### **Dimensions**





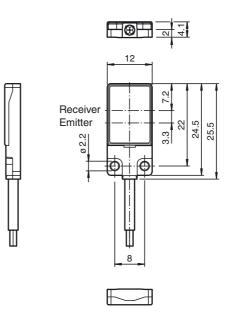
# **Model Number**

# OBR1500-R2F-E2-L

Laser retroreflective sensor with 2 m fixed cable

# **Features**

- Very flat design for direct mounting without mounting bracket
- DuraBeam Laser Sensors durable ٠ and employable like an LED
- Glare protected with polarization filter •
- Very bright, highly visible light spot



# **Electrical connection**



Pepperl+Fuchs Group www.pepperl-fuchs.com

Refer to "General Notes Relating to Pepperl+Fuchs Product Information" USA: +1 330 486 0001 fa-info@us.pepperl-fuchs.com

Germany: +49 621 776 4411 fa-info@de.pepperl-fuchs.com



General specifications   0 1500 mm     Effective detection range   0 1500 mm     Threshold detection range   1800 mm     Reference target   L400 reflector     Light source   LASER LIGHT     Light source   LASER LIGHT     Light source   LASER LIGHT, DO NOT STARE INTO BEAM     Laser class   1     Wave length   680 nm     Beam divergence   > 5 mrad     Puise length   680 nm     Beam divergence   > 5 mrad     Puise length   80 nm     Beam divergence   3 prox. 3 is     Repetition rate   approx. 16.6 kHz     max. puise energy   8 nl     Angle deviation   approx. 0.5 °     Object size   typ. starts from 1.5 mm     Diameter of the light spot   approx. 35 mm at a distance of 2000 mm     Angle of divergence   approx. 1°     Optical face   frontal     Ambient light limit   E0047-5-2: 30000 Lux     MTTG   800 a     Mission Time (T <sub>M</sub> )   20 a     Diagnostic Coverage (DC)   0 %     Indicators/operating weater   Ing (appro	Laserlabel
Reflector distance 60 1500 mm   Threshold detection range 1800 mm   Reference target H40 reflector   Light type modulated visible red light , 680 nm   Polarization filter yes   Laser nominal ratings LASER LIGHT   Note LASER LIGHT , DO NOT STARE INTO BEAM   Laser class 1   Wave length 680 nm   Beam divergence > 5 mrad   Pulse length approx. 16.6 kHz   max. pulse energy 8 nJ   Angle deviation approx. 16.6 kHz   max. pulse energy 8 nJ   Angle deviation approx. 15.7 mm   Diameter of the light spot approx. 17   Optical face frontal   Ambient light limit EN 60947-5-2: 30000 Lux   Functional safety related parameters MTTF   MTTF 800 a   Diagnostic Coverage (ICC) 0 %   Indicators/operating means Operation indicator   LED green, statically lif Power on , short-circuit : shine falling short of the stability control : OFF wis interrupted   Electrical specifications III   Operating voltage Ug 12 24 V   No-load supply current Iq<<10 mA   Protoction class III   Output<	
Threshold detection range 1800 mm   Reference target H40 reflector   Light source LASER LIGHT   Light source LASER LIGHT   Light source LASER LIGHT   Delarization filter yes   Laser nominal ratings 1   Note LASER LIGHT, DO NOT STARE INTO BEAM   Laser class 1   Wave length 680 nm   Beam divergence > 5 mrad   Pulse length approx. 16.6 kHz   max. pulse energy 8 nJ   Angle deviation approx. 3 sin   Diameter of the light spot approx. 3 sm at a distance of 2000 mm   Angle deviation approx. 3 sm at a distance of 2000 mm   Angle deviation approx. 3 sm at a distance of 2000 mm   Angle deviation approx. 3 sum at a distance of 2000 mm   Angle deviation approx. 3 sum at a distance of 2000 mm   Angle deviation approx. 3 sum at a distance of 2000 mm   Angle deviation approx. 4 Hz)   Functional safety related parameters MTTG   MTTG 800 a   Mission Time (Ta) 20 a   Diagnostic Coverage (DC) 0 %   Indicator LED green, statically lif Power on , short-circuit : hing (approx. 4 Hz)   Function indicator Ne ce	
Reference target H40 reflector   Light source LASER LIGHT   Up thy e modulated visible red light , 680 nm   Polarization filter yes   Laser nominal ratings I   Note LASER LIGHT , DO NOT STARE INTO BEAM   Laser class 1   Wave length 680 nm   Beam divergence > 5 mrad   Putse length approx. 3 µs   Repetition rate approx. 16.6 kHz   max. pulse energy 8 nJ   Angle od visition rate approx. 15.6 kHz   max. pulse energy 8 nJ   Angle od visition rate approx. 15.5 °   Object size typ. starts from 1.5 mm   Diameter of the light spot approx. 15 °   Angle od visiting regence approx. 15 °   Musion Time (T <sub>M</sub> ) 20 a   Diagnostic Coverage (DC) 0 %   Indicators/operating means Doperation indicator   LED green, statically lif Power on , short-circuit : hing (approx. 4 Hz)   Function indicator LED green, statically lif Power on , short-circuit : hing (approx. 4 Hz)   Function indicator LED green, statically lif Power on , short-circuit : hing (approx. 4 Hz)   Function indicator NO contact / dark on   Signal output 1 PNP output, short-circuit protected, rever	
Light source LASER LIGHT   Light type modulated visible red light, 680 nm   Polarization filter yes   Laser nominal ratings I   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. 15 %   max. pulse energy 8 n J   Angle deviation approx. 05 °   Object size typ. starts from 1.5 mm   Diameter of the light spot approx. 1°   Optical face frontal   Ambient light limit EN 60947-5-2 : 30000 Lux   Functional safety related parameters MTTF_d   MTTF_d 800 a   Mission Time (T <sub>M</sub> ) 20 a   Diagnostic Coverage (DC) 0 %   Doperation indicator LED green, statically lit Power on , short-circuit : hing (approx. 4 Hz)   Function indicator Leceiver: LED yellow, lights up when light beam when failing short of the stability control : OFF wis interrupted   Electrical specifications III   Operating voltage max. 30 mA , resistive load   Voltag drop U_g < 1.5 V DC	CLASS 1
