Room Pressure Control RPC-C1

NA-NB Models with Standard or High-Speed Actuator and Controller with Pressure transducer for Room Pressure Control

NK-NL Models with Standard or High-Speed Actuator and Controller with Pressure transducer for Room Pressure Control

Room Pressure Control And Airflow Measurement RPC-C1-AF

NA-NB Models with Standard or High-Speed Actuator and Controller with pressure transducers for Room Pressure Control and Air Flow Measurement

NK-NL Models with Standard or High-Speed Actuator and Controller with pressure transducers for Room Pressure Control and Air Flow Measurement

Description

Barcol-Air Room Pressure Control VAV series with Standard or High Speed Actuator and Controller with Room Pressure transducers are supplied fully factory assembled and calibrated and ready for operation

The NA and NB model terminals have round casing, and the NK and NL series are rectangular casing. All units provide accurate room pressure control either on the air inlet side of the room or on the air exhaust side. The NA and NK series have single skin bodies, and the NB and NL series have double skin with enclosed insulation for improved acoustic and thermal performance

VAV Terminal Features

- ✧ Galvanised steel bodies with optional polyester powder paint finish or stainless steel body for enhanced corrosion resistance.
- ✧ NA and NB round series have sandwich construction galvanized steel oval damper blade for linearized performance with neoprene blade seal for low leakage.
- ✧ NK and NL rectangular series have aluminum extruded parallel damper blades with edge seals and blade Synchronizing gear wheels. NKS low leakage version also have low leakage seals at the ends of the damper blades.
- ✧ Low casing air leakage:
  - NA & NB series - Class C according to Standard EN1751.
  - NK & NL series standard version - Class A and NKS low leakage version - Class C according to EN1751.

- Low closed blade air damper leakage:
  - NA & NB series - Class 4 according to Standard EN1751 except diameters 100 and 125 which are Class 3.
  - NK & NL series standard version - Class 1. NKS low leakage version - Class 4 according to Standard EN1751, except models with 100mm and 200mm height which are Class 3.

Control Features

- Choice of Damper Actuator-Standard or High Speed.

Speed	Standard Speed	Standard Speed	High Speed
Model	BA504S24A	BALM24A-SR	BA104Q24SR
Operating time	70 Seconds	150 seconds	2.5 seconds
Nominal torque	4 NM	5 NM	4 NM
Power Requirement	24ac or 24VDC	24VAC or 24VDC	24VAC or 24VDC
Power Input	2.5W	3W	13W

Other models available upon request.

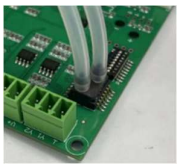
- Modbus RTU Room Pressure controller

Model	RPC-C1
Power Requirement	24VDC
Power Input	3W

- Optional Input Power Converter accessory available for 230VAC to 24VDC power supply.
- Communication protocol: Modbus RTU, or BACnet IP or BACnet MSTP with accessory Communication Transfer Modules:

  -BAC1001: Modbus RTU transfer to BACnet IP (256 points) or
  -BAC2004: Modbus RTU transfer to BACnet IP or BACnet MSTP (1024 points)

- Controller inputs and outputs
  - Inputs: 3 x UI
  - Outputs: 1 x Passive DO, 2 xAO
- Room pressure set point adjustments via:
  - Laptop (Modbus RTU)
  - Building Management System (Modbus RTU)
  - HMI touch screen

