



**Flame monitoring systems for  
Single burner heating and  
Industrial applications**

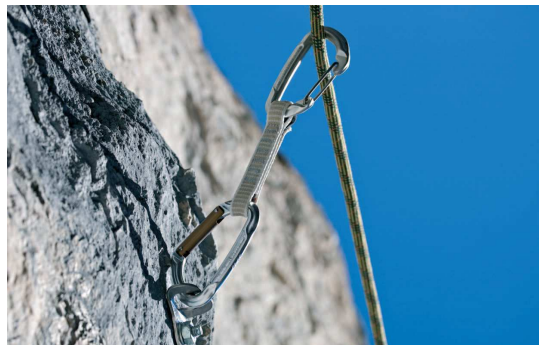
## The company - Who we are

BST Solutions GmbH, established 2004 in Ratingen, Germany, offers flame monitoring solutions for residential heating and industrial combustion in different applications. The diversity of applications and functions of these devices are based on the constant exchange of experience and close cooperation with our customers.

## We set the trends!

BST Solutions has set a number of innovative milestones in flame monitoring technology over the years:

- Processor-based Compact Flame Controller with communication ability for heating technology
- Universal flame signal output guarantees a wide variety of applications with various burner controls
- Over 20 patents covering the entire spectrum of flame monitoring, from basic research and procedures to electronic circuits.



## Safety - is our priority

Growing demands on safety and increasing significance of environmental protection pose new challenges for industrial plants. The range of BST products offers the right flame monitoring for every combustion process.

## Quality - for your satisfaction

BST Solutions pays particular attention to the complete testing of its devices before these are delivered to the customer. This guarantees our customers full and long-term operational reliability during use.

Quality starts from our Suppliers and components must satisfy our own high standards because a chain always breaks at its weakest link. This is another reason for the reliability of our products.

## Compact flame controller

Compact Flame Detector means it is agency-certified as a stand-alone device that does not require a separate amplifier module.

## Summary

Device	KLC 10/11	KLC 20	IFC/IFR 10/11	IFC/IFR 50	KHM 20	KHM 50	CFC 200 UV	CFC 200 UV1	CFC 200 IR	CFC 200 IR1
Sensor UV-Tube	X	-	X	X	-	X	-	-	-	-
Sensor Semiconductor	-	X	-	-	X	-	X	X	X	X
UV Spectrum 185 to 260nm	X	-	X	X	-	X	-	-	-	-
UV Spectrum 190 to 550nm	-	-	-	-	-	-	-	X	-	-
UV Spectrum 280 to 420nm	-	-	-	-	-	-	X	-	-	-
VIS/IR Spectrum 380 to 1150nm	-	X	-	-	X	-	-	-	-	-
VIS/IR Spectrum 300 to 1050nm	-	-	-	-	-	-	-	-	X	-
IR Spectrum 1050 to 2700nm	-	-	-	-	-	-	-	-	-	X
Viewing direction Mode	R / RA	A	A / R	A / R	A	A	A	A	A	A
			Intermittent				continuous			
Self-monitoring	-	-	-	-	-	-	X	X	X	X
Natural Gas	X	X*	X	X	X	X	X	X	-	X
Furnace Gas	X	X*	X	X	X	X	X	X	-	X
Coke Oven Gas	X	X*	X	X	X	X	X	X	-	X
Light Oil	X	X	X	X	X	X	X	X	X	X
Heavy Oil	X	X	X	X	X	X	X	X	X	X
Biomass	-	-	-	-	-	-	X	X	X	-
H <sub>2</sub> S Gas	-	-	-	-	-	-	-	-	-	X
Flame signal	FET	FET	FET	Relay	Relay	Relay	Relay	Relay	Relay	Relay
Potential free	no	no	no	yes	yes	yes	yes	yes	yes	yes
Suitable for switching input	X	X	X	X	X	X	X	X	X	X
Suitable for ionization input	X	X	X	-	X	X	-	-	-	-
Operating temperature 4°F to 140°F	X	X	X	X	X	X	X	X	X	X
Fully electronic	-	X	-	-	X	-	X	X	X	X
Maintenance free	-	X	-	-	X	-	X	X	X	X
Small size	X	X	-	-	-	-	-	-	-	-
Robust	-	-	X	X	X	X	X	X	X	X
Simple installation	X	X	X	X	X	X	X	X	X	X
Applications	Gas burner, dual fuel burner						Gas and oil burner	Diffusion flames	Claus plants, Waste incineration etc	
Industrial Usage	-	-	X	X	X	X	X	X	X	X
Heating Technology	X	X	X	X	X	X	X	X	X	X

