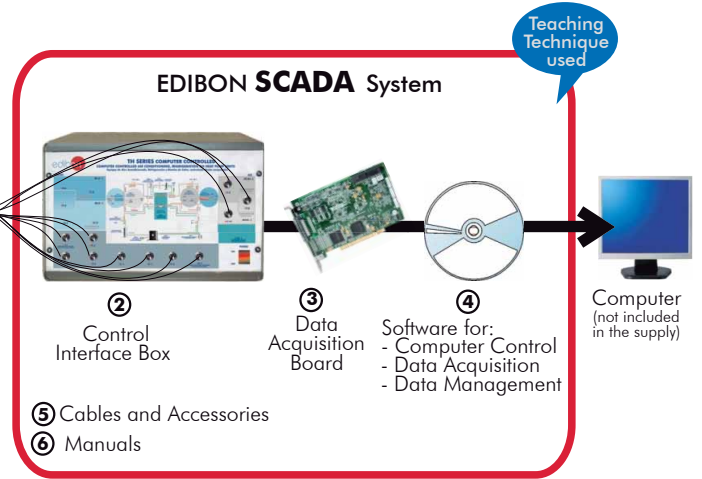




① Unit: THAAAC. Air Conditioning Unit (one condenser (air) and one evaporator (air))



*Minimum supply always includes: 1 + 2 + 3 + 4 + 5 + 6
(Computer not included in the supply)

Key features:

- **Advanced Real-Time SCADA.**
- **Open Control + Multicontrol + Real-Time Control.**
- **Specialized EDIBON Control Software based on Labview.**
- **National Instruments Data Acquisition board (250 KS/s , kilo samples per second).**
- **Calibration exercises, which are included, teach the user how to calibrate a sensor and the importance of checking the accuracy of the sensors before taking measurements.**
- **Projector and/or electronic whiteboard compatibility allows the unit to be explained and demonstrated to an entire class at one time.**
- **Capable of doing applied research, real industrial simulation, training courses, etc.**
- **Remote operation and control by the user and remote control for EDIBON technical support, are always included.**
- **Totally safe, utilizing 4 safety systems (Mechanical, Electrical, Electronic & Software).**
- **Designed and manufactured under several quality standards.**
- **Optional CAL software helps the user perform calculations and comprehend the results.**
- **This unit has been designed for future expansion and integration. A common expansion is the EDIBON Scada-Net (ESN) System which enables multiple students to simultaneously operate many units in a network.**

**OPEN CONTROL
+
MULTICONTROL
+
REAL TIME CONTROL**

For more information about Key Features, click here:



ISO 9000: Quality Management
(for Design, Manufacturing,
Commercialization and After-sales service)



European Union Certificate
(total safety)



