COMPACT FLAME CONTROLLER

CFC 200

(Formerly 8.XX)

TECHNICAL DESCRIPTION

EDITION: TB CFC200-REV3-2015-04-07

IMPORTANT:	Please note, that all mounting and wiring as well as all changing or adjustment at the flame monitoring and evaluation equipment should only be carried out by fully trained and authorized personnel. BFI Automation is pleased to support you if you do not have any experience with the equipment. Our service personnel is carrying out world wide installations, supervision and commissioning and is available upon request. For the stage of planning you can ask our sales and project engineers for any support you may need. BFI Automation is providing any kind of training for your engineers. PLEASE READ THIS LEAFLET CREFULLY AS IT CONTAINS NECESSARYINFORMATION FOR THE USE OF THIS EQUIPMENT. FOR MORE DETAILED INFORMATION PLEASE REFER TO THE OPERATING AND MAINTENANCE MANUAL.

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Compact flame controller
CFC 200

- **Flame scanner with integrated flame controller**
- **TÜV approved, DIN-DVGW certified**
- **CFC 200 UV1 (formerly 8.0) : recommended for pure gas and oil/gas mixture fuels**
- **CFC 200 UV (formerly 8.30) : recommended for pure gas and oil/gas mixture fuels**
- **CFC 200 IR (formerly 8.40) : recommended for pure oil fuels in diffusion burners**
- **CFC 200 IR3 (formerly 8.70): recommended for gas fuels in radiant-surface burners and for waste gases**
- **Adjustable sensitivity**
- **Analogue flame intensity output**
- **Optical state indication**
- **Non-wearing sensors**
- **Protection IP 65**

WARNING

WARNING: IMPROPER INSTALLATION OF THESE PRODUCTS MAY BE HAZARDOUS TO LIFE AND PROPERTY

Function

The integral method in the respective spectral range is used for the flame radiation analysis of the compact flame controller.
After pre amplification, the unwanted portion of constant light is withdrawn from the output signal. The subsequent sensitivity adjustment permits signal suppression for the adaptation to the respective burner condition.
The subsequently connected band pass filter achieves that modulation of the typical flame radiation of the primary combustion zone is evaluated only, and outside light signals from neighbouring burners can be differentiated from the individual burner.
The further functional groups integrate the signal processing for the dynamic monitoring channel, which, by means of a dark-phase monitoring, continuously checks the failure-safety of the unit.
A component defect leads to an immediate switch-off of the flame-relay, which is available as a potential-free changeover contact.
The switching state „flame on“ is displayed by a yellow LED on the rear side of the unit, just as the intensity of flame, which is displayed by a flashing green LED.
A flame intensity output 0(4) - 20 mA can be used for external displays. The range can be selected by jumper see drawing on page 3.
The safety switch-off time, which always depends on the fuels to be detected, is factory adjusted to 1 second. Longer switch-off times in acc. to local specifications available as option.

