

# **Infilex™ VC for LonTalk® Protocol**

## **LONMARK® Functional Profile: VAV Controller (VAV)**

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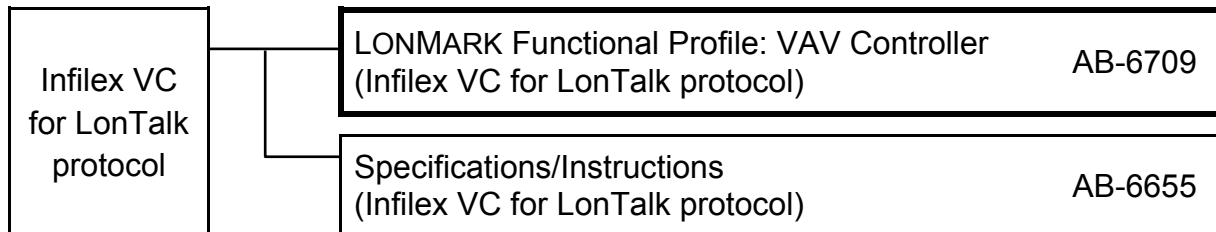
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# Introduction

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This manual describes the network profile (network variables and configuration properties) of Infilex™ VC for LonTalk® protocol.

## **Manual Usage**



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# 1. Input Network Variables

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## 1.1 Space Temperature Input

This input network variable is used to receive space temperature (room temperature) from another device via the network.

- Variable name: nviSpaceTemp
- SNVT type: SNVT\_temp\_p
- Valid range: -10.00 °C to 50.00 °C
- Default value: 327.67 °C (invalid value)  
This value is adopted at power-up.
- Updating process: In case of not receiving an update within the specified receive heartbeat time (nciRcvHrtBt), nviSpaceTemp changes to the default value.

Notes:

- \* When nviSpaceTemp value is valid, this variable is handled as space temperature.
- \* When nviSpaceTemp value is invalid, the value input from the temperature sensor (or from the sensor inside of the user terminal) is handled as space temperature.

## 1.2 Temperature Setpoint Input

This input network variable is used to receive temperature setpoint from another device via the network.

- Variable name: nviSetPoint
- SNVT type: SNVT\_temp\_p
- Valid range: -10.00 °C to 35.00 °C
- Default value: 327.67 °C (invalid value)  
This value is adopted at power-up.
- Updating process: nviSetPoint does not receive update based on the receive heartbeat time (nciRcvHrtBt).

Notes:

- \* When nviSetPoint value is valid,  
Cooling setpoint =  $nviSetPoint + (nciSetPnts.occupied\_cool - nciSetPnts.occupied\_heat) / 2$   
Heating setpoint =  $nviSetPoint - (nciSetPnts.occupied\_cool - nciSetPnts.occupied\_heat) / 2$
- \* When nviSetPoint value is invalid, nciSetPnts.occupied\_cool value is handled as cooling setpoint, and nciSetPnts.occupied\_heat value is handled as heating setpoint.

### 1.3 Application Mode Input

This input network variable is used to switch over the VAV unit operation modes from another device via the network.

- Variable name: nviApplicMode
- SNVT type: SNVT\_hvac\_mode
- Valid range: 0: HVAC\_AUTO (Switches to automatic cooling/heating changeover mode)  
1: HVAC\_HEAT (Switches to heating mode.)  
3: HVAC\_COOL (Switches to cooling mode.)  
9: HVAC\_FAN\_ONLY (Switches to fan mode.)
- Default value: HVAC\_AUTO
- Updating process: In case of not receiving an update within the specified receive heartbeat time (nciRcvHrtBt), nviApplicMode changes to the default value.

Notes:

- \* When nciVavAux.VavAux05 is set to 0 (nciVavAux.VavAux05 = 0), nviOccCmd turns on and off the VAV unit.
  - \* When nciVavAux.VavAux05 is set to 1 (nciVavAux.VavAux05 = 1), nviApplicMode can turn on and off the VAV unit.
- Each input value in this case corresponds to the operations as follows.
- HVAC\_AUTO: Automatic cooling/heating changeover operation
  - HVAC\_HEAT: Heating mode operation
  - HVAC\_COOL: Cooling mode operation
  - HVAC\_OFF: OFF

### 1.4 VAV Manual Override Input

This input network variable is used to forcibly control the flow and damper position with another device in manual mode via the network.

- Variable name: nviManOverride
- SNVT type: SNVT\_hvac\_overid
- SNVT configuration: Refer to the table below.

