

Pyrometer Series CellaTemp® PS for Non-Contact Temperature Measurements



Quick and exact
temperature measurement
from -30 °C to $+3000\text{ °C}$.



Type Survey

| Type | Description | Measuring ranges |
|--------|-----------------------------|---------------------------------------|
| PS 1x | Low temperature | -30 °C to $+800\text{ °C}$ |
| PS 2x | Universal pyrometers | $+300\text{ °C}$ to $+1400\text{ °C}$ |
| PS 3x | High temperature | $+700\text{ °C}$ to $+2500\text{ °C}$ |
| PS 36 | Fibre optic pyrometers | $+700\text{ °C}$ to $+2500\text{ °C}$ |
| PS 4x | Glass surface pyrometers | $+300\text{ °C}$ to $+2500\text{ °C}$ |
| PS 122 | Infrared temperature switch | $+300\text{ °C}$ to $+1300\text{ °C}$ |

You do not find a suitable version?

For special solutions please do not hesitate to get in touch with us.

KELLER H,C,W,

MEASURING · CONTROL · SYSTEMS

Convince Yourself of the Advantages of the Pyrometer Series CellaTemp® PS

General

- For temperatures from -30 °C to +3000 °C
- Digital signal processing
- No chopper sensors; i. e. no mechanical rotating parts inside the instrument
- Wear and tear free
- No maintenance

Optics

- Very good optical characteristics by application of a precision lens with broad band antireflection coating. The lens is made from semiconductor material (non-hygroscopic)
- Different distance ratios
- Customized focus adjustment
- Smallest target diameter 1.4 mm

Electronics

- Digital construction
- High accuracy due to the use of micro controllers
- Very short response time
- Very large measuring ranges
- Very low energy consumption
- Highly protected from electromagnetic radiation
- Meets the requirements of the law concerning electromagnetic compatibility
EN 50081-2, EN 50082-2

Interface

- Analogue interface 0 (4) to 20 mA linearized

Mechanical Construction

- Robust stainless steel housing
- Compact construction
- Electrical connection via plug
- Protection type IP 65
- Ex-housing available

- Large programme of accessories for high protection of the pyrometer even under very rough environmental conditions

Parameter setting

- Binary adjustable emissivity; externally or via DIP-switches in the plug

Functions

- Automatic temperature control of the instrument with alarm signal; the current output signal increases to 20.8 mA when exceeding the limit temperature

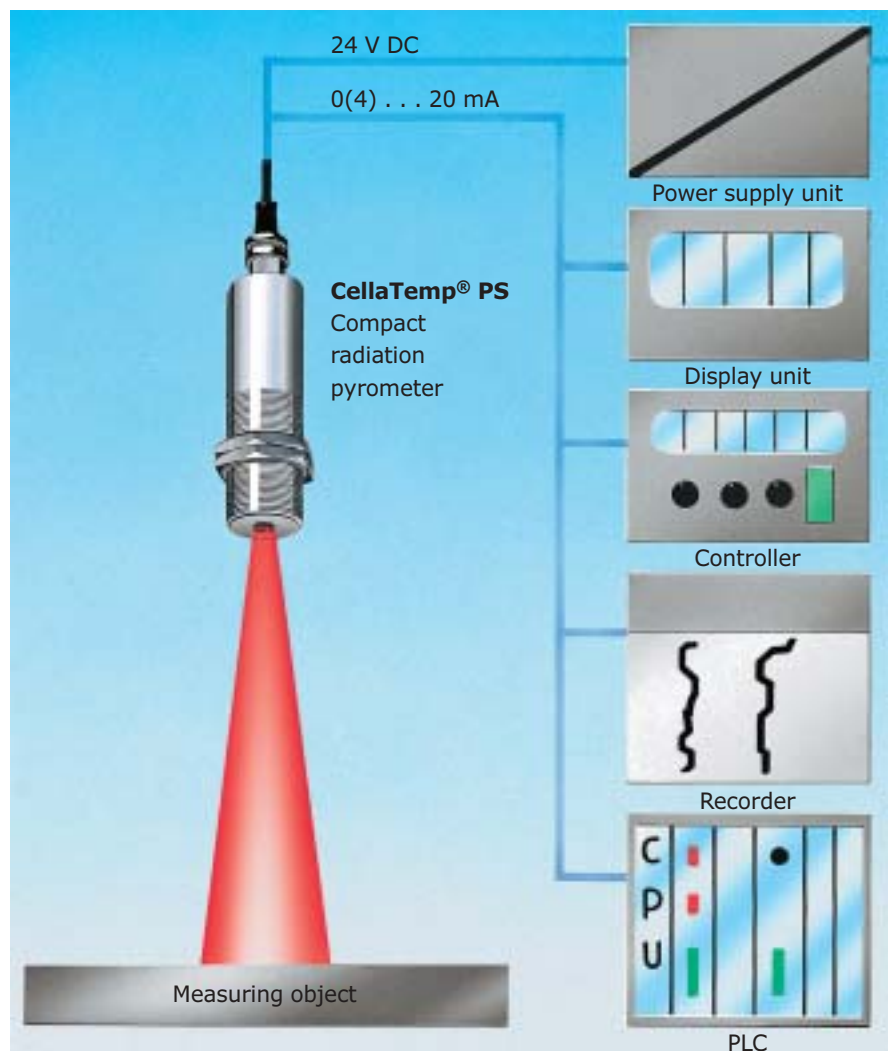
Versions with fibre optic (PS 36)

