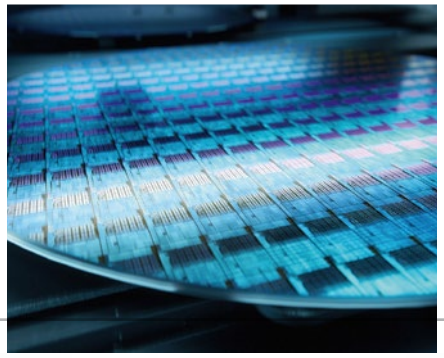
KELLER
infrared temperature solutions ITS

# Infrared thermometer

## CellaTemp® PK / PKF / PKL

for non-contact temperature measurements
from -30 °C to +2500 °C

KELLER A DIVISION OF GROUPE LEGRIS INDUSTRIES

5 years warranty

QUALITY made in Germany

## Range of models

### Compact infrared thermometer

| Type | Measuring range | Application |
|---|---|---|
| **Single-colour infrared thermometer** | | |
| PK 11 | 0 - 1000 °C | Non metals |
| PK 12 | -30 - 300 °C | Non metals at low temperatures |
| PK 14 | 0 - 500 °C | Non metals large objects |
| PK 18 | 0 - 500 °C | Non-metals in aggressive measuring environment |
| PK 21 | 250 - 1600 °C | Metals, ceramics, molten glass |
| PK 24 | 250 - 1600 °C | Metals, ceramics large objects |
| PK 25 | 75 - 650 °C | Metals at very low temperatures |
| PK 29 | 150 - 800 °C | Aluminum, bright metal surfaces, laser applications |
| PK 31 | 500 - 2500 °C | Metal, ceramics at high temperatures |
| PK 35 | 450 - 1400 °C | Wafer production |
| PK 41 | 300 - 1300 °C | Glass surfaces |
| PK 42 | 500 - 2500 °C | |
| PK 51 | 400 - 1400 °C | Flame-heated furnaces |
| PK 52 | 500 - 2000 °C | |
| PK 72 | 400 - 2000 °C | Hot $CO_2$ containing gases |
| PK 73 | 500 - 2500 °C | Hot CO containing gases |
| PK 74 | 250 - 1700 °C | Hot $CO_2$ containing gases |
| PK 75 | 400 - 2000 °C | Hot $CO_2$ containing gases |
| **Two-colour infrared thermometer** | | |
| PK 62 | 700 - 1700 °C | Sooty flames |
| PK 68 | 550 - 1400 °C | Metals, ceramics, molten glass at difficult measuring conditions like dust, steam, smoke |

### Compact infrared thermometer with LED spot light

| Type | Measuring range | Application |
|---|---|---|
| **Single-colour infrared thermometer** | | |
| PKL 11 | 0 - 1000 °C | Non metals, coated metals |
| PKL 28 | 250 - 1600 °C | Metals (small measuring objects), induction heating |
| PKL 29 | 180 - 1200 °C | Metals (small measuring objects), induction heating at low temperatures |
| PKL 38 | 500 - 2500 °C | Metals (small measuring objects), induction heating at high temperatures |
| **Panorama infrared thermometer** | | |
| PKL 63 | 650 - 1600 °C | Metals (oscillating measuring objects), production and heat treatment of wires, rods, bolts |
| **Two-colour infrared thermometer** | | |
| PKL 68 | 650 - 1600 °C | Metals (small measuring objects), induction heating at difficult measuring conditions like dust, steam, smoke |

### Infrared thermometer with optical fibre and optical sensor head

| Type | Measuring range | Application |
|---|---|---|
| **Single-colour infrared thermometer with fibre optic and sensor head** | | |
| PKF 26 | 300 - 1600 °C | Metals, ceramics, molten glass |
| PKF 36 | 550 - 2500 °C | Metals, ceramics at high temperatures |
| **Two-colour infrared thermometer with fibre optic and sensor head** | | |
| PKF 66 | 700 - 1800 °C | Metals, ceramics, molten glass at difficult measuring conditions like dust, steam, smoke |
| PKF 67 | 600 - 1400 °C | |

# Infrared thermometer CellaTemp® PK / PKF / PKL

## Special features

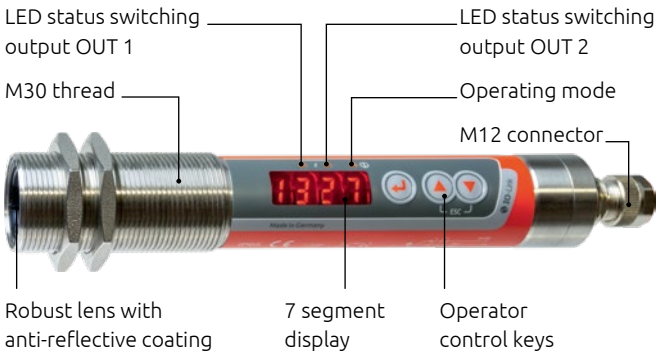
- Compact infrared thermometer with large, bright LED display and control panel
- All parameters adjustable with control keys on the sensor head and digital interface
- Vitality indicator for self-monitoring service display
- Supply voltage monitor
- SCM function for pollution monitoring
- Wide band anti-reflective precision lenses
- Large measuring ranges with high temperature resolution over the entire temperature range
- Analogue output 0/4 - 20 mA and modern IO-Link communication interface according to the latest standard
- 2 universally configurable switching outputs
- PKL version with patented LED spotlight
- PKF version with fibre-optic cable and separate optical measuring head

## Serie CellaTemp® PK

The infrared thermometer CellaTemp® PK records the infrared radiation emitted by an object and converts it into an electrical signal. The detected temperature is displayed and transmitted to the analogue output and the digital interface for further processing.

Thanks to a unique combination of analogue and digital linearisation, the CellaTemp® PK has consistently high-resolution signal processing over the entire measuring range. Therefore, even with wide measuring ranges, the infrared thermometer has a very high temperature resolution while its noise equivalent temperature difference (NETD) is extremely low. The pyrometer thus supplies stable measurement readings even when the response times are extremely short (from 2 ms) and the measured temperatures are very low.

The bright and energy-efficient display unit is based on state-of-the-art LED technology. Even from a great distance it is easy to read.




## CellaTemp® PK 18 for asphalt and concrete mixing plants

The CellaTemp® PK 18 is equipped with an especially resilient lens, allowing its use even in extreme environmental conditions, such as in asphalt and concrete mixing plants, preventing the lens from damage by aggressive vapours and dust.

## CellaTemp® PK 25 / 29 for metals at low temperatures and for laser applications

With conventional short-wavelength pyrometers, daylight or extraneous radiation from the surrounding area can interfere with the measurement at low temperatures and objects with low emissivity. The CellaTemp® PK 25 / 29 pyrometers are therefore equipped with a special blocking filter to avoid such influences.

The devices are used for a wide range of applications in the metal-working industry, and in particular for measuring the temperature of aluminium and shiny metals.

The optical filters also block the high-energy laser radiation used in heat treatment processes that involve diode, Nd:YAG or CO2 lasers.

## CellaTemp® PK 41 / 42 for measuring glass

Since glass is a volume radiator, devices that operate at a wavelength between 4.6 - 4.9 µm are required to measure the temperature near the surface. In this range, glass has an emissivity of almost 100 %.

The CellaTemp® PK 41/42 are equipped with the appropriate wavelength filters. This enables precise temperature measurement regardless of the colour, type and thickness of the glass.

## CellaTemp® PK 51 / 52 for flame-heated furnaces

The CellaTemp® PK 51 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. This allows precise measurements of the firebed through flames and combustion gases.

## CellaCombustion PK 62 for flame measurement

The CellaCombustion PK 62 is a special infrared thermometer 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 at two wavelengths. The flame temperature can be used to control the burnout during firing operation in order to minimise pollutant emissions and slagging of the combustion chamber walls.

## CellaCombustion PK 72/74/75 for small combustion plants

The CellaCombustion PK 72/74/75 uses a specific wavelength, in which hot $CO_2$-containing 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.

The PK 72/74 detects infrared radiation in the area close to walls (< 1–2 m) and the PK 75 at a sighting depth of approx. 2–4 m.

## CellaCombustion PK 73 for large combustion plants

The CellaCombustion PK 73 uses a specific wavelength, in which the chemical components of the hot CO-containing 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.

## Infrared thermometer CellaTemp® PKF with optical fibre and optical sensor head

### CellaTemp® PKF 26/36/66/67

The electronic elements of the CellaTemp® PKF 26/36/66/67 version are separated from the measuring head. A fibre optics cable transmits the infrared radiation to the electronic unit where it is transformed into an electric signal. The measuring head is entirely composed of mechanical and optical components, enabling its use at ambient temperatures up to 250 °C without auxiliary cooling systems. The fibre optics version is also used in confined spaces or in powerful electromagnetic fields. The fibre optics cable is detachable both from the measuring head and the electronic unit using a screw-in FSMA connector which makes the cable easy to install. The length of the fibre optics cable can be up to 50 m.

### Laser pointer

The laser pointer PK 01/E has to be attached to the end of the optical fibre to set the focal distance and to check the alignment during setup of the fibre-optic pyrometers Cella Temp® PKF 26/36/66/67. The spotlight indicates the exact position and size of the measuring field.

## Infrarot Thermometer CellaTemp® PKL with LED pilot light

### Special features of the LED spot light

- lights up permanently
- shows exactly the size and position of the target as well as the focal point
- is absolutely safe
- innovative, bright LED technology with low power consumption
- Parallax-free – identical geometric and optical axis to exclude squinting of the device
- green spotlight is bright and clearly visible to the eye

### CellaTemp® PKL 11/28/29/38/68

The CellaTemp® PKL comes with an integrated LED spot light. The spot light is an indispensable aid for precisely aligning the infrared thermometer to the focal distance and the hot zone, especially when measuring small objects. The LED spot light is continuously illuminated and due to its permanent control function it offers a high degree of operational safety.

Thanks to the high-precision mechanical and optical design the geometric and optical axes are identical, thus the CellaTemp® PKL is parallax-free. As a result, the patented spot light indicates the exact position and true size of the measuring point. This ensures precise measurement, especially for small objects and small viewing openings.

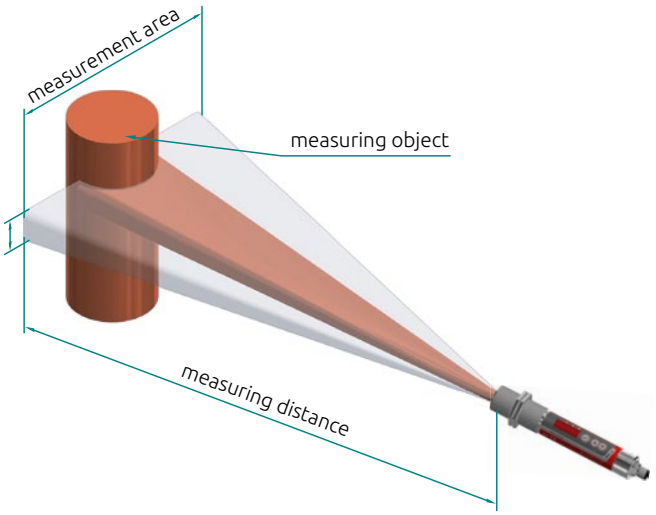
The optical system of the CellaTemp® PK features a high-quality glass lens optimised for the visible and infrared range. This ensures that within the focal range both the infrared radiation on the sensor and the spot light are reproduced in an equally sharp way.

The LED light is technically safe and there is no risk of injury to the human eye. Unlike a laser, it is not subject to aging and, regardless of the ambient temperature, it always works with a constant luminous intensity. The maximum permissible ambient temperature is 65 ° C , even with spotlight.

The latest LED technology provides bright light spot with low power consumption. Due to the high sensitivity of the human eye to this wavelength, the green LED light is still clearly visible even on red glowing objects.

## Panorama pyrometer CellaTemp® PKL 63

The two-colour infrared thermometer CellaTemp® PKL 63 features a rectangular measuring field. The unique design enables the pyrometer to detect the temperature of target objects which move within the rectangular field. This is accomplished without requiring any moving parts. The CellaTemp® PKL 63 reliably captures objects which




typically show fluctuating behaviour (such as swaying wires). The rectangular field 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.

## Two-colour pyrometer

The two-colour pyrometers CellaTemp® PKL 63, PK(L) 68 and PKF 66 capture the infrared radiation of the object at two wavelengths at the same time and spot using a photodiode in sandwich design. The temperature is then defined by the ratio of these two signals.

The advantage of a two-colour measuring procedure is that it produces a correct reading even when the infrared radiation picked up by the sensor is weakened by up to 90%. The two-colour pyrometer reacts substantially less sensitive than a single-colour pyrometer to visual obstructions in the target area caused by steam, dust and smoke . The same applies if the optical system of the device or the inspection glass of the furnace is dirty or inspection openings are clogged. Therefore, two-colour pyrometers are preferably used for industrial applications in harsh ambient environments and under difficult measuring conditions, such as rotating kilns in the cement industry or rolling mills in the steel industry.

The ratio principle also compensates for changes in the radiation characteristics of the measuring object. The emissivity, i.e. the radiation characteristics of the object to be measured may change due to the nature of the surface or in relation to the temperature, but with simultaneous changes over both wavelengths there is no influence on the measurement.

Another advantage of the two-colour infrared thermometers is that the measuring object may even be smaller than the target field of the device. Therefore, with smaller measuring objects, such as in inductive heating installations, a two-colour infrared thermometer is less sensitive to an imperfect alignment than a single-channel thermometer.

## Analogue output

The analogue output supplies a signal linear to the temperature; 0/4 – 20 mA are optionally available. The range setting can be configured with the control keys according to the needs of the user. The outputs deactivate and a warning appears on the display when the internal temperature reaches > 75 °C.

## Switching outputs

With a hot object in the sensor's field of view, a switching contact is triggered when a pre-defined temperature threshold is exceeded. An LED indicates this switching status. Optionally, the switch can operate as a normally closed or normally open contact.

This configurable switch on/switch off delay permits a suppression of short interference pulses and for the adaptation of the switching outputs to the response time of a PLC.

**A variety of possible applications includes:**

- Monitoring of limit temperatures or temperature ranges
- Signalisation of soiling of the lens or viewing window
- Signalisation of status information of the DTD function (Discontinuous Temperature Detection)
- Determination of the measuring time
- Synchronisation of the measurement value transmission to a PLC

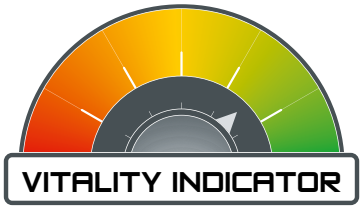
## Optical system

An infrared thermometer uses an optical measuring method for non-contact temperature measurements. The quality of the optical system has a great influence on the measurement accuracy of the device as a whole.

This influence is defined as "size of source effect". Light scattered into the optical path will result in false temperature data. When the distance to the target or the size of the object change, the temperature reading may change as well depending on the quality of the optical system.

The precision lenses used in the CellaTemp PK® pyrometer provide excellent imaging characteristics, high optical resolution and a minimum sensitivity to stray light. The anti-reflective coated lenses are extremely durable, easy to clean and therefore suitable for rough industrial applications.

## Vitality indicator




Due to physical and chemical processes, electronic components are subject to ageing effects. These are extremely dependent on the operating temperature. The new generation of the CellaTemp® PK pyrometer series is equipped with a new, smart function, the vitality indicator. This is a Self-Monitoring, Analysis and Reporting Technology (SMART), i.e. a function for self-monitoring, analysis and status reporting.

The vitality monitor continuously collects the relevant operating data in order to monitor the progress of any ageing effects depending on the operating temperature and operating time. The current status

can be shown on the display at any time and read out by a PLC via the IO-Link interface. The pyrometer independently determines and signals the optimum time for a service check and calibration.

The vitality monitor also records the operating time. This allows the quality assurance and calibration department to configure a service and calibration interval for preventive maintenance itself. The device then automatically reminds the user of the next inspection date.

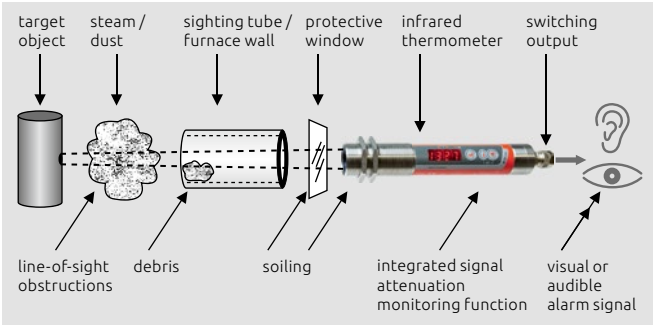
## Monitor for the supply voltage

The availability of a stable power supply is not always guaranteed in all regions. External interference in particular can lead to fluctuations or temporary failures. Operating electronic devices with an unstable, short or long-term unacceptable power supply can lead to malfunctions or even destruction of the devices.

The monitor function in the pyrometer permanently monitors the supply voltage and records the duration for which the sensor was operated with an undervoltage and overvoltage. If necessary, this information can be used to take measures to stabilise the supply voltage and thus prevent incorrect measurements and device failure.

## Contamination monitoring

The two-colour infrared thermometers CellaTemp® PKL 63, PK(L) 68 and PKF 66/67 are equipped with a SCM (Smart Contamination Monitoring) function that continuously monitors the signal intensity. If the infrared radiation decreases to a critical value due to a contamination of the lens or the protective window, this condition is recorded, visually displayed on the device and transmitted via a switching contact. Visual obstructions in the target area or deposits in the furnace opening are also detected. The sensitivity to detect the contamination level is adjustable.




## DTD function

The two-colour infrared thermometers CellaTemp® PKL 63, PK(L) 68 and PKF 66/67 are equipped with a DTD (Discontinuous Temperature Detection) function. In discontinuous processes it is used for the automatic detection of the temperature.

The measurement starts automatically when this function detects a hot object. It ends when the temperature is below the threshold and the maximum value is displayed. A switching contact may be activated during the measurement for synchronisation with a PLC. The duration of measurement can thus also be recorded.

## Technical data *

**Analogue output**
- 0/4 - 20 mA linear according to NAMUR 43, scalable
- max. burden 500 Ω

**2 switching outputs**
- PNP open collector active from positive supply voltage
- NC or NO
- current-carrying capacity 150 mA
- clocked overload safety shut-off ≥ 250 mA

**Interface**
- IO-Link V1.1
- Transmission speed COM 3 (230.4 kbit/s)

**Display**
- 4 x 7 segment red, character height 8 mm

**Resolution of power output**
- 0.1 K + 0.005 % of the set span

**Resolution of display**
- 0.1 K for T < 200 °C
- 1 K for T ≥ 200 °C

**Power supply**
- 18 - 32 V DC

**Power consumption**
- ≤ 50 mA (≤ 75 mA with spot light) at 24 V DC without load current

**Ambient temperature**
- 0 - 65 °C

**Storage temperature**
- -20 - +80 °C

**Housing material**
- Stainless steel V2A (1.4305)

**Permissible humidity**
- 95 % r.H. max. (non-condensing)

**Protection**
- IP65 acc. to DIN 40050 protection class III

**Connection**
- M12 connector, 5-pole A coding (DIN EN 61076-2-101)

**Weight**
- approx. 0.4 kg

**Shock resistance** (EN60068-2-27)
- 30 g (11 mg)

**Vibration resistance** (EN60068-2-6)
- 5 g (10 - 2000 Hz)

* 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

## Diagnostic function

The diagnostic function ensures a high operational reliability. Incorrect supply voltages, reverse polarities of connections, overloads at the switching output, unacceptable ambient temperatures or out-of-range object temperatures appear on the display as error messages.

## Service function

The service function is used during setup or running operation to key in a simulated temperature value that is displayed and transmitted via the analogue and digital output. This feature checks the correct functioning and range setting for the downstream signal processing units (display, controller, PLC) quickly and safely even without a hot object.

## Reverse polarity protection

- for the power supply voltage
- for the analogue output
- for the switching output

## LED display

- Display of the switching status, in the event of overloading and in the event of incorrect connection of the supply voltage
- Display of the signal power in two-colour infrared thermometer
- Display of the operating mode

## Operating elements

- 3 buttons

## Troubleshooting

- Output overload
- Excess temperature in the sensor
- Measuring range too high/too low
- Incorrect supply voltage connection
- incorrect supply voltage

## EMC 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

## Fibre optic cable for CellaTemp® PKF

| Type | Length | Weight |
|---|---|---|
| LWL-2HT | 2 m | 0.08 kg |
| LWL-5HT | 5 m | 0.19 kg |
| LWL-10HT | 10 m | 0.38 kg |

other lengths up to 50 m on request

**Ambient temperature**
- -40 - +250 °C

**Material**
- brass, nickel-plated

## Scope of delivery

- Infrared thermometer
- Short manual
- 2 fastening nuts

The full manual and the KITS app are available via the KELLER homepage as a download.

**Additionally for CellaTemp® PKF**
- Measuring head, depending on model
- Fibre optic cable (please specify length)

The connecting cable VK 02/L (length as required) must be ordered separately.

## Adjustable parameters

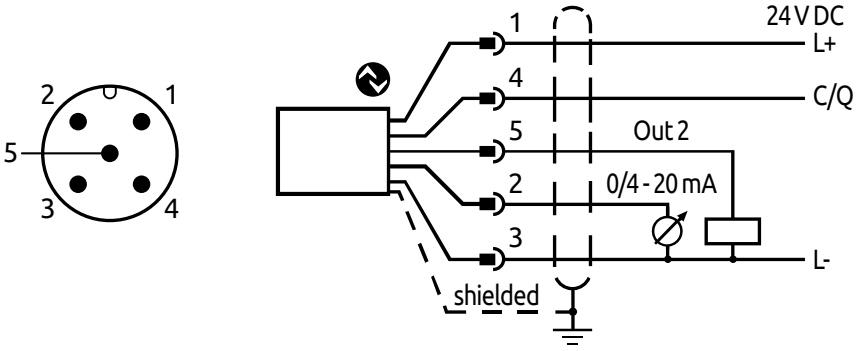
**Analogue output**
- Analogue output 0 / 4 – 20 mA
- Scaling of the analogue output

**Switching output**
- ON and reset
- Source of the switching signal
- Switching function: NC and NO contacts
- Switch-on and switch-off delay

**General parameters**
- Temperature unit °C/°F
- Emissivity (quick set) with temperature display
- Smoothing time constant
- Hold time for peak value
- Temperature correction for up to 5 interpolation points
- Signal threshold of the vitality indicator
- Operating time of the service interval
- Reset to factory setting
- Key lock
- Temperature simulation
- Temperature display

**Additionally for the two-colour thermometer**
- Emissivity ratio
- Measuring method single-colour / two-colour
- Alarm and shut down threshold for contamination monitoring
- Source of the analogue output
- Source of the second switching contact
- Threshold for the DTD function
- Soot factor (at the CellaCombustion PK 62)

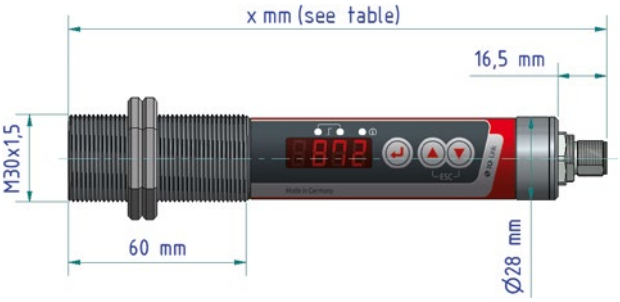
## Connector pin assignment




It is imperative to use a cable with shielding.

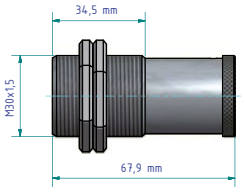
## Dimensions

Compact infrared thermometer

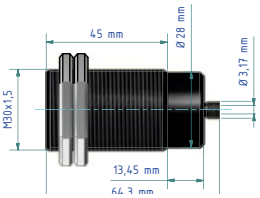



| Length of the compact infrared thermometer | |
|---|---|
| **Type** | **Length** |
| PK 11, PK 12, PK 14, PK 18 | 189 mm |
| PK 21, PK 24, PK 25, PK 29, PK 31, PK 35, PK 62, PK 68 | 213.5 mm |
| PK 41, PK 42, PK 51, PK 52, PK 72, PK 73, PK 74, PK 75, PKL 11 | 205.5 mm |
| PKL 28, PKL 29, PKL 38, PKL 63, PKL 68 | 239 mm |

Infrared thermometer with fibre optic PKF 26, PKF 36, PKF 66




PA 41.01 / PA 41.03

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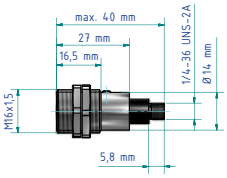
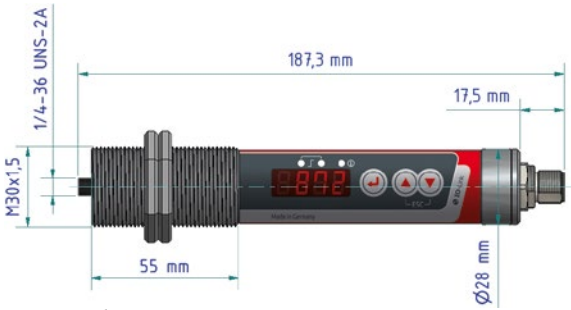



PA 41.05 / PZ 41.18




electronics

## Supplementary lenses

A lens can be screw-mounted on the sensor of the infrared thermometer CellaTemp® PK for the measurement of very small objects.

| Infrared thermometer | Supplementary lens | Distance to target | Target Ø |
|---|---|---|---|
| PK 21 / 31 | PK 21/E AF 2 | 500 mm | 5 mm |
| PKL 29 | PS 27/E AF 6 | 150 mm | 3.5 mm |

Supplementary lens

Infrared thermometer PK

## Technical data - Compact infrared thermometer CellaTemp® PK

| Type | Measuring range | Spectral sensitivity | Focal distance | Target size | Measurement uncertainty*1 | Response time $t_{90}$ | Repeat-ability | Temperature coefficient*2 |
|---|---|---|---|---|---|---|---|---|
| **Single-colour infrared thermometer** | | | | | | | | |
| PK 11 BF 1 | 0 - 1000 °C<br>32 - 1832 °F | 8 - 14 µm | 0.3 m | Ø 11 mm | 0.75 % of measured value [°C] plus 2.0 K | ≤ 60 ms | 1 K | 0.1 K/K<br>(for T < 250 °C)<br>0.04 %/K<br>(for T > 250 °C) |
| PK 11 BF 2 | | | 0.9 m | Ø 33 mm | | | | |
| PK 12 BF 1 | -30 - 300 °C<br>-22 - 572 °F | | 0.3 m | Ø 18 mm | | ≤ 90 ms | | |
| PK 14 BF 1 | 0 - 500 °C<br>32 - 932 °F | | 1.0 m | Ø 0.42 m | | ≤ 60 ms | | |
| PK 18 BF 1 | | | 0.3 m | Ø 11 mm | | | | |
| PK 21 BF 1 | 250 - 1600 °C<br>482 - 2912 °F | 1.0 - 1.7 µm | 1.5 m | Ø 10 mm | 0.3 % of measured value [°C] plus 2.5 K | ≤ 2 ms for T > 600 °C | | 0.07 %/K |
| PK 24 BF 1 | | | 1.0 m | Ø 0.2 m | | | | |
| PK 25 BF 1 | 75 - 650 °C<br>167 - 1202 °F | 1.8 - 2.4 µm | 0.3 m | Ø 7 mm | 0.3 % of measured value [°C] plus 4.0 K | ≤ 2 ms for T > 200 °C<br>≤ 15 ms for T > 125 °C<br>≤ 50 ms for T > 100 °C<br>≤ 200 ms for T > 75 °C | 2 K | 0.25 K/K<br>(for T < 500 °C)<br>0.05 %/K<br>(for T > 500 °C) |
| PK 29 BF 1 | 150 - 800 °C<br>302 - 1472 °F | 1.8 - 2.2 µm | 0.3 m | Ø 7 mm | | ≤ 2 ms for T > 300 °C<br>≤ 15 ms for T > 200 °C<br>≤ 45 ms for T > 150 °C | | |
| PK 31 BF 1 | 500 - 2500 °C<br>932 - 4532 °F | 0.78 - 1.06 µm | 1.5 m | Ø 8 mm | 0.2 % of measured value [°C] plus 2.5 K | ≤ 2 ms for T > 900 °C | 1 K | 0.07 %/K |
| PK 35 BF 1 | 450 - 1400 °C<br>842 - 2552 °F | 0.82 - 0.93 µm | 0.3 m | Ø 6.5 mm | 0.3 % of measured value [°C] plus 3.0 K | ≤ 25 ms for T > 500 °C<br>≤ 2 ms for T > 650 °C | 2 K | |
| PK 41 BF 1 | 300 - 1300 °C<br>572 - 2372 °F | 4.6 - 4.9 µm | 0.4 m | Ø 11 mm | 0.5 % of measured value [°C] plus 2.5 K | ≤ 90 ms | 2 K | 0.04 %/K |
| PK 42 BF 1 | 500 - 2500 °C<br>932 - 4532 °F | | 0.4 m | Ø 7 mm | 1.0 % of measured value [°C] | ≤ 60 ms | 4 K | |
| PK 51 BF 1 | 400 - 1400 °C<br>752 - 2552 °F | 3.8 - 4.0 µm | 0.4 m | Ø 11 mm | | ≤ 90 ms | 2 K | |
| PK 52 BF 1 | 500 - 2000 °C<br>932 - 3632 °F | | 0.4 m | Ø 7 mm | | ≤ 60 ms | 4 K | |
| PK 72 BF 1 | 400 - 2000 °C<br>752 - 3632 °F | $CO_2$ range | 0.4 m | Ø 7 mm | | | 2 K | |
| PK 73 BF 1 | 500 - 2500 °C<br>932 - 4532 °F | CO range | 0.4 m | Ø 7 mm | | | 4 K | |
| PK 74 BF 1 | 250 - 1700 °C<br>482 - 3092 °F | $CO_2$ range | 0.4 m | Ø 7 mm | 1.0 % of measured value [°C] *3 | | | 0.04 %/K *3 |
| PK 75 BF 1 | 400 - 2000 °C<br>752 - 3632 °F | $CO_2$ range | 0.4 m | Ø 7 mm | 1.0 % of measured value [°C] | | 2 K | 0.04 %/K |
| **Two-colour infrared thermometer** | | | | | | | | |
| PK 62 BF 1 | 700 - 1700 °C<br>1292 - 3092 °F | 0.80/1.05 µm | 1.5 m | Ø 20.5 mm | 1.0 % of measured value [°C] | ≤ 10 ms | 2 K | 0.05 %/K |
| PK 68 BF 1 | 550 - 1400 °C<br>1022 - 2552 °F | 0.95/1.05 µm | 1.5 m | Ø 21 mm | | ≤ 10 ms for T > 650 °C | | |

*1 at ε = 1 and Ta = +23 °C  *2 deviation to Ta = +23 °C  *3 for T ≥ 400 °C, below that possibly less accurate

## Technical data - Infrared thermometer with fibre optic CellaTemp® PKF

| Type | Measuring range | Spectral sensitivity | Measuring head | Focal distance | Target size | Measurement uncertainty*1 | Response time $t_{90}$ | Repeat-ability | Temperature coefficient*2 |
|---|---|---|---|---|---|---|---|---|---|
| **Single-colour infrared thermometer with fibre optic and sensor head** | | | | | | | | | |
| PKF 26 BF 1 | 300 - 1600 °C<br>572 - 2912 °F | 1.0 - 1.7 µm | PA 41.01 | 0.2 m - ∞ | 180 : 1 | 0.3 % of measured value [°C] plus 2.5 K | ≤ 2 ms for T > 600 °C | 2 K | 0.07 %/K |
| PKF 26 BF 2 | | | PKS 21.01 | 1.5 m | Ø 7.2 mm | | | | |
| PKF 26 BF 3 | | | PA 41.05 | 0.12 m - ∞ | 100 : 1 | | | | |
| PKF 26 BF 4 | | | PZ 41.18 | 33 - 45 mm | 50 : 1 | | | | |
| PKF 36 BF 1 | 550 - 2500 °C<br>1022 - 4532 °F | 0.78 - 1.06 µm | PA 41.01 | 0.2 m - ∞ | 190 : 1 | | ≤ 2 ms for T > 900 °C | | |
| PKF 36 BF 2 | | | PKS 21.01 | 1.08 m | Ø 6.9 mm | | | | |
| PKF 36 BF 3 | | | PA 41.05 | 0.12 m - ∞ | 100 : 1 | | | | |
| PKF 36 BF 4 | | | PZ 41.18 | 33 - 45 mm | 50 : 1 | | | | |
| **Two-colour infrared thermometer with fibre optic and sensor head** | | | | | | | | | |
| PKF 66 BF 1 | 700 - 1800 °C<br>1022 - 4532 °F | 0.95 / 1.05 µm | PA 41.01 | 0.2 m - ∞ | 190 : 1 | 1.0 % of measured value [°C] plus 3.0 K | ≤ 10 ms for T > 800 °C | 2 K | 0.05 %/K |
| PKF 66 BF 2 | | | PKS 21.01 | 1.08 m | Ø 6.9 mm | | | | |
| PKF 66 BF 3 | | | PA 41.05 | 0.12 m - ∞ | 100 : 1 | | | | |
| PKF 66 BF 4 | | | PZ 41.18 | 33 - 45 mm | 50 : 1 | | | | |
| PKF 66 BF 5 | | | PA 41.03 | 1.8 m | Ø 8 mm | | | | |
| PKF 67 BF 5 | 600 - 1400 °C<br>1112 - 2552 °F | | PA 41.03 | 1.8 m | Ø 16 mm | | | | |

## Technical data - Compact infrared thermometer with LED spot light CellaTemp® PKL

| Type | Measuring range | Spectral sensitivity | Focal distance | Target size | Measurement uncertainty*1 | Response time $t_{90}$ | Re-peata-bility | Temperature coefficient*2 |
|---|---|---|---|---|---|---|---|---|
| **Single-colour infrared thermometer** | | | | | | | | |
| PKL 11 BF 1 | 0 - 1000 °C<br>32 - 1832 °F | 8 - 14 µm | 0.295 m | Ø 9 mm | 0.75 % of measured value [°C] plus 2.0 K | ≤ 60 ms | 1 K | 0.1 K/K (for T < 250 °C)<br>0.04 %/K (for T > 250 °C) |
| PKL 11 BF 2 | | | 0.089 m | Ø 3.2 mm | | | | |
| PKL 28 BF 1 | 250 - 1600 °C<br>482 - 2912 °F | 1.0 - 1.7 µm | 0.21 m | Ø 1.4 mm | 0.3 % of measured value [°C] plus 2.5 K | ≤ 2 ms for T > 600 °C | | 0.07 %/K |
| PKL 28 BF 2 | | | 1.0 m | Ø 6.7 mm | | | | |
| PKL 29 BF 1 | 180 - 1200 °C<br>356 - 2192 °F | 1.8 - 2.2 µm | 0.29 m | Ø 6.2 mm | 0.3 % of measured value [°C] plus 4.0 K | ≤ 2 ms for T > 300 °C<br>≤ 10 ms for T > 250 °C<br>≤ 25 ms for T > 180 °C | | 0.25 K/K (for T < 500 °C)<br>0.05 %/K (for T > 500 °C) |
| PKL 38 BF 1 | 500 - 2500 °C<br>932 - 4532 °F | 0.78 - 1.06 µm | 0.21 m | Ø 1.2 mm | 0.2 % of measured value [°C] plus 2.5 K | ≤ 2 ms for T > 900 °C | | 0.07 %/K |
| PKL 38 BF 2 | | | 1.0 m | Ø 5.6 mm | | | | |
| **Panorama infrared thermometer with rectangular measuring field** | | | | | | | | |
| PKL 63 BF 1 | 650 - 1600 °C<br>1202 - 2912 °F | 0.95 / 1.05 µm | 0.21 m | 4.1 x 0.6 mm | 1.5 % of measured value [°C] | ≤ 10 ms for T > 750 °C | 3 K | 0.05 %/K |
| PKL 63 BF 2 | | | 1.0 m | 18.5 x 2.7 mm | | | | |
| **Two-colour infrared thermometer** | | | | | | | | |
| PKL 68 BF 1 | 650 - 1600 °C<br>1202 - 2912 °F | 0.95 / 1.05 µm | 0.21 m | Ø 1.2 mm | 1.0 % of measured value [°C] | ≤ 10 ms for T > 750 °C | 2 K | 0.05 %/K |
| PKL 68 BF 2 | | | 1.0 m | Ø 5.6 mm | | | | |
| PKL 68 BF 3 | | | 1.5 m | Ø 8.6 mm | | | | |

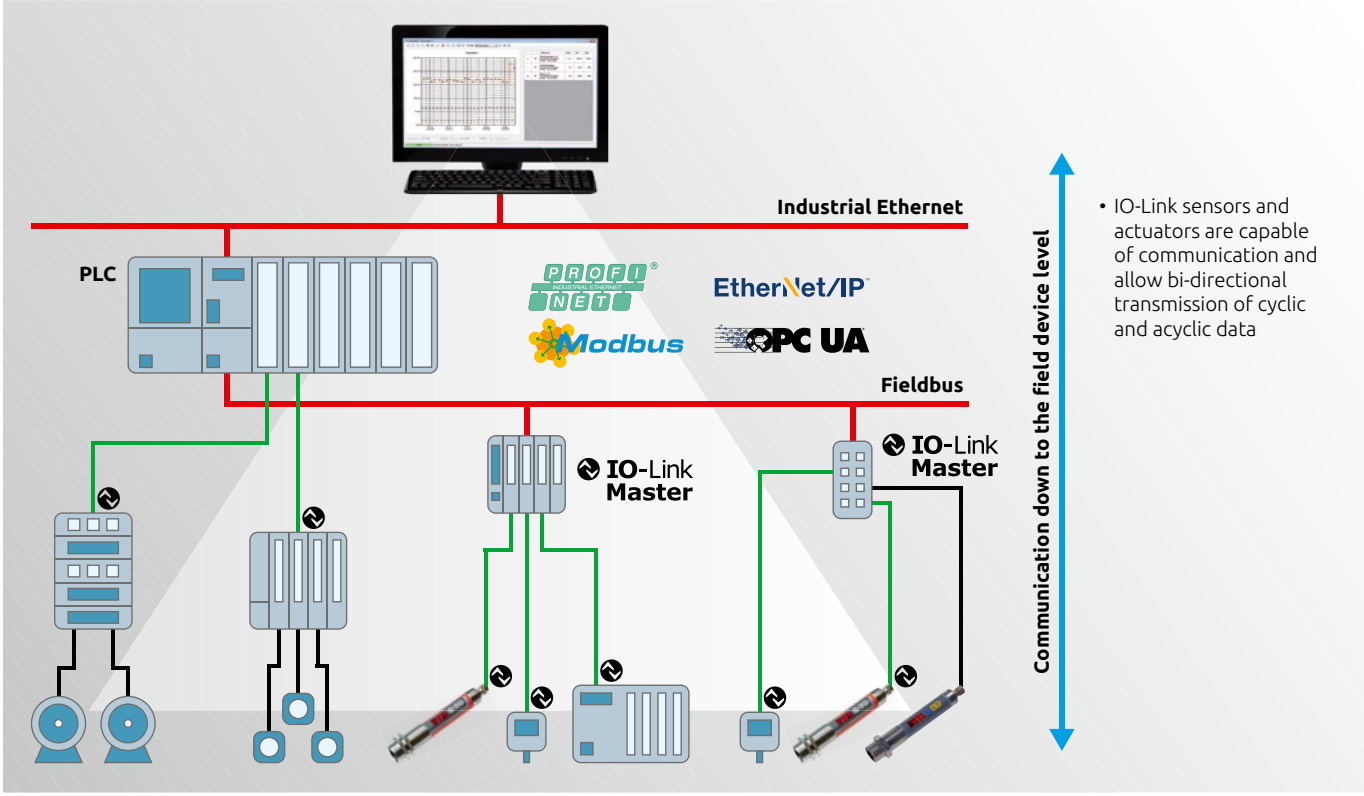
*1 at ε = 1 and Ta = +23 °C  *2 deviation to Ta = +23 °C

## IO Link interface

All devices of the CellaTemp® PK series are equipped with the new IO-Link communication interface according to IEC 61131-9.

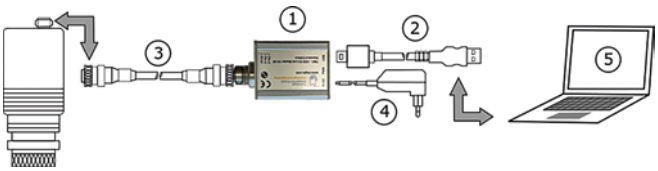
**Advantages of the IO-Link interface**

- Standardised non-proprietary and field-bus- independent interface
- Cost-effective and simple point-to- point connection with a standard cable
- Low wiring costs
- Setting to work is easy
- Data transmission without interference
- Automatic parameter setting with central data backup
- Full transparency down to the lowest field level
- Systematic diagnostic concepts
- Device exchange by plug & play



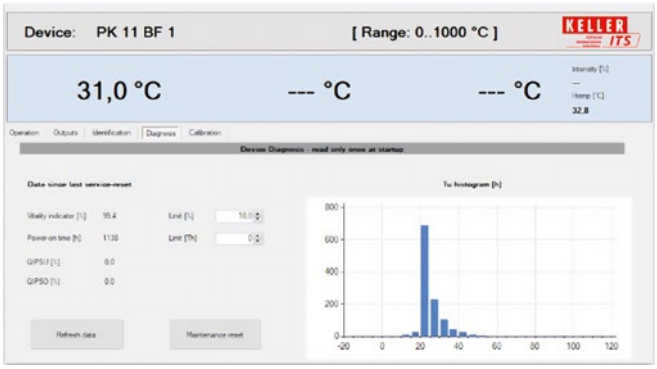

## Operating the pyrometer on the PC via the USB interface

The CellaTemp® PK can also be operated via a PC using an IO-Link USB master.




The VK 03/C communication set includes:

① IO-Link USB master
② USB cable
③ Connection cable
④ Plug-in power supply
⑤ Communication software SW 50




The software can be used to parameterise the pyrometer externally, read out all data, perform a user calibration and record measured values.

## KITS App

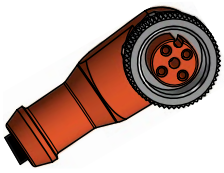
The KELLER KITS App is a digital information and communication platform for the service. It meets the various possibilities of a modern digital service management to provide assistance quickly and easily, at any time and anywhere in the world.

The app provides all the necessary information such as operating manuals, technical drawings, commissioning and maintenance instructions online via tablet or smartphone in 24 languages.

The Troubleshooting Guide supports systematic troubleshooting and finding solutions to technical problems. The ticket system enables quick and easy communication with the KELLER service team.


## Accessories

Shielded cable
VK 02 / L AF 1: 5 m
VK 02 / L AF 2: 10 m

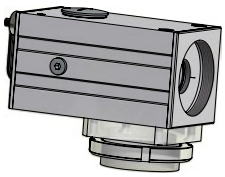


Shielded cable
VK 02/R AF 1: 5 m

Thermal insulating tube
PS 01/K

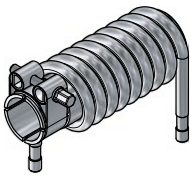
Laser pointer
PK 01/E

Axial air nozzle
PS 01/A AF 1 (M30)
PS 01/A AF 2 (1 1/4")

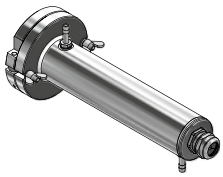


Oscillating mirror
PZ 20 / X AF 5 (± 14.4 °)
PZ 20 / X AF 6 (± 28°)

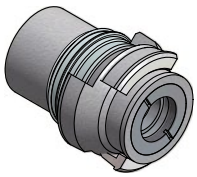
Set of mounting brackets
PS 11/U



Cooling jacket
PK 01/B AF 1

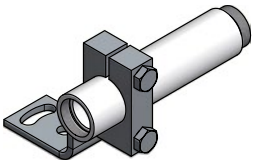


Cooling jacket, sealed
PK 01/C AF 1 (M30)
PK 01/C AF 2 (M65)



Bayonet coupling
PS 11/N AF 4 (G1.1/4")
PS 11/N AF 5 (M30)

90 ° deflection mirror
PS 11/W



Clamping collar
with angle
PS 11/K-35 AF 2

Mounting bracket
PS 11/P

Supplementary lens
PK 11/E (for PK 11)
PK 21/E (for PK 21 / 31)
PS 41/E (for PK 41 / 42)
PS 42/E (for PK 41 / 42)
PS 27/E AF 1
(for PKL 28 / 38 / 68)

Quartz window
PS 01/I AF 2
Sapphire window
PS 15/I
ZnS window adapter
PS 11/D AF 2

Further details on accessories at www.keller.de/its

# Mounting combinations and measuring systems

In addition to the extensive range of accessories, various mounting combinations up to complex measuring systems are available. Details can be found using the 'Mounting combinations' tool on the KELLER homepage.

## Examples of mounting combinations

**Mounting combination PK 21-001**
**consisting of:**

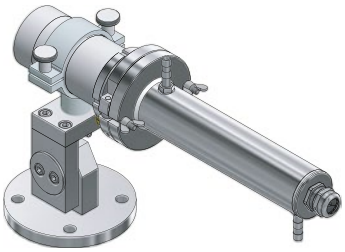
- Air purge PS 01/A AF 1
- Tube cap ZA 01/A AF 1
- Dust stop ZA 01/C AF 1
- Ball flange ZA 01/D AF 1
- Thermal insulation tube PS 01/K AF 1
- Quartz window PS 01/I AF 2
- Intermediate tube ZA 01/M AF 1
- Clamp ZA 01/E AF 1
- Flange ZA 01/I AF 1

**Mounting combination PK 21-004**
**consisting of:**

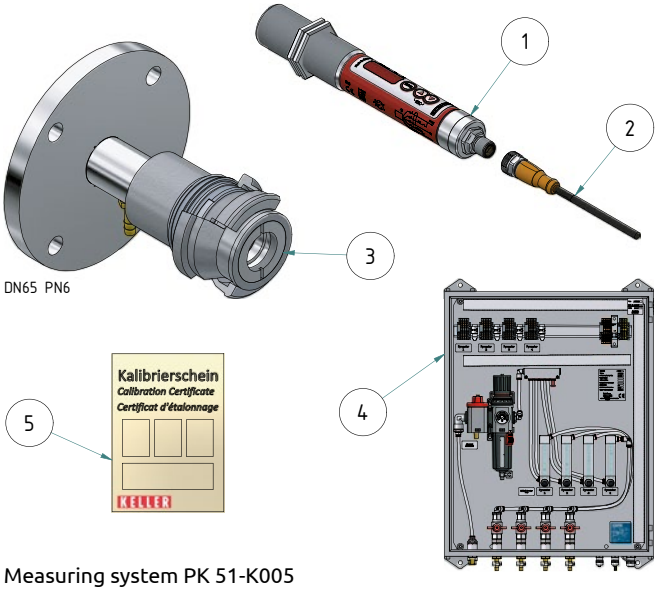
- Air purge PS 01/A AF 1
- Quartz window PS 01/I AF 2
- Bayonet coupling PS 11/N AF 5
- Washer Ø 35 mm
- Flange PK 20/F-70/I AF 1

**Mounting combination PK 01-027**
**consisting of:**

- Cooling jacket, closed PK 01/C AF 2
- Air purge PZ 20/A AF 1
- Clamping collar PZ 20/L AF 2
- Dust stop PZ 20/T
- Intermediate tube PZ 20/J
- Mounting PB 08/Q AF 1
- Flange PB 08/R AF 1



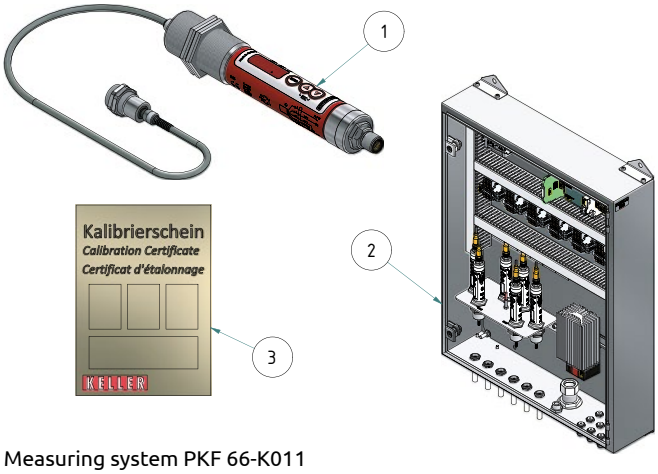
## Examples of measuring systems




**Measuring system PK 51-K005**
**consisting of:**

① Pyrometer CellaTemp PK 51 AF 1/IO
② Cable VK 02/L AF 2
③ Mounting combination PK 15-009, consisting of:
- Sapphire protective window PS 15/I AF 1
- Air purge PS 01/A AF 1
- Bayonet coupling PS 11/N AF 5
- Washer Ø 35 mm
- Flange PK 20/F-130

④ Pneumatic connection box VP 20.08
⑤ Calibration certificate

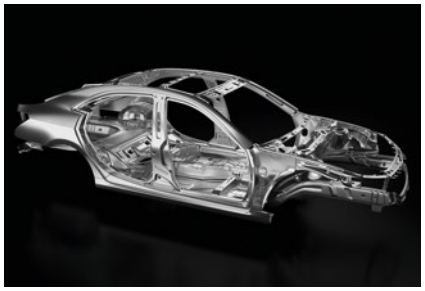



**Measuring system PKF 66-K011**
**consisting of:**

① Pyrometer CellaTemp PKF 66 AF 3/IO
- Fibre optic cable
- Fibre optic measuring head PA 41.05

② Connection box SK 842
③ Calibration certificate

## Applications

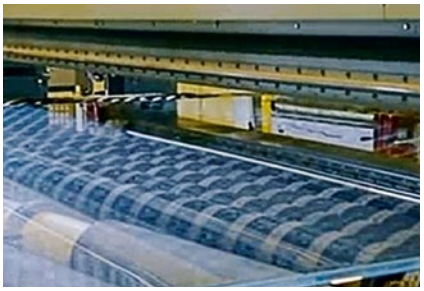

Aluminium

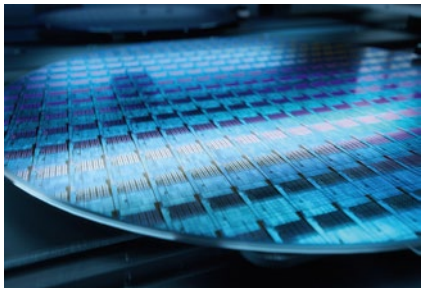

Building materials


Combustion plant

Research and Development


Foundry

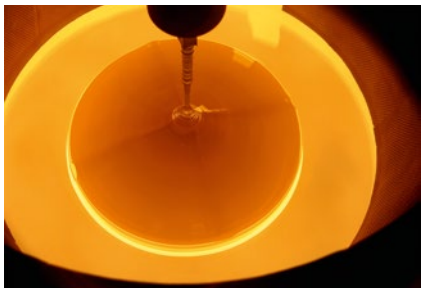

Glass


Semiconductor manufacturing


Blast furnace / Hot-blast stove


Induction


Coking plant


Crystal growing


Furnace


Forge


Continuous casting


Rolling mill

## Other products

**CellaTemp® PA**
Versatile pyrometers with focusable lens, through-the-lens sighting/ laser spotlight or video camera.

**CellaTemp® PA-LWL**
Versatile fiber optics pyrometers with focusable head and laser spotlight.

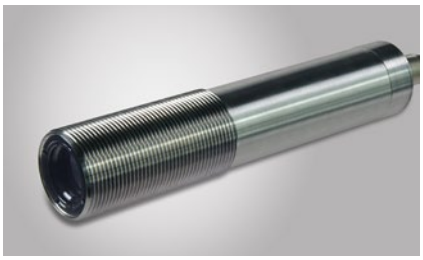
**CellaCast PT**
Portable pyrometer for non-contact temperature measurement of molten metal at automated casting machines and blast furnaces.

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

**CellaTemp® PX**
Pyrometers with IO-Link interface, focusable lens, through the lens sighting or laser spotlight.

**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.



**CellaTemp® PR**
Compact infrared thermometer with analogue output and IO-Link interface.

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 350 models and measuring 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.

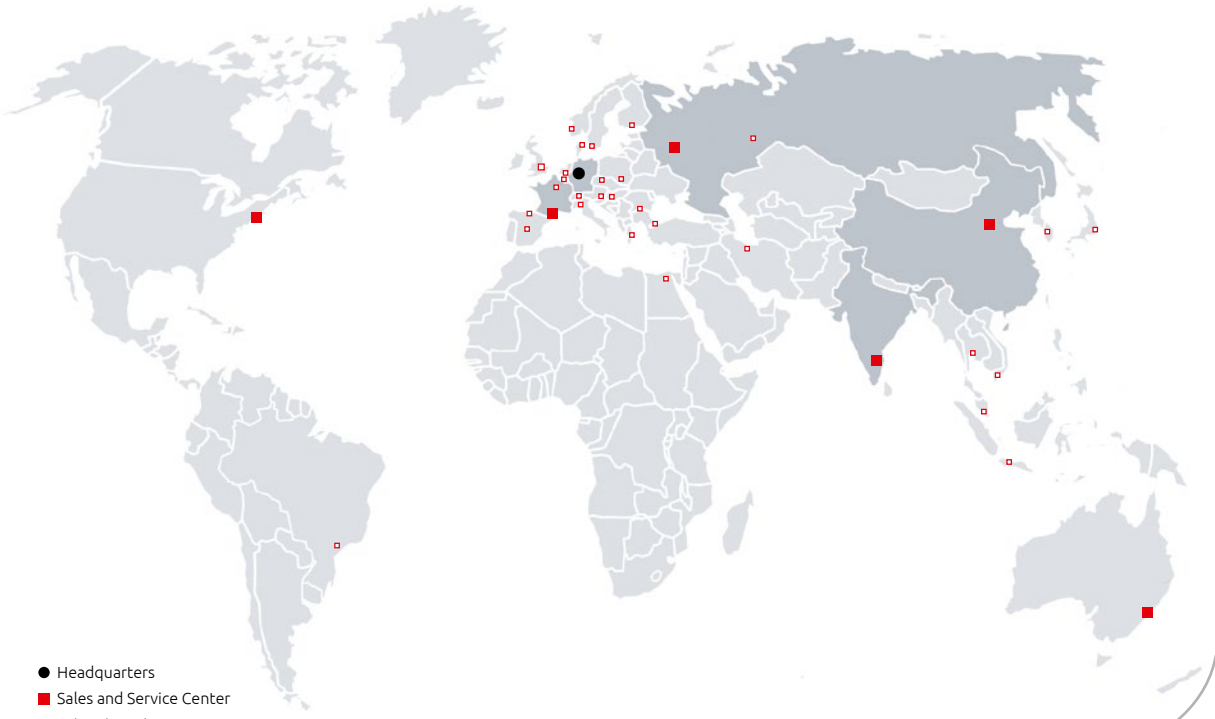
A global network of distributors and service points ensures competent and personal consultation on site.

No 1 in terms of ACCURACY RELIABILITY INNOVATION

KELLER

Creating Solutions

infrared temperature solutions ITS




No 1 in terms of ACCURACY RELIABILITY INNOVATION

IO-Link

PROFIBUS

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