

# Original Operating Instructions

## UV Compact Flame Detector IFR 11

Type: IFR 11  
Document: TB IFR 11 EN Rev1



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# 1 General aspects

## 1.1 Preamble

This Quick Guide provides an overview of the technical data of the IFR 11, its application, installation and handling, as well as ordering data and accessories.  
Binding is solely the original operating instructions of the IFR 11 in its currently valid version.  
To reflect the original operating instructions of the IFR 11:

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## 2 Safety

### 2.1 Intended use

The IFR 11 is a compact UV flame detector, which has been developed for single flame combustion which produces little light or radiation in the visible spectrum and has very low flame modulation/flicker frequency. The design of the UV sensor ensures that the flame detector does not react to background radiation from hot refractory or from any other infra-red light source.

The UV flame detector is equipped with an optical interface which visibly indicates the flame signal intensity. The IFR 11 can be connected directly to the ionisation or LDR input of the control box. It is compatible in its physical dimensions and connection capability to other series IFR flame detectors. All IFR accessories are identical and therefore this reduces the variety of components used in production and makes it simpler for field application and service.

The UV flame detector IFR 11 has been developed to meet the requirements of UL 372-2, CSA C22.2 and EN 298. The internal increase of the UV tube voltage immediately after apply supply voltage ensures the safety requirements for the examination of the UV tube to through-ignition. A simple change from ionisation flame control to the IFR 11 is permissible therefore also with control boxes without own UV tube input.

#### **▲WARNING**

*Danger when improperly used !*

*The device may cause hazards if it is not used as intended and/or for any other purposes.*

*The device has to be used only for the purposes for which it is intended.*

*The procedures described in the operating instructions have to be observed.*

The manufacturer/supplier shall not be liable for damage resulting from use for non-intended purposes. The user/operating company alone shall bear the risk.

#### 2.1.1 Safety test

#### **▲WARNING**

*In order to ensure correct operation, the compact flame detector IFR 11 as well as flame amplifiers of all applications have to be tested several times by starting and stopping the burner several times. In all cases the flame relay has to be switched off reliably in case of an absent flame. Carry out this test whilst several neighbouring burners are started and stopped and different boiler outputs are used. This is an indispensable pre-requisite for a safe and correct operation of the device !*

### 3 Technical data

#### 3.1 General characteristic features

- UV-Tube
- Fully electronic construction
- Spectral analyzing process
- CE 085CN0133
- UL File MH47747

#### 3.2 Electrical system, optical system, mechanical system

Optical features	185 to 260 nm, tolerated flame signal fades approx. 200 ms
Orientation	radial
Lifetime of the tube	approx. 10000 h
Distance to flame	< 2 m
Input	230 V AC 120 V AC ( optional ) Nominal frequency 50-60 Hz
Prefuse	max. 1 A , slow
consumption	max. 5,5 mA
Operating temperature	-20 to +60°C (temperatures higher than 50°C reduces life of the UV tube )
Operating position	any position
Kind of protection	IP 65
Protection class	I
Humidity	max. 95% r.H., non-condensing
Electrical connenction	Amphenol eco mate plug C016
Restart time	>5s between controlled shutdown and renewed heat request
Output data	Flame on reaction time typically 0.5s

	Log off time <0.5s
Switching output	Floating, galvanically isolated max. switching current 15 mA max. switching power 0.3 W max. switching voltage 280 V AC / 400 V DC

