

BEFORE USE

Thank you for choosing M-System. Before use, please check contents of the package you received as outlined below.

If you have any problems or questions with the product, please contact M-System’s Sales Office or representatives.

■ PACKAGE INCLUDES:

- Discrete input module.....(1)
- NeuronID label.....(2)

■ MODEL NO.

Confirm Model No. marking on the product to be exactly what you ordered.

■ INSTRUCTION MANUAL

This manual describes necessary points of caution when you use this product, including installation, connection and basic maintenance procedures.

LNS Plug-in Software (model: R7LPLG) is usable to set up Functional Blocks. For detailed information, refer to the R7PLG Users Manual. The R7LPLG is downloadable at M-System’s web site: <http://www.m-system.co.jp>

POINTS OF CAUTION

■ POWER INPUT RATING & OPERATIONAL RANGE

- Locate the power input rating marked on the product and confirm its operational range as indicated below:
24V AC rating: 24V ±10%, 50/60 Hz, approx. 70mA
24V DC rating: 24V ±10%, approx. 40mA

■ GENERAL PRECAUTIONS

- The unit can acquire 16 points of discrete input, also pulse input can be acquired up to 8 points out of 16 points.
- When counter pulse and discrete are mixed and acquired, make sufficient consideration to them.
- Before you remove the unit or mount it, turn off the power supply and input signal for safety.

■ ENVIRONMENT

- Indoor use.
- When heavy dust or metal particles are present in the air, install the unit inside proper housing with sufficient ventilation.
- Do not install the unit where it is subjected to continuous vibration. Do not subject the unit to physical impact.
- Environmental temperature must be within -10 to +55°C (14 to 131°F) with relative humidity within 30 to 90% RH in order to ensure adequate life span and operation.

■ WIRING

- Do not install cables close to noise sources (relay drive cable, high frequency line, etc.).
- Do not bind these cables together with those in which noises are present. Do not install them in the same duct.

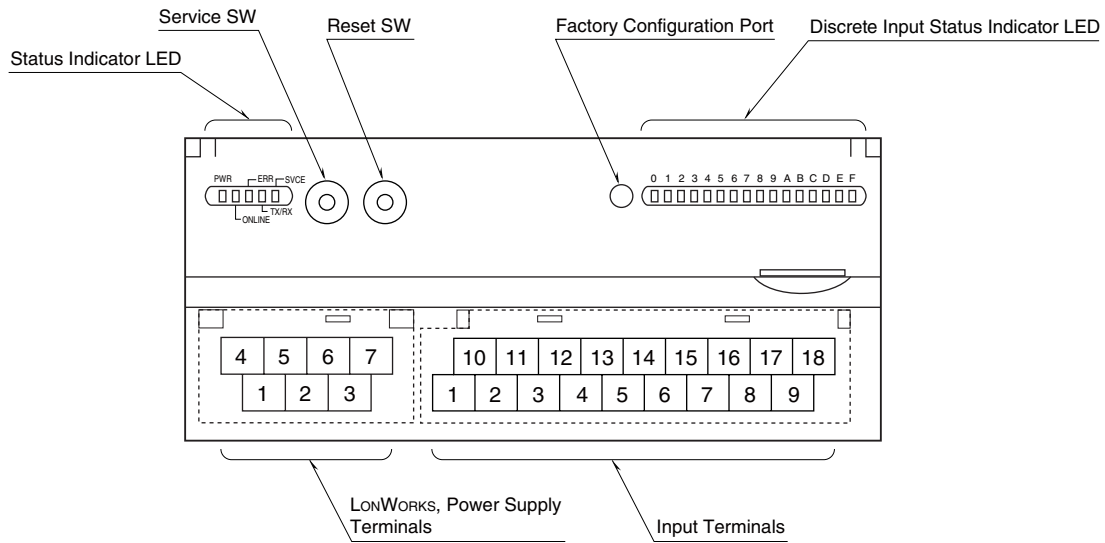
■ RESTRICTIONS WHEN USING LonMaker3.0 or 3.1

- Operating Environment
Please use LonMaker3.0 under the Environment of LNS3 Service Pack 8 and use LonMaker3.1 under the Environment of LonMaker3.1 Service Pack 3 or later.
Please use resource files of LonMark Resource File Ver12 or later.
- LNS Plug-in Software is not usable.
- The network variable of nvoCNTOut (fbCNT) is only SNVT_count_f.
- When registering a Device on LonMaker, please don’t use the following items.
External Interface Definition / Upload From Device
Specify Device Channel / Auto-Detect

■ AND

- The unit is designed to function as soon as power is supplied, however, a warm up for 10 minutes is required for satisfying complete performance described in the data sheet.

COMPONENT IDENTIFICATION



■ STATUS INDICATOR LED

| ID | COLOR | STATE | MEANING |
|--------|-------|----------------------|--|
| PWR | Green | ON | Internal 5V is normal |
| | | OFF | Internal 5V is abnormal. |
| ONLINE | Green | ON | Online |
| | | Blink approx. 0.5 Hz | Offline Sending/receiving of Network Variables has stopped. |
| | | Blink approx. 2 Hz | Receiving Wink Message |
| | | OFF | Abnormal state |
| ERR | Red | ON | Writing in the non-volatile memory |
| | | Blink | Abnormal state |
| | | OFF | Normal state |
| TX/RX | Green | ON | Sending/receiving Network Variables |
| | | OFF | Communication is lost. |
| SVCE | Green | ON | No network information |
| | | Blink approx. 0.5 Hz | Offline Sending/receiving of Network Variables has stopped. |
| | | OFF | Normal state |

■ DISCRETE INPUT STATUS INDICATOR LED

Used to show discrete input signal status.

- ON : LED ON
- OFF : LED OFF

Note: For firmware version 0.14 or smaller, when the discrete inputs are commissioned by LonMaker, the LEDs indicate the status of them.

■ SERVICE SWITCH

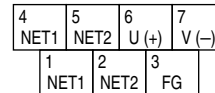
Used to identify the node in LONWORKS network configuration.

■ RESET SWITCH

Used to reset the Neuron Chip. Press the switch behind the front cover to reset.

Control functions are halted while completing resetting and restarting. Confirm no danger before conducting resetting.

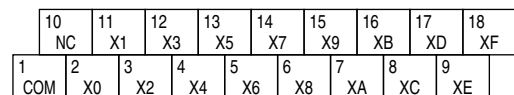
■ POWER SUPPLY, LONWORKS TERMINAL ASSIGNMENT



| NO. | ID | FUNCTION, NOTES |
|-----|-------|--------------------------|
| 1 | NET1 | LONWORKS communication 1 |
| 2 | NET2 | LONWORKS communication 2 |
| 3 | FG | FG |
| 4 | NET1 | LONWORKS communication 1 |
| 5 | NET2 | LONWORKS communication 2 |
| 6 | U (+) | Power input |
| 7 | V (-) | Power input |

Note: LONWORKS wiring must be paired between NET1 terminals and/or NET2 terminals.

