

# Ultrasonic Sensors

## Ultrasonic Sensors

### Operating Principle

Ultrasonic sensors are designed for contactless and wear-free detection of a variety of targets by means of sonic waves.

Diffuse and retro-reflective ultrasonic sensors emit pulses periodically. The reflected sonic waves can be received and converted into electric signals. The detection of reflected sonic wave depends on the intensity of the sound wave, which is determined by the distance between the target and the active surface. The operating principle is "echo delay", the time difference of sonic waves emitting and returning. Moreover, the emitter of opposed ultrasonic sensors emit a narrow band to the receiver, which can analyze ultrasonic signals. The receiver transmits output whenever it encounters targets.

Ultrasonic sensors are designed for detection of a variety of targets. It's not important whether the target is transparent or colored, metallic or non-metallic, firm, liquid or powdery. Environmental conditions hardly affect their function.

### Sensing Range

The ultrasonic wave is angular in light of sensor structure. Only if targets that are within wave range can the reflection be detected. The echo wave of the 'blind zone', the area between active surface and minimum sensing range, will not be detected.

### Temperature Compensation

The ultrasonic sensors are equipped with temperature sensing and compensation circuit to compensate changes in operating distance caused by variation in temperature.

### Safety

Ultrasonic sensors cannot be used to assure personal safety.

### Type

Diffuse, retro-reflective and opposed ultrasonic sensors are available.

### Diffuse

The target just like a reflector, once it enters into the prepared sensing range, the reflective sonic waves will make the sensor operating.

### Retro-reflective

A reflector, like sequin, is equipped directly to the retro-reflective sensor which prepares switching range according to the reflector. The sensor no longer identifies reflector to initiate sensor operation when target arrives at the area between sensor and reflector.

### Opposed

The opposed sensor is composed of an emitter and receiver in the opposite direction. The ultrasonic signal will interrupt when it meets target and sensor transmits outputs.

