DTS MCM

Multi-Circuit Monitor

Revenue Grade Electrical Sub-metering

R25

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1 PRODUCT OVERVIEW

What is the DTS MCM Sub-Metering Solution?

The DTS MCM is a fully contained Multi-Channel Sub-Metering solution.

- 9, 12, 18 or 24 Current Circuits (3 x 3 phase, 4 x 3 phase, 6 x 3 phase & 8 x 3 phase inputs)
- Based on the DTS 307 ultra compact meter
- Pre-wired (Voltage and Communications)
- Pluggable
- Internal components mounted on a DIN rail
- ANSI C12.20 – Revenue Grade
- UL Listed, CE, FCC Part 15 Class B
- BTL Listed, SunSpec Alliance certified
- RS-485: Modbus RTU and BACnet MS/TP protocols loaded as default, (field selectable)
- Ethernet: Modbus TCP and BACnet/IP
- 208 – 480Vac L-L 4 Wire
- CT inputs can be field selectable for 333mV or Rogowski CTs (NO integrator required)
- 1 x digital output per DTS 307 meter (kWh Energy pulse output)
- Self-powered OR 24 Vac / 12-24Vdc auxiliary power supply
- Bi-directional for renewable systems (NET metering)
- Wall mounting, lockable Weather-proof enclosure options
- Available with opaque or transparent lid
- Amply internal space for easy wiring.
- kWh (Active Energy) Counter Display option
- Various communications and Cloud connect options available
- Made in America

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1.1 Supplied Items

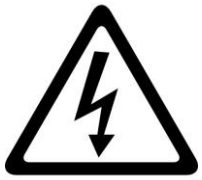
Check that the meter and equipment match your order specifications and has not been damaged during shipping. Verify that the following item(s) match with the corresponding model from the data sheet:

- DTS MCM power & energy meter enclosure
- The internal DTS 307 measuring and communications options as per your order
- The voltage connectors will be pre-wired and plugged into the DTS 307 meters
- The RS-485 communications cable are pre-wired but NOT plugged in
- The 6-pin connectors for the current are also be supplied separately and not plugged into the meters.

1.2 Document Conventions

SYMBOLS

ATTENTION	ATTENTION
This section contains information that is important to the operation of the meter.	Cette section contient des informations importantes pour le fonctionnement du compteur.



WARNING	AVERTISSEMENT
This section contains very important safety information to reduce the risk of electrical shock.	Cette section contient des informations de sécurité très importantes pour réduire le risque de choc électrique.

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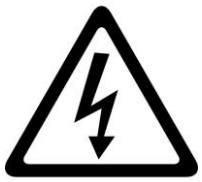
1.3 Product Specification



WARNING	AVERTISSEMENT
Measurement Category III **DTS 307 is intended for 208Vac to 480Vac L-L use** **Do NOT exceed this usage**	**Catégorie de mesure III** **Le DTS 307 est destiné à une utilisation 208Vac à 480Vac L-L** **Ne dépassez PAS cette utilisation**
Use the model number of the DTS 307 to verify that it is suitable for the voltage, type and category of the installation.	Utilisez le numéro de modèle du DTS 307 pour vérifier qu'il convient à la tension, au type et à la catégorie de l'installation.
Failure to use the correct current transformers, and/or connecting too high a voltage can result in death or personal injury and may permanently damage the DTS meter.	Le fait de ne pas utiliser les transformateurs de courant corrects et/ou de connecter une tension trop élevée peut entraîner la mort ou des blessures corporelles et peut endommager de manière permanente le compteur DTS.

1.3.1 Model Numbers

The DTS MCM model numbers are in the form:

DTS MCM – xx – y – zzC

Please see the "Model Number Builder" on the datasheet for the DTS MCM webpage for details of the available model numbers.

1.3.2 Current Inputs

Current Inputs	Value	Description	Notes
All		333mV Split/Solid Core or Rogowski Coil CT	The choice between 333mV or Rogowski Coil CTs is software selectable. All three channels must be the same CT type. The Rogowski Coil input sensitivity is also software selectable.

1.3.3 Power Supply

Service Type	Value	Description	Neutral Required	Neutral Optional
y	N	Self-Powered Va-Vn (120Vac to 277Vac L-N)	•	
	A	24Vac or 12-24Vdc Aux Powered		•

1.3.4 Environment

Operating Temperature:	-31°F	to	158°F	(-35°C to 70°C)
Storage Temperature:	-40°F	to	185°F	(-40°C to 85°C)
Relative Humidity:	5%	to	95%	(non-condensing)
Operating Altitude:	Up to		2,000m	

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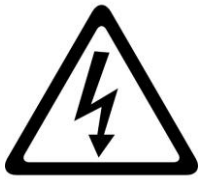
2 INSTALLATION

2.1 Safety Guidelines



WARNING	AVERTISSEMENT
To reduce the risk of electric shock, always open or disconnect circuit from power-distribution system (or service) of building before installing or servicing submetering equipment or current sensors.	Pour réduire le risque de choc électrique, toujours ouvrir ou débrancher le circuit du système de distribution d'énergie (ou service) du bâtiment avant installer ou entretenir des équipements de sous-comptage ou des capteurs de courant.

