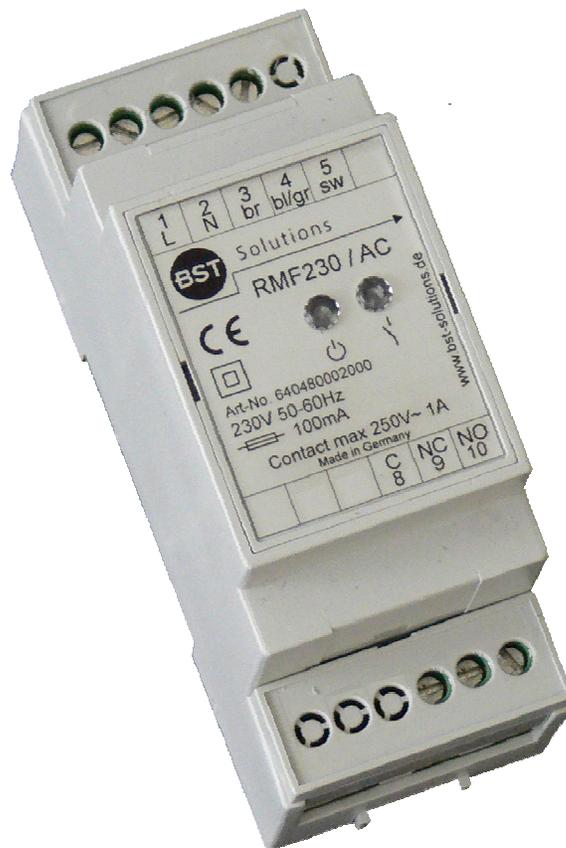


## Original Operating Instructions Relay Module Flame Detector

Type: RMF  
Document: BA RMF EN Rev 2



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<b>1</b>	<b>General aspects</b>	<b>1-1</b>
1.1	Introduction	1-1
1.2	Warning notes	1-2
1.3	Copyright protection	1-3
1.4	Disposal information	1-3
1.5	Warranty	1-4
1.6	Obligation of the operating company	1-5
1.7	Liability disclaimer	1-6
1.8	Declaration of conformity	1-7
1.9	Address of the manufacturer	1-8
<b>2</b>	<b>Safety</b>	<b>2-1</b>
2.1	Intended use	2-1
2.2	Requirements on persons	2-2
2.3	Safety instructions	2-3
2.4	Safety devices	2-4
2.4.1	Fundamental aspects	2-4
2.4.2	Safety devices on the RMF	2-4
2.5	Safety instructions in case of maintenance and troubleshooting	2-5
2.5.1	Fundamental aspects	2-5
2.5.2	Electrical / electronic devices	2-6
2.5.3	Testing per German Workplace Safety Ordinance (BetrSichV)	2-7
2.5.4	Safety test	2-7
<b>3</b>	<b>Technical data</b>	<b>3-1</b>
3.1	General characteristic features	3-1
3.2	Electric, optic, mechanic	3-1
3.3	Weight	3-2
3.4	Dimensions	3-2
3.5	Block diagram RMF	3-2
3.6	Block diagram RMF-R	3-2
<b>4</b>	<b>Transport, installation and connection</b>	<b>4-1</b>
4.1	Scope of delivery	4-1
4.2	Packaging	4-2
4.3	Shipping instructions	4-2
4.4	Dimensions	4-2
4.5	Installation	4-3
4.6	Connection	4-4
4.6.1	Electrical connection	4-4
4.6.2	Connector diagram RMF	4-4
4.6.3	Anschlussplan RMF-R	4-5
4.7	Storage	4-5
<b>5</b>	<b>Description</b>	<b>5-1</b>
5.1	Functional description RMF	5-1

<b>6</b>	<b>Operation of the Relay Module Flame Detector</b>	<b>6-1</b>
6.1	Test of the RMF	6-1
<b>7</b>	<b>Maintenance and servicing</b>	<b>7-1</b>
<b>8</b>	<b>Troubleshooting</b>	<b>8-1</b>
<b>9</b>	<b>Order data</b>	<b>9-1</b>

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# 1 General aspects

## 1.1 Introduction

These operating instructions are a helpful guide for ensuring the successful and safe operation of the Relay Module Flame Detector. They contain important information on how to operate the system safely, correctly and efficiently. Observing the operating instructions will help to prevent hazards, reduce costs of repair and downtimes and increase the reliability and life of the device.