Light source LASER LIGHT   Light type modulated visible red light, 680 nm   Polarization filter yes   Laser rominal ratings 1   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. 15 %   Max, pulse energy 8 n J   Angle deviation approx. 15 %   Object size typ, starts from 1.5 mm   Diameter of the light spot approx. 35 mm at a distance of 2000 mm   Angle divergence approx. 1°   Optical face frontal   Ambient light limit EN 60947-5-2: 30000 Lux   Functional safety related parameters MTTF_g   MTTF_G 800 a   Mission Time (T <sub>M</sub> ) 20 a   Diagnostic Coverage (DC) 0 %   Operation indicator LED green, statically lit Power on , short-circuit : hing (approx. 4 Hz)   Function indicator LED green, statically lit power on , short-circuit : hing (approx. 4 Hz)   Potection class II   Operating voltage max. 30 MA, resistive load   Voltag dopp U_g 1 PNP output, short-circuit protected, reverse po oper collector	LASER
Light typemodulated visible red light , 680 nmPolarization filteryesLaser nominal ratingsNoteLASER LIGHT , DO NOT STARE INTO BEAMLaser class1Wave length680 nmBeam divergence> 5 mradPulse lengthapprox. 3 µsRepetition rateapprox. 16.6 kHzmax. pulse energy8 nJAngle deviationapprox. 15.6 kHzmax. pulse energy8 nJAngle deviationapprox. 15.7 °Object sizetyp. starts from 1.5 mmDiameter of the light spotapprox. 35 mm at a distance of 2000 mmAngle of viewgenceapprox. 1 °Optical facefrontalAmbient light limitEN 60947-5-2 : 30000 LuxFunctional safety related parametersMTTF_dMTTF_d800 aMission Time (T <sub>M</sub> )20 aDiagnostic Coverage (DC)0 %Indicators/operating meansOOperation indicatorLED green, statically lif Power on , short-circuit : chire fulling (approx. 4 Hz)Function indicatorLED green, statically lif power on , short-circuit : chire fulling (approx. 4 Hz)Function indicatorLED green, statically lif power on , short-circuit : chire fulling (approx. 4 Hz)Function indicatorNo contact / dark onSignal output1 PNP output, short-circuit protected, reverse po open collectorSignal output1 PNP output, short-circuit protected, reverse po open collectorSwitching voltagemax. 30 V DCSwitching urentmax. 30 V DC </td <td>FRODUCT</td>	FRODUCT
Polarization filteryesLaser nominal ratingsNoteLaser nominal ratingsLASER LIGHT, DO NOT STARE INTO BEAMLaser class1Wave length680 nmBeam divergence> 5 mradPulse lengthapprox. 3 usRepetition rateapprox. 16.6 kHzmax. pulse energy8 nJAngle deviationapprox. 16.6 kHzmax. pulse energy8 nJAngle deviationapprox. 35 mm at a distance of 2000 mmAngle deviationapprox. 35 mm at a distance of 2000 mmAngle of divergenceapprox. 1°Optical facefrontalAntimet rof the light spotapprox. 1° frontalAntimet rof the light spotapprox. 1° frontalAntimet rof Trag800 aMission Time (T <sub>M</sub> )20 aDiagnostic Coverage (DC)0 %IndicatorSoperating meansOperation indicatorReceiver: LED yelow, lights up when light beam when falling short of the stability control ; OFF wi is interruptedElectrical specificationsIIIOutput1 PNP output, short-circuit protected, reverse po open collectorSwitching voltagemax. 50 mA, resistive loadVoltage dropU_d $\leq 1.5$ V DCSwitching voltagemax. 50 yellDirective 2014/30/CUEN 60947-5-2:2007 EN 60947-5-2/A1:2012Switching voltagemax. 50 mA, resistive loadVoltage dropU_d $\leq 1.5$ V DCSwitching requencyf approx. 2 kHzResponse lime250 yesDirective 2014/30/CU	
Laser nominal ratings   IASER LIGHT , DO NOT STARE INTO BEAM     Laser class   1     Wave length   680 nm     Beam divergence   > 5 mrad     Pulse length   approx. 3 us     Repetition rate   approx. 16.6 kHz     max. pulse energy   8 nJ     Angle deviation   approx. 0.5 °     Object size   typ. starts from 1.5 mm     Diameter of the light spot   approx. 35 nm at a distance of 2000 nm     Angle of divergence   approx. 1°     Optical face   frontal     Ambient light limit   EN 60947-5-2 : 30000 Lux     Functional safety related parameters   MTTF <sub>d</sub> Mission Time (T <sub>M</sub> )   20 a     Diagnostic Coverage (DC)   0 %     Indicators/operating means   Operation indicator     LED green, statically lit Power on , short-circuit : hing (approx. 4 Hz)     Function indicator   LED green, statically lit Power on , short-circuit : hing (approx. 4 Hz)     Function indicator   U <sub>B</sub> Operating voltage   U <sub>B</sub> Operating voltage   U <sub>B</sub> Signal output   V <sub>D</sub> Signal output   NO contact / dark on	
NoteLASER LIGHT, DO NOT STARE INTO BEAMLaser class1Wave length680 nmBeam divergence> 5 mradPulse lengthapprox. 3 µsRepetition rateapprox. 16.6 kHzmax. pulse energy8 nJAngle deviationapprox. 16.6 kHzmax. pulse energy8 nJAngle deviationapprox. 15 mmDiameter of the light spotapprox. 35 mm at a distance of 2000 mmAngle deviationapprox. 1 forntalOptical facefrontalAmbient light limitEN 60947-5-2 : 30000 LuxFunctional safety related parametersMTTFgMTTFg800 aMission Time (T <sub>M</sub> )20 aDiagnostic Coverage (DC)0 %Indicator Soloperating meansOperation indicatorLED green, statically lit Power on , short-circuit : hing (approx. 4 Hz)Function indicatorLED green, statically lit Power on , short-circuit : hing (approx. 4 Hz)No-load supply currentI0No-load supply current10No-load supply currentNO contact / dark onSignal output1 PNP output, short-circuit protected, reverse po open collectorSwitching voltagemax. 30 V DCSwitching requencyfBesponse time250 µsDirective conformityEN 60947-5-2:2007 EN 60947-5-2/A1:2012 ENStandardsEN 60947-5-2:2007 EN 60947-5-2/A1:2012 ENMabient conditions-10 60 "C (14 140 "F)Storage temperature-20 70 "C (-4 158 "F)Mechanical specific	
