Email :
sales@laboratoryinstrumentsmanufacturers.com

Product Name : Power Transmission And Distribution Workstation-Didactic Equipment	**Product Code :** LIM-CAT-L0043-00006

Description :

Power Transmission And Distribution Workstation-Didactic Equipment

Technical Specification :

Power Transmission And Distribution Workstation-Didactic Equipment
The Power transmission and distribution workstation is developed to allow students to give a knowledge of the major components of electric powertransmission and distribution systems: transformer, transmission, and busbars.
In this laboratory the basic circuits of power engineering, series, and parallel connections of operating equipment (lines, transformers) as well as circuitsinvolving the conversion of delta connections to star connections and vice versa, is analysed.
The workstation is controlled by an industrial Supervision and Control Data Acquisition (SCADA) software that will communicate with all the activedevices in the trainer to provide real-time measurements, system status and system control. The software is structured following a didactic approach.dividing each unit of study into single exercises. The open SCADA licence give the teachers the possibility to create their own projects and fullycustomize the experiments by displaying the parameters of interest and controlling the actuators for an “intelligent” power management.
The Power transmission and distribution set Configuration has modular structure and it consist of didactic panels that is installed on avertical frame.
The modularity of this didactic system grant to students a direct and immediate approach to the topic,offering the opportunity to studyvarious subjects and performing different learning activities. With this system, it is possible to perform at least the following experiments:

Three-phase transformers
Transformer vector group.
Transformer no load performance.
Transformer short-circuit performance and equivalent circuit.
Load performance.
Zero impedance.
Asymmetrical load.
Autotransformer.
Parallel operation.
Transmission lines
Studies on three-phase transmission lines
1. No-load performance,Ferranti effect.
2. Matched load performance.
3. Three-phase symmetrical short-circuits.
4. Resistive-inductive load.
5. Resistive-capacitive load.
6. Zero-phase impedance.
7. Parallel compensation for a resistive-inductive load.
8. Series compensation for a resistive-inductive load.
9. Three-phase asymmetric short-circuit.
Parallel and series connection of transmission lines
Series connection of two lines.
Parallel connection of two lines.
Transmission line with earth-fault compensation
Earth fault on a line with an isolated star point.
Petersen suppression coil.
Power distribution
Three-pole double busbar systems
Basic double busbar system.
Double busbar system with load.
Busbar coupling.
Network topologies
Radial network.
Meshed network.
The set of power engineering modules include the following:
Motorized Three-Phase Power Supply-Didactic Equipment
Motorized three-phase variable power supply, power supply unit for variable 3-phase voltage suitable for supplying ac machines. It provide an ACoutput 3-phase from 0 to 400 V, 2 A.

It is provided with a 16 A, 30 mA differential magneto-thermal main switch, a key operated emergency push-button, start and stop push buttons.amotor protection circuit breaker: 6.3 to 10 A.
It include a multifunctional digital instrument to voltage, current and power measurement on a single phase.
The analysed phase can be chosen by aselector located on the front panel.
Terminals for the external control of the motorized variator
4 mm safety terminals for electrical connections icluded.
RS485 port for Modbus communication
Supply voltage:
three-phase from mains.
The module is supplied with manual in English language.
THREE-PHASE TRANSFORMER-Didactic equipment-2 units
Three-phase transformer for feeding a transmission line model 400 kV with scale factor 1:1000.
Primary
Star or delta connection

3 x 400V windings with tap at 230V
Protected with fuses on the rear
Secondary
3x 230V windings with taps at+5%,-5%,-10%,-15%
Star connection for 3 x400V
Protected with fuses on the rear
Tertiary
3x230V
Delta connection
Rated power: 1000VA Various star and delta connections possible with different vector groups.
This module has insulated front panel, 4 mm safety terminals.
The module is supplied with manual in English language.
THREE-PHASE POWER METER-Didactic equipment-2 units
The module consist of a three-phase network monitoring device.
It has isolated front panel and it is suitable for the measurement of three-phase RMS, and peak values of voltages and currents (for 3 and 4 wireconnections) as well as active, reactive, and apparent power, active, reactive, and apparent energy,power factor, instantaneous THD, and frequency.
It allow to view the measures in different modes such as numerics (measures and energy section), graphics (different types of information from thephasor page), and userpages (completely configurable).

