TOFniva

Installation and Operation Manual

CEDES AG is certified according to ISO 9001: 2015

115 078 | 181128 | V 1.2

CEDES

Contents

1. About this manual

This 'TOFniva Installation and Operation Manual', with metric and US measurements is the original version.

The version number is printed at the bottom of each page.

To make sure you have the latest version, visit www.cedes.com from where this manual and related documents can be downloaded.

1.1 Measurements

Measurements are, if not stated otherwise, given in mm (non-bracketed numbers) and inches (numbers in brackets).

1.2 Related documents

TOFniva datasheet
001 234 en

1.3 CEDES headquarters

CEDES AG
Science Park
CH-7302 Landquart
Switzerland

2. Safety information

IMPORTANT
READ BEFORE INSTALLATION!

The TOFniva was developed and manufactured using state-of-the-art systems and technologies. However, injury and damage to the sensor can still occur.

To ensure safe conditions:

- Read all enclosed instructions and information.
- Follow the instructions given in this manual carefully.
- Observe all warnings included in the documentation and attached to the sensor.
- Do not use the sensor if it is damaged in any way.
- Keep the instruction manual on site.

The TOFniva should only be installed by authorized and fully trained personnel! The installer or system integrator is fully responsible for the safe integration of the sensor. It is the sole responsibility of the planner and/or installer and/or buyer to ensure that this product is used according to all applicable standards, laws and regulations in order to ensure safe operation of the whole application.

Any alterations to the device by the buyer, installer or user may result in unsafe operating conditions. CEDES is not responsible for any liability or warranty claim that results from such manipulation.

Failure to follow instructions given in this manual and/or other documents related to the TOFniva may cause customer complaints, serious call backs, damage, injury or death.

2.1 Non-intended use

The TOFniva **must not** be used for:

- Protection of dangerous machines
- Equipment in explosive atmospheres
- Equipment in radioactive environments

Use only specific and approved safety devices for such applications, otherwise serious injury or death or damage to property may occur!

3. Symbols, safety messages

Symbol	Meaning
▸	Single instruction or measures in no particular order
1. 2. 3.	Sequenced instructions
•	List, in no order of importance
→	Reference to a chapter, illustration or table within this document
Important	Important information for the correct use of the sensor

3.1 Safety messages categories

Warning of serious health risks

WARNING
Serious health risks

Highlights critical information for the safe use of the sensor. Disregarding these warnings can result in serious injury or death.

- Follow the measures highlighted by the triangle-shaped arrows
- Consult the safety information in Chapter 2 of this manual

Caution of possible health risk

CAUTION
Possible health risks

Highlights critical information for the safe use of the sensor. Disregarding these warnings can result in injury.

- Follow the measures highlighted by the triangle-shaped arrows
- Consult the safety information in Chapter 2 of this manual

Notice of damage risk

NOTICE
Risk of damage

Disregarding these notices can lead to damage to the sensor, the door controller and/or other devices.

- Follow the measures highlighted by the triangle-shaped arrows

4. Introduction

The TOFniva is a compact yet powerful and flexible range of sensors. These detect people and objects within a planar area of max 2.0 m by 2.0 m. TOF technology enables TOFniva sensors to operate with all types of backgrounds without any need to recalibrate. Their main feature is their ability to easily adapt to different detection field needs – this is done using two potentiometers for x-axis and y-axis. TOFniva sensors are available with and without blanking in both center and side mounted versions.

4.1 Detection fields

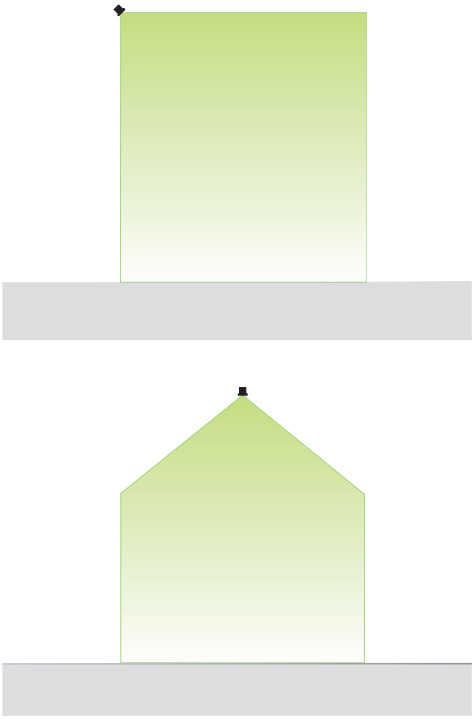


Figure 1: TOFniva detects objects within a maximum area of 2.0 m by 2.0 m. A side-mounted and a center-mounted version are available