Always adhere to the following safety guidelines:

- Only qualified personnel or **licensed electricians** should handle the installation. Input voltages to the DTS 307 can be hazardous.
- Follow all applicable local and national electric codes.
- Verify input voltage and current are within thresholds for the specific DTS 307 model. (See Product Specification on page 5)
- **Only Current Transformers that are listed to UL 2808 for use in 250Vac or 600Vac line-to-line circuits (as appropriate for the installation) may be used with this meter.**
- **ONLY USE CURRENT TRANSFORMERS WITH OUTPUTS THAT ARE COMPATIBLE WITH THE MODEL OF DTS 307 (SEE SECTION 1.3.2). THE USE OF ANY OTHER CURRENT TRANSFORMER CAN RESULT IN PERMANENT DAMAGE TO THE DTS 307.**
- Avoid any electrostatic discharge prior to working on the DTS 307 by first touching a grounded structure prior to handling the DTS 307.
- Before applying power make sure that all current transformer and voltage connections are securely connected to the input terminals of the DTS 307.
- If the DTS 307 is installed incorrectly any built-in safety features may no longer be functional.
- Before handling the DTS 307 ensure that all power running to the DTS 307 is removed.
- The DTS MCM may be used outdoors since the ingress protection level of the enclosure is (EN 60529): IP66; IP67. It is the responsibility of the user to ensure that this rating is suitable for the application.
- The enclosure must be equipped with a **user supplied lock** or other means to prevent unauthorized access.

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2.2 General Mounting Requirements and Guidelines

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When mounting the DTS MCM make sure to follow these guidelines:

- Always completely de-energize the electrical panelboard, switchboard, industrial control equipment and/or energy monitoring management equipment before installing or servicing the DTS 307 meter and/or its Current Transformers.
- See section 2.1 above for further safety information.
- Only UL or ETL rated conduits and glands should be used.
- It is recommended that two separate conduits be run for voltage conductors and current sensors leads.
- Any communications wiring must be run in a separate conduit.
- Use Copper Conductors ONLY.
- Only Current Transformers that are listed to UL 2808 for use in 250Vac or 600Vac line-to-line circuits (as appropriate for the installation) may be used with this meter.
- The Current Transformers may NOT be installed in equipment where they exceed 75% of the wiring space of any cross-sectional area within the equipment.
- Current Transformer may NOT be installed in areas where they would block ventilation openings.
- Current Transformer may NOT be installed in areas of breaker arc venting.
- Current Transformers must be secured, and their conductors routed so that they do not directly contact live terminals or buses.
- Mount the enclosure containing the DTS 307 as close as possible to the electrical panel being monitored, so that it is within easy reach of the electrical disconnect breaker.

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- A UL or ETL certified 600V circuit-breaker must be installed as a disconnecting device for the DTS MCM and must be positioned within easy reach of the DTS MCM. The circuit-breaker employed for this disconnecting device shall meet the relevant requirements of IEC 60947-1 and IEC 60947-3, be suitable for the application, and MUST be clearly marked as being **"the disconnecting device"** for the DTS 307. See table below for the wire gauge to use for the breaker rating.

WIRE & BREAKER GUIDE	
Gauge of Wire	**Recommended Breaker**
18 AWG	5 Amp 600V 3-Pole Breaker
14 AWG	15 Amp 600V 3-Pole Breaker
12 AWG	20 Amp 600V 3-Pole Breaker

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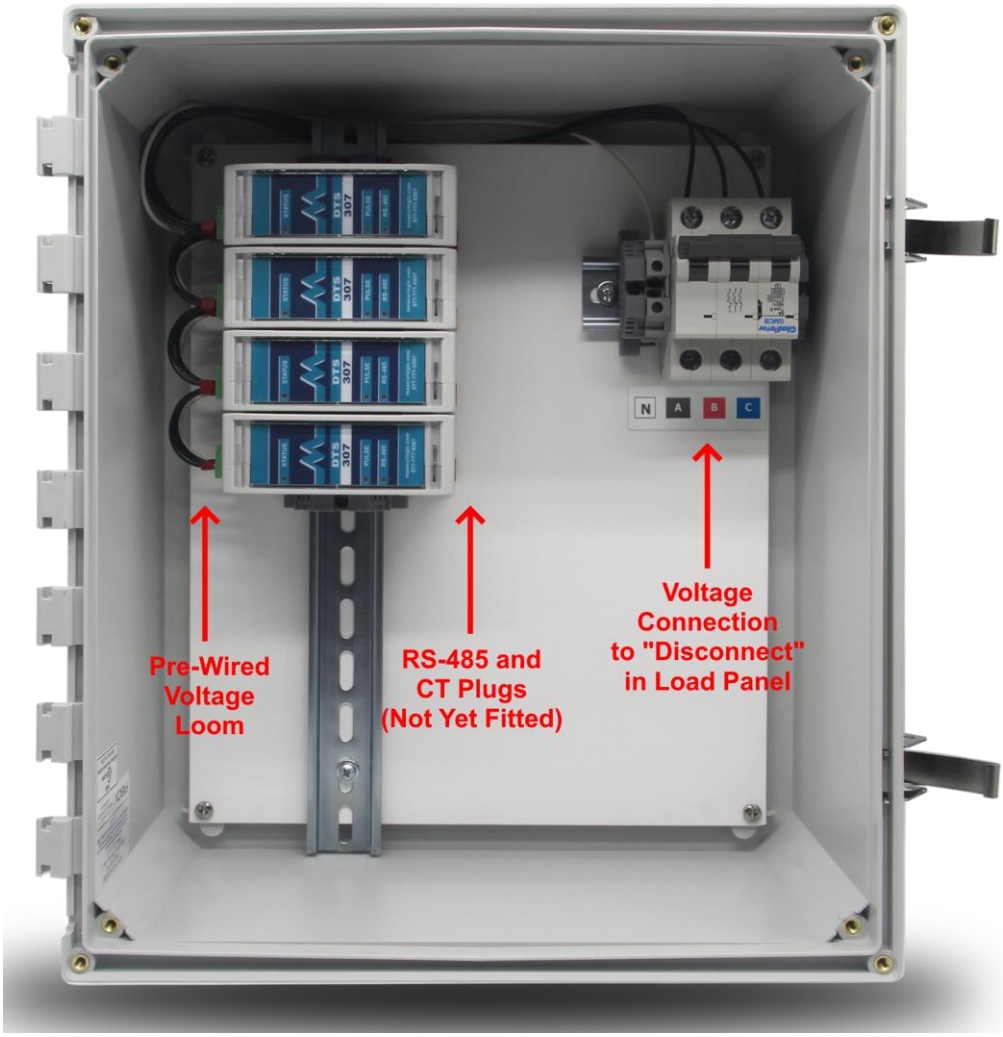
3 CONNECTING TO THE DTS MCM

