Procon

MelcoREMOTE
MelcoREMOTE2G

FOR INSTALLERS

INSTALLATION AND OPERATION MANUAL
Version 1.0.0

For safe and correct use, please read this installation manual thoroughly before installing the MelcoREMOTE.

MITSUBISHI ELECTRIC UK

Preface

Safety warnings

⚠ Caution:

Do not expose to rain or moisture.

⚠ Screened Signal Cables:

Use only screened cables for connecting peripherals to any Procon MelcoREMOTE 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 MelcoREMOTE with respect to the receiver.
> Move the Procon MelcoREMOTE away from the receiver.

If necessary, consult a Procon MelcoREMOTE 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.

Amendment Register

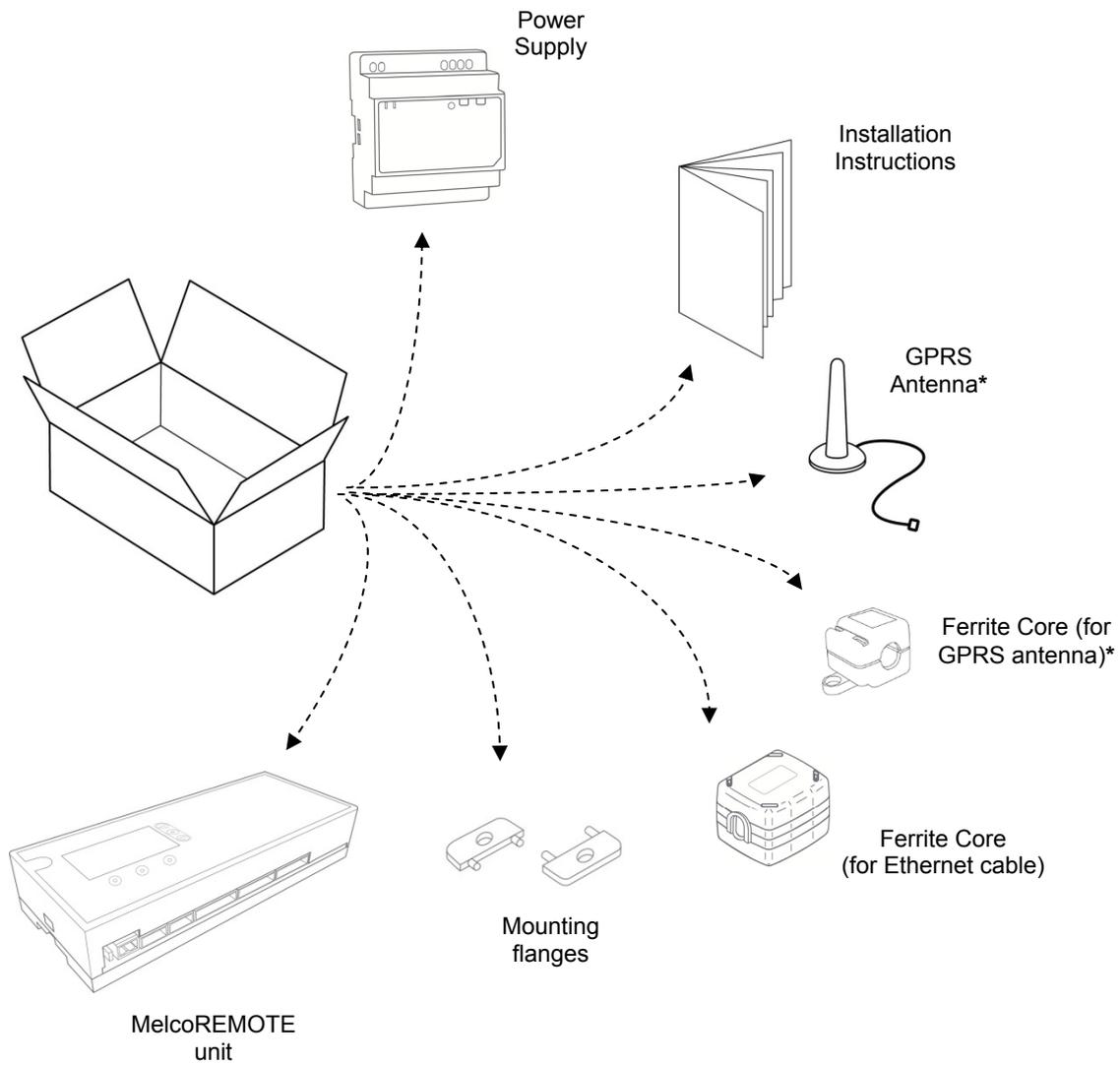| Version	Latest Firmware Version	Date	Author	Notes
V1.0.0	5.29	21/07/15	GD	First release

Any additional notes since printing will be appended to the rear of this document on separate sheets of paper.

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Supply

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Instructions

GPRS
Antenna*

Ferrite Core (for
GPRS antenna)*

Ferrite Core
(for Ethernet cable)

MelcoREMOTE
unit

Mounting
flanges

* Only for GPRS version MelcoREMOTE2G

Ethernet   4 Analogue Outputs   12 Configurable Inputs

GPRS Antenna
Connector

LCD Screen

6 Push
Buttons

Procon **MelcoREMOTE**

Power
Supply

RS-485
Port 1

RS-485
Port 2

12 Switched DC
Power Outputs

1. Quick start guide

Step 1:

Mount the Procon MelcoREMOTE and power supply on suitable DIN rail and complete the wiring between the two. Connect the 230VAC power supply but do <u>not</u> switch ON.

Step 2:

Connect the GPRS antenna or Ethernet cable, depending on the desired server connection method.

Step 3:

If required, connect the MelcoREMOTE to the Mitsubishi Centralised Controllers (e.g. AE-200) with Ethernet cable.

Step 4:

Connect all other required inputs, outputs and RS-485 devices (e.g. MelcoBEMS MINI (A1M) devices).

Step 5:

Switch ON the power supply and check the MelcoREMOTE produces a double beep and within 1 minute successfully connects and synchronises with the server. After the synchronisation is complete the screen will show the message 'Online' or 'Connected to server', both of these indicate a successful connection has been made.

Please refer to the *Configuration and Commissioning* section for more information on the messages shown on the screen.

Step 6:

The current readings of all configured I/Os can be viewed and checked using the screen, see section *Configuration and Commissioning* for more details.

This section also describes the 'toggle' feature which can be used to temporarily switch the digital outputs ON/OFF for testing purposes.

2. Safety precautions

> ➢ **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.

> ⚠ **Warning:**
> Carefully read the labels affixed to the main unit

⚠ **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 MelcoREMOTE is an automatic monitoring, logging and control device which communicates over the Internet, allowing users to monitor and control A/C and other devices from anywhere in the world by simply logging onto a webpage or by using a smartphone app.

Procon MelcoREMOTE connects to the Internet and communicates with a central server, uploading stored data logs and downloading configuration data.

Procon MelcoREMOTE connects to the server using Ethernet.
Procon MelcoREMOTE2G connects to the internet using the built in GPRS modem with SIM card.

Throughout this installation manual, unless otherwise specified both Procon MelcoREMOTE and Procon MelcoREMOTE2G are referred to as just MelcoREMOTE.

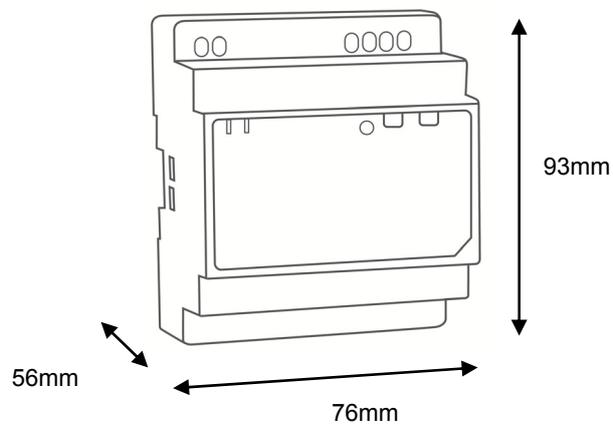**Figure 1** shows the items included with the MelcoREMOTE.

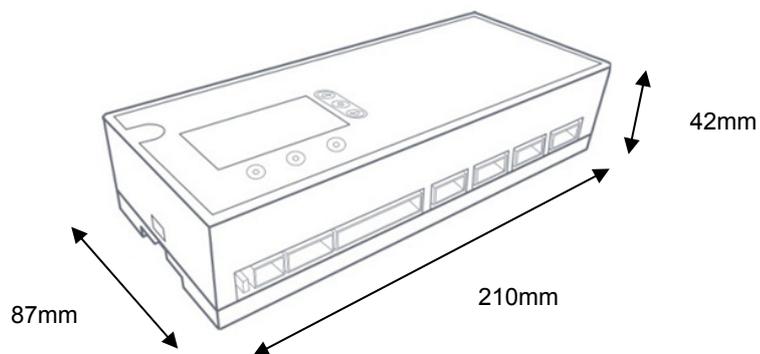**Figure 2** shows an overview of MelcoREMOTE.

4. Mounting

The MelcoREMOTE and power supply should be mounted on DIN rail in a panel of suitable size, leaving enough space around the unit for cable conduit and additional equipment.