4.2 Features of the TOFniva

- Excellent detection capability, independent of reflectance
- Individual setting of the detection area
- Detection area operates with all types of background
- Insensitive to ambient light

4.3 Type description

TOFniva – a – bb – c – d – e – fff; g; h,h*i,i

a	:	A	Angle	
		C	Center	
bb	:	Aperture angle in °		
c	:	x-axis		**Threshold settings**
		N	Potentiometer	
		T	Teach-in	
		P	Preset	
d	:	y-axis		
		N	Potentiometer	
		T	Teach-in	
		P	Preset	
e	:	C	Automatic calibration	
fff	:	1PP	Output - PNP/NPN (push-pull)	
		2PP	2*Output - PNP/NPN (push-pull)	
		1NP	Output - NPN	
		1PN	Output - PNP	
		2NP	2*Output - NPN	
		2PN	2*Output - PNP	
g	:	-	Non-blanking	
		B	Blanking	
h,h	:	x-axis Protection field in m		**Only if Preset type**
i,i	:	y-axis Protection field in m		

Figure 2: Type description

5. Configuration

5.1 Type of threshold setting

The distance at which the sensor triggers an output is the threshold. The TOFniva requires a threshold setting for the x-axis as well as the y-axis using potentiometers. A factory setting as well as a mixture of potentiometer and preset are also possible on request.

Note: The sensor uses a ±120 mm (±4.72 in) hysteresis. The hysteresis is the difference between the switching points changing the status from 'free field' to 'object detected' and back from 'object detected' to 'free field' compared to the nominal limit.

5.1.1 Threshold setting via potentiometer

The threshold distance at which the sensor triggers an output is set with a potentiometer for the x-axis and y-axis. This is done using the potentiometer at the back of the sensor. If the sensor points to a background, the distance of the switching threshold to the background is recommended to be set at 150 mm.

Important:
The cable exit of the sensor in the Figure 3 is always at the bottom.

Important:

- The scale is not printed on the sensor. The potentiometer can be adjusted linear from of 0.4 m to 2.0 m; see Figure 3 below.
- Take a small screw driver and turn the potentiometer to the required position.

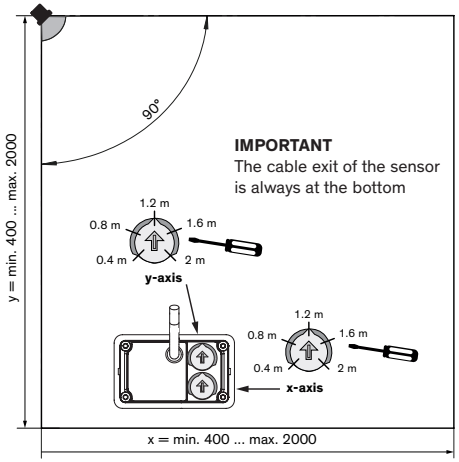


Figure 3: A type: Detection field using potentiometer

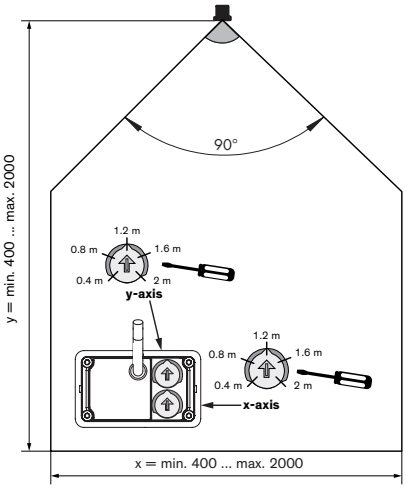


Figure 4: C type: Detection field using potentiometer

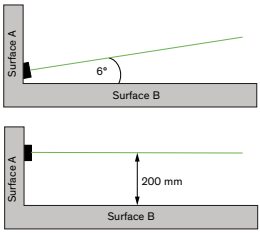
Parameter	Value
Operating range x-axis	Min.: 0 ... 400 mm Max.: 0 ... 2,000 mm
Operating range y-axis	Min.: 0 ... 400 mm Max.: 0 ... 2,000 mm
Aperture angle	90°

Table 1: Parameter - detection field

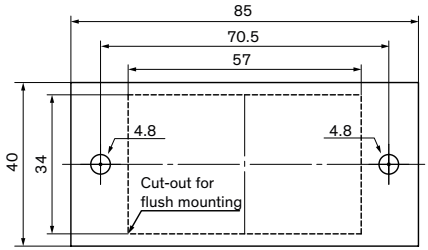
6. Installation

1. Switch off main power to the control unit and mark clearly that this system is out of service before performing any work on the system.
2. Define the ideal place to mount the sensor

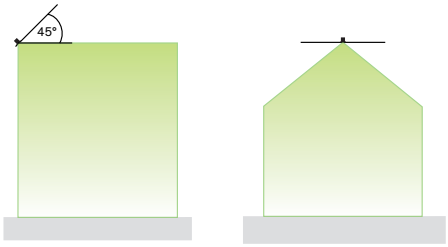
Important: The TOFniva must be mounted with a 6° angle or with a minimum distance of 200 mm parallel to Surface B.



