

Portable ALPHA® Meters Installation Information

General

This leaflet provides information about installing, operating, and maintaining the Portable ALPHA, ALPHA Plus, and A3 ALPHA meters (hereafter referred to generically as ‘Portable ALPHA’). To make the most of your investment in Elster Electricity’s Portable ALPHA meter, follow the procedures outlined in this document.

The Portable ALPHA contains the electronic assembly from the respective ALPHA meter. This leaflet does not discuss the electronic assembly—refer to the technical manual for the specific meter: *ALPHA Solid State Meter Technical Manual* (TM42-2180), *ALPHA Plus Meter Technical Manual* (TM42-2182 or TM42-2185), *A3 ALPHA Meter Technical Manual* (TM42-2190 or TM42-2195) and the *ALPHA Meter Enhanced Function Option Boards Technical Manual* (TM42-2181) for information about the electronic assembly.

Though a Portable ALPHA is functionally similar to its respective ALPHA meter, the Portable ALPHA meter’s chassis assembly and cover assembly are physically and functionally different from those of the meter. The ALPHA optical port of the cover assembly has been retained in the Portable ALPHA.

The Portable ALPHA includes a set of four voltage test cables, four test clips, and a carrying case. Current probes are not included, but the carrying case will hold three portable clamp-on current probes.

The voltage and current inputs to the Portable ALPHA are AC only and are provided as 4-millimeter banana sockets in the chassis assembly. Four color-coded test sockets are provided for voltage inputs and are designated Line 1 (black), Line 2 (red), Line 3 (blue), and Neutral (white). *The Portable ALPHA obtains power to energize the internal circuits via the Line 1 and Neutral sockets.* The voltage limitations for the Line 1 to neutral sockets is 96 to 528 Vrms, while Line 2 and Line 3 have limitations of zero to 528 Vrms. The three voltage inputs are directly associated with the potential indicators in the LCD panel. The potential indicator A is associated with Line 1, indicator B with Line 2, and C with Line 3. (See Figure 1.)

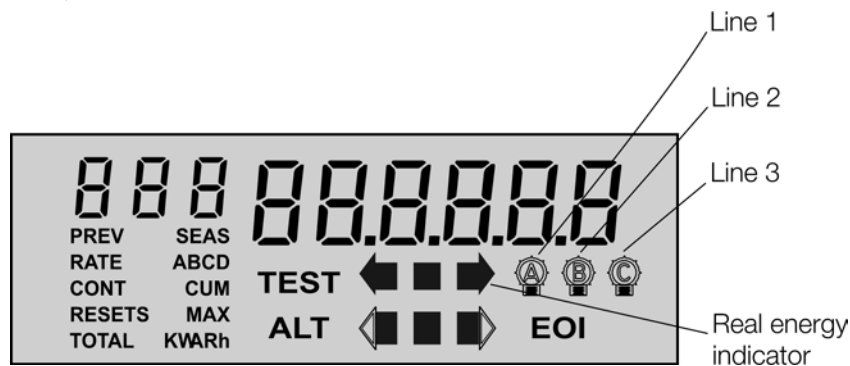


Figure 1 The LCD Panel on the Portable ALPHA

The chassis assembly of the Portable ALPHA uses current transformers that permit smaller values of current to be used for measurements. The internal current transformers provide isolation and excellent linearity up to their upper limit of two amperes for each of the current input sections. There are six 4-millimeter banana sockets in the chassis assembly to permit the monitoring of three currents labeled Line 1, Line 2, and Line 3. Two sockets are provided per line and are color-coded to maintain proper current direction so that the phase relationships of the measured quantities will be accurate. The red socket is always used as the current in or current source, while a black socket is used as the current out or the load current.

Four color-coded voltage test cables are provided to match the associated voltage test sockets of the Portable ALPHA. Four test clips for connecting to the voltage sensors are provided.

Provisions have been made for optional relay outputs and optional communications. The only relay option available in the Portable ALPHA is two Form C solid-state relay contacts. Communications is available using the External Modem Ready, Internal Modem, RS232 or RS485 option boards. If a communications option is supplied, the relay option is always included. If either the relay option or the communications option are supplied, access is provided by the respective connectors as shown in Figure 3 on page 6. The External Modem Ready option, the Internal Modem option, the RS232 option or the RS485 option board allows serial communications with the Portable ALPHA through the Communications Port. The Internal Modem permits the user to connect directly to public switched telephone network, while the External Modem Ready permits a connection to a user-supplied external modem. The RS232 or the RS485 option board permits the user to connect the meter directly to a computer, modem, or other data communication devices.

▲ WARNING
Use authorized utility procedures to install and operate all electrical test instruments. Dangerous voltages are present. Equipment damage, personal injury and death can result if safety precautions are not followed.

