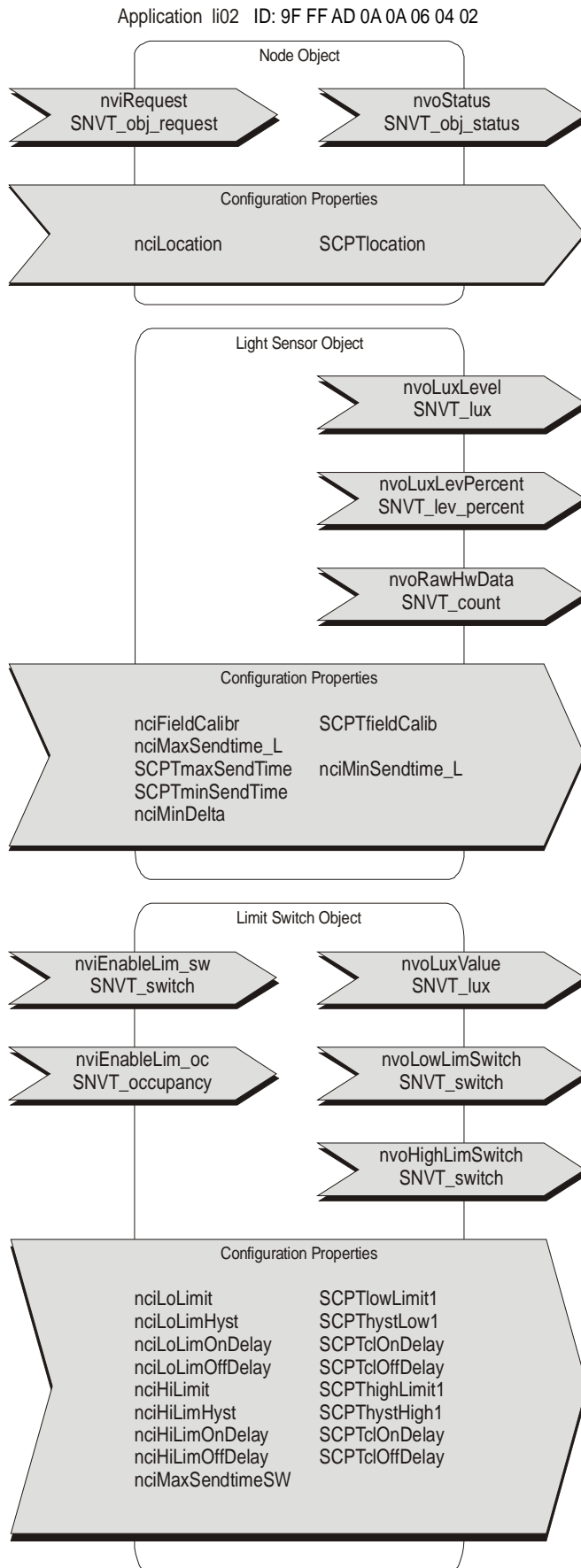


Software Application li02 (Sensing + limit switch)

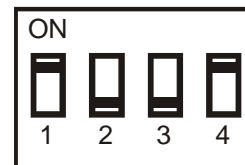
for sensors, model LI04, LI65 and LDF (FT-X1 transformer / FT3120 transceiver)



Application for measuring of light intensity, evaluation of two limit switches as well as data output.

The prescriptions of LonMark® function profile 1010 are observed.

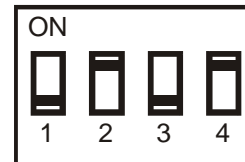
Measuring ranges: The light sensor disposes of measuring ranges 0 - 2.000 lux, 0 - 20.000 lux and 0 - 65.535 lux. The measuring ranges are selected via the DIP-switch at the device and via configuration parameter nciMeasureRange.

