



MECHATRONICS LABORATORY

AIM:

To know the design, modeling & analysis of basic electrical, hydraulic & pneumatic systems using software and trainer kits.

OBJECTIVES:

- To familiarize in fluid power automation and different components of Hydraulics, pneumatics, electro hydraulic/ electro pneumatic and PLC based systems
- Hands on experience in designing and executing of circuits for real systems

LIST OF EXPERIMENTS:

1. Simulation of basic hydraulic, pneumatic and electrical circuits.
2. Study of Electro pneumatic circuits.
3. Simulation of electro- pneumatic circuits using microprocessor.
4. Modeling and analysis of basic hydraulic, pneumatic and electrical circuits using 'AUTOMATION STUDIO' Software.
5. Study of various types of transducers.
6. Study of various signal conditioning circuits.
7. Open and closed loop control of AC and DC drives.
8. Study of PLC and its applications.

LIST OF EQUIPMENTS :

1. Basic Pneumatic Trainer Kit with manual and electrical controls/PLC Control each
2. Basic Hydraulic Trainer Kit
3. Hydraulics and Pneumatics Systems Simulation Software /Automation studio sets
4. 8051 - Microcontroller kit with stepper motor and drive circuit sets
5. LAB VIEW software with Sensors to measure Pressure, Flow rate, direction, speed, velocity and force. sets

AATMM01 Basic Pneumatic Trainer Kit with manual and electrical controls/PLC

INTRODUCTION & DESCRIPTION:

A pneumatic actuator converts energy (typically in the form of compressed air) into mechanical motion. The motion can be rotary or linear, depending on the type of actuator. The equipment consists of pneumatic actuators and circuit elements and PLC board

UTILITIES REQUIRED:

- 230Vac, 50Hz Power supply, 3 Amperes single phase power supply
- Floor area 1.5 m²

TECHNICAL DETAILS:

- Sequencing of two double acting cylinder by two solenoid valves.
- Time delay in above.
- Logic circuits - AND, NOT, OR, NAND, NOR.
- Feed and Traverse circuit-quick return mechanism shaper
- ABB PLC with 24 I/O

FEATURES:

- Wood mounted table
- PLC or Microprocessor with I/O with master slave facility

RANGE OF EXPERIMENTS:

- Simulation of basic hydraulic, pneumatic and electrical circuits.
- Study of Electro pneumatic circuits.
- Simulation of electro- pneumatic circuits using microprocessor
- Study of PLC and its applications.



AATMM02 Basic Hydraulic Trainer Kit

INTRODUCTION & DESCRIPTION:

A hydraulic actuator converts energy (typically in the form of compressed fluid) into mechanical motion. The motion can be rotary or linear, depending on the type of actuator. The equipment consists of hydraulic actuators and circuit elements.

UTILITIES REQUIRED:

- 230Vac, 50Hz Power supply, 3 Amperes single phase power supply
- Floor area 2 m²
- Dust free environment.

TECHNICAL DETAILS:

SPECIFICATIONS :

- Sump: 10-20 Liter Capacity (Approximate) Vane or Gear Type
- Flow: 10-20 LPM at Working Pressure 35-50 Kg/Cm²
- Drive Motor : 1-2 HP Single Phase, Induction motor - 1400 - 2000 RPM
- Pressure Relief valve for safety and pressure adjustment
- Flow Control: Pressure reducing, Sequencing, Non-Return, Solenoid operated directional control valve, and relief valve. 2 - 4 Numbers of pressure gauges.
- Return line filter
- Sequencing and pressure reducing
- Hydraulic cylinder
- Two numbers of pressure gauges
- Universal manifold

FEATURES:

- Separate switch for manual control of solenoid valves
- Primary safety circuit.
- Control of Single acting cylinder with different valves.
- Control of Double cylinder using different valves.
- Speed control of both cylinders.
- Sequencing of two double acting cylinders.
- Impact circuit with quick exhaust valve.
- Circuit involving single and double pilot valve.

RANGE OF EXPERIMENTS:

- Simulation of basic hydraulic, pneumatic and electrical circuits



AATMM03 Hydraulics and Pneumatics Systems Simulation Software /Automation

INTRODUCTION & DESCRIPTION:

Automation Studio is circuit design, simulation, training, troubleshooting and documentation software for fluid power and electrical systems. It is an all in one flexible and innovative software solution for increased engineering productivity. The software allows you to design and validate a complete virtual mechatronic machine. It is one of the effective tools for doing training, troubleshooting and maintenance

UTILITIES REQUIRED:

- 230Vac Supply, 50Hz, 5 Amps single phase AC power supply
- Computer with i3 processor, 4 GB RAM, 250 GB HDD

TECHNICAL DETAILS:

SPECIFICATIONS:

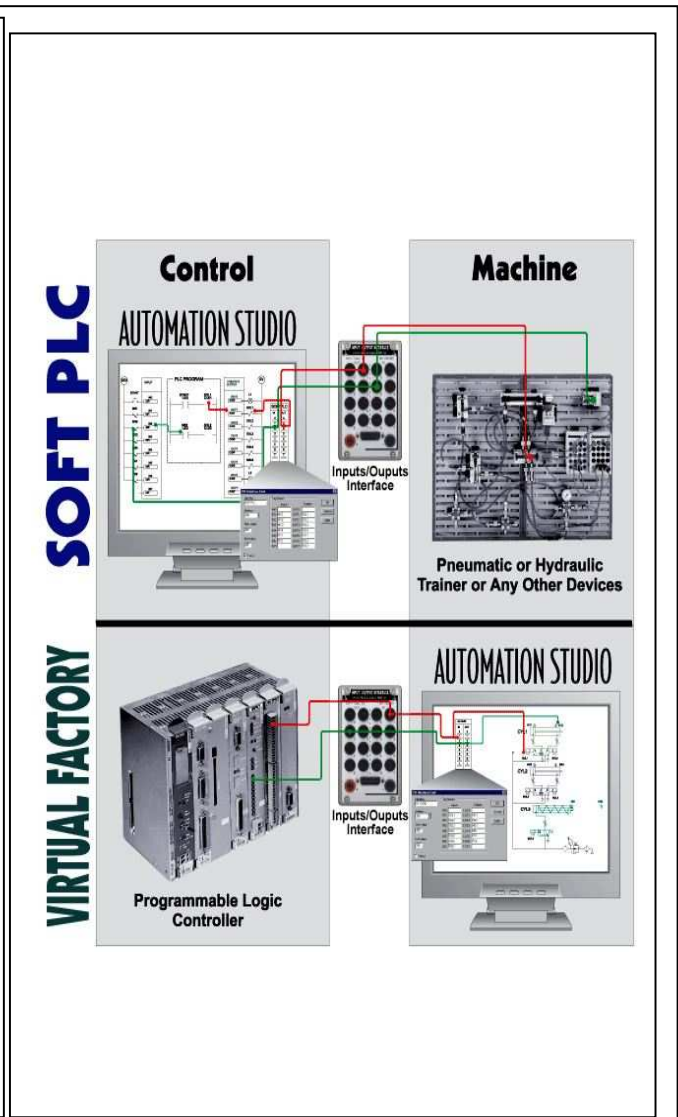
- Includes 14 libraries
- PLC ladder logic for ABB and Siemens
- HMI and control panel
- Digital electronics circuit design and simulation
- Electrical One-Line circuit design and simulation

FEATURES:

- User friendly configuration tools and sizing module
- Cross section animations
- Plotting simulated parameters for in depth analysis
- A SOFTPLC trainer to control real devices such as a pneumatic or electric power trainers.
- PLC simulator trainer system (a real PLC sends signals to the software components.)

RANGE OF EXPERIMENTS:

1. Simulation of basic hydraulic, pneumatic and electrical circuits.
2. Study of Electro pneumatic circuits.
3. Simulation of electro- pneumatic circuits using microprocessor.
4. Modeling and analysis of basic hydraulic, Pneumatic and electrical circuits using AUTOMATION STUDIO' Software.
5. Study of PLC and its applications.



AATMM04 8051 - Microcontroller kit with stepper motor and drive circuits

INTRODUCTION & DESCRIPTION:

The Microcontroller kit can be used to develop and prototype with any of 8051, 40 pin microcontrollers. The RS232 driver on board allows easy connection with PC or other embedded hardware. The board have User buttons and status LEDs. The bridge rectifier allow this board to be powered with both AC and DC power supply adapters

UTILITIES REQUIRED:

- 230Vac, 50Hz, 5Amps single phase power supply
- Computer with Core 2 Duo processor, 2GB RAM, 100GB HDD

TECHNICAL DETAILS:

SPECIFICATIONS:

- 8051 Development Board (WITH CHIPS RS232,RTC1307,I2C24004,ULN2003)
- Burg Connecters 20 Nos
- Software CD(Flash Magic,Data sheets,Example Porograms,Manual,Keil Eva)
- Quartz crystal 11.0592 MHz

FEATURES:

- RS232 Tx, Rx interface with MAX232 IC on socket
- ULN 2803 To Drive Stepper Motor & Relays
- 7Seg Multitplexed Display
- Four Interrupt switches

RANGE OF EXPERIMENTS:

6. Study of various signal conditioning circuits.
7. Open and closed loop control of AC and DC drives.
8. Study of PLC and its applications.



AATMM05 LABVIEW software with Sensors to measure Pressure, Flow rate, direction, speed, velocity and force

INTRODUCTION & DESCRIPTION:

LabVIEW is a system-design platform and development environment for a visual programming language from National Instruments. LabVIEW (Laboratory Virtual Instrument Engineering Workbench) has a dataflow programming language that can be used for data acquisition, measuring and control from various types of sensors using the data acquisition card.

UTILITIES REQUIRED:

- 230Vac, 50Hz, 5 Amps, single phase power supply
- A Computer with minimum i3 processor, 4GB RAM, 250GB HDD

TECHNICAL DETAILS:

SPECIFICATIONS :

- Pressure gauge with the range upto 100 bar
- Hydraulic flow indicator 100 LPM
- 230Vac Solenoid valve for direction control
- 4 digit RPM indicator
- Load cell with Indicator upto 100kg

FEATURES:

LabVIEW 2013 with Compact RIO DAQ that can be even used to read any sensor and any system can be controlled

RANGE OF EXPERIMENTS :

- Study of various types of transducers.
- Study of various signal conditioning circuits

