

## Description

- Operation mode and max sensing range:  
Thru-beam: 0-20 m  
Diffuse proximity: 0-1 m  
Retro reflective: 0,1-3 m  
Fibre: Dependent on fibre optic
- IO-Link communication interface
- PC software for parameter configuration and diagnostics with optional USB-IO-Link Master 02
- M8 or M12 plug connection
- Sensitivity adjustment via potentiometer
- Switch selectable light or dark function
- Power and output indicators
- High tolerance to hostile environments
- 10-30 V dc supply voltage
- 4 pin, IO-Link / push-pull and NPN or PNP output
- Test input



The 7000-IO series consists of a self-contained transmitter SMT, and a receiver SMR, which are to be used in thru-beam mode, an SMP for diffuse proximity, SMRR for retro reflective and an SMPF for use with fibre optic cables.

The complete series is available with a 10-30 V dc supply voltage. All sensors offer a combined IO-link and push-pull output, together with a supplementary NPN or PNP output.

The SM 7000-IO is equipped with an IO-link communication interface which allows a variety of process parameters and settings to be configured and monitored, which includes: sensitivity adjustment, teach-in function, automatic gain adjustment, output mode, on/off time

delay, one-shot timer, hysteresis. Sensitivity adjustment and light or dark function may also be manually configured via integral potentiometers.

The SMR is available with either a 0.5 ms response time and a 7 metre range or with a 2 ms response time and a 20 metre range. The test input in the SMT is intended to be used for disabling or enabling the transmitting power temporarily for test purpose or for multiplexing applications.

The complete series is protected against reverse polarity of power supplies, control input and output signals. The output is protected against short circuit and inductive loads.

## Technical Data

|                                                  | SMT               | SMR                                                  |             | SMP | SMPF              | SMRR |
|--------------------------------------------------|-------------------|------------------------------------------------------|-------------|-----|-------------------|------|
|                                                  |                   | 7x07                                                 | 7x20        |     |                   |      |
| Supply voltage                                   | 10-30 V dc        |                                                      |             |     |                   |      |
| Voltage ripple                                   | Max. 15 %         |                                                      |             |     |                   |      |
| Reverse polarity protected                       | Yes               |                                                      |             |     |                   |      |
| Short circuit protected                          | –                 | Yes                                                  |             |     |                   |      |
| Current consumption                              | 25 mA             | 30 mA                                                |             |     |                   |      |
| Maximum output load                              | –                 | 200 mA / 30 V dc                                     |             |     |                   |      |
| Maximum residual voltage                         | –                 | 2 V                                                  |             |     |                   |      |
| IO-Link communication                            | Yes               |                                                      |             |     |                   |      |
| Maximum operation frequency                      | –                 | 1000 Hz                                              | 250 Hz      |     |                   |      |
| Response time t <sub>ON</sub> / t <sub>OFF</sub> | –                 | 0,5 ms / 0,5 ms                                      | 2 ms / 2 ms |     |                   |      |
| Power on indicator                               | Green LED         |                                                      |             |     |                   |      |
| Output indicator                                 | –                 | Yellow LED                                           |             |     |                   |      |
| Hysteresis                                       | –                 | Approx. 15-20 %                                      |             |     | Approx. 3-10 %    |      |
| Light source                                     | Infrared (880 nm) | –                                                    |             |     | Infrared (880 nm) |      |
| Opening angle                                    | –                 | +/- 6°                                               |             |     | +/- 4°            |      |
| Emission angle                                   | +/- 2°            | –                                                    |             |     |                   |      |
| Housing material                                 | Sensor housing    | Stainless Steel (AISI 316 / 1.4401) or Polycarbonate |             |     |                   |      |
|                                                  | Front lens        | Polycarbonate                                        |             |     |                   |      |

## Environmental Data

| Environmental Data     |                 | SMT              | SMR        |      | SMP        | SMPF | SMRR       |
|------------------------|-----------------|------------------|------------|------|------------|------|------------|
|                        |                 |                  | 7x07       | 7x20 |            |      |            |
| Vibration              |                 | 10-55 Hz, 0,5 mm |            |      |            |      |            |
| Shock                  |                 | 30 g             |            |      |            |      |            |
| Light immunity         | @ 5° incidence  | –                | 20 000 lux |      | –          |      |            |
|                        | @ 15° incidence | –                | –          |      | 40 000 lux |      | 25 000 lux |
| Temperature, operation |                 | – 20 to +60 °C   |            |      |            |      |            |
| Temperature, storage   |                 | – 40 to +80 °C   |            |      |            |      |            |
| Sealing class          |                 | IP 67            |            |      |            |      |            |
| Approvals              |                 | CE UK CA         |            |      |            |      |            |

