

Using the RS-485 Option with the ALPHA Plus® and A3 ALPHA® Meters

General

The RS-485 option board may be provided on ALPHA Plus and A3 ALPHA meters with timekeeping features. This option board provides a method for connecting multiple meters using a common set of wires for communication purposes. RS-485 provides for bi-directional data transmission up to 19.2 k bits per second (bps) between 32 devices, one device being the controller. This feature is useful when multiple meters are positioned some distance from each other within a specific electricity user site and one central location is required for communications. The maximum cable length in RS-485 communications paths is 4,000 feet (1,200 meters). RS-485 is also useful in connecting one telephone line to multiple meters that are grouped within a control room or metering closet.

For more information about the ALPHA Plus meter, see the ALPHA Plus meter technical manual (TM42-2182C or later). For more information about the A3 ALPHA meter, see the A3 ALPHA meter technical manual (TM42-2190A or later).

⚠ WARNING

Use authorized utility procedures to install and service metering equipment. Dangerous voltages are present. Equipment damage, personal injury and death can result if safety precautions are not followed.

Use circuit closing devices on current transformer secondaries. Dangerous currents and voltages are present. Equipment damage, personal injury and death can result if circuit closing devices are not used.

RS-485 Option Board

The RS-485 option board is a single board design providing a cable connector for the Receive (Rx) and Transmit (Tx) connections. This communication board may also be provided with 2 or 4 relay outputs. See the meter's technical manual for information on configuring the relays. These relays are optional and must be specified at the time of order entry.

The RS-485 option board mounts directly to the main circuit board of the ALPHA Plus or A3 ALPHA meter using the 20 pin connector (J4). Reference Figure 1.

Termination Resistors

Most documents referring to the application of RS-485 communication will specify the use of a termination resistor at each end of the cable. This is required for very high speed communications over the RS-485 circuit. Since the ALPHA Plus and A3 ALPHA meters' communications is at 19.2 k bits per second (bps) or less, it does not require termination resistors. However it will operate with termination resistors in place.

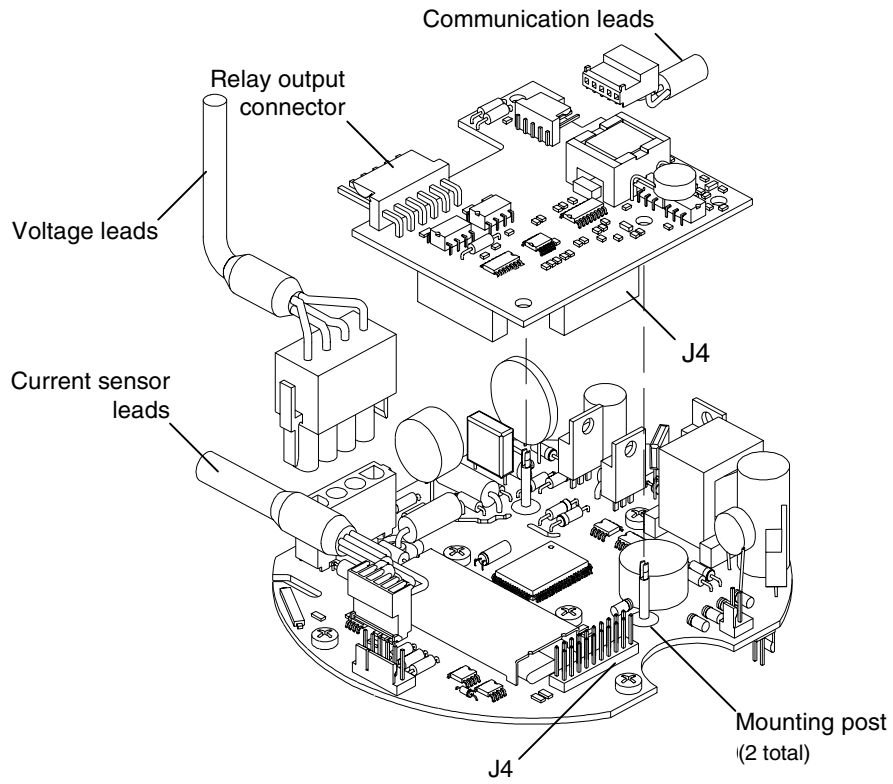
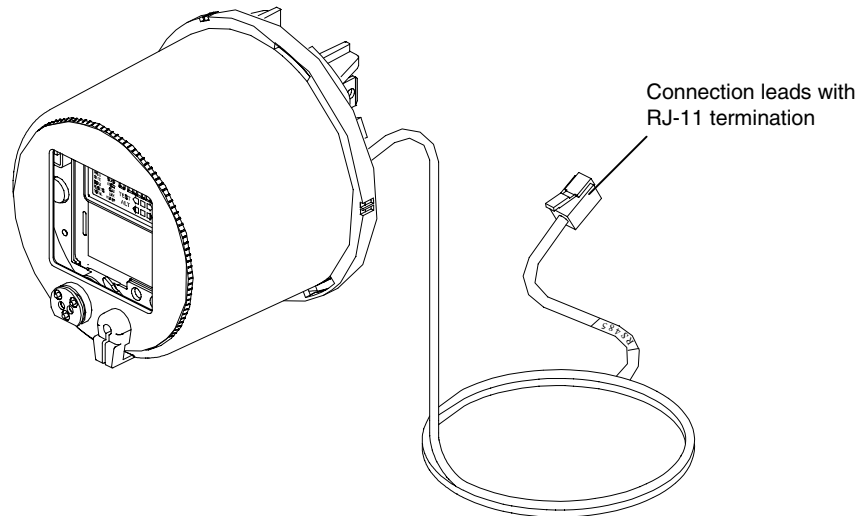


