



## System overview

### F300K Compact Flame Scanner



# 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 1-7



UL 372, UL 1998



CSA-C22.2 No. 199



In preparation.



EN 60079, Ex Device Group II Device Category 3,  
IBExU12ATEX  
Ex nA nC ic IIC T5 (T6) Gc X (Zone 2)

# The new generation of flame monitoring.

An innovative and versatile flame scanner for a wide range of applications that can address virtually any control task. This is the next generation of flame monitoring. The new F300K compact flame scanner from LAMTEC now offers operators of industrial furnaces and power stations a high-end product that meets the high demands of complex furnaces safely, reliably and effectively.

Digital technology has led to an enormous leap forward in performance in many sectors. Furnace technology has also profited significantly from microprocessors, networking capability and smart software solutions. The benefits range from simplified optimisation via more precise flame analyses (incl. software-aided simulation and optimisation) through to the networking of multiple devices for automatic burner firing rate and fuel consumption optimisation as well as remote con-



The LAMTEC F300K flame scanner in operation.

## Advantages:

- Microprocessor flame monitoring in a compact design
- Integrated flame sensor, amplifier and flame relay
- Flame self-learning function ON/OFF
- Intuitive menu-driven interface using graphics and symbols
- Digital flame frequency evaluation in 14 selectable ranges (5 to 210 Hz)
- Three selectable operating modes
- Remote software with diagnostics function
- Standard version certified for Ex Zone II

## Applications:

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

## Fuels:

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

trol, diagnostics and maintenance via bus connection. The new F300K SIL 3 compact flame scanner combines a variety of future-oriented functions and components – all in a compact housing with clear LED display and menu-driven operation.

### Compact design

The F300K consists of a cylindrical housing with an axial light aperture. The unit can be configured and commissioned without the need to open the device. This means that the high IP67 protection rating for use in dusty and wet working conditions for the entire unit remains in place without restrictions. Even the standard version is certified for Ex Zone II.

### Flame sensor and switch amplifier in one

The F300K combines flame sensor and flame evaluation in one device. This means that the flame from the burner being monitored can be reliably discriminated from other flames in multi-burner systems or outside influences such as glowing refractories. For different applications and fuels there are various types available with IR and UV semiconductor sensors with selected spectral ranges. There is choice of models utilising IR or UV semiconductor sensors with different spectral ranges to match specific applications. For applications with high selection or analysis requirements, an IR/UV double sensor can also be used. Thanks to the qualitative and quantitative application of the individual spectral ranges, even the smallest changes in combustion can be detected. Digital flame frequency evaluation enables individual flames to be differentiated from background radiation and flames from other burners with a high level of precision. The innovative self-learning function ensures the optimum characteristics of the flame are selected for precise discrimination. The self-learning function is highly intuitive and significantly reduces commissioning time.

### Three pre-selected operating modes

The F300K offers three operating modes for the user to choose from. This means that switching thresholds and frequency ranges can be parameterised for each operating mode individually and independently from the others. To achieve this there are 14 specific frequency ranges divided into two groups. The switching thresholds are infinitely adjustable and there are 13 preset amplification levels. It is possible to switch between the three individual operating modes 'on the fly' during operation. The inputs affected are monitored for plausibility of actuation.

### User-friendly operation

The standard version of the F300K is supplied with one LED display. An integrated User Interface (UI) with easy-to-understand, language-neutral, graphic symbols is available as an option. All the device settings can be carried out using the intuitive menu-driven display and the simply four button keypad. Symbol based icons, logical displays and clear control elements ensure rapid

and effective commissioning with a minimum level of training requirement.

### Mobile control unit

For the F300K, LAMTEC also offers an external user interface that can be used both as a mobile control unit and integrated as a stationary unit in the control cabinet. This control unit can also be loaded and secured using parameter records, for example.

### Field bus interfaces included

Up to 32 F300K devices can be networked via the internal FLAME SCANNER SYSTEM BUS (FSB). The individual flame scanners can be selected, activated and configured via the menu on the external control unit or the F300K remote software. The connection to the field and control level can be established via various field bus interfaces or gateways.



