Micro Detectors

Italian Sensors Technology

Cylindrical
Ultrasonic Sensor M18
UK6 short housing

Ultrasonic Sensors
Catalogue

Cod. CAT3EUK1375901
Datasheet - UK6 - English - Ed.01/2013

Series
UK6

M18
short housing

www.microdetectors.com

industries and applications

Packaging Industry
Glass Industry
Marble Industry
Wood Industry
Labelling system

features

Models with single digital output

Models with current or voltage analogue output: programmable switching points and slope outputs to optimize the resolution

Working area adjusting by external Teach-in to avoid tampering of the sensing distance

Two adjustment modes on all models: window Teach-in and on object Teach-in.

Two LEDs: green LED for the echo reception and orange LED for the output state, Teach-in function and NO/NC configuration or analogue slope output

Complete protection against electrical damages

Plastic and stainless steel AISI 316L housing

approvals

CE cULus

protection degree

IP67





M18 cylindrical ultrasonic sensor with short housing UK6

UK6 sensors are characterized by an extremely compact **housing of 6 cm only** (including connector), that make them suitable in all applications needing a limited space to be installed.
The working range selection and the change of the “Normally Open/Normally Closed” state or analogue output slope are possible through the remote Teach-in and without any further external accessory.
They work in direct diffuse mode, with a minimum sensing distance up to **40 mm** and with a switching frequency up to **40 Hz** (digital output models).
Two LED indicators, visible through the transparent plug and cable exit, furnish information about the output and the regulation procedure (orange LED) and about the echo reception (green LED).
All the UK6 codes are temperature compensed, ensuring reliability in the detection for entire working range.
UK6 sensors have a housing totally filled of resin, to be suitable for applications subject to vibrations, and boast of IP67 protection grade.

pack content

Installation manual (English + Italian): CAT8BUK1365301

2 plastic nuts or metallic nuts

2 flexible washer

further commercial and technical documents available

Application book “Construction and Agricultural machines” (italian CAT3I001269401 and English CAT3E001269501)

High resolution pictures.

Application note:
- presence control of marble and granits panels (italian: CAT3IUK1370901 and english: CAT3EUK1371001)
- panel detection in polishing machines (italian: CAT3IUK1370601 and english: CAT3EUK1370701)
- flat panel detection for glass cutting machines (italian: CAT3IUK1266701 and english: CAT3EUK1266801)

customization already tested

-

minimum quantity that can be ordered

1 piece

code description

UK 6 A / D P - 0 E 1F UL

- **UK** M18 ultrasonic sensor
- **6** Short housing
- **A** 40-300 mm direct diffuse
- **C** 120-900 mm direct diffuse / 120-700 mm direct diffuse for metallic housing models
- **D** Sensitivity adjustment by external Teach-in(*)
- **P** PNP- NO/NC digital output
- **N** NPN- NO/NC digital output
- **1** 0...10 V voltage analogue output
- **2** 4...20 mA current analogue output
- **-**
- **0** Plastic housing
- **1** Stainless steel AISI 316L (DIN 1.4404) housing
- **E** M12 plug cable exit
- **A** 2 m PCV cable exit
- **1F** Switching frequency f=20Hz
- **UL** With cULus certification

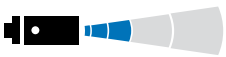
(*) Sensitivity adjustment and status selection available by external Teach-in

available models (cULus certified)

