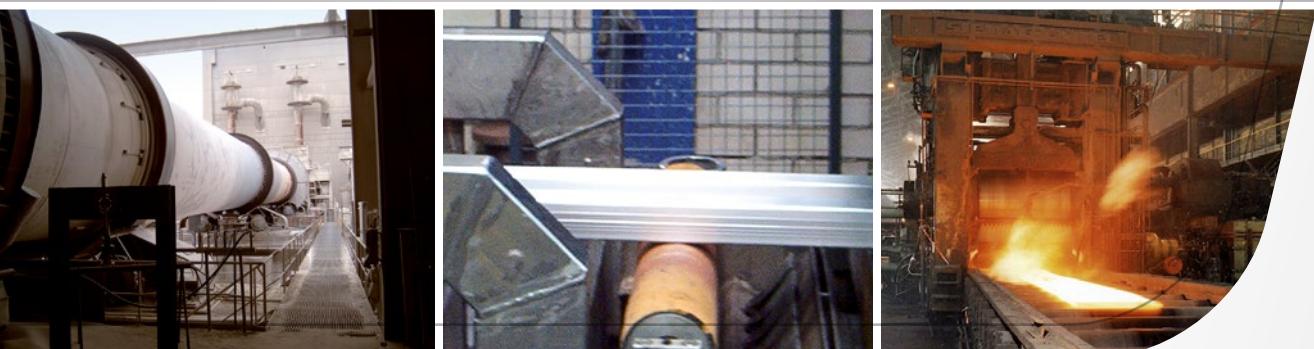




**NO1** in terms of  
ACCURACY  
RELIABILITY  
INNOVATION



# Pyrometer CellaTemp® PA

for non-contact temperature measurement  
from 0 °C to + 3500 °C

# Pyrometer CellTemp® PA

## Range of models



Single-colour pyrometer

Model	Temperature range	Application	Shot shape
PA 10	0 - 1000 °C	nonmetals	<input type="radio"/>
PA 13	500 - 1600 °C	flame heating	<input type="radio"/>
PA 15	300 - 1300 °C	glass surfaces	<input type="radio"/>
	500 - 2500 °C		<input type="radio"/>
PA 17	400 - 2000 °C	hot CO <sub>2</sub> containing gases	<input type="radio"/>
PA 18	500 - 2500 °C	hot CO containing gases	<input type="radio"/>
PA 20	250 - 2000 °C	metals, ceramics, molten glass	<input type="radio"/>
	350 - 2500 °C		<input type="radio"/>
PA 28	75 - 650 °C	aluminium; bright, shiny metal surfaces; laser applications	<input type="radio"/>
PA 29	150 - 800 °C	aluminium; bright, shiny metal surfaces; laser applications PVD coating process	<input type="radio"/>
	180 - 1200 °C		
	250 - 2000 °C		
	350 - 2500 °C		
PA 30	500 - 2500 °C	metals, ceramics, high temperatures	<input type="radio"/>
PA 35	600 - 3500 °C	precise measurement of metals, semiconductors	<input type="radio"/>
PA 38	450 - 1800 °C	coating and heat treatment of semiconductor wafers	<input type="radio"/>

Single-colour pyrometer

Model	Temperature range	Application
PA 21	300 - 2000 °C	metals, ceramics, molten glass
	450 - 2500 °C	
PA 31	550 - 2500 °C	metals, ceramics, high temperatures
	700 - 3000 °C	
PA 36	650 - 3000 °C	precise measurement of metals, semiconductors

Two-colour pyrometer

Model	Temperature range	Application	Shot shape
PA 40	500 - 1400 °C	metals, cement, lime, graphite, glass gobs, crystal pulling	<input type="radio"/>
	650 - 1700 °C		<input type="radio"/>
	750 - 2400 °C		<input type="radio"/>
	850 - 3000 °C		<input type="radio"/>
PA 43	600 - 1400 °C	wires, rods, heating coils, filaments	<input type="checkbox"/>
	650 - 1700 °C		<input type="checkbox"/>
	750 - 2400 °C		<input type="checkbox"/>
	850 - 3000 °C		<input type="checkbox"/>
PA 44	750 - 2400 °C	silicon, silicon carbide	<input type="radio"/>
	850 - 3000 °C		<input type="radio"/>
PA 45	900 - 3200 °C	Graphite production, Crystal growing	<input type="radio"/>
PA 47	700 - 1700 °C	sooty flames	<input type="radio"/>
PA 50	500 - 1400 °C	metals at low temperatures	<input type="radio"/>
PA 60	300 - 800 °C	metals at very low temperatures	<input type="radio"/>
	400 - 1000 °C		<input type="radio"/>
PA 64	500 - 1400 °C	CVD coating process	<input type="radio"/>

Two-colour pyrometer

Model	Temperature range	Application
PA 41	700 - 1800 °C	metals, cement, lime, graphite, glass gobs, crystal pulling
	800 - 2400 °C	
	900 - 3000 °C	
	1100 - 3000 °C	

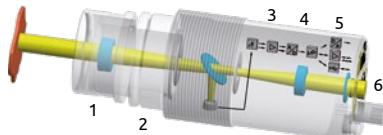
# Pyrometer CellTemp® PA

## Special Features

- Wide measuring ranges with high resolution
- Modular design: Electronics and optionally up to 5 optics
- Focusable optics
- 3 target sighting options: through-the-lens, colour video camera or laser spot light
- 2 analogue outputs, 2 switching outputs, inputs provide versatile configuration options

- Compact models and fibre optic models
- Two-colour and single-colour pyrometers
- Parameters adjustable via control keys
- USB and RS-485 bus interface
- SCM function for dirty window monitoring (two-color pyrometer)
- Option: ATD function (automatic temperature detection)

## CellTemp® PA Series



The CellTemp® PA Pyrometer Series is based on a modular concept consisting of the following components: optics, sensor and signal processing, data output and target sighting.

The **optical system** (1) comprises one of five available objective lenses. Select the one most suitable, depending on the required target size and measuring distance. The pyrometer is infinitely adjustable to ensure superior precision across a wide focusing range.

The **aperture** (2) determines the shape of the measurement area. As a standard, the pyrometer features a circular measurement spot. As an option, the two-colour pyrometer models can be equipped with a rectangular measurement area.

A **sensor** (3) detects the IR radiation emitted by an object's surface. It is based on the latest DC technology and does not involve any moving parts. Depending on the specific model, CellTemp® pyrometers are available either in a single-colour version (single wavelength detector) or in a two-colour version (dual wavelength detector).

Special **signal processing** (4) combined with high-resolution analogue-to-digital conversion enables a wide measuring span. The temperature resolution remains uniformly high across the entire measuring range.

For **measurement data output** (5), CellTemp® PA features 2 analogue outputs, a USB interface and a network compatible RS-485 interface as well as two switching outputs.

Three **target sighting** (6) systems are available to facilitate focusing, alignment and indication of spot size: through-the-lens sighting, laser spot light or an integrated video camera.

## Analogue outputs

CellTemp® PA features two analogue outputs which the user can custom configure. Two-colour pyrometers allow you to record the temperatures detected at each of the separate wavebands in addition to the ratio from these two signals (the two-colour temperature). Examining this data affords an analysis of the measured object's emissivity behaviour.



Analogue output 1 can be assigned to the current temperature reading, whereas output 2 can be programmed to perform another signal processing task such as maximum value, average value or to monitor the device's internal temperature.

## Analogue input

Alternatively, the second analogue output can be configured as a signal input. This enables remote emissivity adjustment during running operations, either via PLC or when used together with the material selection switch VK 30.01.

Another possible use: to feed in the temperature signal from the radiation emitted by another source (as measured by another sensor). CellTemp® PA can correct for the effect of this interfering radiation and thus produce readings of the true object temperature.

## Switching outputs

CellTemp® PA's two switching outputs provide a variety of configuration possibilities. They can be assigned to monitor a specific process temperature such as the device's internal temperature.

- The outputs function as a normally open or normally closed contacts
- This results in different application possibilities
- Monitor compliance with configured limit values
- Trigger a status indicator
- Synchronize data communication to the PLC

## Switching inputs

Both switching outputs can also be operated as switching inputs for:

- Control memory reset command
- Activate the laser spot light

## Data communication

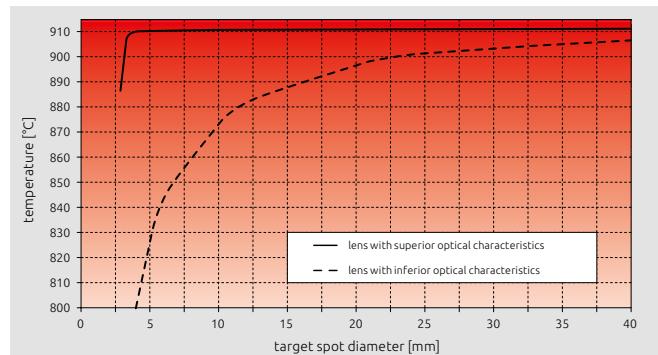
The CellTemp® PA features a USB interface and a network compatible RS-485 interface to enable remote pyrometer configuration. Beyond that, the RS-485 also provides network communication capabilities and permits long distance data transmission.

Because of its integrated software, the CellTemp® PA can communicate with all commonly used operating systems at any PC or terminal, regardless of language.

The shipment includes the multilingual software Cellaview for remote control, online display of the measurement curve, measurement analysis and storage of measured values.

## Optics

A pyrometer is an optical means of measuring temperature. The quality of the optics greatly influences the the accuracy of the measurement. The „size of source effect“ is a factor which affects the uncertainty of the measurement. Light scattered into the optical path will result in false temperature data. When the target size or the distance to the target change, as shown in the chart, the temperature reading will change as well, depending on the quality of the optical system.



Influence of the size of the measured object on the temperature display with good and bad error correction of the optics of the pyrometer

CellTemp® PA pyrometers feature an optical system which is optimized for the visible and infrared range. The superior glass lens features an antireflective coating. Due to its superior imaging properties, the high-precision lens provides consistently high optical resolution across the entire focusing range and a very small „size of source effect“.

In addition, the patented optics and apertures are mechanically designed to minimize sensitivity to light scattered into the sight path, so that the devices measure the same values even at different measuring distances.

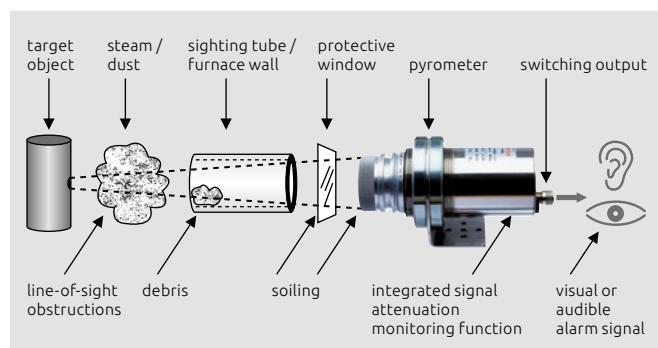
## Supplementary lenses



The CellTemp® PA can capture target spots as small as Ø 0.3 mm when an additional lens is mounted. The pyrometer models can be combined with supplementary lenses in a variety of ways, enabling additional optical resolutions for maximum versatility.

## Dirty window monitor

Two-colour pyrometers feature SCM (Smart Contamination Monitoring), a function which indicates when the pyrometer lens or the protective quartz window are dirty. The pyrometer identifies when the emitted IR energy does not completely reach the sensor due to obstructions in the line of sight or dirt buildup in the furnace port hole. The user can adjust the sensitivity of this function to a tolerated amount of signal attenuation.



Indication of field-of-view obstruction

## Sighting options for compact models



### Through-the-lens

The CellTemp® PA compact models can be supplied with through-the-lens, parallax-free sighting. The wide field of view makes it easy to focus on the target object. The ocular features a widened interpupillary distance, making it suitable for users who wear glasses or a helmet.



The circle in the viewfinder indicates the exact position and size of the measured target spot. If the target is especially bright, the polarizing filter PA 20/P can be mounted on the lens to protect the user's eye. For devices with a measuring range over 2000 °C, the filter is included as standard.



### Laser spot light

The third sighting option available for CellaTemp® PA is an integrated laser spot light. The laser dot marks the center of the target spot and is well visible even from a distance of up to 10 m. The laser is activated either directly by push-button or remote by means of an external switch or via interface.



### Video camera

As an option, the pyrometer can be equipped with a built-in colour video camera to view the target. Based on the latest HDR (High Dynamic Range) technology, the camera provides a higher dynamic range from the imaging process and automatic exposure control. The video image appears without over-exposure and glare.

Another special feature is TBC (target brightness control). The light sensitivity adapts dynamically to the target object captured within the measurement spot to produce a high-contrast image of the target, regardless of whether the object focused on is cooler or hotter than the background.

The white balance can be switched to either „automatic“ or „daylight“ mode. The video signal also transmits the measurement data. The temperature reading is superimposed onto the screen. A separate PC is not required. A video image allows you to observe possible changes in the microstructure of the measured object relative to temperature. Because the video recording captures the temperature data in conjunction with the visible surface behaviour, it enables in-depth data analysis and process optimisation.

The target marker shown on the screen indicates the exact size of the measuring field. With a resolution of 5.6 µm / pixel, even the tiniest target objects are visible. The video signal is electrically isolated from the supply voltage to prevent noise that may interfere with the image signal. The camera provides reliable performance and a sharp image in ambient temperatures up to 65 °C.



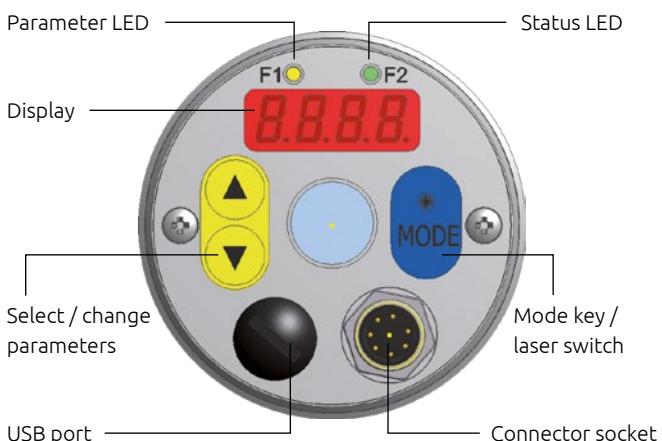
Thanks to the automatic exposure control and the TBC feature, the target always appears in optimum exposure. The temperature reading and the circled target spot are superimposed onto the image.



Without TBC, the light exposure would be averaged over the total illumination. A bright target object in front of a dark background would appear overexposed as shown above.

### Control keys

Parameters can be configured during running operations using the rear keypad. The large control keys are easy to access and operate. The brightly lit 8 mm digits on the LED display are visible from a great distance. Two status LEDs can be custom configured to indicate operating conditions.



### Adjustable parameters

- Temperature range
- Measured variable and scale of analog input and output signals
- Smoothing filter
- Min/max memory
- Hold time
- Emissivity
- Transmittance
- Background radiation correction
- Alarm contacts (mode and limits)
- ATD function parameters
- Linearization
- Function of LEDs
- Temperature scale °C / °F
- Simulation of current and temperature

#### In addition, for two-colour pyrometers

- One-colour/two-colour mode
- Signal attenuation threshold level
- Soot factor (at the CellaCombustion PA 47)

#### In addition, for model with camera

- TBC target brightness control
- White balance

### Shipment includes

- Pyrometer CellaTemp® PA
- Connection cable VK 02/A (5 m)\*
- Video cable VK 02/F (5 m)\* for model with built-in camera
- USB cable VK 11/D (1.8 m)
- CellaView software
- Instruction manual

**i** \* other lengths must be ordered separately

## ATD Function

ATD (Automatic Temperature Detection) is an optional feature especially useful for temperature control at discontinuous processes.

With ATD, objects moving across the pyrometer's field of view at undefined intervals are automatically detected. Examples include rolled steel slabs at a rolling mill stand or billets discharged from an induction heating system.

With ATD, CellTemp® PA automatically recognizes a hot object and starts measuring the temperature. The measuring cycle either adapts dynamically to the duration of the object in the sight path, or it can be custom configured by the user. At the end of each measurement, a temperature reading is generated for each object.

## Diagnostics feature

During setup and running operations, a test current or a temperature can be applied to perform diagnostic and simulation functions.

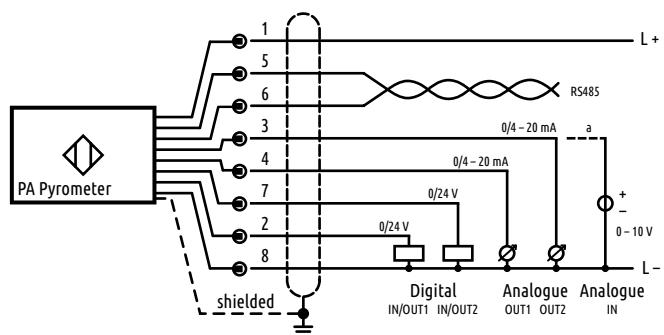
Without requiring a hot object in the field of view, it is possible to test the entire signal path to the transducer and to the control system.

## Calibration for tungsten

Due to the physical properties of tungsten, its emissivity changes as a function of its temperature.

For tungsten filament applications, the CellTemp® PA 40 can be calibrated with a special response curve for the behaviour of tungsten. This calibration option enables the pyrometer to correct for any temperature-induced emissivity changes.

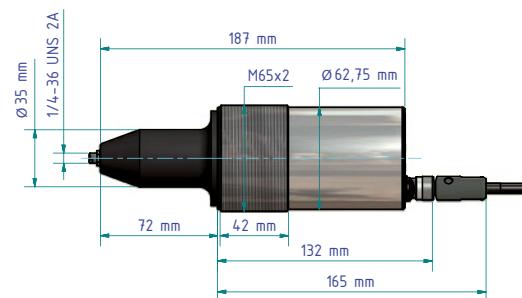
## Connection diagram



## EMV standard

- DIN EN IEC 61000-6-2:11/2019
- DIN EN IEC 61000-6-4:09/2020
- BS EN IEC 61000-6-2:2019
- BS EN IEC 61000-6-4:2019

## Dimensions



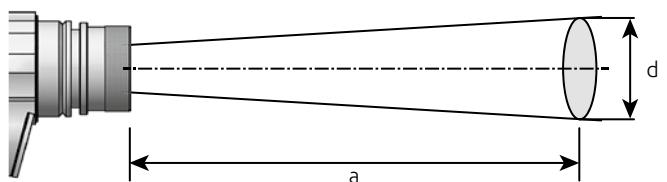
PA 41.01

PZ 41.18/PA 41.05

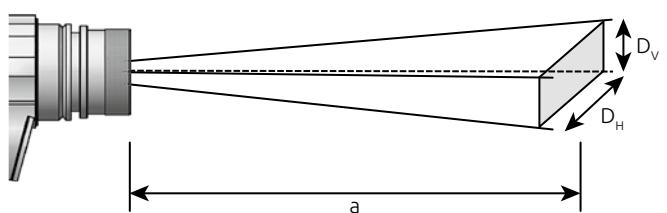
## Measuring area

For pyrometers with focusable optics, the optical ratio  $D$  is defined as ratio of the measurement field over the measuring distance. The diameter of the measurement area at the focus distance results from the formula:

$$d = \frac{a}{D}$$



For models with rectangular field of view, the definition is extended to the horizontal  $D_H$  and vertical  $D_V$  optical ratio.



## Technical data \*

Pyrometer		Permissible humidity	Protection
<b>2 Analogue outputs</b>	• 0(4) - 20 mA linear, scalable	• 95% r.H. max. (non-condensing)	• IP65 according to DIN 40050
<b>Load</b>			
• max. 500 Ω	<b>Resolution current output</b>	<b>Ambient temperature</b>	<b>Connectivity</b>
	• 0.2 K + 0.03% of selected range	• 0 - 65 °C (without cooling)	• M12 thread, 8-pin connection
<b>Voltage input</b>		<b>Storage temperature</b>	
• 0 - 10 V linear, scalable	<b>Resolution</b>	• -20 - +80 °C	<b>Weight</b>
<b>2 Switching outputs</b>	<b>temperature reading</b>		• approx. 0.9 kg
• Open Collector 24 V, ≤ 30 mA	• 1 K	<b>Housing material</b>	
<b>2 Switching inputs</b>	<b>Resolution USB / RS 485</b>	• Stainless steel	
• to 24 V	• 0.1 K in terminal mode		
<b>Data communication</b>	<b>Operating voltage</b>		
• USB	• 24 V DC +10% / -20%	<b>Camera specifications</b>	
• RS 485	<b>Current consumption</b>	<b>Video signal</b>	<b>TBC exposure control</b>
Integrated user interface	• ≤ 135 mA	• Composite PAL, 1Vpp, 75 Ohm	• Automatic, across the pyrometer's entire measuring range
<b>LED Display</b>	• ≤ 150 mA with laser sighting	<b>Resolution</b>	<b>Connectivity</b>
• 4-digit (digit height 8 mm)	• ≤ 175 mA with video camera	• 722 x 576 pixels	• TNC connector
	• Ripple ≤ 200 mV	<b>Screen display</b>	
		• Target size and position	
		• Temperature reading	

\* Specifications of the technical data according to DIN IEC TS 62492-1 and DIN IEC TS 62492-2

Calibration of the pyrometers according to VDI / VDE 3511 sheet 4.4

## Software Cellaview

The Cellaview software is included in the scope of delivery. It is a Microsoft SQL server-based database software running under Windows designed for real-time graphic display, analysis and storage of the measurement readings. Monitoring, remote control and configuration of the pyrometer are additional features of this software. The modern MDI-based user interface makes it possible to open multiple graphs at the same time. The series of measurements of up to 31 instruments can be recorded simultaneously.

- Windows-based multiple-document interface (MDI)
- Microsoft SQL Server Compact-based database
- Graphic display, recording and logging of measurement data
- Free selection and combination of the measurement readings and status information of up to 31 devices in one or more diagrams
- Simultaneous start of any number of diagrams to record series of measurements in parallel
- Configuration of the cycle duration for data logging and independent archiving
- Parameter setting, calibration and remote control of the pyrometers
- Saving, loading and transferring of configuration profiles of the devices
- Filtering function to reduce data volume
- Automatic device search
- Permanent connection monitoring
- Automatic archiving of the series of measurements
- Tamper-proof storage of the series of measurements

- Optional data storage in CSV or Excel format
- Zoom, scroll and analysis functions
- Cursor to display the temperature and the time on the measurement curve
- Very fast data recording (milliseconds)
- Logging of user entries in a log file to check for configuration changes
- Download and software update via Internet
- No license restriction
- Runs under Windows XP, Vista, 7, 8, 10
- 9 languages selectable



## Single-colour pyrometer

Model			Technical data													
Target sighting			Temp. range	Wave-length	Lens system	Focus range	Distance ratio	Response time $t_{98}$	Precision*	Reproducibility						
Through-the-lens	Video camera	Laser spot light	0 - 1000 °C 32 - 1832 °F	8 - 14 µm	PZ 10.01	0.30 m - $\infty$	50 : 1	≤ 30 ms	1% of reading, min. 2 K based on 30 ms	1 K						
PA 10 ...	For non-metal materials, such as ceramics, wood, rubber, synthetic materials, textiles, paper															
AF 1	AF 1/C	AF 1/L			PZ 10.05	0.15 m - 0.30 m	48 : 1									
AF 2	AF 2/C	AF 2/L	PA 20 ... For metallic surfaces, ceramics, liquid glass at medium temperature range  250 - 2000 °C 482 - 3632 °F  350 - 2500 °C 662 - 4532 °F	1.1 - 1.7 µm	PZ 20.01	0.40 m - $\infty$	175 : 1	≤ 50 ms (T>250 °C)	0.3% of reading, min. 4 K	1 K						
AF 1	AF 1/C	AF 1/L			PZ 20.03	0.20 m - 0.40 m	150 : 1									
AF 2	AF 2/C	AF 2/L			PZ 20.06	1.20 m - $\infty$	275 : 1									
AF 3	AF 3/C	AF 3/L			PZ 20.05	0.20 m - $\infty$	40 : 1									
AF 4	AF 4/C	AF 4/L			PA 20.06	0.60 m - $\infty$	380 : 1									
AF 9	AF 9/C	AF 9/L			PZ 20.01	0.40 m - $\infty$	175 : 1	≤ 50 ms (T>350 °C)	0.3% of reading, min. 4 K	1 K						
AF 5	AF 5/C	AF 5/L			PZ 20.03	0.20 m - 0.40 m	150 : 1									
AF 6	AF 6/C	AF 6/L			PZ 20.06	1.20 m - $\infty$	275 : 1									
AF 7	AF 7/C	AF 7/L			PZ 20.05	0.20 m - $\infty$	40 : 1									
AF 8	AF 8/C	AF 8/L			PZ 20.01	0.40 m - $\infty$	175 : 1	≤ 50 ms (T>900 °C)	0.3% of reading, min. 4 K	1 K						
PA 30 ...	For metallic surfaces, ceramics, liquid glass at high temperature range															
AF 1	AF 1/C	AF 1/L		500 - 2500 °C 932 - 4532 °F	0.78 - 1.06 µm	PZ 20.01	0.40 m - $\infty$	210 : 1								
AF 2	AF 2/C	AF 2/L				PZ 20.03	0.20 m - 0.40 m	200 : 1								
AF 3	AF 3/C	AF 3/L				PZ 20.06	1.20 m - $\infty$	310 : 1								
AF 4	AF 4/C	AF 4/L				PZ 20.05	0.20 m - $\infty$	55 : 1								
AF 5	AF 5/C	AF 5/L				PA 20.06	0.60 m - $\infty$	430 : 1								

\*(at  $\epsilon = 1$  and  $T_a = +23 °C$ )

## Pyrometers for special applications

### CellaTemp® PA 13

The CellaTemp® PA 13 was especially developed for temperature measurements in flame heated furnaces. Thanks to the selective spectral range of 3.9 µm, water vapour and  $CO_2$  existing in the pyrometer's field of vision have no effect on the measuring results, even when measuring from large distances. This allows precise measurements through flames and combustion gases.

### CellaTemp® PA 15

In the range of 4.6-4.9 µm glass has an emissivity of almost 100%. Above 5 µm, atmospheric influences, such as humidity or water vapour, affect the measurement. The CellaTemp® PA 15 is provided with a blocking filter with a spectral sensitivity of 4.6-4.9 µm, thus measuring the temperature from the near surface area of the glass. Owing to the wavelength used, changes in thickness, different types of glass or varying moisture contents in the atmosphere do not affect the measurement reading.

### CellaCombustion PA 17

The CellaCombustion PA 17 uses a specific wavelength, in which hot carbonaceous gases have a high optical density and therefore good radiation properties. The pyrometers are used to measure the exhaust gas temperature in gas-fired boilers and small combustion plants.

### CellaCombustion PA 18

The CellaCombustion PA 18 uses a specific wavelength, in which the chemical components of the hot combustion gas have a high optical density. The devices are used in large combustion plants such as thermal waste-disposal plants and coal power plants.

### CellaTemp® PA 28

The CellaTemp® PA 28 is equipped with a light-intense lens and a special sensor for the reliable low temperature measuring of metals.

### CellaTemp® PA 29

CellaTemp® PA 29 was designed with a special band-stop filter and sensor which ignore interfering IR radiation from sources such as daylight or laser beams. CellaTemp® PA 29 features a response spectrum which is far less sensitive to incidental light reflections from nearby hot objects than most commonly available pyrometers which are responsive at short wavelengths. In combination with supplementary lenses the CellTemp® PA 29 can capture target spots as small as Ø 0.3 mm. It is suitable for measuring reflective metals and aluminium at low temperatures. In addition, the CellTemp® PA 29 is used in PVD (physical vapour deposition) coating processes or in processes in which diode, Nd:YAG or  $CO_2$  lasers are used for heating.

## CellaTemp® PA 35

The Cellatemp PA 35 features a narrow-band, short wavelength spectral response to minimize the effect of interferences which lead to measurement errors. Detectors which respond to narrow wavebands at short wavelengths are far less susceptible to dust, steam, smoke or a dirty lens. Metal surfaces, for example, exhibit higher emissivity at shorter wave-lengths and at higher temperatures. Due to the special wavelength, it is especially suitable for temperature detection of metals and high-temperature applications or thin semiconductors.

## CellaWafer PA 38

The Cellawafer PA 38 is used for temperature measurement during the coating and heat treatment of semiconductor wafers. Due to its short-wave and narrow-band measuring wavelength, the device is used for measurements in MOCVD and RTP processes.

## CellaCrystal PA 44

The Cella Crystal PA 44 has been developed for optical temperature measurement in the production of Si and SiC crystals. The calibration is especially adapted to the growth process. Because of the hybrid signal evaluation with a constantly high resolution of < 0.1 K over the entire measuring range and the very high long-term stability of the uniform light sensor technology, the instruments meet the high demands on the required measuring accuracy.

## CellaCrystal PA 45

The Cellacystal PA 45 two-colour pyrometer is characterised by a very wide measuring range of 900 - 3200 °C. Thanks to hybrid signal processing, it has a consistently high signal resolution and extremely high long-term stability over the entire measuring range. This makes it ideal for carbonising, graphitising and crystal growing.

## CellaCombustion PA 47

The Cellacombustion PA 47 is a special pyrometer for non-contact temperature measurement of sooty flames in coal power plants or waste incineration plants. The measurement and signal processing based on the two-colour method detects the heat radiation of the sooty particles of the flame in the near infrared range at two wavelengths. The burn-out operation can be controlled by the flame temperature to reduce the pollutant emission and to minimize the slagging of the walls in the combustion chamber.

## CellaCrystal PA 64

The Cellacystal PA 64 is used for temperature measurement in CVD (chemical vapour deposition) coating processes. Due to the special wavelength, the pyrometer can also be used for plasma-assisted vapour deposition.

## Pyrometers for special applications

Model			Technical data								
Target sighting			Temp. range	Wave-length	Lens system	Focus range	Dis-tance ratio	Response time $t_{98}$	Precision*	Repro-duc-ability	
Through-the-lens	Video camera	Laser spot light									
PA 13 ...	For measurements in combustion plants and flame-heated furnaces										
AF 1	AF 1/C	AF 1/L	500 - 1600 °C 932 - 2912 °F	3.9 µm	PZ 15.03	0.80 m - ∞	45 : 1	≤ 100 ms	1% of reading	2 K	
PA 15 ...	For glass surfaces										
AF 1	AF 1/C	AF 1/L	500 - 2500 °C 932 - 4532 °F	4.6 - 4.9 µm	PZ 15.03	0.80 m - ∞	70 : 1	≤ 100 ms	0.75% of reading	2 K	
AF 2	AF 2/C	AF 2/L	300 - 1300 °C 572 - 2372 °F		PZ 15.03	0.80 m - ∞	45 : 1		0.75% of reading, min. 3 K		
PA 17 ...	For measurements in environments with hot, CO <sub>2</sub> -containing gases (e.g. in gas-fired boilers and small combustion plants)										
AF 1	AF 1/C	-	400 - 2000 °C 752 - 3632 °F	CO <sub>2</sub> range	PZ 15.03	0.80 m - ∞	75 : 1	≤ 100 ms	0.75% of reading + 1 K	2 K	
PA 18 ...	For measurements in environments with hot, CO-containing gases (e.g. in thermal waste-disposal plants and coal power plants)										
AF 1	AF 1/C	-	500 - 2500 °C 932 - 4532 °F	CO range	PZ 15.03	0.80 m - ∞	70 : 1	≤ 100 ms	0.75% of reading	2 K	
PA 28 ...	For measurements of aluminium, polished metal surfaces and laser applications										
AF 10	AF 10/C	AF 10/L	75 - 650 °C 167 - 1202 °F	1.8 - 2.4 µm	PZ 20.08	0.30 m - ∞	48 : 1	≤ 200 ms (T>75 °C) ≤ 50 ms (T>100 °C) ≤ 15 ms (T>125 °C) ≤ 2 ms (T>200 °C)	0.75% of reading, min. 3 K	1 K	

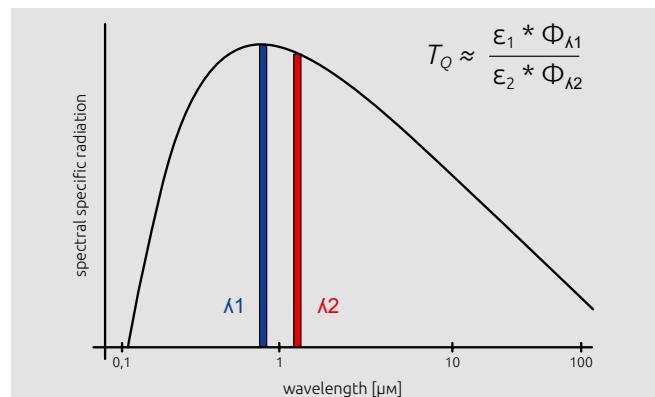
Pyrometers for special applications

Model			Technical data									
Target sighting			Temp. range	Wavelength	Lens system	Focus range	Distance ratio	Response time $t_{98}$	Precision*	Reproducibility		
Through-the-lens	Video camera	Laser spot light										
PA 29 ... For measurements of aluminium, polished metal surfaces, at laser applications and in PVD coating processes												
AF 10	AF 10/C	AF 10/L	150 - 800 °C 302 - 1472 °F	1.8 - 2.2 $\mu\text{m}$	PZ 20.08	0.30 m - $\infty$	48 : 1	$\leq 50$ ms (T>150 °C) $\leq 15$ ms (T>200 °C) $\leq 2$ ms (T>350 °C)	0.75% of reading, min. 5 K	1 K		
AF 21	AF 21/C	AF 21/L	180 - 1200 °C 356 - 2192 °F		PZ 20.01	0.40 m - $\infty$	60 : 1	$\leq 75$ ms (T>180 °C) $\leq 35$ ms (T>200 °C) $\leq 5$ ms (T>300 °C) $\leq 2$ ms (T>600 °C)				
AF 22	AF 22/C	AF 22/L			PZ 20.03	0.20 m - 0.40 m	56 : 1					
AF 23	AF 23/C	AF 23/L			PZ 20.06	1.20 m - $\infty$	96 : 1					
AF 1	AF 1/C	AF 1/L	250 - 2000 °C 482 - 3632 °F		PZ 20.01	0.40 m - $\infty$	210 : 1	$\leq 50$ ms (T>250 °C) $\leq 2$ ms (T>750 °C)	0.5% of reading, min. 4 K			
AF 2	AF 2/C	AF 2/L			PZ 20.03	0.20 m - 0.40 m	200 : 1					
AF 3	AF 3/C	AF 3/L			PZ 20.06	1.20 m - $\infty$	310 : 1					
AF 4	AF 4/C	AF 4/L			PZ 20.05	0.20 m - $\infty$	55 : 1					
AF 5	AF 5/C	AF 5/L			PZ 20.01	0.40 m - $\infty$	210 : 1	$\leq 50$ ms (T>350 °C)				
AF 6	AF 6/C	AF 6/L	350 - 2500 °C 662 - 4532 °F		PZ 20.03	0.20 m - 0.40 m	200 : 1	$\leq 2$ ms (T>900 °C)				
PA 35 ... For the precise measurement of metals, very high temperatures and semiconductors												
AF 11	AF 11/C	AF 11/L	600 - 3500 °C 1112 - 6332 °F	0.82 - 0.93 $\mu\text{m}$	PZ 20.01	0.40 m - $\infty$	210 : 1	$\leq 50$ ms (T>650 °C) $\leq 2$ ms (T>850 °C)	0.3% of reading, min. 4 K	1 K		
AF 12	AF 12/C	AF 12/L			PZ 20.03	0.20 m - 0.40 m	200 : 1					
AF 13	AF 13/C	AF 13/L			PZ 20.06	1.20 m - $\infty$	310 : 1					
AF 14	AF 14/C	AF 14/L			PZ 20.05	0.20 m - $\infty$	55 : 1					
AF 15	AF 15/C	AF 15/L			PA 20.06	0.60 m - $\infty$	430 : 1					
PA 38 ... For measurement during the coating and heat treatment of semiconductor wafers												
AF 10	AF 10/C	AF 10/L	450 - 1800 °C 842 - 3272 °F	0.88 $\mu\text{m}$	PZ 20.08	0.30 m - $\infty$	60 : 1	$\leq 50$ ms (T>500 °C) $\leq 2$ ms (T>650 °C)	0.3% of reading, min. 4 K	1 K		
PA 44 ... For the precise measurement of Si and SiC crystals												
AF 4	AF 4/C	AF 4/L	750 - 2400 °C 1382 - 4352 °F	0.95 / 1.05 $\mu\text{m}$	PZ 20.01	0.40 m - $\infty$	150 : 1	$\leq 10$ ms (T>950 °C)	6K (< 850°C) 0.35% + 2K (850..1500°C) 0.5% + 2K <td data-kind="parent" data-rs="3">2 K</td>	2 K		
AF 5	AF 5/C	AF 5/L			PZ 20.03	0.20 m - 0.40 m	140 : 1					
AF 7	AF 7/C	AF 7/L			PZ 20.01	0.40 m - $\infty$	150 : 1	$\leq 10$ ms (T>1050 °C)	0.35% + 2K 0.5% + 2K (1500..2400°C) 1.0% <td data-kind="ghost"></td>			
PA 45 ... for measurement in graphite production and crystal growth												
AF 1	AF 1/C	AF 1/L	900 - 3200 °C 1652 - 5792 °F	0.9 / 1.05 $\mu\text{m}$	PZ 20.01	0.40 m - $\infty$	210 : 1	$\leq 10$ ms	0.35% + 2K 0.5% + 2K (1500..2400°C) 1.0% <td data-kind="parent" data-rs="2">2 K</td>	2 K		
AF 2	AF 2/C	AF 2/L			PZ 20.03	0.20 m - 0.40 m	200 : 1					
PA 47 ... For the measurement of sooty flames (e.g. in power plants or incineration plants)												
AF 1	AF 1/C	-	700 - 1700 °C 1292 - 3092 °F	0.9 / 1.05 $\mu\text{m}$	PZ 20.01	0.40 m - $\infty$	80 : 1	$\leq 20$ ms (T>650 °C) $\leq 10$ ms (T>750 °C)	1% of reading	2 K		
PA 64 ... For the measurement in CVD coating processes												
AF 2	AF 2/C	AF 2/L	500 - 1400 °C 932 - 2552 °F	1.5 / 1.9 $\mu\text{m}$	PZ 20.03	0.20 m - 0.40 m	75 : 1	$\leq 30$ ms	0.75% of reading, min. 4 K	2 K		

\*(at  $\epsilon = 1$  and  $T_a = +23$  °C)

## Compact two-colour pyrometer

The two-colour pyrometer detects the infrared radiation emitted from an object's surface at two separate wavelengths. The dual sandwich detector uses a two-element photo-diode to capture both radiation intensities simultaneously from the exact same spot. The pyrometer produces temperature data based on the ratio of these two intensities. The advantage of the two-colour or dual wavelength technique is that the pyrometer will still produce highly accurate temperature data, even at signal attenuation of up to 90%. The two-colour or ratio pyrometer is far less sensitive to contaminants in the line of sight such as steam, dust or smoke than a standard single-colour pyrometer. Even if other sources impair the visibility such as dirt on the pyrometer lens or sediment and debris buildup within the sight tube, it has up to a certain degree no influence on the measurement value. When the signal is equally attenuated at both wavelengths, this will have no impact on the accuracy of the temperature reading. The two-colour method enables the pyrometer to correct for measurement errors which would otherwise occur when a material's emissivity varies as a function of temperature or surface properties, or when the pyrometer

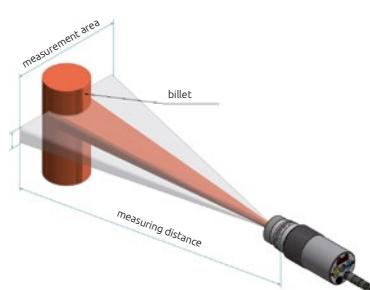


is used at a production line which produces a variety of products having different emissivities.

Model			Technical data										
Target sighting	Temp. range	Wave-length	Lens system	Focus range	Distance ratio	Response time $t_{98}$	Precision*	Reproducibility					
Through-the-lens	Video camera	Laser spot light											
PA 40 ...	For use in these industries: steel, ceramics or cement in harsh environments												
AF 20	AF 20/C	AF 20/L	500 - 1400 °C 932 - 2552 °F	0.95 / 1.05 μm	PZ 20.08	0.30 m - ∞	55 : 1	≤ 10 ms (T > 650 °C)	1% of reading	2 K			
AF 1	AF 1/C	AF 1/L	650 - 1700 °C 1202 - 3092 °F		PZ 20.01	0.40 m - ∞	80 : 1	≤ 20 ms (T > 650 °C)					
AF 2	AF 2/C	AF 2/L			PZ 20.03	0.20 m - 0.40 m	75 : 1						
AF 3	AF 3/C	AF 3/L			PZ 20.06	1.20 m - ∞	120 : 1						
AF 10	AF 10/C	AF 10/L			PZ 20.05	0.20 m - ∞	20 : 1						
AF 13	AF 13/C	AF 13/L			PZ 20.08	0.30 m - ∞	55 : 1						
AF 21	AF 21/C	AF 21/L			PA 20.06	0.60 m - ∞	190 : 1						
AF 4	AF 4/C	AF 4/L	750 - 2400 °C 1382 - 4532 °F		PZ 20.01	0.40 m - ∞	150 : 1	≤ 10 ms (T > 950 °C)					
AF 5	AF 5/C	AF 5/L			PZ 20.03	0.20 m - 0.40 m	140 : 1						
AF 6	AF 6/C	AF 6/L			PZ 20.06	1.20 m - ∞	240 : 1						
AF 11	AF 11/C	AF 11/L			PZ 20.05	0.20 m - ∞	35 : 1						
AF 14	AF 14/C	AF 14/L			PZ 20.08	0.30 m - ∞	100 : 1						
AF 22	AF 22/C	AF 22/L			PA 20.06	0.60 m - ∞	370 : 1						
AF 7	AF 7/C	AF 7/L			PZ 20.01	0.40 m - ∞	150 : 1						
AF 8	AF 8/C	AF 8/L	850 - 3000 °C 1562 - 5432 °F	0.95 / 1.55 μm	PZ 20.03	0.20 m - 0.40 m	140 : 1	≤ 10 ms (T > 1050 °C)					
AF 9	AF 9/C	AF 9/L			PZ 20.06	1.20 m - ∞	240 : 1						
AF 12	AF 12/C	AF 12/L			PZ 20.05	0.20 m - ∞	35 : 1						
AF 15	AF 15/C	AF 15/L			PZ 20.08	0.30 m - ∞	100 : 1						
AF 18	AF 18/C	AF 18/L			PA 40.01	86 mm - 115 mm	250 : 1						
AF 23	AF 23/C	AF 23/L			PA 20.06	0.60 m - ∞	370 : 1						
PA 50 ...	For measurements of materials with varying emissivity												
AF 1	AF 1/C	AF 1/L	500 - 1400 °C 932 - 2552 °F	0.95 / 1.55 μm	PZ 20.01	0.40 m - ∞	80 : 1	≤ 30 ms	1% of reading	2 K			
AF 2	AF 2/C	AF 2/L			PZ 20.03	0.20 m - 0.40 m	75 : 1						
AF 3	AF 3/C	AF 3/L			PZ 20.06	1.20 m - ∞	120 : 1						
AF 4	AF 4/C	AF 4/L			PZ 20.05	0.20 m - ∞	20 : 1						
PA 60 ...	For measurements at low temperatures from 300 °C												
AF 1	AF 1/C	AF 1/L	300 - 800 °C 572 - 1472 °F	1.5 / 1.9 μm	PZ 20.08	0.30 m - ∞	39 : 1	≤ 30 ms	1% of reading	2 K			
AF 11	AF 11/C	AF 11/L	400 - 1000 °C 752 - 1832 °F		PZ 20.01	0.40 m - ∞	80 : 1						

\*(at  $\epsilon = 1$  and  $T_a = +23 °C$ )

## Panorama pyrometer® with rectangular measurement area



The CellTemp® PA 43, a panorama pyrometer®, features a rectangular measurement area. The unique design enables the pyrometer to detect the temperature of target objects which move within the rectangular area. This is accomplished without requiring any moving parts.

The CellTemp® PA 43 reliably captures objects which typically show fluctuating behaviour (such as swaying wires). The rectangular area is also ideal when measuring objects whose position tends to vary during the production process. Such objects include billets or metal rods at a roller table.

A rectangular measurement field simplifies pyrometer alignment and focusing in applications which involve small measurement objects. The pyrometer models can be combined with supplementary lenses for very small targets such as filaments.

Model			Technical data									
Target sighting			Temp. range	Wave-length	Lens system	Focus range	Distance ratio	Response time $t_{98}$	Precision*	Reproducibility		
Through-the-lens	Video camera	Laser spot light										
PA 43 ... For use in these industries: steel, ceramics, or cement in harsh environments												
AF 20	AF 20/C	AF 20/L	600 - 1400 °C 1112 - 2552 °F	650 - 1700 °C 1202 - 3092 °F	PZ 20.08	0.30 m - $\infty$	$D_v = 150 : 1$ $D_h = 30 : 1$	$\leq 10 \text{ ms}$ ( $T > 650 \text{ °C}$ )	1.5% of reading	3 K		
AF 1	AF 1/C	AF 1/L			PZ 20.01	0.40 m - $\infty$	$D_v = 230 : 1$ $D_h = 45 : 1$					
AF 2	AF 2/C	AF 2/L			PZ 20.03	0.20 m - 0.40 m	$D_v = 215 : 1$ $D_h = 40 : 1$					
AF 3	AF 3/C	AF 3/L			PZ 20.06	1.20 m - $\infty$	$D_v = 375 : 1$ $D_h = 75 : 1$					
AF 10	AF 10/C	AF 10/L			PZ 20.05	0.20 m - $\infty$	$D_v = 55 : 1$ $D_h = 10 : 1$					
AF 13	AF 13/C	AF 13/L			PZ 20.08	0.30 m - $\infty$	$D_v = 150 : 1$ $D_h = 30 : 1$					
AF 21	AF 21/C	AF 21/L			PA 20.06	0.60 m - $\infty$	$D_v = 500 : 1$ $D_h = 95 : 1$					
AF 4	AF 4/C	AF 4/L	750 - 2400 °C 1382 - 4532 °F	0.95 / 1.05 $\mu\text{m}$	PZ 20.01	0.40 m - $\infty$	$D_v = 350 : 1$ $D_h = 50 : 1$	$\leq 10 \text{ ms}$ ( $T > 950 \text{ °C}$ )				
AF 5	AF 5/C	AF 5/L			PZ 20.03	0.20 m - 0.40 m	$D_v = 330 : 1$ $D_h = 45 : 1$					
AF 6	AF 6/C	AF 6/L			PZ 20.06	1.20 m - $\infty$	$D_v = 580 : 1$ $D_h = 85 : 1$					
AF 11	AF 11/C	AF 11/L			PZ 20.05	0.20 m - $\infty$	$D_v = 85 : 1$ $D_h = 11 : 1$					
AF 14	AF 14/C	AF 14/L			PZ 20.08	0.30 m - $\infty$	$D_v = 230 : 1$ $D_h = 34 : 1$					
AF 17	AF 17/C	AF 17/L			PA 40.01	86 mm - 115 mm	$D_v = 380 : 1$ $D_h = 80 : 1$					
AF 22	AF 22/C	AF 22/L			PA 20.06	0.60 m - $\infty$	$D_v = 730 : 1$ $D_h = 105 : 1$					
AF 7	AF 7/C	AF 7/L	850 - 3000 °C 1562 - 5432 °F	0.95 / 1.05 $\mu\text{m}$	PZ 20.01	0.40 m - $\infty$	$D_v = 350 : 1$ $D_h = 50 : 1$	$\leq 10 \text{ ms}$ ( $T > 1050 \text{ °C}$ )				
AF 8	AF 8/C	AF 8/L			PZ 20.03	0.20 m - 0.40 m	$D_v = 330 : 1$ $D_h = 45 : 1$					
AF 9	AF 9/C	AF 9/L			PZ 20.06	1.20 m - $\infty$	$D_v = 580 : 1$ $D_h = 85 : 1$					
AF 12	AF 12/C	AF 12/L			PZ 20.05	0.20 m - $\infty$	$D_v = 85 : 1$ $D_h = 11 : 1$					
AF 15	AF 15/C	AF 15/L			PZ 20.08	0.30 m - $\infty$	$D_v = 230 : 1$ $D_h = 34 : 1$					
AF 18	AF 18/C	AF 18/L			PA 40.01	86 mm - 115 mm	$D_v = 380 : 1$ $D_h = 80 : 1$					
AF 23	AF 23/C	AF 23/L			PA 20.06	0.60 m - $\infty$	$D_v = 730 : 1$ $D_h = 105 : 1$					

\*(at  $\epsilon = 1$  and  $T_a = +23 \text{ °C}$ )

## Single-colour / two-colour fibre optics pyrometer



A pyrometer with fibre optics has the sensor head housed separately from the electronics assembly. A fibre optic cable transmits the detected infrared energy to the electronics. The optical sensor head can withstand ambient temperatures up to 250 °C without cooling. Both the sensor head and the fibre optic cable are unsusceptible to electromagnetic radiation. Pyrometers with fibre optics are ideal for cramped, hard-to-access locations. Three different focusable optical heads are available. Select the one most suitable, depending on the required target size and measuring distance.

to 250 °C without cooling. Both the sensor head and the fibre optic cable are unsusceptible to electromagnetic radiation. Pyrometers with fibre optics are ideal for cramped, hard-to-access locations. Three different focusable optical heads are available. Select the one most suitable, depending on the required target size and measuring distance.

For target sighting and focussing, the pyrometer features a built-in laser spot light. Laser sighting can be activated either by remote switch, using the control keys on the instrument, or via interface.

The optical fibre can be supplied at a length of up to 50 m, ensuring that the electronics can be installed at a safe distance. The fibre optic cable is equipped with a screw connector at each end to ease installation and detachment. Metallic armouring provides the optical fibre with a high degree of mechanical protection.



PA 41.../V devices with two optical fibers and vacuum feedthrough

Model	Technical data								
Type	Temp. range	Wave-length	Lens system	Focus range	Distance ratio	Method	Response time $t_{98}$	Precision*	Reproducibility
PA 21 ...	For metallic surfaces, ceramics, liquid glass at medium temperature range								
AF 11	300 - 2000 °C 572 - 3632 °F	1.1 - 1.7 µm	PA 41.01	0.20 m - ∞	180 : 1	single-colour	≤ 50 ms (T>300 °C)	0.75% of reading, min. 4 K	2 K
AF 21			PZ 41.05	0.12 m - ∞	100 : 1		≤ 2 ms (T>800 °C)		
AF 22			PZ 41.18	33 mm - 45 mm	50 : 1		≤ 50 ms (T>450 °C)		
AF 901			PA 41.02	0.50 m - ∞	320 : 1		≤ 2 ms (T>900 °C)		
PA 31 ...	For metallic surfaces, ceramics, liquid glass at high temperature range								
AF 11	550 - 2500 °C 1022 - 4532 °F	0.78 - 1.06 µm	PA 41.01	0.20 m - ∞	190 : 1	single-colour	≤ 50 ms (T>600 °C)	0.75% of reading	2 K
AF 21			PZ 41.05	0.12 m - ∞	100 : 1		≤ 2 ms (T>800 °C)		
AF 22			PZ 41.18	33 mm - 45 mm	50 : 1		≤ 50 ms (T>750 °C)		
AF 901			PA 41.02	0.50 m - ∞	340 : 1		≤ 2 ms (T>950 °C)		
PA 36 ...	For the precise measurement of metals, very high temperatures and semiconductors								
AF 11	650 - 3000 °C 1202 - 5432 °F	0.82 - 0.93 µm	PA 41.01	0.20 m - ∞	190 : 1	single-colour	≤ 50 ms (T>680 °C)	0.75% of reading	2 K
AF 21			PZ 41.05	0.12 m - ∞	100 : 1		≤ 2 ms (T>900 °C)		
AF 22			PZ 41.18	33 mm - 45 mm	50 : 1		≤ 2 ms (T>900 °C)		
PA 41 ...	For use in these industries: steel, ceramics or cement in harsh environments								
AF 211	700 - 1800 °C 1292 - 3272 °F	0.95 - 1.05 µm	PA 41.01	0.20 m - ∞	110 : 1	two-colour	≤ 20 ms (T>850 °C)	1.5% of reading	3 K
AF 221			PZ 41.05	0.12 m - ∞	50 : 1		≤ 20 ms (T>950 °C)		
AF 222			PZ 41.18	33 mm - 45 mm	36 : 1		≤ 20 ms (T>1050 °C)		
AF 222/V			PZ 41.18	33 mm - 45 mm	36 : 1		≤ 20 ms (T>1350 °C)		
AF 11	800 - 2400 °C 1472 - 4352 °F	0.95 - 1.05 µm	PA 41.01	0.20 m - ∞	190 : 1		≤ 20 ms (T>950 °C)		
AF 21			PZ 41.05	0.12 m - ∞	100 : 1		≤ 20 ms (T>1050 °C)		
AF 22			PZ 41.18	33 mm - 45 mm	50 : 1		≤ 20 ms (T>1050 °C)		
AF 22/V			PZ 41.18	33 mm - 45 mm	50 : 1		≤ 20 ms (T>1050 °C)		
AF 111	900 - 3000 °C 1652 - 5432 °F	0.95 - 1.05 µm	PA 41.01	0.20 m - ∞	190 : 1		≤ 20 ms (T>1050 °C)		
AF 111/V			PA 41.01	0.20 m - ∞	190 : 1		≤ 20 ms (T>1050 °C)		
AF 121			PZ 41.05	0.12 m - ∞	100 : 1		≤ 20 ms (T>1050 °C)		
AF 122			PZ 41.18	33 mm - 45 mm	50 : 1		≤ 20 ms (T>1050 °C)		
AF 901	1100 - 3000 °C 2012 - 5432 °F		PA 41.02	0.50 m - ∞	340 : 1		≤ 20 ms (T>1350 °C)		

\*(at  $\epsilon = 1$  and  $T_a = +23 °C$ )

## Accessories



Shielded cable  
VK 02/A AF 1: 5 m  
VK 02/A AF 2: 10 m  
VK 02/A AF 3: 20 m



Mounting bracket  
with 2 shaft nuts  
PA 11/U



Mounting angle,  
adjustable  
PA 11/K



Clamping collar  
PZ 20/L: Ø 70 mm  
PZ 20/N: Ø 65 mm



Pedestal mount  
PB 08/K



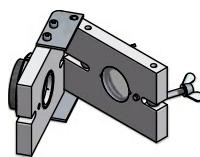
Air purge  
PZ 20/A



ZnS window PA 10/I  
Sapphire window PA 15/I  
Quartz window PA 20/I



Quick connector with window  
PA 10/C (ZnS)  
PA 15/C (Sapphire)  
PA 20/C (Quartz)



Window with hinge  
PZ 10/I (ZnS)  
PZ 15/I (CaF2)  
PZ 20/I (Quartz)



Mounting with flange  
PB 08/Q AF1 (Mounting)  
PB 08/R AF1 (Flange)



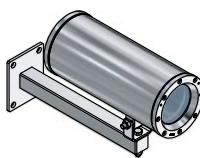
Illumination ring  
PZ 10/P



Ball flange  
PB 08/I



Intermediate tube  
PZ 20/C



Ex proof enclosure  
PZ 40/N AF1



Protective enclosure,  
open PA 40/B



Protective enclosure  
closed PA 40/M



Cooling jacket, open  
PA 20/B



Cooling jacket, closed  
PA 20/M



Cooling jacket PA 20/M  
AF2 for pyrometer  
with camera



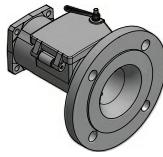
Supplementary lens  
PZ 20/O



Protective glass  
PZ 10/I AF 1 (ZnS)  
70146 (Quartz)



Junction box with  
material selection switch  
VK 30.01



Flange tube  
PB 08/M AF1



Fan  
PB 08/F AF4



Connection head  
PB 08/N



Mirror attachment 90°  
PA 20/E



Dust stop  
PZ 10/T (35 mm)  
PZ 20/T (20 mm)



Intermediate tube  
with socket  
PZ 40/C



Intermediate tube  
PZ 20/J



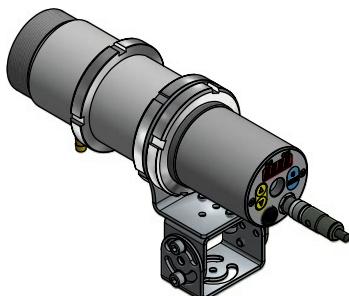
Flange  
PZ 20/F

## Mountings

### Mounting PA 20-006

#### consisting of:

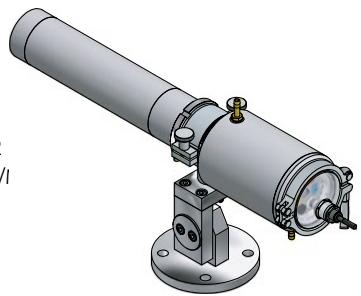
- Air purge PZ 20/A
- Intermediate tube PZ 20/J
- Mounting bracket PA 11/U
- Mounting angle, adjustable PA 11/K



### Mounting PA 83-010 for pedestal mount

#### consisting of:

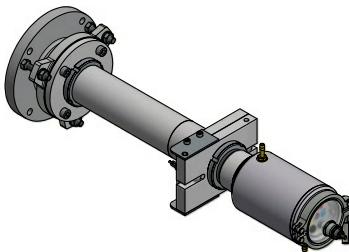
- Dust stop PZ 10/T
- Intermediate tube PZ 20/C
- Air purge PZ 20/A
- Clamping collar PZ 20/L AF 2
- Cooling jacket, closed PA 20/I
- Hose nozzle G1/8"
- Mounting PB 08/Q AF 1
- Flange PB 08/R AF 1



### Mounting PA 20-027 for furnace installation

#### consisting of:

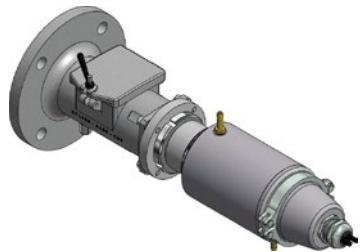
- Cooling jacket PA 20/M AF 1
- Quartz window with hinge PZ 20/I
- Air purge PZ 20/A
- Intermediate tube PZ 20/C
- Mounting flange PZ 20/F
- Dust stop PZ 20/S
- Ball flange PB 08/I



### Mounting PA 20-077 for hot blast stoves

#### consisting of:

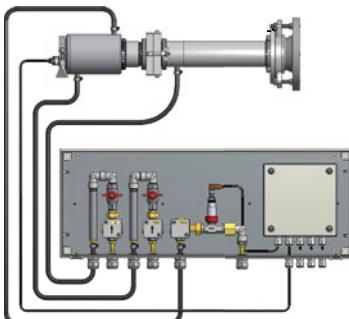
- Cooling jacket, closed PA 20/M AF 2
- Flange PB 08/O
- Flange tube PB 08/M AF 1



### Mounting PA 20-065 for compressed air for the cement industry

#### consisting of:

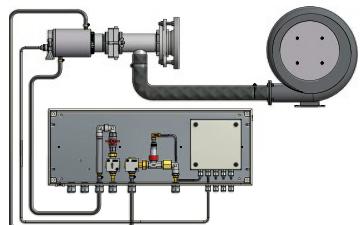
- Cooling jacket PA 20/M AF 1
- Quartz window with hinge PZ 20/I
- Air purge PZ 20/A
- Intermediate tube PZ 20/C
- Flange PZ 20/F
- Dust stop PZ 20/S
- Ball flange PB 08/I
- Hose clamp 10-16 mm
- Industrial hose GP40
- Mounting plate in wall housing SK 613 with flow monitor



### Mounting PA 20-066 fan air for the cement industry

#### consisting of:

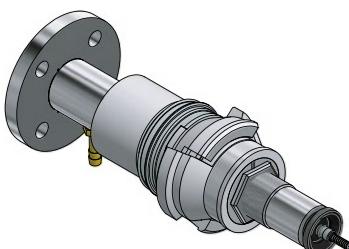
- Cooling jacket PA 20/M AF 1
- Quartz window with hinge PZ 20/I
- Intermediate tube with socket PZ 40/C
- Flange PZ 20/F
- Ball flange PB 08/I
- Fan PB 08/F AF 3
- Aluminium hose PB 08/L
- Hose clamps 10-16 mm and 50-70 mm
- Industrial hose GP40
- Mounting plate in wall housing SK 749 with flow monitor



### Mounting of the fibre optics version PA 21-001 for furnace installation

#### consisting of:

- Quartz window PS 01/I AF 2
- Bayonet coupling PS 11/N AF 5
- Air purge PS 01/A AF 1
- Shim Ø 35 mm
- Flange PS 01/N



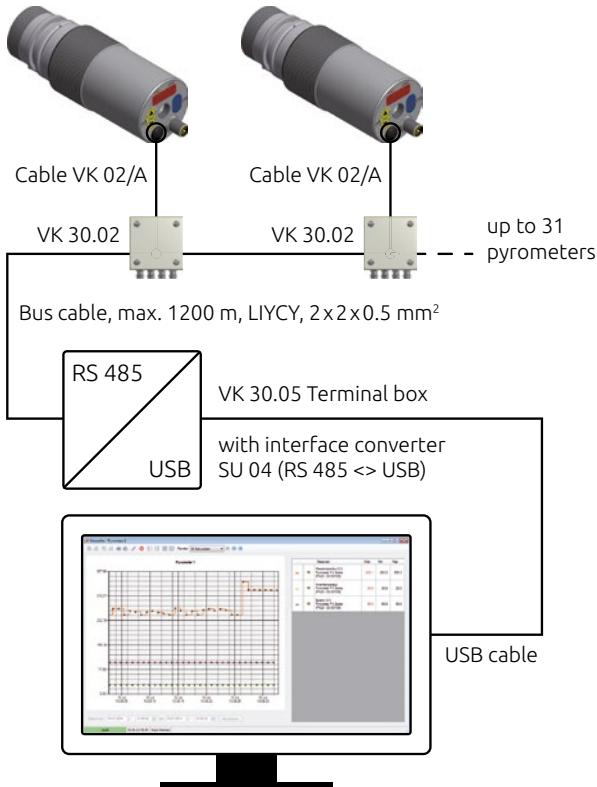
### Mounting PA 20-004 with oscillating mirror for pedestal mount

#### consisting of:

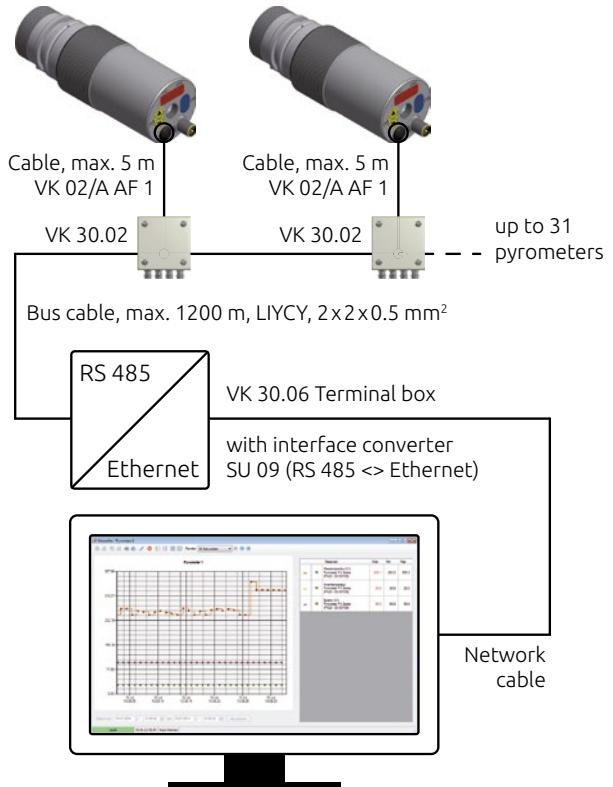
- Cable VK 01/X
- Oscillating mirror PZ 20/X AF 6
- Intermediate tube PZ 20/J
- Clamping collar PZ 20/L AF 2
- Cable VK 01/Y AF 3
- Pedestal mount PB 08/K AF 2



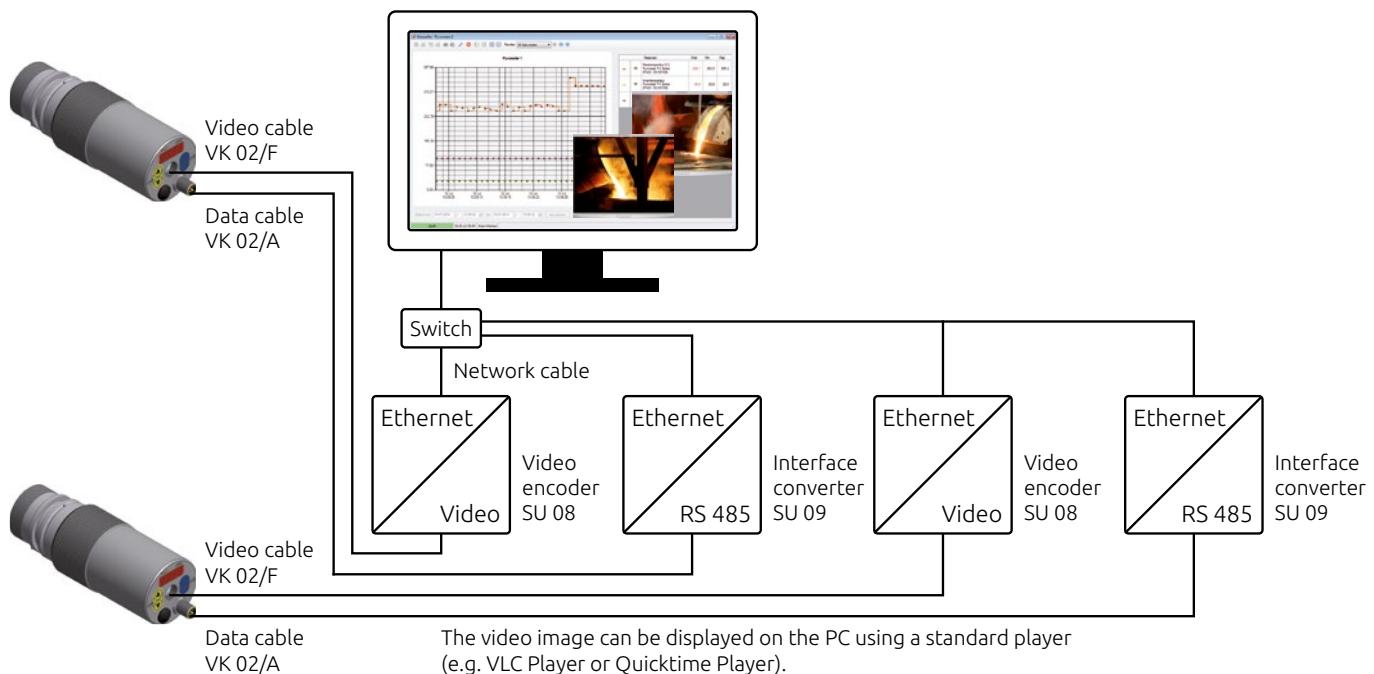
## Networking and communication via the USB interface



## Networking and communication via Ethernet interface



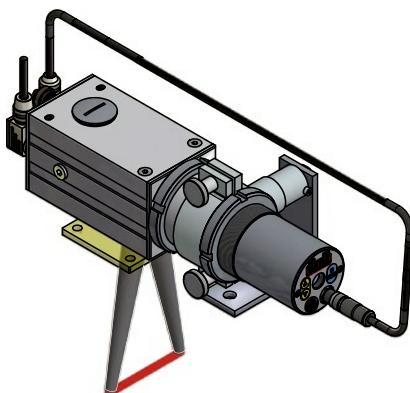
Networking, communication and video transmission via Ethernet



## Special Accessories

### Oscillating mirror PZ 20/X

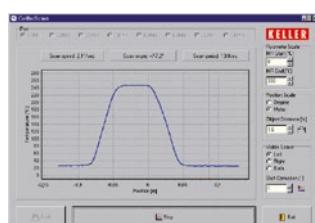
An oscillating mirror with scanner function can be mounted to a CellaTemp® PA pyrometer. The measurement field is deflected to capture the target object. Use the analogue output in conjunction with a RS-422 interface to collect temperature readings together with target position.



With the PZ/20 X you can:

- Detect „hot spots“ at belt conveyors
- Capture swaying wires
- Generate temperature profiles of sheet metals and steel slabs
- Measure the temperature of objects at a roller table whose size and position are not constant

The PZ 20/X accessory is supplied with CellaScan software to generate graphic images showing temperature data plotted against the scan angle.

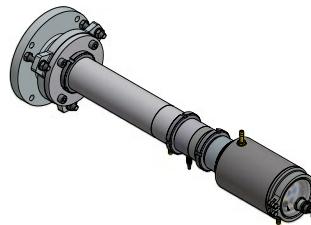


### Illumination ring PZ 10/P



In dark furnaces, it is often impossible to see the target. Installing an auxiliary light source in a second porthole can be quite difficult and costly. Thus, in actual practice, pyrometers are often focused at the target only at the time of installation. Verification of correct focusing during running operations will not be possible.

The PZ 10/P illuminates the target spot in a closed furnace, utilizing the same furnace opening in which the pyrometer is installed. This built-in accessory is part of the pyrometer's mounting assembly.



The illumination ring helps you align and focus the pyrometer to the measurement spot at the time of initial setup. What's more, this accessory lets you view the target area anytime later, such as during routine spot checks, and make adjustments if necessary.

When used in conjunction with a pyrometer featuring a built-in video camera, you can view a live image of the illuminated target at a control room monitor.

### Display unit DA 230

- Input: 0(4)–20 mA / 0(2)–10 V Thermocouples type K, S, J, T PT 100
- Analogue output: 0(4)–20 mA
- User-configurable ranges
- Panel mounting: 48 x 96 mm
- Supply voltage: 115–230 V/50–60 Hz
- Source voltage: 24 V DC
- RS-485 interface
- Data communication in ASCII format
- CellaMevis software for online imaging and archiving of temperature data



### Interface converter/Video encoder



Interface converter SU 04  
RS 485 <> USB



Video encoder SU 08  
Video <> Ethernet

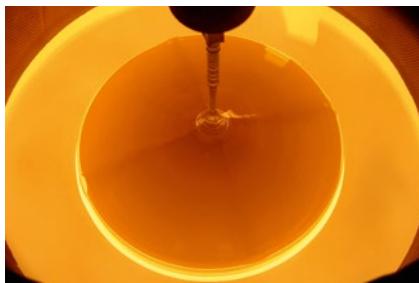


Interface converter SU 09  
RS 485 <> Ethernet

## Applications



Asphalt and concrete mixing



Crystal growing



Coke oven



Wires, tubes and rods



Filaments / Metal bands



Runner



Incineration plant



Rolling mill



Blast furnace / stove dome



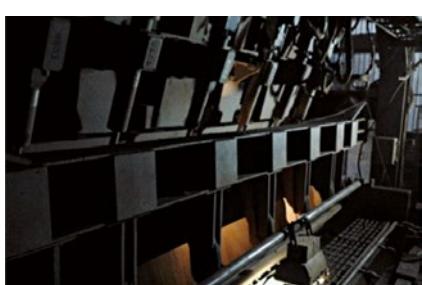
Power plant



Continuous casting



Rotary kiln



Sinter plant



Glass production



Induction heating

## Other products



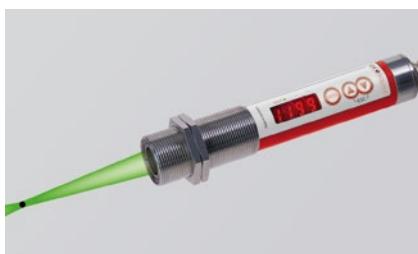
**CellaPort PT**

Portable single-colour and two-colour pyrometers with through-the-lens sighting and USB interface.



**CellaCast PT**

Portable pyrometer for non-contact temperature measurement of molten metal at automated casting machines and blast furnaces.



**CellaTemp® PK(L)**

Compact infrared thermometer for cramped environments. Optional with LED spot light.



**CellaTemp® PKF**

Compact infrared thermometer with optical fibre and optical sensor head.



**CellaTemp® PX**

Pyrometers with IO-Link interface, focusable lens, through the lens sighting or laser spot light.



**CellaTemp® PX-LWL**

Pyrometers with IO-Link interface, fibre optics, focusable measuring heads and laser spot light.



**Mikro PV**

Intensity comparison pyrometer for ultra accurate measurement.



**CellaSwitch**

Compact infrared switch with LED display and auto-diagnostics.

Since 1967, the Division Infrared Thermometer Solutions (ITS) of KELLER HCW GmbH develops and manufactures precision instruments and systems solutions for non-contact temperature measurements. Thanks to the continuous development of its range, KELLER ITS now is one of the leading providers for infrared thermometers and pyrometers worldwide.

With its very large product range of more than 250 models and systems KELLER ITS offers solutions for all standard applications and a variety of special measuring tasks.

Following the KELLER philosophy, the key focus in the development and production of the devices is set to the high measuring accuracy and reliability. Therefore, KELLER grants a warranty of 5 years on its products.

A global network of distributors and service points ensures competent and personal consultation on site.





- Headquarters
- Sales and Service Center
- Sales abroad



**IO-Link**



Keller HCW GmbH  
Infrared Temperature Solutions (ITS)  
Carl-Keller-Straße 2-10  
49479 Ibbenbüren-Laggenbeck  
Germany

[www.keller.de/its](http://www.keller.de/its)  
Tel. +49 (0) 5451 850  
Fax +49 (0) 5451 85412  
[its@keller.de](mailto:its@keller.de)

## Sales and Service Center

Frankreich  
[www.keller.de/its](http://www.keller.de/its)  
Tel. +33 (0) 951 453050  
[its@keller.de](mailto:its@keller.de)

Spanien  
[www.umi.es](http://www.umi.es)  
Tel. +34 94 446 62 50  
[comercial@umi.es](mailto:comercial@umi.es)

Italien  
[www.giga-tech.it](http://www.giga-tech.it)  
Tel. +39 (0) 296489130  
[contatti@giga-tech.it](mailto:contatti@giga-tech.it)

China  
[www.keller-its.cn](http://www.keller-its.cn)  
Tel. +86 (0) 10 828 679-20  
[keller@germantech.com.cn](mailto:keller@germantech.com.cn)

Österreich  
[www.sensotec.at](http://www.sensotec.at)  
Tel. +43 313 551 650  
[office@sensotec.at](mailto:office@sensotec.at)

Indien  
[www.keller-itsindia.com](http://www.keller-itsindia.com)  
Tel. +91 (0) 98841 11025  
[info@keller-itsindia.com](mailto:info@keller-itsindia.com)

Russland  
[www.ampermetr.com](http://www.ampermetr.com)  
Tel. +7 343 384 55 45  
[info@ampermetr.com](mailto:info@ampermetr.com)

Korea  
[www.ultratec.co.kr](http://www.ultratec.co.kr)  
Tel. +82 (0) 70 8282 5979  
[ellen@ultratec.co.kr](mailto:ellen@ultratec.co.kr)