



UK1 and UKR1 series

M18 cylindrical direct diffuse & retro-reflective Ultrasonic Sensor UK1 with Teach-In button



M18 with Teach-In button



features

- Models with adjustable digital output
- Models with current or voltage analogue outputs
- Working area adjusting (single point teach, standard window, adjustable hysteresis) by Teach-in button suitable for all models for a fast coming into work
- Multifunction LED indicator: output state, echo presence, fw identification, teach block
- Plastic or metallic (AISI 316L) housing, M12 plug exit and PVC cable

web contents



- Application notes
- Photos
- Catalogue / Manuals



code description

UK 1 A / G 1 - 0 E SY AN IO

| | UK | 1 | A | / | G | 1 | - | 0 | E | SY | AN | IO |
|-----------------------------|----|---|---|---|---|---|---|---|---|----|----|----|
| series | UK | M18 Ultrasonic Sensor | | | | | | | | | | |
| function | | Direct diffuse models | | | | | | | | | | |
| | R | Retroreflective models | | | | | | | | | | |
| housing type | 1 | Standard housing | | | | | | | | | | |
| nominal sensing distance Sn | A | 50 - 400 mm (150 - 900 mm retroreflective models) | | | | | | | | | | |
| | C | 80 - 900 mm (150 - 800 mm retroreflective models) | | | | | | | | | | |
| | D | 150 - 1,600 mm (250 - 1,600 mm retroreflective models) | | | | | | | | | | |
| | F | 200 - 2,200 mm (300 - 2,200 mm retroreflective models) | | | | | | | | | | |
| adjustment | G | Adjustment by Teach-In button | | | | | | | | | | |
| output | 1 | 0...10 V single voltage analogue output | | | | | | | | | | |
| | 2 | 4...20 mA single current analogue output | | | | | | | | | | |
| | 4 | NPN - NO/NC digital output + 4 ... 20 mA current analogue output | | | | | | | | | | |
| | 6 | PNP - NO/NC digital output + 4 ... 20 mA current analogue output | | | | | | | | | | |
| | 7 | PNP - NO/NC digital output + 0 ... 10 V voltage analogue output | | | | | | | | | | |
| | 9 | NPN - NO/NC digital output + 0 ... 10 V voltage analogue output | | | | | | | | | | |
| | N | NPN - NO/NC single digital output | | | | | | | | | | |
| | P | PNP - NO/NC single digital output | | | | | | | | | | |
| | W | PNP - two digital outputs with adjustable firmware (standard window, coded window, adjustable hysteresis) | | | | | | | | | | |
| | M | NPN - two digital outputs with adjustable firmware (standard window, coded window, adjustable hysteresis) | | | | | | | | | | |
| housing materials | 0 | Plastic housing | | | | | | | | | | |
| | 1 | AISI 316L (DIN 1.4404) stainless steel housing (axial) | | | | | | | | | | |
| | 2 | 90° emission, plastic housing | | | | | | | | | | |
| cable exit / connector | A | Axial cable exit (2 m) | | | | | | | | | | |
| | E | M12 plug cable exit | | | | | | | | | | |
| SY | SY | SYNC/MUX function | | | | | | | | | | |
| ATEX | AN | ATEX certified, Cat.3 2.22 Zone | | | | | | | | | | |
| IO-Link | IO | IO-Link models | | | | | | | | | | |

UK1 - UKR1



M18 with Teach-In button

available models

single output

| housing | output | distance (mm) | analogue output 0...10 V | analogue output 4...20 mA | 1 x PNP - NO/NC | 1 x NPN - NO/NC |
|------------------------------|------------------|---------------|-----------------------------|------------------------------|-----------------|-----------------|
| plastic | M12 connector | 50...400 | UK1A/G1-0ESY | UK1A/G2-0ESY | UK1A/GP-0ESY | UK1A/GN-0ESY |
| | | 80...900 | UK1C/G1-0ESY | UK1C/G2-0ESY | UK1C/GP-0ESY | UK1C/GN-0ESY |
| | | 150...1,600 | UK1D/G1-0ESY | UK1D/G2-0ESY | UK1D/GP-0ESY | UK1D/GN-0ESY |
| | | 200...2,200 | UK1F/G1-0ESY | UK1F/G2-0ESY | UK1F/GP-0ESY | UK1F/GN-0ESY |
| stainless steel AISI 316L | | 50...400 | UK1A/G1-1ESY | UK1A/G2-1ESY | UK1A/GP-1ESY | UK1A/GN-1ESY |
| | | 80...900 | UK1C/G1-1ESY | UK1C/G2-1ESY | UK1C/GP-1ESY | UK1C/GN-1ESY |
| | | 150...1,600 | UK1D/G1-1ESY | UK1D/G2-1ESY | UK1D/GP-1ESY | UK1D/GN-1ESY |
| | | 200...2,200 | UK1F/G1-1ESY | UK1F/G2-1ESY | UK1F/GP-1ESY | UK1F/GN-1ESY |
| plastic | cable | 50...400 | UK1A/G1-0ASY | UK1A/G2-0ASY | UK1A/GP-0ASY | UK1A/GN-0ASY |
| | | 80...900 | UK1C/G1-0ASY | UK1C/G2-0ASY | UK1C/GP-0ASY | UK1C/GN-0ASY |
| | | 150...1,600 | UK1D/G1-0ASY | UK1D/G2-0ASY | UK1D/GP-0ASY | UK1D/GN-0ASY |
| | | 200...2,200 | UK1F/G1-0ASY | UK1F/G2-0ASY | UK1F/GP-0ASY | UK1F/GN-0ASY |
| stainless steel AISI 316L | | 50...400 | UK1A/G1-1ASY | UK1A/G2-1ASY | UK1A/GP-1ASY | UK1A/GN-1ASY |
| | | 80...900 | UK1C/G1-1ASY | UK1C/G2-1ASY | UK1C/GP-1ASY | UK1C/GN-1ASY |
| | | 150...1,600 | UK1D/G1-1ASY | UK1D/G2-1ASY | UK1D/GP-1ASY | UK1D/GN-1ASY |
| | | 200...2,200 | UK1F/G1-1ASY | UK1F/G2-1ASY | UK1F/GP-1ASY | UK1F/GN-1ASY |

