# System overview

## Compact Flame Scanner F200K

LAMTEC

Sensors and systems for combustion engineering

www.lamtec.de

# Approvals.

CE 0085
Gas Appliances Directive 2009/142/EC, CE0085

CE 0036
Pressure Equipment Directive 97/23/EC, CE0036

SIL 3
SIL 3 Confirmation, DIN EN 61508 Parts 2

UL 372, UL 1998

LTL
CSA-C22.2 No. 199

EN 60079, Ex Device Group II Device Category 3,
IBExU05ATEX
EX nA nC II T6 X (Zone 2)
- 20 °C ≦ Ta ≦ + 60 °C

EN 60079, EX Device Group II Device Category 2
PTB03 ATEX
II 2 G/D EEx de II C T6 (Zone 1)

# Compact Flame Scanner F200K.

With the F200K, LAMTEC has developed a compact flame scanner that can be used in a number of different areas and for a diverse range of monitoring requirements. With the new generation of flexible compact flame scanners, LAMTEC provides operators of industrial combustion systems and power plants with a state-of-the-art product. As such, the F200K compact flame scanner is capable of tackling monitoring requirements for complex modern burners in a safe, efficient and reliable manner.

## Compact design

The F200K consists of a cylindrical case containing an integrated flame sensor and circuit amplifier. Light enters on the axis. Users are able to make all settings independently. The device has received the IP67 protection rating and, as a result, is suitable for use in dusty or damp working environments. In addition to the standard design, it is also available in designs certified for use in Ex Zone I and II.

**The LAMTEC F200K flame scanner in operation.**

## Advantages:

- Flame monitoring in a compact design
- Integrated flame sensor and switch amplifier
- Three stages for digital flame frequency evaluation
- Two selectable operating modes
- Also available with certification for Ex Zone I and II
- Simple operation and adjustment
- No special tools required for the commissioning process

## Applications:

- Combustion systems with and without selection tasks
- Single and multi-fuel burners
- Combustion space monitoring
- Power plants, heating plants, process furnaces, waste combustion plants, etc.

## Fuels:

- Gas
- Oil
- Coal
- Biomass
- Process waste gases
- Dust of all kinds
- Special fuels
- Chemical residues

### A flame sensor and flame evaluation device in one

The F200K combines flame sensors and flame evaluation in one device. Thanks to the qualitative and quantitative analysis of the individual spectral ranges, even the smallest changes in combustion can be detected. The device features ten sensitivity levels.

The integrated flame sensor detects the flame (ON/OFF) in terms of spectrum, intensity and frequency. There are three stages for digital flame frequency evaluation. A trend indication can also be connected for ideal flame direction adjustment.

Various IR and UV semiconductor sensors with selected spectral ranges are available depending on the area of application and the type of fuel used. These sensors are installed as single sensors.

# Product description.

| Type | Spectrum Radiation range | Viewing angle | Preferred application/fuels |
|---|---|---|---|
| F200K1 UV-1<br>F200K2 UV-1 Ex-I and Ex-II | 260 ... 400 | Approx. 8° | ■ Oil<br>■ Gas |
| F200K1 UV-2<br>F200K2 UV-2 Ex-I and Ex-II | 210 ... 380 | Approx. 8° | ■ Oil<br>■ Gas<br>■ Special gases such as refinery gases and blast furnace gases |
| F200K1 UV-3<br>F200K2 UV-3 Ex-I and Ex-II | 210 ... 380 | Approx. 8° | ■ Special fuels with high intensity and high selection requirements |
| F200K1 IR-1<br>F200K2 IR-1 Ex-I and Ex-II | 1200 ... 2800 | Approx. 60° | ■ Oil, gas, wood and coal fired furnaces with a high level of flue-gas recirculation<br>■ Yellowish waste gases without UV radiation or with shielding of the UV spectrum by water vapour and dust |
| F200K1 IR-2<br>F200K2 IR-2 Ex-I and Ex-II | 850 ... 1200 | Approx. 50° | |

### Two selectable operating modes

The F200K offers users the choice of two operating modes. This enables users to choose between two different settings in relation to the amplification levels. Switching between the two operating modes during operation is quick and easy.

### Design and effectiveness

The F200K flame scanner combines the flame sensor and switching amplifier in a cylindrical housing with an axial light emission opening.

