



## 3119-600 Series Temperature Controlled Chambers



Operating Instructions M55-16547-EN Revision E

*The difference is measurable®*

## Electromagnetic Compatibility

Where applicable, this equipment is designed to comply with International Electromagnetic Compatibility (EMC) standards. To ensure reproduction of this EMC performance, connect this equipment to a low impedance ground connection. Typical suitable connections are a ground spike or the steel frame of a building.

---

## Proprietary Rights Notice

This document and the information that it contains are the property of Illinois Tool Works Inc. (ITW). Rights to duplicate or otherwise copy this document and rights to disclose the document and the information that it contains to others and the right to use the information contained therein may be acquired only by written permission signed by a duly authorized officer of ITW.

---

## Trademarks

Instron<sup>®</sup> is a registered trademark of Illinois Tool Works Inc. (ITW). Other names, logos, icons and marks identifying Instron products and services referenced herein are trademarks of ITW and may not be used without the prior written permission of ITW.

Other product and company names listed are trademarks or trade names of their respective companies.

---

## Original Instructions

Copyright © 2017 Illinois Tool Works Inc. All rights reserved.  
All of the specifications shown in this document are subject to change without notice.

---

### Worldwide Headquarters

Instron  
825 University Avenue  
Norwood,  
MA 02062-2643  
United States of America

### European Headquarters

Instron  
Coronation Road  
High Wycombe,  
Bucks HP12 3SY  
United Kingdom

## Table of Contents

<b>Chapter 1</b>	<b>Introduction</b>	<b>7</b>
	About 3119-600 Series Chambers	7
	About this Manual	9
	Additional Chamber Documentation	9
	Product Labelling	10
	System Hazard Warning Labels	10
	Product Identification Label	10
	Control Panel and Rear Input Panel Labelling	10
<b>Chapter 2</b>	<b>Safety</b>	<b>11</b>
	General Safety Precautions	11
	Warning Signs Used	12
	Electrical	13
	Thermal Contact	14
	Specimens	14
	Cryogenic Gases: Asphyxiation and Toxicity	15
	Glass Fibre Insulation	15
	High Pressure Gases	16
	Rotating Parts	16
	Physical Testing Machine	16
	Material Safety Data Sheets	17
<b>Chapter 3</b>	<b>Function of Controls and Indicators</b>	<b>19</b>
	Chamber Door	19
	Power Indicator	19
	Door Handle	19
	Control Panel Buttons and Indicators	20
	Rear Input Panel Connections and Labels	22
	Removable Wedges	24
	Removing the Wedges	24
	Replacing the Wedges	24

<b>Chapter 4</b>	<b>Operating the Chamber</b> .....	<b>25</b>
	Getting Started .....	26
	Opening and Closing the Chamber Door.....	27
	Switching On the Chamber.....	28
	Enabling Low Speed Fan Mode .....	28
	Home Page .....	29
	Checking Settings.....	29
	Switching the Chamber Light On and Off .....	29
	Heating or Cooling to a Temperature Setpoint.....	30
	About the Temperature Setpoint .....	30
	Stopping Heating or Cooling .....	31
	Returning the Chamber to Ambient Temperature .....	31
	Shutting Down the Chamber .....	33
	Preventive Maintenance .....	34
	Changing the Eurotherm 3208 Controller Menu .....	35
	Changing the Alarm Settings.....	36
	Auxiliary Alarm.....	36
	Resetting a Tripped Alarm .....	37
	Changing the Temperature Units.....	37
	Changing the Ramp Rate .....	38
	Using the Timer/Programmer .....	39
	About the Programmer.....	41
	Running, Holding or Stopping a Program .....	42
	Connecting the Chamber to a Computer .....	43
	Analog Output.....	45
	Fault Finding.....	45
<b>Appendix A</b>	<b>Additional Configuration Parameters</b> .....	<b>49</b>
	Introduction.....	49
	Getting Started .....	49
	Changing User Levels.....	50
	3208 Controller Access Level Configuration .....	50
	Changing from Level 1 to Level 2 .....	51

Setting Level 2 Parameters .....	51
Autotune .....	53
Control Parameters .....	54
Run Recipe (Factory Reset and DC Output Calibration) .....	55
Resetting the Chamber to Factory Defaults .....	55
Calibrating an External Device using the Controller’s DC Output .....	55
DC Output Configuration .....	56
<b>Appendix B Hints and Tips for Using Chambers.....</b>	<b>57</b>
Minimising Energy and Coolant Consumption .....	57
Looking after your Equipment .....	58
Ease of Use .....	59
Optimising Your Testing .....	59



# Chapter 1

## Introduction

---

This chapter introduces the chamber and contains the following sections:

- About 3119-600 Series Chambers ..... 7
  - About this Manual ..... 9
  - Additional Chamber Documentation ..... 9
  - Product Labelling..... 10
- 

### About 3119-600 Series Chambers

The Instron 3119-600 Series environmental chamber provides a means of carrying out materials tests in an accurately controlled air temperature environment.

The chamber (see [Figure 1](#)) is designed to fit between the columns of a physical testing machine. Pullrod access is provided on the top and bottom surfaces of the chamber and an integrated control panel provides the user interface for all of the chamber functions. The chamber is supplied with removable wedges to allow easy removal of the chamber from the test area without dismantling the load string.

Different height chambers are available; these are selected to suit the required application. All chambers operate from ambient temperature to the top of their temperature range. An optional cooling module can be supplied if testing at below ambient temperatures is required.

The chamber window is heated to keep it frost free at below ambient temperatures. The limit of this feature is -30°C. Below this limit window clarity may degrade, however, depending on ambient temperature, humidity and other influencing factors, the central third of the window is expected to remain frost free.

The chamber can be mounted onto the load frame in a fixed position or on a roller mounting assembly, which enables the chamber to be moved clear of the working area. Refer to the Pre-Installation manual for mounting options.

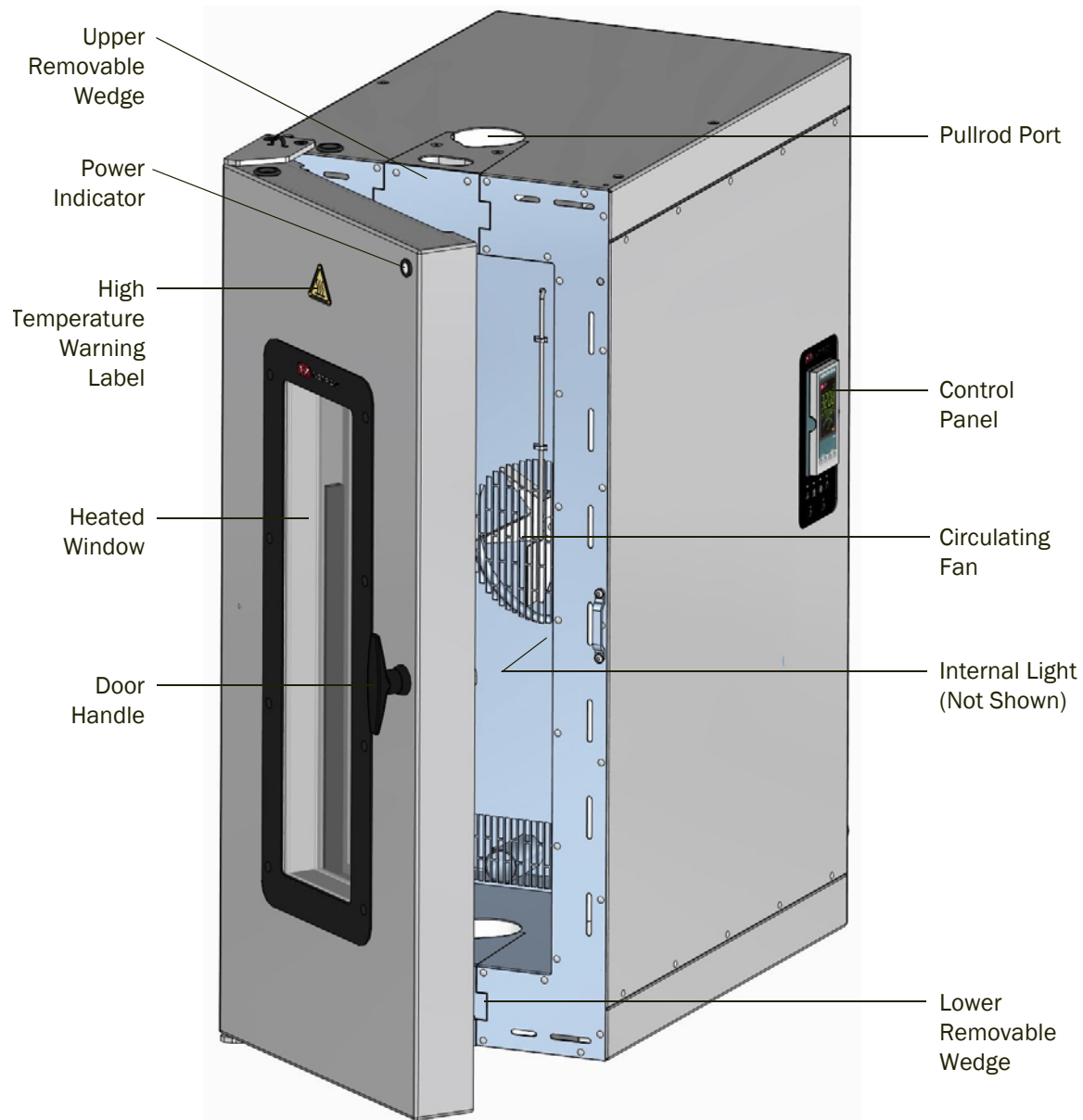


Figure 1. 3119-600 Chamber Components

---

## Caution

**Eyebolts are included with the chamber to enable initial positioning and installation of the chamber only.**

After installation, certification and maintenance of the eyebolts as lifting equipment become the customer's responsibility. Refer to relevant local legislation.



## About this Manual

This manual contains the information necessary to operate the chamber by giving safety information, describing the controls and providing detailed procedures for general operation.

Further to general operating procedures, [Appendix A](#) provides details about additional configuration procedures. Hints and tips on how to get the best from your chamber are provided in [Appendix B](#).

### Caution

---

**Other than the procedures prescribed in this manual, do not adjust the configuration parameters of the controller. Configuration parameter errors can seriously impair the performance of the controller or cause damage to the chamber.**

The procedures detailed in this manual have been validated by Instron. You are advised to use only these specific procedures and in the manner documented. You are advised not to change any parameters of the controller other than those detailed in this manual. Key combinations and/or sequences not documented in this manual may result in configuration parameters being modified. Instron does not accept liability for configuration changes other than those documented in this manual.

## Additional Chamber Documentation

Product specifications and detailed information on installing the chamber are provided in the Pre-Installation manual.



Refer to other documentation supplied with your testing system for load frame, pullrod, grips and software operating instructions.

# Product Labelling

## System Hazard Warning Labels

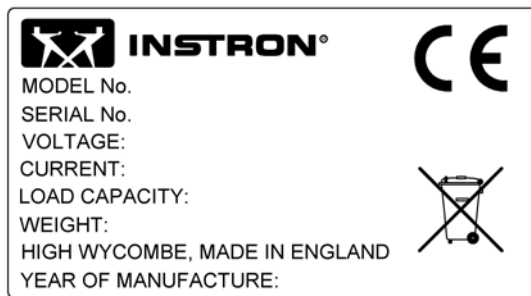
Various system safety labels are used to identify and draw your attention to potential hazard areas on your system. See “Safety” on page 11 for illustrations of all hazard labels and their meaning.