4.1. Power supply dimensions

93mm

56mm

76mm

4.2. MelcoREMOTE dimensions

42mm

87mm

210mm

4.3. Mounting flanges
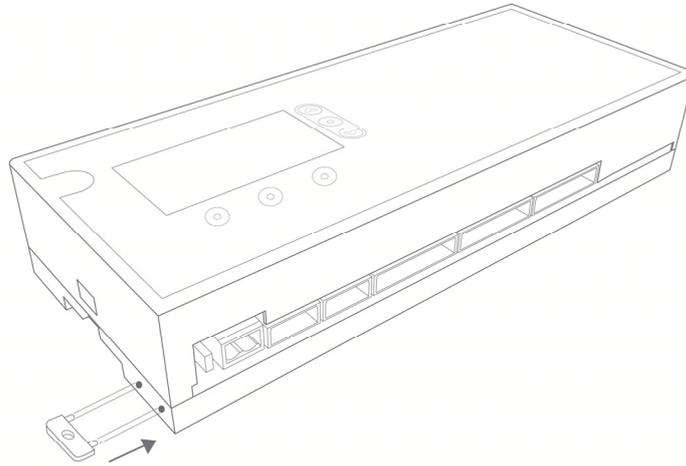
⚠ **Appropriate wall fixings must be used**

4.4. Installation Location

When installing MelcoREMOTE:

- 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, if applicable

5. Antenna connection*

⚠ **Ensure the Antenna cable is screwed tightly to the Antenna connector on the top of the MelcoREMOTE unit.**

⚠ **To maintain the appropriate EMC classification for the intended environment the Ferrite Core supplied with the MelcoREMOTE must be installed onto the antenna cable with 2 loops (Image below), and be located at the boundary of the panel the MelcoREMOTE is installed within.**
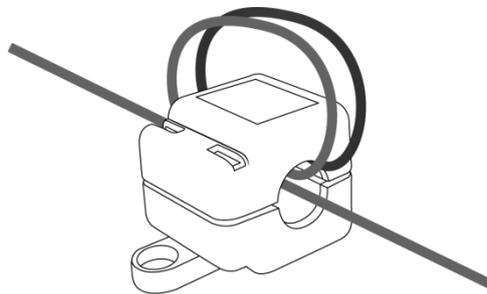
The antenna should be located on a metal surface, as the antenna has a magnetic base.

The most suitable location for the antenna can be discovered by checking the antenna signal strength via the display on the MelcoREMOTE unit.

  * **Only for GPRS version MelcoREMOTE2G**

6. Ethernet connection

⚠ **If communication via Ethernet is required then in order to maintain the appropriate EMC classification for the intended environment a cable ferrite (Wurth 74271221S) must be Installed onto the CAT 5/6 cable with 1 loop (Image below), and be located as close as possible to the MelcoREMOTE Ethernet socket.**
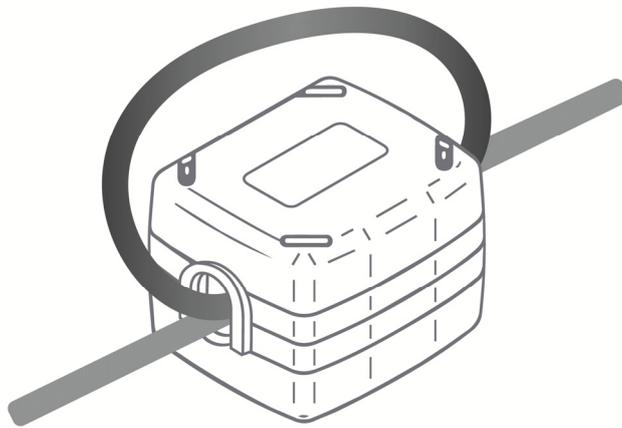
7. Connecting power

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

Ensure the mains cable supplying the power to the MelcoREMOTE power supply is suitably rated for the intended environment and current draw of the MelcoREMOTE.

⚠ **Warning:**
Electrical work should be done by qualified electrical engineers / 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.

⚠ **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**

8. Connecting I/O

⚠ **Caution:**
Only use shielded cables for connecting sensors to MelcoREMOTE, 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.

All shields must be tied to an appropriate Earth point within the installation panel.

8.1. Connecting Inputs

For all input types Belden 8760 type cable is recommended.

8.1.1. 0-10V Inputs
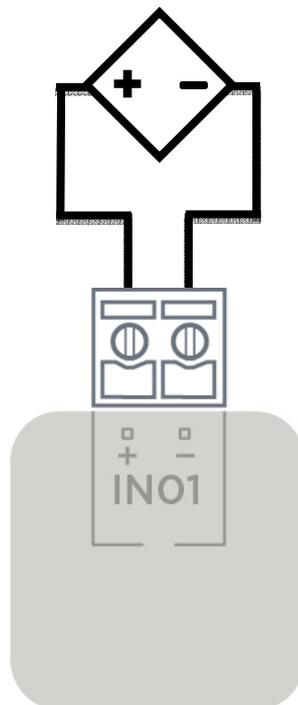
The maximum cable length for 0-10V inputs is 250m. This represents a deviation of < 1%.

8.1.2. Resistance (10K Thermistor) Inputs
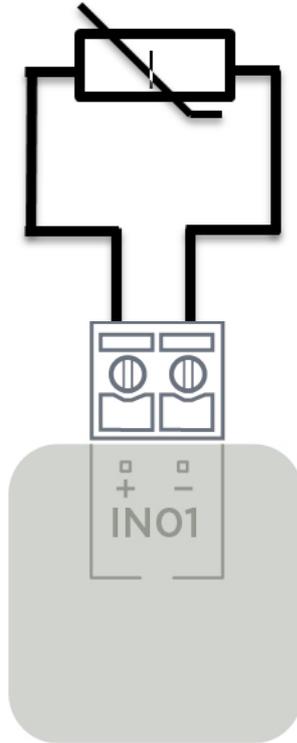
The maximum cable length for resistance type inputs is 250m. This represents a deviation of < 1% at 25ºC for 10K thermistors.

8.1.3. Digital Inputs
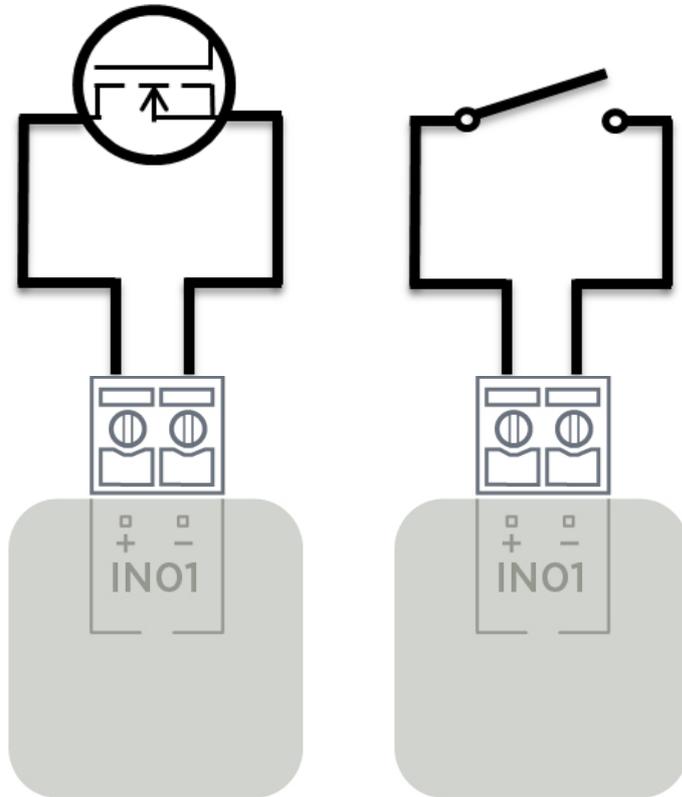
The maximum cable length for digital inputs is 1000m. This represents a cable loss of < 0.1V.

8.1.4. 4-20mA Inputs
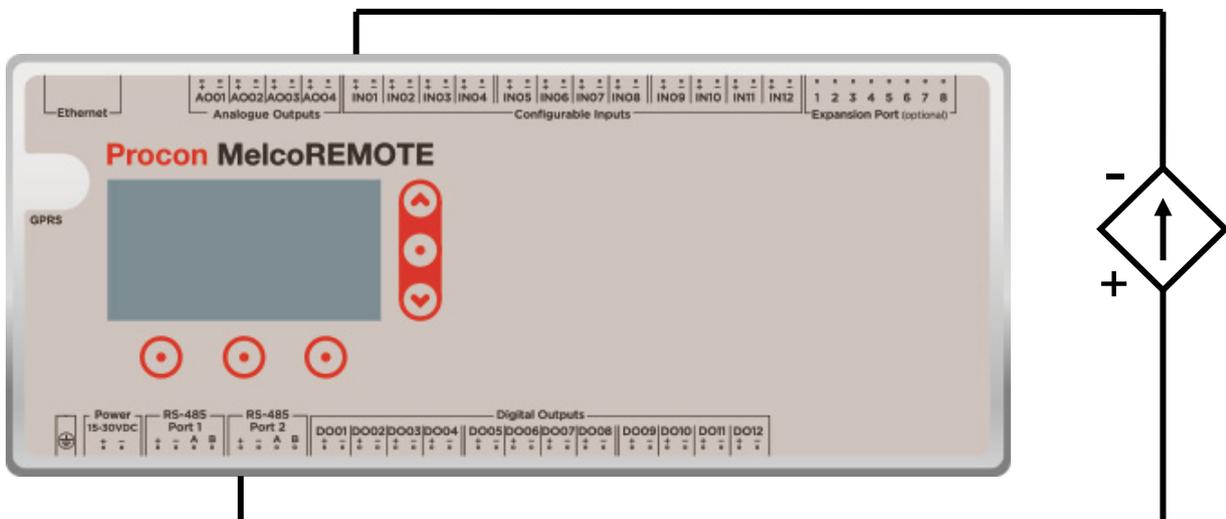
To connect a 4-20mA sensor that requires "loop" power:

- Isolate the MelcoREMOTE supply.

