Experiment 31: FINDING THE SLIP IN TRI-PHASE ASYNCHRONOUS MOTOR

Purpose: Finding the slip in asynchronous motors, analyzing its relation with the load, and measuring the speed of the motor.

Equipments:

- -Experiment board with energy unit Y-036/001
- -Railed motor table Y-036/003
- -Three phase asynchronous motor Y-036/015
- -Foucoult brake (dynamic load) Y-036/024
- -Hand tachometer
- -Jagged cable ,cable with IEC plug

Connection diagram for the experiment :

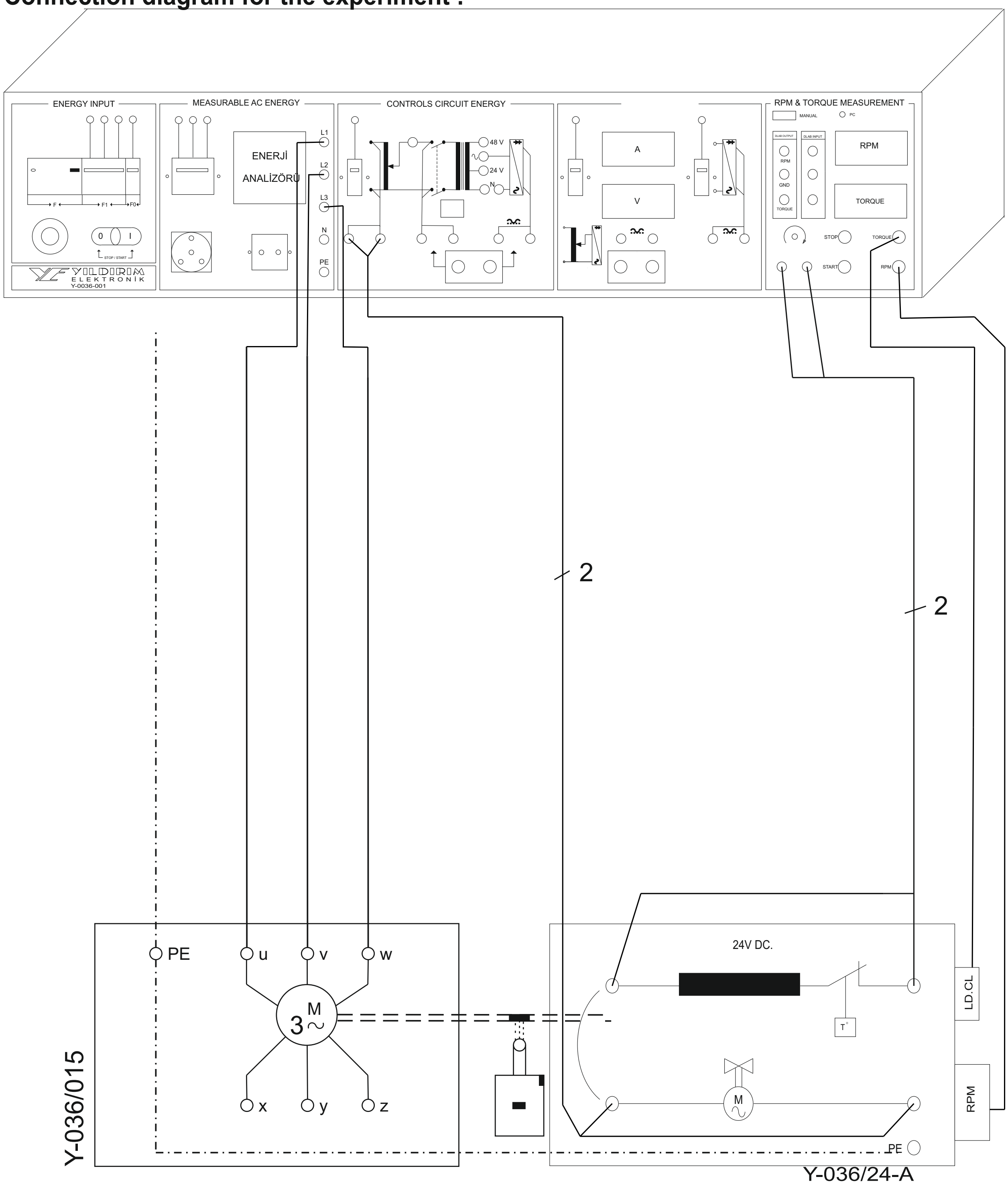

Figure 31.1:Connection diagram for finding the slip of the tri-phase asynchronous motor.

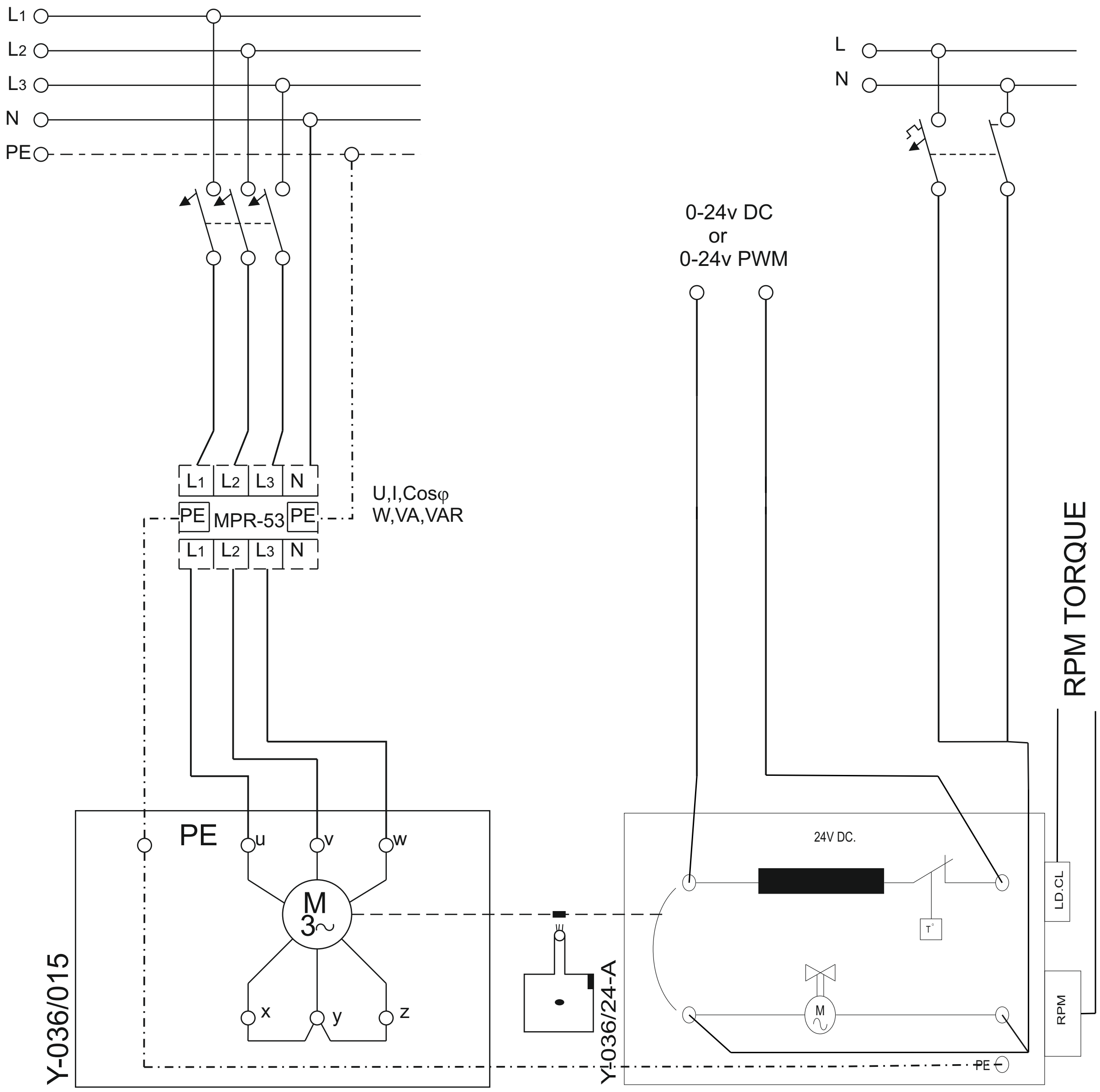

Figure 31.2:Connection diagram for finding the slip of the tri-phase asynchronous motor.

Information :The slip speed (S) in asynchronous motors is the difference between the speed of the rotating field (n_r or n) and the speed of the rotor (n_s or n_o).

$$S=n_s-n_r \quad \text{slip speed,}$$

$$S=\frac{n_s-n_r}{n_s}\cdot 100 \quad \text{slip.}$$

The slip at no-load operation is small for asynchronous motors. The slip increases with the increasing load. It is not possible the slip to be zero. In order to produce a torque, an EMF voltage must be induced in the rotor and a current must flow in the rotor. The slip's being small (S=1) means that the rotor is stationary. In that situation the motor (stator winding) pulls very high currents from the network. The slip is found using the following methods.

Finding slip with tachometer: The speed of the rotor is measured from the shaft of the rotor using tachometer. The speed of the rotating magnetic field is calculated using the number of poles and frequency. Therefore the slip is calculated.

Finding Slip with stroboscopic (aluminum) disk and neon lamp: Black and white bands as many as the pole number are drawn on the aluminum disk connected to the shaft of the rotor. A neon lamp supplied with the same network as the motor is hold on the disc while the motor is rotating. At that instance the bans seem to rotate in the reverse direction with the motor.