Data item	Description	Range	Default value
state	No manual override	0:HVO_OFF	HVO_OFF
	Controls flow to the value in the flow field.	2:HVO_FLOW_VALUE	
	Controls flow to the value calculated from value in the percent field.	3:HVO_FLOW_PERCENT	
	Fully opens the damper.	4:HVO_OPEN	
	Fully closes the damper.	5:HVO_CLOSE	
	Controls flow to the minimum flow limit.	6:HVO_MINIMUM	
	Controls flow to the maximum flow limit.	7:HVO_MAXIMUM	
percent		0 % to 100 %, 7FFF (invalid)	0
flow		0 l/s to 65535 l/s, FFFF (invalid)	0

- Updating process: nviManOverride does not receive update based on the receive heartbeat time (nciRcvHrtBt).

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## 1.5 Occupancy Input

This input network variable is used to turn on/off VAV unit from another device via the network.

- Variable name: nviOccCmd
- SNVT type: SNVT\_occupancy
- Valid range: 0: OC\_OCCUPIED (ON)  
1: OC\_UNOCCUPIED (OFF)  
3: OC\_STANDBY (Setback operation)
- Default value: OC\_NUL
- Updating process: nviOccCmd does not receive update based on the receive heartbeat time (nciRcvHrtBt).

## 1.6 Fan ON/OFF Command Input

This input network variable is used to receive fan ON/OFF command from another device via the network. Fan is thus forcibly turned on and off with this input network variable.

- Variable name: nviFanSpeedCmd
- SNVT type: SNVT\_switch
- Valid range: value = 0.0 % to 100.0 %  
state = 0 to 1, 0xFF

nviFanSpeedCmd.state	nviFanSpeedCmd.value	Operation
FF	—	Fan forced ON/OFF cancel
00	—	Fan forced OFF
01	0 (0.0 %)	Fan forced OFF
01	1 to 255 (0.5 % to 100.0 %)	Fan forced ON

- Default value: value = 0.0 %  
state = 0xFF (automatic control)
- Updating process: nviFanSpeedCmd does not receive update based on the receive heartbeat time (nciRcvHrtBt).

## 1.7 Heater Override Input

This input network variable is used to receive override of the heater control (that enables/disables heater control) from another device via the network.

- Variable name: nviHeaterOverid
- SNVT type: SNVT\_switch
- Valid range: value = 0.0 % to 100.0 %  
state = 0 to 1, 0xFF

nviHeaterOverid.state	nviHeaterOverid.value	Operation
FF	—	Hot water supplied (Heater control enabled)
00	—	Hot water supplied (Heater control enabled)
01	0 (0.0 %)	Hot water supplied (Heater control enabled)
01	1 to 255 (0.5 % to 100.0 %)	Hot water unsupplied (Heater control disabled)

- Default value: value = 100.0 %  
state = 1 (Hot water unsupplied (heater control disabled))
- Updating process: nviHeaterOverid does not receive update based on the receive heartbeat time (nciRcvHrtBt).

## 1.8 Duct Inlet Temperature Input

This input network variable is used to receive AHU supply air temperature from another device via the network.

- Variable name: nviDuctInTemp
- SNVT type: SNVT\_temp\_p
- Valid range: -10.00 °C to 35.00 °C
- Default value: 327.67 °C (invalid value)  
This value is adopted at power-up.
- Updating process: In case of not receiving an update within the specified receive heartbeat time (nciRcvHrtBt), nviDuctInTemp changes to the default value.

## 1.9 Outdoor Temperature Input

This input network variable is used to receive the outdoor temperature from another device via the network and to indicate the value (outdoor temperature) on the user terminal display connected to Inflex VC.

- Variable name: nviOutdoorTemp
- SNVT type: SNVT\_temp\_p
- Valid range: -99.9 °C to 99.9 °C
- Default value: 327.67 °C (invalid value)  
This value is adopted at power-up.
- Updating process: In case of not receiving an update within the specified receive heartbeat time (nciRcvHrtBt), nviOutdoorTemp changes to the default value.

## 1.10 Rainfall Information Input

This input network variable is used to receive the rainfall information from another device via the network and to indicate rain on the user terminal display connected to Inflex VC.

- Variable name: nviRainState
- SNVT type: SNVT\_switch
- Valid range: value = 0.0 % to 100.0 %  
state = 0 to 1, 0xFF

nviRainState.state	nviRainState.value	Indication
FF	—	Indicator (umbrella symbol) OFF
00	—	Indicator (umbrella symbol) OFF
01	0 (0.0 %)	Indicator (umbrella symbol) OFF
01	1 to 255 (0.5 % to 100.0 %)	Indicator (umbrella symbol) ON

- Default value: value = 0.0 %  
state = 0xFF
- Updating process: nviRainState does not receive update based on the receive heartbeat time (nciRcvHrtBt).

## 1.11 AHU Operating State Input

This input network variable is used to receive AHU ON/OFF state from another device via the network and to specify the damper position.