All illustrations and drawings in these operating instructions are shown for illustration purposes and do not contain details for design.

The operating instructions always have to be accessible at the device. They have to be read and applied by each person who is required to work with/on the device.

This work may involve, for example:

- operation
- troubleshooting during operation
- servicing
- maintenance (upkeep, inspection, repair) and/or
- transport

This should be confirmed by the operating company in writing.

## 1.2 Warning notes

The following warning notes are used in these operating instructions:

### **⚠ DANGER**

*This warning level indicates an imminent hazardous situation.*

*If the hazardous situation is not prevented, this will result in death or severe injury.*

*Follow the instructions that accompany this warning to prevent the risk of death and severe personal injury.*

### **⚠ WARNING**

*This warning level indicates a potentially hazardous situation.*

*If the hazardous situation is not prevented, this may result in death or severe injury.*

*Follow the instructions that accompany this warning to prevent the potential risk of death and severe personal injury.*

### **⚠ CAUTION**

*This warning level indicates a potentially hazardous situation.*

*If the hazardous situation is not prevented, this may result in slight or moderate injuries.*

*Follow the instructions that accompany this warning to prevent the injury of persons.*

### **CAUTION**

*This warning level indicates potential damage to property.*

*If this situation is not prevented, it may result in damage to property.*

*Follow the instructions that accompany this warning to prevent damage to property.*

### **NOTICE**

*A notice indicates additional information that will make the handling of the device easier.*

---

### **1.3 Copyright protection**

These operating instructions have to be treated as confidential. They may only be used by authorised staff. Access by third parties may only be granted upon written agreement of BST Solutions.

All documents are protected in keeping with the German copyright law.

The disclosure and reproduction of documentation, in whole or in part, as well as the exploitation and communication of its content shall not be permitted unless expressly stated otherwise. Offenders are liable for prosecution and the payment of damages.

We reserve all rights to exercise industrial property rights.

### **1.4 Disposal information**

The Relay Module Flame Detector is equipped with electrical and electronic components and must be disposed separate from household waste. Follow the local and actual regulations for waste disposal.



### 1.5 Warranty

**Read these operating instructions carefully and in full before operating the Relay Module Flame Detector!**

The manufacturer is not liable for damage or operating malfunctions that result from the operating instructions not being observed.

The operating company has to supplement the operating instructions with operating instructions on the basis of national regulations on accident prevention and environmental protection, including information on supervision and notification requirements with respect to special operating circumstances, e.g. regarding organisation of work, working processes and staff deployed.

The recognised technical rules for safe and professional working also have to be observed in addition to the operating instructions and the regulations on accident prevention applicable to the country and place of use.

The warranty shall become void, for example, in the event of:

- inappropriate use
- use of impermissible equipment
- incorrect connection
- prior works that are not part of the supplied product or service
- non-use of original spares and accessories
- conversion, if this has not been approved by BST Solutions
- non-performance of specified maintenance work

#### **NOTICE**

*It is recommended that the operator of the device concludes a service contract with BST Solutions. This guarantees that the device is regularly checked by our service staff and ensures that any required wearing and spare parts are available without long delivery periods.*

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## 1.6 Obligation of the operating company

The Relay Module Flame Detector may cause hazards if it is operated inappropriately or in an improper condition.

The operating company is under the obligation to operate the machine in proper state only. The operating company has to secure hazardous areas that exist between BST devices and the customer's own equipment.

