

Thermophil[®] INFRAsmart R 300 / R 301 / R 302

- Contactless measurement of temperature for all applications.
- Sturdy and tight stainless steel housings to IP 64.
- Two-wire 4-20 mA technique
- HART[®] interface
- Choice of spectral ranges
- Variable measuring ranges
- Max. ambient temperature 70 °C



The **INFRAsmart R 300/301/302** family comprises stationary pyrometers for contactless measurement of temperature.

This technique is a big advantage, for example, if the object to be measured moves or is live. The contactless measuring principle also makes sense if the measured object is a poor conductor of heat (e.g. plastic films, paper or bulk materials) or if the measurement has to be completed quickly. This results in a very broad range of applications, such as:

Thermoforming machines for plastics,
 Extruders for plastics,
 Calendaring lines for plastic films,
 Coating machines,
 Glassworking,
 Metalworking,
 Supervision of products on conveyor belts,
 Monitoring of plant overheating, etc.

With the R 301 and R 302 types, the infrared radiation is focused on the sensing element by a lens. The R 300 type works with a high-gloss, gold-plated cone.

The pyrometers are extremely compact, with integrated electronic components that convert the measurement signal to 4...20 mA.

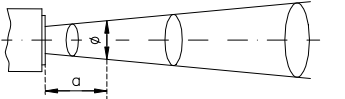
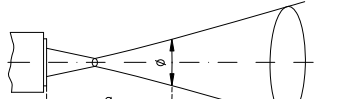
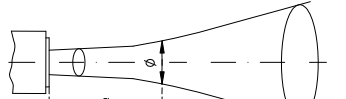
Cooling systems are available for operation at ambient temperatures higher than 70 °C.



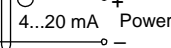
An air purging nozzle can be supplied for dusty or damp environments to keep the lens or the cone clean.

Fixing brackets and various other accessories are also available.

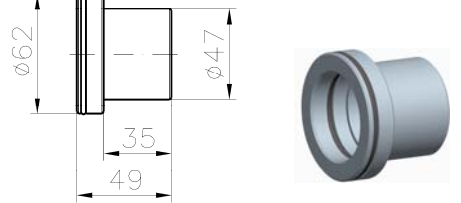
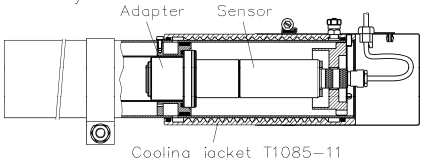
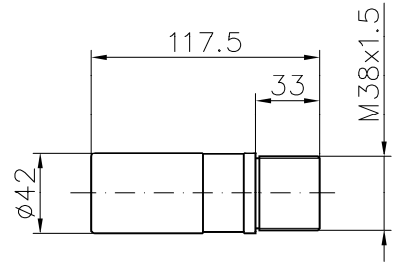

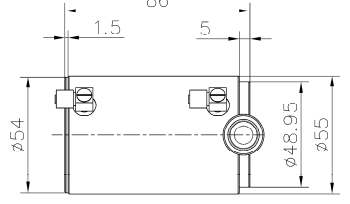

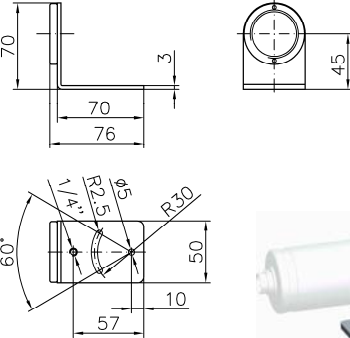
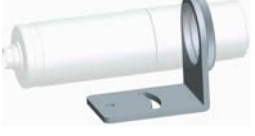
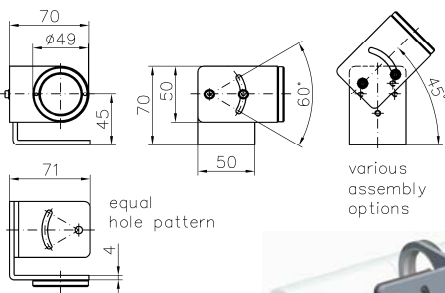

