

This Quick Start Guide is designed to familiarize the user with the connection and configuration of the DTS SMX power meter. 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 SMX Measurement Circuit Specifications** in section 2)
- DTS SMX power monitor. Check input ranges and configuration on the front 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 SMX

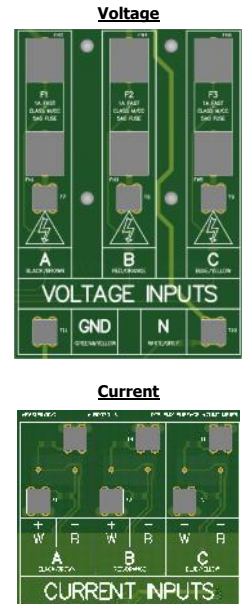
Wiring Voltage and Current Inputs:

The DTS SMX 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.

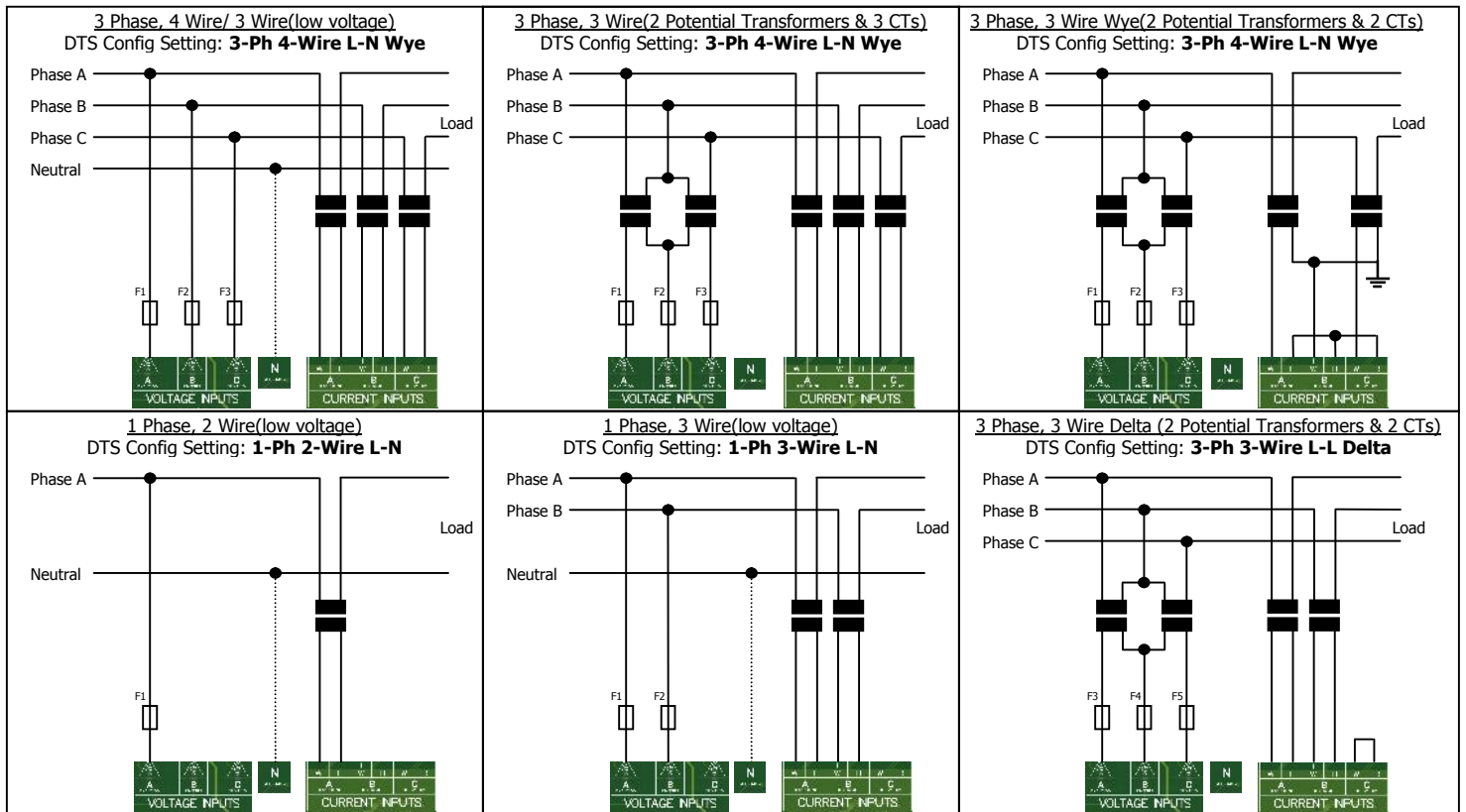
Input wiring terminals are located on the inside of the DTS SMX and are clearly indicated on the circuit board with white lettering. To minimize the risk of shock or injury while the unit is in service, the voltage input circuit is covered by an acrylic plate with a warning label. It is recommended that the size of wire used for the input terminals does not exceed 2 mm² (14 AWG) wire. The wires are connected by means of screws that clamp down onto the input wires.