- Optic and electronics connected by fibre optic cable

- For ambient temperatures up to +250 °C for optic and fibre-optic cable without cooling
- Focussable optic
- Small optical heads of Ø 30 mm or Ø 12 mm
- External spotlight for target marking
- Fibre optic cable screwable at both sides
- Kevlar fibre optic cable (up to +85 °C) or metal-protected fibre optic cable (up to +250 °C)

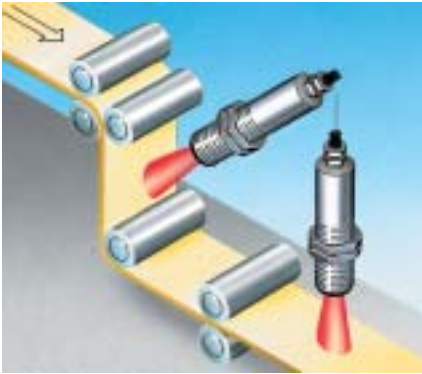
Version as infrared temperature switch (PS 122)

- Open collector output when the temperature limit is exceeded
- Limit temperature, emissivity and inversion of the switching output are adjustable by means of a connecting cable or via DIP switches in the plug
- Measuring range +300 °C to +1300 °C, step size 10 K



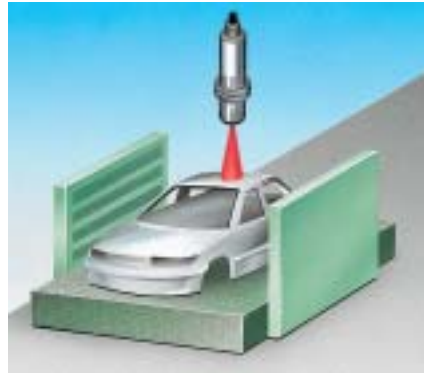
CellaTemp® PS

Examples of Applications



Moving objects or objects which are difficult to access

Process and quality control of textiles, paper, coated sheet metals and plastic foils within seconds



Varnish and paint

Continuous detection and control of temperatures in the varnishing line without damaging the measuring object



Continuous casting plant, rolling mill

Quick temperature detection of slabs and rolled steel plates



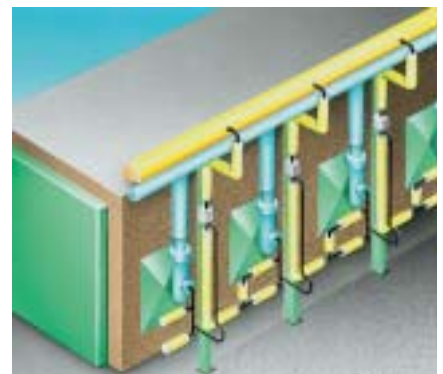
Resin extruders and moulding machines

Temperature and quality control of the heater, the molten resin injector and materials after moulding



Adhesives, asphalt, concrete

Quality control of manufacturing and treatment of adhesives, glue, asphalt, concrete or aggressive substances



Annealing furnace and tunnel kiln, combustion plant

Wear and tear free measuring system for the detection of the direct temperature of load and burning stock for furnace control and documentation

Technical Data of the Pyrometer Series CellaTemp® PS

| Version | | Low Temperature | | | | | |
|------------------------------------|------|----------------------------------|------------------------|----------------------------------|----------------------------------|-----------------|-------------------------------|
| Type | | PS 11 AF... | PS 12 AF... | PS 13 AF... | PS 14 AF... | PS 15 AF... | PS 16 AF... |
| Distance ratio | | 20:1 | 10:1 | 30:1 | 1.5:1 | 10:1 | 25:1 |
| Focal distance | | 300 mm | 300 mm | 1000 mm | 1000 mm | 300 mm | 100 mm |
| Ranges | AF1: | 0 °C to +150 °C | -30 °C to +70 °C | 0 °C to +250 °C | 0 °C to +150 °C | | 0 °C to +150 °C |
| | AF2: | 0 °C to +300 °C | -10 °C to +40 °C | 0 °C to +500 °C | 0 °C to +300 °C | 0 °C to +300 °C | 0 °C to +300 °C |
| | AF3: | 0 °C to +500 °C | | | | | 0 °C to +500 °C |
| | AF4: | 0 °C to +800 °C | | | | | |
| | AF7: | 0 °C to 1000 °C | | | | | |
| Sensor | | Thermopile | | | | | |
| Spectral range | | 8 to 14 μm | | | | | |
| Accuracy (at ε=1 and Tu=+23 °C) | | 1 % of reading at least 1.5 K | AF1:2.0 K AF2:1.5 K | 1 % of reading at least 2.5 K | 1 % of reading at least 1.5 K | | 1% of reading at least 2 K |
| Repeatability | AF1: | 1.0 K | 1.0 K | 1.5 K | 1.0 K | | 1.5 K |
| | AF2: | 1.5 K | 1.0 K | 2.0 K | 1.5 K | 1.5 K | 2.0 K |
| | AF3: | 2.0 K | | | | | 2.5 K |
| | AF4: | 2.5 K | | | | | |
| | AF7: | 3.0 K | | | | | |
| Response time t90 | AF1: | ≤ 100 ms | ≤ 150 ms | ≤ 100 ms | ≤ 100 ms | | 1.5 s |
| | AF2: | ≤ 85 ms | ≤ 150 ms | ≤ 100 ms | ≤ 85 ms | ≤ 100 ms | ≤ 100 ms |
| | AF3: | ≤ 80 ms | | | | | ≤ 85 ms |
| | AF4: | ≤ 80 ms | | | | | |
| | AF7: | ≤ 80 ms | | | | | |
| Resolution | AF1: | 1.0 K | 0.7 K | 1.0 K | 1.0 K | | 1.0 K |
| | AF2: | 1.0 K | 0.5 K | 1.5 K | 1.0 K | 1.0 K | 1.0 K |
| | AF3: | 1.5 K | | | | | 1.5 K |
| | AF4: | 2.0 K | | | | | |
| | AF7: | 2.5 K | | | | | |

Technical Data of the Pyrometer Series CellaTemp® PS

| Version | Universal Pyrometers | | | | |
|------------------------------------|----------------------------------|---------------------|-----------|-----------|-----------|
| Type | PS 21 ... | PS 22 ... | PS 23 ... | PS 24 ... | PS 25 ... |
| Distance ratio | 100:1 | 30:1 | 10:1 | 5:1 | 65:1 |
| Focal distance | 800 mm | 300 mm | 300 mm | 300 mm | 200 mm |
| Ranges | AF1: | +300 °C to +900 °C | | | |
| | AF2: | +400 °C to +1400 °C | | | |
| | AF3: | | | | |
| | AF4: | | | | |
| | AF11: | | | | |
| Sensor | InGaAs-Fotodiode | | | | |
| Spectral range | 1.0 to 1.7 µm | | | | |
| Accuracy (at ε=1 and Tu=+23 °C) | 0.3% of reading but at least 4 K | | | | |
| Repeatability | 3 K | | | | |
| Response time t98 | ≤ 2 ms for T > +600 °C | | | | |
| Resolution | AF1: 1.5 K; AF2: 2.0 K | | | | |
| Switching output | | | | | |
| Hysteresis | | | | | |
| Switching point | | | | | |

Technical Data of the Pyrometer Series CellaTemp® PS

| Version | High Temperature | | | | |
|------------------------------------|--|----------------------|-----------|--|-----------------------------|
| Type | PS 31 ... | PS 32 ... | PS 35 ... | PS 36 (LWL-Pyrometer) | |
| Distance ratio | 100:1 | 30:1 | 65:1 | Sensor 30: 80:1 for AF1 to AF4 | Sensor 12: 50:1 for AF11 |
| Focal distance | 800 mm | 300 mm | 200 mm | 0.15 m to ∞ | 0.12 m to ∞ |
| Ranges | AF1: | +700 °C to +1400 °C | | | |
| | AF2: | +800 °C to +2000 °C | | | |
| | AF3: | +1000 °C to +2500 °C | | +1000 °C to +3000 °C | |
| | AF4: | | | +900 °C to +1600 °C | |
| | AF11: | | | | +700 °C to +1400 °C |
| Sensor | Si-Fotodiode | | | | |
| Spectral range | 0.78 to 1.06 μm | | | | |
| Accuracy (at ε=1 and Tu=+23 °C) | T < +1500 °C 0.3 % of reading T ≥ +1500 °C 0.5 % of reading but at least 4 K | | | T < +1500 °C 0.5 % of reading T < +2500 °C 0.6 % of reading T ≥ +2500 °C 0.75 % of reading but at least 5 K | |
| Repeatability | 3 K | | | 4 K | |
| Response time t98 | ≤ 2 ms for T > +900 °C | | | ≤ 10 ms for T > +900 °C | |
| Resolution | AF1: 1.5 K; AF2: 2.0 K; AF3: 2.5 K, AF4: 1.5 K, AF11: 1.5 K | | | | |
| Switching output | | | | | |
| Hysteresis | | | | | |
| Switching point | | | | | |