3. Cut a hole at the defined position into Surface A. For the use of the flush mounting use the delivered drilling pattern or use a surface mounting kit. More details about available surface mounting kit are written in the accessories sheet of the TOFniva.



Important: The angle type has to be mounted at a 45° angle to the detection area. The centre type can be mounted flat (0°).



4. Place the sensor and connect it according connecting diagram in Chapter 7.
5. Switch on mains and power-up the control unit.
6. Adjust the detection field.
7. Test if the system is working correctly.

7. Input / Output description and electrical connection

Generally the TOFniva has one output that is triggered if the detection field is interrupted. For this purpose, a push-pull output is used. With the logic selector (gray wire, Figure 6), the logic of the output signal can be configured for “HIGH“ on object or “LOW“ on object operation (Figure 5), according to the controller requirements.
The logic selection is performed during start-up.

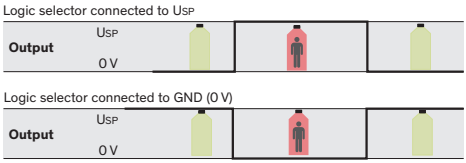
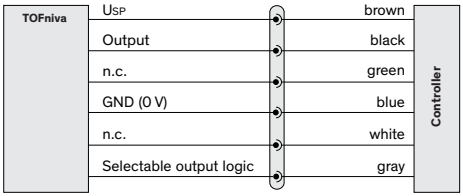


Figure 5: Output (PNP/NPN) logic



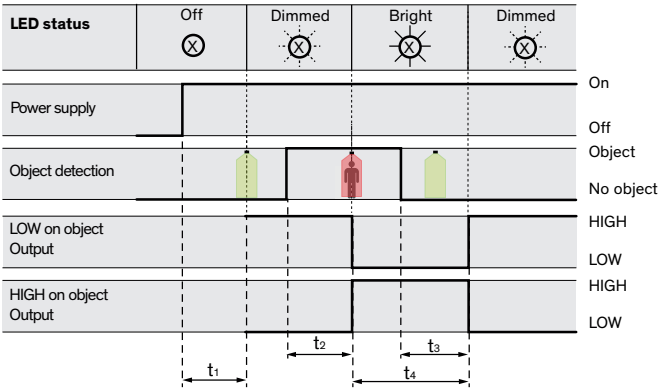
n.c. = not connected and isolated

Figure 6: Connection diagram

8. Start-up

1. Switch on mains and power up.
2. Check if LED lights up.
3. Check the distance setting and the reaction of the sensor, including the status LED, by placing an object into the detection area at different heights and widths.

9. Timing diagram



	Time	Value [ms]
Power-on time	t_1	1,000
Max. response time	t_2	200
Release time	t_3	200
Min. switching time	t_4	200

Figure 7: General timing diagram / general timing table

10. LED signals

The red LED provides the sensor's status. The respective LED is dimmed when the power is OK and the detection field is free. The LED glows bright when an object is detected and the respective output triggered. The LED is visible from the front.

LED status	Description
LED off	No power
LED dimmed red	No object detected
LED bright red	Object detected

11. Blanking

The TOFniva is available with and without a blanking function. Versions that features blanking trigger the output when objects are dynamic (moving) within the detection field. Static objects within the detection field will be ignored and blanked out (after 30 seconds). This covers with objects that are already present at power up (i.e. bollards).

Start-up:

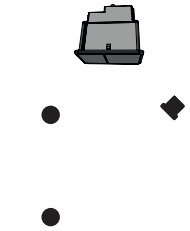


Figure 8: Active blanking - start-up sequence with i.e. bollards.

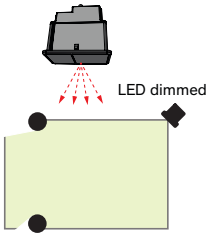


Figure 9: After start-up the bollards are blanked out from the detection field.

Active blanking:

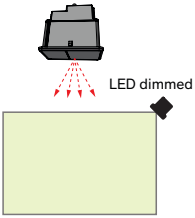


Figure 10: The detection field is free.

