Original Operating Instructions
Radiation Pyrometer

Type: **SPM U16W**

Document: **BA SPM U16W EN Rev1**

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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 radiation pyrometer. 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 BFI Automation.

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 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 Radiation pyrometer!

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 harmonised with BFI Automation
- non-performance of specified maintenance work

NOTICE

It is recommended that the operator of the device concludes a service contract with BFI Automation. 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.

1.6 Obligation of the operating company

The Radiation pyrometer 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 BFI 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 BFI Automation for consequential damages.

BFI Automation 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

BFI Automation Mindermann GmbH

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EU Konformitätserklärung
EC Declaration of Conformity

Produkt *Product*	**Flammenstrahlungsmesser** *Flame radiation scanner*
Typ *Type*	**SPM** *SPM*

Hiermit erklären wir, dass bezeichnete Flammenstrahlungsmesser, in seiner Konzipierung und Bauart sowie in der von uns in Verkehr gebrachten Ausführung, den grundlegenden Sicherheitsanforderungen folgender EU-Richtlinien entsprechen:

This is to confirm that the described flame radiation scanner in there 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:

Richtlinien *Directives*	2014/30/EU	EMV Richtlinie *EMC directive*
Normen *Standards*	EN 60730-1:2016	
Kennzeichnung ATEX *Identification ATEX*		

Ausgestellt durch
Issued by: BFI Automation Mindermann GmbH

Rechtsverbindliche Unterschrift
Legally binding signature

Name	Funktion *Function*	Ort, Datum *Place, Date*
Michael Thomas	Prokurist *Authorized Officer*	Heiligenhaus, den 30.03.2020

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1.9 Address of the manufacturer

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2 Safety

2.1 Intended use

The flame radiation pyrometer is only intende for the detection of flame intensities. The SPM must **not** be used as a safety-related flame monitor.

⚠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 Radiation pyrometer.

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.

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 Radiation pyrometer 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 Radiation pyrometer

The Radiation pyrometer has been fitted with the following safety devices:

- Housing (protection against accidental contact)
- Earth connection of device (optional)

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 conformity 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 BFI Automation, 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 BFI Automation or approved of by BFI Automation 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 amplifiering 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 in keeping with the 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 keeping with the German Workplace Safety Ordinance (BetrSichV) in force and the applicable electrical regulations.

In case of queries, please get in touch with BFI Automation.

3 Technical data

3.1 General characteristic features

- UV-Sensor
- Fully electronic construction
- Spectral analyzing process
- Main bands CO_2, C_2, CH, OH

3.2 Electrical system, optical system, mechanical system

Spectral sensitivity	350 to 550 nm
Angle of view	16°
Operating voltage	24 VDC, isolated internally
Current consumption	max. 250 mA
Range of operating temperature	-20°C to +70°C
Electric connection	dustproof plug-type connector
Type of protection	IP 65
Cable length	max. 500 m (KW 5)
Sighting tube connection	1“ internal thread ISO 228
Purge air connection	½“ internal thread ISO 228
Purge air volume	10 Nm^3/h
Purge air pressure	0.02 bar over the internal pressure of the combustion chamber

3.3 Weight

Weight	approx. 1.5	kg

3.4 Dimensions

Length	235	mm
Width	108	mm
Height (with plug)	190	mm

3.5 Adjustment controls

The radiation pyrometer is equipped with one DIP switch and two rotary switches.

The adjustment cannot be carried out during operation as the adjustment controls are located inside the housing.

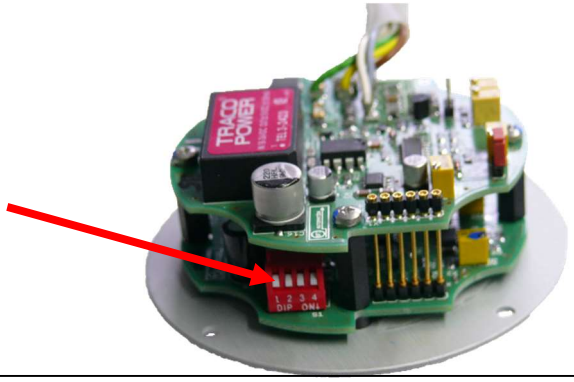
3.5.1 Integration time (DIP switch S201)

The integration of the SPM output signal allows the adaption to control systems and dynamic actuators. In case that immediate SPM reaction to a change of radiation is required, a shorter integration time should be set. For actuators with a longer time delay it would be advisable to use a slow-changing output signal achieved by a longer SPM integration time