- Connect the positive (+) terminal on the sensor to the **RS-485 Port 1+** or **RS-485 Port 2+** terminal on the MelcoREMOTE.

- Connect the negative (-) terminal on the sensor to the required positive (+) configurable input terminal on MelcoREMOTE (e.g. **IN01+**).

The maximum cable length for 4-20mA inputs is 1000m. This represents a cable loss of < 5V at 25mA.

8.2. Connecting Outputs
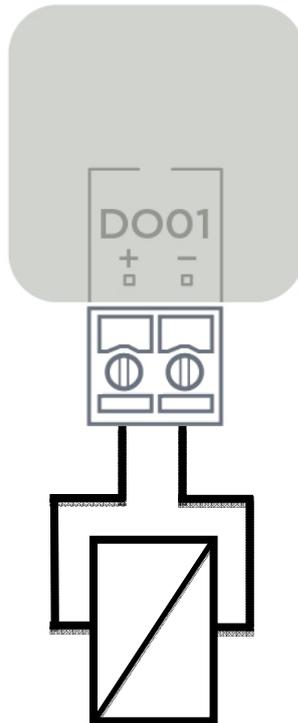
For connecting contactors (nominal 100mA coil) to digital outputs, the maximum cable length is 50 metres (16/0.2, tri-rated cable). This represents a cable loss of <1V @ 80mA (typical contactor current).

9. Connecting Mitsubishi Centralised Controllers

MelcoREMOTE can be used to connect to one or more Mitsubishi centralised controllers, such as the AE-200, EW-50, AG-150, G-50 and GB-50, via Ethernet. It can be configured to access data for all A/C Groups setup on the centralised controller. Certain A/C settings can be changed such as Drive, Setpoint, Mode, Air Direction, Fan Speed, whilst values such as the Return Air Temperature can be monitored.

9.1. Connection using crossover cable

If a single centralised controller is to be connected to the MelcoREMOTE then a direct connection between the two can be made using a crossover cable.
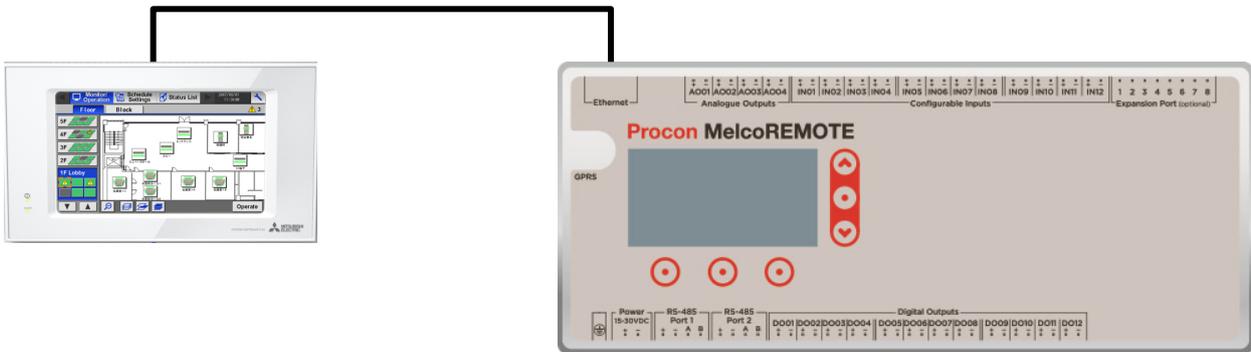
9.2. Connection through a switch/hub

As an alternative to using a direct connection with crossover cable, the connection through an Ethernet hub or switch can be used instead. This method must be used if more than one centralised controller is to be connected to MelcoREMOTE.

When using a switch/hub all Ethernet cable must be the *straight-through* type, as opposed to the *crossover* type.
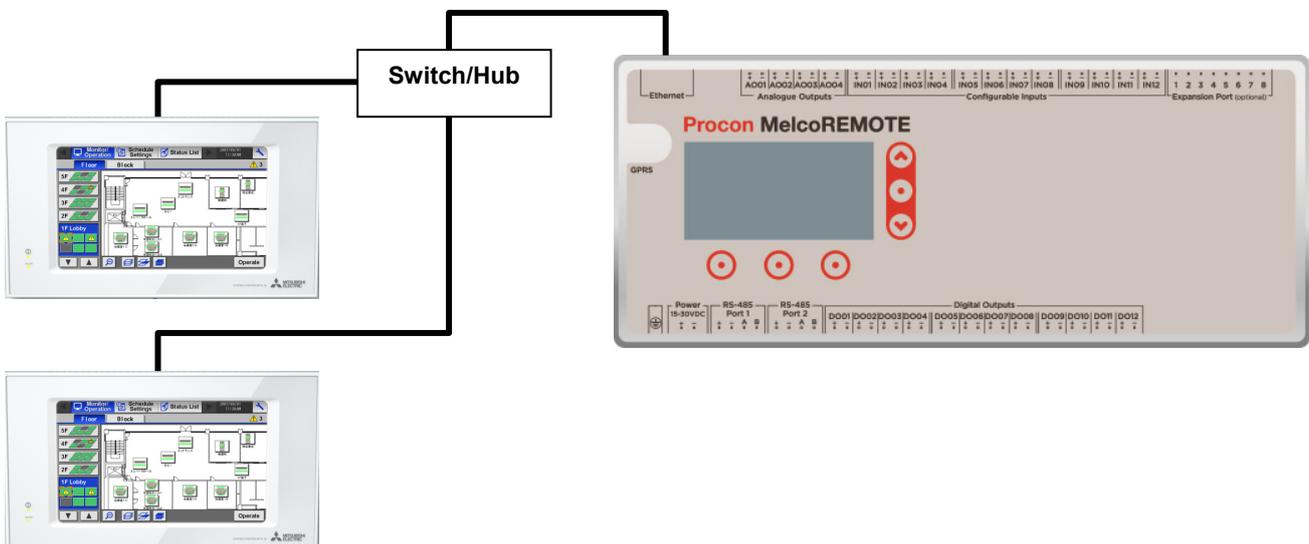
9.3. Configuration

The default IP address for all centralised controllers is 192.168.1.1 and subnet mask 255.255.255.0.
The default IP address for MelcoREMOTE is 192.168.1.2 and subnet mask 255.255.255.0.
When connecting Ethernet devices together each one needs to have a unique IP address.

9.3.1. PIN Codes

The following PIN codes must be entered to enable communication between the central controller and MelcoREMOTE.

Controller Type	PIN Code required
G-50	G50-WebMonitor
GB-50	GB50-Basic
AG-150	AG150-Basic
AE-200 / EW-50	(no PIN required)

⚠ **The applicable centralised controller PIN code must be entered to enable communication with MelcoREMOTE.**

9.3.2. AE-200 / EW-50

The AE-200 and EW-50 controller has a setting called '*Old Model Compatibility Mode*' which needs to be set to ON for correct operation with MelcoREMOTE. This setting can be accessed through the '*Initial Setting*' screen under the '*Advanced*' tab or embedded webpage for the AE-200, for the EW-50 it must be changed through the embedded webpage.

⚠ **All AE-200 and EW-50 controllers must have their 'Old Model Compatibility Mode' setting set to ON for correct operation with the MelcoREMOTE.**

10. Connecting Modbus Devices

MelcoREMOTE can act as a Modbus Master device and be configured to communicate with external Modbus Slave devices, to expand its I/O.

The following types of Modbus Slave device can be connected to MelcoREMOTE :

- - Devices supporting the Modbus RTU protocol via RS-485 (e.g. *MelcoBEMS MINI (A1M)*)

- - Devices supporting the Modbus TCP protocol via Ethernet

10.1. Modbus RTU devices

The MelcoREMOTE has two RS-485 ports which can be used independently to connect to external devices which support the Modbus RTU communication protocol.

Using RS-485, multiple devices can be connected together in a daisy chain bus formation. The maximum length of the bus is 1000m, and up to 32 devices can be connected together on the bus. The following image shows two MelcoBEMS MINI Modbus devices connected in a daisy-chain formation to a MelcoREMOTE.
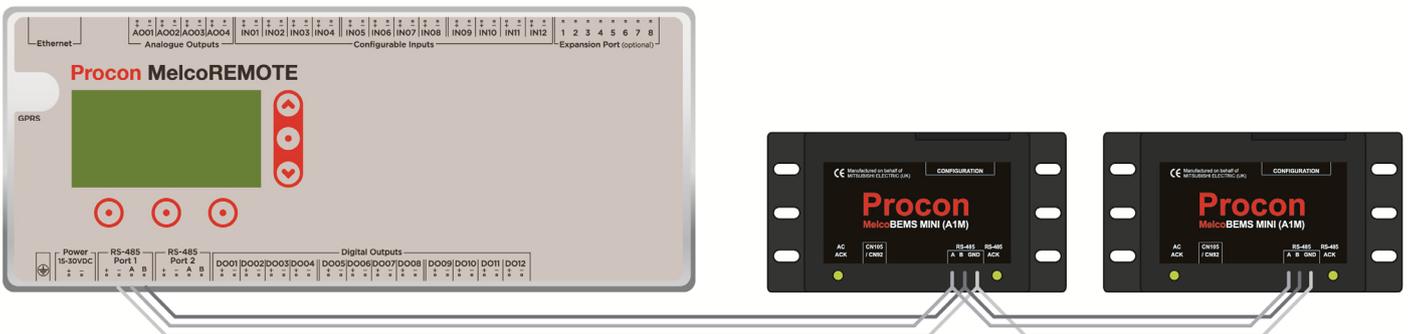
Every Modbus device has two connections named '*A*' and '*B*' (although some devices use different naming conventions, such as '*D+*' and '*D-*'). All '*A*' connections should be wired together in the chain, as should all the '*B*' connections. MelcoREMOTE also requires a common ground between all Modbus devices connected to it.

