SMB350

User Manual

2015/11/10 Version : 3.0e

DAE Instrument Corp. http://www.DAEinstrument.com/

SMB350 User Manual, 2015, Nov.

DAE Headquarters
5F, No. 157, Xinhu 1st Road, Neihu District, Taipei 11494, Taiwan, R.O.C.
Tel：+886 (02)-2793-6123 Fax：+886 (02)-2793-6150
e-mail：info@DAEinstrument.com

DAE Controls LLC.
2707 Golfview Dr. 103 Troy Michigan 48084, USA
Tel：+1 (248)-635-3708 Fax：+1 (248)-822-8138
e-mail：info@DAEcontrols.com

Safety Precautions

Please read these safety instructions before using this equipment.

For safety purposes, please observe the following when unwrapping and installing the package：

1. When opening the package, check that the contents have not been damaged during transit.
2. Check to make sure that the product model and the labeling on the outside of the packaging are consistent.
3. This product is designed and suitable for most electrical power panels.
4. Do not install this product at the openings of ventilation ducts or near heat sources.
5. Make sure that the actual wiring conforms to the wiring diagram designated in this manual.
6. Guard against dust and water damage.
7. Make sure all power sources to be connected to the product have been shut off before installing.
8. If the equipment is used in a manner not specified by manufacturer, the protection provided by the equipment may be impaired.

	This symbol means double insulation.
	This symbol means to beware of electric shock, turn off all adjacent sources of high voltage during installation.
	This symbol means there is risk of danger.

The SMB350 is a sensitive electrical equipment, care should be taken so that the maximum benefit and performance can be derived from the device.

Before cleaning or performing any maintenance on the SMB350, disconnect the device from its auxiliary power source. The input voltage and current should be either turned off or disconnected.

Cleaning

Use a dry cloth or dry brush to wipe away the dust, or use in conjunction with a vacuum cleaner to suck the dust as it is being wiped away. Do not use any water or other liquid cleaning agents.

Ventilation

Check to make sure that there is sufficient space around the periphery of the SMB350 to allow air to circulate. Reposition any extraneous wiring that is on the SMB350.

Maintenance

Check to make sure that the wiring contacts are tight and making good contact, tighten any terminal screws that may have loosened over time from jarring or vibration. Make sure that the wiring contact of each terminal is not touching or shorting adjacent terminals.

Repair

Do not attempt to repair the product or modify the circuitry, contact the product representative or a qualified electrical person if the product requires repair or servicing.

CONTENT

1 Introduction

1.1 General Description

The SMB350 is a multi-circuit and multi-function meter with up to 8 channels for measuring 3 phase loads. The SMB350 can measure not only the kW and kWh, but the voltage, current and PF as well.

The SMB350 can be used in 3 phase 4 wire, 3 phase 3 wire, 1 phase 2 wire and 1 phase 3 wire configurations. The SMB350 offers up to 24 channels when used in 1 phase 2 wire configurations.

1.2 Features

- Small and compact, can be used for new or existing panels
- Multiple channels on one module
- Selection of 4 or 8 channel (SMB350-4 or SMB350-8)
- Each channel can be used as 3p4w, 3p3w, 1p3w or as 3 separate 1p2w
- Multiple function - kW, kWh, kVAr, kVArh, VA, Voltage, Current, frequency, PF
- RS485 Communications using Modbus/RTU protocol
- On board LCD display and control buttons for on-site configuration and diagnosis
- Wide selection of dedicated CTs - solid core CTs for economy, split core CTs for convenience
- Power supply using either 120VAC or 240VAC

1.3 Certifications

- UL/CUL Listed
- CE
- FCC

1.4 Specifications

Item	Descriptions
Common Voltage	• A/B/C/N
Channels	• SMB350-4 4 channels of 3p4w or 3p3w or 12 channels of 1p2w • SMB350-8 8 channels of 3p4w or 3p3w or 24 channels of 1p2w
Current Measurement	• Depends on dedicated CT type
Voltage Measurement	• Max Voltage : 80~350 VAC (L-N), 600 VAC (L-L) • Frequency : 50 or 60 Hz
Display	• 2 lines by 16 characters LCD for displaying measurement parameters
Auxiliary Power	• AC 120 or 240V, ±10%, 50 or 60 Hz
Settable Parameters	• Address, baud rate, CT ratio for each channel (5A CT only) from 1~2000 (equivalent range 1~10,000A)
Operating Environment	• -30~50℃ (-22~122℉) • 0~95% non-condensing
Power Consumption	• 6VA
Mounting	• DIN rail
Host Communication	• RS485-1 port • Physical Interface: RS485 • Protocol: Modbus/RTU • Baud rates: 1200, 2400, 4800, 9600 bps • Modbus address: 1 to 99 • Data format: 8/n/1 • Default: address = 1, baud rate = 9600, can be changed on meter or through Modbus
Touch Panel Interface	• RS485-2 port
Measured Parameters	• Voltage (L-N), Voltage (L-L), Current (A) • kW, kWh, kVAr, kVArh • Power Factor (PF), Frequency
Measurement Category	• CAT III
Accuracy (*)	• 0.5% from 1% to 100% of rated load
Dimensions (W x H x D)	• 9.92” x 3.74“ x 2.4” (252 x 95 x 61 mm)
Net Weight	• SMB350-4：680g • SMB350-8：710g

* Based on DAE’s solid-core CT @ PF=1

1.5 Product Information

(1) Ordering Code

SMB350-8

Ordering Code	Compatible CT	Max. Current	CT Type	Remark
SMB350-8-A	CT-5D3	5A	Solid-Core	Use with 5A output regular CTs CT ratio depends on specs of regular CTs
	CT-5S	5A	Split-Core	Use with 5A output regular CTs
SMB350-8-B	CT-50D3	50A	Solid-Core	
	CT-200D3	200A	Solid-Core	
	CT-50S	50A	Split-Core	
	CT-100S	100A	Split-Core	
	CT-200S	200A	Split-Core	
	CT-400S	400A	Split-Core	**CT ratio = 2**
	CT-600S	600A	Split-Core	**CT ratio = 3**
SMB350-8-S	CT-5D3	5A	Solid-Core	**Channel 1 only** Use with 5A output regular CTs CT ratio depends on specs of regular CTs
	CT-5S	5A	Split-Core	**Channel 1 only** Use with 5A output regular CTs CT ratio depends on specs of regular CTs
	CT-50D3	50A	Solid-Core	Channel 2~8
	CT-200D3	200A	Solid-Core	Channel 2~8
	CT-50S	50A	Split-Core	Channel 2~8
	CT-100S	100A	Split-Core	Channel 2~8
	CT-200S	200A	Split-Core	Channel 2~8
	CT-400S	400A	Split-Core	**Channel 2~8, CT ratio = 2**
	CT-600S	600A	Split-Core	**Channel 2~8, CT ratio = 3**

Note : CT ratio = 1 when using 50A~200A CTs.

Please see Section 2.10 when using with regular 5A output CTs.

SMB350-4

Ordering Code	Compatible CT	Max. Current	CT Type	Remark
SMB350-4-A	CT-5D3	5A	Solid-Core	Use with 5A output regular CTs CT ratio depends on specs of regular CTs
	CT-5S	5A	Split-Core	Use with 5A output regular CTs
SMB350-4-B	CT-50D3	50A	Solid-Core	
	CT-200D3	200A	Solid-Core	
	CT-50S	50A	Split-Core	
	CT-100S	100A	Split-Core	
	CT-200S	200A	Split-Core	
	CT-400S	400A	Split-Core	**CT ratio = 2**
	CT-600S	600A	Split-Core	**CT ratio = 3**

Note : CT ratio = 1 when using 50A~200A CTs.

Please see Section 2.10 when using with 5A regular output CTs.