The operating company has to appoint and instruct responsible staff:

- Only deploy trained or instructed staff.
- Clearly set out the responsibilities of the staff with regard to operation, set-up, maintenance and repair.
- Regularly check that staff are safety conscious and aware of hazards and are observing the operating instructions.
- Before starting work, staff who are assigned to work with/on the device have to have read and understood the operating instructions, in particular the chapter on "Safety", as well as the relevant regulations.
- The operating instructions and relevant regulations have to be stored in such a way that they are accessible to operating and maintenance staff.
- Set out who will have responsibility for device operation and ensure that this person has the authority to overrule any unsafe instructions of third parties.

### **NOTICE**

*Generally valid legal and other binding regulations on accident prevention and environmental protection have to be observed and instructed, in addition to the operating instructions.*

### 1.7 Liability disclaimer

All technical information, data and guidance on device operation that are contained within these operating instructions are, to the best of our knowledge, correct at the time of printing, taking into account our present understanding and experience.

We reserve the right to make technical changes with respect to the further development of the flame amplifier outlined in these operating instructions. No claims can be made based on the specifications, illustrations and descriptions of these operating instructions.

We shall not be liable for damage or operating malfunctions that result from operating errors, inappropriate repairs or the non-observance of the operating instructions. We expressly state that only original spare parts and accessories approved by us may be used. This also applies to the components of other manufacturers that have been used.

The installation or use of non-approved spare and accessory parts and any unauthorized retrofits and modifications are not permitted for safety reasons and exclude any liability by BST Solutions for consequential damages.

BST Solutions is liable for possible errors or omissions with the exclusion of additional claims entered into in the framework of the warranty obligations conceded to in the contract. Claims for damages, on whatever legal basis they may be, shall be excluded.

Translations into foreign languages are carried out in good faith. We cannot accept any liability for translation errors; this also applies where the translation has been carried out or has been commissioned by us. The original text alone shall be binding.

Descriptions and illustrations do not necessarily depict the delivered product or a possible spare parts order. Drawings and graphics are not to scale.

## 1.8 Declaration of conformity



BST Solutions GmbH  
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 Germany

Tel.: +49 2056 98947-0  
 Web: www.bst-solutions.de

### EU Konformitätserklärung EC Declaration of Conformity

**Produkt**            **Relaismodul für Flammenwächter RMF1**  
*Product*            *Relay module for Flame detectors RMF1*  
**Typ**                 **RMF1/230, RMF1/120, RMF1/24**  
*Type*                *RMF1/230, RMF1/120, RMF1/24*

Hiermit erklären wir, dass das vorstehend bezeichnete Relaismodul in seiner Konzipierung und Bauart sowie in der von uns in Verkehr gebrachten Ausführung den grundlegenden Sicherheitsanforderungen folgender EU-Richtlinien entspricht

*This is to confirm that the above described Relay Module in its design and type of construction complies with the provisions of the Directive of the Council of the European Communities on the approximation of the laws of the member states relating to*

	2014/35/EU	Niederspannungsrichtlinie <i>Low voltage directive</i>
	2014/30/EU	EMV Richtlinie <i>EMC directive</i>
<b>Normen</b> <i>Standards</i>	EN 298:2012; EN 13611:2007+A2:2011 EN 60730-1:2011; EN 55032:2012	

**Ausgestellt durch**            BST Solutions GmbH  
*Issued by*

**Rechtsverbindliche  
 Unterschrift**  
*Legally binding signature*



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*Name*  
 Eberhard Röllecke

*Funktion*  
 Geschäftsführer  
 General Manager

*Ort, Datum*  
 Place, Date

Heiligenhaus, den 11.02.2019

### 1.9 Address of the manufacturer

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Internet: [www.bst-solutions.de](http://www.bst-solutions.de)

## 2 Safety

### 2.1 Intended use

The Relay Module Flame Detector makes a safety-related binary signal ON/OFF from a flame detector in the form of potential free relay contacts available for a burner control box. The operating state of the RMF and the status of the flame relay are shown on two LED in the front. The RMF protects the flame detector electrically.

