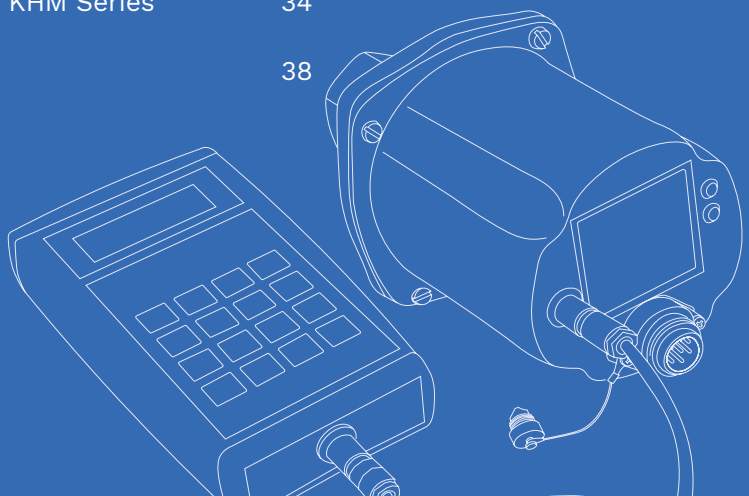
BFI Automation

Products Catalog
Flame Monitoring
& Evaluation Systems

Content



The company – Who we are

The name BFI Automation stands for innovative, trendsetting and future-oriented technology.

The family-owned company, now in its second generation, was founded in Ratingen in 1973 and has set decisive milestones in optical flame monitoring in its now almost 50-year history.

BFI Automation GmbH offers solutions for industrial flame monitoring. Through close cooperation and continuous exchange with our customers, we are always developing new systems and forward-looking technologies. This has made BFI Automation GmbH a market leader in the field of flame monitoring with representatives in over 20 countries worldwide.

The former sister company BST Solutions GmbH has been active in the field of flame monitoring for original equipment manufacturers of heating technology and industrial firing equipment since 2004. In 2023, both companies merge to form BFI Automation GmbH. By bundling the activities of both the companies under the brand name Flamonitec®, we have created the world‘s largest supply portfolio for flame monitoring systems for our customers, from heating technology to industrial firing systems and large-scale power plants. Reliable, safe and technologically at the highest level – this is what the Flamonitec® brand stands for – worldwide!

The growing demands for safety and the increasing importance of environmental protection present new challenges for industrial companies. The Flamonitec® product range offers the right flame monitoring system with all relevant safety certificates for every combustion process.

Through their maximum quality and over-fulfillment of safety standards, Flamonitec® products help to meet these challenges appropriately. A good example is that our Flamonitec® System 3000 has already met today’s safety requirements according to SIL3 for 30 years.

More than 20 patents in the field of flame monitoring show what the BFI Automation understands by innovation. The entire spectrum of flame monitoring is covered, from basic research to processes and electronic circuits.

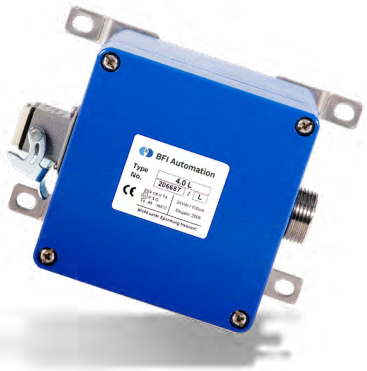
We preserve values and create sustainable innovations!

Since 2017, the BFI Automation GmbH is operating from its new facility in Heiligenhaus, Germany.

Flame Scanners – System 3000

Standard housing

Ex-housing



OE-Converter housing for FOC

Features

- Fail safe design and self checking
- Qualified for single and multi burner applications
- Certified for continuous, intermittent and 72 h operation
- Available with different spectral sensitivity ranges from UV up to IR and also in combination
- Non-wearing due to fully electronic design
- Mounting and connecting compatible with all BFI flame scanners of series 3000
- SIL 2
- SIL 3 (depending on system)

Applications

- Power plants
- Gas turbines
- H_2S-plants (Claus units)
- Duct burners
- Rotary kiln plants
- Fluidized bed firings
- Cracker
- High pressure combustions
- Waste incinerating plants/grid firings
- Residuals combustion
- Low NOx-applications

All flame scanners are building a complete flame monitoring system in combination with a flame amplifier of the series 3000 (pages 6/7).

The flame monitoring and evaluation system 3000 was developed with due consideration of safety and optimal availability of customer plants. Our goal is the safe and reliable monitoring of fuel burning systems, provision of criteria to optimize the combustion process and to reduce emission of pollutants. The system is able to discriminate flames from different burners and to monitor these flames selectively.

Technical Data

Self checking	fully electronic, once per second
Spectral sensitivity	190 to 7000 nm
Sight opening angle	2.7 °
Operating temperature	- 40 °C to + 85 °C
High temperature application	up to 600 °C with fiber optic technology (see page 24)
Power supply	24 V DC
Current consumption	approx. 100 mA
Adjustment	multiple sensitivity channels, partially seperate adjustable senstitivity ranges for UV and IR
Electrical connection	Zone 2 housings with dustproof plug-connector (optional with cable gland / conduit). Zone 1 housings with cable gland.
Type of protection	IP65 (IP66 for Ex-housings)
Cable length	500 m, up to 1000 m with special specification
Sight connection	G 1" female thread ISO 228
Purge air connection	G ½" female thread ISO 228 with standard housing
Required purge air quantity	10 m³/h
Weight	approx. 1,5 kg (approx. 4 to 13 kg with Ex-housings)
Certificates	TUEV, IECEx, ATEX, CSA/UL, EN298, SIL 2, SIL 3 for 2.0, 2.0GT, 2.0L or 2.0LA combined with 3001, 3001S or 3001D

All flame scanners are also available with fiber optic technology and/or with Ex-proof housings.

Applications

Flame Scanner	Spectral Range	Gas	Oil	Coal	H_2S
Type 2.0	300 to 2700 nm	■	■	▪	
Type 2.0 GT	300 to 2700 nm	■	■	▪	
Type 3.32	280 to 420 nm	■	■		
Type 4.0	300 to 1050 nm		■	▪	
Type 4.1	300 to 1050 nm		■	■	
Type 4.2	300 to 1050 nm		■	■	
Type 7.0	1050 to 2700 nm*	■	▪	▪	■
Type 7.0/2	1050 to 2700 nm*	■	▪	▪	■
Type 7.1	1050 to 2700 nm*	■	▪	▪	■

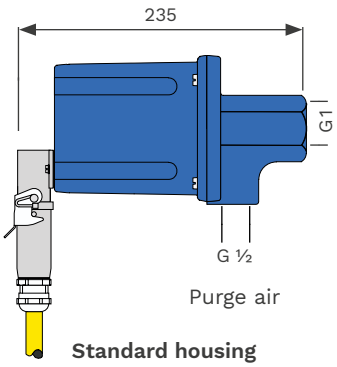
*up to 7000 nm with special glass available ■ = especially qualified ▪ = qualified

Fuels

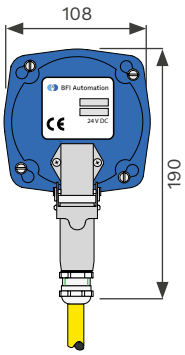
- Oil (LDO & HFO)
- Natural gas, blast furnace gas and coke oven gas
- Biomass/biogas
- Powdered coal
- Sulfur
- Naphtha
- H_2S
- H_2
- NH_3

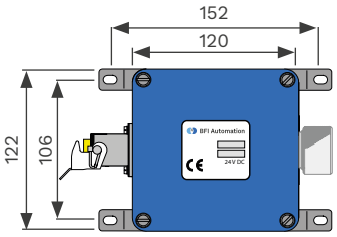
Dimensions

IP65, ATEX Zone 2, similar to NEMA4/Class 1 Div 2



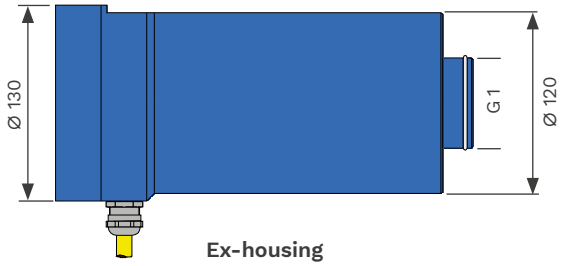
Standard housing



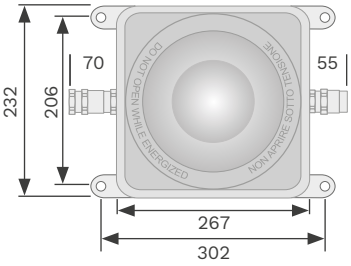


OE-Converter housing for FOC

IP66, ATEX Zone 1, similar to NEMA4/Class 1 Div 1



Ex-housing

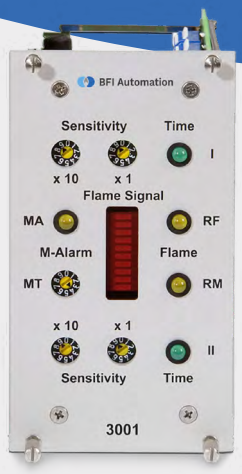


Ex-OE-Converter housing for Ex-FOC

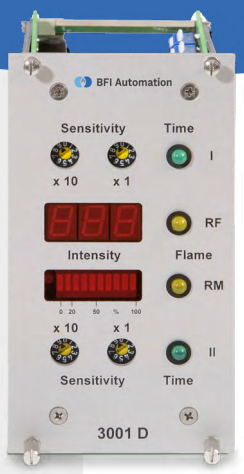
Accessories

- Swivel mount
- Ball valve
- Heating insulator
- Pressure barrier
- Measuring adapter
- Signal generator
- Special cable
- Alignment tool
- Heating
- Tropicalization

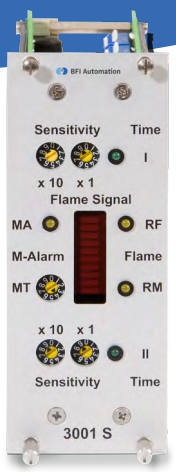
Flame Amplifiers – System 3000



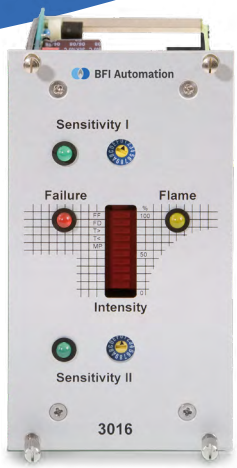
Type 3001



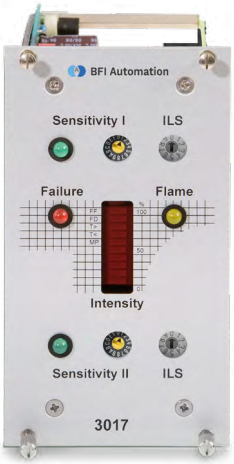
Type 3001D



Type 3001S



Type 3016



Type 3017

Features

- Fail safe design and self checking
- Selective monitoring of different flames
- Certified for continuous, intermittent and 72 h operation
- Optimization of combustion process
- Multiple sensitivity ranges and switch-off times, selectable by remote signal
- Parallel connection of multiple flame scanners (scanner redundancy)
- 19-inch design in accordance with international standards
- SIL 2
- SIL 3 (depending on system)

Applications

- Power plants
- Gas turbines
- H_2S-plants (Claus units)
- Duct burners
- Rotary kiln plants
- Fluidized bed firings
- Cracker
- High pressure combustions
- Waste incinerating plants/grid firings
- Combustion of residuals
- Low NO_x-applications

All flame amplifiers are building a complete flame monitoring system in combination with a flame scanner of series 3000 (pages 4/5).