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   8 n.J     Angle deviation   approx. 5 °     Object size   typ. stars from 1.5 mm     Diameter of the light spot   approx. 3 mm at a distance of 2000 mm     Angle deviation   approx. 1 °     Optical face   frontal     Ambient light limit   EN 60947-5-2: 30000 Lux     Functional safety related parameters   MTFrd     MTFrd   800 a     Mission Time (T <sub>M</sub> )   20 a     Diagnostic Coverage (DC)   0 %     Indicator/operating means   Coperating indicator     Operation indicator   LED green, statically lit Power on , short-circuit : hing (approx. 4 Hz)     Function indicator   Receiver: LEO yellow, lights up when light beam when falling short of the stability control ; OFF wis is interrupted     Electrical specifications   III     Operating voltage   U <sub>B</sub> 12 24 V     No-load supply current   I <sub>0</sub> NO contact / dark on     Signal output   1 PNP output, sh	
Wave length 680 nm   Beam divergence > 5 mrad   Pulse length approx. 3 us   Repetition rate approx. 16.6 kHz   max. pulse energy 8 nJ   Angle deviation approx. 0.5 °   Object size typ. starts from 1.5 mm   Diameter of the light spot approx. 35 nm at a distance of 2000 nm   Angle of divergence approx. 1 °   Optical face frontal   Ambient light limit EN 80947-5-2: 30000 Lux   Functional safety related parameters MTTFd   MTTFd 800 a   Mission Time (T <sub>M</sub> ) 20 a   Diagnostic Coverage (DC) 0 %   Indicators/operating means EED green, statically lit Power on , short-circuit : hing (approx. 4 Hz)   Function indicator LED green, statically lit Power on , short-circuit : interrupted   Electrical specifications UB   Operating voltage UB   Voload supply current UG   Voload supply current Voload supply current   Switching type NO contact / dark on   Signal output 1 PNP output, short-circuit protected, reverse por open collector   Switching type NO contact / dark on   Signal output 1 PNP output, short-circuit protected, reverse por open collector   Switc	CLASS 1
Beam divergence> 5 mradPulse lengthapprox. 3 µsRepetition rateapprox. 16.6 kHzmax. pulse energy8 nJAngle deviationapprox. 0.5 °Object sizetyp. starts from 1.5 mmDiameter of the light spotapprox. 35 mm at a distance of 2000 mmAngle of divergenceapprox. 35 mm at a distance of 2000 nmAngle of divergenceapprox. 1 °Optical facefrontalAmbient light limitEN 60947-5-2: 30000 LuxFunctional safety related parametersMTTFdMTTFd800 aMission Time (T <sub>M</sub> )20 aDiagnostic Coverage (DC)0 %Indicators/operating meansDoperation indicatorCoperation indicatorLED green, statically lit Power on , short-circuit : hing (approx. 4 Hz)Function indicatorReceiver: LED yellow, lights up when light beam when failing short of the stability control ; OFF willsElectrical specificationsIIIOperating voltageUB12 24 VNo-load supply currentI0No contact / dark onSignal output1 PNP output, short-circuit protected, reverse po open collectorSwitching voltagemax. 50 mA, resistive loadVoltage dropUStandard compatibilityDirective 2014/30/EUEN 60947-5-2:2007 EN 60947-5-2/A1:2012 EN UL 60947-5-2:2017 EN 60947-5-2/A1:2012 EN UL 60947-5-2:2017 EN 60947-5-2:/A1:2012 EN UL 60947-	LASER PRODUCT
Pulse length   approx. 3 µs     Repetition rate   approx. 16.6 kHz     max.pulse energy   8 nJ     Angle deviation   approx. 0.5 °     Object size   typ. starts from 1.5 mm     Diameter of the light spot   approx. 35 sm at a distance of 2000 mm     Angle of divergence   approx. 1 °     Optical face   frontal     Ambient light limit   EN 60947-5-2 : 30000 Lux     Functional safety related parameters   MTTF,     MTTF,   800 a     Mission Time (TM)   20 a     Diagnostic Coverage (DC)   0 %     Indicators/operating means   Operation indicator     Operation indicator   LED green, statically lit Power on , short-circuit : hing (approx. 4 Hz)     Function indicator   Receiver: LED yellow, lights up when light beam when falling short of the stability control ; OFF wis interrupted     Electrical specifications   Operating voltage   U     Output   1 PNP output, short-circuit protected, reverse po open collector     Switching voltage   max. 30 V DC     Switching type   NO contact / dark on signal output     Signal output   1 PNP output, short-circuit protected, reverse po open collector     Sw	IEC 60825-1: 2007 certified.
Repetition rateapprox. 16.6 kHzmax. pulse energy8 nJAngle deviationapprox. 5.5 °Object sizetyp. starts from 1.5 mmDiameter of the light spotapprox. 35 mm at a distance of 2000 mmAngle deviationapprox. 1 °Optical facefrontalAmbient light limitEN 60947-5-2 : 30000 LuxFunctional safety related parametersMTTFqMTTFq800 aMission Time (T <sub>M</sub> )20 aDiagnostic Coverage (DC)0 %Indicators/Operating meansIED green, statically lit Power on , short-circuit : hing (approx. 4 Hz)Function indicatorLED green, statically lit power on , short-circuit : hing (approx. 4 Hz)Function indicatorIIPorating voltageUg 12 24 VNo-load supply current log < 10 mA	Complies with 21 CFR 1040.10 and 1040.11 except
