

IMPAC IN 6/78

Accurate, rugged, and reliable pyrometer for non-contact temperature measurement on thin and thinnest glass sheets in ranges between 150 and 1100°C (302 to 2012°F).



The Impac® IN 6/78 pyrometer is specifically designed for non-contact temperature measurements on the thinnest of glass surfaces. Its special 7.8 μm wavelength makes it possible to accurately and reliably measure glass sheets below 1 mm thickness (ultra-thin glass). As such, it sets new standards for stress-free sheet glass production on manufacturing lines all around the world.

PRODUCT HIGHLIGHTS

- Temperature ranges between 150 and 1100°C (302 to 2012°F)
- Measurement of ultra-thin glass sheets with less than 1 mm thickness
- Easy installation and maintenance due to compact, rugged IP65 stainless steel housing for harsh environments
- Multiple onboard digital and analog interfaces for direct and fast PLC communication
- Specially designed and coated high-end optics for high accuracy and excellent size of source effects

TYPICAL APPLICATIONS

- Glass industry - measurement of ultra-thin glass sheets

AT A GLANCE

Temperature Ranges

IN 6/78-L
400 to 1100°C (752 to 2012°F)

IN 6/78-H
150 to 800°C (302 to 1472°F)

Spectral Range

7.8 μm , FWHM 0.6 μm

Measurement Uncertainty

0.7% of reading or 3.5°C, whatever is greater, in °C

Repeatability

1°C

Optics

Fixed optics:
IN 6/78-L: a = 370 mm
IN 6/79-H: a = 350 mm

Field of View

N 6/78-L: 75:1 (min 5 mm)
IN 6/79-H: 50:1 (min 7 mm)

OVERVIEW

The version IN 6/78-L is equipped with optics with a better field of view for the measurement of small objects. The high-speed version IN 6/78-H has a shorter exposure time of only 30 ms and is suited for fast measuring tasks.

The full digital core sensor design of the IN 6/78 provides a wide temperature range with high accuracy. The pyrometer is equipped with specially designed and coated high-end optics, which reduce the effects of

ambient reflectance and guarantee the best possible accuracy.

You can connect the pyrometers to a PC through an RS485 to USB connection. You can then use the InfraWin software to make parameter adjustments, get temperature details, log data, and further analyze your complete temperature processes.

TECHNICAL DATA

Measurement Specifications		
Temperature Range	IN 6/78-L: 400 to 1100°C (752 to 2012°F) IN 6/78-H: 150 to 800°C (302 to 1472°F)	
Sub Range	Any range adjustable within the temperature range, minimum span: 51°C	
Spectral Ranges	7.8 μm, FWHM 0.6 μm	
Resolution	0.1°C on interface, <0.1% of temperature range at the analog output	
Emissivity ε	10 to 125%, adjustable in steps of 0.1%	
Transmittance τ	10 to 100%, adjustable in steps of 0.1%	
Exposure time T ₉₀	IN 6/78-L: 80 ms IN 6/78-H: 30 ms Adjustable to 0.5 s, 1 s, 2 s, 5 s, 10 s, 30 s	
Measurement Uncertainty (ε = 1, t ₉₀ = 1 s, T _{amb} = 44°C)	0.7% of reading or 3.5 °C, whatever is greater, in °C	
Repeatability (ε = 1, t ₉₀ = 1 s)	1°C	
Noise Equivalent Temperature Difference (NETD) (ε = 1, T _{amb} = 44°C)	IN 6/78-L: 500°C NETD at t ₉₀ = 80 ms / °C = 0.3 NETD at t ₉₀ = 1 s / °C = 0.1	IN 6/78-H: 200°C NETD at t ₉₀ = 80 ms / °C = 0.9 NETD at t ₉₀ = 1 s / °C = 0.2
	IN 6/78-L: 800°C NETD at t ₉₀ = 80 ms / °C = 0.3 NETD at t ₉₀ = 1 s / °C = 0.1	IN 6/78-H: 500°C NETD at t ₉₀ = 80 ms / °C = 0.5 NETD at t ₉₀ = 1 s / °C = 0.1

Optical Specifications	
Sighting	None
Optics	Silicon

Electrical	
Power Supply	24 VDC (18 to 30 VDC) nominal, ripple must be less than 0.5 V
Power Consumption	Max 50 mA
Load	Max 500 Ω
Isolation	Power supply, analog output, digital interface, and video signal are electrically isolated from each other

TECHNICAL DATA (CONTINUED)

Environmental Specifications	
Protection Class	IP 65 IEC 60529 (value in mated condition)
Operating Position	Any
Ambient Temperature	0 to 70°C (32 to 158°F)
Storage Temperature	-20 to 80°C (-4 to 176°F)
Relative Humidity	Non-condensating conditions
Weight	410 g (~0.90 lbs)
Housing	Stainless steel
CE Label	According to EU directives about electromagnetic immunity

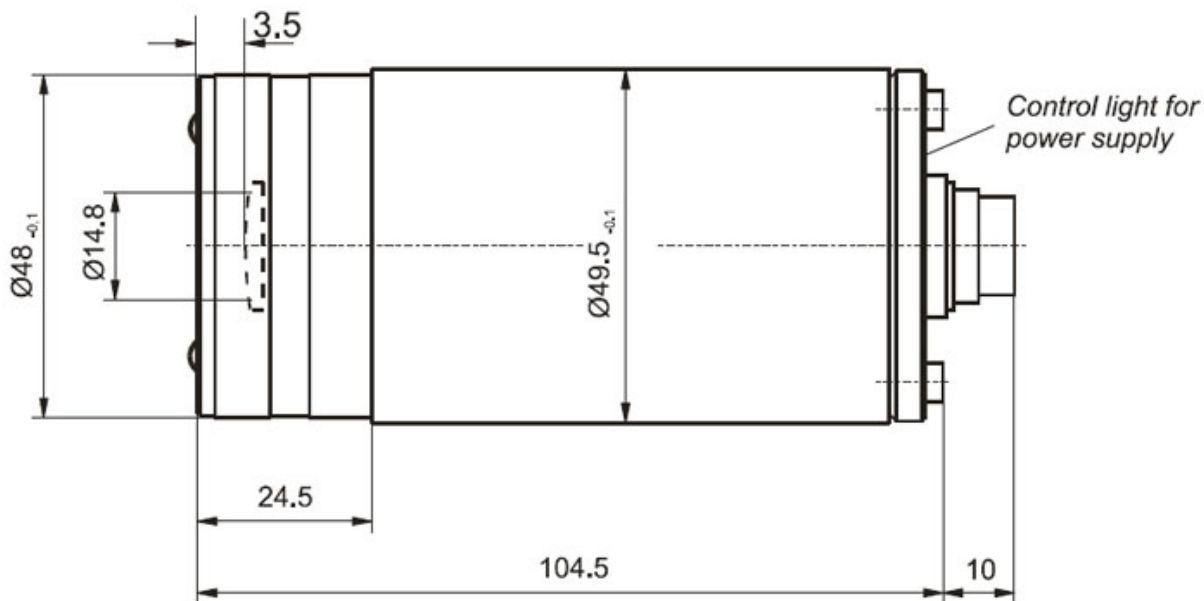
Interface	
Connection	12-pin connector
Parameters	Adjustable via interface: emissivity, sub range, settings for maximum value storage, address, baud rate (1200 Bd to 115.2 kBd), transmittance, response time t_{90} , 0 to 20 mA or 4 to 20 mA analog output range, °C / °F
	Readable via interface: measured value, internal temperature of the unit

Communication	
Analog Output	0 to 20 mA or 4 to 20 mA (linear)
Digital Interface	RS485 (half-duplex)
Maximum Value Storage	Built-in single and double store clearing with clear time t_{CL} (0.1 s, 0.25 s, 0.5 s, 1 s, 5 s, or 25 s), via interface or automatically with each new item to be measured
RS485 Bus Address	Set via digital interface
RS485 Baud Rate	1200 Bd to 115.2 kBd
Temperature Output	Adjustable to °C or °F

¹ MB is a shortcut used for temperature range (in German: Messbereich).

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.

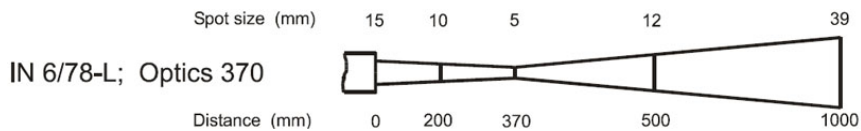
PRODUCT SCHEMATIC



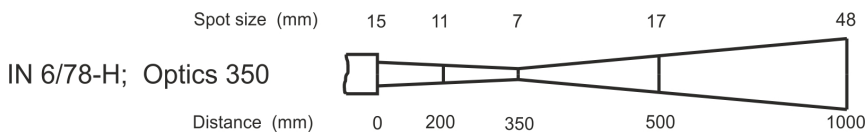
Dimensions in mm

OPTICS

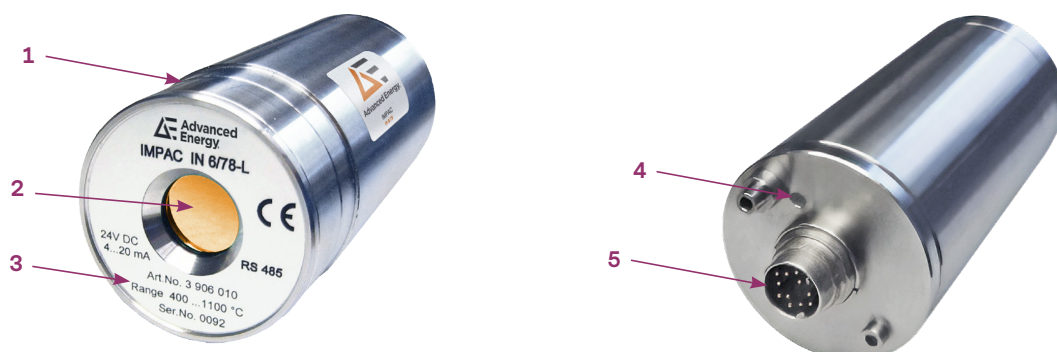
IN 6/78-L (Optics 370)	
Distance a [mm]	Spot Diameter M [mm]
0	15
200	10
370	5
500	12
1000	39



IN 6/78-H (Optics 350)	
Distance a [mm]	Spot Diameter M [mm]
0	15
200	11
350	7
500	17
1000	48



INTERFACE



- 1 Stainless steel housing
- 2 Optics
- 3 Type label

- 4 Control light for power supply
- 5 Electrical connector

REFERENCE NUMBERS

Type	Temperature Range	Reference Number
IN 6/78-L	400 to 1100°C (752 to 2012°F)	3 906 010
IN 6/78-H	150 to 800°C (302 to 1472°F)	3 906 900

Scope of Delivery

Pyrometer with PC software InfraWin for adjustment and evaluation, Works Certificate, and Manual

Ordering Note

A connection cable is not included in scope of delivery and must be ordered separately

ACCESSORIES

PN	Description
3 820 740	Connection cable, 5 m, temperature resistant up to 200°C (straight connector) ¹
3 820 330	Connection cable, 5 m, straight connector ¹
3 820 500	Connection cable, 10 m, straight connector ¹
3 820 510	Connection cable, 15 m, straight connector ¹
3 820 810	Connection cable, 20 m, straight connector ¹
3 820 820	Connection cable, 25 m, straight connector ¹
3 820 520	Connection cable, 30 m, straight connector ¹
3 820 340	Connection cable, 5 m, 90° connector ¹
3 820 530	Connection cable, 10 m, 90° connector ¹
3 820 540	Connection cable, 15 m, 90° connector ¹
3 820 830	Connection cable, 20 m, 90° connector ¹
3 820 840	Connection cable, 25 m, 90° connector ¹
3 820 550	Connection cable, 30 m, 90° connector ¹
3 852 290	Power supply NG DC for DIN rail mounting; 100 to 240 VAC ⇒ 24 VDC, 1 A
3 852 540	Power supply NG 0D 85 to 265 VAC ⇒ 24 VDC, 600 mA
3 852 550	Power supply NG 2D for DIN rail mounting; 85 to 265 VAC ⇒ 24 VDC, 600 mA with 2 settable limit switches
3 826 750	USB to RS485 adapter cable, HS-version, 1.8 m long
3 852 440	Protocol transducer RS485/RS232 (switch.) ⇔ Profibus-DP for 1 device
3 852 460	Protocol transducer RS485 ⇔ Profibus DP for 32 devices
3 852 620	Protocol converter UPP RS485 or RS232 ⇔ ProfiNet, for 1 pyrometer
3 852 630	Protocol converter UPP RS485 ⇔ ProfiNet, for max. 32 pyrometers
3 890 650	DA 4000: LED-display, 2-wire power supply, 2 limit switches (relay contacts), 230 VAC
3 891 220	DA 4000: LED-display, 2-wire power supply, 2 limit switches (relay contacts), 115 VAC
3 890 570	DA 6000-N: digital display, to allow adjustment of pyrometer through RS485 interface
3 890 530	DA 6000: like the DA 6000-N, but with analog input and 2 limit switches for the RS485 interface.
3 826 500	HT 6000: portable battery driven indicator and instrument for pyrometer parameter settings; RS232 / RS485
3 826 510	PI 6000: PID programmable controller
3 846 100	Mounting tube
3 846 120	Flange tube
3 834 210	Adjustable mounting support (Series 5 and 6)
3 835 160	Air purge unit, aluminium
3 835 440	Air purge unit, stainless steel
5 837 410	Cooling jacket for IN 6/78
3 837 540	Cooling plate for series 5 and 6, with air purge

¹ All connection cables include a short adapter cable with a 9-pin SUB-D connector. This connector may be used in combination with the RS485 to USB adapter.

INFRAWIN 5 OVERVIEW

InfraWin is easy-to-use measurement and evaluation software for remote configuration of stationary, digital Impac brand pyrometers.

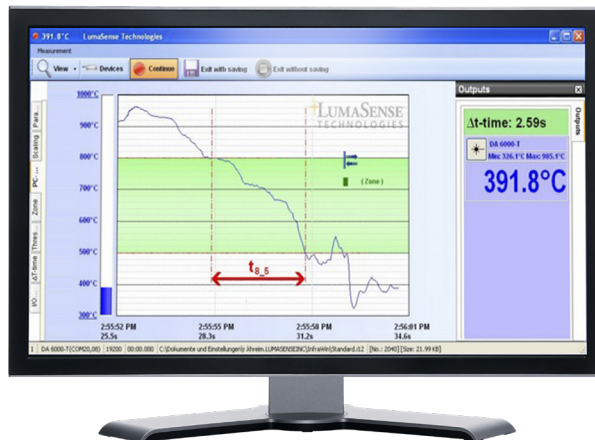
This software allows the user to remotely adjust and control settings for one or two pyrometers from a single computer. InfraWin also allows the user to simultaneously monitor and control temperatures.

- Display temperature data as color bars and online graphics
- Capture downstream evaluations as tables, graphics or text files
- Calculate the spot size for different measuring distances
- Features UPP standard (Universal Pyrometer Protocol)

Pyrometer Settings

An Impac digital pyrometer connected to a PC will be automatically detected by the software. All available parameters are adjustable, including emissivity, response time, maximum value storage, output signal and sub range.

Further special functions are adjustable for example controllers or TV parameters on instruments available with these functions. Changes are transmitted directly to the pyrometer.



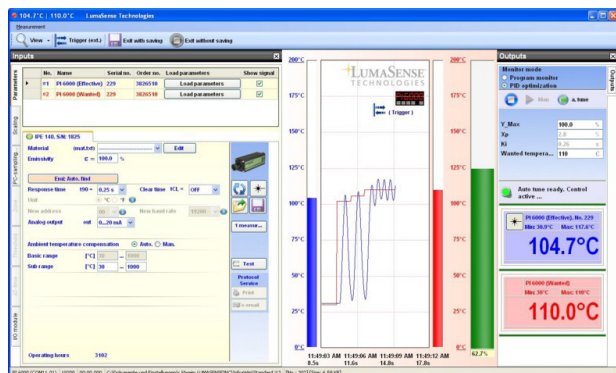
Measurement with Color Bar

In this window a temperature value for the upper or lower limit can be adjusted numerically or with the mouse.

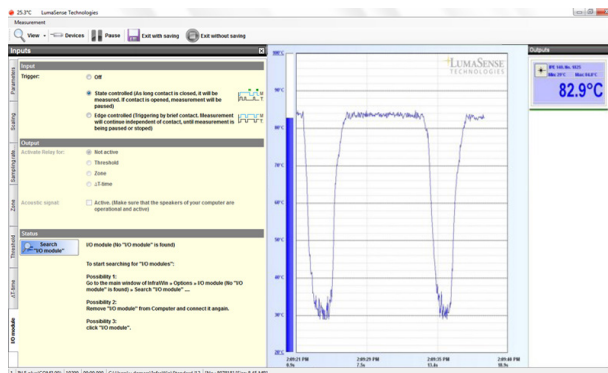
The acquired minimum and maximum value is indicated as well as the inner temperature of the pyrometer. The emissivity is changeable during the measurement at any time.

Infrared Calculator

After input of the aperture and the focused spot size per datasheet, the calculation of spot sizes at non-focused distances is possible.



Measurement with Internal Temperature of radiation temperature and internal instrument temperature. Parameters can be changed during the measurement.



I/O Module allows users to trigger measurement externally and gives a potential free output contact.



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ABOUT ADVANCED ENERGY

Advanced Energy (AE) has devoted more than three decades to perfecting power for its global customers. AE designs and manufactures highly engineered, precision power conversion, measurement and control solutions for mission-critical applications and processes.

AE's power solutions enable customer innovation in complex semiconductor and industrial thin film plasma manufacturing processes, demanding high and low voltage applications, and temperature-critical thermal processes.

With deep applications know-how and responsive service and support across the globe, AE builds collaborative partnerships to meet rapid technological developments, propel growth for its customers and power the future of technology.

PRECISION | POWER | PERFORMANCE

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