(2) Current Sensor Requirement

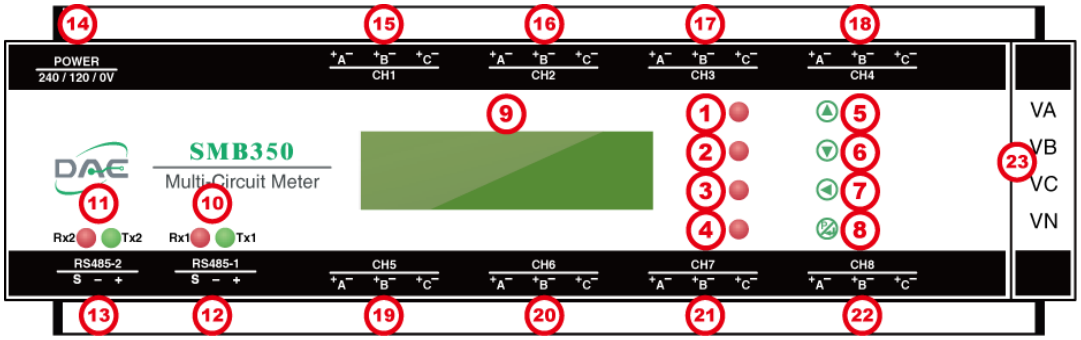
Configuration	CT required
1-Phase, 2 Wire	1 CT
1-Phase, 3 Wire	2 CTs
3-Phase, 3 Wire	2 CTs
3-Phase, 4 Wire	3 CTs

2 Installation

The SMB350 is a sophisticated energy meter with multiple capabilities and functions. Before installation be sure to read and understand this section and the appropriate wiring diagrams. Installation of this device must be performed by qualified personnel according to these instructions and in conjunction with all applicable electrical codes. DAE Instrument and its representatives assume no responsibility for any damage or injury resulting from the improper installation of this equipment.

WARNING: Please make sure you have read the “Safety Precautions” on the beginning of this user manual before you start installation.

2.1 Front Panel & Terminals



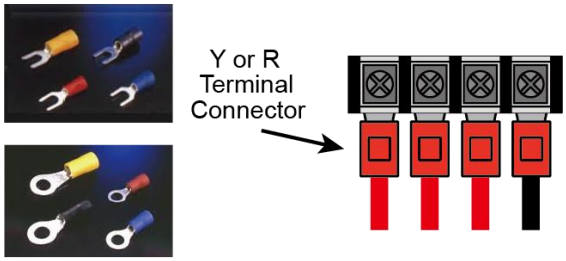
Item	Label / Name	Function
1	LED Indicator 1	System activity - blinks during normal operation
2	LED Indicator 2	not used
3	LED Indicator 3	not used
4	LED Indicator 4	not used
5	Up Button	Scroll up
6	Down Button	Scroll down
7	Left Button	Change to next digit when setting
8	Page/Enter Button	Change to next page, or enter
9	LCD Display	2 line by 16 characters, for showing system status and parameters
10	RX1, TX1 (for primary RS485)	RS485 communication activity: RX - receive activity TX - transmit activity
11	RX2, TX2(for auxiliary RS485)	
12	RS485-1 Terminals (Primary)	RS485 interface connectors - (S), (-), (+)
13	RS485-2 Terminals (Auxiliary)	
14	Auxiliary Power	Auxiliary working power used by module, isolated from the measured power
15	Channel 1 - A, B, C	Channel 1 3-phase current inputs
16	Channel 2 - A, B, C	Channel 2 3-phase current inputs
17	Channel 3 - A, B, C	Channel 3 3-phase current inputs
18	Channel 4 - A, B, C	Channel 4 3-phase current inputs
19	Channel 5 - A, B, C	Channel 5 3-phase current inputs
20	Channel 6 - A, B, C	Channel 6 3-phase current inputs
21	Channel 7 - A, B, C	Channel 7 3-phase current inputs
22	Channel 8 - A, B, C	Channel 8 3-phase current inputs
23	Measured voltage terminals - VA, VB, VC, VN	Common voltage for all channels

Note : Items 19 to 22 are not applicable to the SMB350-4

2.2 Terminals Detail

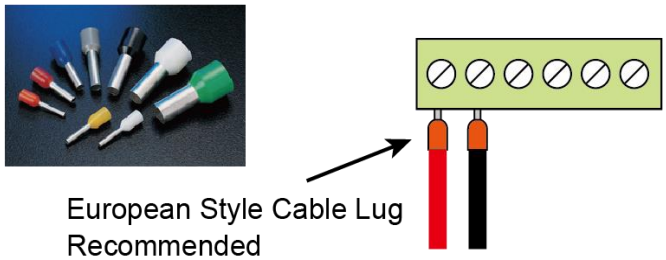
(1) Voltage input terminals (Measured voltage input)

Use the proper size and wire type as per electrical regulations.



(2) Other terminals

Make sure that the wires are screwed tightly onto the terminals and making good contact.

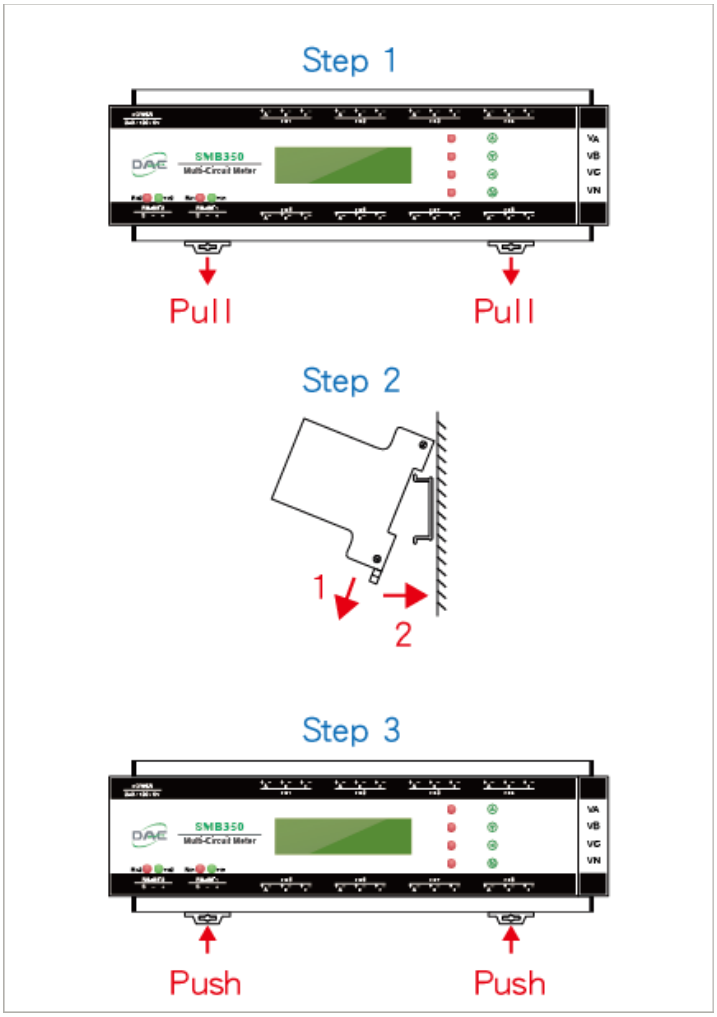


(3) Recommended Wire Size

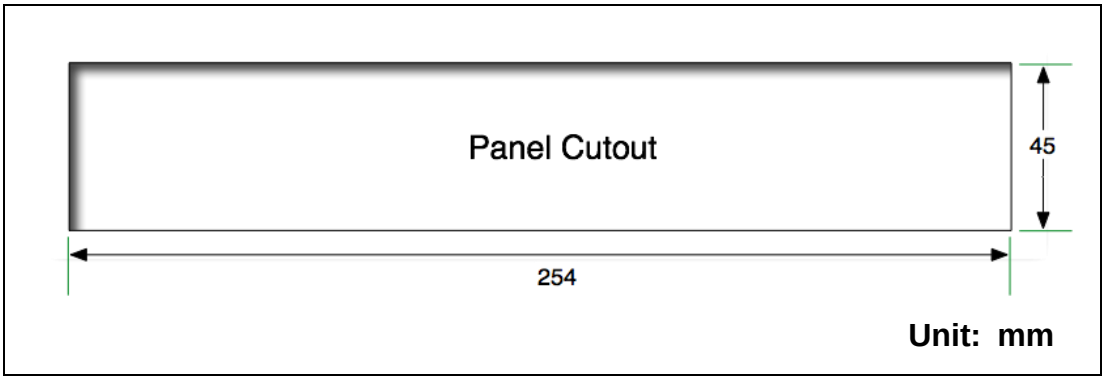
Terminal type	Wire range
Auxiliary power	#12-24 AWG, screw torque 7 lb-inch
RS485	#12-24 AWG, screw torque 7 lb-inch
Current input	#12-24 AWG, screw torque 7 lb-inch
Measured voltage input	#10-18 AWG, screw torque 16 lb-inch

2.3 Mounting Procedure

(1) Mounting



(2) Panel Cutout



2.4 Before Installation

(1) Check that the ratings and specification of the model to be installed is suitable for its intended application.

