SIEMENS



FDL242

Linear smoke detector

Technical Manual

Imprint

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1 About this document

Goal and purpose

This document contains information on the linear smoke detector FDL242. Following the instructions consistently and carefully ensures smooth and safe operation.

Target groups

The information in this document is intended for the following target groups:

Target group	Activity	Qualification
Product Manager	 Is responsible for information passing between the manufacturer and regional company. 	 Has obtained suitable specialist training for the function and for the products.
	 Coordinates the flow of information between the individual groups of people involved in a project. 	 Has attended the training courses for Product Managers.
Project Manager	 Coordinates the deployment of all persons and resources involved in the project according to schedule. 	 Has obtained suitable specialist training for the function and for the products.
	• Provides the information required to run the project.	 Has attended the training courses for Project Managers.
Project engineer	 Sets parameters for product depending on specific national and/ or customer requirements. 	 Has obtained suitable specialist training for the function and for the products.
	 Checks operability and approves the product for commissioning at the place of installation. 	 Has attended the training courses for Product Engineer.
	Is responsible for troubleshooting.	
Installation personnel	 Assembles and installs the product components at the place of installation. 	 Has received specialist training in the area of building installation technology or electrical installations.
	 Carries out a function check following installation. 	
Commissioning personnel	 Configures the product at the place of installation according to customer-specific requirements. 	 Has obtained suitable specialist training for the function and for the products.
	 Checks the product operability and releases the product for use by the operator. 	Has attended the training courses for commissioning personnel.
	 Searches for and corrects malfunctions. 	
Maintenance personnel	• Carries out all maintenance work.	Has obtained suitable specialist
	 Checks that the products are in perfect working order. 	training for the function and for the products.
	 Searches for and corrects malfunctions. 	

Source language and reference document

- The source/original language of this document is German (de).
- The reference version of this document is the international version in English. The international version is not localized.

Document identification

The document ID is structured as follows:

ID code	Examples
ID_languageCOUNTRY_ modification index	A6V10215123_deDE_a
= multilingual or international	A6V10215123_ena
	A6V10315123a

Date format

The date format in the document corresponds to the recommendation of international standard ISO 8601 (format YYYY-MM-DD).

Presentation conventions

Text markups

Special text markups are used as follows in this document:

Δ	Prerequisite for an instruction telling you what to do	
1.	Instruction with at least two steps	
2.		
۲	Instruction with one step	
—	Interim step in an instruction	
 Variant, option, or detailed information on an instruction 		
\Rightarrow	Interim result of an instruction	
\Rightarrow	Final result of an instruction	
•	Lists	
[→ X]	Reference to a page number	
'Text'	Quote, exact match	
<button ></button 	Identification of buttons	
>	Indicates a link and identifies steps in a sequence, e.g., 'Menu bar' > 'Help' > 'Help topics'	
↑ Text	Identifies a glossary entry	

Additional information and tips



The 'i' symbol identifies additional information and tips to simplify the procedure.

1.1 Download center

You can download various types of documents, such as data sheets, installation instructions, and license texts via the following Internet address: https://siemens.com/bt/download

♦ Enter the document ID in the search field.

i

You will also find information about search variants and links to mobile applications (apps) for various systems on the home page.

1.2 Revision history

The version of the reference document is valid for all languages into which the reference document is translated.

i	The first edition of the document into a language and/or for a country might have the version 'd', for example, instead of 'a', if the document has already reached this publication version.

Version	Edition date	Brief description
а	2023-09-07	First edition

2 Safety

2.1 Intended use

The linear smoke detector FDL242 is intended exclusively for use on an FDnet/C-NET detector line.

The linear smoke detector FDL242 must not be used in systems or components that trigger or control extinguishing systems.

2.2 Safety notes

The safety notices must be observed in order to protect people and property. The safety notices in this document contain the following elements:

- Symbol for danger
- Signal word •
- Nature and origin of the danger
- Consequences if the danger occurs •
- Measures or prohibitions for danger avoidance •

Symbol for danger



This is the symbol for danger. It warns of risks of injury. Follow all measures identified by this symbol to avoid injury or death.