⚠ **Caution:**
Use only shielded twisted-pair cables for 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.

All shields must be tied to an appropriate Earth point within the installation panel.

Depending upon the application and the equipment connected to MelcoREMOTE, termination and/or pull up/down resistors may be required. MelcoREMOTE has built in jumper selectable termination and pull up/down resistors.
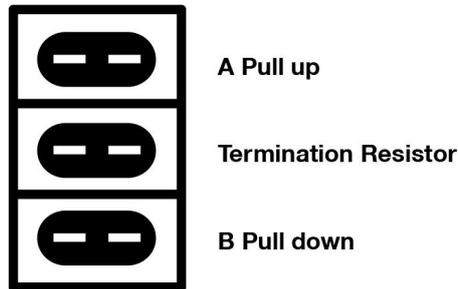
To power RS-485 Modbus devices which require 24VDC, MelcoREMOTE can be used to provide DC power and ground from the **RS-485 +** and **RS-485 -** connections respectively. Ensure the current draw of the devices does not result in the power supply exceeding its maximum current rating (See the *Technical specification* section for more information).

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

For help with RS-485 connectivity see the *Troubleshooting* section.

10.2. *Modbus TCP devices*

MelcoREMOTE has an Ethernet port which can be used to communicate with external devices which support the Modbus TCP communication protocol.

A *crossover* Ethernet cable can be used to form a direct connection between MelcoREMOTE and a single Modbus TCP device. If multiple devices are to be connected then a network must be created using one or more Ethernet switches/hubs, along with *straight through* Ethernet cable. This is the same as how Centralised Controllers connect to MelcoREMOTE.

10.3. *Modbus Slave mode*

Either one or both of the two RS-485 ports on MelcoREMOTE can be configured to provide Modbus Slave functionality. This allows MelcoREMOTE to act as a Modbus Slave device so that 3rd party controllers can access all I/O data from the MelcoREMOTE.
The *Modbus Slave Register tables* sections provides more information on Modbus Slave mode.

MelcoREMOTE can also be configured to also act as a Modbus TCP Slave device.

10.4. *I/O Module Mode*

MelcoREMOTE can be set to be a standalone I/O module which does not require a server connection. MelcoREMOTE then acts as a Modbus RTU Slave and Modbus TCP Slave device to allow its I/O data to be accessed.

See the *Configuration and Commissioning* section for more information.

11. Server Connection

MelcoREMOTE requires a connection to a server in order to upload data logs and download configuration and control data. This connection is via either GPRS or Ethernet. See the *Configuration and Commissioning* section for more information on configuring the MelcoREMOTE with the correct connection settings.

11.1. GPRS

An active GPRS enabled SIM card needs to be fitted inside the MelcoREMOTE unit to provide a server connection via GPRS. In addition the supplied GPRS antenna must be fitted and screwed firmly into the unit.

11.1.1. Fitting/Replacing a SIM Card

Under certain circumstances it may be necessary to fit or change the SIM card in the MelcoREMOTE unit.

To do this, follow the following procedure:

1) Ensure the power to the MelcoREMOTE is switched OFF.

2) Remove the MelcoREMOTE from the DIN rail and use a screwdriver to remove the lid, as shown in the following diagram.
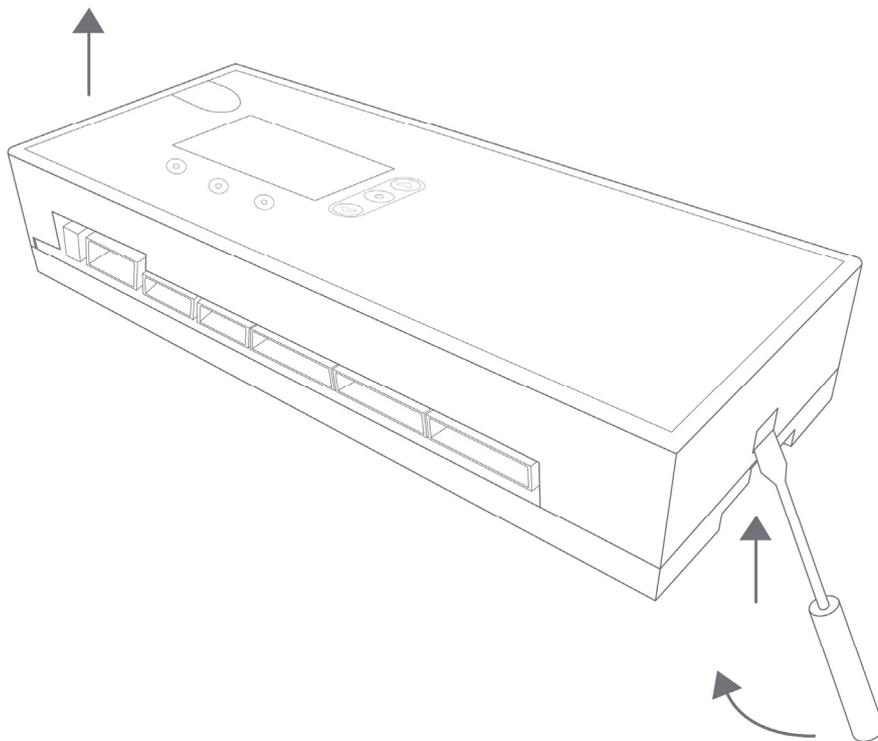
3) The SIM card is located in the SIM holder which is situated on the PCB located in the lid of the unit.
    If needed, remove the old SIM card, then fit the new one by sliding it into the SIM holder, in the direction of the arrow in the following diagram:
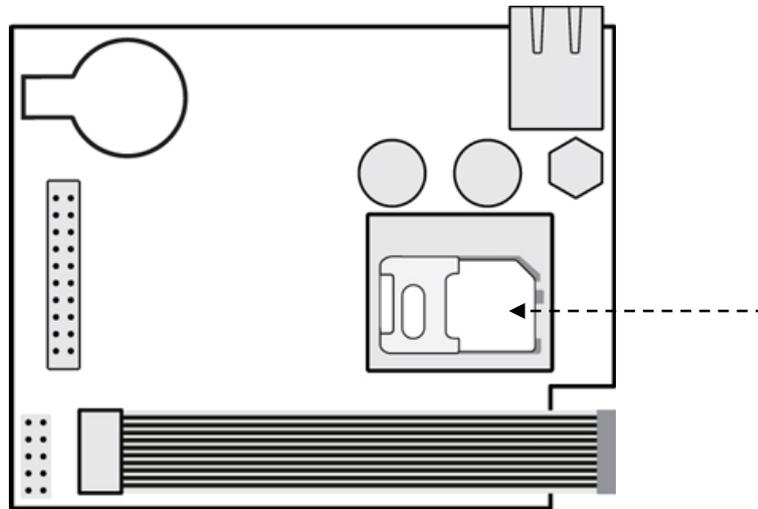
4) Replace the lid of the unit by pressing down until it has clicked into place.

5) It may be necessary to change the MelcoREMOTE network setting after the new SIM is fitted. See the **Configuration and Commissioning** chapter for more information on how to do this.

6) If not already fitted, fit the GPRS antenna. This should be located upright on a metal surface, as it has a magnetic base.

⚠ **The SIM card should be inserted such that the side with the metal contacts on are face down (i.e. not visible when fitted).**

⚠ **The SIM card fitted must be GPRS enabled, contact the SIM provider to confirm this if necessary.**

⚠ **The SIM must not have a PIN enabled.**

⚠ **Ensure the antenna is screwed tightly into the MelcoREMOTE unit.**

⚠ **Avoid using prepay (pay as you go) SIM cards.**

11.2.   Ethernet

Ethernet can be used to connect to the server as an alternative to GPRS.

MelcoREMOTE has a 10BASE-T Ethernet controller built in to allow the unit to connect to the server via a corporate Ethernet network, using standard Cat5/Cat6 cable.

MelcoREMOTE supports DHCP but can be assigned a static IP address instead if required.

⚠ **It is recommended to check the connection settings are correct before plugging in the Ethernet cable for the first time – see the *Configuration and Commissioning* section.**

11.3.   Modbus I/O Module

MelcoREMOTE can be set to be a standalone Modbus I/O module which does not require a server connection. MelcoREMOTE then acts as a Modbus RTU Slave and/or Modbus TCP Slave device to allow the current I/O values to be accessed.

To enable I/O Module mode the Connection Type must be set to '*None (slave)*'. See the *Configuration and Commissioning* chapter for more details.

The *Modbus Slave Register tables* sections provides more information on Modbus for I/O Module mode.

