DTS 310 333mV/5A – RJ-45 Ethernet Meter

This Quick Start Guide is to familiarize the user with the connection and configuration of the DTS 310 DIN rail mounted single / 3 phase power & energy meter for use with:

Current Sensor Inputs
333mV or Flexible Rogowski Coil
or 5A (Model Dependent)

Ethernet Communications
Modbus TCP and **BACnet/IP**

Applicable DTS 310 Models		
DTS 310 Model #	**Measurlogic Part #**	**Description**
DTS 310-34-EB-A-4	**D310-0084**	• 208V-480V 3ph 3 or 4 wire • 333mV / Rogowski CTs • Self-powered • Modbus TCP and BACnet/IP Ethernet
DTS 310-36-EB-A-3	**D310-0118**	• 208V-600V 3ph 3 or 4 wire • 333mV / Rogowski CTs • 24Vdc auxiliary powered • Modbus TCP and BACnet/IP Ethernet
DTS 310-54-EB-A-4	**D310-0094**	• 208V-480V 3ph 3 or 4 wire • 5A CTs • Self-powered • Modbus TCP and BACnet/IP Ethernet
DTS 310-56-EB-A-3	**D310-0114**	• 208V-600V 3ph 3 or 4 wire • 5A CTs • 24Vdc auxiliary powered • Modbus TCP and BACnet/IP Ethernet

If you do not see your specific meter model number above please contact Measurlogic Inc. at 303-805-5252 or info@measurlogic.com.

ATTENTION	
For more information please use the DTS 310 installation guide **https://www.measurlogic.com/product/dts-310/**	

7268 S. Tucson Way, Centennial CO 80112
Tel: 877-777-6567
e-mail: info@measurlogic.com
web: www.measurlogic.com

Quick Start Guide - DTS 310-xx-EB-A-x (Ethernet)

This Quick Start Guide is designed to familiarize the user with the connection and configuration of the DTS 310 DIN rail mounted single / 3 phase power & energy meter with 333mV/Rogowski Coil current sensor inputs, and Ethernet Modbus TCP and BACnet IP communications.

Supplied Items

Check that the meter and equipment match your order specifications and has not been damaged during shipping. The following component(s) are included in the package:

- **The DTS 310 power meter.** Check input ranges, output configuration and auxiliary power supply (if applicable) on the label of the unit. For a more detailed explanation of the part number please download the latest version of the DTS 310 datasheet from: https://www.measurlogic.com/product/dts-310/
- The necessary green connector plugs are fitted to the DTS meter.

Connecting the DTS 310

Wiring Voltage and Current Inputs

The DTS 310 accepts voltage inputs directly up to 480V or 600V 3 phase L-L (model dependent) or through PTs (potential transformers) for higher voltages. Three phase currents are measured via "safe" **333mV or Flexible Rogowski CTs or 5A CTs** (current transformers). Check the model number of the DT 310 as connection of any other CT than these outputs could cause damage to the instrument**. If there are any questions, please call Measurlogic before powering up the unit**. Please refer to ***Application/Connection Examples*** for information on wiring conventions.

Input wiring terminals are clearly indicated and located on the upper side of the DTS 310 label. The Current and Voltage terminal strips are pluggable to allow easy replacement of the DTS 310, if required. Removing the terminal strips should only be done once power has been removed from the DTS 310. Input wiring terminals accept 2.5 mm^2 (12 AWG) wire. The wires are connected by means of screw terminals that clamp down onto the input wires. The voltage/PT inputs require fuses, not included, (see diagrams below) and should be rated at 1A 600Vac. Measurlogic can provide an in-line fuse kit as an option if required.

Wiring Optional Auxiliary Power Input (AUX)

Self-powered DTS 310 meters are powered from the input voltage between Phase A & Phase B or between Phase A & Neutral (depending on model number), so no additional auxiliary power supply is needed. DC Auxiliary powered DTS 310 meters can also be ordered, with the following DC voltage options being available. (Fuses not included with meter but are offered as an option). Please see the blue label on the actual meter for details about the power supply option that is fitted to the meter.

