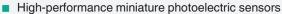


# Laser triangulation sensor with background suppression

### OBT80-R2-E2-L



- DuraBeam Laser Sensors durable and employable like an LED
- 45° cable outlet for maximum mounting freedom under extremely tight space constraints
- Improvement in machine availability with abrasion-resistant, antistatic glass front
- Precision object detection, almost irrespective of the color

Laser triangulation sensor with background suppression, ultra-small design with M2 mounting, 80 mm sensing range, PNP output, 2 m fixed cable



### **Function**

The R2 series nano sensor has been developed for a broad range of applications. It offers excellent durability and is exceptionally easy to install. The housing is compact and, with its 45° cable outlet, can be installed in the smallest spaces. New functional principles and functionality open up a range of new options. The DuraBeam laser sensors are durable and can be used in the same way as a standard sensor. The abrasion-resistant lens allows long operating times close to the moving object.

#### Safety Information



CLASS 1 LASER PRODUCT IEC 60825-1: 2007 certified. Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50. dated June 24, 2007

## CLASS 1 LASER PRODUCT

IEC 60825-1: 2007 certified.

Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007

### **Safety Information**

#### **Laser Class 1 Information**

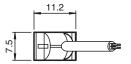
The irradiation can lead to irritation especially in a dark environment. Do not point at people! Maintenance and repairs should only be carried out by authorized service personnel!

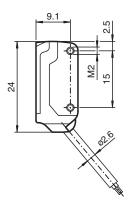
Attach the device so that the warning is clearly visible and readable. The warning accompanies the device and should be attached in immediate proximity to the device.

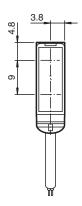
Caution - Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

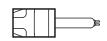


# **Dimensions**







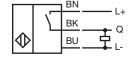


# **Technical Data**

General specifications					
Detection range	20 80 mm				
Reference target	standard black, 100 mm x 100 mm				
Light source	laser diode				
Light type	modulated visible red light , 680 nm				
Laser nominal ratings					
Note	LASER LIGHT , DO NOT STARE INTO BEAM				
Laser class	1				
Wave length	680 nm				
Beam divergence	> 5 mrad				
Pulse length	approx. 3 μs				
Repetition rate	approx. 16.6 kHz				
max. pulse energy	9.5 nJ				
Black-white difference (6 %/90 %)	< 15 % at 80 mm				
Diameter of the light spot	approx. 2 mm at a distance of 80 mm				
Angle of divergence	approx. 2 °				
Optical face	frontal				
Ambient light limit	EN 60947-5-2 : 30000 Lux				
Functional safety related parameters					
MTTF <sub>d</sub>	800 a				
Mission Time (T <sub>M</sub> )	20 a				
Diagnostic Coverage (DC)	0 %				

