**SIEMENS** 

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**7**716





QRC1... for frontal illumination

QRC1.... for lateral illumination

# **Blue-flame Detectors**

**QRC1...** 

Blue-flame detectors for the supervision of blue- or yellow-burning oil or gas flames.

Blue-flame detectors are used primarily in connection with burner controls for small-capacity burners in intermittent operation.

The QRC1... and this Data Sheet are intended for use by OEMs which integrate the flame detectors in their products!

Use

The QRC1... is a compact UV-sensitive blue-flame detector with an integrated preamplifier. It is designed for frontal and lateral (90°) illumination.

QRC1... is suited for use with following burner controls and with photoresistive detectors QRB1... - in terms of plug-in facility:

- LOA2... (except LOA25...), LOA3...
- LMOx4...
- LGB3...
- LAL1...
- LME23...
- LMV2..., LMV3...

The spectral sensitivity of the QRC1... is a maximum of approximately 300 nm so that it optimally covers the range of UV radiation of blue-burning oil or gas flames.

Since the QRC1... also detects UV fractions of the radiation spectrum of other luminous sources (e.g. from boiler house illumination or sunlight), the standard regulations for extraneous light still apply.

The QRC1... must not detect UV radiation from ignition sparks, as otherwise lockout occurs during the prepurge time, due to extraneous light.



# To avoid injury to persons, damage to property or the environment, the following warning notes must be observed!

#### Do not open, interfere with or modify the flame detector!

- All activities (mounting, installation and service work, etc.) must be performed by qualified staff
- Before making any wiring changes in the connection area, completely isolate the
  plant from mains supply (all-polar disconnection). Ensure that the plant cannot be
  inadvertently switched on again and that it is indeed dead. If not observed, there is
  a risk of electric shock hazard
- Ensure protection against electric shock hazard by providing adequate protection for the connection terminals
- Each time work has been carried out (mounting, installation, service work, etc.), check to ensure that wiring is in an orderly state and make the safety checks as described in «Commissioning notes»
- Fall or shock can adversely affect the safety functions. Such flame detectors must not be put into operation, even if they do not exhibit any damage

#### **Mounting notes**

- Ensure that the relevant national safety regulations are complied with
- Locate the ignition electrode such that the QRC1... cannot detect ignition sparks, as otherwise lockout occurs due to extraneous light
- Fit the flame detector with the help of a plug inserted in a hole on the burner. For hole on the burner, refer to "Dimensions".
  - The securing and sealing lips of the plug give the QRC1... a firm hold in the hole, even in the case of vibrations, also allowing the detector to be removed for maintenance work
- Locate the QRC1... such that it can detect the most radiation-active zone of the flame
- For the precise adjustment of the distance between the most radiation-active range of the flame and the converging lens of the UV-sensitive diode, the QRC1... can be displaced in its plug by about 10 mm in both longitudinal directions «S» (snap-in) (refer to «Dimensions»)

### Installation notes

- Always run the detector cables separately while observing the greatest possible distances from other cables and units
- It is important to achieve practically disturbance- and loss-free signal transmission:
  - Line capacitance reduces the magnitude of the flame signal
  - Use a separate cable
- Observe the permissible length of the detector cable (refer to «Technical data»)

#### **Commissioning notes**

- Informations of measuring circuit an the required detector current values, refer to Data Sheet of the accordant burner control
- Informations about the safety checks to be carried out, refer to Data Sheet of the accordant burner control

### Standards and certificates

Only in connection with burner control



Conformity to EEC directives

- Electromagnetic compatibility EMC (immunity)
- Directive for gas appliances
- Low-voltage directive

2004/108/EC 90/396/EEC 2006/95/EC



ISO 9001: 2000 Cert. 00739



ISO 14001: 2004 Cert. 38233

#### Service notes

- · When cleaning the detector, always use a clean cloth
- Do not use any burner cleansing sprays

#### **Disposal notes**



The flame detector contains electrical and electronic components and must not be disposed of together with household waste.

Local and currently valid legislation must be observed.

