

Software Description

Subject to technical alteration
Issue 21.01.11

Softwareapplication wrf04_co2_01

1 Overview

Standard application for temperature, relative humidity and CO2 measuring and data output. All functions are converted under consideration of the LonMark® function profile **1040 Temperature Sensor** and **1050 Relative Humidity Sensor** and **1070 CO2 Sensor**. The application uses standard network variables (SNVT) and standard configuration properties (SCPT).

Output Variables:

Temperature:

nvoHVACTemp (SNVT_temp_p)
nvoFixPtTemp (SNVT_temp)
nvoT_HighLimit (SNVT_switch)
nvoT_LowLimit (SNVT_switch)

AirQuality:

nvoCO2_ppm (SNVT_ppm)
nvoCO2_HighLimit (SNVT_switch)

Relative Humidity:

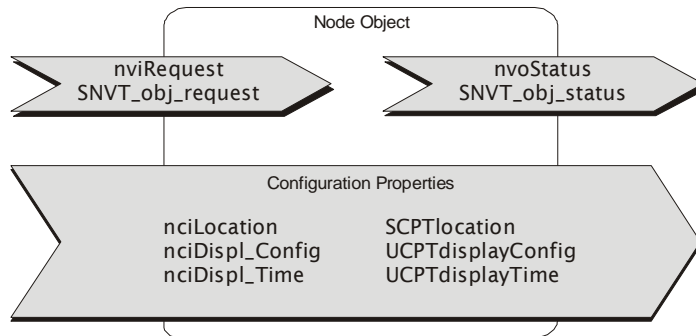
nvoHVACRH (SNVT_lev_percent)
nvoRH_HighLimit (SNVT_switch)
nvoRH_LowLimit (SNVT_switch)

Limit switch:

The sensor object offers the additional option to configure an upper and lower limiting value by means of hysteresis values. Output is made by the variables *nvoxx_LowLimit* and *nvoxx_HighLimit* of type SNVT_switch.

2 Node Object

Application wrf04_co2_01 ID: 9F:FF:AD:0A:1E:06:04:03



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

2.1 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.

2.2 Output Variables Node Object

nvoStatus

SNVT Type: SNVT_obj_status, Index 93

Function: Output variable with the required 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 property in the device available to the LON integration tool.

2.1 Configuration Parameter Node Object

SCPTlocation

SCPT Index: 17, SNVT_str_asc

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

UCPTdisplayTime

UCPT Index: 16, SNVT_time_sec

Function: The configuration property defines the period of time of a display message respectively the Update interval of the display. (Preset value: 5,0 sec)

Node Object

UCPTdisplConfig

UCPT Index: 46, SNVT_state

Function: By UCPTdisplConfig the display type and the values that shall be indicated in the main field can be configured. If several measuring values are shown, the display toggles between the measuring values in the time interval UCPTdisplayTime.

UCPTdisplConfig.bit[0] = 1* ==> Room temperature displayed

UCPTdisplConfig.bit[0] = 0 ==> Room temperature not displayed

UCPTdisplConfig.bit[1] = 1* ==> CO2 displayed

UCPTdisplConfig.bit[1] = 0 ==> CO2 not displayed

UCPTdisplConfig.bit[2] = 1 ==> Relative humidity displayed

UCPTdisplConfig.bit[2] = 0* ==> Relative humidity not displayed

UCPTdisplConfig.bit[8] = 1* ==> °C is the unit of measurement for the temperature display

UCPTdisplConfig.bit[8] = 0 ==> °F is the unit of measurement for the temperature display

