

# AUTOMETERS

SYSTEMS

## I. Introduction

This document provides operating, maintenance and installation instructions of A-45 series. The unit measures and displays the characteristics of single phase two wires application. It provides voltage, current, power, frequency, power factor and energy information. A-45 series has both direct connect types and 5A CT operated types. The direct connect type can work with direct load 45A. Two Pulse outputs and 1 remote communication port is provided.

This series covers 3 models:

Model	Current Input	Communication
A-45P	Direct connect 45A	Pulse output only
A-45M	Direct connect 45A	Pulse plus Modbus
A-45CTM	5A CT operated	Pulse plus Modbus

## 2.Specifications

### 2.1 General Specifications

Voltage AC (Un).....	230V
Voltage Range.....	176~276V AC
Current Input.....	0.25~5(6)A
Power consumption.....	<2W/10VA
Frequency.....	50/60Hz (50Hz only for MID version)
AC voltage withstand.....	4KV for 1 minute
Impulse voltage withstand.....	6KV-1.2uS waveform
Overcurrent withstand.....	20Imax for 0.01s
Pulse output rate.....	1000imp/kWh (default) 100/10/1 imp/kWh/kVarh (configurable)
Display.....	LCD with white backlit
Max reading.....	999999 kWh

### 2.2 Accuracy

Voltage.....	0.5% of range maximum
Current.....	0.5% of nominal
Frequency.....	0.2% of mid-frequency
Power factor.....	1% of Unity
Active power.....	1% of range maximum
Reactive power.....	1% of range maximum
Apparent power.....	1% of range maximum
Active energy.....	Class 1 IEC62053-21
Reactive energy.....	Class B EN50470-3 (MID product only)
	1% of range maximum

### 2.3 Environment

Operating temperature.....	-25°C to +55°C
Storage and transportation temperature.....	-40°C to +70°C
Reference temperature.....	23°C ±2°C
Relative humidity.....	0 to 95%, non-condensing
Altitude.....	up to 2000m
Warm up time.....	3s
Mechanical Environment.....	M1
Electromagnetic environment.....	E2
Degree of pollution.....	2

### 2.4 Mechanics

Din rail dimensions.....	18x119x62 (WxHxD) DIN 43880 DIN rail
Mounting.....	35mm
Sealing.....	IP51 (indoor)
Material.....	self-extinguishing UL94V-0

## 3. Display

### 3.1 Initialization Display

When it is powered on, the meter will initialize and do self-checking.

	8888888 kWh	Full Screen. It will last for 3 seconds
1	020 105	Software version. It will last for 3 seconds
2	000478 kWh	Total active energy (kWh)

After the self-checking program, the meter display will show the total active energy (kWh)

## A-45 SERIES MID Approved B and D



- Measures kWh, Kvarh, KW, Kvar, KVA, PF, Hz, dmd, V, A, etc.
- Bi-directional measurement IMP & EXP
- Two pulse outputs
- RS485 Modbus
- Din Rail one Module width (18mm)
- 45A direct connected
- 5 Amp C.T operated
- Better than Class 1 accuracy

### 3.2 Scroll Display Button

After the self-checking program, the meter display will show the total active energy (kWh)



Click the button, the LCD display will scroll the measurements.

1	000478 kWh	Total active energy(kWh) Display format:0000.00
1-1	000245 kWh	Import active energy(kWh) Display format: 0000.00
1-2	000232 kWh	Export active energy(kWh) Display format: 0000.00
2	2198<	Voltage (V)
3	20.18>	Current (A)
4	22102W	Active power (W)
5	F 5000	Frequency (F)
6	PF 100	Power factor (PF)
7	1d 001	Modbus Address or Primary address
8	b 9600	Default: 001Baudrate Default : 9600bps
9	P-rty E	Parity Even/Odd/None are optional
10	ct 100	Primary current 1A-9999A Default: 5 (sample shows 100A)
11	ct 5	CT 2 Secondary current 5A
12	620205	Software version

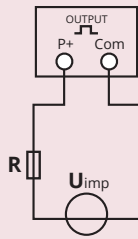
## 4. Communication

### 4.1 Pulse Output

The meter is equipped with 2 pulse outputs, which are fully isolated from the inside circuit. That generates pulses in proportion to the measured energy. The pulse outputs are polarity dependent, passive transistor output requiring an external voltage source, the voltage shall be 5-27V DC, and the maximum input current shall be 27mA DC.

**ATTENTION:** Pulse output must be fed as shown in the adjacent wiring diagram. Ensure polarities and connection mode are correct. Opto-coupler with potential-free SPST-No Contact.