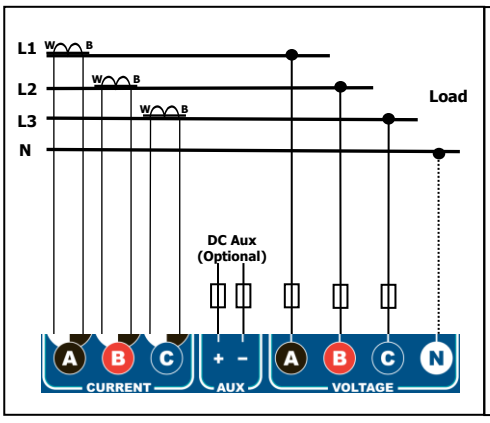
- 12 Vdc **OR** 24 Vdc **OR** 48 Vdc (Model dependant)

Note: It is important to pay attention to the polarity when using a DC power supply. See label above for a reference to the polarity. Incorrect connection **will** damage the DTS 310.

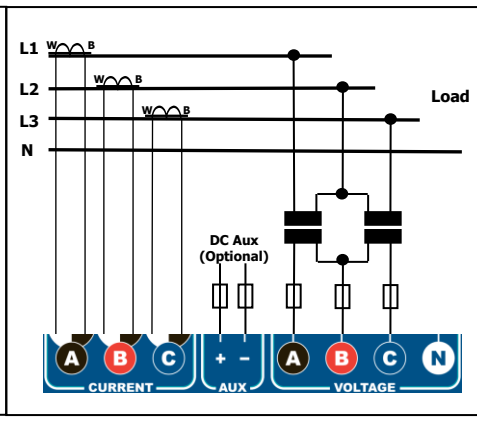
The following connection diagrams depict some examples of typical applications.
Other connection configurations are possible. (Consult Measurlogic)

Application/Connection Examples

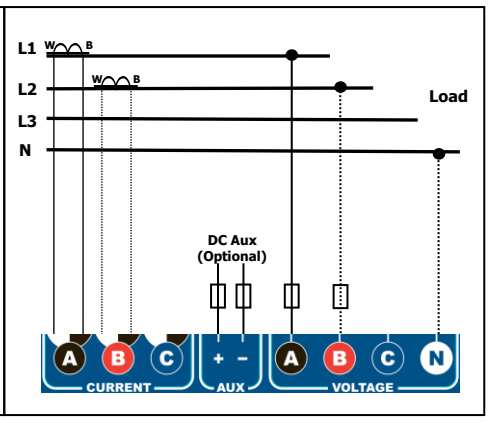
3 Phase, 3 Wire/ 4 Wire (low voltage)



3 Phase, 3 Wire(2 Potential Transformers & 3 CTs)



1 Phase, 2 or 3 Wire



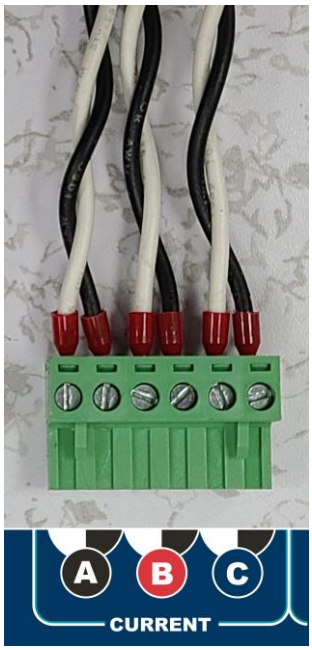
7268 S. Tucson Way, Centennial CO 80112
Tel: 877-777-6567
e-mail: info@measurlogic.com
web: www.measurlogic.com