**DIP 1 - 3:**

Measuring range: 0 - 2.000 lux

DIP 4 = ON:

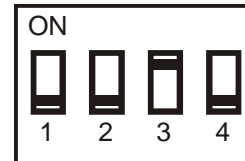
==> Sensor model: LDF

**DIP 1 - 3:**

Measuring range: 0 - 20.000 lux

DIP 4 = ON:

==> Sensor model: LDF

**DIP 1 - 3:**

Measuring range: 0 - 65.535 lux

DIP 4 = OFF:

==> Sensors model: LI04, LI65

Output variables: The measured light value is output by the variables type SNVT_lux, SNVT_lev_percent and SNVT_count.

Calibration: By means of an external luxmeter the exact light intensity can be detected and input via the parameter nciFieldCalibrir. The reflection factor is calculated automatically and both the measured and the final value of the measuring range are corrected, accordingly.

Limit switch: The Limit Switch Object offers the possibility to configure an upper and lower limit switch via a hysteresis value and delay times. The limit switches can be activated respectively deactivated by the input variables nviEnableLim_sw/_oc. Thereby the possibility is given to connect the function with a LON-occupancy sensor.

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

SNVTType: SNVT_obj_request, Index 92

Function: Input variables with functions RQ_NORMAL, RQ_UPDATE_STATUS and RQ_REPORT_MASK.

nvoStatus

SNVTType: SNVT_obj_status, Index 93

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

Configuration Parameter Node Object:

nciLocation

SCPTType: SCPTlocation, Index 17, SNVT_str_asc

Function: Additional input possibility to store information for identification of position.

Light Sensor Object

Object includes functions for measuring of light intensity and data output.

Network Variables Light Sensor Object:

nvoLuxLevel

SNVTType: SNVT_lux, Index 79

Function: Output variable for measured light intensity in Lux. Data output is made depending on configuration parameters nciMinSendtime_L, nciMaxSendtime_L and nciMinDelta and 3 s and after reset.

nvoLuxLevPercent

SNVTType: SNVT_lev_percent, Index 81

Function: Output variable for measured light intensity in % from the measuring range. Data output is made analog to nvoLuxLevel.

nvoRawHwData

SNVTType: SNVT_count, Index 8

Function: Output variable for measured light intensity as direct measuring result of 12-bit AD-converter. Data output is made analog to nvoLuxLevel.

Configuration Parameter Light Sensor Object:

nciFieldCalibr

SCPTType: SCPTfieldCalib, Index 90, SNVT_lux

Function: Configuration parameter for self-calibration of light detector. Exact light intensity can be detected and stored via an external Luxmeter. The reflection factor is calculated automatically and the measured value is corrected, accordingly. (Preset value: 0 Lux ==> Field calibration deactivated)

nciMaxSendtime_L

SCPTType: SCPTmaxSendTime, Index 49, SNVT_time_sec

Function: Heartbeat function. Stipulates interval period after which light intensity is sent independent on result changes. By means of the input values < 1 sec. the heartbeatfunction is deactivated. (Preset value: 60 sec.)

nciMinSendtime_L

SCPTType: SCPTminSendTime, Index 52, SNVT_time_sec

Function: Stipulates the smallest update-interval of output variables. An update is made after expiration of „nciMinSendtime_L“, if the light value has changed by more than „nciMinDelta“. Minsend function is disabled with input value < 1 sec. (Preset value: 1 sec.)

nciMinDelta

SCPTType: SCPTminDeltaLevel, Index 88, SNVT_lev_cont

Function: If light intensity changed by „nciMinDelta“ (% from current measuring value), the new values are transmitted. Function depends on adjustment of „nciMinSendtime_L“.
(Range: 0 % - 100 %; preset value: 5 %)

nciMeasureRange

SCPTType: SCPTmaxRnge, Index 20, SNVT_lux

Function: Configuration parameter for software set-up of measuring range. When using the configuration parameter nciFieldCalibr, the measuring end point values are corrected by the calculated reflection factor.

!! The set value must be in accordance with the adjustment of the DIP switches on the light sensor.

Measuring range 0 -2000 lux \Rightarrow DIP1 = ON, DIP2 = OFF, DIP3 = OFF \Rightarrow nciMeasureRange = 2000

Measuring range 0 -20000 lux \Rightarrow DIP1 = OFF, DIP2 = ON, DIP3 = OFF \Rightarrow nciMeasureRange = 20000

Measuring range 0 -65535 lux \Rightarrow DIP1 = OFF, DIP2 = OFF, DIP3 = ON \Rightarrow nciMeasureRange = 65535

With final input, the output value nvoLuxLevel is set = 0.

