

## Features

- The trainer is designed for the teaching the fundamental concepts of transformer and electrical machines. The student will learn about the characteristics of transformer, DC Machine, single phase ac machine, three-phase asynchronous ac machine and three-phase synchronous ac machine as a three phase generator.
- The Trainer uses the most modern genuine industrial machines in accordance with the IEC 60038 and insulation F classes.
- All the electrical machine are in fractional horse power capacity (approx ½ HP), so it is small enough for easy handling.
- Completed with workbench that already equipped with galvanic isolated power supply.
- The workbench equipped with a cupboard to store the motors and other modules.
- The trainer already has basic measuring equipment for electrical machine (Torque meter, RPM meter, Voltmeter, Ampere meter and power meter).
- The electrical machine can be attached from one to another with coupling system.
- The electrical system is equipped with emergency stop button.
- All inputs and outputs on each panel are equipped with safety socket and safety connecting cross 4-mm.
- Complete with comprehensive experiment manual book to guide student step by step conducting experiments.

## Covered Topics

- LE050001E Voltage transformation in single phase transformer
- LE050002E Current transformation in single phase transformer
- LE050003E Single phase transformer at no-load and short circuit
- LE050004E Loading of single phase transformer
- LE050005E Efficiency of a single phase transformer
- LE050006E Three phase transformer in star-star circuit at no-load
- LE050007E Three phase transformer in star-star circuit with unbalanced load
- LE050008E Three phase transformer in delta-star circuit at no-load
- LE050009E Three phase transformer in delta-star circuit with unbalanced load
- LE050010E Three phase transformer in star-delta circuit at no-load
- LE050011E Three phase transformer in star-delta circuit with unbalanced load
- LE050012E Starting characteristic of a single phase capacitor run AC machine
- LE050013E Changing the rotation directional of a single phase capacitor run AC machine
- LE050014E Torque-speed characteristic of a single phase capacitor run AC machine
- LE050015E Starting characteristic of a three phase squirrel cage induction AC machine
- LE050016E Changing the rotation directional of a three phase squirrel cage induction AC machine
- LE050017E Torque-speed characteristic of a three phase squirrel cage induction AC machine
- LE050018E Starting characteristic of a three phase induction ac machine Dahlander
- LE050019E Changing the rotation directional of a three phase induction AC machine Dahlander
- LE050020E Torque-speed characteristic of a three phase induction AC machine Dahlander
- LE050021E Starting characteristic of a Slip-ring three phase induction AC machine
- LE050022E Changing the rotation directional of a Slip-ring three phase induction AC machine
- LE050023E Torque-speed characteristic of a Slip-ring three phase induction AC machine
- LE050024E Starting characteristic of a synchronous three phase induction AC machine
- LE050025E Torque-speed characteristic of a synchronous three phase induction AC machine
- LE050026E V-Characteristic of a synchronous three phase induction AC machine
- LE050027E Three phase synchronous AC machine as a three phase synchronous generator
- LE050028E Synchronizing circuit (light-dark circuit)
- LE050029E No-load and short circuit characteristic of three phase synchronous AC machine
- LE050030E RLC load characteristic of three phase synchronous AC machine
- LE050031E Exciter-regulator characteristic of three phase synchronous AC machine
- LE050032E Starting characteristic of a DC series machine

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# Fundamental of Electrical Machine Trainer

PT 981156



## Training Panel System

### >> Covered Topics Continued

- LE050033E Changing the rotation directional of a DC series machine
- LE050034E Speed adjustment of a DC series machine
- LE050035E Torque-speed characteristic of a DC series machine
- LE050036E Starting characteristic of a DC shunt machine
- LE050037E Changing the rotation directional of a DC shunt machine
- LE050038E Speed adjustment of a DC shunt machine
- LE050039E Torque-speed characteristic of a DC shunt machine
- LE050040E Starting characteristic of a DC compound machine
- LE050041E Changing the rotation directional of a DC compound machine
- LE050042E Speed adjustment of a DC compound machine
- LE050043E Torque-speed characteristic of a DC compound machine
- LE050044E Characteristic of separately excited generator at no-load and loaded
- LE050045E DC series generator
- LE050046E DC shunt generator
- LE050047E DC compound generator

## Specification

- **Bench Power Supply [ PTE-046-01 ]**
  - Main source power supply 3 x 230V, current 4A
  - AC three phase fixed 3 x (0 - 220 - 380)V
  - AC Single phase adjustable 0 - 240V
  - DC Adjustable 0 - 200VDC
  - Phase control lamps, L1, L2 and L3
  - Push button emergency
  - Each AC or DC source complete with main switch
- **Single Phase Transformer [ PTE-046-02 ]**
  - Primary : 0 - 50V
  - Secondary : 2 x (0 - 12 - 24V)
  - Current : 5A
- **Single Phase Capacitor Run AC Machine [ PTE-046-04 ]**
  - Nominal voltage 230V, power 370Watt, 2.9A, frequency 50Hz, speed 2750RPM, Cos  $\phi$  0.72, and Capacitor run 12.5  $\mu$ F.
- **Three Phase Squirrel Cage AC Machine [ PTE-046-05 ]**
  - Rating for motor operation: 370Watt, 230/400V, current 1.56/0.9A Y/ $\Delta$ , Cos  $\phi$  0.78, 2840RPM, 2 pole and frequency 50Hz
- **Three Phase AC Machine Dahlander [ PTE-046-06 ]**
  - Rating for motor operation: 220 - 290Watt, 400V, current 0.9/1 0.6A Y/ $\Delta$ , Cos  $\phi$  0.56/ 0.59, 1440/2907RPM, 4/2 pole and frequency 50Hz
- **Three Phase Slip-ring AC Machine [ PTE-046-07 ]**
  - Rating for motor operation: 200Watt, 220/380V, current 1.1/0.65A Y/ $\Delta$ , 1450 RPM frequency 50Hz and V. rotor 220VAC.

- **Three Phase Synchronous AC Machine [ PTE-046-08 ]**
  - Rating for motor operation: 250Watt, 220/380V Y/ $\Delta$ , current 0.65/ 0.37A, Cos  $\phi$  1 V. excitation 200V DC, I excitation 0.25A, 3000RPM and frequency 50Hz
- **DC Compound [ PTE-046-09 ]**
  - Rating for motor operation: 250Watt, 220VDC, 3000 RPM, and V. Excitation 200VDC
- **Brake Machine [ PTE-046-10 ]**
  - Serves in connection with unit control brake machine to record the torque and speed in electrical machines.  
The source supply is provided by the unit control brake machine via a connecting lead.
  - Nominal voltage 12VDC, current 0.52A and max torque 5N.
- **Unit Control Brake Machine [ PTE-046-11 ]**
  - For the supply, control and regulation of the magnetic powder brake, the recording of characteristic (speed/torque) is possible in automatic operation. Main source 220V AC, 50Hz.
  - Equipped with:
    - Instrument to measure speed with scala 0 - 5000 RPM
    - Instrument to measure torque with scala 0 - 5Nm
- **Starter For DC Machine [ PTE-046-13 ]**
  - Circular rheostat for starting DC Motors Resistance 100, 160Watt
- **Field Regulator For AC And DC Machine [ PTE-046-14 ]**
  - Circular rheostat for starting DC Motors Resistance 3300, 160Watt
- **Field Regulator For AC And DC Generator [ PTE-046-15 ]**
  - Circular rheostat for starting DC Motors Resistance 3300, 160Watt
- **Rectifier Circuit [ PTE-046-17 ]**
  - Nominal voltage 230V AC, current source 10A
- **Synchronization Indicators [ PTE-046-21 ]**
  - With three indicator lamps for quality of the phase relationship between mains and generator voltage (bright dark circuit)
- **Main Switch [ PTE-046-22 ]**
  - On/ Off Switch, switch load 10A/ 400V, 4pole and switch position OFF-ON
- **Star Delta Switch [ PTE-046-23 ]**
  - Switch load 10A/ 400V and switch position OFF-Y- $\Delta$
- **Pole Changing [ PTE-046-24 ]**
  - Switch load 10A/ 400V and switch position OFF-1-2
- **Motor Starter And Protective Circuit Breaker [ PTE-046-25 ]**
  - 3 pole equipped with overload and instantaneous short-circuit trip. Setting range 1-1.6A
- **DC Voltmeter [ PTE-046-26 ]**
  - Measuring instrument DC voltage, measuring range 0-125-250VDC, moving coil meter, classes 2. Equipped with selector switch for selection the voltage range.
- **DC Amperemeter [ PTE-046-27 ]**
  - Measuring instrument DC ampere, measuring range 1-5A, moving coil meter, classes 2. Equipped with selector switch for selection the voltage range.
- **Digital Power Meter [ PTE-046-28 ]**
  - Measuring instrument digital power meter, main source 220VAC. Can be use measuring voltage, current, frequency, VAR, Watt and power factor. Display 4 digit LED.

