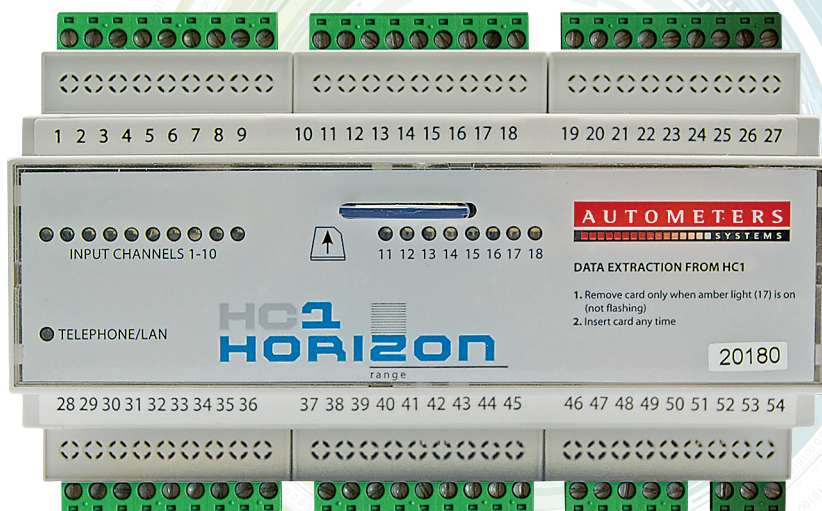


The Horizon HC1 is a data collector capable of collecting data from a variety of communication devices. It has 10 independently programmable pulse inputs for Utility meters and 3 Modbus LANS for communicating Power meters.

For data storage there is 8Mb of on board storage and a 1GB SD removable memory card. This coupled with the option of the GPRS Connection for remote monitoring and reporting make the HC1 an ideal choice for capturing and reporting data.

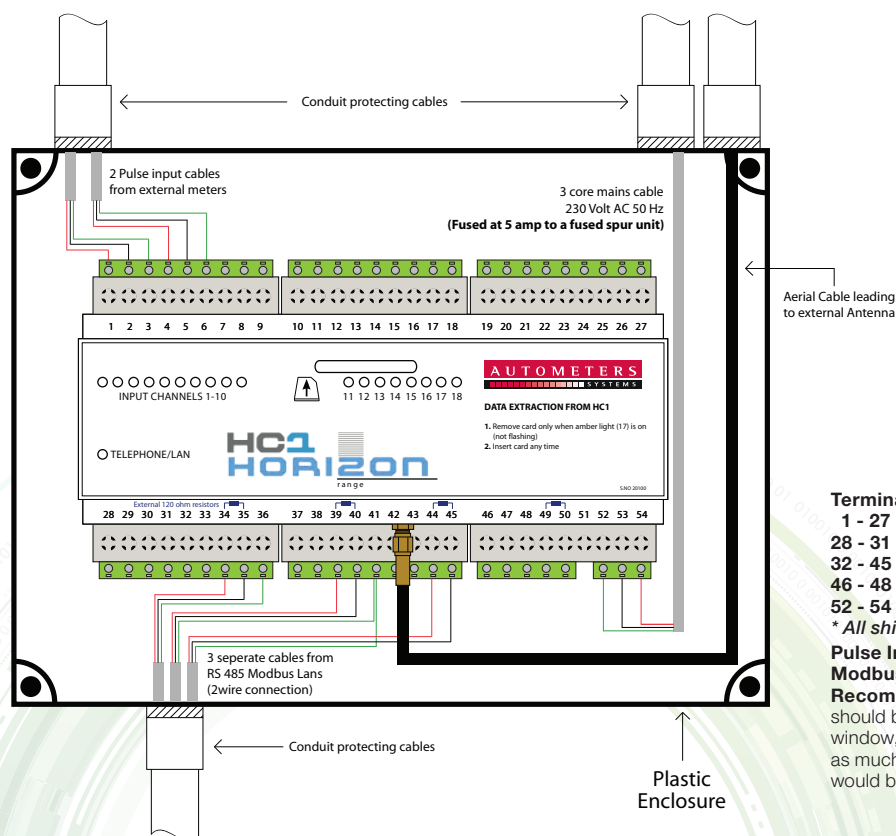
The removable 1Gb SD memory card allows a simple yet low cost solution for data logging. Data extraction is simple, remove the SD memory card, transfer to a local PC and when inserted into the PC a "pop up" window will appear with data files displayed. All files are stored as standard CSV Files and can be accessed simply using Microsoft Excel or Access.