## Available Types

|             | Type | Power Supply | Control Feature | Output | Connection       |              | 4 pin, M8 plug    | 4 pin, M12 plug  | Range |
|-------------|------|--------------|-----------------|--------|------------------|--------------|-------------------|------------------|-------|
|             |      |              |                 |        | Housing Material | Housing Type |                   |                  |       |
| Transmitter | 7000 | 10-30 V dc   | Test Input      | –      | Polycarbonate    | M18 x 1      | SMT 7000-IO TP T4 | SMT 7000-IO TP J | 20 m  |
|             |      |              |                 |        | Stainless Steel  |              | SMT 7000-IO TS T4 | SMT 7000-IO TS J |       |
|             |      |              |                 |        |                  |              |                   |                  |       |
|             |      |              |                 |        |                  |              |                   |                  |       |

|          |                 |               |                                                 |                 |                   |         |                   |                  |                  |
|----------|-----------------|---------------|-------------------------------------------------|-----------------|-------------------|---------|-------------------|------------------|------------------|
| Receiver | 7407            | 10-30<br>V dc | Sensitivity<br>pot. and<br>light/dark<br>switch | NPN             | Polycarbonate     | M18 x 1 | SMR 7407-IO TP T4 | SMR 7407-IO TP J | 0-7 m            |
|          | Stainless Steel |               |                                                 |                 | SMR 7407-IO TS T4 |         | SMR 7407-IO TS J  |                  |                  |
|          | PNP             |               |                                                 | Polycarbonate   | SMR 7507-IO TP T4 |         | SMR 7507-IO TP J  |                  |                  |
|          |                 |               |                                                 | Stainless Steel | SMR 7507-IO TS T4 |         | SMR 7507-IO TS J  |                  |                  |
|          | NPN             |               |                                                 | Polycarbonate   | SMR 7420-IO TP T4 |         | SMR 7420-IO TP J  | 0-20 m           |                  |
|          |                 |               |                                                 | Stainless Steel | SMR 7420-IO TS T4 |         | SMR 7420-IO TS J  |                  |                  |
|          | 7520            |               |                                                 | PNP             | Polycarbonate     |         | SMR 7520-IO TP T4 |                  | SMR 7520-IO TP J |
|          |                 |               |                                                 |                 | Stainless Steel   |         | SMR 7520-IO TS T4 |                  | SMR 7520-IO TS J |

|                   |                 |               |                                                 |                 |                   |         |                   |                  |         |
|-------------------|-----------------|---------------|-------------------------------------------------|-----------------|-------------------|---------|-------------------|------------------|---------|
| Diffuse Proximity | 7400            | 10-30<br>V dc | Sensitivity<br>pot. and<br>light/dark<br>switch | NPN             | Polycarbonate     | M18 x 1 | SMP 7400-IO TP T4 | SMP 7400-IO TP J | 0-0,5 m |
|                   | Stainless Steel |               |                                                 |                 | SMP 7400-IO TS T4 |         | SMP 7400-IO TS J  |                  |         |
|                   | PNP             |               |                                                 | Polycarbonate   | SMP 7500-IO TP T4 |         | SMP 7500-IO TP J  |                  |         |
|                   |                 |               |                                                 | Stainless Steel | SMP 7500-IO TS T4 |         | SMP 7500-IO TS J  |                  |         |
|                   | 7401            |               |                                                 | NPN             | Polycarbonate     |         | SMP 7401-IO TP T4 | SMP 7401-IO TP J | 0-1 m   |
|                   |                 |               |                                                 |                 | Stainless Steel   |         | SMP 7401-IO TS T4 | SMP 7401-IO TS J |         |
|                   | 7501            |               |                                                 | PNP             | Polycarbonate     |         | SMP 7501-IO TP T4 | SMP 7501-IO TP J |         |
|                   |                 |               |                                                 |                 | Stainless Steel   |         | SMP 7501-IO TS T4 | SMP 7501-IO TS J |         |

| Fibre Sensor | 7400 | 10-30<br>V dc | Sensitivity<br>pot. and<br>light/dark<br>switch | NPN             | Polycarbonate      | M18 x 1 | SMPF 7400-IO TP T4 | SMPF 7400-IO TP J | Refer to<br>Glass Fibre<br>Optics<br>data sheet |
|--------------|------|---------------|-------------------------------------------------|-----------------|--------------------|---------|--------------------|-------------------|-------------------------------------------------|
|              |      |               |                                                 | Stainless Steel | SMPF 7400-IO TS T4 |         | SMPF 7400-IO TS J  |                   |                                                 |
|              | 7500 |               |                                                 | PNP             | Polycarbonate      |         | SMPF 7500-IO TP T4 | SMPF 7500-IO TP J |                                                 |
|              |      |               |                                                 |                 | Stainless Steel    |         | SMPF 7500-IO TS T4 | SMPF 7500-IO TS J |                                                 |

Note: Glass fibre optic cable to be ordered separately.