dimension	function	housing	distance	output	analogue output 0...10 V	analogue output 4...20 mA	1 x PNP NO/NC	1 x NPN NO/NC
M18	direct diffuse	plastic housing	40...300 mm	M12 plug cable	UK6A/D1-0EUL	UK6A/D2-0EUL	UK6A/DP-0EUL	UK6A/DN-0EUL
							UK6A/DP-0E1FUL	UK6A/DN-0E1FUL
			120...900 mm		UK6C/D1-0EUL	UK6C/D2-0EUL	UK6C/DP-0EUL	UK6C/DN-0EUL
			40...300 mm	cable	UK6A/D1-0AUL	UK6A/D2-0AUL	UK6A/DP-0AUL	UK6A/DN-0AUL
							UK6A/DP-0A1FUL	UK6A/DN-0A1FUL
			120...900 mm		UK6C/D1-0AUL	UK6C/D2-0AUL	UK6C/DP-0AUL	UK6C/DN-0AUL
M18	direct diffuse	AISI 316L (DIN 1.4404)	40...300 mm	M12 plug cable	UK6A/D1-1EUL	UK6A/D2-1EUL	UK6A/DP-1EUL	UK6A/DN-1EUL
			120...700 mm		UK6C/D1-1EUL	UK6C/D2-1EUL	UK6C/DP-1EUL	UK6C/DN-1EUL
			40...300 mm	cable	UK6A/D1-1AUL	UK6A/D2-1AUL	UK6A/DP-1AUL	UK6A/DN-1AUL
			120...700 mm		UK6C/D1-1AUL	UK6C/D2-1AUL	UK6C/DP-1AUL	UK6C/DN-1AUL

technical specifications of plastic housing models(cULus certified models)

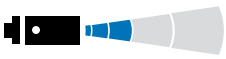
according to IEC EN 60947-5-2 and ICE EN 60947-5-7


models	UK6A/D*-1*UL	UK6C/D*-1*UL
		
maximum sensing distance Sn	300 mm (1)	900 mm (2)
minimum operating distance (blind zone)	40 mm	120 mm
beam angle	± 10°	± 8°
switching frequency (digital output)	40 Hz 20 Hz UK6A/D*0*1FUL	6 Hz
response time (digital output)	12 ms 25 ms UK6A/D*0*1FUL	80 ms
differential travel	2%	
repeat accuracy	2%	
linearity error	≤ 3%	
operating temperature	-20°C ...+60°C	
digital temperature compensation	yes	
operating voltage	15 - 30 Vdc	
thermal drift	< 7%	
ripple	5%	
leakage current	≤ 10 µA @ 30 Vdc	
output voltage drop	2,2 V max (IL=100mA)	
No-Load current	≤ 35 mA	
maximum load current (digital output)	100 mA	
adjustment set point	external Teach-in	
time delay before availability	≤ 300 ms (digital output); ≤ 900 ms (analog output)	
supply electrical protections	polarity reversal, transient	
digital output electrical protections	short circuit (auto reset), over voltage pulses	
analogical output electrical protections	over voltage pulses	
EMC	conforming to the EC Directive 2004/108/EC requirements according to EN 60947-5-2	
protection degree	IP67 (3) (EN 60529)	
housing material	PBT	
active head material	epoxy-glass resin	
tighteening torque	1 Nm	
weight	15 gr (connector exit), 80 gr (cable exit)	
storage temperature	-35°C...+70° without freezing	

(1) Metallic target 100 x 100 mm
(2) Metallic target 200 x 200 mm
(3) Protection granted only by plug mounted in a correct way

technical specifications of metallic housing models (cULus certified models)

according to IEC EN 60947-5-2 and ICE EN 60947-5-7

models	UK6A/D*-1*UL	UK6C/D*-1*UL
		
maximum sensing distance Sn	300 mm (1)	700 mm (2)
minimum operating distance (blind zone)	40 mm	120 mm
beam angle	± 10°	± 8°
switching frequency (digital output)	10 Hz	6 Hz
response time (digital output)	25 ms	80 ms
differential travel	2%	
repeat accuracy	2%	
linearity error	≤ 3%	
operating temperature	-20°C ...+60°C	
digital temperature compensation	yes	
operating voltage	15 - 30 Vdc	
thermal drift	≤ 7% (digital output); 5% (analog output)	
ripple	5%	
leakage current	≤ 10 µA @ 30 Vdc	
output voltage drop	2,2 V max (IL=100mA)	
No-Load current	≤ 40 mA	
maximum load current (digital output)	100 mA	
time delay before availability	≤ 300 ms (digital output); ≤ 900 ms (analog output)	
adjustment set point	external Teach-in	
supply electrical protections	polarity reversal, transient	
digital output electrical protections	short circuit (auto reset), over voltage pulses	
analogical output electrical protections	short circuit	
EMC	conforming to the EC Directive 2004/108/EC requirements according to EN 60947-5-2	
protection degree	IP67 (3) (EN 60529)	
housing material	stainless steel AISI 316L	
active head material	epoxy-glass resin	
tighteening torque	50 Nm	
weight	35 gr (connector exit), 95 gr (cable exit)	
storage temperature	-35°C...+70° without freezing	

