



Operating instructions
20-LED light tower

GB

DV2900
DV2910
DV2920
DV2930

Contents

1	Preliminary note	3
1.1	Symbols used	3
2	Safety instructions	4
3	Intended use	5
4	Function	6
5	Installation	7
6	Electrical connection	8
6.1	Pin assignment	8
7	Operating and display elements	9
7.1	Signal Light Mode	9
7.2	Level Meter Mode	10
8	Operation	11
8.1	Signal Light Mode	11
8.2	Level Meter Mode	11
8.3	User-specific colour combinations	12
9	Parameter setting	14
9.1	Identification	14
9.1.1	Application-specific tag	14
9.1.2	Function tag	14
9.1.3	Location tag	14
9.2	Parameter	14
9.2.1	Operating mode	15
9.2.2	LED Intensity	15
9.2.3	Buzzer Intensity	15
9.2.4	User preference color Bank 1. LED x	15
9.2.5	User preference color Bank 2. LED x	15
9.2.6	User preference color Bank 3. LED x	15
9.2.7	Select user color	15
9.2.8	Blank between Segments	15
9.2.9	Segment colors. Segment x	16
9.2.10	Segment appearance. Segment x	16
9.2.11	Size of segment. Segment x	16
9.2.12	Direction of flow	16
9.2.13	Scope of appearance	17
9.2.14	Level meter thresholds. LED x	17
9.2.15	LED Colors. LED x	18
9.2.16	LED appearance. LED x	18
10	Maintenance, repair and disposal	19

1 Preliminary note

You will find instructions, technical data, approvals and further information using the QR code on the unit / packaging or at www.ifm.com.

1.1 Symbols used

- ✓ Requirement
- ▶ Instructions
- ▷ Reaction, result
- [...] Designation of keys, buttons or indications
- Cross-reference
-  Important note
Non-compliance may result in malfunction or interference.
-  Information
Supplementary note

2 Safety instructions

- The unit described is a subcomponent for integration into a system.
 - The system architect is responsible for the safety of the system.
 - The system architect undertakes to perform a risk assessment and to create documentation in accordance with legal and normative requirements to be provided to the operator and user of the system. This documentation must contain all necessary information and safety instructions for the operator, the user and, if applicable, for any service personnel authorised by the architect of the system.
- Read this document before setting up the product and keep it during the entire service life.
- The product must be suitable for the corresponding applications and environmental conditions without any restrictions.
- Only use the product for its intended purpose (→ Intended use).
- If the operating instructions or the technical data are not adhered to, personal injury and/or damage to property may occur.
- The manufacturer assumes no liability or warranty for any consequences caused by tampering with the product or incorrect use by the operator.
- Installation, electrical connection, set-up, programming, configuration, operation and maintenance of the product must be carried out by personnel qualified and authorised for the respective activity.
- Protect units and cables against damage.
- Replace damaged units, otherwise the technical data and safety will be impaired.
- Observe applicable documents.

3 Intended use

The unit is used for the visual display of machine conditions. The versions DV2910 and DV2930 additionally have a buzzer for acoustic signalling.

The LEDs / LED segments and the audible warning device can be switched on and off individually.



The unit is not suited for environments with particular requirements on mechanical stability (e.g. shock/vibration).

The unit is intended for indoor use only.

► Observe the operating conditions (→ Technical data at www.ifm.com).



The unit is not approved for safety-related tasks in the field of operator protection.

4 Function

This unit has an IO-Link communication interface which enables direct access to process and diagnostic data. In addition it is possible to set the parameters of the unit while it is in operation. Operation of the unit via the IO-Link interface requires an IO-Link master.

With a PC, suitable IO-Link software and an IO-Link adapter cable, communication is possible while the system is not in operation.

The IODDs necessary for the configuration of the unit, detailed information about process data structure, diagnostic information, parameter addresses and the necessary information about the required IO-Link hardware and software can be found at www.ifm.com.

5 Installation

-  ▶ Disconnect the power of the machine before installation.
-  ▶ For installation choose a flat mounting surface.

