Pyrometer CellaPort
PT 14x, 160
Ident.-No.: 106 4679 10/2018

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.

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PT14x_en.doc
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Contents

1 Miscellaneous

1.1 Information about this manual

The Operating Manual shall enable the user to properly install the pyrometer and those accessories which are necessary.

Before starting installation, be sure to read and understand this entire manual, in particular the chapter on safety! The instructions contained in this manual, especially those concerning safety, as well as site-specific regulations governing UV radiation must be complied with at all times!

1.2 Explanation of symbols

Important safety-related references in this manual are marked with a symbol.

This symbol indicates important information which, if neglected, might result in pyrometer damage, malfunction or breakdown.

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

1.3 Liability and Warranty

All information compiled in this manual is in accordance with applicable regulations. The statements made are based on state-of-the-art technology and reflect our extensive knowledge and many years of experience.

☞ *Always carefully read this Operating Manual before beginning any work on or with the instrument, especially prior to installation and initial setup! The Manufacturer shall not be held liable for any damages or malfunctions arising from a disregard of the warnings and instructions contained herein.*

This Operating Manual must be retained for future use. Please ensure that all persons who wish to operate the instrument have access to this manual.

1.4 Copyright

This Operating Manual should be treated as confidential. It is solely intended for use by persons involved with the instrument. This manual may not be made available to a third party without prior Manufacturer's consent. Please contact the Manufacturer if the need should arise.

☞ *The data, texts, charts, drawings, images or other representations contained in this manual are copyright-protected and furthermore, subject to intellectual property rights. Violators will be prosecuted. Unauthorised use and copyright infringement will be subject to penalty by law.*

Reproductions of any kind, in whole or in part, as well as the exploitation or disclosure of this manual's content without the explicit written approval of the Manufacturer are expressly prohibited by law. Violations shall be subject to compensation claims by the Manufacturer. The right to claim additional indemnities remains reserved.

2 Safety

This chapter outlines all important safety aspects to be considered for optimum employee protection and to ensure safe and reliable operations.

2.1 Intended use

The pyrometer is solely intended for non-contact measurement of temperatures as described in this manual. Any other use is not intended. Operational safety can only be ensured when the instrument is used for its intended purpose.

It is prohibited to use the pyrometer for any other purpose beyond what is specified in this manual. Using the instrument in any other manner will be considered as improper.

The manufacturer is only liable for damage that occurs during correct use. The prerequisite for any liability, however, is that the cause of the damage is due to a defective product and the defect in the product was caused by the manufacturer.

2.2 User's responsibility

The pyrometer may only be used when it is in perfect working condition.

2.3 Electromagnetic Compatibility

The devices comply with the essential safety requirements of the Electromagnetic Compatibility Directive 2014/30/EU (EMC Act).

2.4 Quality Management Certification

The KELLER HCW Quality Management System meets the DIN EN ISO 9001 standards for design, production, repairs and service for non-contact infrared temperature measuring equipment.

2.5 Environmental Management

Sustainable economic management is more important than ever.
KELLER HCW’s corporate environmental management system complies with DIN EN 14001/50001 standards.

3 Scope of delivery

Make sure that all of the following components have been included with your shipment:

- Pyrometer
- Carrying case
- Battery charger
- Calibration certificate
- Software CellaView (Download Version)
- USB cable

4 Pyrometer types

Model	Range	Application
PT 140	500 – 1400 °C	Metal, cement, lime, graphite, crystal growing
	650 – 1700 °C	
	750 – 2400 °C	
	850 – 3000 °C	
PT 143	600 – 1400 °C	Wire measuring, rods, heating coils, heating tapes, glass gobs
	650 – 1700 °C	
	750 – 2400 °C	
	850 – 3000 °C	
PT 147	700 – 1700 °C	Flame temperature
PT 160	300 – 800 °C	Metal

5 General Description

5.1 Intended Use

The CellaPort PT series provides efficient pyrometers for non-contact temperature measurements.

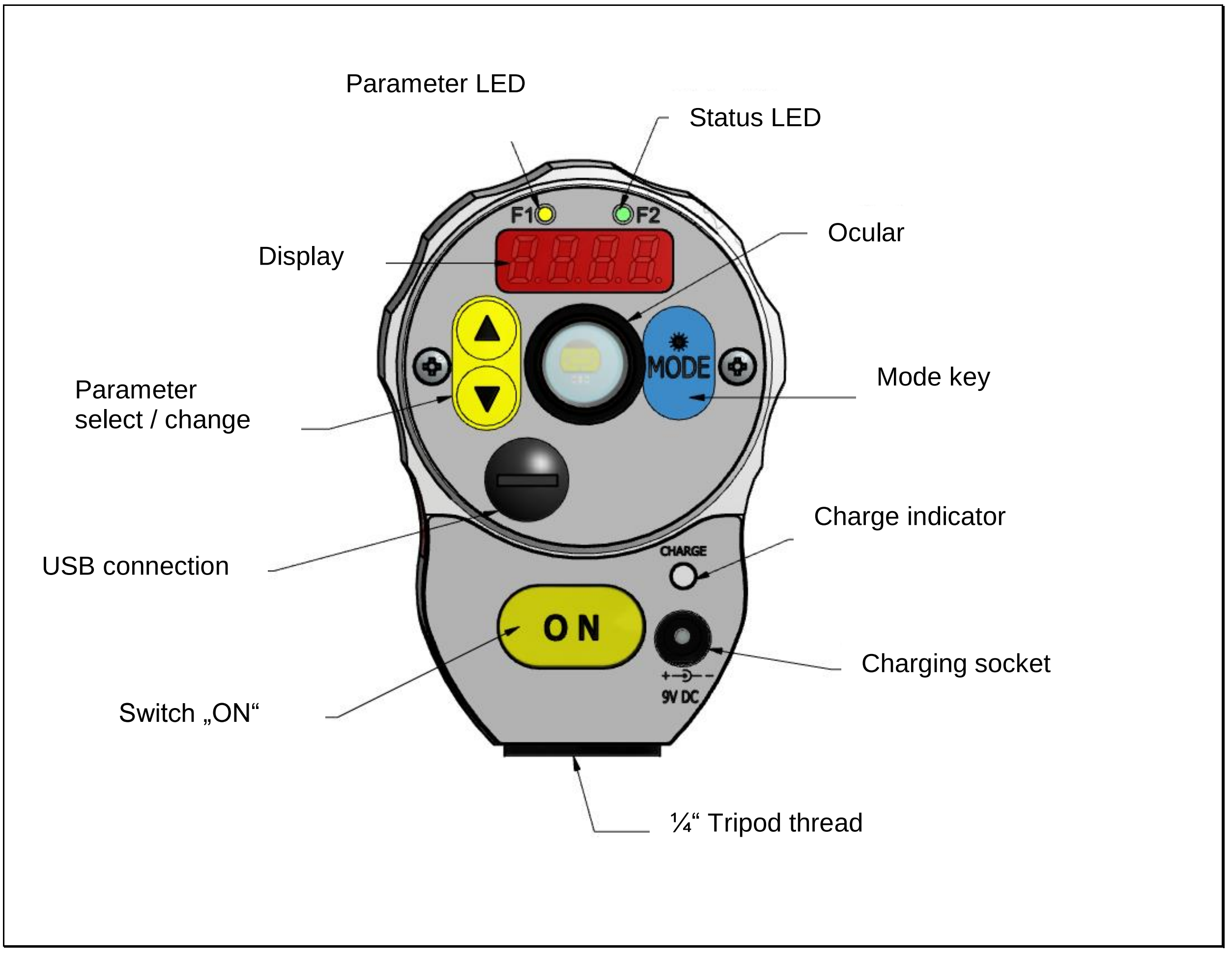
The two-colour pyrometer CellaPort PT measures the intensity of infrared radiation at two different wavelengths. The ratio of these two intensities is proportional to the temperature. The CellaPort PT is used for temperature measurement from 300 °C to 3000 °C. These instruments serve a broad range of applications which include the iron and steel producing industry as well as the metal, glass, cement and chemical industries.

Flame temperature measurement (only PT 147)

A key parameter for optimizing burnout and minimizing pollutant emissions in incinerators is the knowledge of the combustion chamber temperature, which can be determined in different ways. One of the possible methods is the measurement of the flame temperature. The pyrometer PT 147 detects the temperature of the soot particles in flames. The particle temperature of the flame is determined following the algorithm of Rössler: from the black body temperature of the spectral measured value and the colour temperature of the two-colour measurement value. This method has the advantage that the optical thickness of the flame and the penetration depth of the pyrometer are taken into account.

5.2 Operating Controls and Display

The rear panel of the CellaPort has a 4-digit display and 4 push-buttons. The display normally indicates the currently measured temperature. During configuration (using the push-buttons), the display will show the parameter you are setting. Whenever the display shows a parameter, the F1 Parameter LED (yellow) will light up. During a running measurement, the F2 Status LED (green) will light up.



6 Charging the batteries

Connect the battery charging socket of the CellaPort to the provided power supply (9 V DC). The charge indicator lights as long as the batteries are being charged. A complete charging cycle takes approx. 15 hours.

Only use the power supply which comes with the pyrometer. Do not use any other power supply as this may cause irreparable damage to the device.

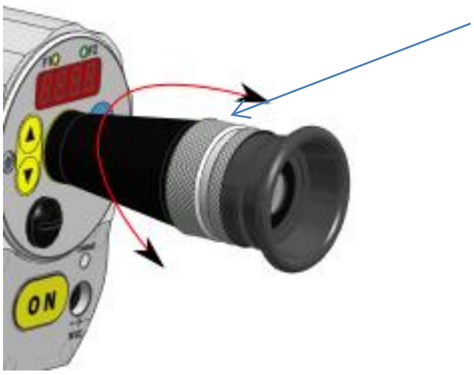
The charger is only for charging the battery.
The rechargeable battery is only charged when the pyrometer is switched off

7 Preparing the pyrometer for measurements

7.1 General Information

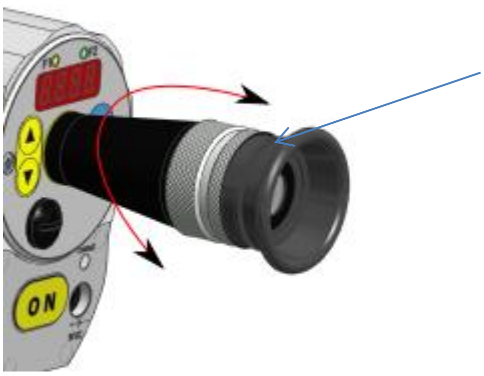
The pyrometer’s field of view must remain unobstructed. Any obstruction may lead to measurement errors.

7.2 Diopter compensation



The pyrometer offers diopter compensation to adjust the sighting device to the user’s vision. Turn the ring until you see a sharp image of the target spot indication in the viewfinder.

7.3 Brightness control to protect the eye



Instruments with a measuring range of > 2000 °C are equipped with a polarisation filter to control brightness and protect the user’s eye.

7.4 Focusing the pyrometer

The pyrometer is equipped with focusable optics. Turn the lens until the target object ***and*** the target marker (distinctly marked in the viewfinder) ***both*** appear in sharp focus simultaneously

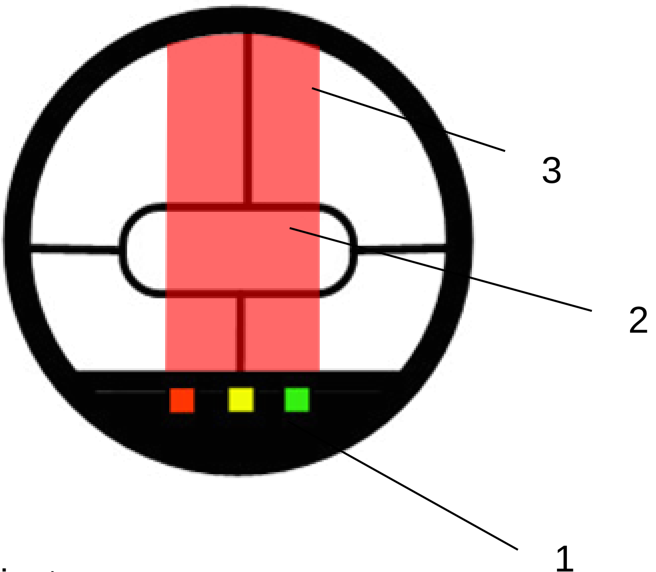
☞

*To ensure precise temperature measurement, the pyrometer **must** be correctly focused on the target object*

7.5 Align the pyrometers

Direct the CellaPort to the object to be measured. The target marker in the through-the-lens sighting device indicates the size of the target. (see technical data/ course of target). When measuring with a two-colour pyrometer, the object to be measured is not required to fill the complete measurement area. The integrated traffic light function in the viewfinder signals an inadmissible partial illumination and the measurement is stopped.

7.6 Performing a measurement



1) Traffic light indicates
2) Measurement area
3) Target object

Press the ON button to switch on the device. If necessary adjust the ratio correction. Focus the target marker at the diopter correction switch and adjust the pyrometer lens to the correct measuring distance.

Measurement is in progress as long as you press the ON button. The temperature (depending on the configured mode) is displayed on the rear panel when you release the ON button. As an option, the measurement readings can be transmitted via interface.

☞ *The amount of thermal radiation emitted from an object depends on the specific radiation properties of the material and its surface. Non-contact temperature measurement requires that you determine the material constant (emissivity) of the target object prior to first-time use*

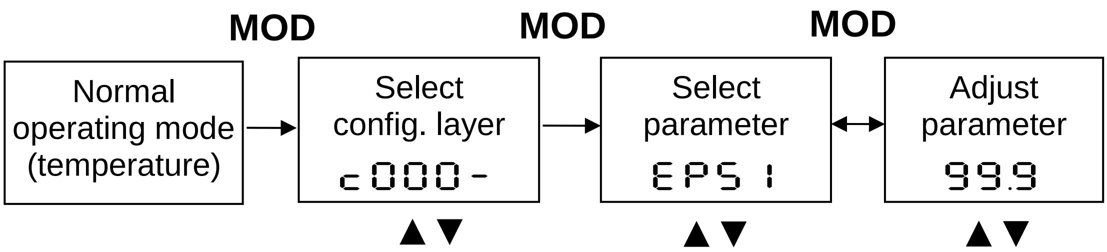
7.7 Automatic switch-off

In the default setting, the CellaPort switches off automatically after 2 minutes if none of the control keys are pressed. Automatic switch-off can be configured from 1 – 60 minutes. The CellaPort measures continuously when it is in "automatic disconnection deactivated" mode.

8 Setting parameters at the pyrometer (basic configuration)

Use the buttons ▲▼ and the „MODE" button on the rear panel to access and configure parameters. With these buttons you can view and adjust all settings required for operating the pyrometer.

Menu structure:



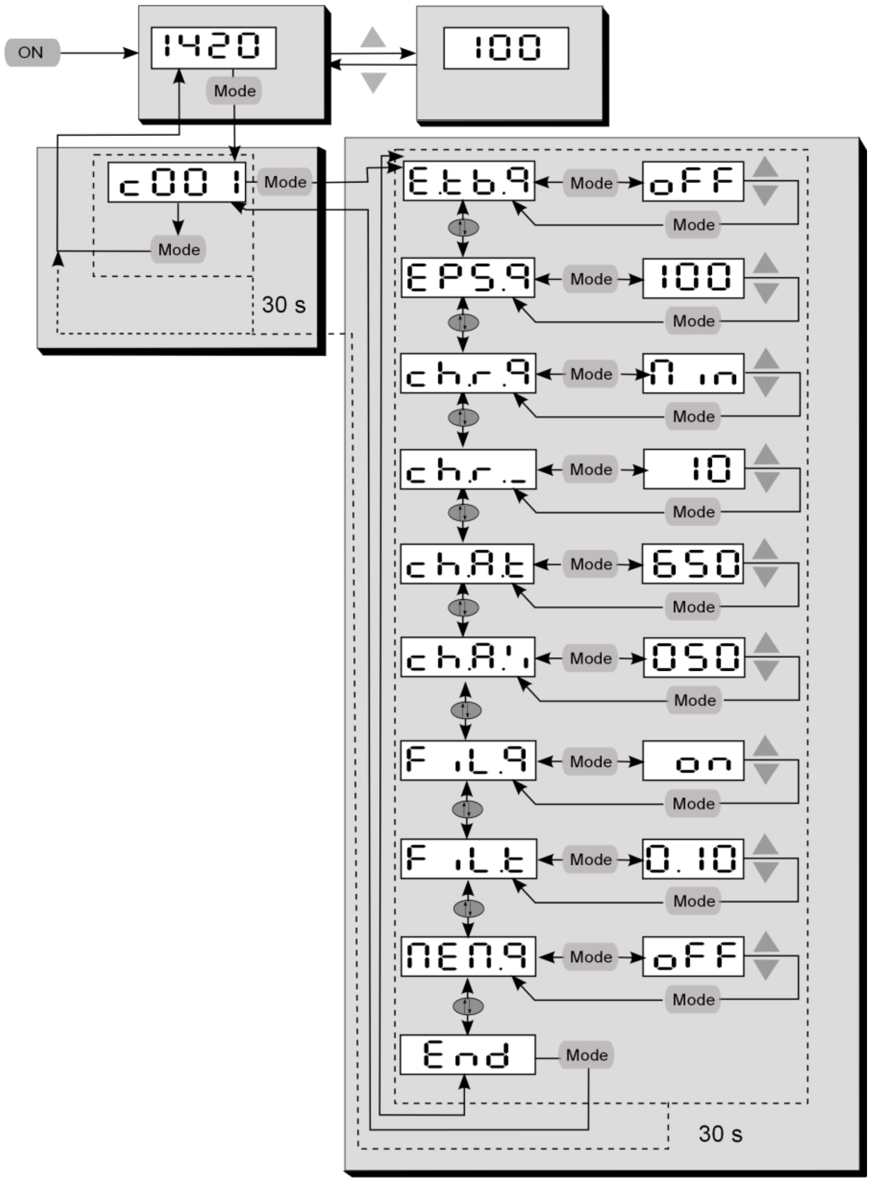
1. Press the MODE button while in normal operating mode to switch to "configuration layer" mode.
2. Use ▲▼ to select the configuration layer for the parameter you wish to set.
3. Press MODE to confirm. Press ▲▼ to select the particular parameter.
4. Press MODE to confirm. Press ▲▼ to adjust the parameter value.
5. Press MODE again to end. Press ▲▼ to select End.

Whenever a control key has not been pressed within 30 seconds, the pyrometer will automatically return to normal operating mode. The modified value is applied.

☞ *Key lock may have been activated at the terminal. When selecting the configuration layer you will be prompted to enter an access code with P000 . To obtain full access to parameter settings, enter P 100 otherwise you will only be able to view parameters but not change them.*

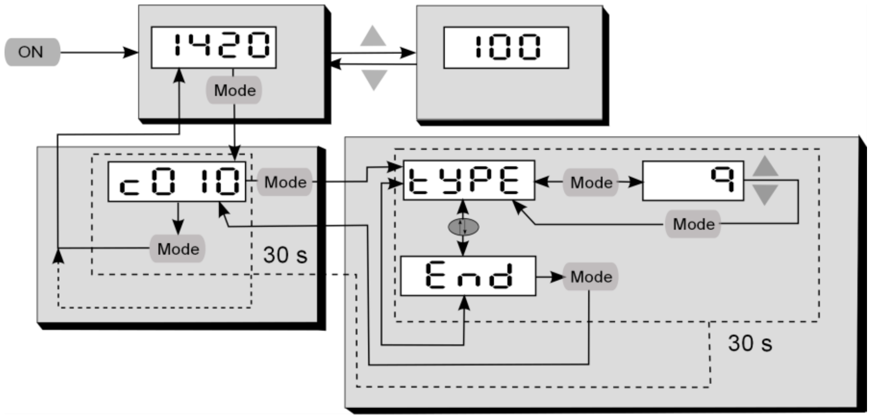
9 Menu

9.1 Measurement two-colour/ratio mode configuration layer C001

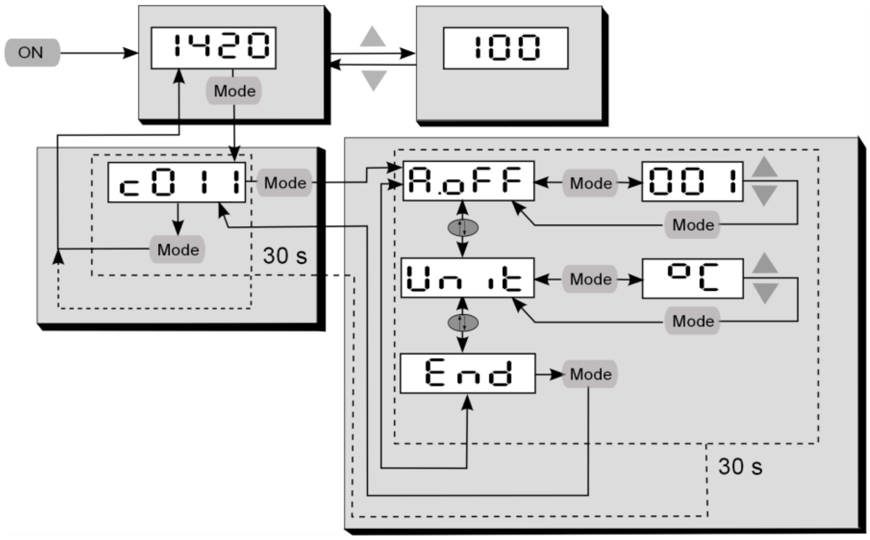


In the default configuration, certain parameter settings will be hidden. If required, you can have them shown

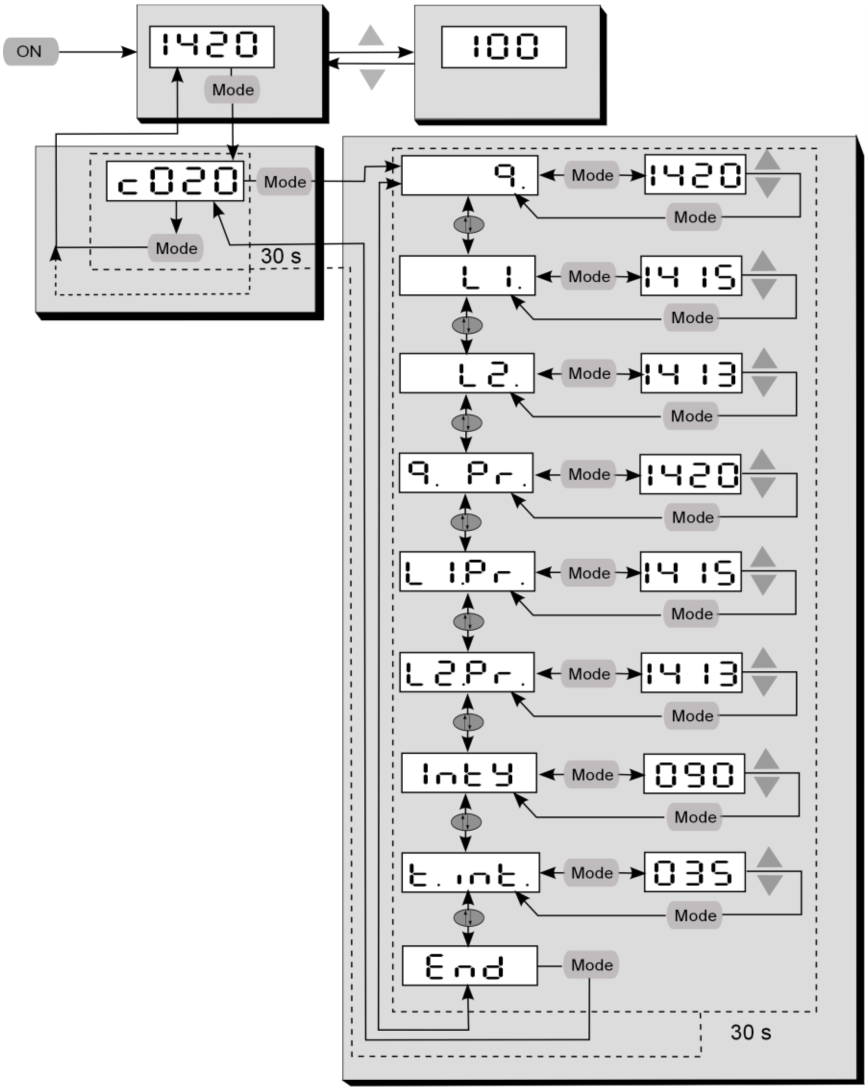
9.2 Configuration data acquisition configuration layer C010



9.3 General function configuration layer C011



9.4 Displayed temperature readings configuration layer C020



10 Setting the Emissivity Ratio (two-colour/ratio mode)

When the radiation properties of the target object's surface (emissivity) differ at two different wavelengths, or when interferences in the field of view—such as dust or steam—do not weaken the signal to the same degree at each wavelength, the pyrometer can be adjusted by setting the ratio of these two emissivity coefficients.