The DTS SMX is powered directly from the line voltage (Phases A-B) and requires no auxiliary supply to operate. **The voltage inputs are fitted with fusing** appropriate for the model of the meter (represented by F1-F3 in the diagrams below) rated at 1A 600Vac for 480V systems or 2A 250V for 208V systems.

The following connection diagrams depict some examples of typical applications. Other connection configurations are possible. Note that for some connections, the configuration of the meter should be changed to reflect the wiring using the DTS Config software, as noted in each diagram. (SMX Model Dependant)



Application/Connection Examples



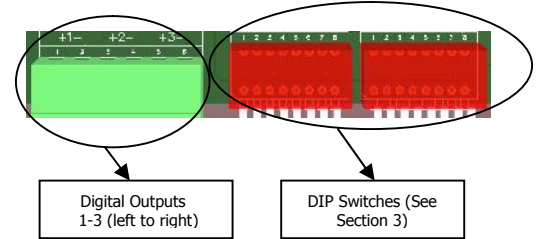
DTS SMX Measurement Circuit Specifications (Model Dependant)

- Voltage range: 120-208Vac or 208V-480V L-L
- Rated voltage: 280Vac L-N / 485Vac L-L
- Permanent overload: 1.25x
- Frequency: 45 to 65Hz
- Rated current: 1A to 5A isolated, 333mV for mV CT version
- Permanent overload: 1.5x
- Current input burden: 0.5VA @ 5A

DTS SMX Digital I/O Circuit

The DTS SMX supports up to 3 digital inputs/outputs, depending on the model. Input/output wiring terminals are located next to the DIP switches on the Display Board (mounted on the door). The six pins of the terminal are numbered 1 to 6 from left to right, and are grouped into 3 pairs of adjacent pins, so channels 1, 2 and 3 are on pins 1&2, 3&4 and 5&6 respectively.

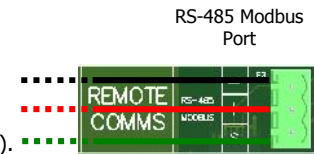
- Channels 1 and 2 may be ordered as either digital inputs or digital outputs. Channel 3 may only be a digital output.
- The digital outputs are potential-free solid state relays that can be configured for energy pulses or threshold triggers.
- The digital inputs will accept dry contacts or NPN open collector inputs.



DTS SMX Communications Connections

The DTS SMX comes equipped with an RS-485 2-wire port for remote Modbus communications. Connecting through different communications converters is detailed later in sections 5.1 and 5.2.

- Up to 32 DTS meters or other Modbus devices can have their RS-485 Modbus ports daisy-chained together to communicate through the same converter (2-wire shielded 18-24 AWG recommended).

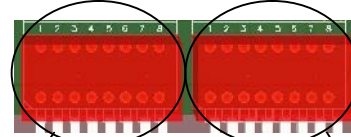


3. Configuring the DIP Switches – Comms Settings and Unit Options

The DTS SMX has two 8-way DIP switches that provide the user a simple and flexible interface for configuration. The **right hand side** block of DIP switches (SW1) are used to set up the device's Modbus address and baud rate, while the **left hand side** block of DIP switches (SW2) control display, digital output, and CT ratio options.

Switch 1

- Modbus Address (add each switch value when ON)
- Baud Rate
- If all switches are set to off, default settings are used



Switch 2
Display/DO/CT Settings

Switch 1
Comms Settings

Switch 1

Description	Switch Position							
	1	2	3	4	5	6	7	8
Modbus Address		64	32	16	8	4	2	1
9600 Baud Rate	OFF							
19200 Baud Rate	ON							
Modbus addr 100 and 9600 Baud (Default setting)	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF

Example:

The switch settings shown in this picture provide the following configuration:

- 9600 Baud rate
- Modbus Address 105



Switch 2

- Switch 2 controls 4 separate functions through the binary states of the switches: The brightness of the backlight, the number of scrolling display pages, the primary CT value, and the digital output mapping.
- Position 8 controls the display backlight. Position the switch **ON** for a backlight and **OFF** for no backlight.

