



ISO 9001



Infrared Flame Detectors

QRI...

Infrared flame detectors for use with Siemens HVAC burner controls for the supervision of gas, oil or other flames that emit infrared radiation. The QRI... are suited for burners of any capacity, either in continuous or intermittent operation.

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

Use

Key features of the QRI... flame detectors:

- Detector with infrared-sensitive flame detecting element
- Integrated flame signal amplifier
- Designed for frontal and lateral (90°) illumination
- Suited for use with burner controls type LMV5...
- Secured to the burner with a flange and a clamp

The spectral sensitivity of the QRI... is a maximum of about 2 μm , which means that it covers the infrared radiation emitted by gas, oil, and coal flames as well as other sources of infrared radiation.

Owing to the electronic self-supervision of the flame signal, the QRI... can be used in connection with suitable burner controls designed for burners in continuous or intermittent operation.

The sensitivity of the QRI... is such that it must be fitted behind the burner's baffle plate.



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

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

- Before performing any wiring changes in the connection area of the QRI... , the burner control must be completely isolated from the mains supply (all-polar disconnection)
- Ensure protection against electric shock hazard through appropriate mounting
- Check wiring and all safety functions prior to commissioning
- Due to its mounting location behind the baffle plate, the flame detector has a high signal sensitivity and, therefore, identifies small variations in infrared radiation as a flame. For this reason, make certain that so-called heat streaks after loss of flame (emitted for example by after-glowing combustion chamber lining) will not reach the detector as these would simulate a flame. Likewise, moving parts in the detector's viewing range can cause infrared radiation from the boiler (or a viewing tube) to be modulated, thereby possibly generating sporadic detector signals. For this reason, the burner or boiler manufacturer must make certain that such modulated radiation cannot reach the flame detector. For example, loose cables (moving up and down in the fan's airstream) are not permitted within the detector's viewing range
- Check to make sure the burner will initiate lockout when – while the burner is running – the flame detector is removed from its fixing on the burner and – without moving it – is exposed to room lighting
- Fall or shock can adversely affect the safety functions. Such units may 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
- Secure the flame detector to the burner with the clamp and flange provided. With the clamp's fixing screw loosened, the detector can be correctly adjusted against the flame. This adjustment can be checked by watching the intensity of the flame signal on the AZL... display and operating unit of the LMV5... burner control, or with the help of the measurement circuit (refer to «Detector signal measurement»)
- Ensure that the connection between the metal surface of the flange and the burner's earthed housing is electrically conductive

Installation notes

- Installation work must be carried out by qualified staff
- Observe the permissible length of the detector cables (refer to «Technical data»)
- Always run the ignition cable separate while observing the greatest possible distance to other cables
- Test the flame detector on all applications. When used in connection with the LMV5..., the test is to be made with a test routine (for details, refer to the Basic Documentation P7550)
- Make certain that the detector's cable does not get into contact with hot burner or boiler surfaces

Commissioning notes

- Commissioning and maintenance work must be carried out by qualified staff
- When commissioning the plant or when doing maintenance work, make the following safety checks:

a)	Burner startup with flame detector darkened	Lockout at the end of «TSA»
b)	Burner startup with flame detector exposed to extraneous light (e.g. light from an incandescent lamp interrupted at about 20 Hz)	Lockout at the end of the pre-purge time
c)	Simulation of flame failure during operation. For that purpose, darken the flame detector during operation and maintain this status	Lockout or restart, depending on the burner control's configuration

- Make a loss-of-flame test with the AZL... of the LMV5... burner control

Standards

CE conformity according to the directives of the European Union

- Electromagnetic compatibility EMC 89 / 336 EEC
- Low voltage directive 73 / 23 EEC
- Directive for gas appliances 90 / 396 EEC

Service notes

- To clean the detector's lens, use a soft, clean cloth (free from oil and solvents)
- Check wiring and all safety functions each time a flame detector has been replaced

Disposal notes



The flame detector contains electrical and electronic components and may not be disposed of together with household garbage. Local and currently valid legislation must be observed.