**Certificates ISO 14000 and
ECO-Management and Audit Scheme**
(environmental management)

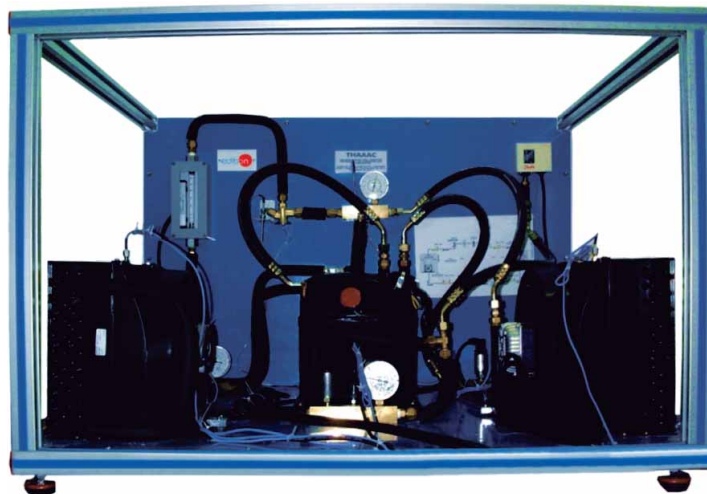


**Worlddidac Quality Charter
Certificate**
(Worlddidac Member)

Items supplied as standard

① **THAAAC. Unit:**

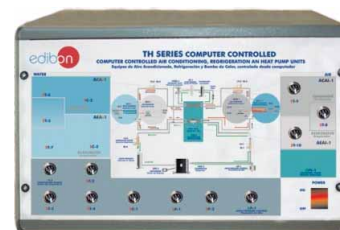
- Bench-top unit.
- Anodized aluminium structure and panels in painted steel.
- Main metallic elements in stainless steel.
- Diagram in the front panel with similar distribution to the elements in the real unit.
- Cooling compressor, computer controlled.
- Air condenser, computer controlled.
- High pressure control.
- Coolant accumulation tank.
- Cooling filter.
- Expansion valve.
- Air evaporator, computer controlled.
- Tank of division of the cooling liquid.
- 4 Manometers.
- 7 Temperature sensors:
 - Temperature sensor, J type (compressor outlet).
 - Temperature sensor, J type (condenser outlet).
 - Temperature sensor, J type (evaporator inlet).
 - Temperature sensor, J type (compressor inlet).
 - Temperature sensor, J type (room air).
 - Temperature sensor, J type (condenser outlet/air).
 - Temperature sensor, J type (evaporator outlet/ air).
- Flow sensor.
- 2 Pressure sensors:
 - Cooling pressure sensor (compressor outlet).
 - Cooling pressure sensor (compressor inlet).
- Wattmeter.



THAAAC. Unit

② **THAAAC/CIB. Control Interface Box :**

- Control interface box with process diagram in the front panel and with the same distribution that the different elements located in the unit, for an easy understanding by the student.
- All sensors, with their respective signals, are properly manipulated from -10V. to +10V. computer output. Sensors connectors in the interface have different pines numbers (from 2 to 16), to avoid connection errors. Single cable between the control interface box and computer.
- The unit control elements are permanently computer controlled, without necessity of connections during the whole process test procedure.
- Simultaneous visualization in the computer of all parameters involved in the process.
- Calibration of all sensors involved in the process.
- Real time curves representation about system responses. Storage of all the process data and results in a file. Graphic representation, in real time, of all the process/system responses.
- All the actuators' values can be changed at any time from the keyboard allowing the analysis about curves and responses of the whole process.
- All the actuators and sensors values and their responses are displayed on only one screen in the computer.
- Shield and filtered signals to avoid external interferences.
- Real time computer control with flexibility of modifications from the computer keyboard of the parameters, at any moment during the process.
- Real time computer control for pumps, compressors, resistances, control valves, etc.
- Open control allowing modifications, at any moment and in real time, of parameters involved in the process simultaneously.
- Three safety levels, one mechanical in the unit, other electronic in the control interface and the third one in the control software.



THAAAC/CIB

③ **DAB. Data Acquisition Board:**

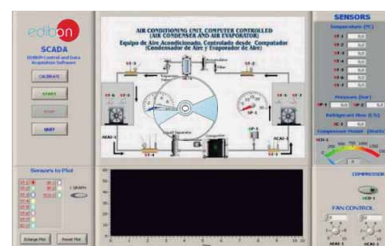
- PCI Data acquisition board (National Instruments) to be placed in a computer slot. Bus PCI.
- Analog input: Channels= 16 single-ended or 8 differential. Resolution= 16 bits, 1 in 65536.
 - Sampling rate up to: 250 KS/s (Kilo samples per second). Input range (V)= ±10V.
 - Data transfers=DMA, interrupts, programmed I/O. Number of DMA channels=6.
- Analog output: Channels=2. Resolution= 16 bits, 1 in 65536. Maximum output rate up to: 833 KS/s.
 - Output range(V)= ±10V. Data transfers=DMA, interrupts, programmed I/O.
- Digital Input/Output: Channels=24 inputs/outputs. D0 or DI Sample Clock frequency: 0 to 1 MHz.
- Timing: Counter/timers=2. Resolution: Counter/timers: 32 bits.



