# M18 SENSORS WITH DISCRETE OR ANALOGUE OUTPUT

**ULTRASONIC SENSORS**



- *High precision and switching frequency*
- *Colour independence and transparent object detection*
- *Easy Teach-in setting and 2 bi-coloured signalling LEDs*
- *Models with digital NPN - PNP and 0 - 10 V or 4- 20 mA analogue outputs*

# US18 SERIES

The range of measurement and inspection devices is enriched thanks to the introduction of new ultrasonic M18x1 ABS tubular sensors of the **US18** series.

Models with axial or radial acoustic emission and with discrete bipolar output (1 NPN and 1 PNP) or with 4-20 mA or 0-10 V analogue output are available.

The extremely reduced blind zone and the unequalled 5 ms response speed are only two of the many features that are worth highlighting.

The sensors are easily configured through the Teach-in function, while the operating status is visibly signalled by 2 bi-coloured LEDs.

The temperature compensation function corrects the sound speed changes due to temperature variations, so the sensor precision remains unchanged in all situations and a 0.5 mm resolution is guaranteed.

The electrical connection is accomplished through standard M12 5-pole connectors.

The new **US18** ultrasonic sensors detect all objects independent from the non sound-absorbent material, reflectivity, transparency and colour, thus perfectly suiting applications in the automotive, packaging, machine tool fields and material transformation processes.

**DATASENSOR**
*value through detection*

# ULTRASONIC SENSORS

Models with discrete output are excellent foreground and/or background suppressors. The Teach-in procedure allows to fix a switching window with 10 mm width and to detect minimum and maximum values.

The models with analogue output are conceived as distance sensors: the analogue output can be scaled on windows of any width inside the operating range, or positioned at the centre of a detection window with a fixed width of 100 mm.
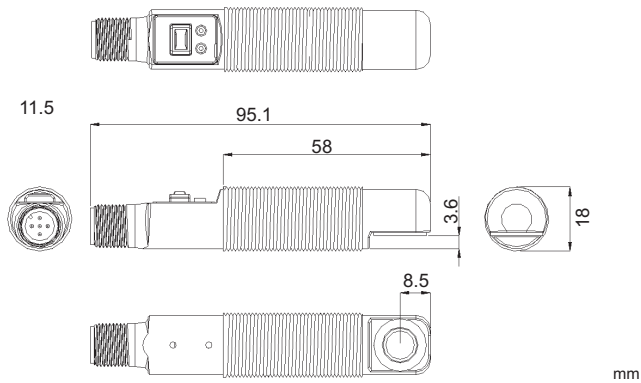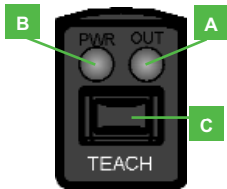
## DIMENSIONS

**AXIAL VERSIONS**

90.9
53.8
18

**RADIAL VERSIONS**

11.5
95.1
58
3.6
18
8.5

mm
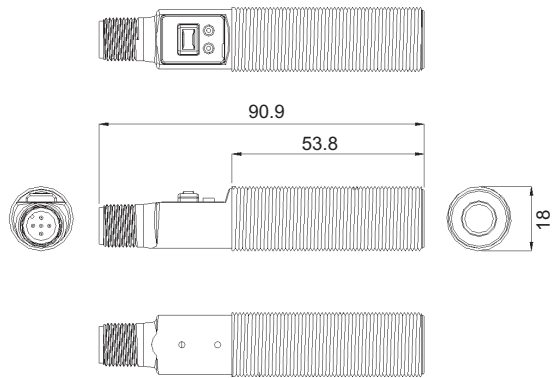
## INDICATORS AND SETTINGS

| | |
|---|---|
| **A** | Output status LED |
| **B** | Power / signal intensity LED |
| **C** | Teach-in push-button |

B  PWR  OUT  A
C
TEACH

## ACCESSORIES

For d**edicated accessories** refer to the **ACCESSORIES** section of this catalogue.

Refer also to **Connectors (A.03)** and **Fixing Brackets (A.04)** of the **General Catalogue**.

## CONNECTIONS

| | | |
|---|---|---|
| BROWN | 1 | + 10 … 30 Vdc |
| WHITE | 2 | NPN OUTPUT |
| BLACK | 4 | PNP OUTPUT |
| GREY | 5 | REMOTE TEACH (0…2 Vdc) |
| BLUE | 3 | 0 V |

| | | |
|---|---|---|
| BROWN | 1 | + 10 … 30 Vdc |
| BLUE | 3 | 0 V |
| WHITE | 2 | 4…20 mA or 0…10 Vdc |
| BLACK | 4 | 5…30 Vdc (fast) / 0…2 Vdc (slow) |
| GREY | 5 | REMOTE TEACH (0…2 Vdc) |