The RMF1 may only be operated in combination in a control cabinet or protective housing.

#### **NOTICE**

*The RMF1 is only in combination with aKLC1x or KLC2x or KLC2002 or IFx10/11 compliant with EN298:2012.*

#### **⚠ 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.

## 2.2 Requirements on persons

### **NOTICE**

*Work on/with the device may only be performed by persons authorized to do so based on their training and qualification. Furthermore, such persons have to have been commissioned by the operating company.*

Do not allow any persons who are being apprenticed, educated, instructed or on a general training programme to work on the device without the constant supervision of an experienced person.

Persons who are under the influence of drugs, alcohol or medication that affects reactivity shall not be permitted to carry out work on the device.

Connection, set-up, maintenance and repair work may only be carried out by qualified specialist staff.

This device may cause hazards if it is operated inappropriately by untrained staff or if it is not used for its intended purpose.

Generally valid legal and other binding regulations on accident prevention and environmental protection in addition to basic health and safety requirements have to be observed. The operating company has to instruct its staff accordingly.

## 2.3 Safety instructions

The following instructions on accident prevention have to be observed when operating the Relay Module Flame Detector:

### **NOTICE**

*Only operate the device if it is in a proper state !*

- Do not remove or disable safety devices.
- Check for externally noticeable damage and defects prior to using the device ! Immediately notify the appropriate authority/person of any changes that occur (including changes in operating performance). If necessary, stop and secure the device immediately.
- Allow only authorised specialist staff to carry out set-up and/or maintenance work.
- Replace worn or defective parts.
- Use suitable maintenance tools only.
- After repair work, refit all safety devices and carry out electrical and mechanical checks.
- Check the operating instructions for details of displays as well as switch-on and switch-off procedures.
- Prior to switching on the device, make sure that no-one can be endangered by the device !
- The operating instructions always have to be kept close to the device and be readily at hand.
- Any non-compliance with the safety instructions outlined in these operating instructions may lead to damage to property, personal injury or even death.

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## 2.4 Safety devices

### 2.4.1 Fundamental aspects

Check the safety equipment and locking devices on the device for safe operational condition.

Only operate the device if all safety devices are present and enabled. The operating company or operator of the Relay Module Flame detector is responsible for the proper operation of the device.

#### **NOTICE**

*The device has been fitted with warning and danger signs for the protection of operating staff. These signs have to be observed. Damaged or illegible signs have to be replaced immediately.*

### 2.4.2 Safety devices on the RMF

The Relay Module Flame Detector has been fitted with the following safety devices:

- Housing (protection against accidental contact)
- Internal fuse

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## 2.5 Safety instructions in case of maintenance and troubleshooting

### 2.5.1 Fundamental aspects

- Deadlines set or indicated in the operating instructions for repetitive checks / inspections shall have to be observed !
- Appropriate workshop equipment is essential for performing maintenance work.
- In conformance with the electrical regulations, work on the electrical equipment of the system may only be carried out by an electrical specialist or by trained staff under the direction and supervision of an electrical specialist.
- The adjustment, maintenance and inspection activities and deadlines stipulated by BST Solutions, including information on the replacement of parts / assemblies, have to be observed! These tasks may only be carried out by authorised specialist staff.
- Operating staff have to be informed before maintenance or other special work is carried out. A supervisor has to be appointed.
- Screw connections which have been loosened during maintenance and servicing work, have to be tightened.
- If maintenance and repairs require safety devices to be dismantled, these devices have to be remounted and checked as soon as the maintenance and repair work has been completed.
- Operating and auxiliary materials as well as exchanged parts have to be disposed of in a safe and eco-friendly way.
- Spare parts supplied by BST Solutions or approved of by BST Solutions only may be used.

