

Experiment 23: LOADED OPERATION OF THE SINGLE PHASE TRANSFORMER FINDING REGULATION AND EFFICIENCY OF IT

Purpose: Analyzing loaded operation of the transformer, analyzing the effects on regulation and efficiency

Equipments:

- Experiment board with energy unit Y-036/001
- A.C measurement unit Y-036/005
- Single phase transformer Y-036/028
- Energy analyzer Y-036/004
- Switch with two poles Y-036/052
- Rheostat 50 Ω 1000w Y-036/066
- Jagged cable , cable with IEC plug

Connection diagram for the experiment :

Y-036/001

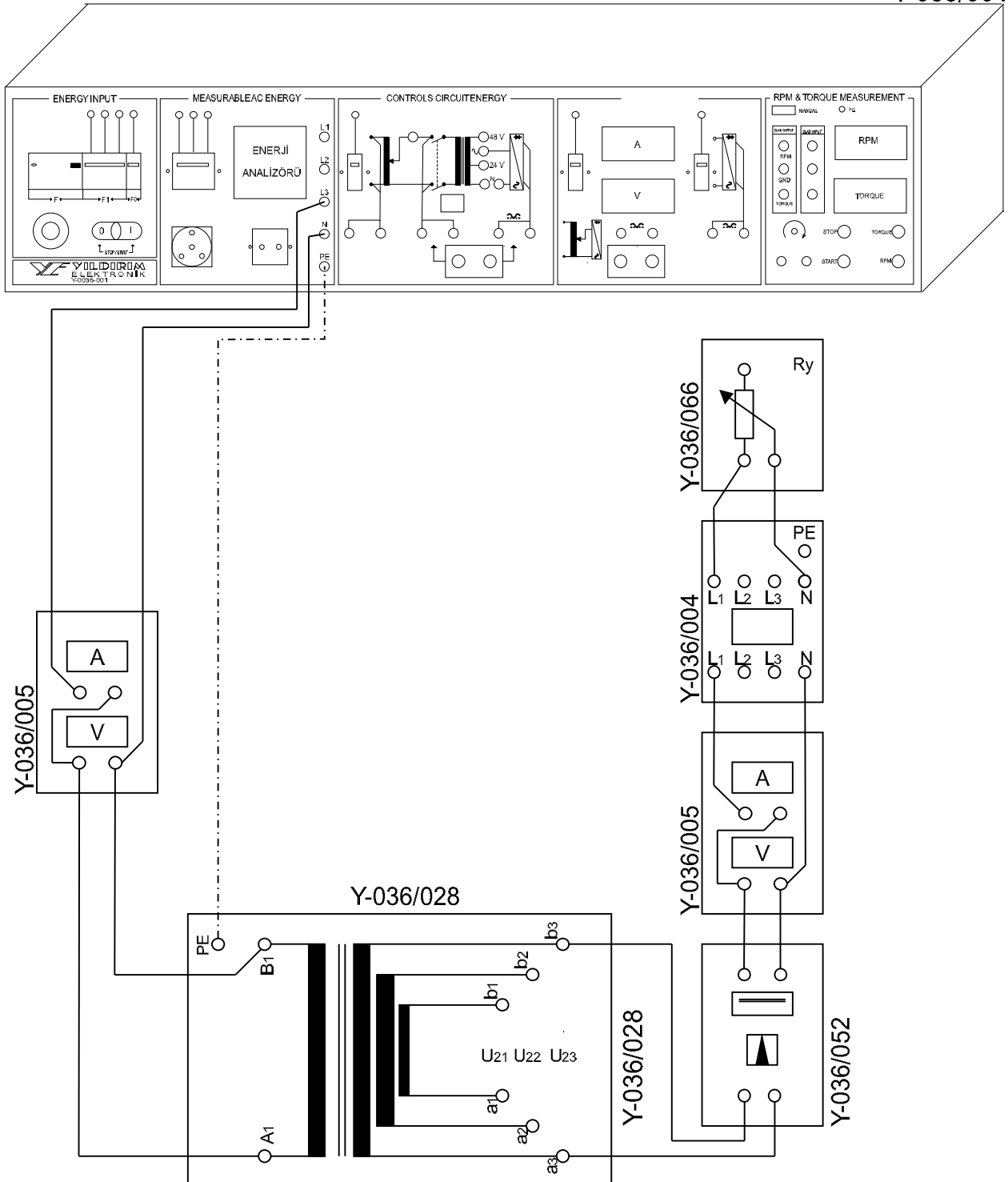


Figure 23.1 Connection diagram for the loaded operation of the single phase transformer.