(2) Verify that the dedicated CT being used is compatible with the type of SMB350. Note that the SMB350 cannot be directly used with non-DAE dedicated CTs. See the special application section for using the SMB350 with common 5A output CTs.

(3) Verify that the current rating of the dedicated CT being used is suitable for its intended load.

(4) Make sure to turn off all power sources to the SMB350 and any adjacent power sources before performing the installation.

2.5 Meter Installation

(1) Mount the SMB350 to the desired DIN rail track location and lock it in place.

(2) Attach the dedicated CTs to the CT terminal with their appropriate channels and phases.

(3) Connect the appropriate SMB350 auxiliary power source terminals to the corresponding power source with an intermediate fuse, use the fuse seat and fuse provided with the product. The SMB350 can be used with either 120V or 240V AC.

(4) Connect the measured voltage terminals of the SMB350 to their corresponding voltages with a fuse for each phase. (Use 10 to 18 AWG, 600V wire for both the auxiliary power source and the measured voltage terminals.)

(5) Assemble the CTs onto the corresponding conductors being measured making sure that the direction and orientation of the CTs with wiring are consistent. With solid core CTs, the wire must be threaded through the CT, which would necessitate disconnecting the wire from the load. With split core CTs and clamp type CTs, the CT can be opened and clipped or clamped onto the conductor without the need to disconnect the wiring to the load.

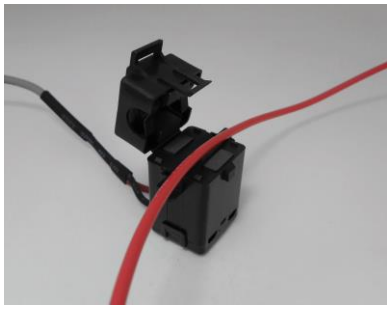
2.6 CT Installation

Polaris meters only can use the dedicated CT provided by DAE. DAE's dedicated CTs have two types as the follow descriptions.

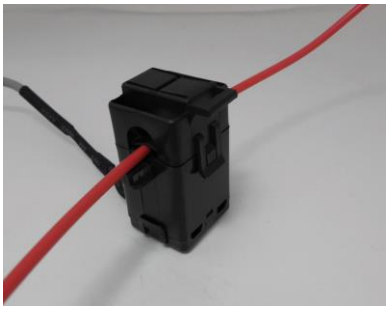
(1) Split-core CT installation

Load side

Step 1. Open the split-core CT



Step 2. Hoop up the loading wire



Step 3. Clipped the split-core CT

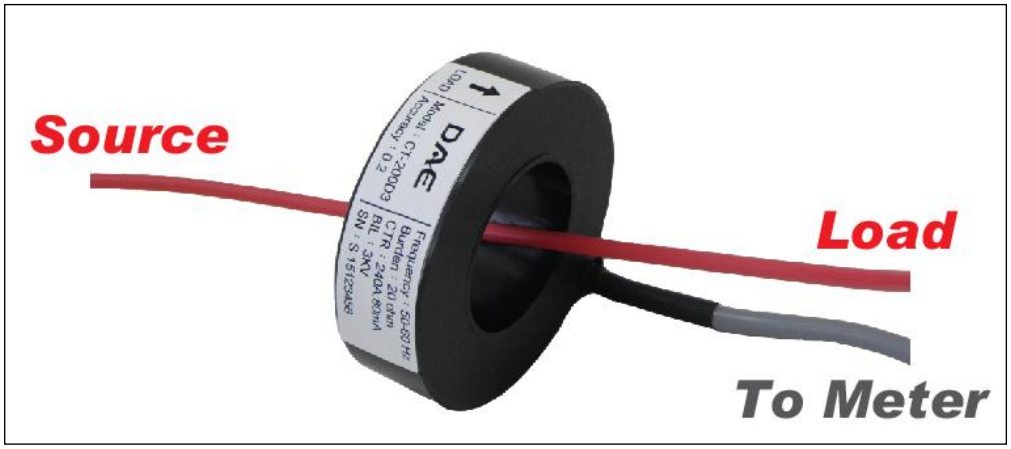
Meter side

Red wire to CT+ terminal on the meters, and black wire to CT- terminal on the meters. Please see the "Terminals" section.

(2) Solid-core CT installation

Load side

With solid core CTs, the wire must be threaded through the CT, which would necessitate disconnecting the wire from the load.

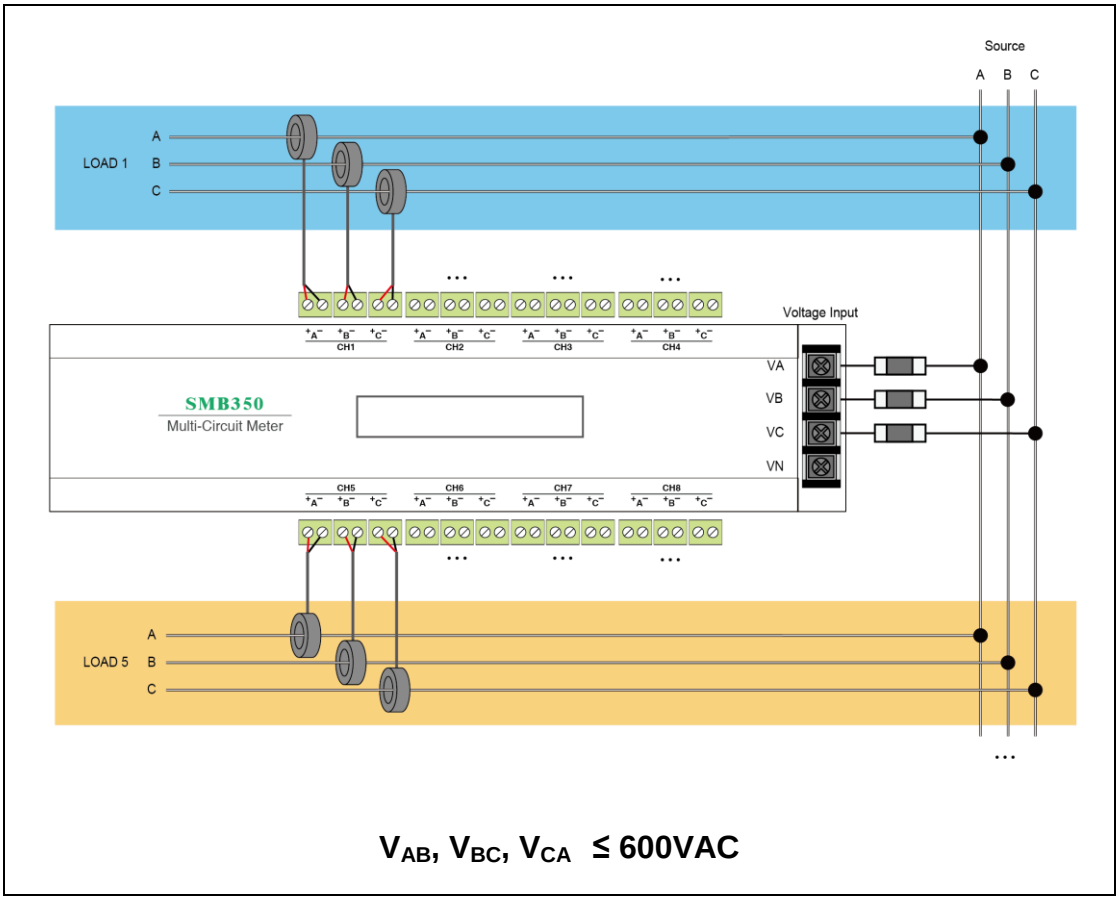


Meter side

Red wire to CT+ terminal on the meters, and black wire to CT- terminal on the meters. Please see the “Terminals” section.