Installation

The Portable ALPHA is enclosed in a rain-tight assembly and can be used in an outdoor environment. The Portable ALPHA is not position sensitive relative to mounting. If the relay option is supplied, the relay output cable (Style 4074B23G01) is connected to the Relay Outputs connector on the Portable ALPHA. (See Figure 3 on page 6 and Figure 4 on page 6.) The relay contacts are identified by color as shown in Figure 2.

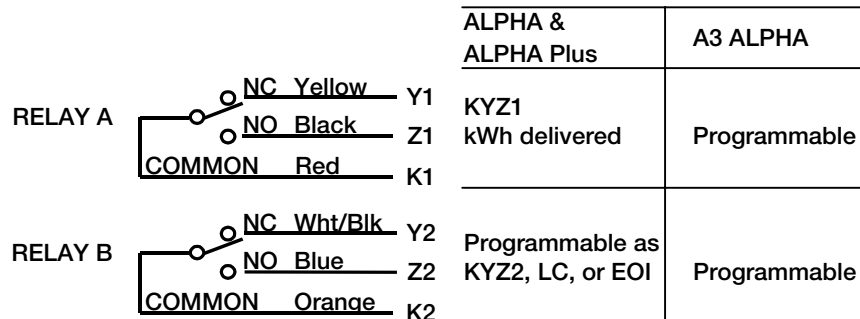


Figure 2. Color Code for the Relay Output Cable when Two Relays are Supplied

Connecting an Option Board

External Modem Ready Option Board. Using the External Modem Ready Option requires the Elster Electricity *External Modem Interface Adapter* (Style 1C11412G01 or 1C11412G02). This is a “D” type connector housing containing a custom circuit designed to work with the communications port from the ALPHA module option board. It plugs into the external modem’s 25-pin connector. The connection between the Portable ALPHA and the *External Modem Interface Adapter* is accomplished with a communication cable (Style 4074B30G01). One end of the ten foot, four conductor cable is connected to the Communications Port of the Portable ALPHA. (See Figure 3 on page 6 and Figure 5 on page 6.) The opposite end of the four conductor cable is terminated with a modular plug, which is to be plugged into the External Modem Interface Adapter.

Internal Modem Option Board. If the Internal Modem Option is supplied, connection to the public switched network is accomplished using the provided communications cable (Style 4074B30G01). Referring to Figure 3 on page 6 and Figure 5 on page 6, connect the communications cable to the Communications Port on the Portable ALPHA. The opposite end of the communication cable is terminated with a modular plug for connection to a telephone company provided USOC RJ11C modular jack.

RS232/RS485 Option Boards. If the RS232 option board is supplied, the distance between the meter and a receiving device should not be greater than 25 feet. The cable terminates with a standard RJ-11 jack. For interface with the typical 25-pin connection to a serial port of a computer or a modem, you should use an adapter (Elster Electricity’s DB25M-RS232 connector). If the RS485 option board is supplied, the cable that exits the meter is connected to a controller (may also be connected to one or more meters). The controller may then be connected to a modem.

Connecting the Voltage Leads

Before you install the Portable ALPHA:

- Ensure that the slot of the Test Mode button is horizontal (indicates the unit out of test mode).
- Attach one end of a voltage lead to the colored socket that matches the insulation color of the lead.
- Verify that the voltage to be metered is within the specified limits of the Portable ALPHA.
- Connect the test clips to the appropriate points to be metered. (See the attached wiring diagrams.)

Connecting the Current Leads

WARNING

In connecting current sensors (current transformers), be aware that unterminated secondaries can exceed safe voltage levels and can cause personal injury or equipment damage. Use authorized utility procedures and circuit closing devices on any current transformer.

Remember that the Line 1-to-Neutral (black-to-white) connection is the source of power to the Portable ALPHA and should be connected first.

When you install the current sensor:

- Ensure that the polarity is correct.
- To maintain the correct direction of energy flow for the Portable ALPHA, the current from the source must enter the red socket and exit the black socket, continuing to the load.
- When using clamp-on current probes as current sensors, pay close attention to the markings on the current probe to ensure correct phase polarity. (See Figure 14 on page 11.)

The current sensor should be physically connected on the load side of the voltage sensor for Line 1. This avoids the possibility of introducing the current required to operate the Portable ALPHA in the current sensor and distorting the measurement at low current levels.

Verifying Meter Function

⚠ WARNING

Do not disassemble the Portable ALPHA chassis assembly or the electronic assembly from the chassis with any test voltages or currents applied to the inputs of the Portable ALPHA. Doing so could expose you to dangerous voltages, resulting in equipment damage, personal injury, or death.

After connecting the current sensors, verify that the pulse arrows in the LCD (see Figure 1) are blinking. Two sets of right and left pointing arrows, one above the other, are located on the LCD, with the upper set located directly to the left of the potential indicators. The upper set of arrows indicates watt-hours (kWh) and the lower set indicates alternate energy (kVARh or kVAh), if available. Right-pointing arrows indicate energy delivered; left-pointing arrows indicate energy received.