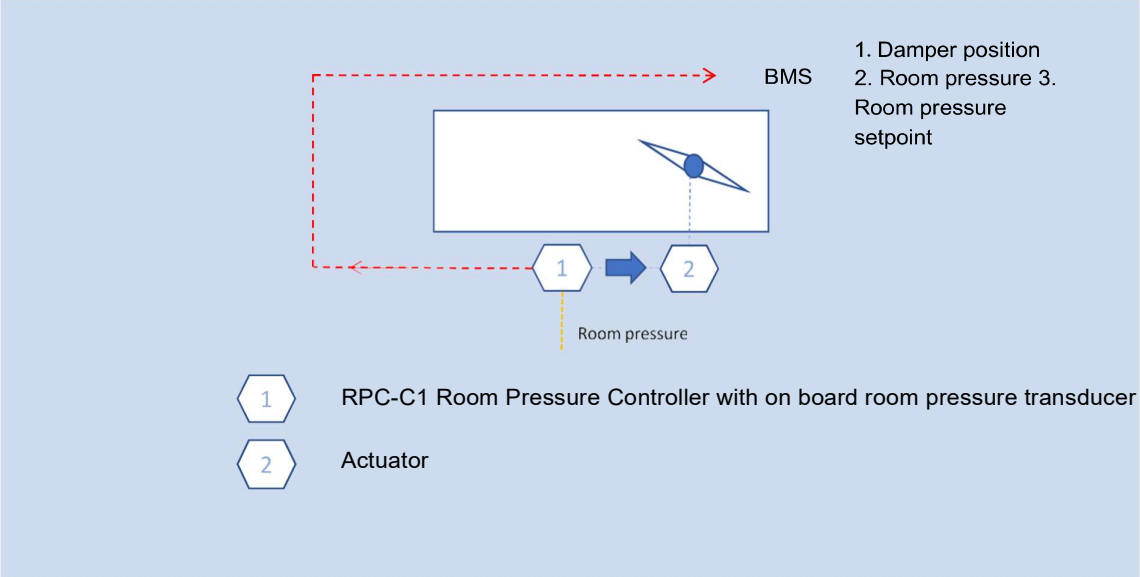


- Air pressure transducer (static membrane type) mounted on RPC-C1 control board Used for room pressure measurement on units requiring room pressure control only or for air flow sensor differential pressure measurement on units also requiring air flow measurement.
- External room air pressure transducer (static membrane type). Factory installed on units requiring room pressure control and airflow measurement functions.

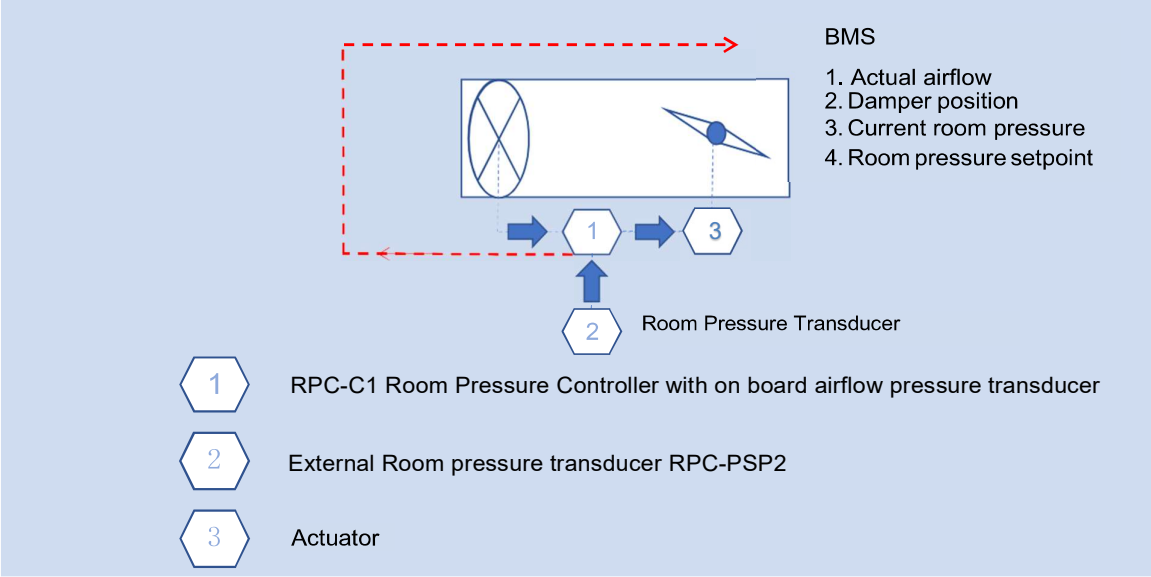
Model	RPC-PSP2
Pressure Range	±100 Pa
Offset (FSS)	1.0%
Accuracy (1 to 70 Degrees C)	1.0%
Stability over one year (FSS)	1.0%
Pressure Sensing Element	Ceramic
Power Supply	24VDC±10%.

