

## S534-6-MOD-MID

*Smart Three Phase Energy Counter*



***USER MANUAL***

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## Risk Information

### Information for Your Own Safety

This manual does not contain all of the safety measures operating the equipment (module, device) for different conditions and requirements. However, it does contain information which you must know for your own safety and to avoid damages. These information are highlighted by a warning triangle indicating 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 safety 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 person who are authorized 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, proper storage, installation and proper operation and maintenance. When operating electrical equipment, 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 counter only in dry surroundings.
- ✧ Do not mount the counter in an explosive area or expose the counter to dust, mildew and insects.
- ✧ Make sure the wires are suitable for the maximum current of this counter.
- ✧ Make sure the AC wires are connected correctly before activating the current/voltage to the counter.
- ✧ Do not touch the counter connecting clamps directly with metal, blank wire and your bare hands as you may get 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 function of the counter, and will cause no warranty.
- ✧ Do not drop, or allow strong physical impact on the counter as the high precisely components inside may be damaged.
- ✧ Designed to be mounted inside of switchboards or cabinet on DIN rail.

- ✧ This device must have a suitable sized Circuit Breaker feeding the Multi Function Energy Counter so it does not exceed the maximum rated current.
- ✧ The supply wiring of this device shall be suitable sized cable to match the installed circuit breaker.
- ✧ A Disconnection Device (Circuit Breaker) should be installed close to the Multi Function Energy Counter.
- ✧ The Disconnection Device shall be marked as the Disconnection Device for the Multi Function Energy Counter.

**Disclaimer**

We have checked the contents of this publication and every effort has been made to ensure that the descriptions are as accurate as possible.

However, deviations from the description cannot be completely ruled out, so that no liability can be accepted for any errors contained in the information given. The data in this manual is checked regularly and the necessary corrections are included in subsequent editions. We are grateful for any improvements that you suggest.

## Chapter 1. Introduction

### 1.1 Product Introduction

The counter measures and displays the characteristics of single phase two wire (1p2w), three phase three wire (3p3w) and three phase four wire (3p4w) supplies, including voltage, frequency, current, power, active and reactive energy, imported or exported. Energy is measured in terms of kWh, kVArh. Maximum demand current can be measured over preset periods of up to 60 minutes. In order to measure energy, the unit requires voltage and current inputs in addition to the supply required to power the product. The requisite current input(s) are obtained via current transformers(CT).

The counter can be configured to work with a wide range of CTs with 1A/5A output, giving the unit a wide range of operation. An RS485 communication port is available on the counter for remote data transmission.

This unit can be powered from a separate auxiliary AC power supply. Alternatively it can be powered from the monitored supply, where appropriate.

### 1.2 Product Characteristics

- Bi-directional measurement IMP & EXP
- RS485 Modbus RTU
- Multi-parameters measurement
- LCD with white backlit, adjustable backlit time

#### Measurements:

- Phase voltage: V1, V2, V3
- Line voltage: V1-2, V2-3, V3-1
- Current: I1, I2, I3, IN
- Active power: P1, P2, P3, P\_total (total active power)
- Reactive power: Q1, Q2, Q3, Q\_total (total reactive power)
- Apparent power: S1, S2, S3, S\_Total (total apparent power)
- Frequency: Hz
- Power factor: PF
- Active energy: Ep\_imp (import active energy), Ep\_exp (export active energy), Ep\_total (total active energy)
- Reactive energy: Eq\_imp (import reactive energy), Eq\_exp (export reactive energy), Eq\_total (total reactive energy)
- THD-I and THD-U
- Maximum demand: MD

#### Setup:

- RS485 Modbus RTU
- Demand interval time
- Backlit time
- Supply system 1p2w, 3p3w, 3p4w
- Reset
- Password modification

## Chapter 2. Technical Parameters

### 2.1 Technical Parameters

|                           |                         |
|---------------------------|-------------------------|
| Voltage AC (Un)           | 3*230/400VAC            |
| Voltage range             | 100 - 277V AC ( L-N )   |
| Voltage between phase     | 100 to 480V AC ( L-L)   |
| Current input             | 0.05-5(6)A              |
| Over current withstand    | 20Imax for 0.5S         |
| Frequency rating value    | 50/60Hz                 |
| AC voltage withstand      | 4KV/1min                |
| Impulse voltage withstand | 6kV – 1.2/50μS waveform |
| Power consumption         | ≤ 2W/10VA               |
| Display                   | LCD with white backlit  |
| Max. reading              | 9999999.9 kWh/kVArh     |

### 2.2 Mechanical Characteristics

|                                        |                                        |
|----------------------------------------|----------------------------------------|
| Weight                                 | ≈310g                                  |
| IP Degree of Protection<br>(IEC 60529) | IP51 Front Display<br>IP20 Whole Meter |
| Dimensions (DxHxW)                     | 65*94.5*72mm                           |
| Mounting                               | DIN Rail 35mm                          |
| Material of counter Case               | Self-extinguishing UL 94 V-0           |
| Mechanical Environment                 | M1                                     |

### 2.3 Performance Criteria

|                       |                             |
|-----------------------|-----------------------------|
| Operation humidity    | ≤90% Non-condensing         |
| Storage humidity      | ≤95% Non-condensing         |
| Operating temperature | -40°C~+70°C                 |
| Storage temperature   | -40°C~+80°C                 |
| Pollution Degree      | 2                           |
| Altitude              | ≤2000m                      |
| Vibration             | 10Hz to 50Hz, IEC 60068-2-6 |

### 2.4 Electromagnetic Compatibility

|                             |                 |
|-----------------------------|-----------------|
| Electrostatic Discharge     | IEC 61000-4-2   |
| Immunity to Radiated Fields | IEC 61000-4-3   |
| Immunity to Fast Transients | IEC 61000-4-4   |
| Immunity to Impulse Waves   | IEC 61000-4-5   |
| Conducted Immunity          | IEC 61000-4-6   |
| Immunity to Magnetic Fields | IEC 61000-4-8   |
| Immunity to Voltage Dips    | IEC 61000-4-11  |
| Radiated Emissions          | EN55032 Class B |
| Conducted Emissions         | EN55032 Class B |

