

Sensytherm IR

Infra-red measurement systems
for non-contact measurement
of temperature

10/10-5.11 EN



- **Non-contact temperature measurement based on infra-red technology**
- **Robust design**
- **Compact construction for industrial applications**
- **Easy to install and operate**
- **Rapid, non-contact measurement of temperature, reaction free with no effect on the process**
- **Fast response times ideal for dynamic process**
- **Authorised for use in hazardous areas**
- **Various accessories for adaptation to the process requirements**

Features

The use of modern detectors and coated optics in conjunction with microprocessor-controlled evaluation electronics provides the basis for precision, reliability and long-term stability. Those are the requirements of the industrial application of the Sensytherm IR measurement system.

Applications

Non-contact measurement systems offer many advantages over conventional procedures. Since there is no direct contact with the objects to be measured, temperatures can easily be measured on rotating and moving parts, in places where access is difficult or on sensitive surfaces. Even the temperature of the aggressive media or molten material can be measured accurately and safely from a distance.

The ABB logo, consisting of the letters 'ABB' in a bold, stylized, black font.

General overview of the devices

Operating principle and construction

Non-contact temperature measurement is based on the physical principle that all objects have a natural electromagnetic radiation which changes in dependence of their temperature. The intensity of the radiated energy and its characteristic wavelength considerably depend on the objects' temperature.




Infra-red measurement systems like Sensytherm IR use special lenses for collecting, focussing and filtering this radiation. An infra-red (IR) detector in the ray path then generates from this the respective electrical signal that is linearized and processed in the microprocessor-controlled electronics downstream in the circuit to achieve analog and digital output variables.

The adjustable emissivity coefficient allows to compensate material and surface influences, so that the measuring result is not affected inadmissibly.

Applications

- Paper, textile, chemical, petrochemical, automotive, plastics, food and beverages, glass, and power industries
- Quality assurance, maintenance and services

Models

Stationary process measuring devices	
<p>Continuous temperature measurement allowing for precise process control and, thus, used for process monitoring, production control and quality assurance.</p>	
<p>Sensytherm IR-P (see page 3)</p> <ul style="list-style-type: none"> – Sensors and electronics accommodated in the same housing – Robust process measuring instruments for harsh industrial environments – Ex certificate – Anodised aluminium or stainless steel housing – Available as standard version or special versions for the measurement of combustion temperatures – Remote parameterisation through HART communication 	
<p>Sensytherm IR-C (see page 11)</p> <ul style="list-style-type: none"> – Miniature sensing head for use in confined spaces – Sensing head and electronics in separate units – For ambient temperatures of up to 120 °C, no additional cooling equipment required – Parameters can be set easily on site, i.e. directly on the sensing head – Remote parameterization via RS 485 possible for machine and plant engineering 	
Mobile, hand-held devices	
<p>Infra-red measuring instrument, hand-held, for rapid temperature measurement on site, e.g. for quality assurance, maintenance and service purposes</p>	
<p>Sensytherm IR-X/IR-L60/IR-H20 (see page 13)</p> <ul style="list-style-type: none"> – High-precision temperature measurement, universal – Circular laser hologram for marking the target with a pointer (IR-X4) – Quickly adaptable to different materials through preset material table with emissivity coefficients (IR-X4) 	

Technical data

Sensytherm IR-P process measuring device

- Compact aluminum (optionally: stainless steel) housing, also accommodating the entire electronics
- Protection class IP 65
- Fixed retaining bracket and spigot-type mounting nut included in the standard scope of delivery
- Approved for use in hazardous areas
- 2-wire measuring system
- 4...20 mA analog output



	Sensytherm IR-PA (Basic model)	Sensytherm IR-PD (Smart® model)
Temperature measuring ranges	- 18... 500 °C (Fresnel lens) - 18... 500 °C (AMTIR) 200...1000 °C 200...1500 °C 500...2000 °C Special applications: Glass 250...1650 °C Flue gas 250...1650 °C Plastics 10... 360 °C	Type -RGNP $\lambda = 8-14 \mu\text{m}$ Type -RGNG $\lambda = 8-14 \mu\text{m}$ Type -RGMG $\lambda = 3.9 \mu\text{m}$ Type -RGMS $\lambda = 3.9 \mu\text{m}$ Type -RGHG $\lambda = 2.2 \mu\text{m}$ Type -RGSG $\lambda = 5.0 \mu\text{m}$ Type -RGSR $\lambda = 4.24 \mu\text{m}$ Type -RGSK $\lambda = 7.9 \mu\text{m}$
Output signal	4...20 mA, linear	
Measurement uncertainty (where emissivity coeffic. is known)	$\pm 1 \%$ of the measured value or 1.4 °C, whichever is greater	
Reproducibility	$\pm 0.5 \%$ of the measured value or 0.7 °C, whichever is greater	
Sensor data	Thermopiles	
Response time	165 ms (100 ms for RGHG)	
Emissivity coefficient	Adjustment range 0.10...1.00 manual via rotary switch	Adjustment range from 0.10...1.00 digital via FSK interface
Alarm output	-	- Limit values with variable adjustment - Switching capacity 24 V/150 mA - Optional NO or NC contacts
Parameters can be defined remotely using HART protocol	-	Sensor recognition/bus address Measuring range spread Limit value adjustment Measurement rate/integration time
Power supply	24 V DC $\pm 10 \%$	
Protection class	IP 65 (IEC 529)	
Certified explosion proofing (opt.)	EEx ib IIC T4	
Environmental conditions	Temperatures Relative humidity Shock Vibration	no cooling 0...70 °C with air cooling max. 120 °C with water cooling max. 175 °C with protective housing max. 315 °C 10...95 % (non-condensing) IEC 68-2-27 and MIL STD 810 D IEC 68-2-6 and MIL STD 810 D
	<ul style="list-style-type: none"> - Fixed temperature range - Emissivity coefficient adjustable via rotary switch; factory setting: 0.95 	<ul style="list-style-type: none"> - Parameterizable via FSK modem - HART protocol - Configurable temperature range - Adjustable application-specific parameters

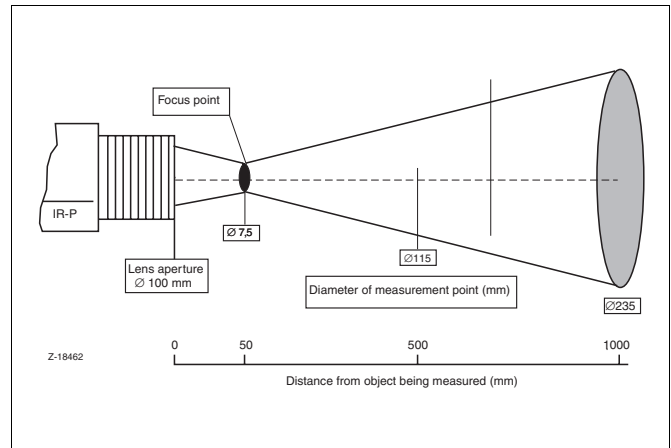
Technical data

Measuring field diagrams

As infra-red rays behave in the same way as “visible“ light, lenses can also be used in this situation to obtain optical representations, or so-called measuring fields.