Explosive atmosphere

Laser light

Heat

Additional danger symbols

These symbols indicate general dangers, the type of danger or possible consequences, measures and prohibitions, examples of which are shown in the following table:



Signal word

The signal word classifies the danger as defined in the following table:

Signal word	Danger level
DANGER	'DANGER' identifies a dangerous situation, which will result directly in death or serious injury if you do not avoid this situation.
WARNING	'WARNING' identifies a dangerous situation, which may result in death or serious injury if you do not avoid this situation.
CAUTION	'CAUTION' identifies a dangerous situation, which could result in slight tomoderately serious injury if you do not avoid this situation.
NOTICE	' <i>NOTICE</i> ' identifies a possibly harmful situation or possible damage to property that may result from non-observance.
	'NOTICE does not relate to possible bodily injury.

How risk of injury is presented

Information about the risk of injury is shown as follows:

	 Nature and origin of the danger Consequences if the danger occurs Measures / prohibitions for danger avoidance

How possible damage to property is presented

Information about possible damage to property is shown as follows:

NOTICE	
•	Nature and origin of the danger
	Consequences if the danger occurs
•	Measures / prohibitions for danger avoidance

2.3 Safety regulations for the method of operation

National standards, regulations and legislation

Siemens products are developed and produced in compliance with the relevant European and international safety standards. Should additional national or local safety standards or legislation concerning the planning, mounting, installation, operation or disposal of the product apply at the place of operation, then these must also be taken into account together with the safety regulations in the product documentation.

Electrical installations

	Electrical voltage Electric shock
<u>/4</u>	• Work on electrical installations may only be carried out by certified electricians or by instructed persons working under the guidance and supervision of a certified electrician, in accordance with the electrotechnical regulations.
	 Wherever possible disconnect products from the power supply when carrying out commissioning, maintenance or repair work on them.
	• Lock volt-free areas to prevent them being switched back on again by mistake.
	 Label the connection terminals with external voltage using a 'DANGER External voltage' sign.
	 Route mains connections to products separately and fuse them with their own, clearly marked fuse.
	 Use an easily accessible disconnecting device in accordance with EN IEC 62368-1 outside the installation.
	Produce earthing as stated in local safety regulations.
	Noncompliance with the following safety regulations
	Risk of injury to persons and damage to property
	Compliance with the following regulations is required.

Specialist electrotechnical knowledge is required for installation.
 Installation must be performed by a specialist.
If the installation is not performed properly, this could invalidate the electrical
safety precautions, which would not be obvious to non-experts.

Mounting, installation, commissioning and maintenance

- Any tools such as ladders must be safe and designed for the task in question.
- When starting up the fire control panel, check that no unstable states can occur.
- Ensure that all the points listed under 'Testing and checking the product functions' are observed.
- Do not set controls to normal operation until you have tested and check all the product functions and handed over the system to the customer.

Testing and checking the product functions

- Prevent false triggering of the remote transmission.
- If you check building equipment or control devices from external companies, cooperate with the responsible contact persons.
- Neither personal injury nor damage to building equipment should occur when activating fire controls for test purposes. The following instructions must be followed:
 - Use the correct potential (usually that of the building equipment).
 - Check the controls only as far as the interface (relay with blocking option).
 - Make sure that only the controls to be tested are activated.
- Inform others before testing alarm devices and anticipate that people might react in panic.
- Inform people about possible noise or fog that might occur.
- Inform the corresponding alarm and fault receiving stations before testing the remote transmission.

Modifications to the system design and the products

Modifications to the system and to individual products may lead to faults, malfunctioning and safety risks. Written confirmation must be obtained from Siemens and the corresponding safety bodies for modifications or additions.

Modules and spare parts

- Components and spare parts must comply with the technical specifications defined by Siemens. Only use products specified or recommended by Siemens.
- Only use fuses with the specified fuse characteristics.
- Wrong battery types and improper battery changing lead to a risk of explosion. Only use the same battery type or an equivalent battery type recommended by Siemens.
- Batteries must be disposed of in an environmentally friendly manner. Observe national guidelines and regulations.

