Transmission Line Simulator

Simulator Hardware

Comprehensive **Affordable** **Easy to Use**

Product Highlights

Features :

- 110 V, 3 Phase station model.

- Auto transformer in the station side for voltage control.

- Energy meter in both station and load models to measure the voltage, current, power, power factor, etc.

- Transmission line model as 18 pi circuits, consisting of series inductor, series resistor and shunt capacitor. (Values can be varied as per the experiment)

- Series capacitor model to vary the series compensation from 10% to 50%

- Autotransformer for voltage control in the loading section

- Inductive and resistive load.

- Capacitor bank to improve on the power factor.

- Upto 400Km transmission line length can be achieved using the simulator.

List of Experiments :

- PU modeling of the given transmission line on given base

- Computation of the transmission line simulator values for the given line

- Ferranti effect simulation for an un-loaded line

- Surge impedance loading of the line

- Loading of the line at given power factor

- Capacitive compensation

- Over current relay

- Definite time over/under voltage protection
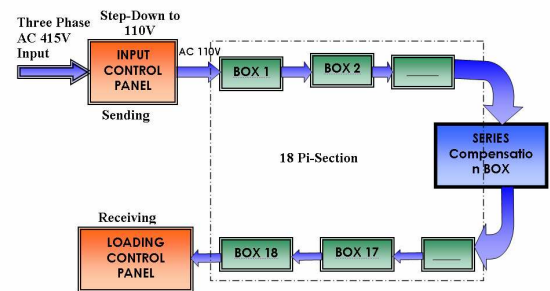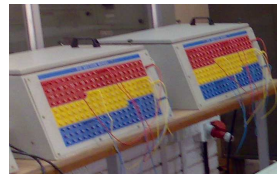
Conceptualized by Industry Experts for academic Institutions

In the electrical engineering stream, the aspects of power system analysis and operation and control are imparted both in UG and PG level. As part of the course, students learn the load flow analysis, fault calculation. Most of the experiments are carried out with the software simulation. However the student cannot visualize the various voltage levels of operation, the losses and the limitation on the physical distances involved in transmission power through long distances. In this connection, it is envisaged to develop an actual miniature model of the transmission line simulator.

Transmission Line Simulator is a sophisticated module developed with the purpose of helping students in their understanding of some basic ideas in power systems. The simulation will also help the students to demonstrate the effects of different parameters on the power system with easier experiments.
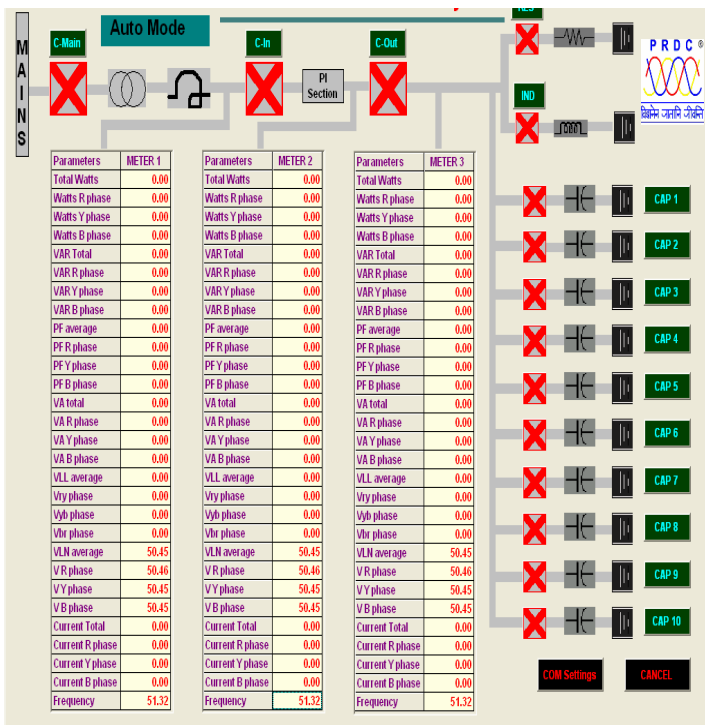
FOR ENQUIRIES CALL: +91-80-4245-5555

Transmission Line Simulator

Software & Automation

Software :

To compute the simulator parameters for the given real world transmission line, a software is supplied. It is possible to select the type of conductor and voltage level for that conductor. The conductor types and voltage levels are according to the standards. After selecting the conductor type, voltage level, it is required to enter "Line length", "Actual Load", "No of Pi Sec" and the software generates all the required values automatically.