If a GPRS module is fitted, all data is transferred at time of logging to the Secure Autometers Horizon Website. Here data can be viewed, graphed or downloaded when ever required. A Logical view can be created for cost centre analysis and automated reporting can be set to email information on a timescale to suit.



With the addition of the Horizon Invoicing package multi utility invoices can be manually and automatically generated in monthly, quarterly or yearly intervals.

**Diagram 1 - Horizon HC1 data collector installed in the Horizon-9 enclosure**



**HC1 Meter mounted in the enclosure**

### Terminals:

- 1 - 27 Pulse inputs from meters
- 28 - 31 Optional equipment
- 32 - 45 RS 485 Modbus terminals
- 46 - 48 Pulse Input from meter
- 52 - 54 Mains Input (230 Volt)
- \* All shields are Zero volt (not earth)

**Pulse Input Cable:** Beldon 9841 (2 core or equal)

**Modbus Cable:** Beldon 9841(2 core or equal)

**Recommended Height for Fixing Enclosure:** The enclosure should be fitted at a height to ensure it is easy to open the window, remove the card and in a position where it is protected as much as possible from mechanical damage. A good height would be 1.5 meters from the floor.

## Installation

The HC1 should be installed in a dry, dirt free environment away from heat sources and very high electric fields. Temperatures should not exceed 70 C or fall below -20°C. The HC1 is a din rail meter and must be fitted in an enclosure which complies with all the relevant health and safety regulations concerning enclosures. The HC1 should only be installed by a competent qualified electrician.

The HC1 comes standard with its own enclosure, this should be fitted to ensure easy access at all times, fitted at a suitable height allowing the user to open the front window and remove the card from the HC1 with out the need for ladders. A good height would be 1.5 metres from the floor.

Check contents before installing, you should receive the HC1 meter

with a small plastic bag containing four 120 ohm resistors. If the Horizon HC-9 enclosure is supplied it will also contain a small plastic bag containing a metal din rail bar, two screws and a number of plastic grommets. Where possible we advise to use conduit to protect the cables.

Before installing the HC1 it is imperative that you check that the HC1meter has been programmed in accordance to your order. This will be indicated by the separate document enclosed with the HC1 meter.

When wiring cables into the enclosure make sure there is plenty of length and that the connections are tight. Where possible allow approximately six inches of spare length on each cable. Diagram 1 shows an indication of the cable connections and position of the HC1 in the enclosure, to simplify the diagram it does not show the extra six inches of cable recommended as above on each cable.

### Connecting the HC1 Meter

#### Pulse Inputs Connections

Terminals 1-27 and 46-48 are dedicated for pulses from External meters and care should be taken when connecting wires to these terminals. A red indicator has been allocated and will flash (numbered 1-10) to indicate the HC1 receiving a pulse input from an external meter.

If the external meters are fitted with the transistor / opto pulse output rather than a voltage free relay, it is imperative that the + and - wires have been connected to the correct HC1 and HCC input terminals.

#### Modbus Connection

The HC-1 is fitted with three RS 485 Modbus communication channels, terminals 34,35, 36,- channel 1, 39,40, 41- channel 2 and 44, 45, 41, channel 3 each with an individual red indicator light 13, 14 and 15 positioned on the front of the meter. The red indicator light will be illuminated when the channel is connected and will flash when data is being transmitted. We recommend that you use Beldon cable 9841 or equivalent for all communication cable.

**The external 120 ohm resistors must be wired in at both ends of the Lan. See Diagram 2. Horizon HC1 Wiring Schematic, Page 5.**

#### Telephone Module

The HC1 can be fitted with an internal GPRS telephone module, this module down loads the HC1 data direct to Autometers Systems private WEB site for manipulating the data into spread sheets and costs centres. Two red lights apply to the telephone module, one light is labelled Telephone /Lan this light will illuminate when the network is present, the other light is number 16 this light will remain on indicating that a telephone module is fitted and flash when it is sending information to the web.