The black parts are counted in a certain amount of time (second). So that,

$$\%S = \frac{Z}{2.f.t} \cdot 100$$

f :Frequency of the source
t :The duration of time of counting (sec.)
Z :Number of black bands counted

Finding of the slip of the wound rotor asynchronous motor with mili-voltmeter:
The wound rotor asynchronous motor is started with a resistance connected to the rotor winding. The oscillation number in a certain amount of time is determined by the AC mili-voltmeter connected to the terminals of the rotor winding. The movement of the pointer from left to zero and zero to right is handled as one oscillation. After counting the oscillation per unite time, the slip is found according to the equation below.

$$\%S = \frac{Z}{t.f} \cdot 100$$

Z :Number of oscillations (per sec.)
t : Counting duration (sec.)
f :Frequency of the supply

Procedure :

-Connect the circuit shown in the Figure 31.1,31.2
-Apply the reflecting band to coupled cover. (stick)
-Set the voltage of the tri-phase asynchronous motor (Y-connected)to its nominal value.
-Measure the speed of the motor (n_r) using sensor and tachometer and then record.
-Increase the DC voltage of the magnetic powder brake starting from (0) volt step by step. At the same time apply 220V AC to its fan motor (L-N).
-Increase the DC voltage up to 24V max or 1.5 times the rated current is reached.
-In each DC voltage step, take note of the speed of the rotor (n_r) measuring by the tachometer.
-Turn of the energy and finish the experiment.

Values recorded in the experiment :

Energy analyzer						Uf	If	n_s	n_r	S	EXPLANATION
U	I	Cosφ	W	VA	VAR						

Evaluation :

Question 1:Define the slip and explain how it is found.
Question 2:Is there any difference between the slip value(S) calculated and the value measured in the experiment? Explain the reason.
Question 3: What does the slip's being between 0,1-1 mean? Explain.
Question 4:Does the slip increase with the increasing speed? Explain the reason.
Question 5: What should be done to create a torque without any slip? Explain.
Question 6: State your final observations about the experiment.

Experiment 32: NO-LOAD OPERATION OF THE ASYNCHRONOUS MOTOR

Purpose : Finding the stationary losses (Pfe), frictional losses of the asynchronous motor; Analyzing the starting current at no-load for ⅄ ,△ connections.

Equipments :
- -Experiment board with energy unit Y-036/001
- -Railed motor table Y-036/003
- -Three phase asynchronous motor Y-036/015
- -Jagged cable ,cable with IEC plug
- -Tachometer

Connection diagram for the experiment :

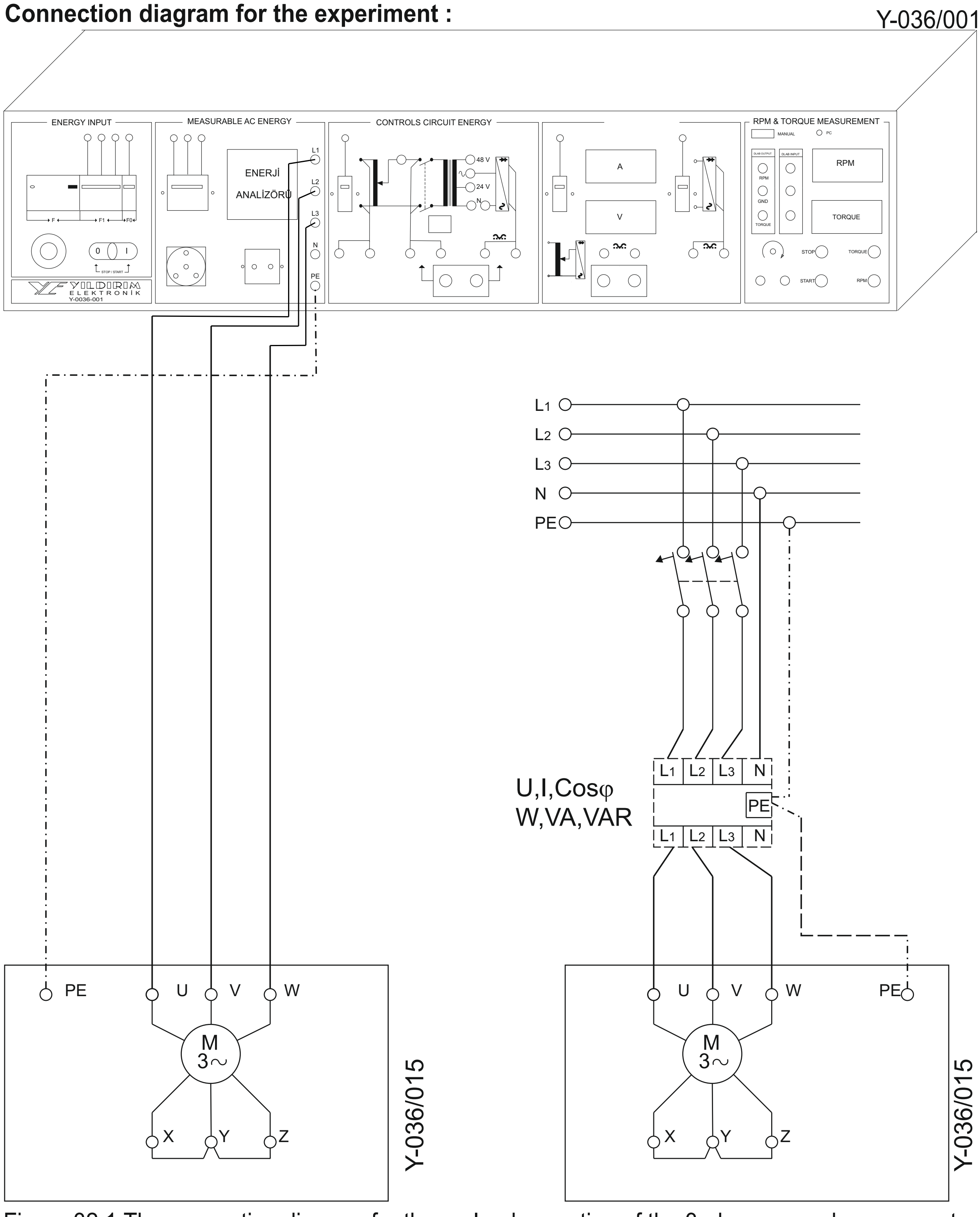

Figure 32.1:The connection diagram for the no-load operation of the 3-phase asynchronous motor.

Information: The asynchronous motors are supplied with little current and power by the network. This small power meets the constant losses of the motor.

These losses are;

Iron Losses P_{fe}

Friction and wind losses P_s

In no-load operation motor operates with nominal voltage and the slip of the asynchronous motor is too small. Asynchronous motors in no-load operation pull 15-50 % of the nominal current from the supply according to the structure of motor. The elements of this current are magnetic field current (Im), and(Iw)current for meeting the losses. The power factor of the motor is 0.1-0.3 initially.

Power at no-load operation:

$$P_{no\text{-}load} = \sqrt{3}.U_h.I_b.Cos\varphi_b$$

Losses at no-load operation:

$$P_{cub} + P_{fe} + P_{sü}$$

$$P_{no\text{-}load} = P_{cub} + P_{fe} + P_{fri}.$$

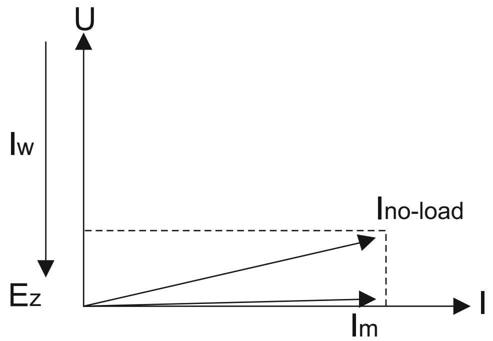

Figure 2 :The components of the current at no-load operation of the asynchronous motor

The asynchronous motor rotating field does not change at no-load or full-load.The speed varies too little at no-load and full load. In that operation there are cupper losses. That loss must be very small such as the current.

Procedure :

Note: The reason of using 4kw asynchronous motor (y-036/016) in the experiment is due to see the big measurement values in measurement units.

-Connect the circuit shown in the figure: 32.1.
-Apply nominal voltage to the Y-connected motor clemence.
-Observe and take note of the starting parameters (I) of the motor.
-At normal operation of the motor, take note of the values U,I,Cosφ,W,VA,VAR from the energy analyzer.
-Measure and take note of the motor speed (n_r) from the motor shaft with tachometer.
-Turn of the energy and finish the experiment.
-Repeat the same procedure above after connecting the clemence of the motor in △ form.
-Turn of the energy and finish the experiment.

Values recorded in the experiment:

(⅄ connected) Energy analyzer							(△connected) Energy analyzer							EXPLANATION
U	I	Cosφ	W	VA	VAR	starting I	U	I	Cosφ	W	VA	VAR	starting I	

Evaluation :

Question 1: Why did we perform the no-load operation experiment for the asynchronous motor?
Question 2:Why is the value of Cosφ small at no-load?
Question 3: Find the cupper (Pcu), iron (Pfe) and frictional(Pfri) losses at no-load operation. What happens to cupper loss? Explain.
Question 4:Is the calculated value of the Cosφ same with the measured value of Cosφ? Explain the reason if not.
Question 5:Are the starting currents different for Y and △ connections? Explain.
Question 6:State your final observations about the experiment.

Experiment 33: SHORT CIRCUIT (BLOCKED ROTOR) TEST OF THE TRI-PHASE ASYNCHRONOUS MOTOR

Purpose: Finding the cupper losses (Pcu) and the equivalent resistance (Re) of the asynchronous motor.