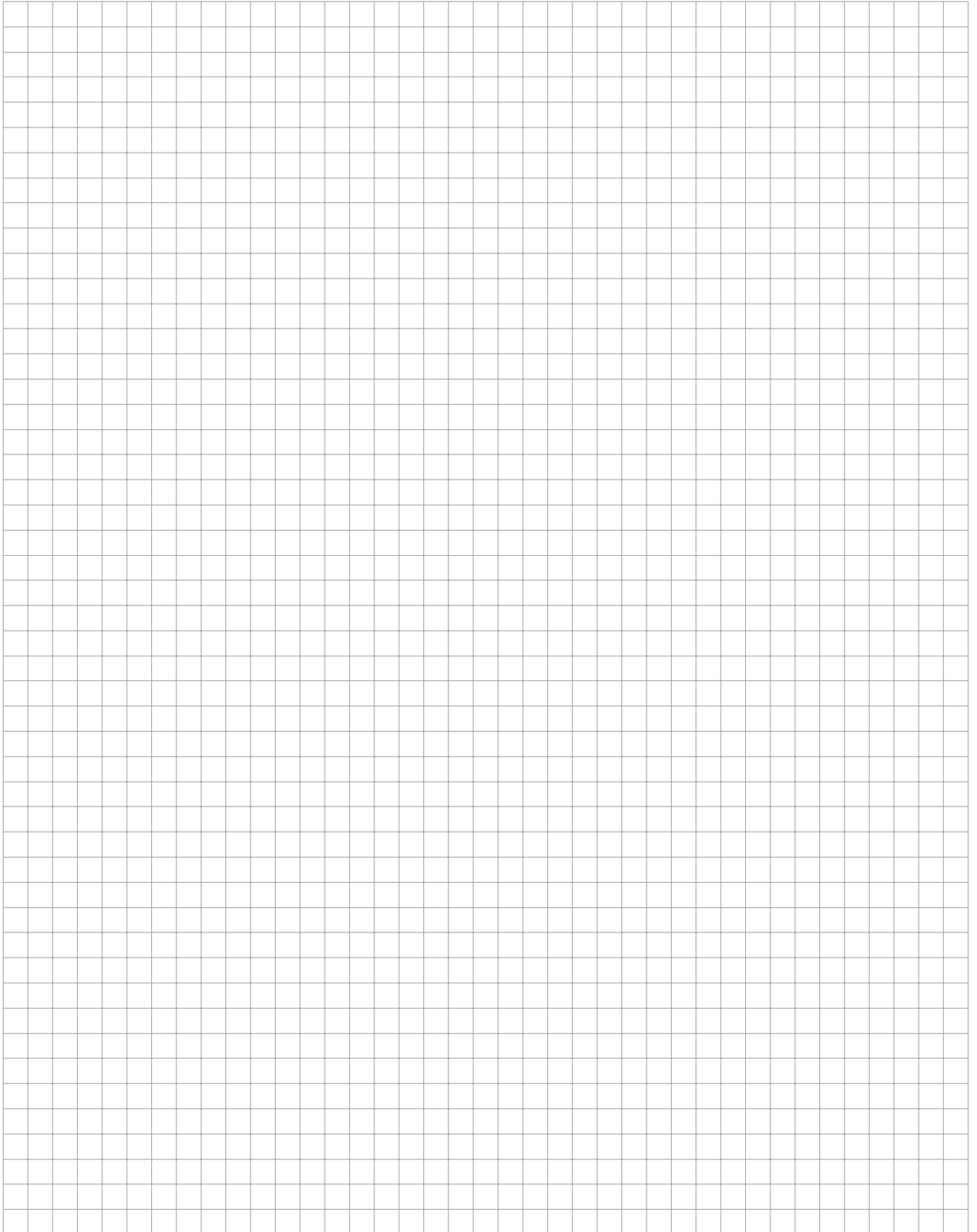
### Programming

Ultrasonic sensors can be programmed to its optimal according to application conditions.

### Mounting

Ultrasonic sensor can be mounted onto any place. However, deposits on the surface of sensor should be avoided.

To acquire an optimal reflection, the mounting of the sensor should be 90° between the sound wave axis and target. When unable to achieve, (due to huge targets for instance) maximum possible detection range can be determined based on experiment, which is decided by material, surface finishes, and direction of the target object.



## Ultrasonic Sensors

Type Code:

U	K	300		G	18		O	P	6	L		Q12
		Operating Distance			Dimension					Function Display		Connection
		300mm			M18*1					LED		Q12:M12*1 4-pin Q12.1:M12*1 5-pin Empty: Cable
	Detection type			Housing Material					Operating Voltage Range			
	K: Direct reflect			G: Metal barrel BG: Right angle metal barrel					6: 10-30VDC 7: 15-30VDC			
Principle								Output Type				
U: Ultrasonic								P: PNP N: NPN				
								Output Function				
								O: NO C: NC B: Change-over (NO/NC) V: Connection programmable (NO/NC) LI: Analogue output (current) LU: Analogue output (voltage) LIU: Analogue output (current and voltage) RS2: RS232 interface				

# Ultrasonic Sensors

## Ultrasonic Sensors -M18 Direct Reflect



### Descriptions:

Metal housing, threaded barrel, DC 4/5-wire, double-color LED indicator, degree of protection IP65.