Mechanical design

The QRI... has an impact-proof housing made of black plastic. The lens is fitted in a dust-tight position.
The QRI... can be secured to the burner within its adjusting range, using the clamp and the flange provided.
The 3-core connecting cable is ready connected to the QRI... and features cable strain relief.
Depending on the type of burner construction, there are flame detectors for frontal or lateral illumination available.

Type summary

Type code

Q R I 2 B 2 . A 1 8 0 B 1

7719101e/0402

Accessory

1 = flange and clamp

End of cable

A = nonstripped

B = stripped / ferrules

C = with RAST5 connectors

Series letter

A = standard

B = higher sensitivity

Application

A = frontal illumination

B = lateral illumination

Main group and basic design

QRI = infrared flame detector

Ordering

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

Accessories



Flange

4 241 8855 0



Clamp

4 199 8806 0



Mounting set

AGG2.110

For frontal illumination, including heat insulator with $\frac{3}{4}$ " 14-NPSM thread



Adapter, protective sleeve Pg9 / $\frac{1}{2}$ " 14-NPSM thread

AGG2.120

Standard types

Type reference	Illumination	Cable length «L»	Cable end	Accessories
QRI2B2.A180B	Lateral	180 cm	Stripped	---
QRI2A2.B180B	Frontal	180 cm	Stripped	---
QRI2B2.B180B	Lateral	180 cm	Stripped	---
QRI2B2.B180B1	Lateral	180 cm	Stripped	Flange and clamp

Technical data

General detector data	Operating voltage		
	- Operation	DC 14 V \pm 5 %	
	- Test	DC 21 V \pm 5 %	
	Signal voltage	DC 0...5 V	
	Length of connecting cable	max. 180 cm	
	Degree of protection	IP 54	
	Power consumption	< 0.5 W	
	Length of auxiliary detector cable	max. 100 m	
	Safety class	II	
	Vibrations to IEC 6068-2-6	max. 1 g / 10...500 Hz	
	Weight incl. cable 180 cm	approx. 0.175 kg	
	Mounting position	optional	
	Environmental conditions	Transport	IEC 60 721-3-2
		Climatic conditions	class 2K2
		Mechanical conditions	class 2M2
Temperature range		-25...+85 °C	
Humidity		< 95 % r.h.	
Operation		IEC 60721-3-3	
Climatic conditions		class 3K5	
Mechanical conditions		class 3M2	
Temperature range		-20...+60 °C	
Humidity		short-time (max. 1 min.) up to 75 °C < 95 % r.h.	



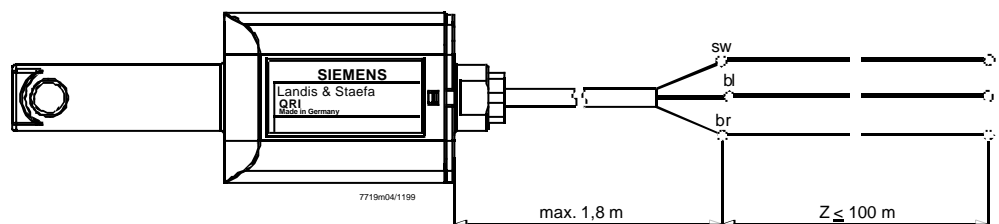
Condensation, formation of ice and ingress of water are not permitted!

Function

With this type of flame supervision, the changes in infrared radiation are used to generate the flame signal. The flame-detecting element is an infrared-sensitive photoresistor whose spectral sensitivity covers the range of about 1...3 μ m. The detector does not respond to constant radiation or to radiation with mains frequency harmonics (e.g. 50 Hz or multiples thereof). The suppression of these radiation frequencies is made electronically, directly dependent on the current mains frequency at which the relevant burner control (e.g. LMV...) is operated. As a result, filtering takes place within a very narrow band, which means that the signal generated by the flame can be almost completely utilized since the frequency and the rate of change of infrared radiation constantly change. Hence, the detector's ability to capture the flame's radiation behind the burner's baffle plate is extremely high. As a result of the high level of sensitivity, constant or mains frequency-harmonic extraneous light sources remain undetected only if the detector itself is not moved. Due to its short-wave spectrum, the ignition spark will not be detected. The detector's analog output signal (0...approx. +5 V) is a measure of the changes of the flame's radiation intensity.

