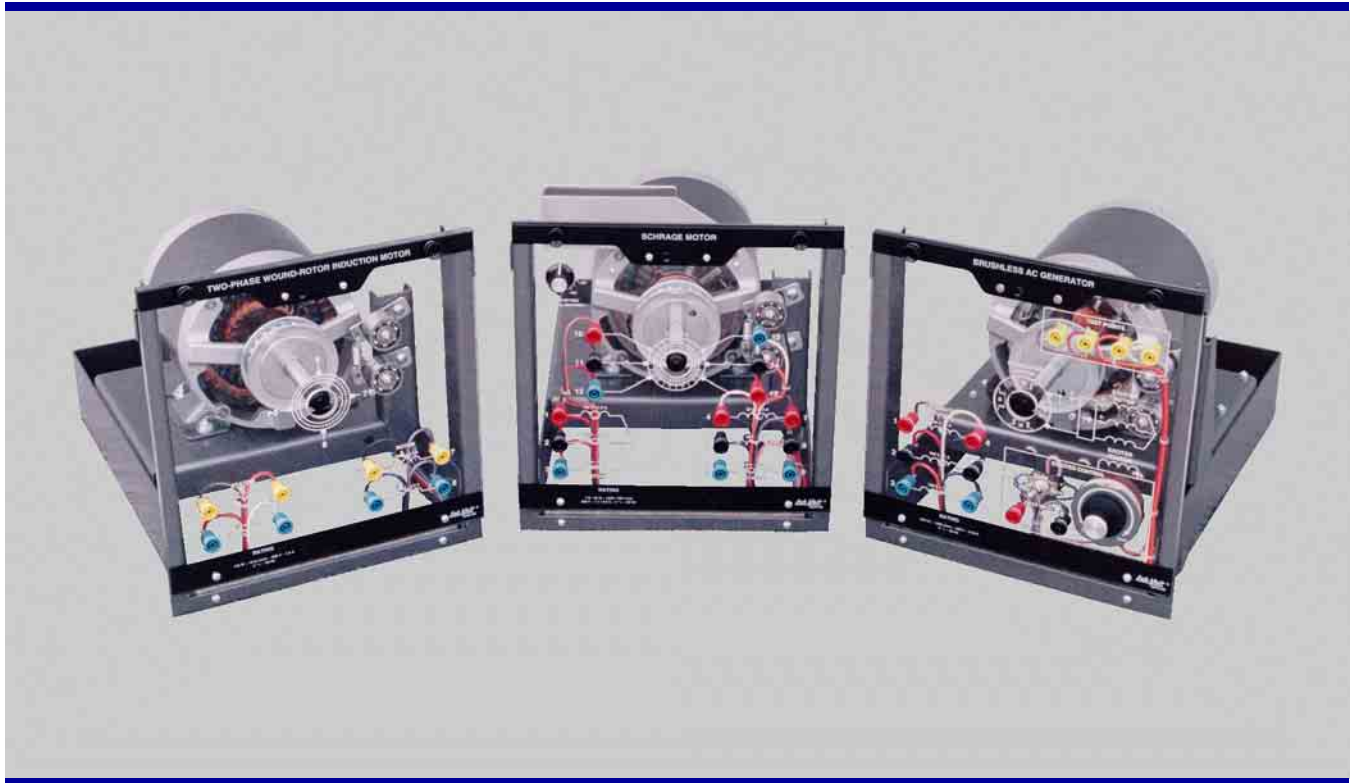




Electric Power / Controls

0.2 kW

ADDITIONAL MOTORS / GENERATORS MODELS 8233, 8234, AND 8243



GENERAL DESCRIPTION

The Lab-Volt Electromechanical System (EMS) is a unique approach to electric power technology in philosophy and in design. All machines are designed, engineered, and manufactured for education and are not adaptations of equipment designed for any other use.

The EMS machines are the result of Lab-Volt's engineering expertise and the careful research of educational requirements and industrial applications. The machines are scale models of their industrial counterparts and are designed to operate like large power equipment used in industry. This engineering detail, coupled with Lab-Volt's dedication to educational requirements, permits students to investigate industrial machinery characteristics not previously observable in a classroom.

All machines are mounted in standard-size EMS modules. The modules are constructed of heavy-gauge steel, finished in baked enamel, and equipped with a

clear plastic faceplate fitted with a chrome piano hinge. The faceplate can be lowered for access to the machinery, and when closed is secured by two quick-lock fasteners. All electrical components of the machines are terminated on the faceplates by 4-mm color-coded safety jacks and are identified by schematic symbols, numbered terminal codes, and the electrical rating.