- Variable name: nviAHUState
- SNVT type: SNVT\_switch
- Valid range: value = 0.0 % to 100.0 %  
state = 0 to 1, 0xFF

nviRainState.state	nviRainState.value	Operation
FF	—	AHU ON
00	—	AHU OFF
01	0 (0.0 %)	AHU OFF
01	1 to 255 (0.5 % to 100.0 %)	AHU ON

- Default value: value = 0.0 %  
state = 0xFF (AHU operation)
- Updating process: nviAHUState does not receive update based on the receive heartbeat time (nciRcvHrtBt).

## 1.12 Airflow Setpoint Input

This input network variable is used to receive airflow setpoint from another device via the network. This input network variable can be used to receive the airflow setpoint from another Inflex VC (master) for interlock control as well.

- Variable name: nviAirFlowSetPt
- SNVT type: SNVT\_flow
- Valid range: 0 l/s to 65535 l/s (65535 l/s is invalid.)
- Default value: 65535 (invalid)
- Updating process: nviAirFlowSetPt does not receive update based on the receive heartbeat time (nciRcvHrtBt).

\* Note: To use this input network variable, be sure to set the Inflex VC application of the basic parameters (nciParaVAV11.VavMisc02) to 'temperature control as interlocked VAV controller (1)'.

## 1.13 Reheater Forced Operation

This input network variable is used to receive reheat forced ON/OFF command from another device via the network.

- Variable name: nviReheatCmd
- SNVT type: SNVT\_switch
- Valid range: value = 0.0 % to 100.0 %  
state = 0 to 1, 0xFF

nviReheatCmd.state	nviReheatCmd.value	Operation
FF	—	Reheater forced ON/OFF cancel
00	—	Reheater forced OFF
01	0 (0.0 %)	Reheater forced OFF
01	1 to 255 (0.5 % to 100.0 %)	Reheater forced ON

- Default value: value = 0.0 %  
state = 0xFF (Automatic control)
- Updating process: nviReheaterCmd does not receive update based on the receive heartbeat time (nciRcvHrtBt).

\* Note: This input network variable does not function with the reheater type 'any' of the application/control parameters (nciParaVav01).

## 1.14 Forced Control Command Input

This input network variable is used to receive the VAV damper forced open/close command from another device via the network.

- Variable name: nviOpeVav1
- UNVT type: UNVT\_ope\_vav1
- Valid range: 7: OP\_DAMP\_OPEN (forcibly opens the damper.)  
8: OP\_DAMP\_CLOSE (forcibly closes the damper.)  
9: OP\_DAMP\_STOP (forcibly stops the damper operation.)  
10: OP\_DAMP\_AUTO (automatically controls the damper.)
- Default value: OP\_NUL
- Updating process: nviOpeVav1 does not receive update based on the receive heartbeat time (nciRcvHrtBt).

## 2. Output Network Variables

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### 2.1 Space Temperature Output

This output network variable is used to send space temperature (room temperature) to another device via the network.

- Variable name: nvoSpaceTemp
- SNVT type: SNVT\_temp\_p
- Valid range: 0.00 °C to 50.00 °C
- Default value: 327.67 °C (invalid value)  
This value is adopted at power-up.
- Transmitting process: In case of nvoSpaceTemp not being updated within the specified send heartbeat time (nciSndHrtBt), the current nvoSpaceTemp value will be sent again. Note that nvoSpaceTemp is not updated within the minimum send time (nciMinOutTm).  
When output value has yy °C or more changed from the current nvoSpaceTemp value, nvoSpaceTemp is updated and then sent. (yy = the value specified by nciCovPara.SpaceTempMinDlt)  
If nciCovPara.SpaceTempMinDlt is 0, the current nvoSpaceTemp value different from the output value is updated and then sent.

### 2.2 Unit Status Output

This output network variable is used to send the object (unit) status to another device via the network.

- Variable name: nvoUnitStatus
- SNVT type: SNVT\_hvac\_status
- Valid range: nvoUnitStatus.OpMode  
1: HVAC\_HEAT (Heating mode ON)  
3: HVAC\_COOL (Cooling mode ON)  
6: HVAC\_OFF (OFF)  
9: HVAC\_FAN\_ONLY (Fan ON)  
nvoUnitStatus.in\_alarm  
0: VAV unit normal  
1: VAV unit error  
Other enumerations are not used.
- Default value: HVAC\_OFF, 0 (VAV unit normal)
- Transmitting process: nvoUnitStatus is updated when the value has changed. In case of nvoUnitStatus not being updated within the specified send heartbeat time (nciSndHrtBt), the current nvoUnitStatus will be sent again. Note that nvoUnitStatus is not updated within the minimum send time (nciMinOutTm).

## 2.3 Effective Setpoint Output

This output network variable is used to send temperature setpoint (for temperature control) to another device via the network.