DATASENSOR

Versions and options: refer to **MODEL SELECTION TABLE**
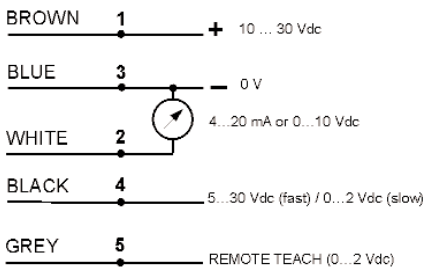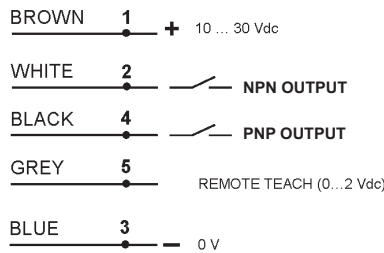
## TECHNICAL DATA

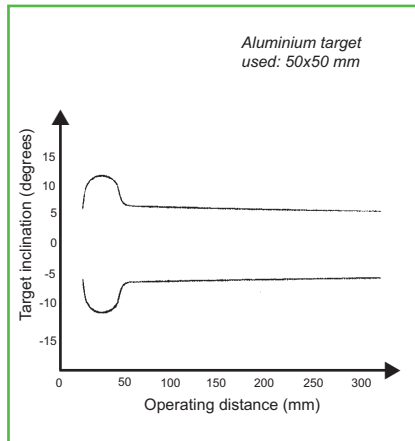| | Models with discrete output | Models with analogue ouput |
|---|---|---|
| Operating distance (typical values): | 30 … 300 mm | |
| Power supply: | 10 … 30 Vdc (limit values), polarity inversion protection | |
| Ripple: | ≤ 2 Vpp | |
| Consumption: | 65 mA max., 40 mA typical at 25 Vdc | |
| Output type: | NPN and PNP | 0…10 Vdc or 4…20 mA |
| Output current: | 100 mA max., short-circuit protection | |
| Saturation voltage: | PNP < 1.2 V at 10 mA, < 1.6 V at 100 mA NPN < 200 mV at 10 mA, < 600 mV at 100 mA | |
| Load resistance: | | voltage output: 2.5 kΩ min. |
| | | current output: 1 kΩ max. |
| Response time: | 5 ms | 2.5 ms (black wire at 0-2 Vdc or unconnected) 30 ms (black wire at 5-30 Vdc) |
| Switching frequency: | 100 Hz | 200 Hz (black wire at 0-2 Vdc or unconnected) 16 Hz (black wire at 5-30 Vdc) |
| Delay at powering: | 300 ms | |
| Indicators: | yellow-green bi-coloured OUTPUT LED red POWER LED | |
| Setting: | Teach-in or remote input | |
| Ultrasonic emission frequency: | 300 KHz, repeated each 2.5 ms | |
| Temperature drift: | minor than 1.7 % at detection distance | |
| Repeatability: | 0.5 mm | |
| Minimum detection window: | 5 mm | |
| Hysteresis: | 0.7 mm | |
| Resolution *: | ±1 mm with 2.5 ms response time ±0.5 mm with 30 ms response time | |
| Minimum detection window dimension: | 5 mm | |
| Operating temperature: | -25 … 55 °C | |
| Storage temperature: | -25 … 70 °C | |
| Electrical protection: | Class 2 | |
| Housing material: | Polyester | |
| Mechanical housing: | IP67 | |
| Connections: | M12 5-pole connector | |
| Weight: | 25 g | |
| Standard reference: | EN 60068-2-6, EN 60068-2-27 | |

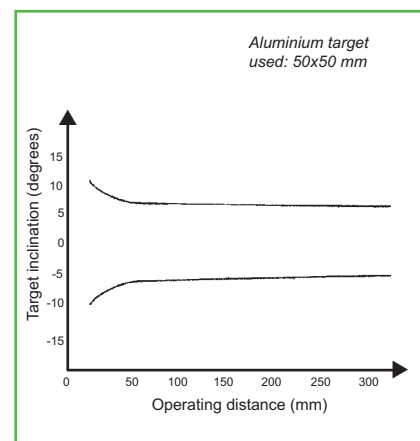* with 50x50 mm aluminium target at 22°C and constant operating conditions

CE

## DETECTION DIAGRAMS



— 2.25 mm bar
—·— 8 mm bar
- - - 50x50 mm target

Lateral distance (mm) / Operating distance (mm)
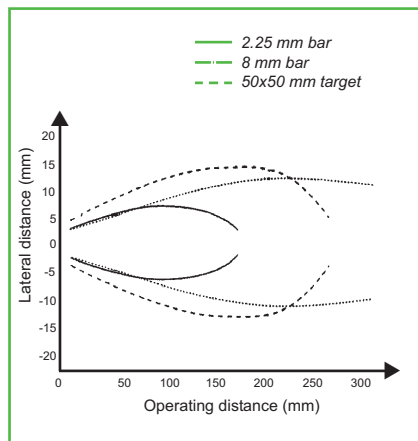
**Beam - distance variation
(typical values)**



