OVERVIEW
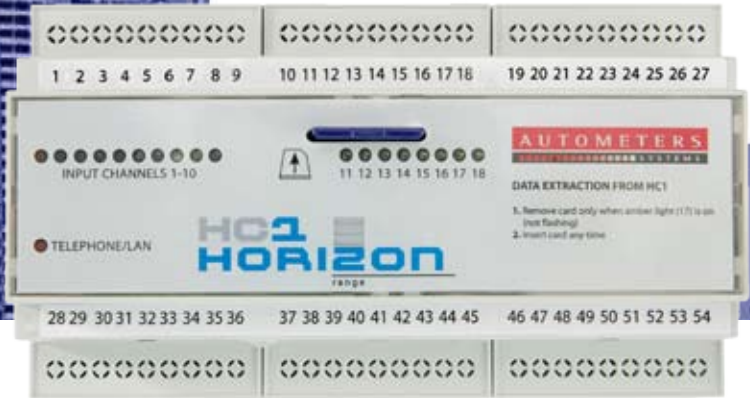
The Horizon HC1 is a data collector capable of collecting data from up to ten single pulse input devices, three Modbus RS 485 local area networks (Lan) and one Canbus Lan (receiving information from Autometers HCC 16 input devices). With 8Mb on board memory, 1 GB removable memory card and optional telephone module make it the ideal choice for capturing and reporting data.

The HC1 can be programmed to accept up to ten individual meter inputs from external meters all with different output values thus enabling it to accept pulses from Electricity, Water and Gas meters.
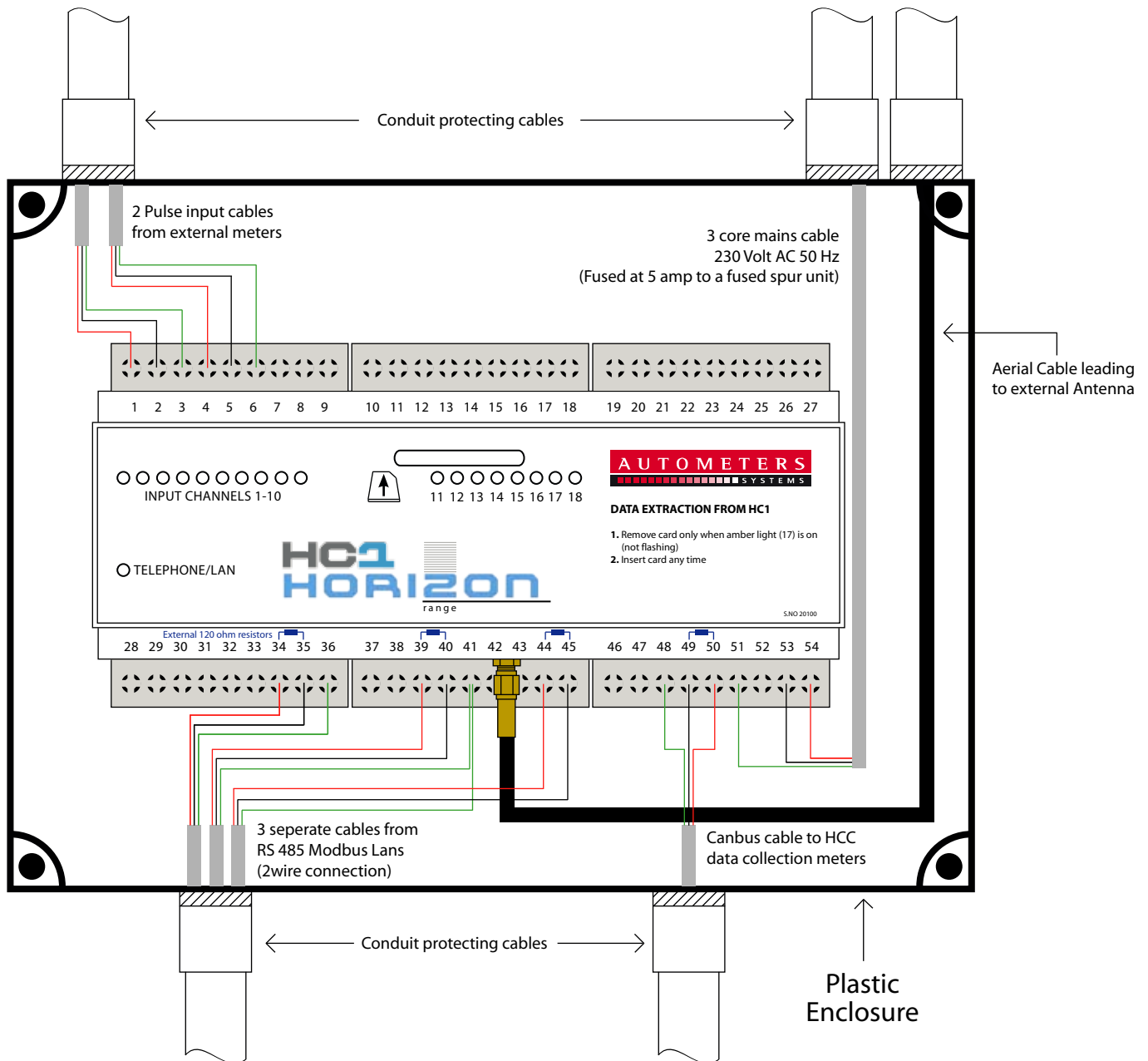
The removable 1Gb memory card allows a simple and low cost solution for extracting the data for analysis in other equipment. To read the data remove the card from the HC1 and insert it into a local computer, the information will automatically down load and be placed directly into an Excel spread sheet. Here you can design you own report for further analysis. (The P.C. must have Excel software)

