

WFZ

Fork sensors

SICK
Sensor Intelligence.



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WFZ

Gabelsensoren



de

en

ko

Beschriebenes Produkt

WFZ

Hersteller

SICK AG
Erwin-Sick-Str. 1
79183 Waldkirch
Deutschland

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Inhalt

1	Zu diesem Dokument.....	5
2	Zu Ihrer Sicherheit.....	6
3	Bestimmungsgemäße Verwendung.....	6
4	Bedien- und Anzeigeelemente.....	7
5	Montage.....	8
6	Elektrische Installation.....	8
7	Inbetriebnahme.....	9
8	Störungsbehebung.....	12
9	Demontage und Entsorgung.....	12
10	Wartung.....	12
11	Technische Daten.....	13
12	Anhang.....	14

de

1 Zu diesem Dokument

1.1 Weiterführende Informationen

Die Produktseite mit weiterführenden Informationen finden Sie unter der **SICK Product ID** unter: pid.sick.com/{P/N}.

P/N entspricht der Artikelnummer des Produkts.

Folgende Informationen sind produktabhängig verfügbar:

- Datenblätter
- Dieses Dokument in allen verfügbaren Sprachversionen
- CAD-Daten und Maßzeichnungen
- Zertifikate (z. B. Konformitätserklärung)
- Weitere Publikationen
- Software
- Zubehör

1.2 Symbole und Dokumentkonventionen

Warnhinweise und andere Hinweise



GEFAHR

Weist auf eine unmittelbar gefährliche Situation hin, die zum Tod oder zu schweren Verletzungen führt, wenn sie nicht vermieden wird.



WARNUNG

Weist auf eine möglicherweise gefährliche Situation hin, die zum Tod oder zu schweren Verletzungen führen kann, wenn sie nicht vermieden wird.



VORSICHT

Weist auf eine möglicherweise gefährliche Situation hin, die zu mittelschweren oder leichten Verletzungen führen kann, wenn sie nicht vermieden wird.



WICHTIG

Weist auf eine möglicherweise gefährliche Situation hin, die zu Sachschäden führen kann, wenn sie nicht vermieden wird.



HINWEIS




Hebt nützliche Tipps und Empfehlungen sowie Informationen für einen effizienten und störungsfreien Betrieb hervor.


Handlungsanleitung

- ▶ Der Pfeil kennzeichnet eine Handlungsanleitung.
 1. Eine Abfolge von Handlungsanleitungen ist nummeriert.
 2. Nummerierte Handlungsanleitungen in der gegebenen Reihenfolge befolgen.
- ✓ Der Haken kennzeichnet ein Ergebnis einer Handlungsanleitung.

2 Zu Ihrer Sicherheit

2.1 Allgemeine Sicherheitshinweise

- Vor der Inbetriebnahme die Betriebsanleitung lesen.
-  Anschluss, Montage und Einstellung nur durch Fachpersonal.
-  Kein Sicherheitsbauteil gemäß EU-Maschinenrichtlinie.
-  Gerät bei Inbetriebnahme vor Feuchte und Verunreinigung schützen.
- Diese Betriebsanleitung enthält Informationen, die während des Lebenszyklus des Sensors notwendig sind.
- Die Strahlung des Sendelichtes darf nicht durch zusätzliche optische Bauteile fokussiert werden.

LASERKLASSE 1	
	Laser 1
EN/IEC 60825-1:2014	
Maximale Pulsleistung: < 2,5 mW Impulsdauer: 4 µs Wellenlänge: 650 - 670 nm	
Entspricht 21 CFR 1040.10 und 1040.11 mit Ausnahme von Abweichungen nach Laser-Hinweis 56, 8. Mai 2019	



ACHTUNG

ACHTUNG: Eingriffe oder Manipulationen oder nicht bestimmungsgemäße Verwendung kann zu gefährlicher Belastung durch Laser-Lichtstrahlung führen.

3 Bestimmungsgemäße Verwendung

Das Einweg-Lichtschranken-System WFZ besteht aus zwei optoelektronischen Sendeeinheiten und Empfangseinheiten. Die jeweiligen Sendeeinheiten und Empfangseinheiten sind gekreuzt angeordnet, sodass Objekte im Mittelpunkt des Kreuzungspunkts, durch Signalisierung beider Schaltausgänge (Q1 + Q2) positioniert werden können. Das WFZ wird zum optischen, berührungslosen Erfassen und Positionieren von Objekten eingesetzt.

4 Bedien- und Anzeigeelemente

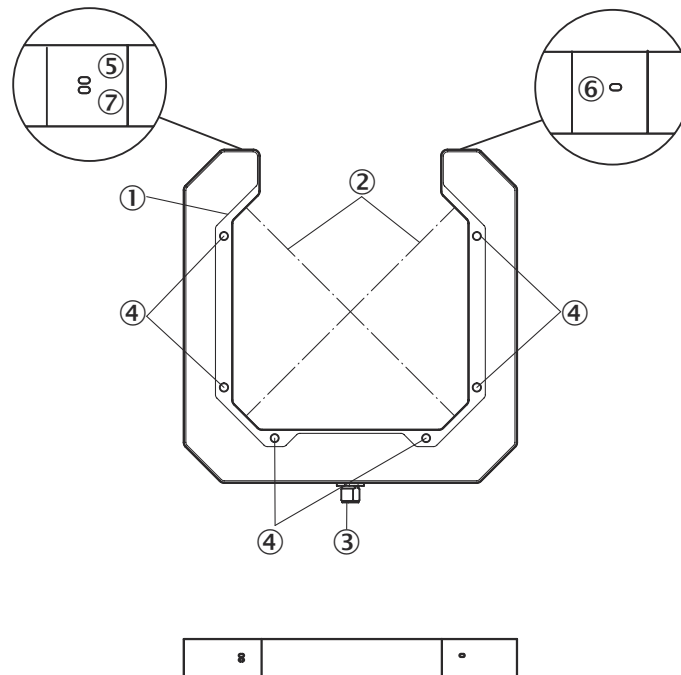


Abbildung 1: LEDs

- ① Deckelseite = obere Seite
- ② Detektionsachse
- ③ Stecker M12, 5-polig
- ④ Befestigungsbohrung Ø 5,4 mm
- ⑤ Grüne LED: Versorgungsspannung aktiv
- ⑥ Gelbe LED: Status Lichtempfang Q2
- ⑦ Gelbe LED: Status Lichtempfang Q1

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5 Montage

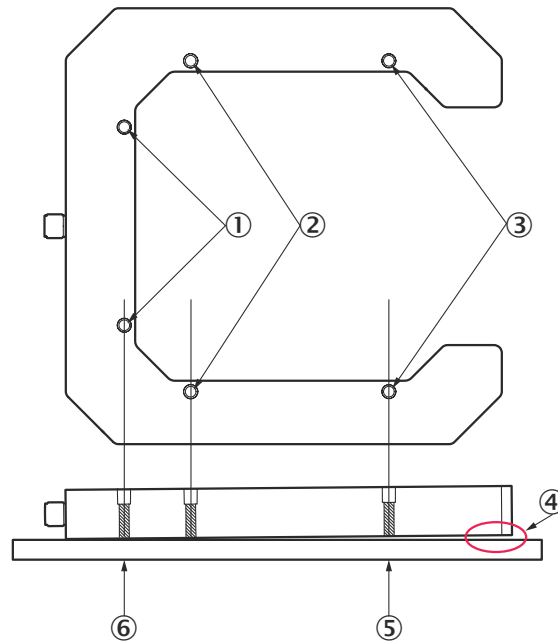


Abbildung 2: Montage

- ① Basisschrauben
- ② Optionale Basisschrauben
- ③ Gabelschrauben
- ④ Keine Verformung!
- ⑤ Gabelschrauben sind lose
- ⑥ Basisschrauben sind fest

Zur normalen Montage der WFZ wird empfohlen, die Basisschrauben zu verwenden.

