

This Quick Start Guide is designed to familiarize the user with the connection and configuration of the DTS-SKT and DTS-STKD power meter through RS-485 communication. 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 SKT Measurement Circuit Specifications** in section 2)
- DTS SKT power monitor. Check auxiliary power supply, input ranges, and output configuration on the top label of the unit.
- Check that the meter and equipment matches your order specifications and has not been damaged during shipping.

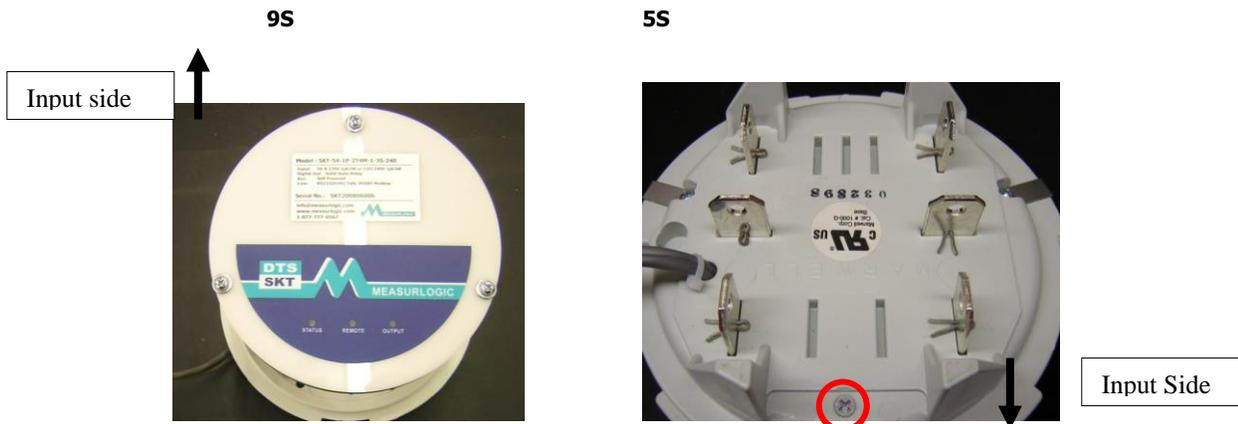
2. Connecting the DTS SKT

Wiring Voltage and Current Inputs

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

Note: Make sure your circuit is not live, before installing your SKT

The socket connections are on the bottom of the SKT, the small stabs are only used for voltage, the large stabs can act as both voltage and current, but primarily are used for current. To plug in the SKT first determine the current input stabs, regardless of the type of SKT the input side will always be the row of large stabs with one standoff directly in the middle of it. The current output stabs are surrounded on either side by standoffs. The Measurlogic logo should be right side up. It is advised that you rest the input current stabs on their terminal, and make sure the remaining stabs are lined up before pushing the meter in to the socket.



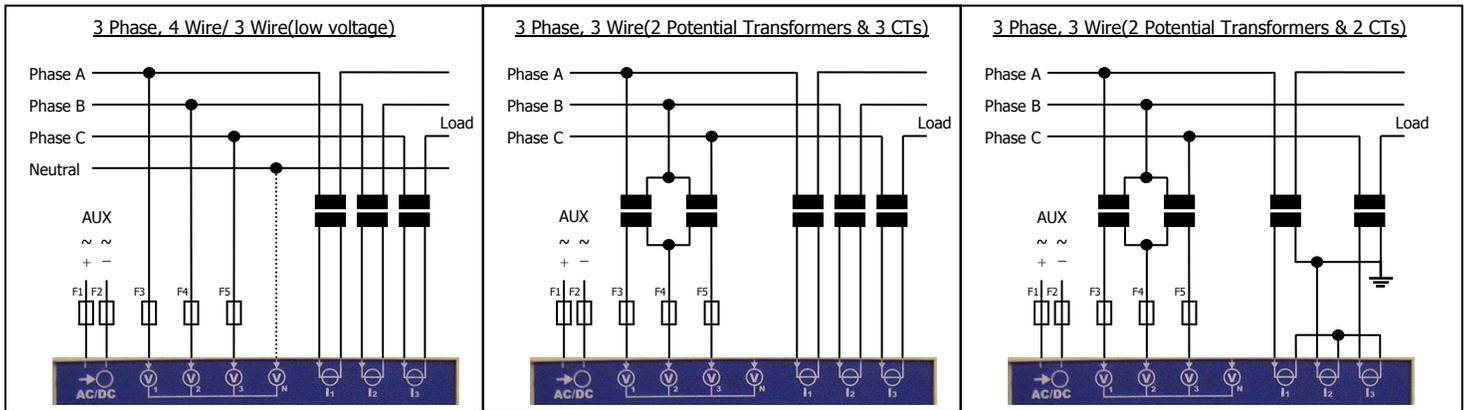
Auxiliary Power Input (AUX)