UCPTdisplConfig.bit[9] = 1* ==> Decimal point for temperature displayed

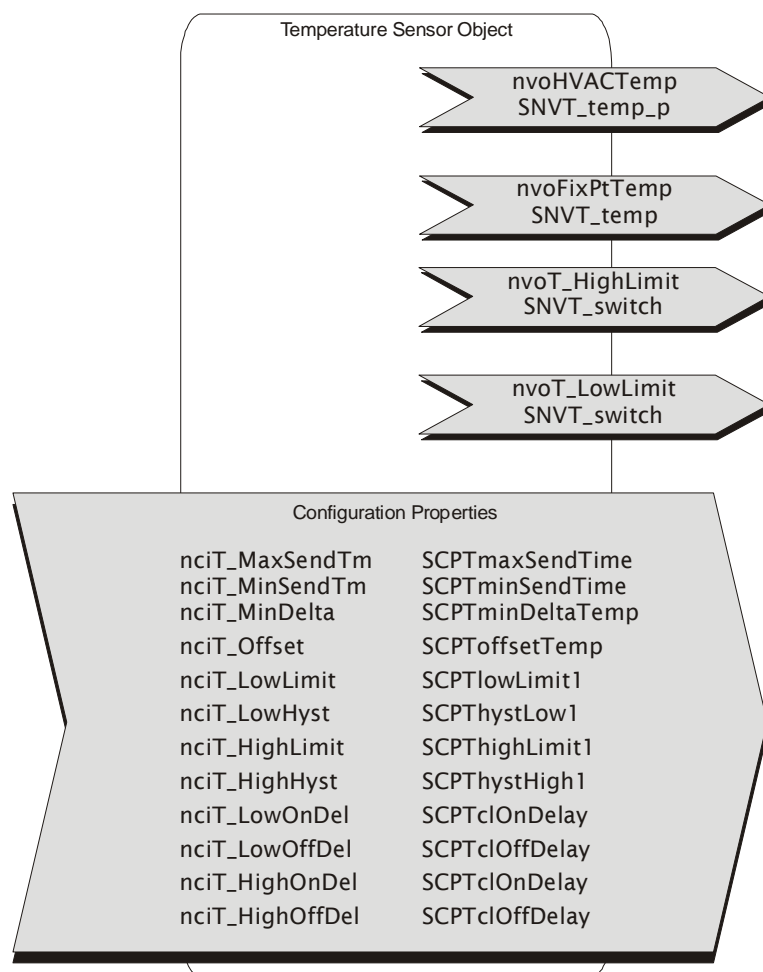
UCPTdisplConfig.bit[9] = 0 ==> Decimal point for temperature not displayed

UCPTdisplConfig.bit[10] = 1* ==> Decimal point for humidity displayed

UCPTdisplConfig.bit[10] = 0 ==> Decimal point for humidity not displayed

* = present values

3 Temperature Sensor Object



The object includes the functions for temperature measuring, evaluation of limit switch and data output.

3.1 Network Variables Temperature Sensor Object

nvoHVACTemp

SNVT Type: SNVT_temp_p, Index 105

Function: Output variable for measured temperature value (resolution 1/100 °C). Data output is made depending on the the configuration parameters *nciT_MinSendTm*, *nciT_MaxSendTm*, *nciT_MinDelta*, upon change of limit switch and approx. 5 sec. 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*.

nvoT_LowLimit

SNVT Type: SNVT_switch, Index 95

Function: Output variable of limit switch for lower limiting value. If the lower limiting value is under-run ($nciT_LowLimit - nciT_LowHyst / 2$) for the time *nciT_LowOnDel* **nvoT_LowLimit = 100.0 1** is set.

Temperature Sensor Object

If the lower limiting value ($nciT_LowLimit + nciT_LowHyst / 2$) is exceeded for the time $nciT_LowOffDel$ **nvoT_LowLimit = 0.0 0** is set.

Data output is made upon change of output value, depending on $nciT_MaxSendTm$ and approx. 5 sec. after reset.

nvoT_HighLimit

SNVT Type: SNVT_switch, Index 95

Function: Output variable of the limit switch for upper limiting value if the upper limiting value ($nciT_HighLimit + nciT_HighHyst / 2$) is exceeded for the time $nciT_HighOnDel$ **nvoT_HighLimit = 100.0 1** is set. If the upper limiting value ($nciT_HighLimit - nciT_HighHyst / 2$) is under-run for the time $nciT_HighOffDel$ **nvoT_HighLimit = 0.0 0** is set. Data output is made upon change of output value, depending on $nciT_MaxSendTm$ and approx. 5 sec. after reset.

3.2 Configuration Parameter Temperature Sensor Object

nciT_MaxSendTm

SCPT Type: SCPTmaxSendTime, Index 49, SNVT_time_sec

Function: Heartbeat function. Stipulates interval period after which all output variables of the object are sent, independently on a value change. By means of the input values < 1 the heartbeat function is deactivated. (Preset value: 5 min)

nciT_MinSendTm

SCPT Type: SCPTminSendTime, Index 52, SNVT_time_sec

Function: Stipulates smallest update interval of the temperature output variables. An update is made after expiration of $nciT_MinSendTm$, if the temperature value has changed by more than $nciT_MinDelta$. By means of the Input values < 1 the function is deactivated. (Preset value: 5 sec)

nciT_MinDelta

SCPT Type: SCPTminDeltaTemp, Index 64, SNVT_temp_p

Function: If the temperature changes by the adjusted value $nciT_MinDelta$, the new temperature values are transmitted. The function is depending on the adjustment of the parameter $nciT_MinSendTm$. (Range ≥ 0 °C; Preset value: 0,30 °C)

nciT_Offset

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 on room temperature sensors in our „Infoblatt THK“.

