

This Quick Start Guide is designed to familiarize the user with the connection and configuration of the DTS-305 DIN rail mounted single / 3 phase power & energy meter with RS-485 or TCP communications. These instructions are given using the Windows XP OS.

1. Supplied Items

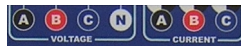
The following component(s) are included in the package:

- Quick Start Guide (DTS 305 Measurement Circuit Specifications in section 2)
- DTS 305 power monitor. Check auxiliary power supply, input ranges, and output configuration on the side label of the unit.
- Check that the meter and equipment matches your order specifications and has not been damaged during shipping.

2. Connecting the DTS 305

Voltage Current

Wiring Voltage and Current Inputs



The DTS 305 accepts current and voltage inputs either directly coupled or via CTs (current transformers) and PTs (potential transformers). Please refer to Application/Connection Examples for information on wiring conventions.

Input wiring terminals are located on the upper side of the DTS 305 and are clearly indicated on the unit's faceplate. The terminal strip is pluggable to allow easy replacement of the DTS 305 if required. However, to minimize the risk of inadvertent disconnection of the input current circuits, the terminal strip is also fastened to the DTS enclosure by means of two screws. Input wiring terminals accept 2.5 mm² (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, (represented by F3-F5 in the diagrams below) rated at 1A 600Vac.

Wiring Auxiliary Power Input (AUX)



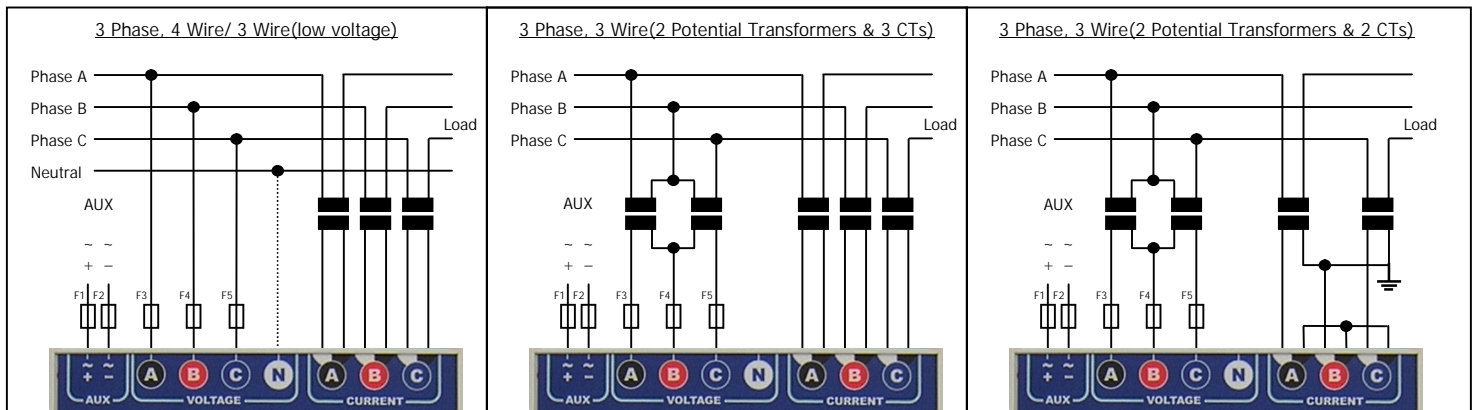
The DTS 305 operates normally when powered by an externally fused auxiliary supply (fuses rated 2A 300Vac) in the following ranges. (Fuses not included with meter). These ranges are model dependant. See the rating label of the unit for more information.

- 90 to 265 or 90 to 277 Vac 50/60 Hz or Vdc
- 9-36 Vdc
- 18 -72 Vdc

Note: It is important to pay attention to the polarity when using a DC power supply. See the diagrams below for a reference to the polarity.

The following connection diagrams depict some examples of typical applications. Other connection configurations are possible.

