



by **KELLER**
infrared
temperature
solutions **ITS**



PYROMETER CellaTemp[®] PA Mixed-Mode Function

Ident no.: 1117971

06/2022

MANUAL

Contents

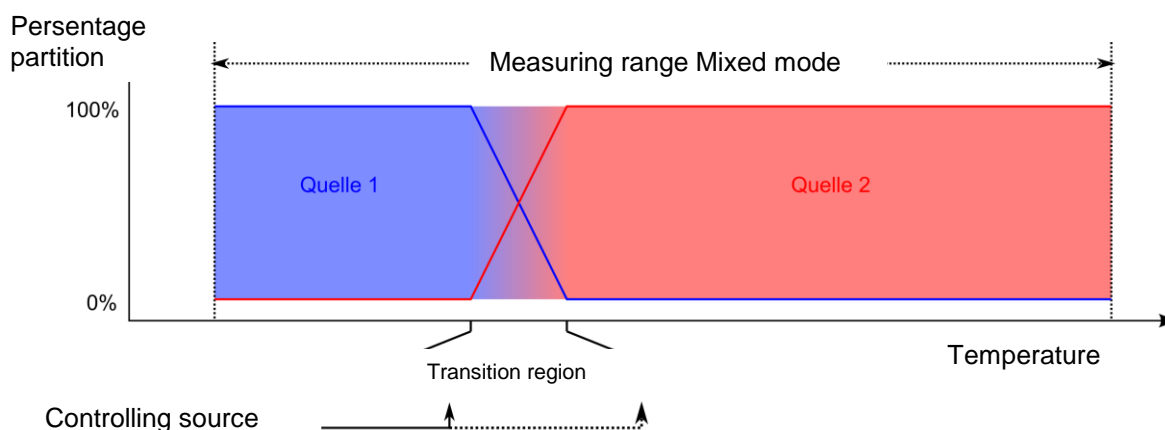
- 1 General description. 1**
- 2 Mixed-mode function for extending the measuring range..... 1**
- 3 Configuration layer Mixed-Mode 2**
- 4 Factory setting of the mixed mode function 3**
- 5 Adjustment of the measured values 3**
- 6 Setting parameters at the pyrometer 4**
 - 6.1 Setting the parameters using the button.....4
 - 6.2 Operation of the pyrometer via terminal program4
 - 6.2.1 Main menu.....5
 - 6.2.2 Parameter/diagnostic overview5
 - 6.2.3 Description of the Mixed Mode submenu.....6

1 General description.

The mixed-mode function is used to link two measured values of a ratio pyrometer and to generate a continuous analogue output signal.

In the lower measuring range up to the start temperature of the transition range, the measured value of the set source 1 is output.

Above the defined end temperature of the transition range, the output signal corresponds to the measured value of source 2. A sliding transition takes place between the start and end temperature, in which the measured values of the two sources are added together, weighted as a percentage. The set controlling source determines the reference value of the initial and final temperature of the transition range. In addition, the entire measuring range of the mixed-mode channel can be set via the parameters "Measuring range start" and "Measuring range end".



2 Mixed-mode function for extending the measuring range

With mixed-mode operation, the measuring range can be extended to lower initial temperatures by linking a spectral and a quotient temperature. At the beginning of the measuring range the device works as a spectral pyrometer and from the end of the transition range as a ratio pyrometer.

Since the pyrometer provides different measured values for the spectral and quotient temperature depending on the emissivity of the measuring object and the degree of partial filling of the measuring spot (if the measuring object is smaller than the measuring field of the pyrometer), the two measured values must be matched to each other in the middle of the transition range for a linear transition.

For this purpose, the emissivity ϵ_1 or ϵ_2 (depending on the selected source) must be adjusted so that the two temperature values are identical in the middle.

3 Configuration layer Mixed-Mode

The following table the parameters of the mixed-mode function are listed and describes their function.

Configuration layer `c 004` (Mixed-Mode parameter)

Parameter	Function	Explanation
<code>n .H.</code>	Mixed-mode	<code>oFF</code> off <code>oN</code> on
<code>r n6._</code>	define lower limit of temp. span	
<code>r n6.~</code>	define upper limit of temp. span	
<code>t n5._</code>	Transition range begin	
<code>t n5.~</code>	Transition range end	
<code>Src.1</code>	Select source 1 1. Quelle	<code>L 1</code> Lambda 1 <code>L 2</code> Lambda 2 <code>q</code> Quotient
<code>Src.2</code>	Select source 2.	<code>L 1</code> Lambda 1 <code>L 2</code> Lambda 2 <code>q</code> Quotient
<code>Src.c</code>	Selection of the controlling source	<code>L 1</code> Lambda 1 <code>L 2</code> Lambda 2 <code>q</code> Quotient
<code>SAUE</code>	Save	Save changes / exit menu
<code>ESc</code>	Escape	Discard changes / exit menu

To operate the pyrometer in mixed mode, the corresponding source of the analog output must be set. Optionally, the scaling (measuring range start and end) of the analog signal can be adjusted if required.

Configuration layer `c 0 10` (Analog output parameter)

Parameter	Function	Explanation
<code>Ao 1S</code>	Ao1 select source	<code>L 1</code> Lambda 1 <code>L 2</code> Lambda 2 <code>q</code> ration mode (puotient) <code>n .H.</code> Mixed ((the selected temp. reading source will be shown on the display)
<code>Ao 1._</code>	Ao1 define lower limit of temp. span	
<code>Ao 1.~</code>	Ao1 define upper limit of temp. span	

4 Factory setting of the mixed mode function

When delivered, the pyrometer is already set to mixed-mode operation and the parameters are configured according to the table.

Configuration layer c 004

Parameter	PA 40 AF 1	PA 40 AF 4	PA 50 AF 1
PIH	00	00	00
rn6 ₊	500 °C	600	400 °C
rn6 ₋	1700 °C	2400 °C	1400 °C
tn5 ₊	640 °C	740 °C	490 °C
tn5 ₋	660 °C	760 °C	510 °C
src1	L2	L2	L2
src2	9	9	9
src3	L2	L2	L2

Configuration layer c 010

Parameter	PA 40 AF 1	PA 40 AF 4	PA 50 AF 1
Ro15	PIH	PIH	PIH
Ro1 ₊	500 °C	600 °C	400 °C
Ro1 ₋	1700 °C	2400 °C	1400 °C

5 Adjustment of the measured values

In order to ensure a linear transition of the measured values, the adjustment must be carried out as follows during commissioning:

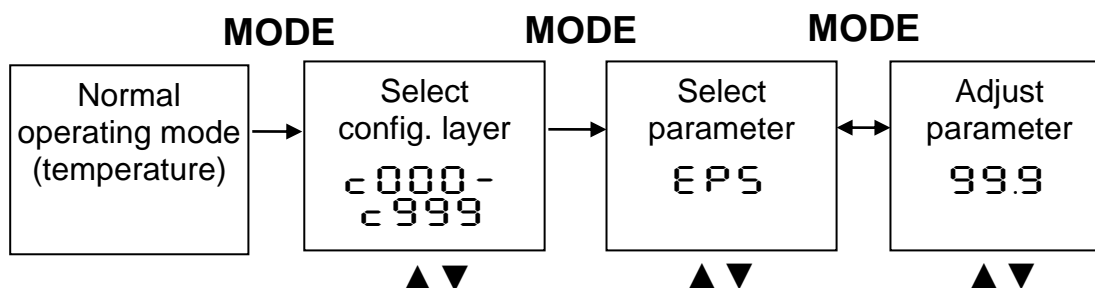
1. Align the pyrometer to the target object. Set the two-colour emissivity correction to 100 %.
2. Heat up the object to a temperature approx. in the middle of the transition range. Wait certain times until the temperature is stabilises.
3. Make a note of the displayed quotient temperature.
4. Check the spectral temperature L1 or L2. (depending on the set source 1). The quotient temperature and the spectral temperature should be the same. If the spectral temperature is higher than the quotient temperature, increase the emissivity, otherwise decrease it. The emissivity L1 can be set in code page "c 002" parameter EPS1 or L2 in code page "c 003" parameter EPS2.

6 Setting parameters at the pyrometer

6.1 Setting the parameters using the button

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 pyrometer operation.

Menu structure:

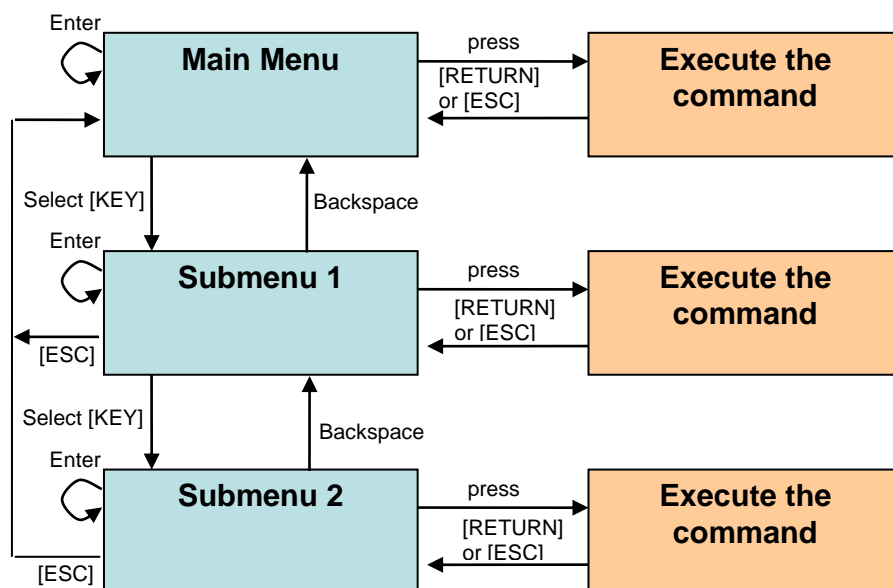


1. Press the MODE button while in normal operating mode to switch to "configuration layer" mode. Die Codeseite des gewünschten Parameters mit ▲▼ auswählen.
2. Use ▲▼ to select the configuration layer for the parameter you wish to set.
3. Press MODE to confirm. Press ▲▼ to select the particular parameter.
4. Press MODE to confirm. Press ▲▼ to adjust the parameter value.
5. Press MODE again to end. Press ▲▼ to select END/SAVE
6. Now use MODE to either apply the changes you have made to the settings [S R U E] or to close without saving these changes [E n d]. After that, the display panel will resume showing the temperature reading.

6.2 Operation of the pyrometer via terminal program

By default, the pyrometer has fully integrated communications software to the point-to-point connection with a PC. As an alternative to the CellaView software, all parameters that are required for a measurement data acquisition or a general configuration of the pyrometer can be configured via a simple terminal connection using the terminal program.

Most key parameters are directly available in the main menu. Further functions are contained in submenus. Navigation within the menus is explained in the following graphics:



To set the pyrometer to the terminal mode, simultaneously hold down the **Ctrl** key and press the **E** key twice in rapid succession.

Direct commands have an assigned key. Example: E for emissivity (epsilon). Submenu settings are shown in brackets. Example: [MIXED MODE]

6.2.1 Main menu

After starting the terminal or entering "H", the main menu appears:

```

-----
Mainmenu
-----
0: [QUOTIENT] ..... E: Quick access EPSILON
1: [LAMBDA 1] ..... A: Quick access FILTER
2: [LAMBDA 2] ..... T: Quick access Ao1 SOURCE
C: [I/O] ..... Y: Quick access Ao1 SCALE BEGIN
K: [CALIBRATION] ..... Z: Quick access Ao1 SCALE END
M: [MIXED MODE]
H: Show this help-site ..... J: Show diagnosis
W: Show ambient temperature ..... Q: Show calibration data
X: Show measure temperatures ..... P: Show channel parameters
-----
>
  
```

6.2.2 Parameter/diagnostic overview

Command "P" shows an overview of the current parameters:

```

-----
- PA50 AFxx 500-1400C - 00/xxx HM - 28.01.13 -
- PA50SW001/0 QP 0,95/1,55um Version 01.80 10.02.15 -
-----
MIX function ..... on Ao 1 source ..... mixed
MIX range ... 500.0 - 2400.0 C Ao 1 scale .. 700.0 - 1700.0 C
MIX transition 680.0 - 700.0 C Ao 1 current .....0-20 mA
1st source ..... lambda 1 Ao 2 source ..... off
2nd source ..... quotient
ctrl source ..... lambda 1
  
```

```

Do 1 source ..... ready-signal
Do 1 function ..... level/signal

Unit ..... Celsius
Terminal assigned to ..... USB
Autoprint ..... on
Print cycle time ..... 0.1 s
Protocol address ..... 001
Display ..... active
Key lock ..... off
Status LED ... assigned to Do 1
    
```

>

The parameters of the measured value recording quotient are listed at the top left. The I/O configuration is in the right column. The general settings are on the bottom left.

A detailed description of the individual menu items can be found in the pyrometer operating instructions.

6.2.3 Description of the Mixed Mode submenu

In the sub menu „Mixed Mode“ you can adjust all relevant parameters In the sub menu „Mixed Mode“ you can adjust all relevant parameters:

- Activation/ deactivation of the temperature calculation
- Measuring range of the Mixed Mode
- Beginning off the transition zone
- Selection of the first source (100 % temperature below the transition zone)
- Selection of the second source (100 % temperature above the transition zone)
- Selection of the controlling source (temperature control for transition zone)

>M

Submenu MIXED-MODE

```

MIX function ..... on
MIX range ... 500.0 - 2400.0 C
MIX transition 680.0 - 700.0 C
1st source ..... lambda 1
2nd source ..... quotient
ctrl source ..... lambda 1
    
```

```

M: Function Mixed-Mode
A: Set range begin
B: Set range end
C: Set transition begin
D: Set transition end
E: Set 1st source
F: Set 2nd source
G: Set ctrl source
X: Show mixed temperature
ESC: Back to MAIN-MENU
    
```

>MIXED MODE >

With command „T“ in the main menu you can select the source for the analogue output. Select “4” for Mixed Mode. The display shows the Mixed Mode temperature.

```
>T  
Set Analog Out 1 SOURCE:  
1: Lambda 1  
2: Lambda 2  
3: Quotient  
4: Mixed
```

Your choice>



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.

Pyrometer LLC | 70 Weber Ave. | Ewing, NJ 08638
www.pyrometer.com | T: 609.443.5522