- Variable name: nvoEffectSetPt
- SNVT type: SNVT\_temp\_p
- Valid range: 10.00 °C to 35.00 °C (327.67 °C is invalid.)
- Default value: 0.0 °C  
This value is adopted at power-up.
- Transmitting process: In case of nvoEffectSetPt not being updated within the specified send heartbeat time (nciSndHrtBt), the current nvoEffectSetPt value will be sent. Note that nvoEffectSetPt is not updated within the minimum send time (nciMinOutTm).  
When output value has yy °C or more changed from the current nvoEffectSetPt value, nvoEffectSetPt is updated and then sent.  
(yy = the value specified by nciCovPara.EffectSetPtMinDlt)  
If nciCovPara.EffectSetPtMinDlt is 0, the current nvoEffectSetPt value different from the output value is updated and then sent.

## 2.4 Airflow Setpoint Output

This output network variable is used to send airflow setpoint to another device via the network.

- Variable name: nvoFlowControlPt
- SNVT type: SNVT\_flow
- Valid range: 0 l/s to 65535 l/s (65535 l/s is invalid.)
- Default value: 0 l/s  
This value is adopted at power-up.
- Transmitting process: In case of nvoFlowControlPt not being updated within the specified send heartbeat time (nciSndHrtBt), the current nvoFlowControlPt value will be sent. Note that nvoFlowControlPt is not updated within the minimum send time (nciMinOutTm).  
When output value has yy °C or more changed from the current nvoFlowControlPt value, nvoFlowControlPt is updated and then sent.  
(yy = the value specified by nciCovPara.FlowContPtMinDlt)  
If nciCovPara.FlowContPtMinDlt is 0, the current nvoFlowcontrolPt value different from the output value is updated and then sent.

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## 2.5 Box Flow Output

This output network variable is used to send the measured flow of VAV unit to another device via the network.

- Variable name: nvoBoxFlow
  - SNVT type: SNVT\_flow
  - Valid range: 0 l/s to 65535 l/s (65535 l/s is invalid.)
  - Default value: 0 l/s
- This value is adopted at power-up.
- Transmitting process: In case of nvoBoxFlow not being updated within the specified send heartbeat time (nciSndHrtBt), the current nvoBoxFlow value will be sent again. Note that nvoBoxFlow is not updated within the minimum send time (nciMinOutTm).  
When output value has yy% or more changed from the current nvoBoxFlow value, nvoBoxFlow is updated and then sent.  
(yy = the rate specified by nciCovPara.BoxFlowMinDlt)  
If nciCovPara.BoxFlowMinDlt is 0, the current nvoBoxFlow value different from output value is updated and then sent.

## 2.6 Occupancy Output

This output network variable is used to send the actual operating state of VAV unit to another device via the network.

- Variable name: nvoOccCmd
- SNVT type: SNVT\_occupancy
- Valid range: 0: OC\_OCCUPIED (ON)  
1: OC\_UNOCCUPIED (OFF)  
3: OC\_STANDBY (Setback operation)
- Default value: OC\_NUL
- Transmitting process: nvoOccCmd value is updated when the value has changed. In case of nvoOccCmd not being updated within the specified send heartbeat time (nciSndHrtBt), the current nvoOccCmd will be sent again. Note that nvoOccCmd is not updated within the minimum send time (nciMinOutTm).

## 2.7 Static Pressure Excess and Deficiency Output

This output network variable is used to send the static pressure conditions (excess/deficiency) to another device via the network.

- Variable name: nvoStaticPress
- SNVT type: SNVT\_switch
- Valid range: value = 0.0 % to 100.0 %  
state = 0 to 1, 0xFF

Operating state	nvoStaticPress.state	nvoStaticPress.value
Static pressure appropriate	0	0 (0.0 %)
Static pressure deficient	1	100 (50.0 %)
Static pressure excess	1	200 (100.0 %)

- Default value: value = 0  
state = 0
- Updating process: In case of nvoStaticPress not being updated within the specified send heartbeat time (nciSndHrtBt), the current nvoStaticPress value will be sent again. Note that nvoStaticPress is not updated within the nciMinOutTm time.  
If nciCovPara.StaticPMinDIt is 0, the current nvoStaticPress value different from the output value is updated and then sent.  
If, on the other hand, nciCovPara.StaticPMinDIt is 1, nvoStaticPress is not updated.

## 2.8 Control Status Output

This output network variable is used to send control status to another device via the network.