Application/Connection Examples

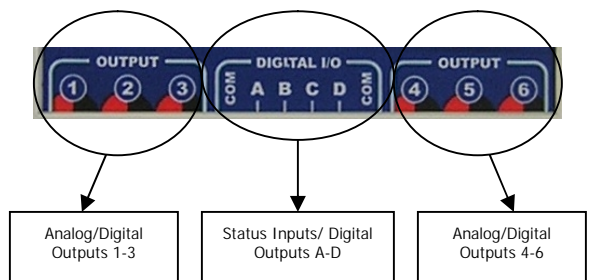


Wiring Analog and Digital Outputs

The DTS 305 can support up to 6 analog outputs and/or 10 digital outputs, depending on model. Output wiring terminals are located on the bottom side of the DTS 305 and are represented on the faceplate as seen in this diagram:

Analog/Digital Outputs (Marked 1-6)

- As analog outputs, terminals 1-6 are capable of all ranges $\pm 20\text{mA}$ (10V optional) and are independently mapped to whichever electrical entity and scale the user wishes, depending on the model of the unit.

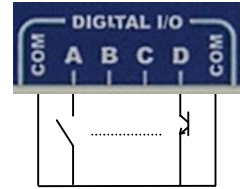


- As digital outputs, terminals 1-6 will be N.O. potential free solid state relays. These outputs can be configured for energy pulses or threshold triggers.

Digital Inputs/Outputs (Marked A-D)

- Terminals A-D can be specified on order placement to be either status inputs or digital outputs.
- As status inputs, terminals A-D will accept dry contacts or NPN open collector inputs and must be connected as shown in this diagram:
- As digital outputs, terminals A-D will be N.O. potential free solid state relays.

Terminals A-D as Inputs



DTS 305 Measurement Circuit Specifications

- Voltage range: 120-480Vac L-L, 3 or 4w (600v optional)
- Rated voltage: 280Vac L-N / 485Vac L-L
- Permanent overload: 1.25 x (1.05 x – 600V option)
- Frequency: 45 to 65Hz
- Rated current: 1A to 5A isolated, 333mV for mV CT version
- Permanent overload: 1.5x In for 1A or 5A versions
- Current input burden: 0.5VA @ 5A

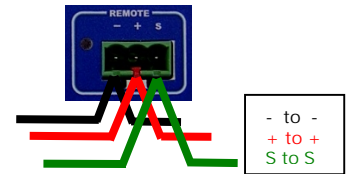
3. Wiring Remote Communications Interface

The DTS 305 has either a 2 wire RS-485 or Ethernet remote communications interface depending on Model.

2 Wire RS-485 Communications

The RS-485 port communicates using the Modbus RTU or BACnet MSTP protocol. Connection is by means of a pluggable 3 way screw terminal. Suggested communications wire is 18-22 AWG 2 core shielded cable. To connect multiple DTS 305 meters on the same 2 wire network the meters should be daisy chained together. **DO NOT connect the meters in a STAR topology.**

- Unless otherwise stated through correspondence or specified on the label of the DTS 305 unit, default parameters for RS-485 Modbus 2-wire communications are:
Modbus Address: 100, Baud Rate 9600, Parity: None, Data Bits: 8, Stop Bits: 1. This is notated as 9600,N,8,1 100.



RJ45 TCP Communications

TCP / Ethernet communication is available through the RJ45 socket mounted on the DTS 305. Modbus TCP, BACnet/IP, SNMP or DNP 3.00 are the protocols available, depending on model. Connect to an Ethernet switch by means of a straight CAT5 cable. Each DTS DC with TCP connectivity has a unique MAC address which is listed on the label.

- The default IP address is 192.168.1.150 and the default Modbus address is 100.

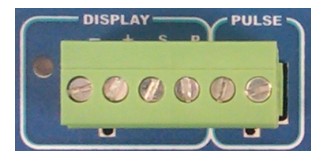


The IP address can be changed to any valid IP address using a utility called DTSsetupTCP. Download the latest version of DTSsetupTCP from <http://www.measurlogic.com/software>. Alternatively, an e-mail can be sent to info@measurlogic.com to request the latest version.

4. Wiring Remote DTS Display Interface and pulse output

The DTS 305 has 6 way pluggable 3 way screw terminal to interface with the remote DTS Display and the Pulse output. This output is a N.O. potential free solid state relay.

If a remote DTS Display module is ordered / supplied it will include a 3ft communications cable that will plug into the DTS 305 as indicated. A 7ft or 10ft DTS Display communications cable option is also available.