If you have purchased the HC1 with a telephone module you must install it with a view of receiving a good network signal from the telephone company an ideal position would be to install the HC1 on an outside wall. This then ensures that the external antenna can be installed easily. ( The antenna comes with a 5 metre cable).

#### Memory Card

The HC1 comes with an 8 Mb internal memory and a 1 Gb removable memory card. The internal memory reads the meters and then up dates the removable memory card. By removing the memory card and inserting in to a convenient computer you can down load all the stored data. All data is stored as a coma delimited CSV file and can be opened directly with a Microsoft Excel, for files with up to 65 thousand lines of logged information you will need to use Microsoft Access.

When the card is removed, data is still continually logging on the onboard memory. This memory is limited and care should be taken to ensure the card is replaced with the original one or a new SD card as soon as possible.

The memory card can only be removed when the orange light (17) is permanently on. Do not remove the card when the light is flashing

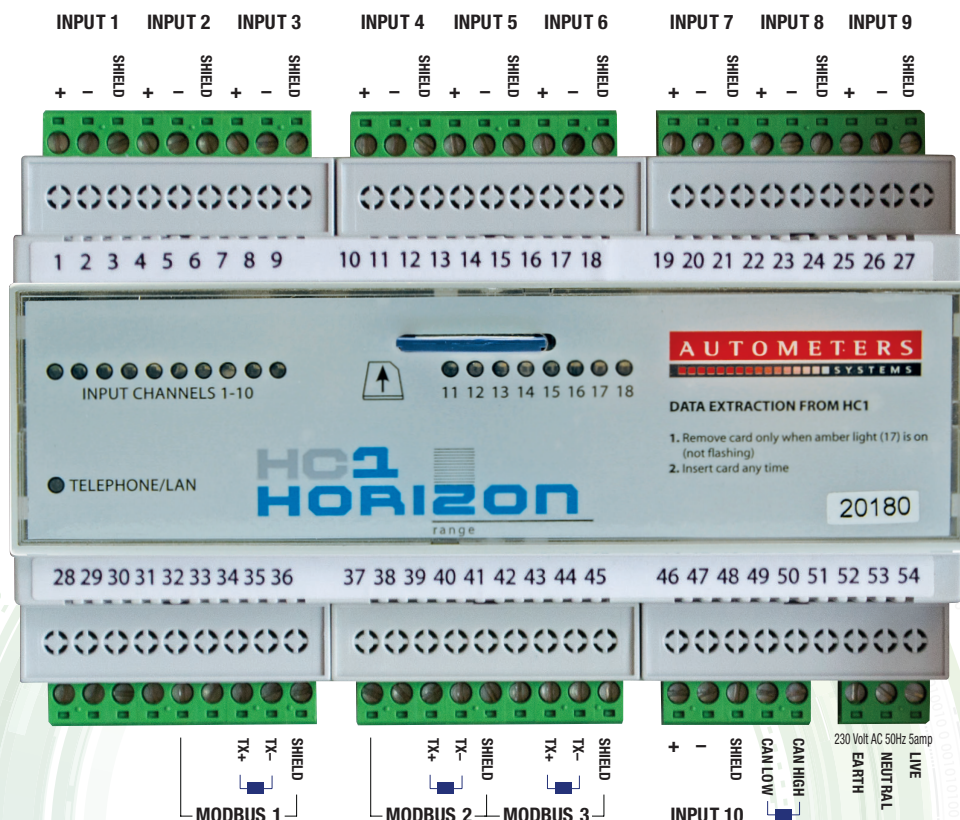
The card can be re-inserted any time.

The red indicator lights numbered 1- 10 will illuminate in a running sequence to indicate the removable memory card is full.

#### Power Supply

The power supply to the HC-1 Data collector is 230 Volt, 50 Hz, 2 amp and should be supplied from a double pole fused Spur unit situated close to the HC-1 meter, the spur unit must be clearly marked as the disconnection switch for the HC-1 unit. The supply wires are connected to terminals 52 Earth, 53 Neutral and 54 Live. A green light (number 18) will illuminate indicating HC-1 has main voltage applied.