Equipments :

-Experiment board with energy unit	Y-036/001
-Tri-phase variac	Y-036/002
-Railed motor table	Y-036/003
-Energy analyzer	Y-036/004
-Magnetic powder brake	Y-036/024-A
-3 phase asynchronous motor	Y-036/015
-Jagged cable ,cable with IEC plug	

Connection diagram for the experiment :

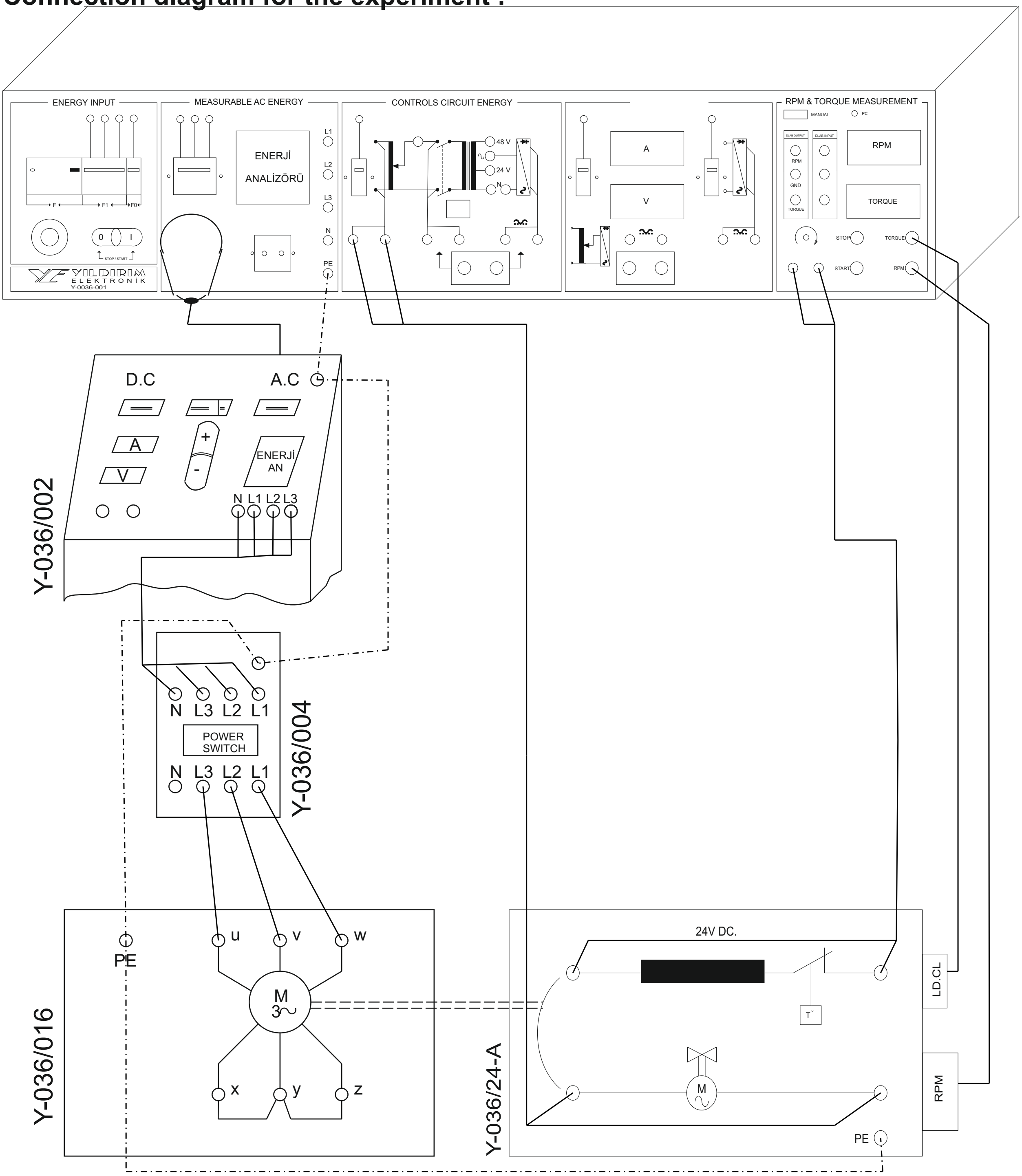

Figure 33.1:Connection diagram for block rotor test of the tri-phase asynchronous motor

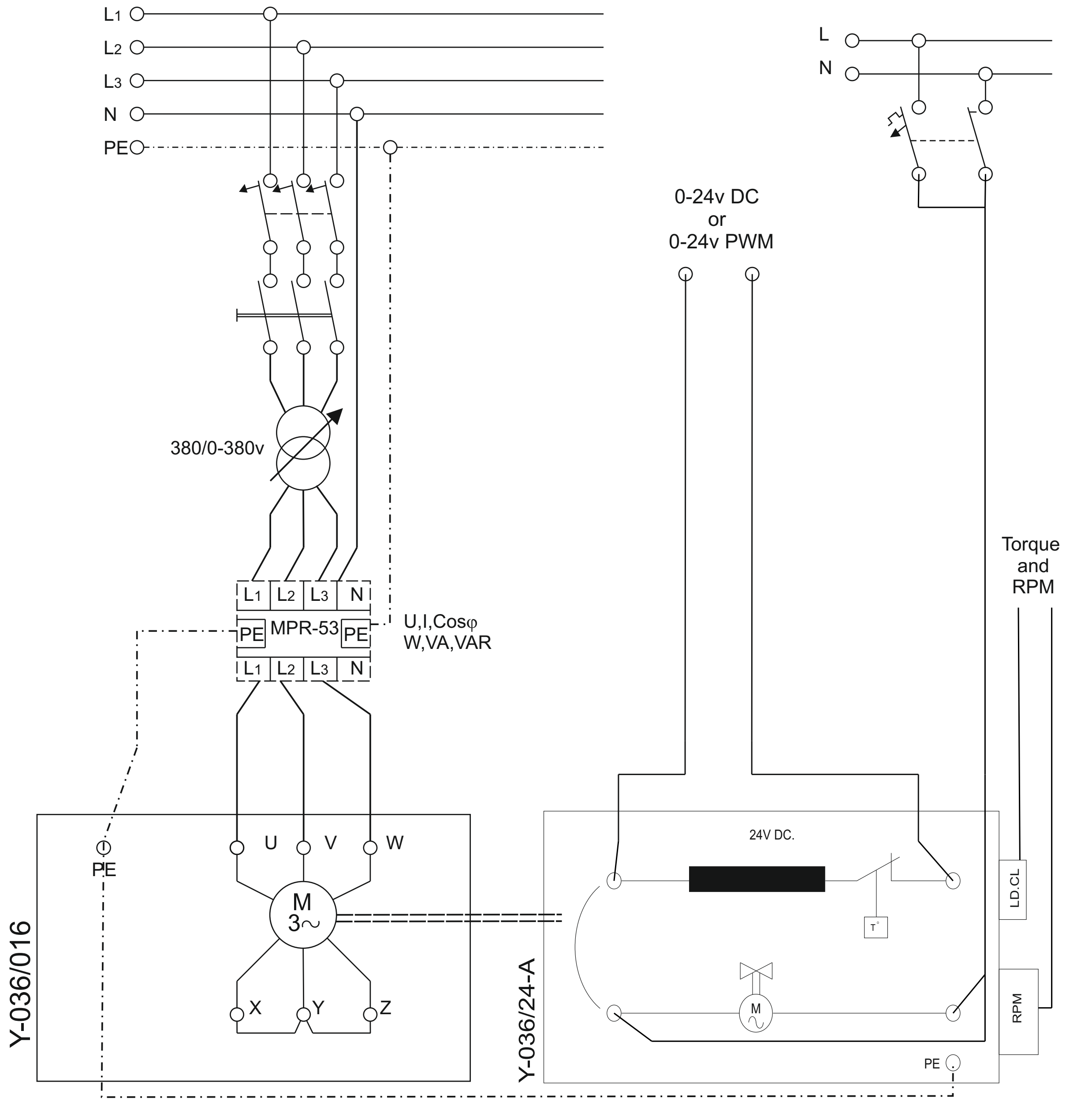

Figure 33.2:Connection diagram for block rotor test of the tri-phase asynchronous motor

Information: The voltage applied to the motor is increased starting from zero step by step. The current of the motor is increased up to the nominal value first, then it is increased to the 150 % of the nominal value for a short time. The rotor is blocked during the experiment. The voltage applied to the motor is 40 % of its nominal value. At that instant the power applied to the motor gives the cupper losses. Since the rotor is not rotating, the friction and wind losses are zero. The iron losses are very small. Since we find Re in this test, the cupper loss is obtained for any load current.

$$Pl = P_{cu} = 3.I_1^2 R_e$$

$$R_e = \frac{P_{cu}}{3.I_1^2}$$

The relation between the applied voltage and current-power and the relation between current and power factor-impedance-power is obtained in this experiment.
The components of the short circuit current of the asynchronous motor are,

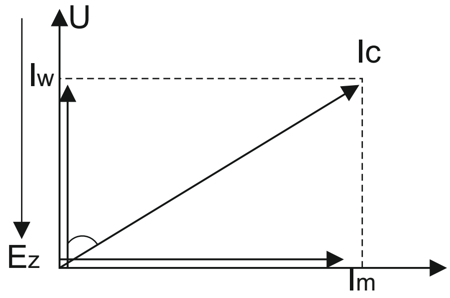

Figure.2.Short circuit test current component of the asynchronous motor

I_c- Short circuit current(current of the stator)
I_m- Magnetic field current
I_w- The current to meet the losses (P_{cu}+P_{fe}) the blocked rotor asynchronous motor is similar to transformer with secondary circuit.

Procedure:

Note:You can use tri-phase 1kw motor (Y-06/016) instead of tri-phase 4kw motor (Y-036/015) in the experiment. To block the motor you can use magnetic powder brake with set the max power.
-Connect the circuit shown in the figure 33.1, 33.2
-In order to prevent the rotation of motor shaft, use magnetic powder brake. Apply the max power in torque and rpm unit and press the start button.
-Increase the supply voltage of the motor starting from zero, step by step, by using the variable AC supply unit (variac Y-036/002).
-Increase the voltage up to the motor current takes its nominal value. Take note of the parameters (U,I,Cosφ,W,VA,VAR) in the energy analyzer in each step.
-Find the short circuit power Pk using the equation $Pk=3.I^2.Re$ and the parameters,Pcu (cupper loss) and Re (equivalent resistance).
-Increase the voltage of the motor until the motor current takes 1.5 times the nominal value step by step (do not operate the motor for a long time over the rated values). In that case take note of the parameters in the energy analyzer.
-Turn of the energy and finish the experiment.