DAB

④ **THAAAC/CCSOF. Computer Control + Data Acquisition + Data Management Software:**

- Compatible with actual Windows operating systems. Graphic and intuitive simulation of the process in screen.
- Compatible with the industry standards.
- Registration and visualization of all process variables in an automatic and simultaneous way.
- Flexible, open and multicontrol software, developed with actual windows graphic systems, acting simultaneously on all process parameters.
- Management, processing, comparison and storage of data.
- Sampling velocity up to 250,000 data per second.
- Calibration system for the sensors involved in the process.
- It allows the registration of the alarms state and the graphic representation in real time.
- Comparative analysis of the obtained data, after the process and modification of the conditions during the process.
- Open software, allowing to the teacher to modify texts, instructions. Teacher's as student's passwords to facilitate the teacher's control on the student, and allowing the access to different work levels.
- This unit allows the 30 students of the classroom to visualize simultaneously all results and manipulation of the unit, during the process, by using a projector or an electronic whiteboard.



THAAAC/CCSOF

⑤ **Cables and Accessories**, for normal operation.

⑥ **Manuals:** This unit is supplied with 8 manuals: Required Services, Assembly and Installation, Interface and Control Software, Starting-up, Safety, Maintenance, Calibration & Practices Manuals.

* **References 1 to 6: THAAAC + THAAAC/CIB + DAB + THAAAC/CCSOF + Cables and Accessories + Manuals are included in the minimum supply, enabling a normal operation.**

Continue...

Additional and optional items to the standard supply

PLC. Industrial Control using PLC (7 and 8):

⑦ PLC-PI. PLC Module:

Circuit diagram in the front panel.

Front panel:

Digital inputs(X) and Digital outputs (Y) block:

16 Digital inputs, activated by switches and 16 LEDs for confirmation (red).

14 Digital outputs (through SCSI connector) with 14 LEDs for message (green).

Analog inputs block:

16 Analog inputs (-10V. to + 10V.)(through SCSI connector).

Analog outputs block:

4 Analog outputs (-10V. to + 10V.)(through SCSI connector).

Touch screen:

High visibility and multiple functions.

Display of a highly visible status.

Recipe function.

Bar graph function.

Flow display function.

Alarm list.

Multi language function.

True type fonts.

Back panel:

Power supply connector.

Fuse 2A.

RS-232 connector to PC.

USB 2.0 connector to PC.

Inside:

Power supply outputs: 24 Vdc, 12 Vdc, -12 Vdc, 12 Vdc variable.

Panasonic PLC:

High-speed scan of 0.32 μsec. for a basic instruction.

Program capacity of 32 Ksteps, with a sufficient comment area.

Power supply input (100 to 240 V AC).

DC input: 16 (24 V DC).

Relay output: 14.

High-speed counter.

Multi-point PID control.

Digital inputs/outputs and analog inputs/outputs Panasonic modules.

Communication RS232 wire, to computer (PC).

⑧ THAAAC/PLC-SOF. PLC Control Software:

For this particular unit, always included with PLC supply.



PLC-PI

Items available on request

⑨ THAAAC/CAL. Computer Aided Learning Software (Results Calculation and Analysis).

⑩ THAAAC/FSS. Faults Simulation System.

Software Main Screens

Main screen

Note: ST= Temperature sensor. SP= Pressure sensor. SC= Flow sensor. ACO-1=Compressor. AEAI-1= Air evaporator. ACAI-1= Air condenser.

Examples of Sensors Calibration screens

Reference	Sensors	Volts	Calibrated	AT
<input type="checkbox"/>	ST-1	0.2753	29.8346	29.83
<input checked="" type="checkbox"/>	ST-2	0.3335	29.7856	29.79
<input type="checkbox"/>	ST-3	0.331	29.0641	29.06
<input type="checkbox"/>	ST-4	0.3254	29.5453	29.55
<input checked="" type="checkbox"/>	ST-5	0.3295	29.4276	29.43
<input checked="" type="checkbox"/>	ST-6	0.3458	34.752	34.75
<input type="checkbox"/>		-0.0037	-0.0037	0
<input type="checkbox"/>		4.004	-8.01826	8.02
<input type="checkbox"/>		3.4769	3.4769	3.48
<input type="checkbox"/>		3.215	291.888	291.89
<input type="checkbox"/>		3.066	3.066	3.07
<input type="checkbox"/>		2.6614	2.6614	2.66
<input type="checkbox"/>		2.4291	2.4291	2.43
<input type="checkbox"/>	SC-1	0.1291	0.1424	0.14
<input type="checkbox"/>	SC-2	0.0104	-0.0211	0.02
<input type="checkbox"/>	AN-1	5.9886	5.9886	5.99

