







## **Model Number**

#### OBE20M-R100-S2EP-IO-IR

Thru-beam sensor with fixed cable

## **Features**

- Miniature design with versatile mounting options
- IO-link interface for service and process data
- Various frequencies for avoiding mutual interference (cross-talk immunity)
- Extended temperature range -40°C ... 60°C
- High degree of protection IP69K

# **Product information**

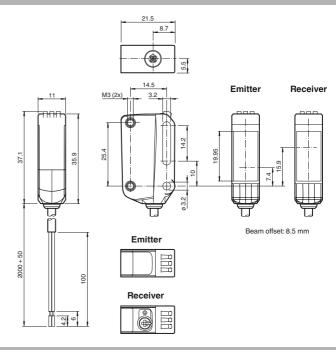
The R100 series miniature optical sensors are the first devices of their kind to offer an end-to-end solution in a small single standard design — from thru-beam sensor through to a distance measurement device. As a result of this design, the sensors are able to perform practically all standard automation tasks.

The entire series enables sensors to communicate via IO-Link.

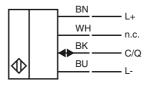
The DuraBeam laser sensors are durable and can be used in the same way as a standard

The use of Multi Pixel Technology gives the standard sensors a high level of flexibility and enables them to adapt more effectively to their operating environment.

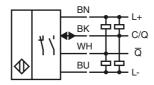
## **Dimensions**



## **Electrical connection emitter**



#### **Electrical connection receiver**



## Indicators/operating means

## **Emitter**



Operating indicator

# Receiver

- Light-on/Dark-on changeover switch
- 2 Sensitivity adjuster
- 3 Operating indicator / dark on
- 4 Signal indicator
- Operating indicator / light on