12. Configuration and Commissioning

12.1. Buttons

MelcoREMOTE has six buttons on the front fascia, as the following image shows.
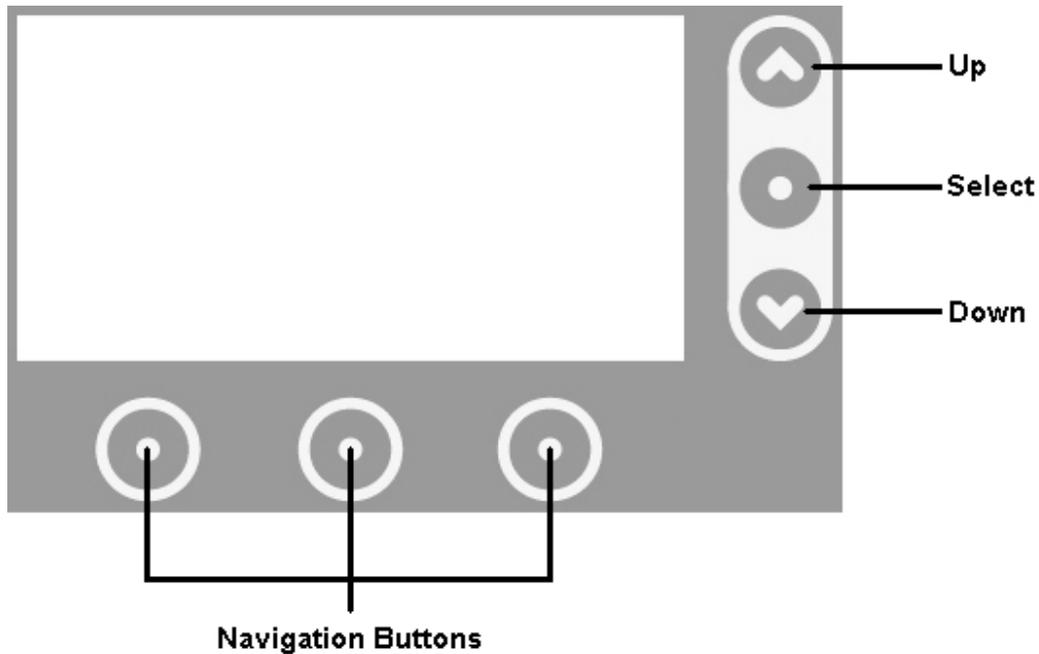
12.2. Initial power on

Upon applying power the MelcoREMOTE will beep twice and the LCD backlight will illuminate.

After a few seconds the MelcoREMOTE firmware version will be briefly shown before the *Status* Screen. MelcoREMOTE will immediately attempt to connect and synchronise with the server via GPRS or Ethernet.

12.3. Screen navigation

The three navigation buttons located below the LCD are used mainly for navigation between screens. The text on the bottom line of the LCD indicates the function of the button directly below it.
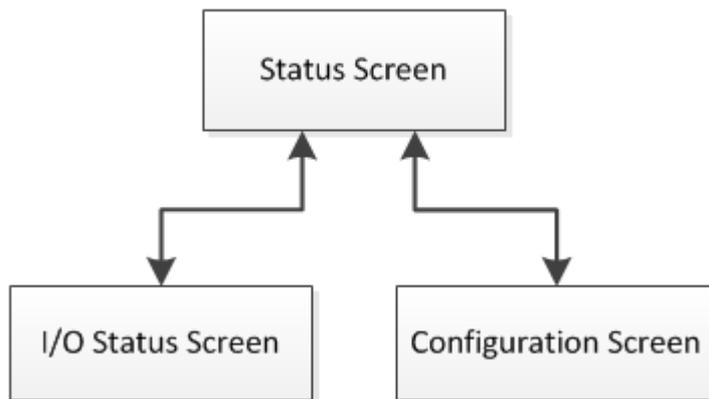
12.4.   Status screen

The *Status* screen is effectively the 'home' screen and provides server connection information.

When using GPRS the current GSM signal strength will be shown in addition to server connection information, when using Ethernet the IP address of the MelcoREMOTE will be shown, when set to be an I/O module the Modbus RTU Slave ID and Baud Rate will be shown.
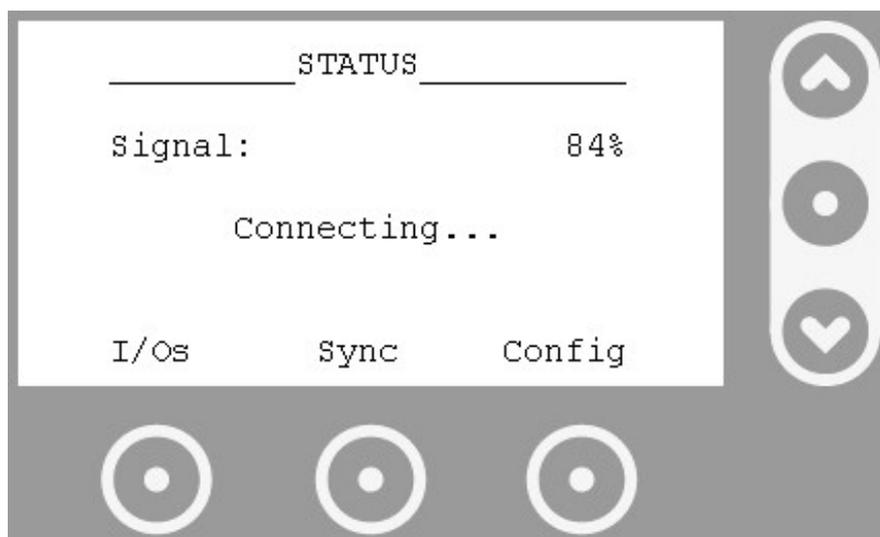
Status screen when using GPRS
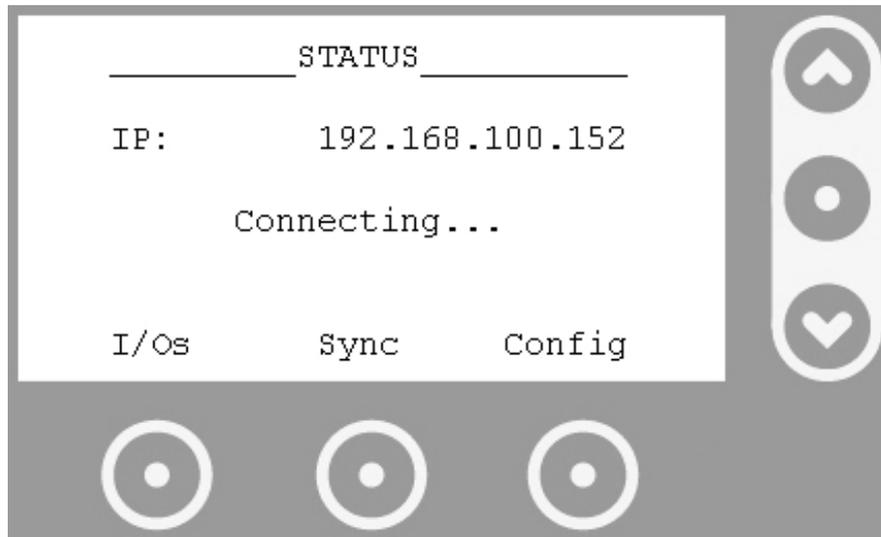
Status screen when using Ethernet
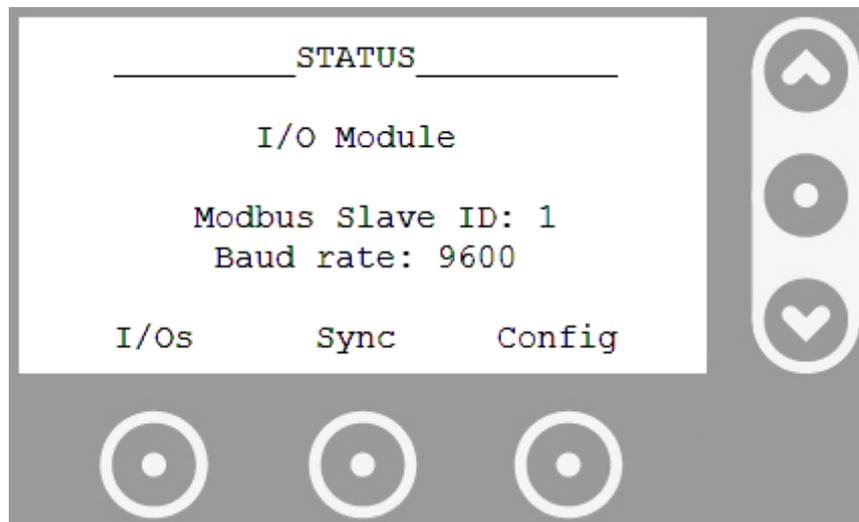
Status screen when set to be an I/O module

When set to GPRS or Ethernet the text in the centre of the screen describes the current connection state. This text will change whilst the MelcoREMOTE establishes a server connection. The sequence of events MelcoREMOTE would typically take to synchronise with the server (using GPRS) are:

1) Modem initialisation

2) GSM signal strength check

3) Connection to Internet

4) Connection to server

5) Synchronisation with server

While the MelcoRETAIL synchronises with the server the progress is displayed, as shown in the following image.
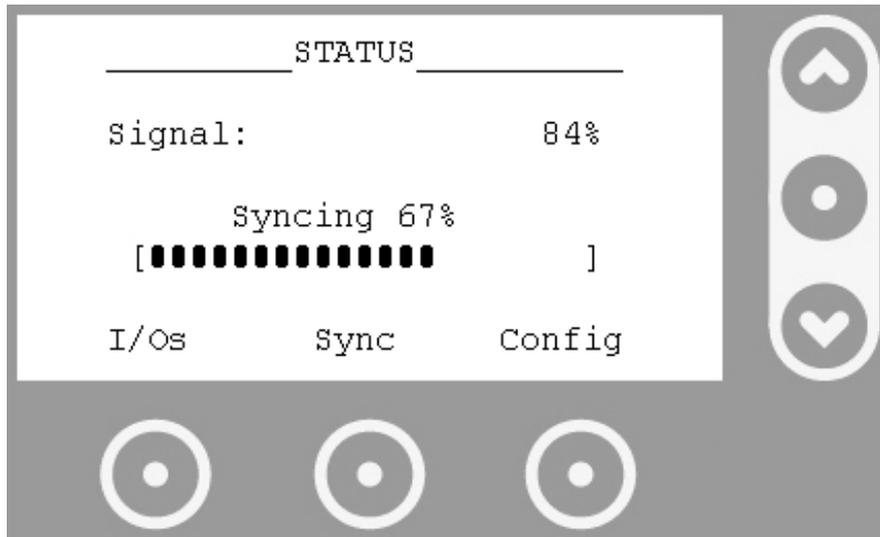
Synchronisation progress indication

Pressing *I/Os* enters the *I/O Status* screen, pressing *Sync* forces the MelcoRETAIL to synchronise with the server and *Config* enters the *Configuration* screen. The Status screen can always be returned to from either the *I/O Status* or *Configuration* screens by pressing *Back*.

12.5.   *Password protection*

The *I/O Status* and *Configuration* screens can be protected by means of an optional 4-digit *Commissioning Password*. When shipped from the factory MelcoREMOTE does not have this password enabled and all screens are freely accessible. After commissioning this password can be enabled and changed to prevent unauthorised access to MelcoREMOTE configuration and output overrides.

⚠ **If you unexpectedly encounter a password protected screen please contact your supplier.**

12.6. Configuration screen

From the *Status* screen the *Configuration* screen can be accessed. The *Configuration* screen allows the connection settings to be modified.

The *Up* and *Down* buttons can be used to change the value currently shown, the *Select* button can be used to move onto the next highlighted field, if applicable (e.g. for when changing IP addresses).

The *Next* and *Back* buttons can be used to navigate through the different settings. When all settings have been set the option to save the settings will appear. After *Yes* or *No* have been selected the *Status* screen will be returned to.
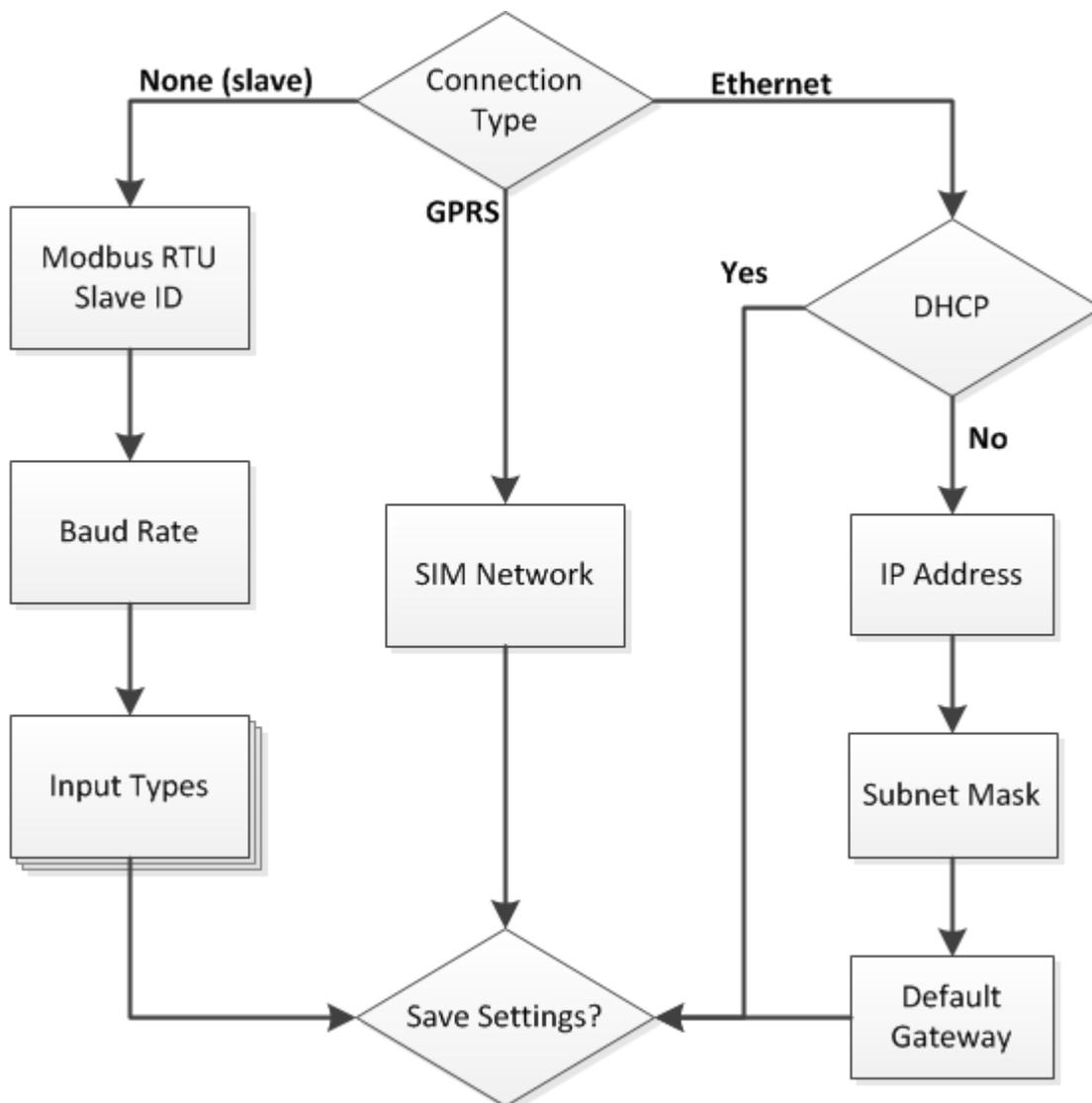
Configuration screen navigation

12.6.1. SIM network selection

There are several networks available for selection including O2, T-Mobile, Vodafone, Orange and BT. All MelcoREMOTE2G units will be supplied with a KPN 2G roaming SIM so there is not normally be a need to change this setting.

MelcoREMOTE2G will not be able to connect to the server if this setting is incorrect and doesn't match the network of the SIM inserted.

⚠ **SIM will be supplied activated and roaming from Ex-Works Date, this will be the beginning of the 60 month SIM Contract.**

⚠ **See *Server Connection* chapter for more details on using SIM cards in MelcoREMOTE**
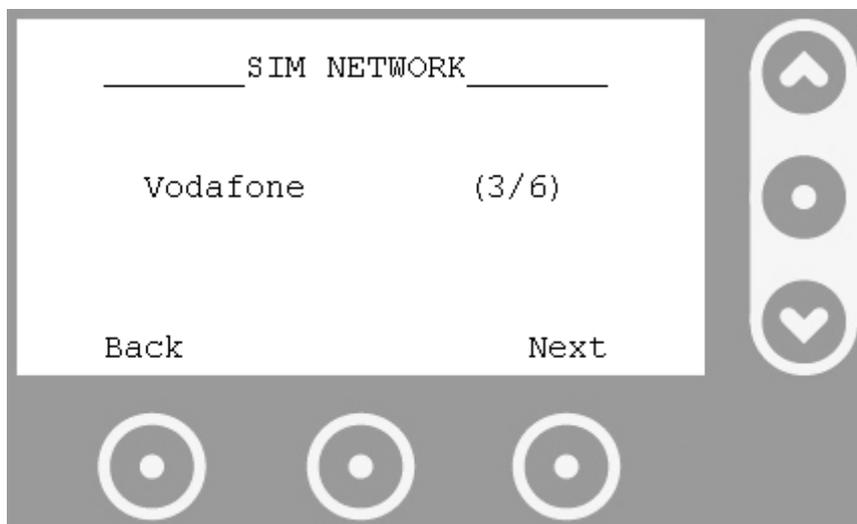
SIM network selection screen

12.6.2. I/O Types

When set to standalone I/O module mode (*Connection Type* set to *None (slave)*) the configurable input types can be changed via the *Configuration* Screen.

The configurable input type can be changed by pressing the *Change* button. The possible input types are 0 – 10V, 4 – 20mA, 10K Resistive and Digital.

The next/previous configurable input can be selected by pressing the *Up* and *Down* buttons.