3.1 Introduction

The DTS MCM is very configurable so can easily be adapted to suit different applications.

The most common configuration of the DTS MCM is with everything self-contained in a weatherproof enclosure.

The illustrations below are for a DTS MCM-SB-N-12C mounted in a 14" x 12" x 7" enclosure:



The voltage loom to the DTS 307 meters and the other DIN rail mounted equipment is pre-wired and pre-fitted. The input voltage connection is made to the conveniently positioned breaker and neutral terminal on the right.

The DTS MCM is shipped with the RS-485 loom and the CT connectors supplied loose in a packet. This is done to make the initial wiring and connections easier.

- Wire the CTs into the 6-way current plugs as shown in section 3.5 and plug into the DTS 307 meters.
- Once all the current plugs have been inserted, plug in the RS-485 communications loom.

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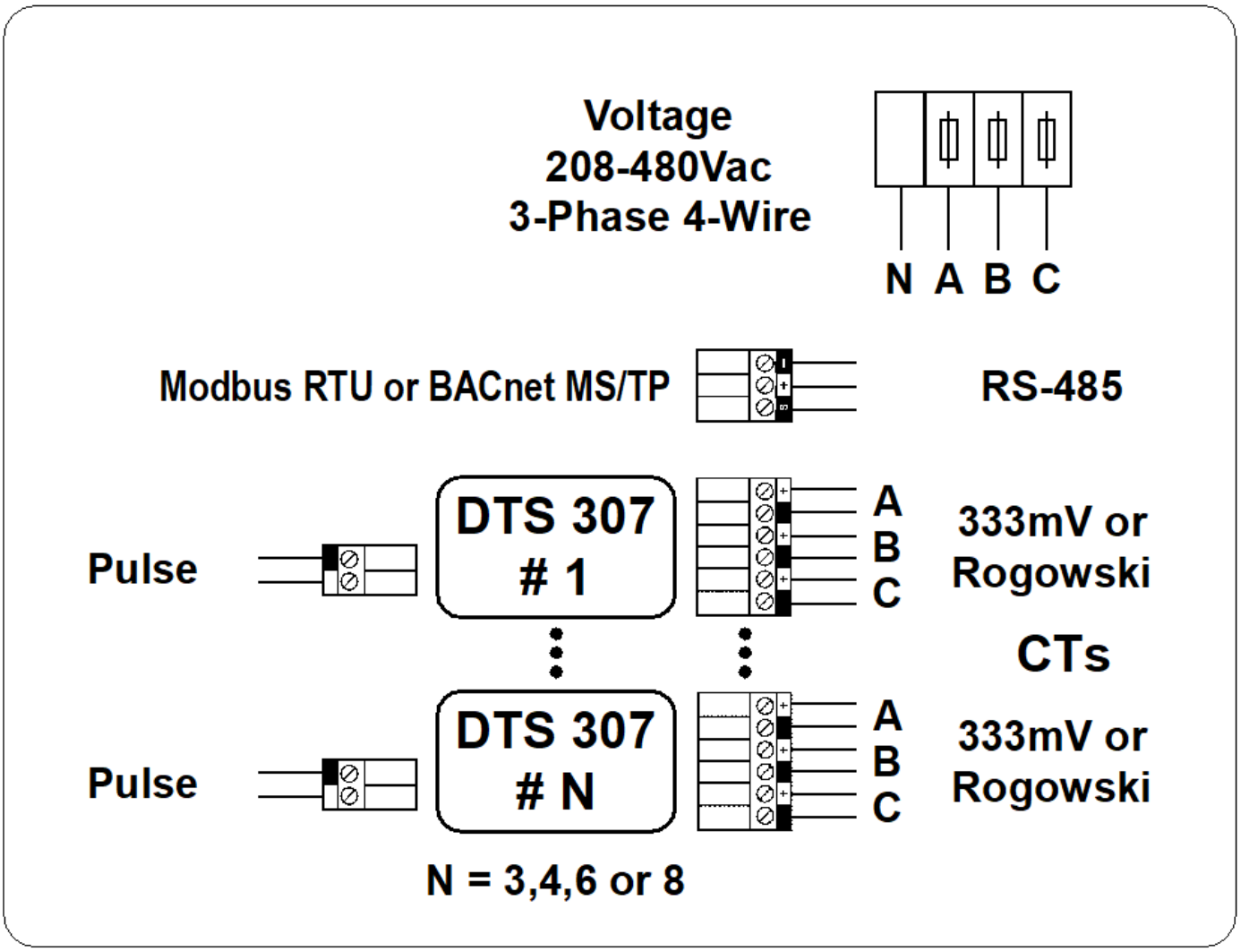
3.2 Connection Overview