Diagram 2 - Horizon HC1 wiring schematic



#### Terminals:

- 1 - 27 Pulse inputs from meters
- 28 - 31 Optional equipment
- 32 - 45 RS 485 Modbus terminals
- 46 - 48 Pulse Input from meter
- 52 - 54 Mains Input (230 Volt)
- \* All shields are Zero volt (not earth)

**Pulse Input Cable:** Beldon 9841 (2 core or equal)

**Modbus Cable:** Beldon 9841 (2 core or equal)

#### Modbus Configuration

Number of Modbus LANS – 3  
Number of meters per LAN – Upto 256  
Maximum LAN Length – 1000 Metres  
Protocol – 2 Wire RTU, Floating Point High word first, 9600 Baud, Even Parity.

\* When wiring Modbus 2 wire insert 120 ohm resistors at both ends of the Lan network between TX + and TX -

#### Information on Indicator Lights:

- 1 - 27 Red lights flash when pulse is recieved from meter.
- 11 Blue light flashing indicates the processor is running and working.
- 12 Red Light: On all the time indicates Canbus is active. When flashing indicates data is being transmitted.
- 13 Red Light (Modbus 1): On all the time indicates RS 485 is active. When flashing indicates data is being transmitted.
- 14 Red Light (Modbus 2): On all the time indicates RS 485 is active. When flashing indicates data is being transmitted.
- 15 Red Light (Modbus 3): On all the time indicates RS 485 is active. When flashing indicates data is being transmitted.
- 16 Red Light: On all the time indicates Telephone is active. When flashing indicates data is being transmitted.
- 17 Amber Light: On all time indicates card is in the slot. When flashing indicates data is being written to the card. When off indicates the card has been removed.
- 18 Green Light on indicates Power On.

**Telephone/Lan:** Red Light on indicates if Network is present.



### Autometers Commissioning

If Autometers systems are commissioning the HC1 on site then please ensure that the cables are properly installed in the enclosure and labelled. Where possible please leave details of the pulse value on each cable inside the enclosure. If using RS 485 Modbus please leave a list with the type of individual meters, the location and any other helpful information regarding the installation of the RS 485 network system.

**Please Note:** The engineer is only available to check the connections in the enclosure and commission the HC1 unit; his/her priority is to make sure the HC1 unit is functioning correctly. Where possible should an external problem be at fault he will assist the local electrician to solve the problem but only if time is permitting. Should an external fault still be present and can not be solved due to time then another appointment with the engineer may have to be scheduled.

### Power On

When the HC1 has been installed and all the cables have been connected you are ready to switch the power on. When power is on you will notice a range of lights illuminate.

1. The green light (18) should be on this indicates Power is supplied to the meter
2. The blue light (11) should be flashing indicating the processor is working.
3. The orange light (17) should be on indicating the memory card is inserted

If the telephone module is fitted.

4. The red light (16) will be on indicating telephone active
5. The red light (Tele/Lan) will be on indicating connected to network.

If data is being received from external meters.

6. Red lights will flash (1-10) when pulses from external meters are being received.

7. Red lights will flash(13-15) when information on Modbus is being received.

Should any of these lights not be working, check the wiring carefully.

### The HC1 and Memory Card

The HC1 data collector has an internal memory of 8 Mb and a removable data card with 1 Gb of memory.

The data collector will start to log information as soon as the power has been switched on. The data will start to be logged on the internal memory even if the removable card is not inserted on a first in first out basis. When you insert the removable card this will enable the 8Mb internal memory to download onto the 1 Gb removable card.

The number of days retained in the memory will be decided on the number of meters connected and the number of parameters being recorded of each meter. When you insert the 1 Gb memory card you have created a much larger storage system enabling many extra months of stored data.

### Checking the Memory Card

The HC1 when powered up will start to log the data according to how you have requested the meter to be set up in the factory.

For example, you have requested the HC1 to log data every 30 minutes - on the hour and the half hour.

When the HC1 has been powered up for the first time and after a few minutes it will send the first set of log files to the memory card, there after will only send every 30 minutes.