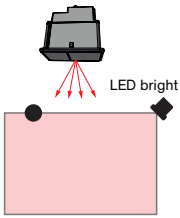


Figure 11: A static object is placed in the detection field (i.e a trash bag). The object will be detected.

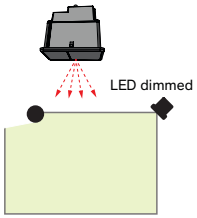


Figure 12: After 30 s the static object will be blanked out and the TOFniva continues its operation with the new geometry of the detection field.

12. Trouble shooting

Status	Action
LED off	▸ Check supply power ▸ Check electrical connections
Object in the safeguarded area and LED dimmed red	▸ Check distance setting
No object in the safeguarded area and LED bright red	▸ Check electrical connections ▸ Check distance setting

If the problem persists, please contact your local CEDES representative (www.cedes.com).

13. Maintenance

Although the TOFniva does not need regular maintenance, a periodical functional check is strongly recommended as follows:

- Check the mounting position and detection area of the sensor.
- Clean the optical window with a soft towel and a little soapy water.

NOTICE
Damage to the optical window

- Never use any solvents, cleaners or mechanically abrasive towels or highpressure water to clean the sensors.

14. Disposal

The TOFniva should only be replaced if a similar protection device is installed. Disposal should be done using the most up-to-date recycling technology according to local regulations and laws. There are no harmful materials used in the design and manufacture of the sensor. Traces of such dangerous materials may be found in the electronic components but not in the quantities that are harmful.

15. Technical data

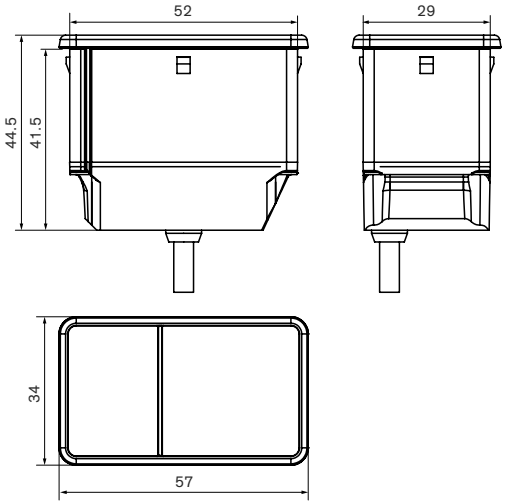
Optical	
Detection area - Width and length	Min. 0 ... 400 mm Max. 0 ... 2,000 mm
Mechanical	
Dimensions (w × h × l)	57 × 34 × 44.5 mm
Housing material	Polycarbonate
Housing color	Black
Enclosure rating	IP65
Temperature range	−20 °C ... +65 °C
Electrical	
Supply voltage U_{SP}	24 VDC ±20%
Current consumption at 24 VDC	50 mA (peak max. 0.5 A)
Output	PNP/NPN (push-pull)
Max. response time	200 ms
Min. switching time	200 ms
Power-on time	1 s
General	
Eye safety	EN 62471:2008
EMC emission	EN 61000-6-3:2007 EN 12015:2014
EMC immunity	EN 61000-6-2:2005 EN 12016:2013
Vibration	IEC 60068-2-6:2007
Shock	IEC 60068-2-27:2008
RoHS	2011/65/EU
Certificate	CE

Connection cable and electrical connection	
Sensor	
Length	0.25 m
Connection	M8, 6-pin
Diameter	Ø 4.2 mm
Material	PVC, black
Plug color	Blue
Connection cable	
Length	2 m (other lengths on request)
Connection	M8, 6-pin
Diameter	Ø 4.2 mm
Material	PVC, black
Plug color	Blue
Wires	AWG26
• brown	U_{SP}
• blue	GND (0 V)
• black	Output
• white	Not connected
• gray	Selectable output logic
• green	Not connected

16. Dimensions

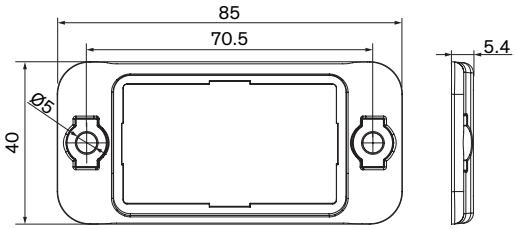
Measurements (all dimensions in mm)