The flame monitoring and evaluation system 3000 is based on different flame amplifier modules, manufactured as 19"-slide-in modules. They contain all control logics and provide the signals for external processing.
The flame monitoring and evaluation system 3000 was developed with due consideration of safety and optimal availability of customer plant. The goal is the safe and reliable monitoring of fuel burning systems, provision of criteria to optimize the combustion process and to reduce emission of pollutants. The system is able to discriminate flames from different burners and to monitor these flames selectively.

Technical Data

Self checking	fully electronic, once per second
Flame intensity output	0/4 to 20 mA
Relay output	1 safety change-over-contact, internally fused 1A 1 auxiliary change-over-contact (3001/3001D/3001S/ 3016, 3017), 1 failure alarm (3016, 3017)
Power supply	24 V DC
Current consumption	approx. 300 mA (3001, 3001D, 3001S, 3016, 3017)
Operating temperature	- 20 °C to + 70 °C (3001, 3001D, 3001S) 0 °C to + 60 °C (3016, 3017)
Cable lenght	500 m, up to 1000 m with special specification
Safety	fail safe design, self checking
Mode of operation	continuous
Weight	see 'Technical Features' on next page
Type of protection	IP00
Safety switch OFF time	selectable 1 to 6 s (3001, 3001D, 3001S) selectable 200 to 650 ms (3016) selectable 0,5 to 6 s (3017)
Certificates	TUEV, CSA, UL, EN298, SIL 2, SIL 3 for 3001, 3001S/ 3001D combined with 2.0, 2.0GT, 2.0L or 2.0LA

All flame amplifiers are also available in Ex-housings. See chapter 'Housings' on pages 26/27.

Technical Features

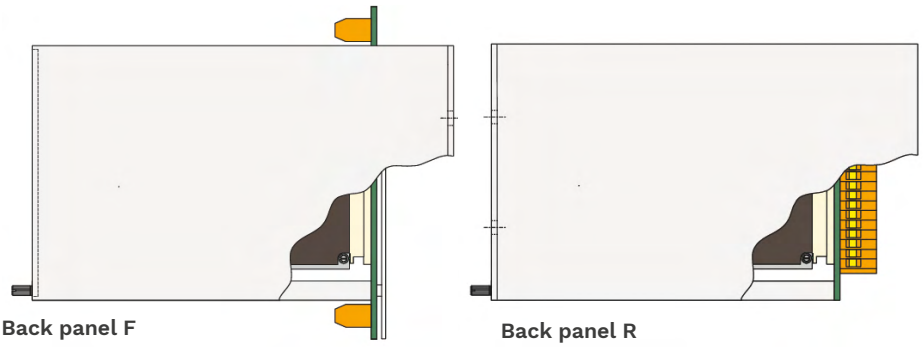
Type	3001	3001D	3001S	3016	3017
Amount of channels	2	2	2	2	2
Amount of sensitivity channels	2	2	2	2	2
Switch OFF times	1-6 s	1-6 s	1-6 s	200-650 ms	0,5-6 s
Intensity bar graph	■	■	■	■	■
Intensity indication, digital	-	■	-	-	-
Impulse divider	-	1:1, 1:2, 1:4	-	-	-
Pre-alarm	adjustable	50% fix	adjustable	adjustable	adjustable
Dimensions in 19"-units	14HP/3U	14HP/3U	10HP/3U	14HP/3U	14HP/3U
Weight (approx.)	450 g	460 g	410 g	320 g	330 g
SIL	SIL 3*	SIL 3*	SIL 3*	SIL 2	SIL 2

***in combination with flame scanner 2.0 / 2.0GT / 2.0L / 2.0LA** ■ **= Yes - = No**

Overview Material Numbers

Type	Material-No.
Flame amplifier 3001	6020-3001-00
Flame amplifier 3001D	6020-3001-20
Flame amplifier 3001S	6020-3001-40
Flame amplifier 3016	6020-3016-00
Flame amplifier 3017	6020-3017-00

Overview about available cable connections for 19" racks, built-on and built-in housings. (Dimensions see chapter 'Housings' on page 26)



Back panel F

Back panel R

Housing Variants

- 19"-rack
- 19"-built-in housing
- 19"-built-on housing
- Wall mounting housing IP66
- Ex-wall mounting housing for ATEX Zone 1

Accessories

- Multipoint connector
- Back panel R, F or RTA
- Signal generators
- Power supply modules
- Selector units
- Flame evaluation unit
- Signal evaluator unit
- Special cable
- Heating
- Tropicalization

Back panels and Connectors

Our backpanels providing screw terminals for easy wiring, accessible from rear side (R) and front side (F). The back panel 3001RTA offers an additional failure output.

Compact Flame Controller – CFC x000

Standard housing

Ex-housing

OE-Converter housing for FOC

Features

- Fail safe design and self checking
- Qualified for single and multi burner applications
- Available with different spectral sensitivity ranges from UV up to IR and also in combination
- Certified for continuous, intermittent and 72 h operation
- Non-wearing due to fully electronic design
- Programmable via software
- Flame analysis via software
- Bus-ready in combination with converter 5012/5012SD/6012
- Robust housing
- SIL 3
- IECEx

Applications

- Power plants
- Gas turbines
- H_2S-plants (Claus units)
- Duct burners
- Rotary kiln plants
- Fluidized bed firings
- Cracker
- High pressure combustions
- Waste incinerating plants/grid firings
- Residuals combustion
- Low NO_x-applications
- Decarbonized combustions (e.g. H2/NH3)

The Compact Flame Controller CFC combines flame scanner and flame amplifier module built as an all-in-one system.

The Compact Flame Controller CFC x000 series has been developed for applications on large steam generators and industrial boilers. The goal is safe and reliable monitoring of fuel burning systems, provision of data to optimize the combustion process and to reduce emission of pollutants. The system is able to discriminate flames from different burners and to monitor these flames selectively. All parameters can be optimized for any combustion via the corresponding software.

Technical Data

Self checking	fully electronic, once per 800 ms
Spectral sensitivity	190 to 7000 nm
Sight opening angle	2.7 °
Operating temperature Version UV / UV1	- 40 °C to + 85 °C (- 20 °C to + 70 °C with CSA & IECEx) - 55 °C to + 85 °C
High temperature application	up to 600 °C with fiber optic technology (see page 24)
Flame relay	1 switch over contact (potential free)
Safety switch OFF time	1 to 5 s
Flame intensity output	0/4 to 20 mA
Power supply	24 V DC
Current consumption	approx. 100 mA
Adjustment	multiple parameter channels, remote selection, adjustable via software
Electrical connection	Zone 2 housings with dustproof plug-connector (optional with cable gland/conduit). Zone 1 housings with cable gland.
Type of protection	IP65 (IP66 with Ex-housings)
Sight connection	G 1" female thread ISO 228
Purge air connection	G ½" female thread ISO 228 with standard housing
Required purge air quantity	10 m³/h
Weight	approx. 1,5 kg (approx. 4-13 kg with Ex-housings)
Certificates	TUEV, IECEx, ATEX, CSA, AGA, EN298, SIL 3, UL, IECEx
Interface	infrared (for software CFC Com1) RS 232/485 (for software CFC NET)

Our Compact Flame Controllers CFC x000 are also available with fiber optic technology and/or with Ex-proof housings.

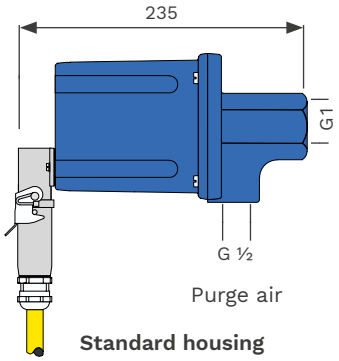
Applications

CFC Type	Spectral Range	Spectral Sensitivity	Gas	Oil	Coal	H_2S	Bio	H_2
CFC x000UV	UV	280 to 420 nm	■	■			■	■
CFC x000UV1	UV/VIS	190 to 550 nm	■	■			■	■
CFC x000IR	UV/IR	300 to 1050 nm		■	■		■	
CFC x000IR1*	IR	1050 to 2700 nm (7000 nm)	■	■	■	■	■	■
CFC x000IR2	UV/IR	300 to 2700 nm	■	■	■		■	■
CFC x000IR3	IR	1050 to 2700 nm				■	■	■
CFC x000IR4*	UV/IR	300 to 1050 nm	■	■	■			

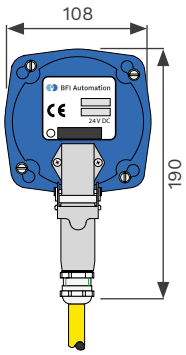
***not available for CFC 1000** ■ **= especially qualified** ■ **= qualified**

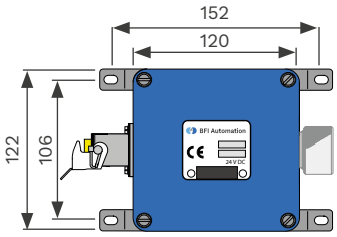
Dimensions

IP65, ATEX Zone 2, similar to NEMA4 / Class 1 Div 2



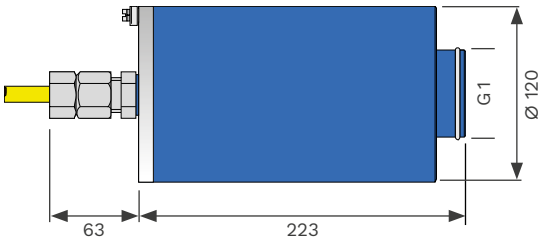
Standard housing



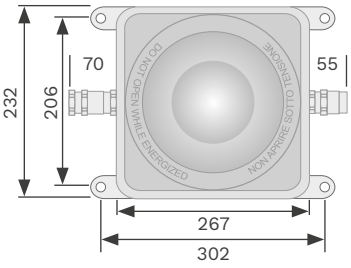


OE-Converter housing for FOC

IP66, ATEX Zone 1, similar to NEMA4 / Class 1 Div 1
*The Ex-housing is also available in V4A stainless steel



Ex-housing



Ex-OE-Converter housing for Ex-FOC

CFC-Configuration

Function	CFC 1000	CFC 2000	CFC 3000	CFC 4000
Multiple (2/4) parameter channel, remote selection		■	■	■
Frequency analysis via software		■	■	■
DC-rough signal evaluation via software		■	■	■
RS 232 interface, network ready with converter 5012 (uni-directional)			■	
RS 232 interface, network ready with converter 6012 (bi-directional)				■
Failure output	■	■		

■ **= Function available**

Fuels

- Oil (LDO & HFO)
- Natural gas, blast furnace gas and coke oven gas
- Biomass / biogas
- Powdered coal
- Sulphur
- Naphtha
- H_2S
- H_2
- NH_3

Accessories

- Swivel mount
- Ball valve
- Heating insulator
- Pressure barrier
- Signal generator
- Special cable
- Alignment tool
- Heating
- Tropicalization
- Power supply
- Adapter unit
- Converter 5012 / 6012
- Software
- CFC COM x000 / NET / TAB

Network Solution for CFC x000

Network Solution

CFC 4000 / 6012 with bi-directional data communication:

DCS / BMS
- 6012 provides signals for DCS / BMS:
- Flame Relay (SIL3)
- 3x mA output

Service Computer (at the burner)
SERVICE ENGINEER & CFC COM x000
- Local configuration of CFC via IR communication cable
- Parameter management
- Flame analysis
- Signal recording