The telephone module (if fitted) allows you access to Autometers Horizon web site, the Horizon software enables you to view and create your own style of reports. The software not only allows you to view meters but also to move any individual meter into a different Zone enabling you to create individual load and cost centres. Also available is Autometers new billing system which using the Web and the meters information can create individual invoices and bill tenants directly.

Another alternative using the telephone module is that Autometers with a small set up charge can design a report which can be sent to you directly by e-mail or by post. This report can be sent to you every week or month or as you require it. This enables you more free time and not requiring a computer.

Using the HC1 gives you many options.

DIAGRAM 1 - HORIZON HC1 DATA COLLECTOR INSTALLED IN THE HORIZON-9 ENCLOSURE

Conduit protecting cables

2 Pulse input cables
from external meters

3 core mains cable
230 Volt AC 50 Hz
(Fused at 5 amp to a fused spur unit)

Aerial Cable leading
to external Antenna

1 2 3 4 5 6 7 8 9   10 11 12 13 14 15 16 17 18   19 20 21 22 23 24 25 26 27

INPUT CHANNELS 1-10

11 12 13 14 15 16 17 18

AUTOMETERS SYSTEMS

DATA EXTRACTION FROM HC1

1. Remove card only when amber light (17) is on (not flashing)
2. Insert card any time

TELEPHONE/LAN

HC1 HORIZON range

S.NO 20100

External 120 ohm resistors
28 29 30 31 32 33 34 35 36   37 38 39 40 41 42 43 44 45   46 47 48 49 50 51 52 53 54

3 seperate cables from
RS 485 Modbus Lans
(2wire connection)

Canbus cable to HCC
data collection meters

Conduit protecting cables

Plastic
Enclosure

Terminals:
1 - 27 Pulse inputs from meters
28 - 31 Optional equipment
32 - 45 RS 485 Modbus terminals
46 - 48 Pulse Input from meter
49 - 50 Canbus Input from HCC meter
51 - 54 Mains Input (230 Volt)

* All shields are Zero volt (not earth)

Pulse Input Cable:
Belden 9841 (2 core or equal)

Modbus and Canbus Cable:
Belden 9842 or (4 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.

HC1 Meter mounted in the enclosure.

H-9.19.12.07.

📍 *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
If you are using RS 485 Modbus as the communication protocol you must check if the meters are wired in 2 wire or 4 wire. Always use Modbus 1 when wiring the cables into the HC1 then if you require another Lan use Modbus 2 and finally 3.

It is essential that the TX and Rx are connected to the correct Terminals on the external meters and also to the HC1. The Modbus channel terminals are from numbers 32 – 45 a maximum of three Lans are available. Each Lan has its own individual red light to indicate it is in uses (numbers13, 14 and 15). The red light will remain on all the time when active, flashing light means data is being transmitted.

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

Can Bus connection

The can bus connection is used to communicate to the Horizon range of HCC data collection units. Canbus terminals are from 48-50 and have a red light to indicate it is being used, (number 12). The red light will remain on all the time when active, flashing light means data is being transmitted.