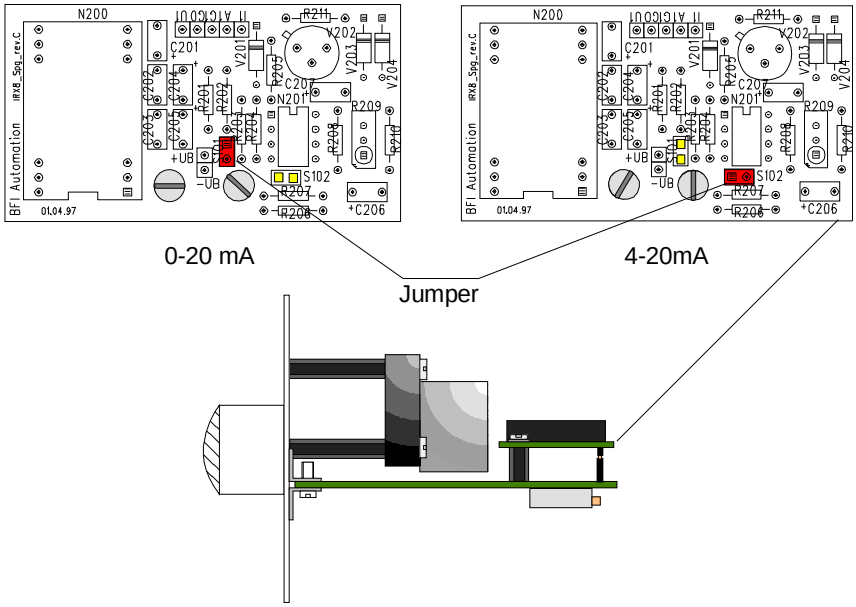
WARNING

WARNING: The response of the scanner depends on burner configuration as well as on the turbulence and spectral characteristics of the flames. Application assistance is available on request

Sensitivity Adjustment

By using a potentiometer which is located on the back side of the compact flame controller beneath a screw it is easily possible to adapt the controller to various firing conditions.
Turning the potentiometer counter clockwise will reduce the sensitivity. Please note that a reduction of the sensitivity might also cause a reduction of the current output for the intensity.

