

Wiring Consumption Meter With BDM Micro Inverters Split Phase Residential System

Application Note: BDM-20240302
Version: 1.0

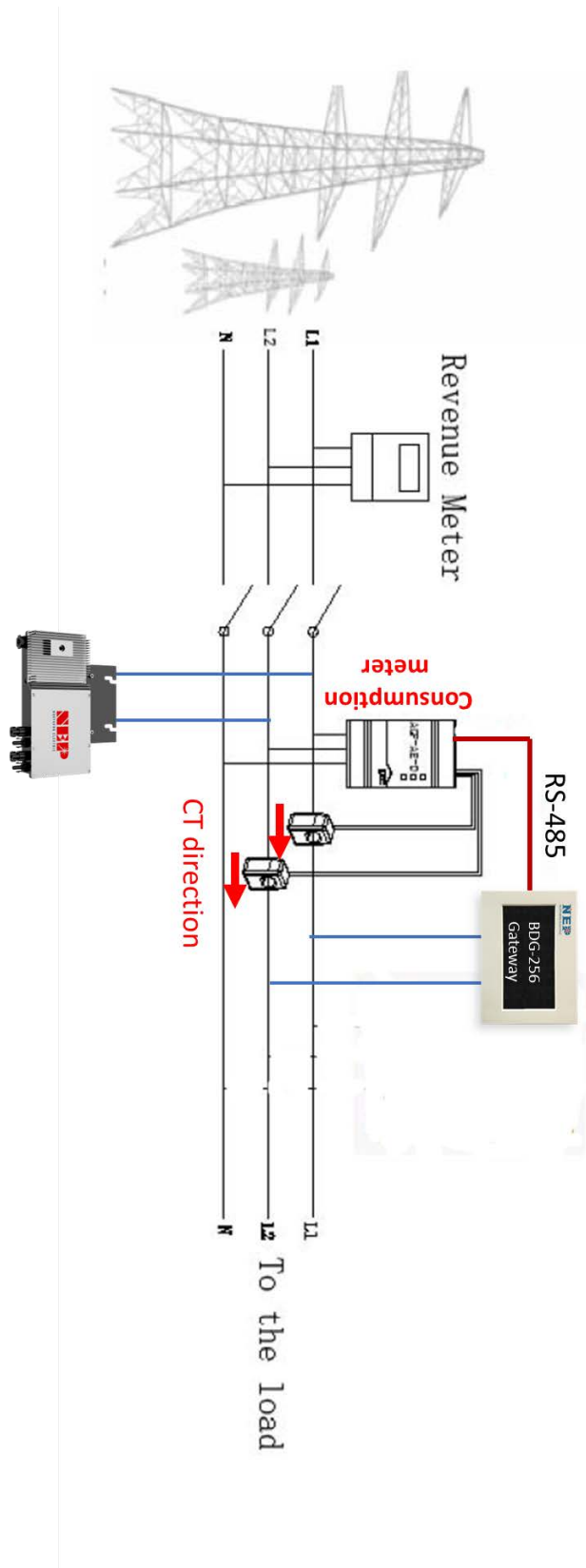
1 Executive Summary

This technical note provides a direction on connecting a consumption meter with BDM micro inverters. The inverter system is a split phase residential system. The meter can reach 0.5% accuracy at 100Arms or 1% accuracy at 200Arms