■ INPUT TERMINAL ASSIGNMENT

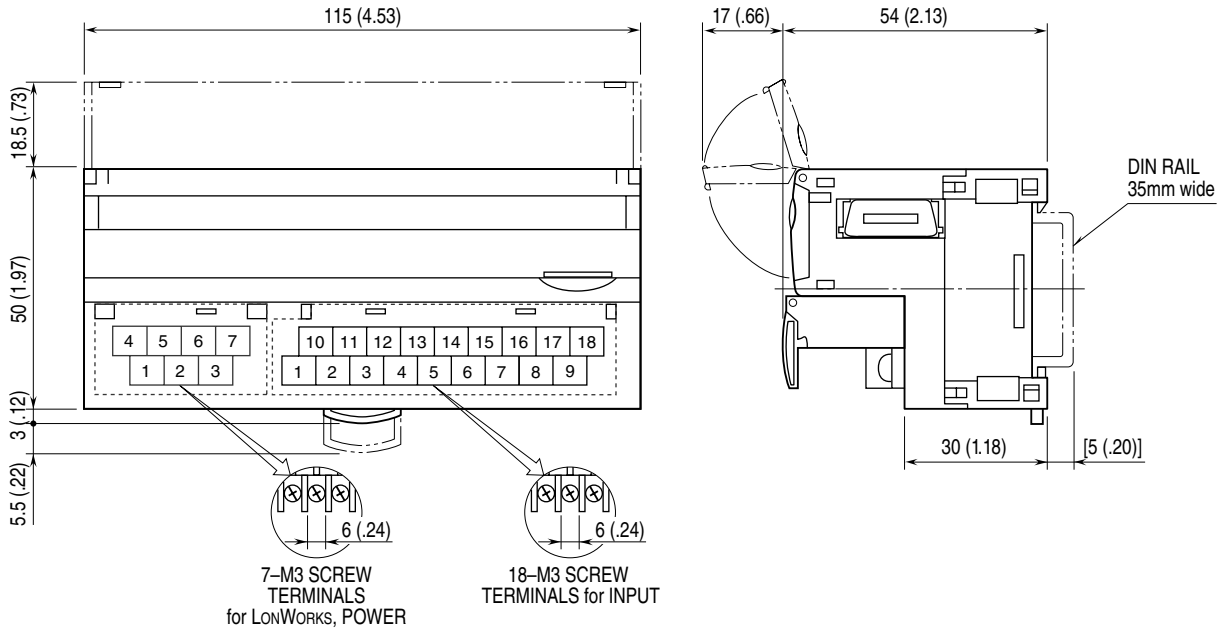


| NO. | ID | FUNCTION | NO. | ID | FUNCTION |
|-----|-----|----------|-----|----|---------------|
| 1 | COM | Common | 10 | NC | No Connection |
| 2 | X0 | Input 0 | 11 | X1 | Input 1 |
| 3 | X2 | Input 2 | 12 | X3 | Input 3 |
| 4 | X4 | Input 4 | 13 | X5 | Input 5 |
| 5 | X6 | Input 6 | 14 | X7 | Input 7 |
| 6 | X8 | Input 8 | 15 | X9 | Input 9 |
| 7 | XA | Input 10 | 16 | XB | Input 11 |
| 8 | XC | Input 12 | 17 | XD | Input 13 |
| 9 | XE | Input 14 | 18 | XF | Input 15 |

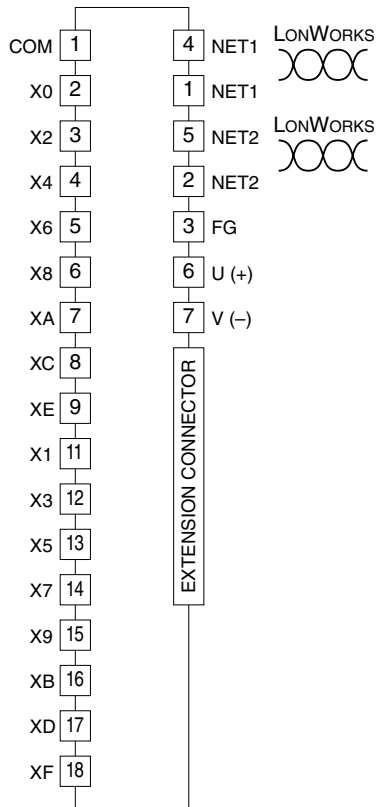
TERMINAL CONNECTIONS

Connect the unit as in the diagram below.

EXTERNAL DIMENSIONS unit: mm (inch)



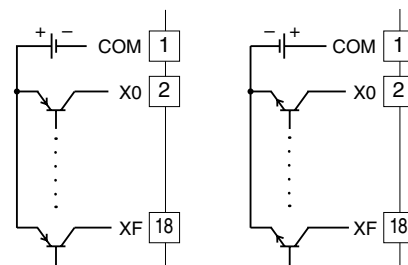
CONNECTION DIAGRAM



Input Connection Examples

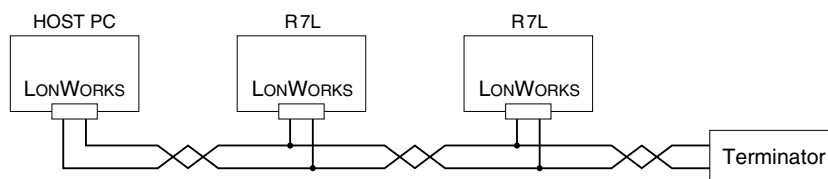
PNP Connection

NPN Connection



COMMUNICATION CABLE CONNECTIONS

■ HOST PC CONNECTION



WIRING INSTRUCTIONS

■ SCREW TERMINAL

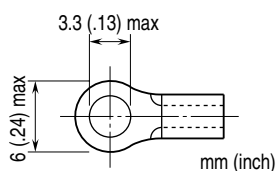
Torque: 0.5 N·m

■ SOLDERLESS TERMINAL

Refer to the drawing below for recommended ring tongue terminal size. Spade tongue type is also applicable.

Applicable wire size: 0.25 to 1.65 mm² (AWG 22 to 16)

Recommended manufacturer: Japan Solderless Terminal MFG. Co., Ltd, Nichifu Co., Ltd



DEVICE INTERFACE FILE

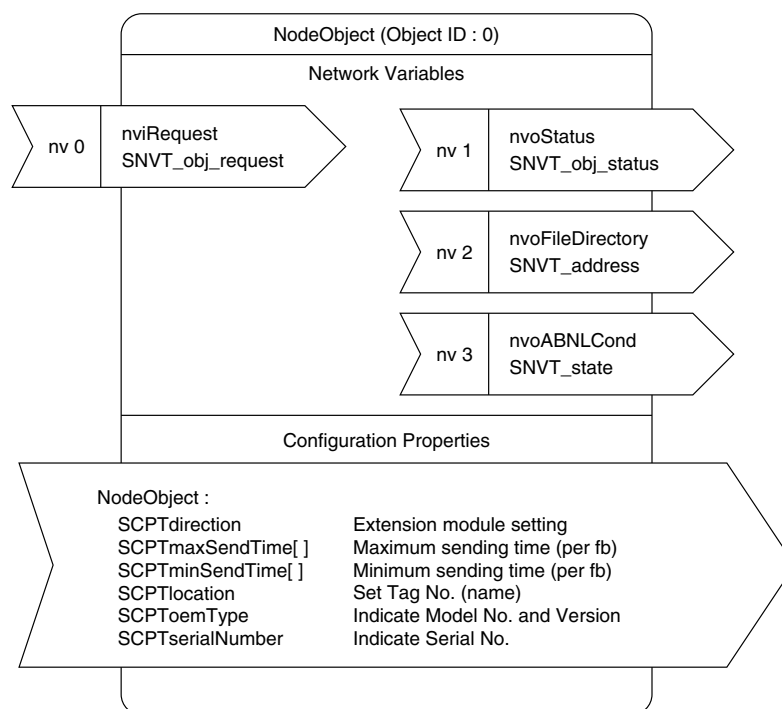
Device Interface File (XIF) is used to define a LONWORKS device when programmed on LonMaker. For this module, the following file is used:

R7L-DA16v113.XIF

The XIF files are downloadable at M-System's web site: <http://www.m-system.co.jp>

FUNCTIONAL BLOCKS

■ NodeObject



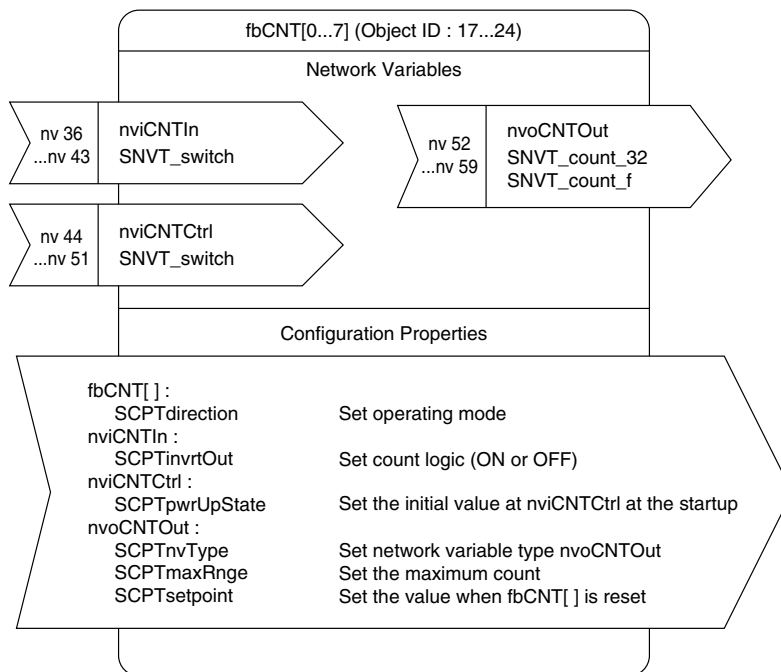
• Network Variables

| NETWORK VARIABLE | TYPE { Range } { Default } | EXPLANATIONS |
|------------------|----------------------------------|--|
| nviRequest | {SNVT_obj_request} | For use with LonMaker and other tools. |
| nvoStatus | {SNVT_obj_status} | For use with LonMaker and other tools. |
| nvoFileDirectory | {SNVT_address} | For use with LonMaker and other tools. Required to get access to Configuration Properties. |
| nvoABNLCond | {SNVT_state} | Shows the device status (All 0s in normal conditions). Bit 0 through Bit 9 : Invalid Bit 10 : E ² PROM Configuration Property check sum error Bit 11 : E ² PROM Count data check sum error (Bit 10 and Bit 11 can be reset to 0 by RQ_CLEAR_STATUS against NodeObject.) Bit 12 through Bit 15 : Invalid |

• Configuration Properties

| CONFIGURATION PROPERTY | NETWORK VARIABLE | TYPE { Range } { Default } | EXPLANATIONS |
|-----------------------------------|------------------|---|--|
| SCPTdirection | ---- | {SNVT_state} {0 or 1} {0,0,0,0,0,0,0,0, 0,0,0,0,0,0,0,0} | Bit 0, Bit 1: Setting the extension module (Power supply must be reset when this configuration property is changed.) 0,0 : Without extension module 1,0 : Discrete input (fb and other settings assigned to the 9th and following points are invalid with 8-point input module.) 0,1 : Discrete output (fb and other settings assigned to the 9th and following points are invalid with 8-point output module.) Set this property before an extension module is connected. Bit 2 through Bit 15 : Invalid |
| SCPTmaxSendTime [Number of fb] | ---- | {SNVT_time_sec} {0.0,10.0...3600.0} {0.0} | Maximum time interval to send network variables (per fb). (Power supply must be reset when this configuration property is changed.) Network variables are sent out in the specified intervals even when there is no change in the value. No sending when a value less than 10.0 is set. Invalid property when the assigned fb has no network variables to be sent to the network. |
| SCPTminSendTime [Number of fb] | ---- | {SNVT_time_sec} {0.0,0.2...3600.0} {1.0} | Minimum time interval to send network variables (per fb). (Power supply must be reset when this configuration property is changed.) Network variables are sent out in the specified intervals even when there are changes in the value faster than the interval. No sending when a value less than 0.2 is set. Invalid property when the assigned fb has no network variables to be sent to the network. |
| SCPTlocation | ---- | {SNVT_str_asc} {30-character string} {""} | Used to write Tag No. (name) |
| SCPToemType | ---- | {SNVT_str_asc} {e.g. "R7L-DA16_VER:0.10"} | Used to indicate Model No. and Version |
| SCPTserialNumber | ---- | {SNVT_str_asc} {e.g. "ZZ123456"} | Used to indicate Serial No. |

■ FUNCTIONAL BLOCK: fbCNT [0...7]



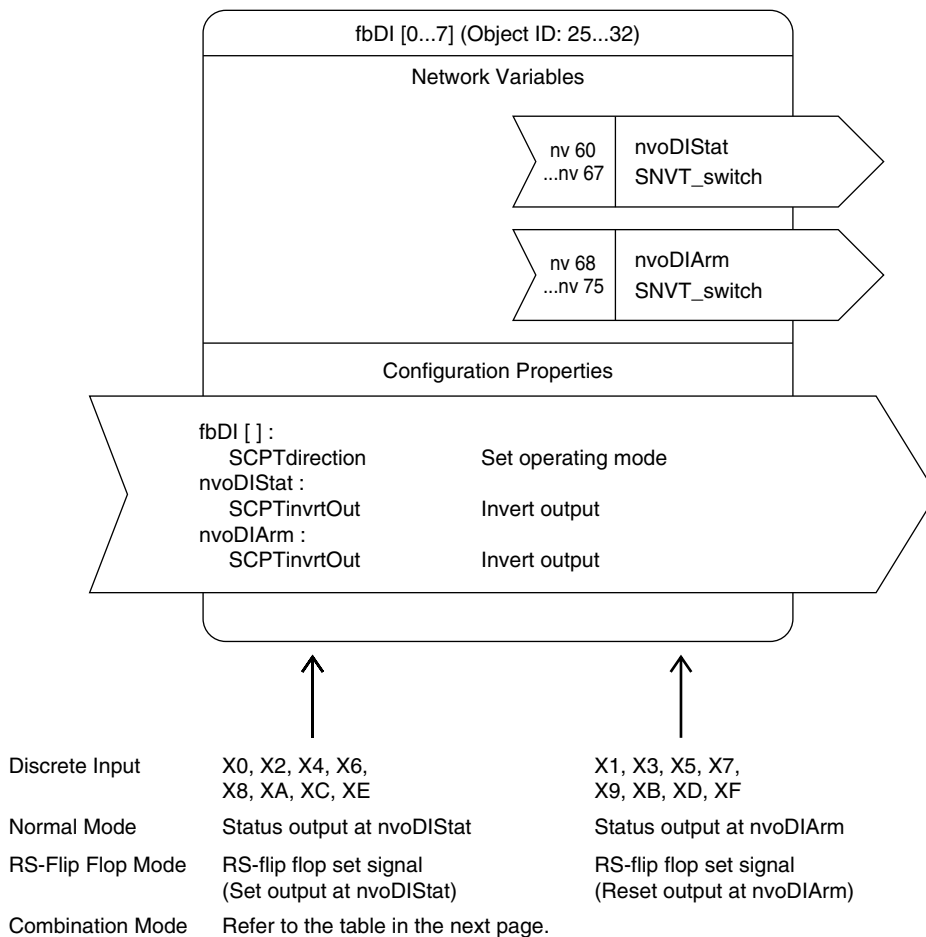
• Network Variables

| NETWORK VARIABLE | TYPE { Range } { Default } | EXPLANATIONS |
|------------------|---|---|
| nviCNTIn | {SNVT_switch} {0.0 0}, {100.0 1}, {Invalid} {0.0 0} | Counted object |
| nviCNTCtrl | {SNVT_switch} {0.0 0}, {100.0 1}, {Invalid} {0.0 0} | Controls operation of fbCNT 0.0 0 : Stop counting 100.0 1 : Start counting Invalid : Reset count value |
| nvoCNTOut | {SNVT_count_32} {0...999 999 999} {0} {SNVT_count_f} {0...999 999} {0} | Number of ON counts or accumulated time of ON status at nviCNTIn or the input terminal |