### Mechanical design

The detector's housing is made of black plastic and has a displaceable plug with stops. The 3-core connecting cable is firmly connected to the QRC1... and features strain relief. The front of the detector has a protective glass to ensure protection against accidental contact and dust.

QRC1... with mirror fixture

In the case of burner designs that do not allow the QRC1... to be illuminated from the front, the detector is also available with a mirror attachment for lateral illumination.

When ordering, please give type reference according to «Standard types» or «Type summary».

Type reference		_					End	of cable	!
	Mains voltage (50 / 60 Hz)	Cable length L (refer to Dimensions) (mm)	Plug	Class of sensitivity	Direction of illumina- tion	Viewing window	Strain relief AGK	Plug AGK	Ferrule
QRC1A1.101C27	AC 230 V	350	with	Normal	Frontal	Plexiglas			х
QRC1A1.103C27	AC 230 V	500	with	Normal	Frontal	Plexiglas			Х
QRC1A1.162C27	AC 230 V	270	with	Normal	Frontal	Plexiglas		53.2	
QRC1A1.170C27	AC 230 V	130	with	Normal	Frontal	Plexiglas		53.0	
QRC1A1.181C27	AC 230 V	240	with	Normal	Frontal	Plexiglas		56.38	
QRC1A1.1013C27	AC 230 V	350	with	Normal	Frontal	Fused quartz			Х
QRC1A2.101C27	AC 230 V	350	with	Middle	Frontal	Plexiglas			Х
QRC1A2.103C27	AC 230 V	500	with	Middle	Frontal	Plexiglas			х
QRC1A2.104C27	AC 230 V	700	with	Middle	Frontal	Plexiglas			Х
QRC1A2.181C27	AC 230 V	240	with	Middle	Frontal	Plexiglas		56.38	
QRC1A3.101C27	AC 230 V	350	with	High	Frontal	Plexiglas			Х
QRC1A3.103C27	AC 230 V	500	with	High	Frontal	Plexiglas			х
QRC1C0.182C27	AC 230 V	270	with	Normal	Lateral	Plexiglas	68.733	56.38	
QRC1C2.103C27	AC 230 V	500	with	Middle	Lateral	Plexiglas			х

### **Technical data**

General detector data	Mains voltage	AC 230 V -15 / +10 %		
	Mains frequency	50 / 60 Hz ±6 %		
	Power consumption	0.35 VA		
	Tolerated flame signal interruptions	Approx. 300 ms		
	Length of connecting cable	max. 1 m		
	Length of auxiliary detector cable	Max. 20 m		
		(only in case of separate cable runs, refer		
		to «Max. detector cable length»)		
	Detector cable	3 x 0.5 mm <sup>2</sup> ; 5.45 mm dia.		
	Degree of protection	IP40		
	Safety class	II		
	Vibrations to IEC 68-2-6	Max. 1 g, 10500 Hz		
	Weight incl. 350 mm cable	Approx. 0.029 kg		
	Mounting position	Optional		
Environmental	Storage	DIN EN 60721-3-1		
conditions	Climatic conditions	Class 1K3		
	Mechanical conditions	Class 1M2		
	Temperature range	-20+60 °C		
	Humidity	<95 % r.h.		
	Transport	DIN EN 60721-3-2		
	Climatic conditions	Class 2K2		
	Mechanical conditions	Class 2M2		
	Temperature range	-25+80 °C		
	Humidity	<95 % r.h.		
	Operation	DIN EN 60721-3-3		
	Climatic conditions	Class 3K5		
	Mechanical conditions	Class 3M1		
	Temperature range	-20+60 °C		
		short-time (max. 1 min) up to 75 °C		
	Humidity	<95 % r.h.		



# Condensation, formation of ice and ingress of water are not permitted!

### **Function**

The QRC1... has a special UV-sensitive diode with a quartz-glass lens which concentrates the flame's radiation on the active part of the diode.