Aluminium target
used: 50x50 mm

Target inclination (degrees) / Operating distance (mm)

**Maximum target inclination
(models with discrete output)**



Aluminium target
used: 50x50 mm

Target inclination (degrees) / Operating distance (mm)

**Maximum target inclination
(models with analogue output)**

DATASENSOR

## MODEL SELECTION TABLE

| MODEL | HOUSING TYPE | OUTPUT | ORDER N° |
|---|---|---|---|
| US18-PA-5-N03-OH | axial | NPN and PNP | 95B040000 |
| US18-PR-5-N03-OH | radial | NPN and PNP | 95B040010 |
| US18-PA-5-N03-IH | axial | 4-20 mA analogue | 95B040020 |
| US18-PR-5-N03-IH | radial | 4-20 mA analogue | 95B040030 |
| US18-PA-5-N03-VH | axial | 0-10 V analogue | 95B040040 |
| US18-PR-5-N03-VH | radial | 0- 10 V analogue | 95B040050 |

## ACCESSORIES

## DIMENSIONS

### ST-5011

### ST-5012
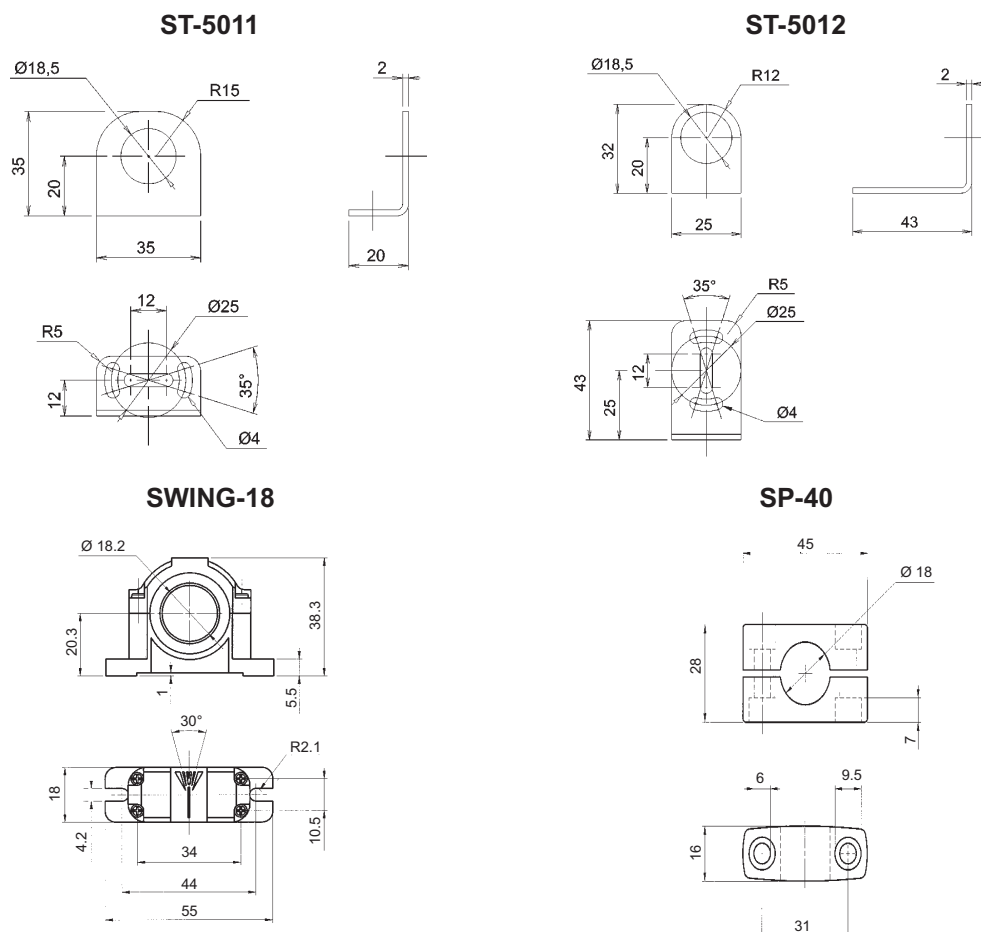


### SWING-18

### SP-40



## ACCESSORY SELECTION TABLE

| MODEL | DESCRIPTION | ORDER N° |
|---|---|---|
| ST-5011 | M18 fixing bracket | 95ACC5240 |
| ST-5012 | M18 fixing bracket | 95ACC5250 |
| SWING-18 | adjustable support for plastic tubular M18 sensors | 895000006 |
| SP-40 | fixed support for tubular M18 sensors | 95ACC1370 |
| CS-A1-03-G-03 | axial M12 5 pole unshielded 3 m connector | 95ACC2110 |
| CS-A1-03-G-05 | axial M12 5 pole unshielded 5 m connector | 95ACC2120 |

*Refer also to **Accessories for Sensors** of the **General Catalogue***

**ULTRASONIC SENSORS**