16.1 Sensor

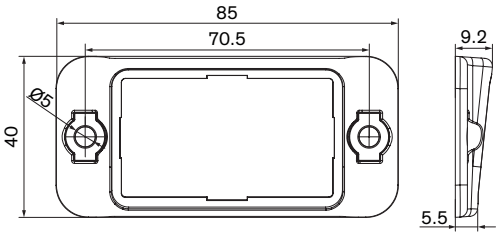


16.2 Mounting brackets

Flat - flush mounting



6° - flush mounting



目录

1. 关于本手册

本《TOFniva操作手册》（公制和美制量度）为原始版本。

版本号打印于每页的底部。

可访问www.cedes.com进行本手册和相关文档的下载，以确保您获取的为最新版本。

1.1 量度

除特殊说明外，文中给出的量度均为毫米(非括号内数字)和英寸(括号内数字)。

1.2 相关文件

TOFniva 数据表
001 234 zh

1.3 CEDES 总部

CEDES AG
Science Park
CH-7302 Landquart
Switzerland

2. 安全信息

重要注意事项
安装前阅读!

TOFniva是使用最先进的系统和技术开发制造的，然而，对传感器的损伤仍有可能发生。

为确保安全:

- 阅读所有附上的指导和信息。
- 认真按照本手册给出的指令操作。
- 遵守文档中关于传感器的所有警告。
- 如果传感器发生任何损坏，请勿使用。
- 指导手册应放置在现场。

TOFniva必须由经过授权和充分培训的人员进行安装!
安装人员和系统集成人员对传感器的安全集成负完全责任。规划人员、安装人员以及买方的唯一责任是确保本产品的使用符合所有适用的标准、法律和法规要求，以确保整个应用的安全运行。

任何人(如购买者、安装人员或使用者)对该设备的任何改动都有可能导致不安全的操作条件。CEDES概不承担任何责任或者由这些操作导致的索赔。

不遵守本手册或其它文件中关于TOFniva的指令可能会引起客户投诉、严重的召回及人员伤亡。

2.1 非指定用途

TOFniva 绝对不能用于:

- 危险设备的安全防护
- 易爆环境中的设备
- 辐射环境中的设备

这类应用只能用于特定和被认可的安全装置，否则将有可能造成严重的人身伤亡或者财产损失!

3. 符号，安全信息

符号	含义
▸	无特定顺序的单一指令或措施
1.	具有特定顺序的指令
2.	
3.	
•	列表，非重要性排序
→	参考文档中的章节、插图或表格
重要注意事项	正确使用传感器的重要信息

3.1 安全条例类别

严重的健康风险警告

警告
严重的健康风险

突出显示安全使用此传感器的关键信息。忽略这些警告可能会导致严重的人员伤亡。

- 遵守三角标识所突出的措施。
- 请查阅本手册第2章中的安全信息。

小心可能的健康风险

小心
可能的健康风险

突出显示安全使用此传感器的关键信息。忽略这些警告可能会导致严重的人员伤亡。

- 遵守三角标识所突出的措施。
- 请查阅本手册第2章中的安全信息。

注意损伤风险

注意
损伤风险

忽略这些注意事项可能导致传感器、门控制器和/或其它设备的损伤。

- 遵守三角标识所突出的措施。

4. 简介

TOFniva是一款小巧但功能强大且应用灵活的传感器。它可以探测到最大2.0米×2.0米的平面区域内的人和物体。TOF技术使TOFniva传感器可以在所有类型的背景下工作，而不需要重新校准。它能够很容易地适应不同探测场的要求——通过调整x轴和y轴的两个电位计来实现。TOFniva传感器具备中心安装和侧边安装两个版本，可选是否需配置消隐功能。