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System components	Taabuiaal data		
Emitter   OBE20M-R100-SI-O-IR   Receiver   OBE20M-R100-SI-O-IR   Receiver   OBE20M-R100-SI-O-IR   OBE20M-R1	Technical data		
Receiver   OBE20M-R100-2EP-IO-IR	•		OPESOM BLOOK IO ID
General specifications         0.2 20 m           Effective detection range         0.2 20 m           Trinsehold detection range         25 m           Light source         LED           Light source         LED           Light source         LED           Light source         5.4 **           Light source         5.4 **           Light source         5.4 **           Ambient light limit         EN 60947-5-2 : 30000 Lux           Functional safety related parameters         EN 60947-5-2 : 30000 Lux           MTTFg         462 a           Mission Time (T <sub>M</sub> )         20 a           Diagnostic Coverage (DC)         0 %           Indicators/operating means         Operating indicator           Operating indicator         LED green: constantly on power on diashing (H2) - short circuit flashing with short break (1 H2) - IO-Link mode flashing with short break (1 H2) - IO-Link mode flashing with short break (1 H2) - IO-Link mode flashing with sort break (1 H2) - IO-Link mode flashing with sort break (1 H2) - IO-Link mode flashing (H2) - insufficient operating reserve flashing with communication; green LED goes out briefly (1 Electrical spec			
Effective detection range			OBE20M-N 100-2EF-10-IN
Light source	•		0.2 20 m
Light source LED in modulated infrared light   LED risk group labelling			
Light type  LED risk group labelling  LED risk group labelling  Angle of divergence  Angle of divergence  Angle of divergence  Angle of divergence  MITT <sub>d</sub> 462 a  Mission Time (T <sub>M</sub> )  20 a  Diagnostic Coverage (DC)  Mission Time (T <sub>M</sub> )  Doparation indicator  Operation indicator  Function indicator  Control elements  Function indicator  Functi	=		
LED risk group labelling			
Diameter of the light spot	= ::		•
## Ambient light limit	Diameter of the light spot		· - ·
Functional safety related parameters  MTF <sub>d</sub> Mission Time (T <sub>M</sub> )  Diagnostic Coverage (DC)  Operation indicator  Operation indicator  Constantly on - power on flashing (4Hz) - short circuit flashing (4Hz) - insufficient operating reserve Permanently (1 - slight pt path clear Permanently off - object detected Flashing (4 Hz) - insufficient operating reserve Receiver: light/dark switch  Control elements  Control elements  Control elements  Receiver: sensitivity adjustment  Ool link communication: green LED goes out briefly (1 Electrical specifications  Operating voltage  U <sub>B</sub> 10 30 V DC  max. 10 %  No-load supply current  Interface  Interface  Interface bye  Transfer rate  COM 2 (38.4 kBaud)  10-Link (via C/O = pin 4)  Transfer rate  COM 2 (38.4 kBaud)  10-Link (via C/O = pin 4)  Transfer rate  COM 2 (38.4 kBaud)  10-Link (via C/O = pin 4)  Transfer rate  COM 2 (38.4 kBaud)  10-Link (via C/O = pin 4)  Transfer rate  Compatible master port type  Process data output: 2 Bit  Process data output	Angle of divergence		5.4 °
MITEd Mission Time (Tityl) Diagnostic Coverage (DC) No Silvanostic Covera	Ambient light limit		EN 60947-5-2 : 30000 Lux
Mission Time (T <sub>M</sub> ) Diagnostic Coverage (DC) Demansion (Department) Department (Department) Depa	Functional safety related parame	eters	
Diagnostic Coverage (DC)   0 %     Indicators/operating means	MTTF <sub>d</sub>		462 a
Indicators/operating means  Operation indicator  LED green:	, 1417		
Departion indicator  LED green:     constantly on - power on     Itashing (AHz) - short circuit     Itashing (AHz) - insufficient operating reserve     Receiver: sensitivity adjustment     Control elements     Receiver: sensitivity adjustment     Itashing (AHz) - short switch     Receiver: sensitivity adjustment     Italian - short switch     Propertion of the short switch     Propertications     Operating voltage     Italian - short switch     No-load supply current     Italian - short switch     Receiver: ≤ 13 mA     Receiver: ≤ 13 mA at 24 V supply voltage     Italian - short switch     Italian - short sw	Diagnostic Coverage (DC)		0 %
