AUTOMETERS SYSTEMS

HORIZON
Energy Monitoring and Invoicing

HORIZON SYSTEM METER HT-100

Multi Function , Multi Tariff , MID Approved. Autometers Modbus V6.

Declaration of Conformity

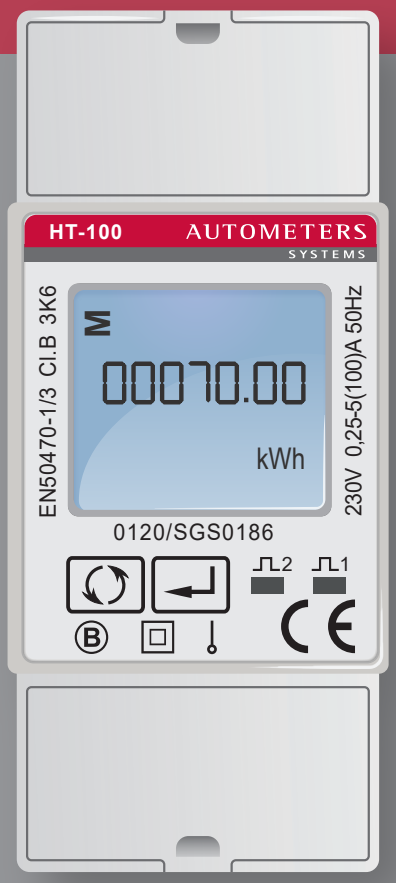
We, Autometers Systems Ltd
4B Albany Road, Manchester, M21 0AW, UK
Ensure and declare that apparatus:
Energy Meter: HT-100 With the measurement range 230V / 0, 25~5(100) A 50Hz Are in conformity with the type as described in the
EU-type examination certificate 0120/SGS0186
With Serial number in format of XXXXXXXX, Batch format: xxxxxx

The fulfilment of the essential requirements set out in Annex I and in the relevant instrument specific Annexes has been demonstrated.

The electricity meter types described above are in conformity with the relevant union harmonization legislation and satisfy the appropriate requirements of the Directive 2014/32/EU with the following standards:

EN 50470-1: 2006, Electricity metering equipment (AC) Part 1: General requirements, tests and test conditions. Metering equipment (class indexes A, B and C)
EN 50470-3: 2006, Electricity metering equipment (AC) Part 3: Particular requirements - Static meters for active energy (class indexes A, B and C)


SGS
EU Type Examination Certificate Number: 0120/SGS0186
Autometers Systems, Ltd.
4B Albany Road,
Manchester,
M21 0AW,
United Kingdom.
Instrument Identification:
A-100 Series
HT-100
Instrument Traceable Number
0120/SGS0186
Single Phase, Active Import/ Export (kWh), Multifunction, Indoor, Electricity Meter
has been assessed and certified as meeting the requirements of
EU Directive 2014/32/EU
on Measuring Instruments Annex II, Module B
This certificate is valid until 15th April 2025
Issue 2
Certification is based on report number(s) SHES1412006493O1 16th April 2015
EMA 202963/1 16th April 2015
EMA 204868/1 3rd June 2015
Authorised Signature



Introduction

This document provides operating, maintenance and installation instructions for the HT-100 series 1 phase 2 wire din rail mounted kWh meters.

The Bi-directional measurements make the meter suitable for active and reactive energy for all power monitoring applications including the new Solar PV requirements for measuring Energy. The HT-100 has the facility for being able to program four tariffs with its built-in timer switch for monitoring energy in different periods.

Model	Measurements	Communication	Pulse Outputs	Multi-Tariffs
HT-100	U, I, P, Q, PF, Hz, Dmd, kWh, kVarh, Import, Export	RS 485 Modbus	1: Configurable 2: 1000 Imp/kWh	4 Tariffs (RTC)

I. Unit Characteristics

1.1 Unit Characteristics

- MID Approved B & D
- Multifunction KWh, Amps and Volts etc.
- 100Amp direct connected
- Multi tariff
- RS 485 Modbus output (Autometers V.6)
- Two Pulse outputs (1 Programmable)
- Large display with back-light
- Password protected
- Two modules wide

1.2 Pulse output

The meter provides two pulse outputs. Both pulse outputs are passive type.
Pulse output 1 can be set to generate pulses to represent total / import / export kWh or kVarh.
The pulse constant can be set to generate 1 pulse per:0.001 (default)/0.01/0.1/1kWh/kVarh.
Pulse width:200/100/60ms
Pulse output 2 is non-configurable. It is fixed up with active kWh (Imp). The constant is 1000Imp/kWh.