These measuring field diagrams from infra-red sensors show graphically the ray path of the optics used in the measuring instrument. They supply information on the diameter of the measurement point in relation to the distance from the object being measured.

Special optics or so-called focus optics can be used for particular applications. Here, close to the lens, the measurement cone is focused to a relatively small diameter. This enables temperatures in small, narrow components to be determined. The characteristic values for the available optics for the individual Sensytherm IR measurement systems can be seen from the diagrams.



Choosing the optimal infra-red measurement system

The measuring temperature determines which measurement system is chosen, e. g. at low temperatures -18...500 °C the RGNP or RGNG type is appropriate. The distance and size of the object to be measured are criteria for selecting the required optics for the infra-red measuring transmitter. The measuring field diagrams on the right-hand side can be used for this.

In harsh environments and high temperatures various accessories, such as cooling devices, air blowers or protective piping may be used (see overview of accessories).

The following examples provide clarification:

1. Tubes wrapped in epoxy resin in a drying chamber

Requirements:

Meas. temperature	130...180 °C
Size of object	40 mm...250 mm Ø (various pipes)
Measuring distance	750 mm

Selection:

Due the temperature range, both the RGNP and the RGNG type are suitable measurement systems. Both cover a measuring range from -18 °C...500 °C.

Based of the measuring field diagram however, only C meets the necessary requirements:

- Measuring point < 40 mm at distance of 750 mm.

All other optics yield a larger measuring field diameter at a distance of 750 mm.

2. Assembly line with bulk material (cement clinker)

Requirements:

Meas. temperature	on average 200...250 °C Hot spots > 350 °C to be detected
Size of object	65 cm (650 mm) assembly line width
Measuring distance	not determined, can be adapted to measurement task. Distance not greater than 3 m however (ceiling height)

Selection:

The RGNP or RGNG low temperature systems are suitable here. Based on the measuring field diagram however, only B is appropriate as only this can achieve the required measuring point diameter at a distance of 3 m max. (measuring field extrapolated at a distance of 3 m). All other optics need a greater distance to cover this large measuring field. Optic D, for example, needs a distance of 3.2 m.

3. Measuring temperature of combustion chamber wall of refuse incineration plant

Requirements:

Meas. temperature	800...1100 °C
Size of object	Fireclay wall, opposing; dimensions unimportant
Measuring distance	4 m across combustion chamber
Special features	Measurement system to be flanged close to process, high ambient temperature (approx. 80 °C) at boiler

Selection:

In this temperature range both the RGMS and the RGHG type can be used.

The decisive factor is the possibility of measuring the temperature above 200 °C during the heating phase. Consequently the RGMS type with its extended measuring range (up to 1500 °C) should be chosen.

The system is mounted to the boiler wall with hinged flanges to enable the combustion chamber to be inspected easily by swinging out the hinged flange.

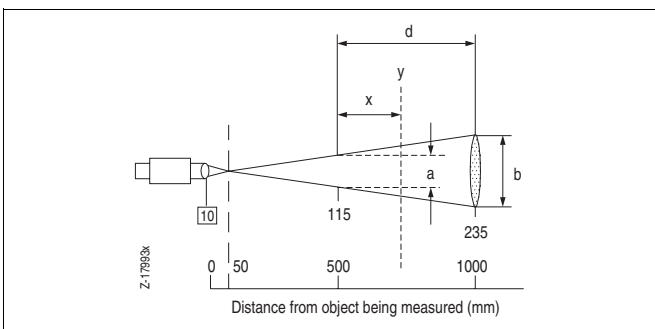
Air- and water-cooled housings shield against high temperature. An air blower with a scavenging air capacity of approx. 20 l/min prevents the lens from getting dirty.

Measuring field diagram F shows that a pipe connection piece of 500 mm, for example, must have a minimum diameter > 30 mm. It is better, however, to install larger pipes to allow more leeway when positioning the fittings.

Technical data

Measuring field diagrams

Sensor type	Optics		
	Standard	Stage 1	Stage 2
Low temperature range -18 °C...500 °C Type RGNP (Fresnel lens)	A 100 mm Ø @ 1520 mm 	B Focus point 7.5 mm Ø at a distance of 50 mm 	
Low temperature range -18 °C...500 °C Type RGNG	C 45 mm Ø @ 1520 mm 	D Focus point 2.5 mm Ø at a distance of 76 mm 	E Focus point 6.4 mm Ø at a distance of 200 mm
Medium tmp. range 200 °C...1000 °C Type RGMG 200 °C...1500 °C Type RGMS Special application Glass Type RGSG Flue gas Type RGSR Plastic Type RGSK	F 45 mm Ø @ 1520 mm 	G Focus point 2.5 mm Ø at a distance of 76 mm 	H Focus point 6.4 mm Ø at a distance of 200 mm
High temperature range 500 °C...2000 °C Type RGHG	K 25 mm Ø @ 1520 mm 	L Focus point 1.3 mm Ø at a distance of 50 mm 	M Focus point 3.4 mm Ø at a distance of 200 mm