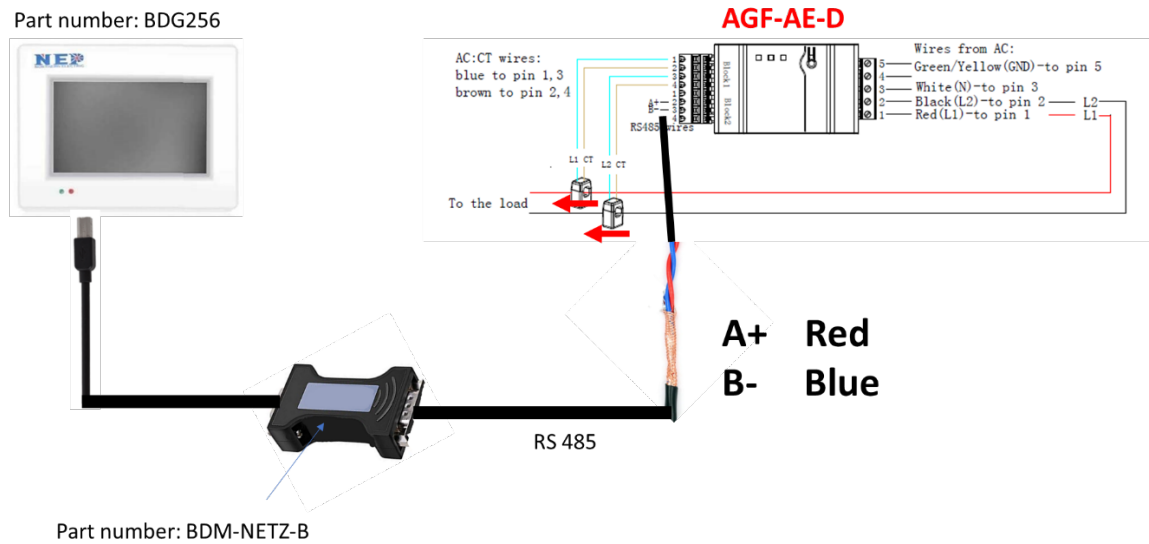
Accessories:

- BDG-256 gateway (1)
- AGF-AE-D power meter (1)
- BDM-NETZ-B RS485 cable (1)

2 System Connection Diagram



3 Meter Connection Diagram



4 Configure Consumption Monitoring in NEPViewer

Step-1: Input Meter ID in the BDG-256 gateway. Meter ID is an 8-digit barcode attached on the meter, starting with FF, for example FF00001E (refer to “BDG-256 Quick Installation Guide” on inputting a device ID in the gateway)

Step-2: Register the BDG-256 gateway in NEPViewer. The consumption power shows up on the monitoring in a “green” box

Appendix:

AGF-AE-D Electric Meter Installation Guide

AGF-AE-D

Electricity Meter Installation Guide V1.0

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IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS

This manual contains important instructions for Model AGF-AE-D that shall be followed during installation and maintenance of the inverter.

Safety Information

The following safety symbols are used in this document. Familiarize yourself with the symbols and their meaning before installing or operating the system.

CAUTION :Risk of Electric Shock, Do Not Remove Cover.No User Serviceable Parts Inside. Refer Servicing To Qualified Service Personnel.



PRUDENCE : Le boîtier ne doit en aucun cas être ouvert. Aucun composant interne n'est à entretenir. Reportez-vous à un technicien qualifié pour tout entretien.

WARNING:Hazardous voltage is still present 5 minutes after all power sources have been disconnected.



ATTENTION:Une tension dangereuse est toujours présent 5 minutes après que toutes les sources d'alimentation ont été débranchées

INFORMATION provided that when known and used will ensure optimal operation of the system.



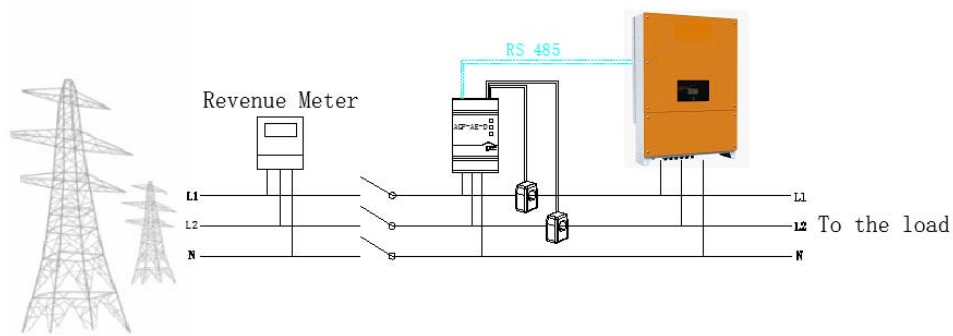
La connaissance et l'utilisation des INFORMATIONS fournies garantissent un fonctionnement optimal du système.

