DTS 310 333mV RS-485 Serial Meter

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 for use with:

- **333mV or Flexible Rogowski Coil current sensor inputs**
- **RS-485 Serial Modbus RTU or BACnet MS/TP communications.**

Applicable DTS 310 Models		
DTS 310 Model #	**Measurlogic Part #**	**Description**
DTS 310-34-SB-A-4	**D310-0128**	• 208V-480V 3ph 3 or 4 wire • 333mV / Rogowski CTs • Self-powered • RS-485 serial Modbus RTU or BACnet MS/TP
DTS 310-36-SB-A-3	**D310-0164**	• 208V-600V 3ph 3 or 4 wire • 333mV / Rogowski CTs • 24Vdc auxiliary powered • RS-485 serial Modbus RTU or BACnet MS/TP
DTS 310-36-SB-A-6	**D310-0182**	• 208V-600V 3ph 4 wire • 333mV / Rogowski CTs • Self-powered • RS-485 serial Modbus RTU or BACnet MS/TP

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/	

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Quick Start Guide - DTS 310-3x-SB-A-x (RS-485 Serial)

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 RS-485 serial Modbus RTU or BACnet MS/TP communications.

Supplied Items

Check that the meter and equipment matches 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 terminal 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** (current transformers). 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)

The DTS 310 operates normally when power is applied to Phase A, Phase B and/or Neutral depending on model number so no additional auxiliary power supply is needed. To provide added flexibility to the DTS 310 meter it can be powered from a DC auxiliary supply (model dependant) in the following ranges. (Fuses not included with meter but are offered as an option). See the rating label of the unit for more information.

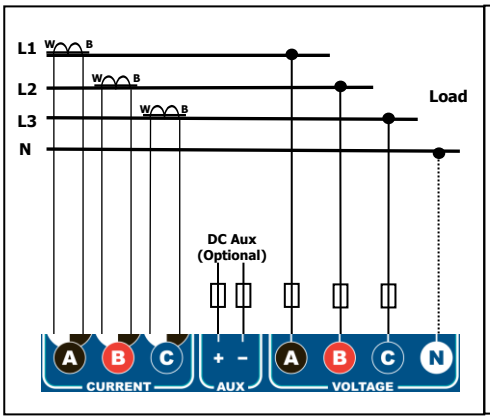
- 12 Vdc **OR** 24 Vdc **OR** 48 Vdc

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.

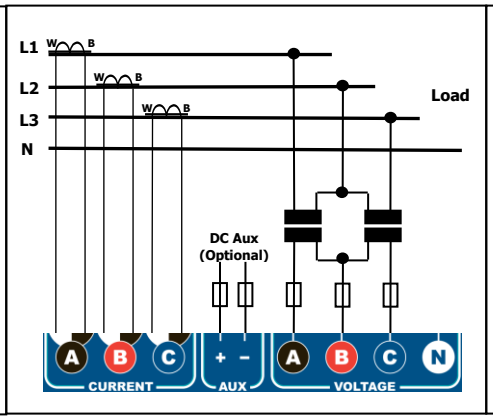
The following connection diagrams depict some examples of typical applications. Other connection configurations are possible. (Consult Measurlogic)

Application/Connection Examples

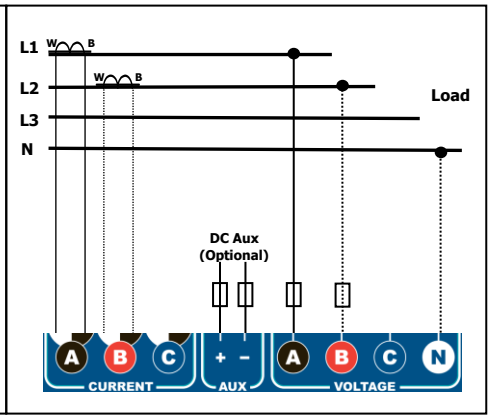
3 Phase, 3 Wire/ 4 Wire (low voltage)



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



1 Phase, 2 or 3 Wire



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Wiring the Digital Pulse Output

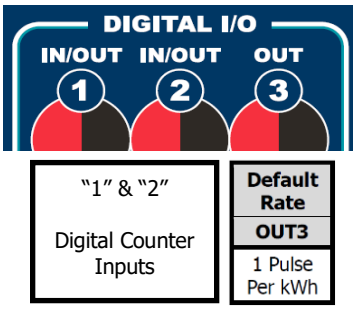
The DTS 310 serial meter has 2 x Digital Inputs and 1 x Digital Output.