• Configuration Properties

| CONFIGURATION PROPERTY | NETWORK VARIABLE | TYPE { Range } { Default } | EXPLANATIONS |
|------------------------|------------------|---|--|
| SCPTdirection | ---- | {SNVT_state} {0 or 1} {0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0} | <p>Bit 0 through 5: Counted object</p> <p>0,0,0,0,0,0 : nviCNTIn</p> <p>1,0,0,0,0,0 : X0 1,0,0,0,1,0 : ExX0</p> <p>0,1,0,0,0,0 : X1 0,1,0,0,1,0 : ExX1</p> <p>1,1,0,0,0,0 : X2 1,1,0,0,1,0 : ExX2</p> <p>0,0,1,0,0,0 : X3 0,0,1,0,1,0 : ExX3</p> <p>1,0,1,0,0,0 : X4 1,0,1,0,1,0 : ExX4</p> <p>0,1,1,0,0,0 : X5 0,1,1,0,1,0 : ExX5</p> <p>1,1,1,0,0,0 : X6 1,1,1,0,1,0 : ExX6</p> <p>0,0,0,1,0,0 : X7 0,0,0,1,1,0 : ExX7</p> <p>1,0,0,1,0,0 : X8 1,0,0,1,1,0 : ExX8</p> <p>0,1,0,1,0,0 : X9 0,1,0,1,1,0 : ExX9</p> <p>1,1,0,1,0,0 : XA 1,1,0,1,1,0 : ExXA</p> <p>0,0,1,1,0,0 : XB 0,0,1,1,1,0 : ExXB</p> <p>1,0,1,1,0,0 : XC 1,0,1,1,1,0 : ExXC</p> <p>0,1,1,1,0,0 : XD 0,1,1,1,1,0 : ExXD</p> <p>1,1,1,1,0,0 : XE 1,1,1,1,1,0 : ExXE</p> <p>0,0,0,0,1,0 : XF 0,0,0,0,0,1 : ExXF</p> <p>ExX0 through ExXF: Extension discrete input</p> <p>Bit 6: Count function</p> <p>0 : Number of status changes from OFF to ON</p> <p>1 : Accumulated time of ON status</p> <p>Bit 7: Memory storage at the non-volatile memory</p> <p>0 : Count retained in the memory and preset at the startup</p> <p>1 : Count always reset to 0</p> <p>Bit 8 through 15 : Invalid</p> <p>Minimum input pulse width 500 ms for nviCNTIn, 50 ms for the input terminals.</p> <p>DO NOT connect a network variable to nviCNTIn when one of the input terminals (other than nviCNTIn) is assigned as the counted object.</p> <p>ON time per 1 second increments.</p> |
| SCPTinvrtOut | nviCNTIn | {SNVT_lev_disc} {ST_OFF, ST_ON} {ST_OFF} | <p>Count logic at nviCNTIn.</p> <p>ST_OFF : Count with nviCNTIn = ON</p> <p>ST_ON : Count with nviCNTIn = OFF</p> |
| SCPTpwrUpState | nviCNTCtrl | {SNVT_switch} {0.0 0}, {100.0 1}, {Invalid} {100.0 1} | <p>Set value applied at nviCNTCtrl when the power supply is turned on.</p> <p>0.0 0 : Stop counting</p> <p>100.0 1 : Start counting</p> <p>Invalid : Reset count value</p> |
| SCPTnvType | nvoCNTOut | {SNVT_nv_type} {} {SNVT_count_f} | <p>Indicates nvoCNTOut type.</p> <p>For use with LonMaker and other tools.</p> |
| SCPTmaxRnge | nvoCNTOut | Same as nvoCNTOut. Default = Max. range value available for the type | <p>Maximum count for nvoCNTOut. Count reset to 0 and restarted at overflow.</p> |
| SCPTsetpoint | nvoCNTOut | Same as nvoCNTOut. Default = Max. range value available for the type | <p>Set value applied at nvoCNTOut when fbCNT[] is Over-Ride.</p> |

■ FUNCTIONAL BLOCK: fbDI[0...7]



• Input Terminal v.s. fbDI Network Variables (nvoDIStat, nvoDIArm) Assignments

| FUNCTIONAL BLOCK | NETWORK VARIABLE | OUTPUT TERMINAL |
|------------------|------------------|-----------------|
| fbDI[0] | nvoDIStat | X0 |
| | nvoDIArm | X1 |
| fbDI[1] | nvoDIStat | X2 |
| | nvoDIArm | X3 |
| fbDI[2] | nvoDIStat | X4 |
| | nvoDIArm | X5 |
| fbDI[3] | nvoDIStat | X6 |
| | nvoDIArm | X7 |
| fbDI[4] | nvoDIStat | X8 |
| | nvoDIArm | X9 |
| fbDI[5] | nvoDIStat | XA |
| | nvoDIArm | XB |
| fbDI[6] | nvoDIStat | XC |
| | nvoDIArm | XD |
| fbDI[7] | nvoDIStat | XE |
| | nvoDIArm | XF |

■ FUNCTIONAL BLOCK: fbDI[0...7]

• Network Variables

Normal Mode

| NETWORK VARIABLE | TYPE { Range } { Default } | EXPLANATIONS |
|------------------|---|---|
| nvoDIStat | {SNVT_switch} {0.0 0}, {100.0 1}, {Invalid} {0.0 0} | Outputs X0, X2, X4, X6, X8, XA, XC, XE status |
| nvoDIArm | {SNVT_switch} {0.0 0}, {100.0 1}, {Invalid} {0.0 0} | Outputs X1, X3, X5, X7, X9, XB, XD, XF status |

RS-Flip Flop Mode

| NETWORK VARIABLE | TYPE { Range } { Default } | EXPLANATIONS |
|------------------|---|--|
| nvoDIStat | {SNVT_switch} {0.0 0}, {100.0 1}, {Invalid} {0.0 0} | X0, X2, X4, X6, X8, XA, XC, XE : Set signal X1, X3, X5, X7, X9, XB, XD, XF : Reset signal When X0 or X1 receives an one-shot signal, fbDI data is set or reset respectively nvoDIStat outputs ON signal at Set. nvoDIArm outputs ON signal at Reset. |
| nvoDIArm | {SNVT_switch} {0.0 0}, {100.0 1}, {Invalid} {0.0 0} | |