REQUIRED SERVICES

Electrical supply: 220V, 1-phase + neutral + ground, 50 Hz.; or 110V, 1-phase + neutral + ground, 60Hz.; and 1 CV max.

Computer (PC).

DIMENSIONS & WEIGHTS

THAAAC Unit : -Dimensions: 900 x 600 x 500 mm. approx.
-Weight: 75 Kg. approx.
Control Interface Box: -Dimensions: 490 x 330 x 310 mm. approx.
-Weight: 10 Kg. approx.
PLC Module (PLC-PI): -Dimensions: 490 x 330 x 310 mm. approx.
-Weight: 30 Kg. approx.

RECOMMENDED ACCESSORIES

For refilling R134a refrigerant and maintenance, we recommend:

- T/KIT1. Maintenance Kit, containing: vacuum pump, hoses and manometers.
- T/KIT2. Maintenance Kit, containing: leakage detector.
- R134a refrigerant (to be acquired by the customer locally).

AVAILABLE VERSIONS

Offered in this catalogue:

- **THAAAC.** Computer Controlled **Air Conditioning Unit (one condenser (air) and one evaporator (air)).**

Offered in other catalogue:

- **THAAAB.** **Air Conditioning Unit (one condenser (air) and one evaporator (air)).**

OTHER AVAILABLE AIR CONDITIONING UNITS

Air Conditioning Units:

- **THA2AC.** Computer Controlled **Air Conditioning Unit (two condensers (water and air) and one evaporator (air)).**
- **THA2AB.** **Air Conditioning Unit (two condensers (water and air) and one evaporator (air)).**
- **THALAC.** Computer Controlled **Air Conditioning Unit (one condenser (water) and one evaporator (air)).**
- **THALAB.** **Air Conditioning Unit (one condenser (water) and one evaporator (air)).**

Refrigeration and Air Conditioning Units:

- **THAR22C.** Computer Controlled **Refrigeration and Air Conditioning Unit (two condensers (water and air) and two evaporators (water and air)).**
- **THAR22B.** **Refrigeration and Air Conditioning Unit (two condensers (water and air) and two evaporators (water and air)).**
- **THAR2LC.** Computer Controlled **Refrigeration and Air Conditioning Unit (two condensers (water and air) and one evaporator (water)).**
- **THAR2LB.** **Refrigeration and Air Conditioning Unit (two condensers (water and air) and one evaporator (water)).**
- **THARL2C.** Computer Controlled **Refrigeration and Air Conditioning Unit (one condenser (water) and two evaporators (water and air)).**
- **THARL2B.** **Refrigeration and Air Conditioning Unit (one condenser (water) and two evaporators (water and air)).**
- **THARA2C.** Computer Controlled **Refrigeration and Air Conditioning Unit (one condenser (air) and two evaporators (water and air)).**
- **THARA2B.** **Refrigeration and Air Conditioning Unit (one condenser (air) and two evaporators (water and air)).**
- **THARALC.** Computer Controlled **Refrigeration and Air Conditioning Unit (one condenser (air) and one evaporator (water)).**
- **THARALB.** **Refrigeration and Air Conditioning Unit (one condenser (air) and one evaporator (water)).**
- **THARLLC.** Computer Controlled **Refrigeration and Air Conditioning Unit (one condenser (water) and one evaporator (water)).**
- **THARLLB.** **Refrigeration and Air Conditioning Unit (one condenser (water) and one evaporator (water)).**

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



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REPRESENTATIVE: