

IMPAC pyrometers with focusable optics for non-contact temperature measurements on metals, ceramics, graphite etc. with temperature ranges between 5 °C and 1300 °C

## IPE 140



- Short response times, min. 1.5 ms
- Small spot sizes, min 0.9 mm
- Built-in digital display with temperature indication
- Parameter adjustments via integrated key pad or interface
- Optimized through lens view finder or laser targeting light
- Test current output
- Housing with precision mounting rail for safe mounting and accurate alignment
- Interface RS232 / RS485 switchable
- Focusable optics



The IPE 140 is a digital, highly accurate pyrometer for non-contact temperature measurement on metals, ceramics, graphite, etc.

Different focusable optics with extremely small spot sizes are available for optimal match of the instrument to the application.

The pyrometer parameters can be selected via the integrated key pad. These settings are indicated on the built-in LCD Display. In measuring mode, the actual temperature is indicated.

The pyrometer is equipped with RS232 and RS485 serial interfaces (switchable inside the pyrometer). This enables the reading of temperature and pyrometer parameters via the provided InfraWin PC-software. If necessary, the parameters also can be changed via PC.

A laser targeting light or through lens view finder for exact alignment of the pyrometer is available.

### Typical applications:

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

# Technical Data

## Measurement Specifications

Temperature Ranges:	5 - 350 °C (MB 3.5) 5 - 500 °C (MB 5) 30 - 1000 °C (MB 10) 50 - 1200 °C (MB 12)
Sub Range:	Any range adjustable within the temperature range, minimum span 51 °C
Spectral Range:	3 - 5 µm
Signal Processing:	Alternating light signal, digitized immediately
Measurement Uncertainty:	MB 3.5: below 250 °C: 1 °C above 250 °C: 0.4% of reading in °C + 1 °C ( $\epsilon = 1$ , $t_{90} = 1$ s, $T_{amb} = 23$ °C) All others: below 400 °C: 2.5 °C above 400 °C: 0.4% of reading in °C + 1 °C
Repeatability:	MB 3.5: 0.1% of reading in °C + 0.2 °C All others: 0.1% of reading in °C + 1 °C
Resolution:	Interface and display: 0.1 °C, analog output: < 0.03% of temperature range
Emissivity $\epsilon$ :	10 to 100% adjustable in steps of 0.1%

## Interface

Sighting:	Laser targeting light (max. power level < 1 mW, $\lambda = 630-680$ nm, CDRH class II) or through lens view finder
Parameters:	Adjustable at the instrument or via serial interface: emissivity; exposure time; analog output; address; baud rate; waiting period; °C or °F; setting of the maximum value storage; temperature sub range



**Note:** The determination of the technical data of this pyrometer is carried out in accordance with VDI/VDE IEC TS 62942-2, the calibration / adjustment in accordance with VDI/VDE 3511, Part 4.4. See <http://info.lumasenseinc.com/calibration> for more information.

## Communication

Exposure Time $t_{90}$ :	1.5 ms, with dynamical adaption at low signal levels; adjustable up to 10 s
Analog Output:	Linear 0 to 20 mA or 4 to 20 mA, DC, switchable; load max. 500 Ohm
Test Current Output:	Fixed 10 mA (for 0 to 20 mA analog output) or fixed 12 mA (for 4 to 20 mA analog output)
Serial Interface:	Switchable inside the pyrometer: RS232 or RS485 addressable, half duplex; baud rate up to 115 kBd
Maximum Value Storage:	Single or double storage; cleared by: preselected time interval or external deletion contact or via digital interface or automatically with the next measuring object

## Environmental Specifications

Protection Class:	IP65 (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 W x D)
Mechanical Tests:	Vibration proof corresponding DIN EN 60068-2-6, shock proof corresponding DIN EN 60068-2-27
Relative Humidity:	Non condensing conditions
CE Label:	According to EU directives about electromagnetic immunity

## Electrical

Power Supply:	24 V AC/DC (14 to 30 V AC/DC) (AC: 48 to 62 Hz)
Power Consumption:	Max. 6 VA
Isolation:	Power supply, digital interface, analog output are galvanically isolated against each other and housing

