TITLE: TROUBLESHOOTING MANUAL

POSSIBLE ERRORS

1. Code not compiling.
2. Incorrect voltage displaying as compared to a TRMS (True Root Mean Square) meter.
3. Incorrect current/power display.
4. Meter refusing to send data to things board or not connecting to API (Application Programming Interface).
5. Keypad not displaying what is pressed correctly.
6. Incorrect LED (Light Emitting Diode) display.

SOLUTION TO POSSIBLE ERROR

1. CODE NOT COMPILING:

Code may not compile due to library used in code not installed in the library folder of the Arduino IDE (Integrated Development Environment) installation path. Developer should copy the necessary library to the installation path, and restart the IDE then try re-compiling or install the libraries from

SKETCH → INCLUDE LIBRARY → ADD ZIP LIBRARY, then add the necessary library with the complain on the **verbose** output.

2. INCORRECT VOLTAGE DISPLAYING AS COMPARED TO A TRMS METER:

Meter may display incorrect voltage if the developer did not tune the variable resistor to calibrate the voltage in comparison with a TRMS meter or another developer may choose to change the calibration formula on the firmware to display the voltage correctly. The calibration formula can be seen in the void measure() under mains_input_value=mains_v*0.425560128029263831732967543667.

3. INCORRECT CURRENT/POWER DISPLAY:

Meter may display wrong current/power if not properly calibrated according to the transformation ratio and if the current transformer is not in-line with the burden resistor based on the below formula :

Burden resistor = (Aref *CT turns) / (2√2 *CT current)

Where :

Aref = analog reference voltage(5v)

CT turns= current transformer turn ratio

CT current = current transformer maximum current handling capability.

Note: the resistor value does not have to be exact, but close to the calculated value.

After doing this and true value is not gotten as compared to a current measuring meter, developer will need to re-calibrate from the formula available in void measure() under curr=relcur*0.025454545454545454545454545454 to get desired current as measured and displayed by the current measuring meter or device, which in turn affect the power displayed.

4. METER REFUSING TO SEND DATA TO THINGS BOARD OR NOT CONNECTING TO API:

Change the APN (Access Point Name) to match the APN of the Simcard used, also check to make sure there is match between the things board token on firmware and things board page token created.

5. KEYPAD NOT DISPLAYING WHAT IS PRESSED CORRECTLY:

If meter does not display what is pressed correctly on the LCD while inputting STS token, developer should reverse keypad connection on hardware.

6. INCORRECT LED DISPLAY:

If LED display incorrectly for low/normal credit, developer can change hardware connection to LED or change code pin assignment between green LED and red LED on #define red_led and #green_led.