



Refrigeration, Air Conditioning, and Heating

## AIR HANDLING / ENERGY MANAGEMENT TRAINING SYSTEM, MODEL 3403



### GENERAL DESCRIPTION

The Lab-Volt Model 3403 Air Handling / Energy Management Training System is designed to introduce students to the principles and components of air handling and energy management, and help students develop an appreciation for the method of control.

The trainer can be controlled manually or by an Allen-Bradley MicroLogix 1400 Programmable Logic Controller (PLC). Access to the PLC is obtained through a personal computer. Instruction on energy management and optimizing system efficiency is provided through the PLC's programming.

# AIR HANDLING / ENERGY MANAGEMENT TRAINING SYSTEM MODEL 3403

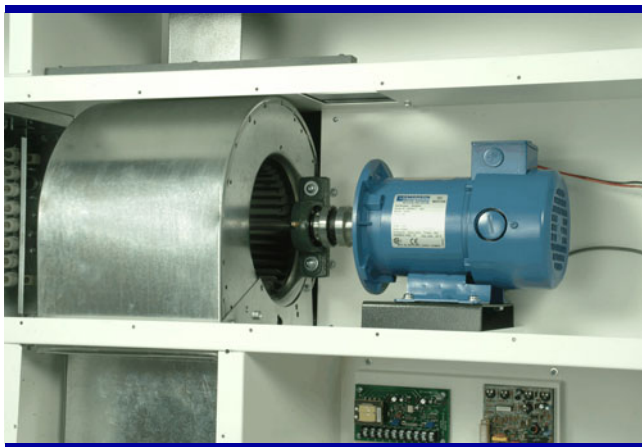
## Features

The Air Handling / Energy Management Training System, Model 3403, includes the air handling system, a programmable logic controller, and a computer. The trainer specifically includes two hermetic ¼ hp compressors designed to operate on R134a refrigerant. A cooling coil (with condensing unit) and electric heaters provide the temperature variation.



The exterior air conditioner simulates different environments.

A humidifier and dehumidifier are provided to condition the circulating air. The trainer includes fresh air, return air, and exhaust air ducts, variable-speed blower, and motor driven mixing dampers to control the air flow.



The variable-speed blower.

Plexiglas windows on the trainer ducting allow the operation of all air handling devices to be observed. Controls for the system include low pressure switch, thermostatic expansion valve, solenoid valves, humidistats and thermostatic controllers. Instrumentation on the training system includes indicator lamps, inclined-tube manometers for air flow rate monitoring and one digital chart recorder to monitor power consumption.

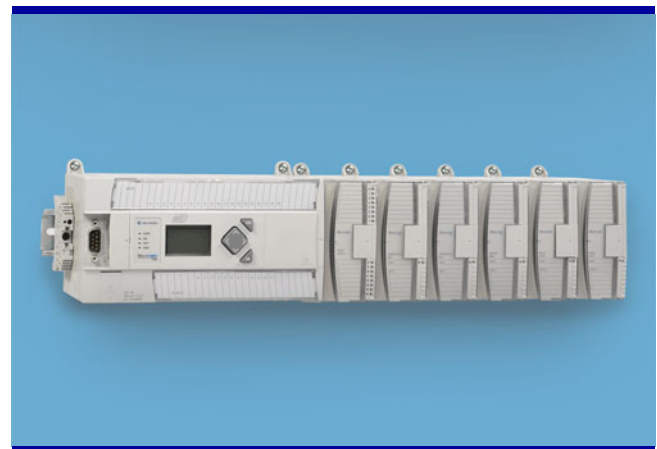


Some controls and indicators.

Lockable fault insertion switches can be used to introduce sixteen distinct electrical faults, permitting trainees to practice their troubleshooting skills and to demonstrate proficiency.

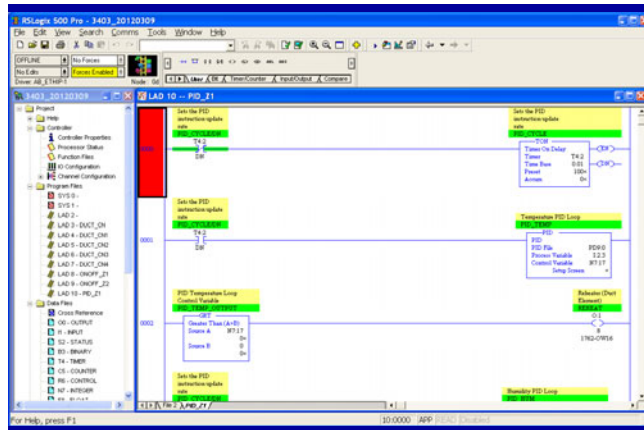
## PLC software

The programmable logic controller provides all inputs and outputs necessary to control the trainer. Specialized Rockwell software is provided to program and run the PLC from a personal computer.