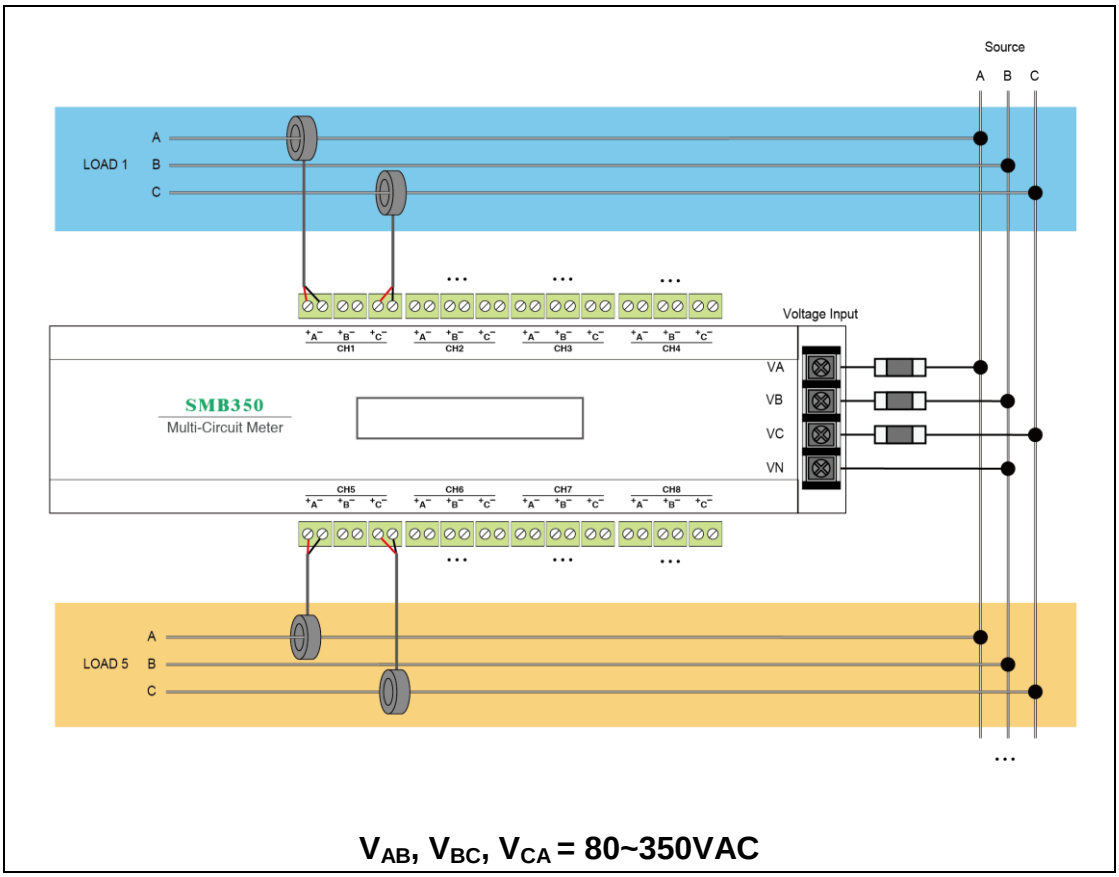
2.7 Wiring Diagram

(1) 3-Phase, 3 Wire, 3 CTs



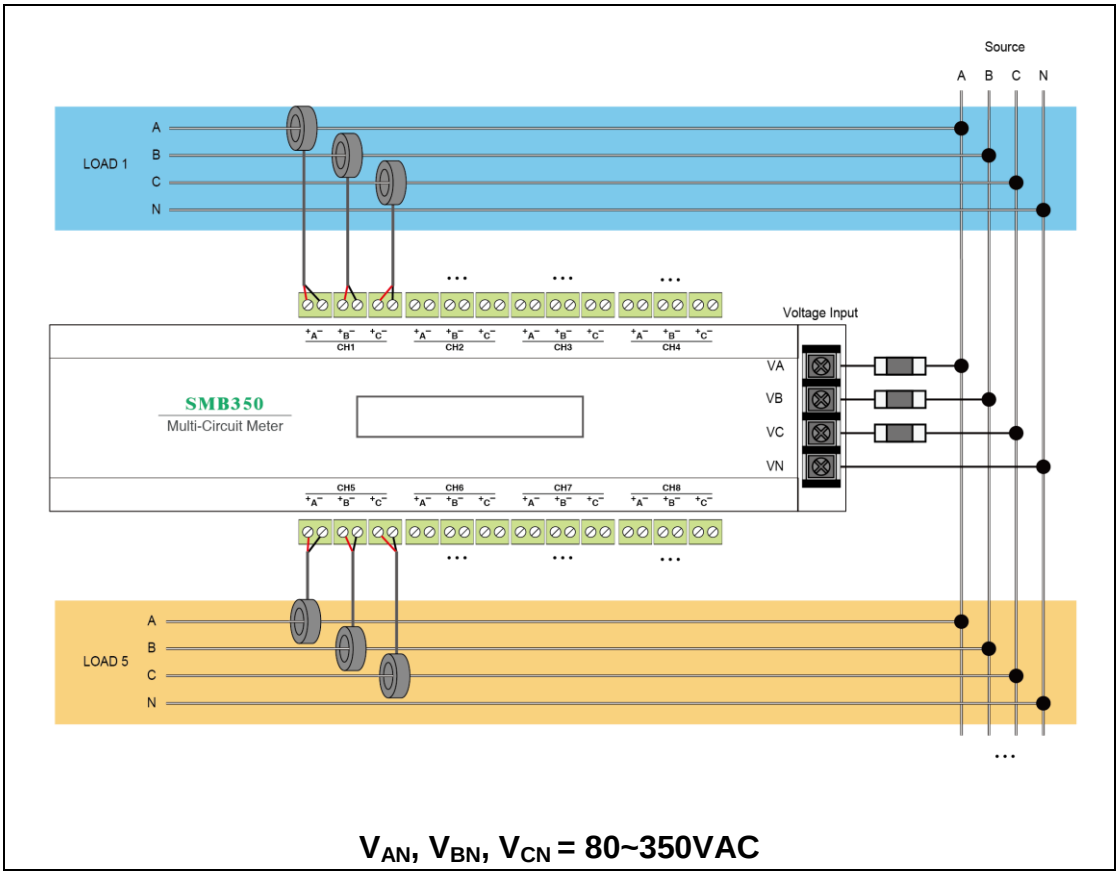
V_{AB}, V_{BC}, V_{CA} ≤ 600VAC

(2) 3-Phase, 3 Wire, 2CT



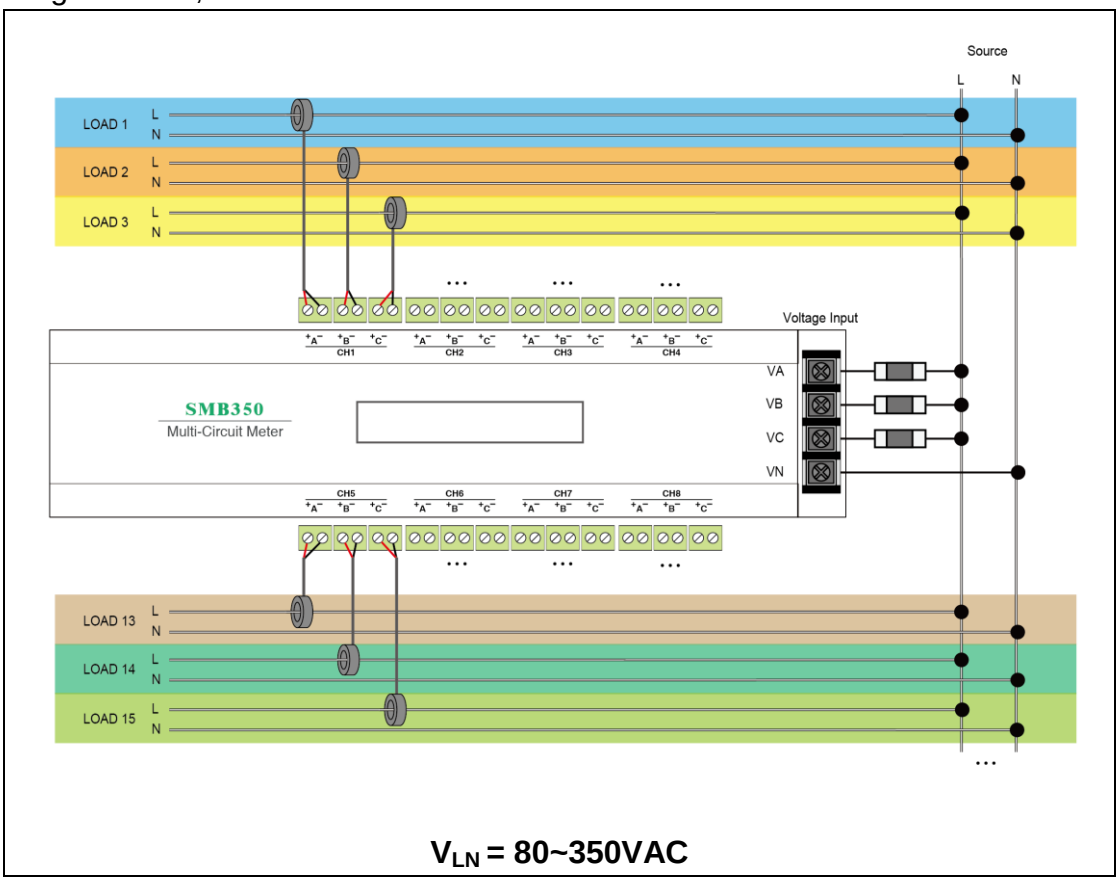
V_{AB}, V_{BC}, V_{CA} = 80~350VAC

(3) 3-Phase, 4 Wire



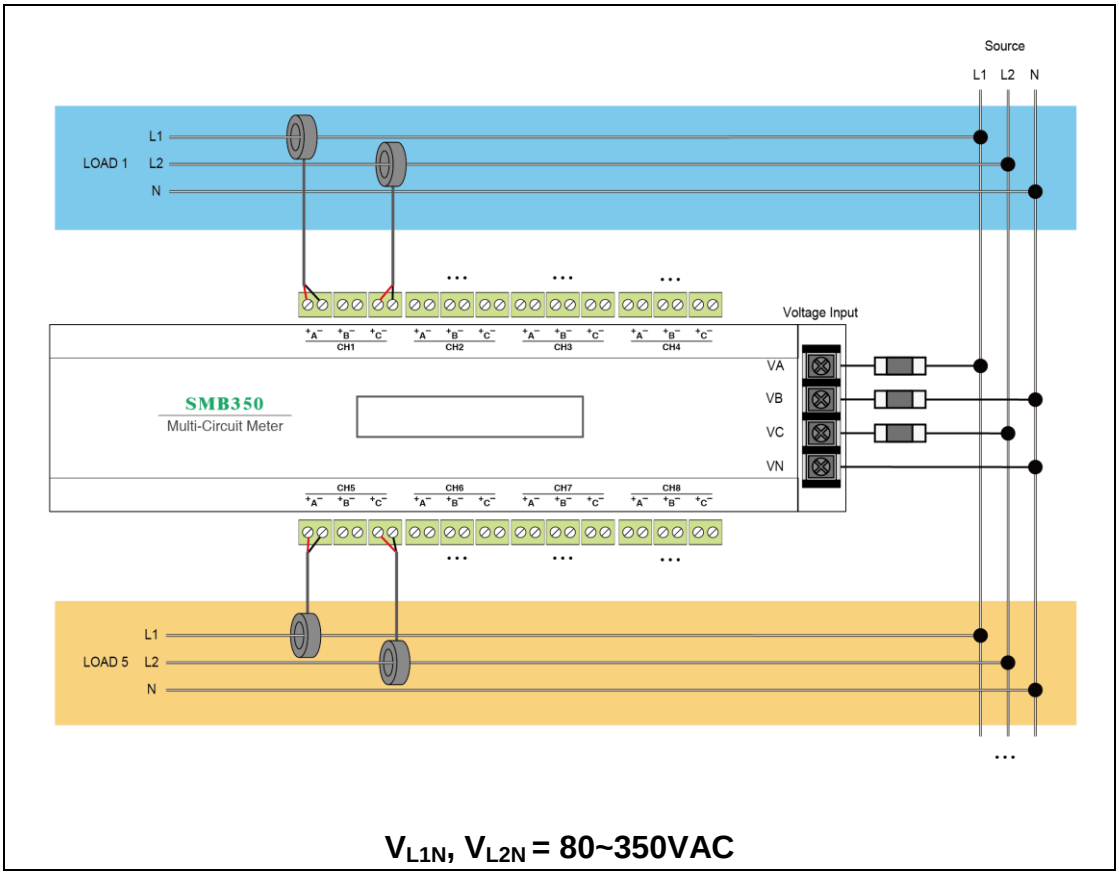
V_{AN}, V_{BN}, V_{CN} = 80~350VAC

(4) Single-Phase, 2 Wire