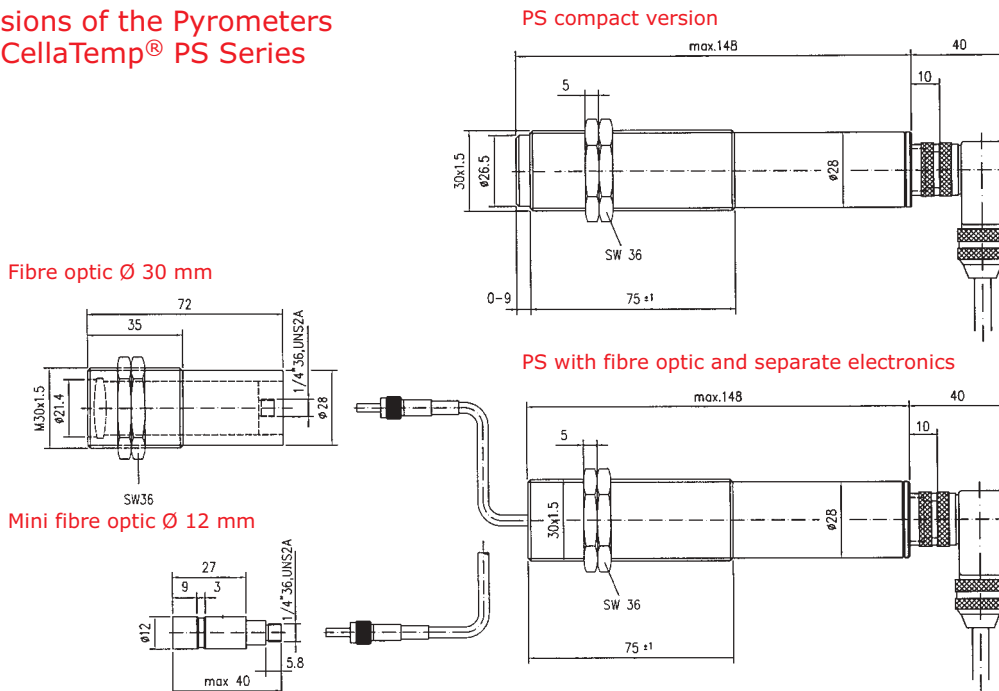
Technical Data of the Pyrometer Series CellaTemp® PS

| Version | Infrared Temp. Switch | Glass Surface Pyrometer | |
|--|---|---------------------------------|----------------------|
| Type | PS 122 | PS 41... | PS 42... |
| Distance ratio | 30:1 | 30:1 | 50:1 |
| Focal distance | 300 mm | 600 mm | 400 mm |
| Ranges | AF1: | +300 °C to +1300 °C | +300 °C to +1300 °C |
| | AF2: | | +700 °C to +1500 °C |
| | AF3: | | +1000 °C to +2500 °C |
| | AF4: | | |
| | AF11: | | |
| Sensor | InGaAs-Fotodiode | Thermopile | |
| Spectral range | 1.0 to 1.7 μm | 4.46 to 4.82 μm | |
| Accuracy (at $\epsilon=1$ and $T_u=+23$ °C) | Switching point 10 K | 1 % of reading but at least 5 K | |
| Repeatability | 5 K | 4 K | |
| Response time t_{98} | Response time of the switch ≤ 4 ms | $t_{90}=0.2$ s | $t_{90}=0.1$ s |
| Resolution | | 3 K | |
| Switching output | Low: ≤ 1.5 V, High $> U_b - 4.5$ V, I out: 50 mA | | |
| Hysteresis | 10 K | | |
| Switching point | Adjustable via cable; Step size 10 K | | |

Common Technical Data

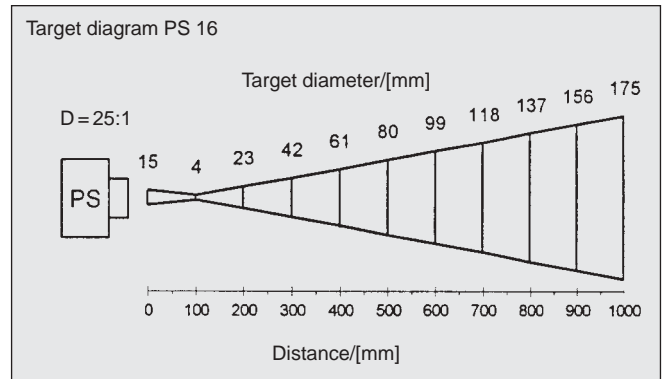
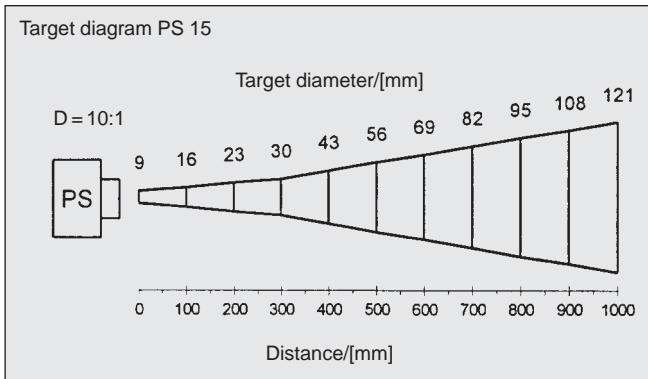
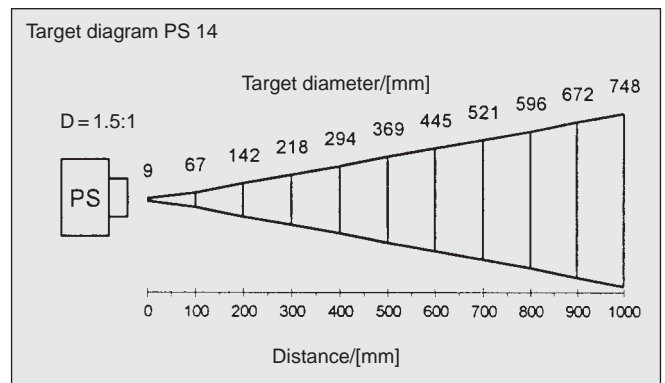
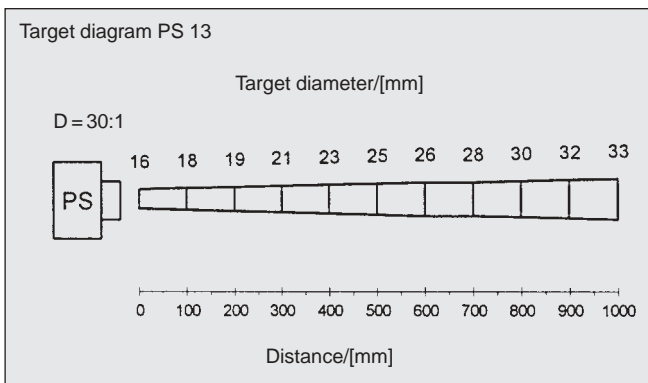
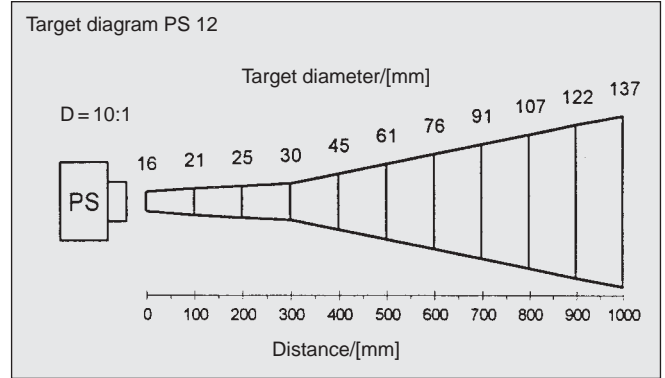
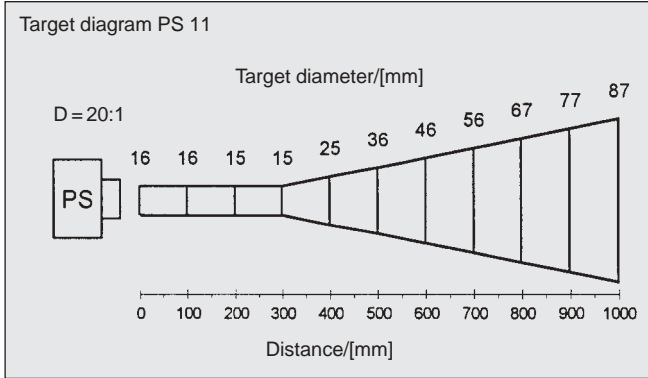
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|--|---|
| Analogue output signal | 0 (4) to 20 mA linearized (except PS 122) |
| Load | Max. 500 Ohm (PS 12: 450 to 500 Ohm) (except PS 122) |
| Dimensions | Ø 30 mm x 190 mm (incl. plug) |
| Emissivity setting | 0.199 to 0.996 in steps of 0.0039 |
| Linearization | Digital with microcontroller; ≥ 255 set points |
| Temperature coefficient (deviation to +23 °C) | 0.07 % of reading/K (PS 12: 0.1 K/K) |
| Electromagnetic compatibility | According to EN 50081-2, EN 50082-2 |
| Power supply | 24 V DC +10-20 %, < 50 mA |
| Storage temperature | -20 °C to +80 °C |
| Ambient temperature | 0 °C to +65 °C (PS 12: 0 °C to +40 °C) |
| Housing material | Stainless steel |
| Electrical connection | With plug |
| Weight | Abt. 0.3 kg |
| Protection | IP 65 |
| Optional Accessories | Calibration certificate according to ISO 9001, calibration certificate according to DKD Large variety of accessories (protecting accessories, digital displays etc.) |

Dimensions of the Pyrometers of the CellaTemp® PS Series



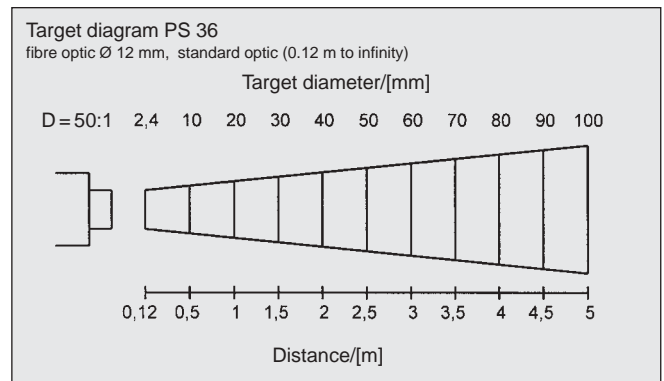
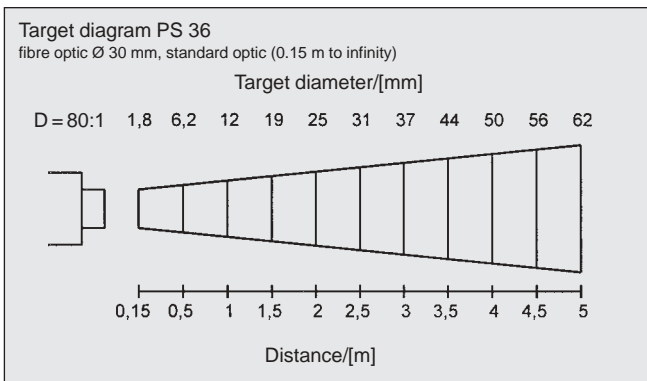
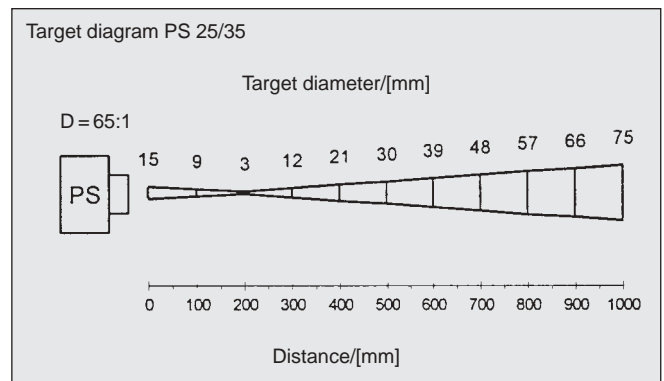
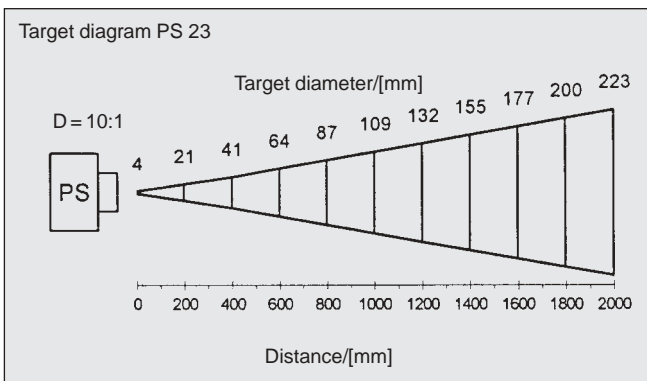
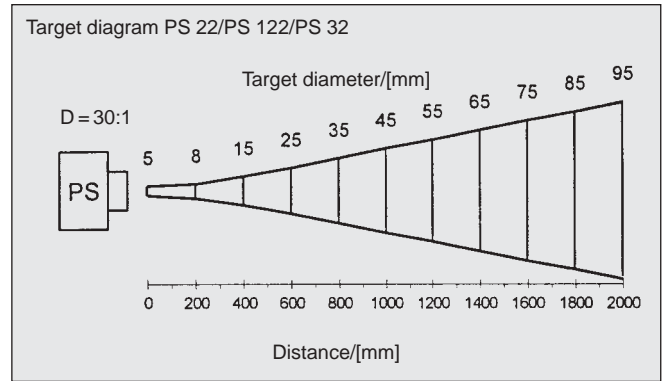
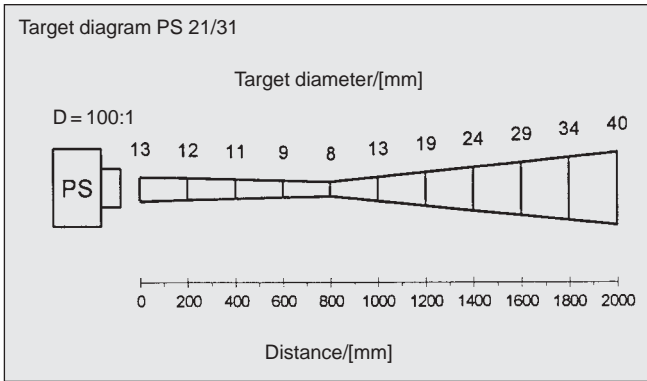
Target Diagrams