☞ During normal operating mode, the emissivity ratio can be set at the pyrometer using the ▲▼ buttons. When simultaneously pressing the MODE key, the display shows the current measuring temperature while the emissivity ratio coefficient continues to be adjusted in the background. This is an easy way to determine the emissivity ratio when the object temperature is known. The modified values are directly adopted.

Once you have configured the emissivity ratio parameter, the pyrometer will maintain this specific setting. The pyrometer will always operate with this value unless you change the setting.

11 Initializing emissivity ratio constants

The CellaPort lets you store up to 10 emissivity ratio factors. Before you perform a new measurement, simply use the ▲▼ control keys to select your preconfigured emissivity factor. When you select a stored emissivity ratio factor, the display will briefly show the preconfigured factor for that emissivity ratio factor.

11.1 Define number of emissivity ratio constants in array

Before you configure the pyrometer with emissivity ratio factors, you must define the size/length of the array. This is the number of emissivity ratio you would like the array to contain (10 maximum). Using parameter E.tb.9, enter the total number.

Measurement two-colour/ratio mode configuration layer C001

Parameter	Function	Explanation
E.tb.9	Enter desired number of elements in array	If E.tb.1 = oFF, then use ▲▼ keys to manually set emissivity ratio

11.1.1 Store and assign emissivity ratio constants

Next, assign a value to each emissivity ratio constant in the index.

Measurement two-colour/ratio mode configuration layer C001

Parameter	Function	Explanation
E. 01	Emissivity ratio Memory position 1	z. B. 100.5 %
E. 02	Emissivity ratio Memory position 2	z. B. 101 %
E. 03	Emissivity ratio Memory position 3	z. B. 101.5 %

11.2 Select the emissivity ratio constant

The memory position can optionally be set using the menu.

Measurement two-colour/ratio mode configuration layer C001

Parameter	Function	Explanation
E. idH	Memory position	Shows current selected emissivity ratio constant, e.g. E. 02

12 Adjusting the soot factor (Flame temperature measurement)

By default, the PT 147 is configured for the two-colour measurement. For the flame measurement, the soot factor of the flame must be set. This factor is determined by the flame type. As a first approximation, the parameter should be set to 1.2. If necessary, the device can be set to the real flame type. For this purpose, a reference measurement is carried out, e.g. with a thermocouple, and the PT 147 is set to the reference temperature by way of the soot factor. The soot factor is set on the code page C001 parameter drc.n.

When using protective windows, the transmission of the window must be adjusted for the spectral channel. The value to be set can be found in the specification of the window.

Code page c003 parameter tAU.2

CAUTION!

It is strongly recommended to use only approved protective windows specified by the manufacturer, which remain neutral regarding the wavelengths. If you use commercial glass there is a risk of a faulty measurement due to selective influences.

13 Determining and Setting Emissivity (Spectral mode)

In pyrometry, the specific radiation characteristics of the measured object will influence the generated temperature data. In order to produce accurate and reliable temperature readings, the pyrometer must be configured according to the specific material constant (emissivity).

To determine the correct setting of the emissivity of a comparative measurement is carried out by a contact measurement. In order to minimize measurement differences between the two different physical measuring methods, the comparison measurement is almost the same time and performs at the same measuring point as possible.

In spectral operation mode, emissivity can be set at the pyrometer using the ▲▼ buttons. When simultaneously pressing the MODE key, the display shows the current measuring temperature while the emissivity coefficient continues to be adjusted in the background. This is an easy way to determine the emissivity when the object temperature is known. The modified values are directly adopted.

Once you have configured the emissivity parameter, the pyrometer will maintain this specific setting. The pyrometer will always operate with this value unless you change the setting.

14 Initializing emissivity factors (Spectral mode)

The CellaPort lets you store up to 10 emissivity factors for lambda 1 and lambda 2. Before you perform a new measurement, simply use the ▲▼ control keys to select your preconfigured emissivity factor. When you select a stored emissivity factor, the display will briefly show the preconfigured factor for that emissivity factor.

14.1 Define number of emissivity constants in array

Before you configure the pyrometer with emissivity factors, you must define the size/length of the array. This is the number of material constants you would like the array to contain (10 maximum). Using parameter E.tb.1/ E.tb.2, enter the total number.
12

Temperature measurement lambda 1 (Configuration layer: C002)

Parameter	Function	Explanation
E.tb.1	Enter desired number of elements in array	If E.tb.1 = oFF, then use ▲▼ keys to manually set emissivity

14.1.1 Store and assign emissivity constants

Next, assign a value to each material constant in the index (E. 01, E. 02 etc.).

Temperature measurement lambda 1 (Configuration layer: c002)

Parameter	Function	Explanation
E. 01	Emissivity Memory position 1	z. B. 75 %
E. 02	Emissivity Memory position 2	z. B. 60 %
E. 03	Emissivity Memory position 3	z. B. 50 %

14.2 Select the emissivity constant

The memory position can optionally be set using the menu.

Temperature measurement lambda 1 (Configuration layer: c002)

Parameter	Function	Explanation
E.idH	Memory position	Shows current selected emissivity constant, e.g. E. 02

☞ Parameters for lambda 2 are identical to lambda 1. See Chapter 16.1.3

15 Further configuration

15.1 Configuration – signal conditioning

15.1.1 Transmission factor (spectral mode)

The pyrometer has to be adjusted for the transmission properties of any supplementary lens and/or protective window screwed onto the pyrometer. Set the pyrometer for the specific transmission factor (a percentage value) which is indicated either in the product's data sheet or on the lens itself. This is parameter tAU.1 and can be accessed at configuration layer c002/c003. If you are not using any auxiliary lens or protective window, set the parameter to 100.0.

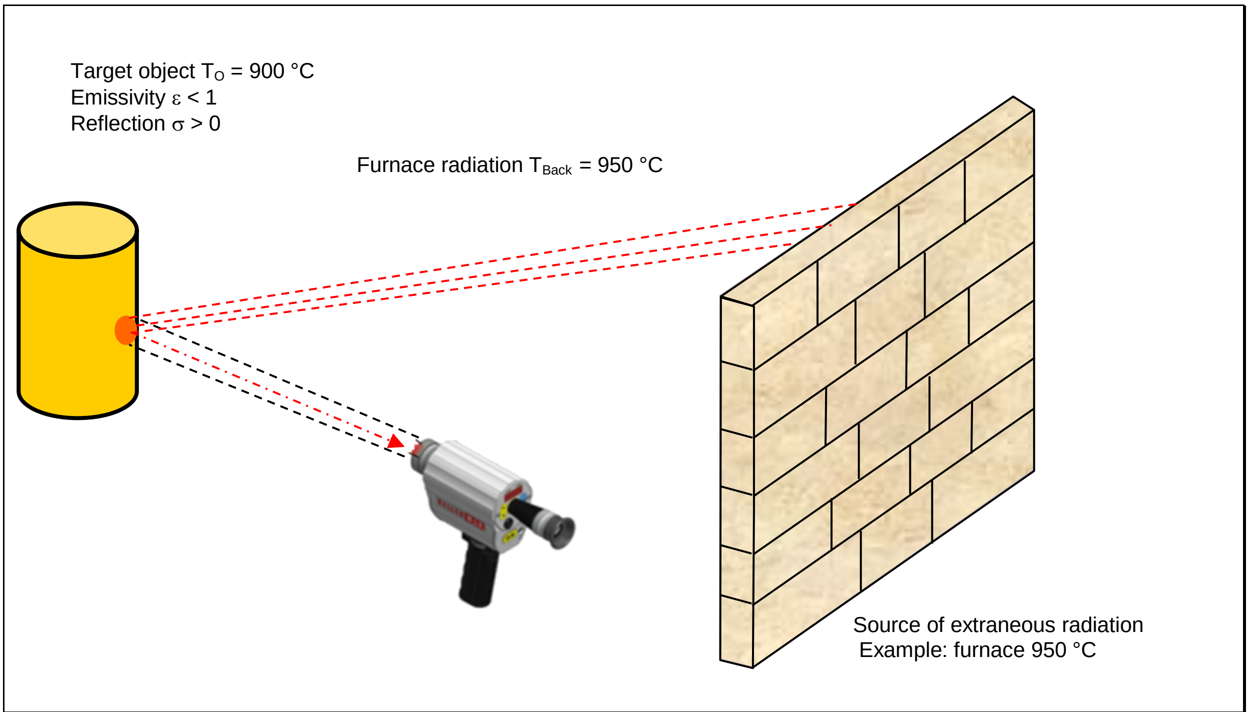
15.1.2 Background Temperature Compensation (Spectral mode)

Thermal radiation reflected from the surrounding will require that you make an additional correction when the reflected radiation is strong compared to the natural radiation of the target. This applies to object surfaces which have very low emissivity or when the temperature of the object is lower than the temperature of its surroundings.

The background radiation reflected from the object consists of the following factors:

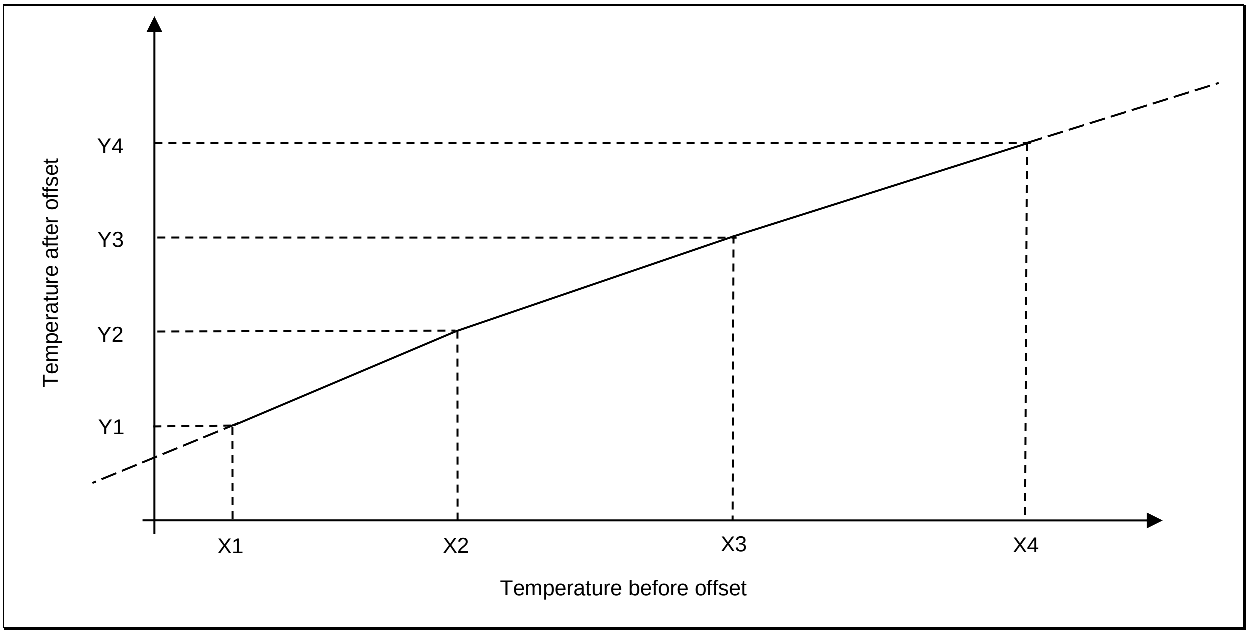
- Background temperature
- Background size
- The capability of the background material to reflect infrared radiation

To ensure that the measurement is not distorted and that the temperature readings are completely accurate, you should activate "background temperature compensation" (switch on c002 or c003 / bAc.1). Now enter the temperature value of the ambient source of radiation (bAc.t) and its influence as a percentage (bAc.%). The influence in percent stands for the size and the capability of the material to emit infrared radiation. You will have to determine these variables first.



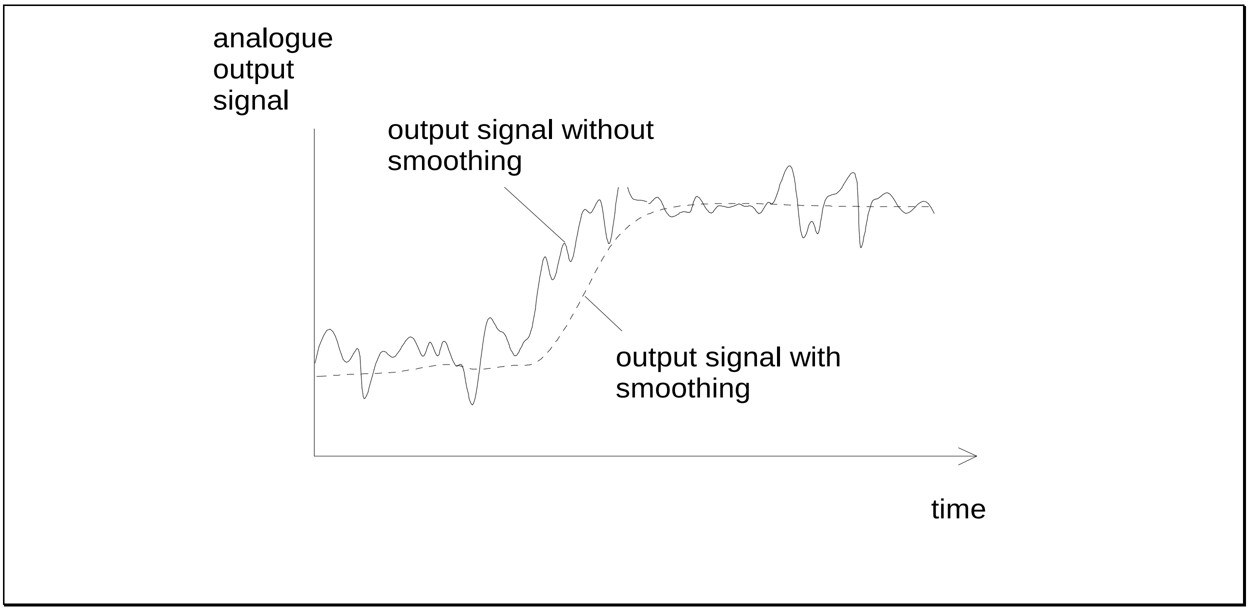
15.1.3 Temperature offset using linear interpolation

When necessary, CellaPort PT allows you to program an offset for the temperature reading reported. The offset correction can be configured individually with a minimum of 2 and a maximum of 10 interpolating points (X/Y nodes). This information is stored in a user-defined temperature-indexed lookup table and used for signal conditioning. For values lower than the 1st node and higher than the last node, the first and last linear segments are extrapolated. Enter the nodes in ascending order. Use the rear panel display to access this function via c001/ Lin.1.



15.1.4 Smoothing function

When the target object's temperature is erratic, it makes sense to smooth these temperature fluctuations in order to stabilize the signal. The greater the time constant t_{98}, (user-definable), the lower the effect of these fluctuations on the yielded temperature reading. The pyrometer's response time is proportional to the time constant. Set signal smoothing via parameter c001/FiL.9.



15.2 Min/Max memory

The pyrometer features a data memory to store minimum and maximum (peak) temperature readings. This feature can be configured in one of the following modes:

- Memory off
- Store minimum value (single)
- Store maximum value (single)
- Store double max. value for cyclical processes
- ATD function (Only available in pyrometer with ATD function)

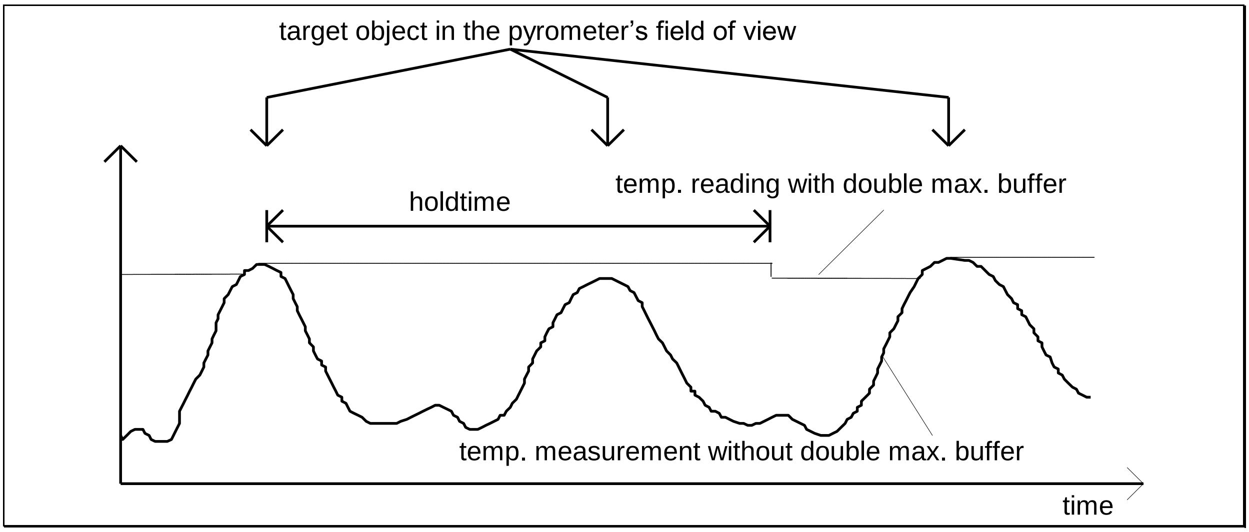
15.2.1 Min/Max Memory

In this mode—also called peak picker—the pyrometer determines the highest or lowest temperature reading and keeps the temperature reading. The value is stored until you press the ON button again. Additionally, you can define the smoothing filter setting.

15.2.2 Double Maximum Memory with hold time

In this operating mode the pyrometer continuously detects the maximum temperature reading. This value is stored for the duration of the configured hold time and is displayed on the rear panel. In mid-sequence – after 50% lapse of the hold time – a second internal peak picker starts. When the hold time has expired without finding a new max value, the output signal decreases to the value of the second peak temperature (if it turned out being lower than the first peak).

This memory mode serves to detect the maximum temperature of objects moving periodically past the pyrometer lens. The temperature reading is kept for the duration of the configured holding time when the pyrometer does not detect any hot object. The holding time should be configured to approximately 1.5 times as long as the cycle of the moving targets. This ensures that a temperature measurement gap is avoided and temperature changes are detected quickly.

