User Manual

LON Valve Actuator SA-22

Art. no. MTN887391

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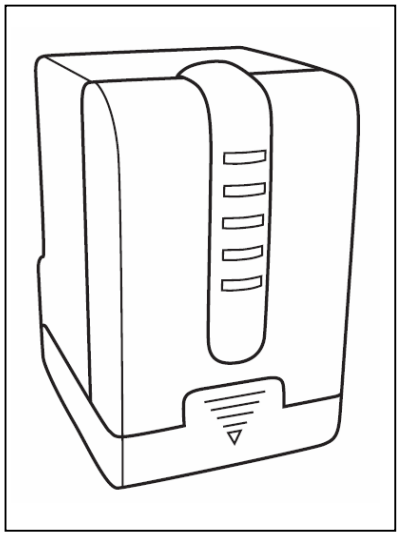
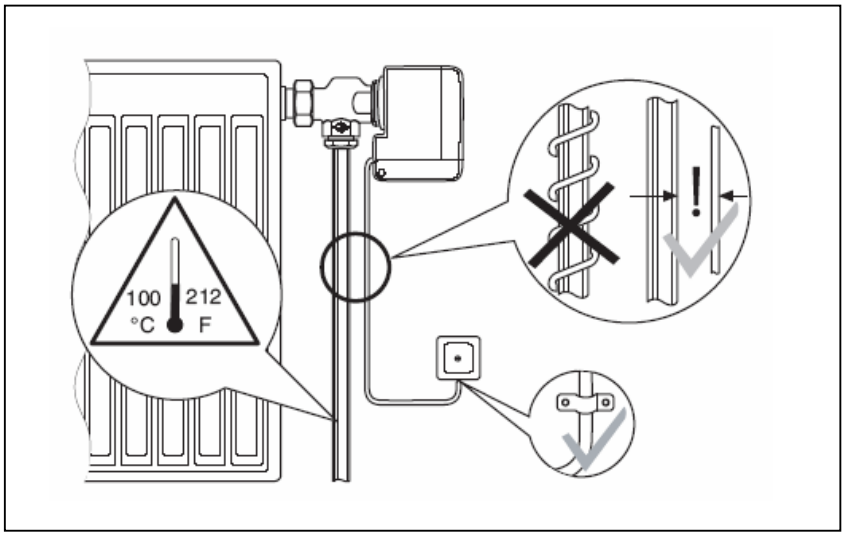
1. Description

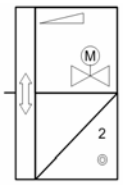




LPT UPI

. • heating and cooling applications
. • two inputs for floating contacts (e. g. for window control, occupancy sensors or
. dewpoint detectors etc.)
. • regular automatic valve adjustment and valve lift detection
. • service pin and service LED
. • status LEDs to indicate the valve lift
. • connection via pre-assembled, fixed cable (approx. 1 m)
. • very low-noise operation
. • mounting on thermostatic valve connection thread M30x1.5
. • dimensions: 82 x 50 x 65 mm (H x W x D)
. • software application for drive control and analysis of the digital input values
. according to the applicable LonMark profiles

2. Function

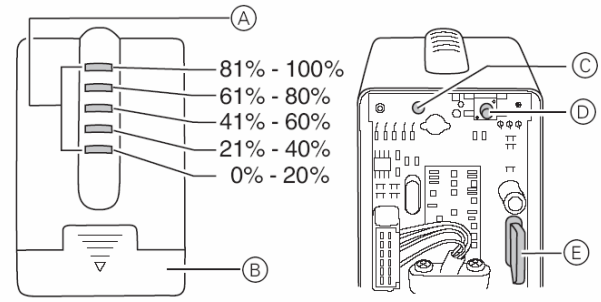


The Valve Actuator is an electro-motive proportional drive with integrated LON interface to control heating and cooling systems. It is suited for room temperature controls with heaters, radiators, convectors, heating circuit dividers for under-floor heating, and so on.

The Valve Actuator works with a mechanical force of up to 120 N and has a stroke of 1 ... 6 mm.

It is based on the LON Link Power Technology and does not require any additional power supply.

The two digital inputs are voltage supplied by the device itself. They can be used to connect floating contacts.