The available integration times can be taken from the following diagram:

DIP-Switch 1	2	3	4	Time [s] 0 - 90 %	Time [s] 0 - 99 %
☐	☐	☐	☐	110	220
■	☐	☐	☐	10	20
☐	■	☐	☐	4,9	9,8
☐	☐	■	☐	1,1	2,1
☐	☐	☐	■	0,54	1,1
■	■	■	■	0,33	0,65

S201



Examples:

Switch 1 = preset time for 0 to 90% output signal
10 seconds

Switch 4 = preset time for 0 to 90% output signal
0,5 seconds

Factory setting = 110 seconds

NOTICE

A longer integration time leads to a delayed change of output signal. Consider this delay time when checking the device.

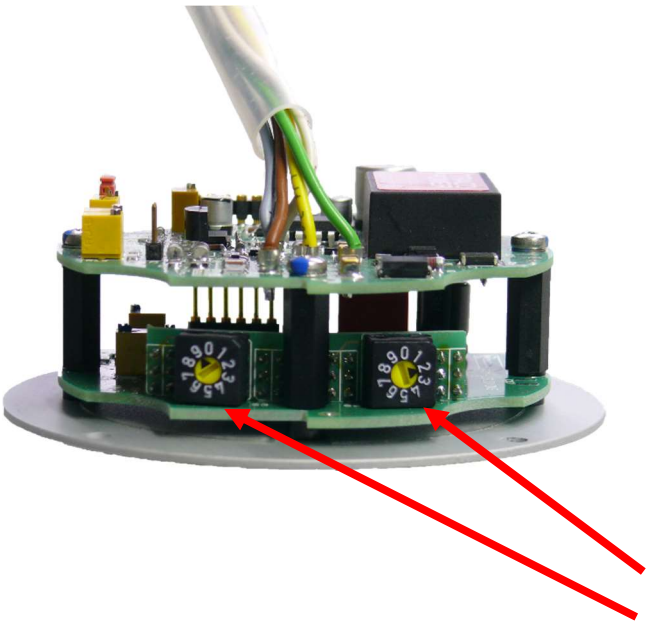
3.5.2 Gain and Offset setting (rotary switch S202 and S203)

The functional principle of gain and offset can be taken from the output characteristics.

Use offset to fade out of the background signal, which also results into 10 fan-out curves for the gain. In case of strong amplification (gain = 9) a smaller change of radiation intake is leading to a big change of SPM output signal.

Adjust the offset to the level of background signal by using a 10 step rotary switch. As soon as the required setting is done, the gain setting is to be done the same way.

In case the SPM alignment causes stronger differences of radiation energy, it is recommended to chose a smaller amplification setting only to get a smoother signal.



NOTICE

It is not possible to overturn the switches.

S202 (Gain)

S203 (Offset)

Offset to fade out undesired background radiation or of a permanent signal due to high gain setting.

Position 0 = maximum background compensation (+ 0 dB)

Position 3 = medium background compensation (- 40 dB)

Position 9 = no background compensation (-120 dB)

Factory setting = 9

Gain for adjustment of the radiation energy, to be shown over the analogue output range.