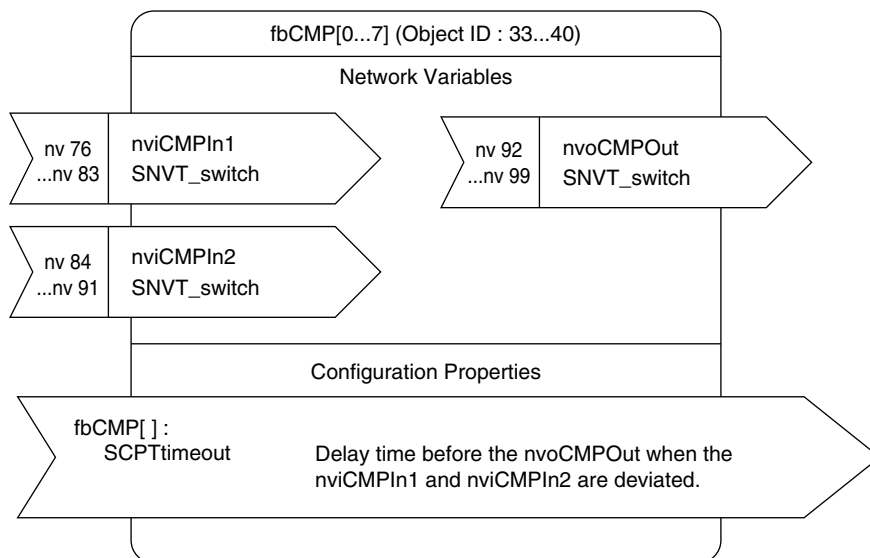
Combination Mode

| NETWORK VARIABLE | TYPE { Range } { Default } | EXPLANATIONS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------------|---|---|--------------|----------|-----------|----------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|-----|-------------|---------|----|-----|--------------|---------|-----|----|-------------|-------------|----|----|--------------|--------------|
| nvoDIStat | {SNVT_switch} {0.0 0}, {100.0 1}, {Invalid} {0.0 0} | <p style="text-align: center;">Contact input, nvoDIStat and nvoDIArm Reference Table</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>X0</th> <th>X1</th> <th rowspan="2">nvoDIStat</th> <th rowspan="2">nvoDIArm</th> </tr> </thead> <tbody> <tr> <td>X2</td> <td>X3</td> </tr> <tr> <td>X4</td> <td>X5</td> </tr> <tr> <td>X6</td> <td>X7</td> </tr> <tr> <td>X8</td> <td>X9</td> </tr> <tr> <td>XA</td> <td>XB</td> </tr> <tr> <td>XC</td> <td>XD</td> </tr> <tr> <td>XE</td> <td>XF</td> </tr> <tr> <td>OFF</td> <td>OFF</td> <td>0.0 0 (OFF)</td> <td>Invalid</td> </tr> <tr> <td>ON</td> <td>OFF</td> <td>100.0 1 (ON)</td> <td>Invalid</td> </tr> <tr> <td>OFF</td> <td>ON</td> <td>0.0 0 (OFF)</td> <td>0.0 0 (OFF)</td> </tr> <tr> <td>ON</td> <td>ON</td> <td>100.0 1 (ON)</td> <td>100.0 1 (ON)</td> </tr> </tbody> </table> | X0 | X1 | nvoDIStat | nvoDIArm | X2 | X3 | X4 | X5 | X6 | X7 | X8 | X9 | XA | XB | XC | XD | XE | XF | OFF | OFF | 0.0 0 (OFF) | Invalid | ON | OFF | 100.0 1 (ON) | Invalid | OFF | ON | 0.0 0 (OFF) | 0.0 0 (OFF) | ON | ON | 100.0 1 (ON) | 100.0 1 (ON) |
| X0 | X1 | | nvoDIStat | nvoDIArm | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| X2 | X3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| X4 | X5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| X6 | X7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| X8 | X9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| XA | XB | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| XC | XD | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| XE | XF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| OFF | OFF | 0.0 0 (OFF) | Invalid | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ON | OFF | 100.0 1 (ON) | Invalid | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| OFF | ON | 0.0 0 (OFF) | 0.0 0 (OFF) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ON | ON | 100.0 1 (ON) | 100.0 1 (ON) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| nvoDIArm | {SNVT_switch} {0.0 0}, {100.0 1}, {Invalid} {0.0 0} | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Configuration Properties

| CONFIGURATION PROPERTY | NETWORK VARIABLE | TYPE { Range } { Default } | EXPLANATIONS |
|------------------------|------------------|---|--|
| SCPTdirection | ---- | {SNVT_state} {0 or 1} {0,0,0,0,0,0,0,0, 0,0,0,0,0,0,0} | Bit 0, Bit 1: fbDI operating mode 0,0 : Normal mode 1,0 : RS-Flip Flop mode 0,1 : Combination mode Bit 2 through 15 : Invalid |
| SCPTinvrtOut | nvoDIStat | {SNVT_lev_disc} {ST_OFF, ST_ON} {ST_OFF} | Contact input logic is inverted at nvoDIStat. ST_OFF : OFF at open contact, ON at closed contact ST_ON : ON at open contact, OFF at closed contact |
| SCPTinvrtOut | nvoDIArm | {SNVT_lev_disc} {ST_OFF, ST_ON} {ST_OFF} | Contact input logic is inverted at nvoDIArm. ST_OFF : OFF at open contact, ON at closed contact ST_ON : ON at open contact, OFF at closed contact |

■ FUNCTIONAL BLOCK: fbCMP[0...7]



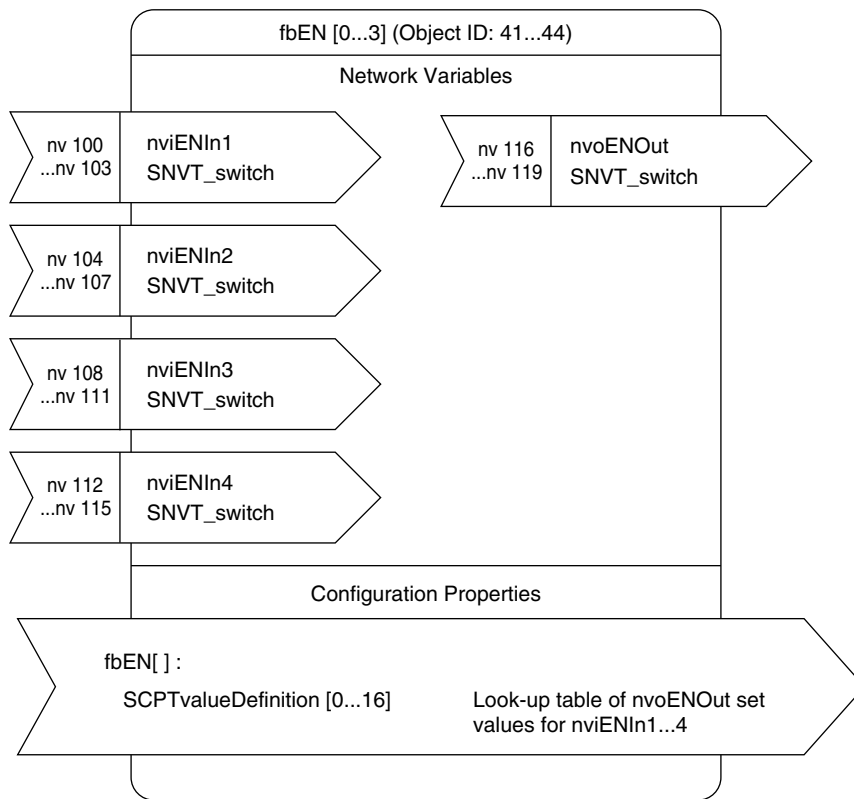
• Network Variables

| NETWORK VARIABLE | TYPE { Range } { Default } | EXPLANATIONS |
|------------------|---|---|
| nviCMPIn1 | {SNVT_switch} {0.0 0}, {100.0 1}, {Invalid} {0.0 0} | Connects to the network variable to be compared. |
| nviCMPIn2 | {SNVT_switch} {0.0 0}, {100.0 1}, {Invalid} {0.0 0} | Connects to the network variable to be compared. |
| nvoCMPOut | {SNVT_switch} {0.0 0}, {100.0 1}, {Invalid} {0.0 0} | nviCMPIn1 and nviCMPIn2 are compared. OFF is output when both values are equivalent, ON or 'Invalid' is output when they are not. ON is output when nviCMPIn1 status change caused the discrepancy. 'Invalid' is output when nviCMPIn2 status change caused it. OFF is output when nviCMPIn1 and/or nviCMPIn2 is 'Invalid,' regardless of the values of both. |