The DTS SKT draws its auxiliary power from the measured values, allowing any externally fused connection to power it.(fuses rated 2A 300Vac) Our SKTs can be made to support higher voltage, with an internal voltage transformer.

- 90 to 265 Vac 50/60 Hz (Default)
- 240-480 Vac 50/60 Hz (Transformer)

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

Application/Connection Examples



Digital Output

- All SKTs are capable of one potential free solid state relay. Which can be configured before delivery or set up in DTSConfig (See part 6, Configuring Outputs)

DTS SKT Measurement Circuit Specifications (W/O Transformer)

- Voltage range: 90-265Vac L-L, 3 or 4w
- Rated voltage: 156Vac 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

DTS SKT Measurement Circuit Specifications (Transformer)

- Voltage range: 240-480Vac L-L, 3 or 4w
- Rated voltage: 280Vac L-N / 485Vac L-L
- Permanent overload: 1.25 x (1.05 x – 600V option)
- Frequency: 45 to 65Hz
- Rated current: 5A to 200A isolated, 333mV for mV CT version
- Permanent overload: 1.5x In for 1A or 5A versions
- Current input burden: 0.5VA @ 5A

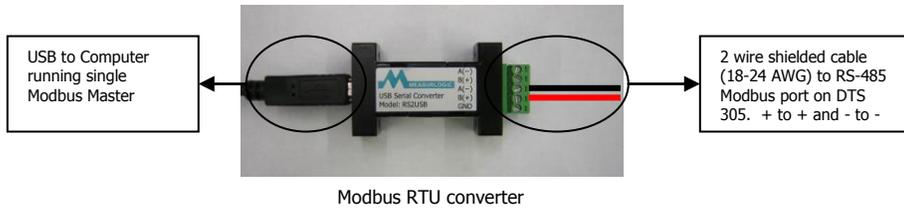
3. Installation of DTS Config Configuration and Monitoring Software

- 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.

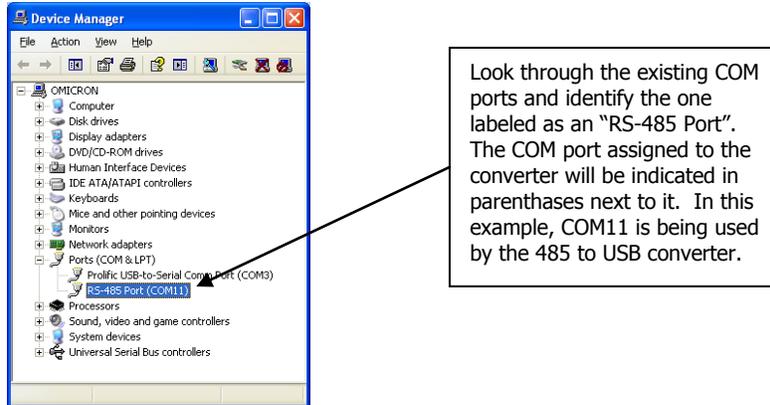
4.1 Connecting and Installing the RS-485 to USB Converter (RS-485 to USB Connectivity)

- 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 **Communications Cable Quick Start Guide**.
- 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 B(+) and A(-) terminals on the Modbus RTU converter is 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 the 2 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.



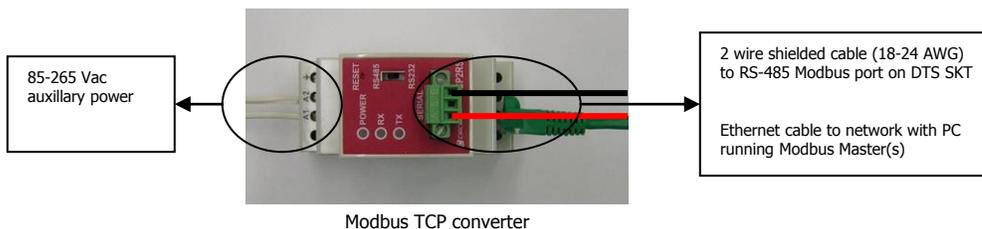
Take note of this COM port, as it will be needed to connect a DTS SKT to a Modbus master application, such as DTS Config

4.2 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 – to the male communication cable of the SKT RS-485 Modbus, to the equivalent A(+) and B(-) terminals on the Modbus TCP converter.