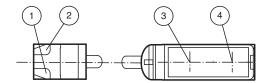
Common	Technical Data		
Operation indicator         LED green, statically lit Power on , short-circuit : LED green flashing (approx. 4 Hz)           Euch circle a pecifications         LED yellow: lights when object is detected           Electrical specifications         LED yellow: lights when object is detected           Operating vorlarge         U <sub>8</sub> 12 24 V           No-load supply current         I₀         < 10 mA			
Function indicator	Indicators/operating means		
Departing voltage	Operation indicator		LED green, statically lit Power on , short-circuit : LED green flashing (approx. 4 Hz)
Operating voltage         U <sub>B</sub> 12 24 V           No-load supply current         I <sub>B</sub> < 10 mA           Protection class         III           Debuty         III           Switching type         I PNP output, short-circuit protected, reverse polarity protected, open collector           Switching voltage         I PNP output, short-circuit protected, reverse polarity protected, open collector           Switching current         max. 30 v DC           Switching frequency         f         approx. 2 kHz           Switching frequency         f         approx. 2 kHz           Response time         2 b         6047-5-2           Exponse time         5 mody47-5-2         Exponse time           Conformity         T         FN 60947-5-2           Laser safety         T         EN CU 20/2011           UL approval         EN 60 602-5-1/2007 Complies with 21 CFR 1040,10 and 1040,11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007	Function indicator		LED yellow: lights when object is detected
No-load supply current   No	Electrical specifications		
Protection class         IIII           Duty         Switching type         NO contact           Signal output         1 PNP output, short-circuit protected, reverse polarity protected, open collector           Switching voltage         max. 30 V DC           Switching current         max. 50 MA, resistive load           Voltage drop         U <sub>d</sub> ≤ 1.5 V DC           Switching frequency         f approx. 2 kHz           Response time         250 µs           Conformity         EN 60947-5-2           Laser safety         EN 60825-1:2007           Approvals and certificates         EN 60825-1:2007           EAC conformity         TR CU 020/2011           UL approval         E87056, cULus Recognized, Class 2 Power Source           CCC approval / marking not required for products rated ≤36 V           FDA approval         EC 60825-1:2007 Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007           Ambient temperature         2 - 20 60 °C (4 140 °F)           Storage temperature         - 30 70 °C (-22 158 °F)           Mechanical specification         11.2 mm           Housing width         7.5 mm           Housing depth         1 P67           Connection         2 m fixed cable           Me	Operating voltage	$U_B$	12 24 V
Cutput         Switching type         NO contact           Signal output         1 PNP output, short-circuit protected, reverse polarity protected, open collector           Switching voltage         max. 30 V DC           Switching current         max. 50 mÅ, resistive load           Voltage drop         U <sub>d</sub> ≤ 1.5 V DC           Switching frequency         f         approx. 2 kHz           Response time         250 μs           Conformity         EN 60947-5-2           Laser safety         EN 60925-1:2007           Approvals and certificates         EN 60825-1:2007           EAC conformity         TR CU 020/2011           UL approval         E87056, cULus Recognized, Class 2 Power Source           CCC approval         CCC approval / marking not required for products rated ≤36 V           FDA approval         IEC 60825-1:2007 Complies with 21 CFR 1040.10 and 1040.11 except for deviations present to the servotice No. 50, dated June 24, 2007           Ambient conditions         2-260°C (-4140°F)           Storage temperature         -2060°C (-4140°F)           Storage temperature         -3	No-load supply current	$I_0$	< 10 mA
Switching type         NO contact           Signal output         1 PNP output, short-circuit protected, reverse polarity protected, open collector           Switching voltage         max. 30 V DC           Switching current         max. 50 mA, resistive load           Voltage drop         U <sub>d</sub> ≤ 1.5 V DC           Switching frequency         f approx. 2 kHz           Response time         250 μs           Conformity         Conformity           Product standard         EN 60947-5-2           Laser safety         EN 60825-1:2007           Approvals and certificates         TR CU 020/2011           UL approval         E87056 , cULus Recognized, Class 2 Power Source           CCC approval         E87056 , cULus Recognized, Class 2 Power Source           CCC approval         E87056 , cULus Recognized, Class 2 Power Source           CCC approval         E0 60825-1:2007 Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007           Ambient conditions         20 60 °C (-4 140 °F)           Storage temperature         20 60 °C (-4 140 °F)           Mechanical specifications         T.5 mm           Housing width         7.5 mm           Housing depth         11.2 mm           Degree of protection         1 mix fixed cabl	Protection class		III