The following labels are visible on all 3119-600 series chambers:

Label	Location	Purpose
	Door front above window	High temperature hazard warning label - warns user about high temperature in vicinity. See page 14 for more details. Note that the window is heated when cooling is enabled, so the window can be hot at any time.
	Rear of chamber	Electrical hazard warning label - warns user about dangerous voltages. See page 13 for more details.

## Product Identification Label

The product identification is stamped onto a serial number plate that is attached to the rear of chamber, above the rear input panel.



## Control Panel and Rear Input Panel Labelling

See page 20 for control panel labelling and page 22 for rear input panel labelling.

# Chapter 2

## Safety

---

This chapter gives information on product safety labelling and operational hazards. It contains the following sections:

- General Safety Precautions ..... 11
- Warning Signs Used ..... 12
- Electrical..... 13
- Thermal Contact ..... 14
- Specimens ..... 14
- Cryogenic Gases: Asphyxiation and Toxicity ..... 15
- Glass Fibre Insulation ..... 15
- High Pressure Gases..... 16
- Rotating Parts ..... 16
- Physical Testing Machine ..... 16
- Material Safety Data Sheets..... 17

---

## General Safety Precautions

### Warning

---



**Hazard - Chambers have inherent critical risks, you are strongly advised to carry out your own safety risk assessment taking into account all the information provided in this chapter.**

Chambers involve inherent hazards from high temperature and sub-zero temperature surfaces and components. It is important to be aware of all parts which are potentially hazardous, particularly the insides of chambers and items which are removed from them.

Wherever it is considered that safety is compromised, press the fan button OFF on the touch panel controller or press the mains circuit breaker OFF (O) on the rear panel.

---



Carefully read the operating instructions and observe all Warnings and Cautions. The term Warning is used where a hazard may lead to injury or death. The term Caution is used where a hazard may lead to damage to the equipment or to loss of data.

Ensure that the system set-up and the test being performed constitute no hazard to operators or others (see general guidelines on page 27).

The following pages detail various general warnings that must be heeded at all times. There are more specific Warnings and Cautions in the text whenever a potential hazard exists.







The best safety precautions are a thorough understanding of the equipment by reading the instruction manuals and always using good judgement.

It is our strong recommendation that you carry out your own product safety risk assessment and use this to determine suitable personal protective equipment.

## Warning Signs Used

When a symbol is enclosed in a triangle, it becomes a warning sign. A symbol on its own may be a warning, e.g. the “dangerous voltage” symbol, or may indicate the use of a control e.g. “Transfer of heat, general” symbol means that the control switches heating on and off. Chamber controls are shown in the “[Function of Controls and Indicators](#)” chapter.

Table 1. Warning Signs

Sign	Meaning	Standard
	Warning - dangerous voltage	Symbol derived from BS6217:1981 (417-IEC-5036-a) “Dangerous voltage”
	Warning - hot surface	Symbol derived from ISO7000-0535 “Transfer of heat, general” Warning sign derived from BS 6217:1981 (417-IEC-5041)
	Warning - cold surface	Symbol derived from ISO 7000:1989 022 - graphical symbol for use on equipment cooling
	Warning - keep fingers away from rotating machinery	Symbol designed to ISO 3864 - international design standard for safety symbols.

---

# Electrical

## Warnings

---



**Electrical Hazard** – Ensure that the electrical socket used by the chamber power cable is connected to a suitably grounded point. Disconnect the unit from the power supply before removing any panel/cover or changing any fuse.

Repairs should only be carried out by an Instron Service Engineer, contact your local Instron representative if you suspect an electrical fault. Disconnect equipment from the electrical power supply before removing any electrical safety covers or replacing fuses. Do not reconnect the power source while the covers are removed. Refit the covers as soon as possible.



**Electrical Disconnection Hazard** – After disconnection from the power supply, leave adequate time for any residual charge to dissipate before touching the conductors of the power cable attached to the chamber.

When the chamber is disconnected from the mains power supply there may be a residual charge due to capacitance which gives a risk of electrical shock if the mains leads are touched. Until this charge has had sufficient time to dissipate, do not touch the power lead conductors even when the unit is disconnected from the power supply. Usually the charge dissipates in less than five minutes but the time is strongly dependent on atmospheric conditions. If in doubt consult a qualified electrician before disconnecting the unit mains supply.

---

## Thermal Contact

### Warning

---

---



Hazard - The operator **MUST** consult their supplier's Material Safety Data Sheet on the particular cryogenic gas being used before using this equipment at sub-ambient temperatures. Instron advise that you receive training in the handling of cryogenic gases from your supplier.

---

### Warning

---

---



High/Low Temperature Hazard - Wear adequate personal protective equipment when using equipment at extremes of temperature. This hazard applies to the physical parts of the chamber, items in or removed from the chamber and the hot air/cold cryogenic gases from inside the chamber.



Temperatures above 60°C and below 0°C can cause burns and serious injury. The chamber has been designed to eliminate possible hazards, but it is inevitable that the points where specimens or processed items leave the chamber can be at temperatures outside these limits.

---

Take particular care with items that are removed from chambers whilst still hot or cold. Provide receptacles for such items as they can maintain their temperature for long periods. When removing items from the chamber use the door as a shield from hot air or cold cryogenic gases. Cold vapours can cause burns similar to heat burns and provoke respiratory problems. Depending on the chamber mounting and any attached accessories, the door may open or close under its own weight (when unlatched).

## Specimens

### Warning

---

---



Hazard - Certain materials may become flammable, explosive or toxic when exposed to extreme temperatures.

The 600 series environmental chambers are not intended for use with unstable materials that may be flammable, explosive or toxic under extreme conditions. Any hazard resulting from the failure of a test specimen, assembly, or structure is entirely the responsibility of the owner and the user of the equipment.

---

# Cryogenic Gases: Asphyxiation and Toxicity

## Warning

---



**Asphyxiation Hazard - Cryogenic gases can reduce the amount of oxygen in the working environment to dangerous levels.**

Refer to your supplier's Material Safety Data Sheet for limits and monitoring information.

---

## Warning

---



**Toxicity Hazard - Carbon dioxide is toxic.**

In certain concentrations carbon dioxide can be dangerous. Refer to your supplier's Material Safety Data Sheet for limits and monitoring information.

---

When cryogenic gases are used with the chamber reduce all spaces around the pullrods as much as possible, or seal them. Routing the exhaust hose to a well ventilated area will reduce, but not eliminate, leakage of cryogenic gas around the chamber. Ensure that the area around the system is suitably ventilated to avoid asphyxiation / toxicity hazards.



*Extraction systems may need to meet legislative requirements. Refer to pertinent government publications for details.*

# Glass Fibre Insulation

## Warning

---



**Hazard - Do not disassemble the chamber. Glass fibre insulation can cause skin, eye or upper respiratory tract irritation in some individuals. Refer to the "[Material Safety Data Sheets](#)" on page 17.**

Repairs should only be carried out by an Instron Service Engineer. The glass fibre insulation used in the chamber is retained within its panels and does not represent a hazard in normal use. Contact your local Instron representative if any glass fibre insulation is exposed.

---

## High Pressure Gases

### Warning

---



**High Pressure Gas Hazard - Shutting off a gas cylinder may leave high pressure gas in pipe work. Always de-pressurise pipe work before disconnection.**

Instron advise that you receive training in the handling of high pressure gases from your gas supplier. Never disconnect high pressure pipe work until you are sure that it is safe to do so.

---

## Rotating Parts

### Warning

---



**Rotating Machinery Hazard - Disconnect power supply before removing the covers.**

Repairs should only be carried out by an Instron Service Engineer; contact your local Instron representative if you suspect a fault with the chamber. There are exposed rotating parts of the fan in the rear electrical compartment of the chamber. In normal operation access to the rear compartment is not required. Do not access the rear electrical compartment without first disconnecting the chamber from the power supply. Do not reconnect any power supply while the covers are removed.

---

## Physical Testing Machine

### Warning

---



**Moving Parts Hazard - The moving parts of physical testing machines on which chambers are fitted can give rise to severe moving part hazards.**

When using environmental chambers on testing machines the operator must be aware of all of the moving part hazards and use the environmental chamber taking all necessary precautions. Consult the safety section of the physical-testing machine operating instructions.

---



## Material Safety Data Sheets

This section contains information to allow you to obtain current Material Safety Data Sheets (MSDS) directly from the manufacturers. Instron is not responsible for the content or accuracy of these MSDSs.

Material	Location	Manufacturer MSDS information
Microtherm Standard Panel (Microtherm G).	<p>Microtherm G block is used in the chamber's removable wedges on the 3119-607, 3119-608 and 3119-610 models only.</p> <p>Microtherm G block is contained between the 3119-608 chamber's outer panels and inner case.</p>	<p>Belgium  MICROTHERM N V  INDUSTRIEPARK-NOORD 1,  B-9100 SINT-NIKLAAS  Phone : + 32 (0)3 760 19 80  Fax : + 32 (0) 3 760 19 99  Panel MSDS No: msds_G_SG_UK</p> <p>For the most up to date MSDS for the product visit the web page [<a href="http://www.microthermgroup.com">www.microthermgroup.com</a>].</p>
Sindanyo H91	Sindanyo H91 is used in the chamber's removable wedges on the 3119-605, 3119-606 and 3119-609 models only.	<p>Tenmat Limited  Ashburton Road West  Trafford Park, Manchester  M17 1RU  United Kingdom  Phone: +44 (0)161 872 2181  Fax: +44 (0)161 872 7596  e-mail: info@tenmat.com</p> <p>For the most up to date MSDS Information for the product visit the web page [<a href="http://www.tenmat.com">www.tenmat.com</a>].</p>

Material	Location	Manufacturer MSDS information
SUPERWOOL 607 Blanket	SUPERWOOL 607 Blanket is contained between all chamber outer panels and inner case.	THERMAL CERAMICS LIMITED Tebay Road, Bromborough Wirral, Merseyside CH62 3PH United Kingdom Phone: +44 (0) 151 334 4030 Fax: +44 (0) 151 334 1684
SUPERWOOL Paper 332-E	SUPERWOOL Paper 332-E is contained within all the chamber doors.	THERMAL CERAMICS HSE Department Route de Lauterbourg - BP 148 67163 WISSEMBOURG Cedex France Phone: +33 (0)3 88 54 95 50 Fax: +33 (0)3 88 54 29 20  Blanket MSDS No: 105 Paper MSDS No: 357  To confirm this is the most up to date MSDS for the product, visit the web page [ <a href="http://www.thermalceramics.com">www.thermalceramics.com</a> ]
CO <sub>2</sub> /LN <sub>2</sub>	Where option is fitted to your chamber.	Contact your local supplier for information on material safety.

## Chapter 3

# Function of Controls and Indicators

---

• Chamber Door .....	19
• Control Panel Buttons and Indicators .....	20
• Rear Input Panel Connections and Labels .....	22
• Removable Wedges.....	24

---

## Chamber Door

### Power Indicator

The white LED power indicator is located at the top right hand side of the door. It illuminates when the circuit breaker is switched on (see [“Rear Input Panel Connections and Labels”](#) on page 22).

### Door Handle

The door handle has a two stage operation, i.e. latch and seal. See [“Opening and Closing the Chamber Door”](#) on page 27 for details.

# Control Panel Buttons and Indicators

The control panel buttons and indicators are described below.