### Features:

- Various output type: switch  
analogue: 0-10V/4-20mA
- Convenient mounting
- Circuit protection
- THACH-IN or programming optional

### Parameter:

Type	Operating distance	Voltage range	Output function	Output type	Switching frequency	Connection	Mechanical drawing
UK300-G18-VP6L-Q12	30-300mm	10...30VDC	NO/NC	PNP	13Hz	M12,4-pin connector	Drawing 2
UK300-BG18-VP6L-Q12	30-300mm	10...30VDC	NO/NC	PNP	13Hz	M12,4-pin connector	Drawing 1
UK300-G18-VN6L-Q12	30-300mm	10...30VDC	NO/NC	NPN	13Hz	M12,4-pin connector	Drawing 2
UK300-BG18-VN6L-Q12	30-300mm	10...30VDC	NO/NC	NPN	13Hz	M12,4-pin connector	Drawing 1
UK300-G18-LI6L-Q12	30-300mm	15...30VDC	Current (4-20mA)	Analogue	—	M12,4-pin connector	Drawing 2
UK300-BG18-LI6L-Q12	30-300mm	15...30VDC	Current (4-20mA)	Analogue	—	M12,4-pin connector	Drawing 1
UK300-G18-LU7L-Q12	30-300mm	15...30VDC	Voltage (0-10V)	Analogue	—	M12,4-pin connector	Drawing 2
UK300-BG18-LU7L-Q12	30-300mm	15...30VDC	Voltage (0-10V)	Analogue	—	M12,4-pin connector	Drawing 1
UK500-G18-2VP6L-Q12.1	30-500mm	10...30VDC	NO/NC	PNP	8Hz	M12,5-pin connector	Drawing 3
UK500-G18-2VN6L-Q12.1	30-500mm	10...30VDC	NO/NC	NPN	8Hz	M12,5-pin connector	Drawing 3
UK500-G18-LI6L-Q12.1	30-500mm	15...30VDC	Current (4-20mA)	Analogue	—	M12,5-pin connector	Drawing 3
UK500-G18-LU7L-Q12.1	30-500mm	15...30VDC	Voltage (0-10V)	Analogue	—	M12,5-pin connector	Drawing 3
UK1000-G18-2VP6L-Q12.1	70-1000mm	10...30VDC	NO/NC	PNP	3Hz	M12,5-pin connector	Drawing 3
UK1000-G18-2VN6L-Q12.1	70-1000mm	10...30VDC	NO/NC	NPN	3Hz	M12,5-pin connector	Drawing 3
UK1000-G18-LI6L-Q12.1	70-1000mm	15...30VDC	Current (4-20mA)	Analogue	—	M12,5-pin connector	Drawing 3
UK1000-G18-LU7 L-Q12.1	70-1000mm	15...30VDC	Voltage (0-10V)	Analogue	—	M12,5-pin connector	Drawing 3

### Technical Data:

Operating voltage	10...30VDC/15...30VDC
Max.pulsating voltage	10%
Max. load current	200mAmax
Output voltage drop	2.0 V max/3.0 V max(at 150 mA)
Power delay	Refer to products
Indicator	LED
Output function	Switch output / Analogue output
Housing	Metal
Weight	Refer to products
Ambient temperature	Refer to products
Circuit protection	Overload protection, short-circuit protection, polarity protection, short-term overvoltage protection

## Ultrasonic Sensors -M30 Direct Reflect

### Descriptions:

Metal housing, threaded barrel, DC 4/5-wire, double-color LED indicator, degree of protection IP65.



### Features:

- Various output type: switch
  - switch+RS232
  - analogue+RS232
- Convenient mounting
- Circuit protection
- THACH-IN or programming optional