Disregard of the safety regulations

Before they are delivered, Siemens products are tested to ensure they function correctly when used properly. Siemens disclaims all liability for damage or injuries caused by the incorrect application of the instructions or the disregard of danger warnings contained in the documentation. This applies in particular to the following damage:

- Personal injuries or damage to property caused by improper use and incorrect application
- Personal injuries or damage to property caused by disregarding safety instructions in the documentation or on the product
- Personal injury or damage to property caused by poor maintenance or lack of maintenance

2.4 Standards and directives complied with

A list of the standards and directives complied with is available from your Siemens contact.

2.5 Release Notes

Limitations to the configuration or use of devices in a fire detection installation with a particular firmware version are possible.

Â	 Limited or non-existent fire detection Personal injury and damage to property in the event of a fire. Read the 'Release Notes' before you plan and/or configure a fire detection installation. Read the 'Release Notes' before you carry out a firmware update to a fire detection installation.

NOTICE		
•	 Incorrect planning and/or configuration Important standards and specifications are not satisfied. Fire detection installation is not accepted for commissioning. Additional expense resulting from necessary new planning and/or configuration. Read the 'Release Notes' before you plan and/or configure a fire detection installation. Read the 'Release Notes' before you carry out a firmware update to a fire detection installation. 	

3 Scope of delivery





Detector base



Detector head



Reflector

Short-range mask



Product label (example)

- 1 Product version
- 2 Order number

The layout of the product label and the information it contains may differ from this illustration depending on the product and approval.

4 General information

Safety

Only position the detector in a location where no people or objects can interrupt the ray.

Do not install the detector or reflector in an environment where condensation or ice could occur, unless preventative measures have been taken.

Installation

Carry out all installations in accordance with local guidelines and regulations.

Position the detector and reflector as high as possible but at least 30 cm from the ceiling. Make sure that there are no reflective surfaces within a radius of 0.5 m from the center of the ray's path. See Figure 1 'Mounting location'.

Use the right reflector for the detection distance in question:



Mount the reflector (1) directly opposite the detector.

Do not mount the reflector on reflective surfaces.



Fig. 1: Mounting location

Automatic signal monitoring and building movement tracking

The FDL242 automatically compensates for gradual reductions in the signal level, such as those caused by soiling of the optical elements or building movements, within a defined range. The building movement tracking function of the FDL242 is an additional function that is not described by EN 54-12.

Building movements, such as those caused by temperature fluctuations over the course of a day or over the seasons, can result in deformations of the walls on which the detector and its reflector are mounted. Wall deformations can result in the ray being misaligned. The building movement tracking function of the FDL242 enables misalignments of this nature to be corrected. The precision motor installed in the FDL242 allows angle variations of 4.5°, based on the zero point of the optics.

Tolerance regarding ray misalignment

The infrared ray is cone-shaped due to the expansion caused by scattering. Within the cone, the radiation energy decreases as it moves from the center outward. The usable range of the ray has an opening angle of 0.6°. For the distances from the FDL242 shown, this results in usable ray diameters and associated tolerances for the misalignment of the ray.

Beyond the specified tolerance (0.6°) of the ray, the building movement tracking function enables the tolerance to be additionally increased by up to 4.5° in all directions. Depending on the starting position of the motor-controlled optics:

- Maximum for central alignment
- Reduced for non-central alignment



Fig. 2: Ray cone diameters

4.1 Signal processing

The detector's signal processing efficiently distinguishes between fire events and deceptive phenomena. As well as taking measured values below a certain response threshold into account, an evaluation of the smoke density progression over an extended period is also used to define a basis for a danger level being reached. The detector evaluates the signal based on internal diagnoses and reports the result to the control panel.

The standardized signal value includes signal compensation which compensates for any slow signal drifts, such as those caused by soiling of the detector's optical elements.