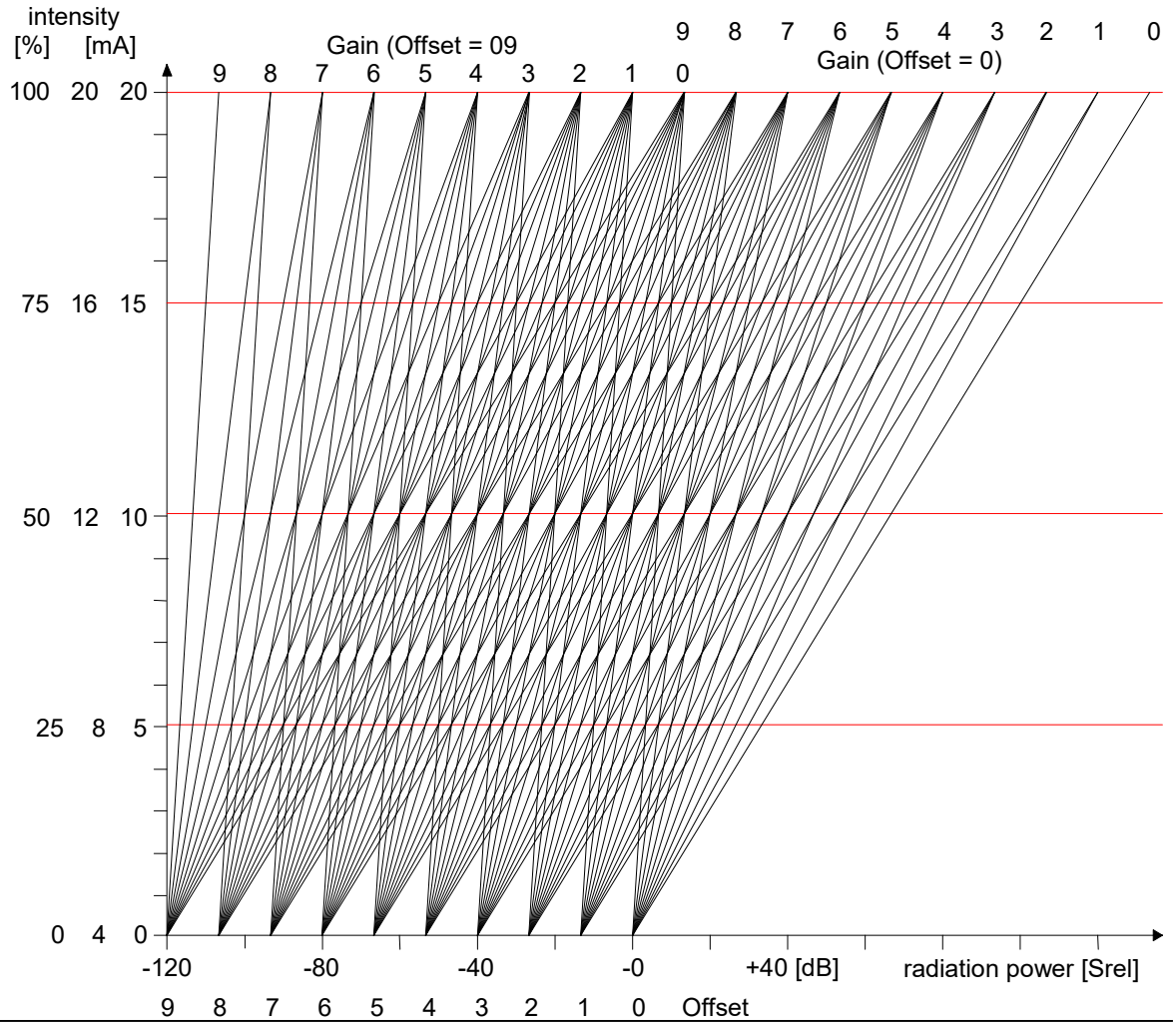
Position 1 = small signal gradient for bigger changes of radiation (120 dB)

Position 4 = medium signal gradient for medium changes of radiation (40 dB)

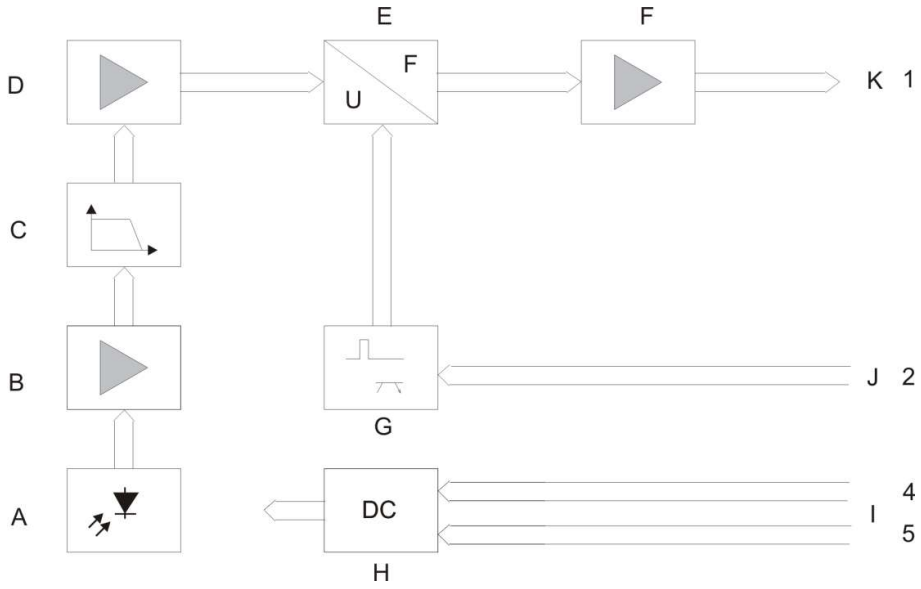
Position 9 = big signal gradient for smaller changes of radiation (15 dB)

