

ALPHA Plus® and A3 ALPHA® Switchboard Meters with the CPS Power Supply

General

This leaflet contains general installation instructions for ALPHA Plus and A3 ALPHA meters with the CPS power supply in FT-21 cases. The electronic module used in the switchboard meter is the same as is used in the corresponding socket or A-base meter. This leaflet does not discuss the electronic assembly—refer to the technical manual for the specific meter: ALPHA Plus Meter Technical Manual (TM42-2182 or TM42-2185 [Canadian]) or A3 ALPHA Meter Technical Manual (TM42-2190 or TM42-2195 [Canadian]) for information about the electronic assembly.

The meter is mounted on a removable chassis, which is held in the case by two latches. All metering connections between the case and the chassis are made through the test switches.

 **CAUTION**

To prevent electrical shock and bodily injury, automatic shorting switches are provided on all current circuits so that current transformers are not inadvertently opened when you test or remove the chassis.

The voltage and current inputs to the switchboard meter are located on the rear of the case. The switchboard meter has an operating range of 96 to 528 Vrms. The maximum current is 20 A.

An optional AnyPhase™ power supply is available for A3 ALPHA meters. When equipped with the AnyPhase power supply, the meter will operate as long as voltage remains on any two voltage input connections (phase-phase or phase-neutral).

 **CAUTION**

When using the AnyPhase power supply on 4-wire wye applications, the absolute phase-phase voltage must not exceed 528 V. Meters with the AnyPhase power supply cannot be used on 347/600 V services.

Provisions have been made for optional relay outputs and optional communications. One optional relay output has a three-terminal molded insulation block installed in three knockouts at the top back of the case (Figure 5). This is the configuration used for a single KYZ output from the meter (when supplied).

A separate FT case configuration is provided for any meter that has either: 1) a communication output; or 2) two or more relay outputs. This configuration uses a 24-position connector mounted on the chassis with a mating connector mounted in the back of the case. Signals from the case-mounted connector go to two 12-pin terminal blocks on the back of the case (Figure 6). Terminal block positions are identified by number (numbered 21 through 44) rather than by function. The function of the individual terminal is dependent on the particular configuration of the ALPHA module or switchboard chassis. Some terminal numbers have different functions depending on the supplied relay and communications options. See the following figures for specific function terminal numbers: Figure 7, Figure 8, Figure 9, Figure 10, Figure 11, and Figure 12.

ALPHA Plus and A3 ALPHA meters are available in FT-21 cases for the following wiring configurations:

- 3-phase 3-wire (2 element equivalent) - see Figure 2
- 3-phase 4-wire wye (2 1/2 element equivalent) - see Figure 3
- 3-phase 4-wire wye (3 element equivalent) - see Figure 4

Installation

The meter case should be mounted and permanently wired before the meter chassis is placed in the case. See Figure 1 for panel cut-out information.

▲ 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.

Hardware supplied with the meter permits semi-flush mounting on panels up to 3/16-inch thick.

