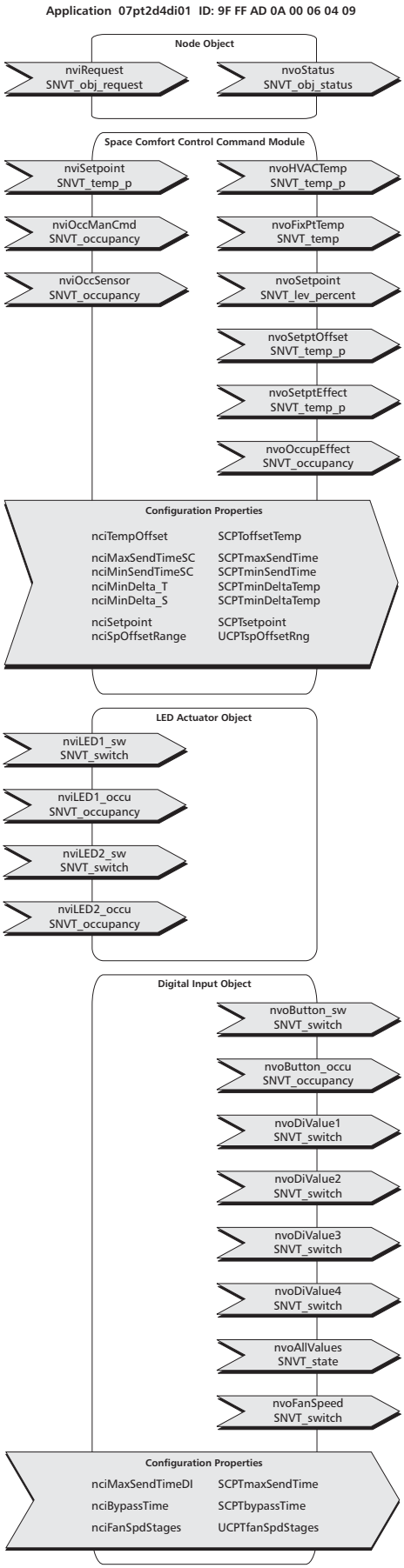
Software Application 07pt2d4di01 (Sensors, Room operating panels)

For sensors model WRF06.../WRF07... LON with digital inputs and operating elements

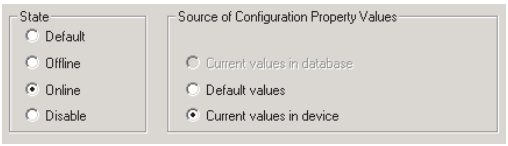


Standard application for room sensors model WRF06/WRF07 LON with operating elements and digital inputs. All functions are converted under consideration of the existing LonMark® defaults. The application uses standard network variables (SNVT) and standard configuration parameters (SCPT).
For extended adjustment options, user defined configuration parameters (UCPT) are used. The UCPTs used are defined in the ***Thermokon Device Recource Files*** from version 1.3 or higher and should be installed at the PC, before the device patterns are made-up by the installation tool.

Temperature measuring: The measuring is made by an internal sensor. The values are output by the network variables ***nvoHVACTemp*** and ***nvoFixPtTemp***.

!! Upon production the temperature sensor is calibrated by !! the configuration variable nciTempOffset. Thus the !! preadjusted device-specific values should be taken over !! when connecting the device to the LON-network.

Example LonMaker:



Setpoint adjustment: The setpoint correction in a range from ***nciSpOffsetRange*** can be raised respectively reduced via the regulator. Output of the offset value is made by ***nvoSetptOffset***.

The effective setpoint ***nvoSetptEffect*** is calculated in dependence on the input variables for room occupancy (***nviOccManCmd*** and ***nviOccSensor***) out of the setpoint defaults via nciSetpoint resepectively nviSetpoint and the adjusted setpoint offset.

In addition, the position of the regulator is output as a percent value (0-100 %) by the output variable ***nvoSetpoint.***

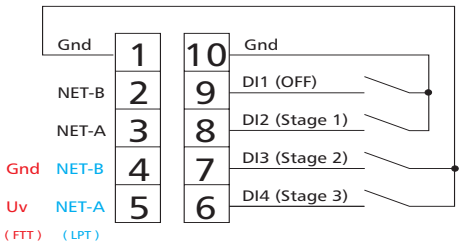
LEDs: Depending on the device type, up to two LEDs can be controlled via the input variables type SNVT_switch or SNVT_occupancy.