### Parameter:

Type	Operating distance	Voltage range	Output function	Output type	Switching frequency	Connection	Mechanical drawing
UK2000-G30-VP6L-Q12.1	80-2000mm	10...30VDC	NO/NC	PNP	3.3Hz	M12,5-pin connector	Drawing 6
UK4000-G30-VP6L-Q12.1	200-4000mm	10...30VDC	NO/NC	PNP	1.5Hz	M12,5-pin connector	Drawing 8
UK6000-G30-VP6L-Q12.1	350-6000mm	10...30VDC	NO/NC	PNP	0.8Hz	M12,5-pin connector	Drawing 10
UK2000-G30-VN6L-Q12.1	80-2000mm	10...30VDC	NO/NC	NPN	3.3Hz	M12,5-pin connector	Drawing 6
UK4000-G30-VN6L-Q12.1	200-4000mm	10...30VDC	NO/NC	NPN	1.5Hz	M12,5-pin connector	Drawing 8
UK6000-G30-VN6L-Q12.1	350-6000mm	10...30VDC	NO/NC	NPN	0.8Hz	M12,5-pin connector	Drawing 10
UK500-G30-2VPRS2-Q12.1	30-500mm	10...30VDC	NO/NC+RS232 interface	PNP	7Hz	M12,5-pin connector	Drawing 4
UK2000-G30-2VPRS2-Q12.1	80-2000mm	10...30VDC	NO/NC+RS232 interface	PNP	2.5Hz	M12,5-pin connector	Drawing 4
UK4000-G30-2VPRS2-Q12.1	200-4000mm	10...30VDC	NO/NC+RS232 interface	PNP	1Hz	M12,5-pin connector	Drawing 7
UK6000-G30-2VPRS2-Q12.1	350-6000mm	10...30VDC	NO/NC+RS232 interface	PNP	0.5Hz	M12,5-pin connector	Drawing 11
UK500-G30-2VNRS2-Q12.1	30-500mm	10...30VDC	NO/NC+RS232 interface	NPN	7Hz	M12,5-pin connector	Drawing 4
UK2000-G30-2VNRS2-Q12.1	80-2000mm	10...30VDC	NO/NC+RS232 interface	NPN	2.5Hz	M12,5-pin connector	Drawing 4
UK4000-G30-2VNRS2-Q12.1	200-4000mm	10...30VDC	NO/NC+RS232 interface	NPN	1Hz	M12,5-pin connector	Drawing 7
UK6000-G30-2VNRS2-Q12.1	350-6000mm	10...30VDC	NO/NC+RS232 interface	NPN	0.5Hz	M12,5-pin connector	Drawing 11
UK500-G30-LIURS2-Q12.1	30-500mm	10...30VDC	Voltage (0-10V) /Current (4-20mA) +RS232 interface	Analogue	—	M12,5-pin connector	Drawing 5
UK2000-G30-LIURS2-Q12.1	80-2000mm	10...30VDC	Voltage (0-10V) /Current (4-20mA) +RS232 interface	Analogue	—	M12,5-pin connector	Drawing 5
UK4000-G30-LIURS2-Q12.1	200-4000mm	10...30VDC	Voltage (0-10V) /Current (4-20mA) +RS232 interface	Analogue	—	M12,5-pin connector	Drawing 9
UK6000-G30-LIURS2-Q12.1	350-6000mm	10...30VDC	Voltage (0-10V) /Current (4-20mA) +RS232 interface	Analogue	—	M12,5-pin connector	Drawing 12

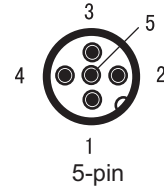
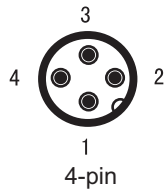
### Technical Data:

Operating voltage	10...30VDC/15...30VDC
Max.pulsating voltage	10%
Max. load current	200mAmax
Output voltage drop	2.0 V max/3.0 V max(at 150 mA)
Power delay	Refer to products
Indicator	LED
Output function	Switch output / Analogue output / RS232 interface
Housing	Metal
Weight	Refer to products
Ambient temperature	Refer to products
Circuit protection	Overload protection, short-circuit protection, polarity protection, short-term overvoltage protection