Um eine bessere Stabilität zu erzielen, können die optionalen Basisschrauben verwendet werden.



HINWEIS

Es ist wichtig, dass die Montageoberfläche eben ist.



HINWEIS

Um die maximale Vibrationsfestigkeit zu erreichen, müssen alle sechs Befestigungsbohrungen verwendet werden.

Dies erfordert eine absolut ebene Montagefläche, um ein Verdrehen des Sensors zu vermeiden.

Die Bezugspunkte der jeweiligen Befestigungsbohrungen zum gekreuzten Lichtstrahl kann der Maßzeichnung entnommen werden, [siehe Abbildung 8](#).

6 Elektrische Installation

Anschluss der Sensoren muss spannungsfrei ($U_V = 0 \text{ V}$) erfolgen. Je nach Anschlussart sind die folgenden Informationen zu beachten:

- Steckeranschluss

Erst nach Anschluss aller elektrischen Verbindungen die Spannungsversorgung ($U_V > 0$ V) anlegen bzw. einschalten.


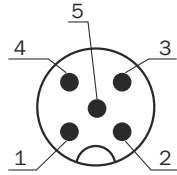
Erläuterungen zum Anschlussschema (Tabellen 2-7):

Q = Schaltausgänge

6.1 DC

DC: 10 V ... 30 V DC, siehe "Technische Daten", Seite 13

Tabelle 1: DC

WFZ		
1	BN	+ (L+)
2	WH	Q2
3	BU	- (M)
4	BK	Q1
5	GY	ET
		

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7 Inbetriebnahme

7.1 Ausrichtung

Ausrichtung: Positionierung von Objekten in den gekreuzten Lichtstrahlen

Das Unterbrechen eines der beiden gekreuzten Lichtstrahlen wird durch das jeweilige Schaltverhalten Q1 / Q2 signalisiert.

Wird der Lichtstrahl 1 unterbrochen, so wird der Schaltausgang Q1 (pin 4) deaktiviert.

Wird der Lichtstrahl 2 unterbrochen, so wird der Schaltausgang Q2 (pin 2) deaktiviert.

Deckt ein Objekt beide Lichtstrahlen ab, so werden die Lichtstrahlen 1 + 2 unterbrochen und durch die Schaltausgänge Q1 + Q2 signalisiert.

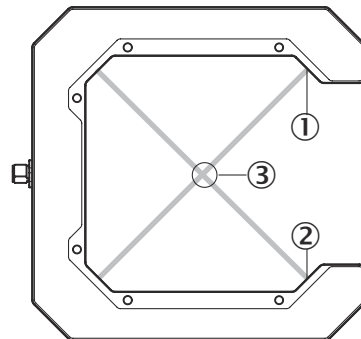


Abbildung 3: Schaltausgänge

- ① Lichtstrahl 1, Q1
- ② Lichtstrahl 2, Q2
- ③ Kreuzungspunkt

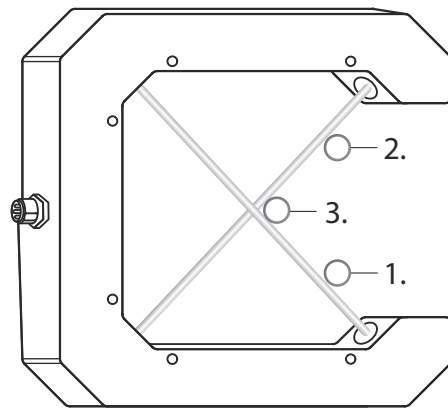


Abbildung 4: Bezugspunkte

Bei der Schaltpunktpositionierung muss die Größe des Objektes berücksichtigt werden, [siehe Abbildung 4](#).

Der Positioniervorgang kann wie folgt vorgenommen werden:

Punktbestimmung

1. Mit dem Werkstück in das WFZ einfahren, bis ein Schaltausgang schaltet
2. Das Werkstück seitlich bewegen, bis der zweite Schaltausgang schaltet
3. Zurück zur mittleren Position bewegen und anschließend Richtung Gabelmitte bewegen bis der Kreuzungspunkt erreicht ist und beide Schaltausgänge schalten

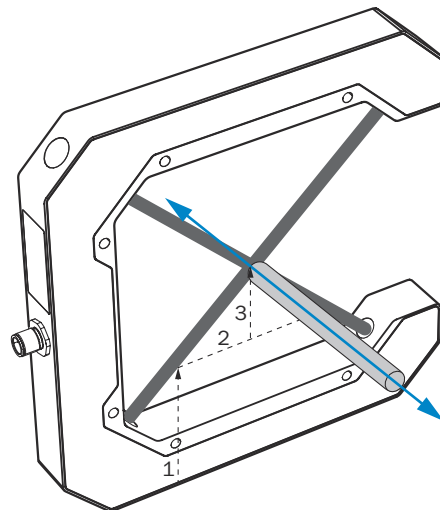


Abbildung 5: Punktbestimmung an der Objektspitze

Die Ausrichtung des Werkstücks auf der Z-Achse kann zusätzlich ermittelt werden, indem das Werkstück nach der Punktbestimmung auf der Z-Achse verschoben nochmals positioniert wird (Schritt 4, 5 und 6).

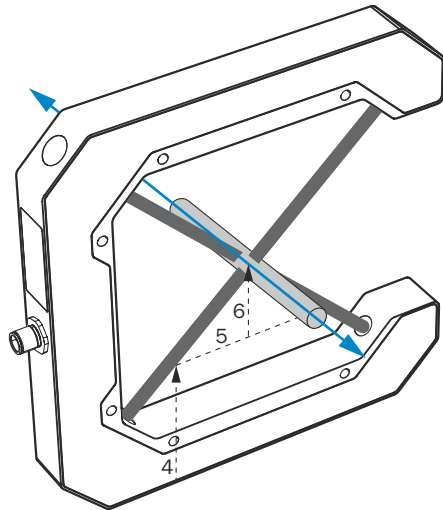


Abbildung 6: Erneute Punktbestimmung

Wenn zwei Punkte auf der Z-Achse des Werkstücks im Kreuzungspunkt des WFZ liegen, ist das Werkstück nicht nur mittig sondern auch senkrecht zum WFZ ausgerichtet.

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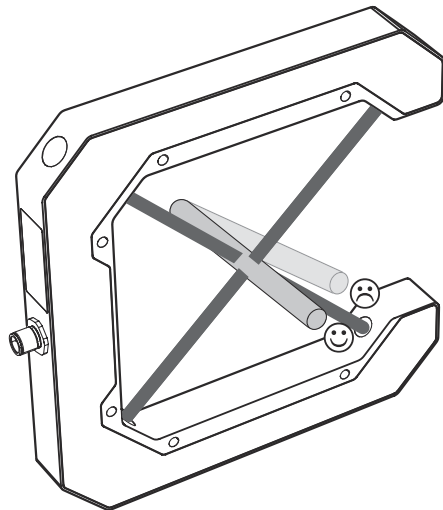


Abbildung 7: Korrekte Positionierung im Kreuzungspunkt, senkrecht zum WFZ

7.2 Teach-in-Funktion (Pin 5)

Pin 5 bzw. graue Leitung > 1 s auf + (L+) legen. Während des Teach-Vorgangs blinken die gelben LEDs.



HINWEIS

Es wird empfohlen, für die maximale Messgenauigkeit die Teach-in-Funktion vor jeder Messung durchzuführen. Mindestens aber:

- nach der Erstinbetriebnahme des Sensors
- nach der Reinigung
- wenn die Lichtstrahlen ein schwaches Signal anzeigen, obwohl der Lichtweg frei ist

7.3 Schaltausgang

PNP (Last → M): Lichtweg frei, Ausgang (Q) High

8 Störungsbehebung

Tabelle Störungsbehebung zeigt, welche Maßnahmen durchzuführen sind, wenn die Funktion des Sensors nicht mehr gegeben ist.