This label appears on the inside of the lid of the DTS MCM, which provides a quick connection overview for the meter.



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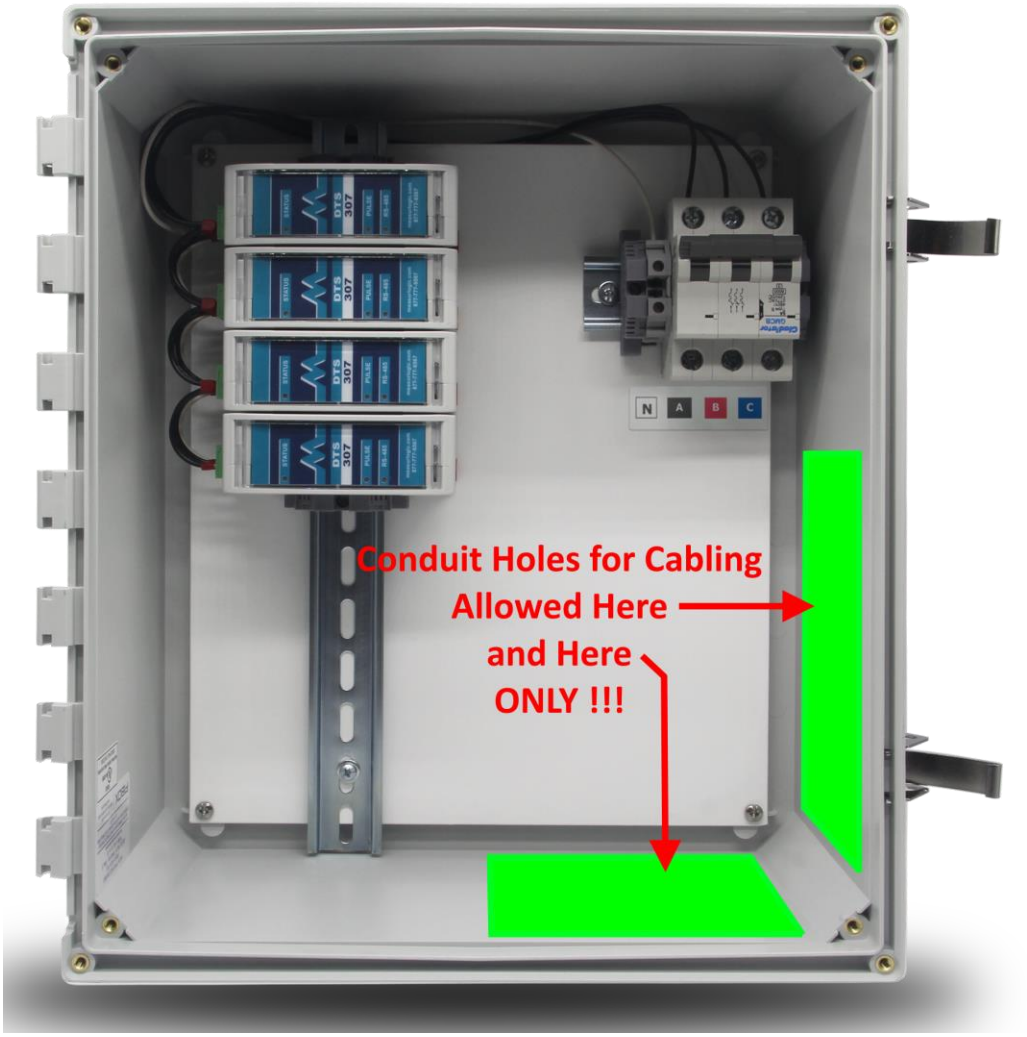
3.3 Conduit Holes



The following guidelines should be followed for conduiting into the enclosure:

- **Conduit holes are only allowed in the areas shown in the image above.**
- To avoid damage to any of the electronic parts in the enclosure, **DO NOT drill holes for conduit at any other position on the enclosure.**
- **Voltage and Current MUST be run in separate conduit.**
- As there are many CT wires entering the enclosure, more than 1 conduit for the CT wires may be needed.
- Any hardware communications cables MUST also be run in a separate conduit.