Factory setting = 2

3.5.3 Characteristic field



3.6 Block diagram SPM



1 – 5 pin number in the Harting plug
A Sensor
B Logarithmic preamplifier
C Low pass
D Amplifier
E U/F-converter
F Power amplifier
G Electronic shutter
H Power adapter
I Power supply
J System clock
K Signal output

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

- Radiation pyrometer SPM U16W
- Operating instructions
- Connection cable (optional)
- Harting connector set (set) and/or complete
- Ball flange (optional)
- 3-way-ball-valve (optional)
- Heating insulator (optional)
- Optical alignment device (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 BFI Automation 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 Radiation pyrometer 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 Forwarding instructions

NOTICE

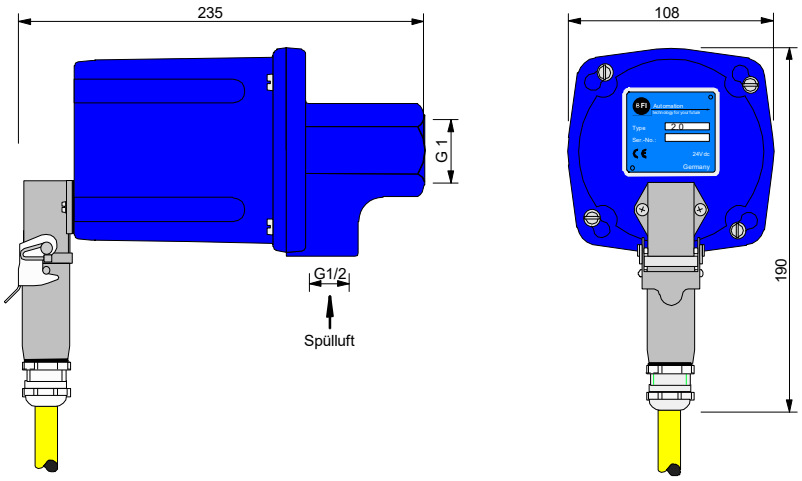
Do not subject the appliance to heavy impacts during transport. Do not subject the appliance to any humidity !

4.4 Weight - Radiation pyrometer

1.5 kg

4.5 Space requirement

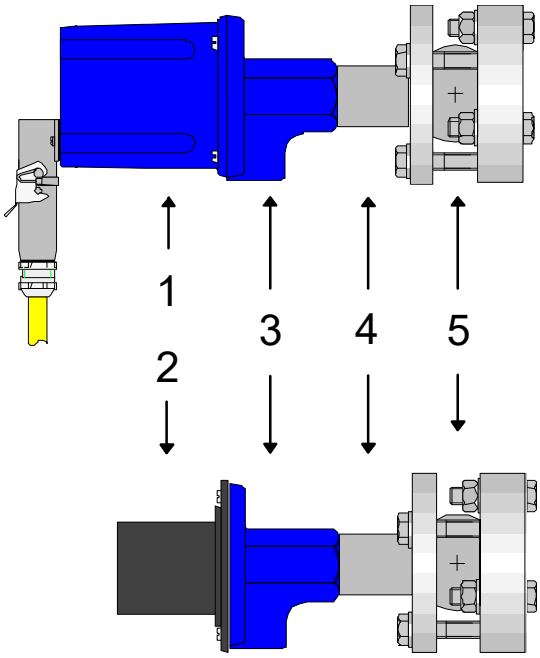
See following illustration.



4.6 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 !



1 Radiation pyrometer
2 Optical alignment device
3 Purge air flange
4 Heating insulator
5 Ball-flange

The Radiation pyrometer has been provided with oblong holes for easy installation on the purge air flange.

The sighting tube connection has been provided with a G1" internal thread.

In order to ensure perfect flame amplifiering, the correct and low-vibration position of the sighting tube relative to the flame is essential. The Radiation pyrometer has to be aligned in such a way that a perfect visual image is set. For this purpose use the optical adjusting device (available as an accessory) as shown in the following illustration.

