

Mini-Motors Laboratory

Educational Training Equipment for the 21st Century

Bulletin 259H

Description

All of the rotating electrical machines and accessories required for a basic Electrical Power course are contained in the Hampden Mini-Motors Laboratory. The equipment illustrated is the basic package, to which compatible Hampden motors, controllers, and accessories may be added.

MODEL MGB-100-DG Bedplate

Holds motors and generators securely during tests. Includes quick-connect coupling and shaft guards.

MODEL DM-100A DC Motor/Generator

May be used as either motor or generator; series, shunt, or compound.

MODEL SFR-100 Series Field Rheostat

Changes the degree of compounding of a DC generator

MODEL DYN-100A-DM Dynamometer

Measures torque in ounce-force inches in either direction. May also be used as DC motor or generator.

MODEL SM-100-3 Synchronous Motor/Alternator

Runs as a synchronous motor or operates as a three-phase alternator when driven by AC or DC motor.

MODEL MFM-100 Multi-Function Machine

Runs as a split-phase; a capacitor start; a permanent-capacitor; or a two-capacitor motor.

MODEL RL-100A Resistance Load

Applies resistive load to generators and alternators.

MODEL RLC-100 Resistance/Reactance Load

Applies unity, lagging, or leading power factor load.

MODEL SLA-100M Strobe-Tachometer

Measures speeds between 100 and 12,000 RPM

MODEL HT-100K Digital Optical Tachometer

Measures speeds between 0 and 10,000 RPM with accuracy of 0.25% of actual speed.



Power and Metering

To satisfactorily perform the required experiments, the following power should be available:

- Fixed 120V AC 1 ϕ , 2-wire 10A
- Fixed 208/120V AC 3 ϕ , 4-wire, 10A
- Variable 0-240/140V AC 3 ϕ , 4-wire, 9A
- Variable 0-150V DC, 1.0A, isolated, 1% RMS
- Variable 0-125V DC, 5.0A, isolated, 1% RMS

The following meters should also be available:

- DC Voltmeter; 0-75/150V (2)
- DC Ammeter; 0-0.5/1.0/2.5/5.0A (2)
- AC Voltmeter; 0-150/300V
- AC Ammeter; 0-0.5/2/4/8A (2)
- AC Wattmeter; 0-150/300/600/1200W (2)

All of the above power and metering facilities are included in the Hampden **MODEL HMD-100-CM** Deluxe Console.

Three-Phase Add-On

The study of three-phase motors and alternators may be enhanced by the addition of the following equipment (shown below) to the Hampden Mini-Motors Laboratory:

MODEL IM-100 Induction Motor

Runs as a 3 ϕ , 4-pole, squirrel-cage motor.

MODEL WRM-100-3A Wound-Rotor Motor

Runs as a 3 ϕ , 4-pole, wound rotor motor.

MODEL WRSC-100 Wound-Rotor Speed Controller

Used to vary the speed of the WRM-100-3A.

MODEL SYN-100 Synchronizing Phasing Lamps

Used to synchronize two alternators.

All Hampden units are available for operation at any voltage or frequency

Hampden
ENGINEERING CORPORATION

Series 100 Accessories

Educational Training Equipment for the 21st Century

Bulletin 256J

MODEL BT-100A-ZM Tachometer-Generator & Indicator



Dimensions: 11"H x 6"W x 14"D
Shipping Weight: 15 lbs.

The **Model BT-100A-ZM** couples to the shaft of Hampden Series 100 machines for continuous speed measurements of 0–2000 rpm or 0–4000 rpm in either direction of rotation. A DC voltage, directly proportional to speed (6V/1000 rpm), is available through pomona jacks for use as a feedback signal in automatic control systems.

MODEL SLA-100M Strobe Tachometer



Shipping Weight: 3 lbs.

The **Model SLA-100M** Strobe Tachometer is a multi-purpose stroboscopic lamp with a digital LED readout and knob for adjusting the flash rate between 100 to 12,000 flashes per minute (FPM). Accuracy is ± 1 FPM.

The **SLA-100SYN** option is provided with input and output jacks to provide external triggering or synchronization.

MODEL HPT-100A Digital Photo Tachometer



Dimensions: 3¼"H x 6"W x 6¼"D.
Shipping Weight: 5 lbs.

The **Model HPT-100A** Hand Tachometer measures rotational speed between 50 rpm and 10,000 rpm. The photo sensor is mounted on a magnetic bracket that allows "hands free" speed measurement. Line-powered (115V or 230V AC) digital circuits display speed via five 0.5" high 7-segment LEDs. Accurate within 1 rpm. Also provides a 0 to 5 volt DC analog output for use as a feedback signal in closed loop motor speed control systems

MODEL HT-100-K Digital Optical Tachometer



Dimensions: 2¾"
Shipping Weight: 2 lbs.

The **Model HT-100-K** Digital Optical Tachometer measures rotational speed between 2.5 and 100,000 rpm. The HT-100-K is a precision instrument of especially rugged construction. Accuracy is $\pm 0.01\%$ of the actual speed being measured. Designed for ease of use. Furnished complete with case, contact tip assembly and assorted accessories.

MODEL MGB-100DG Motor Bedplates



MODEL MGB-100DG for two machines
Dimensions: 4"H x 32"W x 16"D
Shipping Weight: 25 lbs



MODEL MGB-100-DG3 for three machines
Dimensions: 4"H x 48"W x 16"D
Shipping Weight: 30 lbs

The **Model MGB-100DG** Motor Bedplates hold Hampden Series 100 Machines securely in place during experimentation. The bedplates, constructed of heavy steel, rest on rubber vibration pads. They are furnished complete with serrated rubber couplings and necessary shaft guards.

MODEL PS-100 Plugging Switch



Dimensions: 8¾"H x 4"W x 14"D
Shipping Weight: 5 lbs

The **Model PS-100** Plugging Switch is a three-terminal control circuit sensing device mechanically connected to the motor shaft. It illustrates how the reversal of armature connections can create a large braking torque. Plugging can be arranged for either direction of motor rotation

All Hampden units are available for operation at any voltage or frequency

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Series 100 Loading Accessories

Educational Training Equipment for the 21st Century

Bulletin 255H

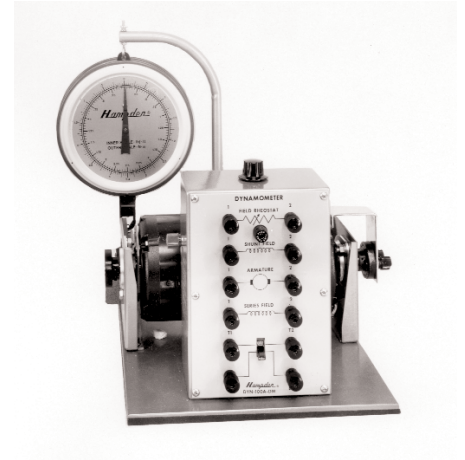
DYN-100A-DM Electrodynamometer



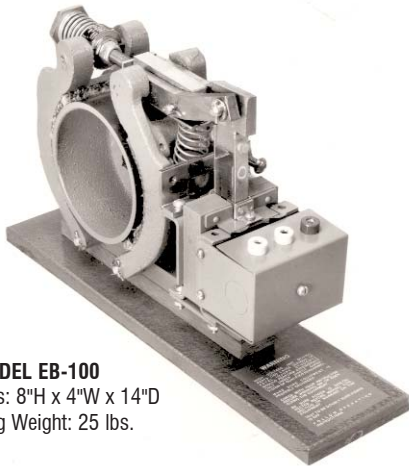
MODEL DYN-100A-DM
Dimensions: 10" H x 13" W x 14" D
Shipping Weight: 70 lbs

The Hampden **Model DYN-100A-DM** is a DC motor/generator cradled in sealed bearings to form a trunnion mount. It may be used: (1) as a DC machine in the determination of DC series, shunt, and compound motor and generator characteristics, (2) as a prime mover in generator and alternator load tests, and (3) as a generator to measure motor torque in either direction of rotation.

Its 6-inch diameter, zero-centered scale indicates torque to 2.5 lb-ft. and 3.4 N-m. The electro-dynamometer is rated at 1/3 HP as a motor and 250 watts as a generator. Furnished complete with cords.



EB-100 Electric Brake



MODEL EB-100
Dimensions: 8"H x 4"W x 14"D
Shipping Weight: 25 lbs.

The Hampden **Model EB-100** Electric Brake is a solenoid operated magnetic shoe brake with a continuous torque rating of 3 lb-ft. A large (4" diameter) wheel is mounted on the shaft of the motor to be braked. The solenoid coil is rated up to 240 volts AC. Ground and coil terminals are brought out to Hampden HR-1S receptacles.

H-REM-LC-D Load Cell and Signal Conditioner

The Hampden **Model H-REM-LC-D** Load Cell is designed to be used with any standard Hampden dynamometer, replacing the circular scale. The signal conditioner measures and displays torque on a digital read-out. Two separate amplifiers are used to permit torque measurements in either English units (lb-ft) or SI units (N-m). Separate analog output (0-5V DC) is available via Hampden HR-1S receptacles on the rear of the unit.



MODEL H-REM-LC-D
Dimensions: 8"H x 19"W x 8½"D
Shipping Weight: 25 lbs.

All Hampden units are available for operation at any voltage or frequency

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