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JOHNSON CONTROLS

Phoenix Interface (PHX200 or PHX600)

The Phoenix Lab and Fume Hood Interface Module (PHX) is an input/out device that connects a Phoenix Controls Corporation Makeup Air Controller Interface (MIJ) to a Johnson Controls Metasys ® Network or Companion ™ System. Cooperatively designed between Johnson Controls, Inc. and Phoenix Controls Corporation, the PHX provides complete point monitoring and control of laboratory airflow control applications.

The PHX is fully supported by Metasys Revision 5.0, Companion 4.0, HVAC PRO ™ 4.0 (or greater) configuration software, and the Zone Terminal. The PHX 200/600 also controls the temperature of the lab by anticipating changes in temperature caused by fume hood airflow variations.

The combined package controls laboratory airflow conditions and communicates to the Metasys Network, thus providing a constant and safe laboratory and fume hood environment.

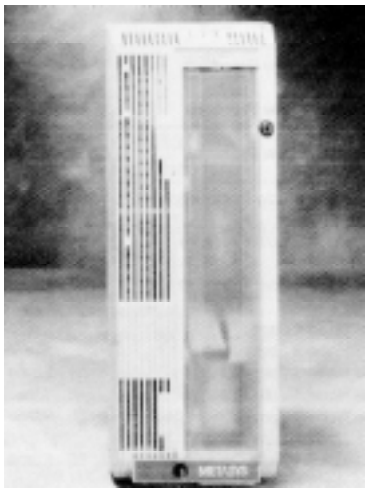


Figure 1: Phoenix Interface Module 200/600

Features and Benefits

❑ **N2 Bus Network Communications**	Laboratory airflow and fume hood information is integrated into the Metasys Network at the Operator Workstation or Companion.
❑ **System Synergy**	More than 120 points can be monitored or controlled on up to six fume hoods and the laboratory.
❑ **Local Zone Bus Communications**	JCI Zone Terminal provides control and monitoring of points.
❑ **Phoenix Controls Corporation Maintains Customer Expectations in Lab and Fume Hood Safety**	Phoenix Controls Makeup Air Controller provides less than one second fume hood sash and lab pressurization response time.
❑ **Johnson Controls, Inc. Maintains Customer Expectations in Total Facility Management**	JCI temperature and humidity controls provide a stable facility and lab environment.

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Order No. 595.1-025

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N2 Communication Points for a Six Hood Laboratory

This list of points is the total number of points possible for N2 Communication per a six hood laboratory.