Digital inputs: All digital inputs (presence key, external digital iputs and rocker switch) are output indiviually by the variables type SNVT_switch as well as collectively by means of the output variables nvoAllValues type SNVT_state.

Presence key: Evaluation and output of the presence key is made via the network variables nvoButton_sw and nvoButton_occu, whereas the status (pressed/not pressed) is output by ***nvoButton_sw.***
By means of ***nvoButton_occu*** (in combination with ***nciBypassTime***) a user time prolongation respectively an overtime function can be realized.

Fan speed adjustment: Specially for the evaluation of an externally connected rotary switch for fan speed regulation the output variables ***nvoFanSpeed*** are used, whereas the number of fan speed steps can be configured by ***nciFanSpdStages***

Configuration of terminals:



Speciality for model WRF07PS...
The rocker switch is internally connected to the digital inputs DI2 and DI3

Speciality for model WRF07..2T..
The second bush button is internally connected to the digital input DI4

Node Object

The Node Object supervises and controls the functions of the individual objects within the unit. The basic functions required by the LonMark® are supported.

Network 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.

nvoStatus

SNVT Type: SNVT_obj_status, Index 93
Function: Output variables including the required status Bits „invalid_id“ and „invalid_request“.

Space Comfort Control Command Module

Object for temperature measuring, setpoint adjustment as well as for detection of effective room occupancy.

Network Variables Space Comfort Control Command Module:

nviSetpoint

SNVT Type: SNVT_temp_p, Index 105
Function: Input variable for default of setpoint temperature. It is not absolutely necessary to connect this network variable with a higher-graded node. If no update is made for nviSetpoint, the initialization value 0x7FFF (=327,67°C) is maintained. For calculation of the effective setpoint, the value of the configuration parameter ***nciSetpoint*** is used. If nviSetpoint receives an update with a valid setpoint, the effective setpoint is calculated by the value of the input variables.

nviOccManCmd und nviOccSensor

SNVT Type: SNVT_occupancy, Index 109
Function: Input variables for default of room occupancy. The current room occupancy affects the calculation of the effective setpoint ***nvoSetptEffect*** (see table 1) and is made available by ***nvoOccupEffect,*** the external temperature regulator. Initialization value for both variables: OC_NUL

nviOccManCmd: Default via building control system by: OC_OCCUPIED, OC_STANDBY, OC_UNOCCUPIED
nviOccSensor: Presence detection in the room by: OC_OCCUPIED, OC_UNOCCUPIED

nviOccManCmd	nviOccSensor	>>>	nvoOccupEffect	nvoSetptEffect
OC_NUL	OC_NUL	>>>	OCCUPIED	nciSetpoint + nvoSetptOffset **or** nviSetpoint + nvoSetptOffset
OC_OCCUPIED	****	>>>		
****	OC_OCCUPIED	>>>		
OC_STANDBY	OC_NUL OC_UNOCCUPIED	>>>	STANDBY	nciSetpoint + nvoSetptOffset **or** nviSetpoint + nvoSetptOffset
OC_UNOCCUPIED	OC_NUL OC_UNOCCUPIED	>>>	UNOCCUPIED	nciSetpoint **or** nviSetpoint

Table 1: Room occupancy and effective setpoint

nvoHVACTemp

SNVT Type: SNVT_temp_p, Index 105
Function: Output variable for the measured temperature value (resolution 1/100 °C). Data output is made in dependence on the configuration variables nciMaxSendTimeSC, nciMinSendTimeSC, nciMinDelta_T and approx. 4 s after reset.

nvoFixPtTemp

SNVT Type: SNVT_temp, Index 39
Function: Output variable for measured temperature value (resolution 1/10 °C). Data output is made analog to nvoHVACTemp.

nvoSetpoint

SNVT Type: SNVT_lev_percent, Index 81
Function: Output variable for position of setpoint(0 - 100 %). Data output is made in dependence on the configuration paramaters nciMaxSendTimeSC, nciMinSendTimeSC, nciMinDelta_S, as well as upon change of room occupancy and after approx. 4 s. after reset.

