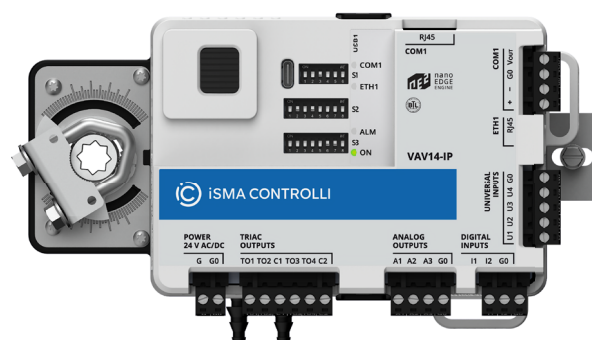# VAV14-IP

## Variable Air Volume controller

| MODEL | DESCRIPTION |
|---|---|
| VAV14-IP | Variable Air Volume (VAV) - freely programmable and configurable IP controller with a pre-loaded VAV application, integrated actuator, and differential pressure sensor. Niagara-enabled with nano EDGE ENGINE embedded. Native BACnet and Modbus protocols. |

## APPLICATION AND USE

VAV14-IP is a configurable and freely programmable controller with BACnet IP, BACnet MS/TP, Modbus TCP/IP, and Modbus RTU protocols. Being equipped with a tailor-made VAV application with the possibility of its further enhancement makes the controller useful not only for typical VAV boxes but for all types, even the most advanced ones.

The VAV14-IP controllers are developed on the nano EDGE ENGINE software platform, which offers cloud connectivity, real-time programming, and automatic exposure of Data Points. It enables seamless integration with BMS. The platform supports remote control, real-timemonitoring, and data analysis, which enable energy consumption tracking, boost system performance, and facilitate meeting maintenance needs.

## FEATURES

- Enhanced energy efficiency
- Seamless programming and maintenance
- Built-in powerful application
- 150 Data Points

- 2 fail-safe Ethernet ports with a built-in switch
- 13 I/Os onboard + pressure sensor
- BACnet IP, BACnet MS/TP Modbus TCP/IP, and Modbus RTU
- Built-in real-time clock
- Esthetically structured cabling

## TECHNICAL CHARACTERISTICS

| DESCRIPTION | | VAV14-IP |
|---|---|---|
| Power supply | Voltage | DC: 24 V ± 20%, 7 W; AC: 24 V ± 20%, 18 VA |
| Universal inputs | Number of inputs | 4 |
| | Voltage input | Voltage measurement: 0-10 V DC<br>Input impedance: 100 kΩ<br>Measurement accuracy: ±0.1%<br>Measurement resolution: 3 mV at 12-bit and 1 mV at 16-bit |
| | Current input | Current measurement: 0-20 mA<br>Required external resistor: 200 Ω<br>Measurement accuracy: ±1.1%<br>Measurement resolution: 15 µA at 12-bit and 5 µA at 16-bit |
| | Digital input | Output current ~1 mA |
| | Resistance input | Measurement of resistance: 0-1000 kΩ<br>Measurement resolution for 20 kΩ load: 20 Ω at 12-bit and 1 Ω at 16-bit<br>Measurement resolution for PT1000 and NI1000: 0.1 Ω at 16-bit<br>Resistance measurement method: voltage divider |
| Universal inputs | Temperature input | Measurement with RTDs (resistance temperature detectors)<br>Accuracy: ±0.1℃<br>The PT1000 and NI1000 sensors use 16-bit resolution |
| | Measurement resolution | 12-bit (default), 16-bit |
| | Processing time | 10 ms/channel at 12-bit<br>140 ms/channel at 16-bit |

The performances stated in this sheet can be modified without any prior notice.

