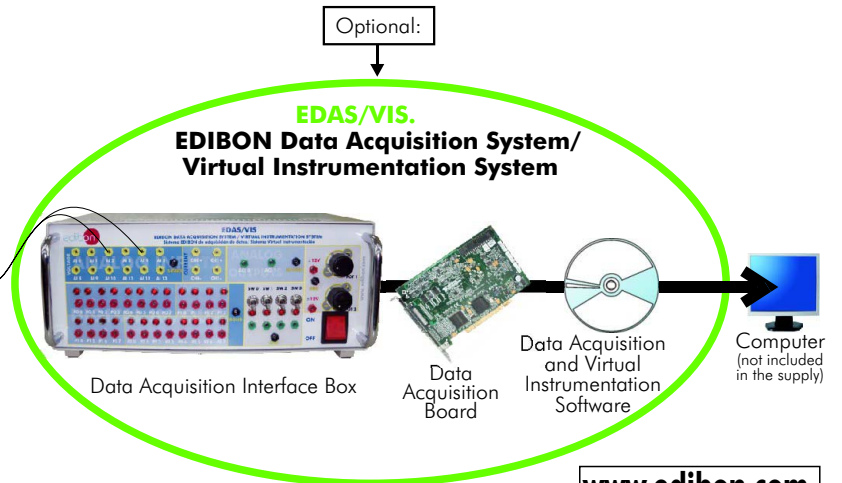


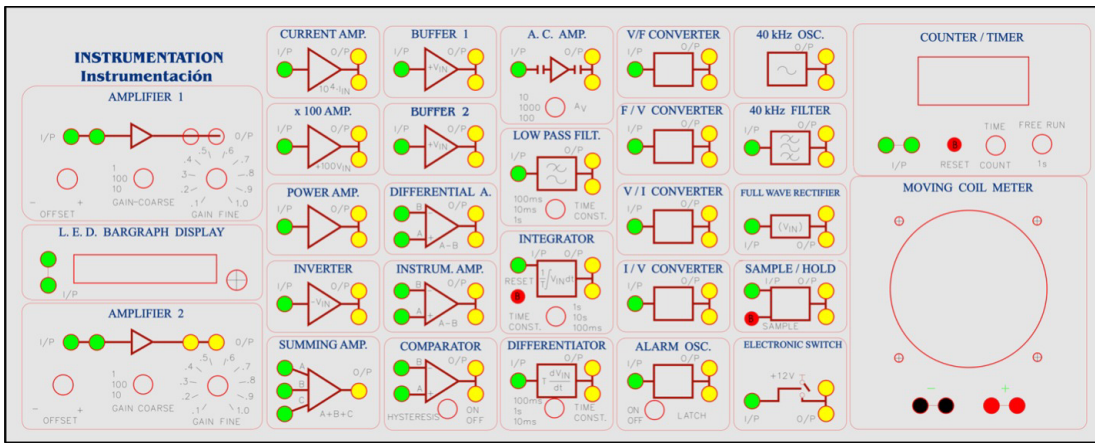


SAIT. Trainer



www.edibon.com
Products
Products range
Units
2.-Electronics

DIAGRAMS AND ELEMENTS ALLOCATION



Front Panel detail

Lower Panel detail



DESCRIPTION

The SALT Trainer is designed to show most of the devices used in the industry that allow the electronic systems to communicate with the real world, to measure physical variables and to control industrial processes.

It is a trainer with a logical distribution of its components that facilitates the rapid comprehension of the elements that form it, all housed in a solid robust with the power supply incorporated.

Input Transducers:

These convert an analog signal into an electrical one and permit us to make an evaluation of these transducers, with their characteristics, adjustments and practical applications.

Output Transducers:

These convert an electrical signal into an analog one permit us to make an evaluation of these transducers, their characteristics, adjustments and practical applications.

Signal Conditioning Circuits:

These allow us to carry out a profound study and analysis of the numerous circuits and included signal conditioners, in addition to the particular properties of: amplifiers, signal converter circuits, comparators, filters and circuits that carry out mathematical operations.