When all input types have been configured, pressing the Next button will advance to the next screen.
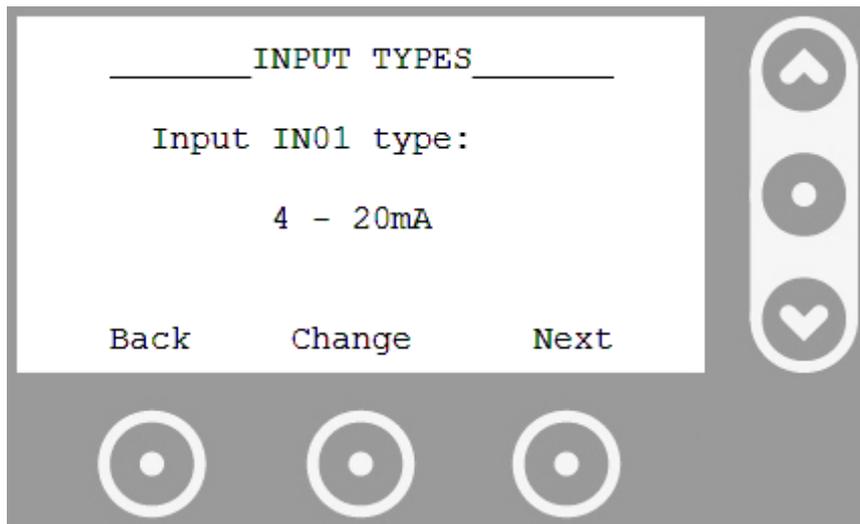
Configurable Input type selection

12.7.   I/O Status screen

The *I/O Status* screen shows live values for all MelcoREMOTE I/Os (for Variable type I/Os only the ones being logged are shown).

When the *I/O Status* screen is first entered it shows the name and live value for input IN01. The value will update every second.
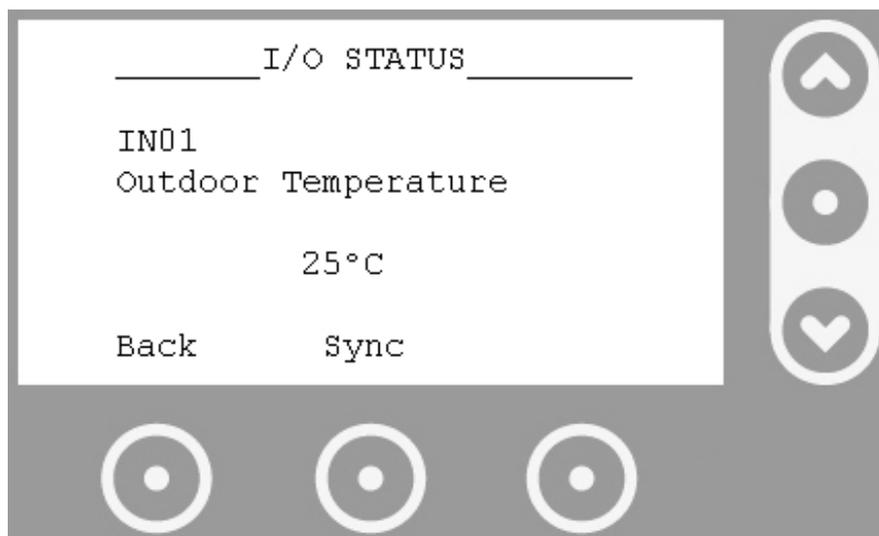
I/O Status screen for configurable input IN01

Using the *Up* and *Down* buttons to the right of the LCD the other I/Os can be viewed (IN02, IN03, IN04 etc…).

When the connection type is GPRS or Ethernet, if the I/Os have not been pre-configured they will have their default I/O name and unit of measure, and configurable inputs will have their default input type which is 0-10V..

When set to standalone I/O module mode (*Connection Type* set to *None (slave)*) the configurable input types must be changed via the *Configuration* Screen. The configurable input values on the *I/O Status* screen will always be shown in their raw units (i.e. Volts, mA or Ω).

12.7.1. External device I/Os

External device I/Os are only viewable on the screen if those external devices have been pre-configured.

If MelcoREMOTE fails to read a register from an external device its value will show READ ERROR, or if MelcoREMOTE fails to write to a register value WRITE ERROR will be shown.

12.7.2. Overriding outputs

To aid commissioning, digital output type I/Os can be overridden (ON/OFF) to test installation wiring. To override a digital output navigate to it by pressing the *Up* and *Down* buttons and press the *Toggle* button. The value shown on screen will update to reflect the new value.
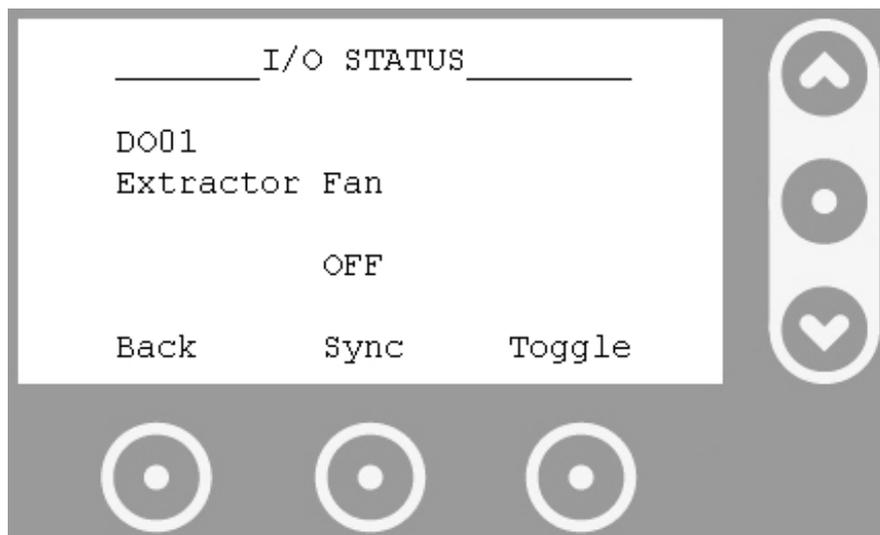
I/O Status screen for digital output DO01

The output will remain in the overridden state until either the *Back*, *Up* or *Down* buttons are pressed. At this point the output will resume its previous state from before the *Toggle* button was pressed the first time for that output. Any control logic set up to control the output will resume.

⚠ **Whilst an output is being overridden its state will not be changed by any control logic.**

⚠ **When overriding an output on an external device it may take a few seconds for the override to take effect.**

13. Troubleshooting

This chapter gives suggested solutions to problems that users may encounter when installing and configuring MelcoREMOTE.

13.1.   Status screen messages

Error Message	Possible cause(s)	Possible solution(s)
SIM ERROR (*using GPRS*)	No SIM card fitted	Insert GPRS enabled SIM card
	SIM not fitted correctly	Check SIM is fitted correctly as described in the *Server Connection* chapter of this manual
	SIM not activated	Check with SIM provider that the SIM has been activated
MODEM ERROR (*using GPRS*)	MelcoREMOTE could not communicate with GPRS modem	Contact the technical support team for assistance, see the *Technical Support* section
SIM PIN (*using GPRS*)	SIM has a PIN enabled	Disable the SIM PIN (this can be done by installing the SIM into a mobile phone, if the PIN is known)
NO SIGNAL (*using GPRS*)	Inadequate GPRS signal	Move antenna to better location (e.g. away from metalwork, away from sources of electrical noise, closer to a window)
		Check antenna is tightly screwed onto the MelcoREMOTE unit
		Use a SIM from a different network provider (this may or may not help)
		Fit a high gain antenna or external antenna.

		Ensure SIM card is GPRS enabled (contact SIM provider for confirmation)
CONNECTION ERROR (*using GPRS*)	MelcoREMOTE cannot establish an internet connection	Check correct SIM network is selected via Configuration screen.
		Error could be due to inadequate GPRS signal, see possible solutions for the NO SIGNAL error message.
CONNECTION ERROR (*using Ethernet*)	MelcoREMOTE cannot establish an internet connection	Check IP address settings are correct
		Check LAN firewall allows outbound connections on TCP port 1000
ETHERNET ERROR (*using Ethernet*)	MelcoREMOTE cannot connect to Ethernet network	Check Ethernet cable is fitted correctly
DHCP ERROR (*using Ethernet*)	MelcoREMOTE cannot obtain IP address information from the DHCP server	Check Ethernet cable is fitted correctly. Contact your LAN network administrator for assistance
SERVER ERROR	MelcoREMOTE cannot connect to server	If problem persists for more than 15 minutes contact the technical support team for assistance, see the *Technical Support* section

13.2. *Configurable inputs*

Problem	Possible cause(s)	Possible solution(s)
Input value not as expected	Input type not setup correctly	Set input type correctly
	Incorrect wiring	Check wiring is correct, see the *Connecting I/O* chapter.