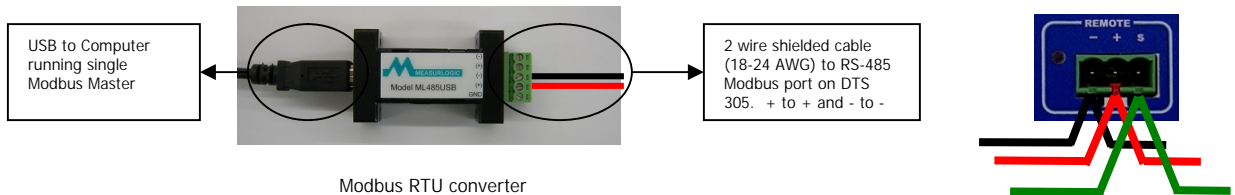
5. Installation of DTS Config Configuration and Monitoring Software

- DTS Config is a program used to easily monitor and configure meters from the DTS family from your PC.
- Download the latest version of DTS Config from <http://www.measurlogic.com/software>. Alternatively, an e-mail can be sent to info@measurlogic.com to request the latest version of DTS Config.
- Access the DTSConfigSetup file to begin the installation process
- Follow the instructions on the screen.

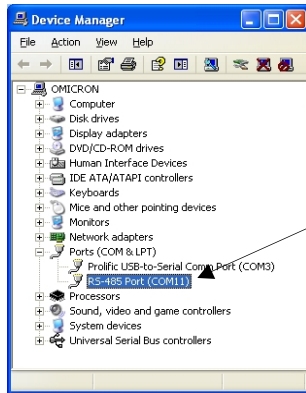
6. Connecting and Installing a RS-485 to USB Converter (RS-485 to USB Connectivity)

- Install the drivers for the Modbus RTU converter and establish it as a COM port on the PC using the included CD. For more information on this, refer to the ML485USB USB to RS-485 2-Wire Mini Converter sheet supplied with the converter.
- Connect a 2-wire shielded cable (18-24 AWG) to + and - on the terminals of the RS-485 Modbus port of the DTS 305 to the like + and - terminals on the Modbus RTU converter if using the DTS485CC-USB Rev U2 supplied converter kit.
- If using the DTS485CC-USB Rev E1 converter kit, a preconnected cable will be supplied and no further wiring is needed.

NOTE: Only one Modbus master application may be run at any one time while connecting through an RTU converter.



- Once both drivers are installed for an RS-485 to USB converter, take these steps to find which COM port it has been assigned:
- Open the computer's control panel.
- Select the System icon > Select the Hardware tab > Click the Device Manager button > Expand the Ports (COM & LPT) tree.



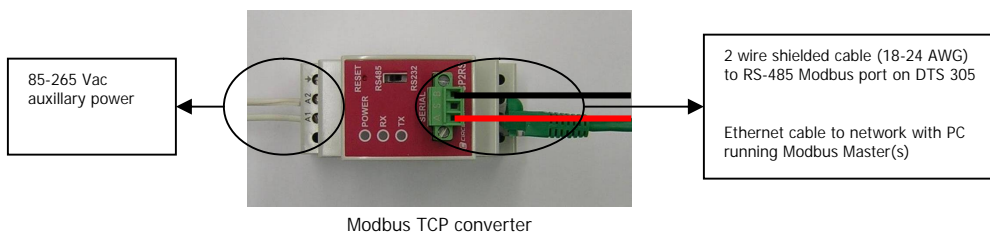
Look through the existing COM ports and identify the one labeled as an "RS-485 Port". The COM port assigned to the converter will be indicated in parentheses next to it. In this example, COM11 is being used by the 485 to USB converter.

- Take note of this COM port, as it will be needed to connect a DTS 305 to a Modbus master application, such as DTS Config.