The student must wire the circuit to carry out the practices. The connections are of 2 mm. The student will become familiar with the connections of these traducers .

SPECIFICATIONS

The Transducers and Instrumentation Trainer "SALT" shows didactically the function principles of the transducers most used in industry. It is divided into two parts: the lower part, in which all the input and output transducers are found, while in the upper part, the system of signal conditioning and those of instrumentation are found; the Electrical and Pneumatic power supplies are housed in its interior.

Input Transducers:

Resistance Transducers for applications in angular or linear position:

Linearly sliding potentiometer. Rotary carbon-track potentiometer. Rotary coil potentiometer. Precision servo-potentiometer.

The Wheatstone Bridge circuit.

Applications of temperature:

NTC (Negative Temperature Coefficient) Thermistors. RTD Sensor (Platinum Transducer with Temperature dependent Resistance). Temperature sensor IC "Integrated Circuit LM 335". Type "K" Thermocouples.

Applications of light:

Photovoltaic Cell. Phototransistor. Photodiode PIN. Photoconductive Cell.

Linear position and force:

Linear Variable Differential Transformer LVDT. Extensiometric Transducer.

Environmental measurements:

Air flow Sensor. Air pressure Sensor. Humidity sensor.

Rotational speed and position control:

Slotted optoelectronic Sensor. Opto- reflective Sensor. Inductive sensor. Hall effect Sensor. Permanent D.C. magnet tachogenerator.

Sound measurements:

Dynamical microphone. Ultrasonic receiver.

Visualization Devices:

Timing device/ counter with LED display.

Graphic bar visualizer.

Mobile coil voltmeter.

Output Transducers:

Electrical Resistance.

Incandescent Lamp.

Applications for the sound output:

Buzzing (Buzzer). Mobile coil loud speaker. Ultrasonic transmitter.

Applications of linear or angular motion:

D.C. Soleinod. D.C. Relay. Solenoid Valve. Permanent Magnet D.C. Motor.

Signal Conditioners:

D.C. Amplifiers.

A.C. Amplifier.

Power Amplifier.

Current Amplifier.

Buffers.

Inverting Amplifier.

Differential amplifier.

V/F and F/V Converters.

V/I and I/V Converters.

Full Wave Rectifier.

Hysteresis convertible Comparator.

Electronic switch.

Oscillator 40 kHz.

Filter 40 kHz.

Time-constant convertible Low Pass Filter.

Circuit with Mathematical Operation:

Adding amplifier.

Integrator with different time constants.

Differentiator with different time constants.

Instrumentation Amplifier.

Circuit SAMPLE & HOLD.

Amplifiers with gain control and offset.

Furthermore it contains a **linearly mounted system of a D.C. motor, tachodynamo, reflective, slotted opto-sensors** to detect the absolute and incremental position.

Cables.

Manuals: **8 manuals supplied:** Practices, Required services, Assembly and Installation, Interface and control software (for computer control units), Starting-up, Safety, Maintenance and Calibration (for computer controlled units).

Continue...

SPECIFICATIONS

OPTIONAL:

EDAS/VIS. EDIBON Data Acquisition System/Virtual Instrumentation System:

The EDAS/VIS System includes a Hardware: DAIB Data Acquisition Interface Box + CAB. Data Acquisition Board and a Software: EDAS/VIS-SOF. Data Acquisition and Virtual Instrumentation Software.

DAIB. Data Acquisition Interface Box:

Metallic box. Dimensions: 310 x 220 x 145 mm. approx.

Front panel:

16 Analog inputs (1 block with 12 voltage channels and 1 block with 2 current channels (4 connections)).

Sampling velocity 1,250,000 samples per second for EDAS/VIS 1.25 Version.

Sampling velocity 250,000 samples per second for EDAS/VIS 0.25 Version.

