

STUDY OF THE DC MOTOR AND THE SYNCHRONOUS MACHINE 300W

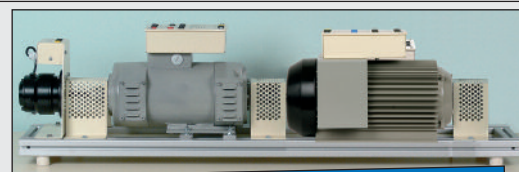
Ref. PACK-DCAC1

COMPOSITION OF THE SET

- 1 Shunt separated motor 220 / 220V
- 1 3-phase synchronous machine - alternator
- 1 Torque sensor
- 1 DC tachogenerator
- 1 Display unit torque and speed
- 1 Power supply inductor DC machine
- 1 Rheostat
- 1 Polar wheel power supply
- 1 Synchronoscope
- 1 Resistive load
- 4 Magnétoelectric voltmeters
- 3 Magnétoelectric ammeters
- 1 AC & DC multimeter clamp

EDUCATIONAL OBJECTIVES

- Study the armature/inductor windings of a DC machine.
- Understand the influence of the Inductor winding on the speed of rotation.
- Note the voltages and currents in the armature and in the inductor.
- Note, calculate and plot the electrical and mechanical quantities of the motor.
- Realize the balance sheet of motor powers.
- Study the functioning of a synchronous machine in Hypo-synchrone and Hyper-synchrone connected to the national electrical grid.
- Understand the functioning and the use a synchronoscope.
- Study the functioning of a synchronous machine in Hypo-synchrone and Hyper-synchrone connected to a resistive load.
- Note, calculate and plot the electrical and mechanical quantities of the alternator.
- Use an ammeter clamp

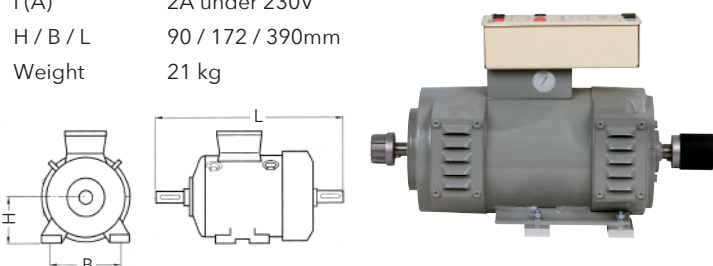


DELIVERED WITH TEACHING RESSOURCES

SHUNT SEPARATED MOTOR 220/220V

This engine works as well with a speed variator as directly connected to a DC supply.

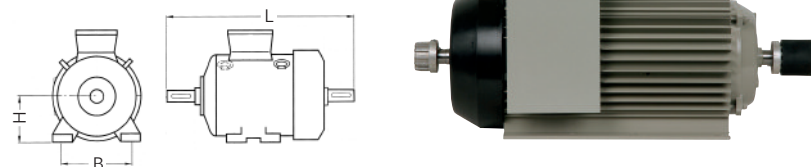
U (V)	220/230V
I (A)	2A under 230V
H / B / L	90 / 172 / 390mm
Weight	21 kg



3-PHASE SYNCHRONOUS MACHINE

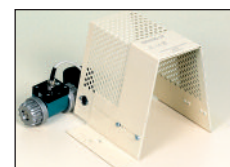
Works as a synchronous motor and 3-phase alternator. Equipped with LEBLANC poles for the mains network synchronization.

U (V)	230/400V
H / B / L	90 / 172 / 470mm
Weight	18 kg



TORQUE SENSOR

Sensor range	20 Nm
Use with	an important inertia
Torque output signal	0 to 5V for the measuring span in Nm (0 to -5V according the rotating way).
Maximum rotating speed	2000rpm.
Sensor supply	between 12 and 28 VDC.