### Summary:

- 3 operating modes, can be externally preselected, switchable during operation
- 14 graduated frequency ranges
- Available as single or double sensor (IR/UV)
- Can be operated via four buttons
- Flame ON/OFF LED, fault, flame intensity, operating modes
- Can be completely operated without opening the device, which means that the same degree of protection IP67 is retained, even during commissioning
- Menu-guided configuration and commissioning with Flame ON/OFF self-learning function
- Alignment assistance by means of a logical graphical display of flame data
- Switching threshold can be individually adjusted in the entire signal range, 13 pre-selectable amplification levels
- Easy operation via graphic user interface with status display (optional)
- Field bus interfaces:
  - MODBUS TCP (client/server)
  - MODBUS RTU (master/slave)
  - Ethernet (Frame)
  - PROFIBUS (Slave)
  - CANopen
- Indepth analysis via F300K remote software (optional)
  - Read, write and store parameter records from multiple F300K devices via CAN-Bus
  - Analysis via the simulation of different parameterisations
- Periodical signals, including the network frequency and their harmonic components are identified. No adjustment of country-specific network frequencies needed
- Analogue output 0/4 ... 20 mA, configurable for flame intensity or other measurements
- Parameter setting capability of switching threshold, frequency range, etc. based on operating mode
- Download, back-up and upload of parameter records in the user interface
- Device selection via menu control
- Operation and commissioning
- 2 operating levels for the commissioning: Standard and expert, password-protected
- Simulation of switching behaviour, "What would happen if?", to assist in setting the Flame ON/OFF parameters with optional user interface or PC remote software

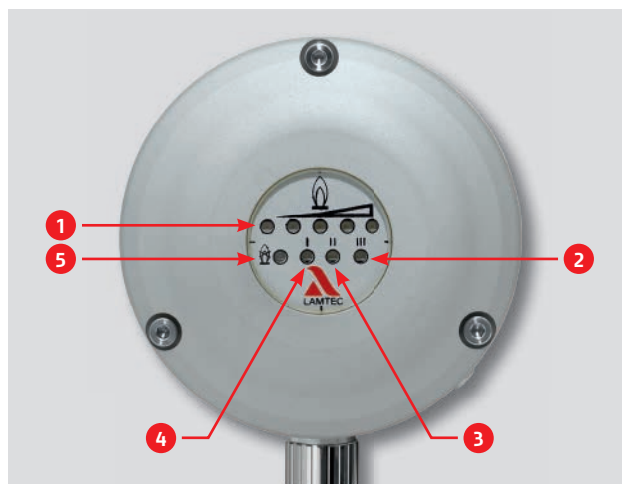
# Product description.

The F300K is available in two versions.

## F300K with LED display.



F300K with LED display.



F300K display unit with LED display.

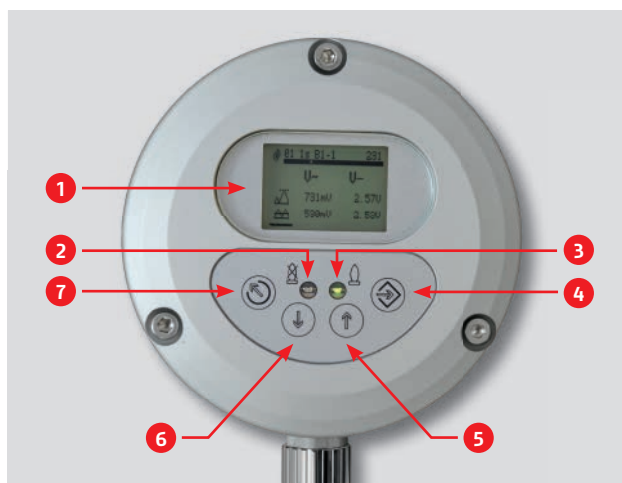
There are two versions of the F300K; LED display and control unit display. The LED display version offers basic operational visualisation including flame status, operating mode and intensity. The control unit display allows full configuration and parameter setting. The functionality of both units is identical.