Limit Switch Object

Object includes function for evaluation of two limit switches which can be configured via hysteresis values and delay periods.

Network Variable Limit Switch Object:**nviEnableLim_sw / nviEnableLim_oc**

SNVTType: SNVT_switch, Index 95 / SNVT_occupancy, Index 109

Function: Input variables for deactivation of limit switches. Thereby, it is possible to connect the function of limit switch to a LON- occupancy sensor.

Limit switch activated: nviEnableLim_sw = 100.0 1 AND nviEnableLim_oc=OC_OCCUPIED

Limit switch disabled: nviEnableLim_sw = 0.0 0 OR nviEnableLim_oc \neq OC_OCCUPIED

Initialization values after reset: 100.0 1 and OC_OCCUPIED, i.e. limit switches are activated.

nvoLuxValue

SNVTType: SNVT_lux, Index 79

Function: Output variables for measured light intensity in Lux
Data output is made analog to nvoLuxLevel.

nvoLowLimSwitch

SNVTType: SNVT_switch, Index 95

Function: Output variable of limit switch for lower limit value.

If the lower limit (nciLoLimit - nciLoLimHyst/2) is not reached for a time being „nciLoLimOnDelay“ nvoLowLimSwitch = 100.0 1 is automatically set.

If low limit (nciLoLimit + nciLoLimHyst/2) is exceeded for a time being „nciLoLimOffDelay“, nvoLowLimSwitch = 0.0 0 is set.

Data output is effected upon change of output value, depending on nciHeartbeat and approx. 3 sec. after reset. (For status changes and output variables please refer to function diagram).

nvoHighLimSwitch

SNVTType: SNVT_switch, Index 95

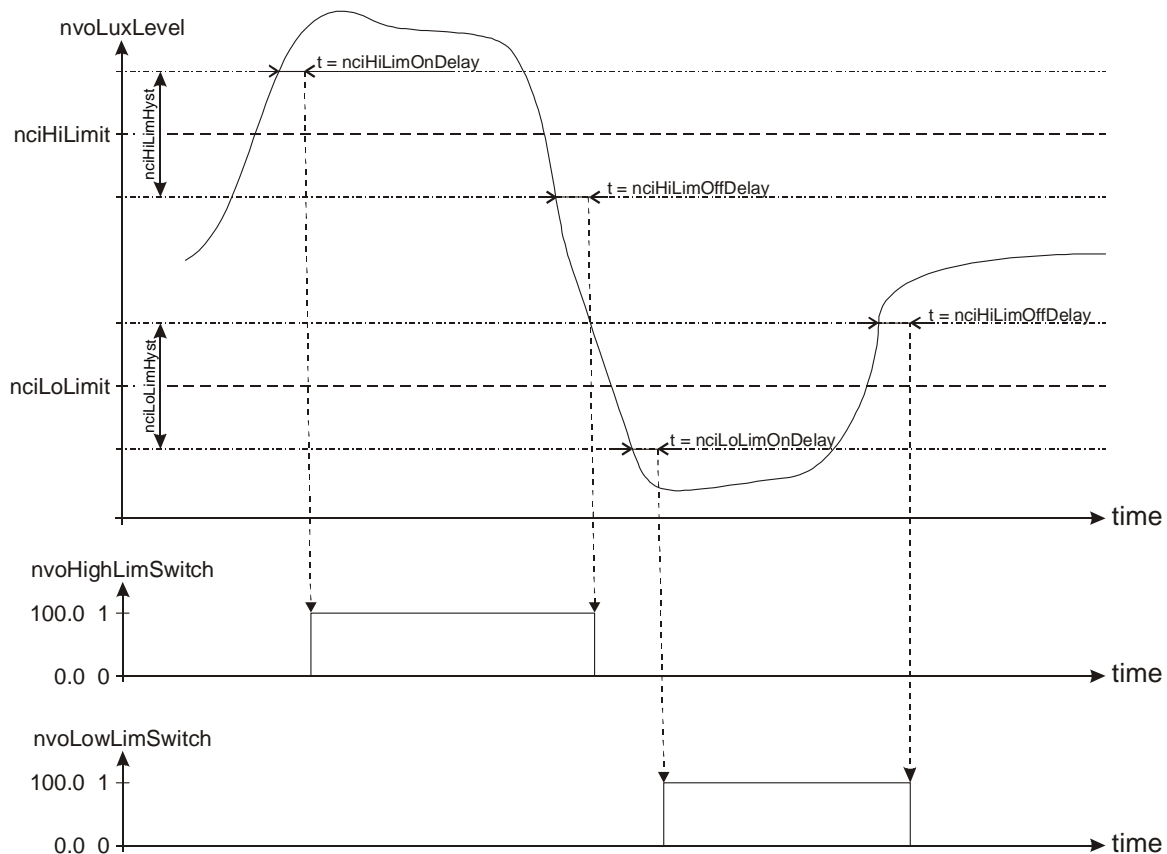
Function: Output variable for high limit switch.