## 2.5.2 Electrical / electronic devices

### **⚠ DANGER**

*Danger to life caused by electrical current!*

*Contact with live wires or components presents a danger to life !*

*Prior to any work on the electrical equipment, disconnect the flame amplifying system from the power supply network !*

### **NOTICE**

*In keeping with the electrical regulations, work on electrical / electronic parts / components may only be carried out by electrical specialists.*

#### **Important rules of conduct**

- Check the device in regular intervals. Any defects or faults ascertained have to be corrected immediately. Switch off the device until the defects have been corrected.
- Equipment parts undergoing inspection, maintenance or repair work have to be made de-energised, if required. First check that the disconnected parts are no longer live, then short to earth. Also isolate neighbouring live parts
- If work is required on live parts, a second person has to be assigned who can disconnect the power supply in case of an emergency. Only use insulated tools !
- Fuses must not be repaired or bridged. Only use original fuses with the specified current !

### 2.5.3 Testing per German Workplace Safety Ordinance (BetrSichV)

In case of the coupling or installation of devices from various manufacturers or suppliers, the operating company has to carry out a precise test, prior to start-up, in accordance with the German Workplace Safety Ordinance (BetrSichV) in force and the applicable electrical regulations.

In case of queries, please get in touch with BST Solutions.

### 2.5.4 Safety test

#### **▲WARNING**

*In order to ensure correct operation, the RMF as well as flame detectors 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 prerequisite for a safe and correct operation of the device !*



### 3 Technical data

#### 3.1 General characteristic features

- Potential free change-over contacts with higher switching power
- Protects with its internal fuse flame detectors

#### 3.2 Electric, optic, mechanic

Operating voltage	230/240V AC 120V AC (optional) 24V DC (optional)
Power consumption AC DC	max. 15 mA max. 100 mA
Relay data	Potential-free change-over contact max. 250V switching voltage max. 1A switching current max. 250VA switching power
NO-contact with series resistor (RMF-R)	max. 100V switching voltage max. 0,005A switching current max. 0,5VA switching power
Response time Switch-on time Switch-off time	max. 20 ms max. 20 ms
Operating temperature	-20 to +60°C
Humidity	max. 95% r.H., non-condensing
Electrical connection	Screw terminals
Mounting	Switch cabinet or Protective housing with the degree of protection according to the place of use
Type of mounting	Mounting rail, 35mm
Kind of protection	IP 20
Protection class	II

### 3.3 Weight

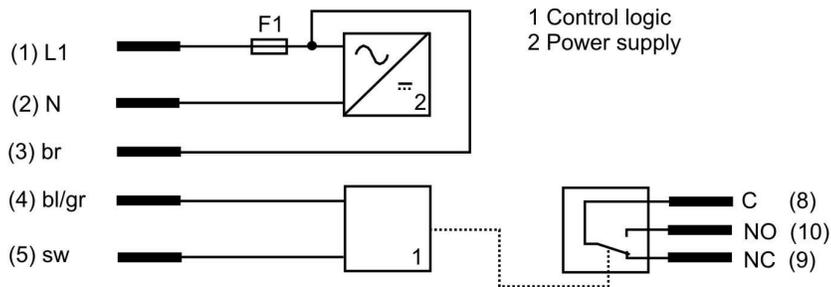
Weight approx. 0.090 kg

### 3.4 Dimensions

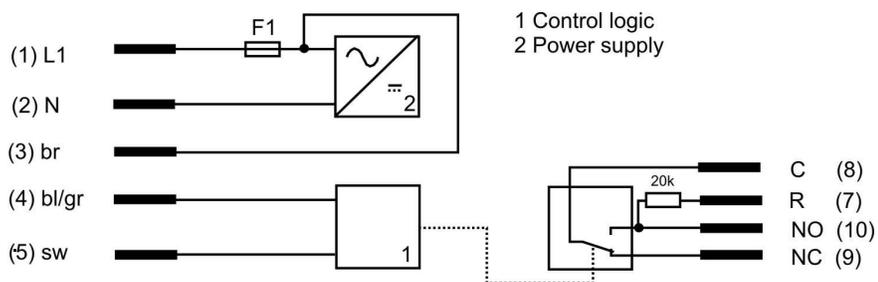
Length ( with plug )	90	mm
Width	36	mm
Height	58	mm

Dimensional drawing see under 4.4

### 3.5 Block diagram RMF



### 3.6 Block diagram RMF-R



## 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

- Relay Module Flame Detector RMF
- Operating instructions (optional, customer dependend)

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 Packaging

The Relay Module Flame Detector is shipped in different packaging materials.