### Logged Data

The removable 1Gb memory card stores logged values in user defined intervals from both pulse and communicating devices. When information is to be downloaded, you simply remove the memory card, transfer to a P.C via a card reader and the file simply downloads into an Excel spread sheet for further analysis.

#### Example 1 - Information recieved via pulse inputs.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
4	HC1 Config Table													
5	Input Channel	Description	PPU	UPP	Debounce(ms)	Tarrif Type	Time 1	Time 2	Time 3	Time 4				
6	1	Gas Meter Flat 1	1	1	20(ms)	Dual	00:00	14:30	--	--				
7	2	Electric Meter Flat 1	0.1	10	20(ms)	Tripple	00:10	14:30	14:35	--				
8	3	Electric Meter Flat 2	100	0.01	20(ms)	Quad	00:20	14:35	14:40	14:45				
9	4	Heat Meter Flat 2	0.01	100	20(ms)	Dual	00:00	13:45	--	--				
10	5	New Input 5	10	0.1	20(ms)	Single	--	--	--	--				
11	6	New Input 6	10	0.1	20(ms)	Single	--	--	--	--				
12	7	New Input 7	10	0.1	20(ms)	Single	--	--	--	--				
13	8	New Input 8	10	0.1	20(ms)	Single	--	--	--	--				
14	9	New Input 9	10	0.1	20(ms)	Single	--	--	--	--				
15	10	New Input 10	10	0.1	20(ms)	Single	--	--	--	--				
16														
17	Input Channel	Description	Gas Meter Flat 1				Electric Meter Flat 1				Electric Meter Flat 2			
18	Log Date/Time(GMT)	Tariff	1	2	3	4	1	2	3	4	1	2	3	4
19	20/05/2013 14:40		230086	137399	--	--	2276870	15090	1382890	--	2267.98	14.25	13.15	1379.47
20	20/05/2013 14:45		230086	137590	--	--	2276870	15090	1384800	--	2267.98	14.25	15.05	1379.48
21	20/05/2013 14:50		230086	137889	--	--	2276870	15090	1387790	--	2267.98	14.25	15.05	1382.47
22	20/05/2013 14:55		230086	138189	--	--	2276870	15090	1390790	--	2267.98	14.25	15.05	1385.47
23	20/05/2013 15:00		230086	138489	--	--	2276870	15090	1393790	--	2267.98	14.25	15.05	1388.47
24	20/05/2013 15:05		230086	138789	--	--	2276870	15090	1396790	--	2267.98	14.25	15.05	1391.47
25	20/05/2013 15:10		230086	139089	--	--	2276870	15090	1399790	--	2267.98	14.25	15.05	1394.47
26	20/05/2013 15:15		230086	139389	--	--	2276870	15090	1402790	--	2267.98	14.25	15.05	1397.47
27	20/05/2013 15:20		230086	139689	--	--	2276870	15090	1405790	--	2267.98	14.25	15.05	1400.47
28	20/05/2013 15:25		230086	139989	--	--	2276870	15090	1408790	--	2267.98	14.25	15.05	1403.47
29	20/05/2013 15:30		230086	140289	--	--	2276870	15090	1411790	--	2267.98	14.25	15.05	1406.47
30	20/05/2013 15:35		230086	140588	--	--	2276870	15090	1414780	--	2267.98	14.25	15.05	1409.46
31	20/05/2013 15:40		230086	140888	--	--	2276870	15090	1417780	--	2267.98	14.25	15.05	1412.46
32	20/05/2013 15:45		230086	141188	--	--	2276870	15090	1420780	--	2267.98	14.25	15.05	1415.46
33	20/05/2013 15:50		230086	141488	--	--	2276870	15090	1423780	--	2267.98	14.25	15.05	1418.46
34	20/05/2013 15:55		230086	141787	--	--	2276870	15090	1426770	--	2267.98	14.25	15.05	1421.45
35	20/05/2013 16:00		230086	142087	--	--	2276870	15090	1429770	--	2267.98	14.25	15.05	1424.45
36	20/05/2013 16:05		230086	142387	--	--	2276870	15090	1432770	--	2267.98	14.25	15.05	1427.45
37	20/05/2013 16:10		230086	142687	--	--	2276870	15090	1435770	--	2267.98	14.25	15.05	1430.45
38	20/05/2013 16:15		230086	142987	--	--	2276870	15090	1438770	--	2267.98	14.25	15.05	1433.45
39	20/05/2013 16:20		230086	143287	--	--	2276870	15090	1441770	--	2267.98	14.25	15.05	1436.45
40	20/05/2013 16:25		230086	143587	--	--	2276870	15090	1444770	--	2267.98	14.25	15.05	1439.45
41	20/05/2013 16:30		230086	143887	--	--	2276870	15090	1447770	--	2267.98	14.25	15.05	1442.45
42	20/05/2013 16:35		230086	144186	--	--	2276870	15090	1450760	--	2267.98	14.25	15.05	1445.44
43	20/05/2013 16:40		230086	144486	--	--	2276870	15090	1453760	--	2267.98	14.25	15.05	1448.44
44	20/05/2013 16:45		230086	144787	--	--	2276870	15090	1456770	--	2267.98	14.25	15.05	1451.45
45	20/05/2013 16:50		230086	145086	--	--	2276870	15090	1459760	--	2267.98	14.25	15.05	1454.44
46	20/05/2013 16:55		230086	145386	--	--	2276870	15090	1462760	--	2267.98	14.25	15.05	1457.44
47	20/05/2013 17:00		230086	145686	--	--	2276870	15090	1465760	--	2267.98	14.25	15.05	1460.44

