- **IR Thermography Camera**

C.A 1877
C.A 1878

ENGLISH

User Manual

CHAUVIN® ARNOUX
CHAUVIN ARNOUX GROUP

English

You have just purchased an **IR thermography camera** and we thank you for your confidence.
For best results from your device:

- **read this** user manual attentively,
- **comply with** the precautions for its use.

MEANING OF THE SYMBOLS USED

	Selective sorting of wastes for the recycling of electrical and electronic equipment within the European Union. In conformity with directive DEEE 2002/96/EC: this equipment must not be treated as household waste.
	Risk of danger. See explanations in this user manual: Problems that may affect the operation of the I.R. camera.
	Notes completing the essential operating procedures.
	Laser radiation, do not look directly into the LASER beam.
CE	This marking certifies compliance with the European "Low Voltage" and "Electromagnetic Compatibility" directives (2006/95/CE and 2004/108/CE).

Specifications of the laser: Class 2, < 1 mW, wavelength 635 nm

WARNING
LASER RADIATION
DO NOT LOOK DIRECTLY INTO THE BEAM
CLASS 2 LASER DEVICE

CONTENTS

1. PRECAUTIONS FOR USE

Before using the camera, make sure that you have read and understood the safety precautions described below. Make sure that the camera is used correctly.

Please refer to this manual each time you encounter a hazard symbol. To avoid exposure to laser radiation, injury, or damage to the device, and be sure that you use the camera in a risk-free way, observe the safety recommendations given below:

 Do not look directly into the laser beam. Do not point the laser beam at people.

 Do not use the instrument other than for its intended purpose; keep it out of reach of children and make sure that it is never treated as a toy.

 Do not aim the device towards the sun or other source of intense heat.

 Use only the recommended batteries and accessories. Do not leave the device connected to mains when not necessary.

 Avoid problems due to condensation.

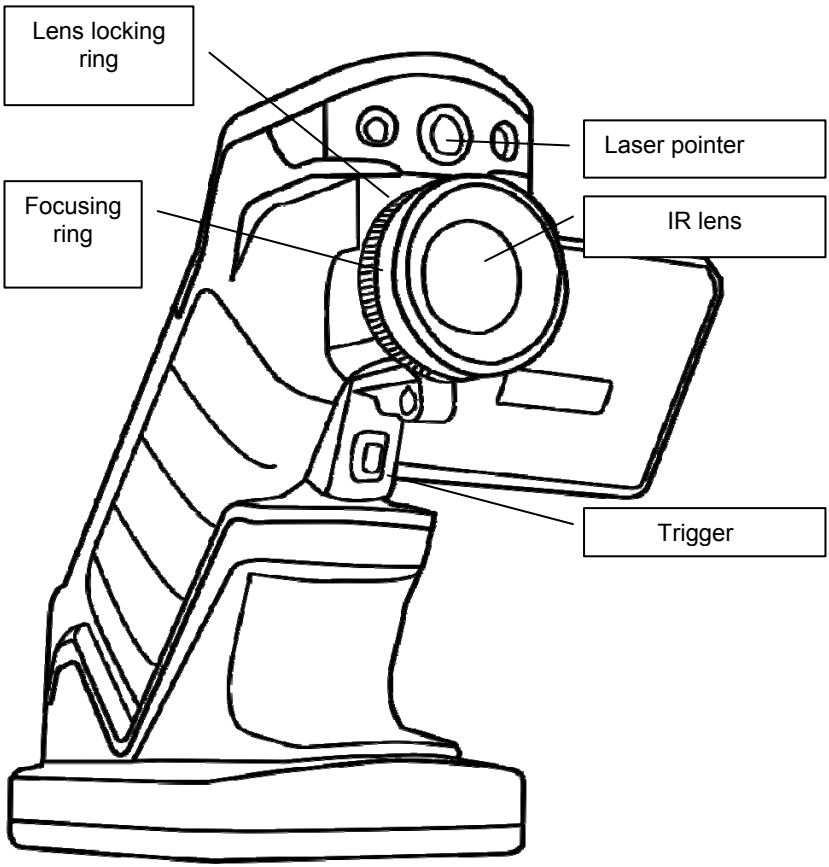
Moving the I.R. camera rapidly from a cold to a warm place can cause condensation (droplets of water) to form on its outside and inside surfaces.

You can avoid this problem by placing the camera in the plastic case and letting it warm slowly to the ambient temperature before removing it from the case.