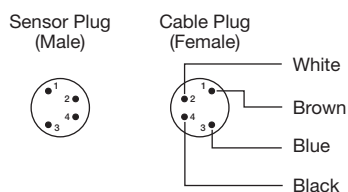
|                  |      |               |                                                 |                 |                    |         |                    |                   |         |
|------------------|------|---------------|-------------------------------------------------|-----------------|--------------------|---------|--------------------|-------------------|---------|
| Retro Reflective | 7400 | 10-30<br>V dc | Sensitivity<br>pot. and<br>light/dark<br>switch | NPN             | Polycarbonate      | M18 x 1 | SMRR 7400-IO TP T4 | SMRR 7400-IO TP J | 0,1-3 m |
|                  |      |               |                                                 |                 | Stainless Steel    |         | SMRR 7400-IO TS T4 | SMRR 7400-IO TS J |         |
|                  | PNP  |               |                                                 | Polycarbonate   | SMRR 7500-IO TP T4 |         | SMRR 7500-IO TP J  |                   |         |
|                  |      |               |                                                 | Stainless Steel | SMRR 7500-IO TS T4 |         | SMRR 7500-IO TS J  |                   |         |

Note: Reflector to be ordered separately.

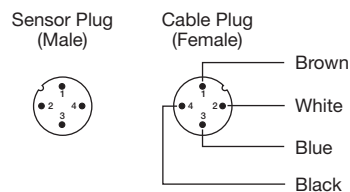
Connections

|                     | M8 Plug / Cable | M12 Plug / Cable |
|---------------------|-----------------|------------------|
| Supply +            | Pin 1 / Brown   | Pin 1 / Brown    |
| Supply -            | Pin 3 / Blue    | Pin 3 / Blue     |
| Test input / Output | Pin 2 / White   | Pin 2 / White    |
| IO-Link             | Pin 4 / Black   | Pin 4 / Black    |

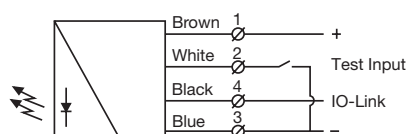
4 pin, M8



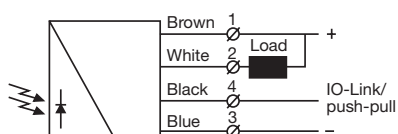
4 pin, M12



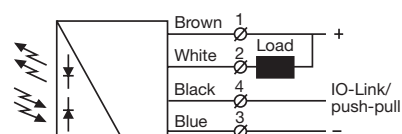
Wiring Diagrams



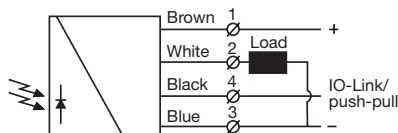
SMT 7000



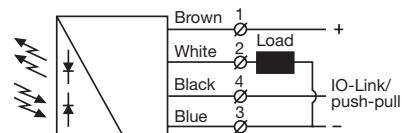
SMR 74xx



SMP / SMPF / SMRR 74xx

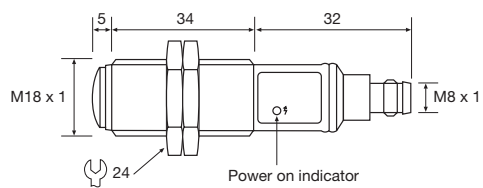
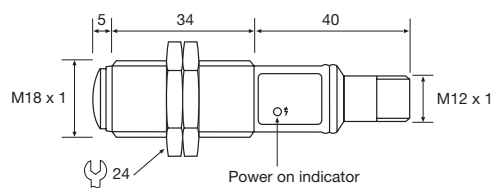
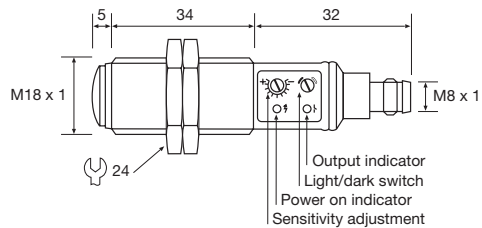
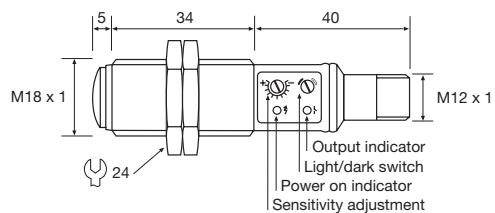
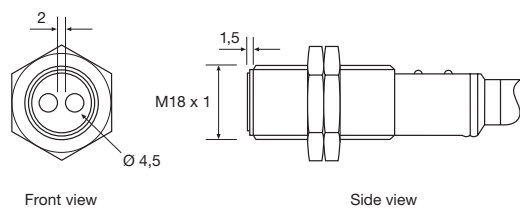