Maximum detector cable length

If the connecting cable length of 180 cm is not sufficient, the burner manufacturer can extend it up to a maximum of 100 m.



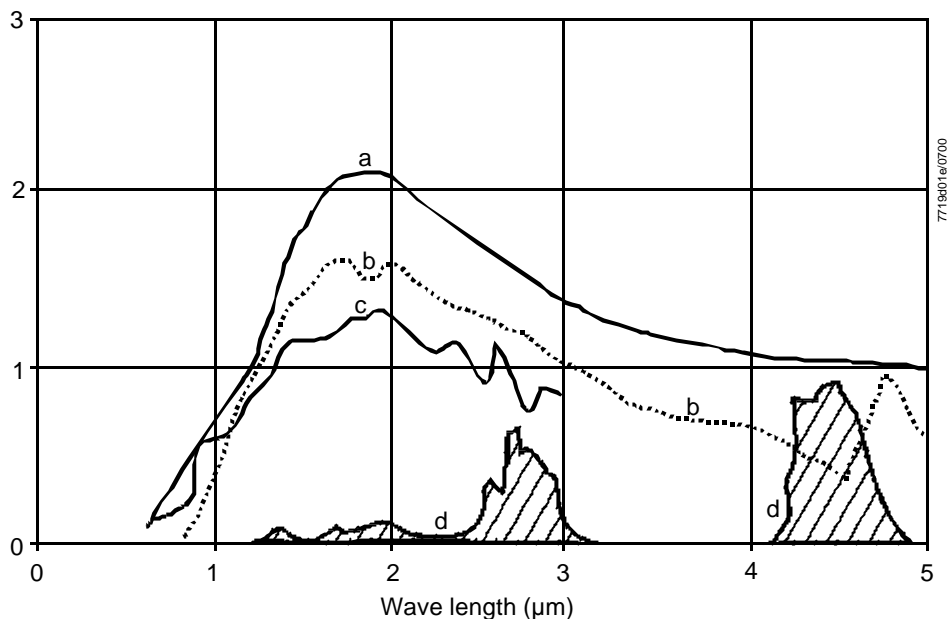
Legend

bl	Blue wire = reference line	sw	Black wire = signal line
br	Brown wire = power line	Z	Extension cable

Spectral curves

Flames

Relative intensity of radiation

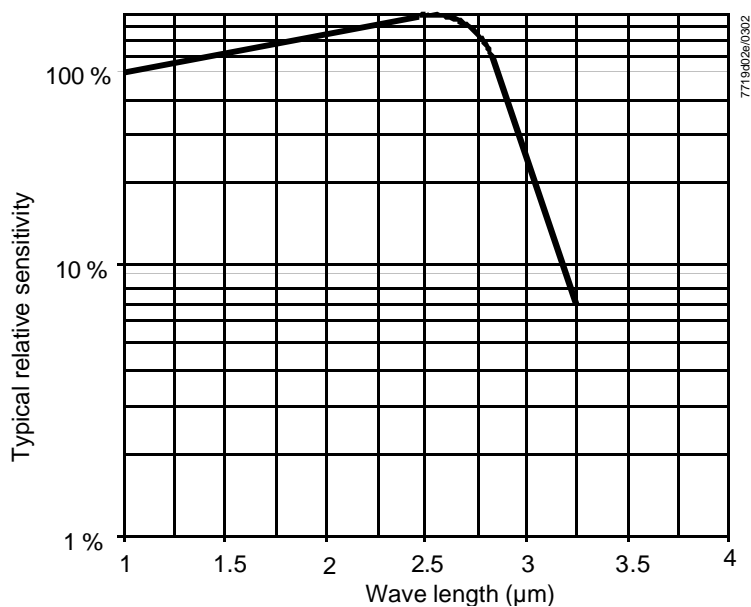


Spectral emission of radiation of luminous and nonluminous flames at 1500 K (extract from VDI Report no. 423, 1981).

