HCM4

Thermal Energy
Calculating Meter Systems For
'The Digital Age'

INSTALLATION INSTRUCTIONS

HCM4008 - Thermal Energy Calculating Meter - 24 volts

Modbus **With Pulsed Output** Modbus

Calculates The Energy Used In Heating or Cooling Systems
KWh & Monetary Read Outs (£ $ E)
Digital High Accuracy Sensors
Strap On Pockets
'On Site' Programming Facility
Manufactured to ISOEN 1434 Parts 1 to 6

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The HCM4 consists of 3 component parts

1 – The HCM4 Energy Calculating Meter
2 – A Set (of two) Digital High Accuracy Digital DHAS sensors
3 – A Set (of two) 'Strap On' Pockets – The temperature sensor bulbs can be strapped directly onto the pipe work .

Mounting

The HCM4 is designed for wall mounting, a screw case hanging position is located at the top centre of the case with two wall fixing positions located under the terminal cover

Wiring

Wiring block list -- terminals are marked on the pcb –
Remove Meter front cover to expose wiring block

Wiring Terminal List

1 = Power In (+) - 24v
2 = Power In (-) - 24v

3 = Sensor Hot -- Brown
4 = Sensor Hot -- Green
5= Sensor Hot -- Blue
6 = Flow Meter 1 (+) (The red led on front of case flashes when it receives a pulse from the flow meter)
7 = Flow Meter 1 (-)
8 = Pulsed Output 1 (+)
9 = Pulsed Output 1 (-)
10 = Analog Output (4 -20 mA) 1 Active (where fitted)
11 = Analog Output (4 - 20 mA) 2 (where fitted)
12 = Analog Output (4 - 20 mA Passive (where fitted)
13 = CAT Terminal (+) –Building Alarm Terminal (where fitted) www.hcm4.com/cat.htm
14 = CAT Terminal (-) – Building Alarm Terminal (where fitted) www.hcm4.com/cat.htm
15 = Pulsed Output 2 (+) -- (where fitted)
16 = Pulsed Output 2 (-) -- (where fitted)
17 = Flow Meter 2 (+) -- (where fitted)
18 = Flow Meter 2 (-) -- (where fitted)
19 = Sensor Cold -- Brown
20 = Sensor Cold – Green
21 = Sensor Cold -- Blue