7. Connecting and Installing the Modbus TCP Converter (RS-485 to Ethernet Connectivity)

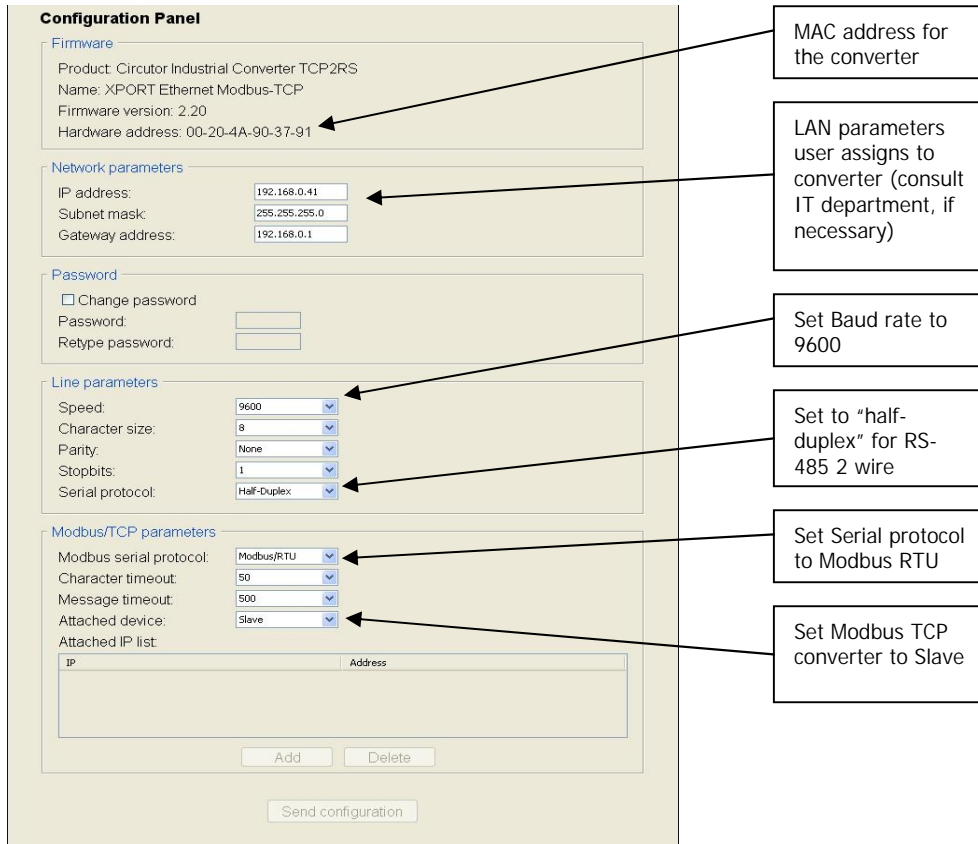
- Install the Modbus TCP converter and establish its location on the LAN using the EDSetup program located in the Software section of the included CD.
 - Contact the company IT department in order to obtain network information and a suitable static IP address if necessary.
 - The Ethernet address (also known as the Hardware or MAC Address) of the Modbus TCP converter can be found on the label of the converter.
- Connect a 2 wire shielded cable (18-24 AWG) to + and - on the terminals of the RS-485 Modbus port of the DTS 305 to the equivalent A(+) and B(-) terminals on the Modbus TCP converter.

NOTE: Multiple TCP master applications may be run simultaneously while connecting through a TCP converter.



- Open a browser and type in the IP address assigned to the converter during installation to open the screen below. The browser will open automatically after the setup if the box "Open Web page" is checked during the process.

- Make any necessary updates as required based on the specific application.



Configuration Panel

Firmware
 Product: Circutor Industrial Converter TCP2RS
 Name: XPORT Ethernet Modbus-TCP
 Firmware version: 2.20
 Hardware address: 00-20-4A-90-37-91

Network parameters
 IP address: 192.168.0.41
 Subnet mask: 255.255.255.0
 Gateway address: 192.168.0.1

Password
 Change password
 Password:
 Retype password:

Line parameters
 Speed: 9600
 Character size: 8
 Parity: None
 Stopbits: 1
 Serial protocol: Half-Duplex

Modbus/TCP parameters
 Modbus serial protocol: Modbus/RTU
 Character timeout: 50
 Message timeout: 500
 Attached device: Slave
 Attached IP list:

IP	Address

 Add Delete
 Send configuration

MAC address for the converter

LAN parameters user assigns to converter (consult IT department, if necessary)

Set Baud rate to 9600

Set to "half-duplex" for RS-485 2 wire

Set Serial protocol to Modbus RTU

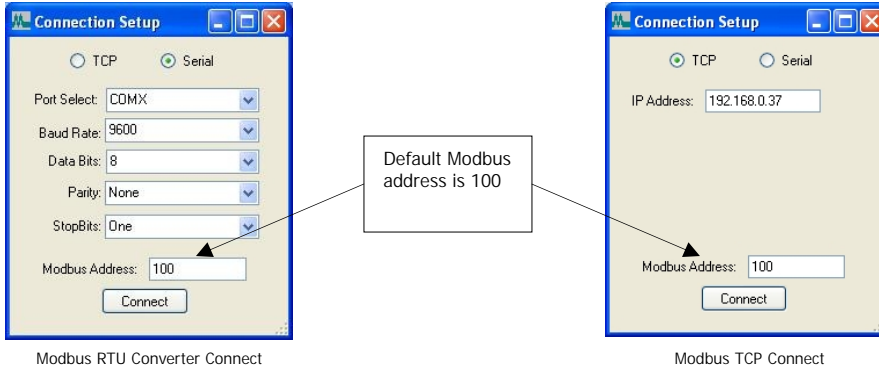
Set Modbus TCP converter to Slave

8. Communicating with DTS Config (see Section 5 for installation)

The DTS 305 has either a 2 wire RS-485 or Ethernet remote communications interface depending on Model.