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
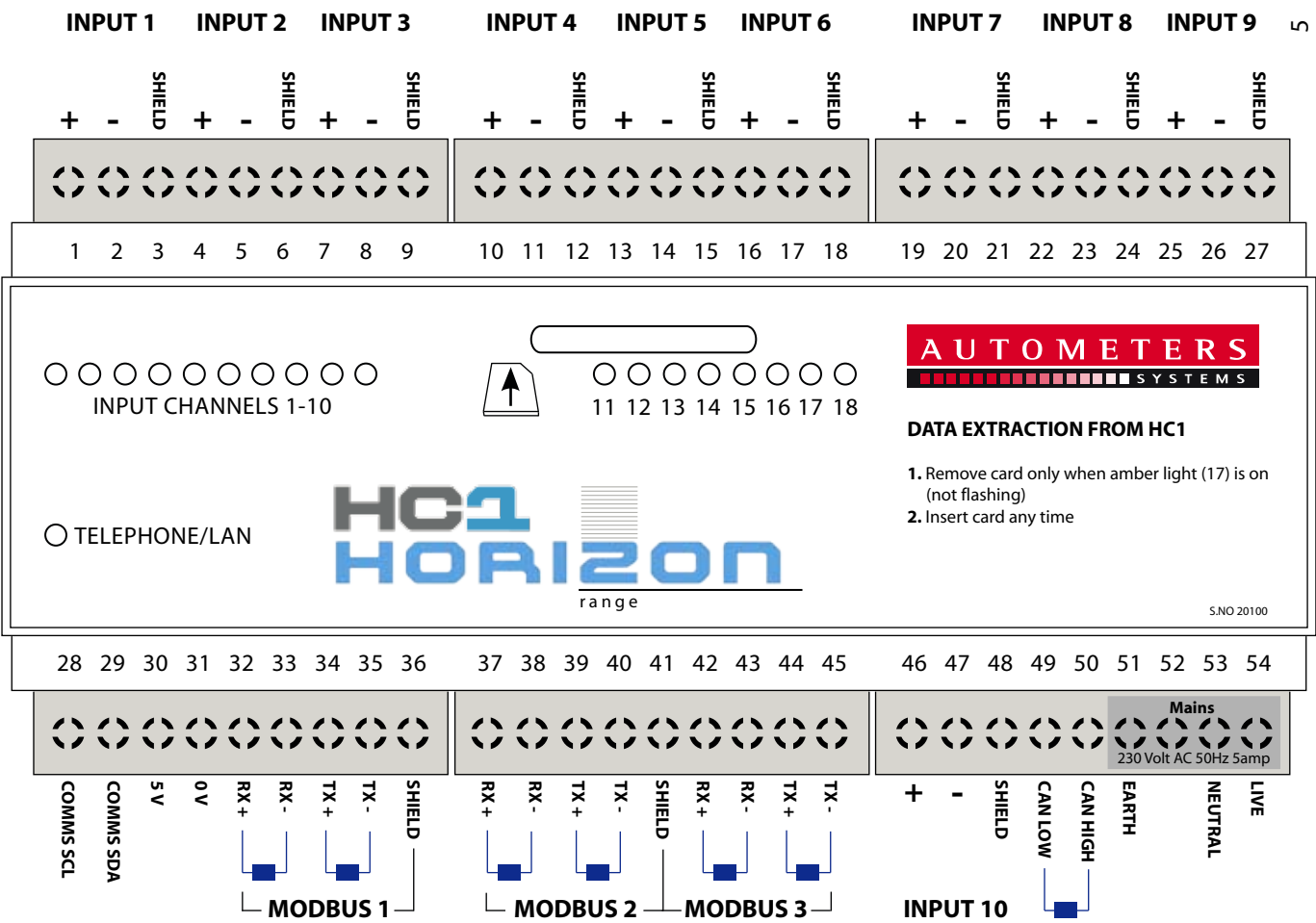
The card can be re-inserted any time.

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 HC1 meter is 230 volt, 50 Hz, 5 amps, and should be supplied from a fused spur unit situated close to the HC1 unit. The supply is connected to terminals 51 Earth, 53 Neutral and 54 live. (Please note terminal 52 is left blank) A green light (number18) will illuminate indicating the HC1 is on.