Installation Tip
Fit sensors and wire in before powering up

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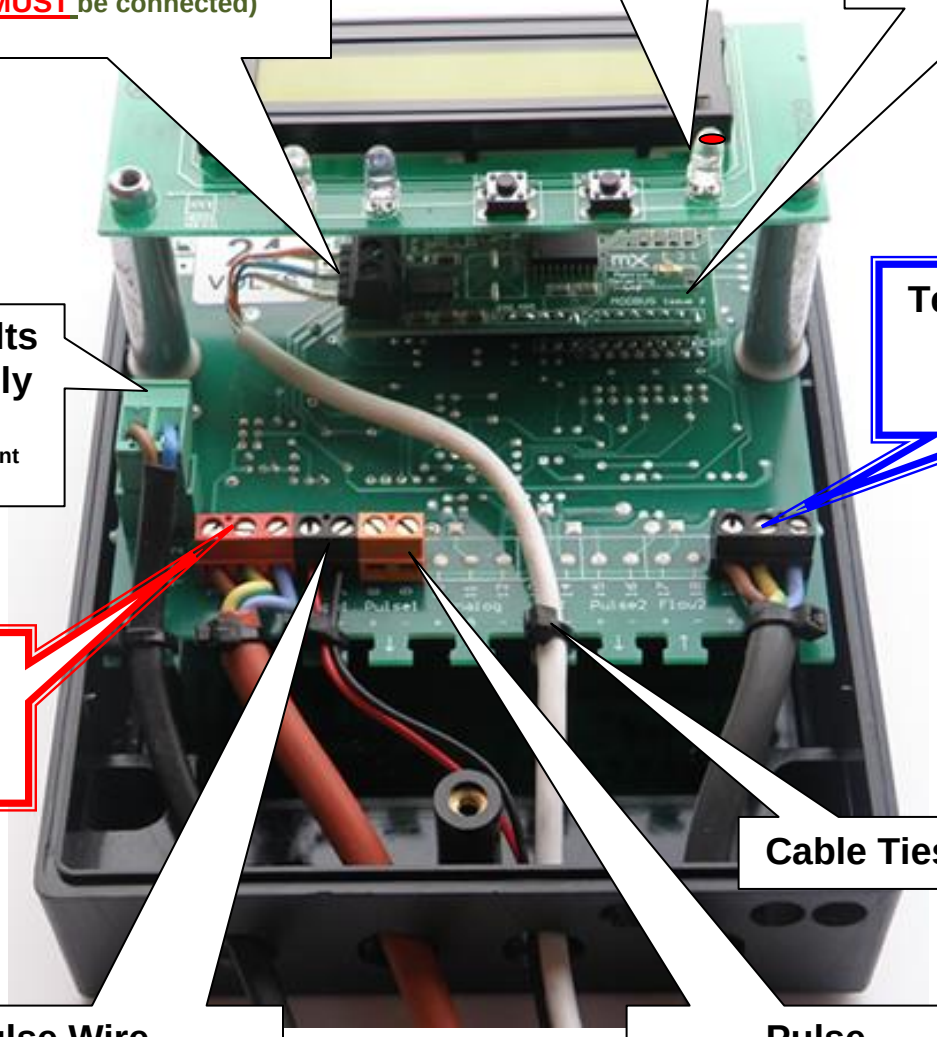
HCM4008 – Wiring (Modbus)



Three Wires To Modbus System
1 & 2 = Data
3 = Ground/Common
(Connected to all devices in the bus)
(Ground MUST be connected)

LED – Flashes Red – when a pulse is received from the flow meter

Modbus - PCB

230 or 24 volts Power Supply To PCB
(As listed on the front cover)

Temperature Sensor Cold

Temperature Sensor Hot

Cable Ties

Pulse Wire From Flow Meter
6 = Red 7 = Black

Pulse Output
8 = + 9 = -

Note – Temperature sensors locate in the same position in both Heating or Chilled Circuits on the PCB

