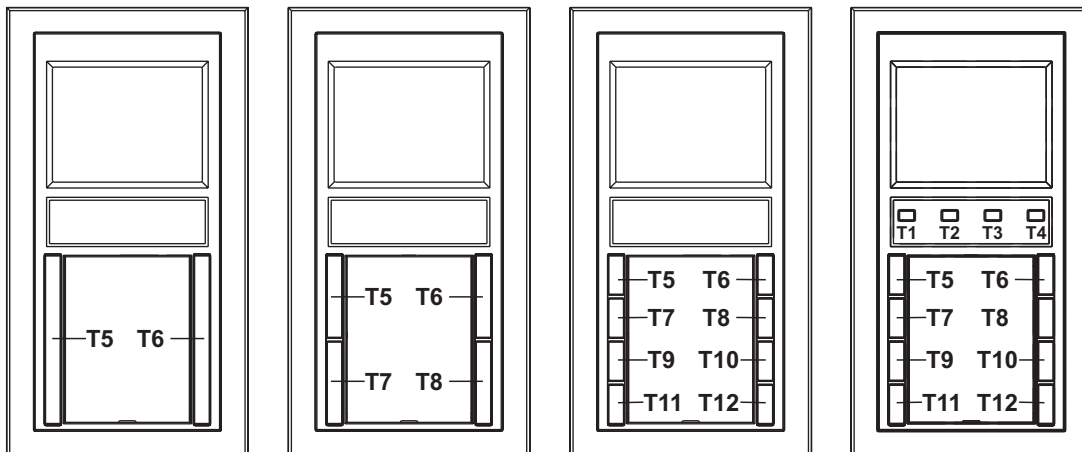


Software Application wrf08_03 (Lighting, Blinds, Air-Conditioning Control)

For model WRF08

The multi-function room operating panel WRF08 is designed for temperature detection and integrated control of HVAC, lighting and blinds for single room control. The operating functions can be flexibly adapted to different room requirements. Thus, various numbers of function buttons are available.

The prescription of the LonMark® function profile **8090** „Space Comfort Control Command Module“, **3200** „Switch“, **1060** „Occupancy Sensor“, and **3250** „Scene Panel“ are considered. For extended adjustment options, user-defined configuration parameters (UCPT) are used. The UCPTs used herewith are defined in the **Thermokon Device Recource Files** from version 1.6 or higher.

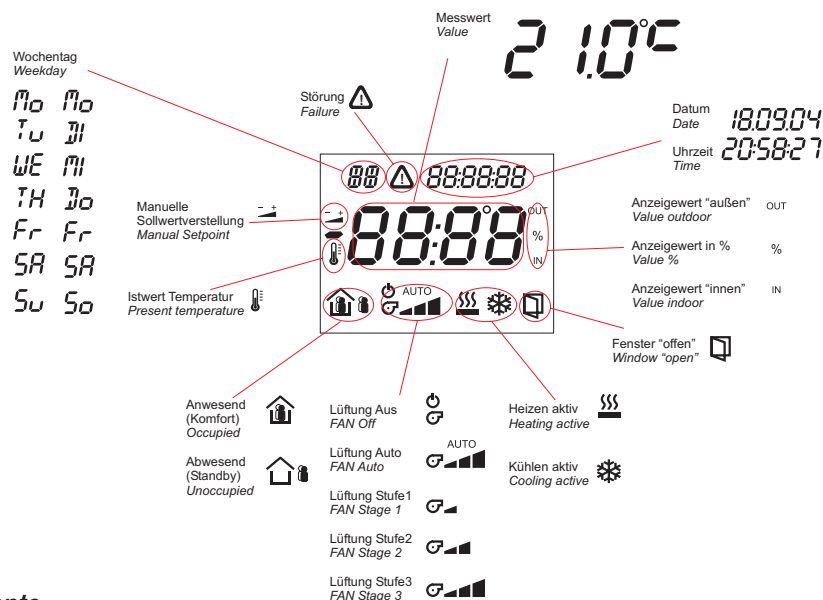
Presentation of the Device Types and Description of the LCD-Display

WRF08 2T Standard

WRF08 4T Standard

WRF08 8T Standard

WRF08 12T Standard

**Control of Segments**

Time, date, weekday:

nviTimeSet, UCPTtimeConfig

Measuring value:

nvoSpaceTemp, nvoSetptEffect, nvoSetptOffset, nviTempOutdoor, nviRH_Indoor, nviRH_Outdoor, UCPTdisplConfig

Room occupancy:

nvoEffectOccup, UCPTdisplConfig

Fan symbols:

nvoFanSpeed, UCPTdisplConfig

Failure:

nviAlarm, nviCmd_all

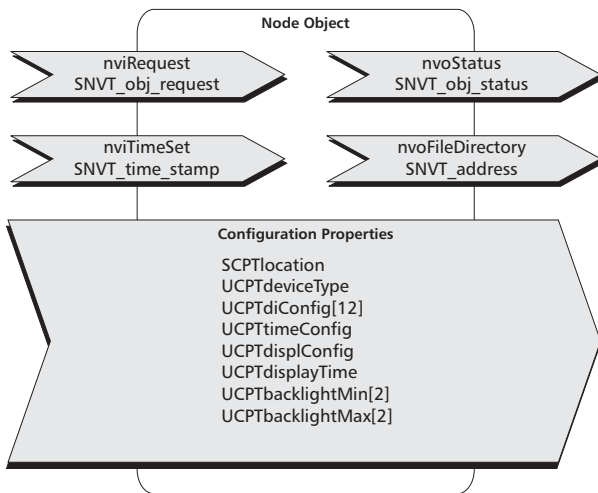
Heating, cooling:

nviUnitStatus, nviCmd_all

Window:

nviEnergyHoldOff, nviCmd_all

Node Object



The Node Object supervises and controls the functions of the individual objects in the device. The basic functions required by the LonMark® are supported, whereas general network variables and configuration parameters for the control and parameterization of the device were added.