Figure 1. ALPHA Plus meter board with RS-485 option board (A3 ALPHA meter is similar)



RJ-11 connections	
Black	Receive-
Red	Receive+
Green	Transmit+
Yellow	Transmit-

Figure 2. Meter with RS-485 cable

RS-485 Connections

The RS-485 cable exits through the option cable opening in the meter base. This cable terminates in an RJ-11 jack. There is a wire marker, 6 inches from the RJ-11 end, with "RS485" printed on it for identifying this option. Reference Figure 2.

Two pairs of wires are used in the RS-485 connection. One pair is for Transmit and the other for Receive. All of the ALPHA meter <Transmit +> wires should be tied together and connected to the <Receive +> of the controller. Likewise, all <Transmit -> wires from the meter should be connected to the <Receive -> of the controller. ALPHA meter <Receive +> connections are made to the controller's <Transmit +> terminal, and the <Receive -> wires tied to the <Transmit -> at the controller. Reference Figure 3.

It is not recommended to connect any devices other than ALPHA meters and the RS-485 controller to the same circuit.

Due to differences in protocols, ALPHA Plus meters and A3 ALPHA meters should *not* be installed on the same RS-485 circuit.

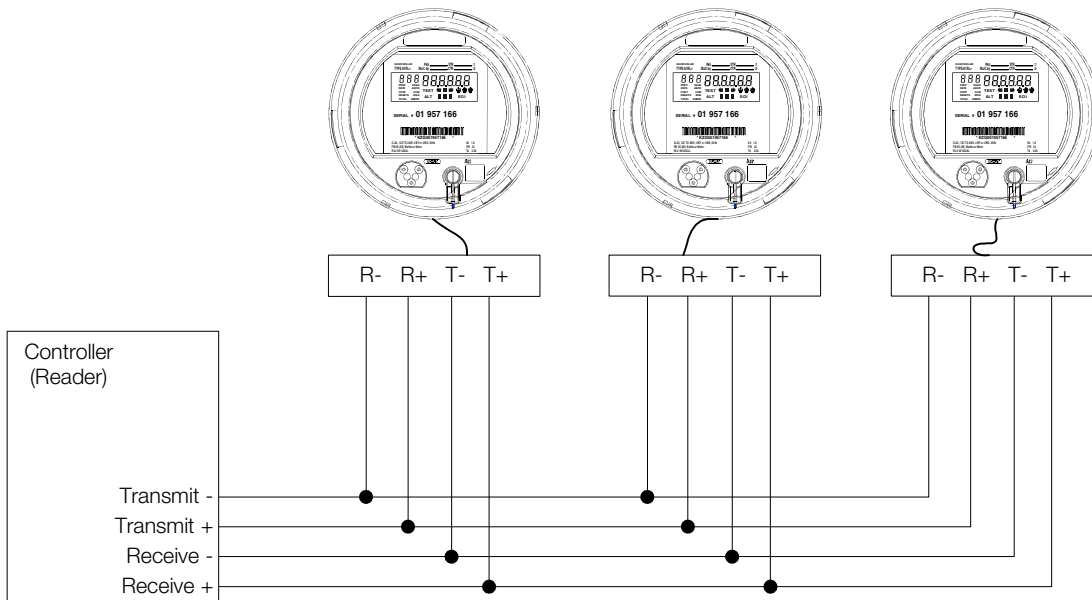


Figure 3. Typical RS-485 wiring

NOTICE

There can be some confusion between equipment suppliers regarding the identification of the "+" and "-" RS-485 connections. Other common nomenclature is "A" and "B". If problems are encountered during installation, it is suggested that the "+" and "-" wires be reversed at the controller for both the transmit and receive connections.

Programming

When more than one ALPHA meter is connected to the RS-485 communication bus, each meter must have a unique number assigned as the “Remote Device Number” when the meter is programmed. The range of the Remote Device Number depends on the meter.

- For ALPHA Plus meters, the range is 0 to 254. Remote Device Number “0” should be used if the RS-485 controller is connected to a telephone modem. The Remote Device Number “0” meter has the responsibility to initialize the modem. Therefore, if no modem is involved, it is recommended that no meter be identified as Remote Device Number “0”. ALPHA meters must also be programmed with an appropriate Remote Definition, using the latest Elster Electricity meter support software.