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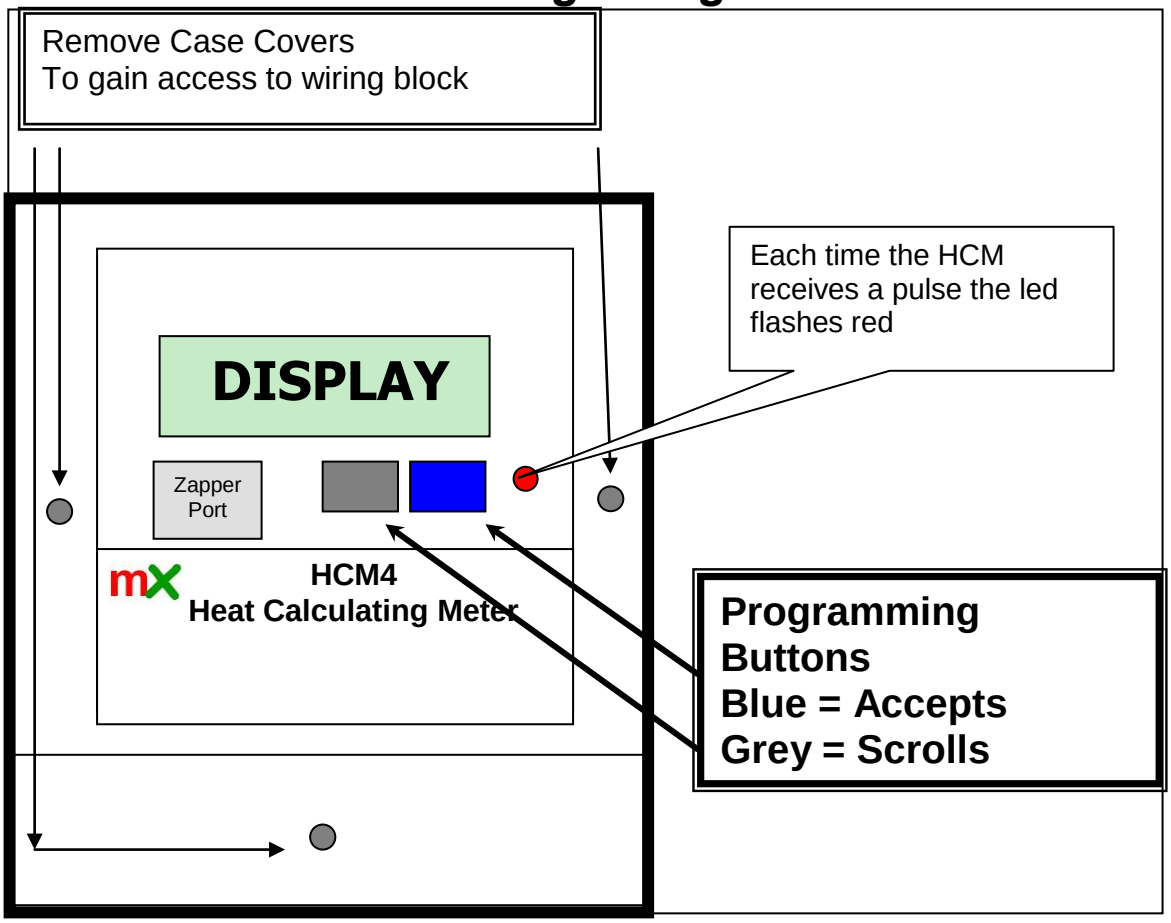
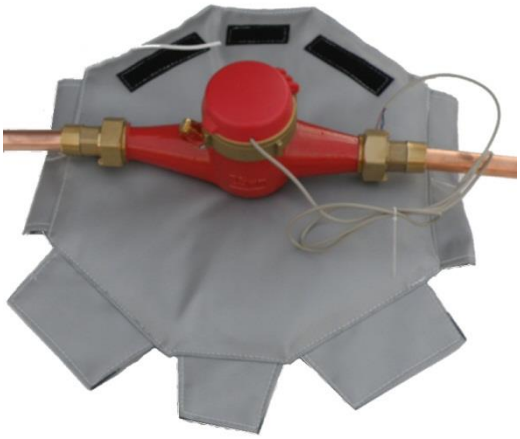


Installation

Remove HCM4 cover and install all wiring leaving the **connection of either mains supply 230v or 24v**
Wiring standards must conform to IEE regulations
It is recommended to use shielded cable manufactured to BS4360 Class 5 or VDE0295 Class 5
It is recommended that the flow meter when in a heating circuit is fully insulated with a Thermal Jacket



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DHAS Sensors (Digital High Accuracy Sensors)

Are highly accurate, temperature thermometers, they are calibrated to an accuracy of 1.0% and a calibration certificate is included with each sensor set.
DHAS are highly efficient, and
The **Red Coloured Sensor**, should always be located in the hottest pipe
Heating Circuit = Flow Chilled Circuit = Return

The **Black Coloured Sensor**, should always be located in the coolest pipe
Heating Circuit = Return Chilled Circuit = Flow

DHAS Sensors (Digital High Accuracy Sensors)
DHAS Sensors are highly accurate, calibrated temperature sensors, there unique design ensures they can be easily strapped onto the pipe work. The sensors have individual serial numbers located on the cable, and a calibration certificate is supplied with each set.
Unlike other similar products DHAS sensors are both flexible and reliable. And is extremely installer friendly
A – They do not have to be a matched pair
B – They can be cut in length without effecting calibration

LD (Long Distance) Temperature Sensors
All versions of HCM's, owing to there digital design,have the unique ability to be able to read data securely with 100% accuracy over long distances, Temperature sensors that can measure accurately for distances up to 200 metres.