The response threshold is reached when the standardized signal value is attenuated by n % (see table in chapter 9). If the signal value falls below the response threshold, algorithms are activated that result in an alarm after a certain period of time.

The response threshold may be higher or lower depending on the sensitivity level of the selected parameter set (see chapter 9). The response threshold is at n % attenuation of the standardized signal value.

- Very sensitive: 44 %
- Sensitive: 50 %
- Standard: 58 %



Fig. 3: Response threshold at different sensitivities

- 1 Signal (typical progression during smoke generation)
- 2 'Very sensitive' response threshold: 44 %
- 3 'Sensitive' response threshold: 50 %
- 4 'Standard' response threshold: 58 %

5 Cabling

The software contained in the FDL242 processes the sensor data and generates a fire alarm or fault status as applicable.

The status is sent to the control panel via FDnet/C-NET. The FDL242 is supplied with power via FDnet/C-NET.

Wire the FDL242 in accordance with the following connection diagram.

5.1 Unshielded cables

Connection from base to base using twisted or untwisted wire pairs.



- 1 Control panel
- 2 Detector
- 3 Auxiliary terminal DBZ1190-xx
- 4 Ferrite

5.2 Shielded cables

The shielding of the detector line must be connected in the detector base using auxiliary terminals DBZ1190-xx.



- 1 Control panel
- 2 Detector
- 3 Auxiliary terminal DBZ1190-xx
- 4 Ferrite

6 Mounting

Mount the detector base on a stable, vibration-free surface on a wall or girder.

- 1. Mark and drill two holes on the mounting surface at a distance of 86 mm.
- **2.** Use suitable fastening elements to mount the detector base, as shown in the figure.
 - To achieve the specified IP protection, install a rubber washer (M6×30×1.5 mm) between the detector base and mounting surface at each mounting hole.
- **3.** Insert the cable for the detector head into the socket on the printed circuit board of the detector base.
- 4. Align the detector head with the detector base.
- **5.** Take hold of the detector head at the sides and turn it onto the detector base in a clockwise direction until the two markings line up.
- ⇒ The detector head is locked in place in the detector base.



Fig. 4: Mounting the detector on the detector base

7 Cable entry

To guarantee IP protection and cable strain relief, use a cable gland for the cable entry.

Use a cable gland with \geq IP55 and that is suitable for the cable diameter:

- Metal cable gland M20×1.5 (order number: A5Q00004478) with metal counter nut (order number: A5Q00004479)
- Polyamide cable gland M20×1.5 with counter nut, U.I. Lapp GmbH:
 - Clamping range: 5...10 mm: order numbers 53111520 and 53119023
 - Clamping range: 7...13 mm: order numbers 53111420 and 53119023



♦ NOTICE! Opening the cable entry with force may damage the FDL242. Open the cable entry using a suitable drill (Ø20 mm) with centering pin.



Mount a ferrite (1) for each cable.

8 Targeting and alignment

8.1 Introduction

The alignment process consists of the following steps:

- Rough alignment of the detector with the reflector ('Targeting')
- Precise alignment with the center of the reflector ('Alignment')
- Activation of the test alarm to verify function

'Laser Targeting'

The preferred method is laser targeting. A red laser beam enables the FDL242 to efficiently target a reflector that has already been mounted.

For a mounted FDL242, laser targeting allows the simple localization of the reflector's mounting position. For details, see chapter 'Laser targeting and auto alignment – new FDL242 [\rightarrow 22]'.

'Prism Targeting'

Prism targeting should only be used if laser targeting is not possible, e.g., if the laser beam is not visible due to a high brightness level in the room. For details, see chapter 'Prism targeting [\Rightarrow 24]'.

'Auto Alignment'

The preferred and most efficient alignment method is auto alignment. The manual alignment process should only be used if auto alignment does not work.

User interface

The user interface must be accessible for the targeting and alignment process. To do this, loosen the screw and remove the cover cap. The cover cap is connected to the FDL242 with a rubber band.