Ensure that the test mode indicator on the LCD is not blinking. If it is, disconnect all test clips and test sensors from points of measurement. Remove the cover and turn the Test Mode button so that the slot is horizontal (this takes the unit out of test mode). Reinstall the cover and reconnect all test clips and test sensors to the points of measurement.

Operating the Portable ALPHA

For information about operating the Portable ALPHA, see the *ALPHA Solid State Meter Technical Manual* (TM42-2180), *ALPHA Plus Meter Technical Manual* (TM42-2182 or TM42-2185), *A3 ALPHA Meter Technical Manual* (TM42-2190 or TM42-2195) and the *ALPHA Meter Enhanced Function Option Boards Technical Manual* (TM42-2181).

Replacing the Battery

The Portable ALPHA is largely maintenance free, with the exception of the battery. The battery is a 3.6-volt lithium battery used in conjunction with a super capacitor to preserve data during power interruptions. The projected life of the battery is a minimum of five years at 25°C. When the battery discharges below a set level, a Low Battery Warning (F00001) appears as part of the display sequence. (For more information, see the respective technical manual.)

⚠ WARNING

Do not attempt to replace the battery while the unit is powered. Doing so could expose you to dangerous voltages, resulting in personal injury, death, or equipment damage. Disconnect all voltage leads before you disassemble the meter.

To replace the battery:

- 1 First be sure that the power is off.

⚠ CAUTION

The Portable ALPHA must have been powered within an hour prior to installing the battery. If the battery is installed on a Portable ALPHA that has not been powered within the last hour, the Portable ALPHA may not operate correctly and the battery may be prematurely discharged.

- 2 Remove the four screws securing the cover assembly and remove the cover assembly.
- 3 With the cover removed, and the front of the electronic assembly exposed, grasp the battery and pull it straight out of the battery well.
- 4 Unplug the battery wire from the socket on the face of the electronic assembly.
- 5 Plug the new battery in the socket and place the new battery in the battery well.
- 6 Replace the cover assembly and secure it with the four screws removed during disassembly.

If you like, you can use Elster Electricity meter support software to reset the power outage log.

⚠ CAUTION

Exercise care to not apply voltage to current inputs. The current inputs are necessarily a low impedance connection. An applied voltage (for example, 12V) may result in damage to the meter.

