wenglor
the innovative family

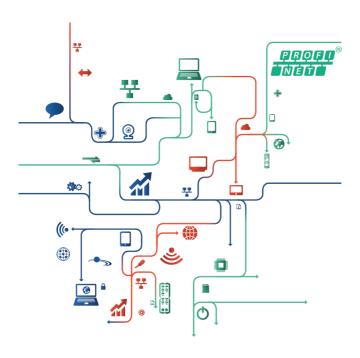# PNBC Block
Simatic Manager S7 und TIA Portal



**Project Engineering Instructions**
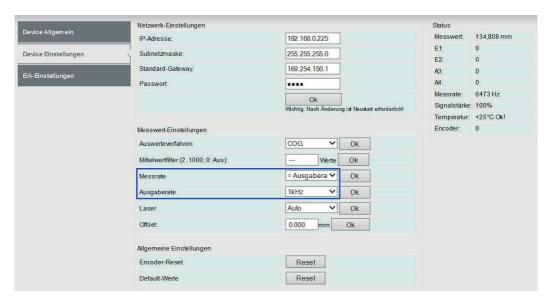
# EN

**Inhaltsverzeichnis**

# 1. Functionality

The function module makes the following functionality available to PNBC sensors:
- Read-out of header data
- Read-out of data resulting from continuous distance measurement (distance values)
- Read-out of data resulting from extended continuous distance measurement
  (distance, intensity and encoder values)

# 2. Initial Start-Up

The sensor's subnet mask, IP address and port must first be selected in the PLC program in order to be able to communicate with the PLC. In this respect it must be assured that the sensor's IP address is within the same range as the IP address of the PLC.

Due to the fact that maximum possible transmission speed depends upon the utilized PLC, we recommend setting the sensor's output rate to 1 kHz and selecting "sampling rate = output rate". The value can be adjusted up or down as required from this setting. Settings can be entered via the sensor's integrated website on the "Device Settings" page:



Initial start-up instructions for the Simatic Manager S7 are included below in section 2.1, and for the TIA Portal in section 2.2

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## 2.1. Simatic Manager S7

### 2.1.1 Setting the Sensor's Subnet Mask

| Symbolic Name | Address | Value (hexadecimal) | Value (decimal) |
|---|---|---|---|
| CON_PARAM.OUCW_1.rem_subnet_id[1] | DB3.DBB28 | FF | 255 |
| CON_PARAM.OUCW_1.rem_subnet_id[2] | DB3.DBB29 | FF | 255 |
| CON_PARAM.OUCW_1.rem_subnet_id[3] | DB3.DBB30 | FF | 255 |
| CON_PARAM.OUCW_1.rem_subnet_id[4] | DB3.DBB31 | 0 | 0 |

### 2.1.2 Setting the Sensor's IP Address

| Symbolic Name | Address | Value (hexadecimal) | Value (decimal) |
|---|---|---|---|
| CON_PARAM.OUCW_1.rem_staddr[1] | DB3.DBB34 | C0 | 192 |
| CON_PARAM.OUCW_1.rem_staddr[2] | DB3.DBB35 | A8 | 168 |
| CON_PARAM.OUCW_1.rem_staddr[3] | DB3.DBB36 | 0 | 0 |
| CON_PARAM.OUCW_1.rem_staddr[4] | DB3.DBB37 | E1 | 225 |

### 2.1.3 Setting the Sensor's Port Address

| Symbolic Name | Address | Value (hexadecimal) | Value (decimal) |
|---|---|---|---|
| CON_PARAM.OUCW_1.rem_tsap_id[1] | DB3.DBB40 | 0B | |
| CON_PARAM.OUCW_1.rem_tsap_id[2] | DB3.DBB41 | B8 | 3000 |

### 2.1.4 Setting the Type of PLC

| Symbolic Name | Address | Value | Comment |
|---|---|---|---|
| CON_PARAM.OUCW_1.local_device_id | DB3.DBB6 | 1 | Typ IM151 |
| | | 2 | Typ CP315 |

## 2.2. TIA Portal

### 2.2.1 Setting the Sensor's Subnet Mask

| Name | Value (decimal) |
|------|-----------------|
| CONNECT.REM_SUBNET_ID[1] | 255 |
| CONNECT.REM_SUBNET_ID[2] | 255 |
| CONNECT.REM_SUBNET_ID[3] | 255 |
| CONNECT.REM_SUBNET_ID[4] | 0 |

### 2.2.2 Setting the Sensor's IP Address

| Name | Value (decimal) |
|------|-----------------|
| CONNECT.REM_STADDR[1] | 192 |
| CONNECT.REM_STADDR[2] | 168 |
| CONNECT.REM_STADDR[3] | 0 |
| CONNECT.REM_STADDR[4] | 225 |

### 2.2.3 Setting the Sensor's Port Address

| Name | Value (hexadecimal) |
|------|---------------------|
| CONNECT.REM_TSAP_ID[1] | 0B |
| CONNECT.REM_TSAP_ID[2] | B8 |

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## 3. Graphic Description of the PNBC Module

```
                    PNBC
  ──  EN                              ENO   ──



  ──  TCP_CmdNo                    DataOut   ──

  ──  AckErr                       CommErr   ──

  ──  ConnEN

  ──  TCP_CmdTrigger
```

## 4. Parameters Description

### 4.1. Input Parameters

| Input Parameter | Data Type | Description |
|---|---|---|
| EN | BOOL | Input enabling |
| TCP_CmdNo | UINT | The corresponding mode is selected depending on the entry.<br>2: Continuous measurement<br>3: Extended continuous measurement<br>11: Laser on<br>12: Laser off |
| AckErr | BOOL | Entry for error detection.<br>1: Error detected |
| ConnEN | BOOL | Establish connection with the controller.<br>1: Activate connection<br>0: Deactivate connection |
| TCP_CmdTrigger | BOOL | Input/output argument – controlled by the module |