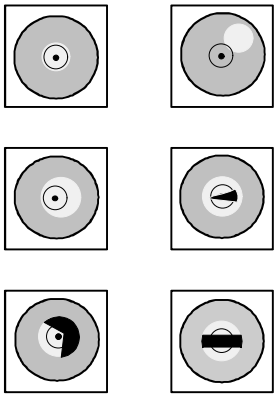
The best setting results when a large visual field is achieved.

⚠CAUTION

Danger of injuring the eyes by infrared and ultraviolet radiation and penetrating gases when checking the flame visually !

Wear filtering protective glasses !

Vision images of the optical adjustment device



correct wrong

NOTICE

The images appear mirror inverted in horizontal and vertical direction !

The length and the diameter of the sighting tube have a direct influence on the usable flame radiation as the visual angle of the lens system is defined. Without restriction of the visual range, the maximum length L of a sighting tube for conventional tube diameters D is as follows:

D:	1“	1.5“	2“
L:	0.5 m	0.8 m	1.1 m

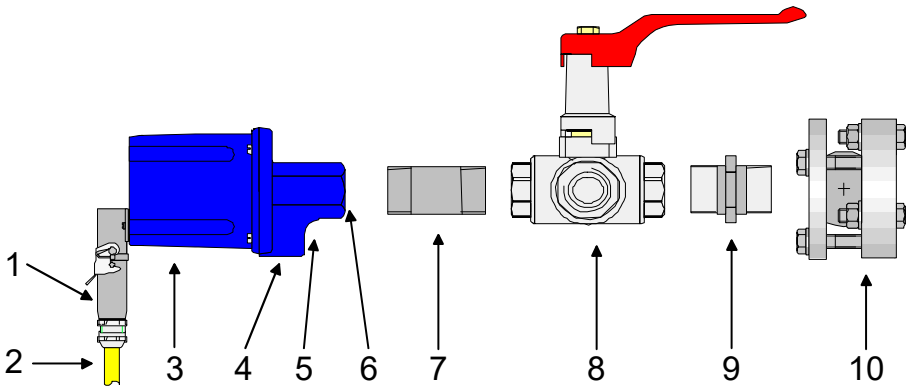
For this reason, the sighting tube should always be as short as possible. A diameter of 2" is recommended.

NOTICE

At a diameter of 1", the sighting tube should not be any longer than 50 cm. When doubling the length, double the diameter to 2" !

By using a ball-flange (optional, part No. 6590-9020-01), the adjustment can be carried out easily ensuring that the ideal sighting point is set mechanically. The Radiation pyrometer is supplied complete with a rapid-installation flange. This flange ensures the unproblematic disassembly of the Radiation pyrometer. It has a purge air connection, the construction of which prevents the soiling of the lens system without the dust-laden purge air damaging the lens. If temperatures of over 50 degrees Celsius occur at the Radiation pyrometer despite the inflow of cooling air caused by the heat dissipation of the sighting tube, heating insulator (optional, part No. 1598-0141-00) has to be used. In case of pressurised combustion, an additional 3-way-ball-valve (optional, part No. 1594-8831-00) has to be fitted for protection. The exit of hot gas after removal of the scanner is prevented, ensuring further cooling and purging of the arrangement.

The entire mechanical peripheral system can be supplied by BFI Automation.



1 Harting plug
2 Special cable KW5
3 Radiation pyrometer
4 Purge air connection
5 Purge air flange
6 Sighting tube connection
7 Heating insulator
8 3-way-ball-valve
9 Double nipple
10 Ball-flange

4.6.1 Company adjustment of the Radiation Pyrometer

⚠DANGER

Danger to life caused by combustion or explosion !

In case of incorrect installation or adjustment, uncontrolled combustion or explosions may be caused !

Observe the adjustment instructions of the plant operator !

Adjustment work may be carried out only by qualified and approved specialist staff !

The Radiation pyrometer has been factory set as follows:

Integration time (DIP-switch S201) all “ON”

Gain (rotary switch S202) is set to 2

Offset (rotary switch S203) is set to 9

4.6.2 Adapting the Radiation Pyrometer to the combustion

⚠DANGER

Danger to life caused by combustion!

In case of incorrect installation or adjustment, uncontrolled combustion may be caused !

Observe the adjustment instructions of the plant operator !

Adjustment work may be carried out only by qualified and approved specialist staff !