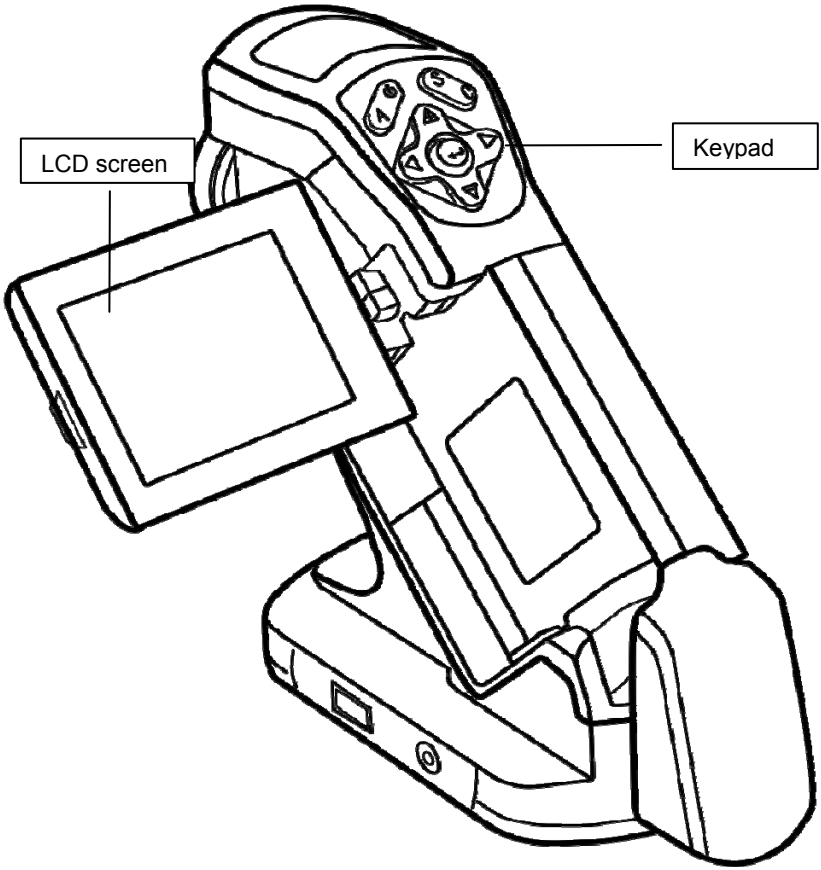
- When you switch on the camera, wait 10 to 15 minutes before recording your first thermograms, to be certain that the camera's temperature has stabilized and that your measurements are correct.
- Focus the lens correctly according to the distance to the target to be inspected.
- In certain specific conditions only, this device may be sensitive to electrostatic discharges (ESD).