All machines have cut-away bell housings (front and rear) to permit visual inspection of the internal construction and observation of the machines during operation with the aid of a strobe light (Model 8922). Externally mounted components, such as centrifugal switches, capacitors, brushes, slip rings, and commutators in addition to the exposed salient poles, squirrel cage, and wound rotors, permit students to clearly determine component function, as well as understand relative position, turns, and wire sizes of the machinery.

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The shaft of each machine has a concave and slotted end to facilitate the use of tachometers, holding brakes, plugging switches, and inertia wheels. A geared pulley is fitted on each machine shaft to mechanically couple machines together through the use of a non-slip timing belt (Model 8942). This flexible belt has molded teeth, which mesh with the geared machine pulleys. Tension for the timing belt is provided by the idler

tensioning ball bearings, which are mounted on each machine module.

Most of the Lab-Volt machines are available in dissectible versions, which can be disassembled and assembled without the use of tools. Students can then easily examine the internal parts and the construction of these machines.

Model 8233 Two-Phase Wound-Rotor Induction Motor



Each phase of the stator windings of this motor is independently terminated and identified on the faceplate to permit operation with a two-phase electric power source. The rotor windings are brought out to the faceplate via external slip rings and brushes. This machine can be used as a wound-rotor induction motor, phase shifter, single-phase variable coupling transformer, two-phase transformer, selsyn control, frequency converter or asynchronous induction generator.

Model 8234 Schrage Motor



The Schrage Motor, Model 8234, is a variable-speed polyphase AC motor with both high torque and efficiency. It requires standard three-phase power.

The Schrage Motor is used in a variety of industrial applications, such as packaging machinery, conveyors, pumps, and knitting machines, where full torque is needed over a variable speed range. The motor is basically a special wound-rotor motor in which a built-in variable-frequency source is connected to one winding, while the network frequency is applied to the other winding. The voltage of the variable frequency source can be set over a certain range and the resulting speed of the motor depends upon this setting.

The Schrage Motor circuit diagram pictured in Figure 1 shows that the primary winding is on the rotor and the insulated secondary winding is on the stator. On the rotor, there is a tertiary, or control, winding, which is connected to the secondary windings on the stator via a commutator and three pairs of adjustable brushes lying on the commutator. When the brushes in each pair move apart or closer together, a variable voltage is applied to the secondary winding by the tertiary winding. The change in voltage varies the speed of the motor below and above synchronous speed.

Model 8243 Three-Phase Brushless AC Generator



The Three-Phase Brushless AC Generator, Model 8243, is a synchronous generator without its conventional brush-gear for field excitation. It comprises an AC power generator and an exciter which can be set in

one of two modes: separately excited (PILOT) or self-excited (AUTO). The exciter voltage is adjustable in both modes using a rheostat control on the module faceplate.

Silk-screened markings on the faceplate clearly identify the rotor and stator windings, as well as other components. A shaft-mounted rectifier assembly interconnects the exciter and generator rotors. Connections of these devices have been brought out to the faceplate through externally mounted slip rings and brushes. In this way, students are able to observe and characterize the function and operation of the brushless AC generator. Students are then able to turn these observations into valuable hands-on learning applications.

Each phase of the stator windings is independently terminated to permit operation in either delta or star (wye) configuration. The rotor, which has a salient pole construction, is equipped with a squirrel-cage damper and salient pole windings.

