"/>	<input type="text" value="mins"/>	Estimated GPRS traffic	
Retry interval:	<input type="text" value="1"/>	<input type="text" value="mins"/>		
Use web proxy:	<input type="checkbox"/>			

17.2. Press the sync button on the Procon M2M

The sync button on the Procon M2M will force an update between the Procon M2M and the M2M Server.

Press the Sync button, wait 1 minute and then click on the *Status* page to update the information on the Engineering Portal.

17.3. Click on “Connect and Log” using the Engineering Portal

A new button is now available on the Engineering Portal to force an update from the M2M Server.

STATUS

Periodic logging: Enabled.

Last logged in: 19/08/2009 11:37:01

Next expected login: 19/08/2009 12:02:01 (00:24:52 remaining)

Direct Status: IDLE

Snapshot: 19/08/2009 11:37:03

Click on *Connect & Log* to update.

The Procon M2M Direct Status will show:

- IDLE then
- QUEUING then
- CONNECTING then
- CONNECTED_WAITING

This process will take no more than 30 seconds and will update the Status page automatically when the Direct Status is back to IDLE.

Note that the Procon M2M firmware may need an upgrade to activate this new function. If you do not see the Connect & Log option on your status page, that means an upgrade is required.

18. M2M diagnostics tool

The Procon M2M diagnostics tool allows direct connection with a PC to the Procon M2M for monitoring purposes.

18.1. Download

The Procon M2M Commissioning software is available on www.mitsubishi-aircon.co.uk.

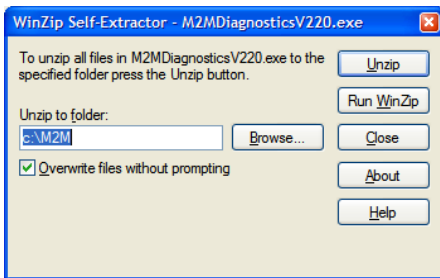
Select Tool and Resources, Download and M2M Commissioning Tools.

18.2. Installation

When the file has been downloaded:

- Double-click the file to extract the files for installation

You will be prompted to select a destination for the installer files:

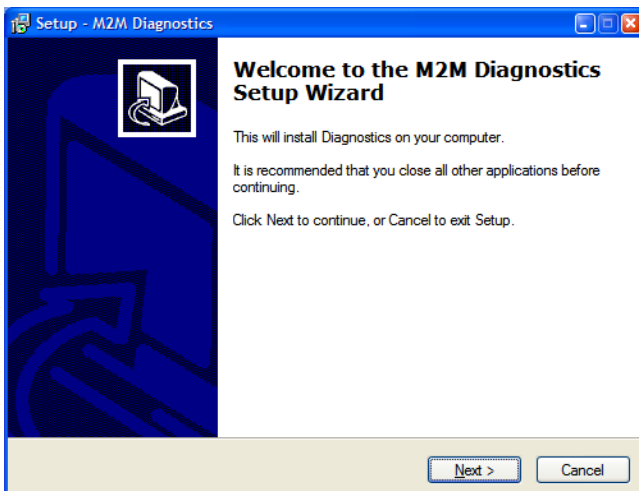


Click the Unzip button to extract to the default location c:\M2M, or click the Browse... button to select an alternative location.

To install the M2M Diagnostics application

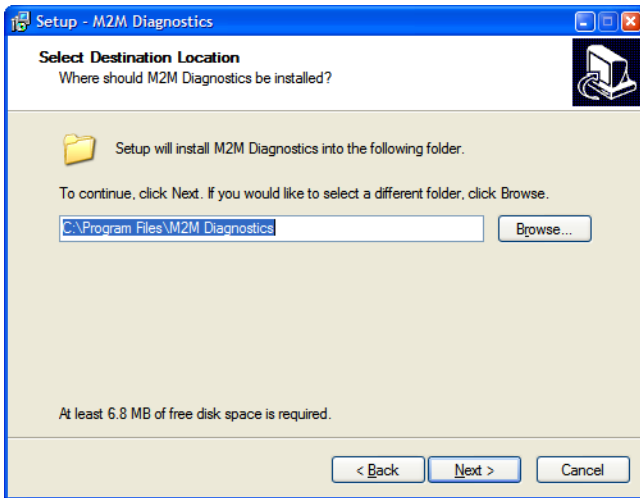
- Go to the location of the installer files, by default c:\M2M
- Run setup.exe