If upper limit (nciHiLimit + nciHiLimHyst/2) is exceeded for a time being „nciHiLimOnDelay“ nvoHighLimSwitch = 100.0 1 is set.

If upper limit (nciHiLimit - nciHiLimHyst/2) is not reached for a time being „nciHiLimOffDelay“ nvoHighLimSwitch = 0.0 0 is set.

Data output is effected upon change of output value, depending on nciHeartbeat and approx. 3 sec. after reset. (For status changes and output variables please refer to function diagram).

Function Diagram Limit Switch



Configuration Parameter Limit Switch Object:

nciLoLimit

SCPTType: SCPTlowLimit1, Index 18, SNVT_lux

Function: Lower limit (Range: 0 - max. measuring range [lux], preset value: 0 lux)

nciLoLimHyst

SCPTType: SCPTthystLow1, Index 13, SNVT_lux

Function: Hysteresis value for calculation of lower switching steps.
(Range: 0 - max. measuring value [lux], preset value: 0 lux)

nciLoLimOnDelay

SCPTType: SCPTclOnDelay, Index 86, SNVT_time_sec

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

nciLoLimOffDelay

SCPTType: SCPTclOffDelay, Index 85, SNVT_time_sec

Function: Switching-off delay for lower limit switch nvoLowLimSwitch.
(Range: 0 - 6553 sec., preset value: 0 sec.)

nciHiLimit

SCPTType: SCPTHighLimit1, Index 9, SNVT_lux

Function: Upper limit switch
(Value range: 0 - max. measured value [lux], preset value: 2000)

nciHiLimHyst

SCPTType: SCPTthystHigh1, Index 11, SNVT_lux

Function: Hysteresis value for calculation of upper switching steps.
(Range: 0 - max. measured value [lux], preset value: 0 lux)

nciHiLimOnDelay

SCPTType: SCPTclOnDelay, Index 86, SNVT_time_sec

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

nciHiLimOffDelay

SCPTType: SCPTclOffDelay, Index 85, SNVT_time_sec

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

nciMaxSendtimeSW

SCPTType: SCPTmaxSendTime, Index 49, SNVT_time_sec

Function: Heartbeat interval. After expiration of time nciMaxSendtimeSW the output variables nvoHighLimSwitch and nvoLowLimSwitch are transmitted.
Heartbeat function is disabled with input values < 1 sec. (preset value: 0)

General Remarks:**Wink - Event**

Service LED is tripped and blinked two times.

Configuration Parameter:

A download of application overwrites manufacturer's configuration parameters.

Configuration parameters are designed as configuration network variables and are also available as bindable network variables within the virtual functional block. Thus parameter changes are possible even without installation tool via a different LON node.

**!! An update of variables is directly written into the non-volatile memory of hardware. User has to make sure
!! that total number of writing cycles does not exceed maximum capacity of non-volatile
!! memory (dimension <10000).**