Tabelle 2: Störungsbehebung

LED / Fehlerbild	Ursache	Maßnahme
Grüne LED leuchtet nicht bzw. flackert	Keine Spannung oder Spannung unterhalb der Grenzwerte	Spannungsversorgung prüfen, den gesamten elektrischen Anschluss prüfen (Leitungen und Steckerverbindungen)
	Spannungsunterbrechungen	Sicherstellen einer stabilen Spannungsversorgung ohne Unterbrechungen
	Sensor ist defekt	Wenn Spannungsversorgung in Ordnung ist, dann Sensor austauschen
Q-LED blinkt gelb	Sensor ist noch betriebsbereit, aber die Betriebsbedingungen sind nicht optimal	Reinigung der optischen Flächen. Teach-in erneut durchführen.
Eine der beiden Q-LEDs leuchtet nicht	Der entsprechende Lichtstrahl ist unterbrochen	Objekt aus Lichtstrahl entfernen
	Die optischen Flächen sind verschmutzt	Reinigung der optischen Flächen. Teach-in erneut durchführen.

9 Demontage und Entsorgung

Der Sensor muss entsprechend den geltenden länderspezifischen Vorschriften entsorgt werden. Bei der Entsorgung sollte eine werkstoffliche Verwertung (insbesondere der Edelmetalle) angestrebt werden.




HINWEIS

Entsorgung von Batterien, Elektro- und Elektronikgeräten

- Gemäß den internationalen Vorschriften dürfen Batterien, Akkus sowie Elektro- und Elektronikgeräte nicht mit dem Hausmüll entsorgt werden.
- Der Besitzer ist gesetzlich verpflichtet, diese Geräte am Ende ihrer Lebensdauer bei den entsprechenden öffentlichen Sammelstellen abzugeben.



WEEE:  Dieses Symbol auf dem Produkt, dessen Verpackung oder im vorliegenden Dokument gibt an, dass ein Produkt den genannten Vorschriften unterliegt.

10 Wartung

Dieser SICK-Sensor ist wartungsfrei.

Wir empfehlen, in regelmäßigen Abständen

- Reinigen der optischen Oberflächen und des Gehäuses
- Verschraubungen und Steckverbindungen zu überprüfen

Reinigung



WICHTIG

Geräteschaden durch unsachgemäße Reinigung!

Eine unsachgemäße Reinigung kann zu einem Geräteschaden führen.

- Nur empfohlene Reinigungsutensilien und Reinigungsmittel verwenden.
- Keine spitzen Gegenstände zum Reinigen verwenden.

- ▶ Reinigen Sie die optischen Flächen in regelmäßigen Abständen und bei Verschmutzung mit einem fusselfreien Optiktuch (Artikelnummer 4003353) und Kunststoffreiniger (Artikelnummer 5600006). Das Reinigungsintervall hängt im Wesentlichen von den Umgebungsbedingungen ab.

Es dürfen keine Veränderungen an Geräten vorgenommen werden.

Irrtümer und Änderungen vorbehalten. Die spezifizierten Produktmerkmale und technischen Daten stellen keine schriftliche Garantie dar.

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11 Technische Daten

WFZ	
Laserklasse	I
Wellenlänge	650 nm
Gabelweite	120 mm
Gabeltiefe	185 mm
Kleinstes detektierbares Objekt (MDO)	0,5 mm
Schaltfunktion	Hellschaltend
Versorgungsspannung U_B	10 V DC ... 30 V DC ¹⁾
Stromaufnahme	< 100mA ²⁾
Ausgangsstrom I_{max}	100 mA
Schaltfrequenz	1.000 Hz ³⁾
Reproduzierbarkeit	± 0,01 mm
Ansprechzeit	0,5 ms ⁴⁾
Initialisierungszeit	50 ms
Schutzart	IP67
Schutzklasse	III
Umgebungstemperatur Betrieb	-10 °C ... +50 °C ⁵⁾
Lagertemperatur	-30 °C ... +65 °C

- 1) Grenzwerte
 U_B -Anschlüsse verpolsicher
Restwelligkeit max. 5 V_{SS}
- 2) Ohne Last.
- 3) Mit Hell- / Dunkelverhältnis 1:1
- 4) Signallaufzeit bei ohmscher Last
- 5) Unter 0 °C Leitung nicht verformen.

Maßzeichnung

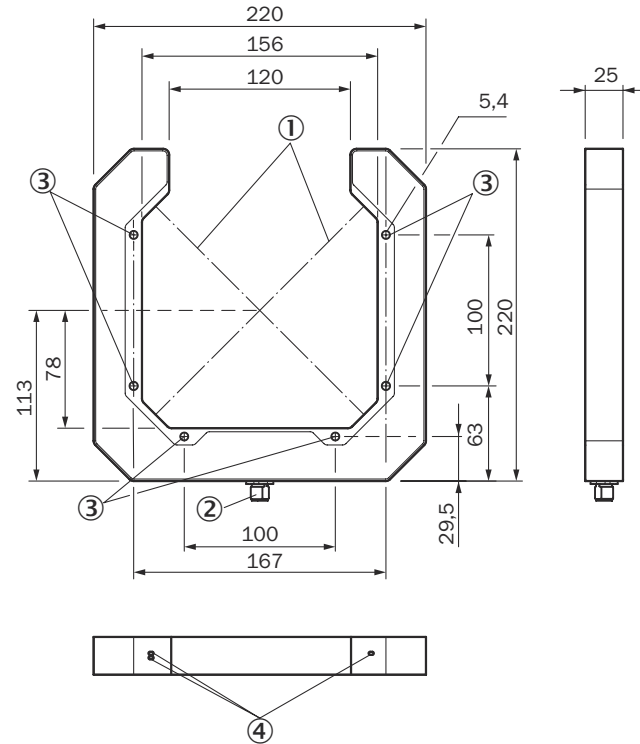


Abbildung 8: Maßzeichnung

- ① Detektionsachsen
- ② Stecker, M12, 5-polig
- ③ Befestigungsbohrung \varnothing 5,4 mm
- ④ Anzeige LED

12 Anhang

12.1 Konformitäten und Zertifikate

Auf www.sick.com finden Sie Konformitätserklärungen, Zertifikate und die aktuelle Betriebsanleitung des Produkts. Dazu im Suchfeld die Artikelnummer des Produkts eingeben (Artikelnummer: siehe Typenschildeintrag im Feld „P/N“ oder „Ident. no.“).

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Described product

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Manufacturer

SICK AG
Erwin-Sick-Str. 1
79183 Waldkirch
Germany

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Contents

1	About this document.....	18
2	Safety information.....	19
3	Intended use.....	19
4	Operating elements and status indicators.....	20
5	Mounting.....	21
6	Electrical installation.....	21
7	Commissioning.....	22
8	Troubleshooting.....	25
9	Disassembly and disposal.....	25
10	Maintenance.....	25
11	Technical data.....	26
12	Annex.....	27

1 About this document

1.1 Further information

You can find the product page with further information under the **SICK Product ID** at: pid.sick.com/{P/N}.

P/N corresponds to the part number of the product.

The following information is available depending on the product:

- Data sheets
- These publication in all available languages
- CAD files and dimensional drawings
- Certificates (e.g., declaration of conformity)
- Other publications
- Software
- Accessories

1.2 Symbols and document conventions

Warnings and other notes

**DANGER**

Indicates a situation presenting imminent danger, which will lead to death or serious injuries if not prevented.

**WARNING**

Indicates a situation presenting possible danger, which may lead to death or serious injuries if not prevented.

**CAUTION**

Indicates a situation presenting possible danger, which may lead to moderate or minor injuries if not prevented.

**NOTICE**

Indicates a situation presenting possible danger, which may lead to property damage if not prevented.

**NOTE**




Highlights useful tips and recommendations as well as information for efficient and trouble-free operation.


Instructions to action

- ▶ The arrow denotes instructions to action.
- 1. The sequence of instructions is numbered.
- 2. Follow the order in which the numbered instructions are given.
- ✓ The tick denotes the results of an action.