Legend

- a Black body
- b Pulverized coal flame
- c Oil flame
- d Gas flame

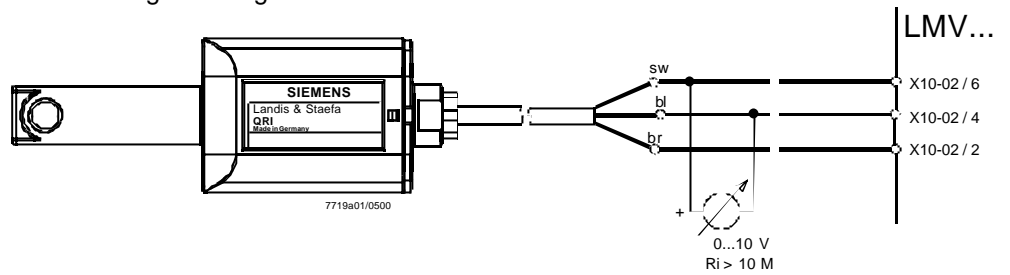
Sensitivity of flame detector



Measurement circuit and connection examples

Measurement of detector current

Refer to «Signal voltage» under «Technical data».

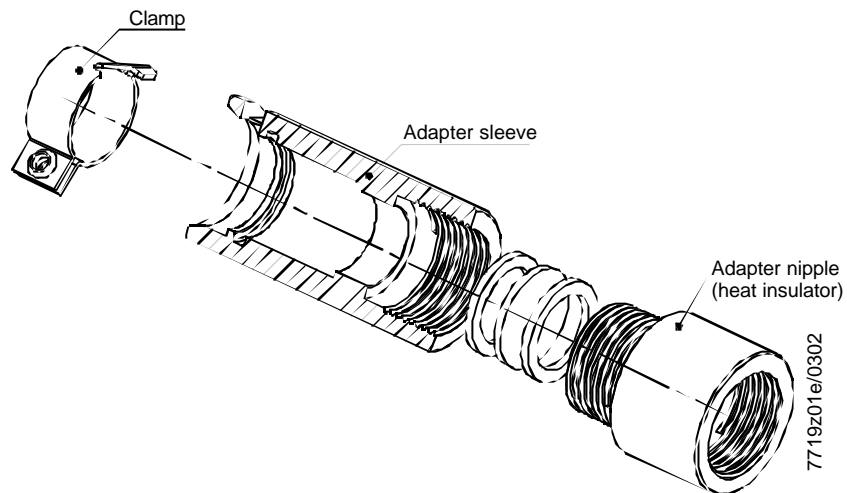


Measurement of the detector's signal with a Voltmeter is not normally required since the flame signal's intensity is shown on the AZL... display and operating unit.

Drawing

AGG2.110

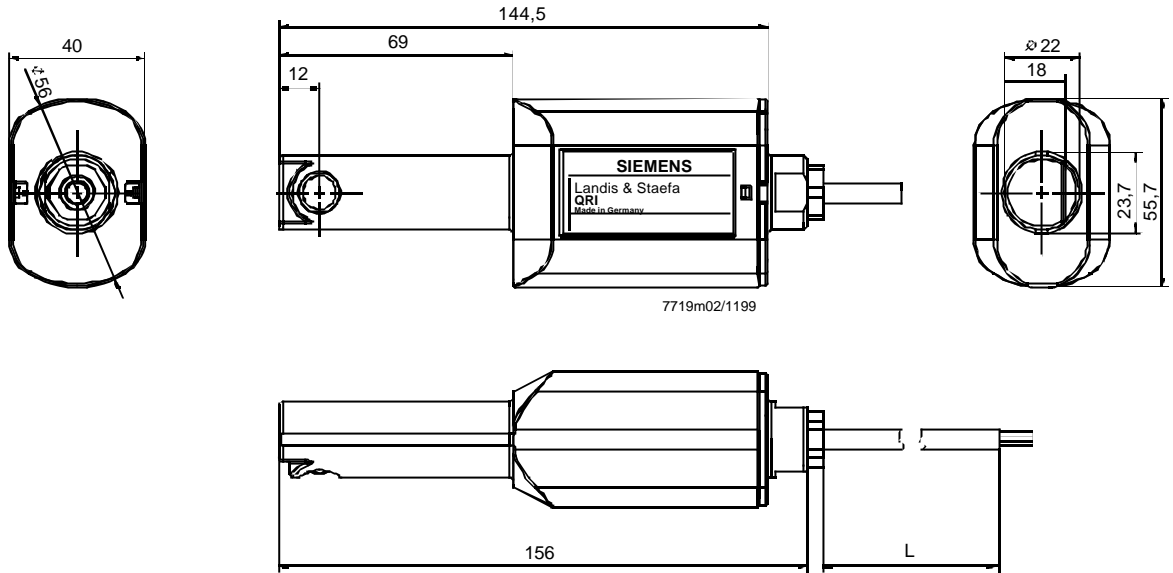
Mounting set is supplied completely assembled.



