

# HCM4

## Thermal Energy Calculating Meter Systems For *'The Digital Age'*

### HCM4004 - Thermal Energy Calculating Meter - 230 volts Pulsed Output & Analog 4 – 20 mA

Calculates The Energy Used In Heating or Cooling Systems  
 KWh & Monetary Read Outs (£ \$ E)  
 Digital High Accuracy Sensors  
 Strap On Pockets Option  
 'On Site' Programming Facility  
 Manufactured to ISOEN 1434 Parts 1 to 6  
 4 – 20 mA Output – Active & Passive



Authorised User No. 00475



#### Order Code

**HCM4004** (4 – 20 mA Version) Standard with Monetary Value & Resettable  
**HCM4004HP** As above + High Precision Version

[www.hcm4.com](http://www.hcm4.com)

INSTALLATION INSTRUCTIONS

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## Thermal Energy Calculating Meter Systems For 'The Digital Age'

### Installation Instructions

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 to be installed in 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 (+) -- Either Mains 230v (110v USA) or 24v**

**2 = Power In (-) -- Either Mains 230v (110v USA) or 24v**

**3 = Sensor Hot -- Brown**

**4 = Sensor Hot -- Green**

**5 = Sensor Hot -- Blue**

**6 = Flow Meter 1 (+)**

**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)**

**14 = CAT Terminal (-) – Building Alarm Terminal (where fitted)**

**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**



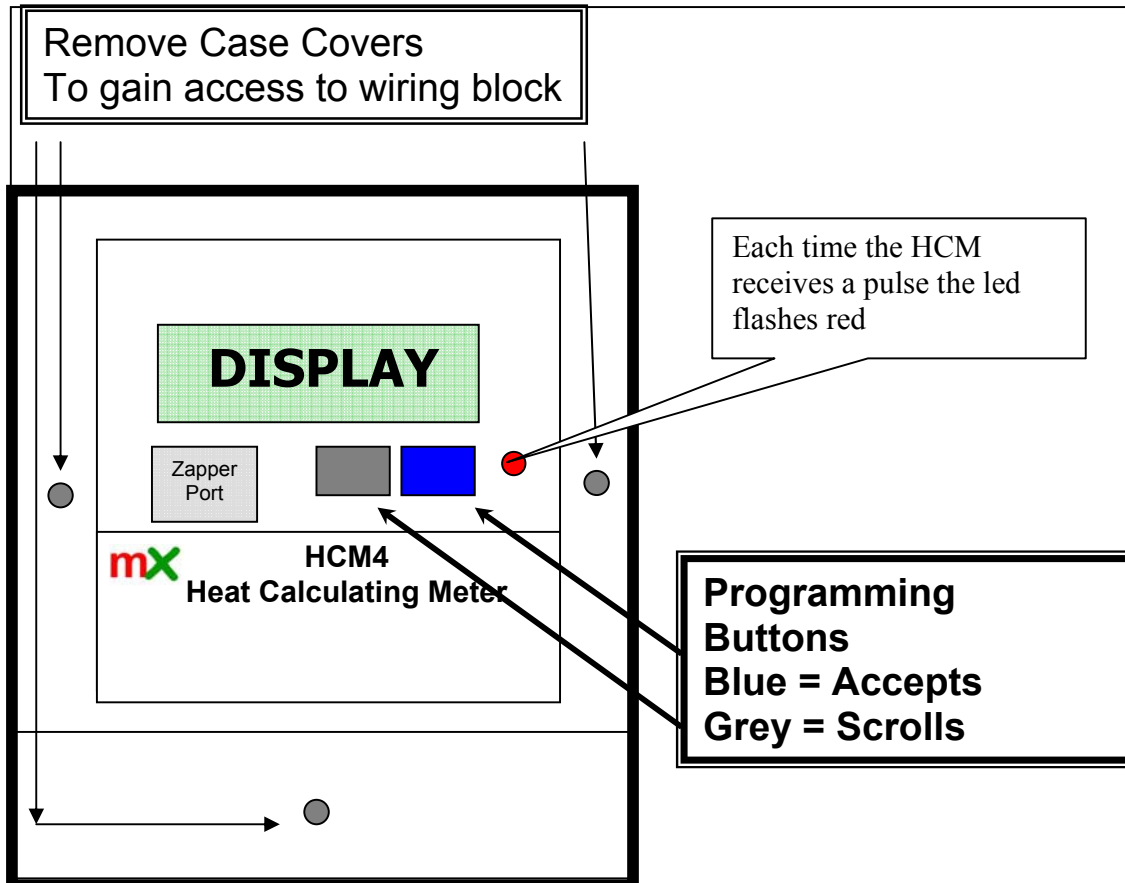
See Page 8



**Installation Tip**  
Fit sensors and wire in  
before powering up

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## Thermal Energy Calculating Meter Systems For 'The Digital Age'