2 Safety information

2.1 General safety notes

- Read the operating instructions before commissioning.
-  Connection, mounting, and adjustment may only be performed by trained specialists.
-  Not a safety component in accordance with the EU Machinery Directive.
-  When commissioning, protect the device from moisture and contamination.
- These operating instructions contain information required during the life cycle of the sensor.
- The radiation of the emitted light must not be focused by additional optical devices.

LASER CLASS 1	
	Laser 1
EN/IEC 60825-1:2014	
Maximum pulse power < 2,5 mW Puls length: 4 µs Wavelength: 650 - 670 nm	
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 56, dated May 8, 2019	



ATTENTION

WARNING: Interruption, manipulation or incorrect use can lead to hazardous exposure due to laser radiation.

3 Intended use

The WFZ through-beam photoelectric sensor consists of two opto-electronic sender and receiver units. The respective sender and receiver units are arranged crosswise so that objects in the center of the crossing point can be positioned using signals from both switching outputs (Q1 + Q2). The WFZ is used for the optical, non-contact detection and positioning of objects.

4 Operating elements and status indicators

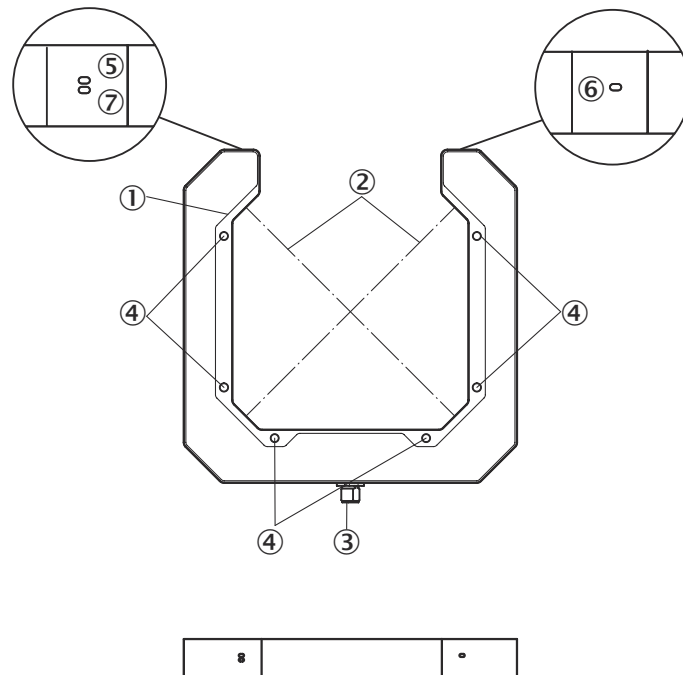


Figure 1: LEDs

- ① Cover side = upper side
- ② Detection axis
- ③ Male connector, M12, 5-pin
- ④ Fixing hole Ø 5.4 mm
- ⑤ Green LED: supply voltage active
- ⑥ Yellow LED: Status of received light beam Q2
- ⑦ Yellow LED: Status of received light beam Q1

5 Mounting

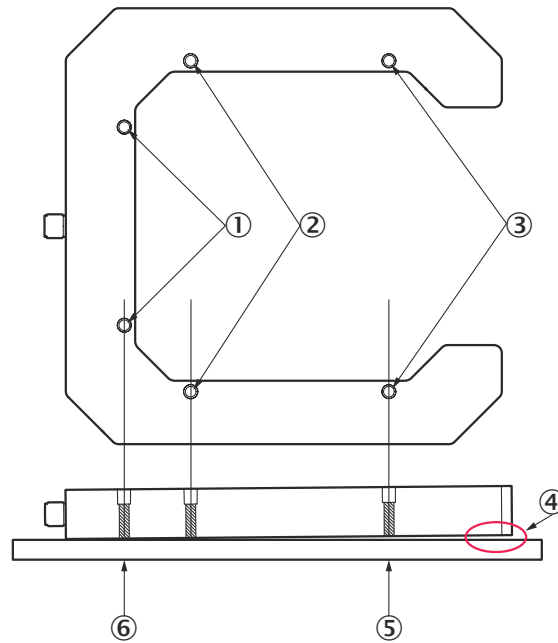


Figure 2: Mounting

- ① Base screws
- ② Optional base screws
- ③ Flank screws
- ④ No deformation!
- ⑤ Flank screws are loose
- ⑥ Base screws are tight

Normal mounting is recommended to be done with the base screws.

To obtain better stability the optional base screws can be used.



NOTE

It is important that the mounting surface is flat.



NOTE

To obtain full vibration resistance all 6 screws are to be used.

This requires an absolute flat mounting surface to avoid twisting of the sensor.

The reference points of the respective fixing holes to the crossed light beam can be seen in the dimensional drawing, [see figure 8](#).

6 Electrical installation

The sensors must be connected in a voltage-free state ($U_V = 0 \text{ V}$). The following information must be observed, depending on the connection type:

- Plug connection

Only apply voltage/switch on the voltage supply ($U_V > 0 \text{ V}$) once all electrical connections have been established.


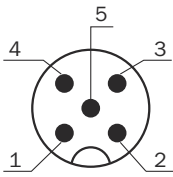
Explanations of the connection diagram (Tables 2–7):

Q = switching outputs

6.1 DC

DC: 10 V ... 30 V DC, see "Technical data", page 26

Table 1: DC

WFZ		
1	BN	+ (L+)
2	WH	Q2
3	BU	- (M)
4	BK	Q1
5	GY	ET
		

7 Commissioning

7.1 Alignment

Alignment: Positioning of objects in the crossed light beams

If one of the two crossed light beams is interrupted, this is signaled by the respective switching behavior of Q1/Q2.

If light beam 1 is interrupted, switching output Q1 (pin 4) is deactivated.

If light beam 2 is interrupted, switching output Q2 (pin 2) is deactivated.

If an object covers both light beams, light beams 1+2 are interrupted and signaled by switching outputs Q1 + Q2.

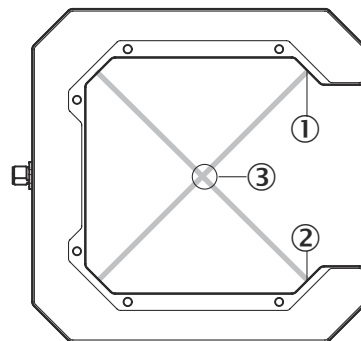


Figure 3: Switching outputs

- ① Light beam 1, Q1
- ② Light beam 2, Q2
- ③ Crossing point

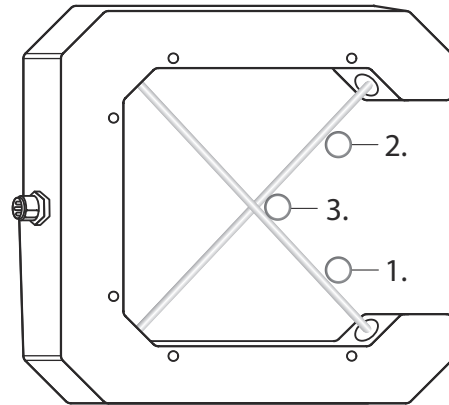


Figure 4: Reference points

The size of the object must be taken into account when positioning the switching point, see figure 4.

The positioning procedure is carried out as follows:

Point determination

1. Move the tool into the WFZ until a switching output switches
2. Move the tool sideways until the second switching output switches
3. Move back to the central position and then move towards the center of the fork until the crossing point is reached and both switching outputs switch

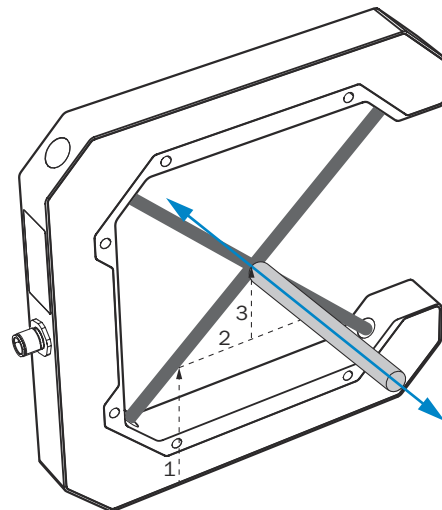


Figure 5: Point determination at the object tip

The alignment of the tool on the Z axis can also be ascertained by repositioning the tool on the Z axis after point determination has been carried out (Step 4, 5 and 6).