Current Transformer Wiring Colors and Connection Polarity

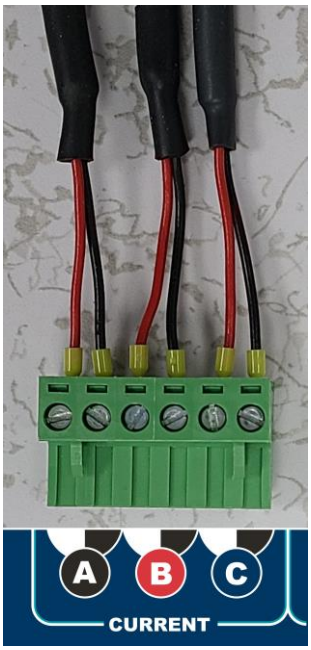
The built-in wires from Current Transformers may have different colors depending on the type and manufacturer. However, the wire representing the **negative (-)** lead is always **black**.

When connecting a CT to the DTS meter, please land the **black wire** on the **black (-) side** of the current input pair on the meter, and land the **other color** wire (**white**, **red** or other color) on the **white (+) side** on the meter.

The pictures below show the wire colors for the Measurlogic series of Split and Solid Core CTs and the Measurlogic series of Rogowski Coil CTs. Please contact Measurlogic if you are unsure about the CT connection wiring.



Split and Solid Core CTs



Rogowski Coil CTs

ATTENTION	ATTENTION
The current transformer connections are shown on the label as black/white, which is common for the twisted pair wire for split and solid core CTs. The Measurlogic Rogowski Coil CTs have black/red wires. If the color of the wires is different to black/white then land the black wire on the black side, and the other color on the white side on the meter.	Les connexions du transformateur de courant sont indiquées sur l'étiquette par un fil noir/blanc, ce qui est courant pour les paires torsadées des transformateurs de courant à noyau fendu et massif. Les transformateurs de courant à bobine Rogowski de Measurlogic possèdent des fils noir/rouge. Si la couleur des fils est différente de noir/blanc, connectez le fil noir à la borne noire et l'autre couleur à la borne blanche du multimètre.

7268 S. Tucson Way, Centennial CO 80112
Tel: 877-777-6567
e-mail: info@measurlogic.com
web: www.measurlogic.com

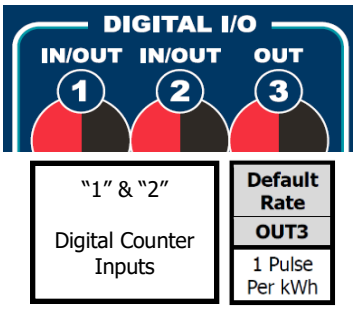
Digital Inputs and Outputs (Digital I/O)

The default DTS 310 meters indicated above are fitted with 2 x digital inputs and a pulse output as standard. They are grouped together with a single 6 way pluggable terminal.

Wiring the Digital Pulse Output

The single digital output – marked "OUT 3" is pre-configured to function as a pulse corresponding to measured kWh. **The default pulse rate is 1 Pulse per kWh**. This is user configurable to a different rate, if required, using our DTS Config software configuration tool

Digital Output (Marked 3)



- The digital output is a **potential-free NO (Normally Open) solid state relay** output.
- The maximum switching voltage is 50Vdc and the maximum switching current is 100mA.
- The relay closure pulse width is 100ms. The minimum time between any two pulses is 100ms.
- **The default pulse rate is 1 pulse per kWh.** This can be changed using DTS Config.
- A suitable wire gage is 18-22 AWG. For longer distances (>100ft) use 18 AWG.

Wiring the Digital Inputs

The two digital inputs – marked "IN/OUT 1" and "IN/OUT 2" are pre-configured to function as general counters. The counter value will match the number of contact closures on its particular input. Any scaling of these counters, if required, needs to be done in the Master application / device. The digital inputs can also function as level status inputs.

Digital Inputs (Marked 1, 2)

- The digital inputs accept dry contacts or NPN open collector inputs.
- A suitable wire gage is 18-22 AWG. For longer distances (>100ft) use 18 AWG.