constantly on - power on flashing (4Hz) - short circuit flashing with short break (1 Hz) - IO-Link mode  Function indicator  Function indicator  Function indicator  Yellow LED: Permanently lit - light path clear Permanently off - object detected Flashing (4 Hz) - insufficient operating reserve  Receiver: Resinstivity adjustment  Parameterization indicator  Control elements  Receiver: Resinstivity adjustment  Parameterization indicator  Portical specifications  Operating voltage  UB 10 30 V DC  max. 10 %  No-load supply current  UB 20 Emitter: ≤ 14 mA  Receiver: ≤ 13 mA at 24 V supply voltage  Ill Interface  Interface type  IO-Link ( via C/Q = pin 4 )  COM 2 (38.4 kBaud)  IO-Link Revision  1.1  Min. cycle time  Process data witdh  Emitter: Process data output: 2 Bit Receiver: Process data output: 2 Bit Receiver: Process data output: 2 Bit Receiver: 0x110401 (1115137) Receiver: 0x110401 (1115137) Receiver: 0x110301 (1114881)  Compatible master port type  Input  Test input  Output  Switching type  The switching type of the sensor is adjustable. The disetting is: CQ - BK: NPN normally open / dark-on, PNP normal ight-on, IO-Link (	ndicators/operating means		
Permanently III - light path clear Permanently off - object detected Flashing (4 Hz) - insufficient operating reserve Receiver: light/dark witch Control elements Receiver: light/dark witch Parameterization indicator Parameterization indicator Peramently object of the service			constantly on - power on flashing (4Hz) - short circuit flashing with short break (1 Hz) - IO-Link mode
Control elements Parameterization indicator Electrical specifications Operating voltage Operating voltage Ripple No-load supply current Io Emitter: ≤ 14 mA Receiver: ≤ 13 mA at 24 V supply voltage Interface Interface type Io-Link ( via C/Q = pin 4 ) Transfer rate COM 2 (38.4 kBaud) Io-Link Revision Interface Interface type Io-Link ( via C/Q = pin 4 ) Transfer rate COM 2 (38.4 kBaud) Io-Link Revision Interface Interface type Process data witdh Emitter: Process data output: 2 Bit Receiver: Process data input: 2 Bit Process data output: 2 Bit Process data input: 2 Bit Process data input: 2 Bit Process data output: 2 Bit Process data output: 2 Bit Process data output: 2 Bit Process data input: 2 Bit Process data input: 2 Bit Process data input: 2 Bit Process data output: 2 Bit Process data input: 2 Bit Process data input: 2 Bit Process data output: 2 Bit Process data input: 2 Bit Process data input: 2 Bit Process data output: 2 Bit Process data output: 2 Bit Process data input: 2 Bit Process data input: 2 Bit Process data input: 2 Bit Process data output: 2 Bit Process data input: 2 Bit Pro	Function indicator		Permanently lit - light path clear Permanently off - object detected
Parameterization indicator  Electrical specifications  Operating voltage  UB  10 30 V DC  Ripple  max. 10 %  No-load supply current  Ighter S 14 mA  Receiver: ≤ 13 mA at 24 V supply voltage  Ill  Interface  Interface type  IO-Link ( via C/Q = pin 4)  Transfer rate  IO-Link Revision  1.1  Min. cycle time  Process data witdh  Emitter:  Process data output: 2 Bit  Receiver:  Process data input: 2 Bit  Process data input: 2 Bit  Process data upput: 2 Bit  Process data output: 2 Bit  Process data outp			5
Description   Compatible master port type   Compatible master po			• •
Operating voltage       UB       10 30 V DC         Ripple       max. 10 %         No-load supply current       Io       Emitter: ≤14 mA         Protection class       III         Interface       III         Interface type       IO-Link (via C/Q = pin 4)         Interface type       IO-Link (via C/Q = pin 4)         Interface type       IO-Link (via C/Q = pin 4)         Interface type       Interface type	Parameterization indicator		IO link communication: green LED goes out briefly (1 Hz)
Ripple max. 10 %  No-load supply current load supply current load supply current loads lill services: £13 mA at 24 V supply voltage lill services. £13 mA at 24 V supply voltage state in the face services. £13 mA at 24 V supply voltage lill services. £13 mA at 24 V supply voltage lill services. £13 mA at 24 V supply voltage lill services. £13 mA at 24 V supply voltage services. £13 mA at 24 V supply voltage lill services. £13 mA at 24 V supply voltage services. £13 mA at 24 V supply voltage lill services. £13 mA at 24 V supply voltage services. £14 mA services.	Electrical specifications		
No-load supply current    Inter: ≤ 14 mA	· · · · · · · · · · · · · · · · · · ·	UB	
Protection class  Ill  Ill  Interface  Interface type  Interface type  Interface type  Interface type  Interface type  Io-Link (via C/Q = pin 4)  Transfer rate  COM 2 (38.4 kBaud)  Io-Link Revision  1.1  Min. cycle time  Process data witdh  Emitter: Process data output: 2 Bit Receiver: Process data output: 2 Bit Proces data output: 2 Bit Process data output: 2 Bit Proces data output: 2 Bit Proce	• • • • • • • • • • • • • • • • • • • •		
Interface  Interface type  In	,	10	Receiver: ≤ 13 mA at 24 V supply voltage
Interface type			
Transfer rate  IO-Link Revision  Min. cycle time  Process data witdh  Emitter: Process data output: 2 Bit Receiver: Process data output: 2 Bit Prodes data output: 2 Bit Process data output: 2 Bit Prodes data output: 2 Bit Proces data output: 2 Bit Prodes data output: 2 Bit Process data outp			IO-I ink ( via $C/O = pin 4$ )
