

Installation Guide

How to
Install and Commission
a Teleterm E3
Meter Concentrator



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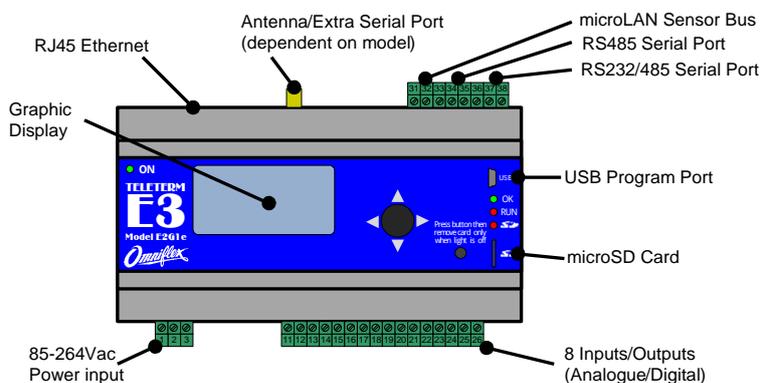
Scope

This document explains the steps involved in installing, configuring and commissioning a successful installation of a Teleterm E3 Meter Concentrator module with a range of meter types.

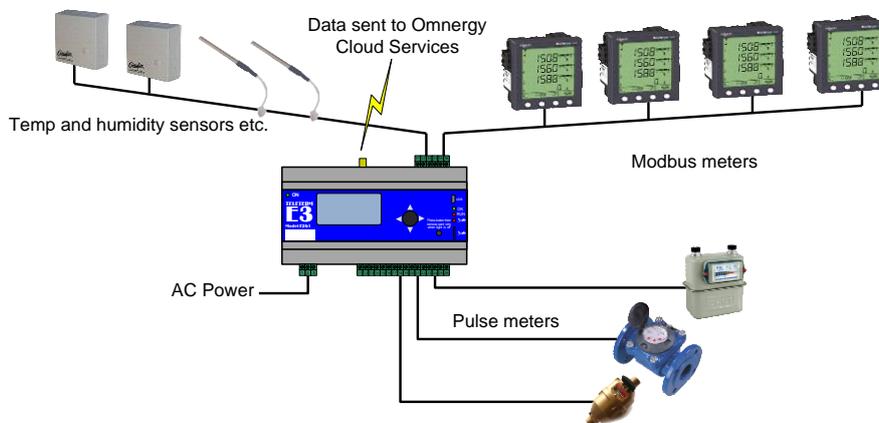
<i>Revision</i>	<i>Date</i>	<i>Description</i>
1	04/09/14	Initial Release
2	07/12/14	Updated with latest version information
3	19/04/17	Updated to E3

1 What is a Teleterm E3 Meter Concentrator?

The Teleterm E3 Meter Concentrator is a DIN rail mounted module that collects data from a range of utility meters (e.g. water, gas, electricity, air and steam) on a site, and sends the readings to the Omnergy cloud server, where the meter data is stored and presented in easy-to-access format to users from any web browser.



The Teleterm E3 can connect to up to 8 pulse output meters, 32 Modbus Meters, and 16 microLAN sensors.



2 Getting Started

This practical guide will lead you through the steps required to successfully install the Teleterm E3 Meter Concentrator module.

This guide is divided into the following sections:

1. Installing the Teleterm E3 in your panel.
2. Connecting, configuring and testing pulse output meters
3. Connecting, configuring and testing Modbus meters.