The DTS Config software utility is used to configure the following

- Communications parameters of the DTS 305.
 - PT and CT ratios
 - Digital I/O (if fitted)
 - Analog Outputs (if fitted)
 - Remote Display parameters layout (if supplied)
- Open DTS Config (Default installation directory C:\Program Files\Measurlogic\DTS305_Config\)
 - Once the program has started, select the "Connect" menu and assign the correct communication parameters of the connected DTS 305 into the Connection Setup window.
 - The default Modbus address (also known as Slave ID and Peripheral Number) is 100 for the DTS 305.
 - For RTU communication, COM X in the example below is the COM port that the Modbus RTU Converter has been assigned.
 - For TCP communication, the IP address is the IP address that the Modbus TCP Converter has been assigned. Below is an example of this.
 - Note that DTS Config will always retain the last communication parameters that were set into it after closing, and will automatically connect to a DTS 305 if it has matching parameters upon startup.

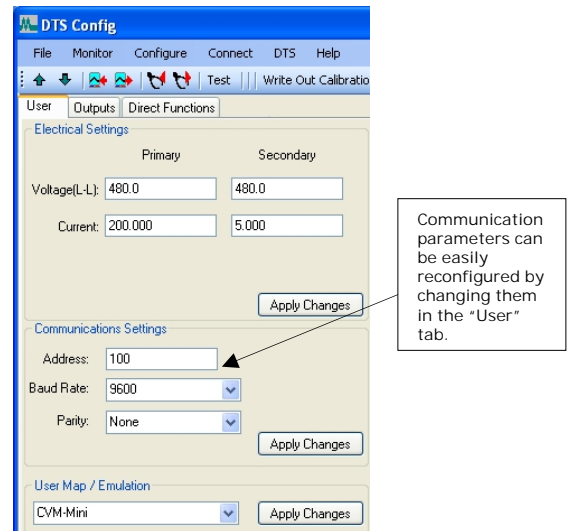


- Allow DTS Config a moment to attempt the initial connection to the DTS 305.
- Select the "Configure" menu to confirm/configure measurement inputs and/or signal outputs (if fitted). Output configuration will be detailed later in this document.
- Select the "Monitor" menu to see all the values being read by the DTS 305.

9. Configuring the DTS 305 Power Monitor in DTS Config

Configuring DTS 305 Inputs and Changing Communication Parameters

- Open the "Configure" window and select the "User" tab.
- Here the existing input and communications settings can be found and configured.
- To configure the measurement inputs, select the relevant Primary Voltage and Current based on the ratios of the installed PT and CT. (For pre-configured meters the PT and relevant CT ratio will already be set)
- To configure the communications settings, select the relevant parameters as needed. DTS Config will automatically adjust the DTS 305 to the new settings after clicking "Apply Changes" and will reconnect with the device.