V_{LN} = 80~350VAC

(5) Single-Phase, 3 Wire



V_{L1N}, V_{L2N} = 80~350VAC

Note : Please install fuses for the voltage inputs.

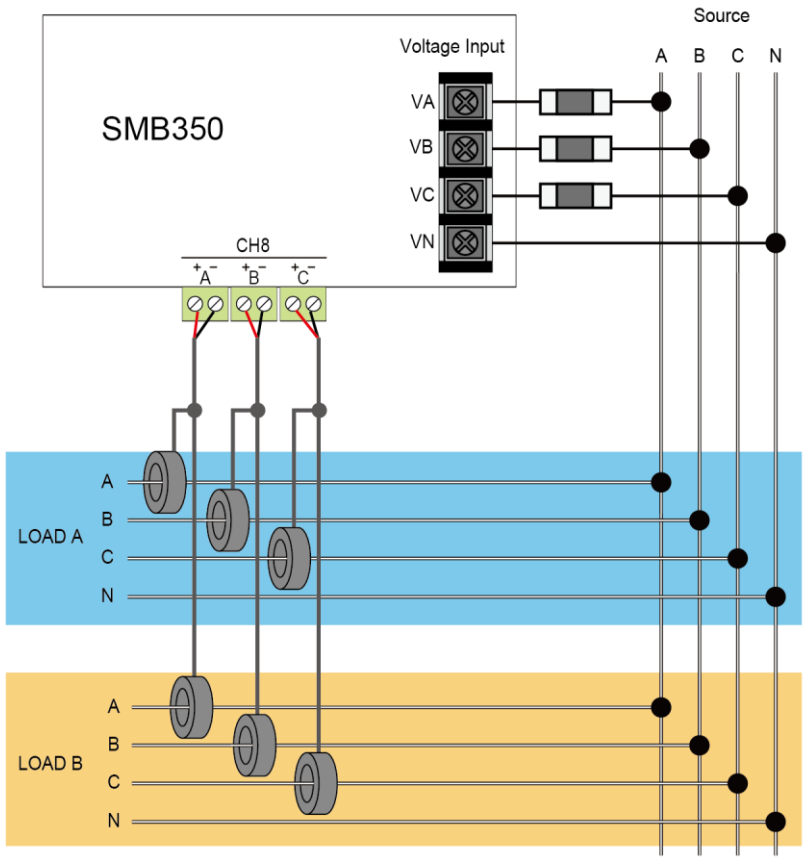
2.8 Measuring Multiple Loads with One Channel

(1) The loads must be the same configuration and come from the same power source.

(2) Max. 3 loads for each meter; each load needs complete sets of CTs and each CT must be the same rating.