Pluggable Green Terminals

Pluggable green terminals are provided with your DTS 310 meter for external connections to the meter. These include the connections for the voltage inputs, current transformer inputs, RS-485 communications and the pulse output/aux input. The blue label on the side of the DTS 310 shows the allocation of these connections on the various plug terminals.

Green Terminal Plugs	Value
Wire Gauge Range	24 to 12 AWG
Wire Stripping Length	7mm to 8mm (about 0.3")
Torque Value	0.5 N m (4.43 lb in)
Suitable Screwdriver	3.0mm or 3.5mm flat head

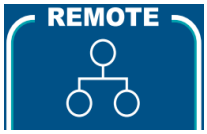
The stripped ends of the wires can be fitted directly into the terminal cages of the green terminals plugs. If you would prefer to use ferrules for multi-strand wires, here is a list of ferrule parts to suit the various wire sizes.

	Ferrules			
	AWG	Color	ElecDirect *	DigiKey *
Voltage 20A CB	12	-	-	-
Voltage 15A CB	14	Blue	FER-14-8D	288-1024-ND
333mV CTs	18-22	Red	FER-18-8D	288-1015-ND
Rogowski CTs	24	Yellow	FER-24-8D	288-1004-ND
Pulse, Comms, Aux	18-22	Red	FER-18-8D	288-1015-ND

** For convenience, part numbers and links are provided for ElectDirect and DigiKey but any equivalent part is acceptable.*

7268 S. Tucson Way, Centennial CO 80112
Tel: 877-777-6567
e-mail: info@measurlogic.com
web: www.measurlogic.com

Ethernet Communications



The DTS 310-xx-EB-A-x models provide Ethernet communications through a standard Ethernet RJ45 jack marked as "REMOTE" on the same side of the DTS 310 meter as the "DIGITAL I/O" plug.

- Use CAT5e or better Ethernet cable that is suitable for the installation location.
- The Ethernet DTS meter can communicate using the **Modbus TCP** and **BACnet/IP** simultaneously.
- Up to 4 Modbus TCP clients can be used at the same time.
- Unless otherwise specified, all new DTS meters now leave the factory with DHCP Client enabled so that the meter can obtain a valid IP Address from the DHCP Server on the local network.
- Please refer to the first youtube video listed below for various methods to find the IP Address allocated to the DTS meter and to access the Embedded Webpages in the DTS meter.
- The IP Address of the DTS meter can be changed to a static IP Address using the Measurlogic DTS Discover Windows App or by using the embedded webpages in the meter.
- The MAC address of the Ethernet interface can be found a label next to the RJ-45 jack.

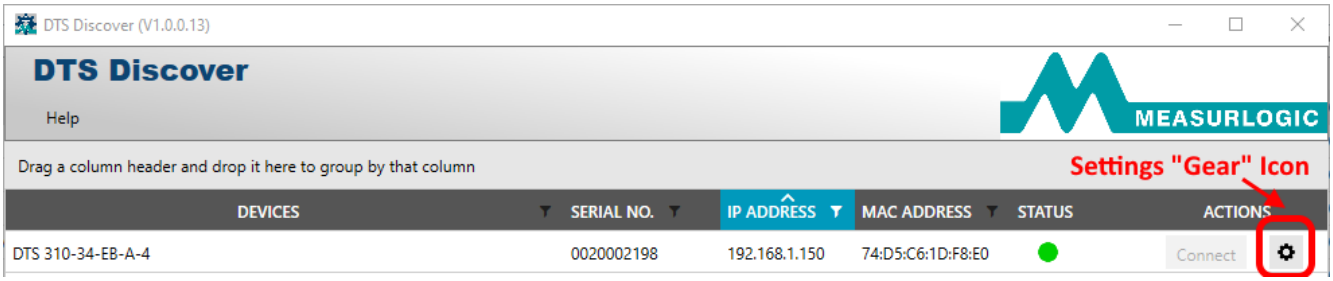
Ethernet Connection and Configuration

The Measurlogic youtube channel hosts some useful instruction videos for finding, connecting to and configuring your Ethernet DTS meter:

- Accessing Embedded Webpages - DTS Meter Network Connectivity: https://www.youtube.com/watch?v=ckjAoacdZ6o
- Navigating Embedded Webpages - DTS Meter Network Connectivity: https://www.youtube.com/watch?v=om70QA8-pdo
- DTS Discover - DTS Meter Network Connectivity: https://www.youtube.com/watch?v=xJLadESTqqU

DTS Discover

The Measurlogic DTS Discover application can find any DTS Ethernet meter. It will even detect DTS Ethernet meters whose IP Address are on a different subnet and thus not accessible over IP, and even DTS meters that have been setup with the same static IP Addresses.



The network parameters of DTS meters equipped with the new network module can easily be changed using the "Settings" or "Gear" icon.

The DTS IoT Gateway products as well as meters equipped with the legacy network module are also detected by DTS Discover. The networking parameters of these devices cannot be change using DTS Discover but pressing the "Settings" or "Gear" icon provides instructions of how to do this.

7268 S. Tucson Way, Centennial CO 80112
Tel: 877-777-6567
e-mail: info@measurlogic.com
web: www.measurlogic.com

Configuring the Current Sensor Type and Rated Current of the CT

The Current Sensor Type, Sensitivity and Rated Current (Amperage) of the CT must be configured using DTS Config.

ATTENTION

The Correct CT type must be connected to the correct DTS 310 model. Incorrect connection **will** damage the DTS 310 and might also damage the CT.

The DTS 310-3x-EB-A-x meters are compatible with the following current sensors ONLY:

- **333mV Output CTs** – This type of current sensor is internally burdened so that the voltage output is 333mV for the current rating as specified on the CT itself. The current rating (Amperage) of the CT must be specified when ordering and cannot be changed in the field.
  - Use DTS Config to configure the Current Sensor Type as "333mV".
  - The Rated Current (Amperage) of the CT as it appears on the CT label MUST be configured in the DTS 310 Meter.
- **Rogowski Coil CTs** – This is a flexible CT. Measurlogic DTS meters can accept Rogowski Coil CTs directly **without** the need for an external integrator. The sensitivity of this type of current sensor is specified in milli-volts (mV) per 1000A at 60Hz. Different models of Rogowski Coils have different sensitivities, which must be selected from the pull-down menus in DTS Config and set accordingly. The CT Rating (Amperage) that is set does not affect the current measurement values. We recommend that you set the CT Rating in the meter to the panel rating, or the expected nominal current being measured.
- **Rogowski Coil CTs (with an external integrator)** – Measurlogic DTS meters can accept Rogowski Coil CTs directly connected to the DTS 310 meter, so an external integrator module is NOT required. However, if the system already has an external integrator module installed, then the output of the integrator will be 333mV for the current specified on the integrator label. For such systems, the DTS 310 meter must be configured for a "333mV" input. The Rated Current (Amperage) as it appears on the integrator label MUST be configured in the DTS 310 Meter.

ATTENTION

If multiple CTs per phase are required, please consult our document "**Using Multiple CT Sets with DTS Meters**" in the "Technical" section of the DTS 310 webpage at https://www.measurlogic.com/product/dts-310/