Operator Station (control room)
OPERATOR & CFC NET
- Boiler overview for operator
- Flame analysis
- Signal recording

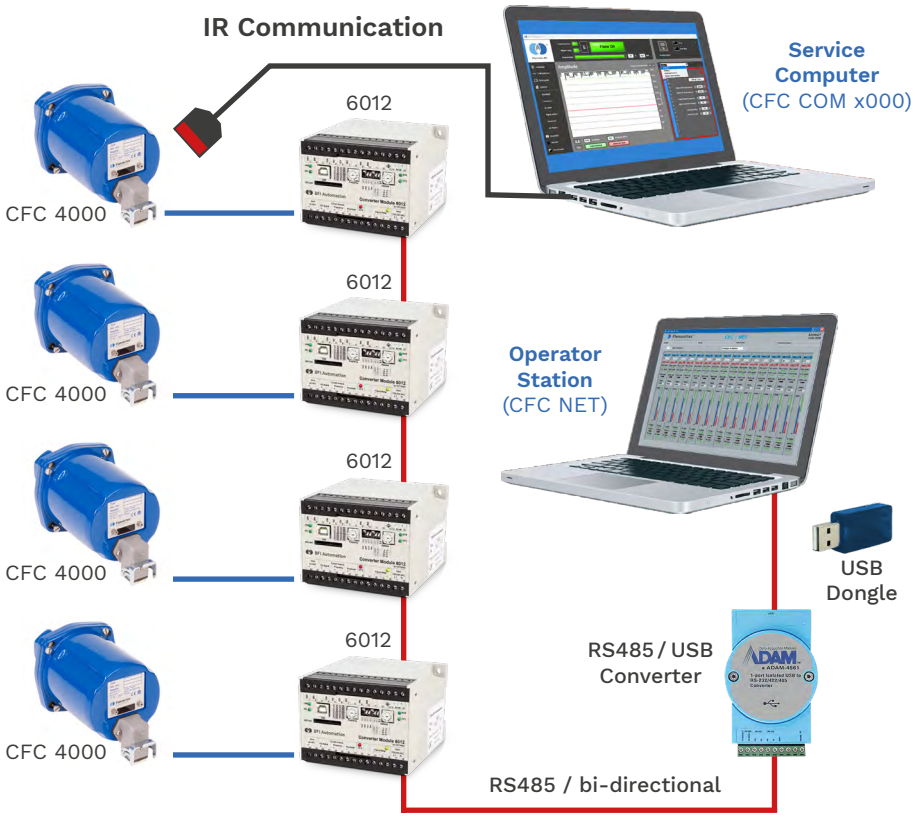
SERVICE ENGINEER, CFC NET & USB DONGLE
- Remote configuration of CFC via RS485 from control room
- Parameter management
- Flame analysis
- Signal recording

Converter 5012 / 5012SD / 6012

A wide range power supply unit and a relay for higher contact ratings are integrated. In combination with a CFC 3000/4000 it provides up to 3 analog output signals for different flame characteristic information, which supports your DCS to optimize the combustion process.

In addition to this, a network of up to 64 CFC 3000/4000 can be established by connecting the converters on a RS485 bus.

The converters 5012SD and 6012 are providing a SD-Card slot for data recording.



Converter 5012

Converter 5012SD

Converter 6012

Technical Data

	Converter 5012/5012SD	Converter 6012
In combination with	CFC 3000	CFC 4000
Power supply input	24 V DC or 100 to 240 V AC	24 V DC or 100 to 240 V AC
Current consumption	approx. 125 mA	approx. 125 mA
Flame relay	1 change-over-contact 250 V / 1 A	1 change-over-contact 250 V / 1 A
Analogue output	0/4 to 20 mA	0/4 to 20 mA
Datalogger on SD-Card (up to 32 GB)	5012 = No 5012SD = Yes	6012 = Yes
Data output	RS485	RS485
Operating temperature	- 20 °C to +60 °C	- 20 °C to +60 °C
Dimensions (W x H x D) mm	99,7 x 75 x 115	99,7 x 75 x 115
Type of mounting	DIN rail mounting (35 mm) or built-on	DIN rail mounting (35 mm) or built-on
Type of protection	IP20	IP20
Weight	approx. 450 g	approx. 450 g

Functional Upgrades of CFC x000

Multi Output Board for GE Gas Turbines

For fail-safe (SIL3) output signals to all control systems:

- Relay output (e.g. Mark IV)
- Pulse output (e.g. Mark V)
- Current output (e.g. Mark VI)

All outputs available on board and selectable via jumper.
(available in OE-Converter wide housing)

Fuel Discrimination Relay

The fuel discrimination relay provides a clear information in multi-fuel application via dry relay contact. The fuel discrimination bases on precise frequency information of two different fuels (1-Hz-Discrimination). (available in OE-Converter housing)

Network via RS485 Interface

For long distances up to 1,200 meters. Remote analysis and configuration of up to 64 CFC 3000 or CFC 4000 with CFC NET software from control room. (available in all ATEX Zone 2 housings)

SD-Card Recorder

For permanent data logging of detailed flame quality and status information on SD card. Data volume 100 MB/day with approx. 25 measurements per second for detailed analysis and reporting. (available in OE-Converter wide housing)

Ready for Operation Relay

Output via potential-free relay contact. (available in all housings, optional)

Wire Break Detection

For detection of wire break & shortcut in relay output circuit.
(available in all housings, optional)

Screw Terminal Connection

(available in OE-Converter wide housing)

CFC x000 in OE-Converter Wide Housing

Upgrades for CFC x000

The Compact Flame Controllers CFC 3000 and CFC 4000 can be upgraded with new hardware features.
Depending on grade of functionality those upgraded CFCs are available in different housings.

Applications

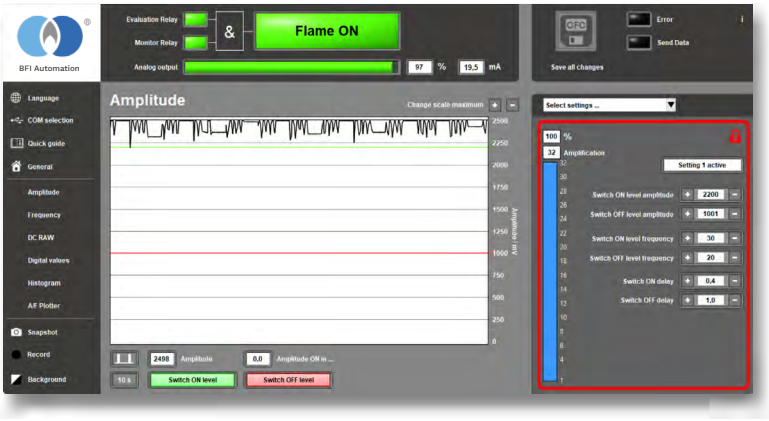
- Retrofit of gas turbines
- Flame detector of large steam generators with centralized managment of signals and parameters (boiler overview, remote configuration, signal recorder, etc.)

Software for CFC x000

Features

- Pure flame radiation signals in real-time and with analysing diagrams
- Visualization of output signals
- Switch ON/OFF thresholds
- Switch ON/OFF times
- Data logger
- Storage and uploading of CFC settings
- Multilingual
- Sensitivity setting
- Failure memory

CFC COM x000



Our software **CFC COM x000** enables flame analysis and programming of any Compact Flame Controller type CFC x000.

Features

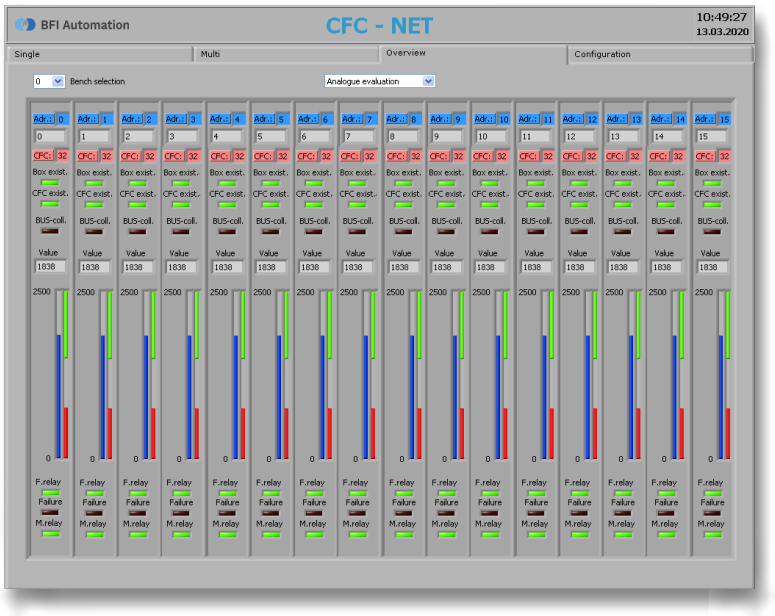
- Pure flame radiation signals in real-time and with analysing diagrams
- Visualization of output signals
- Switch ON/OFF thresholds
- Switch ON/OFF times
- Data logger
- Storage and uploading of CFC settings
- Sensitivity setting
- Failure memory

CFC - COM 1 Tab

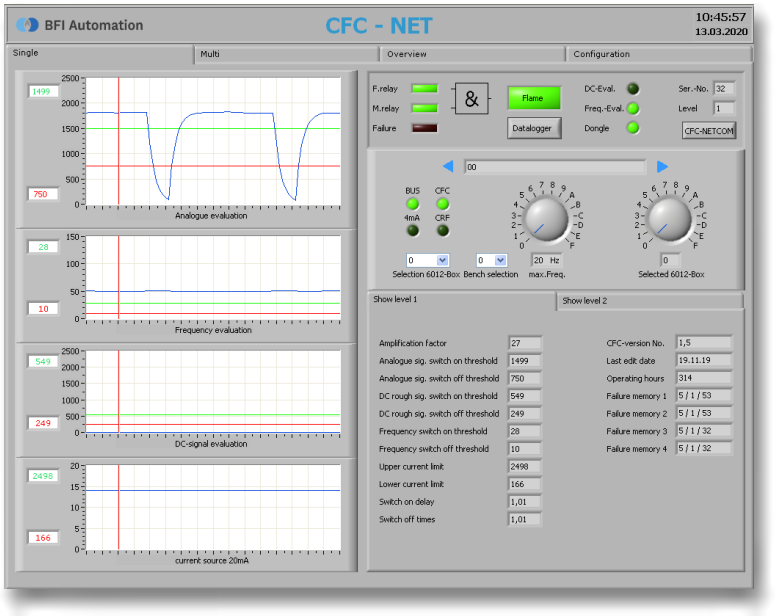
CFC - COM 1 Tab has been designed especially for the use with touch screen PC's (tablets).

Communication Software and Accessories	Material-No.
Communication set for CFC x000 (Software and IR-Cable)	6040-4901-00
USB/IR Data interface cable, 1.5 m	6040-4810-10
USB/IR Data interface cable, 3 m	6040-4810-13
USB/RS 485 - converter (STIXL), USB-Stick	5040-0485-00
USB/RS 485 - converter (ADAM), DIN rail mounting	5040-4561-00
USB Dongle	5040-0420-00
Converter 5012, DIN rail mounting	6020-5012-00
Converter 5012, integrated in a wall mounting housing IP66	6020-5012-01
Converter 5012SD, DIN rail mounting	6020-5012-02
Converter 5012SD, integrated in a wall mounting housing IP66	6020-5012-03
Converter 6012, DIN rail mounting	6020-6012-00
Converter 6012, integrated in a wall mounting housing IP66	6020-6012-01
Programming device for CFC x000 with 8" Touch Screen	7040-2001-00

CFC - NET



Our software **CFC - NET** enables the operator to get a clear overview about flame information of all connected CFC 3000/4000. The CFC bus capability can be achieved via the converter 5012/5012SD/6012.