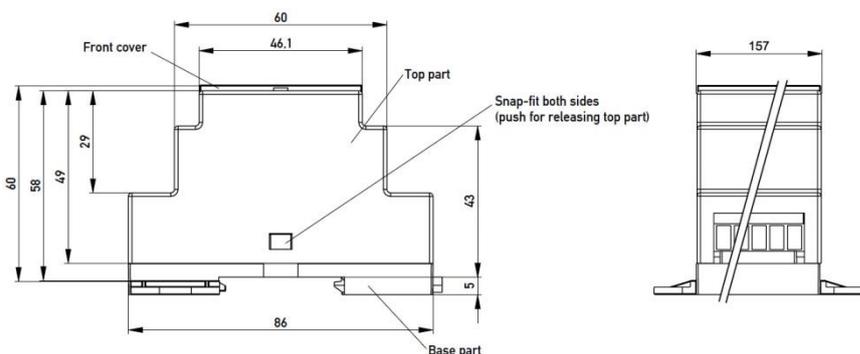
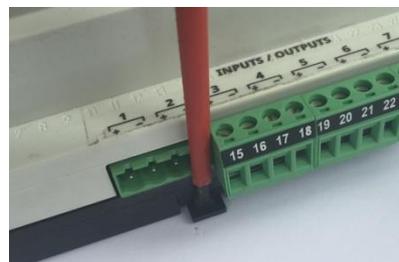
3 Installing the Teleterm E3 in your panel

3.1 Clip the Teleterm E3 to the DIN rail

The Teleterm E3 mounts on to a 35mm DIN rail.

The Teleterm E3 is best mounted in a distribution board or separate enclosure with the front panel accessible for viewing and configuring the unit without the need for a licensed wireman to gain access, and without the need to switch off the panel.

Remove input terminal strip 11-14 (IO1 and IO2) for better access to the DIN rail mounting clip if required.



3.2 Connect the GSM Antenna (Model E3G1 or E3G2 only)

The Teleterm E3G communicates with the Omnergy cloud servers via the GSM mobile phone network.

Mobile phone reception is therefore required where the Teleterm E3G is located.

In this case, the short “stubby” antenna supplied can be connected directly on to the unit as shown below.

If mobile phone reception is poor where the Teleterm E3G is located, then a remote antenna must be installed where reception is adequate.

Please contact Omniflex for details and availability of remotely mounted antenna options.



3.3 Connect AC Power

The Teleterm is powered from a 110-240Vac power source.

Connect power to terminals 1,2,3 as shown.



4 Connecting, configuring and testing pulse output meters

The Teleterm E3 can accept up to 8 pulse output meters. The Teleterm E3 will count the pulses from the meter, scale each pulse into the correct unit of measure, and send the readings periodically to the Omnergy cloud servers for logging and display.

4.1 Connect up to 8 pulse meters

Connect each pulse meter output to one of the 8 inputs using a two core cable. Twisted pair cables are recommended to reduce the incidence of electrical noise inducing false counts on the inputs.

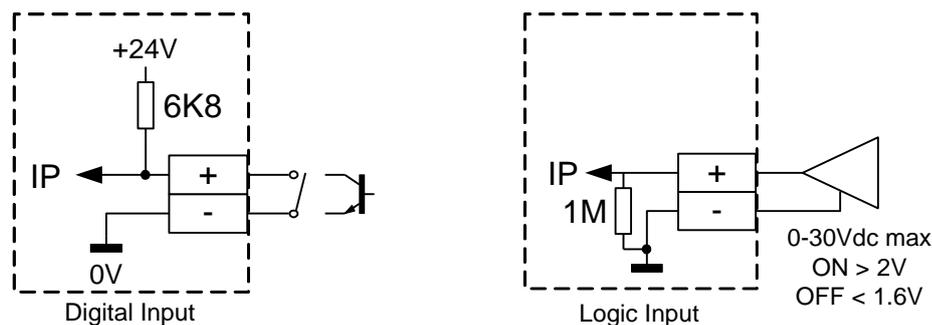
Two types of pulse input are accepted by the Teleterm E3:

- Dry mechanical contact / NPN Transistor Switch inputs,
- Logic voltage inputs.

The Teleterm E3 is shipped with the inputs set as Digital Counter Inputs as default. If Logic Voltage inputs will be used then the relevant inputs must be reconfigured using the Omniset configuration software.

NOTE: The polarity of the connection is important for Transistor switch and Voltage inputs.

Connect each as shown below:



4.2 Configure Pulse Values

As shipped from the factory each counter input is set up to increment 1 count per pulse from the meter.

Pulses from meters generally have a different measure per pulse. For example, the popular Elster V100 water meter has a pulse output of 1 pulse per 5 litres.