available models

double digital output

| housing | output | distance (mm) | 2 x PNP - NO/NC | 2 x NPN - NO/NC |
|------------------------------|------------------|---------------|-----------------|-----------------|
| plastic | M12 connector | 50...400 | UK1A/GW-0ESY | UK1A/GM-0ESY |
| | | 80...900 | UK1C/GW-0ESY | UK1C/GM-0ESY |
| | | 150...1,600 | UK1D/GW-0ESY | UK1D/GM-0ESY |
| | | 200...2,200 | UK1F/GW-0ESY | UK1F/GM-0ESY |
| stainless steel AISI 316L | | 50...400 | UK1A/GW-1ESY | UK1A/GM-1ESY |
| | | 80...900 | UK1C/GW-1ESY | UK1C/GM-1ESY |
| | | 150...1,600 | UK1D/GW-1ESY | UK1D/GM-1ESY |
| | | 200...2,200 | UK1F/GW-1ESY | UK1F/GM-1ESY |
| plastic | cable | 50...400 | UK1A/GW-0ASY | UK1A/GM-0ASY |
| | | 80...900 | UK1C/GW-0ASY | UK1C/GM-0ASY |
| | | 150...1,600 | UK1D/GW-0ASY | UK1D/GM-0ASY |
| | | 200...2,200 | UK1F/GW-0ASY | UK1F/GM-0ASY |
| stainless steel AISI 316L | | 50...400 | UK1A/GW-1ASY | UK1A/GM-1ASY |
| | | 80...900 | UK1C/GW-1ASY | UK1C/GM-1ASY |
| | | 150...1,600 | UK1D/GW-1ASY | UK1D/GM-1ASY |
| | | 200...2,200 | UK1F/GW-1ASY | UK1F/GM-1ASY |

available models

analog and digital output

| housing | distance (mm) | output | 1 x PNP - NO/NC + 1 x 4...20 mA | 1 x NPN - NO/NC + 1 x 4...20 mA | 1 x PNP - NO/NC + 1 x 0...10 V | 1 x NPN - NO/NC + 1 x 0...10 V |
|------------------------------|---------------|---------------|---------------------------------|---------------------------------|--------------------------------|--------------------------------|
| plastic | 50...400 | M12 connector | UK1A/G6-0ESY | UK1A/G4-0ESY | UK1A/G7-0ESY | UK1A/G9-0ESY |
| | 80...900 | | UK1C/G6-0ESY | UK1C/G4-0ESY | UK1C/G7-0ESY | UK1C/G9-0ESY |
| | 150...1,600 | | UK1D/G6-0ESY | UK1D/G4-0ESY | UK1D/G7-0ESY | UK1D/G9-0ESY |
| | 200...2,200 | | UK1F/G6-0ESY | UK1F/G4-0ESY | UK1F/G7-0ESY | UK1F/G9-0ESY |
| | 50...400 | cable | UK1A/G6-0ASY | UK1A/G4-0ASY | UK1A/G7-0ASY | UK1A/G9-0ASY |
| | 80...900 | | UK1C/G6-0ASY | UK1C/G4-0ASY | UK1C/G7-0ASY | UK1C/G9-0ASY |
| | 150...1,600 | | UK1D/G6-0ASY | UK1D/G4-0ASY | UK1D/G7-0ASY | UK1D/G9-0ASY |
| | 200...2,200 | | UK1F/G6-0ASY | UK1F/G4-0ASY | UK1F/G7-0ASY | UK1F/G9-0ASY |
| stainless steel AISI 316L | 50...400 | M12 connector | UK1A/G6-1ESY | UK1A/G4-1ESY | UK1A/G7-1ESY | UK1A/G9-1ESY |
| | 80...900 | | UK1C/G6-1ESY | UK1C/G4-1ESY | UK1C/G7-1ESY | UK1C/G9-1ESY |
| | 150...1,600 | | UK1D/G6-1ESY | UK1D/G4-1ESY | UK1D/G7-1ESY | UK1D/G9-1ESY |
| | 200...2,200 | | UK1D/G6-1ESY | UK1D/G4-1ESY | UK1D/G7-1ESY | UK1D/G9-1ESY |
| | 50...400 | cable | UK1A/G6-1ASY | UK1A/G4-1ASY | UK1A/G7-1ASY | UK1A/G9-1ASY |
| | 80...900 | | UK1C/G6-1ASY | UK1C/G4-1ASY | UK1C/G7-1ASY | UK1C/G9-1ASY |
| | 150...1,600 | | UK1D/G6-1ASY | UK1D/G4-1ASY | UK1D/G7-1ASY | UK1D/G9-1ASY |
| | 200...2,200 | | UK1D/G6-1ASY | UK1D/G4-1ASY | UK1D/G7-1ASY | UK1D/G9-1ASY |



M18 with
Teach-In button



| | UK1A/G*-**SY | UK1C/G*-**SY | UK1D/G*-**SY | UK1F/G*-**SY |
|--|--|-----------------------|-------------------------|-------------------------|
| | | | | |
| maximum sensing distance | 400 mm ⁽¹⁾ | 900 mm ⁽²⁾ | 1,600 mm ⁽²⁾ | 2,200 mm ⁽²⁾ |
| minimum sensing distance | 50 mm | 80 mm | 150 mm | 200 mm |
| sensing range (Sd) | 50...400 mm | 80...900 mm | 150...1,600 mm | 200...2,200 mm |
| beam angle | 10° ± 2° | 10° ± 2° | 15° ± 2° | 14° ± 2° |
| switching frequency (digital output) | 10 Hz | 4 Hz | 3 Hz | 2 Hz |
| response time analogue output (10...90% final value) | 500 ms | | | |
| hysteresis | 1% | | | |
| repeatability | 0.5% | | | |
| resolution | ± 1 mm | ± 2 mm | ± 3 mm | ± 3 mm |
| linearity error | 1% | | | |
| temperature range | - 20°C...+ 70°C | | | |
| temperature compensation | ● | | | |
| operating voltage | 10 - 30 Vcc | | | |
| temperature drift | ± 2 % | | | |
| ripple | 5% | | | |
| leakage current | 10 µA @ 30 Vcc | | | |
| output voltage drop | 2.2 V max. (IL = 100 mA) | | | |
| no-load supply current | ≤ 50 mA | | | |
| output current (digital output) | 100 mA | | | |
| minimum load resistance (analog voltage output) | 3 k Ω | | | |
| set point adjustment | Teach-In button | | | |
| power on delay | ≤ 300 ms | | | |
| short-circuit protection | ● (autoreset) | | | |
| induction protection | ● | | | |
| voltage reversal protection | ● | | | |
| EMC | conforming to EMC Directive, according to EN 60947-5-2 | | | |
| protection degree | IP67 (EN60529) ⁽³⁾ | | | |
| housing material | PBT/stainless steel AISI 316L | | | |
| active head material | Epoxy-Glass resin | | | |
| tightening torque | 1 Nm plastic housing / 50 Nm metallic housing | | | |
| weight | plastic version: 70 g connector - 110 g cable metallic version: 100 g connector - 170 g cable | | | |
| storage temperature | - 35°C...+ 70° without freezing | | | |
| LEDs | green: echo - yellow: output | | | |