Values recorded in the experiment :

Energy analyzer						n	Re	EXPLANATION
U	I	Cosφ	W	VA	VAR			

Evaluation :

Question 1:Why do we perform short circuit test for the asynchronous motor? Explain.
Question 2:What is the value of Cosφ in the experiment? Explain.
Question 3:Why do not we apply the rated voltage to the motor in the experiment?
Question 4: Is the measured value of $Cos\varphi_k$ in the experiment same with the calculated value of $Cos\varphi_k$ using the equation ($Pk=\sqrt{3}.U.I.Cos\varphi_k$)? If not explain the reason.
Question 5: Is there any iron lost in the short circuit test? If there is, why is it omitted? Explain.
Question 6: State your final observations about the experiment.

Experiment 34: LOADED OPERATION OF THE TRI-PHASE ASYNCHRONOUS MOTOR

Purpose : Operating the asynchronous motor with load. Analyzing the parameters power-torque, speed, current, Cosφ, voltage and relations in between.

Equipments :

-Experiment board with energy unit	Y-036/001
-Railed motor table	Y-036/003
-Three phase asynchronous motor	Y-036/015
-Magnetic powder brake	Y-036/024-A
-Tachometer	
-Jagged cable ,cable with IEC plug	

Connection diagram for the experiment :

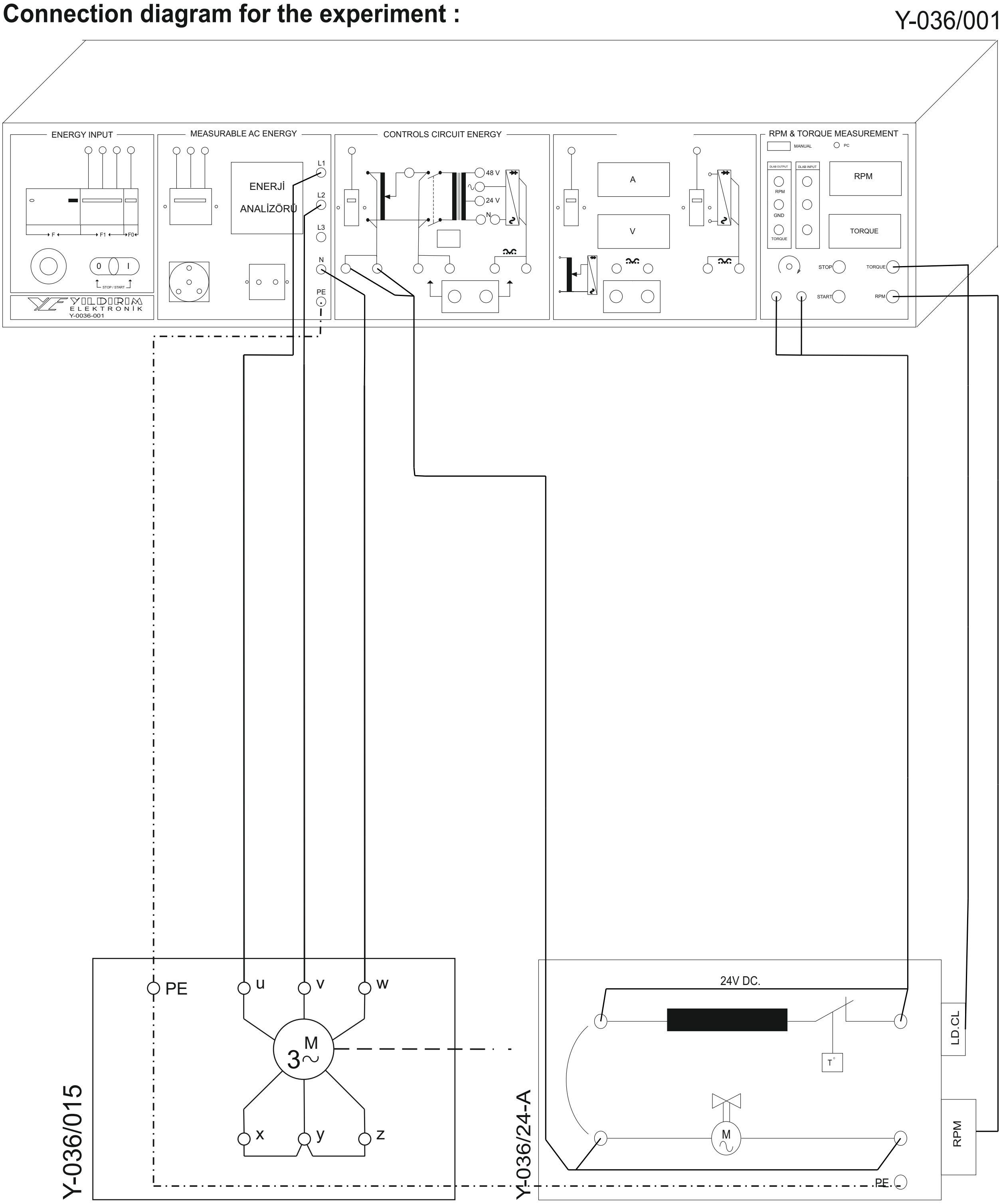

Figure 34.1:Connection diagram for the loaded operation of the tri-phase asynchronous motor

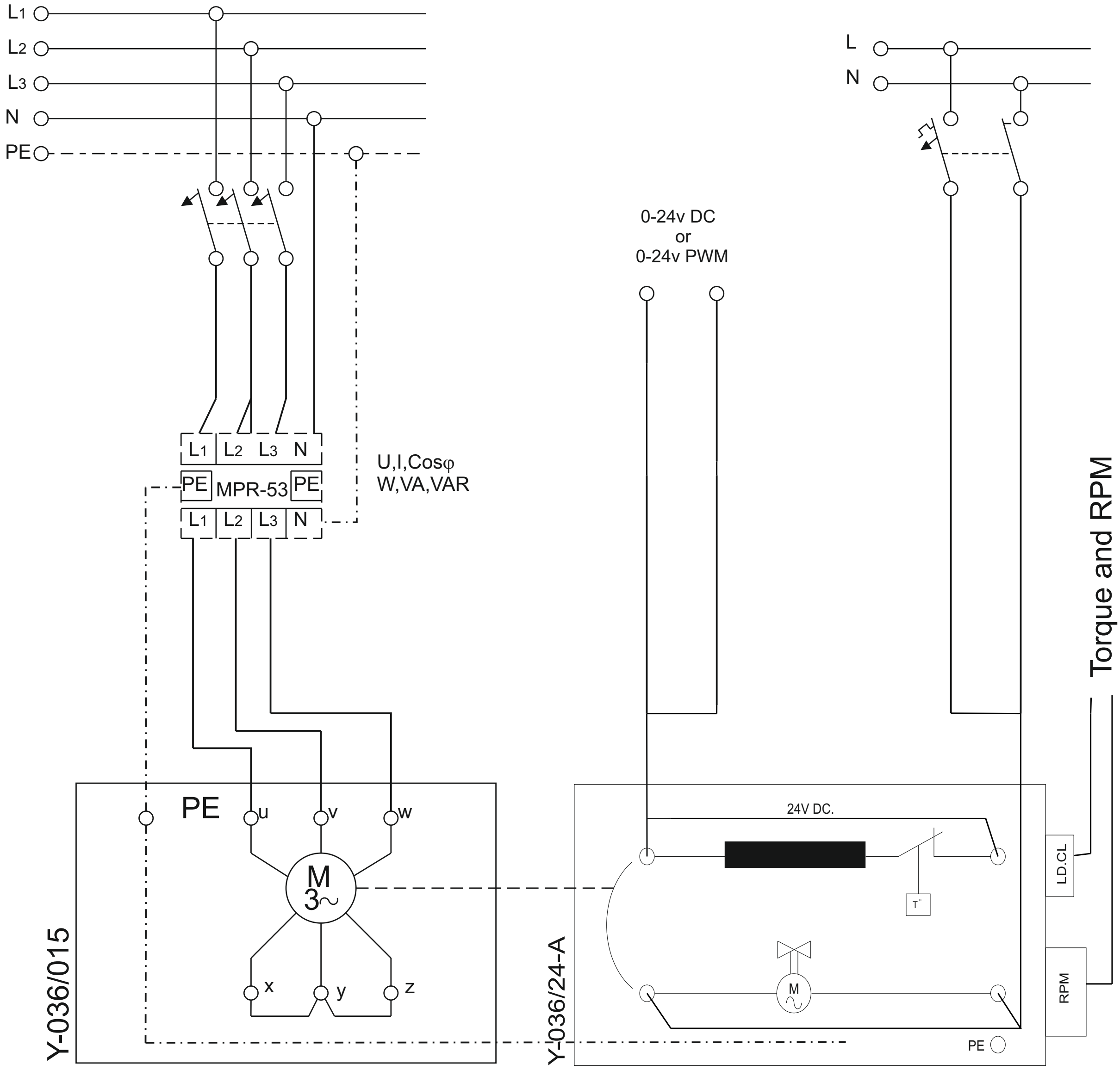

Figure 34.2:Connection diagram for the loaded operation of the tri-phase asynchronous motor

Information :

In loaded operation of the asynchronous motor, we can observe the parameters, Power (P), Torque (T), Speed (n), efficiency (η), slip (S) power factor (Cosφ) , and relations like current-torque, slip-torque.

The speed of the asynchronous motor decreases with the increasing load. The speed decreases linearly at full-load and no-load. But this is not the case at high values.

The power factor of the asynchronous motor is small at no-load and it increases with the increasing load. The slip of the motor also increases up to some value with the increasing load.

The efficiency of the asynchronous motor increases with the increasing load. From 1/3 load to full load, the increase in the efficiency is high.

The torque produced by asynchronous motor increases proportional with the output power of the motor. This increase continues up to the motor is overturn. Some equations for some asynchronous motor parameters.

$$S=\frac{n_s.n_r}{n_s}\cdot 100$$

The rated power of the motor is output power.

$$\eta=\frac{\text{Output power}}{\text{Input power}}$$

$$M=\frac{P_{KV}.975}{n_r}\ \text{kgm.}$$

$P=\sqrt{3.U.Cos\varphi}$ input power

The speed is measured by tachometer, the power factor is measured by Cosφ meter, and the motor losses Pl=Pcu+Pfe+Pf are measured by braking systems.