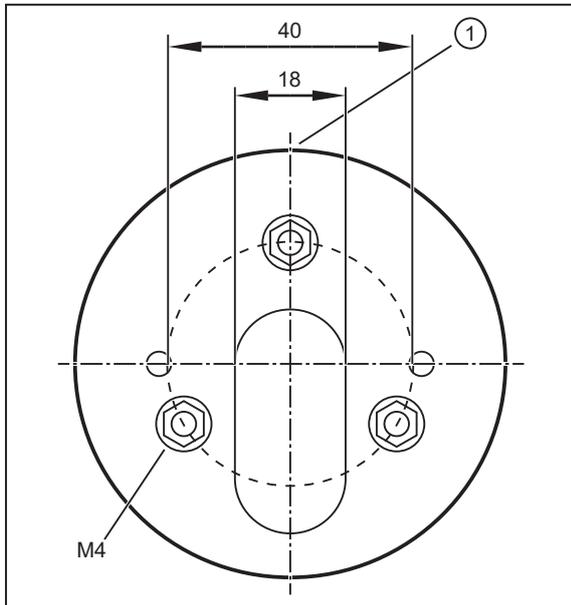


Fig. 1: Fixture (view from bottom)

1: Front side

- ▶ Attach the fixture for the device to the mounting surface using the supplied M4 nuts. Tightening torque 1.8 Nm.
- ▶ Only with the models DV2900 and DV2910:
For mounting on a horizontal surface attach the base to the fixture (overlapping marks on base and fixture) and turn clockwise by approx. 10 ° to fix it. For mounting on a vertical surface loosen the screw in the base, turn the upper part of the base by 180 ° and tighten the screw again. Attach the base to the fixture (overlapping marks on base and fixture) and turn clockwise by approx. 10 ° to fix it.
- ▶ Insert the cable through the fixture and, if necessary, the base and connect the socket with the M12 connector in the signal lamp. Tightening torque max. 0.4 Nm. (Observe the maximum tightening torque of the connection cables.)
- ▶ Attach the signal lamp to the fixture or the base (overlapping marks) and turn clockwise by approx. 10 ° to fix it.

 Integrated seals at the bottom of the fixture and in the base as well as O-rings at the fixture and base prevent ingress of moisture.

 Information about available accessories at www.ifm.com

6 Electrical connection



The unit must be connected by a qualified electrician.

Observe the national and international regulations for the installation of electrical equipment.

Voltage supply according to SELV, PELV.



The IO-Link port must be connected according to the IO-Link specification.

▶ Disconnect power.

▶ Connect the cable with the M12 connector of the unit.
Tightening torque max. 0.4 Nm.



Observe the maximum tightening torque of the connection cable.

6.1 Pin assignment

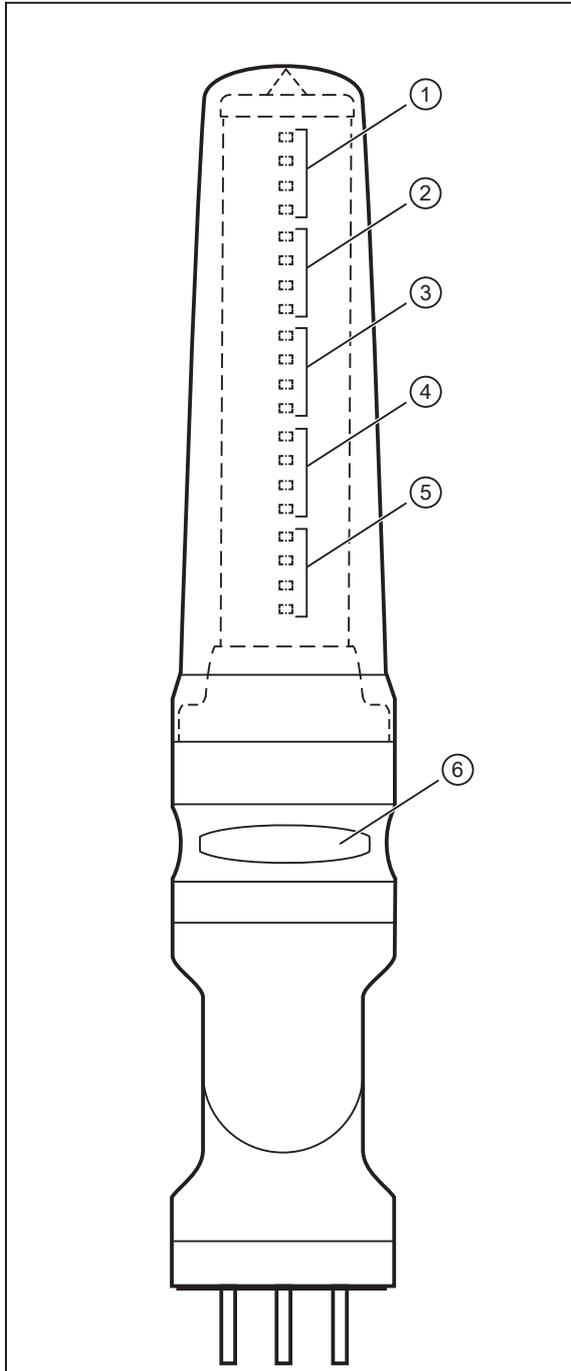
M12 plug IO-Link, 4-pole (4 x 0.34 mm² / AWG 22)