1 - Fume Hood 1 Flow
2 - Fume Hood 2 Flow
3 - Fume Hood 3 Flow
4 - Fume Hood 4 Flow
5 - Fume Hood 5 Flow
6 - Fume Hood 6 Flow
7 - Fume Hood 1 Low Pressure Alarm
8 - Fume Hood 2 Low Pressure Alarm
9 - Fume Hood 3 Low Pressure Alarm
10 - Fume Hood 4 Low Pressure Alarm
11 - Fume Hood 5 Low Pressure Alarm
12 - Fume Hood 6 Low Pressure Alarm
13 - Fume Hood 1 Jam Alarm
14 - Fume Hood 2 Jam Alarm
15 - Fume Hood 3 Jam Alarm
16 - Fume Hood 4 Jam Alarm
17 - Fume Hood 5 Jam Alarm
18 - Fume Hood 6 Jam Alarm
19 - Fume Hood 1 Flow Command
20 - Fume Hood 2 Flow Command
21 - Fume Hood 3 Flow Command
22 - Fume Hood 4 Flow Command
23 - Fume Hood 5 Flow Command
24 - Fume Hood 6 Flow Command
25 - Fume Hood 1 Emergency Override
26 - Fume Hood 2 Emergency Override
27 - Fume Hood 3 Emergency Override
28 - Fume Hood 4 Emergency Override
29 - Fume Hood 5 Emergency Override
30 - Fume Hood 6 Emergency Override
31 - Makeup Airflow
32 - Makeup Airflow Alarm
33 - Makeup VFD Flow
34 - Makeup VFD Flow Alarm
35 - General Exhaust Flow
36 - General Exhaust Flow Alarm
37 - Return Airflow
38 - Return Airflow Alarm
39 - Lab Flow Offset Setpoint
40 - Lab Flow Offset Default Setpoint
41 - Lab Offset Polarity
42 - Actual Flow Offset
43 - Lab Offset Override
44 - Exhaust Flow Scale Factor
45 - Supply Flow Scale Factor
46 - Fume Hood 1 Min Sash Opening
47 - Fume Hood 1 Max Sash Opening
48 - Fume Hood 2 Min Sash Opening
49 - Fume Hood 2 Max Sash Opening
50 - Fume Hood 3 Min Sash Opening
51 - Fume Hood 3 Max Sash Opening
52 - Fume Hood 4 Min Sash Opening
53 - Fume Hood 4 Max Sash Opening
54 - Fume Hood 5 Min Sash Opening
55 - Fume Hood 5 Max Sash Opening
56 - Fume Hood 6 Min Sash Opening
57 - Fume Hood 6 Max Sash Opening
58 - Fume Hood 1 Velocity
59 - Fume Hood 2 Velocity
60 - Fume Hood 3 Velocity
61 - Fume Hood 4 Velocity
62 - Fume Hood 5 Velocity
63 - Fume Hood 6 Velocity
64 - Fume Hood 1 Sash Position
65 - Fume Hood 2 Sash Position
66 - Fume Hood 3 Sash Position
67 - Fume Hood 4 Sash Position
68 - Fume Hood 5 Sash Position
69 - Fume Hood 6 Sash Position
70 - Fume Hood 1 Local Occupied
71 - Fume Hood 2 Local Occupied
72 - Fume Hood 3 Local Occupied
73 - Fume Hood 4 Local Occupied
74 - Fume Hood 5 Local Occupied
75 - Fume Hood 6 Local Occupied
76 - Occupied Status
77 - Shutdown Status
78 - Bypass Valve Airflow
79 - Bypass Valve Airflow Alarm
80 - Building Exhaust Airflow
81 - Building Exhaust Airflow Alarm
82 - Ancillary Exhaust Airflow
83 - Ancillary Exhaust Airflow Alarm
84 - Total Lab Exhaust Airflow
85 - Total Lab Exhaust Alarm
86 - Switched Supply Airflow
87 - Switched Exhaust Airflow
88 - Constant Supply Airflow
89 - Constant Exhaust Airflow
90 - Office Supply Airflow
91 - Office Supply Airflow Alarm
92 - Max Makeup Airflow
93 - Occupied Lab Temp Setpoint
94 - Unoccupied Lab Temp Setpoint
95 - Lab Remote Temp Setpoint
96 - Supply Air Low Temp
97 - Supply Air High Temp
98 - Lab Temp
99 - Lab Supply Air Temp
100 - Adjacent Ambient Temp
101 - Lab Supply Temp Setpoint (Calculated)
102 - Lab Supply Air Cooling Prop Band
103 - Lab Supply Air Cooling Integration
104 - Cooling Command
105 - Thermal Demand
106 - Space Heat Flow Rate
107 - Lab Supply Heating Prop Band
108 - Lab Supply Heating Dead Band
109 - Lab Supply Heating Integration
110 - Heating Command
111 - Hot Deck Airflow
112 - Hot Deck Airflow Alarm
113 - Vent Mode
114 - Purge Mode
115 - Vent Command
116 - Purge Command
117 - Vent Status
118 - Purge Status
119 - Lab Humidity Sensor
120 - Occupied Lab Humidity Setpoint
121 - Unoccupied Lab Humidity Setpoint
122 - Lab Humidity Prop Band
123 - Lab Humidity Dead Band
124 - Lab Humidity Integration
125 - Lab Humidity Offset
126 - Lab Humidity Stroke Time
127 - Lab Humidity Command
128 - Occupied Minimum Ventilation
129 - Unoccupied Minimum Ventilation

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*M*onitor and Control Over 120 Different Points

The PHX200 is used in a lab with up to two fume hoods and the PHX600 is used in a lab with up to six fume hoods. All lab and control monitor points are on both models. You can easily configure the input and output points as well as software features using HVAC PRO Revision 4.0 or greater. The data base can be downloaded through a local Metastat™ (room temperature sensor) or network-wide N2 Communication Bus. The PHX connects the Phoenix MIJ to the Metasys Network through a Network Control Unit (NCU) or Companion.