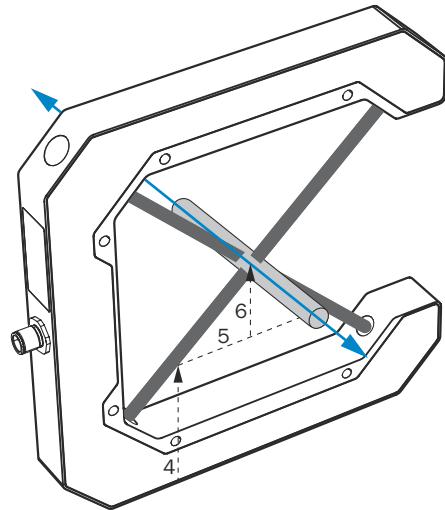


Figure 6: Second point determination

If two points on the tool's Z axis lie within the WFZ's crossing point, the tool is not only centrally aligned but also perpendicular to the WFZ.

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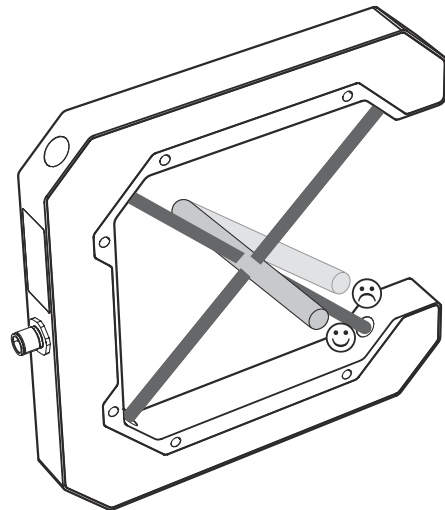


Figure 7: Correct positioning in the crossing point, perpendicular to the WFZ

7.2 Teach-in function (pin 5)

Route pin 5 and gray cable to + (L+) for > 1 s. The yellow LEDs flash during the teach-in procedure.



NOTE

For maximum accuracy, we recommend using the teach-in function before every measurement. At least, however:

- after initial commissioning of the sensor
- after cleaning
- if the light beams display a weak signal, even though the light path is clear

7.3 Switching output

PNP (Load → M): light path free, output (Q) high

8 Troubleshooting

The Troubleshooting table indicates measures to be taken if the sensor stops working.

Table 2: Troubleshooting

LED/fault pattern	Cause	Measures
Green LED does not light up or flickers	No voltage or voltage below the limit values	Check the power supply, check all electrical connections (cables and plug connections)
	Voltage interruptions	Ensure there is a stable power supply without interruptions
	Sensor is faulty	If the power supply is OK, replace the sensor
Q-LED flashes yellow	Sensor is still ready for operation, but the operating conditions are not ideal	Cleaning of the optical surfaces. Perform teach-in again.
One of the two Q-LEDs do not light up	The respective light beam is interrupted	Remove object from light beam
	The optical surfaces are contaminated	Cleaning of the optical surfaces. Perform teach-in again.

en

9 Disassembly and disposal

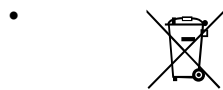
The sensor must be disposed of in line with applicable country-specific regulations. When disposing of them, you should try to recycle them (especially the precious metals).




NOTE

Disposal of batteries, electric and electronic devices

- According to international directives, batteries, accumulators and electrical or electronic devices must not be disposed of in general waste.
- The owner is obliged by law to return this devices at the end of their life to the respective public collection points.



WEEE:  This symbol on the product, its package or in this document, indicates that a product is subject to these regulations.

10 Maintenance

This SICK sensor is maintenance-free.

We do, however, recommend that the following activities are undertaken regularly:

- Clean the optical interfaces and housing
- Check the fittings and plug connectors

Cleaning



NOTICE

Equipment damage due to improper cleaning.

Improper cleaning may result in equipment damage.

- Only use recommended cleaning agents and tools.
- Never use sharp objects for cleaning.

- ▶ Clean the optical surfaces at regular intervals and, in the event of contamination, with a lint-free lens cloth (part number 4003353) and plastic cleaner (part number 5600006). The cleaning interval essentially depends on the ambient conditions.

No modifications may be made to devices.

Subject to change without notice. Specified product properties and technical data are not written guarantees.

11 Technical data

en

WFZ	
Laser class	I
Wavelength	650 nm
Fork width	120 mm
Fork depth	185 mm
Smallest detectable object (MDO)	0.5 mm
Switching function	Light switching
Supply voltage U_B	10 V DC ... 30 V DC ¹⁾
Current consumption	< 100mA ²⁾
Output current I_{max}	100 mA
Switching frequency	1,000 Hz ³⁾
Reproducibility	± 0.01 mm
Response time	0.5 ms ⁴⁾
Initialization time	50 ms
Enclosure rating	IP67
Protection class	III
Ambient temperature, operation	-10 °C ... +50 °C ⁵⁾
Storage temperature	-30 °C ... +65 °C

- 1) Limit values
Reverse polarity protected U_B connections
Residual ripple max. 5 V_{ss}
- 2) Without load.
- 3) With light / dark ratio 1:1
- 4) Signal transit time with resistive load
- 5) Do not bend cables below 0 °C.

Dimensional drawing

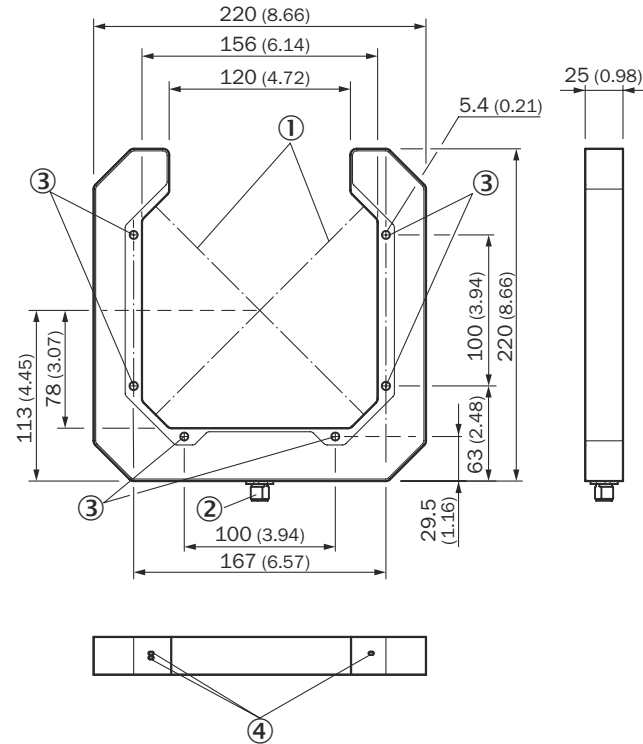


Figure 8: Dimensional drawing

- ① Detection axes
- ② Male connector, M12, 5-pin
- ③ Fixing hole \varnothing 5.4 mm
- ④ LED indicator

12 Annex

12.1 Conformities and certificates

You can obtain declarations of conformity, certificates, and the current operating instructions for the product at www.sick.com. To do so, enter the product part number in the search field (part number: see the entry in the “P/N” or “Ident. no.” field on the type label).

WFZ

포크 센서



de

en

ko

제품

WFZ

제조업체

SICK AG
Erwin-Sick-Str. 1
79183 Waldkirch
독일

법적 공지

이 저작물은 저작권법의 보호를 받습니다. 저작권에 의해 파생되는 모든 권리는 SICK AG에 있습니다. 이 문서 전체 또는 일부를 복사하는 행위는 저작권법의 법적 허용 범위 내에서만 허용됩니다. SICK AG사의 명백한 서면 허가 없이 이 문서를 어떤 형태로든 변경, 요약 또는 번역하는 것을 금합니다.