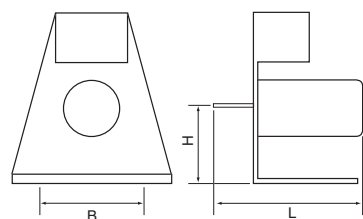
TORQUE & SPEED DISPLAY UNIT

Range (torque)	200,0 Nm
Analogical output	-5V / 0 / +5V
Range (speed)	2000 rpm



DC TACHOGENERATOR

Deliver a continuous voltage proportional to the rotating speed.
Voltage at 1000 rpm 10V
Connector safety terminals
H / B / L 90 x 172 x 170mm



POLAR WHEEL POWER SUPPLY

INDEPENDENT 1	2 x 0 to 30V - 2 x 0 to 3A
SERIAL 1	0 to 60V - 0 to 3A
PARALLEL	0 to 30V - 0 to 6A
Dims/ Weight	255 x 145 x 265mm / 8kg
Power source	Mains 120-240V - 50/60Hz



RHEOSTAT FOR INDUCTOR

0 to 100Ω / 1.8A



POWER SUPPLY INDUCTOR DC MACHINES

- This power supply includes :
 - one variable DC supply with voltmeter & ammeter
 - one fixed DC supply

Protection of users is ensured by galvanic insulation of outputs.

- Mains: Mains cable
- On/Off: General switch and light
- DC variable output: 0-240V / 3A
- DC fixed output: 190V / 1A
- Input protection: by time delay fuses
- Output protection: by thermal magnetic circuit-breakers
- Smoothing: by capacitors
- Dimensions / weight: 210 x 245 x 350mm / 20 kg.



RESISTIVE LOAD

- Power 0.5kW
- Nb switches: 6
- Variation in steps of 5%
- Portable type
- Weight: 15 kg



MAGNETOELECTRIC AMMETER

IDC	100μA to 10A (1,5%)
IAC	10mA to 10A (2%)
mV	100mV for the use of external shunts
Scale length	90mm
Protection	CAT III 600V Pol 2
Safety terminals	yes
Fuses	HPC 500V 3A + HPC 500V 10A
Dims / Weight	170 x 110 x 53mm / 500g



MAGNETOELECTRIC VOLTMETER

VDC	100mV to 1000V (1,5%)
VAC	3 to 1000V (2%)
Scale length	90mm
Protection	CAT III 600V Pol 2
Safety terminals	yes
Fuses	HPC 500V 500mA
Impedances	VDC : 20kΩ/V - VAC : 6,3kΩ/V
Dims / Weight	170 x 110 x 53mm / 500g



CLAMP / MULTIMETER AC & DC

- Auto power off after 25mn
- Recopy output 10mV/A 20kHz
- Back lighting of the screen

Display	4.000 counts
Converter	AC & DC
Bandwidth	50Hz to 500Hz
opening of the jaws	12mm
VDC / VAC	400mV to 600V
IDC / IAC	4 to 80A
OHM	4Ω to 40MΩ
Farad	40nF to 100μF
Fréquencymeter	5Hz to 10MHz
..)))	Ring for R < 150Ω
Ranging	Auto & Manual
Protection	CATIII 600Vrms pol2
Power source	2 batteries LR03
Dimensions / Weight	210 x 70 x 37mm / 200g



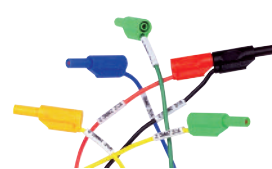
SYNCHRONOSCOPE - 16A - 400V

Allows to securely connect a rotating electric machine to the national 3 x 400V power grid.

- 2 displays indicate the presence and order of the phases.
- 1 central display makes it possible to compare the voltage and frequency difference between the 3-phase 400V network and the rotating machine.
- 1 set of LEDs shows the best time to switch on the synchronization.

SAFETY LEADS Ø4 REAR STACKING

- Very supple wire 30A
- Contacts formed into spring strips
- Working voltage 600V CAT III
- Test voltage 7400V during 1 mn
- Conforms to the standard CEI1010



MOTORS STAND AND ACCESSORIES

The set is supplied with coupling, fastening, covers and guide rails.