NOTE: You may have as many SKTs daisy chained together, as long as they are linked, not branched. IE Male to female, male to female, ending with a male. (see **Conneting Multiple SKTs** for more information)

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.

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

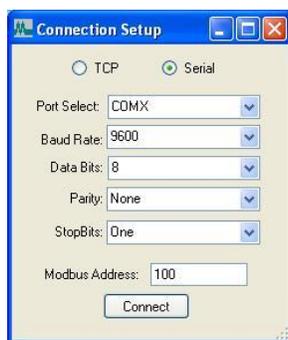
Callouts:

- MAC address for the converter (points to Hardware address)
- LAN parameters user assigns to converter (consult IT department, if necessary) (points to Network parameters)
- Set Baud rate to 9600 (points to Speed)
- Set to "half-duplex" for RS-485 2 wire (points to Serial protocol)
- Set Serial protocol to Modbus RTU (points to Modbus serial protocol)
- Set Modbus TCP converter to Slave (points to Attached device)

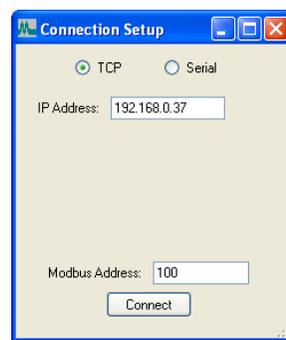
5. Communicating with DTS Config

The DTS SKT is supplied with 2 communication options. An RS-232 serial port inside the meter and two RS-485 Modbus wires (one male, one female) for remote communication. DTS Config will utilize the RS-485 Modbus connection for communication.

- **Unless otherwise stated through correspondence or specified on the side label of the DTS SKT unit, default parameters for RS-485 Modbus 2-wire communications with a DTS SKT 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.**
- Open DTS Config (Default installation directory C:\Program Files\Measurlogic\DTSSKT_Config\)
- Once the program has started, select the "Connect" menu and assign the correct communication parameters of the connected DTS SKT into the Connection Setup window.
- The default Modbus address (also known as Slave ID and Peripheral Number) is 100 for the DTS SKT.
 - 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 SKT if it has matching parameters upon startup.



Modbus RTU Converter Connect



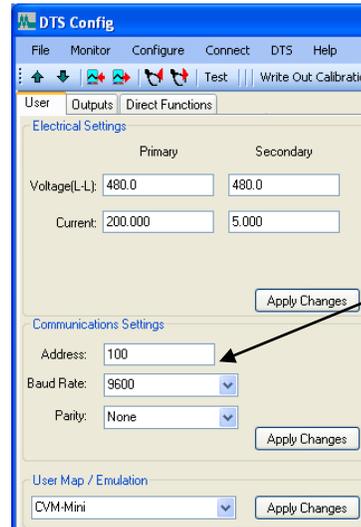
10235 S. Progress Way, Unit 1, Parker CO 80134
 Modbus TCP Converter Connect (777-6567) Fax: 425-799-4780
 Tel: 777-6567 e-mail: info@measurlogic.com
 web: www.measurlogic.com

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

6. Configuring the DTS SKT Power Monitor in DTS Config

Configuring DTS SKT 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.
- To configure the communications settings, select the relevant parameters as needed. DTS Config will automatically adjust the DTS SKT to the new settings after clicking "Apply Changes" and will reconnect with the device.

