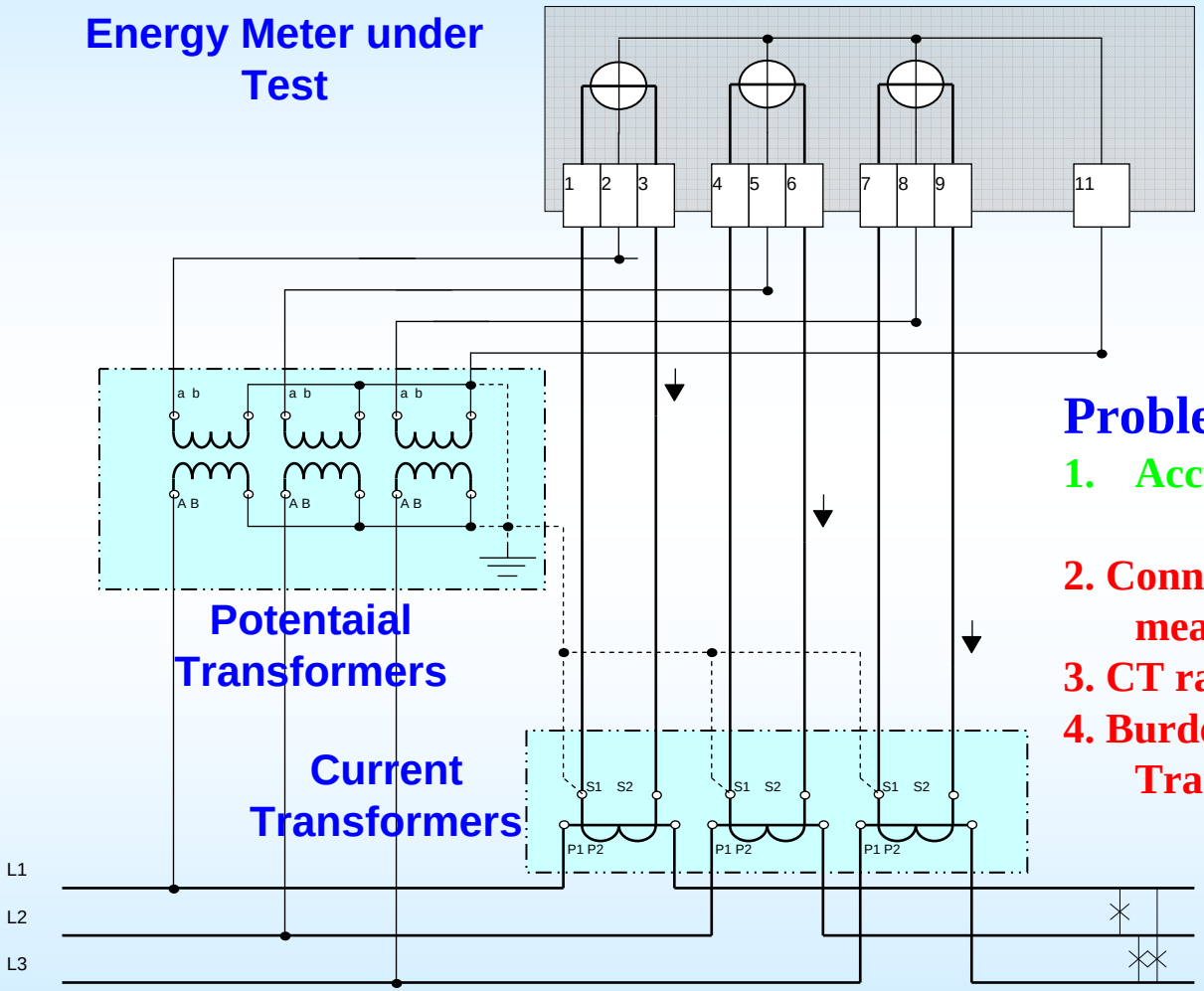
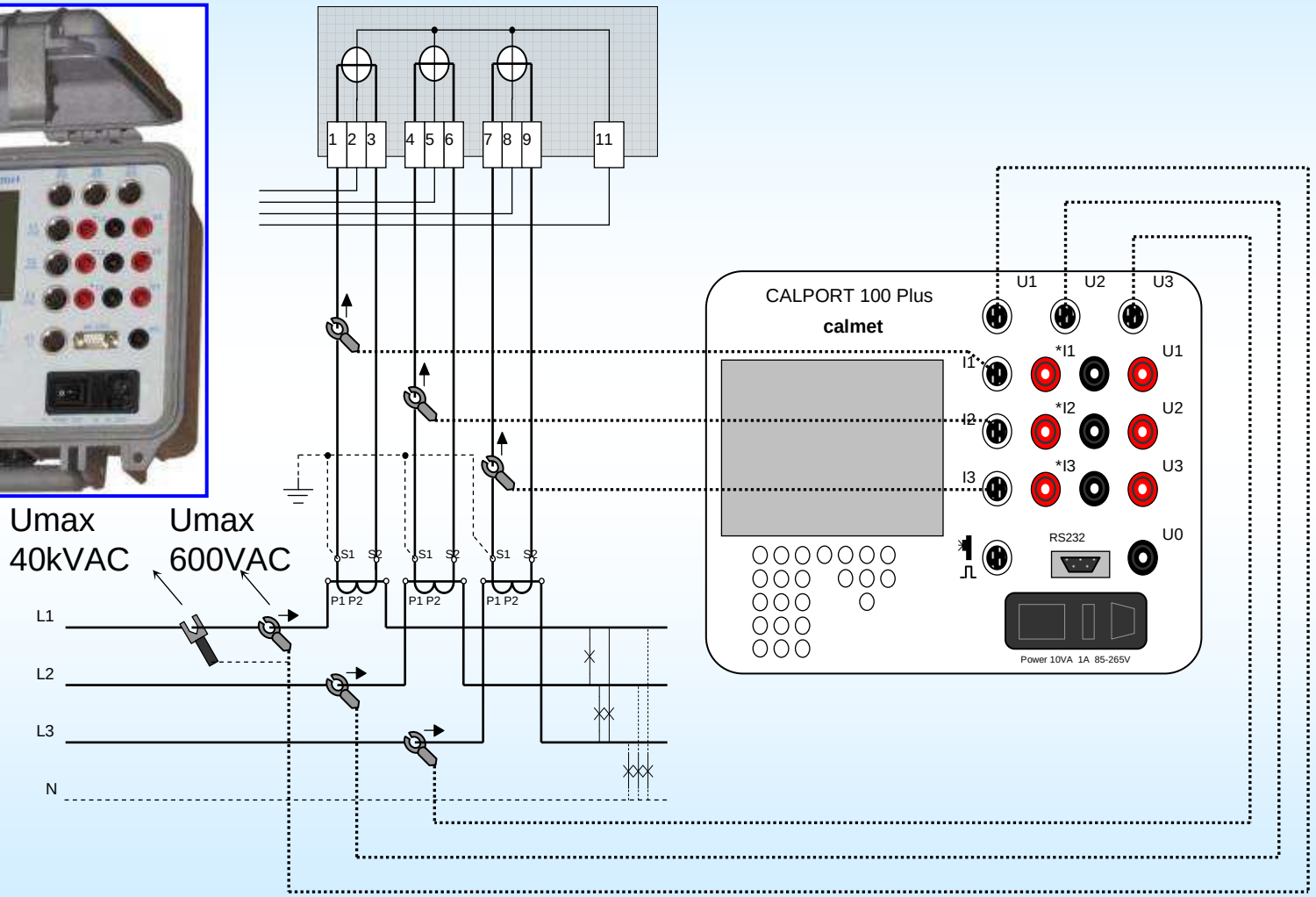
On Site Current Transformer Testing