Output current selection

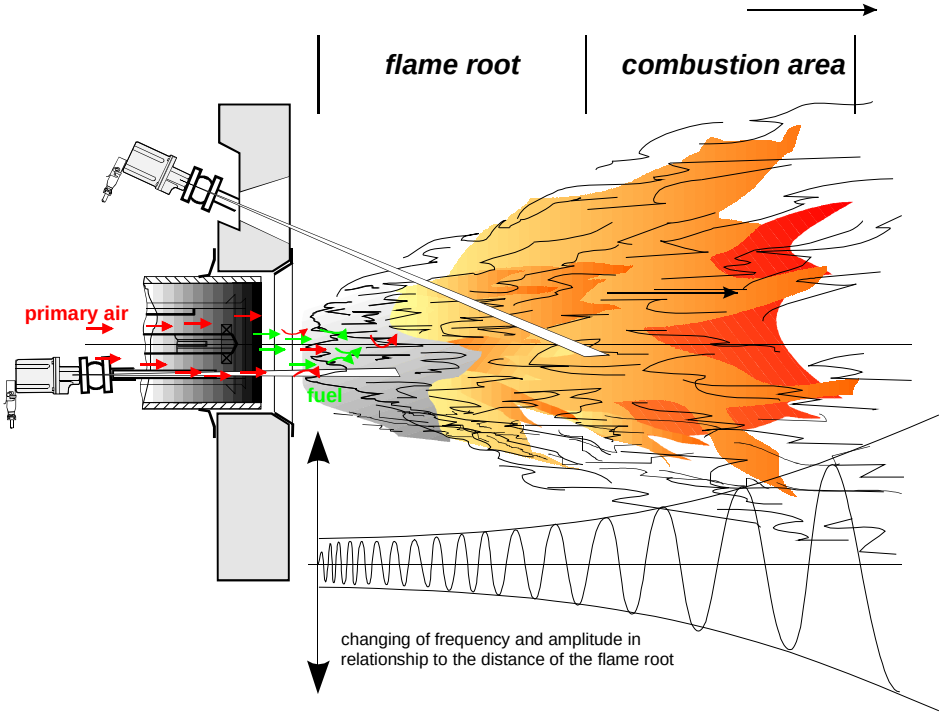


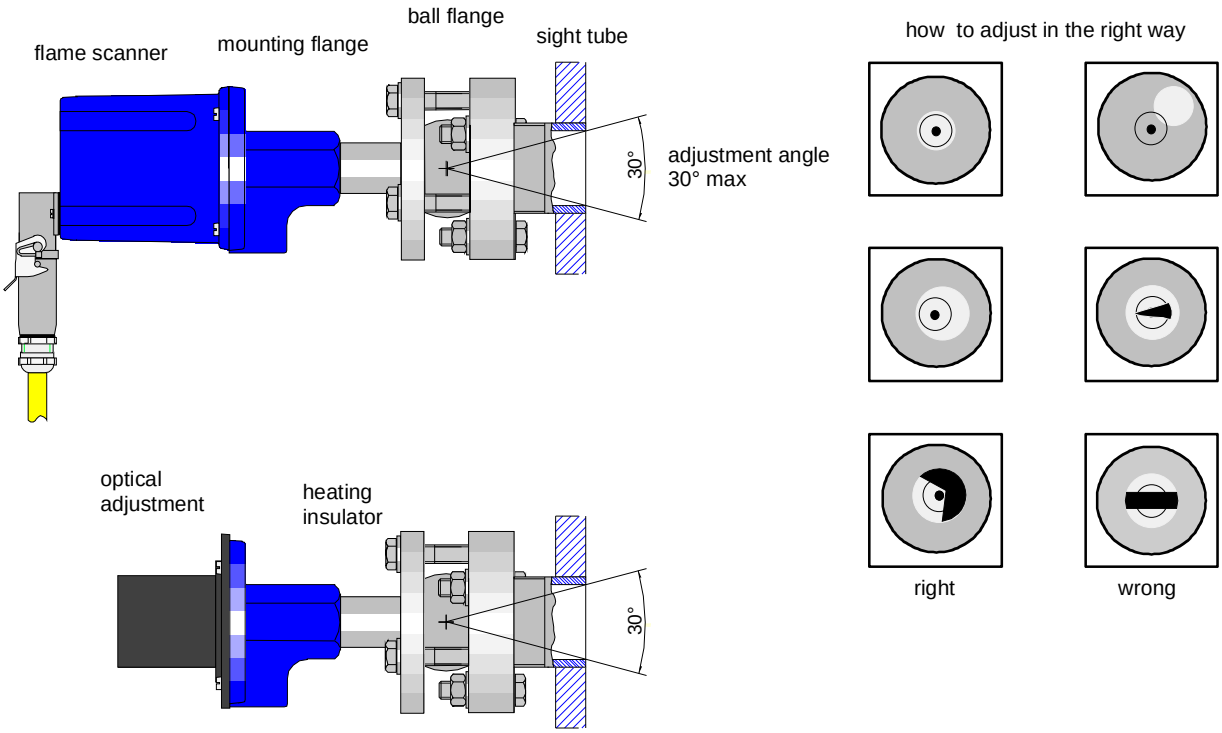
Assembly

The correct positioning of the sight tube to the flame with less vibration is an important requirement for an optimised flame control. The assembly must ensure the primary combustion zone is inside the visible angle of the flame monitoring device for all loads. This is the only way for discriminating flame control. The extension of the sight axis may not cross the first third of other flames.
Length and diameter of the sight tube are directly related to the available flame radiation, because the visibility angle of the device is defined. The maximum length 'L' of a sight tube is related to the tube's diameter 'd'.

d	1"	1,5"	2"
L	0,5m	0,8m	1,1m

The tube should be as short as possible. A diameter of 2 inch is recommended.
The right adjustment is shown in the following drawing. The optical adjustment device BFI 235 is available ex stock (part-no.: P 106)
The compact flame controller is delivered with a flange for quick assembly. The device is equipped with a supply for purge air which prevents the lens of contamination with dust and a subsequent damage. The optimised assembly kit consists of heating insulator, blocking valve and ball flange.
These mechanical devices are also available on demand.





