Temperature ranges from -30° C to + 2,000° C

Distance-to-target ratio up to 200 :1 for instance 5 mm target at 1 m distance

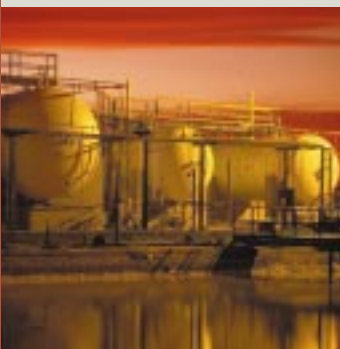**Double-beam or circular laser for exact marking of target area**

Illuminated LCD display menu guided keyboard control

We keep your temperature under control

Checking temperatures during food processing

Thermal controls in chemical plants

Measuring liquids – waste water or other chemical solutions

Portable Infrared Radiation Pyrometer

reference

Precision, Non-Contact Temperature Measurements

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■ *reference*
Portable Infrared Radiation Pyrometer

Innovative in performance and features, designed for ergonomic handling and rugged use, *reference* is your best choice among Infrared Radiation Pyrometers for in-field measurements and preventive maintenance checks.

Precise temperature measurements from -30° C to +2,000°C with a 0.1° C resolution are performed by *reference*.

Exactly-to-the-point or by circular markers the built-in lasers beams indicate the target area. The laser-beams converge on the smallest target spot or form a circular image defining the target size at larger working distances.

Save up to 500 measured data in the *reference* memory – automatically, triggered by internal timer, or manually.

Clear and illuminated display of all relevant measured values, of selected settings, and of saved data.

Flexible PC-software and RS232 interface in the *reference* allow programming of up to 20 different routines and measuring points (tags). The software controls the transfer, display, processing and saving of *reference* data.

Automatic emissivity adjustments are made by *reference* with the aid of a connected thermocouple which senses the surface temperature of heat conducting materials
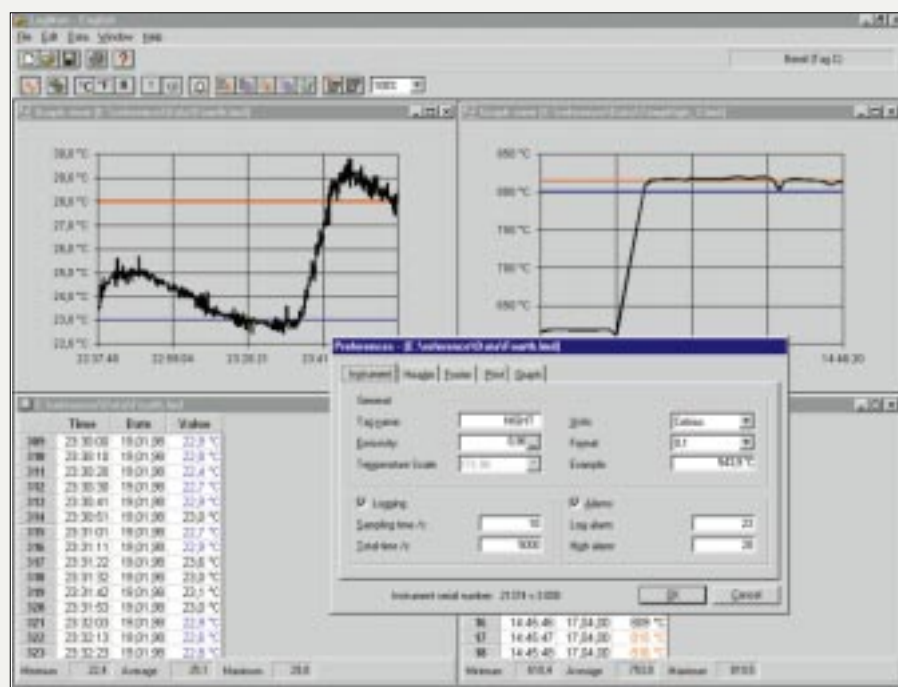

▲ *The display on the rear panel is illuminated by an internal light source.*
◄ *The software delivered with the instruments is running under Windows 95/NT. All measured data are processed for comparison and presented in a graphic chart or in a table. They can be saved, exported or printed as a hard copy.*

■ A Multitude of Applications

Due to the wide range in the spectral response from 0.9 µm to 14 µm, the full variety of known applications can be covered, such as:

▶ *Measurement of glass temperatures during coating processes of monitor screens.*
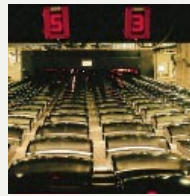
◀ *Thermal controls in textile fabrication*

▶ *Precise monitoring of temperatures during metal forming and manufacturing processes.*

◀ *... and in continuous paper processing*

▶ *Checking surface temperatures in painting and coating.*

◀ *Thermal monitoring during fermentation and sterilization procedures in the food processing industry.*

