

IMPAC Pyrometers

IS 6-TV Advanced • IGA 6-TV Advanced • IGA 6/23-TV Advanced
ISR 6-TV Advanced • IGAR 6-TV Advanced



*Addendum to IS 6 Advanced, IGA 6 Advanced, IGA 6/23 Advanced,
ISR 6 Advanced and IGAR 6 Advanced Manuals*

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1 General Information

1.1 Information about the user manual

Congratulations on choosing the high quality and highly efficient IMPAC Series 6-TV Advanced pyrometer.

This manual provides important information about the instrument and can be used as a work of reference for installing, operating, and maintaining your Series 6-TV Advanced pyrometer. It is important that you carefully read the information contained in this manual and follow all safety procedures before you install or operate the instrument.

To avoid handling errors, keep this manual in a location where it will be readily accessible.



Note: This user manual is intended to supplement the Series 6 Advanced pyrometer manual for the TV version. Additional information about the pyrometer can be found in the corresponding IS 6 Advanced, IGA 6 Advanced, IGA 6/23 Advanced, ISR 6 Advanced, or IGAR 6 Advanced manual.

1.1.1 Legend



Note: The note symbol indicates tips and useful information in this manual. All notes should be read to effectively operate the instrument.



Attention: This sign indicates special information which is necessary for a correct temperature measurement.



Warnings and Cautions: The general warnings and cautions symbol signifies the potential for bodily harm or damage to equipment.

MB

Shortcut for Temperature range (in German: **Messbereich**)

1.1.2 Terminology

The terminology used in this manual corresponds to the VDI- / VDE-directives 3511, Part 4.

1.2 Safety

This manual provides important information on safely installing and operating the Series 6-TV Advanced pyrometer. Several sections of this manual provide safety warnings to avert danger. These safety warnings are specified with a warning symbol. You must read and understand the contents of this manual before operating the instrument even if you have used similar instruments or have already been trained by the manufacturer.

It is also important to continually pay attention to all labels and markings on the instrument and to keep the labels and markings in a permanent readable condition.



Warning: The pyrometer is only to be used as described in this manual. It is recommended that you only use accessories provided by the manufacturer.

1.3 Limit of liability and warranty

All general information and notes for handling, maintenance, and cleaning of this instrument are offered according to the best of our knowledge and experience.

LumaSense Technologies is not liable for any damages that arise from the use of any examples or processes mentioned in this manual or in case the content of this document should be incomplete or incorrect. LumaSense Technologies reserves the right to revise this document and to make changes from time to time in the content hereof without obligation to notify any person or persons of such revisions or changes.

All instruments from LumaSense Technologies have a regionally effective warranty period. Please check our website at <http://info.lumasenseinc.com/warranty> for up-to-date warranty information. This warranty covers manufacturing defects and faults which arise during operation, only if they are the result of defects caused by LumaSense Technologies.

The *Windows compatible software* was thoroughly tested on a wide range of Windows operating systems and in several world languages. Nevertheless, there is always a possibility that a Windows or PC configuration or some other unforeseen condition exists that would cause the software not to run smoothly. The manufacturer assumes no responsibility or liability and will not guarantee the performance of the software. Liability regarding any direct or indirect damage caused by this software is excluded.

The warranty is VOID if the instrument is disassembled, tampered with, altered, or otherwise damaged without prior written consent from LumaSense Technologies; or if considered by LumaSense Technologies to be abused or used in abnormal conditions. There are no user-serviceable components in the instrument.

1.4 Unpacking the Instrument

Before shipment, each instrument is assembled, calibrated, and tested at the LumaSense Factory. When unpacking and inspecting your system components, you need to do the following:

1. Check all materials in the container against the enclosed packing list.
LumaSense Technologies cannot be responsible for shortages against the packing list unless a claim is immediately filed with the carrier. Final claim and negotiations with the carrier must be completed by the customer.
2. Carefully unpack and inspect all components for visible damage. If you note any damage or suspect damage, immediately contact the carrier and LumaSense Technologies, Inc.
3. Save all packing materials, including the carrier's identification codes, until you have inspected all components and find that there is no obvious or hidden damage.



Note: LumaSense encourages you to register your product with us to receive updates, product information, and special service offers:
<http://www.info.lumasenseinc.com/registration>.

1.5 Transport, Packing, Storage

With faulty shipping, the instrument can be damaged or destroyed. To transport or store the instrument, please use the original box or a box padded with sufficient shock-absorbing material. For storage in humid areas or shipment overseas, the device should be placed in welded foil (ideally along with silica gel) to protect it from humidity.

The pyrometer is designed for a storage temperature of -20 to 80 °C with non-condensing conditions. Storing the instrument out of these conditions can cause damage or result in malfunction of the pyrometer.

1.6 Service Request, Repair, or Support

Contact LumaSense Technologies Technical Support in case of a malfunction or service request. Provide clearly stated details of the problem as well as the instrument model number and serial number. Upon receipt of this information, Technical Support will attempt to locate the fault and, if possible, solve the problem over the telephone.

If Technical Support concludes that the instrument must be returned to LumaSense Technologies for repair, they will issue a Return Material Authorization (RMA) number.

Return the instrument upon receipt of the RMA number, transportation prepaid. Clearly indicate the assigned RMA number on the shipping package exterior. Refer to Section 1.7, Shipments to LumaSense for Repair, for shipping instructions.

Technical Support can be contacted by telephone or email:

Santa Clara, California

Telephone:

+1 408 727 1600
+1 800 631 0176

Email:

support@lumasenseinc.com

Frankfurt, Germany

Telephone:

+49 (0)69-97373 0

Email:

eusupport@lumasenseinc.com

Erstein, France

Telephone:

+33 (0)3 88 98 98 01

Email:

eusupport@lumasenseinc.com

1.7 Shipments to LumaSense for Repair

All RMA shipments of LumaSense Technologies instruments are to be prepaid and insured by way of United Parcel Service (UPS) or preferred choice. For overseas customers, ship units air-freight, priority one.

The instrument must be shipped in the original packing container or its equivalent. LumaSense Technologies is not responsible for freight damage to instruments that are improperly packed.

Contact us to obtain an RMA number (if one has not already been assigned by Technical Support). Clearly indicate the assigned RMA number on the shipping package exterior.

Send RMA Shipments to your nearest technical service center:

Santa Clara, California

LumaSense Technologies, Inc.
3301 Leonard Court
Santa Clara, CA 95054 USA
Telephone: +1 408 727 1600
+1 800 631 0176

Email: support@lumasenseinc.com

Frankfurt, Germany

LumaSense Technologies GmbH
Kleyerstr. 90
60326 Frankfurt
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Telephone: +49 (0)69-97373 0

Email: eusupport@lumasenseinc.com

1.8 Disposal / decommissioning

Inoperable IMPAC pyrometers must be disposed of in compliance with local regulations for electro or electronic material.

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2 Introduction

2.1 Technical Data

(Different from IS 6 Advanced, IGA 6 Advanced, IGA 6/23 Advanced, ISR 6 Advanced, or IGAR 6 Advanced)

Video-Signal:	FBAS-Signal ca. 1 VSS at 75 Ohms, PAL (B), 50 Hz, CCIR656 video output galvanically isolated from power supply, analog output and digital interface
Date/Time:	Real time clock with about 14 days buffer (GoldCap)
Connection of Video-Signal:	Separate triaxial socket to support double shielded signal transmission (at pyrometer) BNC connector (on user side - BNC-RCA adapter included) Video signal can be switched off via software
Operating ambient temperature:	0 to 60 °C on the housing



Note: During operation the instruments will warm up and might reach an intrinsic temperature of up to 58 °C.

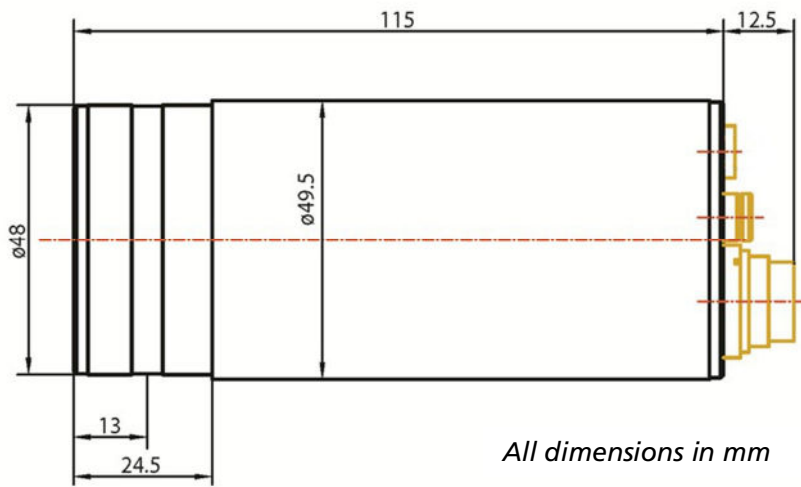
Optics

Superimposed text elements:	Circular target marker, user text, time, date, measured temperature Additional: device temperature or distance or serial no. or intensity (only ISR)
Field of view:	approx. 11.6% x 8.4% of the adjusted measuring distance
Resolution:	768 x 576 Pixel video chip 768 x 520 Pixel displayed on screen
Brightness control:	Automatic or manual (via software)



Note: The calibration / adjustment of this pyrometer is carried out in accordance with VDI/VDE 3511, Part 4.4. See <http://info.lumasenseinc.com/calibration> for more information.

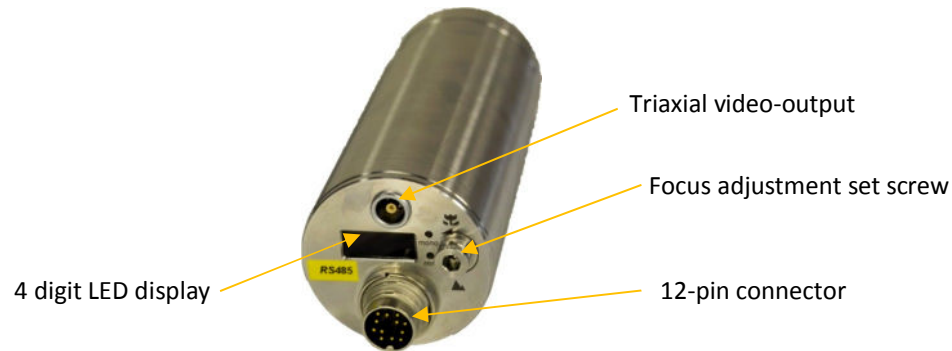
2.2 Dimensions



3 Electrical Installation

3.1 Video Output Electrical Connection

On the back cover of Series 6-TV Advanced pyrometers, there is an additional coaxial connector for the video output. LumaSense offers ready-made video connection cables in various lengths, which are fitted with a BNC connector and a BNC-RCA adapter to connect to a monitor or video grabber.

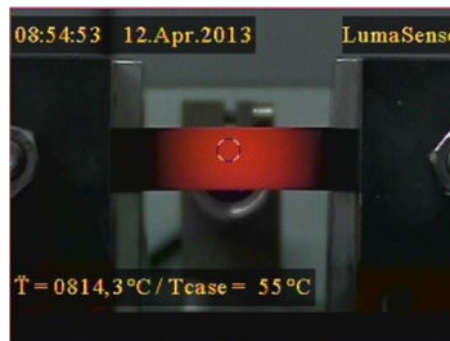


Rear View of the Pyrometer

3.1.1 Video Image

The video image is used for aligning the pyrometer to the measuring object and shows the following information:

- The measuring object and its surroundings
- Target marking circle (The size of the circle corresponds to the measuring target size)
- Current temperature reading
- In addition to the measuring temperature, one of the following parameters is displayed:
 - Internal temperature of the pyrometer (Tcase)
 - Measuring distance (a = xxxxx)
 - Serial number (SNo: xxx)
 - Signal intensity (I = xxx.x% only ISR 6-TV Advanced and IGAR 6-TV Advanced)
- Current Time and Date
- User text (e.g. "LumaSense")

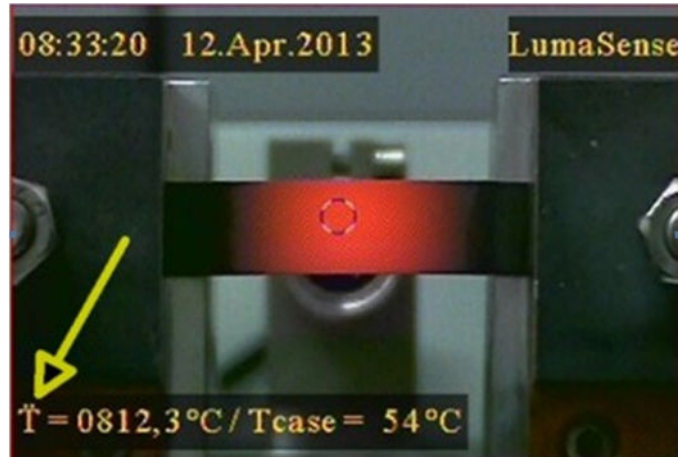


Example of a video image

Operating Mode

The two dots above the letter "T" show the selected operating mode (ISR 6-TV Advanced and IGAR 6-TV Advanced only).

- 2-channel mode: 2 dots displayed. If the signal falls below the set Relative Signal (see "Relative Signal" in ISR 6 Advanced or IGAR 6 Advanced Manual), the temperature displayed on the image will be flashing.
- 1-channel mode: only the left dot is displayed.
- Metal mode: the left dot is displayed continuously, the right dot flashes.
- Smart-Mode (IGAR 6-TV Advanced only): both dots flash.

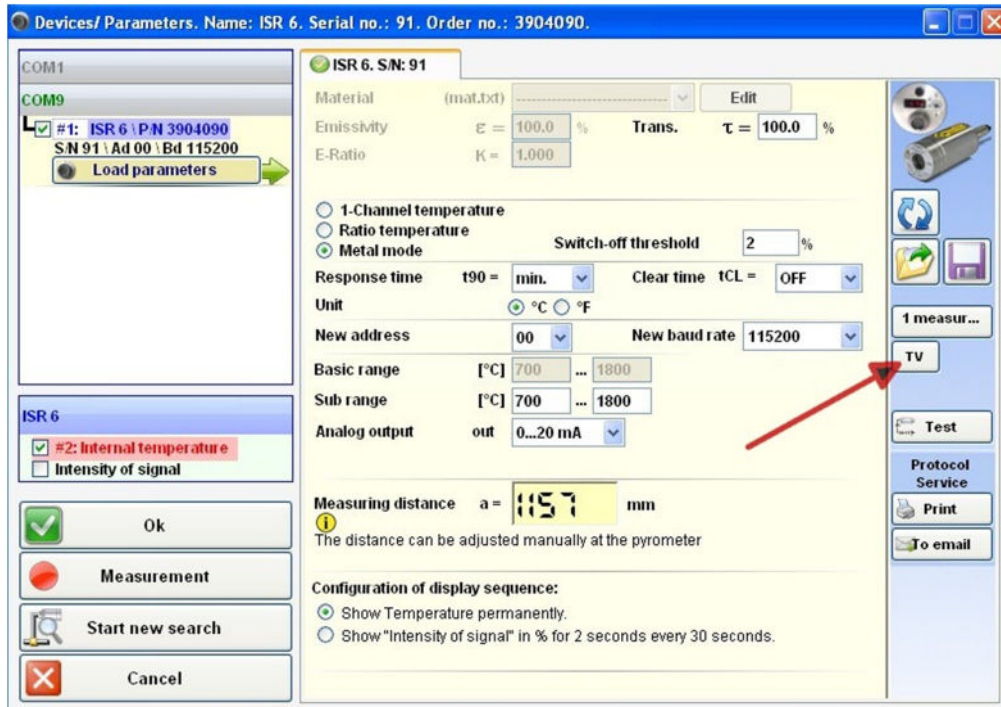


4 Software InfraWin

You can configure the video image and display options using a PC and the InfraWin 5 software (included in scope of delivery).

4.1 Set Video Mode Parameters

1. Choose **TV** for setting the parameters of the video module.



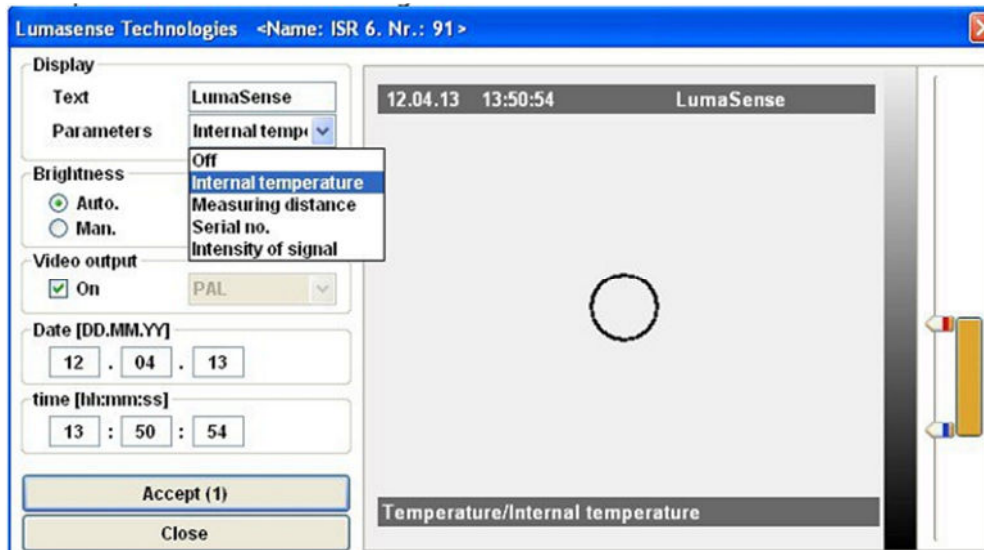
2. Complete the following fields on the screen:
 - **Text:** Enter user text (e.g. "LumaSense")
 - **Parameters:** Display in addition to measuring temperature
 - Off (no parameter is displayed)
 - Device temperature
 - Measuring distance
 - Serial number
 - Signal intensity (ISR 6-TV Advanced and IGAR 6-TV Advanced only)
 - **Brightness:** Selects the brightness adjustment mode of the video image: automatic or manual
 - **Video Output:** To turn on/off the video output (high impedance=off)
 - **Date and Time Settings:** Set the current time and date
3. Click the **Accept** button to save the settings.

4.2 Adjusting Brightness

You can set the brightness control to Manual (Man.) or Automatic (Auto) using the InfraWin 5 software.

- **Manual** - the brightness of the video image can be set manually using the slider at the right side of the video image.
- **Automatic** - the brightness of the video image is automatically controlled. Using the two sliders (red and blue) at the right side of the video image, a range of brightness can be set where the automatic control should work. With the yellow button, the selected range can be moved.

If the circle (representing the current brightness) is within the chosen range, automatic brightness control is not active. Once the circle is outside of the chosen range, automatic brightness control activates and automatically adjusts the brightness until the circle returns to the chosen range.

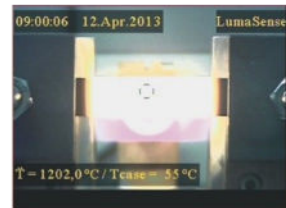
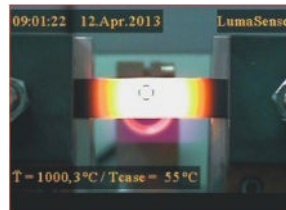
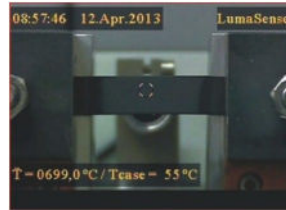


These settings affect the video chip in the pyrometer. By pressing the **Accept** button, the settings are stored in the pyrometer.

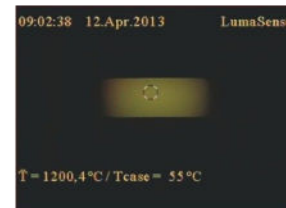
Comparison between manual and automatic control of brightness:

The measuring temperature was changed for the image recording from the beginning of the measuring range to 1200 °C.

Manual brightness control



Automatic brightness control



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5 Accessory (optional)

5.1 Video Grabber (Converts Analog TV to USB)

Using the video grabber (optional accessory) in conjunction with the software InfraWin 5, it is possible to see the video image on the PC screen together with the temperature graph.

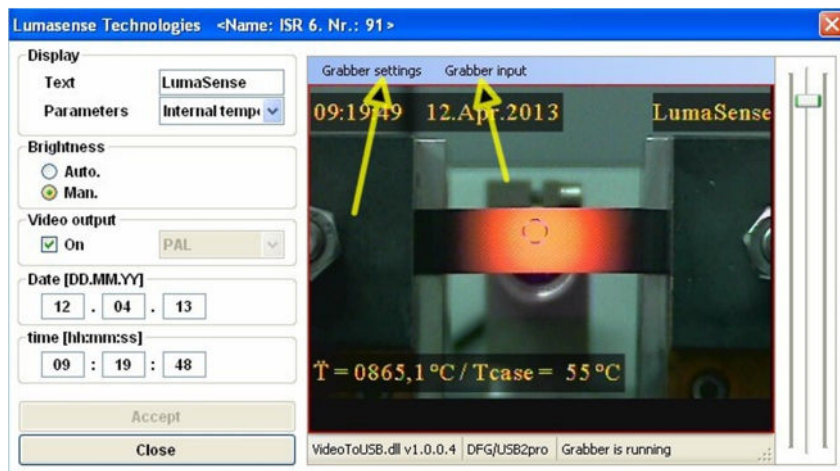
The video image can be size adjusted and positioned at any place of the screen. The properties of the pyro's video chip as well as properties of the video grabber can be adjusted with InfraWin 5.



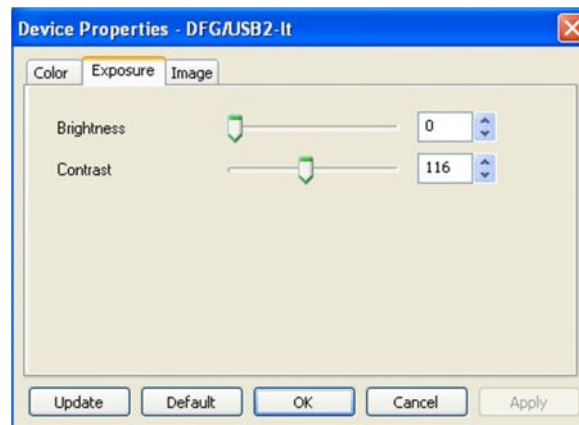
5.1.1 Adjusting Grabber Settings

On top of the video image there is a menu labeled **Grabber settings**. Set the properties of the video image by changing the parameters of the video grabber (works like the controlling knobs of a monitor).

1. Select **Grabber settings**.



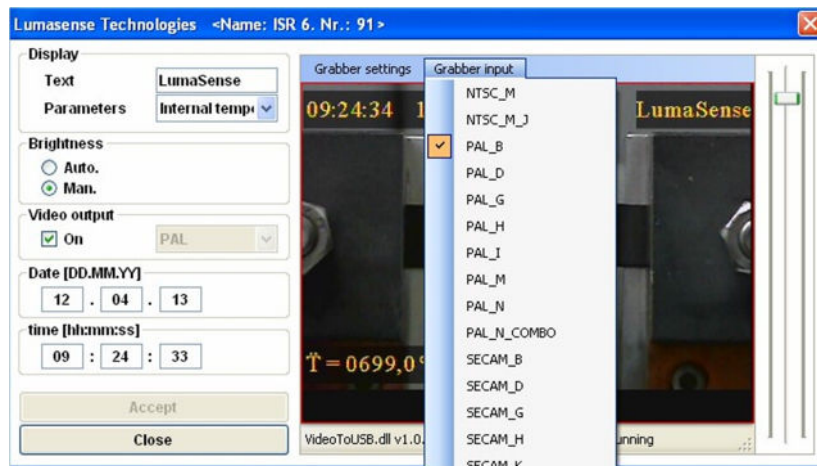
2. Configure the desired settings.



3. Save the configured settings by pressing **OK**.

5.1.2 Adjusting Video Output Settings

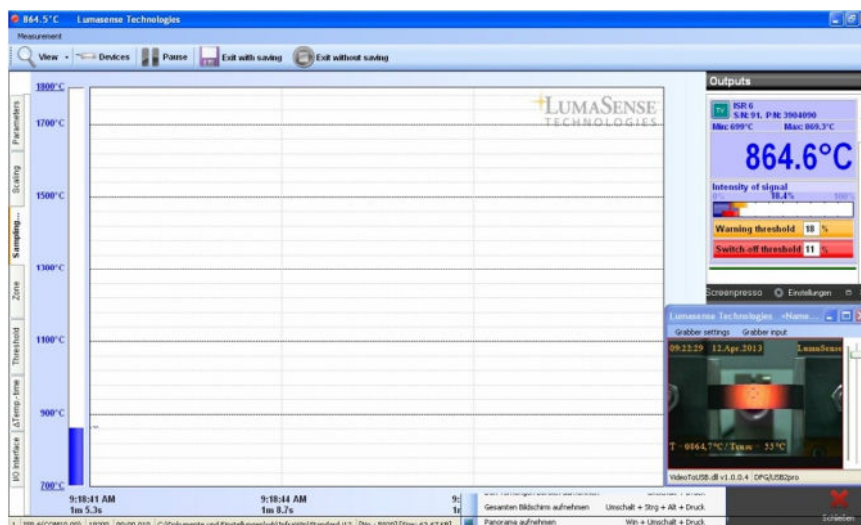
1. Select **Grabber input**.
2. Currently, only **"PAL_B"** is supported.



5.1.3 Viewing the Video Image

During a temperature measurement of the pyrometer, the video image can be displayed on the screen by pressing the **TV** button.

The video image can be positioned anywhere on the screen. Use the slider to change the brightness of the image during the measurement.



6 Data format Universal Pyrometer Protocol (UPP): Extended for Video Module

Software commands can be exchanged directly with the pyrometer through an interface using suitable communication software or by using the **Test** function located in the **Pyrometer Parameters** window of the InfraWin software package.

The data exchange occurs in ASCII format with the following transmission parameters:

- The data format is: 8 data bits, 1 stop bit, even parity (8,1,e) no handshake;
- The device responds to the entry of a command with output (such as the measuring value) + CR (Carriage Return, ASCII 13), to pure entry commands with **ok** + **CR**, or **no** + **CR**.
- Every command starts with the 2-digit device address AA (e. g. "00"). This is followed by 1 lower case command letter and 2 numbers finished with CR.

Example Read Command: Entry: "00v08" + <CR>

Selectable parameter that is additionally shown to the measuring temperature

Read selection: Answer: 2-digit, hex

e.g. "02" + <CR> The measured distance is displayed in addition to temperature.

- The ASCII parameter "X" indicates a change to be made in a parameter. When used, the command contains the new value.

Example Write Command: Entry: "00v08XX " + CR

The case temperature is additionally shown to the measuring temperature. A „?“ after the read command answers with the limits of the respective settings (only a setting command, not a query command).

- A "?" after the lower case command letters answers with the limits of the respective settings (only at setting commands, not at query commands).

Example Read Limits Command: Entry: "00v08?" + CR!

The answer is "00FF" + <CR>

Description	Command	Parameters
v00	v00XX	Text fade in, set value. XX=00..1F,hex Bit[0]: Overlay_0 -> parameter display (0: fade out; 1: fade in) Bit[1]: Overlay_1 -> Time/Date (0: fade out; 1: fade in) Bit[2]: Overlay_2 -> User-Text (0: fade out; 1: fade in) Bit[3]: Overlay_3 -> target circle (0: fade out; 1: fade in) Bit[4]: Firmware-Block Overlay-activation (0: Off →all ovl's off, resolution=768x576; 1: On →ovl's corresponding to Bit[3:0] Settings on and resolution=768x520)
v01	v01	Pixel Coordinates of top left corner of temperature display read. (Overlay_0) Answer = XXXYYY (6-digit, hex) XXX: X-Coordinate YYY: Y-Coordinate (000 = top)
	v01XXXXYY	Set Coordinates of temperature display. XXX: 000..300hex (X-Coordinate) YYY: 000..208hex (Y-Coordinate→Change only in multiples of 2)
	v01?	Coordinates of temperature display read limits. Answer: 000300000208 (PAL) Format xxxXXXyyyYYY xxx min X-Value, XXX max X-Value yyy min Y-Value, YYY max Y-Value
v02		description see „v01“ but Coordinates of time/Date (Overlay_1)
v03		description see „v01“ but Coordinates of UserText (Overlay_2)
v05	v05	store v01,v02,v03,v04 in flash memory
v06	v06	UserText read. Answer: ASCII-String
	v06nnS	UserText write. nn: 01..32hex (number of characters) S: ASCII-String (nn characters long)
	v06?	UserText read limit. Answer: 0132xy x: first character is blank (0x20) y: last character is 'ÿ' (0xff)
v07	v07	Store user-text in flash memory
v08	v08	Selectable parameter, selection read. Answer: 2-digit, hex
	v08XX	Selectable parameter, selection write. XX={00,01,80} 00: case temperature 02: measuring distance 03: Ser-No 80: Intensity (ISR 6-TV Advanced and IGAR 6-TV Advanced only); FF: no parameter
	v08?	Selectable parameter, read limits. Answer: 00FF
v09	v09	Selectable parameter, store selection in flash memory

Description	Command	Parameters
v10	v10	Text properties parameter, read. Answer 4-digit, hex.
	v10ABCD	Text properties parameter, write. A: text color (0..F) B: text transparency (0..7 → 0: transparent; 7: full opacity) C: background color (0..F) D: background transparency (0..7) <i>Color palette:</i> 0=black; 1=DarkRed; 2=Red; 3=Pink; 4=Teal; 5=Green; 6=BrightGreen; 7=Turquoise; 8=DarkBlue; 9=Violet; A=Blue; B=Grey 25%; C=Grey 50%; D=DarkYellow; E=Yellow; F=White <i>In cross faded colors →reduce opacity!!! (e.g. Yellow)</i>
	v10?	Text-properties parameter, read limits. Answer: 0F070F07
v11	v11 v11ABCD v11?	Text properties (date/time) description see „v10“
v12	v12 v12ABCD v12?	Text properties (User Text) description see „v10“
v13	v13 v13ABCD v13?	reserved (Overlay_3 used for pictures → LumasenseLogo, circle marker, AVG_rectangle) description see „v10“ however Text properties (Overlay_3)
v14	v14	store v10,v11,v12,v13 text properties in flash memory
v18	v18	Brightness control, settings read. Answer: 1-digit, hex.
	v18X	Brightness control, settings write. X=0..1 0: manual brightness control 1: automatic brightness control
	v18?	Brightness control, read limits. Answer: 01
v19	v19	Brightness, read. Answer: 3-digit, hex.
	v19XXX	Brightness, write. XXX=000..1A5
	v19?	Brightness, read limits. Answer: 0001A5
v20	v20	Brightness, store in flash memory.
v21	v21	AVG-Rectangle, properties read. Answer: AAABBBCCDDDD (12-digit, hex)
	v21 AAABBBCCDDDD	AVG-Rectangle, properties write. AAA: width (004..300hex) BBB: high (008..208hex → Change only in multiples of 2) CCC: X-Coordinate (000..2FChex) DDD: Y-Coordinate (000..200hex → Change only in multiples of 2) <ul style="list-style-type: none"> • <i>Coordinates-reference : corner top left</i> • <i>If AAA+CCC > 768 , Answer „no“</i> • <i>if BBB+DDD > 520 , Answer „no“</i>
	v21?	AVG-Rectangle, read limits. Answer: 0043000082080002FC000200
v22	v22	AVG-Rectangle, set to position and size of circle marker.
v23	v23	AVG-Rectangle, store in flash memory.

Description	Command	Parameters
v24	v24	Control limit, for automatic brightness read. Answer: XYY (4-digit, hex)
	v24XXYY	Control limit, for automatic brightness write. XX: bottom Control limit (00..FFhex) YY: top Control limit (00..FFhex) brightness of the image is changed by the OV7960 till the average value of the brightness, all pixels within the defined AVG rectangle, is in these control limits)
	v24?	Control limit, read limits. Answer: 00FF00FF
v25	v25	Control limit, store selection in flash memory
v26	v26	Time, read. Answer 6-digit, decimal
	v26hhmmss	Time, write. hh: hour (00..23) mm: minute (00..59) ss: second (00..59)
	v26?	Time, read limit. Answer: 002300590059
v27	v27	Date, read. Answer 6-digit, decimal
	v27DDMMYY	Date, write. DD: day (01..31) MM: month (01..12) YY: year (00..99)
	v27?	Date, read limits. Answer: 013101120099
v31	v31	Video-Out-Tristate read. Answer 1-digit, hex.
	v31x	Video-Out-Tristate write. x = 0..1 0: Disable 1: Enable
	v31?	Video-Out-Tristate, read limits Answer: 01
v32	v32	Video-Out-Tristate, store selection in flash memory

7 Reference Numbers

7.1 Reference numbers instrument

Type	Temperature Range	Reference Number
IS 6-TV Advanced (PAL / RS485)	600 to 1800 °C (MB 18)	3 914 570
	600 to 3000 °C (MB 30)	3 914 530
IGA 6-TV Advanced (PAL / RS485)	250 to 1800 °C (MB 18)	3 914 070
	250 to 2500 °C (MB 25)	3 914 030
IGA 6/23-TV Advanced (PAL / RS485)	50 to 1000 °C (MB 10)	3 914 230
	75 to 1300 °C (MB 13)	3 914 270
	150 to 1800 °C (MB 18)	3 914 310
ISR 6-TV Advanced (PAL / RS485)	600 to 1400 °C (MB 14)	3 904 030
	700 to 1800 °C (MB 18)	3 904 090
	800 to 2500 °C (MB 25)	3 904 160
	1000 to 3000 °C (MB 30)	3 904 230
IGAR 6-TV Advanced (PAL / RS495)	100 to 2000 °C (MB 20)	3 914 720

Ordering note: Connection and video cables are not included in scope of delivery and must be ordered separately.

7.2 Reference numbers accessories (video related)

- 3 920 600 Video cable BNC, 5 m long
- 3 920 610 Video cable BNC, 10 m long
- 3 920 620 Video cable BNC, 15 m long
- 3 920 630 Video cable BNC, 20 m long
- 3 920 640 Video cable BNC, 25 m long
- 3 920 650 Video cable BNC, 30 m long
- 3 920 660 Video cable BNC, 40 m long
- 3 920 670 Video cable BNC, 45 m long
- 3 920 680 Video cable BNC, 60 m long
- 3 920 690 Video cable BNC, 100 m long

All video cables include an adapter BNC-socket to RCA male (CINCH)

- 3 826 740 Passive Video Baluns with BNC connectors for transmitting video signals over standard inexpensive patch cable (eg CAT5 cable). Maximum cable length: 300 m with color video.

- 3 826 730 Video grabber (converts analog TV to USB)

7.3 Reference numbers accessories (other)

3 820 320	Special connection cable with angled connector and additional targeting light push button, 5 m long	
3 820 330	5m connection cable with straight connector	
3 820 500	10m connection cable with straight connector	
3 820 510	15m connection cable with straight connector	
3 820 810	20m connection cable with straight connector	
3 820 820	25m connection cable with straight connector	
3 820 520	30m connection cable with straight connector	(All connection cables include a short adapter cable with a 9-pin D-SUB connector. This connector may be used in combination with the RS485 to USB adapter.)
3 820 340	5m connection cable with right angle connector	
3 820 530	10m connection cable with right angle connector	
3 820 540	15m connection cable with right angle connector	
3 820 830	20m connection cable with right angle connector	
3 820 840	25m connection cable with right angle connector	
3 820 550	30m connection cable with right angle connector	
3 826 510	PI 6000: PID programmable controller, very fast, for digital IMPAC pyrometers	
3 826 720	USB to RS485 adapter cable, 1.8 m long	
3 834 210	Mounting support (adjustable)	
3 835 160	Air purge unit, aluminum	
3 835 590	90° mirror for Series 5 and Series 6, quartz glass window	
3 837 530	Water cooling jacket (heavy duty) with integrated air purge for Series 6 with video	
3 837 540	Cooling plate for Series 5 and 6, with air purge	
3 846 260	Mounting support	
3 846 290	Mounting support with fused silica window	
3 846 590	Vacuum support KF16 with quartz glass window	
3 852 290	Power supply NG DC for DIN rail mounting; 100 to 240 V AC ⇒ 24 V DC, 1 A	
3 852 550	Power supply NG 2D for DIN rail mounting; 85 to 265 V AC ⇒ 24 V DC, 600 mA with two settable limit switches	
3 890 640	DA 4000-N: LED-digital display to be built into the switchboard	
3 890 650	DA 4000: like DA 4000-N, but additionally with 2 limit switches	
3 890 570	DA 6000-N digital display to allow adjustment of the Pyrometer through the RS485 interface	
3 890 530	DA 6000: like DA 6000-N with analog input and 2 limit switches for the RS485 interface	
3 890 630	iLD24-UTP; large digital indicator, 57 mm height of digits	

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