Servicing Instructions

Warning : These servicing instructions are for use by qualified personnel only. To reduce the risk of electric shock, do not perform any servicing other than that specified in the operating instructions

Chapter1: Introduction

In a single inverter system, the meter is connected directly to the inverter. If your inverter has a built-in revenue grade meter (RGM; the inverter is referred to a revenue grade inverter), you can connect an external meter on the same bus as the RGM.



Chapter2: Meter Installation

While Installing the meter, the National Electrical Code, ANSI/NFPA 70 and Canadian Electrical Code C22.1. shall be used.

Chapter2.1: Installation Guidelines

The meter is connected to the inverter using RS485.

AC wire specifications: 1.3 to 2.0 mm diameter / 22-18 AWG stranded wire, 600 V, type THHN, MTW, or THWN.

RS485 wiring specifications:

- Cable type: Min. 3-wire shielded twisted pair (a 4-wire cable may be used)
- Wire cross-section area: 0.32- 0.81 mm²/ 24-18 AWG (a CAT5 cable may be used)



NOTE

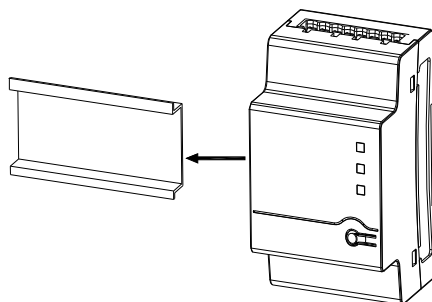
If using a cable longer than 10 m/33 ft in areas where there is a risk of induced voltage surges by lightning, it is recommended to use external surge protection devices. If grounded metal conduit is used for routing the communication wires, there is no need for a lightning protection device.

- The meter is considered “permanently connected equipment” and requires a disconnect means (circuit breaker, switch, or disconnect) and overcurrent protection (fuse or circuit breaker).
- The meter draws 10-30mA, therefore the rating of any switches, disconnects, fuses, and/ or circuit breakers is determined by the wire gauge, the mains voltage, and the current interrupting rating required.
- The switch, disconnect, or circuit breaker must be located near the meter and be easily operated .
- Use circuit breakers or fuses rated for 20A or less.
- Use grouped circuit breakers when monitoring more than one line.
- The circuit breakers or fuses must protect the mains terminals labeled L1 and L2. In the rare cases where neutral has overcurrent protection, the overcurrent protection device must interrupt both neutral and the ungrounded conductors simultaneously.
- The circuit protection / disconnect system must meet all national and local electrical codes.

Chapter2.2: Installing and Connecting the Meter

Chapter2.2.1: To mount the meter

1. The meter should be mounted in a Power Distribution Box
2. Mount the meter on a 35mm DIN rail.



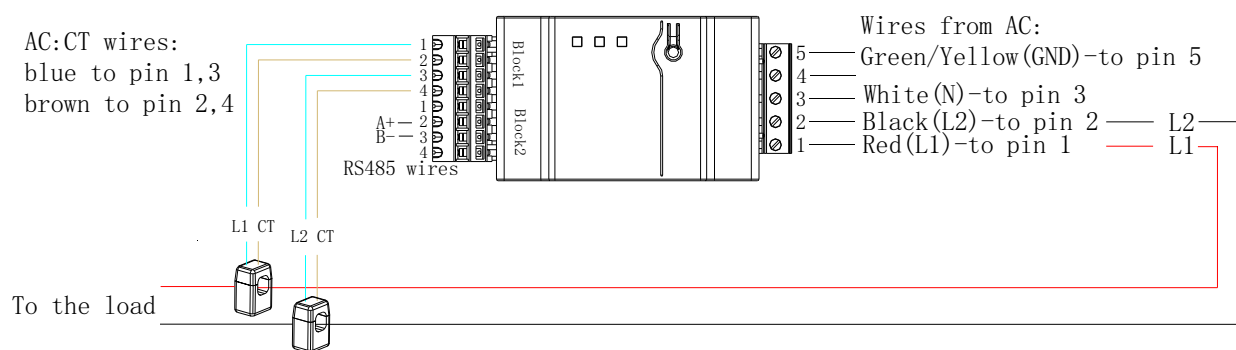
Chapter2.2.2: To install the CTs:

1. Turn off AC power before clamping on current transformers.
2. Install the CTs around the conductor to be measured. Split-core CTs can be opened for 3 installation around a conductor. A nylon cable tie may be secured around the CT to prevent accidental opening.
3. Install the CT with the arrow pointing to the grid for consumption or export measurement.

The current transformer is packed together with the meter.

Chapter 2.2.3: To wire the meter:

If you are connecting the meter to the inverter, Refer to the connection diagram below



NOTE

- Clamp the CT connected to L1 CT around the wire connected to ØL1.
- Clamp the CT connected to L2 CT around the wire connected to ØL2.

1. Verify that power is OFF before making connections.
2. Insert a grounding cable through the appropriate conduit and the knockout that was opened and connect it from Pin 5 of the 5-pin terminal block to the grounding terminal
3. Connect the AC side wires (meter input) using the 5-pin terminal block:
 - a. Insert the wires through the appropriate conduit and the knockout that was opened.
 - b. Loosen the appropriate screws on the 5-pin terminal block.
 - c. Connect each AC wire to the appropriate screw terminal (pins 1, 2). Verify that the lines match the symbols printed on the meter front label.
 - d. Connect ground to pin 5 and neutral to pin 3.
 - e. Tighten the screws making sure the wires are fully inserted and cannot be pulled out easily.
 - f. Insert the 5-pin terminal block into the socket on the meter making sure it is fully seated in the meter.
4. Connect the CT wires to the 4-pin terminal block(block1):
 - a. Insert the wires through the appropriate conduit and the knockout that was opened.
 - b. Connect the blue and brown wires according to the dots printed on the label: blue to pins 1/3, brown to pins 2/4.
 - c. Insert the 4-pin terminal block into the socket on the meter making sure it is fully seated in the meter
5. Connect the RS485 twisted pair cable to the 4-pin terminal block o(block2):
 - a. Insert the wires through the appropriate conduit and the knockout that was opened.
 - b. Connect the wires to the A+ and B- terminals, and connect the shield to the G terminal.
 - c. Insert the 4-pin terminal block into the socket on the meter making sure it is fully seated in the meter
6. Return the terminal block end-stops to the sides of the meter.



NOTE

If the meter is used for two-phase two-wire system (no neutral), please connect L2 and N line at the 5-pin terminal block:

Chapter3: Panel introduction

Chapter3.1: Meter Status Leds

The three status LEDs on the front of the meter can help indicate correct measurements and operation. At normal startup - when power is first applied, all the LEDs light up sequentially for 1 sec.

Chapter3.1.1:Power Status LED

LED	LED Color	Function	Indication	Troubleshooting
RUN	Green	Flashing ON/OFF(for 1sec)	Work normally	/
	Red	ON for >3sec	Internal error	Contact Support
	Yellow	Flashing ON/OFF(for 1sec)	No communication	Check that the communication wires are connected correctly.

Chapter3.1.2:Phase Status LED

LED	LED Color	Function	Indication	
L1/L2	Green	ON for >3sec	No Current	
		Flashing ON/OFF(for 1sec)	Positive power	
	Red	Flashing ON/OFF(for 1sec)	Negative power	check for reversed CTs, swapped CT wires, or CTs not matched with the lines.
		Flashing with green LED	High voltage > 130V	Check the line voltages and the meter rating.
		Flashing with yellow LED	Low voltage < 70V	
	Yellow	Flashing ON/OFF(for 1sec)	Break fault < 30V	
ON for >3sec		Frequency is below 45Hz or above 70Hz	Check for the presence of high noise.	