Figure 2. Control Panel

Table 2. Control Panel Buttons and Indicators









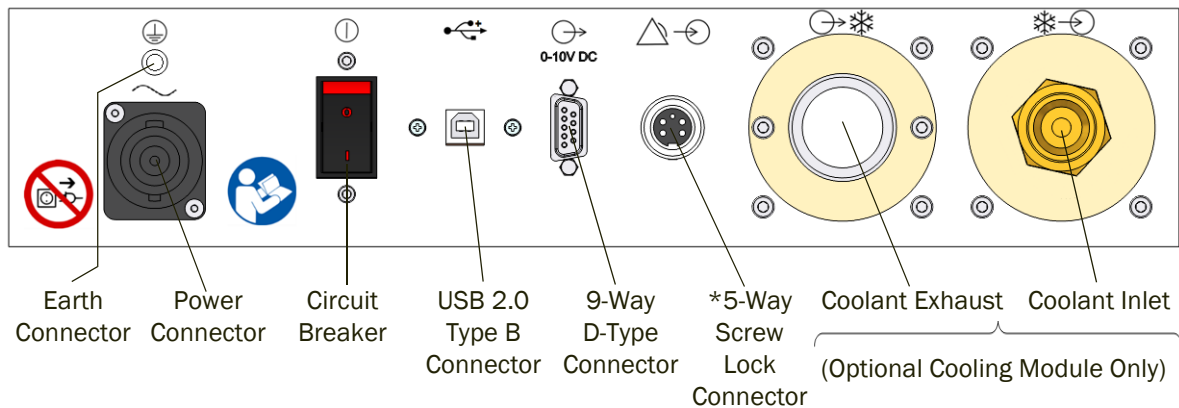
Indicator /Control	Type	Function
ALM	Indicator	Displays RED when an alarm is tripped.
OP1	Indicator	Displays ORANGE when heating power is demanded by controller (regardless of whether thermal control is enabled or not).
OP2	Indicator	Displays ORANGE when cooling power is demanded by controller is on (regardless of whether thermal control is enabled or not).
OP3	Indicator	Displays ORANGE when DC output is installed and configured in the Eurotherm controller.
OP4	Indicator	Displays ORANGE when the alarm is active.
°F	Indicator	Displays current temperature units. See <a href="#">“Changing the Temperature Units”</a> on page 37.
	Four character segmented display	Alpha/numeric display in green. During normal operation, displays the measured temperature of the chamber. Displays text when setting operating parameters. See the procedures in the <a href="#">“Operating the Chamber”</a> chapter.
	Six character segmented display	Alpha/numeric display in green. During normal operation, displays the target temperature (setpoint) of the chamber. Displays text when setting operating parameters. See the procedures in the <a href="#">“Operating the Chamber”</a> chapter.
SPX	Indicator	Not used by any procedures detailed in the chamber manuals. If illuminated contact your local Instron representative.
REM	Indicator	Displays ORANGE when communications between the chamber and a computer are active – see <a href="#">“Operating the Chamber”</a> on page 25.
RUN	Indicator	Displays ORANGE when a setpoint ramp rate is active, or when a program is active – see <a href="#">“Operating the Chamber”</a> on page 25.
MAN	Indicator	Not used by any procedures detailed in the chamber manuals. If illuminated contact your local Instron representative.
	Page button	Press to step through a menu of control parameters – see <a href="#">“Operating the Chamber”</a> on page 25.
	Scroll button	Press to scroll down a menu page of control parameters – see <a href="#">“Operating the Chamber”</a> on page 25.
	Down button	Decreases value of displayed setpoint or function. Holding button down will accelerate parameter decrease rate.
	Up button	Increases value of displayed setpoint or function. Holding button down will accelerate parameter increase rate.
	Fan button and indicator	The button switches fan ON or OFF. The indicator illuminates GREEN when the fan is ON. The indicator pulses when the fan is in low speed mode (see <a href="#">“Enabling Low Speed Fan Mode”</a> on page 28). The heat and cool functions will not operate unless the fan is selected.

Table 2. Control Panel Buttons and Indicators

Indicator /Control	Type	Function
	Heating button and indicator	The button allows the heater to operate on demand from the controller. The indicator illuminates GREEN when the heater is ON.
	Cooling button and indicator	The button allows the cooling valve to operate on demand from the controller. It also enables the window heaters. The indicator illuminates GREEN when the cooling system is ON.
	Light button and indicator	The button switches the interior light ON/OFF. The indicator illuminates GREEN when the light is ON.
	Door open indicator	When the door is OPEN, the indicator illuminates RED. The fan and all heating and cooling operations are halted when the door is opened. They resume when the door is closed.
	Alarm indicator	When lit RED, this indicates that the high or low temperature alarms have been triggered. When illuminated all heating and cooling operations are immediately halted. To reset the alarm see page 37.

## Rear Input Panel Connections and Labels



\*3119-607, 608 and 610 Chambers Only

Figure 3. Rear Input Panel

Table 3. Rear Input Panel Connections





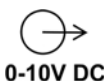
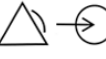

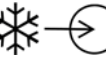

Label	Meaning	Function
	Earth Connector	Earth connection point
	Power Connector	Mains electrical supply input connector
	Circuit Breaker	Switches power supply to chamber. O = Off and I = On
	USB 2.0 Type B Connector	USB communications
	9-Way D-Type Connector	0 - 10 V output connector. Default = retransmission of the chamber temperature
	5-Way Screw Lock Connector	Auxiliary alarm switch input, such as a water cooled grips flow switch. An alarm condition will be detected when the switch contacts are open. When not required use shorting plug supplied. (3119-607, 3119-608 and 3119-610 chambers only)
	Coolant Exhaust Port	Coolant Exhaust Connection (option) 32 mm OD (1 <sup>1</sup> / <sub>4</sub> " diameter pipe)
	Coolant Input Port	LN <sub>2</sub> Coolant inlet connection (option) 1/2" BSP male CO <sub>2</sub> Coolant inlet connection (option) 3/8" BSP male

Table 4. Rear Input Panel Labels

Label	Meaning
	Caution - equipment may be damaged if you disconnect the power cable while power is on. Always switch off the electrical supply to the chamber <u>before</u> disconnecting the power cable from the chamber rear input panel.

## Removable Wedges

The chamber is supplied with removable wedges, to allow easy removal of the chamber from the test area without dismantling the load string.

### Caution

---

The wedge section is fragile and therefore should always be handled with care.

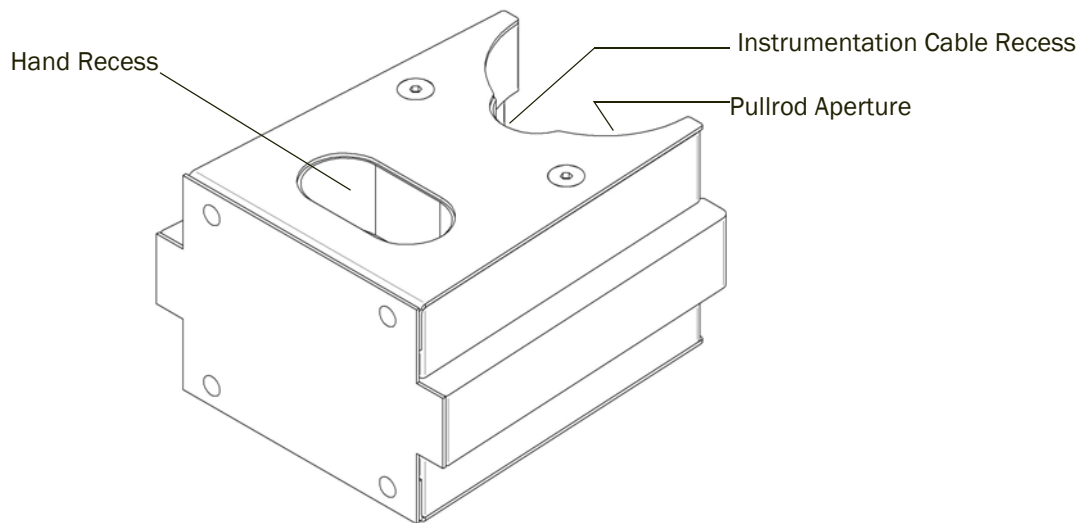


Figure 4. Removable Wedge

### Removing the Wedges

1. Open the chamber door.
2. Grip the wedge using the hand recess and pull forwards.
3. Repeat the above procedure for the remaining wedge.

### Replacing the Wedges

1. Open the chamber door.
2. Slide the wedge into position, ensuring that any instrumentation cabling is located in the recess provided.
3. Repeat for the remaining wedge.



# Chapter 4

## Operating the Chamber

---

This chapter describes the sequence of operating the chamber in normal use and contains the following sections:

• Getting Started .....	26
• Heating or Cooling to a Temperature Setpoint .....	30
• Stopping Heating or Cooling .....	31
• Shutting Down the Chamber .....	33
• Preventive Maintenance .....	34
• Eurotherm 3208 Controller Menu .....	35
• Changing the Alarm Settings .....	36
• Auxiliary Alarm .....	36
• Resetting a Tripped Alarm .....	37
• Changing the Temperature Units .....	37
• Changing the Ramp Rate .....	38
• Using the Timer/Programmer .....	39
• Connecting the Chamber to a Computer .....	43
• Analog Output .....	45
• Fault Finding .....	45

---

### Caution

---

**Other than the procedures in this chapter, do not adjust the configuration parameters of the controller. Configuration parameter errors can seriously impair the performance of the controller or cause damage to the chamber.**

The procedures detailed in this chapter have been validated by Instron. You are advised to use only these specific procedures and in the manner documented. You are advised not to change any parameters of the controller other than those detailed in this chapter. Key combinations and/or sequences not documented in this manual may result in

configuration parameters being modified. Instron does not accept liability for configuration changes other than those documented in this manual.



*When using the procedures described in this chapter for the Eurotherm 3208 controller, the controller will time out and return to the home page if there is a delay of more than 30 seconds between key presses.*

## Getting Started

Before you start, ensure that:

- The chamber is securely mounted to the test machine, or if a roller mount is used, that it is securely fixed in the test position.
- The load string and specimen are aligned and securely fixed according to the test machine manufacturer's operating instructions.
- Any sensitive equipment (such as the machine's load cell) is adequately protected from extremes of temperature such that it operates within its specified temperature range.
- The voltage rating on the chamber matches the mains supply voltage.
- The chamber is connected to an electrical mains supply and that all cables are routed to avoid damage during chamber and test system use. Always clip or tie cables to avoid a trip hazard.
- You are familiar with the information in [Appendix B "Hints and Tips for Using Chambers"](#).

If cooling is required, ensure that:

- The room is suitably ventilated.
- The exhaust hose is connected to the exhaust port on the rear of the chamber, the hose is not blocked and is routed to a suitably ventilated area.
- A suitable cryogenic gas source at the required pressure (50 bar for CO<sub>2</sub> or 1.5 bar for LN<sub>2</sub>) is connected to the rear panel and that the supply is on (refer to any instructions provided by the gas supplier). Below these pressures there will be a significant reduction in performance. This means that, for instance, a set temperature may take longer to achieve, or in an extreme case, it may not be achievable.
- All hoses are routed to avoid trip hazards and damage during chamber/test system use.

---

## Caution

---

Do not bend or damage the temperature probe. The construction of the probe is such that any abuse may destroy it.

---

## Warning

---



**Crush Hazard - Moving components can cause injury.**

After the chamber, push/pullrods and grips/fixtures etc. have been installed, it is important to prevent any accidental crushing by the moving components.

When setting up, use the system features to:

- Prevent the grips coming together.
  - Prevent the crosshead coming into contact with the chamber.
  - Prevent the moving grip driving into the chamber.
  - Provide a minimum clearance of 30 mm to prevent fingers from becoming trapped between moving components.
- 

## Opening and Closing the Chamber Door

The correct door handle position is vertical when closed or open.

---

## Warning

---



**High/Low Temperature Hazard - Take care opening the door.**

Always wear suitable personal protective equipment when opening the chamber door. Hot gases can escape upwards. Cold gases can escape downwards.