Viewing direction: A = axial, R = radial, RA= axial and radial

## Flame detector KLC 10/11/20



### KLC 10

Is a Compact UV-flame detector for heating and single burner applications, suitable for gas-, oil- and combined fuel burners. The flame detector KLC 10 meets the requirements of UL Std 372 for burner management control units which make a 'no-flame' check after normal burner shut down when the flame amplifier is permanently energized. This Flame detector must be disconnected and restarted once per 24 hours.

How to order:

Description	Order-No.
Flame detector KLC 10/120 R, radial	612241322100
Flame detector KLC 10/120 RS , radial & sensitive*	612241322160
Flame detector KLC 10/120 RA, radial & axial**	612241323100
Flame detector KLC 10/120 RAS, radial & axial** & sensitive*	612241323160

\* Higher sensitivity reduces the lifetime of the UV-tube \*\*On axial orientation, sensitivity is reduced about 40%.

### KLC 11

Is a Compact UV flame detector for heating and single burner applications, suitable for gas, oil and combined fuel burners. After connecting to the power supply, internal increase of the UV tube voltage directly guarantees the safety requirements of UL Std 372 by checking UV tube integrity. Therefore an easy change from ionization monitoring to the KLC 11 is possible also on burner controllers without UV input.

How to order:

Description	Order-No.
Flame detector KLC 11, 120 V AC, radial	612143322100
Flame detector KLC 11, 120 V AC, radial & axial**	612143323100

### KLC 20

Wide band KLC 20 is a compact flame detector\*, specially developed for blue burning systems on residential fan burner applications. Flicker frequency of the detected flame radiation is used for the patented evaluation. A microprocessor evaluates and converts the flame signal to a digital signal that is compatible with most burner controls having external wire terminals. Field setting adjustment or commissioning are unnecessary. For gas applications, the implementation with disturbance frequency cut off is to be used. KLC COM software PC interface. Versions without disturbance cut off should not be used in gas applications.

How to order:

Description	Order-No.
Flame detector KLC 20/120 , 25/15 Hz, DFC	612211110105
Flame detector KLC 20/120 , 25/15 Hz	612211210105
Flame detector KLC 20/24 DC , 25/15 Hz, DFC	612311110105
Flame detector KLC 20/24 DC , 25/15 Hz	612311210105
Flame detector KLC 20/24 AC , 25/15 Hz, DFC	612611110105
Flame detector KLC 20/24 AC , 25/15 Hz	612611210105

## Accessories for KLC series



### KLC flange

Serves for the admission, connection and adjustment of the flame detectors KLC. Available 0.28 inch or 0.51 inch high.

How to order:

Description	Order-No.
KLC flange 0.28 inch	665001010000
KLC flange 0.51 inch	665002010000



### Angle adaptor KLC

Allows radial adjustment of the KLC 20 by means of an optimally formed reflecting surface to the flame axis. The angle KLC can substitute for the connection flange KLC

How to order:

Description	Order-No.
Angle adaptor KLC	615001020000



### Adaptor ADP

The adaptor ADP enables mounting of the KLC 20 with additional axial adjustment directly to a combustor opening. A quartz glass serves as pressure barrier and seals heating gases from the combustion chamber.