Sensors can be purchased in the following sizes –
Order Code 404020 5metres Order Code 404030 10 metres
Order Code 404040 50 metres Order Code 404050 100 metres
Order Code 404060 150 metres Order Code 404070 200 metres
(other sizes by request)

Programming Heat Calculator

Installation Tip
Buttons
Left/Grey = Scroll
Right /Blue = Accept

At Boot up - Sequence

Matrix Metering
HCM4008 Version No 2.7

Boot Up –
Is split into 4 sections each section scroll (Left/Grey Button) and Accept with (Right/Blue Button)

1st Screen Set (Setting of Energy Unit)

Energy in KW/KWh

Energy in MW/MWh

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Total Billing Counter either Kilowatt hours (standard) or Megawatt Hours (commercial)

2nd Screen Set (Billing Preference) 2/a

Resettable Energy

Billing in KWh's

If this option chosen

Resettable Money

Billing in Monetary Value

See Page 8 For full explanation

Screen 2/b

Cost 000.p KWh

3rd Screen Set (What type of system is it)

Heating System

Heating/Central Heating/Hot Water

Cooling System

Cooling/Chilled/Air Conditioning

4th Screen Set (Where is the flow meter located)

Meter in Return

Meter in Flow

Where is the flow/water meter located – Return pipe (standard) or Flow pipe

5th Screen (Pulse value from Water Meter)

F1 0001 L/pulse

F1 0100 L/pulse

Pulse value selectable 1,10,100,1000 litres per pulse
Example F10 = 10 litres of water per pulse
(The pulse value is always located on the meter)

Pulse value of meters uk Ltd Flow Meters

Pipe Size	Pulse Value
15mm/20mm/25mm	1
30mm/40mm	10
50mm to 150mm	100
200mm	1000

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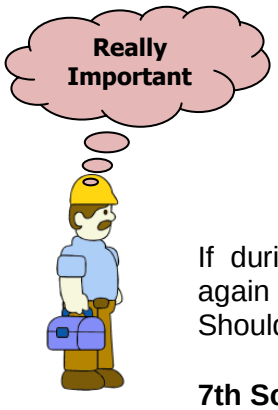
THE HCM4 NOW AUTOMATICALLY SCROLLS THROUGH THE SETTINGS

6th Screen Set



Reject Settings | **Accept Settings**

THIS STAGE IS VERY IMPORTANT

If during the auto scroll you are unsure of the setting – press Reject Settings and start again
Should you be sure the settings are correct - press Accept Setting

7th Screen — **Hold to Save ..**

You will need to hold the Blue/Right button down firmly for 10secs – the buzzer will sound continuously

Last screen
At this point all the settings are saved — **Saved**

END OF PROGRAMMING

Operational Data

Default Screen

See Page 9
For full explanation

RM £ 050.25 — Resettable Money

RE 45697.1 KWh — Resettable Energy KWh/MWh

Total — **TE 0000000.0 KWh**

Total consumption in KWh's (or MWh'S) Nine digits + One 1/10 (NOT reset table)

Instantaneous Energy — **IE 23 KW**

The amount of energy being consumed in the circuit NOW

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Temperature Flow	**tf**	**78.8C**

Temperature in the flow pipe

Temperature Return	**tr**	**78.8C**

Temperature in the return pipe

Flow	**F1**	**354.87 m3/h**

Total flow in metres cubed per hour 1 m3h = 3.6 litres

To Change Settings

Once passed screen set no 7 – the only way to access the settings is with a Zapper Unit Reference **www.hcm4.com/zapper.htm**

Outward Pulse Data – Open Collector
Maximum Operating Voltage 45vdc
Clamp circuit interjection 65vdc
500watt Power Dissipation Limit - Max Current 10amp
Reverse Connection Protection 6vdc
Pulse Width 50 ms
DC Forward Current 0.6v
Rise And Fall Max 18 micro Secs
Isolation Résistance 5 x 10/10 ohms
Isolation Voltage 5 kV
Collector Remitter Saturation Voltage 0.4volts
Operating temperature range -55c to 130c

Outward Pulse Value

10 pulses per KWh (if set for KWh's)
OR 10 pulses per MWh (if set for MWh's)

Error Codes

- Act as a 'Que' in the software to inform of potential problems. When an 'ERROR' occurs the HCM4's buzzer operates.