!! The sensor is calibrated during production. A value change overwrites manufacturer's adjustments!!

nciT_LowLimit

SCPT Type: SCPTlowLimit1, Index 18, SNVT_temp_p

Function: Lower limiting value. (Value range = measuring range, preset value: 8,00 °C)

nciT_LowHyst

SCPT Type: SCPTHystLow1, Index 13, SNVT_temp_p

Function: Hysteresis value for calculation of lower switching threshold. (Preset value: 1,00 °C)

nciT_LowOnDel

SCPT Type: SCPTclOnDelay, Index 86, SNVT_time_sec

Function: Switch-on delay for lower limit switch nvoT_LowLimit. (Range: 0 - 6553 sec., Preset value: 0 sec.)

Temperature Sensor Object

nciT_LowOffDel

SCPT Type: SCPTcOffDelay, Index 85, SNVT_time_sec

Function: Switch-off delay for lower limit switch nvoT_LowLimit.
(Range: 0 - 6553 sec., Preset value: 0 sec.)

nciT_HighLimit

SCPT Type: SCPTHighLimit1, Index 9, SNVT_temp_p

Function: Upper limiting value. (Value range = measuring range, preset value: 40,00 °C)

nciT_HighHyst

SCPT Type: SCPTHystHigh1, Index 11, SNVT_temp_p

Function: Hysteresis value for calculation of upper switching treshold. (Preset value: 1,00 °C)

nciT_HighOnDel

SCPT Type: SCPTcOnDelay, Index 86, SNVT_time_sec

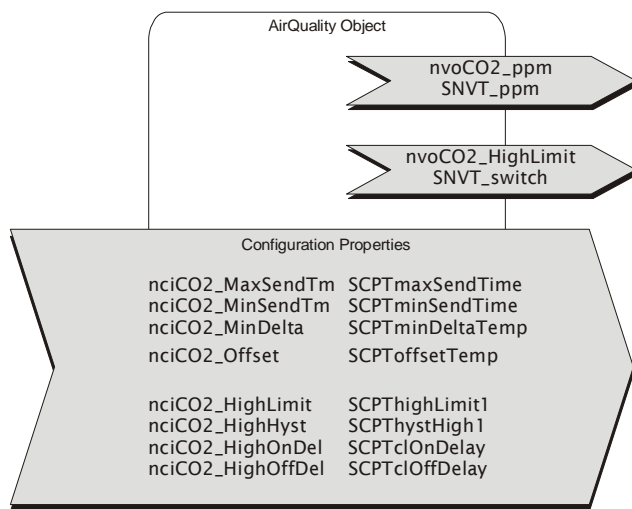
Function: Switch-on delay for upper limit switch nvoT_HighLimit.
(Range: 0 - 6553 sec., Preset value: 0 sec.)

nciT_HighOffDel

SCPT Type: SCPTcOffDelay, Index 85, SNVT_time_sec

Function: Switch-off delay for upper limit switch nvoT_HighLimit.
(Range: 0 - 6553 sec., Preset value: 0 sec.)

4 AirQuality Object



The object includes the functions for AirQuality measuring, evaluation of limit switch and data output.

4.1 Output Variables AirQuality Object

nvoCO2_HighLimit

SNVT Type: SNVT_switch, Index 95

Function: Output variable of the limit switch for upper limiting value if the upper limiting value ($\text{nciCO2_HighLimit} + \text{nciCO2_HighHyst} / 2$) is exceeded for the time *nciCO2_HighOnDel* **nvoCO2_HighLimit = 100.0 1** is set. If the upper limiting value ($\text{nciCO2_HighLimit} - \text{nciCO2_HighHyst} / 2$) is under-run for the time *nciCO2_HighOffDel* **nvoCO2_HighLimit = 0.0 0** is set. Data output is made upon change of output value, depending on *nciCO2_MaxSendCO2m* and approx. 5 sec. after reset.

With input network variable *nviHighLimOff* limit could be switched off.

nvoCO2_ppm

SNVT Type: SNVT_ppm, Index 29

Function: Output variable for measured temperature value (resolution 1ppm).