### 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

### 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

# HCM4

## Thermal Energy Calculating Meter Systems For 'The Digital Age'

### Pipework Recommendation

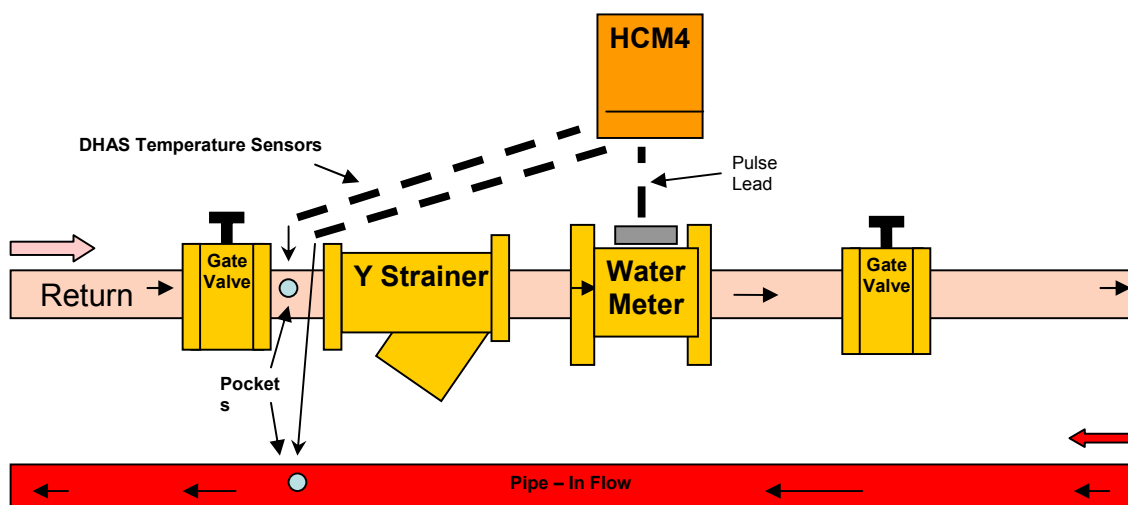
It is strongly recommended that the pipe work is correctly protected with the following valves :- Gate Valves (x2) Strainer (x1)  
Should these not be fitted, the company takes the option to invalidate any guarantee(s)

HCM4

### Heat Calculating Meter

#### Pipe Work and Valve Layout Hot & Chilled Water Circuit

#### 'How it all fits'



### DHAS Sensors ( Digital High Accuracy Sensors )

DHAS Sensors are highly accurate, calibrated temperature sensors, they are designed to fit into pockets which onwardly fit into the pipe work. The sensors have individual serial numbers located on the sealing tags, and a calibration certificate is supplied with each set. Unlike other similar products DHAS sensors are both flexible and reliable. And are extremely installer friendly

A – They do not have to be a matched pair

B – They can be cut in length without effecting calibration

C – They can be added too. ( to a maximum of 10 metres ) And up to 200 metres with LD version

### 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 0 volts

ERROR 3 Data transmission error

ERROR 4 Only 1 sensor connected

ERROR 5 Not a pair (either 2 hot or two cold connected)

FREEZING Temperature in pipes or below 1c

NEGATIVE DELTA T The sensors are likely too be the wrong way round

### Programming Heat Calculator

At Boot up - Sequence

Matrix Metering



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

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## Thermal Energy Calculating Meter Systems For 'The Digital Age'

HCM4004 Version No 2.0

Boot Up

Split into 4 sections each section scroll (Left/Grey Button) and Accept with (Right/Blue Button)

**1<sup>st</sup> Screen Set (Setting of Energy Unit)**

**Energy in KW/KWh**

**Energy in MW/MWh**

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

**2<sup>nd</sup> Screen Set (Billing Preference) 2/a**

**Resetable Energy**

Billing in KWh's

**Resetable Money**

Billing in Monetary Value

See Page 8  
For full  
explanation

**Screen 2/b**

**Cost 000.p KWh**

If this option chosen

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

**Heating System**

**Cooling System**

Heating/Central Heating/Hot Water

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

**5<sup>th</sup> Screen Set (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)

**6th Screen Set (4 – 20 mA – Settings -- Water Flow Meter)**

**Flow on Analog**

**Amax 0000 m3h**

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## Thermal Energy Calculating Meter Systems For 'The Digital Age'