IO-Link Revision  Min. cycle time  Process data witdh  Emitter: Process data output: 2 Bit Receiver: Process data input: 2 Bit Process data output: 2 Bit Proces data output: 2 Bit Process data output: 2 Bit Proces data out	* '		
Process data witdh  Emitter: Process data output: 2 Bit Receiver: Process data output: 2 Bit Product standout output: 2 Bit Product output: 2 Bit Product output: 2 Bit Product output: 2 Bit Product output: 2	IO-Link Revision		
Process data output: 2 Bit Receiver: Process data input: 2 Bit Process data output: 2 Bit Process dat	Min. cycle time		2.3 ms
SIO mode support  Device ID  Emitter: 0x110401 (1115137) Receiver: 0x110301 (1114881)  Compatible master port type  A  Input  Test input  Output  Switching type  The switching type of the sensor is adjustable. The desetting is: C/Q - BK: NPN normally open / dark-on, PNP normall light-on, IO-Link /Q - WH: NPN normally closed / light-on, PNP normall dark-on  Signal output  2 push-pull (4 in 1)outputs, short-circuit protected, reversely polarity protected, overvoltage protected  Switching voltage  max. 30 V DC  Switching current  max. 100 mA , resistive load  Usage category  Voltage drop  Ud  Switching frequency  f 1000 Hz  Response time  0.5 ms  Conformity  Communication interface  Product standard  Ambient conditions  Ambient temperature  -40 60 °C (-40 140 °F) , fixed cable -25 60 °C (-13 140 °F) , movable cable not approconveyor chains  Storage temperature  -40 70 °C (-40 158 °F)  Mechanical specifications  Housing width  11 mm	Process data witdh		Process data output: 2 Bit Receiver: Process data input: 2 Bit
Emitter: 0x110401 (1115137) Receiver: 0x110301 (1114881)  Compatible master port type Input Test input  Switching type  The switching type of the sensor is adjustable. The desetting is: C/Q - BK: NPN normally open / dark-on, PNP normall light-on, IO-Link /Q - WH: NPN normally closed / light-on, PNP normal dark-on  Signal output  Switching voltage  Switching voltage  Switching current  Usage category  Voltage drop  Voltage drop  Voltage orop  Switching frequency	SIO mode support		·
Test input  Test input  Dutput  Switching type  The switching type of the sensor is adjustable. The desetting is:  C/Q - BK: NPN normally open / dark-on, PNP normall light-on, IO-Link /Q - WH: NPN normally closed / light-on, PNP normall dark-on  Signal output  2 push-pull (4 in 1)outputs, short-circuit protected, revipolarity protected, overvoltage protected  Switching voltage  Switching current  Usage category  Voltage drop  Ud  ≤ 1.5 V DC  Switching frequency  f 1000 Hz  Response time  Conformity  Communication interface  Product standard  EN 60947-5-2  Ambient conditions  Ambient temperature  -40 60 °C (-40 140 °F), fixed cable -25 60 °C (-13 140 °F), movable cable not approcently conveyor chains  Storage temperature  -40 70 °C (-40 158 °F)  Mechanical specifications  Housing width  11 mm			Emitter: 0x110401 (1115137)
Test input  Output  Switching type  The switching type of the sensor is adjustable. The desetting is: C/Q - BK: NPN normally open / dark-on, PNP normall light-on, IO-Link /Q - WH: NPN normally closed / light-on, PNP normal dark-on  Signal output  2 push-pull (4 in 1)outputs, short-circuit protected, revipolarity protected, overvoltage protected  Switching voltage  max. 30 V DC  Switching current  max. 100 mA , resistive load  Usage category  DC-12 and DC-13  Voltage drop  Ud ≤ 1.5 V DC  Switching frequency  f 1000 Hz  Response time  Conformity  Communication interface Product standard  EN 60947-5-2  Ambient conditions  Ambient temperature  -40 60 °C (-40 140 °F) , fixed cable -25 60 °C (-13 140 °F) , movable cable not approconveyor chains  Storage temperature  -40 70 °C (-40 158 °F)  Mechanical specifications  Housing width  11 mm	Compatible master port type		A
Output  Switching type  The switching type of the sensor is adjustable. The desetting is:  C/Q - BK: NPN normally open / dark-on, PNP normall light-on, IO-Link /Q - WH: NPN normally closed / light-on, PNP normal dark-on  Signal output  2 push-pull (4 in 1)outputs, short-circuit protected, reveloairity protected, overvoltage protected  Switching voltage  max. 30 V DC  Switching current  max. 100 mA , resistive load  Usage category  DC-12 and DC-13  Voltage drop  Ud  ≤ 1.5 V DC  Switching frequency  f 1000 Hz  Response time  0.5 ms  Conformity  Communication interface  Product standard  EN 60947-5-2  Ambient conditions  Ambient temperature  -40 60 °C (-40 140 °F) , fixed cable -25 60 °C (-13 140 °F) , movable cable not approconveyor chains  Storage temperature  -40 70 °C (-40 158 °F)  Mechanical specifications  Housing width  11 mm	nput		