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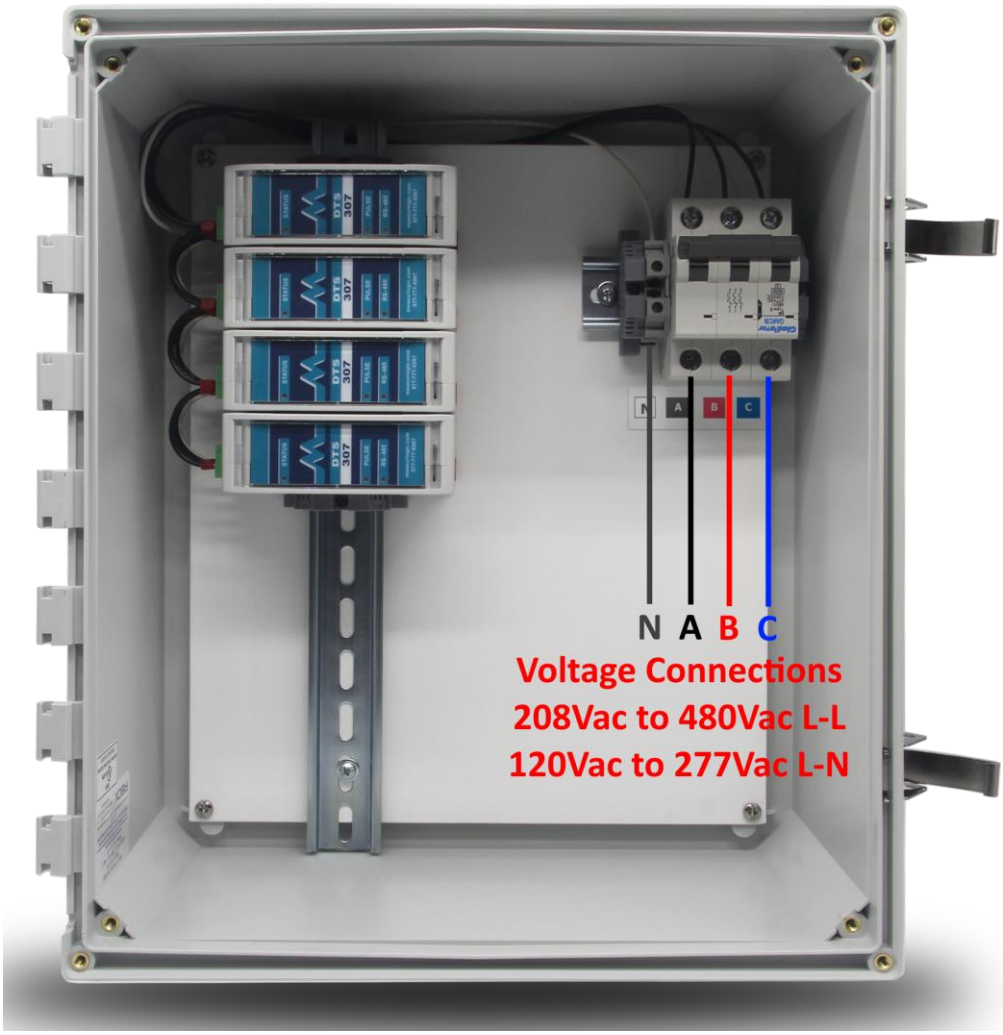
3.4 Voltage Connections



Connect the voltage inputs into the open terminals at the bottom of the circuit breaker located in the top right-hand corner of the enclosure.

Connect the neutral into the open terminal to the left of the breaker.

The voltage loom to the DTS 307 meters and the other DIN rail mounted equipment is pre-wired and pre-fitted to all of the DTS 307 meters. **DO NOT modify this loom in any way.**

ATTENTION	ATTENTION
The internal 5A breaker is for local meter protection only. The DTS MCM must be connected to a breaker in the load panel for wiring protection and to provide a disconnect for the DTS MCM.	Le disjoncteur interne de 5 A est destiné uniquement à la protection du compteur local. Le DTS MCM doit être connecté à un disjoncteur du panneau de charge pour protéger le câblage et assurer la déconnexion du DTS MCM.

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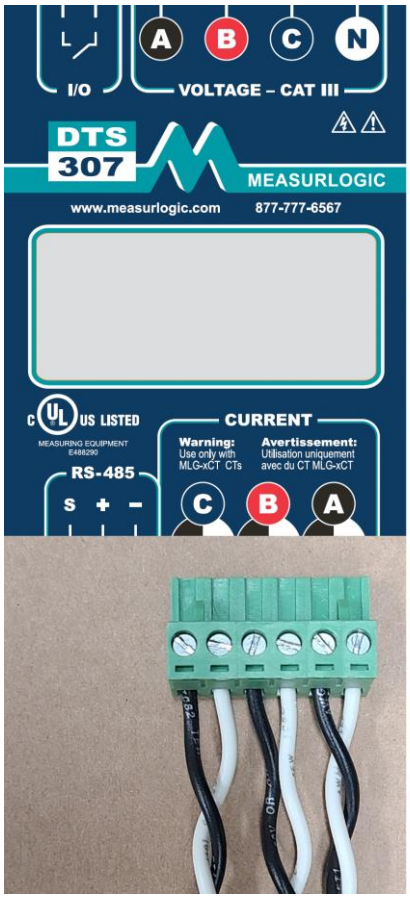
3.5 Current Connections