- Position 7 controls the number of pages the display scrolls through before starting at page 1, again. Position the switch **ON** for 4 pages and **OFF** for all 8 pages.
- Position 3-6 dictate the CT ratio of the meter. The table below represents what switch settings equate to which value:
- Position 1-2 dictate the digital output mappings. The table below represents the different settings:

Switch 2.3-2.6 (CT Primary Selection)

SW 2.3	SW 2.4	SW 2.5	SW 2.6	CT Primary
OFF	OFF	OFF	OFF	Reserved
OFF	OFF	OFF	ON	5
OFF	OFF	ON	OFF	20
OFF	OFF	ON	ON	50
OFF	ON	OFF	OFF	100
OFF	ON	OFF	ON	200
OFF	ON	ON	OFF	400
OFF	ON	ON	ON	600
ON	OFF	OFF	OFF	800
ON	OFF	OFF	ON	1000
ON	OFF	ON	OFF	1500
ON	OFF	ON	ON	2000
ON	ON	OFF	OFF	2500
ON	ON	OFF	ON	3000
ON	ON	ON	OFF	4000
ON	ON	ON	ON	5000

Switch 2.1-2.2 (Digital Output Mappings)

SW 2.1	SW 2.2	Mapping
OFF	OFF	DTS Config Custom Mapping
OFF	ON	1 pulse / 0.1kWh
ON	OFF	1 pulse / 0.5kWh
ON	ON	1 pulse / 1.0kWh

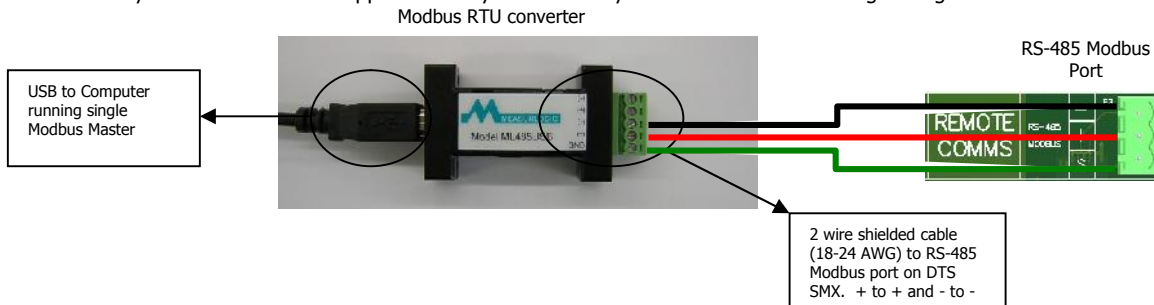
4. Installation of DTS Config Configuration and Monitoring Software

- **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 **DTSTConfigSetup** file to begin the installation process
- Follow the instructions on the screen.

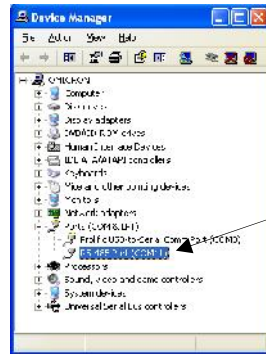
5.1 Connecting and Installing the ML485USB (RS-485 to USB Connectivity)

- 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 SMX 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 pre-connected 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.