NOTICE

All alignments and settings have to be carried out, when new spare parts have been fitted, the Radiation pyrometer has been moved or the flame has changed (by additional fuel, new burner, change in the burner / air register, for example) as well as during all first installations.

For selective combustion monitoring, the device has to be installed in such a way that the primary combustion zone in all combustion modes is inside the visual angle of the Radiation pyrometer.

4.7 Connection

4.7.1 Electrical connection

⚠DANGER

Danger to life caused by electrical current !

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

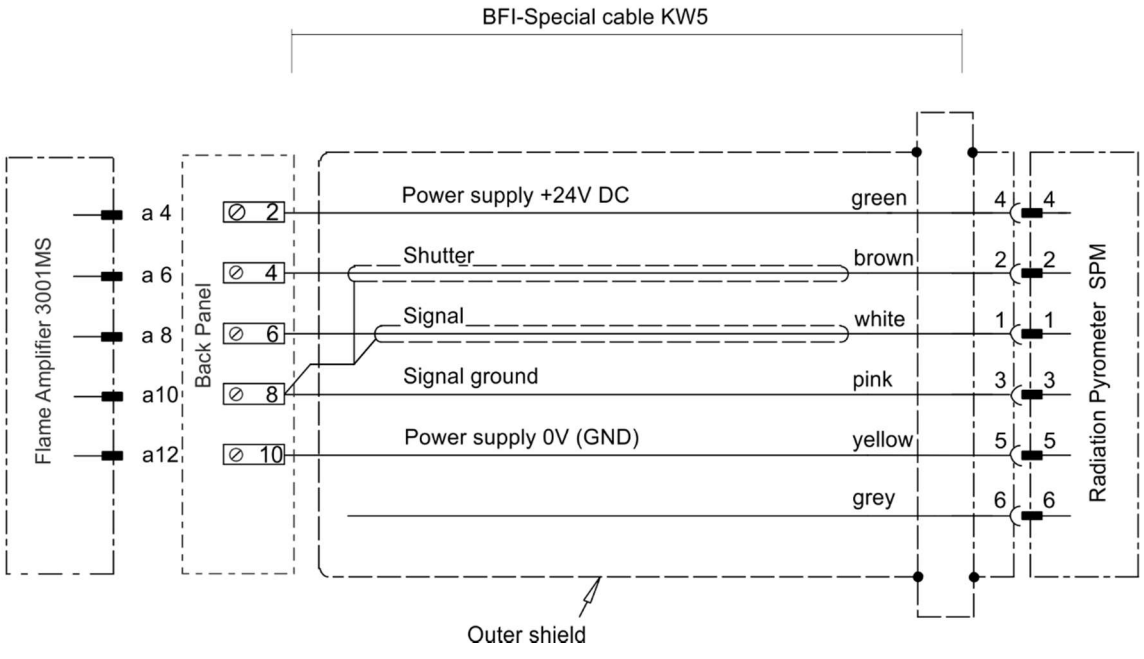
For connection data, please refer to the chapter titled "Technical data" as well as to the following terminal diagram.

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.

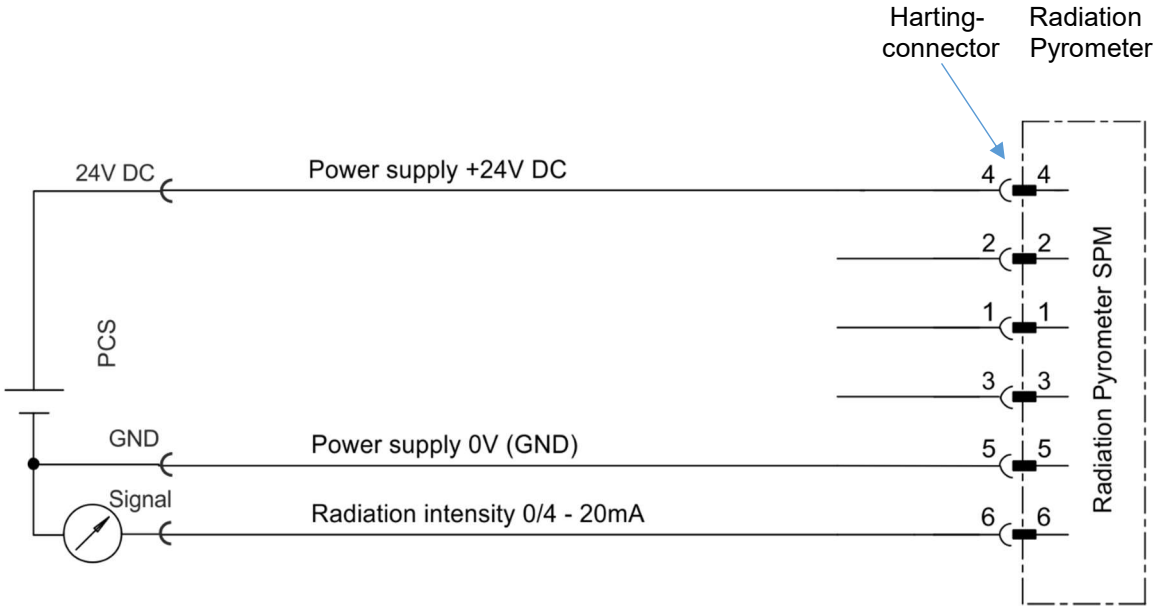
The radiation pyrometer can be used in combination with a flame amplifier or without. A flame amplifier extendes the functionality of the radiation pyrometer, which are described in the associated manuel. The analogue output signal is available also without a flame amplifier.