CAUTION

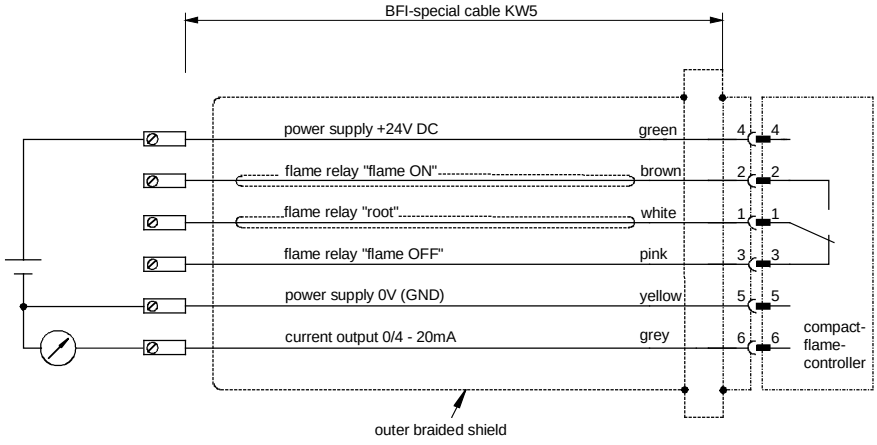
CAUTION: All alignment and adjustment procedures should be used whenever parts are replaced, when the scanner has been moved, when the flame shape has altered (additional fuels, new burners, burner/register modifications), as well as on new installations.

Installation

The pin configuration of the plug connector is shown in the terminal connection diagram.
The flame intensity output has no potential separation from the power supply. It is related to the power supply ground. If there will be any problem in this case an isolation amplifier can be delivered on demand.
A maximum shunt resistance of 250Ω should not be exceeded.
The device is immediately ready for operation after switching on the power supply.
!!Do not disconnect the flame controller while energized!!

Connection diagram

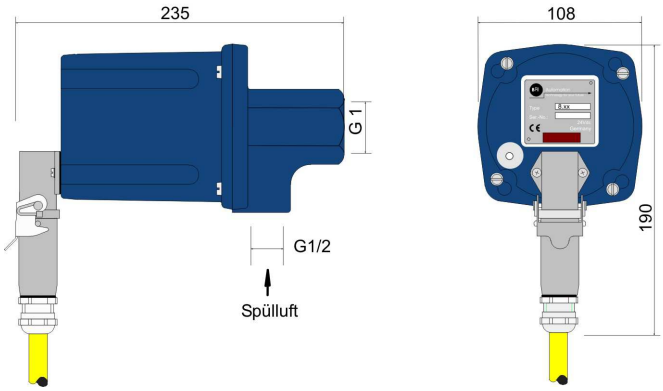
Pin/Terminal	Description	Colour of BFI special cable KW5
1	Flame relay: supply root	white
2	Flame relay: signal ‘flame ON’	brown
3	Flame relay: signal ‘flame OFF’	pink
4	Power supply: +24 V DC	green
5	Power supply: - 0 V (GND)	yellow
6	Current output: 0(4)-20 mA	grey



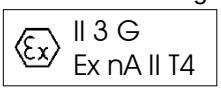
CAUTION

CAUTION: On all applications the compact flame controller must be tested by starting and stopping the burner several times to ensure proper operation. (e.g.: The flame relay must reliable drop out for all flame conditions.) The testing should be done with various adjacent burners ON and OFF and at various load levels. This is a requirement for proper operation.