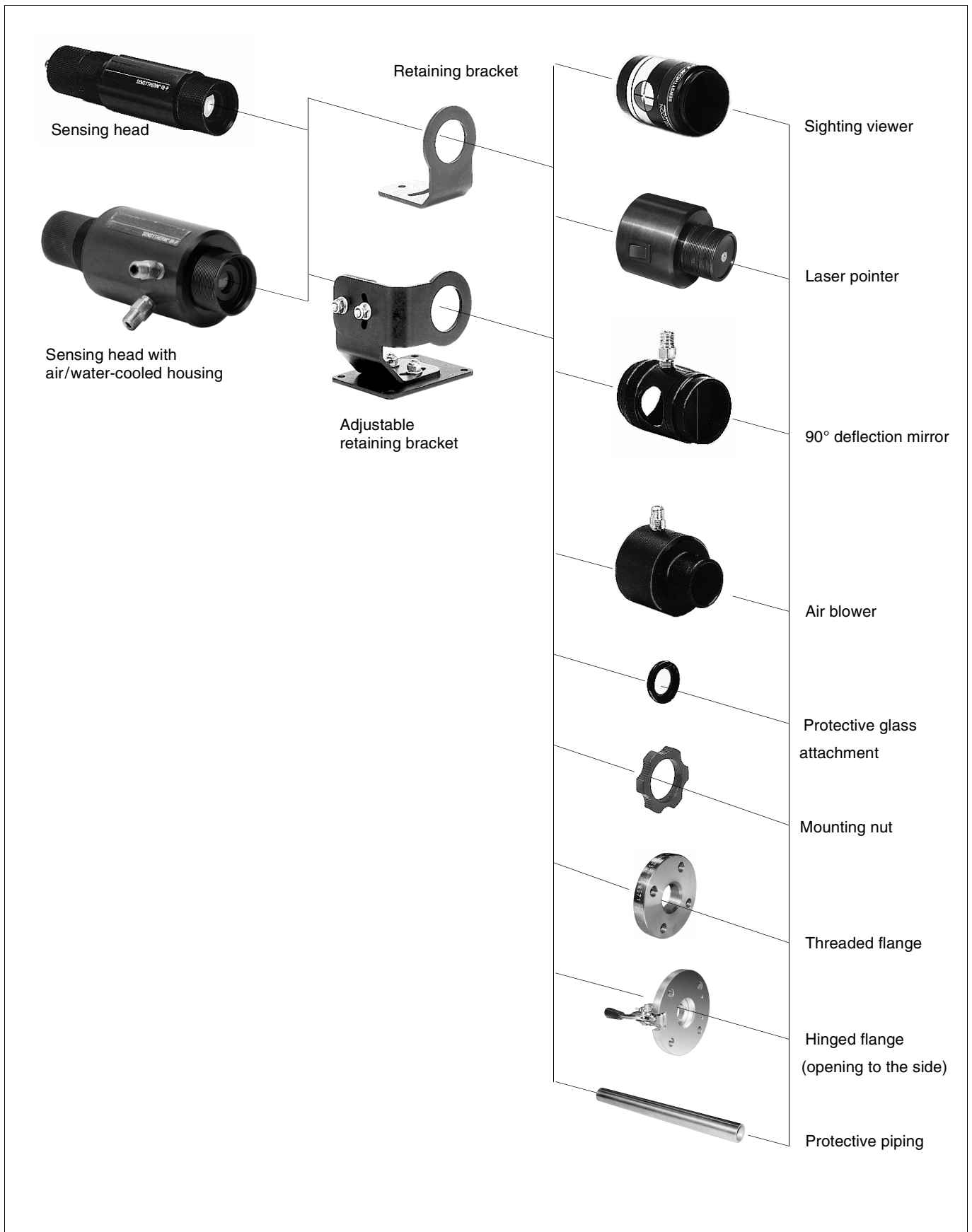


Formula for calculating the diameter of any measuring point

$$y = a + \left[\frac{x}{d} \cdot (b-a) \right]$$

- a = smaller known measuring point
- b = larger known measuring point
- d = distance between measuring points a and b
- x = distance between measuring point a and unknown measuring point
- y = required measuring point

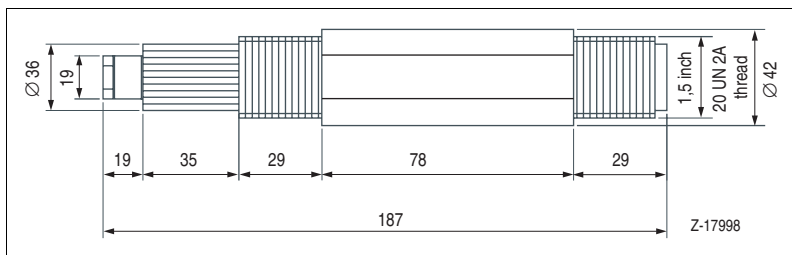
Accessories for Sensytherm IR-P



Dimensional drawings (dimensions in mm)

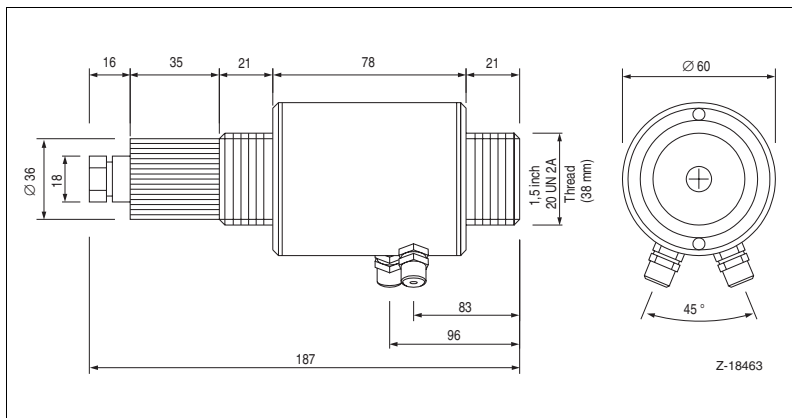
Sensing heads

Standard type



- Straightforward design
- 1.5" 20 UN 2A screw thread at both ends
- Material: black anodised aluminium
- Optional: special steel housing
- PG 9 cable bushing
- IP 65 degree of protection

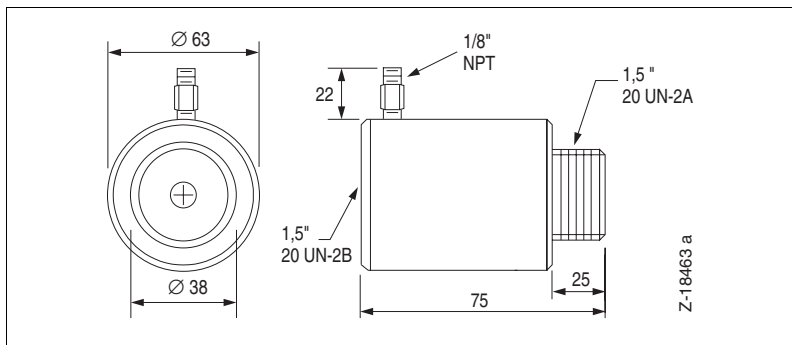
Sensing head with cooling



- Standard model with screwed on cooling jacket
- For use at higher ambient temperatures
- Air (up to 120 °C) or water (up to 175 °C) can be used as coolant
- Connections: 1/8" NPT femal thread or 1/8" NPT male thread
optional: connection for hose with internal Ø 4 mm
- Use of air blower recommended to prevent condensation on lens
- Material: black anodised aluminium
- PG 9 cable bushing
- IP 65 degree of protection

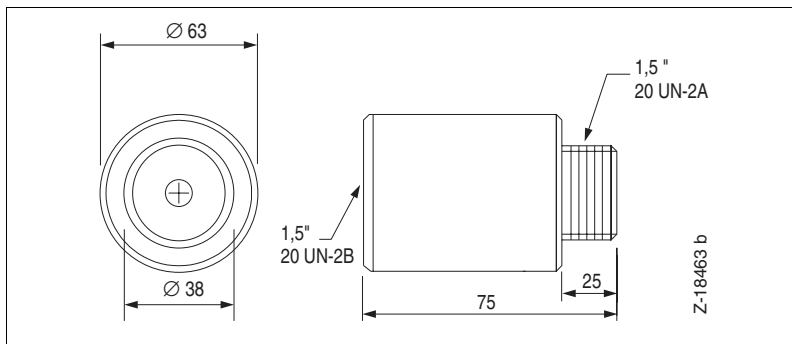
Accessories for Sensytherm IR-P

Air blower



- Prevents dirt and condensation on lens
- Screwed directly onto sensing head
- Air supply: 1/8" NPT female thread or 1/8" NPT male thread
optional: connection for hose with internal Ø 4 mm
- Material: black anodised aluminium
- Optional: special steel housing

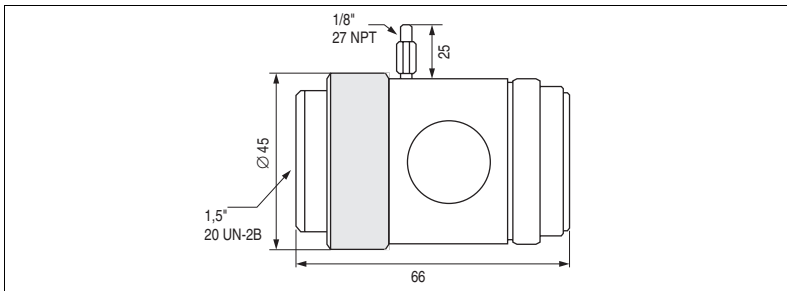
Laser pointer



- Laser beam (635 nm) as positioning aid for infra-red measurement system
- Indicates midpoint of measuring field
- Screwed directly onto sensing head
- Power supply: 2 x miniature 1.5 V batteries
- Prior to starting temperature measurement, remove the laser pointer once the system has been positioned properly
- Material: black anodised aluminium