SMR 75xx



SMP / SMPF / SMRR 75xx

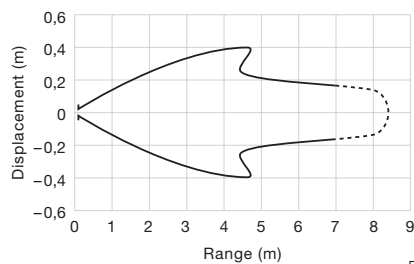
## Dimensions and Descriptions

**SMT TP/TS T4****SMT TP/TS J****SMR / SMP / SMRR / SMPF\* TP/TS T4****SMR / SMP / SMRR / SMPF\* TP/TS J****SMPF\***

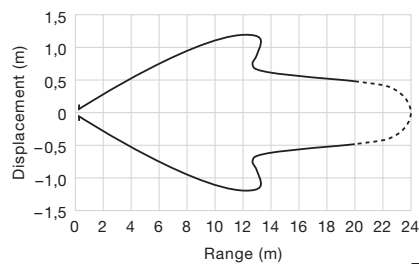
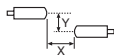
(Units in mm)

Sensing Characteristics

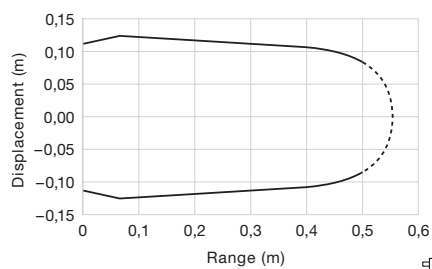
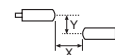
Parallel Displacement



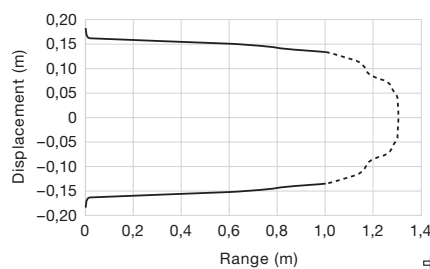
SMT 7000 and SMR 7x07



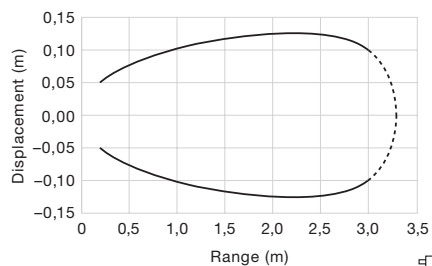
SMT 7000 and SMR 7x20



SMP 7x00 with 20cm x 20cm white paper



SMP 7x01 with 20cm x 20cm white paper

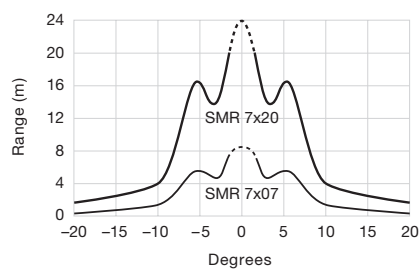


SMRR 7x00 with Ø84mm reflector

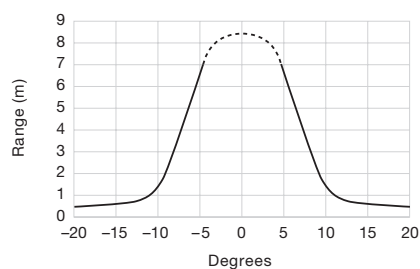
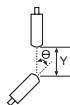


## Sensing Characteristics

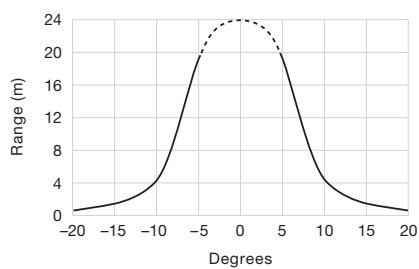
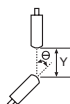
## Angular Displacement