When the Welcome screen is displayed:



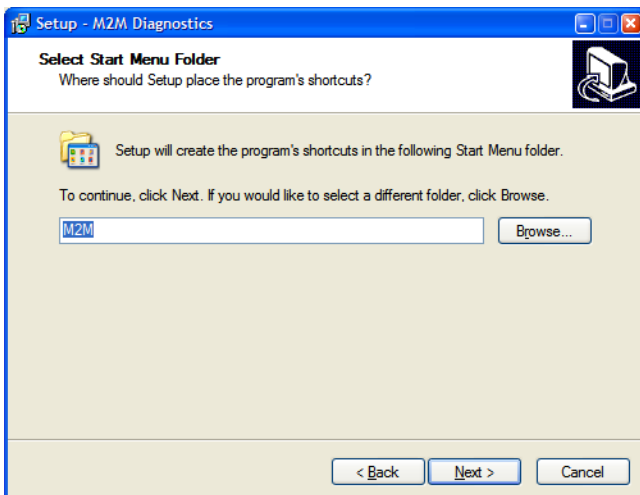
- Click the *Next* button to continue

You will be prompted to select the destination for the installed files:



Click the *Next* button to accept the default location, or click the *Browse...* button to select an alternative location.

The next screen allows you to specify the start menu folder for the program shortcut:



Click the *Next* button to accept the default folder, or click the *Browse...* button to choose an alternative folder.

- On the *Ready to install* screen click the *Install* button to proceed with the installation

Finally when the installation has been completed:

- *Click* the *Finish* button to exit from the Setup Wizard

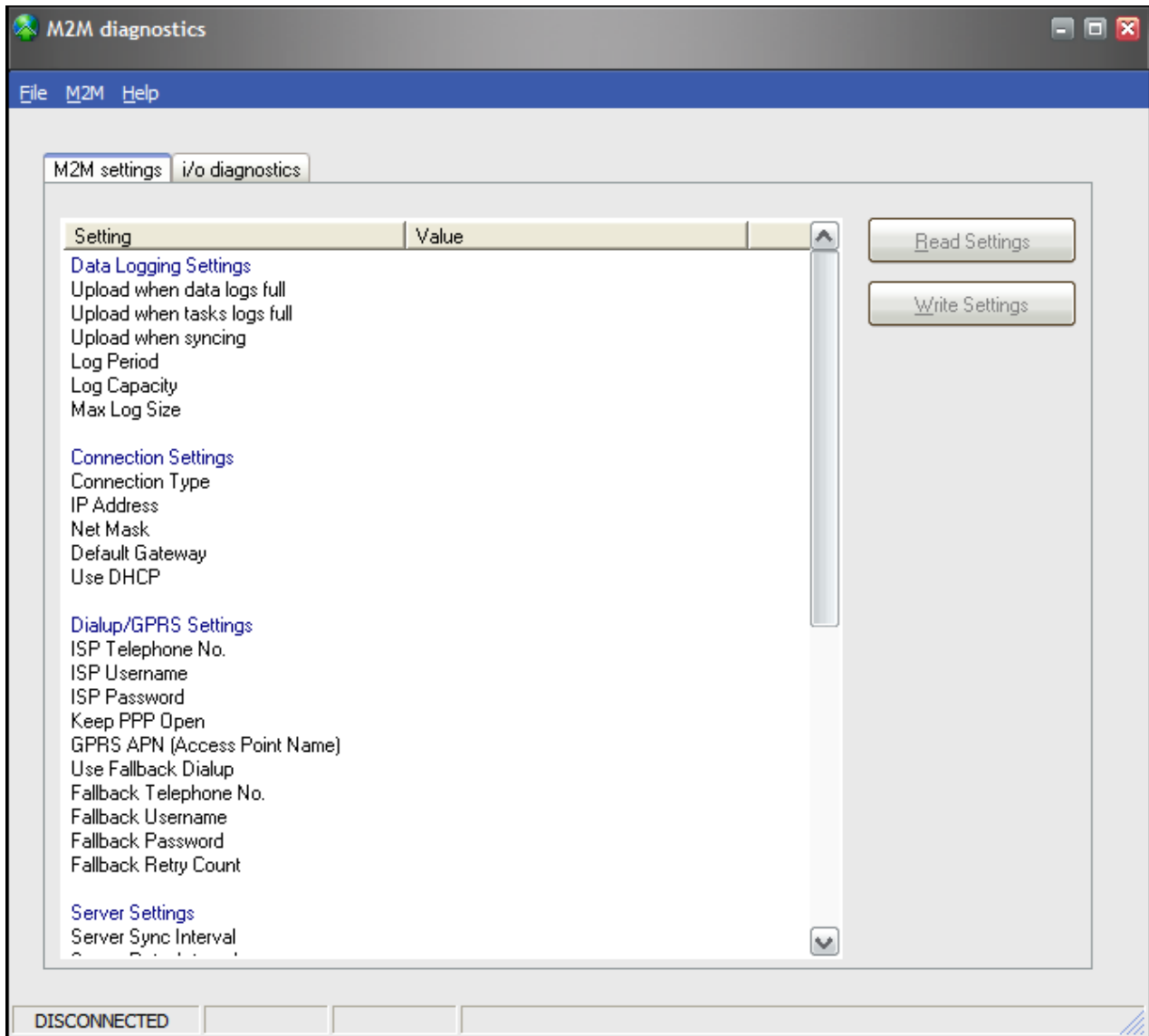
18.3. Running the M2M diagnostics tool

To run the M2M diagnostics tool

- Connect the Procon M2M to the PC using serial cable and the Procon USB port
- Open the Start menu, point to M2M, then click Mini diagnostics tool

The M2M diagnostics tool will be displayed.

The settings will automatically be read from the unit and displayed on the M2M settings panel:



Two tabs are available:

- M2M settings to read the Procon M2M settings
- i/o diagnostics to read inputs and write outputs

19. M2M renewal and data storage update

Find below the procedure:

- 90 days before the end of the contract, the customers registered on M2M will receive a warning Email saying that they have 90 days to renew their contract
- The warning Email will tell the customer to call our Spares and Warranty Department on 0870 3000 800 with the details requested i.e. the M2M serial number (SN*****)
- The customer then calls the Spares and Warranty Department with the serial number as the reference
- The Spares and Warranty Department will send a fax form to fill in to renew the contract
- The contract is for one year (per M2M interface) and costs £175
- **No discounts are applicable**
- When the form has been filled in, the customer will fax it back to the Spares and Warranty Department with the order
- The M2M server will be updated within 3 working days of receiving the order
- Failure to renew the contract will result on the M2M **not** communicating to the M2M server anymore

In the fax form there is also the option of upgrading the M2M data storage from 15Mb (standard data storage) to 115Mb at a cost of £150 per year and per M2M interface.

20. M2M renewal and data storage update form

20.1. Page 1 of 2



M2M Renewal

This form can be used to renew the contract for the M2M server and the SIM card and / or upgrade the M2M server space.

Project information

Project Name	
Project Address	
Project Reference Number	
Clients Name	
Installer Company Name	
Installer Contact Details	
Mini or Maxi M2M	
M2M Serial Number (i.e. SNxxxxxx received with the Email from the server)	S N _ _ _ _ _

ITEM REQUESTED:

		Yes	No
One year M2M annual subscription (£175)	[SAP 229086]	<input type="checkbox"/>	<input type="checkbox"/>
Additional 100Mb M2M server space (£150)	[SAP 229097]	<input type="checkbox"/>	<input type="checkbox"/>

20.2. Page 2 of 2

The contract is for one year at a cost of £175 and includes:

- SIM card cost with a monthly allowance of 6Mb per month
- 15Mb data space on the M2M server

An additional 100Mb space can be purchased on the M2M server at a cost of £150 per year.