		Check wiring polarity.
	Faulty field wiring	Check continuity of field wiring
	Sensor fault	If possible, check sensor reading is as expected using a multimeter
Unit of measure not as expected (e.g. thermistor value shown in Ω instead of °C)	Unit of measure not applied	Apply unit of measure to the input

13.3. MelcoREMOTE does not power up

Problem	Possible cause(s)	Possible solution(s)
No beep heard and no LCD backlight when applying power, but unit does have mains power	Loose wiring	Check connections between power supply and MelcoREMOTE are secure
	Damaged/faulty power supply	Check 24VDC is being supplied from the power supply using a multimeter, if not contact supplier
	Over-current or short circuit	Remove all connections from MelcoREMOTE other than power supply, then troubleshoot field wiring
No mains power	Tripped switch or circuit breaker	Reset the switch or circuit breaker
MelcoREMOTE constantly resets	Ancillary equipment (e.g. contactors or external I/O modules) drawing too much current	Power ancillary equipment from a separate power supply ensuring a common ground connection between power supplies
	Short circuit across 24VDC power supply	Remove the short circuit
	Damaged/faulty power supply	Check 24VDC is being supplied from the power supply using a multimeter, if not contact supplier

13.4. Centralised controllers

Problem	Possible cause(s)	Possible solution(s)
READ ERROR shown on *I/O Status* screen	Centralised controller not connected or powered	Check centralised controller is connected to the MelcoREMOTE via Ethernet and has power
	Incorrect Ethernet cable type used	For a direct connection between MelcoREMOTE and a single centralised controller, use a crossover type cable
	Ethernet devices connected with conflicting IP addresses	Ensure all Ethernet devices on the network have unique IP addresses
	A/C Group not present on centralised controller	Check the Group setup on the centralised controller is as expected
	Required PIN code not entered	Ensure the relevant PIN code on the centralised controller has been entered. See *Connecting Mitsubishi Centralised Controllers* chapter
	'*Old Model Compatibility Mode*' setting set to OFF (AE-200 only)	Check this setting is set to ON
WRITE ERROR shown on *I/O Status* screen	Value being written is out of range	Check value is within range

13.5. External RS-485 devices

Problem	Possible cause(s)	Possible solution(s)
READ ERROR shown on *I/O Status* screen	External device address incorrect	Check configured address is correct. This setting can usually be changed on the external device using DIP switches or config software.
	Two external devices connected on the bus with the same address	Change the address on the conflicting device
	External device communication settings incorrect	Check configured baud rate and parity settings are correct. These settings can usually be changed in the external device using DIP switches or config software.
	Polarity of 'A' and 'B' connections incorrect	Check polarity is correct. Note: The labelling of 'A' and 'B' can be ambiguous so try swapping 'A' and 'B' even if this means going against connection diagrams
	No ground connection	Ensure there is a ground connection between MelcoREMOTE and external device
	RS-485 termination / pullup / pulldown resistors are set incorrectly	See the Connecting to external devices section for more information.
	Too many RS-485 devices connected on the bus	If there are more than 32 devices connected on the bus then an RS-485 repeater may be needed to boost the bus signal. These can be purchased from many different electronics retailers.
	External device register attempted to be read is invalid	Check register numbers against external device documentation.
WRITE ERROR shown on *I/O Status* screen	Value being written is out of range	Check value is within range by referring to device documentation

13.6. Other problems

Problem	Possible Cause(s)	Possible Solution(s)
MelcoREMOTE does not save data logs when power is lost	Backup coin cell battery flat or not present	Fit replacement battery (CR2032 3V Lithium)
MelcoREMOTE loses control functionality when power is lost for more than 30 seconds.		

13.7. Technical support

CONTACT MITSUBISHI TECHNICAL HELPDESK
TELEPHONE: 0870 3000 300
EMAIL: aircon.support@meuk.mee.com

14. Technical specification

Parameter	Min.	Typ.	Max.	Comments
Power supply				
Voltage (AC)	85VAC	230VAC	264VAC	
MelcoREMOTE Voltage (DC)	15VDC	24VDC	30VDC	
Current (AC)		0.48A		At 230VAC
Current (DC)		1.0A	1.5A	
Frequency	47Hz	50Hz	63Hz	
Terminals				
Cable size				
3.81mm pitch connectors			16AWG	
			1.5mm²	
5.08mm pitch connectors			14AWG	
			2.5mm²	
Inputs				
0-10V	0V		10V	Configurable as current/ voltage/
4-20mA	4mA		20mA	resistance or digital.
Thermistor	0Ω		70kΩ	
Digital				
Pulse length	100ms			
Sample frequency	10SPS			
Resolution			15bit	
0-10V Outputs				
Resolution			12bit	
Current drive at 10V			5mA	Per channel
Switched Power Outputs				
Voltage		24VDC	30VDC	
Current			1A	Per channel
			1.5A	Total across all channels
User Interface				
128 x 64 monochrome LCD				
6 buttons				
Sounder		110dB @ 10cm		Internal piezo sounder
Communication Ports				
Ethernet		10Mb/s		Connection via RJ45 connector
RS-485	1200b/s	9600b/s	115200b/s	Connection via 3.81mm connector
GPRS digital modem				
Frequency	850MHz		1900MHz	
Sensitivity		-106dB		
Transmit power	1W @ 1800/1900		2W @ 850/900MHz	

	MHz			
Antenna Gain			2dBi	
Battery				Battery is type 3V CR2032.
Voltage		3V		The battery is only used when the
Lifetime		6 months		MelcoREMOTE is not powered
				from a permanent power source.
Environmental				
Operating temperature	-10°C		40°C	
Storage temperature	-20°C		50°C	
Relative humidity			90%	Non-condensing
Environment resist		IP30		
Dimensions				
Length		210mm		
Width		87mm		
Depth		42mm		
Weight		0.543kg		

15.   Connection Record

IO Ref.	0-10V	4-20mA	Res /Dig	Description
Configurable Inputs				
IN01				
IN02				
IN03				
IN04				
IN05				
IN06				
IN07				
IN08				
IN09				
IN10				
IN11				
IN12				

Switched Power Outputs	
IO Ref.	Description
DO01	
DO02	
DO03	
DO04	
DO05	
DO06	
DO07	
DO08	
DO09	
DO10	
DO11	
DO12	

Analogue Outputs	
IO Ref.	Description
AN01	
AN02	
AN03	
AN04	

RS-485 Expansion Devices	
Address	Description

Centralised Controllers / Modbus TCP Devices	
IP Address	Description

16.   Modbus Slave Register tables

All MelcoREMOTE I/Os are exposed as both Modbus Input (analogue input) registers and Modbus Holding (analogue output) registers. The register numbers are the same for both register types.

Each I/O value is exposed as a 32-bit value, so two Modbus registers are used for each I/O value. The lower of the two register numbers holds the most significant 16-bits of the I/O value.

Each I/O can be read in 9 different data formats; float32, uint32 (0dp, 1dp, 2dp and 3dp) and int32 (0dp, 1dp, 2dp and 3dp).

If an unsigned register (uint32) is being read then any negative value will be returned as value 0.

Outputs can have their values changed via a Modbus write commands to the Holding registers, using function codes 6 and 16.

Here is an example Modbus RTU command to read configurable inputs 1 – 4 from Slave ID 1 as Input registers in the data format uint32 (0dp):
01 04 13 DC 00 08 34 B2

where
01 is the Slave ID,
04 is the function code to read Input Registers,
13 DC is the start register (5084),
00 08 is the number of registers to read (8 registers as each I/O is comprised of two Modbus registers).
34 B2 is the 16-bit CRC.

An example reply from the MelcoREMOTE for the above command is:
01 04 10 00 00 00 17 00 00 26 6B 00 01 1F 17 00 01 1E C1 A5 E0

Where
01 is the Slave ID
04 is the function code to read Input Registers
10 is the number of data bytes following (16)
00 00 00 17 is the value of configurable input 1 (23)
00 00 26 6B is the value of configurable input 2 (9835)
00 01 1F 17 is the value of configurable input 3 (73495)
00 01 1E C1 is the value of configurable input 4 (73409)
A5 E0 is the 16-bit CRC

The following table gives the Modbus register numbers for each I/O type. The register numbers are all zero based.

I/O Name	float32	uint32 0dp	uint32 1dp	uint32 2dp	uint32 3dp	int32 0dp	int32 1dp	int32 2dp	int32 3dp
Timer 01	1000	5000	15000	25000	35000	10000	20000	30000	40000
…	…	…	…	…	…	…	…	…	…
Timer 10	1018	5018	15018	25018	35018	10018	20018	30018	40018
Clock	1020	5020	15020	25020	35020	10020	20020	30020	40020
Ring Indicator	1022	5022	15022	25022	35022	10022	20022	30022	40022
Alarm Indicator	1024	5024	15024	25024	35024	10024	20024	30024	40024
Buzzer	1026	5026	15026	25026	35026	10026	20026	30026	40026
Digital Output 01	1028	5028	15028	25028	35028	10028	20028	30028	40028
…	…	…	…	…	…	…	…	…	…
Digital Output 12	1050	5050	15050	25050	35050	10050	20050	30050	40050
Counter 01	1052	5052	15052	25052	35052	10052	20052	30052	40052
…	…	…	…	…	…	…	…	…	…
Counter 12	1074	5074	15074	25074	35074	10074	20074	30074	40074
Analogue Output 01	1076	5076	15076	25076	35076	10076	20076	30076	40076
…	…	…	…	…	…	…	…	…	…
Analogue Output 04	1082	5082	15082	25082	35082	10082	20082	30082	40082
Config Input 01	1084	5084	15084	25084	35084	10084	20084	30084	40084
…	…	…	…	…	…	…	…	…	…
Config Input 12	1106	5106	15106	25106	35106	10106	20106	30106	40106
Frequency 01	1108	5108	15108	25108	35108	10108	20108	30108	40108
…	…	…	…	…	…	…	…	…	…
Frequency 12	1130	5130	15130	25130	35130	10130	20130	30130	40130
Variable 001	1384	5384	15384	25384	35384	10384	20384	30384	40384
…	…	…	…	…	…	…	…	…	…
Variable 999	3380	7380	17380	27380	37380	12380	22380	32380	42380
EXT001	46000	48100	50200	52300	54400	56500	58600	60700	62800
…	…	…	…	…	…	…	…	…	…
EXT999	47998	50098	52198	54298	56398	58498	60598	62698	64798

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 2006/95/EC

• EMC Directive 2004/108/EC

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