Depending on the requirements of the specific application, the target can be identified exactly by a doublebeam or circular shaped laser. This unique feature allows precise pointing of the instrument to the target center or to the target area at different working distances.

reference 5

Field of view	10	24	60	100	mm

Distance	600	1000	2000	3000	mm

▲ *reference 5 measures the temperature of a target area of 10 mm diameter at a distance of 600 mm. The target area is identified by a circular laser.*

reference 10, 13, 20

Field of view reference 10	10	40	70	mm
Field of view reference 13	6	30	55	mm
Field of view reference 20	5	25	45	mm

Distance	1000	2000	3000	mm
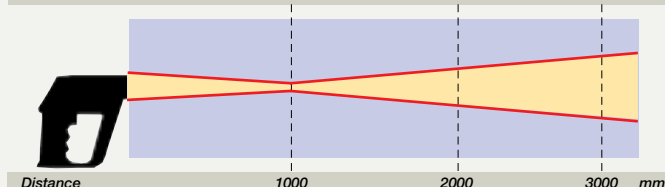
▲ *Infrared Radiation pyrometers reference 10,13 and 10 can measure targets as small as 5 mm at a working distance of 1 m. The position of the target is marked by a double-beam laser.*

■ Innovative Features

Acoustical and optical alarms indicate the transgression of set *reference* thresholds.
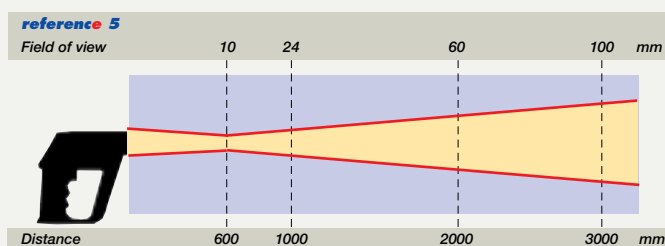
Integrated or punctual measurements of ambient temperatures surrounding the target area are processed by *reference* for emissivity corrections.

Real time calculations of average, minimum and differential temperatures are performed by *reference*.

**Selectable** temperature unit, Celsius, Fahrenheit, or Kelvin, are displayed by *reference*.

Continuous operation of *reference*, including data saving, for 18 hours with fully charged batteries.

Menu guided selection of all *reference* parameters, such as emissivity, ambient temperature, temperature unit, recording data, alarm thresholds, acoustical alarm, analog output, thermocouple input, etc.

General Specifications

Temperature resolution (NETD)	Depends on measured temperature typical value ±0,2° C
Accuracy	±1° C ±0.5% (reference 13 and 20) of the difference between target temperature and housing temperature ±1° C ±1% (reference 5 and 10)
Accuracy as a function of housing temperature	±0.01%/° C of housing temperature deviation from 23° C
Reproducibility	±1° C ±0.5% (reference 13 and 20) ±1° C ±0.25% (reference 5 and 10)
Display	LCD, automatically illuminated at darkness
Temperature units	Celsius, Fahrenheit, or Kelvin switchable
Resolution of display	1° C and 0.1° C, or 1° F and 0.1° F, or 1 K and 0.1 K
Emissivity setting	Adjustable on keyboard from 0.10 to 1.00
Signal functions	Hold, average, maximum, minimum and differential temperature values
Data memory	500 measured values tagged for measured point
Response time	<300 msec
Analog output	1 mV/° C or 1 mV/° F, linear
Digital interfaces	Bi-directional TTL level or RS232 interface
Alarms (High and Low)	Set-points with acoustical alarm
Thermocouple input	Type K -20° C to 1,370° C; Type S -50°C to 1,760° C
Power requirements	alkaline or rechargeable batteries
Operating hours	18 hours, 12 hours with turned on laser
Permissible ambient temperatures	-5° C to 55° C
Weight	approximately 0.8 kg
Housing	ABS, metalized, shock resistant (fiber reinforced)

Models, Applications, and Available Options

Models	reference 5	reference 10	reference 13	reference 20
Applications	Plastics, paint, glass, food construction materials, liquids…		metals, metal oxides, bulk glass,furnaces	
Temperature range	-30° C…930° C	-30° C…1000° C	300° C…1300° C	600° C…2000° C
Field of view	10 mm @ 600 mm	10 mm @ 1000 mm	6 mm @ 1000 mm	5 mm @ 100 mm
Target identification	Cicular shaped laser	double-beam laser	double-beam laser	double-beam laser
telescope	--	--	○	○
High- and low alarms integrated	●	●	●	●

Modellversion	S	Standard	P
Data memory, incl. PC-software and cable, RS232 interface	--	○	●
Analog output	--	○	●
Rechargeable batteries and charger	--	○	●
Vinyl bag	●	●	●
Aluminum carrying case	○	○	○

● = features included, ○ = optional features, -- = options not possible

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