Indicators and operating elements

A LED display of the valve position as a percentage
B Hinged Cover
C Service LED
D Service button
E Locking lever

If the service pin is pressed for more than 10 s and no dew-point alarm is active, then a calibration is released. The lower LED flashes. The device then calibrates itself by driving to the end positions and checking the stroke and the position of the valve. The self-calibration can be executed regularly if necessary.

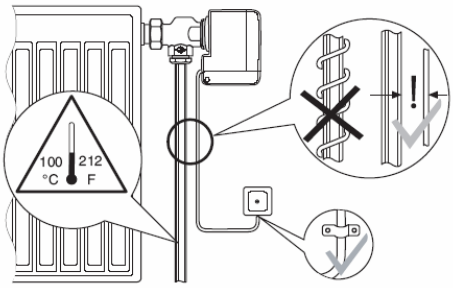
The application software corresponds to the LonMark Interoperability Guidelines.

3. Mounting

The Valve Actuator is mechanically compatible to thermostat-valve bottoms with a screw thread of M30 x 1.5 mm² offered by manufactures such as Braukmann, Danfoss, Heimeier, Honeywell, MNG and Oventrop.
An additional adapter ring is needed for several manufactures.
The software application adjusts the characteristic curve of the valve to the used valve type.
The device is maintenance-free.
Before the commissioning the Valve Actuator has to be mounted on a valve to enable a successful, automatic calibration.
During the commissioning the device executes a network power supply check and then drives to both end positions, lasting around 3 minutes. Thereafter the Valve Actuator drives to the position value being currently requested.

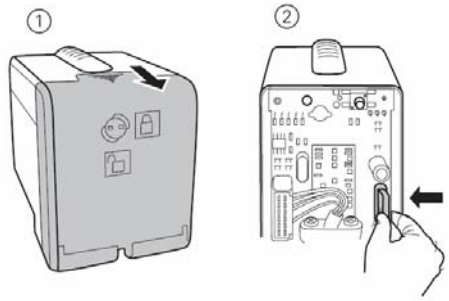
Mounting the Valve Actuator

1 Screw the adapter ring to the heating valve an tighten it (tightening by hand is sufficient).
2 Push the valve drive onto the adapter ring until you hear it lock in.
3 Connect the LON connecting cable.
4 Lay the LON connecting cable in such a way that it is not in constant thermal contact with the valve, heater or pipe.
5 Secure the LON connecting cable to the socket-outlet using an external strain relief.



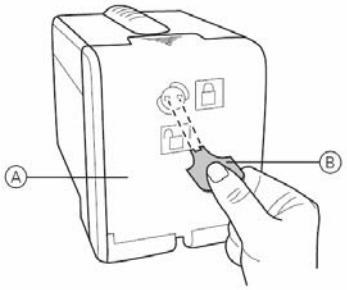
Removing the Valve Actuator

1 Open the valve drive cover.
2 Actuate locking lever and remove the valve drive.
3 Unscrew the adapter ring from the heater.

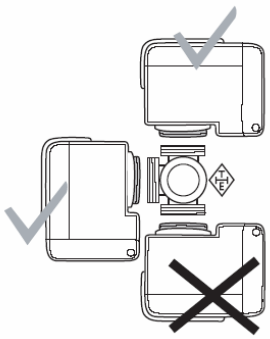


Protection against unauthorized removal

1 Close the cover A to prevent access to the unlocking mechanism of the valve drive and to the programming button.
2 Turn the lock by 90° using the special key B provided.



Installation positions



The device propagates its Neuron-ID by pressing the service pin.
The service LED indicates the programming state.

For the right operation of the Valve Actuator an appropriate application program is needed. Only applications permitted by Schneider Electric may be loaded onto the device.

4. Remarks

Installation and assembly of electrical devices may take place only by an electrical specialist.

When planning and installing an electrical system the relevant standards, guidelines and regulations of the respective country are to be considered. Beyond that the device specifications are to be kept. For project engineering, assembly and line-up detailed expertise of the LonWorks technology is presupposed.

The function of the device is software dependent. Only application programs may be loaded, which are approved by Schneider Electric for this device.

The system integrator has to carry ensuring that the loaded application program and the configured parameters in it correspond with the outside wiring of the device. This applies in particular if for different use several application programs for a device are available.