4.1 探测区域

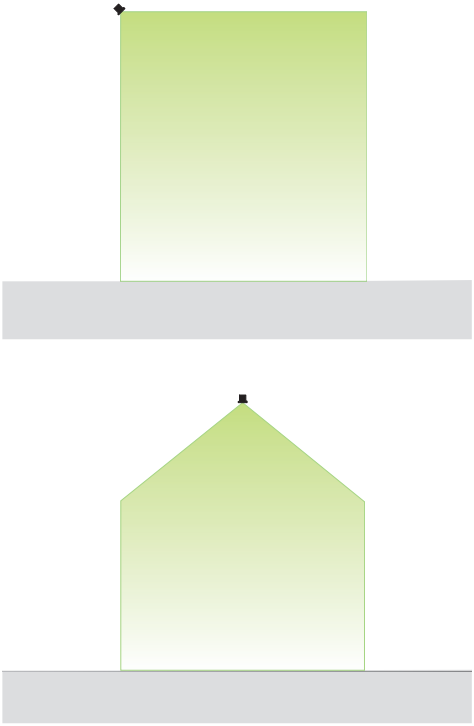


图 1: TOFniva的最大探测范围可达2.0米×2.0米。用户可根据需要选择侧边安装和中心安装的版本。

4.2 TOFniva的特点

- 出色的检测能力，不受反射影响
- 检测区域独立设定
- 检测区域适用于所有类型的背景
- 抗环境光能力极强

4.3 类型说明

TOFniva – a – bb – c – d – e – fff; g; h,h*i,i

a : A 安装于角落
C 安装于中心

bb : 光阑角度

c : x轴
N 电位器
T 校准
P 预设

d : y轴
N 电位器
T 校准
P 预设

e : C 自动校准

阈值设定

fff : 1PP 输出 PNP/NPN (推挽式)
2PP 2*输出 PNP/NPN (推挽式)
1NP 输出 NPN
1PN 输出 PNP
2NP 2*输出 NPN
2PN 2*输出 PNP

g : - 无消隐
B 消隐

h,h : x轴
保护区域（米）

i,i : y轴
保护区域（米）

仅针对预设类型

图 2: 类型说明

5. 配置

5.1 阈值设定类型

传感器触发输出信号的距离即为阈值。TOFniva使用电位计为防护区域的x轴和y轴设定阈值。可提供出厂预设和电位计与预设混合的类型。

注: 传感器使用±120 mm（±4.72 in）迟滞。迟滞是指开关点的状态由“空白场”切换到“检测到物体”和由“检测到物体”切换回“空白场”这两个过程与标称极限之间的距离差异。

5.1.1 通过电位计设定阈值

传感器触发输出信号的阈值距离由x轴和y轴的电位计设定。这是通过传感器背面的电位计完成的。如果使用背景为传感器设定阈值，建议将触发阈值与实际背景的距离设置为150mm。

重要注意事项:
图3中传感器的电缆出口始终位于底部。

重要注意事项:

- 标尺没有印刷在传感器上。电位计可从0.4m线性调整至2.0m，参见下面的图3。
- 使用小一字螺丝刀将电位计旋转到需要的位置。

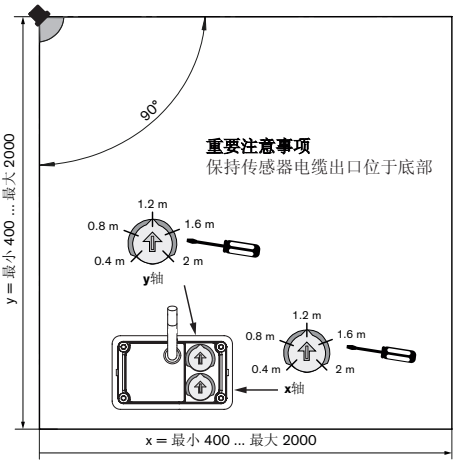


图 3: A型：使用电位器的探测区域

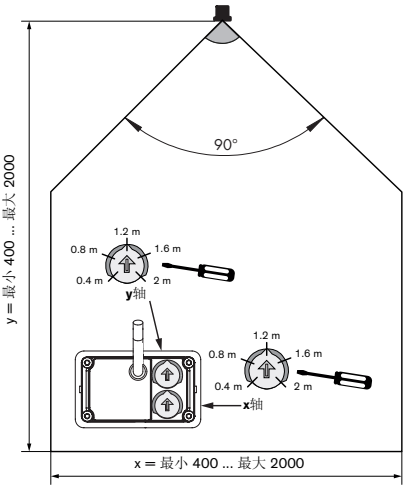


图 4: C型：使用电位器的探测区域

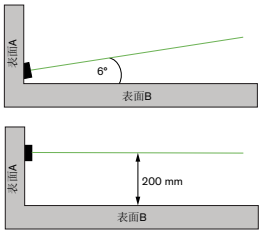
参数	值
探测区域 x-axis	最小: 0 ... 400 mm 最大: 0 ... 2,000 mm
探测区域 y-axis	最小: 0 ... 400 mm 最大: 0 ... 2,000 mm
光阑角	90°

表 1: 参数 – 探测区域

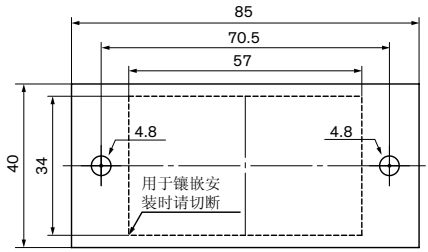
6. 安装

1. 在对系统进行任何操作之前，请先关闭控制单元的主电源，并清楚地标明该系统已停止使用。
2. 确定安装传感器的理想位置。

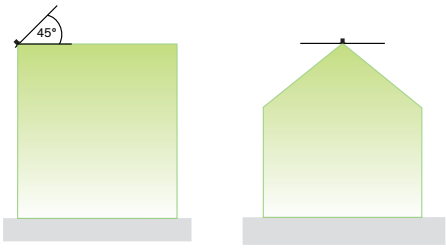
重要注意事项: TOFniva必须安装在与B表面夹角为6° 或与B表面平行最小距离为200mm的位置。