max. pulse energy8 nJAngle deviationapprox. 0.5 °Object sizetyp. starts from 1.5 mmDiameter of the light spotapprox. 35 mm at a distance of 2000 mmAngle of divergenceapprox. 1 °Optical facefrontalAmbient light limitEN 60947-5-2 : 30000 LuxFunctional safety related parametersMTTF <sub>d</sub> MTTF <sub>d</sub> 800 aMission Time (T <sub>M</sub> )20 aDiagnostic Coverage (DC)0 %Indicators/operating meansUED green, statically lit Power on , short-circuit : hing (approx. 4 Hz)Function indicatorLED green, statically lit power on , short-circuit : hing (approx. 4 Hz)Function indicatorReceiver: LED yellow, lights up when light beam when failing short of the stability control ; OFF wi 	for deviations pursuant to Laser Notice No. 50,
Angle deviationapprox. 0.5 °Object sizetyp. starts from 1.5 mmDiameter of the light spotapprox. 35 mm at a distance of 2000 mmAngle of divergenceapprox. 1 °Optical facefrontalAmbient light limitEN 60947-5-2 : 30000 LuxFunctional safety related parametersMTTF_dMTTF_d800 aMission Time (T <sub>W</sub> )20 aDiagnostic Coverage (DC)0 %Indicators/operating meansDerestive:: LED yellow, lights up when light beam when talling short of the stability control ; OFF wits is interruptedElectrical specifications0Operating voltageUB12 24 VNo-load supply currentIoNo-load supply current1 PNP output, short-circuit protected, reverse po open collectorSwitching typeNO contact / dark onSignal output1 PNP output, short-circuit protected, reverse po open collectorSwitching currentmax. 30 V DCSwitching currentmax. 30 V DCSwitching current250 µsDirective conformityElectromagnetic compatibilityDirective conformityEln 60947-5-2:2007 EN 60947-5-2:A1:2012StandardsEln 60947-5-2:2007 EN 60947-5-2:A1:2012Ambient temperature-10 60 °C (14 140 °F)Storage temperature-20 70 °C (-4 158 °F)Mechanical SpecificationsDirective conformityDegree of protectionIP67Connection2 m fixed cableMaterial-10 60 °C (14 140 °F)HousingPC (P	dated June 24, 2007
Object size     typ. starts from 1.5 mm       Diameter of the light spot     approx. 35 mm at a distance of 2000 mm       Angle of divergence     approx. 1 °       Optical face     frontal       Ambient light limit     EN 60947-5-2 : 30000 Lux       Functional safety related parameters     MTTF <sub>d</sub> MTTF <sub>d</sub> 800 a       Mission Time (T <sub>M</sub> )     20 a       Diagnostic Coverage (DC)     0 %       Indicators/operating means     Operation indicator       Clear statically lit Power on , short-circuit : hing (approx. 4 Hz)       Function indicator     LED green, statically lit Power on , short-circuit : hing (approx. 4 Hz)       Function indicator     LED green, statically lit Power on , short-circuit : hing (approx. 4 Hz)       Function indicator     LED green, statically lit Power on , short-circuit : hing (approx. 4 Hz)       Function indicator     LED green, statically lit Power on , short-circuit : of the stability control ; OFF wisis interrupted       Electrical specifications     UB       Operating voltage     UB       Signal output     1 PNP output, short-circuit protected, reverse po open collector       Switching requency     f       Switothing requency     f	
Diameter of the light spotapprox. 35 mm at a distance of 2000 mmAngle of divergenceapprox. 1 °Optical facefrontalAmbient light limitEN 60947-5-2: 30000 LuxFunctional safety related parametersMTTF_d800 aMission Time (T_M)20 aDiagnostic Coverage (DC)0 %Indicators/operating meansDeration indicatorOperation indicatorLED green, statically lit Power on , short-circuit : hing (approx. 4 Hz)Function indicatorReceiver: LED yellow, lights up when light beam when falling short of the stability control ; OFF wi is interruptedElectrical specificationsUB 	
Angle of divergence   approx. 1 °     Optical face   frontal     Ambient light limit   EN 60947-5-2 : 30000 Lux     Functional safety related parameters   800 a     MTF <sub>d</sub> 800 a     Mission Time (T <sub>M</sub> )   20 a     Diagnostic Coverage (DC)   0 %     Indicators/operating means   0     Operation indicator   LED green, statically lit Power on , short-circuit : hing (approx. 4 Hz)     Function indicator   Receiver: LED yellow, lights up when light beam when falling short of the stability control ; OFF wills interrupted     Electrical specifications   10     Operating voltage   Ug     Protection class   III     Output   10 NO contact / dark on     Signal output   1 PNP output, short-circuit protected, reverse po open collector     Switching requency   f     Approx. 2 kHz   Response time     Electromagnetic compatibility   Directive 2014/30/EU     Electromagnetic compatibility   EN 60947-5-2:2007 EN 60947-5-2/A1:2012 EN tult 60947-5-2:2014     Standards   EN 60947-5-2:2007 EN 60947-5-2/A1:2012 EN tult 60947-5-2:2014     Ambient temperature   -10 60 °C (14 140 °F)     Storage temperature	
Optical facefrontalAmbient light limitEN 60947-5-2: 30000 LuxFunctional safety related parametersMTTF_dWTTF_d800 aMission Time (T_M)20 aDiagnostic Coverage (DC)0 %Indicators/operating means0Operation indicatorLED green, statically lit Power on , short-circuit : hing (approx. 4 Hz)Function indicatorReceiver: LED yellow, lights up when light beam when failing short of the stability control ; OFF wi is interruptedElectrical specifications0Operating voltageUB $0 < 10 \text{ mA}$ Protection classIIIOutput1 PNP output, short-circuit protected, reverse po open collectorSwitching typeNO contact / dark on 1 PNP output, short-circuit protected, reverse po open collectorSwitching currentmax. 30 W DCSwitching requencyf approx. 2 kHzResponse time250 $\mu$ sDirective conformityEN 60947-5-2:2007 EN 60947-5-2/A1:2012 EN UL 60947-5-2:2017 EN 60947-5-2/A1:2012 EN UL 60947-5-2:2017 EN 60947-5-2/A1:2012 EN UL 60947-5-2:2017 EN 60947-5-2/A1:2012 EN UL 60947-5-2:2014Ambient conditionsFN 600947-5-2:2007 EN 60947-5-2/A1:2012 EN UL 60947-5-2:2007 EN 60947-5-2/A1:2012 EN UL 60947-5	