### 3.3 Weight

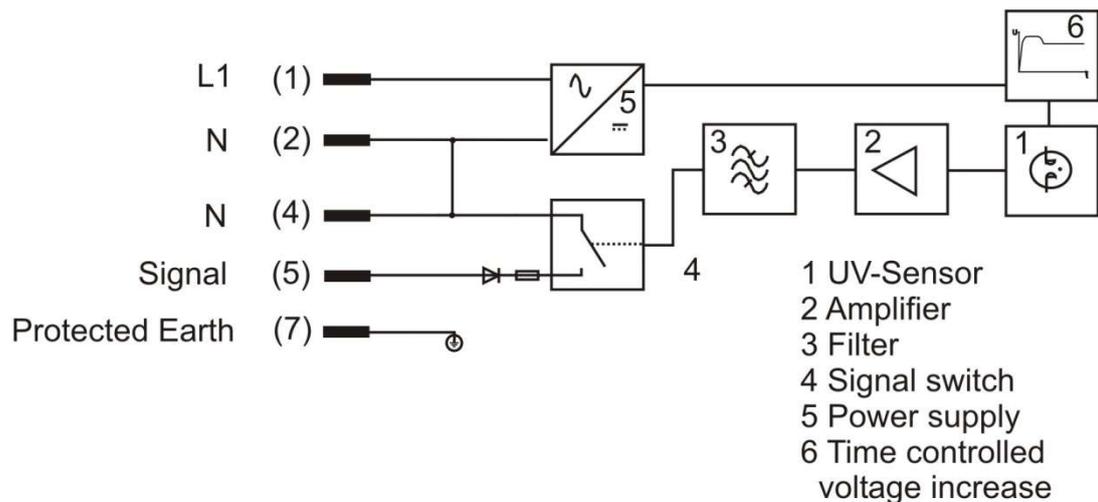
Weight approx. 0.500 kg

### 3.4 Dimensions

Length ( without plug or gland) 176.1 mm  
Width 66 mm  
Height 92 mm

Dimensions see under item 4.4

### 3.5 Block diagram IFR 11



## 4 Transport, installation and connection

### NOTICE

*All installation and connection work may be carried out by qualified and approved specialist staff only !*

*Observe the legal stipulations and adjustment instructions of the plant operator !*

### 4.1 Scope of delivery

- Compact flame detector IFR 11
- Operating instructions (optional, customer dependend)
- Connection cable in other length (optional)

Refer to the order papers for the exact scope of delivery and compare with the delivery note.

Checking for completeness

Check the entire delivery for completeness against the accompanying delivery note. Please refer to our terms of sale and delivery otherwise.

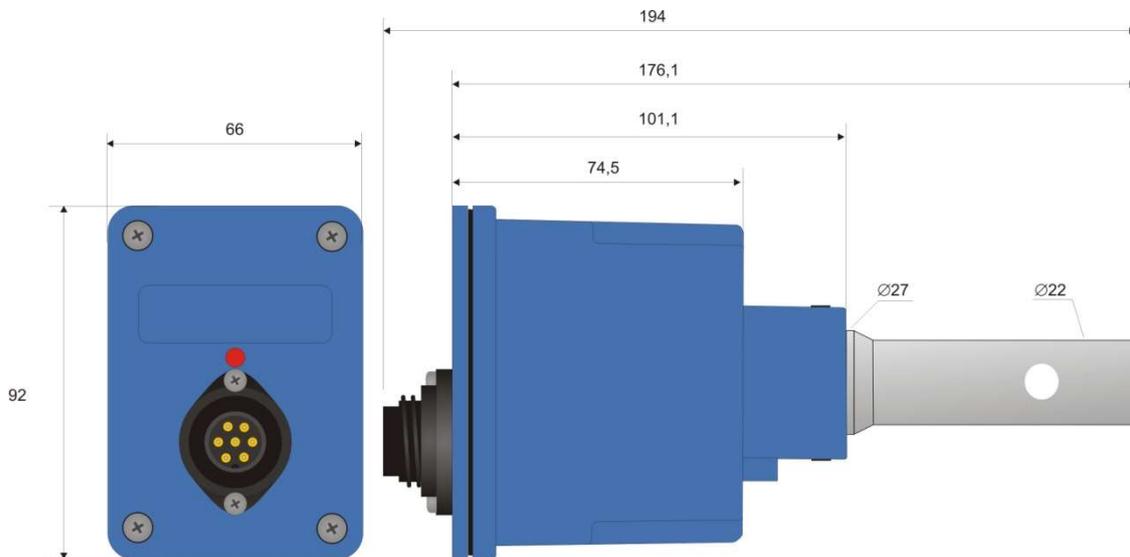
Report any damage

After arrival of the device and accessories, notify the shipping agent, the insurance company and BST Solutions immediately in case of any damage caused by transport or inadequate packaging.

