



Pyrometer *CellaCast PX 8x*

Pyrometer CellaCast PX 8x

Quick start guide

EN

1 General

This manual gives you brief information on how to properly install the pyrometer of the PX 8x series. Detailed information can be downloaded from our website www.keller.de/its/.

2 Explanation of symbols

Important notes in this manual are marked with a symbol.

▲ ATTENTION This symbol points out guidelines. If you do not observe them, the device might be damaged, malfunctioning or even fail to operate.



This symbol points out hints and information which should be heeded for efficient and trouble-free operation.

- ▶ This symbol instructs the operator to take action.
- > Response, Result. This symbol indicates the result of the action.

3 Laser safety instructions

Class 2 Laser Product

- Never look directly into the laser beam path (emitted power <math><1.0\text{ mW}</math> at a wavelength of 630-670 nm)
- Do not leave the instrument unattended when the laser is activated.
- Do not point the laser beam at any person.
- During pyrometer installation and alignment, make sure to avoid the possibility of laser light reflections caused by reflective surfaces.
- All currently valid laser safety standards must be observed.

Laser Warning Label

The black and yellow laser warning label is affixed next to nameplate of the instrument. An arrow indicates the laser emission path (lens opening).

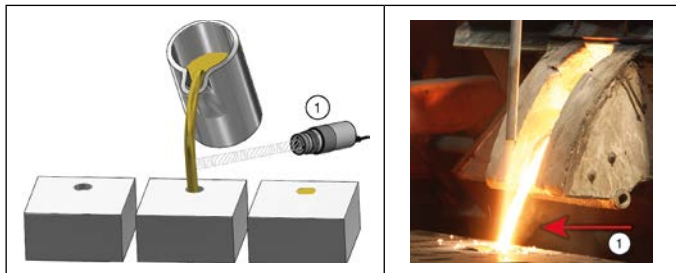
4 Selecting an installation location

When choosing the installation location and during the pyrometer alignment, it is imperative to ensure that only the free pouring stream is within the field of view.

When the background is hotter than the object focused on or when the measurement is made through the inoculant, the accuracy of measurement will be influenced.

The pyrometer should be oriented as far as possible at right angles to the pouring stream. Ideally, the pyrometer should be mounted so that it is aligned with the back of the pouring stream.

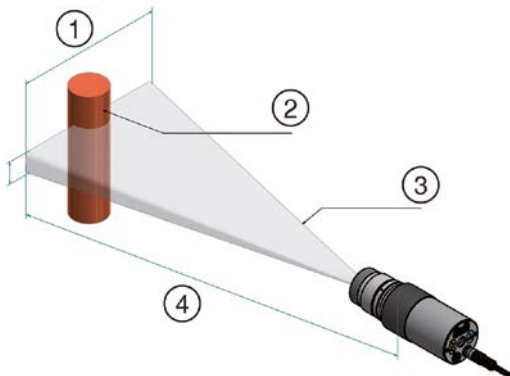
EN



1: Ideal measuring point

5 Mechanical installation

The distance should be adjusted in that way, that the pouring stream is wide enough to fill up at least 30 % of the measurement area. Reduce the distance, if the pouring stream covers less than 30 % of the measurement area. When aiming the pyrometer, make sure that the pouring stream is in the centre of the measurement area. During pouring it must be ensured that the pouring stream is always within the measuring field, even if the pouring stream is fluctuating. In order to prevent the pyrometer optics from contamination, connect the scavenging air. Approx. 50 l/min with a maximum pressure of 6 bars are required for that. Use oil-free and dirt-free compressed air. If the expected ambient temperatures are $> 65^{\circ}\text{C}$, a cooling system is required.



1: Target size	3: Field of view
2: Pouring stream	4: Distance to target

6 Assembly fibre optic cable

One end of the optical fibre has a nameplate showing the serial number of the corresponding basic pyrometer. This is the end which must be screwed onto the pyrometer. For proper connection, the arrow on the nameplate of the fibre optic cable and the arrow on the pyrometer should point toward each other. The serial number of the measuring head should also correspond to the pyrometer.

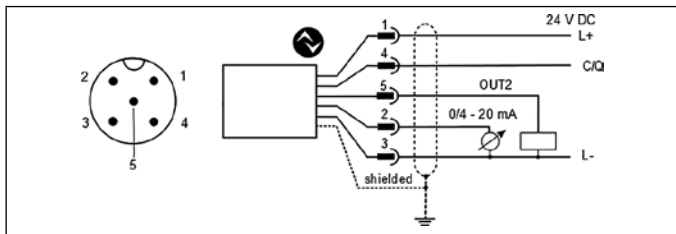
▲ ATTENTION The fibre optic cable must not be exposed to tensile load and must not be twisted. The minimum bending radius is 125 mm.

7 Electrical connection

The pyrometer is supplied with low voltage 24 DC (18 ... 32 V DC).

▲ ATTENTION The device may only be installed by a skilled, qualified electrician. Do not connect it while the voltage supply source is turned on. Please observe international safety regulations at all times.

- ▶ Disconnect the pyrometer from any voltage source.
- ▶ Connect the pyrometer according to the following schematic.



Pin 1	BN (brown)	L+ (Power supply 24V DC)
Pin 4	BK (black)	Open Collector switching output; $I_{max} = 150 \text{ mA}$ or IO-Link OUT 1
Pin 5	GY (grey)	Open Collector switching output; $I_{max} = 150 \text{ m}$ OUT2
Pin 2	WH (white)	Analogue output; 0/4 ... 20mA
Pin 3	BU (blue)	L- (GND)

! The pyrometer must be protected against electromagnetic fields. Therefore, use a shielded cable, connecting it via connector casing of the pyrometer to the housing.

! Use a flyback diode when switching inductive loads.

8 Focussing

If the pyrometer is mounted in a cooling or protective housing, remove the pyrometer from the protective fitting. For easier focusing, hold the pyrometer parallel to the cooling or protective fitting.

Pyrometer with through-the-lens sighting:

When aiming the pyrometer with through-the-lens sighting to a target, both the targeted object and the target marker (distinctly marked circled or rectangle spot in the viewfinder) must appear in sharp focus simultaneously.

Pyrometer with camera:

The models PX xx AF xx /C features an integrated camera. When aiming the pyrometer focus the sensing head until the video images is sharp.

Pyrometer with laser sighting:

The pyrometer models PX xx AF xx /L feature a laser spot light which can be activated to facilitate instrument alignment to the target spot.

To activate the laser, press the MODE button on the rear panel for 2 seconds.

Alternatively, the laser can be switched on with the IO-Link interface.

To focus, rotate the optics until the pilot light is projected as a sharp, round light spot on the object to be measured.

Pyrometer with fibre optic:

The pyrometers have a laser that can be activated to align the sensing head to the target spot. To activate the laser, press the MODE button in the rear panel for 2 seconds.

Alternatively, the laser can be switched on via the IO-Link interface

For focal adjustment loosen the shown socket screw (hexagon socket screw DIN 916) with a wrench (DIN 911) and shift the internal body of the tube towards the lens tube. Due to the O-ring sealing between the internal body of the tube and the lens tube the focal adjustment must be carried out very slowly so that the air pressure in the space between lens and internal body of the tube can be equalised.



1: For focussing solve screw

To protect the laser against overload, an over temperature is provided. At temperatures above 60 °C, the laser switches of an can no longer be activated. To check, whether the laser is activated, the parameter LED lights up.

In normal operation, the laser is switch off. After activation, the laser switch of again after 2 – 15 minutes. The operator must be familiar with the pyrometer and above safety guidelines.

EN

- !** The activated laser pilot light can influence the measured temperature. This influence will vary, depending on the instrument model and the temperature
- !** If focusing is not possible during installation, focusing can also be done outside the plant. To do this, set the pyrometer to the same distance as the distance between the pyrometer and the pouring stream.

9 Parameterization

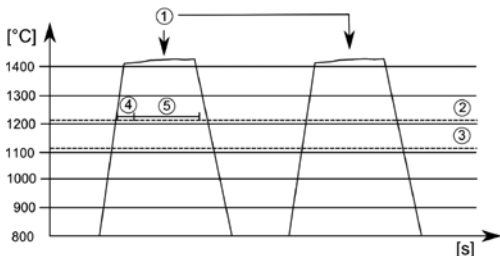
On delivery, the pyrometer is parameterized on a discontinuous pouring stream.

- !** It is only necessary to change the parameters if the casting time is < 5 s

The start of a measuring cycle is automatically detected and depends on limit 1, limit 2 and the dead time. Before starting the measurement, Limit 1 must have fallen below at least once. Limit 2 must be exceeded continuously for the duration of the dead time (T.DEEL). If necessary, the limits are to be adapted.

Two-colour channel [R U] -> ATD function [RR E d]

Parameter	Function	Default
[L 1 . 1]	Limit 1	1100 °C
(L 1 . 2)	Limit 2	1200 °C



1: Measuring object in front of the pyrometer	4: Time delay [E d E L]
2: Limit 2 [L 1 . 2]	5: Sampling time [E R E t]
3: Limit 1 [L 1 . 1]	

9.1 Setting the sampling time at the PX 83

On delivery the pyrometer is parameterized on a discontinuous pouring stream. If the pouring times are < 5 seconds the measuring time needs to be adapted.

EN

The time delay (time after detection of the pouring stream up to the start of the measurement) and the measurement time must be less than the minimum pouring time.

Two-colour channel [9 0] -> ATD function [9 8 5 0]

Parameter	Function	Default
[5 0 5 0]	Time delay [s]	1 s
[5 8 5 0]	Sampling time [s]	Auto

- ▶ Press [Mode] to access the main menu
 - > The display shows [R 0]
- ▶ Press the [▼] until [9 0] is displayed
- ▶ Press [Mode]
 - > The display shows [9 8 5 0]
- ▶ Press [▼] until [9 8 5 0] is displayed
- ▶ Press [Mode]
 - > The display shows [5 0 5 0]
- ▶ Press [▼] until [5 8 5 0] is displayed
- ▶ Press [Mode]
 - > The current sampling time or [R 0 5 0] is displayed
- ▶ Press [▲ or ▼] for 2 second
 - > The display flashes three times
- ▶ Press [▲ or ▼] to set the desired sampling time
- ▶ Press [Mode] to confirm the parameter

Exit operation

- ▶ Wait 30 seconds

or

- ▶ Press [▲ or ▼] to change to the parameter [5 8 5 0]. Then Press [Mode] to change to the functional menu.
- ▶ In the functional menu press [▲ or ▼] to change to the parameter [5 8 5 0], then press [Mode].

If the time delay [5 0 5 0] must also be adjusted, proceed as described above. In this case the parameter [5 0 5 0] must be selected and changed accordingly.

9.2 Setting the sampling time at the PX 80/81

The pyrometer is parameterized for continuous measurement on liquid metals.

The measuring time is set to 15 s in the delivery state. After the measuring time has expired, the measured temperature is shown on the display or the analogue output. Afterwards, the measuring time restarts automatically after the dead time has elapsed.

Two-colour channel [9 0] -> ATD function [9 9 5 0]

Parameter	Function	Default
[5 0 5 0]	Time delay [s]	1 s
(5 9 5 0)	Sampling time [s]	15 s

EN

- ▶ Press [Mode] to access the main menu
 - > The display shows [R 0]
- ▶ Press the [▼] until [9 0] is displayed
- ▶ Press [Mode]
 - > The display shows [9 9 5 0]
- ▶ Press [▼] until [9 9 5 0] is displayed
- ▶ Press [Mode]
 - > The display shows [5 0 5 0]
- ▶ Press [▼] until [5 9 5 0] is displayed
- ▶ Press [Mode]
 - > The current sampling time is displayed
- ▶ Press [▲ or ▼] for 2 second
 - > The display flashes three times
- ▶ Press [▲ or ▼] to set the desired sampling time
- ▶ Press [Mode] to confirm the parameter

Exit operation

- ▶ Wait 30 seconds

or

- ▶ Press [▲ or ▼] to change to the parameter [E 0 0]. Then Press [Mode] to change to the functional menu.
- ▶ In the functional menu press [▲ or ▼] to change to the parameter [E 0 0], then press [Mode].



Alternatively, the parameters can be set via IO-Link.

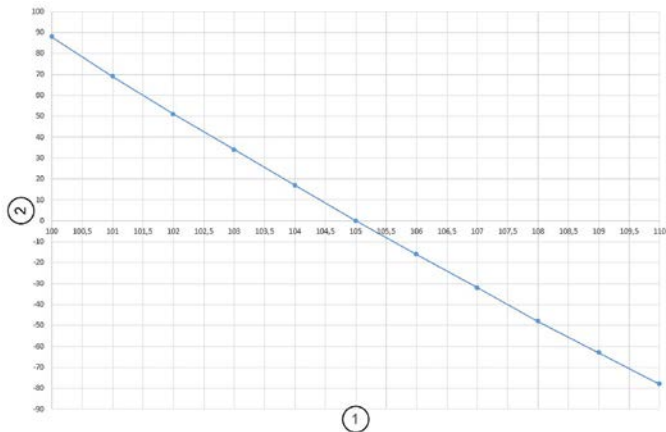
10 Adaptation of temperature level

By changing the emissivity ratio, the difference between the measured temperature level and true temperature can be compensated.

For this purpose, a comparison measurement with an immersion lance is required. Adjust emissivity ratio in such a way that the measured values coincide. An increase in the emissivity ratio results in a low temperature value.

The graph shows an approximation of the influence of the emissivity ratio setting on the change in temperature value.

EN



1	Ratio correction
2	Temperature difference [°C]

Experience has shown that the following settings apply as a first approximation

- grey pig iron 101
- spheroidal graphite iron 104

However, these values may differ in practice. After changing the emissivity ratio, carry out a new control measurement.

The emissivity ratio is set as follows:

- ▶ Press [▲ or ▼] for 2 seconds
 - > The value of the selected emissivity ratio is displayed, for example [10 30]
- ▶ Press [▲ or ▼] until the desired emissivity ratio will show
- ▶ Release the [▲ or ▼] key
 - > The current temperature values is displayed and the new emissivity ratio coefficient is stored



Alternatively, the emissivity ratio can be set via IO-Link.

11 IO-Link

This device has an IO-Link communication interface, which requires an IO-Linkcapable module (IO-Link master) for operation. The IO-Link interface allows direct access to process and diagnostic data and offers the possibility to parameterize the device during operation.

The IODDs required for configuring the IO-Link device as well as detailed information on process data setup, diagnostic functions and parameter addresses are available in the download area at www.keller.de/its.

▲ ATTENTION For IO-Link operation, a 3-wire shielded cable port Class A (Type A) must be used.

12 Trouble Shooting

No measured values are determined.

The measuring system CellaCast checks the validity of the measured values at each measurement and calculates the signal strength. The value for the signal strength must be > 5 %. The signal strength is only indicated during the casting process.

Parameter	Calculated signal strength
95. 6	In [%]

Checking the signal intensity

- ▶ Press [Mode]
 - > The display shows [R 0]
- ▶ Press the key [▼] until the parameter [9 0] is shown in the display
- ▶ Press [Mode]
 - > The display shows [9 E P 5]
- ▶ Press the key [▼] until the parameter [95. 6] is shown
- ▶ Press [Mode]
 - > The signal strength is indicated in the display.

If the displayed signal strength is < 5 %, perform the following checks:

Check the lens or protective screen for contamination.

Check the adjustment and focusing.

- The pyrometer must be focused on the measuring distance.
- The measuring field must be filled to 30 %.
- The pyrometer must have free view to the pouring stream.

13 Shipping, packing and disposal

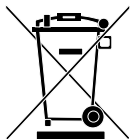
Inspection after shipping

Unpack and inspect the entire shipment immediately upon receipt to make sure it is complete and undamaged. If the container/package shows visible signs of damage, please refuse the shipment. If this is not possible, accept the shipment on the condition that the freight carrier's delivery record is noted with the extent of the damage in order to file a claim. Should you discover a concealed loss or damage, report it to the shipper or freight carrier immediately. If the period for filing claims has expired, you will no longer be able to make any claims for compensation of damage or loss.

Packing

The packages used are made of carefully selected, environmentally compatible materials and are thus recyclable. Please ensure that they are disposed of in an ecologically sound manner.

EN



Disposal of the old device

Old electrical and electronic devices frequently still contain valuable materials.

These devices can be returned for disposal to the manufacturer or they must be disposed properly by the user.

For the improper disposal of the device by the user, the company KELLER HCW is not responsible.

 **IO-Link** is a registered trademark of the IO-Link corporate community.



Copyright prohibits the reproduction or distribution of this instruction manual, including text, photographs or images contained herein, in whole or in part, for any purpose whatsoever, without prior consent of the author. This applies to any form of mechanical or electronic reproduction as well as to electronic transmission in any form through any medium.

Please note:

Unless otherwise stated in this instruction manual, the instruments described herein are subject to change without prior notice, particularly modifications for the sake of technological advancement.