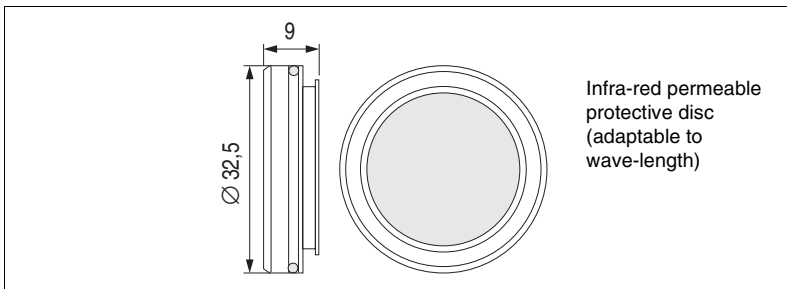
Dimensional drawings (dimensions in mm)

90° deflection mirror



- Enables measuring field to be deflected by 90°
- For use in confined spaces
- Blowing with air required
- Connections: 1/8" NPT female thread or 1/8" NPT male thread
- Material: black anodised aluminium

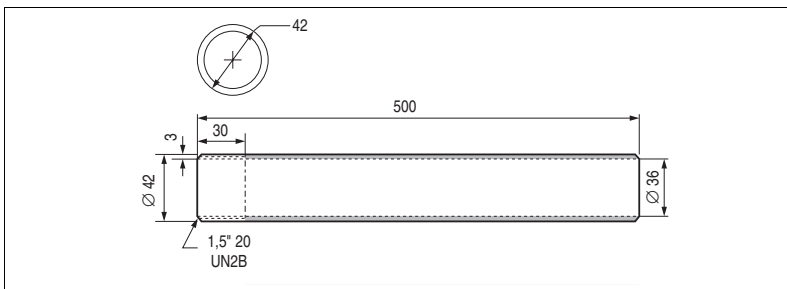
Protective glass



- Shields lens from mechanical damage and dirt
- Inserted inside housing in front of lens
- Dustproof seal through O-ring
- Glass adapted to sensor type

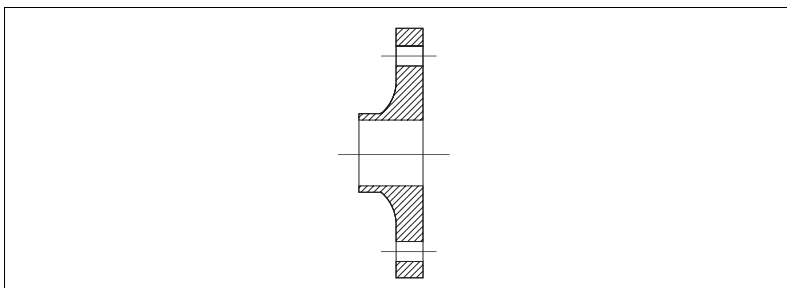
Amtir	RGNP, RGNG
Saphir	RGMG, RGMS
Glass	RGHG
CaF ₂	RGSG, RGSR, RGSK
- Materials: black anodised aluminium
optional: special steel, buna N O-rings

Protective piping



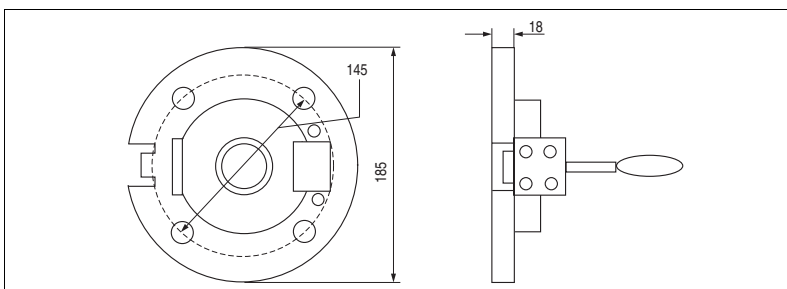
- Used to shield from external influences
- Screwed directly onto air blower or sensing head
- Can be shortened to any length
- Materials:
 - black anodised aluminium
 - steel
 - special steel
 - special design in ceramic on request

Process flange with perforations



- Can be adapted directly to a process connection pipe
- Design with perforations Ø 39 mm
- Following details required for an order:
 - material
 - standard: DIN/ANSI etc.
 - nominal diameter
 - nominal pressure
- Materials:
 - free choice
 - material coating possible

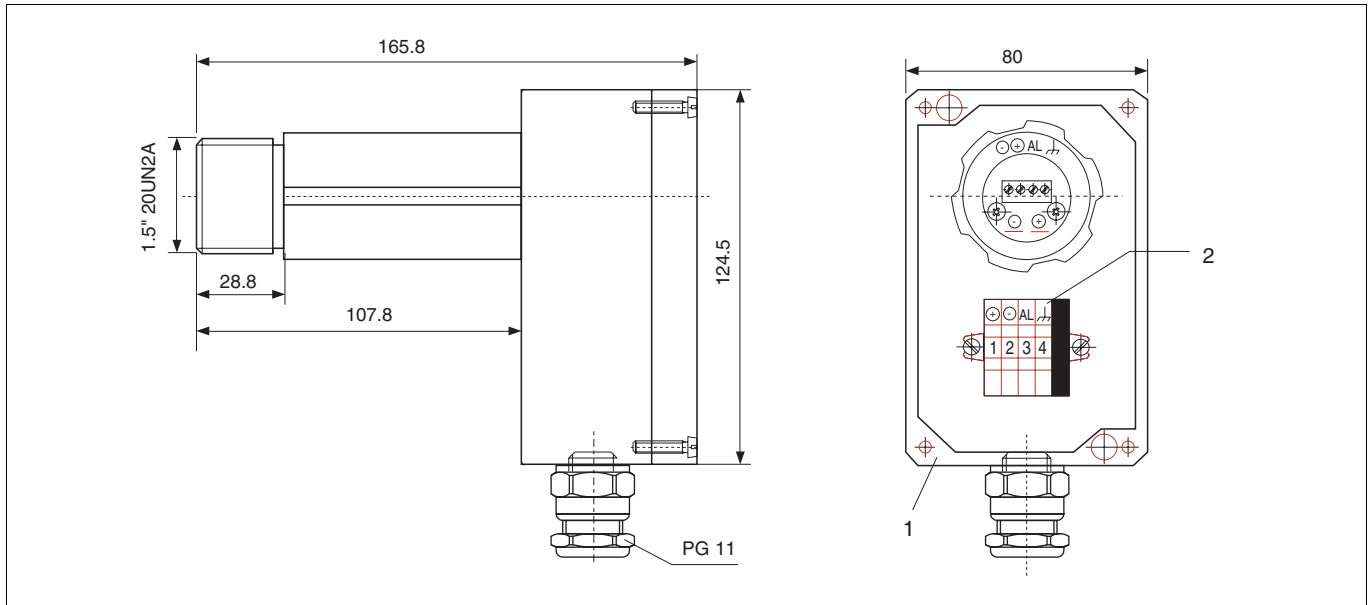
Process flange with hinged device



- Special adaption to allow measurement system to be swivelled away from process connection piece easily
- For use where necessary to check measuring connection piece quickly
- Allows process to be inspected quickly and safely
- Ex stock version
 - material RST 37-2
 - nominal diameter DN 65
 - nominal pressure PN 16
- other types on request

