

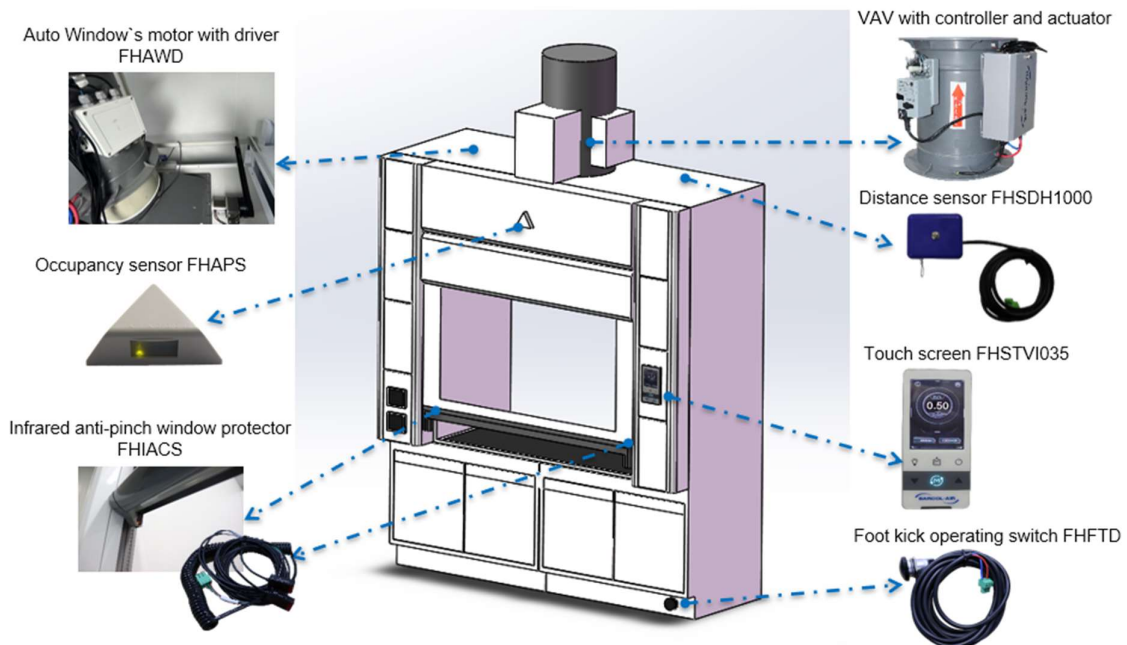
NA Round Control Valves
 Paint Finish or Stainless Steel Body

NZP Venturi Control Valves
 Integrated Molding Thermoplastic Body



Control Application of FHC-C3

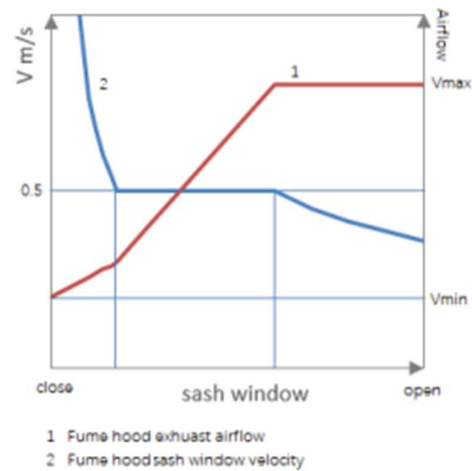
According to EN14175, part 6, Fume Hood operation requires that the exhaust airflow control should achieve maximum safety, quick response and energy saving, and should also have monitoring and alarm functions. The FHC-C3 Fume Hood exhaust airflow is variable and is controlled by the window distance sensor to ensure adequate air velocity and airflow to prevent the contamination of the room. Safety controls include exhaust airflow monitoring with monitoring screen alarm, window distance sensor, occupancy sensor, foot kick operating switch, auto window driver, and infrared anti-pinch window protection are available to provide more function and safety.