Time / Date: After a module reset, the display for time and date is faded out. Only after receipt of a message via the input variable **nviTimeSet** the time is faded in. The time should be synchronized by a LON system clock once a day. The display of the time can be adapted to individual requests by **UCPTtimeConfig**. Please see the parameter description on page 4.

Display of Measuring Value: Besides the room temperature it is also possible to display for example the set point, outdoor temperature or the relative humidity. This configuration is made by means of **UCPTdisplConfig**, whereas the display is changing between the different display values in the time interval **UCPTdisplayTime**.

Background Illumination: The background illumination of the LCD and the text field can be selected separately. In the stable state, i.e. after a module reset or if no button actuation is made for a time exceeding 15 seconds, the value **UCPTbacklightMin[0]** determines the brightness of the LCD and the value **UCPTbacklightMin[1]** determines the brightness of the label area. By actuating one button, the stable state is left and the values **UCPTbacklightMax** determine the brightness of the LCD and the label area.

Button Functionality and Device Types: During installation, the device type used (2T, 4T, 8T, 12T) must be adjusted by the parameter **UCPTdeviceType**. Different functions and objects such as set point adjustment or light control can be allocated to the buttons. The configuration of the buttons T1 to T12 is made by **UCPTdiConfig[0]** to **UCPTdiConfig[11]**.

Input Variables Node Object:

nviRequest

SNVT Type: SNVT_obj_request, Index 92

Function: Input variable including the functions RQ_NORMAL, RQ_UPDATE_STATUS and RQ_REPORT_MASK.

nviTimeSet

SNVT Type: SNVT_time_stamp, Index 84

Function: Input variable for synchronisation of the time displayed by means of a LON system clock. After a module reset the time is faded out as long as a first valid value is received.

Output Variable Node Object:

nvoStatus

SNVT Type: SNVT_obj_status, Index 93

Function: Output variable including the requested status bits „invalid_id“ and „invalid_request“.

nvoFileDirectory

SNVT Type: SNVT_address, Index 114

Function: The output variable makes the address data of the configuration parameter in the device available to the LON-integration tool.

Configuration Parameter Node Object:**SCPTlocation**

SCPT Index: 17, SNVT_str_asc

Function: Additional input option to store information on the location in the device.

UCPTdeviceType

UCPT Index: 42, SNVT_count

Function: The adaption to the software is made by this configuration parameter. Valid input values are:

Device type 2T ==> UCPTdeciceType = 2
 Device type 4T ==> UCPTdeciceType = 4
 Device type 8T ==> UCPTdeciceType = 8
 Device type 12T ==> UCPTdeciceType = 12

Preset value: 8

UCPTdiConfig[0]...[11]

UCPT Index: 44, typedef struct {unsigned short Byte[4]} UNVT_str_hex4

Function: These configuration parameters determine the button functions and their allocation to the output variables.

UCPTdiConfig[0] configures **button T1**
 UCPTdiConfig[1] konfigures **button T2**
 :
 UCPTdiConfig[11] configures **button T12**

Example: Button **T5** configures for **Switch-Object-0** as **light button with toggle function**:
 UCPTdiConfig[4].**Byte[0] = 0** and UCPTdiConfig[4].**Byte[1] = 2**

Configuration of Buttons for Lighting and Blind by UCPTdiConfig			
Allocation Button - Function Block		Function	
Byte[0]	Description	Byte[1]	Description
0	Switch-Object 0	1	actuated / not actuated
1	Switch-Object 1	2	Light Toggle
2	Switch-Object 2	3	Light only ON
3	Switch-Object 3	4	Light only OFF
4	Switch-Object 4	5	Light Toggle with dimming
			Switch-on value = Max-value
5	Switch-Object 5	6	Light Toggle with dimming
			Switch-on value = last ON-value
6	Switch-Object 6	7	Light only brighter by dimming
			Switch-on value = Max-value
7	Switch-Object 7	8	Light only brighter by dimming
			Switch-on value = last ON-value
		9	Light only darker by dimming
		0A	Blind UP
		0B	Blind DOWN
		0C	Command automatic (= 0.0 -1)

Configuration of Buttons for Scene Control by UCPTdiConfig			
Allocation Button - Function Block		Funktion	
Byte[0]	Description	Byte[1]	Description
8	Scene Panel	01-FF	Scenen-Number

Configuration of Buttons for Control of Room Occupancy by UCPTdiConfig			
Allocation Button - Function Block		Funktion	
Byte[0]	Description	Byte[1]	Description
9	Occupancy Sensor	1	OCCUPIED, overtime function
		2	Toggle Occupied/Unoccupied
		3	only OCCUPIED
		4	only UNOCCUPIED

Configuration of Buttons for Air-Conditioning by UCPTdiConfig			
Allocation Button - Function Block		Funktion	
Byte[0]	Description	Byte[1]	Description
0A	Space Comfort Control Command Module	1	Set temperature Plus
		2	Set temperature Minus
		3	Fan stage Plus
		4	Fan stage Minus
		5	Fan stage "only AUTO"

Notice: The release of the operating buttons for air-conditioning control is depending on the current room occupancy (see Space Comfort Control Command Module). An adjustment of the values is only possible with `nvoEffectOccup = OC_OCCUPIED`.

UCPTtimeConfig

UCPT Index: 45, typedef struct {unsigned short Byte[4]} UNVT_str_hex4

Function: By UCPTtimeConfig the display mode of weekday, date and time can be configured.