4.2 Input Variables AirQuality Object

nviHighLimOff

SNVT Type: SNVT_switch, Index 95

Function: *nviHighLimitOff* = 0.0 0 limit output is enabled via *nvoCO2_HighLimit*.
nviHighLimitOff = 100.0 1 *nvoCO2_HighLimit* is set to 100.0 1
nviHighLimitOff = 0.0 1 *nvoCO2_HighLimit* is set to 0.0 0

4.3 Configuration Parameter for AirQuality Object

nciCO2_MaxSendTm

SCPT Type: SCPTmaxSendTime, Index 49, SNVT_time_sec

Function: Heartbeat function. Stipulates interval period after which all output variables of the object are sent, independently on a value change. By means of the input values < 1 the heartbeat function is deactivated. (Preset value: 5 min)

nciCO2_MinSendTm

SCPT Type: SCPCO2minSendTime, Index 52, SNVCO2_time_sec

Function: Stipulates smallest update interval of the CO2 output variables. An update is made after expiration of *nciCO2_MinSendTm*, if the CO2 value has changed by more than *nciCO2_MinDelta*. By means of the input values < 1 the function is deactivated. (Preset value: 5 sec).

nciCO2_MinDelta

SCPT Type: SCPCsndDelta, Index 27, SNVT_ppm

Function: If the CO2-Value changes by the adjusted value *nciCO2_MinDelta*, the new CO2-values are transmitted. The function is depending on the adjustment of the parameter *nciCO2_MinSendTm*. (Range >= 0 ppm; Preset Value: 50ppm)

nciCO2_Offset

SCPT Type: SCPToffset, Index 26, SNVT_ppm

Function: Offset for CO2-Value. By means of this parameter a software calibration is possible.

nciCO2_HighLimit

SCPT Type: SCPTHighLimit1, Index 9, SNVT_ppm

Function: Upper limiting value. (Value Range = measuring range, preset value: 1200 ppm)

nciCO2_HighHyst

SCPT Type: SCPTHystHigh1, Index 11, SNVT_ppm

Function: Hysteresis value for calculation of upper switching threshold. (Preset value: 100ppm)

nciCO2_HighOnDel

SCPT Type: SCPTclOnDelay, Index 86, SNVT_time_sec

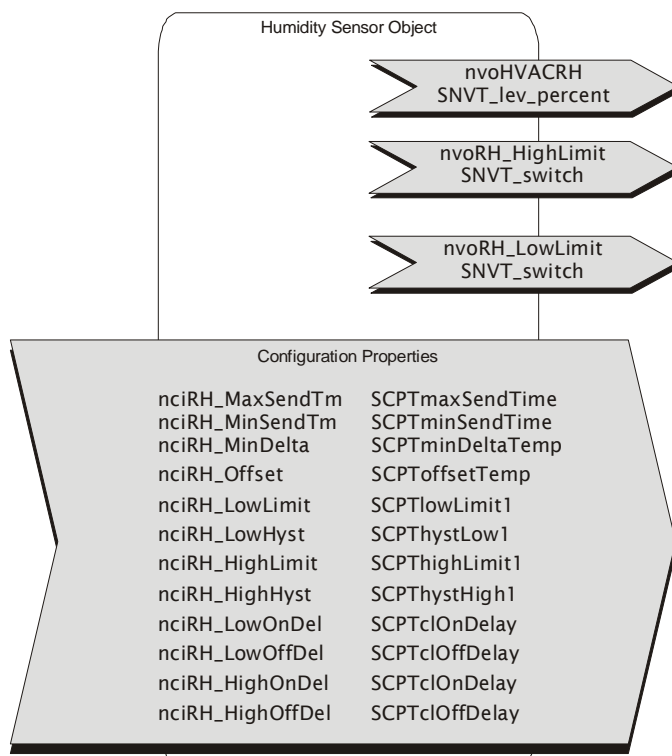
Function: Switch-on delay for upper limit switch nvoCO2_HighLimit. (Range: 0 - 6553 sec., preset value: 0 sec.)

nciCO2_HighOffDel

SCPT Type: SCPTclOffDelay, Index 85, SNVT_time_sec

Function: Switch-off delay for upper limit switch nvo CO2_HighLimit.

5 Relative Humidity Sensor Object



The object includes the functions for relative humidity measuring, evaluation of limit switch and data output.

5.1 Output variables Relative Humidity Sensor Object

nvoHVACRH

SNVT Type: SNVT_lev_percent, Index 105

Function: Output variable for measured relative humidity value (resolution 0,1%). Data output is made depending on the the configuration parameters *SCPTmaxSendTime*, *SCPTminSendTime* and *SCPTminDeltaTemp*, 1,5 to 4 s after reset.

nvoRH_LowLimit

SNVT Type: SNVT_switch, Index 95

Function: Output variable of limit switch for lower limiting value. If the lower limiting value is under-run ($\text{nciRH_LowLimit} - \text{nciRH_LowHyst} / 2$) for the time *nciRH_LowOnDel* **nvoRH_LowLimit = 100.0 1** is set.