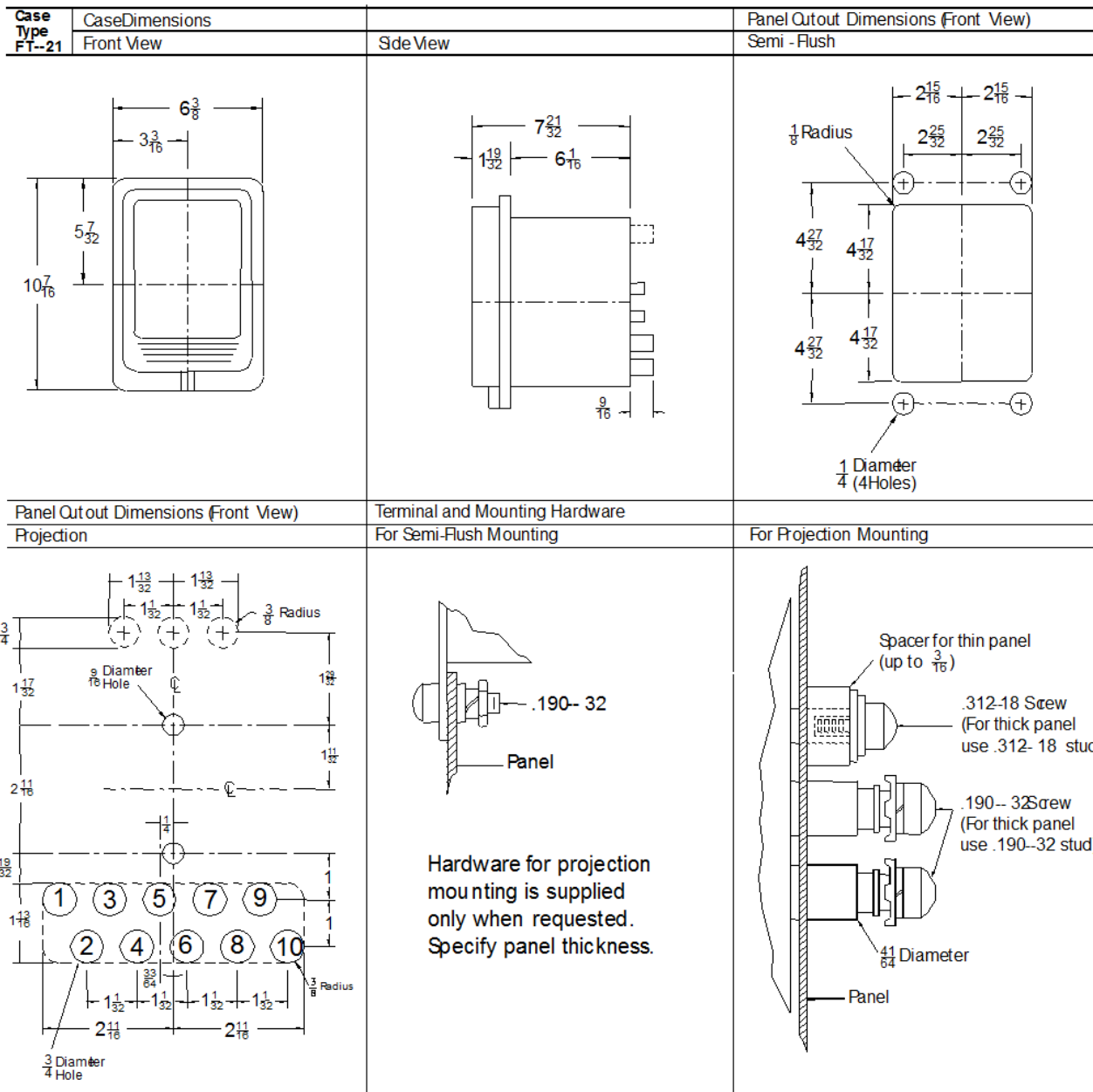
NOTICE

Cases with the terminal block output are not recommended for projection mounting due to the panel area required to be cut out for output connector and terminal blocks.

Opening the test switches will disconnect the meter chassis from the case (and close incoming current circuits). Test clip leads can then be attached to test lugs (above each jaw on the chassis) and to the switches as required. Test plugs are also available (from ABB Inc. - Power Technologies, Coral Springs FL) to facilitate testing:

- FT Test Plug Enhancement, model # 1164046 - A 10-position plug for test using a separate supply source. Ten terminals bring out connections to a metering device between the case and the meter chassis only.
- Individual Circuit Current Test Plug, Style # 7B4618G04 - An individual current circuit test plug for inserting leads to an external metering device between the case and the meter chassis.

Figure 1. FT-21 case and mounting



Approximate Unit Weight: 10 lbs. (4.6 Kg)

Approximate Shipping Weight: 12 lbs (5.6 Kg)

Interface Connections

It is the user's responsibility to apply the correct interface connectors, wired properly, to use the communications features supplied per the figures listed in Table 1-1, Table 1-2, and Table 1-3.

Table 1-1, Table 1-2, and Table 1-3 are included for reference only and are to be used to identify the relay and communication options supplied on a given meter and associate the meter with the particular figures that indicate the terminal block number for the output signals.

To determine the options supplied on the removable switchboard chassis, refer to the style coding in the upper left corner of the nameplate. For the A3 ALPHA meter the style coding begins with ZD and for the ALPHA Plus meter the style coding begins with ZQ (Fields 1 and 2). Counting from left to right for the ALPHA Plus meter, the seventh character field indicates the output option and the eighth character field indicates the communications option. Counting from left to right for the A3 ALPHA meter, the sixth character field indicates the output option and the seventh and eighth characters indicate the communications options.

Table 1-1. Relay output options

ALPHA Plus—field 7 A3 ALPHA—field 6 Value	Output option	See
1	1 relay (KYZ)	Figure 5
3	2 relays	Figure 6, Figure 7
4	4 relays	Figure 6, Figure 8
6	6 relays	Figure 6, Figure 9

Table 1-2. ALPHA Plus Communications options

Field 8 Value	Communications option	See
0	none	Figure 5
D	internal modem	Figure 6, Figure 12
E	RS-232	Figure 6, Figure 10
F	RS-485	Figure 6, Figure 11
G	internal modem (with outage reporting battery)	Figure 6, Figure 12
P	internal modem & RS-485 (line sharing)	Figure 6, Figure 12, Figure 11
Q	internal modem (with outage reporting battery) & RS-485 (line sharing)	Figure 6, Figure 12, Figure 11

Table 1-3. A3 ALPHA Communications options

Fields 7 and 8 Value	Communications option Comm 1	Comm 2	See
00	none	none	Figure 6, Figure 5
D0	internal modem	none	Figure 6, Figure 12
G0	internal modem (with outage reporting battery)	none	Figure 6, Figure 12
E0	RS-232	none	Figure 6, Figure 10
F0	RS-485	none	Figure 6, Figure 11
DE	internal modem	RS-232	Figure 6, Figure 12, Figure 10
DF	internal modem	RS-485	Figure 6, Figure 12, Figure 11
GE	internal modem (with outage reporting battery)	RS-232	Figure 6, Figure 12, Figure 10
GF	internal modem (with outage reporting battery)	RS-485	Figure 6, Figure 12, Figure 11
T4	Ethernet MODBUS protocol		Figure 13
T5	Ethernet DNP protocol		Figure 13
T6	Ethernet C12.21 protocol		Figure 13

Communications Cables

The connection between the FT case terminal blocks and the RS-232 and RS-485 devices is accomplished with a user-supplied cable. The cable terminal leads connect to the FT terminal blocks as shown in Figure 6, Figure 10, and Figure 11.

The connection between the FT case terminal blocks and the internal telephone modem is accomplished using an Elster-supplied communications cable (Style 4074B31G02) [see Figure 6 and Figure 12]. The opposite end of the 4-conductor cable is terminated in a modular plug which is connected to a standard USOC RJ-11C modular jack or to another connector as required.

RS-232 option

A meter with an RS-232 option provides RS-232 signals to the FT case terminal block as described in Figure 10. The user must provide the appropriate cable for connecting to the RS-232 device.

RS-485 option

A meter with an RS-485 option provides RS-485 signals to the FT case terminal block as described in Figure 11. The user must provide the appropriate cable for connecting to the RS-485 device.

Ethernet

A meter with an Ethernet option provides signals to the FT case terminal block as described in Figure 13. The user must provide the appropriate cable for connecting to the RJ-45 connector.