!! Please note: After a module reset, the display for date and time is faded out. The ime is only faded in after !! receipt of a telegram via the input variable *nviTimeSet*. The time should be synchronised by a LON system !! clock once a day.

UCPTtimeConfig.Byte[0] = 0	==>	Weekday faded out
UCPTtimeConfig.Byte[0] = 1	==>	Weekday English
UCPTtimeConfig.Byte[0] = 2	==>	Weekday German
UCPTtimeConfig.Byte[1] = 0	==>	Date faded out
UCPTtimeConfig.Byte[1] = 1	==>	Date English (JJ.MM.TT)
UCPTtimeConfig.Byte[1] = 2	==>	Datum German (TT.MM.JJ)

UCPTtimeConfig.Byte[2] = 0 ==> **Time** faded out
 UCPTtimeConfig.Byte[2] = 1 ==> **Time** with seconds
 UCPTtimeConfig.Byte[2] = 2 ==> **Time** without seconds
 UCPTtimeConfig.Byte[3] = 0 ==> **Time** 24-hours mode
 UCPTtimeConfig.Byte[3] = 1 ==> **Time** 12-hours mode

Preset values: .Byte[0] = 2, .Byte[1] = 2, .Byte[2] = 2, .Byte[3] = 0

UCPTdisplConfig

UCPT Index: 46, SNVT_state

Function: By means of UCPTtimeConfig the presentation mode of the weekday, date and time can be configured. If several measuring values are indicated, the display is switching back and forth between the measuring values in the time interval **UCPTdisplayTime**.

UCPTtimeConfig.bit[0] = 1* ==> **Room temperature** displayed
 UCPTtimeConfig.bit[0] = 0 ==> **Room temperature** not displayed
 UCPTtimeConfig.bit[1] = 1 ==> **Outdoor temperature** displayed
 UCPTtimeConfig.bit[1] = 0* ==> **Outdoor temperature** not displayed
 UCPTtimeConfig.bit[2] = 1 ==> **Set temperature effective** displayed
 UCPTtimeConfig.bit[2] = 0* ==> **Set temperature effective** not displayed
 UCPTtimeConfig.bit[3] = 1 ==> **Set point offset** displayed
 UCPTtimeConfig.bit[3] = 0* ==> **Set point offset** not displayed

If bit2 = 1 and bit3 =1, then the effective set point temperature is displayed

UCPTtimeConfig.bit[4] = 1* ==> °C is the unit of measurement for the temperature display
 UCPTtimeConfig.bit[4] = 0 ==> °F is the unit of measurement for the temperature display
 UCPTtimeConfig.bit[5] = 1* ==> **Decimal point for temperature** displayed
 UCPTtimeConfig.bit[5] = 0 ==> **Decimal point for temperature** not displayed
 UCPTtimeConfig.bit[6] = 1 ==> **Relative humidity** of the room air displayed
 UCPTtimeConfig.bit[6] = 0* ==> **Relative humidity** of room air not displayed
 UCPTtimeConfig.bit[7] = 1 ==> **Relative humidity** of outdoor air displayed
 UCPTtimeConfig.bit[7] = 0* ==> **Relative humidity** of outdoor air not displayed
 UCPTtimeConfig.bit[8] = 1* ==> **Decimal point for relative humidity** displayed
 UCPTtimeConfig.bit[8] = 0 ==> **Decimal point for relative humidity** not displayed
 UCPTtimeConfig.bit[9] = 1* ==> **Symbols room occupancy** displayed (status of nvoEffectOccup)
 UCPTtimeConfig.bit[9] = 0 ==> **Symbols room occupancy** not displayed
 UCPTtimeConfig.bit[10] = 1 ==> **Symbols fan** displayed
 UCPTtimeConfig.bit[10] = 0* ==> **Symbols fan** not displayed
 UCPTtimeConfig.bit[11] = 1 ==> **Display set point offset** with set point adjustment
 UCPTtimeConfig.bit[11] = 0* ==> **Set temperature effective** with set point adjustment

* = preset values

UCPTdisplayTime

UCPT Index: 16, SNVT_time_sec

Function: This configuration parameter defines the period of time of a display message respectively the up-date interval of the display. (preset value: 5,0 sec)

UCPTbacklightMin[0],[1]

UCPT Index: 48, SNVT_lev_cont

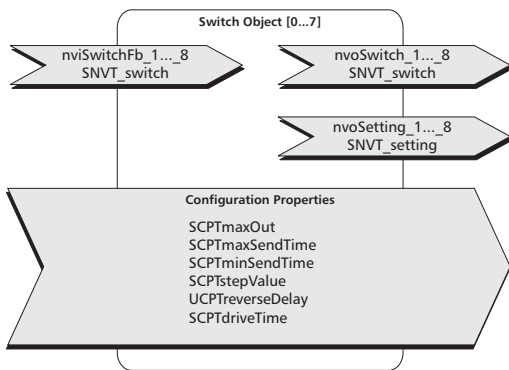
Function: In the stable state, i.e. after module reset or if no button actuation is made for a period longer than 15 sec. the value **UCPTbacklightMin[0]** determines the background illumination of the LCD. The value **UCPTbacklightMin[1]** determines the brightness of the label area.

UCPTbacklightMax[0],[1]

UCPT Index: 48, SNVT_lev_cont

Function: If the stable state is left by actuation of a button, the value **UCPTbacklightMax[0]** determines the brightness of the background illumination of the LCD. The value **UCPTbacklightMax[1]** determines the brightness of the label area.

Switch Object



Eight identical switch objects for light and blind control. Both, the allocation of the buttons to the individual objects and the determination of the functions are made by the configuration parameters UCPTdiConfig[0]...[11] in the Node Object. Possible functions are light control ON/OFF, light control ON/OFF with dimming or blinds UP/DOWN with automatic run.