1.3 RS485 Serial-Modbus RTU

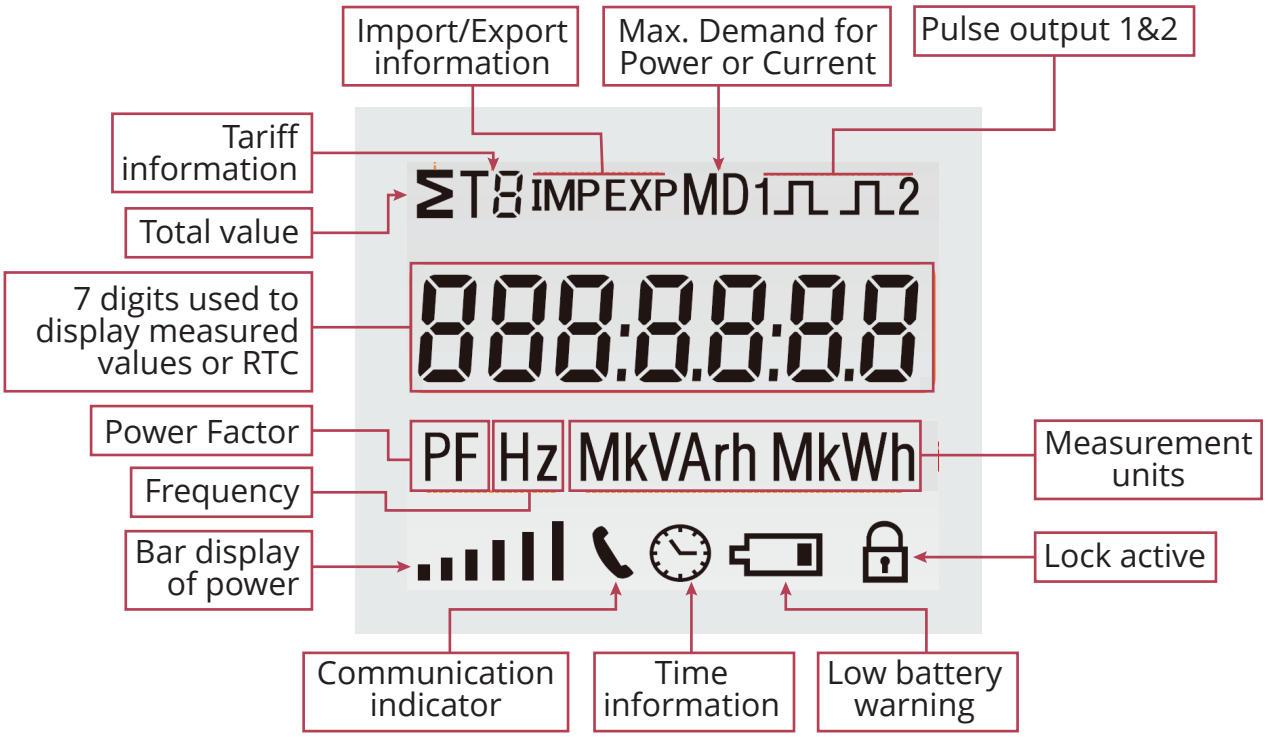
RS485 serial port with Modbus RTU protocol (Autometers V.6 protocol) to provide a means of remotely monitoring and controlling the unit.