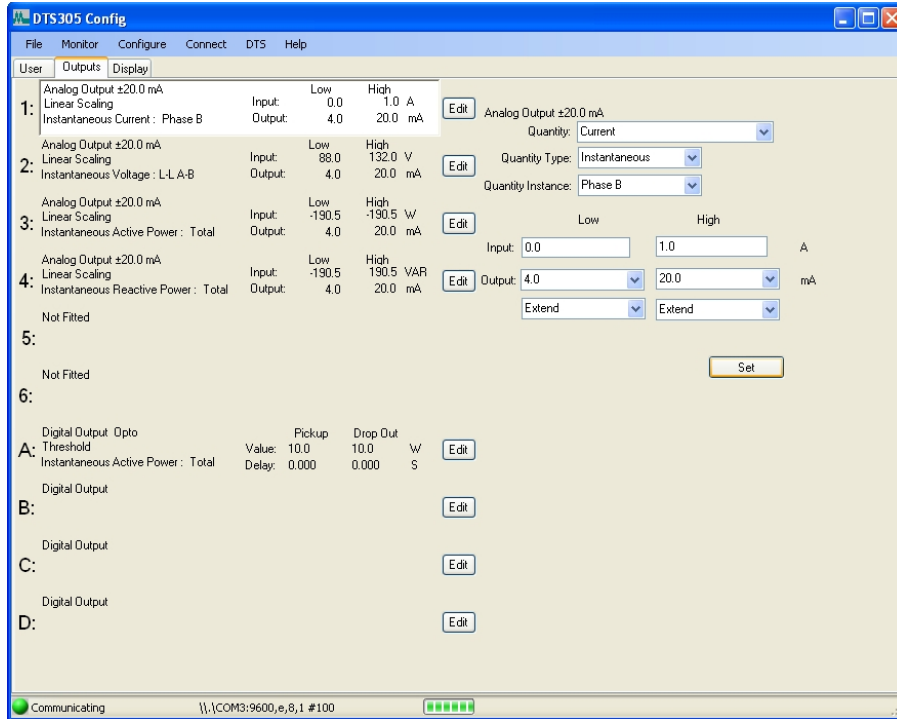


Configuring DTS 305 Analog or Digital Outputs

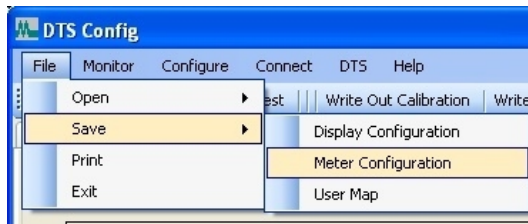
Note that if the DTS 305 is not fitted with analog or digital outputs, the "Outputs" tab will display "Not Fitted" as seen below. Disregard this section if that is the case.



- Open the "Configure" window and select the "Outputs" tab.
- Here the existing analog and digital outputs can be found and configured.
- To configure the signal outputs (if applicable) select the relevant output in the tree view on the right and configure it accordingly to the quantity instance, range, and values needed, as seen below.



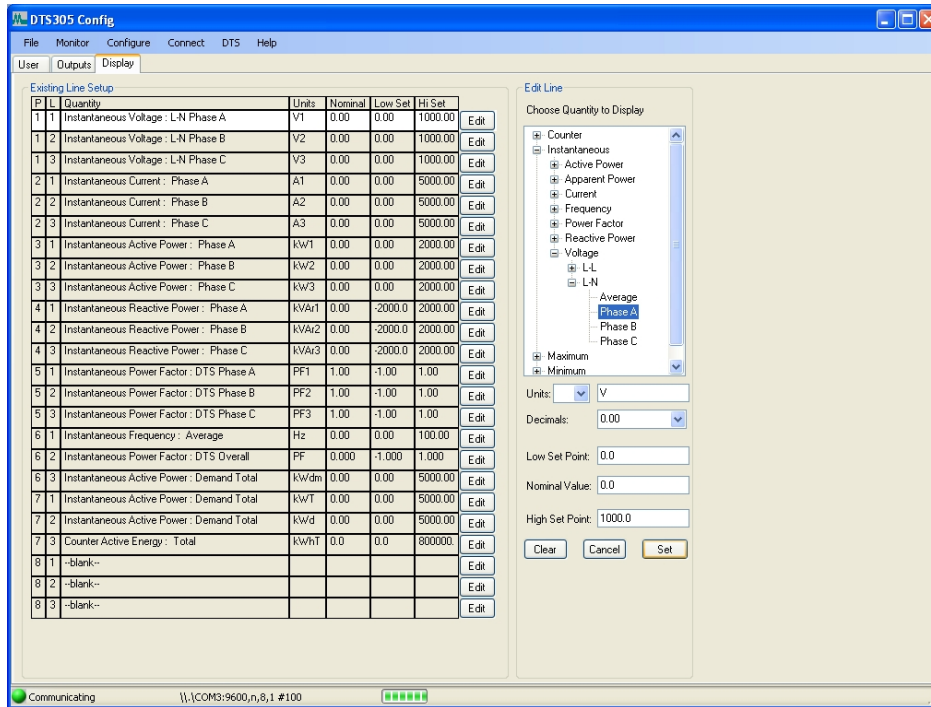
- Outputs will be configured once the “Set” button is pressed.
- In order to save these outputs in a template for future use, select “Save>Meter Configuration” from the “File” menu and save the file in the desired location.