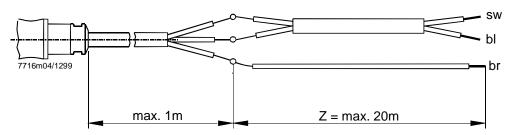
A filter ensures that fractions of radiation of longer wave lengths will be eliminated. A preamplifier is used to amplify the signal of the diode to the level required for the flame signal amplifier of the respective burner control.

Flame signal interruptions of short duration are tolerated (refer to «Technical data» under «Tolerated flame signal interruptions»), thus ensuring more stable detector currents and more stable operation of the burner in the event of strongly flickering flames.

If the maximum cable length of 1 m is not sufficient, the burner manufacturer can extend the cable by a maximum of  $20\ m.$ 

In that case, the following rule must be observed when laying the cable:

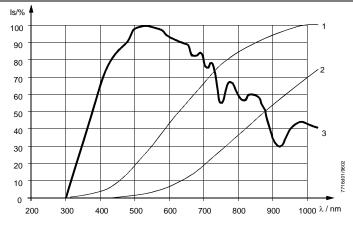
To minimize the coupling capacitances of the detector signal lines to the live conductor, live conductor «L» (brown core) must be laid separately or segregated from the detector signal line.



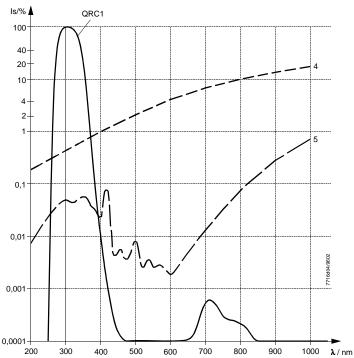
Legend

- Z Auxiliary cable
- bl Blue core = neutral conductor «N»
- br Brown core = live «L»
- sw Black core = signal line

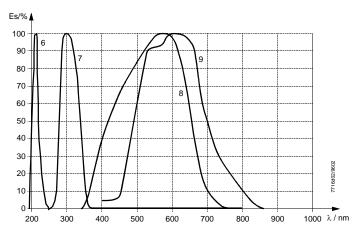
Extraneous light



Flames



Sensitivity of light detector



Legend

4 Yellow-burning oil flame

5 Blue-burning oil flame

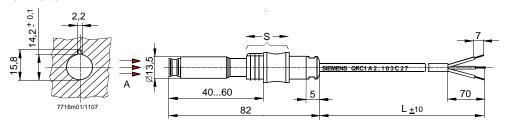
6 UV photocell9 QRB... photo resistance

7 QRC1... photo diode

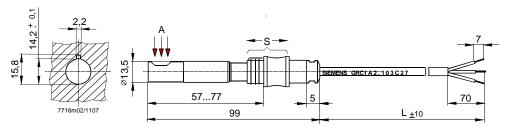
Selenium cell

#### Dimensions in mm

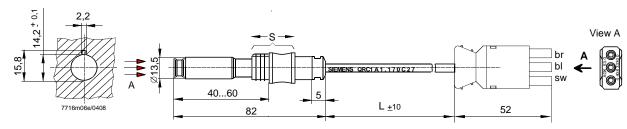
## Frontal illumination



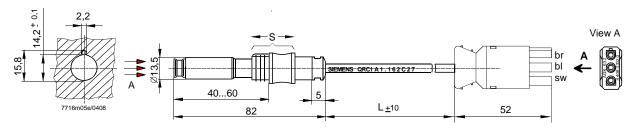
### Lateral illumination



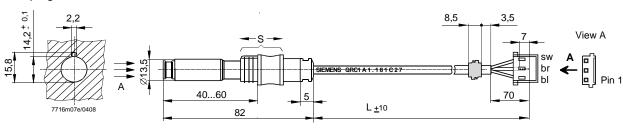
# QRC... with plug AGK53.0



# QRC... with plug AGK53.2



# QRC... with plug AGK56.38 and strain relief AGK68.733



Legend

bl Blue

br Brown

A Incidence of illumination

sw Black

Available cable length (refer to «Type summary»)

S Range of displacement of plug produces a change in the dimensions ...

...40...60 mm (front) 50 mm as supplied

...57...77 mm (side) 67 mm as supplied

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