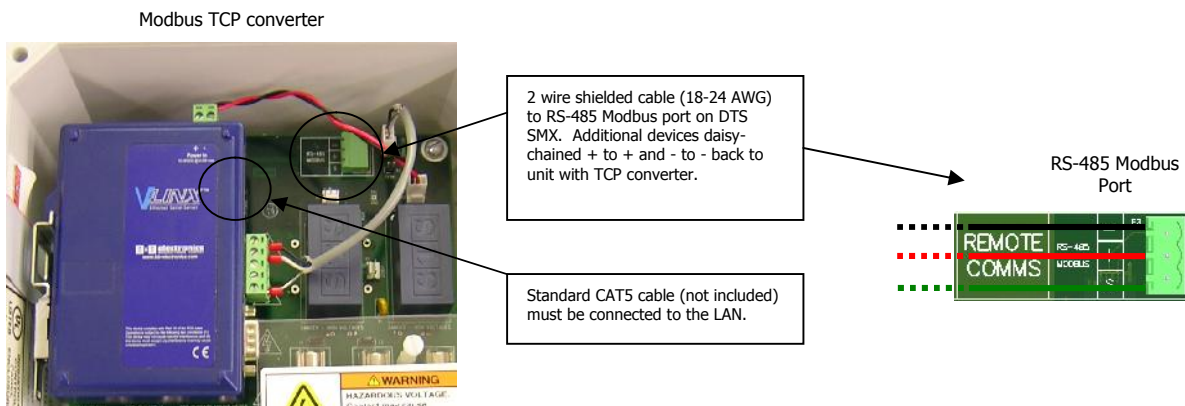
Look through the existing COM ports and identify the one labeled as an "RS-485 Port". The COM port assigned to the converter will be indicated in parentheses next to it. In this example, COM11 is being used by the 485 to USB converter.

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

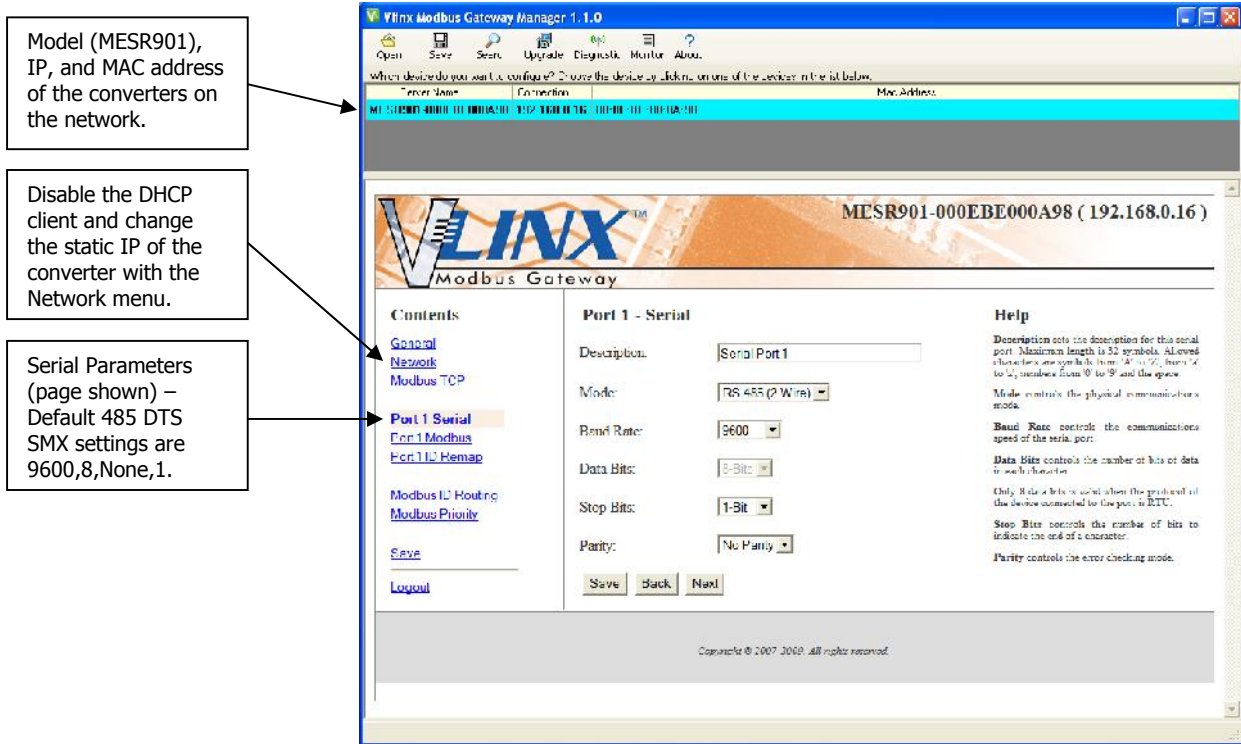
5.2 Connecting to the Modbus TCP Converter (RS-485 to Ethernet Connectivity)