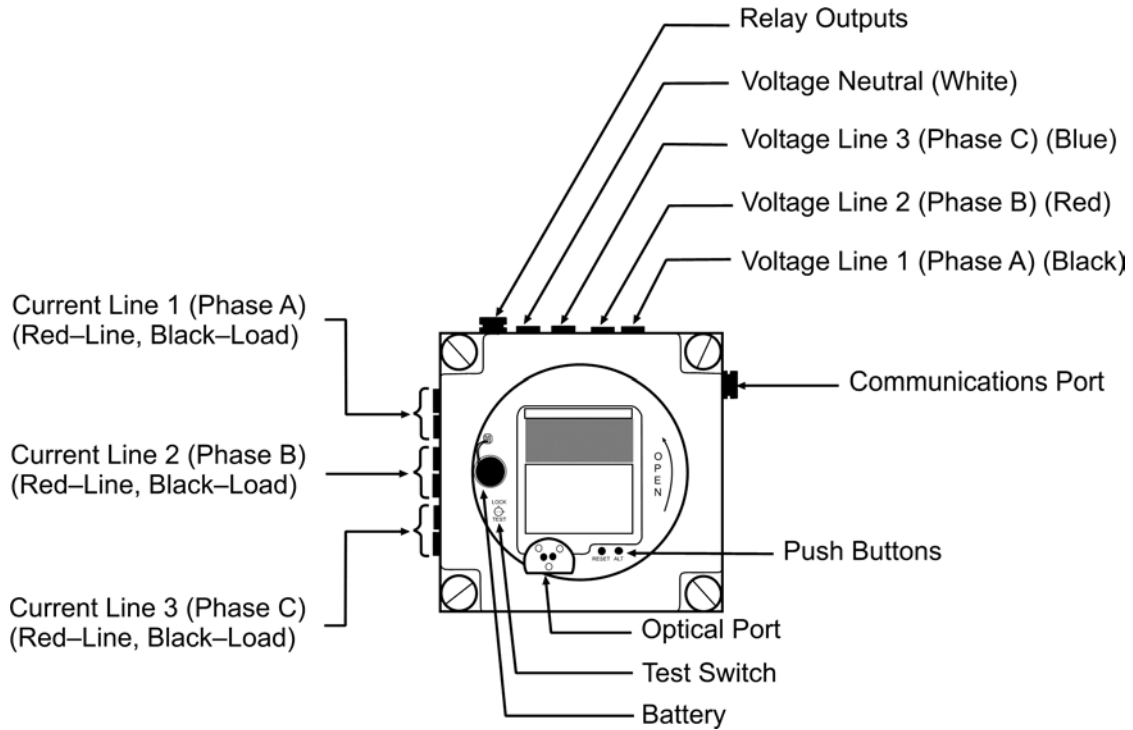


Figure 3. Portable ALPHA Connections

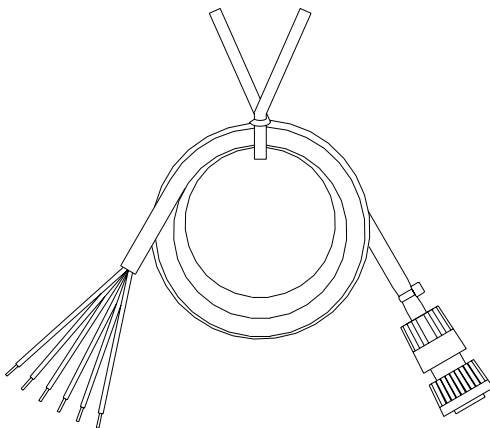


Figure 4 Portable ALPHA Connections

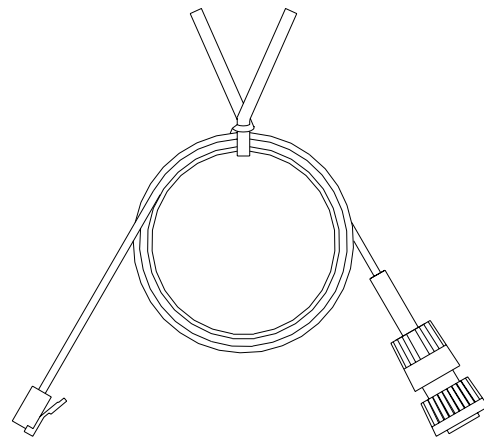


Figure 5 Communications Cable

Wiring Diagrams

The Portable ALPHA is a 3-stator solid-state meter intended to direct connect to systems where the operating voltages are within the standard operating voltage range (120V to 480V) of the Portable ALPHA and the current does not exceed the Portable ALPHA upper limit of 2.0 Amperes. When voltage and/or currents exceed these limits, either potential transformers and/or current transformers must be used. Clamp-On current probes are shown in the wiring diagrams since most system currents and metering current transformers can exceed the portable ALPHA internal limit of 2.0 Amperes. The Voltage

Line 1 and Voltage Neutral inputs are used to power the electronics of the Portable ALPHA and therefore must always be used.

The following notes apply to Figure 6 through Figure 13.

- (1) The current probe shown as an input to the Portable ALPHA is AEMC Corporation AC current probe model SD604A (see Figure 14). It is available from Elster Electricity as style number 1C11410H01. The probe has 60-inch red and black leads terminated in 4mm jacks that fit the current sensor inputs on the Portable ALPHA. The current measurement range is 250ma to 1000A AC with a 1000:1 ratio. The model SD604A has open secondary voltage protection by limiting the output to 20 volts maximum.
- (2) For improved accuracy, all voltage inputs should be activated by connecting to a source voltage.

CAUTION

Exercise care to not apply voltage to current inputs. The current inputs are necessarily a low impedance connection. An applied voltage (for example, 12V) may result in damage to the meter.