Fig. 5: User interface

8.2 User interface



alignment

2 Slide switch 4 Direction keys

¹ The four bottom switches have no function.

Switch settings for various processes

The positions of the two setting switches are used for various processes:

- Laser targeting
 - Settings: 'Alignment-Auto' or 'Alignment-Manual', 'Targeting-Laser'
 - To start laser targeting: Move the slide switch from 'Operate' to 'Align'.
- Auto alignment after targeting
 - Settings: 'Alignment-Auto', 'Targeting-Laser', or 'Targeting-Prism'
 - To start auto alignment: Move the slide switch from 'Align' to 'Operate'.
- Prism targeting
 - Settings: 'Alignment-Auto' or 'Alignment-Manual', 'Targeting-Prism'
 - To start prism targeting: Move the slide switch from 'Operate' to 'Align'.
- Manual alignment after targeting
 - Settings: 'Alignment-Manual', 'Targeting-Laser', or 'Targeting-Prism'
 - To start manual alignment: Move the slide switch from 'Align' to 'Operate'.
- Normal operation
 - Settings: 'Alignment-Auto' or 'Alignment-Manual', 'Targeting-Auto' or 'Targeting-Manual'
 - Normal operation starts automatically once the alignment process has been completed successfully.

Status indicators for targeting/alignment

For a description of the status indicators, see the process description for targeting and alignment in the following chapters.

Direction keys

The direction keys are used to align the FDL242 for the laser targeting, prism targeting, and manual alignment processes.

8.3 General notes

To activate the targeting and alignment process, the FDL242 must be supplied with power via one of the following devices:

- Control panel
- Line tester FDUL221
- DC 24 V power supply or battery

When the FDL242 is commissioned via the FDnet/C-NET detector line, the FDL242 must be placed in test mode by the control panel.

The targeting and alignment process only works at a supply voltage >20 V.

In normal operation, the green LED on the right flashes once per second during targeting and twice every 3 seconds during alignment. If it flashes more slowly, i.e., once every 3 seconds during targeting and twice every 6 seconds during alignment, the supply voltage is too low. If the supply voltage is too low, the targeting or alignment process will not work correctly. It must be established why the supply voltage is too low and the issue must be rectified.

8.4 Laser targeting and auto alignment – new FDL242

The information below describes how the targeting and alignment process is performed on a new FDL242 for the first time.

If an FDL242 has previously been aligned and operated, but is now being used in a new mounting situation, the differences in the process to be followed are described in chapter 'Realignment of a previously aligned FDL242 [\rightarrow 28]'.

*	 Laser beam class 3R, 5 mW, wavelength 630680 nm Serious injury to the eyes Avoid direct eye contact with the laser beam. Follow local regulations when using class 3R products. 	

- Before power is supplied to the FDL242, the switches must be in the following positions:
 - (1) Slide switch to the right: 'Operate'
 - (2) Setting switches to the left: 'Alignment-Auto', 'Targeting-Laser'

WARNING! The laser can be activated at any time if the slide switch (1) is in the left 'Align' position.



- **1.** Start laser targeting.
 - Slide the slide switch (1) to the left.



⇒ The green LED on the right flashes once per second: The system is in targeting mode.



- **2.** If a reflector is mounted, use the direction keys to move the laser point to the center of the reflector.
 - If the reflector has not been mounted yet, move the laser point to the intended mounting position of the reflector.



- Once the reflector has been mounted, make sure that the laser point is approximately in the center of the reflector.
- If the laser beam is not visible, due to a very bright environment or long distances, for example, prism targeting can be used (see 'Prism targeting [→ 24]').
- 3. Start auto alignment.
 - Slide the slide switch (1) to the right.



- ⇒ The flashing LEDs indicate that alignment is in progress.
- ⇒ The green LED on the right flashes twice every 3 seconds: The system is in alignment mode.



NOTICE		
	Power supply open line before auto alignment is complete	
	The detector will indicate a fault status the next time it is switched on.	
1	Repeat the auto alignment process.	
ě	 Auto alignment takes no more than 5 minutes. Only disconnect the power supply from the FDL242 once auto alignment has been completed successfully. 	