Internal Modem option

Referring to Figure 12, connect the red lead of a supplied communication cable to the FT case terminal block position terminal 42 (Ring), and connect the green lead to the terminal block position terminal 43 (Tip). The remaining black and yellow leads of the communications cable are not used and can be removed by cutting each lead near the outer insulating sheath. The conductive component of the unused black and yellow leads should not be allowed to come into contact with each other or any electrically conductive surface. The opposite end of the communication cable is terminated with a modular plug for connection to a telephone company provided USOC RJ-11C modular jack.

Operation & Maintenance

For information about operating the ALPHA Plus or A3 ALPHA switchboard meter, see the ALPHA Plus Meter Technical Manual or A3 ALPHA Meter Technical Manual.

The switchboard meter is largely maintenance-free, with the exception of the battery used on some styles. A 3.6 volt lithium battery is used in conjunction with a supercapacitor to maintain real time clock operations of the ALPHA Plus and A3 ALPHA meters during power interruptions. The projected carryover of the battery is a minimum of five years at 25 °C. When the battery discharges below a set level, a low battery warning (F000001) appears as part of the display sequence. (For more information, see the appropriate technical manual for your meter.)

▲ WARNING

Do not attempt to replace the battery while the unit is powered. Doing so could expose you to dangerous voltages, resulting in equipment damage, personal injury, or death. Remove the meter chassis from the case before disassembling the meter.

Replacing the time-of-use clock battery

To replace the 3.6 volt lithium battery:

1. Ensure that the meter chassis is removed from the case.
2. With the front of the electronic assembly exposed, grasp the battery and pull it straight out of the battery well.
3. Unplug the battery wire from the socket on the face of the electronic assembly.

⚠ CAUTION

The switchboard meter must have been powered within an hour prior to installing the 3.6-volt lithium battery. If the 3.6-volt lithium battery is installed on a switchboard meter that has not been powered within the last hour, the switchboard meter may not operate correctly and the battery may be prematurely discharged.

4. Plug the new battery in the socket and place the new battery in the battery well.
5. Replace the switchboard meter chassis in the case.
6. Close the metering switches and install the cover.
7. If you like, you can use Elster Electricity meter support software to reset the power outage log.

Replacing the outage reporting battery

The optional internal modem with outage reporting capabilities has a lithium battery present to provide energy for modem operation during a power outage.

To replace this modem battery:

1. Ensure that the meter chassis is removed from the case.
2. Grasp the electronic housing assembly, rotate the assembly counterclockwise to detach it, and expose the CT housing with the modem battery.
3. Remove the battery lead assembly connector from the internal modem assembly.
4. The modem battery is located in the CT housing battery well and has adhesive on each side to hold it in place during shipment. Use a thin-bladed screwdriver tip to dislodge the adhesive. The battery can then be removed from the CT housing.
5. Replace with a new battery assembly by sliding the new battery in the CT housing battery well.
6. Plug the battery lead assembly connector into the internal modem assembly connector.
7. Replace the electronic housing assembly, rotating clockwise to lock into place.
8. Replace the meter chassis to the case, close the metering switches, and install the cover.

Wiring Diagrams

Meter Wiring

Wiring to the lower terminals on the rear of the FT-21 meter case is as shown in Figure 2, Figure 3, and Figure 4.

Figure 2. 3-phase, 3-wire (2-element equivalent)

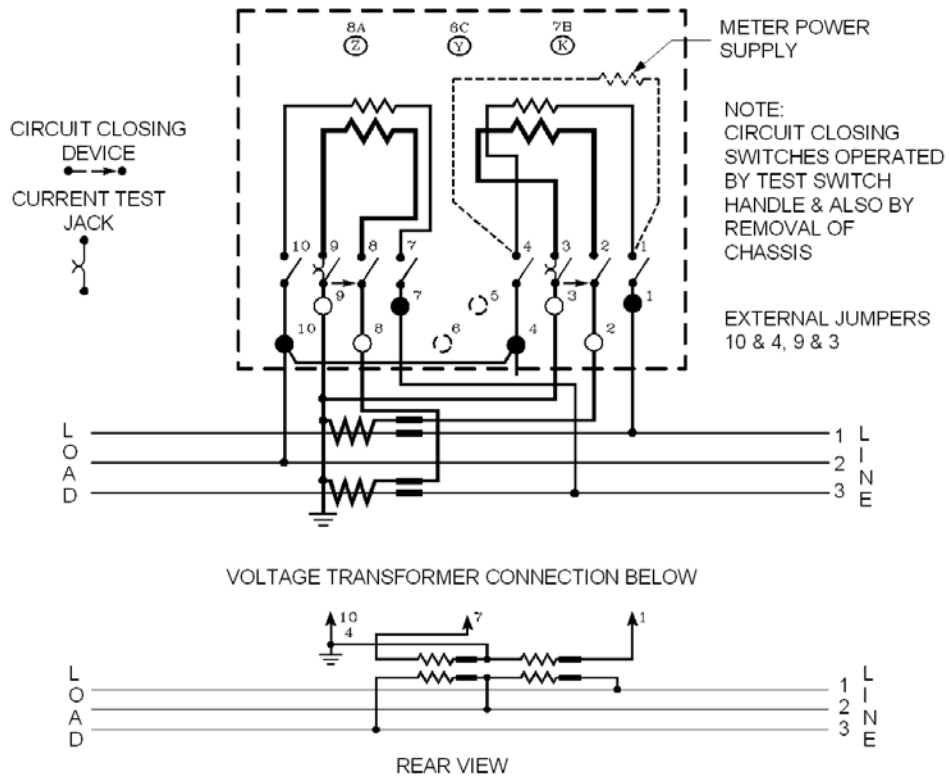


Figure 3. 3-phase, 4-wire Wye (2½ element equivalent)