For the graphics mode, the module display the following:
Voltages trend,
Current trend,
Load bars,
Power,
Energy,
Analog indicators,
Phasor diagram
Harmonics.
The unit provide the user with six pages configurable choosing the types of page between instantaneous values, average values, energies, graphics andsetpoint, and its composition with up to 6 measurements foreach page.
It has the following technical features:
Input voltage: nominal 400Vac (52÷693 Vac phase to phase,30÷400Vac phase to neutral),
Input current: up to 10A (5A with 10:5 current transformers),
Operating frequency:40÷70 Hz,
Harmonics: up to21s,
Auxiliary supply:90-250 Vac, 50/60Hz with single-phase from mains.
On the front panel, it include:
2 ports RS485 (Male/Female) supporting Modbus RTU protocol and allowing the module to be connected to high-level acquisition software,
2 digital outputs (with 2mm terminals) programmable as pulse/status/alarm (photo-MOS type, 10÷300Vdc/150mAmax,12÷250Vac/150mAmax),
A power-on switch,
LCD large display format (96x96) with navigation buttons.
This module has 4 mm safety terminals for inputs and outputs with ground and is installed on a vertical frame.
The module is supplied with manual in English language.
RESISTIVE LOAD-Didactic equipment
It consist of a single or three-phase resistive step-variable load.
MECHANICAL FEATURES:
Metallic box, on the front panel all the controls, the protections, the output terminals, and a schematic diagram on PVC label is shown.
ELECTRICAL FEATURES

The load is composed by three resistances, with possibility of star, delta, and parallel connection, controlled by three switches. It is providedalso with fuses protection.
As a function of the switch positions, there is the following phase values:

Position	Resistance [?]	Max power per phase [W]
1	1050	46
2	750	66
3	435	113
4	300	167
5	213	234
6	150	333
7	123	400

Power in single or three phase connection is 1200 W.
Rated voltage in star connection 400 V, in ? connection 230V, in single-phase 230V.
It has insulated front panel, 4 mm safety terminals.
The unit is supplied with a manual in English language.
INDUCTIVE LOAD-Didactic equipment
It consist of a single or three-phase inductive step-variable load. Housed in a metallic box.
Mechanical Features:
Metallic box, on the front panel all the controls, the protections, the output terminals, and a schematic diagram on PVC label is shown.
electrical features:
The load is composed by three inductances, with possibility of star, delta, and parallel connection, controlled by three switchesIt is provided also with fuses protection.
As a function of the switch positions, there is the following phase values(calculated at 50Hz):

Position	Inductance [H]	Max power per phase [VAr]
1	5.071	33
2	3381	50
3	2028	83
4	1268	133
5	1014	166
6	0.78	216
7	0.563	299

Max Reactive Power 900Var in three-phase or single – phase connection
Rated Voltage in star connection 400V, in Delta Connection is 230V,in single phase 230V.
It Has insulated front panel,4mm safety terminals
CAPACITIVE LOAD-Didactic equipment
It consist of a single or three-phase capacitive step-variable load. Housed in a metallic box.

Mechanical Features:
The load is composed of a rugged metal structure and on the front panel all the controls, the protections, the output terminals, and a clear synopticdiagram is collected. This item is provided also with fuses protection.
Electrical Features:
The load is composed of capacitors, with possibility of star, delta, and parallel connection, controlled by three switches.It is provided also with fuses protection.
As a function of the switch position, there is the following phase values (calculated at 50Hz):

Position	Capacitance [?F]	Max power per phase [VAr]
1	2	33
2	3	50
3	5	83
4	8	133
5	10	166

6	13	216
7	18	299

Max reactive power in single-phase or three-phase connection 900 VAr.
Rated voltage in star connection is 400V, in ? connection is 230V, and in single-phase is 230V.
4 mm safety terminals included on the front panel for the electrical connection.
The module is supplied with manual in English language.
POWER CIRCUIT BREAKER-Didactic equipment- 4 units
Three-phase power circuit breaker with normally closed auxiliary contact. It has insulated front panel with the electrical scheme.
Features:
Contact load capability: 400 Vac,3 A
Supply voltage:single-phase from mains
Power circuit:
Insulation voltage:750V
Thermal current: 20A
Auxiliary contact:
Insulation voltage:750V.
Rated current: 3A
Auxiliary power:
Single-phase voltage 220V,50-60Hz
It is possible to control manually the power breaker switch using the push buttons “on” and “off” or externally via the switching contact PLC orRELAY.