- ⇒ The green LED on the left indicates the process step (1...5). $\overset{\bullet}{\longrightarrow}$ \bigcirc
- ➡ The yellow LED in the middle indicates a fault. The number of flashes indicates which step has a fault.



- 4. If the alignment process fails, check the following points:
 - The correct number of reflectors have been mounted.
 - The minimum distance to other objects has been observed.
 - There are no reflective surfaces around the reflector or near to the laser beam.
- 5. Repeat the alignment process if all the requirements are met.
- If the alignment process fails repeatedly, perform a manual alignment (see 'Manual alignment [→ 26]').
- ➡ If the alignment has been completed successfully, the green LED on the right will flash for 10 seconds.

 $\circ \circ$

⇒ The FDL242 is ready for the alarm threshold to be selected.

The detector can be tested in order to ensure that it works in operation and is correctly connected to the control panel.

To activate the test alarm, see chapter 'Status indicator and troubleshooting $[\rightarrow 30]' >$ 'Activating the test alarm'.

8.5 Prism targeting

Only use prism targeting if the laser is not visible, e.g., if the ambient lighting is very bright or over very long distances.

	Laser beam class 3R, 5 mW, wavelength 630680 nm Serious injury to the eyes	
	 Avoid direct eye contact with the laser beam. Follow local regulations when using class 3R products. 	

▷ ▲ WARNING! The laser can be activated at any time if the slide switch (1) is in the left 'Align' position.

1. Slide the setting switch (2) to the right.



- 2. Start prism targeting.
 - Slide the slide switch (1) to the left.



➡ The LEDs on the left and in the middle flash simultaneously for approx. 5 seconds.



⇒ The green LED on the right flashes once per second: The system is in targeting mode.

 $\bigcirc \bigcirc$

⇒ The green LED on the left lights up: The detector is receiving enough light back from the reflector.

 $\bigcirc \bigcirc \bigcirc$

- 3. Cover the reflector.
- **4.** If the green LED on the left goes out, the detector is receiving light from the reflector.
 - Continue with the alignment step: See 'Laser targeting and auto alignment
 new FDL242 [→ 22]', step 3 'Start auto alignment'.
- **5.** If the green LED on the left lights up when the reflector is covered, the detector is receiving light from a different object in or around the ray's path.
 - Make sure that no reflective objects are within 0.5 m of the center of the ray's path.
 - Start prism targeting again.
- **6.** If the yellow LED flashes once per second, the detector is receiving too little light from the reflector.
 - ➡ The number of flashes within a second indicates how strong the signal is that is being received.



- Using the direction keys, move the detector in one axis until the number of flashes increases.



- If the number of flashes stays the same, continue to move the detector in the same direction.
- If the number of flashes decreases, move the detector in the other direction.
- If the number of flashes increases, continue to move the detector in this direction until the LEDs meet one of the following two conditions:
- If the green LED on the left lights up, cover the reflector. As soon as the green LED goes out, continue with the alignment step: See 'Laser targeting and auto alignment new FDL242 [→ 22]', step 3 'Start auto alignment'.
- ➡ If the yellow LED flashes less often, move the detector 2 steps back and carry out the process of moving the detector in the other axis.
- **7.** If prism targeting has been performed in both axes and the green LED on the left still does not light up, check the following:
 - The correct number of reflectors has been used for the specified distance.
 - The distance is no more than 120 m.
 - The reflector has been mounted directly opposite the detector.
 - ⇒ Once these points have been ensured, start prism targeting again.

8.6 Manual alignment

Manual alignment should only be used if auto alignment has failed despite the following points having been ensured:

- The correct number of reflectors have been mounted.
- Objects have been mounted at least 0.5 m from the center of the ray's path.
- 1. Slide the setting switch (2) to the right.



- 2. Start manual alignment.
 - Slide the slide switch (1) to the left and then to the right.
 - ➡ The green LED on the right flashes twice every 3 seconds: The system is in alignment mode.