DIAGRAM 2 - HORIZON HC1 WIRING SCHEMATIC

| INPUT 1 | INPUT 2 | INPUT 3 | INPUT 4 | INPUT 5 | INPUT 6 | INPUT 7 | INPUT 8 | INPUT 9 | 5 |

SHIELD (repeated above each input group)

+ - SHIELD + - SHIELD + - SHIELD   + - SHIELD + - SHIELD + - SHIELD   + - SHIELD + - SHIELD + - SHIELD

1 2 3 4 5 6 7 8 9   10 11 12 13 14 15 16 17 18   19 20 21 22 23 24 25 26 27

INPUT CHANNELS 1-10   11 12 13 14 15 16 17 18

AUTOMETERS SYSTEMS

DATA EXTRACTION FROM HC1

1. Remove card only when amber light (17) is on (not flashing)
2. Insert card any time

TELEPHONE/LAN

HC1 HORIZON range

S.NO 20100

28 29 30 31 32 33 34 35 36   37 38 39 40 41 42 43 44 45   46 47 48 49 50 51 52 53 54

COMMS SCL | COMMS SDA | 5 V | 0 V | RX + | RX - | TX + | TX - | SHIELD | RX + | RX - | TX + | TX - | SHIELD | RX + | RX - | TX + | TX - | + | - | SHIELD | CAN LOW | CAN HIGH | EARTH | NEUTRAL | LIVE

MODBUS 1   **MODBUS 2**   **MODBUS 3**   **INPUT 10**

Mains 230 Volt AC 50Hz 5amp

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

* When wiring Modbus 4 wire insert 120 ohm resistors at both ends of the Lan network between RX + and RX -, TX + and TX -

* When wiring Canbus 2 wire insert 120 ohm resistors at both ends of the Lan network between CAN HIGH and CAN LOW

Terminals:

1 - 27 Pulse inputs from meters
28 - 31 Optional equipment
32 - 45 RS 485 Modbus terminals
46 - 48 Pulse Input from meter
49 - 50 Canbus Input from HCC meter
51 - 54 Mains Input (230 Volt)

* All shields are Zero volt (not earth)

Pulse Input Cable:
Belden 9841 (2 core or equal)

Modbus and Canbus Cable:
Belden 9842 or (4 core or equal)

Information on Indicator Lights

1-10 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 Canbus is connected to other data collectors.
6. The red light (12) will be on indicating active

If data is being received from external meters.
7. Red lights will flash (1-10) when pulses from external meters are being received.
8. 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 down load 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.

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
4	HC1 Config Table											
5	Input	Description/Location	Tarrif A									
6	1	kWh Flat 1	00:00:00									
7	2	Gas Flat 1	00:00:00									
8	3	None	00:00:00									
9	4	None	00:00:00									
10	5	None	00:00:00									
11	6	None	00:00:00									
12	7	None	00:00:00									
13	8	None	00:00:00									
14	9	None	00:00:00									
15	10	None	00:00:00									
16												
17	Log Date	Log Time	Input 1	Input 2	Input 3	Input 4	Input 5	Input 6	Input 7	Input 8	Input 9	Input 10
18												
19	10/08/2007	GMT:12:33:00	22007	22003	0	0	0	0	0	0	0	0
20	10/08/2007	GMT:12:35:00	22127	22123	0	0	0	0	0	0	0	0
21	10/08/2007	GMT:12:37:00	22247	22243	0	0	0	0	0	0	0	0
22	10/08/2007	GMT:12:39:00	22367	22363	0	0	0	0	0	0	0	0
23	10/08/2007	GMT:12:41:00	22487	22483	0	0	0	0	0	0	0	0
24	10/08/2007	GMT:12:43:00	22607	22603	0	0	0	0	0	0	0	0