Ambient light limitEN 60947-5-2: 30000 LuxFunctional safety related parameters800 aMTTFq800 aMTTFq20 aDiagnostic Coverage (DC)0 %Indicators/operating means0Operation indicatorLED green, statically lit Power on , short-circuit : hing (approx. 4 Hz)Function indicatorReceiver: LED yellow, lights up when light beam when falling short of the stability control ; OFF wi is interruptedElectrical specifications0Operating voltageUB1212Protection classIIIOutput1Switching typeNO contact / dark on 1 PNP output, short-circuit protected, reverse po open collectorSwitching requencyfapprox. 2 KHzResponse time250 $\mu$ sDirective conformityElectromagnetic compatibility Directive conformityElectromagnetic compatibility Directive conformityStandardsEN 60947-5-2:2007 EN 60947-5-2/A1:2012Ambient conditions Ambient temperatureAmbient conditionsAmbient conditionsAmbient conditionsDegree of protectionPerforectionMaterial HousingPC (Polycarbonate) and Stainless steel Optical faceOptical facePMMA CableConnection2 mMass Cable length2 mMass Cable length2 m	
Functional safety related parameters     MTTF <sub>d</sub> 800 a     Mission Time (T <sub>M</sub> )   20 a     Diagnostic Coverage (DC)   0 %     Indicators/operating means   0     Operation indicator   LED green, statically lit Power on , short-circuit : hing (approx. 4 Hz)     Function indicator   Receiver: LED yellow, lights up when light beam when falling short of the stability control ; OFF wills is interrupted     Electrical specifications   0     Operating voltage   UB     12 24 V     No-load supply current   I0     <10 mA	CLASS 1
MTTF_d800 aMission Time (T_M)20 aDiagnostic Coverage (DC)0 %Indicators/operating meansOperation indicatorLED green, statically lit Power on , short-circuit : hing (approx. 4 Hz)Function indicatorLED green, statically lit Power on , short-circuit : hing (approx. 4 Hz)Function indicatorReceiver: LED yellow, lights up when light beam when failing short of the stability control ; OFF wi is interruptedElectrical specifications0Operating voltageUB b12 24 VNo-load supply currentI010 or AProtection classIIISwitching typeNo contact / dark onSignal output1 PNP output, short-circuit protected, reverse po open collectorSwitching voltagemax. 30 V DCSwitching frequencyfapprox. 2 kHzResponse time250 µsDirective conformityElectromagnetic compatibility Directive 2014/30/EUElectromagnetic compatibilityDirective conformityStandardsEIN 60947-5-2:2007 EN 60947-5-2/A1:2012 EN UL 60947-5-2:2017 EN 60947-5-2/A1:2012 EN UL 60947-5-2:2014Ambient temperature-10 60 °C (14 140 °F) Storage temperatureDarge of protectionIP67 ConnectionConnection2 m fixed cableMaterialPUR Aass approx. 20 gMassapprox. 20 gTightening torque, fastening screws0.25 Nm Cable lengthCablePUR Aass approx. 20 gTightening torque	LASER PRODUCT
MTTF_d800 aMission Time (T_w)20 aDiagnostic Coverage (DC)0 %Indicators/operating meansOperation indicatorLED green, statically lit Power on , short-circuit : hing (approx. 4 Hz)Function indicatorLED green, statically lit Power on , short-circuit : hing (approx. 4 Hz)Function indicatorReceiver: LED yellow, lights up when light beam when falling short of the stability control ; OFF wi is interruptedElectrical specifications0Operating voltageUB b12 24 VNo-load supply currentI010 or AProtection classIIISwitching typeNO contact / dark onSignal output1 PNP output, short-circuit protected, reverse po open collectorSwitching voltagemax. 30 V DCSwitching frequencyfapprox. 2 kHzResponse time250 µsDirective conformityElectromagnetic compatibility Directive 2014/30/EUElectromagnetic compatibilityDirective conformityStandardsEN 60947-5-2:2007 EN 60947-5-2/A1:2012 EN UL 60947-5-2:2017 EN 60947-5-2/A1:2012 EN UL 60947-5-2:2017 EN 60947-5-2/A1:2012 EN Due 60 of C (14 140 °F) Storage temperature-10 60 °C (14 140 °F)Storage temperature-20 70 °C (-4 158 °F)Mechanical specificationsDegree of protectionPef7Connection2 m fixed cableMassapprox. 20 gTightening torque, fastening screws0.25 Nm<	
Mission Time (T_M)20 aDiagnostic Coverage (DC)0 %Indicators/operating means0Operation indicatorLED green, statically lit Power on , short-circuit : hing (approx. 4 Hz)Function indicatorReceiver: LED yellow, lights up when light beam when falling short of the stability control ; OFF wi is interruptedElectrical specifications $V_B$ Operating voltageU_BNo-load supply current $l_0$ Protection classIIIOutputNO contact / dark onSwitching typeNO contact / dark onSignal output1 PNP output, short-circuit protected, reverse po open collectorSwitching outragemax. 30 V DCSwitching frequencyfapprox. 2 kHzResponse time250 µsDirective 2014/30/EUEN 60947-5-2:2007 EN 60947-5-2/A1:2012StandardsEIN 60947-5-2:2007 EN 60947-5-2/A1:2012 EN UL 60947-5-2:2014Ambient temperature-10 60 °C (14 140 °F)Storage temperature-20 70 °C (-4 158 °F)Mechanical specificationsPG7 ConnectionDegree of protectionIP67Connection2 m fixed cableMaterial-HousingPC (Polycarbonate) and Stainless steelOptical facePMMA CableCablePURMassapprox. 20 gTightening torque, fastening screws0.25 NmCable length2 m	IEC 60825-1: 2007 certified.