이 문서에서 언급하는 상표는 각 소유주의 소유물입니다.

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원본 문서

이 문서는 SICK AG사의 원본 문서입니다.



ko

목차

1	본 문서에 대해.....	31
2	안전 수칙.....	32
3	규정에 맞는 사용.....	32
4	조작 및 표시 요소.....	33
5	마운팅.....	34
6	전기 설치.....	34
7	작동 개시.....	35
8	장애 해결.....	38
9	해체 및 폐기.....	38
10	정비.....	38
11	기술 데이터.....	39
12	부록.....	40

ko

1 본 문서에 대해

1.1 더 자세한 정보

자세한 정보를 포함한 제품 페이지는 **SICK Product ID** `pid.sick.com/{P/N}`에 있습니다.

P/N은 제품의 부품 번호에 해당합니다.

다음 정보가 제품에 따라 제공됩니다.

- 데이터시트
- 이 문서의 모든 가용한 언어판
- CAD 데이터 및 치수 도면
- 인증서(예: 적합성 선언서)
- 기타 발행물
- 소프트웨어
- 액세서리

1.2 기호 및 문서 표기 규칙

경고 지침 및 기타 지침



위험

방지하지 못하는 경우 사망 또는 심각한 부상을 유발하는 직접적인 위험 상황을 나타냅니다.



경고

사망 또는 심각한 부상을 유발할 수 있는 위험이 내포된 상황을 나타냅니다.



주의

방지하지 못하는 경우 중간 수준이나 가벼운 부상을 유발할 수 있는 위험이 내포된 상황을 나타냅니다.



중요

방지하지 못하는 경우 물적 손해를 유발할 수 있는 위험이 내포된 상황을 나타냅니다.



주

유용한 팁 및 권장 사항과 효율적이고 장애 없는 작동을 위한 정보를 강조합니다.




실행 지침


▶ 화살표는 실행 지침을 나타냅니다.

1. 연속되는 실행 지침에는 번호가 매겨져 있습니다.
 2. 번호를 매긴 실행 지침을 주어진 순서대로 따르십시오.
- ✓ 체크 표시는 실행 지침의 결과를 나타냅니다.

2 안전 수칙

2.1 일반 안전 지침

- 커미셔닝 전에 먼저 작동 지침서를 읽으십시오.
-  연결, 마운팅, 설정 작업은 반드시 전문 인력이 실시해야 합니다.
-  EU 기계류 지침에 따른 안전 부품이 아닙니다.
-  커미셔닝 시 장치를 습기와 오염으로부터 보호하십시오.
- 이 작동 지침서에는 센서의 라이프 사이클 동안 필요한 정보가 있습니다.
- 송신광이 추가적인 광학 부품에 의해 한곳에 집중되어서는 안 됩니다.

LASER CLASS 1	
	Laser 1
EN/IEC 60825-1:2014	
Maximum pulse power < 2,5 mW Puls length: 4 µs Wavelength: 650 - 670 nm	
Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 56, dated May 8, 2019	



경고

주의: 개입 또는 조작 또는 규정에 맞지 않는 사용 행위는 레이저 광선으로 인한 위험을 초래할 수 있습니다.

3 규정에 맞는 사용

투과형 빔 광전 센서 WFZ는 두 개의 광전 송수신 장치로 구성되어 있습니다. 각 송수신 장치가 엇갈리게 배열되어 있으므로 두 스위칭 출력(Q1 + Q2)의 신호를 이용하여 물체를 교차점의 중심에 위치시킬 수 있습니다. WFZ는 물체의 비접촉식 광학 감지 및 포지셔닝에 사용됩니다.

4 조작 및 표시 요소

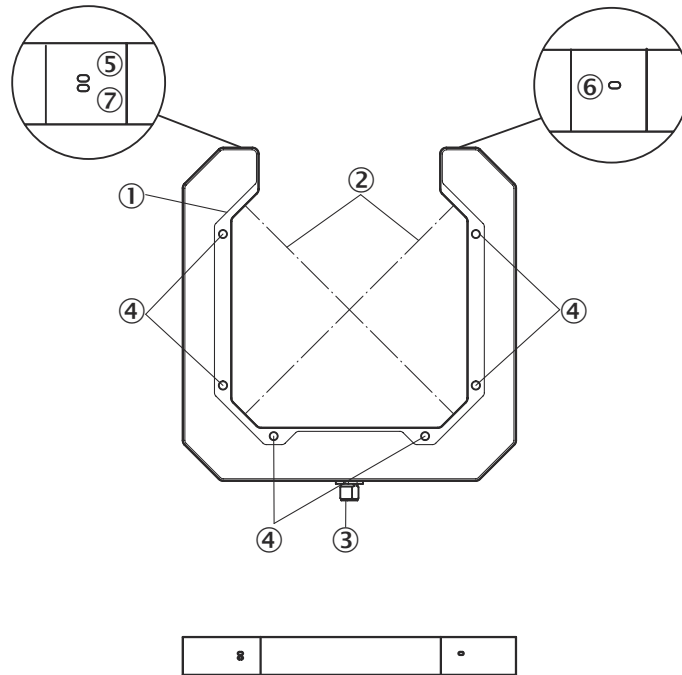


그림 1: LED

- ① 커버 쪽 = 위쪽
- ② 감지 축
- ③ 수 커넥터 M12, 5핀
- ④ 고정 보어 $\varnothing 5.4\text{mm}$
- ⑤ 초록색 LED: 공급 전압 활성화 상태
- ⑥ 노란색 LED: Q2 광 수신 상태
- ⑦ 노란색 LED: Q1 광 수신 상태

ko

5 마운팅

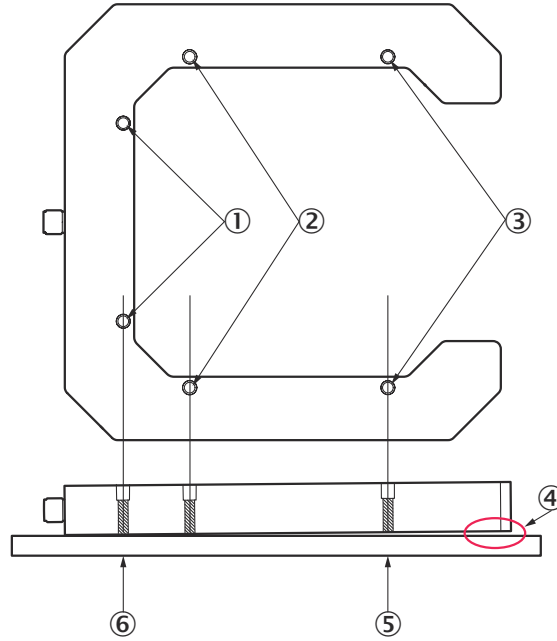


그림 2: 마운팅

- ① 베이스 나사
- ② 옵션 베이스 나사
- ③ 포크 나사
- ④ 변형 아님!
- ⑤ 포크 나사는 느슨함
- ⑥ 베이스 나사는 단단함

WFZ를 일반적으로 마운팅할 때는 베이스 나사를 사용할 것을 권장합니다.
안정성을 높이기 위해 옵션 베이스 나사를 사용할 수 있습니다.

i 주
마운팅 표면이 평평한 것이 중요합니다.

i 주
내진동성을 극대화하려면 고정 보어 여섯 개를 전부 사용해야 합니다.
이때 센서가 비틀리지 않도록 마운팅면이 절대적으로 평평해야 합니다.

교차된 광선에 대한 각 고정 보어의 기준점은 치수 도면을 참고하십시오 [참조 그림 8](#).

6 전기 설치

센서를 무전압 상태($U_V = 0V$)로 연결해야 합니다. 연결 유형에 따라 다음 정보에 유의해야 합니다.