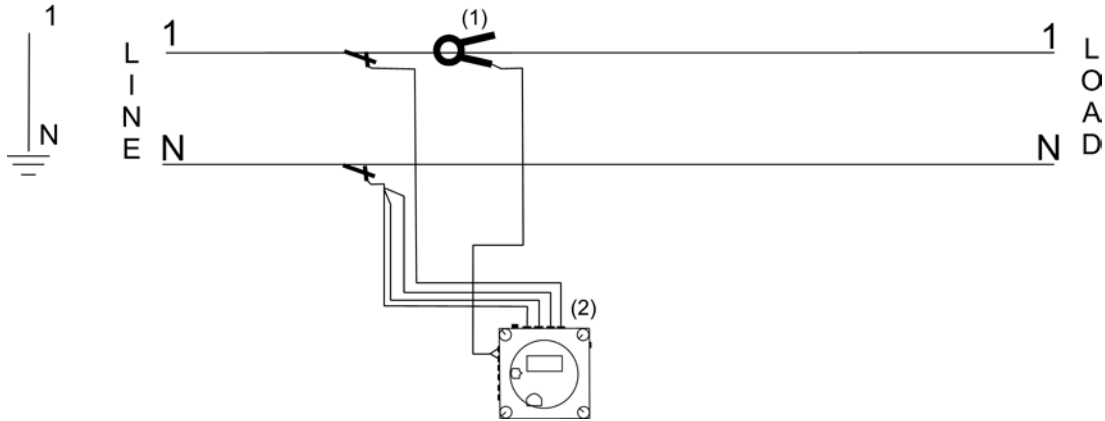
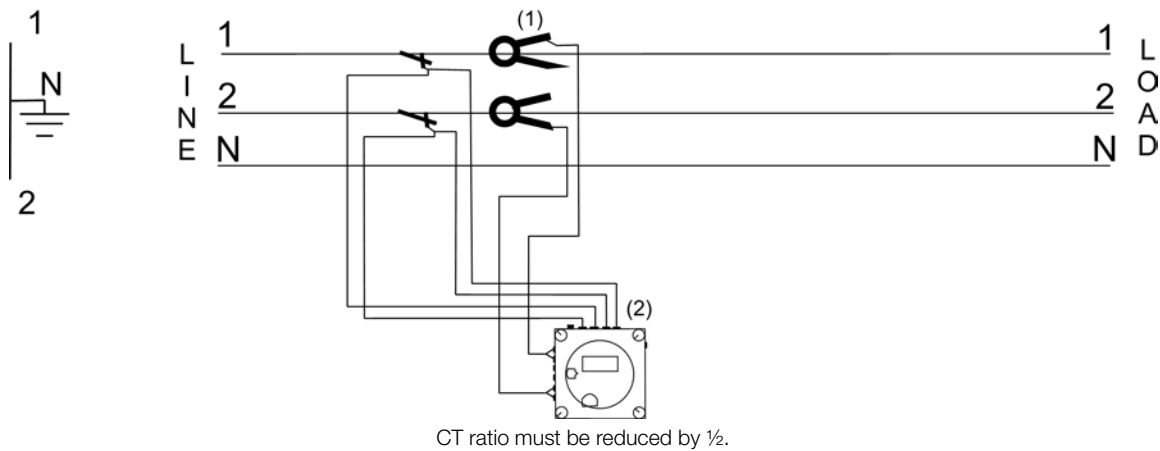


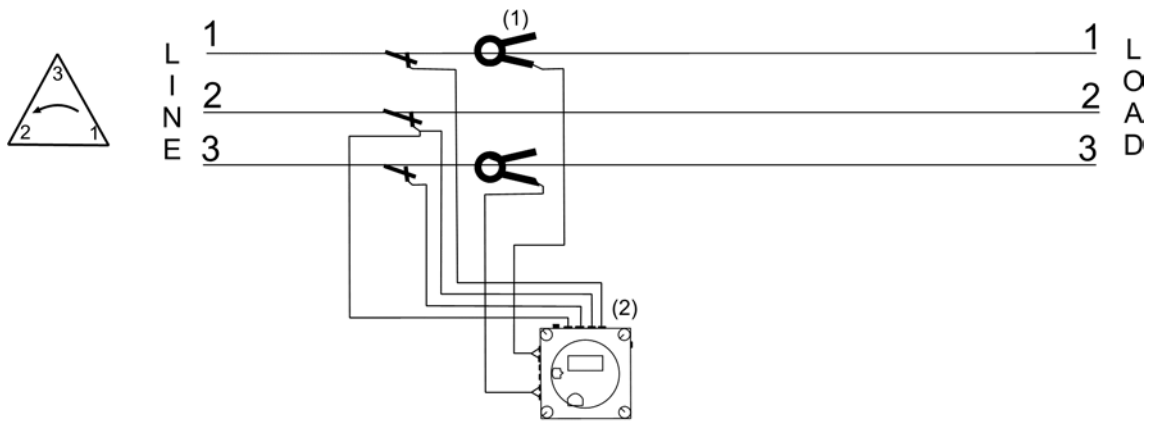
Figure 6. 1-Phase, 2-Wire



NOTICE

You need to reverse the phasing on the current probe for phase 2.

Figure 7. 1-Phase, 3-Wire



NOTE: The jumper from Line 2 to the neutral connection on the Portable ALPHA applies Line 1 to Line 2 voltage to power the Portable ALPHA electronics.