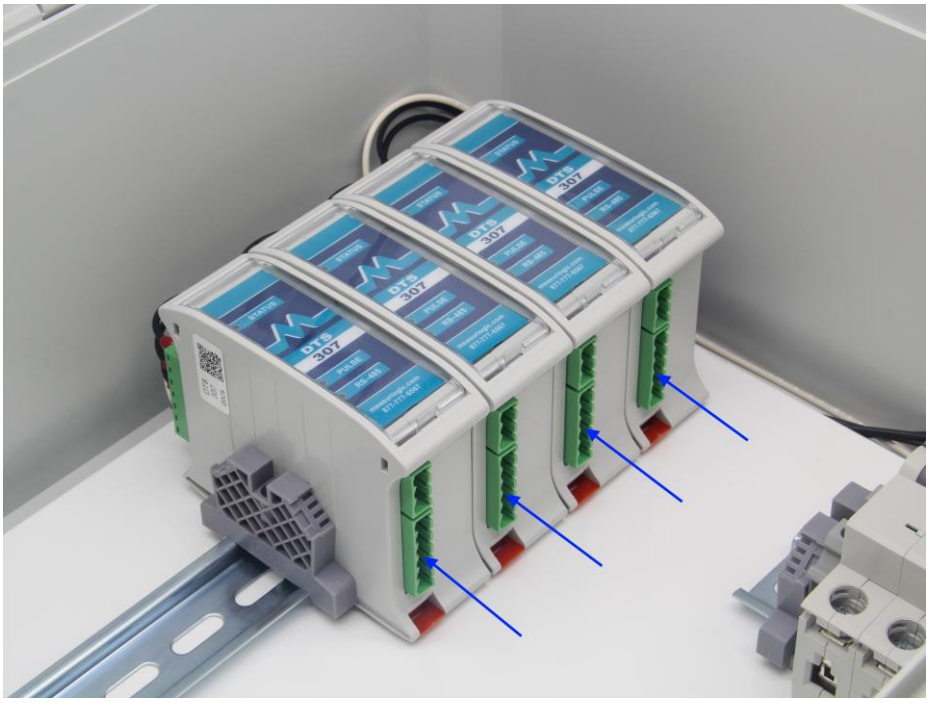
Since the DTS 307 meters are mounted vertically on the DIN Rail next to other meters or devices, the large blue side label of the DTS 307 may not be visible.

The DTS 307 side label, CT wire pairs, current plug orientation and phase order.



DIN Rail Side of DTS 307 Meter

The blue arrows show the position of the current connectors on the meter. When the 6-way current CT plugs are inserted, the Phase-A CT pair is closest to the DIN Rail.



Connect the wires for each CT as shown above. The 6-way plug is divided into three pairs of connections. Ensure that the black wire from the CT is on the left-hand side of the pair with the plug orientated as shown. The white (or red) wire from the CT is on the right-hand side of the pair. This corresponds to the colors on the label. Note that Phase-A CT wire pair is on the right-hand side of the plug and Phase-C is on the left.

When the 6-way CT plug is plugged into the DTS 307 meter, the Phase-A will be closest to the "DIN Rail Side".

ATTENTION	ATTENTION
Current transformers should be connected to the same panel as the voltage connections.	Les transformateurs de courant doivent être connectés au même panneau que les connexions de tension.

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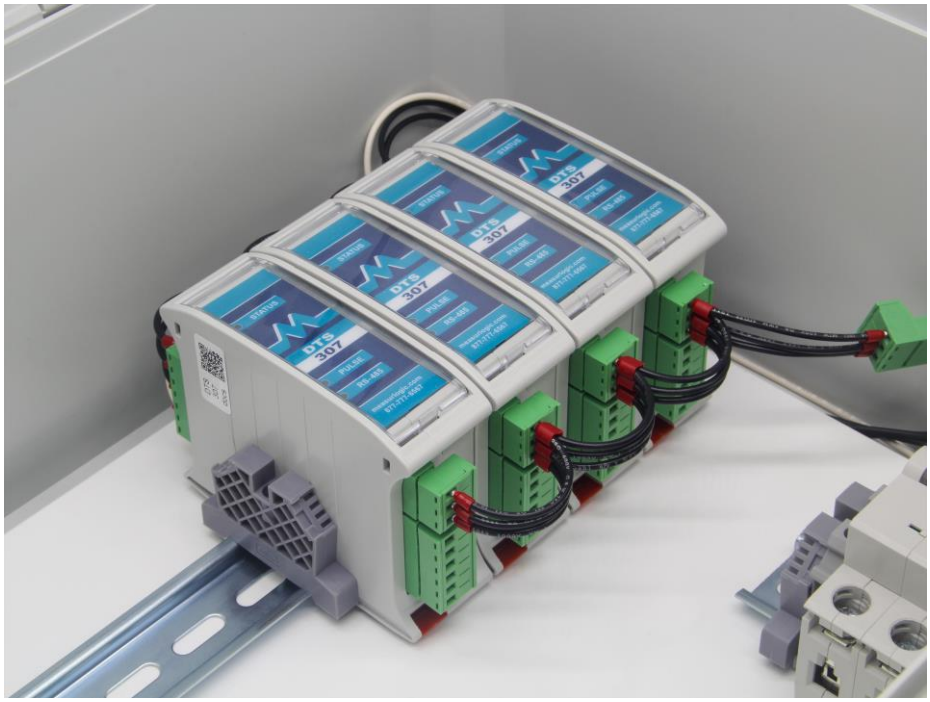
3.6 Communications Loom

The communication loom is pre-wired and is supplied in a separate packet. It is easiest to first complete and fit the current plugs. Once all the current plugs are fitted to their DTS 307 meters, then the communication loom can be fitted.

