

# TED Pro ENERGY MONITORING AND CONTROL SYSTEM

## SINGLE AND THREE-PHASE ELECTRICAL SERVICES WORLDWIDE

### OVERVIEW

The TED Pro Energy Monitoring and Control System is a state-of-the-art system for use in residential, commercial and government buildings and small industrial complexes. The system allows the user to monitor energy usage, thereby managing energy use through awareness of energy use and costs. Energy use and alerts can be presented on a custom display, computer, over the Internet, on mobile devices or by text or email messages. Colored LEDs alert the user to rate-tier changes, high demand, cost or other user-defined parameters.

The system is designed to work on any single or 3-phase electrical system anywhere in the world and is compatible with numerous energy or demand-rate billing systems, including fixed, time-of-use, step/tiered, seasonal, demand, or any combination of those mentioned. The system also accommodates taxes, fixed charges, and fuel surcharges to accurately reflect the monthly electric bill.

The basic system consists of an MTU and an ECC, descriptions of each follow below.

The Measuring Transmitting Unit (MTU) measures the energy consumption, demand, voltage, current, and power factor. We offer three types of MTU depending on the requirements of your electrical system:

- **MTU Pro** is designed for 3-phase systems in small-to-medium size commercial, institutional and industrial environments. It is suitable for any 3-phase system up to 5000A, 600V. It has two options for data-communication between MTU and ECC: **PLC or Ethernet**.
- **MTU Lite** is designed for 3-phase wye systems in small business applications where maximum amperage is 200A and maximum voltage is 277V. It is also ideally suited for residential occupancies with 3-phase services, common in some parts of Europe and South America. Data communication between MTU and ECC is via PLC.
- **MTU Home** is designed for single-phase residential and small commercial use with a maximum amperage of 400A and 240V. Data communication between MTU and ECC is via PLC.

The MTU is generally located at the main electrical panel and transmits the information collected over the building's existing electrical wiring, using a state-of-the-art Power Line Carrier communication (PLC) to an ECC which receives and interprets the data. Multiple MTUs can be used to give individual measurement of panels or loads. For systems with solar, wind or other alternative generation, TED will provide the user consumption, generation and net usage.

The Energy Control Center (ECC) is the communication hub for the system. It receives raw energy-use data from the MTU(s), interprets the data and calculates the current energy cost, cost today, month-to-date, etc. The ECC can be configured to communicate with mobile devices, computers, networks, thermostats, and load control devices via Ethernet, PLC, or WiFi. System can be configured to send text or e-mail alerts using the free TED Advisor feature.

Multiple ECCs in multiple locations can be monitored and compared via the Internet using TED's proprietary TED Commander software.

System and Utility Rate setup is quick, easy and intuitive using our setup wizards.

To this basic system can be added numerous options:

- Multiple MTUs can be added to separately measure various loads or generation.
- **TED Spyder** – The Spyder mounts in, or beside the electrical panel and is connected to the MTU. The Spyder records detailed usage of up to 8 single or multi-phase circuits. These individual readings are

stored in the ECC for display. Each TED system can support up to 4 MTUs and 4 Spyders, thus monitoring up to 36 separate, individual loads.

- Multiple systems can be used and the data aggregated at a central location.
- Communication Modules. ECC includes two USNAP ports, an Ethernet and USB port.
  - o WiFi modules – Allow wireless communication with a router or other WiFi-enabled device.
  - o ZigBee modules – Allows communication with Smart Meters, Smart Thermostats and other ZigBee-enabled devices.
- Smart Thermostats
  - o WiFi or ZigBee-based