- ➡ The yellow and green LEDs may flash if the detector needs to perform an adjustment to the power supply.
- **3.** If the left green and the yellow LED are no longer flashing, move the detector in the vertical axis using the direction keys.

- Press the down direction key once and watch the LEDs.



- ➡ If the yellow and green LEDs flash, the signal has not changed and no further movement is required in this axis.
- **4.** If the yellow LED flashes, the signal is weaker and the detector has moved away from the reflector.
 - Move the detector 2 steps in the opposite direction.
 - ⇒ The left LED should flash green.
- **5.** If the green LED on the left flashes, the signal is stronger and the detector is moving closer to the reflector.
 - Move the detector in the same direction one step at a time and wait for the LEDs to flash after each step.
 - ➡ If the green LED on the left flashes, continue to move the detector in the same direction.
 - ➡ If the yellow and green LEDs flash, perform the movement in the horizontal axis.
 - ➡ If the yellow LED flashes, move the detector 1 step in the opposite direction and switch to the movement in the horizontal axis.
- 6. Perform the same process in the horizontal axis.
 - Start by moving the detector to the left.
 - Watch how the LEDs flash and take action as described in step 5.
- **7.** Once alignment has been performed in both axes, slide the setting switch (2) to the left.
- ⇒ The green LED on the right flashes for 10 seconds.



The detector can be tested in order to ensure that it works in operation and is correctly connected to the control panel.

To activate the test alarm, see chapter 'Status indicator and troubleshooting $[\rightarrow 30]' >$ 'Activating the test alarm'.

8.7 Realignment of a previously aligned FDL242

If an FDL242 that has previously been aligned is used in a new mounting situation, the FDL242 has to be realigned.

When the FDL242 is switched on for the first time in the new mounting situation, the previously used alignment data will be used and it is highly likely that the FDL242 will generate an alarm.

If the realignment is performed with the aid of the line tester FDUL221 or a DC 24 V power supply, the alarm has no influence and the targeting and alignment process can be performed as described in the previous chapters.

If a realignment is performed with the aid of the control panel, an alarm generated by the FDL242 will prevent test mode from being activated.



Laser beam class 3R, 5 mW, wavelength 630...680 nm Serious injury to the eyes

- Avoid direct eye contact with the laser beam.
- Follow local regulations when using class 3R products.
- 1. To perform the realignment with the aid of the control panel, slide the slide switch (1) to the 'Align' position and both setting switches (2) to the left before activating the detector line.

A WARNING! The laser can be activated at any time if the slide switch (1) is in the left 'Align' position.



- ➡ If the FDL242 is supplied with power while the slide switch is in the 'Align' position, the FDL242 immediately enters targeting mode. The FDL242 blocks the alarm and issues a fault message instead.
- **2.** The steps for the targeting and alignment process can be performed as described in the previous chapters.
- ⇒ Once the targeting and alignment process has been completed successfully, the fault message is revoked and the FDL242 enters normal operation.

9 Settings

Fire threshold values

Available parameter sets

No.	Designation	Alarm for n % attenuation	Response value % (EN 54-12)
01	Standard with interruption of ray = error	58	35 (1.87 dB)
02	Standard with interruption of ray = alarm	58	35 (1.87 dB)
03	Sensitive with interruption of ray = error	50	29 (1.49 dB)
04	Sensitive with interruption of ray = alarm	50	29 (1.49 dB)
05	Very sensitive with interruption of ray = error	44	25 (1.25 dB)
06	Very sensitive with interruption of ray = alarm	44	25 (1.25 dB)

All parameter sets are approved according to EN 54-12.

'Alarm for n % attenuation' denotes the percentage ray attenuation that will trigger an alarm.

The setting for the parameter set depends on the FDnet/C-NET detector line. The parameter set is set via the control panel. For the process, see the control panel documentation.

The FDL242 detects an interruption to the ray if a signal attenuation of 98 % occurs within 2 s.



If an FDL241-9 is replaced with an FDL242, pay attention to the differences in the fire threshold values.