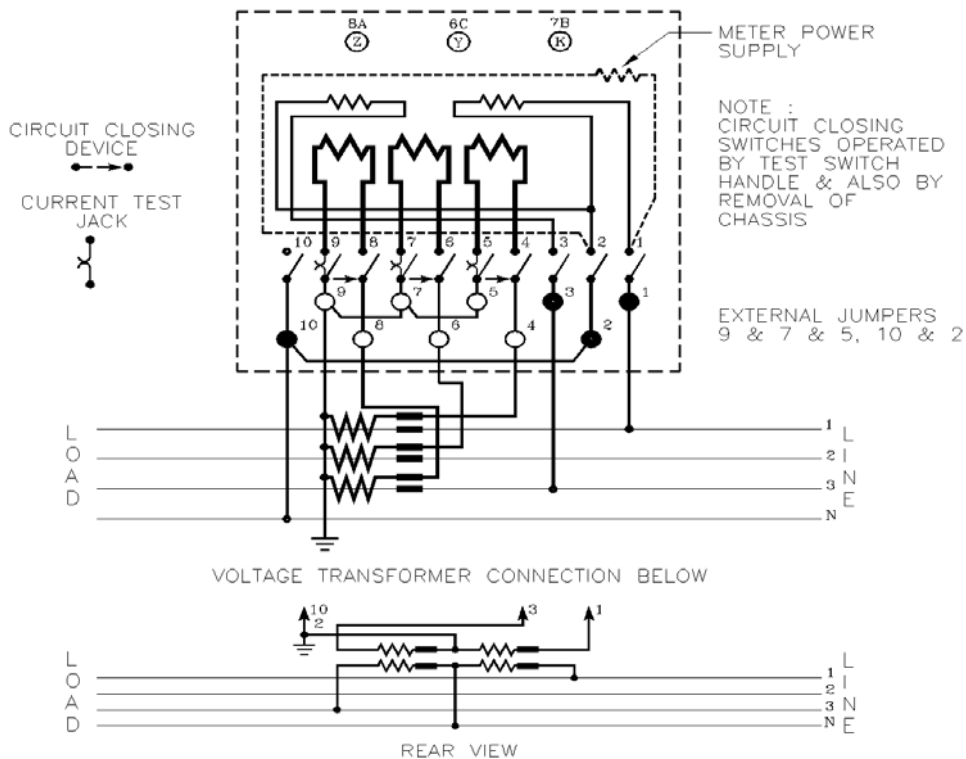


Figure 4. 3-phase, 4-wire Wye (3-element equivalent)