Signal output         1 PNP output, short-circuit protected, reverse polarity protected, open collector           Switching voltage         max. 30 ∨ DC           Switching current         max. 50 mA , resistive load           Voltage drop         U <sub>d</sub> ≤1.5 ∨ DC           Switching frequency         f         approx. 2 kHz           Response time         250 μs           Conformity         F         Product standard         EN 60947-5-2           Laser safety         EN 60825-1:2007           Approvals and certificates         TR CU 020/2011           UL approval         1 B87056 , cULsus Recognized, Class 2 Power Source           CCC approval         CCC approval/ marking not required for products rated ≤36 V           EDA approval         1 E6 60825-1:2007 Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007           Ambient conditions         Storage temperature         30 70 °C (-22 158 °F)           Mechanical specifications         T.5 mm           Housing height         1.2 mm           Housing depth         1.1.2 mm           Degree of protection         1 P67           Connection         2 m fixed cable           Material         PC/ABS and TPU           Optical face         PUR	Output		
Switching outrent         max. 30 V DC           Switching current         max. 50 mA , resistive load           Voltage drop         U <sub>d</sub> ≤ 1.5 V DC           Switching frequency         f         approx. 2 kHz           Response time         ≥ 50 μs           Conformity         Froduct standard         EN 60947-5-2           Lase safety         EN 60825-1:2007           Approvals and certificates         TR CU 020/2011           UL approval         E87056, cULus Recognized, Class 2 Power Source           CCC approval         EC 60825-1:2007 Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007           Ambient conditions         IEC 60825-1:2007 Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007           Mechanical specifications         VEX.           Housing width         7.5 mm           Housing height         1.2 mm           Housing depth         11.2 mm           Degree of protection         IP67           Connection         2 m fixed cable           Material         Housing         PC/ABS and TPU           Optical face         1 glass           Coble         PUR   Installation	Switching type		NO contact
Switching current         max. 50 mA , resistive load           Voltage drop         U <sub>d</sub> ≤ 1.5 V DC           Switching frequency         f         approx. 2 kHz           Response time         ≥ 250 μs           Conformity         Conformity           Product standard         ≦ N 60947-5-2           Laser safety         EN 609825-1;2007           Approvals and certificates         EAC conformity         TR CU 020/2011           UL approval         ≦ 87056 , cULus Recognized, Class 2 Power Source           CCC approval         CCC approval / marking not required for products rated ≤36 V           FDA approval         EEC 60825-1:2007 Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007           Ambient conditions         Ambient temperature         -20 60 °C (-4 140 °F)           Storage temperature         -30 70 °C (-22 158 °F)           Mechanical specifications         Flousing width         7.5 mm           Housing depth         11.2 mm           Degree of protection         IP67           Connection         2 m fixed cable           Material         1           Housing         PC/ABS and TPU           Optical face         2 m fixed cable           Installation <td>Signal output</td> <td></td> <td>1 PNP output, short-circuit protected, reverse polarity protected, open collector</td>	Signal output		1 PNP output, short-circuit protected, reverse polarity protected, open collector
Voltage drop         Ud approx. 2 kHz           Switching frequency         f approx. 2 kHz           Response time         250 μs           Conformity         Froduct standard         EN 60947-5-2           Laser safety         EN 60825-1:2007           Approvals and certificates         TR CU 020/2011           EAC conformity         TR CU 020/2011           UL approval         E87056, cULus Recognized, Class 2 Power Source           CCC approval         CC deproval/marking not required for products rated ≤36 V           FDA approval         IEC 60825-1:2007 Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007           Ambient conditions         Ambient temperature         20 60 °C (-4 140 °F)           Storage temperature         7.5 mm           Mechanical specifications         FM           Housing width         7.5 mm           Housing depth         11.2 mm           Housing depth         11.2 mm           Begree of protection         1P67           Connection         2 m fixed cable           Material         PC/ABS and TPU           Optical face         1 glass           Cable         PUR   Installation	Switching voltage		max. 30 V DC