(1) Metallic target 100 x 100 mm (2) Metallic target 200 x 200 (3) Protection guarantee only with plug cable well mounted

available models

90° emission models

| housing | material | output | distance (mm) | 1xPNP-NO/NC + 1x4...20 mA | 1xNPN-NO/NC + 1x4...20 mA | 1xPNP-NO/NC + 1x0...10 V | 1xNPN-NO/NC + 1x0...10 V | 2 x PNP | 2 x NPN |
|---------|----------|--------|---------------|------------------------------|------------------------------|-----------------------------|-----------------------------|--------------|--------------|
| M18 | plastic | M12 | 50...400 | UK1A/G6-2ESY | UK1A/G4-2ESY | UK1A/G7-2ESY | UK1A/G9-2ESY | UK1A/GW-2ESY | UK1A/GM-2ESY |
| | | | 80...900 | UK1C/G6-2ESY | UK1C/G4-2ESY | UK1C/G7-2ESY | UK1C/G9-2ESY | UK1C/GW-2ESY | UK1C/GM-2ESY |
| | | | 150...1.600 | UK1D/G6-2ESY | UK1D/G4-2ESY | UK1D/G7-2ESY | UK1D/G9-2ESY | UK1D/GW-2ESY | UK1D/GM-2ESY |
| | | | 200...2.200 | UK1F/G6-2ESY | UK1F/G4-2ESY | UK1F/G7-2ESY | UK1F/G9-2ESY | UK1F/GW-2ESY | UK1F/GM-2ESY |



M18 with
Teach-In button

technical specifications

90° emission models

| | UK1A/G*-2ESY | UK1C/G*-2ESY | UK1D/G*-2ESY | UK1F/G*-2ESY |
|---|--|-----------------------|-------------------------|-------------------------|
| | | | | |
| nominal sensing distance | 400 mm ⁽¹⁾ | 900 mm ⁽²⁾ | 1,600 mm ⁽²⁾ | 2,200 mm ⁽²⁾ |
| minimum sensing distance | 50 mm | 80 mm | 150 mm | 200 mm |
| sensing range | 50...400 mm | 80...900 mm | 150...1,600 mm | 200...2,200 mm |
| beam angle | 10° ± 2° | 10° ± 2° | 15° ± 2° | 14° ± 2° |
| hysteresis | 1% | | | |
| repeatability | 0.5% | | | |
| resolution | ± 1 mm | ± 2 mm | ± 3 mm | ± 3 mm |
| linearity error | 1% | | | |
| switching frequency | 10 Hz | 4 Hz | 3 Hz | 2 Hz |
| response time analogue output (10...90% final value) | 500 ms | | | |
| operating voltage | 10...30 Vdc | | | |
| max. ripple content | 5% | | | |
| output current | 100 mA (digital output) | | | |
| minimum load resistance (analog voltage output) | 3 k Ω | | | |
| set point adjustment | Teach-In button | | | |
| output voltage drop | ≤ 2.2 V (@ I = 100mA) | | | |
| no-load supply current | ≤ 50 mA | | | |
| leakage current | ≤ 10 µA @ 30V | | | |
| power on delay | ≤ 300 ms | | | |
| ambient temperature range | - 20°C...+ 70°C | | | |
| temperature drift of Sr | ± 2% | | | |
| short-circuit protection | ● (autoreset) | | | |
| induction protection | ● | | | |
| voltage reversal protection | ● | | | |
| EMC | conforming to EMC Directive, according to EN 60947-5-2 | | | |
| weight | 75 g | | | |
| LEDs | green: echo - yellow: output | | | |
| protection degree | IP67 (EN 60529) ⁽³⁾ | | | |
| housing material | plastic housing: PBT | | | |
| active head material | epoxy glass resin | | | |
| connection | M12 plug cable exit | | | |
| storage temperature | - 35°C...+ 70° without freezing | | | |
| tightening torque | 1 Nm | | | |

(1) Metallic target 100 x 100 mm (2) Metallic target 200 x 200 (3) Protection guarantee only with plug cable well mounted



available models

retroreflective models

| housing | material | output | distance (mm) | PNP - NO+NC | NPN - NO+NC |
|---------|---------------------------|---------------|---------------|---------------|---------------|
| M18 | plastic | M12 connector | 100...400 | UKR1A/GW-0ESY | UKR1A/GM-0ESY |
| | | | 150...900 | UKR1C/GW-0ESY | UKR1C/GM-0ESY |
| | | | 250...1.600 | UKR1D/GW-0ESY | UKR1D/GM-0ESY |
| | | | 300...2.200 | UKR1F/GW-0ESY | UKR1F/GM-0ESY |
| | stainless steel AISI 316L | | 100...400 | UKR1A/GW-1ESY | UKR1A/GM-1ESY |
| | | | 150...900 | UKR1C/GW-1ESY | UKR1C/GM-1ESY |
| | | | 250...1.600 | UKR1D/GW-1ESY | UKR1D/GM-1ESY |
| | | | 300...2.200 | UKR1F/GW-1ESY | UKR1F/GM-1ESY |

technical specifications

retroreflective models

| | UKR1A/G*-*SY | UKR1C/G*-*SY | UKR1D/G*-*SY | UKR1F/G*-*SY |
|------------------------------------|--|--------------|--------------|--------------|
| | | | | |
| nominal sensing distance | 400 mm | 900 mm | 1,600 mm | 2,200 mm |
| reflector minimum sensing distance | 100 mm | 150 mm | 250 mm | 300 mm |
| beam angle | 10° ± 2° | 10° ± 2° | 15° ± 2° | 14° ± 2° |
| switching frequency | 10 Hz | 4 Hz | 3 Hz | 2 Hz |
| operating voltage | 10...30 Vdc | | | |
| max. ripple content | 5% | | | |
| output type | PNP or NPN | | | |
| output current | 100 mA | | | |
| output voltage drop | ≤ 2.2 V (@ I = 100mA) | | | |
| no-load supply current | ≤ 50 mA @ Val=24V | | | |
| leakage current | ≤ 10 µA @ 30V | | | |
| power on delay | ≤ 300 ms | | | |
| ambient temperature range | - 20°C...+ 70°C | | | |
| temperature drift of Sr | ± 2 % | | | |
| short-circuit protection | ● (autoreset) | | | |
| induction protection | ● | | | |
| voltage reversal protection | ● | | | |
| LEDs | green: echo - yellow: output | | | |
| protection degree | IP67 | | | |
| EMC | conforming to EMC Directive, according to EN 60947-5-2 | | | |
| housing material | PBT / stainless steel AISI 316L | | | |
| active head material | epoxy - glass resin | | | |
| connection | M12 plug cable exit | | | |
| weight | plastic version: 70 g - metallic version: 100 gr | | | |
| storage temperature | -35°..+70°C | | | |
| set point adjustment | teach-in button | | | |
| tightening torque | 1 Nm plastic housing / 50 Nm metallic housing | | | |

adjustment

Reflector detection (Sd)

Install the sensor in the correct position. Install the background (any solid, flat, fixed surface) perpendicularly to the sensor's axes. Press the Teach-in button. Yellow LED blink for 5 times, after that, the sensor acquires the background position (Sd distance).