.**Example 2,** *Overleaf* - *Information recieved via RS 485 Modbus*

Example 2 - Information recieved via RS 485 Modbus

Meter 900186

Date	L1 Amp	L2 Amp	L3 Amp	N Amp	Tot. Amp	L1 Volt	L2 Volt	L3 Volt	Tot. KW	Tot. KVA	Tot. KVAR	Tot. PF	MD KW	MD KVA	MD KVAR	HZ	KWH Imp	KVAH Imp
26 07 2007 09:07	257.68	180.64	137.84	118.16	576.16	234.75	238.73	240.62	135.51	135.52	1.29	1	178.3	178.3	12.7	49.95	100281.6	102967.2
26 07 2007 08:52	164.24	181.44	139.2	39.12	484.88	239.09	237.13	243.09	113.64	113.65	1.38	1	178.3	178.3	12.7	49.96	100252.8	102938.4
26 07 2007 08:37	164.56	185.12	115.76	43.52	465.44	240.09	236.74	240.4	108.54	109.23	1.44	1	178.3	178.3	12.7	49.92	100224.8	102910.4
26 07 2007 08:22	164.64	181.2	112.48	46.8	458.32	241.59	232.83	240.86	106.28	106.28	0.6	1	178.3	178.3	12.7	49.94	100197.6	102883.2
26 07 2007 08:07	155.76	173.76	137.2	40	466.72	242.86	237.22	241.67	105.24	105.27	1.41	1	178.3	178.3	12.7	49.95	100170.4	102856.8
26 07 2007 07:52	45.28	35.28	76.4	55.6	156.96	245.35	243.3	244.87	34.5	34.92	5.41	0.99	178.3	178.3	12.7	49.94	100152	102837.6
26 07 2007 07:37	60.72	24.4	78.48	75.84	163.6	244	243.33	246.31	32.4	32.81	5.19	0.99	178.3	178.3	12.7	49.95	100142.4	102828
26 07 2007 07:22	46.8	24.16	93.2	73.28	164.16	246.62	243.64	241.97	31.62	31.93	4.47	0.99	178.3	178.3	12.7	49.93	100133.6	102819.2
26 07 2007 07:07	34.72	24.16	99.92	62.88	158.8	240.34	241.71	242.48	29.67	30.59	7.46	0.97	178.3	178.3	12.7	49.94	100125.6	102811.2
26 07 2007 06:52	28.96	24.48	73.6	39.92	126.88	241.81	245.54	241.82	27.42	28.67	8.62	0.95	178.3	178.3	12.7	50.03	100118.4	102804
26 07 2007 06:37	29.52	25.2	79.04	44.48	133.76	244.16	246.89	249.18	27.96	30.18	11.34	0.93	178.3	178.3	12.7	50.05	100111.2	102796
26 07 2007 06:22	28.8	24.4	70.4	38.4	123.6	240.78	245.68	245.75	26.48	27.98	9.06	0.95	178.3	178.3	12.7	50	100104	102788
26 07 2007 06:07	93.76	26.08	58.08	75.44	177.92	248.39	248.77	236.63	41.08	41.39	5.07	0.99	178.3	178.3	12.7	50.02	100096.8	102780.8
26 07 2007 05:52	257.68	180.64	137.84	118.16	576.16	234.75	238.73	240.62	135.51	135.52	1.29	1	178.3	178.3	12.7	49.95	100281.6	102967.2
26 07 2007 05:37	164.24	181.44	139.2	39.12	484.88	239.09	237.13	243.09	113.64	113.65	1.38	1	178.3	178.3	12.7	49.96	100252.8	102938.4
26 07 2007 05:22	164.56	185.12	115.76	43.52	465.44	240.09	236.74	240.4	108.54	109.23	1.44	1	178.3	178.3	12.7	49.92	100224.8	102910.4
26 07 2007 05:07	164.64	181.2	112.48	46.8	458.32	241.59	232.83	240.86	106.28	106.28	0.6	1	178.3	178.3	12.7	49.94	100197.6	102883.2
26 07 2007 04:52	155.76	173.76	137.2	40	466.72	242.86	237.22	241.67	105.24	105.27	1.41	1	178.3	178.3	12.7	49.95	100170.4	102856.8
26 07 2007 04:37	45.28	35.28	76.4	55.6	156.96	245.35	243.3	244.87	34.5	34.92	5.41	0.99	178.3	178.3	12.7	49.94	100152	102837.6
26 07 2007 04:22	60.72	24.4	78.48	75.84	163.6	244	243.33	246.31	32.4	32.81	5.19	0.99	178.3	178.3	12.7	49.95	100142.4	102828
26 07 2007 04:07	46.8	24.16	93.2	73.28	164.16	246.62	243.64	241.97	31.62	31.93	4.47	0.99	178.3	178.3	12.7	49.93	100133.6	102819.2
26 07 2007 03:52	34.72	24.16	99.92	62.88	158.8	240.34	241.71	242.48	29.67	30.59	7.46	0.97	178.3	178.3	12.7	49.94	100125.6	102811.2
26 07 2007 03:37	28.96	24.48	73.6	39.92	126.88	241.81	245.54	241.82	27.42	28.67	8.62	0.95	178.3	178.3	12.7	50.03	100118.4	102804
26 07 2007 03:22	29.52	25.2	79.04	44.48	133.76	244.16	246.89	249.18	27.96	30.18	11.34	0.93	178.3	178.3	12.7	50.05	100111.2	102796
26 07 2007 03:07	28.8	24.4	70.4	38.4	123.6	240.78	245.68	245.75	26.48	27.98	9.06	0.95	178.3	178.3	12.7	50	100104	102788
26 07 2007 02:52	93.76	26.08	58.08	75.44	177.92	248.39	248.77	236.63	41.08	41.39	5.07	0.99	178.3	178.3	12.7	50.02	100096.8	102780.8
26 07 2007 02:37	257.68	180.64	137.84	118.16	576.16	234.75	238.73	240.62	135.51	135.52	1.29	1	178.3	178.3	12.7	49.95	100281.6	102967.2
26 07 2007 02:22	164.24	181.44	139.2	39.12	484.88	239.09	237.13	243.09	113.64	113.65	1.38	1	178.3	178.3	12.7	49.96	100252.8	102938.4
26 07 2007 02:07	164.56	185.12	115.76	43.52	465.44	240.09	236.74	240.4	108.54	109.23	1.44	1	178.3	178.3	12.7	49.92	100224.8	102910.4

⚲ *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**.
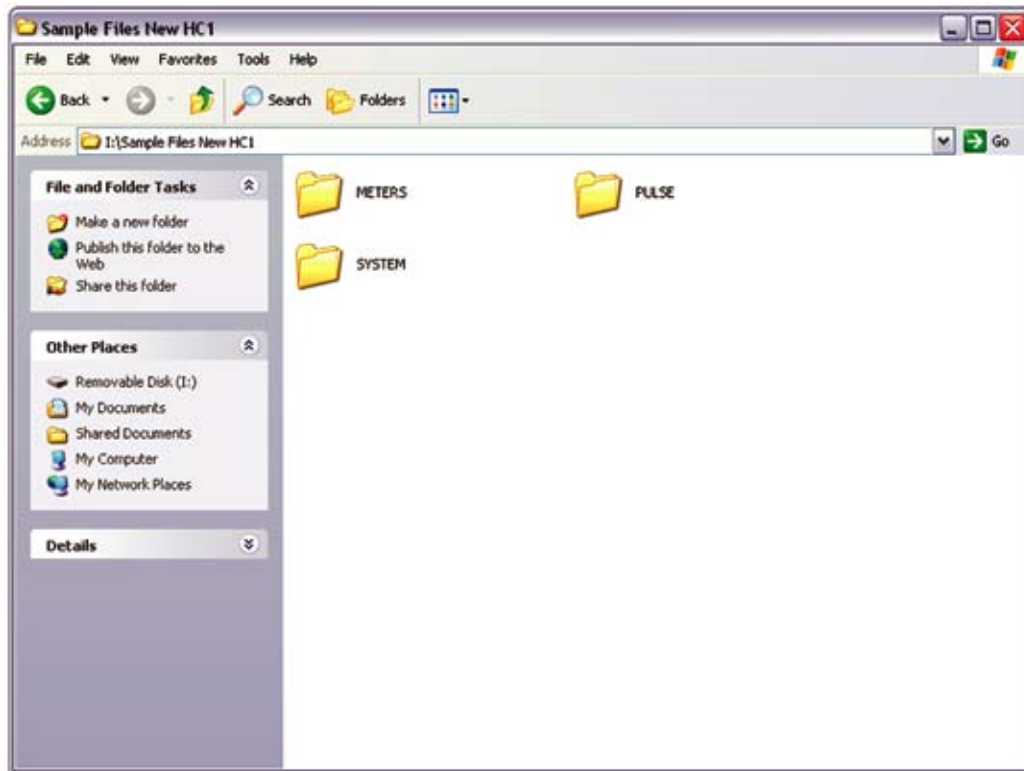
There are 3 Files Shown.

 This file contains all logged data for meters connected to the HC1 using the 3 Modbus LAN's.

 This file contains all logged data for meters connected to the HC1 using the 10 off Pulse inputs.