5. Technical Data

Power supply	
Supply voltage:	DC 42.8 V (supplied by the network)
Power consumption (typ.):	2 LPUL (<= 500 mW), 11 mA at 42 V
Network interface	
Transceiver type:	LON Link Power Transceiver (LPT-11)
Drive	
Valve stroke:	1 .. 6 mm
Force:	120 N (200 N upon request); optimized for thermostat valves with resilient jointing
Drive-time:	20 s / mm
Digital inputs	
Number:	2
Contact voltage:	app. 21 V
Contact current:	app. 1 mA per channel
Controls	
Service pin:	Propagates the Neuron ID
Indicators	
Service LED (red):	lit: network access error flashes: module unconfigured
Status LEDs (red):	Indicates the current valve stroke
Connections	Cord set fixed to the device, type (Y) EYY-OB 3 x 3 x 0,6; app. length 1 m
Bus:	Red and black wire
Digital inputs:	Input 1 (E1): wire white and green Input 2 (E2): wire yellow and brown
Housing	
Dimensions:	82 x 46 x 65 mm (H x W x D)
Protection class:	IP21
Colour:	White
Protection class:	III
Fitting position:	Vertical to horizontal
Site conditions	
Operating temperature:	0 .. +45 °C
Fluid temperature:	max. 100 °C
Device behaviour	
After Power-up and commissioning:	Device performs a movement into both end positions after checking the bus voltage and then moves to the configured control position.
Bus power failure:	The device stops and stays in the current position

6. Application description

Die application "887391VA02D" is for configuration of the LON Valve Actuator SA-22.

The LON Valve Actuator SA-22 can be used for single room temperature control to automatically open and close valves. It is suited for heating and cooling applications.
The integrated digital inputs can be connected with dry contacts, e. g. window contacts or the signal output of a dew-point sensor. The state of these contacts can be provided to an external controller or to the internal “Valve Actuator” via an internal binding.

Function

1. General

After power-up the program waits 5 .. 260 s until the software initialisation is finished. During this time all LEDs are off and the Valve Actuator is not driven. Then an initialisation drive starts, i. e. the Valve Actuator closes and opens completely once. During this time the Valve Actuator does not process any commands (drive, calibration) and a LED flashes.

When the Neuron is set online, the device resets.

If the service pin is pressed for more than 10 s and no dew-point alarm is active, then a calibration is released. The lower LED flashes.

If the upper and the lower LED simultaneously shine, the calibration has not been correctly executed.

The green and the yellow wires of the connecting cable correspond to the first Switch Object [0], the brown and the yellow wires correspond to the second Switch Object [1].

A Wink command causes that all LEDs flash for 30 s.

If the configuration is set via the NCIs, a reset must follow.

2. Valve Actuator

- Three LON inputs with different priorities are provided.
- Dew-point supervision can be analysed.
- The current position of the valve can be indicated at the device und propagated via the LON network.
- The effect direction of the Valve Actuator is invertible.

3. Digital Inputs

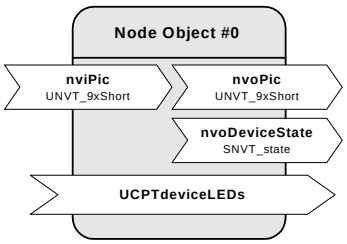
- The mode of the connected contacts is configurable.
- Several inputs can be “OR”-combined.

6.1 System requirements

For the configuration of the application a LNS-compatible commissioning tool is needed! All properties are used as “User-defined Configuration Property Types” (UCPT’s) by Direct-Memory-Access. For use of these properties, the Schneider Electric Device Resource Files” (DRF’s) have to be installed **before (!)** a device template is created.

The used LNS must be version 2.0 or higher.

6.2 Node Object



Input Network Variables

nviPic

Type:	UNVT_9xShort
Valid Range:	Each 0 .. 255
Default Value:	All 0
Description:	For internal function only!

Output Network Variables

nvoPic

Type:	UNVT_9xShort
Valid Range:	jeweils 0 .. 255
Default Value:	All 0
Description:	For internal function only!