**ECC (Energy Control Center)**



**MTU Pro**



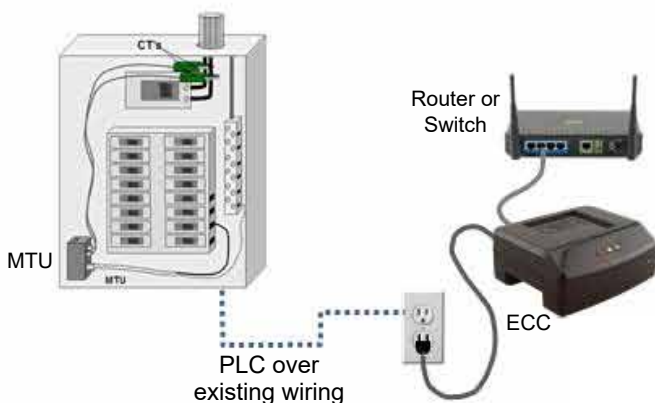
**MTU Lite / MTU Home**



**Spyder**



## How TED Works



# TECHNICAL SPECIFICATIONS

Measuring Transmitting Units (MTUs)			
	Pro	Pro Lite	Pro Home
<b>Types of Services</b>			
Single-phase 2-Wire or 3-Wire	Yes	Yes	Yes
3-phase 4-Wire Wye	Yes	Yes	No
3-phase 3-Wire Delta	Yes	No	No
3-phase 4-Wire Hi-leg Delta	Yes	No	No
Frequency	50/60 Hz	50/60 Hz	50/60 Hz
Maximum Voltage - Phase/Phase	600 V	n/a	n/a
Maximum Voltage - Phase/Neutral	347 V	277 V	240 V
Minimum Voltage	180 V	95 V	95 V
Maximum Current - per phase	5000A *	200A	400A**
Maximum Wire Size	500 MCM (23mm OD)*	4/0 AWG (15mm OD)	4/0 AWG (15mm OD)
Voltage Measurement	Voltage Divider Circuit	Voltage Divider Circuit	Voltage Divider Circuit
Current Measurement	400A:3V Split-Core CTs	200A:1.5V Split-Core CTs	200A:1.5V Split-Core CTs
Operating Temperature	$-40^{\circ}\text{C} < T_A < +50^{\circ}\text{C}$	$-40^{\circ}\text{C} < T_A < +50^{\circ}\text{C}$	$-40^{\circ}\text{C} < T_A < +50^{\circ}\text{C}$
Energy Measurement and Calculations	ADE 7854ACPZ	Cirrus CS5461A	Cirrus CS5461A
Overall Accuracy	*** Better than $\pm 2\%$	*** Better than $\pm 2\%$ 1-phase, $\pm 4\%$ 3-phase	*** Better than $\pm 2\%$
Measure and Transmit Energy	$\pm 1\text{W}$	$\pm 1\text{W}$	$\pm 1\text{W}$
Measure and Transmit Demand	$\pm 1\text{VA}$	$\pm 1\text{VA}$	$\pm 1\text{VA}$
Measure and Transmit Voltage	$\pm 0.1\text{V}$	$\pm 0.1\text{V}$	$\pm 0.1\text{V}$
Measure and Transmit Phase Currents	$\pm 0.01\text{A}$	$\pm 0.01\text{A}$	$\pm 0.01\text{A}$
Measure and Transmit Power Factor	$\pm 0.1\%$	$\pm 0.1\%$	$\pm 0.1\%$
Communication Interface	PLC / Ethernet	PLC	PLC
PLC System	Yitran IT700 System	Yitran IT700 System	Yitran IT700 System
Tested and Approved to:	FCC Part 15, UL916, CSA C22.2#205, IEC 61010-1		

\* Will measure up to 5000A with three 400A parallel feeds using additional CT sets. For systems over 1200A please contact TED Customer Service.

\*\* Will measure up to 400A with two parallel 200A using additional CT set or with optional 400A CT set.

\*\*\* From 1.5% to 100% of Full Scale

Data-Receiving Units	
	Energy Control Center (ECC)
Works w/ 3-phase & single phase MTU	Yes
Maximum Voltage Phase/Neutral	277 V
Minimum Voltage Phase/Neutral	95 V
Frequency	50/60 Hz
Cord Types Available	UL / EU / UK / AU
Operating Temperature	$+5^{\circ}\text{C} < T_A < +40^{\circ}\text{C}$
Communication Methods Available	PLC, Ethernet, Wifi, ZigBee
USB 2.0 Port	1

<b>Data-Receiving Device</b>	
	<b>Energy Control Center (ECC)</b>
USNAP 2.0 Port	2
Display Port	1
Compatible w/ ZigBee SE 2.0 smart meter	Yes
Accept Demand Reduction Request from Utility	Yes
Maximum number of MTUs on one system	4
Maximum number of Spydres on one system	4
Maximum number of Loads Measured	36
Power-on LED	Blue
Link Status LED	Green / Yellow
Transmit / Receive	Green / Red
Energy-Use Indicator Bar	Green / Yellow / Red