 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;
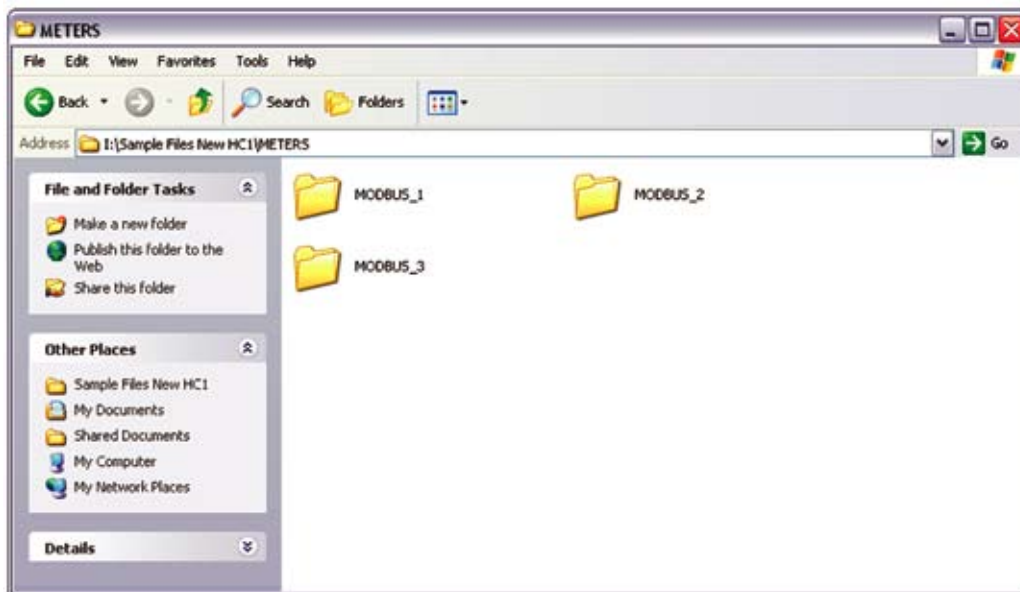
Each folder represents the Modbus Channel on the HC1.

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.**
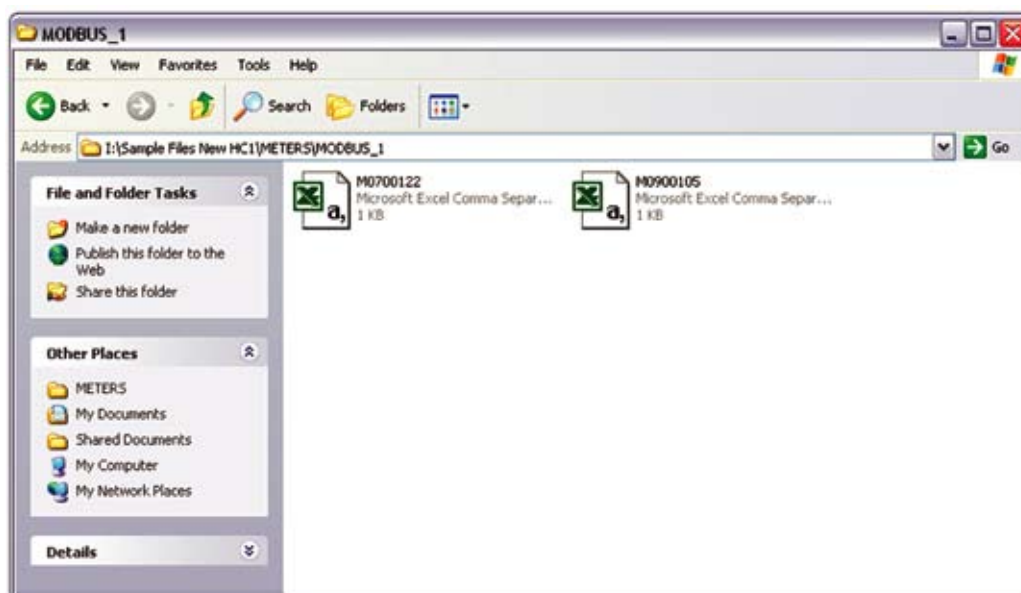

The files shown are individual to the meters connected to the Modbus LAN.