Figure 8. 3-Phase, 3-Wire Delta

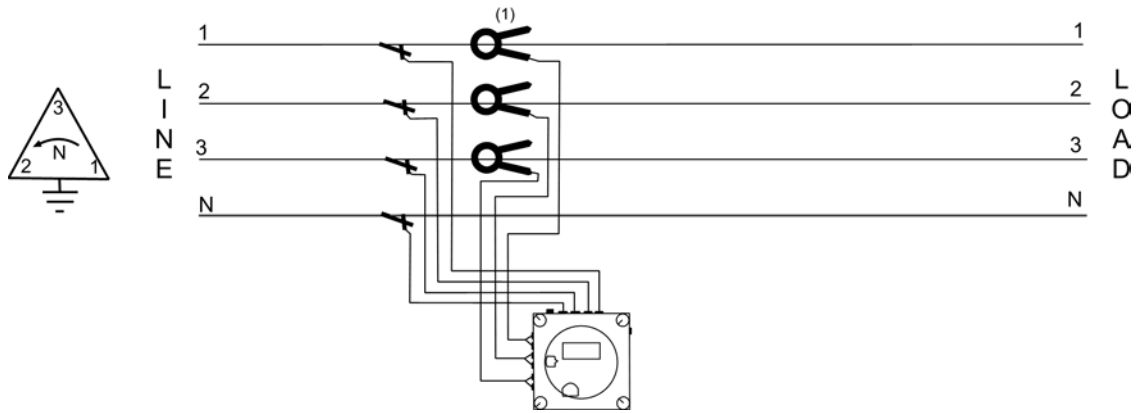


Figure 9. 3-Phase, 4-Wire Delta

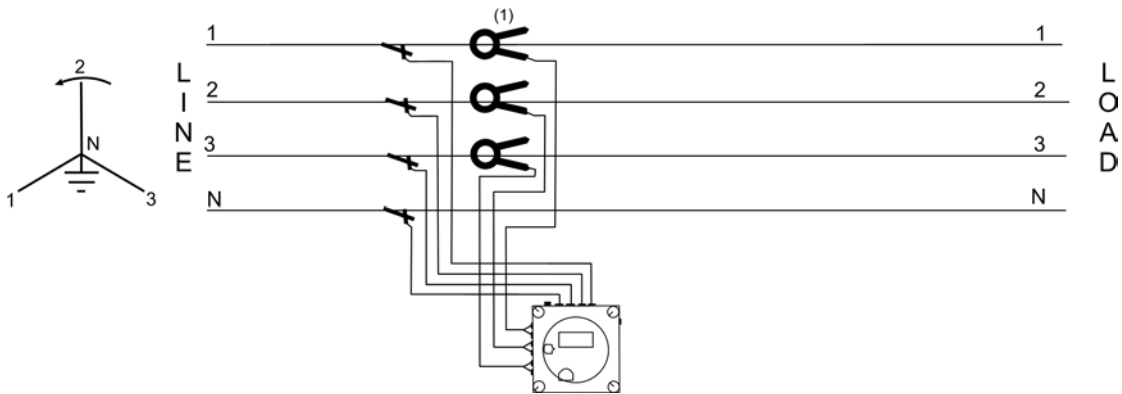
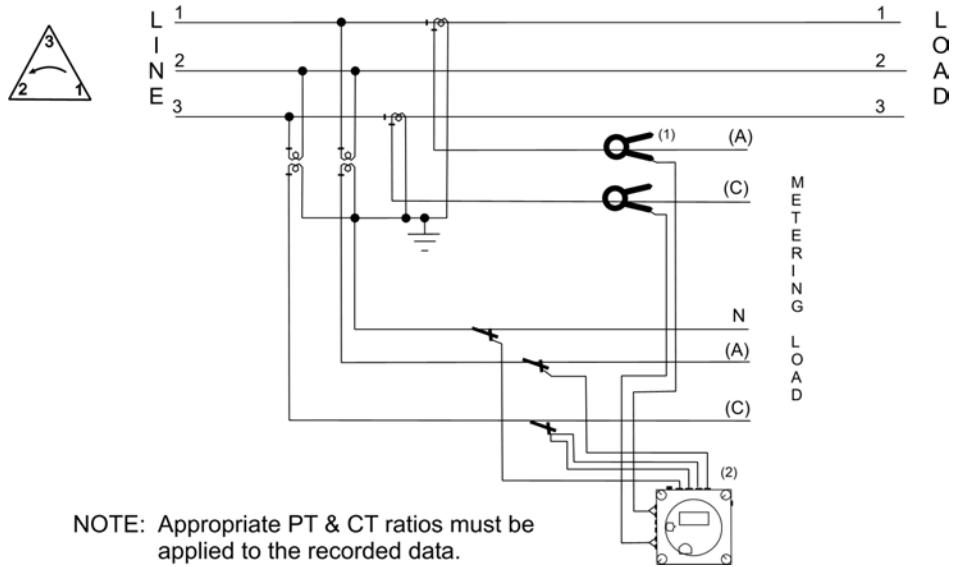