Standard housing

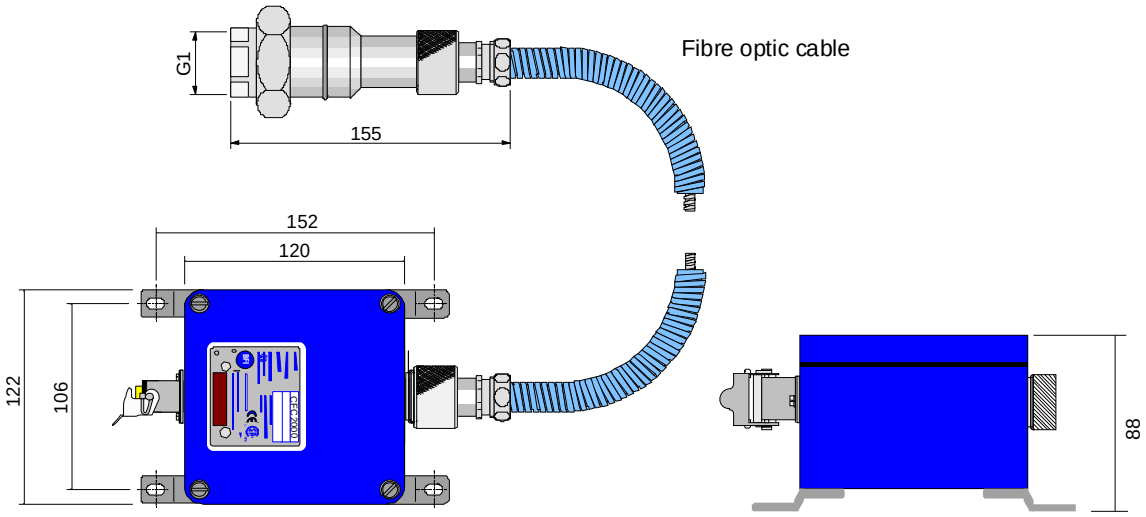


Standard housing suitable for use in hazardous area Zone 2



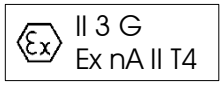
OE-Converter housing

SKL

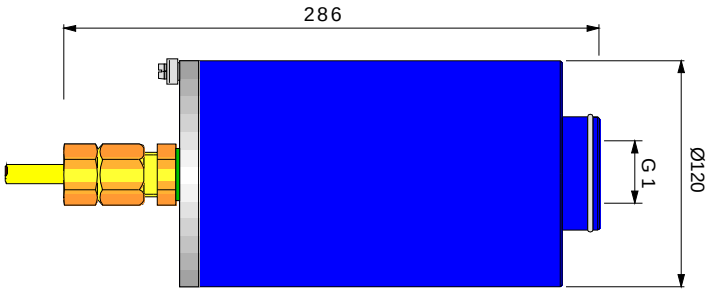


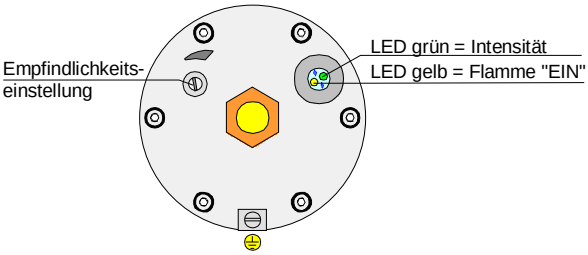
O/E-Converter

Suitable for use in hazardous areas Zone 2



Ex-proofed housing





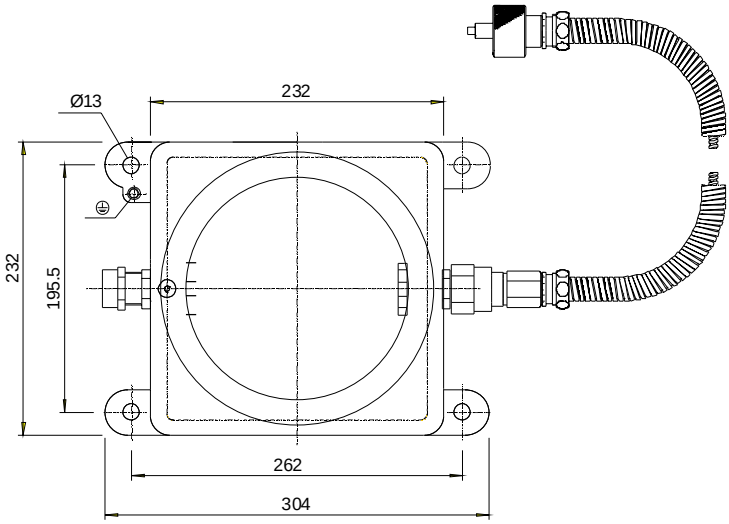
For areas classified as Zone I

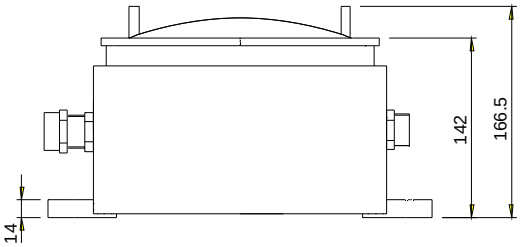
PTB 03 ATEX 1051

CE 0044
Type 07-6152-9016
Ex II 2G Ex de IIC T6
II 2D Ex tD A22 IP 65 T 80°C

Explosion Proof Housing for OE-Converter

For one OE-Converter





CE 0044
Type 07-4160-1165/5003
Ex II 2G Ex de IIC T6 Gb
II 2D Ex tb IIIC T 80° Db

For use in hazardous areas classified as Zone 1
KEMA 08 ATEX 0123

Accessories

Power supply 230/115V AC
Swivel mount 1 inch and 2 inch flange disk
Heating insulator 1 inch
3-way ball cock 1 inch
Pressure screw joint 5bar size 1 inch
Optical adjusting device

Technical data

Spectral sensitivity	
CFC 200 UV1 (formerly 8.0)	190 up to 550 nm
CFC 200 UV (formerly 8.30)	280 up to 420 nm
CFC 200 IR (formerly 8.40)	300 up to 1050 nm
CFC 200 IR3 (formerly 8.70)	1050 up to 2700 nm
Visual aperture	2.7 degrees
Input voltage	24 V DC
Current consumption	approx. 200 mA
Construction	according to SELV III
Ambient temperature	-20°C...+70°C
Current output	0(4)...20 mA (Ra < 250 Ohm) flame intensity
Flame relay	1 change-over contact, potential free VDE 0110, Class A max. 48 V switching voltage max. 1 A switching current (fused with 0.5 A) max. 30 W switching power switching point "flame on"5(8) mA switching point "flame off"< 5(8) mA