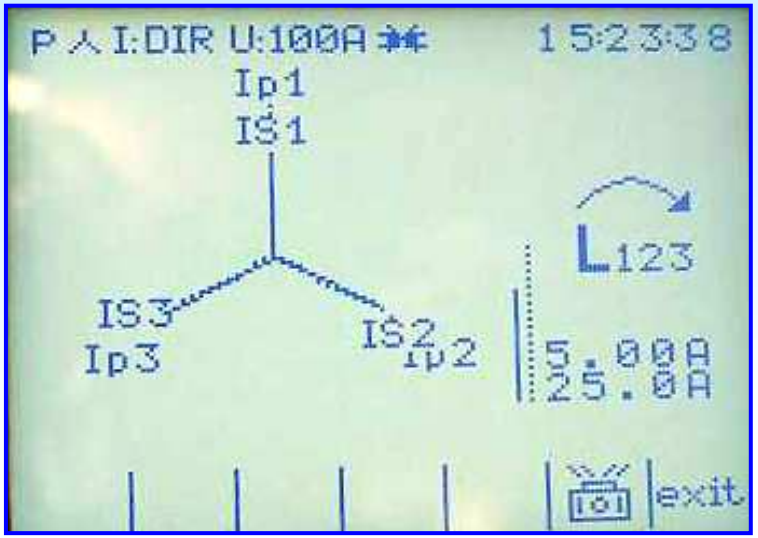
Problems:

1. Accuracy of Energy Meter (SOLVED)
2. Connection correctness in measurement circuit
3. CT ratio and phase shift error
4. Burden of Current and Voltage Transformers

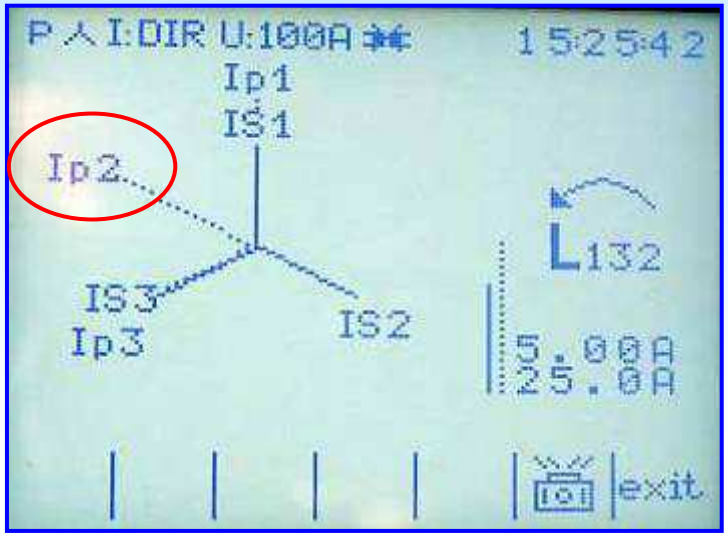
Calport100 Plus Analyser & Tester of Energy Meters and Network