The linear smoke detector FDL242 must not be used in systems or components that trigger or control extinguishing systems.

10 Status indicator and troubleshooting

Status indicator



Fig. 7: Status indicator (1)

Status	Indication	
Normal operation	Flashes green once every 10 s or no indication (configured on the control panel)	
Test mode	Flashes orange twice every 4 s	
Alarm	Flashes red once every second	

Cleaning

The detector compensates for soiling automatically. If the compensation limit is reached, the detector indicates a fault and the detector must be cleaned.

Recommendation: Regularly clean the glass lenses and reflector with a lint-free cloth.

If the detector indicates a fault status after it has been cleaned, this may have been caused by the signal strength having increased above the threshold value. If this is the case, realign the detector.

Activating the test alarm

Recommendation: Carry out a test alarm after installation or cleaning.

- 1. Activate 'Detector test' mode on the control panel.
 - ⇒ In test mode, the status indicator flashes orange twice every 4 seconds.
- **2.** For a test alarm, slowly (>5 s) cover the reflector with the red test filter from the commissioning kit (S54331-S11-A1).
 - ⇒ The detector triggers an alarm after approx. 5 seconds.
 - If the alarm does not sound, check whether the attenuation of the signal value is sufficient to reach the alarm threshold. If necessary, turn or move the test filter a little.
- **3.** To carry out an additional test of the interruption to the ray, quickly (<2 s) cover the reflector with the yellow test filter from the commissioning kit (S54331-S11-A1).
 - ⇒ Depending on the selected parameter set, the detector will transmit a fault message after approx. 5 s (parameter set 01, 03, 05) or trigger an alarm (parameter set 02, 04, 06).

- If the detector does not respond, check whether the attenuation of the signal value is sufficient to reach the threshold for detecting an interruption to the ray. If necessary, turn or move the test filter a little.
- 4. Deactivate 'Detector test' mode on the control panel.
- ⇒ The detector is ready for operation.

11 Specifications

11.1 Technical data

Voltage/current characteristics			
Operating voltage (DC V)	12	20	33
Operating current (mA)	3.7	2.5	1.5
Current during alignment (mA)	5.5	11.3	7.2
Designation	Minimum	Typical	Maximum
Attenuation alarm (%)	44	58	58
Pre-alarm delay (s)	_	10	-
Fault delay (s)	-	10	-
Distance between detector and reflector (m) (4 reflectors for distance >50 m)	5	_	120
Fault message in the event of rapid signal attenuation within 2 s (%)	-	≥98	-
Detector angular alignment	-	-	±4.5°
Tolerance of ray alignment error – detector	-	±0.5°	-
Tolerance of ray alignment error – reflector	_	±5°	-
Optical wavelength (nm)	-	850	-
Operating temperature (°C)	-20	-	+55
Storage temperature (°C)	-40	-	+85
Air humidity, no moisture condensation (%)	-	-	93
Protection category	_	IP53	-
Conductor cross-section (mm ²)	0.2	_	1.5
Flammability limit, housing	_	UL94 V-0	-

Line separator

The line separator is closed via an actuation signal from the control panel. Required line voltage: DC 12...33 V (normal range)

Line voltage	Nominal: DC 32 V (= V _{nom})
	Minimum: DC 12 V (= V_{min})
	Maximum: DC 33 V (= V_{max})
Voltage at which the line separator opens.	Minimum: DC 7.5 V (= V _{SO min})
	Maximum: DC 10.5 V (= V _{SO max})
Permanent current when switches are closed	Max. 1.5 A (= I _{C max})
Switching current (e.g., in the event of a short-circuit)	Max. 2 A (= I _{S max})
Leakage current when switches are open	Max. 1 mA (= I _{L max})
Serial impedance when switches are closed	Max. 0.4 Ω (= Z _{C max})

11.2 Dimensions



Reflector, W×H×D: 100×100×10 mm

11.3 Environmental compatibility and disposal



12 Open-source software

This product includes software developed by Texas Instruments Incorporated.

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