nvoSetptOffset

SNVT Type: SNVT_temp_p, Index 105
Function: Output variable for setpoint correction, which can be set with the setpoint adjuster. As a standard, the value range is lying between -3 and +3 K and can be adjusted by ***nciSpOffsetRange.*** Data output is made analog to nvoSetpoint.

nvoSetptEffect

SNVT Type: SNVT_temp_p, Index 105
Function: Output variable for effective setpoint. The effective setpoint is calculated via the defaults of nviSetpoint respectively nciSetpoint and setpoint adjustment, set-up at the device (see table 1). Data output is made analog to nvoSetpoint.

nvoOccupEffect

SNVT Type: SNVT_occupancy, Index 109
Function: Output variable for effective room occupancy (see table 1). Data output is made after value change, in dependence on the configuration variables nciMaxSendTimeSC and 4 s after reset.

Configuration Parameter Space Comfort Control Command Module:

nciTempOffset

SCPT Type: SCPToffsetTemp, Index 70, SNVT_temp_p
Function: Offset for temperature value. By means of this parameter, a software calibration is possible. Please note the remarks regarding flush mounting room temperature sensors with transducers.
!! The sensor is calibrated upon production. A change of the value overwrites the adjusted values of !! the manufacturer.

nciMaxSendTimeSC

SCPT Type: SCPTmaxSendTime, Index 49, SNVT_time_sec
Function: Heartbeat function. Stipulates the interval time, after which all output variables of the object are sent independent of a value change. By means of the input values = 0, the hearbeat function is deactivated. (Preset value: 5min)

nciMinSendTimeSC

SCPT Type: SCPTminSendTime, Index 52, SNVT_time_sec
Function: Stipulates the smallest update interval of the output variables for temperature and setpoint. An update is made after expiration of ***nciMinSendTimeSC***, if the temperature value of the output variables has changed by more than ***nciMinDelta_T*** bzw. ***nciMinDelta_S***. By means of the input values = 0, the function is deactivated (preset value: 5 sec.).

nciMinDelta_T

SCPT Type: SCPTminDeltaTemp, Index 64, SNVT_temp_p
Function: If the temperature changes by the adjusted value ***nciMinDelta_T***, the new temperaure values are transmitted. The function depends on the adjustment of the parameter ***nciMinSendTimeSC***.
(Range >= 0 °C; preset value: 0,30 °C)

nciMinDelta_S

SCPT Type: SCPTminDeltaTemp, Index 64, SNVT_temp_p
Function: If the setpoint temperature changes by the set value ***nciMinDelta_S*** , the new setpoints are trasnmitted. The function depends on the adjustment of the parameter ***nciMinSendTimeSC***.
(Range >= 0 °C; preset value: 0,10 °C)

nciSetpoint

SCPT Type: SCPTsetpoint, Index 213, SNVT_temp_p
Function: Default of basic setpoint for calculation of effective setpoint (table 1). (Preset value: 22,00 °C)

nciSpOffsetRange

UCPT Type: UCPTspOffsetRng, Index 12, SNVT_temp_p
Function: Configuration parameter for the range of adjustable setpoint correction, i.e. the preset default setpoint can be changed by the user by the value +/- nciSpOffsetRange. (Preset value: 3)

LED Actuator Object

The object contains the functions for control of the LEDs via different network variables.

Network Variables LED Actuator Object:

nviLED1_sw (left LED)

SNVT Type: SNVT_switch, Index 95
Function: Control of left LED via the input variable type Typ SNVT_switch.
0.0 0 ==> LED = OFF
100.0 1 ==> LED = ON

nviLED1_occu (left LED)

SNVT Type: SNVT_occupancy, Index 109
Function: Control of LED via input variable type SNVT_occupancy.
OC_UNOCCUPIED ==> LED = OFF
OC_OCCUPIED ==> LED = ON

nviLED2_sw (right LED)

SNVT Type: SNVT_switch, Index 95
Function: Control of right LED via input variable type SNVT_switch.
0.0 0 ==> LED = OFF
100.0 1 ==> LED = ON

nviLED2_occu (right LED)

SNVT Type: SNVT_occupancy, Index 109
Function: Control of LED via the input variable type SNVT_occupancy.
OC_UNOCCUPIED ==> LED = OFF
OC_OCCUPIED ==> LED = ON

Digital Input Object

The Object contains the functions for evaluation of a 4-fold key respectively switch and presence key.