Design of a line simulator window — Simulation Of Transmission Line Parameters

Parameter	Value	Unit
Resistance	0.080170	ohm/km
Reactance	0.412728	ohm/km
Suspectance B/2	0.000001404911	mho/km
per pi sec length		km
per pi sec R		ohm
per pi sec X		ohm
per pi sec B/2		mho
Base Voltage		kv
Base Power		MVA
Base Current		A
Base Impedance Z		ohm
Base Admittance Y		mho
Pi Section R		pu
Pi Section X		pu
Pi Section B/2		pu
Sim Base Voltage		V
Sim Base Current		A
Sim Base Power		VA
Sim Base Impedence		ohm
Sim Base Admittance		mho
Sim Pi Section R		ohm
Sim Pi Section X		ohm
Sim Pi Section B/2		mho
Sim Pi Section C/2		m farad
Sim Pi Section L		mH

Select Conductor Type: Zebra · Select Voltage Level: 220 · No of Pi Sec: 0 · Actual Current · Enter Line length: 0 km · Simulated Current · Enter Actual Load: 0 MVA · **Calculate**

Resistance: R1 0.1, R2 0.2, R3 0.3, R4 0.4, R5 0.01, R6 0.02, R7 0.03, R8 0.04, R9 0.001, R10 0.002, R11 0.003, R12 0.004

Inductance: L1-L2 0.636, L1-L3 1.273, L1-L4 1.91, L1-L5 2.54, L1-L6 3.18, L1-L7 3.82, L1-L8 4.456, L1-L9 5.1, L1-L10 5.73, L1-L11 6.366, L12-L13 0.0636, L12-L14 0.1273, L12-L15 0.191, L12-L16 0.254, L12-L17 0.318

Capacitance: C1/C13 0.1, C2/C14 0.22, C3/C15 0.33, C4/C16 0.47, C5/C17 0.01, C6/C18 0.022, C7/C19 0.033, C8/C20 0.047, C9/C21 0.001, C10/C22 0.0022, C11/C23 0.0033, C12/C24 0.0047

Total Resistance / Actual Resistance · Total Inductance / Actual Inductance · Total Capacitance / Actual Capacitance

Auto Mode — C-Main, C-In, Pi Section, C-Out

Parameters	METER 1	Parameters	METER 2	Parameters	METER 3
Total Watts	0.00	Total Watts	0.00	Total Watts	0.00
Watts R phase	0.00	Watts R phase	0.00	Watts R phase	0.00
Watts Y phase	0.00	Watts Y phase	0.00	Watts Y phase	0.00
Watts B phase	0.00	Watts B phase	0.00	Watts B phase	0.00
VAR Total	0.00	VAR Total	0.00	VAR Total	0.00
VAR R phase	0.00	VAR R phase	0.00	VAR R phase	0.00
VAR Y phase	0.00	VAR Y phase	0.00	VAR Y phase	0.00
VAR B phase	0.00	VAR B phase	0.00	VAR B phase	0.00
PF average	0.00	PF average	0.00	PF average	0.00
PF R phase	0.00	PF R phase	0.00	PF R phase	0.00
PF Y phase	0.00	PF Y phase	0.00	PF Y phase	0.00
PF B phase	0.00	PF B phase	0.00	PF B phase	0.00
VA total	0.00	VA total	0.00	VA total	0.00
VA R phase	0.00	VA R phase	0.00	VA R phase	0.00
VA Y phase	0.00	VA Y phase	0.00	VA Y phase	0.00
VA B phase	0.00	VA B phase	0.00	VA B phase	0.00
VLL average	0.00	VLL average	0.00	VLL average	0.00
Vry phase	0.00	Vry phase	0.00	Vry phase	0.00
Vyb phase	0.00	Vyb phase	0.00	Vyb phase	0.00
Vbr phase	0.00	Vbr phase	0.00	Vbr phase	0.00
VLN average	50.45	VLN average	50.45	VLN average	50.45
V R phase	50.46	V R phase	50.46	V R phase	50.46
V Y phase	50.45	V Y phase	50.45	V Y phase	50.45
V B phase	50.45	V B phase	50.45	V B phase	50.45
Current Total	0.00	Current Total	0.00	Current Total	0.00
Current R phase	0.00	Current R phase	0.00	Current R phase	0.00
Current Y phase	0.00	Current Y phase	0.00	Current Y phase	0.00
Current B phase	0.00	Current B phase	0.00	Current B phase	0.00
Frequency	51.32	Frequency	51.32	Frequency	51.32

COM Settings · CANCEL · CAP 1 – CAP 10 · PRDC

Automation and Remote Control :

The main scope of remote control and monitoring is to acquire the voltage, current, power factor, watt levels at different stages of the transmission line simulator and to have remote on/off control of breakers.

Following are the features of this remote control system –

- Multiple interfaces with energy meters.
- Database interface for storing tripped data.
- Automatic identification of the relay trip information by using color-coding.
- Editable comport for the communications.
- Editable Energy meter ID's.

To get a feel of the remote control and operation of the substation, this facility is developed.

The simulator has two modes of operation. In case of manual mode, in the GUI, one can visualize the meter parameters and the current on/off status of contactors. No open/close command is possible remotely. In case of remote mode, in addition to viewing the parameters, it is possible to open/close the contactors.

FOR ENQUIRIES CALL: +91-80-4245-5555