Dimensional drawings (dimensions in mm)

Infra-red temperature measurement system in field housing IP 65

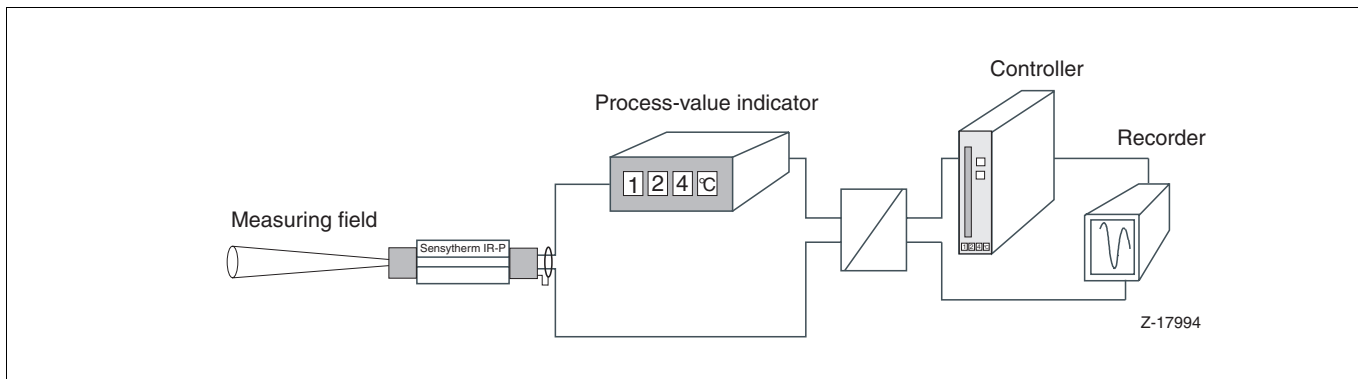


- Robust field housing
- Degree of protection IP 65 with cable connector PG 11
- Terminal assembly inside, 4-pin

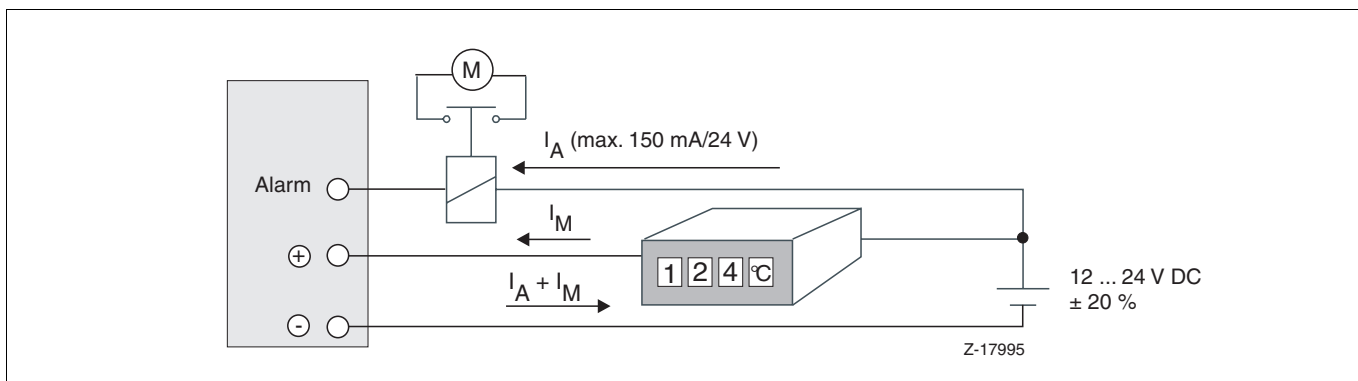
- 1 Aluminium field housing
- 2 Terminal socket

Connection options

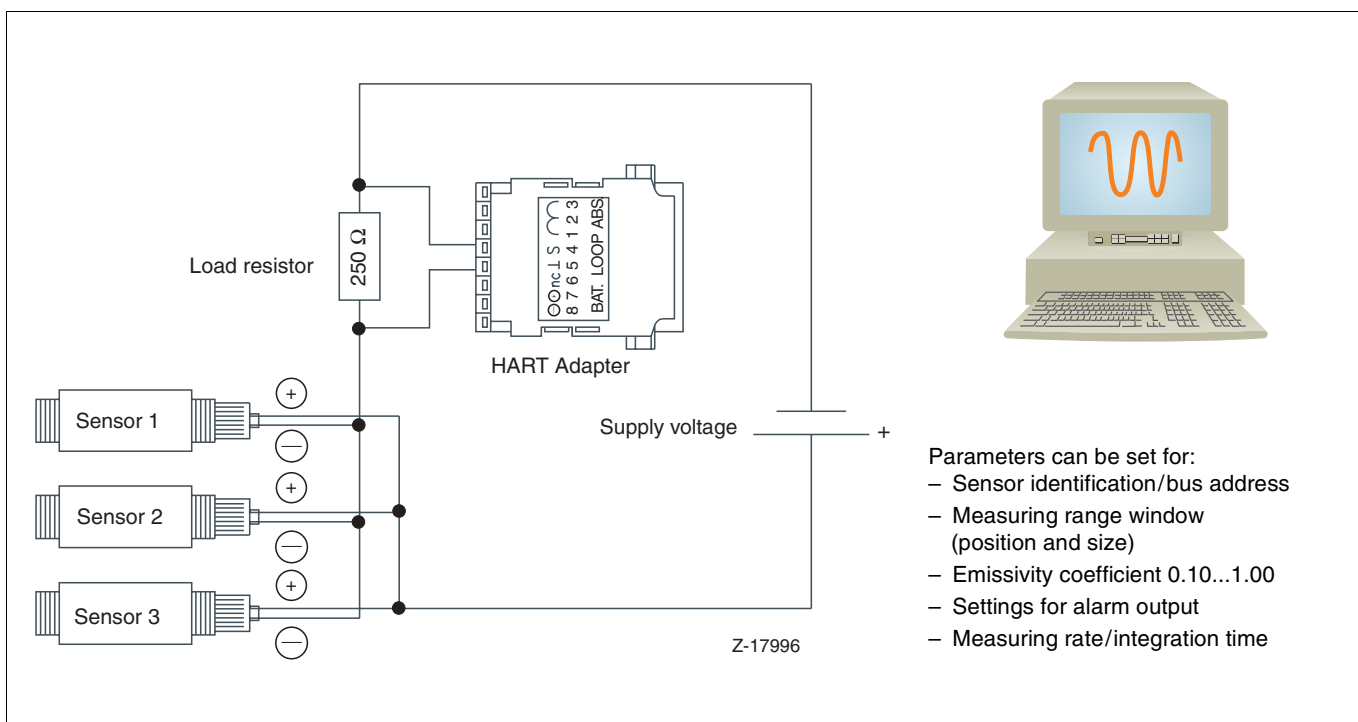
Current loop 4...20 mA



Current loop 4...20 mA, use of the alarm output



Multi-drop-mode – data communication based on the HART protocol



Technical data

Sensytherm IR-C the compact infra-red thermometer

The Sensytherm IR-C miniature sensor is designed to cover the entire temperature range of -40...600 °C. The measuring system consists of two components: the miniature sensing head and the separate electronics. The sensor is so small that it can be installed in nearly every place, but provides the same features as "normal-size" systems. It is accommodated in a robust stainless steel housing that always ensures full operating efficiency, even in harsh environments with ambient temperatures of up to 85 °C/120 °C, without requiring additional cooling.