How to order:

Description	Order-No.
Adaptor ADP 10-UV, NPSM 1/2" - 14, quartz glass, aluminium	575010512110
Adaptor ADP 20-UV, NPSM 1/2" - 14, quartz glass, heat insulating	On request



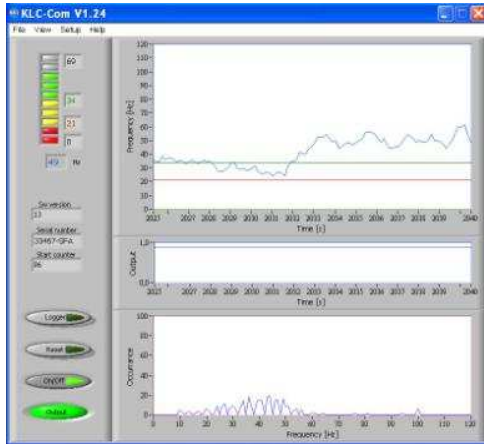
### Connection cable KLC

Consist of angle plug and a cable with stripped and crimped cable ends. Connection cable can be made to my length.

How to order:

Description	Order-No.
Connection cable KLC , length XX	On request

## Diagnostic Tool KLC COM



KLC COM is a PC interface with the flame detectors KLC 20 and KHM 20 presenting graphical and numeric display of relevant performance measurements, disturbance frequency cut off and switch status. Analysis of the flame signal is possible. Flame signal intensity and frequency distribution are displayed. This data can be stored with the data logging function and be processed with programs such as MS Excel.

How to order:

Description	Order-No.
Diagnostic tool KLC COM	731000080980

## Compact flame detector IFC/IFR 10/11

IFC/IFR 10/11 is a compact UV flame detector which is specially designed for severe conditions often experienced in industrial application single flame combustion. IFC/IFR 10/11 can be connected directly to the ionization or LDR input of the control box. The UV sensor ensures that the flame detector does not react to background radiation from hot refractory or from any other infrared light source.

The flame detector IFC/IFR 10/11 has been developed to meet the requirements of UL Std 372 for burner management control units which make a 'no-flame' check after normal burner shut down when the flame amplifier is permanently energized.



With the diopter holder, which serves also as a mounting of the flame detector to the combustion chamber, the IFC/IFR 10 can be fitted with different glasses and lenses to special requirements. This flame detector is equipped with an optical interface which visibly indicates the flame signal intensity. A simple diagnosis of the flame intensity is directly on the furnace or boiler possible.