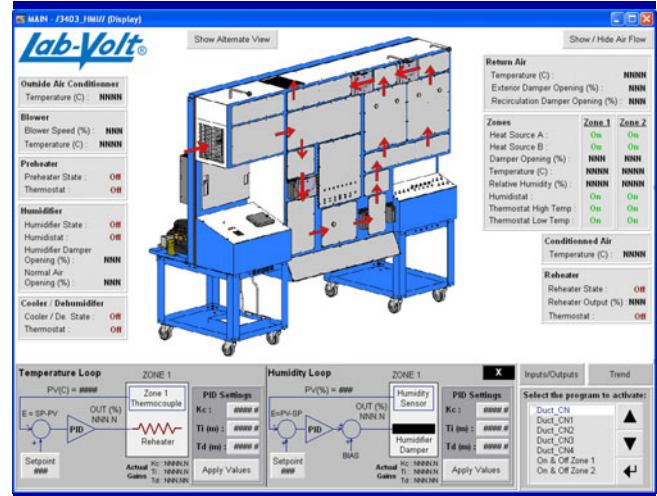
MicroLogix 1400 Module

The RSLogix 500 software permits to create, modify, and monitor ladder diagrams.



RS Logix 500 Software

Trends, loop displays, and alarm summary are accessible through the Supervisory Control and Data Acquisition (SCADA) program run with FactoryTalk View Machine Edition.



Finally, direct communication can be established between the PLC and the computer using the RSLinx software and the dedicated communication cable.

## TABLE OF CONTENTS OF THE STUDENT MANUALS

### Familiarization with the Air Handling / Energy Training System (85055-00)

- Air Flow Control
- Temperature Control
- Humidity Control
- The Programmable Logic Controller
- Supervisory Control and Data Acquisition (SCADA)
- PID Control of Temperature and Humidity

## LIST OF EQUIPMENT

QTY	DESCRIPTION	ORDERING NUMBER <sup>1</sup>
1	Air Handling / Energy Management Training System .....	3403-00
1	Familiarization with the Air Handling / Energy Training System .....	85055-00

## LIST OF OPTIONAL EQUIPMENT

QTY	DESCRIPTION	ORDERING NUMBER
1	Refrigeration Charging Equipment .....	3440-50
1	Refrigerant Recovery Unit .....	3445-10

<sup>1</sup> The ordering numbers shown apply to the English 120-V version. Other versions are available. Refer to the Ordering Numbers section.

# AIR HANDLING / ENERGY MANAGEMENT TRAINING SYSTEM

## MODEL 3403

### SPECIFICATIONS

Model 3403 – Air Handling / Energy Management Training System		120/208 V – 60 Hz	220/380 V – 50 Hz	240/415 V – 50 Hz
Power Requirement	Voltage	120/208 V	TBE <sup>2</sup>	
	Current	20 A	TBE	
	Electrical Distribution	3-phase 5 wires, star (wye) connected, including neutral and ground		
Programmable Controller	Allen Bradley MicroLogix 1400 including:			
	24 Vdc inputs (20)			
	Relay outputs (28)			
	Thermocouple inputs (8)			
	Analog current/voltage inputs (4)			
	Analog current/voltage outputs (8)			
	Ethernet/IP and RS-232C/RS-485 Communications Ports			
Compressor		2 Hermetically sealed, 1/4 hp		
Refrigerant		R134a		
Evaporator	Cooler/Dehumidifier	1 forced-air coil		
	Exterior air conditioner	1 forced-air coil		
Condenser		2 forced-air coil		
Heating Elements		Exterior air conditioner (1000 W), preheater (500 W / 1000 W), reheater (1000 W)		
Humidifier		Forced air partially immersed rotating drum		
Controls Devices		Low pressure switch, thermostatic expansion valve, thermostatic controllers, and solenoid valves.		
Instrumentation		Humidity transmitters, thermocouples, paperless recorder, air velocity manometers, and indicator lamps.		
Fault Insertion		16 fault-insertion switches		
Physical Characteristics	Dimensions (H x W x D)	1870 x 2210 x 840 mm (74 x 87 x 33 in)		
	Net Weight	432 kg (950 lb)		
Personal computer	Description	IBM® compatible PC with printer		
	Pre-installed software	RS Logix 500, FactoryTalk View Studio ME, FactoryTalk View ME Station, RSLinx		

### ORDERING NUMBERS

120/208 V – 60 Hz			220/380 V – 50 Hz			240/415 V – 50 Hz
ENGLISH	FRENCH	SPANISH	ENGLISH	FRENCH	SPANISH	ENGLISH
3403-20	TBE	3403-22	TBE	TBE	TBE	TBE
3440-50	3440-50	3440-50	3440-55	3440-55	3440-55	3440-5A
3445-10	TBE	TBE	3445-15	TBE	TBE	TBE
85055-00	TBE	TBE	85055-00	TBE	TBE	85055-00

Table 1. Equipment Ordering Numbers

<sup>2</sup>TBE = To be established (Contact your Lab-Volt representative for additional information)

Reflecting Lab-Volt's commitment to high quality standards in product, design, development, production, installation, and service, our manufacturing and distribution facility has received the ISO 9001 certification.

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