Each Teleterm E3 counter input can be scaled into the correct unit of measure using the free Omniset configuration software package.

Each input can be scaled using two factors. A multiplication factor and a division factor.

$$\text{Reading} = \text{Counts} \times \text{Multiplication Factor} \div \text{Division Factor}$$

Each factor can be in the range -32768 to +32767.

Example:

To scale an Elster V100 meter pulses into litres (5 litres per pulse), you would set the multiplication factor to 5, and the division factor to 1.

If you want scale the reading to kilolitres, you would set the multiplication factor to 5 and the division factor to 1000.

If you wish to set the Teleterm E3 internal counter to match the meter's absolute display value, then this can also be done using the Omniset software utility.

4.3 Testing the accuracy of pulse meters

To ensure that each pulse input is working correctly and properly scaled, two readings must be taken a significant time apart, so that at least 100 pulses have been counted, and the results compared with the display on the meter.

This consumption test is typically done over a one month period.

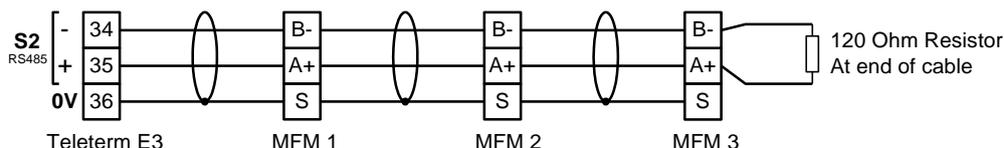
1. Read the meter at the beginning and the end of the test period, and record the date and time of the readings.
2. Subtract the start reading from the end reading on the meter to get the consumption.
3. Subtract the start reading from the end reading on the Teleterm E3 (or on the Omnergy web site) at the same dates and times to get the consumption recorded by the Teleterm and Omnergy website.
4. Compare the two consumption readings. These two readings should be within 1% of each other if at least 100 pulse counts were counted.

5 Connecting, configuring and testing Modbus Meters

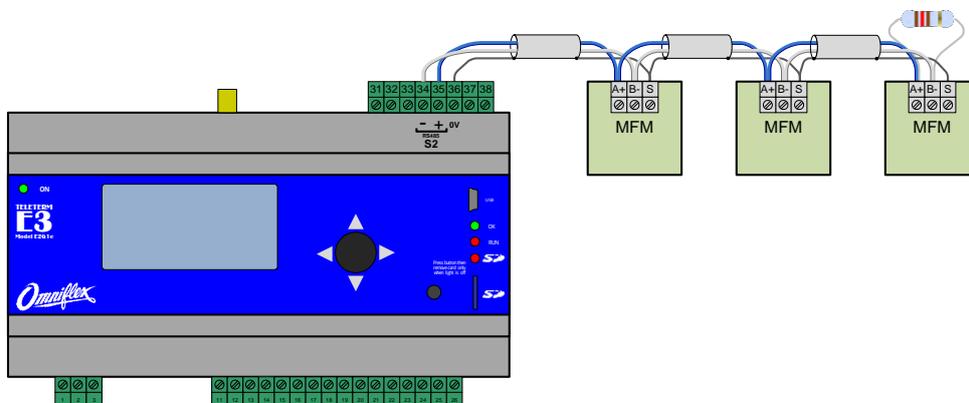
The Teleterm E3 can read up to 32 Modbus meters. The Teleterm E3 uses RS485 two wire communications set to Modbus RTU protocol at 9600 baud on Serial Port S2.

5.1 Connect the Modbus Network Cable

- 5.1.1 Each Modbus meter must be wired together into a “Modbus Network” as shown in the diagrams below.



- 5.1.2 The meters must be connected in a ‘bus’ or ‘daisy chained’ configuration with no spur connection longer than 5 metres.
- 5.1.3 Cable routing for the Modbus network should be selected to minimise the total length of the Modbus cable. Total cable length should be 300m maximum.
- 5.1.4 The Modbus network must never be looped back to the start point.