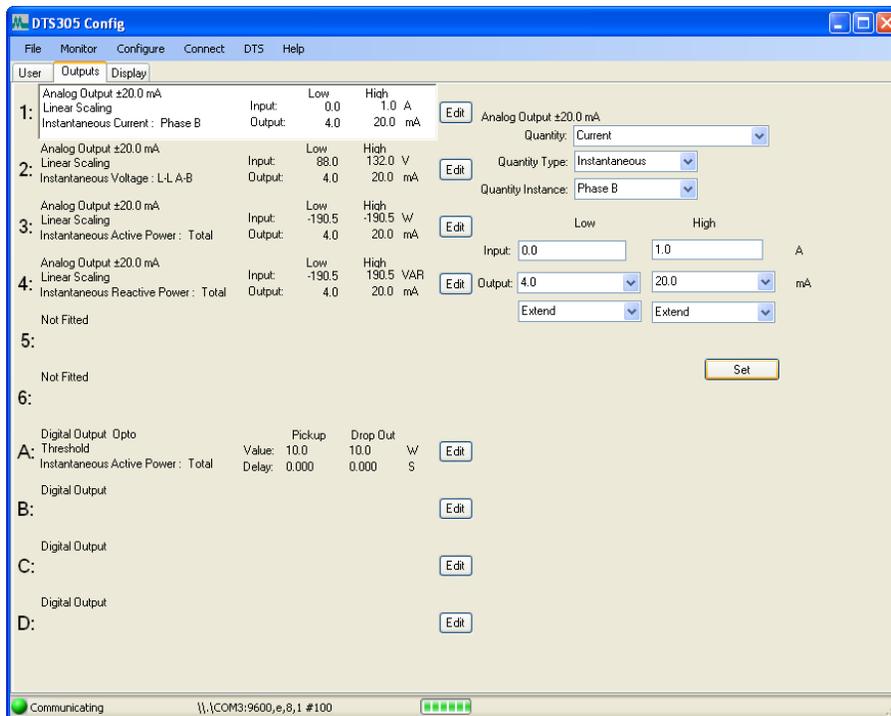


Configuring DTS SKT Outputs

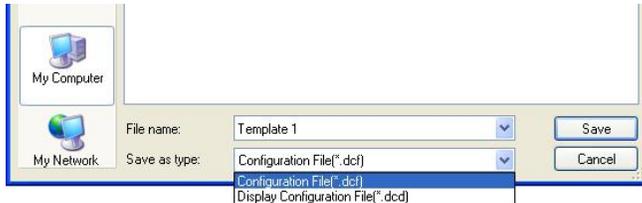
Note that if the DTS SKT is not fitted with a digital output, the "Outputs" tab will display "Not Fitted" as seen below. Disregard this section if that is the case.



- Open the "Configure" window and select the "Outputs" tab.
- Here the existing 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.



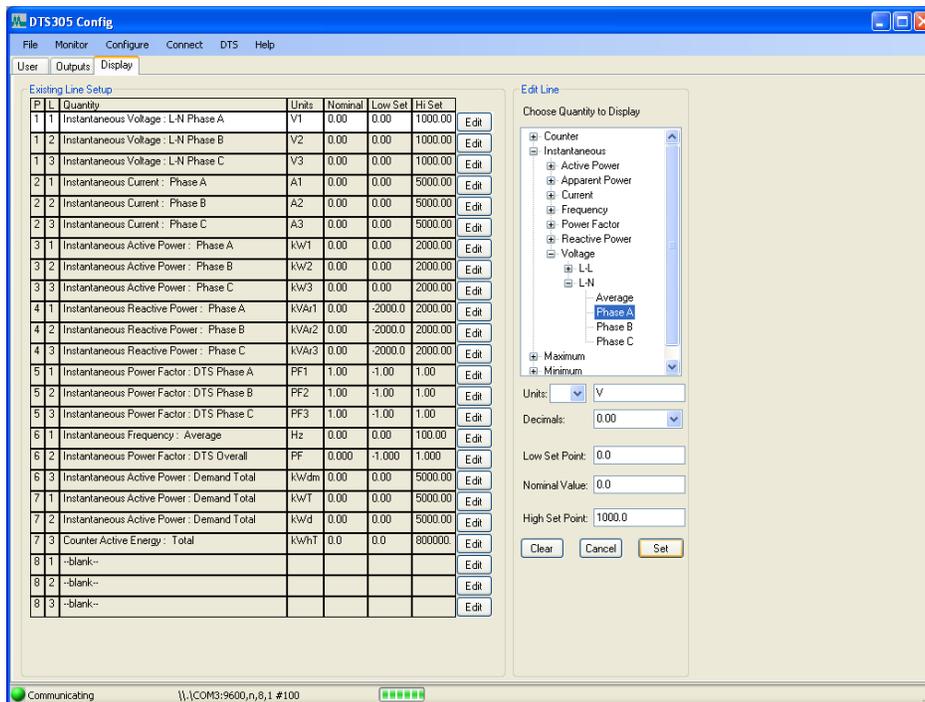
- Outputs will be configured once the "Set" button is pressed.
- In order to save these outputs in a template for future use, select "Save Config As..." from the "File" menu and save the file in the desired location.
 - Note that the file may be saved as either a Configuration File or a Display Configuration File. For the purpose of saving the input and output configurations in a template, use the Configuration Format as seen below.