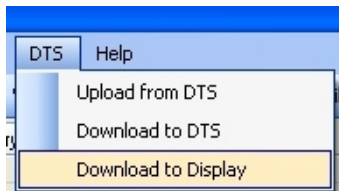
Configuring a DTS Display

This section is only relevant if a DTS 305 is being run in conjunction with a DTS Display peripheral device. If it is not, disregard this section.

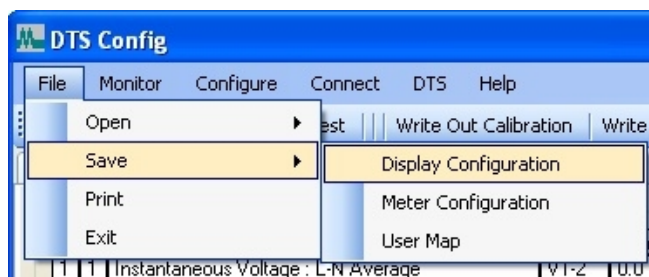
- If a DTS Display requires configuration, first attach the supplied cable between the DTS Display's COMMS port and the DTS 305's LOCAL port.
- Ensure that both devices are powered and functioning. If the DTS Display is reading “No DTS” check that the wiring is correct.
- Run DTS Config.
- After connecting to the DTS 305 in DTS Config (as explained previously), open the “Configure” menu.
- Open the “Display” tab as seen below.
 - Note that if a DTS Display is not connected to the DTS 305 upon starting DTS Config, this tab will not be present until an upload is performed from the “DTS” menu.



- This screen allows simple configuration of the DTS Display parameters.
- Once all desired changes have been made, download the new template to the DTS Display through the “DTS” Menu as seen below.

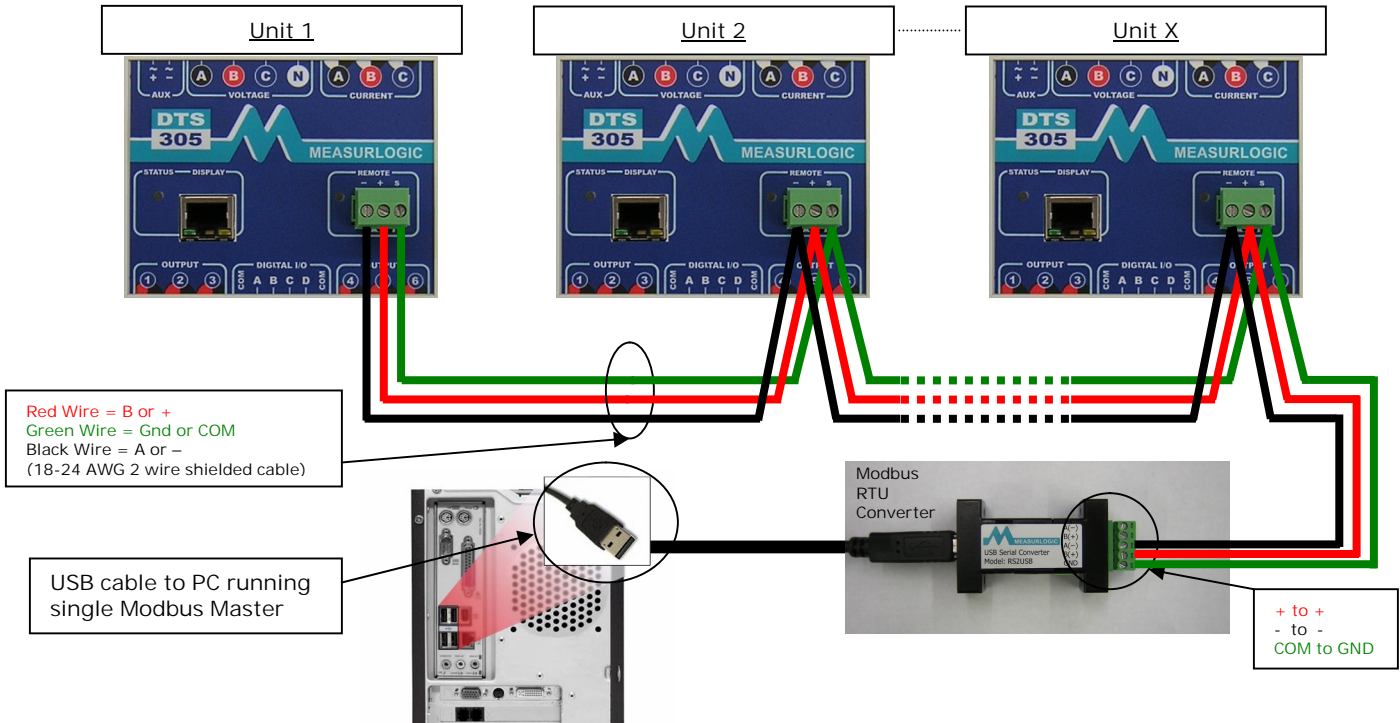


- After downloading the new template to the DTS display, it is possible to save the template for future use. Select “Save>Display Configuration” from the “File” menu and save the file in the desired location.