- Variable name: nvoLoadResetSt
- SNVT type: SNVT\_count
- Valid range: 0: FCU OFF or sensor trouble  
1: Request for cooling capacity increase  
2: Appropriate cooling  
3: Minimum flow  
4: Appropriate heating  
5: Request for heating capacity increase  
6: Request for appropriate cooling  
7: Request for appropriate heating
- Default value: 0  
This value is adopted at power-up.
- Transmitting process: In case of nvoLoadResetSt not being updated within the specified send heartbeat time (nciSndHrtBt), the current nvoLoadResetSt value will be sent again. Note that nvoLoadResetSt is not updated within the minimum send time (nciMinOutTm).  
If nciCovPara.LoadResetStMinDIt is 0, the current nvoLoadResetSt value different from the output value is updated and then sent.  
If, on the other hand, nciCovPara.LoadResetStMinDIt is 1, nvoLoadResetSt is not updated.

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## 2.9 Damper Position Output

This output network variable is used to output the value of damper position to another device via the network.

- Variable name: nvoDampPosition
- SNVT type: SNVT\_lev\_percent
- Valid range: 0 % to 100 %
- Default value: 0 %
- Transmitting process: In case of nvoDampPosition not being updated within the specified send heartbeat time (nciSndHrtBt), the current nvoDampPosition value will be sent again. Note that nvoDampPosition is not updated within the minimum send time (nciMinOutTm).  
When output value has yy% or more changed from the current nvoDampPosition value, nvoDampPosition is updated and then sent. (yy = the rate specified by nciCovPara.DampPosiMinDlt)  
If nciCovPara.DampPosiMinDlt is 0, the current nvoDampPosition value different from output value is updated and then sent.

## 2.10 Fan Speed Output

This output network variable is used to send the fan operating state to another device via the network.

- Variable name: nvoFanSpeed
- SNVT type: SNVT\_switch
- Valid range: value = 0.0 % to 100.0 %  
state = 0 to 1

Operating state	nvoFanSpeed.state	nviFanSpeed.value
Fan ON	1	200 (100.0 %)
Fan OFF	0	0 (0.0 %)

- Default value: value = 0  
state = 0
- Updating process: In case of nvoFanSpeed not being updated within the specified send heartbeat time (nciSndHrtBt), the current nvoFanSpeed value will be sent again. Note that nvoCoolOutput is not updated within the nciMinOutTm time.  
If nciCovPara.FanSpeedtMinDlt is 0, the current nvoFanSpeed value different from the output value is updated and then sent.  
If, on the other hand, nciCovPara.FanSpeedMinDlt is 1, nvoFanSpeed is not updated.

## 2.11 Reheater Output

This output network variable is used to send the reheater operating state to another device via the network. Reheater to which this network variable is output is specified by setting the reheater type of the application/control parameter (nciParaVav01).

- Variable name: nvoReheater
- SNVT type: SNVT\_lev\_percent
- Valid range: 0.0 % to 100.0 %

Reheater type	Reheater output	nvoReheater (%)
ON/OFF control type	OFF	0.00
	ON	100.00
2-step control type	OFF	0.00
	LO	50.00
	HI	100.00
Floating proportional control type	0 to 100	0.00 to 100.00

- Default value: 0 %
- Updating process: In case of nvoReheater not being updated within the specified send heartbeat time (nciSndHrtBt), the current nvoReheater value will be sent again. Note that nvoReheater is not updated within the nciMinOutTm time.  
When output value has yy% or more changed from the current nvoReheater value, nvoReheater is updated and then sent. (yy = the rate specified by nciCovPara.ReheatMinDIt)  
If nciCovPara.ReheatMinDIt is 0, the current nvoReheater value different from output value is updated and then sent.

## 2.12 Current VAV Flow Percentage Output

This output network variable is used to send the percentage of the current VAV flow to the maximum flow limit to another device via the network.

- Variable name: nvoFlowSetPt
- SNVT type: SNVT\_lev\_percent
- Valid range: 0.00 % to 100.00 %
- Default value: 0.00  
This value is adopted at power-up.
- Transmitting process: In case of nvoFlowSetPt not being updated within the specified send heartbeat time (nciSndHrtBt), the current nvoFlowSetPt value will be sent again. Note that nvoFlowSetPt is not updated within the minimum send time (nciMinOutTm).  
When output value has yy% or more changed from the current nvoFlowSetPt value, nvoFlowSetPt is updated and then sent. (yy = the rate specified by nciCovPara.FlowSetPtMinDIt)  
If nciCovPara.FlowSetPtMinDIt is 0, the current nvoFlowSetPt value different from output value is updated and then sent.

# 3. Configuration Properties

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## 3.1 Send Heartbeat

This configuration property defines the maximum period of time for output network variables sending an update.

- Variable name: nciSndHrtBt
- SCPT type: SCPTmaxSendTime (49)
- SNVT type: SNVT\_time\_sec
- Valid range: 0.0 to 6553.4 sec
- Default value: 0.0 sec (Automatic update not available.)