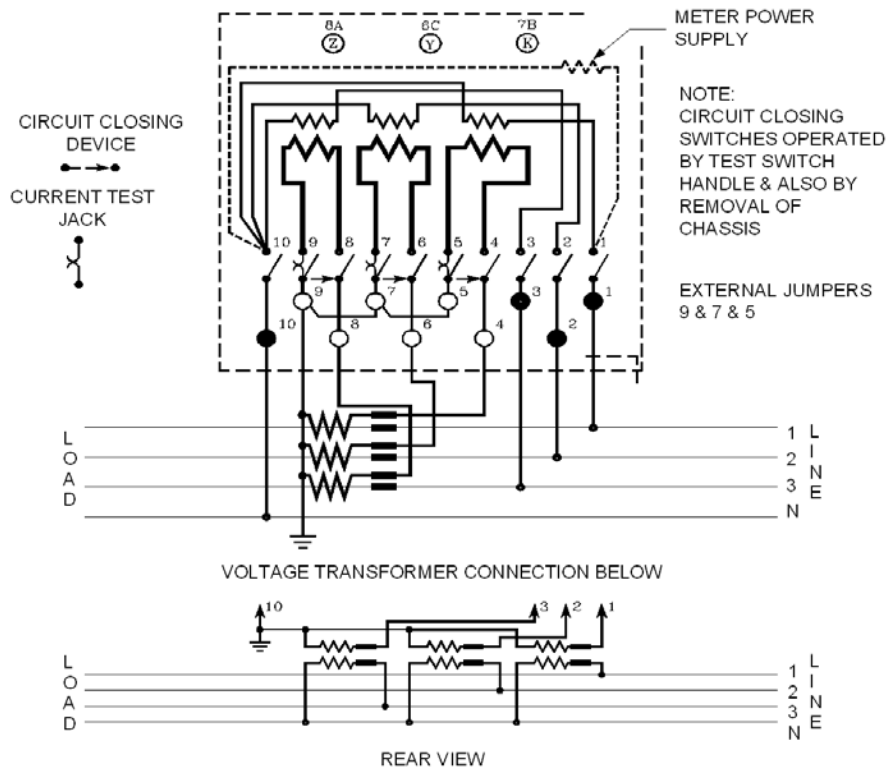


Figure 5. FT-21 case with single KYZ relay

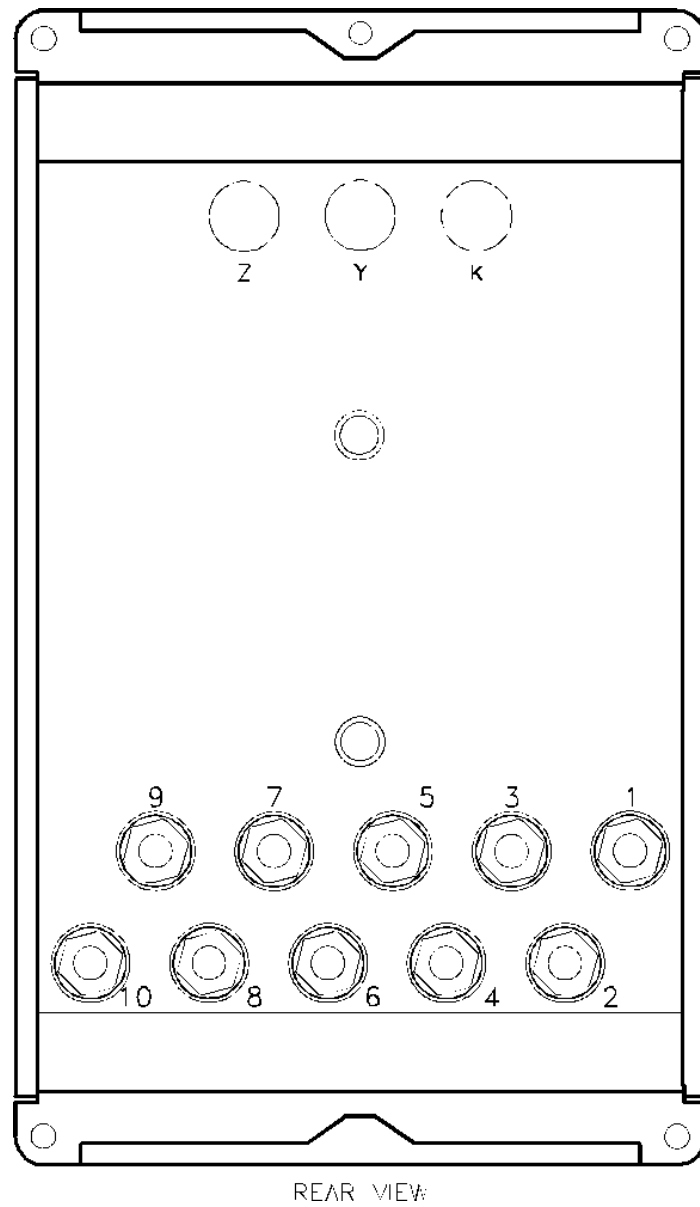
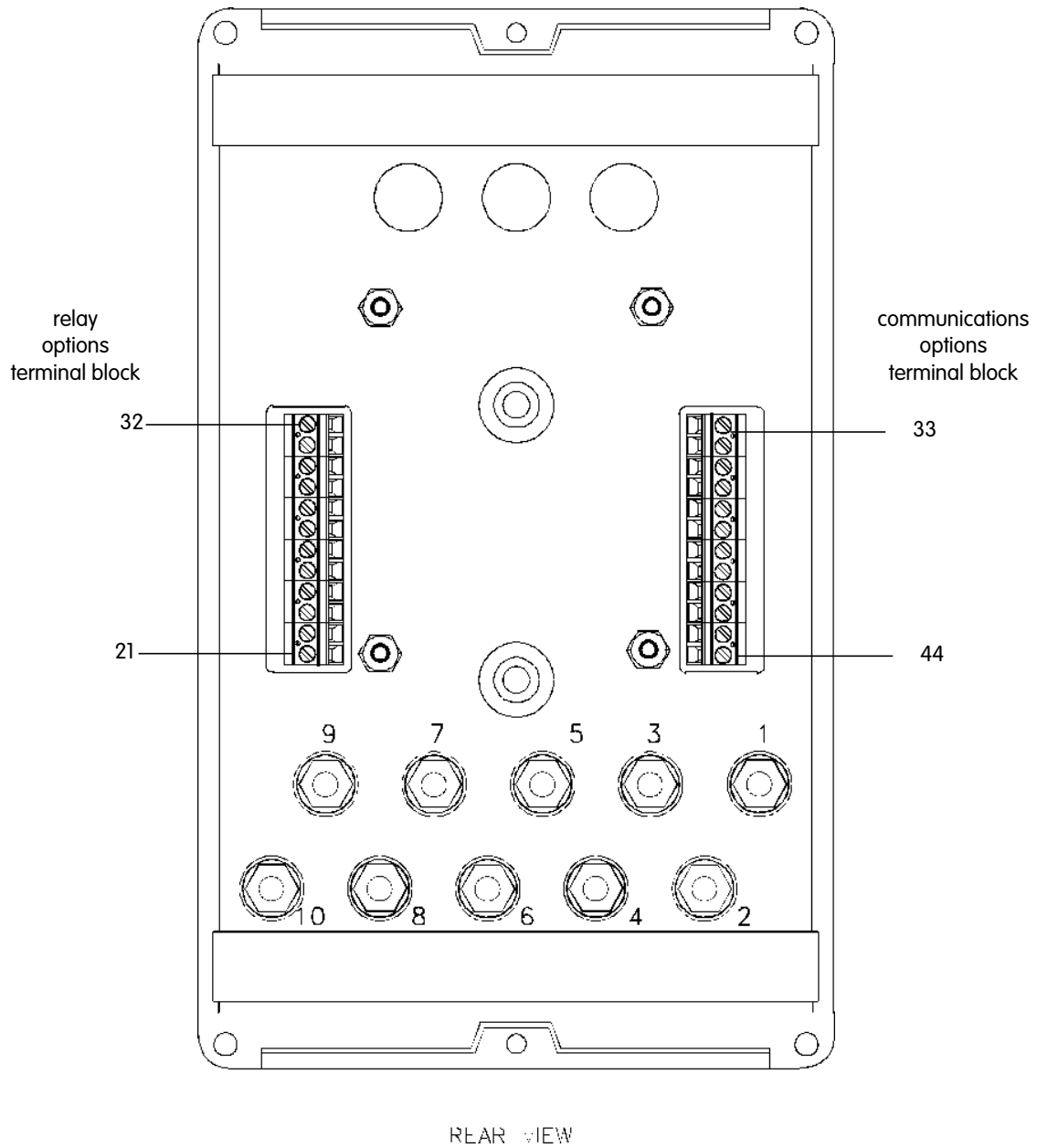


Figure 6. FT-21 case with terminal block outputs



The FT case terminals 21-44 support wire size 26-14 AWG.

