



# Impac<sup>®</sup> Pyrometers

## Series 6-TVD with Video Processing Box

### User Manual Addendum

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## Product Usage Statement



### **WARNING:**

Read this entire manual and all other publications pertaining to the work to be performed before installing, operating, or maintaining this equipment. Practice all plant and product safety instructions and precautions. Failure to follow instructions can cause personal injury and/or property damage. If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment might be impaired. All personnel who work with or who are exposed to this equipment must take precautions to protect themselves against serious or possibly fatal bodily injury.

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- [tech.writing@aei.com](mailto:tech.writing@aei.com)

To order a manual, please contact Technical Support:

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# Safety and Product Compliance Guidelines

## Important Safety Information

To ensure safe installation and operation of the Advanced Energy Series 6-TVD unit, read and understand this manual before attempting to install and operate this unit. At a minimum, read and follow the safety guidelines, instructions, and practices.

## Danger, Warning, and Caution Boxes



This symbol represents important notes concerning potential harm to people, this unit, or associated equipment. Advanced Energy includes this symbol in danger, warning, and caution boxes to identify specific levels of hazard seriousness.



### **DANGER:**

**DANGER** indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury. **DANGER** is limited to the most extreme situations.



### **WARNING:**

**WARNING** indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury, and/or property damage.



### **CAUTION:**

**CAUTION** indicates a potentially hazardous situation that, if not avoided, could result in minor or moderate injury, and/or property damage. **CAUTION** is also used for property-damage-only accidents.

## Interpreting Product Labels

The following labels might appear on the unit:



or



or



CE label

Complies with applicable European directives.

UK Conformity Assessed label

Complies with applicable United Kingdom regulations.

Chassis ground terminal

This terminal is available to connect the chassis to a specific ground. It is not required to be connected to an external ground to meet safety requirements. It is commonly used for electromagnetic compatibility (EMC) grounding of the chassis. Refer to the installation instructions.

Refer to manual for more information

## Product Compliance

The following sections include information about unit compliance and certification, including the conditions of use required to be in compliance with the standards and directives.

### Product Certification

Certain options of this product may be certified according to the list below.

For more information, refer to the Certificate or Letter of Conformity (US) or Declaration of Conformity (EU) accompanying the product.

- CE Marking – Self-declaration, assessed by AE Corporate Compliance
- EMC measurements – Verified by AE Corporate Compliance

### Important

The calibration/adjustment of the pyrometer was carried out in accordance with VDI/VDE directive “Temperature measurement in industry, Radiation thermometry, Calibration of radiation thermometers,” VDI/VDE 3511, Part 4.4.

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

For additional details on this directive, visit <http://www.advancedenergy.com>, **Design Resources** → **Technical Content**, search for Pyrometer Calibration Geometry, and click on the matching link. You can also order the directive from Beuth Verlag GmbH in D-10772 Berlin Germany (<https://www.beuth.de/en>).

## Safety and EMC Regulations, Directives, and Standards

For information concerning compliance to applicable EU requirements, refer to the EU Declaration of Conformity shipped with this unit. For information concerning compliance to applicable UK requirements, refer to the UK Declaration of Conformity for this unit. The Declaration of Conformity might also include a supplementary section covering compliance to other regulatory requirements and/or industry standards or guidelines.

## Conditions of Use

Comply with the stated directives and standards by meeting the following conditions of use:

- Install and operate this unit in a pollution degree environment according to environmental specifications.
- Operate this device within the ambient temperature declared in the specifications.
- Use only a shielded cable for communications and/or control connections.
- Use only a shielded cable for the input power connections.
- Use only a shielded cable for the output process power connections.
- Verify that input voltage and current source capacity are within specifications before turning on the unit.
- To prevent electromagnetic interference, connect the product to ground.
- Use proper electrostatic discharge (ESD) precautions.
- Dispose of this product as directed by applicable laws and regulations.
- For the input and output power connections, use wires that are suitable for at least the maximum allowed ambient temperature of the unit.
- Do not allow condensation of any liquids or accumulation of conductive dust on the instrument. Doing so will have unpredictable results, possibly including, but not limited to, loss of accuracy.

- Advanced Energy requires that AE-trained personnel perform all maintenance and service on the unit.

## Environmental Compliance

- **EU RoHS – European Union Directive 2011/65/EU (RoHS 2)**

Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment

This product is EU 2011/65/EU (RoHS 2) compliant, containing no more than the maximum concentration of hazardous substances listed in Annex II, but might utilize application exemptions in Annex III or IV.

- **European Delegated Directive (EU) 2015/863 (RoHS 3) – Amendment to Annex II of Directive 2011/65/EU (RoHS 2) Regarding the List of Restricted Substances**

This product is also compliant to the 2015/863 amendment, containing no more than the maximum concentration of four additional hazardous substances (phthalates) listed in amended Annex II.

# Product Overview

## Introduction

The Series 6-TVD pyrometer provides video functions to the features of the instrument. This user manual addendum is intended to supplement the Series 6 manuals for the TVD version. Additional information about the pyrometers is found in the corresponding IGAR 6-TVD Smart, ISR 6-TVD Advanced, IGA 6-TVD Advanced, IS 6-TVD Advanced, and IGA 6/23 Advanced pyrometer manuals.

### Important

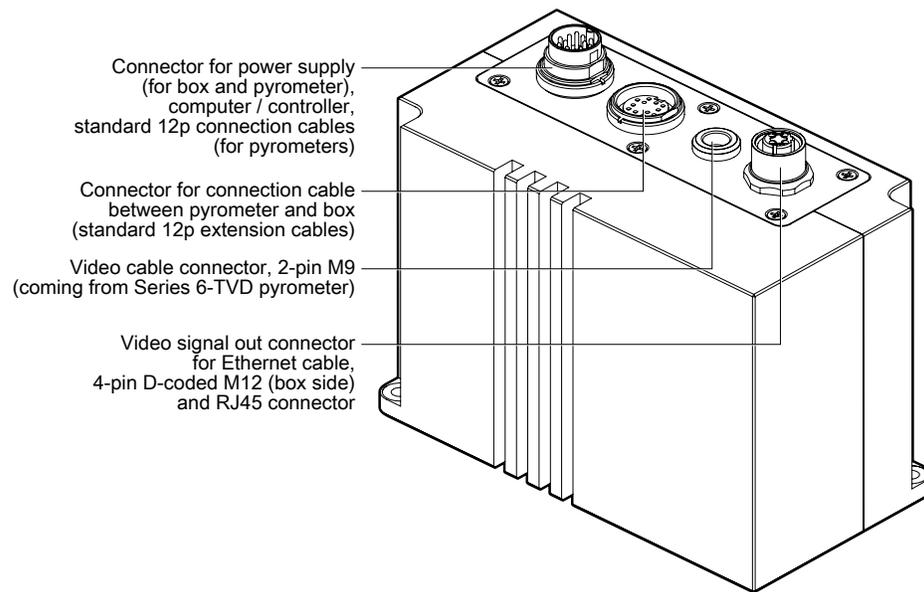
The instrument includes only a works certificate, a manual, and the InfraWin software for adjustment/evaluation. All cables must be ordered separately.

For more information about the options available for your pyrometer, see the online product data sheet.

1. Navigate to <https://www.advancedenergy.com/>, click **Design Resources**, and click **Technical Content**.
2. Select **Data Sheets** under **Document Type**.
3. Search for your pyrometer model in the **Quick Filter** box.
4. Click on the results to review.

## Video Processing Box

To process the video signal coming from the Series 6-TVD pyrometer, the instrument must be operated in conjunction with the Video Processing Box (VPB).



**Figure 2-1.** Video processing box

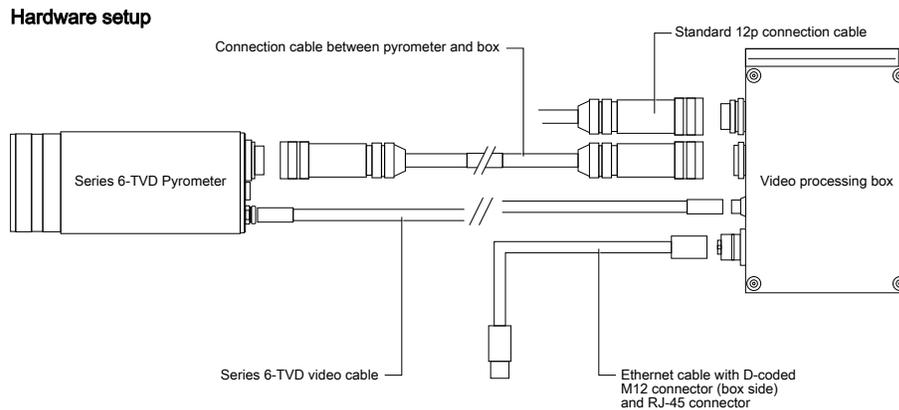
To connect the VPB to the pyrometer you will need additional cables.

- A standard 12-pin connection cable to power both the pyrometer and the video processing box
- A connection cable between the pyrometer and the VPB
- A Series 6-TVD video cable
- A standard Ethernet cable with 4-pin D-coded M12 connector (box side) and RJ-45 connector to process the video signal from the VPB to the network or computer

Review the data sheet, see [“Introduction”](#) for ordering information.

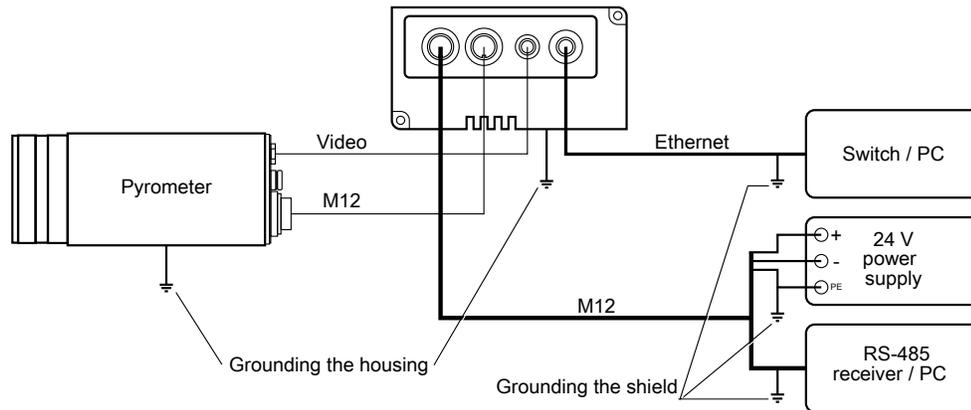
**Important**

The VPB needs approximately 40 seconds after power on before accurate operation.



**Figure 2-2.** Video processing box - hardware setup

Review the following image to ensure the complete setup is grounded properly.



**Figure 2-3.** Grounding concept Series 6-TVD setup

Use the InfraWin software to access the pyrometer video chip and the VPB properties. Position and adjust the video image anywhere on the screen, including alongside the temperature graph being monitored.

# Installation, Setup, and Operation

## Visual Functions

### Video Output Electrical Connection

On the back of the Series 6-TVD pyrometer, there is an additional connector for the video output. AE offers ready-made video connection cables in various lengths, which are designed to connect the pyrometer with the VPB.



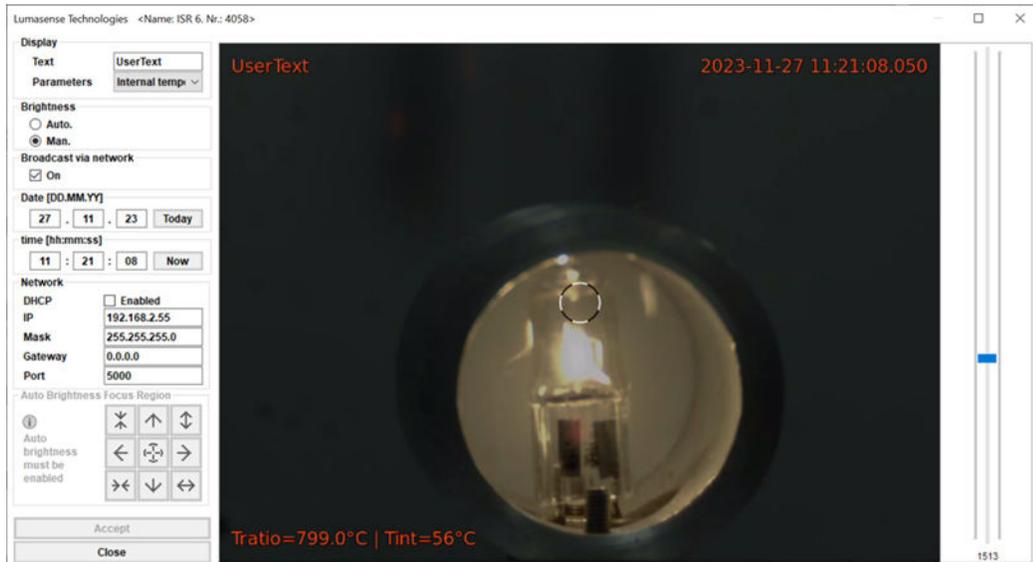
*Figure 3-1. Rear view of the pyrometer*

### Video Image

The video image can be accessed either using the InfraWin software or via Ethernet. You can use the video image to align the pyrometer to the measuring object. The following information is superimposed on the video screen:

- The measuring object and the surrounding environment
- A circle marking the measuring target size
- The current temperature reading
- You can select one of the additional parameters listed to be displayed as well:
  - Internal temperature of the pyrometer (**Tint**) which is shown in the following image
  - Distance from the measuring object to the pyrometer (**a = xxxx mm**)

- Serial number (**Sno.:xxxx**)
- Signal intensity (**I=xxx.x%**); only for ISR 6-TVD Advanced and IGAR 6-TVD Smart models
- Current time and date
- User text



*Figure 3-2. Example of a video image*

## Operating Mode

The temperature display in the video image also shows the operating mode the Series 6-TVD unit is currently set to.



**Figure 3-3.** Identifying operating mode

- **Tmono** = 1-channel mode
- **Tratio** = 2-channel mode (only for ISR 6-TVD Advanced and IGAR 6-TVD Smart units)
- **Tmetal** = Metal mode (only for ISR 6-TVD Advanced and IGAR 6-TVD Smart units)
- **Tsmart** = Smart mode (only for IGAR 6-TVD Smart)

As an alternative to the InfraWin software or standard Ethernet, the video image can also be displayed using a VLC (Video LAN Client) player. A new .sdp (session description protocol) file must be created with the following settings.

```
v = 0
m = video 5000 RTP/AVP 96
c = IN IP4 192.168.2.1551
a = rtpmap:96 H264/90000
```

When using the VLC player, the video image will be displayed with a short delay (contrary to real-time image using InfraWin software). You can minimize this delay by setting the network caching of the VLC player to 500 ms.

**Windows Start → VLC → Tools → Preferences → All → Input/Codecs → Advanced → Network caching (ms)**

<sup>1</sup> Data in bold is dependent on individual system configuration (IP and port)

# Normal Operation

## Setting Video Mode Parameters

To access the video image via Ethernet, set all relevant parameters according to your network requirements.

### Default Setting of the VPB

- IP address = 192.168.1.10
- Port = 5000
- Netmask = 255.255.255.0
- Gateway = 0.0.0
- DHCP = deactivated

You can configure the video image and display options using your host computer and the InfraWin software.

1. Click **TV** to set the VPB parameters.

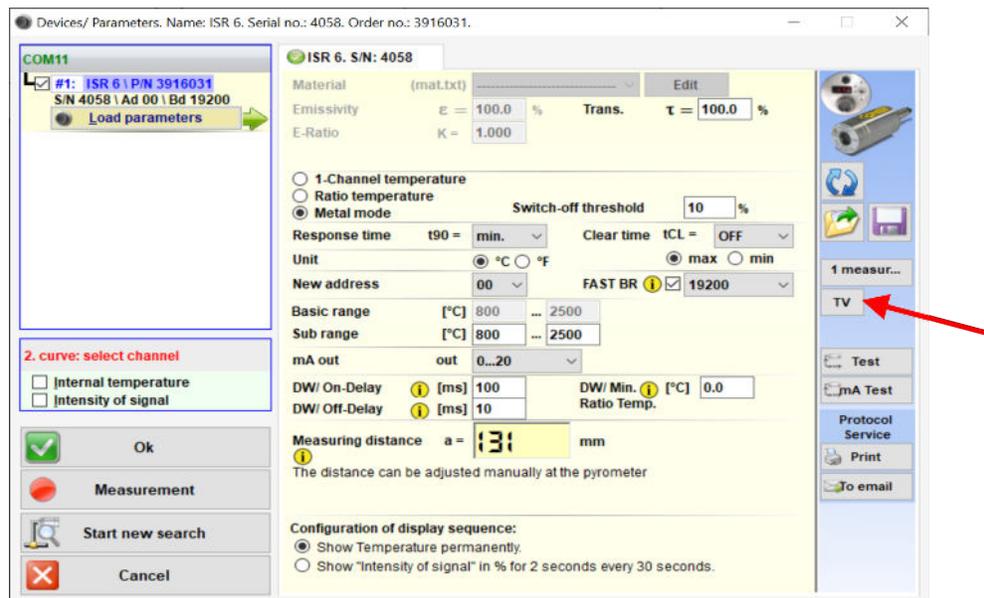
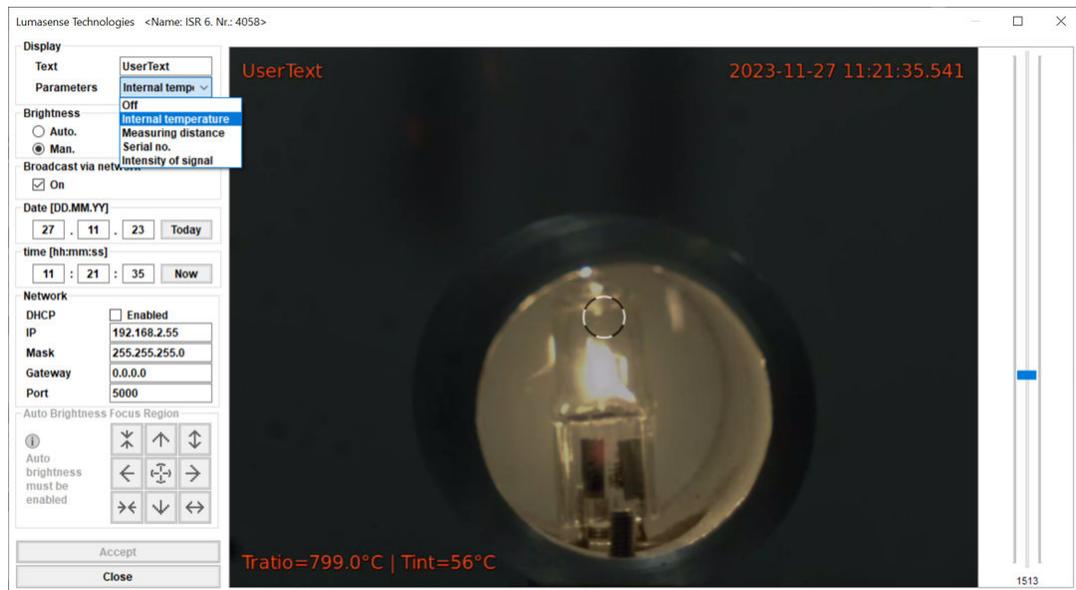


Figure 3-4. Screenshot from InfraWin 5 software

2. The resulting window shows the current video image and offers several video setting options.



**Figure 3-5.** Video settings

- **Text:** Enter individual user text to be displayed.
  - **Parameters:** Besides the temperature display, one additional informing parameter can be displayed in the image:
    - **Off** (no additional parameter is displayed)
    - **Internal temperature (Tint)**
    - **Measuring distance**
    - **Serial number**
    - **Signal intensity** (only available with ISR 6-TVD Advanced TVD and IGAR 6-TVD Smart TVD)
  - **Brightness:** Select automatic or manual (also see “Video Brightness”)
  - **Broadcast via network:** Activate or deactivate
  - **Date:** Set current date
  - **Time:** Set current time
  - **Network settings:**
    - Enable/disable DHCP
    - IP address
    - Subnet Mask
    - Gateway
    - Port
  - **Auto Brightness Focus Region:** (also see “Video Brightness”)
3. Click **Accept** to save the settings.

## Video Brightness

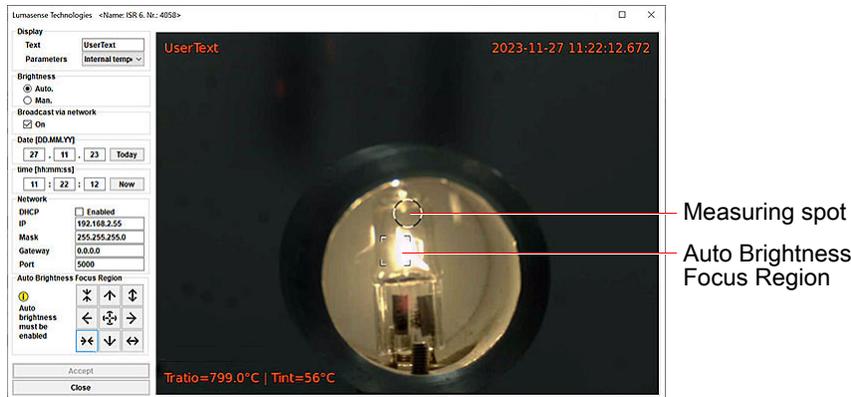
You can set the brightness control to **Man.** (Manual) or **Auto.** (Automatic) using the InfraWin software, or using the UPP commands.

- In **Man.** mode, video image brightness can be manually adjusted using the slider at the right side margin.



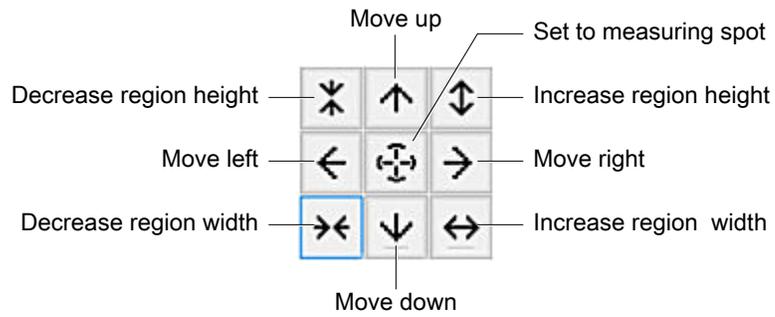
**Figure 3-6.** Brightness range indicator

- In **Auto.** mode, the brightness of the video image is automatically controlled. The reference point for the automatic brightness control does not have to be the actual measuring spot, but any reference point/area in the video image.



**Figure 3-7.** Auto Brightness Focus Region

The Auto Brightness Focus Region can be changed in size and can be moved to any region of the video image using the arrow keys on the bottom left of the interface as shown in the figure above.



**Figure 3-8.** Adjusting auto brightness

Click **Accept** to save the changed settings.

### Comparing Manual and Automatic Control of Brightness

The measuring temperature was changed for the image recording for temperatures around 1200°C (2192°F). The following figure illustrates the difference of manually controlling image brightness versus automatic brightness control.



Figure 3-9. Manual control on the left, automatic control on the right

## Maintenance

### Refurbishment Schedule

To maintain optimal performance of your Series 6-TVD unit, AE recommends a 3 – 5 year refurbishment schedule. Contact AE Technical Support within this timeframe to determine if any refurbishment is recommended for your unit.

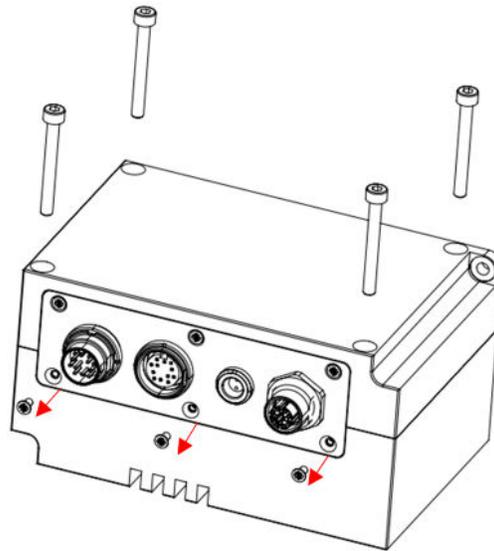
### VPB - Battery Replacement

The Video Processing Box (VPB) uses a battery (CRC123A with 3 V @ 1500 mAh) for the real-time clock. The battery is designed to last approximately two years.

However, replacement is also recommended if the VPB has not been in operation for more than 22 months.

### To Replace the Battery

1. Remove the cover of the VPB by unscrewing the four Allen screws at the corners of the cover and the three bottom screws below the connectors.

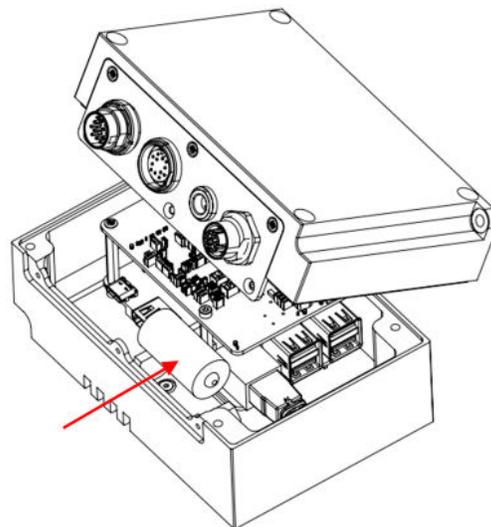


*Figure 3-10. VPB - remove cover*

#### **Important**

Take care to ensure the Video Processing Box is not contaminated with dust or debris while cover is removed.

2. Remove the old battery (shown in the following image) from the battery holder and replace it with a battery of the same type.



*Figure 3-11. Replace battery*

3. Replace the cover. Re-install the four corner Allen screws, the three bottom screws below the connectors, and tighten all fasteners just beyond hand tight.

# Troubleshooting and Technical Support

Before requesting support, perform the recommended checks and the troubleshooting procedures in this chapter. If you are still unable to resolve the issue and resume normal operation of the equipment, contact Technical Support. You can find the contact information for “[Technical Support](#)” on page 4-1.

## Technical Support

For help using or troubleshooting products, contact the Advanced Energy Technical Support Organization (TSO). Proceed as follows:

1. Make a note of the serial number (SN) and part number (PN) listed on the product label.
2. To contact the TSO by email, address the message to [Technical.Support@aei.com](mailto:Technical.Support@aei.com). In the body of the email, include the serial number (SN) and part number (PN) of the product and a description of the issue.
3. To contact the TSO by telephone, dial +1.866.865.5180 (toll-free in the United States of America).
4. To contact the TSO at its business address, write to:  
AE World Headquarters  
1625 Sharp Point Drive  
Fort Collins, CO 80525 USA

–OR–

LumaSense® Technologies (an Advanced Energy company)  
Kelsterbacher Strasse 14  
65479 Raunheim, Germany

## Service, Repairs, and Upgrades

Before returning equipment for service, refurbishment, calibration, upgrade, or repair, obtain a Return Material Authorization (RMA) number. Request an RMA number using one of the methods explained in the following sections.

### Obtaining an RMA Number Using an Existing MyAE Account

For customers who have a MyAE account, proceed as follows:

1. Make a note of the serial number (SN) and part number (PN) listed on the product label.
2. Go to [advancedenergy.com](http://advancedenergy.com) and click **MyAE**→ **MyAE Dashboard** located at the top of the screen.
3. Enter the user credentials and click **Log in**.
4. Click **Submit RMA**, **Submit Multiple RMAs**, or **Upload RMAs via CSV**.
5. Follow the instructions to complete the form(s).
6. Click the appropriate button(s) to complete the request.

## Obtaining an RMA Number Using the Online Form

To obtain an RMA number using the online form, proceed as follows:

1. Make a note of the serial number (SN) and part number (PN) listed on the product label.
2. To display the RMA Request Form, go to [advancedenergy.com](http://advancedenergy.com) and click **Services** located at the top of the screen.
3. On the **Services** screen, click **Submit an RMA Form**.
4. Follow the instructions to complete the form, and then click **Submit**. Required fields are marked with asterisks.

A Technical Support representative will respond with an RMA number and shipping instructions.

## Obtaining an RMA Number by Email

To obtain an RMA number by email, proceed as follows:

1. Make a note of the serial number (SN) and part number (PN) listed on the product label.
2. Address an email to [TECHSUPPORT@aei.com](mailto:TECHSUPPORT@aei.com).
3. In the email subject line, include "RMA request", followed by the product serial number (SN) found on the product label. If there is prepopulated information in the subject line, replace it.
4. In the body of the email, include the serial number (SN) and part number (PN) found on the product label and a description of the reason for returning the equipment.

## Obtaining an RMA Number by Telephone

To obtain an RMA by telephone, proceed as follows:

1. Make a note of the serial number (SN) and part number (PN) listed on the product label.

2. Dial +1.866.865.5180 (toll-free in the United States of America).

For returns and repairs, contact Advanced Energy to get the correct shipping address.

# Unit Dimensional Drawings

All dimensions are shown in mm.

## Video Processing Box

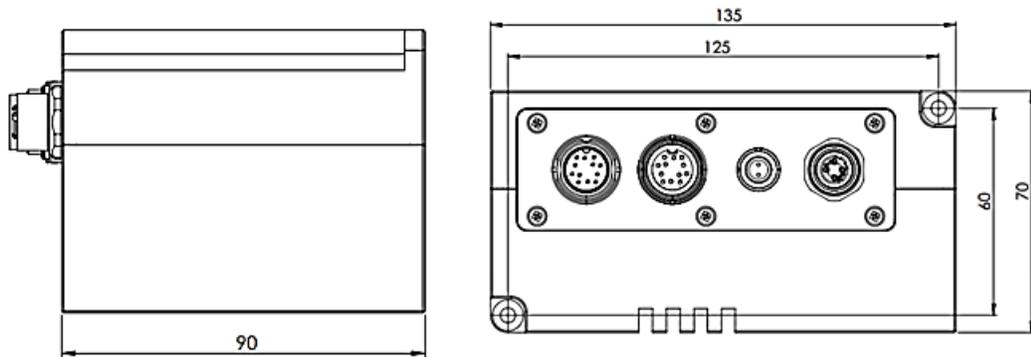


Figure A-1. Overhead and side view of VFB

## Pyrometer Dimensions

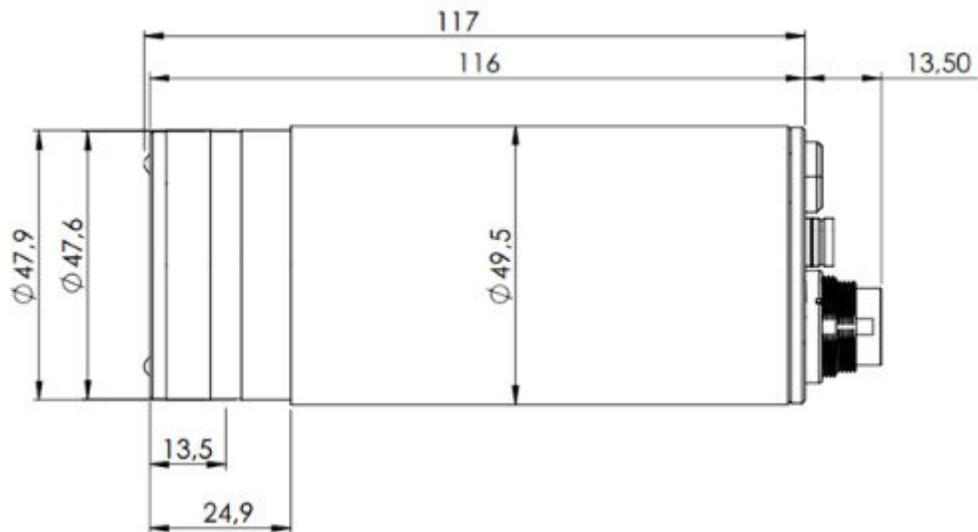


Figure A-2. Series 6-TVD pyrometer

# Technical Data

## TVD Model Pyrometers

The following data supplements the technical data sections found in the full user manuals for the Series 6 pyrometers; the information presented here is specific only to the TVD model pyrometers.

**Table B-1. Video specifications**

Attribute	Details
Video signal	FPD-Link3; The video output is galvanically isolated from the power supply, analog output, and digital interface.
Video output signal of Video Processing Box (VPB)	Digital video stream over Ethernet
Date/time	Real-time clock
VPB signal connection	M12 D-coded to RJ-45 industrial Ethernet cable (CAT6)
Video signal connection	Series 6-TVD video cable. Video signal can be switched off via the InfraWin software.
Operating ambient temperature	Pyrometer = 0° to 60°C (32° to 140°F) on the housing Video Processing Box = 0° to 50°C (32° to 122°F) on the housing
<b>Important</b> During operation, the Series 6-TVD instruments warm up and might reach an intrinsic temperature of up to 58°C (136°F).	

**Table B-2. Optics - TVD pyrometer models only**

Attribute	Details
Superimposed text elements	The text superimposed on the video screen includes a circular target marker, user text, time, date, and measured temperature. Optional additional features: device temperature, distance to target, instrument serial number, and intensity (only for ISR 6-TVD Advanced and IGAR 6-TVD Smart).
Field of view	Approximately 9.4% x 6.7% of adjusting measuring distance
Resolution	1344 x 968 pixel
Brightness control	Brightness is set automatically but it can be controlled manually through the InfraWin software.

# UPP Commands

## Universal Pyrometer Protocol - Data Format

### Important

The UPP commands listed in this section are used in addition to the standard commands shown in the full user manual. This addendum provides only the UPP commands extended for video modules.

Please note the following general details about using UPP commands:

- The data format is: 8 data bits, 1 stop bit, even parity (8, 1, e).
- There are no spaces between the address, command, and parameter.
- The command name must be lowercase.
- All commands must be terminated with a carriage return <CR>.
- The device responds to the entry of a command with output (such as the measuring value) + <CR>, (carriage return or ASCII 13), to pure entry commands with ok + <CR>, or no + <CR>.
- The data exchange for these commands is in ASCII format <AA>vxx<VAL><CR>, where:
  - <AA> is the 2-digit pyrometer address
  - v is the video module identifier
  - xx is the numerical 2-character command identifier
  - <VAL> is a data parameter (entry commands and write commands require a data parameter, the format of which will vary depending on the command)
  - <CR> represents a carriage return, indicating the end of the command sequence
- If you send a read command, the pyrometer will respond with the currently set parameter.
  - An example of a read command: 00v08 + <CR>
  - The response would be a 2-digit hexadecimal reading of that parameter.
- If you send a write command, the currently set parameter will be changed to the value of the supplied parameter; the pyrometer will respond with ok to confirm that a change has been made.
  - An example of a write command: <AA>v08<VAL> + <CR>
  - Where <VAL> indicates the change to be made to v08 parameter.

- If you send a write command and either omit the required data parameter or you replace a required data parameter with <?>, the pyrometers will respond with the limits of the respective settings for the parameter.
  - For example, if you enter <AA>v08? + <CR> the pyrometer could respond with 00FF, indicating no parameter was set.

## UPP Commands and Descriptions

*Table C-1. Display commands*

Parameter	Command	Description
Text display	<AA>v00<VAL>	<p>Sets the text display for overlays 0 to 4.</p> <p>Value (&lt;VAL&gt;) is a 2-digit hexadecimal from 00 to 1F.</p> <p>Example: 01v00&lt;10 = Pyrometer at address 01, time and date fade out from video display.</p> <p>Bit[0] = Overlay_0 = Parameter display            Bit[1] = Overlay_1 = Time/date            Bit[2] = Overlay_2 = User text            Bit[3] = Overlay_3 = Target circle</p> <p>Valid values are 0 and 1.</p> <p>0 = Fade out            1 = Fade in</p> <p>Bit[4] = Firmware - Block Overlay activation            Valid values are 0 and 1.</p> <p>0 = All Overlays off (resolution = 768 x 576)            1 = All Overlays on (resolution = 768 x 520)</p>
Temperature display	<AA>v01	<p>Coordinates are always counted from the corner closest to the temperature display.</p> <p>(Overlay_0)</p> <p>The pyrometer responds with a 6-digit hexadecimal: the first three digits identify the X-coordinate, and the last three digits identify the Y-coordinate (000 = top).</p>
	<AA>v01XXXXYY	<p>Set the coordinates to display the temperature.</p> <p>Value is a 6-digit hexadecimal: the first three digits identify the X-coordinate (XXX = 000 to 300 hex),</p>

**Table C-1. Display commands (Continued)**

Parameter	Command	Description
		and the last three digits are the Y-coordinate (YYY = 000 to 208 hex). The Y-coordinates can only be changed in multiples of 2.
	<AA> <b>v01?</b>	Reports the limits of the temperature display coordinates.  The pyrometer responds with a 12-digit hexadecimal string, the first 6-digits identify the X coordinate range, and the last 6-digits identify the Y coordinate range.  Answer: 000300000208 (PAL)  Format xxxXXXyyyYYY  xxx min X-Value, XXX max X-Value  yyy min Y-Value, YYY max Y-Value
Text display (Time/date)	<AA> <b>v02</b>	Description see <b>v01</b> but refers to the coordinates of time/date (Overlay_1)
Text display (User text)	<AA> <b>v03</b>	Description see <b>v01</b> but refers to the coordinates of time/date (Overlay_2)
Save text display	<AA> <b>v05</b>	Stores <b>v01</b> , <b>v02</b> , <b>v03</b> , and <b>v04</b> in flash memory.

**Table C-2. User text commands**

Parameter	Command	Description
	<AA> <b>v06</b>	Reports the current text displayed. The pyrometer responds with an ASCII string.
User text	<AA> <b>v06nnS</b>	Writes the text user wants to display.  <i>nn</i> = 01 to 32 (number of hexadecimal characters to display)  <i>S</i> = ASCII string ( <i>nn</i> characters to display)
	<AA> <b>v06?</b>	Reads the text limits; the pyrometer responds with an ASCII string, for example, 0132xy.  <i>x</i> = First character is blank (0x20)  <i>y</i> = Last character is 'ÿ' (0xFF)
Save user text	<AA> <b>v07</b>	Stores written text in flash memory.

**Table C-3. Selectable parameter commands**

Parameter	Command	Description
Selectable parameter	<AA>v08	Reports current selectable parameter, the response is a 2-digit hexadecimal.
	<AA>v08XX	Writes selectable parameter, XX valid values include: 00 = Case temperature 02 = Measuring distance 03 = Serial number 80 = Intensity (ISR 6 Advanced and IGAR 6 Smart pyrometers only) FF = No parameter
	<AA>v08?	Reads limits of selectable parameter, pyrometer response could be 00FF.
Store selected parameter	<AA>v09	Stores selected parameter in flash memory.

**Table C-4. Brightness control commands**

Parameter	Command	Description
Brightness control	<AA>v18	Reports brightness control settings, response is 1-digit hexadecimal.
	<AA>v18X	Writes brightness control; valid values are 0 or 1. 0 = Manual brightness control 1 = Automatic brightness control
	<AA>v18?	Reads brightness control limits; response is 01.

**Table C-5. Brightness commands**

Parameter	Command	Description
Brightness	<AA>v19	Reports brightness setting; response is a 3-digit hexadecimal.
	<AA>v19xxx	Writes brightness setting; valid values for xxx = 000 to 1A5.
	<AA>v19?	Reads brightness limits; response is 0001A5.
Save brightness	<AA>v20	Stores brightness setting in flash memory.

**Table C-6. AVG-Rectangle commands**

Parameter	Command	Description
AVG-Rectangle	<AA>v21	Reports AVG-Rectangle properties, response is a 12-digit hexadecimal (AAABBBCCCDDD).
	<AA>v21AAABBBCCCDDD	Writes AVG-Rectangle properties. Valid values are:  AAA = Width (004 to 300 hexadecimal)  BBB = Height (008 to 208 hexadecimal and only change in multiples of 2)  CCC = X-Coordinate (000 to 2FC hexadecimal)  DDD = Y-Coordinate (000 to 200 hexadecimal and only change in multiples of 2)  Coordinates of the top left corner of the display.  If AAA+CCC > 768, response no.  If BBB+DDD > 520, response no.
	<AA>v21?	Reads AVG-Rectangle limits and responds with a 12-digit hexadecimal in the format AAABBBCCCDDD.  Example: 0040082FC200
AVG-Rectangle position and size	<AA>v22	AVG-Rectangle, set position and size of target circle marker.
Save AVG-Rectangle	<AA>v23	Stores AVG-Rectangle setting in flash memory.

**Table C-7. Control limit commands**

Parameter	Command	Description
Control limits	<AA>v24	Reports control limit for automatic brightness, response is 4-digit hexadecimal, XYYY.
	<AA>v24XYYY	Writes control limit for automatic brightness.  XX = Bottom control limit (00 to FF hexadecimal)

**Table C-7. Control limit commands (Continued)**

Parameter	Command	Description
		<p><i>YY</i> = Top control limit (00 to FF hexadecimal)</p> <p>The video module adjusts the image brightness to the average value; all pixels within the defined AVG- rectangle are within these control limits.</p>
	<AA>v24?	Reads the control limits, response is 00FF00FF.
Save control limits	<AA>v25	Stores control limit selection in flash memory.

**Table C-8. Time and date commands**

Parameter	Command	Description
Time	<AA>v26	Reports the time; responds with a 6-digit decimal ( <i>hhmmss</i> ).
	<AA>v26 <i>hhmmss</i>	Writes the time, valid values are as follows: <i>hh</i> = Hour (00 to 23) <i>mm</i> = Minute (00 to 59) <i>ss</i> = Second (00 to 59)
	<AA>v26?	Reads time limit, response would be 002300590059.
Date	<AA>v27	Reads the date; responds with a 6-digit decimal ( <i>DDMMYY</i> ).
	<AA>v27 <i>DDMMYY</i>	Writes the date; valid values are as follows: <i>DD</i> = Day (01 to 31) <i>MM</i> = Month (01 to 12) <i>YY</i> = Year (00 to 99)
	<AA>v27?	Reads date limits, response is 013101120099.

**Table C-9. Video-out commands**

Parameter	Command	Description
Video-out	<AA>v31	Reports video-out tristate, response is a 1-digit hexadecimal.
	<AA>v31 <i>x</i>	Writes video-out tristate; valid value are either 0 or 1.

*Table C-9. Video-out commands (Continued)*

Parameter	Command	Description
		0 = Disable 1 = Enable
	<AA> <b>v31?</b>	Reads the limits of video-out tristate; response is 01.
Save video-out	<AA> <b>v32</b>	Stores selection of video-out tristate in flash memory.

*Table C-10. Network settings*

Parameter	Command	Description
IP address	<AA> <b>ip</b>	Reports current IP address setting, response is an 8-digit hexadecimal.
	<AA> <b>ipxxxxxxxx</b>	Write IP address; 8-digit hexadecimal, xxxxxxxx = 00000000 to FFFFFFFF, hexadecimal.
	<AA> <b>ip?</b>	Read IP address limits; response is 00000000FFFFFFF, hexadecimal.
Network mask	<AA> <b>nm</b>	Reports current network mask, response is an 8-digit hexadecimal.
	<AA> <b>nmxxxxxxxx</b>	Write network mask; valid values; xxxxxxxx = 00000000 to FFFFFFFF, hexadecimal.
	<AA> <b>nm?</b>	Read network mask limits; response is 00000000FFFFFFF, hexadecimal.
Gateway	<AA> <b>gw</b>	Reports current gateway value, response is an 8-digit hexadecimal.
	<AA> <b>gwxxxxxxxx</b>	Write current gateway value; valid values; xxxxxxxx = 00000000 to FFFFFFFF, hexadecimal.
	<AA> <b>gw?</b>	Read current gateway limits; response is 00000000FFFFFFF, hexadecimal.
DHCP	<AA> <b>dhcp</b>	Reports current DHCP value, response is 1-digit hexadecimal.
	<AA> <b>dhcpx</b>	Write DHCP value. Valid values are 0 or 1.  0 = Deactivate (the last static IP address set by the user is activated. If not: 0.0.0.0. alternatively, send comments nm, IP, and gw in series)  1 = Activate (premise: existing DHCP server in network. Linux sends request to DHCP server to receive a valid IP address. This can take up to 90 seconds. As long as Linux is waiting for an

*Table C-10. Network settings (Continued)*

Parameter	Command	Description
		answer, the reply to the IP/NM/GW commands will be 00000000 respectively 0.0.0.0.
	<AA> <b>dhcp?</b>	Read DHCP limits, response is 0 or 1

*Table C-11. UDP video signal settings*

Parameter	Command	Description
UDP	<AA> <b>gp</b>	Reports current UDP port value (4-digit decimal)
	<AA> <b>gp</b> xxxx	Write UDP port value; valid values; xxxx = 0000 to 9999, decimal.
	<AA> <b>gp?</b>	Reads UDP port limits, response is a decimal from 0000 to 9999.

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