If the lower limiting value ($\text{nciRH_LowLimit} + \text{nciRH_LowHyst} / 2$) is exceeded for the time *nciRH_LowOffDel*

nvoRH_LowLimit = 0.00 is set.

Data output is made upon change of output value, depending on *nciRH_MaxSendRHm* and approx. 5 sec. after reset.

nvoRH_HighLimit

SNVT Type: SNVT_switch, Index 95

Function: Output variable of the limit switch for upper limiting value

If the upper limiting value ($\text{nciRH_HighLimit} + \text{nciRH_HighHyst} / 2$) is exceeded for the time *nciRH_HighOnDel*

nvoRH_HighLimit = 100.0 1 is set.

Relative Humidity Sensor object

If the upper limiting value ($\text{nciRH_HighLimit} - \text{nciRH_HighHyst} / 2$) is under-run for the time *nciRH_HighOffDel*

nvoRH_HighLimit = 0.00 is set.

Data output is made upon change of output value, depending on *nciRH_MaxSendTm* and approx. 5 sec. after reset.

5.2 Configuration parameter Relative Humidity Sensor Object

nciRH_MaxSendTm

SCPT Type: SCPTmaxSendTime, Index 49, SNVT_time_sec

Function: Heartbeat function. Stipulates interval period after which all output variables of the object are sent, independently on a value change. By means of the input values < 1 the heartbeat function is deactivated. (Preset value: 5 min)

nciRH_MinSendTm

SCPT Type: SCPTminSendTime, Index 52, SNVT_time_sec

Function: Stipulates smallest update interval of the relative humidity output variables. An update is made after expiration of *nciRH_MinSendTm*, if the relative humidity value has changed by more than *nciRH_MinDelta*. By means of the input values < 1 the function is deactivated. (Preset value: 5 sec)

nciRH_MinDelta

SCPT Type: SCPTminDeltaTemp, Index 64, SNVT_lev_percent

Function: If the relative humidity changes by the adjusted value *nciRH_MinDelta*, the new relative humidity values are transmitted. The function is depending on the adjustment of the parameter *nciRH_MinSendTm*. (Range $\geq 0\%$; Preset value: 1,00 %)

nciRH_Offset

SCPT Type: SCPToffsetTemp, Index 70, SNVT_lev_percent

Function: Offset for relative humidity value. By means of this parameter a software calibration is possible.

nciRH_LowLimit

SCPT Type: SCPTlowLimit1, Index 18, SNVT_lev_percent

Function: Lower limiting value. (Value range = measure range, preset value: 20,00 %)

nciRH_LowHyst

SCPT Type: SCPTHystLow1, Index 13, SNVT_lev_percent

Function: Hysteresis value for calculation of lower switching threshold. (preset value: 5,00 %)

nciRH_LowOnDel

SCPT Type: SCPTclOnDelay, Index 86, SNVT_time_sec

Function: Switch-on delay for lower limit switch *nvoRH_LowLimit*.
(Range: 0 - 6553 sec., preset value: 0 sec.)

nciRH_LowOffDel

SCPT Type: SCPTclOffDelay, Index 85, SNVT_time_sec

Function: Switch-off delay for lower limit switch *nvoRH_LowLimit*.
(Range: 0 - 6553 sec., preset value: 0 sec.)

nciRH_HighLimit

SCPT Type: SCPTHighLimit1, Index 9, SNVT_lev_percent

Function: Upper limiting value. (Value range = measuring range, preset value: 80,00 %)

nciRH_HighHyst

SCPT Type: SCPTHystHigh1, Index 11, SNVT_lev_percent

Function: Hysteresis value for calculation of upper switching threshold. (Preset value: 5,00 %)

nciRH_HighOnDel

SCPT Type: SCPTclOnDelay, Index 86, SNVT_time_sec

Function: Switch-on delay for upper limit switch *nvoRH_HighLimit*.
(Range: 0 - 6553 sec., preset value: 0 sec.)

nciRH_HighOffDel

SCPT Type: SCPTclOffDelay, Index 85, SNVT_time_sec

Function: Switch-off delay for upper limit switch *nvoRH_HighLimit*.
(Range: 0 - 6553 sec., preset value: 0 sec.)