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nvoDeviceState

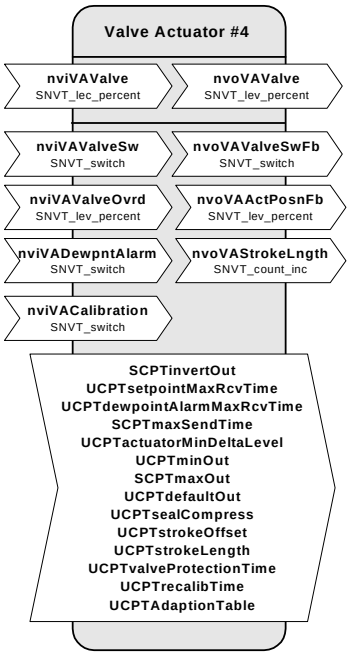
Type:	SNVT_state
Valid Range:	.bit0 .. .bit15: 0 or 1
Default Value:	All 0
Description:	The bits indicate device status and failure: .bit0: timeout communication .bit1: communication error (missing reception) .bit2: checksum error of a response .bit3: communication error (faulty length) .bit4: NotACKnowlegde as PIC-response .bit8: searching studs .bit9: reference driving .bit10: active start delay .bit11: active dew-point alarm .bit12: invalid studs .bit13: wrong stroke length .bit14: wrong stroke offset .bit15: drive command is sent to PIC If bit0 .. bit3 are permanently indicated, please contact the manufacturer.

Configuration Properties

UCPTdeviceLEDs (nciDeviceLEDs)

Type:	UNVT_boolean
Valid Range:	FALSE, TRUE
Default Value:	FALSE
Description:	On-/Off switching of the LED position indicator. Errors are indicated all the time.

6.3 Valve Actuator



Input Network Variables

nviVAValve

Type:	SNVT_lev_percent
Valid Range:	0 .. 100 %, 0x7FFF
Default Value:	0x7FFF (invalid)
Description:	Set-point input with no priority.

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nviVAValveSw

Type:	SNVT_switch
Valid Range:	.value: 0 .. 100 % .state: 0, 1, -1
Default Value:	.value = 0 .state = -1 (invalid)
Description:	Set-point input with low priority. An invalid telegram {0,0; -1} must be received to release this input.

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nviVAValveOvrd

Type:	SNVT_lev_percent
Valid Range:	0 ... 100 %, 0x7FFF
Default Value:	0x7FFF (invalid)
Description:	Set-point input with high priority. An invalid telegram 0x7FFF must be received to release this input.

Input Network Variables

nviVADewpntAlarm

Type:	SNVT_switch
Valid Range:	.value: 0 .. 100 % .state: 0, 1
Default Value:	.value = 0 .state = 0
Description:	Input for dew-point alarm. If here a telegram with `.value` > 0 and `.state` = 1 has been received, the valve with highest priority is closed. The energy lock is enabled.

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nviVACalibration

Type:	SNVT_switch
Valid Range:	.value: 0 .. 100 % .state: 0, 1
Default Value:	.value = 0 .state = 0
Description:	A calibration of the Valve Actuator is released by `.value` > 0 und `.state` = 1, i. e. the stud positions are re-calculated. Both the outputs `nvoVAActPosnFb`, `nvoVAStrokeLngth` and the inputs `nviVAValve`, `nviVAValveSw`, `nviVAValveOvrd` are not updated or processed. If a dew-point alarm is active, the calibration time is delayed until the alarm elapses. **The Valve Actuator must not be recalibrated more often than the once a week.**

Output Network Variables

nvoVAValveFb

Type:	SNVT_lev_percent
Valid Range:	0 .. 100 %, 0x7FFF
Default Value:	0x7FFF (invalid)
Description:	Feedback of the valid set-point value.

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nvoVAValveSwFb

Type:	SNVT_switch
Valid Range:	.value: 0 .. 100 % .state: 0, 1, -1
Default Value:	.value = 0 .state = -1 (invalid)
Description:	Feedback of the valid set-point value.

---

nvoVAActPosnFb

Type:	SNVT_lev_percent
Valid Range:	0 .. 100 %, 0x7FFF
Default Value:	0x7FFF (invalid)
Description:	Indicator of the current actuator position as percent level of the valve stroke.

Output Network Variables

nvoVAStrokeLngth

Type: SNVT_count_inc
Valid Range: -32,768 .. 32,767
Default Value: 0
Description: Indicator of the current actuator position in µm. This value is not inverted with invert effect direction.

