DC-Shunt Motor

- **Load characteristics (torque-speed characteristics).**
- **Efficiency characteristics of the DC-Shunt Motor.**

  $\eta=f(P_{out})$
- **Reversing the direction of rotation.**

  To study the methods how change direction of motor rotation.
- **Speed control of DC-Shunt Motor.**

  To study effect I_m, $U = f(n)$.

DC-Series Motor

- **Load characteristics (torque-speed characteristics).**
- **Efficiency characteristics of the DC-Series Motor.**

  $\eta=f(P_{out})$
- **Reversing the direction of rotation.**

  To study the methods how to change direction of motor rotation.
- **Speed control of DC-series motor.**

  To study effect I_m, $U = f(n)$.

Synchronous Generator

- **Measurement of no-load characteristic E = f (I_m)**

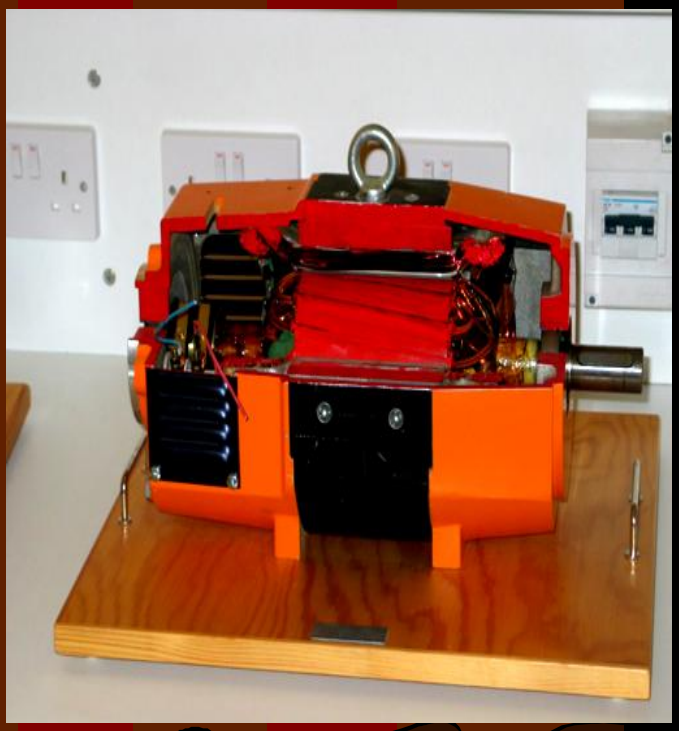
  The induced no-load voltage as a function of the exciting current.

- **Measurement of short-circuit characteristic I_a = f (I_m).**

  The armature current as a function of the excitation current when the stator is short-circuit.

- **Measurement of load characteristics U = f (I_a).**

  The generator voltage as a function of the armature current.



Induction Motor

- **No-load test and blocked test.**

  To determine according to the loss summation method.

- **Measuring the efficiency and torque characteristic.**

  To measure the efficiency at different loads and to measure the torque characteristic the delivered torque as function of the slip. M = f (S).

- **Determine the starting currents and to investigate plugging.**

  Start/delta start is effected by changing over the windings. The start current for start/delta start is reduced.

  Plugging is effected by reversing two of the motor terminations, so causing a tendency to rotate in the opposite direction.

Separately Excited DC-Generator

- **No-load test:**

  To determine the characteristic emf=f (Im), the induced on-load voltage as a function of the excitation current.

- **Load (output) characteristics:**

  To determine the external characteristic U=f(I_B),the voltage of the generator as a function of the load current I_B.

- **Efficiency of the separately excited DC-generator**.

Single Phase Transformer (2)

- **Short circuit test:**

  To carry out a short circuit test on single phase transformer, to determine the constants of the equivalent circuit, to determine the losses, and to determine the impedance of transformer.

- **Load test:**

  To carry out the load test on a single phase transformer by direct loading and to find its efficiency and regulation.

Single Phase Transformer (1)

- **Open circuit test:**

  To determine the magnetic branch circuit constant, on load current, iron losses at various voltage.

- **Turn ratio test:**

  To study the relation between voltage on the primary and secondary side of single phase transformer.

- **Polarity test:**

  To find the polarity of transformer winding and to study its importance.