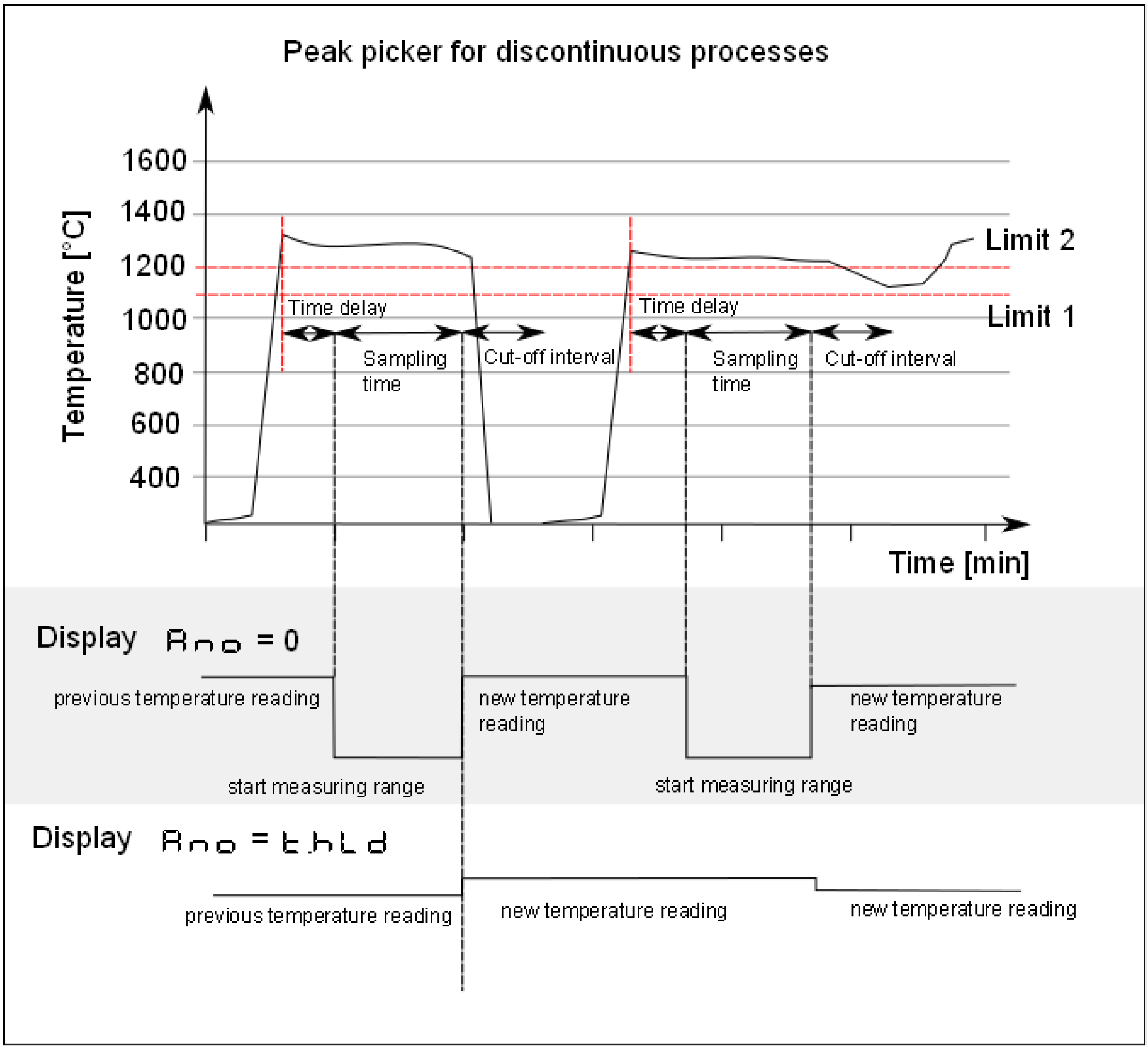


15.2.3 Double Maximum Memory with hold time "Combined"

The function of the double maximum memory "combined" is similar to that of the double maximum memory. However, the hold time starts when the spectral temperature is at its highest point. Displayed is the corresponding two-colour temperature. If the spectral temperature decreases during the hold time, the corresponding two-colour temperature is only displayed when the hold time has elapsed. If the spectral temperature rises during the hold time, the corresponding two-colour temperature is directly displayed.

15.2.4 Automatic Temperature Detection (ATD)

The ATD function allows a very easy and fully automatic capture of the temperature. As soon as the pyrometer is switched on and aimed at a hot object, the measurement starts automatically. The threshold value to detect a hot object is adjustable. Depending on the configuration, the measurement ends either after a selectable period or when there is no longer a hot object in the pyrometer's measurement area. At the end of the measurement the captured value is displayed until a new measuring object is detected. To eliminate unrealistic measurement differences, it is possible to check the determined measured value for plausibility in relation to the previous measured value and to filter it out. The new measured value can also be averaged with a weighting factor to eliminate large jumps between the measured values.



Threshold limits

The start of a measuring cycle is determined automatically and is dependent on the following variables:

Parameter	Function
Limit 1 (Li. 1)	Before beginning the measurement, the temperature reading must have been lower than Limit 1 at least once. If Auto reset is activated (A.r St = on), Limit 1 will be ignored
Limit 2 (Li. 2)	Limit 2 must be exceeded at least for the duration of the time delay (t.dEL).
Time Delay (t.dEL):	See Limit 2

When the conditions are fulfilled, the sampling time can begin (t.Act).

Parameter	Function
Sampling time (t.Act)	During the sampling time the temperature is detected and stored as a temperature value.

☞ The parameter t.Act = 0 automatically recognises the end of the discontinuous process (measured temperature < L2). The pyrometer then shows "Auto" instead of the time under parameter t.Act.

Display and output of temperature reading [Ano]

The parameter Ano (normal display mode) defines which temperature value is saved during sampling.

Parameter	Function
Display mode (Ano)	„t =0“ displays the lower temperature range limit during the measurement. „t.hLd“ indicates the previous temperature reading during the current measurement.

The green status LED indicates that a measurement is currently in process.

Average weighting [F - Pr] Plausibility check

When the sampling time has ended, an average value is calculated for recorded measuring cycles. The temperature reading is weighted with the previously saved average value and added.

Parameter	Function
Weighted average (F - Pr)	Factor for average weighting. If you enter 100%, averaging will be off.

The smaller you set the F - Pr factor, the stronger the weighting will be.

When the averaging function is activated (F - Pr <100%) a plausibility check will be performed. The difference in temperature between the current reading and the previously stored average is determined. If this deviation is greater than the plausibility threshold tSP, the transmitted data will be „0“ and the average value will remain unchanged.
Enter the upper threshold and lower threshold for the permissible deviation separately.

Parameter	Function
Plausibility (t SP _)	Permitted temperature difference for a valid measurement when the new value is lower than the stored measured value.
Plausibility (t SP ¯)	Permitted temperature difference for a valid measurement when the new value is higher than the stored measured value.

If a measuring cycle does not start during the period t.oUt the saved average will be deleted and reinitialized when the next cycle begins.

Parameter	Function
Timeout (t.oUt)	Time cycle for deleting average value (in minutes)

At the end of the measuring cycle the pyrometer displays the averaged temperature value (or the invalid reading „- - - - ").

Cut-off interval [t.d iS]

A cut-off interval (time lag) begins after the measuring time has ended. This cut-off interval must expire before the next measurement can start with the cycle starting conditions described above.

Parameter	Function
Cut-off interval (t.d iS)	The interval between one completed sampling and the start of a new sampling.

Timeout [t.oUt]

If a measuring cycle does not start during the period t.oUt , the saved average will be deleted and reinitialized when the next cycle begins.

Parameter	Function
Timeout (t.oUt):	Time out for average function (in minutes)

Autoreset Function [A.r St]

Activate auto reset for the ATD function to run cyclically. Limit 1 will then be ignored.

Normally, for a new measuring cycle to start, the detected temperature must have dropped below Limit 1. If, however, you wish to measure a continuous process (continuous material flow), you must activate Auto Reset. Limit 1 will then be ignored. Sampling will continue (restarting automatically and producing temperature readings cyclically) as long as Limit 2 is exceeded for the time period defined by t.dEL.

Parameter	Function
Autoreset (A.r-St):	Autoreset on/off

Parameter Set Li2 check on tAct [ch.L.2]

When this parameter is set to ON (ch.L.2=on), the detected temperature must exceed Limit 2 during the entire measuring time (tAct) in order for the pyrometer to generate a valid temperature reading. The measurement is discarded when the value falls below Limit 2.
The display shows „- - - -“

Parameter	Function
Set Li2 check on tAct (ch.L.2)	on/off

16 Setting Parameters at the device

In addition to the configuration possibilities described, many parameters can be adjusted at the rear panel using push buttons. These settings can be accessed via configuration layers.

16.1 Configuration layers

The configuration layers are structured as follows:

- c001 Temperature measurement two-colour/ratio mode
- c002 Temperature measurement lambda 1
- c003 Temperature measurement lambda 2
- c010 I/O configuration (LED / Buzzer)
- c011 General function
- c020 Display temperature readings

The following chart lists all parameters. In the factory default configuration, certain parameters and configuration layers will not be accessible by control key. This is meant to simplify pyrometer operation for the user. These parameters are indicated by❶. If required, remote access to these parameters can be enabled via PC interface or at configuration layer c011. Open the user calibration menu (Menu mode: Full).

Some parameter settings will be hidden if their basic function has been deactivated. For example, you will not be able to adjust the smoothing time of the filter if the filter has been turned off or switched to automatic mode.

16.1.1 Temperature measurement using two-colour/ratio mode (Configuration layer: c00 1)

Parameter	Function	Explanation	
E.tb.9	Array size	Use array with 1-10 entries or enter material constant directly into the pyrometer	
EPS.9	Ratio correction		
E. idH	Memory position	Customize the array; assign a value to each of the ratio correction in the array. Possible indexes depend on the size of the array	
E. 0 1	Assign ratio correction constants	Customize the array; assign a value to each of the ratio correction in the array. Possible indexes depend on the size of the array	
ch.r.9	Plausibility check ratio mode	oFF off n in deactivation when below limit n inA. deactivation when below or above limit	
drc.n	Soot factor	Value oFF, 0.5 – 2.5 (PT 147 only)	
drc.d	Flame density	Calculated flame density, 0 -10 (PT 147 only)	❶
ch.r._	Relative limit min.	Relative lower limit [%] , two-colour temp. reading invalid (signal intensity)	
ch.r.‾	Relative limit max.	Relative upper limit [%] , two-colour temp. reading invalid (signal intensity)	
ch.A.t	Absolute min. temp.	Absolute lower limit, two-colour temp. reading invalid	
ch.A.'ı	Absolute minimum Emissivity	Absolute lower limit [%], two-colour temp. reading invalid	
L in.9	Temperature offset using linear	oFF off 2 - 10 number of nodes used	❶
L. H 1	node x 1 - 10	Signal input (initial value) node n	❶
L. Y 1	node y 1 - 10	Signal output (resulting value) node n	❶
F iL.9	Smoothing filter	oFF on	
F iL.t	Smoothing time	Time in seconds t98	
nEn.9	Min/Max memory	oFF off n in lowest (min.)temperature, single nAH highest (max.) temperature, single dbL.n double maximum d iS.n ATD function	
nEn.t	Hold time for Min/Max	Hold time in sec.	
F iL.n	Smoothing filter for min/max*	oFF OFF on ON	
F iL.t	Smoothing time*	Time t98 in sec.	
t.dEL	time delay **	For ATD function, see Chap. 15.2.4	
t.Act	Sampling time **	For ATD function, see Chap. 15.2.4	
t.d iS	cut-off interval **	For ATD function, see Chap. 15.2.4	
t.oUt	Timeout**	For ATD function, see Chap. 15.2.4	
L i. 1	Limit 1**	For ATD function, see Chap. 15.2.4	
L i. 2	Limit 2**	For ATD function, see Chap. 15.2.4	
F-Pr	Average weighting **	For ATD function, see Chap. 15.2.4	

tSP_	Plausibility threshold **	For ATD function, see Chap. 15.2.4	
tSP‾	Plausibility threshold **	For ATD function, see Chap. 15.2.4	
nEn.t	Hold time for Min/Max	Hold time in sec.	
F iL.n	Smoothing filter for min/max*	oFF OFF on ON	
F iL.t	Smoothing time*	Time t98 in sec.	
End	End	Exit menu	

* Only available with Min/Max and Double Max modes

** Only available with ATD function

16.1.2 Temperature measurement lambda 1 (Configuration layer: c002)

In the factory default configuration, all parameter settings for digital inputs and outputs will be hidden.

Parameter	Function	Explanation	
E.tb.1	Array size	Use array with 1-10 entries or enter material constant directly into the pyrometer	
EPS.1	Emissivity factor L1	Enter material constant directly into the pyrometer	
E. idH	Memory position	Choose an entry from the material constants array	
E. 01	Assign material constants	Customize the array; assign a value to each of the material constants in the array. Possible indexes depend on the size of the array	
tAU.1	Transmittance factor L1		
bAc.1	Ambient temperature compensation		❶
bAc.t	Temp. of ambient source of radiation		❶
bAc.'i	Influence of ambient IR radiation	The reflected thermal radiation from the surroundings as a portion of the total IR radiation collected by the sensor in %	❶
L in.1	Temperature offset using linear	oFF off 2- 10 number of nodes used	❶
L. H1	node x 1 - 10	Signal input (initial value) node n	❶
L. Y1	node y 1 - 10	Signal output (resulting value) node n	❶
F iL.1	Smoothing filter	oFF smoothing not activated on simple smoothing	
F iL.t	Smoothing time	time t98 in sec for simple smoothing	
nEn.1	Min/Max memory	oFF off n in lowest (min.)temperature, single nAH highest (max.) temperature, single dbLn double maximum d iSn ATD function	
nEn.t	Hold time for Min/Max	Hold time in sec.	
F iL.n	Smoothing filter for	oFF OFF on ON	

	min/max*		
FiLt	Smoothing time*	Time t98 in sec.	
t.dEL	time delay **	For ATD function, see Chap. 15.2.4	
t.Act	Sampling time **	For ATD function, see Chap. 15.2.4	
t.diS	cut-off interval **	For ATD function, see Chap. 15.2.4	
t.oUt	Timeout**	For ATD function, see Chap. 15.2.4	
Li. 1	Limit 1**	For ATD function, see Chap. 15.2.4	
Li. 2	Limit 2**	For ATD function, see Chap. 15.2.4	
F-Pr	Average weighting **	For ATD function, see Chap. 15.2.4	
tSP_	Plausibility threshold **	For ATD function, see Chap. 15.2.4	
tSP‾	Plausibility threshold **	For ATD function, see Chap. 15.2.4	
Ano	Mode of display **	t=0 show lower limit of temp. range during running measurement t.hLd Hold previous temp. reading during running measurement	
A.rSt	Auto reset**	For ATD function, see Chap. 15.2.4	
chL2	Set Li2 check on tAct**	For ATD function, see Chap. 15.2.4	
End	End	Exit menu	

* Only available with Min/Max and Double Max modes
** Only available with ATD function

16.1.3 Temperature measurement lambda 2 (Configuration layer: c003)

By default, some parameters are suppressed to facilitate operation.

Parameter	Function	Explanation	
E.t.b.	Array size	Use array with 1-10 entries or enter material constant directly into the pyrometer	
EPS.2	Emissivity factor L2	Enter material constant directly into the pyrometer	
E.idH	Memory position	Choose an entry from the material constants array	
E. 01	Assign material constants	Customize the array; assign a value to each of the material constants in the array. Possible indexes depend on the size of the array	
tAU.2	Transmittance factor L2		
bAc.2	Ambient temperature compensation		❶
bAc.t	Temp. of ambient source of radiation		❶
bAc.'i	Influence of ambient IR radiation	The reflected thermal radiation from the surroundings as a portion of the total IR radiation collected by the sensor in %	❶
Lin.2	Temperature offset	oFF off	❶

	using linear	2 - 10 number of nodes used	
L. H 1	node x 1 - 10	Signal input (initial value) node n	❶
L. Y 1	node y 1 - 10	Signal output (resulting value) node n	❶
F iL.2	Smoothing filter	oFF smoothing not activated on simple smoothing	
F iL.t	Smoothing time	time t98 in sec for simple smoothing	
MEM.1	Min/Max memory	oFF off M in lowest (min.)temperature, single MAX highest (max.) temperature, single dbLM double maximum d iSM ATD function	
MEM.t	Hold time for Min/Max	Hold time in sec.	
F iL.M	Smoothing filter for min/max*	oFF OFF on ON	
F iL.t	Smoothing time*	Time t98 in sec.	
t.dEL	time delay **	For ATD function, see Chap. 15.2.4	
t.Act	Sampling time **	For ATD function, see Chap. 15.2.4	
t.d iS	cut-off interval **	For ATD function, see Chap. 15.2.4	
t.oUt	Timeout**	For ATD function, see Chap. 15.2.4	
L i. 1	Limit 1**	For ATD function, see Chap. 15.2.4	
L i. 2	Limit 2**	For ATD function, see Chap. 15.2.4	
F-Pr	Average weighting **	For ATD function, see Chap. 15.2.4	
tSP_	Plausibility threshold **	For ATD function, see Chap. 15.2.4	
tSP-	Plausibility threshold **	For ATD function, see Chap. 15.2.4	
Ano	Mode of display **	t=0 show lower limit of temp. range during running measurement thLd Hold previous temp. reading during running measurement	
A.rSt	Auto reset**	For ATD function, see Chap. 15.2.4	
chL.2	Set Li2 check on tAct**	For ATD function, see Chap. 15.2.4	
End	End	exit menu	

* Only available with Min/Max and Double Max modes

** Only available with ATD function

☞ L1 stands for lambda 1, meaning the temperature reading from lambda 1
L2 stands for lambda 2, meaning the temperature reading from lambda 2

16.1.4 Configuration I/O (Configuration layer: c0 10)

In the factory default configuration, all parameter settings for digital inputs and outputs will be hidden.

Parameter	Function	Explanation	
tYPE	Operating mode/ measuring technique	q ratio mode (quotient) L 1 Lambda 1 L 2 Lambda 2	
LEd.	LED (green)	oFF OFF on ON	❶
LEd.S	LED: define source	rdY Status indicates 'ready' L 1 Lambda 1 L 1.Pr Lambda 1 without peak picker L 2 Lambda 2 L2.Pr. Lambda 2 without peak picker q Two-colour/ratio mode q. Pr. Two-colour/ratio mode without peak picker tU Inner device temperature IntY. Signal intensity Atr.1 Triggered by ATD function Lambda 1* Atr.2 Triggered by ATD function Lambda 2* Atr.q Triggered by ATD function two-colour/ratio mode* dirt Dirt Alert AAc.1 Measuring time ATD Lambda 1* AAc.2 Measuring time ATD Lambda 2 * AAc.q Measuring time ATD two colour/ratio mode *	❶
LEd.F	LED function	LuL. Switch direction "Level" (LED activated if limit exceeded) LuL.- Switch direction "Level" (LED / output inverted) rnG. Switch direction "Range" (LED activated if range exceeded) rnG.- Switch direction "Range" (LED / output inverted)	❶
LEd.t	LED switching threshold	Switching threshold (only available at function "Level")	❶
LEd.h	LED signal threshold	Hysteresis +/- relative to signal threshold (only available at function "Level")	❶
LEd._	LED lower limit of range	Lower limit of range for switch signal (only available function "range")	❶
LEd.‾	LED upper limit of range	Upper limit of range for switch signal (only available function "range")	❶
LEd.L	LED delay time		❶
LEd.n	LED hold time		❶
bU2.	Buzzer	oFF OFF on ON	❶
bU2.S	Buzzer: define source	rdY Status indicates 'ready' L 1 Lambda 1 L 1.Pr Lambda 1 without peak picker L 2 Lambda 2 L2.Pr. Lambda 2 without peak picker q Two-colour/ratio mode q. Pr. Two-colour/ratio mode without peak picker tU Inner device temperature IntY. Signal intensity	❶

		A.tr.1 Triggered by ATD function Lambda 1* A.tr.2 Triggered by ATD function Lambda 2* A.tr.9 Triggered by ATD function two-colour/ratio mode* dirt Dirt Alert A.Ac.1 Measuring time ATD Lambda 1* A.Ac.2 Measuring time ATD Lambda 2 * A.Ac.9 Measuring time ATD two colour/ratio mode *	
bU2.F	Buzzer function	LuL. Switch direction “Level” (buzzer activated if limit exceeded) LuL.- Switch direction “Level” (buzzer / output inverted) rnG. Switch direction “Range” (buzzer activated if range exceeded) rnG- Switch direction “Range” (buzzer / output inverted)	❶
bU2.t	Buzzer switching threshold	Switching threshold (only available at function “Level”)	❶
bU2.h	Buzzer signal threshold	Hysteresis +/- relative to signal threshold (only available at function “Level”)	❶
bU2._	Buzzer lower limit of range	Lower limit of range for switch signal (only available function “range”)	❶
bU2.‾	Buzzer upper limit of range	Upper limit of range for switch signal (only available function “range”)	❶
bU2.L	Buzzer delay time		❶
bU2.M	Buzzer hold time		❶
End	End	exit menu	❶

* Only available with ATD function

16.1.5 General Functions (Configuration layer: c011)

Parameter	Function	Explanation	
A.oFF	Auto switch-off	oFF automatic switch-off function deactivated 1-60 time period in minutes for auto switch-off delay	
A.Str.	Auto temp. data ouput	oFF automatic temp. data output is off on temp. data output at PC terminal	❶
A.cYc.	Cycle for auto temp. data output	Select cycle time in s	❶
Addr.	Device address	Enter address of device for non-terminal mode	❶
dISP.	Display control	"on" Display panel indicates "on" iA1 Indicated temperature reading according to operating mode	❶
Unit	temperature unit	°C degrees Celsius °F degrees Fahrenheit	
MEnU	Menu-Mode	norM With ❶ marked parameter are not shown FULL All parameters are shown	
End	End	exit menu	

16.1.6 Displayed temperature readings (Configuration layer: c020)

Parameter	Function	Explanation	
q.	Temp. reading Quotient	Shows current temperature reading in two-colour mode	
L 1.	Temp. reading Lambda1	Actual temperature reading lL 1	
L2.	Temp. reading Lambda1	Actual temperature reading L 2	
q. Pr.	Temp. reading Quoti-ent Pre	Shows current temperature reading in two-colour/ratio mode prior to peak picker	
L 1.Pr.	Temp. reading Lamb-da1 Pre	Shows current temperature reading for L1 prior to peak picker	
L2.Pr.	Temp. reading Lamb-da 2 Pre	Shows current temperature reading for L2 prior to peak picker	
IntY.	Signal-Intensity	Calculated signal intensity	
t. int.	Inner temperature	Current inner temp. of device	
End	Ende	Menü verlassen	

17 Software CellaView

The software CellaView can be used for representation, analysis and archiving of measured values of your pyrometer.

You can download the CellaView software here:

www.keller.de/its/

18 PC Interface

The CellaPort features a USB port to enable data communication to a PC for remote device configuration and temperature monitoring. Either use the CellaView software or use another standard terminal program.

The USB port is on the back of the pyrometer, covered by a protective cap. The pyrometer is supplied with a standard USB cable.

A Windows®operating system released prior to Windows®7 will not automatically identify the CellaPort as the peripheral device. The required driver is on the download area CellaView or use the link www.prolific.com.tw to download the PL 2303 driver.

When using the CellaView software no additional parameter must be set.

For more information on CellaView, please refer to the software instruction manual.

If you are using a terminal program such as HyperTerminal, set parameters for the serial interface as follows:

When using a terminal software, e.g. Hyperterminal, enter the parameters manually as follows:

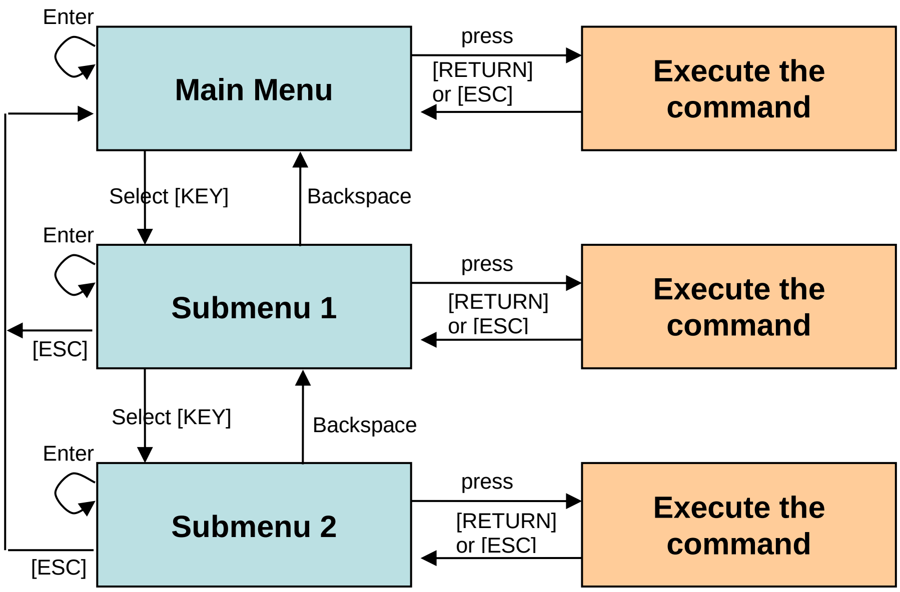
57600 Baud / 8 Data bits / odd parity / 1 stop bit / no handshake

☞ *Serial communication starts approximately 2 seconds after the data terminal ready (DTR) control signal is enabled at the interface. Activate this signal in the terminal program or device configuration*

After enabling the interface and selecting parameter settings, the pyrometer will automatically transmit data via serial interface (autoprint activated).

19 Remote configuration

Pyrometer setup and temperature monitoring can be configured from a PC running a simple serial terminal such as HyperTerminal. Many key parameters can be easily accessed from a keyboard. Additional functions and settings can be programmed from cascading submenus, as shown in the menu navigation chart below:



To set the pyrometer to the terminal mode, simultaneously hold down the **Ctrl key** and press the **E key** twice in rapid succession.
A help menu will appear on the screen.

Direct commands have an assigned key. Example: E for epsilon (ratio correction). Submenu settings are shown in brackets. Example `[Quotient]`

19.1 Main Menu

After starting the terminal program or after entering „H“ the main menu will appear

```
------------------------------------------------------------------
>H
------------------------------------------------------------------
Mainmenu
------------------------------------------------------------------
0: [QUOTIENT]                      E: Quick access EPSILON
1: [LAMBDA 1]                      A: Quick access FILTER
2: [LAMBDA 2]                      T: Quick access TYPE of measure
C: [I/O]
K: [CALIBRATION]

H: Show this help-site             J: Show diagnosis
W: Show ambient temperature        Q: Show calibration data
X: Show measure temperatures       P: Show channel parameters
------------------------------------------------------------------
```

19.2 View Current Configuration

Command „P“ shows you how your CellaPort PT is currently configured.

```
------------------------------------------------------------------
-    PT 143 AF1     650-1700C - 00/00112 - Job  - 21.10.13       -
-    PT40SW101/0   QP 0,95/1,05um  Version 01.02  10.07.13       -
------------------------------------------------------------------
Qu range ....  650.0 - 1700.0 C    DISPLAY source ....... quotient
Qu epsilon ratio ...... 100.0 %
Qu check L2  rel.limit  10.00 %
Qu abs.limit   650 C @  50.00 %
Qu linearization .......... off
Qu filter ..........     0.10 s
Qu memory type ............ off    GRN.LED source ... ready-signal
                                   GRN.LED function   level/signal

Unit .................. Celsius    GRN.LED delay time ...   0.00 s
Terminal assigned to ...... USB    GRN.LED hold time ....   0.00 s
Autoprint ......... on (cyclic)    BUZZER  source ............ off
Print cycle time .....    0.1 s
Protocol address .......... 001
Display ........... temperature
Key lock .................. off

------------------------------------------------------------------
>
```

At the top left, there is a list of data acquisition parameters for the two colour reading (Quotient). The right-side column shows LED/Buzzer-Configuration. At the bottom left you will find general settings.

19.3 Submenus

19.3.1 Configure two-colour/ratio mode

Press key "0“ to access the data acquisition parameters for the quotient.

```
------------------------------------------------------------------
Submenu QUOTIENT
------------------------------------------------------------------
Qu epsilon ratio ...... 100.0 %
Qu check L2  rel.limit  10.00 %
Qu abs.limit   650 C @  50.00 %
Qu linearization .......... off
Qu filter ..........     0.10 s
Qu memory type ............ off

C: [CONFIG EPSILON TABLE]
E: Epsilon
U: [Q-CHECK]
L: [LINEARIZATION]
F: Filter
M: [MEMORY]
P: Show parameter
Q: Show calibration data
O: Show signal intensity
X: Show measure temperatures
Y: Show premax measure temps.
ESC: Back to MAIN-MENU
------------------------------------------------------------------
>QUOTIENT >
```

19.3.2 Lambda 1

Press key „1“ to access all data acquisition parameters for Lambda 1.

```
------------------------------------------------------------------
Submenu LAMBDA 1
------------------------------------------------------------------
L1 epsilon ...........  99.0 %
L1 transmission ....... 100.0 %
L1 backc. ................. off
L1 linearization .......... off
L1 filter ..........     0.10 s
L1 memory type ............ off

C: [CONFIG EPSILON TABLE]
E: Epsilon
T: Transmission
B: Background-Compensation
L: [LINEARIZATION]
F: Filter
M: [MEMORY]
P: Show parameter
Q: Show calibration data
X: Show measure temperatures
Y: Show premax measure temps.
ESC: Back to MAIN-MENU
------------------------------------------------------------------
>LAMBDA 1 >
```

19.3.3 Lambda 2

Press key „2“ to access all data acquistion parameters for Lambda 2.

```
------------------------------------------------------------------
Submenu LAMBDA 2
------------------------------------------------------------------
L2 epsilon ...........  99.0 %
L2 transmission ....... 100.0 %
L2 backc. ................. off
L2 linearization .......... off
L2 filter ..........     0.10 s
L2 memory type ............ off

C: [CONFIG EPSILON TABLE]
E: Epsilon
T: Transmission
B: Background-Compensation
L: [LINEARIZATION]
F: Filter
M: [MEMORY]
P: Show parameter
Q: Show calibration data
X: Show measure temperatures
Y: Show premax measure temps.
ESC: Back to MAIN-MENU
------------------------------------------------------------------
>LAMBDA 2 >
```

19.3.4 Quick access to emissivity / signal smoothing / operating mode

Use keys "E", "T", „B“ und "F" to access and change the emissivity setting, smoothing filter and measuring mode.

19.3.5 I/O Signal Configuration

Press „C“ to access and adjust all settings regarding LED and buzzer.

```
------------------------------------------------------------------
Submenu I/O
------------------------------------------------------------------
C: [STATUS LED CONTROL]
D: [BUZZER CONTROL]
M: [OPTIONS]
ESC: Back to MAIN-MENU
------------------------------------------------------------------
>I/O >
```

The LED and buzzer configuration are grouped in submenus where each can be accessed for further configuration.

LED-Control:

```
------------------------------------------------------------------
Submenu CONTROL LED
------------------------------------------------------------------
GRN.LED source ... ready-signal
GRN.LED function   level/signal
GRN.LED delay time ...   0.00 s
GRN.LED hold time ....   0.00 s

S: Set source
F: Set function
D: Set delay time
O: Set hold time
ESC: Back to MAIN-MENU
------------------------------------------------------------------
>I/O >LED CONTROL >

Set status LED source:
 0: Off
 1: Ready-Signal
 2: Lambda 1
 3: Lambda 1 premax
 4: Lambda 2
 5: Lambda 2 premax
 6: Quotient
 7: Quotient premax
 8: Signal intensity
 9: Dirt Alert
10: Ambient Temperature
11: Lambda 1 ATD Trigger
12: Lambda 2 ATD Trigger
13: Quotient ATD Trigger
14: Lambda 1 ATD tAct
15: Lambda 2 ATD tAct
16: Quotient ATD tAct
------------------------------------------------------------------
Your choice>
```

Buzzer-control:

```
-------------------------------------------------------------------
Submenu CONTROL 2
-------------------------------------------------------------------
BUZZER  source ............ off

S: Set source
ESC: Back to MAIN-MENU
-------------------------------------------------------------------
>I/O >BUZZER CONTROL >S

Set buzzer control source:
 0: Off
 1: Ready-Signal
 2: Lambda 1
 3: Lambda 1 premax
 4: Lambda 2
 5: Lambda 2 premax
 6: Quotient
 7: Quotient premax
 8: Signal intensity
 9: Dirt Alert
10: Ambient Temperature
11: Lambda 1 ATD Trigger
12: Lambda 2 ATD Trigger
13: Quotient ATD Trigger
14: Lambda 1 ATD tAct
15: Lambda 2 ATD tAct
16: Quotient ATD tAct
-------------------------------------------------------------------
Your choice>
```

In the submenu "Options" you can program a keylock. If keylock is activated and you wish to change a parameter setting, enter Code P 100 for full access. If you enter an incorrect code, you can view the configuration but you will not be able to change the setting.

```
-------------------------------------------------------------------
Submenu OPTIONS
-------------------------------------------------------------------
Autoprint ......... on (cyclic)
Print cycle time .....    0.1 s
Protocol address .......... 001
Display ........... temperature
Key lock .................. off
Unit ................. Celsius

A: Set autoprint function
T: Set output cycle time
P: Set protocol-address
D: Set display function
E: Set key lock
F: Set unit Celsius/Fahrenheit
R: Switch off pyrometer
ESC: Back to MAIN-MENU
-------------------------------------------------------------------
>I/O >OPTIONS >
```

19.3.6 Automatic temperature data output

For continuous serial transmission of temperature data, you must activate automatic temperature data output.

In the submenu “Options”, command **“A"** activates (on) / deactivates (off) this function.

If ATD is activated, the temperature data will only be transmitted after successful completion of measurement.

If ATD is deactivated, press command **"T"** to select the cycle time in which the current temperature data are transmitted through the serial interface.

When *automatic* temperature data output is activated, the pyrometer will ***not*** display the parameter settings when it is switched on. Instead, the pyrometer will instantly begin transmitting data.

Temperature data format

two-colour/ratio   Lambda 1 – Lambda 2 (one cycle):

Byte	Negative Temperature	Positive Temperature	Temperature exceeds measuring range	Temperature falls below measuring range
1	Space	Space	Space	Space
2	Minus symbol -	Space	Minus symbol -	Minus symbol -
3	Digit 1000	Digit 1000	O	U
4	Digit 100	Digit 100	V	N
5	Digit 10	Digit 10	E	D
6	Digit 1	Digit 1	R	E
7	Decimal point .	Decimal point .	Space	R
8	Decimal place	Decimal place	Space	Space
9	Space	Space	Minus symbol -	Minus symbol -
10	Unit C or F	Unit C or F	Space	Space
11	Tabulator	Tabulator	Tabulator	Tabulator
12	Space	Space	Space	Space
13	Minuszeichen -	Space	Minus symbol -	Minus symbol -
14	Digit 1000	Digit 1000	O	U
15	Digit 100	Digit 100	V	N
16	Digit 10	Digit 10	E	D
17	Digit 1	Digit 1	R	E
18	Decimal point .	Decimal point .	Space	R
19	Decimal place	Decimal place	Space	Space
20	Space	Space	Minus symbol -	Minus symbol -
21	Unit C or F	Unit C or F	Space	Space
22	Tabulator	Tabulator	Tabulator	Tabulator
23	Space	Space	Space	Space
24	Minuszeichen -	Space	Minus symbol -	Minus symbol -
25	Digit 1000	Digit 1000	O	U
26	Digit 100	Digit 100	V	N
27	Digit 10	Digit 10	E	D
28	Digit 1	Digit 1	R	E
29	Decimal point .	Decimal point .	Space	R
30	Decimal place	Decimal place	Space	Space
31	Space	Space	Minus symbol -	Minus symbol -
32	Unit C or F	Unit C or F	Space	Space
33	Carriage Return	Carriage Return	Carriage Return	Carriage Return

☞ All signs/symbols are ASCII coded; preceding zeros will be transmitted

The cycle time in which the temperature reading is transmitted can be set via parameter AcYc (minimum cycle duration is 0.1 second).

19.4 User Recalibration

If ever required, the pyrometer can be recalibrated. Go to Submenu Calibration. Press command „K“ and then enter the password „100“ to access the calibration menu.

```
---------------------------------------------------------------------
---------------------------------------------------------------------
Submenu CALIBRATION
---------------------------------------------------------------------
Name .... "Pyrometer PT Series"
Menu mode ............. default

1: [LAMBDA 1 CALIBRATION]
A: Reset settings to factory default
E: Set menu mode
S: Set pyrometer name
Z: End Calibration-Mode
ESC: Back to MAIN-MENU
---------------------------------------------------------------------
>CALIBRATION >
```

You can reset all configurations you have made to your pyrometer and restore the factory default settings using command "A". This also applies to data acquisition parameters, LED and buzzer.

Press command "E" if you would like to view all parameters which are otherwise hidden. Because this list of menu items is quite long, we only recommend this for advanced users. If you intend to carry out measurements of molten metal only, it makes sense to maintain the factory configuration. This will keep those parameters, which will not require adjustment, hidden

Command "S" enables the user to enter a short word to designate the measurement location/task. This text can be accessed from the Main Menu by pressing "Q".

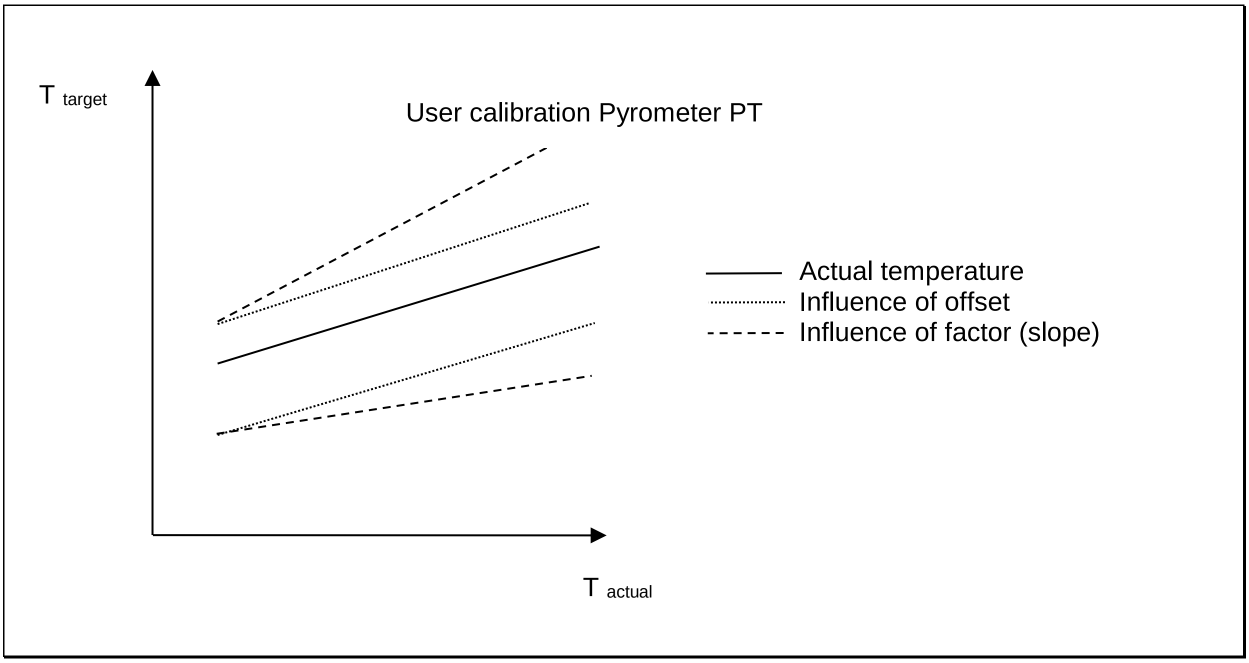
```
---------------------------------------------------------------------
Submenu LAMBDA 1
---------------------------------------------------------------------
L1 range ....    0.0 - 1000.0 C
L1 User calibration ....... off
L1 User def. offset    +0.00000
L1 User def. factor    +1.00000

A: Set L1 - extended-range
B: Set L1 User-Cal. On/Off
ESC: Back to MAIN-MENU
---------------------------------------------------------------------
>CALIBRATION >LAMBDA 1 >
```

Use command "A" to reconfigure the pyrometer‘s measuring range. The range can be adjusted to be either larger or smaller than the factory-configured range. When customizing the temperature range, make sure that upper and lower temperatures you enter are compatible with the pyrometer’s actual working range.

Use key "B" for direct access to enable adjustments to the CellaPort PT.

To recalibrate your CellaPort, you will require a calibration furnace and a reference standard

If you make a mistake while making the adjustments, simply enter offset=0.0 und factor=1.0, or set User Calibration to „off“.



20 Maintenance

20.1 Cleaning the pyrometer lens/protective glass

A false temperature reading will be generated when the lens/protective glass is dirty. Therefore check the lens periodically and clean it, if necessary.

Dust can be removed by simply blowing it away or by using a soft brush. A special lens cleaning cloth is ideal, but any soft, clean, lint-free cloth will be suitable.

If the lens is quite dirty, use a very mild liquid detergent and rinse carefully with clear water while holding the pyrometer down. Apply as little pressure as possible to avoid scratching the lens.

Make sure to turn off the pyrometer before removing or attaching the lens. Failure to do so may result in damage to the instrument!

☞ *Protect the pyrometer against high ambient temperatures, high air humidity, high voltage and strong electromagnetic fields. Never point the lens directly towards the sun*

21 Accessories

Description	Type	Item No.
Protective glass M46	70146	120314
USB Cable	VK 11/D	1009677
Power supply		1053975
Carrying case	PT 110/A	1052289
Supplementary lens	PZ 20/O-50	514744
Supplementary lens	PZ 20/O-63	514985
Supplementary lens	PZ 20/O-75	513840
Supplementary lens	PZ 20/O-120	514973

21.1 Supplementary lens

Pyrometer	**Supplementary lens**							
Type	PZ 20/O-50		PZ 20/O-63		PZ 20/O-75		PZ 20/O-120	
	distance [mm]	spot size Ø in mm	distance [mm]	spot size Ø in mm	distance [mm]	spot size Ø in mm	distance [mm]	spot size Ø in mm
PT 140 AF 4/7	36-41	0.35-0.45	45 - 54	0.4 – 0.6	52 - 63	0.45 – 0.7	84 - 112	0.7 – 1.1
PT 140 AF 5/8	31-36	0.3-0.4	38-45	0.35-0.5	43-52	0.4-0.6	66-84	0.55-0.9
PT 140 AF 6	41	0.3					101-112	0.55-0.67

Pyrometer		**Supplementary lens**							
Type		PZ 20/O-50		PZ 20/O-63		PZ 20/O-75		PZ 20/O-120	
		distance [mm]	Mess-fleck in mm	distance [mm]	spot size in mm	distance [mm]	spot size in mm	distance [mm]	spot size in mm
PT 143 AF 1	h	36-41	1.2 – 1.6	45 - 54	1.4 – 1.2	52 - 63	1.6 – 2,.4	84 - 112	2.4 – 3.8
	v		0.2 – 0.3		0.4 – 0.4		0.5		0.5 – 0.8
PT 143 AF 2	h	31 - 26	1.1 – 1.4	38 - 45	1.3 – 1.7	43 - 52	1.4 – 2	66 - 84	2 – 2.9
	v		0.2 – 0.3		0.3		0.3 – 0.4		0.6
PT 143 AF 3	h	41	1					101 - 112	1.9 – 2.4
	v		0,2						0.4 – 0.5
PT 143 AF 13	h	34 - 41	1.7 – 2.4					77 - 112	3.5 – 5.7
	v		0.3 – 0.5						0.7 – 1.1
PT 143 AF 4	h	35 - 41	1.0 – 1.4	45 - 54	1.3 – 1.8	52 - 63	1.4 – 2.1	84 - 112	2.1 – 3.4
	v		0.2		0.2 – 0.3		0.3 – 0.4		0.4 – 0.6
PT 143 AF 5	h	31 - 35	0.9 – 1.2	38 - 45	1.1 – 1.5	43 - 52	1.3 – 1.8	66 - 84	1.8 – 2.6
	v		0.2		0.2 – 0.3		0.2 – 0.3		0.4
PT 143 AF 5	h	31 - 35	0.9 – 1.2	38 - 45	1.1 – 1.5	43 - 52	1.3 – 1.8	66 - 84	1.8 – 2.6
	v		0.2		0.2 – 0.3		0.2 – 0.3		0.4
PT 143 AF 6	h	41	0.9					101 - 112	1.7 – 2.1
	v		0.1						0.3
PT 143 AF 14	h	24 - 41	1.5 – 2.1					77 - 112	3.1 – 5
	v		0.3						0.5 – 0.8

22 Theory of Non-Contact Temperature Measurements

All materials radiate thermal energy in all states of aggregation above absolute zero. This radiation is mainly caused by atomic or molecular oscillations. The intensity of this infrared radiation is a measure for the temperature of the radiating body. A pyrometer detects this radiation and displays it as a temperature value.

22.1 Emissivity

This coefficient lies between 0...100 %. A body with ideal radiation (black body) has a coefficient of 100 %. Materials with the same temperature but with lower radiation intensity have coefficients lower than 100 %. Exact temperature readings can only be obtained when the emissivity coefficient of the target is correctly adjusted on the pyrometer. The pyrometer then automatically compensates for the lower radiation.

For non-contact measurements the CellaPort uses the intensity of the infrared radiation at a certain wavelength.
It is necessary to configure the CellaPort to the respective emissivity coefficient of the measuring object. An incorrectly set emissivity coefficient leads to wrong temperature readings. Below is a table showing emissivity coefficients for various materials.

22.2 Temperature measurement using spectral mode

For non-contact measurements the CellaPort uses the intensity of the infrared radiation at <u>one certain wavelength</u>.
It is necessary to configure the CellaPort to the respective emissivity coefficient of the measuring object to get exact measuring results. An incorrectly set emissivity coefficient leads to wrong temperature readings

In pyrometry, the specific radiation characteristics of the measured object will influence the generated temperature data. In order to produce accurate and reliable temperature readings, the pyrometer must be configured according to the specific material constant (emissivity).

The annex includes a table showing emissivity coefficients for various materials.

22.3 Temperature measurement using two-colour/ratio mode

The quotient channel of the CellaPort measures the infrared radiation at two wavelengths and calculates the ratio of these two radiation values. This quotient (or this ratio) of the two intensities is proportional to the temperature. The ratio remains constant even when the radiation intensities decrease, e.g. with vapour and dust in the field of view, fogged-up lenses or changing surface properties (emissivity coefficient) of the measured object. Therefore, with a homogeneous weakening of the signal, the two-colour pyrometer still provides a stable measuring signal.
If weakening of the radiation is not homogeneous or depending on the wavelengths, the ratio of the two radiation intensities is not constant: the **emissivity ratio** changes. This emissivity ratio is the correction factor that is set at the pyrometer and that needs to be adapted to the measured object when measuring with a two-colour pyrometer.

Resumé:
The two-colour measuring method offers great advantages due to its insensivity to the described disturbances.
The applications cover large segments of the iron and steel producing industry and the metal, cement and chemical industries.

22.4 Emissivity Coefficient Table – Spectral Mode

List of emissivity coefficients of different materials in %

	PT 140/143
Wavelength λ	**0,8...1,1 µm**
"Black Body"	100
Aluminium, polished	15
Aluminium, blackened	25
Asbestos cement	70
Bronce, polished	3
Bronze, blackened	30
Chromium, polished	30
Iron, heavily scaled	95
Iron, rolling skin	90
Iron, liquid	30
Gold and silver	2
Graphite, blackened	90
Copper, oxidized	90
Brass, oxidized (tarnished)	70
Nickel	20
Porcelain, glazed	60
Porcelain, rough	85
Soot	95
Fireclay	50
Slag	85
Pottery, glazed	90
Bricks	90
Zinc	60

23 General technical data

Digital output:
Cyclical data output,
adjustable cycle time

Resolution Display:
1 K

Resolution USB:
0.1 K

Power supply
Rechargeable battery pack
Mains adapter

Battery-life
Up to 12 hours of use
(based on continuous operating
at T_a = 23 °C

Permissible humidity
95% r.H. max.
(non-condensing)

Ambient operating temperature:
0 - 50 °C

Storage temperature:
-20 - 50 °C

Housing:
Aluminium

Protection rating:
IP 40 nach DIN 40050

Weight:
Approx.. 1.1 kg

Sighting
Through-the-lens sighting, parallax free imaging, target spot indicator, diopter compensation, polarizing filter

ATD function
automatically identifies the target and detects its temperature

24 Technical Data PT 140 AF 20

Measuring range:
500 ... 1400 °C

Sensors:
photo diode

Spectral sensitivity:
0.95/ 1.05 µm

Response time t_{98}:
≤ 10 ms (T> 650 °C)

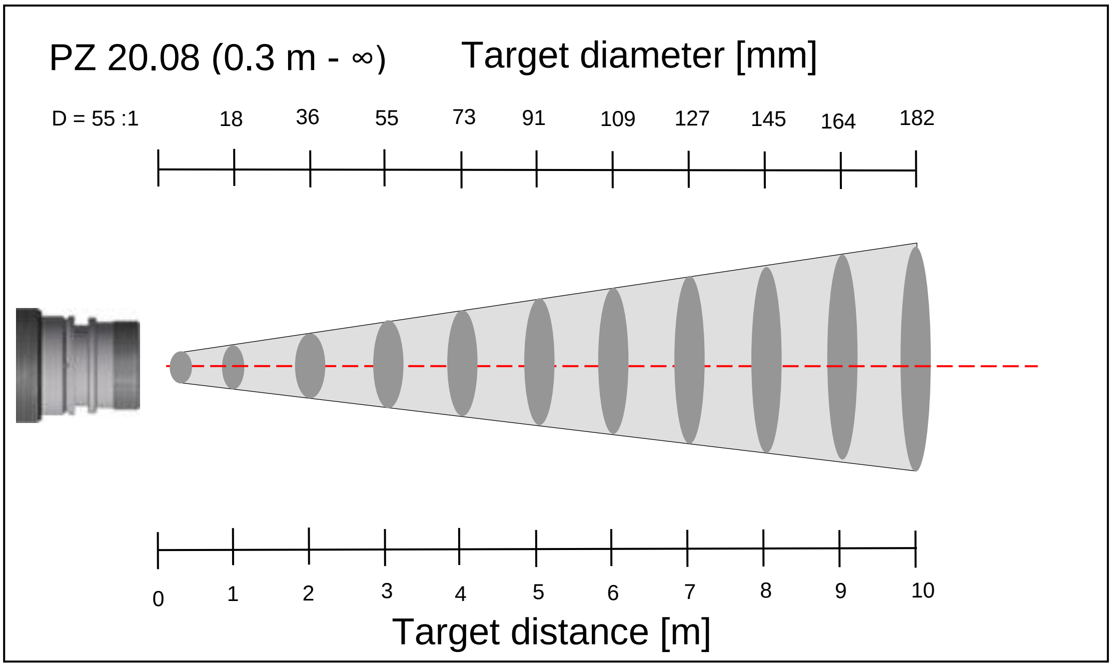
Measuring uncertainty:
1 % of range
(at ε =1.0 and T_A = 23 °C)

Repeatability:
2 K

Temperature coefficient with reference to 23 °C:
≤ 0.05 %/K
of measured value

24.1 Field of View Diagrams PT 140 AF 20

PT 140	Lens	Focussing range	Distance to target size ratio
AF 20	PZ 20.08	0.3 m - ∞	55:1



25 Technical Data PT 140 (650 – 1700 °C)

Measuring range:
650 ... 1700 °C

Sensors:
photo diode

Spectral sensitivity:
0.95/ 1.05 µm

Response time t_{98}:
≤ 10 ms (T> 750 °C)

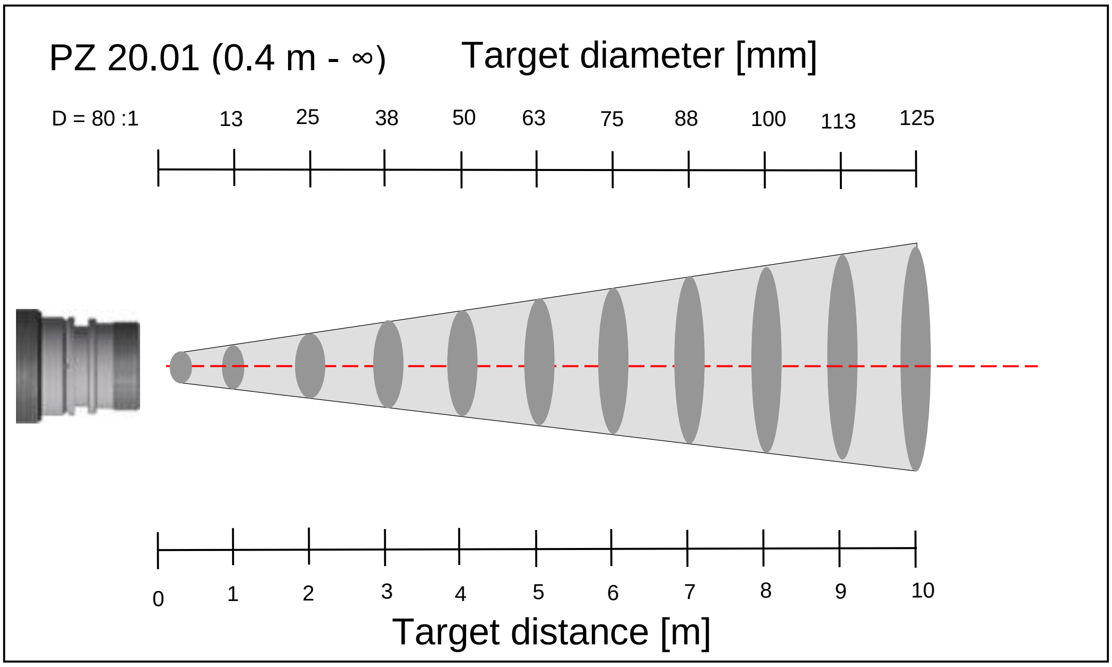
Measuring uncertainty :
1 % of range
(at ε =1.0 and T_A = 23 °C)

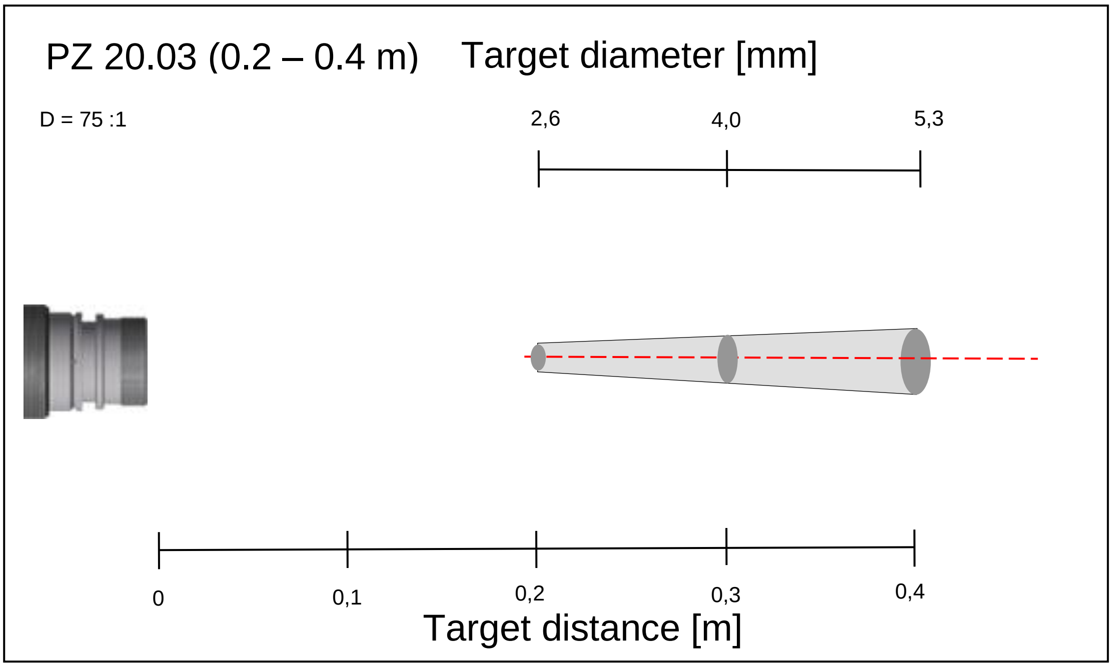
Repeatability:
2 K

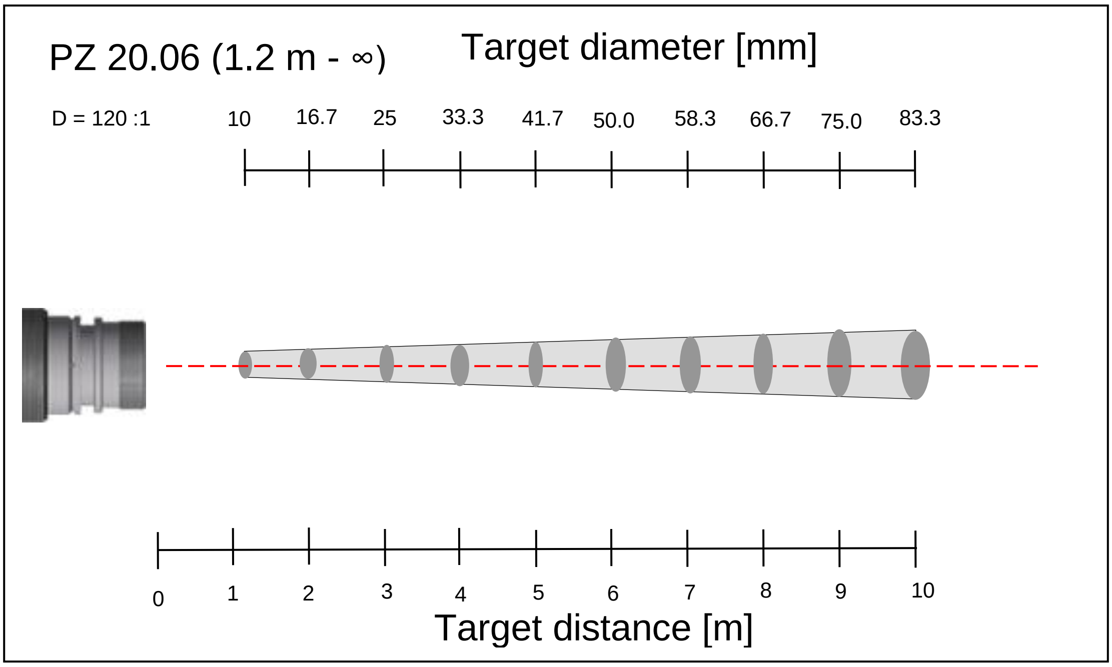
Temperature coefficient with reference to 23 °C:
≤ 0.05 %/K
of measured value

25.1 Field of View Diagrams PT 140 (650 – 1700 °C)

PT 140	Lens	Focussing range	Distance to target size ratio
AF 1	PZ 20.01	0.4 m - ∞	80:1
AF 2	PZ 20.03	0.2 m – 0.4 m	75:1
AF 3	PZ 20.06	1.2 m - ∞	120:1




PZ 20.03 (0.2 – 0.4 m)
Target diameter [mm]
D = 75 :1
2,6
4,0
5,3
0
0,1
0,2
0,3
0,4
Target distance [m]


PZ 20.06 (1.2 m - ∞)
Target diameter [mm]
D = 120 :1
10
16.7
25
33.3
41.7
50.0
58.3
66.7
75.0
83.3
0
1
2
3
4
5
6
7
8
9
10
Target distance [m]

26 Technical Data PT 140 (750 – 2400 °C)

Measuring range:
750 … 2400 °C

Sensors:
photo diode

Spectral sensitivity:
0.95/ 1.05 µm

Response time t_{98}:
≤ 10 ms (T> 950 °C)

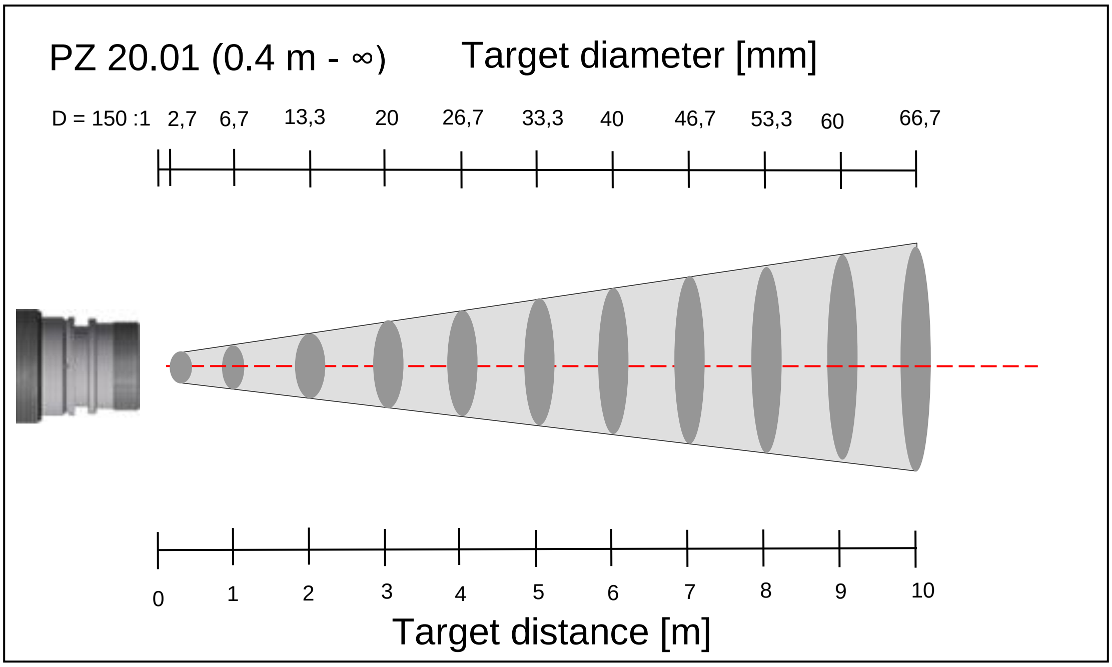
Measuring uncertainty:
1 % of range
(at ε =1.0 and T_A = 23 °C)

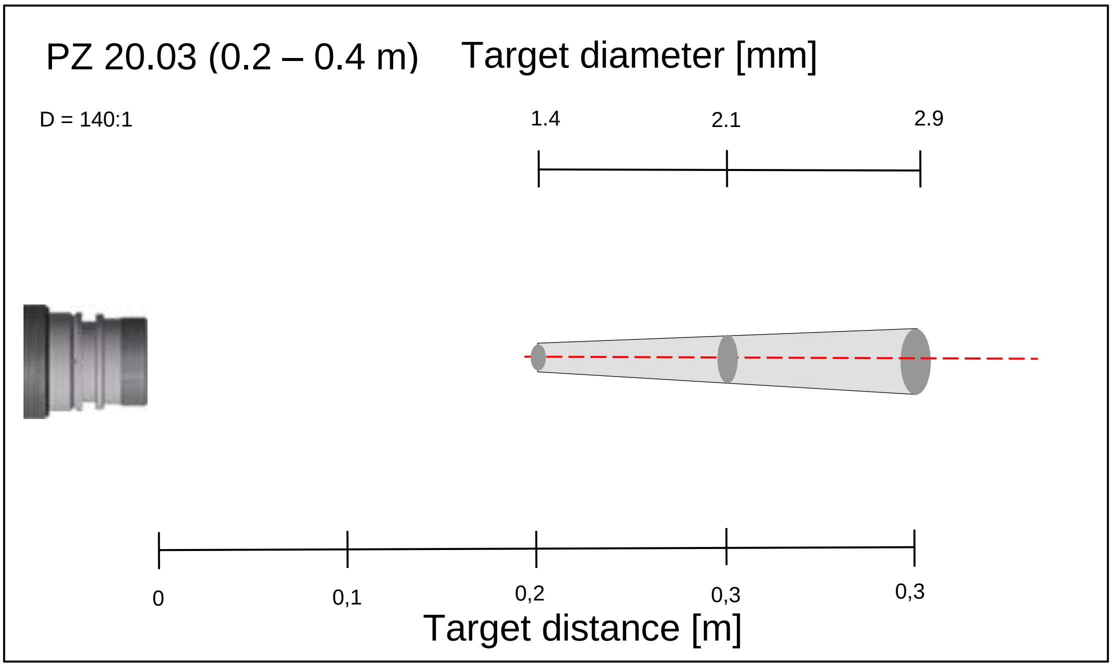
Repeatability:
2 K

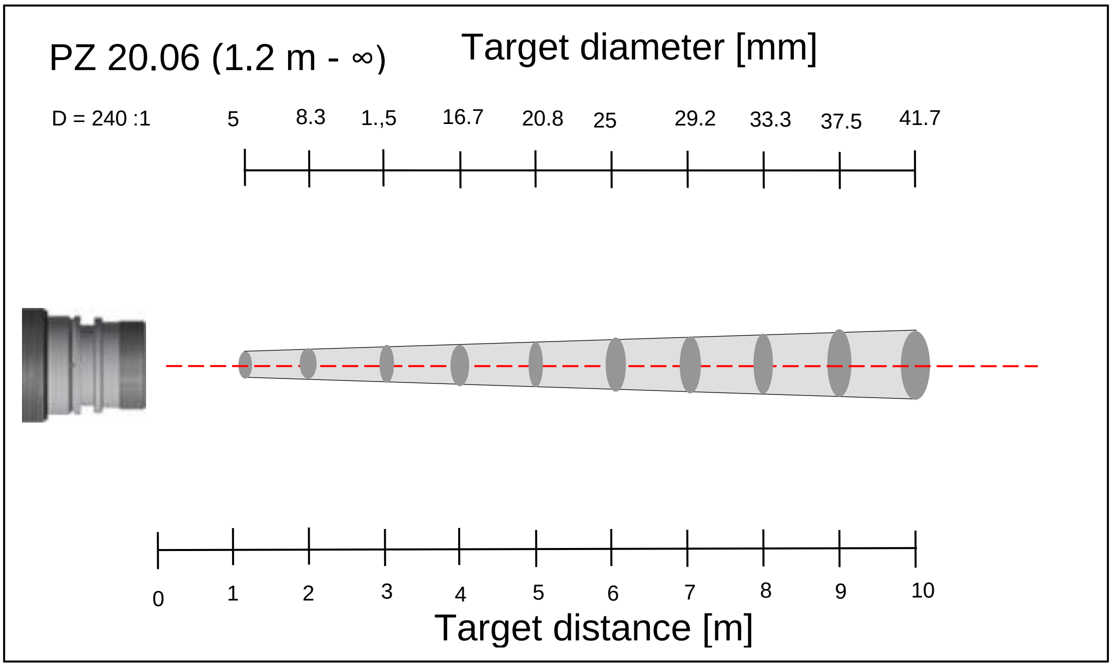
Temperature coefficient with reference to 23 °C:
≤ 0.05 %/K
of measured value

26.1 Field of View Diagrams PT 140 (750 – 2400 °C)

PT 140	Lens	Focussing range	Distance to target size ratio
AF 4	PZ 20.01	0.4 m - ∞	150:1
AF 5	PZ 20.03	0.2 m – 0.4 m	140:1
AF 6	PZ 20.06	1.2 m - ∞	240:1




PZ 20.03 (0.2 – 0.4 m)
Target diameter [mm]
D = 140:1
1.4
2.1
2.9
0
0,1
0,2
0,3
0,3
Target distance [m]


PZ 20.06 (1.2 m - ∞)
Target diameter [mm]
D = 240 :1
5
8.3
1.,5
16.7
20.8
25
29.2
33.3
37.5
41.7
0
1
2
3
4
5
6
7
8
9
10
Target distance [m]

27 Technical Data PT 140 (850 – 3000 °C)

Measuring range:
750 … 2400 °C

Sensors:
photo diode

Spectral sensitivity:
0.95/ 1.05 µm

Response time t_{98}:
≤ 10 ms (T> 950 °C)

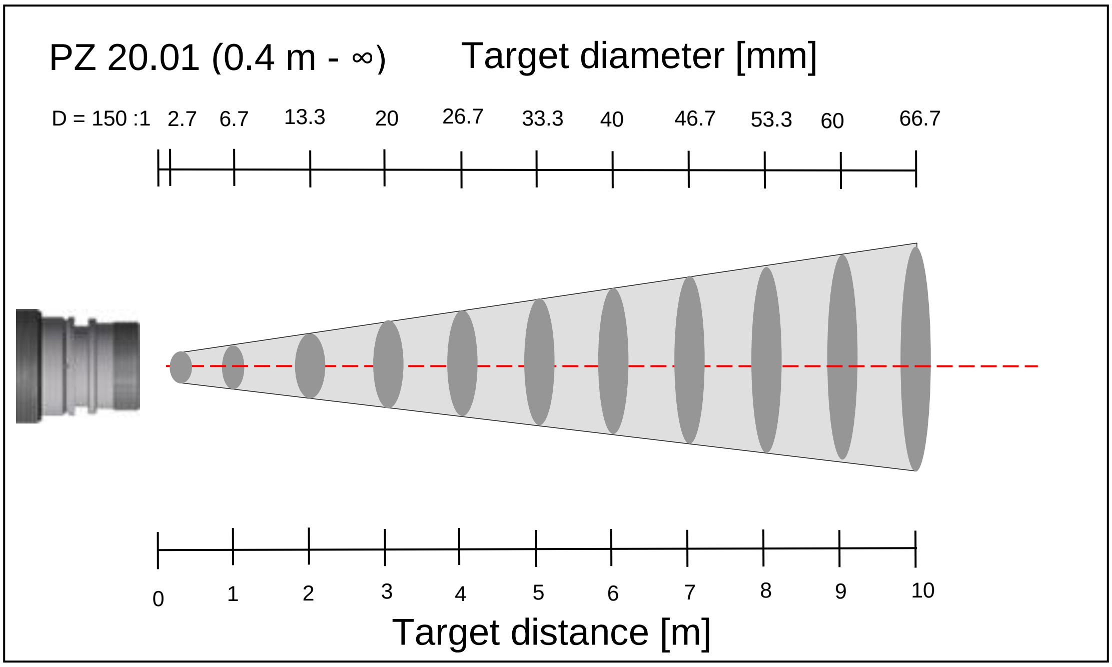
Measuring uncertainty:
1 % of range
(at ε =1.0 and T_A = 23 °C)

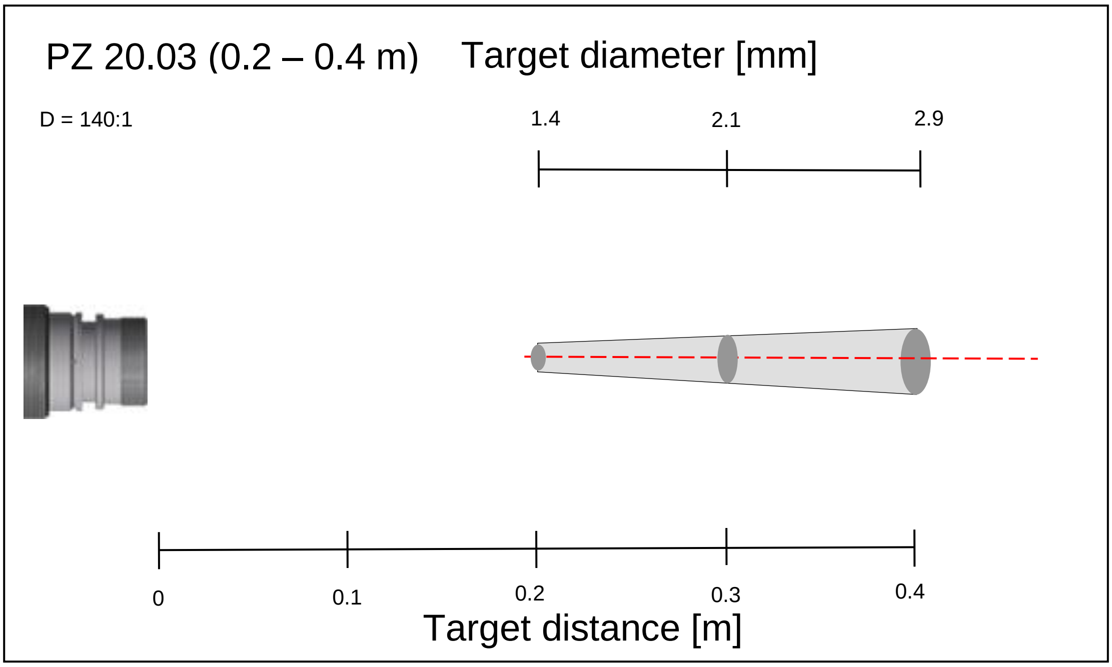
Repeatability:
2 K

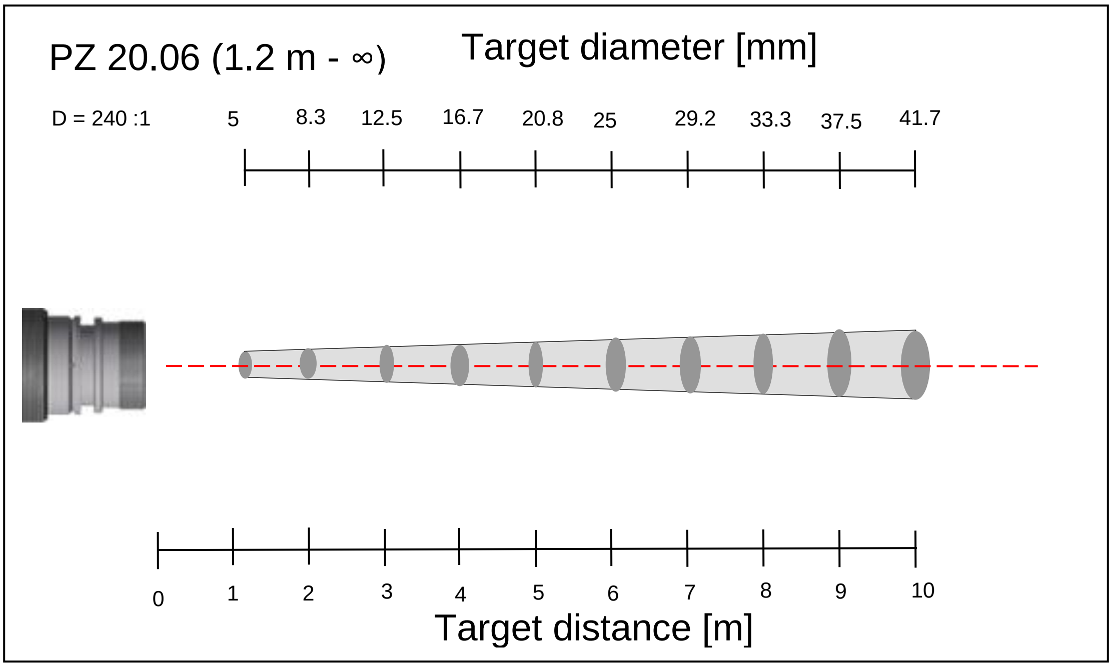
Temperature coefficient with reference to 23 °C:
≤ 0.05 %/K
of measured value

27.1 Field of View Diagrams PT 140 (850 – 3000 °C)

PT 140	Lens	Focussing range	Distance to target size ratio
AF 7	PZ 20.01	0.4 m - ∞	150:1
AF 8	PZ 20.03	0.2 m – 0.4 m	140:1
AF 9	PZ 20.06	1.2 m - ∞	240:1




PZ 20.03 (0.2 – 0.4 m)
Target diameter [mm]
D = 140:1
1.4
2.1
2.9
0
0.1
0.2
0.3
0.4
Target distance [m]


PZ 20.06 (1.2 m - ∞)
Target diameter [mm]
D = 240 :1
5
8.3
12.5
16.7
20.8
25
29.2
33.3
37.5
41.7
0
1
2
3
4
5
6
7
8
9
10
Target distance [m]

28 Technical Data PT 143 (MR 600 – 1400 °C)

Measuring range:
600 ... 1400 °C

Sensors:
photo diode

Spectral sensitivity:
0.95/ 1.05 µm

Response time t_{98}:
≤ 10 ms

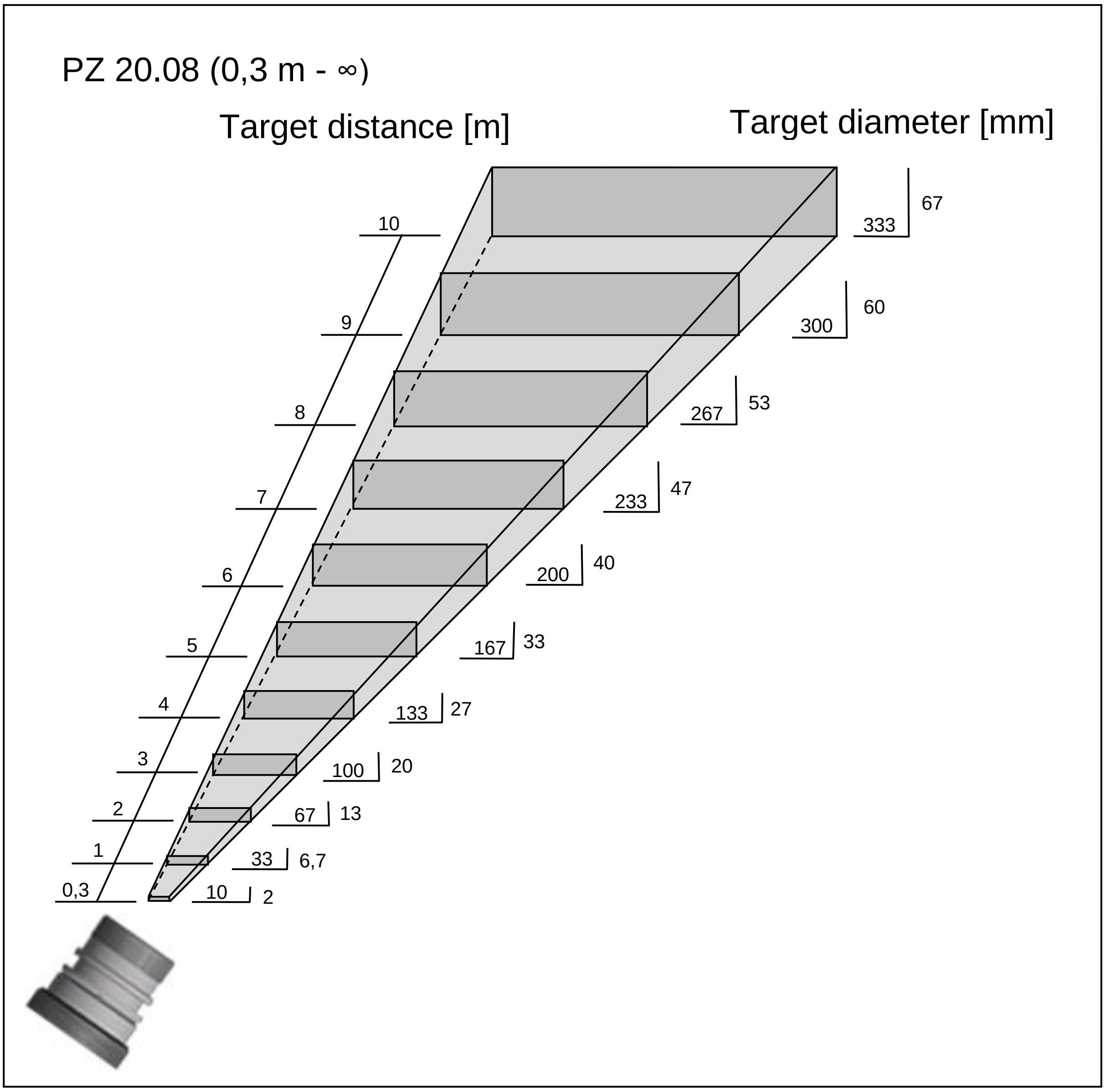
Measuring uncertainty:
1,5 % of range
(at ε =1.0 and T_A = 23 °C)

Repeatability:
3 K

Temperature coefficient with reference to 23 °C:
≤ 0.05 %/K
of measured value

28.1 Field of View Diagrams PT 143 (MB 600 – 1400 °C)

PT 143	Lens	Focussing range	Distance to target size ratio
AF 20	PZ 20.08	0.4 m - ∞	D_V= 150:1 D_H= 30:1



29 Technical Data PT 143 (650 – 1700 °C)

Measuring range:
650 ... 1700 °C

Sensors:
photo diode

Spectral sensitivity:
0.95/ 1.05 µm

Response time t_{98}:
≤ 10 ms

Measuring uncertainty:
1,5 % of range and but at least 4 K (at ε =1.0 and T_A = 23 °C)

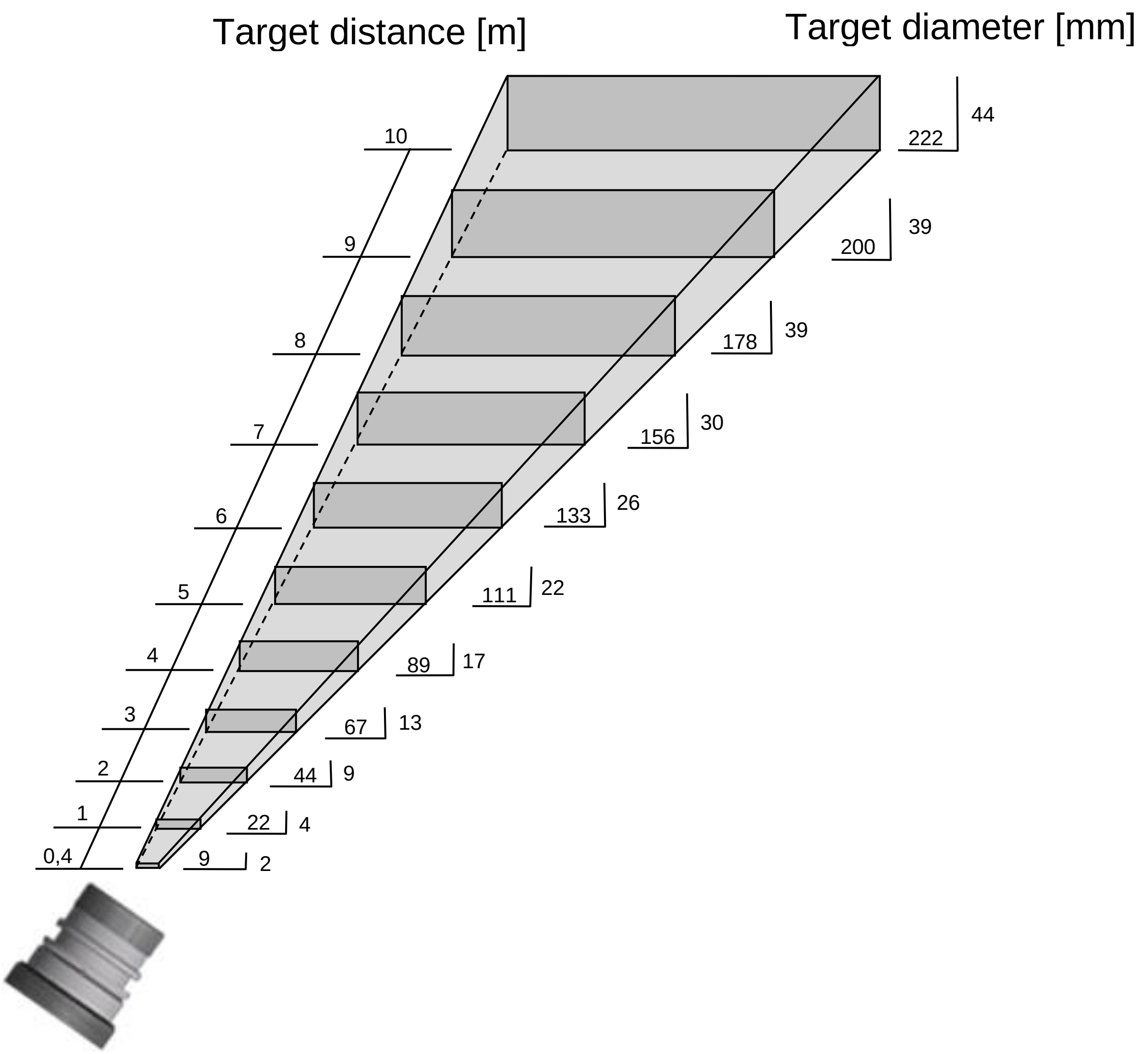
Repeatability:
3 K

Temperature coefficient with reference to 23 °C:
≤ 0.05 %/K
of measured value

29.1 Field of View Diagrams PT 143 (650 - 1700°C)

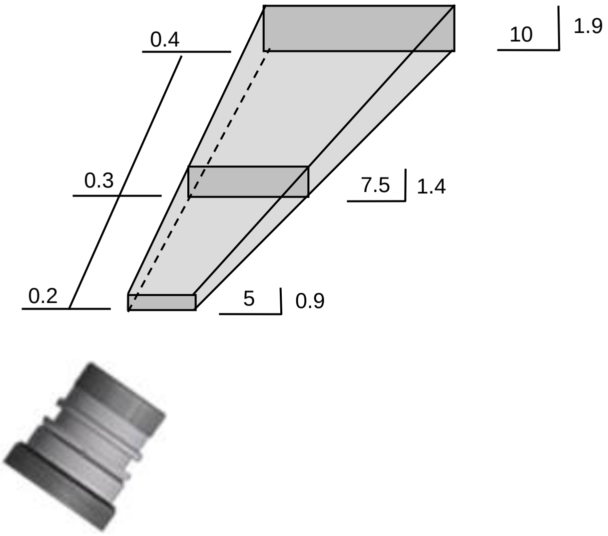
PT 143	Lens	Focussing range	Distance to target size ratio
AF 1	PZ 20.01	0.4 m - ∞	D_V= 230:1 D_H= 45:1
AF 2	PZ 20.03	0.2 m – 0.4 m	D_V= 215:1 D_H= 40:1
AF 3	PZ 20.06	1.2 m - ∞	D_V= 375:1 D_H= 75:1
AF 10	PZ 20.05	0.2 m - ∞	D_V= 55:1 D_H= 10:1
AF 13	PZ 20.08	0.3 m - ∞	D_V= 150:1 D_H= 30:1

PZ 20.01 (0.4 m - ∞)

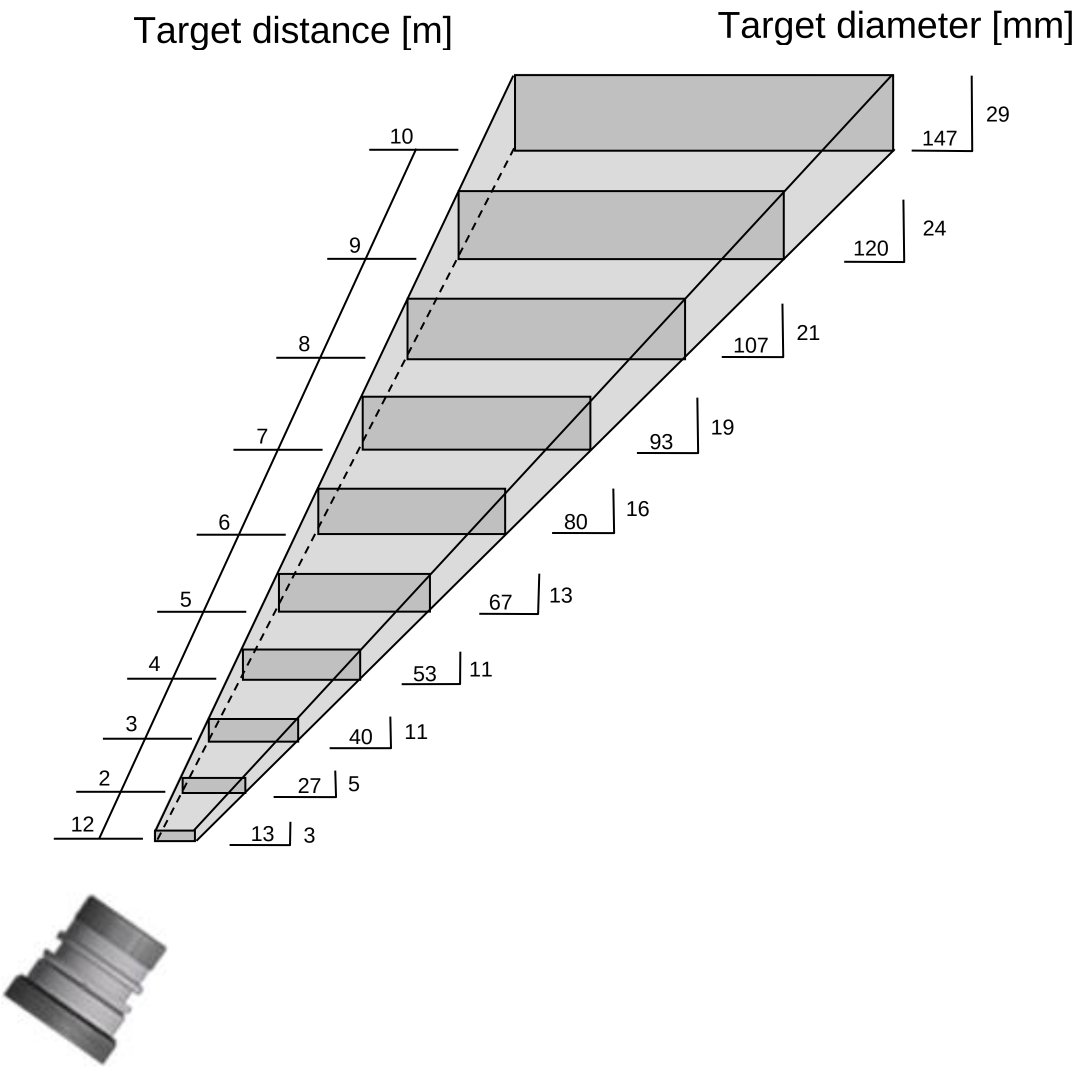

Target distance [m]
Target diameter [mm]
10
9
8
7
6
5
4
3
2
1
0,4
222 44
200 39
178 39
156 30
133 26
111 22
89 17
67 13
44 9
22 4
9 2

PZ 20.03 (0.2 – 0.4 m)

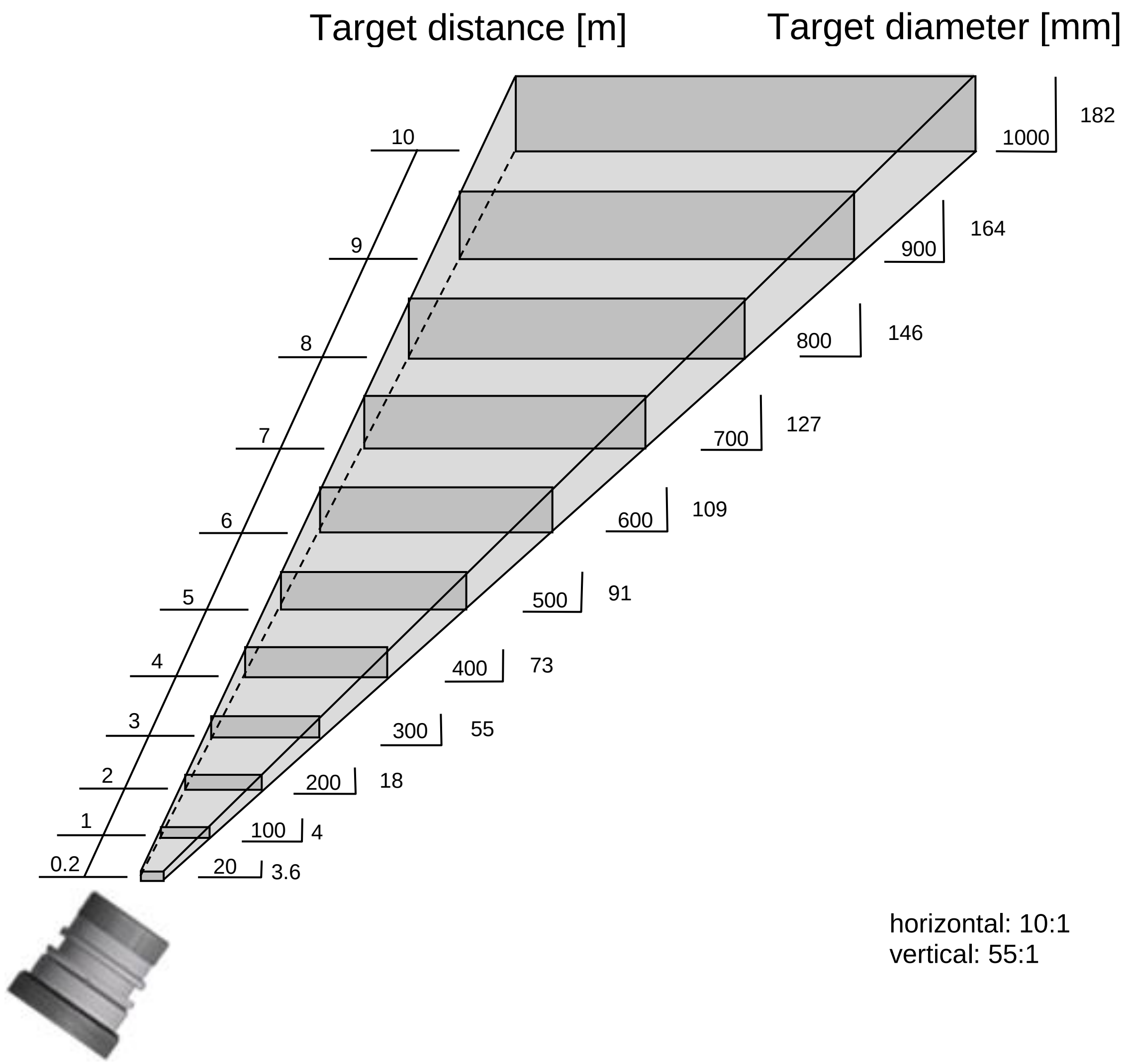
Target distance [m] Target diameter [mm]



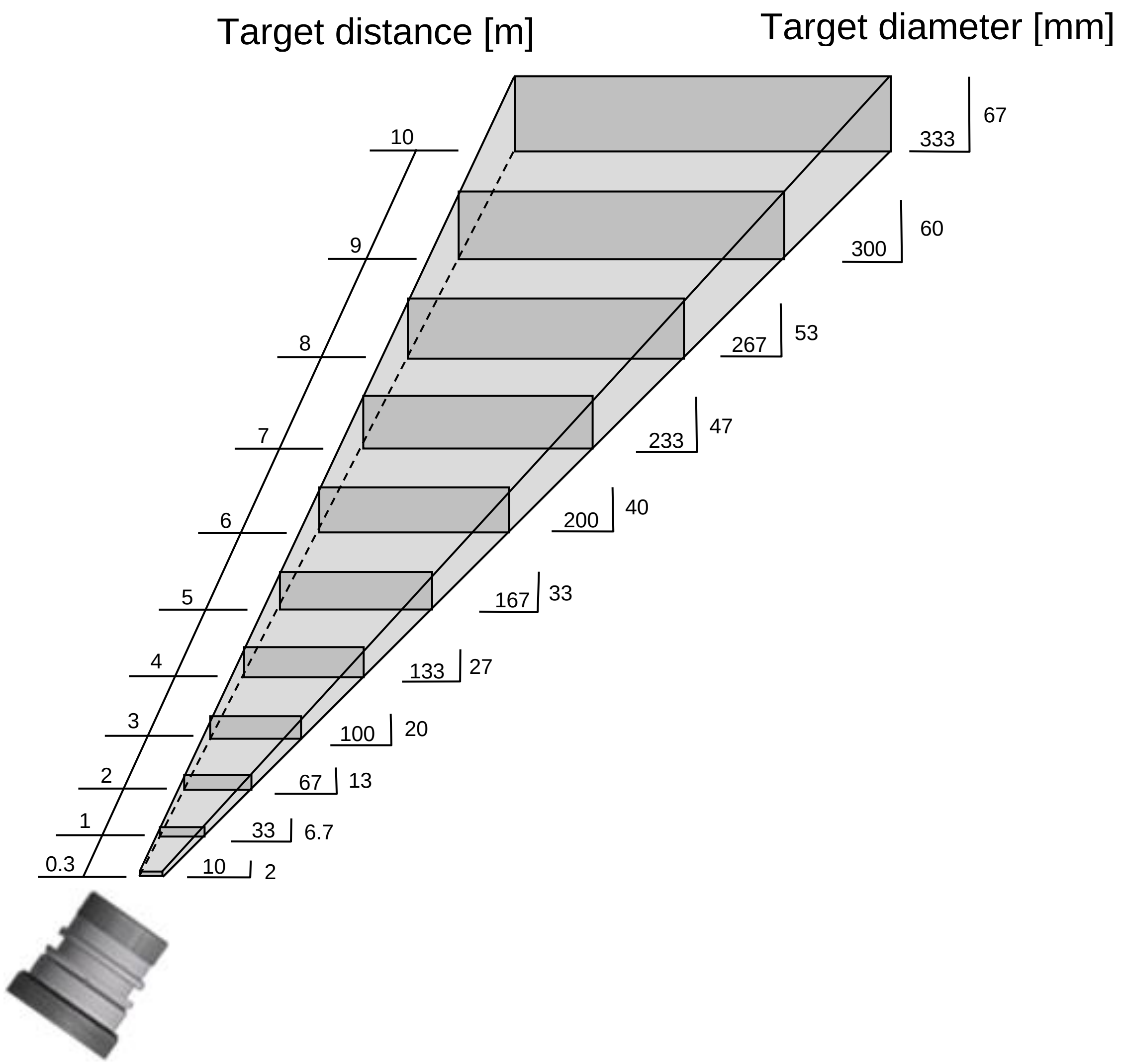
PZ 20.06 1.2 m - ∞


Target distance [m]
Target diameter [mm]
10
9
8
7
6
5
4
3
2
12
147
29
120
24
107
21
93
19
80
16
67
13
53
11
40
11
27
5
13
3

PZ 20.05 (0.2 m - ∞)


Target distance [m]
Target diameter [mm]
10
9
8
7
6
5
4
3
2
1
0.2
1000
182
900
164
800
146
700
127
600
109
500
91
400
73
300
55
200
18
100
4
20
3.6
horizontal: 10:1
vertical: 55:1

PZ 20.08 (0.3 m - ∞)


Target distance [m]
Target diameter [mm]
10
9
8
7
6
5
4
3
2
1
0.3
333 67
300 60
267 53
233 47
200 40
167 33
133 27
100 20
67 13
33 6.7
10 2

30 Technische Daten PT 143 (MB 750 - 2400°C)

Measuring range:
750 ... 2400 °C

Sensors:
photo diode

Focussing range:
0.95/ 1.05 µm

Response time t_{98}:
≤ 10 ms

Measuring uncertainty:
1.5 % of measured value
(at ε =1.0 and T_A = 23 °C)

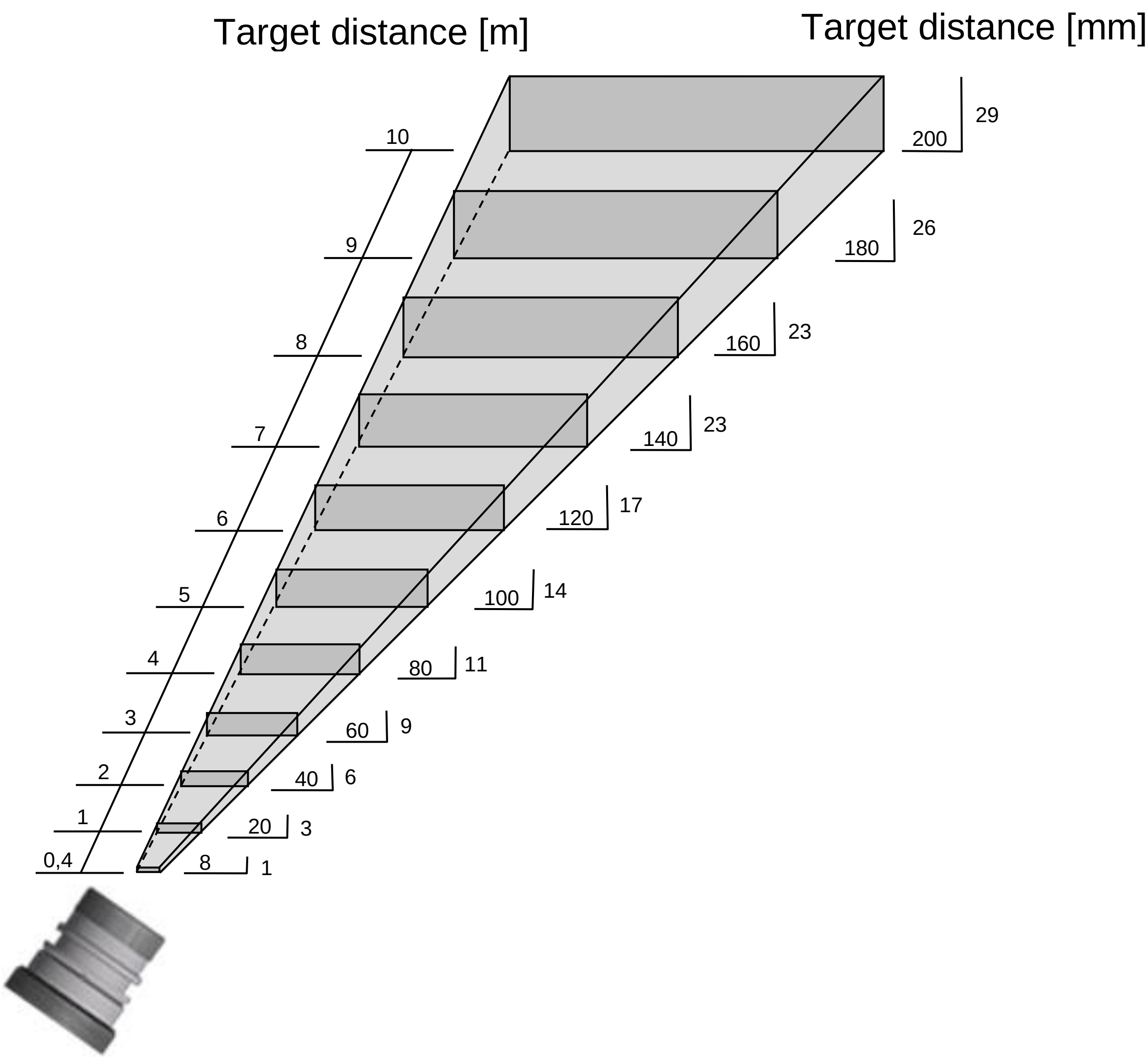
Repeatability:
3 K

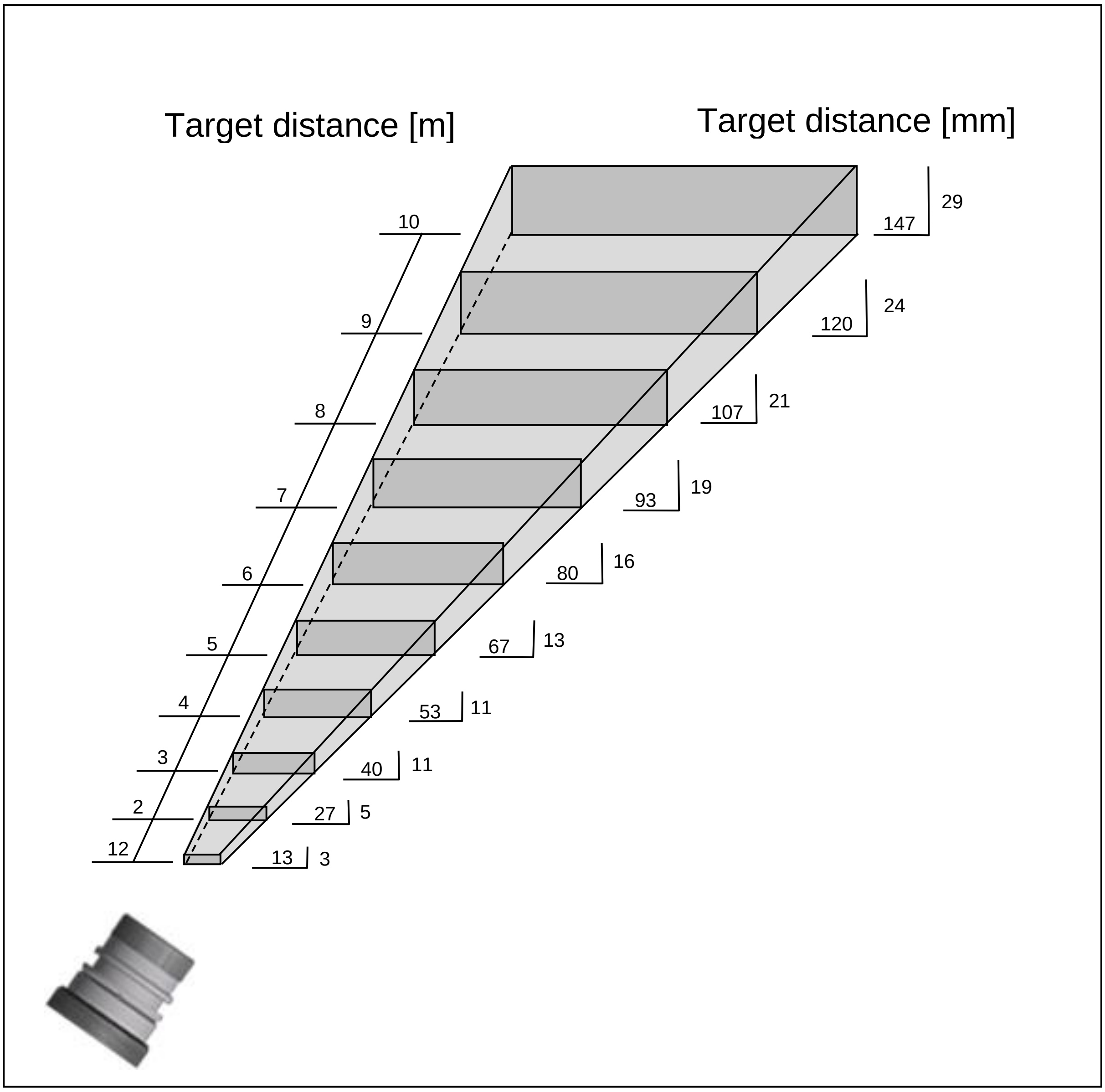
Temperature coefficient:
≤ 0.05 %/K
of measured value [°C]
Deviation to T_A= 23 °C

30.1 Field of View Diagrams PT 143 (MB 750 - 2400°C)

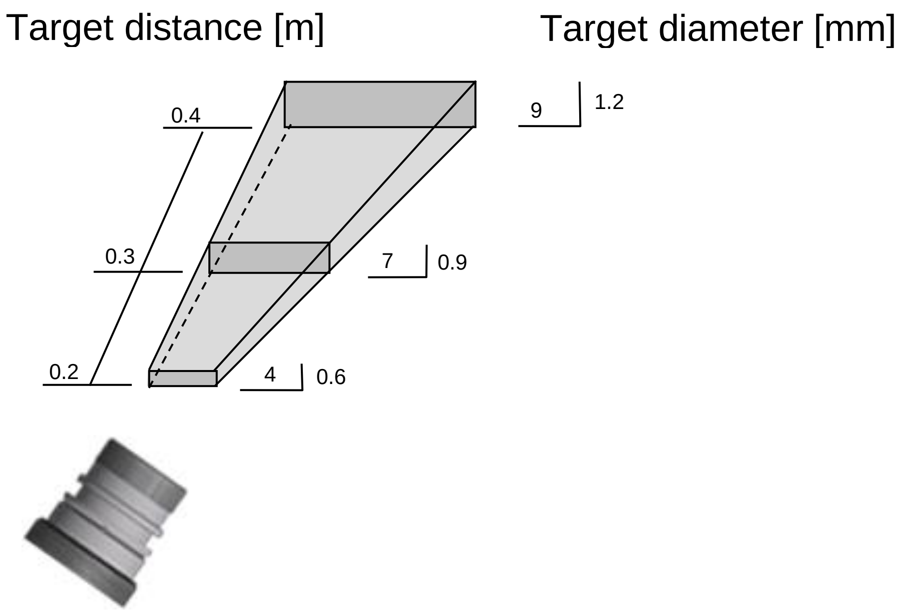
PT 143	Lens	Focussing range	Distance to target size ratio
AF 4	PZ 20.01	0.4 m - ∞	D_V= 350:1 D_H= 50:1
AF 5	PZ 20.03	0.2 m – 0.4 m	D_V= 330:1 D_H= 45:1
AF 6	PZ 20.06	1.2 m - ∞	D_V= 580:1 D_H= 85:1
AF 11	PZ 20.05	0.2 m - ∞	D_V= 85:1 D_H= 11:1
AF 14	PZ 20.08	0.3 m - ∞	D_V= 230:1 D_H= 34:1

PZ 20.01 (0,4 m - ∞)