This power contacts state is indicated by LEDs:
Green led=open contacts
Red led=closed contacts
While at SIGNAL OUTPUT terminals will be available a TTL level:
Low level (0V) = open contacts
High level (5V) = closed contacts
The RS flip-flop state is indicated by a led:
Yellow led=set flip-flop
4 mm safety terminal and 2 mm terminals included on the front panel for the electrical connection.
It include protection fuses.
This didactic panel is installed on a vertical frame.
It is supplied with manual in English language.
LINE CAPACITOR-Didactic equipment-2 units
Module with insulated panel, three-phase transmission line capacitor with exactly half of the operating capacitance of the 400 kV transmission line modelwith a length of 360 km, Capacitance:3 x 2.5 ?F,450 Vac.
This module has insulated front panel, 4 mm. safety terminals.
The module is supplied with manual in English language.
DIGITAL VECTOR GROUP METER-Didactic equipment
This instrument allow to measure and compare the voltage value and phase angle between two different inputs to determine the transformation ratio andvector group of a three-phase transformer. Both voltage values is visualized at the same time on the LCD display, and a double digital bar graph makesit easy to compare them.
The user communicate with the device through the RS485 serial port using Modbus protocol, to collect data using a supervision software such asSCADA or LabVIEW.
Technical features:
Automatic Scaling
Input range:0÷750 Vac, 50/60Hz
Accuracy:+/-0.5%
Resolution: 16bits
Refresh rate: 0.5s
Power supply:90÷260 Vac,50/60Hz

Power consumption:3VA
Communication:Modbus (RS485)
This module has insulated front panel, 4 mm. safety terminals.
The module is supplied with manual in English language.
DIGITAL AC/DC MULTIRANGE POWER METER-Didactic equipment

Instrument used to measure the power (P, Q, S) on a single circuit branch in AC and DC. The RMS value of the voltage, current and active power (P) be visualized on the LCD display along with the reactive (Q) and apparent power (S) values. A digital bar graph make it easy to monitor the activepower's intensity and a dedicated function button allows the adjustment of its scale.
The user can communicate with the device through the RS485 serial port using Modbus protocol, to collect data using a supervision software such asSCADA or LabVIEW.
Technical features:
Automatic Scaling
Current range:0÷20 Iac/dc,50/60Hz
Voltage range: 0÷750 Vac/dc,50/60Hz
Power range: 0÷ 1000W, VAr and VA
Accuracy:+/-0.5%
Resolution: 16bits
Refresh rate: 0.5s
Power supply: 90÷260 Vac,50/60Hz
Power consumption: 3 VA
Communication: Modbus (RS485)
These didactic panels is installed on a vertical frame.
This module has insulated front panel, 4 mm. safety terminals.
The module is supplied with manual in English language.
OVERHEAD LINE MODEL-Didactic equipment-2 units
Three-phase model of an overhead power transmission line that has the following features:
360 km long
Voltage: 400 kV
Current: 1000 A.
Scale factor-1:1000
Line resistance:13?
Line inductance:290 mH
Mutual capacitance:0.5?F
Earth capacitance:1 ?F
Earth resistance:11?
Earth inductance: 250 mH
This module has insulated front panel, 4 mm safety terminals.
This didactic panel is installed on a vertical frame.
It is supplied with manual in English language.
LINE MODEL-Didactic equipment
Three-phase model of an overhead power transmission line that has the following features:
110 km long
Voltage: 400 kV
PETERSEN COIL-Didactic equipment
Module with insulated panel, Petersen coil,
inductance with 20 taps for earth fault compensation in transmission lines:
2000mH-1800mH-1600mH-1400mH-1250mH-1100mH-980mH-860mH-750mH-620mH-500mH-400mH-300mH-220mH-160mH-120mH-80mH-40mH-20mH-5mH-0.
Inductance:0.005...2H
Rated voltage:230 V
Rated current:0.5 A