There is a single 3-way female flying connector at the one end of the cable. This connector is suitable for directly plugging in our CCOM-0017 USB to RS-485 adapter for easy configuration of the DTS 307 meters using DTS Config.

A mating 3-way male plug is also supplied for connection to the host RS-485 communications network. This allows the normal communications to be easily disconnected if necessary.

All the DTS 307 meters will be set to unique Modbus Addresses. The default is starting at Modbus Address #1.



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4 LED Definitions

The DTS 307 is equipped with 2 LEDs useful for diagnostics and troubleshooting – **STATUS** and **REMOTE.**

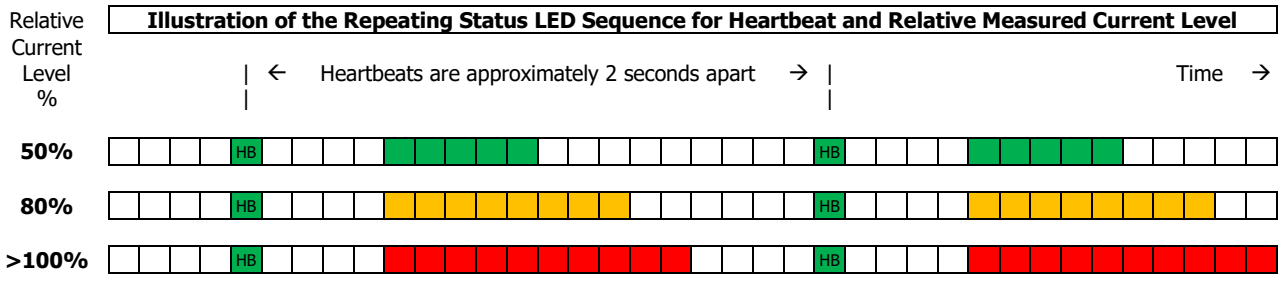
4.1 Status LED

- The **STATUS** LED consists of a repetition of **two flashes** and shows whether the measured power is being consumed/imported or generated/exported, as well as the magnitude of the total current.
- The **First Flash** is the "heartbeat" and indicates that the meter is ON and the direction of energy:

Green – Energy is being consume/imported

Orange – Energy is being generated/exported

- The Color and Length of the **Second Flash** indicates the "total current level" for all the measured phases relative to the total service current:
  - GREEN for 5-80% of total service current
  - ORANGE for 80-100% of total service current
  - RED for >100% of total service current



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4.2 Remote LED

- The **REMOTE** LED is a communications indicator which is present on all meters fitted with an RS-485 serial port.
- The LED will flicker GREEN when the DTS 307 receives data on the BUS and AMBER when the DTS 307 transmits data in response.

Green – Data being received

Amber – Data being transmitted

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5 INSTALLATION OF DTS CONFIG AND MONITORING SOFTWARE

- **DTS Config** is a program used to easily monitor and configure meters from the DTS family from your local PC or across the LAN depending on the installation.
- Download the latest version of DTS Config from https://www.measurlogic.com/software-drivers/. Alternatively, an e-mail can be sent to info@measurlogic.com to request the latest version of DTS Config.
- Unzip the **DTSConfigSetup** file and double click the **setup.exe** file to begin the installation process.
- Follow the instructions on the screen.

5.1 Configuring the Current Sensor Type and Rated Current of the CT

ATTENTION	ATTENTION
The DTS MCM meter only supports 333mV and Rogowski Coil CTs. DO NOT attempt to connect a 5A secondary CT to the DTS MCM, as this will result in damage to the DTS MCM and the CT.	Le compteur DTS MCM ne prend en charge que les TC à bobine de 333 mV et Rogowski. N'essayez PAS de connecter un TC secondaire de 5A au DTS MCM, car cela entraînerait des dommages au DTS MCM et au TC.

The **DTS 307** meters in the **DTS MCM** are compatible with the following current sensors:

- **333mV Output CTs (default)** – This type of current sensor 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 Rated Current of the CT as it appears on the CT label MUST be configured in the DTS 307 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 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 307 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 307 meter must be configured for a "333mV" input. The Rated Current as it appears on the integrator label MUST be configured in the DTS 307 Meter.

NOTE
Our document "**Using Multiple CT Sets with DTS Meters**" in the "Technical" section of the DTS 307 webpage at https://www.measurlogic.com/product/dts-307/ contains more detailed information regarding multiple 333mV and Rogowski Coil CT applications.