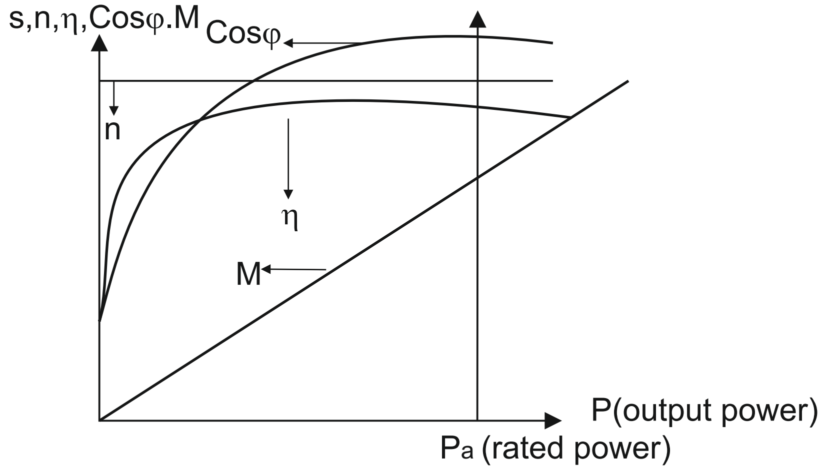

Figure 34.3 Load characteristics of the asynchronous motor

Procedure :

Note:* Magnetic powder brake (Y-036/024-A) is used to load the asynchronous motor in the experiment. DC shunt, compound generator and load group can also be used.
*The tri-phase asynchronous motor in the figure is Y-connected. Be careful about the values in the label of the motor since the motor is directly connected to the network.

-Connect the circuit shown in the figure 34.1, 34.2
-Operate the tri-phase asynchronous motor by applying nominal voltage to it.
-Take note of the parameters (U,I,Cosφ,W,VA,VAR) in the energy analyzer at this condition.
-Operate the fan motor of the magnetic powdert brake (220V AC).
-Apply voltage to the magnetic powder brake from the RPM and Torque unit with press the start button, starting from zero, step by step.
Continue until the asynchronous motor reaches nominal power. Observe and take note of the parameters in the energy analyzer and the values Nm, n in each step.
-Set the power of the tri-phase asynchronous motor to 1.5 times the nominal power by increasing the DC voltage applied to themagnetic powder brake. Observe and take note of the parameters in the energy analyzer and the values If, Uf, n in that case.
-Repeat the procedure above step by step after connecting the motor in △ form considering the rated values of the asynchronous motor. Compare the Y and △ connections for loaded operation of the motor. If the motor doesn›t appropriate running star/delta connection, connect delta with using AC motor driver (Y-0036/026 or Y-0036/026-A.)
-Turn of the energy and finish the experiment.

Values recorded in the experiment :

Energy analyzer						n rpm	S Calculate	M Calculate	η	Torque Nm	EXPLANATION
U	I	Cosφ	W	VA	VAR						

Evaluation :

Question 1: What is the relation between the speed (n) and load (Po) of the asynchronous motor?
Question 2: What is the relation between the slip (S) and load (Po) of the asynchronous motor?
Question 3: Analyze the torque value of the asynchronous motor.
Question 4:What is turnover torque and when does it occur?
Question 5:Analyze the efficiency value (η) in loaded operation of the asynchronous motor.
Question 6:State your final observations about the experiment.

Experiment no: 35 OPERATION OF THE ASYNCHRONOUS MACHINE AS A GENERATOR

Purpose: To see the operation of the asynchronous machines as a generator by rotating their armature over the circuit (wind turbine or any mechanic rotating energy), to see, analyse, and understand the effects of the capacity of the condenser group as a required external excitation.

Equipment :	-Experiment table with energy unit	Y-036/001
	-Railed motor stand	Y-036/003
	-Energy analyser	Y-036/004
	-AC measurement	Y-036/005
	-3 phase asynchronous motor	Y-036/015-016
	-3 phase adjusted ohmic load	Y-036/056
	-3 phase adjusted inductive load	Y-036/058

Connection diagram for the experiment : Y-036/001

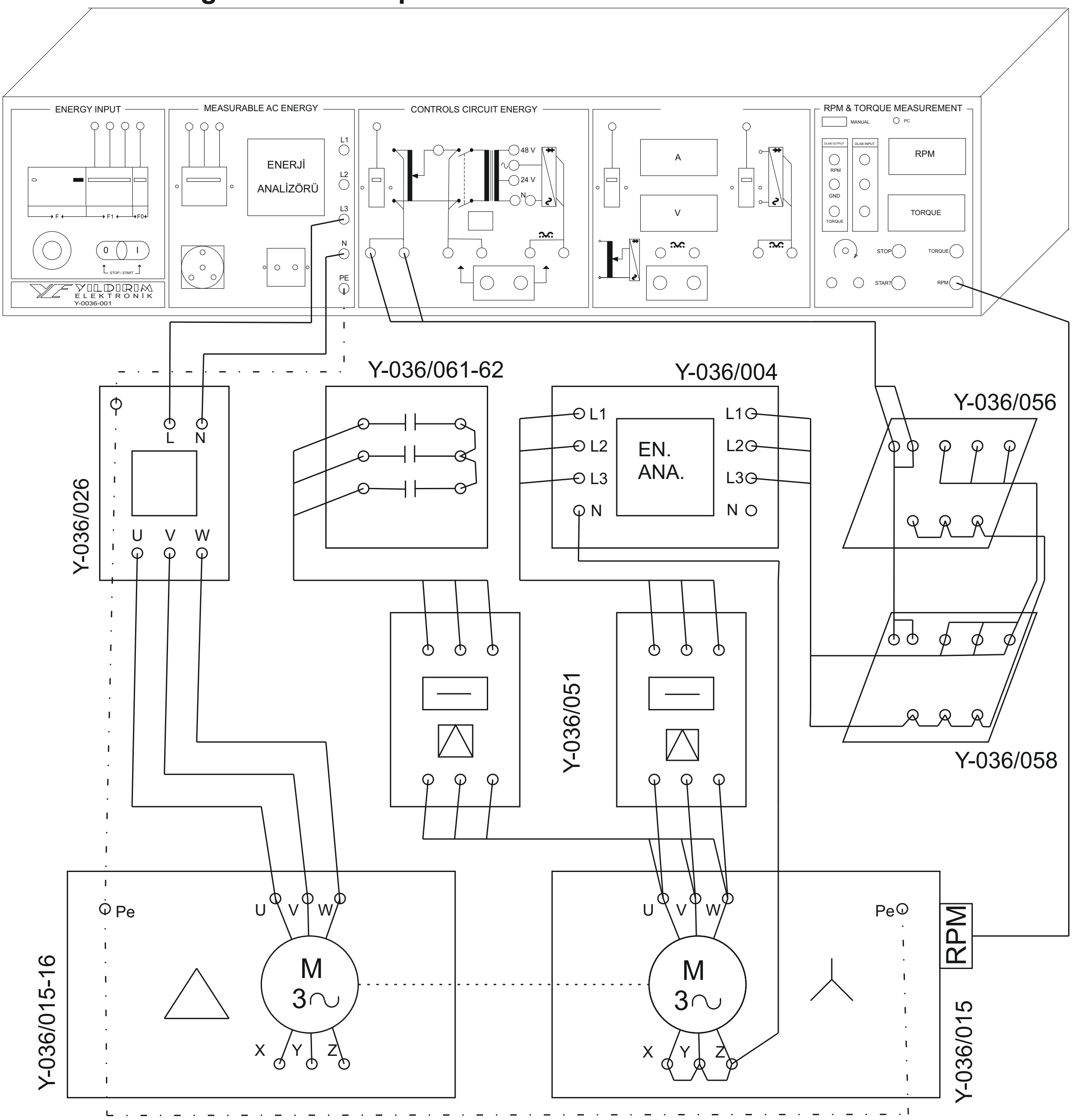

Figure 35.1: The experiment schema of operation of the asynchronous machine as a generator

