SIEMENS

# JTG-HM-FDF241 Infrared Flame Detectors
# Product Manual

## Overview

The flame detector measures infrared radiation and can therefore detect organic material fires with and without smoke.

The table below shows what types of fire the flame detector can and cannot detect.

| Detection | No detection |
|---|---|
| Liquid fires without smoke | - |
| Gas fires without smoke | - |
| Open organic material fires with smoke, for example fires of:<br>● Wood<br>● Synthetic material<br>● Gas<br>● Oil-based products | Inorganic materials, such as:<br>● Hydrogen<br>● Phosphorus<br>● Sodium<br>● Magnesium<br>● Sulfur |

However, if inorganic materials are burning in a fire with organic materials, e.g. packaging material, the flame detector can detect the fire.

Thanks to extended sensory technology, JTG-HM-FDF241 is not susceptible to deceptive phenomena (e.g. the sun) and can therefore also be used in outdoor areas.

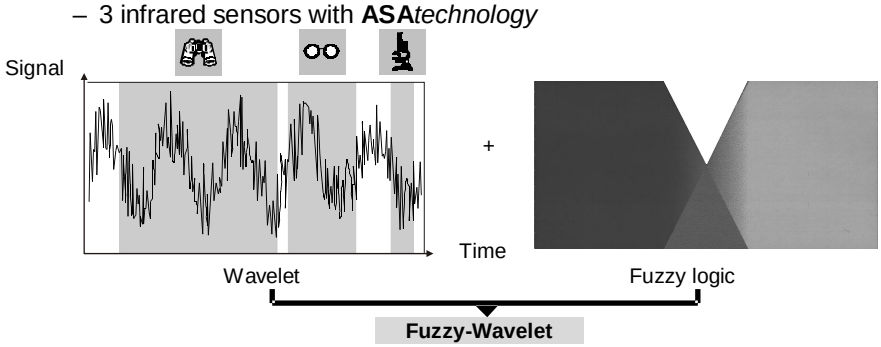
## Characteristics

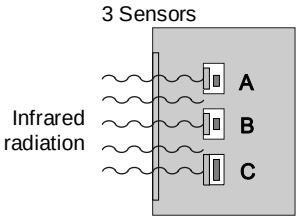
– Fulfill Chinese standard GB15631-2008 “Special type fire detector“
– ASA JTG-HM-FDF241 flame detector for the most demanding application (inside and outside), detection with 3 infrared sensors and ASA***technology***

– Excellent immunity to false alarms thanks to a combination of fuzzy logic and Wavelet analysis
– Event-controlled detection behavior
– Microprocessor-controlled signal evaluation
– Two-wire installation for all types of cable
– Communication via FDnet/C-NET (individual addressing), digital signal processing
– Protected electronics
– Built-in alarm indicator (AI)
– Integrated line separator
– Regular selftest function

## Function

– 3 infrared sensors with **ASA***technology*




The detection elements of the infrared flame detector consist of two pyroelectric sensors and a silicon photo diode.
**Sensor A:**
The pyroelectric sensor A reacts to infrared flame gas in the characteristic $CO_2$ spectral range between 4.0... 4.8 µm.
**Sensor B:**
The pyroelectric B measures the infrared radiation of sources of interference in the range between 5.1... 6 µm
**Sensor C:**
The silicon photo diode measures the solar radiation in the range between 0.7... 1.1 µm

– One sensor measures the hot carbon dioxide in a specific flame wavelength; the two other sensors simultaneously measure the interference radiation in other wavelengths.
– With intelligent signal processing through fuzzy algorithms and wavelet analysis, the JTG-HM-FDF241 achieves excellent detection reliability while maintaining the highest immunity to interference radiation and sunlight.
– In order to safeguard against a possible decision emergency, the detector contains an additional emergency activation channel.

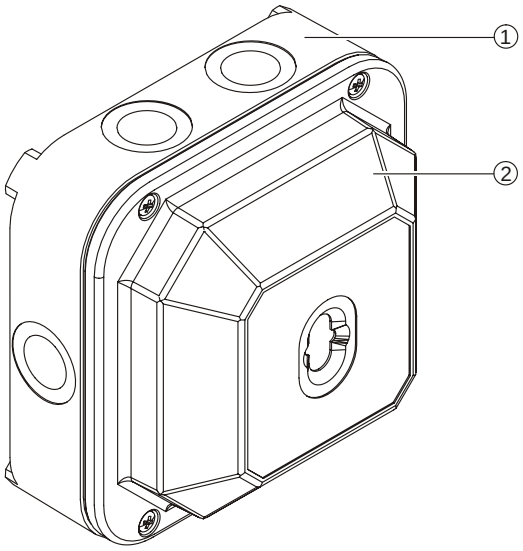
## Application

To detect smokeless liquid and gas fires as well as smoke-generating open fires resulting from the combustion of carbonaceous materials such as wood, synthetics, gases, oil products, etc.