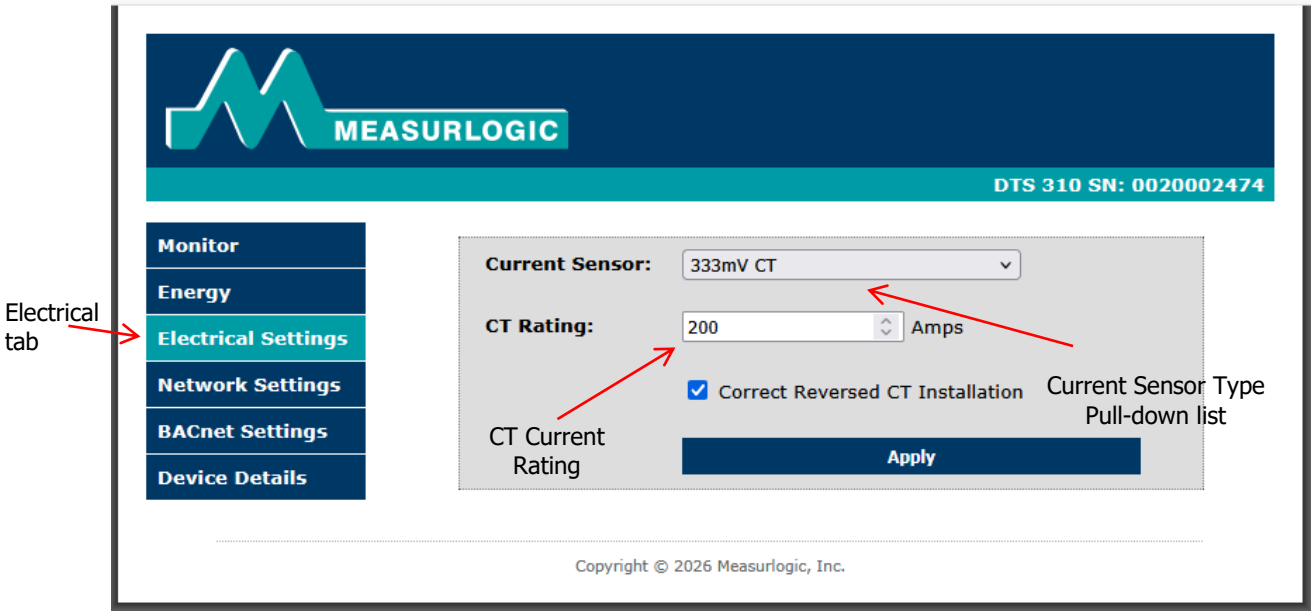
The DTS 310-5x-EB-A-x meters are compatible with the following current sensors ONLY:

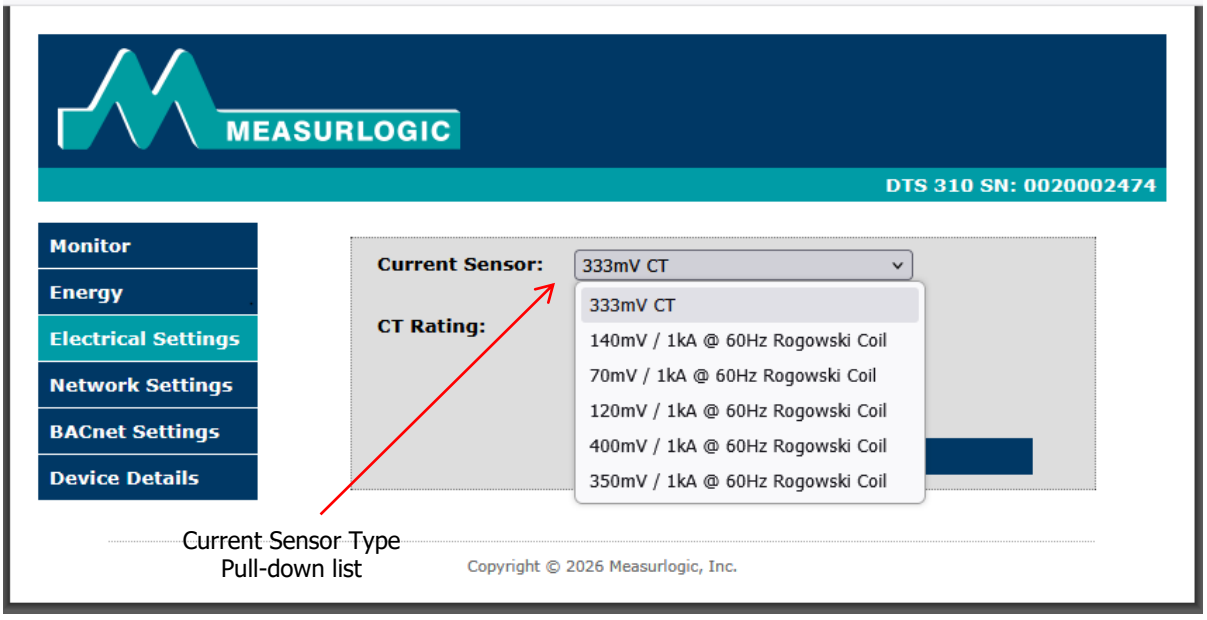
- **5A Output CTs** – This type of current sensor should be installed with shorting blocks to avoid damage to the CT in the event of open secondary wiring. The current rating (Amperage) of the CT must be specified when ordering and cannot be changed in the field. This Rated Current (Amperage) of the CT as it appears on the CT label MUST be using current switches [SW.4 .. SW.8].
- The switches [SW.1..SW.3] on the DTS meter **MUST** all be **OFF**.
- **DO NOT connect 5A Output CTs to a meter with 333mV current inputs.**