- 5.1.5 The Modbus network cable must be RS485 compliant cable. The following two manufacturer’s cables are approved:
 1. Olex Data Cable RS485 Single Pair screened – Product Code JD1PS485A3
 2. Belden Data Cable RS485 Single Pair screened – Belden Type 9841
- 5.1.6 The drain wire (shield) shall be continuous to the end of the Modbus loop and must not be earthed other than at the Teleterm E3 on the 0V terminal. If the Multi-Function Meter being used does not provide a screen terminal, then the screens should be joined in the cable (not earthed).

- 5.1.7 The end of the Modbus Network must be terminated with a 120 ohm 0.5W, 5% resistor.
- 5.1.8 It is recommended that the network installation be made to facilitate ease of maintenance by providing terminations at the entrance to each Distribution Board or panel to allow each panel to be isolated from the network for diagnostic purposes.

5.2 Configure each Modbus Meter Communications

Each Modbus meter must be configured in the meter settings for operation on the Modbus network. Consult the instruction guide for the specific meter you are using to learn how to set the following parameters:

- 5.2.1 The Modbus Communications must be set to the following:

Modbus RTU Protocol (8 Data bits, 1 Stop Bit)
9600 baud
No Parity

(Note: Modbus RTU mode and number of data bits are not normally settable in most meters as this is the only mode in which the meter can operate).

- 5.2.2 The Address of each meter must be set sequentially from 1 upwards.

Meter addresses should be allocated logically according to the physical layout of the meters on the switchboards. This makes the meters easier to find during fault finding.

It is recommended that a master list of meters with their description and Modbus addresses is prepared. A sample meter list is included in the Appendix of this Installation Guide as FORM A.

- 5.2.3 Send this Master Meter List to Omniflex to complete the configuration of the Omnergy website.

5.3 Configure CT Ratios in each Energy Meter

NB: PAY SPECIAL ATTENTION TO THIS STEP

Errors in this step are the single biggest cause of problems on new installations, because it is very difficult to detect when CT ratios are set incorrectly.

Common causes of error are:

1. CT Ratio of the CT used does not match the CT ratio specified in the design documents (and used to configure the meter).
2. CT Ratio of the CT does not match the CT ratio programmed in the meter.
3. CT phases are mixed up causing meter to run "backwards".
4. CT wires are swapped causing negative current to be measured.

To prevent these problems, a simple configuration and test procedure is recommended.

FORM B – CT Ratio Tests is provided in the Appendix to assist in following this procedure:

- 5.3.1 Physically verify the CT ratio written on the CT attached to the energy meter.
- 5.3.2 Set the CT ratio and Voltage parameters etc in the meter accordingly. Consult the instruction guide for the specific meter you are using to learn how to set the CT ratio etc.
- 5.3.3 Check the CT ratio is set correctly by measuring the actual load current with a clamp meter and check that the meter reading matches.
- 5.3.4 Record the verification and test steps on the FORM B provided as a record of work undertaken.

5.4 Record all Meter Readings

As a final step in the commissioning of the system, a full set of meter readings must be taken directly from the meters. These will be used by Omniflex to verify that the configuration of the Omnergy website has been completed correctly, and that meter readings displayed on the website match the actual meter readings on the meters.

For energy meters with multiple values, only kWh is required as verification.

- 5.4.1 Before taking readings, ensure with Omniflex that all meter readings are being successfully transmitted to the Omnergy website.
- 5.4.2 Visit each meter, read the meter reading, and record the reading on the FORM C – Readings sheet provided in the Appendix of this Installation Guide. The date and time that the reading is taken must also be recorded.
- 5.4.3 Send this test sheet to Omniflex. Omniflex will check that the readings being displayed on the website match the actual readings observed.

APPENDIX

Use these forms to assist in the installation and commissioning process.

FORM A – Master Meter List

Use this form to make a reference list of all meters in the system.

FORM B – Current Transformer Test Results

Use this form to verify all Energy Meter CT ratios by inspection and testing.

FORM C – Meter Reading Results

Use this form to record all meter readings once commissioning is complete.

Lifetime technical support for all Omniflex products is available by email on techsupport@omniflex.com.

Alternatively, you can check the knowledgebase on the Omniflex web site at www.omniflex.com.

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