**To open the door:**

1. Turn the handle 90° counter clockwise. This release the compression on the door seal.
2. Turn the handle another 90° counter clockwise. This unlatches the door.
3. Swing the door open.

**To close the door:**


1. Ensure the door handle is turned counterclockwise as far as it will go and is vertical.

2. Swing the door closed until the door seals touch the frame.
3. Turn the handle 90° clockwise. This engages the door latch.
4. Turn the handle a further 90°. You will see the door pull into the frame. This compresses the door seal.

## Switching On the Chamber


1. Close the chamber door (see [page 27](#)).



*The door must be closed during all procedures. Opening the door stops the fan and any heating or cooling that is taking place. When the door is open the control panel door indicator  illuminates RED.*

*The fan and all heating and cooling operations are halted when the door is opened. They resume when the door is closed.*

2. Switch power to the chamber ON using the circuit breaker on the rear panel of the chamber.

The controller display illuminates (the indicators flash) and the controller runs through its self test routine. When complete, the controller upper display shows the current chamber temperature and the lower display shows the current setpoint. All indicators extinguish apart from the control panel alarm indicator  which illuminates RED.



*For the analog output, **OP3** displays at all times. See [Table 2](#) on [page 21](#) for details.*

3. Press the fan button .

The RED alarm indicator extinguishes, the fan button indicator illuminates GREEN and the fan motor starts. Pressing the fan button again stops the fan motor and the GREEN indicator extinguishes.



*The fan must be running for heating or cooling to take place. Switching off the fan during any of the procedures immediately stops heating or cooling.*

You are now ready to use the chamber according to the procedures described in this chapter.


## Enabling Low Speed Fan Mode

There are two modes of fan operation: full speed and low speed.

In normal use, the fan is set to full speed mode by pressing the fan button for less than 1.5 seconds (i.e. by 'normal' pressing of the fan button). If the specimen is very delicate

and/or the transducer measurement is very small, using low fan speed mode could reduce the noise on the readings.

**To enable low speed fan mode:**

- Press and hold the fan button  for 1.5 seconds.

The fan indicator pulses GREEN when low speed fan mode is enabled.

**To stop the fan motor whilst in low speed fan mode:**

- Press the fan button  for less than 1.5 seconds.

**To toggle between low and full speed fan modes (while either fan mode is enabled):**

- Press the fan button  for 1.5 seconds.

The indicator illuminates or pulses GREEN accordingly.



*It is normal for the noise level produced by the fan to increase slightly when it is in low speed mode.*

## Home Page

When the self test is complete the controller upper display shows the current chamber temperature and the lower display shows the current setpoint. This is referred to in the following procedures as the 'home page'.

## Checking Settings

If you wish to change the units of temperature displayed, see [“Changing the Temperature Units”](#) on page 37.


If you are the first user, the chamber alarms and setpoint ramp rates are set to the default values. If these settings are left at their default values, under normal conditions the alarms will not interfere with the test and the chamber will heat or cool at its maximum rate. If you are not the first user, the alarm and setpoint ramp rate may have been set to values that could impair the performance of the chamber during the test. For more details on the alarm and setpoint ramp rate settings and how to change them, see page 36 and page 38 respectively.

## Switching the Chamber Light On and Off

Once the chamber is ready for use, you can switch the chamber light on or off as required.



The interior light is designed for use at any temperature within the range of the chamber.

1. Press the light button  to switch on the chamber light.  
The indicator above the button illuminates GREEN to show the light is ON.
2. Press the button again to switch off the chamber light. The indicator extinguishes.



## Heating or Cooling to a Temperature Setpoint

### About the Temperature Setpoint

The temperature setpoint is the user specified desired temperature of the chamber.

Before you start this procedure, ensure that all the steps in “[Getting Started](#)” on page [26](#) are complete.

To heat or cool to a temperature setpoint:

1. Press either the up button  or the down button  until the lower display shows the setpoint you require.
2. Wait for the display to flash once. The setpoint is accepted.




### Warnings

---



High/Low Temperature Hazard - Wear personal protective equipment when handling equipment at extremes of temperature. Temperatures above 60°C and below 0°C can cause burns and serious injury.



3. The fan indicator is illuminated GREEN when the fan is running. If it is not illuminated, press the fan button .
4. To begin thermal control, either:
  - a. Press the heater button , or
  - b. If the setpoint is below ambient temperature (and a cooling module option is fitted) press the cooling button .



The cooling button also enables the window heaters. During heating only operations it is recommended that cooling is disabled.



For hints and tips on how to get the best from your chamber, see [Appendix B](#).

## Caution

---

Ice may form on the inside of the chamber if you open the door when the chamber temperature is below 0°C. When the chamber returns to ambient temperature the ice will melt and the resulting water could affect your load frame or accessories.

The **OP1** indicator illuminates when the temperature of the chamber is below the setpoint (when heating) and the **OP2** indicator illuminates when the cooling solenoid is open temperature of the chamber is above the setpoint (when cooling). These display regardless of whether thermal control is enabled or not. The OP1 and OP2 indicators are solid when maximum power is being demanded and flash when the demanded power is reduced.

The appropriate indicator illuminates and the chamber temperature proceeds to the setpoint.

5. Allow the chamber to stabilise at the setpoint for as long as possible.



Although the air within the chamber and the chamber itself will have reached the setpoint, the load string temperature will usually take longer to stabilise due to the heat losses in the pullrods and the mass of the grips used.

## Stopping Heating or Cooling

To stop heating or cooling, deselect the appropriate button. Switching the fan off will stop heating and cooling automatically.

## Returning the Chamber to Ambient Temperature

The best way to complete a temperature run is to return the setpoint to room temperature and allow the chamber to reach near ambient temperature. This has the advantage that the contents of the chamber will be near ambient temperature and are less likely to cause a thermal hazard to the operator.

After testing at sub-ambient temperatures and before maintenance, heat the chamber to 100°C for 30 minutes or until all moisture caused by frost has been driven off. Then return the chamber to ambient as described above.

## Caution

---

---

If you do not allow the chamber to return to ambient temperature after testing below 0°C, ice may form on the inside of the chamber when you open the door.



## Shutting Down the Chamber

### Caution

---

---

Equipment may be damaged if you disconnect the power cable while power is on.

Always switch off the electrical supply to the chamber before disconnecting the power cable from the chamber rear input panel.

When you have finished testing, you are advised to turn the chamber off and conduct any preventive maintenance necessary (see page 34).

To turn off the chamber:

1. If you are using high pressure cryogenic gas:

### Warning

---

---



**High Pressure Gas Hazard - Shutting off a high pressure cryogenic gas cylinder may leave high pressure gas in pipe work. Always de-pressurise pipe work at the end of a test session.**

Never disconnect high pressure pipe work until you are sure that it is safe to do so.

---

- a. Shut the high pressure cryogenic gas cylinder valve.
  - b. Set the chamber to a cooling cycle. The solenoid valve opens and the pressure in the pipe work decays to ambient atmospheric pressure.
2. In all cases, when the chamber reaches ambient temperature turn it OFF using the contact breaker switch on the rear panel of the chamber.

## Preventive Maintenance

This section covers the chamber only. Refer to the documentation provided for maintenance of load frames, grips, pullrods, etc.

### Warning

---



**High/Low Temperature Hazard - Do not undertake any preventive maintenance while the chamber is above 60°C or below 0°C.**

Temperatures above 60°C and below 0°C can cause burns and serious injury. Wait until the chamber is near ambient temperature before undertaking any preventive maintenance

---

### After Each Test Session

- Clean the interior of the chamber with a soft dry cloth to remove any debris.

### Periodically

Depending on chamber use:

- Check all cables, hoses and connectors for damage.
- Wipe the exterior of the chamber with a soft damp cloth.
  - Do not use abrasives, harsh detergents or solvents.
  - Do not use liquids near electrical connectors.
- Inspect the door seal for damage.


### Every 6 Months

- Arrange for calibration verification, traceable to national or international standards. Contact your local Instron representative. If the chamber is used routinely below 0°C then the thermocouple characteristics can change more rapidly. In this case it is recommended that thermocouple calibration is checked more frequently.

### As Required Dependant on Chamber Use

- Replace the thermocouple. It is not possible to give a definitive lifetime of a thermocouple as it depends on test temperature, test length and temperature cycling. Under normal use it is recommended that the thermocouple is replaced every 2 years.

# Changing the Eurotherm 3208 Controller Menu

Figure 5 illustrates the menu sequence observed when pressing the scroll button . The procedures that follow this section are in the order they appear in the menu.

There are additional menu choices when **tm.cfg** has been configured to **prog**. See “Using the Timer/Programmer” on page 39 for details.

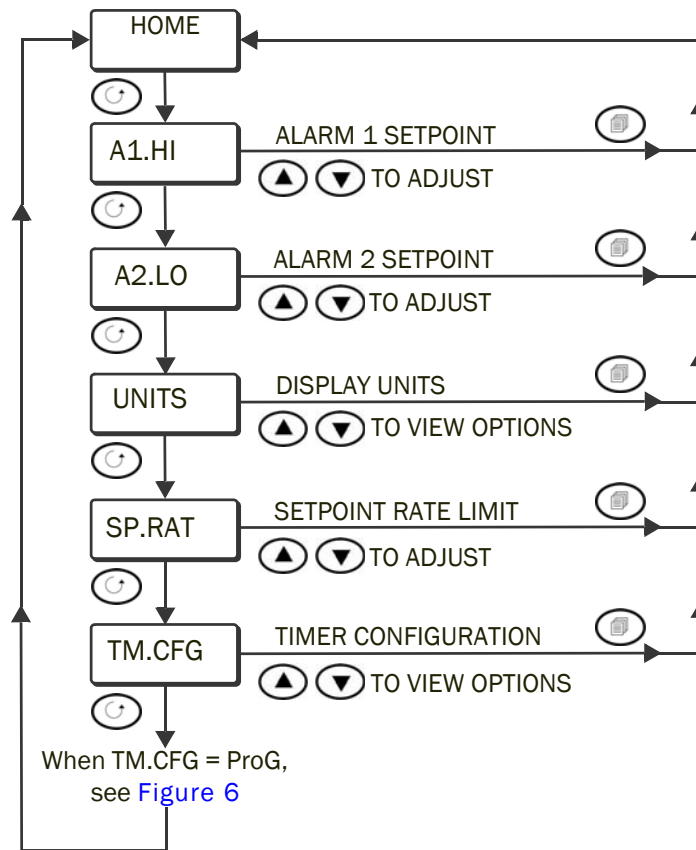



Figure 5. Eurotherm 3208 Controller Menu



## Changing the Alarm Settings

The chamber is delivered with the alarms set 10°C either side of the operating range of the chamber, i.e. -110°C to +360°C. You can change these alarm values if, for example, you always operate within a much smaller range or you wish to protect a delicate specimen.

To change the alarm setting:

1. Press the scroll button  a number of times until either **A1.HI** (high temperature alarm) or **A2.LO** (low temperature alarm) appears in the controller lower display.

If you wait a few seconds, the text **ALARM 1 SETPOINT** (high temperature alarm) or **ALARM 2 SETPOINT** (low temperature alarm) as appropriate, scrolls across the screen.

2. Press either the up button  or the down button  as appropriate until the figure displayed is the alarm value you require.
3. Wait a few seconds. The lower display flashes once to show the value is accepted.



*If the low alarm is set higher than the ambient temperature, or the high alarm is set lower than the ambient temperature, the chamber will not function.*



*Do not set the alarm limit too close to your setpoint temperature:*

- Any temperature control overshoot could cause the alarm to trip.
- A tripped alarm takes some time to reset (see [“Resetting a Tripped Alarm”](#) below).

4. Press the page button  to return to the home page.


## Auxiliary Alarm

The 3119-607, 3119-608 and 3119-610 chambers have provision for the connection of an external alarm switch, e.g. a water cooled grips flow switch. An alarm condition will be detected when the switch contacts are open.

A shorting plug is provided for use in applications where an auxiliary alarm switch is not required.

## Resetting a Tripped Alarm



When an alarm trips:

- The chamber stops heating (or cooling).
- The fan stops.
- The **ALM** indicator displays in the controller's upper indicators.
- Scrolling text describing the alarm tripped alternates with the setpoint temperature in the controller's lower display.
- The alarm indicator  illuminates red.




*As all heating and cooling functionality is inhibited when an alarm is tripped, you can only allow the chamber to cool or warm naturally until the temperature is within the normal operating range. Opening the chamber door will speed the return of the chamber to within the alarm parameter, but take great care due to the high or low temperature hazard this presents to the operator.*

When the chamber is within the valid temperature range of the alarms:


1. Press the scroll button  and the page button  at the same time to acknowledge the alarm.

The **ALM** indicator in the controller's upper indicators extinguishes and the scrolling message ceases to display.

2. Press the fan button  to cancel the control panel alarm indicator. You can then start heating or cooling again.

## Changing the Temperature Units

Temperature units are displayed at the top right hand of the controller display. To change the units:

1. Press the scroll button  a number of times until **UNITS** is shown in the lower display.

If you wait a few seconds, the text **DISPLAY UNITS** scrolls across the screen


2. Press the up or down buttons,  or , until the units you want are shown in the upper display.

There is a choice of **%C**, **%F**, **%k**, **nonE** or **PErc** (%).

## Caution

---

Do not select **nonE** or **PErc** as these are not supported and you will not be able to control the chamber temperature.

3. Wait a few seconds and the chosen units will flash once. This indicates the selection is accepted.
4. Press the page button .

The display returns to the home page and for:

- °C and °F, the selected temperature units displays above the upper display.
- °K there are no units displayed.

## Changing the Ramp Rate


The ramp rate is the target speed for temperature changes in the chamber, expressed in degrees per minute. The real speed of temperature change cannot exceed the power limitations of the heating element or cooling medium. When cooling without cryogenic gases the speed will be limited to the heat dissipation rate of the chamber. The size of the load string and specimen can have an affect the speed of temperature changes.

The default ramp rate setting (OFF) applies full power to the heating element or fully opens the cooling solenoid (where optional cooling module is fitted). This is sufficient for most testing applications. Changing the ramp rate is useful if you want a slow rise or fall in temperature.






*The programmer function takes precedence over a setpoint ramp rate. In order to use a setpoint ramp rate the programmer must be turned off (default). See [“Using the Timer/Programmer”](#) on page 39 for details.*

To change the ramp rate:

1. Press the scroll button  a number of times until **SP.RAT** is shown in the lower display.

If you wait a few seconds, the text **SETPOINT RAMP RATE** scrolls across the screen.

2. Press either the up button  or the down button  as appropriate until the figure displayed is the ramp rate you require (in degrees per minute).
3. Wait a few seconds. The lower display flashes once to show the value is accepted.
4. Press the page button  to return to the home page.



### Heating or cooling at a set ramp rate

- To enable the ramp rate, enter a new setpoint (see [page 30](#)).



*If your setpoint was already determined, change it by 1°, wait for the controller to accept it and then change it back to apply the new ramp rate.*

- Start heating or cooling as required. The control temperature proceeds to the setpoint at the new ramp rate.

The **RUN** indicator displays until the ramp has been completed. During a ramp the upper display shows the measured chamber temperature and the lower display shows the 'working setpoint'. The working setpoint counts from the current chamber temperature to the desired setpoint at the ramp rate. To see the actual setpoint at any time, press the scroll button  once. Press the page button  to return to the home page.

The setpoint can be adjusted at any time during a ramp as detailed on [page 30](#). The ramp to the new setpoint will start from the current measured chamber temperature. A ramp rate can be altered at any time during a ramp using the instructions detailed in steps [1](#) to [4](#) above.

### Turning off a ramp rate


- Follow step [1](#) above and press the down button until **OFF** is displayed.
- Follow steps [3](#) and [4](#).

The **RUN** indicator will no longer be displayed when the setpoint is changed. The setpoint ramp rate is now disabled and the chamber will heat and cool at its maximum rate.

## Using the Timer/Programmer

The controller's programmer mode allows a series of ramps and dwells to be configured. When the timer configuration (**TM.CFG**) parameter is set to **none**, the controller menu is as shown in [Figure 5](#). The timer/programmer detailed in this section is only available if you have the timer configuration set to **ProG**. The other timer functions (**dwEl**, **DELy** and **SFSst**) are not supported by the 3119-600 chambers.

To turn on the timer/programmer:

- From the home page, press the scroll button  a number of times until **TM.CFG** is shown in the lower display.

If you wait a few seconds, the text **TIMER CONFIGURATION** scrolls across the screen.

2. Press either the up button (▲) or the down button (▼) until **ProG** appears in the controller upper display.
3. Wait a few seconds. The display flashes once to show the value is accepted.
4. Press the page button (📄) to return to the home page.

The full menu of [Figure 5](#) plus that of [Figure 6](#) is now available.

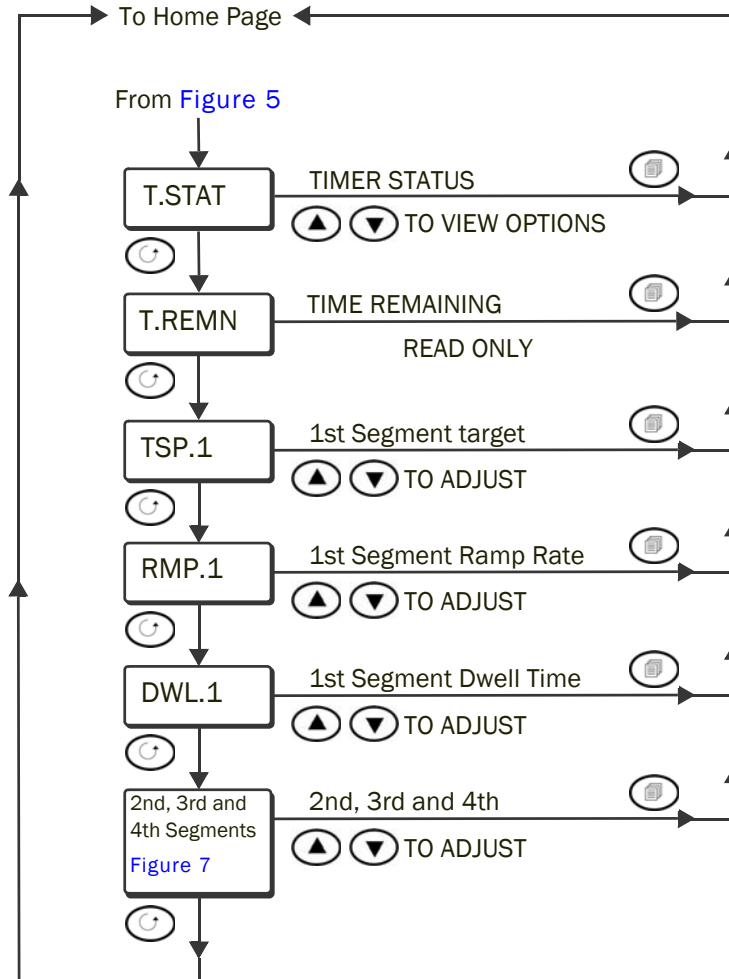


Figure 6. Eurotherm 3208 Controller TM.CFG = ProG Menu

**To turn off the timer:**

1. From the home page, press the scroll button (📄) a number of times until **TM.CFG** is shown in the lower display.
2. Press either the up button (▲) or the down button (▼) until **nonE** appears in the controller upper display.
3. Wait a few seconds. The display flashes once to show the value is accepted.



- Press the page button  to return to the home page.

Only the menu of [Figure 5](#) is now available.

## About the Programmer

The eight segment programmer consists of four ramp/dwell pairs. Each ramp comprises a controlled rate of change of setpoint to a target level. Each ramp is followed by a dwell at that level. You set the ramp rate, target level and dwell time. An example program profile is shown in [Figure 7](#).

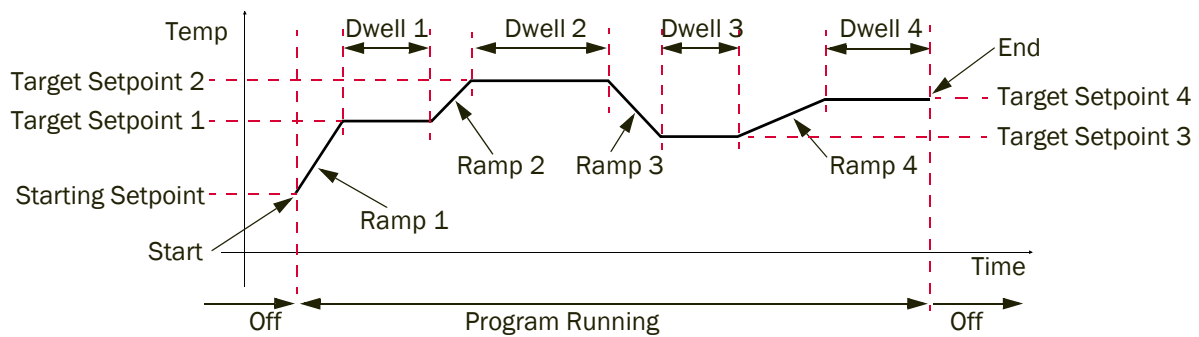


Figure 7. Example of Eight Segment Program

### To configure the programmer:





The program always starts from the current measured temperature.









The time units are always hours and minutes, e.g. HH:MM.

Temperature units are the units currently set (see [page 37](#)).



This procedure assumes you are setting all the program parameters in sequence before the controller times out and returns to the home page. If the controller does return to the home page, you will need to press the scroll button until the parameter you require appears.

- From the home page, press the scroll button  a number of times until **TSP1** is shown in the lower display.  
If you wait a few seconds, the text **TARGET SETPOINT 1** scrolls across the screen.
- Press the scroll button , **Tsp.1** appears in the lower display.  
If you wait a few seconds, the text **Target setpoint1** scrolls across the screen.

3. Press either the up button  or the down button  to set the target setpoint for section 1 of the program.
4. Press the scroll button , **rmp.1** appears in the lower display.  
If you wait a few seconds, the text **ramp rate1** scrolls across the screen.
5. Press either the up button  or the down button  to set the ramp rate for section 1 of the program.
6. Press the scroll button , **dwel.1** appears in the lower display.  
If you wait a few seconds, the text **dweltime1** scrolls across the screen.
7. Press either the up button  or the down button  to set the dwell time for section 1 of the program.
8. Continue through the menu for sections 2, 3 and 4, repeating the actions described in steps 2, 4 and 6







When the timer ends it will dwell at the value of **TSP.4**, e.g. if **TSP.4** is set to 200 °C the controller will dwell at 200 °C after the timer has finished.

If you want to return the chamber to ambient at the end of a program set **TSP.4** to an ambient temperature.

Where ramp/dwell pairs are not required, set the ramp rate and dwell parameters to **OFF** and set the target setpoint the same as the preceding segment.

## Running, Holding or Stopping a Program

1. Configure your program as described in the procedure on page 41.
2. From the home page, press the scroll button  a number of times until **T.STAT** is shown in the lower display.
3. Press either the up button  or the down button  to select either:
  - a. **run** - The program starts and **RUN** displays orange in the controller lower indicators.
  - b. **hoLd** - The program pauses. **RUN** flashes orange in the controller lower indicators.
  - c. **rES** - The programme stops and returns to the start.If you are in the **T.STAT** screen when the program is complete, a fourth state of **end** displays.
4. Press the scroll button , **T.remn** appears in the lower display.  
If you wait a few seconds, the text **TIME Remaining** scrolls across the screen.