## OPERATIONAL SPECIFICATIONS

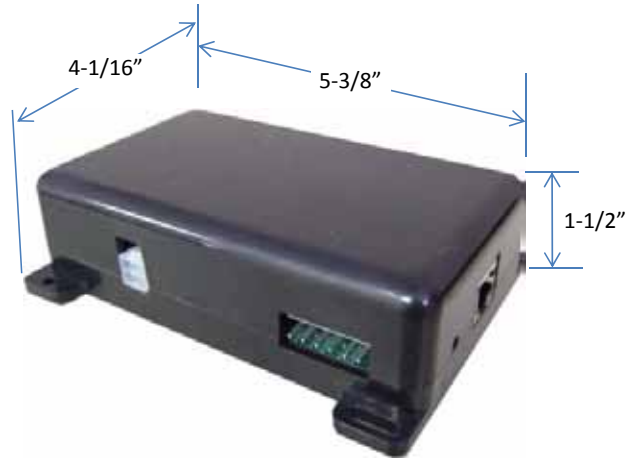
	<b>Energy Control Center (ECC)</b>
<b>Software</b>	
TED Footprints™ - Historical, Graphical, Profiling, TED Advisor, TED Commander	Included*
System and Utility Rate Setup	Wizard Setup
<b>Solar / Wind Generation</b>	
Display System Load	Yes
Display System Generation	Yes
Display Net Usage	Yes
<b>Data Display Options</b>	
Computer - TED Footprints™ Software	Yes
Desktop LCD Display	Yes
Wireless LCD Display	Yes
Mobile Phones or Pads	Yes
TED Commander - Aggregates data from multiple systems	Yes
Third Party Applications	Yes
<b>Data Storage / Display</b>	
Second Data	Every second for 1 hour
Minute Data	Every minute for 48 hours
Hour Data	Every hour for 90 days
Day Data	Every day for 2 years
Month Data	Every month for 24 years

	<b>Energy Control Center (ECC)</b>
<b>Rate Structures</b>	
Rates downloadable from Internet	Yes
Rates can be pre-programmed	Yes
Number of TOU Rates	4
Number of Tier/Step Rates	4
Critical Peak Rates	Yes
Weekend Rates	Yes
Holiday Rates (US and Canada)	Yes
Seasonal Rates (4 seasons)	Yes
Tier/Step within Seasons	Yes
Tier/Step within TOU periods	Yes
TOU Rates within Seasons	Yes
Demand Charges or Demand Penalties	Yes
Update Time	1 Second
<b>Optional Devices / Equipment</b>	
Wireless Display with Backlight/Battery	Yes
Smart Thermostats	Wifi or ZigBee
USNAP Modules	Yes - 2 (Wifi or ZigBee)
USB Dongle	Wifi or ZigBee