3. 在表面A的指定位置上钻一个孔。为了实现镶嵌安装，请使用交付的钻孔模版或使用表面安装套件。更多关于可用的表面安装套件的详细信息请参阅TOFniva的附件表。



重要注意事项: 角安装型必须与检测区域成**45°**夹角进行安装。中心安装型可以平行（**0°**）安装。



4. 安装传感器，按照第7节中的接线图对传感器进行连接。
5. 接通主电源并启动控制单元。
6. 调整探测场。
7. 测试系统是否正常工作。

7. 输入/输出说明和电气连接

通常，如果探测场中有干扰物体，TOFniva会触发一个输出信号。因此这里使用了推挽式输出。通过使用逻辑选择器（灰色线，图6），输出信号的逻辑可根据控制器的要求配置为探测到物体输出“高电平”或探测到物体输出“低电平”（图5）。逻辑选择在启动期间执行。

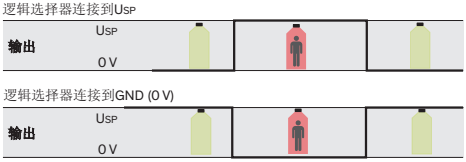
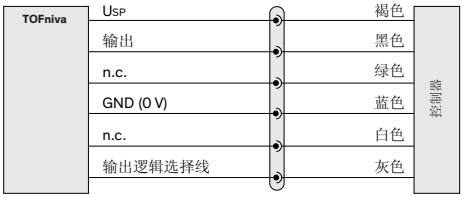


图 5: 输出逻辑（PNP/NPN）



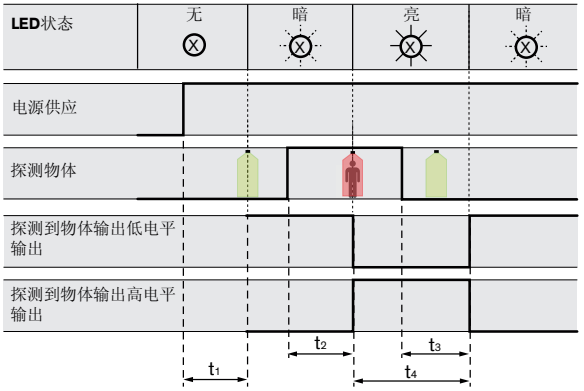
n.c. = 未连接、分离

图 6: 接线图示

8. 启动

1. 接通主电源并启动。
2. 检查LED灯是否打开。
3. 将物体置于探测区域内的不同高度和方位，检查距离设置和传感器的反应，包括状态LED。

9. 时序图



	时间	值 [ms]
通电时间	t_1	1,000
最大响应时间	t_2	200
释放时间	t_3	200
最小开关时间	t_4	200

图 7: 总时序图/总时序表

10. LED信号

红色LED灯提示传感器的状态。当电源正常且探测场空闲时，相应的LED灯将变暗。当探测到物体并触发相应的输出时，LED灯会亮起。LED灯位于传感器正面。

LED状态	说明
LED无	无电源
LED暗红色	无物体被探测到
LED亮红色	物体被探测到

11. 消隐

TOFniva的消隐功能为可选项。当物体在探测场中处于动态(移动)时，具有消隐功能的版本会触发输出。探测场内的静态对象将被忽略并清除(30秒后)。这包括在通电时就已经存在的物体（例如路桩）。

启动:

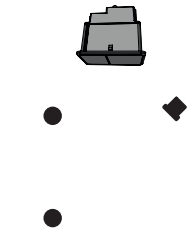


图 8: 激活消隐 – 启动路桩序列

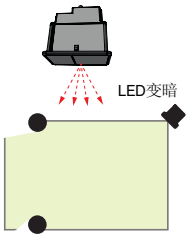


图 9: 启动后，路桩被从探测场清除。

激活消隐:

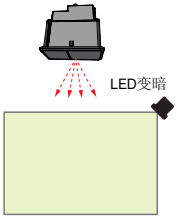


图 10: 探测场无干扰物体

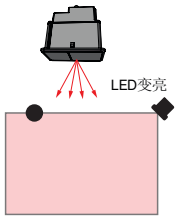


图 11: 在探测场中放置一个静态物体（例如垃圾袋）。
该物体将会被探测到。

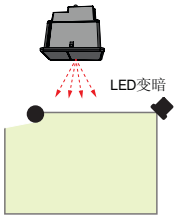


图 12: 30秒之后这个静态物体将会被清除，TOFniva更新探测场几何特征后继续运行。

12. 故障排除

状态	步骤
LED无	▸ 检查供电电源 ▸ 检查电气连接
安全防护区域有物体，LED为暗红色。	▸ 检查距离设置
安全防护区域无物体，LED为亮红色。	▸ 检查电气连接 ▸ 检查距离设置

如果问题仍然存在，请联系您当地的CEDES公司代表(www.cedes.com)。

13. 维护

虽然TOFniva不需要定期维护，但强烈建议定期进行如下功能检查:

- 检查传感器的安装位置和探测区域。
- 用软毛巾和少量肥皂水清洁光学窗口

注意事项
对光学窗口造成损伤

- 切勿使用任何溶剂、清洁剂、机械研磨毛巾或高压水清洗传感器。

14. 处置

只有在安装了类似的保护装置时，才能更换TOFniva。处置应根据当地法规和法律使用最新的回收技术。在传感器的设计和制造过程中未使用有害物质。电子元件中可能会含有少量的危险物质，但其含量不会对人体造成伤害。

15. 技术数据

光学参数	
探测区域 - 长度和宽度	最小 0 ... 400 mm 最大 0 ... 2,000 mm

机械参数	
尺寸规格（宽*高*长）	57 × 34 × 44.5 mm
外壳材质	聚碳酸脂
外壳颜色	黑色
防护等级	IP65
温度范围	−20 °C ... +65 °C

电子参数	
供电电压 U_{SP}	24 VDC ±20%
电流消耗24 VDC	50 mA (最大峰值电流0.5 A)
输出	PNP/NPN (推挽式)
最大响应时间	200 ms
最小开关时间	200 ms
通电时间	1 s

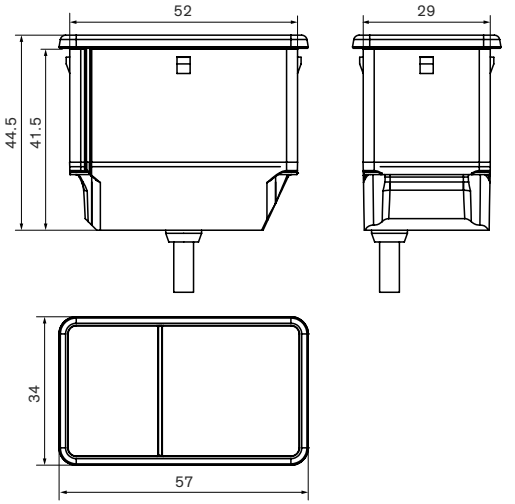
总览	
眼安全规范	EN 62471:2008
EMC 电磁辐射	EN 61000-6-3:2007 EN 12015:2014
EMC 抗干扰	EN 61000-6-2:2005 EN 12016:2013
震动	IEC 60068-2-6:2007
冲击	IEC 60068-2-27:2008
有害物质	2011/65/EU
认证	CE

电缆和电气连接	
传感器	
长度	0.25 m
连接	M8, 6-pin
直径	Ø 4.2 mm
材质	PVC, 黑色
插头颜色	蓝色
连接电缆	
长度	2 m (其它长度可定制)
连接	M8, 6-pin
直径	Ø 4.2 mm
材质	PVC, 黑色
插头颜色	蓝色
线缆	AWG26
· 褐色	U_{SP}
· 蓝色	GND (0 V)
· 黑色	输出
· 白色	未连接
· 灰色	输出逻辑选择线
· 绿色	未连接

16. 尺寸

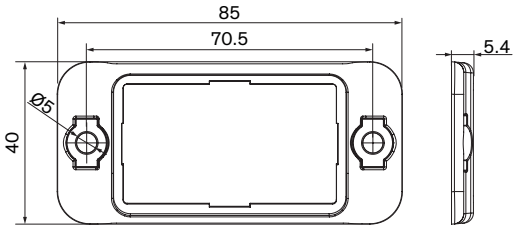
单位尺寸（毫米）

16.1 传感器

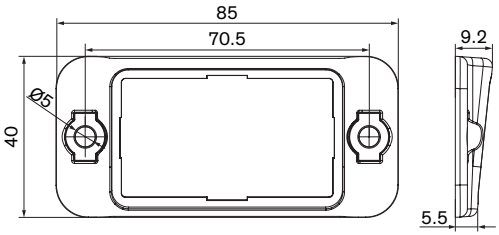


16.2 安装支架

平面 – 镶嵌安装



6°- 镶嵌安装



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