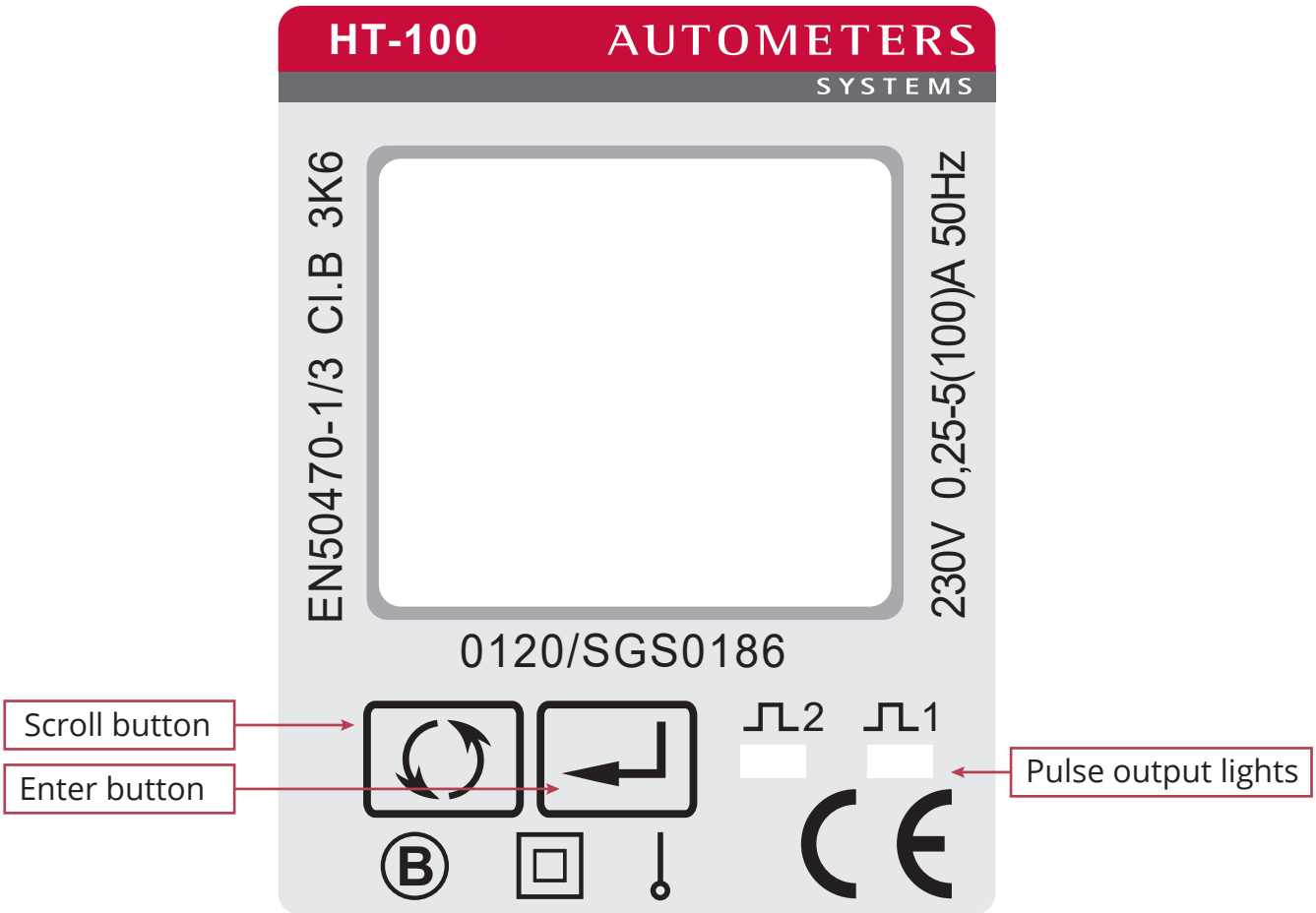
1.4 Tariff Setting

The tariff settings are normally done in the factory by means of the RS 485 Modbus. Four tariffs and ten time segments can be set with the natural day.

2. Operation

2.1 LCD Display





2.2 Start-up Screens

All display segments light up

Software version

Modbus ID or Mbus primary address

Baud rate

Total kWh

2.3 Scroll Display by Buttons

After initiation and self-checking program, the meter displays the measured values. The default page is total kWh. To view other information press the scroll button onthe front panel.

The HT-100 can display the following:

Total kWh - import kWh - Export kWh - T1kWh - T2kWh - T3kWh - T4kWh - Total kVarh - Import kVarh - Export kVarh - T1kVarh - T2kVarh - T3kVarh - T4kVarh - Max. power demand - T1Max. power demand - T2Max. power demand - T3Max. power demand - T4 Max. power demand - Voltage - Current - W - Var - VA - Power factor - Frequency - Pulse constant - Modbus ID - Baud rate - Date - Time - Time segment 1 - Time segment 2 - Time segment 3 - Time segment 4 - Time segment 5 - Time segment 6 - Time segment 7 - Time segment 8 - Time segment 9 - Time segment 10