Flame failure response time, switch-off time	1 second, factory preset other switch off times on request
Sight tube connection	1" internal thread ISO 228
Purge air connection	1/2" internal thread ISO 228
Purge air quantity	10 m^3/h at standard conditions
Electrical connection	
Standard	Harting connector HAN8 90 degrees
Flame proof housing	3m special cable
OE-Converter	Harting connector HAN8 90 degrees
EX-OE-Converter	M20-screw joint and terminal clamps inside
Dimension	
Standard with flange	235 x 108 mm (Length x Diameter)
Explosion proof housing	223 x 120 mm (Length x Diameter)*
OE-Converter housing	120 x 122 x 80mm (Length x Width x Height)*
Ex-OE-Converter housing	232 x 232 x 166,5mm (Length x Width x Height)*
Triple Ex-OE-Converter	276 x 276 x 218mm (Length x Width x Height)* *without plugs and mounting bracket

Class of protection	Standard and OE-Converter housing IP 65, similar to NEMA 4/Class 1 Div 2 ATEX Zone 2 II 3 G Ex nA II T4 Ex proof housing IP66, similar to NEMA 4/Class 1 Div 1 ATEX Zone 1 PTB 03 ATEX 1051 CE 0044 Type 07-6152-9016 II 2G Ex de IIC T6 II 2D Ex tD A22 IP 65 T 80°C Ex-OE-Converter housing ATEX Zone 1 KEMA 08 ATEX 0123 CE 0044 Type 07-4160-1165/5003 II 2G Ex de IIC T6 Gb II 2D Ex tb IIIC T 80° Db
Weight	
Standard	1.5 kg
Explosion proof housing	4.0 kg
OE-Converter housing	1.5 kg
Ex-OE-Converter housing	7.0 kg
Triple Ex-OE-Converter h.	13.0 kg

Electronic self-monitoring for the fail-safe function control of the device according VDE 0116, EN 298:2012, and TRD 411 to 414. DIN-DVGW approved and CE conformity.
Certified to CSA standards.

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