# Advantages of the Digital Signal Processing

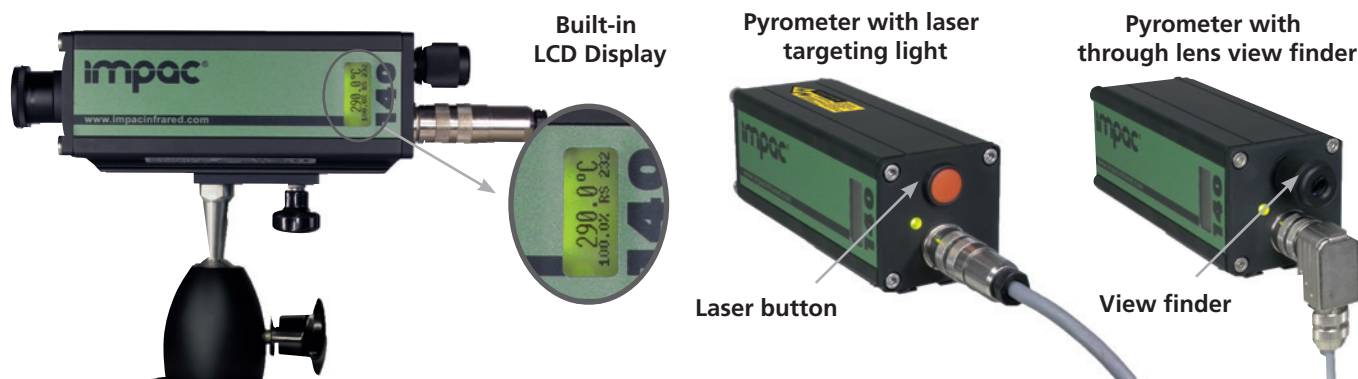
The signal processing of series 140 pyrometers is fully digital, i.e. the detector signal is digitized immediately and digitally processed. With this technique, an extremely high accuracy and repeatability as well as very long measuring ranges are achieved.

**Accuracy:** The high accuracy is achieved by the digital linearization 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 automatically corresponds to the selected sub range. This setting of a sub range can be done without recalibration of the pyrometer and does not affect 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.

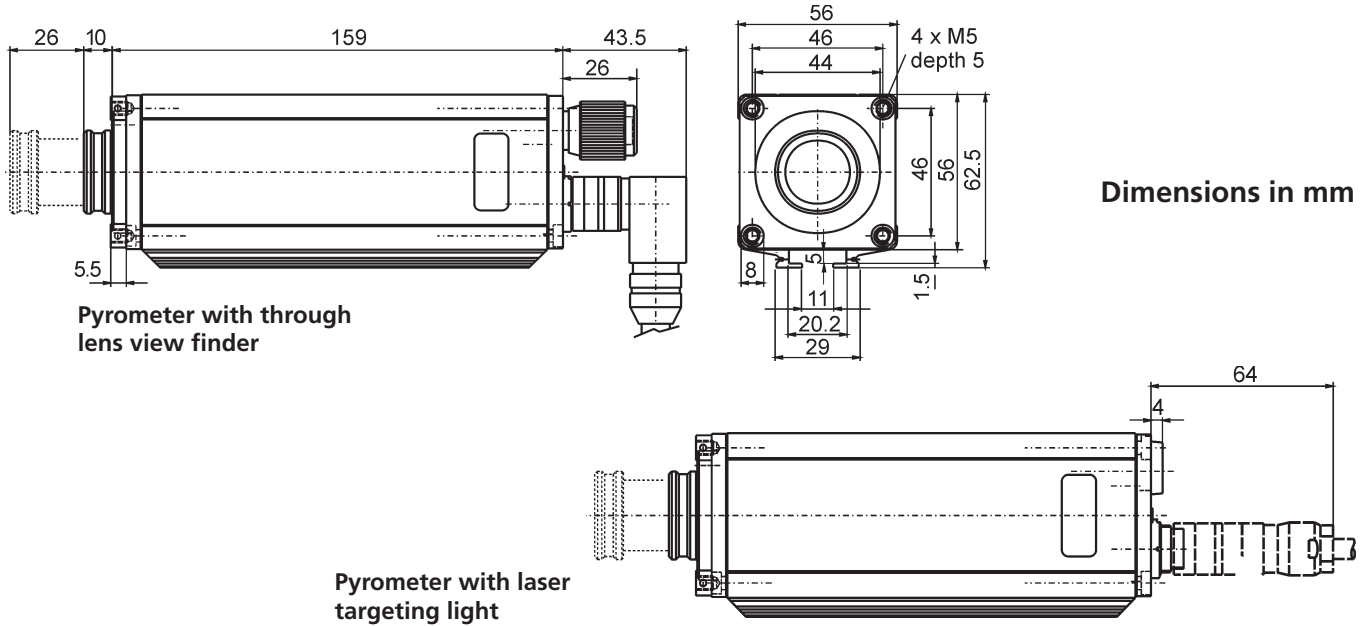
**Output:** The analog measuring outputs 0 to 20 mA or 4 to 20 mA are selectable as well as the serial digital interfaces RS232 or RS485. The interface also allows the pyrometer to be controlled via the PC.

**Bus control:** The serial interface RS485 facilitates the integration of the pyrometer into 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.



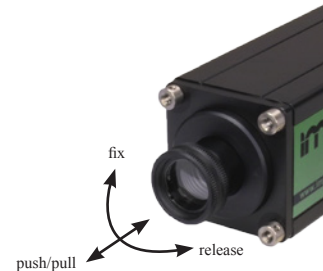
## Product Schematic



## Optics

The pyrometers are available with different focusable optics. They offer 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 (all distances are measured from the front of the lens). The different optics are exchangeable without recalibration of the pyrometer. For spot sizes between those in the table, values can be found by interpolation.

IPE 140					
Optics	Meas. distance a [mm]	Spot size $M_{90}$ [mm]			
		MB 3.5	MB 5	MB 10	MB 12
0-PE	71	2.4	1.6	-	-
	78	3.0	2.0	-	-
	90	3.6	2.4	-	-
1-PE	105	3.6	2.4	1.1	0.9
	120	4.4	2.9	1.3	1.0
	150	6.2	4.1	1.7	1.4
2-PE	200	6.3	4.2	1.8	1.4
	260	8.6	5.7	2.4	1.8
	440	17.1	11.4	4.6	3.5
3-PE	345	10.2	6.8	2.9	2.3
	580	26.7	12.6	5.1	4
	1000	34.5	23	9.2	7.1
	4300	158	105	42	32
Aperture D [mm]:		14 ... 17			



## Reference Numbers

IPE 140		With laser targeting light	With through lens view finder
MB 3.5:	5 to 350 °C	3 875 900	-
MB 5:	5 to 500 °C	3 875 740	3 875 750
MB 10:	30 to 1000 °C	3 875 720	3 875 730
MB 12:	50 to 1200 °C	3 875 700	3 875 710

### Ordering note:

When ordering, please select one focusable optics. A connection cable is not included in the scope of delivery.

### Scope of delivery:

Pyrometer with focusable optics, works certificate, *InfraWin* operating and analyzing software

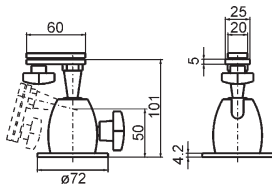
## Accessories

- 3 820 340 Connection cable, length 5 m, 90° connector
- 3 820 530 Connection cable, length 10 m, 90° connector
- 3 820 540 Connection cable, length 15 m, 90° connector
- 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
- 3 820 330 Connection cable, length 5 m, straight connector
- 3 820 500 Connection cable, length 10 m, straight connector
- 3 820 510 Connection cable, length 15 m, straight connector
- 3 820 810 Connection cable, length 20 m, straight connector
- 3 820 820 Connection cable, length 25 m, straight connector
- 3 820 520 Connection cable, length 30 m, straight connector
- 3 820 740 Connection cable, length 5 m, straight connector, temperature resistant up to 200 °C
- 3 820 750 Connection cable, length 5 m, 90° connector, temperature resistant up to 200 °C
- 3 834 280 Adjustable mounting angle
- 3 834 270 Ball and socket mounting

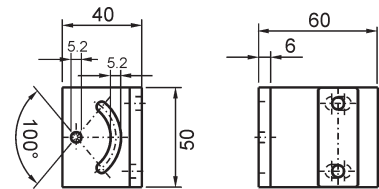
- 3 835 230 Air purge
- 3 837 290 Cooling jacket, stainless steel
- 3 834 200 Ball and socket mounting for cooling jacket
- 3 837 240 Cooling plate
- 3 835 460 90° mirror for IPE 140
- 3 843 530 Rugged scanner SCA 140, with CaF2 window for IPE 140
- 3 835 290 Air purge for scanner SCA 140
- 3 852 290 Power supply NG DC for DIN rail mounting; 100 to 240 V AC → 24 V DC, 1 A
- 3 890 640 LED digital display DA 4000-N
- 3 890 650 LED digital display DA 4000: with 2 limit switches
- 3 890 560 LED digital display DA 6000-N: with possibility for Pyrometer parameter settings for digital IMPAC pyrometers; RS232 interface
- 3 890 520 LED digital display DA 6000; DA 6000-N additional with 2 limit switches and analog input and output
- 3 826 500 HT 6000, portable battery driven indicator and instrument for pyrometer parameter setting



*Ball and socket mounting*



*Mounting angle*



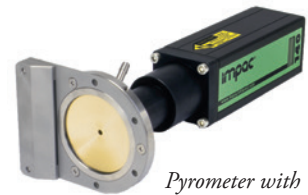
*Cooling plate*



*90° mirror*



*Air purge*



*Pyrometer with emissivity enhancer*



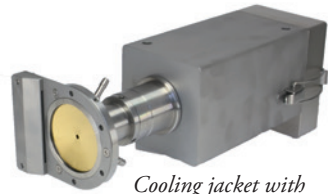
*Stainless steel cooling jacket*



*Scanner SCA 140 for small angles up to 12°*



*LED digital display*



*Cooling jacket with emissivity enhancer*

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## Awakening Your 6<sup>th</sup> Sense

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