- If a DTS SMX has been ordered with the TCP Gateway option, it will come pre-mounted and wired into the unit as seen below.
- Once the DTS SMX has been installed and is running, establish the TCP converter's location on the LAN using the Vlinx Modbus Gateway Manager software and instructions included on the CD.
 - Contact the company IT department in order to obtain network information and a suitable static IP address if necessary.
 - The MAC address (also known as the Hardware or Ethernet Address) of the Modbus TCP converter can be found on the front label of the DTS SMX.
- In order to attach other Modbus devices to the TCP converter, connect a 2 wire shielded cable (18-24 AWG) to + and - on the "RS-485 Modbus" connector of the DTS SMX. Multiple devices can be connected in a daisy-chain fashion this way. (See last page)

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



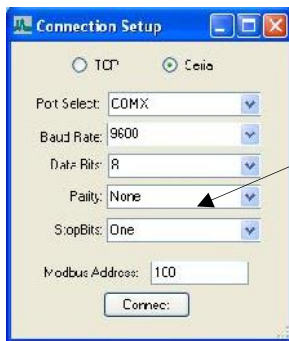
- Open a browser and type in the IP address assigned to the converter during installation to open the screen below. The browser will open automatically after the setup if the box "Open Web page" is checked during the process.
- Make any necessary updates as required based on the specific application.



6. Communicating with DTS Config

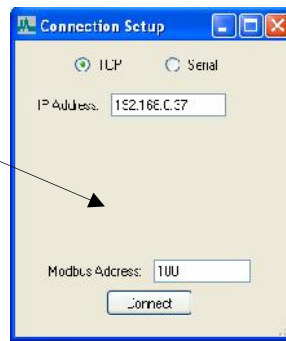
The DTS SMX is supplied with an RS-485 port for remote communication. DTS Config will utilize this Modbus port for communications through an appropriate 485 converter.

- **Default parameters for RS-485 Modbus 2-wire communications with a DTS SMX are as follows: Modbus Address: 100, Baud Rate 9600, Parity: None, Data Bits: 8, Stop Bits: 1. This is notated as 9600,N,8,1 #100.**
 - The Modbus address and baud rate of the DTS SMX can be changed by means of adjusting the DIP switches inside the unit. Refer to the table below for switch settings.
- 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 SMX into the Connection Setup window.
- The default Modbus address (also known as Slave ID and Peripheral Number) is 100 for the DTS SMX.
 - 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 SMX if it has matching parameters upon startup.



Modbus RTU Converter Connect

Default Modbus address is 100



Modbus TCP Converter Connect

Factory Modbus Settings	
Address	<u>100</u>
Baud Rate	<u>9600</u>
Parity	<u>None</u>
Data Bits	<u>8</u>
Stop Bits	<u>1</u>

- Allow DTS Config a moment to attempt the initial connection to the DTS SMX.
- 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 SMX.

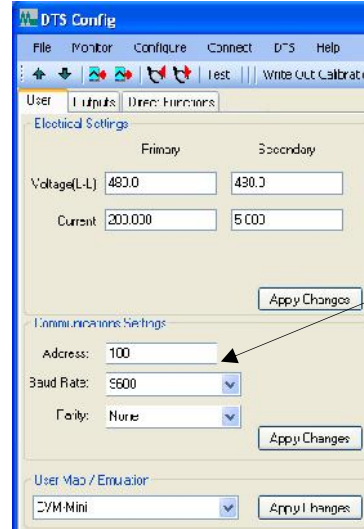
7. Configuring the DTS SMX Power Monitor in DTS Config

Configuring DTS SMX Inputs

- 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 based on the ratios of the installed PT. Primary and secondary voltages must be the same for all low voltage applications. The CT primary is chosen through the DIP switches, but can be viewed here for confirmation.
- Communications settings are configured through the DIP switches. The field in this window shows what they are currently set to.