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



### 4.2 Pulse Output 1

The pulse output is configurable and can be set to generate pulses to represent total import/export kWh or kvarh. The default is 100 imp/kWh Import energy. The pulse width is factory set at 100 ms.

### 4.3 Pulse Output 2

Pulse output 2, the constant (red light) is non configurable and is factory set to 1000 imp/kWh. The pulse width is factory set at 60 ms.

### 4.4 RS 485 Output for Modbus

The A-45CTM is supplied with an RS 485 Modbus RTU protocol for communication. The following parameters can only be set in the factory.

Parity : NONE / EVEN / ODD ( Default EVEN )  
Stop bits: 1 / 2 ( Default 1 )  
Modbus Address : 1-247  
Baud Rate :2400, 4800, 9600 ( Default 9600 )

Please contact us for the detailed Modbus/M-Bus communication protocol.  
Default: Autometers protocol v.6

## 5. Safety

### 5.1 Safety Instructions

This manual does not contain all the safety instructions for the operation of the equipment (module, device) because special operating conditions and local code requirements or regulations may necessitate further measures. However, it does contain information which must be read for your personal safety and to avoid material damages. This information is highlighted by a warning triangle and is represented as follows, depending on the degree of potential danger.



#### WARNING

This means that failure to observe the instruction can result in death, serious injury, or considerable material damage.



#### CAUTION

This means hazard of electric shock and failure to take the necessary precautions will result in death, serious injury or considerable material damage.

### Qualified Personnel

Operation of the equipment (module, device) described in this manual may only be performed by qualified personnel. Qualified personnel, in this manual, means persons who are authorised to commission, start up, ground and label devices, systems and circuits according to safety and regulatory standards.

### Proper Handling

The prerequisites for perfect, reliable operation of the product are proper transport, storage installation, and assembly as well as proper operation and maintenance. When operating electrical equipment, certain parts of this equipment automatically carry dangerous voltages. Improper handling can therefore result in serious injuries or material damage.

- Use only insulating tools
- Do not connect while circuit is live (hot)
- Place the meter only in dry surroundings
- Do not mount the meter in an explosive area or expose the meter to dust, mildew and insects
- Make sure the used wires are suitable for the maximum current of this meter
- Make sure the AC wires are connected correctly before activating the current/voltage to the meter
- Do not connect the meter to a 3 phase - 400VAC - network
- Do not touch the meter connecting clamps directly with your bare hands, with metal, blank wire or other material as you may get an electrical shock
- Make sure the protection cover is placed after installation
- Installation, maintenance and reparation should only be done by qualified personnel
- Never break the seals and open the front cover as this might influence the functionality of the meter and will void the warranty
- Do not drop or allow physical impact to the meter as there are high precision components inside that may break

## 6. Installation



The A45 series is designed to fit a standard 35mm DIN Rail


## 7. Programming the Meter

To enter set up mode press the button for 3 seconds. The meter has four programmable settings: CT1, Address, Baud Rate and Parity. Note: Under SET mode if there is no operation, the display will revert to the default display.

### 7.1 CT1 Setting





Under this menu, long press the button  for 3 seconds to enter the set up mode. The first digit will flash. Press the button  to increase or decrease the number.

Long press the button  for 4 seconds to confirm the setting. After setting the CT1 data will be automatically stored and the display will return to the setting mode.

### 7.2 Modbus Address Setting





Under this menu, long press the button  for 3 seconds to enter the set up mode. The first digit will flash. Press the button  to increase or decrease the number. Wait 4 seconds, the next digit will flash. Repeat until correct value has been selected. After 4 seconds the address data will be automatically stored and the display will return to the setting mode.

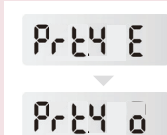
Modbus default: Baudrate 9600, parity Even



### 7.3 Baud Rate Setting



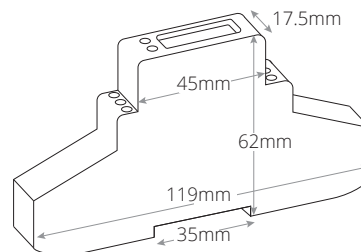
Under this menu, long press the button  for 3 seconds to enter the set up mode. The digits will flash. Press the button  to choose the Baud Rate options (from 1200 to 9600). After 4 seconds the Baud Rate will be automatically stored and the display will return to the setting mode.

### 7.4 Parity Setting



Under this menu, long press the button  for 3 seconds to enter the set up mode. The digits will flash. Press the button  to choose the Parity option (none/even/odd). After 4 seconds the Parity data will be automatically stored and the display will return to the setting mode.

## 7. Dimensions



## 8. Wiring diagram

- Blue circle indicates Pulse Output 1 terminals (Default 100 imp/kWh)
- Red circle indicates Modbus Output terminals TX+, TX-