Input Variables Switch Object:

nviSwitchFb_1...8

SNVT Type: SNVT_switch, Index 95

Function: Input variable for the current status of the light groups controlled by Switch_1...8.

Output Variables Switch Object:

nvoSwitch_1...8, nvoSetting_1...8

SNVT Type: SNVT_switch, Index 95; SNVT_setting, Index 117

Function: Output variables for control of light groups and for control of light and blind controllers. The output values are depending on the function adjustments. By UCPTdiConfig.Byte[0] = 0 - 7 buttons are allocated to a switch object. UCPTdiConfig.Byte[1] = 0 - 0C hex allocates a function to these buttons. It is also possible to allocate several buttons to a switch object, e.g. T5 for switching-off and T6 for switching-on the light.

UCPTdiConfig.Byte[1] = 01_{hex} Button actuated/ not actuated

Button actuated	nvoSwitch.value	= SCPTmaxOut
	nvoSwitch.state	= 1
	nvoSetting.function	= SET_ON;
	nvoSetting.setting	= SCPTmaxOut;
Button not actuated	nvoSwitch.value	= 0
	nvoSwitch.state	= 0
	nvoSetting.function	= SET_OFF;
	nvoSetting.setting	= 0;

UCPTdiConfig.Byte[1] = 02_{hex} Light Toggle

Each button actuation results in a toggle of the lighting, i.e. between ON and OFF

Lighting ON	nvoSwitch.value	= SCPTmaxOut
	nvoSwitch.state	= 1
	nvoSetting.function	= SET_ON;
	nvoSetting.setting	= SCPTmaxOut;
Lighting OFF	nvoSwitch.value	= 0
	nvoSwitch.state	= 0
	nvoSetting.function	= SET_OFF;
	nvoSetting.setting	= 0;

UCPTdiConfig.Byte[1] = 03_{hex} Lighting ON

Each button actuation results in a switching-on of the lighting

Lighting ON	nvoSwitch.value	= SCPTmaxOut
	nvoSwitch.state	= 1
	nvoSetting.function	= SET_ON;
	nvoSetting.setting	= SCPTmaxOut;

UCPTdiConfig.Byte[1] = 04_{hex} Lighting OFF

Each button actuation results in a switching-off of the lighting

Lighting OFF	nvoSwitch.value	= 0
	nvoSwitch.state	= 0
	nvoSetting.function	= SET_OFF;
	nvoSetting.setting	= 0;

UCPTdiConfig.Byte[1] = 05_{hex} Light Toggle with Dimming, Switch-on value = max. Value

Short-term button actuations (< 1 s) lead to a toggle of the current light status, whereas the .value - switching-on value always amounts to SCPTmaxOut. By a longer button actuation (> 1 s) the dimming function is activated, i.e. based on the current light status, the .value-value of the switch variable is increased or reduced as long as the button is actuated.

Lighting at maximum value	nvoSwitch.value	= SCPTmaxOut
	nvoSwitch.state	= 1
Lighting on 50%	nvoSwitch.value	= 50,0
	nvoSwitch.state	= 1
Lighting OFF	nvoSwitch.value	= 0
	nvoSwitch.state	= 0

The variables nvoSetting are not changed in this setting.

UCPTdiConfig.Byte[1] = 06_{hex} Light Toggle with Dimming, Switch-on value = last On-value

Function as with 05hex, but with the difference, that the value SCPTmaxOut is not taken over when switching-on the light, but the last switch-value. The smallest switch-on value is limited to 20%.

UCPTdiConfig.Byte[1] = 07_{hex} Lighting ON with Brighter Dimming, Switch-on value = max. Value

If the lighting is switched-off, a button actuation leads to an immediate switching-on of the lighting. By longer button actuations (> 1 s) the function „brighter dimming“ is activated, i.e. based on the current light status, the .value -value of the switch variables is increased in percent steps by UCPTstepValue as long as the maximum value SCPTmaxOut is reached. The sending interval in the dimming mode is set by SCPTminSendTime and amounts to approx. 300ms., preset. ca. 300ms.

Switching-on of light	nvoSwitch.value	= SCPTmaxOut
	nvoSwitch.state	= 1
	nvoSetting.function	= SET_ON;
	nvoSetting.setting	= SCPTmaxOut;
Brighter dimming	nvoSwitch.value	= last value + UCPTstepValue
	nvoSwitch.state	= 1
	nvoSetting.function	= SET_UP;
	nvoSetting.setting	= UCPTstepValue;

UCPTdiConfig.Byte[1] = 08_{hex} Lighting ON with Brighter Dimming, Switch-on value = last On-value

Function as with 07hex, but with the difference, that the value SCPTmaxOut is not taken over when switching-on the light, but the last switch-on value. The smallest switch-on value is limited to 20%.

UCPTdiConfig.Byte[1] = 09_{hex} Lighting OFF with Darker Dimming

If the lighting is switched-on, a short-term button actuation (< 1 s) leads to an immediate switching-off of the lighting. By a longer button actuation (> 1 s) the function „darker dimming“ is activated, i.e. based on the current light status, the .value - value of the switch variables is reduced in percent steps by UCPTstepValue as long as the value 0 is reached. The sending interval in the dimming mode is adjusted by SCPTminSendTime and amounts to approx. 300ms, preset.