Features

- Analyzing on diagrams in real-time
- Switchover from boiler overview to burner view
- Visualization of output signals
- Switch ON/OFF thresholds
- Switch ON/OFF times
- Sensitivity settings
- SD-Card data logger with 5012SD or 6012
- Multilingual
- Configuration menu
- Failure memory
- Remote programming of CFC 4000 with converter 6012 from control room via USB Dongle

Compact Flame Controller – CFC 200

Standard housing

Ex-housing

OE-Converter housing for FOC

Features

- Fail safe design and self checking
- Particularly suitable for single burner applications
- Available with different spectral sensitivity ranges from UV up to IR and also in combination
- Non-wearing due to fully electronic design
- SIL 2
- Cost-efficient

Applications

- Power plants
- Duct burner
- High pressure plants
- Claus plants
- Waste incineration plants/grid firings
- Rotary kiln plants
- Fluidized bed firings
- Cracker
- Residue incineration
- Low NO_x-applications

The Compact Flame Controller CFC 200 unites flame scanner and flame amplifier in one housing.

The Compact Flame Controllers of the series CFC 200 are designed for the monitoring of gas- and oil flames on single burner applications.

Technical Data

Self checking	fully electronic, once per 700 ms
Spectral sensitivity	190 to 2700 nm
Angle of view	2.7 °
Operating temperature	- 20 °C to + 70 °C
High temperature application	up to 600 °C via FOC (see page 24)
Flame relay	1 change-over contact (potential-free)
Safety switch-off time	1 s, other times on request
Flame intensity	0/4 to 20 mA
Operating voltage	24 V DC
Current consumption	approx. 100 mA
Adjustment	sensitivity potentiometer
Electrical connection	Zone 2 housings with dustproof plug-connector (optional with cable gland/conduit). Zone 1 housings with cable gland.
Type of protection	IP65 (IP66 with Ex-housings)
Sight connection	G 1" female thread ISO 228
Purge air connection	G 1/2" female thread ISO 228 with standard housing
Required purge air quantity	10 m³/h
Weight	approx. 1,5 kg (approx. 4 to 13 kg with Ex-housings)
Certificates	TUEV, IECEx, ATEX, DVGW, CSA, EN298

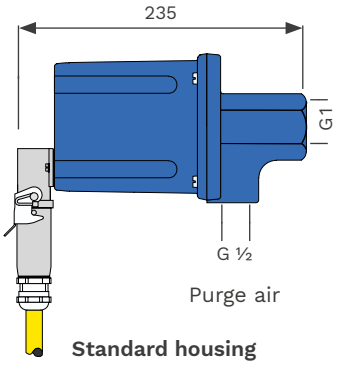
All of our Compact Flame Controllers CFC 200 are available in FOC-technology and/or Ex-versions.

Applications

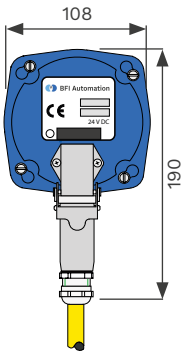
CFC Type	Spectral Range	Spectral Sensitivity	Gas	Oil
CFC 200 UV1	UV/VIS	190 to 550 nm	■	■
CFC 200 UV	UV	280 to 420 nm	■	■
CFC 200 IR	UV/IR	300 to 1050 nm	-	■
CFC 200 IR3	IR	1050 to 2700 nm	■	■

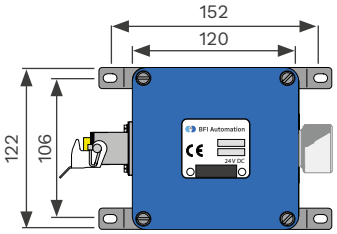
Dimensions

IP65, ATEX Zone 2, similar to NEMA4/Class 1 Div 2



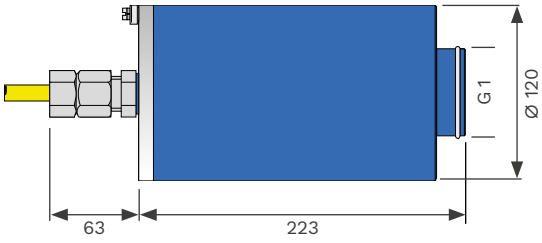
Standard housing



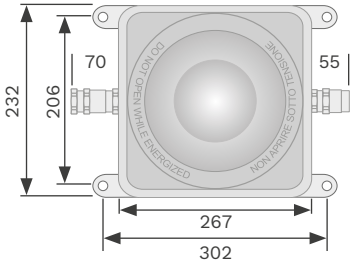


OE-Converter housing for FOC

IP66, ATEX Zone 1, similar to NEMA4/Class 1 Div 1



Ex-housing



Ex-OE-Converter housing for Ex-FOC

Type of combustions

- Light- and heavy fuel oil
- Natural-, furnance- and coke oven gas
- Biomass
- H_2S-gas

Accessories

- Swivel mount
- Ball valve
- Heating insulator
- Pressure barrier
- Signal generator
- Special cable
- Alignment tool
- Heating
- Tropicalization

Compact Flame – Controller CFC 100

Compact Flame Controller type CFC 100 with hand programming device HT 100

Features

- Fail safe design and self checking
- Certified for continuous and intermittent operation
- Qualified for single and multi burner applications
- Dual channel flame monitoring system
- Intensity and relay status indication via LED
- 3 times increased lifetime of the UV-tube
- 20 times increased shutter lifetime

Applications

- Power plants
- Duct burner
- Surface burner
- Rotary kiln plants
- Fluidized bed firings
- Cracking
- Mesh burner
- Quartz burner
- Waste incineration plants
- Low NO_x-applications

Type of combustions

- Natural gas
- Oil
- Mix firing

Accessories

- Hand programming device
- Operating terminal
- Power supply
- Swivel mount
- Ball valve
- Heating insulator
- Pressure barriere
- Special cable
- Alignment tool
- Heating
- Tropicalization

The Compact Flame Controller CFC 100 combines flame scanner and flame amplifier module built as all-in-one system.

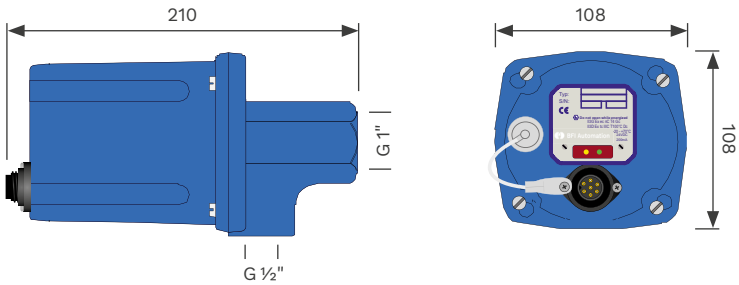
The Compact Flame Controller CFC 100 has been designed to monitor gas- and oil flames on single and multi burner applications. First time with UV tube sensors it is possible to set high-resolution thresholds for flame discrimination. Due to new shutter design with an electrical/mechanical combination the CFC 100 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.

Technical Data

Self checking	2 minutes electronically followed by 5 s electro-mechanically
Spectral sensitivity	185 to 260 nm
Angle of view	2.7 °
Operating temperature	- 20 °C to + 60 °C
Flame relay	1 change-over contact (potential-free)
Safety switch-off time	1 s
Operating voltage	24 V DC
Power consumption	approx. 200 mA
Electrical connection	dust-proof connector
Type of protection	IP65
Sight connector	G 1" female thread ISO 228
Purge air connector	G ½" female thread ISO 228
Required purge air quantity	10 m³/h
Weight	approx. 1.5 kg
Certificates	EN298, UL
Type	**Material-No.**
Compact Flame Controller CFC 100	6012-1031-00
Hand programming device HT 100	7040-2010-00

Dimensions

IP65, similar to NEMA4/Class 1 Div 2



Power Supply Units

Technical Data	3002	3002A
Input voltage	230 V AC or 115 V AC	230 V AC or 115 V AC
Output voltage	24 V DC	24 V DC
Output current	2 x 2.5 A	1 x 2.5 A
Power	2 x 60 VA	1 x 60 VA
Status indication	LED	LED
Status information	-	Relay output
Type of protection	IP00	IP00
Operating temperature	- 20 °C to + 70 °C	- 20 °C to + 70 °C
Weight	approx. 2.5 kg	approx. 2.5 kg
Front dimensions	70.78 mm (14HP) x 128.7 mm (3U) x 188.0 mm	70.78 mm (14HP) x 128.7 mm (3U) x 188.0 mm
Type	**Material-No.**	**Material-No.**
230 V AC	6020-3002-00	6020-3002-10
115 V AC	6020-3002-01	6020-3002-11

Power Supply Unit 3002/3002A

Supplies all components of BFI Flame Monitoring System with the needed voltage of 24 V DC. The power supply is optionally available with status information with model 3002A.

Technical Data	5002
Input voltage	230-240 V AC or 115-120 V AC
Power consumption	approx. 100 mA
Output voltage	24 V DC
Output current	200 mA
Type of mounting	DIN rail, 35 mm
Type of protection	IP20
Operating temperature	- 20 °C to + 60 °C
Weight	approx. 0.5 kg
Dimensions	45 x 73 x 120 mm
Type	**Material-No.**
230 V AC	6020-5002-00
115 V AC	6020-5002-01

Power Supply Unit 5002

The power suppply can be used for all BFI Compact Flame Controllers. It supplies enough power for one device and it is equipped with a relay for higher switching power. The device is designed for DIN rail mounting. Electrical connection by screw terminals.

Converter 5012/5012SD/6012

The integrated wide range power supply serves the Compact Flame Controller CFC x000 with the needed 24 V DC. (Technical details see on page 10)

Flame Evaluation, Selector Unit & Diode Decoupling Unit

Flame Evaluation 3003

The flame evaluation 3003 operates in combination with one flame scanner and flame amplifier of the series 3000 and displays the digital scanner output signal. The 3003 provides additional relay outputs, controlled by adjustable thresholds and ON/OFF delay times.

Technical Data	3003
Power supply	24 V DC
Current consumption	approx. 100mA
Intensity indicator	LED-7-segment 3-digit
Status indication	relais output (RD) fault diagnostic (FD)
Threshold	adjustable, 001 to 999
Switch-ON delay	adjustable, 1s to 9s
Switch-OFF delay	adjustable, 1s to 9s
Type of protection	IP00
Operating temperature	- 20 °C to + 70 °C
Weight	approx. 0.5 kg
Dimensions	70.78 mm (14HP) x 128.7 mm (3U) x 188.0 mm
Material-No.	6020-3003-00

Flame Evaluator 3007

The flame evaluator 3007 converts up to four digital flame scanner output signals into linear analog signal outputs. The measurement range of each channel can be adjusted separately. The 3007 is a supplementary unit to our flame amplifiers.

