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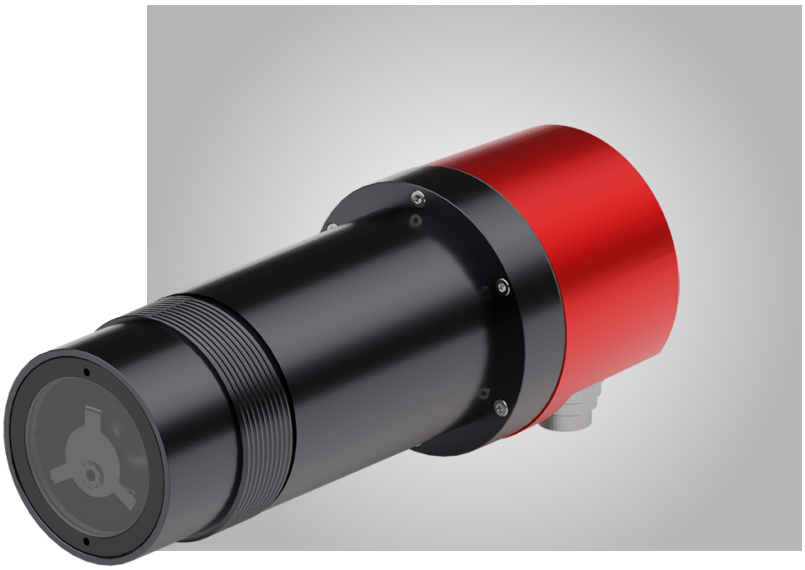

SPOT+ Series Catalogue

Smart high-precision pyrometers

See degrees differently.

SPOT+ MONOCHROMATIC PYROMETERS

M100, M160, M210, M3-5 and M390 Standard Body

Mono (or monochromatic) pyrometers operate on a single wavelength. To obtain accurate temperature measurements, you must have a clear view of the product and know the emissivity of the surface.

Mono pyrometers are band-pass radiation pyrometers detecting the radiation intensity within a (usually) narrow spectral (wavelength) band. Obtaining correct temperature measurements requires a clear and full view of the object to be measured and knowledge of the actual spectral surface emissivity.

Depending on the spectral response of the pyrometer, the influence through surface emissivity changes decreases with shorter wavelength instruments and vice versa. Typically, the shortest possible instrument wavelength (spectral response) is recommended to be used.

Specification Headlines

- 50 to 2500 °C / 122 to 4532 °F
- Field of view 30:1 - 200:1
- Multiple Detector Types
- Patented* pulsed green LED targetting
- Full range of accessories available

APPLICATIONS & USES

- **M100:** General purpose, metals, glass, refractories
- **M160:** General purpose, metals and glass processing
- **M210:** Low-temperature metals
- **M390:** Reheat furnaces
- **M3-5:** Rolling mill coiler, heat treatment
- **M100 FO, M160 FO:** Fibre-optic pyrometers are ideal for use in processes where the measuring point is too hot or where lack of space prevents the use of a standard pyrometer.

FEATURES & BENEFITS

- **SPOTPro software** provides datalogging at up to 1 kHz data rate & control of the SPOT+ pyrometers when used with the SPOT Actuator.
- **Rapid response times** and smart onboard processing provides immediate live process control.
- **Precise process temperature control** improves product quality and reduces scrap.
- **Hazardous area housing** available to use the pyrometer in the harshest of environmental conditions.

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SPOT+ RATIO PYROMETERS

R100, R160, R210 Standard Body

Ratio pyrometers operate at two separate wavelengths and can correct for dust, dirty windows, obstacles in its optical path and slightly changing object emissivity, as long as both wavelength signals are affected proportionally by emissivity or process changes.

Ratio pyrometers are often used if the measuring SPOT+ is not fully placed on the object or the object is smaller than the pyrometer SPOT+ size, if changing transmissions are present in the optical path of the pyrometer – like dust, steam, obstacles – or if the object surface emissivity is changing within a certain amount.

Ratio pyrometers are also capable of monitoring the actual signal strength, e.g. the amount of dirt on view port windows, increasing absorption or obstructions in the optical path.

Specification Headlines

- 125 to 3500 °C / 257 to 6332 °F
- Field of view 60:1 - 200:1
- Multiple Detector Types
- Patented* pulsed green LED targetting
- Full range of accessories available

APPLICATIONS & USES

- **R100 :** High-temperature processes with variable emissivity or obscuration, such as cement klins.
- **R160 :** General purpose with variable emissivity or obscuration.
- **R210:** Low-temperature processes with variable emissivity or obscuration.
- **R100 FO, R160 FO:** Fibre-optic pyrometers are ideal for use in processes where the measuring point is too hot or where lack of space prevents the use of a standard pyrometer.

FEATURES & BENEFITS

- **SPOTPro software** provides datalogging at up to 1 kHz data rate & control of the SPOT+ pyrometers when used with the SPOT Actuator.
- **Rapid response times** and smart onboard processing provides immediate live process control.
- **Precise process temperature control** improves product quality and reduces scrap.
- **Hazardous area housing** available to use the pyrometer in the harshest of environmental conditions.

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SPOT+ APPLICATION PYROMETERS

AL, GS, MM, TMT

Multi-Mode Application pyrometers are multi-band spectral radiation pyrometers with specific modes to automatically detect and compensate for emissivity changes duringindustrial processes. They detect infrared radiation within multi-spectral bands and automatically calculate the real emissivity and resulting non-greyness values.

Different specific application modes are selectable, such as aluminium processing, annealing, coating, galvanising processes or silicon and electrical steel or similar.

Specification Headlines

- 125 to 1800 °C / 257 to 3272 °F (Model dependent)
- Field of view 30:1 - 230:1
- Application specific wavelengths
- Patented* pulsed green LED targetting
- Full range of accessories available

APPLICATIONS & USES

- **AL / LT :** High-temperature and low temperature processes for aluminium production
- **GS :** Galvanised and galvannealed steel strip temperature measurement
- **MM:** Molten metal temperature measurement in foundry and tapping applications.
- **TMT:** Temperature readings of tube wall metal temperatures in all types of tube furnaces. Including boilers, reformers and crackers.

FEATURES & BENEFITS

- **Specialised application algorithms** to provide accurate digital temperature readings allowing optimisation of process speeed and quality.
- **Durable sapphire protection window** prevents scratches , solvents and can be easily cleaned with a soft cloth.
- **Modbus TCP/IP** is a widley used and popular industrial Ethernet protocol.
- **Single sensor solution** is ideal for use with customer PLC's or DCS systems with no requirement for a seperate processor, making it easy to implement in small or large organisations, and the same instrument can be used for different processes.

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MONO PYROMETER MODELS

	M100	M160	M210	M390	M3-5	M100 FO	M160 FO
Measurement Range:	500 -1800 °C / 932 - 3272 °F	250 -1600 °C / 482 - 2912 °F	50 -1100 °C / 122-2012 °F	150 - 1800 °C 302 - 3272 °F	0 - 500 °C 32 - 932 °F	500 -1800 °C / 932 - 3272 °F	250 -1600 °C / 482 - 2912 °F
Extended Range:	500 -2500 °C / 932 - 4532 °F	-	-	-	-	-	-
Field of View (90% of energy):	200:1	200:1	60:1	30:1 †	30:1 †	100:1 3 m, 6 m and 10 m light guides available	
Detector Type:	Single Wave-length 1.0 µm	Single Wave-length 1.6 µm	Single Wave-length 2.3 µm	Single Wave-length 3.9 µm	Broadband 3-5 µm	Single Wave-length 1.0 µm	Single Wave-length 1.6 µm
Display:	Local with video streaming					Local display	
Settings:	Configure locally using the pyrometer interface or remotely (using the Web server or SPOTPro or IMAGEPro. Emissivity, mode, current output range, alarm logic output and thresholds, network settings, focus and LED, language and user name (focus and LED on standard body only)						
Sighting Image:	Local display and remote video streaming					Not available	
Focus Range:	300 mm / 11.8 in to infinity, locally or remotely adjusted					100 mm / 3.9 in to 500 mm 19.7 in manually adjusted	
LED Targeting:	Patented* pulsed green LED focus pattern					Red circle LED	
Mounting:	Full range of mountings and accessories available - see Mountings and Accessories Brochure or visit our website						
Measurement Accuracy:**	±0.25 % K or 2 K			±1 % K (T<1100 °C) ±1.5 % K (T>1100 °C)	1 % K	±0.25 % K or 2 K	
Repeatability:	<1 °C						
Resolution:	0.1 °C						
Noise:**	<0.5 °C RMS						
Sealing:	IP65						
Response Time:	1 ms to 10 s				10 ms to 10 s	1 ms to 10 s	
Analogue I/O:	Two 4-20 mA outputs, One 4-20 mA input, Contact closure input, Relay output						
Communications:	EtherNet/IP, REST API, Modbus TCP/IP, web server						
Processing Functions:	Peak/Valley Picking, Averager, Modemaster, CMD in sampling, CMD out alarms						
Power Req.:	Power over Ethernet or 19 to 30 V DC at the instrument; 8 W max consumption						
Software:	Live configuration and temperature display on any web browser. Optional SPOTPro or IMAGEPro software with data-logging, live and historical data trending, plus remote image capture, control of multiple instruments (image capture not available on fibre-optic versions)						
Languages:	Integrated multiple language selections: English, German, French, Italian, Spanish, Portuguese (Brazilian), Japanese, Chinese (simplified Mandarin), Korean, Russian, Polish						
Ambient Temp. Range:	5-60 °C specified, 0-70 °C operating before cooling required					Optic head up to 200 °C / 392 °F	
Warranty:	See our website at www.ametek-land.com for warranty details						

† 98% of energy
* Patent Number GB2497609
** Measurements within specification over 5-95% of range

RATIO PYROMETER MODELS

	R100	R160	R210	R100 FO	R160 FO
Measurement Range:	550 -1800 °C / 1022 - 3272 °F (ratio) 400 -1800 °C / 752 - 3272 °F (overall) 700 to 3500 °C / 1292 to 6332 °F (all modes)†	550 -1600 °C / 1022 - 2912 °F (ratio) 250 -1600 °C / 482 - 2912 °F (overall)	125 -1100 °C / 257-2012 °F	550 -1800 °C / 1022 - 3272 °F (ratio) 400 -1800 °C / 752 - 3272 °F (overall)	550 -1600 °C / 1022 - 2912 °F (ratio) 250 -1600 °C / 482 - 2912 °F (overall)
Field of View (90% of energy):	200:1	200:1	60:1	100:1 3 m, 6 m and 10 m light guides available	
Detector Type:	Ratio Short Wavelength; Detector 1: 1.0 µm, Detector 2: 1.2 µm	Ratio Short Wavelength; Detector 1: 1.0 µm, Detector 2: 1.5 µm	Ratio Mid Wavelength; Detector 1: 2.1 µm, Detector 2: 2.4 µm	Ratio Short Wavelength; Detector 1: 1.0 µm, Detector 2: 1.2 µm	Ratio Short Wavelength; Detector 1: 1.0 µm, Detector 2: 1.5 µm
Display:	Local with video streaming			Local display	
Settings:	Configure locally using the pyrometer interface or remotely (using the Web server or SpotPro or ImagePro. Emissivity, mode, current output range, alarm logic output and thresholds, network settings, focus and LED, language and user name (focus and LED on standard body only)				
Sighting Image:	Local display and remote video streaming			Not available	
Focus Range:	300 mm / 11.8 in to infinity, locally or remotely adjusted			100 mm / 3.9 in to 500 mm 19.7 in manually adjusted	
LED Targeting:	Patented* pulsed green LED focus pattern			Red circle LED	
Mounting:	Full range of mountings and accessories available - see Mountings and Accessories Brochure or visit our website				
Measurement Accuracy:**	Mono & Duo: ±0.25% K or 2 K Ratio & Multi: ±0.5% K or 5 K				
Repeatability:	<1 °C				
Resolution:	0.1 °C				
Noise:**	<0.5 °C RMS				
Sealing:	IP65				
Response Time:	Adjustable 1 ms to 10 s		Adjustable 15 ms to 10 s	Adjustable 1 ms to 10 s	
Analogue I/O:	Two 4-20 mA outputs, One 4-20 mA input, Contact closure input, Relay output				
Communications:	EtherNet/IP, REST API, Modbus TCP/IP, web server				
Processing Functions:	Peak/Valley Picking, Averager, Modemaster, CMD in sampling, CMD out alarms				
Power Req.:	Power over Ethernet or 19 to 30 V DC at the instrument; 8 W max consumption				
Software:	Live configuration and temperature display on any web browser. Optional SPOTViewer software with datalogging, live and historical data trending, plus remote image capture, control of multiple instruments (image capture not available on fibre-optic versions)				
Languages:	Integrated multiple language selections: English, German, French, Italian, Spanish, Portuguese (Brazilian), Japanese, Chinese (simplified Mandarin), Korean, Russian, Polish				
Ambient Temp. Range:	5 - 60 °C specified, 0 - 70 °C operating before cooling required			Optic head up to 200 °C / 392 °F	
Warranty:	See our website at www.ametek-land.com for warranty details				

* Patent Number GB2497609
** Measurements within specification over 5-95% of range

SPECIFICATIONS

	SPOT+ AL	SPOT+ AL LT (Low Temp)
Measurement Range - Modes:	200 -800 °C / 392-1472 °F - E, Q, S, F, F Mg, L	130 -700 °C / 266 -1292 °F - F, F Mg 150-700 °C / 302-1292 °F - E, Q, S
Field of View:	60 :1 to 90%	30 :1
Detector Type:	Application-specific selected range of narrow wavelength bands designed to optimise temperature accuracy measurement of aluminium	
Display:	Local display with image streaming	
Settings:	Configure locally using the thermometer interface or remotely (using the Webserver, SPOTViewer, or SPOTPro). Emissivity, Mode, current output range, alarm logic output and thresholds, network settings, focus and LED, language and user name	
Sighting:	Integrated video with local display and remote image capture. Patented* pulsed Green LED focus pattern confirmation	
Focus Range:	300 mm / 11.8 to infinity, locally or remotely adjusted	Nominal target spot diameter 10mm at 300mm focus; 17mm at 500mm focus; 33mm at 1m focus. Twice nominal target area is recommended.
Repeatability:	±3 °C at 200 °C, ±1 °C at 300 °C and above (extrusion and quench), ± 5 °C (lubricated strip, forming/forging and liquid metal)	±3 °C at 150 °C, ±1 °C at 300 °C and above (extrusion and quench), ± 5 °C (lubricated strip, forming/forging)
Mounting:	Full range of mountings and accessories available	
Measurement Accuracy:	± 5 °C at 200 °C, ± 2 °C or 0.25 %K at 300 °C and above (extrusion and quench) ± 5 °C or ±0.5 %K (lubricated strip, forming/forging and liquid metal)	± 5 °C at 150 °C, ± 2 °C or 0.25 %K at 300 °C and above (extrusion and quench) ± 5 °C or ±0.5 %K (lubricated strip, forming/forging)
Resolution:	0.1 °C	
Noise:	5 °C at 200 °C, <0.5 °C at 300 °C and above	5 °C at 150 °C, <0.5 °C at 300 °C and above
Sealing:	IP65	
Response Time:	Adjustable 15 ms to 10 s	
Processing Functions:	Peak/Valley Picking, Averager, Modemaster, CMD In sampling or LED control, CMD Out alarms, emissivity output or actuator control	
Power Req.:	Power over Ethernet or 24 to 30 V DC at the instrument	
Software:	Live configuration and temperature display on any web browser. Freely downloadable SPOTViewer software with datalogging, live and historical data trending plus remote image capture; SPOTPro software available for use with multiple SPOT pyrometers	
Inputs:	4 - 20 mA Input, 24 V DC CMD In, Ethernet, (TCP-IP, Modbus TCP, DHCP, http, udp, ICMP)	
Outputs:	2x4 - 20 mA, CMD Out relay, Ethernet (TCP-IP, Modbus TCP, DHCP, http, udp, ICMP)	
Languages:	Integrated multiple language selections: English, German, French, Italian, Spanish, Portuguese (Brazilian), Japanese, Chinese (simplified Mandarin), Korean, Russian, Polish	
Ambient Temp. Range:	5 - 60 °C / 41 - 140 °F specified, 0-70 °C / 32 - 158 °F operating before cooling required	0 - 45 °C / 32 - 113 °F operating before cooling required
Warranty:	See our website at www.ametek-land.com for warranty details	

***Patent Number: GB2497609**

SPECIFICATIONS

	SPOT+ GS
Measurement Range:	200 -1000 °C / 392-1832 °F on highly reflective liquid / galvanised surfaces 125 to 1000 °C / 257 to 1832 °F on higher emissivity galvannealed surfaces (ε >0.5)
Field of View (90% of energy):	60:1
Detector Type:	Application specific selected range of narrow wavelength bands designed to optimise temperature accuracy for the measurement of gavannealed and galvanised strip
Display:	Local display with image streaming
Settings:	Configure locally using the pyrometer interface or remotely (using the web server or SPOTPro). Mode, current output range, alarm logic output and thresholds, network settings, focus and LED, language and user name
Sighting:	Integrated video with local display and remote image capture. Patented pulsed Green LED focus pattern confirmation
Focus Range:	300 mm / 11.8 in to infinity, locally or remotely adjusted
Repeatability:	±3 °C < 200 °C, ±2 °C or 0.25 % K at 300 °C and above
Measurement Accuracy:	± 5 °C < 200 °C, ± 2 °C or 0.25 % K at 300 °C and above
Resolution:	0.1 °C
Noise:	5 °C < 200 °C, 1.5 °C at 250 °C, <0.5 °C at 300 °C and above
Sealing:	IP65
Response Time:	Adjustable 15 ms to 10 s
Mounting:	Full range of mountings and accessories available
Interfaces:	0-20 mA DC or 4-20 mA DC, Digital or Analogue (0 or 4-20 mA) CMD In and CMD Out, Modbus TCP/IP, REST API, EtherNet/IP, web server
Processing Functions:	Peak/Valley Picking, Averager, Modemaster, CMD In sampling or LED control, CMD Out alarms, emissivity output or actuator control
Power Req.:	Power over Ethernet or 24 V DC
Software:	Live configuration and temperature display on any web browser. Optional SPOTPro software with datalogging, live and historical data trending plus remote image capture
Languages:	Integrated multiple language selections: English, German, French, Italian, Spanish, Portuguese (Brazilian), Japanese, Chinese (simplified Mandarin), Korean, Russian, Polish
Ambient Temp. Range:	5 - 60 °C / 41 - 140 °F specified, 0-70 °C / 32 - 158 °F operating before cooling required
Warranty:	See our website at www.ametek-land.com for warranty details

***Patent Number: GB2497609**

SPECIFICATIONS

	SPOT+ MM
Measurement Range:	600 to 1800 °C / 1112 to 3272 °F
Field of View (90% of energy):	200:1
Detector Type:	Application specific NIR wavelength designed to optimise temperature accuracy measurement of molten metals.
Display:	Local display with image streaming
Settings:	Configure locally using the thermometer interface or remotely (using the Webserver or SPOT Viewer). Emissivity, mode, current output range, alarm logic output and thresholds, network settings, focus and LED, language and user name
Sighting:	Integrated video with local display and remote image capture. Patented* pulsed Green LED focus pattern confirmation
Focus Range:	300 mm / 11.8 in to infinity, locally or remotely adjusted
Repeatability:	±5 °C
Measurement Accuracy:	±0.5 %K
Resolution:	0.1 °C
Noise:	5 °C
Sealing:	IP65
Response Time:	Adjustable 1 ms to 10 s
Mounting:	Full range of mountings and accessories available
Processing Functions:	Peak/Valley Picking, Averager, Modemaster, CMD In sampling or LED control, CMD Out alarms, emissivity output or actuator control
Power Req.:	Power over Ethernet or 24 V DC
Software:	Live configuration and temperature display on any web browser. Optional SPOT Viewer software with datalogging, live and historical data trending plus remote image capture; control of multiple instruments; SPOT Pro Software available for use with multiple SPOT pyrometers
Inputs:	24 V DC, CMD In, Ethernet, (TCP-IP, Modbus TCP, DHCP, http, udp, ICMP)
Outputs:	0 to 20 mA, 4 to 20 mA, CMD Out, Ethernet (TCP-IP, Modbus TCP, DHCP, http, udp, ICMP)
Languages:	Integrated multiple language selections: English, German, French, Italian, Spanish, Portuguese (Brazilian), Japanese, Chinese (simplified Mandarin), Korean, Russian, Polish
Ambient Temp. Range:	5 - 60 °C / 41 - 140 °F specified, 0-70 °C / 32 - 158 °F operating before cooling required
Warranty:	See our website at www.ametek-land.com for warranty details

***Patent Number: GB2497609**

SPECIFICATIONS

	SPOT+ TMT
Measurement Range:	300 to 1800 °C / 572 to 3272 °F
Field of View (90% of energy):	230:1
Detector Type:	3.9 µm Single Wavelength
Display:	Local display with image streaming
Settings:	Configure locally using the pyrometer interface or remotely (using the Web server or SpotPro or ImagePro. Emissivity, mode, current output range, alarm logic output and thresholds, network settings, focus and LED, language and user name (focus and LED on standard body only)
Sighting Image:	Integrated video with local display and remote image capture.
Focus Range:	300 mm / 11.8 in to infinity, locally or remotely adjusted
LED Targeting:	Patented* pulsed green LED focus pattern
Mounting:	Full range of mountings and accessories available - see Mountings and Accessories Brochure or visit our website
Measurement Accuracy:	±1 %K
Resolution:	0.1 °C
Noise:	0.5 °C
Sealing:	IP65
Response Time:	10 ms to 10 s
Analogue I/O:	Two 4-20 mA outputs, One 4-20 mA input, Contact closure input, Relay output
Communications:	EtherNet/IP, REST API, Modbus TCP/IP, web server
Processing Functions:	Peak/Valley Picking, Averager, Modemaster, CMD In sampling or LED control, CMD Out alarms, emissivity output or actuator control
Power Req.:	Power over Ethernet or 19 to 30 V DC at the instrument; 8 W max consumption
Software:	Live configuration and temperature display on any web browser. Optional SPOTPro or IMAGEPro software with datalogging, live and historical data trending, plus remote image capture, control of multiple instruments (image capture not available on fiber-optic versions)
Languages:	Integrated multiple language selections: English, German, French, Italian, Spanish, Portuguese (Brazilian), Japanese, Chinese (simplified Mandarin), Korean, Russian, Polish
Ambient Temp. Range:	5 - 60 °C / 41 - 140°F specified, 0 - 70°C / 32 - 158 °F operating before cooling required
Warranty:	See our website at www.ametek-land.com for warranty details

***Patent Number: GB2497609**

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