• Configuration Properties

| CONFIGURATION PROPERTY | NETWORK VARIABLE | TYPE { Range } { Default } | EXPLANATIONS |
|------------------------|------------------|--|---|
| SCPTtimeout | ---- | {SNVT_time_sec} {0.1...60.0} {5.0} | Delay time before ON or 'Invalid' is output when a discrepancy occurs between nviCMPIn1 and nviCMPIn2. OFF is immediately output when nviCMPIn1 and nviCMPIn2 states match, regardless of this setting. |

■ FUNCTIONAL BLOCK: fbEN[0...3]



• Network Variables

| NETWORK VARIABLE | TYPE { Range } { Default } | EXPLANATIONS |
|------------------|---|---|
| nviENIn1 | {SNVT_switch} {0.0 0}, {100.0 1}, {Invalid} {0.0 0} | Encoder input 1 |
| nviENIn2 | {SNVT_switch} {0.0 0}, {100.0 1}, {Invalid} {0.0 0} | Encoder input 2 |
| nviENIn3 | {SNVT_switch} {0.0 0}, {100.0 1}, {Invalid} {0.0 0} | Encoder input 3 |
| nviENIn4 | {SNVT_switch} {0.0 0}, {100.0 1}, {Invalid} {0.0 0} | Encoder input 4 |
| nvoENOut | {SNVT_switch} {0.0 0}, {100.0 1}, {Invalid} {0.0 0} | Outputs the SCPTvalueDefinition[] value according to the input signal status |

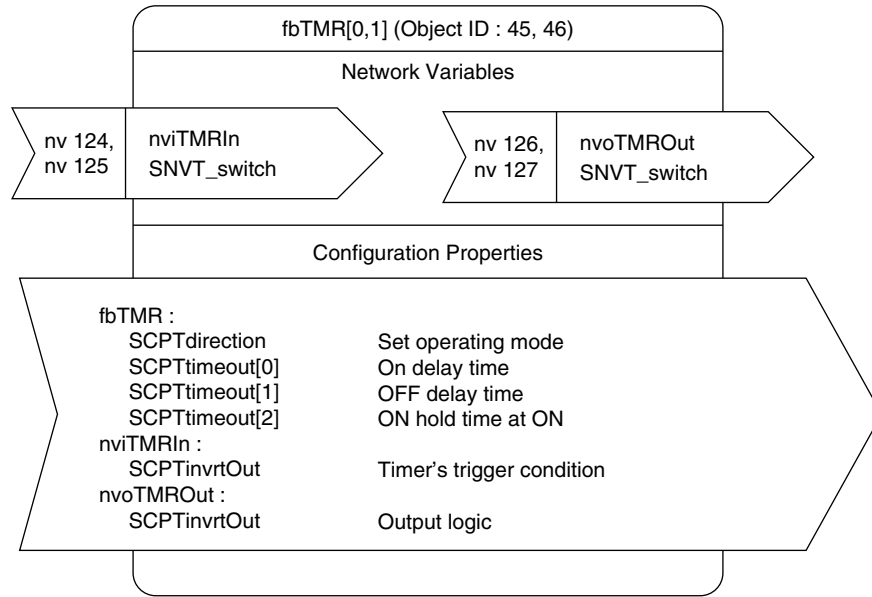
• Configuration Properties

| CONFIGURATION PROPERTY | NETWORK VARIABLE | TYPE { Range } { Default } | EXPLANATIONS |
|-----------------------------|------------------|---|--|
| SCPTvalueDefinition[0...16] | ---- | {SNVT_switch} {0.0 0}, {100.0 1}, {Invalid} {0.0 0} | Table (below) defines output value against each input status |

• Input v.s. SCPTvalueDefinition

| nviENIn1 | nviENIn2 | nviENIn3 | nviENIn4 | nvoENOut VALUE |
|--------------------------------|----------|----------|----------|-------------------------|
| OFF | OFF | OFF | OFF | SCPTvalueDefinition[0] |
| ON | OFF | OFF | OFF | SCPTvalueDefinition[1] |
| OFF | ON | OFF | OFF | SCPTvalueDefinition[2] |
| ON | ON | OFF | OFF | SCPTvalueDefinition[3] |
| OFF | OFF | ON | OFF | SCPTvalueDefinition[4] |
| ON | OFF | ON | OFF | SCPTvalueDefinition[5] |
| OFF | ON | ON | OFF | SCPTvalueDefinition[6] |
| ON | ON | ON | OFF | SCPTvalueDefinition[7] |
| OFF | OFF | OFF | ON | SCPTvalueDefinition[8] |
| ON | OFF | OFF | ON | SCPTvalueDefinition[9] |
| ON | ON | OFF | ON | SCPTvalueDefinition[10] |
| OFF | ON | OFF | ON | SCPTvalueDefinition[11] |
| ON | OFF | ON | ON | SCPTvalueDefinition[12] |
| OFF | OFF | ON | ON | SCPTvalueDefinition[13] |
| ON | ON | ON | ON | SCPTvalueDefinition[14] |
| OFF | ON | ON | ON | SCPTvalueDefinition[15] |
| Invalid in one or more nviENIn | | | | SCPTvalueDefinition[16] |

■ FUNCTIONAL BLOCK: fbTMR[0,1]



• Network Variables

| NETWORK VARIABLE | TYPE { Range } { Default } | EXPLANATIONS |
|------------------|---|---|
| nviTMRIn | {SNVT_switch} {0.0 0}, {100.0 1}, {Invalid} {0.0 0} | Starts the timer function. With 'Invalid,' nvoTMROut is reset to the default status and the internal counter is reset. |
| nvoTMROut | {SNVT_switch} {0.0 0}, {100.0 1}, {Invalid} {0.0 0} | Timer output |

• Configuration Properties

Common

| CONFIGURATION PROPERTY | NETWORK VARIABLE | TYPE { Range } { Default } | EXPLANATIONS |
|------------------------|------------------|---|--|
| SCPTdirection | ---- | {SNVT_state} {0 or 1} {0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0} | Bit 0 : fbTMR operating mode 0 : One shot mode 1 : Cyclic mode Bit 1 through 15 : Invalid |
| SCPTinvrtOut | nviTMRIn | {SNVT_lev_disc} {ST_OFF, ST_ON} {ST_OFF} | Timer's trigger condition ST_OFF : Start with nviTMRIn = ON, Stop at OFF ST_ON : Start with nviTMRIn = OFF, Stop at ON |
| SCPTinvrtOut | nvoTMROut | {SNVT_lev_disc} {ST_OFF, ST_ON} {ST_OFF} | Inverts the timer output logic. ST_OFF : nvoTMROut = ON with the timer functioning and ON, nvoTMROut = OFF in any other conditions. ST_ON : nvoTMROut = OFF with the timer functioning and ON, nvoTMROut = ON in any other conditions. |

One Shot Mode

| CONFIGURATION PROPERTY | NETWORK VARIABLE | TYPE { Range } { Default } | EXPLANATIONS |
|------------------------|------------------|--|---|
| SCPTtimeout[0] | ---- | {SNVT_time_sec} {0.0...800.0} {10.0} | Delay time before nvoTMROut is turned on after nviTMRIn has been turned on. |
| SCPTtimeout[1] | ---- | {SNVT_time_sec} {1.0...800.0,800.1} {10.0} | Time to maintain ON status of nvoTMROut after it has been turned on. 800.1 = Latching (no turning off) |
| SCPTtimeout[2] | ---- | {SNVT_time_sec} {0.0...800.0,800.1} {10.0} | Delay time before nvoTMROut is turned off after nviTMRIn has been turned off. 800.1 = Latching (no turning off) (With SCPTtimeout[1] also set to '800.1,' nvoTMROut remains on. Set 'Invalid' at nviTMRIn to turn nvoTMROut off. |

[Example]

- Providing one-shot output when nviTMRIn is turned on:

SCPTtimeout[0] : One-shot output delay time

SCPTtimeout[1] : Pulse width

SCPTtimeout[2] : 800.1* (Holds nvoTMROut when nviTMRIn is turned off.)