Display no: 1~41

Total active energy
(import and export energy)
eg. 70.00 kWh

Import active energy
eg. 50.00 kWh

Export active energy
eg. 20.00 kWh

T1 active energy
eg. 10.00kWh

T2 active energy
eg. 10.00 kWh

T3 active energy
eg. 30.00 kWh

T4 active energy
eg. 20.00 kWh

Total reactive energy
eg. 10.00 kVArh

Import reactive energy
eg. 5.00 kVArh

Export reactive energy
eg. 5.00 kVArh

T1 reactive energy
eg. 2.00 kVArh

T2 reactive energy
eg. 2.00 kVArh

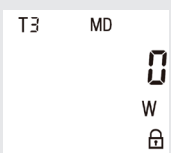
T3 reactive energy
eg. 2.00 kVArh

T4 reactive energy
eg. 4.00 kVArh

Max. power demand
eg. 6938W

T1 Max. power demand
eg. 0W

T2 Max. power demand
eg. 0W



T3 Max power demand
eg. 0W

T4 Max. power demand
eg. 0W

Voltage
eg. 229.8V

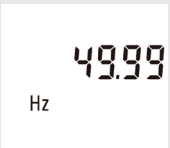
Current
eg. 30.156A

Active power
eg. 4700W

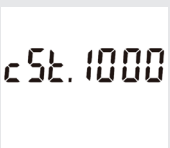
Reactive power
eg. 1030VAr

Apparent power
eg. 4811VA

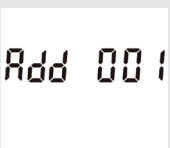
Power factor
eg. 1.000



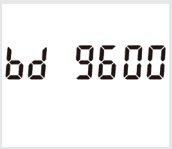
Frequency
eg. 49.99Hz



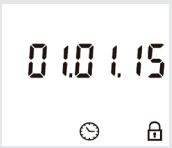
Pulse 2 Constant
eg. 1000



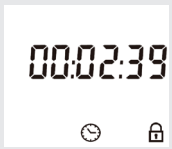
Modbus address
eg. 001



Baud rate
eg. 9600



Date
Format: Day.Month.Year
eg. 1st Jan 2015



Time
Format: Hour:Minute:Second
eg. 00:02:39

Time segment 1
Format: Hour:Minute.Tariff
eg. 00:00 Tariff 1

Time segment 2
Format: Hour:Minute.Tariff
eg. 02:00 Tariff 2

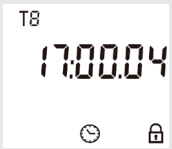
Time segment 3
Format: Hour:Minute.Tariff
eg. 04:00 Tariff 3

Time segment 4
Format: Hour:Minute.Tariff
eg. 05:00 Tariff 4

Time segment 5
Format: Hour:Minute.Tariff
eg. 07:25 Tariff 1

Time segment 6
Format: Hour:Minute.Tariff
eg. 08:11 Tariff 2

Time segment 7
Format: Hour:Minute.Tariff
eg. 15:40 Tariff 3



Time segment 8
Format: Hour:Minute.Tariff
eg. 17:00 Tariff 4

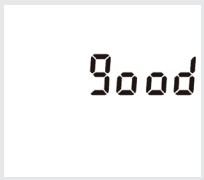
Time segment 9
Format: Hour:Minute.Tariff
eg. 19:00 Tariff 1

Time segment 10
Format: Hour:Minute.Tariff
eg. 23:00 Tariff 2

2.4 Set-up Mode

To enter set-up mode, press the “enter” button for 3 seconds.

To access set-up mode the password must be entered.
Default password: 1000



The setting has been done correctly.

The information entered is incorrect. Please try again.

2.4.1 Modbus Address

Default ID is 001
Range:001-247

Press the Enter button, the first digit will flash.
Press the scroll button to change the value. Once the new value has been selected, press the Enter button to confirm the setting.
Press Enter to confirm. The value shown in red will flash. Press the scroll button to change the option. After choosing the new value, press the Enter button to confirm.

2.4.2 Baud Rate

Default value 9600bps
Range: 1200, 2400, 4800, 9600bps

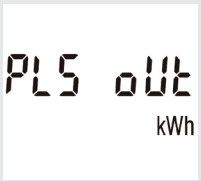
Press the Enter button, the red digits will flash.
Press the scroll button to change the value. Once the new value has been selected, press the Enter button to confirm the setting.

2.4.3 Parity

Default: Even
Options: None / Odd / Even

Press the Enter button, the red digits will flash.
Press the scroll button to change the value. Once the new value has been selected, press the Enter button to confirm the setting.

2.4.4 Pulse Output 1



Default: 100Imp/kWh
Options: kWh / kVArh / Imp. kWh / Exp. kWh / Imp. kVArh / Exp. kVArh

Press the Enter button, the red digits will flash.
Press the scroll button to change the option. Once the new pulse output option has been selected, press the Enter button to confirm the setting.

2.4.5 Pulse Output 2 (Constant)

Default: 1000
Options: 1000 / 100 / 10 / 1

Press the Enter button, the red digits will flash.
Press the scroll button to change the option. Once the new pulse constant option has been selected, press the Enter button to confirm the setting.

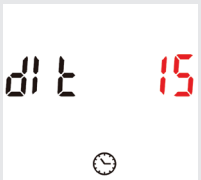
2.4.6 Pulse Duration

Default: 100ms
Options: 200 / 100 / 60ms

Press the Enter button, the red digits will flash.
Press the scroll button to change the option. Once the new pulse duration option has been selected, press the Enter button to confirm the setting.

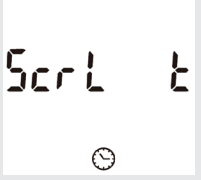
2.4.7 Demand Integration Time

Default: 15 minutes
Options: off (0) / 5 / 10 / 15 / 30 / 60 minutes

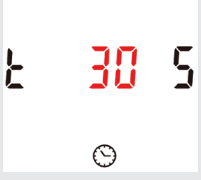


Press the Enter button, the red digits will flash.
Press the scroll button to change the option. Once the new DIT option has been selected, press the Enter button to confirm the setting.