Digital Inputs (Marked 1, 2)

- Digital Counter Inputs, which interface to an external NO (Normally Open) dry contact switch.

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. This minimum time between any two pulses is 100ms.
- **The default pulse rate is 1 pulse per kWh.** This can be changed using DTS Config.



Switch Settings for the Current Sensor Type and Sensitivity

The DTS 310 energy serial meter has an 8-way DIP switch situated next to the pluggable 6-way I/O terminal. [SW.1..SW.3] are is used to configure current sensor type and sensitivity (Highlighted in BLUE in diagram below). The CT Rating must be set using DTS Config.

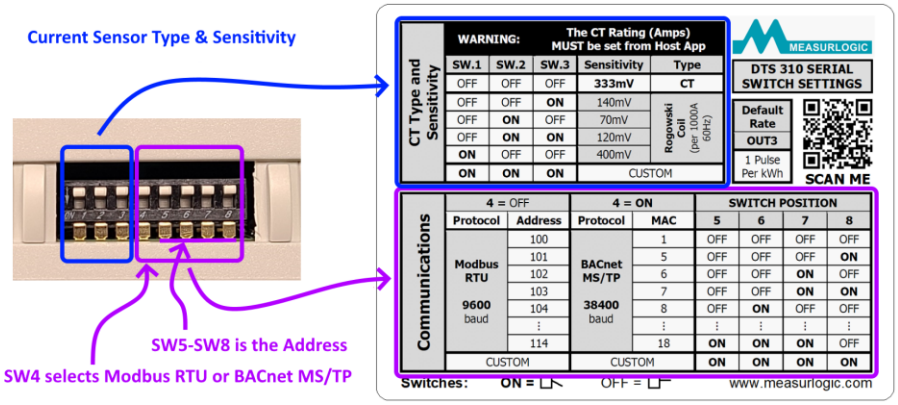
ATTENTION – SWITCHES [SW.1..SW.3]

- The DTS 310 will be shipped with all the CT Type switches in the "**OFF**" position.
- The DTS 310 switches **MUST** be setup by the user to match the **CT Type**.
- The DTS 310 **CT Rating** current **MUST** be set using DTS Config.

The DTS 310-3x-SB-A-x meter is compatible with the following current sensors:

- **333mV Output CTs** – This type of current sensors is internally burdened so that the voltage output is 333mV for the current rating that is specified on the CT itself. The current rating of the CT must be specified when ordering and cannot be changed in the field. The switches [SW.1..SW.3] on the DTS meter must be set for "333mV CT" (all OFF). **The CT Rating cannot be set using the switches and MUST be set using DTS Config.**

- **Rogowski Coil CTs** – This is a flexible CT. 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 tables and the switches [SW.1..SW.3] set accordingly. The CT Rating that is set using DTS Config does not affect the current measurement values. We recommend that you set the CT Rating in DTS Config to the panel rating, or the expected nominal current being measured.