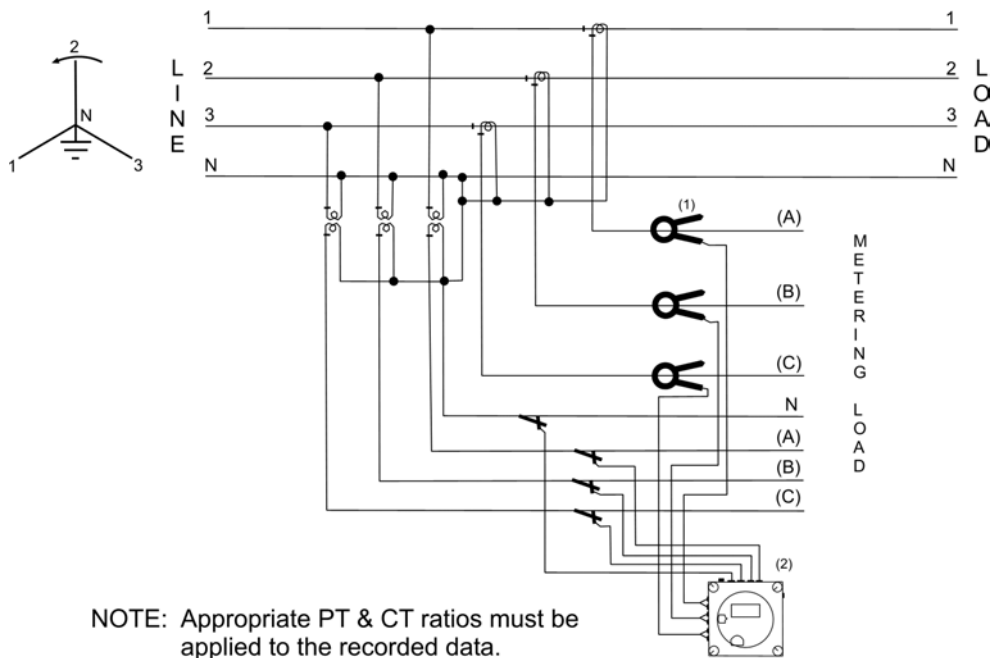
Figure 10. 3-Phase, 4-Wire Wye



NOTICE

Be sure to use the appropriately rated probes for the measured service. The probes provided by Elster Electricity are 1000:1 which is too high to use on CT secondaries. Failure to use the proper ratio will result in inaccurate data.

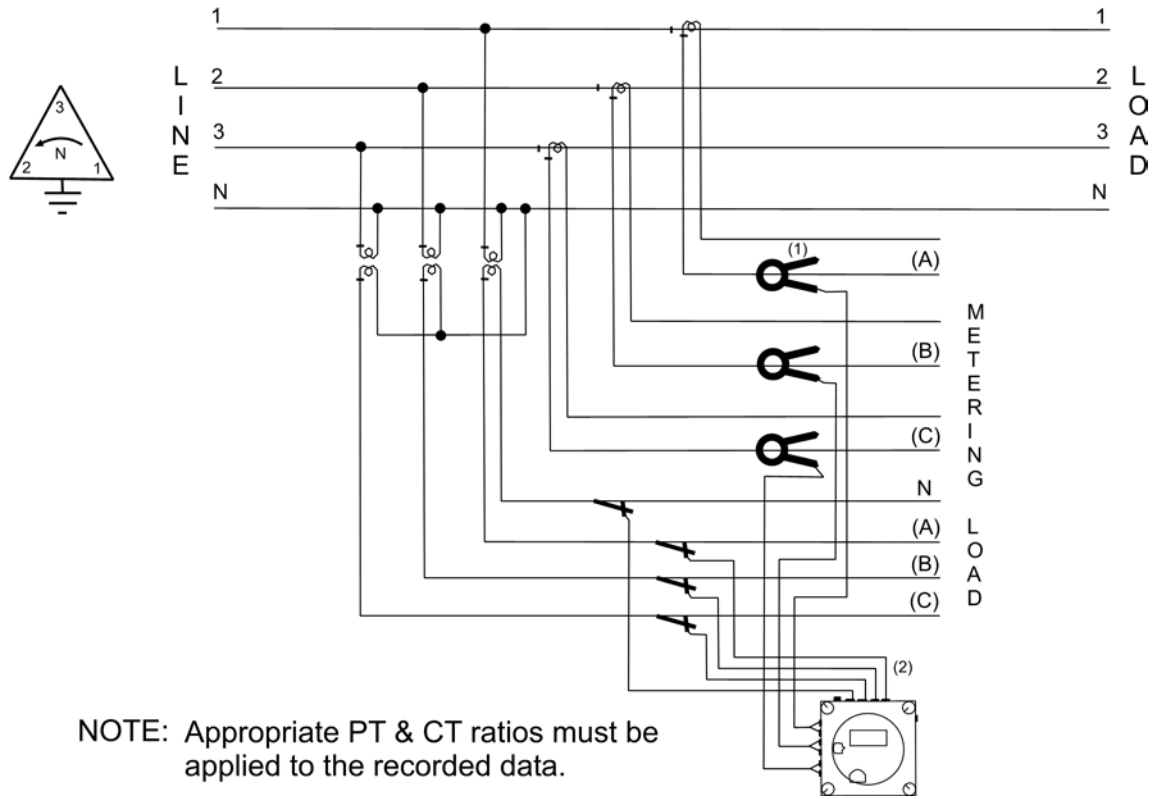
Figure 11. 3-Phase, 3-Wire Delta



NOTICE

Be sure to use the appropriately rated probes for the measured service. The probes provided by Elster Electricity are 1000:1 which is too high to use on CT secondaries. Failure to use the proper ratio will result in inaccurate data.