2. DESCRIPTION

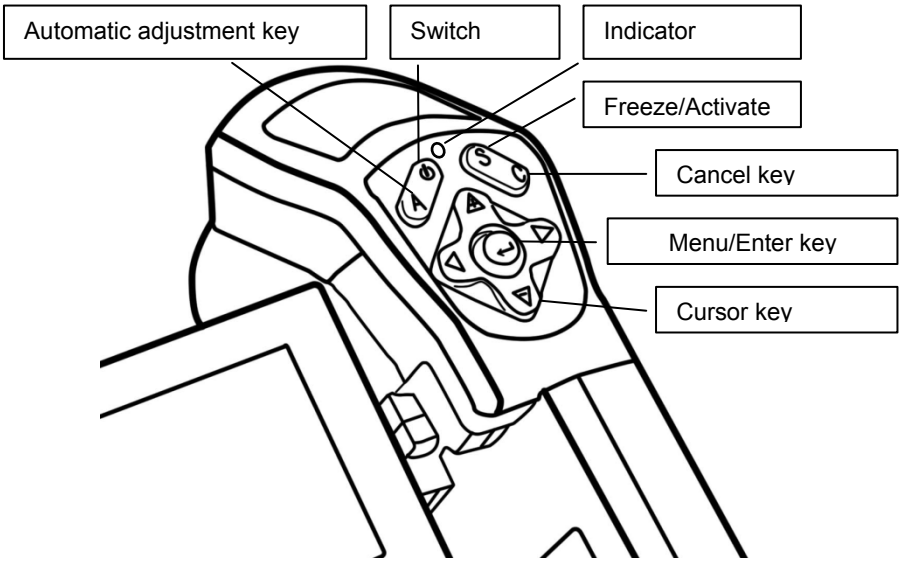
2.1 FRONT PANEL



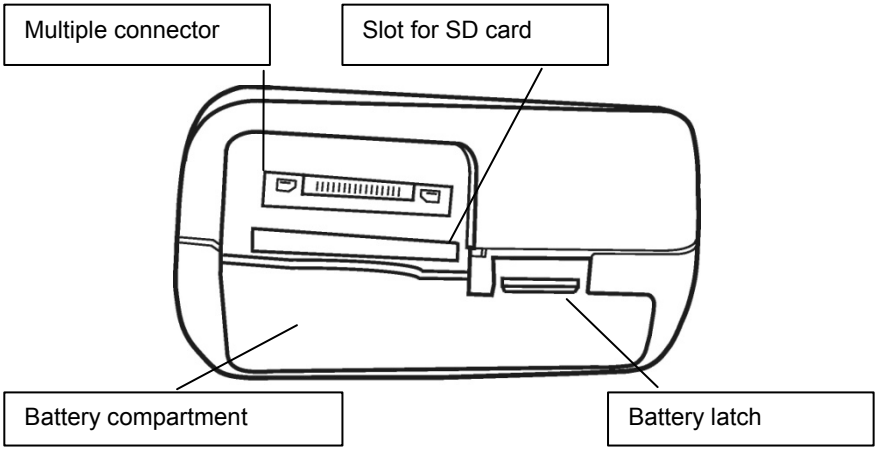
2.2 VIEW OF BACK AND BOTTOM



2.3 CONTROLS



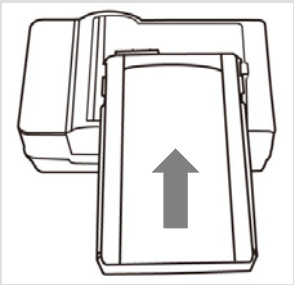
2.4 BOTTOM/CONNECTORS



3. PREPARING THE IR CAMERA

3.1 CHARGING THE BATTERY

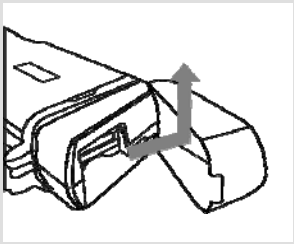
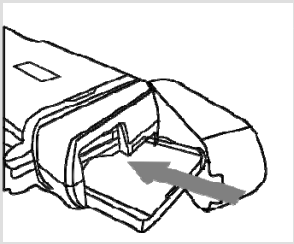
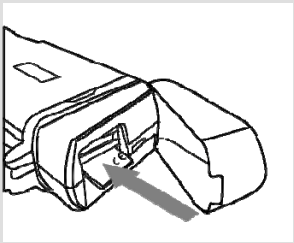
Proceed as follows to charge the battery for the first time, and thereafter when the "battery low" icon appears on the screen.

1		**Align the edge of the battery pack with the line marked on the battery, then insert it in the direction shown by the arrow.**
2	**Connect the mains cord to the battery charger and the plug at the other end to a wall outlet.**	**The charging indicator lights up red during charging of the battery and turns green when the battery is fully charged.**
		After recharging, disconnect the battery charger and remove the battery pack.

- The battery is a lithium ion battery, and so does not have to be completely discharged before it is recharged. It can be recharged at any time. However, since the life span of the battery is approximately 300 charging cycles, we recommend charging the battery only when it has been completely discharged, so that it will last longer.
- The recharging time varies with the ambient relative humidity and the battery charge condition.

3.2 INSTALLING THE BATTERY / SD CARD

Install the battery in the camera as follows.

	• Charge the battery before using it for the first time.	
1		**Check that the power is off and slide the battery compartment cover in the direction shown by the arrow.**
2		**Insert the battery.** **Insert the battery in the direction shown by the arrow.**
3		**Insert the SD card.** **Insert the SD card in the direction shown by the arrow.**
4	**Close the cover of the battery/SD card compartment.**	
	• Remove the battery when the camera is not in use. • The SD card must be formatted for FAT 32; otherwise the IR camera will not recognize it.	

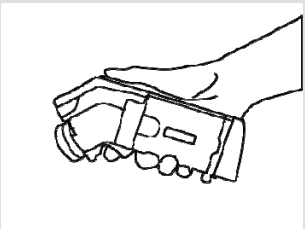
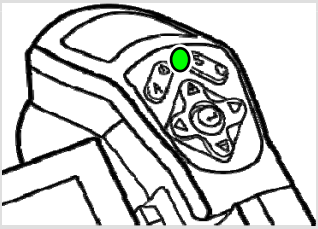
Symbols representing the battery charge condition

The following icons on the LCD screen indicate the condition of the battery.

	Battery adequately charged
	Battery low
	Battery needs to be replaced or recharged

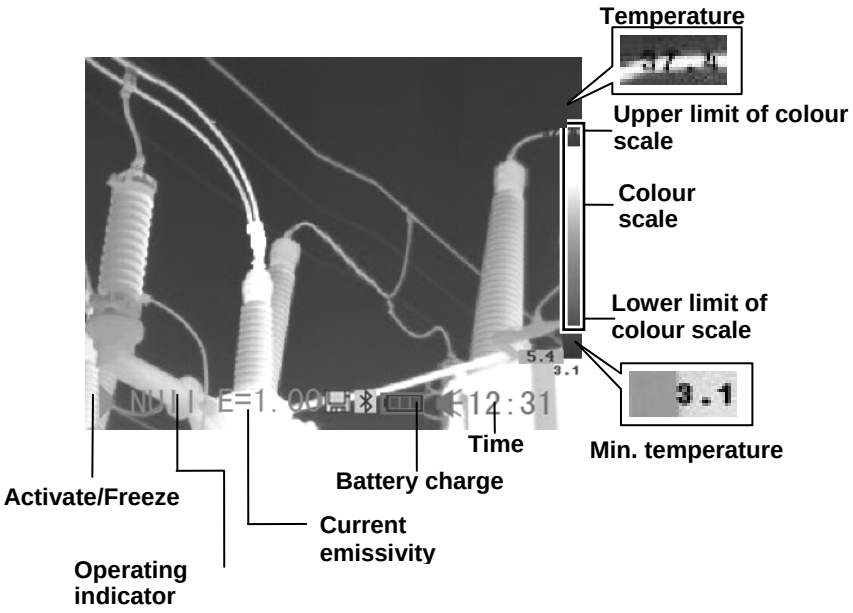
3.3 POWERING UP THE CAMERA

The indicator comes on when the camera is powered up.

1		**Holding the camera correctly in your right hand, place your thumb above the keypad and your index finger alongside the trigger.**
2		**Press the switch for 3 seconds.** **The indicator lights up green.**
3	**After a moment, the startup screen is displayed.**	
4	**Switching the camera off:** **Press the switch for 3 seconds.** **The indicator goes off.**	

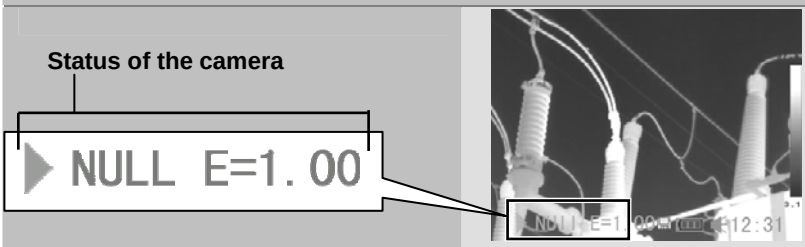
3.4 CHECKING THE INFORMATION ON THE LCD SCREEN

The LCD screen has a field of view covering 100% of the real image sighted.
The following information is displayed on the screen.



About the operating indicator

- The operating indicator indicates the current operating status of the camera.



Status of the camera	**Menu**	**Displays the menu mode.**
	Null	**Displays the non-menu mode with no analysis tool selected.**
	***SP1**	**Displays the current analysis tool Cursor 1**
	CAP.	**Displays the current analysis tool mode of the cursor in automatic tracking.**
	E	**Current emissivity value.**
		An SD card has been inserted.

* The status varies according to the camera model.

Before doing anything more, please switch to [Null] mode.

How do I switch to [Null] mode?

- Press the cancel key several times until the null message appears on the operating indicator.

3.5 SETTING THE DATE AND TIME

You must set the date and time when the camera is used for the first time.

1	**Check that the IR camera is in null mode.**	
2	**Press the MENU/ENTER key then the UP or DOWN arrow of the selector to choose [System Setup].**	<Spot > File ► < Iron > Object para. ► System Setup ►
3	**Press the UP or DOWN arrow of the selector to choose [Date & Time], then press the MENU/ENTER key.**	Date & Time ► File setup ► <Standard> Local Setup ► System Info. ►
4	**Setting the date and time:** • Press the UP or DOWN arrow of the selector to choose an item to modify; • Press the LEFT or RIGHT arrow of the selector to set the value.	Date & time Year: Month: Day: Hour: Minute:
5	**After setting the parameters, press the MENU/ENTER key to save the changes or the C key to return to the main menu without saving.**	

3.6 LOCAL PARAMETERS

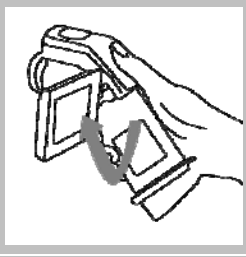
In this menu, you can select the style of the integrated menu system.

1	**Check that the IR camera is in Null mode.**	
2	**Press the MENU/ENTER key then the UP or DOWN arrow of the selector to choose [System Setup].**	<Spot > File ► < Iron > Object para. ► System Setup ►
3	**Press the UP or DOWN arrow of the selector to choose [Local Setup], then press the MENU/ENTER key.**	Date & Time ► File setup ► <Standard> Local Setup ► System Info. ►
4	**Local Setup:** • Press the UP or DOWN arrow of the selector to choose a field to modify; • Press the LEFT or RIGHT arrow of the selector to set the values.	Local Setup Language : Video output : Temp. Unit : Dist. Unit :
5	**After setting the parameters, press the MENU/ENTER key to save the changes or the C key to return to the main menu without saving.**	

	**About the local parameters**
Language	**Selects the language of the menus and messages.**
Video output	**Determines the format of the video output of the camera: PAL or NTSC.**
Temp. unit	**Chooses the scale for display of the temperature by the camera: °C or °F.**
Dist. unit	**Determines the unit of distance displayed by the camera: Metres or Feet.**

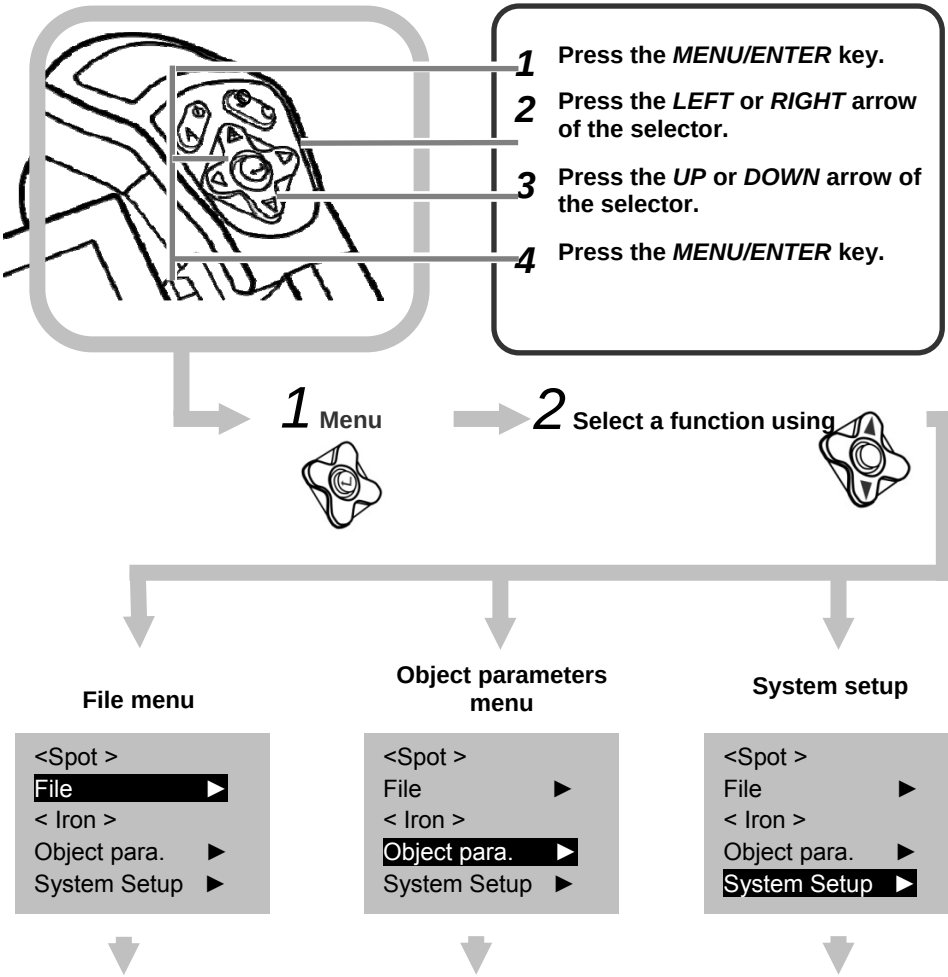
4. BASIC FUNCTIONS

4.1 USING THE LCD SCREEN

	If you want to use the LCD screen to film, play back the thermal images, and set the parameters of the menus, proceed as follows.	
1	**Open the LCD screen in the direction shown by the arrow.**	
2	**Aim the IR camera at a subject.**	
	• For a better temperature measurement, place the subject at the centre of the image displayed on the LCD screen. • The LCD screen is switched off when it is closed.	

4.2 SELECTION OF THE MENUS AND PARAMETERS

You can select the parameters by pressing the MENU/ENTER key.



3 **Select the values of the parameters using**

00001/00002/001/001
< Dir > DIACA006
Open CA000001.MIR

Object para.		
Emiss.	:	0.95
Distance	:	5m
Env. Temp.	:	25.0°C
Humidity	:	50%
Alert Temp.	:	25.0°C
Alert	:	Off

Date & Time	▶
File setup	▶
<Standard>	
Local Setup	▶
System Info.	▶

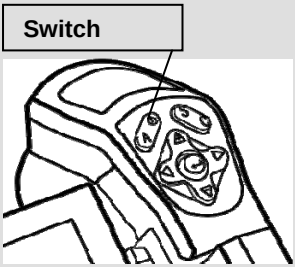
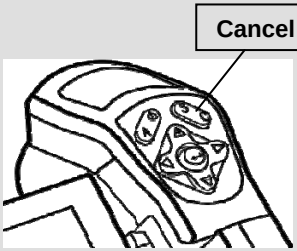
4 **Change the parameters using**

Exit

	The choice of menus displayed will depend on the use and on the content of the parameters.
	The choice of menus depends on the type of camera.

4.3 RESTORING THE DEFAULT PARAMETERS

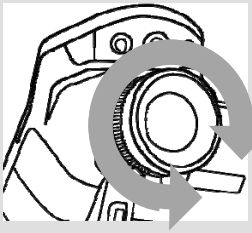
You can reset the parameters of use of the menus and keys to their default values.

1		**Switch the IR camera off.**
2		**Press both the switch and the C key for a few seconds.**
	The stored data will not be erased when you restore the operating parameters of the menus and keys to their default values.	

5. TAKING SHOTS

5.1 ADJUSTING THE CAMERA

5.1.1 MANUAL FOCUSING

1		**Aim the IR camera at the subject.**
2		**Turn the focusing ring to adjust the sharpness of the subject.**
3		**Turn the ring until the image is clear.**

5.2 ADHUSTING THE IR CAMERA

5.2.1 ADJUSTING THE IMAGE

You can set the brightness and contrast of the image captured by the IR camera manually or automatically.

5.2.1.1 Automatic adjustment

The IR camera automatically adjusts the brightness and/or the contrast of the image when you press the ***A*** key.

5.2.2 ADJUSTMENT OF THE PALETTE

1	**Press the MENU/ENTER key.**	
2	**Press the UP or DOWN arrow of the selector to choose the current element and on LEFT or RIGHT arrow to choose the palette.**	<Spot > File ► < Iron > Object para. ► System Setup ►
3	**After this operation, press the MENU/ENTER key to save the changes or the C key to close the menu without saving.**	

The camera provides 6 kinds of palettes: Iron, Iron Inverted, Rainbow, Feather, Grey and Inverted Grey.

5.2.3 FREEZE/ACTIVATE AN IMAGE

1	**Check that the IR camera is in NULL mode.**	
2	**Press the S key. This freezes the image.**	
3	**Press the S key. The image is reactivated.**	

5.3 PRESENTATION OF THE ANALYSIS FUNCTIONS

5.3.1 ADJUSTMENT OF THE OBJECT/GLOBAL PARAMETERS

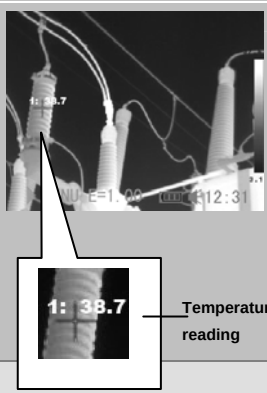
1	**Press the MENU/ENTER key.**	
2	**Press the UP or DOWN arrow of the selector to choose [Object para.]. Then press the MENU/ENTER key.**	<Spot > File ► < Iron > Object para. ► System Setup ►
3	**Adjustment of the analysis parameters.** • Press the UP or DOWN arrow of the selector to choose an item to modify. • Press the RIGHT or LEFT arrow of the selector to adjust the values.	Object para. Emiss. : 0.95 Distance : 5m Env. Temp. : 25.0°C Humidity : 50% Alert Temp. : 25.0°C Alert : Off
	After this operation, press the MENU/ENTER key to save the changes or the C key to return to the main menu without saving.	