Operating distance (Sr)

The effective operating distance (Sr) is equivalent to background distance (Sd) decreases of 10%. This hysteresis allows the correct detection of the target even if the background is vibrating during the machine normal operations



available models

IO-Link

| housing | output | output | distance | model |
|------------------------------|------------------|-------------------------|-------------|----------------|
| stainless steel AISI 316L | M12 connector | IO-Link or push-pull | 50...400 | UK1A/GW-1EIOSY |
| | | | 200...2.200 | UK1F/GW-1EIOSY |

technical specifications

IO-Link models

| | UK1A/GP-1EIOSY | UK1F/GP-1EIOSY |
|---|---|---|
| |  |  |
| nominal sensing distance (Sn) | 50-400 mm ⁽¹⁾ | 200-2,200 mm ⁽²⁾ |
| adjustable sensing range (Sd) | 50-400 mm ⁽¹⁾ | 200-2,200 mm ⁽²⁾ |
| background min distance in BGS mode | 100 mm | 300 mm |
| sensitivity adjustment | Teach in button | |
| beam angle | 10±2° | 14±2° |
| repeatability | 0.5% | |
| resolution | 1 mm | |
| operating voltage | 10-30 Vdc | |
| ripple | 5% | |
| no-load current | ≤50 mA | |
| transducer frequency | 300 kHz | 200 kHz |
| power on delay (digital output) | ≤ 500 ms | |
| power supply protections | polarity reversal, transient | |
| digital output electrical protections | short circuit (autoreset), over voltage pulses | |
| max. current analogical voltage output | 40 mA | |
| LEDs | green: echo - yellow: output | |
| temperature range | -20°..+70°C | |
| temperature compensation | ● | |
| temperature drift (digital output) | ±2% | |
| housing material | AISI316L | |
| active head material | Epoxy - Glass resin | |
| protection degree | IP67 (EN 60529) ⁽³⁾ | |

(1) Metallic target 100 x 100 mm (2) Metallic target 200 x 200 (3) Protection guarantee only with plug cable well mounted

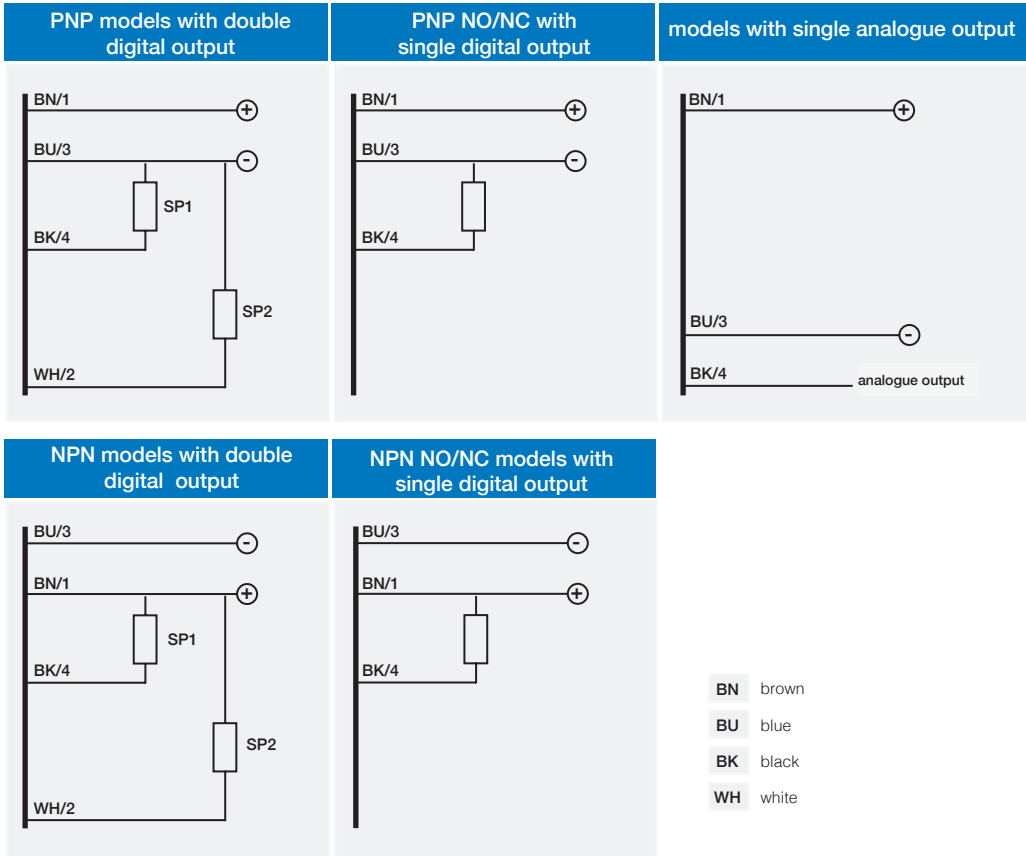


M18 with
Teach-In button

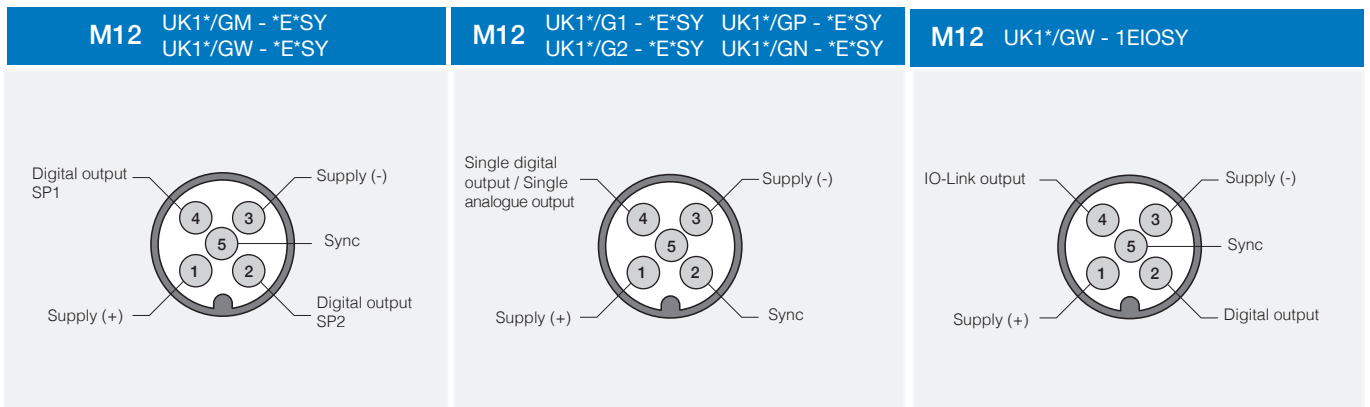


electrical diagrams of connections

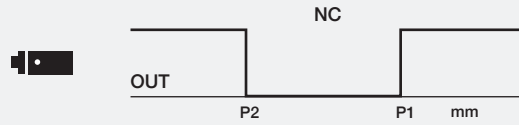
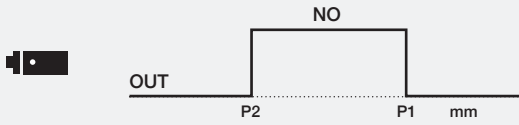
M18 with Teach-In button