Switching-off of lighting	nvoSwitch.value	= 0
	nvoSwitch.state	= 0
Darker dimming of lighting	nvoSetting.function	= SET_OFF;
	nvoSetting.setting	= 0;
	nvoSwitch.value	= last value - UCPTstepValue
	nvoSwitch.state	= 1
	nvoSetting.function	= SET_DOWN;
	nvoSetting.setting	= UCPTstepValue;

UCPTdiConfig.Byte[1] = 0A_{hex} Blind UP

In the configuration mode „Blind UP“ only the nvoSetting-Variables are changed and sent. Short-term button actuations (< 2 s) are designed for the fine adjustment of the lamellas. A long-term button actuation (> 2 s) starts the automatic run and controls the blind for the time SCPTdriveTime continuously into the direction open. The automatic run can be stopped by a renewed button actuation.

Run-up of blind	nvoSetting.function	= SET_UP;
Stop blind	nvoSetting.function	= SET_STOP;

The command SET_NULL is sent with a delay of 500ms after the command SET_STOP was sent .

UCPTdiConfig.Byte[1] = 0B_{hex} Blind DOW

In the configuration mode „Blind DOWN“ only the nvoSetting-Variables are changed and sent. Short-term button acutations (< 2 s) are designed for the fine adjustment of the lamellas. A long-term button actuation (> 2 s) starts the automatic run and controls the blind for the time SCPTdriveTime continuously into the direction close. The automatic run can be stopped by a renewed button actuation.

Run-down of blind	nvoSetting.function	= SET_DOWN;
Stop blind	nvoSetting.function	= SET_STOP;

The command SET_NULL is sent with a delay of 500ms after the command SET_STOP is sent.

UCPTdiConfig.Byte[1] = 0C_{hex} Command Automatic

The actuation of an „Automatic-Button“ switches the variables nvoSwitch to the value 0,0 -1. Thus, it is possible to set e.g. a light controller from an external override back to the automatic run.

Configuration Parameter Switch Object:
SCPTmaxOut

SCPT Index: 93, SNVT_lev_cont

Function: This configuration parameter determines the maximum output value of the variable nvoSwitch.value.

SCPTmaxSendTime

SCPT Index: 49, SNVT_time_sec

Function: Heartbeat function. This configuration parameter stipulates the interval time after which the output variable is sent. By means of input values = 0 the heartbeat function is deactivated.
(Preset value: 0,0 s)

SCPTminSendTime

SCPT Index: 52, SNVT_time_sec

Function: This configuration parameter stipulates the sending interval of the output variables in the dimming mode. By means of input values = 0 the function is deactivated. (Preset value: 0,3 s)

SCPTstepValue

SCPT Index: 92, SNVT_lev_cont

Function: This configuration parameter defines the step size of the variables nvoSwitch.value in the dimming mode.

UCPTreverseDelay

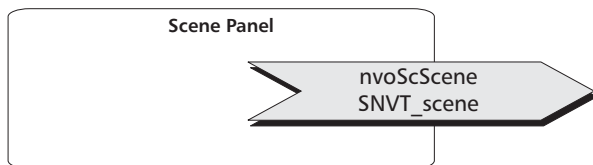
UCPT Index: 14, SNVT_count

Function: The configuration parameter defines the reverse delay with a rotation reverse of the blind motors in ms. Thus an alternate command e.g. from nvoSetting = SET_UP to nvoSetting = SET_DOWN is output with a delay. (Preset value: 500 ms)

SCPTdriveTime

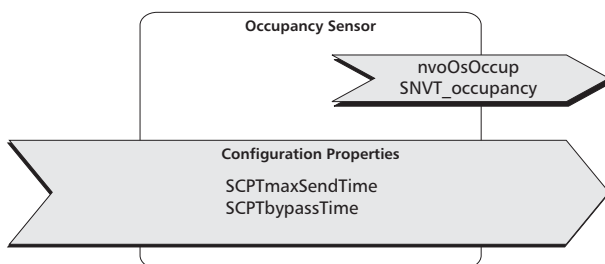
UCPT Index: 45, SNVT_time_sec

Function: This configuration parameter defines the maximum switch-on time of the blind motors in the automatic run. (Preset value: 100,0 s)

Scene Panel**Output Variables Scene Panel:****nvoScScene**

SNVT Type: SNVT_scene, Index 115

Function: Output variable for control of a scene panel. The output values are depending on the function adjustments. By UCPTdiConfig.Byte[0] = 8 the buttons are allocated to the scene object. UCPTdiConfig.Byte[1] = 01_{hex} - FF_{hex} allocates a scene number to these buttons, which are called-off with short-term button actuations by SC_RECALL. With long-term button actuations (> 2s) the scene is learned in again by SC_LEARN. For confirming a newly learned-in scene, the button back-indication LED blinks short. It is also possible to allocate several buttons to the scene panel, e.g. button T5 for calling scene 1 and button T6 for calling scene 2.

Occupancy Sensor Object**Output Variables Occupancy Sensor Object:****nvoOsOccup**

SNVT Type: SNVT_occupancy, Index 109

Function: Output variable for presence status message in rooms. The output values are depending on the function settings. By UCPTdiConfig.Byte[0] = 9 buttons are allocated to the occupancy sensor object. UCPTdiConfig.Byte[1] = 01_{hex} - 04_{hex} allocates a function to these buttons. It is also possible to allocate several buttons to an occupancy sensor object. nvoOsOccup can be bound on the input variable nviOccSensor for local presence status message.

UCPTdiConfig.Byte[1] = 01_{hex} Presence button with overtime function

By button actuation the output variable nvoOsOccup receives the value OC_OCCUPIED and the reset time is started. After expiration of the delay time SCPTbypassTime the output variable is set back to the value UNOCCUPIED. Each button actuation restarts the reset time.

UCPTdiConfig.Byte[1] = 02_{hex} Presence button with toggle function

By button actuation the output variable nvoOsOccup switches forth and back between the values OC_OCCUPIED and OC_UNOCCUPIED.

