TOFniva

Installation and Operation Manual

CE ℞ (RoHS)

CEDES AG is certified according to ISO 9001: 2015

English   Pages   2 – 9

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 re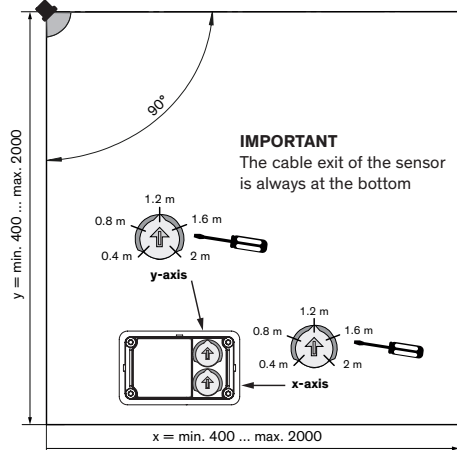calibrate. Their main feature is their ability to easily adapt to different detection field needs – this is done using two potentiometers for x-axis and y-axis. TOFniva sensors are available with and without blanking in both center and side mounted versions.

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	
		N	Potentiometer
		T	Teach-in
		P	Preset
d	:	y-axis	
		N	Potentiometer
		T	Teach-in
		P	Preset
e	:	C	Automatic calibration

Threshold settings

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	
i,i	:	y-axis	
		Protection field in m	

Only if Preset type

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
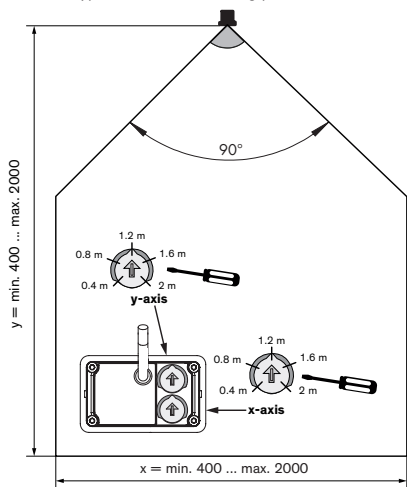
Figure 4:   C type: Detection field using potentiometer

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.
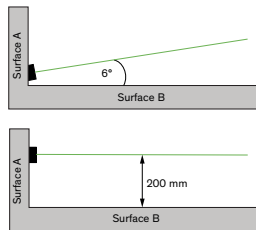
3. Cut a hole at the defined position into Surface A. For the use of the flush mounting use the delivered drilling pattern or use a surface mounting kit. More details about available surface mounting kit are written in the accessories sheet of the TOFniva.
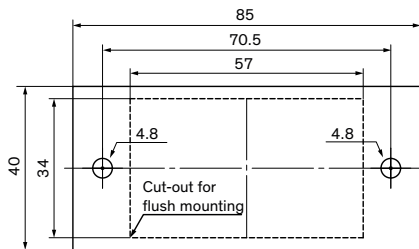
Important: The angle type has to be mounted at a 45° angle to the detection area. The centre type can be mounted flat (0°).
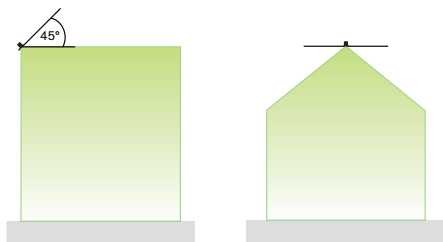
4. Place the sensor and connect it according connecting diagram in Chapter 7.

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.
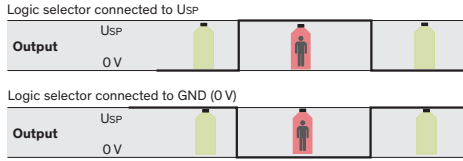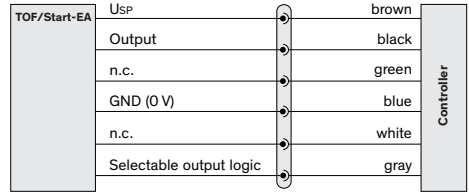The logic selection is performed during start-up.