This parameter is read only. It shows what remains of the sum of the dwell times you have programmed. It can be accessed at any time when your program is running.



*This parameter is useful if you have long dwell times, however it cannot sum the ramp times. Therefore if you have long ramp times, the value displayed will not indicate when your program will end.*

## Connecting the Chamber to a Computer

The chamber temperature can be controlled and recorded by supported Instron software packages on a PC with a supported operating system<sup>1</sup>. The level of functionality is determined by the software package used (refer to the relevant Instron software manual for details). In order to control the chamber via USB, the driver on the provided CD needs to be installed on the appropriate computer(s). The instructions below describe how to install the driver.

### Before Installation

1. Do not connect the chamber USB to the computer.
2. Log in as an administrator.

### Installation

3. Insert the CD.
4. Run setup.exe.
5. Connect the USB cable to the chamber and a spare port on your computer. See provided installation drawing for details.
6. Follow the on screen prompts and select automatic installation. This step may need to be repeated several times.
7. Verify the installation was successful using the instructions provided with your Instron software. If you are prompted to select a COM port number follow the instructions below. Leave all other COM port settings as their defaults (Baud Rate: 9600 and Address/Unit ID: 1).

1. Supported operating systems: Windows<sup>®</sup> 7 (32 & 64 bit) and Windows<sup>®</sup> 10.

8. To find the COM port numbers associated with the chamber, open the Device Manager. Follow the appropriate instructions below for your operating system:
  - a. (Windows® 7): Click the **Start** button, then click **Control Panel > System and Maintenance > Device Manager**.

(Windows® 10): Find and open the **Device Manager**

  - b. If you are prompted for an administrator password or confirmation, type the password or provide confirmation.
  - c. Expand **Ports (COM & LPT)** and look for a series of 4 ports named **USB Serial Port** as shown in [Figure 8](#). Note the highest COM port number in the series of 4. This may be required by supported Instron software.

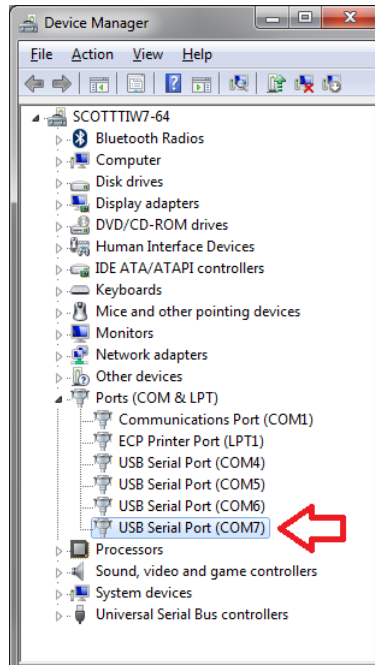


Figure 8. Windows® 7 Device Manager with chamber COM Ports Highlighted

## Analog Output

The 0-10V DC retransmission of the chamber temperature can be monitored and recorded using certain Instron equipment and software. If required, the output can be used to calibrate an external device. See [“Calibrating an External Device using the Controller’s DC Output”](#) on page 55 for details.

## Fault Finding

### Warning

---



**Electrical Hazard – Disconnect the unit from the power supply before removing any panel/cover for fault finding purposes or changing any fuse.**

Disconnect equipment from the electrical power supply before removing any electrical safety covers or replacing fuses. Do not reconnect the power source while the covers are removed. Refit the covers as soon as possible.

---

### Caution

---

**Repairs should only be carried out by an Instron Service Engineer.**

If a fault condition is suspected, follow the instructions in this chapter ([“Operating the Chamber”](#)) very carefully to ensure that any difficulties encountered are not as a result of operator negligence or misuse.

When a fault condition has been identified refer to [Table 5](#) to identify the possible cause(s). Any repairs that require the dismantling of the chamber should only be carried out by an Instron service engineer.

Should a fault be discovered with your environmental chamber, contact your local Instron service office or agent. However, note the following points:

- Always disconnect the chamber from the power supply before attempting any repair or component replacement.
- Ensure that the replacement part is correct.
- Take care to fit the replacement component in exactly the same way as the original was fitted.

- Check all connections and ensure that all covers are in place before re- connecting the power supply.





*If the fault is not resolved by the following fault finding table, contact your local Instron representative.*

*Table 5. Fault Finding*

Fault Condition	Possible Cause
Chamber does not operate	<ul style="list-style-type: none"> <li>• Check Mains Supply switch on rear panel is on (I).</li> <li>• Check mains supply is on.</li> </ul> If the problem persists, contact your local Instron representative.
Touch Panel controls do not illuminate or they flash continuously	<ul style="list-style-type: none"> <li>• Check that the chamber is connected to the correct supply voltage.</li> <li>• Check that the mains O/I switch is set to I.</li> </ul> If the problem persists, contact your local Instron representative.
The push buttons do not illuminate and the push buttons have no effect, but the display illuminates.	Contact your local Instron representative.
The controller display does not illuminate but the push buttons and push button LED's operate.	Contact your local Instron representative.
The fan does not rotate	<ul style="list-style-type: none"> <li>• The door is open.</li> <li>• The fan is seized. Contact your local Instron representative.</li> <li>• The fan motor is not working. Contact your local Instron representative.</li> </ul>
The heat button has no effect	<ul style="list-style-type: none"> <li>• Fan not operating.</li> <li>• No heat demand from the Eurotherm temperature controller. Check OP1 illuminated and that the set point is above ambient temperature.</li> <li>• Heating element not operating. Contact your local Instron representative.</li> </ul>

Table 5. Fault Finding

Fault Condition	Possible Cause
The cool button has no effect	<ul style="list-style-type: none"> <li>• Cooling pack not fitted.</li> <li>• Cryogenic supply not turned on.</li> <li>• Fan not operating.</li> <li>• No cool demand from the Eurotherm temperature controller. Check OP2 illuminated and that the set point is below ambient temperature.</li> <li>• The cryogenic gas supply is at a lower pressure than required (50 bar for CO<sub>2</sub> or 1.5 bar for LN<sub>2</sub>). Below these pressures there will be a significant reduction in performance.</li> </ul> <p>If the problem persists, contact your local Instron representative.</p>
Lights do not illuminate	<ul style="list-style-type: none"> <li>• Check bulbs and replace if necessary.</li> </ul> <p>If the problem persists, contact your local Instron representative.</p>
Alarm warning light does not extinguish 	<ul style="list-style-type: none"> <li>• Check if chamber temperature is higher or lower than the alarm points AL1 or AL2.</li> <li>• If necessary readjust the alarm set points.</li> </ul>
Door open warning light does not extinguish 	<ul style="list-style-type: none"> <li>• Check door is closed.</li> <li>• Possible door switch fault. Contact your local Instron representative.</li> </ul>
The outer window does not heat when the cooling mode is selected	<ul style="list-style-type: none"> <li>• Contact your local Instron representative.</li> </ul>





# Appendix A

## Additional Configuration Parameters

---

• Introduction . . . . .	49
• Getting Started . . . . .	49
• Changing User Levels . . . . .	50
• Autotune. . . . .	53
• Control Parameters . . . . .	54
• Run Recipe (Factory Reset and DC Output Calibration) . . . . .	55
• DC Output Configuration . . . . .	56

---

### Caution

---

Do not adjust parameters of the controller that are not documented in this manual. Configuration parameter errors can seriously impair the performance of the controller or cause damage to the chamber.

This appendix details how to change chamber control parameters. If such changes lead to problems operating the chamber, you should restore the factory settings. The product warranty does not cover user changes to the control parameters.

## Introduction

This appendix is intended for experienced users only (e.g. laboratory managers), and contains information on procedures outside of routine operation.

Hints and tips on how to get the best from your chamber are contained in [Appendix B](#).

## Getting Started

Refer to [Chapter 3 “Function of Controls and Indicators”](#) and [Chapter 4 “Operating the Chamber”](#) to familiarise yourself with the controls and normal operating procedures.

## Changing User Levels

### 3208 Controller Access Level Configuration

The 3208 controller fitted to the 3119-600 series of chambers has the following levels of access:

- Level 1 - The procedures accessible for this level are described in previous chapters.
- Level 2 - This level provides access to level 1 procedures and the additional setup procedures shown in [Table 6](#). Under normal use, this level of access is not required.

*Table 6. 3208 Controller Access Level Configuration*

Order	Eurotherm Parameters	Purpose	Number of Parameters	Operation (Level 1)	Setup (Level 2)
1	Autotune	To improve control at specific temperatures.	2	Not Available	Read/Write
2	Control Parameters	To allow manual adjustment of control behaviour.	8	Not Available	Read/Write
3	Run Recipe	To reset parameters to factory defaults. or: To assist with DC calibration procedure.	1	Not Available	Read/Write
4	DC Output Configuration	To check DC calibration settings.	2	Not Available	Read Only
5	Alarm (High and Low)	See page <a href="#">36</a> .	2	Read/Write	Read/Write
6	Change Units	See page <a href="#">37</a> .	1	Read/Write	Read/Write
7	Set Point Ramp Rate	See page <a href="#">38</a> .	1	Read/Write	Read/Write
8	Timer Parameter (When Enabled)	See page <a href="#">39</a> .	19	Read/Write	Read/Write




*The controller defaults to level 1 when power is cycled.*

See pages [51](#) to [55](#) for detailed descriptions of the level 2 procedures.

## Changing from Level 1 to Level 2

See “3208 Controller Access Level Configuration” on page 50 for details on what is available for each level.

1. Press and hold the page button .

After a few seconds the upper display shows **LEv1** and the lower display shows **GOTO**.

2. Release the page button .

3. Press the up  or down  buttons until the upper display shows **LEv2**.

After two seconds the upper display shows **0** and the lower display shows **code**.


4. Press the up  or down  buttons to enter the pass code **2**.

Wait until the display flashes once to show that the code is accepted. You are now in level 2.



*If an incorrect code is entered, the controller reverts to level 1.*

To change from level 2 to level 1:

1. Press and hold the page button .

After a few seconds the upper display shows **LEv2** and the lower display shows **GOTO**.


2. Press the down  button to select **LEv1**.

The controller returns to level 1 home page.



*The controller defaults to level 1 when power is cycled.*

## Setting Level 2 Parameters

**Figure 9** illustrates the menu sequence observed when pressing the scroll button . The procedures that follow this section are in the order they appear in the menu. (For level 1 parameters, see **Figure 5**).

There are additional menu choices when **tm.cfg** has been configured to **prog**. Refer to **Figure 6** for details.