4.7.1.1 Terminal diagram with flame amplifier



Harting connector	Function	Colour of conduct	Backpanel terminal	3001 contact
1	Signal	wh	6	a8
2	System clock	br	4	a6
3	Signal ground	pk	8	a10
4	Power supply +24 VDC	gn	2	a4
5	Power supply GND	ye	10	a12
6	0/4…20mA (*Not used*)	gr	12	a16

4.7.1.2 Terminal diagram without flame amplifier



Harting	Function
1	Signal *(not used without flame amplifier)*
2	System clock (*not used without flame amplifier)*
3	Signal GND *(not used without flame amplifier)*
4	Power supply +24 VDC
5	Power supply GND
6	Analogue Output 0/4-20 mA

NOTICE

Prior to the connection of the Radiation pyrometer, observe the separate operating instructions of the flame amplifier 3001MS/3001DMS !

4.7.2 Connecting the special cable KW5 to Harting Connector

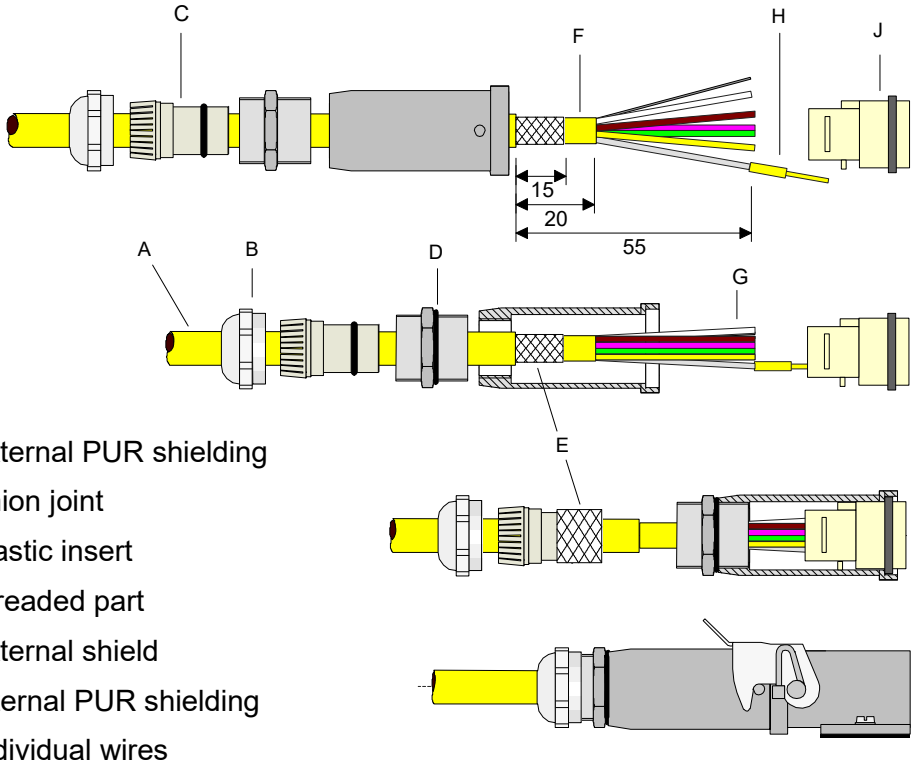
NOTICE

No contact chamber may remain bare !