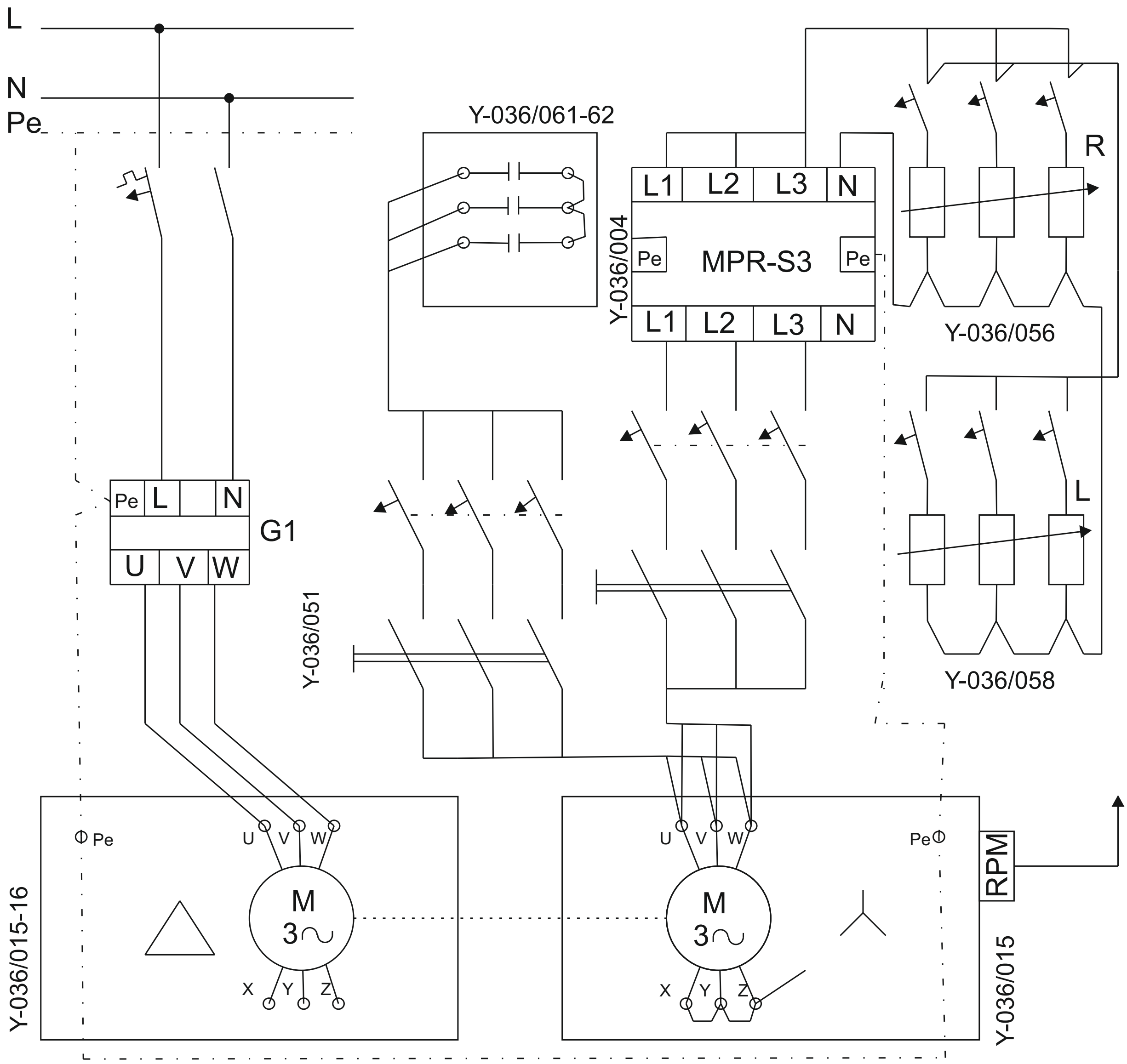

Figure 35.2: The circuit schema of the operation of the asynchronous machine as a generator

Procedure:

Note: The operation of the asynchronous machine as a generator will be made by exciting with the external excitation condenser groups. Thus, in accordance with our laboratorial oppurtunities;

-The asynchronous machines

-The condenser groups may be in different values.

-When the machine, which operates as a motor and rotates connected to the optional network, exceeds the synchronous speed, you can operate it as a generator.

-Examine the label values of the machines used in the experiment.

-Establish the experimental circuit in the figure 35.1,35.2.

-Rotate the rotating machine (asynchronous motor) by means of the invertor over the synchronous speed of the machine that will operate as a generator.

-Switch the circuit breaker of the condenser group to ON position and make the asynchronous machine produce electric energy.

-Switch the circuit breaker of the load group to ON position and monitor and record the energy produced by the asynchronous machine through the energy analyser U(L-L , L-N), Hz, adjust by raising and lowering the speed of the machine rotating to adapt these values to the network L-N (220v 50Hz). In this state, record U,Hz,n values.

**DO NOT EXCEED THE ASYNCHRONOUS GENERATOR POWER IN LOADINGS!

-Load the asynchronous generator by bringing each phase of the ohmic load to level 1 or 2 as equal. In this state, record U,I,cosf,Hz,w,n values.
-If the voltage value in loading changes and it is possible by adjusting the speed of the rotating machine, switch to the normal network (220v 50Hz) value by changing the condenser value.
-Deactivate the ohmic load and load the asynchronous generator with the inductive loading, repeat the operation above (in ohmic load) and record U,I,cosf,Hz,VA,VAR, w,n values in this state.
-Use the inductive load together with the ohmic load and load the asynchronous generator. Repeat the operations above. Record the parameters of the energy analyser and circuit.
-Cut the energy and finish the experiment.

Values recorded in the experiment :

Rotator Machine			Asynchronous Generator							EXPLANATION
U	I	n	U	I	cosϕ	Hz	W	VA	VAR	

Evaluation:

Question 1: Explain the operation of the asynchronous machine as a generator.
Question 2: What sort of an interaction in the armature and stator takes place in the asynchronous machine when the synchronous speed is exceeded?
Question 3: What is the effect of the condenser capacity in the operation of the asynchronous machine as a generator? Explain.
Question 4: What happens in the values over the synchronous speed? Explain.
Question 5: What is the effect of the loads to the asynchronous generator? Explain with the values you have taken.
Question 6: Explain the varieties, qualities, and areas of usage of the asynchronous generator.

Experiment 36: LOADED OPERATION OF THE TRI-PHASE ASYNCHRONOUS MOTOR

Purpose : Operating the asynchronous motor with load. Analyzing the parameters power-torque, speed, current, Cosφ, voltage and relations in between with using D-LAB..

Equipments :

-Experiment board with energy unit	Y-036/001	-Tachometer
-Railed motor table	Y-036/003	-D-LAB-E
-Three phase asynchronous motor	Y-036/015	
-Magnetic powder brake	Y-036/024-A	
-AC Motor driver	Y-036/26-A	
-Jagged cable ,cable with IEC plug		

Connection diagram for the experiment :

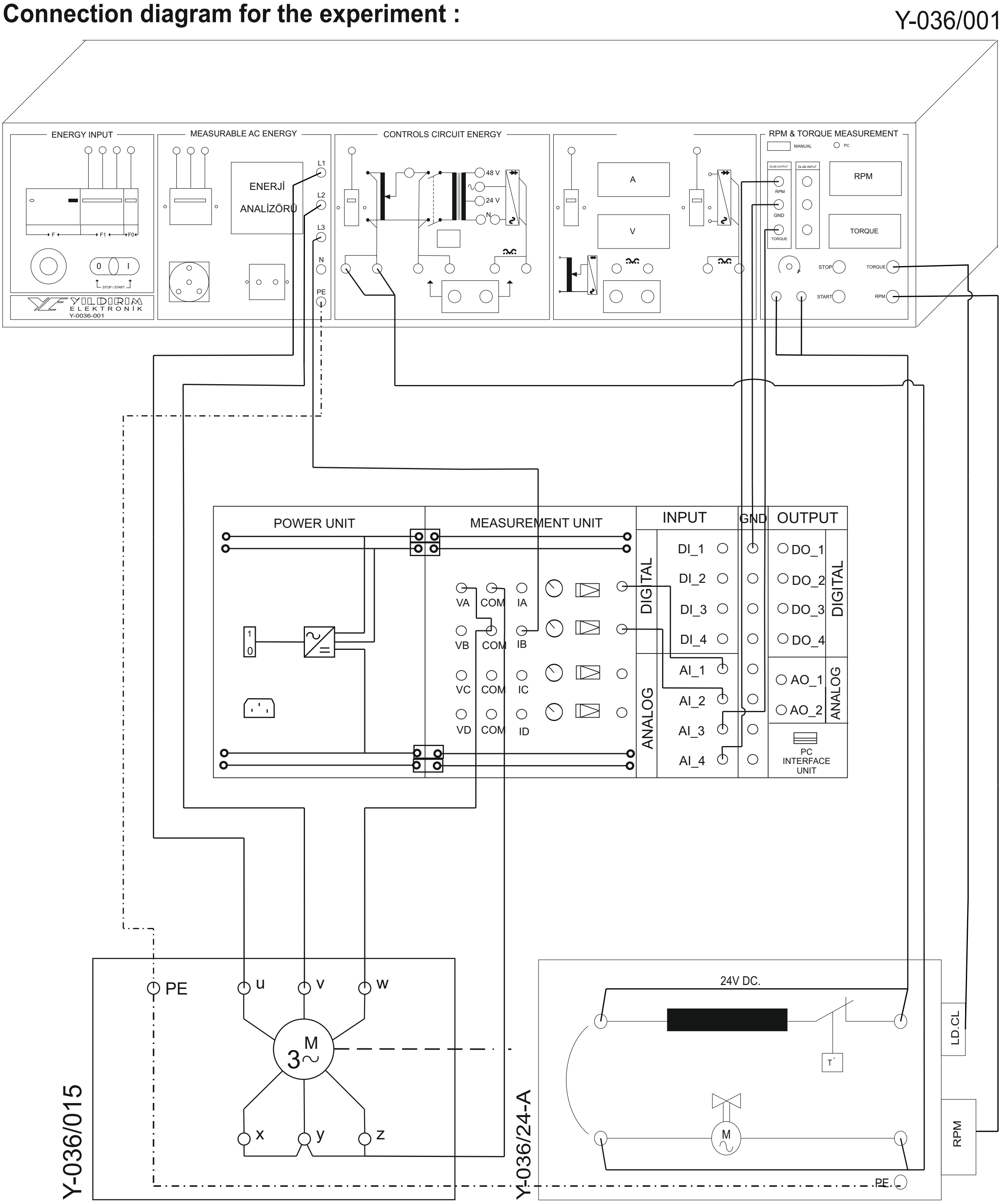

Figure 36.1:Connection diagram for the loaded operation of the tri-phase asynchronous motor