Logic selector connected to U$_{SP}$

Output	U$_{SP}$
	0 V

Logic selector connected to GND (0 V)

Output	U$_{SP}$
	0 V

Figure 5: Output (PNP/NPN) logic

TOF/Start-EA		
U$_{SP}$		brown
Output		black
n.c.		green
GND (0 V)		blue
n.c.		white
Selectable output logic		gray

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.
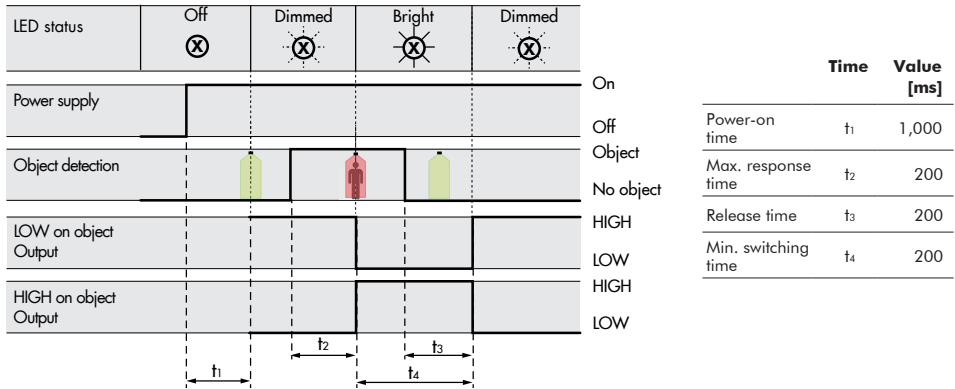
9. Timing diagram

	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).
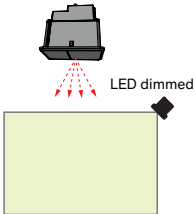
Start-up:

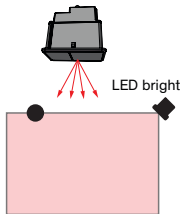**Figure 8:** Active blanking - start-up sequence with i.e. bollards.

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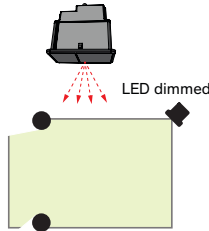
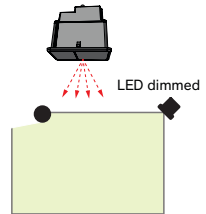**Figure 9:** After start-up the bollards are blanked out from the detection field.

Active blanking:

LED dimmed

Figure 10: The detection field is free.

LED bright

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

LED dimmed

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	
- With 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	50 mA
at 24 VDC	(peak max. 0.5 A)
Output	PNP/NPN (push-pull)
Max. response time	
- Area without cross-traffic < 1 m	200 ms
- Area with cross-traffic > 1 m	400 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

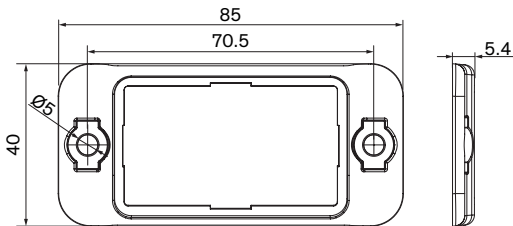|	
Length	2 m
	(other lengths on request)
Connection	M8, 6-pin
Diameter	Ø 4.2 mm
Material	PVC, black
Plug color	Blue
Wires	AWG26
• brown	U_{SP}
• blue	GND (0 V)
• black	Output
• white	Not connected
• gray	Selectable output logic
• green	Not connected

16. Dimensions

Measurements (all dimensions in mm)

16.1 Sensor
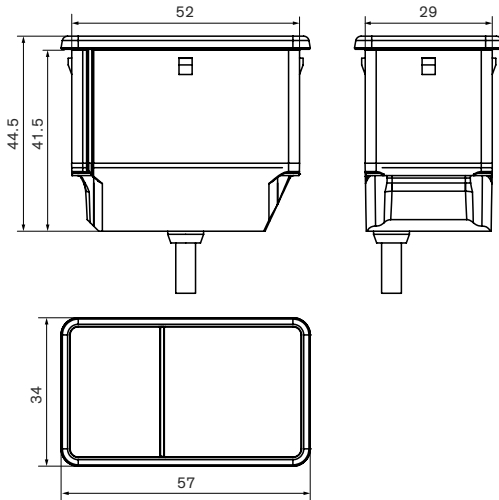
16.2 Mounting brackets

Flat - flush mounting

6° - flush mounting

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