## 3.2 Receive Heartbeat

This configuration property defines the maximum period of time for input network variables receiving an update.

- Variable name: nciRcvHrtBt
- SCPT type: SCPTmaxRcvTime (48)
- SNVT type: SNVT\_time\_sec
- Valid range: 0.0 to 6553.4 sec
- Default value: 0.0 sec (Variable receiving error detection not available.)

## 3.3 Minimum Send Time

This configuration property defines the minimum period of time between output network variable transitions.

- Variable name: nciMinOutTm
- SCPT type: SCPTminSendTime (52)
- SNVT type: SNVT\_time\_sec
- Valid range: 0.0 to 6553.4 sec
- Default value: 0.0 sec (Minimum send time control not available.)

## 3.4 Maximum Flow

This configuration property defines the maximum flow for temperature control of VAV unit.

- Variable name: nciMaxFlow
- SCPT type: SCPTmaxFlow (51)
- SNVT type: SNVT\_flow
- Valid range: 0 to 65535 liters/sec
- Default value: 65535 liters/sec

\* Note: Value larger than the 'VAV unit maximum flow' of the flow control parameter (nciParaVav04.VavFlowCtrl101) can not be set.

## 3.5 Minimum Flow

This configuration property defines the minimum flow for temperature control of VAV unit.

- Variable name: nciMinFlow
- SCPT type: SCPTminFlow (54)
- SNVT type: SNVT\_flow
- Valid range: 0 to 65535 liters/sec
- Default value: 65535 liters/sec

\* Note: Value larger than the 'VAV unit maximum flow' of the flow control parameter (nciParaVav04.VavFlowCtrl101) or larger than the maximum flow (nciMaxFlow) can not be set.

### 3.6 Occupancy Temperature Setpoints

This configuration property defines the default occupancy temperature setpoints for heating mode and for cooling mode.

- Variable name: nciSetPnts
- SCPT type: SCPTsetPnts (60)
- SNVT type: SNVT\_temp\_setpt
- SNVT configuration: Refer to the table below.

Data item	Description	Range	Default value
occupied_cool	Cool setting for occupied mode	10.00 °C to 35.00 °C	23.00 °C
standby_cool	Cool setting for standby mode	10.00 °C to 35.00 °C	25.00 °C
unoccupied_cool	Cool setting for unoccupied mode	10.00 °C to 35.00 °C	28.00 °C
occupied_heat	Heat setting for occupied mode	10.00 °C to 35.00 °C	21.00 °C
standby_heat	Heat setting for standby mode	10.00 °C to 35.00 °C	19.00 °C
unoccupied_heat	Heat setting for unoccupied mode	10.00 °C to 35.00 °C	16.00 °C

\* Note: When nviSetPoint value is invalid, the default value shown in the table above is adopted corresponding to its control mode (cool/heat).

### 3.7 Output Network Variables COV

This configuration property defines the rate of change (COV = change of value) between the current and updated output network variables. An updated value that has changed for more than the specified (nciCovPara) is sent.

- Variable name: nciCovPara
- UCPT type: UCPTvavMinDelta3
- UNVT type: UNVT\_v\_min\_delt3
- UNVT configuration: Refer to the table below.

	Data item	Description	Range	Default value
1	(LoadResetType)	Not used.	1 to 5	1
2	SpaceTempMinDIt	COV for nvoSpaceTemp	0.0 °C to 25.5 °C	0.0
3	EffectSPMinDIt	COV for nvoEffectSetPt	0.0 °C to 25.5 °C	0.0
4	FlowContPtMinDIt	COV for nvoFlowControlPt	0 % to 100 %	0
5	BoxFlowMinDIt	COV for nvoBoxFlow	0 % to 100 %	0
6	StaticPMinDIt	COV for nvoStaticPress	0 to 1	0
7	LoadRstStMinDIt	COV for nvoLoadResetSt	0 to 1	0
8	FlowSetPtMinDIt	COV for nvoFlowSetPt	0 % to 100 %	0
9	(SpaceTempMinDIt2)	Not used.	0.0 °C to 25.5 °C	0.0
10	(SpaceRHMinDIt)	Not used.	0 to 1005	0
11	(BatChangeMinDIt)	Not used.	0 to 1	0
12	FanSpeedMinDIt	COV for nvoFanSpeed	0 to 1	0
13	ReheatMinDIt	COV for nvoReheater	0 % to 100 %	0
14	DampPosiMinDIt	COV for nvoDampPosition	0 % to 100 %	0

\* Note: For details regarding COV of the data items 2 to 8 and 12 to 14, refer to the corresponding descriptions in "2. Output Network Variables".

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### 3.8 Basic Parameters

This configuration property defines the Inflex VC applications (Inflex VC applications and temperature sensors to be connected to) necessary for VAV control.