2.4.8 Scroll Time Interval



Default: 0 seconds
Options: 0 - 30 seconds



Press the Enter button, the red digits will flash.
Press the scroll button to change the option. Once the new scroll time interval has been selected, press the Enter button to confirm the setting.

2.4.9 Password Set-up

Default: 1000

Press the Enter button, the first digit will flash.
Press the scroll button to change the option. Once the new password has been selected, press the Enter button to confirm the setting.

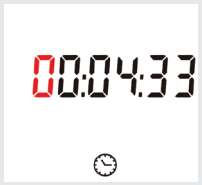
2.4.10 Date

Press Enter to access date set-up mode.

Date format: Day.Month.Year
Press the scroll button to change the value. Once the value has been selected, press the Enter button to confirm the setting.

2.4.11 Time Set-up

Press the Enter button to enter the time set-up page



Time format: Hour:Minute:Second
Press the Enter button, the red digits will flash.
Press the scroll button to change the option. Once the new time has been selected, press the Enter button to confirm the setting.

3. Specification

3.1 Accuracy

Voltage	0.5% of range maximum
Current	0.5% of nominal
Frequency	0.2% of mid-frequency
Active power	1% of range maximum
Reactive power	1% of range maximum
Apparent power	1% of range maximum
Active energy	Class 1 IEC62053-21 Class B EN50470-3
Reactive energy	1% of range maximum

3.2 General Specifications

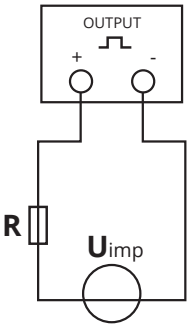
Voltage AC (Un)	230V
Voltage range	176~276 AC
Base current (Ib/Iref)	5A
Max. current (Imax)	100A
Min. current (Imin)	0.25A
Starting current	0.4% of Ib/Iref
Power consumption	<2W/10VA
Frequency	50Hz (for MID version) 50/60Hz ±2% (for non MID version)
AC voltage withstand	4kV for 1 minute
Impulse voltage withstand	6kV-1.2uS wavform
Over current withstand	30 Imax for 0.01s
Pulse 1 output rate	configurable, default, 1000i/kWh
Pulse 2 output rate	non-configurable, 1000i/kWh
Display	LCD backlit
Max. reading	99999.99kWh

3.3 Environment

Operating temperature	-25°c to +55°c
Storage/transportation temperature	-40°c to 70°c
Reference temperature	23°c ±2°c
Relative humidity	0 to 95% non-condensing
Installation category	CAT II
Mechanical environment	M1
Electromagnetic environment	E2
Degree of pollution	2

*Maximum operating and storage temperatures are int he context of typical daily and seasonal variation.

3.4 Pulse Output Diagram



ATTENTION: Pulse output must be fed as shown in the adjacent wiring diagram. Scrupulously respect polarities and the connection mode. Opto-coupler with potential-free SPST-NO Contact.

Contact range: 5~27V DC
Max. current input: 27mA DC

Pulse output circuit diagram

3.5 RS485 Output for Modbus RTU

The meter provides a RS485 Modbus output for remote monitoring. The default is Autometers V.6. For other protocols it can be configured via the display using the password.

Baud rate:	1200, 2400, 4800, 9600
Parity:	none / odd / even
Stop bit:	1 or 2
Modbus address:	001 to 247

3.6 Mechanics

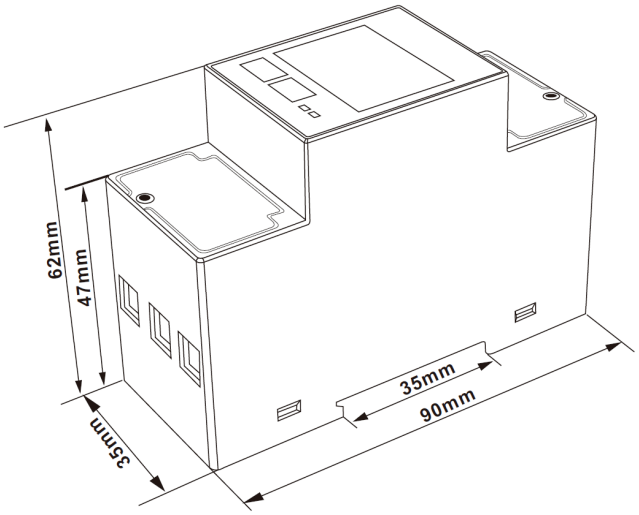
DIN rail dimensions:	35x92x65 (WxHxD) Per DIN 43880
Mounting:	DIN rail 35mmn
Sealing:	IP51 (indoor)
Material:	self-extinguishing UL94V-1