*You are advised to return the chamber controller to level 1 when you have set the level 2 parameters to your requirements.*

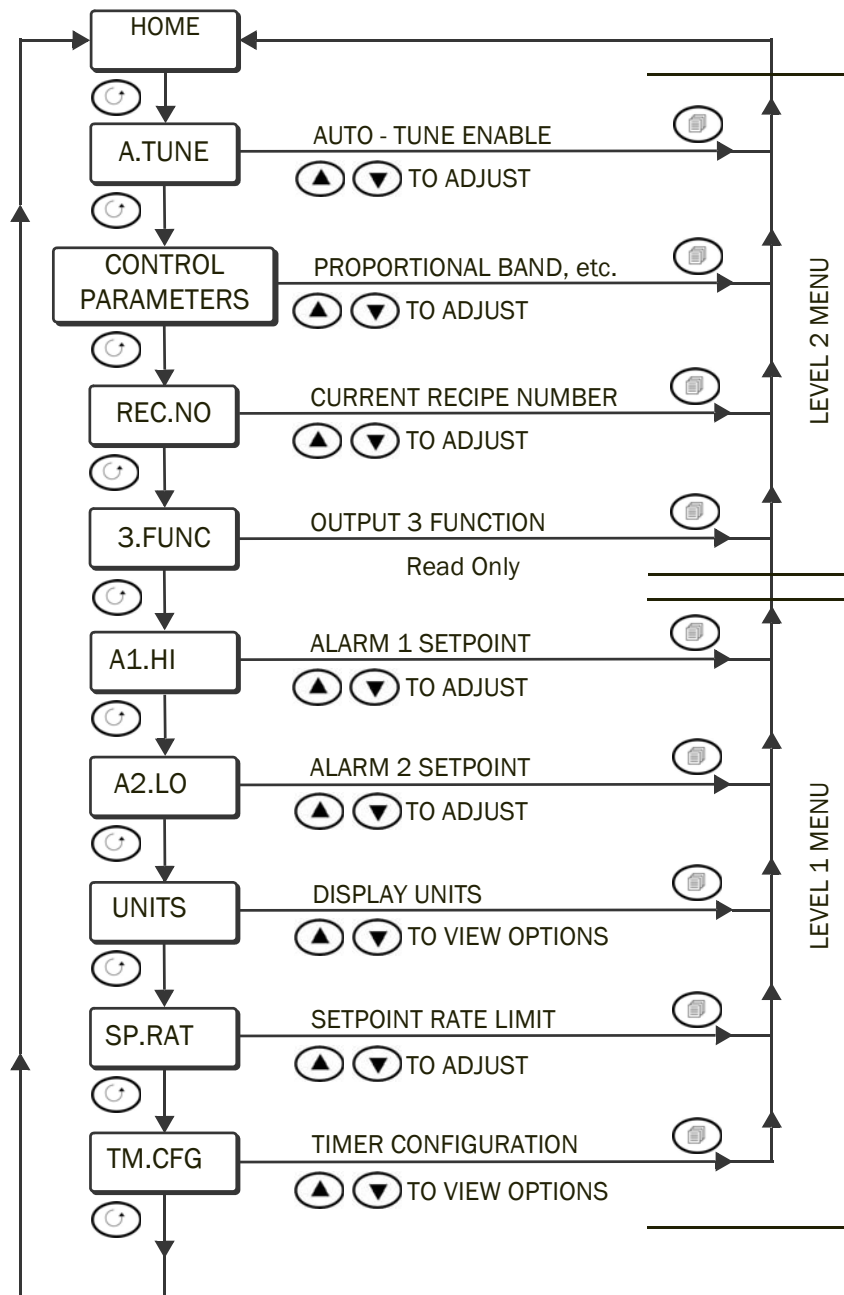


Figure 9. Eurotherm 3208 Controller Level 2 Menu

# Autotune







When delivered from the factory, or if you use the **REC.NO** (factory reset) function (see [page 55](#)), the chamber is optimised to give its published performance over the whole temperature range for a typical load string.

You can use the **a.tune** function to automatically tune the chamber so that you obtain a smaller variation for a specific temperature. It may also be useful if you have, for instance, particularly large grips which affect the temperature gradient in the chamber.

## Caution

**Auto tuning for a specific temperature may cause the chamber to be outside its published specification for other temperatures, particularly at extremes of performance. To restore factory settings, see [page 55](#).**

To autotune:

1. Ensure that your controller is set to level 2 (see [page 51](#)), the chamber is close to ambient temperature and the fan is disabled.
2. From the Home Page, press the up or down buttons,  or  to set a target temperature.
3. Press the scroll button  once, so that **a.tUNE** is shown in the lower display.  
If you wait a few seconds, the text **auto - tune enable** scrolls across the screen
4. Press the up or down buttons,  or , the display toggles from **OFF** to **On**.
5. Press the page button  and enable the fan, heating and/or cooling as required.

In the home page display **tunE** alternates with the measured temperature in the upper display until the target temperature is reached. When **tunE** no longer flashes, auto tuning is complete and the controller resets **a.tUNE** to **OFF**.

The new control terms are permanent until either a new auto tuning process is undertaken or the **rec.no** function is enabled (see [page 55](#)).

## Control Parameters

### Caution

Configuration parameter errors can seriously impair the performance of the controller or cause damage to the chamber.

Instron recommend that you do not change any of the parameters listed in [Figure 7](#).

If you find that the factory settings or the auto tuning function (see [page 53](#)) do not give you the performance you require, visit [www.eurotherm.com/downloads/documents/user-guides/](http://www.eurotherm.com/downloads/documents/user-guides/) and download the 3200 Engineering Manual for more details about these parameters. To restore factory settings, see [page 55](#).

*Table 7. Control Parameters*

Initial Display	Scrolling Display	Factory Setting
<b>pb</b>	<b>proportional band</b>	8
<b>te</b>	<b>integral time</b>	104
<b>td</b>	<b>derivative time</b>	OFF
<b>r2G</b>	<b>relative cool gain</b>	0.6
<b>cb.hi</b>	<b>cut back high</b>	20
<b>cb.lo</b>	<b>cut back low</b>	11
<b>op.hi</b>	<b>output high</b>	100.0
<b>op.lo</b>	<b>output low</b>	-100.0

# Run Recipe (Factory Reset and DC Output Calibration)

Recipes set multiple parameters to pre-determined values from look-up tables.

Use the **rec.no** function to run recipes that:


- Reset the chamber to the factory control values for all the parameters that can be accessed in levels 1 and 2.
- Set up the DC Output Configuration function to allow external calibration of a device.

## Resetting the Chamber to Factory Defaults

### Caution

---

This procedure will reset your controller to factory settings. Any previous changes made will be lost.

1. Ensure that your controller is set to level 2 (see [page 51](#)).
2. From the Home Page, press the scroll button  until **rec.no** appears in the lower display. The upper display will show **nonE**.

If you wait a few seconds, the text **current recipe number** scrolls across the screen.

3. Press the up or down buttons,  or  to select **rSEt** in the upper display.

Wait until the display changes to **nonE** to show that the reset has taken place.


4. Press the page button  to return to the home page.

## Calibrating an External Device using the Controller's DC Output


### Caution




---

This procedure will reset your controller to factory settings so that any previous changes made will be lost.

1. Ensure that your controller is set to level 2 (see [page 51](#)).
2. From the Home Page, press the scroll button  until **rec.no** appears in the lower display. The upper display will show **nonE**.

If you wait a few seconds, the text **current recipe number** scrolls across the screen.

3. Press the up or down buttons,  or  to select **dcAL** in the upper display.

4. Press the scroll button  once. **3.func** appears in the lower display.  
If you wait a few seconds, the text **output 3 function** scrolls across the screen.  
Check that the upper display shows **w.SP**. If it does not, repeat steps 1 to 4.
5. Press the page button  to return to the home page.
6. Switch off the chamber fan (press the fan button  so that the GREEN indicator extinguishes).
7. Adjust the chamber setpoint to highest possible value. Calibrate your device for “high” taking the highest value +10 °C (18 °F) as 10 V to allow for overshoot.
8. Adjust the chamber setpoint to lowest possible value. Calibrate your device for “low” taking the lowest value -10 °C (18 °F) as 0 V to allow for overshoot.





*Even if the chamber is not fitted with cooling, the lowest setpoint value -10 °C (18 °F) must still be used for 0 V calibration.*

Table 8. Example Calibration

Chamber Temperature Range	Chamber Setpoints used in Steps 7 & 8	Chamber Output	Temperature set on Calibrated Device (+/-10 °C for overshoot)
350 °C	350 °C	10V	360 °C
Ambient	-100 °C	0V	-110 °C

Your device is now calibrated.

9. Run the reset recipe. See [“Resetting the Chamber to Factory Defaults”](#) on page 55.
10. Press the scroll button  once. **3.func** appears in the lower display.  
Check that the upper display shows **PV**. If it does not, repeat steps 9 and 10.
11. Press the page button  to return to the home page.

## DC Output Configuration

This is a read-only function used in steps 4 and 10 of [“Calibrating an External Device using the Controller’s DC Output”](#) on page 55.



# Appendix B

## Hints and Tips for Using Chambers

---

• Minimising Energy and Coolant Consumption. ....	57
• Looking after your Equipment .....	58
• Ease of Use .....	59
• Optimising Your Testing .....	59

---

### Minimising Energy and Coolant Consumption

- To prevent loss of heat or coolant around pullrods and pushrods, always use any convection shields or port plugs provided. This minimises energy and coolant consumption as well as unnecessary output of cryogen into the surroundings.
- Use the smallest grips and pullrods possible in order to reduce heat-up times and maximise the available travel in an environmental chamber.
- When performing tests above ambient temperature, ensure the window heaters (if fitted) are switched off to minimise energy consumption. The window heaters are disabled by switching off cooling. Also note that window heaters themselves can result in the inside temperature of the chamber rising well above ambient temperature.
- Minimise energy and coolant consumption by planning your testing to run batches of tests at the same or similar temperatures together.
- Select the most suitable cooling type - Liquid Nitrogen (LN<sub>2</sub>) or Carbon Dioxide (CO<sub>2</sub>):

LN<sub>2</sub> is normally preferred for the following reasons:

- LN<sub>2</sub> allows a lower minimum temperature: -100 °C to -150 °C (CO<sub>2</sub> allows -70 °C minimum).
- LN<sub>2</sub> is more readily available in larger quantities than CO<sub>2</sub>. Dewars for storing LN<sub>2</sub> are often large, whereas CO<sub>2</sub> is normally used in standard size gas cylinders that need to be changed more frequently.
- CO<sub>2</sub> has additional associated safety hazards when compared to LN<sub>2</sub> - see [“Cryogenic Gases: Asphyxiation and Toxicity”](#) on page 15 for more details.

Occasionally CO<sub>2</sub> is a more appropriate choice for the following reasons:

- CO<sub>2</sub> can be stored for long periods of time without loss, whereas LN<sub>2</sub> is continually lost even when stored in a Dewar flask that is not in use. This could be an advantage for occasional users of CO<sub>2</sub>.
- CO<sub>2</sub> has higher cooling power than LN<sub>2</sub> per unit volume, so the chamber air temperature, the specimen and fixtures will all reach the required temperature quicker than with LN<sub>2</sub>.
- Losses from CO<sub>2</sub> carrying pipe work are small compared to losses from LN<sub>2</sub> pipe work. With LN<sub>2</sub> it is critical to insulate as much of the hoses and associated pipe work as possible.

With both cryogenics, the cryogenic supply should be situated as close as possible to the chamber to maximise the cooling power and minimise the losses.

## Looking after your Equipment

- Make sure you use the recommended anti-seize compounds and lubricants on your grips to help aid specimen removal and minimise corrosion due to condensation. Refer to the documentation supplied with your grips for details.
- ALWAYS perform a heating cycle after operating the chamber below ambient temperature in order to remove any condensation or frosting from the load string and chamber. Many load string components, as well as bolts and other fasteners on your system, are not made from stainless steel and are therefore prone to corrosion if exposed to liquid water. Liquid water from melted ice can easily find its way through the lower chamber port and accumulate on the base of the machine. After running a cold test check around the system and remove any liquid water.
- When using a Dewar flask for dispensing LN<sub>2</sub>, ensure that you vent the pressure to below 2.5 bar before operating the chamber. This is particularly important after a new or re-filled Dewar is used because mechanical disturbance can cause a build-up in gas pressure.