- Variable name: nciParaVav11
- UCPT type: UCPTvavMiscellaneous2
- UNVT type: UNVT\_v\_misc
- UNVT configuration: Refer to the table below.

	Data item	Description	Range	Default value
2	VavMisc02	Inflex VC application	0 to 2	0
4	VavMisc04	Temperature sensor type	0 to 1	0

#### VavMisc02 (Inflex VC application)

VAV controller application is selected from the below.

- 0: Temperature and flow control as default VAV controller  
(Temperature control is applicable.)
- 1: Temperature control as interlocked VAV controller (slave)  
(Flow setpoint is sent from the interlocking VAV controller (master). Temperature control is not applicable.)
- 2: Constant flow control as CAV (constant air volume) controller  
(Temperature control is not applicable.)

#### VavMisc04 (Temperature sensor application type)

Temperature sensor used for temperature control is selected from the below.

- 0: Neosensor (Pt100  $\Omega$ )
- 1: Built-in sensor of the user terminal (Neopanel™)

### 3.9 Application/Control Parameters

This configuration property defines the parameters regarding Inflex VC control and application types.

- Variable name: nciParaVav01
- UCPT type: UCPTvavCtrl3
- UNVT type: UNVT\_v\_ctrl\_typ3
- UNVT configuration: Refer to the table below.

	Data item	Description	Range	Default value
4	VavCtrlType04	Flow for VAV unit OFF	0 % to 101 %	0
5	VavCtrlType05	Damper position for AHU OFF	0 to 1	0
7	VavCtrlType07	Wind speed sensor type	1 to 2	2
8	VavCtrlType08	Fan type	0 to 3	0
9	VavCtrlType09	Reheater type	0 to 12	0

#### VavCtrlType04 (Flow for VAV unit OFF)

When nvoOccCmd is set to OC\_UNOCCUPIED, flow setpoint is set.

- 0 to 100: Flow for VAV unit OFF per maximum flow is set in percentage.
- 101: Flow for VAV unit OFF is set as the minimum flow.

#### VavCtrlType05 (Damper position for AHU OFF)

When nviAHUstate is set to 0, damper position is set.

- 0: Damper fully opens.
- 1: Damper fully closes.

#### VavCtrlType07 (Airflow sensor type)

Airflow sensor type is set.

- 1: Differential pressure sensor built-in the Inflex VC
- 2: External sensor (Pulse input to Inflex VC)

#### VavCtrlType08 (Fan type)

Fan type of VAV unit is set.

- 0: No fan
- 1: Series fan (Fan is ON when VAV unit is ON.)
- 2: Parallel fan (Fan is ON when VAV unit in heating mode is ON.)
- 3: Parallel fan (Fan is ON when VAV unit in heating mode with fan speed set to 'low' is ON.)

#### VavCtrlType09 (Reheater type)

Reheater type of VAV unit is set.

- 0: No reheater
- 1: Hot water heater with ON/OFF valve step 1
- 2: Hot water heater with ON/OFF valve step 2
- 3: Hot water heater with proportional valve
- 11: Electric heater with ON/OFF valve step 1
- 12: Electric heater with ON/OFF valve step 2

\* Note: Parameter other than the above is not used.

### 3.10 Temperature Control Parameters

This configuration property defines the parameters necessary for temperature control.

- Variable name: nciParaVav02
- UCPT type: UCPTvavTempCtrl3
- UNVT type: UNVT\_v\_temp\_ctrl3
- UNVT configuration: Refer to the tables below.

	Data item	Description	Range	Default value
1	VavTempCtrl01	Cooling proportional band	0.1 °C to 25.5 °C	3.0
2	VavTempCtrl02	Heating proportional band	0.1 °C to 25.5 °C	3.0
3	VavTempCtrl03	Cooling integral time	0 min. to 255 min.	15
4	VavTempCtrl04	Heating integral time	0 min. to 255 min.	15
8	VavTempCtrl08	Temperature control dead band	0.0 °C to 25.5 °C	0.2
13	VavTempCtrl13	Step 1 reheater setpoint	1 % to 100 %	33
14	VavTempCtrl14	Step 2 reheater setpoint	1 % to 100 %	66
16	VavTempCtrl16	Reheater differential	1 % to 100 %	10
17	VavTempCtrl17	Fan residual operating time	1 min. to 255 min.	5

VavTempCtrl01 (Cooling proportional band)

Proportional band for cooling operation is set.

VavTempCtrl02 (Heating proportional band)

Proportional band for heating operation is set.

VavTempCtrl03 (Cooling integral time)

Integral time for cooling operation is set.

VavTempCtrl04 (Heating integral time)

Integral time for heating operation is set.

VavTempCtrl08 (Temperature control dead band)

When differential between the actual temperature and temperature setpoint is within the temperature control dead band, PID output is set to 0.