Diagnostic Coverage (DC)   0 %     Indicators/operating means   Coperation indicator   LED green, statically lit Power on , short-circuit : hing (approx. 4 Hz)     Function indicator   Receiver: LED yelow, lights up when light beam when falling short of the stability control ; OFF wisis interrupted     Electrical specifications   Portection class   III     Operating voltage   UB   12 24 V     No-load supply current   I0   < 10 mA	Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to
Indicators/operating meansOperation indicatorLED green, statically lit Power on , short-circuit : hing (approx. 4 Hz)Function indicatorReceiver: LED yellow, lights up when light beam when falling short of the stability control ; OFF wi is interruptedElectrical specificationsOperating yoltageOperating voltageUB12 24 VNo-load supply currentI00< 10 mA	Laser Notice No. 50, dated June 24, 2007
Operation indicatorLED green, statically lit Power on , short-circuit : hing (approx. 4 Hz)Function indicatorReceiver: LED yellow, lights up when light beam when falling short of the stability control ; OFF wi is interruptedElectrical specifications $Q_B$ Operating voltage $U_B$ No-load supply current $I_0$ $I = 0$ $I = 24 V$ No-load supply current $I_0$ $I = 0$ $I = 24 V$ No-load supply current $I_0$ $I = 0$ $I = 24 V$ Switching typeNO contact / dark onSignal output $I = NPP$ output, short-circuit protected, reverse po open collectorSwitching voltagemax. 30 V DCSwitching currentmax. 50 mA, resistive loadVoltage drop $U_d$ Switching frequencyfapprox. 2 kHzResponse time250 $\mu$ sDirective conformityEIN 60947-5-2:2007 EN 60947-5-2/A1:2012StandardsEN 60947-5-2:2007 EN 60947-5-2/A1:2012 EN UL 60947-5-2: 2014Ambient temperature $-10 \dots$ 60 °C (14 140 °F)Storage temperature $-20 \dots$ 70 °C (-4 158 °F)Mechanical specifications $PC$ (Polycarbonate) and Stainless steelDegree of protectionIP67Connection2 m fixed cableMaterialPUR HousingHousingPC (Polycarbonate) and Stainless steelOptical facePMMA CableCablePUR MassApprox. 20 gTightening torque, fastening screws0.25 Nm2.5 Nm </td <td></td>	
hing (approx. 4 Hz)Function indicatorhing (approx. 4 Hz)Receiver: LED yellow, lights up when light beam when falling short of the stability control ; OFF wi is interruptedElectrical specifications $V_B$ Qperating voltageUBProtection classIIIOutput $12 \dots 24 V$ Switching typeNO contact / dark onSignal output1 PNP output, short-circuit protected, reverse po open collectorSwitching voltagemax. 30 V DCSwitching typeVdSwitching frequencyfapprox. 2 kHzResponse time250 µsDirective conformityElectromagnetic compatibilityDirective 2014/30/EUEN 60947-5-2:2007 EN 60947-5-2/A1:2012 EN UL 60947-5-2:2017 EN 60947-5-2/A1:2012 EN EN 60947-5-2:2017 EN 60947-5-2:2017 EN 60947-5-2/A1:2012 EN EN 60947-5-2:2017 EN 60947-5-2/A1:2012 EN EN 60947-5-2	
Function indicatorReceiver: LED yellow, lights up when light beam when falling short of the stability control ; OFF wi is interruptedElectrical specificationsImage: Control is a control is con	LED green flas-
when failing short of the stability control ; OFF will is interrupted     Electrical specifications     Operating voltage   U <sub>B</sub> No-load supply current   I <sub>0</sub> Protection class   III     Output   III     Switching type   NO contact / dark on     Signal output   1 PNP output, short-circuit protected, reverse po open collector     Switching voltage   max. 30 V DC     Switching current   max. 50 mA, resistive load     Voltage drop   U <sub>d</sub> Switching frequency   f     Response time   250 µs     Directive conformity   EN 60947-5-2:2007 EN 60947-5-2/A1:2012     Standards   EN 60947-5-2:2007 EN 60947-5-2/A1:2012 EN UL 60947-5-2/A1:2012 EN UL 60947-5-2:2014     Ambient conditions   FN 60947-5-2:2007 EN 60947-5-2/A1:2012 EN UL 60947-5-2:201     Ambient temperature   -10 60 °C (14 140 °F)     Storage temperature   -20 70 °C (-4 158 °F)     Mechanical specifications   Pogree of protection     Degree of protection   IP67     Connection   2 m fixed cable     Material   PUR     Mase   approx. 20 g     Tightening torque, fa	is free fleebee
is interrupted     Electrical specifications     Operating voltage   U <sub>B</sub> 1224 V     No-load supply current   I <sub>0</sub> < 10 mA	
Electrical specifications     Operating voltage   U <sub>B</sub> 1224 V     No-load supply current   I <sub>0</sub> < 10 mA	REF-H40
Operating voltage $U_B$ $1224 V$ No-load supply current $I_0$ < 10 mA	
No-load supply currentI₀<10 mAProtection classIIIOutputNO contact / dark onSignal output1 PNP output, short-circuit protected, reverse po open collectorSwitching voltagemax. 30 V DCSwitching currentmax. 50 mA, resistive loadVoltage dropU_d ≤ 1.5 V DCSwitching frequencyfapprox. 2 kHzResponse time250 µsDirective conformityElectromagnetic compatibilityDirective 2014/30/EUEN 60947-5-2:2007 EN 60947-5-2/A1:2012StandardsEN 60947-5-2:2007 EN 60947-5-2/A1:2012 EN UL 60947-5-2: 2017 EN 60947-5-2/A1:2012 EN UL 60947-5-2: 2014Ambient conditionsAmbient temperature-10 60 °C (14 140 °F)Storage temperature-20 70 °C (-4 158 °F)Mechanical specificationsDegree of protectionIP67ConnectionAnterialHousingPC (Polycarbonate) and Stainless steelOptical facePMMACableQuite facePURMassapprox. 20 gTightening torque, fastening screws0.25 NmCable length2 m	Reflector, rectangular 47.5 mm x 23.5