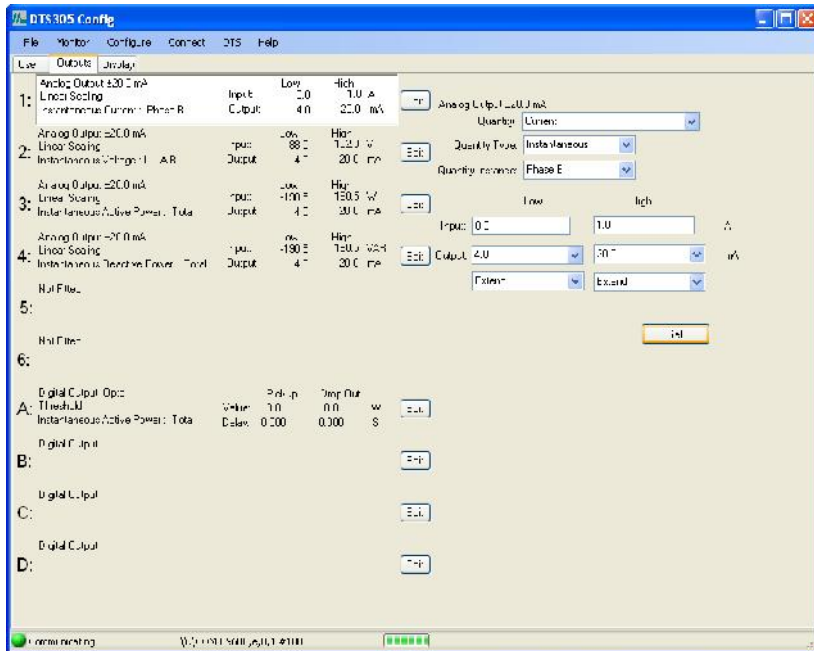
Configuring DTS SMX Outputs

Note that the DTS SMX will only show digital outputs as "fitted" in the "Outputs" tab. It will display "Not Fitted" for all locations it does not detect a digital output in, as seen below.

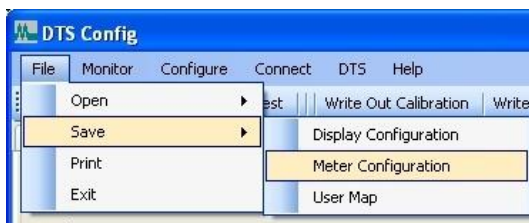


Communication parameters can be easily reconfigured by changing them in the "User" tab.

- Open the "Configure" window and select the "Outputs" tab.
- Here the existing digital outputs can be found and configured.
- To configure the signal outputs (if Switches 2.2 and 2.1 are set to OFF) select the relevant output (1-3) in the tree view on the right and configure it accordingly to the quantity instance, range, and values needed, as seen below.

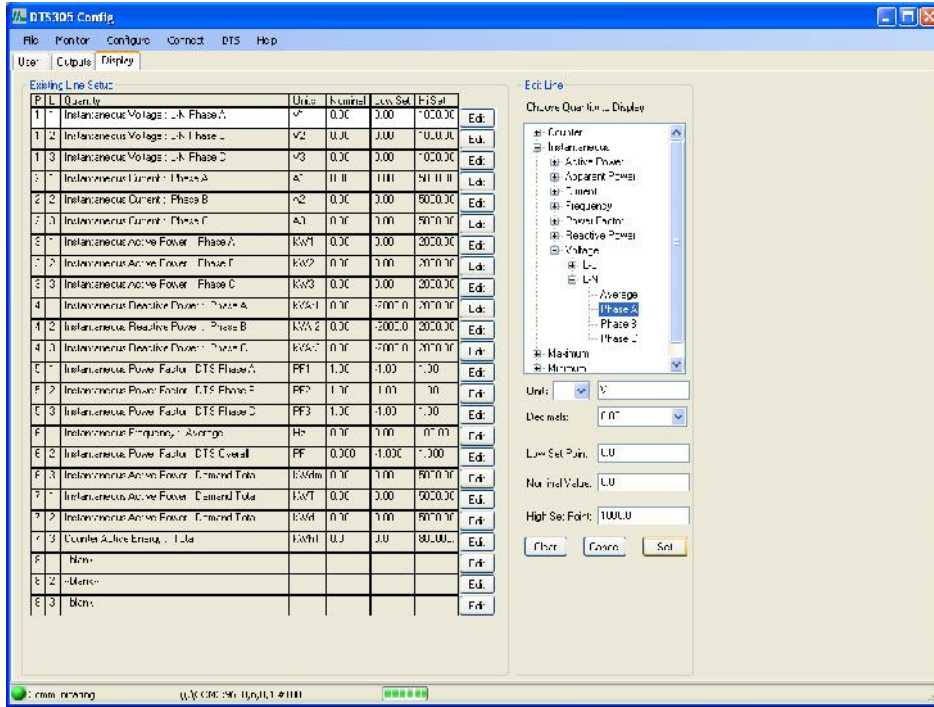


- Outputs will be configured once the "Set" button is pressed.
- In order to save these outputs in a template for future use, select "Save>Meter Configuration" from the "File" menu and save the file in the desired location.