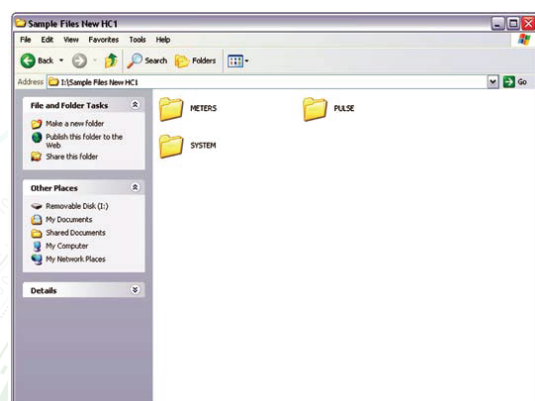
### Example 2 - Information recieved via RS 485 Modbus

	A	B	C	D	E	F	G	H	I	J	K
1	LogDate	LogTime	Serial No.	L1 Volt	L2 Volt	L3 Volt	L1 Amp	L2 Amp	L3 Amp	Tot. Amp	Tot. KW
2	12/03/2013	GMT:17:31:00	900669	237.7	239.92	232.12	45.44	23.92	53.24	122.6	28.324
3	12/03/2013	GMT:18:01:00	900669	234.57	237.52	231.94	42.96	26.4	56.12	125.48	28.762
4	12/03/2013	GMT:18:31:00	900669	234.01	237.29	235.25	40.4	26.32	31.92	98.64	22.683
5	12/03/2013	GMT:19:01:00	900669	232.17	236.13	236.62	47.32	27.68	22.84	97.84	22.404
6	12/03/2013	GMT:19:31:00	900669	231.18	235.43	237	43.76	25.92	22.88	92.56	21.217
7	12/03/2013	GMT:20:01:00	900669	233.28	238.5	238.82	44.2	17.52	15.44	74.84	17.454
8	12/03/2013	GMT:20:31:00	900669	232.43	238.78	235.43	39.92	19.32	23.76	83	18.994
9	12/03/2013	GMT:21:01:00	900669	233.71	241.55	242.18	44.88	13.72	6.68	65.28	14.627
10	12/03/2013	GMT:21:31:00	900669	236.85	242.49	240.33	36.48	14.28	19.56	70.32	16.288
11	12/03/2013	GMT:22:01:00	900669	239.02	242.21	239.23	30	9.16	17.16	56.32	13.078
12	12/03/2013	GMT:22:31:00	900669	235.49	237.75	242.15	31.96	17.24	11.56	60.76	14.04
13	12/03/2013	GMT:23:01:00	900669	240.93	241.73	243.65	18.84	6.16	5.8	30.56	6.928
14	12/03/2013	GMT:23:31:00	900669	240.68	240.27	243.72	20.84	9.52	4.2	34.56	7.852
15	13/03/2013	GMT:00:01:00	900669	241.53	239.18	243.8	16.12	9.24	4.2	29.56	6.672
16	13/03/2013	GMT:00:31:00	900669	240.63	240.37	242.2	12.72	7.48	4.28	24.48	5.446
17	13/03/2013	GMT:01:01:00	900669	239.81	239.64	241.28	12.96	4.8	4.16	21.92	4.804
18	13/03/2013	GMT:01:31:00	900669	240.38	241.09	243.16	12.72	6.96	4.28	24.08	5.356
19	13/03/2013	GMT:02:01:00	900669	239.96	241.14	241.49	12.88	4.92	4.6	22.4	4.956
20	13/03/2013	GMT:02:31:00	900669	241.34	241.7	242.88	12.8	5.08	4.6	22.52	4.956
21	13/03/2013	GMT:03:01:00	900669	242.44	243.18	243.69	12.84	4.84	4.32	22	4.83
22	13/03/2013	GMT:03:31:00	900669	243.18	243.86	243.97	14.24	4.4	4.24	22.88	5.059
23	13/03/2013	GMT:04:01:00	900669	239.64	240.74	240.74	13.44	5	4.64	23.08	5.026
24	13/03/2013	GMT:04:31:00	900669	241.34	241.6	241.18	12.68	5.08	6.24	24.16	5.295
25	13/03/2013	GMT:05:01:00	900669	238.72	238.47	239.39	13	4.8	6.24	24.04	5.291
26	13/03/2013	GMT:05:31:00	900669	237.72	239.84	239.43	13.28	4.32	6.36	23.96	5.162
27	13/03/2013	GMT:06:01:00	900669	239.84	239.11	240.95	13.08	4.08	4.32	21.48	4.65