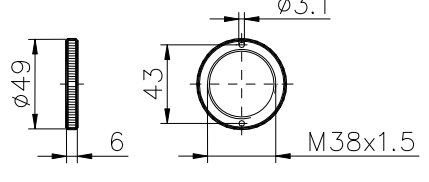

- **Measuring ranges:**
0...2000 °C in sub-ranges
- **Measurement signal:**
4...20 mA, linear
- **Power supply:**
12...30 V DC
- **Smallest measuring field:**
5 mm Ø
- **Vibration-proof, no moving parts**
- **Interface: HART[®] protocol**
- **Cluster / category**
II2G EEx ib IIC T6 ... T4
for application in Ex zone 1 or zone 2
- **Cluster / category**
II2G Ex ibD21 T₁₀₀ 105°C/160°
C for application in Ex zone 21 or zone 22
- **IBExU06ATEX1089**
- **DTM and PDM for sensor management**
- **Temperature monitoring with ignition protection standard IPL 1, TÜV certificate no. 71332449**



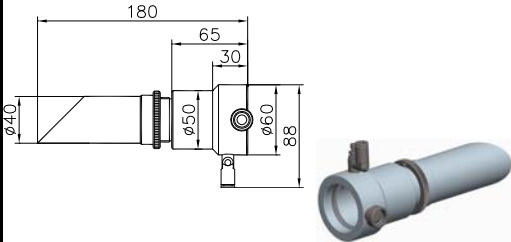
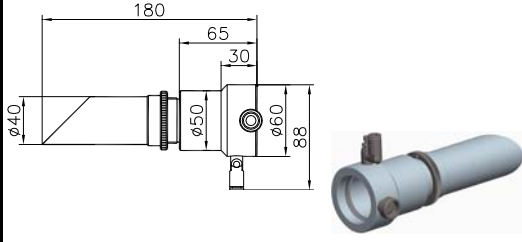
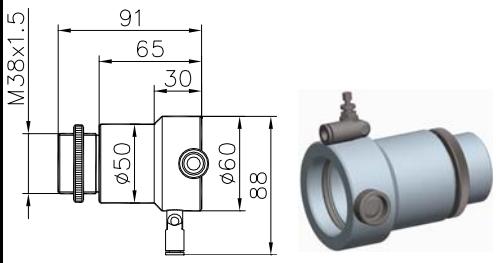
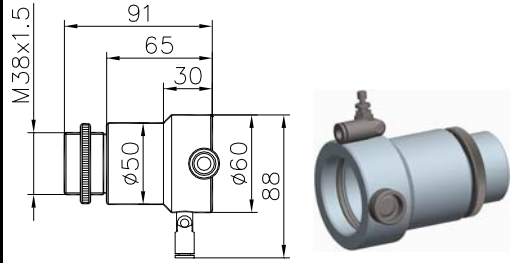
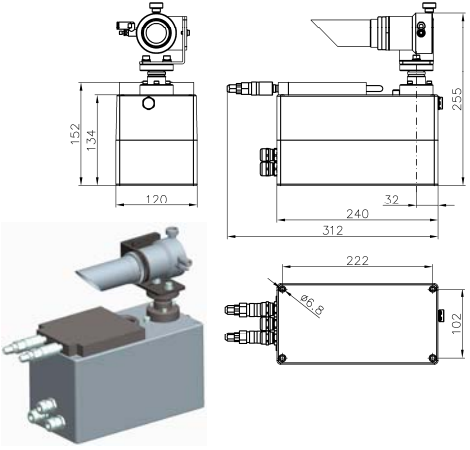


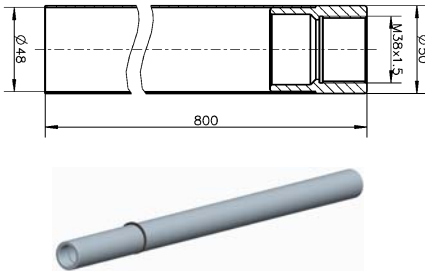
Technical data				
Measuring range				
Overall	max. 0...+400 °C with R 300 max. 0...+2000 °C with R 301/R 302			
Spectral response	8...14 µm; 2...2.7 µm; 4.9...5.5 µm; 7.9 µm (R 300)			
Emission factor	0.1 to 1, settable externally via the HART® interface			
Measuring field	Depending on distance (see "Distance ratio")			
Interface	HART® protocol (FSK BELL 202, 1.2 kbit/s)			
Functions (configurable via HART®-Interface)	Unit, Range limits, Emission factor, Transmission factor, Temperature alarm, Damping, Maximum and Minimum mode, Fault current, Fieldbus address			
Output (current interface)				
Output signal	4...20 mA, linear			
Permissible load	≤ 500 Ω for standard version/U _H = 24 V			
	Intrinsically safe circuit EEx ib IIC			
	max. input voltage	U _i = 28 V		
	max. input current	I _i = 105 mA		
	max. power input	P _i = 1,0 W		
	max. internal capacity	C _i = 12 nF		
	max. internal inductance	L _i = 0,2 mH		
Accuracy				
Measuring accuracy	≤ 1 % of measuring range (at 23 °C and for emission factor = 1)			
Temperature sensitivity	≤ 0.03 %/C°			
Response time	t _{0,9} = 0.2 s			
Ambient conditions				
Ex	Type	Ambient Temperature	Temperature class	max. Surface Temperature
	R30x	-20°C ... +60°C	T6	T ₁₀₀ 105°C
Permissible operating temperature	0...+70 °C			
Permissible storage temperature	-10...+70 °C			
Climatic class	KSF according to DIN 40040			
Power supply				
U _H = 12...30 V DC, max. 25 mA, max. residual ripple ≤ 150 mV rms				
Connection				
4-pole plug connector, degree of protection IP 64				
Mechanical data				
Type	R 300	R 301	R 302	
Housing material	Stainless steel (material no. 1.4301)			
Degree of protection	IP 64			
Weight	1100 g	1100 g	1460 g	
Dimensions				
R 300		R 301		R 302
<p>222749.dwg</p>		<p>222749.dwg</p>		<p>216214.dwg</p>

Distance ratio R 300	R 301	R 302
 <p>measuring distance a</p> <p>field of view ϕ (95 %)</p> <p>for field a : $\phi = 1.7$</p> <p>215910.dwg</p>	 <p>measuring distance a</p> <p>field of view ϕ (95 %)</p> <p>exact point at 100mm 20:1 for field 6:1</p> <p>215912.dwg</p>	 <p>measuring distance a</p> <p>field of view ϕ (95 %)</p> <p>exact point at 1000mm 33:1 for field 25:1</p> <p>215913.dwg</p>

Connection	Plug connector	R 300/301/302	Evaluator
With plug connector	 <p>External view/ connector soldering side</p>		

Accessories

<p>Adapter Type R 300-100 replacing R 20 with R 302</p>  <p>Assembly:</p>  <p>Order No. 216298</p>	<p>For sensor R 302</p>	<p>Laser pointer Type R 300-101</p>   <p>Order No. 216299</p>	<p>For sensor R 300 R 301 R 302</p>
<p>Cooling jacket Type R 300-102</p>   <p>Order No. 216711</p>	<p>For sensor R 300 R 301 R 302</p>	<p>Fixed bracket Type R 300-105</p>   <p>Order No. 216975</p>	<p>For sensor R 300 R 301 R 302</p>
<p>Adjustable bracket Type R 300-106</p>  <p>various assembly options</p>  <p>Order No. 216976</p>	<p>For sensor R 300 R 301 R 302</p>	<p>Mounting nut Type R 300-00-024</p>   <p>Order No. 216989</p>	<p>For sensor R 300 R 301 R 302</p>

<p>RS 232/HART[®] modem incl. software Type R 300-107</p> 	<p>For sensor R 300 R 301 R 302</p> <p>Order No. 220930</p>	<p>Test set for testing pyrometers R30x Type R 300-110</p> 	<p>For sensor R 300 R 301 R 302</p> <p>Order No. 241933</p>
<p>Sensor bracket with air flush Type R 300-111</p> 	<p>For sensor R 301 R 302</p> <p>Order No. 242754</p>	<p>Sensor bracket with air flush (plastics) Type R 300-113</p> 	<p>For sensor R 301 R 302</p> <p>Order No. 246173</p>
<p>Sensor bracket with air flush (without cable protection) Type R 300-114</p> 	<p>For sensor R 300 R 301 R 302</p> <p>Order No. 247210</p>	<p>Sensor bracket with air flush (without cable protection) Type R 300-115</p> 	<p>For sensor R 300 R 301 R 302</p> <p>Order No. 247802</p>
<p>Pyrometer slewing device Type R 300-116</p> 	<p>For sensor R 302</p> <p>Order No. 277319</p>	<p>Connecting kit for pyrometer slewing de- vice Type R 300-117</p> 	<p>For sensor R 300-116</p> <p>Order No. 277409</p>
<p>Cooling water connecting kit for pyrome- ter Type R 300-132</p> 	<p>For sensor R 300-116</p> <p>Order No. 286185</p>	<p>Pyrometer Protection tube (stainless steel) Type R 300-118</p> 	<p>For sensor R 302</p> <p>Order No. 277420</p>

<p>Cooling jacket for pyrometer Type R 300-120</p>	<p>For sensor R 301</p> <p>Order No. 279028</p>	<p>Cooling jacket for pyrometer Type R 300-121</p>	<p>For sensor R 302</p> <p>Order No. 279027</p>
<p>Protective cap for pyrometer Type R 300-122</p>	<p>For sensor R 300 R 301 R 302</p> <p>Order No. 279030</p>	<p>Sensor bracket with air nozzle (aluminium) Type R 300-123</p>	<p>For sensor R 301</p> <p>Order No. 279031</p>
<p>USB/HART-modem incl. software Type R 300-125</p>	<p>For sensor R 300 R 301 R 302</p> <p>Order No. 281175</p>	<p>USB/Profibus-modem incl. software Type R 300-126</p>	<p>For sensor R 300 R 301 R 302</p> <p>Order No. 281176</p>
<p>Cleaning kit for pyrometer Type R 300-128</p>	<p>For sensor R 300 R 301 R 302</p> <p>Order No. 282302</p>	<p>IR silicon slice with seal Type R 300-129 e.g. together with R 300-111, R 300-113</p> <p>silicon wafer Flat gasket</p>	<p>For sensor R 301 R 302</p> <p>Order No. 285141</p>
<p>Pyrometer protection tube D = 50 mm, L= 800 mm Type R 300-130</p>	<p>For sensor R 302</p> <p>Order No. 285875</p>	<p>Pyrometer protection tube D = 50 mm, L= 300 mm Type R 300-131</p>	<p>For sensor R 302</p> <p>Order No. 285876</p>