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/

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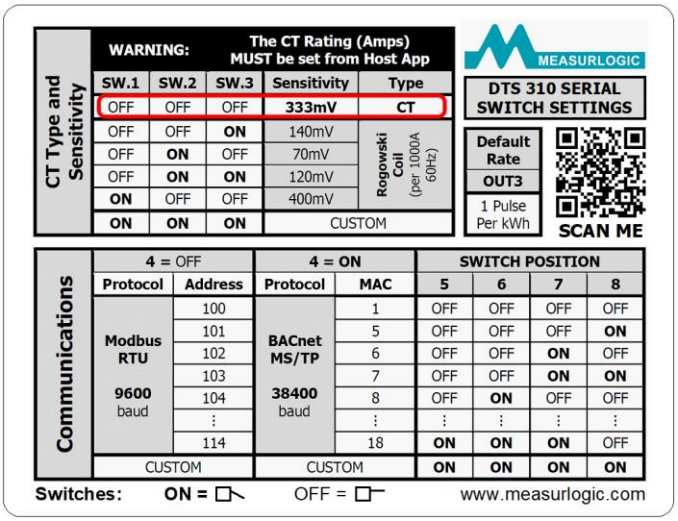
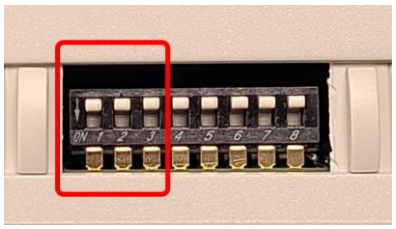
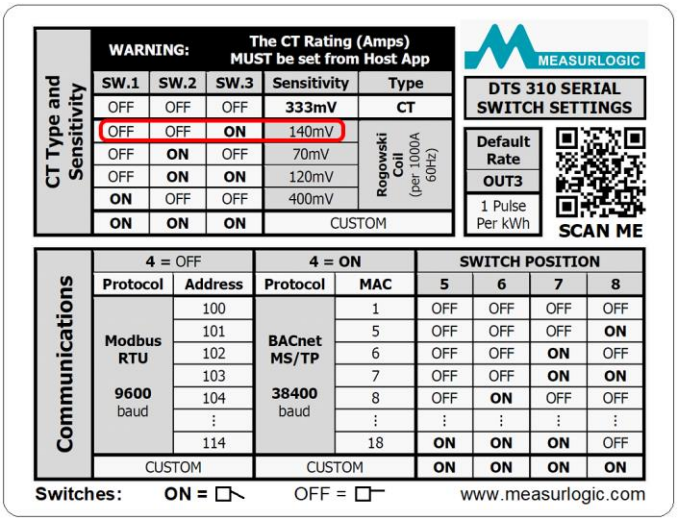
Switch Label Lookup Examples	Corresponding Switch Settings



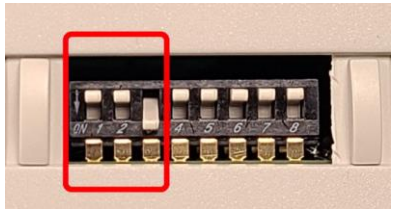
Standard 333mV CT



Current Rating of CT is set using DTS Config

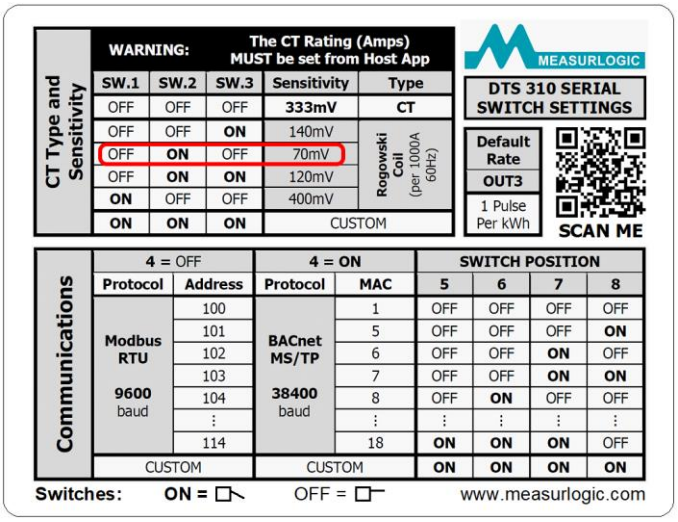


Rogowski Coil
140mV per 1000A @ 60Hz

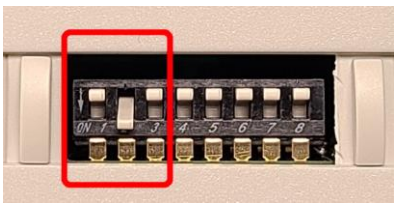


Nominal Current is set using DTS Config

The Maximum Current for this Rogowski Coil is 2500A



Rogowski Coil
70mV per 1000A @ 60Hz



Nominal Current is set using DTS Config

The Maximum Current for this Rogowski Coil is 5000A

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Communications Parameters – Selected using the Switch Settings