ERROR 1 No sensors connected or shorted to 5volts
ERROR 2 Data shorted to O volts
ERROR 3 Data transmission error
ERROR 4 Only 1 sensor connected
ERROR 5 Not a pair (either 2 hot or two cold connected)

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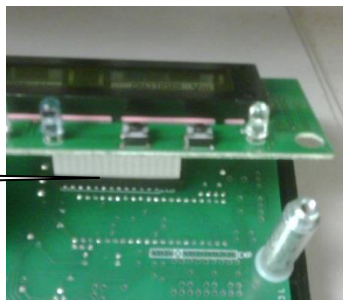
FREEZING Temperature in pipes or below 1c NEGATIVE DELTA T The sensors are likely too be the wrong way round

Power Failure = Either – Sensors Incorrectly wired - **Check Wiring**
Or - Damaged Sensors – **Replace**
Reverse Energy - Shown when Temperature difference between flow and return is less than 1 c

Display – Dim or Showing Blocks Only = Display Dislodged
Pull display out of its socket and replace carefully



EXPLANATIONS & FAQ's

(Ref 2nd Screen Setting) Reset able Energy (A) or Monetary Value (B)
This offers the option of either having the default screen showing as :-

A Energy -- Shown as KWh (standard applications) or
MWh (Commercial Applications)
B Monetary Value -- Shows the value as real money !!!

Q1 -- Can I reset the screens
A1 -- Yes with a zapper unit
Q2 -- Do I lose all the data at reset
A2 -- No the system integrity is kept,the 2nd screen in operation retains the total usage since start and is not resettable
Q3 -- What security of settings are there
A3 -- Once the settings have been saved (9th Screen) they cannot be tampered with
Q4 -- How can I change the settings and monetary values
A4 -- Security is important for this reason we have developed a zapper unit
The zapper **www.hcm4.com/zapper.htm** unit will open the software for settings and monetary value resetting. The company registers each zapper unit sold
Q5 -- What is shown on the screen when in operation
A5 -- The current total which can be reset – either KWh's or Monetary value

Q6 – I am trying to set up a HCM and I keep getting '**POWER FAILURE**'. on the display .
A6 -- The sensors are either incorrectly wired – re check the wiring – or sensors damaged .

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Guarantee

All products are guaranteed on a return to base basis only, for a period of 12 months from dispatch date. No compensation can be offered, relating to consequential loss. Where HCM4 Calculators are installed, not using Meters UK water/flow meters This could alter the known operational criteria, and effect the product integrity. The company reserve the rights to refuse claims where deemed correct.
This product is sold subject to the company Despatch, Guarantee & Returns Policy only
www.meters.co.uk/policy.htm

Typical Set Up – (Unless bespoke request)
Type Of Modus – RTU – 2 wire plus ground – RS485
No meters on bus 250
Maximum Length of cable run 4kilometres
Electrical Supply Via bus
Power Consumption 3.0mA
Communication Speed 9600 baud
Data Format 1 start bit 8 data bits 1 stop bit – Even Parity
Read Registers – Use Function Code 4 (Read Input Registers)
Register 1 & 2 = 32 bit Total Energy kWh

Register 3 & 4 = 32 bit Instantaneous Power kW
Register 5 = 16 bit Flow Temperature C
Register 6 = 16 bit Return Temperature C
Register 7 & 8 = 32 bit Flow Rate m3/h

Power Consumption – 1.5 mA
Markings Approvals Standard EN 1434 – 3
CE Complies to requirements when fitted to meters uk Ltd manufactured products
Signal Quality ISO7480 section 3.6

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