The switching type of the sensor is adjustable. The desetting is:	Test input		emitter deactivation at +U <sub>B</sub>
setting is: C/Q - BK: NPN normally open / dark-on, PNP normall light-on, IO-Link /Q - WH: NPN normally closed / light-on, PNP normal dark-on  Signal output 2 push-pull (4 in 1)outputs, short-circuit protected, reviolarity protected, overvoltage protected  Switching voltage max. 30 V DC  Switching current max. 100 mA , resistive load  Usage category DC-12 and DC-13  Voltage drop Ud ≤ 1.5 V DC  Switching frequency f 1000 Hz  Response time 0.5 ms  Conformity  Communication interface Product standard EN 60947-5-2  Ambient conditions  Ambient temperature -40 60 °C (-40 140 °F) , fixed cable -25 60 °C (-13 140 °F) , movable cable not approconveyor chains  Storage temperature -40 70 °C (-40 158 °F)  Mechanical specifications  Housing width 11 mm	•		
Signal output  2 push-pull (4 in 1)outputs, short-circuit protected, revenolarity protected, overvoltage protected  Switching voltage  Switching current  Usage category  DC-12 and DC-13  Voltage drop  Voltage drop  Switching frequency  Fasponse time  Conformity  Communication interface  Product standard  Ambient conditions  Ambient temperature  Storage temperature  Ambient specifications  Housing width  2 push-pull (4 in 1)outputs, short-circuit protected, revenolation 10 pour protected, overvoltage protected  max. 30 V DC  max. 100 mA , resistive load  DC-12 and DC-13  S V DC  Switching frequency  f 1000 Hz  1000 Hz  ES 61131-9  EN 60947-5-2  Ambient conditions  Ambient temperature  -40 60 °C (-40 140 °F) , fixed cable -25 60 °C (-13 140 °F) , movable cable not approconveyor chains  Storage temperature  -40 70 °C (-40 158 °F)	Switching type		setting is: C/Q - BK: NPN normally open / dark-on, PNP normally closed / light-on, IO-Link /Q - WH: NPN normally closed / light-on, PNP normally open /
Switching voltage $max. 30 \ V DC$ Switching current $max. 100 \ mA$ , resistive load  Usage category $DC-12 \ and \ DC-13$ Voltage drop $U_d \le 1.5 \ V DC$ Switching frequency $f 1000 \ Hz$ Response time $0.5 \ ms$ Conformity  Communication interface $IEC \ 61131-9$ Product standard $EN \ 60947-5-2$ Ambient conditions  Ambient temperature $-40 \dots 60 \ ^{\circ}C \ (-40 \dots 140 \ ^{\circ}F)$ , fixed cable $-25 \dots 60 \ ^{\circ}C \ (-13 \dots 140 \ ^{\circ}F)$ , movable cable not approximate to $-40 \dots 70 \ ^{\circ}C \ (-40 \dots 158 \ ^{\circ}F)$ Wechanical specifications  Housing width $11 \ mm$	Signal output		2 push-pull (4 in 1)outputs, short-circuit protected, reverse
Switching current $max. 100 mA$ , resistive load $max. 100 mA$ , re	Switching voltage		
$\begin{array}{llllllllllllllllllllllllllllllllllll$			
$\begin{array}{llllllllllllllllllllllllllllllllllll$			
Switching frequency f 1000 Hz Response time 0.5 ms  Conformity Communication interface IEC 61131-9 Product standard EN 60947-5-2  Ambient conditions Ambient temperature -40 60 °C (-40 140 °F) , fixed cable -25 60 °C (-13 140 °F) , movable cable not approconveyor chains  Storage temperature -40 70 °C (-40 158 °F)  Mechanical specifications Housing width 11 mm	= = :	U <sub>d</sub>	
Comformity  Communication interface IEC 61131-9  Product standard EN 60947-5-2  Ambient conditions  Ambient temperature -40 60 °C (-40 140 °F) , fixed cable -25 60 °C (-13 140 °F) , movable cable not approconveyor chains  Storage temperature -40 70 °C (-40 158 °F)  Mechanical specifications  Housing width 11 mm	• •	_	1000 Hz
Communication interface IEC 61131-9 Product standard EN 60947-5-2  Ambient conditions  Ambient temperature -40 60 °C (-40 140 °F) , fixed cable -25 60 °C (-13 140 °F) , movable cable not approconveyor chains  Storage temperature -40 70 °C (-40 158 °F)  Mechanical specifications  Housing width 11 mm	Response time		0.5 ms
Product standard EN 60947-5-2  Ambient conditions  Ambient temperature -40 60 °C (-40 140 °F) , fixed cable -25 60 °C (-13 140 °F) , movable cable not approconveyor chains  Storage temperature -40 70 °C (-40 158 °F)  Mechanical specifications  Housing width 11 mm	Conformity		
Ambient conditions  Ambient temperature  -40 60 °C (-40 140 °F), fixed cable -25 60 °C (-13 140 °F), movable cable not approconveyor chains  Storage temperature  -40 70 °C (-40 158 °F)  Mechanical specifications  Housing width  11 mm			
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Mechanical specifications Housing width 11 mm			-25 60 °C (-13 140 °F) , movable cable not appropriate for
Housing width 11 mm	Storage temperature		-40 70 °C (-40 158 °F)
•	•		
Housing height 37 1 mm			
	Housing height		37.1 mm
Housing depth 21.5 mm	Housing aepth		21.5 MM