(1) Metallic target 100 x 100 mm
(2) Metallic target 200 x 200 mm
(3) Protection granted only by plug mounted in a correct way

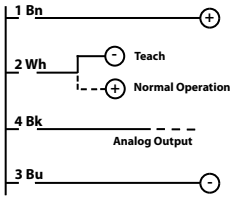
Products

M18
short housing

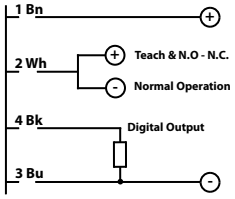
BN	brown
BU	blue
BK	black
WH	white

electrical diagrams of connections

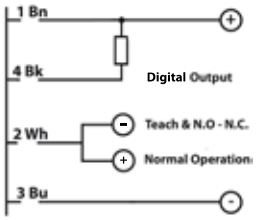
Models with single analogue output



PNP NO/NC models

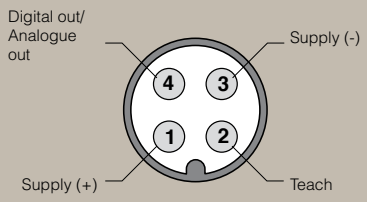


NPN NO/NC models



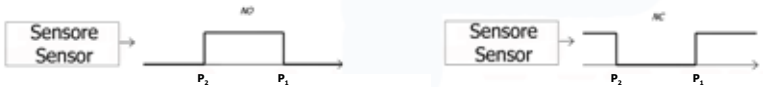
M12

UK6*/**-**

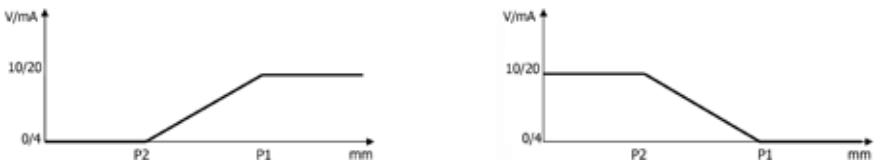


available outputs

Models with single digital output



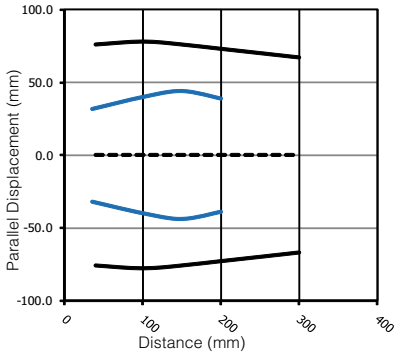
Models with single analogue output



response diagram

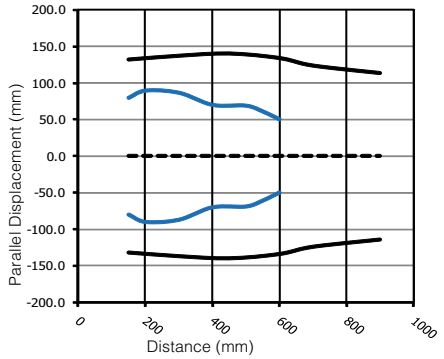
UK6A/**-**

—— Target 100 x 100 mm
------ Round bar dia. 25 mm



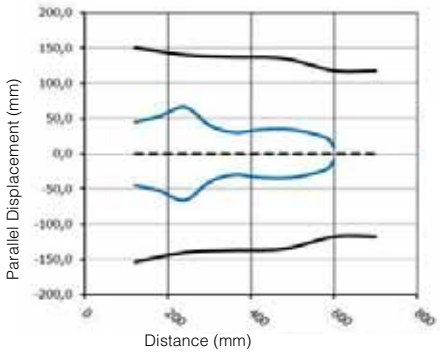
UK6C/**-0*

—— Target 200 x 200 mm
------ Round bar dia. 25 mm



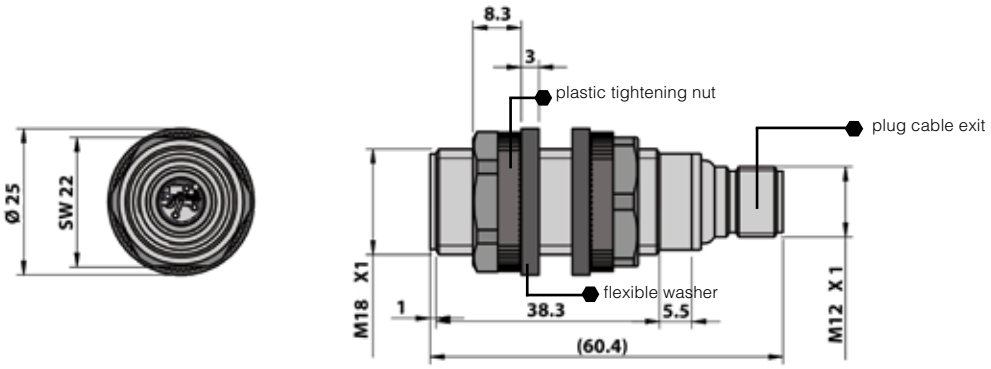
UK6C/**-1*

—— Target 200 x 200 mm
------ Round bar dia. 25 mm



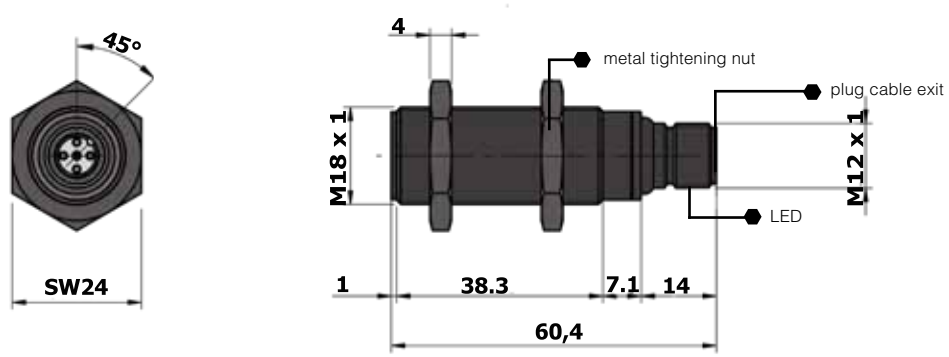
dimensions

UK6*/**-0EUL



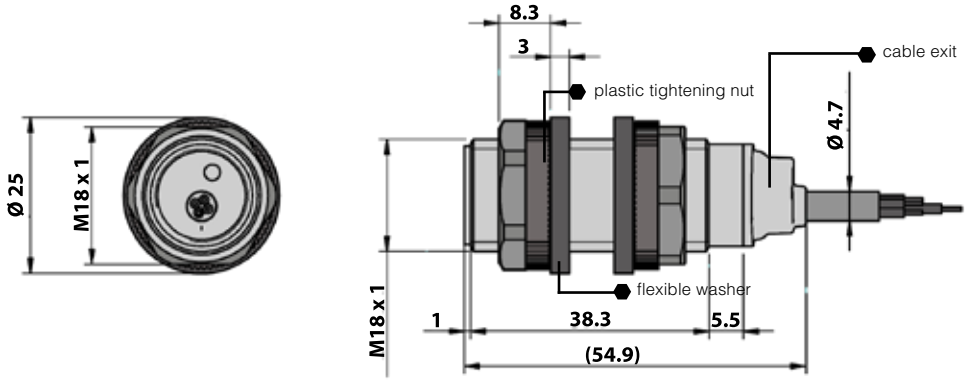
mm

UK6*/**-1EUL



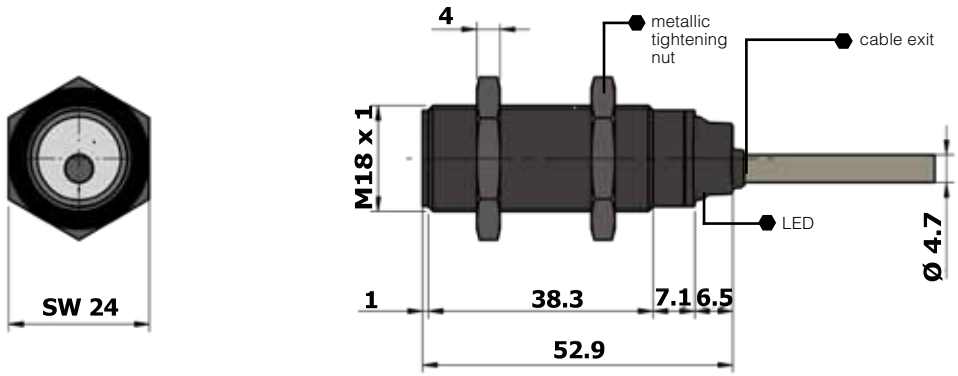
mm

UK6*/**-0AUL



mm

UK6*/**-1AUL