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- **Three Phase R-L-C Loads and Single Phase Load [ PTE-046-30 ]**
  - Nominal power 30W-300Watt continuously variable
  - Three resistances with possibility to connect in star/ delta, controlled by three switches with 7 steps variable per phase nominal voltage 220/380VAC and 300V.
  - Three inductive with possibility to connect in star/ delta, controlled by three switches with 7 steps variable per phase nominal voltage 220/380VAC and 300VAR
  - Three capacitive with possibility to connect in star/ delta, controlled by three switches with 7 steps variable per phase nominal voltage 220/380VAC and 300VAR
- **Three Phase Transformer and 3 Pole Rheostat for Slip-Ring AC Machine [ PTE-046-31 ]**
  - Primary : 3 x (0 - 50)
  - Secondary : 3 x (0 - 12- 24)
  - Current : 5A
  - 3 Circular rheostat for three phase Slip-Ring AC machine. Resistance 330, 330Watt



Electrical Machines



Three Phase R-L-C Loads and Single Phase Load  
PTE-046-30



Three Phase Transformer and 3 Pole Rheostat for Slip-Ring AC Machine  
PTE-046-31

## Training Panel System

### PT 981156 Fundamental of Electrical Machine Trainer consists of

Cat. No.	Description	Qty.	Cat. No.	Description	Qty.
PTE-046-01	Bench Power Supply	1 pc	PTE-046-26	DC Voltmeter	1 pc
PTE-046-02	Single Phase Transformer	1 pc	PTE-046-27	DC Amperemeter	1 pc
PTE-046-04	Single Phase Capacitor Run AC Machine	1 pc	PTE-046-28	Digital Power Meter	1 pc
PTE-046-05	Three Phase Squirrel Cage AC Machine	1 pc	PTE-046-30	Three Phase R-L-C Loads and Single Phase Load	1 pc
PTE-046-06	Three Phase AC Machine Dahlander	1 pc	PTE-046-31	Three Phase Transformer and 3 Pole Rheostat for Slip-Ring AC Machine	1 pc
PTE-046-07	Three Phase Slip-Ring AC Machine	1 pc			
PTE-046-08	Three Phase Synchronous AC Machine	1 pc	GSN 305	Coupling	2 pcs
PTE-046-09	DC Compound Machine	1 pc	GSE-231 01	Safety connecting lead 30cm, Black	7 pcs
PTE-046-10	Brake Machine	1 pc	GSE-231 02	Safety connecting lead 30cm, Red	9 pcs
PTE-046-11	Unit Control Brake Machine	1 pc	GSE-232 01	Safety connecting lead 50cm, Black	7 pcs
PTE-046-13	Starter for DC machine	1 pc	GSE-232 02	Safety connecting lead 50cm, Red	9 pcs
PTE-046-14	Field Regulator for AC and DC Machine	1 pc	GSE-233 01	Safety connecting lead 100cm, Black	10 pcs
PTE-046-15	Field Regulator for AC and DC Generator	1 pc	GSE-233 02	Safety connecting lead 100cm, red	12 pcs
PTE-046-17	Rectifier Circuit	1 pc	GSE-233 03	Safety connecting lead 100cm, Blue	6 pcs
PTE-046-21	Synchronization indicators	1 pc	GSE-233 04	Safety connecting lead 100cm, yellow	10 pcs
PTE-046-22	Main Switch	1 pc	GSE-233 05	Safety connecting lead 100cm, Yellow-green	5 pcs
PTE-046-23	Star Delta Switch	1 pc	GSE 235	Safety connecting cross	10 pcs
PTE-046-24	Pole Changing	1 pc	GSN 245	TPS Frame 1200mm	1 set
PTE-046-25	Motor Starter & Protective Circuit Breaker	1 pc	L05S-01E	Experiment manual book	1 pc

Specifications and illustrations are subject to change without prior notice