Protection class   III     Output   Switching type   NO contact / dark on     Signal output   1 PNP output, short-circuit protected, reverse por open collector     Switching voltage   max. 30 V DC     Switching current   max. 30 M, resistive load     Voltage drop   U <sub>d</sub> ≤ 1.5 V DC     Switching frequency   f   approx. 2 kHz     Response time   250 μs     Directive conformity   EN 60947-5-2:2007 EN 60947-5-2/A1:2012     Standard conformity   Standards     Standards   EN 60947-5-2:2007 EN 60947-5-2/A1:2012 EN UL 60947-5-2:2014     Ambient conditions   Ambient temperature     Ambient temperature   -10 60 °C (14 140 °F)     Storage temperature   -20 70 °C (-4 158 °F)     Mechanical specifications   Degree of protection     Degree of protection   IP67     Connection   2 m fixed cable     Material   Housing     Optical face   PMMA     Cable   PUR     Mass   approx. 20 g     Tightening torque, fastening screws   0.25 Nm     Cable length   2 m	mm, mounting holes, fixing strap
OutputSwitching typeNO contact / dark onSignal output1 PNP output, short-circuit protected, reverse por open collectorSwitching voltagemax. 30 V DCSwitching currentmax. 50 mA, resistive loadVoltage dropUd dSwitching frequencyfapprox. 2 kHzResponse time250 $\mu$ sDirective conformityElectromagnetic compatibilityDirective 2014/30/EUElectromagnetic compatibilityDirective 2014/30/EUStandard conformityStandard sElectromagnetic representationMethanical specificationsAmbient temperature-10 60 °C (14 140 °F)Storage temperature-20 70 °C (-4 158 °F)Mechanical specificationsDegree of protectionPeried of protectionMaterialHousingPC (Polycarbonate) and Stainless steelOptical facePURMassapprox. 20 gTightening torque, fastening screws0.25 NmCable length2 m	DEE H02
Switching typeNO contact / dark onSignal output1 PNP output, short-circuit protected, reverse por open collectorSwitching voltagemax. 30 V DCSwitching currentmax. 50 mA, resistive loadVoltage dropUd dSwitching frequencyfapprox. 2 kHzResponse time250 $\mu$ sDirective conformityElectromagnetic compatibilityDirective 2014/30/EUEN 60947-5-2:2007 EN 60947-5-2/A1:2012Standard conformityStandardsEN 60947-5-2:2007 EN 60947-5-2/A1:2012 EN UL 60947-5-2: 2014Ambient temperatureAmbient temperature-10 60 °C (14 140 °F) Storage temperatureDegree of protectionIP67 ConnectionDegree of protectionIP67 ConnectionMaterialPUR MassHousingPC (Polycarbonate) and Stainless steel PUR MassMassapprox. 20 gTightening torque, fastening screws0.25 NmCable length2 m	REF-H23
Signal output1 PNP output, short-circuit protected, reverse po open collectorSwitching voltagemax. 30 V DCSwitching currentmax. 50 mA , resistive loadVoltage drop $U_d$ $\leq 1.5$ V DCSwitching frequencyfapprox. 2 kHzResponse time250 µsDirective conformityElectromagnetic compatibilityDirective 2014/30/EUEN 60947-5-2:2007 EN 60947-5-2/A1:2012Standard conformityStandardsEN 60947-5-2:2007 EN 60947-5-2/A1:2012 EN UL 60947-5-2: 2014Ambient conditionsAmbient conditionsAmbient temperature-10 60 °C (14 140 °F) · 20 70 °C (-4 158 °F)Mechanical specificationsDegree of protectionIP67 ConnectionConnection2 m fixed cableMaterialPC (Polycarbonate) and Stainless steelOptical facePMMA CableCablePUR MassMassapprox. 20 gTightening torque, fastening screws0.25 Nm 2.25 Nm	Reflector with mounting holes
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Voltage dropUd d≤ 1.5 V DCSwitching frequencyfapprox. 2 kHzResponse time250 $\mu$ sDirective conformityElectromagnetic compatibilityDirective 2014/30/EUEN 60947-5-2:2007 EN 60947-5-2/A1:2012Standard conformityStandardsEN 60947-5-2:2007 EN 60947-5-2/A1:2012 EN UL 60947-5-2: 2014Ambient conditionsAmbient conditionsAmbient temperature-10 60 °C (14 140 °F) Storage temperatureStorage temperature-20 70 °C (-4 158 °F)Mechanical specificationsDegree of protectionIP67 ConnectionConnection2 m fixed cableMaterialHousingPC (Polycarbonate) and Stainless steel Optical faceOptical facePMMA CableMassapprox. 20 gTightening torque, fastening screws0.25 Nm 2 m	lar 32 mm x 20 mm, mounting holes
Switching frequency   f   approx. 2 kHz     Response time   250 μs     Directive conformity   Electromagnetic compatibility     Directive 2014/30/EU   EN 60947-5-2:2007 EN 60947-5-2/A1:2012     Standard conformity   Standards     Standards   EN 60947-5-2:2007 EN 60947-5-2/A1:2012 EN UL 60947-5-2:2014     Ambient conditions	
Response time250 μsDirective conformityElectromagnetic compatibilityDirective 2014/30/EUEN 60947-5-2:2007 EN 60947-5-2/A1:2012Standard conformityStandardsEN 60947-5-2:2007 EN 60947-5-2/A1:2012 EN UL 60947-5-2: 2014Ambient conditionsAmbient conditionsAmbient temperature-10 60 °C (14 140 °F) storage temperatureDegree of protectionIP67Connection2 m fixed cableMaterialHousingPC (Polycarbonate) and Stainless steel Optical faceOptical facePURMassapprox. 20 gTightening torque, fastening screws0.25 NmCable length2 m	REF-MH23