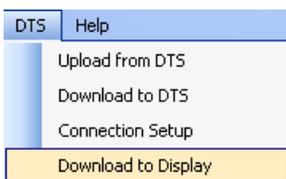
Configuring a SKTD Display

This section is only relevant if a SKT is being run in conjunction with a SKTD. or if you only have a SKTD running. If it is not, disregard this section.

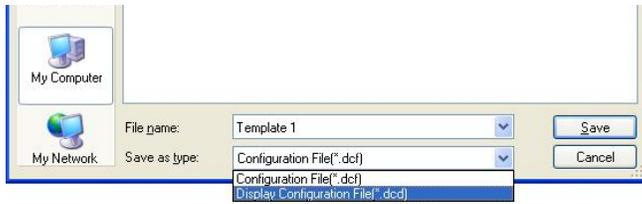
- Run DTS Config.
- After connecting to the DTS SKT in DTS Config (as explained previously), open the "Configure" menu.
- Open the "Display" tab as seen below.
 - Note that if a Display is not being recognized, try to preformed an upload from the "DTS" menu.



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



- After downloading the new template to the display, it is possible to save the template for future use. Select "Save Config As..." from the "File" menu and save the file in the desired location.
 - Note that the file may be saved as either a Configuration File or a Display Configuration File. For the purpose of exclusively saving a display template, use the Display Configuration Format as seen below.



7. **POWERSTUDIO Energy Management Software**

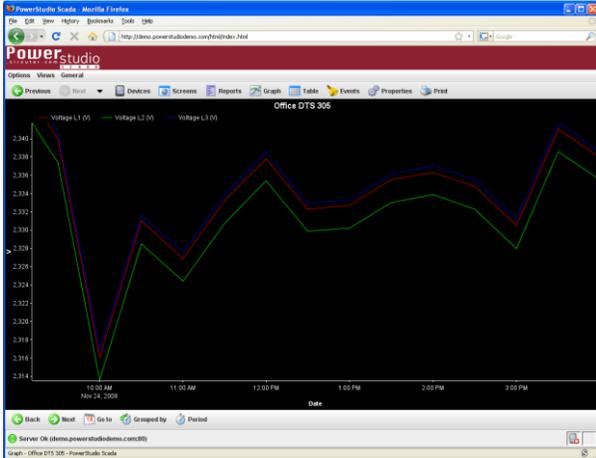
PowerStudio is a flexible web based monitoring and logging energy management application that is capable of operating with the DTS family of energy meters. An upgraded version of **PowerStudio** called **PowerStudio SCADA** can also provide the ability to customize interactive screen layouts and automated reports to suit your requirements. **PowerStudio SCADA DELUXE** further increases the web application's versatility by allowing custom Modbus drivers to be configured for complete use with any 3rd party Modbus devices.

PowerStudio is intended to be installed on a PC or server on the network that can run 24/7/365. This allows constant real-time or logged data to be viewed through a standard browser from any location on your network.

Key features of PowerStudio are:

- Based on a central database that can reside on **any** PC on the LAN.
- PC does not have to be dedicated to this task but should be backed up with a UPS so that you ensure data logging 24/7/365.
- Software is purchased and owned by the customer. There are **NO** additional monthly or annual licenses payable.
- There is no limit to the number of users. This is controlled by the Administrator of the system providing user access through password control.
- Number of attached devices also is not limited so expanding the system to accommodate multiple meters can easily be achieved. **There is NO per device license**
- The number of meters on the network as well as the requested number of values per meter will have an impact on the update time of the data in the database.
- User access to specific meters or groups is also configurable by the Administrator.
- Custom screen and report design tools are included, as standard, within **PowerStudio SCADA**.
- Drivers for all Measurlogic meters are included with **PowerStudio SCADA**
- **PowerStudio Scada DELUXE** is required to interface any 3rd party instrument that has a Modbus RTU or TCP output
- Real time display of all electrical parameters or process variables
- Display of historic data (day, week, month etc.)
- Ability to export historical data in Excel or XML formats
- Ability to link with 3rd party applications using XML, OPC or DDE
- Event triggered email

Below are some examples of data being displayed through the **PowerStudio** interface in a typical browser.