Figure 7. 2 relays - terminal block number assignments

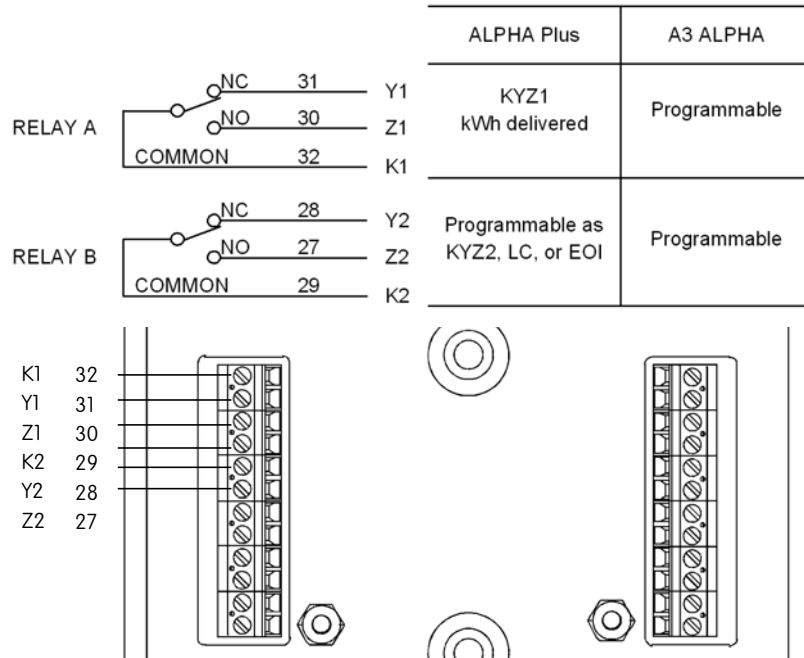


Figure 8. 4 relays - terminal block number assignments

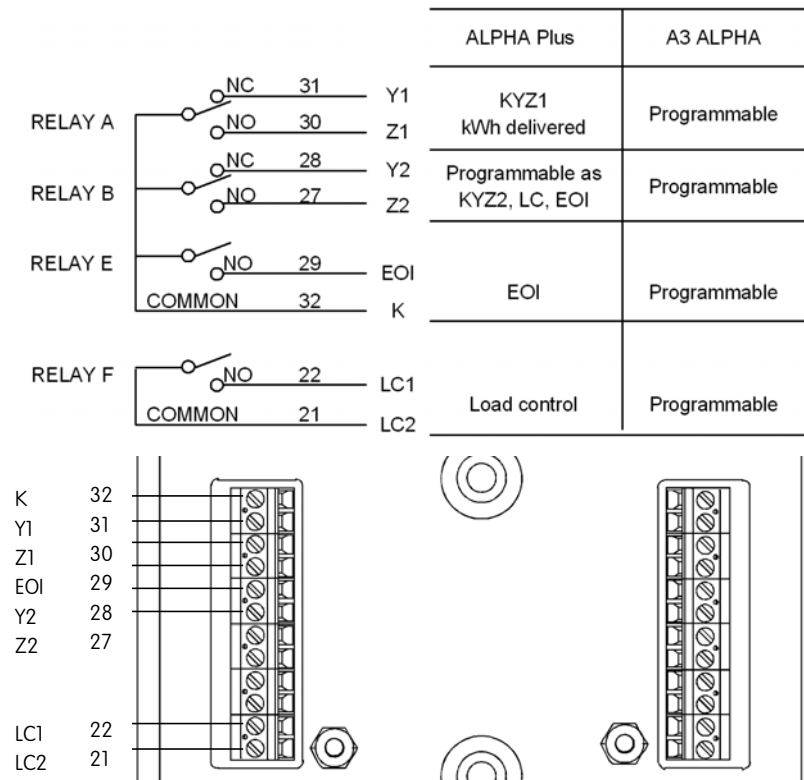


Figure 9. 6 relays - terminal block number assignments

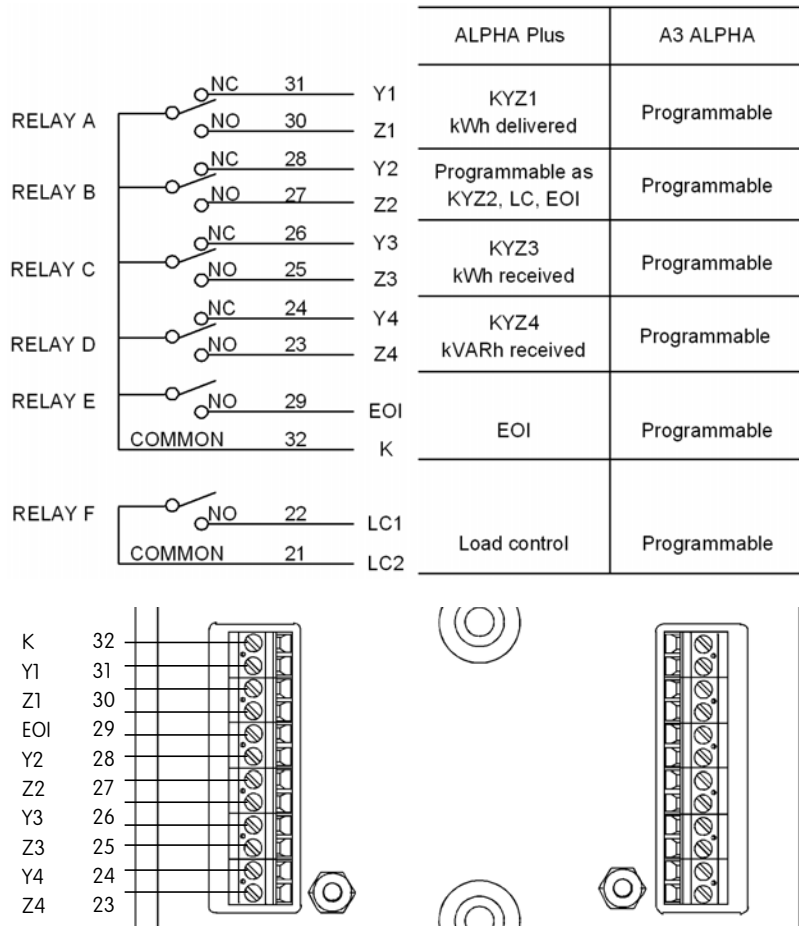
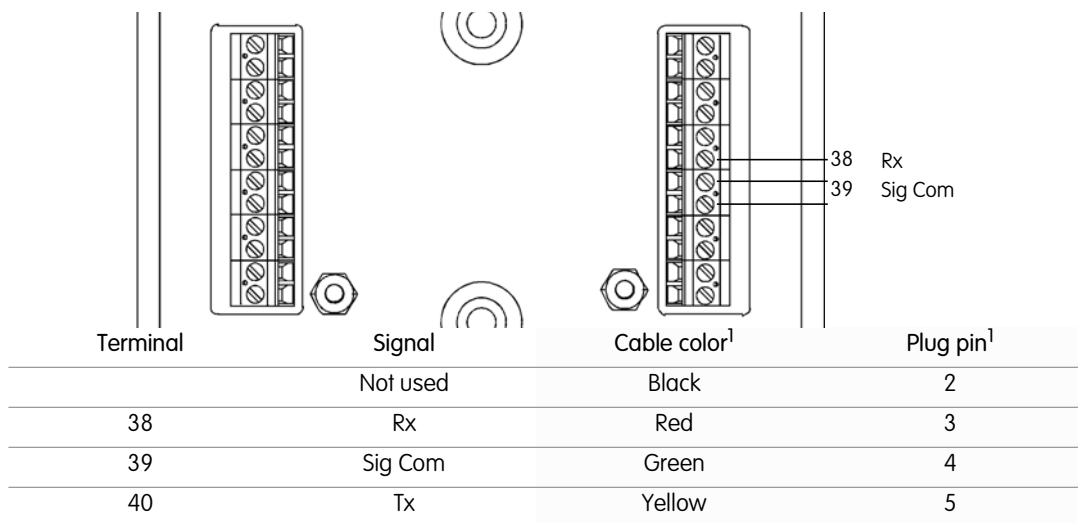
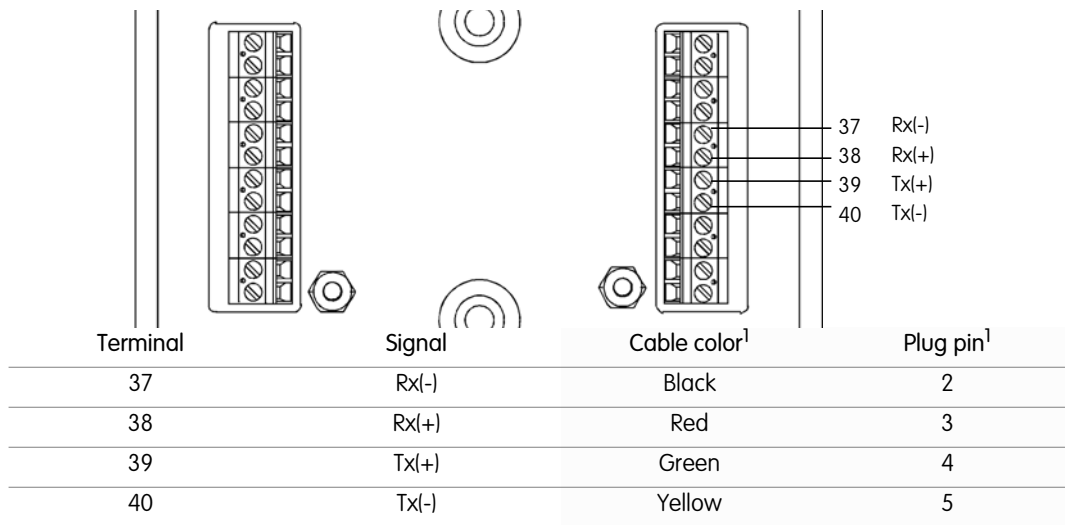


Figure 10. RS-232 option - terminal assignments



1. Cable not provided with FT-21 case. Color codes shown are Elster Electricity default wire colors for cables provided on S-base and A-base meters that terminate to an RJ-11 plug.

Figure 11. RS-485 option - terminal assignments



1. Cable not provided with FT-21 case. Color codes shown are Elster default wire colors for cables provided on S-base and A-base meters that terminate to an RJ-11 plug.