Note that NO discounts can be applied on those costs.

When the payment has been received the server will be updated within 3 working days.

Failure to complete and return this form will result in the cancellation of the communication between the M2M interface and the M2M server.

Please Fax to Spare Parts Department on 0870 3000 333.

Signed:

Date.....

Print Name:

Company:

MEU-UK Office Use Only	
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Project Reference Number	
SAP Order Number	
Reference	

21. Applicable air conditioning models

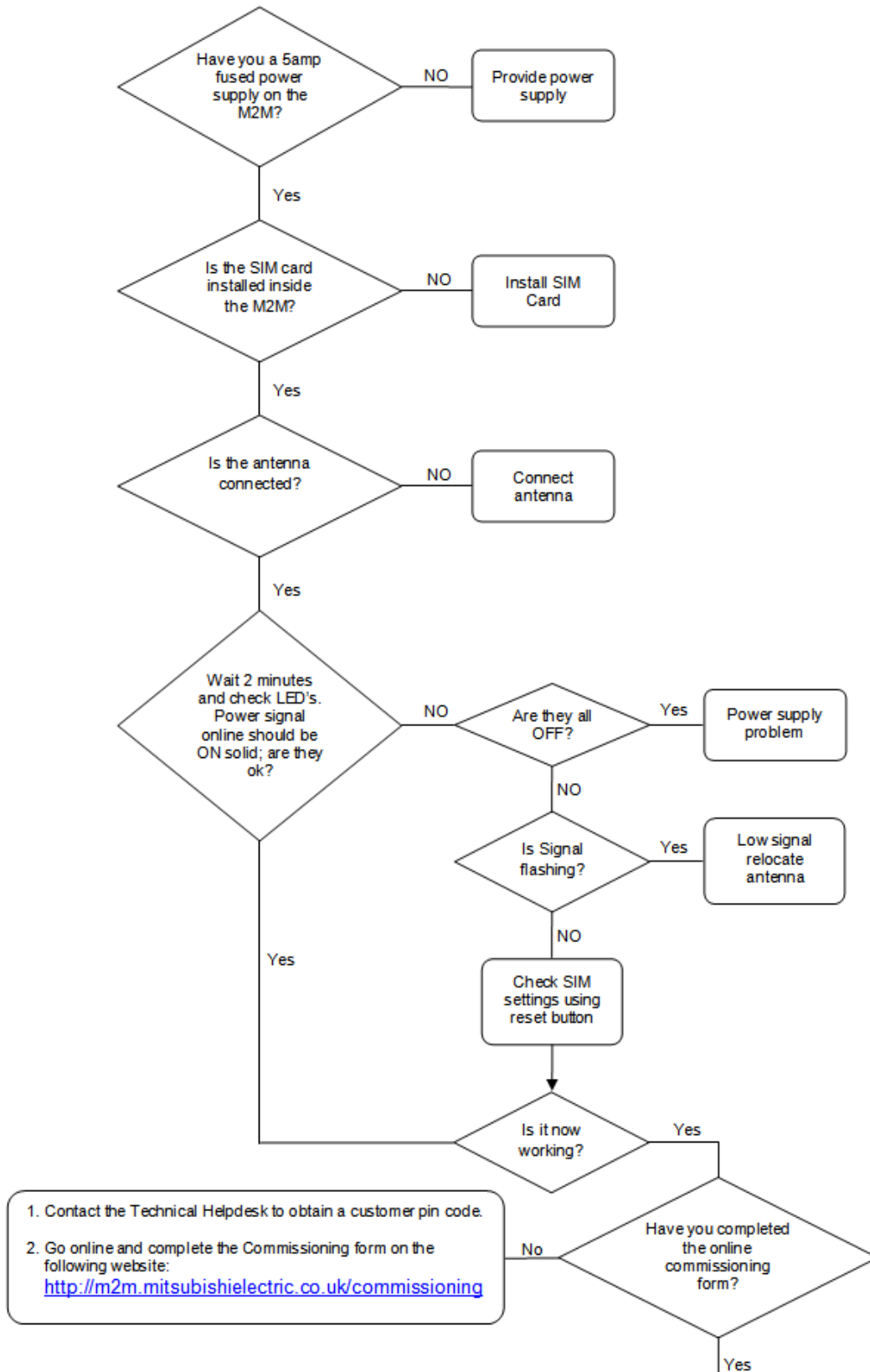
Below is a list of Air Conditioning models that can be connected to this unit using A1M interfaces:

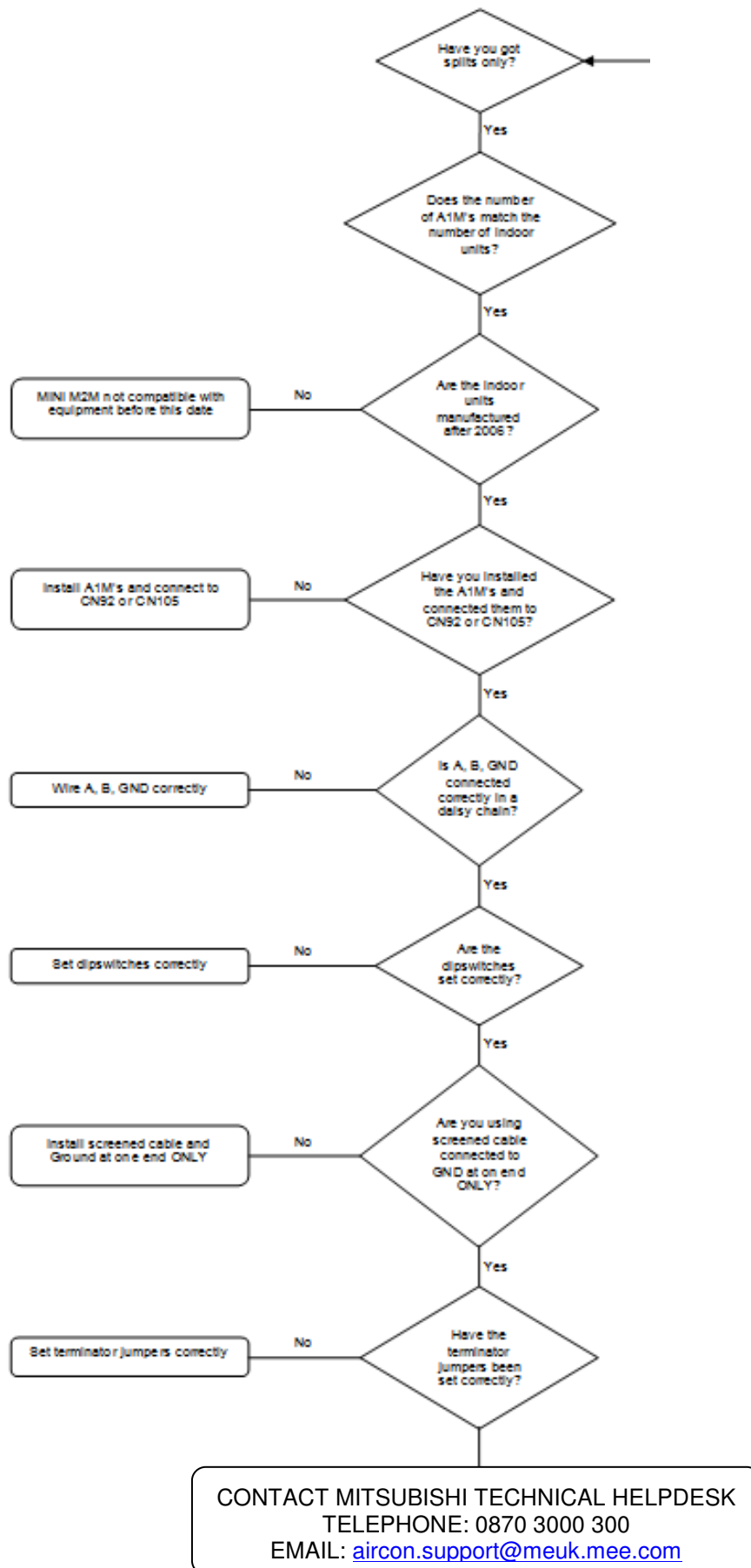
- M series product range manufactured after 2006
- Mr Slim product range manufactured after 2006