7268 S. Tucson Way, Centennial CO 80112
Tel: 877-777-6567
e-mail: info@measurlogic.com
web: www.measurlogic.com

Configuring the Electrical Settings using the Embedded Web Pages

Select "Electrical Settings" from the left menu on the embedded webpage to show the Current Transformer settings.





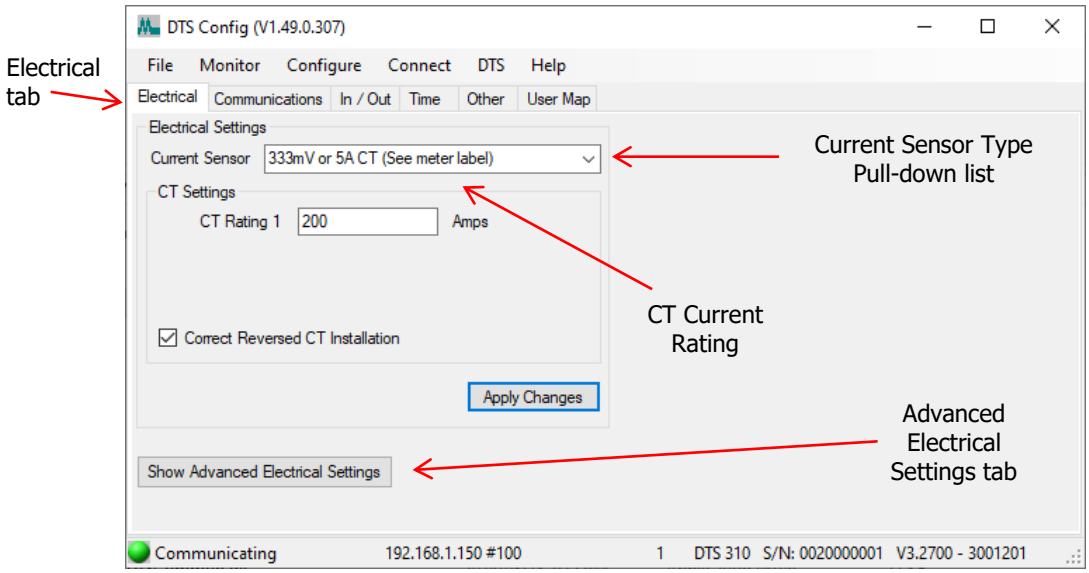
Please see the following Measurlogic youtube channel videos for more information on the embedded webpages in the Ethernet DTS meter:

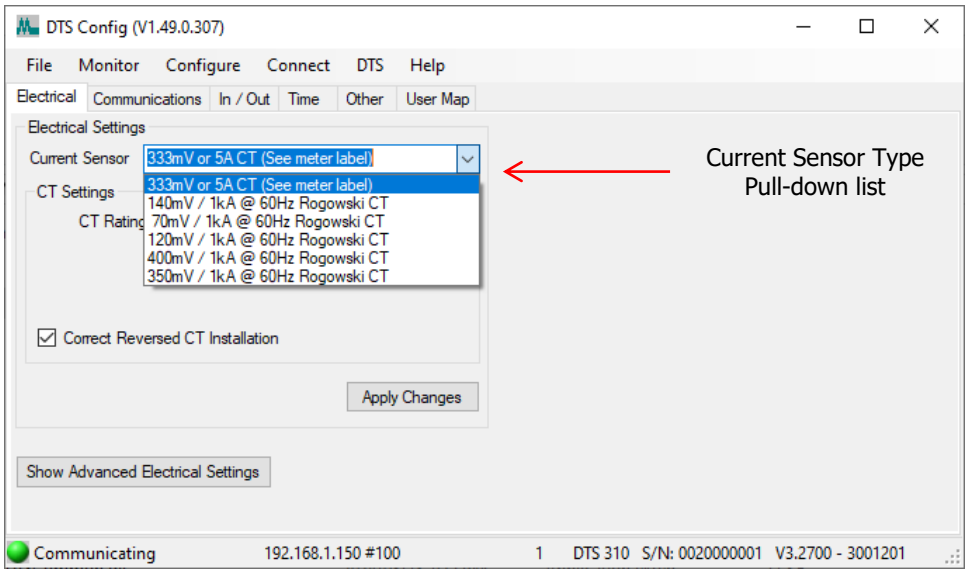
- Accessing Embedded Webpages - DTS Meter Network Connectivity: https://www.youtube.com/watch?v=ckjAoacdZ6o
- Navigating Embedded Webpages - DTS Meter Network Connectivity: https://www.youtube.com/watch?v=om70QA8-pdo

7268 S. Tucson Way, Centennial CO 80112
Tel: 877-777-6567
e-mail: info@measurlogic.com
web: www.measurlogic.com

Configuring the Electrical Settings using DTS Config

DTS Config is a software monitoring and configuration tool. Select "Configure" from the menu. The Current Transformer settings can be found in the "Electrical Settings" tab. The screenshots show the layout of the latest version of DTS Config. The screen layout for previous versions of DTS Config may differ.





7268 S. Tucson Way, Centennial CO 80112
Tel: 877-777-6567
e-mail: info@measurlogic.com
web: www.measurlogic.com

Details for the Electrical Settings

Configuring 333mV output CTs

- Set the CT Rating (Amperage) of the CTs that are being used.
- Ensure that the "Current Sensor" type selected shows "333mV CT".

Configuring Rogowski Coil CTs

- Set the CT Rating (Amperage) to the panel rating, or the expected nominal current being measured. This value does not affect the current measurement values.
- Select a Rogowski Coil output option from the "Current Sensor" drop down list that matches the output of the Rogowski Coils being used, as this directly affects the current measurement values.

Configuring 5A Secondary CTs

- Set the CT Rating (Amperage) of the CTs that are being used.
- Ensure that the "Current Sensor" type selection shows "5A CT".

Voltage(L-L) Primary and Secondary settings (DTS Config Only)

The voltage primary and secondary setting are in the "Advanced Electrical Settings".

- **Low Voltage Applications:** Do NOT change the Voltage(L-L) Primary and Secondary settings. These two numbers MUST be the same values for correct low voltage operation. The ratio of these two numbers must be 1:1.
- **Medium or High Voltage Applications (with external PTs):** The Voltage(L-L) Primary and Secondary settings MUST be set according to the primary and secondary ratings of the external PTs.

7268 S. Tucson Way, Centennial CO 80112
Tel: 877-777-6567
e-mail: info@measurlogic.com
web: www.measurlogic.com