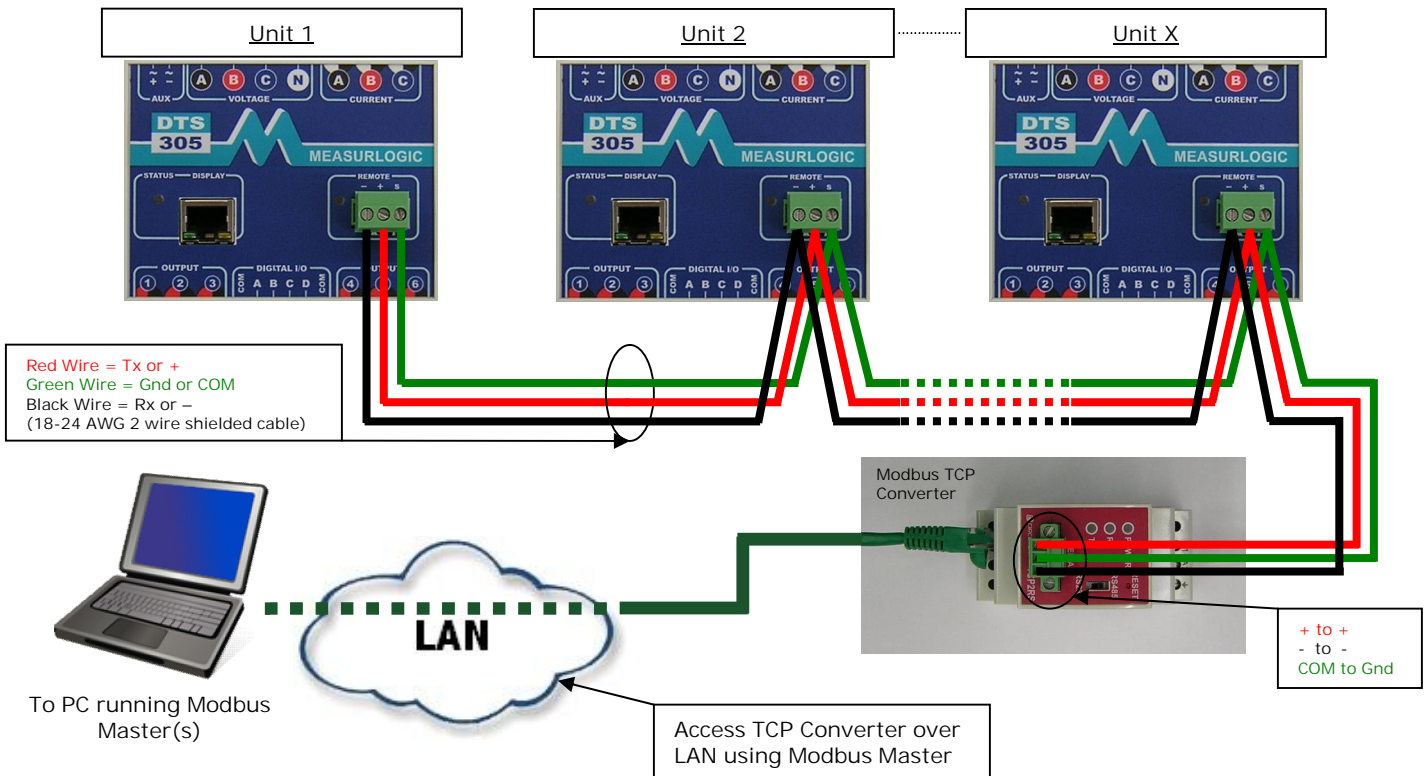


The following are types of diagrams of how to connect one or more RS-485 Serial DTS 305 meters to a PC through different converters.

DTS 305 to PC communication through Modbus RTU converter:



DTS 305 to PC communication through Modbus TCP converter:



If there are any questions please contact:
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