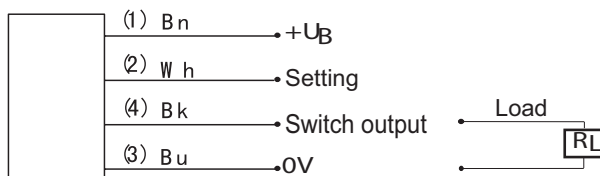
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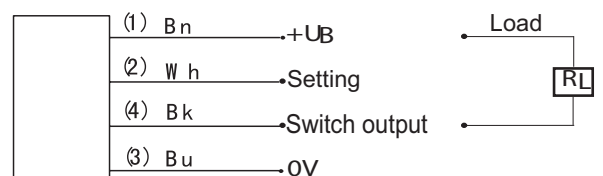
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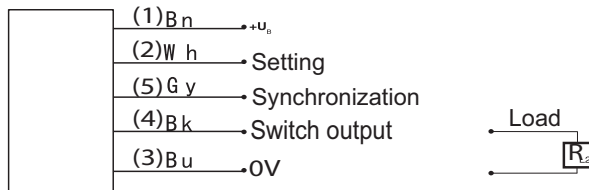
PNP N.O.



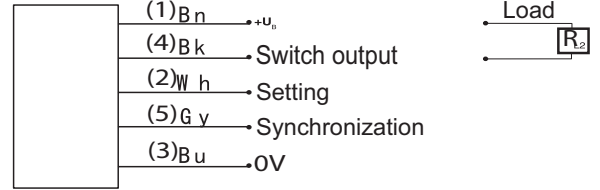
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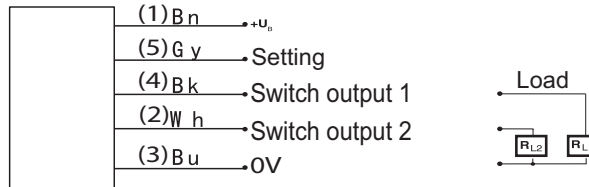
PNP N.O/N.C



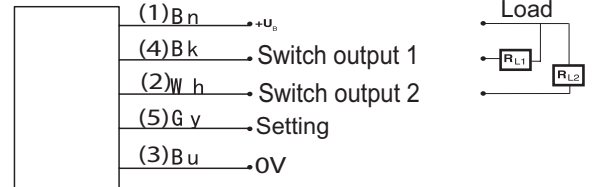
NPN N.O/N.C



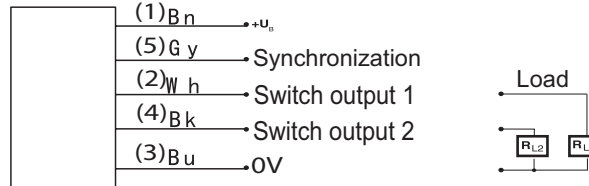
2xPNP N.O/N.C (1)



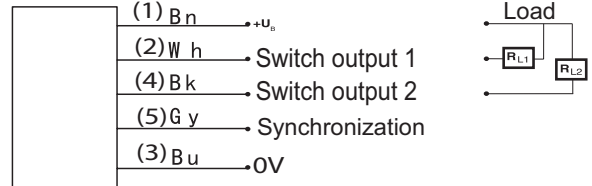
2xNPN N.O/N.C (1)



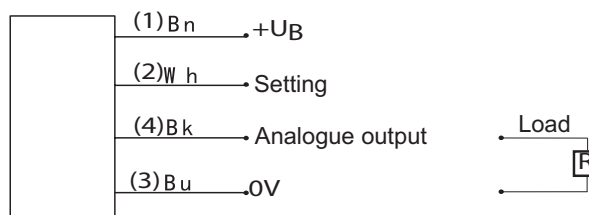
2xPNP N.O/N.C (2)



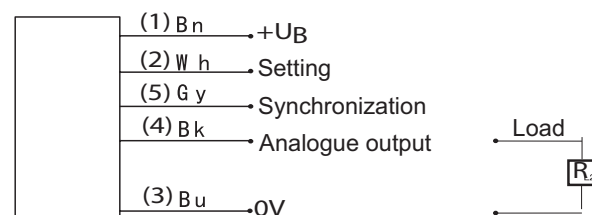
2xNPN N.O/N.C (2)