## 4.2. Output Parameters

| Output Parameter | | Data Type | Description |
|---|---|---|---|
| ENO | | BOOL | Output enabling |
| DataOut | HeaderCommonOut | STRUCTURE | Read-out of header data for continuous and extended continuous measurement.<br>See detailed description in section 4.2.1 |
| | Data-ContiOut | STRUCTURE | Read-out of data resulting from continuous measurement:<br>See detailed description in section 4.2.2 |
| | Data-ExtContiOut | STRUCTURE | Read-out of data resulting from extended continuous measurement:<br>See detailed description in section 4.2.3 |
| CommErr | | BOOL | 1: Communication error<br>The sensor's output rate is higher than the PLC's reading rate.<br>Solution: Reduce the sensor's output rate. |

### 4.2.1 Description of the Header

| HeaderCommonOut | Data Type | Description |
|---|---|---|
| Data Format | DWORD | Read-out of the data format.<br>4470: continuous distance measurement<br>4480: extended continuous distance measurement |
| Sensor Name | Array [1...12] of CHAR | Sensor's order number |
| Serial Number | Array [1...12] of CHAR | Sensor's serial number |
| SW-Version | Array [1...10] of CHAR | Software version |
| OperatingTime | DWORD | Operating time counter in ms |
| MeasRangeLLin_mm | WORD | Measuring range lower limit in mm |
| MeasRangein_mm | WORD | Measuring range in mm |
| LaserPower | WORD | Read-out of laser power in W.<br>Possible values include:<br>1 (= 0.1 mW)<br>.<br>.<br>.<br>10 (= 1 mW) |
| SamplingRate | WORD | Read-out of the sampling rate in Hz.<br>Possible values:<br>900<br>.<br>.<br>.<br>30,000 |

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| HeaderCommonOut | Data Type | Description |
|---|---|---|
| Temperature | BYTE | Read-out of temperature inside the sensor in °C |
| EvaluationMethod | BYTE | Read-out of the selected evaluation method.<br>2: COG<br>5: edge |
| RegulatorMode | BYTE | Read-out of settings for laser power and sampling rate.<br>0: automatic sampling rate regulation and laser power regulation<br>1: automatic sampling rate, laser power manually adjustable<br>2: automatic laser power, sampling rate manually adjustable<br>3: Laser power and sampling rate manually adjustable |
| EncRightShift | BYTE | Read-out of the scaling factor of the encoder input.<br>1: every $2^{nd}$ encoder pulse is counted<br>2: every $4^{th}$ encoder pulse is counted<br>.<br>.<br>.<br>8: every $256^{th}$ encoder pulse is counted |
| Status | BYTE | Read-out of the status as a 7-bit value.<br>Bit 0: out-of-range error: intensity or distance is outside of the valid working range<br>Bit 1: internal peak memory overflow error<br>Bit 2: sensor FIFO overflow: CPU processing is unable to keep up with the measurement data<br>Bits 3 to 7: = 0 |
| InOutStatus | BYTE | Read-out of the input/output status as a 7-bit value.<br>Bit 0: status of I/O 1<br>Bit 1: status of I/O 2<br>Bit 2: status of I/O 3<br>Bit 3: status of I/O 4<br>Bit 7: laser status: 1 = on, 0 = off |
| OutputRate | WORD | Read-out of the output rate in Hz.<br>Possible values include:<br>10<br>.<br>.<br>.<br>30,000 |

| HeaderCommonOut | Data Type | Description |
|---|---|---|
| AverageFilter | WORD | Read-out of the rolling average via x values.<br>Possible values for "x" include:<br>0; 1 = off<br>2<br>.<br>.<br>.<br>1000 |
| Offset | WORD | Read-out of zero-point offset.<br>Possible values for "x" include:<br>-30,000<br>.<br>.<br>.<br>30,000<br><br>Conversion of offset in bits to offset in mm:<br>$offset\ [mm]\ = x\ /\ 65{,}536\ \times\ measuring\ range\ [mm]$ |
| NumberOfValuesPer-Packet | WORD | Read-out of the number of measured values per packet.<br>Possible values include:<br>In the event of continuous measurement:<br>1<br>.<br>.<br>.<br>450<br>In the event of extended continuous measurement:<br>1<br>.<br>.<br>.<br>150 |

### 4.2.2 Description of Continuous Measurement

| Data-ContiOut | Data Type | Description |
|---|---|---|
| Distance | Array [1...450]<br>of WORD | Distance value (0 ... 65,535) |
| Distance_mm | Array [1...450]<br>of REAL | Distance value in mm |

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### 4.2.3 Description of Extended Continuous Measurement

| Data-ContiOut | Data Type | Description |
|---|---|---|
| Distance | Array [1...150] of WORD | Distance value (0 ... 65,535) |
| Distance_mm | Array [1...150] of REAL | Distance value in mm |
| Intensity | Array [1...150] of WORD | The intensity value is represented as a 16-bit value. Bits 0 to 11: intensity value (= peak value, 0 to 4095) Bit 12: reserved (= 0) Bit 13: reserved (= 0) Bit 14: error bit: intensity too low or too high Bit 15: error bit: distance outside of measuring range The following formula for converting the digital value into a percentage is used to arrive at the signal strength displayed on the website: *Signal strength as percentage = intensity value / 16* |
| Encoder | Array [1...150] of WORD | The encoder value is represented as a 16-bit value (0 … 65,535). A converted value in mm cannot be provided here because conversion depends on the utilized encoder and how it's installed. |