UCPTdiConfig.Byte[1] = 03_{hex} Presence button OCCUPIED

By button actuation the output variable nvoOsOccup receives the value OC_OCCUPIED.

UCPTdiConfig.Byte[1] = 04_{hex} Presence button UNOCCUPIED

By button actuation the output variable nvoOsOccup receives the value OC_UNOCCUPIED.

Configuration Parameter Occupancy Sensor Object:***SCPTbypassTime***

SCPT Index: 34, SNVT_time_min

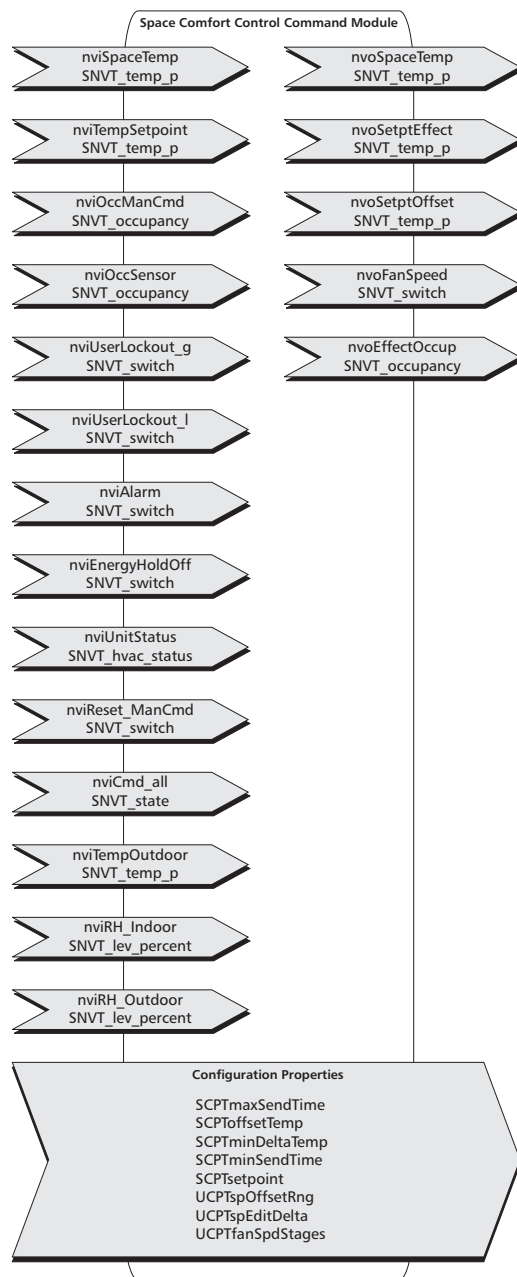
Function: Delay time in minutes. After expiration of SCPTbypassTime the output variable nvoOsOccup is set back to OC_UNOCCUPIED. (Preset value: 90 min)

SCPTmaxSendTime

SCPT Index: 49, SNVT_time_sec

Function: Heartbeat function. Stipulates the interval time after which the output variables are sent. By means of input values = 0, the heartbeat function is deactivated. (Preset value: 120s)

Space Comfort Control Command Module



Input Variables Space Comfort Control Command Module:

nviSpaceTemp

SNVT Type: SNVT_temp_p, Index 105

Function: Input variable for connection of an external LON temperature sensor. The external value is taken over, if the initialisation value 0x7FFF (=327,67 °C) was changed by a NV-Update after reset. As long as the initialisation value is not changed after reset, the internal temperature sensor remains active.

nviSetpoint

SNVT Type: SNVT_temp_p, Index 105

Function: Input variable for default of the basic set point temperature.

It is not obligatory necessary to bind this network variable with a higher-ranged node. If no update is made for nviSetpoint, the initialisation value 0x7FFF (=327,67°C) is kept and the value of the configuration parameter **nciSetpoint** is used for the calculation of the effective set point (basic setpoint + offset). If nviSetpoint receives an update with a valid set point, the effective set point is calculated by the value of the input variables.

Space Comfort Control Command Module:

Temperature Detection: Temperature detection is either made by the integrated temperature sensor or via the input variable nviSpaceTemp by an external LON sensor. For an afterwards calibration of the internal sensor the configuration parameter SCPToffsetTemp is used.

Measurement Indication: Additionally to the measured room temperature it is possible to show the input variables **nviTempOutdoor**, **nviRH_Indoor** and **nviRH_Outdoor** in the display. The configuration of the display is made in the Node Object by means of the parameters **UCPTdisplConfig** and **UCPTdisplayTime**. If more than one measuring value should be shown, the display switches forth and back between the measuring values in the time interval.

Set Point Default: The effective set point (basic set point) nvoSetptEffect is calculated in reliance on the input variables to the room occupancy (nviOccManCmd and nviOccSensor) of the set point defaults **SCPTsetpoint** respectively nviTempSetpoint and the offset value **nvoSetptOffset** (see table 1).

For the evaluation of internal occupancy status message the output variable nvoOcOccup of the „Occupancy Sensor“ must be combined with the input variable nviOccSensor.

The offset value **nvoSetptOffset** can be raised respectively lowered via appropriate parameterized operating buttons within a range UCPTspOffsetRng.