Switching frequency         f         approx. 2 kHz           Response time         250 μs           Conformity         Forduct standard         EN 60947-5-2           Laser safety         EN 60825-1:2007           Approvals and certificates         EAC conformity         TR CU 020/2011           UL approval         E87056, cULus Recognized, Class 2 Power Source           CCC approval         CCC approval / marking not required for products rated ≤36 V           FDA approval         IEC 60825-1:2007 Complies with 21 CFR 1040-10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007           Ambient conditions         Ambient temperature         -20 60 °C (-4 140 °F)           Storage temperature         -30 70 °C (-22 158 °F)           Mechanical specifications         Housing width         7.5 mm           Housing depth         11.2 mm           Housing depth         11.2 mm           Degree of protection         IP67           Connection         2 m fixed cable           Material         PC/ABS and TPU           Optical face         glass           Cable         PUR           Installation         Fixing screws , 2 x M2 allen head screws included with delivery	Switching current		max. 50 mA, resistive load
Response time         250 μs           Conformity         Froduct standard         EN 60947-5-2           Laser safety         EN 60825-1:2007           Approvals and certificates         EAC conformity         TR CU 020/2011           UL approval         E87056 , cULus Recognized, Class 2 Power Source           CCC approval         CCC approval / marking not required for products rated ≤36 V           FDA approval         IEC 60825-1:2007 Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007           Ambient conditions         Ambient temperature           Ambient temperature         -20 60 °C (-4 140 °F)           Storage temperature         -30 70 °C (-22 158 °F)           Mechanical specifications         T.5 mm           Housing width         7.5 mm           Housing depth         11.2 mm           Degree of protection         1P67           Connection         2 m fixed cable           Material         Housing           PC/ABS and TPU           Optical face         glass           Cable         PUR           Installation         Fixing screws , 2 x M2 allen head screws included with delivery	Voltage drop	$U_{d}$	≤ 1.5 V DC
Product standard EN 60947-5-2 Laser safety EN 60825-1:2007  Approvals and certificates  EAC conformity TR CU 020/2011  UL approval E87056 , cULus Recognized, Class 2 Power Source  CCC approval CCC approval CCC approval Pmarking not required for products rated ≤36 V  FDA approval EEC 60825-1:2007 Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007  Ambient conditions  Ambient temperature	Switching frequency	f	approx. 2 kHz
Product standard  EN 60947-5-2  Laser safety  EN 60825-1:2007  Approvals and certificates  EAC conformity  UL approval  CCC approval  ECC app	Response time		250 μs
Laser safety Approvals and certificates  EAC conformity TR CU 020/2011 UL approval EB7056 , cULus Recognized, Class 2 Power Source CCC approval CCC approval CCC approval / marking not required for products rated ≤36 V FDA approval BEC 60825-1:2007 Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007  Ambient conditions Ambient temperature -20 60 °C (-4 140 °F) Storage temperature -30 70 °C (-22 158 °F)  Mechanical specifications  Housing width 7.5 mm Housing depth 11.2 mm  Degree of protection 1P67  Connection 2 m fixed cable  Material Housing Optical face Gable PUR  Installation Fixing screws , 2 x M2 allen head screws included with delivery	Conformity		
Approvals and certificates  EAC conformity  TR CU 020/2011  UL approval  E87056, cULus Recognized, Class 2 Power Source  CCC approval  CCC approval  CCC approval  CCC approval (CCC approval for products rated ≤36 V)  FDA approval  BEC 60825-1:2007 Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007  Ambient conditions  Ambient temperature  -20 60 °C (-4 140 °F)  Storage temperature  -20 60 °C (-22 158 °F)  Mechanical specifications  Housing width  7.5 mm  Housing depth  11.2 mm  Degree of protection  IP67  Connection  2 m fixed cable  Material  Housing  Optical face  Gable  PUR  Installation  Fixing screws , 2 x M2 allen head screws included with delivery	Product standard		EN 60947-5-2
EAC conformity UL approval E87056, cULus Recognized, Class 2 Power Source CCC approval CCC approval CCC approval / marking not required for products rated ≤36 V FDA approval BEC 60825-1:2007 Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007  Ambient conditions  Ambient temperature -20 60 °C (-4 140 °F) Storage temperature -30 70 °C (-22 158 °F)  Mechanical specifications  Housing width 7.5 mm Housing height 44 mm Housing depth 11.2 mm Degree of protection IP67 Connection 1P67 Connection 2 m fixed cable  Material Housing Optical face Gable PUR Installation Fixing screws , 2 x M2 allen head screws included with delivery	Laser safety		EN 60825-1:2007