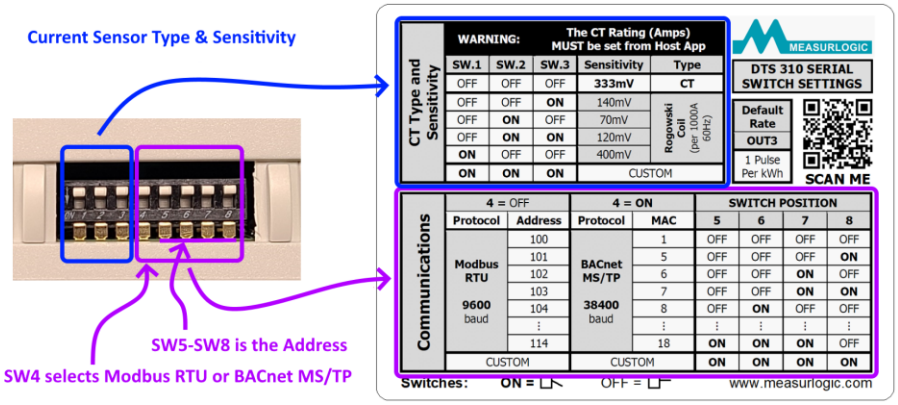
The DTS 310 energy serial meter has an 8-way DIP switch situated next to the pluggable 6-way I/O terminal. SW.4 is used to select between Modbus RTU and BACnet MS/TP protocols. [SW.5..SW.8] is used to select the device address (Highlighted in PURPLE in the diagram below).

ATTENTION – SWITCHES [SW.4..SW.8]

- The DTS 310 will be shipped with all comms switches in the "**OFF**" position.
- The default setting is Modbus RTU, 9600 baud, address 100.

The DTS 310-3x-SB-A-x meter communication group of switches is sub-divided as follows:

- **Serial Protocol** – The serial protocol is selected using SW.4, where the OFF position is Modbus RTU and the ON position is BACnet MS/TP. The protocol is always determined by this SW.4 even for the custom configuration.
  - The baud rate for Modbus RTU when using the switch options is 9600.
  - The baud rate for BACnet MS/TP when using the switch options is 38400.
- **Device Address** – As only 4 switch positions [SW.5..SW.8] are available, the choices of device addresses is tailored to be the most suitable for the protocol selected: *(Please see the next section for custom communications settings.)*
  - **Modbus RTU** – All four switches in the OFF position is the Measurlogic default Modbus address of 100. The further Modbus Address options are 101 through to 114 as shown in the table.
  - **BACnet MS/TP** – All four switches in the OFF position is the generally accepted MAC address of 1 for new devices. It is recommended that the MAC address is changed to another value during commissioning. Note that the further MAC address switch options are 5 through 18 as shown in the table. The MAC address is automatically added to 473000 to generate the Device ID.



Communications Parameters – Custom Settings

If the switches [SW.5..SW.8] are all in their "**ON**" position, then "CUSTOM" communications parameters can be set for baud rate, address/MAC, Device ID. The protocol is always determined by SW.4 even for the custom configuration. We recommend the following procedure:

Step	Description	Modbus RTU	BACnet MS/TP
1	Select the desired protocol, and set switches [SW.5..SW.8] all OFF	SW.4 is OFF	SW.4 is ON
2	Verify that the meter communicates at	Modbus 100 at 9600 baud	BACnet MAC 1 at 38400
3	Power OFF the meter		
4	Set the switches [SW.5..SW.8] all ON		
5	Power ON the meter		
6	The meter will communicate with the same parameters as above	Modbus 100 at 9600 baud	BACnet MAC 1 at 38400
7	Change the communication parameters as desired	Use DTS Config	Use YABE
The custom communication parameters will be persistent and will be retained if power is lost to the meter. After custom communications parameters are configured, DO NOT change [SW.4..SW.8]. Doing so, will revert to the communication parameters defined by the switches and the custom parameters will be lost.			