The F200K1 variant features a 6-level switch for setting the sensitivity level while the F200K2 option includes two sensitivity ranges that can be selected externally, each with a 6-level switch and frequency transmission ranges corresponding to the technical data. The mains frequency and its harmonics are cut out. The standard version is intended for use with 50 Hz mains networks. On request, the device can be supplied for use with 60 Hz applications with factory-fitted settings. The F200K2's multi-level switch for the sensitivity settings in both sensitivity ranges and the variable frequency settings enable the system to be adjusted to the monitored flame. The display and operation elements are attached underneath the housing case.

In addition to the strip light intensity indication and the status display for the flame signal, the device is also fitted with a measurement port for intensity with 4 (0) ... 20 mA. A switching function in the device enables the intensity indication to be used as support for settings and adjustment. The direct flame intensity can be measured at various measurement points.

**Summary:**

- Two operating modes
- Operating modes can be selected externally
- Operating modes can be switched during operation
- Graduated frequency ranges

| Design options | F200K1 | F200K2... (Ex) |
|---|---|---|
| Sensitivity range | One sensitivity range<br>Six stages | Two sensitivity ranges, increased sensitivity in range II,<br>can be switched externally, six stages per range |
| Frequency range | 10 ...190 Hz * | 10/20/30 ... 190 Hz*, can be adjusted on the device |
| * Additional versions for lower threshold frequencies also available on request | | |

| Auxiliary energy, input | |
|---|---|
| Supply voltage | 24 VDC ± 20 %, protection rating III |
| Power consumption | 4 W |

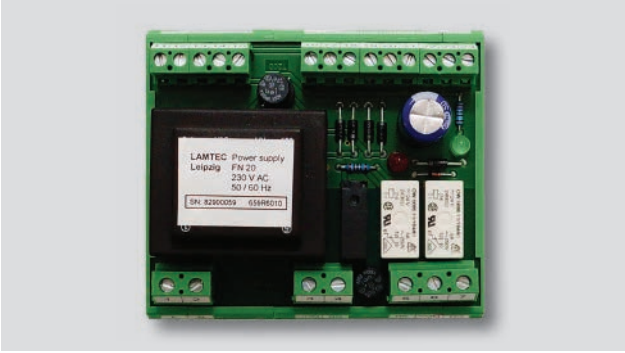
Remote range switch-over (F200K2 only), floating contact, can be switched via power supply

# Accessories.

### FN20 power pack

The FN20 power pack enables the F200K compact flame scanner to be connected to a mains AC voltage. It is intended for use with top hat rail assembly but can also be delivered for attachment to a mounting plate upon request.

The FN20 power pack includes an output relay adjusted for connecting the F200K compact flame scanner to 230 V or 115 V mains AC voltage. It must be installed in a way that enables it to attain an IP40 protection rating. The FN20 power pack is also available in an optional IP65 case.




**FN20 for top hat rail assembly FN20 in the connection housing with FSB connector, not shown.**

### FG21 + FG24 connection housing

LAMTEC offers two versions of the FG2X connection housing:

- FG21 with four screwed cable glands
- FG24 Ex-II for use in explosive environments, with four screwed cable glands

All housings are available in the IP66 protection rating design. The connection with an "open end" and the corresponding connection housings ensure easy electrical connection to the burner control. The FG24 housing is suitable for use in Ex zone 2 ⟨Ex⟩ II 3G EX nA II T4 Gc X.

### Connecting cable 659R6112, -13, -14

For the F200K, connecting cables are available in 3, 5 and 10 metre lengths.

An LiYcY cable is used as standard. This has a temperature range of -40 ... +80 °C (inactive). A silicone cable is also available for the temperature range -40 ... +150 °C. For special ambient conditions, the silicone cable can also be supplied with a stainless steel metal protected tube. This cable is also approved according to UL. All plug connections have a minimum protection class of IP67 to permit use in unfavourable conditions.

### FHXX and FVXX adjustable holder

You will find a complete overview of the holders and cooling-air housings for LAMTEC flame scanners in the document "Accessories Product Category for Flame Monitoring Systems" (DLT7660).

### Flame-scanner testing device

You can use the FFP30 to test that your flame scanner is working properly. The testing device simulates a variable flame frequency. The testing device is screwed onto the flame scanner, and the IR or UV beam activated via a rocker switch. The F200K must be set to an adequate sensitivity to detect the flame simulation.

It is designed to test all flame scanners from LAMTEC.