| DESCRIPTION | | VAV14-IP |
|---|---|---|
| Digital inputs | Number of inputs | 2 |
| | Type | Dry contact or fast pulse counter (saved on SD card) |
| | Maximum input frequency | 100 Hz |
| Analog outputs | Number of outputs | 3 |
| | Voltage range | 0-10 V DC |
| | Maximum load current | 20 mA |
| | PWM | 0.01 Hz, 0.1 Hz, 1 Hz, 10 Hz, 100 Hz |
| | Resolution | 12-bit |
| | Accuracy | ±0.5% |
| Triac outputs | Number of outputs | 4 |
| | Load | 0.5 A at 20 V AC up to max. 24 V AC |
| | Peak load per channel | 1.5 A at 20 V AC up to max. 24 V AC (30 s) |
| | Gate control | Zero crossing turn ON |
| | Frequency range | 47 to 63 Hz |
| | Snubber | Snubberless triac |
| Pressure sensor | Pressure range | -500 to 500 Pa (-2 to 2 inWC) |
| | Accuracy | 3% of reading |
| | Zero point accuracy | 0.1 Pa (0.0004 inWC) |
| | Calibration | Air and N2 |
| | Resolution | 16-bit |
| Damper actuator | Torque | 4 Nm (35 in-lb) |
| | Angle of rotation | 95° adjustable |
| | Fits shaft diameter | 8.5 to 18.2 mm (5/16 to 3/4 in) |
| COM1 | RS485 interface | Up to 128 devices |
| | | Half- duplex |
| | Communication protocols | BACnet MS/TP, Modbus RTU |
| | Ports | RJ45 + screw connector |
| | Baud rate | 2400-115200 |
| | Vout | Max. 2.5 W, max. 40 V DC - depends on the input supply voltage<br>23 V DC for 24 V DC input supply voltage<br>33 V DC for 24 V AC input supply voltage |
| ETH1 | Ethernet interface | 2 ports, fail-safe protected |
| | Communication protocols | BACnet IP, Modbus TCP/IP |
| | Baud rate | 10/100 Mb/s |
| USB1 | USB 2.0 | USB type C |
| Ingress protection | IP rating | IP20 for indoor installation |
| Temperature | Storage | -40°C to +85°C (-40°F to 185°F) |
| | Operating | 0°C to +50°C (32°F to 122°F) |
| Humidity | Relative | 0 to 95% RH (without condensation) |
| Screw connectors | Type | Removable screw terminals |
| | Maximum cable size | 2.5 mm$^2$ (18…12 AWG) |
| Housing | Material | Plastic (PC/ABS) |
| | Mounting | Directly on an air duct or in a panel |
| Dimensions | Width | 196.89 mm/7.75 in |
| | Length | 112.61 mm/4.43 in |
| | Height | 77.00 mm/3.00 in |

# WIRING DIAGRAMS
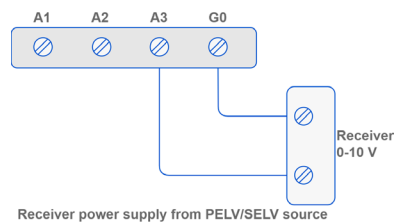
## Power Supply
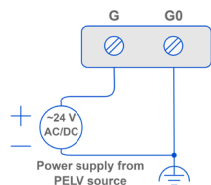


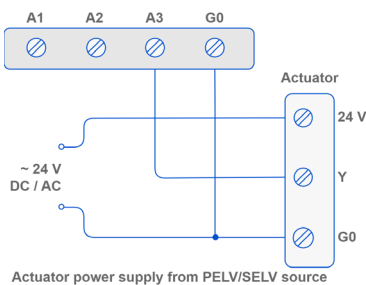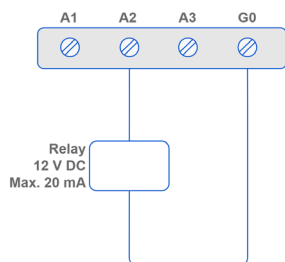## Communication
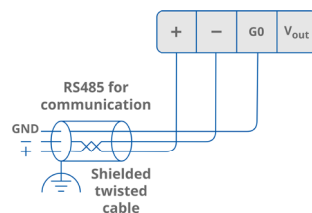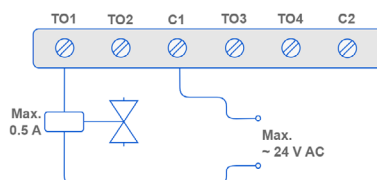


## Universal Inputs
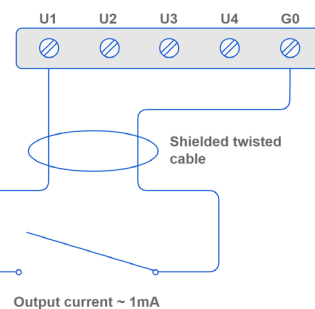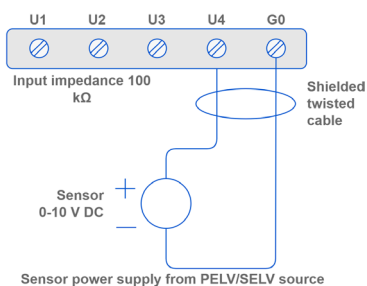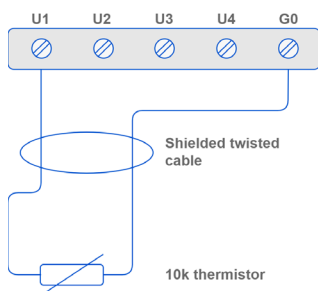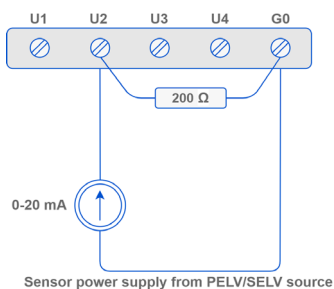


## Digital Inputs
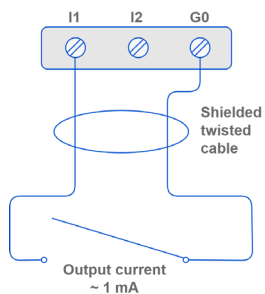


## Analog Outputs



## Triac Outputs



# APPLICATION EXAMPLE
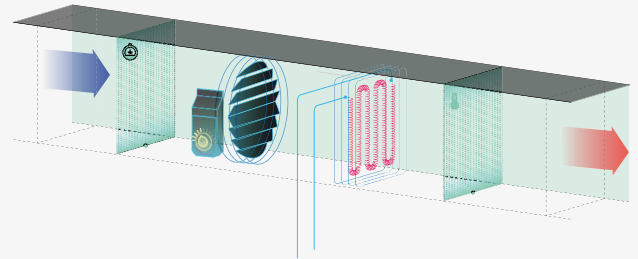
## Configuration options

- VAV cooling
- VAV cooling/heating
- VAV cooling with electric reheater
- VAV cooling with water reheater and optional perimeter
- VAV cooling with 2-stage electric reheater with optional perimeter
- Series fan powered VAV cooling with water reheater and optional perimeter
- Series fan powered VAV cooling with 2-stage electric reheater with optional perimeter
- Parallel fan powered VAV cooling with water reheater and optional perimeter
- Parallel fan powered VAV cooling with 2-stage electric reheater with optional perimeter

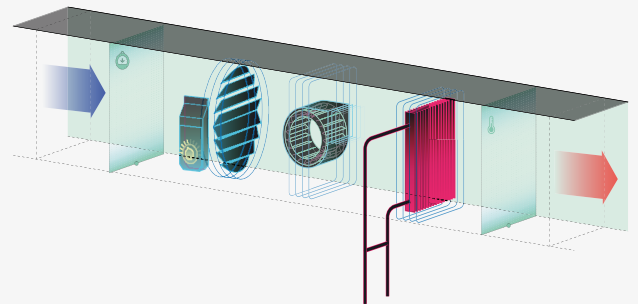**Out-of-the-box support for 216 VAV box types**

VAV cooling
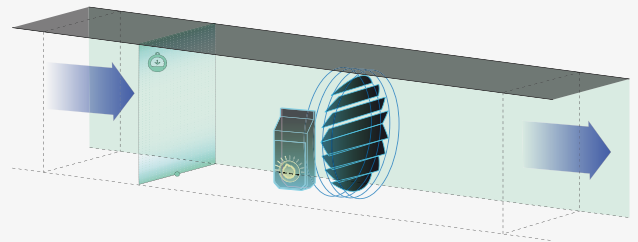
VAV cooling with electrical reheater

Series fan powered VAV cooling with water reheater and optional perimeter

## APPLICATION CONFIGURATION

The VAV application can be configured using a number of convenient methods suited for variuos user requirements:

- DIP switches
- iSMA Configurator
- Control Point VAV panel
- iC Device Manager service for Niagara
- BACnet objects/Modbus registers

### Configuration and balancing tools

iSMA Configurator:
- free of charge
- portable
- communication over BACnet IP

Supported VAV14-IP features:
- VAV application
- Airflow settings
- Balancing

*powered by*
niagara
framework®

iC Device Manager service for Niagara 4:
- free of charge service
- communicates over BACnet IP
- works with iC Workbench and 3rd party Workbench tools

Supported VAV14-IP features:
- VAV application
- Airflow settings
- Balancing

## PROGRAMMING SOFTWARE

Real-time programming - program from scratch or customize the VAV14-IP controller application instantly, in real time, using block programming on a wire sheet.

**iC Tool:**
- free of charge
- easy deployment of large projects using IP manager and Multi Device Manager views

**nE2 Link for Niagara 4:**
- license-free
- Device extension for BACnet and Modbus protocols
- real-time block programming using wire sheet
- complete device management
- supported in Niagara 4.11 and up

## DEDICATED ROOM PANEL - CONTROL POINT VAV

The Control Point VAV is a multiprotocol wall-mounted multisensor with a built-in LCD screen and control buttons for effective comfort management. Together with VAV Controller it allows for optimal operation and plug-and-play installation enabling both commissioning and maintenance savings.

## DIMENSIONS [mm, in]