– large industrial warehouses
– chemicals production plants
– chemicals stores
– petrol storage and pump stations
– arc welding workshops
– ferries and cargo boats
– ships' engine rooms
– underground tunnels
– power plants
– transformer stations
– printing works
– motor test beds
– malls
– wood stores
– hangars for military and civil aircraft

## Structure

The flame detector consists of the base FDFB291 (1) and the flame detector FDF241-CN (2).




1 Base for flame detector

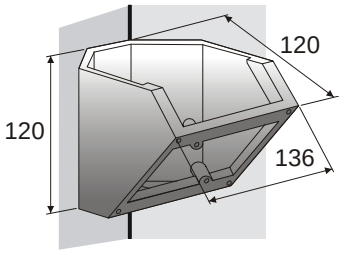
2 Flame detector

**Accessory:**

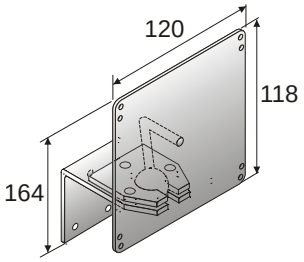
A mounting bracket and ball and socket joint are available to aid flame detector installation at a particular angle. A rain hood is available to protect against rain.

All dimensions in mm.

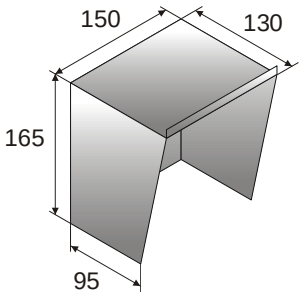
Mounting bracket MV1



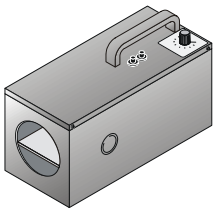

Ball and socket joint MWV1




Rain hood DFZ1190




Test lamp LE3



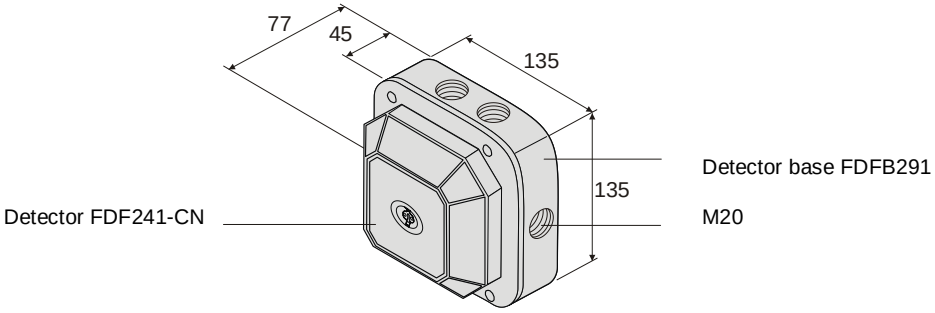
## Internal alarm indicator

The detectors are provided with an internal alarm indicator. The internal alarm indicator shows the operating status of the detector (see table).

| Status | Flashing mode of the AI (controlled by panel) |
|---|---|
| Normal | off |
| Alarm | steady on |

## Dimensions

All dimensions in mm.