Low Temperature Versions

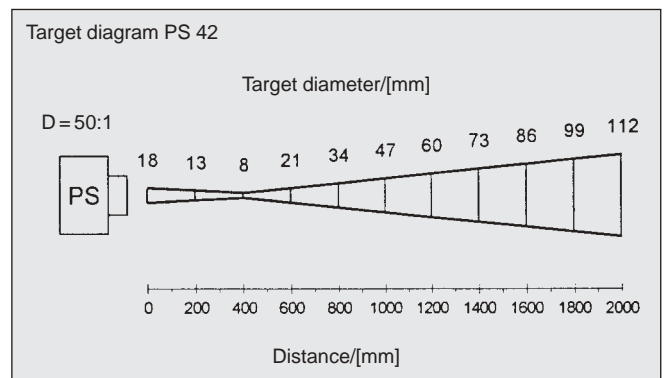
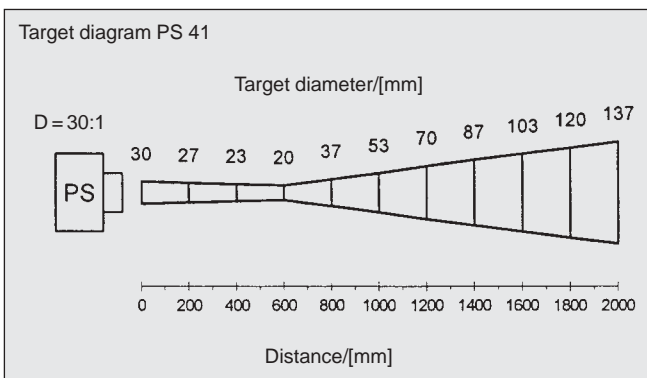


Target Diagrams

Universal Pyrometers and High Temperature Versions



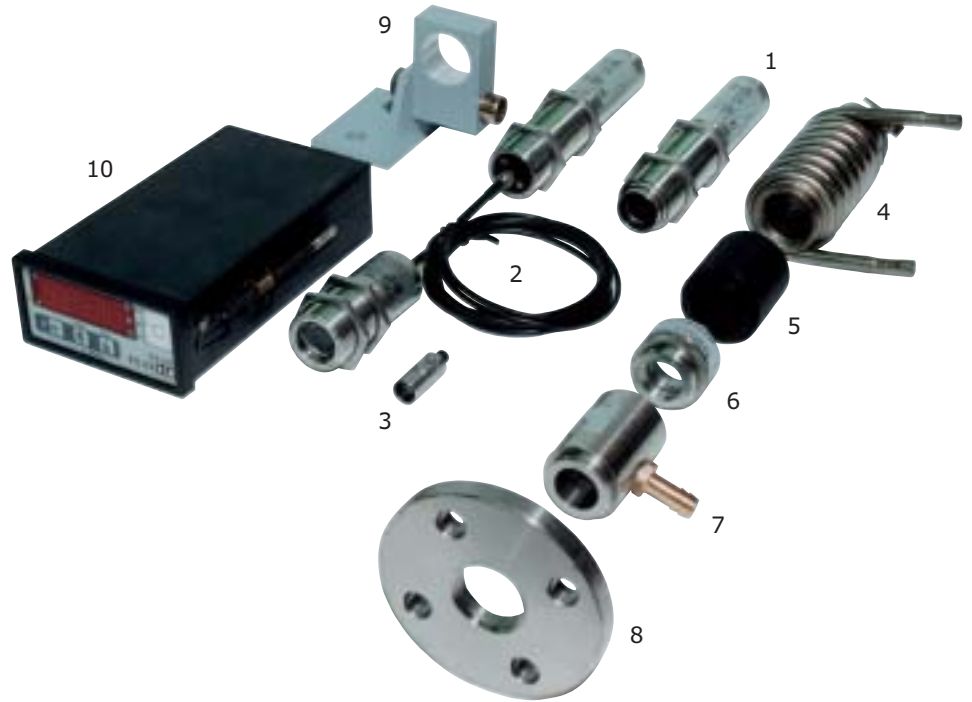
Glass Surface Pyrometers



Accessories and Instruments of the Pyrometer Series CellaTemp® PS

For the pyrometers of the PS series we provide a wide range of protecting accessories to allow operation even under rough industrial conditions.

- (1) Pyrometer PS with cylindrical housing and M-30 thread.
- (2) Pyrometer type PS 36 with fibre optic cable and optical head Ø 30 mm for the use at high ambient temperatures up to +250 °C without cooling.
- (3) Alternatively miniature optical head Ø 12 mm.
- (4) Cooling jacket PS 01/B protects the pyrometer at high ambient temperatures.
- (5) Insulation tube PS 01/K prevents the heat transfer from the hot accessories to the pyrometer.
- (6) Protection glass from quartz type PS 01/I or ZnS type PS 11/D for the protection of the lens of the pyrometer.
- (7) Axial air nozzle PS 01/A is powered with air. The airflow creates an air cushion which avoids the soiling of the optic or of the protection glass.
- (8) Flange PS 01/N can be mounted on the outside wall of the furnace



- for a face side mounting of a complete set of accessories.
- (9) Mounting bracket with angle PS 11/K for a simple installation of the pyrometer.
- (10) Display DA 230 is a programm-

able, universal digital display which provides 24 V DC power supply for the pyrometer. The display provides a lot of helpful functions for the evaluation of the temperature readings.

This set of accessories is an example for the installation of a PS pyrometer on the top of an oven. The surface temperature of the material inside the oven is measured from the outside.

The plastic insulation tube interrupts the heat transfer from the hot accessories to the pyrometer. The quartz glass keeps dust and aggressive gases away from the optic. The air nozzle prevents a soiling of the quartz glass. The sighting tube improves the flushing effect of the air nozzle by increasing the air cushion. That avoids the intrusion of dust and soil. The complete set is installed with the flange and can be adjusted by the ball flange.

Version PS 36 with fibre optic cable is used at high ambient temperatures and can be operated without cooling. The optical head and the fibre optic cable can withstand temperatures up to + 250 °C.



Survey of the Delivery Programme

Non-contact temperature measuring instruments

Portix

Portable pyrometer with data storage and interface. Also available as combination device with probe connector -30 °C to +1999 °C.



Optix

Portable Pyrometer with through-the-lens sighting and focussable interchangeable optics from +250 °C to +2500 °C.



Intensity Comparison Pyrometer Mikro

For high-precision temperature control of small and very small objects in a continuous range from +700 °C to +3500 °C.



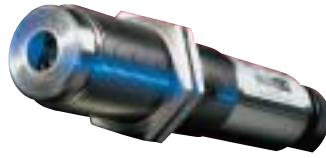
CellaTemp® PM

Digital miniature pyrometer for temperature measurements from 0 °C to +400 °C.



CellaTemp® PS

Digital mini Pyrometer situated in a high grade steel housing Ø 30 x 190 mm for ranges of application from -30 °C to +3000 °C.



CellaTemp® PS 36

Digital Pyrometer with mini fibre optic head Ø 12 mm. +700 °C to +2500 °C.



CellaTemp® PZ

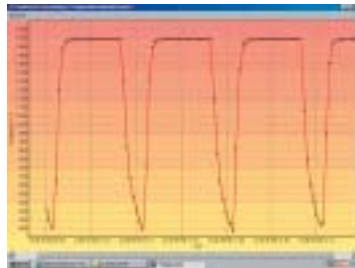
With through-the-lens sighting or fibre optic available as spectral pyrometer or two-colour pyrometer for temperature measurements from 0° C to +3000 °C.



Visualization software

CellaMevis®

CellaMevis® is an industrial software running under Windows® for the real-time display, analysis and filing of temperature readings.



Temperature data logger

CellaLog®

Mainly independent temperature logger -40 °C to +85 °C.



Humidity and temperature measuring instruments

Cellahum® GB

Combined humidity and temperature measuring instrument from 0 to 100 % r. h. or -30 °C to +170 °C for gases as channel or cable version.



System and automation technology

- System solutions for the recording, visualization and filing of measuring values.
- Process control, automation and visualization solutions for weighing, mixing and dosing systems.



KELLER H.C.W.

KELLER HCW GmbH – a member of the CERIC Group

49470 Ibbenbüren-Laggenbeck (Germany) · P. O. B. 2064 · Tel. +49 54 51/85-0 · Fax +49 54 51/85-310 · info@keller-hcw.de · www.keller-hcw.de