	About the analysis parameters:
Emiss	Property of the material essential to a correct determination of the temperature of the target sighted. Parameter ranging from 0 to 1 in steps of 0.01.
Distance	Distance between the thermography operator and the target sighted. Parameter ranging in steps of 1m.
Env. Temp	Enter the temperature of environment.
Humidity	Enter the ambient relative humidity.
Alert temp.	Preset the alarm temperature value.
Alert	Activates or desactivates the temperature alert. When the parameter is set to "On": - if the [Capture Spot] parameter is "Maximum" in the analysis tools, the alert is triggered as soon as the threshold set is exceeded. - If the [Capture Spot] parameter is "Minimum", the alert is triggered as soon as there are temperatures below the threshold set.

5.3.2 ADJUSTMENT OF THE ANALYSIS TOOLS

This item briefly explains how to adjust the thermal image analysis tools.

5.3.3 CURSOR ANALYSIS

1	**Press the MENU/ENTER key.**	
2	**Press the UP or DOWN arrow of the selector to choose the [Spot] menu.**	<Spot > File ► < Iron > Object para. ► System Setup ►
3	Maximum or Minimum spot will automatically track the hottest or coldest point according to the user's choice. Press the LEFT or RIGHT arrow to select automatic detection of the hottest or coldest point.	<Maximum > File ► < Iron > Object para. ► System Setup ►
4	**Moving the cursor.** • Start from step 1 to select the cursor. • Press the UP, DOWN, LEFT, RIGHT arrows of the selector to move the cursor. • Press the Menu/Enter key to fix the position of the cursor. The cursor temperature reading changes in real time.	
5	**Removing the cursor;** • Start from step 1 to define or select the cursor to be analyzed. • Press the C key to delete the cursor.	

5.4 OPEN AND RECORDING THE IMAGE

You can save the image by pressing the ***S*** key of the selector for 3 seconds.

	**The image will be saved in the current folder.**

6. READING AND ERASING

6.1 OPENING THE IMAGES

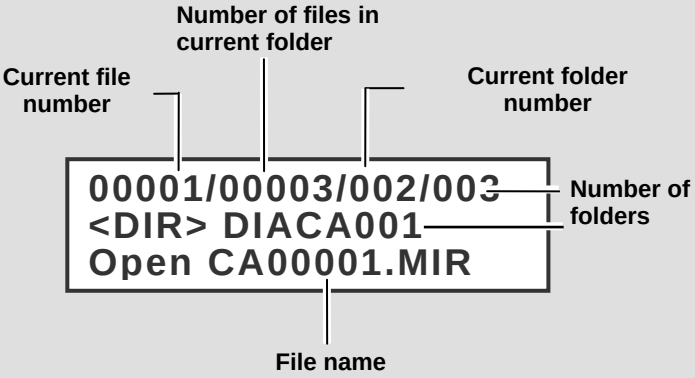
You can view and analyze the images recorded on the LCD screen.

1	**Press the MENU/ENTER key.**	
2	**Press the UP or DOWN arrow of the selector to choose the [File] menu.**	<Spot > File ► < Iron > Object para. ► System Setup ►
3	**Press the UP or DOWN arrow of the selector to choose [Open], then press the MENU/ENTER key.**	00001/00002/001/001 < Dir > DIACA006 Open CA000001.MIR

How to select an image.

1

When the [Open] or [Delete] option has been selected in the [File] menu, a message similar to the one shown below is displayed on the screen.



2

If the image you want to open or delete is not in the current folder, press the [LEFT] or [RIGHT] arrow of the selector several times to select the image.

3

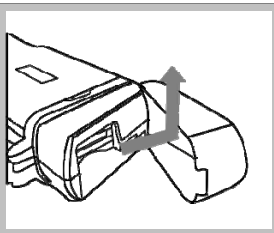
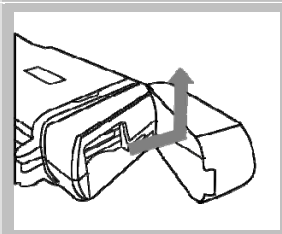
Press the *S* key to activate the image.