VavTempCtrl13 (Step 1 reheater setpoint)

For VAV unit with reheater, PID output value of the step 1 reheater is set.

VavTempCtrl14 (Step 2 reheater setpoint)

For VAV unit with reheater, PID output value of the step 2 reheater is set.

VavTempCtrl16 (Reheater differential)

For VAV unit with reheater, differential between reheater operations is set.

VavTempCtrl17 (Fan residual operating time)

For VAV unit with reheater and fan, fan residual operating time after the reheater is turned off is set.

\* Note: Parameters other than the above are not used.

### 3.11 Flow Control Parameters

This configuration property defines the parameters necessary for flow control.

- Variable name: nciParaVav04
- UCPT type: UCPTvavFlowCtrl1\_3
- UNVT type: UNVT\_v\_flow\_1\_3
- UNVT configuration: Refer to the table below.

	Data item	Description	Range	Default value
1	VavFlowCtrl101	Maximum flow of VAV unit	0 l/s to 2778	2778
2	VavFlowCtrl102	Flow conversion factor	0.0000 to 0.9999 m <sup>2</sup>	0.1111
3	VavFlowCtrl103	Wind speed conversion factor	5.0 to 1000.0	28.8

#### VavFlowCtrl101 (Maximum flow of VAV unit)

Maximum flow of VAV unit is set.

#### VavFlowCtrl102 (Flow conversion factor)

Conversion factor that calculates box flow (measured flow) based on the wind speed data is set.

#### VavFlowCtrl103 (Wind speed conversion factor)

Conversion factor that calculates wind speed based on the wind speed signal (pulse input) is set.

Notes:

- \* Parameters other than the above are not used.
- \* The above parameters are required if the wind speed sensor type of 'application/control parameters' (nciParaVav02.VavCtrlType07) is set to the external sensor (pulse input to Inflex VC) (2). These parameters are not used if the wind speed sensor type is set to the differential pressure sensor built in Inflex VC (1).

### 3.12 Input/Output Adjustment Parameters

This configuration property defines hot-water reheater valve operating time for one stroke.

- Variable name: nciParaVav07
- UCPT type: UCPTvavAI\_Adjustment3
- UNVT type: UNVT\_v\_ai\_adj3
- UNVT configuration: Refer to the table below.

	Data item	Description	Range	Default value
7	VavAiAdjust07	Reheater valve operating time per stroke	30 to 255 sec.	150

#### FcuAiAdjust02 (Reheater valve operating time per stroke)

Operating time that the reheater valve in fully closed position fully opens.

- \* Note: Parameters other than the above are not used.

### 3.13 Other Parameters

This configuration property defines the parameters necessary for power failure restoration.

- Variable name: nciVavAux
- UCPT type: UCPTvavAux
- UNVT type: UNVT\_v\_aux
- UNVT configuration: Refer to the table below.

	Data item	Description	Range	Default value
1	VavAux01	Output delay time	0 to 255	0
2	VavAux02	Temperature setpoint / control setting	0 to 1	0
3	VavAux03	Unit ON or OFF status after power failure restoration	0 to 3	0
4	FcuAux04	Temperature setpoint after power failure restoration	0 to 1	0
5	FucAux05	VAV unit ON and OFF	0 to 1	0

#### VavAux01 (Output delay time)

To prevent heavy traffic of the communication line after the power failure restoration, a certain time period after the power failure restoration is inserted before the output network variables start to be sent. This time period is set by the parameter VavAux01.

#### VavAux02 (Temperature setpoint/control setting)

Temperature setpoint which is output to the effective setpoint output (nvoEffectSetPt) is selected from the below.

- 0: Temperature setpoint currently used for control  
(e.g., cooling temperature setpoint for cooling operation, heating temperature setpoint for heating operation)
- 1: Temperature operating setpoint  
(e.g., value set for the temperature setpoint input (nviSetPoint), user terminal setpoint)

#### VavAux03 (Unit ON or OFF status after power failure restoration)

Unit operating status after the power failure restoration is selected from the below.

- 0: ON after the power failure restoration
- 2: OFF after the power failure restoration
- 3: Operating status before the power failure is back after the power failure restoration.

#### VavAux04 (Temperature setpoint after power failure restoration)

Temperature setpoint after the power failure restoration is selected from the below.

- 0: Temperature setpoint derived from the occupancy temperature setpoint (nciSetPnts) is set after the power failure restoration.
- 1: Temperature setpoint set before the power failure is back after the power failure restoration.

#### VavAux05 (VAV unit ON and OFF)

Input network variable that turns on and off the VAV unit is selected from the below.

- 0: nviOccCmd (Occupancy input)
- 1: nviApplicMode (Application mode input)









*Specifications are subject to change without notice.*

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