Controller Features:

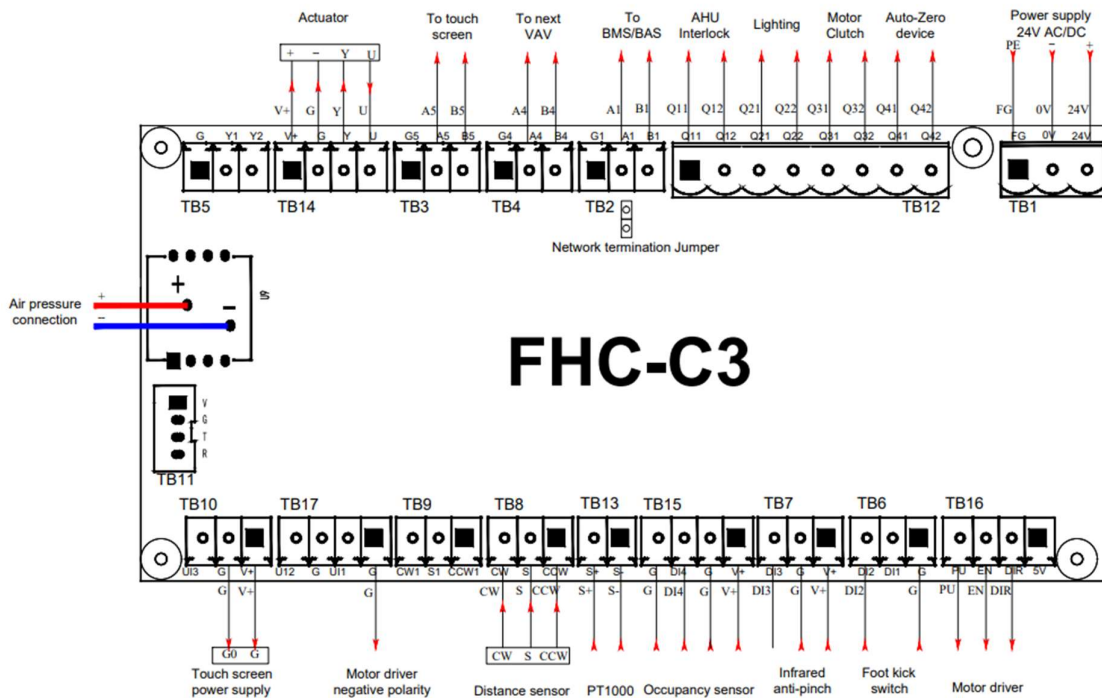
- ◆ The Fume Hood exhaust airflow is controlled to ensure a safe air velocity of 0.5m/s through the cabinet's window opening to protect the operator and to prevent the contaminating the room.
- ◆ Fast response time, less than 2.5 seconds.
- ◆ Can integrate 3 channels communication interface, supported by Modbus RTU communication.
- ◆ Has 4 x DI, 4 x UI, 4 x DO and 3 x AO. Can provide exhaust fan interlock, fume hood lighting, emergency mode alarm, and can monitor cabinet air temperature.
- ◆ Touch screen can display actual face velocity, window position, operation mode, actual exhaust airflow and alarms.
- ◆ Alarms: Incorrect window position, incorrect velocity and no air alarm.
- ◆ Operation mode:
 - Standard mode (0.5m/s open window velocity),
 - Energy saving mode (0.3m/s open window velocity),
 - Emergency mode.
- ◆ High-Speed Damper Actuators

Model Number	BA104Q24SR
Operating time	2.5 seconds
Nominal torque	4 NM
- ◆ Comprehensive full feature controller for air system control when applied with optional sub system controls including:
 - Fume Hood Exhaust Air Volume Measurement & Control
 - Fume Hood Sash Window Open Height Measurement & Monitor
 - Fume Hood Window Open Area Air Velocity Monitor
 - Fume Hood Normal Operation and Energy Saving Operation Monitor & Control
 - Fume Hood Internal Air Temperature Measurement & Monitor
 - Fume Hood Sash Window Auto-Movement Control
- ◆ Nominal power requirements: 24VAC or 24VDC 50/60Hz power supply.
Standard 50w power converter/transformer for normal operation.
If select auto window drive option, need 100w 24VDC power converter.
- ◆ Optional built-in power converter available for 230VAC to 24VDC or transformer for 230VAC to 24VAC power supply.
- ◆ Building Management System Communication via Modbus RTU protocol.
BACnet IP or BACnet MS/TP also applicable via accessory Modbus-BACnet transfer modules.



- ◆ FHC-C3 Controller inputs and outputs
 - Inputs: 4 x DI, 4 x UI
 - Outputs: 4 x Passive DO, 3 x AO
- ◆ Set point adjustments via:
 - Monitor & Control Touch Screen Model: FHTVI035
 - Laptop via Modbus Connector
 - Building Management System (BMS)

Controller Configuration and Wiring Guidelines



1. The standard FHC-C3 product is supplied for use with a customer supplied 24VDC or 24VAC power supply which should be field connected to the 24VAC/DC terminals on the controller. If a 24VDC power supply is used it is essential to follow the indicated positive and negative polarity of these connections to avoid damage to the controls.
2. If the customer orders an optional factory installed and wired 230VAC to 24VDC or 24VAC power converter/transformer, then the external 230VAC power supply should be site connected to 230VAC terminals on the power converter/transformer, including the earth terminal.