- For A3 ALPHA meters, the range is 1 to 254. Remote Device Number “1” should be used if the RS-485 controller is connected to a telephone modem. The Remote Device Number “1” meter has the responsibility to initialize the modem. Therefore, if no modem is involved, it is recommended that no meter be identified as Remote Device Number “1”. ALPHA meters must also be programmed with an appropriate Remote Definition, using the latest Elster Electricity meter support software.

Relay Options

The pulse output relays (when present) are brought out of the meter base via a cable on the ALPHA Plus or A3 ALPHA meter. There can be two (2) or four (4) relays provided with the RS-485 option board.

The relay output cable uses the color coding below. Reference Figure 4 and Figure 5.

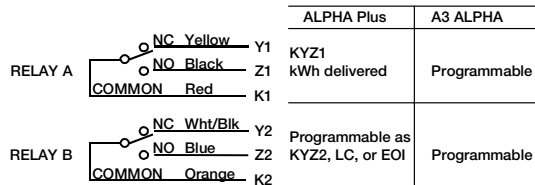


Figure 4. 2-relay output color coding

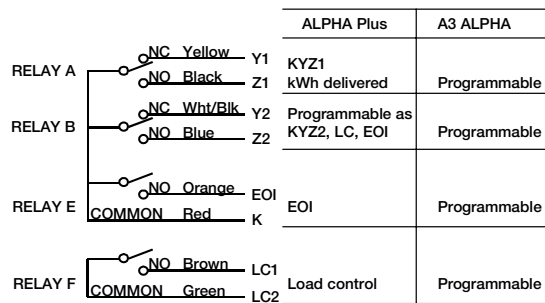


Figure 5. 4-relay output color coding

DISCLAIMER OF WARRANTIES AND LIMITATIONS OF LIABILITY

There are no understandings, agreements, representations, or warranties either express or implied, including warranties of merchantability or fitness for a particular purpose, other than those specifically set out by any existing contract between the parties. Any such contract states the entire obligation of the seller. The contents of this document shall not become part of or modify any prior existing agreement, commitment, or relationship.

The information, recommendations, descriptions, and safety notices in this document are based on Elster Electricity, LLC experience and judgment with respect to operation and maintenance of the described product. This information should not be considered as all-inclusive or covering all contingencies. If further information is required, Elster Electricity, LLC should be consulted.

No warranties, either expressed or implied, including warranties of fitness for a particular purpose or merchantability, or warranties arising from the course of dealing or usage of trade, are made regarding the information, recommendations, descriptions, warnings, and cautions contained herein.

In no event will Elster Electricity, LLC be responsible to the user in contract, in tort (including negligence), strict liability or otherwise for any special, indirect, incidental, or consequential damage or loss whatsoever, including but not limited to: damage or loss of use of equipment, cost of capital, loss of profits or revenues, or claims against the user by its customers resulting from the use of the information, recommendations, descriptions, and safety notices contained herein.