### Data Extraction

To extract historical data, simply remove the card from the HC1 (ensuring that the amber light on LED 17 in Not Flashing) and insert into an SD card reader on your PC.

The following file will self extract to your screen.

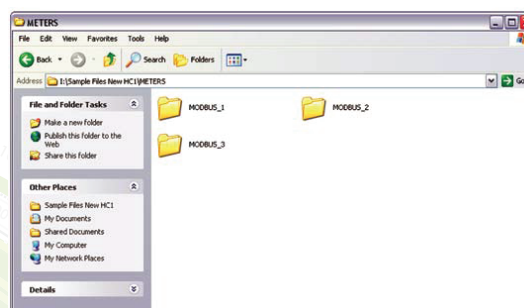


There are 3 Files Shown.

-  **METERS** This file contains all logged data for meters connected to the HC1 using the 3 Modbus LAN's.
-  **PULSE** This file contains all logged data for meters connected to the HC1 using the 10 off Pulse inputs.
-  **SYSTEM** This file contains programming files for the HC1.

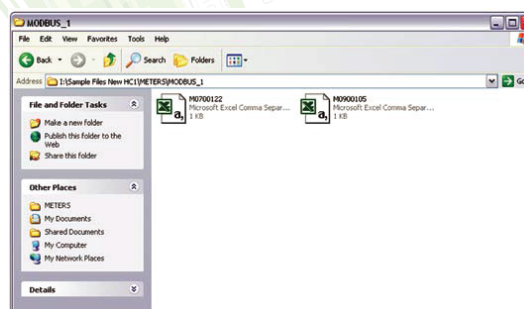
### Meter Data Extraction

To extract data from the **METERS Folder**, simply, double click the file using the left hand mouse button. A new window will appear as below;



Each folder represents the Modbus Channel on the HC1.

Eg if you want to extract data for the meters connected to Modbus Channel 1 (terminals 32-36) then double click, using the left hand mouse button on the **MODBUS\_1 folder**.



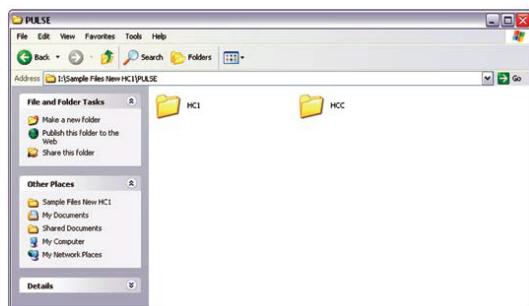
The files shown are individual to the meters connected to the Modbus LAN.