All contact chambers in the contact insert have to be fitted with crimp contacts !

For this purpose use a suitable crimp tool (BFI part No. 8980-4801-00) !

On the Radiation pyrometer side the external shielding is connected to the housing mass by means of a clamp connection located between the plastic insert the threaded part in the cable gland (not available in KW3 cable). The internal shielding is cut on the Radiation pyrometer side and is connected to the flame amplifier side along with the signal GND (see terminal diagram).



A: external PUR shielding
B: union joint
C: plastic insert
D: threaded part
E: external shield
F: internal PUR shielding
G: individual wires
H: crimp contact
J: female contact

4.8 Storage

Do not unpack any packed Radiation pyrometers 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

The radiation pyrometer SPM U16W is a system to evaluate flame radiation intensity, which can be functionally extended by using a flame amplifier 3001MS/3001DMS to get e.g. a relay contact or a pre-alarm output.

The main field of application for this fully electronic radiation pyrometer is measuring of flame radiation at residue combustion processes of any kind, like waste incineration plants.

The radiation pyrometer SPM uses primarily the emitted radiation of these radicals, which courses the corrosion and converts it into an analogue output signal. The resulting signal can be used to control the secundary air, which ensures the complete post-combustion. That minimizes the corrosion of the boiler parts.

The SPM uses the integral analyzing method of UV-radiation. Spectral filters enables the evaluation of specific radiation bands, who are representative for the radicals emission quantity. The resulting electrical signal can be used to control the secondary combustion air and therefor for an efficient and complete combustion. The input signal is processed logarithmically. That guarantees a very wide dynamic scanner range. The user is able to adjust offset and gain locally to adapt the system to the combustion.The integration time can be adjusted too to adapt the output signal to the existing process control unit. The radiation pyrometer offers pulse output signal for BFI flame amplifier and an analogue output signal as well.

The radiation pyrometer is fully electronic, i.e. it has no mechanically moving parts. The sensor element is not subject to ageing, so that the sensitivity of the radiation pyrometer remains unchanged even after many years in service. The device is maintenance-free.

6 Operation of the Radiation Pyrometer

NOTICE

For the operation of the Radiation pyrometer, please observe the separate operating instructions of the flame amplifier.

NOTICE

The response of the Radiation pyrometer depends on the burner configuration as well as on the air flow and the spectral characteristic (wave length).

6.1 Test of the Radiation Pyrometer

NOTICE

Please also refer to the separate operating instructions of the flame amplifier !

In order to ensure correct operation, the Radiation pyrometers as well as flame amplifiers of all applications have to be tested several times by starting and stopping the burner several times. 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 !

7 Maintenance and servicing

The Radiation pyrometer requires no maintenance.

For cleaning, use a moist cloth to wipe the housing from the outside only.

NOTICE

Do not scratch the lens !

8 Failures

Problem:	Display:	Cause:	
No flame - *ON* signal after the burner has been started	No analogue signal LED RF *OFF* LED RM *OFF*	Flame amplifier is not operational	Check power supply Check fuse F101 (F 0.8 amps) Replace flame amplifier Check electrical connection
	Analogue signal < 25 % LED RF + RM *OFF*	Flame signal too low	Check Radiation pyrometer Check / set sensitivity
		Flame signal below the switch-ON threshold	Increase sensitivity Reduce switch-on threshold
	Analogue signal 25 - 100 % LED RF *ON* LED RM *OFF*	Self-test error	Check / set switch-off times Check cable shield Replace Radiation pyrometer Replace flame amplifier Check installation including cable routes for EMC sources High voltage / radio
	Analogue signal 25 - 100 % LED RF + RM *ON*	Relay contact or wiring problem	Check fuse F102 (T 1 amp) Check electrical connection

9 Order data

Radiation pyrometer SPM U16W is available from BFI Automation Mindermann GmbH under the following order data:

Description	Part-No.
Radiation Pyrometer SPM U16W	6010-0105-10

10 Accessories

Type	Part-No.
Swivel mount G1“ with G2“ flange disc	6590-9020-01
3-Way-Valve G1“	1594-8831-00
Heating insulator G1“	1598-0141-00
Double nipple 2 x G1“ outer thread	1591-0241-00
Special cable KW5	6060-0560-00
Optical alignment tool BFI 235	6030-0235-00