Technical Data	3007
Power supply	24 V DC
Current consumption	approx. 340 mA
Channels	4
Output per channel	0/4 to 20 mA, max. load 500 Ohms
Measurement ranges	5 selectable
Type of protection	IP00
Operating temperature	- 20 °C to + 70 °C
Weight	approx. 0.4 kg
Dimensions	70.78 mm (14HP) x 128.7 mm (3U) x 188.0 mm
Material-No.	6020-3007-00

Technical Data	3012
Power supply	24 V DC
Current consumption	approx. 100mA
Decoupling	4 x 2,5 A; 24 V DC
Voltage monitoring Low voltage High voltage	24 V DC - 20 % + 20 %
Failure alarm output	switch over relay contact, one per channel
Failure alarm reset	local or remote
Status indication	operation: LED green alarm: LED red
Type of protection	IP00
Operating temperature	- 20 °C to + 70 °C
Weight	approx. 0.4 kg
Dimensions	70.78 mm (14HP) x 128.7 mm (3U) x 188.0 mm
Material-No.	6020-3012-00

Diode Decoupling Unit 3012

The purpose of this diode decoupling and voltage monitoring unit 3012 is to decouple four separate DC power supplies (e.g. 2 x 3002) and to monitor over and under voltages. In combination with two power supply units the 3012 creates a redundant power supply with alarm output.

Technical Data	3210
Power supply	24 V DC
Current consumption	approx. 100 mA
Signal output	selected flame scanner signal, summarized flame signal, failure alarm contact
Status indication	two-color-LED per Signal, failure alarm-LED
Failure alarm relay	2 switch-over contacts, 250 V/ 1A / 300 VA
Type of protection	IP00
Operating temperature	- 20 °C to + 70 °C
Weight	approx. 0.3 kg
Dimensions	70.78 mm (14HP) x 128.7 mm (3U) x 188.0 mm
Material-No.	6020-3210-00

Selector Unit 3210

The selector unit 3210 provides up to three single flame intensity scanner signals on one output and in addition the summarized signal of the connected flame scanners. This selector unit is an ideal supplement for a redundant flame scanner operation in combination with our flame evaluation unit 3003. An on board failure alarm output can be used to identify a flame scanner without signal.

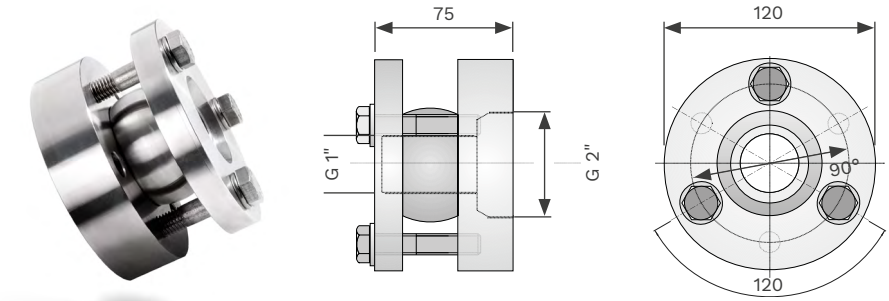
Accessories

Pressure Barrier

Prevents the pass out of hot and toxic combustion gases on overpressure furnaces and protects personnel and the flame scanner. Optional available with purge media inlet and for various pressures.

Swivel Mount

Use this swivel mount for the alignment of flame scanners and Compact Flame Controllers to the primary combustion zone. The range of alignment is ± 15° in all directions. The swivel mount is available with special materials (stainless steel, hastelloy, etc.) and NPT threads.



Technical Data

Material	galvanized steel	stainless steel
Process connection	G 2"	G 2"
Flame scanner connection	1"	1"
Dimensions	115 x 120	115 x 120
Weight	approx. 5 kg	approx. 5 kg
Material-No.	6590-9020-01	6590-9050-01

Ball Valves

The ball valve isolates the sight tube from the combustion chamber. The three-way-valve provides a purge media inlet, which purges the sight tube arrangement also in closed position.

Technical Data	2-Way-Valve	3-Way-Valve
G1"	1595-8821-00	1594-8831-00
G1 ½"	on request	1595-8831-00

Additional variants available on request

Optical Alignment Device

For the optimum alignment of BFI flame scanners and Compact Flame Controllers. The monitored zone and the surrounding area is shown on the special designed visor window.

BFI 235

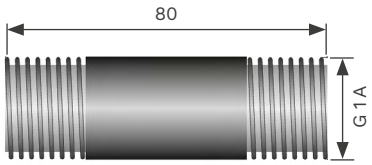
BFI 235 - EX

BFI 235 - LWL

Type	Material-No.
Optical alignment device BFI 235	6030-0235-00
Optical alignment device BFI 235 - EX	6030-0235-02
Optical alignment device BFI 235 - LWL	6030-0235-03

Heating Insulator

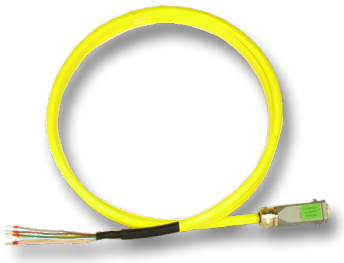
To be mounted between the swivel mount and the flame scanner/ Compact Flame Controller. It reduces the temperature transfer siginficant and protects so the flame scanner or Compact Flame Controller. Due to the special material this insulator can be used also for potential isolation between the burner and the electronic.



Technical Data	Thread Size	max. Temperature	Material-No.
Heating insulator	G 1"	260 °C	1598-0141-00
Heating insulator	NPT 1"	260 °C	1598-0143-00

Special Cable

For the connection between Flame Scanner and Flame Amplifier of the BFI System 3000. This cable provides a high efficiency protection against electrical, electrostatic and electromagnetic fields. The cable is halogen-free and resistant against microbes, oil, ozone and UV radiation. It is largely resistant to petrols, acids and alkaline solutions. For special application we provide cables like e.g. rodent proof version or UL listed cable.



All cables can be delivered with mounted connectors.

Type	Material-No.
Special cable KW5	6060-0560-00
Special cable KW5-UL	6060-0570-00
Special cable KW6	6060-0680-00
Special cable KW6-UL	6060-0670-00
Mounting of connector	9080-1201-00 (including connector)
Mounting of connector	9080-1202-00 (excluding connector)

Measurement and Test Devices

Measuring Adapter

The measuring adapters enable an interrupt-free connection of BFI measuring and test devices. The internal relay in types 236 and 237 can be used to select single scanners remotely in order to work in AND & OR operation with other BFI Flame Scanners.

BFI 234

BFI 236/237

Type	Material-No. (standard)	Material-No. (with state indicator)
Measuring adapter BFI 234 (with Harting connector)	6040-2342-00	-
Measuring adapter BFI 236 (OR operation)	6040-2362-00	7040-2362-01
Measuring adapter BFI 237 (AND operation)	6040-2372-00	6040-2372-01

Signal Generator/Evaluator

This device provides all optical and electrical signals for the functional tests of BFI flame scanners and amplifiers series 3000. The device is available with up to two light sources (UV/IR) and will be delivered along with connection cables.

By handy design of the new compact signal generator 5101 and the integrated battery it is particulary suitable for short on-site tests in the system.

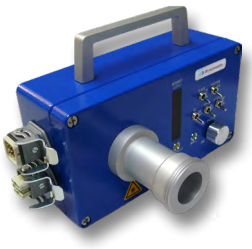
The new compact signal generator 5102 for CFC x000 is specifically designed for on-site testing of the CFC family.

The new compact signal generator 5107 is specifically designed for on-site testing of thermopile based BFI devices.

3101 IR/IR2/UV

Type	Light Source	Material-No.
Signal generator 3101 IR/IR2/UV	UVA + IRA + IRB	6030-3101-22
Signal generator 3101 NAGT	IRA + IRB	6030-0015-03
Flame signal evaluator 3103	-	6030-3103-00
Compact signal generator 5101	UVA + IRA + IRB	6030-5101-00
Compact signal generator 5102	UVA + IRA + IRB	6030-5102-00
Compact signal generator 5107	IRB	6030-5107-00

Compact signal generator 5101



Compact signal generator 5102

Compact signal generator 5107

Fiber Optic Technologies

FOC & SKL

Type	Length	X-IR	UV
Sensor head SKL with fiber optic	2 m	6051-1020-00	6055-1020-62
Sensor head SKL with fiber optic	3 m	6051-1030-00	6055-1030-62
Sensor head SKL with fiber optic	5 m	6051-1050-00	6055-1050-62
Sensor head SKL with fiber optic	7 m	6051-1070-00	6055-1070-62
Sensor head SKL with fiber optic	10 m	6051-1100-00	6055-1100-62
Other versions	on request	on request	on request

SKL

Type	Material-No.
Sensor head SKL IR	6050-9010-00
Sensor head SKL UV	6050-9020-00

Additional variants (three-hole or four-hole flange disc) available.

FOC

Standard Type	Transmission	Material-No.
FOC X-IR	300 to 2450 nm	5051-1xxx-00
FOC UV	200 to 1200 nm	5055-1xxx-62

The 'x' stands for the length in decimeter of the FOC.

Fiber Optic System

The system is consisting of a Sensor head SKL (lens unit) and a Fiber Optic Cable (FOC). This system enables the mounting of the flame monitoring system optics on locations which are not easy to reach or having high temperatures or strong vibrations. We differentiate our fiber optic systems by the spectral range, length and mounting method. Customized lengths of FOC can be quoted on request.
The standard design temperature range is - 60 to + 200 °C. We also provide high temperature versions up to + 350 °C. The glass fibers are protected by a high-strength stainless steel hose. The type of protection is IP68.

Sensor Head SKL (lens unit)

The SKL is a robust lens unit for the flame monitoring in the UV, VIS and IR range. It projects the flame radiation onto the Fiber Optic Cable (FOC). The SKL will be delivered with a 1" female thread for the mounting to the process. Various adapters/pressure barriers on request.

Fiber Optic Cable (FOC)

The FOC is made up of a high quality glass fiber bundle, which is protected by a cover of glass silk braid and a stainless steel hose against mechanical damages. Optional we provide high temperature versions up to + 350 °C.

Fiber Optic Technologies

Fiber Optic Lance (FOL)

Wherever the optic of the flame monitoring system must be mounted inside the combustion chamber or burner (e.g. tilting burner), Fiber Optic Lances are essential. The lances are available in 4 different standard designs. Customized configuration of single lengths A to D.

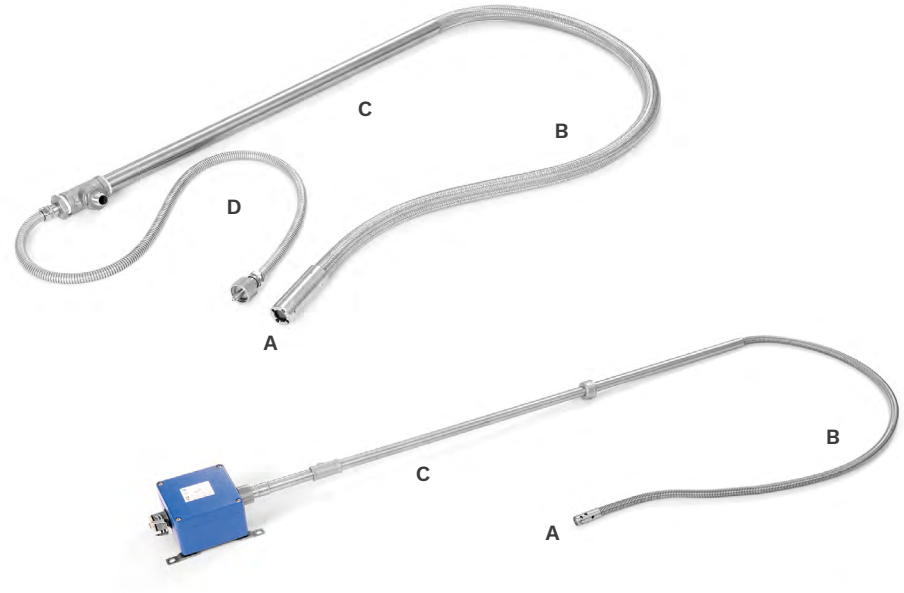
The air cooled Fiber Optic Lances are also in high temperature versions available. Beside our standard version with maximum temperatures up to + 200 °C we provide the following high temperature (HT) versions:

- + 350 °C
- + 600 °C

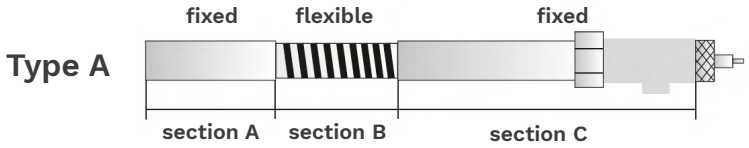
The total length should not exceed 20 m.