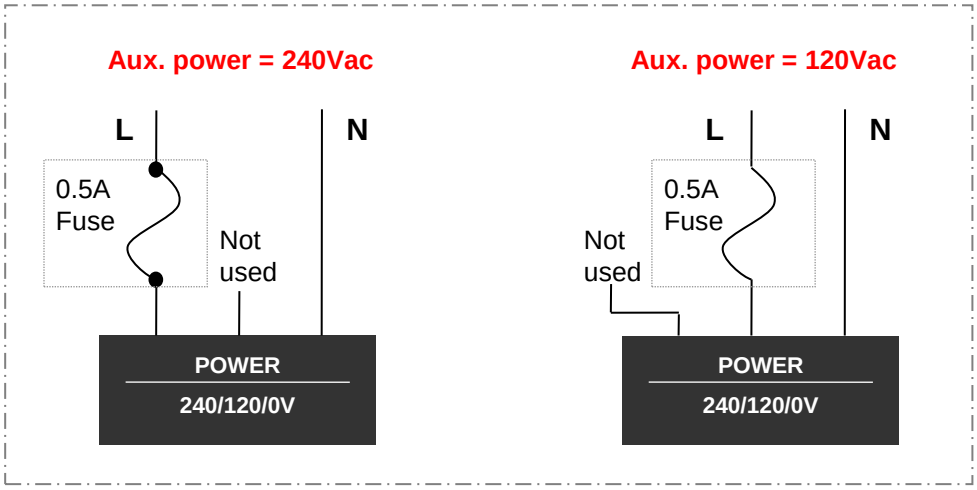
(3) The load wire thread through the CTs must be the same direction. The multiple CTs for the same phase of multiple loads must connect to the correct polarity (Red wire to CT+ terminal and black wire to CT- terminal on the meters).

e.g. 3-Phase, 4 Wire, Channel 8 Wiring



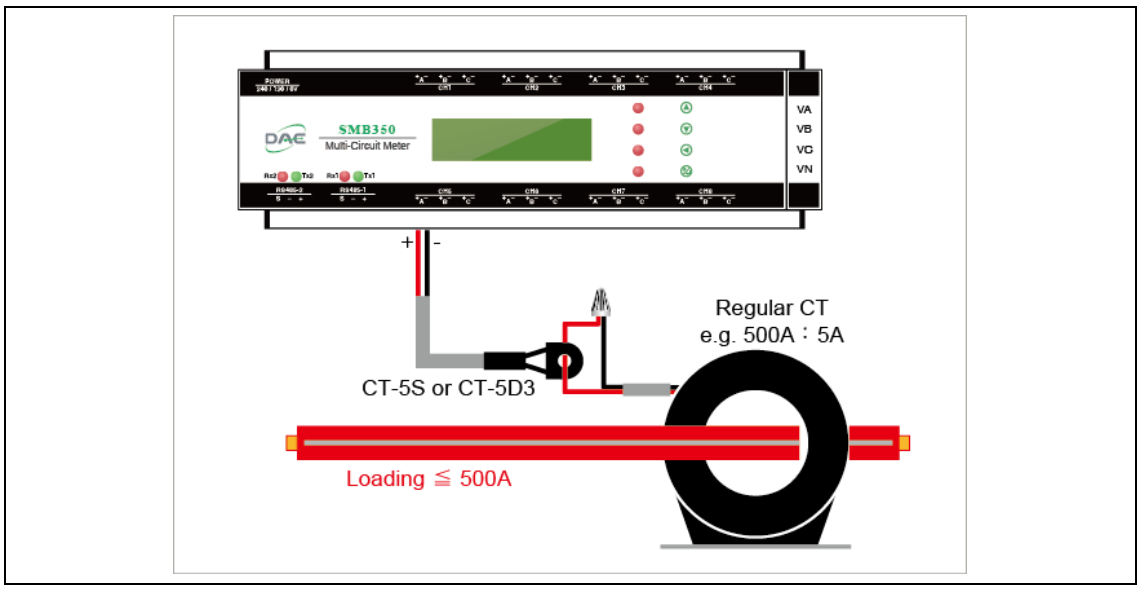
2.9 Auxiliary Power

The auxiliary voltage is single phase and can be derived from either a 240VAC or 120VAC power source, but not both. The auxiliary power is the working voltage for the SMB350 itself and is electrically isolated from the measured voltage. Although the auxiliary voltage can be derived from the same source as the measured voltage it is not recommended as the working voltage should be as isolated from the measured voltage and be stable as possible so that fluctuations in the measured voltage does not affect the SMB350 logic and measurement circuits.



2.10 Using a Regular 5A Output CT

For installations with pre-existing CTs or if larger capacities is required, the user should choose the dedicated 5A CT (either the CT5D3 or the CT5S) and connect the user provided CT to the dedicated 5A CT as shown in the diagram below.



When using regular CT, the SMB350 needs to set the CT ratio. For example, when using 500A : 5A regular CTs, the CT ratio should set 100.

2.11 RS485 Installation

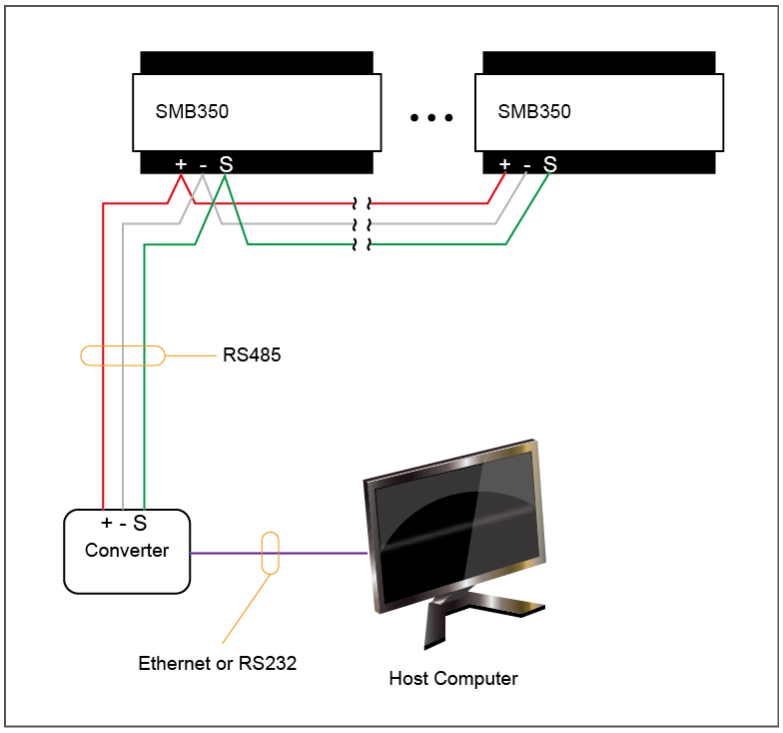
The SMB350 is equipped with two RS485 communication ports. These two ports can both be used for reading the same data, but only port 1 allows writing, while port 2 is read only..

Port 1 is typically used when connecting to a central host, while port 2 is intended for connecting with a secondary HMI (human machine interface) devices such as touch panels, digital intercoms and industrial PCs.

When connecting to a central host, port 1 is to be used primarily, while port 2 is for connecting with secondary HMI devices such as touch panels, digital intercoms or industrial PCs.

Multiple SMB350 may be connected to the same RS485 network. All the positive terminals are to be connected together using the same red conductor, and all the negative terminals are to be connected together to the same blue wire. The shielding wire should be grounded to the panel or enclosure.

Since most modern computers have no built in RS485, a converter is necessary to convert the RS485 signals into something the host computer can understand. Typically this converter can either be an RS485 to RS232 converter, with the host computer needing to have built in RS232 port or expansion card; or for some computers with no expansion such as a notebook computer, an alternative would be to use a commercially available RS485 to Ethernet converter.



3 Operating and Display

3.1 Preface

Each SMB350 meter has several display pages to show different info, settings and measurement parameters of the meter.

3.2 LED Display

The LCD shows the various parameters organized into pages, since the LCD can only display 2 lines at a time, the  and  arrow keys are used to scroll up and down to the previous and next parameters on the page, respectively. The  key is used to go to the next page.