Robust, convenient, reliable

A switch for selecting the emissivity coefficient is provided on the Sensytherm IR-C electronics. Additionally, a special function for measured value processing - e.g. maximum or minimum value holding or averaging - is available. The possible field of applications ranges from plastics to food processing.

Benefits:

- Miniature sensing head, for use in confined spaces
- Ambient temperatures of up to 85 °C or 120 °C without cooling
- Selectable thermocouple, voltage or current output
- Digital indicator for temperature and parameters on the sensor
- Easy setting of the following parameters directly on the sensor:
 - Temperature range
 - Emissivity coefficient
 - Output signal (0...5 V, 4...20 mA, thermocouple type J/K)
 - Maximum value holding
 - Minimum value holding
 - Averaging
- Optical resolution 2:1 or 10:1
- 12...24 V DC power supply

Models and temperature ranges

Sensytherm IR-CL
-40...600 °C

Thermal parameters

Optical resolution
10:1 or 2:1

Measuring deviation
± 1 % of the measured value

Reproducibility
± 0.5 % of the measured value

Parameterisation
on the sensor

Response time (t95)
150 ms; optionally 65 ms

Electrical parameters

Power supply
12...24 V DC

Signal processing
Maximum and minimum value holding, averaging



General parameters

Protection class
IP 65

Ambient temperature
Sensing head standard 0...85 °C
special 0...120 °C
Electronics box 0...65 °C

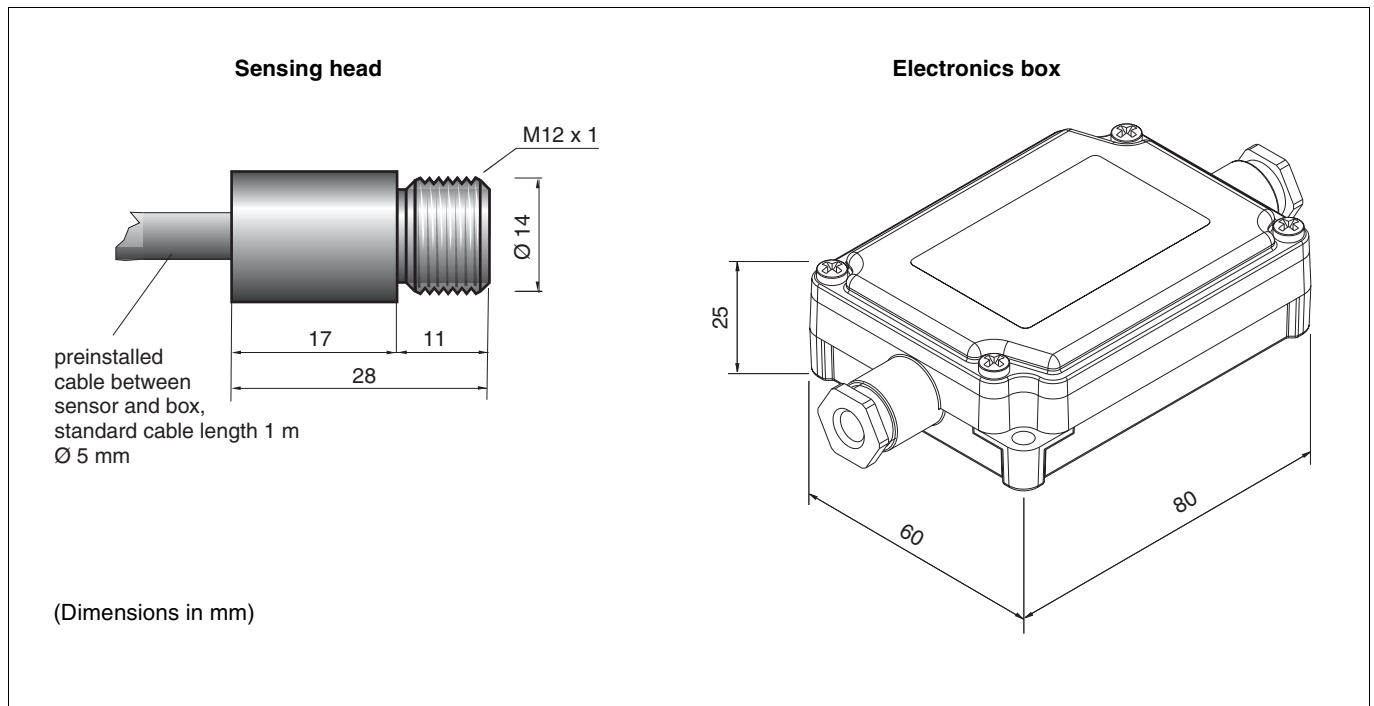
Cable lengths: sensor electronics
1 m, 3 m, 8 m, 15 m

Material
Sensing head stainless steel
Electronics box die-cast

Dimensions
Sens. head (L x Ø) 28 x 14 mm
Electronics box 80 x 60 x 25 mm

Weight
Sens. head (+ 1 m cable) 50 g
Electronics box 270 g

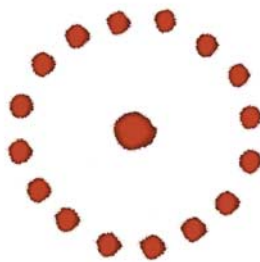
Dimensional drawings



Technical data

Hand-held measuring system Sensytherm IR-X

- Extended measuring range up to 900 °C
- Laser hologram for display of measured value (indicating measuring-point)
- Easy to handle
- Table of materials (preset emissivity)
- Internal data logger (100 locations)
- Wide software package with graphics function
- Rigid measuring case
- IR-X4: with power supply unit, interface cable and contact sensor for reference temperature measurement
- Upon request:
 - Devices with focus point optics (Ø 6 mm at 0.3 m distance)
 - Portable thermoprinter
 - Ex certificate



Measuring point of circular laser spot



Technical data	Sensytherm IR-X2	Sensytherm IR-X4
Temperature range	-30...900 °C	
Accuracy (measuring deviation)	± 1 % of measured value or ± 1 °C at ambient temperature of 23 °C ± 5 °C and known emissivity coefficient (whichever value is greater)	
Reproducibility	± 0.5 % of measured value or 0.5 °C (whichever value is greater)	
Response time	250 ms	
Optical resolution	35:1	
Spectral sensitivity	Rated value 8...14 µm, thermopile detector	
Alarms	High alarm	High/Low alarm
Emissivity coefficient	0.10...1.00, digitally adjustable	
Material table (preset emissivity)	-	+
Display resolution	0.1 °C	
Operating temperature	0...50 °C	
Laser pointer	Circular laser spot (laser class 2)	
Interfaces	-	Analog output mV/RS 232
Data logger	-	+
Measuring case	+	+ (incl. accessories)
Power supply	2 x 1.5-V batteries, type LR6 (Mignon)	
Dimensions	153 mm x 50 mm x 195 mm	
Weight	480 g	900 g

Technical data**Hand-held measuring device**

- Robust housing in solvent-resistant plastic
- Optics recessed for improved protection
- Fastening eyelet

Microprocessor control makes a variety of measurement routines possible, e.g. display of max./min. values, measurement of temperature difference, audible alarms for limit values etc.