## 2.4 Safety

|                                                |                                                     |
|------------------------------------------------|-----------------------------------------------------|
| Over-voltage Category                          | CAT III                                             |
| Installation Category                          | CAT III                                             |
| Current Inputs                                 | Require External Current Transformer for Insulation |
| Insulating Encased counter of Protective Class | II                                                  |

## 2.5 Accuracy

| Parameters      | Accuracy                                         |
|-----------------|--------------------------------------------------|
| Voltage         | ±0.2%                                            |
| Current         | ±0.2%                                            |
| Frequency       | ±0.05%                                           |
| Power Factor    | ±0.005                                           |
| Active Power    | ± 0.5%(5%Ib~Imax)                                |
| Reactive Power  | ± 2%(5%Ib~Imax)                                  |
| Apparent Power  | ± 0.5%(5%Ib~Imax)                                |
| Active Energy   | Class 0.5S IEC62053-21<br>Class C EN50470-3:2022 |
| Reactive Energy | Class 2 IEC 62053-23                             |

## 2.6 Outputs

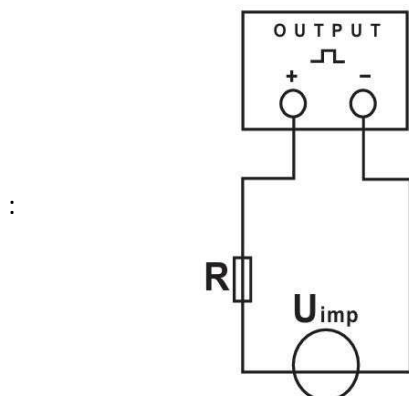
### 2.6.1 RS485 Modbus RTU

For Modbus RTU, the following RS485 communication parameters can be configured from the Set-up menu:

|                        |                                          |
|------------------------|------------------------------------------|
| Bus Type               | RS485                                    |
| Communication Protocol | Modbus RTU                               |
| Baud Rate              | 2.4k/4.8k/9.6k(default)/19.2k /38.4k bps |
| Address Range          | 001 to 247                               |
| Bus Load               | 64 PCS                                   |
| Communication Distance | 1000m                                    |
| Parity Bit             | none(default)/ odd / even                |
| Stop Bit               | 1 or 2                                   |
| Data Bits              | 8                                        |

## 2.6.2 Pulse output

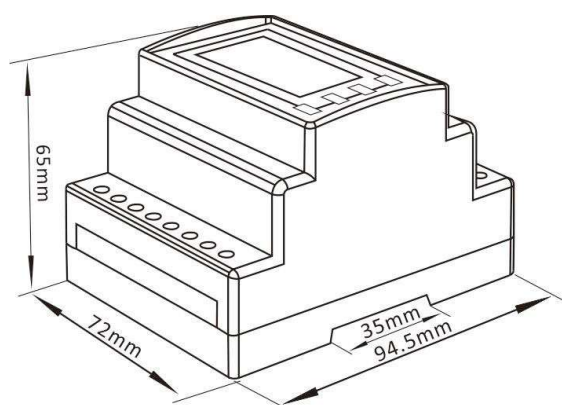
The counter is equipped with pulse outputs, which are fully isolated from the inside circuit. They generate pulses in proportion to the measured energy. The pulse output is polarity dependent, passive transistor output requiring an external voltage source for correct operation. For this external voltage 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 wiring diagram on the left.  
 Scrupulously respect polarities and the connection mode.  
 Opto-coupler with potential-free SPST-NO Contact.  
 Contact range 5~27VDC  
 Max. current Input: 27mA DC

| Pulse outputs type            | Two independent channels of optocoupler passive pulse outputs |                                                                                  |
|-------------------------------|---------------------------------------------------------------|----------------------------------------------------------------------------------|
| Pulse output 1 (configurable) | Type                                                          | kWh/kVArh<br>Default: kVArh                                                      |
|                               | Constant                                                      | 0.01, 0.1, 1, 10, 100, 1000 kWh/kVArh per imp<br>Default: 0.01 kWh/kVArh per imp |
|                               | Width                                                         | 200, 100, 60mS<br>Default: 200mS                                                 |
| Pulse output 2 (fixed)        | Type                                                          | Total kWh                                                                        |
|                               | Constant                                                      | 3200 imp/kWh                                                                     |
|                               | Width                                                         | 100mS                                                                            |