The table below specifically compares points for a two fume hood system to a six fume hood system.

Table 1: Point Counts for PHX Interface Module

Point Type	PHX200 (2 Fume Hoods)	PHX600 (6 Fume Hoods)
Analog Inputs	22 Total (16) 0 to 10 VDC signals to the Makeup Air Controller (MIJ) **AND** (6) RTD temperature elements (1000 ohm nickel, 1000 ohm platinum, or silicon) **OR** 2K ohm setpoint potentiometers **OR** 0 to 10 VDC transducers	38 Total (32) 0 to 10 VDC signals to the Makeup Air Controller (MIJ) **AND** (6) RTD temperature elements (1000 ohm nickel, 1000 ohm platinum, or silicon) **OR** 2K ohm setpoint potentiometers **OR** 0 to 10 VDC transducers
Binary Inputs	20 Total (16) 0-12 VDC to the Makeup Air Controller board **AND** (4) 24 VAC only BI 4 may be used as an accumulator input for frequencies less than 2 Hz	36 Total (32) 0-12 VDC tied to the Makeup Air Controller **AND** (4) 24 VAC input only BI 4 may be used as an accumulator input for frequencies less than 2 Hz
Analog Outputs	5 Total 0 to 10 VDC @ 10 mA (3 connected to Makeup Air Controller-MIJ)	5 Total 0 to 10 VDC @ 10 mA (3 connected to Makeup Air Controller-MIJ)
Binary Outputs	6 Total (6) 24 VAC Triacs at 0.5 amp Low or High side common selectable	6 Total (6) 24 VAC Triacs at 0.5 amp Low or High side common selectable
N2 Bus	Isolated	Isolated
Zone Bus	8-pin phone jack on controller 6-pin phone jack at zone sensor	8-pin phone jack on controller 6-pin phone jack at zone sensor

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Connectivity

When connected to the Metasys Network, the PHX provides point and control information to the rest of the network. The device communicates through an N2 Bus. For a smaller facility, the PHX can function as a standalone controller with a Zone Terminal (AS-ZTU100-1). The figure below illustrates the connectivity overview of the Metasys Network and the laboratory.