	Selection of the folder and file name.	
1	**Press the MENU/ENTER key.**	
2	**Press the UP or DOWN arrow of the selector to choose the [System Setup] menu, then press the MENU/ENTER key.**	<Spot > File ► < Iron > Object para. ► System Setup ►
3	**Press the UP or DOWN arrow of the selector to choose the [File Setup] menu, then press the MENU/ENTER key.**	Date & Time ► File setup ► <Standard> Local Setup ► System Info. ►
4	**Press the UP or DOWN arrow of the selector to choose the [Directory Name] menu, then on the LEFT or RIGHT arrow to select the folder. [File Number] is the file number in the current folder.**	File Setup Directory name: File number: File name:
5	**Press the UP or DOWN arrow of the selector to choose the [File Name] menu, then the LEFT or RIGHT arrow to select the file name.**	

7. DOWNLOADING IMAGES

7.1 DOWNLOADING IMAGES USING THE SD CARD

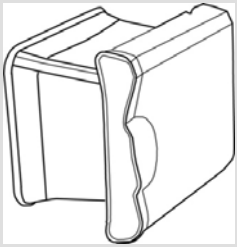
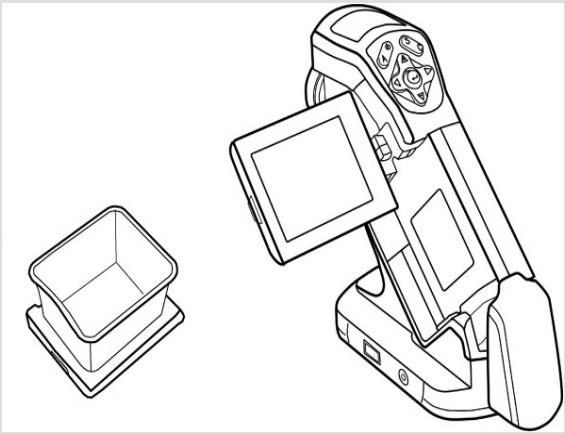
You can withdraw the SD card from the camera and download the images to a computer using the SD card reader provided.

1	**Open the cover of the battery/SD card compartment.**	
2	**Press gently on the SD card, which will then be ejected automatically.**	
3	**You can download the IR images using the SD card reader provided.**	

8. ACCESSORIES

8.1 USING THE SUN SHADE

When you film outdoors in sunlight, the sun shade will make it easier to see the screen clearly.

1		**Install the sun shade in the direction shown by the arrow, following the instructions below.**
2		

9. TROUBLESHOOTING

Problem	Cause	Solution
The camera fails to operate	No power supply	• Switch the camera on. See *Powering up the camera*
	Battery voltage too low	• Completely recharge the battery.
	Bad contact between the camera and battery terminals	• Wipe the terminals with a clean, dry cloth.
The camera fails to record	Internal memory full	• If possible, load the images onto a computer and erase them from the camera to make room.
	Internal memory incorrectly formatted	• Format the internal memory to FAT32 format.
Battery discharges rapidly	Battery capacity reduced because of a year or more without use since the last full charge.	• Replace the battery with a new one.
	Battery life span exceeded.	• Replace the battery with a new one.
The battery fails to recharge	Bad contact between the battery and the charger.	• Wipe the terminals with a clean, dry cloth. • Connect the power cord to the charger and insert its plug firmly into a wall outlet.
	Battery life span exceeded.	• Replace the battery with a new one.

10. MAINTENANCE

For maintenance, use only the spare parts specified. The manufacturer cannot be held liable for any accident following a repair not done by its own customer service department or an approved repairer.

10.1 SERVICING AND MAINTAINING THE CAMERA

Proceed as follows to clean the body of the camera, the lens, the LCD screen, and the other parts.

BODY OF THE CAMERA
Wipe the body of the camera with a soft cloth or lens cleaning cloth.

LENS
Remove dust and dirt using a lens blowing brush and then any remaining dirt by wiping the lens gently with a soft cloth.

- Never use synthetic cleaners on the body of the camera or on the lens.

LCD SCREEN
Use a blow brush to eliminate dust and dirt. If necessary, wipe the screen gently with a soft cloth or a lens cleaning cloth to remove persistent dirt.

- Never rub the LCD screen and never press hard on its surface, since this might damage it or cause other problems.

⚠ Never use thinners, benzene, synthetic cleaners, or water to clean the camera, since these substances might damage the equipment or alter its performance.

10.2 METROLOGICAL CHECK

Like all measuring or testing devices, the instrument must be checked regularly.

We recommend checking this instrument yearly. For checks and calibrations, contact one of our accredited metrology laboratories (information and contact details available on request), our Chauvin Arnoux subsidiary or the branch in your country.

10.3 REPAIR

For all repairs before or after expiry of warranty, please return the device to your distributor.

11. WARRANTY

Except as otherwise stated, our warranty is valid for twelve months starting from the date on which the equipment was sold. Extract from our General Conditions of Sale provided on request.

The warranty does not apply in the following cases:

- Inappropriate use of the equipment or use with incompatible equipment,
- Modifications made to the equipment without the explicit permission of the manufacturer's technical staff,
- Work done on the device by a person not approved by the manufacturer,
- Adaptation to a particular application not anticipated in the definition of the equipment or not indicated in the user's manual,
- Damage caused by shocks, falls, or floods.

12. APPENDIX

12.1 TABLE OF EMISSIVITIES

Material	Temperature (°C)	Approximate emissivity
Metals		
Aluminium		
Polished aluminium	100	0.09
Commercial aluminium sheet	100	0.09
Oxidized chrome-anodized aluminium	25 ~ 600	0.55
Slightly oxidized aluminium	25 ~ 600	0.10 ~ 0.20
Highly oxidized aluminium	25 ~ 600	0.30 ~ 0.40
Brass		
Shiny brass (extreme polishing)	28	0.03
Oxidized brass	200 ~ 600	0.61 ~ 0.59
Chromium		
Polished chromium	40 ~ 1090	0.08 ~ 0.36
Copper		
Shiny copper	100	0.05
Highly oxidized copper	25	0.078
Copper oxide	800 ~ 1100	0.66 ~ 0.54
Molten copper	1080 ~ 1280	0.16 ~ 0.13
Gold		
Shiny gold	230 ~ 630	0.02
Lead		
Pure lead (no oxidation)	125 ~ 225	0.06 ~ 0.08
Slightly oxidized	25 ~ 300	0.20 ~ 0.45
Magnesium		
Magnesia	275 ~ 825	0.55 ~ 0.20
Magnesia	900 ~ 1670	0.20
Mercury	0 ~ 100	0.09 ~ 0.12

Nickel		
Polished by anodizing	25	0.05
Electrolysed	20	0.01
Unpolished		
Nickel wire	185 ~ 1010	0.09 ~ 0.19
Nickel sheet (oxidized)	198 ~ 600	0.37 ~ 0.48
Nickel oxide	650 ~ 1255	0.59 ~ 0.86
Nickel alloy		
Nickel-chromium alloy wire (shiny) (refractory)	50 ~ 1000	0.65 ~ 0.79
Nickel-chromium alloy	50 ~ 1040	0.64 ~ 0.76
Refractory nickel-chromium	50 ~ 500	0.95 ~ 0.98
Nickel-silver alloy	100	0.14
Stainless steel		
18-8	25	0.16
304(8Cr, 18Ni)	215 ~ 490	0.44 ~ 0.36
310(25Cr, 20Ni)	215 ~ 520	0.90 ~ 0.97
Tin		
Commercial tinplate	100	0.07
Highly oxidized	0 ~ 200	0.60
Zinc		
Oxidation at 400°C	400	0.01
Shiny galvanized iron plate	28	0.23
Oxidized zinc powder	25	0.28
Non-metallic materials		
Brick	1100	0.75
Refractory brick	1100	0.75
Graphite (carbon black)	96 ~ 225	0.95
Enamel (white)	18	0.90
Asphalt	0 ~ 200	0.85
Glass (surface)	23	0.94
Refractory glass	200 ~ 540	0.85 ~ 0.95
Calcimine (whitewash)	20	0.90
Oak	20	0.90

13. TECHNICAL SPECIFICATIONS

Description	Characteristic	C.A 1877	C.A 1878
Imaging performance	Field of view/Minimum focal distance	10°x7.5° / 0.1m	12.5°x9.4°/ 0.1m
	Thermal sensitivity (NETD)	0,08°C @ 30°C	
	Type of detector	Focal-plane network, uncooled micro-bolometer.	
	Frequency	9 Hz	
	IR resolution	80x60	100x80
	Spectral band	8-14 µm	
	Focusing mechanism	Manual focusing.	
	I.F.O.V. (with standard objective lens)	2.2 mrad	
Presentation of image	Image modes	Thermal	
	Merge	No	
	Image annotation	No	
	Screen	2.5" TFT screen	
Measurement	Temperature range	-20 °C~250 °C	
	Precision	±2°C or ±2% of reading *	
	Measurement modes/Analysis tools	1 mobile cursor/automatic hot-cold cursor	
	Temperature alarms	Yes	
	Configuration controls	Language/Date/time format/Palettes/Units	
	Measurement corrections	Temperature of environment/Emissivity correction/Distance/Humidity	
Memory	Type/Memory capacity	SD card/2GB removable, up to 16GB	
	Formats	.MIR	

Laser pointer/Torch light	Classification/Type	Class 2.1mW / 635nm (red) EN 60825-1
	Torch light	No
Conformities	Electromagnetic compatibility	EN 61326-1
	Safety	EN 61010-1
Power supply	Type of battery: Operating time	Rechargeable lithium battery / approximately 3 hours
	Mains adapter	8V-11V output to the camera
	Power management	Standby mode
Environmental conditions	Operating temperature	-15 °C to +50 °C (5 °F to 122 °F)
	Storage temperature range	-40 °C to +70 °C (-40 °F to + 158 °F)
	Humidity	Relative humidity 95% from +25°C to +40°C (+77°F to +104°F), without condensation.
	Protection	IP54
	Shock/Vibration	25 G/2 G
Physical characteristics	Weight	Less than 500 g (with the battery)
	Dimensions	172 mm x 80 mm x 162 mm
Software	RayCAm Preview Software	

** Reference conditions: @ 1 meter, (23 ± 3) °C, (50 ± 15) % RH*

14. STATE AT DELIVERY

C.A 1877 DiaCAm IR thermography camera P01651277
C.A 1878 DiaCAm IR thermography camera P01651278

Delivered with:

- 1 plain cardboard box for transport
- 1 battery charger
- 1 battery
- 1 2GB miniSD card
- 1 card reader
- DiaCam Preview software on CD ROM
- 1 user manual DiaCAm on CD ROM
- 1 DiaCAm Preview software user manual on CD ROM

ACCESSORIES & SPARES

Sun shade P01651532
Battery P01296045
Battery charger P01296046
Cigar lighter adapter HX0061
Introduction to thermography ..... Contact us

10 - 2012
Code 694067A02 - Ed. 1

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