Automatic graphs spanning any date range and logging interval

Tables showing accurate and detailed values of any variable

Parameter	L1	L2	L3	II
Voltage	120.00	119.96	119.99	120.00
Phase angle (°)	207.87	207.71	207.86	207.81
Phase angle (°)	0.6	0.6	0.6	0.90
Total distortion (%)	60.00	60.00	60.00	96.0
Distribution in neutral tension (%)	3.4	5.5	2.2	
Frequency (Hz)	2.1	0.6	1.8	
Power factor (PF)				
Current (A)	80.0	40.0	95.0	72.0
Neutral current (A)				0.0
Total distortion (%)	0.0	0.0	0.0	0.0
Distribution in neutral current (%)				
Instantaneous				
Voltage	0.0	0.0	0.0	0.0
Current	23.8		22.9	
Energy				
Active (kW)	Consumed (kWh)	Generated (kWh)		
Capacitive (kvarh)	132.8	45.292		
Inductive (kvarh)	48273.3	3846.3		
Apparent (kVAh)	207,199.0	186,040		
Temperature (°C)				85.2

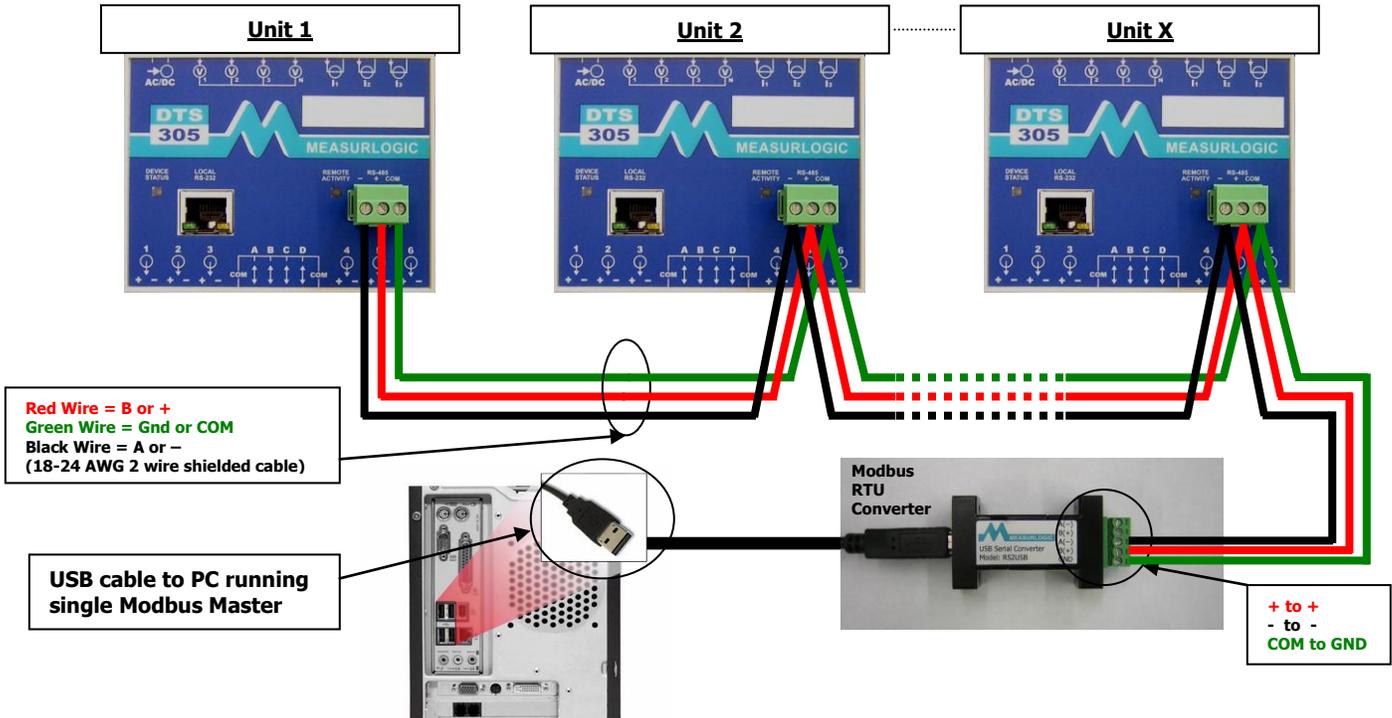
Real-time data of every measured variable in connected devices