- * If SCPTtimeout[2] equals other than 800.1, the pulse width equals the addition of SCPTtimeout[1] and SCPTtimeout[2].

- Turning nvoTMROut on in a specific time period after nviTMRIn is turned on:

SCPTtimeout[0] : ON delay time

SCPTtimeout[1] : 800.1 (Holds nvoTMROut on while nviTMRIn remains on.)

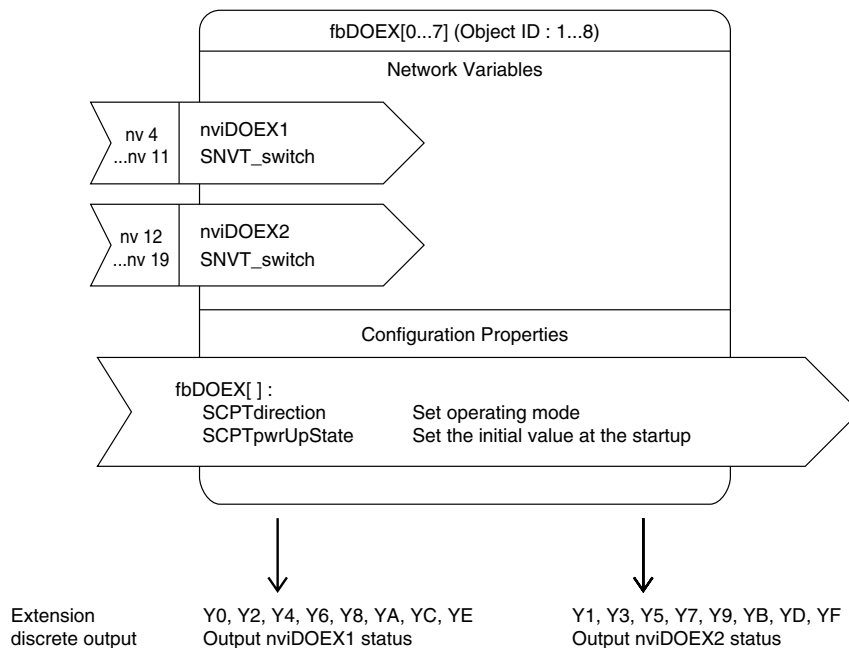
SCPTtimeout[2] : Time to hold nvoTMROut on after nviTMRIn is turned off.

Cyclic Mode

| CONFIGURATION PROPERTY | NETWORK VARIABLE | TYPE { Range } { Default } | EXPLANATIONS |
|------------------------|------------------|---|--|
| SCPTtimeout[0] | ---- | {SNVT_time_sec} {0.0} {0.0} | Invalid |
| SCPTtimeout[1] | ---- | {SNVT_time_sec} {0.0...800.0} {0.0} | Defines ON-OFF time period. ON and OFF times are equal. One pulse cycle equals twice as long as the set value. |
| SCPTtimeout[2] | ---- | {SNVT_time_sec} {0.0} {0.0} | Invalid |

■ FUNCTIONAL BLOCK: fbDOEX[0...7]

This Functional Block is valid only when the output extension module is specified at NodeObject.



• Output Terminal v.s. fbDOEX Network Variables (nviDOEX1, nviDOEX2) Assignments

| FUNCTIONAL BLOCK | NETWORK VARIABLE | OUTPUT TERMINAL |
|------------------|------------------|-----------------|
| fbDOEX[0] | nviDOEX1 | Y0 |
| | nviDOEX2 | Y1 |
| fbDOEX[1] | nviDOEX1 | Y2 |
| | nviDOEX2 | Y3 |
| fbDOEX[2] | nviDOEX1 | Y4 |
| | nviDOEX2 | Y5 |
| fbDOEX[3] | nviDOEX1 | Y6 |
| | nviDOEX2 | Y7 |
| fbDOEX[4] | nviDOEX1 | Y8 |
| | nviDOEX2 | Y9 |
| fbDOEX[5] | nviDOEX1 | YA |
| | nviDOEX2 | YB |
| fbDOEX[6] | nviDOEX1 | YC |
| | nviDOEX2 | YD |
| fbDOEX[7] | nviDOEX1 | YE |
| | nviDOEX2 | YF |

■ FUNCTIONAL BLOCK: fbDOEX[0...7]

• Network Properties

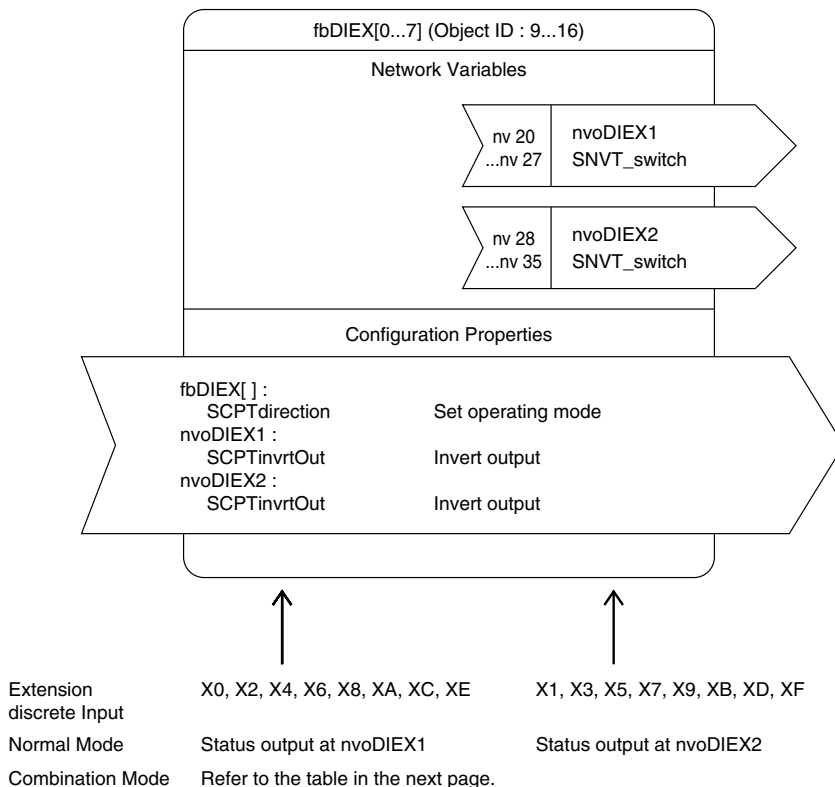
| NETWORK VARIABLE | TYPE { Range } { Default } | EXPLANATIONS |
|------------------|---|--|
| nviDOEX1 | {SNVT_switch} {0.0 0}, {100.0 1}, {Invalid} {0.0 0} | Turns on or off Y0, Y2, Y4, Y6, Y8, YA, YC, YE of the extension module depending upon this input. 100.0 1 : ON Other : OFF |
| nviDOEX2 | {SNVT_switch} {0.0 0}, {100.0 1}, {Invalid} {0.0 0} | Turns on or off Y1, Y3, Y5, Y7, Y9, YB, YD, YF of the extension module depending upon this input. 100.0 1 : ON Other : OFF |