1 LED in the display bar indicates the intensity of the flame as a dotted display: chain of 2 x yellow and 3 x green; middle LED flashing = warning. 2 LED green = operating mode 3. 3 LED green = operating mode 2. 4 LED green = operating mode 1. 5 LED red = flame OFF/ready for operation - flashes in the event of a fault.

## F300K with user interface (UI).



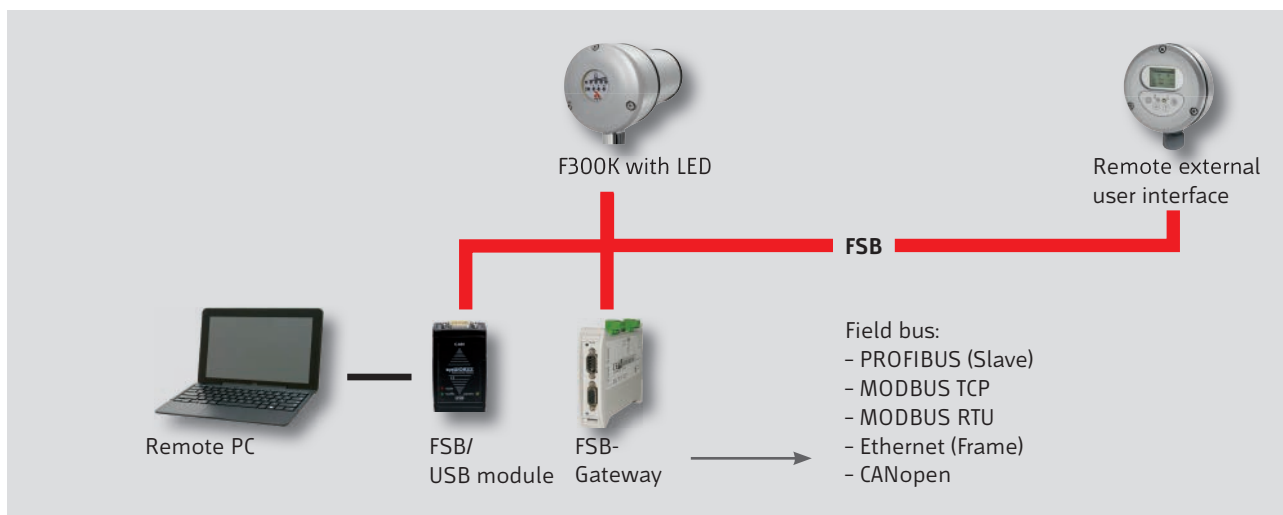
F300K with UI.



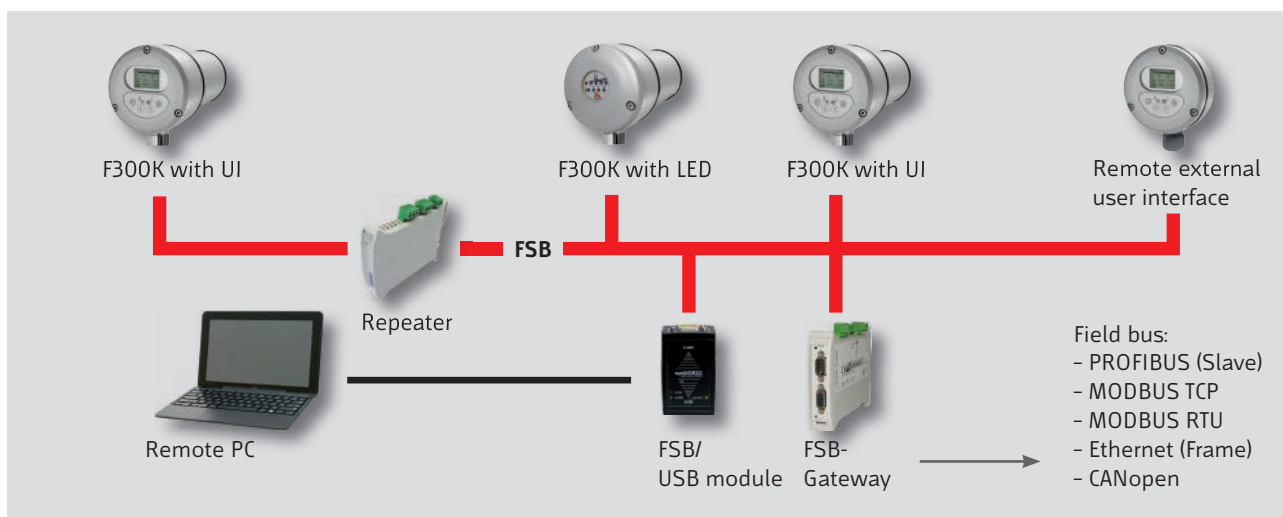
F300K operating and display unit with UI.