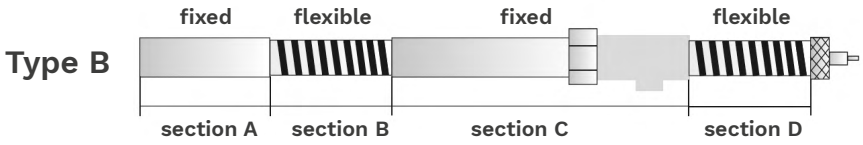
Accessories

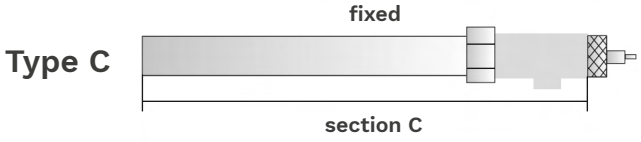
- Guiding tube, fixed
- Guiding tube, flexible
- Guide tube stopper

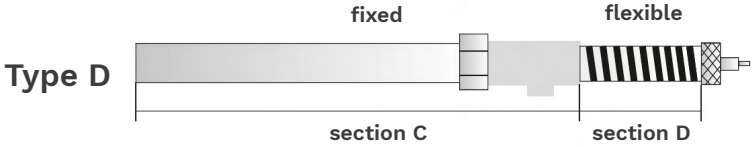


Customized configuration of single lengths A to D.



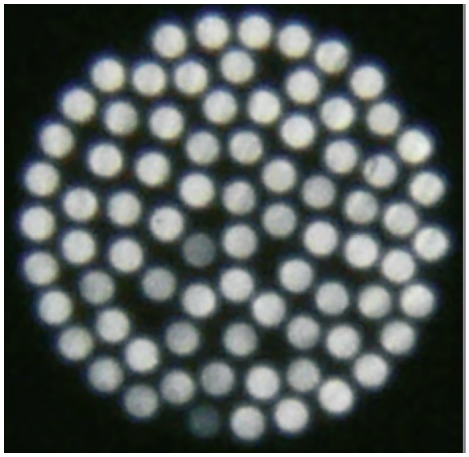




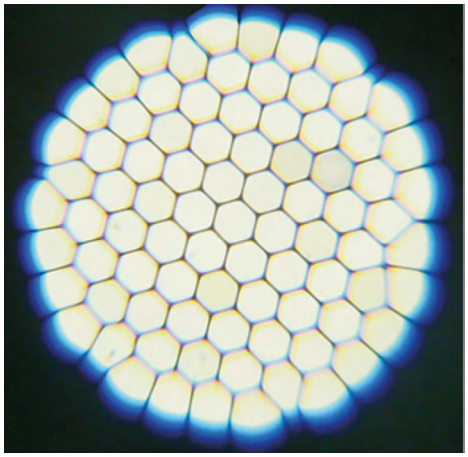


BFI Fibre Optic Lances can be designed as per customers request. Highly economical for replacement of existing FOL by using existing guide tubes (plug & play) during boiler operation.

Special Fiber Optic Solutions



Fiber bundle Standard-FOC and HT-FOC



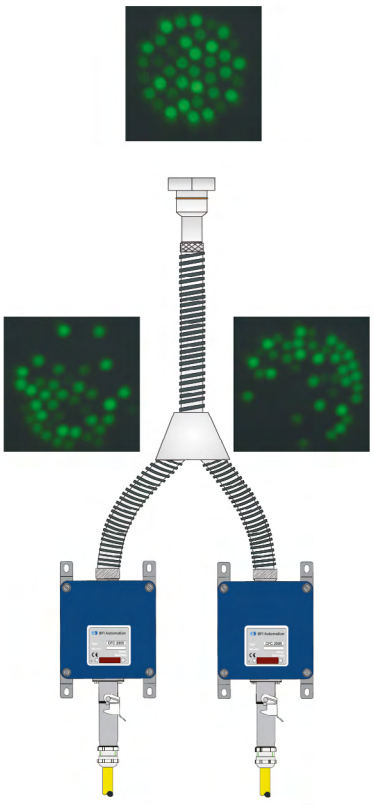
Fiber bundle Super-HT-FOC

Due to the glue technology the space in between the single glass fibers can not be used for the light transport. The usable area for light transport typically amounts to approx. 50 % of the total fiber bundle area.

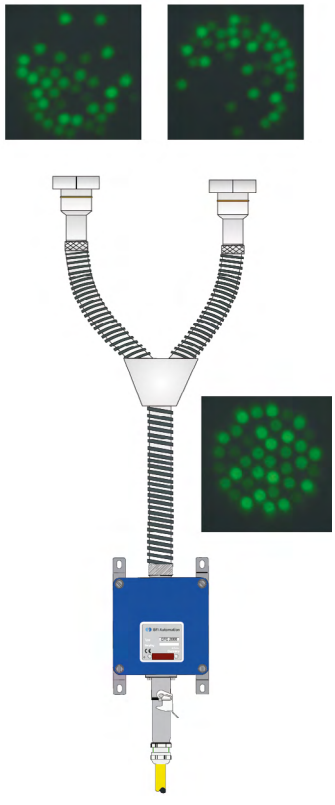
The special treatment of the FOC ends does not require any glue. The space, which is normally used by the glue can be filled with additional fibers, so that the ratio between usable and loss area is much better. The usable area for light transport is typical higher than 95 % of the total fiber bundle area.

FOC/FOL with high temperature tip

The temperature resistance can be increased up to + 350 °C by using a special glue technology.
BFI Automation offers fiber optics, allowing us to special treatment of the fiber bundle having a temperature resistance of up to + 600 °C at a sufficient purge air. In addition to the very high temperature resistance this version provides also an increased transmission.



Splitting of one flame signal to two Flame Scanners / CFC.



Merging of two flame signals to one Flame Scanner / CFC.

Y-Type Fiber Optic Cable

The Y-type FOC uses all benefits of the BFI fiber optic standard series. Due to the splitting of the fiber bundle this Y-type FOC can be used to realize a redundant operation either on scanner side or on optic side.

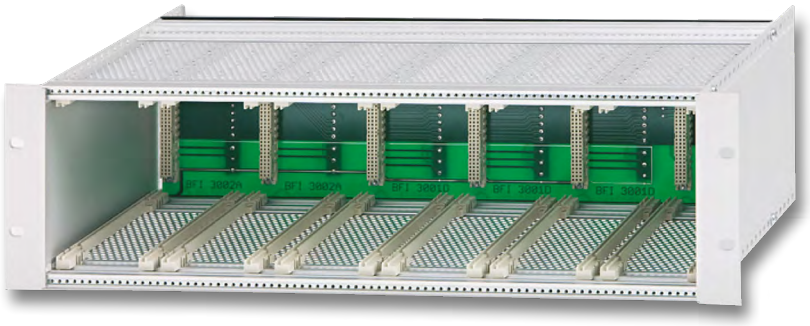
Application

- Scanner redundancy also on one sight port.
- Enhancement of the monitored area by using two of the optics.
- Separation of different spectral transmission ranges.

Housings and Racks

19"- built-in rack

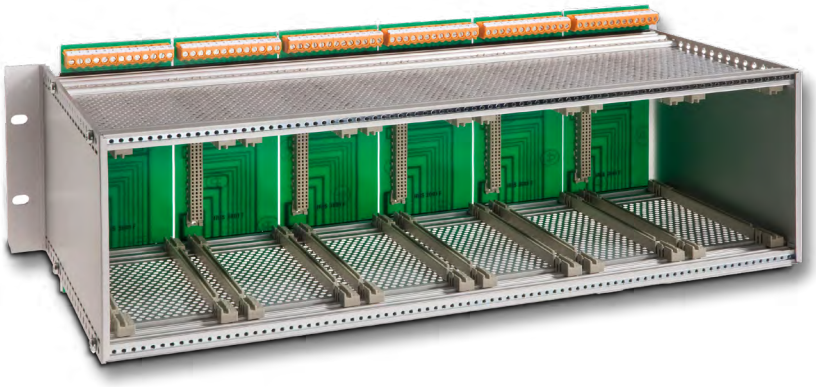
For the series 3000 we provide 19"-built-in-racks from one to six plug-in units (14HP). The connection can be easily done via screw terminals from the rearside. Alternative we provide standard connectors in accordance with international standards. Type of protection is IP20.



	14HP	28HP	42HP	56HP	84HP
All dimensions ± 0.4 mm	for 1 plug-in unit series 3000	for 2 plug-in unit series 3000	for 3 plug-in unit series 3000	for 4 plug-in unit series 3000	for 6 plug-in unit series 3000
Material-No.	6830-0701-01	6830-0702-01	6830-0703-01	6830-0704-01	6830-0706-01

19"- built-on rack

For cabinet or wall mounting we provide 19"-built-on racks. The electrical connection can be can be done via frontside screw terminals. Type of protection is IP20.



	14HP	28HP	42HP	56HP	84HP
All dimensions ± 0.4 mm	for 1 plug-in unit series 3000	for 2 plug-in unit series 3000	for 3 plug-in unit series 3000	for 4 plug-in unit series 3000	for 6 plug-in unit series 3000
Material-No.	6830-0701-00	6830-0702-00	6830-0703-00	6830-0704-00	6830-0706-00

Wall Mounting Housings

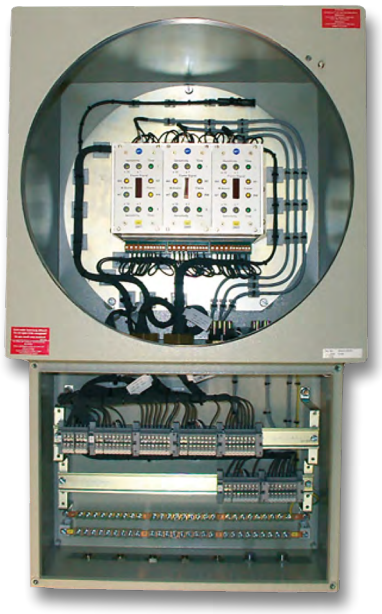
For the field installation we provide wall mounting housings in three different sizes. The housings are made of impact resistance ABS with a clear and lockable front cover and a separate wiring chamber. The type of protection is IP66. All connections between BFI modules/ devices and screw terminals are pre-wired.

Example

Housing size	Material-No.
20HP	6830-0601-00
30HP	6830-0602-00
49HP	6830-0603-00

Ex-Wall Mounting Housings

Explosion proof housing for hazardous areas with an Ex-proof window.
This cabinet is designed to house for each up to 3 plug-in units in two 19" racks of the series 3000. The 19" racks are completely pre-wired and tested. The Ex-d housing is mechanically connected with the Ex-e wiring chamber. The window allows seeing the indication lamps of the flame amplifier modules.