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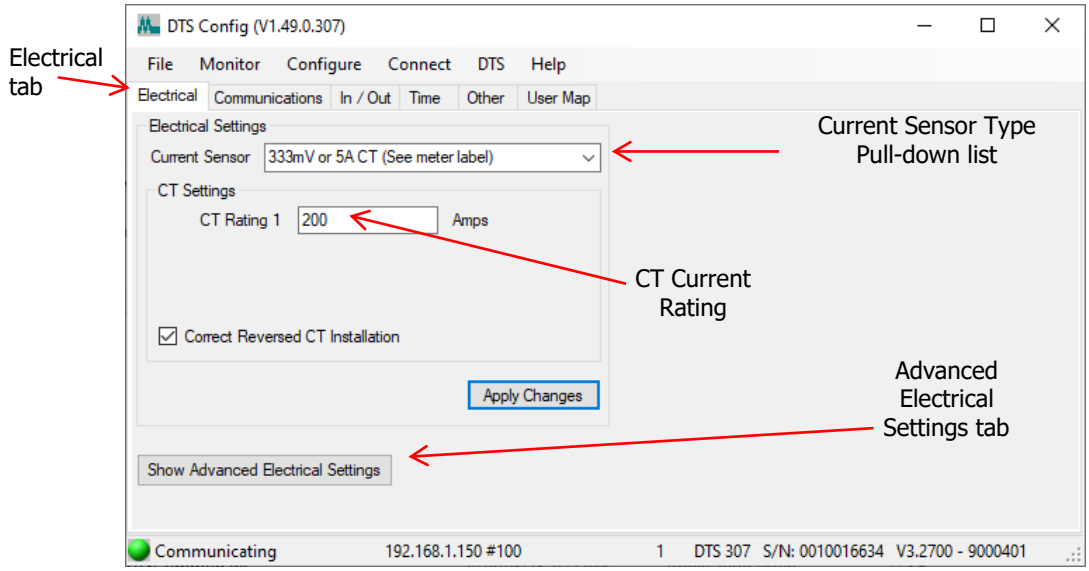
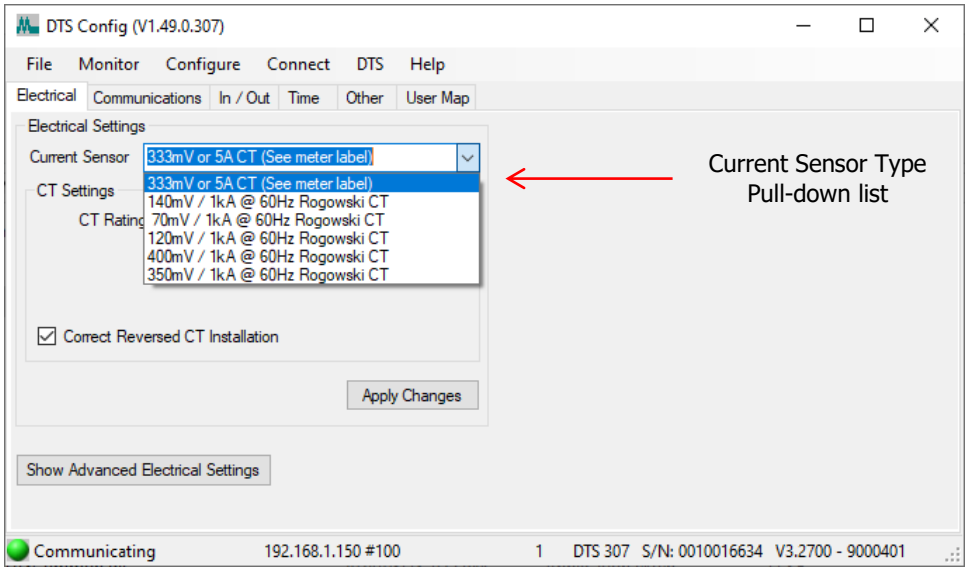
5.1.1 Configuring the Electrical Settings using DTS Config

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.





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.

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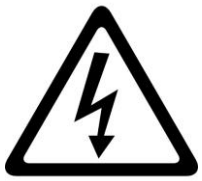
6 MAINTENANCE AND SERVICE



WARNING	AVERTISSEMENT
There are NO other user serviceable parts in the DTS 307, and no regular maintenance is required. If additional maintenance is needed, please contact Measurlogic Inc.	Il n'y a AUCUNE autre pièce réparable par l'utilisateur dans le DTS 307, et aucun entretien régulier n'est requis. Si une maintenance supplémentaire est nécessaire, veuillez contacter Measurerlogic Inc.

6.1 Cleaning Instructions

WARNING	AVERTISSEMENT
To reduce the risk of electric shock, always open or disconnect circuit from power-distribution system (or service) of building before installing or servicing submetering equipment or current sensors.	Pour réduire le risque de choc électrique, toujours ouvrir ou débrancher le circuit du système de distribution d'énergie (ou service) du bâtiment avant installer ou entretenir des équipements de sous-comptage ou des capteurs de courant.

Regular cleaning of the DTS 307 is **NOT** required, but if you do wish to clean the DTS 307, please note the following:

- Before attempting to clean the DTS 307 ensure that all power running to the DTS 307 is removed.
- **Use only a slightly damp cloth to clean the outside of the meter only**.
- Do not use any harsh chemicals or detergents.
- No water or any other liquid must be allowed to enter the meter.
- Do not use a spray bottle.

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