Integrated graphic user interface for menu-driven configuration, commissioning and operating simulation of the switch response with "What would happen if?". Data back-up/download and upload of the configuration and setting.

1 Display. 2 LED on and red = flame OFF/ready for operation - flashing red = fault. 3 LED on and green = flame ON, LED flashing green = fault. 4 ENTER key. 5 UP key. 6 DOWN key. 7 ESC/BACK key.



Example: Networking with an F300K.



Example: Networking of multiple F300Ks.

### Selection criteria

The spectral sensitivity of the flame scanners determines their suitability for specific fuels.

Overview of suitable flame scanners: The suitability of the device types may differ from that indicated in the table depending on particular circumstances.

Type	Spectrum/nm	Approx. view angle	Preferred applications/fuels
F300K UV-1	260 ... 400	8°	<ul style="list-style-type: none"> <li>Oil</li> <li>Gas</li> <li>Dust (where there is little shielding of the UV spectrum by unburned dust)</li> </ul>
F300K UV-4	215 ... 360	8°	<ul style="list-style-type: none"> <li>Oil</li> <li>Gas</li> <li>Special gases such as refinery gases and blast furnace gases</li> </ul>
F300K IR-2	850 ... 1200	20°	<ul style="list-style-type: none"> <li>Combustion space monitoring</li> </ul>
F300K IR-3	1000 ... 1700	60°	<ul style="list-style-type: none"> <li>Oil, gas, wood, coal and dust-fired furnaces with a high level of flue-gas recirculation</li> <li>Yellowish waste gases without UV radiation or with shielding of the UV spectrum by water vapour and dust</li> </ul>
F300K IR-4	1000 ... 2200	60°	
F300K UVIR-1	215 ... 360 850 ... 1700	8° 8°	UV: Oil, gas, special gases like refinery gases and furnace gases IR: Oil, gas, wood, coal, dust furnaces with strong flue-gas recirculation, waste gases with yellowish colour without UV radiation or with shielding of UV components using water vapour and dust

## Accessories.

### Power supplies FN30-00, FN30-10, FN30-20, FN30-30

The FN30 power supply is available in four different versions. Versions FN30-20 and FN30-30 are equipped with output/coupling relay and fulfil the requirements of EN298 and conform to SIL 2 in accordance with EN61508.

Alternatively, a standard power supply with an output voltage of 24 V that meets the protective separation requirements can be used.

Power supply FN30 is designed for top rail mounting, but is also available in an integrated housing.



FN30-00 for top rail mounting.



FN30-10 in the connection housing with FSB plug connector.



FN30-20 (230 VAC) / FN30-30 (115 VAC) in the connection housing with 230 VAC / 115 VAC output relay.

### Connection cable 659N0500

For the F300K, connection 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 for the temperature range -40 ... +150 °C is also available. For special ambient conditions, the silicone cable can also be supplied with a stainless steel metal protected hose. This cable is also approved in line with UL. All plug connections have a minimum protection class of IP67 to permit use in unfavourable conditions.