## Installation

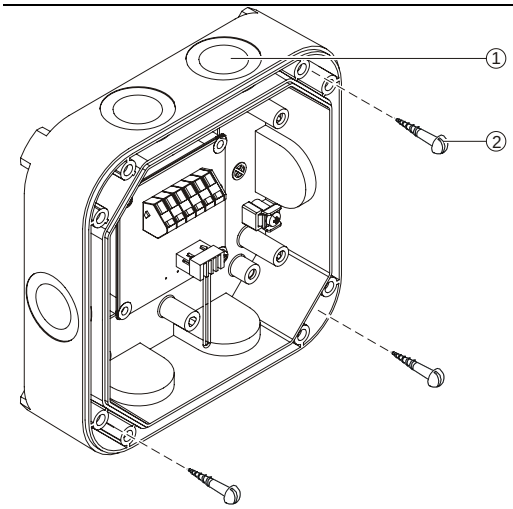



Fig. 1

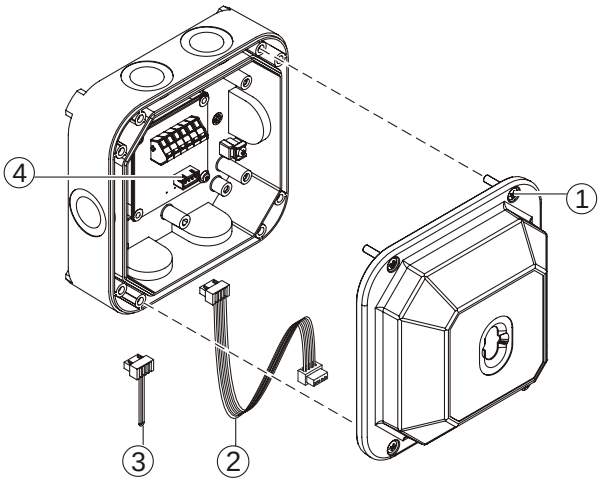



Fig. 2

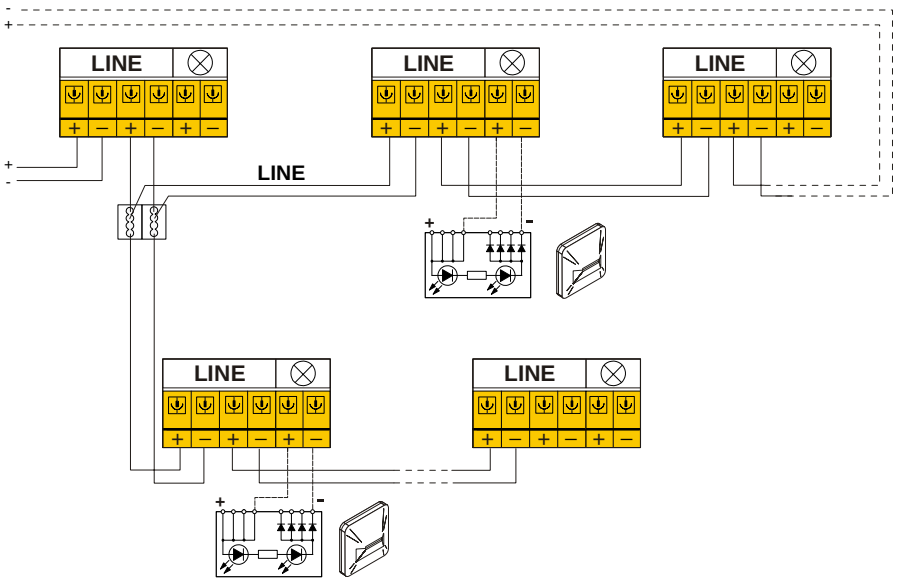



Fig. 3

**Install base FDFB291 for flame detector JTG-HM-FDF241 (Fig. 1)**

**Danger of fall!**
Always use a secured ladder or lifting platform for the mounting work!

1. Break open the plastic parts in the base for flame detector at the openings you require for cable entry (1).
   If necessary screw the M20 x 1.5 metal cable gland into the openings.
2. Use four screws (2) to fit the base for flame detector on the mounting bracket, ball and socket joint, rain hood or directly on a stable, vibration-free surface.

The base for flame detector is fitted.

**Electric connection (Fig. 3)**

Only use cables with a wire diameter of 0.2 to 1.5 $mm^2$.
Only connect one wire to each terminal!
Connect the wire to the terminals in accordance with the connection diagram.

**Electric voltage!**
Observe positive and negative poles!

**Install flame detector on base (Fig. 2)**

1. Remove bridging connector (3) from base for flame detector.
2. Use the connection cable (2) to connect connections (4) in the base for flame detector and on the flame detector.
3. Use four screws (1) to secure the flame detector to the base for flame detector.

The flame detector is fitted.

**Set parameter**

Once the detector line has been read in, you need to set the parameter set.

- For FDnet/C-NET operation, the DIP switches in the flame detector are not active. Use the control panel to set the parameter set you want.

The table below shows the parameter sets and associated numbers.

| No. | FDF241-CN |
|---|---|
| 01 | Robust |
| 02 | Universal |
| 03 | Universal fast |
| 04 | Sensitive |
| 05 | Sensitive fast |
| 06 | Rapid |
| 07 | Motor test bed |

**In order to guarantee product safety and meet the CCCF requirement, DO NOT reassemble the product!**

## Maintenance

- **Performance check**

  **Performance check with test lamp LE3**

  1. On the control panel, switch off the remote transmission of alarms. To do this set the 'Detector test' operating mode on the control panel.
  2. Use test lamp LE3 to check the flame detector. The maximum distance between test lamp and flame detector depends on the set parameter set (see table below).
     ⇨ The flame detector activates an alarm within 20 seconds.
     ⇨ The alarm indicator on the flame detector flashes.
  3. On the control panel, switch the remote transmission of alarms back on.