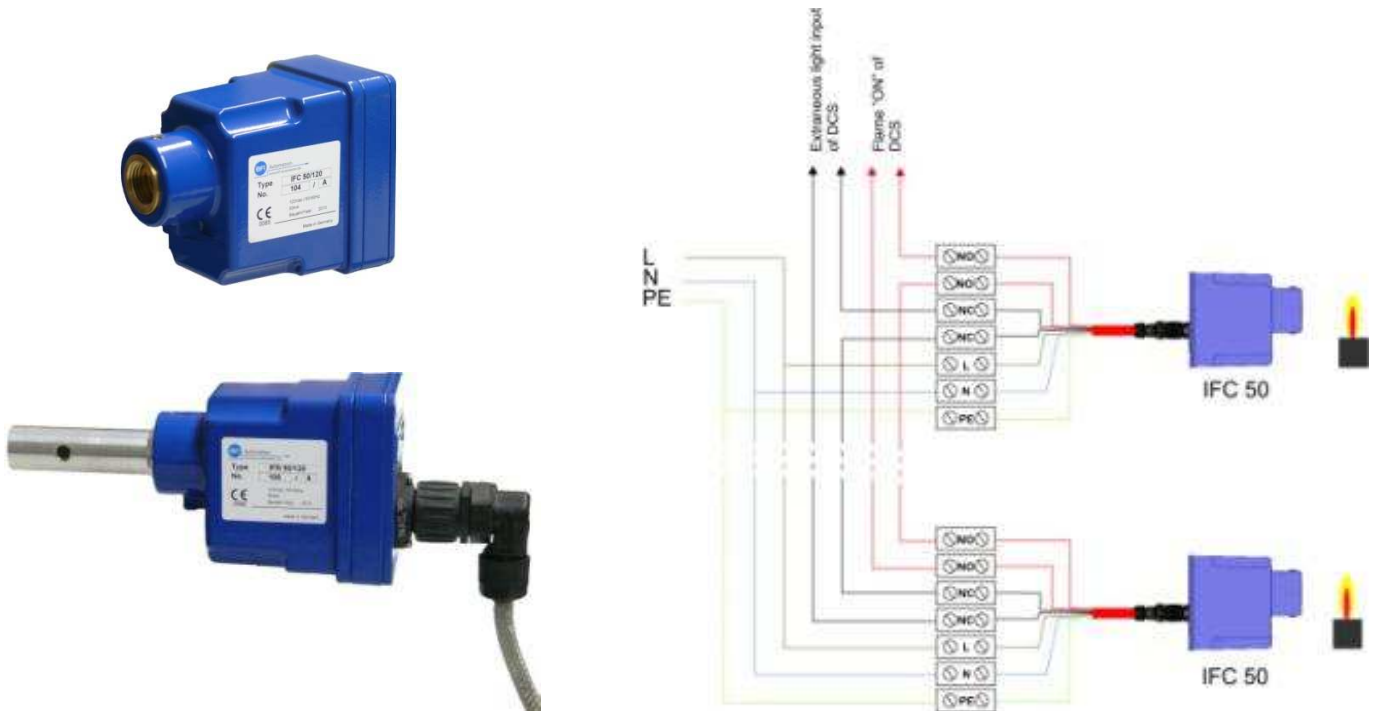
Internal increase of the UV tube voltage immediately after applying supply voltage ensures the IFC/IFR 11 to safety requirement in accordance with the UL Std 372 for examination of UV tube to through ignition.

How to order:

Description	Order-No.
IFC 10/120 , axial	612281031000
IFC 10/120 S, axial, sensitive*	612281031160
IFR 10/120 , radial	612291031000
IFR 10/120 S, radial, sensitive*	612291031160
IFC 11/120 , axial	612283031000
IFR 11/120 , radial	612293031000

\* Higher sensitivity reduces the lifetime of the UV-tube.

## Compact flame detector IFC/IFR 50



IFC/IFR 50 is a compact UV flame detector\* conceived especially for industrial furnace applications. Its internal relay offers one isolated NC contact and an isolated NO contact with high switching performance. Thus, the IFC/IFR 50 is suitable for multi-flame control with ambient light control. The flame detector IFC/IFR 50 is provided according to the UL Std 372 for firing, which requires a controlled shutdown upon flame signal interruption.

The UV tube ensures that background radiation is ignored, i.e. glowing refractory lining or mixing unit parts. The internal increase of UV tube voltage immediately after supply voltage application complies with UL Std 372 for examination UV tube on start-up for intermittent type burners.

The dioptr serves as mounting interface of the flame detector to the furnace chamber. IFC/IFR 50 can be adapted with various accessories to special applications. A LED indicates flame intensity. Easy diagnosis of the flame intensity is possible with it directly in the combustion apparatus. Suggested operating temperature range is 0°F to 140°F. Temperatures greater than 120°F reduce the life span of the UV tube. Heat-insulating accessories are available from us.