4 mm. safety terminal included on the front panel for the electrical connection.
This module has insulated front panel with the electrical scheme.
It is supplied with manual in English language.
DOUBLE BUSBAR WITH TWO DISCONNECTORS-Didactic equipment -3 units
Module with insulated panel.
Suitable for extending the double busbar system.
The module has insulated front panel with the electrical scheme and four light push buttons (two red and two green).
Each busbar has a supply branch that will be connected or disconnected by using a disconnector.
It is possible to control manually the power breaker switch using two couples of push-buttons “on” and “off” or externally via the switching contactPLC or RELAY.
This power contacts state is indicated by LEDs:
Green led=open contacts.
Red led=closed contacts.
While at SIGNAL OUTPUT terminals will be available a TTL level: A
Low level (0V) = open contacts.
High level (5V) =closed contacts.
The RS flip-flop state is indicated by a led:
Yellow led=set flip-flop.
4 mm. safety terminal and 2 mm. terminals included on the front panel for the electrical connection.
It is supplied with manual in English language.
THREE-PHASE POWER SUPPLY-Didactic equipment
It is suitable for a three-phase supply at the mains voltage and frequency.
Output: three-phase +N+T at safety terminals.
Protection through differential magneto-thermal switch and pilot lamp.
Key operated switch for the three-phase supply and pilot lamps for the three phases.
This module has insulated front panel, 4 mm. safety terminals.
The module is supplied with manual in English language.

MODBUS COMMUNICATION HUB AND LOAD CONTROLLER - Didactic equipment
Module with insulated front panel including:
One RS485 input and four RS485 outputs on Channel 1 (4 Wire) on the rear,
One RS485 input and four RS485 outputs on Channel 2 (2 Wire) on the rear,
Analog output 1:0÷10V,
Analog output 2:0÷10V,
Twelve relay outputs: 1NO/1NC each with 2 mm terminals,
One switch for power on/off and a socket for power supply connector.
This didactic panel is installed on a vertical frame.
It is supplied with manual in English language.
SCADA SOFTWARE
Software for control and data acquisition that permit theoperations of control and data acquisition.
It is in a form of a Run-time system that allow users to concentrate on the purpose of the experiments and to obtain the necessary data in an easy and effective way.
Personal computer supplied with the system
THREE-PHASE ISOLATION TRANSFORMER-Didactic equipment
Isolation transformer is placed between the three-phase mains and the laboratories providing a three-phase secondary voltage with isolated neutralsuitable for the module's operation.
Technical features:
Three-phase mains input with +10%/-10% adjustment.
Output:400V with +5%/-5% adjustment.
3 x three phase CEE sockets (3P+N+E)
2 x single phase CEE sockets (2P+E)
2 x single phase type F socket

16 A, 30 mA differential magneto-thermal protection
Motor-protection circuit breaker: 6.3 to 10 A.
Mushroom emergency stop push-button
Output power: 6 KVA
It is supplied with manual in English language.
KIT OF CONNECTING LEADS
HOLDER FOR LEADS
Realized in a rugged structure, this product is used to store and organize the various connecting leads in the laboratory.
Is equipped with wheels at the base.
THREE-LEVELS FRAME - 2 units
Metal frame with three levels for fitting the modules the laboratory with a led strip on the top and a PC holder. It is mounted on the workbench. 120X90 WORKBENCH - 2 units

Workbench with melamine flatbed. Two holes is present on the flatbed to allow the assembly of a three-level frame.
Technical features:
Dimensions: 80x120x90 (HxWxL)
Complete with locking wheels
Supplied with 15 sockets protected by a thermal magnetic circuit breaker.
60X90 WORKBENCH - 2 units
The multifunctional bench is used in electrical engineering laboratories as support for electrical machines.
Technical features:
Dimensions:80x60x90cm (HxWxL)
Complete with locking wheels.

Power Transmission And Distribution Workstation-Didactic Equipment, Power Transmission And Distribution Workstation-Didactic Equipment Bulk Suppliers, Power Transmission And Distribution Workstation-Didactic Equipment Tools, Power Transmission And Distribution Workstation-Didactic Equipment Power Transmission And Distribution Workstation-Didactic Equipments, Power Transmission And Distribution Workstation-Didactic Equipment Manufacturers, Power Transmission And Distribution Workstation-Didactic Equipment Suppliers from India, China, Kenya.