Configuration Properties

SCPTinvertOut (nciVAinvertOut)

Type: SNVT_lev_disc
Valid Range: ST_OFF, ST_ON
Default Value: ST_OFF
Description: The effect direction is inverted. This is for valve types which are closed forceless.

UCPTsetpointMaxRcvTime (nciVAsetptMxRcvT)

Type: SNVT_time_sec
Valid Range: 0 .. 6,553 s
Default Value: 0 (disabled)
Description: Reception heartbeat. Checks the bound inputs `nviVAValve`, `nviVAValveSw` and `nviVAValveOvrd` if regular updates occur. If no updates have been received, the default value `UCPTdefaultOut` is applied.

UCPTdewpointAlarmMaxRcvTime (nciVAdewptMxRcvT)

Type: SNVT_time_sec
Valid Range: 0 .. 6,553 s
Default Value: 0 (disabled)
Description: Reception heartbeat. Checks the bound input `nviVADewpntAlarm` if regular updates occur. If no updates have been received, the valve is closed.

SCPTmaxSendTime (nciVAmaxSendTime)

Type: SNVT_time_sec
Valid Range: 0 .. 6,553 s
Default Value: 0 (disabled)
Description: Maximum period of time before the output network variables `nvoVAValveFb` and `nvoVAValveSwFb` are automatically updated. This time also defines the cycle transmission time for the feedback outputs.

SCPTminDeltaLevel (nciVAminDeltaLvl)

Type: SNVT_lev_cont
Valid Range: 0.5 .. 10 %
Default Value: 0.5 %
Description: Sets the minimum position change required before a drive of the actuator is launched.

Configuration Properties

UCPTminOut (nciVAminOut)

Type: SNVT_lev_cont
Valid Range: 0 .. 100 %
Default Value: 0
Description: Minimum correcting value of the actuator, to overcome the compression of the rubber seal. The property overrides a possible curve adaptation.

SCPTmaxOut (nciVAmaxOut)

Type: SNVT_lev_cont
Valid Range: 0 .. 100 %
Default Value: 100 %
Description: Works like a flow rate limitation. The valve is maximally opened up to the configured value. This property also overrides a possible curve adaptation.

UCPTdefaultOut (nciVAdefaultOut)

Type: SNVT_lev_cont
Valid Range: 0 .. 100 %
Default Value: 15 %
Description: This valve position is enabled by power-up, reset or an error (e. g. receive timeout expires). Is effective beyond the curve (`UCPTAdaptationTable`) and works linear to the valve stroke.

UCPTsealCompress (nciVAsealCmprss)

Type: SNVT_count_inc
Valid Range: -500 .. 500
Default Value: 100
Description: Stroke in µm, the seal is compressed by the valve protection against rubber wear.

UCPTstrokeOffset (nciVAstrokeOffst)

Type: SNVT_length_mil
Valid Range: 0 .. 8.0 mm
Default Value: 0 (disabled)
Description: Stroke, which the valve lifter stands out from the valve adapter. This value can be manually measured. It is required for calibration. If the value determined by the calibration deviates more than 1mm, the calibration is invalid and the corresponding LEDs shine. Then the Valve Actuator can not be controlled through the LON network.

UCPTstrokeLength (nciVAstrokeLngth)

Type: SNVT_length_mil
Valid Range: 0 .. 8.0 mm
Default Value: 0 (disabled)
Description: Stroke of the valve, which is required for calibration. This value is usually provided by the technical documentation of the valve. It can also be manually measured at the valve itself (recommended). If the value determined by the calibration deviates more than 1mm, the calibration is invalid and the corresponding LEDs shine. Then the Valve Actuator can not be controlled through the LON network.

