

## STUDY OF THE BEHAVIOUR OF A MACHINE IN HYPO AND HYPERSYNCHRONY

An asynchronous motor can convert mechanical energy into electrical energy. To perform this conversion, it has to be driven above the synchronous speed. QUICK-IPLUS is a set of modules of measurement (H-250mm) of switching and 2 asynchronous motors mounted on the same axis of rotation for studying hypersynchrony. The speed controller module drives the first motor above its synchronous speed so that the second becomes a three-phase generator. A central zero wattmeter module indicates the direction of the electrical energy consumed or fed in the case of feeding into the grid. A central 0 phase-meter module demonstrates the change of power factor according to the addition of capacitors or speed variation.



Sockets on the back of the console for connecting the modules

ref. QUICK-IPLUS

ref. QUICK-I without frame and console



### EDUCATIONAL OBJECTIVES

- Study the hyposynchronous and hypersynchronous operations of an asynchronous motor.
- Study the effect of a battery of capacitors on the power factor value.
- Study the synchronisation with the national grid.
- Study energy use at an isolated site.
- Calculate the efficiencies of an energy production system.
- Use a clamp ammeter.

### TEACHING RESOURCES STUDENT & TEACHER

#### Proposed Practical Works

- Procedure of synchronization with the national grid.
- Hyposynchronous and hypersynchronous measurement.
- Reading power factor using a battery of capacitors and consequences.
- Plot of the electrical characteristics of the energy production system.
- Calculation of the overall efficiency.
- Study of the operation at an isolated site.

#### Comprises

- 1 Single-phase power supply module 230V AC with RC circuit-breaker and emergency stop button.
  - 1 Speed controller module 1500W. Single-phase power supply 230V AC, motor supply output 3 x 230V AC.  
Adjustment of the rotation frequency by potentiometer on the front.
  - 1 Three-pole cut-out module.
  - 2 digital display modules: Current - Voltage
  - 1 Module with central zero analogue display of the power.
  - 1 Module with central 0 analogue display of power factor.
  - 1 Start/Stop switch module for synchronizing with the electricity grid 3x230/400V.
  - 1 Set of rotating machinery: 2 asynchronous motors 1500W, 3x 230/400V.
  - 1 Resistive load 2000W.
  - 1 Capacitive load 2000 kVAR.
  - 1 set of safety leads for carrying out the different practical works.
  - 1 frame with wheels (H x W x D): 2000 x 1490 x 750mm equipped with a rack for cords (30 fingers) and a melamine tablet 19mm
  - 1 three-phase power console:
    - 1 4-poles thermal magnetic circuit breaker (16A)
    - 1 Emergency stop push button with key
    - 1 Push button + LED indicator
    - 1 3-phase output 3x 400V+N+E on 4mm safety terminals
    - 2 230Vac sockets (2P + E)
    - 12 230Vac sockets (2P + E) with ON indicator (back side)
- Mains power supply 230V - 50/60Hz. 3-metre lead with plug 2P+E.



The set can be supplied without the motor set, without capacitive or resistive load, please ask for details.