Analogue output (1)

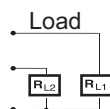
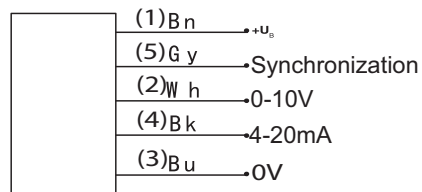


Analogue output (2)



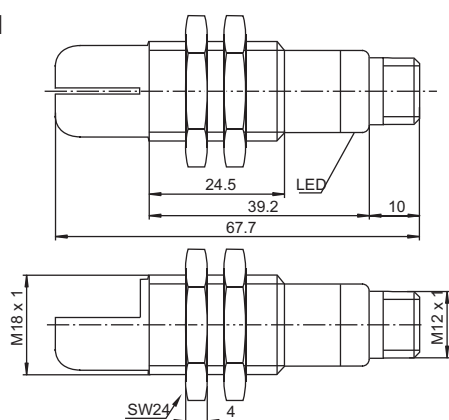
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Analogue output (3)

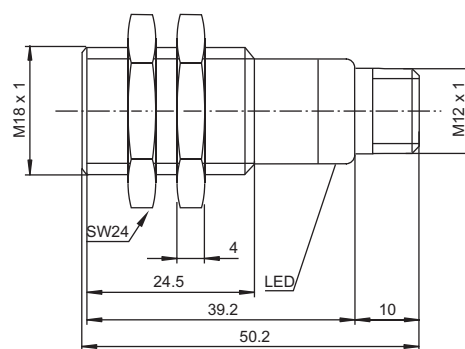


## Mechanical Drawing:

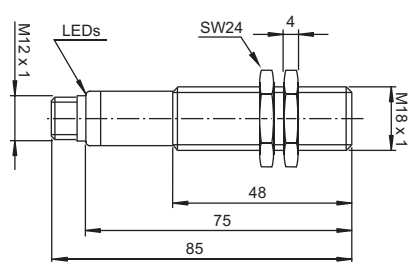
Drawing 1



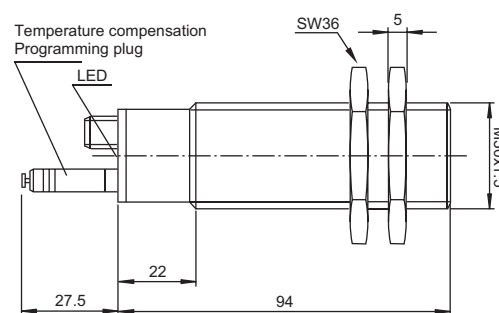
Drawing 2



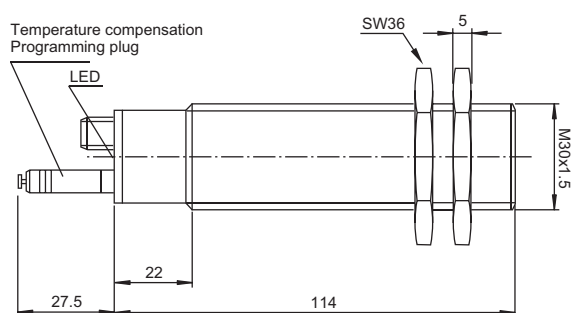
Drawing 3



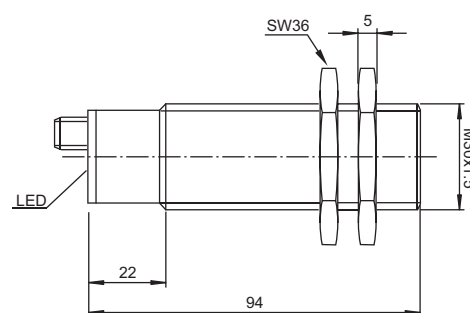
Drawing 4



