![Wahl Instruments, Inc. logo]

a50 and z50

Thermal Image Camera

User Manual

! Warnings, Cautions and Notes

<u>**Definitions**</u>

! **WARNING** Could cause bodily injury or death.

! **CAUTION** Could cause damage to equipment or permanent loss of data.

! **NOTE** provides useful information to the operator.

<u>**Important Information**</u> **– Read before using the Instrument**

! **WARNING** – Laser Radiation is emitted from this device. **Do Not** stare into Laser Beam. **Class 2 Laser, 635 nm, 0.9mW**

! **CAUTION** - Never point the lens directly toward a strong radiation source (ie. Sun, direct or reflected laser beam, etc), with power on or power off, as damage may result to the thermal detector used inside. **Permanent damage may result!**

! **CAUTION -** The original shipping carton should be kept for use for future transportation. Do not drop, shake or impact the thermal imager excessively, in use or during transportation.

! **CAUTION -** Store the unit in its original case in a cool, dry, well-ventilated area away from strong electromagnetic fields.

! **CAUTION -** Protect the surface of the lens from being stained or damaged by foreign objects such as sludge or chemicals. Please replace the lens cap after use.

! **CAUTION -** Please remember to backup image data regularly to avoid losing important data.

! **NOTE** - For maximum measurement accuracy, allow 3 to 5 minutes for camera to stabilize after initial power up.

! **NOTE** - Each camera is factory calibrated. It is recommended that calibration be performed every 12 months.

! **CAUTION -** Do not open case. Unit does not contain any user serviceable parts. Repair should be performed by factory authorized technicians only.

WARRANTY & CALIBRATION REGISTRATION at www.palmerwahl.com/register

Registration is fast and easy. In about a minute you can have your product automatically registered for Warranty Protection and our Calibration Reminder service. Let Palmer Wahl help you protect your investment, and maintain product accuracy and compliance with ISO and other quality standards.
Questions? Call Customer Service
at 1-800-421-2853 or 828-658-3131
Or email: register@palmerwahl.com

Contents

Upgrade Installation Guide

1 Introduction

Thank you for choosing the Wahl Instruments "a50" or "z50" hand-held infrared thermal imager.

Model Identification

"a" prefix imagers operate with a 9 Hz sample rate

"z" prefix imagers operate at a 30 Hz sample rate.

"30" Series (Detectors) are entry level reduced feature imaging cameras.

"50" Series (Inspectors) are full-featured imaging cameras

Features

30 Series Detectors include the following features:

User selectable Auto or manual level and span control

°C, °F or K measurement scale

4 user selectable color palettes

11 user selectable languages

Hot temperature spot measurement

Cold temperature spot measurement

2 User selectable spot measurements

High temperature Alarm setting

T Reflect - Reflected temperature compensation

2X digital zoom

Freeze screen for viewing current image

Video Output – NTSC or PAL

50 Series Inspectors include all the above 30 Series features plus:

7 additional color palettes for a total of 11

3 Area measurements

2 line measurements

Image storage via SD card

CMOS visible image and storage

Audio recording

Isotherm Alarm

T Correct – Measurement Offset correction

Built in Emissivity Table list of common materials

Upgrades and Options

30 Series Detectors are field upgradeable to 50 Series Inspectors.

30 and 50 Series models are field upgradeable for High temperature measurements.

30 and 50 Series models are factory upgradeable for Wide Angle or Telephoto Lenses.

All imagers use an uncooled focal plane infrared detector, and display the thermal image as a multi-color image with user selectable color palette, sensitivity and span. On Inspectors the image may be stored in the SD card and subsequently transferred to a PC for analysis and report generation as desired.

Applications:

Preventive maintenance

- Power industry: Power line and power facility thermal state checking; problem and defect diagnosis.

- Electrical system: Identify potential circuit overloads.

- Mechanical system: Reduce downtime and avoid catastrophic failure.

Construction science

- Roof: Quick identification of water penetration problems.

- Structure: Commercial and residential energy audits.

- Moisture detection: Determine root cause of moisture and mildew.

- Verification: Verify corrective actions are sufficient.

Others:

- Iron and steel industry: Inspect steel refining and rolling processes; diagnose hot-blast stove defects; detect the embryo temperature of armor plate, etc.

- Firefighting: Forest fire prevention and detection of latent ignition

source. Preventive detection on specific materials of auto-ignition. Detection of potential spark ignition sources.

- Medical: Human body surface temperature detection and screening.

- Petro/chemical: Oil pipeline status inspection; material surface temperature detection; insulation inspection; power equipment status, etc.

1.1 Standard accessories

- INSPECTOR infrared thermal image camera w/wrist strap
- Carrying case
- **#12449-15** Video output cable
- **#12449-07** Lithium ion batteries (2)
- **#12449-03** Lithium battery charger
- **#12449-16** Lens cap
- User manual
- Infrared report and analysis software system CD
- **#12449-13** SD card
- **#12449-14** SD card reader

1.2 Optional accessories

- **#12449-10** External 0.5x wide-angle lens
- **#12449-11** External 2x telescopic lens

2 Camera overview

2.1 Function keys

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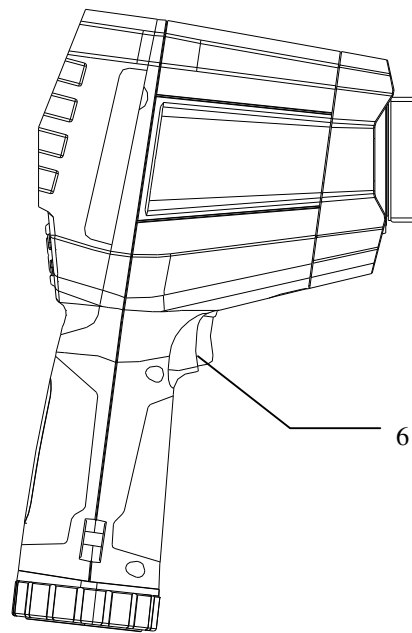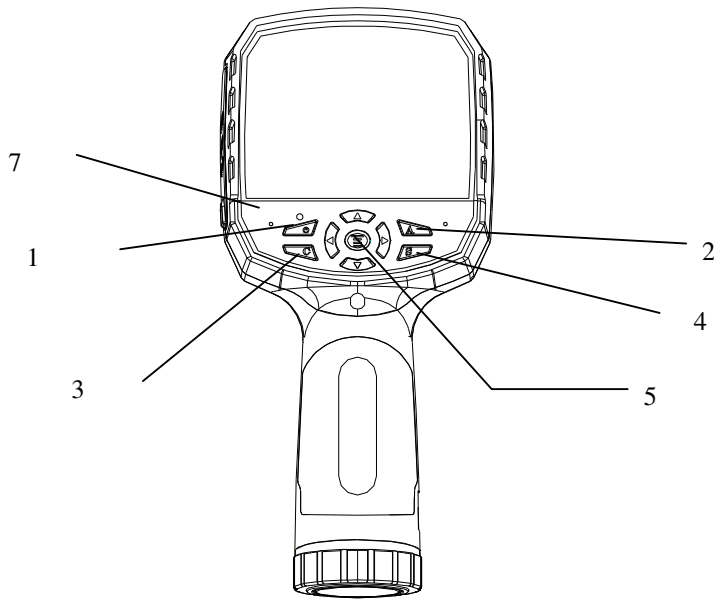
[1] Power key

Press and hold the Power Key for > 3 seconds to power on/off the camera.

! Note: After powering off, please wait ten seconds before powering the camera on again.

[2] Select/Auto key (Marked "A")

The "A" or attribute button performs 2 functions.

a) The first function is modification of selected functions. It is obtained by a quick press and release (less than 2 seconds), that will select enabled functions to modify their parameters. Subsequent presses will "scroll" through the available functions. The selected function will be highlighted in yellow. The functions include:

- **Measurement cursors, areas, and lines**

  Cursors and lines - pressing the arrow keys will move their position. Pressing the Menu key will display the attribute box. Pressing the **C** key will delete the selected parameter.

  Areas – Arrow keys adjust the attribute specified in the display attribute box. Pressing the Menu key will display the attribute box. In this box, the user can select to adjust either position or size of the area. After selection, the arrows will then adjust the attribute.

- **Color Palette**

  Pressing the left or right arrows will scroll through the available color palettes, displaying their name above the palette. The selected palette will become active after about 3 seconds of selecting it and will be set as the default power on palette.

- **Level/Span values**

  Pressing the left or right arrow will reduce or increase the Span and pressing the up or down arrow will increase or reduce the Level. If the

unit is in Automatic mode, modifying any of these parameters will select Manual mode.

b) The second function performed is to force an internal calibration cycle. This is performed by pressing and holding the **A** key for 5 seconds or more. The camera will perform an auto calibration cycle, indicating "calibrating", ensuring the most accurate thermal measurement.

[3] Cancel/Camera key (Marked "C")

- Pressing and releasing the **C** key cancels the present operation when in M**enu** mode.

- Pressing and releasing the **C** key when an image is frozen or being viewed from memory, will return to real-time measurement status.

- When not in menu mode or parameter editing, pressing and releasing the **C** key will toggle between the thermal image and the visible CCD camera image.

- When a parameter is selected, such as a measurement cursor, pressing the **C** key will delete the highlighted measurement.

[4] Freeze/Save key (Marked "S")

Used for freezing or saving thermal image. Press the key once to freeze the image. Press Confirm to save the image or Press C to return to real-time measurement. If Voice recording is enabled, Voice comment dialog box will display.

[5] Menu/Confirm key (bar)

Includes **Up**, **Down**, **Left**, **Right** and **Menu/Confirm** (center) keys. Function varies with operation mode.

In **Menu mode**, it is used for menu selection. **Up** and **Down** keys are for same level of menu operation. **Left** and **Right** keys are for additional

levels of menu operation. **Confirm** key (center) is to activate the menu and confirm the choice.

In **Image mode**, press **Up** or **Down** key to activate X2 digital zoom. The screen will display "X2" in the upper left corner. Press **Up** or **Down** key to return to the original image.

In **Spot Measurement** editing mode (activated immediately after adding a spot or by selecting via the **A** key), press the **Menu** key to display the attribute box. Press four navigation keys to move the spot location.

In line temperature measurement editing mode (activated immediately after adding a line or by selecting via the **A** key), press the **Menu** key to display the attribute box. If measurement line is horizontal, press **Up** and **Down** keys to move the line location; press **Left** and **Right** keys to move the reference line. If measurement line is vertical, press **Left** and **Right** keys to move the line; press **Up** and **Down** keys to move the reference line.

In area measurement editing mode (activated immediately after adding an area or by selecting via the **A** key), press the **Confirm** key to display the attribute box. Select either size or position in the attribute box. Press the four navigation keys to change the area size or position.

[6] Trigger/Shortcut key

The trigger key serves as a shortcut to access the following functions:
Laser – Pulling trigger activates laser sight and releasing deactivates it.
Spot or Area – Pulling and releasing trigger adds a spot or area. Pulling and releasing trigger again removes the spot or area.
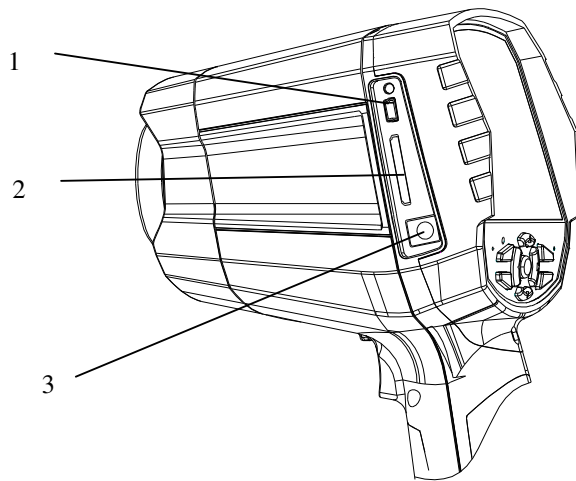Save – Pulling trigger initiates a Save cycle.
IR/CCD - Pulling and releasing trigger toggles between the IR image and the CCD image.

[7] Microphone

Used for recording a voice message with the Saved image. See Section 4.5.3 for details.

2.2 Interface

[1] Video port

Video interface is via the mini-USB plug and supplied video cable

[2] SD Card interface

Accepts standard size SD cards such as supplied 2GB capacity card.
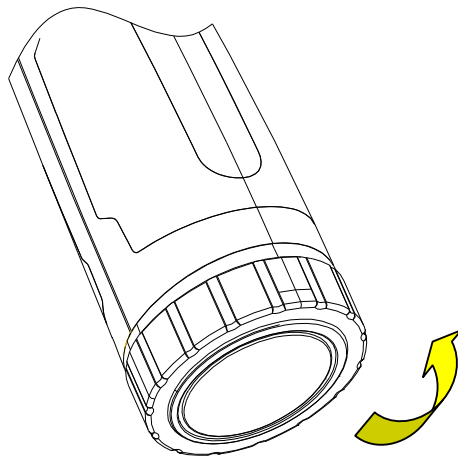
[3] Power interface

External power input interface. Power source should be + 12VDC. Center pin is positive terminal.
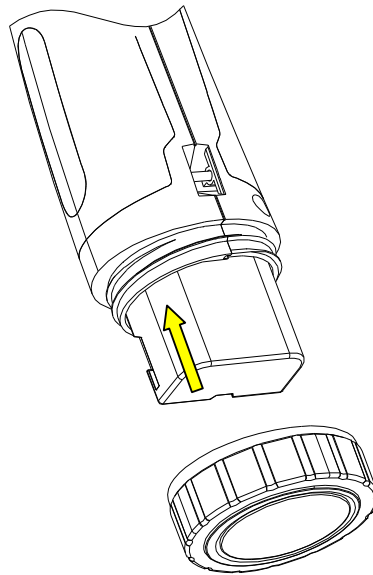
3 Getting started

3.1 Battery Installation and Replacement

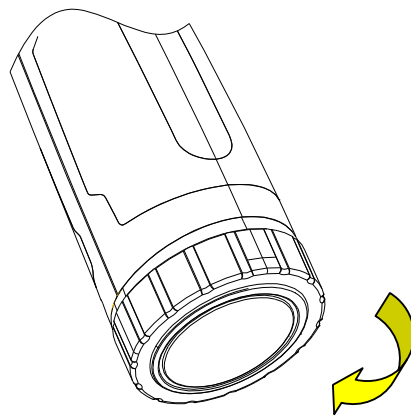### 3.1.1 Inserting or removing battery

Battery compartment is located inside the handle. Turn the cover counter-clockwise to remove. Remove battery for replacement.

Insert the battery (the battery contacts must face into the battery compartment).
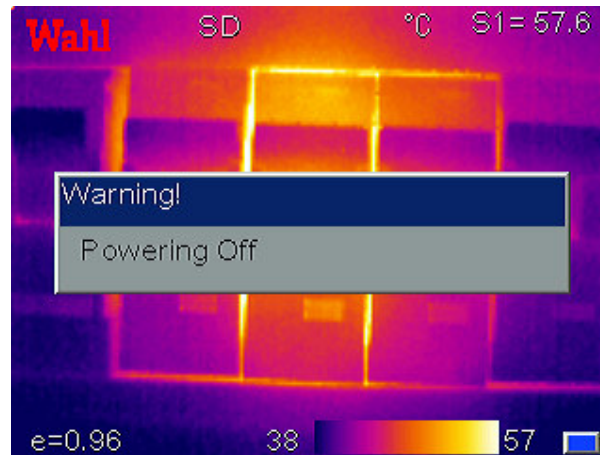
Replace cover and screw down in a clockwise direction.

! CAUTION: Use only original manufacturer replacement battery. Use of incorrect battery may result in physical or electrical damage to the instrument due to incorrect voltage or physical size difference.

3.1.2 Replacing battery

When battery has approximately 5% charge remaining, the warning will be displayed and the instrument will turn off in approximately 3 seconds.
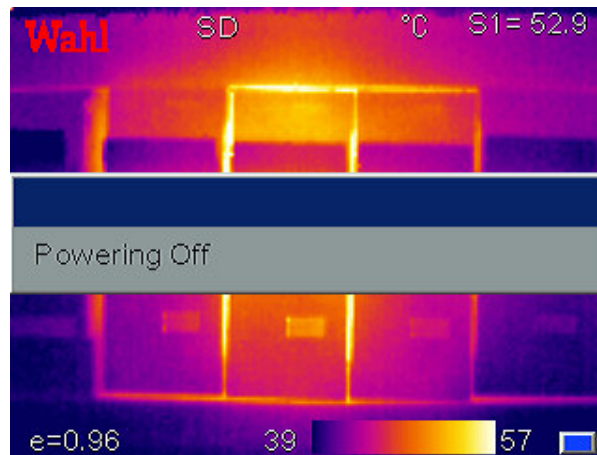
Powering off display

3.2 Battery safety and usage

Batteries should be stored in an ambient temperature of -4°F (−20°C) to 67.9°F (+20°C). Lithium batteries will self-discharge during storage, so they should be fully charged before storage. Self-discharge may affect long term battery performance. Furthermore, it is recommended that the battery should be charged in a set time, as below;

Ambient temperature of:

- -4°F (−20°C) to 67.9°F (+20°C), once every 6 months

- 67.9°F (+20°C) to 113°F (+45°C), once every 3 months

- 113°F (+45°C) to 149°F (+60°C), once every month

For optimal Battery Life, the battery should be recharged when it has greater than 50% charge remaining.

The ambient temperature for charging should be 32°F (0°C) to 104°F (+40°C). If under 32°F (0°C), the battery capacity will be diminished; if over 104°F (+40°C), the battery may overheat, resulting in permanent damage.

! **WARNING:**

! Never disassemble, incinerate or puncture battery

! Never short circuit the battery

! Keep battery dry

! Keep out of reach of children

! Always dispose of battery in accordance with local, state and federal regulations

3.3 Quick access

3.3.1 Capture an image

- After installing the battery, press and hold the power key (≥3 seconds) until the display comes on. After approximately 50 seconds, the power on routine will finish and the camera will start its measurements.
- Remove the lens cap and aim at the target. Adjust the focus for the clearest target thermal image. **! NOTE**: Failure to properly focus the camera will result in increased measurement error.

3.3.2 Temperature measurement

- If no measurement cursors are on screen, add a measurement spot, area or line by pressing **MENU** and selecting Measurement. Press **CONFIRM** and scroll left or right to select the proper measurement parameter. Aim the cursor indicator onto the target object on the screen. The temperature will be displayed in the upper right corner of the screen. For highest accuracy measurements, force a calibration cycle by pressing the **A** key for 5 seconds until "**Calibrating**" appears in upper left portion of display.

- If you want to measure the current thermal image in detail, press **S** key to freeze the image for on-screen analysis. Save the image if future analysis is desired. For details, see Section 4.

- If the target object's temperature is lower or higher than the limits of the camera, it will display <XXX° or >XXX° with XXX being the min or max temperature of the selected range.

- To modify the measurements attributes, select the measurement parameter, and then press the **Confirm** key. The screen will display the settings dialog box. The below figures are spot, line and area measurement respectively.
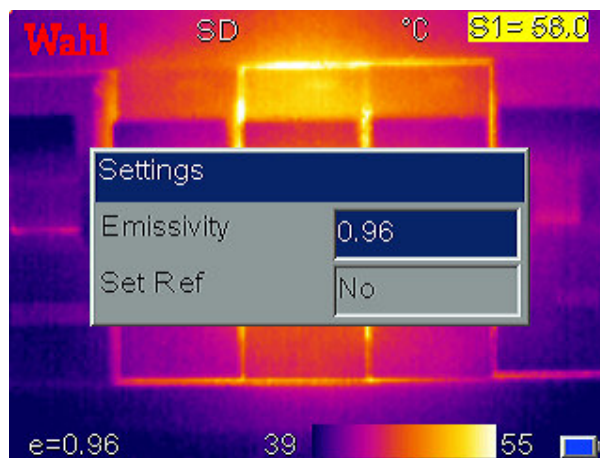
Spot settings include emissivity and reference temperature. When **Set Ref** is set as **Yes**, the displayed values of other measurements will be their delta from this measurement. Setting a specific measurement cursor as a reference will change the reference for all measurements.
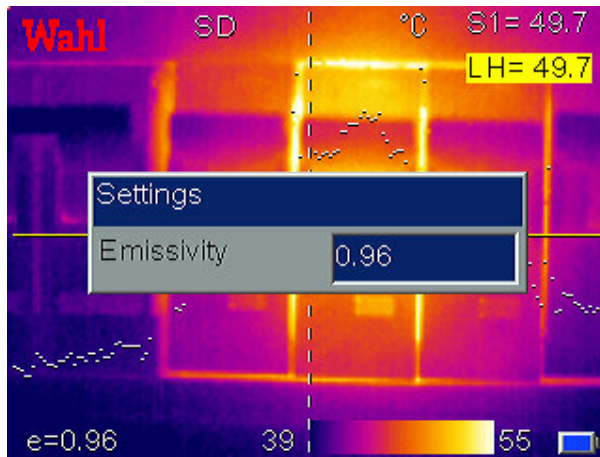
Line settings only include the emissivity.
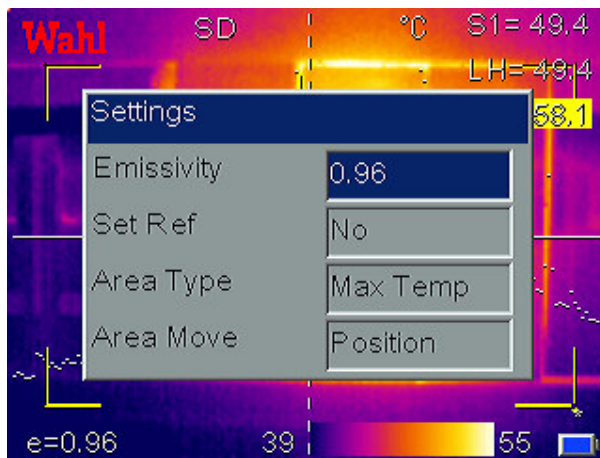
Area settings can modify the emissivity, area measurement type and area move parameter. Measurement types are Min Temp, Max Temp or Average Temp. Area Move parameter choices are Position or Size. The selected parameter will be adjusted by the directional arrow keys. When "Set Ref" is set as **Yes**, the displayed values of other measurements will be their delta from this measurement. Setting a specific measurement cursor as a reference will change the reference for all measurements.

3.3.3 Save image

There are three ways to save the image:
- Press **S** key to freeze the image and then select "**Save**" to save the image, or select "**Cancel**" to exit the operation.
- Press **Menu** key to activate the main menu. Choose **File->Save** and the system will initiate the save cycle.
- With the "**Trigger**" parameter, located in **Setup**->**Sys. Setup**-

>**Trigger,** set to "**Save Key**", pulling and releasing the trigger key will initiate the save cycle.

3.3.4 Viewing stored Images

- Press **Menu** key to activate the main menu. Choose **File->Open** to open the image.
- When image is opened, choose **Left** or **Right** keys to select the previous or next images respectively.
- If the instrument is in IR mode, it will display all IR images of each saved image, it will display "**No Image**" if there is no IR image for that saved image.
- If the instrument is in CCD mode, it will display all CCD images of each saved image, it will display "**No Image**" if there is no CCD image for that saved image.
- If the trigger is configured to IR/CCD mode by **Setup**->**Sys. Setup**->**Trigger**, when in image view, the trigger can switch between IR and CCD images for each saved image. it will display "No Image" if there is no IR or CCD image for that saved image.
- Press **C** key to exit the Image view mode and return to the real-time measurement mode.
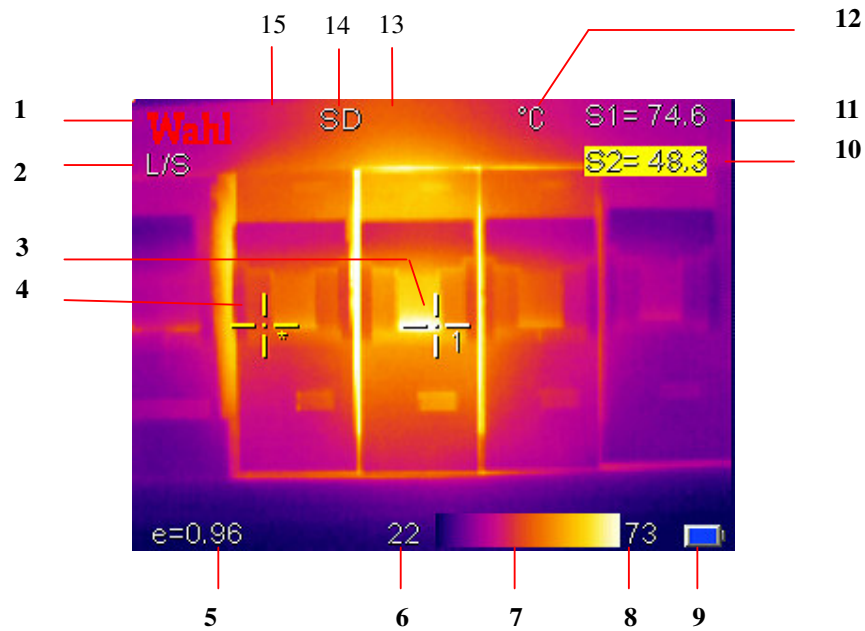
3.3.5 Export saved images

Images cannot be downloaded via the USB port. To export saved images, remove the SD card and insert into SD card reader, connect to USB port on PC and export saved images.

4 Operation guide

4.1 Graphic interface description

4.1.1 Screen graphic interface

[1] Company logo: WAHL

[2] Operating status: displays the current operational status

[3] Spot temperature measurement: White crosshair

[4] Selected spot temperature: Yellow crosshair

[5] Emissivity: Indicates Imagers emissivity setting.

[6] Minimum temperature: Indicates minimum value of the palette.

[7] Palette: Palette bar. User can choose from 11 palettes.

[8] Maximum temperature: Indicates maximum value of the palette.

[9] Battery status: Indicates the current battery status.

[10] [11] Result: Indicates the value of the temperature of the target object. Yellow denotes the value of the temperature of the selected object for editing.
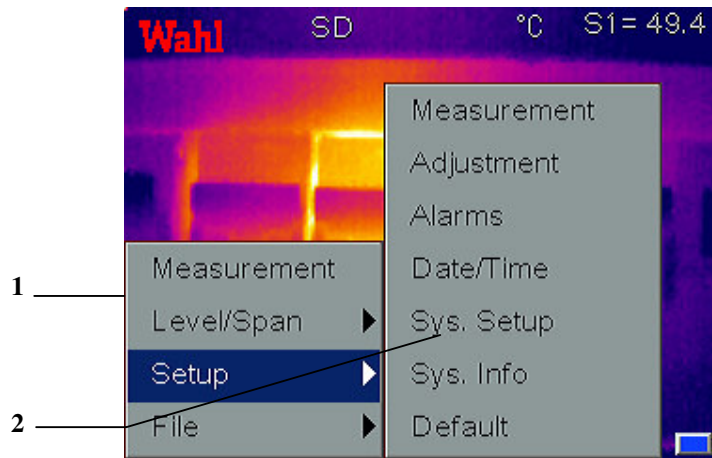
[12] Temperature unit: Three options: °C, °F or K.

[13] External lens symbol: Displays "0.5x" for wide-angle or "2x" for telephoto lens.

[14] SD card symbol: Displays "SD" when SD card is installed.

[15] Digital zoom symbol: Displays "X2" when digital zoom is activated.

❗ **NOTE: Not all models have all functions, so the working status screen may not show all features.**

4.1.2 Main menu

[1] Main menu: Displays four options: Measurement, Level/Span, Setup,

and File.

[2] Low-level menu: The **>** indicates a low-level menu is available,

accessed by the right arrow key **>** (See Figure.4.1.2.1).

4.1.3 Dialog box
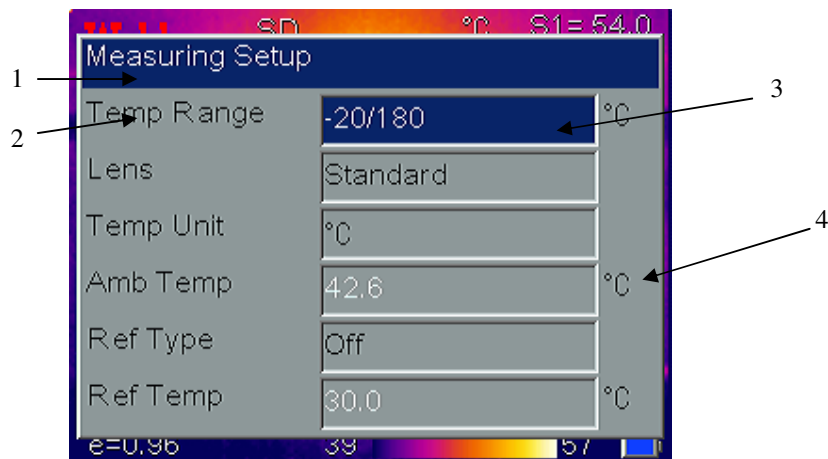
[1] Dialog box name: Displays the dialog box name, e.g. Measuring Setup.

[2] Item title: A dialog box may contain several items, such as Temp

Range.

[3] Item content: Items show specified content. Black text denotes valid

or changeable, and white denotes invalid for this selection.

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[4] Unit: Indicates the current selected temperature unit.

4.1.4 Prompt box interface

[1] Prompt box name: Display the prompt box name.
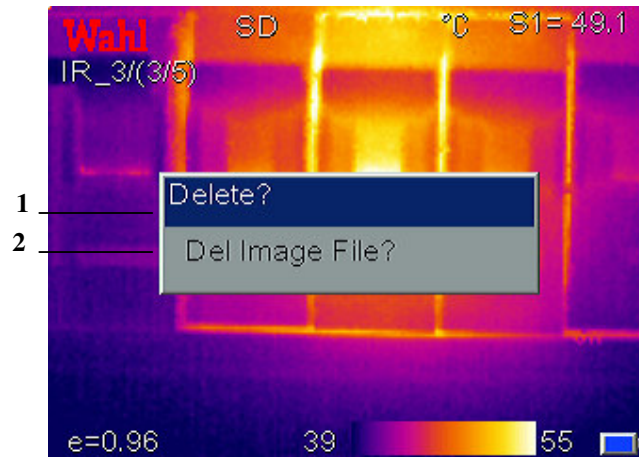
[2] Content: Display the content in the prompt box, e.g. Del Image File?

4.2 Measurement

Used for adding or deleting a measurement. Press **Confirm** key to activate the main menu. Select **Measurement** and press **Confirm** key. It will display the Measurement dialog box. Use the **Left** and **Right** arrows to scroll through the available measurement options. Highlight the option you wish to use and press **Confirm** key. Options are:

- None – Deletes all measurements from the screen.

- Add Hot Spot – adds a moving cursor that automatically displays the hottest spot in the image. Designated by SH for result, and ✛H for measurement curser.

- Add Cold Spot – adds a moving cursor that automatically displays the coldest spot in the image. Designated by SC and ✛C.

- Add Spot – adds up to 2 fixed cursors, user adjustable by the cursor

editing mode. Designated by S1, $+$1 and S2, $+$2.

- Horizontal – Adds horizontal line measurement to display profile of temperatures along the line. Designated by LH. Either Horizontal or Vertical can be enabled at one time, but not both.

- Vertical – Adds vertical line measurement to display profile of temperature along the vertical line. Designated by LV. Either Horizontal or Vertical can be enabled at one time, but not both.

- Area – adds up to 3 area boxes, with min, max or average detection within each box. Areas can be sized and moved by the user. Designated by []1, []2 and []3.

- **NOTE: When min, max or average is set in one area the same function is set for all other areas.**

! **NOTE: To delete a single object, press A key to select the object and then press C key to delete.**
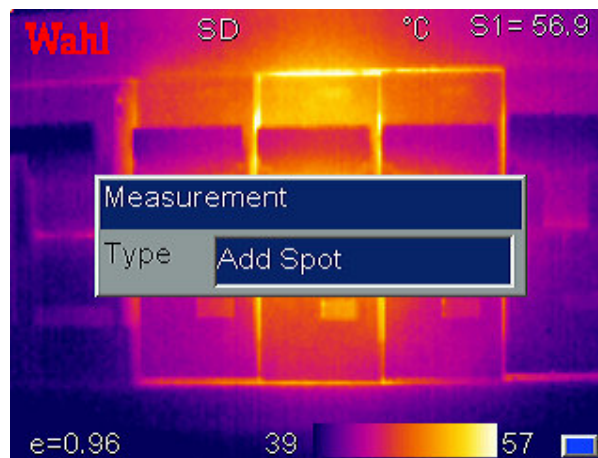

4.3 Level/Span

There are two operational modes for assigning the color palette to the thermal image. In **Auto** mode, the camera automatically determines the low and high temperature levels to assign to the lower and upper ends of the

palette. These are determined based on the min and max temperatures being measured by the camera. In **Level/Span** mode, the Operator may assign the lower and upper end values to enhance the image quality by adjusting the temperature to color relationship.

   Press **Confirm** key to activate the main menu and select **Level/Span**. The low-level menu will display the inactive mode followed by a "?". Pressing the **>** key followed by the **Confirm** key or pressing the **Confirm** key twice, will switch to the displayed mode. Press **A** key to select palette and adjust the image manually.

   In **Level/Span** mode pressing the **left** or **right** arrow will reduce or increase the Span and pressing the **up** or **down** arrow will increase or reduce the Level. If the unit is in **Auto** mode, modifying any of these parameters will select **Level/Span** mode.

4.4 Setup menu
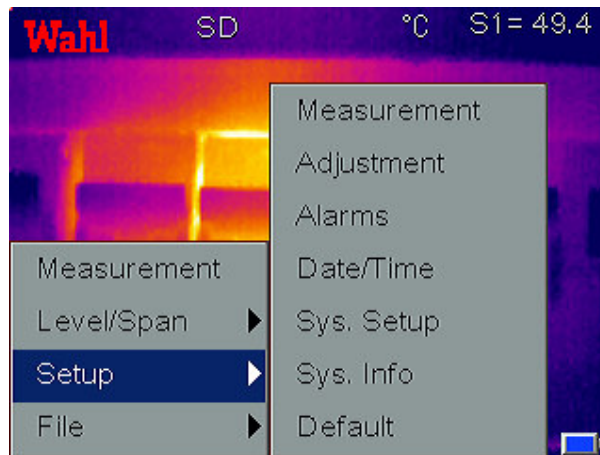
4.4.1 Measuring Setup
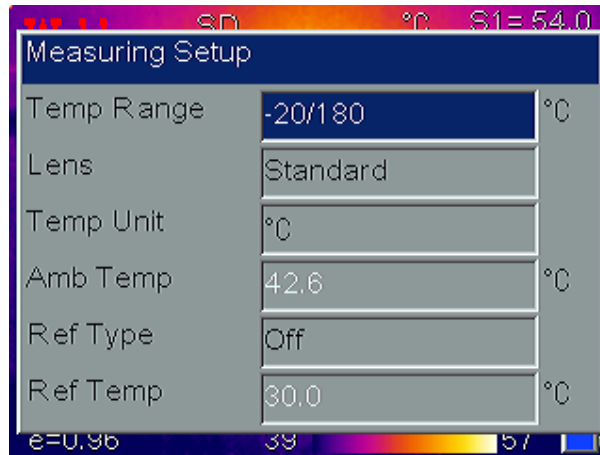
Press **Confirm** key to activate the main menu. Select Setup->MeasureSet and press **Confirm** key to display the Measuring Setup dialog box. User can view or set temperature range, lens type, temperature unit, ambi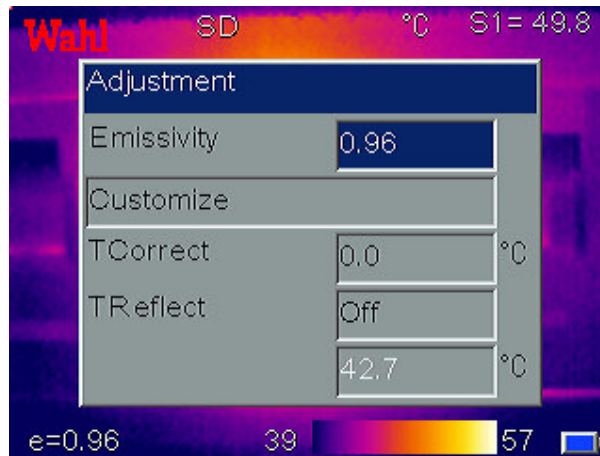ent temperature, reference type and reference temperature. Press **Up** and **Down** keys to choose different items, **Left** and **Right** keys to modify the item contents.

- **Temp Range:** Select Standard -4°/356°F (-20°/180°C) or High 212°/1112°F (100°/600°C) temperature range. Requires **High Temperature** option for High Temperature selection to appear.

- **Lens:** Select **Standard**, **Telephoto** or **Wide Angle**. Requires **Telephoto** and/or **Wide Angle** option for these options to appear.

- **Temperature unit:** Select between °C, °F and K scales.

- **Ambient temperature:** Camera will display internal ambient temperature automatically. Used for automatic calibration and is not user editable.

- **Reference type:** When Ref Type is "On", the temperature of the measured object displayed by the cursor on the screen is the difference from the selected reference or the reference temperature set below.

- **Reference temperature:** When **Ref Type Ref Temp** is enabled, this item is editable. A fixed temperature may be entered as the reference temperature.

4.4.2 Adjustment

Press **Confirm** key to activate the main menu. Select **Setup->Adjustment** and press **Confirm** key to display the Adjustment dialog box. User may set emissivity, temperature correct and temperature reflect. Press **Up** and **Down** keys to choose different items, **Left** and **Right** keys to modify the item contents.

- **Emissivity** The emissivity of a given material will vary with temperature and surface finish. If not set manually, system will use the default value. Appendix A provides emissivities of common materials.
- **Customize:** Select material from pre-defined list via left and right keys.
- **TCorrect:** Sets offset correction temperature used for cursor measurements but does not affect Image color palette temperatures. Usable range is ± 9.9°C.
- **TReflect:** When Set to **On**, allows user to enter value of reflected temperatures that may be in viewed image.

4.4.3 Alarms

Press **Confirm** key to activate the main menu. Select Setup->Alarms and press **Confirm** key to display the Analysis dialog box. User can set temperature alarm, alarm temperature, alarm color, isotherm color, isotherm temperature and isotherm width. Press **Up** and **Down** keys to choose menu items, **Left** and **Right** keys to modify the item contents.

An alarm is triggered when a measurement cursor's measurement meets or exceeds the **Set Alarm Temp** setting. All pixels above this temperature will change to the color as set in **Alarm Color**. When the **Alarm Color** is set to **None**, only the audible alarm will sound. When using alarms with **Area** measurements, the selected measurement mode, **Min**, **Max** or **Average** will have to meet or exceed the set temperature in order to trigger the alarm.

- **Temp Alarm: Off** disables alarm function, **On** enables alarm function and allows setting of **Set Alarm Temp** and **Alarm Color**.
- **Alarming Temp:** Sets the alarm detection temperature. Only enabled when Temp Alarm is set to **On**.
- **Alarming Color:** Selects the color in which the alarming pixels are displayed. If set to None, no changes are made to the screen's color. Only enabled when **Temp Alarm** is set to **On**.

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- **Isotherm Color:** Activates the Isotherm display by displaying the image in the set temperature range by the specified color. There are 11 colors to choose from. Setting to **Off**, disables the feature.

- **Isotherm Temp:** Sets the center temperature of the isotherm.

- **Isotherm Width:** Sets the width of the displayed Isotherm band. For example, if **Isotherm Temp** is set to 122°F (50°C) and **Isotherm Width** is set to 1°F or °C, the isotherm band will be from 121.5F (49.5°C) to 122.5°F (50.5°C).

4.4.4 Date/Time
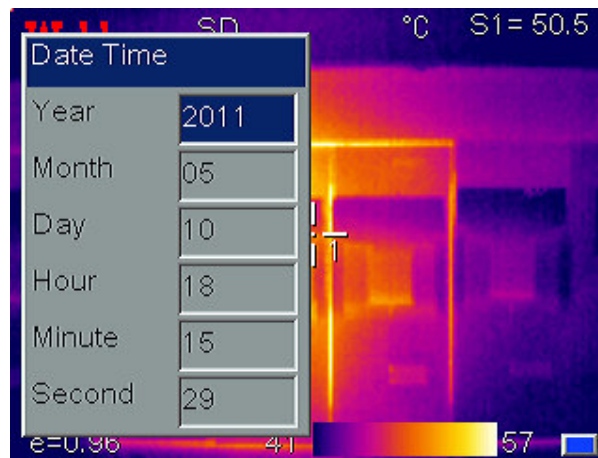
Allows the user to set the system date and time. After setting, the camera will save the current setting.

Press **Confirm** key to activate the main menu. Select **Setup->Date/Time** and press **Confirm** key to open the **Date/Time** dialog box. User can set Year, Month, Day, Hour, Minute and Second. Press **Up** and **Down** keys to choose menu items, **Left** and **Right** keys to modify the item contents.

! **NOTE: If the imager is not used for a long period, the system clock may need to be reset due to the internal battery being depleted.**

4.4.5 System Setup
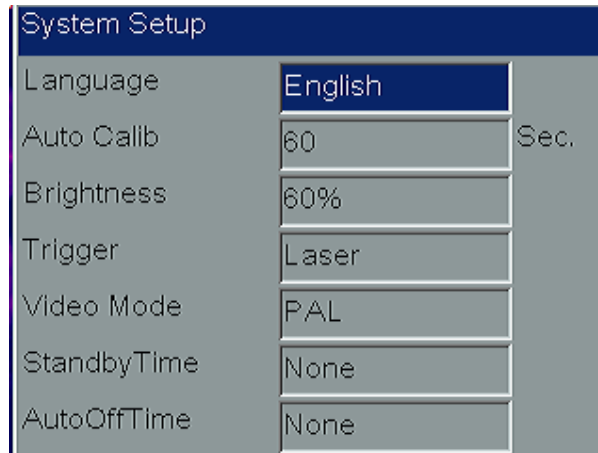
Press **Confirm** key to activate the main menu. Select **Setup->Sys. Setup** and press **Confirm** key to open the **System Setup** dialog box. User can set Language, Auto calibration interval, Brightness, Trigger assignment, Video mode, Standby time and Auto off time. Press **Up** and **Down** keys to choose menu items, **Left** and **Right** keys to modify the item contents.

- **Language: Select system language from 11: English, Spanish, French, German, Italian, Portuguese, Korean, Japanese, Russian, Simplified Chinese** and **Traditional Chinese**.

- **Auto Calib:** Sets the time interval for auto calibration to occur. Range is **0**, which is Off and **30 to 600** in 1 second increments. Auto calibration is used to improve image quality and measurement accuracy during use.

- **LCD Brightness:** User can select the brightness of LCD display with choices being **20**, **40**, **60, 80,** and **100%**.

- **Trigger:** User can define the trigger key function from Laser, Spot Temp, Area Temp, Save key and IR/CCD.

  - ➢ **Laser:** Allows user to Turn on and off the laser from the trigger key with Laser on only when trigger is depressed.

 - ➢ **Spot Temp:** Adds or deletes Spot Measurement.

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> ➢ **Area Temp:** Adds or deletes Area Measurement.

> ➢ **Save key:** Initiates the save routine.

> ➢ **IR/CCD:** Switches between IR image and CCD image.

- **Video Mode:** Allows selection of **PAL** or **NTSC** video output.

- **StandbyTime:** Allows user to select **None**, **2**, **5**, **10** or **15** minutes. If no button depressions are made during the set time, the camera will turn off the screen automatically, to prolong battery life. Press any key except power key to reactivate the screen. If set to **None**, the function is disabled.

- **AutoOffTime:** Allows user to select **None**, **2**, **5**, **10** or **15** minutes. If no button depressions are made during the set time, the camera will turn off the main power automatically to prolong battery life. If set to **None**, the function is disabled.

4.4.6 System Info
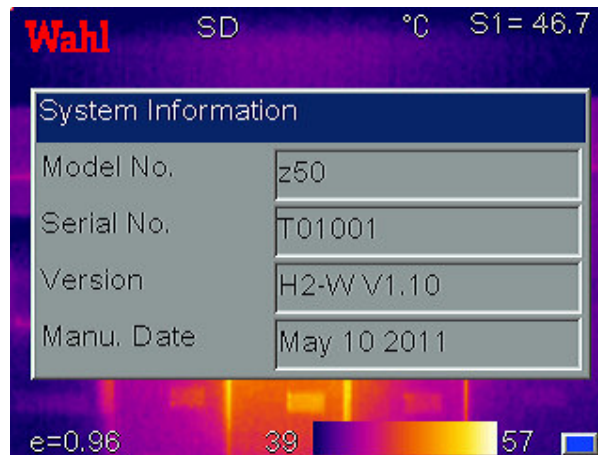
Press **Confirm** key to activate the main menu. Select **Setup->Sys. Info** and press **Confirm** key to open the **System Information** dialog box. It displays the Model number, Serial number, Version number and Date of Manufacture.

4.4.7 Factory Default
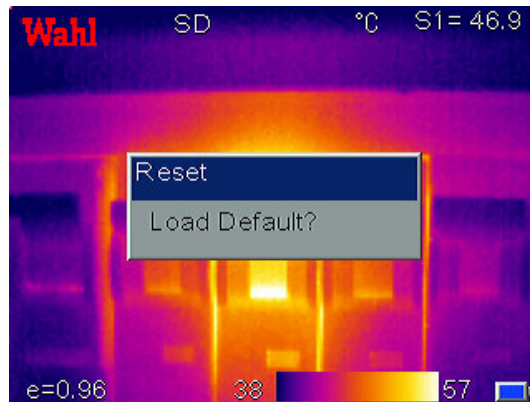
Used to reset factory defaults. Press **Confirm** key to activate the main menu. Select **Setup->Default** and press **Confirm** key to open the **Reset** dialog box. Press **Confirm** key to reset the factory default. Press **C** key to cancel the reset operation. Appendix B indicates the detailed factory default parameter table.

! **NOTE: Default Reset function will delete all parameters defined by user.**

! **NOTE: Restoring Default settings will NOT delete images stored on the SD card.**
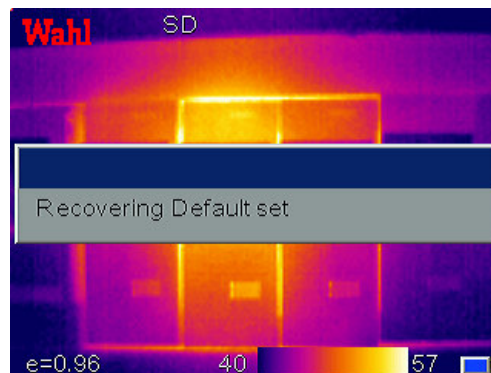
4.5 File
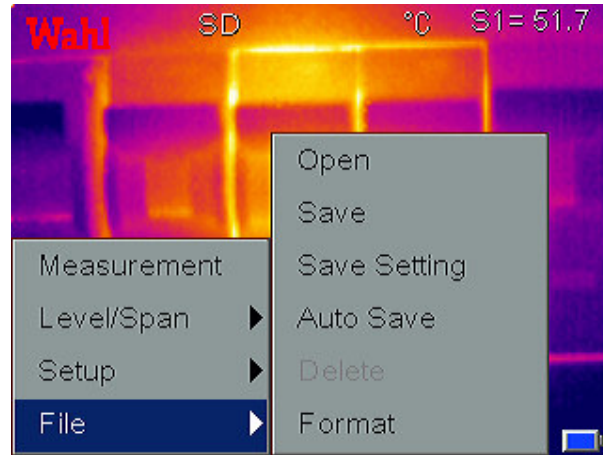
4.5.1 Open

Press **Confirm** key to activate the main menu. Select **File->Open**, press **Confirm** key to open the saved images. Press **Left** and **Right** keys to change the images. Press **C** key to exit the opened image and return to measurement status. The imager will open the last image displayed or the last image saved, whichever occurred last.

[1] Current file name, created by Imager.

[2] Current displayed image file number

[3] Total number of images currently stored

4.5.2 Save

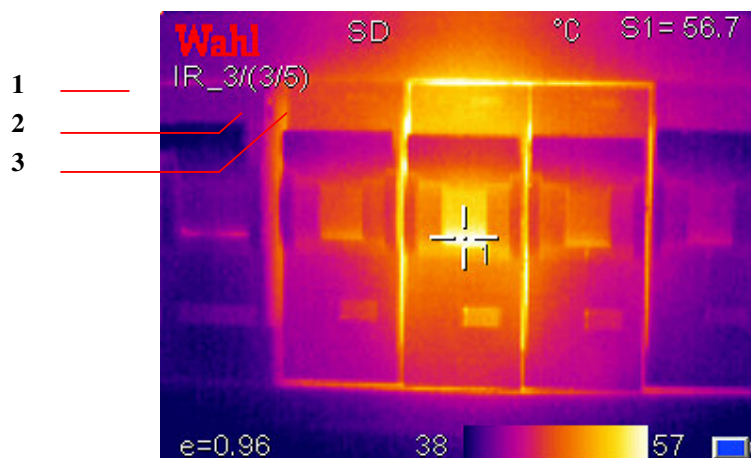Used to save the image, performs the same functionality as the Save key. Press **Confirm** key to activate the main menu. Select **File->Save**, press **Confirm** key to save the current image into the SD card or highlight **Cancel** and press **Confirm** key to cancel Save operation. Alternatively, the **C** key may be pressed to cancel. **Saving Data** will display.
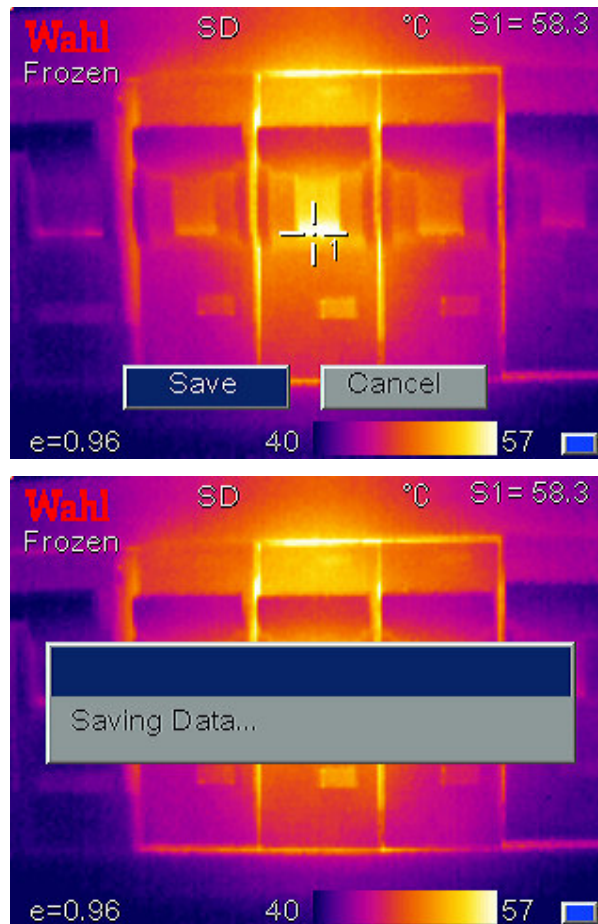
With **Voice Save** set in **Save Settings** menu, the Voice Comment dialog box will display as below. Select **Record** and press **Confirm** key to start recording.
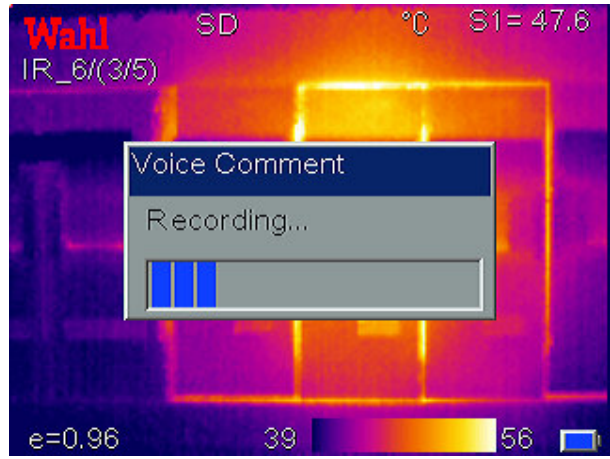
If Voice Save was **On**, Recording will start. Speak clearly into the microphone on the control panel. Record function allows up to 40 seconds of recording time and may be stopped at any time by pressing the **Confirm** key.
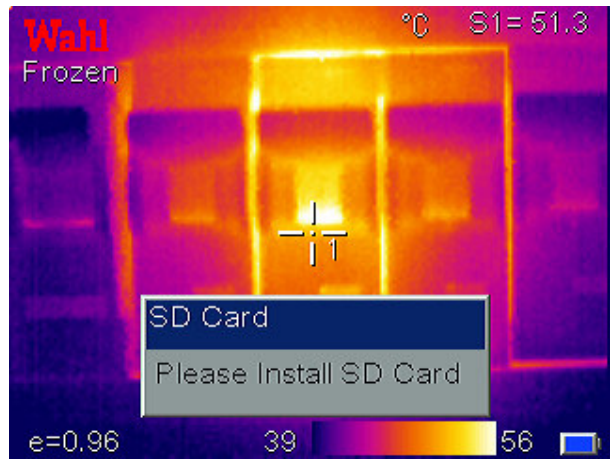
If the SD card is not installed the display will prompt the user to install a SD card.
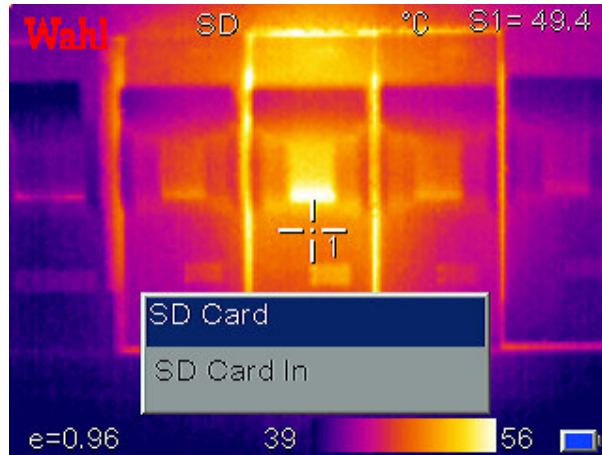
The Display will acknowledge when the SD card is installed properly.

4.5.3 Save Setting

The Save Setting menu allows enable/disable of the CCD Camera and voice recording. Press **Confirm** key to activate the main menu. Select **File->Save Setting**, press **Confirm** key to display the Save Setting dialog box. Press **Up** and **Down** keys to choose the option. Press **Left** and **Right** keys to set On or Off.

Link Save - With Link Save On, the imager will always save an IR image and a CCD image with every save operation. With Link Save off, the imager will only save whichever image the camera is viewing at the time of the save.

!   NOTE: When Imager is in the visible camera mode, thermal detector calibration does not occur and may result in lower accuracy images when saved. Always save thermal images with thermal camera active, when Link Save is ON.

Voice Save – With Voice Save On, the imager will start the voice record cycle after confirmation of the save image. No recording will occur with Voice Save set to Off. Voice save setting is ignored with the Auto Save function.

!   NOTE: To add voice comment to an already existing uncommented image, enable Voice Save, open the image to be

**modified and select File>Save. The imager will prompt you to
record the message and the new image will be assigned a new
image number while the old image will remain unchanged.**
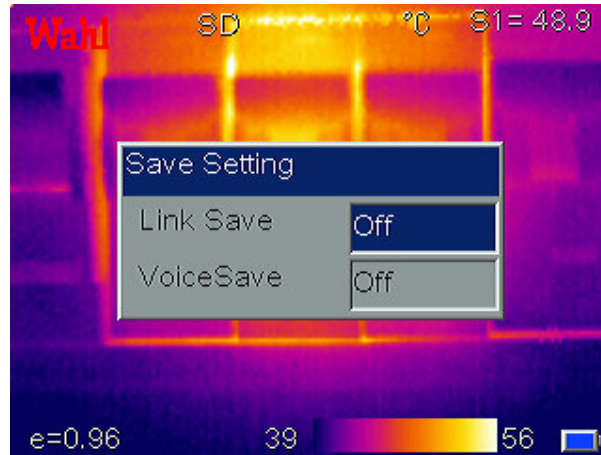
4.5.4 Auto Save

Auto Save allows the camera to automatically save images at a user-specified interval. Voice annotation is inactive with Auto Save. With Auto Save set to 0 the function is disabled. To enable, select 10 to 3600 seconds (1 hour), in 1-second increments. To set, press **Confirm** key to activate the main menu. Select **File->Auto Save**, press **Confirm** key to display the Auto Save dialog box. Press **Left** and **Right** keys to set the values. Press the **Confirm** key to accept and recording timer will start, saving images at the selected interval.
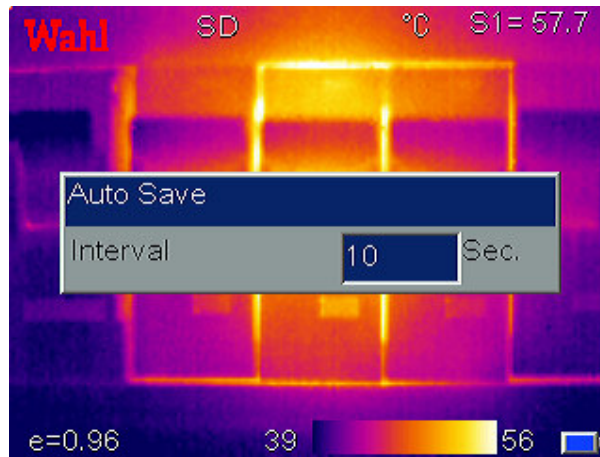
4.5.5 Delete

Used for deleting the image. When camera is in image replay mode, press **Confirm** key to activate the main menu, select File->Delete, press **Confirm** key to display the below prompt box. Press **Confirm** key to delete the current opened image. If it has voice comment, it will be deleted together. Press **C** key to cancel the deletion.
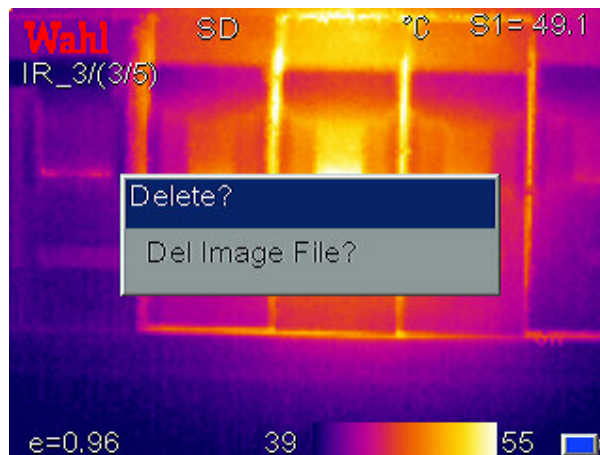
！ **CAUTION: Before deleting, make sure the file is not needed or already backed up. Files cannot be recovered after deletion.**

4.5.6 Format

Format is used for formatting the SD card. Press **Confirm** key to activate the main menu. Select File->Format and press **Confirm** key to display the below dialog box. Press **Confirm** key to do format; press **C** key to cancel the format.
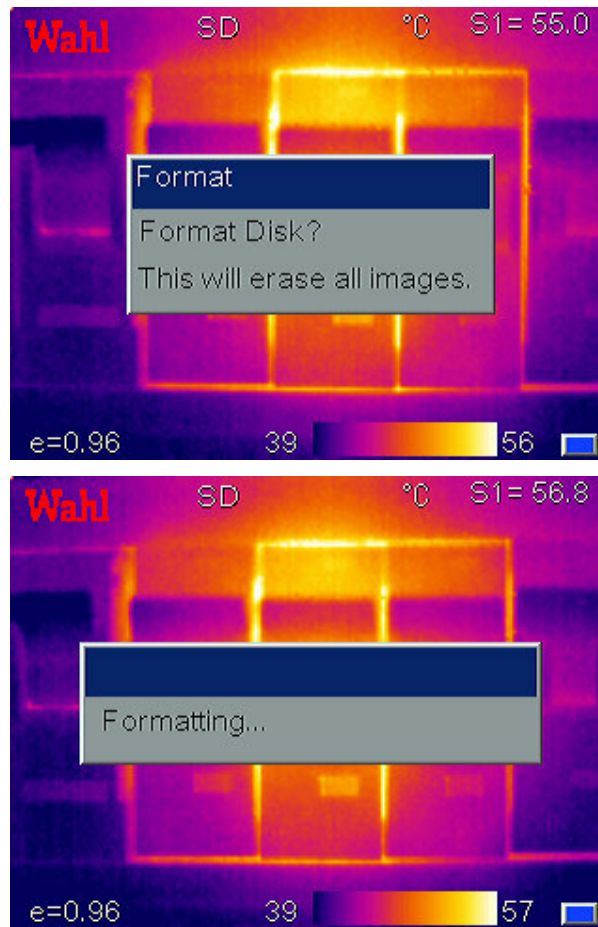
! **CAUTION: Before formatting, make sure all files are not needed or already backed up. Data cannot be recovered after formatting. Use Caution when using this function as <u>ALL IMAGES</u> and <u>FILES</u> on the SD card will be deleted. If formatting via PC, please use FAT16 format.**

5 Technical specifications

50 Series Inspector		Technical Specifications
Detector performance	Detector	Uncooled focal plane array
	Resolution/Pixel size	160 × 120
	Spectral Range	8 to 14µm
	Thermal sensitivity	0.1°C @ 30°C
Image performance	Frame frequency	a Series = 9Hz z Series = 30Hz
	LCD Display	High resolution 3.5" color LCD, 640 x 480
	Digital camera	1.3 Mega pixels CMOS sensor
	Digital Zoom	2X Zoom
Lens parameter	Field of view	17.5° × 13°
	Focus Range	0.1m to ∞
	Focus type	Manual
	Spatial resolution	1.9mrad
Measurement analysis	Measurement range	Lo = -4°F to 356°F (-20°C to 180°C) Hi = 212°F to 1112°F (100°C to 600°C)
	Measurement accuracy	greater of ±2% of reading or ±2°C **! NOTE: Instrument is not calibrated below -10°C**
	Image control — Palette	11 color Palettes
	Image control — Image adjustment	Auto/Manual Level and Span/Brightness
	Level and Span Measurement calibration	Auto/Manual
	Measurement mode	Spot temperature measurement and area temperature measurement (Maximum, minimum or average value) and line temperature, isotherms
	Number of measurement spots	1 Hot, 1 Cold, plus 2 Adjustable
	Number of measurement areas	3
	alarm	High Temperature Audible & Visible Alarm, Isotherm Visible alarm
	Setup function	Date/Time, Temperature unit °C/°F/K, Language
	Emissivity range	Adjustable from 0.01-1.0
	T Reflect	Manual Adjustment
	T Correct	Manual Adjustment
Image storage	Medium type	SD card
	Storage Type	Manual single image save or programmable auto save to SD Card
	Infrared image file format	JPEG, 14 bit data

Image storage (continued)	File size	60K (typical value)
	Voice comment	45s voice record together with image (internal microphone)
Laser indicator	Laser indicator	Class 2 <1mW/635nm Red
Power system	Battery type	Rechargeable lithium ion battery
	Battery working time	Approx 6 hours
	Power save mode	Yes
	Charging system	**#12449-03** - Included External Wall Mount Battery Charger **#12449-02** – Optional Internal AC Adaptor with Car charger and International plugs
Environmental parameter	Ambient temperature	5°F to 122°F (-15°C to +50°C)
	Humidity	≤ 90% (Non-condensing)
	Protection class	IP54
Physical characteristics	Size	4.5 x 5.9 x 9 in (115 × 150 × 230mm)
	Weight (exclude battery)	1.65 lbs (0.75Kg)
	Tripod connection	1/4"-20 Thread
	Housing	Impact Resistant Plastic & Wrist Strap
	Audio output	No
	Video output	PAL or NTSC
	SD card interface	Yes

Specifications subject to change without notice

Troubleshooting

Please follow the table below to diagnose and correct the problem. If

problem still exists, please contact our service department.

Problem	Cause & Solution
The camera does not power on.	● Battery not installed or installed incorrectly →Install battery or re-install battery ● Battery is out of power. →Change battery. ● "Power off" protection is enabled →Wait for 5 seconds and reboot.
The camera powers off automatically.	● Battery is out of power. →Change battery ● AutoOffTime option is enabled →Set as None.
Battery depletion is too fast	● Environmental temperature is too low ● Rechargeable battery is not charged completely. →Recharge the battery. ● Rechargeable battery is out of power completely and cannot be recharged. →Change to new battery.
No thermal image	● Lens cover is not removed. →Remove lens cover. ● In image freeze status →Press C key to exit.
Thermal image is white-black.	● White-black palette is selected →Select normal palette.

Appendix A Common material emissivity

Material	Surface	Temperature °C	Emissivity（ε）
Aluminum	Non- oxidized	100	0.20
	Oxidized	100	0.55
Brass	Burnished to Brown	20	0.40
	Dull luster	38	0.22
	Oxidized	100	0.61
Copper	Seriously Oxidized	20	0.78
Iron	Oxidized	100	0.74
	Rusty	25	0.65
Cast iron	Oxidized	200	0.64
	Non- Oxidized	100	0.21
Wrought iron	Quarry-faced	25	0.94
	Polished	38	0.28
Nickel	Oxidized	200	0.37
Stainless steel	Oxidized	60	0.85
Steel	Oxidized	200	0.79
Common brick	Surface	20	0.93
Concrete	Surface	20	0.92
Glass	Polished plate	20	0.94
Lacquer	White	100	0.92
	Black	100	0.97
Carbon	Smoke black	25	0.95
	Candle soot	20	0.95
	Rough lead surface	20	0.98
Oil paint	Value of 16 colors	100	0.94
Paper	White	20	0.93
Sand soil	Surface	20	0.90
Timber	Dressed	20	0.90
Water	Distilled water	20	0.96
Skin	Human	32	0.98
Ceramic	Thin	21	0.90
	Thick	21	0.93

Appendix B

Factory default parameter setting table

Table.1 Measurement temperature setting table

Parameter	Value
Temperature Range	-20 to 180°C
Lens	Standard
Temp Unit	°C
Ref Type	Off
Ref Temp	30°C

Table.2 Measurement temperature correction table

Parameter	Value
Emissivity	0.96
TCorrect	0°C
TReflect	OFF

Table.3 Analysis setting table

Parameter	Value
Temp Alarm	OFF
Alarming Temp	50.0°C
Alarming Color	NONE
Isotherm Color	OFF
Isotherm Temp	50.0°C
Isotherm Width	1.0°C

Table.4 System setting table

Parameter	Value
Language	English
Brightness	60%
Auto Calib	60S
Video Mode	NTSC
Quick Access	Laser
StandbyTime	5 minutes
AutoOffTime	15 minutes

Addendum

a30, a50, z30 and z50 Upgrade Installation Guide

1. Make certain the power is turned off to the imager to be upgraded.

2. Verify the serial number on the SD card case matches the thermal imager to be upgraded.

3. Insert the SD card into the SD card slot of the imager, located behind the rubber protection cover on the left side of the imager.

4. Power on imager.

5. Upgrade will occur during the imager power on routine.

6. If Model number is changed, new model number should appear on screen when powering up.

7. If High Temperature was enabled, press Menu → Setup → Measurement and with Temp Range highlighted the left/right arrows should allow selection of the High Temperature range.

8. **Note!** After completion of upgrading, the remaining file may be deleted from the SD card and the card may be used for image storage.

In the event you require technical assistance, you may call our customer service department at 1-800-421-2853 or at the number listed below.

234 Old Weaverville Road, Asheville, NC 28804

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