- 수 커넥터 접속구

모든 전압 공급 장치를 연결한 후에 비로소 전압 공급($U_V > 0V$)을 가하거나 켜십시오.

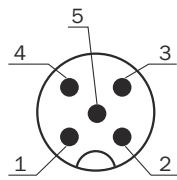
결선도에 대한 설명(표 2-7):

Q = 스위칭 출력

6.1 DC

DC: 10V ... 30V DC, 참조 "기술 데이터", 페이지 39

표 1: DC

WFZ		
1	BN	+(L+)
2	WH	Q2
3	BU	-(M)
4	BK	Q1
5	GY	ET
		

7 작동 개시

7.1 정렬

정렬: 교차된 광선에서 물체 포지셔닝

교차된 두 광선 중 하나가 끊기면 Q1/Q2의 각 스위칭 거동을 통해 이를 알 수 있습니다.

광선 1이 끊기면 스위칭 출력 Q1(핀 4)이 비활성화됩니다.

광선 2가 끊기면 스위칭 출력 Q2(핀 2)가 비활성화됩니다.

물체가 두 광선을 가리면 광선 1 + 2가 끊기고 스위칭 출력 Q1 + Q2가 이를 알립니다.

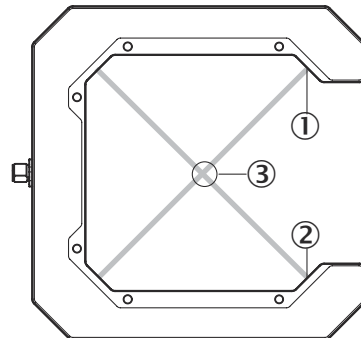


그림 3: 스위칭 출력

- ① 광선 1, Q1
- ② 광선 2, Q2
- ③ 교차점

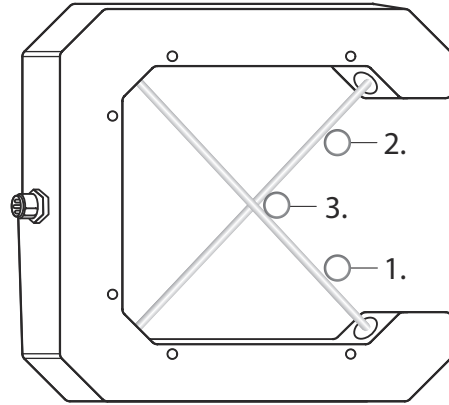


그림 4: 기준점

스위칭 지점 포지셔닝 시 물체의 크기를 고려해야 합니다 [참조 그림 4](#).

포지셔닝 절차는 다음과 같이 진행할 수 있습니다.

점 결정

1. 스위칭 출력이 하나 스위칭될 때까지 WFZ에 작업물을 넣으십시오.
2. 또 하나의 스위칭 출력이 스위칭될 때까지 작업물을 옆으로 움직이십시오.
3. 중간 위치로 다시 움직인 다음, 교차점에 도달하여 두 스위칭 출력이 스위칭될 때까지 포크 중앙 방향으로 움직이십시오.

ko

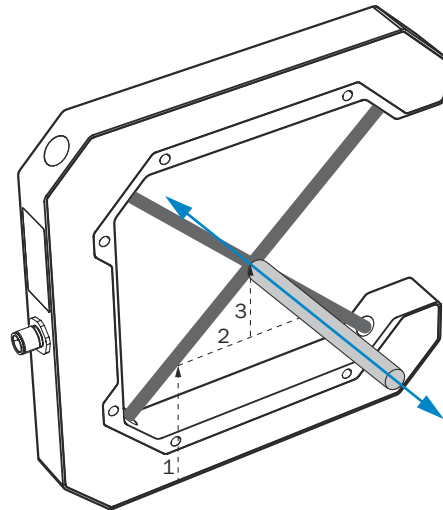


그림 5: 물체 끝부분의 점 결정

점 결정 후에 작업물을 Z축상에서 옮겨 다시 포지셔닝함으로써 작업물의 Z축상 정렬 상태를 추가로 조사할 수 있습니다(단계 4, 5, 6).

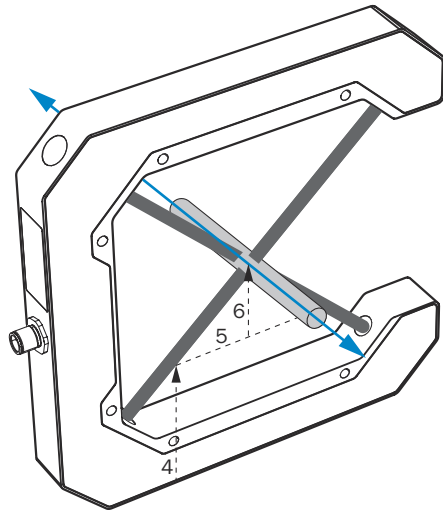


그림6: 점 재결정

작업물의 z축상 두 점이 WFZ의 교차점에 있으면 작업물이 중앙에 있으면서 WFZ에 대해 수직으로 정렬된 것입니다.

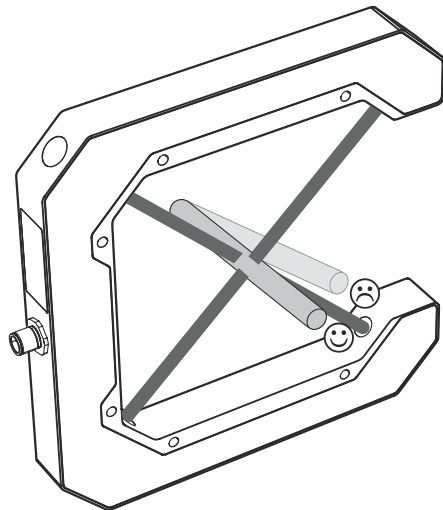


그림7: 교차점에서의 올바른 포지셔닝, WFZ에 대해 수직

ko

7.2 티치인 기능(핀 5)

핀 5 또는 회색 케이블을 1s 이상 +(L+)에 연결하십시오. 티치인 과정 중에 노란색 LED 표시부가 깜빡입니다.



주
측정 정확도를 극대화하려면 측정 전에 매번 티치인 기능을 실행할 것을 권장합니다. 적어도 다음의 경우에 티치인 기능 실행:

- 센서의 최초 커미셔닝 후
- 청소 후
- 광로가 열려 있는데도 광선이 약한 신호를 보일 때

7.3 스위칭 출력

PNP(부하 → M): 광로 열림, 출력(Q) High

8 장애 해결

장애 해결 표는 센서의 기능에 문제가 생겼을 때 취해야 하는 조치를 보여줍니다.

표 2: 장애 해결

LED/오류 증상	원인	조치
초록색 LED가 켜지지 않음 또는 꺼질 듯 말 듯함	전압이 없거나 전압이 한계값을 밑돌음	전압 공급 장치 점검, 전체 전기 연결 점검(케이블 및 플러그 연결부)
	전압 공급 중단	중단 없이 안정적인 전압 공급 확보
	센서에 결함이 있음	전압 공급 장치에 문제가 없는 경우, 센서 교체
Q LED가 노란색으로 깜빡임	센서가 작동 준비 상태이기는 하지만 작동 조건이 최적이 아님	광학 표면 청소. 티치인을 다시 실행합니다.
두 Q-LED 중 하나가 켜지지 않음	해당 광선이 끊김	물체를 광선에서 제거
	광학 표면이 오염됨	광학 표면 청소. 티치인을 다시 실행합니다.

ko

9 해체 및 폐기

센서를 유효한 국가별 규정에 따라 폐기해야 합니다. 폐기 시 재료를 재활용하려 노력해야 합니다(특히 귀금속).




주

배터리, 전기 및 전자 기기의 폐기

- 국제 규정에 따라 배터리, 충전지, 전기 및 전자 기기는 생활쓰레기로 폐기해서는 안 됩니다.
- 소유자는 서비스 수명이 끝난 이러한 기기를 해당 공공 수집소에 갖다줄 법적 의무를 집니다.