The most frequently used packaging materials are cardboard and plastics (foils, foamed material).

### NOTICE

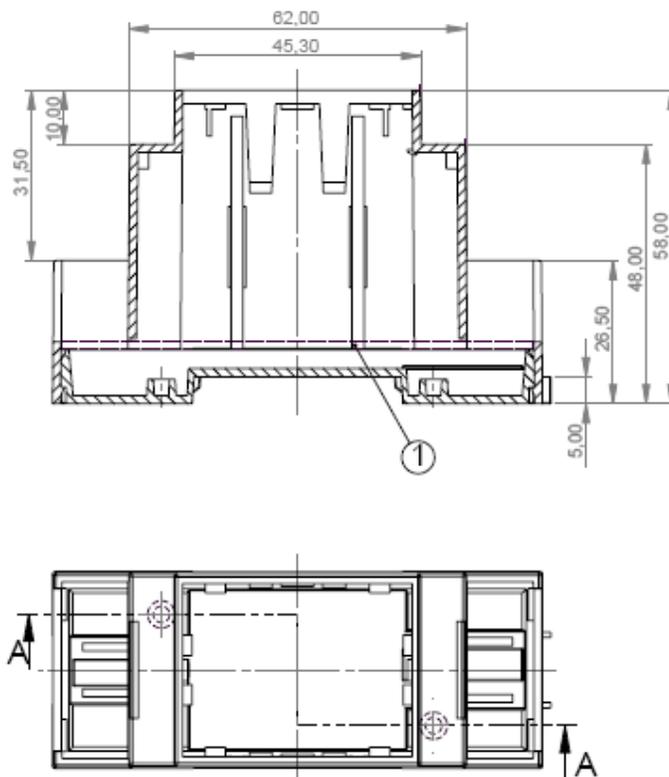
*Packaging has to be disposed of in an environmentally friendly way and in accordance with the relevant provisions on disposal.*

## 4.3 Shipping instructions

### NOTICE

*Do not subject the appliance to heavy impacts during transport. Do not subject the appliance to any humidity !*

## 4.4 Dimensions



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## 4.5 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 RMF should be mounted on a top hat rail. Please take care on standardized wiring. The connections should be made according to table 4.6. The correct function can only be ensured if the connection order is made in the right way.

## 4.6 Connection

### 4.6.1 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.

### 4.6.2 Connector diagram RMF

	Connection-Nr.	Allocation	External connection	Color, Flame detector
	1	L1 or +24V DC	L1 or +24V DC	(brown)
	2	N or 0V DC	N or 0V DC	(blue)
	3	L1-connection, outgoing	L1-connection flame detector	brown
	4	Switching output flame detector	Signal output flame detector	blue / grey
	5	N-connection, incoming	N-connection flame detector	black
	8	C	Switching input	-
	9	NC	Normally closed contact	-
	10	NO	Normally open contact	-

## 4.6.3 Anschlussplan RMF-R



Connection-Nr.	Allocation	External connection	Color, Flame detector
1	L1 or +24V DC	L1 or +24V DC	(brown)
2	N or 0V DC	N or 0V DC	(blue)
3	L1-connection, outgoing	L1-connection flame detector	brown
4	Switching output flame detector	Signal output flame detector	blue / grey
5	N-connection, incoming	N-connection flame detector	black
7	R	Series resistor 20k	-
8	C	Switching input	-
9	NC	Normally closed contact	-
10	NO	Normally open contact	-

## 4.7 Storage

Do not unpack any packed RMF and accessories.