2 Analog outputs.

24 Digital inputs/outputs, configurable as inputs or outputs, with 24 state led indicators.

These digital inputs/outputs are grouped in three ports of eight channels (P0, P1 and P3).

4 Digital signal switches 0-5V.

2 Analog signal potentiometers $\pm 12V$.

Main ON/OFF switch.

Inside:

Internal power supply of 12 and 5 V. Potentiometer.

Back panel:

Power supply connector. SCSI connector (for connecting with the data acquisition board).

Connecting cables.



DAIB

DAB. Data Acquisition Board:

For EDAS/VIS 1.25 Version:

PCI Data acquisition board (National Instruments) to be placed in a computer slot. Bus PCI.

Analog input:

Number of channels= 16 single-ended or 8 differential. **Resolution= 16 bits**, 1 in 65536.

Sampling rate up to: 1,250,000 S/s (samples per second). Input range (V)= $\pm 10V$.

Data transfers=DMA, interrupts, programmed I/O. Number of DMA channels=6.

Analog output:

Number of channels=2. **Resolution= 16 bits**, 1 in 65536. **Max. output rate up to: 833 KS/s.**

Output range(V)= $\pm 10V$. Data transfers=DMA, interrupts, programmed I/O.

Digital Input/Output: Number of channels=24 inputs/outputs. **Port 0 up to 8 MHz.**

Timing: **Counter/timers=2**. Resolution: Counter/timers: 32 bits.

For EDAS/VIS 0.25 Version:

Sampling rate up to: 250,000 S/s (samples per second).

Analog output: Max. output rate up to: 10 KS/s.

Digital Input/Output: Number of channels=24 inputs/outputs. **Port 0 up 1 MHz.**

Rest of characteristics are the same than EDAS/VIS 1.25 Version.



DAB

EDAS/VIS-SOF. Data Acquisition and Virtual Instrumentation Software:

Compatible with actual Windows operating systems. Amicable graphical frame.

Configurable software allowing the temporal/frequency representation of different inputs and outputs. Visualization of a voltage of the circuits on the computer screen.

It allows all data store in a file, print screens and reports of the signals at any time.

Measurement, analysis, visualization, representation and report of results.

Set of Virtual Instruments:

- **Oscilloscope:**

Channels: 12 simultaneous. Maximum input voltage: $\pm 10V$.

All 12 input channels could be scaled to compare signal with different voltage levels.

"Math Menu" with operations as Addition, Subtraction, Multiplication and Division, between any of the 12 oscilloscope channels.

- **Function Generator:**

Two independent signal generators, for sinusoidal, triangular, saw tooth and square.

Channels: 2 (allowing working simultaneously). Maximum output voltage: $\pm 10V$.

It includes a graph where an output signal for each channel is shown.

- **Spectrum Analyzer:**

Channels: 12 (simultaneous). Max. voltage: $\pm 10V$. Digital spectrum analyzer: based on the FFT.

- **Multimeter:**

Voltmeter (Channels: 12 (simultaneous). Max voltage: $\pm 10V$ RMS).

Ammeter (Channels: 2 (simultaneous). Max. Ampere: 500 mA rms per channel).

- **Transient Analyzer.**

- **Logic Analyzer:**

Number of Input channels: 8. TTL Voltage Level.

Clock Source: 3 different sources.

This instrument allows receiving as far as 8 digital signal simultaneously at 1 or 8 Mbps (depending of the version).

- **Logic Generator:**

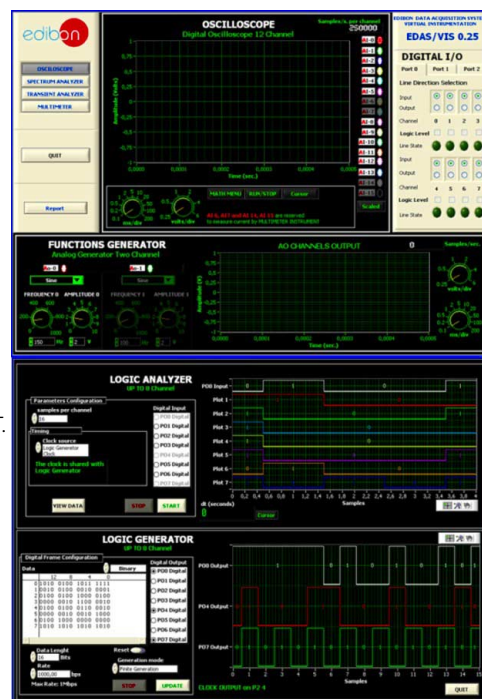
Number of transmission channels: 8. TTL voltage level.