<p>IR silicon slice 8 - 14 μm Type R 300-133</p> 	<p>For sensor R 301 R 302</p> <p>Order No. 286282</p>	<p>Connection coupling 4-pole (axial)</p> 	<p>For sensor R 300 R 301 R 302</p> <p>Order No. U233085</p>
<p>Connection coupling 4-pole</p> 	<p>For sensor R 300 R 301 R 302</p> <p>Order No. U266182</p>	<p>Power supply 230 V, output 24 V DC in rail-mounting housing Type 5906-3</p> 	<p>For sensor R 300 R 301 R 302</p> <p>Order No. U8901159063</p>
<p>Power supply 230 V, output 24 V DC in surface housing Type 5906-4</p> 	<p>For sensor R 300 R 301 R 302</p> <p>Order No. U8901159064</p>	<p>Connection cable, open ends Type WN 293-6</p>  <p>Length acc. to specification</p> <p>b\bnw2938.dwg</p>	<p>For sensor R 300 R 301 R 302</p> <p>Order No.</p> <ul style="list-style-type: none"> 3 m U01110322936 6 m U01110622936 10 m U01191022936 15 m 246691 20 m 290525 30 m 246596 40 m 246597 50 m 246598 60 m 246600 70 m 246601
<p>Connection cable Ex, open ends Type WN 293-8</p>  <p>Length acc. to specification</p> <p>b\bnw2938.dwg</p>	<p>For sensor R 300 R 301 R 302</p> <p>Order No.</p> <ul style="list-style-type: none"> 3 m 245550 6 m 245551 10 m 245552 15 m 245546 20 m 280130 30 m 288916 60 m 288933 100 m 286613 	<p>Connection cable R3x, corrugated hose 3m, open ends Type 293-9</p>  <p>Length acc. to specification</p> <p>Corrugated hose 3m</p> <p>b\bnw2939.dwg</p>	<p>For sensor R 300 R 301 R 302</p> <p>Order No.</p> <ul style="list-style-type: none"> 6 m 286186 10 m 286188 15 m 286189 30 m 286190 40 m 286191 50 m 286192 60 m 286193 70 m 286194
<p>Connection cable, connection coupling 90° Type WN 293-10</p>  <p>Length acc. to specification</p>	<p>For sensor R 300 R 301 R 302</p> <p>Order No. 294041</p>	<p>Connection cable Ex, connection coupling 90° Type WN 293-11</p>  <p>Length acc. to specification</p>	<p>For sensor R 300 R 301 R 302</p> <p>Order No.</p> <ul style="list-style-type: none"> 10 m 302906 60 m 290261

Order code

Model		Type		Spectral range		Measuring range	
neutral	0	R 300	0	8...14µm	1	Default	00
Standard	1					0...200 °C	02
Ex zone 1/2/21/22	3					0...250 °C	03
						0...400 °C	04
						Setpoint	99
		R 301	1	8...14µm	1	Default	00
		R 302	2			-50...200 °C	52
						0...200 °C	02
						0...250 °C	03
						0...400 °C	04
						0...600 °C	06
						0...1000 °C	10
						Setpoint	99
				2...2,7µm	2	500...2000 °C	15
						Setpoint	99
				3,9µm	4	200...1000 °C	13
						Setpoint	99
				4,9...5,5µm	5	250...1400 °C	14
						Setpoint	99

743		30			100		
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Meaning of the order code

Select the required configuration from each column and enter the corresponding code digits in the order number fields.

Model	Neutral: Standard:	Neutral rating plate BARTEC rating plate
Type	R 300 R 301 R 302	INFRAsmart IR sensor in two-wire technique with cone 1.7 : 1, for ambient temperatures up to 70 °C The 7.9 µm spectral range is only available for the R 300 type. INFRAsmart IR sensor in two-wire technique with lens 20 : 1, for ambient temperatures up to 70 °C INFRAsmart IR sensor in two-wire technique with lens 33 : 1, for ambient temperatures up to 70 °C
Spectral range	8...14 µm 2...2.7 µm 3.9 µm 4.9...5.5 µm 7.9 µm	Possible measuring range: -50...200 °C 0...200 °C, 0...400 °C, 0...600 °C, 0...1000 °C For steel; possible measuring range: 500...2000 °C Medium temperature, glass, objects behind gases; possible measuring range: 200...1000 °C For glass; possible measuring range: 250...1400 °C For plastic; possible measuring range: 25...350 °C
Measuring range	Default: Setpoint:	Maximum measuring range, not programmable Programmable according to customer requirement