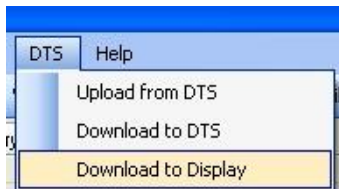


Configuring a DTS Display

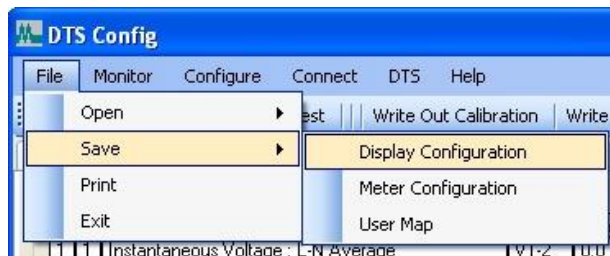
- The DTS SMX has a built-in DTS Display that can be customized to the user's specifications in DTS Config
- To configure the display, run DTS Config and connect to the DTS SMX as explained, previously.
- After connecting, open the "Configure" menu.
- Open the "Display" tab as seen below.



- 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.

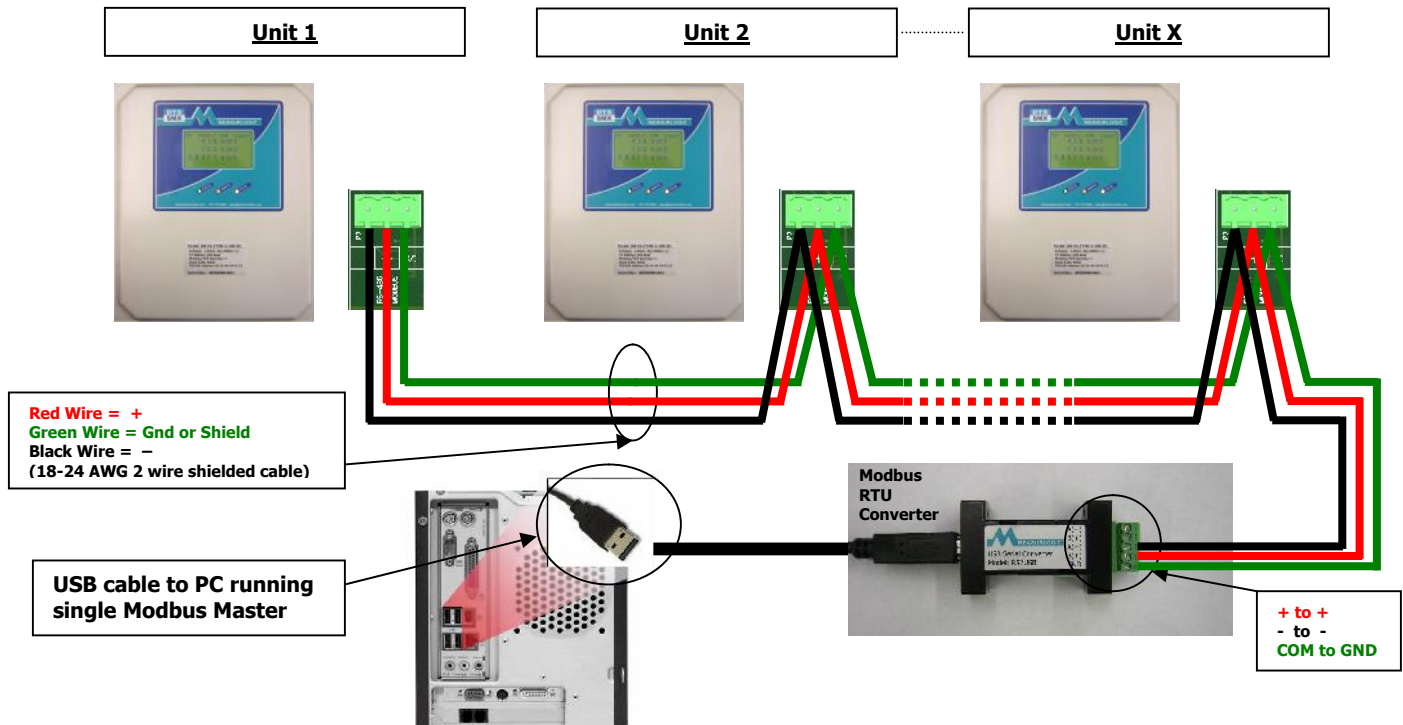


- After downloading the new template to the DTS display, it is possible to save the template for future use. Select "Save>Display Configuration" from the "File" menu and save the file in the desired location.