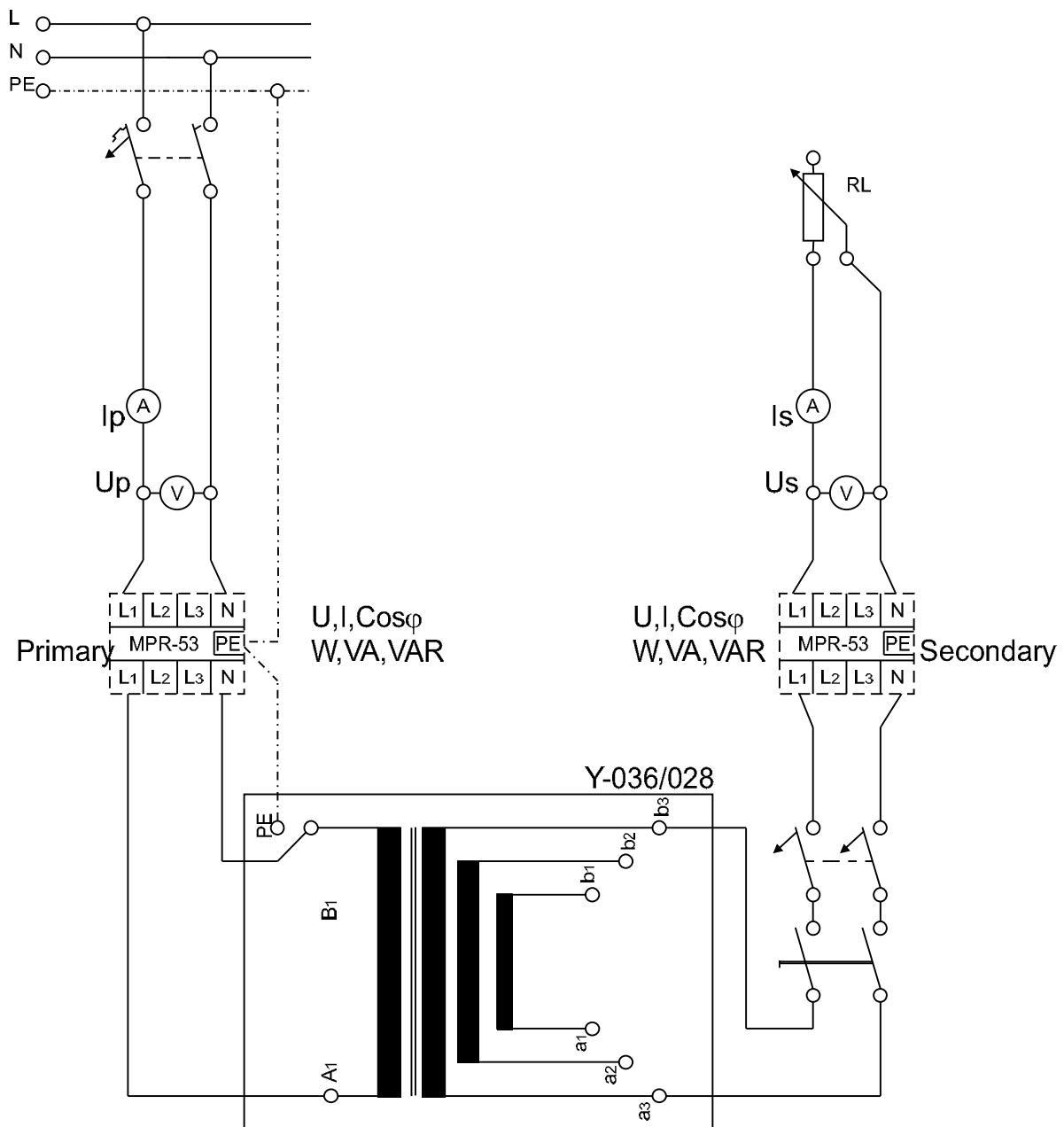


Figure 23.2 Connection diagram for the loaded operation of the single phase transformer.

Procedure :

Note: *It is possible to use L-N or L-L connection according to the rated value of the transformer.

*The measurements for the primary circuit can be performed by using the energy analyzer on the energy unit (Y-036/001).

*The experiment can be performed on a single or all outputs of the secondary.

*Use lamp group or second rheostat if the rheostat used is insufficient.

-Connect the circuit shown in figure 23.1 and 23.2.

*It is necessary to use measurement devices capable of measuring small values to measure the current and power values (I-W) at no-load operation of the transformer.

-Set the voltage of the primary circuit to its rated value while there is no load at the secondary of the transformer. Take note of the values I_p , U_p , U_s and the parameters in the energy analyzer.

-Load the transformer up to 1.25 times the rated power using the load rheostat (RL) step by step. Take note of the values I_p , U_p , U_s and the parameters in the energy analyzer in each step.

-When the secondary is at rated load $\left(\%R_g = \frac{\text{No-load } U_s - \text{Full load } U_s}{\text{Full load } U_s} \cdot 100 \right)$

Find the voltage regulation.

-Find the value of the efficiency $\left(\eta = \frac{P_2}{P_1} \cdot 100 \right)$ For each loading stage.

-Optional: Repeat the same procedure above for the secondary.

-Turn of the energy and finish the experiment.

Values recorded in the experiment :

PRIMARY CIRCUIT						SECONDARY CIRCUIT						Explanation
U	I	cos ϕ	W	VA	VAR	U	I	cos ϕ	W	VA	VAR	

QUESTIONS