### FV40 adjustable holder

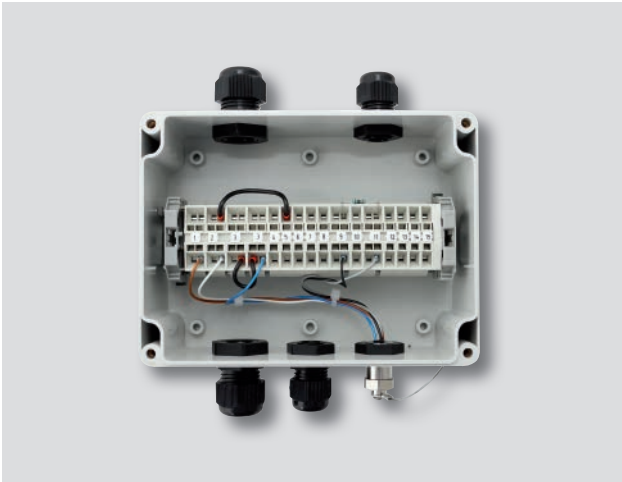
You will find a complete overview of the holders and cooling-air housings for LAMTEC flame scanners in the document 'Holding Devices for Flame Monitoring Systems'



### FG30-00 + FG30-20 connection housings

LAMTEC offers two versions of the FG30 connection housing:

- FG30-00 with four cable glands and an M12 circular connector for FSB
- FG30-20 Ex II for use in explosion-hazard areas with four cable glands and an M12 circular connector for FSB



FG30-00 housing.



FG30-20.

All housings are available in the IP66 protection class version. The connection with an “open end” and the corresponding connection housings ensures easy electrical connection to the burner control. The FG30-20 housing is suitable for use in Ex Zone 2  $\text{Ex}$  II 3G EX nA II T4 Gc X.

### 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 F300K must be set to an adequate sensitivity to detect the flame simulation.

It is designed to permit the testing of all flame scanners from LAMTEC.



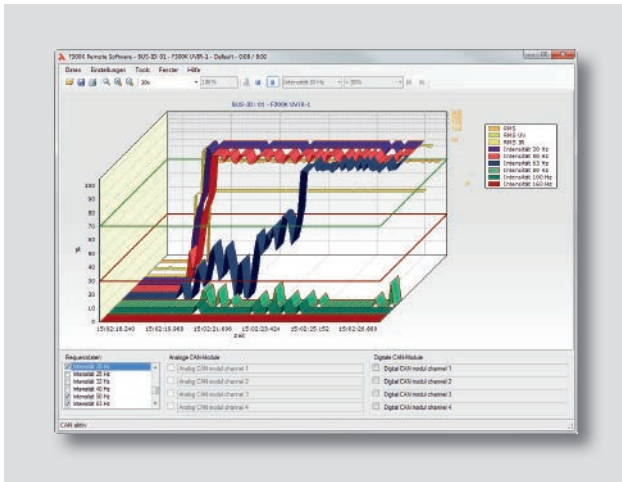
### FB30 external user interface (UI)

- Functions as for the integrated user interface
- A control unit can be coupled simultaneously with one or more F300K devices
- The control unit can be connected directly via the connection housing
- Power supply from the supply to the F300K (24 VDC)



## F300K remote software

- Connection to the PC via FSB/USB module and adapter cables
- The F300K remote software permits the full parameter setting of an F300K. In addition, it also offers analysis, data backup and recording functions
- In addition to the F300K data, you can also connect up and record external, analogue and/or digital data by means of FSB modules. All of the data is synchronised



## Repeater

One repeater is required for a total FSB line length of over 80 m. The line length can be extended to double the length using the repeater. By the use of multiple repeaters, up to 32 flame scanners with a line length of several 100 m can be coupled via a bus system.



## FSB adapter

If there is no option for connecting the FSB, e.g. via a connection housing, the FSB adapter can be integrated between the F300K and connection cable.



