IP 140

Highly accurate, fully digital, fast

Pyrometer with focussable optics for non-contact temperature measurements on metals, ceramics, graphit etc. between 50 and 1300°C

- Temperature ranges between 50 and 1300°C

- Short response times, min. 1.5 ms

- Extremly small spot sizes, min 0.25 mm

- Built in digital display with temperature indication

- Optimized thru-lens view finder or laser targeting light

- Test current output

- Housing with precision mounting rail for safe mounting and accurate alignement

- Interface RS232 / RS485 switchable

- Focussable otics

The **IP 140** is a digitial, highly accurate pyometer for non-contact temperature measurement on metals, ceramics, graphit etc.
For optimal adaption of the intrument to the application 3 different focussable optics with extremly small spot sizes are available.
The pyrometer parameters can be selected via the integrated key pad, the settings are indicated on the built-in LC-Display. In measuring mode the actual temperature is indicated.

The pyrometer is equipped with the serial interfaces RS232 and RS485 (switchable inside the pyrometer). This enables additionally the reading of temperature and pyrometer parameters via the providet PC-software *InfraWin.* If necessary the parameters also can be changed via PC.
A laser targeting light or thru-lens view finder for exact alignement of the pyrometer is available.

Typical applications:

- preheating
- annealing
- tempering
- welding
- forging
- hardening
- sintering
- melting
- soldering
- rolling
- brazing
- normalizing

Technical Data

Temperature ranges:	MB 4: 50 ... 400°C MB 12: 160 ... 1200°C MB 5.5: 75 ... 550°C MB 13: 200 ... 1300°C MB 7: 100 ... 700°C
Subrange:	any range adjustable within the temperature range, minimum span 51°C
Spectral range:	2 ... 2.8 µm
Signal processing:	alternating light signal, digitized immediately
Accuracy: (ϵ = 1, t_{90} = 1 s, T_U = 23°C)	below 400°C: 2°C above 400°C: 0.3% of measured value in °C +1°C
Repeatability:	0.1 % of measured value in °C + 1°C
Resolution:	interface: 0.1°C, analog output: < 0.1 % of temperature range
Response time t_{90}:	1.5 ms, with dynamical adaption at low signal levels; adjustable up to 10 s
Emissivity ϵ:	0.100 ... 1.000 adjustable in steps of 0.001
Analog output:	linear 0 ... 20 mA or 4 ... 20 mA, DC, switchable; load max. 500 Ohm
Power supply:	24 V AC/DC (14 ... 30 V AC/DC) (AC: 48 ... 62 Hz)
Power consumption:	max. 6 VA
Sighting:	laser targeting light or thru-lens view finder
Serial interface:	switchable inside the pyrometer: RS232 or RS485 addressable, half duplex; baud rate up to 115 kBd
Parameters:	adjustable at the instrument or via serial interface: emissivity; response time; analog output; address; baud rate; waiting period t_W; °C or °F; setting of the maximum value storage; temperature sub range
Maximum value storage:	single or double storage; cleared by: - preselected time interval - external deletion contact or via digital interface - automatically with the next measuring object
Test current output:	fixed 10 mA (for 0 ... 20 mA analog output) or fixed 12 mA (for 4 ... 20 mA analog output)
Isolation:	power supply, digital interface, analog output are galvanically isolated against each other and housing
Protection class:	IP65 (nach DIN 40 050)
Ambient temperature:	0 ... 53°C at housing
Storage temperature:	-20 ... 60°C
Weight:	approx. 550 g
Dimensions [mm]:	195 x 56 x 62,5 (L x B x H)
CE-label:	according to EU directives about electromagnetic immunity

Advantages of the digital signal processing

The signal processing of series 140 pyrometers is made fully digitally, i.e. the detector signal will be digitized immediately and digitally processed. With this technique an extremly high accuracy and repeatability as well as very long measuring ranges are achieved.

Accuracy:	The high accuracy will be achieved by the digital linearisation of the sensor output as well as the digital compensation of the ambient temperature.
Temperature range:	Due to the digital technique the user can set any temperature sub range within the full temperature range. The minimum span of the sub range is 51°C. The analog measuring output corresponds automatically to the selected sub range. This setting of a sub range can be done without recalibration of the pyrometer and does not effect the high accuracy and repeatability. As almost any sub range is adjustable, the storage of spare instruments or the replacement of other pyrometers is simplified.
Output:	The analog measuring outputs 0 ... 20 mA or 4 ... 20 mA are selectable as well as the serial digital interfaces RS232 or RS485. Additionally the interface allows the controlling of the pyrometer via PC.
Bus control:	The serial interface RS485 facillitates the integration of the pyrometer in existing field bus systems.
Calibration:	If a suitable calibration source is available, a calibration of the pyrometers can be done via serial interface without opening the housing.