Take steps to minimise and prevent further damage.

Report the insurance case to the insurance company without delay and transmit the full claim documents at once in order to expedite the claims settlement (at the latest in sufficient time before the expiry of any periods of preclusion and/or limitation relating to the compensation claims against third parties).

## 4.2 Dimensions IFR 11



## 4.3 Installation

### NOTICE

*All installation and connection work may be carried out by qualified and approved specialist staff only ! The legal regulations as well as adjustment instructions of the plant operator have to be observed !*

*The IFR 11 should be mounted close to the flame with straight alignment.*

The alignment is to concentrate on the primary zone of the flame (flame root). The distance from the flame should be less than 2 m. Upon completion of the assembly work the screws of the rear sight to the flame menwächters are to be tightened down. At high temperature on the sight glass, which could heat the UV tube to about 60 ° C, an air connection is to be provided. To avoid interference, the direct view is to avoid a spark.

The maximum cable length of the cable is to be noted (see "Technical data"). The connecting cable is to run separately from the high-energy ignition and power lines over long distances and not parallel to transfer it to.

### ⚠ DANGER

For safety reasons and technical regulations a controlled burner shut down of at least once per 24 hours must be guaranteed. Check according to EN 298:2012-11 need to check the UV tube to be used in the burner control to the controlled shutdown on the presence of a flame signal back.

## 4.4 Connection

### 4.4.1 Electrical connection

**⚠ DANGER**

*Danger to life caused by electrical current !*

*The safety instructions and local safety regulations have to be observed during connection !*

For connection data, please refer to the chapter titled "Technical data" as well as to the following terminal diagram.

Ensure that the available supply voltage complies with the voltage indicated on the type plate.

Prior to connection, check the device and the connecting cables for visible damage.

### 4.4.2 Connection diagram IFR 11

Occupancy male and female plug	PIN	Internal connection AC/DC	Cable number	Connection for ionization output / LDR
	1	<b>L</b>	1	L
	2	<b>N*</b>	2	N
	3	NC	-	-
	4	NC	-	-
	5		3	ION/LDR
	6	NC	-	-
	PE	<b>PE</b>	Green / yellow	PE

\*internally

### 4.4.3 Connection to BMS

		Control unit	
Cable color	general	Dungs MPA 22 - connection number	More BMS on mand de-
grey	neutral	12 – 5 N	
black	signal	12 – 3 Ion	
brown	phase	6 – 17 L1	
green-yellow	protected e- arth	protected e- arth	

## 4.5 Storage

Do not unpack any packed compact flame detector IFR 11 and accessories.

The following conditions apply to storage:

- Store in a dry place. Maximum relative humidity 95 %. Non condensing.  
In addition, it has to be assured that the floor in the storage area will remain dry throughout the storage period.
- Protect from direct sunlight. Storage temperature:  
-20 degrees to +50 degrees C (-4 degrees to 120 degrees F).
- Store in a dustfree location.
- Avoid mechanical vibrations and damage.

## 5 Description

### 5.1 Functional description IFR 11

The IFR 11 is a compact UV flame detector, which has been developed for single flame combustion which produces little light or radiation in the visible spectrum and has very low flame modulation/flicker frequency. The design of the UV sensor ensures that the flame detector does not react to background radiation from hot refractory or from any other infra-red light source.

The UV flame detector is equipped with an optical interface which visibly indicates the flame signal intensity. The IFR 11 can be connected directly to the ionisation or LDR input of the control box. It is compatible in its physical dimensions and connection capability to other series

IFR flame detectors. All IFR accessories are identical and therefore this reduces the variety of components used in production and makes it simpler for field application and service.