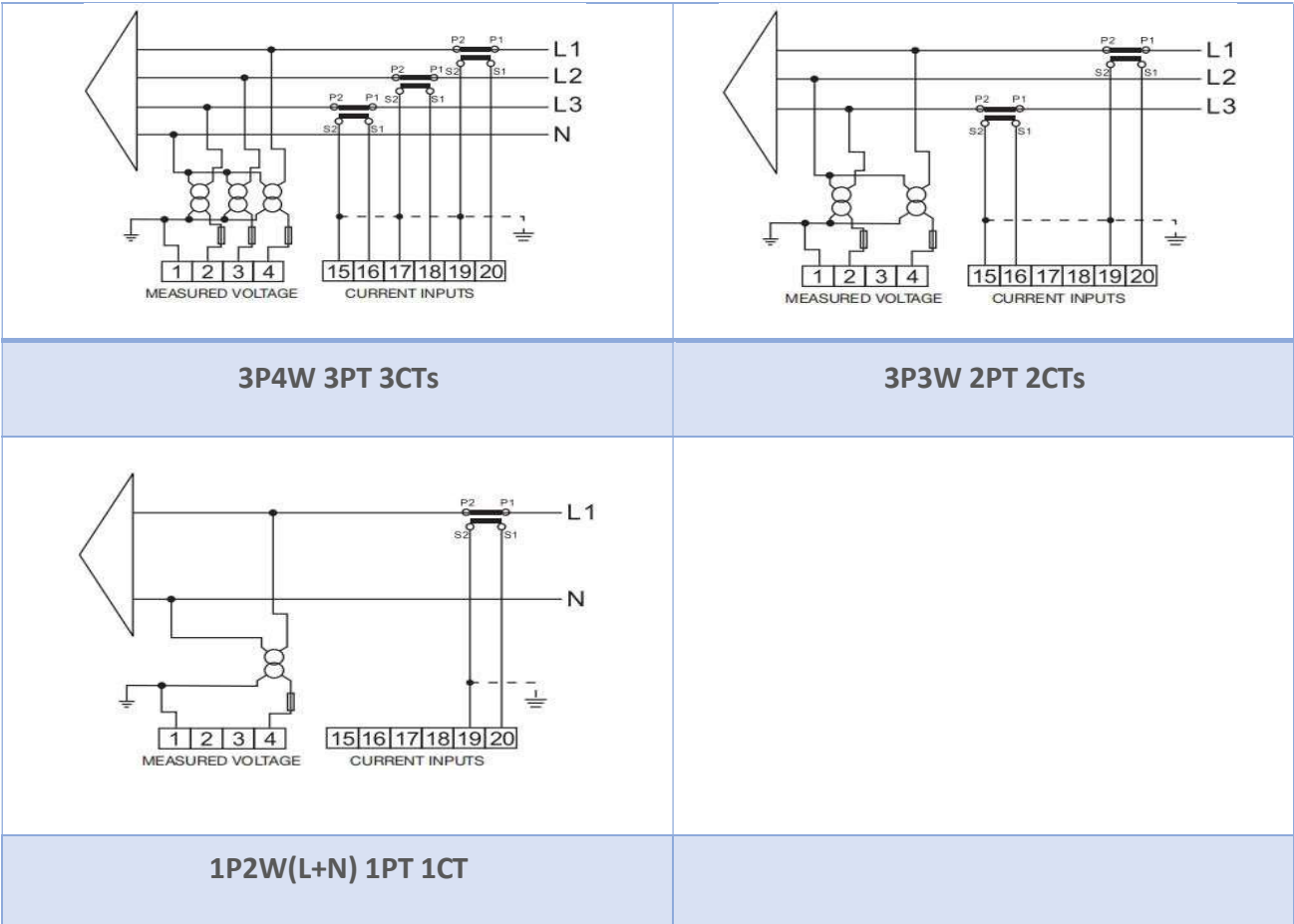
## 2.7 Dimensions



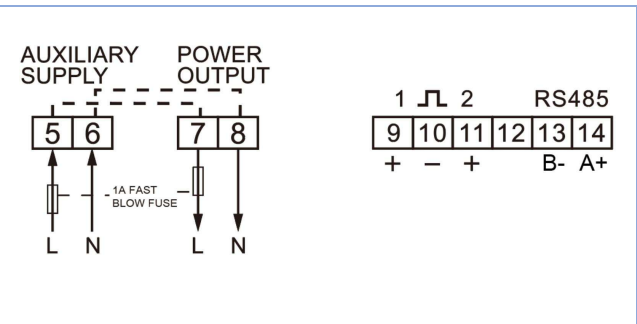
Height: 94.5 mm  
 Width: 72mm  
 Depth: 65mm

## 2.8 Wiring Diagram

### Current and Voltage Inputs



### Definitions of Other Terminals



## Wiring Guide

|                 |                        |                                    |
|-----------------|------------------------|------------------------------------|
| Terminal<br>①~⑧ | Measurement Connection | Screw Connection                   |
|                 | Strip Length           | 6-7mm                              |
|                 | Rigid/Supple           | 0.5-2.5mm <sup>2</sup> (22~12 AWG) |
|                 | Tightening Torque      | 0.4Nm                              |
|                 | Model                  | PH0                                |
| Terminal<br>⑨~⑳ | Measurement Connection | Screw Connection                   |
|                 | Strip Length           | 6-7mm                              |
|                 | Rigid/Supple           | 0.5-2.5mm <sup>2</sup> (30~12 AWG) |
|                 | Tightening Torque      | 0.4Nm                              |
|                 | Model                  | PH0                                |

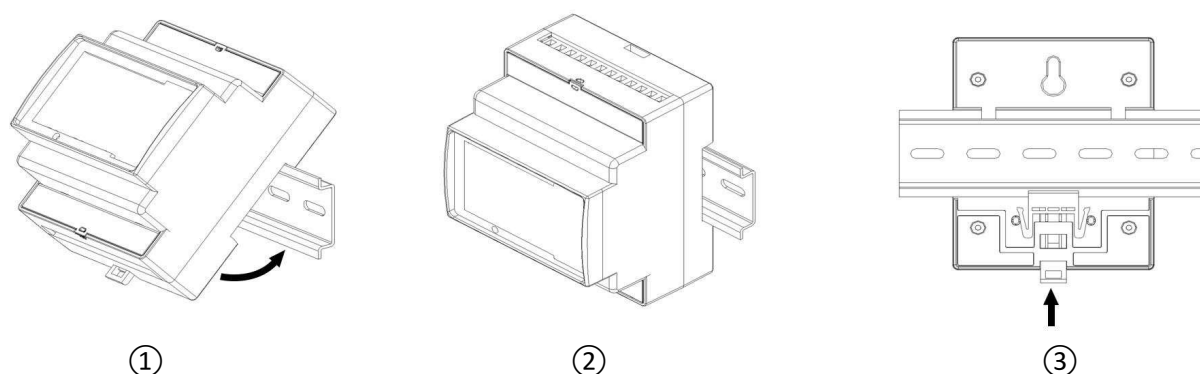
## Installation

Step 1: Select a 35mm-wide DIN rail, Pull down the back-end clip on the counter to unlock the mounting mechanism.

Step 2: Align Upper Slot with DIN Rail. Position the upper slot of the counter's DIN rail groove onto the DIN rail, ensuring full contact (see Figure 1).