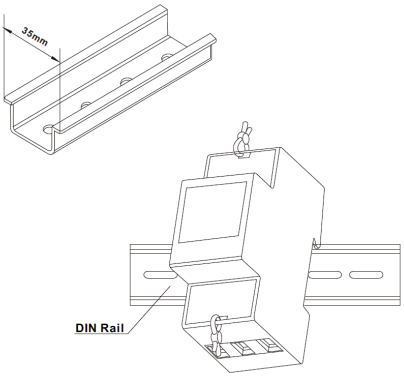
WARNING

Important Safety Information is contained in sections 5-6. Familiarize yourself with this information before attempting installation or other procedures. Symbols used in this document:

Risk of Danger: These instructions contain important safety information. Read them before starting installation or servicing of the equipment.
Caution: Risk of Electric Shock

4. Dimensions





5. Maintenance

In normal use, little maintenance is needed. As appropriate for service conditions, isolate electrical power, inspect the unit and remove any dust or other foreign material present. Periodically check all connections for freedom from corrosion and screw tightness, particularly if vibration is present.

The front of the case should be wiped with a dry cloth only. Use minimal pressure, especially over the viewing window area. If necessary wipe the rear case with a dry cloth. If a cleaning agent is necessary, isopropyl alcohol is the only recommended agent and should be used sparingly. Water should not be used. If the rear case exterior or terminals should be contaminated accidentally with water, the unit must be returned to Autometers Systems Ltd for inspection and testing.

6. Installation

The meter is designed to be fitted on a DIN rail in a suitable enclosure. The unit is intended for use in a reasonably stable ambient temperature within the range -25°C to +55°C. Do not fit the meter where there is excessive vibration or in excessive direct sunlight.
Please note terminal covers should be fitted and sealed.
See connection diagrams page 16.

6.1 Safety

The unit is designed in accordance with IEC 61010-1:2010 – Permanently connected use, Normal condition. Installation category III, pollution degree 2, basic insulation for rated voltage.

7. Electrician.

The HT-100 DIN rail meter should only be installed by a fully qualified electrician who has knowledge of electricity meters connected with current transformers.

It is the installer who is fully responsible for the safe installation of this meter. It must be installed to meet the current electrical regulations concerning installation of electricity meters.

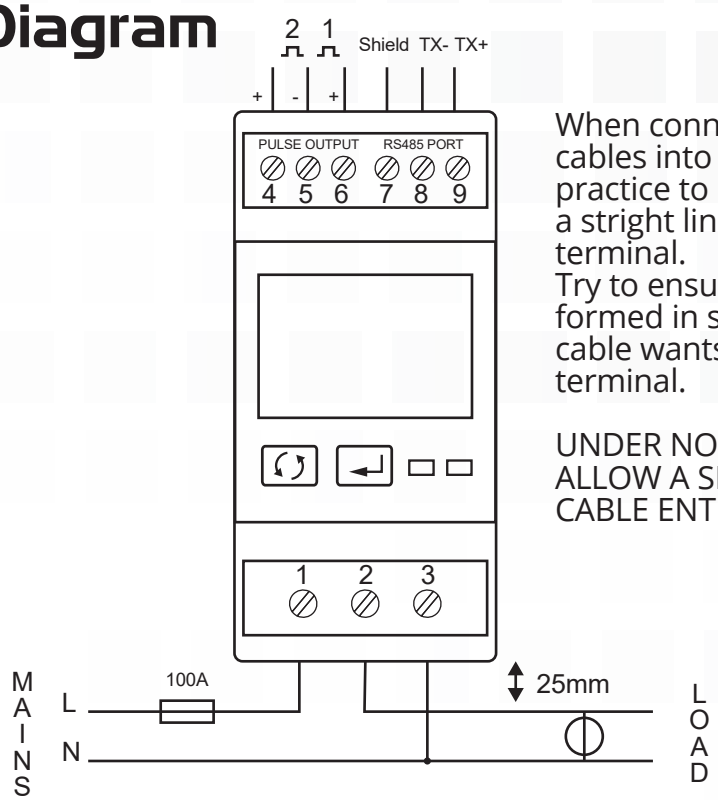
8. EMC Installation Requirements

Whilst this unit complies with all relevant EU EMC (electro-magnetic compatibility) regulations, any additional precautions necessary to provide proper operation of this and adjacent equipment will be installation dependent and so the following can only be general guidance: Avoid routing wiring to this unit alongside cables and products that are, or could be, a source of interference.
The auxiliary supply to the unit should not be subject to excessive interference. In some cases, a supply line filter may be required.