# Order information.

| 659R60 – | A 10 | A 20 | A 30 | A 40 | A 50 | A 60 |
|---|---|---|---|---|---|---|
| | SPECTRUM | HOUSING | MAINS FREQUENCY | POWER OUTPUT | DISPLAY RANGE | CABLE LENGTHS |

**F200K**

| A 10 - “SPECTRUM” | Selection |
|---|---|
| Type 1 UV-1 UV spectral range 260 ... 400 nm | 03 |
| Type 2 UV-1 UV spectral range 260 ... 400 nm | 04 |
| Type 1 UV-2 UV spectral range 210 ... 380 nm | 05 |
| Type 2 UV-2 UV spectral range 210 ... 380 nm | 06 |
| Type 1 UV-3 UV spectral range 210 ... 380 nm | 13 |
| Type 2 UV-3 UV spectral range 210 ... 380 nm | 14 |
| Type 1 IR-1 IR spectral range 1,200 ... 2,800 nm | 01 |
| Type 2 IR-1 IR spectral range 1,200 ... 2,800 nm | 02 |
| Type 1 IR-1 H 3 s IR spectral range 1,200 ... 2,800 nm | 11 |
| Type 2 IR-1 H 3 s IR spectral range 1,200 ... 2,800 nm | 12 |
| Type 2 IR-2 F IR spectral range 850 ... 1,200 nm | 00 |
| Type 2 IR-2 F 4 s IR spectral range 850 ... 1,200 nm | 08 |
| **A 20 - “HOUSING”** | **Selection** |
| Standard | 0 |
| with screw attachment | V |
| IR for Ex-Zone 1 (II 2G EEx d IIC T6) / SIL 3 | Z1 IR |
| UV for Ex-Zone 1 (II 2G EEx d IIC T6) / SIL 3 | Z1 UV |
| for Ex-Zone 2 (II 3G EEx nAC IIC T6 X) / SIL 3 | Z2 |
| for Ex-Zone 2 (II 3G EEx nAC IIC T6 X) / SIL 3 with screw attachment | Z2/V |

## F200K accessories

| Power supply units | Selection |
|---|---|
| FN20 power pack, 230 VAC with relay output | 659R6010 |
| FN20 power pack, 230 VAC with relay output in IP65 housing | 659R6010/G |
| **Connecting/extension cable** | **Selection** |
| Connecting/extension cable (not for Ex1), length 3 m | 659R6112 |
| Connecting/extension cable (not for Ex1), silicone, length 3 m | 659R6112/SI |
| Connecting/extension cable (not for Ex1), length 5 m | 659R6113 |
| Connecting/extension cable (not for Ex1), silicone, length 5 m | 659R6113/SI |
| Connecting/extension cable (not for Ex1), length 10 m | 659R6114 |
| Connecting/extension cable (not for Ex1), silicone, length 10 m | 659R6114/SI |
| **Holders** | **Selection** |
| FH30-00 adjustable holder with mounting bracket and 1" external thread | 659S1501 |
| FH30-10 adjustable holder with mounting bracket and purging-air coupling 1/2" i, standard | 659S1500 |
| FH40-10 adjustable holder with mounting bracket and purging-air coupling 1/2" i and ball joint | 659S1600 |
| FV30-00 screw-in holder with 1" external thread and anodized aluminium screw attachment, without purging-air coupling | 659S1201 |
| FV30-01 screw-in holder with 1" external thread for F200K with screw connection, 1.4404 stainless steel, without purging-air coupling | 659S1202 |
| FV30-10 adjustable holder for screw attachment, with purging-air coupling, 1/2" i | 659S1200 |
| FV40-10 adjustable holder for screw attachment, with purging-air coupling, 1/2" i and ball joint | 659S1300 |
| **Accessories** | **Selection** |
| FS51 adjustable holder, with ball joint, with cooling air housing, air coupling 1/2" i | 659R6107 |
| FS56 adjustable holder, hangable, adjustable, with cooling air housing, air coupling 1/2" i | 659R6099 |
| FS50 cooling air housing with air coupling 1/2" i | 659R6109 |
| Quick-release coupling 1/2" with locking socket, for purging-air coupling, brass material, hose connection 6/8 mm | 659ES126 |
| FH20-10 holder with side view (90° passive mirror) | 659V3100 |
| **Optional components** | **Selection** |
| FG21 connection housing, aluminium, IP 65, for FFS05 / 06 / F200K without socket | 659R0110ABG |
| FG24Ex connection housing, polyester (IP65), protection type EEx e II T 6, for FFS05 ... and F200K2 ... series | 659R0111 |
| FFP30 universal testing device for IR and UV | 659M5000 |

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