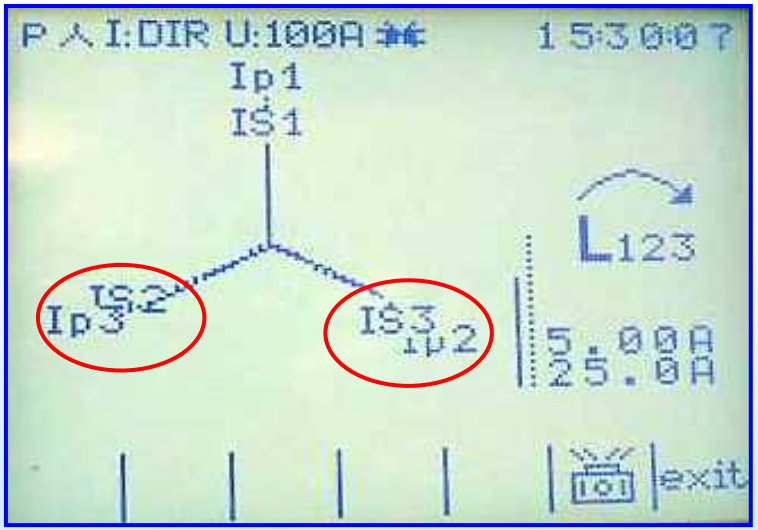
Results of Connection Correctness Test



Correct connection



Primary Current Ip2 connected in reversed way



Interchanged Secondary Windings IS2 & IS3

CT Ratio & Phase Shift Error

Example: CT ratio and phase shift error test
CT: 25A/5A in phase L2

Ip – measured value of primary current

Is – measured value of secondary current

Ip/Is – measured CT Ratio

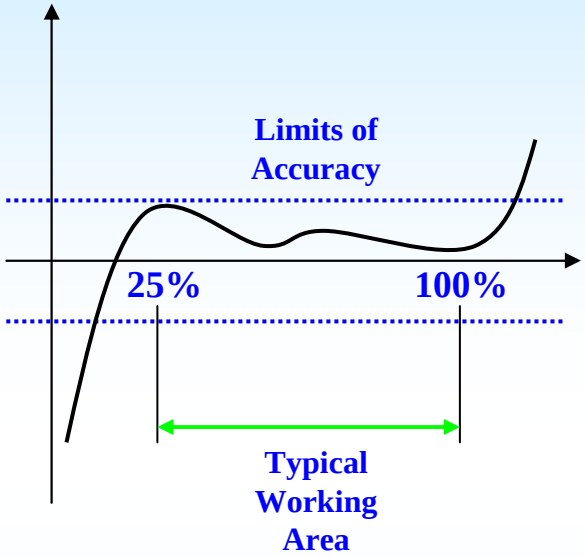
I_{pn}/I_{sn} – nominal value of CT Ratio

ε – CT Ratio Error

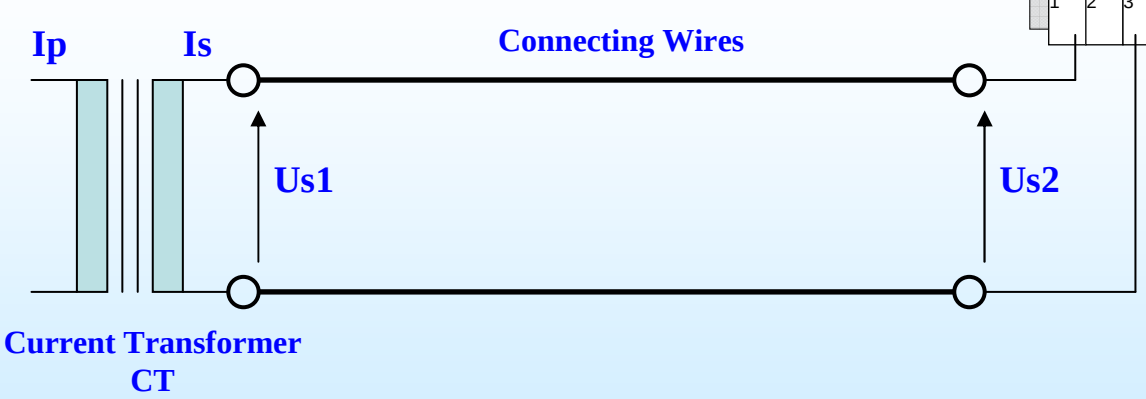
dφ – CT Phase Shift Error

CT Burden Test

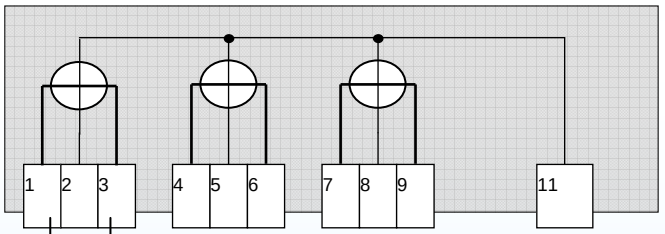
ε – CT Ratio Error in [%]



[%] Percent of Nominal Power of CT - Sn



Energy Meter under Test



Example:

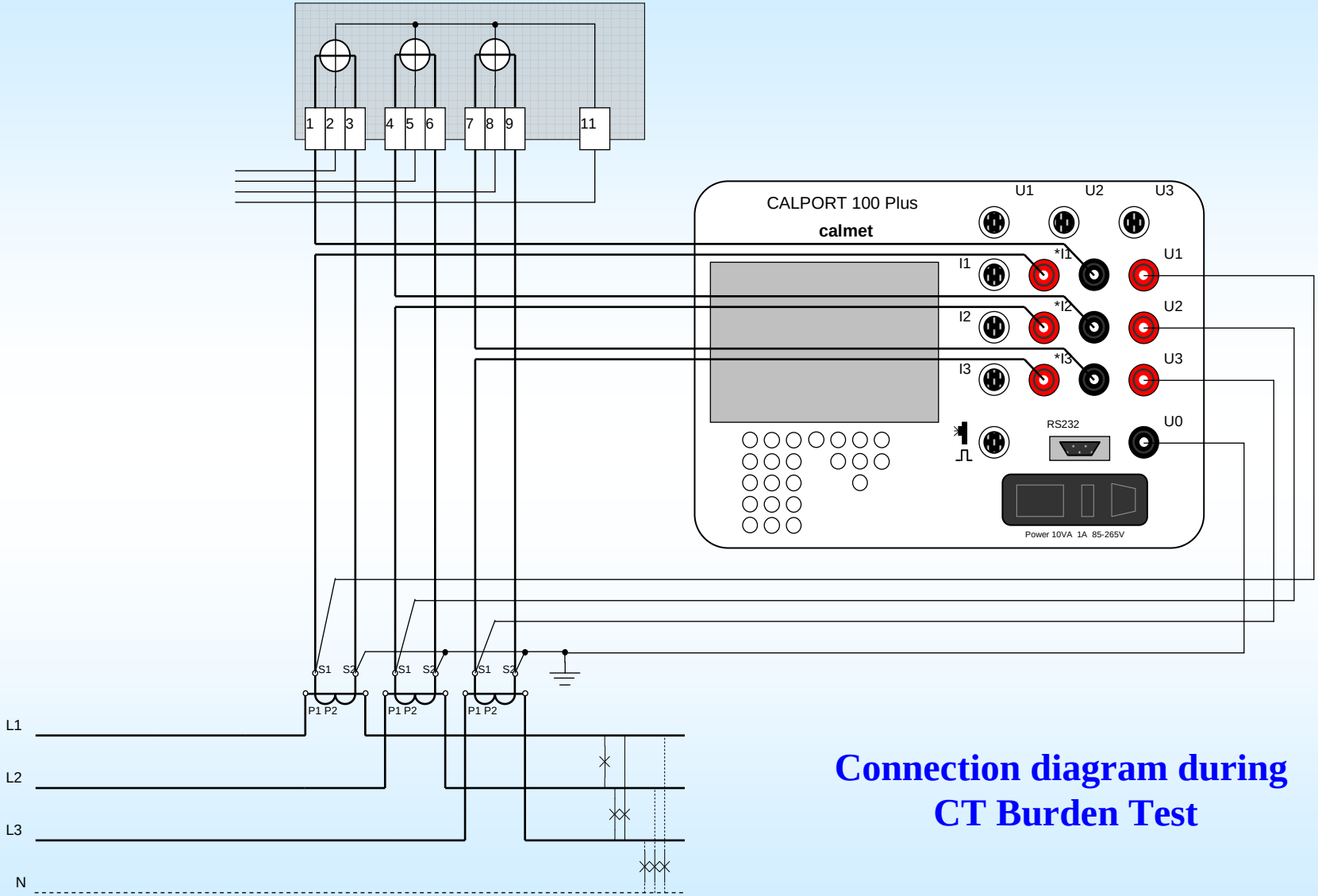
Rp – wires Resistance

$$R_P = \frac{\rho_{CU} \cdot l}{S} = \frac{0,0175\Omega \frac{mm^2}{m} \cdot 2 \cdot 10m}{1mm^2} = 0,35\Omega$$

Pp – Power losses in Wires

$$P_P = I_2^{\,2} \cdot R_P = 5^2 A \cdot 0,35\Omega = 8,75VA$$

CT Burden Test by means of Calport100Plus



Connection diagram during CT Burden Test

CT Burden Testing - examples

Current Transformer with nominal power Sn=20VA

Correct, full power usage (99.88% of Sn)

Nominal Power Sn is exceeded (125.2% of Sn)

Conclusions

Extended measurement functions and graphic representation of results enables full test of Energy Measuring System on Site.

Tested is not only Energy Meter but also all additional accessories like CT and PT.

Tested are also working conditions of equipment by checking the wiring and burden (load) of transformers.