  ⇨ The flame detector is ready.

| No. | Parameter set | Max.Distance | No. | Parameter set | Max.Distance |
|---|---|---|---|---|---|
| 1 | Robust | 6 m | 5 | Sensitive fast | 8 m |
| 2 | Universal | 6 m | 6 | Rapid | 13 m |
| 3 | Universal fast | 6 m | 7 | Motor test bed | 13 m |
| 4 | Sensitive | 8 m | | | |

**Performance check with a test fire**

1. On the control panel, switch off the remote transmission of alarms. To do this set the 'Detector test' operating mode on the control panel.
2. Use a test fire to test the flame detector.
   ⇨ The flame detector activates an alarm within 20 seconds.
   ⇨ The alarm indicator on the flame detector flashes.
3. On the control panel, switch the remote transmission of alarms back on.

⇨ The flame detector is ready.

- **Cleaning**
  The flame detector sensors must be clearly visible through the protective glass. Proceed as follows if this is not the case:
  1. Clean the protective glass from the outside with a soft, damp cloth. Washing-up liquid may be used if the glass is very dirty.
  2. Carry out performance check.

- **Recommendation:**
  – Any detectors should be replaced after 12 years of service, independent from the environmental conditions.
  – DO NOT dispose the product with domestic waste. Please observe the 'Dispose Regulation on wasted electronics products' for disposing.

**Fire hazard from test fire**
**Bodily injury and material damage**
- Only specially trained persons may undertake test fires. These persons must be trained in how to handle fire extinguishers.
- The size of the test fire depends on the room height.

## Technical data

| | | |
|---|---|---|
| Detector line | | |
| | Operating voltage (addressable) (quiescent) | 12...33 VDC |
| | Operating current (addressable) (quiescent) | 0.7 mA |
| | Maximum current connection factor | 3 |
| | Quiescent current connection factor | 3 |
| | Address connection factor | 1 |
| | Separator connection factor | 1 |
| | Communication protocol | FDnet/C-NET |
| Line separator | | |
| | Line voltage nominal | 32 V DC (=$V_{nom}$) |
| | Line voltage minmum | 12 V DC (=$V_{nom}$) |
| | Line voltage maximum | 33 V DC (=$V_{nom}$) |
| | Voltage at which separator opens minimum | 7.5 V DC (=$V_{SO\,min}$) |
| | Voltage at which separator opens maximum | 10.5 V DC (=$V_{SO\,max}$) |
| | Permanent current when switches are closed | Max. 0.5 A (=$I_{C\,max}$) |
| | Switching current (e.g. in event of short circuit) | Max. 1 A (=$I_{S\,max}$) |
| | Leakage current when switches are open | Max. 1 mA (=$I_{L\,max}$) |
| | Serial impedance when switches are closed | Max. 0.5 Ω (=$Z_{C\,max}$) |
| External alarm indicator | External alarm indicators that can be connected | 2 |
| | Voltage | 10…17 VDC |
| | Power | 9…15 mA |

| | | |
|---|---|---|
| | Length of line | • Max. 30 m unshielded cables or when the shielding is connected to the detector's positive pole<br>• Max. 5 m if the shielding is connected to earth |
| Ambient conditions | Operating temperature | -35...+70 °C |
| | Storage temperature | -40...+75 °C |
| | Humidity<br>(no heavy condensation of window) | ≤95 % rel. |
| | Protection category EN60329 / IEC60529 | IP67 |
| Mechanical data | Dimensions without base<br>(Length x Width x Height) | 135 x 135 x 32 mm |
| | Weight | 0.500 kg |
| | Color | ~RAL 9010 pure white |
| | Connection terminals | 0.2...1.5 $mm^2$ |
| Standards | Standards | GB 15631-2008 |
| | QA standards | Siemens Standard SN 36360, ISO 9001, ISO 9004 |

## Details for ordering

| Type | Part no | Designation | Weight |
|---|---|---|---|
| JTG-HM-FDF241 | S54330-F3-A1 | Flame detector | 0.500 kg |
| FDFB291 | A5Q00003310 | Detector base | 0.250 kg |
| – | A5Q00004478 | Metal screwed cable gland M20 | 0.039 kg |
| MV1 | BPZ:3950450001 | Mounting bracket | 0.285 kg |
| MWV1 | BPZ:3674840001 | Ball and socket joint | 0.860 kg |
| LE3 | BPZ:3669510001 | Test lamp | 5.260 kg |
| DFZ1190 | BPZ:5302660001 | Rain hood | 0.640 kg |

Siemens Switzerland Ltd
Building Technologies Division
International Headquarters
Fire Safety & Security Products
Gubelstrasse 22
CH-6301 Zug
Tel. +41 41 – 724 24 24
www.siemens.com/buildingtechnologies



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