22. Important notes

- The online form must be filled in before switching ON the Procon M2M at <http://m2m.mitsubishielectric.co.uk/commissioning>. The SIM card will then be activated within 3 working days
- Ensure there is sufficient GSM signal at the site of the Procon M2M
- The Vodafone SIM card included with the Procon M2M includes 6Mb of data per month
- A third party SIM card can be used as long as the GRPS connection is activated and the Procon M2M is configured accordingly
- It is recommended to limit the number of variables monitored and controlled on the Engineering Portal Status page to limit the amount data sent and received on the SIM card
- It is also recommended to limit sync period to limit the amount data sent and received on the SIM card
- The Server data storage is 15Mb per year and can be upgraded to 115Mb at a yearly cost
- The Procon M2M is not compatible with PAYG (Pay As You Go) SIM card
- Any text messages sent from the Procon M2M is not included in the contract and will be charged separately
- The Modbus network must be connected A to A, B to B, GND to GND
- Screened cable must be used on the Modbus network
- The Modbus network must be daisy chained and not in a star network
- Each A1M must be addressed
- 1 A1M unit is required per indoor unit (or one per system on the master if using twins / triples / quads)
- The split units must have CN92 / CN105 connection. This connection is only on units produced on or after 2006

23. Troubleshooting flow chart





24. Troubleshooting

This chapter gives suggested solutions to problems that users may encounter when accessing a Procon M2M via the Internet, using the Diagnostics application, or using the configurable I/O.

24.1. Problems connecting via GPRS

If the Procon M2M fails to connect to the server the Online indicator on the front panel will flash rapidly at 2Hz. In this case check the following:

- Ensure that the antenna is connected securely and is pointing upwards to maximise signal strength
- Ensure that the SIM card is installed firmly in place
- Ensure that GPRS has been enabled on the SIM card by your network provider
- Ensure that you have selected the correct mobile settings for your SIM card

If the GPRS signal strength is poor, the Procon M2M will fail to connect to the server. It will keep trying at regular intervals and communicate with the server once the GPRS signal strength returns to normal.

If the Procon M2M repeatedly fails to connect, try relocating the unit closer to a window or away from metalwork, which may shield the signal, or fit a larger external antenna.

24.2. Problems using the configurable inputs

If an input does not seem to be measuring correctly:

- Check the circuit connected to the input with a multimeter
- Check that the input is configured correctly for the appropriate sense circuit; see *Configuring the inputs and outputs*
- Check the polarity of the input if using 0-10V or 4-20mA.
- Use the Procon M2M Diagnostics application I/O diagnostics panel to give a dynamic display of the status of each input

If data is not being logged correctly from the input on the M2M website:

- Check that the input has been configured correctly on the M2M website and that logging has been enabled for the input; see *Changing the website configuration*
- Check that you have pressed the Sync button twice on the Procon M2M front panel to download the configuration of the input, and upload logged data to the Procon M2M server
- Check that you have refreshed the Procon M2M Status page on the M2M website to show the value of the input

This product is designed and intended for use in the residential, commercial and light-industrial environment.

The product at hand is based on the following EU regulations:

- Low Voltage Directive 73/23/EEC
- Electromagnetic Compatibility Directive 89/336/EEC

Please be sure to put the contact address/telephone number on this manual before handing it to the customer.

mitsubishi electric uk

MITSUBISHI ELECTRIC UK, TRAVELLERS LANE, HATFIELD HERTFORDSHIRE, AL10 8XB