SMT 7000



SMR 7x07



SMR 7x20



**PC Programming and Monitoring**
**General Setup**

|    | Settings                                  | Function                                                                                                     | Parameters                                     |
|----|-------------------------------------------|--------------------------------------------------------------------------------------------------------------|------------------------------------------------|
| 1  | System Command – Restore Factory Settings | Restores all user settings to default values                                                                 | N/A                                            |
| 2  | System Command – Teach Gain               | Determines the lowest possible gain to switch on                                                             | N/A                                            |
| 3  | Hysteresis                                | Adjust the hysteresis level                                                                                  | 0-10% / 0-40%*                                 |
| 4  | Gain Input                                | Select gain control mode                                                                                     | Potentiometer / IO-Link                        |
| 5  | Gain Value                                | Adjust the gain level (applicable when IO-Link Gain Input mode is selected)                                  | 0-255                                          |
| 6  | Light/Dark Operated Input                 | Select light/dark operated selection mode                                                                    | Potentiometer / IO-Link                        |
| 7  | Light Operated                            | Select to invert output (applicable when IO-Link mode is selected in Light/Dark Operated Input)              | True / False                                   |
| 8  | On Delay                                  | On delay time between the expression becomes true and the output is switched                                 | 0.00-600.00 s                                  |
| 9  | Off Delay                                 | Off delay time between the expression becomes false and the output is switched                               | 0.00-600.00 s                                  |
| 10 | One-Shot Time                             | Select duration the output be active when switching from not active to active                                | 0.00-600.00 s                                  |
| 11 | Forced Output                             | Select if output shall be forced to the value in Forced Value or from the sensor input                       | True / False                                   |
| 12 | Forced Value                              | Select output state if the Forced Output is True                                                             | True / False                                   |
| 13 | Forced Ctrl. Input *                      | Select control (test) input selection mode                                                                   | Cable / IO-Link                                |
| 14 | Forced Ctrl. Input Value *                | Select control (test) input configuration to high or low                                                     | True (transmitting) / False (not transmitting) |
| 15 | Operating Hours Event Time                | Initiates an event message when operating hours reaches the value. No event is initiated when 0 is selected. | 0-4294967295 hours                             |

**Note:** Settings marked \* are applicable for SMR receiver type only.

**USB-IO Link Master 02 PC Software Screenshot**

| Name                       | R/W | Value                    | State | Unit |
|----------------------------|-----|--------------------------|-------|------|
| System Command             | wo  | Restore Factory Settings | d     |      |
| System Command             | wo  | Teach gain               | d     |      |
| Hysteresis                 | nw  | 5                        | d     | %    |
| Gain input                 | nw  | Potentiometer            | d     |      |
| Gain value                 | nw  | 0                        | d     |      |
| Light/Dark operated input  | nw  | Potentiometer            | d     |      |
| Light operated             | nw  | false                    | d     |      |
| On delay                   | nw  | 0.00                     | d     | s    |
| Off delay                  | nw  | 0.00                     | d     | s    |
| Oneshot time               | nw  | 0.00                     | d     | s    |
| Forced output              | nw  | false                    | d     |      |
| Forced value               | nw  | false                    | d     |      |
| Operating hours event time | nw  | 0                        | d     | h    |

Screenshot example shown with SMP sensor type.

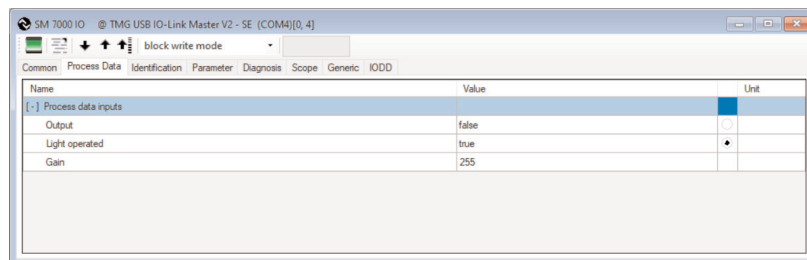
## PC Programming and Monitoring

## Process Data

|   | Name           | Description                                  | Parameters   |
|---|----------------|----------------------------------------------|--------------|
| 1 | Output         | Indicates status of output                   | True / False |
| 2 | Light Operated | Indicates status of light operated selection | True / False |
| 3 | Gain           | Indicates status of the gain value           | 0-255        |
| 4 | Ctrl. Input *  | Indicates status of control/test input       | True / False |

**Note:** Data marked \* are applicable for SMT transmitter type only.

## USB-IO Link Master 02 PC Software Screenshot



*Screenshot example shown with SMP sensor type.*

Telco reserves the right to change specifications without notice.