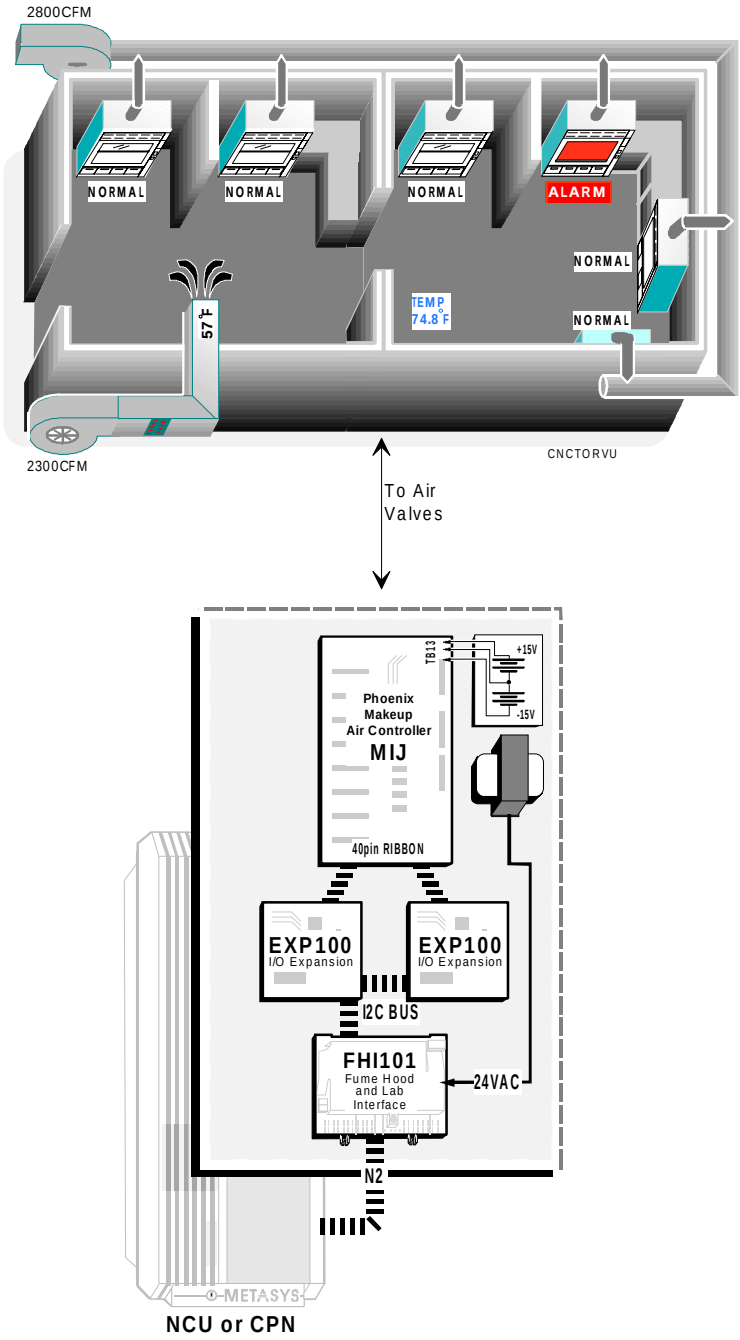


Figure 2: PHX Connectivity Overview

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The Safe Total Building Solution

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Accuracy

- modified venturi valve for high turn down of 10 to 1
- +/- 5 percent of reading, not of full scale, for low flow accuracy
- calibrated and traceable to the National Institute of Standards and Technology (NIST/NBS)
- local closed loop control using analog electronics
- energy savings through variable air volume and night setback of temperature/humidity
- certification training program insures experienced people are used on your project
- unique linear calibrated airflow controls

Speed

- less than one second system response time
- sash sensing provides immediate response
- safety verified through ASHRAE testing
- closed loop variable frequency drives
- fast responding pneumatic controls

Stability

- low overshoot eliminates fluctuations in hood face velocity
- lab pressurization polarity remains constant
- intersystem hunting is eliminated in manifolded system
- simple addition, subtraction, and high signal selection for control stability
- thermal anticipation provides more stable temperature control with extreme changes in fume hood flow (patent pending)

Data Logging

- totally integrated FMS with fire, smoke control, security, and HVAC
- document proper operation of lab and fume hood performance per OSHA 1910.1
- continually monitor hood, valve, and lab
- access to all vital lab environmental information—alarm monitoring, trending, historical data storage

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Ordering Information

The following is a list of code numbers and descriptions for the PHX and accessory equipment.

Table 2: PHX Interface Modules

Code Number	Description
AS-PHX200-0 (2 fume hoods)	PHX connects to a Phoenix MIJ Controller (ordered from JCI)[1]
AS-PHX600-0 (6 fume hoods)	PHX connects to a Phoenix MIJ Controller (ordered from JCI)[1]
MIJ 500 (0 to 6 fume hoods)	Connects to PHX200 or PHX600. Order from: Phoenix Controls Corporation 55 Chapel Street Newton, MA 02158 Phone: 617/964-6670

Table 3: Sensors/Transmitters

Code Number	Description	Type
EP-8000-2	Electro-Pneumatic Transducer 0.5 to 19 PSIG	0 to 10 VDC, High Volume (relay)
HE-6300 Series	Wall Mount Humidity Transmitter	12-30 VDC Supply
HE-6310 Series	Duct Mount Humidity Transmitter	12-30 VDC Supply
HLC-1000 Series	High Limit Humidity Control	12-30 VDC Supply
TE-6100-961	Silicon Sensor	1035 ohms at 77°F (25°C)
TE-6100-11	Nickel Sensor without setpoint, phone cable connections	1000 ohms at 70°F (21°C)
TE-6100-12	Nickel Sensor with Warmer/Cooler Pot, phone cable connections	1000 ohms at 70°F (21°C)
TE-64X0X-X0X0 **TE-64X1X-X0X0** **TE-64X3X-X0X0** **TE-64X5X-X0X0**	Nickel or platinum sensor, with or without setpoint, wall or surface mounting, with phone jack or terminal blocks, with or without thermometer	Nickel–1000 ohms at 70°F (21°C) Platinum–1000 at 32°F (0°C) Setpoint: warmer/cooler or graduated scale 65°F to 85°F or 18°C to 30°C

[1]Includes enclosure, power supply, transformer unit, expansion board(s)—MIJ ordered separately.