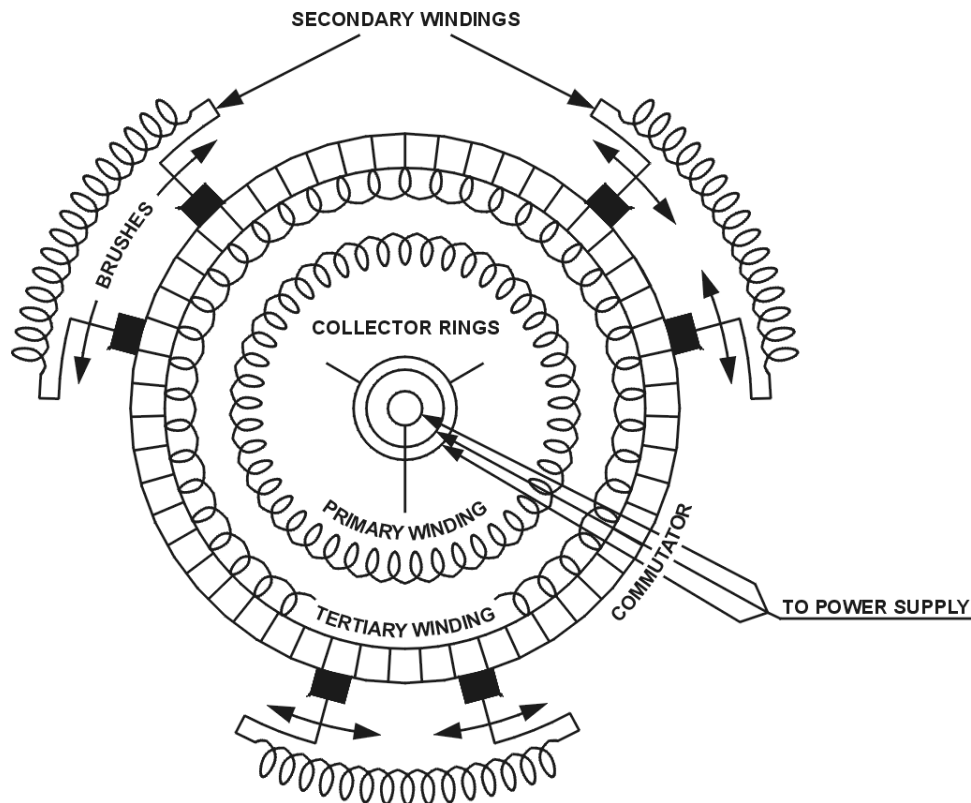


Figure 1. Circuit Diagram of the Schrage Motor

ADDITIONAL MOTORS / GENERATORS

MODELS 8233, 8234, AND 8243

SPECIFICATIONS

Model 8233 – Two-Phase Wound-Rotor Induction Motor		120/208 V – 60 Hz	220/380 V – 50 Hz	240/415 V – 50 Hz
Rating	Output Power	175 W		
	Stator Voltage (per phase)	120 V – AC	220 V – AC	240 V – AC
	Rotor Voltage (per phase)	120 V – AC	220 V – AC	240 V – AC
	Full Load Speed	1610 r/min	1290 r/min	1325 r/min
	Full Load Current	1.6 A	0.79 A	0.76 A
Physical Characteristics	Dimensions (H x W x D)	308 x 291 x 440 mm (12.1 x 11.5 x 17.3 in)		
	Net Weight	14.1 kg (31 lb)		
Model 8234 – Schrage Motor		120/208 V – 60 Hz	220/380 V – 50 Hz	240/415 V – 50 Hz
Rating	Output Power	175/40 W	175/30 W	175/40 W
	Rotor Voltage	208 V, 3 phases	380 V, 3 phases	415 V, 3 phases
	Stator Voltage	30/52 V, 3 phases	18/31 V, 3 phases	20/35 V, 3 phases
	Full Load Speed	2200/500 r/min	1700/300 r/min	1800/400 r/min
	Full Load Current	1.1/0.9 A	0.6/0.35 A	0.58/0.37 A
	Physical Characteristics	Dimensions (H x W x D)	308 x 291 x 440 mm (12.1 x 11.5 x 17.3 in)	
Net Weight		14.4 kg (31.7 lb)		
Model 8243 – Three-Phase Brushless AC Generator		120/208 V – 60 Hz	220/380 V – 50 Hz	240/415 V – 50 Hz
Rating	Output Power	120 VA	110 VA	120 VA
	Output Voltage	120/208 V, 3 phases	220/380 V, 3 phases	240/415 V, 3 phases
	Output Current	0.33 A	0.15 A	0.15 A
	Exciter Current	1 A	0.5 A	0.5 A
	Exciter Control Input Voltage	120 V – DC	220 V – DC	240 V – DC
	Speed	1800 r/min	1500 r/min	1500 r/min
	Physical Characteristics	Dimensions (H x W x D)	308 x 291 x 440 mm (12.1 x 11.5 x 17.3 in)	
Net Weight		17.5 kg (38.5 lb)		

ORDERING NUMBERS

120 V – 60 Hz			220 V – 50 Hz			240 V – 50 Hz
ENGLISH	FRENCH	SPANISH	ENGLISH	FRENCH	SPANISH	ENGLISH
8233-00	8233-01	8233-02	8233-05	8233-06	8233-07	8233-0A
8233-D0 ¹	8233-D1	8233-D2	8233-D5	8233-D6	8233-D7	8233-DA
8234-00	8234-01	8234-02	8234-05	8234-06	8234-07	8234-0A
8243-00	8243-01	8243-02	8243-05	8243-06	8243-07	8243-0A
26217	N/A	N/A	26217	N/A	N/A	26217

Table 1. Equipment Ordering Numbers

¹ Ordering numbers with the suffix "D" correspond to dissectible versions of machines.

Reflecting Lab-Volt's commitment to high quality standards in product, design, development, production, installation and service, our manufacturing and distribution facility has received the ISO 9001 certification.

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