Flow Meter (water)

The maximum setting (the 20mA) scroll and set

7th Screen Set (only if 4 -20mA is required on Energy )

Energy on Analog

Amax 0000 kW/MW

Instantaneous Energy

The maximum setting (the 20mA) scroll and set

### END OF PROGRAMMING THE HCM4 NOW AUTOMATICALLY SCROLLS THROUGH THE SETTINGS

Really  
Important

8th 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

9th Screen Set

Hold to Save...

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

Last screen

Saved

At this point all the settings are saved

### Operational Data

Default Screen

RM £ 050.25

RE 45697.1 KWh

See Page 8  
For full explanation

Resetable Money

Resetable Energy KWh/MWh

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## Thermal Energy Calculating Meter Systems For *'The Digital Age'*

**Total Energy**

**TE 0000000.0 KWh**

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

**Instantaneous  
Energy**

**IE 23 KW**

The amount of energy being consumed in the circuit NOW

**Temperature  
Flow**

**tf 78.8C**

Temperature in the flow pipe

**Temperature  
Return**

**tr 78.8C**

Temperature in the return pipe

**Flow**

**F 354.87 m3/h**

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

**Analog (4 -20mA)**

**AF 6 mA**

When set for flow

**AI 6 mA**

When set for Energy

### To Change Settings

Once passed screen set no 9 – the only way to access the settings is with a Zapper Unit  
Reference [www.hcm4.com/zapper.htm](http://www.hcm4.com/zapper.htm)

### Output 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 msecs

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## Thermal Energy Calculating Meter Systems For 'The Digital Age'

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 120c

### Outward Pulse Value

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

### 4 – 20 mA Data

Can be set for either instantaneous Flow or Energy  
Total no of graduations 800  
Value of each graduation 20 micro amps  
Supply Voltage 15 volts  
Maximum Voltage 30 volts  
**High Refresh Rate = 1 second**

Source – Active (outward) Terminal No's 10 & 11  
Highest Permissible Load Resistance 600 Ohms  
Sink – Passive – (inward) Terminals No's 11 & 12  
(Terminal 11 = common)

### EXPLANATIONS & FAQ's

(Ref 2<sup>nd</sup> Screen Setting ) Resetable 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 2<sup>nd</sup> screen in operation retains the total usage since start and is not resetable

Q3 -- What security of settings are there

A3 -- Once the settings have been saved (9<sup>th</sup> 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](http://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 incorrectly wired – re check the wiring



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## Thermal Energy Calculating Meter Systems For 'The Digital Age'

### 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 right to refuse claims were deemed correct.

This product is sold strictly subject to the company Dispatch, Guarantee & Returns Policy

[www.meters.co.uk/policy.htm](http://www.meters.co.uk/policy.htm)

### Other HCM4 versions available

#### CAT Terminals (Calculator Alarm Terminal)



Offers the option of providing a error alarm to a Building Management System

How it works -- The BMS despatches a voltage (max 30 volts) to CAT Terminal 1 (wiring terminal 13)

In the event of an error occurring a voltage would be returned to the BMS on CAT Terminal 2 (wiring terminal 14)

In operation CAT Terminal 2 would have zero volts – In error mode CAT Terminal 2 would have a voltage

### High Precision

Where high accuracy is required the HP version uses higher quality materials to be able to be calibrated to 0.02% accuracy

### LD ( Long Distance ) Temperature Sensors

Temperature sensors that can measure accurately for distances from 10 metres up to 200 metres

## NEED REMOTE READINGS ACCESS TO METERS!!!

### Remote Counter Unit

**PROVIDES EASY ACCESS TO READING FOR ALL TYPES OF UTILITY METERS – Electricity – Gas - Heat & Water etc**

- ✓ 1 & 6 way versions
- ✓ Easy programming – (two buttons on front)
- ✓ kWh/m3h or Monetary Read Outs ( £ \$ E )
- ✓ Manufactured to ISOEN 8859-2
- ✓ Simple User Friendly Readout
- ✓ 230/24 volts
- ✓ Pulse Output (with grab circuit)
- ✓ Zero Display Option ( Resetable Display)
- ✓ 230v or 24v



Reference [www.meters.co.uk/rcu.htm](http://www.meters.co.uk/rcu.htm)



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