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## **5.2 Optionally function blocks for IFR 11**

### **5.2.1 Relay module 1 for flame detectors RMF 1**

The compact flame detector IFR 11 is a low power signal output equipped to simulate ionization or LDR signal. If a relay switch contact is required, the use of RMF 1 is recommended. The RMF 1 has an electrically isolated changeover contact with a maximum switching voltage of 250 V AC, a maximum switching current of 1 A and a maximum rating of 250 VA. More information can be found in BA RMF1 EN in its current version.

## 6 Operation of the flame detector

### 6.1 Test of the flame detector

To ensure the proper operation, the flame detector has to be tested several times by starting and stopping the burner. As long as there is no flame in all cases the flame relays has to be switched off solid. The test should be repeated for different operation situations ( see also datasheet ). This is an essential condition for a safe and proper operation.

### 6.2 Operating indicator LED

Via the built-in LED the flame detector is indicating the following operating conditions:

LED	Meaning
off	IFR 11 is without connection or there is no detected flame
Blinking	Flame is detected The blinking of the LED represents the flame signal intensity Increasing blinking = higher intensity
on	The flame is detected with highest intensity

## 7 Maintenance and servicing

### 7.1 Cleaning

For cleaning, use a moist cloth to wipe the housing from the outside only. For maintenance of the sight glass, please use a clean and lint free cloth. Do not use any kind of cleaning sprays or liquids.

#### **NOTICE**

*Do not scratch the glass !*

### 7.2 Maintenance interval

There is a maintenance interval of less than 10000 hours of operation are observed. If the flame detector operated at temperatures  $> 50^{\circ} \text{C}$ , the maintenance interval is shortened considerably.

### 7.3 Safety check

A safety check of flame monitoring must be carried out during every commissioning and maintenance of the furnace because the UV tube subjects a natural aging and the end of its life causes problems. Here the following steps should be checked:

- The attempt to start the burner flame detector is darken -> after the end of the safety time into lock indicate a fault!
- The attempt to start the burner's flame detector with an external UV radiation, eg lighter or gas flame (ambient lighting is not sufficient) to illuminate - must go into lock during the pre-ventilation mode!
- The operation of the burner flame detector is darken -> depending on type of control boxrunng must either by executing a restart attempt at the end of the safety time or immediately after darkening the burner indicate a fault!

### 7.4 Behavior in case of malfunction

In case of malfunctioning of the flame sensor must be replaced, and send back to the manufacturer for check. Precaution after crossing the tube service life of 10,000 h should the UV tube be replaced by the manufacturer or by authorized personnel. IFR 11 is a safety component and may not be opened!

## 8 Troubleshooting

Error description	Cause	Remedy
No flame signal	I)connecting error or no active power  II) Glass dirty  III) IFR 11 malfunction IV)Tube faulty	Please check the plugs an the con- nections of the burner controller box  Power off the IFR and take it out of the flange. Now clean the glass carefully with a clean and fuzz-free cloth  Exchange IFR Exchange tube
Ambient light interference	I) Tube faulty II) View to sparks	Exchange tube Change view

### 9 Order data

The compact flame detector IFR 11 is available from BST Solutions GmbH under the following order data:

Item	Version	Order No.:
Flame detector <b>IFR 11 / 230</b> plug version	230 V AC	611193031000
Flame detector <b>IFR 11 / 120</b> plug version	120 V AC	611293031000

## 10 Accessories

Following accessories are offered by BST Solutions :

Artikel	Ausführung	Artikelnummer
UV-tube kit for IFR		5010-0050-12
Relay module for flame detectors RMF 230V		640480002000
Relay module for flame detectors RMF-R 230V	with additional resistor output (20 k $\Omega$ )	640480002001
Relay module for flame detectors RMF 120V		640480002100
Relay module for flame detectors RMF-R 120V	with additional resistor output (20 k $\Omega$ )	640480002101
Connection cable with female right-angled plug, length 1.8 m		561313041800
Connection cable with female right-angled plug, length 3.0 m		561313043000
female right-angled plug		165303041000