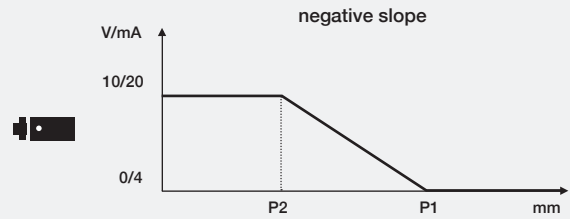
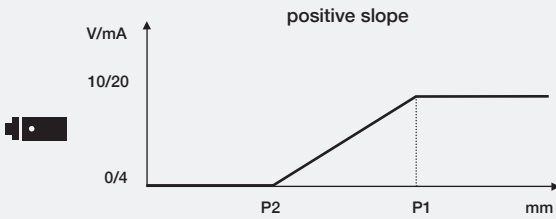
connectors



models with single digital output



models with single analogue output



models with double digital output - coded window, adjustable hysteresis, standard window

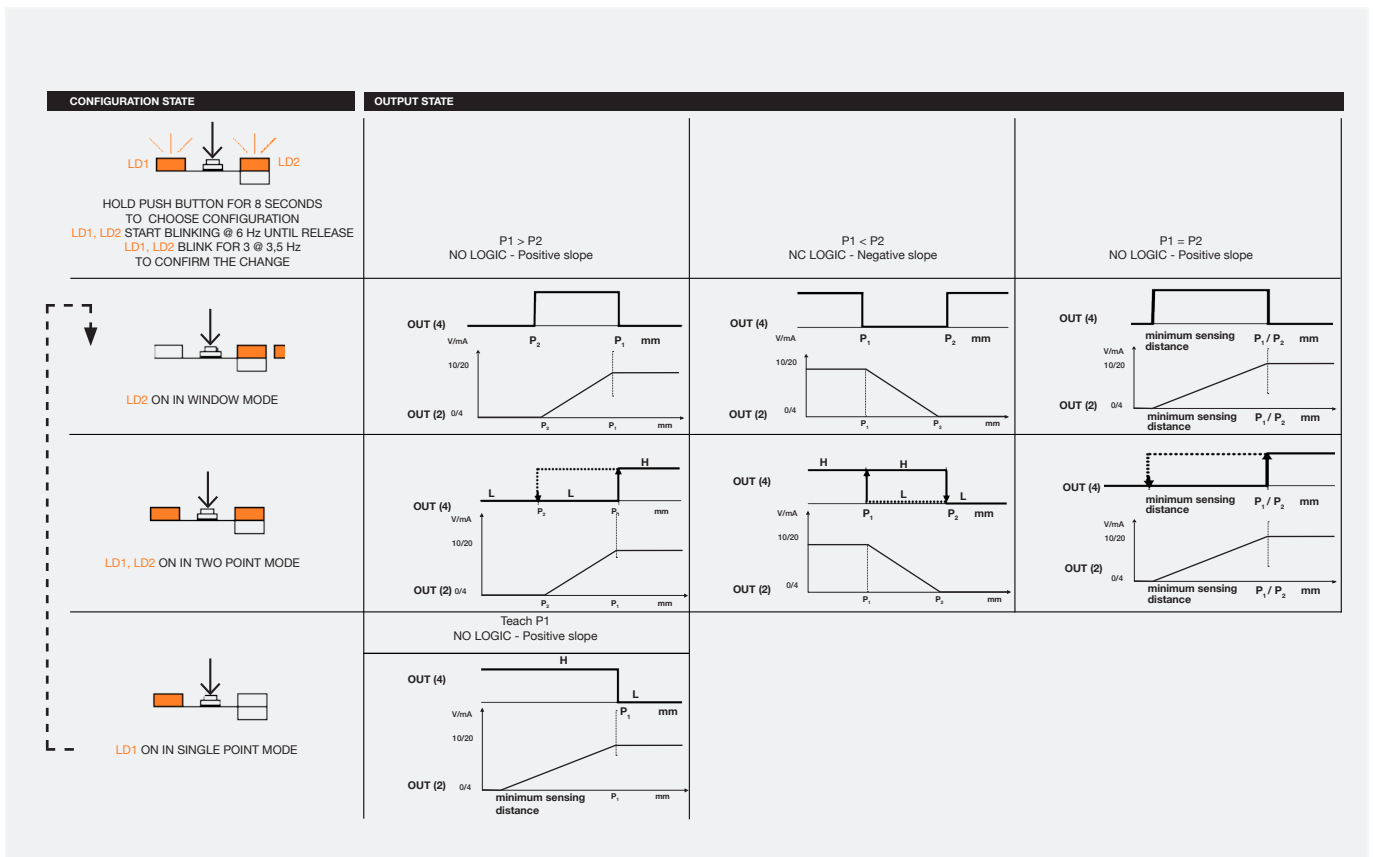
| CONFIGURATION STATE | OUTPUT STATE | | |
|--|--|--|---|
| <p>HOLD PUSH BUTTON FOR 8 SECONDS TO CHOOSE CONFIGURATION LD1, LD2 START BLINKING @ 6 Hz UNTIL RELEASE LD1, LD2 BLINK FOR 3 @ 3.5 Hz TO CONFIRM THE CHANGE</p> | <p>$P1 > P2$ LOGICA NO</p> | <p>$P1 < P2$ LOGICA NC</p> | <p>$P1 = P2$ LOGICA NO</p> |
| <p>LD1 ON IN SINGLE POINT MODE</p> | | | |
| <p>LD1 ON IN WINDOW MODE</p> | | | |
| <p>LD1, LD2 ON IN TWO POINT MODE</p> | | | |