Control Schematic

- For room pressure control only

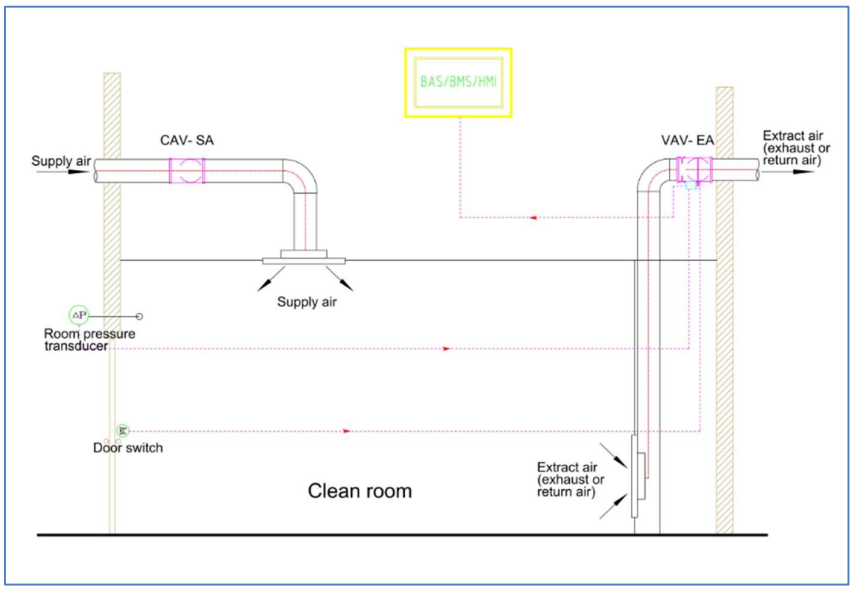


- For room pressure control and air flow measurement



Typical Application

– Clean Room Pressure Control- Extract airflow



- System Operation

  - Constant supply airflow controlled by supply air CAV terminal CAV-SA.
  - Variable exhaust or return airflow controlled by VAV terminal VAV-EA with C1 system controller with local or remote Room Pressure Sensor to maintain positive or negative pressure in the clean room by varying the exhaust or return airflow according to the required room pressure. and airflow cascade design.

- Positive or Negative room pressure.

  - Room positive pressure is assured by controlling the variable exhaust or return airflows to be less than the constant supply airflow.
  - Room negative pressure is assured by controlling the variable exhaust or return airflows to be more than the constant supply airflow.

- Room Pressure Control. The room pressure is controlled by closed - loop control which automatically and quicky adjusts the airflow of the VAV-EA terminal to maintain a stable room pressure.

- Room Pressure Control Override. When the clean room door is opened a clean room open/close door switch provides a signal interface to the VAV-EA C1 controller to activate room pressure override control, whereby the VAV-EA valve is controlled to its current position avoiding rapid changes in room pressure due to the open room door. After the clean room door is closed the system automatically returns to its normal room pressure control mode of operation.

- The C1 controller is configured with a RS485 communication interface for Modbus RTU communication protocol with the following capabilities:

  - Control inputs from the BAS/BMS or HMI interface for:

  - Room required control pressure and alarm setting values.

- Fire control alarm.
- Door switch status

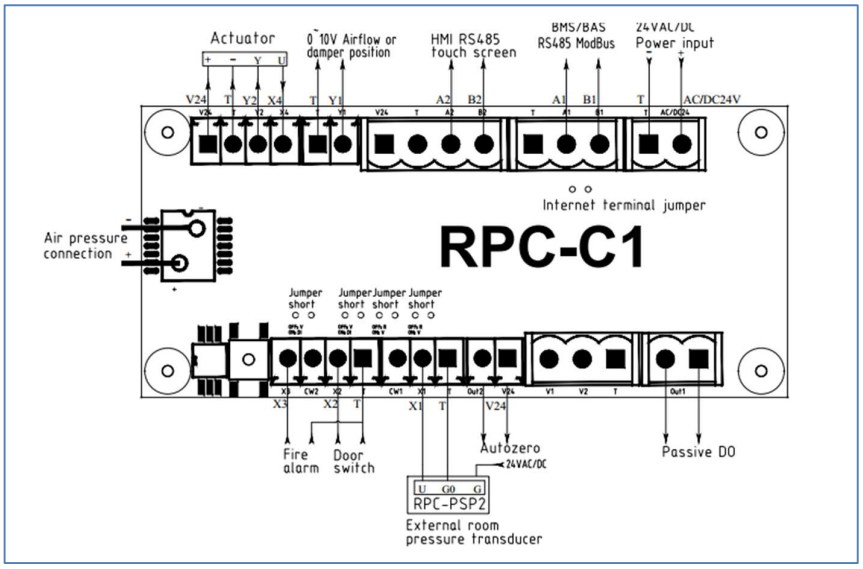
➢ Control outputs to BAS/BMS or HMI interface which are:

- Actual room pressure
- Total measured extract airflow (exhaust or return air) at VAV-EA
- VAV damper position
- Room pressure override control status
- Room under and over pressure tolerance settings
- High and low airflow alarms.