Example

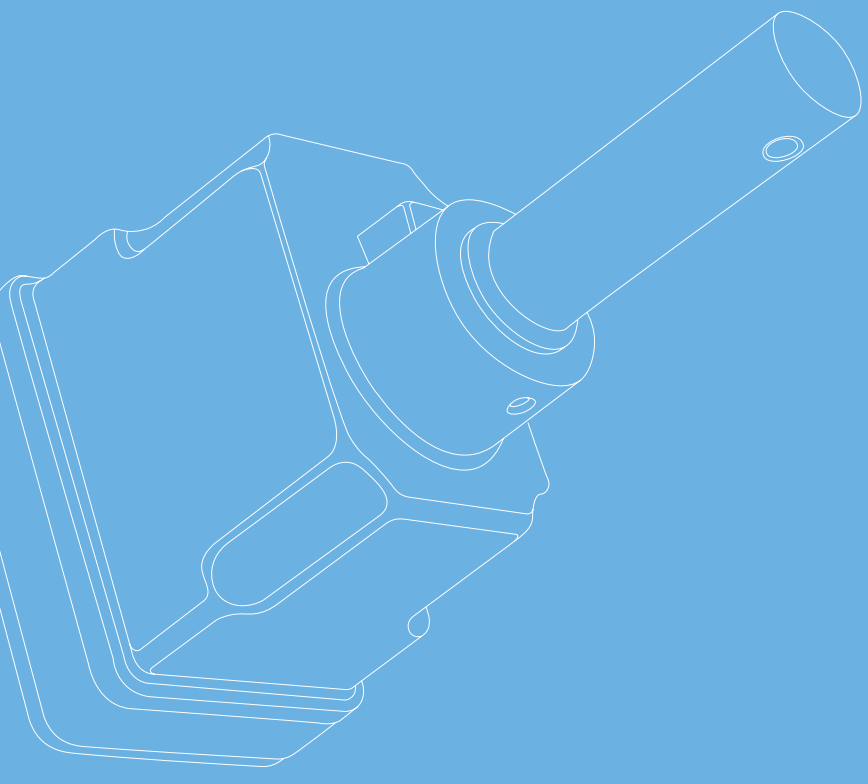
Accessories

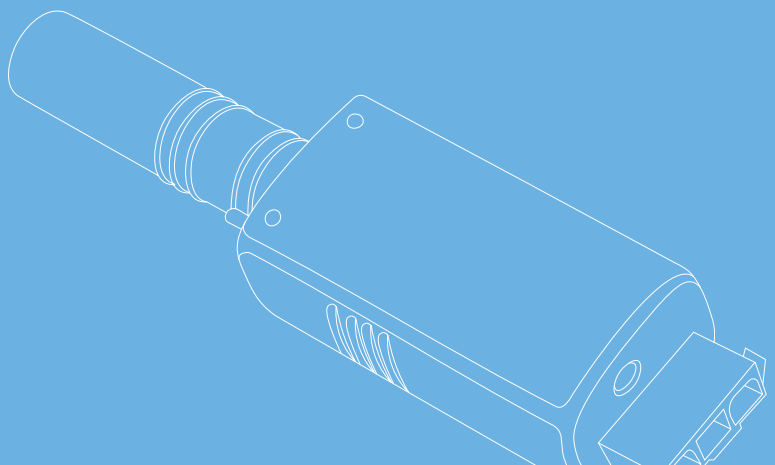
- Drain-plug
- Heating
- MTL-Ex-barriers

Technical Data

Ex-classification	II 2G Ex de II C T6	II 2G Ex de II C T6	II 2G Ex de II C T6
Type of protection	IP55	IP55	IP65
Dimensions	860 x 594 x 410 mm	645 x 325 x 311 mm	755 x 435 x 311 mm
Color of the housing	RAL 6034	RAL 7032	RAL 7032
Weight	approx. 150 kg	approx. 37 kg	approx. 58 kg
Material-No.	1830-5313-01	1830-5314-00	1830-5314-01

Heating technology and thermal process applications





Summary

Device	KLC 10/11	KLC 20/21	IFC/IFR 10/11	IFC/IFR 50	KHM 20	IFC/IFR 400
Sensor UV-Tube	■	–	■	■	–	–
Sensor Semiconductor	–	■	–	–	■	■
UV Spectrum 185 to 260nm	■	–	■	■	–	–
VIS/IR Spectrum 380 to 1150 nm	–	■	–	–	■	■
Viewing direction	radial or radial and axial	axial	axial/radial	axial/ radial	axial	axial/ radial
Mode	inter-mittent	inter-mittent	inter-mittent	inter-mittent	inter-mittent	continu-ous
Self-monitoring	–	–	–	–	–	■
Natural Gas	■	■	■	■	■	■
Hydrogen Gas	■	–	■	■	–	–
Synthetic fuel	■	■	■	■	■	■
Light Oil	■	■	■	■	■	■
Heavy Oil	■	■	■	■	■	■
Flame signal	FET	FET	FET	Relay	Electroni-cal Relay	Relay
Potential free	no	no	no	yes	yes	yes
Suitable for switching input	■	■	■	■	■	■
Suitable for ionization input	■	■	■	–	■	■
Operating temperature -20 °C to 60 °C	■	■	■	■	■	■
Fully electronic	–	■	–	–	■	■
Maintenance free	–	■	–	–	■	■
Small size	■	■	–	–	–	■
Robust	–	–	■	■	■	■
Simple installation	■	■	■	■	■	■
Applications	Gas burner, dual fuel burner	Gas burner, dual fuel burner	Gas burner, dual fuel burner	Gas burner, dual fuel burner	Gas burner, dual fuel burner	Gas burner, dual fuel burner
Industrial Usage	–	–	■	■	■	■
Heating Technology	■	■	■	■	■	■

Flame Detector - KLC Series

Flame Detector KLC 10

Flame Detector KLC 11

KLC 10 / 11

Are compact UV-flame detector for heating and single burner applications, suitable for gas-, oil- and dual fuel burners. The flame detectors has been developed to meet the requirements of EN 298:2012 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 for started up once in a day.

Features

- Intermittent operation
- Compact design
- Transistor output
- Quick change in the plant possible
- Insensitive to daylight
- Can be connected directly instead of ionization probes or LDR
- Alignment optional:
  R - radial
  RS - radial & sensitive
  RA - radial & axial
  RAS - radial & axial & sensitive

UV-flame detector specially designed for single burner firing systems that produce almost no radiation in the visible light spectrum or operate with very low flame modulation.

The flame signal intensity can be easily recognised via an LED as a visual indicator. The KLC 1x can be connected directly to the ionisation or LDR input of the automatic burner control system. It is compatible in its dimensions, connection dimensions and pin assignment with other devices from the KLC series. All accessories are therefore identical and reduce the variety of parts in production and service.

Technical data	KLC 10 / 11
Sensor	UV tube
Spectral range	185 - 260 nm
Lifetime UV tube	max. 10,000 h
Supply voltage	230 V AC optionally 120 V AC
Current consumption	max. 5.5 mA
Operating temperature	-20 °C to +60 °C (> 50 °C reduces lifetime)
Protection class	IP 21
Switch-on delay Switch-off delay	typically 0.5 s < 0.5 s
Switching output	open collector
Weight	0.029 kg
Output	max. switched current 15 mA max. switched power 0.3 W max. switched voltage 280 V AC / 400 V DC

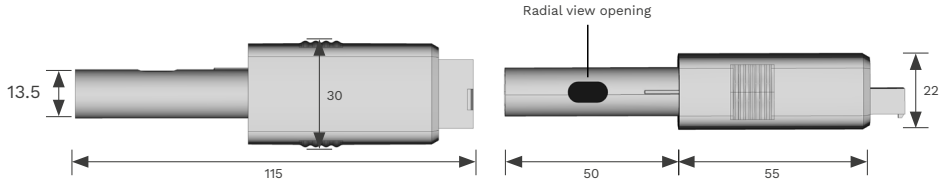
Overview Material Numbers

Type	Material-No.
KLC 10/230 R, radial	6011-1130-05
KLC 10/230 RS, radial & sensitive	6011-1130-08
KLC 10/230 RA, radial & axial*	6011-1130-06
KLC 10/230 RAS, radial & axial & sensitive*	6011-1130-07
KLC 10/120 RAS, radial & axial & sensitive*	6011-1323-00
KLC 11/230 R, radial	6011-1330-02
KLC 11/230 RA, radial & axial*	6011-1330-03
KLC 11/120 RA, radial & axial*	6011-1320-01

***optional axial (reduced sensitivity at approx. 40%)**

Dimensions

IP21



Flame Detector KLC 10 / 11

Fuels

- Oil (LDO & HFO)
- Natural gas, Propan, Butan
- Biomass/biogas
- Synthetic fuels
- Methanol
- H_2
- NH_3

Application

- Oil burner
- Gas burner

Accessories

- Relay module RMF
- KLC cable
- KLC flange
- Angled mirror adapter for KLC
- Adapter ADP
- UVT-COM readout unit

Flame Detector - KLC Series

Flame Detector
KLC 20

Flame Detector
KLC 21

KLC 20 / 21

The KLC 2x only evaluates the flickering of the flame to be monitored. A device version with interference frequency suppression is optionally available. Uniform light beams and any constant frequencies do not lead to a permanent flame detection. Disturbing sources of extraneous light, e.g. from fluorescent tubes or low-frequency background radiation from glowing brickwork, are suppressed. Unintentional influences on the flame detection can thus be avoided.
Via the LED display as an optical interface, it is possible to read out various relevant operating parameters (e.g. monitoring of the flame signal, serial number).

Features

- Intermittent operation
- Compact design
- Transistor output
- Quick change in the plant possible
- Insensitive to daylight
- Can be connected directly instead of ionization probes or LDR

The KLC series broadband flame detector are compact flame detectors specially designed for blue-burning combustion systems in forced-air burner applications in the domestic sector.

The patented evaluation of the signal takes place via the flicker frequency of the radiation of the upcoming flame. A processor enables the evaluation and conversion of the flame signal to a digital signal in the value required for the flame signal amplifier of the corresponding automatic burner control system.

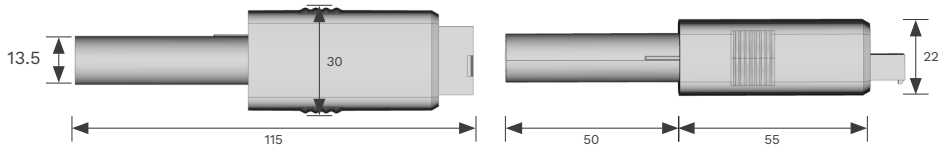
Technical Data	KLC 20 / 21
Sensor	Semiconductor
Spectral range	320 - 1150 nm
Supply voltage	230 V AC optionally 120 V AC optionally 24 V AC / DC
Current consumption	max. 5.5 mA
Operating temperature KLC 20 Operating temperature KLC 21	-20 °C to +60 °C -20 °C to +75 °C
Protection class	IP21
Switch-on delay Switch-off delay	typically 0.5 s < 0.6 s
Switching output	open collector
Weight	0.029 kg
Output	max. switched current 15 mA max. switched power 0.3 W max. switched voltage 280 V AC / 400 V DC

Overview Material Numbers

Type	Material-No.
KLC 20/230, 25/15Hz	6011-1433-02
KLC 20/230, 52/15Hz	6011-1436-00
KLC 20/120, 25/15Hz	6011-1423-03
KLC 20/120, 52/15Hz	6011-1426-00
KLC 20/24, 25/15Hz	6011-1413-02
KLC 20/24, 52/15Hz	6011-1416-00
KLC 21/230, 25/15Hz	on request
KLC 21/230, 52/15Hz	on request
KLC 21/24, 25/15Hz	6011-1413-20
KLC 21/24, 52/15Hz	on request

Dimensions

IP21



Flame Detector KLC 20 / 21

Fuels

- Oil (LDO & HFO)
- Natural gas, Propan, Butan
- Biomass/biogas
- Synthetic fuels
- Methanol
- NH_3

Application

- Oil burner
- Gas burner

Accessories

- Relay module RMF
- KLC cable
- KLC flange
- Angled mirror adapter for KLC
- Flame simulator TG 10
- Adapter ADP
- KLC-COM readout unit

Compact Flame Detector - IFC Series

Industrial flame detectors

UV flame detector for harsh industrial environments with intermittent operation. The IFx series features a robust die-cast aluminum housing with IP65 protection. The housing design allows for quick replacement of the unit on site.

