

FH50 to FH150

Fractional Horsepower Electrical Machines

Part of the Electrical Machines Teaching System, this is a range of optional electrical machines for use with the Test Bed (FH2)

- Full range of fractional horsepower a.c. and d.c. machines which fit easily into cradles on the test bed (FH2) – no need for tools
- Industrial machines modified for educational use, for full range of realistic tests
- Each machine has mimic plate to help students understand how it works and how to connect its windings
- Includes motors for performance tests and generators for efficiency tests
- Includes two-speed motor, capacitor start and induction motors, wound rotor machine and a d.c. machine to cover many different motor techniques



The FH110 A.C. Series Motor



The FH150 Stepper Motor, driven by the SMS2 Stepper Motor System

Description

Part of TecEquipment's Electrical Machines Teaching System, this range (FH50 to FH150) is made up of a selection of interchangeable fractional horsepower electrical machines. They are each of similar frame size and rating.

They allow students to study performance and typical applications of motors and generators. They show the student the advantages and disadvantages of each machine. This helps them to understand why we use different types of machine for different jobs.

All windings and the earth of each machine connect to a 16-way plug. This fits into the socket on the test bed.

Each machine comes with a dedicated mimic plate which has a diagram of the machine's winding details. The students fit this over the machine connection sockets on the test bed. This helps them see how and where to connect the supplies and instruments to the machine.

TecEquipment adapts each machine to fit easily into the cradles of the test bed. The output shaft of each machine couples directly to the dynamometer of the test bed (with a nylon coupling). The student needs no tools.

The range includes:

- D.C. Compound Machine (FH50)
- Shaded Pole Motor (FH60)
- Split-Phase Motor (FH70)
- Capacitor Motor (FH80)
- Cage Rotor Induction Motor (FH90)
- Wound Rotor Machine (FH100)
- A.C. Series Motor (FH110)
- Two-Speed Induction Motor (FH130)
- Synchronous Reluctance Motor (FH140)
- Stepper Motor (FH150) – needs the Stepper Motor System (SMS2)

The Test Bed includes suggested experiments for most of the machines. The user guide for the Stepper Motor System (SMS2) includes suggested experiments for the stepper motor (FH150).

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- An ISO 9001 certified company

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Standard Features

- Two-year warranty
- Made in accordance with the latest European Union directives

Experiments

Refer to the Electrical Machines overview datasheet for full details.

Recommended Ancillaries

Other products in the Electrical Machines Teaching System (see overview datasheet).

Essential Services

The Test Bed (FH2) holds and gives power for most of the machines, except the Stepper Motor (FH150). This machine needs the Stepper Motor System (SMS2) to drive it.

Operating Conditions

Operating environment:
Laboratory environment

Storage temperature range:
-25°C to +55°C (packed)

Operating temperature range:
+5°C to +40°C

Operating relative humidity range:
80% at temperatures < 31°C decreasing linearly to 50% at 40°C

Sound Levels

Less than 70 dB(A)

Specification

NOTE: all ratings are nominal and may vary slightly

D.C. Compound Machine (FH50):
Works as a shunt, series and compound motor and also a generator. Approximate ratings are:

- As a motor: 100 W (shunt), 110 V, 1500 rev.min⁻¹
- As a generator: 40 W (shunt), 110 V, 1500 rev.min⁻¹

Note: For d.c. generator experiments, two FH50s are needed – one as the test machine itself and the other as the prime mover.

Shaded Pole Motor (FH60):
Single-phase induction motor
Four-pole, 70 W, 230 V, 50/60 Hz
Nominal speed: 1490/1780 rev.min⁻¹

Split-Phase Motor (FH70):
Single-phase induction motor
Four-pole, 160 W, 230 V, 50/60 Hz
Nominal speed: 1490/1780 rev.min⁻¹

Capacitor Motor (FH80):
Single-phase capacitor start/run induction motor
Four-pole, 180 W, 230 V, 50/60 Hz
Nominal speed: 1490/1780 rev.min⁻¹

Note: To complete all experiments with this motor in the FH2/3 user guide requires three Capacitance Load Modules (C1).

Cage Rotor Induction Motor (FH90):
Three-phase, four-pole induction motor
120 W, 230 V (Delta), 50/60 Hz
Nominal speed: 1473/1770 rev.min⁻¹
Star or delta operation

Wound Rotor Machine (FH100):
Three-phase, four-pole wound rotor machine for operation as:

- Slip ring induction motor:
120 W, 230 V (Delta), 50/60 Hz, three-phase
Nominal speed: 1460/1750 rev.min⁻¹
Fully compatible with slip ring motor starter in FH2 Test Bed
- Synchronous motor:
120 W, 230 V (Delta), 50/60 Hz, three-phase
Synchronous speed: 1500/1800 rev.min⁻¹
- Synchronous generator:
80 W, 230 V (Delta), 50/60 Hz, three-phase
Synchronous speed: 1500/1800 rev.min⁻¹
Note: FH50 required as prime mover

A.C. Series Motor (FH110):
Single-phase commutator motor
120 W @ 5000 rev.min⁻¹, 230 V, 50/60 Hz

Two-Speed Induction Motor (FH130):
Two-speed, three-phase induction motor
Pole changing/Dahlander winding, 2/4 pole
120 W, 230 V, 50/60 Hz
Nominal speeds: 1465/2970 rev.min⁻¹

Synchronous Reluctance Motor (FH140):
Three-phase, four-pole, 120 W, 230 V (Delta), 50/60 Hz
Synchronous speed: 1500/1800 rev.min⁻¹
May be operated in star or delta

Stepper Motor (FH150):
Hybrid stepper motor
200 steps per revolution, two-phase, 1.25 A per phase, 5.5 V per phase
Includes rotary scale calibrated 0–200 to indicate parts of a revolution. For use with and energised by the SMS2 Stepper Motor Drive System.

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