Dimensions

Dimensions in mm

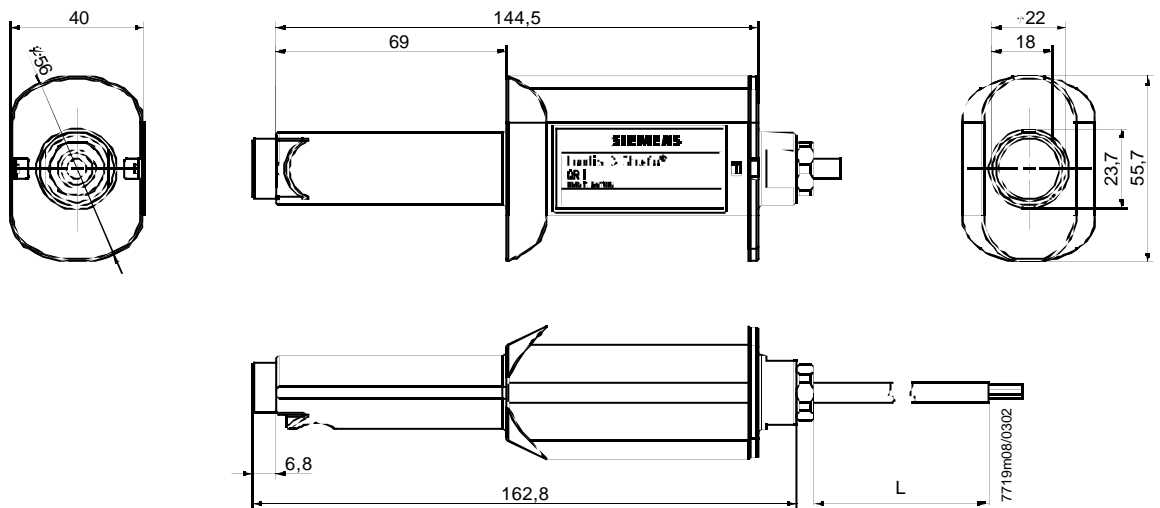
QR12B...
For lateral illumination



Legend

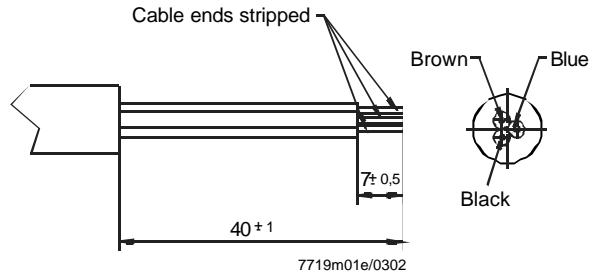
L Available cable length (refer to «Type summary»)

QR12A...
For frontal illumination



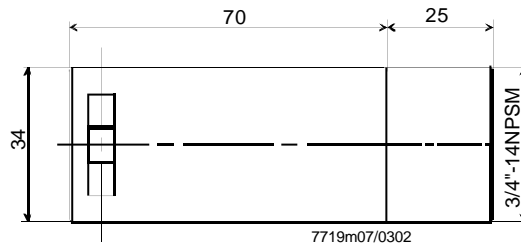
Dimensions (cont'd)

Connecting cable



For mounting set AGG2.110

Adapter nipple and adapter sleeve



AGG2.120