P1 maximum selected working distance and first point to select

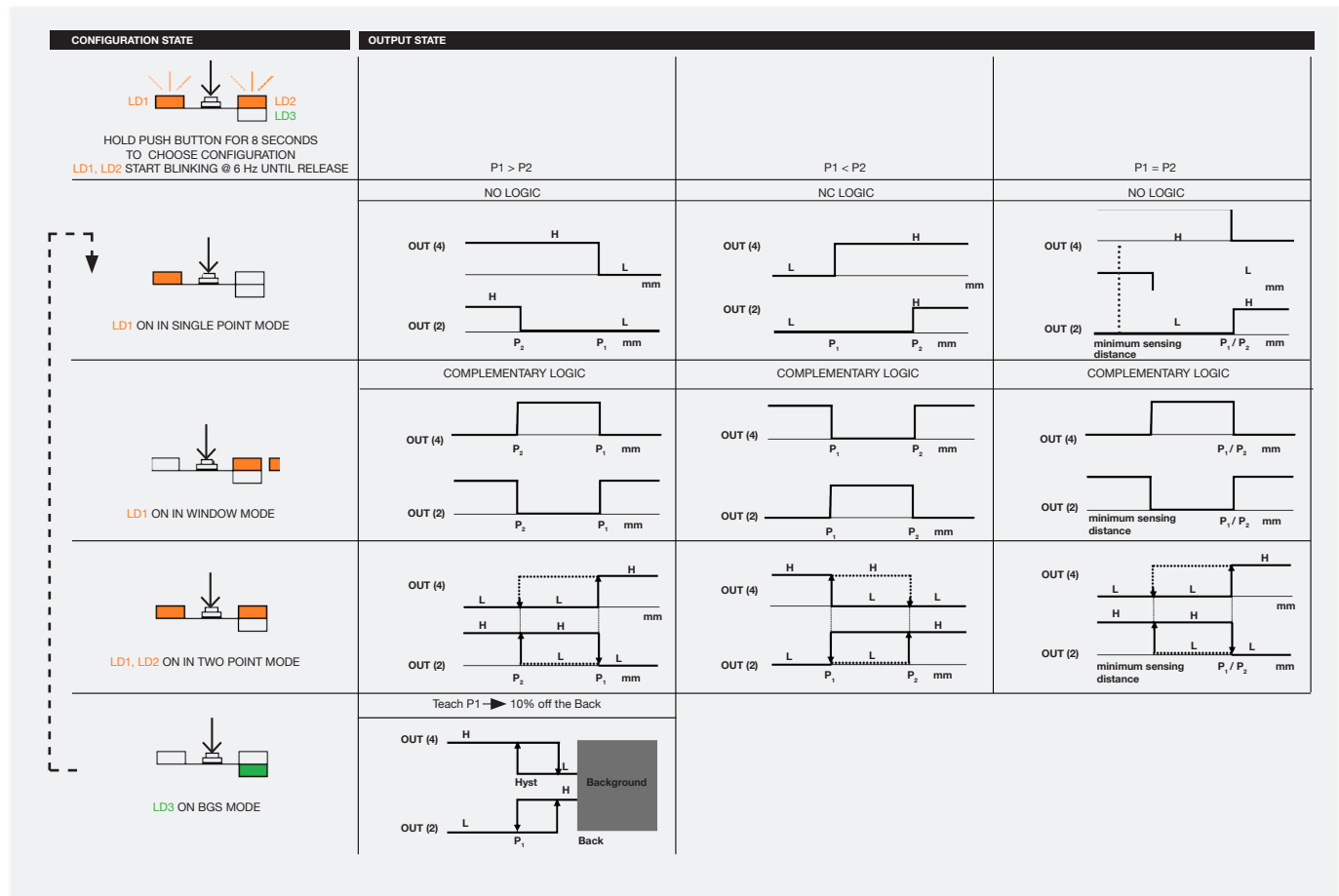
P2 minimum selected working distance and second point to select