- 1: L+
- 2: not used
- 3: L-
- 4: IO-Link

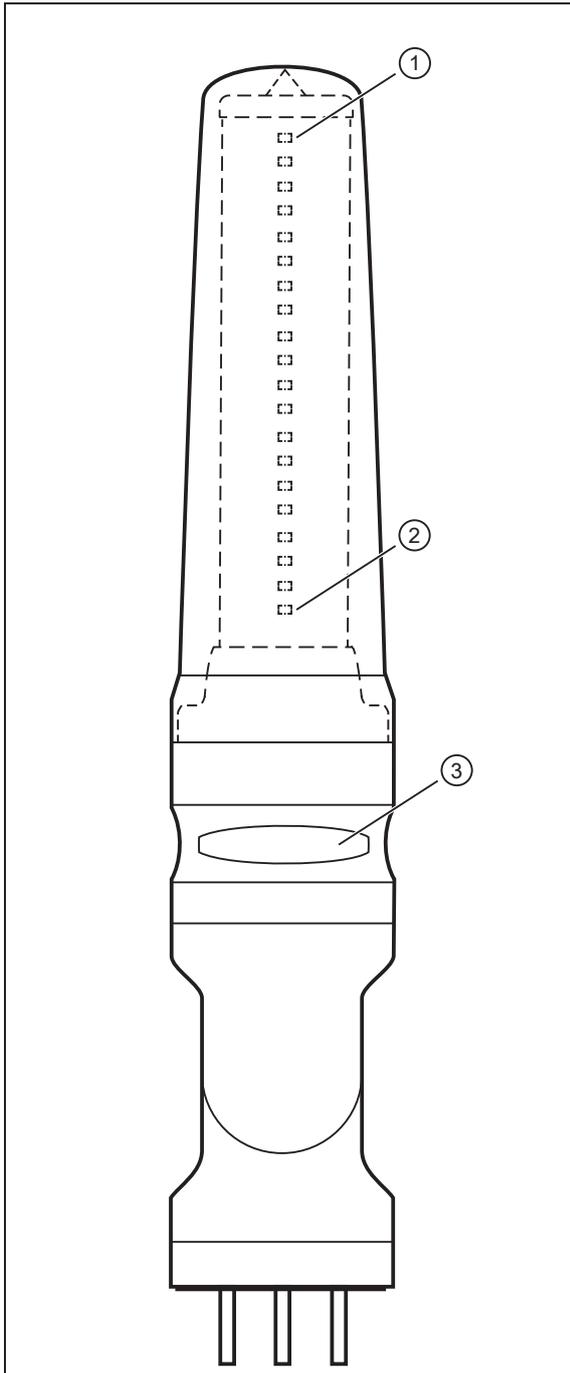
7 Operating and display elements

7.1 Signal Light Mode



- 1: Segment 1 with 4 RGB LEDs as factory setting (number and size of the LED segment can be configured)
- 2: Segment 2 with 4 RGB LEDs as factory setting (number and size of the LED segment can be configured)
- 3: Segment 3 with 4 RGB LEDs as factory setting (number and size of the LED segment can be configured)
- 4: Segment 4 with 4 RGB LEDs as factory setting (number and size of the LED segment can be configured)
- 5: Segment 5 with 4 RGB LEDs as factory setting (number and size of the LED segment can be configured)
- 6: Buzzer (only DV2910 and DV2930)

7.2 Level Meter Mode



- 1: LED 20 as factory setting (direction of movement of LED control can be configured)
- 2: LED 1 as factory setting (direction of movement of LED control can be configured)
- 3: Buzzer (only DV2910 and DV2930)

8 Operation

Connect the unit to an IO-Link master (master port class A) using a 4-pole connection cable. The controller switches the individual LEDs / LED segments on and off in the configured colours according to the set parameters.