Drawing 5



Drawing 6



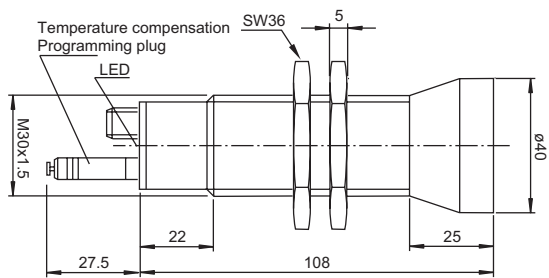


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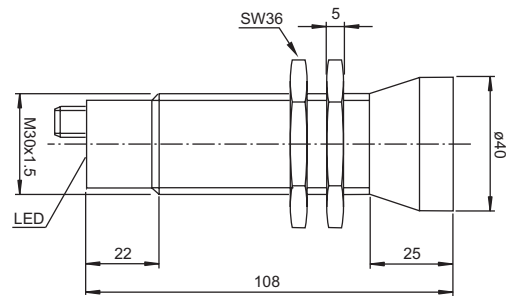
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### Mechanical Drawing:

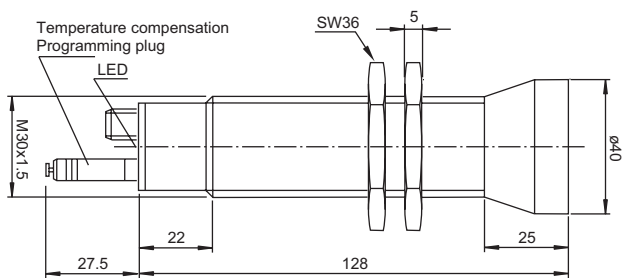
Drawing 7



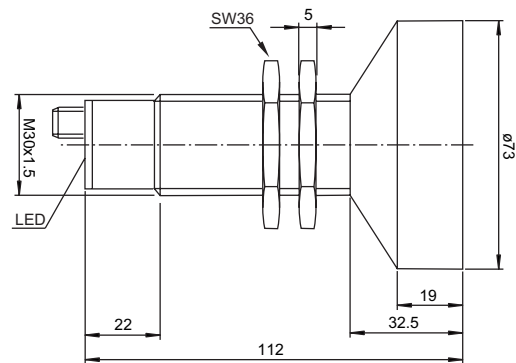
Drawing 8



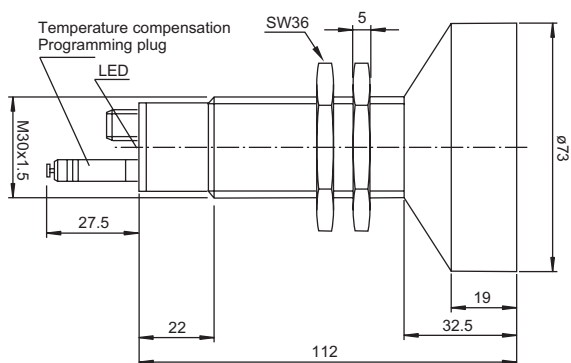
Drawing 9



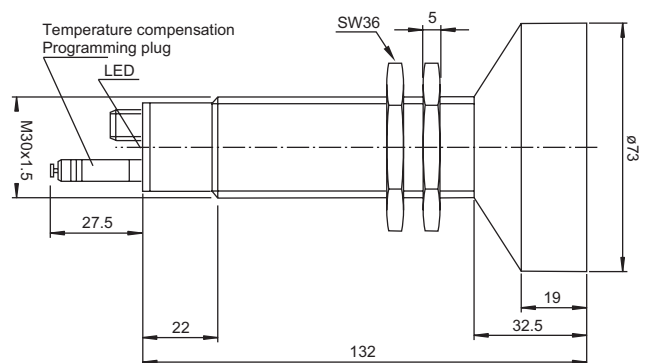
Drawing 10



Drawing 11



Drawing 12



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