This instrument allows generating up to 8 digital simultaneous signals of 1 or 8 Mbps (depending of the version).

Sampling velocity 1,250,000 samples per second for EDAS/VIS 1.25 Version.

Sampling velocity 250,000 samples per second for EDAS/VIS 0.25 Version.

Manuals: This system is supplied with the following manuals: Required Services, Assembly and Installation, Interface and Software, Starting-up, Safety, Maintenance & Practices Manuals.



EDAS/VIS-SOF

*Note: for more information see EDAS/VIS specific Catalogue: www.edibon.com/products/catalogues/en/units/electronics/transducersensors/EDAS-VIS.pdf

EXERCISES AND PRACTICAL POSSIBILITIES

Some Practical Possibilities of the Trainer:

- 1.- Basic Control Systems description.
- Characteristics of the Control System:
- 2.- Characteristics of an ON/OFF temperature control System.
 - 3.- Characteristics of an ON/ OFF Lighting System.
 - 4.- Investigation of the Characteristics of a Positional Control System.
 - 5.- Proportional Control.
 - 6.- Proportional+Integral Control.
 - 7.- Proportional+Derivate Control.
 - 8.- Proportional+Integral+Derivate Control.
 - 9.- Characteristics of a Speed Control System.
 - 10.- Operation in Open Loop.
 - 11.- Operation in Closed Loop, Proportional Control.
 - 12.- Proportional+Integral Control.
 - 13.- Proportional+Integral+Derivate Control.
- Display devices:
- 14.- Application of the Timer/Counter as a meter of time.
 - 15.- Application of the Timer/Counter as a simple counter.
 - 16.- Application of the Timer/Counter as rev-counter or frequency-meter.
 - 17.- Characteristics of an L.E.D. bargraph display unit.
 - 18.- Characteristic of a Mobile Coil Meter.
 - 19.- Comparison of Digital, Bargraph and Mobile Coil meters.
 - 20.- To widen the voltage index of the B. M. meter.
- Variable Resistance transducers in angle or linear arrangement:
- 21.- Variation of the Output Voltage for a Potentiometer used as a Position transducer.
 - 22.- The Buffer as compensator for the effect of the load on the output voltage of a potentiometer.
 - 23.- Servo potentiometer. Variation of the output voltage with respect to its position.
 - 24.- Measuring the Resistance using a Wheatstone Bridge Circuit.
 - 25.- Measuring the Voltage using "Null Balance" Procedures (Method 1).
 - 26.- Measuring Voltages using "Null Balance" Procedures (Method 2). Measuring voltages smaller than the normal available voltage.
 - 27.- Measuring Voltages using "Null Balance" Procedures (Method 2). Measuring voltages greater than the normal voltage.
- Transducers for Applications of Temperature Measurement:
- 28.- Characteristics of an Integrated Temperature Circuit.
 - 29.- Construction of a Digital Thermometer using the facilities of the TRANSDUCER TRAINER.
 - 30.- Characteristics of a Platinum Temperature Dependent Resistance (T.D.R.) Transducer.
 - 31.- The N.T.C. (Negative Temperature coefficient) Thermistor.
 - 32.- Characteristics of an N.T.C. Thermistor (Resistance measuring method).
 - 33.- Characteristics of the N.T.C. Thermistor used in an alarm circuit (double thermistor).
 - 34.- Characteristics of a Type "K" Thermocouple.
- Transducers for Light Measuring Applications:
- 35.- Characteristics of a photovoltaic cell.
 - 36.- Characteristics of a photo-transistor.
 - 37.- Luminous intensity detector.