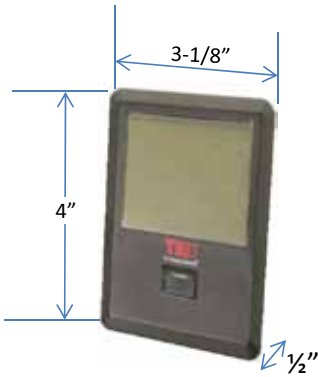
# TED Pro Series Dimensions



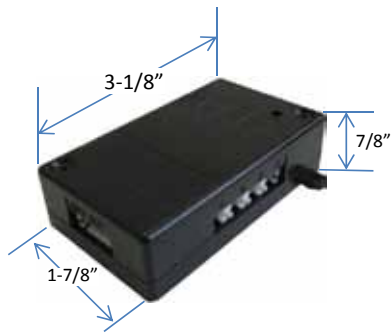
**ECC – Energy Control Center**



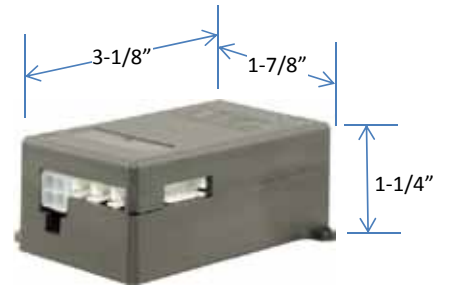
**Pro MTU and MTU-RC**



**Wired and Wireless Display**



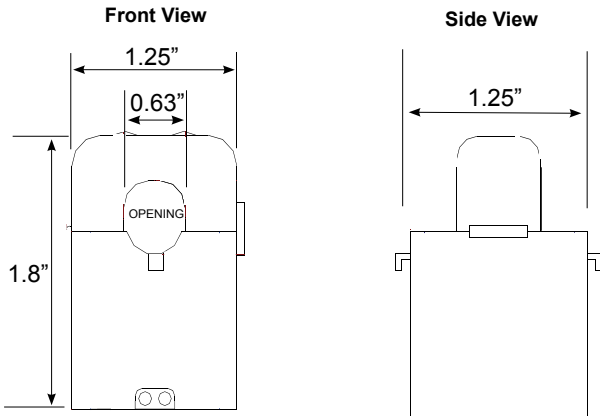
**Spyder**



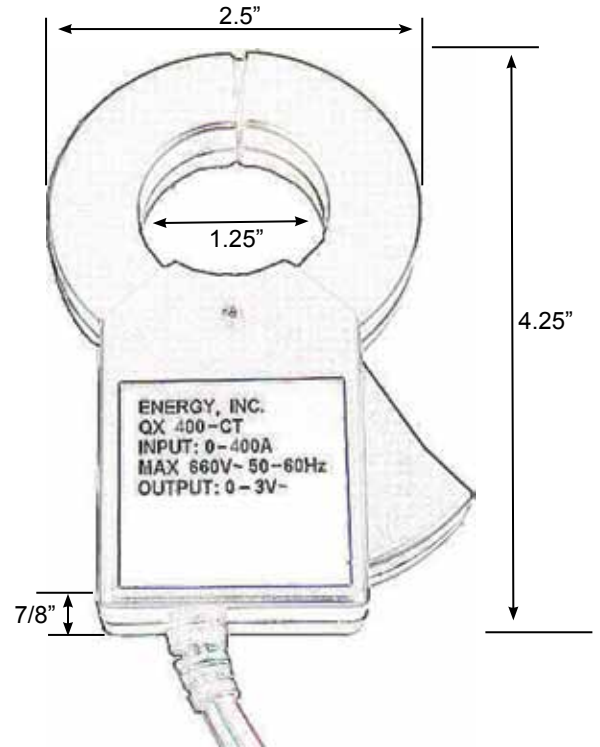
**MTU Home and Lite**

# TED Pro Current Transformers

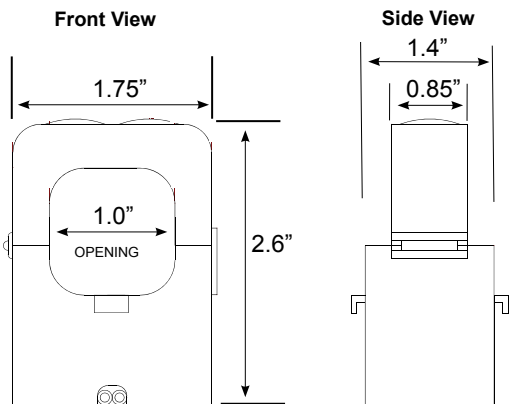
## CT601B - 200A Split-core CT



## CT400XL - 400A Large Split-core CT



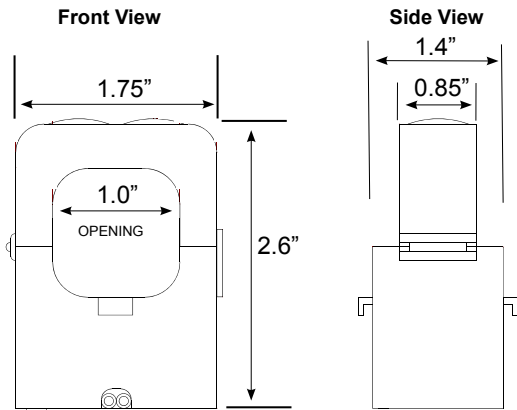
## CT301 - 400A Standard Split-core CT



All CT Wire: UL1015 22AWG PVC Wire (600V)

# TED Pro 400A Current Transformers

## CT301 - 400A Standard Split-core CT



CT Wire: UL1015 22AWG PVC Wire (600V)

## CT400XL - 400A Large Split-core CT