## Ease of Use

- If you test at ambient and non-ambient temperatures, using an optional roller-carriage mounting and a chamber with removable wedge-ports considerably simplifies the process of changing load strings and allows the chamber to be pushed back out of the test area.
- To avoid unwanted pre-loading of specimens due to grip closure or thermal expansion during the soak period, use the “Specimen Protect” feature available with some models of Instron test system.

## Optimising Your Testing

- For optimum window clarity during low temperature testing always switch on the window heaters (if fitted) for 40 minutes prior to running your tests. This is done by enabling cooling (see [“Heating or Cooling to a Temperature Setpoint”](#) on page 30). This is especially important when using non-contacting extensometry to ensure reliable target tracking.
- The temperature indicated by the chamber is the air temperature in the chamber and may differ from the actual specimen temperature by a certain amount (depending on various factors such as the size of the load string). If a temperature ramp is produced by the chamber, the specimen temperature will not follow immediately. Consider using an independent temperature sensor attached to or very near the specimen for a more accurate measurement of specimen temperature.
- If testing delicate specimens, consider reducing the fan speed to minimise turbulence (see [“Enabling Low Speed Fan Mode”](#) on page 28). Some chambers do not have a variable fan speed. On these chambers you can switch the fan off completely, however this also stops the heating/cooling functions. Switching the fan off is only suitable for tests lasting short periods of time, where any change in temperature is considered acceptable.
- Minimise the time that the chamber door remains open when changing specimens in order to reduce energy/coolant consumption, and internal frosting of the chamber, load string and window.
- Where possible, keep the relative humidity of the laboratory as low as possible to minimise condensation and frosting when testing below ambient temperatures.
- Always allow sufficient soak-time at the setpoint temperature to ensure that the specimen has reached thermal equilibrium before performing your test. Be aware that if you change directly from high to low temperature tests (or vice versa), the load string components will take considerably longer to reach the new setpoint temperature (and will also use more energy and coolant).

- The air circulation from the centrifugal fan within the inner chamber and from the impeller near the motor, is shown in [Figure 10](#). The internal air is directed in a figure of eight from the heaters behind the baffle over the load train pull rods of the testing machine, across the specimen and back to the internal impeller via the alarm and control thermocouples. This air flow enables the heat losses (or gains) from the testing machine pull rods to be counterbalanced before the air circulates over the specimen at the centre of the load train. The control thermocouple is thus usually closely connected to the specimen by a short air stream. Provided the heat losses for the load train are not excessive and the system has been allowed to reach thermal equilibrium the thermocouple temperature is usually a close representation of the specimen temperature. If you are especially concerned about the specimen temperature, then a suitable measurement thermocouple should be attached to the specimen.

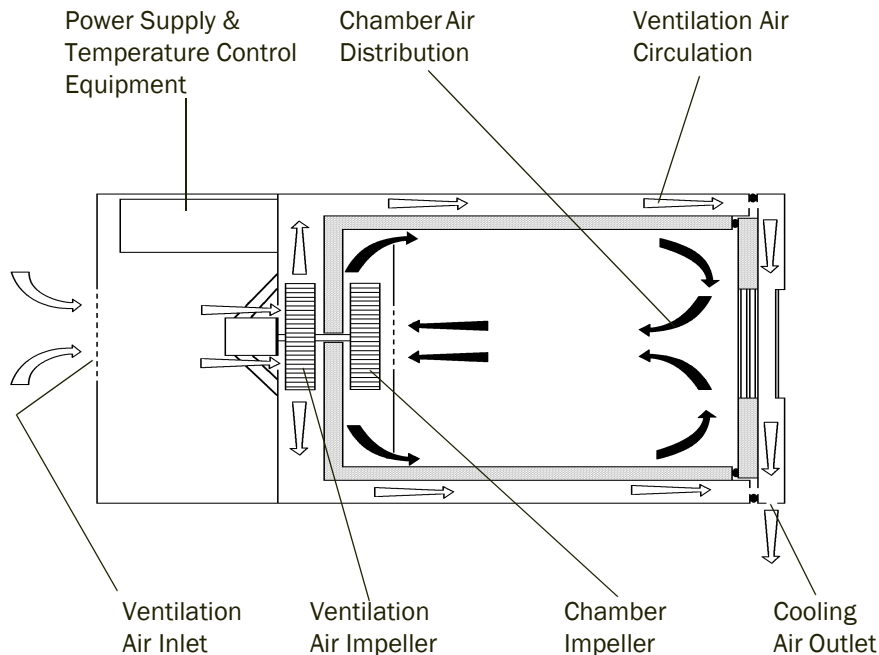


Figure 10. Temperature Cabinet Air Circulation

The fan motor also drives a second impeller mounted outside the insulation, which circulates air from the rear of the chamber into the space between the insulation and the outer panels. This airflow exits through the perforations in the door frame and helps to keep the outer skin of the chamber close to ambient temperature.

- Large or very wide specimens and fixtures can impede the forced-convection air flow in the chamber. This can result in a degradation of thermal gradients and produce local temperatures that differ from that shown by the chamber controller.

- The performance of chambers at temperatures close to ambient is reduced and you will see larger gradients and larger % setpoint errors. Heat is generated naturally by re-circulation of the air, by the motor and the electronics of the chamber, so it may be impossible to obtain stable, accurate temperatures very close to ambient. Better control can sometimes be obtained by:
  - Using heating and cooling together, even though the setpoint is above ambient (at 50 °C for example).
  - Changing the control parameters (see [“Autotune”](#) on page 53).
  - Between ambient temperature and 25 °C above ambient, control accuracy may be improved by restricting the maximum heating power, for example to 50% of full power. See [“Control Parameters”](#) on page 54 for details on how to change this value and other control parameters.
  - Between ambient temperature and 25 °C below ambient, control accuracy may be improved by using the gas outlet of an LN<sub>2</sub> Dewar (rather than the normal liquid outlet), where available. Using this set up may require the control parameters to be changed (see [“Autotune”](#) on page 53). This set up may prevent the chamber from reaching its lowest or highest rated temperatures and will impact the time it takes to cool down or heat up. It is strongly recommended that any changed control parameters are returned to their original values when they are no longer required. See [“Run Recipe \(Factory Reset and DC Output Calibration\)”](#) on page 55 for instructions on resetting to factory default parameters.
- Remember to allow sufficient time for the specimen to reach the test temperature after inserting it into the grips. Consider putting a number of specimens in the chamber to reach the test temperature provided the different thermal history that results is not significant. This will also help to improve testing productivity.
- Ensure that ALL load string components are rated for use at the required test temperature. Certain items such as rubber-coated jaw faces have reduced temperature ranges compared to the rest of the load string. The chamber may be capable of exceeding the temperature rating of the load string so ensure that temperature limits and alarms are set accordingly.



# Index

<b>A</b>	
about	
access level configuration . . . . .	50
chamber . . . . .	7
other documentation . . . . .	9
temperature setpoints . . . . .	30
this manual . . . . .	9
access level configuration, about . . . . .	50
access to load string . . . . .	24
air circulation . . . . .	60
alarm	
auxiliary . . . . .	36
changing setting . . . . .	36
resetting tripped . . . . .	37
alarm setting, changing . . . . .	36
analog output . . . . .	45
asphyxiation hazard . . . . .	15
autotune . . . . .	53
auxiliary alarm . . . . .	36
<b>C</b>	
calibrating an external device . . . . .	55
chamber door, open and close . . . . .	27
chamber, about . . . . .	7
changing	
alarm setting . . . . .	36
level 2 parameters . . . . .	51
ramp rate . . . . .	38
temperature units . . . . .	37
user levels . . . . .	50
checking settings . . . . .	29
close chamber door . . . . .	27
connecting the chamber to a computer . . . . .	43
connections, rear panel . . . . .	22
control parameters . . . . .	54
controller menu . . . . .	35
controller menu, level 2 . . . . .	51
controls and indicators . . . . .	20
cooling	
stopping . . . . .	31
to setpoint . . . . .	30
cryogenic gases hazard . . . . .	15
<b>D</b>	
DC output . . . . .	56
<b>E</b>	
electrical disconnection hazard . . . . .	13
electrical hazard . . . . .	13
<b>F</b>	
factory reset . . . . .	55
fault finding . . . . .	45
front door LED . . . . .	19
<b>G</b>	
general safety precautions . . . . .	11
getting started	
additional configuration parameters . . . . .	49
normal operation . . . . .	26
glass fibre insulation hazard . . . . .	15
<b>H</b>	
hazard	
asphyxiation . . . . .	15
cryogenic gases . . . . .	15
electrical . . . . .	13
electrical disconnection . . . . .	13
glass fibre insulation . . . . .	15
high pressure gases . . . . .	16
moving parts . . . . .	16
rotating machinery . . . . .	16
specimens . . . . .	14
thermal contact . . . . .	14
toxicity . . . . .	15
heating	
stopping . . . . .	31
to setpoint . . . . .	30
high pressure gases hazard . . . . .	16
home page . . . . .	29

<b>I</b>		<b>P</b>	
indicators and controls .....	20	power indicator .....	19
<b>K</b>		preventive maintenance .....	34
key time out .....	26	product labelling .....	10
<b>L</b>		program, how to run .....	42
labelling .....	10	programmer .....	39
level 2 menu .....	51	<b>R</b>	
level 2 parameter		ramp rate, changing .....	38
autotune .....	53	rear panel connections .....	22
control parameters .....	54	recipes .....	55
DC output .....	56	removable wedges .....	24
setting .....	51	resetting the chamber .....	55
lighting .....	29	resetting tripped alarm .....	37
load string access .....	24	returning to ambient .....	31
<b>M</b>		rotating machinery hazard .....	16
maintenance, preventive .....	34	run recipe .....	55
manual, about .....	9	running a program .....	42
Material Safety Data Sheets .....	17	<b>S</b>	
menu level 2, controller .....	51	Safety Data Sheets .....	17
menu, controller .....	35	safety, general .....	11
moving parts hazard .....	16	serial number label .....	10
MSDS .....	17	setpoints, about temperature .....	30
<b>O</b>		setting level 2 parameters .....	51
open chamber door .....	27	shutting down .....	33
operating		starting .....	26
auxiliary alarm .....	36	stopping heating or cooling .....	31
changing alarm settings .....	36	switching on .....	28
changing ramp rate .....	38	<b>T</b>	
checking settings .....	29	temperature setpoints, about .....	30
cooling to setpoint .....	30	temperature units, changing .....	37
getting started .....	26	thermal contact hazard .....	14
heating to setpoint .....	30	time out .....	26
lighting .....	29	timer .....	39
preventive maintenance .....	34	timer program, how to run .....	42
resetting tripped alarm .....	37	touch panel controls and indicators .....	20
shutting down .....	33	toxicity hazard .....	15
stopping heating or cooling .....	31	tripped alarm, resetting .....	37
switching on .....	28	troubleshooting .....	45
		turning off chamber .....	33



**U**

user levels, changing . . . . .	50
using the timer/programmer . . . . .	39

**V**

ventilation (air circulation) . . . . .	60
---	----

**W**

warning	
asphyxiation . . . . .	15
cryogenic gases . . . . .	15
electrical . . . . .	13
electrical disconnection . . . . .	13
glass fibre insulation . . . . .	15
high pressure gases . . . . .	16
moving parts . . . . .	16
rotating machinery . . . . .	16
specimens . . . . .	14
thermal contact . . . . .	14
toxicity . . . . .	15
warning label . . . . .	10
warning signs . . . . .	12
wedges, removable . . . . .	24





The background of the page is a light gray color with a subtle, abstract design. It features several curved, overlapping lines in shades of gray, creating a sense of motion and depth. A prominent feature is a circular area on the left side, filled with a fine grid of small dots, which resembles a speaker grille or a technical component. The overall aesthetic is clean, modern, and professional.

Product Support: [www.instron.com](http://www.instron.com)