Features

- Intermitted operation
- Output signal either potential-free relay contacts or ionization simulation
- Different designs for optimal alignment with the flame
- Metal housing with IP65 protection for industrial applications
- With various voltage versions
- CE-certified
- Stand-alone flame detector
- Easy implementation of the flame detector into existing systems
- Die-cast aluminium housing
- Relay output with 1 NC contact and 1 NO contact
- Quick exchange on site possible

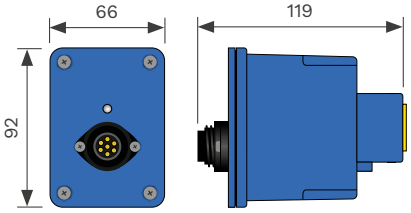
Compact flame detectors combine sensor technology, flame evaluation and signal output conveniently in one housing.

Flamonitec compact flame detectors are available in different housings for every application, whether for heating technology or for industrial requirements. Another advantage is the simple integration into the firing control system.

Technical Data	IFC 10 / 11 / 50
Sensor	UV tube
Alignment	axial
Spectral range	185 - 260 nm
Lifetime UV tube	max. 10,000 h
Supply voltage	230 V AC, optionally 120 V AC
Current consumption	max. 5.5 / 18 mA
Operating temperature	-20 °C to +60 °C
Protection class	IP65
Switch-on delay Switch-off delay	typically 0.5 s < 0.5 s
Switching output	open collector / relay
Weight	0.52 / 0.59 kg

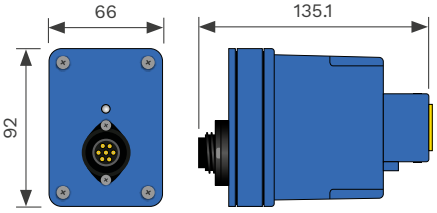
Dimensions IFC 10 / 11

IP65



Dimensions IFC 50

IP65



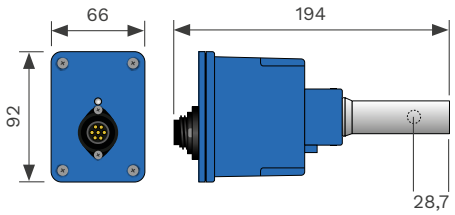
Compact Flame Detector - IFR Series

Technical Data	IFR 10 / 11 / 50
Sensor	UV tube
Alignment	radial
Spectral range	185 - 260 nm
Lifetime UV tube	max. 10,000 h
Supply voltage	230 V AC, optionally 120 V AC
Current consumption	max. 5.5 / 18 mA
Operating temperature	-20 °C to +60 °C
Protection class	IP65
Switch-on delay Switch-off delay	typically 0.5 s < 0.5 s
Switching output	open collector / relay
Weight	0.55 / 0.62 kg

Type	IFC	IFR
10/230	6015-1104-00	6015-2104-00
11/230	6015-1114-00	6015-2114-00
50/230	6015-1204-00	6015-2204-00
10/120	6015-1103-00	6015-2103-00
11/120	6015-1113-00	6015-2113-00
50/120	6015-1203-00	6015-2203-00

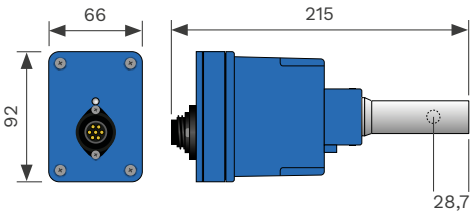
Dimensions IFR 10 / 11

IP65



Dimensions IFR 50

IP65



Applications

- Single gas burner
- Single oil burner

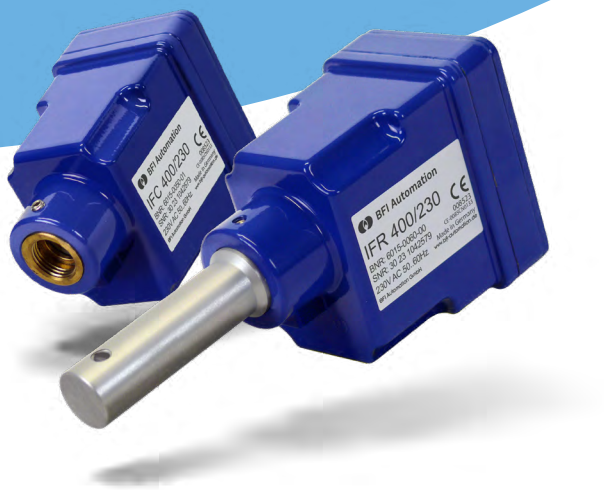
Fuels

- Oil (LDO & HFO)
- Natural gas, Propan, Butan
- Biomass/biogas
- Synthetic fuels
- Methanol
- H_2
- NH_3

Accessories

- Relay module RMF
- IFx cable
- Connection adapter 1/2"
- Connection adapter 1/2" with purge air connection
- UVT-COM readout unit

Compact Flame Detector - IFx 400 Series



Features

- Continuous operation
- Entry-level model
- Cost-optimised for OEMs
- 3-channel flame evaluation
- Various output signal
- Robust metal housing

Application

- Single gas burner
- Single oil burner

Rugged compact flame detector for harsh industrial applications where continuous operation is required.

The IFC/IFR 400 is a compact flame detector for continuous operation that was specially developed for industrial combustion furnaces. It offers either a galvanically isolated changeover contact as a safety-relevant criterion for a PLC control or a simulation for the ionisation output of a burner control unit, so that a wide variety of applications can be covered in a price-conscious manner.
Flame detection is realised by means of a 3-channel evaluation of the flame signal. Flame detection is signalled by an LED. The data within the flame detector can also be transmitted to the BSTcom software via this. In particular, the graphical and numerical representation of the flame signal is thus excellently possible and is later useable for analysis through the logger function.

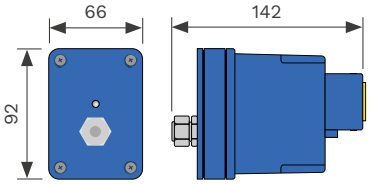
Technical Data	IFC 400 / IFR 400
Sensor	Semiconductor
Flame orientation	axial / radial
Spectral range	350 - 1100 nm
Supply voltage	230 V AC, optionally 120 V AC
Power consumption	max. 50 mA / 5 mA
Operating temperature	-20 °C to +70 °C
Protection class	IP65
Switch-on delay Switch-off delay	< 1 s < 1 s
Relay output	Floating, potential-free change-over contact max. switching current 0.5 A max. switching power 125 W max. switching voltage 250 V AC
Weight	0.7 kg

Overview Material Numbers

Type	Material-No.
IFC 400/230 with 1.5 m cable	6015-0050-01
IFC 400/230 for ionization, with 1.5 m cable	6015-0050-04
IFR 400/230 with 1.5 m cable	6015-0060-01
IFR 400/230 for ionization, with 1.5 m cable	6015-0060-04

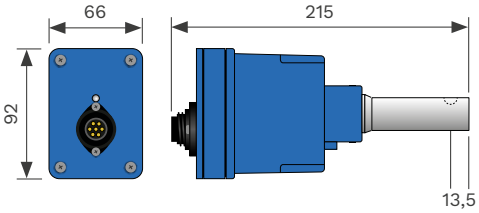
Dimensions IFC 400

IP65



Dimensions IFR 400

IP65



Fuels

- Oil (LDO & HFO)
- Natural gas, Propan, Butan
- Biomass/biogas
- Synthetic fuels
- Methanol
- H_2
- NH_3

Accessories

- Relay module RMF
- Connection adapter 1/2"
- Connection adapter 1/2" with purge air connection
- IFx-COM readout unit

Accessories

KLC Flanges

Serves for the admission, connection and adjustment of the flame detectors KLC available in 7 mm and 13 mm.

Type	Lenght	Material-No.
KLC flange	7 mm	1550-4220-07
KLC flange	13 mm	1550-4220-13

Angle Adapter KLC

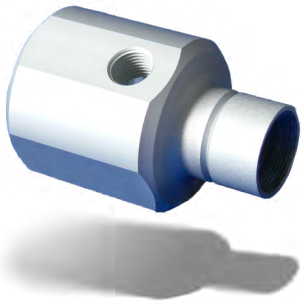
With the optionally available corner adaptor the radial adjustment of the KLC 20 is carried out by means of an optimally formed out reflecting surface to the flame axis. The corner adaptor substitutes at the same time for the connection flange KLC.

Type	Mirror	Material-No.
Angle adapter KLC		1550-4225-10
Angle adapter KLC	Stainless steel	1550-4225-20

Adapter ADP

The adaptor ADP enables to be able to mount the flame guards KLC 2x with additional axial adjustment directly to a fire space opening. A quartz glass prevents the escape of gases from the combustion chamber.

Type	Material-No.
Adapter ADP 10-UV, R ½”	6580-2030-00
Adapter ADP 20-UV, NPSM ½”-14	6580-2031-00



Purge air adapter for IFC / KHM

Adapter 1“ with ½“ or with ¼“ purge air connector.

Type	Material-No.
Adapter 1“ with ½“-purge air connector	1830-0161-12
Adapter 1“ with ¼“-purge air connector	1830-0161-14

Cable IFx

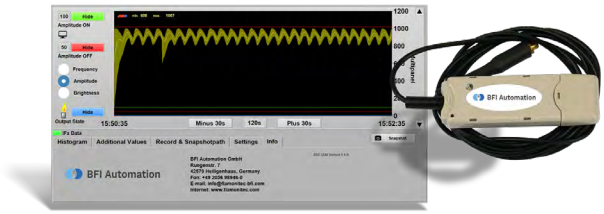
Cable KLC

Connection Cable

Consist of angle plug and a cable with stripped and crimped cable ends. The cable length is customized.

Type	Material-No.
Connection cable KLC, length XX	On request
Connection cable IFC/IFR, length XX	On request

Diagnostic tool



USB diagnostic tools are available for the various flame detector series, especially for the development and service departments, in order to read out and log all relevant measurement data and information from the respective flame detector series via the BSTcom software. In particular, the graphical and numerical representation of the flame signal is thus excellently possible and is later useable for analysis through the logger function. The KLCcom is used for the KLC2x and KHM20 series; the UVTcom for the KLC1x, IFx1x and 5x and the IFxcom for the IFx400 series.

Type	Material-No.
Diagnostic tool KLC-COM	6040-4830-00
Diagnostic tool UVT-COM	6040-4832-00
Diagnostic tool IFX-COM	6040-4833-00

RMF

The relay module flame detector serves for moving of the switching output signal of the series KLC, IFC 10/11 efficient relay contacts free of potential. With it these flame detectors can be used in PLC or round controls. It indicates his working condition and the status of the flame relay by means of LEDs on the front and secures the tension care of the flame detector electrically. Implementation with special functions can be also provided here.

Type	Material-No.
RMF 1/230	6040-0001-00
RMF 1/120	6040-0001-01
RMF 1/24 DC	6040-0001-20

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