Directive conformity     Electromagnetic compatibility     Directive 2014/30/EU   EN 60947-5-2:2007 EN 60947-5-2/A1:2012     Standard conformity     Standards   EN 60947-5-2:2007 EN 60947-5-2/A1:2012 EN UL 60947-5-2:2014     Ambient conditions     Ambient temperature   -10 60 °C (14 140 °F)     Storage temperature   -20 70 °C (-4 158 °F)     Mechanical specifications   En fixed cable     Degree of protection   IP67     Connection   2 m fixed cable     Material   PUR     Housing   PC (Polycarbonate) and Stainless steel     Optical face   PMMA     Cable   PUR     Mass   approx. 20 g     Tightening torque, fastening screws   0.25 Nm     Cable length   2 m	Reflector with Micro-structure, rectangu-
Electromagnetic compatibility Directive 2014/30/EU EN 60947-5-2:2007 EN 60947-5-2/A1:2012 Standard conformity Standards EN 60947-5-2:2007 EN 60947-5-2/A1:2012 EN UL 60947-5-2: 2014 Ambient conditions Ambient temperature -10 60 °C (14 140 °F) Storage temperature -20 70 °C (-4 158 °F) Mechanical specifications Degree of protection IP67 Connection 2 m fixed cable Material Housing Optical face PMMA Cable PUR Mass approx. 20 g Tightening torque, fastening screws 0.25 Nm Cable length 2 m	lar 23 mm x 13.8 mm, diagonal mounting
Directive 2014/30/EUEN 60947-5-2:2007 EN 60947-5-2/A1:2012Standard conformityStandardsEN 60947-5-2:2007 EN 60947-5-2/A1:2012 EN UL 60947-5-2: 2014Ambient conditionsAmbient temperature-10 60 °C (14 140 °F) Storage temperature-20 70 °C (-4 158 °F)Mechanical specificationsDegree of protectionIP67 ConnectionConnection2 m fixed cableMaterialHousingPC (Polycarbonate) and Stainless steel Optical faceOptical facePMMA CableMassapprox. 20 gTightening torque, fastening screws0.25 Nm 2 m	hole
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Standard conformity     Standards   EN 60947-5-2:2007 EN 60947-5-2/A1:2012 EN UL 60947-5-2: 2014     Ambient conditions     Ambient temperature   -10 60 °C (14 140 °F)     Storage temperature   -20 70 °C (-4 158 °F)     Mechanical specifications   Degree of protection     Degree of protection   IP67     Connection   2 m fixed cable     Material   Housing     PC (Polycarbonate) and Stainless steel     Optical face   PMMA     Cable   PUR     Mass   approx. 20 g     Tightening torque, fastening screws   0.25 Nm     Cable length   2 m	Other suitable accessories can be found a
StandardsEN 60947-5-2:2007 EN 60947-5-2/A1:2012 EN UL 60947-5-2: 2014Ambient conditionsAmbient temperature-10 60 °C (14 140 °F) Storage temperature-20 70 °C (-4 158 °F)Mechanical specificationsDegree of protectionIP67Connection2 m fixed cableMaterialHousingPC (Polycarbonate) and Stainless steelOptical facePMMACablePURMassapprox. 20 gTightening torque, fastening screws0.25 NmCable length2 m	www.pepperl-fuchs.com
UL 60947-5-2: 2014     Ambient conditions     Ambient temperature   -10 60 °C (14 140 °F)     Storage temperature   -20 70 °C (-4 158 °F)     Mechanical specifications   IP67     Degree of protection   IP67     Connection   2 m fixed cable     Material   IP67     Optical face   PMMA     Optical face   PUR     Mass   approx. 20 g     Tightening torque, fastening screws   0.25 Nm     Cable length   2 m	60905 1:0007
Ambient conditionsAmbient temperature-10 60 °C (14 140 °F)Storage temperature-20 70 °C (-4 158 °F)Mechanical specificationsDegree of protectionIP67Connection2 m fixed cableMaterialHousingPC (Polycarbonate) and Stainless steelOptical facePMMACablePURMassapprox. 20 gTightening torque, fastening screws0.25 NmCable length2 m	00023-1:2007
Ambient temperature-10 60 °C (14 140 °F)Storage temperature-20 70 °C (-4 158 °F)Mechanical specificationsDegree of protectionIP67Connection2 m fixed cableMaterial	
Storage temperature -20 70 °C (-4 158 °F)   Mechanical specifications IP67   Degree of protection IP67   Connection 2 m fixed cable   Material Image: Control of the state of t	
Mechanical specifications     Degree of protection   IP67     Connection   2 m fixed cable     Material   Image: Steel of Protection     Housing   PC (Polycarbonate) and Stainless steel     Optical face   PMMA     Cable   PUR     Mass   approx. 20 g     Tightening torque, fastening screws   0.25 Nm     Cable length   2 m	
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Material     Housing   PC (Polycarbonate) and Stainless steel     Optical face   PMMA     Cable   PUR     Mass   approx. 20 g     Tightening torque, fastening screws   0.25 Nm     Cable length   2 m	
HousingPC (Polycarbonate) and Stainless steelOptical facePMMACablePURMassapprox. 20 gTightening torque, fastening screws0.25 NmCable length2 m	
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Tightening torque, fastening screws 0.25 Nm   Cable length 2 m	
Cable length 2 m	
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Approvals and certificates	
Approvals and certificates	
UL approval E87056 , cULus Recognized, Class 2 Power Sc	
CCC approval CCC approval / marking not required for produc	cts rated ≤36 V
FDA approval IEC 60825-1:2007 Complies with 21 CFR 1040	
1040.11 except for deviations pursuant to Laser	
dated June 24, 2007	

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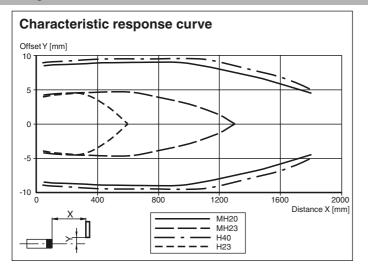
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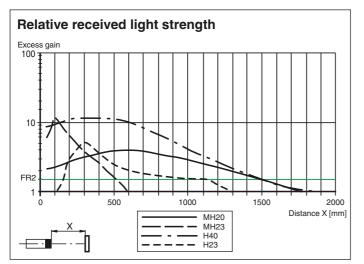
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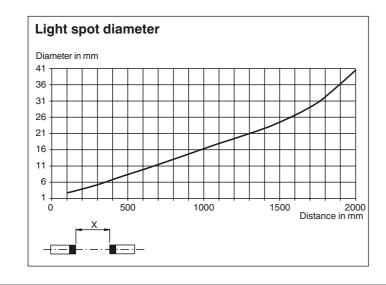


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# **Curves/Diagrams**







# Laser notice laser class 1

- 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. ٠
- Caution Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

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