Chapter3.2: Button description

When the software version of the meter needs to be updated, Refer to the following steps:

1. communicate with the meter by RS 485;
2. Open the programming software, load the new software to update,
3. Press the "reset" button for 3sec, the meter will restart
4. Wait for the program to be completed

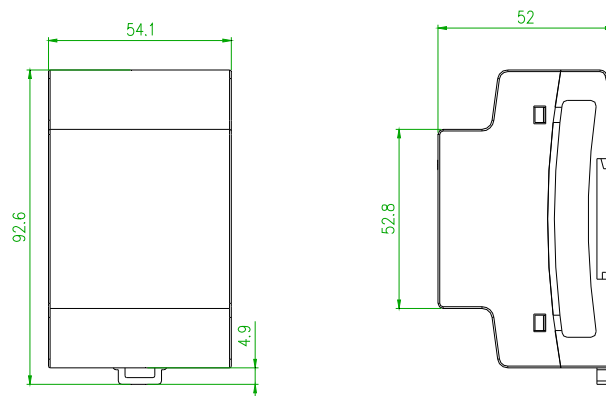
Chapter4: Meter Technical Specifications

Meter Electrical Service			Units
	AGF-AE-D/100	AGF-AE-D/200	
Rated Voltage-Line to N	120		V
Rated Voltage-Line to Line	208/240		V
Extended Voltage Range	88%~110%		
AC Frequency	60		Hz
Grids Supported	L1/L2/N/PE		
Power Consumption	1.2		W
Communication			
Meter Communication Interfaces	RS 485		
Response Time	≤1		S
Meter Accuracy			
Rated RMS current	100	200	A
1%-100% of CT Current	±0.5	±1	%
Current Transformers			
Number of Supplied Current Transformers	2		
Dimensions	I.D:15 O.D:35	70.5×54.5×39 (H×W×D)	mm
Standard Compliance			
Safety	UL1741		
Installation Specifications			
Dimensions(H×W×D)	54.1×87.8×52		mm
Weight	0.2		kg
Operating Temperature Range	-30~55		°C
Relative Humidity (noncondensing)	5 - 90		%
Mounting Type	DIN-Rail, 35mm		

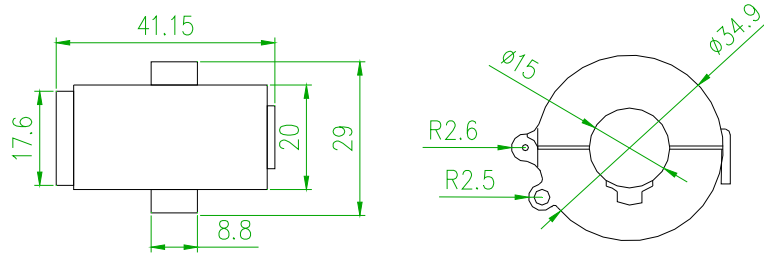
The meter is intended to be installed in a power distribution box in the end use. The acceptance of the application is to be evaluated in the end product

Chapter 5 Dimensions

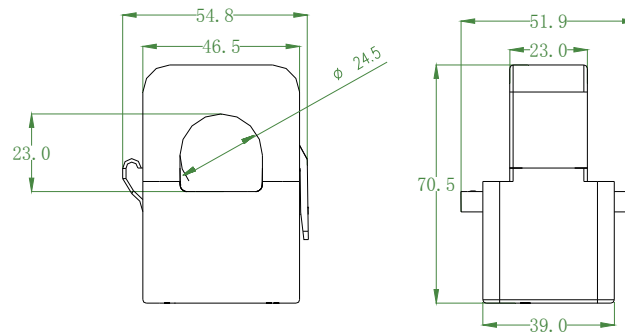
Chapter 5.1: Meter Dimensions (±0.5mm)



Chapter 5.2: Current Transformers Dimensions ($\pm 0.5\text{mm}$)



100A CT



200A CT

APPENDIX

Accessories list

Item	Quantity
Current Transformer	2
Plug component	3

Specification Revision 1.0

Contents subject to change with notice to contract customers.