◆ Interlocks – Air supply and exhaust fans.

◆ Communication via Modbus RTU or BACnet IP or BACnet MSTP by using accessory Communication Transfer Modules.

Room Pressure Controller RPC-C1 Connection Diagram



Controller Configuration and Wiring Guidelines

1. The standard RPC-C1 controller is suitable for use with a 24VDC power supply connected to the 24VDC terminals on the Controller. It is essential to follow the indicated positive and negative polarity of these connections. Alternatively, a 24VAC power supply can be connected to the 24VAC terminals on the controller.
2. The RPC-CI controller can be supplied with a factory installed and wired accessory 230VAC to 24VDC/AC power converter. In this case the site provided 230VAC power supply should be connected to the 230VAC power input terminals on the power converter.
3. For units ordered for room pressure control only, the unit is factory configured for the room pressure to be measured by the controller's built in air pressure transducer. For units ordered for room pressure control and air flow measurement the unit is factory configured for the air flow to be measured using the controller's built in air pressure transducer and the room pressure to be measured by the RPC-PSP2 external pressure transducer.

4. The pneumatic connection tubes from the room pressure transducer to the room pressure sensing points should be less than 5M long to avoid excessive pressure drop and the connector marked “+” is for connection to the measuring room, and the "-" is for connection to the reference space of the measuring room.
5. The room pressure controller controls the room pressure and also measures the air flow (for the version with air flow measurement). To control the room pressure, it adjusts the damper position and thereby the air volume automatically by monitoring the difference between the measured room pressure and the room pressure set point that is entered via the external system BAS/BMS or HMI touch screen.
6. The controller has a built in standard RS485 connector for Modbus RTU protocol communication. The communication cable should be a shielded twisted pair with the shielded layer connected to ground.
7. The controller has three universal inputs (X1, X2, X3). X1 is factory connected to the external RPC-PSP2 pressure transducer when used. X2 and X3 are available for site connection to the door switch and fire alarm. When required the door switch indicates if the door is open in order to lock the VAV damper in its current position. When required the fire alarm signal will lock the VAV damper in the full open or full closed position as programmed.
8. The controller can give feedback on the Damper Position or the Airflow from terminal Y1 using a 0-10VDC output signal.
9. The controller has available a passive connection via terminals Out 1 for interlock with the air supply or exhaust fans as needed.
10. The controller has available a connection via terminals Out 2 which is factory connected to the auto zero accessory when ordered.
11. 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.

Accessories

- Accessory room pressure transducer RPC-PSP2, that is required on units ordered for both room pressure control and airflow measurement.
- Accessory Communication Transfer Modules:
  - BAC1001 - Modbus RTU to BACnet IP (256 points) or
  - BAC2004 - Modbus RTU to BACnet IP/BACnet MSTP (1024 points).
- Accessory Auto Zero device BAC-ZE to maintain the airflow measurement accuracy correcting the zero-point drift
- Accessory Power Converters:
  - 230VAC to 24VDC
  - 230VAC to 24VAC

Order Code

NA / 250 / RPC-C1 / FA / TD /***

1 2 3 4 5 6

Position 1: VAV product group

NA/NB/NK/NL/NZP, details please find relevant VAV catalogue.

Position 2: VAV size

Details please find relevant VAV catalogue

Position 3: Controller model

RPC-C1: room pressure control only
RPC-C1-AF: room pressure control and airflow measurement

Position 4: actuator type

FA: fast speed actuator
SA: standard speed actuator

Position 5: transformer type

T0: exclude transformer, site offer power supply
TD: include 24VDC transformer
TA: include 24VAC transformer

Position 6: other options

None represents no options ordered.
BAC1001: order 256 points Transfer Modules
BAC2004: order 1024 points Transfer Modules
BAC-ZE: order auto zero device

Order Model Example:
Model: NAROB/S/250/RPC-C1-AF/FA/TD/BAC-ZE
Represents:
Stainless steel NA250, with room pressure controller with airflow measurement controller, with Barcol-Air fast actuator, with offering 24Vdc transformer, with auto zero device.