• Configuration Properties

| CONFIGURATION PROPERTY | NETWORK VARIABLE | TYPE { Range } { Default } | EXPLANATIONS |
|------------------------|------------------|---|---|
| SCPTdirection | ---- | {SNVT_state} {0 or 1} {0,0,0,0,0,0,0,0, 0,0,0,0,0,0,0} | Bit 1: Output held or not at power off 0 : OFF at the power startup 1 : Outputs the held status at the power startup Bit 0, Bit 2 through 15 : Invalid |
| SCPTpwrUpState | nviDOEX1 | {SNVT_switch} {0.0 0}, {100.0 1}, {Invalid} {0.0 0} | Set value applied at nviDOEX1 when the power supply is turned on. |
| SCPTpwrUpState | nviDOEX2 | {SNVT_switch} {0.0 0}, {100.0 1}, {Invalid} {0.0 0} | Set value applied at nviDOEX2 when the power supply is turned on. |

■ **FUNCTIONAL BLOCK: fbDIEX[0...7]**

This Functional Block is valid only when the input extension module is specified at NodeObject.



• **Input Terminal v.s. fbDIEX Network Variables (nvoDIEX1, nvoDIEX2) Assignments**

| FUNCTIONAL BLOCK | NETWORK VARIABLE | INPUT TERMINAL |
|------------------|------------------|----------------|
| fbDIEX[0] | nvoDIEX1 | X0 |
| | nvoDIEX2 | X1 |
| fbDIEX[1] | nvoDIEX1 | X2 |
| | nvoDIEX2 | X3 |
| fbDIEX[2] | nvoDIEX1 | X4 |
| | nvoDIEX2 | X5 |
| fbDIEX[3] | nvoDIEX1 | X6 |
| | nvoDIEX2 | X7 |
| fbDIEX[4] | nvoDIEX1 | X8 |
| | nvoDIEX2 | X9 |
| fbDIEX[5] | nvoDIEX1 | XA |
| | nvoDIEX2 | XB |
| fbDIEX[6] | nvoDIEX1 | XC |
| | nvoDIEX2 | XD |
| fbDIEX[7] | nvoDIEX1 | XE |
| | nvoDIEX2 | XF |

■ FUNCTIONAL BLOCK: fbDIEX[0...7]

• Network Variables

Normal Mode

| NETWORK VARIABLE | TYPE { Range } { Default } | EXPLANATIONS |
|------------------|---|---|
| nvoDIEX1 | {SNVT_switch} {0.0 0}, {100.0 1}, {Invalid} {0.0 0} | Outputs X0, X2, X4, X6, X8, XA, XC, XE status of the extension module |
| nvoDIEX2 | {SNVT_switch} {0.0 0}, {100.0 1}, {Invalid} {0.0 0} | Outputs X1, X3, X5, X7, X9, XB, XD, XF status of the extension module |

Combination Mode

| NETWORK VARIABLE | TYPE { Range } { Default } | EXPLANATIONS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------------|---|--|--------------|----------|----------|----------|----|----|----|----|--|--|----|----|--|--|----|----|--|--|----|----|--|--|----|----|--|--|----|----|--|--|-----|-----|-------------|---------|----|-----|--------------|---------|-----|----|-------------|-------------|----|----|--------------|--------------|
| nvoDIEX1 | {SNVT_switch} {0.0 0}, {100.0 1}, {Invalid} {0.0 0} | Contact input, nvoDIEX1 and nvoDIEX2 Reference Table <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>X0</th> <th>X1</th> <th rowspan="2">nvoDIEX1</th> <th rowspan="2">nvoDIEX2</th> </tr> <tr> <th>X2</th> <th>X3</th> </tr> </thead> <tbody> <tr> <td>X4</td> <td>X5</td> <td></td> <td></td> </tr> <tr> <td>X6</td> <td>X7</td> <td></td> <td></td> </tr> <tr> <td>X8</td> <td>X9</td> <td></td> <td></td> </tr> <tr> <td>XA</td> <td>XB</td> <td></td> <td></td> </tr> <tr> <td>XC</td> <td>XD</td> <td></td> <td></td> </tr> <tr> <td>XE</td> <td>XF</td> <td></td> <td></td> </tr> <tr> <td>OFF</td> <td>OFF</td> <td>0.0 0 (OFF)</td> <td>Invalid</td> </tr> <tr> <td>ON</td> <td>OFF</td> <td>100.0 1 (ON)</td> <td>Invalid</td> </tr> <tr> <td>OFF</td> <td>ON</td> <td>0.0 0 (OFF)</td> <td>0.0 0 (OFF)</td> </tr> <tr> <td>ON</td> <td>ON</td> <td>100.0 1 (ON)</td> <td>100.0 1 (ON)</td> </tr> </tbody> </table> | X0 | X1 | nvoDIEX1 | nvoDIEX2 | X2 | X3 | X4 | X5 | | | X6 | X7 | | | X8 | X9 | | | XA | XB | | | XC | XD | | | XE | XF | | | OFF | OFF | 0.0 0 (OFF) | Invalid | ON | OFF | 100.0 1 (ON) | Invalid | OFF | ON | 0.0 0 (OFF) | 0.0 0 (OFF) | ON | ON | 100.0 1 (ON) | 100.0 1 (ON) |
| X0 | X1 | | nvoDIEX1 | nvoDIEX2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| X2 | X3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| X4 | X5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| X6 | X7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| X8 | X9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| XA | XB | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| XC | XD | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| XE | XF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| OFF | OFF | 0.0 0 (OFF) | Invalid | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ON | OFF | 100.0 1 (ON) | Invalid | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| OFF | ON | 0.0 0 (OFF) | 0.0 0 (OFF) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ON | ON | 100.0 1 (ON) | 100.0 1 (ON) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| nvoDIEX2 | {SNVT_switch} {0.0 0}, {100.0 1}, {Invalid} {0.0 0} | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

• Configuration Properties

| CONFIGURATION PROPERTY | NETWORK VARIABLE | TYPE { Range } { Default } | EXPLANATIONS |
|------------------------|------------------|---|---|
| SCPTdirection | ---- | {SNVT_state} {0 or 1} {0,0,0,0,0,0,0,0, 0,0,0,0,0,0,0} | Bit 0, Bit 1: fbDIEX operating mode 0,0 : Normal mode 0,1 : Combination mode Bit 2 through 15 : Invalid |
| SCPTinvtOut | nvoDIEX1 | {SNVT_lev_disc} {ST_OFF, ST_ON} {ST_OFF} | Contact input logic is inverted at nvoDIEX1. ST_OFF : OFF at open contact, ON at closed contact ST_ON : ON at open contact, OFF at closed contact |
| SCPTinvtOut | nvoDIEX2 | {SNVT_lev_disc} {ST_OFF, ST_ON} {ST_OFF} | Contact input logic is inverted at nvoDIEX2. ST_OFF : OFF at open contact, ON at closed contact ST_ON : ON at open contact, OFF at closed contact |