 - 38.- The P.I.N. Photodiode.
 - 39.- Characteristics of a P.I.N. Photodiode.
- Linear Position transducers.
- 40.- Characteristics of a Linear Variable Differential Transformer (LVDT).
 - 41.- Characteristics of a Variable Resistance.
 - 42.- Characteristics of a Strain gauge Transducer.
- Transducers for Environmental Measurement Applications:
- 43.- Characteristics of a air flow transducer.
 - 44.- Characteristics of a pressure sensor.
 - 45.- Characteristics of a humidity sensor.
- Rotational Velocity Transducers and Position Measuring Applications:
- 46.- Characteristics of a slotted opto-transducers and its applications for counting and speed measurement.
 - 47.- Characteristics of the reflective opto-transducers and Gray code disk.
 - 48.- Characteristics of an inductive transducer.
 - 49.- Characteristics of a Hall effect transducer.
 - 50.- Characteristics of a D.C. permanent magnet Tachogenerator.
- Transducers for Measuring Sound:
- 51.- Characteristics of a Dynamic Microphone.
 - 52.- Characteristics of an ultrasonic receiver.
- Transducers for Sound Output:
- 53.- Characteristics of the mobile coil loudspeaker.
 - 54.- Characteristics of a Buzzer.
- Output Transducer for Linear or Angular Movement:
- 55.- Characteristics of a D.C. Solenoid.
 - 56.- Characteristics of a D.C. Relay.
 - 57.- Characteristics of a Solenoid air valve.
 - 58.- Characteristics of a Permanent Magnet Motor.
- Signal Conditioning Circuits:
- 59.- Characteristics of the Direct Current amplifiers 1, 2 and x100.
 - 60.- Characteristics of a current amplifier and application of a buffer amplifier.
 - 61.- Characteristics of Power and Buffer Amplifiers.
 - 62.- Characteristics of an Inverter Amplifier.
 - 63.- Characteristics of a Differential Amplifier.
- Signal Converter Circuits:
- 64.- Characteristics of a Voltage to Current Converter.
 - 65.- Characteristics of a Current to Voltage Converter.
 - 66.- Characteristics of a Voltage to Frequency Converter.
 - 67.- Characteristics of a Frequency to Voltage Converter.
 - 68.- Characteristics of a Full Wave Rectifier.
- Comparators, Oscillator and Filters:
- 69.- Characteristics of a Comparator.
 - 70.- Characteristics of an Alarm Oscillator circuit.
 - 71.- Characteristics of an Electronic Switch.
 - 72.- Characteristics of the Oscillator of 40 kHz.
 - 73.- Characteristics of Filters.
- Circuits that carry out Mathematical Operations:
- 74.- Characteristics of a Adding Amplifier.
 - 75.- Characteristics of an Integrator.
 - 76.- Characteristics of a Differentiator Circuit.
 - 77.- Characteristics of a Sample and Hold Circuit.

REQUIRED SERVICES

- Electrical supply: single-phase, 220V./50Hz or 110V./60Hz.
- For using EDAS/VIS. EDIBON Data Acquisition System/Virtual Instrumentation System a Computer (PC) is needed.

DIMENSIONS & WEIGHT

- SAIT Trainer: - Dimensions : 400 x 400 x 300 mm. approx.
- Weight : 10 Kg. approx.
- EDAS/VIS System: - Dimensions : 310 x 220 x 145 mm. approx.
- Weight : 2 Kg. approx.

* Specifications subject to change without previous notice, due to the convenience of improvements of the product.



C/ Del Agua, 14. Polígono San José de Valderas. 28918 LEGANES (Madrid) SPAIN.
Phone: 34-91-6199363 FAX: 34-91-6198647
E-mail: edibon@edibon.com WEB site: www.edibon.com

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REPRESENTATIVE:

