

UAV0560L with Integrated Actuator

Matrix iS21 is a family of versatile hardware and software products developed and manufactured by Matrix Controls Pte Ltd for HVAC & Lighting controls of Intelligent Building Systems.

Matrix Controls has been a manufacturer of VAV controllers since 1990.

DESCRIPTION

UAV0560L is a LonMark(R) compliant controller designed to communicate on the LonTalk(R) open system using Free Topology non-polarised twisted-pair network.

It is an application specific DDC controller for pressure-independent Variable Air Volume terminal box. A differential pressure pitot tube sensor in the VAV terminal box connected to the hi and lo ports of the on-board differential pressure transducer enables the DDC to measure rate of air flow.

Temperature set-point adjustment and space temperature value can be input to UAV0560L via a wall mount command module or thermostat such as Matrix iS21 SAV2LD, SAV3HD or SAV6H.



FEATURES

- Stand-alone or network operation
- Integrated Actuator, easy one step installation
- Automatic calibration 10mins after AHU provides air (to ensure steady air pressure during calibration) or once per day for continuously operating AHUs
- 5 sensor readings per second, outputs update every second
- Programmable time extension, settable through wall modules SAV2LD or SAV3HD
- On-board differential pressure transducer is detachable for easy maintenance
- Occupancy control by detector or by dry contact switch (on the SAV6H)
- Optional programmable time extension & air quality sensing
- Airflow calculation and control can take into consideration- as an optionally- CO2 and or RH
- Space temperature, temperature set point, date and time of the day is available with use of SAV2LD and SAV3HD command module.

APPLICATIONS

UAV0560L is configurable for the following applications: -

- Cooling only
- Cooling with central heating
- Cooling with 3 stage electric reheat
- Cooling with 3 stage electric reheat and serial fan assist
- Cooling with 3 stage electric reheat and parallel fan assist
- Cooling with hot water reheat
- Cooling with hot water reheat and serial fan assist
- Cooling with hot water reheat and parallel fan assist

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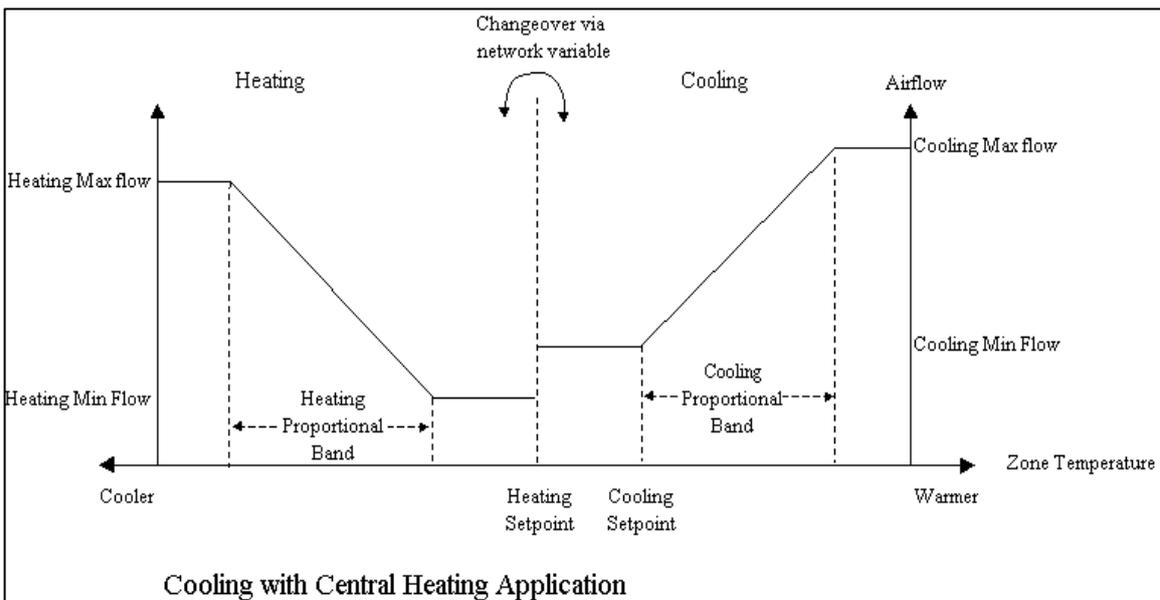
UAV0560L

COOLING ONLY AND COOLING WITH CENTRAL HEATING APPLICATION

In both Cooling only and Cooling with Central Heating Application, UAV0560L performs only the damper positioning to meet the cooling and heating demand.

In Cooling only application, UAV0560L maintains zone temperature at cooling temperature set point by providing a supply of cooled air through PID damper positioning (opens damper to lower zone temperature) and the rate of airflow is between the Cooling Maximum Flow and Cooling Minimum Flow.

In Cooling with Central Heating application, cooling process is identical to cooling only application. However, damper positioning algorithm is reverse that of the cooling process when system changes over from cooling to central heating application upon receipt of network command: - HVAC_HEAT. UAV0560L maintains zone temperature at heating temperature set point by providing a supply of heated air through PID damper positioning (opens damper to increase zone temperature) and the rate of airflow is between the Heating Maximum Flow and Heating Minimum Flow.

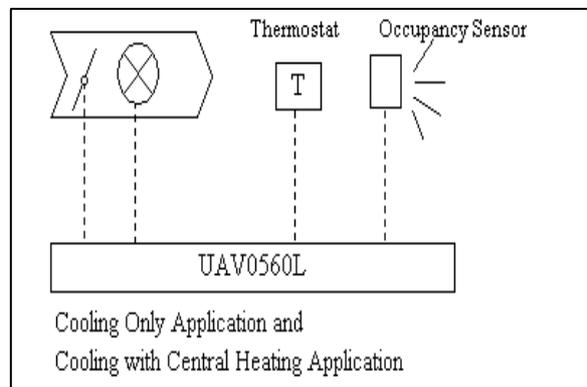


Inputs of UAV0560L

- ❑ One on-board differential pressure transducer.
- ❑ A Precon Type III 10k thermistor point for space temperature.
- ❑ An analog point for temperature setpoint.
- ❑ A digital point for occupancy sensor.
- ❑ Another point is configurable for either an air quality sensor, time extension or smoke sensor.

Outputs of UAV0560L

- ❑ 2 x 24Vac Triac points control of integrated damper



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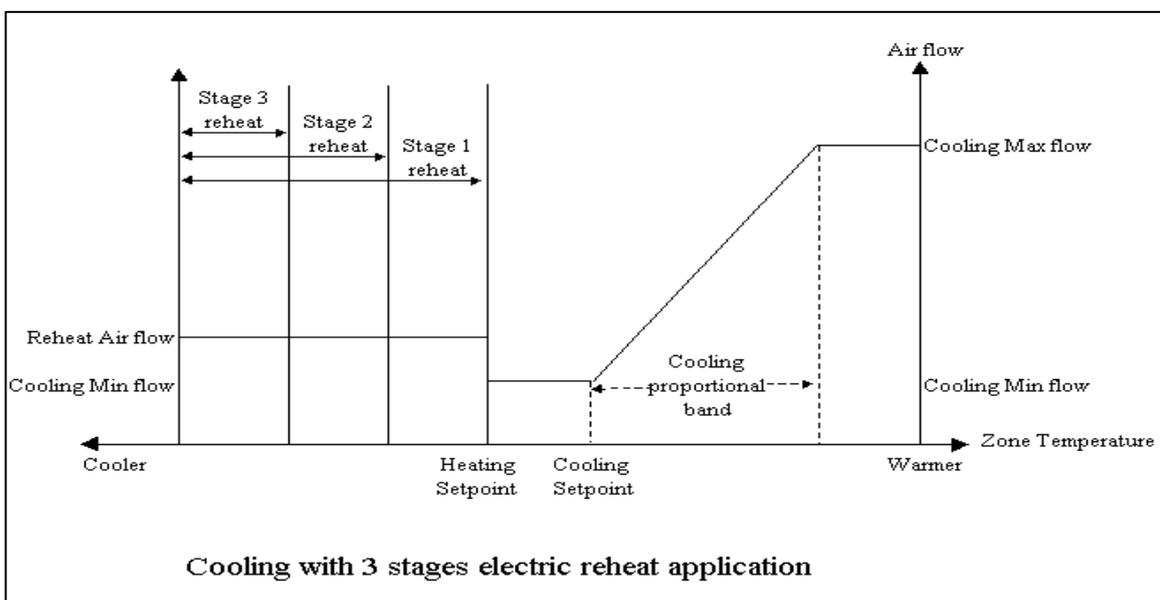
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COOLING WITH 3 STAGE ELECTRIC REHEAT APPLICATION

In Cooling with 3 stage Electric Reheat Application, UAV0560L performs the same cooling process as in other applications. However, heating process begin once zone temperature falls below Heating set point and that the Application Mode is at HVAC_AUTO. UAV0560L starts the electric heating process by raising the rate of airflow to Reheat Airflow and turning on the stage 1 heater.

When zone temperature continues to fall, UAV0560L will turn on the 2nd and then the 3rd heater. Time interval for each stage of heater to turn on is determined by zone temperature and heating set point.

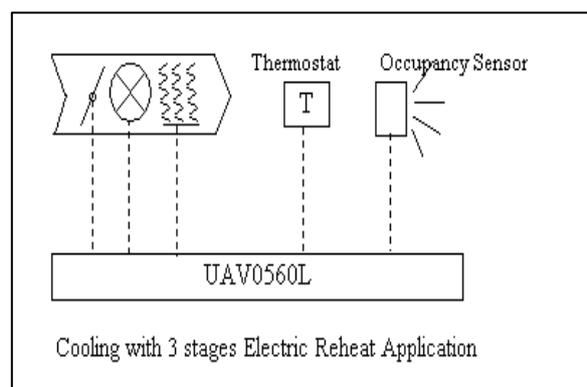


Inputs of UAV0560L

- ❑ One on-board differential pressure transducer.
- ❑ A Precon Type III 10k thermistor point for space temperature.
- ❑ An analog point for temperature set point.
- ❑ A digital point for occupancy sensor.
- ❑ Another point is configurable for either an air quality sensor, time extension or smoke sensor.

Outputs of UAV0560L

- ❑ 2 x 24Vac Triac points control of integrated damper
- ❑ 3 x 24Vac Triac points for electric reheat



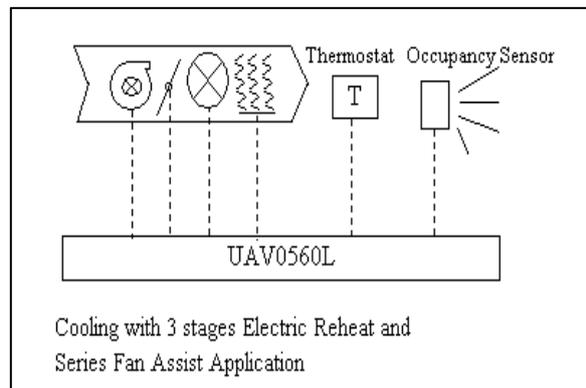
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COOLING WITH 3 STAGE ELECTRIC REHEAT & SERIAL FAN ASSIST APPLICATION

In Cooling with 3 stage Electric Reheat & Serial Fan Assist application, UAV0560L performs the same cooling and heating process as in Cooling with 3 stage Electric Reheat application. The Serial fan will be turn on through occupied and warmup modes and in standby mode when electric heater is turned on.

Inputs of UAV0560L

- ❑ One on-board differential pressure transducer.
- ❑ A Precon Type III 10k thermistor point for zone temperature.
- ❑ An analog point for temperature set point.
- ❑ A digital point for occupancy sensor.
- ❑ Another point is configurable for either an air quality sensor, time extension or smoke sensor.



Outputs of UAV0560L

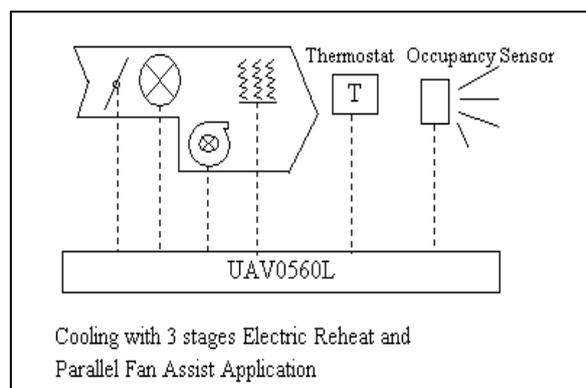
- ❑ 2 x 24Vac Triac points for control of integrated damper
- ❑ 3 x 24Vac Triac points for electric reheat
- ❑ 1 x 24Vac Triac point for serial fan

COOLING WITH 3 STAGE ELECTRIC REHEAT & PARALLEL FAN ASSIST APPLICATION

In Cooling with 3 stage Electric Reheat & Parallel Fan Assist application, UAV0560L performs the same cooling and heating process as in Cooling with 3 stage Electric Reheat application. The parallel fan can either be temperature controlled or flow controlled. For a temperature controlled fan, it will be turned on when electric heater is turned on. A flow controlled fan will turn on when rate of airflow falls below the Flow set point for fan control.

Inputs of UAV0560L

- ❑ One on-board differential pressure transducer.
- ❑ A Precon Type III 10k thermistor point for zone temperature.
- ❑ An analog point for temperature set point.
- ❑ A digital point for occupancy sensor.
- ❑ Another point is configurable for either an air quality sensor, time extension or smoke sensor.



Outputs of UAV0560L

- ❑ 2 x 24Vac Triac points for control of integrated damper
- ❑ 3 x 24Vac Triac points for electric reheat
- ❑ 1 x 24Vac Triac point for parallel fan

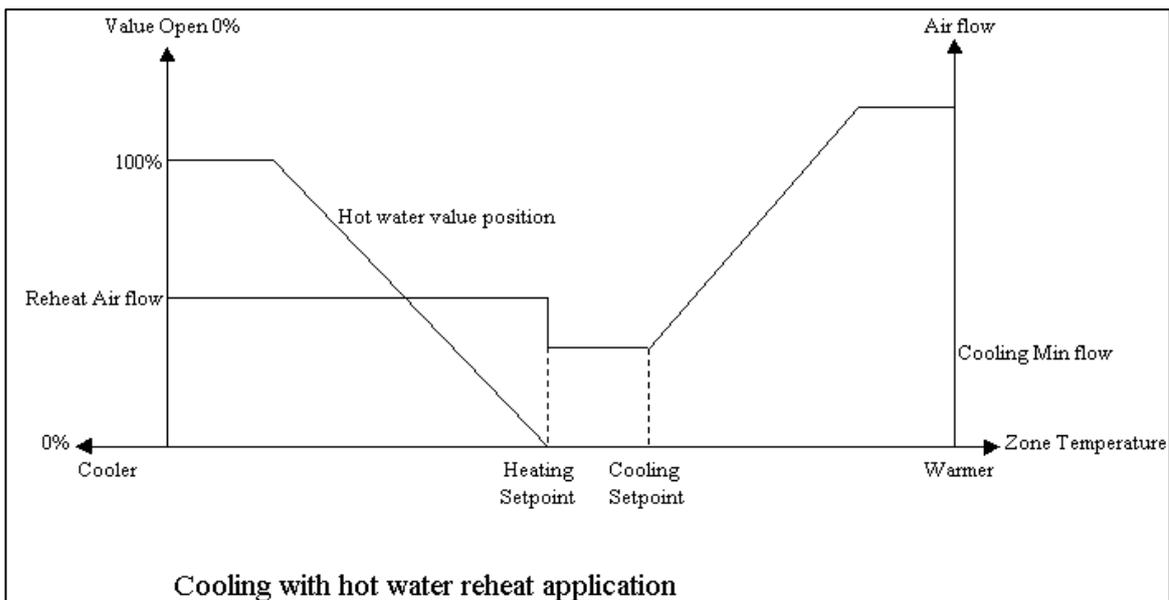
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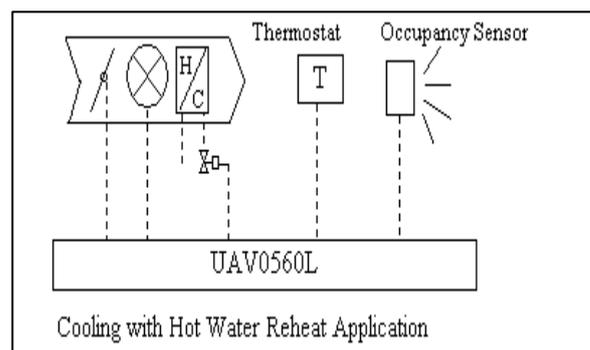
COOLING WITH HOT WATER REHEAT APPLICATION

Cooling with Hot Water Reheat application has the same cooling & heating process as the Cooling with 3 Stage Electric Reheat application except for one difference. Instead of turning on the electric heater in 3 stages during the heating process, UAV0560L will raise the rate of airflow to Reheat Airflow and adjusting the hot water valve opening according to zone temperature.



Inputs of UAV0560L

- ❑ One on-board differential pressure transducer.
- ❑ A Precon Type III 10k thermistor point for zone temperature.
- ❑ An analog point for temperature set point.
- ❑ A digital point for occupancy sensor.
- ❑ Another point is configurable for either an air quality sensor, time extension or smoke sensor.



Outputs of UAV0560L

- ❑ 2 x 24Vac Triac points for damper control
- ❑ 1 x 24Vac Triac point or 2 x 24Vac Triac points for hot water valve

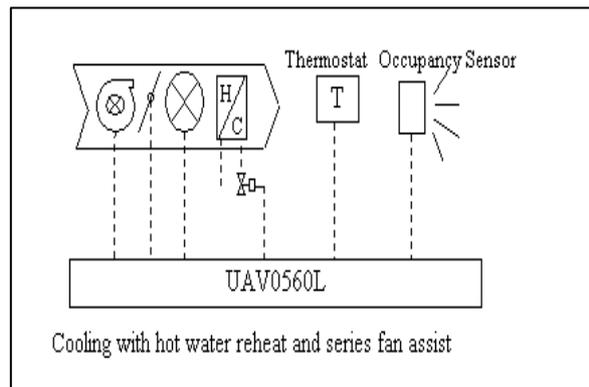
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COOLING WITH HOT WATER REHEAT & SERIAL FAN ASSIST APPLICATION

In Cooling with Hot Water Reheat & Serial Fan Assist application, UAV0560L performs the same cooling and heating process as in Cooling with Hot Water Reheat application. The Serial fan will be turn on through out occupied and warmup modes, and in standby mode when hot water valve is opened.

Inputs of UAV0560L

- ❑ One on-board differential pressure transducer.
- ❑ A Precon Type III 10k thermistor point for zone temperature.
- ❑ An analog point for temperature set point.
- ❑ A digital point for occupancy sensor.
- ❑ Another point is configurable for either an air quality sensor, time extension or smoke sensor.



Outputs of UAV0560L

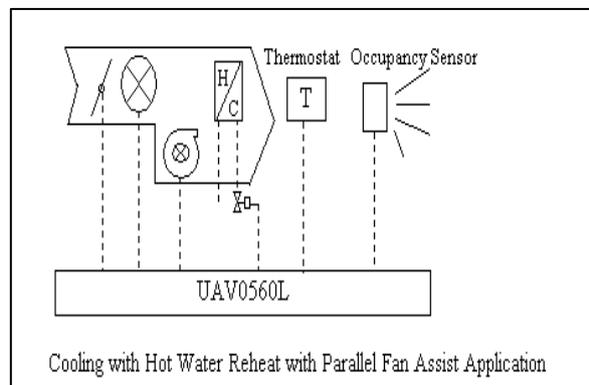
- ❑ 2 x 24Vac Triac points for damper control
- ❑ 1 x 24Vac Triac point for serial fan
- ❑ 1 x 24Vac Triac point or 2 x 24Vac Triac points for hot water valve

COOLING WITH HOT WATER REHEAT & PARALLEL FAN ASSIST APPLICATION

In Cooling with Hot Water Reheat & Parallel Fan Assist application, UAV0560L performs the same cooling and heating process as in Cooling with Hot Water Reheat application. The parallel fan can either be temperature controlled or flow controlled. For a temperature controlled fan, it will be turned on when hot water valve is being opened. A flow controlled fan will turn on when rate of airflow falls below the Flow set point for fan control.

Inputs of UAV0560L

- ❑ One on-board differential pressure transducer.
- ❑ A Precon Type III 10k thermistor point for zone temperature.
- ❑ An analog point for temperature set point.
- ❑ A digital point for occupancy sensor.
- ❑ Another point can be configured for air quality sensor, time extension or smoke sensor.



Outputs of UAV0560L

- ❑ 2 x 24Vac Triac points for damper control
- ❑ 1 x 24Vac Triac point for parallel fan
- ❑ 1 x 24Vac Triac point or 2 x 24Vac Triac points for hot water valve

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AIR QUALITY CONTROL APPLICATION

UAV0560L is able to perform air quality control with LonTalk(R) Carbon dioxide sensor on the network by controlling the supply of fresh air into the controlled zone. When carbon dioxide concentration is high, UAV0560L causes the damper to open for more air to flow into the zone.

OCCUPANCY MODES

Occupied Mode provides zone control for that time of the day when a particular zone is occupied by people and needs to have its zone temperature controlled within comfortable limits.

Standby Mode is for that time of the day when a particular zone is not occupied by people and does not need the cooling or heating to be controlled as close to the set point as defined for occupied mode. In standby mode, the cooling set point is set to a higher temperature and the heating set point is set back to a lower temperature.

Bypass Mode is activated when the time extension button or timer on the thermostat is set. The controller in **Standby Mode** will then go into **Bypass Mode**. **Bypass mode** will end when timer counts down to zero and the controller goes back to **Standby Mode**.

Unoccupied Mode is used when a particular zone is not in used for a long period of time. When the controller is set to **Unoccupied Mode**, it will not perform any control and the damper will be fully closed.

APPLICATION MODES

An air handler controller or any other supervisory controller or intelligent interface device can command UAV0560L to operate in various application modes using the network variable: "nviApplicMode".

Auto Mode: This mode allows UAV0560L controller to perform heating or cooling process according to the demands of the zone. It allows the controller to change from heating to cooling process when the zone temperature rises above the cooling set point, and to change from cooling to heating process when the zone temperature falls below the heating set point. This is applicable to all configuration types except for Cooling with Central Heating where the **Auto Mode** only allows changing from heating to cooling. In this configuration type, UAV0560L will switch from cooling to heating only when the received "nviApplicMode" value is HVAC_HEAT.

Heat Mode: This mode will force UAV0560L controller to perform the heating process, whether it is electric reheat, hot water reheat or central heating dependent upon the configuration types.

Cool Mode: In this mode, the controller will perform only the cooling process and will maintain the rate of airflow at Cooling Minimum flow as the zone temperature continues to drop.

Morning Warm-up Mode: This mode will bring the zone temperature closer to the occupied set point before the occupied time.

Night Purge Mode: In this mode, the controller will open the damper to maximum position to allow the zone to be cooled by outside air.

EMERGENCY MODE

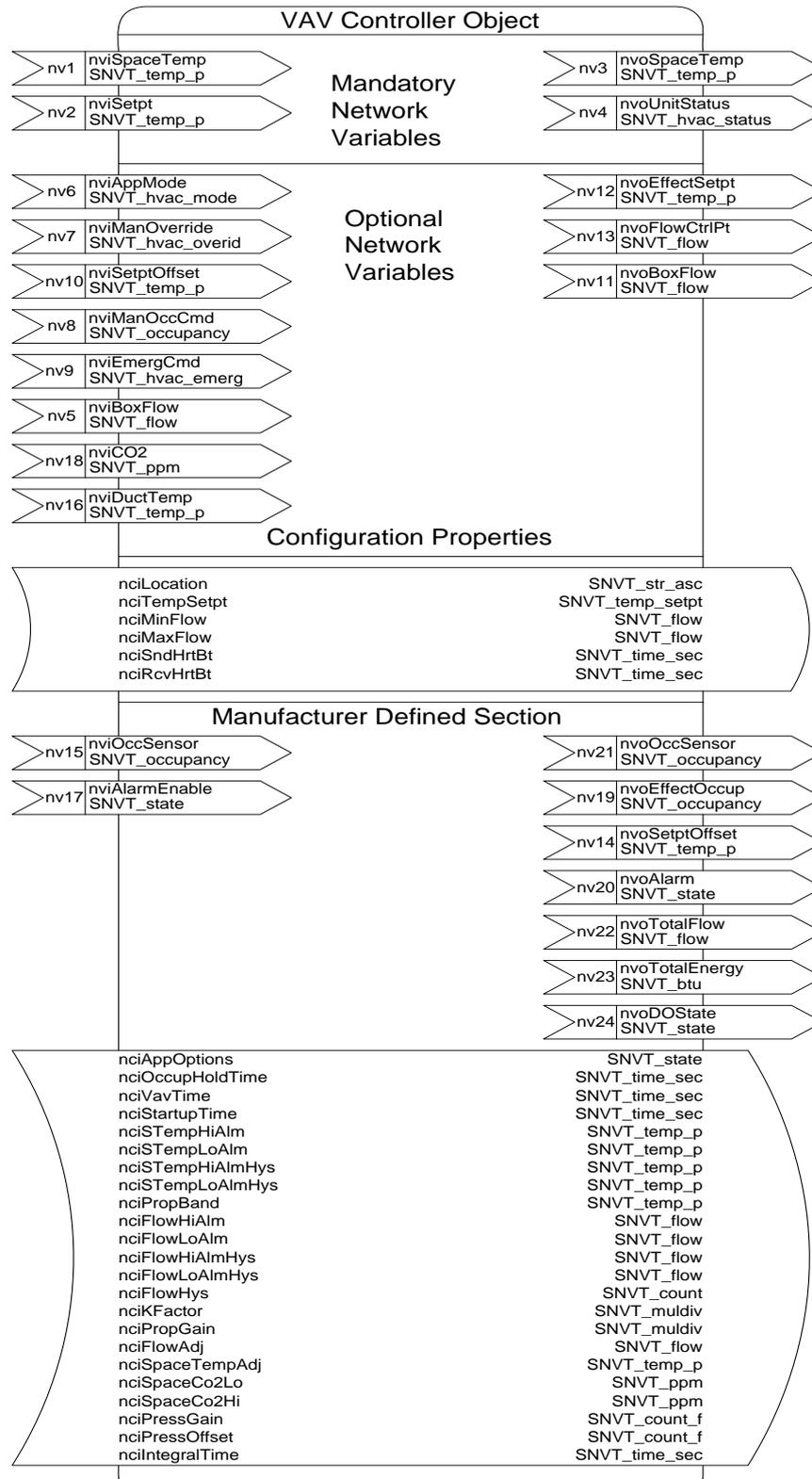
In the event of an emergency, a supervisory mode can command the UAV0560L to perform various emergency mode operations such as pressurization, depressurization, smoke purge and shutdown.

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LONMARK OBJECTS AND NETWORK VARIABLES



Matrix iS21 VAV Controller



UAV0560L

SPECIFICATIONS

Supply

- ❑ 24VAC +/- 5%, 50-60Hz
- ❑ Power consumption: < 7.0 VA

Communication Channel

- ❑ FT/TP - 78.6kbps

Neuron Type

- ❑ FT3150, 10MHz

Transceiver

- ❑ FT-X1

LonMark(R) Version

- ❑ 3.2

Communication protocol

- ❑ LonTalk(R)

Conformance to CE standards

- ❑ Emission ----- EN50081-1
- ❑ Immunity ----- EN50082-1

Size & Weight

- ❑ 190 x 145 x 70 mm
- ❑ 1100 gm

Operating Environment

- ❑ 0 to 50 degrees Celsius
- ❑ 0 to 95% RH (non-condensing)

Interoperability Conformance

- ❑ LonMark Interoperability Guidelines
- ❑ LonMark object profile # 8010

Airflow sensor

- ❑ Ceramic Diaphragm
- ❑ 0-3 mBar differential pressure designed range

Actuator

- ❑ 6Nm rated torque
- ❑ 90 sec travel time for 90 degrees movement
- ❑ Adjustable mechanical stops

Notes: Specifications subject to change during product improvement/update

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