E87056 , cULus Recognized, Class 2 Power Source CCC approval CCC approval CCC approval CCC approval / marking not required for products rated ≤36 V  EDA approval BEC 60825-1:2007 Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007  Ambient conditions  Ambient temperature -20 60 °C (-4 140 °F) Storage temperature -30 70 °C (-22 158 °F)  Mechanical specifications  Housing width 7.5 mm Housing depth 11.2 mm  Degree of protection 1P67 Connection 2 m fixed cable  Material Housing Optical face Cable PUR  Installation Fixing screws , 2 x M2 allen head screws included with delivery	Approvals and certificates		
CCC approval CCC approval / marking not required for products rated ≤36 V FDA approval IEC 60825-1:2007 Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007  Ambient conditions  Ambient temperature -20 60 °C (-4 140 °F) Storage temperature -30 70 °C (-22 158 °F)  Mechanical specifications  Housing width 7.5 mm Housing height 24 mm Housing depth 11.2 mm  Degree of protection IP67  Connection 2 m fixed cable  Material Housing PC/ABS and TPU Optical face glass Cable PUR  Installation Fixing screws , 2 x M2 allen head screws included with delivery	EAC conformity		TR CU 020/2011
IEC 60825-1:2007 Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007  Ambient conditions  Ambient temperature	UL approval		E87056, cULus Recognized, Class 2 Power Source
Ambient conditions  Ambient temperature -20 60 °C (-4 140 °F) Storage temperature -30 70 °C (-22 158 °F)  Mechanical specifications  Housing width 7.5 mm Housing depth 11.2 mm  Degree of protection IP67  Connection 2 m fixed cable  Material  Housing Optical face Cable  Cable  Installation  pursuant to Laser Notice No. 50, dated June 24, 2007  -20 60 °C (-4 140 °F)  -30 70 °C (-22 158 °F)  -30 70 °C (-22 158 °F)  -40 1	CCC approval		CCC approval / marking not required for products rated ≤36 V
Ambient temperature -20 60 °C (-4 140 °F) Storage temperature -30 70 °C (-22 158 °F)  Wechanical specifications  Housing width 7.5 mm Housing height 24 mm Housing depth 11.2 mm Degree of protection IP67 Connection 2 m fixed cable  Material Housing PC/ABS and TPU Optical face glass Cable PUR Installation Fixing screws , 2 x M2 allen head screws included with delivery	FDA approval		
Storage temperature  -30 70 °C (-22 158 °F)  Mechanical specifications  Housing width  7.5 mm  Housing height  Housing depth  11.2 mm  Degree of protection  IP67  Connection  2 m fixed cable  Material  Housing  PC/ABS and TPU  Optical face  Cable  Installation  Fixing screws , 2 x M2 allen head screws included with delivery	Ambient conditions		
Housing width 7.5 mm  Housing height 24 mm  Housing depth 11.2 mm  Degree of protection IP67  Connection 2 m fixed cable  Material  Housing PC/ABS and TPU  Optical face glass  Cable PUR  Installation Fixing screws , 2 x M2 allen head screws included with delivery	Ambient temperature		-20 60 °C (-4 140 °F)
Housing width 7.5 mm  Housing height 24 mm  Housing depth 11.2 mm  Degree of protection IP67  Connection 2 m fixed cable  Material Housing PC/ABS and TPU Optical face glass  Cable PUR  Installation Fixing screws , 2 x M2 allen head screws included with delivery	Storage temperature		-30 70 °C (-22 158 °F)
Housing height 24 mm  Housing depth 11.2 mm  Degree of protection IP67  Connection 2 m fixed cable  Material PC/ABS and TPU Optical face glass  Cable PUR  Installation Fixing screws , 2 x M2 allen head screws included with delivery	Mechanical specifications		
Housing depth  Degree of protection  IP67  Connection  2 m fixed cable  Material  Housing  PC/ABS and TPU  Optical face Cable  PUR  Installation  11.2 mm  1	Housing width		7.5 mm
Degree of protection IP67  Connection 2 m fixed cable  Material PC/ABS and TPU Optical face glass Cable PUR Installation Fixing screws , 2 x M2 allen head screws included with delivery	Housing height		24 mm
Connection 2 m fixed cable  Material PC/ABS and TPU Optical face glass Cable PUR Installation Fixing screws , 2 x M2 allen head screws included with delivery	Housing depth		11.2 mm
MaterialPC/ABS and TPUHousingPC/ABS and TPUOptical faceglassCablePURInstallationFixing screws , 2 x M2 allen head screws included with delivery	Degree of protection		IP67
Housing PC/ABS and TPU Optical face glass Cable PUR Installation Fixing screws , 2 x M2 allen head screws included with delivery	Connection		2 m fixed cable
Optical face glass Cable PUR Installation Fixing screws , 2 x M2 allen head screws included with delivery	Material		
Cable PUR Installation Fixing screws , 2 x M2 allen head screws included with delivery	Housing		PC/ABS and TPU
Installation Fixing screws , 2 x M2 allen head screws included with delivery	Optical face		glass
· ·	Cable		PUR
Mass approx. 20 g	Installation		Fixing screws , 2 x M2 allen head screws included with delivery
	Mass		approx. 20 g
Cable length 2 m	Cable length		2 m

### Connection



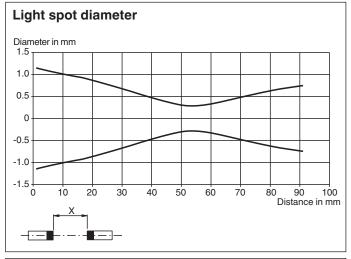


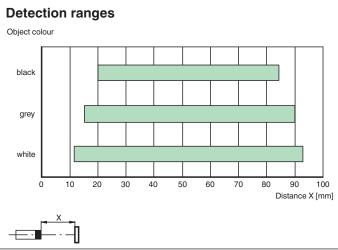
## **Assembly**



_			
	1	Operating display	green
	2	Signal display	yellow
[	3	Emitter	
Γ	4	Receiver	

### **Characteristic Curve**





### **Accessories**

	MH-R2-01	Mounting aid for R2 series, Mounting bracket
1979	MH-R2-02	Mounting aid for R2 series, Mounting bracket
	MH-R2-03	Mounting aid for R2 series, Mounting bracket
	MH-R2-04	Mounting aid for R2 series, Mounting bracket