Configuration Properties

UCPTvalveProtectionTime (nciVAprotectTm)

Type:	SNVT_time_hour
Valid Range:	0 .. 65,535 h
Default Value:	168 h (1 week)
Description:	Periodic valve flushing against drive stops and rubber wear. The Valve Actuator drives once completely ON and OFF. A periodic valve flushing is always recommended; otherwise the operating life might be reduced. A recalibration retriggers this time. **The Valve Actuator must not be recalibrated more often than the once a week.**

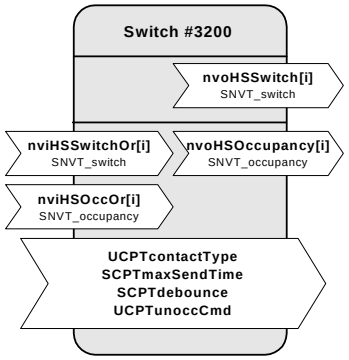
UCPTrecalibTime (nciVArecalibTm)

Type:	SNVT_time_hour
Valid Range:	0 .. 65,535 h
Default Value:	0 (disabled)
Description:	Time interval for the periodic, automatic recalibration (calculation of the ON- and OFF stud) of the Valve Actuator. Usually a regular recalibration is not necessary. **The Valve Actuator must not be recalibrated more often than the once a week.**

UCPTAdaptationTable (nciVAadpttnTable)

Type:	UNVT_adaptation_table
Valid Range:	21 x 0 .. 100 %
Default Value:	Linear division of the percent values
Description:	This property enables the curve adaptation of the Valve Actuator to the used valve hardware.

6.4 HVAC-Switch (Index 0 = yellow / green; white / brown = Index 1)



Input Network Variables

nviHSSwitchOr[i]

Type:	SNVT_switch
Valid Range:	.value: 0 .. 100 % .state: 0, 1
Default Value:	.value = 0 .state = 0
Description:	This input is enabled by an ON-telegram (`.value` > 0; `.state` = 1). The output `nvoHSSwitch[i]` is set to {100,0; 1} and the output `nvoHSOccupancy[i]` is set to OC_OCCUPIED.

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nviHSOccOr[i]

Type:	SNVT_occupancy
Valid Range:	OC_OCCUPIED, OC_UNOCCUPIED, OC_BYPASS, OC_STANDBY, OC_NUL
Default Value:	OC_NUL
Description:	OC_OCCUPIED enables this input. The output `nvoHSSwitch[i]` is set to {100,0; 1} and the output `nvoHSOccupancy[i]` is set to OC_OCCUPIED.

Output Network Variables

nvoHSSwitch[i]

Type:	SNVT_switch
Valid Range:	.value: 0 .. 100 % .state: 0, 1
Default Value:	.value = 0 .state = 0
Description:	This output is set to {100,0; 1}, if the digital input contact is closed or an input has been enabled.

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nvoHSOccupancy[i]

Type:	SNVT_occupancy
Valid Range:	OC_OCCUPIED, OC_UNOCCUPIED, OC_BYPASS, OC_STANDBY, OC_NUL
Default Value:	OC_NUL
Description:	This output is set to OC_OCCUPIED, if the digital input contact is closed or an input has been enabled.

Configuration Properties

UCPTcontactType[i] (nciHScontact0/nciHScontact1)

Type: UNVT_contact_type
Valid Range: CT_NORMALLY_CLOSED, CT_NORMALLY_OPEN
Default Value: CT_NORMALLY_OPEN
Description: This property defines the connected contact types at the input:
CT_NORMALLY_CLOSED = NO-contact
CT_NORMALLY_OPEN = open contact

SCPTmaxSendTime[i] (nciHSmaxSendT0/nciHSmaxSendT1)

Type: SNVT_time_sec
Valid Range: 0 .. 6,553 s
Default Value: 0 (disabled)
Description: Send heartbeat for the outputs `nvoHSSwitch[i]`, `nvoHSOccupancy[i]`. Maximum period of time before these output network variables are automatically updated.

SCPTdebounce[i] (nciHSdebounce0/nciHSdebounce1)

Type: SNVT_time_sec
Valid Range: 0 .. 6,553 s
Default Value: 0 (disabled)
Description: Debounce-time of the des contact to exactly identify a state change.

UCPTunoccCmd[i] (nciHSunoccCmd0/nciHSunoccCmd0)

Type: SNVT_occupancy
Valid Range: OC_UNOCCUPIED, OC_BYPASS, OC_STANDBY, OC_NUL
Default Value: OC_STANDBY
Description: This value is transmitted at an unoccupied state,
OC_UNOCCUPIED used for lighting and blinding control
OC_STANDBY used for HVAC applications