Fan Adjustment: The output value for the fan stages **nvoFanSpeed** can be adjusted by appropriate configured buttons.

nviOccManCmd and nviOccSensor

SNVT Type: SNVT_occupancy, Index 109

Function: Input variable for default of the room occupancy. The current room occupancy determines the values of the control parameter „effective set point“ and „neutral zone“ and thus the set points for heating and cooling (see table 1). Initialisation value for both variables: OC_NUL

nviOccManCmd: default via building control technic: OC_OCCUPIED, OC_BYPASS, OC_STANDBY, OC_UNOCCUPIED

nviOccSensor: presence status message in rooms: OC_OCCUPIED, OC_UNOCCUPIED

nviOccManCmd	nviOccSensor	>>>	nvoEffectOccup	nvoSetptEffect
OC_NUL	OC_NUL	>>>	OCCUPIED	SCPTsetpoint + nvoSetptOffset or nviTempSetpoint + nvoSetptOffset
OC_OCCUPIED	****	>>>		
OC_BYPASS	OC_OCCUPIED	>>>		
OC_NUL	OC_OCCUPIED	>>>		
OC_STANDBY	****	>>>	STANDBY	SCPTsetpoint + nvoSetptOffset or nviTempSetpoint + nvoSetptOffset
OC_NUL	OC_UNOCCUPIED	>>>	UNOCCUPIED	SCPTsetpoint or nviTempSetpoint
OC_BYPASS	OC_UNOCCUPIED	>>>		
OC_UNOCCUPIED	****	>>>		

Table 1: Effective set point depending on the room occupancy

nviUserLockout_g

SNVT Type: SNVT_switch, Index 95

Function: Input variable for locking the operating buttons for scene control, room occupancy and air-conditioning control.

nviUserLockout_g = 100.0 1 ==> buttons are locked

nviUserLockout_g = 0.0 0 ==> buttons are released

nviUserLockout_l

SNVT Type: SNVT_switch, Index 95

Function: Input variable for locking the operating buttons for light and blind control.

nviUserLockout_l = 100.0 1 ==> buttons are locked

nviUserLockout_l = 0.0 0 ==> buttons are released

nviAlarm

SNVT Type: SNVT_switch, Index 95

Function: The input variable controls the LCD symbol „failure“:

nviAlarm = 100.0 1 ==> symbol „ failure“ on
 nviAlarm = 50.0 1 ==> symbol „ failure“ blinks
 nviAlarm = 0.0 0 ==> symbol „ failure“ off

nviEnergyHoldOff

SNVT Type: SNVT_switch, Index 95

Function: The input variable controls the LCD symbol „window“:

nviEnergyHoldOff = 100.0 1 ==> symbol „ window“ on
 nviEnergyHoldOff = 0.0 1 ==> symbol „ window“ off

nviUnitStatus

SNVT Type: SNVT_hvac_status, Index 112

Function: The input variable controls the LCD symbol „heating“ and „cooling“:

nviUnitStatus.heat_output_primary > 0 ==> symbol „ heating“ ON
 nviUnitStatus.heat_output_primary = 0 ==> symbol „ heating“ OFF
 nviUnitStatus.cool_output > 0 ==> symbol „ heating“ ON
 nviUnitStatus.cool_output = 0 ==> symbol „ heating“ OFF

nviReset_ManCmd

SNVT Type: SNVT_switch, Index 95

Function: An update of the variables from 0.0 0 to 100.0 1 leads to a setting back to the user adjustments.

Set point offset temperature: nvoSetptEffect, nvoSetptOffset = 0

Room occupancy: nvoOsOccup = OC_UNOCCUPIED

Fan stage: nvoFanSpeed = 0,0 -1 (AUTO)

nviCmd_all

SNVT Type: SNVT_state, Index 83

Function:

nviCmd_all.bit[0] = 1 ==> see **nviUserLockout_g** = 100.0 1
 nviCmd_all.bit[0] = 0 ==> see **nviUserLockout_g** = 0.0 0
 nviCmd_all.bit[1] = 1 ==> see **nviUserLockout_I** = 100.0 1
 nviCmd_all.bit[1] = 0 ==> see **nviUserLockout_I** = 0.0 0
 nviCmd_all.bit[2] = 1 ==> see **nviReset_ManCmd** = 100.0 1
 nviCmd_all.bit[2] = 0 ==> see **nviReset_ManCmd** = 0.0 0
 nviCmd_all.bit[3] = 1 ==> switch-on symbol **Heating**
 nviCmd_all.bit[3] = 0 ==> switch-off symbol **Heating**
 nviCmd_all.bit[4] = 1 ==> switch-on symbol **Cooling**
 nviCmd_all.bit[4] = 0 ==> switch-off symbol **Cooling**
 nviCmd_all.bit[5] = 1 ==> switch-on symbol **Window**
 nviCmd_all.bit[5] = 0 ==> switch-off symbol **Window**
 nviCmd_all.bit[6] = 1 ==> switch-on symbol **Failure**
 nviCmd_all.bit[6] = 0 ==> switch-off symbol **Failure**

nviTempOutdoor

SNVT Type: SNVT_temp_p, Index 105

Function: By this input variable the outdoor temperature can be prescribed additionally.

nviRH_Indoor

SNVT Type: SNVT_lev_percent, Index 81

Function: By this input variable the relative humidity of the room air can be prescribed additionally.

nviRH_Outdoor

SNVT Type: SNVT_lev_percent, Index 81

Function: By this input variable the relative humidity of the outdoor air can be prescribed additionally.