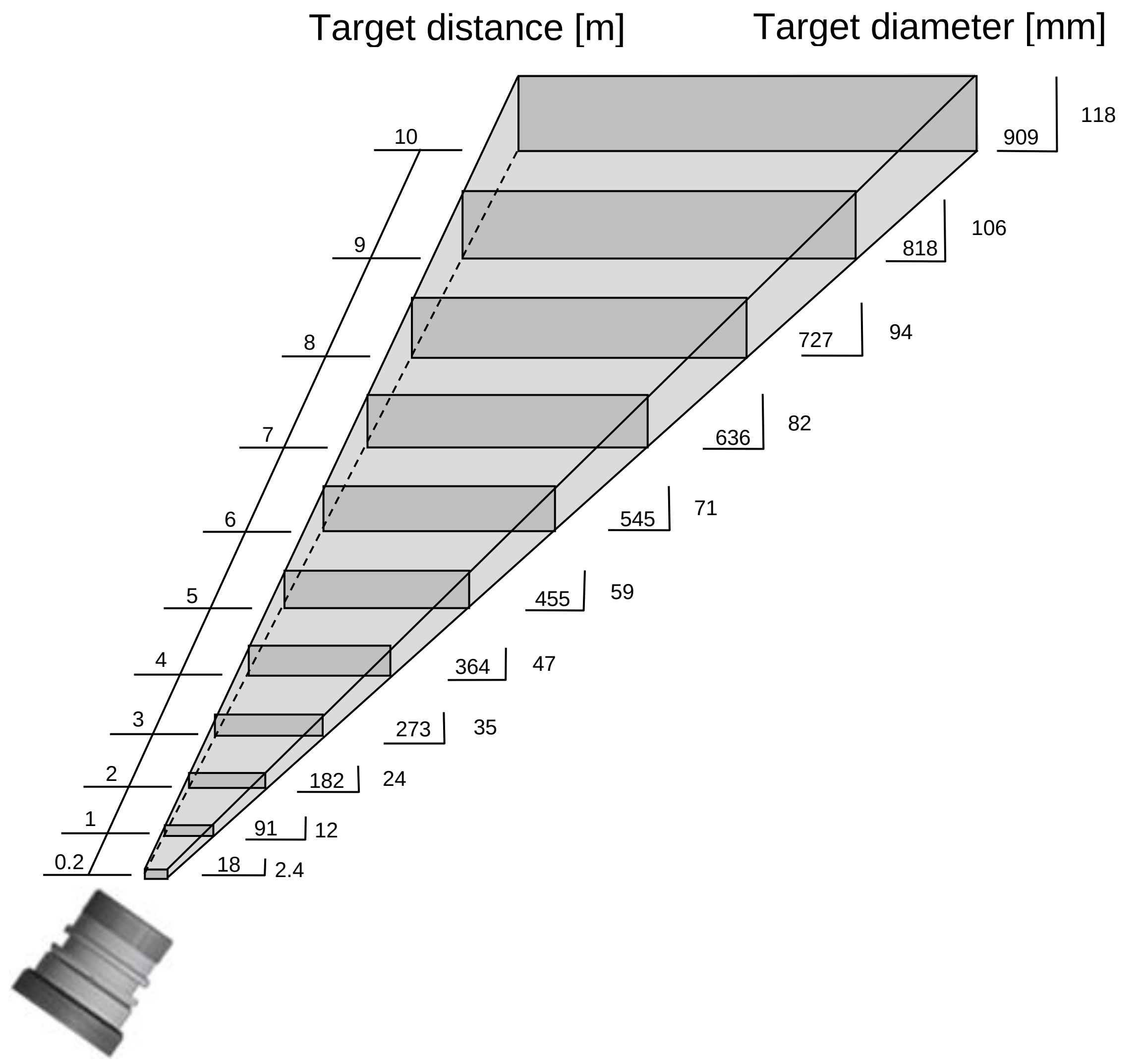

Target distance [m]
Target distance [mm]
10
9
8
7
6
5
4
3
2
1
0,4
200
29
180
26
160
23
140
23
120
17
100
14
80
11
60
9
40
6
20
3
8
1


Target distance [m]
Target distance [mm]
10
9
8
7
6
5
4
3
2
12
147
29
120
24
107
21
93
19
80
16
67
13
53
11
40
11
27
5
13
3

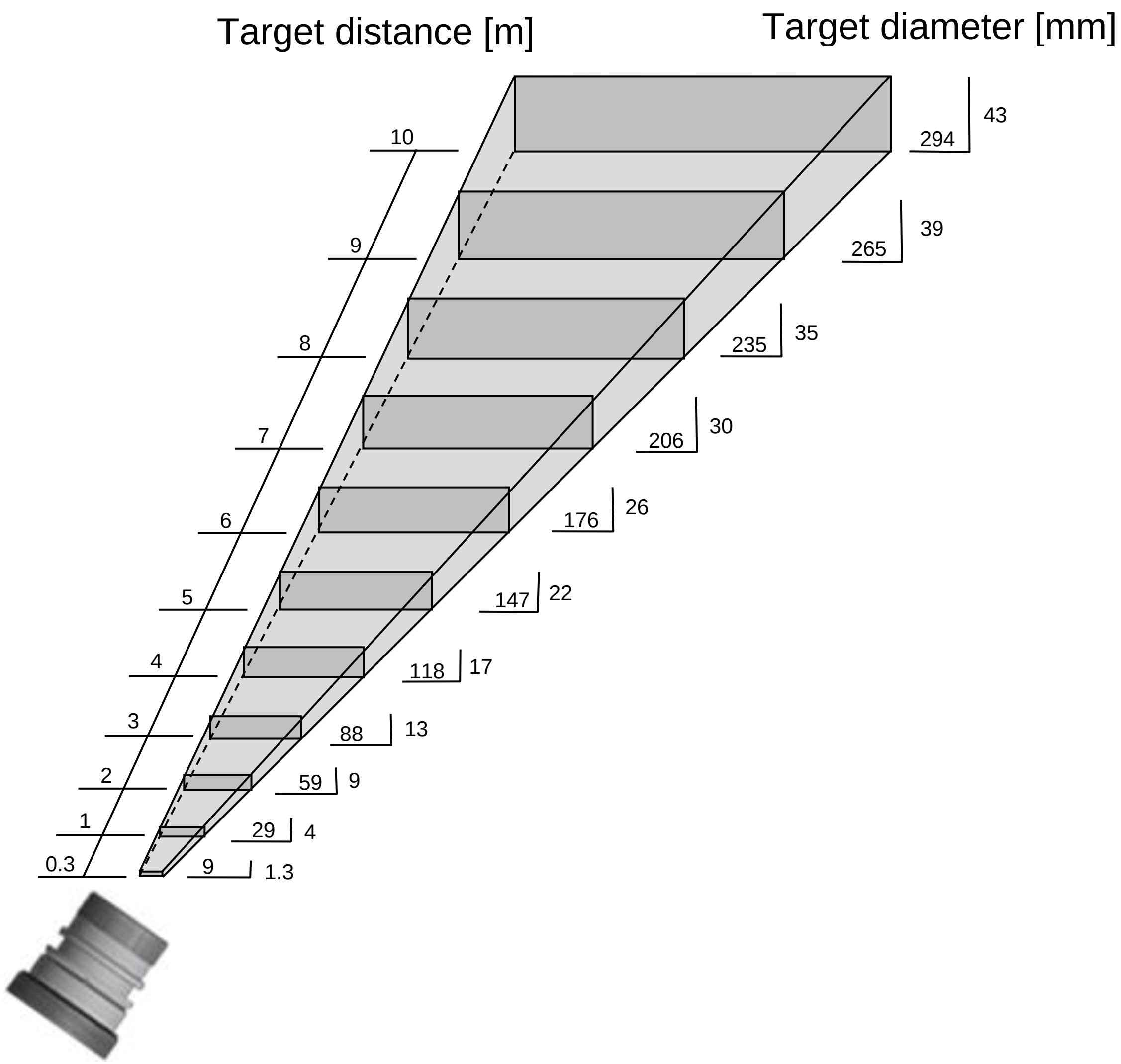
PZ 20.03 (200 – 400 m)



PZ 20.05 (0.2 m - ∞)


Target distance [m]
Target diameter [mm]
10
9
8
7
6
5
4
3
2
1
0.2
909
118
818
106
727
94
636
82
545
71
455
59
364
47
273
35
182
24
91
12
18
2.4

PZ 20.08 (0.3 m - ∞)


Target distance [m]
Target diameter [mm]
10
9
8
7
6
5
4
3
2
1
0.3
294
43
265
39
235
35
206
30
176
26
147
22
118
17
88
13
59
9
29
4
9
1.3

31 Technische Daten PT 147 AF 1

Measuring range:
700 ... 1700 °C

Sensors:
photo diode

Focussing range:
0.8/ 1.05 µm

Response time t_{98}:
≤ 30 ms

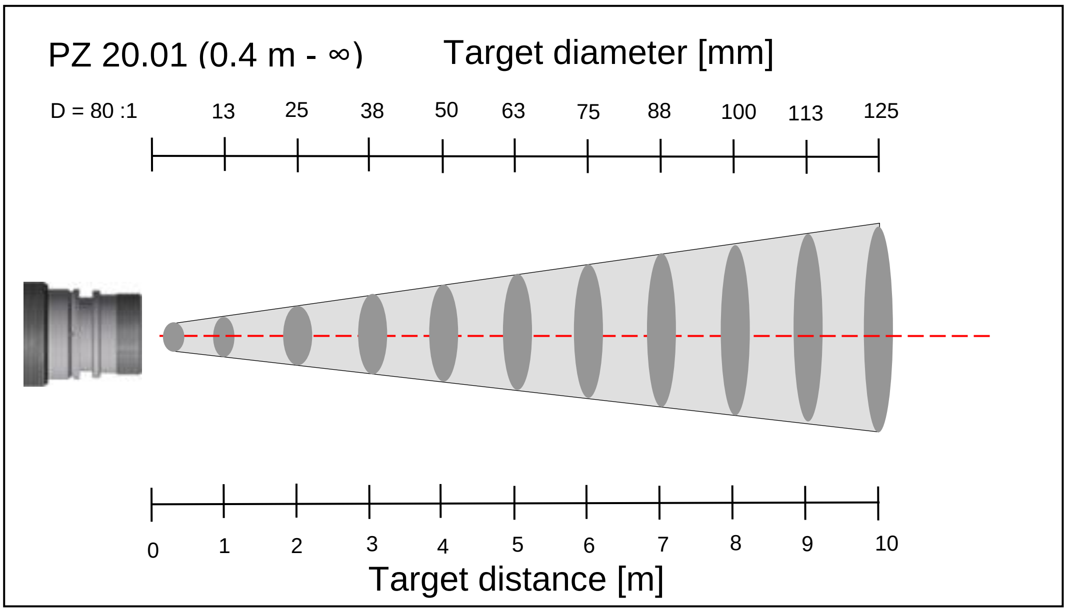
Measuring uncertainty:
1 % of measured value
(at ε =1.0 and T_A = 23 °C)

Repeatability:
2 K

Temperature coefficient:
≤ 0.05 %/K
of measured value [°C]
Deviation to T_A= 23 °C

31.1 Field of View Diagrams PT 147 AF 1

PT 147	Lens	Focussing range	Distance to target size ratio
AF 20	PZ 20.01	0.4 m - ∞	80:1



32 Technische Daten PT 160 AF 1

Measuring range:
300 ... 800 °C

Sensors:
photo diode

Focussing range:
1.5/ 1.9 µm

Response time t_{98}:
≤ 30 ms

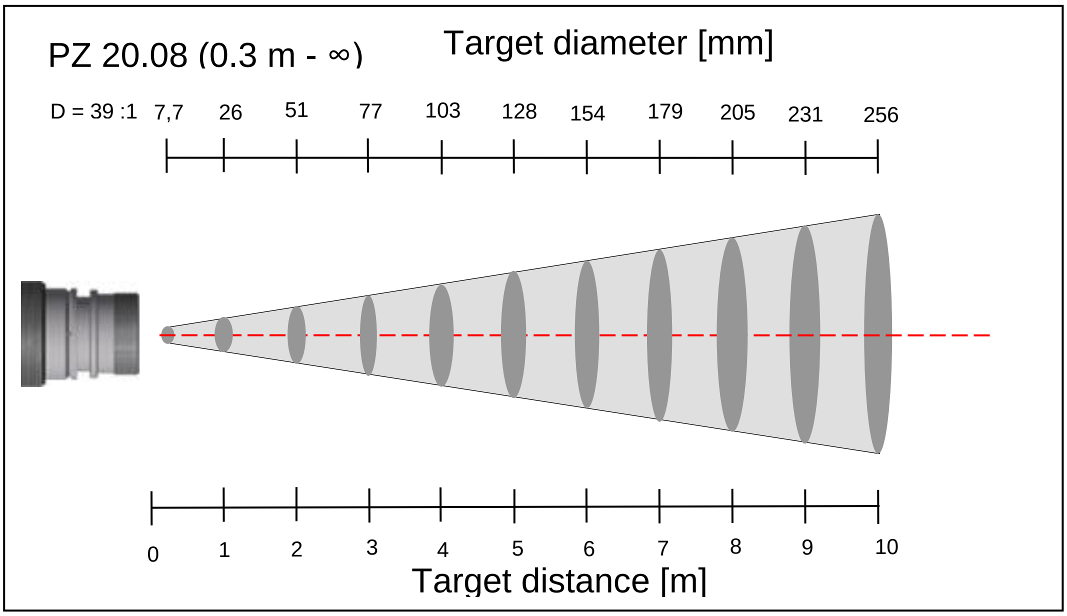
Measuring uncertainty:
1 % of measured value
(at ε =1.0 and T_A = 23 °C)

Repeatability:
2 K

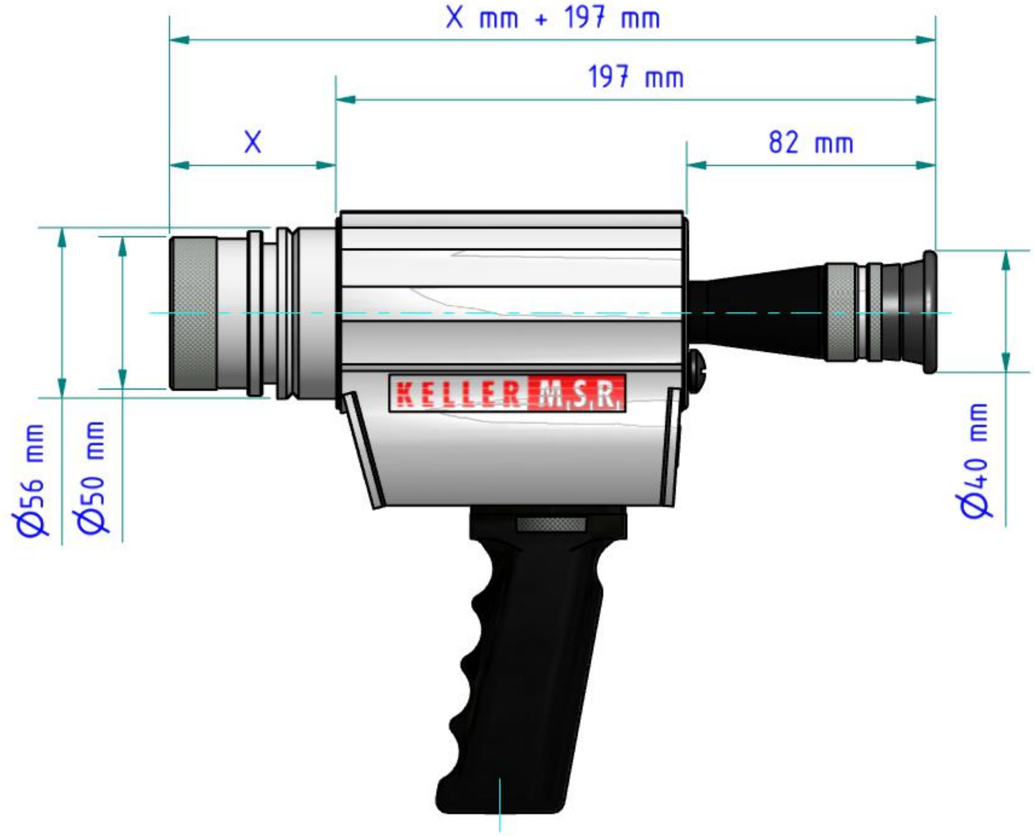
Temperature coefficient:
≤ 0.05 %/K
of measured value [°C]
Deviation to T_A= 23 °C

32.1 Field of View Diagrams PT 160 AF 1

PT 160	Lens	Focussing range	Distance to target size ratio
AF 20	PZ 20.08	0.3 m - ∞	39:1



33 Dimensions



34 Shipping, Packaging and Disposal

34.1 Inspecting your shipment

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 KELLER HCW and to the 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.

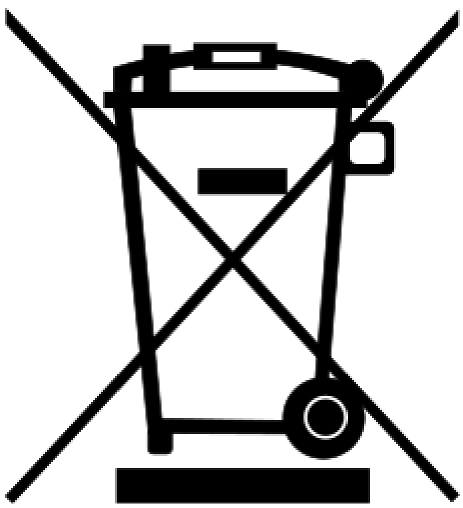
34.2 Packaging

The packages used by KELLER HCW are made of carefully selected, environmentally compatible materials and are thus recyclable. We suggest you retain the packaging for possible future use; otherwise please ensure that they are disposed of in an ecologically sound manner.

34.3 Disposal of used apparatus

Used electrical and electronic equipment often contain valuable components. The owner/user may either return such an instrument to the manufacturer for disposal, or he must dispose of it himself in a professional and nonpolluting manner.

KELLER HCW will not be held accountable for any inappropriate disposal carried out by the user/owner of KELLER HCW instruments.



35 Copyright

36 Default settings

36.1 Temperature measurement (Configuration layer: C001)

Function	Parameter configuration layer C001					Default	Customized configuration
Array size	Etb.1	oFF	1- 10			oFF	
Emissionsgrad Verhältnis	EPS.1					100	
Memory position			E.idH			1	
Material constant 1			E. 01			100.0	
Material constant 2			E. 02			100.0	
Mode Q-Check	chr.9.	oFF	Min	Mi.MA		Min	
Soot factor	drc.n					oFF	
Relatives Limit Min.			chr._	chr._		10.0	
Relatives Limit Max.				chr.‾		100.0	
Absolutes Minimum Temperatur	chAt					MB*	
Absolutes Minium Epsilon	chA'i					50	
Smoothing filter	Fil.1	oFF	on			on	
Smoothing time			FiLt			0.10	
Min/Max memory	MEM.1	oFF	Min MAH	dbL.n	Atd	oFF	
Smoothing time				MEMt		1.00	
Smoothing filter for min/max Smoothing time			FiLM FiLt	FiLM FiLt		oFF 0.10	
					tdEL	1.0	
					tAct	3.0	
					tdiS	0.0	
					toUt	1.0	
					Li. 1	1100 °C	
					Li. 2	1200 °C	
					F-Pr	100.0	
					tSP_	200 °C	
					tSP‾	200 °C	
					Ano	thLd.	
					ArSt	oFF	
					chL2	oFF	
	End						

36.2 Temperature measurement Lambda 1 (Configuration layer: c002)

Function	Parameter configuration layer C002					Default	Customized configuration
Array size	Etb.1	oFF	1- 10			oFF	
Emissivity	EPS.1					99.0	
Memory position			E.idH			1	
Material constant 1			E. 01			100.0	
Material constant 2			E. 02			100.0	
Transmission factor	tAU.					100.0	
Smoothing filter	FiL.1	oFF	on				
Smoothing time			FiLt			4.00	
Min/Max memory	MEM.1	oFF	Min MAX	dbLn	Atd	oFF	
Smoothing time				MEMt		1.00	
Smoothing filter for min/max Smoothing time			FiLM FiLt	FiLM FiLt		oFF 0.10	
					tdEL	1.0	
					tAct	3.0	
					tdiS	0.0	
					toUt	1.0	
					Li. 1	1100 °C	
					Li. 2	1200 °C	
					F-Pr	100.0	
					tSP_	200 °C	
					tSP¯	200 °C	
					Ano	thLd.	
					ArSt	oFF	
					chL2	oFF	
	End						

36.3 Temperature measurement Lambda 2(Configuration layer: c003)

Function	Parameter Configuration layer C001					Default	Eigene Einstellungen
Array size	Etb.1	oFF	1- 10			oFF	
Emissivity	EPS.1					99.0	
Memory position			E.idH			1	
Material constant 1			E. 01			100.0	
Material constant 2			E. 02			100.0	
Transmission factor	tAU.					100.0	
Smoothing filter	FiL.1	oFF	on				
Smoothing time			FiLt			4.00	
Min/Max memory	MEM.1	oFF	MIN MAH	dbLn	Atd	oFF	
Smoothing time				MEMt		1.00	
Smoothing filter for min/max Smoothing time			FiLM FiLt	FiLM FiLt		oFF 0.10	
					tdEL	1.0	
					tAct	3.0	
					tdiS	0.0	
					toUt	1.0	
					Li. 1	1100 °C	
					Li. 2	1200 °C	
					F-Pr	100.0	
					tSP_	200 °C	
					tSP‾	200 °C	
					Ano	tHLd.	
					ArSt	oFF	
					chL2	oFF	
End	End						

*** Start of measuring range**

36.4 General Functions (Configuration layer: c010)

Function	Parameter	Default	Customized configuration
Operating mode	tYPE	q Quotient	
End	End		

36.5 General Functions (Configuration layer: c011)

Function	Parameter	Default	Customized configu-ration
Automatic Switch off	A.oFF	2	
Temperature unit	Unit	°C	
End	End		