The following conditions apply to storage:

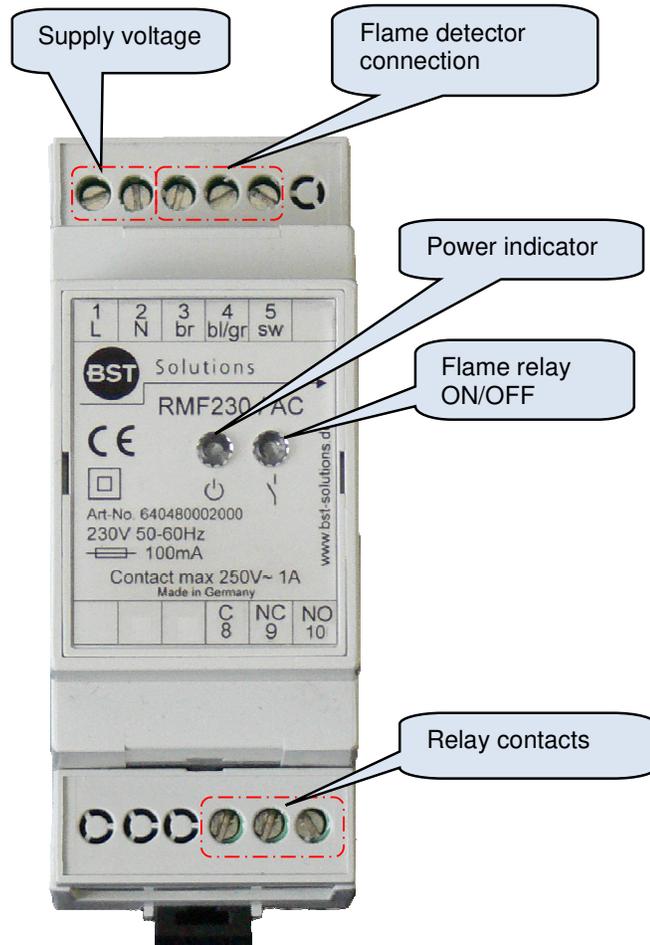
- Store in a dry place. Maximum relative humidity 60 %. In addition, It has to be assured that the floor in the storage area will remain dry throughout the storage period.
- Protect from direct sunlight. Storage temperature: 15 degrees to 25 degrees C (59 degrees to 77 degrees F).
- Store in a dustfree location.
- Avoid mechanical vibrations and damage.



## 5 Description

### 5.1 Functional description RMF

The Relay Module Flame Detector protects himself as well as the connected flame detector with its own internal fuse in the L1-cable. With two LED on the front it shows its operating state and the status of the flame relay. The internal flame relay is potential free and has a much higher switching power than the flame relays of the product lines KLCx or IFx 10 / IFx 11.



## Description



### **6 Operation of the Relay Module Flame Detector**

#### **6.1 Test of the RMF**

To ensure the proper operation, the RMF and the flame detector have 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.



### **7 Maintenance and servicing**

The Relay Module Flame Detector requires no maintenance.

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.



## 8 Troubleshooting

Description	Cause	Remedy
Operating indicator is off	I) no operating voltage	Check the connection of the RMF
	II) RMF out of order	Replace RMF
Relay does not switch, Relay-LED is off	I) Fault of the flame detector	Replace Flame detector
	II) Fault in the wiring of the flame detector	Check connections
	III) no flame	Control the function of the burner



## 9 Order data

The RMF is available from BST Solutions GmbH under the following order data:

Article	Version	Article number
<b>RMF 230V AC</b>	For 230V applications	640480002000
<b>RMF-R 230V AC</b>	For 230V-applications with a 20k series resistor at an additional NO-connector	640480002001
<b>RMF 120V AC</b>	For 120V applications	640480002100
<b>RMF-R 120V AC</b>	For 120V-applications with a 20k series resistor at an additional NO-connector	640480002101
<b>RMF 24V DC</b>	For 24V DC-applications	640480002200
<b>RMF-R 24V DC</b>	For 24V DC-applications with a 20k series resistor at an additional NO-connector	640480002201