Via the parameter [Operating mode] the following modes can be set:

- Signal Light Mode
- Level Meter Mode

8.1 Signal Light Mode

While the device is operating, the controller switches the LED segments and the buzzer (if present) on and off (PDout, cyclical data communication). Signalling corresponds to the pre-defined parameters for the individual LED segments and the buzzer.

Via the acyclic parameter setting the following properties can be set for every LED segment:

- Segment size (number of LEDs for the individual LED segments)
A maximum of 20 LEDs can be divided into a maximum of 5 LED segments.
- Space between the segments
The lowest LED in each LED segment can be switched off.
- Colour per LED segment (off, red, green, orange, blue, violet, turquoise, white, user-specific)
- Colours of the 20 LEDs (3 user-specific combinations with a maximum of 20 colours each)
- Frequency per LED segment (permanently on, flashing slow/medium/fast, blinking slow/medium/fast)
- Brightness of all LEDs (0...100 %)

For the models with an acoustic signal device the audibility of the buzzer can be set (0...100 %).

7	6	5	4	3	2	1	0	PDout
---	Buzzer sound (buzzer style 1...8)			---	User-specific colour combination (Bank 1, 2, 3 or none)		Buzzer	Byte 0
---	---	---	Segment 5	Segment 4	Segment 3	Segment 2	Segment 1	Byte 1

8.2 Level Meter Mode

While in operation the controller transmits an analogue value between 0 and 100 % in byte 1 via PDout. The device indicates it if the analogue value exceeds configured thresholds. Byte 0 determines the display of the visual signalling as well as the acoustic signal (only for DV2910 and DV2930).

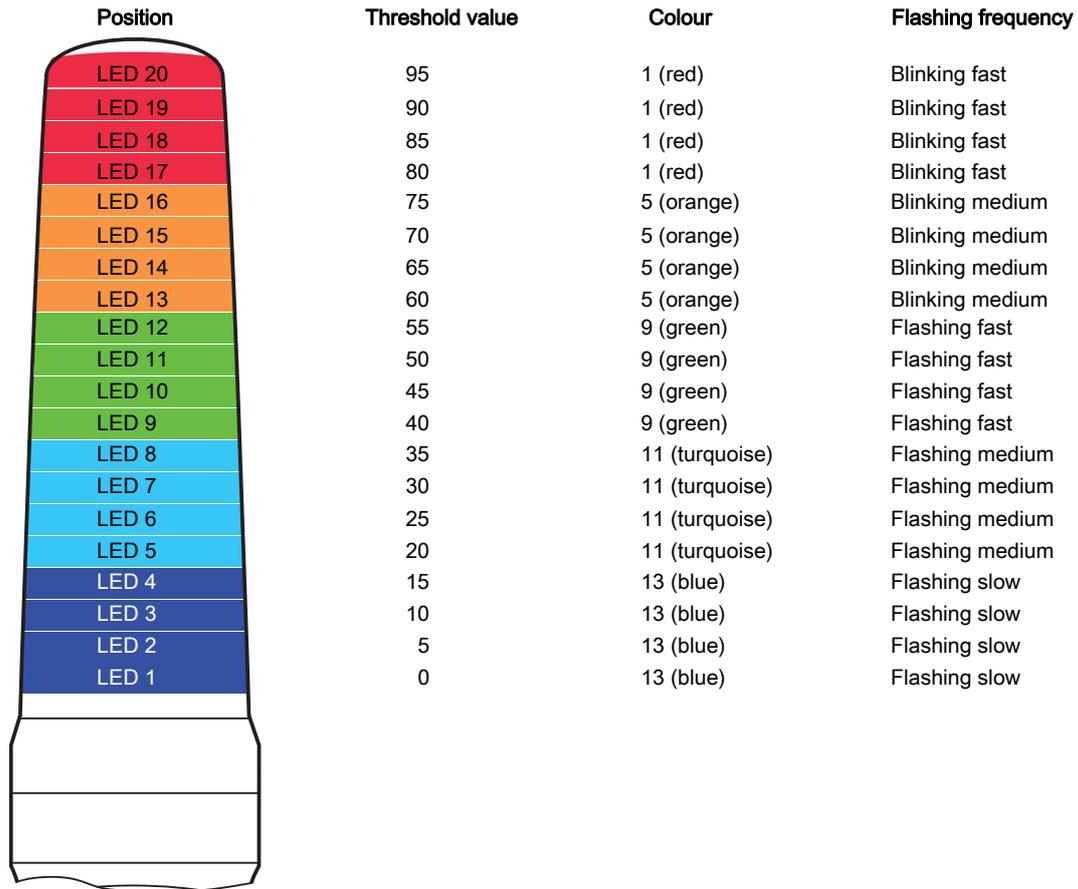


Fig. 2: Application example

Via acyclic parameter setting, the following properties can be set for the LEDs:

- Direction of movement (from bottom to top or from top to bottom)
- Level thresholds per LED (a maximum of 20 thresholds between 0 and 100 in ascending order)
When the threshold is exceeded, the corresponding LED is activated.
- Colours of the 20 individual LEDs (20 different colours each or off)
- Colours of the 20 LEDs (3 user-specific combinations with a maximum of 20 colours each)
- Frequency per LED (permanently on, flashing slow/medium/fast, blinking slow/medium/fast)
- Display range (all LEDs, individual LEDs, top LED only)
- Brightness (0...100 %)

For the models with an acoustic signal device the audibility of the buzzer can be set (0...100 %).

7	6	5	4	3	2	1	0	PDout
---	Buzzer sound (buzzer style 1...8)			---	User-specific colour combination (Bank 1, 2, 3 or none)		Buzzer	Byte 0
---	Analogue value 0...100 %							Byte 1

8.3 User-specific colour combinations

In both Signal Light Mode and Level Meter Mode, the LEDs are controlled according to the process data.

Independently of this, the user has the option of defining three different colour combinations (User preference color Bank 1, Bank 2 and Bank 3).

If a number from 1-3 is sent in the process data (byte 0, bit 1+2), the current display of the segments / LEDs is overwritten with the selected colour combination Bank 1, 2 or 3. For example, in Level Meter Mode, a warning message can be switched to when a certain event occurs (e.g. all LEDs flash red).

9 Parameter setting

Parameters can be set before installation or during operation.



If you change parameters during operation, this will influence the function of the plant.

- ▶ Ensure that there will be no malfunctions in your plant.

During parameter setting the unit remains in the operating mode. It continues to monitor with the existing parameter until the parameter setting has been completed.



Depending on the parameter setting, the parameters available in the menu may change.

Requirements for parameter setting via the IO-Link interface:

- ✓ A suitable parameter setting software, e.g. ifm moneo|configure
- ✓ The Input Output Device Description (IODD) for the device, see documentation.ifm.com
- ✓ One IO-Link master
- ▶ Connect the IO-Link master to a parameter setting software.
- ▶ Set the port of the master to the IO-Link operating mode.
- ▶ Connect the device to a free port of the IO-Link master.
- ▷ The unit switches to IO-Link mode.
- ▶ Change parameter settings in the software.
- ▶ Write parameter settings to the unit.



Notes on parameter setting → Manual of the parameter setting software

9.1 Identification

Under [Identification], individual identifiers can be assigned to the device via the following parameters:

9.1.1 Application-specific tag

Customer-specific application description, max. 32 characters long.

Default value: " *** " / can be freely defined by the customer

9.1.2 Function tag

Customer-specific function tag of the unit, max. 32 characters long.

Default value: " *** " / can be freely defined by the customer

9.1.3 Location tag

Customer-specific location tag of the unit, max. 32 characters long.

Default value: " *** " / can be freely defined by the customer

9.2 Parameter

The type of signalling is configured under [Parameters].

9.2.1 Operating mode

Setting of the operating mode

- Signal Light Mode (→  11)
- Level Meter Mode (→  11)

Factory setting: Signal Light Mode

9.2.2 LED Intensity

Setting of the LED brightness

- 0...100

Factory setting: 70

9.2.3 Buzzer Intensity

Setting of the buzzer volume

- 0...100

Factory setting: 100

9.2.4 User preference color Bank 1. LED x

Colour definition of the 20 LEDs in user-specific combination 1

For each LED, 1 of 21 colours or the switched off state can be configured.