E.g. **M0700122** represents the meter connected to Modbus Lan 1 with Serial Number 700122. To open the file, simply double click using the left hand mouse button and the file will open in Microsoft Excel for evaluation.



### Pulse Data Extraction

To extract data from the **PULSE Folder**, simply, double click the file using the left hand mouse button. A new window will appear as below;



**There are 2 files shown**



HC1

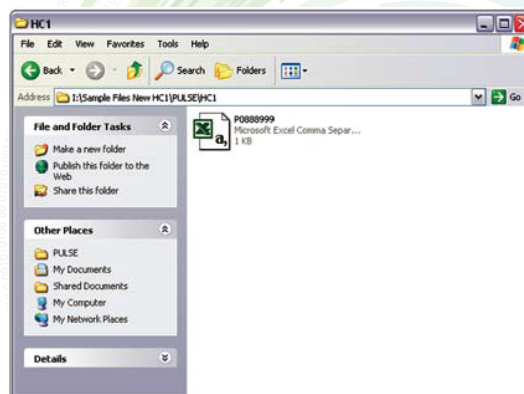
This file contains all the logged date from the external pulse meters which have been connected to the HC1 pulse input terminals (1-27 & 46-48)



HCC

This folder contains all the files (logged date) from the 16 channel HCC units connected via the Canbus network (terminals 49 & 50)

To extract Pulse information from the **HC1 Folder**, simply double click using the Left hand mouse button.



The file shown is individual to the HC1.

E.g. **P088999** represents the HC1 Meter with the Serial Number 888999.

To open the file, simply double click using the left hand mouse button and the file will open in Microsoft Excel for evaluation.

### Technical Specifications

<b>Input/Output Terminals:</b>	10 sets of 3 terminals + , - , and Earth. Supplying a 5Vdc supply to external meters
<b>External Meter Contacts:</b>	Must have a contact rating greater than 5Vdc , 20 Ma7
<b>Burden:</b>	Less than 20 VA with Telephone Module. Less than 10 VA standard
<b>Auxiliary Supply:</b>	230 +/-10% Volts
<b>Frequency:</b>	50 Hz
<b>Temperatures:</b>	Operating: -10°C to + 60°C Storage: - 20°C to + 70°C Humidity: 20-90%RH Non Cond
<b>Material:</b>	Grey UL94-40 Flame Retardant Lexan
<b>Mounting:</b>	35mm Din Rail
<b>Communications:</b>	Number of ports - Three

#### Protocol:

Protocol: RS485 Modbus  
Wire Mode: 2 Wire only  
Baud Rate: 1200, 4800, 9600, 19200, 38400.

#### Memory Card:

Modbus Type: RTU or ASCII  
1GB - SD Card supplied as standard, formatted to FAT32

#### Standards:

EMC - Testing for emissions and Immunity meets the specified Requirements as defined in BS EN 61326:1997

#### LVD Test:

EN 61010-2010  
IEC 61010-1 2010

#### IMPORTANT NOTE:

**The HC-1 and HC1-P must be installed and connected to a 230 volt ac power supply no later than 120 days from delivery date.**

• If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired

### Dedicated Customer Service

Customer care is the cornerstone of the company's success. A positive service policy is observed throughout every specialist area of operation.

The personal involvement of all the directors at every level, a highly trained and motivated staff, fully computerised systems and in depth stockholding combine to provide a level of service which has earned the appreciation of customers across the spectrum of the UK and overseas markets. Computerised distribution systems are geared to a consistent 24 hour despatch of products, with 20 minute despatch being possible in response to urgent demand for small orders.

#### Important.

The attention of the specifier, purchaser, installer or user is drawn to special measures and limitations to use which must be observed when these products are taken into service to maintain compliance with the CE directives. Details of these special measures and limitations of use are available from HMSO.

REF: IEC 1000-5-1(BS195/210788DC) IEC 1000-5-2 (BS 195/214642DC)

IEC 10000-5-6 (BS 195/210789DC).