models with mixed digital + analog output

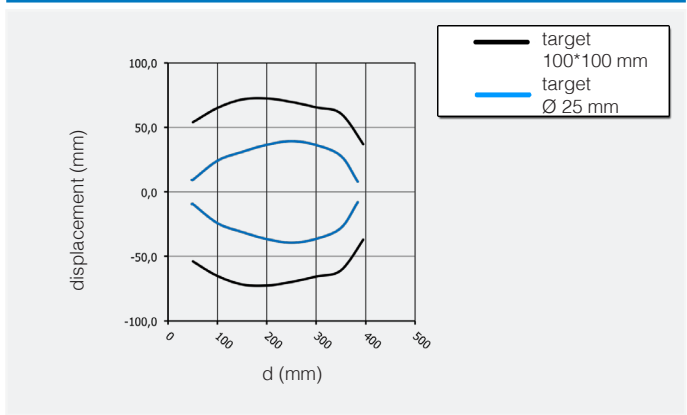


models with IO-Link and digital outputs

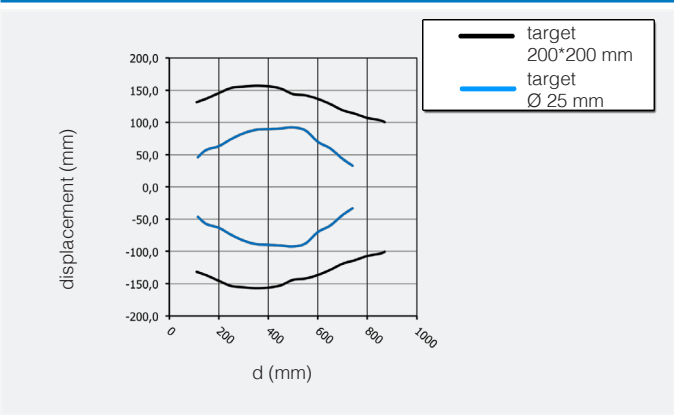




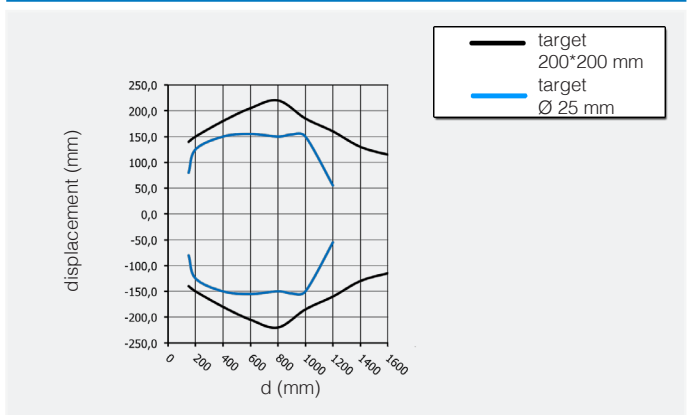
UK1A/**-** parallel displacement



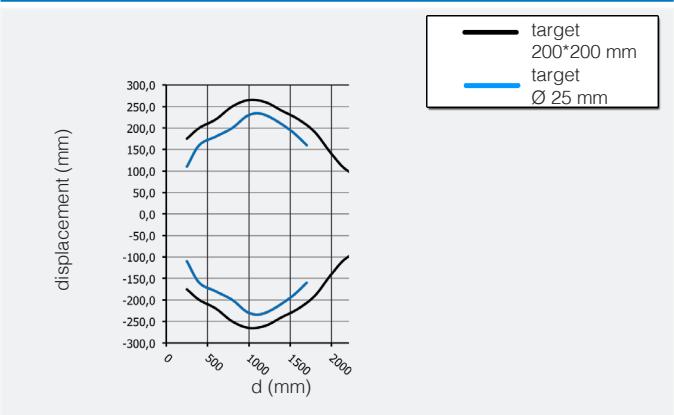
UK1C/**-** parallel displacement



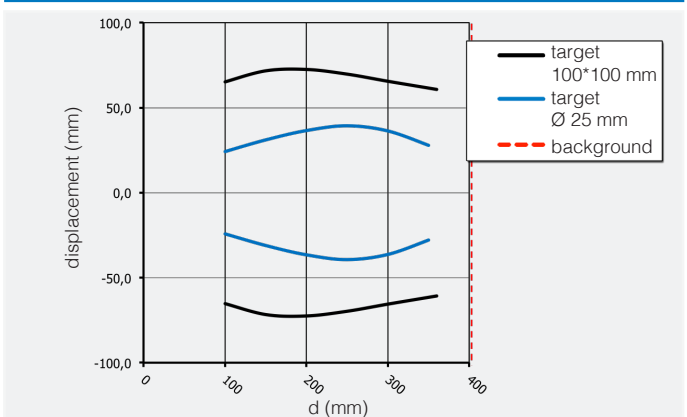
UK1D/**-** parallel displacement



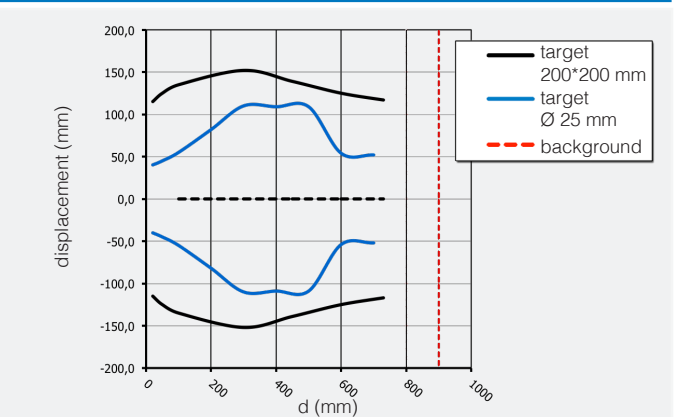
UK1F/**-** parallel displacement



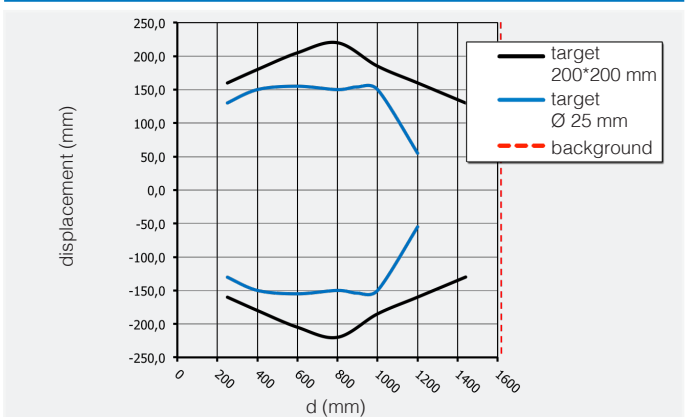
UKR1A/**-** parallel displacement