The hand-held device has a laser pointer for accurate positioning.

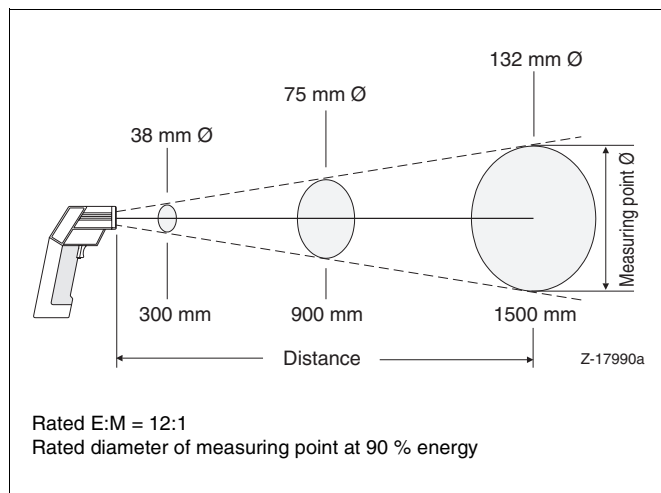


Technical data	Sensytherm IR-H20	Sensytherm IR-L60
Temperature range	-32...400 °C	-32...600 °C
Accuracy (measuring deviation with known emissivity coefficient)	± 1 % of measured value or ± 1 °C at ambient temperature of 23 °C ± 5 °C and known emissivity coefficient (whichever value is greater)	
Reproducibility	± 0.5 % of measured value or 1 °C (whichever value is greater)	
Response time	500 ms	
Optical resolution	12:1	30:1
Spectral sensitivity	Rated value 8...14 µm, thermopile detector	
Emissivity coefficient	fixed to 0.95	0.10...1.00, digitally adjustable
Alarm, acoustic and visual	High	High/Low
Display light	+	+
Temperature display	°C or °F, adjustable	
Display resolution	0.2 °C	0.1 °C
Max. operating temperature	0...50 °C	
Relative air humidity	Max. 95 % at 30 °C, non-condensing	
Storage temperature	-25...70 °C	
Power supply	9 V compound battery	
Dimensions	137 mm x 41 mm x 196 mm (L x W x H)	
Weight	320 g	
Laser pointer	Single-point laser	Circular laser (8-point)
Temperature display	MAX	MAX, MIN, DIF and average
Features	–	Data logger (12 measuring points), sensor connection
Accessories	Transport box	