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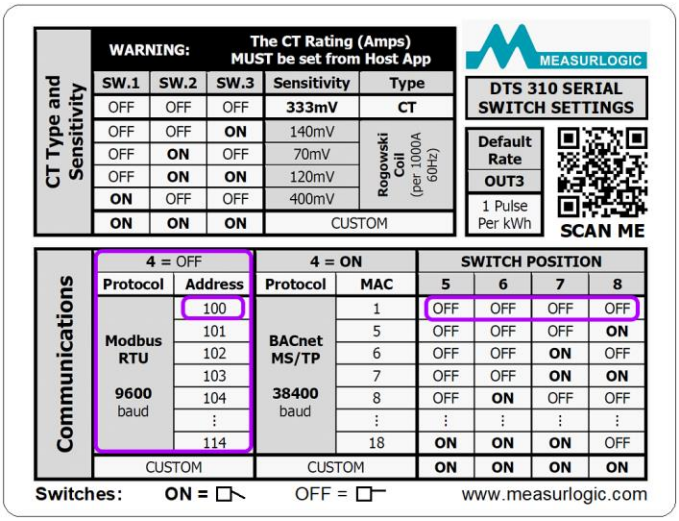
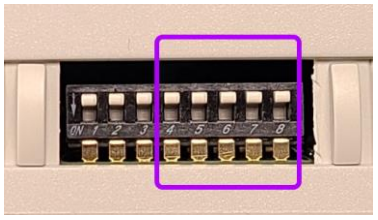
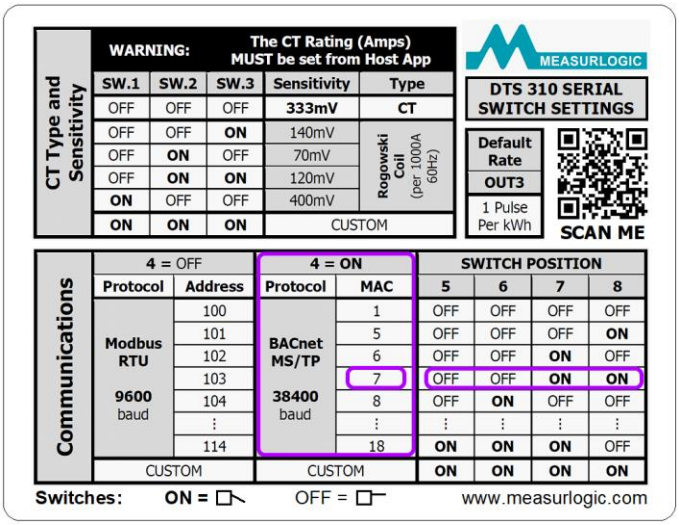
Switch Label Lookup Examples	Corresponding Switch Settings



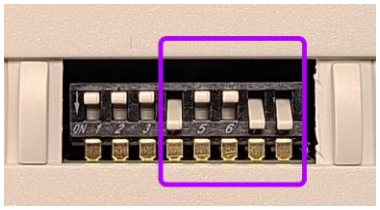
Protocol Modbus RTU
Baud Rate 9600
Modbus Address 100

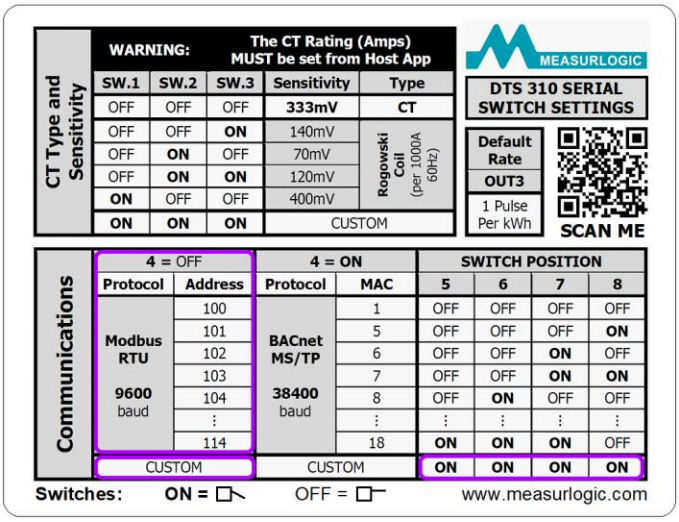


As shipped communications parameters

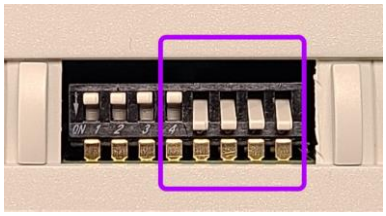


Protocol BACnet MS/TP
Baud Rate 38400
MAC Address 7
Device ID 473007





Protocol Modbus RTU
Baud Rate CUSTOM
Modbus Address CUSTOM



After custom communications parameters are configured, DO NOT change [SW.4..SW.8].

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