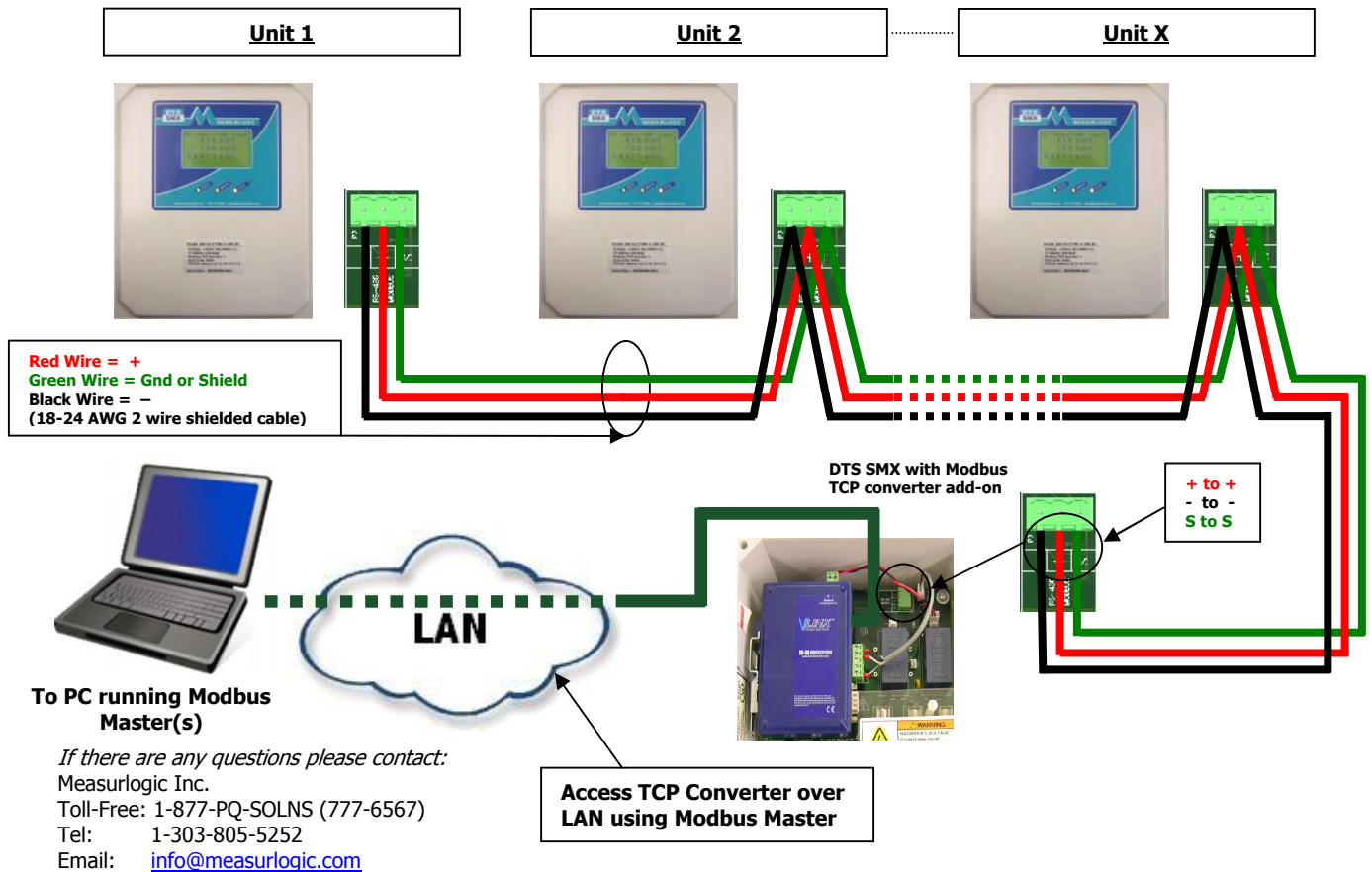


The following are typical diagrams showing connections of one or more DTS SMX meters to a PC through different converters.

DTS SMX to PC communication through Modbus RTU converter:



DTS SMX to PC communication through Modbus TCP converter:



If there are any questions please contact:
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