3. The controller has three sets of built-in standard RS485 connector for Modbus RTU protocol communication.
TB3 is usually connected to HMI screen or the fume hood monitor screen.
TB4 is connected and communicated between the master-slave controllers.
TB2 is connected to BMS system.
The communication cable should be a shielded twisted pair with the shielded layer connected to ground.
4. The controller has four universal inputs (UI1, UI2, UI3, U).
U in TB14 is factory connected to the actuator.
UI1 and UI2 in TB17, and UI3 in TB10 is used for room intelligent control application.
5. The controller also has four digital inputs (DI1, DI2, DI3, DI4).
DI2 in TB6 is normally connected to foot kick switch when used for fume hood control application.
DI3 in TB7 is normally connected to the infrared stop window protection when used for fume hood control application.
DI4 in TB15 is normally connected to occupancy sensor when used for fume hood control application.
DI1 in TB6 leaves for future use.
6. The controller has 4 passive digital outputs (Q11-Q12, Q21-Q22, Q31-Q32, Q41-Q42) in TB12.
Each output with 10amps rated current.
Q11-Q12 is available when required for site connection to interlock with air supply or exhaust fans as needed.
Q21-Q22 is normally used for fume hood cabinet lighting control.
Q31-Q32 is normally used for auto window drive on-off control when used for fume hood application.
Q41-Q42 is factory connected when select the auto zero option.
7. The controller also have three analog outputs (Y1,Y2,Y) .
Y in TB14 is factory connected to the actuator.
Y1 in TB5 is used for room intelligent control application.
Y2 leaves for future use.
8. TB8 is for window distance sensor connection to be finished at site.
Customer should also connect the cabinet temperature sensor to TB13 and sash auto movement drive to TB16 if these options are chosen. For further details contact Barcol-Air for wiring diagrams.
9. When the controller is at the end of the communication network, the control board internet jumper terminals should be capped to end the communication circuit.

Control Products and Accessories



◆ VAV Control Valve with FHC-C3 controller and Fast actuator (Basic configuration)



-NZP models have round bodies with Venturi Air Flow measurement and round control dampers and are manufactured from PP integrated molding corrosion resistant thermoplastics

-VAV valve can also use NA round series with stainless steel or galvanized steel with powder coating finish and a Flo-cross differential pressure airflow sensor.

-Fast actuator, response time less 2.5 seconds.

-Airflow measurement, airflow adjustment and window air velocity control integrated into one controller unit for reduced the logic operation time and faster response.

-Pressure independent control

- Better than 5% accuracy with 150pa~750pa static pressure difference.

◆ Monitor & Display Touch Screen FHTVI035 (Basic configuration)



Color touchscreen display, including: measured window face velocity, sash door open distance, operation mode and exhaust airflow.

Window face velocity setting

On/off cabinet lighting

System on/off operation with one button

In emergency mode, damper exhaust set to emergency airflow, normally maximum airflow.

Alarm functions: window position error, window face velocity error, no airflow error.

◆ Sash Window Distance Sensor FHSDH1000 (Basic configuration)



High precision, linear control sensing technology.

Measuring range 0-1000mm, suitable for most fume hood window application.

Life time more than 100,000 cycles

◆ Occupancy Sensor FHAPS (Option)



Sensing area 2000mm * 800mm

Response time less than 30ms

Automatic reaction changeover, digital output

◆ Auto window drive system FHAWD (Option)



Auto window drive system including pulley, drive roller, maintenance-free servo motor, electromagnetic clutch, infrared anti-pinch window protection and foot kick operating switch.

- In Manual state: Press button on FHTVI035 touch screen to manually control the window to lift up to safety height or drop down to minimal height.

- In Automatic state: Adaptive automatic up and down - the window moves up to safety height automatically when occupancy sensor is active, and down to minimal height when inactive.



Follow me, to move up and down. Window opens to safe height automatically when sensing manual up movement and down to minimal height when sensing manual down movement.



The window safety height can be set on the touch screen at any required level. When manually lift the window, it will automatically go up to the safety height. The safety height can also be set to the maximum to allow for moving equipment in and out of the fume hood.

Infrared anti-pinch window protection. Window automatically stops when sensing obstacles or resistance during the window closing.

◆ Communication Transfer Modules (Option)



BAC1001: Modbus RTU to BACnet IP (256 points)

BAC2004: Modbus RTU to BACnet IP or BACnet MSTP (1024 points)

- ◆ Fume Hood Cabinet Temperature Sensor FHCTS (Option)