## FSB gateway

An interface to the control technology can be implemented via the FSB gateway. This means the data from one or from up to F300K devices can easily be sent via a control technology field bus.



FSB gateway is available for the following field buses:

- PROFIBUS (slave)
- MODBUS TCP (client/server)
- MODBUS RTU (master/slave)
- Ethernet (Frame)
- CANopen

# Order information

659A50 -	A 10	A 20	A 30	A 40
	SPECTRUM	HOUSING	Not assigned	CUSTOMER PARAMETERS

## F300K

A 10 - "SPECTRUM"	Selection
Type UV-1 UV spectral range 260 ... 400 nm	01
Type UV-4 UV spectral range 215 ... 360 nm	04
Type IR-2 IR spectral range 850 ... 1200 nm	10
Type IR-3 IR spectral range 1000 ... 1700 nm	11
Type IR-4 IR spectral range 1000 ... 2200 nm	12
Type UVIR-1 UV spectral range 215 ... 360 nm, IR spectral range 1000 ... 1700 nm	17
A 20 - "HOUSING"	Selection
with integrated user interface UI	UI
with LED display	0
in 1.4404 stainless steel with LED display	V4A
A 40 - "CUSTOMER PARAMETERS"	Selection
Default parameter settings	0*

Example: Standard version F300K UV-4 UI (with integrated user interface) = 659A5001 - 04/UI/0/0

## F300K accessories

Power supply units	Selection
Power supply FN30-00, 100 ... 240 VAC, 50/60 Hz / 24 VDC, IP20, for mounting on DIN rail	659M0400
Power supply FN30-10, 100 ... 240 VAC, 50/60 Hz / 24 VDC, in polyester housing, IP66, black	659R0401
Power supply FN30-20, 230 VAC, 50/60 Hz / 24 VDC, with relay output, in polyester housing, IP66, black	659M0402
Power supply FN30-30, 115 VAC, 50/60 Hz / 24 VDC, with relay output, in polyester housing, IP66, black	659M0403
Connecting/extension cable	Selection
Connecting/extension cable, 3 m long	659N0500
Connecting/extension cable, silicone, 3 m long	659N0510
Connecting/extension cable, 5 m long	659N0501
Connecting/extension cable, silicone, 5 m long	659N0511
Connecting/extension cable, 10 m long	659N0502
Connecting/extension cable, silicone, 10 m long	659N0512
Holders	Selection
FV30-00 screw-in holder with 1" external thread for F300K with screw connection, aluminium plating, no purging-air coupling	659SA1201
FV30-01 screw-in holder with 1" external thread for F300K with screw connection, 1.4404 stainless steel, no purging-air coupling	659SA1202
FV30-10 adjustable holder for screw fixing, with purging-air coupling	659S1200
FV40-10 adjustable holder for screw fixing, with purging-air coupling and ball joint	659S1300
Accessories	Selection
FK46 adjustable holder, with cooling-air housing and purging-air coupling, detachable, adjustable	659S1400
FK41 adjustable holder, with cooling-air housing, purging-air coupling and ball joint	659S1401
FK30 cooling-air housing	659S1100
Optional components	Selection
FG30-00 connection housing incl. socket for FSB connection, ABS plastic, IP65	659N5500
FG30-20 (Ex II) connection housing incl. socket for FSB connection, polyester, IP65	659N5502
FG30-21 connection housing, incl. socket for FSB connection, 1.4404 / 316L stainless steel, IP65	659N5504
FFP30 universal testing device for IR and UV	659M5000
External F300K user interface FB30-00, incl. connection cable, 3 m length, portable	659M2100
External F300K user interface FB30-10, incl. connection cable, 3 m length, switch cabinet installation	659M2101
F300K Remote Software, from WINDOWS XP including USB/CAN module and connecting cable, 3 m length	659R9000
F300K Remote Software, WINDOWS XP and later, incl. connection cable, 3 m length, no USB/CAN module	659R9001
Y-FSB adapter CA05-01, for direct connection of a PC with F300K Remote Software to F300K	659R0801



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