## Accessories

## IO-Link-Master02-USB

IO-Link master, supply via USB port or separate power supply, LED indicators, M12 plug for sensor connection

## OMH-R10X-01

Mounting bracket

## OMH-R10X-02

Mounting bracket

## OMH-R10X-04

Mounting bracket

## OMH-R10X-10

Mounting bracket

## OMH-ML100-03

Mounting aid for round steel ø 12 mm or sheet 1.5 mm ... 3 mm

#### OMH-ML100-031

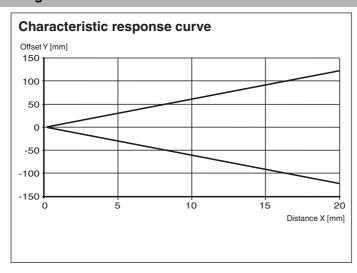
Mounting aid for round steel

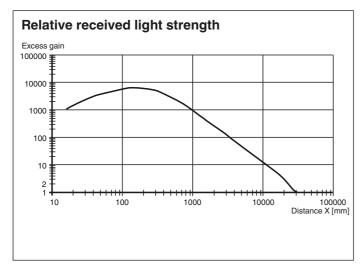
ø 10 ... 14 mm or sheet 1 mm ... 5 mm

Other suitable accessories can be found at www.pepperl-fuchs.com

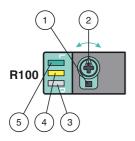
Degree of protection	IP67 / IP69 / IP69K
Connection	2 m fixed cable
Material	
Housing	PC (Polycarbonate)
Optical face	PMMA
Mass	Emitter: approx. 10 g receiver: approx. 10 g
Cable length	2 m
Approvals and certificates	
UL approval	E87056 , cULus Listed , class 2 power supply , type rating 1

# **Curves/Diagrams**





## **Functions and Operation**



- 1 Light-on / dark-on changeover switch
- 2 Sensing range / sensitivity adjuster
- 3 Operating indicator / dark on
- 4 Signal indicator
- 5 Operating indicator / light on

To unlock the adjustment functions turn the sensing range /sensitivity adjuster for more than 180 degrees.

## Sensing Range / Sensitivity

Turn sensing range / sensitivity adjuster clockwise to increase sensing range / sensitivity.

Turn sensing range / sensitivity adjuster counter clockwise to decrease sensing range / sensitivity.

If the end of the adjustment range is reached, the signal indicator starts flashing with 8 Hz.

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## **Light-on / Dark-on Configuration**

Press the light-on / dark-on changeover switch for more than 1 second (less than 4 seconds). The light-on / dark-on mode changes and the operating indicators are activated accordingly.

If you press the light-on / dark-on changeover switch for more than 4 seconds, the light-on /dark-on mode changes back to the original setting. On release of the light-on / dark-on changeover switch the current state is activated.

### **Restore Factory Settings**

Press the light-on / dark-on changeover switch for more than 10 seconds (less than 30 seconds) until all LEDs turn off. On release of the light-on / dark-on changeover switch the signal indicator turns on. After 5 seconds the sensor resumes operation with factory default settings.

After 5 minutes of inactivity the sensing range / sensitivity adjustment is locked. In order to reactivate the sensing range / sensitivity adjustment, turn the sensing range /sensitivity adjuster for more than 180 degrees.

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