Step 3: Following the direction indicated in Figure 1, engage the lower slot of the DIN rail groove onto the DIN rail until audibly seated (see Figure 2).

Step 4: Push up the back-end clip to lock the counter firmly onto the DIN rail (see Figure 3).



## Chapter 3. Operation

### 3.1 Installation Display

|                                                                                     |                                                                                                                                                            |
|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | The first screen lights up all display segments and can be used as a display check.                                                                        |
|    | The second screen and the third screen indicates the firmware installed in the unit.<br>Note: the actual display might be different with the left on here. |
|   |                                                                                                                                                            |
|  | The interface performs a self-test and indicates the result if the test passes.                                                                            |

### 3.2 Button Functions

| Button                                                                              | Short click                                                      |                                 | Long press (3s) |            |
|-------------------------------------------------------------------------------------|------------------------------------------------------------------|---------------------------------|-----------------|------------|
|                                                                                     | Display mode                                                     | Setup mode                      | Display mode    | Setup mode |
|  | V1 V2 V3<br>V1-2 V2-3 V3-1<br>I1 I2 I3<br>IN<br>V %THD<br>I %THD | Return to previous menu         |                 |            |
|  | Hz PF<br>PF1 PF2 PF3<br>MD of I1 I2 I3<br>MD of Power            | Previous page or increase value | CRC             |            |

|                                                                                   |                                                                                                |                             |                  |                 |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|-----------------------------|------------------|-----------------|
|  | P1 P2 P3<br>Q1 Q2 Q3<br>S1 S2 S3<br>P-t Q-t S-t                                                | Next page or decrease value |                  |                 |
|  | Active E-t<br>Reactive E-t<br>Imp Active E<br>Exp Active E<br>Imp Reactive E<br>Exp Reactive E | Move to right side          | Enter Setup mode | Confirm setting |

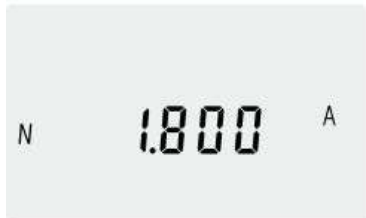
### 3.3 Measurements

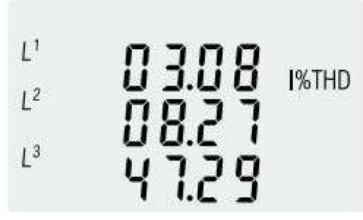
#### 3.3.1 Voltage and current

Each successive pressing of the



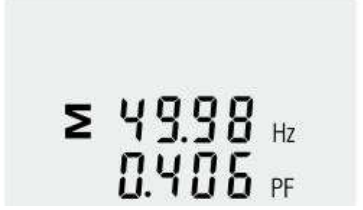
button selects a new range:

|                                                                                     |                                                        |
|-------------------------------------------------------------------------------------|--------------------------------------------------------|
|   | Phase to neutral voltage<br>(Not available under 3P3W) |
|  | Phase to phase voltage<br>(Not available under 1P2W)   |
|  | Current of each phase                                  |
|  | Neutral current<br>(Not available under 3P3W & 1P2W)   |

|                                                                                   |                                                                           |
|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------|
|  | Phase to neutral voltage THD%<br>(Phase to phase voltage THD% under 3P3W) |
|  | Phase current THD%                                                        |

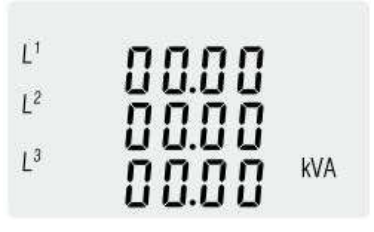
### 3.3.2 Frequency, Power factor and Demand

Each successive pressing of the  button selects a new range:

|                                                                                     |                                                                 |
|-------------------------------------------------------------------------------------|-----------------------------------------------------------------|
|   | Frequency and Power Factor (total)                              |
|  | Power Factor of each phase<br>(Not available under 3P3W & 1P2W) |
|  | Maximum current demand of each phase                            |
|  | Maximum total power demand                                      |

### 3.3.3 Power

Each successive pressing of the  button select a new range:

|                                                                                     |                                                                           |
|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------|
|    | Instantaneous Active Power in kW<br>(Not available under 3P3W & 1P2W)     |
|    | Instantaneous Reactive Power in kVAr<br>(Not available under 3P3W & 1P2W) |
|   | Instantaneous Volt-amps in kVA<br>(Not available under 3P3W & 1P2W)       |
|  | Total W, VAr, VA                                                          |

### 3.3.4 Energy

Each successive pressing of the  button shows following measurements:

For S534-6-MOD-MID:

|                                                                                     |                            |
|-------------------------------------------------------------------------------------|----------------------------|
|  | Total active energy in kWh |
|-------------------------------------------------------------------------------------|----------------------------|

|                                                                                     |                                   |
|-------------------------------------------------------------------------------------|-----------------------------------|
|    | Total reactive energy in kVarh    |
|    | Imported active energy in kWh     |
|    | Exported active energy in kWh     |
|   | Imported reactive energy in kVarh |
|  | Exported reactive energy in kVarh |