Voltage (L-N)		Voltage (L-L)	
Vol-A	V_{AN}	Vol-AB	V_{AB}
Vol-B	V_{BN}	Vol-BC	V_{BC}
Vol-C	V_{CN}	Vol-CA	V_{CA}

Current (A)			
1A-I	Channel 1 Phase A Current	5A-I	Channel 5 Phase A Current
1B-I	Channel 1 Phase B Current	5B-I	Channel 5 Phase B Current
1C-I	Channel 1 Phase C Current	5C-I	Channel 5 Phase C Current
1Avg	Channel 1 Average Current	5Avg	Channel 5 Average Current
2A-I	Channel 2 Phase A Current	6A-I	Channel 6 Phase A Current
2B-I	Channel 2 Phase B Current	6B-I	Channel 6 Phase B Current
2C-I	Channel 2 Phase C Current	6C-I	Channel 6 Phase C Current
2Avg	Channel 2 Average Current	6Avg	Channel 6 Average Current
3A-I	Channel 3 Phase A Current	7A-I	Channel 7 Phase A Current
3B-I	Channel 3 Phase B Current	7B-I	Channel 7 Phase B Current
3C-I	Channel 3 Phase C Current	7C-I	Channel 7 Phase C Current
3Avg	Channel 3 Average Current	7Avg	Channel 7 Average Current
4A-I	Channel 4 Phase A Current	8A-I	Channel 8 Phase A Current
4B-I	Channel 4 Phase B Current	8B-I	Channel 8 Phase B Current
4C-I	Channel 4 Phase C Current	8C-I	Channel 8 Phase C Current
4Avg	Channel 4 Average Current	8Avg	Channel 8 Average Current

Power (kW)			
1A-KW	Channel 1 Phase A Power	5A-KW	Channel 5 Phase A Power
1B-KW	Channel 1 Phase B Power	5B-KW	Channel 5 Phase B Power
1C-KW	Channel 1 Phase C Power	5C-KW	Channel 5 Phase C Power
1-SKW	Channel 1 Total Power	5-SKW	Channel 5 Total Power
2A-KW	Channel 2 Phase A Power	6A-KW	Channel 6 Phase A Power
2B-KW	Channel 2 Phase B Power	6B-KW	Channel 6 Phase B Power
2C-KW	Channel 2 Phase C Power	6C-KW	Channel 6 Phase C Power
2-SKW	Channel 2 Total Current	6-SKW	Channel 6 Total Power
3A-KW	Channel 3 Phase A Power	7A-KW	Channel 7 Phase A Power
3B-KW	Channel 3 Phase B Power	7B-KW	Channel 7 Phase B Power
3C-KW	Channel 3 Phase C Power	7C-KW	Channel 7 Phase C Power
3-SKW	Channel 3 Total Power	7-SKW	Channel 7 Total Power
4A-KW	Channel 4 Phase A Power	8A-KW	Channel 8 Phase A Power
4B-KW	Channel 4 Phase B Power	8B-KW	Channel 8 Phase B Power
4C-KW	Channel 4 Phase C Power	8C-KW	Channel 8 Phase C Power
4-SKW	Channel 4 Total Power	8-SKW	Channel 8 Total Power

Energy (kWh)			
1A-KWH	Channel 1 Phase A Energy	5A-KWH	Channel 5 Phase A Energy
1B-KWH	Channel 1 Phase B Energy	5B-KWH	Channel 5 Phase B Energy
1C-KWH	Channel 1 Phase C Energy	5C-KWH	Channel 5 Phase C Energy
1-SKWH	Channel 1 Total Energy	5-SKWH	Channel 5 Total Energy
2A-KWH	Channel 2 Phase A Energy	6A-KWH	Channel 6 Phase A Energy
2B-KWH	Channel 2 Phase B Energy	6B-KWH	Channel 6 Phase B Energy
2C-KWH	Channel 2 Phase C Energy	6C-KWH	Channel 6 Phase C Energy
2-SKWH	Channel 2 Total Energy	6-SKWH	Channel 6 Total Energy
3A-KWH	Channel 3 Phase A Energy	7A-KWH	Channel 7 Phase A Energy
3B-KWH	Channel 3 Phase B Energy	7B-KWH	Channel 7 Phase B Energy
3C-KWH	Channel 3 Phase C Energy	7C-KWH	Channel 7 Phase C Energy
3-SKWH	Channel 3 Total Energy	7-SKWH	Channel 7 Total Energy
4A-KWH	Channel 4 Phase A Energy	8A-KWH	Channel 8 Phase A Energy
4B-KWH	Channel 4 Phase B Energy	8B-KWH	Channel 8 Phase B Energy
4C-KWH	Channel 4 Phase C Energy	8C-KWH	Channel 8 Phase C Energy
4-SKWH	Channel 4 Total Energy	8-SKWH	Channel 8 Total Energy

Reactive Power (kVArh)			
1A-KVARH	Channel 1 Phase A kVArh	5A-KVARH	Channel 5 Phase A kVArh
1B-KVARH	Channel 1 Phase B kVArh	5B-KVARH	Channel 5 Phase B kVArh
1C-KVARH	Channel 1 Phase C kVArh	5C-KVARH	Channel 5 Phase C kVArh
1-SKVARH	Channel 1 Total kVArh	5-SKVARH	Channel 5 Total kVArh
2A-KVARH	Channel 2 Phase A kVArh	6A-KVARH	Channel 6 Phase A kVArh
2B-KVARH	Channel 2 Phase B kVArh	6B-KVARH	Channel 6 Phase B kVArh
2C-KVARH	Channel 2 Phase C kVArh	6C-KVARH	Channel 6 Phase C kVArh
2-SKVARH	Channel 2 Total kVArh	6-SKVARH	Channel 6 Total kVArh
3A-KVARH	Channel 3 Phase A kVArh	7A-KVARH	Channel 7 Phase A kVArh
3B-KVARH	Channel 3 Phase B kVArh	7B-KVARH	Channel 7 Phase B kVArh
3C-KVARH	Channel 3 Phase C kVArh	7C-KVARH	Channel 7 Phase C kVArh
3-SKVARH	Channel 3 Total kVArh	7-SKVARH	Channel 7 Total kVArh
4A-KVARH	Channel 4 Phase A kVArh	8A-KVARH	Channel 8 Phase A kVArh
4B-KVARH	Channel 4 Phase B kVArh	8B-KVARH	Channel 8 Phase B kVArh
4C-KVARH	Channel 4 Phase C kVArh	8C-KVARH	Channel 8 Phase C kVArh
4-SKVARH	Channel 4 Total kVArh	8-SKVARH	Channel 8 Total kVArh

Power Factor (PF)							
1A-PF	Channel 1 Phase A PF	3A-PF	Channel 3 Phase A PF	5A-PF	Channel 5 Phase A PF	7A-PF	Channel 7 Phase A PF
1B-PF	Channel 1 Phase B PF	3B-PF	Channel 3 Phase B PF	5B-PF	Channel 5 Phase B PF	7B-PF	Channel 7 Phase B PF
1C-PF	Channel 1 Phase C PF	3C-PF	Channel 3 Phase C PF	5C-PF	Channel 5 Phase C PF	7C-PF	Channel 7 Phase C PF
1-SPF	Channel 1 Average PF	3-SPF	Channel 3 Average PF	5-SPF	Channel 5 Average PF	7-SPF	Channel 7 Average PF
2A-PF	Channel 2 Phase A PF	4A-PF	Channel 4 Phase A PF	6A-PF	Channel 6 Phase A PF	8A-PF	Channel 8 Phase A PF
2B-PF	Channel 2 Phase B PF	4B-PF	Channel 4 Phase B PF	6B-PF	Channel 6 Phase B PF	8B-PF	Channel 8 Phase B PF
2C-PF	Channel 2 Phase C PF	4C-PF	Channel 4 Phase C PF	6C-PF	Channel 6 Phase C PF	8C-PF	Channel 8 Phase C PF
2-SPF	Channel 2 Average PF	4-SPF	Channel 4 Average PF	6-SPF	Channel 6 Average PF	8-SPF	Channel 8 Average PF

Note : Channels 5~8 are not applicable to the SMB350-4

3.3 Setup

The follow parameters can be set on the front panel of SMB350.