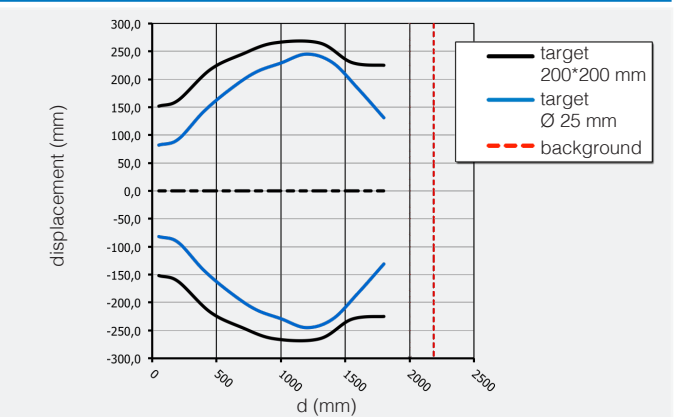
UKR1C/**-** parallel displacement



UKR1D/**-** parallel displacement



UKR1F/**-** parallel displacement

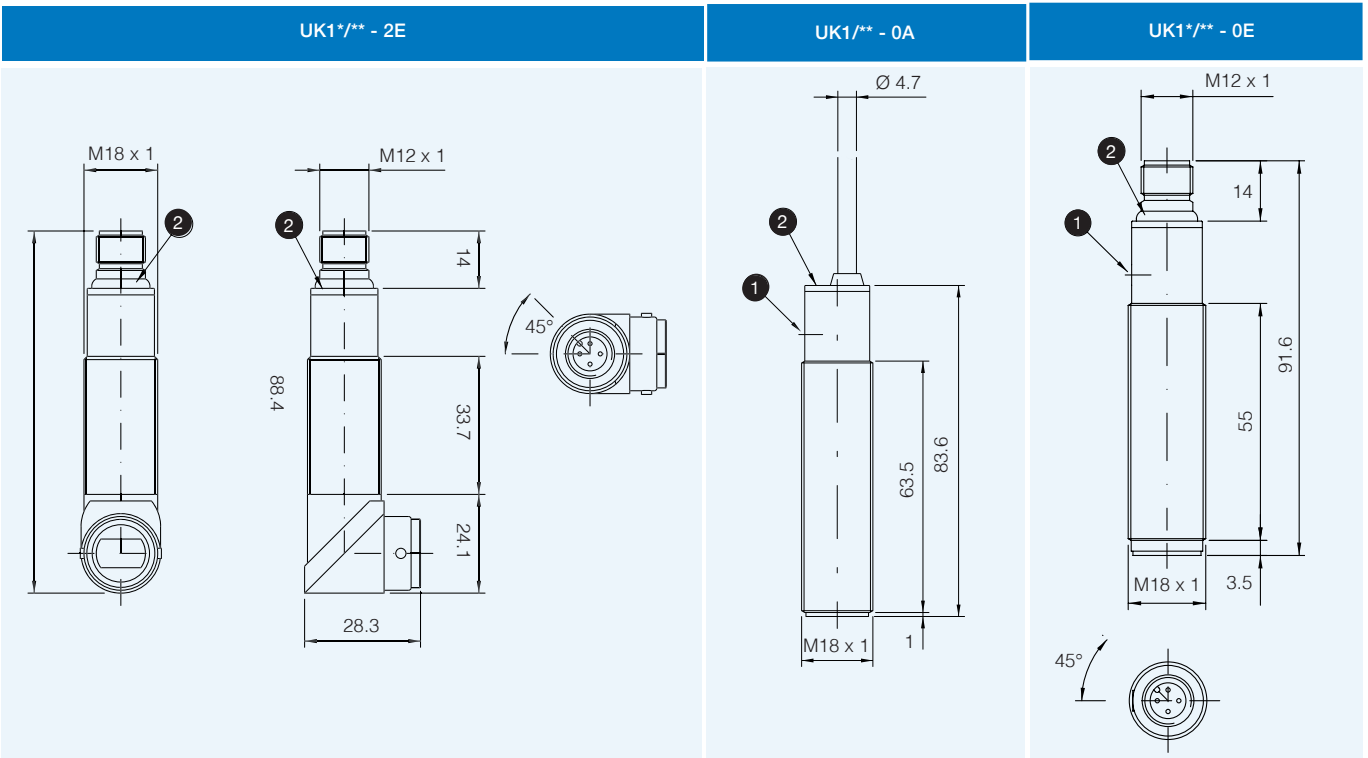




dimensions (mm)

plastic models

M18 with
Teach-In button

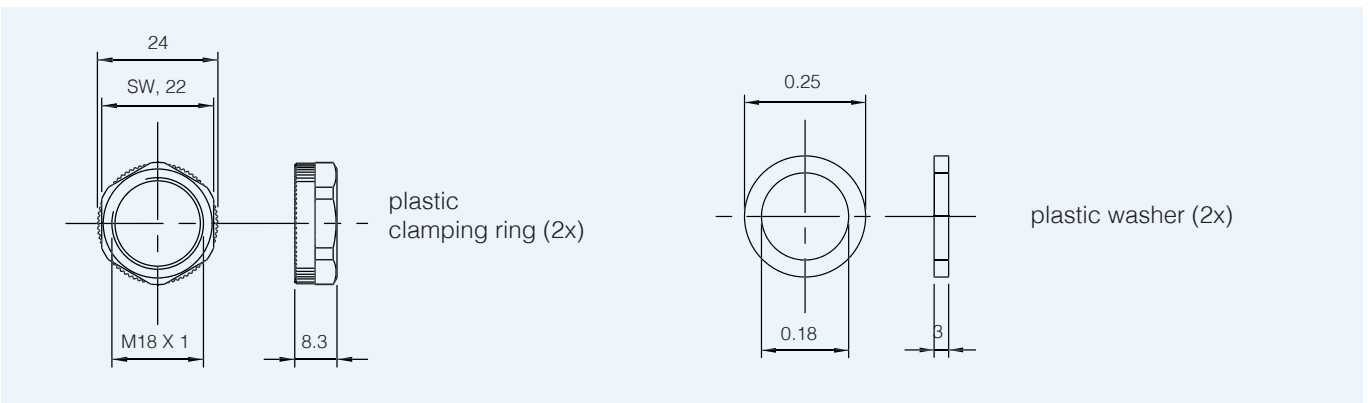


1 Teach-In button

2 LED

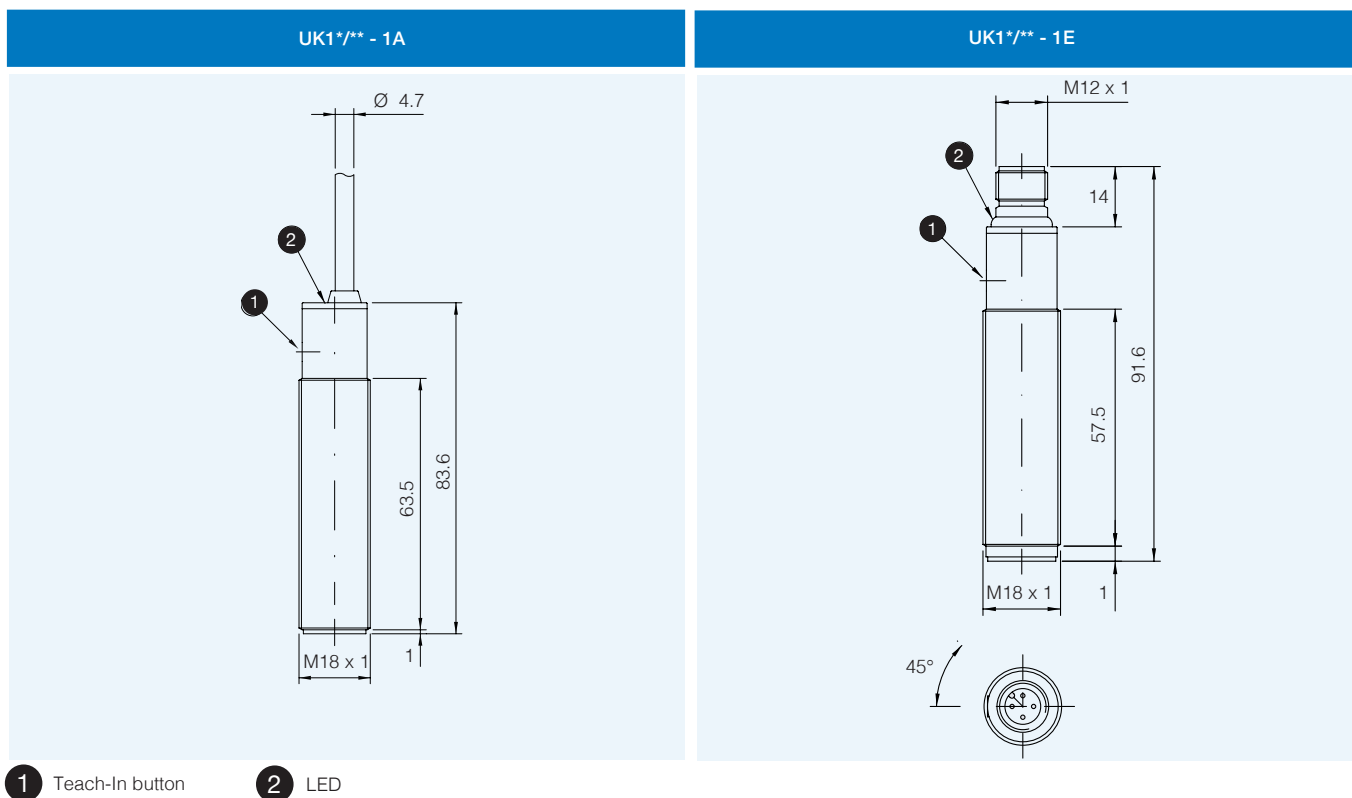
dimensions (mm)

accessories included in all plastic models



dimensions (mm)

metallic models



dimensions (mm)

accessories included in all metallic models