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Table 4: Dampers and Valve Actuators for Heating

Code Number	Description	Type
AV-8020 Series	Valve Actuator Assemblies 1/2 in.	24 VAC Triac / Incremental
AV-8022 Series	Valve Actuator Assemblies 1/2 in.	0 - 10 VDC
AV-8050 Series	Valve Actuator Assemblies 1/2 in., 3/4 in., 1 in., and 1-1/2 in.	24 VAC Triac / Incremental
AV-8051 Series	Valve Actuator Assemblies 1/2 in., 3/4 in., 1 in., and 1-1/2 in.	24 VAC Triac / Incremental / with Feedback
AV-8052 Series	Valve Actuator Assemblies	0 - 10 VDC
EDA-2040-6X	Damper Actuator (6 min)	24 VAC Triac / Incremental
EDA-8x0x	Direct Mount Damper Actuator	24 VAC Triac / Incremental or Proportional 0-10 VDC
AV-8090	Valve Actuator Assemblies 1-1/2 in. to 2 in.	24 VAC Triac / Incremental
AV-8091	Valve Actuator Assemblies 1-1/2 in. to 2 in.	24 VAC Triac / Incremental with Feedback
AV-8092	Valve Actuator Assemblies 1-1/2 in. to 2 in.	0 to 10 VDC
M100C Series	Zone Bus Damper Actuators	Zone Bus Addressable
M100G Series	Proportional Valve and Damper Actuators	0 to 10 VDC

Table 5: Accessories

Code Number	Description	Type
AS-CBLPRO-2 or -1	HVAC PRO Cable	N/A
WS-SWHPRO-004	HVAC PRO Software, Revision 4.0	N/A
WS-SWHPRO-604	HVAC PRO Software Upgrade, Revision 4.0	N/A
AS-CBLCON-0	Zone Terminal (ZT) Adapter	Optional
AS-ZTU100-1	New Zone Terminal (ZT)	Optional

Table 6: Repair Parts

Code Number	Description
AS-FHI101-700	Controller board
AS-EXP100-700	Expander board

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Specifications

Product	N2 Interface for Laboratory Fume Hood Controls
Input Power Requirements	120 VAC (+/- 15%) at 60 Hz, 0.8 amps (96 VA)
Output Power Requirements	FHI101: 24 VAC, 50 VA; PHX200: +/- 15 VDC at 1.5 amp each; PHX600: +/- 15 VDC at 3 amps each; Regulation: +/- 0.05% load; +/- 0.05% line
Analog Input Accuracy	+/- 0.5% typical
Ambient Operating Conditions	32° to 125°F (0° to 52°C) Vertical Mount, 32° to 113°F (0° to 45°C) Horizontal Mount 10 to 90% noncondensing RH; 86°F (30°C) maximum dew point
Ambient Storage Conditions	-40° to 158°F (-40° to 70°C); 10 to 90% noncondensing RH; 86°F (30°C) maximum dew point
Dimensions (H x W x D)	28 in. x 10 in. x 8.5 in. (46 x 25 x 22 mm)
Shipping Weight	36 lbs (17 kg)
Agency Compliance	FCC Part 15, Subpart J-Class A CSA C22.2, No. 205 ISO9000 Certified Design Process UL-916 Energy Management* UL-864-Smoke Control*
Plastics Flammability	UL94 5V
Processors	(3) 80C652 at 11 MHz
Memory–FHI	64K bytes ROM, 32K bytes RAM, 8K bytes EEPROM
EXP	8K bytes ROM, 256 bytes RAM
Diagnostics	Powerup: RAM, EEPROM, ROM Checksum, Continuous RAM
Buses–N2	Serial Asynchronous 9600 Baud EIA RS-485
I^2C	Serial Asynchronous 100,000 Baud Phillips Inter-integrated Circuit
Zone	Serial Asynchronous 1200 Baud EIA RS-422
Zone Terminal (optional)	7-day programmable for 3 modes, 10 holidays, floating holiday
Time Clock Accuracy	+/- 2 seconds per day unpowered
Battery	Lithium 5-year unpowered life at 25°C (77°F)

*pending

The performance specifications are nominal and conform to acceptable industry standards. For application at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products.

JOHNSON CONTROLS

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