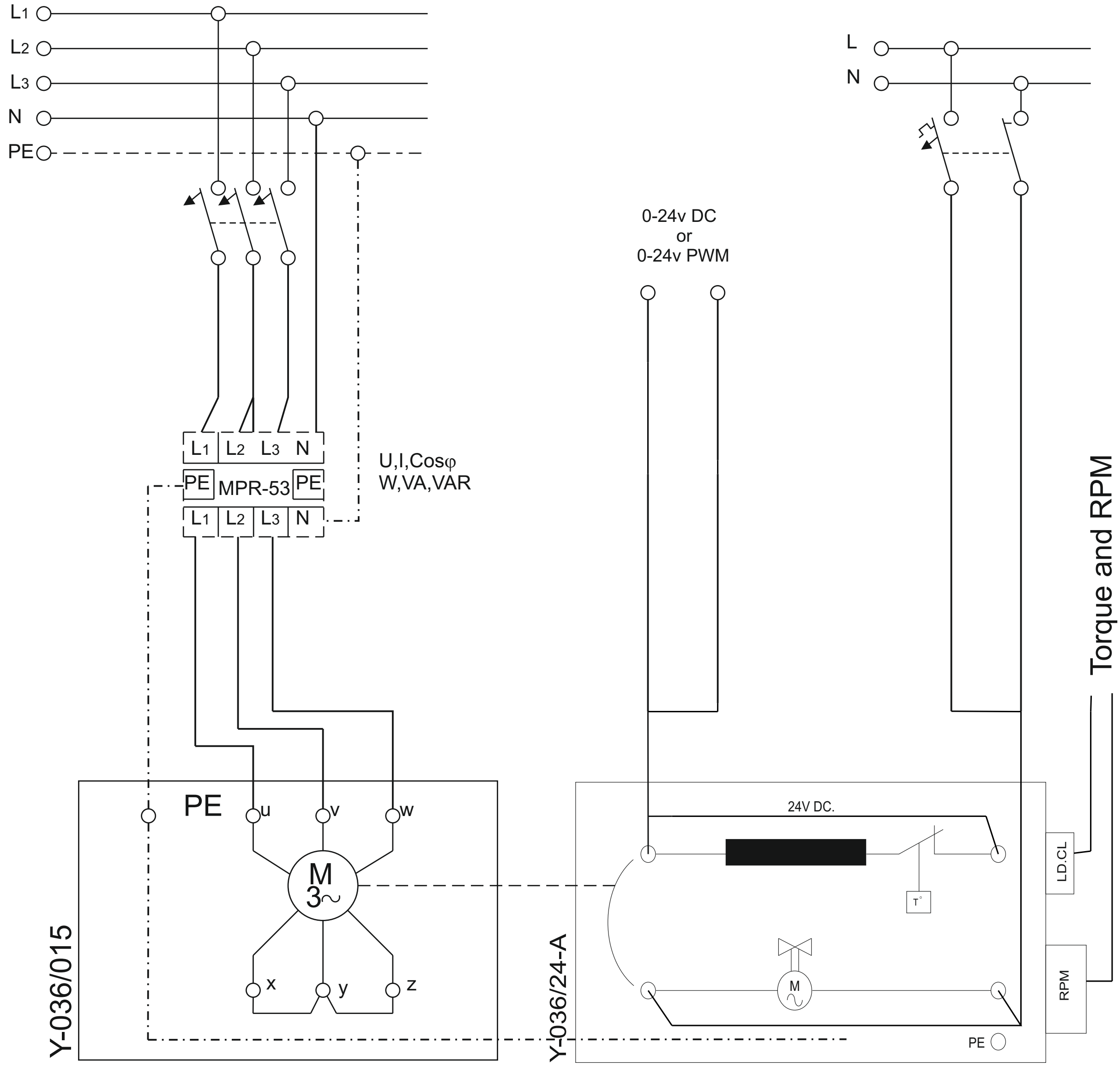

Figure 36.2:Connection diagram for the loaded operation of the tri-phase asynchronous motor

Information :

In loaded operation of the asynchronous motor, we can observe the parameters, Power (P), Torque (T), Speed (n), efficiency (η), slip (S) power factor (Cosφ) , and relations like current-torque, slip-torque.

The speed of the asynchronous motor decreases with the increasing load. The speed decreases linearly at full-load and no-load. But this is not the case at high values.

The power factor of the asynchronous motor is small at no-load and it increases with the increasing load. The slip of the motor also increases up to some value with the increasing load.

The efficiency of the asynchronous motor increases with the increasing load. From 1/3 load to full load, the increase in the efficiency is high.

The torque produced by asynchronous motor increases proportional with the output power of the motor. This increase continues up to the motor is overturn. Some equations for some asynchronous motor parameters.

$$S=\frac{n_s.n_r}{n_s}\cdot 100$$

The rated power of the motor is output power.

$$\eta=\frac{\text{Output power}}{\text{Input power}}$$

$$M=\frac{P_{KV}.975}{n_r}\ \text{kgm.}$$

$$P=\sqrt{3.U.Cos\varphi}\ \text{input power}$$

The speed is measured by tachometer, the power factor is measured by Cosφ meter, and the motor losses Pl=Pcu+Pfe+Pf are measured by braking systems.

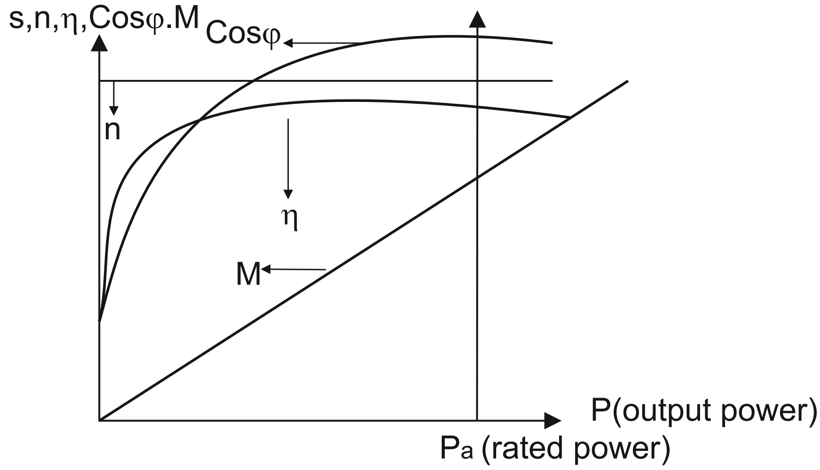

Figure 36.3 Load characteristics of the asynchronous motor

Procedure :

Note:*The tri-phase asynchronous motor in the figure is Y-connected.Be careful about the values in the label of the motor since the motor is directly connected to the network.
-Connect the circuit shown in the figure 36.1, 36.2
-After connect the PC connection with D-LAB run the program. You must do the hardware seup before see the data flow. We do analog inputs respectively voltage, current, torque and RPM. Although do not forget to setup encoder resolution. Otherwise you see the speed is infinity.
-Operate the tri-phase asynchronous motor by applying nominal voltage to it.
-Take note of the parameters (U,I,Cosφ,W,VA,VAR) in the energy analyzer at this condition.
-Operate the fan motor of the magnetic powder brake (220V AC).
-Apply voltage to the magnetic powder brake from the RPM and Torque unit with press the start button, starting from zero, step by step.
Continue until the asynchronous motor reaches nominal power. Observe and take note of the parameters in the energy analyzer and the values Nm, n in each step.
-Set the power of the tri-phase asynchronous motor to 1.5 times the nominal power by increasing the DC voltage applied to themagnetic powder brake. Observe and take note of the parameters in the energy analyzer and the values If, Uf, n in that case.
-Repeat the procedure above step by step after connecting the motor with motor driver Y and △ connection. Compare the Y and △ connections for loaded operation of the motor. How connect the motor with motor driver is in the next pages.
-Turn of the energy and finish the experiment.

Values recorded in the experiment :

Energy analyzer						n rpm	S Calculate	M Calculate	η	Torque Nm	EXPLANATION
U	I	Cosφ	W	VA	VAR						

Evaluation :

Question 1: What is the relation between the speed (n) and load (Po) of the asynchronous motor?
Question 2: What is the relation between the slip (S) and load (Po) of the asynchronous motor?
Question 3: Analyze the torque value of the asynchronous motor.
Question 4:What is turnover torque and when does it occur?
Question 5:Analyze the efficiency value (η) in loaded operation of the asynchronous motor.
Question 6:State your final observations about the experiment.

Experiment 37 :STARTING THE TRI-PHASE ASYNCHRONOUS MOTOR DIRECTLY

Purpose : Observing the current-power torque relation at starting of the tri-phase asynchronous motor, analyzing the relations in no-load/loaded starting.

Equipments :

-Experiment board with energy unit	Y-036/001
-Railed motor table	Y-036/003
-Tri-phase asynchronous motor	Y-036/016 (Y-036/015)
-Magnetic powder brake	Y-036/024-A
-Tachometer	
-Jagged cable ,cable with IEC plug	

Connection diagram for the experiment :