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;
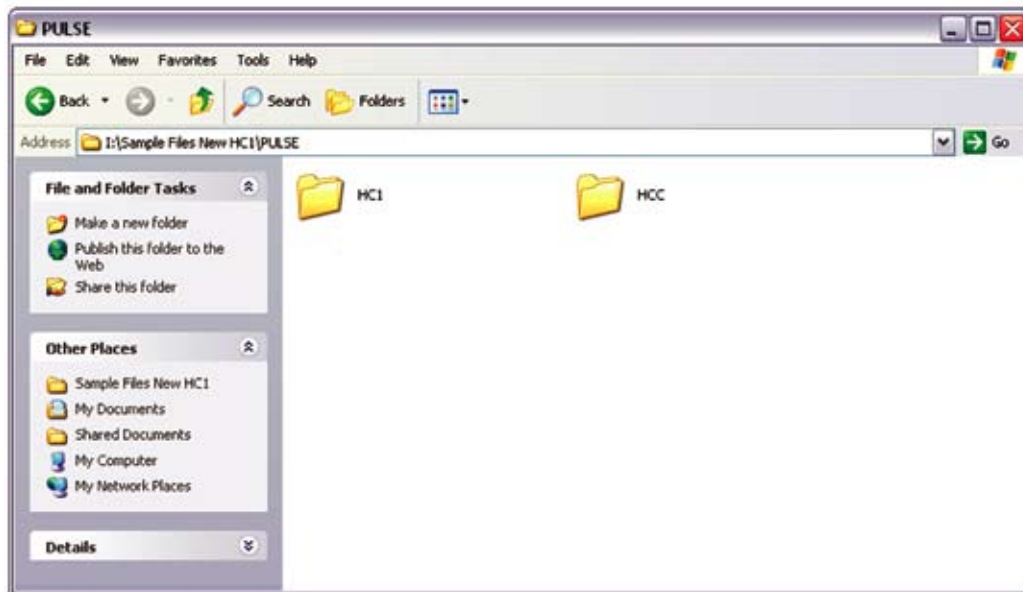

There are 2 files shown

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)

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.
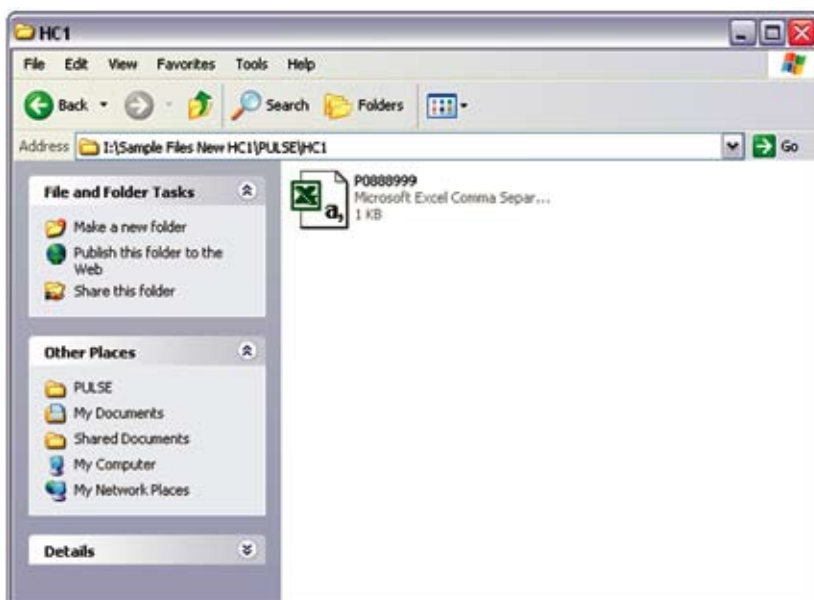
The file shown is individual to the HC1.

E.g. **PO888999** 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

Input/Output Terminals:	10 sets of 3 terminals + ,-, and Earth. Supplying a 5Vdc supply to external meters	**Protocol:**	Protocol: RS485 Modbus Wire Mode: 2 or 4 Wire Baud Rate: 1200, 4800, 9600, 19200, 38400. Modbus Type: RTU or ASCII
External Meter Contacts:	Must have a contact rating greater than 5Vdc , 20 Ma7		
Display Exapnsion:	5Volt (4 terminals).	**CAN Bus Details:**	2 Wire BI-Directional Interface Baud Rate: 50K,125K, 250K, 500K, and 1 Meg.
Burden:	Less than 20 VA with Telephone Module. Less than 10 VA standard		
Auxiliary Supply:	230 +/-10% Volts	**Memory Card:**	1GB - SD Card supplied as standard, formatted to FAT 32.
Frequency:	50 Hz		
Temperatures:	Operating: -10˚C to + 60˚C Storage: - 20˚C to + 70˚C Humidity: 20-90%RH Non Cond	**Standards:**	EMC - Testing for emissions and Immunity meets the specified Requirements as defined in BS EN 61326:1997
Material:	Grey UL94-40 Flame Retardant Lexan	**LVD Test:**	BS EN 61010:2001 / IEC 61010-1:2001
Mounting:	35mm Din Rail		
Communications:	Number of ports - Three		

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).