**Built-in
LC-Display**

Optics

The pyrometer is available with 3 different focussable optics. They are offering the smallest possible spot size at any distance. The adjustment can be done easily without additional tools with help of the „turn and clamp" mechanism (one hand). The spot sizes are shown in the following table.
The different optics are exchangeable without recalibration of the pyrometer.
For measuring distances „a" within the values in the table also the spot sizes „M" are within the values in the table.

Measuring distance a	Spot size M				
	50 ... 400°C	75 ... 550°C	100 ... 700°C	160 ... 1200°C	200 ... 1300°C
Optics 1-P: (distance 100 ... 133 mm)					
100 mm	2.1 mm	0.85 mm	0.6 mm	0.4 mm	0.25 mm
120 mm	3.1 mm	1.3 mm	0.85 mm	0.5 mm	0.35 mm
133 mm	3.9 mm	1.6 mm	1 mm	0.6 mm	0.4 mm
Optics 2-P: (distance 190 ... 340 mm)					
190 mm	3.6 mm	1.5 mm	1 mm	0.7 mm	0.35 mm
260 mm	5.8 mm	2.4 mm	1.6 mm	1.1 mm	0.6 mm
340 mm	8.2 mm	3.4 mm	2.3 mm	1.6 mm	0.8 mm
Optics 3-P: (distance 350 ... 2600 mm)					
350 mm	6.5 mm	2.7 mm	1.85 mm	1.25 mm	0.65 mm
1200 mm	28 mm	11.5 mm	7.8 mm	5.2 mm	2.6 mm
2600 mm	63 mm	26 mm	17.5 mm	11.6 mm	5.8 mm

Aperture D (depends on the objective distance): Basic temperature range up to 700°C: 14 ... 16 mm;
Basic temperature range above 700°C: 8 ... 9 mm

Reference numbers

Pyrometers (basic instruments are equipped with laser targeting light):

3 875 500	IP 140, MB 4	50 ... 400°C
3 875 520	IP 140, MB 5.5	75 ... 550°C
3 875 540	IP 140, MB 7	100 ... 700°C
3 875 560	IP 140, MB 12	160 ... 1200°C
3 875 580	IP 140, MB 13	200 ... 1300°C

Optional:
Thru-lens view finder instead of laser targeting light (*add* **010** to the basic instruments ref. number, e.g. 3 875 510 instead of 3 875 500)

Ordering note:
When ordering please select one focussable optics.
A connection cable is not included in scope of delivery and and has to be ordered separately.

Ordering example:

|	
3 875 570	IP 140 with thru-lens view finder, focussable optics 2-P, temperature range 160 ... 1200°C
3 820 530	connection cable, length 10 m, with 90° connector

Scope of delivery: Pyrometer with focussable optics, *InfraWin* operating and analizing software
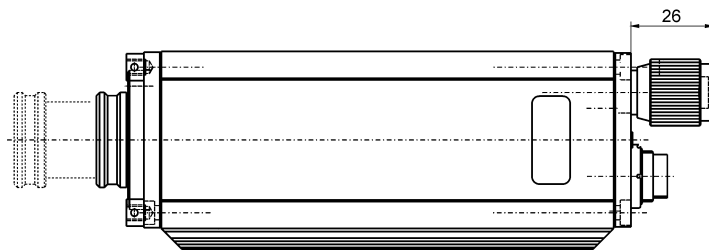
Accessories:

3 820 340	connection cable, length 5 m, 90° connector	3 837 240	cooling plate
3 820 530	connection cable, length 10 m, 90° connector	3 835 280	90° mirror
3 820 540	connection cable, length 15 m, 90° connector	3 843 520	rugged scanner SCA 140, (scanning angle adjustable 0 ... 12°, scanning frequency adjustable 1 ... 5 Hz), with quarz glass window
3 820 830	connection cable, length 20 m, 90° connector		
3 820 840	connection cable, length 25 m, 90° connector		
3 820 550	connection cable, length 30 m, 90° connector	3 835 290	air purge for scanner SCA 140
3 820 330	connection cable, length 5 m, straight connector	3 852 540	power supply NG 0D for DIN rail mounting; 85 ... 265 V AC ⇒ 24 V DC, 600 mA
3 820 500	connection cable, length 10 m, straight connector		
3 820 510	connection cable, length 15 m, straight connector	3 852 550	power supply NG 2D, as NG 0D: additionally with 2 limit switches
3 820 810	connection cable, length 20 m, straight connector		
3 820 820	connection cable, length 25 m, straight connector	3 890 640	LED digital display DA 4000-N
3 820 520	connection cable, length 30 m, straight connector	3 890 650	LED digital display DA 4000: with 2 limit switches
3 820 740	connection cable, length 5 m, straight connector, temperature resistant up to 200°C	3 890 560	LED digital display DA 6000-N: with possibility for pyrometer paramter settings for digital *INFRATHERM* pyrometers; RS232 interface
3 820 750	connection cable, length 5 m, 90° connector, temperature resistant up to 200°C		
3 834 280	adjustable mounting angle	3 890 520	LED digital display DA 6000; DA 6000-N additional with 2 limit switches and analog input and output
3 834 270	ball and socket mounting		
3 835 230	air purge		
3 837 290	cooling jacket, stainless steel	3 890 660	IP 65 front cover for LED digital displays
3 835 060	air purge for cooling jacket	3 826 500	HT 6000, portable battery driven indicator and instrument for pyrometer parameter setting

Dimensions

Pyrometer with
laser targeting light

26   10 5   154   43.5

4

5.5

56
46
44
4 x M5
depth 5

46   56   62.5

8
5
20.2
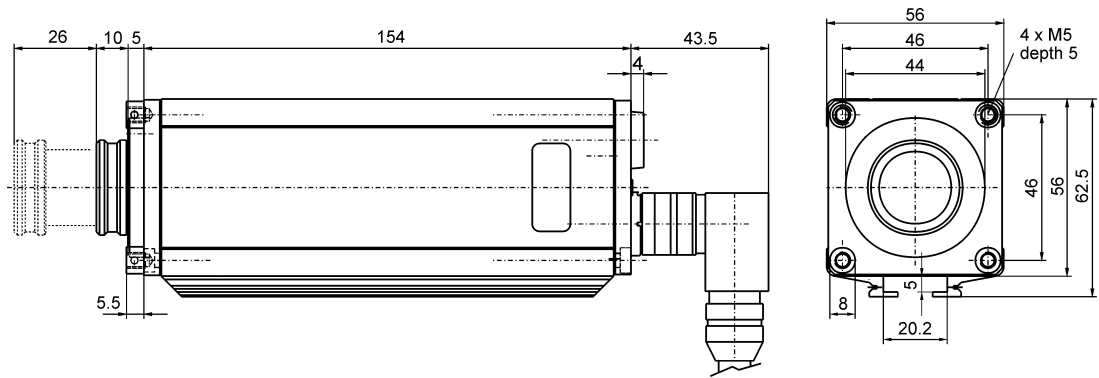
Pyrometer with
thru-lens view finder

26

All dimensions in mm

Overview Accessories

60
25
20
5
101
50
4.2
ø72

Ball and socket
mounting

mounting angle

40
7   20
100°
50
5.2
5.2

36.8   6.4
6
8
34
40
60
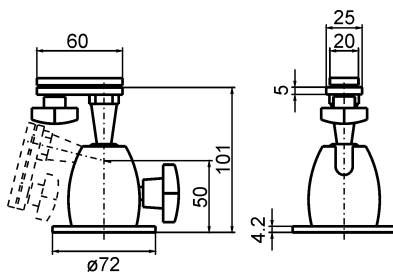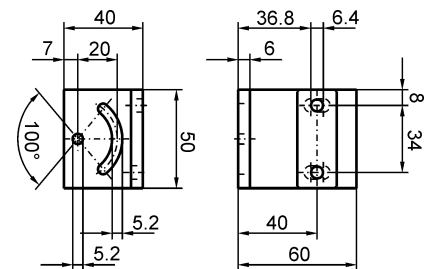
Cooling plate

90° mirror

air purge

Stainless steel
cooling jacket

Scanner
for small angles up to 12°

1362

LED digital display

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Temperature Measurement

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Specifications are subject to change without notice