Output Variables Space Comfort Control Command Module:***nvoSpaceTemp***

SNVT Type: SNVT_temp_p, Index 105

Function: Output variable for measured temperature value. Measuring range 0 - 50°C, resolution 1/100 °C. Data output is made depending on the configuration parameter SCPTmaxSendTime, SCPTminDeltaTemp and SCPTminSendTime and approx. 1,5s - 4,0s after reset.

nvoSetptEffect

SNVT Type: SNVT_temp_p, Index 105

Function: Output variable for effective set point. The effective set point is calculated via the defaults of nviTempSetpoint respectively SCPTsetpoint and set point shift adjusted at the device (see table 1). Data output is made after value change by the user, depending on the configuration parameters SCPTmaxSendTime and approx. 1,5s - 4,0s after reset.

nvoSetptOffset

SNVT Type: SNVT_temp_p, Index 105

Function: Output variable for set point correction, which can be changed via the operating buttons. Data output is made with any button actuation. By UCPTdiConfig.Byte[0] = 0A_{hex} buttons are allocated to the space comfort control command module. UCPTdiConfig.Byte[1] = 01_{hex} - 02_{hex} allocates a function for set point adjustment to these buttons. It is also possible to allocate several buttons to the space comfort controller object.***UCPTdiConfig.Byte[1] = 01_{hex} Increase set point offset***

By button actuation the output variable nvoSetptOffset is increased by the value UCPTspEditDelta. The adjustment range is determined by UCPTspOffsetRng.

UCPTdiConfig.Byte[1] = 02_{hex} Reduce set point

By button actuation the output variable nvoSetptOffset is reduced by the value UCPTspEditDelta. The adjustment range is determined by UCPTspOffsetRng.

!! The actuation of the buttons is **only** evaluated by **nvoEffectOccup = OC_OCCUPIED**. Otherwise button !! actuations are ignored. For the time of the set point adjustment, the indication in the display either !! shows the effective set point nvoEffectSetpt or the offset value nvoSetptOffset depending on the !! configuration.

nvoEffectOccup

SNVT Type: SNVT_occupancy, Index 109

Function: Output variable for the effective room occupancy (see table 1).

Data output is made depending on SCPTmaxSendTime, with value changes and approx. 1,5s - 4,0s after reset.

nvoFanSpeed

SNVT Type: SNVT_switch, Index 95

Function: Output variable for adjusted fan speed. The number of the fan speed stages is adjusted by the configuration parameter UCPTfanSpdStages. The indication in the display shows the currently adjusted fan speed and whether the controller is in the automatic mode.

UCPTfanSpdStages = 1

UCPTfanSpdStages = 2

UCPTfanSpdStages = 3

FAN-SPEED	nvoFanSpeed .value	nvoFanSpeed .state	FAN-SPEED	nvoFanSpeed .value	nvoFanSpeed .state	FAN-SPEED	nvoFanSpeed .value	nvoFanSpeed .state
AUTO	0 %	-1	AUTO	0 %	-1	AUTO	0 %	-1
0	0 %	1	0	0 %	1	0	0 %	1
1	100 %	1	1	50 %	1	1	33,0 %	1
			2	100 %	1	2	66,5 %	1
						3	100 %	1

!! The actuation of the buttons is **only** evaluated with *nvoEffectOccup* = *OC_OCCUPIED*. Otherwise, button !!actuatuions are ignored.

By UCPTdiConfig.Byte[0] = 0A_{hex} buttons are allocated to the space comfort controller object. UCPTdiConfig.Byte[1] = 03_{hex} - 04_{hex} allocates a function for fan speed adjustment to these buttons. It is also possible to allocate several buttons to the space comfort controller object.

UCPTdiConfig.Byte[1] = 03_{hex} Increase Fan Speed Stage

By button actuation the output variable nvoFanSpeed is increased. A button actuation with max. fan stage switches into the mode "Automatic", i.e. the fan stages are automatically adapted to the control variables for heating and cooling (please see the controller function diagram).

UCPTdiConfig.Byte[1] = 04_{hex} Reduce Fan Speed Stage

By button actuation, the output variable nvoFanSpeed is reduced. A button actuation with min. fan stage switches into the mode "Automatic", i.e. the fan stages are automatically adapted to the control variables for heating and cooling (please see the controller function diagram). If the fan is switched-off manually, the control variables for heating and cooling will be set back to 0% as well.

Configuration Parameter Space Comfort Control Command Module**SCPTmaxSendTime**

Index: 49, SNVT_time_sec

Function: Heartbeat function. This configuration parameter stipulates the interval time after which the output variables are sent. By means of input values =0, the heartbeat function is deactivated.
(Preset value: 300,0 s)

SCPTminSendTime

Index: 52, SNVT_time_sec

Function: Stipulates the smallest update interval of the output variables nvoSpaceTemp. An update is made after expiration of „SCPTminSendTime“, if the temperature value of the output variables has changed by more than „SCPTminDeltaTemp“. By input values = 0 the function is deactivated.
(Preset value: 5,0 sec)

SCPTminDeltaTemp

Index: 64, SNVT_temp_p

Function: If the temperature changes by the adjusted value „SCPTminDeltaTemp“, the new temperature value is transmitted. The function is depending on the adjustment of the parameter „SCPTminSendTime“. (Range >= 0 °C; Preset value: 0,30 °C)

SCPToffsetTemp

Index: 70, SNVT_temp_p

Function: Offset for the temperature value. By this parameter a software calibration is possible. Please see the notices for flush-mounting room temperature sensors with transducer.

SCPTsetpoint

Index: 213, SNVT_temp_p

Function: Configuration parameter for set point default (Preset value: 22,00 °C)

UCPTspEditDelta

Index: 9, SNVT_temp_p

Function: Configuration parameter for definition of temperature jumps via the operating buttons. (Preset value: 0.5K, i.e. the set point is changed by 0,5K with any button actuation).

UCPTspOffsetRng

Index: 12, SNVT_temp_p

Function: Configuration parameter for the value range of the adjusted set point correction, i.e. the prescribed set point can be changed by the user by means of the value +/- UCPTspOffsetRng.
(Preset value: 3,0 K)

UCPTfanSpdStages

Index: 13, SNVT_count

Function: Configuration parameter for default of fan stages.
(Preset value: 3 ==> OFF, 33,0 %, 66,5 %, 100,0 %, AUTO)