Network Variables Digital Input Object:

nvoButton_sw

SNVT Type: SNVT_switch, Index 95
Function: Output variable for switch contact of presence key for meassage pressed/ not pressed.

0.0 0 ==> Presence key not pressed
100.0 1 ==> Presence key pressed

The output variable is output after change of input status, after expiration of heartbeat time (nciMaxSendTimeDI) and 4 s after module reset.

nvoButton_occu

SNVT Type: SNVT_occupancy, Index 109
Function: Output variable for presence detection in the room with overtime function. By button actuation, the output variable ***nvoButton_occu*** receives the value OCCUPIED. After expiration of delay time ***nciBypassTime*** it is set back to the value UNOCCUPIED. Each button actuation re-starts the timer. nvoOccupancy can be bound to the input variable nviOccSensor for presence detection and septpoint selection. Data output is made analog to nvoButton_sw.

nvoDiValue[1...4]

SNVT Type: SNVT_switch, Index 95
Function: Status of external potential-free digtial inputs. Data output is made analog to nvoButton_sw.
Potential-free contact closed ==> nvoDiValue[1...4] = 100.0 1
Potential-free contact open ==> nvoDiValue[1...4] = 0.0 0

Speciality for Model WRF07PS.. (with rocker switch)
nvoDiValue2 = 100.0 1 ==> switch in upper position
nvoDiValue3 = 100.0 1 ==> switch in down position
nvoDiValue2/3 = 0.0 0 ==> switch in middle position

Speciality for Model WRF07..2T.. (with second push button)
nvoDiValue4 = 100.0 1 ==> push button pressed
nvoDiValue4 = 0.0 0 ==> push button released

nvoAllValues

SNVT Type: SNVT_state, Index 83
Function: Status of all digital inputs of a collective-NV. Data output is made analog to nvoButton_sw.
Presence key = .bit0
DI1 = .bit1
DI2 or rocker switch up = .bit2
DI3 or rocker switch down = .bit3
DI4 or 2. oush button = .bit4

nvoFanSpeed

SNVT Type: SNVT_switch, Index 95
Function: Specially for evaluation of externally connected rotary switch. For fan speed regulation the output variable ***nvoFanSpeed*** applies, whereas the number of fan speed steps can be configured by ***nciFanSpdStages.*** Data output is made analog to nvoButton_sw.
Speciality for Model WRF07PS.. (with rocker switch): The rocker switch is internally connected to the digital inputs 2 and 3.

nciFanSpdStages = 1

Lüfterstufe	nvoFanSpeed .value	nvoFanSpeed .state
AUTO	0 %	-1
0	0 %	1
1	100 %	1

nciFanSpdStages = 2

Lüfterstufe	nvoFanSpeed .value	nvoFanSpeed .state
AUTO	0 %	-1
0	0 %	1
1	50 %	1
2	100 %	1

nciFanSpdStages = 3

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

Configuration Parameter Digital Input Object:

nciMaxSendtimeDI

SCPT Type: SCPTmaxSendTime, Index 49, SNVT_time_sec
Function: Heartbeat function. Stipulates the interval time, after which the output variables are sent, independently of a value change. By means of the input values = 0, the heartbeat function is deactivated. (Preset value: 0)

nciBypassTime

SCPT Type: SCPTbypassTime, Index 34, SNVT_time_min
Function: Delay time in minutes. After expiration of nciOsBypassTime the output variable nvoOccupancy is set back to OC_Unoccupied. (Preset value: 90 min)

nciFanSpdStages

UCPT Type: UCPTfanSpdStages, Index 13, SNVT_count
Function: Configuration parameter for default of fan speed steps.
(Preset value: 3 ==> ON, 33,0 %, 66,5 %, 100,0 %, AUTO)

General Remark:

Configuration Parameter:

The configuration parameters are designed as configuration network variables. Thereby they are also available as bindable network variables with virtual functional block. Thus parameter chanes are also possible via another LON-node even without installation tool.
!! An update of the variables is directly written into the non-volatile memory of hardware. The user has to make !! sure, that the total number of writing cycles does not exceed maximum capacity of non-volatile memory !! (dimension < 10000).