How to order:

Description	Order-No.
IFC 50/120 , axial	612285031000
IFR 50/120 , radial	612295031000



## Compact flame detector KHM 20



The wide band flame detector KHM 20 is a compact flame detector\* conceived especially for industrial single burner applications with programmable controls (i.e. PLC). The flame signal output is a product of our patented flicker evaluation of any type flame. Field setting adjustment or commissioning are unnecessary. The KHM 20 values only the flickering of the flame being monitored. DC light radiation, any constant frequency, fluorescent lamps or background radiations from refractory are ignored. The diopter serves as mounting interface of the flame detector to the furnace chamber. The KHM 20 can be adapted with glasses, lenses, filters and hole screens can be adapted to special demands. All KHM series accessories are compatible. A LED indicates operational parameters (as for example display of the flame modulation, topical switch state in dependence of the flame signal, serial number) are possible. The KLC COM software serves as an analysis tool. Suggested operating temperature range is 0°F and +140°F and short duration temperature excursions greater than 165°F (<1 min) are allowed.

KHM 20 is available in 120 V AC, 24 V AC and 24 V DC with axial viewing. The KHM 20 is equipped with the function of the disturbance frequency cut off. On this occasion, detects the KHM 20 only real flames which mark themselves by an unstable changing frequency. DC light radiations and any steady frequency, e.g., from fluorescent lamps or other electric lights, are faded out and do not lead to a lasting flame recognition. This function will enable, after the light sensor with a source of light with steady frequency will be impinged, the switching output of the KHM 20 first and after approx. 5-9 seconds it switches off again.

How to order:

Description	Order-No.
KHM 20/120 , 25/15 Hz , DFC for ionization	612231130105
KHM 20/120 , 25/15 Hz , DFC for PLC	612231130205
KHM 20/24 AC, 25/15 Hz, DFC for ionization	612631130105
KHM 20/24 AC, 25/15 Hz, DFC for PLC	612631130205
KHM 20/24 DC, 25/15 Hz, DFC for ionization	612331130105
KHM 20/24 DC, 25/15 Hz, DFC for PLC	612331130205

## Compact flame detector KHM 50



KHM 50 is a compact UV flame detector\* conceived especially for industrial single burner applications, particularly for use with programmable controls (i.e. PLC).

The UV tube ensures that background radiation, such as glowing refractory linings or mixing unit parts are ignored. The internal increase of UV tube voltage immediately after supply voltage application complies with UL Std. 372 for examination UV tube on start-up for intermittent type burners.

The diopter serves as mounting interface of the flame detector to the furnace chamber. IFC/IFR 50 can be adapted with various accessories to special applications. A LED indicates flame intensity. Easy diagnosis of the flame intensity is possible with it directly in the combustion apparatus. Suggested operating temperature range is 0°F to 140°F. Temperatures greater than 120°F reduce the life span of the UV tube. Heat-insulating accessories are available from us.

For the IFC/IFR series and the KHM series we offer a wide spectrum of accessories like diopter, cable and purge air connectors.

How to order:

Description	Order-No.
KHM 50/120 for ionization	612334031000
KHM 50/120 for PLC	612334031011

## Compact Flame Controller CFC 100



The CFC100 has been designed to monitor gas- and oil flames on single and multi burner applications. For the first time with UV tube sensors it is possible to set high-resolution thresholds for flame discrimination. Due to new shutter design with electrical/mechanical combination we increased the shutter lifetime by 20 times. Also the UV tube lifetime was increased by 3 times due to the use of special high-temperature sensors.

How to order:

Description	Order-No.
Compact flame controller CFC 100	S 550.0
Accessories	Order-No.
Hand Terminal HT 100	7040-2010-00

## Compact Flame Controller CFC 200



The compact flame controller combines flame sensor and flame amplifier in one housing.

The compact flame controller\* of the series CFC 200 are designed for monitoring gas and oil flames at single burner applications. Special applications are flame monitoring at Claus plants, fluidized bed firings, rotary kiln plants, or waste incineration. Therefore CFC 200 is offered with different spectral ranges from UV up to IR. The intensity of the flame signal can be adjusted.

How to order:

Description	Order-No.
CFC 200 UV1	S 511.0
CFC 200 UV	S 511.3
CFC 200 IR	S 511.4
CFC 200 IR1	S 511.7

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