Fully customizable interactive screens and automated reports

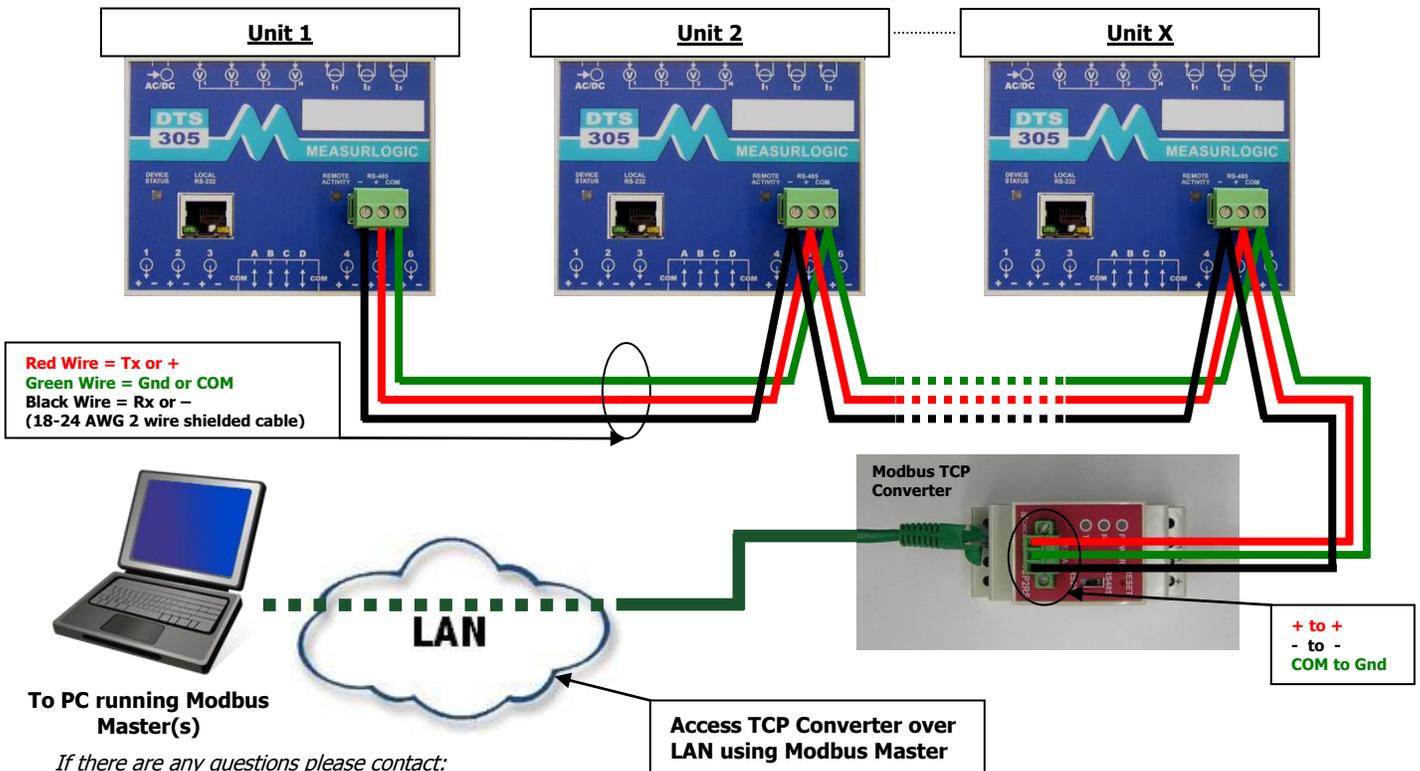
For more information and instructions on how to connect to and use **PowerStudio**, please refer to the **PowerStudio** section of the full **DTS 305 Manual MQ-0004 V1.0**.

The following are types of diagrams of how to connect one or more DTS SKT meters to a PC through different converters.

DTS SKT to PC communication through Modbus RTU converter:



DTS SKT to PC communication through Modbus TCP converter:



If there are any questions please contact:
 Measurlogic Inc.
 Toll-Free: 1-877-PQ-SOLNS (777-6567)
 Tel: 1-303-805-5252
 Email: info@measurlogic.com