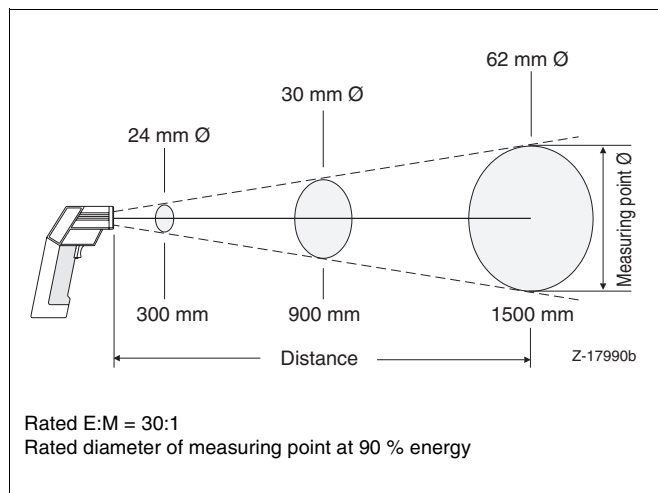
Technical data

Measuring field diagrams

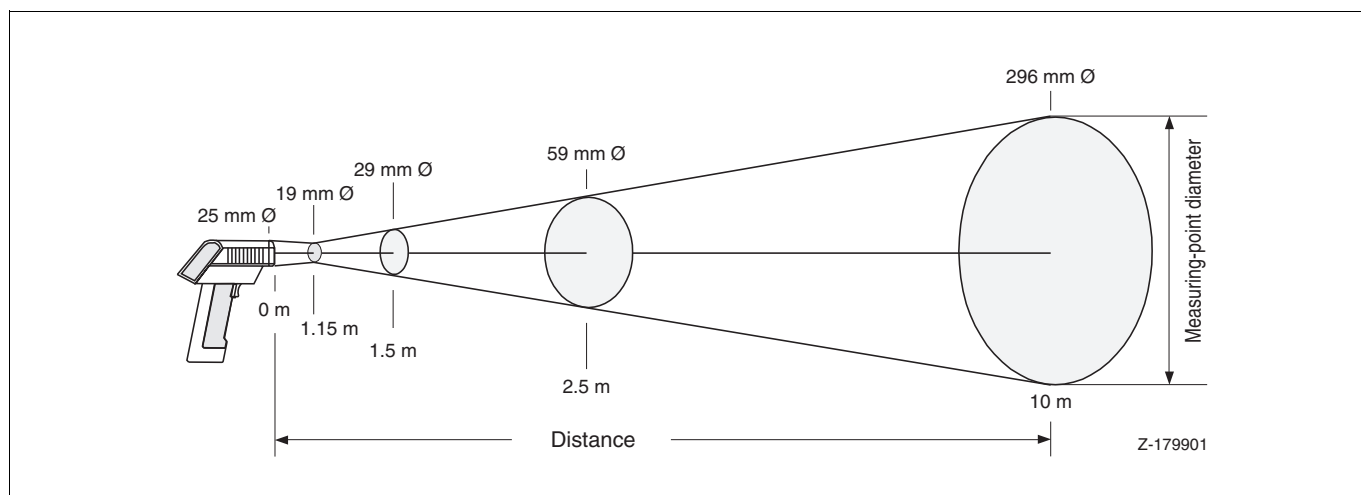
Sensytherm IR-H20



Sensytherm IR-L60



Sensytherm IR-X



Ordering information									
					Catalog No			Code	
Process measuring devices					V10313-			0 0	
Sensytherm IR P-A basic model Manually adjustable emissivity coefficient 4...20 mA output signal Fixed retaining bracket Presettled measuring range					Weight (kg) 0.330			1	
Parameterisabel smart measuring system Sensytherm IR P-D HART communication Emessivity coefficient with adjustable parameters Measurement rate adjustable parameters Free adjustable measuring range window 4...20 mA output signal Integral alarm output Fixed retaining bracket					0.330			2	
Design¹⁾									
Standard sensing system, in aluminium housing								1	
Sensing system in aluminium housing with cooling (incl. air blower)					0.270			2	
field connector housing and threaded terminal end clamps					0.325			3	
cooling system (incl. air blower) + field connector housing					0875			5	
Standard sensing system in stainless steel housing								6	
Sensing system in stainless steel housing with cooling (incl. air blower)								7	
Sensor type									
Temp. measuring range					Wavelength				
RGNP -18...+ 500 °C					8...14 µm			1	
Standard measurement system with coated optics:									
RGNG -18...+ 500 °C					8...14 µm			2	
RGMG 200...1000 °C					3,9 µm			3	
RGHG 500...2000 °C					2,2 µm			4	
Measurement system with special wavelength for measuring glass surfaces at high temperatures:									
RGSG 250...1650 °C					5 µm			5	
Measurement system with special wavelength for measuring thin plastic films:									
RGSK 10...360 °C					7,9 µm			6	
Standard measurement system with special measuring range:									
RGMS 200...1500 °C					3,9 µm			7	
Measurement system with special wavelength for measuring in a combustion chamber:									
RGSR 250...1650 °C					4,24 µm			9	
Optics, measuring field diagram									
Standard								1	
Stage 1								2	
Stage 2								3	
Certification									
None								0	
Approved to PTB for use in hazardous areas ²⁾								1	
Approved for use in hazardous areas and certification calibration								2	
Certified calibration								3	
Additional ordering information									
Operating instructions in German ³⁾							Z3D		
Operating instructions in English ³⁾							Z3E		

1) For technical information see the Technical Handbook

2) Eex ib IIC T4

3) One set of operating instructions in German or English is included. There is a charge for each additional set.

4) Optionally available in stainless steel

Ordering information					
Accessories		Weight (kg)	Catalog No.		
Adjustable retaining bracket for flexible positioning		0.220	10319-7962953		
Air blower prevents condensation as well as dirt on lens		0.245	10319-7962961		
90° deflection mirror for use in confined spaces deflects infra-red beams by 90°		0.115	10319-7962955		
Sighting aid for aligning ray path using mirror and reticule, remove before measuring		0.115	10319-7962956		
Laser pointer screws on in front of optics; remove before measuring; (red) laser marker with 670 wavelength battery-powered		0.330	10319-7957525		
Protective glass attachment easily replaceable, protects optics from damage and dirt					
for type RGNG, RGNP	Amtir 1	0.015	10319-7962957		
for type RGMG, RGMS	Saphir	0.015	10319-7962958		
for type RGHG	Glass	0.015	10319-7962959		
for type RGSg, RGSK, RGSr	CaF ₂	0.015	10319-7962960		
Special protective glass attachment pressure proof incl. air blower					
for type RGHG	protective glass 45 mm		10319-7962967		
for other types	protective glass 25 mm		10319-7962968		
Protective piping 15" 20 UN 2 B thread connection screws on in front of optics 38 mm inner diameter prevents atmospheric disturbance, protects against dirt					
Aluminium	500 mm long		10319-7962962		
Steel	500 mm long		10319-7962963		
Stainless steel	500 mm long		10319-7957532		
Ceramic	length maximum 1.5 m		10319-7962964		
Process flange with perforations directly adaptable to a process connection piece design with perforations Ø 39 mm customer details required: DIN, nominal diameter, nominal pressure, material (steel, stainless steel)			10319-7957528		
Process flange with hinged device for swivelling measurement system to one side enables process to be inspected material St 37 nominal diameter DN 65 nominal pressure PN 1 other designs on request			10319-7957530		

Ordering information				
Signal processing accessories	Weight (kg)	Catalog No.		
Digital indicator with transmitter power supply 31/2 digit LED, preset can be configured freely 100...240 V AC power supply	0.290	10319-7957526		
Digital indicator with transmitter power supply 31/2 digit LED, preset can be configured freely 24 V AC power supply	0.290	10319-7957527		
Digital signal processing FSK (Frequency Shift Keying) modem	0.100	10319-7962970		
Communication software SYC-TEMP dialog system		10318-7962971		
Services Factory calibration with certificate		80646-7962965		

Ordering information										
						Catalog No				
Sensytherm IR-C						V10315-				
Standard pyrometer for use in confined spaces Sensing head and electronics in separate units 24 V DC power supply Indicator for temperature and parameters on the device Selectable output signal: 4...20 mA/0...20 mA, 0...5 V, thermocouple type J/K Selectable max. value or min. value holding or averaging All parameters can be set directly on the device										
Sensytherm IR-CL Temperature range -40...600 °C (factory setting: 0...500 °C)						1				
Optics Optical resolution 2:1 conical working beam Optical resolution 10:1 conical working beam						1				
						2				
Max. ambient temperatures 85 °C on sensing head, electronics box 65 °C 120 °C on sensing head, electronics box 65 °C						1				
						2				
Connection cable between sensing head and electronics Length 1 m Length 3 m Length 8 m Length 15 m							1			
							2			
							3			
							4			
Response time 150 ms 65 ms								1		
								2		
Certificate Without Factory calibration certificate									0	
									1	
Application-specific parameterisation Without With										0
										1

Ordering information				
Hand-held measuring devices	Weight (kg)	Catalog No.		
Sensytherm IR-H20 Temperature range -32...+400 °C Spectral range 8...14 µm Single-point laser Fixed emissivity coefficient of 0.95 MAX temperature Display lighting Rigid plastic case	0,244	10311-7962952		
Sensytherm IR-L60 Temperature range -32...+900 °C Spectral range 8...14 µm 8 point circular laser sighting Display lighting MAX, MIN, AVG temperature Data logger for 12 values High / Low alarm for hot spot search Thermocouple connection Adjustable emissivity coefficient Rigid plastic case	0.244	10311-7962966		
Sensytherm IR-X2 Temperature range -32...+900 °C Spectral range 8...14 µm Display resolution 1 °C Measuring deviation ± 1 % of measured value or ±1 °C Reproducibility ± 0.5 % of measured value or 0.5 °C Circular laser spot (laser IEC class2) High alarm, acoustic and visual Graphical display, display lighting Adjustable emissivity coefficient Battery 2 pcs. 1.5 V (R6/AA)	0.480	10311-7957534		
Sensytherm IR-X4 Temperature range -30...+900 °C Spectral range 8...14 µm Display resolution 1 °C Measuring deviation ± 1 % of measured value or ±1 °C Reproducibility ± 0.5 % of measured value or 0.5 °C Circular laser spot (laser IEC class2) High alarm, acoustic and visual Graphical display, display lighting Adjustable emissivity coefficient Material table (preset emissivity) Internal data logger (100 locations) Data output via interface RS 232 or 1 mV per 1 °C Windows-compatible software RS 232 computer cable 1.5 m Thermocouple type K Battery 2 pcs. 1.5 V (R6/AA) Power supply unit 115 V AC or 230 V AC	0.900	10311-7957535		
Accessories				
Emissivity coefficient adhesive labels For determining temperature accurately on shiny metal surfaces or reflective materials Ø 40 mm heat resistant up to 300 °C ε = 0.95 Delivery quantity: sheet of 35 labels		10311-7957523		
Operating instructions: ¹⁾ German English French				

¹⁾ One set of operating instructions in German or English is included. There is a charge for each additional set.



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