- Modbus address (default 1)
- Baud rate (default 9600)
- CT ratio (default 1)

(1) Setup procedures

Step 1.

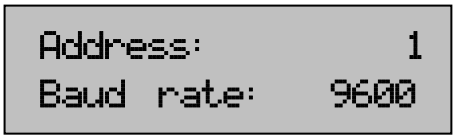
- Press  and hold for 2-3 seconds to enter the setting mode.

Step 2.

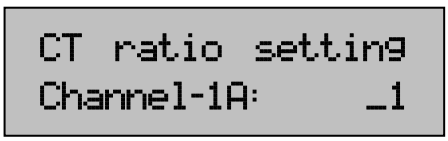
- Press  to change different parameter setting.
- Press  and  to change the value.
- Press  to change the digit.
- Press  and hold for 2-3 seconds to exit the setting mode.

(2) Setup range of each parameter

- Modbus address : 1~254
- Baud rate : 1200 / 2400 / 4800 / 9600 bps



- CT ratio : 1~250 (each channel and each phase)



4 Troubleshooting

The SMB350 multi-circuit meter has been factory calibrated before being packed and shipped and does not require calibration during installation or use. The SMB350 should provide many years of trouble free service if installed and used properly. However, there are times when things do not go as intended and the meter will not work for one reason or another. The following list may help to solve some of the more common problems sometimes encountered.

Problems or Symptoms	Possible Causes and Solutions
The LCD or system indicators do not light up.	(a) Check that the auxiliary power terminal wiring are connected properly. (b) Check that the fuse and circuit breaker are neither blown nor tripped, respectively. (c) Check to make sure that power is being supplied from the power source to the auxiliary power. (d) Check that the power source voltage is within the rated power supply. (e) Check to make sure that the enclosure or terminals are not damaged.
The voltage reads correctly but there the amperage reads zero.	(a) Check that CT wiring to the terminals. (b) Check to make sure that the measured circuit corresponds to its phase. (c) Check to make sure that the power is on for the load circuit being measured. (d) Check the fuse or circuit breaker. (e) Check to make sure that only the L wire passes through the CT, if the N wire is also passing through then remove it from the CT. (f) The CT may be damaged or defective, swap it with another CT for a cross check. If defective or damaged, replace the CT.

Problems or Symptoms	Possible Causes and Solutions
The accumulation of kWh does not match total consumption.	(a) Check the CT ratio if use with regular 5A output CT. (e.g. 500A : 5A, the CT ratio = 100) (b) Check to make sure the Aux. voltage input is continuously 24 hrs/day. (c) Check the CT wiring direction on load and polarity on meters if parallel 2 or 3 CTs for any phase. When parallel 2 or 3 CTs, the wiring direction and polarity must be the same.
The channel shows a very poor power factor value.	(a) Check the CT and voltage wirings and make sure that each CT input is matched to its corresponding voltage. (b) Check to make sure that the measured circuit corresponds to its phase. (c) Use a separate instrument to independently verify that the PF is indeed awry. If so then check the circuit and load to determine what is causing the PF to go askew.

5 Frequently Asked Questions

Q. How can different types of CTs be used on a single SMB350?

A. Different types of CTs may be used on a single SMB350 under certain conditions and with certain limitations, please see the section on “Product Information” for a detailed explanation.

Q. Can a single SMB350 be used to monitor two different sub panels?

A. (1) It is possible If the two sub panels have the same power source.

(2) If the two sub panels do not share the same power source, then two separate SMB350s must be used.

Q. Can a single CT be used to monitor multiple circuits?

A. It is possible to do so if the different circuits share the same phase and power source. The L wire for each circuit must go through the CT in the same direction, and the current rating of the CT in must be higher than the total amperage for all the circuits to be measured.

Q. Can the wires for both the measured voltage and CT secondary be placed within the same conduit?

A. Yes they can be placed together in the same conduit.

Q. Can the wires for both the measured voltage and the communication be placed within the same conduit?

A. No, it is not recommended as the communication is sensitive to noise and interference. They should each be placed in their own conduits separately.

Q. For those with only a single meter, is there a driver or software available to remotely read the meter?

A. DAE provides the Modbus protocol, but the user must provide for the software or purchase DAE's EnergyLink400 auto-metering software.

Q. How to connect to a host computer that doesn't have an RS485 communication port?

A. If the host computer only has an Ethernet port, then use an RS485 to Ethernet converter (e.g. DAE's WSC200 Ethernet converter).

Q. There is no communication or the communication is unstable between the SMB350 and the host computer.

A. (1) Make sure that the network does not form a tree or star topology and that there are no loops.

(2) Check that the converter has its parameters set up properly.

(3) Make sure that the baud rate set for SMB350s and the host computer are the same.

(4) Make sure that each of the SMB350 on the same bus has its own unique device address.

(5) Make sure that the polarities for the RS485 wiring are correct for all the SMB350. All positive terminals must be connected together, and all negative terminals must be connected together.

(6) Make sure that the total length of any single RS485 bus segment is less than 1000 meters (3000 feet), a segment is defined to be one without any intervening repeaters.

(6) Make sure that there are no more than 32 devices on a single RS485 bus segment.

Q. What will happen if the polarities are reversed for each of the following: auxiliary power, CT and communication?

A. (1) The auxiliary power requires AC power which doesn't have a polarity.

(2) The auxiliary power is available in models for either 120 or 240 VAC. If 120VAC is applied to a 220VAC model, the SMB350 will not be damaged, but it won't work either. But if 220VAC is applied to a 120VAC model, then the unit will be damaged.

(3) The SMB350 only considers the absolute value of the current and disregards the direction; thus, the current and energy values can only be positive. However, we still recommended that the current transformers be connected with the correct wiring orientation.

(4) The communication cable is polarity sensitive. RS485 requires that all positive terminals are connected together, and all negative terminals are connected together, reversing any one on any single device will cause the entire RS485 bus to collapse and all communication will fail. If the polarity to any one device is inconsistent with the rest, simply reverse the polarities and the communication should be restored.

Q. I have checked and followed all the troubleshooting guidelines but my problem is still not resolved, what should I do?

A. Contact our technical support by phone or email before concluding that the unit is faulty and removing it. Our technical support team will help to diagnose your problem and provide advice on potential fixes. Please see section 7, "Supplementary Information".

6 Warranty and Return Policy

6.1 Warranty

The warranty is effective for a period of five years from the date of shipment. The buyer must inform DAE of the defect within 80 days after the defect is experienced or found. DAE's responsibility is limited to repair, replacement, or refund, any of which may be selected by DAE in its sole discretion. DAE reserves the right to substitute functionally equivalent new or serviceable used parts.

This warranty covers only defects from normal use and does not include the defects due to improper installation, improper maintenance, misuse, neglect, water damage, acts of nature, tornadoes, any alterations or repairs by others not DAE.

DAE's liability to the Customer from the sale of DAE's products, whether such liability is asserted on the basis of contract, tort or otherwise, shall not exceed the purchase price paid by Customer for the products claimed.

6.2 Return Policy

All returned material must be in good," as new" and in salable condition. A 20% restocking fee is charged on all RMA's.

Products may not be returned if more than 80 days have elapsed since the shipment date from DAE.

Buyer must notify DAE and request a Returned Material Authorization Number (RMA Number) and state the specific reason for return. Unauthorized returns will not be accepted. When requesting an RMA Number please supply the following information:

(1) Distributor name and address
(2) Model number of meter
(3) Original purchase order number
(4) Reason for return

All paperwork and boxes must be marked with an RMA number issued by DAE. All authorized returned materials must be shipped freight prepaid to DAE. DAE is not responsible for uninsured packages or packages lost by your carrier.

RMA's are only valid for 30 days. The buyer will be responsible for all return shipping costs and customs duties.

7 Supplementary Information

Please add fuses to the Aux. voltage input and measured voltage input to protect damage from a short circuit.

Our contact information

US Website: www.DAEcontrols.com
US Email: info@DAEcontrols.com
US Phone: +1-(248) 635-3708
International Website: www.DAEinstrument.com
International Email: info@DAEinstrument.com
International Phone: +886-2-2793-6123

Note : This document may change without notice, please check our website for the latest version.


DAE