WEEE:  제품, 포장 또는 본 문서에 있는 이 기호는 제품에 해당 규정이 적용된다는 것을 나타냅니다.

10 정비

이 SICK 센서는 정비가 필요 없습니다.

SICK는 일정한 시간 간격을 두고

- 광학 표면 및 하우징 청소하기
- 나사 체결부와 플러그 연결부를 점검할 것을 권장합니다.

청소



중요

부적절한 청소로 인한 장치 손상!

부적절하게 청소하면 장치가 손상될 수 있습니다.

- 권장하는 청소 용구와 세제만 사용하십시오.
- 날카로운 물체를 청소에 사용하지 마십시오.

- ▶ 광학 표면을 보풀 없는 렌즈 닦는 헝겊(부품 번호 4003353) 및 플라스틱 클리너(부품 번호 5600006)로 정기적으로 청소하십시오. 청소 간격은 주로 주변 조건에 따라 달라집니다.

장치에 변경을 가해서는 안 됩니다.

예고 없이 변경 가능. 명시된 제품 특징과 기술 데이터는 서면 보증 사항이 아닙니다.

11 기술 데이터

WFZ	
레이저 등급	I
축 길이	650mm
포크 너비	120mm
포크 깊이	185mm
최소 감지 물체(MDO)	0.5mm
스위칭 기능	라이트 스위칭
공급 전압 U_v	10V DC ... 30V DC ¹⁾
소비 전류	< 100mA ²⁾
출력 전류 I_{max}	100mA
최대 스위칭 프리퀀시	1,000Hz ³⁾
재현성	± 0.01mm
응답 시간	0.5ms ⁴⁾
초기화 시간	50ms
인클로저 보호 등급	IP67
보호 등급	III
동작 시 주변 온도	-10°C ... +50°C ⁵⁾
보관 온도	-30°C ... +65°C

- 1) 한계값
 U_B 연결 역극성 보호
잔류 리플 최대 $5V_{SS}$
- 2) 무부하 상태.
- 3) 라이트/다크 비율 1:1
- 4) 신호 전송 시간(저항 부하 있음)
- 5) 0°C 미만에서 케이블 변형 금지.



치수 도면

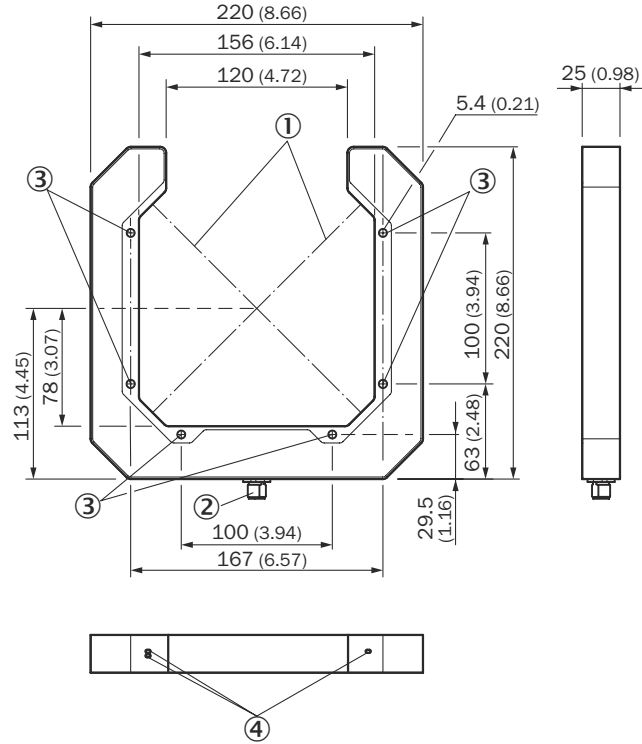


그림 8: 치수 도면

- ① 감지 축
- ② 수 커넥터, M12, 5핀
- ③ 고정 보어 $\varnothing 5.4\text{mm}$
- ④ LED 표시부

12 부록

12.1 적합성 및 인증서

www.sick.com에서 적합성 선언서, 인증서, 제품의 최신 작동 지침서를 확인할 수 있습니다. 이를 위해 검색 필드에 제품의 품목 번호를 입력하십시오(품목 번호: “P/N” 또는 “Ident. no.” 필드에서 명판 기재 내용 참조).

Australia

Phone +61 (3) 9457 0600
1800 33 48 02 – tollfree
E-Mail sales@sick.com.au

Austria

Phone +43 (0) 2236 62288-0
E-Mail office@sick.at

Belgium/Luxembourg

Phone +32 (0) 2 466 55 66
E-Mail info@sick.be

Brazil

Phone +55 11 3215-4900
E-Mail comercial@sick.com.br

Canada

Phone +1 905.771.1444
E-Mail cs.canada@sick.com

Czech Republic

Phone +420 234 719 500
E-Mail sick@sick.cz

Chile

Phone +56 (2) 2274 7430
E-Mail chile@sick.com

China

Phone +86 20 2882 3600
E-Mail info.china@sick.net.cn

Denmark

Phone +45 45 82 64 00
E-Mail sick@sick.dk

Finland

Phone +358-9-25 15 800
E-Mail sick@sick.fi

France

Phone +33 1 64 62 35 00
E-Mail info@sick.fr

Germany

Phone +49 (0) 2 11 53 010
E-Mail info@sick.de

Greece

Phone +30 210 6825100
E-Mail office@sick.com.gr

Hong Kong

Phone +852 2153 6300
E-Mail ghk@sick.com.hk

Hungary

Phone +36 1 371 2680
E-Mail ertekesites@sick.hu

India

Phone +91-22-6119 8900
E-Mail info@sick-india.com

Israel

Phone +972 97110 11
E-Mail info@sick-sensors.com

Italy

Phone +39 02 27 43 41
E-Mail info@sick.it

Japan

Phone +81 3 5309 2112
E-Mail support@sick.jp

Malaysia

Phone +603-8080 7425
E-Mail enquiry.my@sick.com

Mexico

Phone +52 (472) 748 9451
E-Mail mexico@sick.com

Netherlands

Phone +31 (0) 30 229 25 44
E-Mail info@sick.nl

New Zealand

Phone +64 9 415 0459
0800 222 278 – tollfree
E-Mail sales@sick.co.nz

Norway

Phone +47 67 81 50 00
E-Mail sick@sick.no

Poland

Phone +48 22 539 41 00
E-Mail info@sick.pl

Romania

Phone +40 356-17 11 20
E-Mail office@sick.ro

Russia

Phone +7 495 283 09 90
E-Mail info@sick.ru

Singapore

Phone +65 6744 3732
E-Mail sales.gsg@sick.com

Slovakia

Phone +421 482 901 201
E-Mail mail@sick-sk.sk

Slovenia

Phone +386 591 78849
E-Mail office@sick.si

South Africa

Phone +27 10 060 0550
E-Mail info@sickautomation.co.za

South Korea

Phone +82 2 786 6321/4
E-Mail infokorea@sick.com

Spain

Phone +34 93 480 31 00
E-Mail info@sick.es

Sweden

Phone +46 10 110 10 00
E-Mail info@sick.se

Switzerland

Phone +41 41 619 29 39
E-Mail contact@sick.ch

Taiwan

Phone +886-2-2375-6288
E-Mail sales@sick.com.tw

Thailand

Phone +66 2 645 0009
E-Mail marcom.th@sick.com

Turkey

Phone +90 (216) 528 50 00
E-Mail info@sick.com.tr

United Arab Emirates

Phone +971 (0) 4 88 65 878
E-Mail contact@sick.ae

United Kingdom

Phone +44 (0)17278 31121
E-Mail info@sick.co.uk

USA

Phone +1 800.325.7425
E-Mail info@sick.com

Vietnam

Phone +65 6744 3732
E-Mail sales.gsg@sick.com

Detailed addresses and further locations at www.sick.com