mm

accessories

code	description
CD12M/0B-***A1 (1)	Connectors with PVC cable. Axial
CD12M/0B-***C1 (1)	Connectors with PVC cable. Right angle
CD12/0B-***A5US (2)	Connectors with PUR cable and certification cCSAus. Axial
CD12/0B-***C5US (2)	Connectors with PUR cable and certification cCSAus. Right angle
CD12/0B-***A1US (2)	Connectors with PVC cable and certification cCSAus. Axial
CD12/0B-***C1US (2)	Connectors with PVC cable and certification cCSAus. Right angle

(1) ***= 020 (2 m) / ***= 050 (5 m) / ***= 100 (10 m) (2) ***= 050 (5 m) / ***= 100 (10 m) / ***= 150 (15 m)

notes

----- Target axis
—— Measurement
----- Stable switching point of the sensor

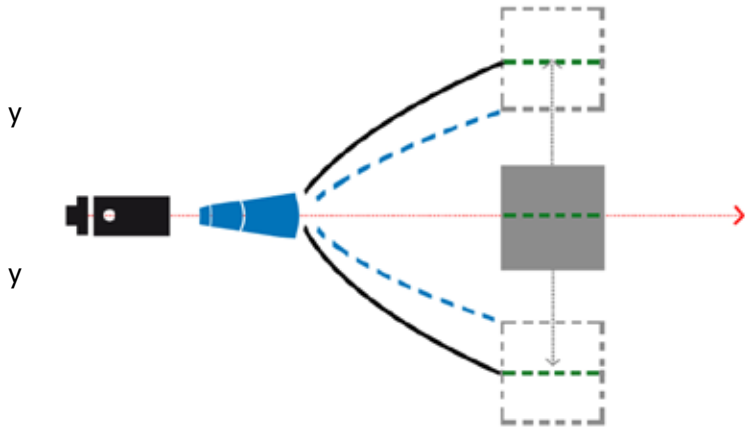


Fig.1

(4) In Response Curves Paragraph, the curve drawn with black continuous line delimits the area in which a plate, metallic target, with size specified in its legend, is detected.
In Response Curves Paragraph, the curve drawn with blue traced line delimits the area in which a cylindrical metallic rod, with a diameter of 25mm, is detected.
Therefore, these two curves don't represent the ultrasonic beam width.

Fig.1 shows how these two curves are obtained: the metallic target, both flat and cylindrical, is introduced in parallel to active face of ultrasonic sensor, moving along Y-axis.

The curves are drawn as following:
- a variable number of sampling points (dependent on the series) of working distances are considered, within the sensing range;
- in correspondence to each sampling point, the target is moved along the Y-axis as long as the output of the sensor doesn't switch stably;
- the curve is drawn connecting this points

.
To obtain the evaluation of ultrasonic beam width it is necessary to decrease half size of the standard target from both the upper curve and from the lower curve, since the reference point is the axis of the target.

This method allows the delineation of an area where it is sure to detect a target avoiding lobes that may have energy levels not sufficient for a correct detection.

Targets with reflection properties lesser than reference targets are detected in an area smaller than that shown in the graphs.

Targets with reflection properties better than reference targets are detected in an area wider than that shown in the graphs.

Measurements /detection of targets for distances smaller than minimum sensing distance are not allowed.

Catalogue
Ultrasonic Sensors

CAT3EUK1375901 ULTRASONIC SENSORS CATALOGUE UK6 ENGLISH ED.01/2013