To protect the product against incorrect operation or permanent damage, surge transients must be controlled. It is good EMC practice to suppress transients and surges at the source. The unit has been designed to automatically recover from typical transients; however in extreme circumstances it may be necessary to temporarily disconnect the auxiliary supply for a period of greater than 10 seconds to restore correct operation.
Screened communication leads are recommended and may be required. These and other connecting leads may require the fitting of RF suppression components, such as ferrite absorbers, line filters etc., if RF fields cause problems.

It is good practice to install sensitive electronic instruments that are performing critical functions in EMC enclosures that protect against electrical interference causing a disturbance in function.

9. Wiring Diagram

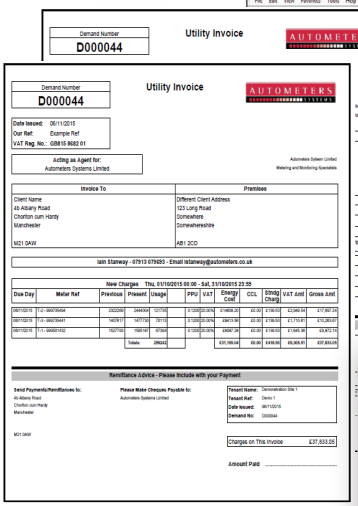


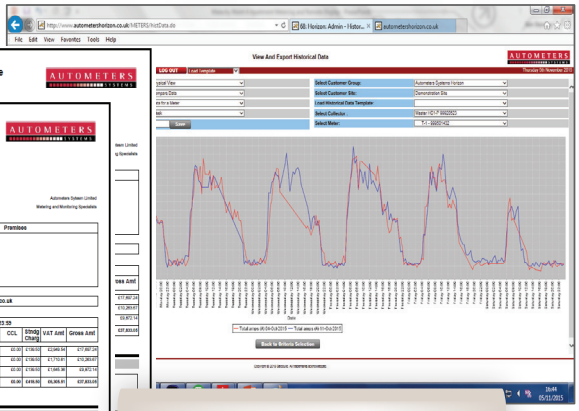
When connecting the mains cables into the meter it is good practice to have approx 25mm in a stright line entering the terminal.
Try to ensure that the cable is formed in such a way that the cable wants to go into the terminal.

UNDER NO CIRCUMSTANCES ALLOW A SHARP BEND ON THE CABLE ENTERING THE TERMINAL.

10. The Horizon Energy Monitoring System With the New HT-100 Series

RS 485 Modbus Communication to enable full data retrieval of kWh for Graphic analysis and Billing