Figure 12. Internal Modem option - terminal assignments

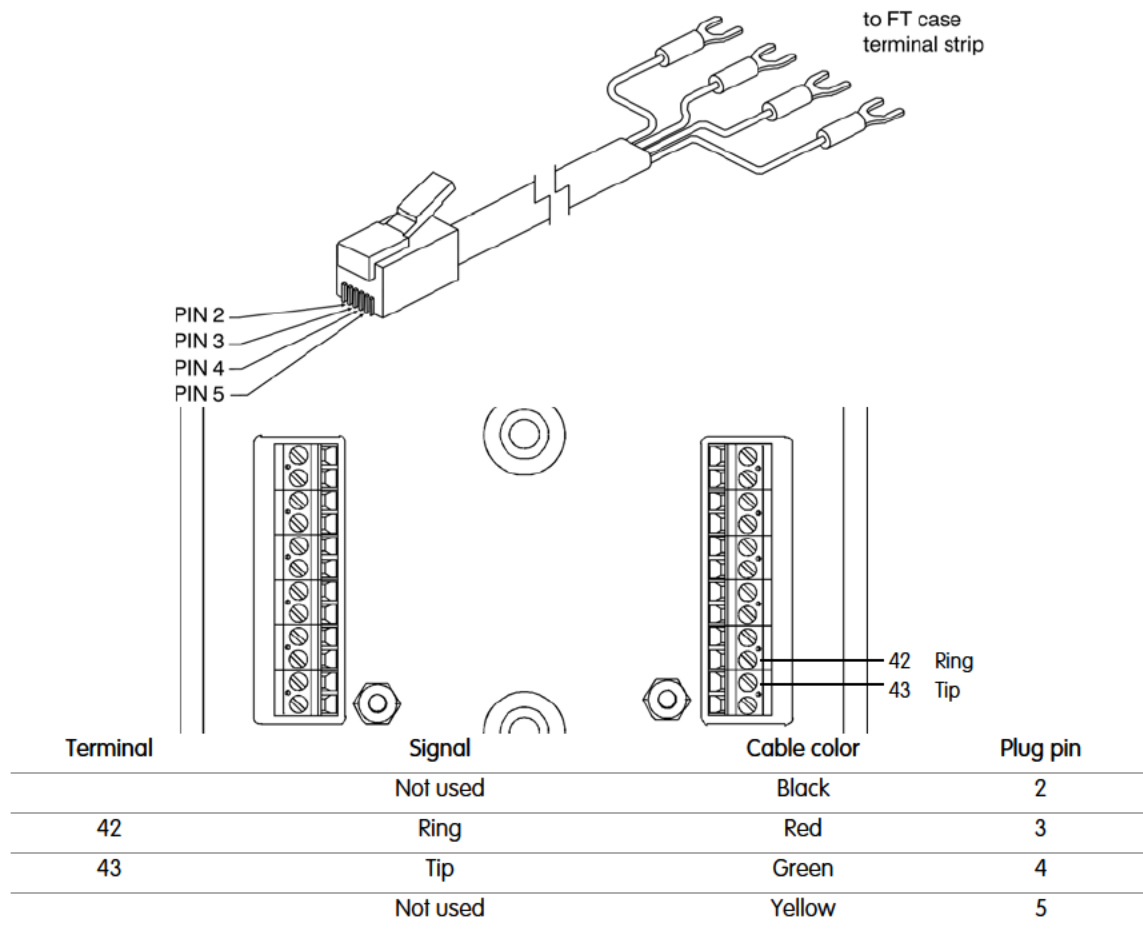
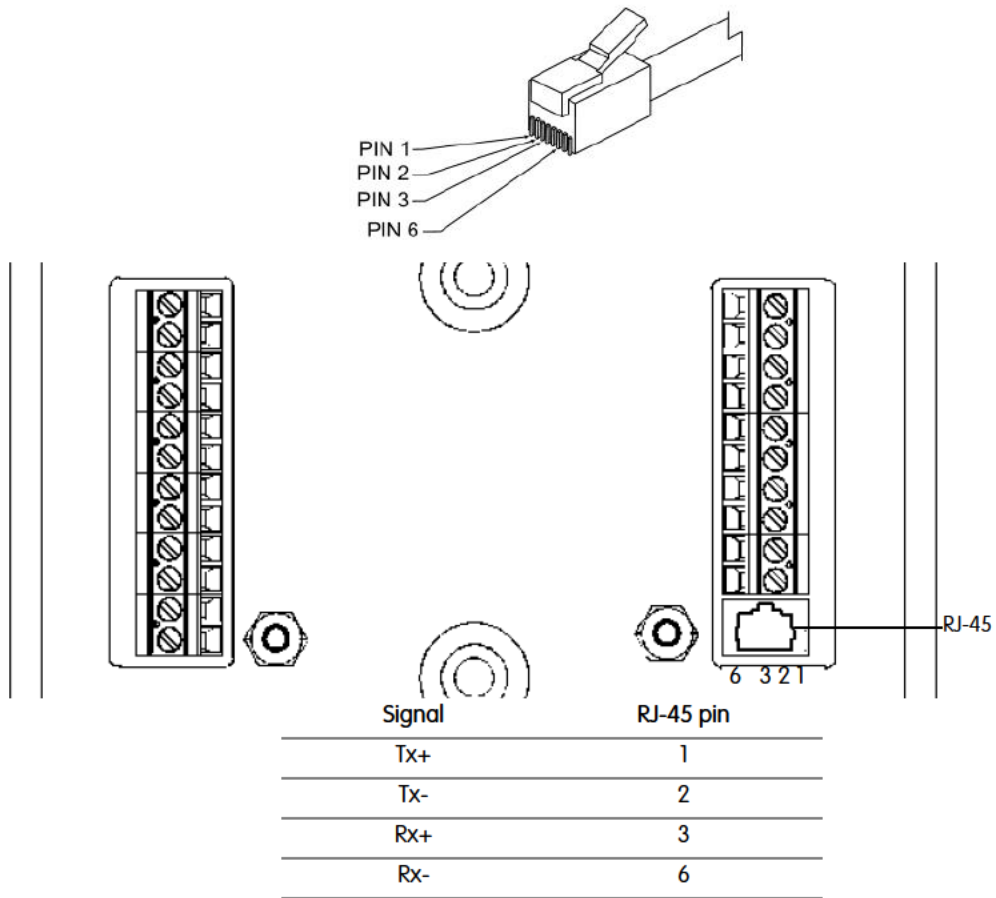


Figure 13. Ethernet option - terminal assignments



Customer Information

This device complies with part 15 of the FCC Rules. Operation is subject to the following 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 may cause harmful interference, in which case, the user is required to correct the interference at his or her own expense.

The ALPHA Plus and A3 ALPHA switchboard 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 RJ-11C 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 the 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 ALPHA Plus or A3 ALPHA switchboard 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 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 ALPHA Plus or A3 ALPHA switchboard meter with modem, for repair or warranty information, please contact Elster Electricity, LLC, RMR Department, +1 919 212 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 could void the user's authority to operate the equipment.

The ALPHA Plus and A3 ALPHA switchboard meters cannot be used on public coin telephone 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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