- **Measuring the resistance of transformer windings:**

  To determine the value of winding resistances which required to determine the copper loss and the voltage drop.

DC-Shunt generator

- **No-load test:**

  To determine characteristic emf=f(Im), the induced on-load voltage as a function of the excitation current.

- **Load (output) characteristics:**

  To determine the external characteristic U=f(IB),the voltage of the generator as a function of the load current IB.

- **Efficiency of the DC-Shunt generator**

Auto Transformer

- **Open circuit test:**

  To determine the magnetic branch circuit constant, on load current, iron losses at various voltage.

- **Turn ratio test:**

  To study the relation between voltage on the primary and secondary side of single phase transformer.

- **Load test:**

  To carry out the load test on a single phase transformer by direct loading and to find its efficiency and regulation.

- **Short circuit test:**

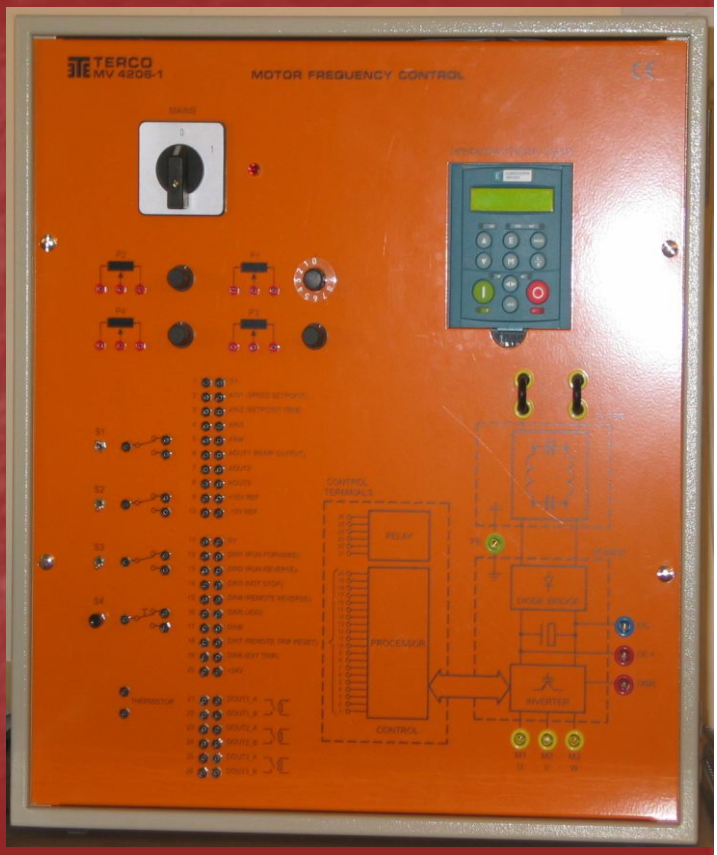
  To carry out a short circuit test on single phase transformer, to determine the constants of the equivalent circuit, to determine the losses, and to determine the impedance of transformer.

Motor Frequency Control

The motor frequency control (Inverter) is designed for speed control of three-phase induction motors.

Controlling the unit locally by using the computer or remotely

This unit suitable for general industrial applications, as control of pump and fans.



Power supply

Include fixed and variable output voltages – for laboratory exercises on electrical machine and power systems. The power pack contains a three-phase transformer, rectifier and variable voltage transformer connected so that fixed and variable DC and AC can be supplied.

Digital Torque Meter

The torque meter is coupled to a load cell mounted on an electromagnetic brake or on a dynamometer.

Allows direct reading of torque, measured in Nm.

Digital Measuring Unit

Using for measuring:

DC-value as: DC-current, DC-voltage.

AC-value as: AC-current, AC-voltage, AC-power.

For three phase and single phase.

Load Resistor

Load resistor contains ganged resistor with continuous spindle regulation.

The resistors are connected to terminals for three-phase, single-phase or DC- voltage

Power Factor Control Unit

The PFC you can minimize the currents caused by reactive losses of power and thereby optimizing the transfer of energy between generation and loading.

This is becoming more and more important today when

“Saving energy”

Transmission Line Trainer

The student must have the opportunity to perform analysis and design calculations in this trainer and to determine the positive sequence line parameters L and C per phase per kilometre of a three phase single circuit transmission lines for different conductor arrangements to understand modelling and performance of short and long lines