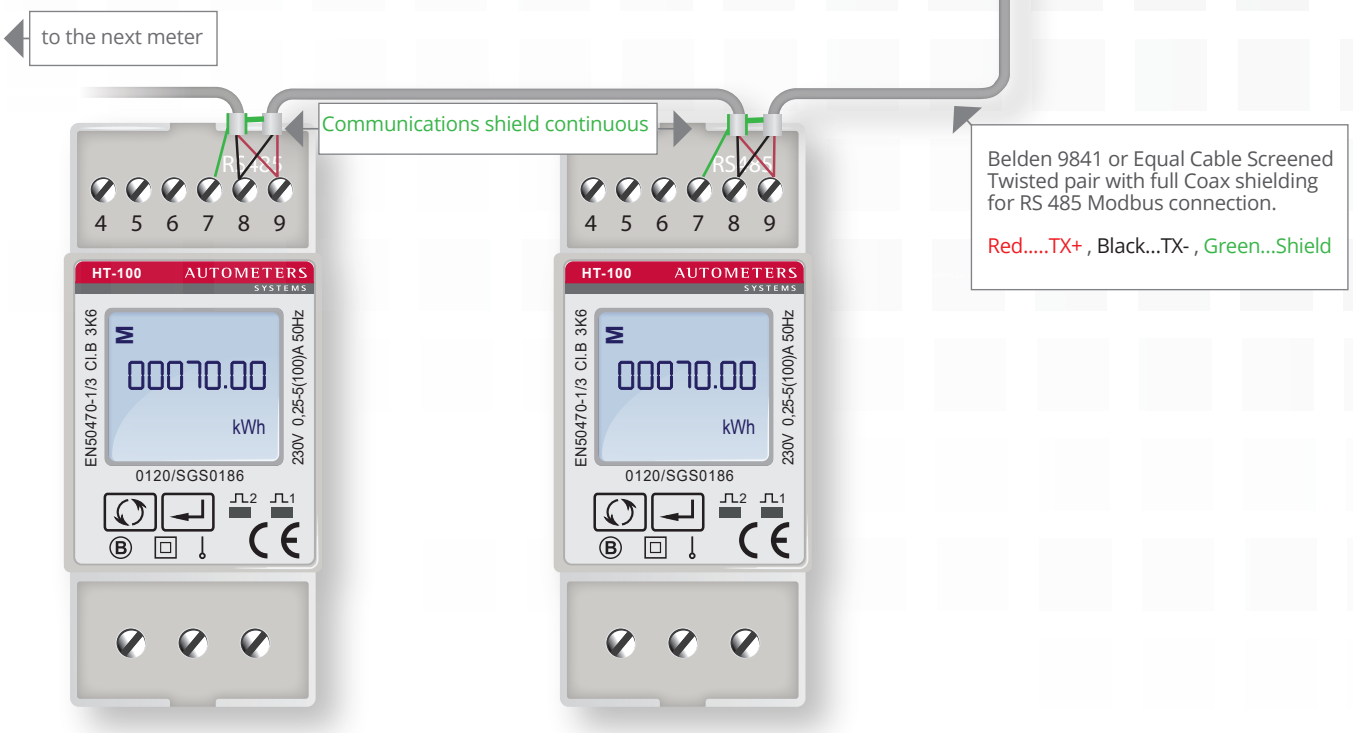


The HC2-P is a surface mounted GPRS enabled data collection device capable of storing information from up to 350 meters via 3 separate Lans

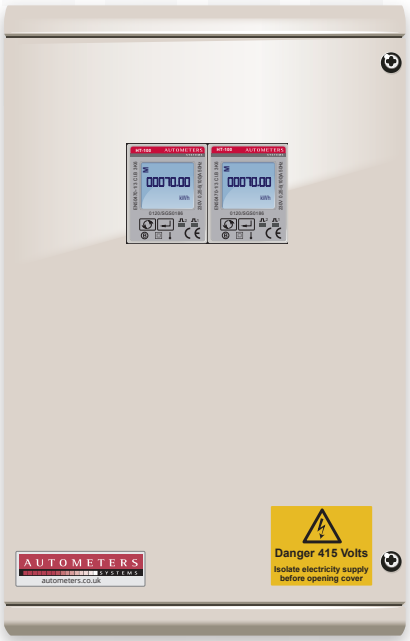
2 x Modbus – up to 127 meters on 1000 metres of Belden 9841 cable.

1 x M-bus – up to 100 devices on 1000 metres of Belcom 410P1824 cable.

HC2-P is powered from either the HS-PS7 or HS-PS13



II. Metal Enclosures for the HT-100 Series

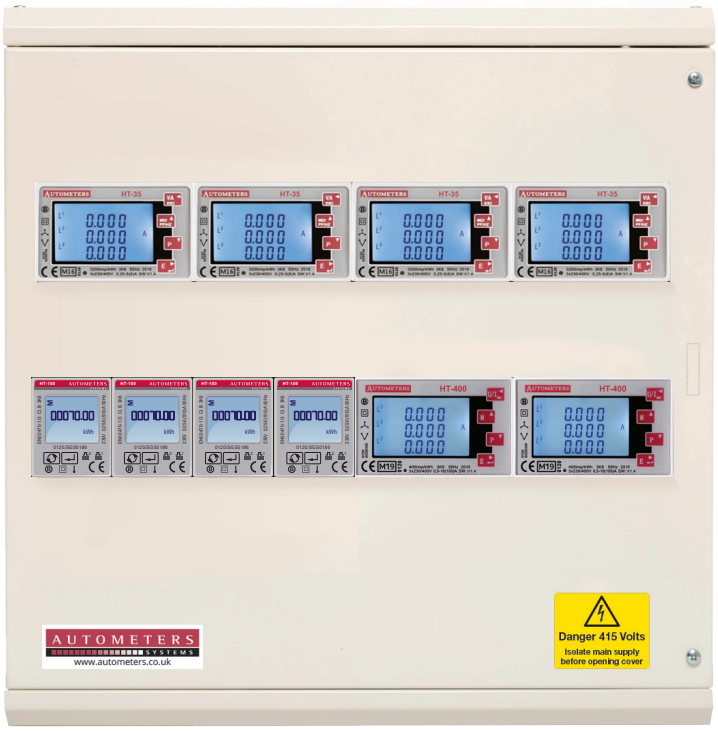


UE-1

Autometers manufacture a number of metal enclosures compatible with the full range of meters it supplies.

The new UE-1 is the latest design for the range of electricity meters.

The enclosure consists of a fuse and shorting terminal arrangement, pre-wired to the meter inside the enclosure.



UE-32

The UE-32 is a metal enclosure allowing 32 single phase meters one module wide, 16 single phase meters two modules wide, or 8 three phase meters 4 modules wide, or a mixture of meters as per the diagram opposite.

Autometers Systems Ltd.
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Eccleshall, Stafford ST21 6JL
Email: sales@autometers.co.uk
Phone: 00(44) 0161 861 9056
Fax: 0161 881 3745
autometers.co.uk

Ref. HT-100.05.2023