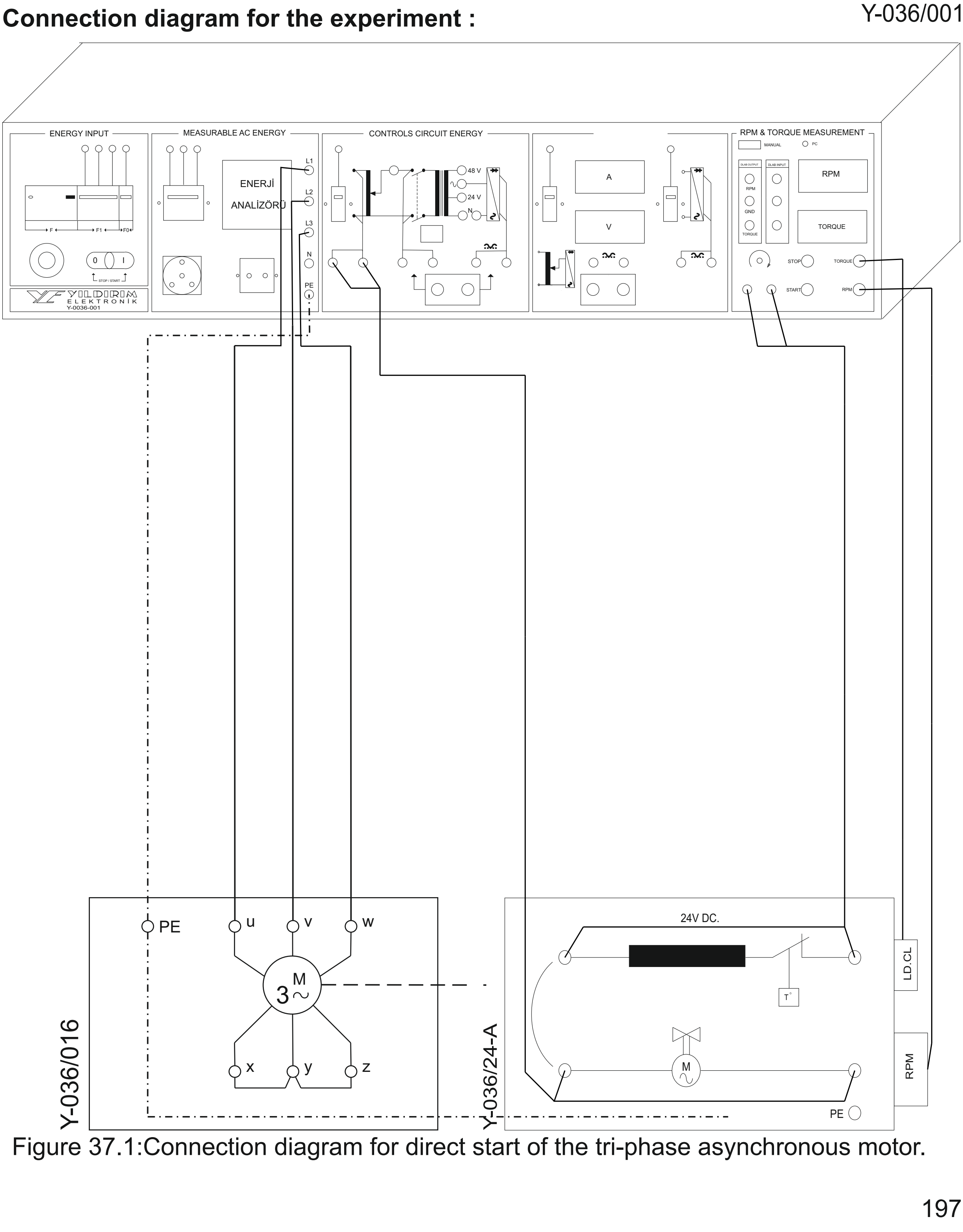

Figure 37.1:Connection diagram for direct start of the tri-phase asynchronous motor.

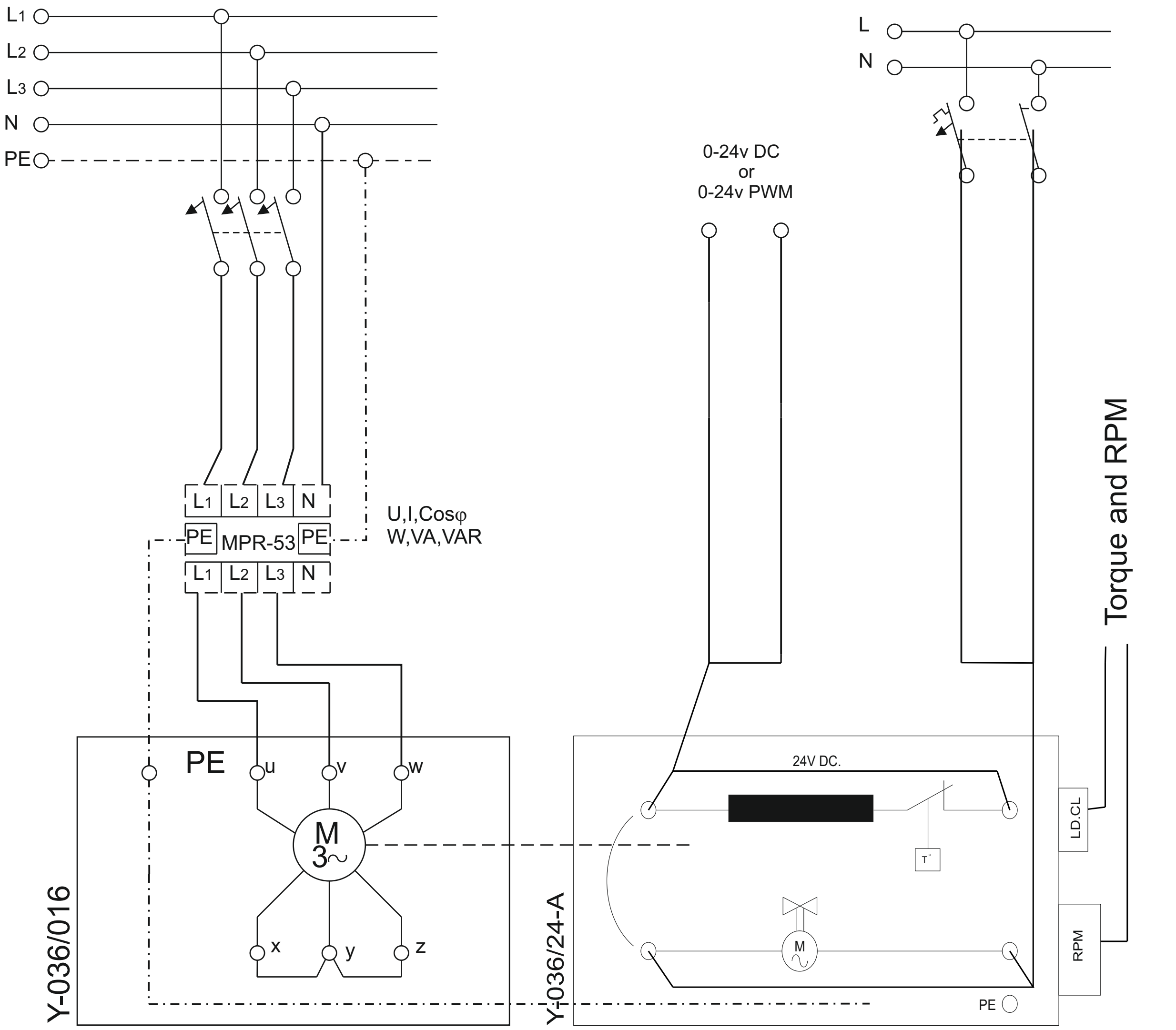

Figure 37.2:Connection diagram for direct start of the tri-phase asynchronous motor.

Information :

In direct start of the asynchronous motor, the motor is directly connected to the circuit via a switch or conductor-thermic controller system. That starting system is applicable for motors with power less than 5 HP-4 KW. The asynchronous motors pull very high currents from the network when starting. This situation continues until the motor reaches 75-80 % of the nominal speed. Starting takes more time when the motor is loaded, also the high current takes more time. Therefore, the motor is started without load. The high current at starting instant do not damage the windings of the motor since it continues for a short time. However, motor protection systems are suggested to be used in asynchronous motors.

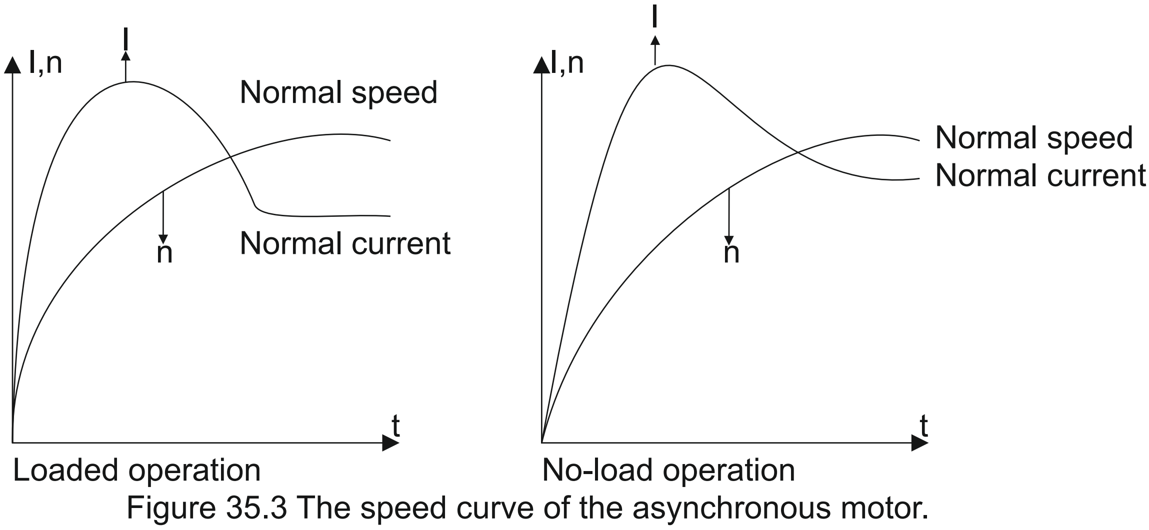

Figure 35.3 The speed curve of the asynchronous motor.

Procedure :

△ Note: Be careful about the label of the asynchronous motor used in the experiment. It should be connected Y and △ form if the conditions are suitable.

-Connect the circuit shown in the figure 37.1, 37.2.
-Start the motor while no-load is connected to it and the motor clemence is Y-connected. Take note of the parameters U,I,Cosφ,W,VA,VAR and n (speed) in the energy analyzer at starting and normal operation times.
-Provide starting and normal operation by loading the motor with the nominal power using the magnetic powder brake.Start with magnetic powder brake %50 and %100 load seperately
-Take note of the parameters U,I,Cosφ,W,VA,VAR and n (speed) in the energy analyzer at starting and normal operation times with load.
-It maybe necessary to repeat the previous step to observe the parameters since the starting duration is very short.
-Repeat the same procedure after connecting the motor in △ form (if possible).
-Observe and take note of the required parameters in any condition.
-Turn of the energy and finish the experiment.

Values recorded in the experiment :

Energy Analyser (road-making)								(normal operation)								Explanation
U	I	Cosφ	W	VA	VAR	n	Nm	U	I	Cosφ	W	VA	VAR	n	Nm	

Evaluation :

Question 1:In which condition, we start the asynchronous motor directly?
Question 2:What are the reasons of the high current at starting of the asynchronous motor? Explain.
Question 3:Analyze the loaded and no-load starting of the asynchronous motor considering the values recorded in the experiment.
Question 4:What are the results of Y-△ connection of the asynchronous motor at starting? Explain.
Question 5:Explain the starting conditions and requirements of the asynchronous motor.
Question 6:State your final observations about the experiment.