Figure 12. 3-Phase, 4-Wire Wye



NOTE: Appropriate PT & CT ratios must be applied to the recorded data.

NOTICE

Be sure to use the appropriately rated probes for the measured service. The probes provided by Elster Electricity are 1000:1 which is too high to use on CT secondaries. Failure to use the proper ratio will result in inaccurate data.

Figure 13. 3-Phase, 4-Wire Delta

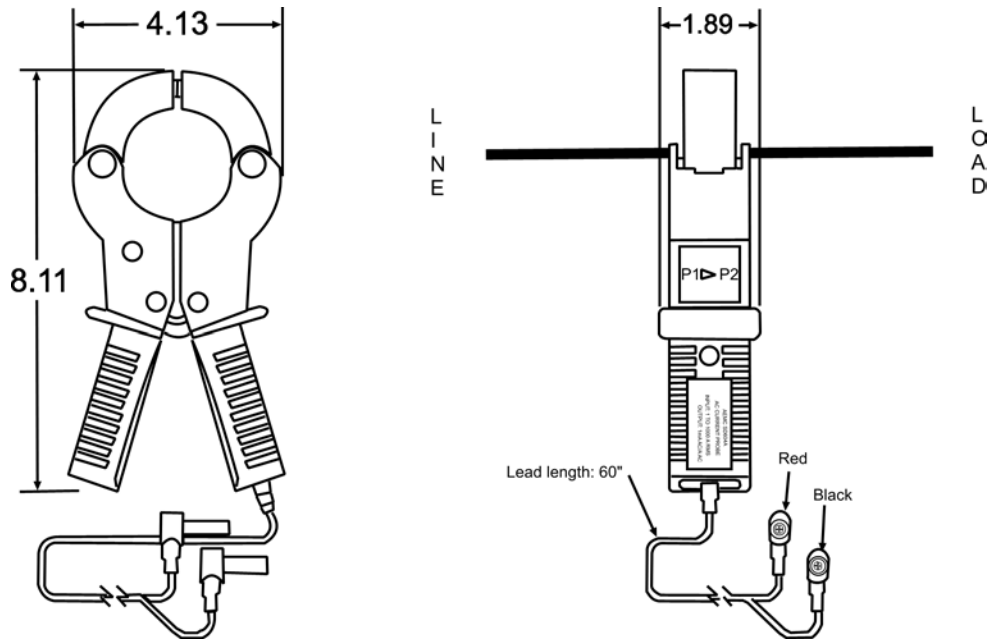


Figure 14. Current Probe

Customer Information

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of the equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

The Portable ALPHA Meter Modem complies with Part 68 of the FCC rules. On the nameplate of this equipment is a label that contains, among other information, the FCC registration number and ringer equivalence number (REN) for this equipment. If requested, this information must be provided to the telephone company.

The connection to the telephone network is through an USOC RJ11C modular jack.

The REN is used to determine the quantity of devices that may be connected to the telephone line. Excessive RENs on the telephone line may result in the devices not ringing in response to an incoming call. In most, but not all areas, the sum of RENs should not exceed five (5.0). To be certain of the number of devices that may be connected to a line, as determined by the total RENs, contact the local telephone company.

If the Portable ALPHA Meter, when equipped with modem, causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. But if advance notice isn't practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

The telephone company may make changes in its facilities, equipment, operations, or procedures that could affect the operation of the equipment. If this happens, the telephone company will provide advance notice in order for you to make necessary modifications to maintain uninterrupted service.

If trouble is experienced with the Portable ALPHA Meter with modem, for repair or warranty information, please contact Elster Electricity, LLC, RMR Department, 919-212-4700. If the equipment is causing harm to the telephone network, the telephone company may request that you disconnect the equipment until the problem is resolved.

Repair by the customer (end user) is limited to mechanical replacement of modules. Any changes or modifications not expressly approved by Elster Electricity, LLC could void the user's authority to operate the equipment.

The Portable ALPHA Meter cannot be used on public coin phone service provided by the telephone company. Connection to party line service is subject to state tariffs. (Contact the state public utility commission, public service commission or corporation commission for information.)

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Elster Electricity, LLC
Raleigh, North Carolina USA
+1 800 338 5251 (US toll free)
+1 919 212 4800
support@us.elster.com
www.elsterelectricity.com



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