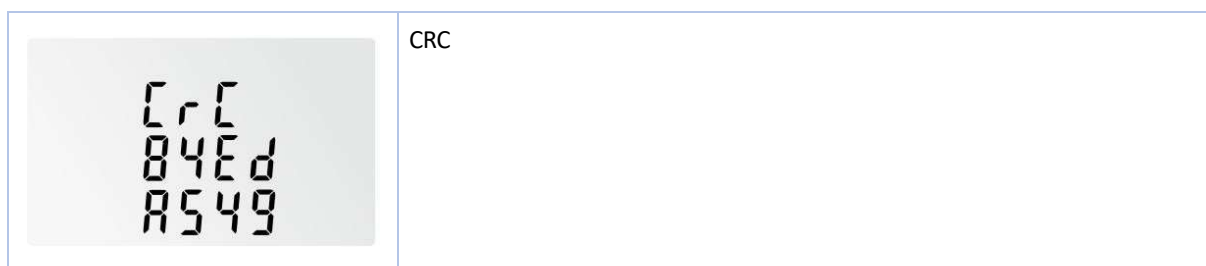
For S534-6-MOD-MID-2T:

|                                                                                     |                            |
|-------------------------------------------------------------------------------------|----------------------------|
|  | Total active energy in kWh |
|-------------------------------------------------------------------------------------|----------------------------|

|                                                                                     |                                                                  |
|-------------------------------------------------------------------------------------|------------------------------------------------------------------|
|    | Total reactive energy in kVarh                                   |
|    | T1 active energy in kWh<br>(Run means under T1 calculation )     |
|    | T2 active energy in kWh                                          |
|  | T1 reactive energy in kVarh<br>(Run means under T1 calculation ) |
|  | T2 reactive energy in kVarh                                      |

### 3.4 Auxiliary Mode

Each successive Long pressing of the  button enter the auxiliary:



### 3.5 Setup Mode

The counter's settable parameters are password protected. Each successive Long pressing on the  button to enter setup mode. Some menu items, such as password and CT, require a four-digit number entry while others, such as supply system, require selection from a number of menu options.

#### 3.5.1 Menu Option Selection

1. Use the  and  buttons to scroll through the different options of the set up menu.
2. Long press  to confirm your selection.
3. If an item flashes, then it can be adjusted by the  and  buttons.
4. Having selected an option from the current layer, long press  to confirm your selection.
5. Having completed a parameter setting, press  to return to a higher menu level.

You will be able to use the  and  buttons for further menu selection.

6. On completion of all setting-up, press  repeatedly until the measurement screen is restored.

#### 3.5.2 Number Entry Procedure

When setting up the unit, some screens require the entering of a number. In particular, on entry to the setting up section, a password must be entered. Digits are set individually, from left to right.

The procedure is as follows:

1. The current digit to be set flashes and is set using the  and  buttons.
2. Short press  to confirm the digit setting and remove to the next.
3. After setting the last digit, long press  to confirm the setting.
4. Press  to return to a higher menu level.

|                    |            |                        |
|--------------------|------------|------------------------|
| Settings interface | Set status | Optional configuration |
|--------------------|------------|------------------------|

|                                                                                     |                                                                                      |                                                                                                        |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
|    |                                                                                      | <b>Password</b><br>Default: 1000                                                                       |
|    |    | <b>ModBus address setting</b><br>Address range: 001~247<br>Default: 001                                |
|    |    | <b>Baud rate setting</b><br>Option: 2.4k, 4.8k, 9.6k, 19.2k, 38.4k bps<br>Default: 9.6k bps            |
|   |   | <b>Parity bit setting</b><br>Option: EVEN, ODD, NONE<br>Default: NONE                                  |
|  |  | <b>Stop bit setting</b><br>Option: 1, 2<br>Default: 1                                                  |
|  |  | <b>CT2 setting (*)</b><br>Option: 1, 5A<br>Default: 5A                                                 |
|  |  | <b>CT rate setting (*)</b><br>Rang:<br>1. 0001~9999(CT2 = 1)<br>2. 0001~9999(CT2 = 5)<br>Default: 0005 |

**(\*) WARNING: please note you will only have one opportunity to set CT1 & CT2.**

|                                                                                                  |                                                                                      |                                                                                                                       |
|--------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
|                 |    | <b>PT2 setting (*)</b><br>Rang: 100~500V<br>Default: 400V                                                             |
|                 |    | <b>PT rate setting (*)</b><br>Rang: 0001~2000<br>Default: 0001                                                        |
| <b>(*) WARNING: please note you will only have one opportunity to set the PT2 &amp; PT rate.</b> |                                                                                      |                                                                                                                       |
|                |   | <b>Pulse output setting</b><br>Option: kWh, kVArh<br>Default: KVArh                                                   |
|               |  | <b>Pulse rate setting</b><br>Option: 0.01, 0.1, 1, 10, 100, 1000 kWh/kVArh per imp<br>Default: 0.01 kWh/kVArh per imp |
|               |  | <b>Pulse duration setting</b><br>Option: 200, 100, 60 mS<br>Default: 200mS                                            |
|               |  | <b>Demand interval time setting</b><br>Option: 0, 5, 8, 10, 15, 20, 30, 60min<br>Default: 60min                       |
|               |  | <b>Backlit time setting</b><br>Option: 0, 5, 10, 30, 60, 120 min<br>Default: 0<br><br>*0 means always on              |

|                                                                                     |                                                                                      |                                                                                                                                                   |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
|    |    | <b>System type setting</b><br>Option: 3P4W, 3P3W, 1P2W<br>Default: 3P4W                                                                           |
|    |    | <b>CLR max demand setting</b>                                                                                                                     |
|    |    | <b>Password setting</b><br>Range: 0000~9999<br>Default: 1000                                                                                      |
|  |  | <b>IA current direction setting</b><br>Option: Frd, Rev<br>Default: Frd<br><br>*Frd = Forward; Rev = Reverse<br>*And so on for IB & IC operation. |

## Chapter 4. Declaration of Conformity MID

SENECA srl declares under our sole responsibility as the manufacturer that the three phase multi-function electrical Energy Counter S534-6-MOD-MID correspond to the production model described in the EU-type examination certificate and the requirements of the Directive 2014/32/EU.

Type examination certificate number MID/B/25/138.

Identification number of the Notified Body: 0598.

## Chapter 5. Communication Protocol

### 5.1 Input Register

| Function code | Description         |
|---------------|---------------------|
| 04            | Read Input Register |

| Address<br>s<br>(Register) | Input Register Parameter          |                   |                |                 | Modbus<br>Protocol Start<br>Address Hex |            | 3<br>Ø | 3<br>Ø | 1<br>Ø |
|----------------------------|-----------------------------------|-------------------|----------------|-----------------|-----------------------------------------|------------|--------|--------|--------|
|                            | Description                       | Length<br>(bytes) | Data<br>Format | Units           | Hi<br>Byte                              | Lo<br>Byte | 4<br>W | 3<br>W | 2<br>W |
| 30001                      | L1 line to neutral RMS volts      | 4                 | Float          | V               | 00                                      | 00         | ✓      | X      | ✓      |
| 30003                      | L2 line to neutral RMS volts      | 4                 | Float          | V               | 00                                      | 02         | ✓      | X      | X      |
| 30005                      | L3 line to neutral RMS volts      | 4                 | Float          | V               | 00                                      | 04         | ✓      | X      | X      |
| 30007                      | L1 RMS current                    | 4                 | Float          | A               | 00                                      | 06         | ✓      | ✓      | ✓      |
| 30009                      | L2 RMS current                    | 4                 | Float          | A               | 00                                      | 08         | ✓      | ✓      | X      |
| 30011                      | L3 RMS current                    | 4                 | Float          | A               | 00                                      | 0A         | ✓      | ✓      | X      |
| 30013                      | L1 active power                   | 4                 | Float          | W               | 00                                      | 0C         | ✓      | X      | ✓      |
| 30015                      | L2 active power                   | 4                 | Float          | W               | 00                                      | 0E         | ✓      | X      | X      |
| 30017                      | L3 active power                   | 4                 | Float          | W               | 00                                      | 10         | ✓      | X      | X      |
| 30019                      | L1 apparent power                 | 4                 | Float          | VA              | 00                                      | 12         | ✓      | X      | ✓      |
| 30021                      | L2 apparent power                 | 4                 | Float          | VA              | 00                                      | 14         | ✓      | X      | X      |
| 30023                      | L3 apparent power                 | 4                 | Float          | VA              | 00                                      | 16         | ✓      | X      | X      |
| 30025                      | L1 reactive power                 | 4                 | Float          | VA <sub>r</sub> | 00                                      | 18         | ✓      | X      | ✓      |
| 30027                      | L2 reactive power                 | 4                 | Float          | VA <sub>r</sub> | 00                                      | 1A         | ✓      | X      | X      |
| 30029                      | L3 reactive power                 | 4                 | Float          | VA <sub>r</sub> | 00                                      | 1C         | ✓      | X      | X      |
| 30031                      | L1 power factor <sup>(1)</sup>    | 4                 | Float          | None            | 00                                      | 1E         | ✓      | X      | ✓      |
| 30033                      | L2 power factor <sup>(1)</sup>    | 4                 | Float          | None            | 00                                      | 20         | ✓      | X      | X      |
| 30035                      | L3 power factor <sup>(1)</sup>    | 4                 | Float          | None            | 00                                      | 22         | ✓      | X      | X      |
| 30037                      | L1 phase angle                    | 4                 | Float          | Degrees         | 00                                      | 24         | ✓      | X      | ✓      |
| 30039                      | L2 phase angle                    | 4                 | Float          | Degrees         | 00                                      | 26         | ✓      | X      | X      |
| 30041                      | L3 phase angle                    | 4                 | Float          | Degrees         | 00                                      | 28         | ✓      | X      | X      |
| 30043                      | Average line to neutral RMS volts | 4                 | Float          | V               | 00                                      | 2A         | ✓      | X      | X      |

|       |                                               |   |       |       |    |    |   |   |   |
|-------|-----------------------------------------------|---|-------|-------|----|----|---|---|---|
| 30047 | Average line RMS current                      | 4 | Float | A     | 00 | 2E | ✓ | ✓ | ✓ |
| 30049 | Sum of line RMS currents                      | 4 | Float | A     | 00 | 30 | ✓ | ✓ | ✓ |
| 30053 | Total active power                            | 4 | Float | W     | 00 | 34 | ✓ | ✓ | ✓ |
| 30057 | Total apparent power                          | 4 | Float | VA    | 00 | 38 | ✓ | ✓ | ✓ |
| 30061 | Total reactive power                          | 4 | Float | VAr   | 00 | 3C | ✓ | ✓ | ✓ |
| 30063 | Total power factor <sup>(1)</sup>             | 4 | Float | None  | 00 | 3E | ✓ | ✓ | ✓ |
| 30071 | Frequency                                     | 4 | Float | Hz    | 00 | 46 | ✓ | ✓ | ✓ |
| 30073 | Import active energy                          | 4 | Float | kWh   | 00 | 48 | ✓ | ✓ | ✓ |
| 30075 | Export active energy                          | 4 | Float | kWh   | 00 | 4A | ✓ | ✓ | ✓ |
| 30077 | Import reactive energy                        | 4 | Float | kVArh | 00 | 4C | ✓ | ✓ | ✓ |
| 30079 | Export reactive energy                        | 4 | Float | kVArh | 00 | 4E | ✓ | ✓ | ✓ |
| 30081 | Apparent energy                               | 4 | Float | kVAh  | 00 | 50 | ✓ | ✓ | ✓ |
| 30083 | Ah                                            | 4 | Float | Ah    | 00 | 52 | ✓ | ✓ | ✓ |
| 30085 | Total active power demand <sup>(2)</sup>      | 4 | Float | W     | 00 | 54 | ✓ | ✓ | ✓ |
| 30087 | Max. total active power demand <sup>(2)</sup> | 4 | Float | W     | 00 | 56 | ✓ | ✓ | ✓ |
| 30101 | Apparent power demand                         | 4 | Float | VA    | 00 | 64 | ✓ | ✓ | ✓ |
| 30103 | Apparent power max. demand                    | 4 | Float | VA    | 00 | 66 | ✓ | ✓ | ✓ |
| 30105 | Neutral current demand                        | 4 | Float | Amps  | 00 | 68 | ✓ | X | X |
| 30107 | Max. neutral current demand                   | 4 | Float | Amps  | 00 | 6A | ✓ | X | X |
| 30109 | Reactive power demand <sup>(2)</sup>          | 4 | Float | VAr   | 00 | 6C | ✓ | ✓ | ✓ |
| 30111 | Reactive power max. demand <sup>(2)</sup>     | 4 | Float | VAr   | 00 | 6E | ✓ | ✓ | ✓ |
| 30201 | L1 to L2 volts                                | 4 | Float | V     | 00 | C8 | ✓ | ✓ | X |
| 30203 | L2 to L3 volts                                | 4 | Float | V     | 00 | CA | ✓ | ✓ | X |
| 30205 | L3 to L1 volts                                | 4 | Float | V     | 00 | CC | ✓ | ✓ | X |
| 30207 | Average line to line volts                    | 4 | Float | V     | 00 | CE | ✓ | ✓ | X |
| 30225 | Neutral current                               | 4 | Float | A     | 00 | E0 | ✓ | X | X |
| 30235 | L1 L/N volts THD                              | 4 | Float | %     | 00 | EA | ✓ | X | ✓ |
| 30237 | L2 L/N volts THD                              | 4 | Float | %     | 00 | EC | ✓ | X | X |
| 30239 | L3 L/N volts THD                              | 4 | Float | %     | 00 | EE | ✓ | X | X |
| 30241 | L1 Current THD                                | 4 | Float | %     | 00 | F0 | ✓ | ✓ | ✓ |
| 30243 | L2 Current THD                                | 4 | Float | %     | 00 | F2 | ✓ | X | X |

|       |                                   |   |       |       |    |    |   |   |   |
|-------|-----------------------------------|---|-------|-------|----|----|---|---|---|
| 30245 | L3 Current THD                    | 4 | Float | %     | 00 | F4 | ✓ | ✓ | X |
| 30249 | Average line to neutral volts THD | 4 | Float | %     | 00 | F8 | ✓ | X | ✓ |
| 30251 | Average line current THD          | 4 | Float | %     | 00 | FA | ✓ | ✓ | ✓ |
| 30259 | L1 current demand                 | 4 | Float | A     | 01 | 02 | ✓ | ✓ | ✓ |
| 30261 | L2 current demand                 | 4 | Float | A     | 01 | 04 | ✓ | ✓ | X |
| 30263 | L3 current demand                 | 4 | Float | A     | 01 | 06 | ✓ | ✓ | X |
| 30265 | Maximum L1 current demand         | 4 | Float | A     | 01 | 08 | ✓ | ✓ | ✓ |
| 30267 | Maximum L2 current demand         | 4 | Float | A     | 01 | 0A | ✓ | ✓ | X |
| 30269 | Maximum L3 current demand         | 4 | Float | A     | 01 | 0C | ✓ | ✓ | X |
| 30335 | L1 to L2 volts THD                | 4 | Float | %     | 01 | 4E | X | ✓ | X |
| 30337 | L2 to L3 volts THD                | 4 | Float | %     | 01 | 50 | X | ✓ | X |
| 30339 | L3 to L1 volts THD                | 4 | Float | %     | 01 | 52 | X | X | X |
| 30341 | Average line to line volts THD    | 4 | Float | %     | 01 | 54 | X | ✓ | X |
| 30343 | Total kWh <sup>(3)</sup>          | 4 | Float | kWh   | 01 | 56 | ✓ | ✓ | ✓ |
| 30345 | Total kVarh <sup>(3)</sup>        | 4 | Float | kVarh | 01 | 58 | ✓ | ✓ | ✓ |
| 30347 | L1 import kWh                     | 4 | Float | kWh   | 01 | 5A | ✓ | X | ✓ |
| 30349 | L2 import kWh                     | 4 | Float | kWh   | 01 | 5C | ✓ | X | X |
| 30351 | L3 import kWh                     | 4 | Float | kWh   | 01 | 5E | ✓ | X | X |
| 30353 | L1 export kWh                     | 4 | Float | kWh   | 01 | 60 | ✓ | X | ✓ |
| 30355 | L2 export kWh                     | 4 | Float | kWh   | 01 | 62 | ✓ | X | X |
| 30357 | L3 export kWh                     | 4 | Float | kWh   | 01 | 64 | ✓ | X | X |
| 30359 | L1 total kWh                      | 4 | Float | kWh   | 01 | 66 | ✓ | X | ✓ |
| 30361 | L2 total kWh                      | 4 | Float | kWh   | 01 | 68 | ✓ | X | X |
| 30363 | L3 total kWh                      | 4 | Float | kWh   | 01 | 6A | ✓ | X | X |
| 30365 | L1 import kVarh                   | 4 | Float | kVarh | 01 | 6C | ✓ | X | ✓ |
| 30367 | L2 import kVarh                   | 4 | Float | kVarh | 01 | 6E | ✓ | X | X |
| 30369 | L3 import kVarh                   | 4 | Float | kVarh | 01 | 70 | ✓ | X | X |
| 30371 | L1 export kVarh                   | 4 | Float | kVarh | 01 | 72 | ✓ | X | ✓ |
| 30373 | L2 export kVarh                   | 4 | Float | kVarh | 01 | 74 | ✓ | X | X |
| 30375 | L3 export kVarh                   | 4 | Float | kVarh | 01 | 76 | ✓ | X | X |
| 30377 | L1 total kVarh                    | 4 | Float | kVarh | 01 | 78 | ✓ | X | ✓ |
| 30379 | L2 total kVarh                    | 4 | Float | kVarh | 01 | 7A | ✓ | X | X |

|       |                |   |       |       |    |    |   |   |   |
|-------|----------------|---|-------|-------|----|----|---|---|---|
| 30381 | L3 total kVArh | 4 | Float | kVArh | 01 | 7C | ✓ | X | X |
|-------|----------------|---|-------|-------|----|----|---|---|---|

**Notes:**

1. The power factor has its sign adjusted to indicate the direction of the current. Positive refers to forward current, negative refers to reverse current.
2. The power sum demand calculation is for import – export.
3. Total kWh / kVArh equals to Import + export.