Factory setting for all LEDs: Off

9.2.5 User preference color Bank 2. LED x

Colour definition of the 20 LEDs in user-specific combination 2

For each LED, 1 of 21 colours or the switched off state can be configured.

Factory setting for all LEDs: Off

9.2.6 User preference color Bank 3. LED x

Colour definition of the 20 LEDs in user-specific combination 3

For each LED, 1 of 21 colours or the switched off state can be configured.

Factory setting for all LEDs: Off

9.2.7 Select user color

Setting of a user-specific colour

1 of 21 colours or the switched off state can be configured.

Factory setting: Lemon



This parameter is only available in Signal Light Mode.

9.2.8 Blank between Segments

Setting of spaces between the individual segments

The lowest LED in each LED segment can be switched off.

- Activated
- Deactivated (factory setting)



This parameter is only available in Signal Light Mode.

9.2.9 Segment colors. Segment x

Colour definition for all LEDs in this segment

- Off
- Red (factory setting for segment 1)
- Green (factory setting for segment 3)
- Orange (factory setting for segment 2)
- Blue (factory setting for segment 5)
- Violet
- Turquoise
- White (factory setting for segment 4)
- User-specific configuration: see parameters Select user color (→ [15](#))



This parameter is only available in Signal Light Mode.

9.2.10 Segment appearance. Segment x

Setting of the flashing frequency for this segment

- Permanently on (factory setting for segment 1...5)
- Flashing slow
- Flashing medium
- Flashing fast
- Blinking slow
- Blinking medium
- Blinking fast



This parameter is only available in Signal Light Mode.

9.2.11 Size of segment. Segment x

Number of LEDs for this LED segment

A maximum of 20 LEDs can be divided into a maximum of 5 LED segments. If a total of 20 LEDs is assigned, no further segment can be configured.

- 0...20

Factory setting for segment 1...5: 4



This parameter is only available in Signal Light Mode.

9.2.12 Direction of flow

Setting of the direction of movement for increasing input value with exceeded thresholds

- From bottom to top (factory setting)
- From top to bottom



This parameter is only available in Level Meter Mode.

9.2.13 Scope of appearance

Setting of the colour and flashing frequency for the LEDs that are activated by exceeded thresholds

- All LEDs (factory setting)
The colour and flashing frequency of the LED with the currently highest exceeded threshold are adopted for all LEDs with a lower threshold configuration.
- Individual LEDs
For each LED activated by an exceeded threshold, the colour and flashing frequency from the associated parameters are kept.
- Only the top LED
The colour and flashing frequency of the LED with the currently highest exceeded threshold are kept from the associated parameters.
For all LEDs with lower threshold configuration, the colour from the associated parameters is kept. However, they light up permanently.



This parameter is only available in Level Meter Mode.

9.2.14 Level meter thresholds. LED x

Setting of the level threshold for this LED

A threshold between 0 and 100 can be configured for each LED. The individual values must be configured in ascending order. When a threshold is exceeded, the corresponding LED is activated.

Factory setting:

LED	Threshold value
1	0
2	5
3	10
4	15
5	20
6	25
7	30
8	35
9	40
10	45
11	50
12	55
13	60
14	65
15	70
16	75
17	80
18	85
19	90

LED	Threshold value
20	95



This parameter is only available in Level Meter Mode.

9.2.15 LED Colors. LED x

Colour definition for this LED

For each LED, 1 of 21 colours or the switched off state can be configured.

Factory setting:

LED	Colour
1...4	blue
5...8	turquoise
9...12	green
13...16	orange
17...20	red



This parameter is only available in Level Meter Mode.

9.2.16 LED appearance. LED x

Setting of the flashing frequency for this LED

- Permanently on (factory setting for LED 1...4)
- Flashing slowly (factory setting for LED 5...8)
- Flashing medium
- Flashing quickly (factory setting for LED 9...12)
- Blinking slow
- Blinking medium (factory setting for LED 13...16)
- Blinking fast (factory setting for LED 17...20)



This parameter is only available in Level Meter Mode.

10 Maintenance, repair and disposal

Cleaning the unit:

- ▶ Disconnect the unit from the voltage supply.
- ▶ Clean the unit from dirt using a soft, chemically untreated and dry micro-fibre cloth.

The operation of the unit is maintenance-free.

Only the manufacturer is allowed to repair the unit.

- ▶ After use dispose of the device in an environmentally friendly way in accordance with the applicable national regulations.