**5.2 Holding Register**

| Function code | Description                      |
|---------------|----------------------------------|
| 10            | Write parameter holding register |
| 03            | Read parameter holding register  |

| Address Register | Parameter            | Modbus Protocol Start Address Hex |          | Valid range                                                                                                                                                           | Mode<br>(ro: read only<br>wo: write only<br>r/w: read/write) |
|------------------|----------------------|-----------------------------------|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
|                  |                      | High Byte                         | Low Byte |                                                                                                                                                                       |                                                              |
| 40001            | Demand Time          | 00                                | 00       | Read minutes into first demand calculation. When the Demand Time reaches the Demand Period then the demand values are valid.<br>Length: 4 bytes<br>Data Format: Float | ro                                                           |
| 40003            | Demand Period        | 00                                | 02       | Demand Period time range: 0 to 60, 0 represents real-time update (demand updated every 1 second).<br>Default: 60min<br>Length : 4 bytes<br>Data Format : Float        | r/w                                                          |
| 40011            | System Type          | 00                                | 0A       | Write system type:<br>1 = 1P2W<br>2 = 3P3W<br>3 = 3P4W<br>Default: 3P4W<br>Length : 4 bytes<br>Data Format : Float                                                    | r/w                                                          |
| 40013            | Pulse Output 1 Width | 00                                | 0C       | Write pulse on period in milliseconds:<br>60, 100 ,200.<br>Default: 200mS<br>Length: 4 bytes<br>Data Format: Float                                                    | r/w                                                          |

|       |                                                |    |    |                                                                                                                                                                                                                                                                                                 |     |
|-------|------------------------------------------------|----|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| 40015 | Key Parameter Programming Authorization (KPPA) | 00 | 0E | Read: to get the status of the KPPA<br>0 = not authorized<br>1 = authorized<br>Write the correct password to get KPPA, enable to program key parameters.<br>Length: 4 bytes<br>Data Format: Float                                                                                               | r/w |
| 40019 | Parity Stop                                    | 00 | 12 | Write the network port parity/stop bits for MODBUS Protocol, where:<br>0 = One stop bit and no parity<br>1 = One stop bit and even parity<br>2 = One stop bit and odd parity<br>3 = Two stop bits and no parity<br>Default: One stop bit and no parity<br>Length: 4 bytes<br>Data Format: Float | r/w |
| 40021 | Modbus Address                                 | 00 | 14 | Address: 1 to 247 for MODBUS Protocol<br>default : 1<br>Length : 4 bytes<br>Data Format : Float                                                                                                                                                                                                 | r/w |
| 40023 | Pulse 1 Rate                                   | 00 | 16 | Write pulse rate index: n<br>= 1 to 6<br>1 = 0.01kwh/imp<br>2 = 0.1kwh/imp<br>3 = 1kwh/imp<br>4 = 10kwh/imp<br>5 = 100kwh/imp<br>6 = 1000kwh/imp<br>Default: 0.01kwh/imp<br>Length : 4 bytes<br>Data Format : Float                                                                             | r/w |
| 40025 | Password                                       | 00 | 18 | Set range 0000 ~ 9999<br>Default: 1000<br>Length: 4 bytes<br>Data Format: Float                                                                                                                                                                                                                 | r/w |
| 40029 | Baud Rate                                      | 00 | 1C | Settable value:<br>0 = 2.4k bps<br>1 = 4.8k bps<br>2 = 9.6k bps<br>3 = 19.2k bps<br>4 = 38.4k bps<br>Default: 9.6k bps<br>Length: 4 bytes<br>Data Format: Float                                                                                                                                 | r/w |
| 40047 | PT ratio                                       | 00 | 2E | PT Ratio range:1~2000<br>Default: 1<br>Length : 4 bytes<br>Data Format : Float                                                                                                                                                                                                                  | r/w |

|        |                        |    |    |                                                                                                                                                                                                   |     |
|--------|------------------------|----|----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| 40049  | PT2                    | 00 | 30 | PT 2 range: 100 ~500V<br>Default: 400V<br>Length : 4 bytes<br>Data Format : Float                                                                                                                 | r/w |
| 40051  | CT 1                   | 00 | 32 | CT 1 range:<br>CT2 = 5 CT 1 range:1~9999<br>CT2 = 1 CT 1 range:1~9999<br>Default: 5<br>Length : 4 bytes<br>Data Format : Float                                                                    | r/w |
| 40053  | CT2                    | 00 | 34 | CT 2: 1A or 5A<br>Default: 5A<br>Length: 4 bytes<br>Data Format: Float                                                                                                                            | r/w |
| 40061  | Backlight time         | 00 | 3C | Backlight time : 0, 5, 10, 30, 60 ,120 min<br>Default: 0 min<br>Length: 4 bytes<br>Data Format: Float                                                                                             | r/w |
| 40087  | Pulse 1<br>Energy Type | 00 | 56 | Write MODBUS Protocol<br>input parameter for pulse<br>out 1:<br>2 = total active energy<br>6 = total reactive energy<br>Default: total reactive energy<br>Length : 4 bytes<br>Data Format : Float | r/w |
| 461457 | Reset                  | F0 | 10 | 00 00 = reset the Maximum demand<br>Length : 2 bytes<br>Data Format: Hex                                                                                                                          | wo  |
| 464513 | Serial Number          | FC | 00 | Serial number<br>Length : 4 bytes<br>Data Format : unsigned int32                                                                                                                                 | ro  |
| 464515 | Meter Code             | FC | 02 | Read counter code<br>Length : 2 bytes<br>Data Format : hex                                                                                                                                        | ro  |
| 464645 | Software version       | FC | 84 | Software version XX.YY<br>XX = first byte<br>YY = second byte<br>Length : 2 bytes<br>Data Format : Hex                                                                                            | ro  |
| 464647 | Program<br>Number      | FC | 86 | Read program number<br>Length : 2 bytes<br>Data Format : Hex                                                                                                                                      | ro  |

If you have any question, please feel free to contact our sales team.

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